POLYMET
MINING

NorthMet Project

Water Modeling Data Package
Volume 2 - Plant Site

Version 11

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This document was prepared for Poly Met Mining Inc. by Barr Engineering Co.

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Acronyms, Abbreviations and Units

Acronym	Description
CDSM	cement deep soil mixing
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
ET	evapotranspiration
FTB	Flotation Tailings Basin
HRF	Hydrometallurgical Residue Facility
HRL	health risk limit
I	infiltration
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
LTVSMC	LTV Steel Mining Company
MCL	maximum contaminant level
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MS	matrix spike
MSD	matrix spike duplicate
MSL	mean sea level
NPDES	National Pollutant Discharge Elimination System
NTS	Northeast Technical Services, Inc.
NWS	National Weather Service
P	precipitation
P10	lower 10th percentile model result
P50	median or 50th percentile model result
P90	upper 90th percentile model result
PTM	Permit to Mine
RMSE	root-mean-squared error
RO	runoff
RO	reverse osmosis

Acronym	Description
RPD	relative percent difference
SDEIS	Supplemental Draft Environmental Impact Statement
SDS	State Disposal System
STS	Sewage Treatment System
UPL	upper prediction limit
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UTL	upper tolerance limit
WWTF	Mine Site Waste Water Treatment Facility
WWTP	Plant Site Waste Water Treatment Plant

Unit	Description
cfs	cubic feet per second
cfs/mi^2	cubic feet per second per square mile
gpm	gallons per minute
in/yr	inches per year
kg/d	kilograms per day
kg/m^3	kilograms per cubic meter
lbs/ft^3	pounds per cubic foot
L/kg	liters per kilogram
m/day	meters per day
mg/L	milligram per liter
MGAL/year	thousand gallons per year
mi^2	square mile
ng/L	nanograms per liter
µg/L	micrograms per liter
yr	year

1.0 Introduction

This document describes the water data for the Poly Met Mining Inc. (PolyMet) NorthMet Project (Project) Plant Site. It presents the regulatory basis, modeling framework, and baseline data, describes the probabilistic modeling used to estimate Project water balances and water quality impacts, and reports the model results.

Several Project Management Plans use the Plant Site water data from this report, including the Water Management Plan – Plant (Reference (1)) the Flotation Tailings Management Plan (Reference (2)) and the Adaptive Water Management Plan (Reference (3)).

Water data for the Mine Site are available in the NorthMet Project Water Modeling Package Volume 1 – Mine Site (Reference (4)). The geochemical properties of Plant Site materials are described in NorthMet Project Waste Characterization Data Package (Reference (5)). When this report references a supporting document, it provides a general description of the supporting document.

1.1 Outline

The outline of this document is:

Section 2.0 Describes the regulatory basis for the water management plan at the Plant Site.

Section 3.0 Describes the modeling framework for water quantity and quality modeling at the Plant Site.

Section 4.0 Describes the baseline data used in water quantity and quality modeling at the Plant Site.

Section 5.0 Describes the modeling approach for water quantity and quality modeling at the Plant Site.

Section 6.0 Describes the water quantity and quality model results for the Plant Site.

This document is intended to evolve through the environmental review, permitting (National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS), Water Appropriations, and Permit to Mine (PTM)), operating, reclamation, and long-term closure phases of the Project. A Revision History is included at the end of the document. The Revision History includes only revisions made to Volume 2 (i.e., revisions made after splitting the package into volumes in June 2011). Revisions made to the combined Mine Site and Plant Site package prior to the June 2011 split are included in the Revision History of Volume 1.

In this document, Flotation Tailings are the NorthMet bulk flotation tailings, the Flotation Tailings Basin (FTB) refers to the newly constructed Flotation Tailings impoundment, and the Tailings Basin is the existing LTV Steel Mining Company (LTVSMC) tailings basin as well as the combined LTVSMC tailings basin and the FTB.

2.0 Regulatory Basis

2.1 Minnesota Surface Water Quality Standards

Minnesota Rules, chapter 7050 defines surface water quality standards applicable to all surface waters of the State. Surface water quality standards vary in the state of Minnesota based on the use classification of the water body. Minnesota Rules, part 7050.0140 describes the following use classifications: Class 1 waters (domestic consumption), Class 2 waters (aquatic life and recreation), Class 3 waters (industrial consumption), Class 4 waters (agriculture and wildlife), Class 5 waters (aesthetic enjoyment and navigation), Class 6 waters (other uses and protection of border waters), and Class 7 waters (limited resource value waters). These classes are further divided into subclasses with letter designations. Water bodies can receive multiple designations. In these cases, the applicable water quality standards usually would be the most restrictive standards from the water's listed classifications. Minnesota Rules, part 7050.0470 lists waters that are specifically classified. All waters that are not specifically listed have a default classification as specified in Minnesota Rules, part 7050.0430.

Minnesota Rules, chapter 7052 establishes additional surface water quality standards for water bodies within the Lake Superior Basin, which includes the Plant Site. These Lake Superior Basin standards, relating to aquatic life, human health and wildlife (Class 2 only), can differ from the water quality standards for the same substances, characteristics, or pollutants in Minnesota Rules, chapter 7050. Where different, the 7052 standards supersede the 7050 standards, even if Minnesota Rules, chapter 7052 is less stringent. For substances, characteristics, or pollutants not listed in Minnesota Rules, chapter 7052, the standards from Minnesota Rules, chapter 7050 apply.

In the Plant Site area, in-stream surface water quality standards for the Embarrass River are Class 2B (recreational purposes and aquatic life; cold or warm water sport or commercial fish; not protected as a source of drinking water), Class 3C (industrial cooling and materials transport), Class 4A (irrigation use), Class 4B (livestock and wildlife use), Class 5 (aesthetic enjoyment and navigation), and Class 6 (other uses), which is the default designation for unlisted waters. All other streams and lakes in the Plant Site Project area have the default classification.

Large Table 1 presents the surface water quality standards for the stream classifications applicable to the Project downstream of the Plant Site for constituents included in the probabilistic model. Some surface water quality standards are hardness-dependent (i.e., the standard is calculated as a function of the hardness in the receiving water). Treatment of these standards is discussed in Section 2.1.1. Minnesota Rules, part 7050.0224, subpart 2 also addresses water quality as it relates to wild rice. This standard and its applicability to the Project are discussed in Section 2.2.

Discharges, either direct or indirect, must not cause violation of water quality standards in the immediate receiving waters, but also must not cause exceedances in downstream waters that may have more stringent water quality standards.

2.1.1 Hardness-based Standards

Per Minnesota Rules, chapters 7050 and 7052, surface water quality standards for the following constituents are calculated as a function of the hardness in the receiving water:

- copper
- cadmium
- lead
- nickel
- zinc

The Minnesota Pollution Control Agency (MPCA) has indicated that Project discharges will be required to meet applicable water quality standards at end of pipe and, for the metals that have a hardness-based standard, the hardness of the discharge itself was used to set the effluent targets for Environmental Impact Statement (EIS) modeling. Besides stormwater, the only discharge for the Project is the effluent from the Waste Water Treatment Plant (WWTP) to the surface waters near the Plant Site. Actual discharge limits will be determined as part of permitting.

The Plant Site probabilistic modeling results for surface waters (Section 6.7) include comparison of constituent concentrations to applicable standards, including hardness-based standards. Hardness-based standards are calculated at each downstream model evaluation location and each model time step. Following MPCA guidance, hardness-based standards at all model evaluation points, except PM-13, are determined using the model-estimated hardness at that evaluation point. For these locations, hardness-based standards are calculated at each model time step based on the instantaneous, mixed water quality. Hardness-based water quality standards at PM-13 are based on the median hardness measured (not modeled) in the receiving stream because the hardness at PM-13 is dominated by the existing stream flow.

2.2 Wild Rice Standard

Minnesota Rules, part 7050.0224 includes a Class 4A standard of 10 mg/L for sulfate “applicable to water used for production of wild rice during periods when the rice may be susceptible to damage by high sulfate levels.” For the evaluation presented in this document however, it is assumed that the sulfate standard applies year-round.

None of the water bodies downstream of the Project are specifically designated as Wild Rice

Waters in Minnesota Rules, chapter 7050. However, MPCA staff guidance identified waters used for the production of wild rice downstream of the Plant Site (Large Figure 1) and determined that this standard will apply to the Embarrass River downstream of PM-13 (Reference (6)).

The MPCA has provided a staff recommendation for determining compliance with the wild rice standard at this location both in the probabilistic water quality modeling results included in the Supplemental Draft Environmental Impact Statement (SDEIS), the Final Environmental Impact Statement (FEIS), and the subsequent monitoring program (Reference (7)). MPCA guidance states that the EIS modeling must demonstrate the following:

- groundwater quality standards can be met at the facility property boundary
- all applicable surface water quality standards can be met in the surface waters at the facility
- no increase in sulfate loading from the existing conditions would occur at PM-11 (Unnamed Creek), PM-19 (Trimble Creek) and MLC-2 (Mud Lake Creek)
- the concentration of sulfate in the Embarrass River at PM-13 would decrease from existing conditions
- no statistically significant increase in sulfate [concentration] would occur in the Embarrass River from upstream of the facility (PM-12.2) to downstream of the facility (PM-13).

In addition, any direct discharges to surface waters in the Embarrass River watershed, such as from the WWTP, will need to meet an effluent limitation based on the 10 mg/L wild rice sulfate water quality standard.

It should be noted that the MPCA staff recommendations are “living documents” and may be subject to change. Changes in MPCA staff recommendations were incorporated into the water quality modeling effort as necessary.

Baseline water quality data for sulfate suggests sulfate reduction is occurring within Spring Mine Creek, the Embarrass River, and the surrounding watersheds although definitive conclusions are not drawn because of the limited number of samples (Section 4.4.3). Due to the extent of the estimated reduction, it is expected that a dilution model approach (described in Section 5.2.1.4), which models sulfate as a conservative parameter and does not include sulfate reduction, will result in overestimation of sulfate concentrations in the Embarrass River and/or its tributaries. This overestimation is expected both in the Continuation of Existing Conditions Scenario Model and Project Model scenario (Section 3.1). Because of this, the Continuation of Existing

Conditions Scenario Model will be used to define existing conditions for assessment of the Project's ability to comply with the MPCA guidance listed above.

2.3 Minnesota Groundwater Standards

Groundwater in Minnesota is protected for use as an actual or potential source of drinking water (Class 1 Waters). The State of Minnesota has adopted the U.S. Environmental Protection Agency (USEPA) primary and secondary drinking water quality standards (40 CFR parts 141 and 143) as its groundwater quality standards (Minnesota Rules, chapter 7060). Minnesota Rules, parts 4717.7100 to 4717.7800 identify health risk limits/standards (HRLs) as appropriate cleanup levels for managing groundwater contamination and risk to human receptors in compliance with Minnesota Rules, chapter 7060. Although not promulgated as rule, the MPCA has developed Risk Assessment Advice values when available toxicity data do not meet the requirements necessary for development of a HRL or Health Based value.

It should be noted that Minnesota Rules, part 7060.0600 also has a provision that states:

> *The groundwater may in its natural state have some characteristics or properties exceeding the standards for potable water supplies. Where the background level of natural origin is reasonably definable and is higher than the accepted standard for potable water and the hydrology and extent of the aquifer are known, the natural level may be used as the standard.*

Groundwater quality standards for the constituents being evaluated are summarized in Large Table 2. The lower of the groundwater standards referenced above was selected as the target groundwater criteria used in this evaluation. The exception to this are the standards based on the secondary maximum contaminant level (secondary MCL) for aluminum, iron, and manganese, consistent with guidance provided by the Co-lead Agencies. Local groundwater already exceeds the secondary MCLs, which is consistent with concentrations seen elsewhere along the Iron Range and northeastern Minnesota. The secondary MCLs were established for treated rather than natural water and were established only as guidelines by the USEPA to assist public water systems in managing their drinking water for aesthetic considerations such as taste, color, and odor. Secondary MCLs are not based on risk to human health. Aluminum, iron, and manganese will be modeled, but estimated concentrations above the secondary MCLs will not be considered exceedances of the groundwater evaluation criteria.

Because measurements show high natural baseline concentrations of beryllium and manganese at the Plant Site, site-specific evaluation criteria were developed for these constituents consistent with the provisions of Minnesota Rules, part 7060.0600. The development of the site-specific evaluation criteria is presented in Section 4.3.4.2 and the values are summarized in Large Table 2.

2.4 Water Appropriations

A water use (appropriations) permit is required from the Minnesota Department of Natural Resources (MDNR) Ecological and Water Resources Division for all users withdrawing more than 10,000 gallons of water per day, or 1 million gallons per year (Minnesota Rules, part 6115.0620). There are several exceptions to water appropriation permit requirements: domestic uses serving less than 25 persons, test pumping of a groundwater source, reuse of water already authorized by a permit, or certain agricultural drainage systems. Permits for water appropriation for mining shall be in agreement with provisions of Minnesota Statues 2014, section 130G.297. An appropriations permit will be needed for process water withdrawal from Colby Lake and for mine pit dewatering. Throughout the course of the Project, including prior to construction, water appropriations for other activities may be needed if the threshold for an appropriate permit is triggered.

Minnesota Power and Cliffs Erie LLC jointly hold a water appropriations permit that allows for withdrawals from Colby Lake of up to 12,000 gpm for any continuous 60-day period and a maximum instantaneous withdrawal rate of 15,000 gpm. The permit also requires that withdrawals be replaced on a gallon for gallon basis with pumping from Whitewater Reservoir when Colby Lake water level falls below an elevation of 1439 feet MSL. The MDNR is expected to amend the permit such that PolyMet will replace Cliffs Erie, which will permit PolyMet to use Colby Lake water for make-up water at the Plant Site during project operations. The permitted appropriation amounts will be determined during permitting. Project make-up water demand is discussed in Section 6.0.

2.5 NPDES / SDS Permitting

As authorized by the Clean Water Act, the NPDES permit program regulates point source discharges to waters of the United States. The NPDES permit program in Minnesota is administered by the MPCA. Industrial facilities in Minnesota may be required to obtain coverage from the MPCA under a NPDES permit and/or a Minnesota SDS permit. These permits establish specific limits and requirements on the quantity and quality of discharges to surface and groundwater and monitor the effects of industrial facilities on surrounding surface waters and groundwater. Permits are enforced through a combination of self-reporting and compliance monitoring.

At the Plant Site, Cliffs Erie currently holds a NPDES/SDS permit (MN0042536) for surface discharge from the south of the Tailings Basin (SD026). This permit also includes the discharge from Pit 5NW to Spring Mine Creek (SD033) and Pit 5SW to Wyman Creek (SD030) (Large Figure 1 and Large Figure 2). Cliffs Erie also holds a NPDES/SDS permit (MN0054089) for surface and groundwater discharges to the north and west of the Tailings Basin. PolyMet will apply for NPDES and/or SDS permit(s) for the Project. The permit(s) will likely incorporate portions of the existing Cliffs Erie permits, including associated monitoring stations.

Other NPDES permits near the Plant Site include the City of Babbitt Wastewater Treatment Plant (MN0020656) which discharges to Hay Lake in the headwaters of the Embarrass River.

3.0 Modeling Framework

This section describes the two scenarios used as the framework for Plant Site water modeling. The overall modeling framework for the SDEIS, and carried forward for the FEIS, is provided in Section 3.0 of Reference (4), which includes a general discussion of probabilistic modeling and Monte Carlo simulation, the selection of a probabilistic modeling platform, and an overview of GoldSim (the selected platform). Section 5.0 describes the Plant Site conceptual model, the model construct, model inputs, and modeling approaches for groundwater and surface water.

3.1 Model Scenarios

Plant Site water modeling includes two scenarios; the Continuation of Existing Conditions Scenario Model and the Project Model.

3.1.1 Continuation of Existing Conditions Scenario Model

The Continuation of Existing Conditions Scenario Model for the Plant Site represents future conditions at the Plant Site in the absence of the Project, including the existing Tailings Basin and existing infrastructure. Specifically, the model represents the Tailings Basin prior to implementation of any of the short term mitigation measures currently required as part of the Cliffs Erie Consent Decree for the Tailings Basin and Area 5. These short term mitigation measures are not intended to be long-term solutions. Because the long-term mitigation measures have not yet been determined, they cannot be modeled.

The Continuation of Existing Conditions Scenario Model simulates many possible futures, rather than simulating specific periods of recent history that correspond to periods of observed water quality. Possible futures are simulated using distributions of input parameters such as precipitation and groundwater quality. Some input parameters are calibrated to achieve model results similar to mean observed water quality. Calibrated parameters include the concentration of constituents in watershed runoff and the release rates from the LTVSMC tailings. The development of model inputs through calibration is discussed further in Section 5.2.1.4.5 and in Section 10.2.1 of Reference (5).

3.1.2 Project Model

The Project Model adds Project features described in the Project Description (Reference (8)). Non-project related model inputs are identical to those used for the Continuation of Existing Conditions Scenario Model. The Project Model includes the FTB, which will be constructed on top of the existing Tailings Basin, as well as engineering controls, such as bentonite amended FTB cover systems to reduce infiltration and oxygen diffusion, the FTB seepage capture systems, and the Waste Water Treatment Plant (WWTP) to treat water collected by the FTB seepage capture systems. The Project Model also includes the Hydrometallurgical Residue Facility (HRF) which will be constructed adjacent to the FTB, with a double liner and leakage collection system installed to prevent virtually all leakage to the environment.

4.0 Baseline Data – Plant Site

4.1 Climate

The mean annual precipitation for the Plant Site area is 28.1 inches for the period 1981-2010, which is the climate normal period as defined by the Climate Prediction Center of the National Weather Service (NWS). This value is based on monthly NWS data collected closest to the Tailings Basin, retrieved using the Minnesota Climatology Working Group dataset (Reference (9)). Approximately 77% of the annual precipitation occurs between May and October, whereas approximately 9% of the annual precipitation corresponds to the water equivalent of snowfall between December and February.

The results of the statistical analysis of precipitation data representative of the long-term climatic conditions in the Embarrass River watershed are presented in Appendix B of Reference (10). These results were used to confirm that periods of water quality monitoring in the study watershed include both wet and dry weather/flow conditions; precipitation (rather than flow) is used as a proxy to determine wet and dry conditions because available flow data for the Embarrass River (Section 4.4.1) do not necessarily cover the same periods of water quality monitoring.

Information on evapotranspiration is drawn from several sources. The mean annual evaporation (from open water surfaces) for the study area was modeled as 20.0 inches in Reference (11). Pan evaporation measurements from Hoyt Lakes for the period 1966-1983 give no evaporation in the winter months, with a yearly total evaporation of 20.8 inches when a pan correction factor of 0.78 is used. No evaporation is considered during the winter. Results from the hydrologic/hydraulic model of the Partridge River watershed (Reference (11) and Reference (12)) indicate that the actual total evapotranspiration from the study watershed (including evaporation from open water surfaces) is 16.8 inches per year. This value is very similar to the mean evapotranspiration of 16 inches per year suggested by Reference (13). Open water evaporation rates used for SDEIS and FEIS modeling are described in Section 5.2.1.1.2 and Section 5.2.2.2.4.

Given the mean annual precipitation at the Plant Site of 28.1 inches and approximately 16.8 inches per year of evapotranspiration, the remaining 11.3 inches are available, annually on average, for infiltration and runoff in the watershed.

4.2 Land Use

Land use patterns were determined using the 2001 National Land Cover Dataset (NLCD) and National Wetlands Inventory (NWI) dataset. The Embarrass River watershed is dominated by upland forests (approximately 50%), wetlands (approximately 35%) and shrub/scrub (approximately 8%). The remaining 7% of the watershed is made up of open water (lakes, pits, ponds in the existing Tailings Basin), developed areas (roads and cities), and what is termed 'barren land' (rock/sand/clay). The category 'barren land' is essentially the exposed LTVSMC tailings of the existing Tailings Basin.

4.3 Geology/Hydrogeology

4.3.1 Geology

The native unconsolidated deposits in the vicinity of Plant Site are a relatively thin mantle of Quaternary age glacial till and associated reworked sediments, most of which were deposited and reworked by the retreating Rainy Lobe during the last glacial period in association with the development of the Vermillion moraine complex (Large Figure 3 and Reference (14)). The existing Tailings Basin was constructed on top of these native unconsolidated materials, although native materials may have been disturbed for use in starter dams in several locations prior to LTVSMC tailings deposition. Soil borings advanced through the LTVSMC tailings and into the underlying native materials reveal that the dominant till lithology underlying the Tailings Basin is an unsorted sandy loam with pebbles, cobbles, and boulders. Some areas are stratified, with lenses of sorted sediment. In places, the till is overlain by up to 10 feet of organic peat.

Depth to bedrock in the area surrounding the Tailings Basin is generally less than 50 feet. Although the thickness of the native sediments below the LTVSMC tailings is unknown, it is estimated that it is similar to the surrounding area. Glacial drift thickens in a northerly direction toward the Embarrass River (Large Figure 4). Wetland areas also become more common to the north, off the flank of the Embarrass Mountains. These wetland areas are also underlain by thin glacial drift in addition to lacustrine deposits, which were deposited by the retreating Rainy Lobe and associated lakes that were trapped between the retreating ice margin and the Giant's Range.

The unconsolidated materials at the site are underlain by quartz monzonite and monzodiorite of the Neoarchean Giant's Range batholith. These pink to dark-greenish gray, hornblende-bearing, coarse-grained rocks are referred to collectively as the "Giant's Range granite". The granite locally outcrops as a northeast-southwest trending ridge and drainage divide that makes up the highest topography in the area (the "Giant's Range"), and has been scoured by glaciers, creating local depressions and linear valleys.

4.3.2 Hydrogeology

4.3.2.1 Tailings Basin

The Tailings Basin, covering an area of approximately 2600 acres (about 4 square miles), was constructed in stages beginning in the 1950s. The Tailings Basin is composed of interbedded layers of LTVSMC tailings which are generally coarser near the dams and finer in the center of the cells. The hydraulic properties of the Tailings Basin material vary over several orders of magnitude and are primarily a function of the grain-size distribution of the deposits. The hydraulic conductivity values throughout the Tailings Basin used for modeling are described in more detail in Section 10.3 of Reference (5). Water that infiltrates through the Tailings Basin (from precipitation and seepage from the existing ponds) initially flows downward and then laterally, where it exits the basin as groundwater or surface seepage. Surface seeps have been observed around the toes of the Tailings Basin. A significant portion of the seepage lost from the Tailings Basin likely discharges to the surface within a short distance from the toe of the basin due to the limited capacity of the surficial aquifer.

4.3.2.2 Surficial Aquifer

4.3.2.2.1 Groundwater Elevations and Flow Directions

Groundwater elevations in the network of monitoring wells located around the Tailings Basin indicate that groundwater flows to the north and northwest, toward the Embarrass River (Large Figure 5). As the Tailings Basin was built up over time, a groundwater mound formed within the basin due to seepage from the various ponds, which altered local flow directions and rates. Groundwater flow to the south and east is generally constricted by the bedrock outcrops of the Giant's Range granite (Reference (15)). However, there is a gap in the bedrock hills near the southern end of the Tailings Basin, which allows some water to flow south via SD026, forming the headwaters of Second Creek (known locally as Knox Creek), a tributary to the lower Partridge River. There is also a gap in the bedrock hills near the eastern side of Tailings Basin Cell 1E, where historic Trimble Creek, flows into the Tailings Basin. Historic Trimble Creek drains the watershed area between Spring Mine and the Tailings Basin. Currently there is no seepage out of the Tailings Basin to the east because the tailings are lower in elevation than the watershed to the east. However, when the Flotation Tailings Basin is constructed, and the elevation of the tailings and the groundwater mound within the tailings increases, seepage may flow out of the Tailings Basin under the FTB East Dam.

Groundwater elevations observed at Plant Site monitoring wells range from approximately 1416 feet above mean sea level (MSL) at GW015 to 1785 feet MSL at GW002. A summary of observed groundwater elevations at the monitoring wells is presented in Table 4-1. Monitoring wells GW001, GW002, and GW005 through GW008 were installed as monitoring points for the NPDES Permit associated with the former LTVSMC operations. These wells have also been monitored for the Project and the elevations presented in Table 4-1 only reflect the data that have been collected for the Project (i.e., historic NPDES Permit monitoring data are not included). In general, water levels at the monitoring wells have fluctuated less than 4 feet during the data collection period. Compared with the other wells, relatively large water level fluctuations have also been observed at GW005, GW008, and GW011. GW005 is located within Cell 2W, where the water level has dropped since LTVSMC ceased operations in 2001. The reasons for larger water level fluctuations at GW008 and GW011 are unknown, but may be related to fluctuations in the elevations of nearby surface water features.

The area to the northwest of the Tailings Basin, including Heikkilla Lake and Heikkilla Creek, is not included in the groundwater flow path areas emanating from the Tailings Basin (Large Figure 6). Although the groundwater elevation contours (Large Figure 5 and

Large Figure 6) indicate that the general direction of groundwater flow in this area is to the northwest toward Heikkilla Lake, groundwater quality data from monitoring wells located northwest of the Tailings Basin do not reflect impacts from Tailings Basin seepage. Rather, the available groundwater quality data suggest that groundwater that originates at the Tailings Basin flows around the Heikkilla Lake area. Chloride concentration data from several monitoring wells were used to evaluate whether impacts from Tailings Basin seepage are apparent in the area not encompassed by the modeled groundwater flow path. Chloride can be used as a conservative tracer of Tailings Basin seepage because it is present in higher concentrations in the basin than in the natural environment and it does not readily react (see Section 4.3.4 for additional discussion of the use of chloride as a tracer for Tailings Basin water). Monitoring well GW002 is located to the southwest of the Tailings Basin and groundwater elevations indicate that it is hydraulically upgradient of the basin. Low chloride concentrations indicate that this location represents unimpacted background conditions. Monitoring well GW013 is located to the northwest of the Tailings Basin, not in the modeled groundwater flow path and GW010 is located in the northwest groundwater flow path. Table 4-2 shows the chloride data (taken from Large Table 3) at the three groundwater wells.

Table 4-1 Groundwater Elevations in Tailings Basin Monitoring Wells, 2007-2013

Monitoring Well	Minimum Elevation (feet MSL)	Maximum Elevation (feet MSL)	Range (feet)
GW001	1484.90	1486.37	1.47
GW002	1783.34	1785.71	2.37
GW005	1598.76	1608.62	9.86
GW006	1486.55	1488.28	1.73
GW007	1505.39	1506.56	1.17
GW008	1556.54	1560.34	3.80
GW009	1467.80	1470.82	3.02
GW010	1472.51	1473.88	1.37
GW011	1467.67	1472.34	4.67
GW012	1488.90	1490.75	1.85
GW013	1459.19	1462.45	3.26
GW014	1445.20	1447.74	2.54
GW015	1415.85	1417.84	1.99
GW016	1448.25	1448.31	0.06

Table 4-2 Chloride Concentrations in Three Wells at the Plant Site

Date	Chloride Concentration (mg/L)		
	GW002	GW013	GW010
Aug-2007	0.65	--	--
Oct-2007	0.74	--	--
Mar-2009	< 0.50	--	--
May-2009	--	--	18.40
Mar-2010	0.90	--	--
May-2010	0.56	--	15.50
Jul-2010	--	0.70	16.80
Sep-2010	--	< 0.50	--
Oct-2010	< 0.50	< 0.50	17.20
Apr-2011	1.20	< 0.50	--
May-2011	--	--	16.85
Jul-2011	0.93	< 0.50	19.70
Oct-2011	0.89	0.58	18.90
Apr-2012	1.4	< 0.50	16.40
Jul-2012	< 0.50	< 0.50	19.50
Oct-2012	0.64	< 0.50	19.90
Apr-2013	0.59	<0.50	--
May-2013	--	--	16.60
Jul-2013	<0.05	<0.05	15.90
Oct-2013	<1.0	<1.0	16.80

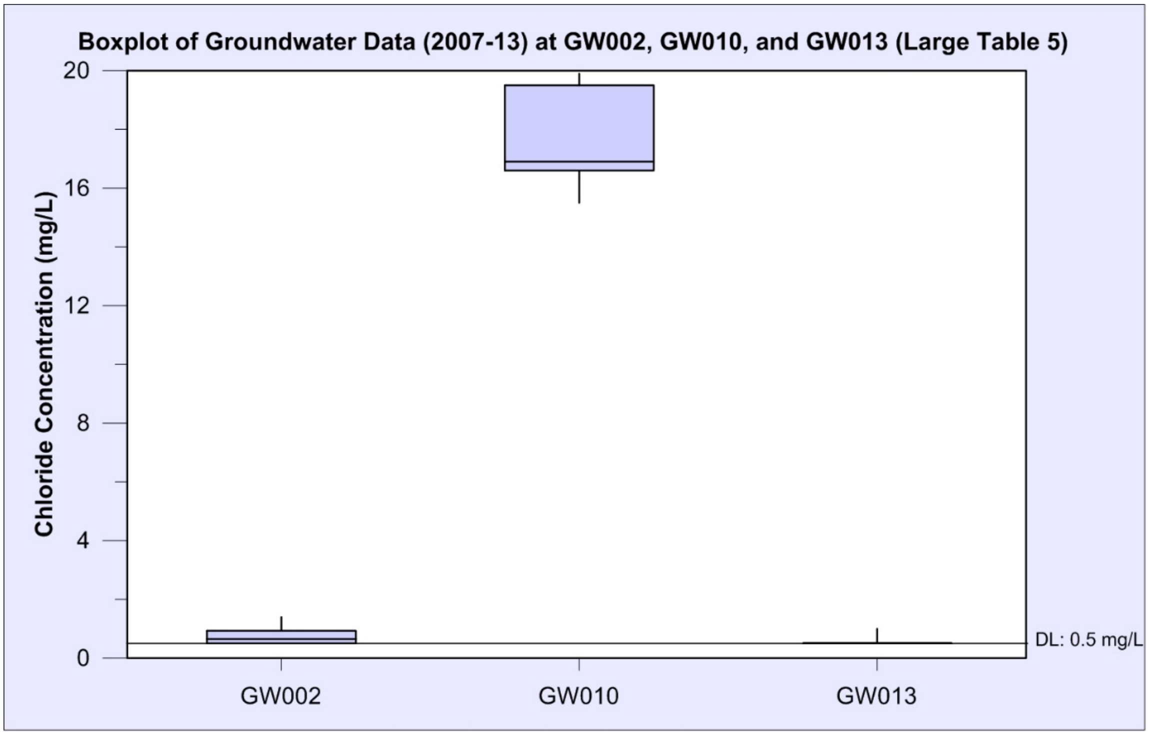


Figure 4-1 Boxplot of Sampled Chloride Concentrations in Three Groundwater Wells

Figure 4-1 shows a box plot of the data at GW002, GW013 and GW010. The plot shows that chloride concentrations at GW002 and GW013 are significantly different than the chloride concentration at GW010. Figure 4-1 supports the conclusions that monitoring well GW013 is not impacted by Tailings Basin seepage, groundwater is not traveling from the Tailings Basin toward Heikkilla Lake, and a groundwater flow path (used for the estimation of potential impacts) is not warranted for the Heikkilla Lake sub-watershed.

4.3.2.2.2 Hydraulic Conductivity

The surficial aquifer materials have been characterized based on soil borings and monitoring wells, which have been completed to the north and west of the Tailings Basin. Glacial deposits generally consist of discontinuous lenses of silty sand to poorly graded sand with silt, to poorly graded sand with gravel. Very little silt or clay has been encountered, with the exception of the soil boring drilled near well GW006, where several feet of silt is interbedded with silty sand (Reference (16)).

Hydraulic conductivity estimates for the surficial aquifer materials are based on in-situ aquifer testing. Single well pumping tests were completed at monitoring wells GW001, GW006, GW007, GW009, GW010, GW011, and GW012. The data collected during the tests was used to estimate the hydraulic conductivity of the surficial material using three different methods; the Moench solution (Reference (17)), the Theis solution (Reference (18)), and using specific capacity data (Reference (19)). The hydraulic conductivity estimates from each solution are different at each location. Not only is there spatial variability, shown by differences between wells, but there is uncertainty in the true conductivity at any given well shown by the differences in the estimates at each well. Table 4-3 shows the resulting estimates of conductivity at each well (Reference (16)). GW009 generally has the lowest estimates of conductivity around 0.5 feet/day and GW010 generally has the highest estimates of conductivity around 50 feet/day. The arithmetic and geometric means of the average hydraulic conductivity estimates at the aquifer test locations are approximately 13.2 feet/day (4.0 m/day) and 4.9 feet/day (1.5 m/day) respectively.

Table 4-3 Hydraulic Conductivity Estimates of the Surficial Material

Monitoring Well	Moench Solution (1997), (ft/d)[(1)]	Theis Solution (1935), (ft/d)[(1)]	Specific Capacity (ft/d)[(1)]
GW001	1.3	1.8	1.6
GW006	9.6	5.7	10.7
GW007	11.5	30.4	14.8
GW009	0.4	0.5	0.6
GW010	52.0	31.9	64.8
GW011	8.6	15.9	11.4
GW012	0.7	2.4	0.7

(1) feet per day

The hydraulic conductivity estimates appear to be log-normally distributed as shown in Figure 4-2.

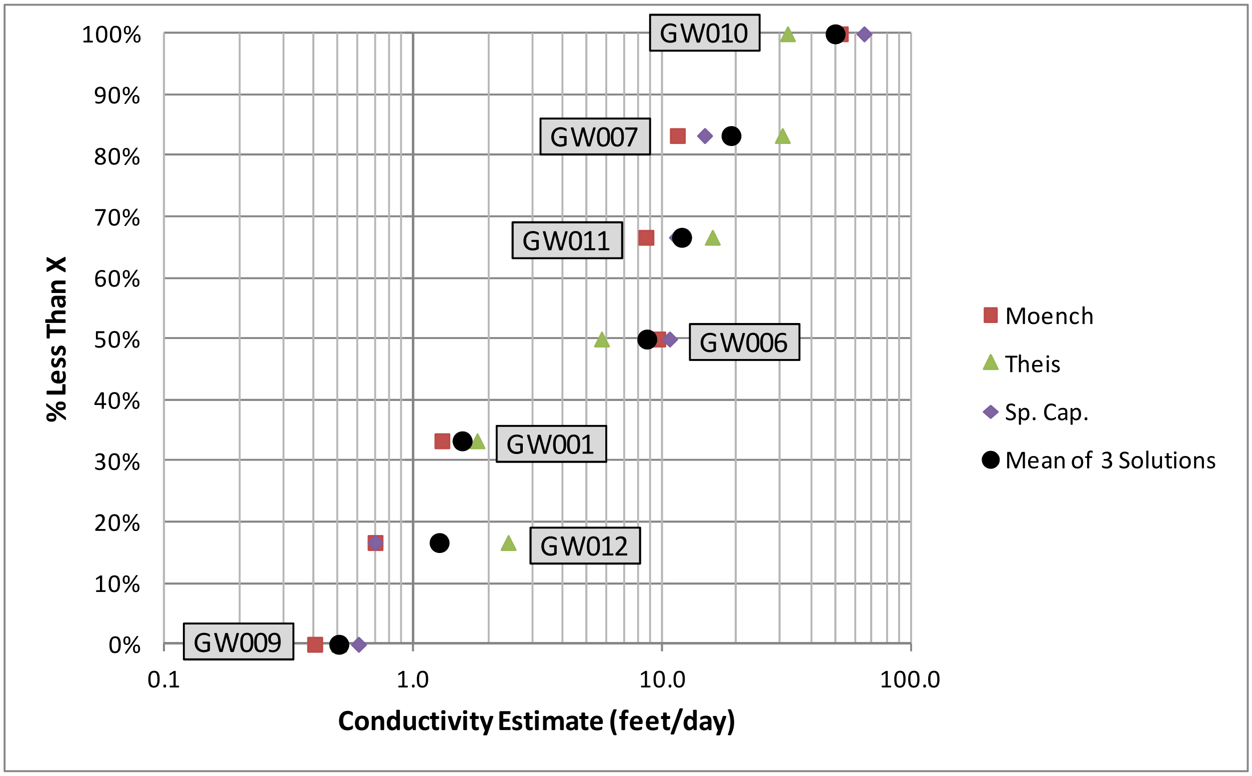


Figure 4-2 Hydraulic Conductivity Test Data in the Surficial Material at the Plant Site

Additional aquifer testing was conducted as part of geotechnical investigations along the alignment of the FTB Containment System. Results of this testing were generally consistent with the values show in Table 4-3, with a minimum estimate of conductivity of 0.1 feet/day, a maximum estimate of conductivity of 130 feet/day and a geometric mean of all conductivity estimates of 4.4 feet/day for the surficial aquifer (Appendix F of Reference (20)). Given the similarity of the new data and existing data, the new values were not included in the development of the distribution of hydraulic conductivity values used in the GoldSim modeling, as agreed to by the Co-lead Agencies. Version 6.0 of the water quality model uses the same hydraulic conductivity range for the surficial material that was used in version 5.0 (Section 5.2.1.3.1).

Because bedrock flow paths are not part of the water quality modeling, the hydraulic conductivity of the bedrock is not discussed in this document. Reference (21) includes details on the hydraulic conductivity of bedrock at the Plant Site.

4.3.3 Water Quantity

The quantity of water flowing through the saturated unconsolidated deposits in the vicinity of the Tailings Basin can be estimated based on observed hydraulic gradients and estimates of hydraulic conductivity and aquifer thickness. Inferred groundwater contours within the surficial aquifer are shown on Large Figure 5. The elevation of bedrock encountered in soil borings at the Tailings Basin toe ranges from 1,444 feet to 1,480 feet and the surficial aquifer in this area has an average saturated thickness of approximately 23 feet (Reference (16)). The thickness of the surficial aquifer increases to the north and northwest, as the thickness of the surficial deposits increase toward the Embarrass River. Given the proximity of the water table to the ground surface observed in monitoring wells near the toe of the Tailings Basin, average hydraulic gradient can be estimated using topographic information on the elevation at the toe of the Tailings Basin and the elevation of the Embarrass River. This results in an average gradient of -0.00444 to the north of Cell 2E, -0.00514 to the north of Cell 2W and -0.00736 to the west of Cell 2W.

The approximate average flow of groundwater through the aquifer can be calculated using the information summarized above and Equation 4-1 (Darcy's Law):

$$Q = -KiA$$

Equation 4-1

Where:

- Q is the volumetric flux through the aquifer [L^3/T]
- K is the hydraulic conductivity of the aquifer [L/T]
- A is the cross-sectional area of the aquifer (i.e., aquifer thickness times length perpendicular to flow) [L^2]
- i is the hydraulic gradient through the aquifer [--].

The total length of the northern dam of Cell 2E is approximately 6,300 feet. Using the mean aquifer conductivity (13.2 feet/day), aquifer thickness (23 feet) and gradient (-0.00444) presented above, the average flow through the aquifer north of Cell 2E and Cell 2W is approximately 44 gpm. The northern dam of Cell 2W is approximately 6,900 feet long. Using the same hydraulic conductivity and aquifer thickness and the average gradient to the north of Cell 2W discussed above (-0.00514), the average flux through the aquifer north of Cell 2W is approximately 56 gpm. With dam length of approximately 9,600 feet and an average gradient of -0.00736, flow to the west of Cell 2W is approximately 110 gpm. This results in a total groundwater flow from the Tailings Basin of 210 gpm.

Groundwater velocity can be estimated using Equation 4-2.

$$v = -\frac{Ki}{n}$$

Equation 4-2

Where:

- v is average linear velocity [L/T]
- n is the aquifer porosity [--].

Assuming a hydraulic conductivity of 13.2 feet/day, a porosity of 0.3, and the range of gradients calculated above, the average linear velocity of groundwater north and west of the Tailings Basin ranges from 0.2 to 0.3 feet/day. Locally, actual velocities likely range over several orders of magnitude, depending on the gradient and hydraulic conductivity of the aquifer material present.

4.3.4 Water Quality

4.3.4.1 Baseline Groundwater Quality

A total of 16 monitoring wells have been installed within and around the Tailings Basin. Monitoring wells GW001 through GW008 were installed as part of the NPDES permit for the Tailings Basin and have been sampled regularly for more than 10 years. Wells GW009 through GW012 were installed in 2009 specifically to provide additional groundwater data for the EIS. Wells GW013 through GW015 were installed as part of the Cliffs Erie Consent Decree, but have also been used to collect data for the EIS. Water quality at well GW014, installed northwest of the Tailings Basin adjacent to Unnamed Creek, has consistently indicated influence from Unnamed Creek and is not believed to be representative of conditions in the surficial aquifer northwest of the Tailings Basin. Well GW016 was installed in August 2013 under the Consent Decree with the explicit objective of providing information about groundwater quality northwest of the Tailings Basin in an area that is not influenced by seepage from Unnamed Creek. Baseline groundwater monitoring data at the Plant Site from wells in the surficial aquifer is summarized in Large Table 3.

With the possible exception of monitoring well GW008, groundwater quality at the wells located within or immediately adjacent to the perimeter of the Tailings Basin indicates influence from Tailings Basin seepage. Tailings Basin seepage is characterized by elevated concentrations of total dissolved solids (TDS) (especially chloride, sulfate, and other major cations and anions). The Tailings Basin seepage also contains higher concentrations of trace constituents such as molybdenum and fluoride.

Some of the monitoring wells located farther from the basin (generally near the property boundary: GW009, GW010, and GW014) indicate possible influence from Tailings Basin seepage, while others appear to be uninfluenced (GW002, GW011, GW013, and GW015). Monitoring well GW009 was considered for designation as a background well during the IAP process, but was later rejected because the well is located within the proposed Tailings Basin flow path, and does have elevated concentrations for some solutes (Reference (22)). In general, concentrations at wells along the property boundary do not exceed health-based groundwater standards (HRLs, MCLs). The exception is manganese, which exceeds the current HRL of 100 µg/L in a number of wells near the property boundary. Manganese is mobile under reducing conditions as Mn^{2+}, while in oxidized environments it tends to form insoluble manganese (Mn^{4+}) oxides (Reference (23)). Manganese is probably released from the LTVSMC tailings by dissolution of manganese-bearing minerals present in the LTVSMC tailings (Reference (24)). However, manganese oxides are also likely present in the surficial aquifer materials. Therefore, it is possible that a general change from an oxidized environment to a more reducing environment could liberate manganese from the surficial aquifer. Because manganese has a high degree of sensitivity to redox conditions, observed manganese concentrations may be controlled by extremely localized water quality conditions, and may not be directly related to Tailings Basin seepage. This sensitivity to local redox conditions also affects dissolved aluminum and iron concentrations, which are also observed at elevated concentrations in some of the monitoring wells. Regional groundwater quality data indicates that manganese concentrations above the HRL and aluminum and iron concentrations above the secondary MCL are not uncommon near the Plant Site and throughout northeastern Minnesota (Reference (25)).

Total dissolved solids concentrations exceed the secondary MCL of 500 mg/L at several locations: GW014, near the property boundary; GW001, GW006, GW007, and GW012, adjacent to the perimeter of the Tailings Basin; and GW005 within the Tailings Basin. At two other locations (GW009 and GW010), total dissolved solids are elevated, but not above the secondary MCL. This indicates the possible influence of Tailings Basin seepage at these locations.

The baseline groundwater quality data at the Plant Site was used for two primary purposes for this modeling:

- to establish background groundwater and recharge concentrations (Section 5.2.1.3.5)
- to establish concentration targets for the calibration of LTVSMC tailings release rates to current conditions (Section 10.2.1 of Reference (5))

Data from wells likely influenced by Tailings Basin seepage were not used to establish background groundwater concentrations for the model. Chloride was the primary constituent used to determine whether or not a given well is likely influenced by Tailings Basin seepage and therefore, whether it could be used to establish background groundwater concentrations.

Elevated chloride concentrations are found in the Tailings Basin ponds. During operations, the Tailings Basin water was re-circulated during processing; however, chloride concentrations in the pond water appear to have remained relatively stable. During the period 1996-1999 (a period for which chloride concentration data are available) concentrations were similar to the present Tailings Basin water concentrations (approximately 30 mg/L; Reference (24)). Chloride is considered a conservative tracer in groundwater because it is highly soluble and generally does not enter into redox reactions, form significant solute complexes or low solubility salts with other ions in freshwater, or adsorb on mineral surfaces (Reference (23)).

Regional background chloride concentrations in groundwater reportedly range from 1.2 – 4.8 mg/L (References (25) and (26)). In contrast, chloride concentrations in Tailings Basin seepage, as measured in wells GW005, GW006, and GW012, which are located within or immediately adjacent to the Tailings Basin, are generally elevated above background concentrations, with concentrations in the range of 15-32 mg/L. Based on the available chloride data, wells GW002, GW011, GW013, and GW015 are believed to be representative of background groundwater concentrations. Chloride concentrations at these wells range from below detection limits to 4.8 mg/L (Large Table 3). Therefore, these four wells were used to estimate baseline groundwater quality.

In general, to determine the baseline groundwater quality, it was prefereable to use dissolved concentrations over total concentrations if possible for each constituent. Generally, the choice to use dissolved concentrations depended on the number of samples available at that time. If there were approximately the same number of samples of total and dissolved, then dissolved was preferable. However, if dissolved concentrations were not sampled until more recently, limiting the number of samples available, and there were significantly more samples of total concentrations, then total concentraitons were used instead. The details and reasoning behind choosing dissolved versus total are presented on a constituent-by-constituent basis in Attachment C discussing the development of baseline groundwater and surface water quality.

4.3.4.2 Site-Specific Evaluation Criteria

Natural background (un-impacted) groundwater concentrations of beryllium and manganese at the Plant Site are greater than secondary drinking water standards and/or the HRL (see Large Table 2 for a summary of the applicable standards). Groundwater standards include primary and secondary drinking water standards and the HRL. Minnesota Rules, part 7060.0600, subpart 8 states that “where the background level of natural origin is reasonably definable and is higher than the accepted standard for potable water and the hydrology and extent of the aquifer are known, the natural level may be used as the standard.”

The same data set that is used to define natural background water quality for use in the water quality impact modeling (Section 5.2.1.3.5) is used to develop site-specific evaluation criteria for use in the environmental review process.

The MPCA, the agency responsible for regulating groundwater quality, does not have a standard method for defining a site-specific groundwater standard based on natural background concentrations. Upper Prediction Limits (UPLs) or Upper Tolerance Limits (UTLs) are commonly used to develop compliance limits, or not-to-exceed values, in federally-lead programs (Reference (27)). USEPA guidance on the statistical analysis of environmental data recommends using the 95% UPL for developing not-to-exceed values, such as natural background concentrations. The 95% UPL is used for the analysis presented here when there is sufficient detected data. For datasets with left-censored data (non-detects), the Kaplan-Meier (KM) method is used for the calculation of the 95% UPL. The ProUCL guidance documents recommend using the Kaplan Meier method for datasets with left-censored data, particularly if it is highly skewed. When there are limited data or few detected concentrations, the first or second highest measured concentration (depending on number of samples and number of detected values) is recommended as an appropriate background concentration (Reference (28)).

The background data for each constituent and location are presented below, along with the statistical measures of 95% UPL and the second highest concentration.

4.3.4.2.1 Plant Site Surficial Aquifer – Beryllium

At the Plant Site, 50 background beryllium groundwater samples were collected from the surficial aquifer. Of these samples, 44 (88%) were recorded as non-detects, with six detected concentrations as shown in Figure 4-3. With so few detected concentrations, it is not advisable to perform parametric statistical analysis of the data (Reference (28)). The highest detected concentration was 2.72 µg/L and the second highest detected concentration was 0.54 µg/L. The majority of samples with concentrations below the detection limit had a detection limit of 0.2 µg/L. Given the high percent of non-detected concentrations and following the ProUCL Guidance (Reference (28)), the second highest detected concentration, 0.54 µg/L, is used as the beryllium evaluation criterion (i.e., natural background level) for the surficial aquifer at the Plant Site.

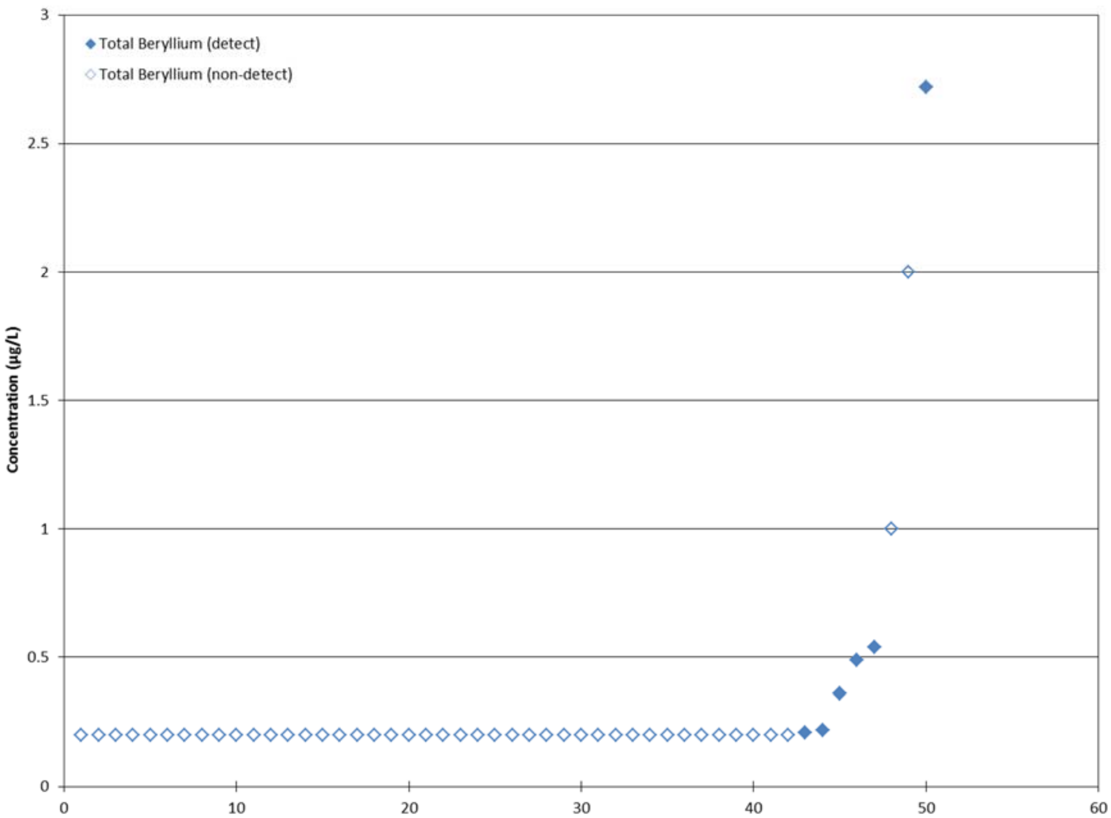


Figure 4-3 Background Total Beryllium Concentrations Measured in the Plant Site Surficial Aquifer (Non-detects Plotted at the Detection Limit)

4.3.4.2.2 Plant Site Surficial Aquifer – Manganese

At the Plant Site, 50 background manganese groundwater samples were collected from the surficial aquifer, all at detected concentrations as shown in Figure 4-4. Non-parametric (distribution-free) methods were used to compute the background statistics. It should be noted that the data are gamma distributed at a 5% significance level; however, use of a gamma distribution would result in a higher evaluation criterion limit and is therefore not proposed.

As seen in Figure 4-4, the highest detected concentration is more than two times larger than the next highest measured concentration. However, this maximum concentration is within the range of manganese concentrations observed in the residential wells that were monitored north of the Tailings Basin, which are also believed to represent natural background concentrations. Manganese concentrations measured in the residential wells north of the Tailings Basin ranged from 0.66 µg/L to 4710 µg/L, with a mean concentration of 580 µg/L (Reference (29)). Given the occasional high concentrations measured in the residential wells, the high concentration measured in the Plant Site wells appears to represent natural variation in background conditions and has been included in calculation of background statistics.

Using the 50 groundwater samples collected from monitoring wells at the Plant Site between 2007 and 2013, the non-parametric 95% UPL was determined (Table 4-4). The 95% UPL, 704 µg/L, is used as the manganese evaluation criteria for the surficial aquifer at the Plant Site.

Table 4-4 Summary Statistics for Background Manganese Concentrations in the Surficial Aquifer at the Plant Site

	Second Highest Detected Concentration	95% UPL
Total Manganese, Surficial Aquifer (µg/L)	730	704

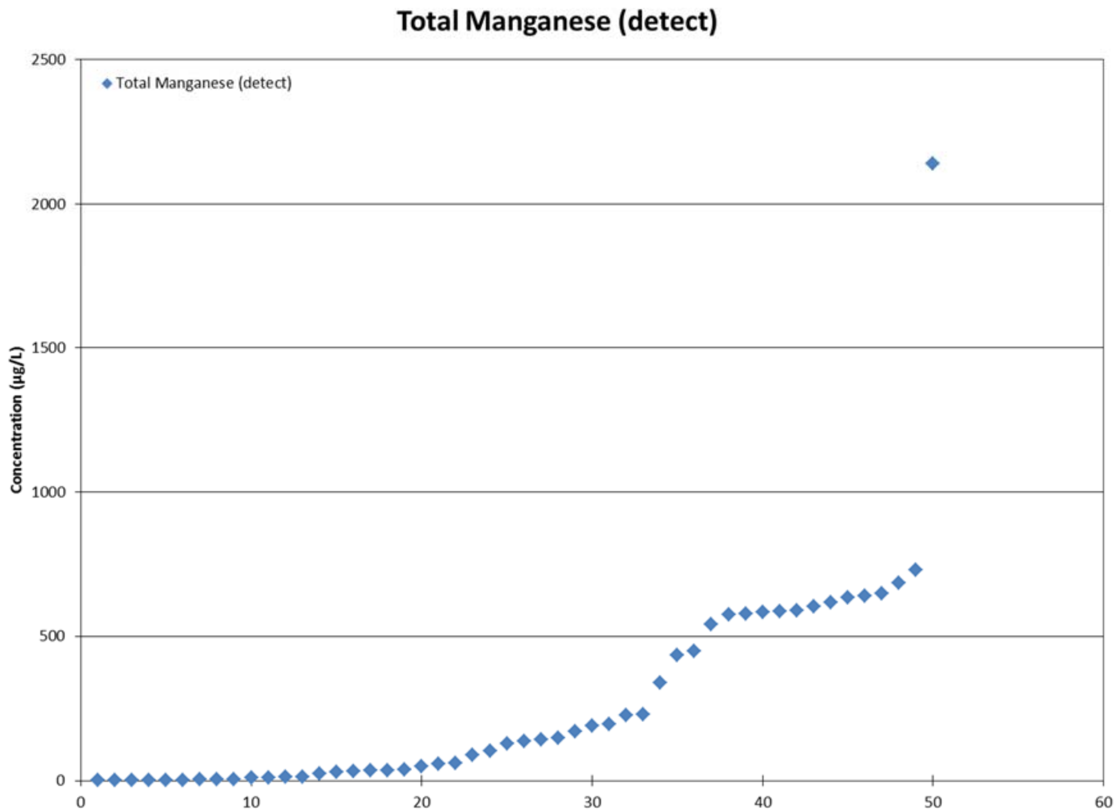


Figure 4-4 Background Total Manganese Concentrations Measured in the Plant Site Surficial Aquifer

4.3.4.3 Quality Assurance and Quality Control Review

A quality assurance and quality control (QA/QC) review was performed on the analytical results for the monitoring wells sampling events for 2007, 2009, 2010, 2011, 2012, and 2013. This review was performed in accordance with the Barr Engineering Standard Operating Procedure for routine data evaluation, which is based on *The National Functional Guidelines for Organic and Inorganic Data Review* (Reference (30), Reference (31)). Most analyses were performed either by Northeast Technical Services Inc., (NTS) (prior to March 2011) or by Pace Analytical (after March 2011) located in Virginia, Minnesota with the exception of cyanide, palladium, platinum, low-level mercury and methyl mercury. When methyl mercury was not performed by NTS or Pace, analyses were sent to ALS Environmental (formerly Columbia Analytical Services), located in Kelso, Washington. The palladium and platinum analyses were performed by Pace Analytical (Pace), located in Minneapolis, Minnesota and/or Braun Intertec Co., located in Minneapolis, Minnesota. Minnesota Valley Testing Laboratories, located in New Ulm, Minnesota, and/or Pace Minneapolis performed the cyanide analyses. For one instance in 2007, all metals were analyzed at Braun Intertec Co., and for a separate sampling event chloride, fluoride, and sulfate were analyzed by Era Laboratories, located in Duluth, MN. The low-level mercury analyses were performed by NTS or Pace in Duluth, MN and Pace Minneapolis in 2011-2012.

In general, the areas covered by the validation process are: USEPA recommended holding times and preservation, blank sample analyses, accuracy data, precision data, and an overall assessment of data quality.

Technical holding times were evaluated for each sample and target parameter, based on the USEPA recommendations listed in 40 CFR SW-846 Test Methods for Evaluating Hazardous Waste. The technical holding times were met for the samples submitted to the laboratories during these sample events with the exceptions qualified (h) as estimated concentrations.

Field blank samples were collected and analyzed during the course of the 2007, 2009, 2010, 2011, 2012, and 2013 sampling events. In these samples, dissolved and/or total metals, general parameters, and/or anions were observed in the field blank samples. If the corresponding detections were small enough (less than five times the field blank value) to potentially be a "false positive" then that data was (b) qualified.

Method blank samples were analyzed and provided for almost all of the reports. In those reports, one or more method blank sample had minor detections of metals and general parameters, however, few data was qualified from these method blank sample detections because all corresponding samples were either five times this concentration amount or non-detect. No other qualifiers were applied based on blank data.

The accuracy and precision data review included evaluation of laboratory control spike (LCS), laboratory control spike duplicate (LCSD), matrix spike (MS), matrix spike duplicate (MSD), and duplicate sample data. Accuracy was evaluated by comparing laboratory percent recoveries from LCS, LCSD, MS, and MSD samples to laboratory acceptance criteria. Precision was evaluated by calculating the relative percent difference (RPD) of the LCS/LCSD sample pairs, MS/MSD sample pairs, and duplicate samples. Equation 4-3 is the RPD formula:

$$RPD = \frac{D_1 - D_2}{(D_1 + D_2)/2} \times 100$$

Equation 4-3

Where:

D1 = concentration of the sample
D2 = concentration of the duplicate sample

An LCS is a sample of analyte-free media spiked with known concentrations of the target analyte that is carried through the same sample preparation and analytical procedures as the project samples. LCS recoveries are used to estimate overall analytical method accuracy independent of sample matrix effects. In 2009, there was one LCS/LCSD pair that affected two lab reports. The data for these reports was re-analyzed, and no data was qualified based on this. The remaining LCS/LCSD pairs met laboratory acceptance criteria and/or deviations were considered minor.

A matrix spike is a project sample spiked with a known concentration of the target analyte that is carried through the sample preparation and analysis procedures in order to assess the accuracy of a method in a given sample matrix. Review of the MS/MSD sample pairs indicated there were percent recoveries and/or RPD for one or more MS/MSD samples that exceeded the laboratory limits for multiple target parameters. The associated project sample data whose MS/MSD percent recoveries and/or RPD exceeded the laboratory acceptance criteria for accuracy, generally, by 5% or more, were (*) qualified.

Laboratory duplicate samples were evaluated, when required, and instances where the calculated RPD value of a project sample exceeded laboratory acceptance criteria the corresponding sample data was qualified as estimated (*).

A field duplicate sample was collected over the course of these sampling events approximately once every day. Field duplicate sample pairs with calculated RPDs greater than 30% are (*) qualified as estimated concentrations. This affected multiple field duplicate sample pairs for metals and general parameters. The RPD exceedances were not qualified if the parameter concentrations were at or near the reporting limit, which exaggerates the RPD value, and is not necessarily indicative of poor precision.

The laboratory (Pace) noted in 2013, the instances when, during the analysis of 5-day biological oxygen demand for the bedrock wells, the oxygen usage was less than 2.0 for all dilutions set for a particular sample. The reported value was calculated from the dilution using the most amount of sample and is considered an estimated less than value and was qualified (*).

The data met the Project requirements and is deemed acceptable for the purposes of this Project with the above mentioned qualifications.

4.4 Embarrass River Watershed

4.4.1 Hydrology

4.4.1.1 Embarrass River

The most extensive flow record near the Plant Site within the Embarrass River watershed is from U.S. Geological Survey (USGS) gage 0401700 – Embarrass River at Embarrass, and extends from 1942 to 1964 (Reference (32)). Another station is located in the Embarrass River watershed, but it is further downstream of the study area (USGS gage 04018000 – Embarrass River near McKinley) and has a shorter period of record (1953-1962). The locations of these two stream gaging stations are shown in Large Figure 1 and the periods of record are presented in Figure 4-5.

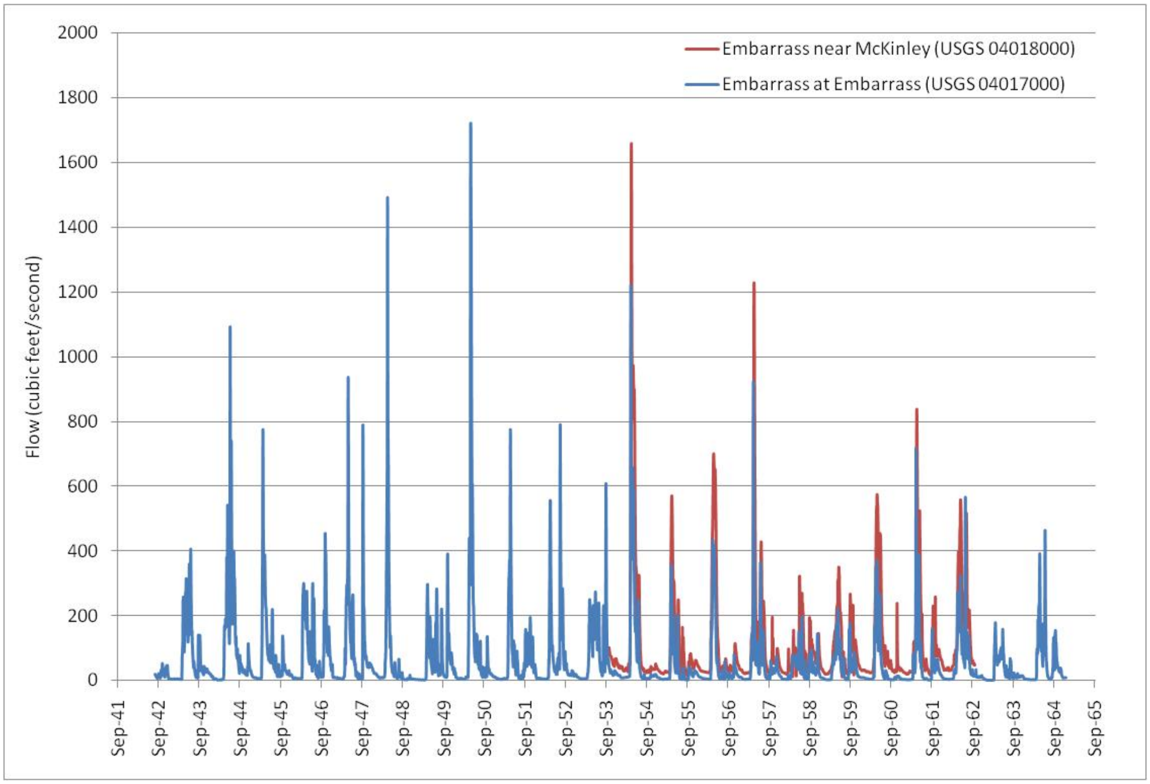


Figure 4-5 Historical Flow Records for the Embarrass River Downstream of the Plant Site

Hydrologic statistics (i.e., Richter statistics, Reference (33)) were calculated for USGS gage 04017000, the flow record closest to the Plant Site, and are presented in Table 4-5. These flow statistics were normalized based on watershed area upstream of the gage (88.3 square miles) and extrapolated to monitoring location PM-13 (watershed area of 111.8 square miles, see Large Figure 2). A comprehensive hydrologic model was not developed to assess Project-related impacts to hydrology in the Embarrass River watershed, based on the relatively small changes in estimated Tailings Basin seepage relative to average flows in the Embarrass River. No adjustments were made to the unit area flow statistics to address climate or hydrologic changes between the period of record and present conditions (Reference (34)).

Table 4-5 Hydrologic Statistics Calculated for the Embarrass River

Statistic	USGS 04017000 1942-1963		PM-13[1]
	cfs	cfs/mi^2	cfs
Annual Daily Mean	64.4	0.73	81.5
October Mean	45.4	0.51	57.4
November Mean	33.2	0.38	42.1
December Mean	14.2	0.16	18.0
January Mean	6.7	0.08	8.5
February Mean	5.0	0.06	6.3
March Mean	22.0	0.25	27.9
April Mean	190.5	2.16	241.2
May Mean	194.0	2.20	245.6
June Mean	114.0	1.29	144.3
July Mean	63.2	0.72	80.0
August Mean	32.2	0.36	40.7
September Mean	51.5	0.58	65.1
Annual Max 1-day Mean	674	7.63	853
Annual Max 3-day Mean	630	7.13	797
Annual Max 7-day Mean	532	6.02	673
Annual Max 30-day Mean	315	3.56	399
Annual Max 90-day Mean	178	2.02	226

Statistic	USGS 04017000 1942-1963		PM-13(1)
	cfs	cfs/mi^2	cfs
Annual Min 1-day Mean	3.45	0.039	4.37
Annual Min 3-day Mean	3.49	0.040	4.42
Annual Min 7-day Mean	3.59	0.041	4.54
Annual Min 30-day Mean	4.00	0.045	5.07
Annual Min 90-day Mean	5.45	0.062	6.90

(1) Note: flow statistics for PM-13 are based on ratio of drainage area only, and do not consider changes in seepage between the USGS record and current conditions (i.e., the values presented in this table are not equivalent to "Continuation of Existing Conditions Scenario" flows.

4.4.1.2 Embarrass River Tributaries

There are four small streams located between the Plant Site and the Embarrass River (Large Figure 7). From east to west they are:

- unnamed creek connected to Mud Lake ("Mud Lake Creek")
- Trimble Creek
- unnamed creek connected to Heikkilla Lake ("Heikkilla Creek")
- unnamed creek on the northwest corner of Cell 2W ("Unnamed Creek")

Note that in the above list the parenthetical names have been added for ease of reference within this report and associated analyses, and do not reflect official names for these water bodies. Other significant tributaries near the Plant Site include Spring Mine Creek, and Bear Creek, and Second Creek. Spring Mine Creek, Bear Creek, and Heikkilla Creek are not affected by the Project and are therefore omitted from further discussion. Section 4.3.2.2.1 contains a detailed discussion on the basis for considering Heikkilla Creek and Heikkilla Lake as unaffected by the existing Tailings Basin and the Project. Second Creek is downstream of the Plant Site and is located within the Partridge River watershed.

The surface watershed areas tributary to these streams are presented in Large Figure 2. Limited flow data exists for the SD006 seep, PM-11, PM-19, MLC-1 and MLC-2 in the form of instantaneous measurements taken at various intervals over the past few years. The available flow data are summarized in Table 4-6.

Table 4-6 Summary of Recent Observed Flow Data around the Tailings Basin

Location	Water body	Period of Record	Number of Observations	Average Flow	
				gpm	cfs
SD006	Unnamed Creek	2008-2009	24	460	1.0
PM-11		2009-2011	17	1,035	2.3
PM-19	Trimble Creek	2009-2011	15	827	1.8
MLC-1	Mud Lake Creek	2011	2	2,780(1)	6.2(1)
MLC-2		2011	5	1,010	2.3

(1) includes 12.1 cfs (5,440 gpm) measurement during snowmelt period (4/12/2011)

4.4.1.3 Estimating Embarrass River Watershed Baseflow

Estimating the amount of flow in the Embarrass River and its tributaries contributed by groundwater is necessary for modeling of future impacts, as groundwater and watershed runoff chemistries differ. It is assumed that baseflow consists solely of groundwater inflow to the stream, and represents a relatively constant source of water to the Embarrass River.

Because baseflow is a constant source of water to the Embarrass River even during periods of little or no watershed runoff, longer-duration low flows (typically observed in winter months) are a reasonable estimate of baseflow. The minimum 30-day average flow is used here as a surrogate statistic for baseflow. The minimum 30-day average flow during each water year was selected as an appropriate time scale to represent baseflow conditions because it is long enough to obtain a reasonable average flow but short enough to avoid inclusion of runoff events caused by winter snowmelt.

The USGS gage record for the Embarrass River at Embarrass (Figure 4-5) was used to estimate baseflow by calculating the minimum 30-day average flow for each complete water year (October through September) in the record. The average minimum 30-day average flow over the period of record is 4.0 cfs at the USGS gage, with annual values ranging from 1.1 to 6.4. The average baseflow corresponds to yield of 0.045 cfs per square mile, or 0.61 inches per year over the tributary watershed. This value extrapolates to a baseflow of 5.1 cfs at monitoring location PM-13. This baseflow yield is used in the probabilistic water quality model as a known, constant value for all watersheds directly tributary to the Embarrass River. The USGS gage record provides a reasonable estimate of overall watershed baseflow, but baseflow may vary by subwatershed.

4.4.2 Past and Current Point and Nonpoint Discharges

4.4.2.1 Pit 5NW

Area 5 comprises a network of four abandoned mine pits formerly owned by LTVSMC, two of which (named Pit 5NE and 5NW) are located along the southern headwaters of the Embarrass River watershed. The other two abandoned mine pits (named Pit 5SE and 5SW) are located in the Wyman Creek watershed, a tributary to Colby Lake.

Pit 5NW is located in the Biwabik Iron Formation. As of November 2007, the Pit 5NW has a water volume of 5,325 acre-feet and is at a water surface elevation of 1,666.5 feet MSL. Pit 5NW has a tributary area of approximately 650 acres. Water seeps from the pit to Spring Mine Creek, which flows north approximately 5 miles before joining the Embarrass River downstream of surface water monitoring station PM-12.

Flow measurements at the permitted discharge location for Pit 5NW (SD033, Large Figure 1) exist at various intervals from 2003 to the present, including continuous gage data collected from August 2010 through July 2011. The available data through the end of 2013 is presented in Figure 4-6.

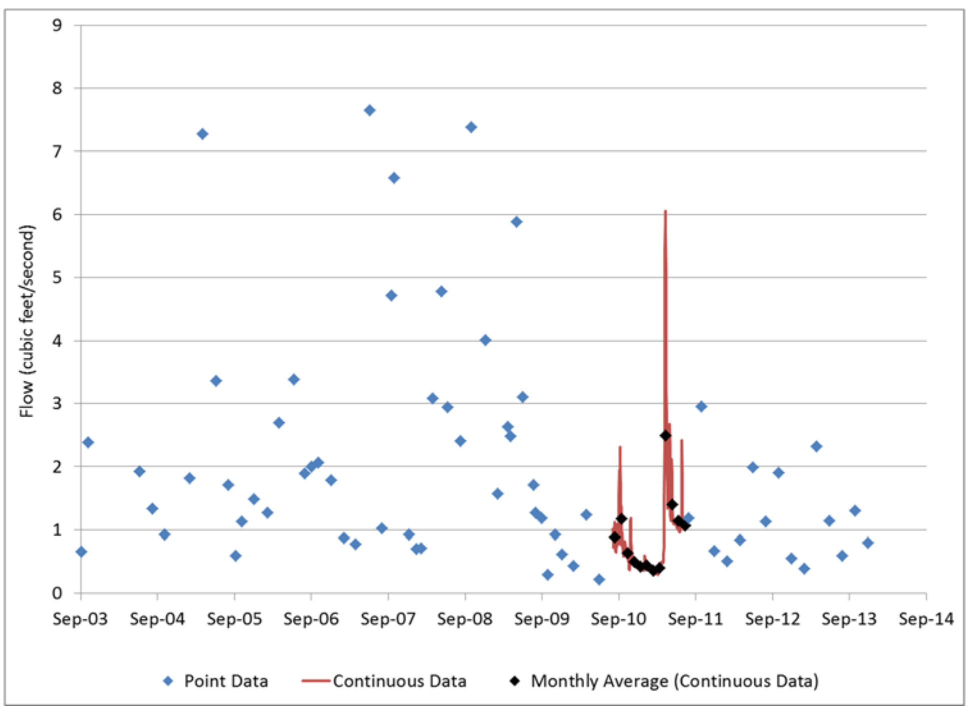


Figure 4-6 Observed Flow Data at SD033 Outfall from the Pit 5NW

4.4.2.2 Babbitt WWTP

The Babbitt WWTP discharges into Hay Lake upstream of PM-12 (Large Figure 2). A flow of 0.33 cfs, half of the design capacity was assumed for this discharge in the analysis performed in support of the DEIS (Reference (10)); this same assumption is used for the SDEIS and FEIS analyses. No changes in the operation of the Babbitt WWTP are anticipated in the next 25 years (Reference (35)).

4.4.3 Sulfate Load Calculations at Sample Points in the Embarrass River

Concurrent flow and sulfate data was collected at several locations along Spring Mine Creek and the Embarrass River in 2010 and 2011. The purpose for this monitoring was to track sulfate loading in the Embarrass River. Seven data points collected from 2010 to 2011 exhibit low sulfate loading upstream of Spring Mine Creek (10 kg/d). The load leaving SD033 averaged approximately 2,600 kg/d. The sulfate loading observed at the end of Spring Mine Creek (monitoring location PM-12.1) was 1,140 kg/day. On average, the load observed at PM-12.1 was approximately 50% of the load measured entering Spring Mine Creek at SD033. The calculated sulfate load along the Embarrass River downstream of Spring Mine Creek averaged 930 kg/day, 600 kg/day, 620 kg/day, and 860 kg/day at locations PM-12.2, PM-12.3, PM-12.4, and PM-13, respectively.

The decreasing loads relative to the SD033 discharge suggest biological sulfate reduction or other losses occurring along Spring Mine Creek and/or the Embarrass River (Figure 4-7). Reduction or other losses is also likely occurring in the wetlands or tributaries between the Tailings Basin and the Embarrass River. The average load calculated between PM-12.2 and PM-13 decreased by approximately 70 kg/day (Figure 4-7) even though there is approximately 3,120 kg/day currently leaving the Tailings Basin towards the Embarrass River (sum of the loads leaving the north, northwest, and west toes of the Tailings Basin, see Reference (5)). In comparison, the calculated load of chloride (a parameter which is a tracer for Tailings Basin seepage and is generally considered conservative) clearly increases in the downstream direction indicating that the Tailings Basin seepage is reaching the Embarrass River (Figure 4-8).

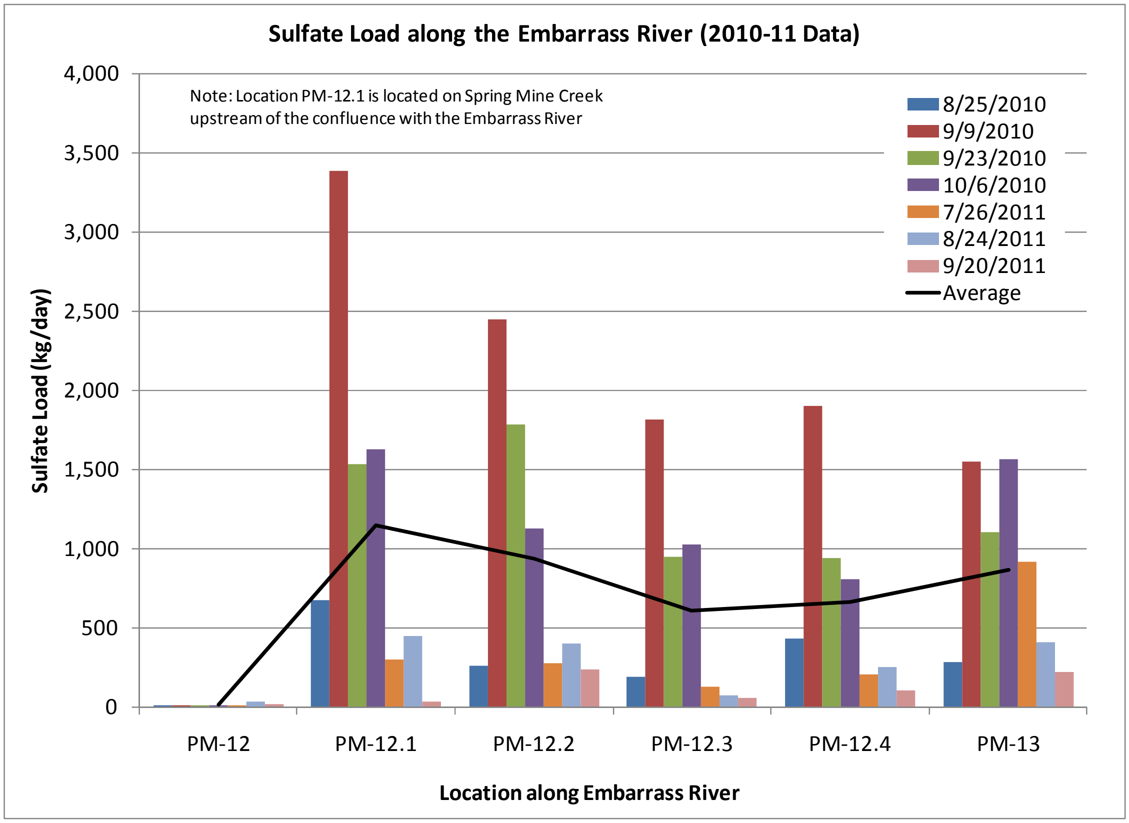


Figure 4-7 Sulfate Load Calculated Along the Embarrass River (2010-2011)

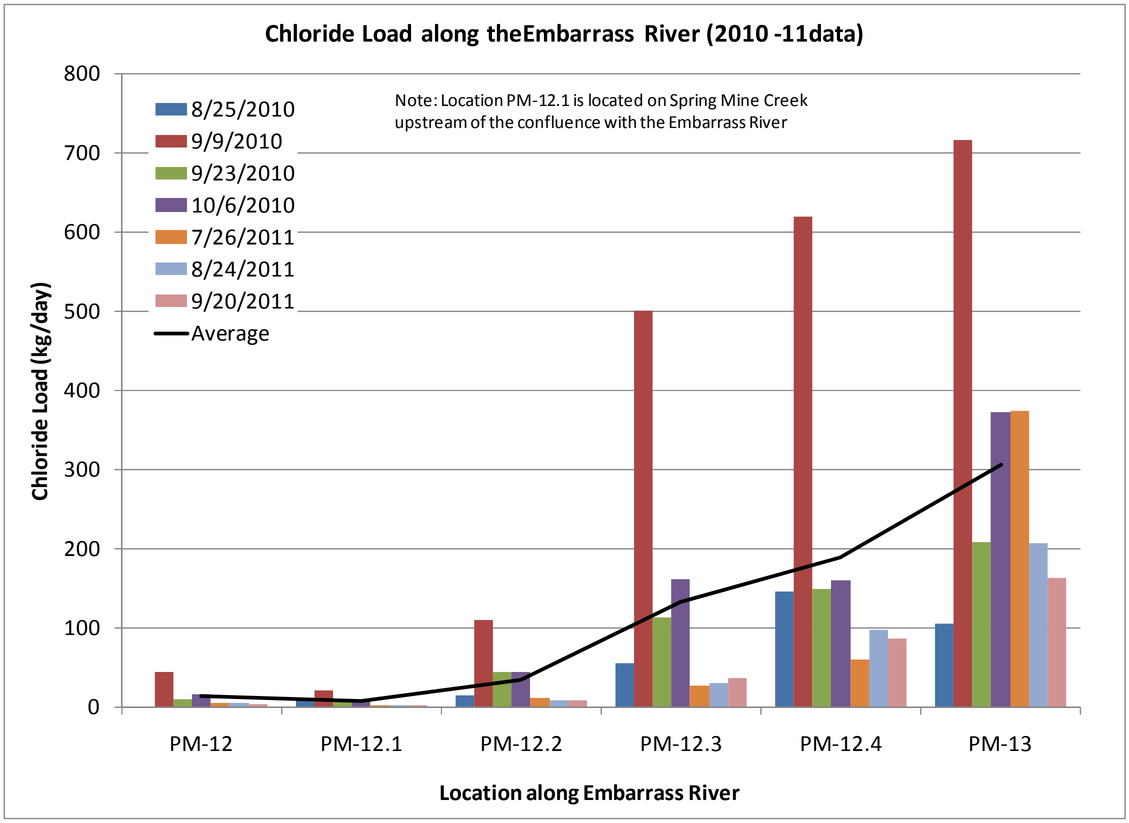


Figure 4-8 Chloride Load Calculated Along the Embarrass River (2010-2011)

It should be noted that the data discussed in this section and presented in Figure 4-7 and Figure 4-8 is limited and represents only a small period of time in 2010 and 2011. Although the data are insufficient to fully quantify the behavior of tailings seepage to the Embarrass River and its tributaries, the trends in the sulfate and chloride load patterns suggest sulfate reduction is occurring. .

4.4.4 Embarrass River Watershed Water Quality

Several locations within the Embarrass River watershed have been monitored for water quality between 2004 and 2013. These locations are shown in Large Figure 2 and include five monitoring locations on the Embarrass River upstream of the chain of lakes (PM-12, PM-12.2, PM-12.3, PM-12.4, and PM-13), two locations along Spring Mine Creek (SD033 and PM-12.1), three locations along Mud Lake Creek (MLC-1, MLC-2, and MLC-3), two locations on Trimble Creek (TC-1 and PM-19), and two locations on Unnamed Creek (UC-1 and PM-11). Water quality data are available for one location on Second Creek (PM-7), located south of the Plant Site in the Partridge River watershed (Large Figure 2). The results of baseline monitoring for these locations are presented in Large Table 4 and Large Table 5 (Large Figure 1 for locations SD004 and SD026). Additionally, water quality data has been collected at six locations within the chain of lakes; including depth samples taken in Sabin Lake, Wynne Lake, and Embarrass Lake (Large Figure 2 for lake locations). Water quality data from these lakes is presented in Large Table 6.

The frequency and extent of monitoring varies by location. Monitoring conducted from 2004 through 2008 generally includes a wider parameter list to characterize the baseline conditions within the watershed. Monitoring after 2008 generally focused on a smaller list of constituents and fewer locations to address specific issues (e.g., ratio of dissolved to total aluminum, sulfate loading by river reach). Monitoring at several of these locations continues.

In the following sections, non-detections are included in calculations at one half the detection limit and duplicate samples are averaged to a single value. It should be noted that all concentrations discussed in Section 4.4.4 refer to total concentrations (rather than dissolved concentrations) unless otherwise noted.

4.4.4.1 Embarrass River Data

Five surface water locations along the Embarrass River have been sampled at some time since 2004 (Large Figure 2 and Large Table 4). Location PM-12, located upstream of the confluence with Spring Mine Creek was sampled 66 times between 2004 and 2013. PM-13, located downstream of the Plant Site and the tributaries described above was sampled 65 times between 2004 and 2013. The list of constituents monitored varies by sample date and year. PM-12.2, PM-12.3, and PM-12.4 (which are located between PM-12 and PM-13 on the river) were sampled for chloride and sulfate four times in 2010. These locations were monitored for sulfate, chloride, aluminum (dissolved and total) and field parameters 11 times in 2011 and 2012, and 12 times in 2013.

Observed water quality data at location PM-12 on the Embarrass River are used for estimating baseline surface runoff quality from contributing unimpacted watershed areas. This analysis, which is presented in Attachment C, used the total concentrations (unfiltered) to represent surface water quality at PM-12. This decision was largely due to the number of total and dissolved samples that were available when this particular analysis was initially conducted. Large Table 4 shows that most constituents have been sampled only for total concentrations, and shows the constituents that have been sampled for both dissolved and total concentrations. Second, the difference between observed total and dissolved concentrations was not considered significant enough to use the smaller data set of dissolved concentrations, with the exception to this being aluminum.

Baseline water quality monitoring results in the Embarrass River upstream of the chain of lakes were assessed relative to applicable water quality standards. For this analysis, the original (noted as 'N' in Large Table 4) and field duplicate (noted as 'FD' in Large Table 4) samples were averaged, and the '*' qualified samples were included. The data reveal some existing exceedances of applicable surface water quality standards (Large Table 1). These exceedances are discussed in the following section by constituent and reference data are presented in Large Table 4. Note that all detections of thallium in the Embarrass River were below the applicable standard, although the detection limit of some samples was greater than the standard.

4.4.4.1.1 Aluminum

Total aluminum exceeded the standard of 125 µg/L in 57 of 152 samples (38%). Eleven of 41 samples exceeded the standard at PM-12; 24 of 42 samples exceeded the standard at PM-13, and 22 of 69 samples exceeded the standard at PM-12.2, PM-12.3 and PM-12.4 (monitored in 2011, 2013, and 2013). Ten of 128 samples of dissolved aluminum taken at PM-12, PM-12.2, PM-12.3, PM-12.4 and PM-13 exceeded the standard. One hundred and eleven samples had concurrent detections of both total and dissolved aluminum, with an average ratio of dissolved to total aluminum of 0.51. The average ratio calculated from 29 samples at PM-12 was 0.77 (ranging from 0.45 to 1.07) while the average ratio at PM-13 calculated from 26 samples was 0.30 (ranging from 0.08 to 0.63). The ratio of dissolved to total aluminum generally decreases in the downstream direction. The ratios of dissolved to total aluminum at locations PM-12.2, PM-12.3, and PM-12.4 were 0.63, 0.43, and 0.42, respectively.

4.4.4.1.2 Mercury

Total mercury exceeded the 1.3 nanograms per liter (ng/L) mercury standard in 64 of 71 samples at PM-12 and PM-13 (including non-detections at one half the detection limit). Other locations on the Embarrass River were not monitored for mercury. All 16 samples of dissolved mercury exceeded the standard. The average concentrations of total and dissolved mercury are 4.3 ng/L and 3.3 ng/L respectively (including non-detections as half the detection limit).

4.4.4.1.3 Sulfate

The Embarrass River upstream of location PM-13 is not designated as a wild rice production water (Section 2.2), however, MPCA staff guidance identified waters used for the production of wild rice downstream of the Plant Site (Large Figure 1) and determined that this standard will apply to the Embarrass River downstream of PM-13 to where the Embarrass River enters Sabin Lake (Reference (6)). Total sulfate at monitoring location PM-12 was greater than 10 mg/L in 9 of 66 samples taken. Downstream of the confluence with Spring Mine Creek, sulfate was greater than 10 mg/L in 133 of 146 samples taken. The average concentrations of sulfate measured at PM-12, PM-12.2, PM-12.3, PM-12.4 and PM-13 were 7.1 mg/L, 131 mg/L, 50.2 mg/L, 42.8 mg/L, and 49.0 mg/L, respectively. Concentrations of sulfate increase at the confluence with Spring Mine Creek due to loading from the Pit 5NW outflow and are further diluted and/or reduced in the downstream direction.

4.4.4.2 Mud Lake Creek, Trimble Creek, and Unnamed Creek

Between the confluence of the Embarrass River with Spring Mine Creek and monitoring location PM-13, three tributaries join the Embarrass River from the south: Mud Lake Creek, Trimble Creek, and Unnamed Creek (Section 4.4.1.2). These tributaries are impacted by the Tailings

Basin and have the potential to be impacted by the Project. Existing exceedances of surface water quality standards are described by constituent below and reference data are presented in Large Table 4. Note that all detections of thallium in Mud Lake Creek and Unnamed Creek were below the applicable standard, although the detection limit of some samples was greater than the standard.

4.4.4.2.1 Aluminum

Total aluminum exceeded 125 µg/L in 1 of 46 samples in Mud Lake Creek and in 1 of 42 samples in Trimble Creek (both exceedences occurred in 2013, but not on the same date). No samples of total aluminum in Unnamed Creek exceeded the 125 µg/L surface water standard. All samples of dissolved aluminum in Mud Lake Creek, Trimble Creek, and Unnamed Creek were below the applicable standard, with a maximum observed concentration of 66 µg/L. The average total aluminum concentrations in Mud Lake Creek, Trimble Creek, and Unnamed Creek are 42 µg/L, 30 µg/L, and 28 µg/L, respectively. Among Mud Lake Creek samples in which dissolved and total aluminum were detected (31 samples), the average ratio of dissolved to total aluminum was 0.74. Among Trimble Creek samples in which dissolved and total aluminum were detected (17 samples), the average ratio of dissolved to total aluminum was 0.72. Among Unnamed Creek samples in which dissolved and total aluminum were detected (16 samples), the average ratio of dissolved to total aluminum was 0.75.

4.4.4.2.2 Mercury

Total mercury exceeded the 1.3 ng/L mercury standard in 17 of 21 samples on Mud Lake Creek and 20 of 33 samples along Unnamed Creek. The average total mercury concentrations along these tributaries are 2.8 ng/L and 1.9 ng/L, respectively. Seven of eight dissolved mercury samples on Unnamed Creek exceeded 1.3 ng/L, with an average concentration of 1.5 ng/L. Total mercury exceeded 1.3 ng/L in 8 of 18 samples on Trimble Creek; the average total mercury concentration in Trimble Creek measured 1.7 ng/L. Seven of eight dissolved mercury samples on Trimble Creek exceeded 1.3 ng/L, with an average concentration of 1.6 ng/L (note that dissolved mercury and total mercury were not measured concurrently). Non-detections were included at half the detection limit to compute average concentrations.

4.4.4.3 Pit 5NW (SD033) and Spring Mine Creek

The Pit 5NW outflows via SD033 to Spring Mine Creek, which flows north past monitoring location PM-12.1 to meet the Embarrass River between monitoring locations PM-12 and PM-12.2 (Large Figure 2). These locations are not anticipated to be impacted by the Project. Their inclusion in the integrated water quality model (Section 5.0) is necessary to accurately estimate water quality impacts downstream of the Plant Site (e.g., PM-13). The list of constituents monitored at SD033 is less extensive than other locations. Location PM-12.1 was monitored only for limited constituents in 2010 and 2011 to assess the conservativeness of the dilution model in estimating concentrations of sulfate downstream of the Pit 5NW outflow. Total and dissolved aluminum and manganese were added to the monitoring in 2012 and 2013. The applicable surface water quality standards for monitored parameters were not exceeded at PM-12.1 with the exception of aluminum (note that this portion of the Embarrass River is not designated as a wild rice production water). Additional monitoring of Spring Mine Creek is continuing as part of the Cliffs Erie Consent Decree. Relevant water quality monitoring results are discussed below by constituent and reference data are presented in Large Table 5.

4.4.4.3.1 Aluminum

Total aluminum exceeded the standard of 125 µg/L at PM-12.1 in one of 23 samples. Dissolved aluminum did not exceed 125 µg/L in any samples. Aluminum was sampled and not detected in any of four samples taken at SD033 in 2011. The average total aluminum concentration at PM-12.1 was 57 µg/L. Among nine samples at PM-12.1 in which dissolved and total aluminum were detected, the average ratio of dissolved to total aluminum was 0.46.

4.4.4.3.2 Hardness

Thirteen of 13 samples taken from 2010 to 2013 (100%) exceeded the 500 mg/L (as $CaCO_3$) standard for hardness at SD033. The average hardness measured was 1,223 mg/L based on those samples. Hardness averaged 381 mg/L in two samples taken at PM-12.1 in 2011. For comparison, the average hardness measured at PM-13 was 122 mg/L in 2012 (hardness was not measured at PM-13 in 2011) and 129 mg/L from 2004 through 2013.

4.4.4.3.3 Sulfate

Spring Mine Creek is not designated as wild rice production water (Section 2.2). However, SD033 is a major source of sulfate loading to the Embarrass River. The sulfate concentration measured at SD033 based on 21 samples from 2010 to 2013 averaged 1,060 mg/L. Monitoring of location PM-12.1 (Spring Mine Creek upstream of the confluence with the Embarrass River) shows an average sulfate concentration of 388 mg/L based on 29 samples from 2010 through 2013. A comparison of sulfate loading at SD033 and PM-12.1 suggests that the decrease in concentration is the result of dilution of the SD033 discharge as well as reduction of sulfate along Spring Mine Creek (Section 4.4.4.5). The available data, however, is insufficient to quantify the amount of sulfate reduction with confidence.

4.4.4.4 Embarrass River Chain of Lakes

Water quality monitoring for sulfate and chloride was performed in Sabin Lake (PM-21 and PM-23), Wynne Lake (PM-22 and PM-24), and Embarrass Lake (EL-1 and EL-2) in 2010 and 2011 (Large Figure 2). Samples were taken at the inlet to each lake and near the center of each lake (at multiple depths: surface, middle, near-bottom). The data are summarized in Large Table 6. Additional monitoring was performed at location PM-21 for total and dissolved aluminum. The monitoring indicates that Embarrass Lake exceeds the 10 mg/L sulfate standard at monitoring location EL-2 where the 10 mg/L sulfate standard applies (Large Figure 1); these results are discussed below.

4.4.4.4.1 Sulfate

Embarrass Lake (monitoring location EL-2) is subject to the 10 mg/L sulfate standard for waters used for the production of wild rice (Section 2.2). The average concentration of sulfate entering the lake (monitoring location EL-1) was 21.5 mg/L in 2010 and 15.6 mg/L in 2011. Sulfate concentrations measured at the surface of Embarrass Lake averaged 23.6 mg/L in 2010; concentrations measured at greater depths were similar. The average surface sulfate concentrations in Sabin Lake in 2010 and 2011 were 14.2 mg/L and 10.6 mg/L, respectively. Concentrations in Wynne Lake were 21.4 mg/L in 2010 and 16.5 mg/L in 2011. In Wynne Lake observations, the concentrations at the bottom of the lake were generally higher than the surface and mid-depth concentrations (Large Table 6). The increasing sulfate concentrations through the chain of lakes suggest that there may be additional sulfate loading from external or internal sources (Section 4.4.4.5).

4.4.4.5 Quality Assurance and Quality Control Review

A QA/QC review was performed on the analytical results for the surface water sampling events for 2008, 2009, 2010, 2011, 2012, and 2013. This review was performed in accordance with the Barr Engineering Standard Operating Procedure for routine data evaluation, which is based on The National Functional Guidelines for Organic and Inorganic Data Review (Reference (30), Reference (31)). Most analyses were performed either by NTS (prior to March 2011) or by Pace Analytical (after March 2011) located in Virginia, Minnesota. There were additional laboratories utilized throughout these sampling events as appropriate.

In general, the areas covered by the validation process are: USEPA recommended holding times and preservation, blank sample analyses, accuracy data, precision data, and an overall assessment of data quality.

Technical holding times were evaluated for each sample and target parameter, based on the USEPA recommendations listed in 40 CFR SW-846 Test Methods for Evaluating Hazardous Waste. The technical holding times were met for the samples submitted to the laboratories during these sample events.

Field blank samples were collected and analyzed during the course of the sampling events. In these samples multiple target parameters were observed in the field blank samples. If the corresponding detections were small enough (less than five times the field blank value) to potentially be a “false positive” then that data was (b) qualified.

Method blank samples were analyzed and provided for the majority of the reports. In those reports, one or more method blank samples had minor detections of metals and general parameters, however, few data was qualified from these method blank sample detections because all corresponding samples were either five times this concentration amount or non-detect. No other qualifiers were applied based on blank data.

The accuracy and precision data review included evaluation of LCS, LCSD, MS, MSD, and duplicate sample data. Accuracy was evaluated by comparing laboratory percent recoveries from LCS, LCSD, MS, and MSD samples to laboratory acceptance criteria. Precision was evaluated by calculating the RPD of the LCS/LCSD sample pairs, MS/MSD sample pairs, and duplicate samples.

The LCS/LCSD pairs were evaluated and all met laboratory acceptance criteria and/or deviations were considered minor. A review of the MS/MSD sample pairs indicated there were percent recoveries and/or RPD for one or more MS/MSD samples that exceeded the laboratory limits for multiple target parameters. The associated project sample data whose MS/MSD percent recoveries and/or RPD exceeded the laboratory acceptance criteria for accuracy, generally, by 5% or more, were (*) qualified.

Laboratory duplicate samples were evaluated, when required, and instances where the calculated RPD value of a project sample exceeded laboratory acceptance criteria the corresponding sample data was qualified as estimated (*).

A field duplicate sample was collected for approximately one in five to ten samples. Field duplicate sample pairs with calculated RPDs greater than 30% are (*) qualified as estimated concentrations. This affected multiple field duplicate sample pairs for metals and general parameters. The RPD exceedances were not qualified if the parameter concentrations were at or near the reporting limit, which exaggerates the RPD value, and is not necessarily indicative of poor precision.

The field measurement of specific conductance at Embarrass River location PM-13 in March 2013 was noted as potentially suspect by the field technician and the data was qualified (BQS) to represent this.

The data met the Project requirements and is deemed acceptable for the purposes of this Project with the above mentioned qualifications.

4.5 Partridge River Watershed

The southern part of the Plant Site lies in the Partridge River watershed. Stormwater runoff from portions of the Process Plant Area and Tailings Basin seepage leaving the south end of the existing LTVMSC Tailings Basin enter Second Creek, a tributary to the lower Partridge River. Details on the hydrology and water quality of Second Creek and the Partridge River are not included in this report, with the exception that Large Table 5 lists observed water quality at monitoring location PM-7 and SD026 (which are the same location). Second Creek hydrology and water quality data are not included in this report because they are not used as inputs to the Plant Site water modeling. The Plant Site water model estimates the flow and load in the seepage from Cell 1E to Second Creek, but does not model the Plant Site's effect on Second Creek because the seepage is collected and returned to the FTB.

5.0 Modeling Approach

This section presents the conceptual model for the Plant Site and provides details on the modeling methodology and input values.

5.1 Conceptual Model

Conceptual models for the main components of the Plant Site, including components of the Continuation of Existing Conditions Scenario Model and the Project Model, are presented below. This includes the existing LTVSMC basin, the FTB, the FTB Containment System, the FTB South Seepage Management System, the Beneficiation Plant, the Hydrometallurgical Plant, the HRF and the WWTP. Additional notes are made where the conceptual model differs from the modeling in the DEIS (Reference (36)) or SDEIS (Reference (37)). The conceptual model for the Plant Site was presented in the approved Work Plan. The Work Plan presents the conceptual model for each mine feature in the probabilistic model and explains how the mine features are interrelated. The Work Plan text has been incorporated below and in Section 5.2 to provide a coherent description of the modeling approach.

5.1.1 Continuation of Existing Conditions Scenario Model

5.1.1.1 Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model

The Tailings Basin determines patterns of runoff and infiltration at the Plant Site and contributes constituent loading to surface water and groundwater. The Tailings Basin conceptual model is based on the baseline geologic and hydrogeologic conditions described in Section 4.3. The Tailings Basin receives direct precipitation and runoff from beaches and unaltered forested watershed areas. Water falling within the Tailings Basin watershed collects in the ponds in Cell 1E and Cell 2E or infiltrates through dams and beaches. The ponds lose water to evaporation from the water surface and to seepage through the pond bottom. As part of the short term mitigation measures at the Tailings Basin associated with the Consent Decree (between Cliffs Erie and the MPCA), seepage from around the basin is being collected and returned to Tailings Basin ponds. Prior to this activity, which began in 2011, the water levels in the Tailings Basin were relatively stable. The pump back system, which began in 2011, is expected to continue to operate, and therefore it is assumed that the system is at steady-state. The volume of water in the ponds in Cell 1E and in Cell 2E is assumed to be known and constant. The volumes come from the pond areas in the MODFLOW model of the existing Tailings Basin and an assumed pond depth of three meters. The surface area of the pond in Cell 1E (374 acres) and in Cell 2E (183 acres) are also assumed known and constant and come from the MODFLOW model of the existing Tailings Basin.

Runoff from the exterior faces of the Tailings Basin contributes to surface water flow in the tributaries near the Tailings Basin, as described in Section 5.1.1.3. Currently, seepage from the Tailings Basin flows to the north, northwest, and west via a combination of groundwater flow and seepage that upwells and becomes surface water flow. Seepage also flows to the south where it forms the headwaters of Second Creek.

The Tailings Basin is assumed to be an ongoing source of constituent load due to oxidation of sulfide minerals within the LTVSMC tailings. This load is transported to the toe of the Tailings Basin by the water that seeps through the LTVSMC tailings.

5.1.1.2 Groundwater Flow and Constituent Transport Conceptual Model

The Groundwater Flow conceptual model is based on the baseline hydrogeologic conditions described in Section 4.3. Groundwater quality is a function of baseline groundwater quality (Section 4.3.4) with additional constituent loading from pond seepage and infiltration through dams and beaches. There are two stages of constituent transport: seepage through the Tailings Basin to the toe of the Tailings Basin, and groundwater flow through the surficial aquifer to the receiving streams.

Seepage within the Tailings Basin generally flows to the north, west, or south. Water quantity and quality estimates are made for the toe of the Tailings Basin along five segments (north, northwest, west, east and south). As seepage reports to the toe of the Tailings Basin, a portion upwells and becomes surface water flow and a portion stays in the ground as groundwater flow. Three groundwater flow paths (north, northwest, and west) have been defined to model seepage from the Tailings Basin (Large Figure 6).

An eastern groundwater flow path is not modeled under existing conditions, because groundwater does not flow to the east from the Tailings Basin. Rather, along most of the eastern side of the Tailings Basin, groundwater flows toward the west, as shown on Large Figure 5. This will change with the construction of the FTB East Dam and the tailings deposition behind the dam, however the eastern portion of the FTB Containment System will collect groundwater flowing to the east. Modeling of the FTB Containment System is described in Section 5.1.2.3.

A southern groundwater flow path is not modeled. Seepage to the south from the Tailings Basin is limited to a confined area where the bedrock and surface topography create a narrow valley at the headwaters of Second Creek. Essentially all seepage from the LTVSMC Tailings Basin to the south emerges as surface seepage within a short distance of the dam toe rather than being transported via subsurface flow. An existing seepage management system captures the majority of the seepage leaving the Tailings Basin, and Cliffs Erie and PolyMet have recently implemented improvements to the existing system to increase its capture efficiency (i.e., ditching upstream of the existing system to drain a small pond contributing seepage). Flow within the Tailings Basin to the south is modeled in order to estimate the quantity and quality of the water captured by the FTB South Seepage Management System.

Transport of the constituent loads from each of the source components (pond seepage, dams, beaches) is modeled using specialized contaminant transport features in GoldSim (Section 3.3 of Reference (4)). These features account for travel times through the basin to the toe and from the toe to the evaluation locations, and the associated attenuation in concentrations due to mixing, dispersion, and sorption (in the case of groundwater flow).

5.1.1.3 Surface Water Conceptual Model

Flows from the Plant Site primarily affect tributaries of the Upper Embarrass River, with minor flows to the lower Partridge River via Second Creek. The surface water conceptual model includes flows and loads in the Upper Embarrass River and tributaries, based on the baseline surface water conditions described in Section 4.4. The Plant Site water model estimates the flow and load that leave the Tailings Basin to the south, but does not model Second Creek.

Constituent loading to the Upper Embarrass River and tributaries is modeled by combining constituent loads from the Tailings Basin transported via groundwater and surface water with other non-Project sources (e.g., watershed runoff, groundwater, point sources) to calculate resulting surface water quality at specific evaluation locations (Large Figure 7).

5.1.2 Project Model

Large Figure 8 shows the proposed layout of the Tailings Basin and many of the Plant Site features which are modeled in the Project Model. Large Figure 9 shows the final design of the Tailings Basin and the Plant Site features which are present in long-term closure. The Project Model includes the Beneficiation Plant, the FTB, the FTB Containment System, the Hydrometallurgical Plant, the HRF, the WWTP, the Sewage Treatment System (STS), and stream augmentation with WWTP effluent. It estimates the effects of Project features on flows and constituent loading during operations, reclamation, and long-term closure.

The Project that is modeled is described in Reference (8). Large Figure 10, Large Figure 11, and Large Figure 12 and show simple block diagrams of the conceptual model for the Plant Site in operations and long-term closure. A timeline showing the major components of the Project is shown on Large Figure 13.

5.1.2.1 Beneficiation Plant

Within the Beneficiation Plant water carries the ore and concentrate through the grinding and flotation processes and then transports the Flotation Tailings to the FTB. Water used to transport Flotation Tailings to the FTB is recycled to the Beneficiation Plant from the FTB Pond. The Mine Plan (Reference (38)) establishes the ore processing rate, which determines the Beneficiation Plant's water demand and the rate that Flotation Tailings will be deposited in the FTB. Ore characteristics and Beneficiation Plant processes influence constituent loading to the FTB Pond, and determine the physical and chemical characteristics of the Flotation Tailings.

The Process Plant Area includes a 10-million gallon capacity concrete Plant Reservoir to supply make-up water for the Beneficiation and Hydrometallurgical Plants. The Plant Reservoir is fed solely by water from Colby Lake. It should be noted that the Plant Reservoir is not included in the Water Quality Model. Colby Lake water is assumed to be routed directly to the Beneficiation Plant and Hydrometallurgical Plant in order to simplify the modeling. The necessary quantity of make-up water for the Beneficiation Plant is the difference between plant water demand and the amount of water available for re-use from the FTB Pond.

5.1.2.2 Flotation Tailings Basin (FTB)

The FTB is placed primarily atop Cell 1E and Cell 2E of the existing LTVSMC Tailings Basin, with a small extension beyond the existing Tailings Basin footprint to the east starting in Mine Year 7 (Attachment A of Reference (2)). The conceptual model of the FTB is comprised of six components, as illustrated in Figure 5-1.

- FTB dams
- FTB buttresses
- FTB beaches
- FTB Pond
- saturated Flotation Tailings
- existing LTVSMC Tailings

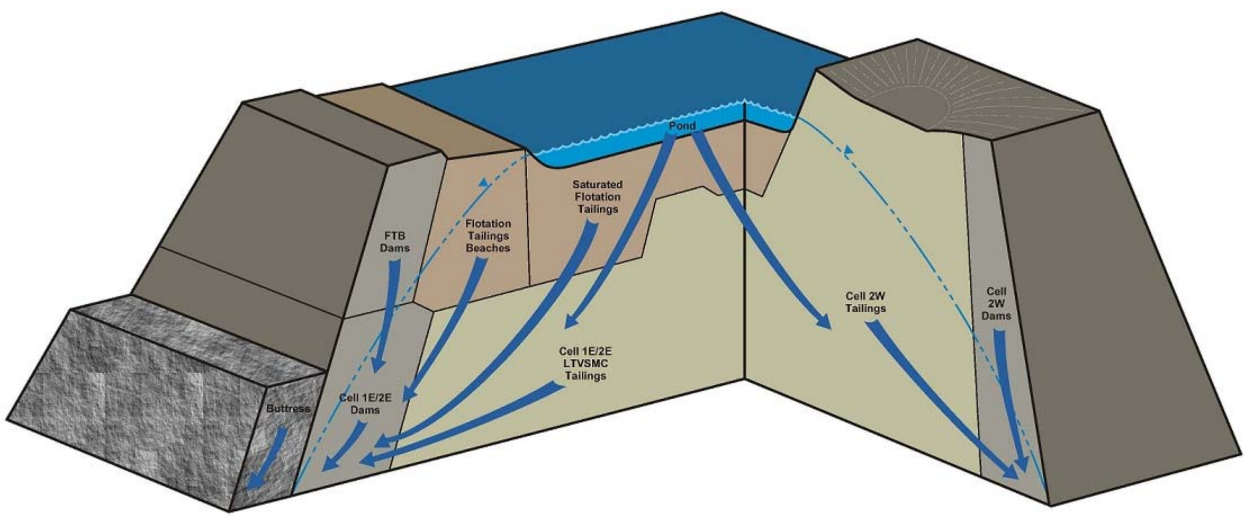


Figure 5-1 Cutout Sketch of the Flotation Tailings Basin

5.1.2.2.1 FTB Dam Conceptual Model

The FTB dams are constructed in stages using existing LTVSMC tailings and other borrow material as specified in Reference (2). Dam design and construction schedule are known and are used as inputs to the Water Quality Model (Reference (2)). The material properties of the FTB dams are used to help determine the amount of precipitation that 1) runs off exterior dam faces and 2) percolates through dam surfaces. Both the runoff water and the water that percolates are part of the flow that leaves the Tailings Basin footprint. A bentonite-amended layer of LTVSMC tailings will be added to the exterior slopes of the dams as they are constructed which will reduce their permeability and the diffusion rate of oxygen into the tailings.

A one-time loading of soluble constituents is released from the LTVSMC tailings used to construct the dams because it is assumed that construction will disturb the oxidized LTVSMC tailings (Section 10.1.2 of Reference (5)). Each time material is added to the dams for construction, this one time loading is applied on a per-unit mass basis. The model also incorporates ongoing constituent load generation due to oxidation within the dams.

In contrast to the DEIS modeling, constituent generation rates for the dams in SDEIS and FEIS modeling are based on a combination of humidity cell results, whole LTVSMC tailings metal to sulfur ratios, and concentration caps that are specific to the LTVSMC tailings. The DEIS modeling used humidity cell results for Flotation Tailings as a surrogate for LTVSMC tailings. This change was made because additional laboratory data for the LTVSMC tailings has become available subsequent to the DEIS.

5.1.2.2.2 FTB Buttress Conceptual Model

The volume of rock required for the buttresses (north and south) were computed prior to the SDEIS. The volumes were recalculated for the Flotation Tailings Management Plant, Version 4 published in November 2014. The most recently calculated rock volume for the north and south buttresses is about 7% less, and about 1% more, respectively, than the volume that was used for the SDEIS modeling. The recently calculated rock volume for the south buttress is greater than the volume that was used for the SDEIS modeling by about 1%. Therefore, the rock volumes of the buttresses were not updated for the FEIS modeling because the rock volumes are either modeled as conservatively higher (with respect to total mass loading) or are insignificantly different. It is anticipated that the volumes will be recalculated again before final design and the final volume will be less than what is currently assumed in the modeling for the FEIS. A bulk density of 140 lbs/ft^3 has been assumed for the buttress material, consistent with the geotechnical analysis presented in Reference (20). Bulk density is needed in order to convert the buttress volume to a mass in order to calculate loading rates from the buttresses.

The buttresses will contribute constituent load to infiltrating precipitation. Because they are constructed of coarse materials from Area 5S stockpiles, it is assumed that there is no runoff from the buttresses. The buttress water balance is modeled in the same way as that for the uncovered waste rock stockpiles at the Mine Site (Section 5 of Reference (4)). Modeling includes evaporative losses and infiltration through the buttresses. Infiltration is added to the flow leaving the FTB footprint which is captured by the FTB Containment System. Buttress material is conservatively treated as Category 1 Waste Rock with respect to its geochemical properties (Section 10.6.5 of Reference (5)).

Loads generated from the buttress were not modeled in the DEIS modeling approach.

5.1.2.2.3 Flotation Tailings Beaches Conceptual Model

The dimensions of the beaches are determined by the design of the FTB and the rate of ore processing in the Beneficiation Plant and the Flotation Tailings deposition plan (Section 4.2 of Reference (2)). During operations, the plant discharge pipe is moved around the perimeter dam spigotting approximately 30% of the Flotation Tailings slurry onto the beaches (the remaining 70% is discharged directly onto the bottom of the FTB Pond). The fraction of slurry used to form the beaches varies through time and is controlled so that the entire perimeter of the FTB is raised at the same rate.

The beaches receive direct precipitation and Flotation Tailings slurry to the active delta (a subsection of the beach where the Beneficiation Plant is actively discharging). Some water is lost to evaporation, some infiltrates through the beaches, and the rest flows to the FTB Pond. The material properties of the Flotation Tailings beaches determine the rate of infiltration. The conceptual model assumes that the portion of the beach in the immediate vicinity of the discharge point is fully saturated due to the slurry discharge rate exceeding the hydraulic capacity of the Flotation Tailings.

The generated sulfate load from unsaturated Flotation Tailings is dependent on the known oxygen content in air, diffusivity through the unsaturated Flotation Tailings (which is dependent on the Flotation Tailings saturation), the depth of unsaturated Flotation Tailings, and scaling factors for temperature and the effects of surface freezing (Section 10.2 and Section 10.3 of Reference (5)). The generated sulfate load is also used to determine the generated loads of other constituents based on laboratory release rate ratios (Section 10.1.1 of Reference (5)). The concentration of each constituent in the seepage water is capped by defined concentration caps (Section 10.4 of Reference (5)).

The conceptual model of the beaches changes during reclamation and long-term closure. At Mine Year 20, the beach will be covered by a bentonite-amended Flotation Tailings layer, designed to restrict the diffusion of oxygen into the Flotation Tailings and reduce constituent generation rates (Section 4.4.3 of Reference (8)). During reclamation and long-term closure, oxygen will diffuse more slowly through the highly saturated bentonite-amended Flotation Tailings layer. Due to an unchanged reaction (oxygen consumption) rate in the underlying Flotation Tailings and significantly reduced oxygen diffusion rate into the Flotation Tailings, the depth to which oxygen can penetrate, and the subsequent generated load, is reduced. The generated loads of sulfate and other constituents are calculated in the same manner as during operations.

A portion of the load generated by the beaches will be transported to the FTB Pond via the runoff from the FTB beaches. This surface weathering load is calculated based on the exposed beach area and laboratory release rates (Section 10.6.2 of Reference (5)). The beaches also contribute constituent load to the toes of the Tailings Basin via infiltration through the unsaturated Flotation Tailings.

In contrast to the DEIS modeling, constituent generation rates for the SDEIS and FEIS modeling are based on a combination of humidity cell results, whole Flotation Tailings metal to sulfur ratios, and concentration caps. The DEIS modeling used only humidity cell results. This change is because the laboratory data indicated that concentration caps in the test cells may be influencing the apparent laboratory release rate for some constituents (Section 5.1.3.2 of Reference (5)).

The degree of saturation in the unsaturated Flotation Tailings is now modeled using the results of physical testing and theoretical unsaturated flow equations. The Flotation Tailings beaches are treated as a single mass with an uncertain ratio of coarse to fine material. The DEIS modeling assumed bulk (i.e., plant discharge ratio of coarse to fine material) Flotation Tailings throughout the beaches. This change is because additional data on the deposition and potential for segregation on the Flotation Tailings beaches has become available subsequent to the DEIS (Attachment C of Reference (5)).

Oxygen transport through the unsaturated Flotation Tailings is based on Fick's Law with a zero-order reaction term rather than a first-order reaction term as it was in the DEIS modeling.

5.1.2.2.4 FTB Pond Conceptual Model

Sources of water and constituent load to the FTB Pond include Flotation Tailings slurry from the Beneficiation Plant, treated process water from the Mine Site Waste Water Treatment Facility (WWTF), effluent from the STS, direct precipitation, storm water run-on, and seepage water collected by the FTB Containment System and FTB South Seepage Management System (collectively referred to as the FTB seepage capture systems). Water is recycled from the FTB Pond to the Beneficiation Plant. Water also leaves the pond as evaporation and as seepage through the pond bottom. The plant discharge will include dissolved constituent loading from the copper sulfate used in processing and from the soluble constituents produced by, and retained on, the ore delivered to the plant from the mine. The quantity of process water from the Mine Site delivered to the FTB Pond is determined by Mine Site GoldSim model. The quality of this water is based on the design of the WWTF (Section 2.2 of Reference (3)). Flows and loading from precipitation and stormwater run-on are influenced by climate inputs, and by properties of FTB dams and beaches (Sections 5.1.2.2.1 and 5.1.2.2.3). Modeling calculates the quantity and quality of water input to the pond from the FTB Containment System (Section 5.1.2.3).

The areas and depths of the ponds in the existing LTVSMC Tailings Basin are used as initial conditions in the modeling of the FTB Pond (Section 5.1.1.1). The area and depth of the FTB Pond over time are determined by design and management practices that optimize the pond level to maintain dam safety and minimize fugitive dust from beaches (Sections 2 and 4 of Reference (2)). Therefore, given the design of the FTB Pond, the dimensional characteristics of the pond are considered known and either varying through time (the top and bottom areas of the pond) or constant through time (the design depth and the slope of the pond between the water surface and the pond bottom).

The conceptual model of the pond changes during reclamation and long-term closure. After mining ceases, the pond no longer receives Flotation Tailings nor treated process water from the Mine Site. All other water inputs to the pond continue. Ten years after the end of operations, at Mine Year 30, the bottom of the pond will be amended with bentonite. This will reduce the seepage of FTB pond water, maintaining a permanent, and potentially perched, pond and limiting oxidation of the underlying Flotation Tailings (Section 5.0 of Reference (3)). Excess pond water will be sent to the WWTP in order to avoid an overflow.

5.1.2.2.5 Saturated Flotation Tailings Conceptual Model

The saturated Flotation Tailings are a source of constituent load to seepage. During operations, saturated Flotation Tailings are found directly under the FTB Pond, and below the phreatic surface throughout the basin (Attachment A). The MODFLOW model of the FTB is used to define depths to the phreatic surface within the FTB. It is also used to define volumes of saturated and unsaturated Flotation Tailings within each area of the existing Tailings Basin (Attachment A). These are treated as known time-varying inputs to the model.

The saturated Flotation Tailings generate a sulfate load which is dependent on the mass flux rate of dissolved oxygen into the saturated Flotation Tailings by the water that seeps from the pond (Section 10.6.1 of Reference (5)). As the model simulates sulfate release, the loads of other constituents are simulated at rates based on release ratios determined from laboratory testing (Section 10.1.1 of Reference (5)). The concentration of each constituent in the seepage water is capped by defined concentration caps (Section 10.4 of Reference (5)).

In contrast to the DEIS modeling, constituent generation rates for the SDEIS and FEIS modeling are based on a combination of humidity cell results, whole Flotation Tailings metal to sulfur ratios, and concentration caps. The DEIS modeling used only humidity cell results. This change was made because the laboratory data indicated that concentration caps in the test cells may be influencing the apparent laboratory release rate for some constituents. The probabilistic water quality model now includes oxidation in the saturated Flotation Tailings within the main model; this effect was analyzed separately in the DEIS modeling.

5.1.2.2.6 Existing LTVSMC Tailings Basin Conceptual Model

Constituent loading from the existing Tailings Basin changes in the Project conceptual model compared to the Continuation of Existing Conditions Scenario Model. As the FTB is developed and the phreatic surface rises, existing LTVSMC tailings that are covered by Flotation Tailings will cease generating load. This is due to saturated conditions and the expected lack of oxygen at depth. In early years of the Project much of the existing LTVSMC tailings in Cell 2E will no longer generate constituent loads. After about Mine Year 7, LTVSMC tailings in Cell 1E will no longer generate constituent loads. Unsaturated LTVSMC tailings in Cell 2W and the existing outer dams will continue to generate loads because they are never covered by Flotation Tailings, although the loads generated will vary as the depth to the phreatic surface changes. The MODFLOW model is used to define areas of the existing LTVSMC tailings (both as constant values in the Continuation of Existing Conditions Scenario model and as time-varying values in the Project Model), depths to saturated LTVSMC tailings throughout the Tailings Basin and the volumes of saturated and unsaturated LTVSMC tailings within each area of the Tailings Basin (Attachment A). These are treated as known time-varying inputs to the model.

It is assumed that there is no chemical interaction between the Flotation Tailings and the existing LTVSMC tailings (Section 10.5 of Reference (5)); the constituent loading produced by LTVSMC tailings and Flotation Tailings is assumed to be additive.

Loads generated from the existing LTVSMC tailings at the Plant Site were not modeled in the DEIS modeling approach. In the current approach, they are modeled using the same method as for the Flotation Tailings, but with material specific properties and calibration factors.

5.1.2.3 FTB Seepage Capture Systems

In the Project Model, the FTB seepage capture systems collect seepage from the Tailings Basin, which results in less seepage discharges to downstream tributaries than in the Continuation of Existing Conditions Scenario Model. To offset this decrease in flow, and reduce hydrological impacts to downstream tributaries, the Project will augment stream flows, as described in Section 5.1.2.8.

The FTB Containment System collects groundwater flow, surface seepage, and stormwater runoff along the northern side of Cell 2E, the northern and western sides of Cell 2W, and a portion of the eastern side of Cell 1E as described in Section 2.1.4 of Reference (1). The portion of the FTB Containment System surrounding the northern and western sides of the Tailings Basin is assumed to capture all of the surface seepage and stormwater runoff, and 90% of the groundwater flow (Attachment C of Reference (1)). The collected water from along the northern and western sides of the Tailings Basin is returned to the FTB Pond for reuse or sent to the WWTP for treatment and discharge as stream augmentation in the Embarrass River tributaries.

The Project Model differs from the Continuation of Existing Conditions Scenario Model in that after construction of the FTB East Dam and tailings deposition behind the dam, groundwater flows to the east from a limited area in the eastern portion of the Tailings Basin. This easterly flow is intercepted by the eastern portion of the FTB Containment System, which is assumed to be 100% effective; no seepage to the east of the Tailings Basin will bypass the FTB Containment System and contribute to Mud Lake Creek (Section 2.1.4 of Reference (1)). The collected water from along the eastern side of the Tailings Basin is returned to the FTB Pond. Flow from within the Tailings Basin to the east is modeled in order to estimate the quantity and quality of the water captured by the FTB Containment System.

The effect of the FTB Containment System in the conceptual model is to reduce the quantity of untreated surface and groundwater leaving the Plant Site, thus reducing constituent loading to downstream surface water and downgradient groundwater. The quantity and quality of water reporting to the FTB Containment System are estimated by accumulating both flows and loads contributing to the FTB Containment System.

The FTB South Seepage Management System collects seepage from the southern side of Cell 1E, as described in Section 2.1.3 of Reference (1). It is assumed that this system captures all of the seepage (100%) in this direction. As with the water collected by the FTB Containment System, water collected by the FTB South Seepage Management System is returned to the FTB Pond for reuse or sent to the WWTP for treatment. The FTB South Seepage Management System reduces the quantity of untreated surface water leaving the Plant Site.

5.1.2.4 Drainage Swale

Local waters immediately to the east of Cell 1E currently drain into the Tailings Basin. This surface flow will be rerouted to the north to the watershed of Mud Lake Creek via a drainage swale constructed in Mine Year 0 (Section 2.5 of Reference (1)), and will serve as the source of stream augmentation for Mud Lake Creek. The elevation of the drainage swale will be higher than the elevation of the eastern portion of the FTB Containment System, to maintain an inward gradient across the containment system. The drainage swale feature is not explicitly modeled in the Project Model. Instead, it is represented by additional watershed area contributing to Mud Lake Creek at MLC-3 (compare Table 1-49a and Table 1-49b of Attachment B).

5.1.2.5 Hydrometallurgical Plant

The water demand of the Hydrometallurgical Plant is a component of the Plant Site water balance. The Hydrometallurgical Plant consumes water in the process of extracting and isolating metals from concentrate produced at the Beneficiation Plant. Water used to transport combined Hydrometallurgical residues (Residue) to the HRF is recycled to the Hydrometallurgical Plant from the HRF pond, minus losses through evaporation and entrainment with the deposited Residue. Make-up water is supplied from Colby Lake via the Plant Reservoir. The plant is scheduled to begin operation in Mine Year 3, with processing rates as specified in Section 5.2.2.4.

5.1.2.6 Hydrometallurgical Residue Facility (HRF)

The HRF is a lined facility with a leakage collection system that returns any leakage to the HRF pond (Reference (39)), so the conceptual model includes no constituent loading from the HRF during operations (Reference (40)). The water balance of the HRF is modeled, however, to aid in the quantification of make-up water demand from Colby Lake and for sizing of the WWTP.

During reclamation, the Residue will be dewatered and HRF pond water will be decanted to the WWTP for treatment, then a cover system will be applied (Section 2.4 of Reference (39)). During reclamation and long-term closure, water collected by the leakage collection system will be sent to the WWTP for treatment. HRF water balance modeling estimates the volume of HRF pond water and leakage collection system water that will need treatment at the WWTP. Precipitation falling on the HRF during long-term closure is not explicitly modeled, but the area is assumed to be part of the contributing watershed. In other words, the runoff from the covered HRF is assumed to be the same as watershed runoff.

In the modeling for the DEIS, seepage from the HRF was considered in the estimation of water quality in the Embarrass River. However, the design of the facility has changed substantially since that time and seepage from the HRF is no longer being modeled.

5.1.2.7 Waste Water Treatment Plant (WWTP)

The WWTP will remove constituent load from water at the Plant Site to levels designed to meet requirements for discharge to the environment. Influent to the WWTP comes from the FTB seepage capture systems during operations, reclamation, and long-term closure, from the FTB Pond during reclamation and long-term closure, and from the HRF during reclamation. Modeling estimates the quantity, quality, and timing of influent to the WWTP from these project features.

Effluent from the WWTP will need to meet applicable surface water quality discharge limits, so effluent concentrations are modeled as constants, based on the WWTP design. Effluent from the WWTP will be discharged to three tributaries around the Tailings Basin: Trimble Creek, Unnamed Creek and Second Creek. Effluent will not be discharged to Mud Lake Creek because the proposed drainage swale will be installed. Modeling estimates the quantity of effluent to be discharged. Distribution of effluent to each tributary is discussed in Section 5.2.2.9.1.

5.1.2.8 Stream Augmentation

The FTB Containment System will decrease flows to tributaries of the Upper Embarrass River and to Second Creek. Based on discussions with the MDNR, Ecological and Water Resources Division, the Project will implement stream augmentation measures to prevent potential hydrologic impacts to the following streams: Unnamed Creek, Mud Lake Creek, Trimble Creek, and Second Creek. The goal of the flow augmentation is to limit the change in average annual flow with the Project to +/- 20% of existing conditions (conditions prior to the implementation of short term mitigation measures as part of the Cliffs Erie Consent Decree).

Stream flow in Trimble Creek, Unnamed Creek, and Second Creek will be augmented with treated effluent from the WWTP. Stream flow in Mud Lake Creek will be augmented with non-contact stormwater runoff diverted via the drainage swale constructed east of the FTB East Dam. The Project Model estimates the quantity of water needed for Stream Augmentation. The quality of water discharged is based on the assumptions for the WWTP effluent quality. The quality of water from the additional watershed diverted to Mud Lake Creek via the drainage swale is assumed to be represented by natural background water quality. Stream Augmentation is included in the modeling of water quality and quantity in the receiving streams.

WWTP effluent discharge for stream augmentation of Unnamed Creek and Second Creek watersheds will be directed to locations near SD006 and SD026 downstream of the FTB seepage capture systems. The exact location to which the WWTP will discharge within the Trimble Creek watershed and the number of these locations will be determined in permitting. The discharge will likely be multiple spigot points along the downstream side of the FTB Containment System so that the WWTP effluent not only provides flow to the tributaries, but also to the wetlands upstream of the headwaters of each tributary. Discharge to the downstream side of the FTB Containment System will most closely mimic existing conditions, where seepage from the Tailings Basin emerges in the wetland areas north of the Tailings Basin.

5.1.2.9 Plant Site Sewage Treatment System

PolyMet will update the existing sanitary sewage treatment system. The existing mechanical sewage treatment plant will be removed, the existing collection system will be refurbished, and a new stabilization pond facility will be constructed. The anticipated stabilization pond facility will consist of two primary ponds and one secondary pond. The secondary pond will discharge to the FTB Pond. The controlled discharge will occur in the spring and fall of each year, with each discharge lasting anywhere between 10 days and 4 months. The system will be designed to treat an initial average daily flow of approximately 26,750 gallons per day. Water quantity and quality from the STS to the FTB Pond is accounted for in the Project Model.

5.1.2.10 Groundwater and Surface Water

The conceptual models for groundwater and surface water presented for the Continuation of Existing Conditions Scenario Model (Sections 5.1.1.2 and 5.1.1.3 respectively) are unchanged for the Project Model, although sources of water and load delivered to the groundwater and surface water systems change. Changes to source terms for the groundwater and surface water systems are described in Sections 5.1.2.2, 5.1.2.3, 5.1.2.7, and 5.1.2.8.

In addition to those changes, the construction of the FTB Containment System cuts off existing model evaluation location UC-1 from Unnamed Creek. Model results are not presented for this location for the Project Model.

5.2 Plant Site Model Construct

Modeling of the estimated impacts to surface and groundwater quality at the selected evaluation locations is performed as a probabilistic Monte Carlo simulation using the GoldSim simulation software (Section 3.1 and Section 3.3 of Reference (4)).

The model time period, time step calculations and output parameters are the same for the Continuation of Existing Conditions Scenario Model and the Project Model. The Project Model adds Project features to the Continuation of Existing Conditions Scenario Model. The difference between Continuation of Existing Conditions Scenario Model results and Project Model results represents the estimated effect of the Project.

The model inputs that are known or have very small uncertainty (as either time-series or constant through time) are termed *deterministic inputs*. Typical deterministic inputs are engineering design parameters (basin dimensions, return water pumping rate, etc.), operational parameters (Beneficiation Plant discharge and water demand, etc.) and physical characteristics (flow path dimensions, stream segment length, topographical elevations, etc.).

The model inputs that have uncertainty in their true values or temporal or spatial variability at any point in the life of the project are termed *uncertain inputs*. These uncertain inputs may be constant through time or vary through mine operation, reclamation and long-term closure. Typical uncertain inputs represent natural variability (annual precipitation and evaporation, stream flow, etc.), environmental parameters (average aquifer hydraulic conductivity, average recharge water quality, etc.), geochemical parameters (constituent generation rates, scale factors, concentration caps, etc.) and performance of engineered systems (cover effectiveness, etc.) Each uncertain input has a defined probability distribution, frequency of sampling and correlation coefficients (if appropriate).

Table 1-1 of Attachment B contains a complete list of all deterministic and uncertain inputs to the Plant Site water quality models (Project Model and Continuation of Existing Conditions Scenario Model), including parameters to define all probability distributions. Table 1-2 through Table 1-54 of Attachment B provide additional detailed input information for selected model inputs.

For both models, the model outputs are continuous from Mine Year 0 (the start of mining) to Mine Year 200, with calculations performed on a monthly time step and results summarized as monthly or annual values as appropriate. Mine Year 200 is a point in time after which the Project Model has reached steady state long-term closure conditions. Steady state long-term closure conditions are defined as:

- the Hydrometallurgical Residue Facility is drained and the final cover is installed
- the Flotation Tailings on the beaches and beneath the pond within the FTB have been amended with bentonite to reduce oxygen availability and maintain a permanent pond
- the groundwater concentrations at the source areas (i.e., the FTB) have peaked and are declining towards an approximate steady state
- seepage from the FTB is collected and discharged via the WWTP with constant or decreasing concentrations

The probabilistic water quality model was executed for 500 realizations (runs). For each realization, the uncertain inputs are randomly sampled based on the defined probability distributions. During each realization the deterministic inputs may vary as a function of time and the uncertain inputs may be sampled according to a defined frequency (e.g., precipitation sampled every year).

5.2.1 Continuation of Existing Conditions Scenario Model

The construct of the Continuation of Existing Conditions Scenario Model is shown in Large Figure 14 and Large Figure 15. This section documents methods, assumptions, and the development of model inputs for the Continuation of Existing Conditions Scenario Model that are not discussed in other documents.

5.2.1.1 Climate

5.2.1.1.1 Precipitation

The probabilistic modeling approach samples a distribution of annual rainfall each year at the beginning of the year (i.e., it is a probabilistic, time-variable parameter). From this value, monthly precipitation values are calculated based on a deterministic ratio of monthly precipitation to annual precipitation (Table 5-1). The sum of the ratios for all twelve months is 1. The average annual precipitation for the Plant Site calculated over the most recent climate normal periods (1981-2010) is approximately 28.1 inches; this value was calculated from NWS sites closest to the Plant Site using the Minnesota Climatology Working Group's High Density Network (HiDen) (Section 4.1 and Reference (41)).

Normal distributions have been shown to provide a good fit to the transformed (cubed root) series of annual precipitation values (Reference (42)). This approach was followed to develop distributions for precipitation at the Plant Site. Figure 5-2 shows the cubed root of annual precipitation for the 30 years of the climate normal period on a normal distribution transformed axis. The linear fit shows the "goodness-of-fit" of a normal distribution to the data used. The slope and intercept of the linear fit are the standard deviation and the mean of the normal distribution respectively. Figure 5-4 shows the cumulative density function of the annual precipitation distribution used in the probabilistic water quality model (normal distribution cubed, $\mu = 3.03\ (in/yr)^{1/3}$, $\sigma = 0.15\ (in/yr)^{1/3}$).

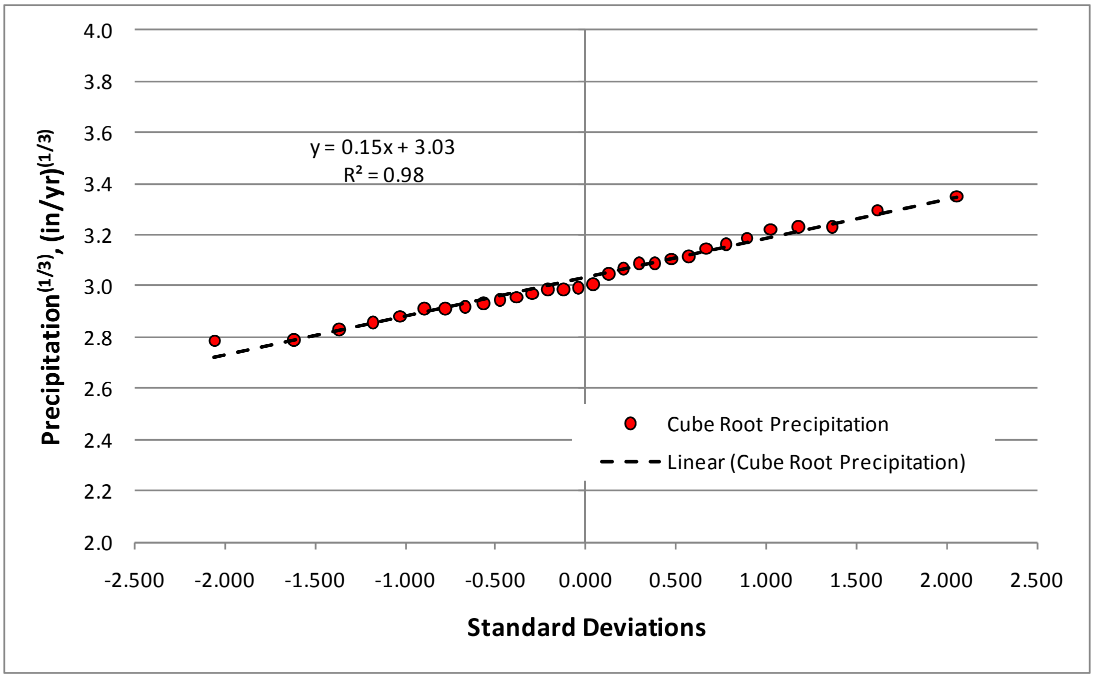


Figure 5-2 Fit of a Normal Distribution to the Cube Root of Climate Normal Precipitation Data

Table 5-1 Monthly Distribution of Plant Site Annual Precipitation (1981-2010)

Period	Average NWS Precipitation (inches)	Percent of Annual
January	0.78	2.8%
February	0.64	2.3%
March	0.95	3.4%
April	1.74	6.2%
May	3.15	11.2%
June	4.11	14.6%
July	3.91	13.9%
August	3.77	13.4%
September	3.91	13.9%
October	2.73	9.7%

Period	Average NWS Precipitation (inches)	Percent of Annual
November	1.45	5.2%
December	0.96	3.4%
Annual	28.1	100%

5.2.1.1.2 Evaporation (Open Water)

Open water evaporation rate estimates for the Plant Site model were determined using the Meyer Model (Reference (43)) for the climate normal period (1981-2010). This is an update from the DEIS modeling which used the previous climate normal period (1971-2000). The monthly values of calculated evaporation were aggregated to generate annual evaporation values (in/yr). Using this generated sample set of 30 years, the average annual open water evaporation for the Plant Site is estimated to be 17.1 in/yr. The Meyer Model results were also used to determine what fraction of evaporation occurs in each month (Table 5-2). Figure 5-3 shows the open-water evaporation results from the modeled climate normal period using the Meyer Model and how well the data fits a normal distribution. Figure 5-4 shows the baseline evaporation rate distribution (normal distribution, μ = 17.1 in/yr, σ = 2.16 in/yr) alongside the baseline precipitation rate distribution for the Plant Site.

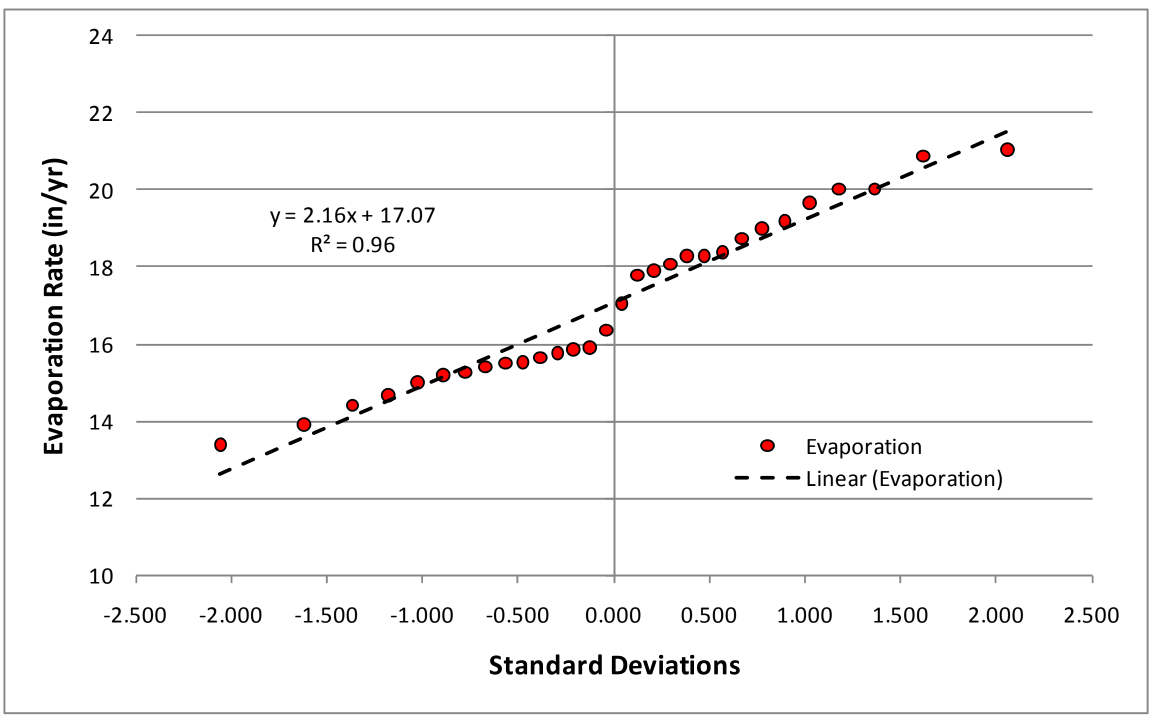


Figure 5-3 Fit of a Normal Distribution to Estimated Open Water Evaporation Rates

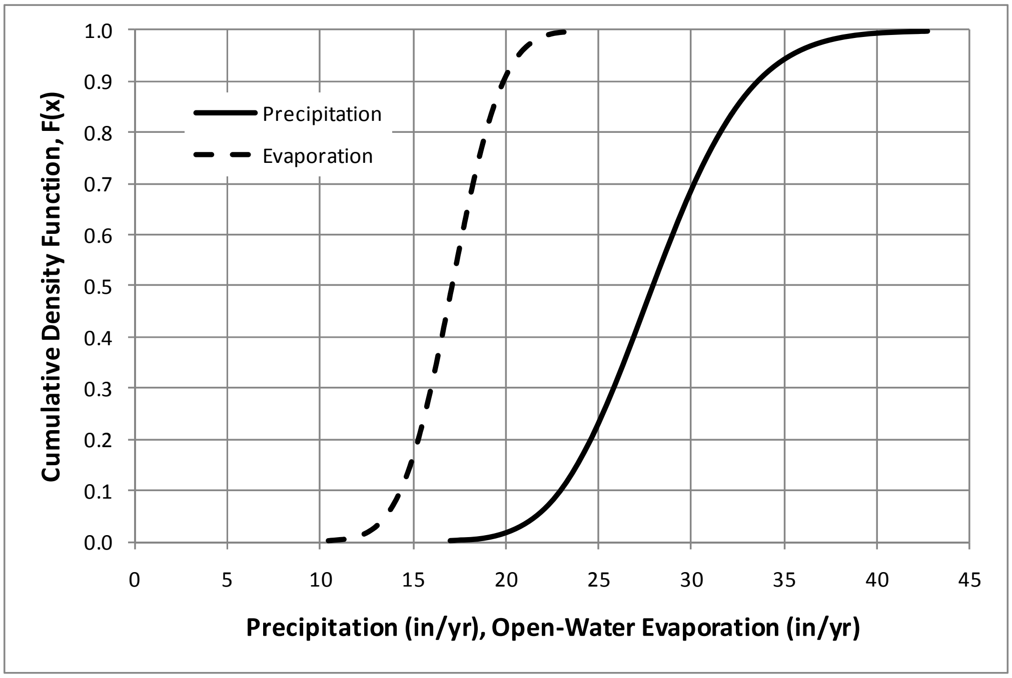


Figure 5-4 Baseline Climate Input Distributions at the Plant Site

Table 5-2 Monthly Distribution of Plant Site Annual Evaporation (1981-2010)

Period	Average Meyer Evaporation (inches)	Percent of Annual
January	0.00	0.0%
February	0.00	0.0%
March	0.57	3.3%
April	1.59	9.3%
May	2.33	13.6%
June	2.48	14.5%
July	2.82	16.5%
August	2.80	16.4%
September	2.29	13.4%
October	1.59	9.3%

November	0.63	3.7%
December	0.00	0.0%
Annual	17.1	100%

5.2.1.2 Existing LTVSMC Tailings Basin (Tailings Basin)

The model estimates how precipitation falling on the Tailings Basin is allocated between evaporation, runoff and infiltration, the amount of load that the LTVSMC tailings generate, and the distribution of the load and water to the various toes of the Tailings Basin.

5.2.1.2.1 Evapotranspiration, Runoff and Infiltration – Cell 2W

When the MODFLOW model of the Tailings Basin was calibrated, optimum infiltration rates were determined for the different areas of the Tailings Basin including Cell 2W. These infiltration rates are not used as a direct input to the GoldSim model, but are used to help define evapotranspiration (*ET*) and runoff (*RO*) rates. To develop distributions for *ET* and *RO* rates from the LTVSMC tailings within Cell 2W, the mean values of *ET* and *RO* were calculated based on precipitation and optimum infiltration rates from the MODFLOW model. The variability was then determined by matching the coefficients of variation from the Meyer Model results (Section 5.2.1.2.2). Therefore, relative variability was maintained and the expected outcomes of infiltration match the calibrated infiltration rates from the MODFLOW model.

Figure 5-5 helps explain this calibration procedure. First, the assumptions are outlined in the following list:

- The interior of Cell 2W (within the dam) is assumed to be bowl shaped so that precipitation that falls within this boundary stays within the boundary. Surface contours support this assumption.
- During deposition of the LTVSMC tailings, the coarse tailings deposited quicker than the fine tailings so that the basin consists of fine LTVSMC tailings in the middle with a ring of coarse LTVSMC tailings around the fine LTVSMC tailings.
- When precipitation falls on the coarse LTVSMC tailings, some evapotranspirates and some runs off into the middle area of fine LTVSMC tailings.
- When precipitation falls on the fine LTVSMC tailings, some evapotranspirates and none of the precipitation runs off of the fine LTVSMC tailings because they are the lowest point of the “bowl shaped” basin.

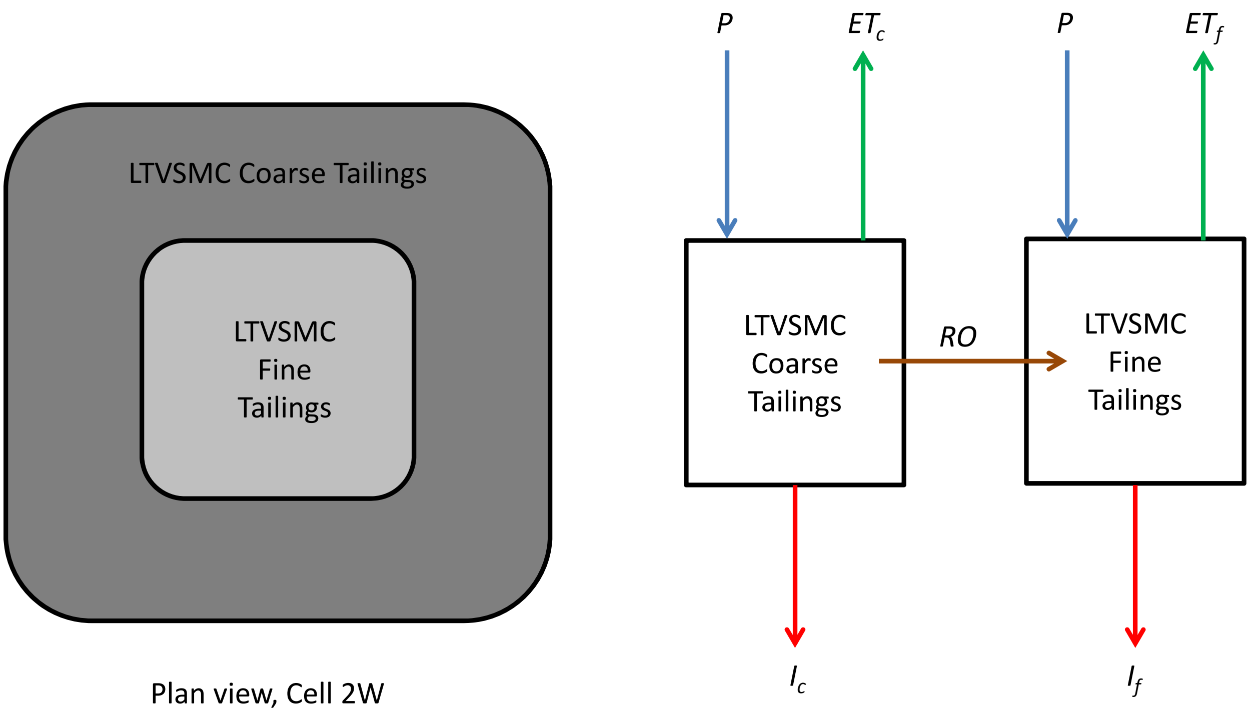


Figure 5-5 Schematic of Assumptions Used in Determining Runoff and Evapotranspiration for Cell 2W

The calibrated MODFLOW model infiltration rates in the coarse and fine LTVSMC tailings are 17.7 and 17.8 in/yr respectively. Therefore, to calculate the most likely fractions of precipitation that will evapotranspirate and/or runoff, Equation 5-1 and Equation 5-2 were formulated:

Coarse LTVSMC Tailings

$$P(1 - ET_c - RO) = I_c = 17.7\ in/yr$$ **Equation 5-1**

Fine LTVSMC Tailings

$$P(1 - ET_f + RO\left(\frac{A_c}{A_f}\right)) = I_f = 17.8\ in/yr$$ **Equation 5-2**

Where *ET* and *RO* are expressed as fractions of *P*, A_c/A_f is the constant ratio of coarse area to fines area, runoff is distributed from the coarse area uniformly across the fine area, and ET_c is equal to ET_f because of the similar cover crop.

If the most likely value of *P* is known and is estimated at 28.1 in/yr (Section 5.2.1.1.1) and the ratio of coarse to fine areas is 0.2942 (890625 m^2 / 3027344 m^2), then the two unknowns (*ET* and *RO*) can be solved for. The solution to the set of equations is that the likely value for *ET* is 0.367 and for *RO* is 0.003.

From the Meyer Model results discussed in Section 5.2.1.2.1, the coefficients of variation for *ET* and *RO* from the reclaimed Tailings Basin were 0.101 and 0.153 respectively (Section 5.2.1.2.2). Therefore, applying the same coefficients of variation, *ET* as a fraction of precipitation from the LTVSMC tailings within Cell 2W is described by a normal distribution with $\mu = 0.367$ and $\sigma = 0.037$. *RO* as a fraction of precipitation from the LTVSMC tailings within Cell 2W is described by a normal distribution with $\mu = 0.003$ and $\sigma = 0.00005$.

Infiltration rates though the coarse LTVSMC tailings and fine LTVSMC tailings are calculated within the GoldSim model using the same methodology discussed below for Cells 1E and 2E.

5.2.1.2.2 Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E

The estimates of evaporation and runoff within Cells 1E and 2E were calculated differently than within Cell 2W because of the existence or non-existence of the ponds. The bowl shape of Cell 2W with fine LTVSMC tailings in the center and the absence of a pond means that any runoff from the coarse LTVSMC tailings within Cell 2W is directed to the fine LTVSMC tailings; and runoff on the fine LTVSMC tailings within Cell 2W has nowhere to go, therefore it is assumed to be zero. In Cells 1E and 2E, runoff from the fine LTVSMC tailings is directed to the existing ponds. Therefore, a runoff term does exist for the fine LTVSMC tailings within Cells 1E and 2E.

Evapotranspiration and runoff for Cells 1E and 2E are estimated using the results from the Meyer Model (Section 5.2.1.1.2) and the calibrated MODFLOW model of the Tailings Basin. The monthly *ET* and *RO* rates from the “reclaimed” land category in the Meyer Model (representing the vegetated LTVSMC tailings) were aggregated to generate annual rates. Precipitation rates used in the Meyer Model were also aggregated to generate annual rainfall rates. Then the annual *ET* and *RO* rates were divided by the annual precipitation to generate annual fractional values. The resulting annual fractional data for *ET* and *RO* were then fit to normal distributions (Figure 5-6). The resulting parameters fit to the *RO* results (mean of 0.248 and standard deviation of 0.038) are used to represent the runoff from the LTVSMC reclaimed dams of Cell 2W. Also, the coefficient of variation from these parameters (0.153) was used to define the variability of runoff from the other portions of the LTVSMC Tailings Basin.

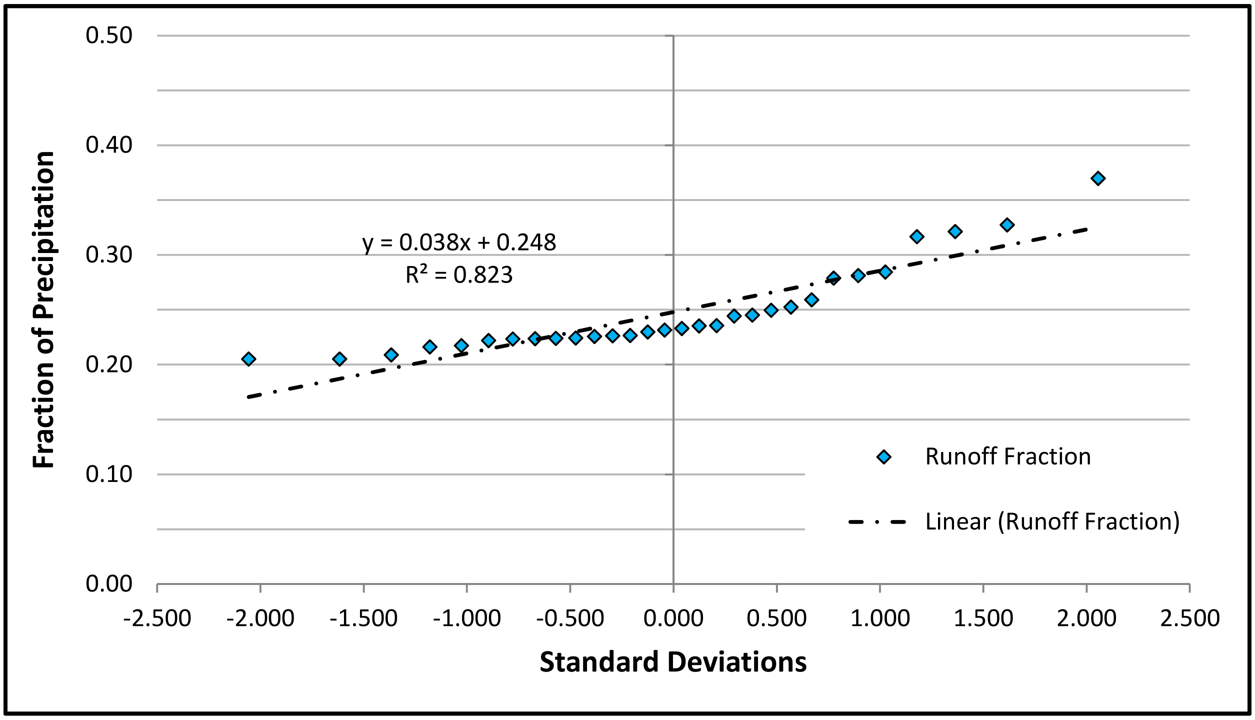


Figure 5-6 Runoff Distribution from the Reclaimed Cell 2W LTVSMC Dams

The other information used from the reclaimed land category in the Meyer Model is the coefficient of variation of the resulting *ET* fractions of precipitation (0.101). Figure 5-7 shows the Meyer Model results of *ET* as a fraction of precipitation. The results are not used outright, but only the coefficient of variation is used to help determine variability in evaporation rates throughout the rest of the Tailings Basin. As explained in Section 5.2.1.2.1, the coefficients of variation of *ET* and *RO* from the LTVSMC tailings ("reclaimed") were used to define the variation of the mean estimates of *RO* and *ET* within Cell 2W.

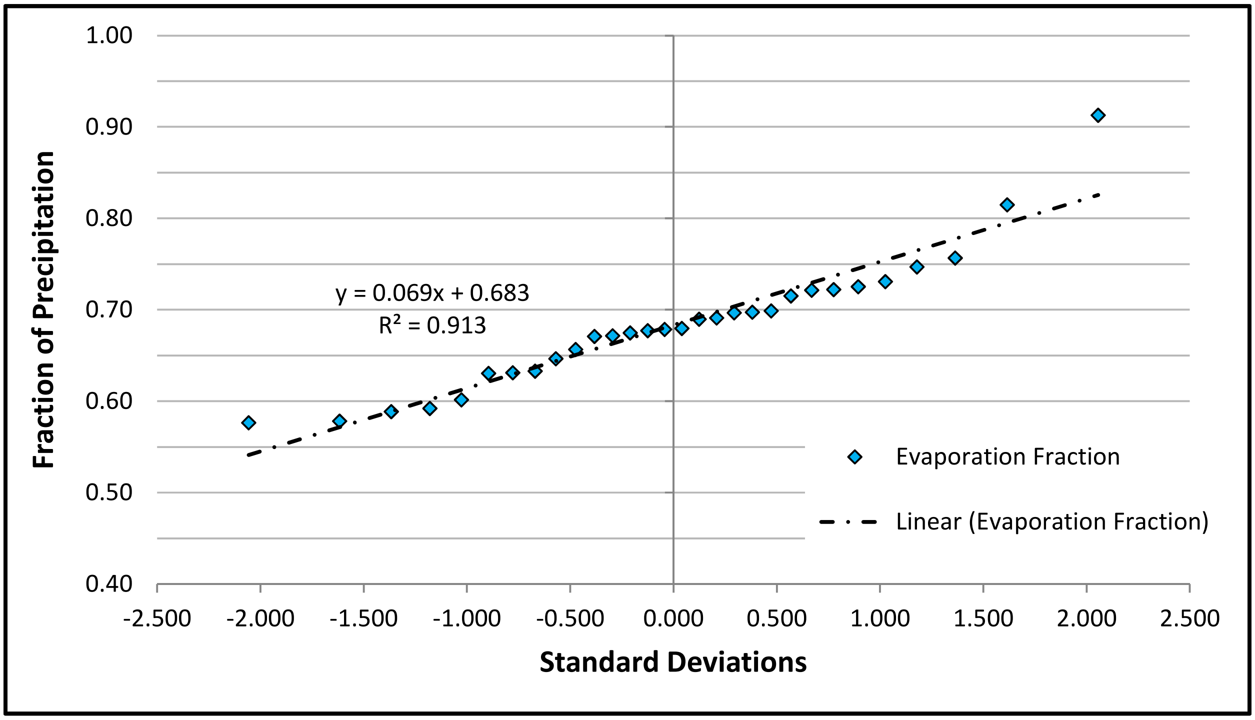


Figure 5-7 Evaporation Distribution from the Meyer Model Reclaimed Land Use

The estimated ET fraction of precipitation that is used for the LTVSMC tailings within Cell 2W (Section 5.2.1.2.1) is assumed to apply to the coarse and fine LTVSMC tailings within both Cell 2E and Cell 1E because it is assumed that the same cover crop is controlling the evaporation and the slopes are relatively the same. The MODFLOW model estimated infiltration rates through those areas as 4.3 in/yr, 4.6 in/yr, 5.9 in/yr, and 3.8 in/yr in the Cell 1E coarse, Cell 1E fine, Cell 2E coarse, and Cell 2E fine respectively (Table 5-3). Table 5-3 shows the resulting distribution parameters estimated to describe runoff from the LTVSMC tailings within Cell 2E and Cell 1E.

Finally, the assumed runoff distribution from the reclaimed LTVSMC tailings (LTVSMC Tailings Basin dams) was used with the MODFLOW estimates within the dams of Cell 2W and Cell 2E to estimate the *ET* rates from the dams of the existing Tailings Basin. The MODFLOW model estimated infiltration rates through those areas as 9.2 in/yr and 6.0 in/yr in the Cell 2W dams and the Cell 2E dams respectively (Table 5-4). Table 5-4 shows the resulting distribution parameters used to estimate evaporation from the dams of the existing LTVSMC Tailings Basin.

Table 5-3 Climate Input Estimates Using Meyer Model and MODFLOW Results

Variable	Units	Cell 1E Coarse	Cell 1E Fine	Cell 2E Coarse	Cell 2E Fine
Mean Precipitation	[in/yr]	28.1	28.1	28.1	28.1
Assumed Mean Evaporation	[fraction]	0.367	0.367	0.367	0.367
MODFLOW Target Infiltration	[in/yr]	4.3	4.6	5.9	3.8
Resulting Mean RO	[fraction]	0.480	0.469	0.423	0.498
RO Coefficient of Variation	[--]	0.153	0.153	0.153	0.153
RO Standard Deviation	[--]	0.073	0.072	0.065	0.076

Table 5-4 Climate Input Estimates (Dams) Using Meyer Model and MODFLOW Results

Variable	Units	Cell 2W Dams	Cell 2E Dams
Mean Precipitation	[in/yr]	28.1	28.1
Assumed Mean Runoff	[fraction]	0.248	0.248
MODFLOW Target Infiltration	[in/yr]	9.2	6.0
Resulting Mean ET	[fraction]	0.425	0.538
ET Coefficient of Variation	[--]	0.101	0.101
ET Standard Deviation	[--]	0.043	0.054

Any available water in each area of the Tailings Basin that is not lost to *ET* or does not become *RO* is considered available for infiltration (*I*). In other words, *I* equals precipitation minus *RO* and *ET* (storage is not allowed on the surface of the Tailings Basin areas). In some cases the randomly generated fractions of available water that become *RO* and *ET* could sum to more than one, which is not physically possible. Therefore, the allocation of precipitation is prioritized and limited to eliminate instances of negative or zero infiltration for model stability and functionality.

In most areas of the basin, the available water is separated into *RO*, *ET*, and *I* in that order because *I* is the unknown, which is solved for and *ET* is assumed to be *potential ET*. Therefore, *RO* is calculated first and subtracted from the available water. Then, *ET* is calculated as the minimum of the potential *ET* and the difference between available water, *RO*, and a nominally small minimum infiltration rate. Then *I* is calculated as precipitation less *RO* and *ET*.

The *I* value calculated however cannot exceed the saturated hydraulic conductivity (K_{sat}) for the given area because ponding is not allowed. In cases where this occurs (primarily the active delta in the Project Model), the *I* is set at the K_{sat} and the excess is added to the *RO* value altering the water balance. Table 5-5 is a simple example of how the climate data affects the water balance.

Table 5-5 Climate Data Calculation Example

Climate Component	Scenario 1	Scenario 2	Scenario 3
Precipitation	100 in/yr	100 in/yr	100 in/yr
RO Fraction	0.25	0.35	0.15
Calculated *RO*	25 in/yr	35 in/yr	15 in/yr
ET Fraction	0.65	0.70	0.60
Calculated *ET*	65 in/yr	64.9 in/yr	60 in/yr
Calculated *I*	10 in/yr	0.1 in/yr	25 in/yr
K_{sat}	15 in/yr	15 in/yr	15 in/yr
Adjusted *I*	10 in/yr	0.1 in/yr	15 in/yr
Adjusted *RO*	25 in/yr	35 in/yr	25 in/yr

Scenario 1 has no corrections being made because the sum of the *RO* and *ET* fractions does not exceed 1 and the calculated *I* rate is less than the K_{sat}, and greater than the minimum infiltration (an assumed value of 0.1 in/yr). Scenario 2 has a correction in the *ET* rate because the sum of the *RO* and *ET* fractions exceeds 1. In Scenario 2, *I* is limited to be no less than the minimum infiltration value for model stability. Scenario 3 has the *I* and *RO* values corrected because the initially calculated *I* rate exceeds the K_{sat}. In this case, the *RO* was increased so that *I* was equal to the K_{sat}. Note that for all cases, the calculated *ET*, adjusted *I*, and adjusted *RO* sum to the precipitation value.

5.2.1.2.3 Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin

The three-dimensional MODFLOW model of the Tailings Basin that was used for the SDEIS to estimate groundwater seepage rates was updated based on direction provided by the Co-lead Agencies for the FEIS (Reference (44)). The model was calibrated to: (1) conditions shortly after LTVSMC operations ceased, when a larger groundwater mound was present beneath the Tailings Basin and (2) the subsequent transient dissipation of the groundwater mound through January 1, 2011. For the FEIS modeling effort, the groundwater models were updated to incorporate groundwater elevation data collected through 2013. Additional changes recommended by the Co-lead Agencies included incorporation of site-specific depth-to-bedrock data and updates to the extent of wetlands based on current wetland delineation information. Additional details regarding the recalibration of the MODFLOW model are presented in Attachment A.

The primary uses of the MODFLOW model for the current modeling effort were to:

- estimate the rate of seepage from the Tailings Basin ponds under existing conditions and from the FTB Pond(s) during operations and reclamation
- estimate the average annual infiltration rate throughout the Tailings Basin under existing conditions as presented in Section 5.2.1.2.1 and Section 5.2.1.2.2
- determine the depth of the phreatic surface within each of the material types present at the surface of the Tailings Basin
- estimate the proportional contribution of the various areas of the Tailings Basin (coarse LTVSMC tailings, fine LTVSMC tailings, Flotation Tailings, dams, ponds) to the total flow of seepage entering the groundwater flow paths

The seepage rates from the ponds are assumed to be known rates calculated by the calibrated MODFLOW models of the existing Tailings Basin (Attachment A).

The USGS particle-tracking code MODPATH (Reference (45)) was used to evaluate the proportion of each groundwater flow path discharge that originates from the various areas of the Tailings Basin (coarse LTVSMC tailings, fine LTVSMC tailings, Flotation Tailings, dams, ponds). In the GoldSim model, water from each of these sources has a different chemical composition, which contributes different amounts of chemical load to the overall load leaving the Tailings Basin. In MODPATH, a particle was started at the phreatic surface in each cell in the uppermost model layer and tracked forward in time. The results of the MODPATH runs were post-processed using ArcGIS to determine which particle traces entered each flow path. By assigning each particle a representative area equal to the area of the model cell in which it originated, the total area of each type of material contributing to each groundwater flow path is determined.

Variability due to precipitation, evaporation and runoff estimates inherently cause the infiltration rates throughout the areas of the Tailings Basin to vary both in time and between model realizations. Therefore, the seepage rates leaving the toes of the Tailings Basin vary with time and between realizations because it is a summation of all of the directed infiltration and seepage throughout the Tailings Basin. Here, directed refers to the calculation that, of a given amount of flow through a given area, i.e., coarse LTVSMC tailings in Cell 2W, some assumed, unique percent reports to each of the five toes. See Table 1-25, Table 1-27, Table 1-35, Table 1-37, and Table 1-39 of Attachment B for details on the values used to determine how much flow from each location reports to each toe of the Tailings Basin.

The depth to the phreatic surface within the different material types estimated by the MODFLOW model (Attachment A) was used to calculate the volume of saturated and unsaturated LTVSMC tailings or Flotation Tailings. The average depth to groundwater was estimated for each material type under current, operations (Mine Years 1, 7, 8, 18, and 20), and closure conditions. Material types and modeled groundwater elevations from each MODFLOW simulation were exported for use in GIS; material type identifiers and modeled groundwater elevations were associated with each groundwater model cell polygon. A zonal statistics analysis was completed using GIS to incorporate the changes in Tailings Basin topography as the Project progresses. Elevation values from raster datasets representing the Tailings Basin topography for each simulation were averaged within each groundwater model cell polygon. The average depth to groundwater for each material type was then calculated by subtracting the groundwater elevation from the ground surface elevation for each groundwater model cell and using the cell-by-cell values to calculate an area-weighted average depth to groundwater for each material type. Finally, the volume of saturated and unsaturated LTVSMC tailings or Flotation Tailings was calculated by approximating a flat bottom to the Tailings Basin and a typical elevation of the tops of each area of the Tailings Basin (i.e., Cell 2W coarse LTVSMC tailings, Cell 2E fine Flotation Tailings, Cell 1E coarse Flotation Tailings, etc.). The volume of saturated material was calculated as the top elevation minus the assumed flat bottom (total height) less the average depth to the phreatic surface calculated as described above, multiplied by the area of the area. Seepage from the ponds and infiltration through the beaches and dams are delayed to account for travel time through the Flotation Tailings and LTVSMC tailings. The delay is applied to both water flow (seepage and infiltration) and mass loading. Delay times used in the DEIS modeling are adopted in the SDEIS modeling and also carried forward into the FEIS modeling. Figure 8-9 through Figure 8-11 of Reference (10) show breakthrough curves of contaminant transport modeling through the Tailings Basin conducted in MODFLOW. These figures show the conservatively short delay times from sources within the Tailings Basin to the toes used in the modeling for the DEIS (10 years for dams, 7 years for beaches and interior areas, and 5 years for pond seepage). Additionally, dispersion is included in the transport of flow and load from the Tailings Basin sources to the toes. Erlang dispersion is the method used to model dispersion (Reference (46)). The dispersion coefficient used in the Erlang method is a unitless number greater than or equal to 1. A value of 1 represents the greatest degree of dispersion, modeled by using exponential smoothing. As the coefficient approaches infinity, dispersion approaches zero.

For the modeling in GoldSim, an assumed coefficient of 25 is used. This means that the standard deviation of the delay time is assumed to be 20% or one-fifth of the delay time itself. For example, because the travel time for seepage from the pond is 5 years, the standard deviation of the travel time is 1 year. The value chosen is a small amount of dispersion, yet disperses the loading originating within the Tailings Basin as would be expected with long travel times through the Tailings Basin.

5.2.1.2.4 Loading

The mass, volume, and composition of LTVSMC tailings are known deterministic inputs to the probabilistic water quality model. Model inputs related to mass loading from the Tailings Basin are shown in the tables in Attachment B and described in Reference (5).

The constituent loads generated from the existing LTVSMC tailings are calculated in the same manner as the Flotation Tailings beaches (Section 5.1.2.2.3). The generated sulfate load is dependent on the known oxygen content in air, diffusivity through the existing unsaturated LTVSMC tailings (which is dependent on the LTVSMC tailings saturation), the depth of unsaturated LTVSMC tailings, and scaling factors for temperature and the effects of surface freezing (Section 10.2 and Section 10.3 of Reference (5)). The main differences are that the existing LTVSMC tailings have tailings specific release rates based on laboratory testing, and the rates are modified due to calibration to existing seepage data (Section 10.2.1 of Reference (5)). Calibrating the LTVSMC tailings release rates to field data means that the Continuation of Existing Conditions Scenario Model has seepage water quality comparable to measured values.

5.2.1.3 Groundwater

Groundwater transport is simulated by incorporating groundwater flow paths into the GoldSim modeling environment using the GoldSim CT module. The model uses a set of the GoldSim CT "cell pathways" linked in series for this process. The setup is essentially a finite-difference or finite-volume analysis which is similar to MODFLOW/MT3D and many other contaminant transport models.

Potential groundwater impacts are assessed at evaluation distances along the groundwater flow paths within the surficial aquifer (Large Figure 6), as was done for the DEIS and the SDEIS. In contrast to the water quality modeling completed for the DEIS, the surface water and groundwater components in the SDEIS and FEIS models are fully coupled within GoldSim. For the DEIS, groundwater transport was simulated using MODFLOW/MT3D models that represented the groundwater flow paths between the FTB and the Embarrass River.

5.2.1.3.1 Groundwater Flow Paths

The links between the surface water and groundwater systems need to be internally consistent to ensure mass conservation. The groundwater and surface water systems are linked using the following assumptions:

- The baseflow in a given reach of the Embarrass River or its tributaries is due to the net aquifer recharge in the undisturbed contributing watershed area that discharges to that reach (see Section 5.2.1.3.2 for a discussion on net recharge). This forms a simple one-to-one relationship between baseflow and net recharge (Equation 5-3).

$$R = \frac{Q}{A_w}$$ **Equation 5-3**

Where Q is baseflow in the reach [L^3/T], A_w is the total contributing watershed area from the right and left banks [L^2], and R is the net recharge rate [L/T]. The average net recharge in the Embarrass River watershed is estimated at 0.61 inches per year (0.045 cfs/mi^2) based on this approach (Section 4.4.1.3).

- The discharge quantity (Q_o) at the downstream end of each groundwater flow path is defined in Equation 5-4.

$$Q_o = RA_f + Q_u$$ **Equation 5-4**

Where Af [L2] is the total undisturbed plan-view area of the groundwater flow path and Qu [L3/T] is any flow into the flow path at the upstream end. For the Plant Site model, Qu is seepage originating from the Tailings Basin.

Figure 5-8 illustrates these assumptions. In the figure on the left, the green areas show the right and left bank contributing areas, the blue area in the middle is the river flowing top to bottom with a baseflow rate Q, and the brown area is the aquifer flow path. In the figure on the right the head in the river is h_2.

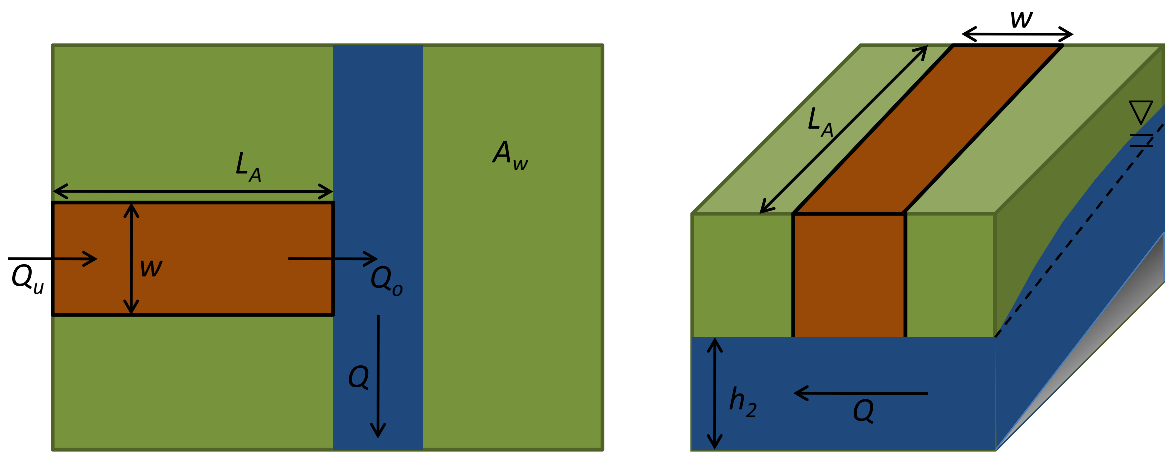


Figure 5-8 Simplified Schematic of a Flow Path within a Watershed Contributing to Baseflow in a River Reach

The ground to the north and west of the toe of the Tailings Basin is likely saturated, evidenced by the vast wetland coverage near the Tailings Basin. Because the water table is very near or at the ground surface, it is likely that the hydraulic gradient in this area is very similar to the ground surface gradient. The groundwater flow at the toes of the Tailings Basin is determined using Darcy's Law, the traditional equation governing groundwater flow, as shown in Equation 5-5.

$$Q_u = -Kidw = -KiA$$

Equation 5-5

Where:

- K is hydraulic conductivity [L/T]
- i is hydraulic gradient [L/L]
- w is aquifer length (perpendicular to flow) [L]
- d is aquifer thickness [L].

The mean hydraulic conductivity is assumed by using the arithmetic mean of the estimated conductivities in Table 4-3, which is 4.0 m/day. The geometric mean is typically considered more representative of the "average" hydraulic conductivity (Reference (47)). In this case, however, the geometric mean of the available data is approximately 1.5 meters/day, just slightly higher than the minimum value of 1.1 meters/day. Therefore, the larger arithmetic mean was used to allow for a larger range of *K* values to be used, which better fit with the estimated baseflow in the Embarrass River. The minimum hydraulic conductivity value of 1.1 meters/day was determined by assuming zero flow into the aquifer at the upstream end, a minimum recharge value of 0.3 in/yr, and the assumed gradients and constant dimensions of the flow paths. In other words, the minimum conductivity is that which can handle the minimum amount of recharge and no additional flow. The north, northwest, and west flow paths had individual minimum values of 1.09 m/day, 1.08 m/day, and 1.10 m/day and the highest of these three was chosen as the target minimum. The parameters of the lognormal distribution used to define *K* were determined by setting the true mean of the distribution to 4.0 m/day and the 0.1% value to 1.1 m/day. This means that only one out of every 1000 values randomly generated is less than 1.1 m/day. Figure 5-9 shows the resulting distribution for hydraulic conductivity assumed in the Plant Site water quality model.

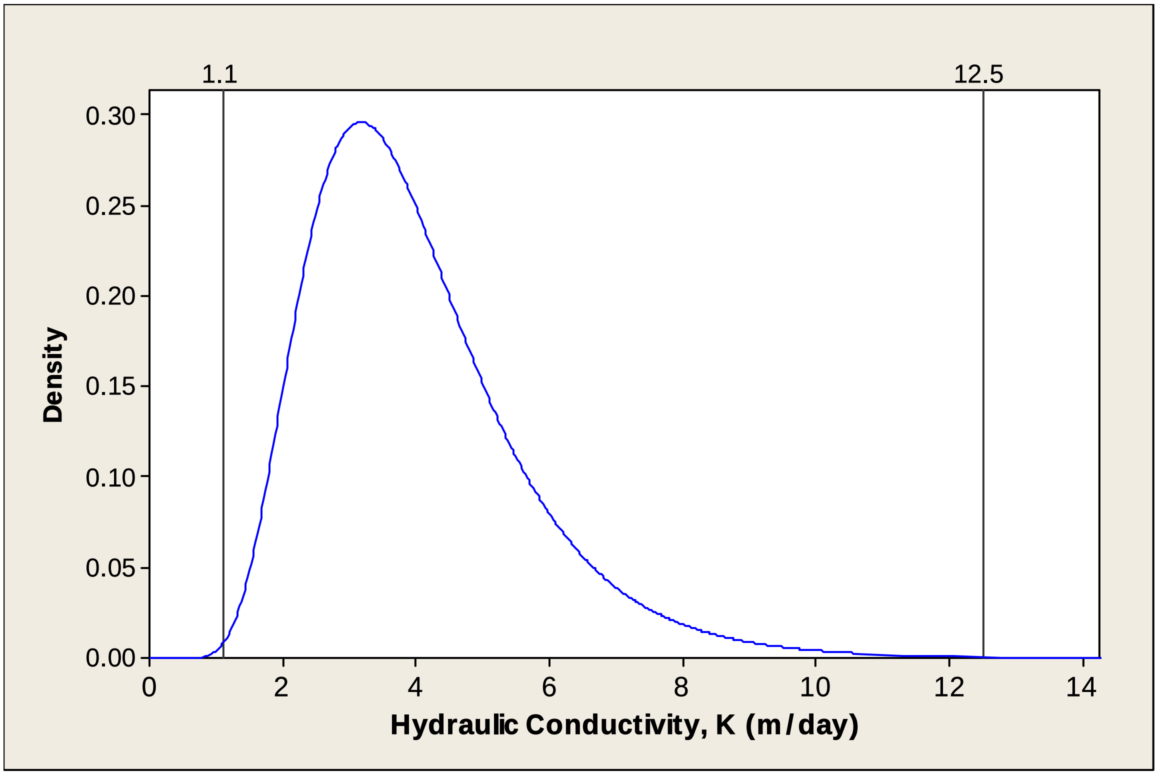


Figure 5-9 Hydraulic Conductivity Distribution Used at the Plant Site

Figure 5-10 shows the distribution relative to the estimates of conductivity from field data. The distribution, which is meant to represent the uncertainty in a spatially averaged hydraulic conductivity, falls near the high end of the sampled data. In the GoldSim model, hydraulic conductivity is a randomly generated input each model realization.

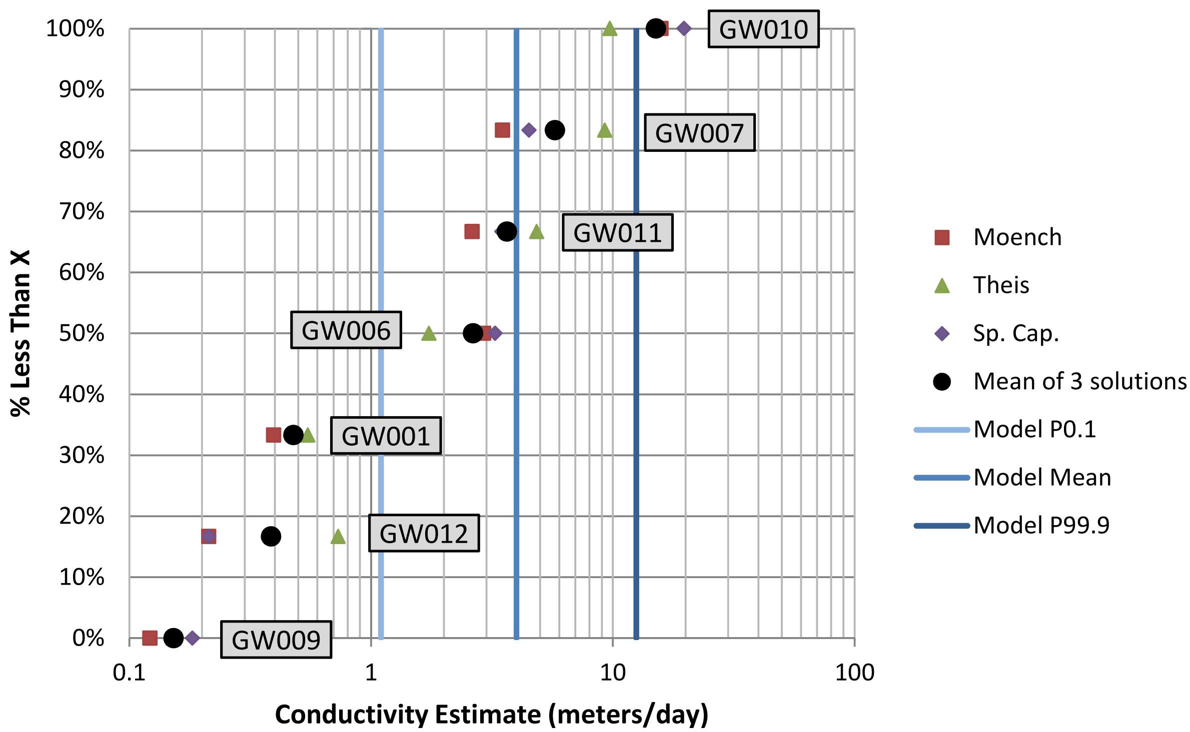


Figure 5-10 Modeled Hydraulic Conductivity Relative to Sampled Data

Hydraulic gradient (*i*) is calculated using topographic information. The terms *d* and *w* from Equation 5-5 are known, deterministic values.

Table 5-6 shows the model input assumptions for the three groundwater flow paths and the range in groundwater flow rates into groundwater from the Tailings Basin.

Table 5-6 Model Input Assumptions with Range of Resulting Groundwater Flow Values

	North Flow Path	Northwest Flow Path	West Flow Path
i [m/m]	-0.00444	-0.00514	-0.00736
d [m]	7	7	7
w [m]	1920	2090	2920

		North Flow Path	Northwest Flow Path	West Flow Path
Percentile	**K [m/day]**	**Q_u Flow (gpm)**	**Q_u Flow (gpm)**	**Q_u Flow (gpm)**
1%	1.52	16.6	20.9	41.8
5%	1.97	21.6	27.2	54.4
10%	2.27	24.8	31.3	62.6
25%	2.86	31.4	39.5	79.0
50%	3.71	40.7	51.2	102.5
75%	4.82	52.7	66.4	132.9
90%	6.08	66.6	83.9	167.9
95%	7.00	76.6	96.6	193.2
99%	9.10	99.6	125.5	251.2
Average	4.00	43.8	55.2	110.4

Groundwater flow in GoldSim is modeled using a series of cells. A “cell” in GoldSim represents a discrete, well-mixed fluid through which constituent mass and flow pass. Using the method proposed in this section, flow into the first cell of a groundwater flow path is calculated using Equation 5-5. Flow along the length of the aquifer is determined using a continuity calculation; the flow leaving a cell is equal to the flow entering a cell from an upgradient cell plus the flow that enters the cell from recharge (Section 5.2.1.3.2). In other words, Equation 5-5 is used to calculate flow entering the upstream end of the aquifer and the flow along the aquifer is calculated by flow continuity (Equation 5-6).

$$Q_l = Q_u + Rwl$$

Equation 5-6

Where:

Q_l is flow at a distance “l” from the upstream end of the aquifer [L^3/T]
Q_u is the flow into the aquifer [L^3/T]
R is the aquifer recharge rate [L/T]
w is the width of the aquifer [L]
l is the distance from the upstream end of the aquifer at which Q_l is calculated [L]

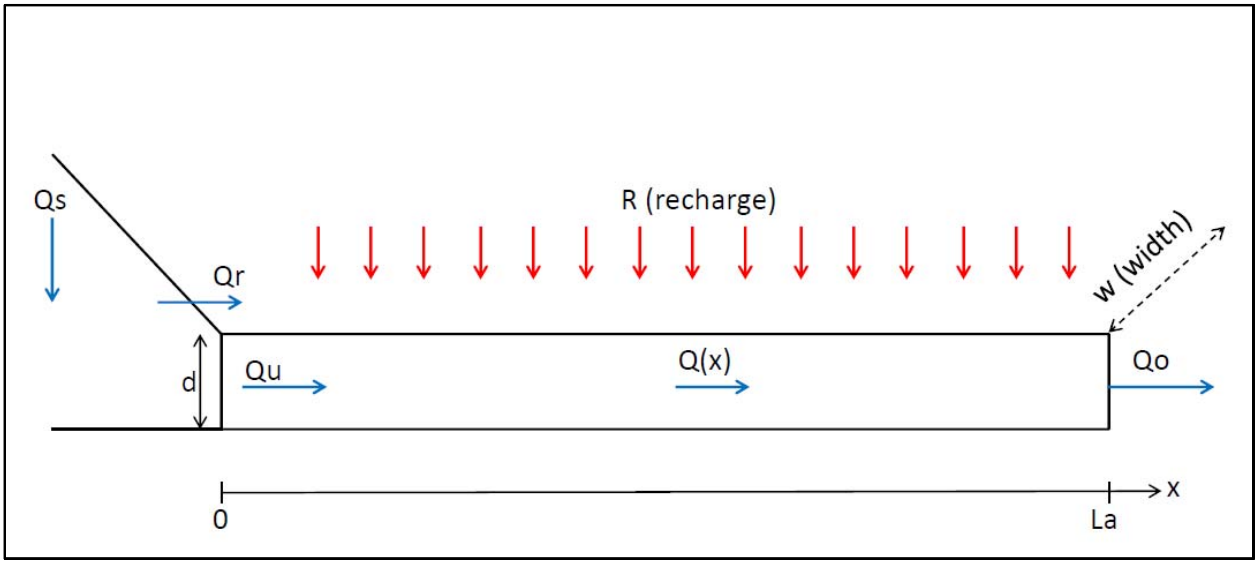


Figure 5-11 Conceptual Drawing of the Modeled Continuation of Existing Conditions Scenario Groundwater Flow Paths at the Plant Site

In Figure 5-11, Q_s is the total seepage rate from the Tailings Basin to the toe (as calculated in the GoldSim model as the sum of infiltration and seepage rates through the Tailings Basin), Q_u is the flow that enters the aquifer, Q_r is the flow that is in excess of the aquifer capacity and upwells to surface flow (discussed below), and Q_o is the flow discharging from the flow path to surface water. In both the Continuation of Existing Conditions Scenario Model and Project Model, the upstream flow (Q_u) is calculated in the same manner and flow and mass load from recharge is added to every cell of the flow path.

Upwelling occurs when the flow in an unconfined aquifer exceeds the capacity of the aquifer. When this happens, the water table elevation is at the ground surface elevation and a portion of the groundwater becomes surface water flow. In the GoldSim model, a check is performed at each time step to see if upwelling is occurring along the toe of the basin. Water that is assumed to upwell becomes surface water flow. In the Continuation of Existing Conditions Scenario Model, this flow is routed to the most upstream surface water evaluation location for the watershed in which the upwelling occurs.

The groundwater flow paths transport mass using a mix of analytical and numerical solution methods. In short, the flow equation is solved analytically and is an exact solution to the idealized representation of the aquifer; the transport equation is solved numerically using a series of well-mixed cells of known volume and flow characteristics. The solution to the network of cells is not explicit in a sense that one cell is solved, then the next, then the next, etc. It is a coupled system of cells so the entire system is solved at once using a set of matrices.

The dimensions of the groundwater flow paths (flow path lengths, widths, and lengths to the evaluation locations) were determined with measurements of the flow paths defined in Large Figure 6. The north groundwater flow path discharges to Mud Lake Creek at MLC-2, the northwest groundwater flow path discharges to Trimble Creek at PM-19, and the West groundwater flow path discharges to the Embarrass River at both PM-12.4 and PM-13. The proportion that discharges to PM-12.4 (7.21%) was determined by measuring the area of the West flow path that contributes to PM-12.4 and dividing it by the total plan-view area of the West flow path.

5.2.1.3.2 Recharge

Recharge of meteoric water to the water table is assumed to be occurring between the Tailings Basin and the Embarrass River. Regionally, annual average recharge rates are estimated to be approximately 32-37% of annual precipitation in the Kawishiwi River basin, which translates to approximately 9 in/yr to 11 in/yr, based on average annual precipitation of 29 in/yr (Reference (48)). This recharge estimate is representative of an average rate across the entire river basin area. In reality, the recharge rate is likely highly variable within the river basin, depending on factors such as localized vegetation cover, topographic relief, and aquifer characteristics. In the Plant Site area, it is likely that in some localized areas, the recharge rate is high due to the presence of coarse grained materials and a sufficient depth between the ground surface and the water table. Conversely, there are likely localized areas where the water table is at or near the ground surface so that groundwater is discharging into surface wetlands and/or streams resulting in very little if any recharge. Deep rooted vegetation could also be removing water from the surficial aquifer causing there to be a net loss of water in some localized areas. The presence of significant areas of wetlands north and west of the Tailings Basin indicates that there are localized areas where recharge is likely very low or nonexistent. Additionally, the water table is typically near the ground surface (generally less than 10 feet near the Embarrass River) making it very likely that plant processes are removing water from the water table and that saturated conditions are increasing runoff and reducing local recharge. Heterogeneity in recharge rates over the area is difficult to quantify and is not represented in the GoldSim model. In addition, the modeling assumes that all groundwater flow remains within the aquifer until the discharge point of the flow path (MLC-2 for the north flow path, PM-19 for the northwest flow path, and PM-13 for the West flow path).

The recharge rate applied to the groundwater flow paths represents a spatially-averaged *net recharge rate*, and is therefore assumed to be uniformly distributed along the length of the flow path. The net recharge rate to the groundwater flow paths is estimated based on the watershed wide average baseflow per watershed area (0.045 cfs/mi^2 or 0.61 in/yr). The assumption of a uniform, net recharge rate is applicable because in the model it is assumed that there are no losses from groundwater except at the downstream end where a flow path discharges all flow to a stream. Also, localized groundwater losses occurring along the flow path, which are offsetting localized, elevated recharge rates, are not quantified and therefore not accounted for. Assuming a uniform, net recharge rate, which does not impact the flow discharging from the flow path or the travel time to the outlet of the flow path, is a reasonable simplifying assumption.

For each flow path, net recharge is randomly generated in GoldSim at the initiation of each model realization and held constant for the remainder of the realization. Both the flow and load from net recharge is applied to the plan-view area of each flow path, increasing the flow and load through the aquifer along its length.

The distribution used to represent the net recharge rate to each flow path is a triangular distribution with 0.6 in/yr as the most likely value, based on the estimated baseflow in the Embarrass River. The lower bound was assumed to be half of the most likely value (0.3 in/yr) and the upper bound is five times the lower bound (1.5 in/yr). This range was based on collective professional judgment during the IAP process. A triangular distribution is commonly used where data are limited but uncertainty is relatively low (less than a factor of 10) and there is knowledge about a most likely value, or midpoint, and a range (Reference (49)). This is the case for average net recharge at the Plant Site. This distribution is consistent with the net recharge distribution assumed for the Mine Site water quality model.

Each flow path receives a unique randomly generated net recharge rate to account for spatial variability. In this way, uncertainty in the actual net recharge rate is accounted for by re-generating net recharge rates each realization and there is spatial variability because the net recharge to each flow path is independent.

Recharge water quality is defined in the same manner as background groundwater quality, described in Section 5.2.1.3.5.

5.2.1.3.3 Sorption

Attenuation due to sorption to the aquifer matrix is simulated for selected constituents (As, Cu, Ni, and Sb). Sorption is modeled within GoldSim by assuming a constant ratio between the amount of mass sorbed on to the aquifer material and the amount of mass dissolved in the water (i.e., linear sorption). The ratio is referred to as the aquifer sorption factor or sorption coefficient (K_d). Given the assumed aquifer dimension, material bulk density and porosity, the surficial material mass within each cell of a groundwater flow path is calculated. The constituent mass is partitioned between the known fluid volume and the known surficial material mass within each cell of a groundwater flow path based on the assumed aquifer sorption factor (K_d).

Aquifer sorption factors (K_d) for arsenic, copper, and nickel were set as deterministic inputs based on their respective USEPA screening values, shown in Table 5-7. These are the same values that were used in the modeling conducted for the DEIS.

For the SDEIS and FEIS water quality modeling, the sorption factor for antimony is treated as a probabilistic input (acknowledging uncertainty in the actual amount of sorption that will occur at the site) using a triangular distribution. The minimum K_d value is based on the lowest value reported in a USEPA literature review (Reference (50)). The mean and maximum K_d values are based on the lowest two values from the site-specific sorption test work (conducted using Mine Site and Plant Site aquifer samples) (Table 5-7). The surficial aquifer is assumed to have a dry (bulk) density of 1,500 kg/m^3 (USDA St. Louis County Soil Survey Database). Sorption of antimony was not included in the DEIS modeling, as site-specific sorption values developed for antimony were below the screening value (site-specific sorption values were larger than the screening values for arsenic, copper and nickel).

Table 5-7 Sediment Sorption Factor (Kd)

Pollutant	Deterministic K_d	Probabilistic K_d (triangular distribution)		
	L/kg	Minimum (L/kg)	Mode (L/kg)	Maximum (L/kg)
Arsenic	25	--	--	--
Antimony	--	1.3	1.6	6.1
Copper	22	--	--	--
Nickel	16	--	--	--

5.2.1.3.4 Dispersion

Dispersion is not a direct input to the mass transport model. Physical dispersion is simulated in the groundwater flow paths using controlled numerical dispersion. Numerical dispersion occurs as part of the numerical method used to solve the system of coupled differential equations in GoldSim. It occurs because mass is transported through a series of well-mixed cells. For example, if the aquifer was represented with one cell, in the first time step, some of the mass entering the cell would be seen leaving the cell because when mass entered the cell, it was instantly “dispersed” throughout the cell, all the way to the other end (due to the cell’s length). On the other hand, if the same length of aquifer was represented using 1 billion cells, dispersion would have a much smaller effect. As mass enters one of the 1 billion “tiny” cells, it would be mixed throughout the entire cell, but the mixing length is so minute that it’s almost as if mass was not dispersed at all. Therefore, there is a relationship between the dispersion length and the number of cells used to represent the aquifer. Using well-mixed cells to represent advection-dispersion transport, the dispersion length is equal to one-half the cell length (page 124 of Reference (51)).

For the GoldSim model, the aquifer flow paths were discretized such that the same dispersion relationship that was used in the modeling for the DEIS (Equation 5-7) is matched as closely as possible.

$$D = 0.83 * [\log(L_A)]^{2.414} \quad \textbf{Equation 5-7}$$

For example, if the aquifer length is 1000 meters, then the desired dispersion length from the equation above is 11.8 m. Then, because the dispersion length is equal to one-half the cell length, the cell lengths should be approximately 23.6 meters. Given the aquifer length and the optimal cell length, the aquifer would be represented using 42 cells to obtain the desired degree of dispersion.

5.2.1.3.5 Background Groundwater Quality

The background groundwater quality represents the quality of the groundwater in un-impacted or undisturbed areas of the watershed within the model. Background groundwater quality is used for two purposes within the GoldSim model:

1) To calculate the loading to the Embarrass River from unimpacted groundwater that discharges into the river; and

2) To determine the quality of recharge that is added along the groundwater flow paths (Section 5.2.1.3.2).

As with the Mine Site, the modeling approach utilizes mean background groundwater concentrations that are homogenous across the modeled area and are constant through time. Use of mean groundwater concentrations is appropriate because groundwater sources cover a wide area and groundwater travel times are relatively slow. Thus, loading from groundwater can be expected to reflect the integration of the spatial and temporal variability observed in the baseline data. Background water quality is either based on four monitoring wells completed in the surficial aquifer at the Plant Site (GW002, GW011, GW013, and GW015 (Section 4.3.4)) or regional data compiled by the MPCA. The development of the background groundwater concentration distributions and the final values used in the GoldSim model are presented in Attachment C.

In natural waters, the concentrations of some constituents are often correlated to one another for a variety of reasons. Such correlations exist in the background water quality data used for the water quality modeling. As a modeling simplification, correlation between constituent concentrations in background groundwater is not simulated in the NorthMet model. This simplification could lead to unrealistic estimates of the total water quality in any particular realization, such as water with high concentration of one constituent and low concentration of another at the same time when the two are in fact positively correlated. Because the impact assessment for the Project compares modeled concentrations to the applicable water quality standard on a constituent-by-constituent basis, however, this simplification is appropriate as long as the modeled distribution for each individual constituent is realistic.

5.2.1.4 Surface Water

The GoldSim model estimates surface water flows and loads by combining flows and loads from the existing Tailings Basin with flows and loads from other sources (e.g., watershed runoff, unimpacted groundwater, point sources, etc.) to calculate resulting flow and water quality in the Embarrass River and its tributaries at specific evaluation locations (Large Figure 7).

5.2.1.4.1 Surface Water Model Evaluation Locations

There are five model evaluation points located along the Embarrass River. Point PM-12 is located at monitoring location PM-12, upstream of Spring Mine Creek. This point is upstream of impacts from the Project and the Pit 5NW and is considered the unimpacted, natural surface water evaluation location in the water quality model. Location PM-12.2 is located downstream of Spring Mine Creek, which allow water quality impacts from Pit 5NW to be separated from those due to the Project. Model evaluation points PM-12.3 and PM-12.4 are located downstream of the confluence of the Embarrass River with Mud Lake Creek and Trimble Creek. Model evaluation point PM-13 is located downstream of the confluence of the Embarrass River with Unnamed Creek, and is downstream of all potential impacts from the Tailings Basin.

There are two model evaluation points for Unnamed Creek. The upstream point, UC-1, is located at the toe of the Tailings Basin. This evaluation point is selected because it approximates the headwaters of Unnamed Creek, and is located at the upstream end of the MDNR public water classification. The downstream model evaluation point is located at current monitoring location PM-11, which allows for a comparison of water quality results with the Continuation of Existing Conditions Scenario Model to monitoring data.

There are two model evaluation points for Trimble Creek. The upstream point, TC-1, is at the intersection of Trimble Creek and the power line corridor approximately one mile north of the Tailings Basin. This evaluation point approximates the upstream end of the MDNR's public waters delineation of Trimble Creek. Aerial imagery does not consistently show a defined channel upstream of this location. A downstream model evaluation point is located at surface water quality monitoring location PM-19, which allows for a comparison of water quality results with the Continuation of Existing Conditions Scenario Model to monitoring data.

There are two model evaluation points for Mud Lake Creek, one located at the outlet of Mud Lake (MLC-3) and one at monitoring location MLC-2. The upstream point is selected because it approximates the headwaters of Mud Lake Creek as well as the upstream end of the MNDR's public waters delineation of Mud Lake Creek. Mud Lake is located upstream of this location, upstream of which a defined stream channel is not apparent. The downstream evaluation location was selected because of the availability of observed water quality data at this location.

These creeks and the respective evaluation points are presented in Large Figure 7. The watershed areas tributary to each evaluation point are included in Table 1-49a of Attachment B. The watershed divides shown in Large Figure 2 show that a significant portion of the seepage from the north toe (north side of Cell 2E) actually contributes flow to Trimble Creek rather than Mud Lake Creek. Therefore, the model assumes that only 25% of upwelled seepage from the north toe is contributing to flow in Mud Lake Creek at MLC-3; the rest is contributing to flow in Trimble Creek at TC-1. A flow control matrix is shown in Table 1-47 of Attachment B which dictates the hydraulic connections in the surface water system. Finally, Table 1-48 of Attachment B shows the assumed constant dimensions of each surface water evaluation location used in the model.

5.2.1.4.2 Embarrass River and Tributary Water Balances

The generic water balance for any given reach (i.e., model node) of the Embarrass River and its tributaries is the same for the entire model duration, and is shown in Equation 5-8.

$$Q_i = Q_{i-1} + Q_{RO} + Q_{GW} + Q_{FP} + Q_{up} + Q_{TBRO} + Q_{other}$$ **Equation 5-8**

In Equation 5-8, Q_i is the flow leaving a given reach (also known as the flow at any given node), Q_{i-1} is the flow into that reach from an upstream reach of the river (if applicable), Q_{RO} is the incremental watershed runoff, Q_{GW} is the incremental groundwater flow from non-modeled flow paths, Q_{FP} is the discharge from modeled groundwater flow path(s) which includes seepage from the Tailings Basin net recharge, Q_{up} is any upwelling seepage from the modeled Tailings Basin toes (Section 5.2.1.3.1), Q_{TBRO} is runoff from the dams of the Tailings Basin, and Q_{other} is any additional surface water discharge (anthropogenic or other) contributing to the flow at a given node. Q_{other}, for example, includes discharges from the Pit 5NW upstream of location PM-12.2 and the Babbitt WWTP discharge upstream of PM-12.

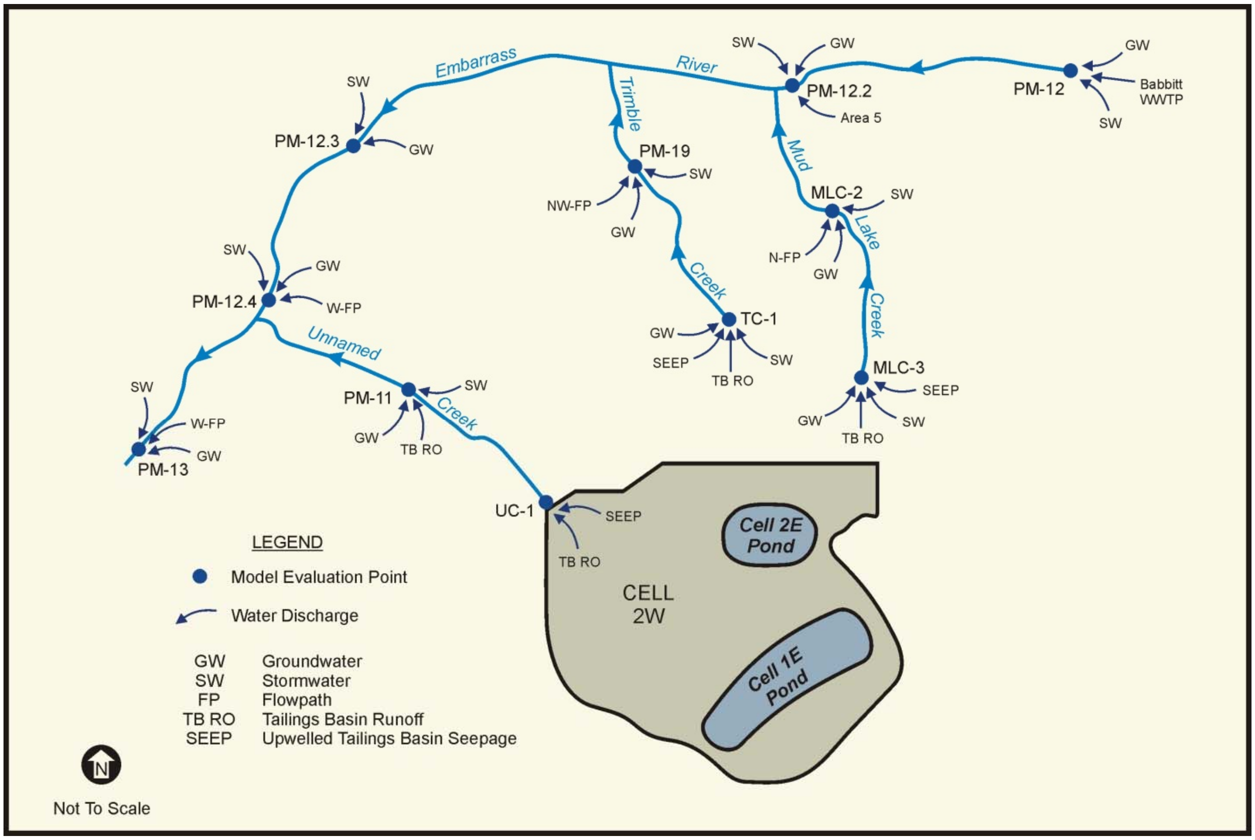


Figure 5-12 Schematic Showing Surface Water Evaluation Locations, Hydraulic Connectivity, and Sources to Each Location for the Continuation of Existing Conditions Scenario Model

Not all components of the water balance shown above are applicable to every surface water evaluation location. Figure 5-12 shows the modeled surface water evaluation locations in the Continuation of Existing Conditions Scenario Model, how they are connected hydraulically, and the sources of flow and load to each location. Groundwater seepage from the Tailings Basin that remains in the aquifer (a portion of Q_{FP}) is tributary to the surface water evaluation point at the downstream end of the groundwater flow path. Thus, the north and northwest flow paths are tributary to evaluation points MLC-2 and PM-19, respectively (Large Figure 6). The west flow path is assumed to be tributary to locations PM-12.4 and PM-13. Seepage from the Tailings Basin that exceeds the aquifer capacity, Q_{up}, (Section 5.2.1.3.1) is assumed to become surface water immediately downstream of the Tailings Basin toes and is modeled as tributary to the most upstream surface water evaluation points (MLC-3, TC-1, and UC-1).

5.2.1.4.3 Developing Model Inputs (Watershed Yield)

A mass balance approach is used to estimate water quality in the Embarrass River and the creeks listed above, due to seepage from the Tailings Basin combining with groundwater inflow from un-impacted portions of the watersheds, watershed runoff, and other anthropogenic point sources. Flow in surface waters at a given time step is a function of a probabilistic value of watershed yield (combination of baseflow and watershed runoff selected from a distribution appropriate to that month) and the tributary watershed area. The distributions of yield for each month, developed using observed USGS flow data, are presented in Table 5-8. The distribution is re-sampled at each model time step (monthly) of each realization. This allows water quality impacts to be computed over a wide range of estimated daily flows in the Embarrass River. The results of this approach are analogous to the probability of having a given concentration on a randomly selected sampling date.

Table 5-8 Distributions of Watershed Yield by Month

%-ile	Daily flow by month (cfs/square mile)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min	0.01	0.01	0.02	0.03	0.24	0.04	0.04	0.02	0.02	0.03	0.06	0.04
5%	0.04	0.02	0.02	0.06	0.46	0.10	0.06	0.04	0.04	0.06	0.11	0.05
10%	0.04	0.03	0.03	0.11	0.58	0.20	0.08	0.05	0.05	0.09	0.14	0.06
20%	0.05	0.03	0.04	0.43	0.76	0.34	0.11	0.07	0.09	0.15	0.16	0.08
50%	0.07	0.05	0.06	1.50	1.53	0.83	0.34	0.16	0.27	0.31	0.28	0.12
80%	0.10	0.07	0.11	3.24	3.02	1.99	0.88	0.50	0.72	0.63	0.51	0.23
90%	0.11	0.08	0.25	4.47	4.22	2.80	1.78	0.86	1.37	1.12	0.74	0.29
95%	0.15	0.10	0.86	6.29	5.96	3.49	3.03	1.44	1.79	1.67	0.96	0.36
Max	0.25	0.16	8.77	16.87	19.48	12.34	8.95	3.22	8.94	5.13	1.88	0.57

Within the GoldSim model, watershed yield is partitioned between groundwater inflow and watershed runoff by evaluation location to properly determine loading from each source. The values listed in Table 5-8 represent total watershed yield, including both watershed runoff and groundwater inflow. The partitioning of these values into watershed runoff and groundwater inflow is described below.

Daily flows in each reach of a modeled surface water is calculated for each model time step using a randomly selected value for watershed yield, the known average baseflow yield, and the deterministic watershed tributary area. From the randomly selected total yield (Table 5-8) and baseflow yield (Section 4.4.1.3), flows from watershed runoff, groundwater from modeled flow paths, and groundwater from non-modeled areas can be separated out for each modeled reach. The calculated flows in each reach, using a mass-balance approach, are summed to generate total daily flow in each modeled reach of the Embarrass River and its tributaries.

5.2.1.4.4 Watershed Runoff Quantity

The watershed yields shown in Table 5-8 implicitly include groundwater inflow. The watershed-wide average baseflow yield, which represents the net aquifer recharge, is estimated at 0.045 cfs/square mile, or 0.61 inches/year (Section 4.4.1.3). The quantity of watershed runoff to a particular model evaluation point can be calculated by subtracting the baseflow yield from the total watershed yield and multiplying the difference by the watershed area, as shown in Equation 5-9.

$$Q_{RO} = (Y_T - Y_b) * A_w \quad \text{Equation 5-9}$$

Where:

Q_{RO} is the incremental flow from watershed runoff [L^3/T]
Y_T is the total watershed yield [L/T]
Y_b is the baseflow yield [L/T]
A_w is the incremental contributing watershed area [L^2].

If the total watershed yield is less than the average baseflow yield ($Y_T < Y_b$), the flow from watershed runoff for that time step is zero and the baseflow yield is set equal to the total watershed yield ($Y_b = Y_T$). This occurs because the watershed yield varies daily, whereas the baseflow yield is a minimum 30-day average.

Incremental loading to each of the surface water evaluation points from watershed runoff is determined by multiplying the incremental watershed runoff flow (Q_{RO}) by the randomly generated estimate of watershed runoff water quality (Section 5.2.1.4.5) at each time step.

5.2.1.4.5 Background Watershed Runoff Quality

The background watershed runoff concentration represents the quality of the water that will run off of un-impacted or undisturbed areas of the watershed within the model. The background watershed runoff quality has not been measured but instead is determined through calibration (described below) so that model results in areas not impacted by the Project best fit the sampled data in those areas. PM-12 is considered to represent unimpacted conditions at the Plant Site.

In natural waters, the concentrations of some constituents are often correlated to one another for a variety of reasons. Such correlations exist in the background water quality data used for the water quality modeling. As a modeling simplification correlation between constituent concentrations in background surface water is not simulated in the NorthMet model. This simplification could lead to unrealistic estimates of the total water quality in any particular realization, such as water with high concentration of one constituent and low concentration of another at the same time when the two are in fact positively correlated. Because the impact assessment for the Project compares modeled concentrations to the applicable water quality standard on a constituent-by-constituent basis, however, this simplification is appropriate as long as the modeled distribution for each individual constituent is realistic.

The Continuation of Existing Conditions Scenario Model was run 500 times (realizations) for a duration of 2 years with a monthly time step. The background groundwater distribution was sampled each realization providing 500 different data points for baseline groundwater quality. Additionally, because the model is run at a monthly time step for 2 years, each of the 500 model realizations provides 24 randomly generated estimates of surface water runoff quality (12,000 random values in all).

The objective of the calibration was to minimize the difference between the observed data (water quality samples at PM-12) and the simulated water quality values at PM-12. The GoldSim model does not attempt to model actual water quality on a specific date or during a specific event. Instead, it attempts to capture the typical or mean water quality and the range in potentially observable values. Therefore, comparisons between observed data and model estimates were made at low, high and intermediate concentrations in order to meet the objectives.

A log-normal distribution has been assumed to describe watershed runoff concentrations. The log-normal distribution was agreed upon in the IAP process for representing uncertainty in existing groundwater quality because this simple distribution can reasonably represent the right-skewed groundwater data and allow for the occasionally observed high concentrations. The same reasoning was applied to the watershed runoff concentration distributions. Additionally, the log-normal distribution does not allow for unrealistic negative values that a normal distribution might generate.

First, the mean of the runoff water quality distribution for each constituent was optimized so that the mean of the resulting mixed water quality at PM-12 in the model was equal to the mean of the observed values for that constituent at PM-12, resulting in zero error at the mean. Second, the standard deviation of the watershed runoff water quality was adjusted to minimize the root-mean-squared error calculated at the 10th, 50th, and 90th percentile concentrations. By minimizing the difference between the observed data and the model estimates at the calibration targets, the model estimates most accurately represents distributions of observed values. The root-mean-squared error (RMSE) of the 10th, 50th, and 90th percentiles was calculated as shown in Equation 5-10:

$$RMSE = \sqrt{\frac{\sum\left(C_{obs,i} - C_{mod,i}\right)^2}{n}}$$

Equation 5-10

Where:

$C_{obs,i}$ = observed concentration at the 10th, 50th, or 90th percentile
$C_{mod,i}$ = modeled concentration at the 10th, 50th, or 90th percentile

n = number of percentiles included in calculation (3)

Calibration was performed until the RMSE was minimized for each constituent (while maintaining a minimum standard deviation of at least 1% of the mean). The overall acceptability of each constituent calibration was not quantitatively assessed, but was qualitatively assessed by visually considered the model fit to the entire distribution of observed data. See Figure 5-13 as an example of the calibration, in this case chloride at PM-12. As a review metric, a normalized RMSE was calculated by dividing the RMSE by the mean of the observed data set for each constituent. The normalized RMSE is presented as a percentage of the mean (e.g., +/- 10%).

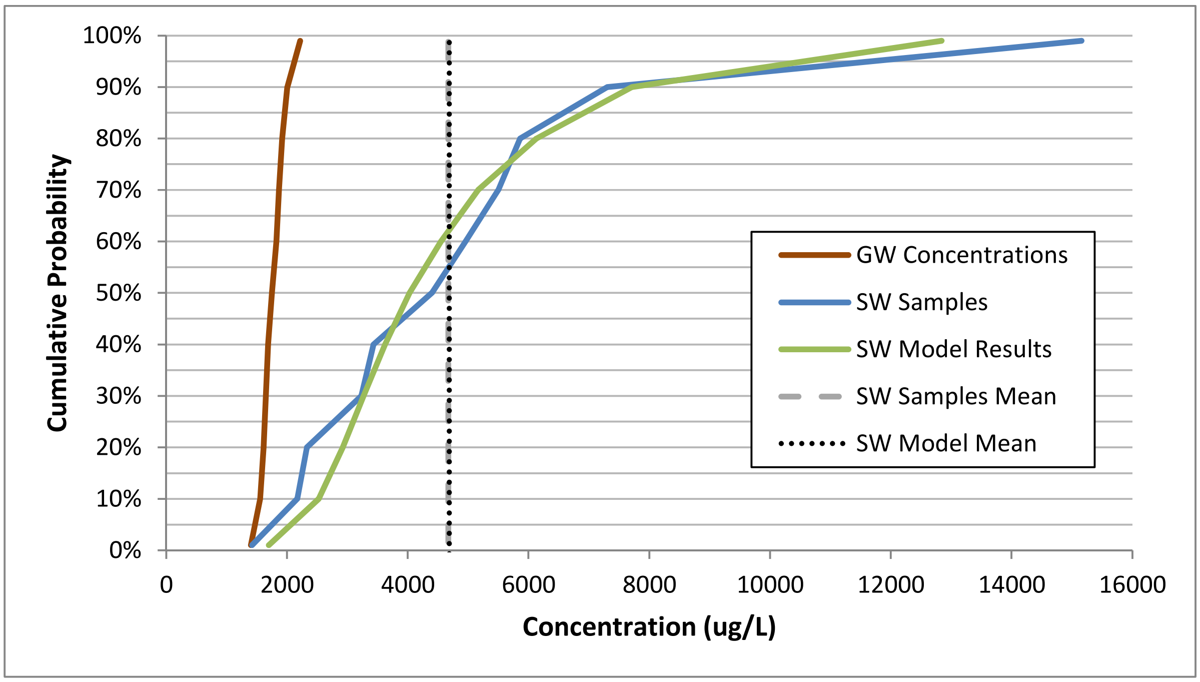


Figure 5-13 Example Calibration of Chloride at PM-12

The calibrated standard deviation, RMSE, sample mean and normalized RMSE are presented below in Table 5-9. The normalized RMSE is below 10% for 13 of the 27 calibrated constituents and less than or equal to 20% for 18 of the 27 calibrated constituents. For the following constituents, the standard deviation of watershed runoff water quality was set to 1% of the mean watershed runoff water quality estimate because the RMSE could not be minimized by reducing the standard deviation: Ba, Be, Ni, Sb, and V.

Table 5-9 Plant Site Natural Watershed Runoff Calibration Statistics – Comparison between Observed and Modeled Embarrass River Concentrations

Constituent	Modeled Mean Runoff Concentration (µg/L)	Modeled Runoff Standard Deviation (µg/L)	RMSE (µg/L)	Observed In-Stream Mean Concentration (µg/L)	Normalized RMSE (% error)
Ag	1.17E-01	7.9E-03	6.13E-03	1.06E-01	6%
Al	1.12E+02	4.9E+01	6.31E+00	9.98E+01	6%
Alk	3.82E+04	4.8E+04	2.79E+03	5.03E+04	6%
As	1.76E+00	2.0E+00	8.90E-02	1.43E+00	6%
B	1.96E+01	3.3E+00	1.68E+00	2.19E+01	8%
Ba	4.58E+00	4.6E-02	5.50E+00	1.90E+01	29%
Be	7.35E-02	7.4E-04	4.51E-02	1.00E-01	45%
Ca	9.47E+03	7.9E+03	6.54E+02	1.38E+04	5%
Cd	8.11E-02	6.3E-03	6.46E-03	9.19E-02	7%
Cl	5.68E+03	2.9E+03	3.67E+02	4.67E+03	8%
Co	1.33E+00	1.0E+00	6.95E-01	1.02E+00	68%
Cr	7.22E-01	8.0E-01	1.87E-01	7.94E-01	24%
Cu	7.55E-01	8.9E-01	1.21E-01	1.12E+00	11%
F	8.51E+01	9.0E+01	9.68E+00	1.01E+02	10%
Fe	5.56E+03	5.0E+03	6.55E+02	4.15E+03	16%
K	8.48E+02	1.2E+03	6.56E+01	1.10E+03	6%
Mg	4.84E+03	5.4E+03	5.55E+02	6.40E+03	9%
Mn	4.85E+02	8.0E+02	1.46E+02	4.30E+02	34%
Na	3.30E+03	1.3E+03	2.16E+02	3.63E+03	6%
Ni	4.18E-01	4.2E-03	1.75E-01	1.43E+00	12%
Pb	2.60E-01	1.5E-01	4.44E-02	2.58E-01	17%
Sb	2.11E-01	2.1E-03	2.07E-02	2.50E-01	8%
Se	4.55E-01	2.0E-01	1.21E-01	5.45E-01	22%
SO4	4.79E+03	1.0E+04	4.09E+03	5.45E+03	75%

Constituent	Modeled Mean Runoff Concentration (µg/L)	Modeled Runoff Standard Deviation (µg/L)	RMSE (µg/L)	Observed In-Stream Mean Concentration (µg/L)	Normalized RMSE (% error)
Tl	1.33E-02	1.2E-01	5.70E-02	5.36E-02	106%
V	1.45E-01	1.5E-03	1.20E+00	1.50E+00	80%
Zn	6.58E+00	1.1E+01	1.71E+00	8.48E+00	20%

Finally, the results of the Continuation of Existing Conditions Scenario Model at other surface water locations (PM-19, PM-11, MLC-2, and PM-13) were used to validate or corroborate other model inputs and assumptions. The calibration of the Continuation of Existing Conditions Scenario Model was approved by the Co-lead Agencies before modeling of the Project was conducted. Additional details on the calibration are presented in Attachment C.

5.2.1.4.6 Tailings Basin Runoff

The quantity of surface runoff to a particular model evaluation point from the exterior dams of the Tailings Basin is calculated by multiplying the runoff rate from the dams by the area of the Tailings Basin dams, as shown in Equation 5-11.

$$Q_{TBRO} = RO * A_{dams}$$ **Equation 5-11**

Where:

Q_{TBRO} is the incremental runoff flow from the Tailings Basin dams [L^3/T]
RO is the runoff rate [L/T] from the Tailings Basin dams (Section 5.2.1.2.1)
A_{dams} is the incremental contributing area of the Tailings Basin dams [L^2].

Incremental loading to each of the surface water evaluation points from the Tailings Basin dams is not included because the vegetated LTVSMC tailings forming the dams are assumed to be relatively inert.

5.2.1.4.7 Groundwater Inflow from Non-Modeled Flow Paths

The baseflow to a stream reach from its tributary area must be partitioned into the quantity coming from modeled groundwater flow paths and the quantity coming from undisturbed areas. For each modeled reach, the quantity of groundwater inflow coming from non-flow path areas of the watershed is calculated using Equation 5-12.

$$Q_{GW} = (A_w - A_{FP}) * Y_b$$ **Equation 5-12**

Where

Q_{GW} is the incremental groundwater flow from non-modeled flow paths [L^3/T]
Y_b is the baseflow yield [L/T]
A_w is the total incremental watershed area [L^2]
A_{FP} is the area of a modeled flow path within the watershed [L^2]

Incremental loading to each of the surface water evaluation points from groundwater outside of modeled flow path areas is determined by multiplying the incremental groundwater flow (Q_{GW}) by the randomly generated estimate of background groundwater quality (Section 5.2.1.3.5) at each time step.

5.2.1.4.8 Adjustment for Low Flow

As discussed in Section 4.4.1.3, the baseflow for the Embarrass River watershed is estimated as the average annual minimum 30-day average flow from the available flow record. It is assumed that the minimum 30-day average flow represents conditions without precipitation or watershed runoff, when all stream flow is derived from net groundwater recharge. The resulting unit area yield (0.045 cfs/mi^2) is used to determine the incremental baseflow to each model evaluation location from non-modeled flow path areas (i.e., the groundwater contribution to stream flow within a given stream reach).

For each model time step, a single value of total watershed yield for the Embarrass River watershed is selected from a probabilistic distribution and flows in each reach are calculated (Section 5.2.1.4.3). If this estimated total yield (Y_T) is greater than baseflow, the excess flow is assumed to be entirely watershed runoff. However, because baseflow is determined from a 30-day average of daily flows, there will necessarily be periods with simulated daily flow *less* than the baseflow. During these low flow periods all water in the stream being modeled is assumed to originate as groundwater contributions to the stream (i.e., there is no watershed runoff). In order to avoid over-estimating the pollutant mass loading from groundwater, the incremental baseflow during these periods (Q_{GW}) from modeled flow paths and from unimpacted groundwater is scaled down (Equation 5-13):

$$if\ Y_T < Y_b \qquad Q_{GW} = (A_w - A_{FP})Y_b * \left(\frac{Y_T}{Y_b}\right) = (A_w - A_{FP})Y_T$$ **Equation 5-13**

This adjustment is illustrated for an example 10-year period in Figure 5-14. The baseflow for this stream segment is decreased whenever modeled stream flows are below approximately 1 cfs.

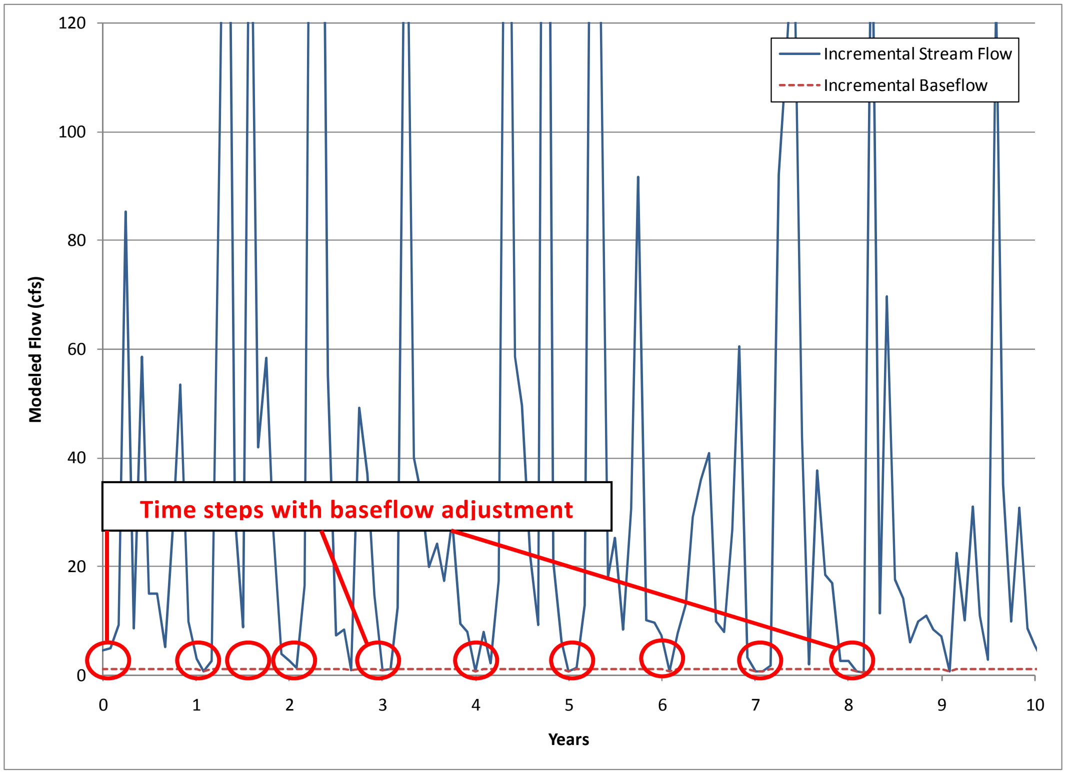


Figure 5-14 Baseflow Adjustment Example

In cases where a surface water evaluation location receives inflow from modeled groundwater flow paths, the estimated flow path contribution to the river reach (Q_{FP}) is scaled by the same ratio as the natural contributions to baseflow (Equation 5-14, see Section 5.2.1.3.1 for a discussion on Q_{FP}):

$$if\ Y_T < Y_b \qquad Q_{FP} = [Q_u + (R * w * L_A)] * \left(\frac{Y_T}{Y_b}\right) \qquad \textbf{Equation 5-14}$$

Because of this modification, constituent mass can be understood as being "held back" just before the river because of the temporary low-flow conditions. In the next time step, if the flow in the river is high enough to accommodate all of the expected groundwater contributions, the constituent mass that was temporarily "held back" is added to the river. No constituent mass is removed from the system because of this low-flow adjustment, only the timing of its arrival at the river is affected.

5.2.1.4.9 Babbitt WWTP

The Babbitt WWTP discharge is added to the most upstream model node representing the Embarrass River (PM-12). A flow of 0.33 cfs, half of the design capacity was assumed for this discharge in the analysis performed in support of the DEIS (Reference (10)); this same assumption is used for the analysis presented here (Section 4.4.2.2).

The concentrations of discharge from the Babbitt WWTP are assumed to be equal to the calibrated watershed runoff concentrations, which is the same assumption that was made in the DEIS modeling (Reference (10)). See Section 5.2.1.4.5 for details of the calibrated watershed runoff water quality.

Loading from the Babbitt WWTP is determined by multiplying the constant flow rate of 0.33 cfs by the randomly generated watershed runoff water quality at each time step. This loading source is added to surface water evaluation location PM-12 and is carried through the rest of the Embarrass River.

5.2.1.4.10 Pit 5NW (SD033) Discharge

Spring Mine Creek is not explicitly modeled within the GoldSim model due to the lack of direct Project impacts within its watershed. To most accurately simulate downstream water quality in the Embarrass River, however, loading from the Pit 5NW discharge must be considered.

There is insufficient data to develop distributions of daily flow unique to each month (as was done for the Embarrass River in Section 5.2.1.4.3). Instead, three distributions of observed flow at SD033 were developed for the following seasonal periods: winter, snowmelt, and open water (Figure 5-15). April and May are considered *snow melt* months each year of each model run. Also, *winter* months are assumed to last between 2.4 and 4.4 months each year as defined by the frozen period in Section 10.2 of Reference (5). Therefore, the winter months are defined based on the winter duration and the assumption that March is the last month of winter. Finally, the remaining months of the year are considered *summer* months.

The distributions were developed using the 63 point measurements and 12 additional data points created by averaging the continuous data at a monthly time step (Figure 4-6). The resulting cumulative density functions are presented in Figure 5-15.

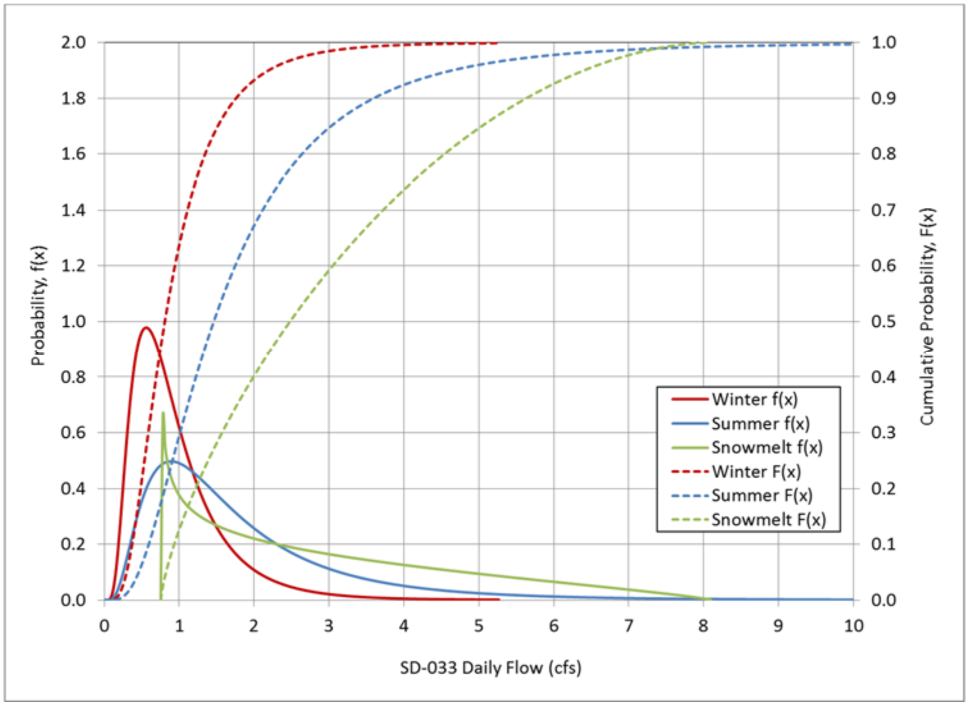


Figure 5-15 Cumulative Probability of Flow at SD033

For each model time step, the appropriate distribution is sampled to estimate the outflow from Pit 5NW. The outflow from Pit 5NW is correlated to the watershed yield distribution with a correlation coefficient of 1 to reflect similar hydrologic conditions throughout the watershed. The outflow from Pit 5NW is tributary to the Embarrass River cell representing the river reach between location PM-12 and PM-12.2 (Large Figure 7).

In the GoldSim model, the concentrations assigned to the Pit 5NW outflow is based on the average constituent values measured at SD033 during 2010 and 2011, including non-detections at half the detection limit (Large Table 5). The constituent concentrations may change over time due to future actions resulting from the Cliffs Erie Consent Decree. For the purposes of this analysis, however, these inputs are considered constant and deterministic. The input concentrations to the model for SD033 are presented in Table 1-44 of Attachment B.

Loading from Pit 5NW via Spring Mine Creek is calculated by multiplying the randomly generated flow at each time step by the constant average concentration at Pit 5NW. The loading term is added to the surface water evaluation location PM-12.2 and is carried through the rest of the Embarrass River.

5.2.2 Project Model

The construct of the Project Model is shown in Large Figure 16 and Large Figure 17. This section documents methods, assumptions, and the development of model inputs for the

Project Model that are not discussed in other documents.

5.2.2.1 Beneficiation Plant

Bateman Engineering Pty Ltd (Bateman) calculated a material mass balance and a water balance for the Beneficiation Plant, which consisted of the following operations: ore crushing, ore grinding, sulfide flotation and concentrate regrinding, and Flotation Tailings disposal (Reference (52)). The water balance was conducted on a process-by-process basis, tallying all of the sources and sinks for water within the plant. A metallurgical simulation software package (MetSim) was used for the process modeling and design. The MetSim model required the following input and output flows: raw or return water input, water in the ore, water in the reagents, gland water, miscellaneous input water, evaporation in the plant, water in the concentrate product, and the water discharged to the FTB. Subsequent to the Bateman water balance study, PolyMet has developed plans to replace the rod and ball mill grinding circuit at the Beneficiation Plant with a semi autogenous grinding mill (Section 4.3.2.2 of Reference (8)). This change does not affect the Beneficiation Plant water balance.

The only components of the Beneficiation Plant water balance that are needed for the water balance for the FTB are the amount of Flotation Tailings and water sent to the basin and the Beneficiation Plant water demand. The MetSim model accounted for planned downtime which is assumed to be 8.74% of the time (about 766 hours per year). The flows detailed in Reference (52) are corrected (dividing by a factor of 0.9126) to represent actual flow rates while the plant is operating.

The water balance provided in Reference (52) is based on the output from the MetSim model. Some water uses in the Beneficiation Plant are not directly related to the metallurgical process and therefore were not included in the water balance. However, they do need to be included in the overall Plant Site water balances. Table 5-10 is a summary of the water uses that were not included in the Bateman study, with flows and fates (Reference (43)).

Included in this flow is an annual average total of 24 gpm (12.62 MGAL/yr) of water that is sent to the FTB and 24 gpm (12.62 MGAL/yr) that is sent to the Hydrometallurgical Residue Facility (Table 5-10). Table 5-11 is a summary of the process water streams between the Beneficiation Plant and the FTB, including the additional process water that was not included in the Bateman study.

The flow rate values from Table 5-11 are direct inputs for the GoldSim model of the Plant Site. In reclamation and long-term closure, the Beneficiation Plant will no longer discharge to or demand water from the FTB.

Table 5-10 Water Uses not Considered in MetSim

Use	Flow Rate (gpm)	Fate
Potable Water	17	10 gpm to FTB, 7 gpm to Area 1 and 2 Shops Sanitary Systems
Hydrometallurgical Plant		
Agitator Seals	4	To Residue Facility
Cathode Wash and Spray	20	To Residue Facility
Beneficiation Plant		
Flotation OSA Flush	6	To FTB
Vehicle Wash Down	8	To FTB
Oxygen Plant	40	Lost to atmosphere
Boiler Water	2	Lost to atmosphere
Grounds and Plant Maintenance	6	Lost to stormwater
Fire Water	4	Lost to leakage
Total	106	

Table 5-11 Beneficiation Process Streams to and from the FTB

Stream	Mass of Tailings (Tons/year)	Flow rate of Water (MGAL/year)(1)
Stream from Beneficiation Plant	12,350,000	7921.7
Additional Water to the FTB	--	13.83
Total Beneficiation Plant Water Demand	--	7590.1
Beneficiation	--	1.729

(1) Flow rates of water from these streams are modified by an uptime factor of 0.9126.

5.2.2.1.1 Raw Water Demand

The FTB has been designed to maintain a permanent pond within the basin. The extent of the pond has been optimized to minimize the Flotation Tailings beach areas while maintaining geotechnical stability of the dams. Maintaining the design volume of water in the pond is therefore a priority. The free water within the FTB is the main source of water to meet the

Beneficiation Plant demand. However, the plant water demand will not be met at the expense of maintaining the necessary pond volume. Any excess water needed in the system is met by pumping make-up water from the Plant Reservoir that is supplied from Colby Lake. The amount of make-up water required is determined at each model time step.

The calculated make-up water during each time step is added to the Beneficiation Plant's continual demand for clean water to estimate the total amount of water that needs to be pumped from Colby Lake throughout operations for purposes of running the Beneficiation Plant.

5.2.2.1.2 Loading

There are three sources of load that will be transported to the FTB with the Beneficiation Plant slurry:

- ore leaching load – the load added to the process water that goes to the FTB due to processing weathered ore
- reagent load – copper sulfate load added as a result of processing
- Colby Lake load – load from Colby Lake when make-up water is required by the Beneficiation Plant

The mass loading from the use of copper sulfate is assumed to be a known value because it is determined by the process design, and the mass loading from the ore is an uncertainty input determined in a manner similar to the waste rock modeling for the Mine Site (Section 10.6.3 of Reference (5)). Loading from Colby Lake is based on the model assumptions presented in Section 5.2.2.9.2. Additional details on these load sources can be found in Section 10.6.3 of Reference (5)).

5.2.2.2 Flotation Tailings Basin (FTB)

The GoldSim model estimates how water entering the FTB is allocated between evaporation, runoff, infiltration, seepage, and pond water. It also estimates how input water quality, the characteristics of the Flotation Tailings and the characteristics of the LTVSMC tailings contribute to constituent loading in runoff, seepage and pond water.

The main components of the FTB water balance can be divided into seven main groups, which are listed below and described in detail in the following text.

- Mine Site WWTF effluent
- Sewage Treatment System effluent (discussed in Section 5.2.2.7)
- Beneficiation Plant and beach development

- climate driven components
- entrainment
- pond seepage
- raw water demands (discussed in Section 5.2.2.1.1)

The mass and volume of Flotation Tailings that is in the FTB each year is based on the expected production rate, which is treated as a known deterministic input to the probabilistic water quality model. FTB construction (heights, areas, lengths, etc.) are known deterministic inputs. These values can be reviewed in Table 1-1, Table 1-23, Table 1-24, and Table 1-30 of Attachment B.

5.2.2.2.1 Inflow from Mine Site WWTF

Effluent from the Mine Site WWTF is pumped to the FTB. The flow rates come from the results of the Mine Site GoldSim model. The results of the Mine Site model are used to create time series' of the means and the standard deviations of the Mine Site WWTF outflow rates and constituent concentrations to the FTB. In the Plant Site GoldSim model, the flow and concentrations from the Mine Site are generated randomly at each time step from the distributions produced by the Mine Site model. The randomly generated flow rates are auto-correlated with a factor of 0.9 to limit the potentially erratic behavior of the time series of flow from the WWTF. The auto-correlation means that, rather than the randomly sampled value being correlated to another model input, the randomly sampled value is correlated to the previous randomly sampled value with a rank correlation coefficient of 0.9. Therefore, if the randomly sampled value at one time is high in the distribution it was sampled from, the next randomly sampled value has a strong chance of being a high value also. The values of the WWTF inputs to the Plant Site GoldSim model (both flow and concentration) are shown in Table 1-8 through Table 1-10 of Attachment B. If no treatment is required in order to meet the WWTF effluent targets, the effluent concentrations may be lower than the defined treatment targets. The distribution of concentrations reflects the probability of lower-than-target concentrations.

Table 5-12 Example Input Table for the Water from the Mine Site WWTF

Mine Year (yr)	Flow Mean (gpm)	Flow Standard Deviation (gpm)	Cu Concentration Mean (mg/L)	Cu Concentration Standard Deviation (mg/L)
0	100	10	0.010	0.001
1	200	10	0.020	0.001
2	500	100	0.020	0.001
3	1000	100	0.010	0.001
…	…	…	…	…

Mine Year (yr)	Flow Mean (gpm)	Flow Standard Deviation (gpm)	Cu Concentration Mean (mg/L)	Cu Concentration Standard Deviation (mg/L)
20	0	0	0	0
…	…	…	…	…
200	0	0	0	0

Using Table 5-12, for example, if the model time were at Mine Year 1, the Plant Site model would select a random flow value from a distribution defined with a mean of 200 gpm and a standard deviation of 10 gpm. If the model time were at year 3.7, the distribution for flow would be defined by a mean of 1000 gpm and a standard deviation of 100 gpm. Similarly, for concentrations from the Mine Site WWTF, if the model were at time 2.4, the copper concentration would be randomly generated from a distribution with a mean of 0.020 mg/L and a standard deviation of 0.001 mg/L. Auto-correlation is not used on the randomly generated concentrations because they are expected to mostly be at the target effluent limits with very limited variability. The values between Mine Year 20 and the final time step are zero because the Mine Site WWTF no longer discharges to the FTB after operations. In the GoldSim model, this flow stream is a direct input into the pond in Cell 2E of the FTB during early years of operations and into the combined pond during later years of operations.

Direct loading to the FTB Pond from the Mine Site WWTF is calculated by multiplying the randomly generated flow by the randomly generated concentration. The Mine Site WWTF will cease pumping water to the Plant Site at the end of operations.

5.2.2.2.2 Inflow from Beneficiation Plant

The water portion of the slurry from the Beneficiation Plant consists of the 7,229.3 MGAL/yr (91.26% uptime of 7,921.7 MGAL/yr) from processes in the Concentrator and the 12.62 MGAL/yr from other processes at the plant (totaling 7,241.9 MGAL/yr or 13,769 gpm). A portion of the Beneficiation Plant slurry is discharged to create beaches, and the balance is discharged subaqueously via diffuser throughout the pond. The estimated split between beach and subaqueous discharge is approximately 30% and 70% respectively and will vary depending on basin conditions. This means that approximately 2,172.6 MGAL/yr will discharge to the beaches and approximately 5,069.3 MGAL/yr will discharge directly to the pond. This ratio, however, will vary through time to properly develop the basin as described in Section 5.2.2.2.3.

5.2.2.2.3 Beneficiation Plant Slurry and Beach Development

The fraction of the discharge from the Beneficiation Plant that is used to form the beaches will be controlled so that the entire FTB is raised at generally the same rate. A mass and volume balance based on the hydraulic analysis of the Flotation Tailings (described in Sections 5.1.3.1

and 10.3 of Reference (5)) is included in the GoldSim model to determine the fraction of plant discharge is delivered to the beaches within the model. The following variables are used in the analysis, shown on Figure 5-16.

$\dot{M}$	Rate at which Flotation Tailings mass is discharged from the plant [M/T]
η	Fraction of plant discharge that is used to form the beaches [--]
ε	Fraction of the feed material (by mass) that is coarse Flotation Tailings [--]
δ	Fraction of the beach (by mass) that is fine Flotation Tailings [--]
Ap	Area of the pond [L2]
Ab	Area of the beach [L2]
θp	Porosity of the Flotation Tailings under the pond [cm^3/cm^3]
θb	Porosity of the Flotation Tailings in the beach [cm^3/cm^3]

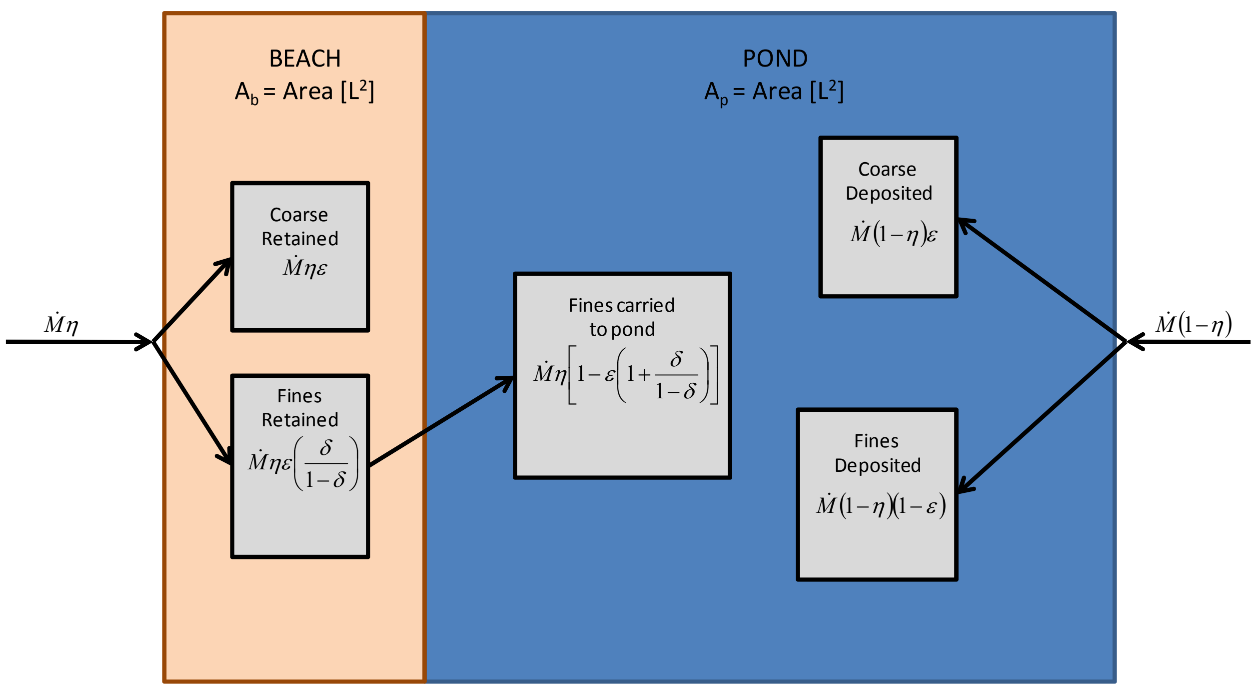


Figure 5-16 Schematic of the Mass Balance of Flotation Tailings Delivered to the FTB

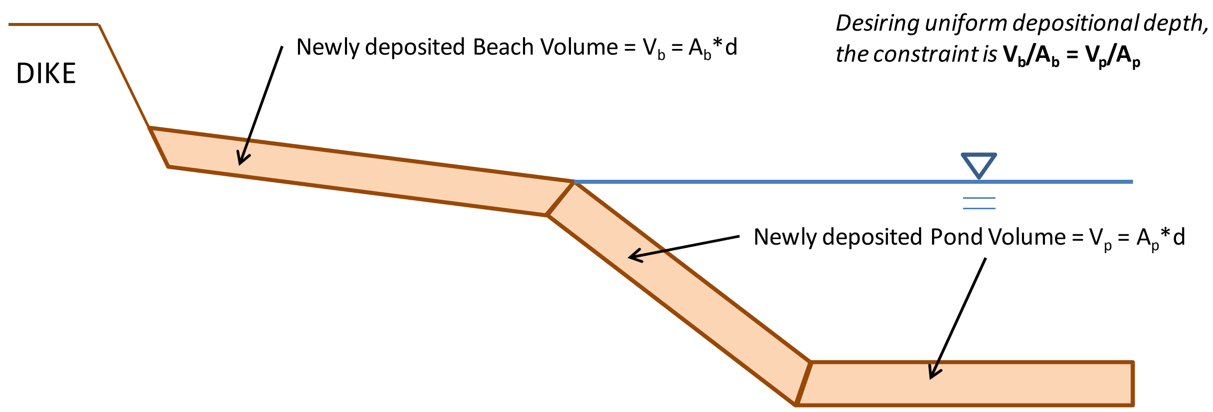


Figure 5-17 Schematic of the Volume Balance of the Flotation Tailings Delivered to the FTB

The beaches must rise at the same rate as the bottom of the pond. Figure 5-17 illustrates this design constraint. This constraint, along with the mass balance shown above, leads to Equation 5-15.

$$\eta = \left\{\varepsilon\left(1+\frac{\delta}{1-\delta}\right)\left[1+\frac{A_p(1-\theta_p)}{A_b(1-\theta_b)}\right]\right\}^{-1} \quad \textbf{Equation 5-15}$$

The uncertainty in the discharge fraction (η) and the sensitivity of η to the random input variables were estimated using a Monte Carlo approach with 1000 realizations. The ratio of pond area to beach area (*Ap/Ab*) is a known value that changes throughout the development of the FTB. Figure 5-18 shows the time series of the area ratio. The porosities of the beach and pond, the solids fraction of the feed material, and the % fine in the beach are all random variables described in Section 5.1.3.1 of Reference (5).

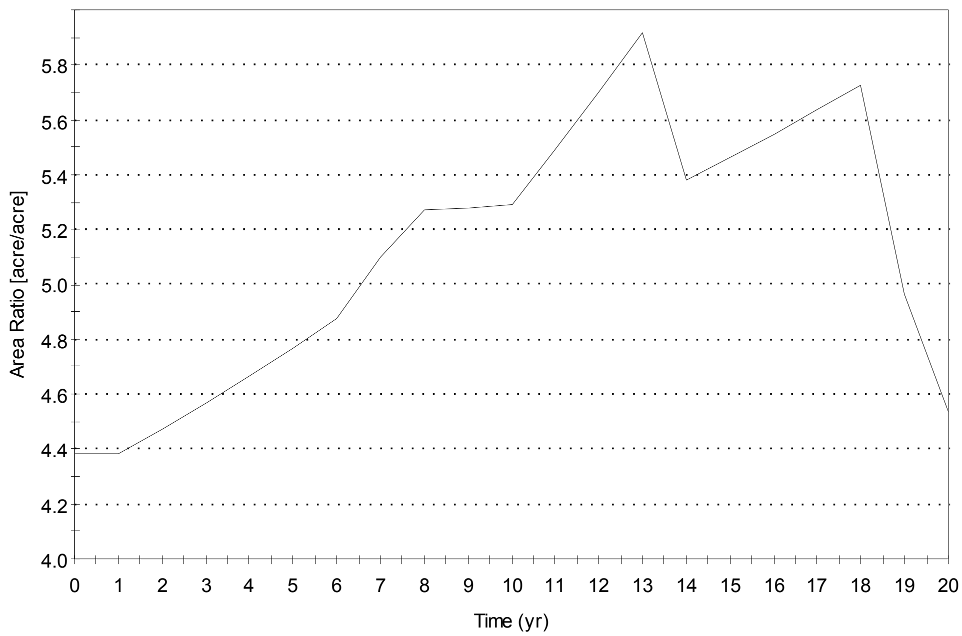


Figure 5-18 Area Ratio as the FTB is Developed

Figure 5-19 shows that the plant must discharge roughly 30% of its total discharge to the beaches to ensure that the FTB develops evenly through time. Figure 5-19 also shows that this value has a range: 90% of the time, the range is about +/- 0.05. For example, at Mine Year 0, the fraction of plant discharge to the beaches is about 0.34 +/- 0.05. However, during some special circumstances, the delivery to the beach is higher or lower than this. To ensure that the GoldSim model is appropriately delivering mass and volume to the beaches and the pond, the delivery fraction calculation is made at each time step. This calculation is then used to determine the mass of coarse and fine Flotation Tailings in the beaches and the pond, and also the saturation of the Flotation Tailings in the beaches.

Figure 5-20 shows the sensitivity of η to the independent random variables. It shows the strength and nature of the relationship. The porosity in the beach has the weakest effect on η, and the porosity in the Flotation Tailings under the pond has the strongest effect.

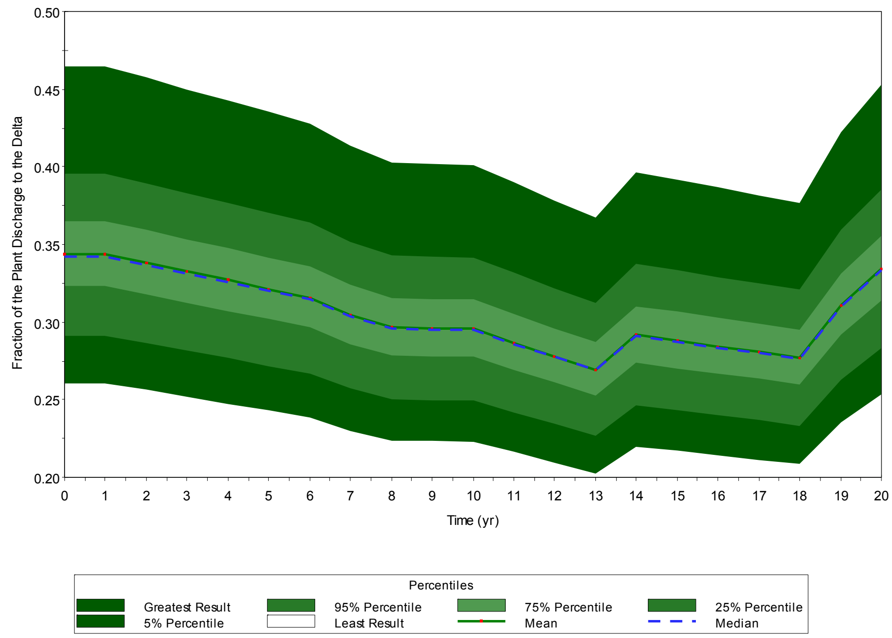


Figure 5-19 Uncertainty in the Fraction of Plant Discharge Delivered to the Beach

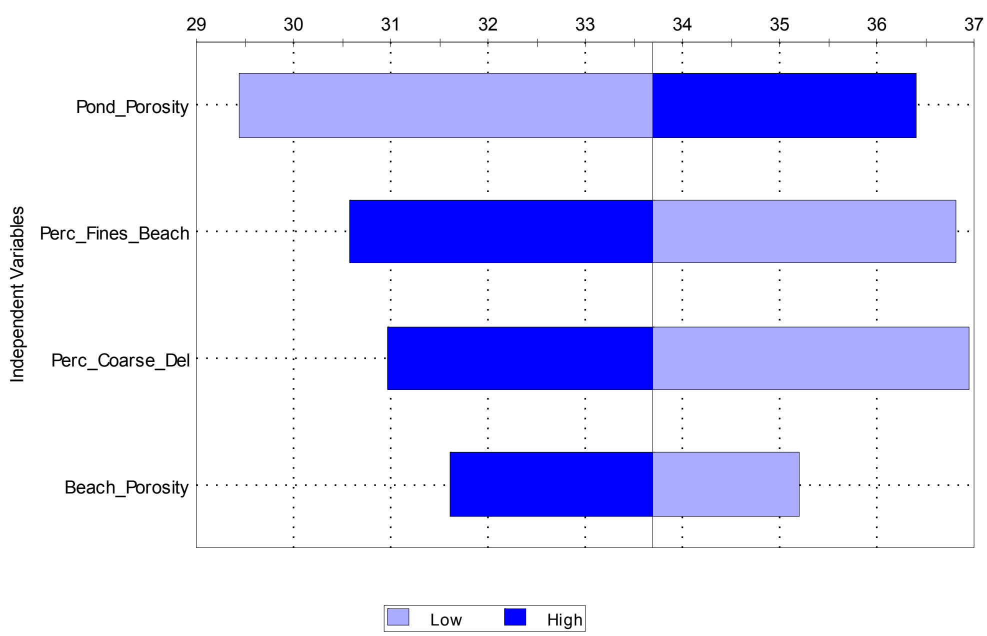


Figure 5-20 Sensitivity Analysis of the Plant Discharge Split at Mine Year 20

Slurry from the Beneficiation Plant that discharges to the beaches is assumed to only be discharged along a portion of one dam at a time. During the early stages of operations, there will only be the North Dam along the north side Cell 2E and it is assumed that this is the only dam that receives the Beneficiation Plant slurry. However, in later years of operation (beyond Mine Year 7), there will be three FTB dams (north, east, and south) and the Beneficiation Plant slurry is assumed to be discharged along only one of the three dams at any given time. The Beneficiation Plant slurry is assumed to be discharged along one dam until the beach is sufficiently built up, at which time it is assumed that the pipes are moved to another dam where the process continues. The portion of each year that slurry is discharged along each of the three dams in the GoldSim model is estimated based on the length of each individual dam compared to the total lengths. For example, the lengths of the North, East and South Dams are approximately 6500 feet, 3600 feet and 7700 feet respectively. According to these lengths, the North, East and South Dams require 36.5%, 20.2% and 43.3% of the discharge slurry that is used for beach construction, which equates to 4.4 months, 2.4 months and 5.2 months out of each year. Table 5-13 is a summary of the timing and volume of discharge to the beaches along each dam.

Table 5-13 Discharge Duration from the Beneficiation Plant to Each Dam

Dam	Length (feet)	% of Total Length	Approximate Discharge Time (months)	Minimum Discharge Time (months)	Maximum Discharge Time (months)	Probability of the Minimum Value	Probability of the Maximum Value
North	6500	36.5%	4.4	4	5	0.6	0.4
East	3600	20.2%	2.4	2	3	0.6	0.4
South	7700	43.3%	5.2	4	6	0.4	0.6

To accommodate this variability in the GoldSim model, the discharge duration of the North and East Dams is randomly generated at the beginning of each year. The remaining time in the year is applied to the South Dam so that all 12 months of each year are accounted for. As an example, at the beginning of a given year in the GoldSim model, it is randomly decided that the North Dam will receive Beneficiation Plant slurry for 4 months and the East Dam will receive Beneficiation Plant slurry for 3 months. Therefore, the South Dam will receive Beneficiation Plant slurry for 5 months of the year. Given these input assumptions, the Beneficiation Plant slurry is discharged to the North Dam from January 1st through April 30th, to the East Dam from May 1st through July 31st, and to the South Dam from August 1st through December 31st, all at a flow rate of approximately 2,172.6 MGAL/yr (Section 5.2.2.2.2).

A dam receiving Beneficiation Plant discharge is assumed to have an active beach area (or delta) which is 625 feet long, has an angular spread of 75°, and has active flow in 30% of this area. These details are the same as what was assumed in the modeling conducted for the DEIS (Reference (43)). Figure 5-21 is a schematic of the beach. From this information, it is assumed that the beach covers 6.9 acres and 2.1 acres has actively flowing slurry. The active flow delta is assumed to have increased evaporative losses due to the temperature of the water leaving the Beneficiation Plant (Section 5.2.2.2.4).

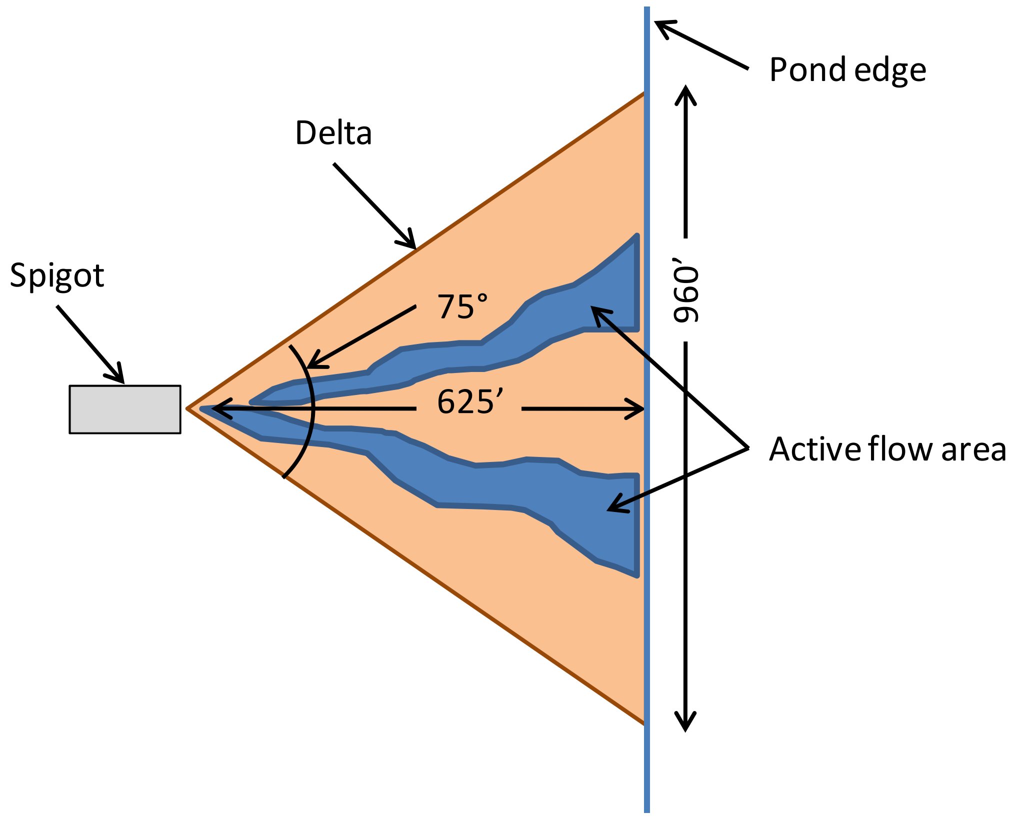


Figure 5-21 Schematic of the Drainage Delta on the Flotation Tailings Beaches

Water is pumped from the FTB Pond to meet as much of the Beneficiation Plant water demand as possible. According to the Bateman water balance, the Beneficiation Plant demands a total of 6,926.7 MGAL/yr (91.26% uptime of 7,590.1 MGAL/yr), which includes the 1.6 MGAL/yr of required clean water which is assumed to come from Colby Lake (note that some water for reuse in certain process steps in the Beneficiation Plant could be meet by effluent from the WWTP, however this is not considered in the GoldSim model). The amount of water returned to the Beneficiation Plant from the FTB Pond is calculated at each time step by first ensuring that the design volume in the FTB Pond is maintained and then returning any excess water to the Beneficiation Plant.

5.2.2.2.4 Climate Inputs; Precipitation, Evaporation and Runoff

Precipitation is described in Section 5.2.1.1.1 and applies to the FTB in the same manner as it does to the existing Tailings Basin in the Continuation of Existing Conditions Scenario Model. It falls on all areas of the Tailings Basin, contributing water to the pond(s) and is used in conjunction with other inputs to determine infiltration rates throughout the LTVSMC tailings and the Flotation Tailings.

Areas of contributing natural watershed add flow to the pond(s) of the Tailings Basin based on the watershed yield at each time step. The flow and load from this source of water are described in Section 5.2.1.4.4. The contributing area varies through time as the FTB is developed and expands slightly to the east. The area was determined by delineating watersheds using digital elevation data and contours. These areas are shown in Table 1-32 of Attachment B.

The banks of Cell 2W also contribute runoff to the pond(s) of the Tailings Basin. The runoff quantity is described in Section 5.2.1.2.2 (Figure 5-6). The contributing area varies through time as the FTB is developed and rises along the eastern banks of Cell 2W. The area was determined by delineating watersheds using digital elevation data and contours. These areas are shown in Table 1-32 of Attachment B.

Evapotranspiration is calculated as either a percentage of precipitation or as a depth per time depending on the area to which it is applied. The following areas have been separated to have unique *ET* values:

- open water in the active pond
- active (receiving slurry from the Beneficiation Plant) Flotation Tailings delta
- inactive Flotation Tailings beaches
- FTB dam side-slopes, covered with bentonite amended LTVSMC tailings
- inactive Flotation Tailings beaches covered with bentonite amended Flotation Tailings

Open-water evaporation (rather than evapotranspiration) from inactive ponds is considered a baseline input. Ponds considered inactive are the existing ponds in Cells 1E and 2E in the Continuation of Existing Conditions Scenario Model and the combined pond in closure (beyond Mine Year 20) in the Project Model. See Section 5.2.1.1.2 for the details on this input. Evaporation from the active ponds and the active delta is higher than for the inactive ponds due to the heated water that is discharged from the Beneficiation Plant. During operations, the ponds in Cells 1E and 2E during early years, and the combined pond in later years, will use the elevated evaporation rates because they will both be heated.

The Meyer Model was used in previous water balance modeling of the FTB (Reference (43)). For the modeling described here, the Meyer Model was simply updated to use climatic data from the new climate normal period (1981-2010) because it had been calibrated to the site-specific land use previously. The monthly values of calculated evaporation are aggregated to generate annual evaporation values (in/yr). Using this generated sample set of 30 years, a distribution was fit to the results to describe the uncertainty in annual average open-water evaporation. Furthermore, as discussed in detail in Reference (43), the existing open water evaporation rates were adjusted to account for heated discharge to the ponds.

The evaporation rates determined for the active pond in early years and the combined pond in later years of operations were 32.5 in/yr and 30.8 in/yr respectively. For comparison, the values used in the DEIS modeling (Reference (43)) were 33 in/yr and 31 in/yr for the active pond in early years and the combined pond in later years respectively. The variability in the evaporation rates from the active ponds is significantly less than the existing evaporation rates because of the steady stream of heated water from the Plant. This steady stream plays a significant role in the temperature of the pond and maintains a more steady evaporation rate. As the pond size increases in later years of operations, the steady stream from the plant has slightly less impact on the pond temperature and therefore, evaporation rates are slightly lower and more variable.

Because the updated evaporation rates from active, heated ponds are nearly identical to the evaporation rates previously used in Reference (43), the evaporation rate from the active delta in Reference (43) (46.0 in/yr) is adopted as the mean active delta evaporation rate for the current modeling (see Section 5.2.2.2.3 for a description of the active delta). The coefficient of variation (standard deviation divided by the mean) of evaporation from the active ponds is 1.7% in early years and 2.2% in later years. This shows the decreased variability as the Plant discharge has more impact on the water temperature. Therefore, it can be assumed that the active delta, which is most impacted by the discharge from the Beneficiation Plant, will have the least variability in evaporation rates. A coefficient of variation of 1.5% was assumed for the active delta resulting in a standard deviation of 0.69 in/yr.

Figure 5-22 shows the statistical fit of a normal distribution to the 30 years of generated data. Figure 5-23 shows the cumulative distribution functions for evaporation from open water sources at the Plant Site.

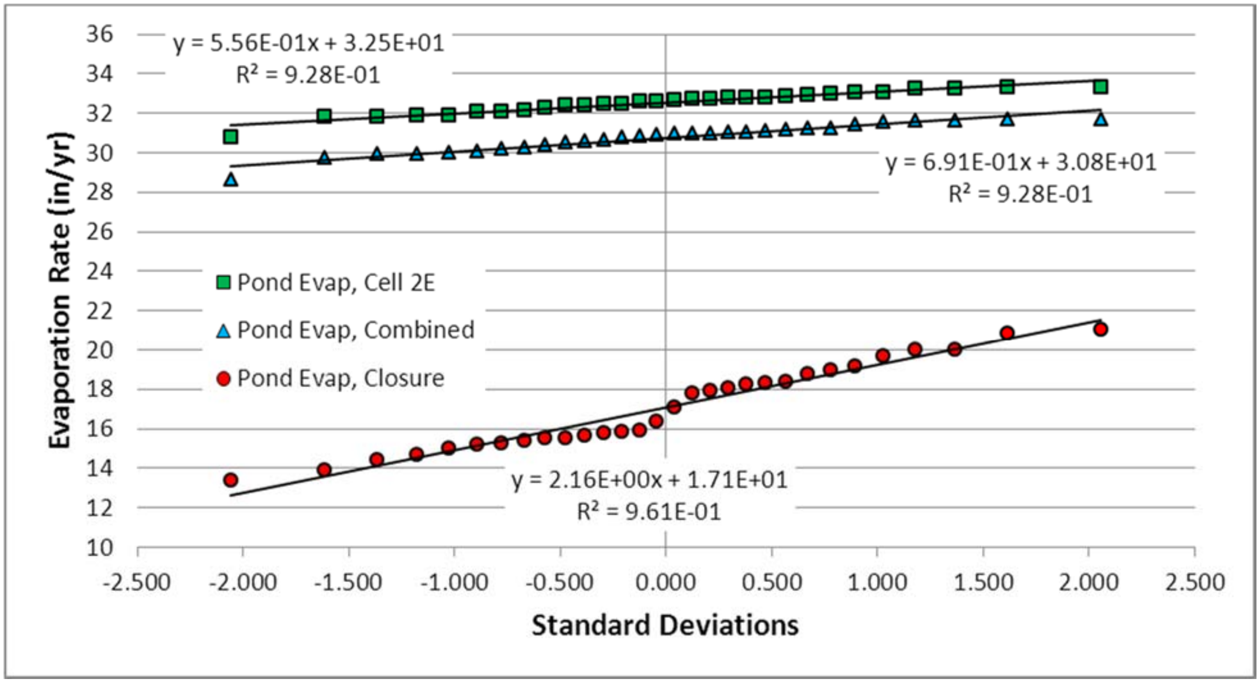


Figure 5-22 Fit of a Normal Distribution to Evaporation from Open Water

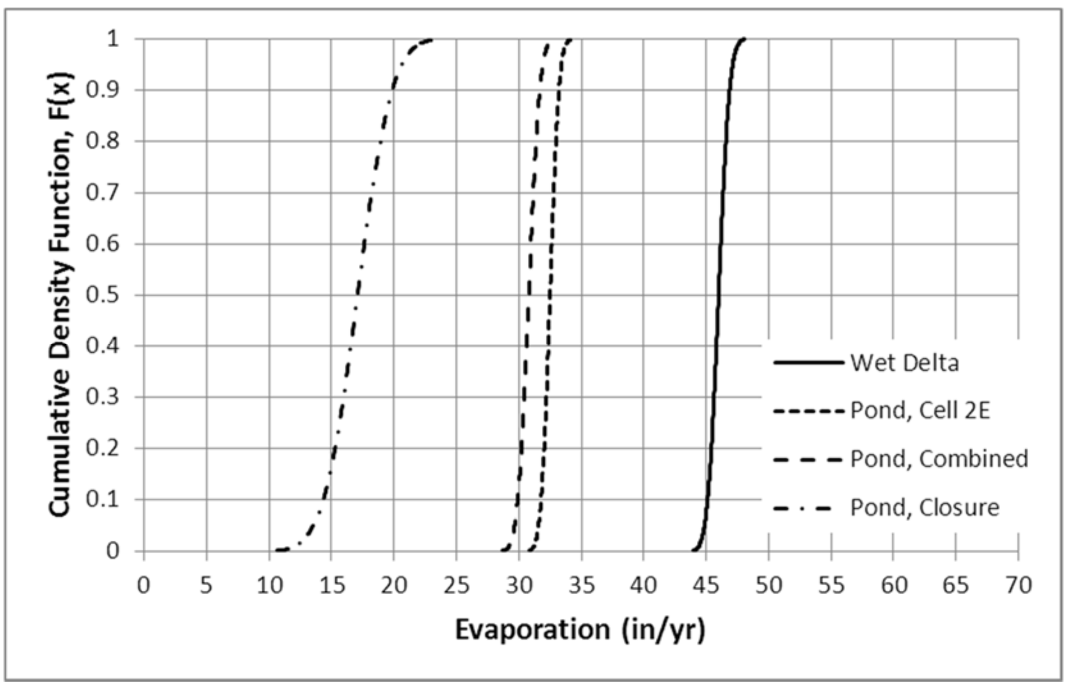


Figure 5-23 Climate Input Distributions for Open Water and the Active Delta

ET and *RO* from the inactive Flotation Tailings beaches were estimated as fractions of precipitation rather than as depths per time. Using the results from the Meyer Model in the "crust" land use category (defined specifically for the Flotation Tailings beaches), the monthly *ET* and *RO* rates and precipitation rates were aggregated to generate annual rates. Then the annual *ET* and *RO* rates were divided by the annual precipitation to generate annual fractional values. The resulting annual fractional data for *ET* and *RO* were then fit to normal distributions (Figure 5-24).

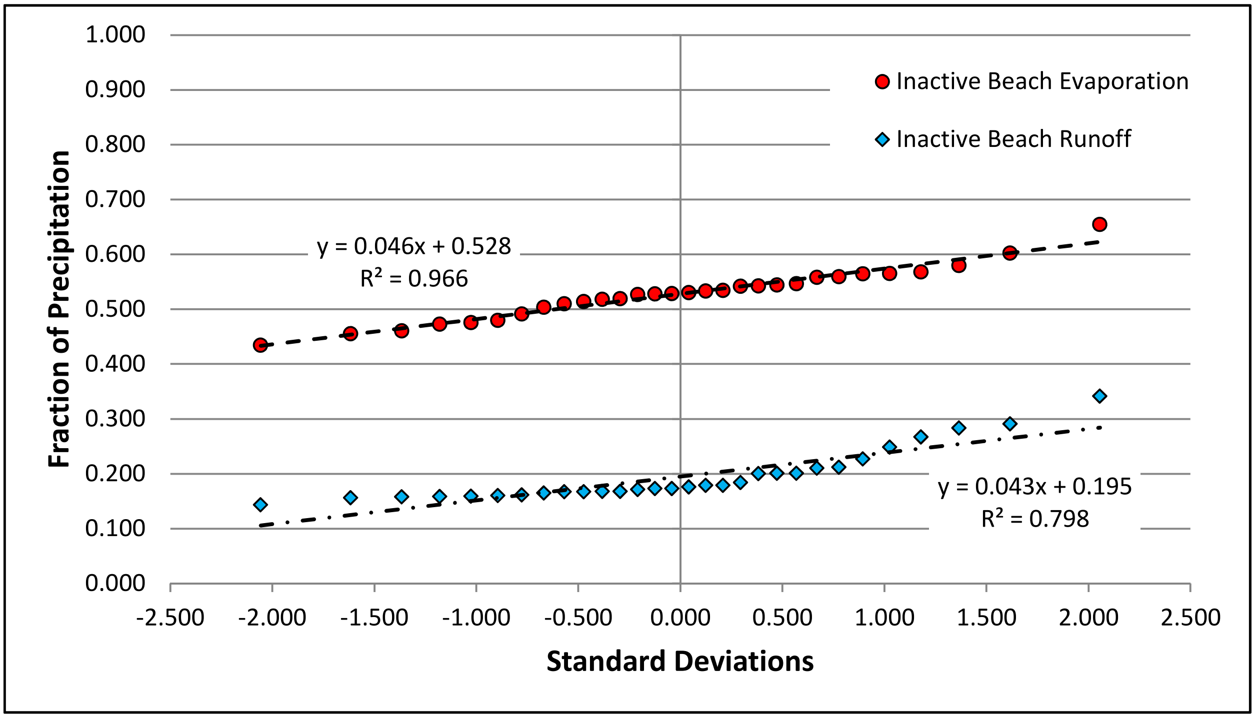


Figure 5-24 Fit of a Normal Distribution for the Inactive Flotation Tailings Beaches

Figure 5-25 shows the CDFs for the fraction of precipitation that becomes *ET* and *RO* from the inactive Flotation Tailings beaches. Table 5-14 shows the statistic fits to the Meyer Model results for both the inactive beaches and the pond.

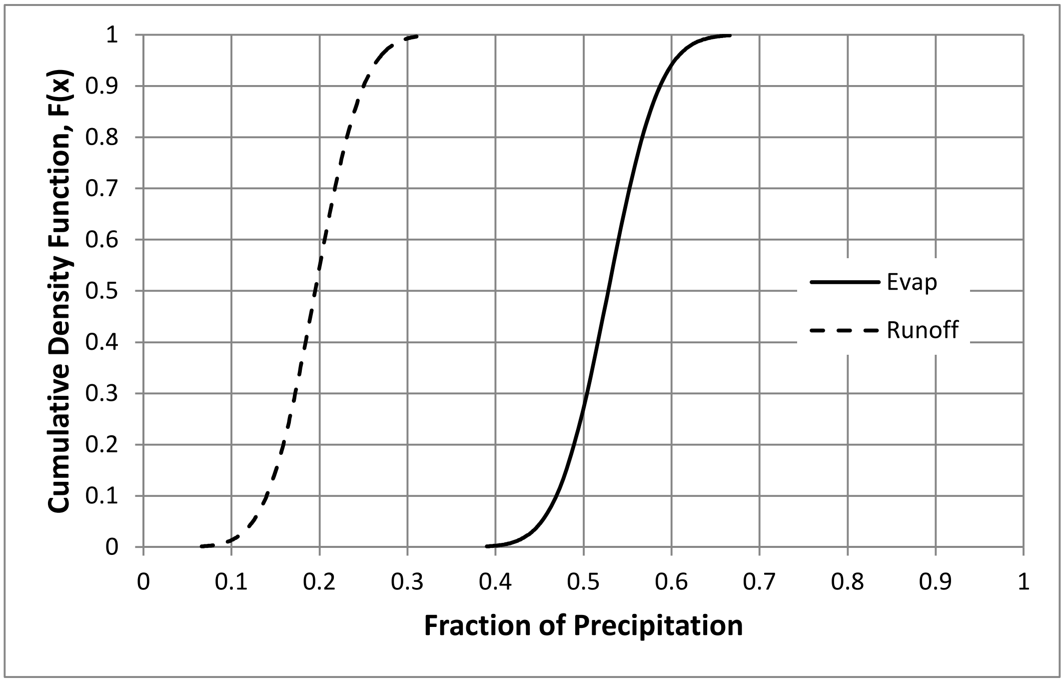


Figure 5-25 Climate Input Distributions for the Inactive Flotation Tailings Beaches

Table 5-14 Statistical Fits to the Meyer Model Results

Variable	Evap, Inactive Beaches	Runoff, Inactive Beaches	Evap, Active Delta	Evap, Pond, Early	Evap, Pond, Early	Evap, Pond, Closure
Units	**(fraction)**	**(fraction)**	**(in/yr)**	**(in/yr)**	**(in/yr)**	**(in/yr)**
Mean	0.528	0.195	46.0	32.5	30.8	17.1
Standard Deviation	0.046	0.043	0.69	0.56	0.69	2.16

NOTE: All variables are assuming a normal distribution.

As part of reclamation, the beaches will be amended with bentonite. The moisture-release properties of the bentonite-amended Flotation Tailings layer controlling the layer's saturation are a deterministic input in the model. The bentonite-amended Flotation Tailings layers were not previously modeled using the Meyer Model. However, a HELP (Hydrologic Evaluation of Landfill Performance) model was developed for the current reclamation plan of the FTB which considered the bentonite-amended Flotation Tailings. This model synthetically generated 100 years of the required climatic data using existing coefficients for Duluth, Minnesota. The model then produced annual means and standard deviations (in inches) for both *ET* and *RO*. Using these HELP model results, the distribution for the fraction of available water that is lost to

ET and *RO* was calculated. The HELP model results give mean and standard deviation results in absolute units (in/yr) rather than fractional units. Therefore, the coefficient of variation was fixed to maintain consistency when converting from absolute to fractional units. Figure 5-26 shows the resulting cumulative distribution functions for *ET* from the inactive beaches covered with bentonite-amended Flotation Tailings and the dam side-slopes covered with bentonite-amended LTVSMC tailings. Table 5-15 shows the statistics from the HELP Model results. During operations, before the beaches are covered with bentonite-amended Flotation Tailings, the mean infiltration rate is about 7.7 in/yr. In closure, when the beaches have been covered by the bentonite-amended Flotation Tailings, the mean infiltration is reduced to about 5.8 in/yr.

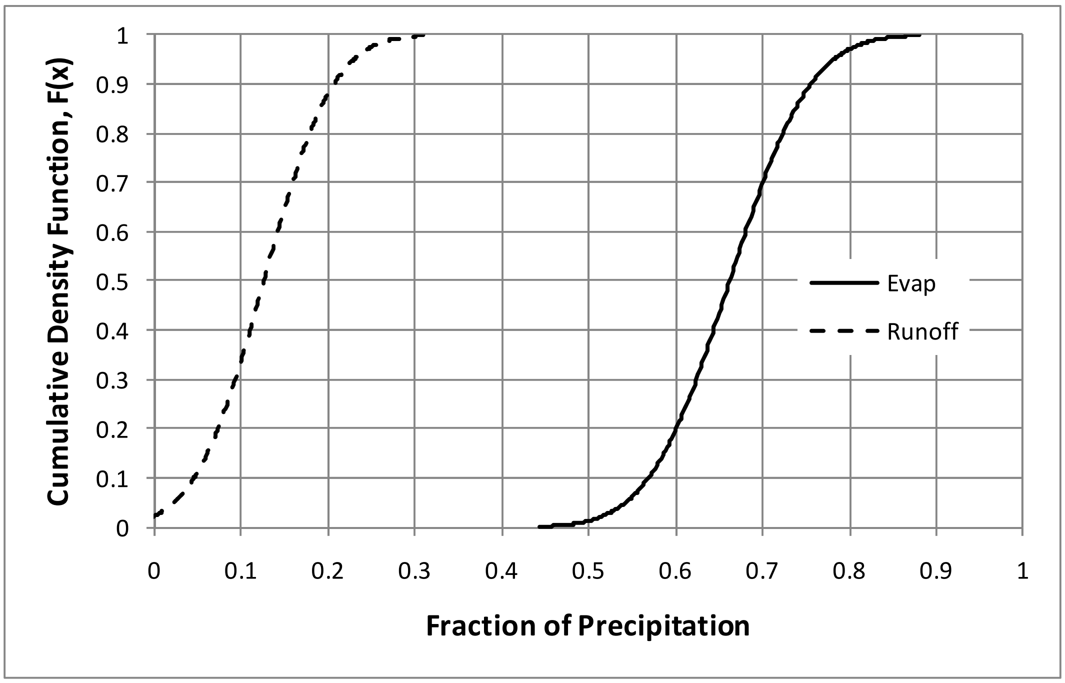


Figure 5-26 Climate Input Distributions for the Bentonite Amended Tailings

Table 5-15 HELP Model Results for Bentonite Amended Tailings

Variable Units	Beach Evaporation *(fraction)*	Beach Runoff *(fraction)*	Dam Evaporation *(fraction)*	Dam Runoff *(fraction)*
Mean	0.662	0.126	0.662	0.126
Standard Deviation	0.073	0.063	0.073	0.063
C.V.[(1)]	0.110	0.503	0.110	0.503

NOTE: Assumes 12" glacial till overlaying 18" of bentonite amended Flotation Tailings overlaying Flotation Tailings
(1) Coefficient of Variation

ET from all areas of the FTB is lost from the system to the atmosphere. *RO* from the Flotation Tailings beaches (both active and inactive), the forested contributing watershed areas, and the existing dam separating Cell 2W from Cell 2E and 1E is added to the free water in the FTB Pond. *RO* from the FTB dams that is directed outside of the Tailings Basin is added to surface water flow captured by the FTB Containment System.

As was done for the LTVSMC tailings in the Tailings Basin, any available water in each area of the FTB that is not lost to *ET* or does not become *RO* is considered available for infiltration (*I*). Therefore, precipitation equals the sum of *I*, *RO* and *ET* (storage is not allowed on the surface of the FTB areas). In some cases the randomly generated fractions of available water that become *RO* and *ET* could sum to more than 1, which is not physically possible. Therefore, the allocation of precipitation is prioritized and limited to eliminate instances of negative or zero infiltration for model stability and functionality, which is discussed in Section 5.2.1.2.1.

5.2.2.2.5 Entrainment

Entrainment loss is the loss of water trapped in the void spaces of the Flotation Tailings during deposition. It is considered a loss because it is removed from the free water within the pond and the circulating water system. The entrainment losses estimated for the current FTB design are dependent on the estimated mass production rate, porosity, and bulk density of the Flotation Tailings (Section 5.1.3.1 of Reference (5) for details on porosity and bulk density of the Flotation Tailings beneath the pond). The relationship to calculate the rate at which void space is made available and therefore, flooded with water, is shown below in Equation 5-16:

$$\dot{V}\theta = \frac{\dot{M}}{\rho_w \gamma}\frac{\theta}{(1-\theta)}$$ **Equation 5-16**

Where:

V-dot is the total volumetric flow rate of the Flotation Tailings and void spaces [L^3/T]
θ is the porosity [L^3/L^3]
M-dot is the mass flow rate of the Flotation Tailings deposited in the basin [M/T]
ρ_w is the density of water [M/L^3]
γ is the specific gravity of the Flotation Tailings [--]

For example, if the mass flow rate of the Flotation Tailings is 10,000,000 tons/yr, the density of water is 62.4 lbs/ft^3, the specific gravity of the Flotation Tailings is 3.0, and the porosity of the bulk Flotation Tailings is 0.52 cm^3/cm^3, then the volumetric flow rate of water lost to the void spaces via entrainment is estimated to be approximately 1650 gpm. It is assumed that all Flotation Tailings are deposited fully saturated.

5.2.2.2.6 Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows

The total seepage from the Tailings Basin consists of seepage from the pond(s), and water that has infiltrated through the beaches and dams. As shown in Attachment B Table 1-1 and Table 1-31, the seepage rates from the ponds are assumed to be known rates calculated by the calibrated MODFLOW models of the existing Tailings Basin and the Flotation Tailings Basin. Total seepage leaving the toes of the Tailings Basin will vary with time and realizations because it is a summation of all of the directed infiltration and seepage throughout the Tailings Basin. In addition, the distribution of flow from each area of the basin to the different toes will vary through time. See Table 1-25, Table 1-27, and Table 1-31 of Attachment B for details on the values used to determine what percentage of flow from each location reports to each toe of the Tailings Basin.

As described in Section 5.2.1.2.3, the depth to the phreatic surface (Table 1-29 of Attachment B) within the different material types estimated by the MODFLOW model (Attachment A) was used to calculate the volume of saturated and unsaturated Flotation Tailings at various points in time during operations, closure and long-term reclamation (Table 1-26 and Table 1-28 of Attachment B). This was done by approximating a flat bottom to the Tailings Basin and a typical elevation of the tops of each area of the Tailings Basin (e.g., Cell 2W coarse LTVSMC tailings). The volume of saturated LTVSMC tailings or Flotation Tailings was calculated as the top elevation minus the assumed flat bottom (total height) less the depth to the phreatic surface, multiplied by the area.

The same delay times and dispersion assumptions for flow within the Tailings Basin used in the Continuation of Existing Conditions Scenario Model (Section 5.2.1.2.3) are used for the Project Model.

The outflow rates from all areas of the Flotation Tailings Basin are directed towards the toes of the Tailings Basin and delayed by the travel times assumed. The flows are then summed together at each toe of the Tailings Basin to determine the total seepage rate at any time.

In reclamation and long-term closure, the FTB will continue to receive water from precipitation and runoff from the adjacent contributing watersheds. The calculations for precipitation and runoff will not change upon closure. The FTB will continue to lose water to evaporation and seepage from the basin. In reclamation and long-term closure, evaporation rates and runoff rates within the FTB are calculated using rates from the bentonite-amended Flotation Tailings described in Section 5.2.2.2.4. Infiltration rates into the bentonite amended Flotation Tailings beaches are reduced in closure because of the addition of bentonite. Because bentonite is added to a layer of the Flotation Tailings in Cell 1E/2E, and not in 2W, infiltration rates in 2W are higher than those in Cell 1E/2E. Seepage rates from the permanent pond in the FTB will also decrease because of the bentonite augmentation in the bottom of the pond. The volumetric seepage rates are calculated based on the extents of the pond.

Because seepage rates from the basin will likely exceed infiltration rates into the FTB at the beginning of closure, the phreatic surface is expected to lower through time until a new equilibrium is reached. As the phreatic surface lowers, the seepage rates from the basin will also decrease. Finally, because of the bentonite augmentation in the bottom of the permanent FTB Pond, the FTB Pond is expected to be perched above the phreatic surface.

5.2.2.2.7 Loading

Model inputs related to mass loading from the FTB are shown in the tables in Attachment B and described in Reference (5).

As discussed in Section 5.6 of Reference (20), cement deep soil mixing (CDSM) will be used to enhance the shear strength of select zones of the existing LTVSMC fine tailings/slimes and peat layers. CDSM is a well-established in-situ soil stabilization method that mixes soil with cement, such as hydrated Portland cement, or another suitable stabilizing agent. In general, hydrated Portland cement is composed of calcium silicate hydrates, portlandite, hydrated aluminates, ferrites, and sulfate minerals. It may contain minor sodium and potassium dissolved in pore fluid. Therefore, it could theoretically be a source of calcium, aluminum, iron, magnesium, sulfate, sodium, potassium and alkalinity to drainage. However, the water model assumes that the cement component of the CDSM zones does not contribute appreciable constituent load for several reasons: 1) the mass of the cement comprises only a minor amount, approximately 0.1% by volume% and approximately 0.01% by mass, of the total mass of LTVSMC tailings in which it will be emplaced; 2) the constituents present in Portland cement are controlled by solubility relationships and observed concentration caps in the seepage from the Tailings Basin and are, therefore, insensitive to release rates; and 3) during the CDSM mix design process, a cement composition will be selected that is relatively non-reactive in the presence of tailings basin seepage.

5.2.2.3 FTB Containment System and FTB South Seepage Management System

In the Project Model, the FTB Containment System is installed a short distance (~250 feet) from the toe of the Tailings Basin (Section 2.1.4 of Reference (1)). The containment system is designed to capture all surface and groundwater flow. However, for the modeling, it is assumed that the containment system along the northern, northwestern, and western sides of the Tailings Basin will capture 100% of the surface flow and 90% of the groundwater flow at the upstream end of the aquifer (Attachment C of Reference (1). This is a conservative assumption, as demonstrated by modeling in Attachment A. Along the eastern side, it is assumed that 100% of the seepage will be captured, both surface flow and groundwater flow (Section 2.1.4 of Reference (1)). The surface flow to the containment system consists of runoff from the Tailings Basin dams, watershed runoff from the watershed area between the toes and the containment system, the upwelled seepage that is in excess of the groundwater flow path capacity, and the infiltration through the north buttress. The amount of groundwater flow that is captured is calculated using Equation 5-17.

$$Q_c = (0.9) * Q_u$$

Equation 5-17

Where:

Q_c is the captured groundwater flow [L^3/T]
Q_u is the flow entering the groundwater flow path from the Tailings Basin seepage [L^3/T]

Flow from the containment system is either 1) sent directly back to the FTB Pond dependent on the demand of the FTB Pond, 2) sent to the FTB WWTP to be treated, or 3) blended with FTB WWTP effluent during West Pit flooding at the Mine Site (from Mine Year 20 to approximately Mine Year 55; set in the model so that a maximum of 50,000 acre-feet of water is sent to the West Pit). Flow from the eastern portion of the FTB Containment System is always sent directly back into the FTB Pond.

The FTB South Seepage Management System, described in Section 2.1.3 of Reference (1), collects 100% of the seepage from the Tailings Basin to the south and any runoff from the exterior of the South Dam. This collected water is either pumped back up into the FTB Pond or is pumped to the WWTP where it is treated and discharged (Section 5.2.2.6).

5.2.2.4 Hydrometallurgical Plant

5.2.2.4.1 Hydrometallurgical Plant Slurry

The Bateman study (Reference (52)) mentioned in Section 5.1.2.2 includes an analysis of the Hydrometallurgical Plant. Table 5-16 shows the results from this study. The values shown are inputs to the Hydrometallurgical Plant portion of the Project Model.

Table 5-16 Hydrometallurgical Process Streams to and from the HRF

Stream	Mass of Residue (Tons/year)	Flow rate of Water (MGAL/year)(1)
Stream from Hydrometallurgical Plant	334,200	114.4
Additional Water to the HRF	--	13.83
Total Hydrometallurgical Plant Water Demand	--	234.2
Hydrometallurgical Plant Clean/Raw Water Demand	--	65.70

(1) Flow rates of water from these streams is modified by an uptime factor of 0.9126

The additional water to the residue facility stream is described in detail in Section 5.1.2.2.

5.2.2.4.2 Raw Water Demand

The HRF has been designed to maintain a settling pond. The free water in the pond is the main source of water to meet the Hydrometallurgical Plant demand. However, the plant water demand will not be met at the expense of maintaining the necessary pond level. Any excess water needed in the system is met by pumping make-up water from the Plant Reservoir which is supplied from Colby Lake. This is a calculation in GoldSim as the model runs through each simulation. Some water for reuse in certain process steps in the Hydrometallurgical Plant could be met by effluent from the WWTP if there was excess effluent beyond what the tributaries or the overall system required, however this is not considered in the GoldSim model.

The calculated make-up water during each time step is added to the Hydrometallurgical Plant's demand for clean water to estimate the total amount of water that needs to be pumped from Colby Lake throughout operations for the hydrometallurgical process.

5.2.2.5 Hydrometallurgical Residue Facility (HRF) Details

The dimensional characteristics of the HRF (volume, area, and elevation) are assumed to be time-varying deterministic inputs based on the design of the facility. The components of the HRF water balance can be divided into five main groups, which are listed below and described in detail in the following text.

- climate
- Hydrometallurgical Plant water
- entrainment

- raw water demands (discussed in Section 5.2.2.4.2)
- leakage

5.2.2.5.1 Climate Inputs; Precipitation, Evaporation, and Runoff

The open water in the HRF facility is the only area where evaporation is being estimated. The open water evaporation rate used for the HRF is the same rate used for the FTB Pond during operations in early years (mean of 32.5 in/yr and standard deviation of 0.56 in/yr). The details describing how these this evaporation rate is estimated is available in Section 5.2.2.2.4. Evaporation from the HRF is lost from the system to the atmosphere.

Watershed yield from the forested watersheds and runoff from the existing reclaimed LTVSMC dams of Cell 2W is calculated the same way as it is done for the FTB (Section 5.2.1.2.2 and Section 5.2.1.4.3). It should be noted that final design of the HRF may include controls for preventing this water from entering the facility. *RO* from open water, intuitively, is assumed to be zero. *RO* from areas within the crest of the HRF that are not inundated with pond water (typically considered the beach area) is assumed to be 100% of precipitation because the entire facility is lined. Runoff from the forested contributing watershed areas and the existing exterior dams of Cell 2W is added to the free water in the pond.

In reclamation, the HRF is drained (both the pond and the water in the pore spaces of the residue) steadily over the course of reclamation (10 years; Mine Year 20 through Mine Year 30) and the drained water is treated by the WWTP and is discharged and/or sent to the FTB. Once the draining and treating is completed, the HRF is covered so that precipitation landing on the HRF runs outward and down the slopes to natural drainage ways. The cap is assumed to be impermeable so that infiltration through the closed HRF does not occur.

5.2.2.5.2 Inflow from the Hydrometallurgical Plant

The water portion of the slurry from the Hydrometallurgical Plant to the HRF consists of the 104.4 MGAL/yr (91.26% uptime of 114.4 MGAL/yr) from the metallurgical process in the Hydrometallurgical Plant and the 12.6 MGAL/yr from other processes at the plant (totaling 117.0 MGAL/yr or 222.5 gpm). The deposition system is described in detail in Section 2.3 of Reference (39).

Water is also pumped from the surface (decanting) of the HRF to meet the Hydrometallurgical Plant water demand (except for the raw water demand). According to the Bateman Hydrometallurgical Plant water balance, the Hydrometallurgical Plant demands a total of 213.7 MGAL/yr, which includes the 59.96 MGAL/yr (114.0 gpm) of clean water from Colby Lake.

5.2.2.5.3 Entrainment

Entrainment loss is the loss of water trapped in the void spaces of the residue during deposition. The entrainment loss at the HRF is calculated the same way as at the FTB described in

Section 5.2.2.2.5. For the residue, the porosity is assumed to vary between 0.53 and 0.61 with the most likely value being 0.57. The specific gravity of the residue is assumed to be 2.76 which is consistent with the MetSim modeling from Bateman.

5.2.2.5.4 Leakage

The double liner system designed for the HRF is impermeable enough so that its effect on the environment can be ignored (Reference (22)). Leakage is ignored because all leakage captured between layers of the double liner is pumped back into the HRF. During operations, the HRF will only lose water via evaporation.

The following assumptions are used to calculate the leakage rate through the upper layer of the double liner.

- Leakage through the upper layer occurs entirely through potential defects in the upper layer.
- The defects are assumed to be circular with a diameter of 1 centimeter.
- The number of defects per acre in the upper layer is uncertain, re-sampled once per realization. The distribution is the same as that for the Mine Site liner leakage calculations; a log-normal distribution with mean 2 defects per acre and standard deviation 1.82 defects per acre.
- Flow through a defect is calculated using the orifice equation. Because there is a pond present in the design of the HRF, the head on the defect is simply the elevation difference between the pond water surface and the liner.
- Flow through the residue material is calculated using Darcy's Law for saturated porous media.
- Flow through the upper layer may be limited either by the size and number of defects in the liner, or the conductivity of the residue material above the liner.

The flow per unit area, q, based on the orifice equation is shown in Equation 5-18, where n is the number of defects per acre [$1/L^2$], a is the area of the defect [L^2], H is the depth of the residue over the liner [L], and d is the distance between the water surface and the residue surface (negative if the water drops below the residue, positive if there is a standing pond) [L].

$$q = 0.6na\sqrt{2g(H+d)}$$

Equation 5-18

When a standing pond is present in the HRF, the flow per unit area, q, based on Darcy's Law is shown in Equation 5-19, where K is the saturated hydraulic conductivity of the hydrometallurgical residue [L/T]. Hydraulic conductivity is deterministic with a value of $3.4x10^{-5}$ cm/sec (Reference (53)).

When the water surface drops below the residue while it is draining in closure, the flow per unit area is simply equal to the saturated hydraulic conductivity; in other words, *d* equals zero.

$$q = K\left(\frac{H+d}{H}\right)$$

Equation 5-19

Figure 5-27 is an example plot of the flow based on the orifice equation and based on Darcy's Law at different residue material depths. The figure shows that, with no residue and an assumed pond of 6 feet deep, there is a leakage flow, which is what would be expected. Second, as the residue material increases, the depth of the pond above the residue becomes less and less important and the flow through the material approaches *K*. The figure also shows that the model will use whichever flow is lower at any given depth of material above the liner system.

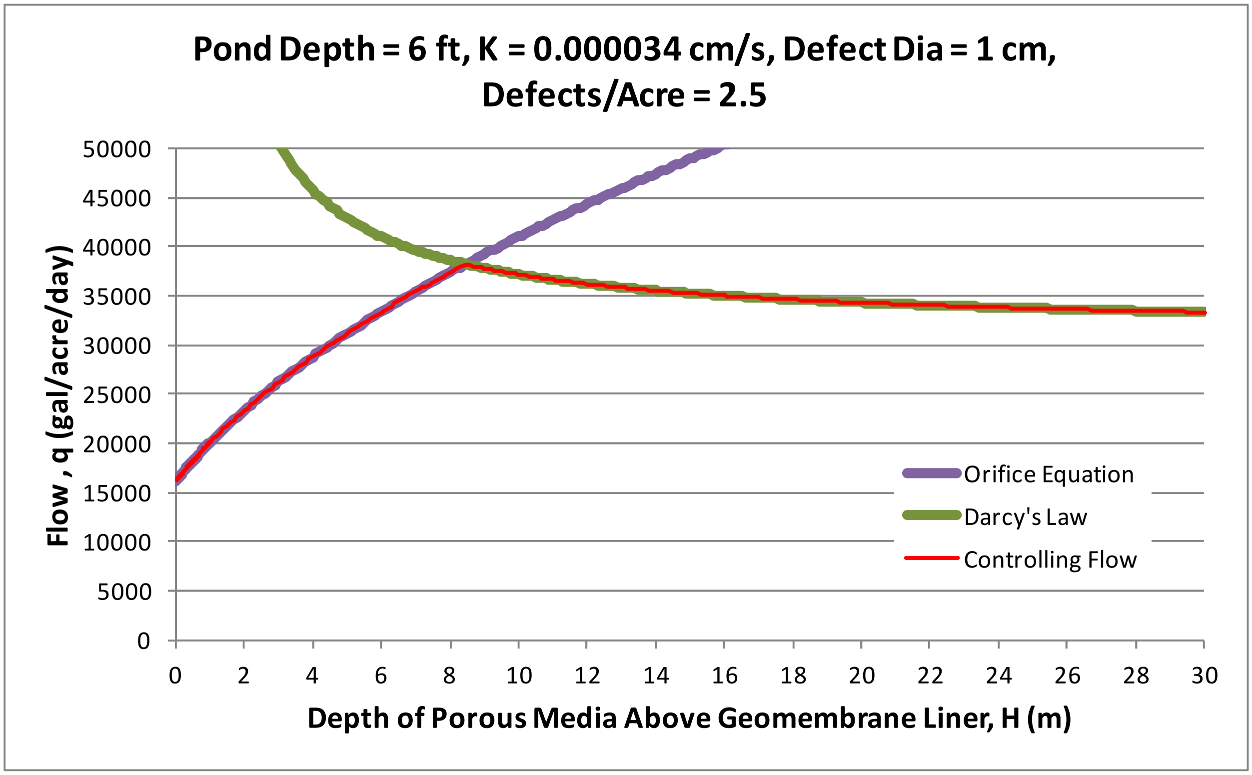


Figure 5-27 Example Leakage Rates from the Upper Layer of the HRF Liner System

5.2.2.6 Waste Water Treatment Plant (WWTP)

The WWTP is designed to treat the water captured by the FTB seepage capture systems and water impacted by the Project. The quantity and quality of influent water to the WWTP is calculated in the GoldSim model. The required capacity is in part driven by the quantity of water needed for stream augmentation (Section 5.2.2.9.1). The model indicates that the treatment capacity of the WWTP is approximately 2,000 gpm through Mine Year 6. In Mine Year 7 the capacity of the WWTP may need to double, to 4,000 gpm, in response to the potential increase in flows from the Mine Site and the FTB seepage capture systems. In reclamation and long-term closure, the WWTP treatment capacity is estimated to be 3,500 gpm, to expedite flooding the West Pit, and to decrease concentrations in the FTB Pond. The expected treatment flow in long-term closure is about 2,400 gpm to handle the excess water in the overall system.

It is assumed, based on the current conceptual level design of the FTB WWTP, that 90% of influent water quantity will be discharged. Discharge locations are described in Section 5.2.2.9.1. Table 5-17 shows the assumed effluent concentration for the FTB WWTP which will be discharged (Section 4.2 of Reference (3)).

Table 5-17 FTB WWTP Effluent Concentrations

Constituent	Effluent Concentration (mg/L)
Ag	0.001
Al	0.125
Alk (as CaCO3)	100
As	0.01
B	0.4
Ba	0.005
Be	0.004
Ca(1)	35.1
Cd	0.002
Cl	1.3
Co	0.005
Cr	0.011
Cu	0.009
F	0.05
Fe	0.3
K	0.5

Constituent	Effluent Concentration (mg/L)
Mg(1)	3
Mn	0.05
Na	2
Ni	0.05
Pb	0.003
Sb	0.031
Se	0.005
SO_4	9
Tl	0.00056
V	0.05
Zn	0.1

(1) Calcium and Magnesium value set so that the effluent hardness is 100 mg/L

Five percent of the influent water quantity is used to backwash the greensand filter. The quality of the backwash water is similar to that of the influent water, with the exception of increased concentrations of Fe, Mn, and K. The concentrations of these constituents in the backwash water are shown in Table 5-18. This stream is recycled back to the FTB Pond.

The remaining 5% of the influent water quantity will become reject concentrate. During operations and for as long as the Mine Site WWTF contains a chemical precipitation step, the WWTP reject concentrate will be sent to the Mine Site WWTF for further treatment. By the end of Mine Year 41, the Mine Site WWTF will stop reclamation treatment of the East Pit; once the West Pit is flooded the WWTF will transition to RO treatment. Once reclamation treatment of the East Pit is complete the reject concentrate from both plants will be evaporated and crystallized. The residual solids will be managed off-site.

Table 5-18 Greensand Filter Backwash Waste Concentrations when not Equal to Influent

Parameter	Units	Filter Backwash
Fe	mg/L	4
Mn	mg/L	30
K	mg/L	11

5.2.2.7 Plant Site Sewage Treatment System

The STS effluent represents the seasonal discharge of water from the secondary stabilization pond to the FTB Pond as described in Section 5.1.2.9. The secondary pond will discharge approximately 11.2 million gallons to the FTB Pond each year. The discharge periods will be once in the spring starting in March and once in the fall starting in September. The discharge period duration will range each season from 1 to 4 months and is treated randomly each time the STS discharges. In the overall water balance, this flow volume is a small amount compared to the other sources of water to the FTB Pond.

The water quality of the STS effluent is estimated by adding a randomly generated load to water equivalent in quality to Colby Lake water. Colby Lake will be the domestic water source for the Plant Site, and the use and treatment of this water will result in increasing concentrations for select constituents (Reference (54)). The constituents where the effluent water quality from the STS is increased above the modeled Colby Lake water quality are shown in Table 1-45 of Attachment B. For other modeled constituents, the net gain of mass load through domestic use and sewage treatment is assumed to be negligible compared to the existing water quality within Colby Lake.

5.2.2.8 Groundwater

The same model assumptions and inputs related to groundwater flow used in the Continuation of Existing Conditions Scenario Model are used in the Project Model. However, the flow through the groundwater flow paths is altered in the Project Model due to the construction of the FTB Containment System. Figure 5-28 is a modified version of Figure 5-11 to show the Project conditions due to the containment system.

As for the groundwater flow paths in the Continuation of Existing Conditions Scenario Model, Q_s is the total seepage rate from the Tailings Basin to the toe (as calculated in the GoldSim model as a function of infiltration rates through the LTVSMC tailings), Q_u is the flow that enters the aquifer, Q_r is the flow that is in excess of the aquifer capacity and upwells to surface flow (Section 5.2.1.3.1 for more details), and Q_o is the flow discharging from the flow path to surface water. Mass load from recharge is added to every cell of the flow path. Additionally, Q_c is the flow that is captured by the containment system (described more fully in Section 5.2.2.3) and $Q1$ is the groundwater flow that bypasses the containment system, transporting constituent load from the Project to the environment.

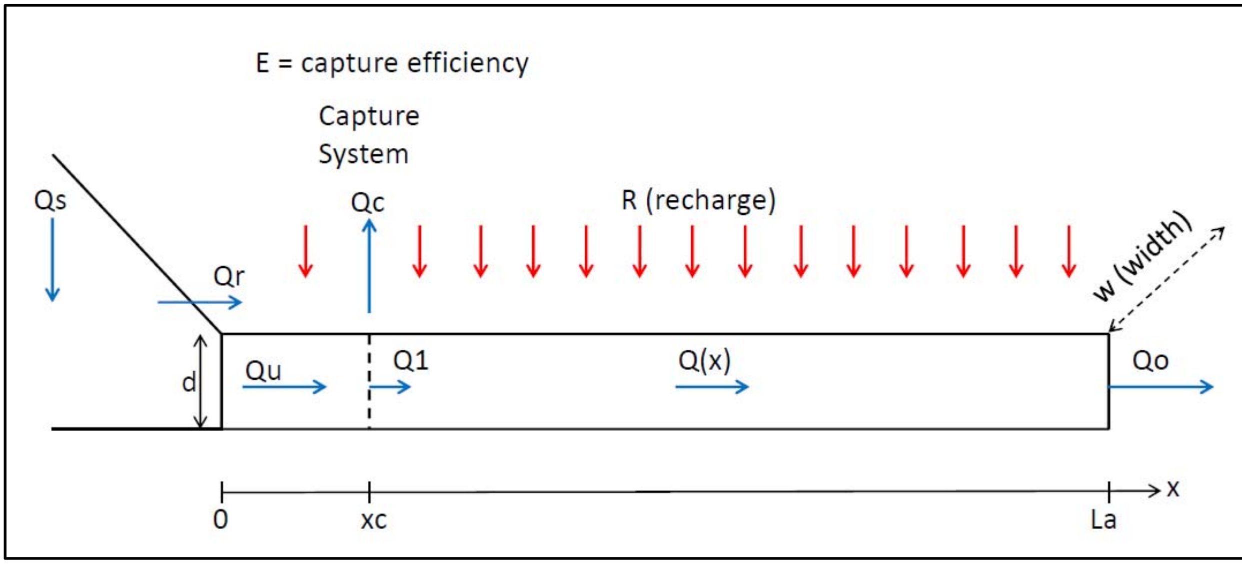


Figure 5-28 Conceptual Drawing of the Modeled Project Groundwater Flow Paths at the Plant Site

The Project Model assumes that the FTB Containment System will capture 100% of the surface flow (Q_s in excess of Q_u, or Q_r) and 90% of the flow at the upstream end of the aquifer (Q_u). Therefore, the groundwater flow that bypasses the containment system (Q_1) is 10% of Q_u (Equation 5-20). Because the eastern portion of the FTB Containment System is assumed to be 100% effective, there is no flow that bypasses this portion of the containment system and therefore Q_1 is zero. All flow captured outside of the East Dam is pumped back up into the FTB Pond.

$$Q1 = (1 - 0.9) * Q_u$$ **Equation 5-20**

Where:

Q_c is the captured groundwater flow [L^3/T]
Q_u is the flow entering the groundwater flow path from the Tailings Basin seepage [L^3/T].

5.2.2.9 Surface Water

Modeling of surface water in the Project Model is conducted using the same assumptions and model inputs (i.e., flow per unit area) as the Continuation of Existing Conditions Scenario Model (Section 5.2.1.4). However, evaluation location UC-1 in the Continuation of Existing Conditions Scenario Model, is not modeled in the Project Model because it is physically within the boundary of the FTB Containment System. Additionally, the FTB Containment System cuts off some sources of water to the surface water evaluation locations that were present in the Continuation of Existing Conditions Scenario Model, such as runoff from the exterior faces of the Tailings

Basin dams. Effluent from the WWTP is an additional source of surface water flow in the Project Model, as discussed further in the following section. Figure 5-29 is a schematic of the surface water evaluation locations in the Project Model, their hydraulic connectivity, and the sources of flow and load to each location. Figure 5-29 is directly comparable to Figure 5-12.

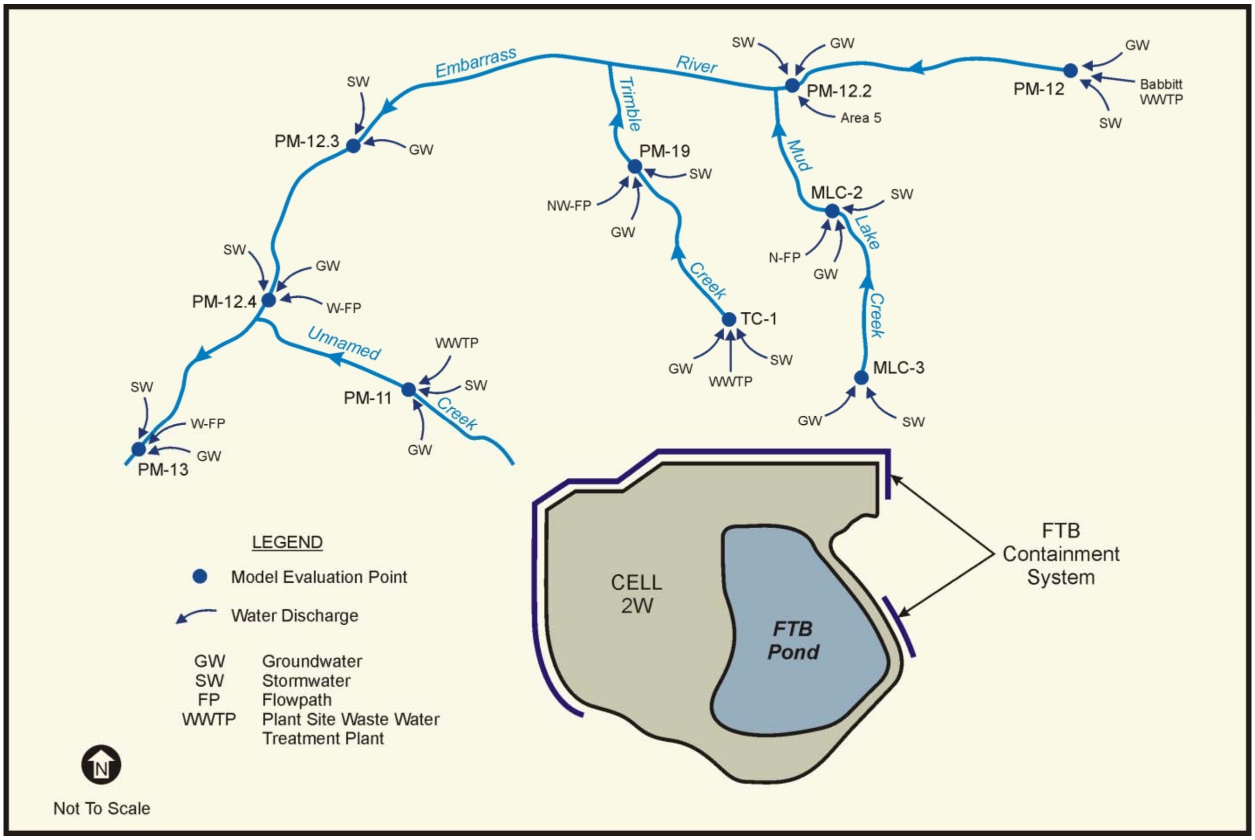


Figure 5-29 Schematic Showing Surface Water Evaluation Locations, Hydraulic Connectivity, and Sources to Each Location for the Project Model

5.2.2.9.1 Stream Augmentation to Prevent Significant Hydrologic Impacts

Construction of the FTB seepage capture systems will significantly reduce the amount of seepage leaving the Tailings Basin, a portion of which would become streamflow in downstream tributary streams, so stream augmentation measures will be implemented as described in Section 5.1.2.8.

Table 5-19 describes the average annual flows in the tributaries under existing conditions, to which the Project will be compared in order to assess hydrologic impacts. Table 5-19 shows (1) the existing seepage from the Tailings Basin, the existing seepage split into (2) groundwater and (3) surface flow, (4) the existing contribution from the watershed, and (5) the total annual average surface flow in the tributaries.

Table 5-19 Existing Average Annual Flow Conditions in the Tributaries in Gallons per Minute

	Mud Lake Creek (MLC-3)	Trimble Creek (TC-1)	Unnamed Creek (PM-11)	Second Creek (SD026)
Current total Tailings Basin seepage to watershed(1)	1980		610	230
Seepage to groundwater(2)	44	55	110	0
Seepage to the tributaries(3)	374	1507	500	230
Existing contribution from the watershed(4)	458	714	750	0
Total annual average surface flow(5)	832	2221	1250	230

(1) Average annual seepage to the toes of the Tailings Basin (sum of rows 2 and 3).

(2) Average aquifer capacity at the upstream end of each flow path (Table 1 of CDF061, Version 1, 01/17/13).

(3) Flow (seepage – aquifer capacity) that reports to each tributary. Note that 75% of the seepage from the north bank (870 gpm) of Cell 2E that *does not* stay in the aquifer actual reports to Trimble Creek because of the location of the watershed divide.

(4) Watershed area includes both the undisturbed watershed areas and the outer banks of the Tailings Basin.

(5) Sum of rows 3 and 4.

Table 5-20 shows the annual average surface flow to the tributaries under Project conditions. Note that compared to existing conditions (Table 5-19) surface flow is reduced to Trimble Creek, Unnamed Creek and Second Creek due to the FTB seepage capture systems, and that surface flow to Mud Lake Creek is increased due to the drainage swale. Table 5-20 also shows the annual average minimum additional flow that must be discharged from the WWTP to each of the four tributaries upstream of the headwaters. These flow requirements are determined by taking +/- 20% of the existing annual average flow and subtracting what is expected to come from the remaining watershed to the tributaries (seepage through the containment system is considered negligible and is not included in the calculation of maximum and minimum flow augmentation). If the target flows are met at the headwaters, they will be met at locations further downstream in the tributaries (as the natural watershed area increases, the percentage of total flow originating as augmentation decreases).

Table 5-20 Determination of Annual Combined Flow Requirement from the WWTP in Gallons per Minute

	Mud Lake Creek (MLC-3)[5]	Trimble Creek (TC-1)	Unnamed Creek (PM-11)	Second Creek (SD026)
Total annual average surface flow[1]	832	2221	1250	230
Expected future contribution from the watershed[2]	734	599	664	0
Minimum requirement from WWTP [3]	0	1178	336	184
Maximum allowable from WWTP [4]	264	2066	836	276
Percent of WWTP	0.00%	69.38%	19.79%	10.83%

(1) Equivalent to item 5 of Table 5-19.

(2) The future contribution from the watershed decreases because the containment system, which is away from the toes of the Tailings Basin, removes watershed area and any runoff from the outer banks of the Tailings Basin.

(3) 80% of the existing total annual average surface flow, less the expected future watershed contribution.

(4) 120% of the existing total annual average surface flow, less the expected future watershed contribution.

(5) The expected future contribution from the watershed for Mud Lake Creek increases because additional watershed is diverted to MLC-3 via the proposed drainage swale. Of the expected 734 gpm, approximately 300 gpm is diverted to MLC-3 through the drainage swale.

The total combined flow required from the WWTP effluent after the construction of the drainage swale must be between 1,698 gpm and 3,442 gpm on an average annual basis (+/- 20% of the current total annual average surface flow, less the expected future watershed contribution, summed for all tributaries). In the GoldSim model, the minimum flow requirement is set at 1,700 gpm. The maximum annual average WWTP effluent flow to the tributaries is currently estimated to be less than 3,600 gpm which is a little more than the maximum allowable of 3,442 gpm. The occasions where the WWTP must operate at 4,000 gpm however are rare and are not expected to be regularly needed for multiple consecutive months. Even with the WWTP operating at full capacity for some months during later years of operations, the average annual flow will still be less than the upper limit of maintaining hydrologic conditions because the effluent during other months of the same year will be less.

The capacity of the WWTP was set at 4,000 gpm so that the storage of water within the FTB Pond is limited. At this capacity, the 90th percentile of the water level in the FTB Pond through operations was limited to about one-tenth of a foot higher than the design level. Additionally, when the water level did increase in the modeling, the increase would occur for one to two months at a time, after which the water level was brought back down by treating and discharging the excess water in the system. When the WWTP capacity was modeled as a lower quantity (i.e., 3,500 gpm) the water level in the FTB Pond would increase by approximately 0.5 feet and would stay elevated for an extended period of time (approximately 6 months). The larger WWTP capacity was chosen for the modeling to provide a greater level of safety regarding the stored volume of water in the FTB Pond, which can have a direct effect on the stability of the dams.

In long-term closure, it is expected that the effluent from the WWTP will be sufficient to meet the minimum flow requirements of the tributaries to prevent significant hydrologic impacts. On an average annual basis, the total inflow to the WWTP (including Tailings Basin seepage, runoff water within the containment system, and water from the FTB Pond to prevent overflow) is expected to be about 2,400 gpm. Removing water losses from the treatment process, the annual average discharge from the WWTP is expected to be less than 2,200 gpm, which is between the minimum and maximum flow constraints for all four tributaries.

5.2.2.9.2 Colby Lake

Colby Lake is the source for make-up water for the Beneficiation Plant and the Hydrometallurgical Plant. Colby Lake is downstream of the Mine Site and the quality of this water body may be affected by Project impacts to the Partridge River. However, other than stormwater, mining features at the Mine Site will not have any surface water discharges during operations. Additionally, long travel times in groundwater flow will prevent any seepage from mining features from arriving at the Partridge River during operations. Therefore, because the Plant Site will only be drawing water from Colby Lake during operations to meet Beneficiation Plant and Hydrometallurgical Plant demand, the quality of Colby Lake water used in the Plant Site GoldSim model does not need to consider potential impacts from the Mine Site. Instead, the Colby Lake water quality used in the Plant Site model is derived from available collected field data through 2013.

Colby Lake water quality is considered a probabilistic input (sampled at each model time step) for the following constituents: aluminum, arsenic, calcium, iron, magnesium, manganese, sulfate, and thallium. Concentrations of these constituents will be sampled from log-normal distributions developed from average daily concentrations observed from 2008 to 2013 (i.e., data collected from multiple lake locations on the same date are averaged to a single data point prior to developing the distribution). Colby Lake water quality for the remaining modeled constituents is considered a constant deterministic equivalent to the average collected data (Large Table 4 of Reference (4)).

The flow of water from Colby Lake to the Plant Site will not be a direct input to the model because it is calculated as the flow necessary to meet the Project make-up water demand. The calculated flow rate from Colby Lake and the modeled water quality of Colby Lake are used together to calculate the loading to the overall system from this model component. In the GoldSim model, this flow stream is a direct input into the Beneficiation Plant and the Hydrometallurgical Plant.

5.2.3 Model Initiations

5.2.3.1 Tailings Basin Initiation

The initial conditions of the Tailings Basin must account for an existing load within the basin and an existing rate at which load is leaving the Tailings Basin. As discussed in the Waste Characterization Data Package (Section 10.2.1 of Reference (5)), the existing water quality of the ponds within the Tailings Basin is based on sampled data (Large Table 7), and the release rates of the LTVSMC coarse and fine tailings were calibrated so that model estimates of water quality at the toes of the Tailings Basin better match the sampled water quality data at the toes of the Tailings Basin.

The existing conditions model was run for 200 years and the final, steady-state average conditions were used as initial conditions for the Continuation of Existing Conditions Scenario Model and Project Model (described in Section 3.1). Initial mass or load for each constituent was calculated in each unsaturated area of the Tailings Basin and at each of the four toes. Additionally, loading rates of each constituent from each of the unsaturated areas and from the ponds of the Tailings Basin were calculated. The loading rates (mass per time) are based on the existing concentrations (mass per volume) and volumetric seepage rates (volume per time) under average conditions. For example, the existing seepage rate from the pond in Cell 2E is estimated at 61.5 in/yr (Table 1-31, Attachment B) and the existing area of the pond is 182.8 acres (Table 1-30, Attachment B). The existing average sulfate concentration of the pond in Cell 2E is 130 mg/L as shown in Table 1-44 of Attachment B. Therefore, the existing loading rate of sulfate from the pond in Cell 2E is about 411 kg/day. Additional load is picked up by the seepage water as dissolved oxygen is consumed and additional sulfate is produced. The total initial loading rate from the pond is shown in Input Table 1-53 of Attachment B. The initial conditions of the Continuation of Existing Conditions Scenario Model and Project Model with respect to loading rates are shown in Input Table 1-52 and Table 1-53 of Attachment B.

5.2.3.2 Groundwater Flow Path Initiation

The groundwater flow paths are represented by a series of coupled, well-mixed cells as described in Section 5.2.1.3.1. The initial concentration of each cell does not equal the background groundwater quality as one might expect. The initial concentration of each cell is the average mixed concentration of each source of flow into that cell, weighted by the flow from each source into that cell, shown in Equation 5-21.

$$C_i = \frac{C_{TB}Q_{TB} + C_{GW}R(wLi)}{Q_{TB} + R(wLi)}$$ **Equation 5-21**

Where:

C_i is the initial concentration in the "ith" cell [M/L^3]
C_{TB} is the average concentration of the existing conditions at the toe of the Tailings Basin (the upstream end of the groundwater flow path) [M/L^3], (Table 1-54 of Attachment B)
Q_{TB} is the seepage from the Tailings Basin into the groundwater flow path [L^3/T]
C_{GW} is the background groundwater quality [M/L^3]
R is the net recharge rate to the aquifer [L/T]
w is the flow path width [L]
L is the length of each cell representing the flow path [L]
"i" is the cell number in the series of cells where 1 is the most upstream cell

For each realization, the initial concentration in each cell is different because the net recharge rate to each flow path and the background groundwater quality is randomly generated each realization. The initial mass then is based on the initial quality and the initial volume of water in each cell, shown in Equation 5-22.

$$M_i = C_i\big(wLd(\theta + K_d(1-\theta)\rho_t)\big)$$ **Equation 5-22**

Where:

M_i is the initial mass in the "ith" cell of the groundwater flow path [M]
d is the depth of the saturated area [L]
θ is the porosity of the surficial matrix material [L^3/L^3]
K_d is the sorption coefficient of a particular constituent of the surficial matrix material [L^3/L^3]
ρ_t is the density of the surficial matrix material [L^3/L^3]

5.2.3.3 Surface Water Initiation

Because of the relatively short residence time of surface water, the initial condition of each surface water evaluation location has minimal impact on the estimates of surface water quality at future times. The estimated water quality at a given surface water evaluation location only has a significant effect on the next few time steps in the model. Therefore, the initial condition of each surface water location is estimated as the average of the sampled water quality data at each location as shown in Table 1-7 of Attachment B. For locations where data does not exist, the nearest downstream surface water evaluation location with available data was used, recognizing that the effect of the initial condition on future model estimates is minimal.

6.0 Model Results

This section discusses results from the probabilistic Plant Site GoldSim water quality model described in this document. All concentration, culpability, and probability of exceedance model results are provided in Attachment D through Attachment L. Section 6.1 discusses water balances in the processing plants, in the FTB Pond, and in the Tailings Basin as a whole. Section 6.2 discusses the mass balance of the Tailings Basin as required by the QAPP (Attachment M). Section 6.3 discusses the water quality in the FTB Pond and the culpable sources of constituent load. Section 6.4 discusses the flow rates and quality of the seepage from the Tailings Basin and the culpable sources of load to the toes. Section 6.5 discusses the impacts to groundwater quality, specifically at the property boundary around the Plant Site. Section 6.6 discusses the impacts to hydrology in the Embarrass River and its tributaries. Section 6.7 discusses surface water quality results in the Embarrass River and in the three tributaries immediately downgradient from the Tailings Basin. Section 6.8 discusses the influent water quality to the WWTP. Finally, Section 6.9 discusses the assessment of mercury at the Plant Site, which required an approach separate from the probabilistic water quality model. Given the low sensitivity of the model predictions to changes in climatic inputs, the climate change sensitivity analysis which was presented in the previous version of this document (version 9) was not updated using the models presented in this report, and the sensitivity analysis was moved to the Sensitivity Analysis of the NorthMet Water Quality Models (Reference (55)).

Also included as Attachment M to this document is the Plant Site Water Quality Model Quality Assurance Project Plan (QAPP), which documents the internal and external reviews of the model inputs, model construct, and model outputs.

6.1 Plant Site Water Balances

Water balances were conducted to account for all water entering or leaving the Tailings Basin and to quantify flow volumes. Water balances were conducted for the Tailing Basin as a whole, the Beneficiation Plant, the FTB Pond, the HRF Pond, and the WWTP. The inflows to and outflows from each of these features were determined based on each feature's unique respective control volume. A control volume is a defined closed region in modeling space through which water and mass flow, and within which water and mass are stored. A probabilistic run was used to determine the monthly mean flow values and these values were then averaged to determine annual mean flow values.

6.1.1 Beneficiation Plant

The Beneficiation Plant water balance is relatively simple, with only one major inflow (water from the FTB Pond), and two major outflows (water used to transport Flotation Tailings to the FTB Pond and to the FTB beaches). A number of smaller, undifferentiated inflows to and outflows from the Beneficiation Plant are combined and shown as OTHER flows. OTHER inflows include water in the raw ore, reagents, gland seals of slurry pumps, and other processes, and OTHER outflows include water lost due to evaporation within the plant and water in the concentrate product output (Section 5.2.2.1). Finally, Colby Lake is used as a source of make-up water when there is insufficient water available in the FTB Pond to meet demand. The Beneficiation Plant water balance using annual average values at Mine Year 10 are shown in Figure 6-1.

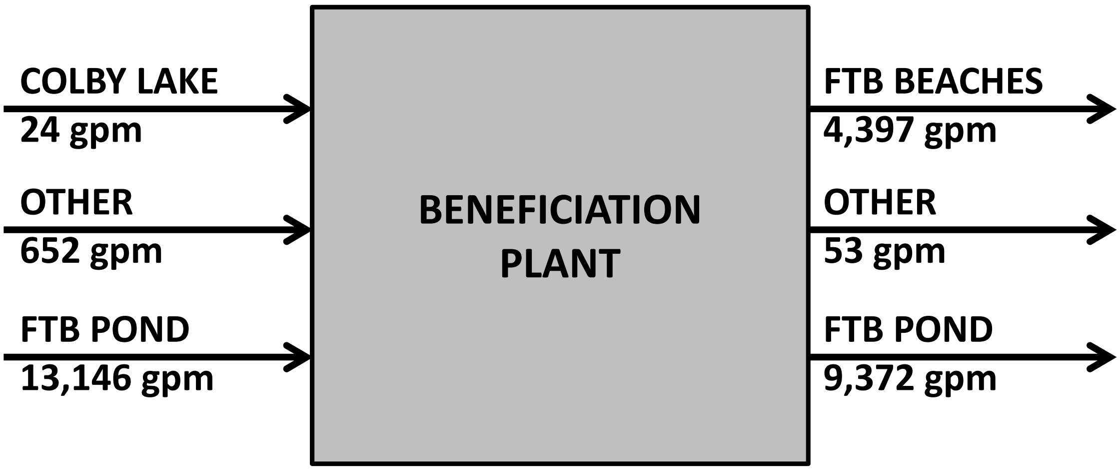


Figure 6-1 Beneficiation Plant Water Balance during Operations (Mine Year 10 Annual Average Flows)

Variations in Beneficiation Plant flows during operations are shown in Figure 6-2. By far the largest inflow is water from the FTB Pond (91% of operations average), with only a small fraction of the water inputs coming from the OTHER sources (5% of operations average) and an even smaller fraction coming from Colby Lake (4% of operations average).

The largest outflows are the streams used to transport the Flotation Tailings to the FTB Pond and beaches (64% and 36% of operations average, respectively). The OTHER outflows are almost negligible (less than, 1% of the operations average outflow).

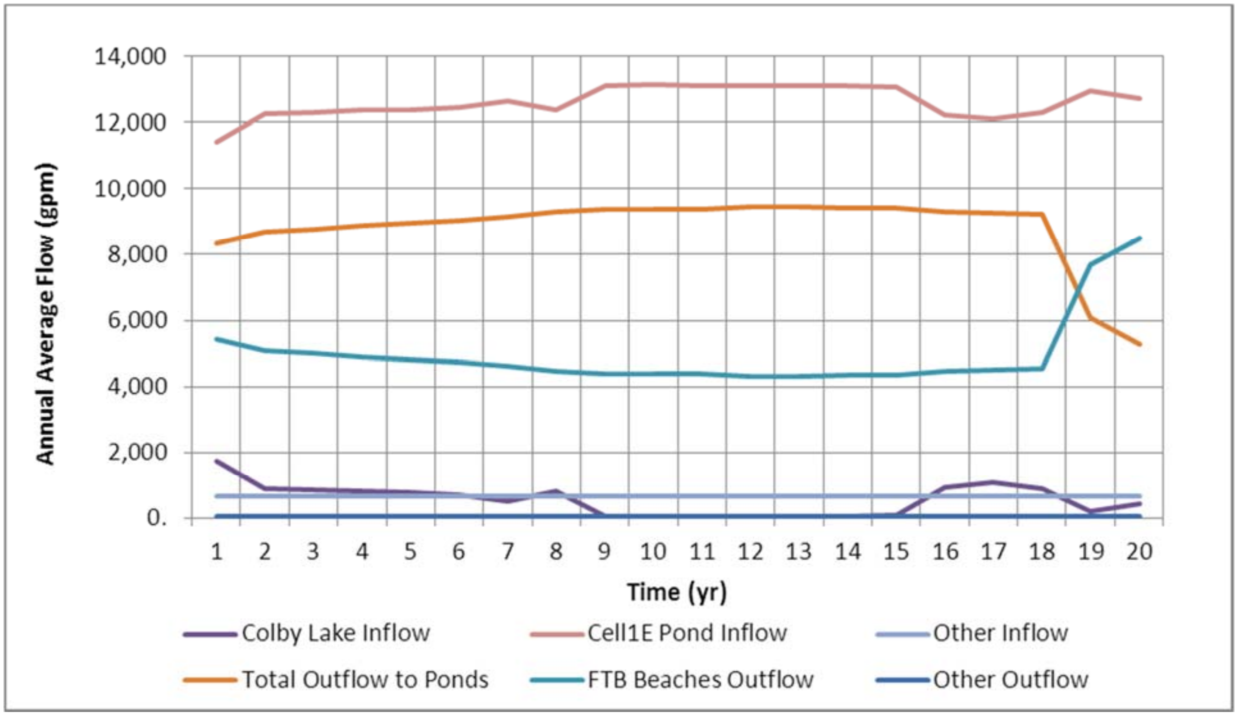


Figure 6-2 Time Series Summary of Average Annual Inflows to and Outflows from the Beneficiation Plant

6.1.2 Flotation Tailings Basin (FTB) Pond

The water balance of the FTB Pond is complex with numerous time-varying, decision based inflows and outflows. During the first seven Mine Years, the FTB Pond is contained within the FTB on top of existing Cell 2E. After that time, the FTB is built up enough that Cell 2E and Cell 1E combine and the combined pond is referred to as the FTB Pond.

The FTB Pond water balance during operations (Mine Year 10) is shown in Figure 6-3. The Beneficiation Plant is responsible for the largest flows to and from the FTB Pond, withdrawing about 13,146 gpm and discharging 9,372 gpm directly into the FTB Pond for subaqueous disposal of the Flotation Tailings. The Beneficiation Plant also discharges about 4,397 gpm to the Flotation Tailings beaches, generating a significant amount of runoff from the beaches to the FTB Pond. The total runoff from the beaches (3,020 gpm) includes both runoff from the plant discharge and from precipitation.

Precipitation to and evaporation from the FTB Pond surface are also significant components of the FTB Pond water balance, although they nearly balance each other out. Average annual precipitation in this area is about 28.1 in/yr and average annual evaporation from the heated FTB Pond (water reaching the FTB Pond has passed through the grinding process which transfers energy into the water which raises the temperature of the water) is estimated to be about

30.8 in/yr, resulting in a net loss of about 2.7 in/yr to evaporation. The volumetric flows of precipitation and evaporation are estimated to be 1,610 gpm and 1,760 gpm respectively.

Inflows to the FTB Pond include 1,170 gpm of untreated water from the toes of the Tailings Basin collected by the seepage capture systems (Section 6.1.4), and 1,750 gpm of Mine Site process water (Section 6 of Reference (4)). Inflows from the WWTP greensand filter backwash (150 gpm), Cell 2W bank runoff (30 gpm), the Sewage Treatment Plant (20 gpm), and natural watershed runoff (135 gpm) are minor inflows to the FTB Pond. Other outflows from the FTB Pond included the water entrained in the newly deposited Flotation Tailings at a rate of 1,480 gpm and 730 gpm of FTB Pond seepage. The final factor affecting the FTB Pond water balance is that the pond becomes larger as the FTB is built up; pond water storage increases by approximately 120 gpm. On average, the modeling showed a net gain of about 20 gpm during Mine Year 10. The FTB Pond volume fluctuates slightly through time and during different realizations. However, the FTB Pond is always drawn back down to the design volume.

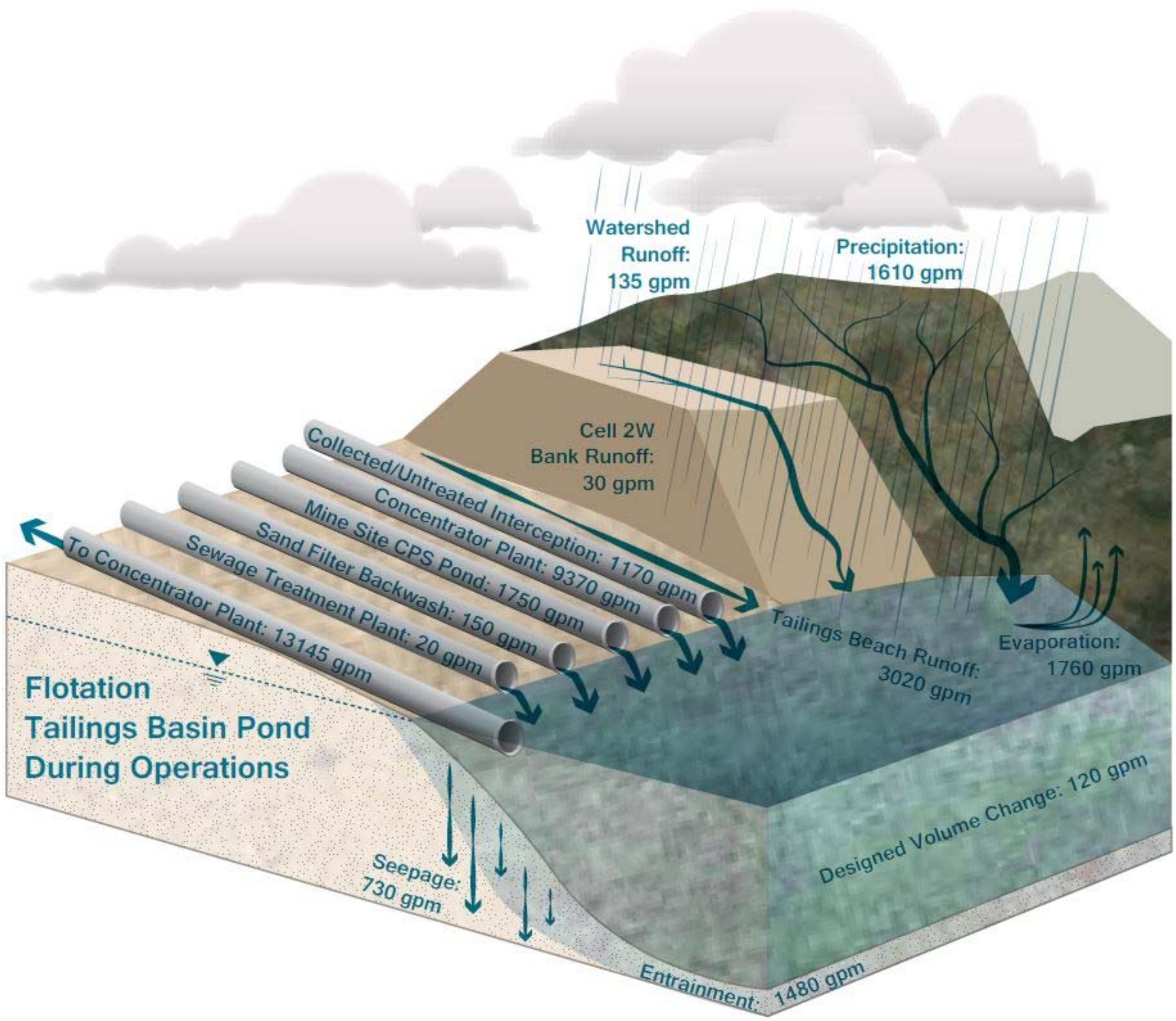


Figure 6-3 FTB Pond Water Balance during Operations (Mine Year 10 Annual Average Flows); net gain of about 20 gpm

The FTB Pond water balance during long-term closure is shown in Figure 6-4. The Beneficiation Plant and Mine Site no longer contribute water to the FTB Pond during this period so the only flows are due to natural processes and the continued use of the WWTP, which removes about 420 gpm to keep the FTB Pond from overflowing. There are also times throughout a given year when about 41 gpm of blended water from the FTB seepage capture systems and WWTP effluent are sent back into the FTB Pond to maintain the design water elevation in the pond.

The inflow from direct precipitation in long-term closure (1,310 gpm) is lower than the precipitation inflow during operations (1,610 gpm) because the pond has a smaller final surface area. Evaporation during long-term closure is much less than during operations (800 gpm vs 1,760 gpm) because the FTB Pond is smaller and cooler (it no longer receives heated Beneficiation Plant water). The average annual evaporation rate used in long-term closure for the FTB Pond is 17.1 in/yr as opposed to 30.8 in/yr used at Mine Year 10. The runoff values from the natural watershed (72 gpm) and the banks of Cell 2W (7 gpm) are reduced because the contributing areas are reduced as the FTB is developed. The Flotation Tailings beach runoff (83 gpm) is also reduced because runoff is purely a function of precipitation in long-term closure, with no discharge to the beaches from the Beneficiation Plant. During long-term closure, tailings are no longer being deposited which means there will be no more losses due to entrainment with the freshly deposited tailings. The bentonite amendment to the bottom of the FTB Pond, and the reduced area, reduce the pond seepage rate to 304 gpm.

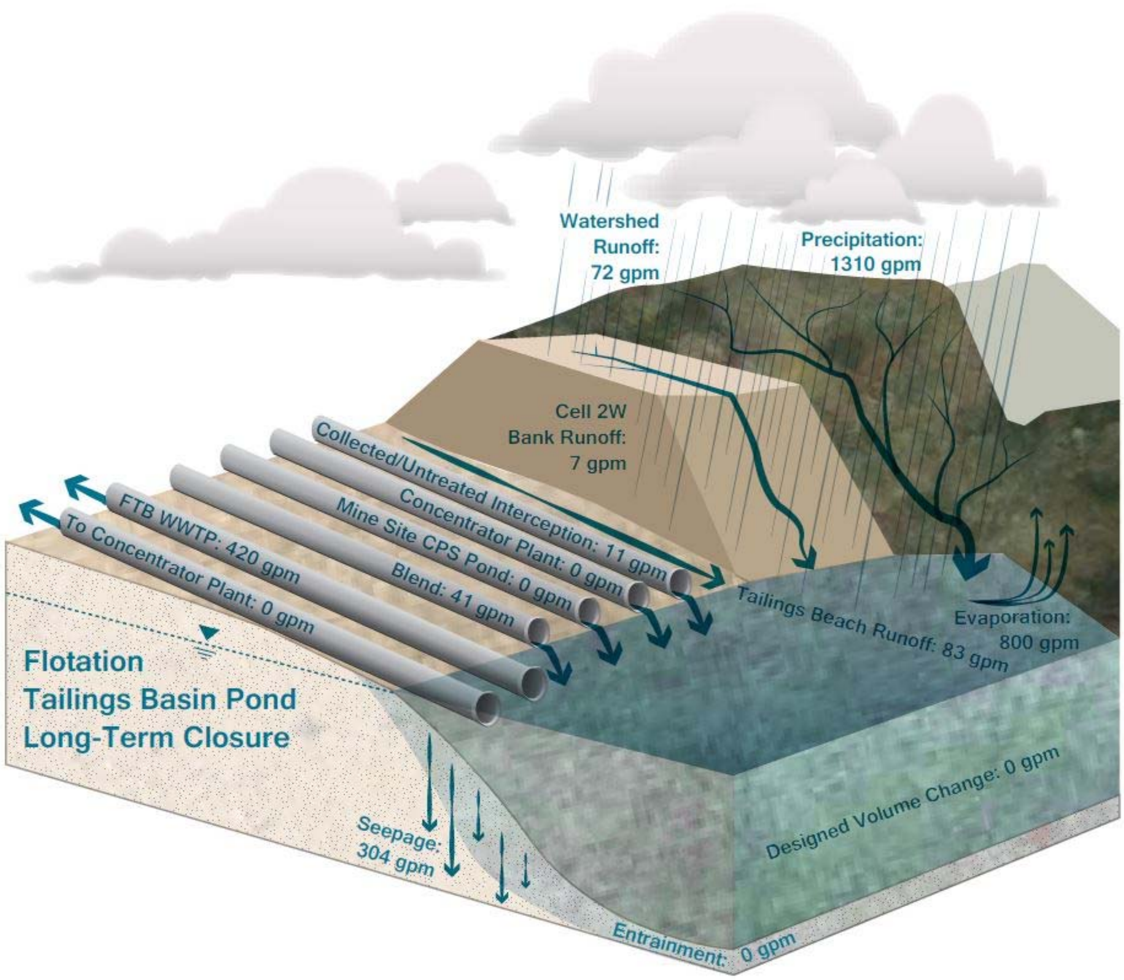


Figure 6-4 FTB Pond Water Balance during Long-Term Closure (Annual Average Flows)

6.1.3 Hydrometallurgical Residue Facility (HRF) Pond

The HRF Pond is a temporary pond within the HRF during Mine Years 3 through 20. The HRF Pond water balance during Mine Year 10 is shown on Figure 6-5. The primary inflow is 223 gpm of water from the Hydrometallurgical Plant. Direct precipitation contributes water at a rate of 112 gpm, and there is also a small amount of runoff from the surrounding watershed (13 gpm). The design of the dams is such that they prevent any runoff from the banks of Cell 2W from entering the HRF during Mine Years 3 through 20. Outflows from the HRF pond include 95 gpm of water lost to evaporation, and 67 gpm of water entrained in the Residue. It is assumed that there is no leakage loss because the double liner and the leakage collection system capture all leakage and pump it back into the HRF Pond. The flow that seeps through the residue to the double liner system (seepage in Figure 6-5) is collected and pumped back (collected seepage in Figure 6-5). Given the inflows and outflows, and the designed volumetric rate of change of water in the HRF Pond (about 14 gpm or about 23 acre-feet per year), there is 172 gpm of water available for return to the Hydrometallurgical Plant. All pumping to and from the HRF Pond ceases after Mine Year 20. During reclamation (Mine Years 21 to 30) the HRF pond is steadily drained at rate of approximately 140 gpm.

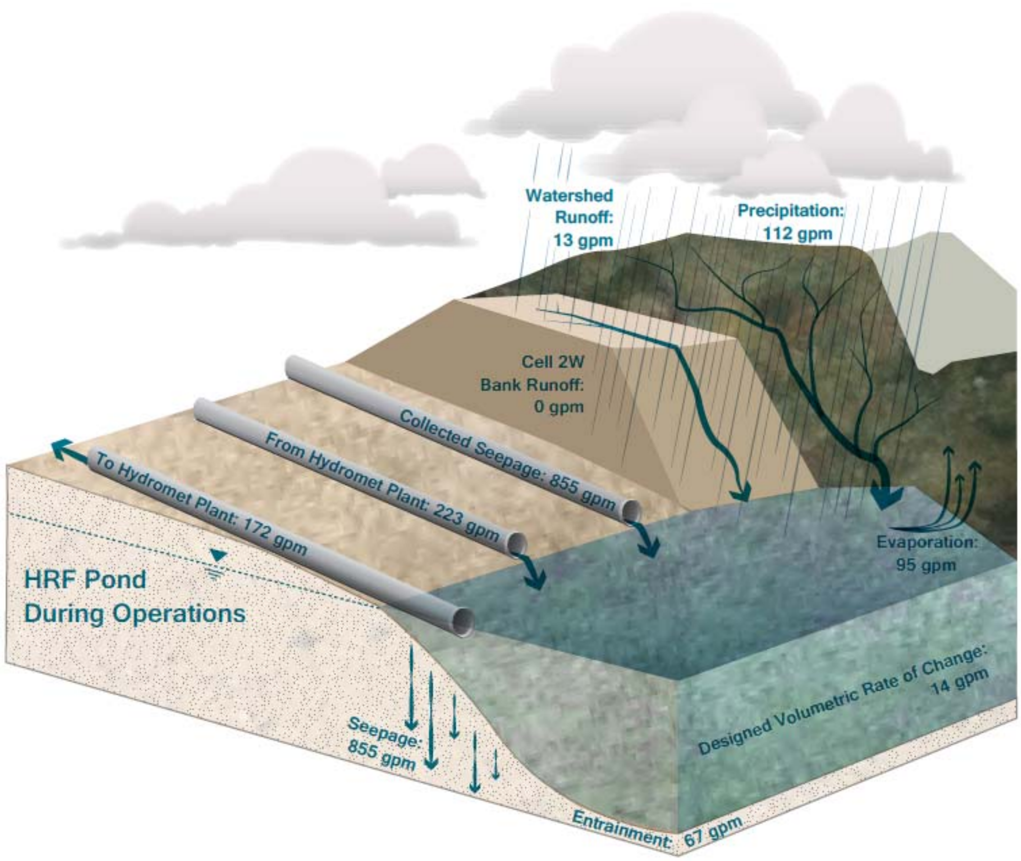


Figure 6-5 HRF Water Balance during Operations (Mine Year 10 Annual Average Flows)

6.1.4 WWTP and FTB Seepage Capture Systems

The WWTP is a critical engineering control feature of the Project. Together, the FTB seepage capture systems capture nearly all of the water leaving the footprint of the Tailings Basin. The amount of captured water exceeds the quantity that can be used by the process and must therefore be treated by the WWTP and discharged. This section discusses the amount of water captured by the FTB seepage capture systems and the inflows to and outflows from the WWTP.

Figure 6-6 shows the mean flow rates captured at each toe of the Tailings Basin and the rate of seepage from the Tailings Basin that is captured. The total flow collected is slightly more than the seepage flow, because the seepage capture systems also collect run off from the dams and from the small watershed area between the toes and the FTB Containment System.

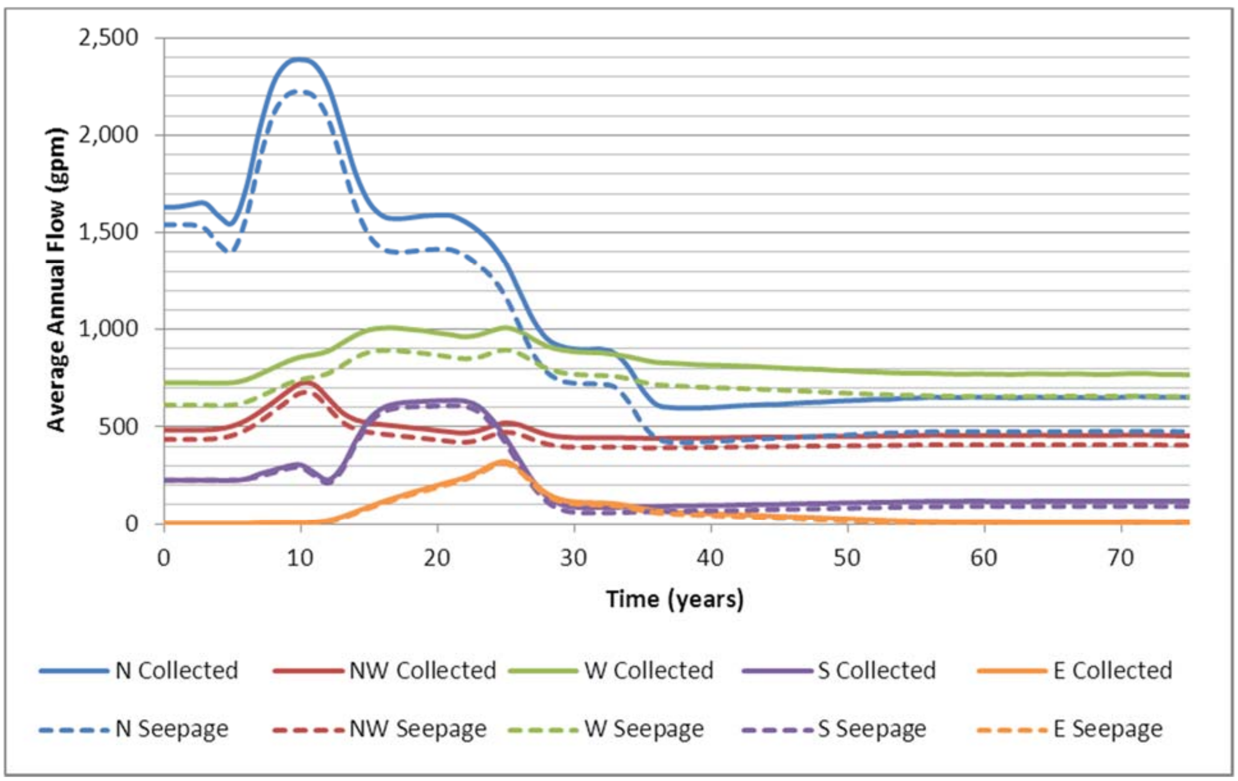


Figure 6-6 Average Flows Captured by the FTB Seepage Capture Systems and the Portions from Tailings Basin Seepage

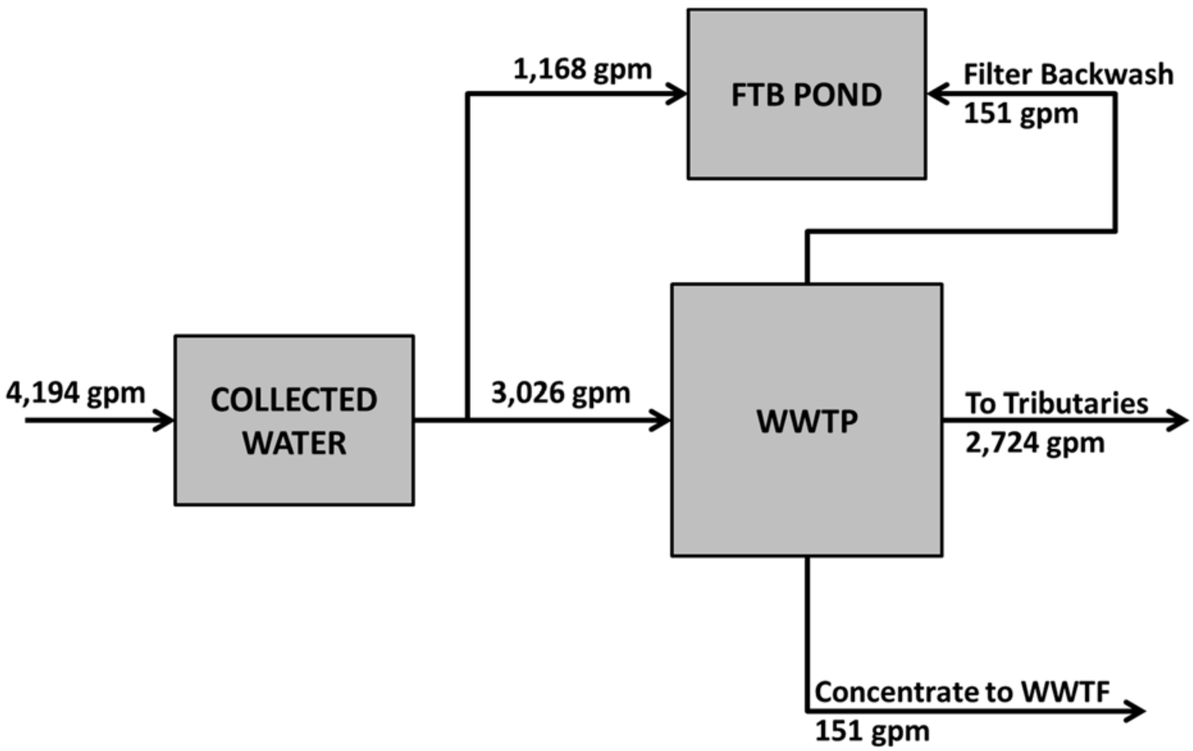


Figure 6-7 WWTP Water Balance during Operations (Mine Year 10 Annual Average Flows)

The WWTP water balance during a typical year of operations (Mine Year 10) is shown in Figure 6-7. During operations, the only water treated by the WWTP is water from the seepage capture systems. Approximately 4,187 gpm is captured at the north, northwest, west, and south toes and an additional 7 gpm is captured at the east toe (seepage from the east toe does not occur until Mine Year 8) totaling 4,194 gpm. Of the total seepage captured by the containment systems, 3,026 gpm is sent to the WWTP and the remainder (1,168 gpm, including all of the 7 gpm from captured at the east toe) is pumped back into the FTB Pond. All seepage routed to the WWTP comes from the north, northwest, west, and south toes; seepage from the east toe is pumped directly back into the FTB Pond.

Of the 3,026 gpm total inflow to the WWTP, 5% (151 gpm) is used to backwash the greensand filter and is returned to the FTB Pond. Five percent (151 gpm) of the inflow ends up as reject concentrate which is sent to the Mine Site WWTF for further treatment. The remainder of the water (2,724 gpm) is treated water discharged to three of the four tributaries around the Tailings Basin.

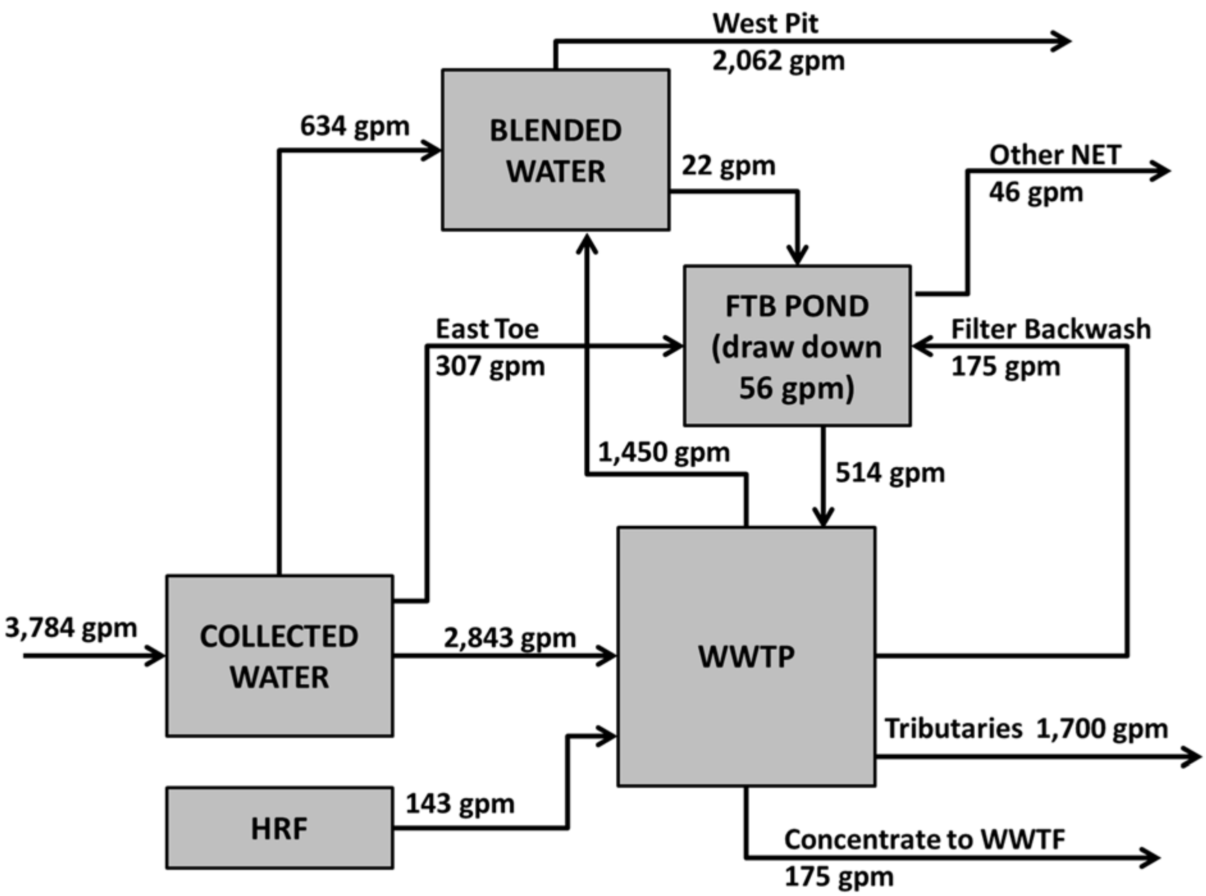


Figure 6-8 WWTP Water Balance during Reclamation (Mine Year 25 Annual Average Flows)

The WWTP water balance during a typical year of reclamation (Mine Year 25) is shown in Figure 6-8. Inflows to the WWTP during reclamation come from the FTB seepage capture systems and the HRF which is steadily dewatered. Outflow from the WWTP goes to the tributaries for stream augmentation, and to the Mine Site to help flood the West Pit. During reclamation the collected quantity of seepage exceeds the capacity of the WWTP, so an untreated portion is blended with the WWTP effluent before the blend is sent to the Mine Site. A small quantity of the blended water is sent to the FTB Pond to maintain the design water elevation and the rest is sent to the Mine Site to help flood the West Pit. The designed pond water elevation was set to maintain an optimum beach length, with the beach as small as possible, to minimize oxidation of the Flotation Tailings, but as large as necessary for dam safety requirements.

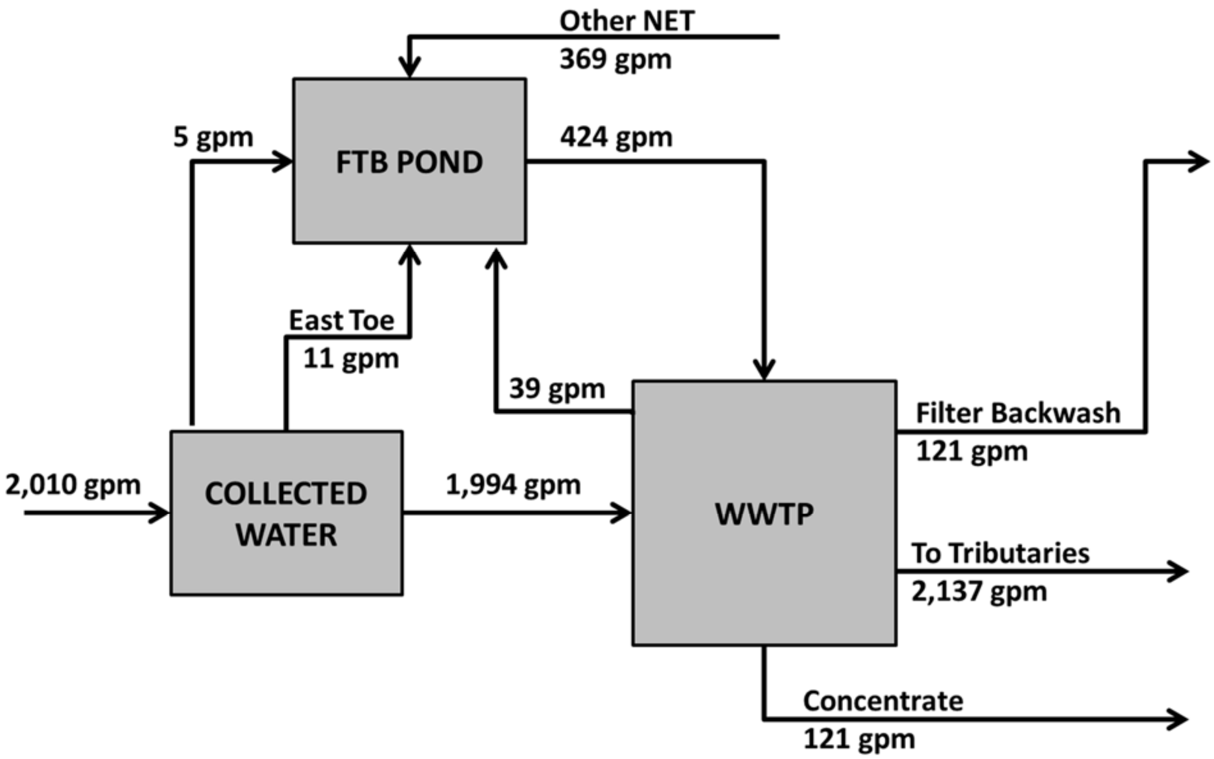


Figure 6-9 WWTP Water Balance during Long-Term Closure (Mine Year 75 Average Annual Flows)

The WWTP water balance during a typical year of long-term closure (Mine Year 75) is shown in Figure 6-9. During long-term closure the seepage from the Tailings Basin is stable, the HRF is no longer being dewatered, and the FTB Pond volume is controlled by pumping water from the FTB Pond to the WWTP for treatment and discharge. The capacity of the WWTP is sufficient to treat all of the collected water from the FTB seepage capture systems and the pumped water from the FTB Pond. Water used to backwash the greensand filter and the water in the reject concentrate is evaporated and the solids managed off-site. WWTP effluent is discharged to the tributaries around the Tailings Basin (except for Mud Lake Creek).

Figure 6-10 shows the inflow sources and rates to the WWTP through time. Figure 6-11 shows the fate of the WWTP influent through time. Each flow can be matched up to one of the arrows in Figure 6-7 through Figure 6-9. Large Table 8 shows these same flows in conjunction with the other flows shown in Figure 6-7 through Figure 6-9 through time.

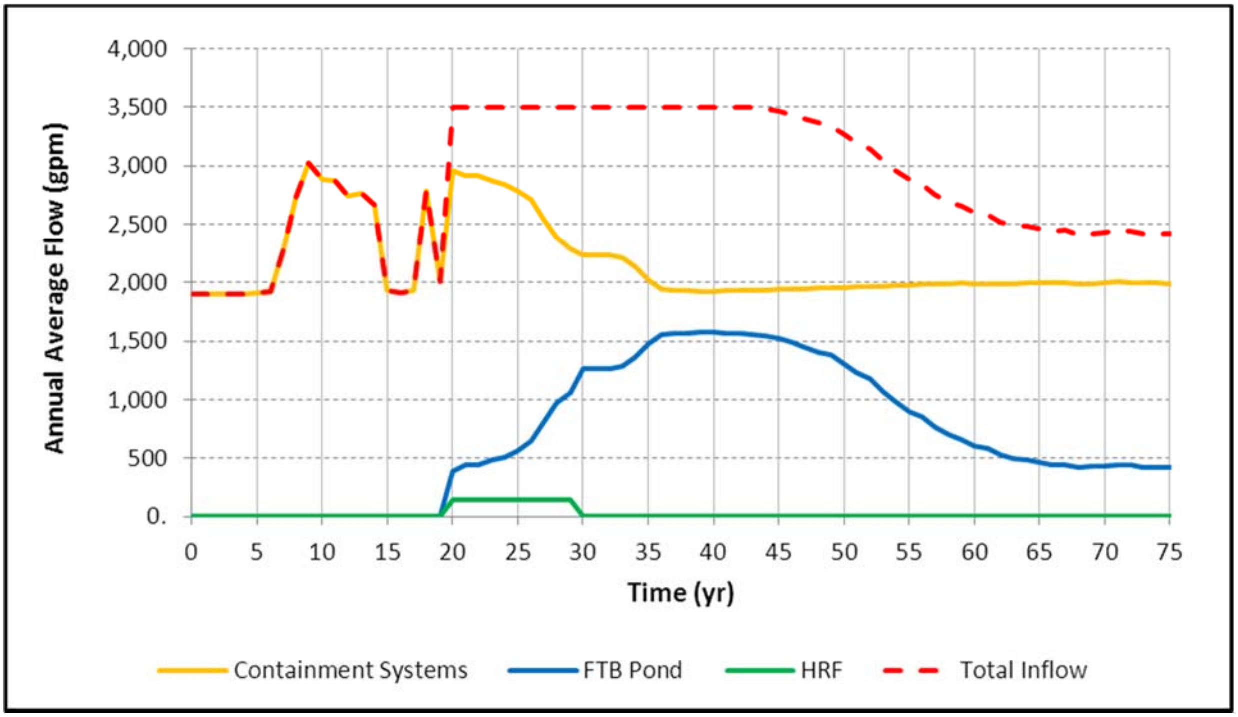


Figure 6-10 Annual Average Flows into the WWTP

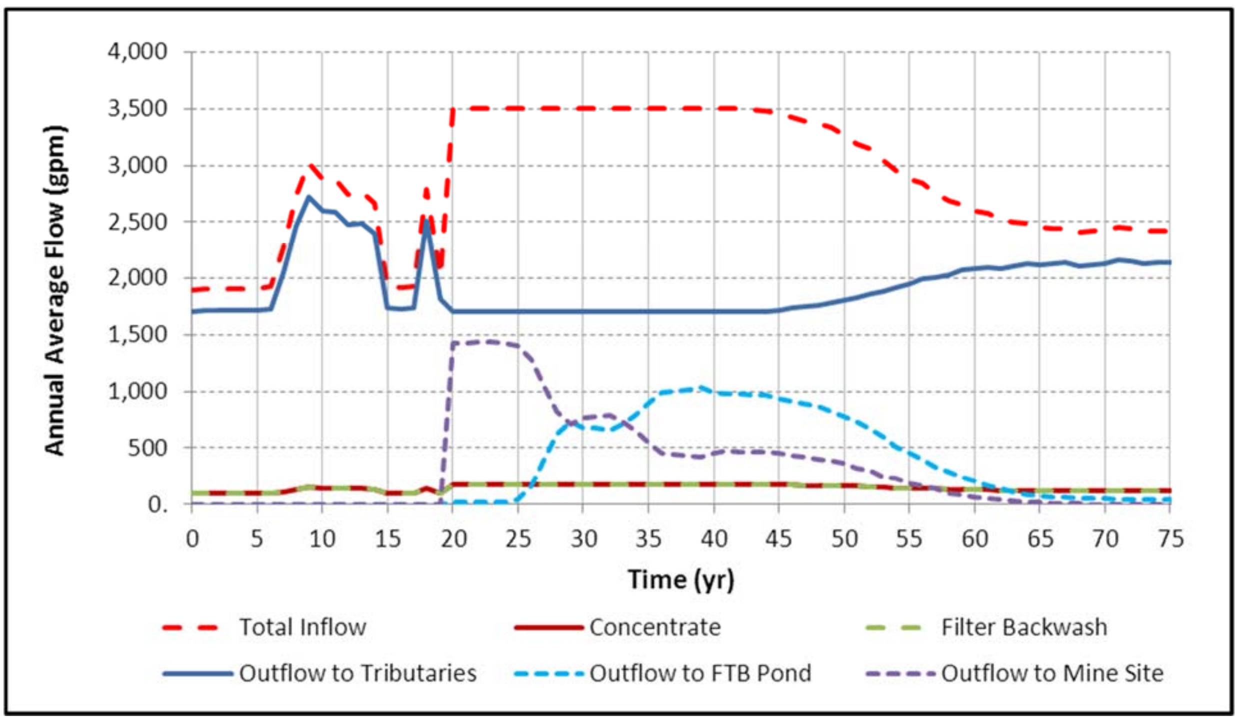


Figure 6-11 Annual Average Flows out of the WWTP and Total Inflow to the WWTP

6.1.5 Tailings Basin as a Whole

A water balance was also performed that encompasses all Plant Site features that route water either directly or indirectly to the Tailings Basin. The control volume for this analysis includes all of the features of the Plant Site including all LTVSMC tailings (existing and newly constructed dams), all Flotation Tailings, the two buttresses, the FTB seepage capture systems, the HRF, the WWTP, the STS, the Beneficiation Plant, and the Hydrometallurgical Plant, as well as flow from the Mine Site WWTF.

The inflows to this control volume are:

- Precipitation
- Watershed yield (including between the toes of the Tailings Basin and the seepage capture systems)
- Flow from the Mine Site WWTF
- Flow from the STS into the FTB Pond
- Water from Colby Lake used in the Beneficiation Plant and the Hydrometallurgical Plant.

The outflows from this control volume are:

- Evaporation
- Flow bypassing the seepage capture systems to groundwater
- WWTP discharge to the tributaries
- Water sent to the Mine Site for flooding of the West Pit during reclamation
- Filter backwash that is evaporated in long-term closure
- Concentrate that is either sent to the Mine Site WWTF or evaporated in long-term closure.

Inflows to the approximately 3,000 acre Tailings Basin are dominated by precipitation (Figure 6-12). The precipitation flow values were calculated by multiplying the annual average precipitation rate of 28.1 in/yr by the combined surface areas of all the LTVSMC tailings and Flotation Tailings, the areas of the dams, the buttresses, and the pond(s). The amount of precipitation falling on the Tailings Basin increases gradually during operations from around 4,300 gpm to a final value of around 4,700 gpm. This increase is due to the Tailings Basin expanding slightly to the east as the FTB is constructed.

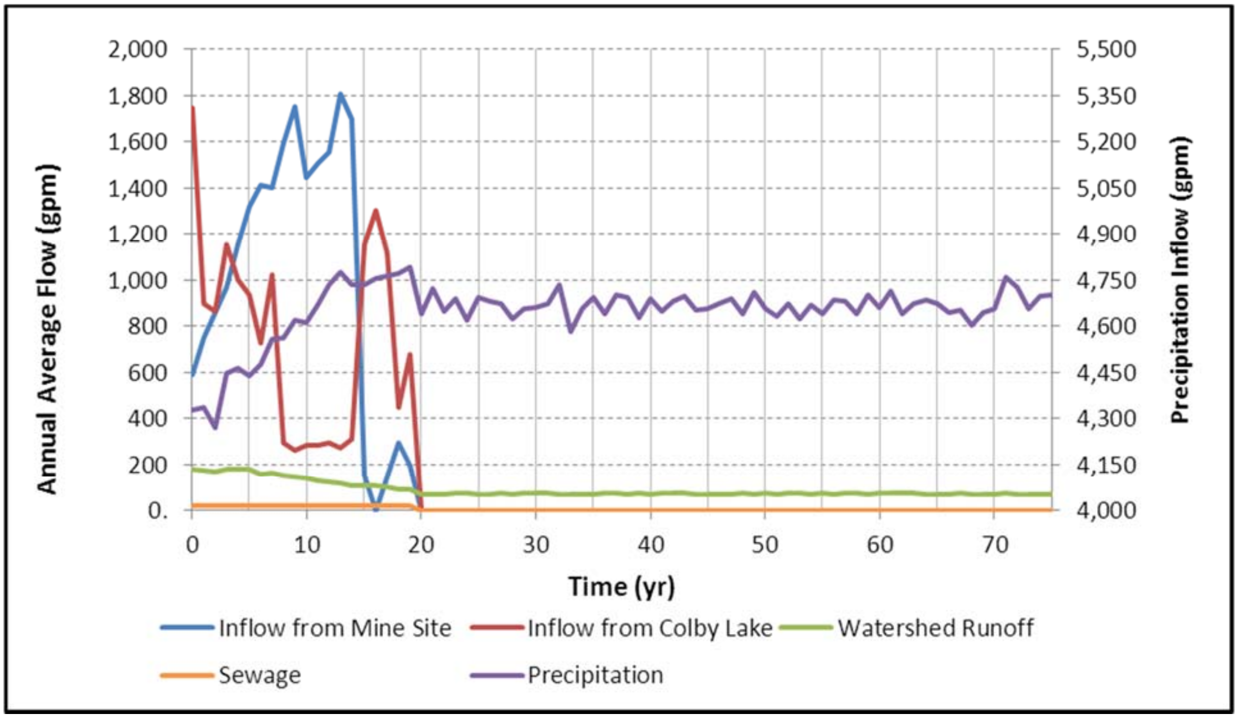


Figure 6-12 Annual Average Flows into the Tailings Basin Control Volume

Watershed runoff is dependent on the contributing watershed area. For the Tailings Basin, this includes the areas contributing to the FTB Pond and the areas between the dam toes and the FTB Containment System. The contributing area to the FTB Pond decreases during operations as Flotation Tailings are added to the FTB. These changes decrease the FTB Pond inflow from watershed runoff from around 200 gpm to around 75 gpm. The watershed runoff values in long-term closure remain relatively constant as the watershed area is no longer changing.

Water is pumped to the Plant Site from the Mine Site at varying rates throughout operations. Water is also pumped to the Plant Site from Colby Lake to provide any needed make up water. The withdrawals from Colby Lake are the smallest of the Tailings Basin inflows. The Beneficiation Plant demand from Colby Lake averages about 560 gpm and varies from about 25 gpm to about 1750 gpm depending on the Mine Year, typically spiking in the Mine Years when a significant increase in the designed FTB Pond volume is required or there is less flow available from the Mine Site such as during Mine Years 16 through 18. The Hydrometallurgical Plant's Colby Lake demand is more constant at around 230 gpm from Mine Year 3 through the end of operations. All of these pumped inflows end at the end of operations in Mine Year 20.

The STS is a very minor addition to the overall system. The inflow to the FTB Pond from the STS will occur twice annually, during the spring and the fall, at about 20 gpm on an annual average basis, and only during operations over the course of a few months at a time.

The largest outflow from the Tailings Basin is evaporation as shown in Figure 6-13. Evaporation shows the same overall increase during operations as for precipitation. Evaporation was calculated by multiplying the surface area of each of the surface types (open water, fine LTVSMC tailings, coarse LTVSMC tailings, dams, and Flotation Tailings beaches) by each surface's specific evaporation rate (in/yr). These values were then added together to obtain one evaporation value for the whole Tailings Basin. The drop in evaporation at Mine Year 20 is due to the decrease in the evaporation rate as the FTB Pond is no longer heated by the discharge from the Beneficiation Plant. During long-term closure, the FTB Pond water level is maintained by pumping excess water to the WWTP and then discharging it to the environment.

Throughout operations, reclamation, and long-term closure, the WWTP is treating and discharging excess water in the Plant Site system. During operations and long-term closure, the WWTP is discharging to the tributaries to help prevent significant hydrologic impacts to the tributaries from the Project. During reclamation, the WWTP effluent is also directed to the Mine Site to aid in flooding the West Pit. The reject concentrate is a small stream of water from the WWTP that is sent to the Mine Site WWTF.

Seepage flow bypassing the seepage capture systems accounts for a very small portion of the Tailings Basin water balance, totaling only about 21 gpm.

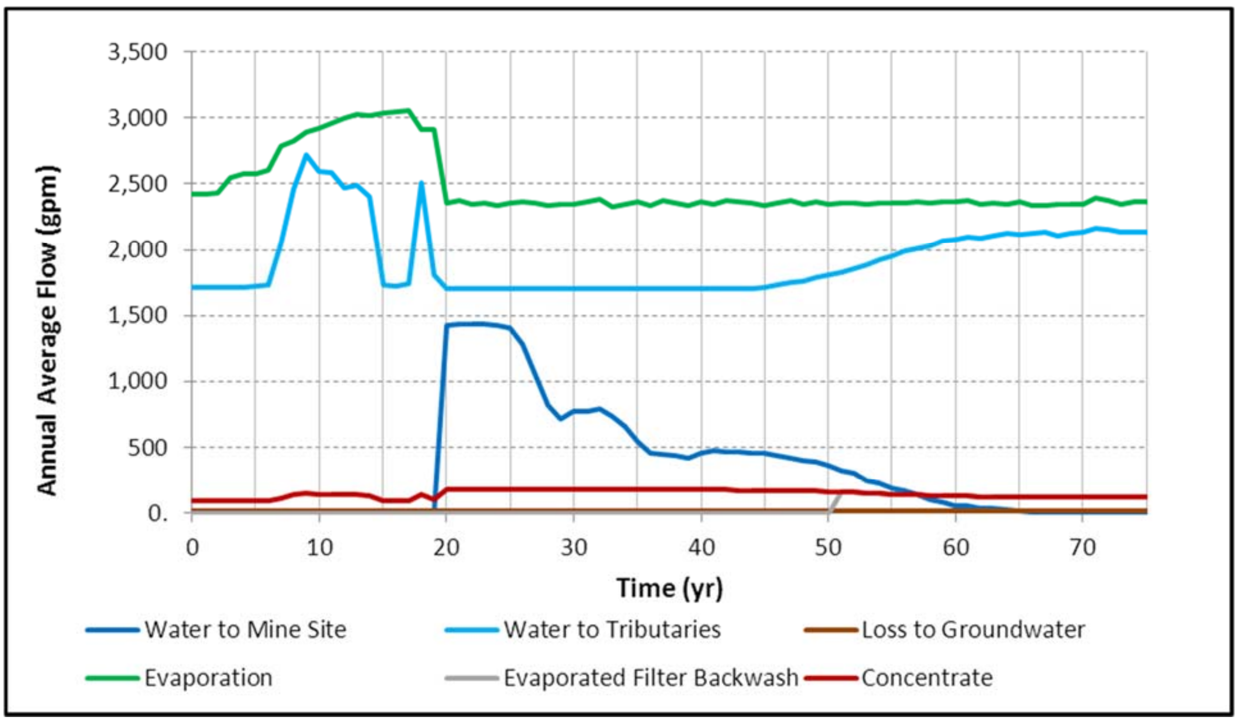


Figure 6-13 Average Annual Flows out of the Tailings Basin Control Volume

Table 6-1 Tailings Basin Water Balance at Three Distinct Time Periods (Annual Average Flow)

	Flow	Operations (Year 10) (gpm)	Reclamation (Year 25) (gpm)	Long-Term Closure (gpm)
Inflows	Precipitation	4,621	4,621	4,683
	Watershed yield	150	75	70
	Mine Site CPS Pond	1,750	0	0
	Colby Lake to Beneficiation Plant	24	0	0
	Colby Lake to Hydrometallurgical Plant	230	0	0
	Sewage Treatment Plant Inflow	21	0	0
Outflows	Evaporation	2,890	2,330	2,350
	Seepage loss to groundwater	21	21	21
	WWTP discharge to tributaries	2,724	1,700	2,140
	Reject Concentrate to Mine Site WWTF	151	175	121
	Filter Backwash	0	0	121
	Blended Water to West Pit	0	1,430	0
Total Inflow		**6,796**	**4,696**	**4,753**
Total Outflow		**5,786**	**5,656**	**4,753**
Balance / Change in Storage		*1,010*	*-960*	*0*

Table 6-1 contains the average flow data for three time periods: Mine Year 10 during operations, Mine Year 25 during reclamation, and long-term closure. Non-zero balances reflect the net gains or losses of water from the Tailings Basin during the years examined. In general, large amounts of water are accumulated by the Tailings Basin during operations as the FTB Pond grows, the phreatic surface rises within the Tailings Basin and the overall size of the Tailings Basin increases. The net long-term losses during reclamation reflect the return to an equilibrium state as the surpluses accumulated during operations are gradually lost. Finally, the flow rates balance in long-term closure once the system is at steady-state.

6.2 Tailings Basin Mass Balance

A mass balance of the Tailings Basin was conducted to ensure that the error in the mass balance was within acceptable limits in accordance with Section 2.4.1 of Attachment M. Acceptable limits are considered +/- 0.1%.

The Tailings Basin mass balance was performed by accumulating all of the mass loading into a control volume, accumulating all of the mass loading leaving the control volume, and checking the change in stored mass from the beginning of the simulation to the end of the simulation. The control volume for this analysis is defined as the total footprint of the Tailings Basin (existing LTVSMC tailings and the Flotation Tailings within the FTB) which includes the pond(s) (Figure 6-14).

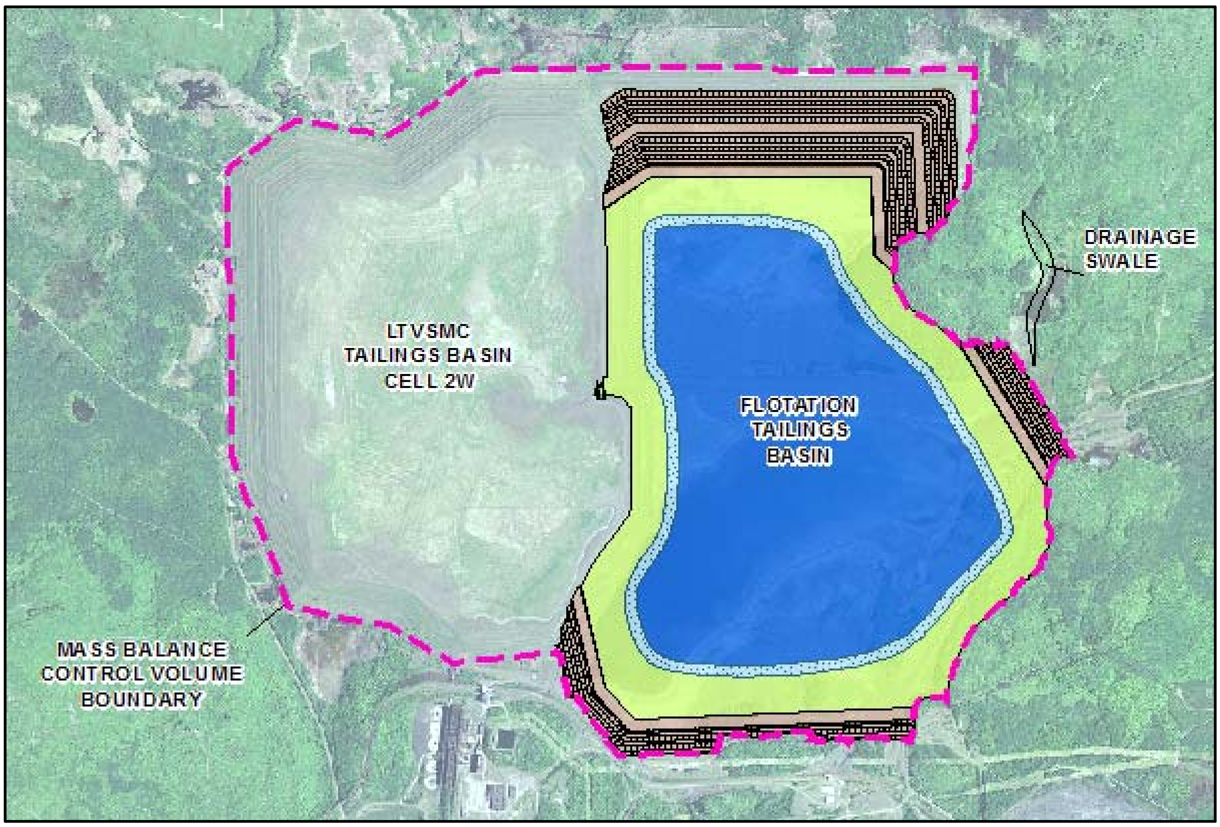


Figure 6-14 Control Volume Boundary for the Tailings Basin Mass Balance

The error is defined in Equation 6-1 where ε_i is the error of the "ith" constituent in units of mass, ΔS is the change in stored mass between time zero and the end of the simulation (200 years), I is the input rate of mass and O is the output rate of mass. The simulation used for the mass balance was a deterministic simulation with all inputs set at median values.

$$\varepsilon_i = \Delta S_i - \int_{t=0}^{t=200} (I_i - O_i)$$

Equation 6-1

The percent error is calculated by dividing the error by the total integrated inflow as shown in Equation 6-2. A negative percent error indicates that mass was lost in the system.

$$\%error = \frac{\varepsilon_i}{\int_{t=0}^{t=200} I_i}$$

Equation 6-2

For the Tailings Basin as a whole, all constituents were well within the acceptable limits of mass balance error. Table 6-2 shows the percent error as defined in Equation 6-2 and the highest percent error at any time throughout the 200 years. As defined in Equation 6-2, the constituent with the highest maximum percent error in the Tailings Basin control volume was chromium with an error of -0.000694% which is well below the 0.1% threshold to be considered acceptable.

Table 6-2 Tailings Basin Mass Balance Percent Error

Constituent	Final Percent Error	Maximum Percent Error
Ag (Silver), %	-1.72E-06	-7.45E-05
Al (Aluminum), %	-3.05E-09	-9.11E-08
Alkalinity, %	-2.49E-06	-8.99E-05
As (Arsenic), %	-8.03E-07	-4.39E-04
B (Boron), %	-2.88E-06	-1.21E-04
Ba (Barium), %	-3.28E-07	-1.12E-04
Be (Beryllium), %	-1.48E-06	-1.43E-04
Ca (Calcium), %	-1.89E-06	-1.39E-04
Cd (Cadmium), %	-3.05E-06	-6.44E-05
Cl (Chloride), %	-2.08E-06	-9.83E-05
Co (Cobalt), %	-3.64E-06	-1.24E-04
Cr (Chromium), %	-5.87E-07	-6.94E-04
Cu (Copper), %	-1.26E-07	-2.48E-04
F (Fluoride), %	-5.00E-07	-3.12E-04
Fe (Iron), %	-5.32E-06	-2.07E-04
K (Potassium), %	-1.11E-06	-1.64E-04
Mg (Magnesium), %	-2.81E-06	-1.15E-04
Mn (Manganese), %	-2.39E-06	-1.28E-04

Constituent	Final Percent Error	Maximum Percent Error
Na (Sodium), %	-1.88E-06	-1.06E-04
Ni (Nickel), %	-8.22E-07	-1.24E-04
Pb (Lead), %	-1.50E-07	-5.88E-04
Sb (Antimony), %	-9.71E-07	-8.20E-05
Se (Selenium), %	-3.86E-06	-1.33E-04
SO4 (Sulfate), %	-1.28E-05	-4.51E-04
Tl (Thallium), %	-2.38E-06	-1.57E-04
V (Vanadium), %	-5.14E-08	-7.64E-05
Zn (Zinc), %	-1.44E-06	-6.92E-05

6.3 Flotation Tailings Basin (FTB) Pond

The FTB Pond is a permanent open-water feature. During operations, FTB Pond water quality must meet requirements for reuse in the Beneficiation Plant. During reclamation, FTB Pond water quality affects the water quality of the West Pit. During all phases of the Project, FTB Pond water quality affects the constituent loading in seepage at the toes of the Tailings Basin. This section discusses the water quality results in the FTB Pond and the major sources of load that drive the resulting water quality. The estimated FTB Pond water quality is not evaluated against surface water standards because it is an internal process water body and the surface water standards are not applicable.

Large Table 9 provides a summary of the estimated concentrations for the FTB Pond during operations, reclamation and long-term closure. Plots of concentrations statistics in the FTB Pond for all constituents are included in Attachment D, and plots of loading culpability to the FTB Pond for all constituents are included in Attachment E. Representative plots are presented and described in Sections 6.3.1 and 6.3.2.

6.3.1 Estimated FTB Pond Concentrations

6.3.1.1 Explanation of Concentration Statistics Plots

Estimated FTB Pond water quality is shown using a series of concentration statistic plots. Data for these plots were created as follows:

- The probabilistic GoldSim model was run at monthly time steps for 200 years (2401 time steps including the initial time zero). At each time step, the concentration in the FTB Pond for each constituent was individually recorded.

- After one realization (i.e., one model run) was completed, the process was repeated until 500 model realizations were completed. The result is 500 estimated concentrations in the FTB Pond of each constituent at every time step.
- At every time step, and for every constituent, the 500 estimated concentrations were sorted smallest-to-largest and 3 single values were chosen to represent the statistics at that particular time step.
- From the 500 estimate concentrations, sorted smallest-to-largest, the 50th value was chosen to represent the 10th percentile (P10), the 250th value was chosen to represent the median (P50), and the 450th value was chosen to represent the 90th percentile (P90). This indicates that at any time, 10% of the model results are less than or equal to the P10 value, 50% are less than or equal to the P50 value, and 90% are less than or equal to the P90 value.
- This process was repeated for all time steps, resulting in 3 time series lines representing the 10th, 50th, and 90th percentiles of concentrations in the FTB Pond at every time step (monthly results).
- For plotting the results over the entire 200 years of the simulation, the data was summarized by year to make the plots legible. The monthly model outputs for the 10th, 50th, and 90th percentiles are plotted on an annual basis by either
    - Taking the maximum value of each percentile for a given year (i.e., the highest 90th percentile value), or
    - Taking the average value of each percentile for a given year (i.e., the average of the twelve 90th percentile values).

6.3.1.2 Model Results

In the FTB Pond, the estimated future concentrations follow one of several patterns. The first pattern is that concentrations rise rapidly and are never concentration capped, resulting in a maximum concentration during the second half of operations. Once major sources of loading to the pond cease after operations, much of the load is removed via seepage between Mine Years 20 and 30. At Mine Year 30, the FTB Pond bottom is amended with bentonite to reduce the seepage and treatment of the pond begins around or shortly before this time. Constituents that follow this pattern are arsenic, calcium, chloride, cobalt, chromium, potassium, magnesium, sodium, nickel, lead, antimony, selenium, sulfate, and hardness. Figure 6-15 is an example of this type of constituent response.

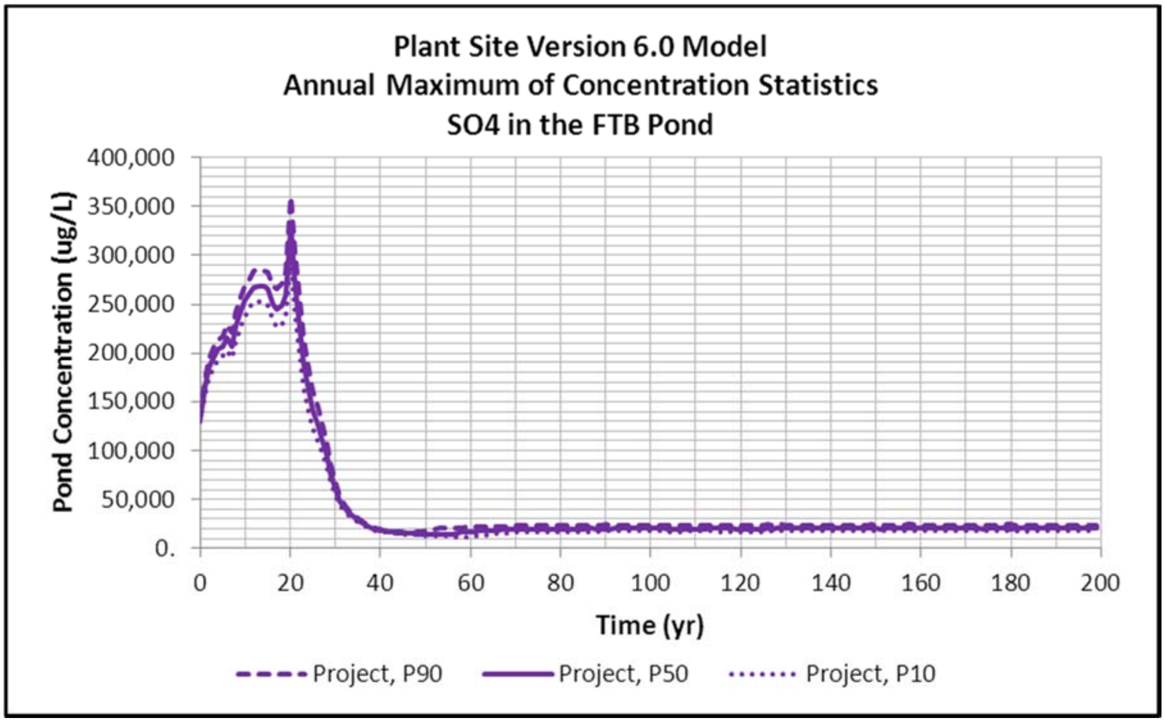


Figure 6-15 Sulfate Concentrations in the FTB Pond

The second pattern is that concentrations quickly become capped (or nearly capped) in the FTB Pond due to heavy loading during operations and remain that way throughout the operational period. The constituent mass above the cap is not removed from the model but rather assumed to have been buried in the Flotation Tailings in the bottom of the FTB Pond and is available to remobilize if seepage concentrations from the FTB Pond drop below the concentration caps. Once operations cease and the loading has significantly diminished, concentrations decrease to equilibrium due to load removal via seepage and treatment by the WWTP. Constituents that follow this pattern are silver, alkalinity, boron, copper, and zinc. Figure 6-16 is an example of this type of constituent response.

The third pattern is that concentrations quickly become capped and remain capped throughout the entire model run due to significant long-term loading. Constituents that follow this pattern are aluminum and iron. Figure 6-17 is an example of this type of constituent response.

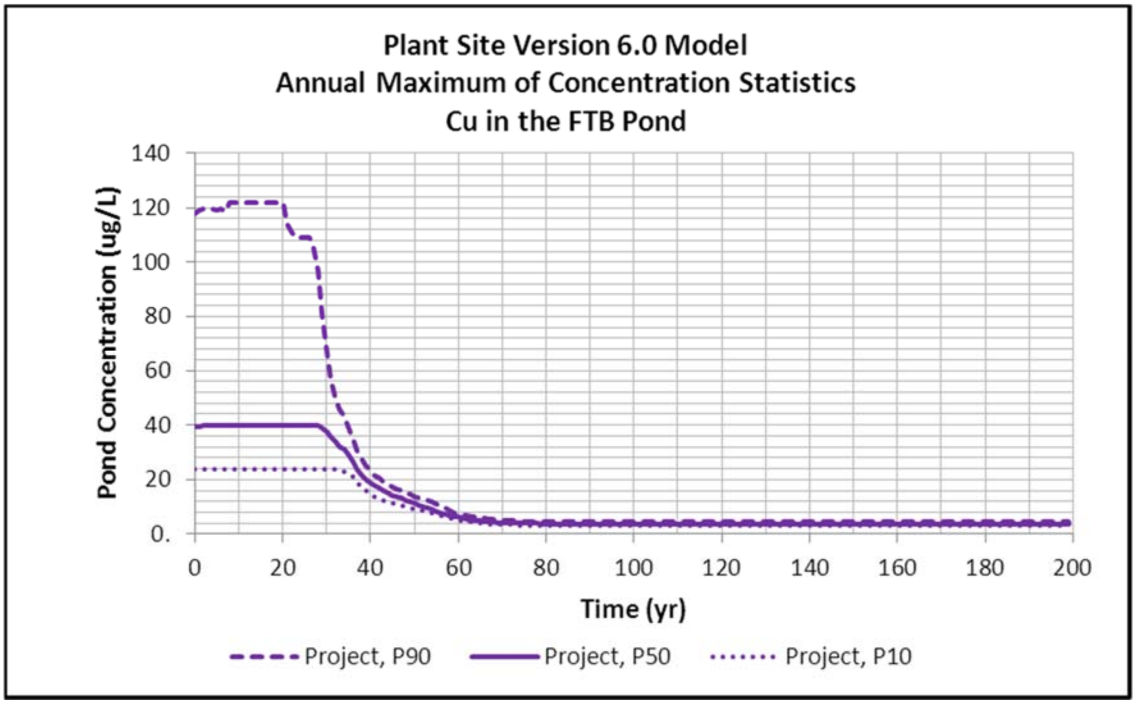


Figure 6-16 Copper Concentrations in the FTB Pond

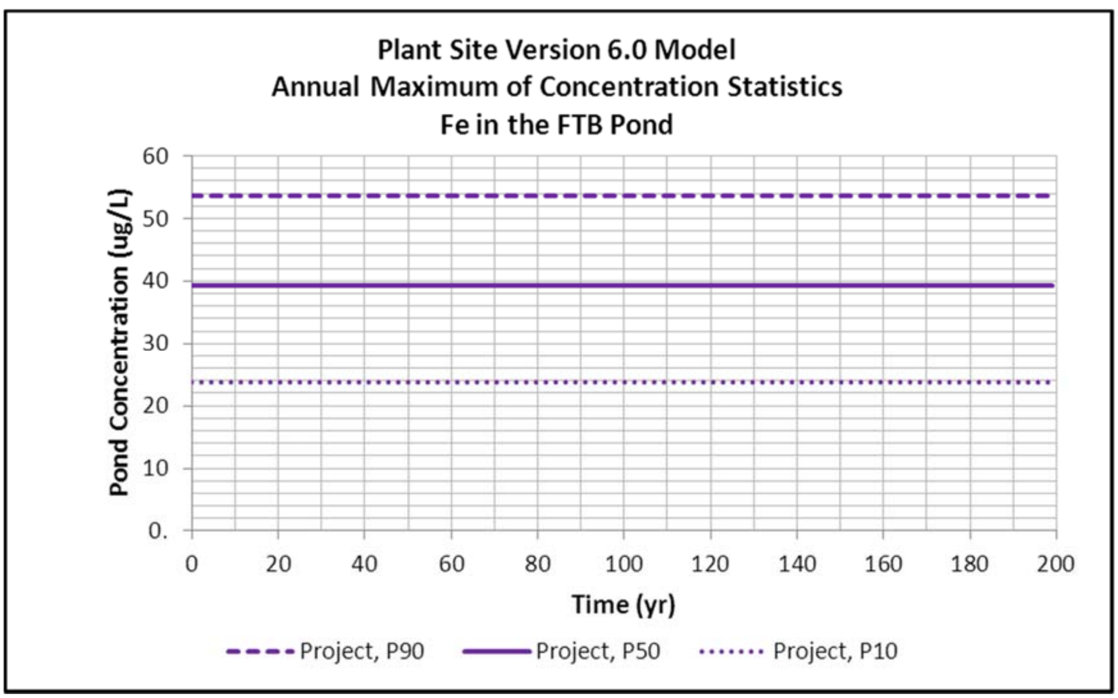


Figure 6-17 Iron Concentrations in the FTB Pond

The fourth pattern is that concentrations decrease significantly from existing conditions, throughout operations and reclamation and come to a much lower equilibrium than existing conditions. This is due to high existing concentrations in the pond and low continued loading associated with the Project and background sources. The high existing condition is likely an artifact of the previous processing operations and/or the unique way that loading of these constituents is generated in the LTVSMC tailings and the Flotation Tailings. Constituents that follow this pattern are barium and fluoride. Figure 6-18 is an example of this type of constituent response.

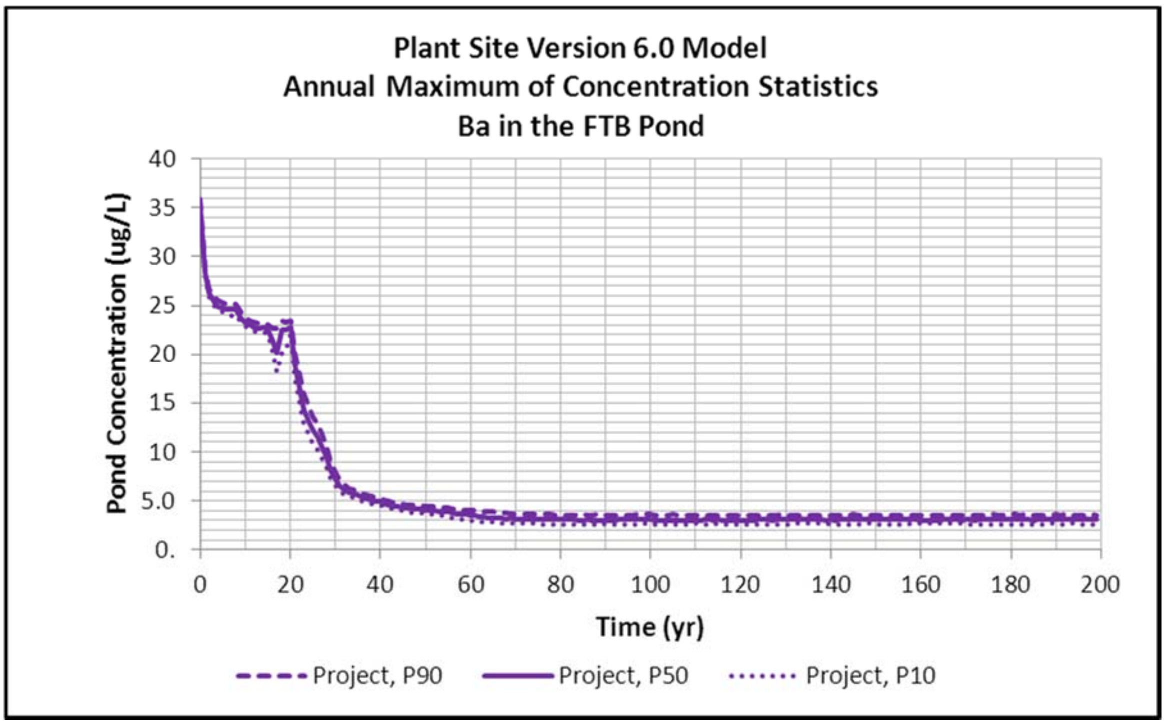


Figure 6-18 Barium Concentrations in the FTB Pond

The fifth pattern is that the concentrations steadily increase from the beginning of operations and eventually become concentration capped (or near capped) at around Mine Year 10. Concentrations remain capped until Mine Year 20 where they decrease again to a new equilibrium. Constituents that follow this pattern are beryllium, cadmium, thallium, and vanadium. Figure 6-19 is an example of this type of constituent response.

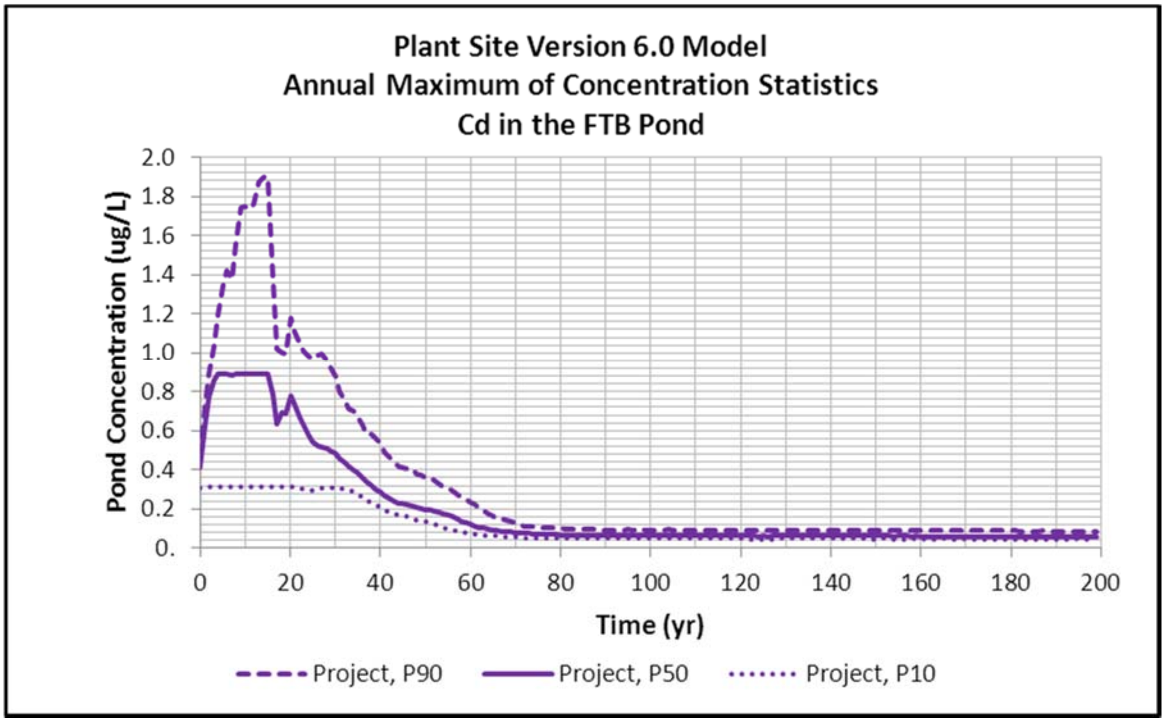


Figure 6-19 Cadmium Concentrations in the FTB Pond

Finally, manganese is unique because of the heavy loading from back-flushing the greensand filter in the WWTP. The WWTP is a significant source of manganese to the FTB Pond and therefore, the manganese in the pond is quickly concentration capped and remains there until Mine Year 40. After Mine Year 40, the greensand filter backwash is no longer sent to the FTB Pond and that loading source ceases. Manganese concentrations quickly decrease to equilibrium beyond Mine Year 40. Figure 6-20 shows the estimated future concentrations of manganese.

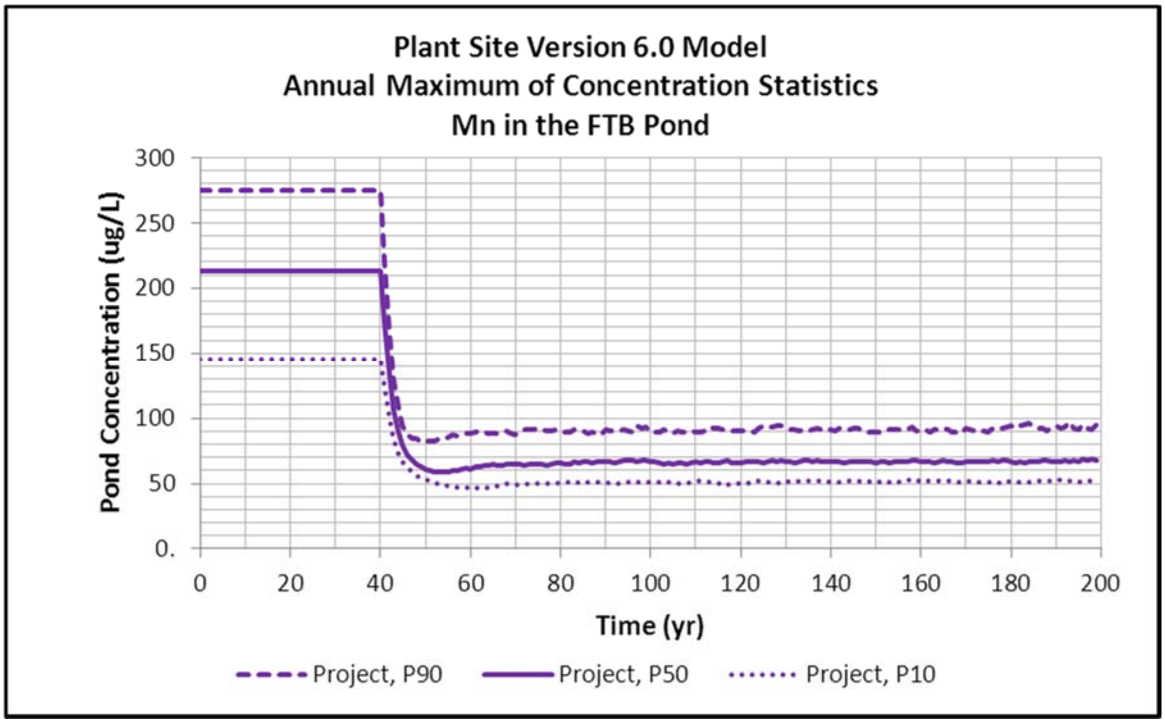


Figure 6-20 Manganese Concentrations in the FTB Pond

6.3.2 Culpability

6.3.2.1 Explanation of Culpability Plots

A culpability analysis was performed using the loading rates from all sources to the FTB Pond. The loading rates are compared to highlight some of the major sources of load for each constituent to the FTB Pond. The tables and plots in this section were created by taking the following steps:

- At any given time step, the mass loading rate (tonnes/yr) from every source contributing mass load to the FTB Pond is calculated and stored. These sources are itemized in the legends of Figure 6-21 through Figure 6-23.

- Once the 500 realizations are complete, at every monthly time step the loading rates of a particular constituent from a particular source were sorted minimum to maximum and the median value (250th) was chosen. This step was performed for all sources and all constituents.

- The monthly median loading rates of each constituent from each source were annualized by taking the average of the twelve monthly median loading rates each year. This results in one representative average annual median loading rate of each constituent from each source.

- A stacked bar graph is used to directly compare the average annual median loading rates from each source for any constituent to the FTB Pond. The source (uniquely colored in Figure 6-21) which covers the most area of the graph at any given time is therefore the most culpable source. Showing a time series graph of loading rates also helps show how the culpable source may change through time.

6.3.2.2 Culpability Results

A culpability analysis was performed on the FTB Pond to determine which loading sources are driving the observed concentration responses. By examining the loading rates at the beginning of operations (the first five years for example), the main source of loading to the FTB Pond driving the initial water quality response of the FTB Pond is dominated by one of three sources: the untreated water from the toes, process water from the Beneficiation Plant, water from the Mine Site. Untreated water from the toes is the dominant source of load for alkalinity, boron, calcium, magnesium, manganese, and sulfate. Process water from the Beneficiation Plant is the dominant source of load for aluminum, cobalt, copper, iron, and nickel. Water from the Mine Site is the dominant source of load for silver, arsenic, barium, beryllium, cadmium, chloride, chromium, fluoride, potassium, sodium, lead, antimony, selenium, thallium, vanadium, and zinc. The following plots show example culpability plots.

For the most part, the untreated water collected by the seepage capture systems is the largest source of sulfate load to the FTB Pond, followed by Mine Site loading and loading from ore processing (Figure 6-21). These significant sources of load drive the sulfate concentration up in the FTB Pond. The contribution from seepage increases during operations as the increased sulfate concentration in FTB pond water causes the concentration in seepage to also increase. Loading from the Mine Site drops at and beyond Mine Year 15 because the flow rate from the Mine Site is minimal. Finally, in long-term closure, the total sulfate loading to the FTB Pond is about 25 metric tons (tonnes) per year, mostly coming from regular weathering of the Flotation Tailings beach.

Most constituents show a marked rise and fall of loading from the untreated toe water between Mine Years 20 and 30. This is due to the water captured at the east toe that is directly sent back into the FTB Pond. This period of time is when flow to the eastern portion of the Tailings Basin is highest, hence the increase in the loading to the Pond from untreated toe water.

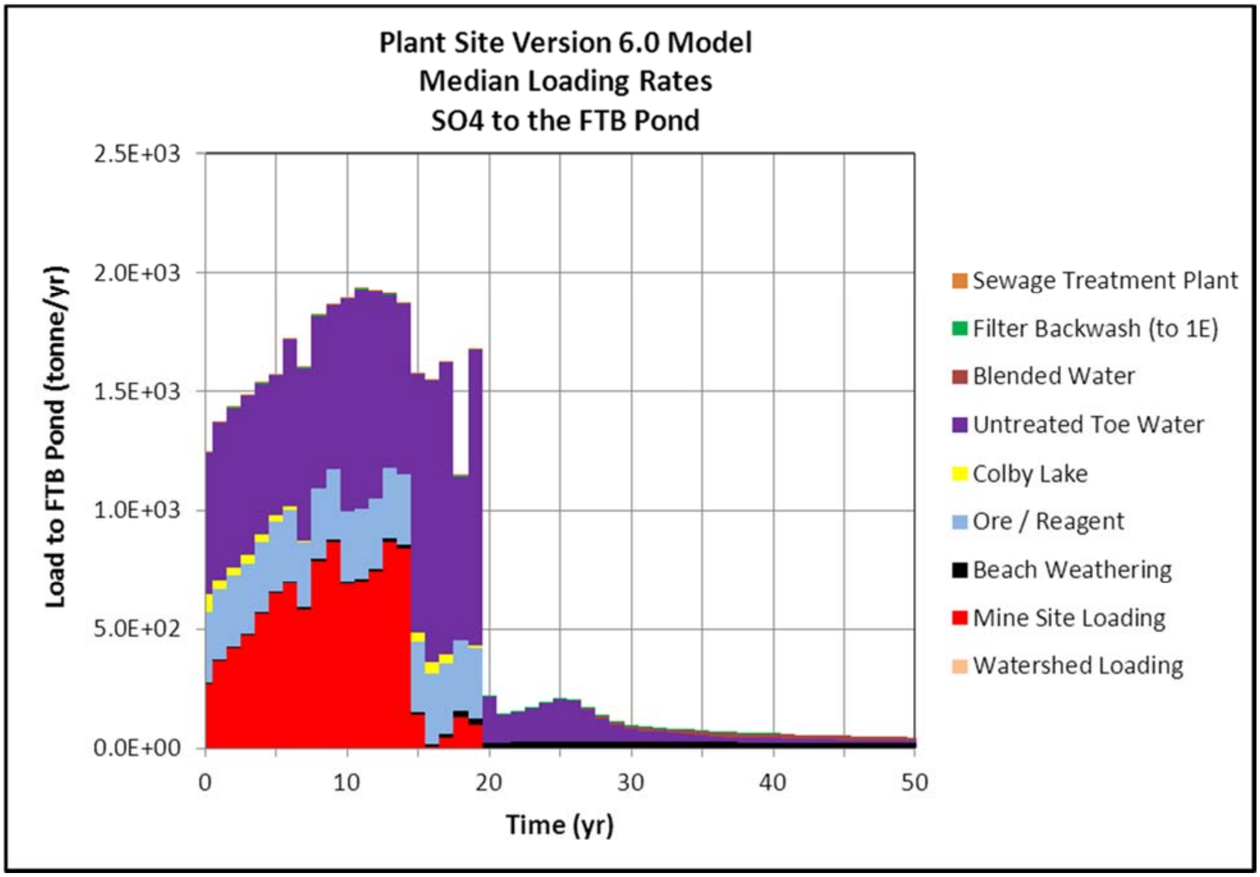


Figure 6-21 Sulfate Loading to the FTB Pond

The Beneficiation Plant is the dominant source of copper loading to the FTB Pond (Figure 6-22); it drives the copper concentration in the FTB Pond to concentration caps almost immediately. The continued loading from the ore processing continues throughout operations and is enough to maintain capped conditions within the FTB Pond. After operations, in long-term closure, the sum of the median loading rates to the FTB Pond is only about 0.005 tonnes per year.

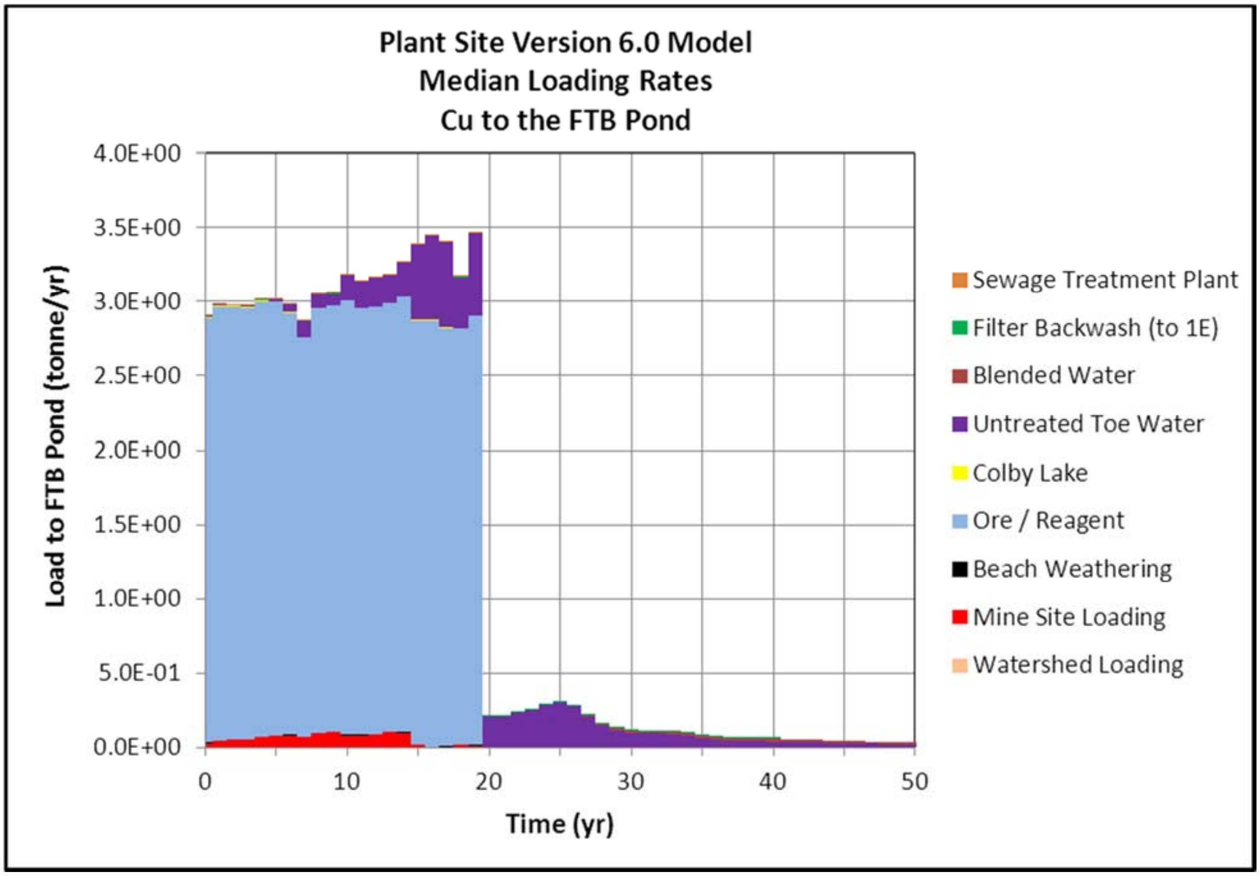


Figure 6-22 Copper Loading to the FTB Pond

Water from the Mine Site is the dominant source of antimony loading to the FTB Pond (Figure 6-23). The Mine Site water has an antimony concentration of 31 µg/L (Table 1-9 of Attachment B). For reference, the initial antimony concentration in the FTB Pond is 0.25 µg/L (Table 1-44 of Attachment B). This source of load is what drives the antimony concentration in the FTB Pond up from the beginning of operations. The rise in concentrations in the FTB Pond increases the loading to the toes of the Tailings Basin, which in turn causes the loading from the FTB capture systems water (routed directly to the FTB Pond) to increase around Mine Year 8. The sum of the median loading rates in long-term closure for antimony is about 0.01 tonnes per year.

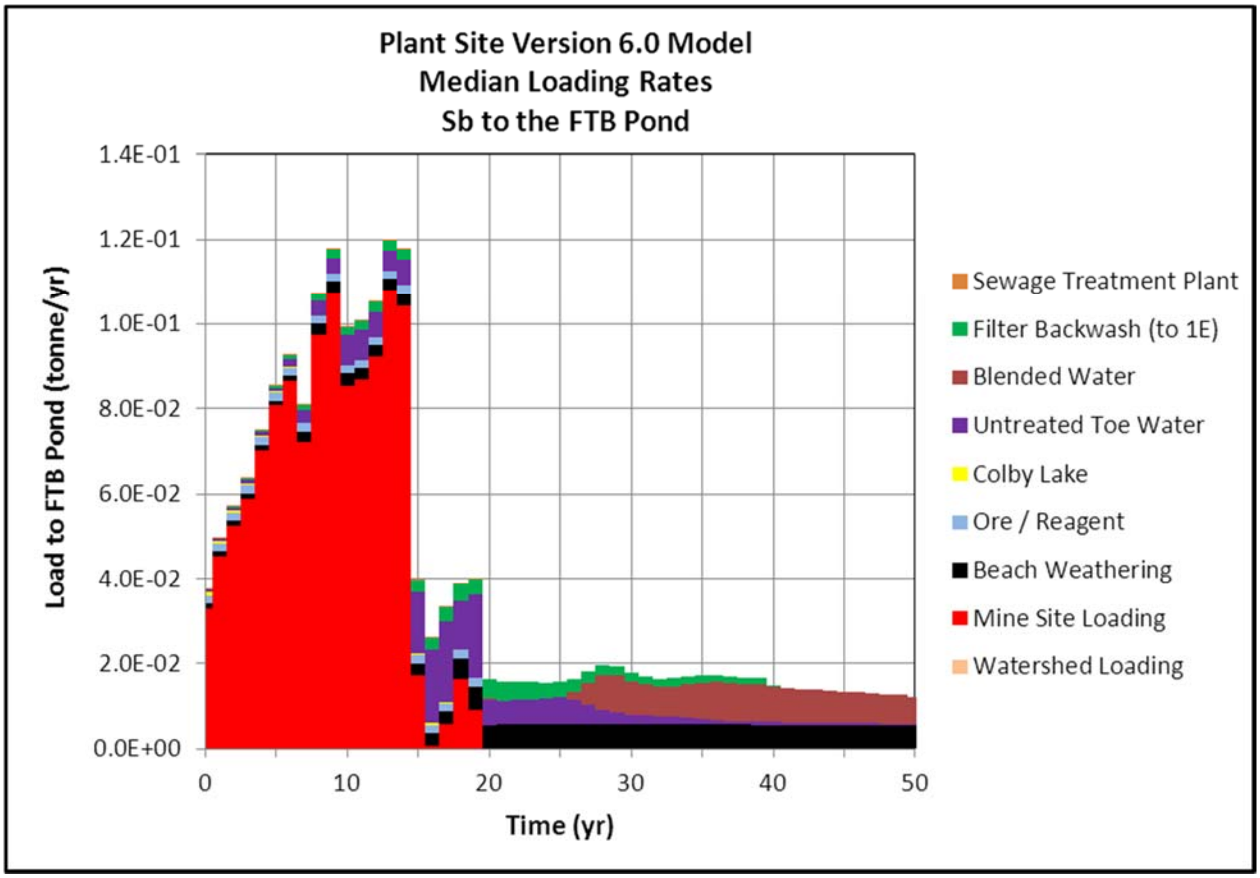


Figure 6-23 Antimony Loading to the FTB Pond

6.4 Tailings Basin Seepage

6.4.1 Seepage Quantity

Seepage from the Tailings Basin is the sum of the infiltration through the Tailings Basin dams, beaches, buttresses and the pond(s). Infiltration throughout the Tailings Basin is divided into flows to the north, northwest, west, east, and south Tailings Basin toes. The flow rates change through time due to high flow rates to the Flotation Tailings beaches from the Beneficiation Plant during operations, the bentonite-amendment applied on the Flotation Tailings beaches at the start of reclamation, and the bentonite amendment in the bottom of the FTB Pond at the end of reclamation. These changes in flow through the Tailings Basin, the travel time throughout the Tailings Basin, and the dynamic phreatic surface all affect the quantity of seepage reporting to each toe of the Tailings Basin. Figure 6-24 shows mean flow rates at each of the five Tailings Basin toes (north, northwest, west, east, and south).

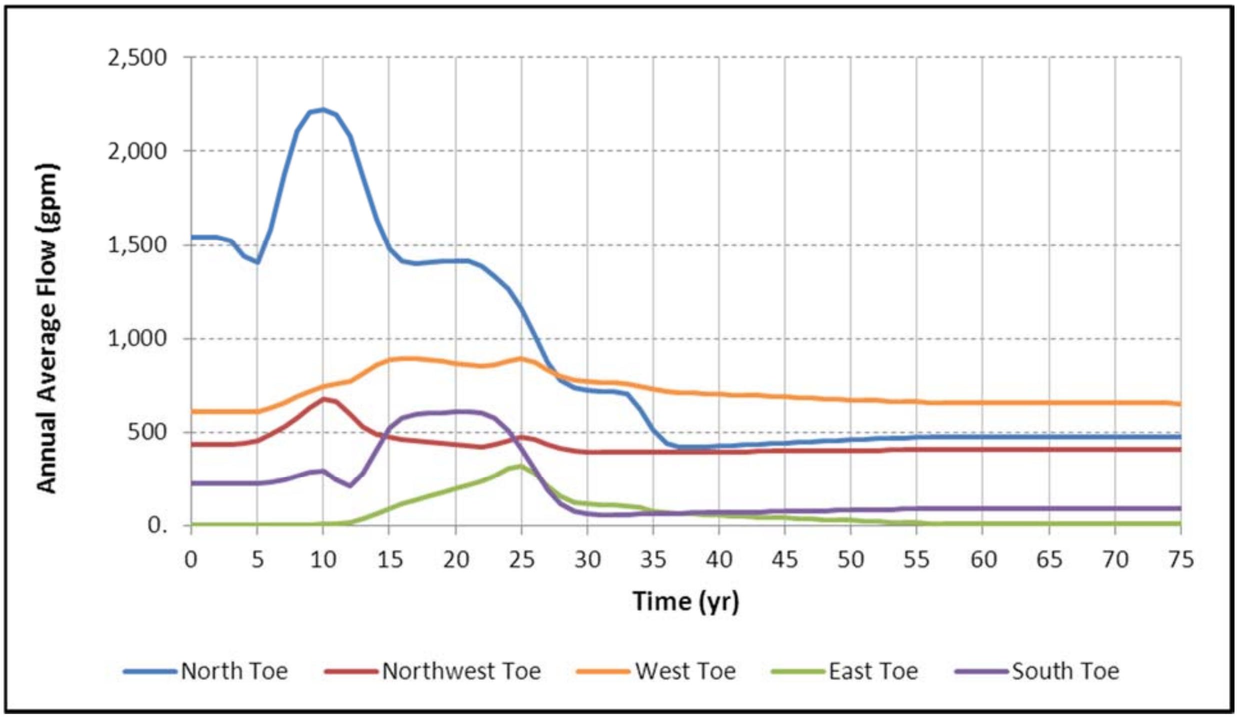


Figure 6-24 Mean Seepage Rates to the Four Toes of the Tailings Basin; Project Model

Once the seepage reaches the Tailings Basin toes, it is divided between flow that remains within the groundwater flow paths and excess flow that upwells as surficial flow at or near the toes, with the majority of the flow upwelling as surficial flow. In reality, the FTB Containment System is expected to capture all of the seepage from the Tailings Basin (Attachment C of Reference (1)); however, for the modeling a small percentage of the groundwater flow is allowed to escape the FTB Containment System In the Project Model at the north, northwest, and west toes, all of the upwelled surficial flows and 90% of the flow to the groundwater flow paths is captured by the FTB Containment System. At the south toe, the model assumes that 100% of the seepage is captured by the FTB South Seepage Management System due to the engineering design and the understanding that all seepage to the south emerges as surface seepage (Section 2.1.3 of Reference (1)). At the east toe, the model assumes that 100% of the seepage is captured by the FTB Containment System due to the localized flow, local bedrock highs, and relatively short overall containment system length (Section 2.1.4 of Reference (1)). The following sections discuss the fate of the Tailings Basin seepage at each toe in the Continuation of Existing Conditions Scenario, during operations (Mine Year 10), and in long-term closure when the seepage is at steady-state.

6.4.1.1 North Toe

Figure 6-25 shows the quantity and fate of seepage from the north toe in the Continuation of Existing Conditions Scenario Model. The modeled mean seepage rate leaving the Tailings Basin footprint is 1540 gpm. The aquifer capacity of the upstream end of the north flow path is 44 gpm on average (Section 5.2.1.3.1). Therefore, 44 gpm of the seepage at the north toe enters the groundwater flow path and the remainder, 1496 gpm, upwells at the toe and becomes surface runoff that contributes flow and load to Mud Lake Creek at MLC-3 and to Trimble Creek at TC-1. The 44 gpm of seepage that enters the groundwater flow path remains as groundwater flow until the flow path discharges to Mud Lake Creek at MLC-2.

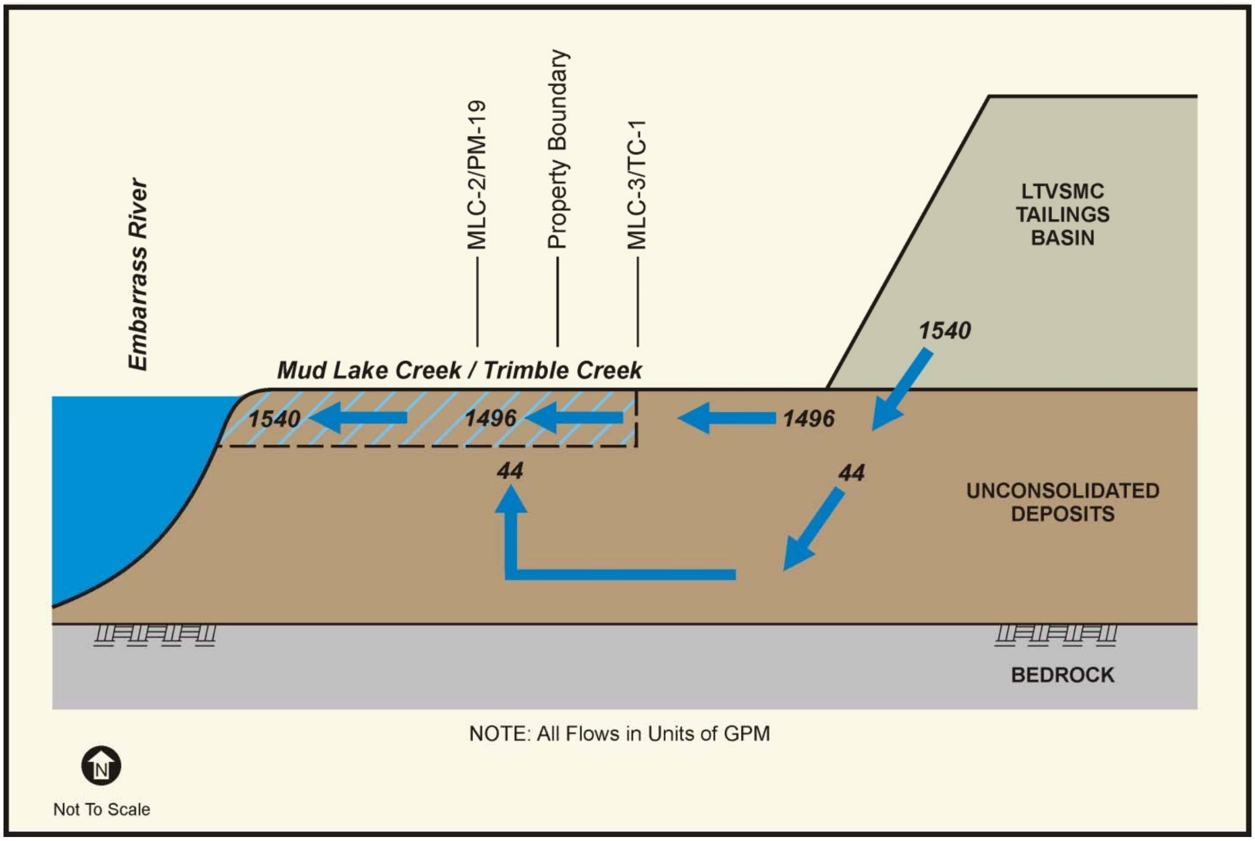


Figure 6-25 Fate of Seepage Flow to the North Toe; Continuation of Existing Conditions Scenario Model

Figure 6-26 shows the quantity and fate of seepage from the north toe during operations. The modeled mean seepage rate leaving the Tailings Basin footprint is 2240 gpm. The north toe experiences a relatively high seepage flow driven by seepage from the FTB Pond and the high infiltration rates through the north Flotation Tailings beach. The upstream capacity of the north flow path is unchanged under Project conditions (44 gpm). Therefore, 44 gpm of the seepage at the north toe enters the groundwater flow path and the remainder, 2196 gpm, upwells at the toe and becomes surface runoff that is fully captured by the FTB Containment System. The FTB Containment System captures 90% of the 44 gpm of seepage that enters the groundwater flow path, resulting in about 4 gpm that bypasses the FTB Containment System and flows to Mud Lake Creek via the north flow path.

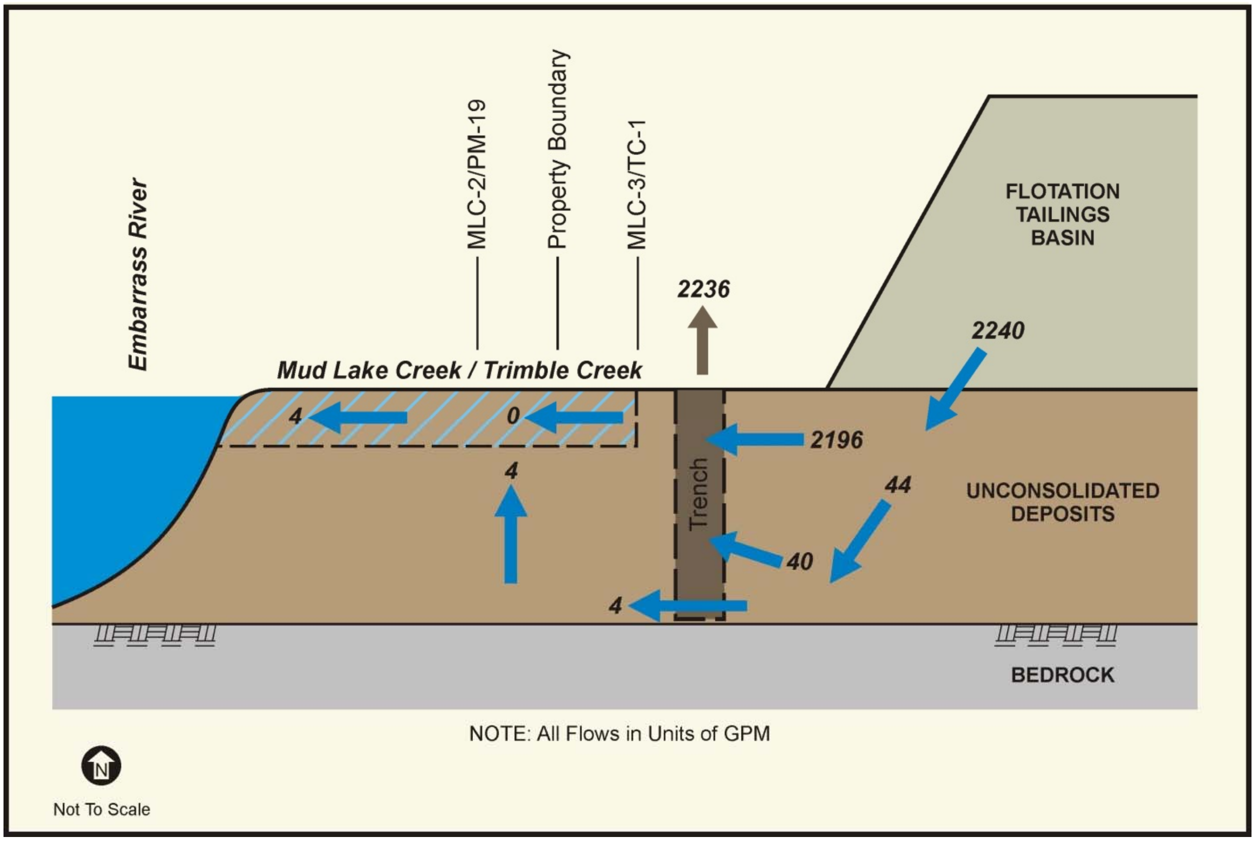


Figure 6-26 Fate of Seepage Flow to the North Toe; Project Model, Operations (Mine Year 10)

Figure 6-27 shows the quantity and fate of seepage from the north toe during long-term closure. The modeled mean seepage rate leaving the Tailings Basin footprint is 480 gpm. The seepage flow in long-term closure is much less than during operations primarily due to the lack of process water infiltrating through the Flotation Tailings beaches and the bentonite-amended Flotation Tailings layers on the beaches and in the bottom of the FTB Pond. The flow bypassing the FTB Containment System is unchanged, resulting in about 4 gpm that bypasses the FTB Containment System and flows to Mud Lake Creek via the north flow path.

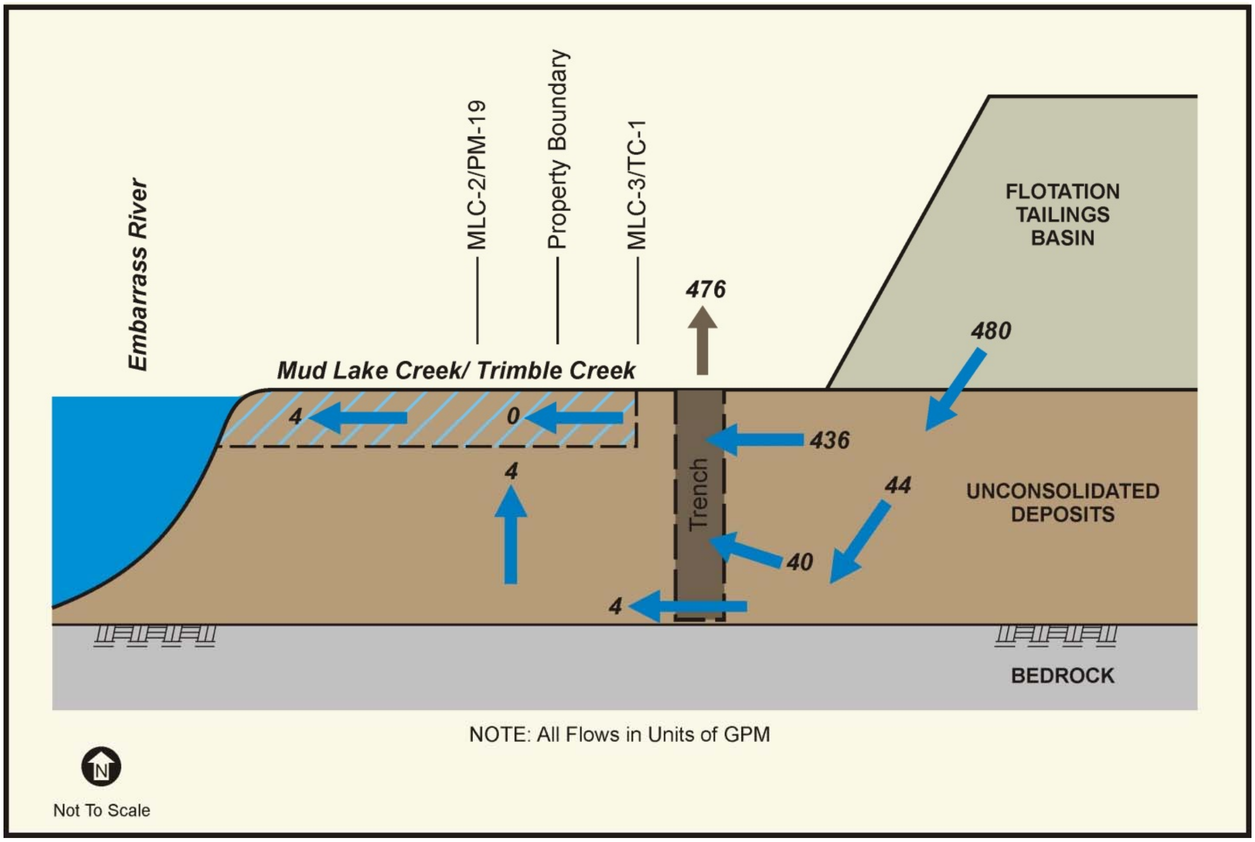


Figure 6-27 Fate of Seepage Flow to the North Toe; Project Model, Long-Term Closure

6.4.1.2 Northwest Toe

Figure 6-28 shows the quantity and fate of seepage from the northwest toe in the Continuation of Existing Conditions Scenario Model. The modeled mean seepage rate leaving the Tailings Basin footprint is 440 gpm. The aquifer capacity at the upstream end of the northwest flow path is 55 gpm on average (Section 5.2.1.3.1). Therefore, 55 gpm of the seepage at the northwest toe enters the groundwater flow path and the remainder, 385 gpm, upwells at the toe and becomes surface runoff that contributes flow and load to Trimble Creek at TC-1. The 55 gpm of seepage that enters the groundwater flow path remains as groundwater flow until the flow path discharges to Trimble Creek at PM-19.

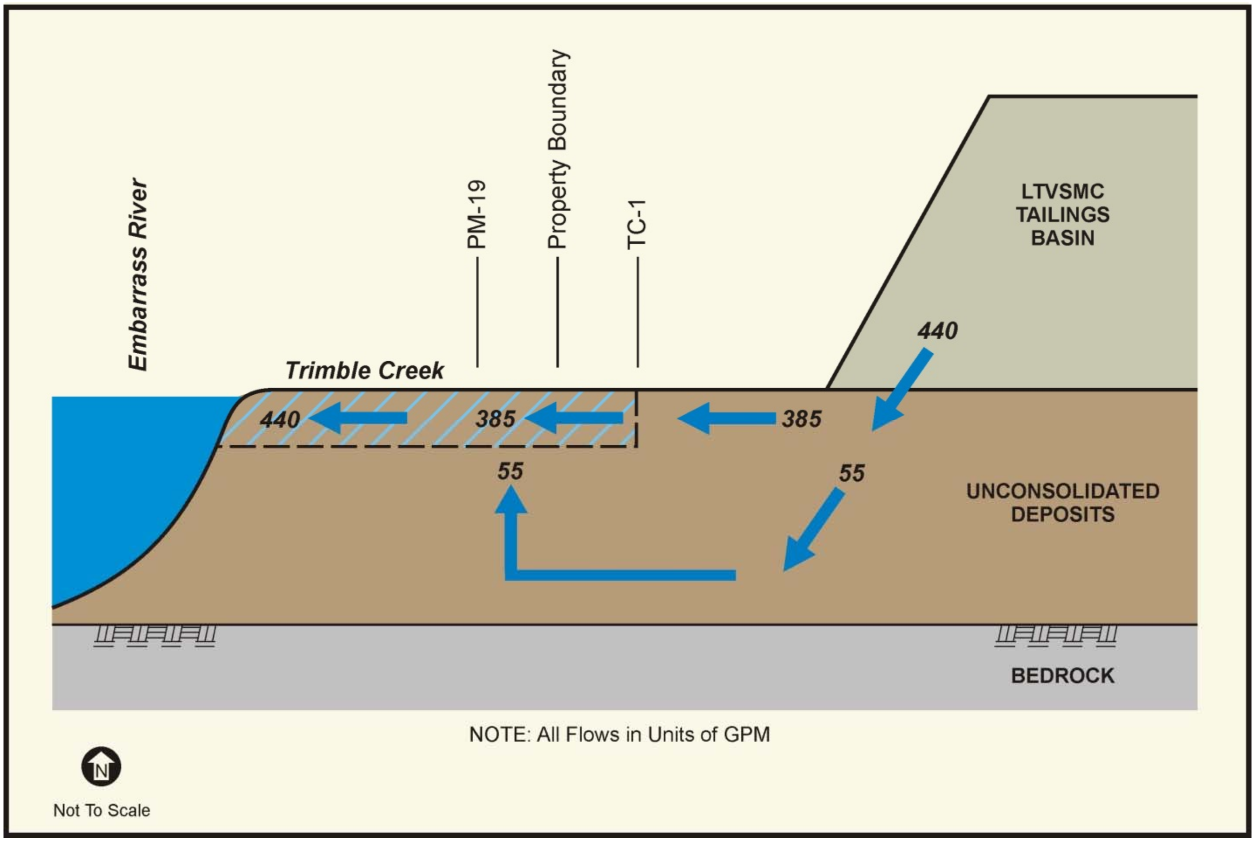


Figure 6-28 Fate of Seepage Flow to the Northwest Toe; Continuation of Existing Conditions Scenario Model

Figure 6-29 shows the quantity and fate of seepage from the northwest toe during operations. The modeled mean seepage rate leaving the Tailings Basin footprint is 630 gpm. The northwest toe experiences an increase in seepage flow during operations driven by the rising phreatic surface due to the Project. The upstream capacity of the northwest flow path is unchanged under Project conditions (55 gpm). Therefore, 55 gpm of the seepage at the northwest toe enters the groundwater flow path and the remainder, 575 gpm, upwells at the toe and becomes surface runoff that is fully captured by the FTB Containment System. The FTB Containment System captures 90% of the 55 gpm of seepage that enters the groundwater flow path, resulting in about 6 gpm that bypasses the FTB Containment System and flows to Trimble Creek via the northwest flow path.

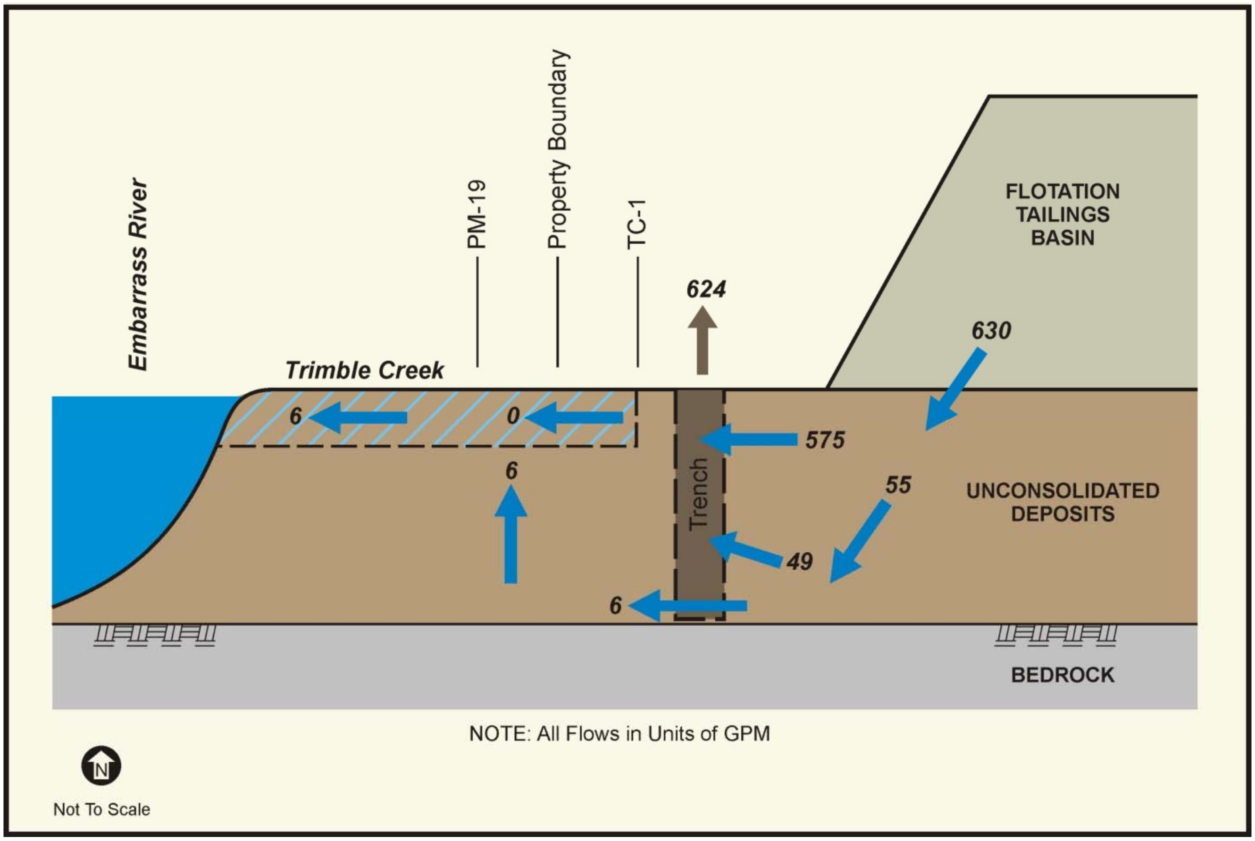


Figure 6-29 Fate of Seepage Flow to the Northwest Toe; Project Model, Operations (Mine Year 10)

Figure 6-30 shows the quantity and fate of seepage from the northwest toe during long-term closure. The modeled mean seepage rate leaving the Tailings Basin footprint is 410 gpm. The seepage flow in long-term closure is much less than during operations primarily due to the lack of process water infiltrating through the Flotation Tailings beaches and the bentonite-amended Flotation Tailings layers on the beaches and the bottom of the pond. The flow bypassing the FTB Containment System is unchanged, resulting in about 6 gpm that bypasses the FTB Containment System and flows to Trimble Creek via the northwest flow path.

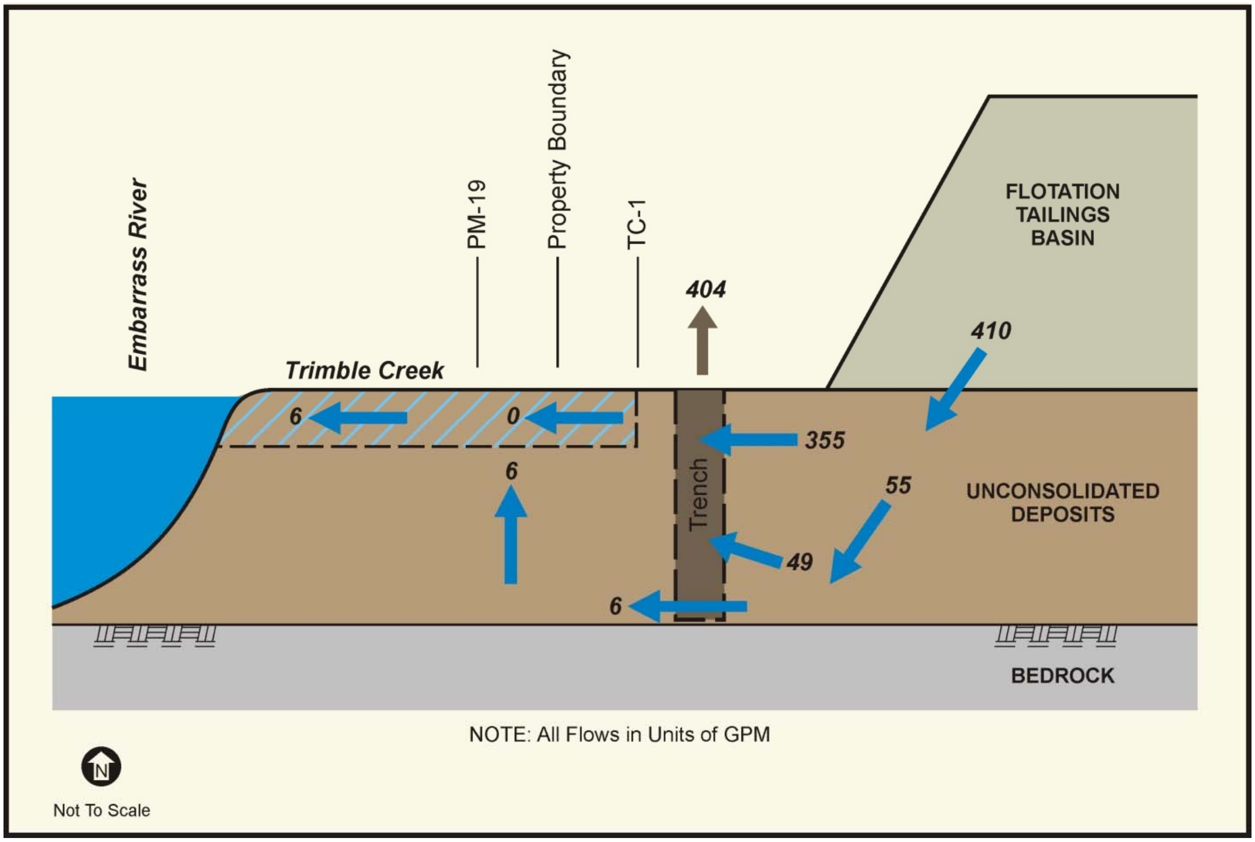


Figure 6-30 Fate of Seepage Flow to the Northwest Toe; Project Model, Long-Term Closure

6.4.1.3 West Toe

Figure 6-31 shows the quantity and fate of seepage from the west toe in the Continuation of Existing Conditions Scenario Model. The modeled mean seepage rate leaving the Tailings Basin footprint is 610 gpm. The aquifer capacity at the upstream end of the west flow path is 110 gpm on average (Section 5.2.1.3.1). Therefore, 110 gpm of the seepage at the west toe enters the groundwater flow path and the remainder, 500 gpm, upwells at the toe and becomes surface runoff that flows to Unnamed Creek at UC-1. The 110 gpm of seepage that enters the groundwater flow path discharges to the Embarrass River.

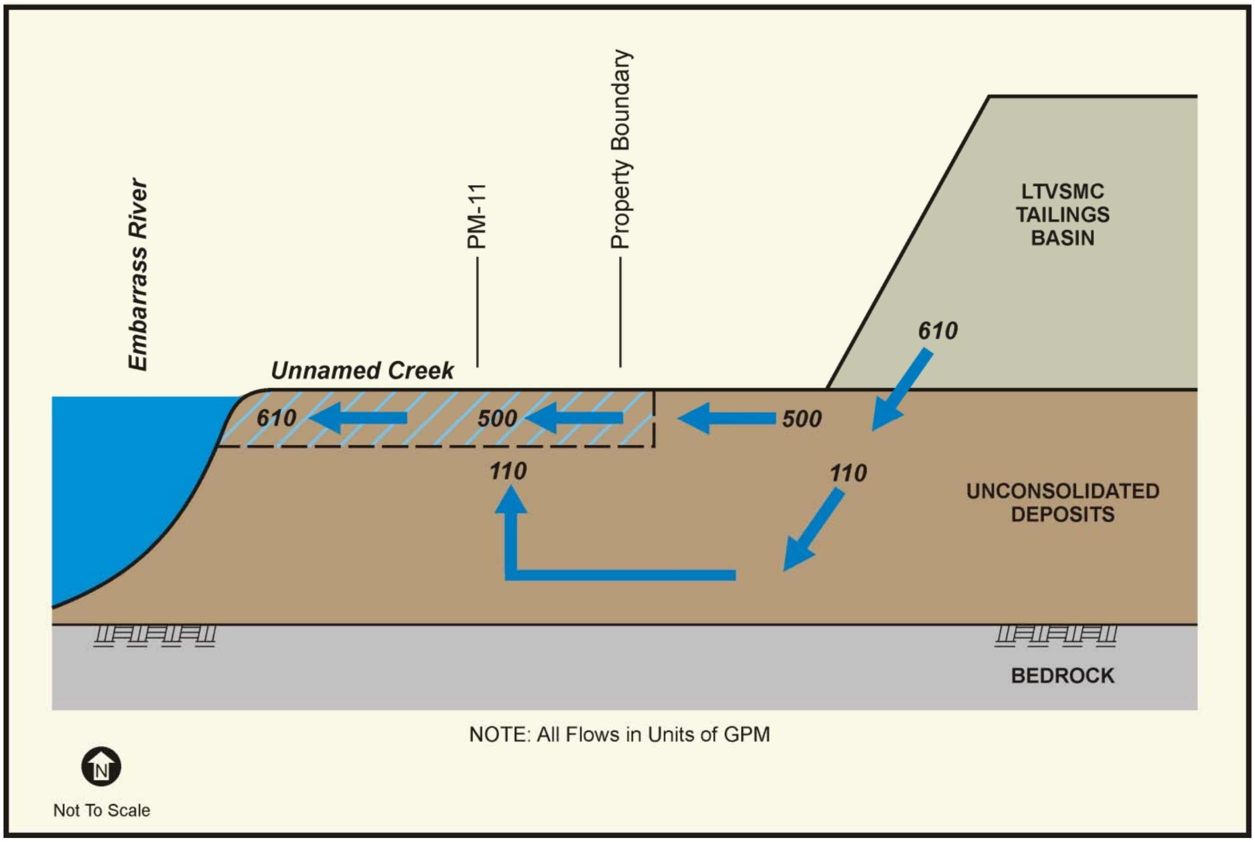


Figure 6-31 Fate of Seepage Flow to the West Toe; Continuation of Existing Conditions Scenario Model

Figure 6-32 shows the quantity and fate of seepage from the west toe during operations. The modeled mean seepage rate leaving the Tailings Basin footprint is 720 gpm. The west toe experiences an increase in seepage flow driven by the rising phreatic surface due to the Project. The upstream capacity of the west flow path is unchanged under Project conditions (110 gpm). Therefore, 110 gpm of the seepage at the west toe enters the groundwater flow path and the remainder, 610 gpm, upwells at the toe and becomes surface runoff that is fully captured by the FTB Containment System. The FTB Containment System captures 90% of the 110 gpm of seepage that enters the groundwater flow path, resulting in about 11 gpm that bypasses the FTB Containment System and flows to the Embarrass River via the west flow path.

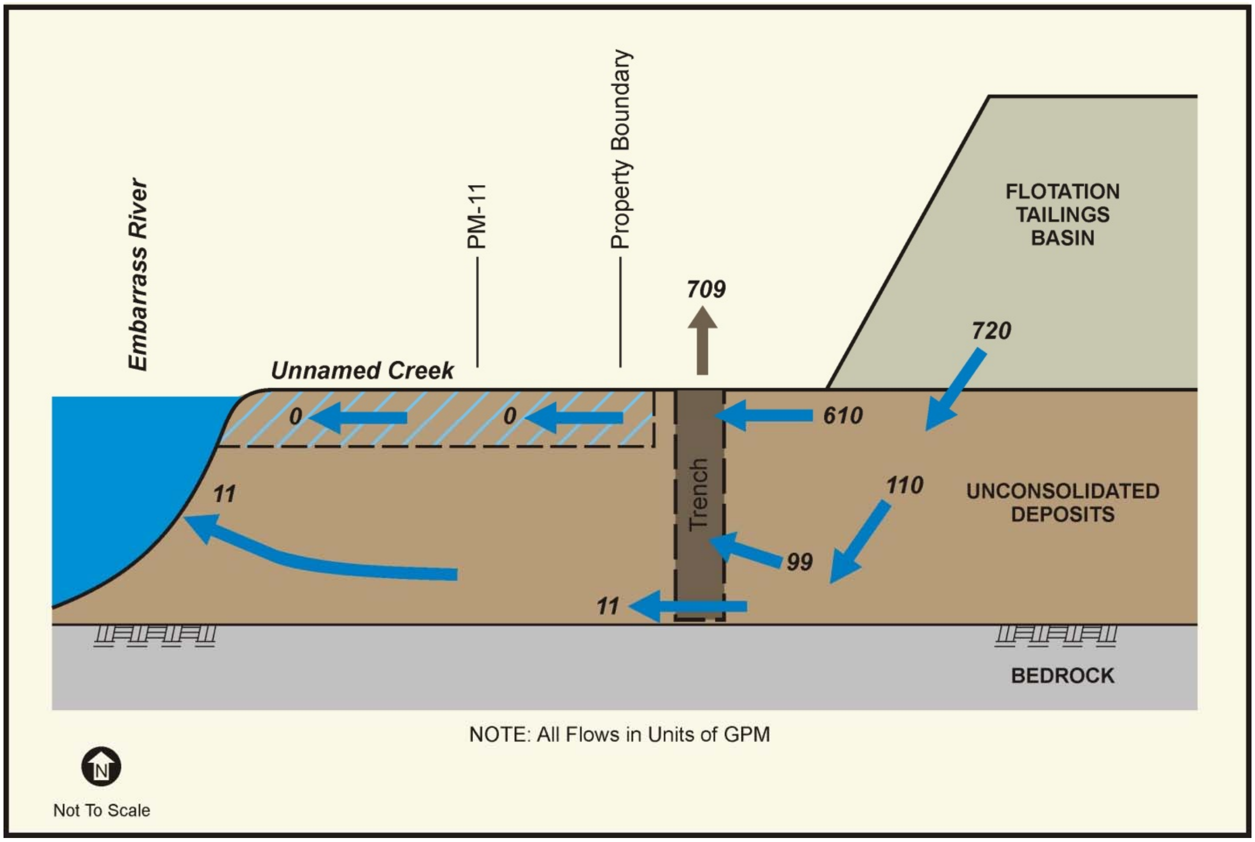


Figure 6-32 Fate of Seepage Flow to the West Toe; Project Model, Operations (Mine Year 10)

Figure 6-33 shows the quantity and fate of seepage from the west toe during long-term closure. The modeled mean seepage rate leaving the Tailings Basin footprint is 660 gpm. The seepage flow in long-term closure is much less than during operations primarily due to the lack of process water infiltrating through the Flotation Tailings beaches and the bentonite-amended Flotation Tailings layers on the beaches and in the bottom of the pond. The flow bypassing the FTB Containment System is unchanged, resulting in about 11 gpm that bypasses the FTB Containment System and flows to the Embarrass River via the west flow path.

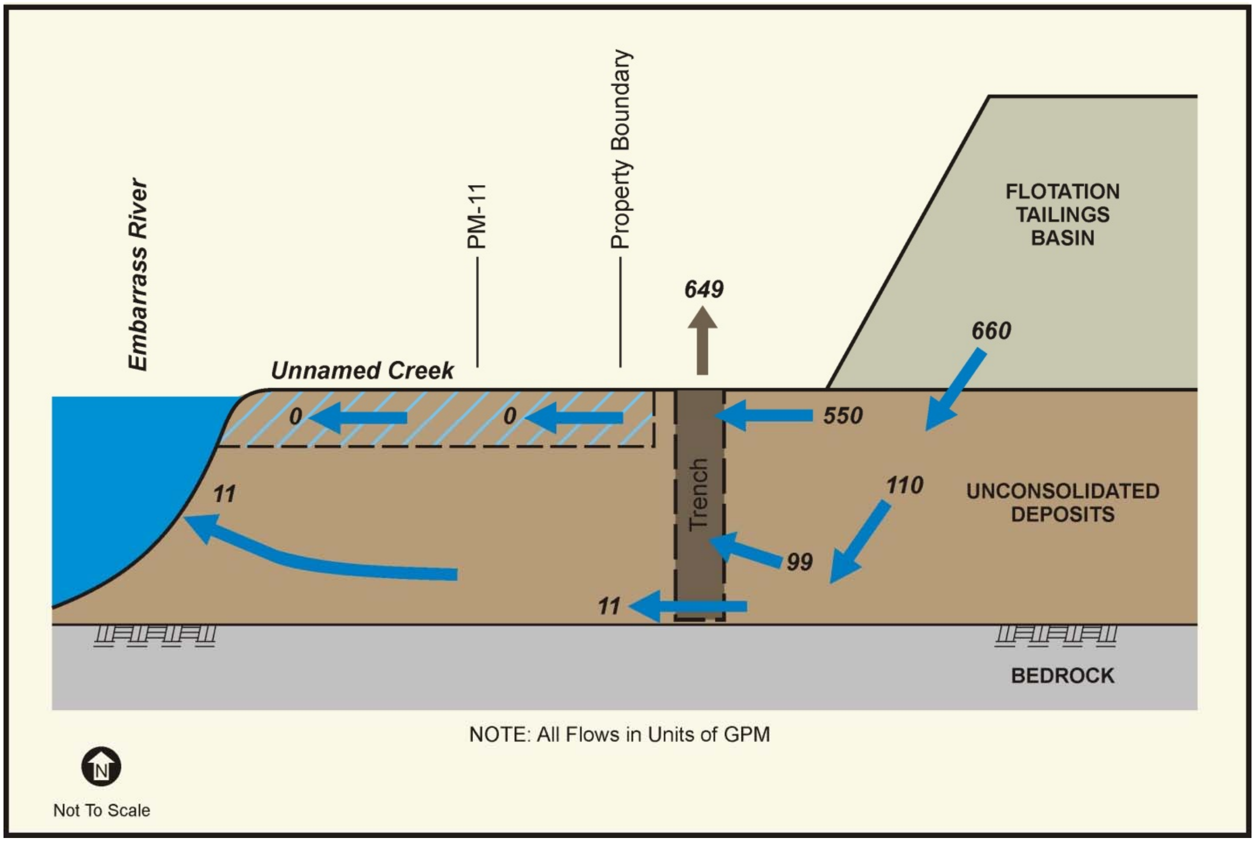


Figure 6-33 Fate of Seepage Flow to the West Toe; Project Model, Long-Term Closure

6.4.1.4 South Toe and East Toe

All seepage from the south toe is captured by the FTB South Seepage Management System and either pumped back into the FTB Pond or treated by the WWTP. The time-varying average seepage flow leaving the south toe is shown in Figure 6-24.

Similarly, all seepage from the east toe is captured by the FTB Containment System and is pumped directly back into the FTB Pond. The time-varying average seepage flow leaving the east toe is shown in Figure 6-24. This captured flow is small compared to the other toes. The flow is zero for Mine Year 0 through Mine Year 7, starts at Mine Year 8, peaks at about Mine Year 25 at about 320 gpm, and then decreases to nearly zero in long-term closure as the phreatic surface drops within the tailings and draws water away from the eastern portion of the Tailings Basin.

6.4.2 Seepage Quality

The seepage water quality varies at each of the four Tailings Basin toes because of variations in the types and quantities of materials through which water flows prior to reaching the toes. Every source of load within the Tailings Basin is directed by percentage to each of the five toes. Therefore, the water quality at each toe is unique. The primary source or sources of loading to seepage at each toe are discussed below. Awareness of what loading sources dominate each toe helps in understanding the water quality response at each toe and the reasons why the Project water quality differs more significantly from the Continuation of Existing Conditions Scenario water quality at some toes. The water quality at the toes of the Tailings Basin is important because it directly affects the water quality that is assumed to bypass the FTB Containment System and affect groundwater quality at the property boundary in each of the three modeled flow paths. It is also important because water collected by the FTB seepage capture systems affects FTB pond water quality and WWTP design. Time-series figures of water quality at the toes of the Tailings Basin for all constituents are included in Attachment F. For a general description of the methods used to create the concentration plots in this section and its sub-sections, see Section 6.3.1.1.

6.4.2.1 North Toe

A summary of estimated concentrations at the north toe during operations, reclamation, and long-term closure is provided in Large Table 10. Seepage water quality at the north toe is dominated by the existing pond in Cell 2E in the Continuation of Existing Conditions Scenario Model and by the Flotation Tailings and the FTB Pond in the Project Model. The Continuation of Existing Conditions Scenario water quality is relatively stable and shows an initial period where the range in concentrations is expanding. This is due to the uncertainty in the constituent mass release rates within the LTVSMC tailings and the time it takes for higher or lower release rates to equilibrate within the Tailings Basin. However, the range in the Continuation of Existing Conditions Scenario water quality is relatively small because the water quality is dominated by the stable water quality of the existing pond in Cell 2E. The Continuation of Existing Conditions Scenario water quality at the north toe also shows a decreasing trend at around Mine Year 60. This is due to depletion of constituent mass in the LTVSMC tailings of the existing Tailings Basin. The depletion occurs when all of the tailings in the unsaturated zone of a particular area of the Tailings Basin have released the available mass of a particular constituent via oxidation. This is particularly visible in Figure 6-34. This trend is also seen then in groundwater, particularly the north flow path. The effect in groundwater is discussed in Section 6.5.2.

This toe shows a significant response in the water quality under the Project conditions. Many constituents show a sharp initial rise in concentrations around Mine Years 5 or 7. This corresponds to the shortest travel time from the pond(s) to the toe (Section 5.2.1.2.3). Some of this spike in concentrations is also due to water flushing through the existing LTVSMC tailings when the Flotation Tailings are placed on top of them in Cell 2E. After this initial increase, the concentration responses follow several general patterns.

Some constituents show a continual rise to a peak concentration at around Mine Year 25, and then an asymptotic decline in concentrations to a new long-term steady-state which may be near, higher than, or lower than the concentrations in the Continuation of Existing Conditions Scenario Model. Some examples of concentration responses like this are cobalt, antimony, selenium, and sulfate (Figure 6-34).

Some constituents reach their maximum concentration around Mine Year 4 or 5, and then plateau for about 15 years (Mine Year 10 to Mine Year 25) before declining again to a long-term steady-state. Some examples of this response are copper and lead. This occurs because the concentration within both the unsaturated portions of the Flotation Tailings and the FTB Pond, the two major sources of load to the north toe for copper and lead, are concentration capped in the Project Model. Figure 6-35 shows this response for lead at the north toe. The very significant increase in lead concentrations, from ~ 1 µg/L to ~ 55 µg/L plays a significant role in the groundwater quality response in the north flow path, as discussed later in Section 6.5.2.

Some constituents, such as chloride, magnesium, and thallium, do not show a significant change due to the Project. There may be some increase in concentrations for a brief period, but concentrations return to steady-state near where concentrations are in the Continuation of Existing Conditions Scenario Model. This is because the release from the Flotation Tailings is similar to the release from the LTVSMC tailings, and the water quality in the FTB Pond does not differ significantly from the water quality in the existing pond in Cell 2E. Figure 6-36 shows the response of magnesium at the north toe.

Finally, some constituents such as aluminum, alkalinity, and boron, show a sharp decrease in concentrations at Mine Year 4 or 5 due to loading from the Flotation Tailings and the FTB Pond being generally less than loading from the LTVSMC tailings. Concentrations eventually increase around Mine Years 80 to 100 when the effect of FTB reclamation results in equilibrium at the north toe, although the concentrations in long-term steady-state are generally lower than in the Continuation of Existing Conditions Scenario Model. Figure 6-37 shows the concentration of aluminum at the north toe.

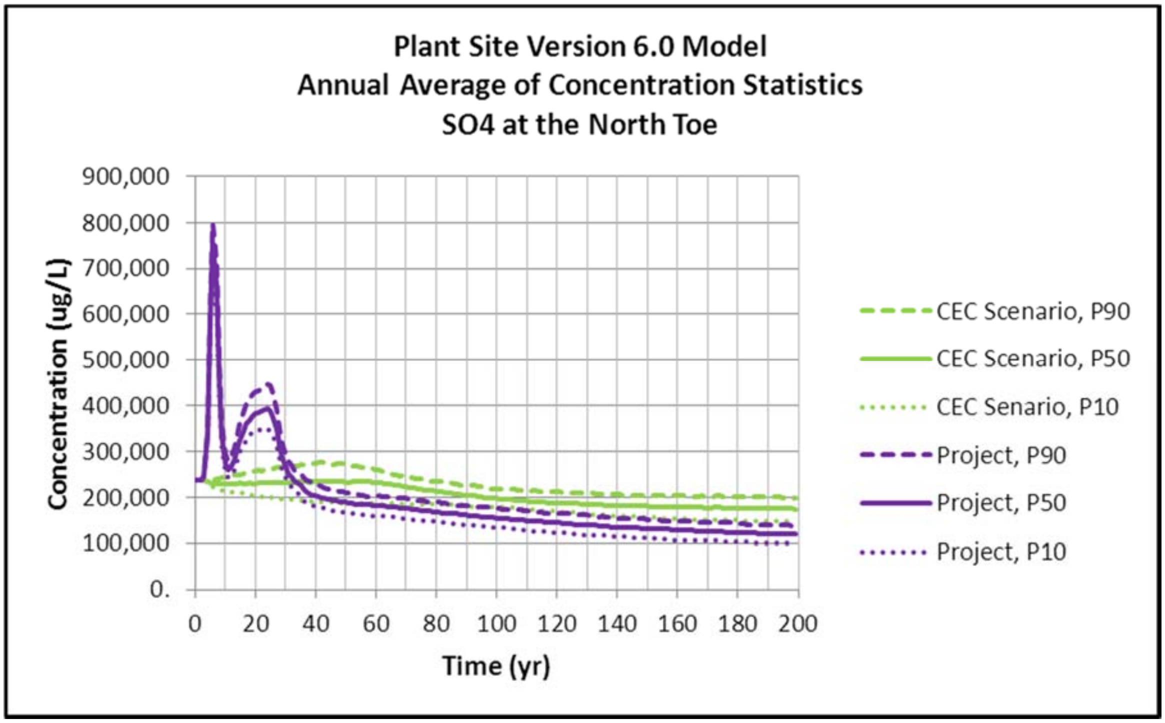


Figure 6-34 Sulfate Concentrations at the North Toe; Continuation of Existing Conditions Scenario vs. Project

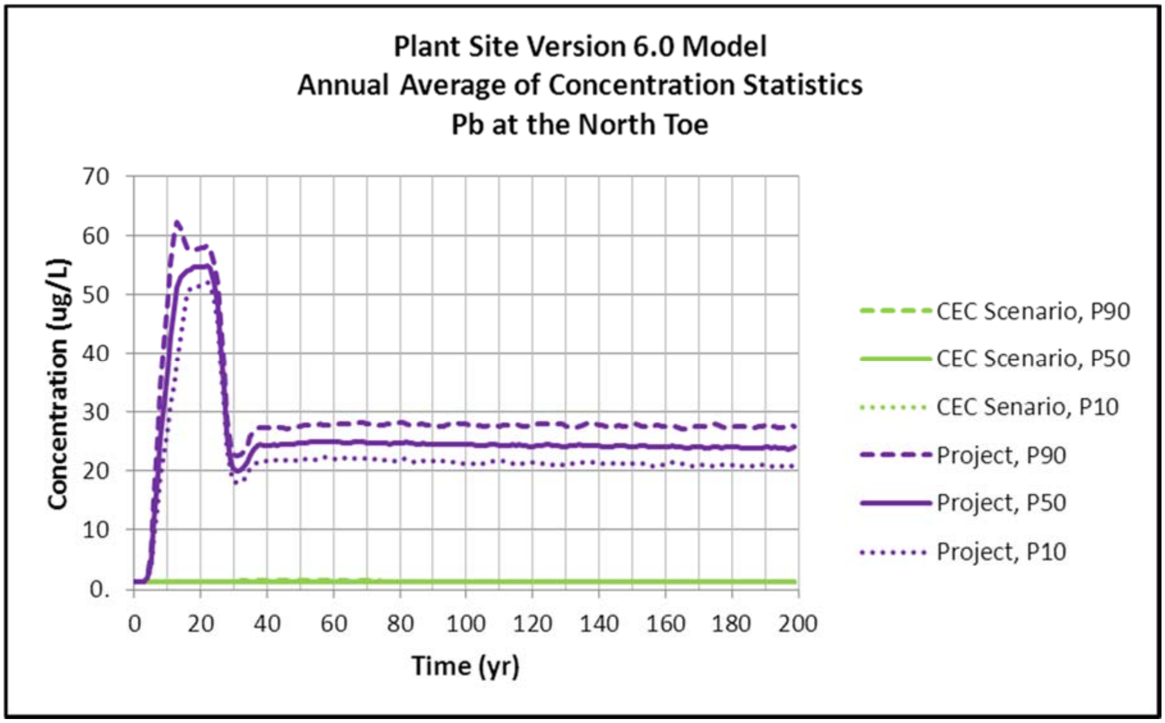


Figure 6-35 Lead Concentrations at the North Toe; Continuation of Existing Conditions Scenario vs. Project

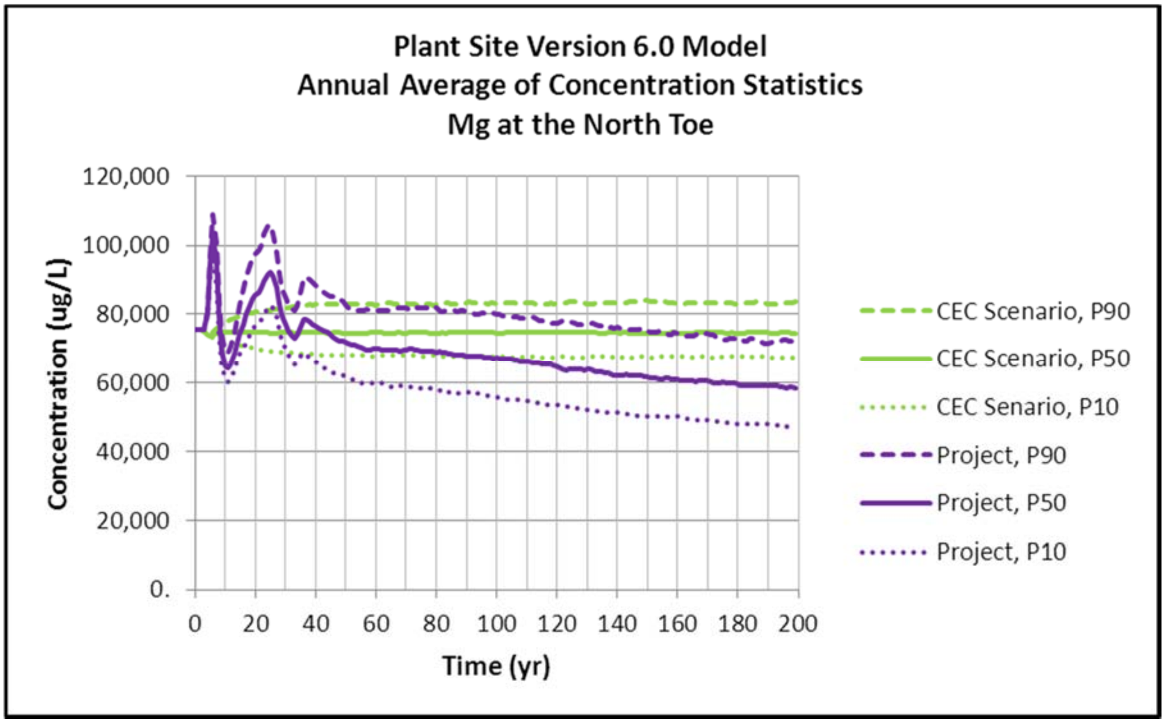


Figure 6-36 Magnesium Concentrations at the North Toe; Continuation of Existing Conditions Scenario vs. Project

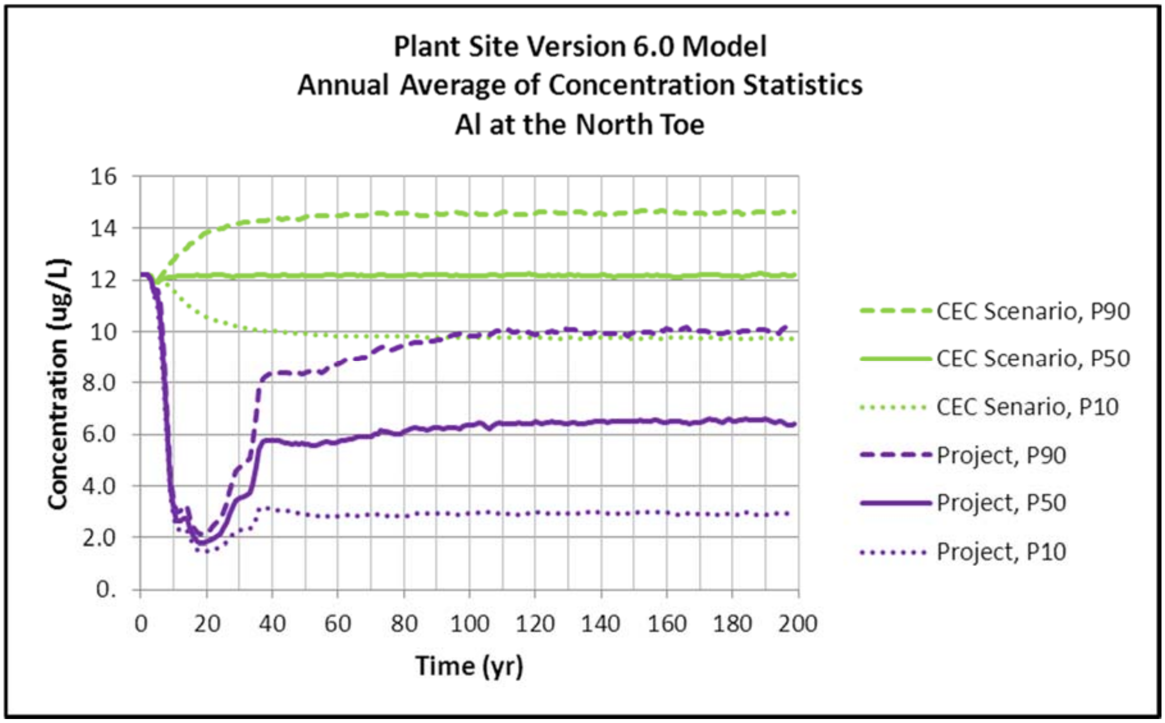


Figure 6-37 Aluminum Concentrations at the North Toe; Continuation of Existing Conditions Scenario vs. Project

6.4.2.2 Northwest Toe

A summary of estimated concentrations at the northwest toe during operations, reclamation and long-term closure is provided in Large Table 11. Seepage water quality at the northwest toe is not consistently dominated by one source of load for all constituents, but is a mixture of loading from existing LTVSMC tailings, the Flotation Tailings, and the FTB Pond. The Continuation of Existing Conditions Scenario water quality is relatively stable and only shows an initial period where the range in concentrations is expanding. This is due to the uncertainty in the constituent mass release rates within the LTVSMC tailings and the time it takes for higher or lower release rates to equilibrate within the Tailings Basin. The range in the Continuation of Existing Conditions Scenario water quality is intermediate relative to the range observed at the north toe and the range observed at the west toe, again because the northwest toe represents a mix of loading dominated by LTVSMC tailings release and pond water quality.

Because this toe is not generally dominated by one source or another, this toe shows a much more varied response in the water quality under the Project conditions. Additionally, the northwest toe, compared to the north toe, is much less controlled by the relatively stable concentrations in the FTB Pond, resulting many times in higher peaks and wider ranges in concentrations during long-term closure. Finally, the concentrations tend to come to equilibrium at around Mine Year 60 and do not show a continued asymptotic increase or decrease in concentrations as seen at the north toe.

In the Project Model, some constituents show a sharp initial rise in concentrations at around Mine Year 8 to 10. From this initial rise, they continue to increase to a very significant peak concentration at around Mine Year 13 and/or Mine Year 25, then a decline to a long-term steady-state concentration at around Mine Year 60 which is very near the concentration in the Continuation of Existing Conditions Scenario Model. Some examples of concentration responses like this are arsenic, cadmium, cobalt, nickel, lead, antimony, selenium, and zinc (Figure 6-38 and Figure 6-39).

Other constituents do not show a significant response in the Project model. Concentrations tend to increase or decrease for a short while, but then hover around the Continuation of Existing Conditions Scenario Model results without much deviation. Also, the range in concentrations seems to be quite close to the range in concentrations in the Continuation of Existing Conditions Scenario Model, indicating that in long-term closure, the northwest toe is mostly dominated by the loading from the unsaturated portions of the LTVSMC tailings. Some examples of concentration responses like this are silver, aluminum, alkalinity, boron, calcium, chloride, magnesium, manganese, and sulfate (Figure 6-40 and Figure 6-41).

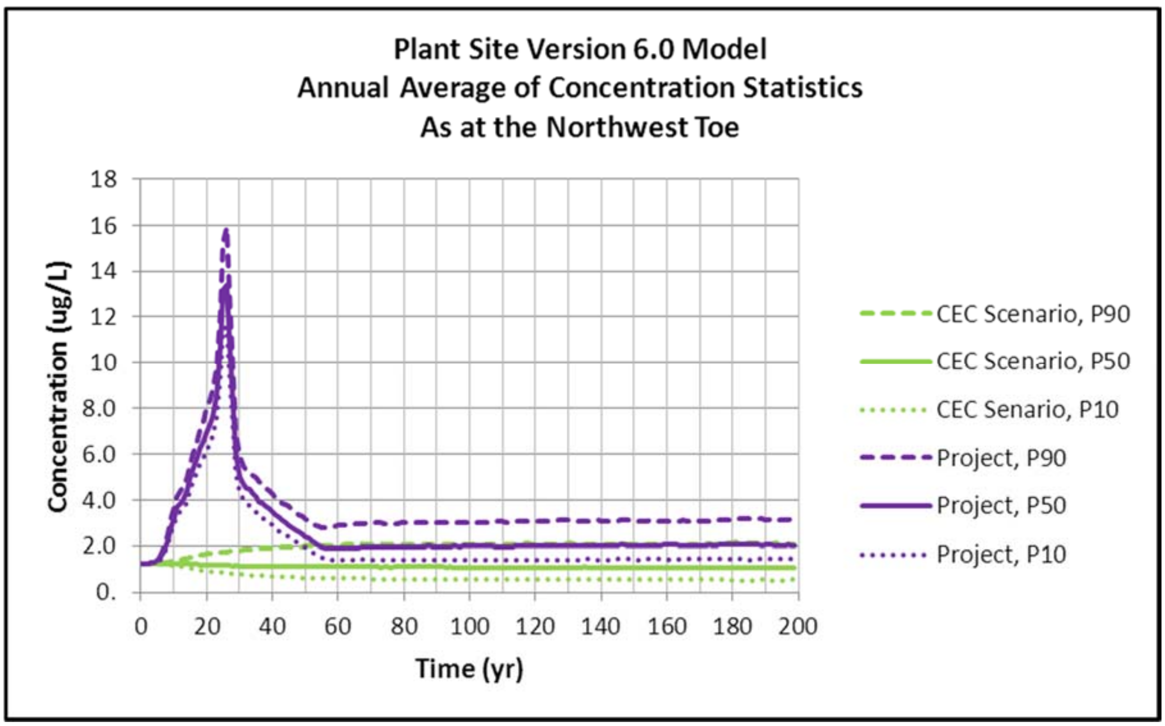


Figure 6-38 Arsenic Concentrations at the Northwest Toe; Continuation of Existing Conditions Scenario vs. Project

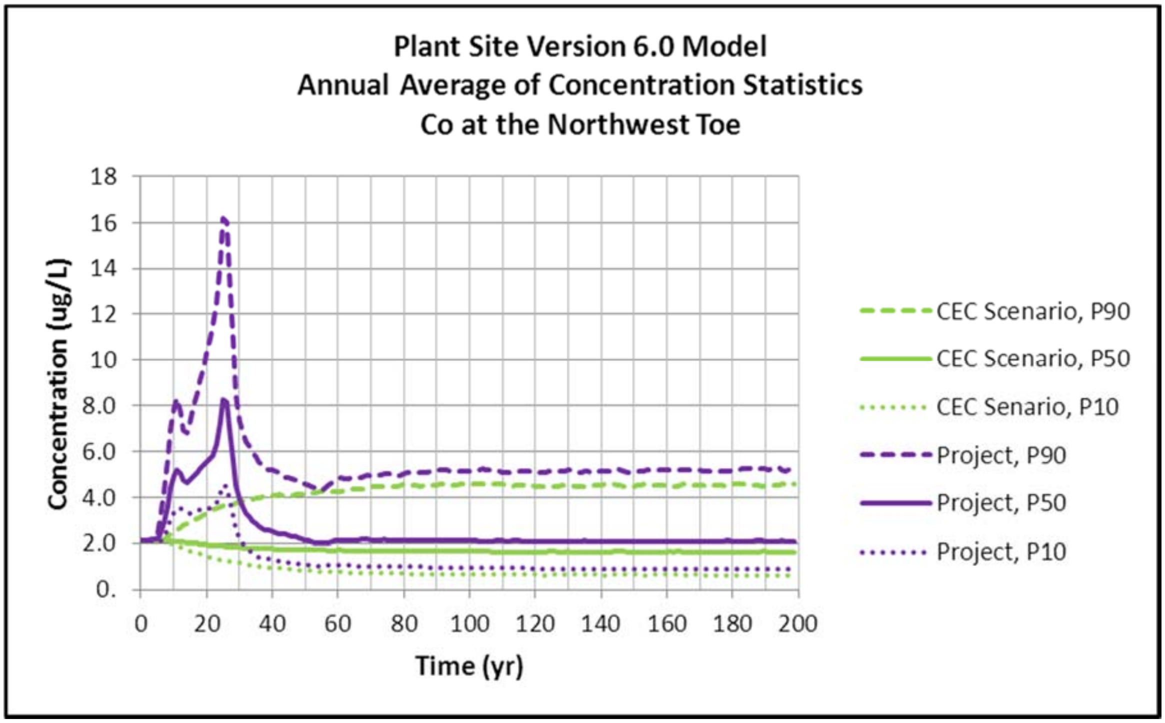


Figure 6-39 Cobalt Concentrations at the Northwest Toe; Continuation of Existing Conditions Scenario vs. Project

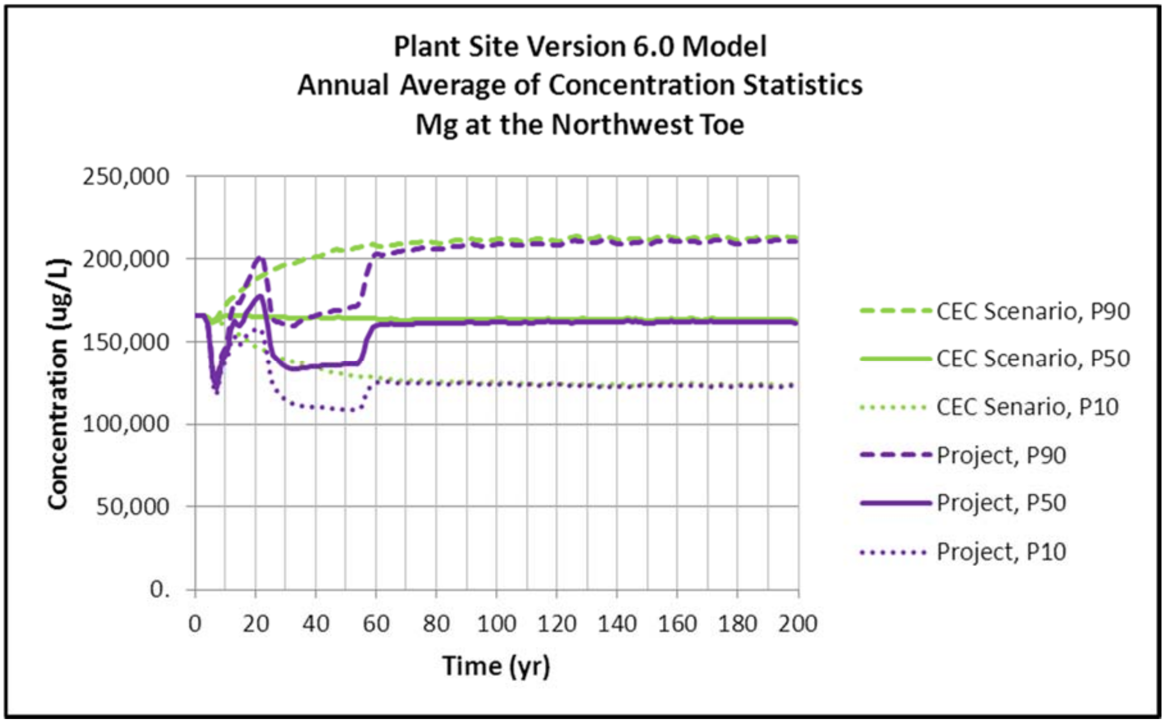


Figure 6-40 Magnesium Concentrations at the Northwest Toe; Continuation of Existing Conditions Scenario vs. Project

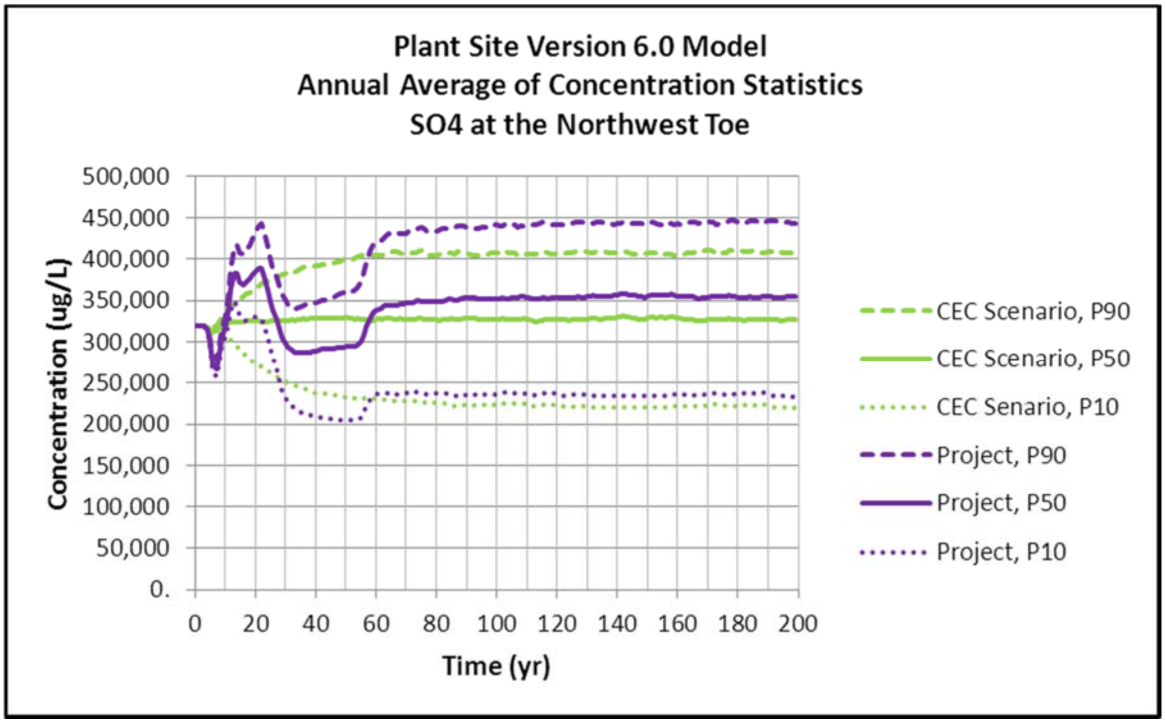


Figure 6-41 Sulfate Concentrations at the Northwest Toe; Continuation of Existing Conditions Scenario vs. Project

6.4.2.3 West Toe

A summary of estimated concentrations at the west toe during operations, reclamation, and long-term closure is provided in Large Table 12. Seepage water quality at the west toe is dominated by the LTVSMC tailings in Cell 2W in both the Continuation of Existing Conditions Scenario Model and the Project Model. The Continuation of Existing Conditions Scenario water quality is relatively stable and only shows an initial period where the range in concentrations is expanding. This is due to the uncertainty in the constituent mass release rates within the LTVSMC tailings and the time it takes for higher or lower release rates to equilibrate within the Tailings Basin. Because this toe is generally dominated by the LTVSMC tailings in Cell 2W, the concentrations under Project conditions do not deviate significantly from the concentrations under the Continuation of Existing Conditions Scenario for most constituents. Additionally, the west toe, compared to the north toe, is much less controlled by the relatively stable concentrations in the FTB Pond, resulting in much wider ranges in concentrations in long-term closure. Finally, the concentrations tend to come to equilibrium at around Mine Year 60 and do not show a continued asymptotic increase or decrease in concentrations as seen at the north toe (for example, compare sulfate at the north toe and at the west toe).

Many constituents show no significant response. Concentrations tend to increase or decrease for a short while, but then hover around the Continuation of Existing Conditions Scenario Model results without much deviation. Also, the range in concentrations seems to be quite close to the range in concentrations in the Continuation of Existing Conditions Scenario Model, indicating that in long-term closure, the west toe is mostly dominated by the loading from the unsaturated portions of the LTVSMC tailings. Some examples of concentration responses like this are silver, aluminum, alkalinity, boron, calcium, magnesium, manganese, and sulfate (Figure 6-42 and Figure 6-43).

Some constituents exhibit a significant concentration spike in the Project model. These are constituents that have very high loading from the Flotation Tailings and high concentrations in the FTB Pond relative to the loading from the LTVSMC tailings. So even though relatively little flow comes to the west toe from the Flotation Tailings and the FTB Pond, the loading from these sources is significant The culpability analysis in Section 6.4.2.6 shows how the FTB is a significant source of load to the west toe for some of these constituents, due mainly to the extremely high concentrations estimated within the Flotation Tailings. These constituents are arsenic, cobalt, copper, nickel, lead, antimony, and zinc (Figure 6-44, Figure 6-45, and Figure 6-46).

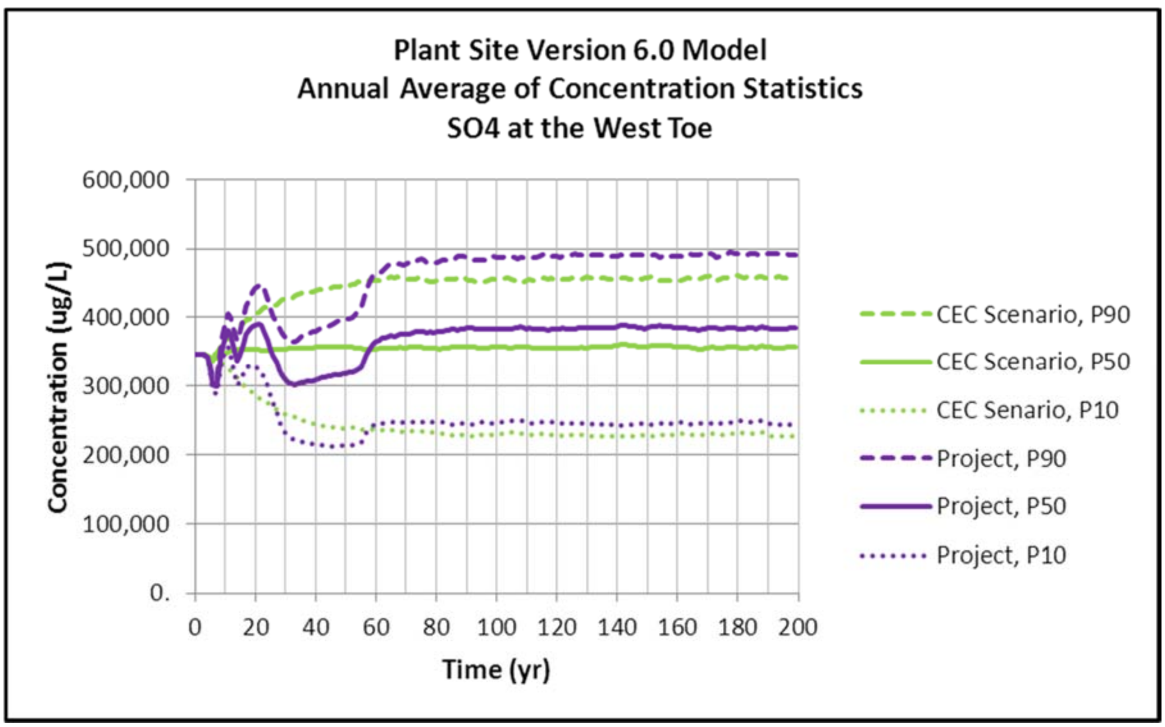


Figure 6-42 Sulfate Concentrations at the West Toe; Continuation of Existing Conditions Scenario vs. Project

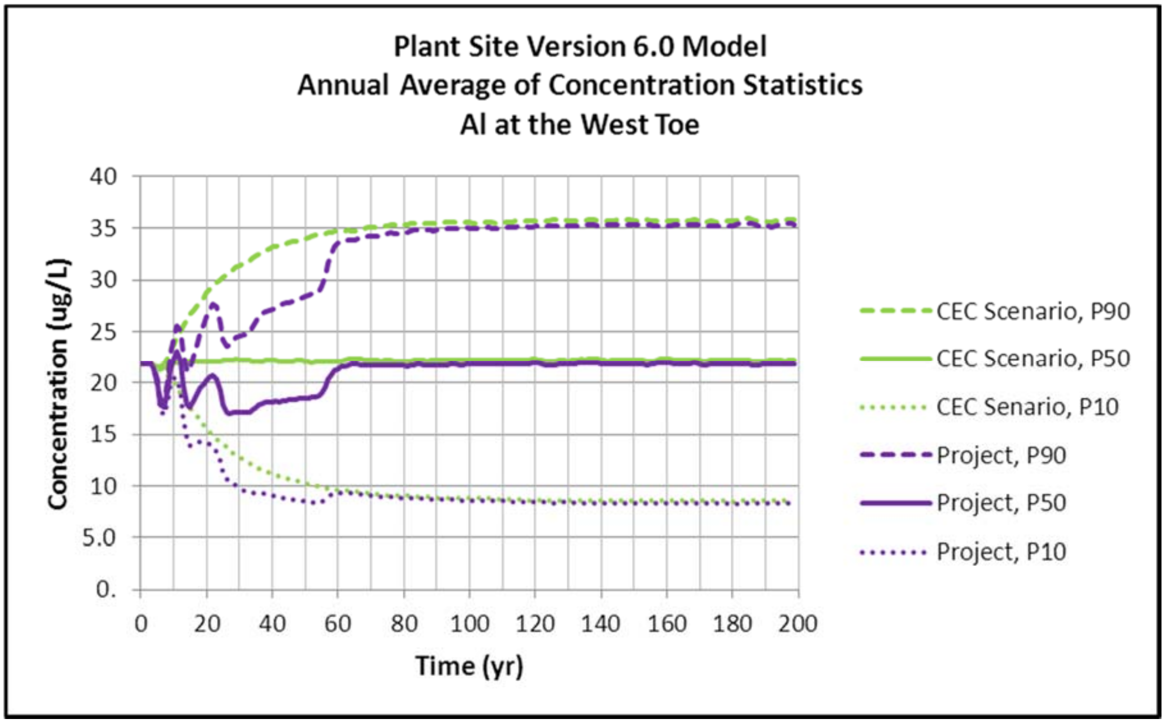


Figure 6-43 Aluminum Concentrations at the West Toe; Continuation of Existing Conditions Scenario vs. Project

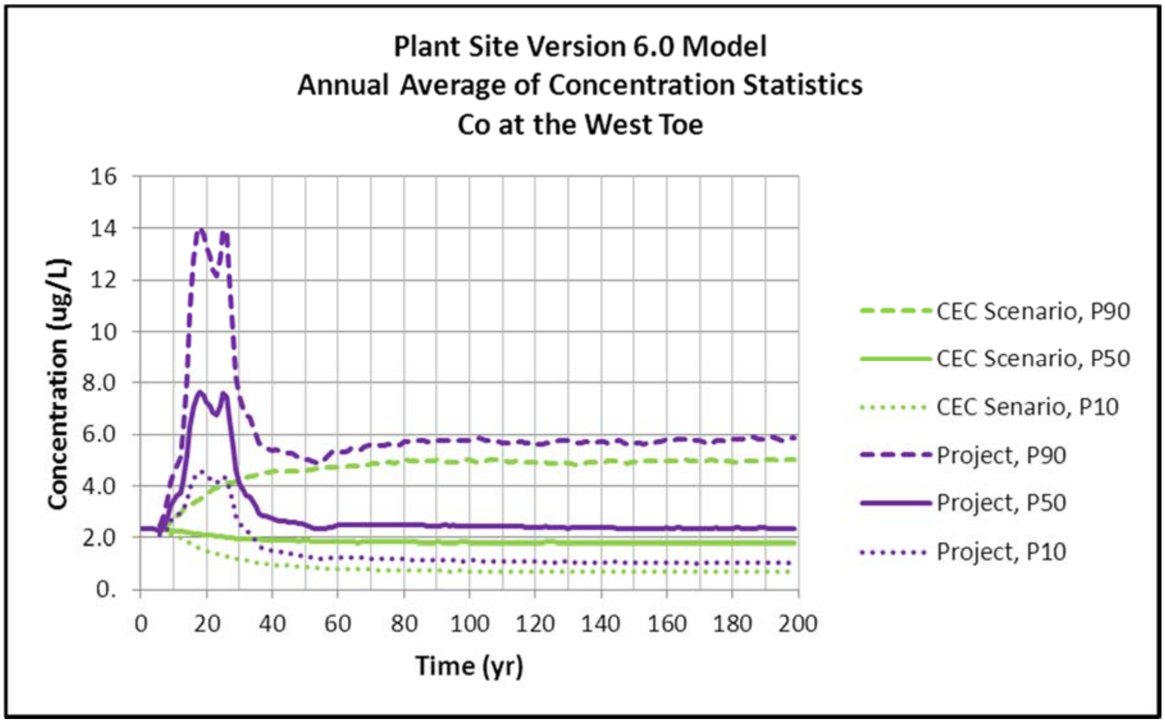


Figure 6-44 Cobalt Concentrations at the West Toe; Continuation of Existing Conditions Scenario vs. Project

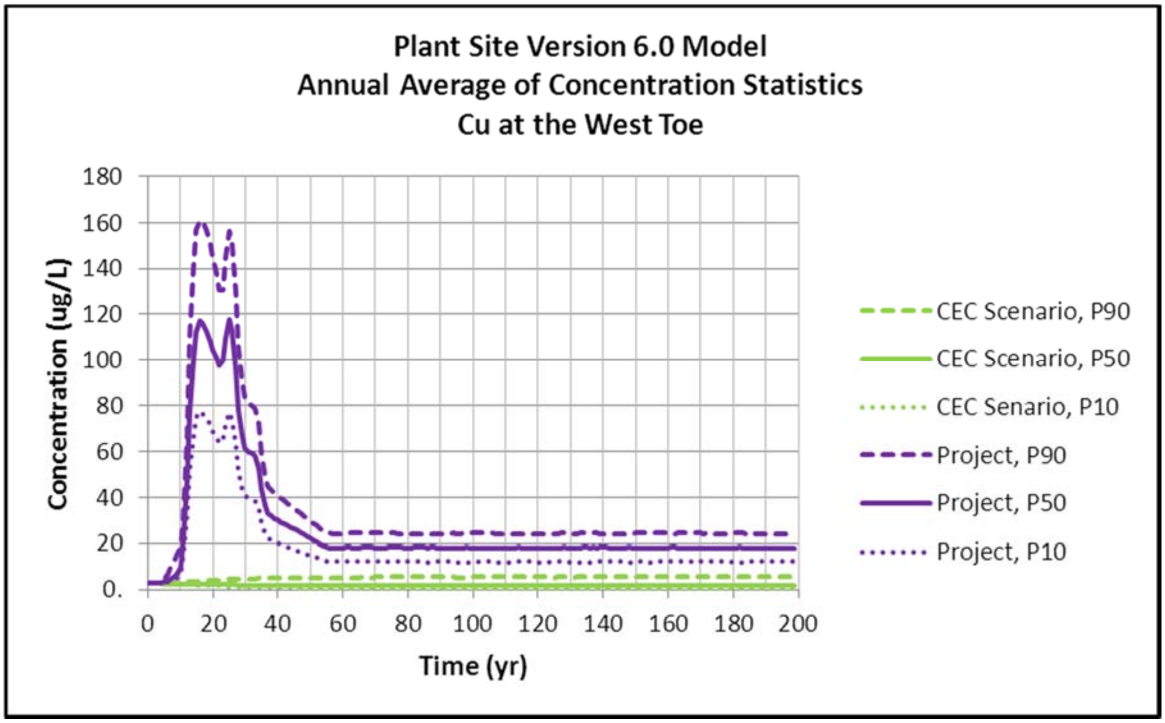


Figure 6-45 Copper Concentrations at the West Toe; Continuation of Existing Conditions Scenario vs. Project

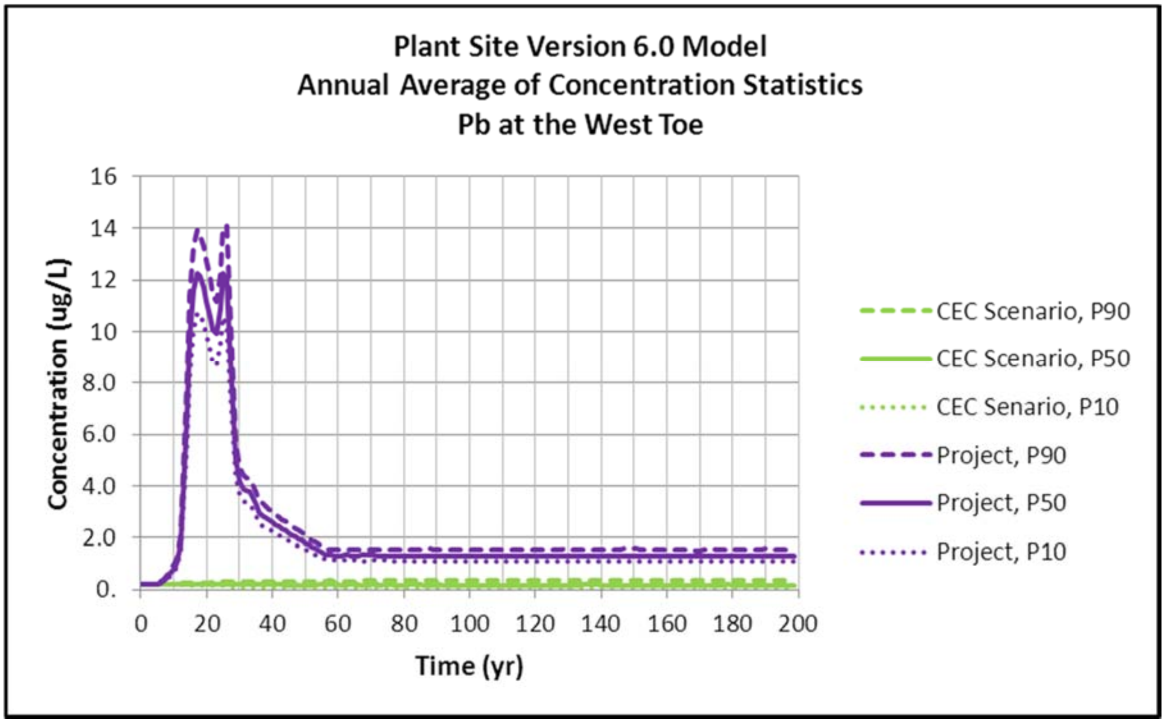


Figure 6-46 Lead Concentrations at the West Toe; Continuation of Existing Conditions Scenario vs. Project

6.4.2.4 South Toe

A summary of estimated concentrations at the south toe during operations, reclamation and long-term closure is provided in Large Table 13.Seepage water quality at the south toe is dominated by the existing pond in Cell 1E in the Continuation of Existing Conditions Scenario Model, and by the FTB Pond in the Project Model once the FTB covers both Cell 1E and Cell 2E. The Continuation of Existing Conditions Scenario water quality is relatively stable and only shows an initial period where the range in concentrations is expanding. This is due to the uncertainty in the constituent mass release rates within the LTVSMC tailings and the time it takes for higher or lower release rates to equilibrate within the Tailings Basin. However, the range in the Continuation of Existing Conditions Scenario water quality is relatively small because the water quality is dominated by the stable water quality of the existing pond in Cell 1E.

Estimates of concentration at the south toe are very similar to those at the north toe in that the dominant sources of water quality are the Flotation Tailings in the south beach and the FTB Pond (Figure 6-47 through Figure 6-50). However, the response at the south toe is slightly delayed (about 7 years) due to the time it takes to first build up Cell 2E before the FTB expands into Cell 1E. The water quality at the south toe is shown for sulfate, arsenic, copper and lead.

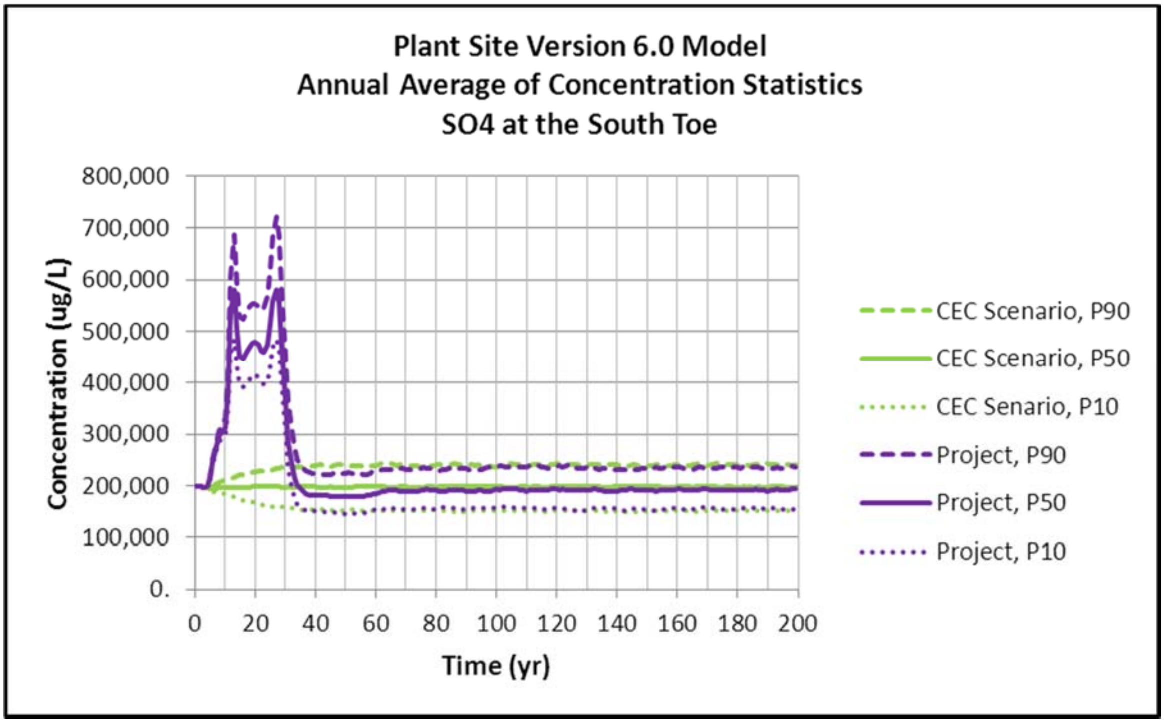


Figure 6-47 Sulfate Concentrations at the South Toe; Continuation of Existing Conditions Scenario vs. Project

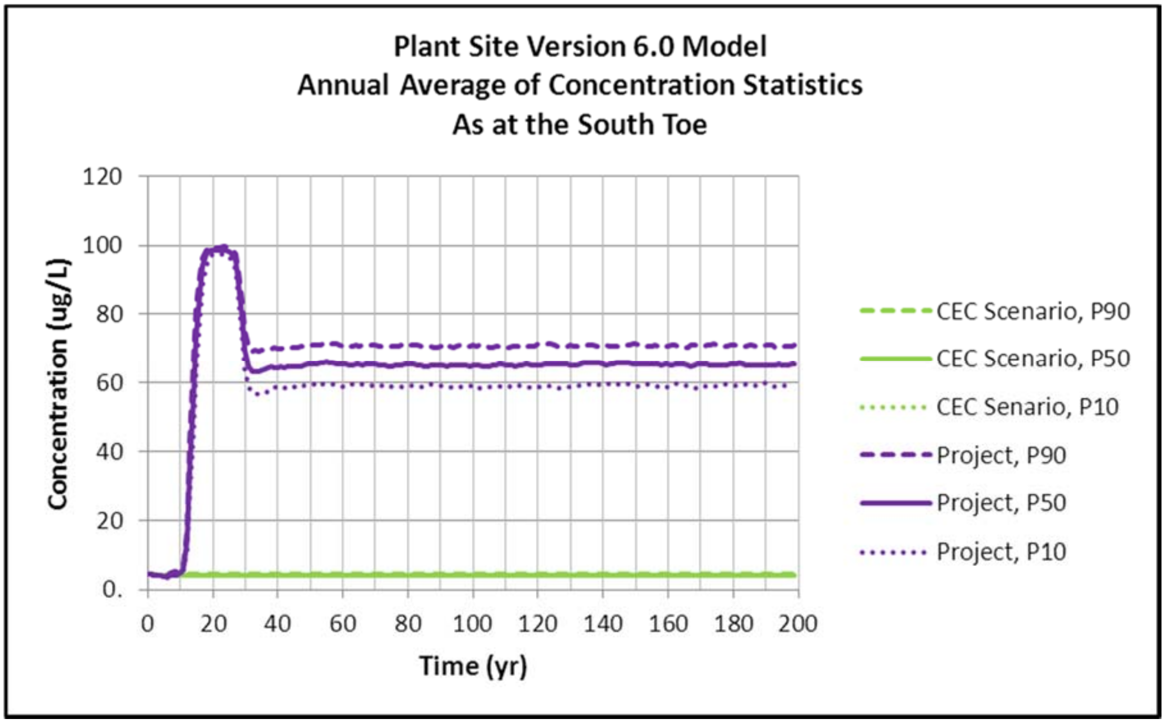


Figure 6-48 Arsenic Concentrations at the South Toe; Continuation of Existing Conditions Scenario vs. Project

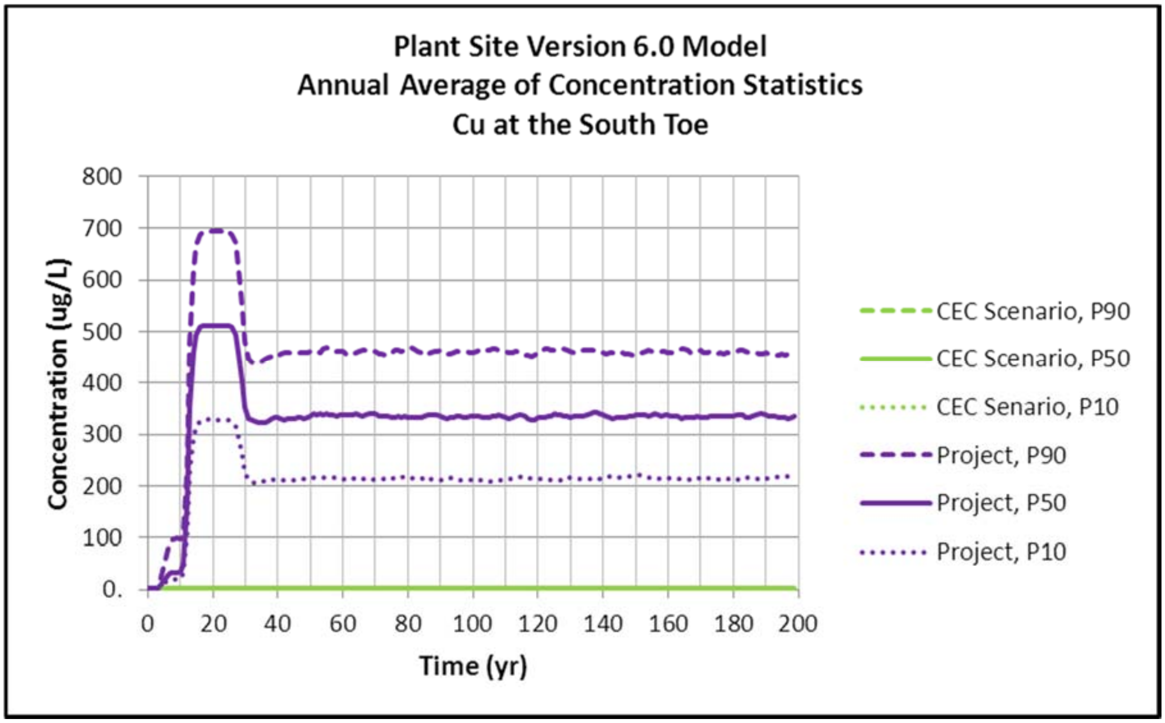


Figure 6-49 Copper Concentrations at the South Toe; Continuation of Existing Conditions Scenario vs. Project

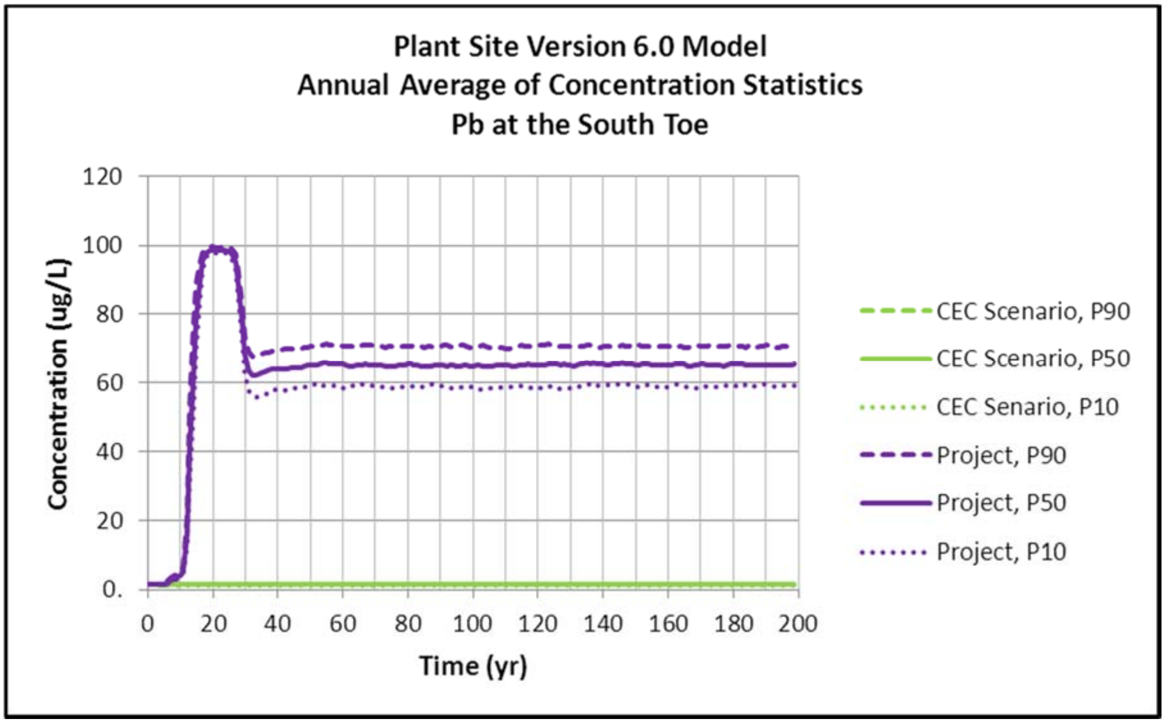


Figure 6-50 Lead Concentrations at the South Toe; Continuation of Existing Conditions Scenario vs. Project

6.4.2.5 East Toe

A summary of estimated concentrations at the east toe during operations, reclamation, and long-term closure is provided in Large Table 14. In the Continuation of Existing Conditions Scenario Model, there is no seepage out of the Tailings Basin to the east because the phreatic surface within the LTVSMC tailings is below the elevation of the surficial material in that area. In fact, surface flow enters the Tailings Basin from the east under existing conditions. The Continuation of Existing Conditions Scenario water quality in the east toe is assumed to be equal to background groundwater quality and does not change during the simulation. In the Project Model, seepage water quality at the east toe is dominated by the FTB Pond once the FTB East Dam is built, and the FTB covers both Cell 1E and Cell 2E.

Estimates of concentration at the east toe during operations (Figure 6-51 through Figure 6-54) are very similar to those at the north and south toes, in that the dominant influences on water quality are the Flotation Tailings in the east beach and the FTB Pond. However, the response at the east toe is delayed until Mine Year 7, when the FTB expands into Cell 1E. In long-term closure, there is relatively little loading to the east toe; the only loading is from the East Dam. Loading is small because the East Dam is quite small and it will be covered by a highly saturated bentonite layer reducing infiltration and oxygen diffusion, and therefore load generation. This results in relatively clean water quality at the east toe in long-term closure.

The water quality at the east toe is shown for chloride, selenium, sulfate, and lead. Most constituents show the same behavior through time at the east toe.

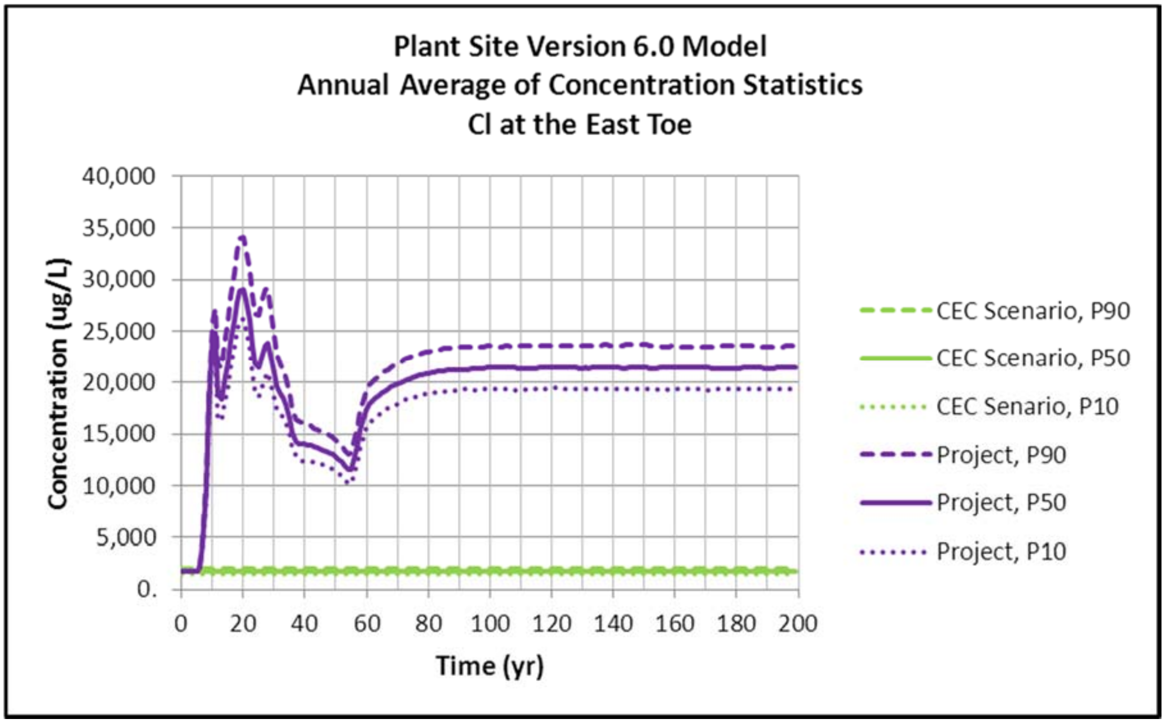


Figure 6-51 Chloride Concentrations at the East Toe; Continuation of Existing Conditions Scenario vs. Project

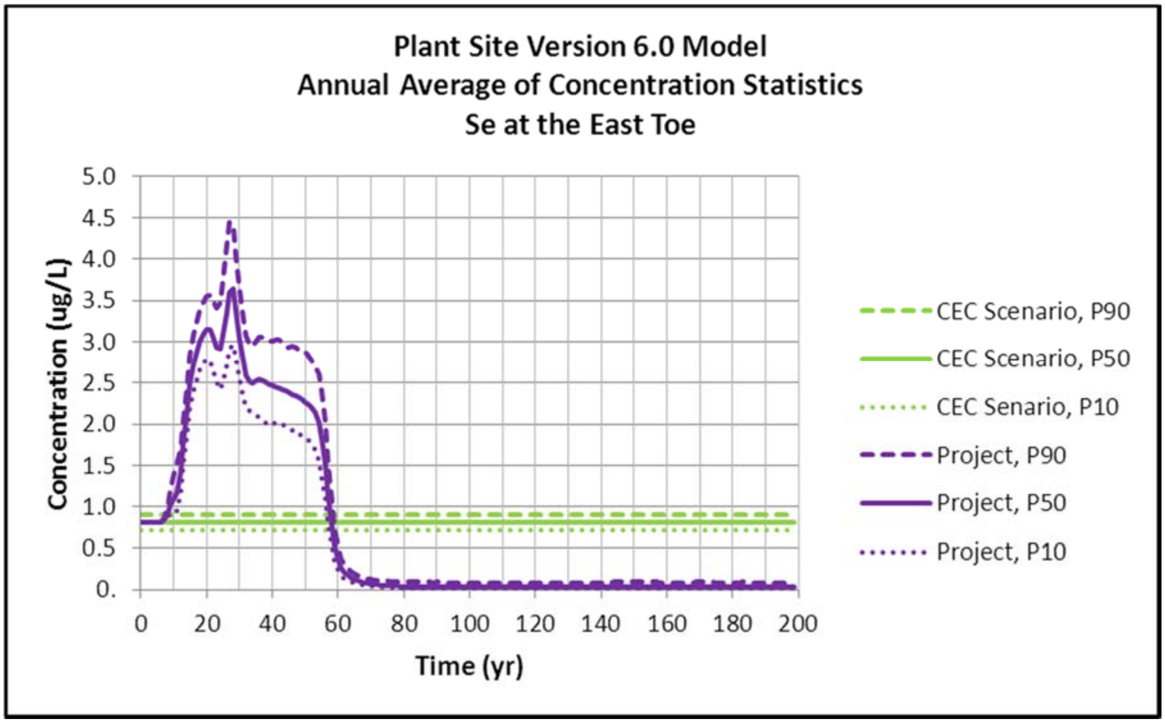


Figure 6-52 Selenium Concentrations at the East Toe; Continuation of Existing Conditions Scenario vs. Project

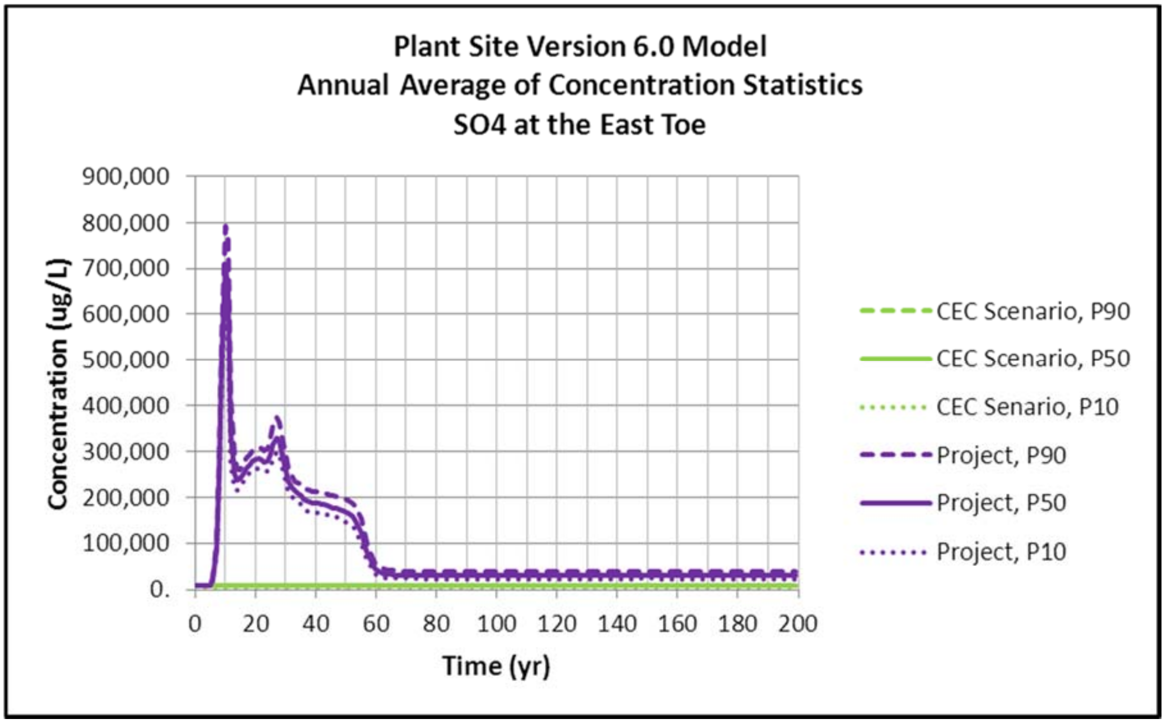


Figure 6-53 Sulfate Concentrations at the East Toe; Continuation of Existing Conditions Scenario vs. Project

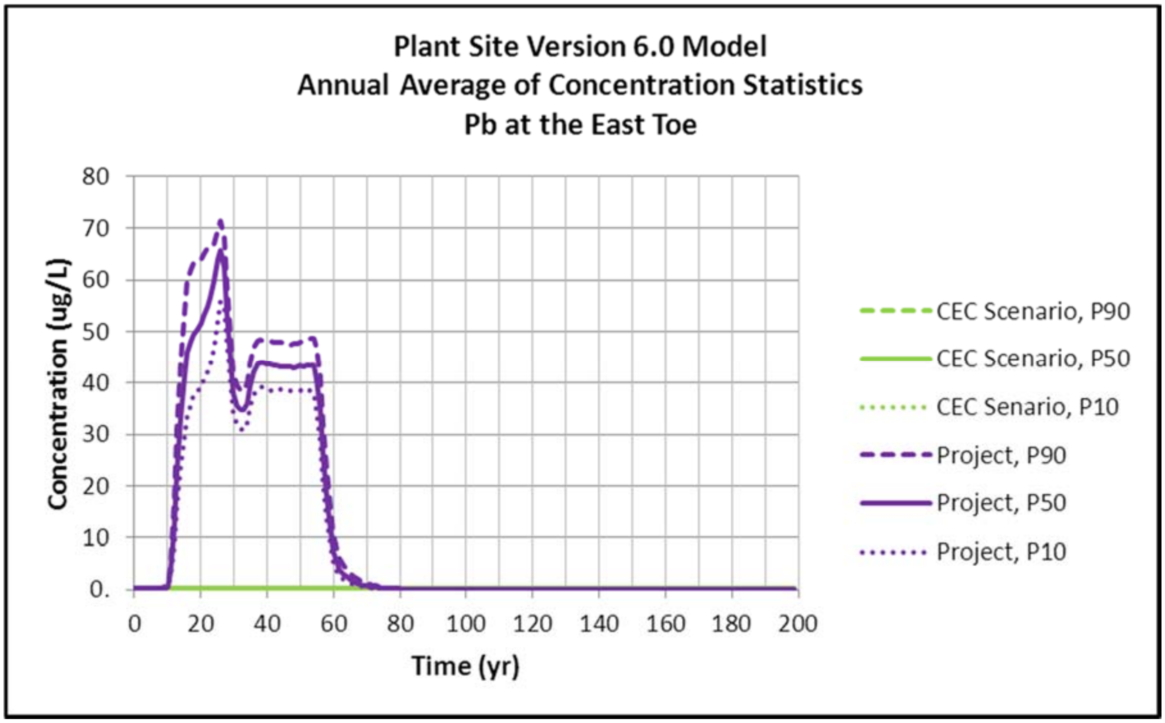


Figure 6-54 Lead Concentrations at the East Toe; Continuation of Existing Conditions Scenario vs. Project

6.4.2.6 Culpability

The culpability analysis attempts to highlight the largest contributing sources of load to the toes of the Tailings Basin. For this discussion, please refer to Figure 5-1 for a three-dimensional illustration of the Tailings Basin and the sources of load to the toes. For the culpability analysis, 14 major sources of load to the toes of the Tailings Basin are considered:

- The FTB Pond. Seepage loading is from the FTB Pond itself and from any additional mass accumulated in the saturated Flotation Tailings below the pond via dissolved oxygen consumption and dissolution of precipitated and buried constituent mass. For Mine Year 0 to 7, it is the pond in Cell 2E; starting in Mine Year 8, it is the combined pond.

- The Cell 1E pond. Seepage loading from the Cell 1E pond. For Mine Year 0 to 7, it is the existing pond in Cell 1E; starting in Mine Year 8, when Cell 1E and Cell 2E combine, this load source no longer exists separately because it is accounted for in the load from the FTB Pond.

- North Dam seepage. Loading is from percolation through the North Dam, which is constructed of borrowed LTVSMC tailings.

- North beach seepage. Loading is from percolation through the north Flotation Tailings beach.
- East Dam seepage. Loading is from percolation through the East Dam, which is constructed of borrowed LTVSMC tailings.
- East beach seepage. Loading is from percolation through the east Flotation Tailings beach.
- South Dam seepage. Loading is from percolation through the South Dam, which is constructed of borrowed LTVSMC tailings.
- South beach seepage. Loading is from percolation through the south Flotation Tailings beach.
- Closure beach seepage. Loading is from percolation through the Flotation Tailings beach after the bentonite cover is applied.
- Cell 1E LTVSMC tailings. Loading is from percolation through all of the oxidizing LTVSMC tailings in the existing Cell 1E.
- Cell 2E LTVSMC tailings. Loading is from percolation through all of the oxidizing LTVSMC tailings in the existing Cell 2E.
- Cell 2W LTVSMC tailings. Loading is from percolation through all of the oxidizing LTVSMC tailings in the existing Cell 2W.
- North buttress. Loading is from percolation through the borrow rock used to form the North buttress; the buttress is conservatively modeled as Category 1 waste rock.
- South buttress. Loading is from percolation through the borrow rock used to form the South buttress; the buttress is conservatively modeled as Category 1 waste rock.

The loading rates plots shown in this section were created following the methods outlined in Section 6.3.2.1. However, the location being evaluated in this section is each toe of the Tailings Basin rather than the FTB Pond. Figure 6-55 is an example culpability analysis showing sulfate at the north toe using median loading rates. The x-axis of Figure 6-55 only goes to year 100, even though the model was run for 200 years, so that the loading variations during the first 40 years of the Project are more clearly visible; loading results out beyond 100 years do not vary significantly. Loading rate plots for all constituents at each of the toes used for the culpability analysis are included in Attachment G.

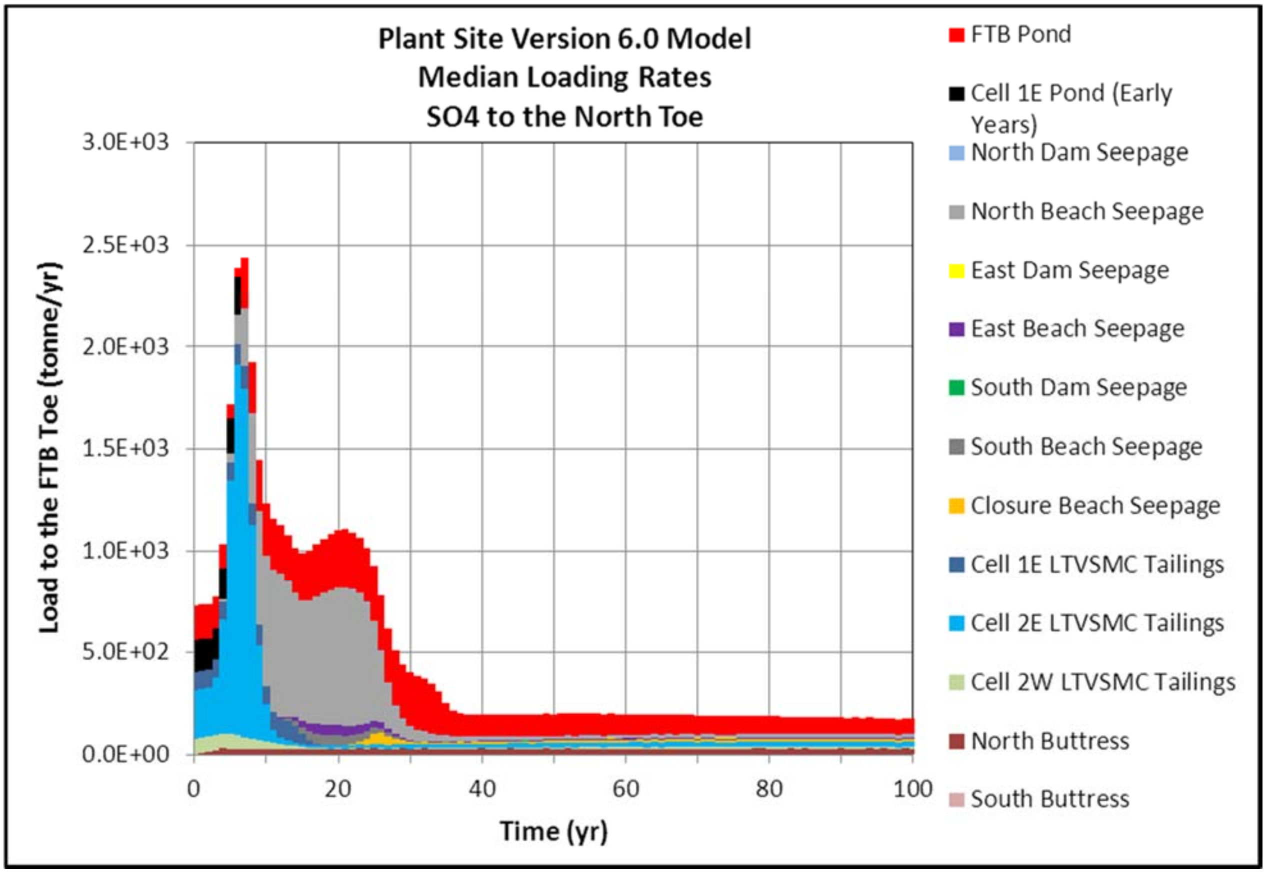


Figure 6-55 Median Loading Rates of Sulfate to the North Toe

At the north toe, the two major load sources are the FTB Pond and percolation through the north Flotation Tailings beach during the highest loading period, which is approximately Mine Years 10 to 20, when total median loading is about 1000 tonnes/yr (Figure 6-55). In long-term closure, the sum of median loading rates of all 14 sources is approximately 200 tonnes/yr and the major source is the FTB Pond. The spike that is observed in the water quality at the north toe can be clearly seen in the culpability plot in Figure 6-55. The source of this spike is mainly flushed load from the LTVSMC tailings in Cell 2E as the tailings are covered by the flotation tailings.

The south toe behaves similarly to the north toe in that for most constituents, the FTB Pond is the most significant loading source. The south Flotation Tailings beach is also a major contributor of load to the south toe. Other contributions, for example from the LTVSMC tailings and the south buttress, are minor in comparison.

At the west toe, the dominant source of load for many constituents is the LTVSMC tailings in Cell 2W. For example, Figure 6-56 shows the culpability analysis of sulfate at the west toe and shows how the loading from Project features is not a significant additional source of sulfate load to the west toe. The increase in the loading rate to the west toe from the LTVSMC Tailings in

Cell 2W from around Mine Year 5 to around Mine Year 20 is due mostly to the increase in the percent of the existing tailings that contribute flow and load to the west toe. For example, Table 1-35 of Attachment B shows that during operations the percent of the coarse and fine LTVSMC tailings in Cell 2W that contribute to the west toe increases from about 64% and 51% respectively to about 73% and 57% respectively. This means that more of the load generating area is contributing to this toe, thereby increasing the loading rate.

Project sources contribute significant loading to the west toe for some constituents (Figure 6-57). The loading from the Project appears most prominently between about Mine Years 15 and 35. Constituents that follow this loading pattern to west toe seepage include arsenic, cadmium, cobalt, chromium, copper, fluoride, nickel, lead, antimony, selenium, vanadium, and zinc.

The major loading sources to the northwest toe vary by constituent because the northwest toe is significantly affected by both existing loading sources (the LTVSMC tailings in Cell 2W) and Project loading sources (the Flotation Tailings and the FTB Pond). Similar to the other culpability plots, the culpability plots for the northwest toe can be used to determine why the concentrations at the northwest toe behave the way they do.

Selected culpability plots to support the model results shown in Section 6.4.2 are presented in Figure 6-58, Figure 6-59, Figure 6-60, Figure 6-61 and Figure 6-62.

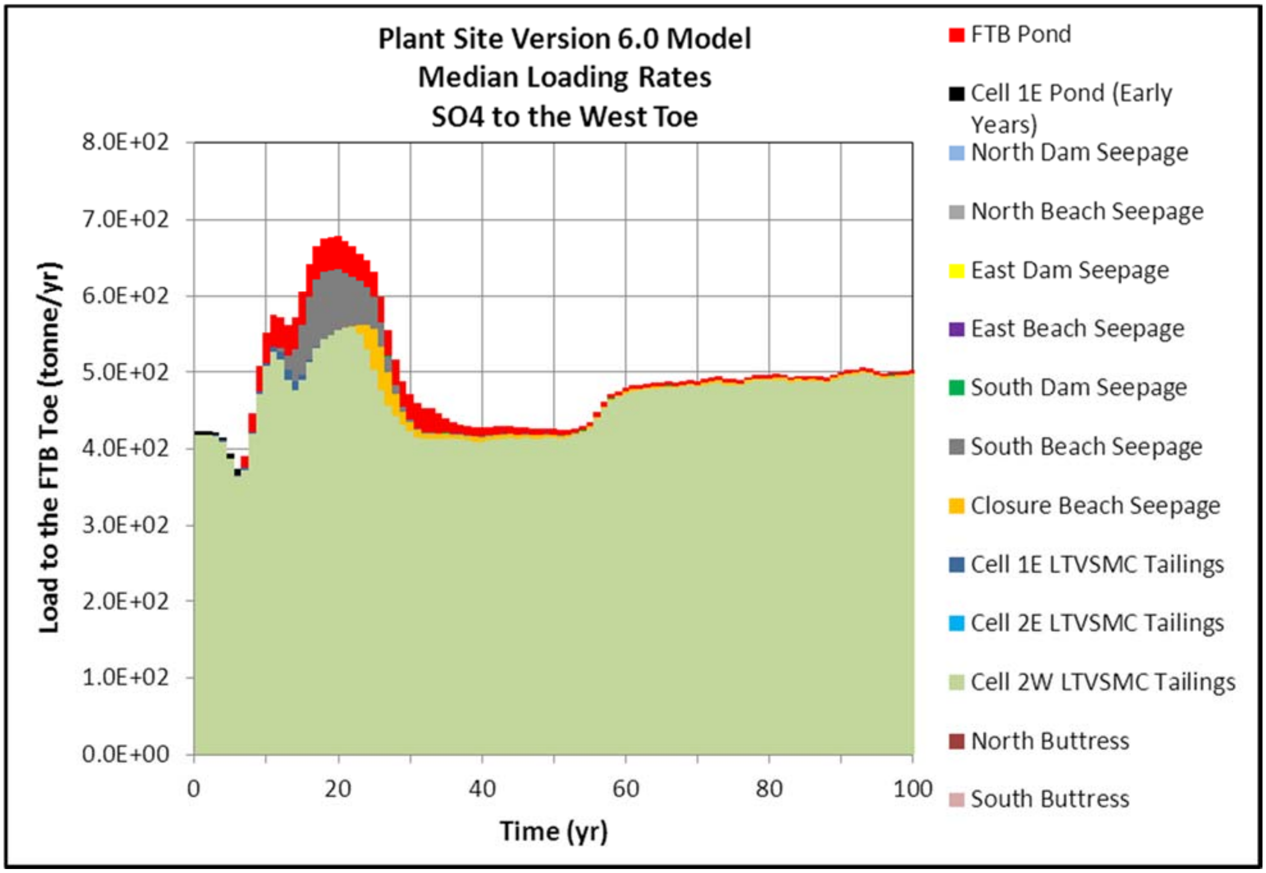


Figure 6-56 Median Loading Rates of Sulfate to the West Toe

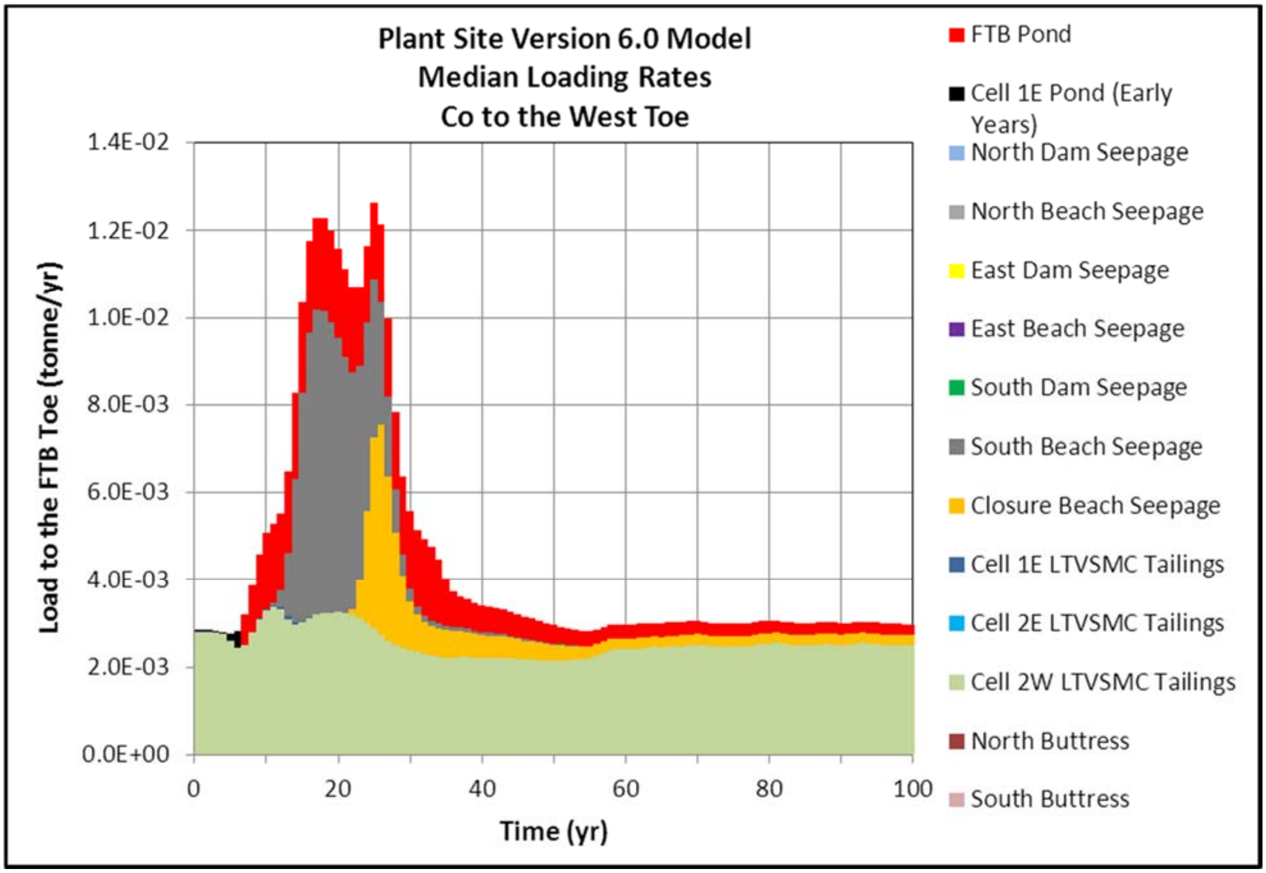


Figure 6-57 Median Loading Rates of Cobalt to the West Toe

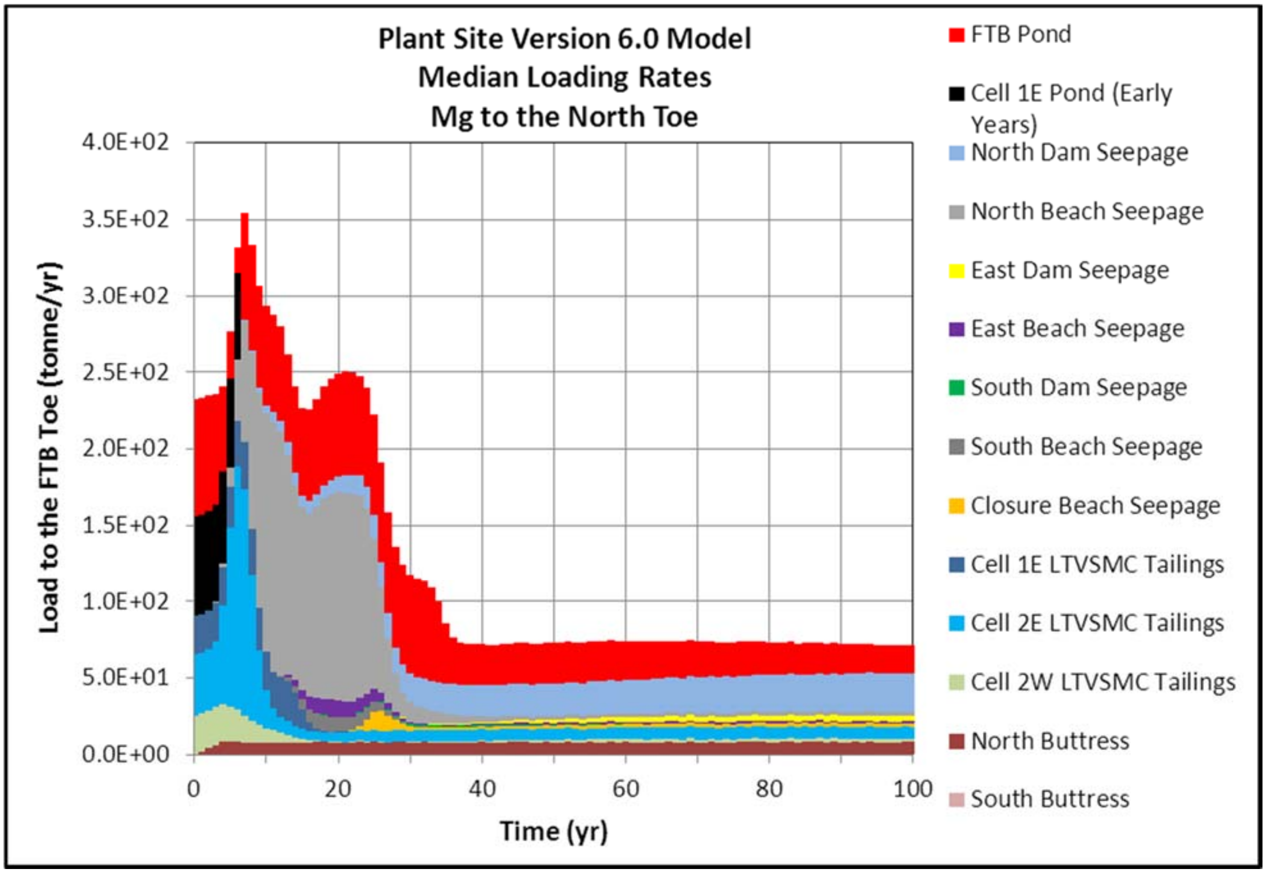


Figure 6-58 Median Loading Rates of Magnesium to the North Toe

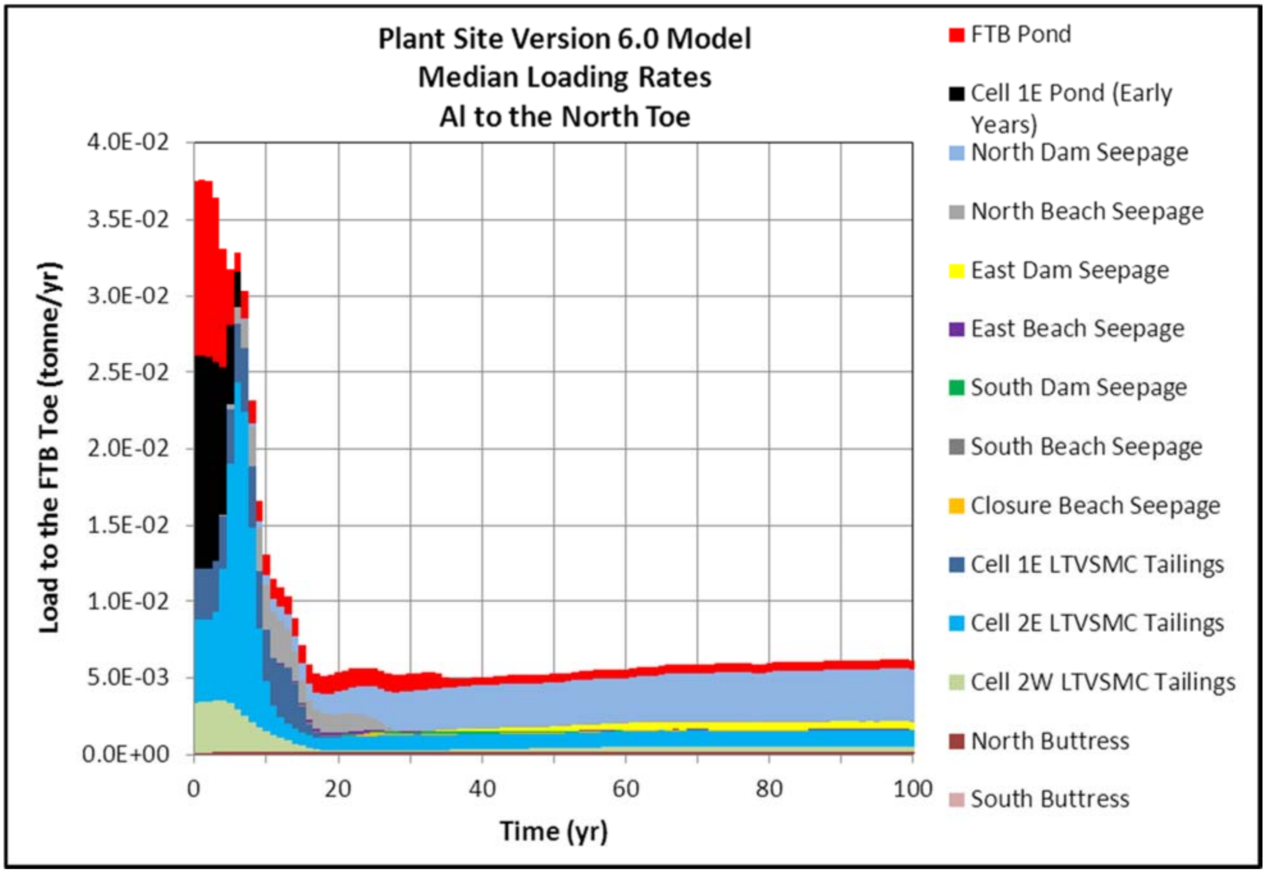


Figure 6-59 Median Loading Rates of Aluminum to the North Toe

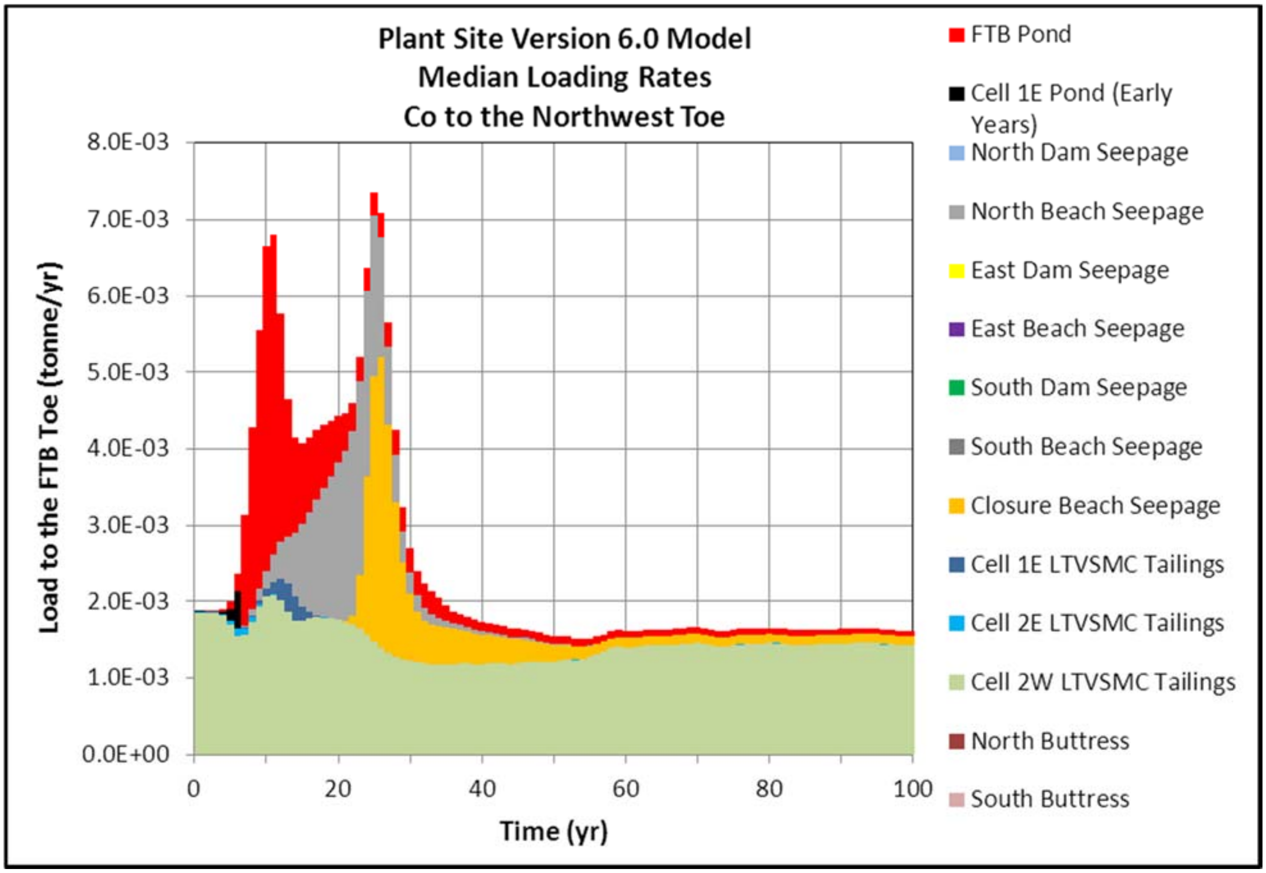


Figure 6-60 Median Loading Rates of Cobalt to the Northwest Toe

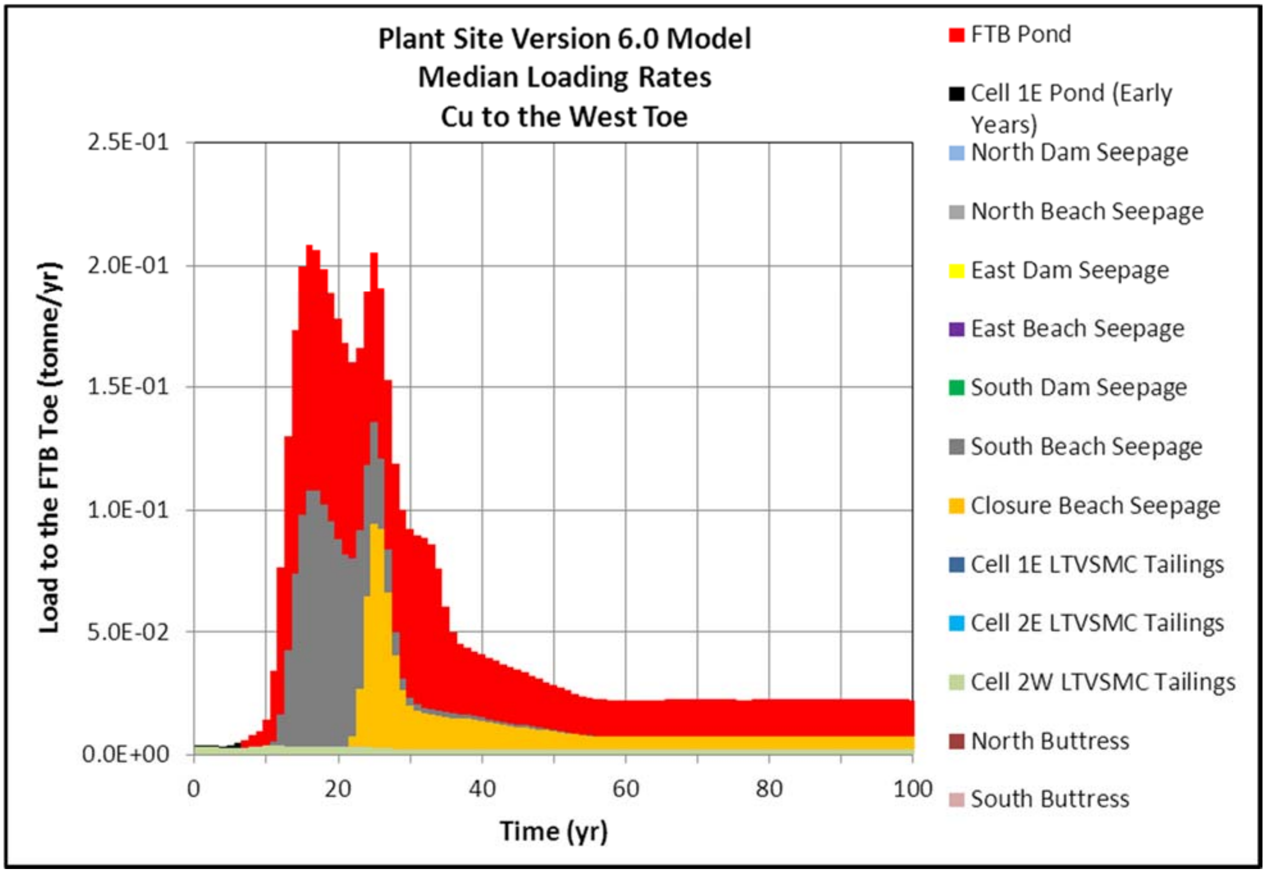


Figure 6-61 Median Loading Rates of Copper to the West Toe

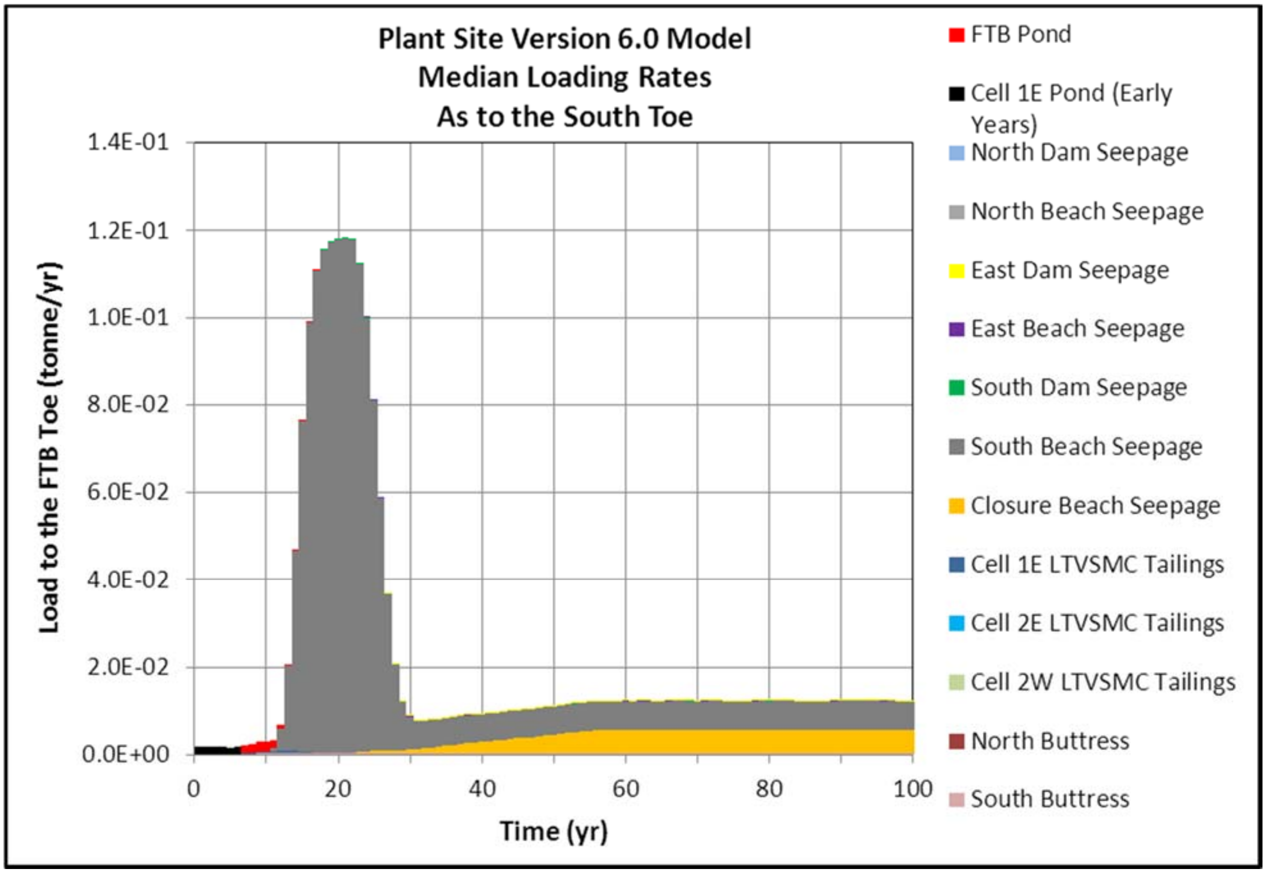


Figure 6-62 Median Loading Rates of Arsenic to the South Toe

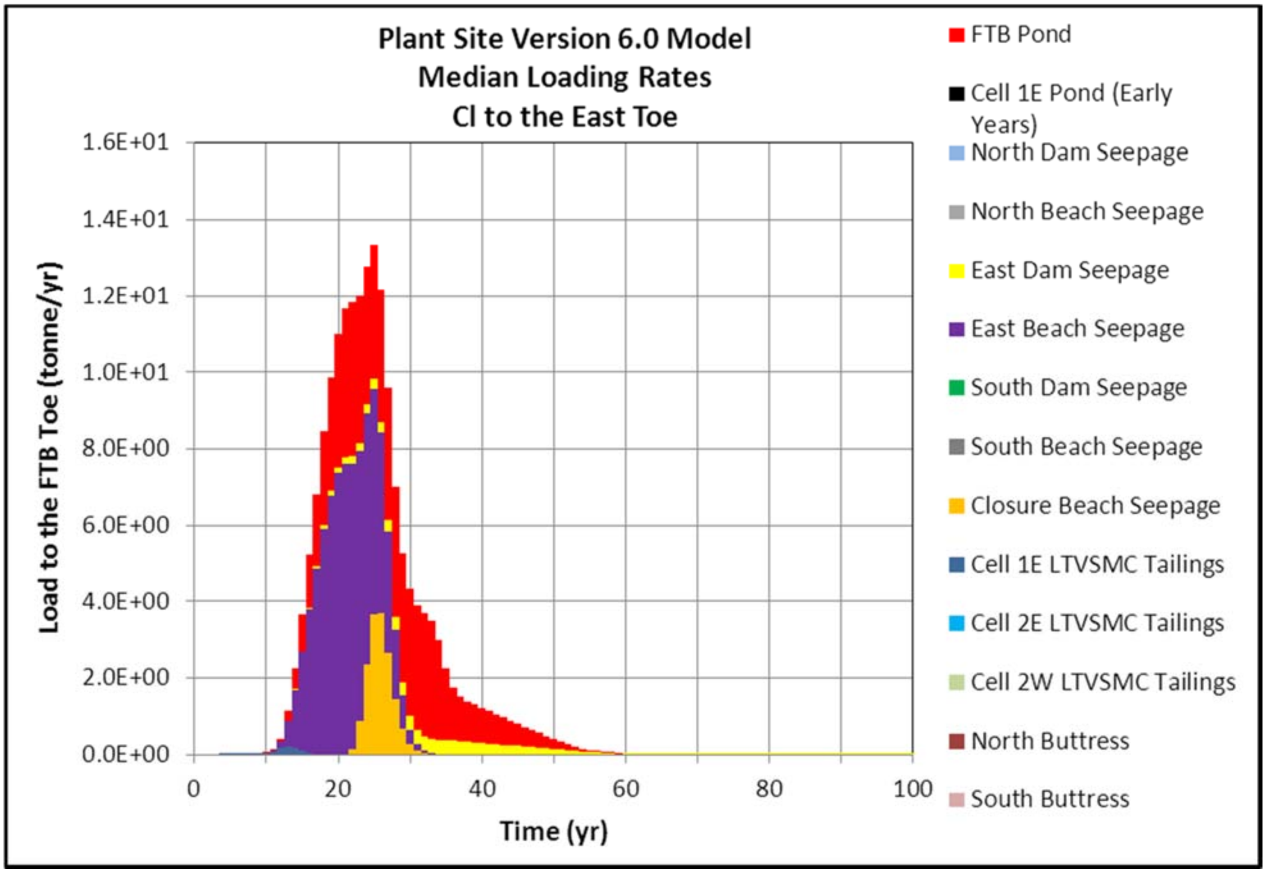


Figure 6-63 Median Loading Rates of Chloride to the East Toe

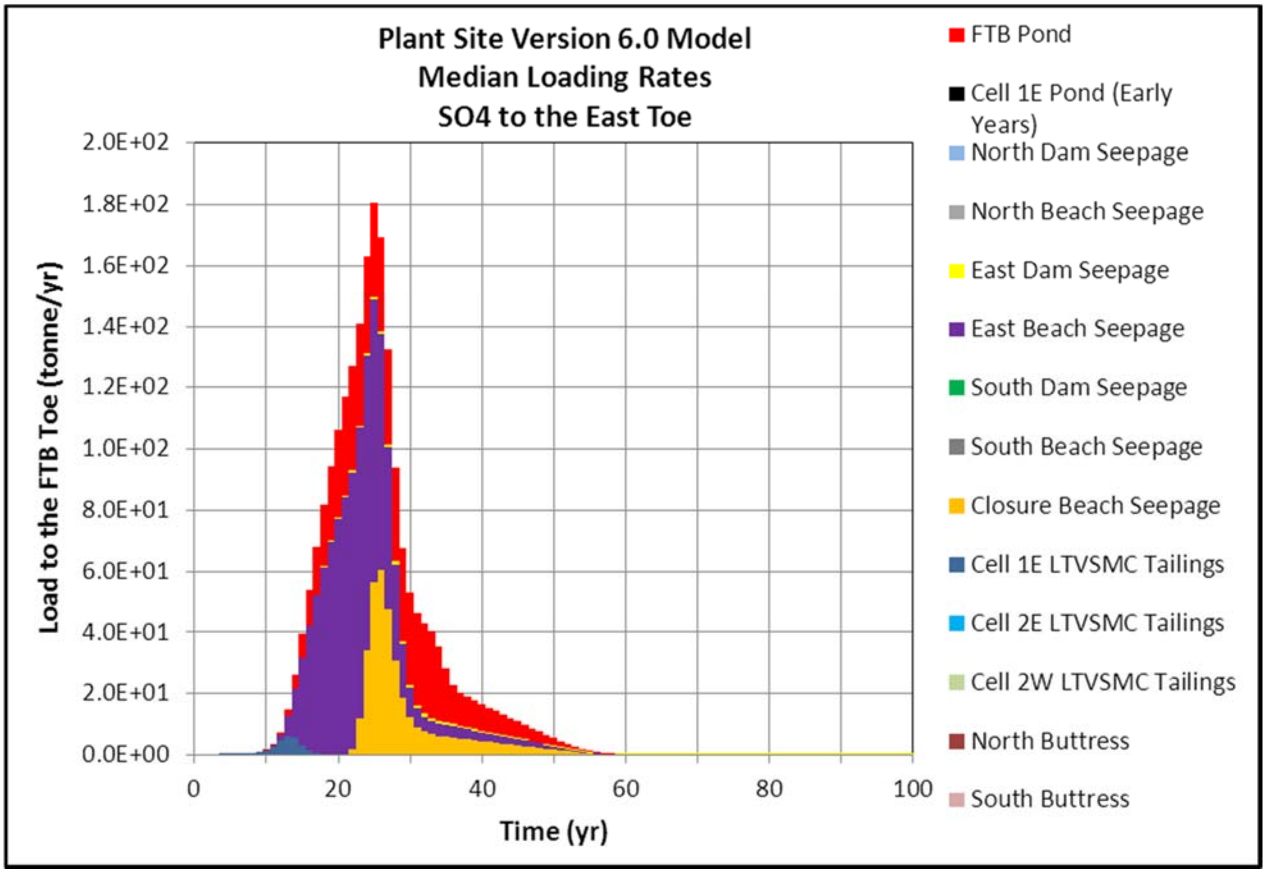


Figure 6-64 Median Loading Rates of Sulfate to the East Toe

6.5 Groundwater Quality

The GoldSim model is used to evaluate estimated groundwater quality relative to the groundwater standards at the property boundary. Quantitative evaluations are made by comparing the 90th percentile concentration to the applicable groundwater standard consistent with direction provided by the Co-lead Agencies as part of the IAP process (Reference (56)). For the NorthMet EIS, the Project will be assumed to estimate a significant effect on water quality if the 90th percentile model concentrations exceed an applicable standard. The State has retained the flexibility to modify this impact criteria based on site-specific factors and model results.

6.5.1 Explanation of Plots

Two types of plots are used in this section:

- Plots showing concentrations statistics
- Plots showing an overview of groundwater concentrations for each location

Each of these plots is described below.

6.5.1.1 Concentration Statistics Plots

Plots of concentration statistics for a given constituent at a given evaluation location are generated using the same method that was used to develop the concentration statistic plots for the FTB Pond (Section 6.3.1.1). All concentration statistics plots for the groundwater flow paths are shown in Attachment H.

6.5.1.2 Overview of Groundwater Concentration Plots

At each groundwater evaluation location, a single overview plot is created. Given the time series of summary statistics (10th percentile, median, 90th percentile) briefly described in Section 6.5.1.1, the range of concentrations shown in these figures is defined by the maximum of the 90th percentile over the modeled 200-year period, to the minimum of the 10th percentile over the modeled 200-year period. These overview figures are included as Large Figure 18 through Large Figure 20.

6.5.2 Estimated Groundwater Concentrations

The ranges of estimated groundwater concentrations at the property boundary for the Project Model are shown on Large Figure 18 through Large Figure 20 and summarized in Large Table 15 through Large Table 17. Estimated groundwater concentrations at the property boundary generally decrease from the initiation of the Project to long-term closure. The Project causes groundwater concentrations for most constituents to decrease because the FTB Containment System is modeled as capturing 90% of the flow and load entering the groundwater flow paths from the Tailings Basin, significantly reducing the effect of the Tailings Basin seepage on groundwater. Therefore, for most constituents, the estimated groundwater concentrations at the property boundary decrease steadily with time towards near-background concentrations. Constituents that fall in this category are silver, alkalinity, boron, barium, chloride, fluoride, iron, potassium, magnesium, sodium, sulfate, thallium, and vanadium.

Sulfate follows this general response of decreasing concentrations over time (Figure 6-65 and Figure 6-66). Large Figure 18 shows the range of groundwater sulfate concentrations modeled in the north flow path through the 200-year modeling period. Large Figure 19 and Large Figure 20 show the same information for the northwest flow path and the west flow path respectively. For many constituents, because of the general declining nature of concentrations at the property boundary, the high end of the range in concentrations shown on Large Figure 18 through Large Figure 20 is the 90th percentile at the beginning of the model run and the low end is the 10th percentile at the end of the model run. For example, on Figure 6-65 showing sulfate at the property boundary in the west flow path, the highest 90th percentile concentration is about 194 mg/L at Mine Year 0 and the lowest 10th percentile concentration is about 30 mg/L at Mine Year 200. Large Figure 20 shows that the range is defined by those two values.

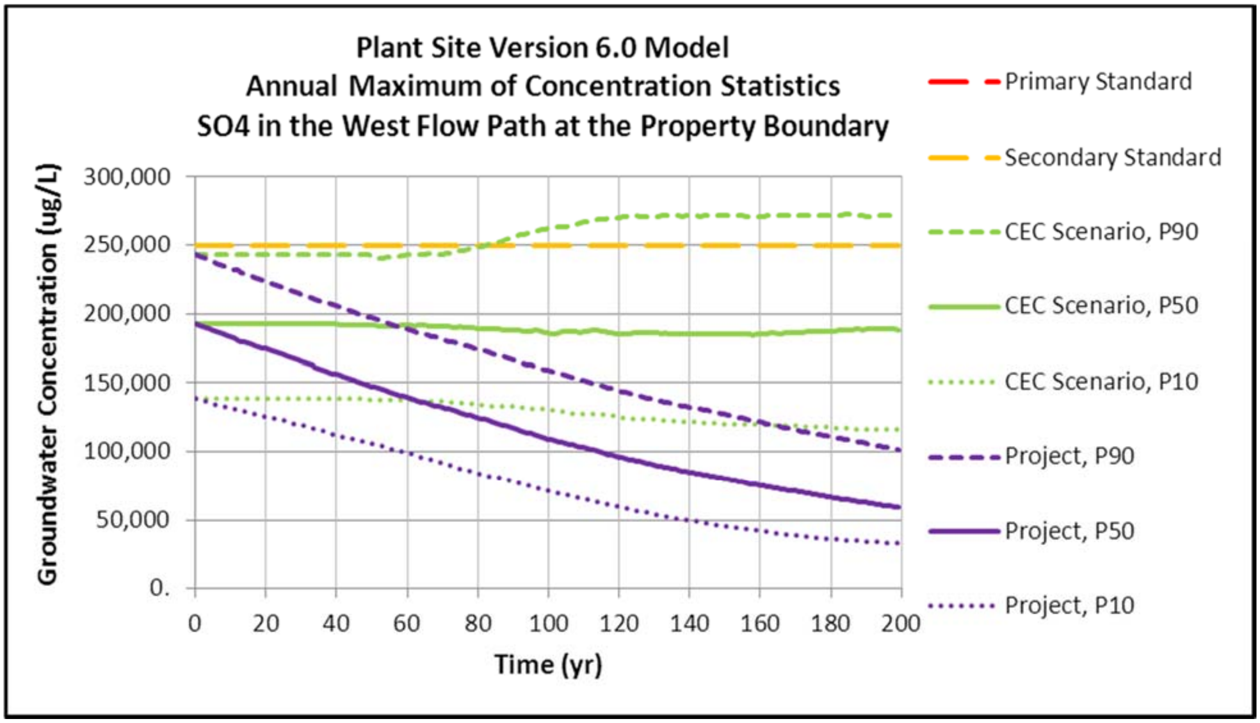


Figure 6-65 Sulfate Concentrations in the West Flow Path at the Property Boundary

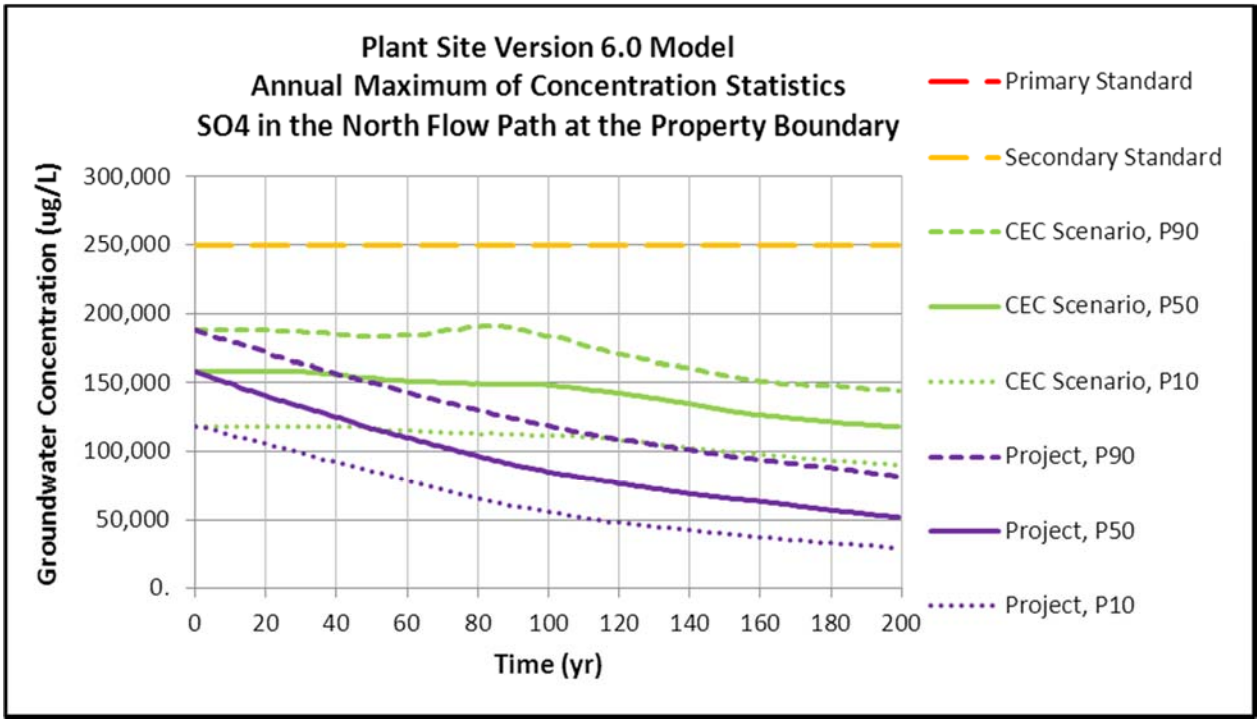


Figure 6-66 Sulfate Concentrations in the North Flow Path at the Property Boundary

In Figure 6-66, the concentrations in the Continuation of Existing Conditions Scenario Model are shown to decline after about Mine Year 100. This is due to depletion of constituent mass within the LTVSMC tailings of the existing Tailings Basin. Further discussion of the depletion in the Tailings Basin and the effect on water quality at the north toe is included in Section 6.4.2.1.

The applicable groundwater standard is estimated to be exceeded by only a few constituents, on only a few flow paths, and these exceedances are not related to the Project. Exceedences are modeled for fluoride in the north flow path, manganese and sulfate in the northwest flow path, and manganese in the west flow path. The high concentrations shown in Large Figure 18 are the concentrations at the initial time step. The concentrations in groundwater decrease from the beginning of the simulation to the end of the simulation as shown, for example, in Figure 6-67. The high concentration in groundwater at the initial time step is an artifact of the high estimated initial concentration at the north toe of the Tailings Basin. Fluoride is one of the few constituents where the release rate from the LTVSMC tailings was not calibrated in the Continuation of Existing Conditions Scenario Model (Section 10.1.2.2 of Reference (5)) because the method of release was assumed to be at concentration caps based on fluorite solubility as it relates to calcium. The concentrations in the Continuation of Existing Conditions Scenario Model at the north toe (~4 mg/L) are significantly higher than what is observed in the groundwater wells at the north toe (~0.15 mg/L).

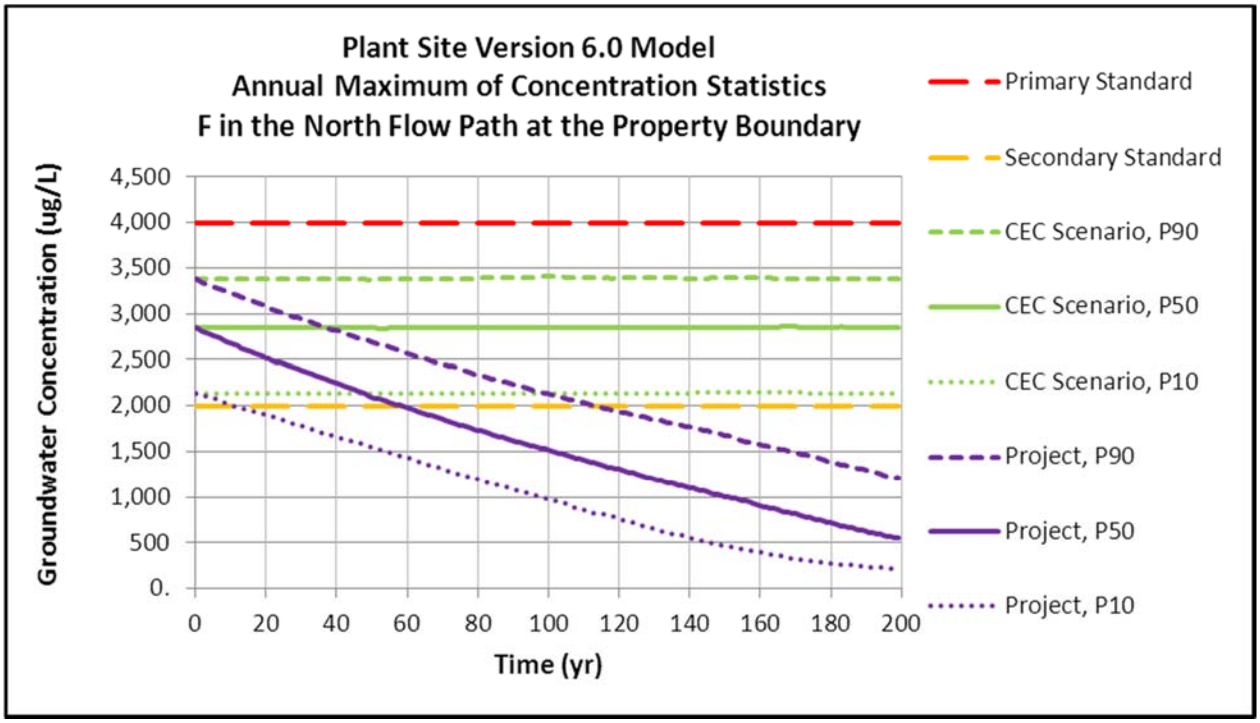


Figure 6-67 Fluoride Concentrations in the North Flow Path at the Property Boundary

For some constituents however, the concentrations in the Project Model increase through time despite the presence of the FTB Containment System. This occurs when the estimated background groundwater and recharge concentrations are higher than the concentrations in the existing seepage from the Tailings Basin. Constituents that follow this pattern are aluminum, beryllium, chromium, manganese (north flow path only), selenium, and zinc. Figure 6-68 shows an example of this type of behavior. Figure 6-69 shows the modeled distribution of background groundwater manganese concentrations. Notice how the concentrations in Figure 6-69 compare to the concentrations in Figure 6-68. Cutting off most of the Tailings Basin seepage, which has a relatively low manganese concentration, causes groundwater concentrations to increase, approaching the dominant background concentrations.

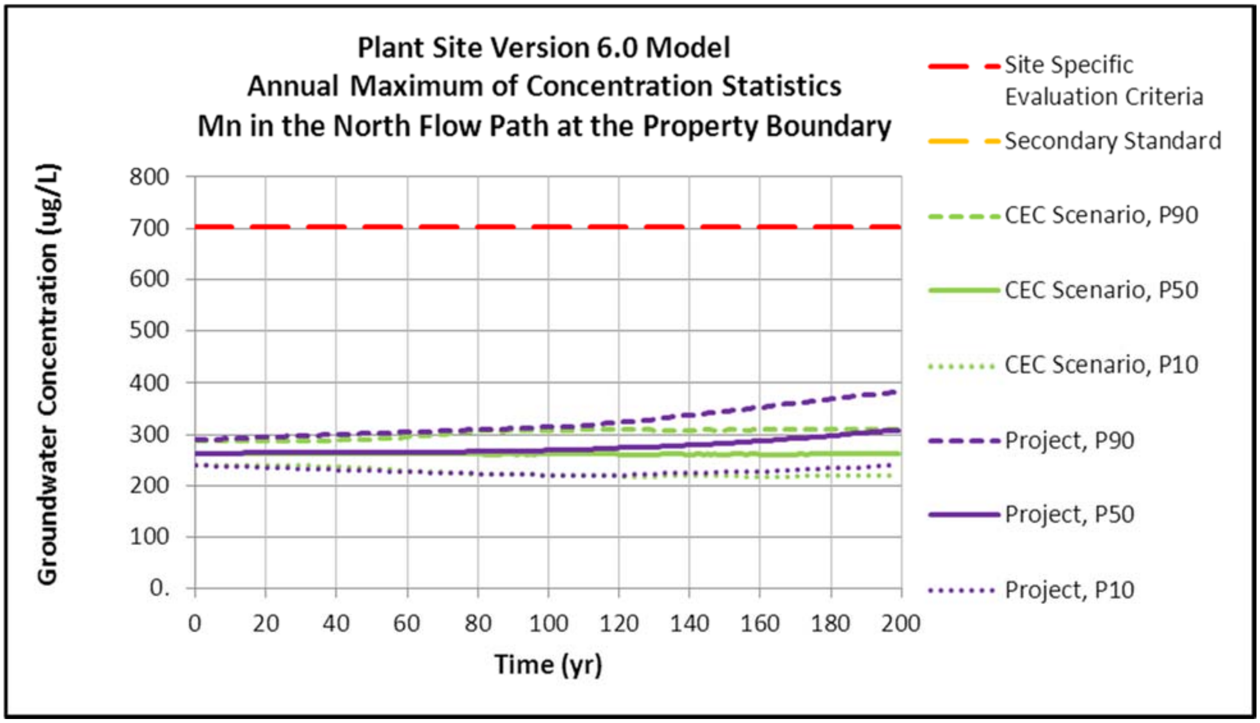


Figure 6-68 Manganese Concentrations in the North Flow Path at the Property Boundary

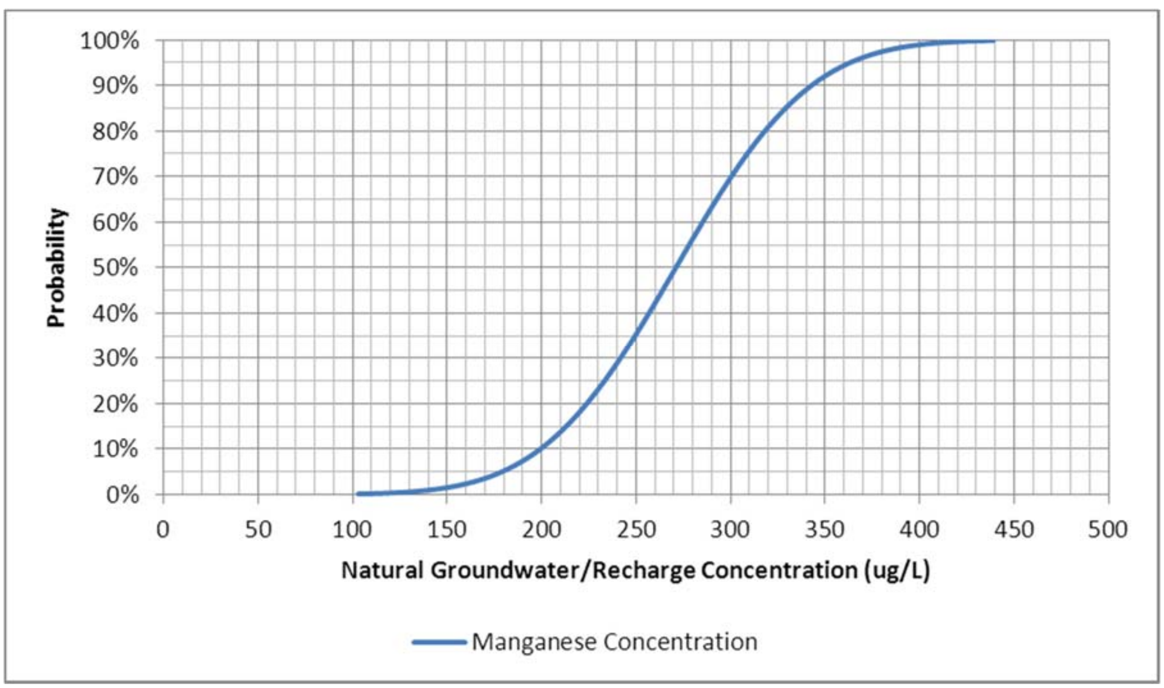


Figure 6-69 Manganese Concentrations in Natural Background Groundwater and Recharge

Only lead and cobalt show a discernible pulse of elevated groundwater concentrations caused by seepage from the Tailings Basin. The estimated groundwater concentrations of lead and cobalt are discussed further in Section 6.5.3.1. For constituents where sorption is included in the model (arsenic, copper, nickel, and antimony), there is no discernible difference in groundwater concentrations at the property boundary for the entire 200-year period due to the long travel times for these constituents.

6.5.3 Discussion of Specific Constituents

Some constituents warrant further discussion. Lead and cobalt are discussed in detail because their estimated concentrations in groundwater at the property boundary continue to rise during the entire 200-year model time period; peak concentrations are not estimated in the model during this period. TDS is discussed because it was not identified as a constituent for inclusion in the GoldSim model, but there is a groundwater standard for TDS that will need to be met by the Project.

6.5.3.1 Lead and cobalt

Lead and cobalt concentrations continue to rise during the entire 200-year modeled time period at the property boundary and at the location where the flow paths discharge to surface water (Figure 6-70 and Figure 6-71). While there is not an applicable groundwater standard for lead or cobalt, there are applicable surface water standards at MLC-2 where the groundwater discharges from the north flow path to Mud Lake Creek. The surface water standard for cobalt is 5 µg/L and for lead is hardness-based. To determine the timing and magnitude of peak groundwater concentrations of lead and cobalt, and address the question of whether the groundwater may cause impacts to surface water, the model simulation period was extended to 500 years. However, given the increased uncertainty associated with making model estimations so far out into the future, it is only appropriate to interpret the results of the 500-year run in a qualitative manner.

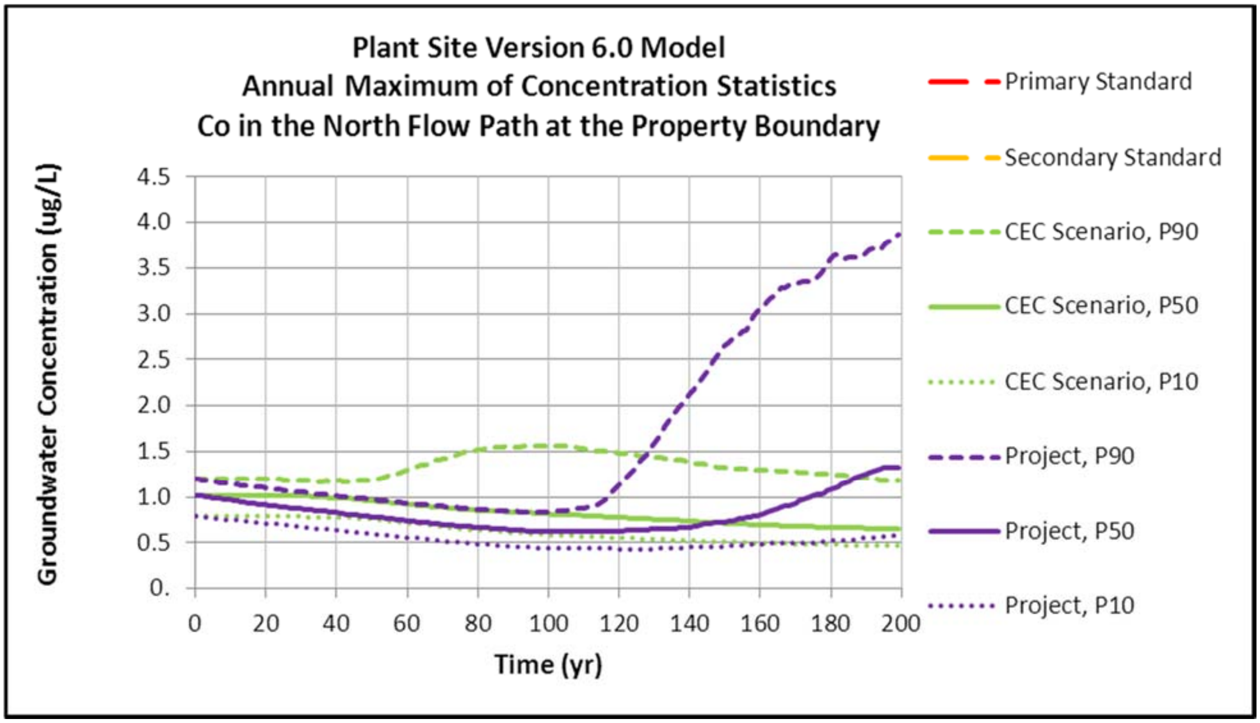


Figure 6-70 Cobalt Concentrations in the North Flow Path at the Property Boundary

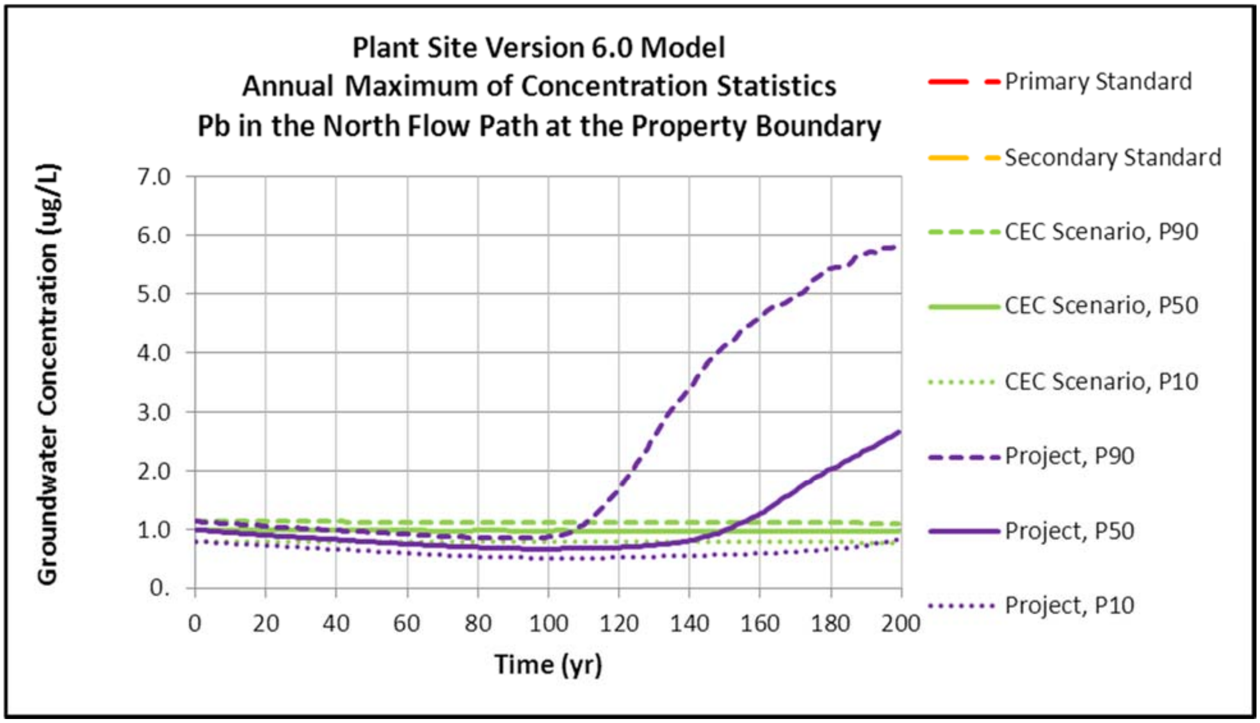


Figure 6-71 Lead Concentrations in the North Flow Path at the Property Boundary

For cobalt, the maximum 90th percentile concentration of cobalt at the Property Boundary, which is less than the surface water standard of 5 µg/L, occurs around Mine Year 250, and decreases to approximately 3.2 µg/L at Mine Year 500 (Figure 6-72). For lead, the maximum 90th percentile concentration at the Property Boundary occurs around Mine Year 300, and decreases to just below 7.0 µg/L at Mine Year 500 (Figure 6-73).

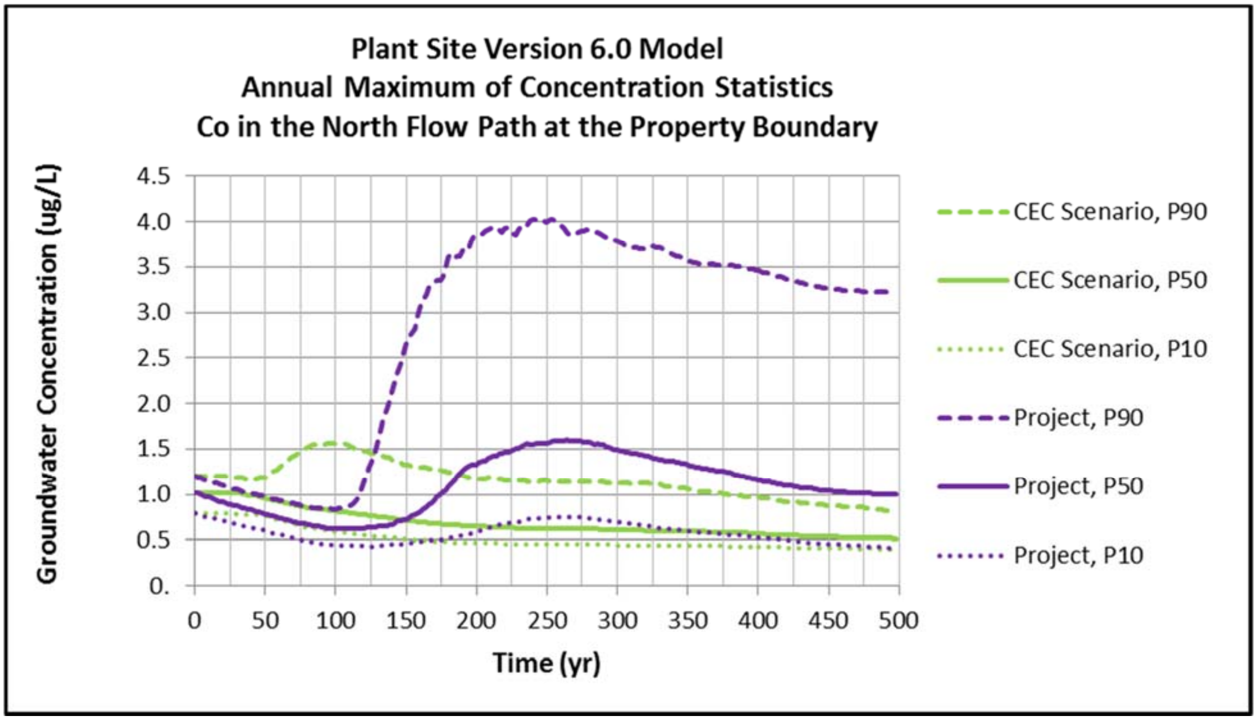


Figure 6-72 Cobalt Concentrations in the North Flow Path at the Property Boundary; 500-Year Simulation

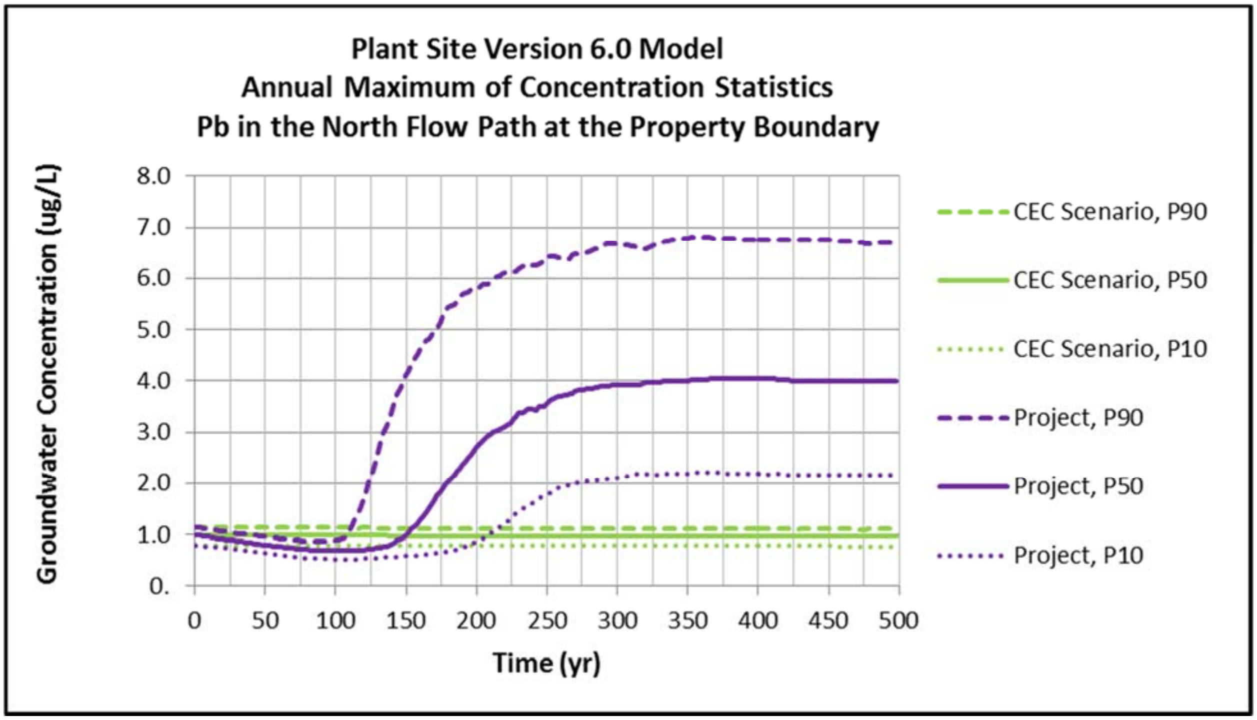


Figure 6-73 Lead Concentrations in the North Flow Path at the Property Boundary; 500-Year Simulation

The maximum 90th percentile concentrations of cobalt and lead at the groundwater discharge point (MLC-2) are 1.6 µg/L and 3.0 µg/L respectively as shown on Figure 6-74 and Figure 6-75.

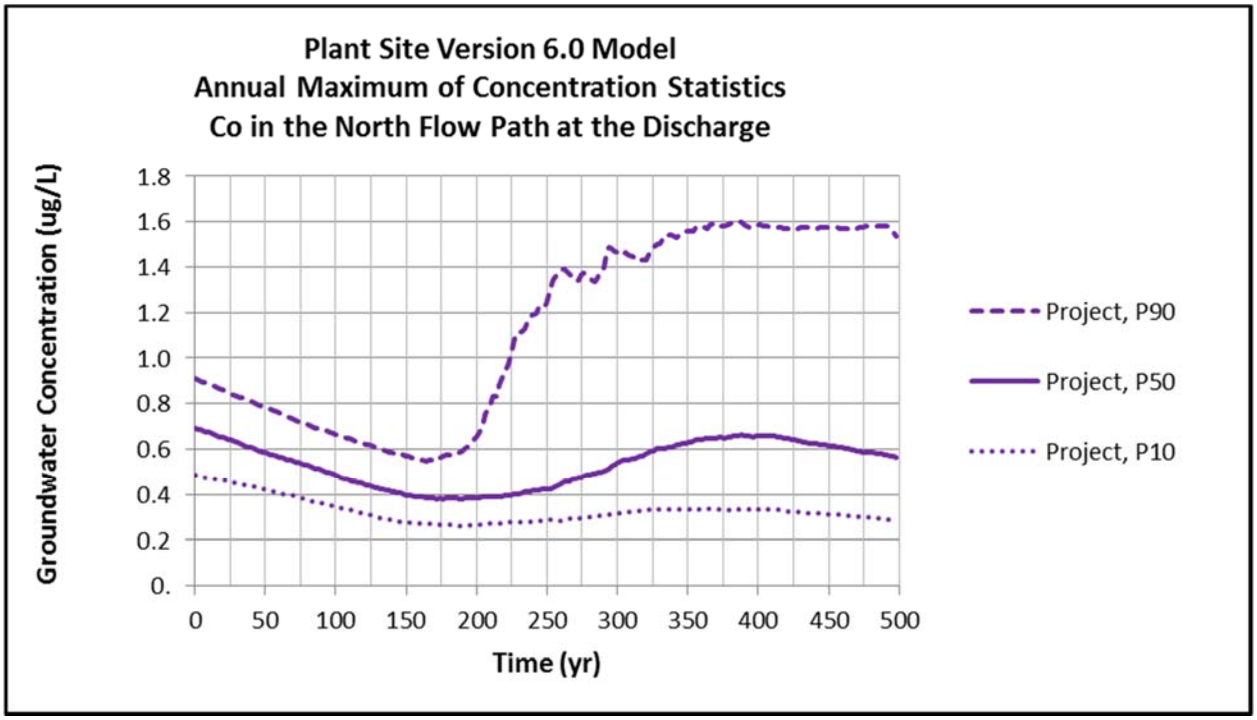


Figure 6-74 Cobalt Concentrations in the North Flow Path at MLC-2 at the Groundwater Discharge Point; 500-Year Simulation

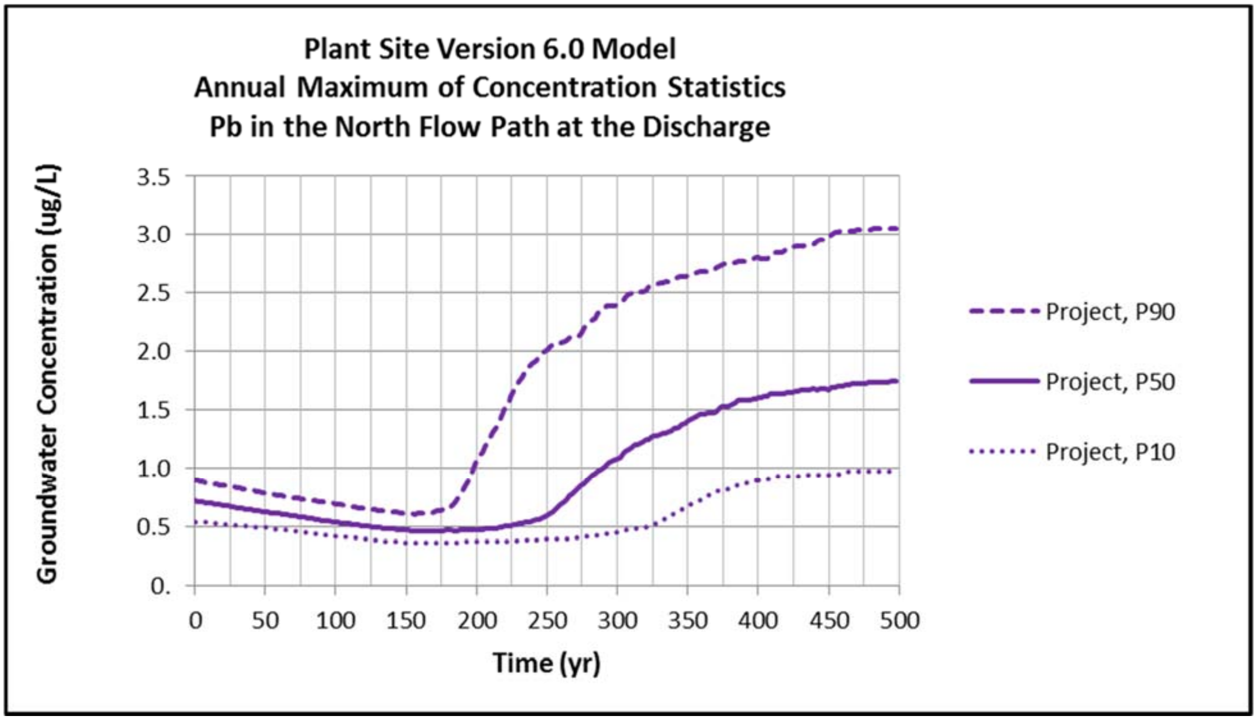


Figure 6-75 Lead Concentrations in the North Flow Path at MLC-2 at the Groundwater Discharge Point; 500-Year Simulation

The estimated concentrations of lead and cobalt at the surface water evaluation location to which the north flow path discharges reflect the apparent arrival of Project related water via the north flow path at about Mine Year 200 to 250. Figure 6-76 shows cobalt concentrations in surface water at MLC-2 and shows the 90th percentile concentration is always below the surface water standard. The Project water via the north flow path does not cause a noticeable rise in the concentration in Mud Lake Creek. In fact, the FTB Containment System and the augmentation of Mud Lake Creek via the drainage swale simply cause Mud Lake Creek concentrations to more closely resemble unimpacted areas. Figure 6-77 shows cobalt at PM-12 for comparison of water quality to Mud Lake Creek with the Project.

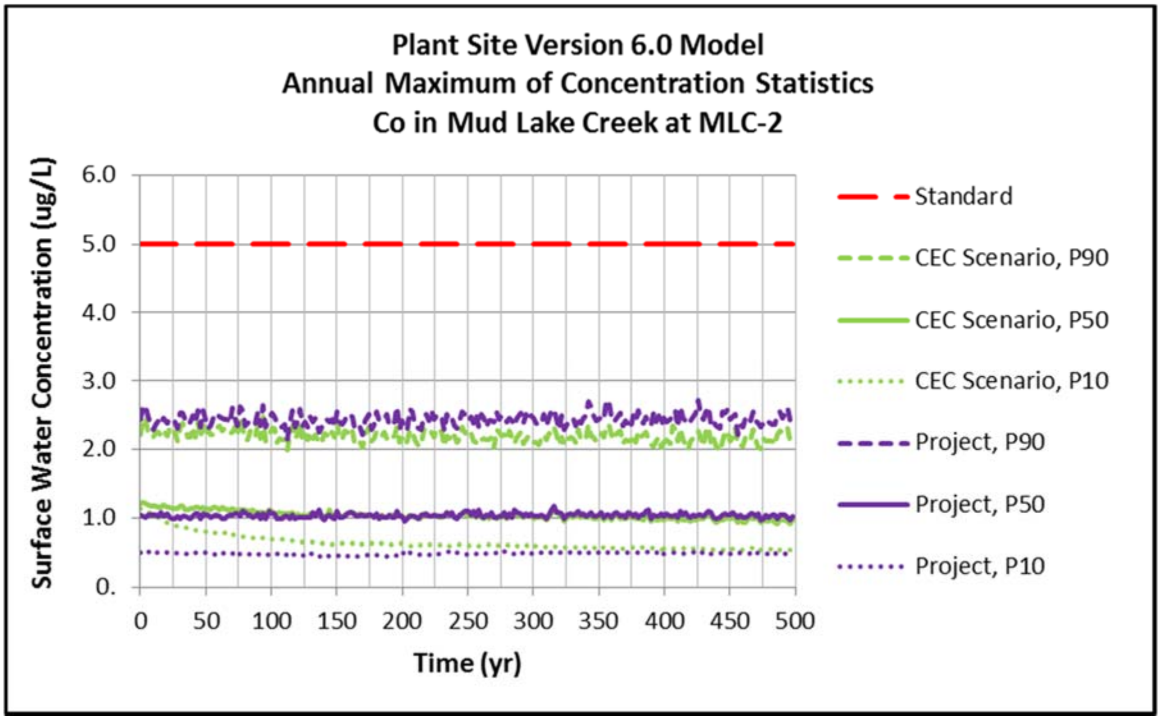


Figure 6-76 Cobalt Concentrations in Surface Water at MLC-2; 500-Year Simulation

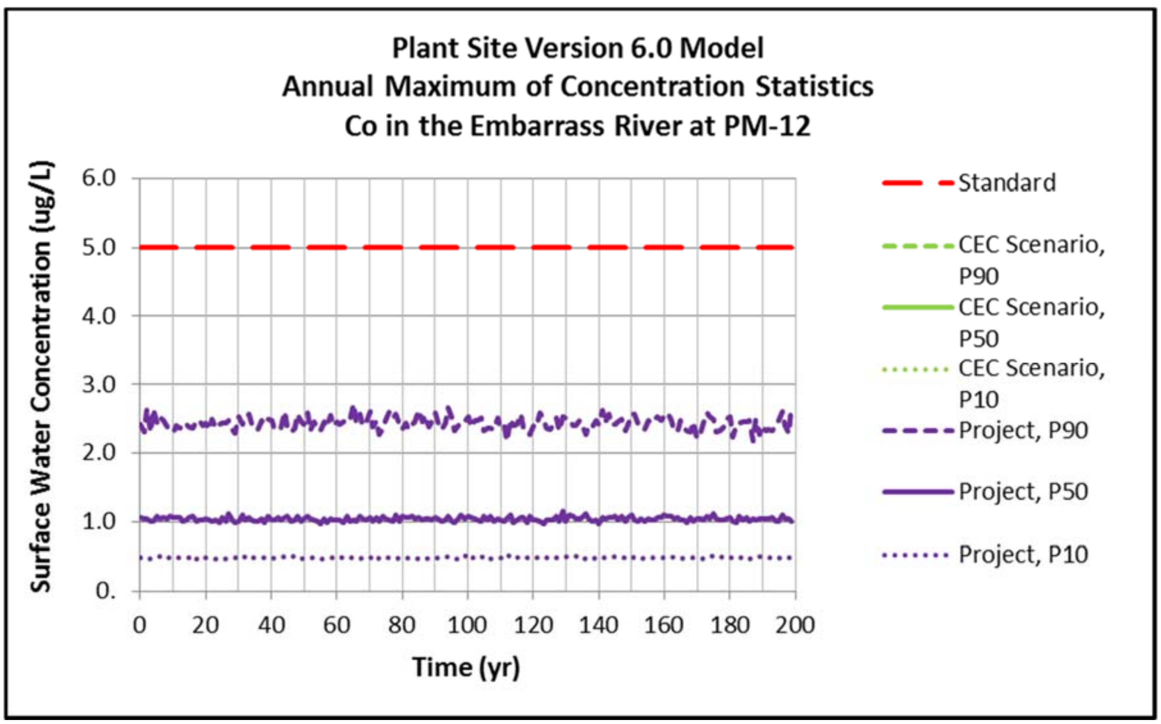


Figure 6-77 Cobalt Concentrations in Surface Water at PM-12

Figure 6-78 shows lead concentrations at MLC-2. The 90th percentile concentrations do rise slightly as a result of the Project related water discharging into the creek, although the expected (50th percentile) concentrations decrease relative to the Continuation of Existing Conditions Scenario model. Additionally, at times during the year where flow in Mud Lake Creek is dominated by groundwater flow (winter months) the hardness ranges from about 60 mg/L (10th percentile) to about 130 mg/L (90th percentile), with a median of about 100 mg/L. At these concentrations, the water quality standards for lead would be 1.7 µg/L, 4.4 µg/L, and 3.2 µg/L respectively. Figure 6-78 clearly shows that the peak 90th percentile of lead concentrations is below even what would be a low hardness-based water quality standard (1.7 µg/L at the 10th percentile of hardness) during conditions dominated by groundwater flow. A discussion of lead in surface water for other periods throughout the year, where there is more significant flow in Mud Lake Creek, is discussed in Section 6.7.5.2. It should be noted that there is general agreement among the Co-lead Agencies that the model may be over estimating lead concentrations from the Flotation Tailings.

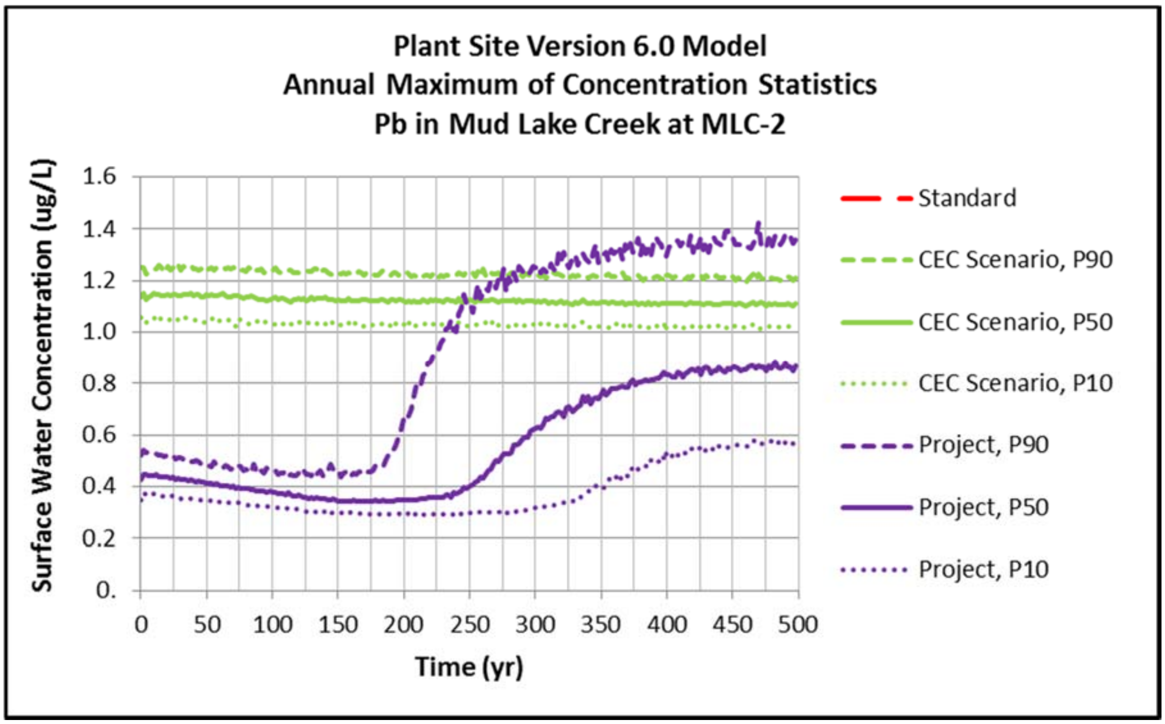


Figure 6-78 Lead Concentrations in Surface Water at MLC-2; 500-Year Simulation

6.5.3.2 Total Dissolved Solids

The Plant Site Water Quality Model is intended to independently model a suite of 28 constituents (Table 2-1 of Attachment B). This suite of constituents does not include TDS. However, there are applicable surface water and groundwater standards for TDS, and the MPCA has requested that model results be compared to the TDS standards for surface water (700 mg/L) and groundwater (500 mg/L). As described below, TDS has been estimated directly in the model at each time step using instantaneous concentrations of other constituents. Estimated TDS concentrations in groundwater are presented here while estimated TDS concentrations in surface water are presented in Section 6.7.5.4. TDS is not directly modeled by the probabilistic water quality model. However, TDS can be estimated using Equation 6-3 (Reference (57)) where all constituent concentrations are in units of mg/L.

$$TDS = 0.6 * Alkalinity + Ca + Mg + Na + K + Cl + SO_4 + F \quad \textbf{Equation 6-3}$$

TDS has been estimated at each time step using the instantaneous concentrations of each of the eight constituents in Equation 6-3. Although TDS is an estimated value, the range of TDS concentrations estimates using the Continuation of Existing Conditions Scenario model results is reasonably close to the actual range of TDS observed in groundwater, as is discussed below.

Sample data from groundwater wells is included in Large Table 3. Groundwater samples in wells that are considered “background/un-impacted” (GW002, GW011, GW013, and GW015) do not exceed the 500 mg/L groundwater standard. Groundwater samples in wells that are considered impacted by existing Tailings Basin seepage and are near the toe of the Tailings Basin (GW001, GW006, GW007, and GW012) exceed the 500 mg/L groundwater standard. Groundwater in monitoring wells near the property boundary (GW009 and GW010) has TDS concentrations of approximately 300-440 mg/L.

Estimated TDS concentrations in the three groundwater flow paths are shown on Figure 6-79 through Figure 6-81. For all three flow paths, the trend is a steady decline in TDS concentrations from an existing, elevated condition to a future condition below the groundwater standard.

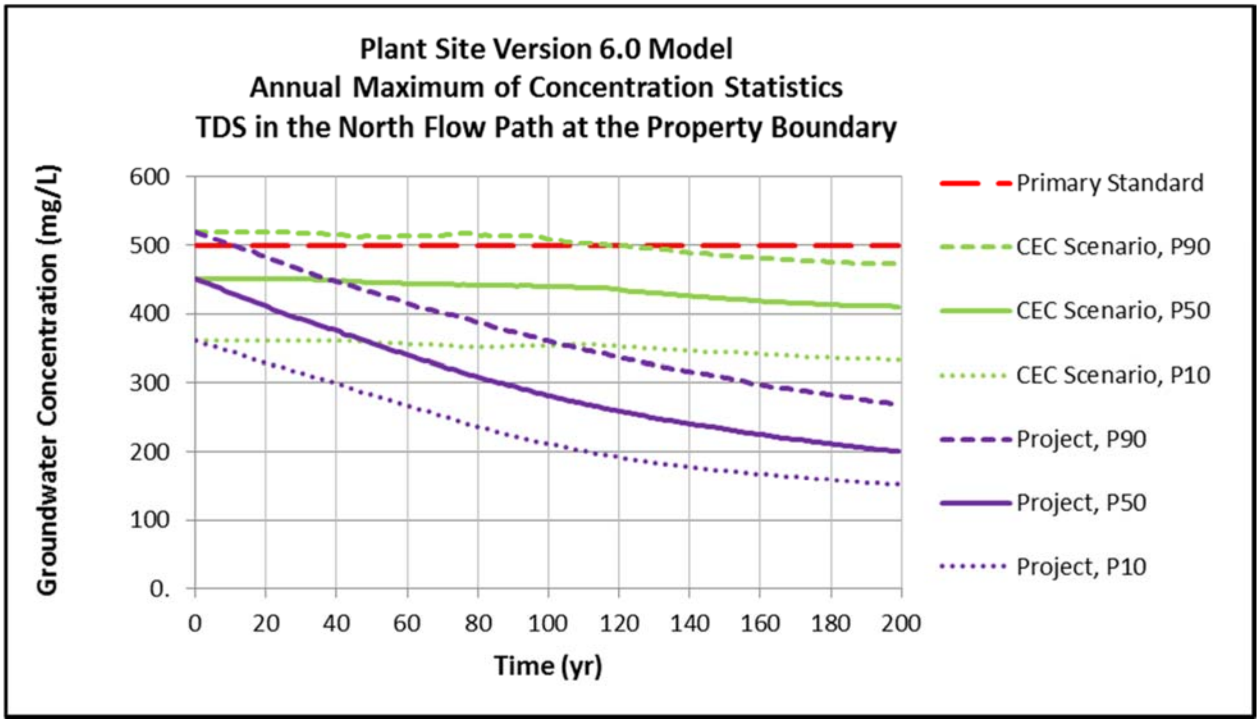


Figure 6-79 TDS Concentrations in the North Flow Path at the Property Boundary

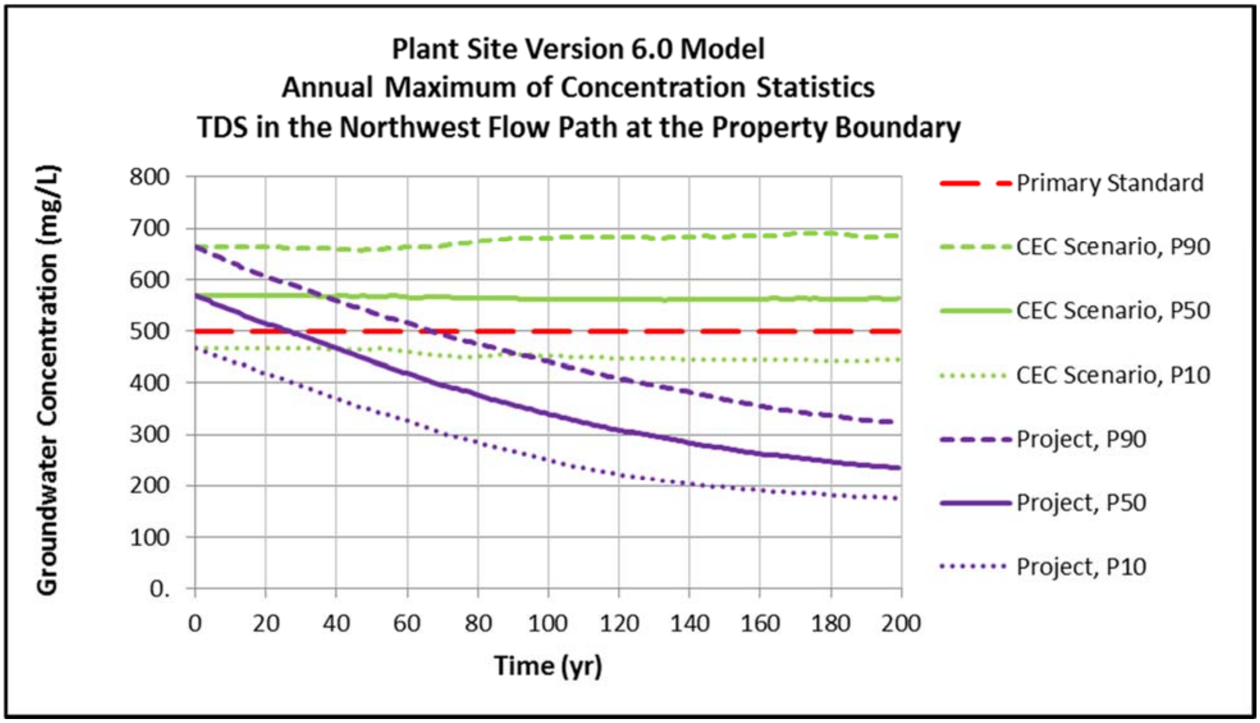


Figure 6-80 TDS Concentrations in the Northwest Flow Path at the Property Boundary

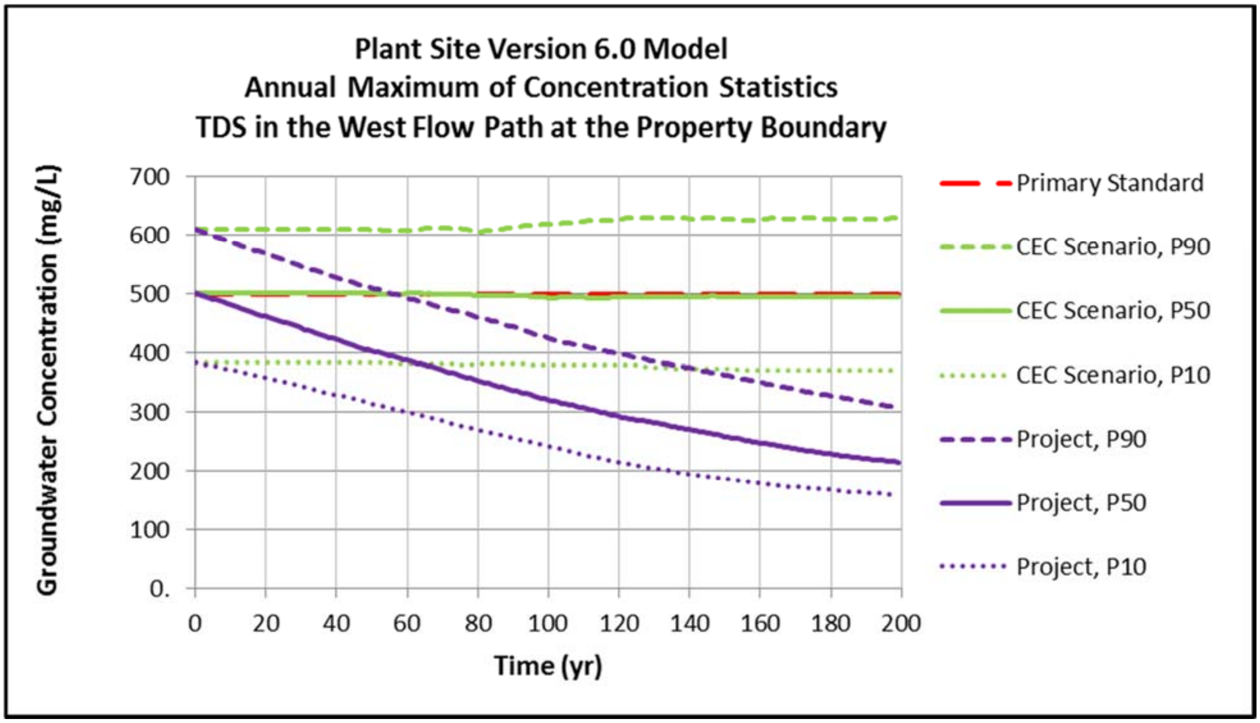


Figure 6-81 TDS Concentrations in the West Flow Path at the Property Boundary

6.6 Surface Water Quantity

Surface water quantity is estimated by modeling the effects of the FTB seepage capture systems (Section 5.2.2.3) as well as stream augmentation with WWTP effluent and the drainage swale (Section 5.2.2.9.1). The seepage capture systems are implemented in the Project Model as engineering controls to protect the environment by reducing constituent loading. The seepage capture systems have a positive impact on water quality downgradient of the Tailings Basin as groundwater and surface water trend to a more natural state (Sections 6.5 and 6.7). However, cutting off the seepage from the Tailings Basin reduces the amount of water that discharges to the nearby downgradient tributaries, which is offset by stream augmentation (Section 5.2.2.9.1).

Changes to annual average stream flows within +/- 20% are not considered to be significant (Section 5.2.2.9.1). Figure 6-82 shows that the Project, with stream augmentation, will not have a significant impact on the hydrology of the downgradient surface water bodies. Figure 6-82 shows the annual average flow in the Project Model divided by the annual average flow in the Continuation of Existing Conditions Scenario Model at each location. The graph only shows up to Mine Year 100 because the results are considered steady-state beyond that point and can be extrapolated out, if necessary.

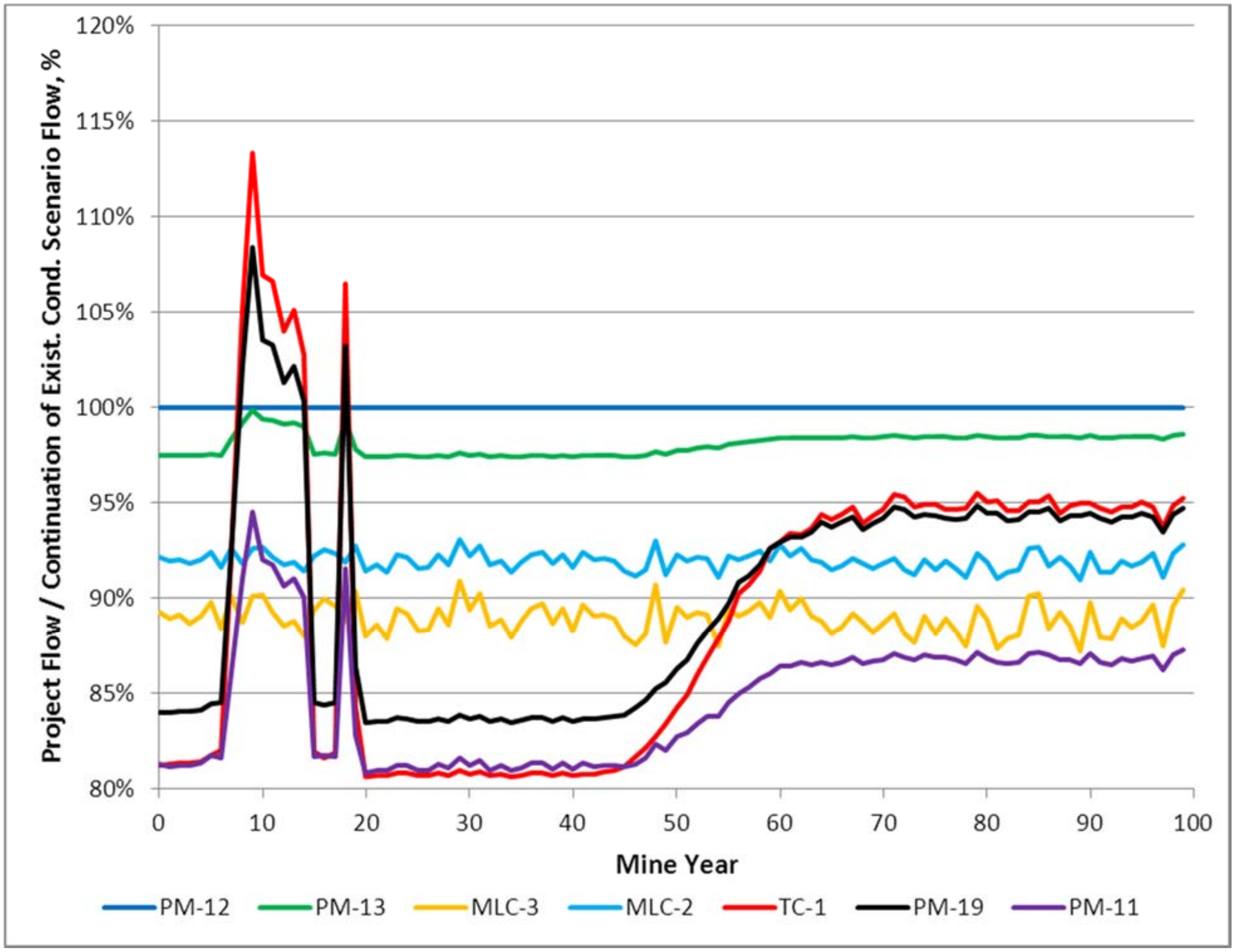


Figure 6-82 Average Annual Flow in the Project Model, as a Percent of the Average Annual Flow in the Continuation of Existing Conditions Scenario Model

Changes in flow at locations downstream of the evaluation locations presented in Figure 6-82 will be less than the changes shown for the upstream location. A few noteworthy observations regarding Figure 6-82 are discussed below.

Upstream of the Project, at PM-12, the percentage is a constant of 100%, as is expected. Results for Mud Lake Creek show that starting in Mine Year 0, upon construction of the drainage swale that will direct additional watershed area to Mud Lake Creek (Section 5.1.2.4) the minimum flow is met at MLC-3 (and MLC-2 by default). Figure 6-82 shows that flow at MLC-3 and MLC-2 are relatively constant, indicating that the drainage swale is effective in preventing hydrologic impacts to Mud Lake Creek.

The results for Trimble Creek and Unnamed Creek show the effects of varying quantities of WWTP discharge, but at all times the Project augmented stream flows are above 80% and below

120% of the annual average Continuation of Existing Conditions Scenario Model flows. Project augmented stream flows in reclamation and long-term closure are within the acceptable range.

The effect of the Project decreases with distance downstream, as can be seen at PM-13, where the maximum change in flow is an approximate 3% decrease in the annual average flow during operations, with a long-term closure decrease of less than 2%.

6.7 Surface Water Quality

Surface water quality is estimated by combining flows and loads from the Plant Site with flows and loads from other sources such as watershed runoff, unimpacted groundwater and upstream point sources (Section 5.2.1.4). The probabilistic water quality model is used to evaluate this estimated mixed water quality relative to the surface water standards at select evaluation locations. Quantitative evaluations are made by comparing the 90th percentile concentration to the applicable surface water standard consistent with direction provided by the Co-lead Agencies as part of the IAP process (Reference (56)). For the NorthMet EIS, the project will be assumed to estimate a significant effect on water quality if the 90th percentile model concentrations exceed an applicable standard. The State has retained the flexibility to modify this impact criteria based on site-specific factors and model results. For most constituents, where the surface water standard is a single value, the comparison of modeled concentrations to the standard is quite simple. However, for the constituents with a hardness based standard (cadmium, copper, nickel, lead, and zinc) making the comparison is more difficult (see Section 2.1.1 for additional discussion of these standards).

As described in Section 5.2.1.4.1, there are five evaluation locations along the Embarrass River, two locations on Mud Lake Creek, two locations on Trimble Creek, and two locations on Unnamed Creek. However, results for one of the locations on Unnamed Creek, UC-1, are not discussed related to the Project Model because that location is within the FTB Containment System in the Project Model. One location on the Embarrass River, PM-12, is upstream of all mining impacts, making it the unimpacted evaluation location within the Continuation of Existing Conditions Scenario and Project Models. PM-13 is downstream of all Project impacts. The evaluation of surface water quality in this section is organized by location. Second Creek is not discussed as an evaluation location because 100% of seepage from the Tailings Basin to the south toe, which would normally report to Second Creek, is captured by the FTB South Seepage Management System. The only water reporting to Second Creek in the Project Model is treated effluent from the WWTP.

6.7.1 Explanation of Plots

Four types of plots are used in this section:

- Plots showing an overview of surface water quality estimated for each location
- Plots showing concentration statistics

- Plots showing probability of an exceedance statistics
- Plots showing the culpability of loading to evaluation locations

The plots showing an overview of the surface water quality estimates are constructed in the same manner as the plots showing an overview of groundwater quality estimates discussed in Section 6.5. Plots showing monthly concentration statistics, probability of exceedance statistics, and loading culpability are discussed further below.

6.7.1.1 Concentration Statistics Plots

The concentration statistics plots are generated by first, calculating representative statistical concentrations at every time step, and second, reducing the data to annual values by selecting either the highest annual concentration of each statistic or the average annual concentration of each statistic. For example, Figure 6-83 shows monthly statistics of the sulfate concentration at PM-12 for 20 years. However, 200 years of highly oscillating results will render these figures illegible. Therefore, the plots are summarized further by using either the annual maximum or the annual average value for each year. Figure 6-84 shows the same sulfate concentrations at the same location, but reduced to single concentration values for each year, and for each statistic. In Figure 6-83, the monthly median concentration oscillates from about 2,000 μg/L to just below 6,000 μg/L. Figure 6-84, showing the annual maximum, shows the median concentration hovering just below 6,000 μg/L, which is the highest value of the median each year. PM-12 is the evaluation location upstream of the Project, so in these two figures, the Project Model results and the Continuation of Existing Conditions Scenario model results are identical.

For the most part, annual maximum plots are shown in this section; however plots of both annual maximum and annual average are provided in Attachment I.

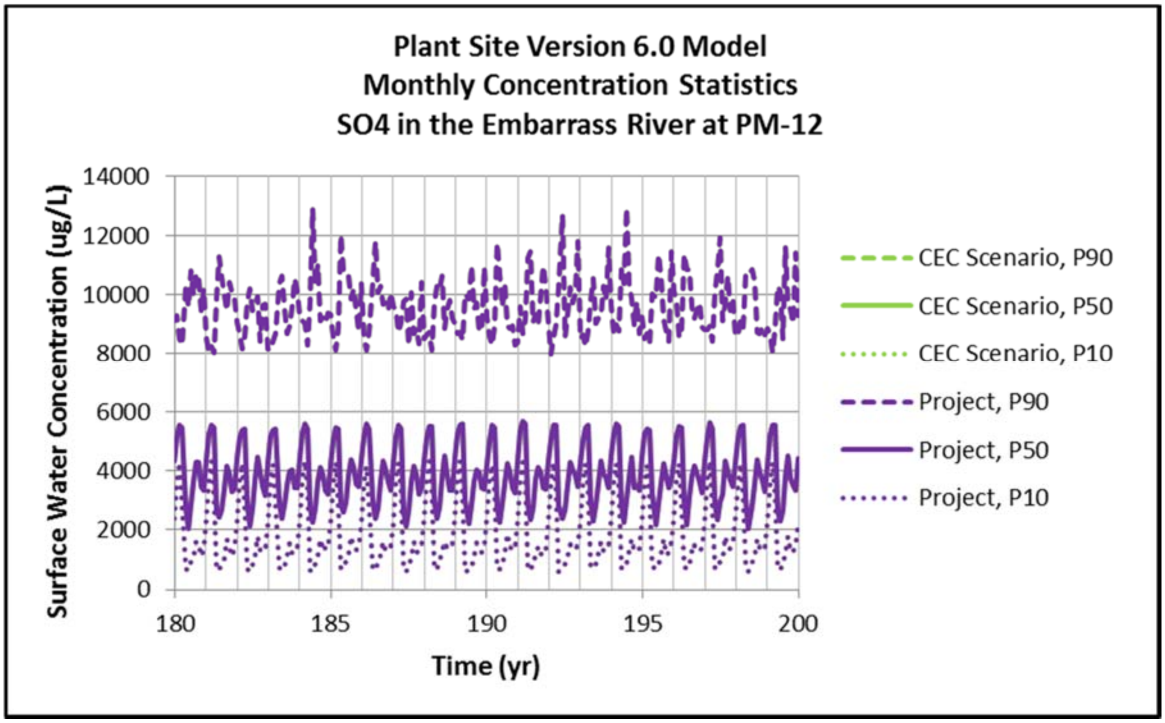


Figure 6-83 Monthly Sulfate Concentrations in the Embarrass River at PM-12

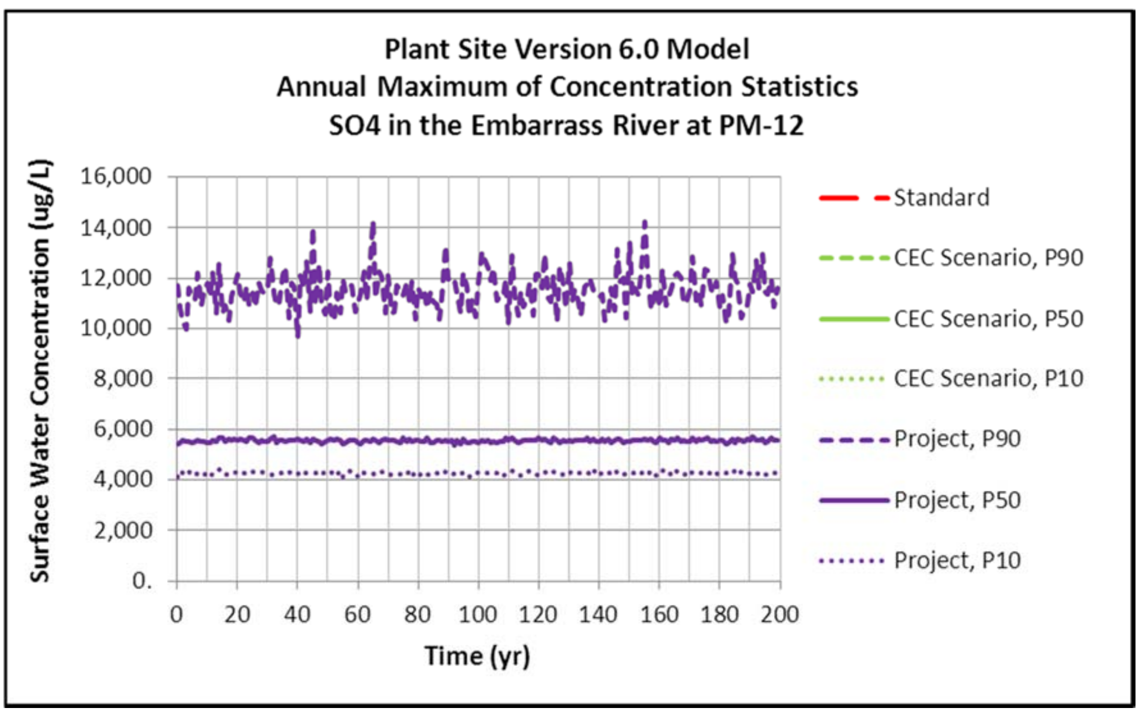


Figure 6-84 Annual Summary of Sulfate Concentrations in the Embarrass River at PM-12

6.7.1.2 Probability of Exceedance at any Time

The likelihood of exceedance through time is an additional method to assess the impact of the Project on surface water quality, particularly for the metals that have a hardness-based standard. The tables and plots in this section were created by taking the following steps:

- At any given time step, all constituents were individually evaluated (true/false) against the applicable surface water standard at all surface water evaluation locations. If the estimated concentration was greater than the standard, the result for that constituent, at that time, and at that location, is true; if it is not over the standard, the result is false.
- The evaluation was performed at every time step during a realization, resulting in a 200-year time series (2401 time steps/results) of true or false values.
- The process was repeated during each of the additional realizations until all 500 realizations were run. The result is a set of 500 true or false results at every time step for each constituent at each location.
- At any time step (24.33 years for example), the number of realizations showing a result of true was divided by 500, resulting in the probability of estimating an exceedance. Zero exceedances results in 0%, 50 exceedances results in 10%, etc.
- The probability of exceedance was determined for all time steps, resulting in a time series of the probability of exceeding the applicable surface water standard.
- Just as for the concentration statistics plots, the probability of exceedance plots are summarized annually by selecting either the maximum annual probability of exceedance for each year, or by the annual average probability of exceedance for each year.

The red line in the example figure, Figure 6-85, shows the probability of exceedance through time. It is possible, however, that an exceedance in the Project Model cannot be attributed to the Project itself and would occur with or without the Project. The above process of tracking exceedances was repeated, tracking only time steps with an exceedance in the Project Model and no exceedances in the Continuation of Existing Conditions Scenario Model. The blue-dashed line shows the probability of the Project Model simulating an exceedance when the Continuation of Existing Conditions Scenario Model would not show an exceedance. This represents the increase in the probability of an exceedance at each time step due to the Project. The red line shows the overall annual maximum probability if the Project were to occur; the blue-dashed line shows the annual maximum impact of the Project on actually causing additional exceedances.

In Figure 6-85, the vertical black-dashed lines separate the time period operations (OPS) from reclamation (REC), and the time period reclamation from long-term closure (LONG-TERM). For the purposes of these plots, the reclamation period (REC) at the Plant Site is defined as the

10 years after operations, before the bottom of the FTB Pond is amended with bentonite. Figure 6-85 shows that in any given year, the aluminum standard at PM-13 has up to a 20%-30% probability of being exceeded, is generally higher during the first halves of operations and reclamation, and is quite stable throughout long-term closure. Figure 6-85 also shows that the Project itself has up to nearly a 5% probability of causing an exceedance during any year of operations and reclamation, and then the probability of a Project-caused exceedance diminishes slightly in long-term closure to about 2% or 3%.

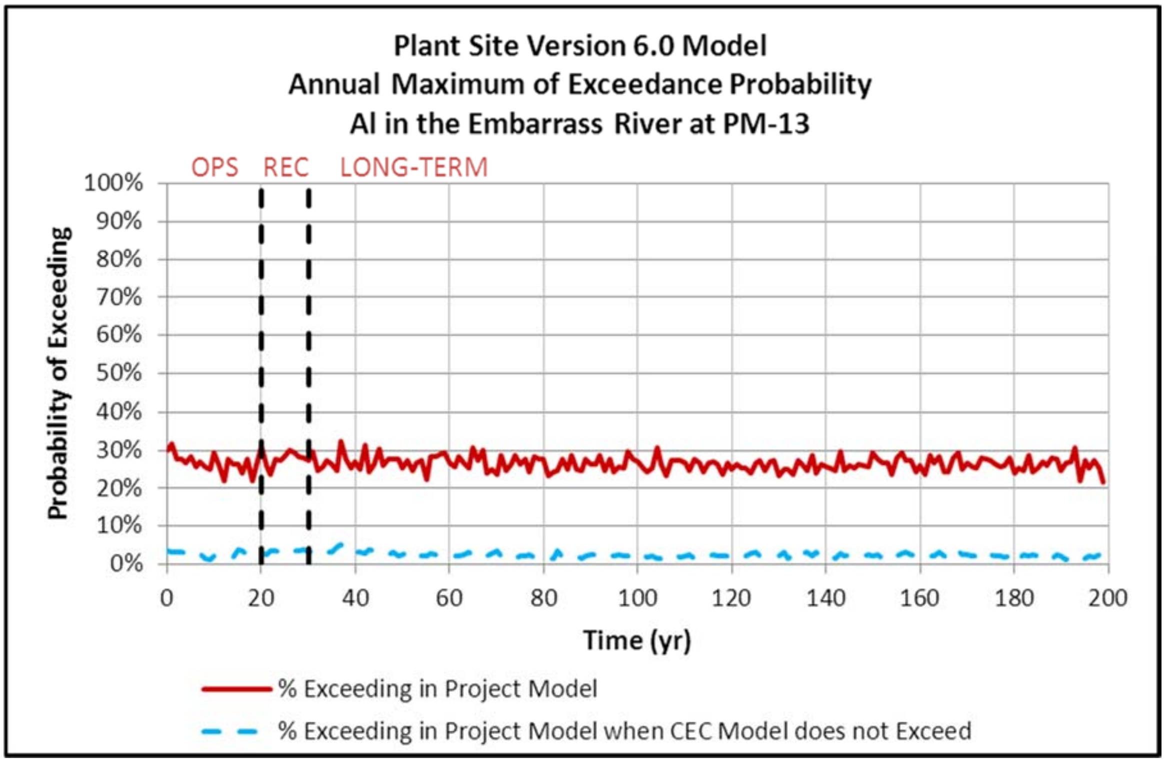


Figure 6-85 Probability of an Aluminum Exceedance at PM-13 through Time

6.7.1.3 Culpability Plots

Culpability plots for the 5 surface water evaluation locations were created in the same manner as described in 6.3.2.1.

6.7.2 Embarrass River Upstream of Project Area

PM-12 is the most upstream evaluation location on the Embarrass River; it is upstream of the Project Area and former LTVSMC Area 5 and thus in the model represents natural conditions (recall that the Babbitt WWTP effluent concentrations are set equal to concentrations in runoff from natural watersheds [Section 5.2.1.4.9]). Sampled surface water data from PM-12 was used to estimate the quality of natural watershed runoff so that the average and range of water quality results matched closely to what was actually observed at PM-12 (Section 5.2.1.4.5). A summary of estimated concentrations at PM-12 during operations, reclamation and long-term closure is provided in Large Table 18. At this location most constituents meet the applicable, constant (i.e., non-hardness based) surface water standard; aluminum is the only exception (Large Figure 21). Figure 6-86 shows the annual maximum of the aluminum surface water concentration statistics at PM-12 (the Project Model results and the Continuation of Existing Conditions Scenario model results are identical). Aluminum is discussed in more detail in Section 6.7.5.1.

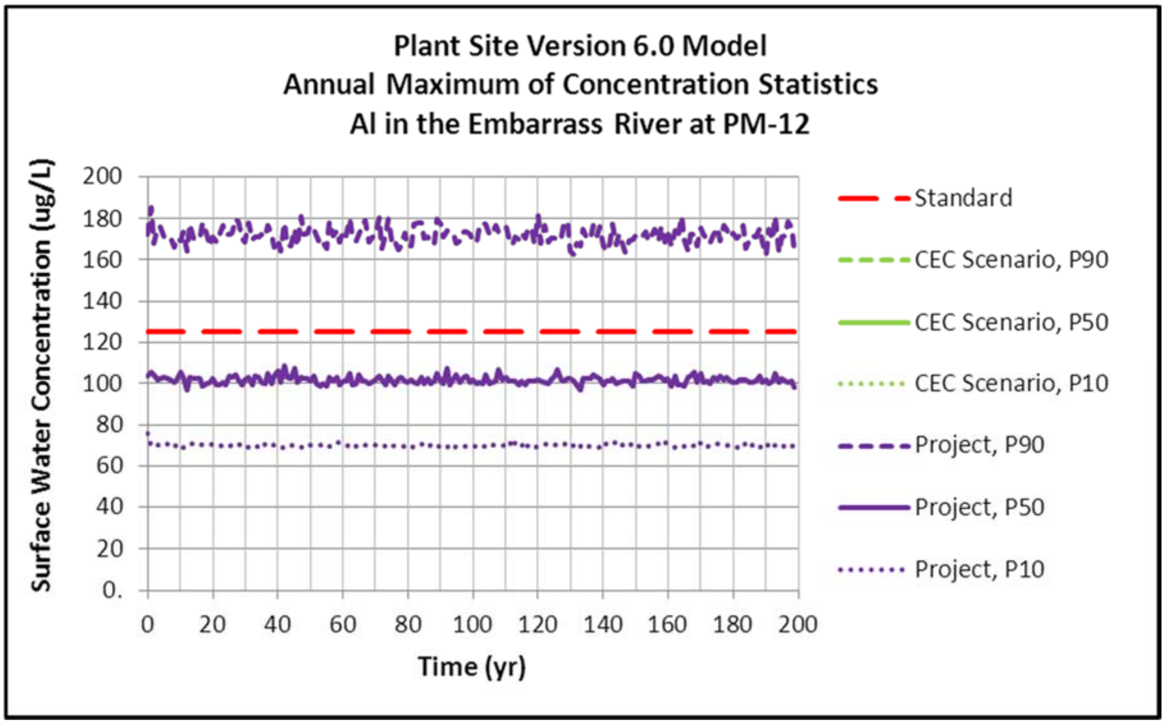


Figure 6-86 Aluminum Annual Maximum Concentrations in the Embarrass River at PM-12

For the constituents with hardness-based standards, plots of the probability of an exceedance need to be assessed in order to determine whether concentrations are estimated to be above the standard at the modeled hardness. Figure 6-87 shows the probability of a lead exceedance through time. The maximum probability of a lead exceedance is 3% to 6%. Note, however, that the blue-dashed line in Figure 6-87 shows that the probability of a Project-caused exceedance is a constant 0%, as expected because PM-12 is an upstream location, unimpacted by the Project. Lead is discussed further in Section 6.7.5.2. None of the other metals with a hardness based standard are estimated to have a greater than 10% probability of an exceedance (all are less than 3% probability) as shown in Attachment J.

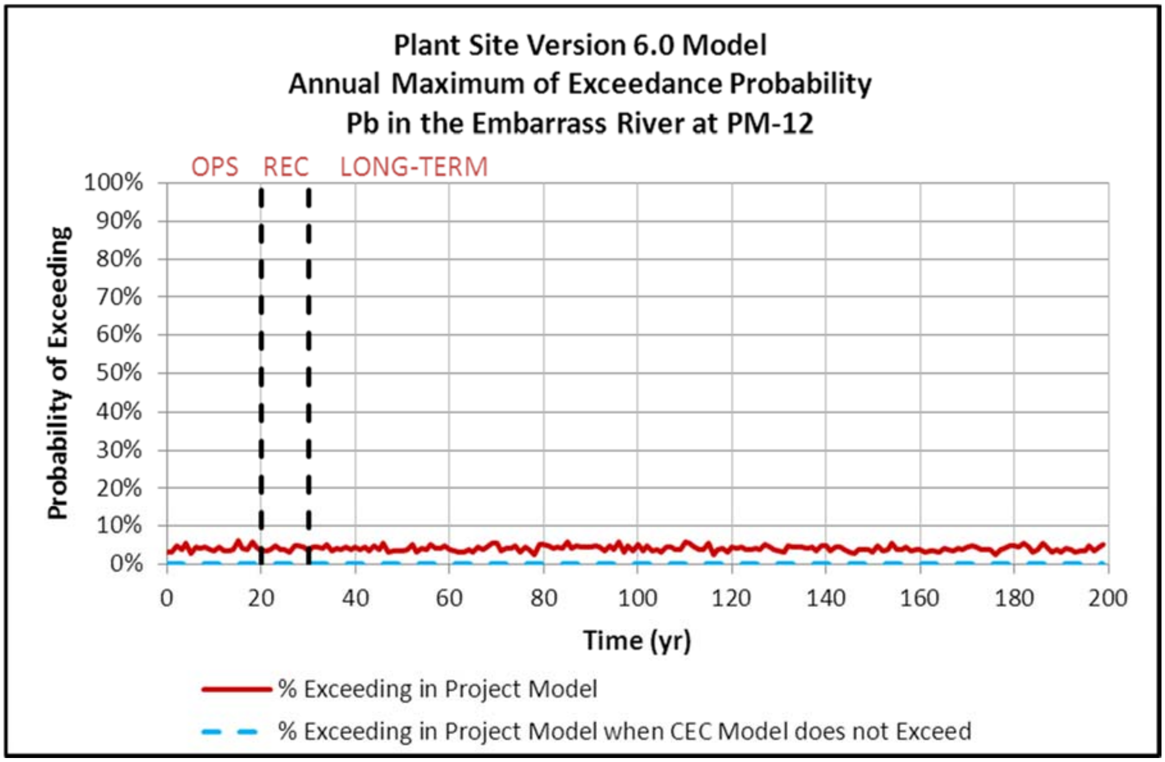


Figure 6-87 Probability of a Lead Exceedance at PM-12 through Time

PM-12.2 is a second location along the Embarrass River that is upstream of the Project. However, this location is significantly different than PM-12 in that it receives discharge from Area 5 via Spring Mine Creek. A summary of estimated concentrations at PM-12.2 during operations, reclamation and long-term closure is provided in Large Table 19. The Project Model and the Continuation of Existing Conditions Scenario Model results at this location are identical because it is upstream of the Project. At this location most constituents meet the applicable, constant (i.e., non-hardness based) surface water standard; aluminum is the only exception and hardness is close to the applicable standard (Large Table 19). Aluminum is discussed in more detail in Section 6.7.5.1. Figure 6-88 shows the annual maximum of the estimated hardness statistics at PM-12.2. As mentioned above, this location is upstream of the Project and is not affected by the Project and any exceedances at this location are not due to the Project.

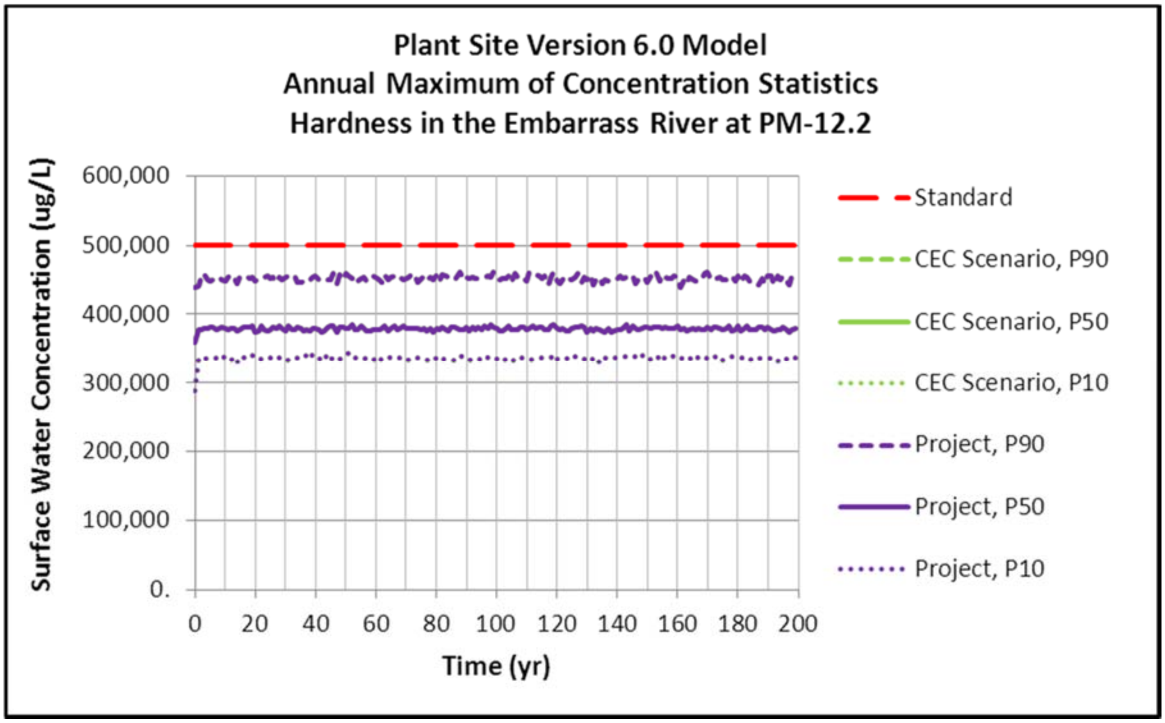


Figure 6-88 Hardness Annual Maximum Concentrations in the Embarrass River at PM-12.2

6.7.3 Embarrass River Tributaries

There are three tributaries to the Embarrass River that are included in the Project and Continuation of Existing Conditions Scenario Models. The three tributaries are shown in Large Figure 7 and are discussed below.

6.7.3.1 Mud Lake Creek (MLC-3, MLC-2)

Mud Lake Creek is a unique tributary because, under the Continuation of Existing Conditions Scenario conditions, it has a significant watershed area (Large Figure 2) and receives a relatively small amount of seepage from the LTVSMC Tailings Basin. Therefore, in the Continuation of Existing Conditions Scenario Model, the water quality in Mud Lake Creek is significantly controlled by natural watershed conditions rather than Tailings Basin conditions. In the Project Model, the Tailings Basin seepage reporting to MLC-3 is completely cut off and the drainage swale is constructed, which increases the watershed area for Mud Lake Creek. At this point, flow in Mud Lake Creek consists almost entirely of natural watershed water, receiving a very small amount of Tailings Basin seepage (~4 gpm) at MLC-2 via the north flow path.

A summary of estimated concentrations at MLC-3 and MLC-2 during operations, reclamation and long-term closure are provided in Large Table 20 and Large Table 21. In Mud Lake Creek, most constituents meet the applicable, constant (i.e., non-hardness based) surface water standard

(Large Figure 22 and Large Figure 23). The only constituent where the 90th percentile concentration exceeded the standard is aluminum in all years of the Continuation of Existing Conditions Scenario and Project Models at both MLC-2 and MLC-3 (Figure 6-110 and Figure 6-111). Aluminum is discussed further in Section 6.7.5.1. For most constituents, concentrations are estimated to be lower in the Project Model than in the Continuation of Existing Conditions Scenario Model (Figure 6-89 and Attachment I). For example, Figure 6-90 shows estimated sulfate concentrations at MLC-2 from the Project Model and the Continuation of Existing Conditions Scenario Model. The steadily declining sulfate concentration in the north flow path (Figure 6-66) is clearly observed in the surface water quality.

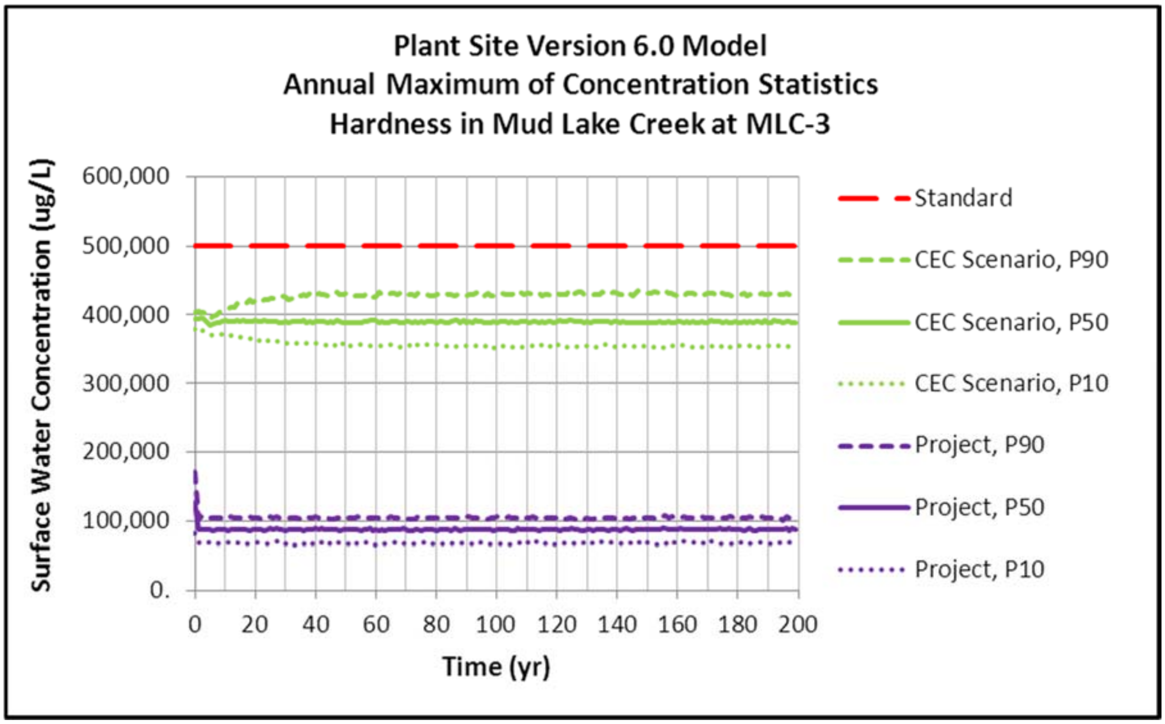


Figure 6-89 Hardness Annual Maximum Concentrations in Mud Lake Creek at MLC-3

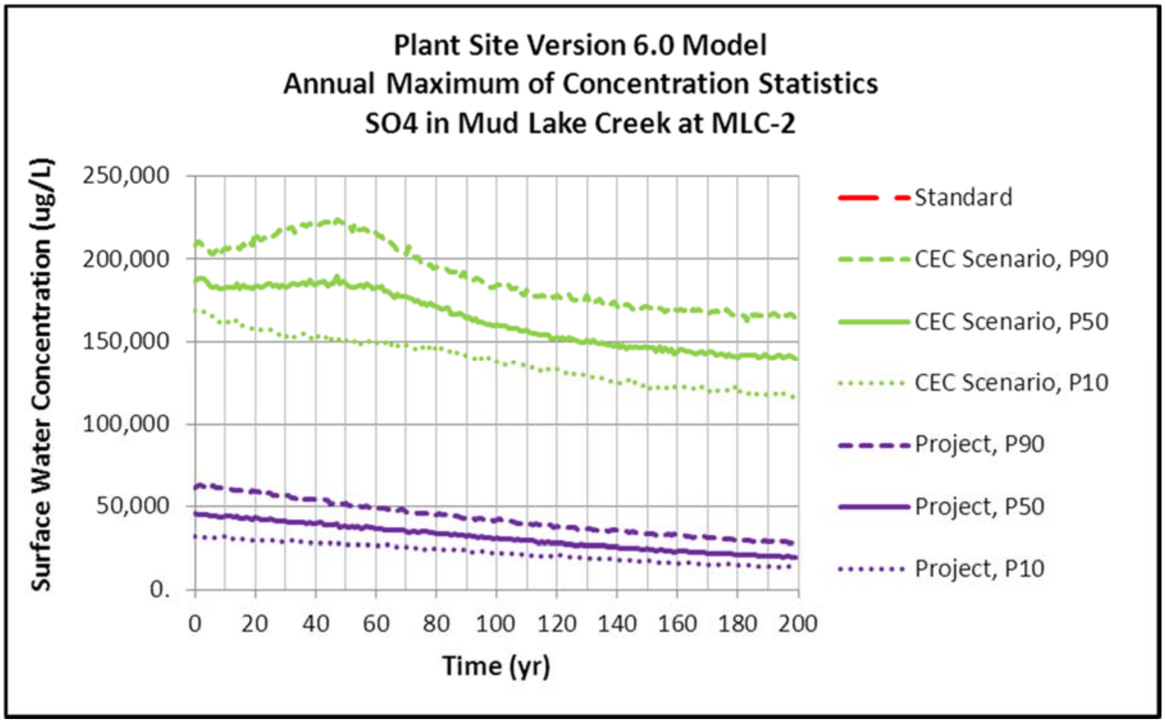


Figure 6-90 Sulfate Annual Maximum Concentrations in Mud Lake Creek at MLC-2

For the constituents with hardness-based standards, plots of the probability of an exceedance need to be assessed in order to determine whether concentrations are estimated to be above the standard at the modeled hardness. Figure 6-91 shows the probability of a lead exceedance through time. The maximum probability of a lead exceedance is less than 10%. Lead is discussed further in Section 6.7.5.2. None of the other metals with a hardness-based standard are estimated to have a greater than 10% probability of an exceedance in Mud Lake Creek at MLC-3 (all are less than 3% probability) as shown in Attachment J.

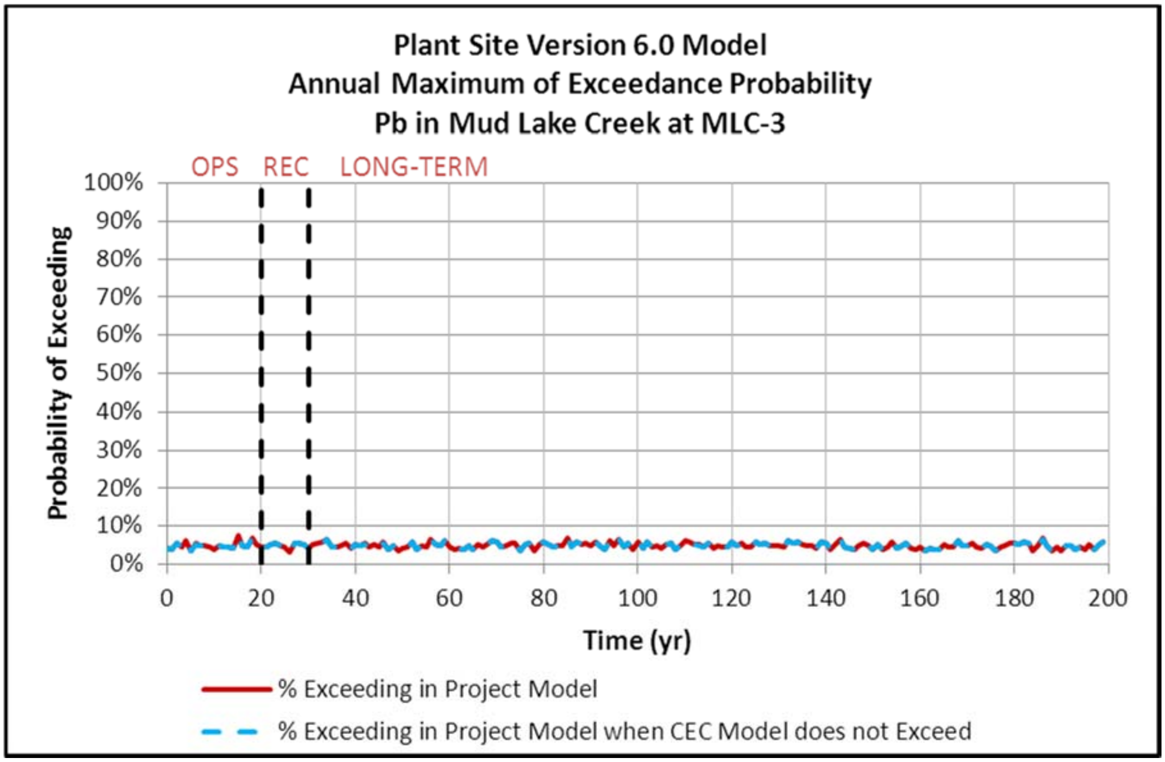


Figure 6-91 Probability of a Lead Exceedance at MLC-3 through Time

6.7.3.2 Trimble Creek (TC-1, PM-19)

Trimble Creek and Unnamed Creek (Section 6.7.3.3) show similar responses in water quality. In the Continuation of Existing Conditions Scenario Model, the water quality in Trimble Creek is significantly affected by seepage from the Tailings Basin. In the Project Model, the Tailings Basin seepage reporting to TC-1 is completely cut off and is replaced with effluent from the WWTP. During operations (up to Mine Year 20), TC-1 receives excess Project water from the WWTP. During reclamation, a large portion of the WWTP effluent is either sent into the FTB Pond or to the Mine Site to help flood the West Pit. Therefore, during reclamation, only the minimum flow of water necessary to prevent hydrologic impacts is discharged from the WWTP to Trimble Creek upstream of TC-1. During long-term closure, excess Project water can be discharged from the WWTP to Trimble Creek. At all times, PM-19 receives the discharge from the northwest flow path, although in the Project Model, the flow from the Project to PM-19 via the northwest flow path is one-tenth that in the Continuation of Existing Conditions Scenario Model. A summary of estimated concentrations at TC-1 and PM-19 during operations, reclamation and long-term closure are provided in Large Table 22 and Large Table 23.
Large Figure 24 and shows a summary of estimated water quality at PM-19 and Large Figure 25 shows a summary of estimated water quality at TC-1.

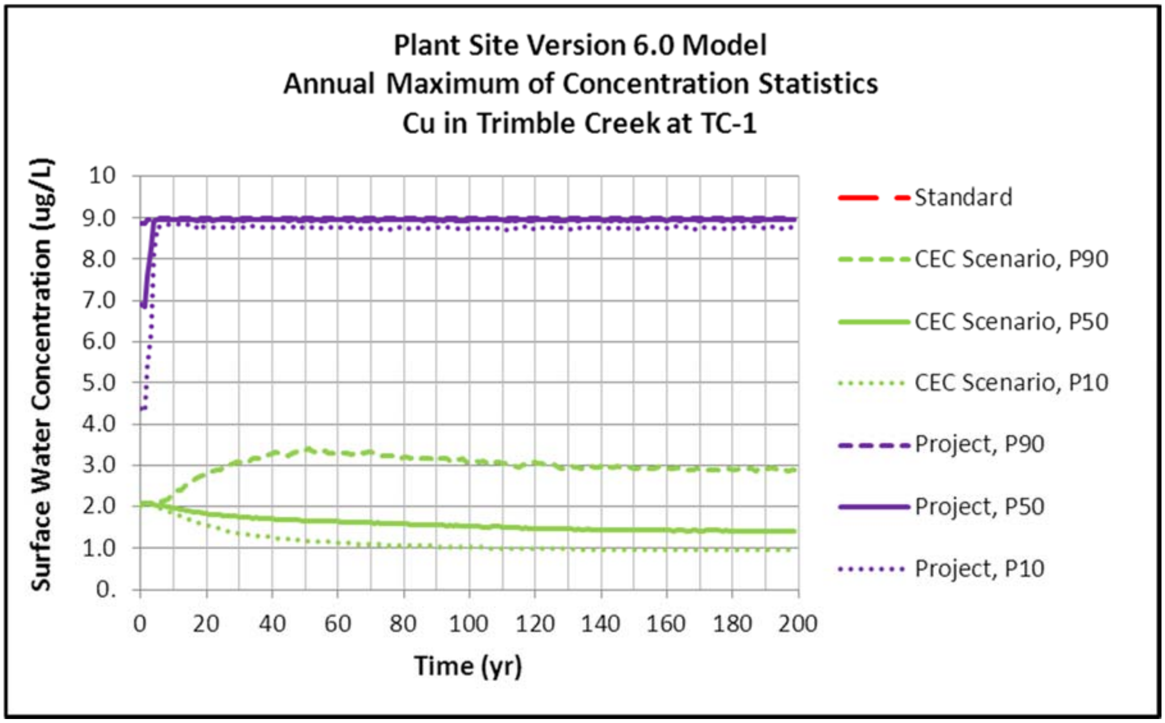


Figure 6-92 Copper Annual Maximum Concentrations in Trimble Creek at TC-1

In the Project Model, the assumed concentration of copper in effluent from the WWTP is 9 µg/L. Throughout a given year, the concentrations rise and fall as wet and dry seasons occur. However, Figure 6-92 clearly shows that the annual maximum concentrations occur when the flow in Trimble Creek is dominated by the WWTP effluent at 9 µg/L. It is also clear that the quality in Trimble Creek at TC-1 is altered immediately with the Project because the WWTP must discharge to the tributary from the beginning of the Project. For reference, the hardness is 100 mg/L in the WWTP effluent, resulting in an anticipated effluent concentration of 9.3 µg/L for the discharge based on the applicable hardness-based surface water standard. Therefore, when the flow in Trimble Creek is dominated by effluent from the WWTP, the water quality will essentially be at the hardness-based water quality standard for copper. Sulfate shows a similar response (Figure 6-93 and Figure 6-95).

Interestingly, some constituents such as sulfate and aluminum show an "inverted" response compared to copper. This is because the concentration in the treated WWTP effluent (9 mg/L for sulfate for example) is much lower than what is currently seeping from the Tailings Basin.

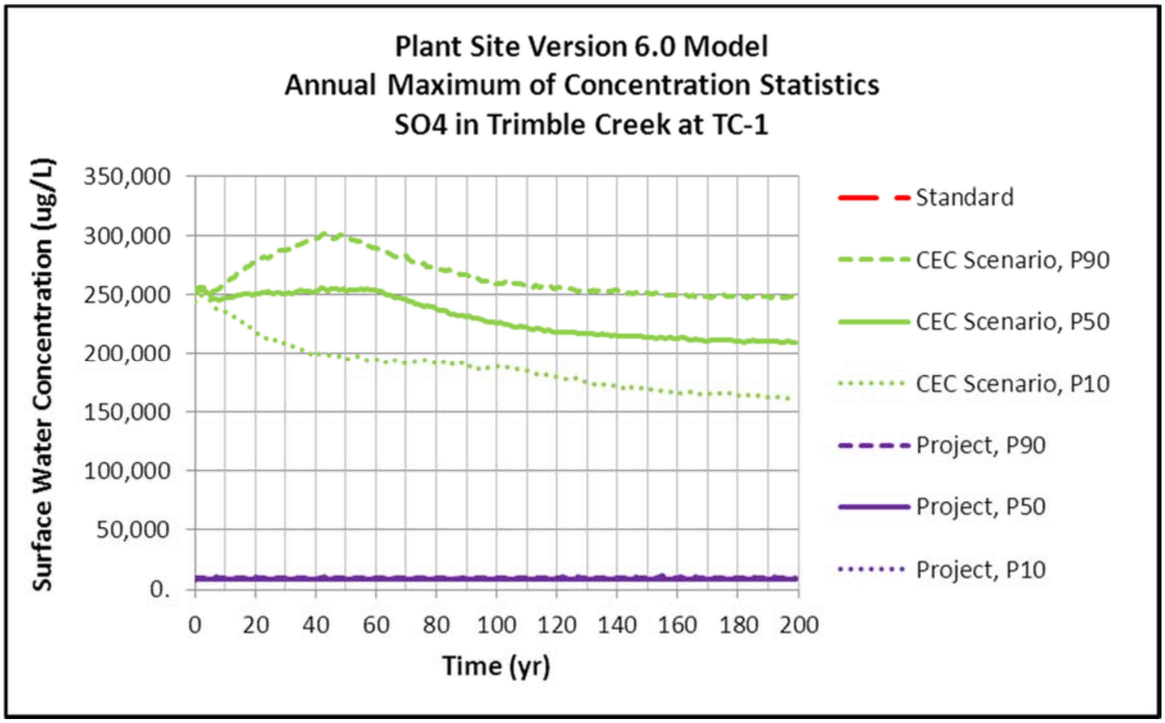


Figure 6-93 Sulfate Annual Maximum Concentrations in Trimble Creek at TC-1

At PM-19, a similar response is observed, although there is more variability because of the additional natural watershed area to PM-19 which provides more variability in the mixed water quality.

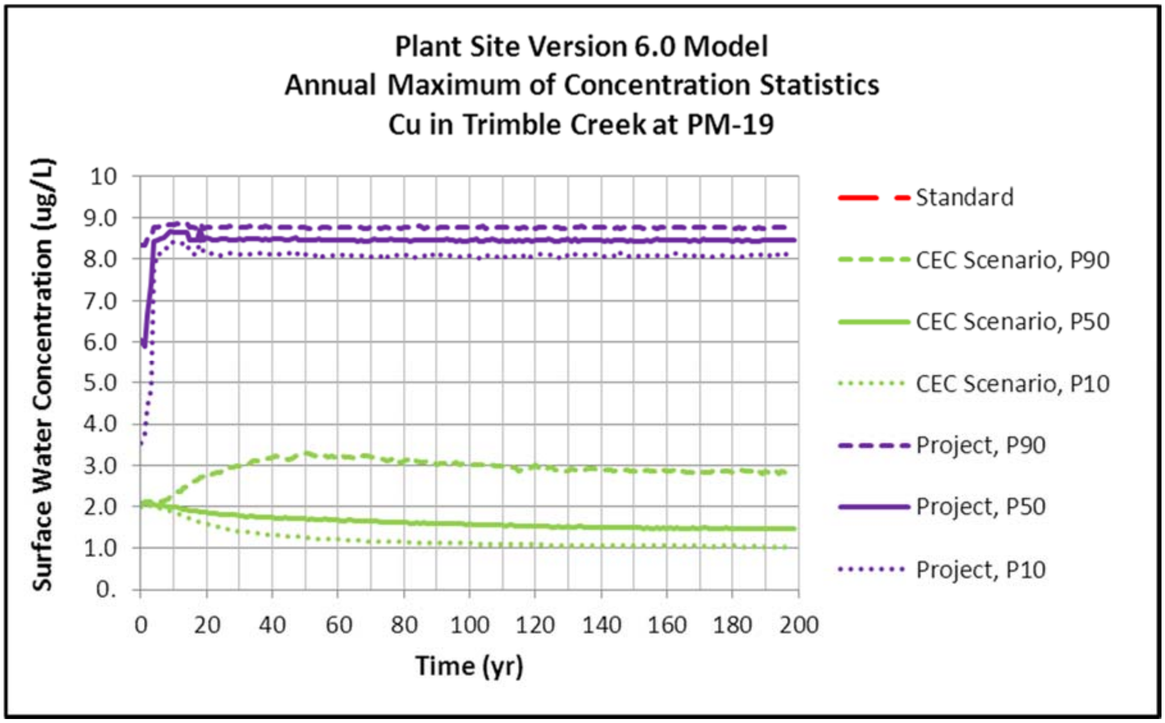


Figure 6-94 Copper Annual Maximum Concentrations in Trimble Creek at PM-19

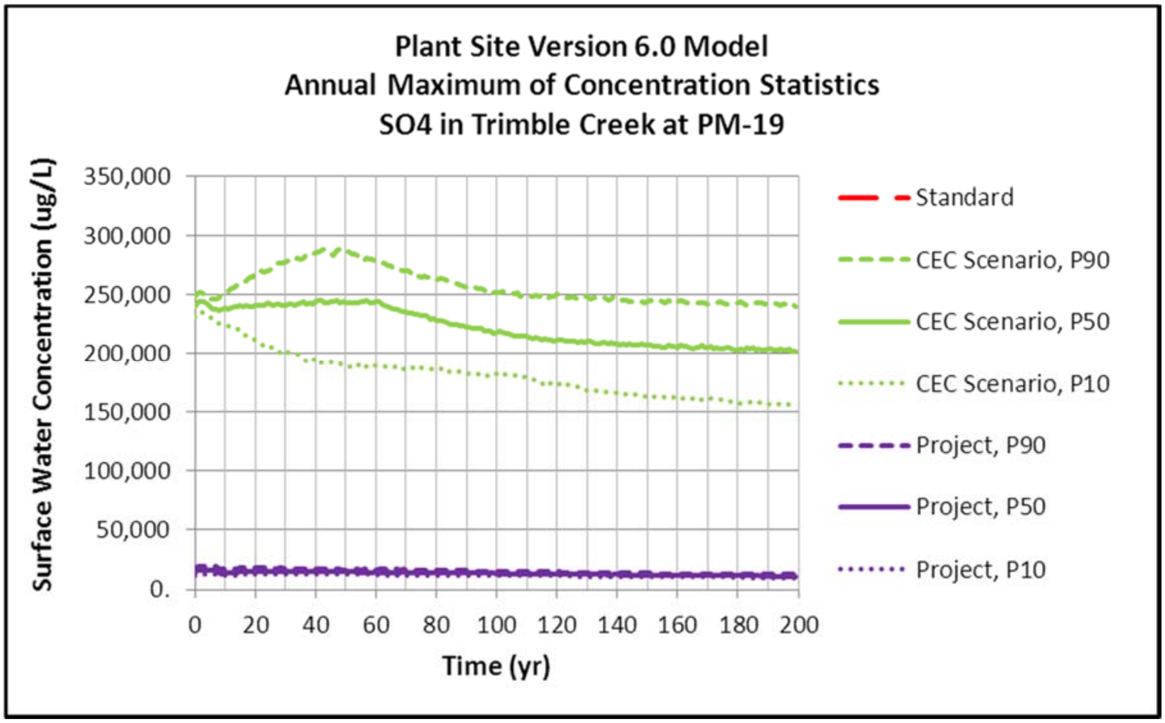


Figure 6-95 Sulfate Annual Maximum Concentrations in Trimble Creek at PM-19

In Trimble Creek, the only constituents where the 90th percentile exceeded the standard are hardness at TC-1 and PM-19 during all years of the Continuation of Existing Conditions Scenario Model (Figure 6-96), and aluminum in some Mine Years of the Project Model and the Continuation of Existing Conditions Scenario Model at PM-19. Aluminum is discussed further in Section 6.7.5.1.

Some constituents, such as cobalt, show the 90th percentile concentration at or very near the surface water quality standard for a significant portion of the 200-year modeling period (Figure 6-97). This is because, during some months, the flow in the tributary is dominated by effluent from the WWTP, which has cobalt concentration set equal to the surface water quality standard.

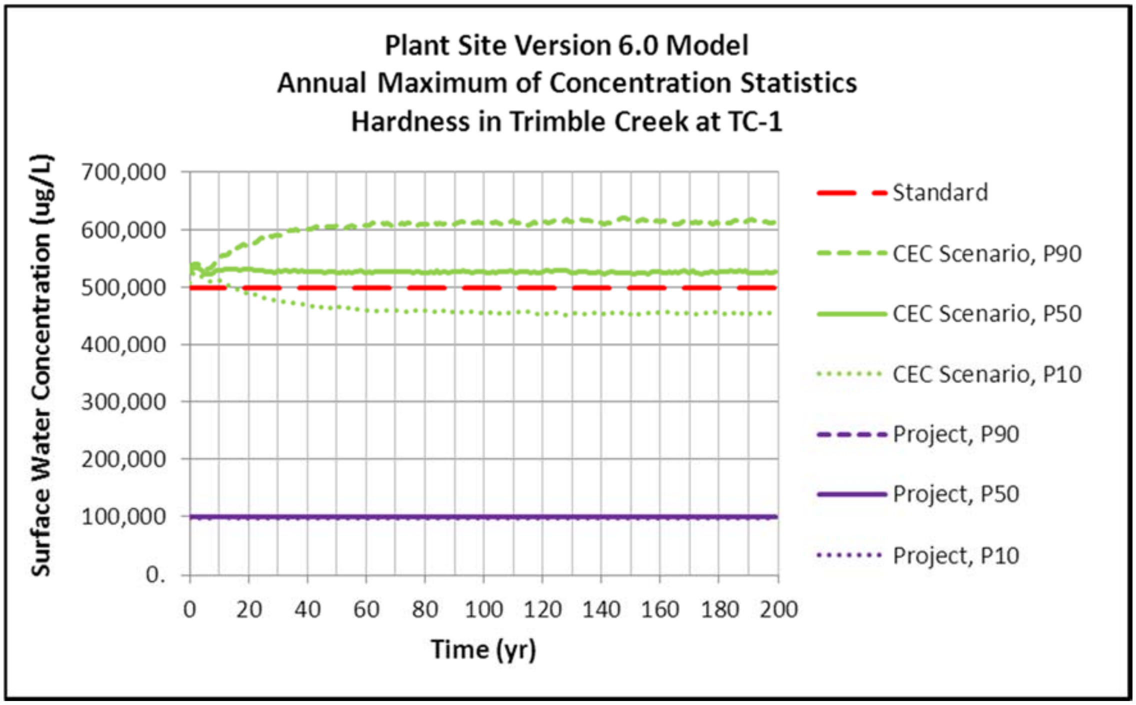


Figure 6-96 Hardness Annual Maximum Concentrations in Trimble Creek at TC-1

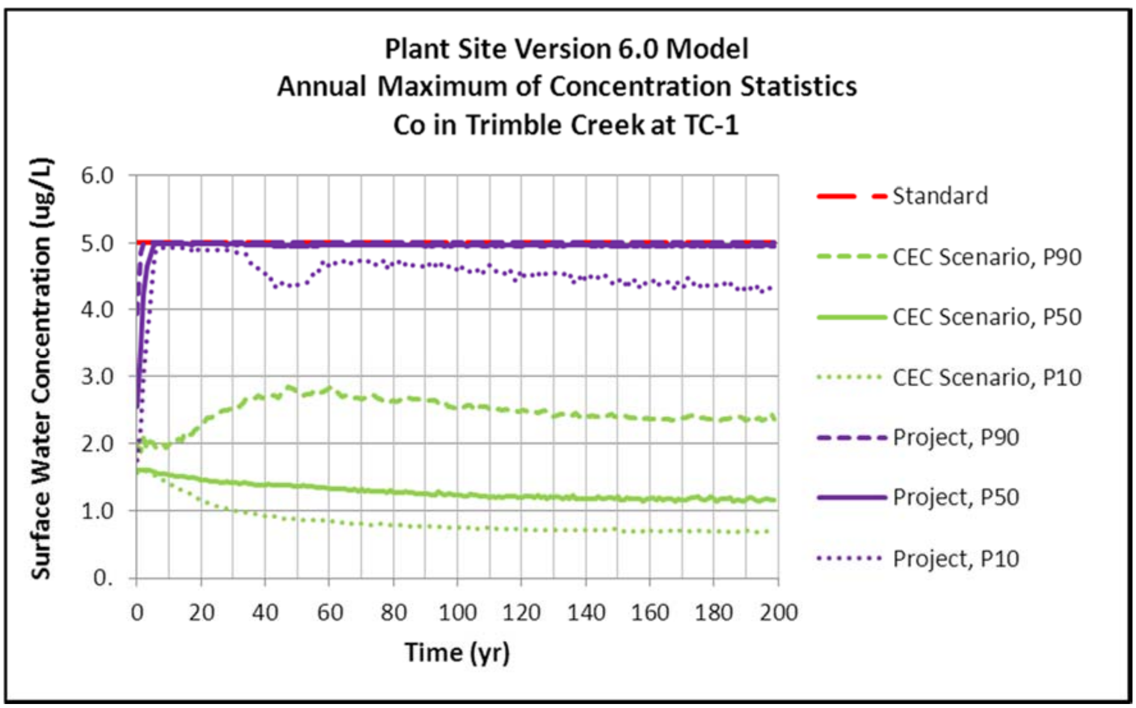


Figure 6-97 Cobalt Annual Maximum Concentrations in Trimble Creek at TC-1

For the constituents with hardness-based standards, plots of the probability of an exceedance need to be assessed in order to determine whether concentrations are estimated to be above the standard at the modeled hardness. Figure 6-98 shows the probability of a lead exceedance through time. The maximum probability of a lead exceedance is greater than 10%. Lead is discussed further in Section 6.7.5.2. None of the other metals with a hardness based standard are estimated to have a greater than 10% probability of an exceedance (all are less than 3% probability) as shown in Attachment J.

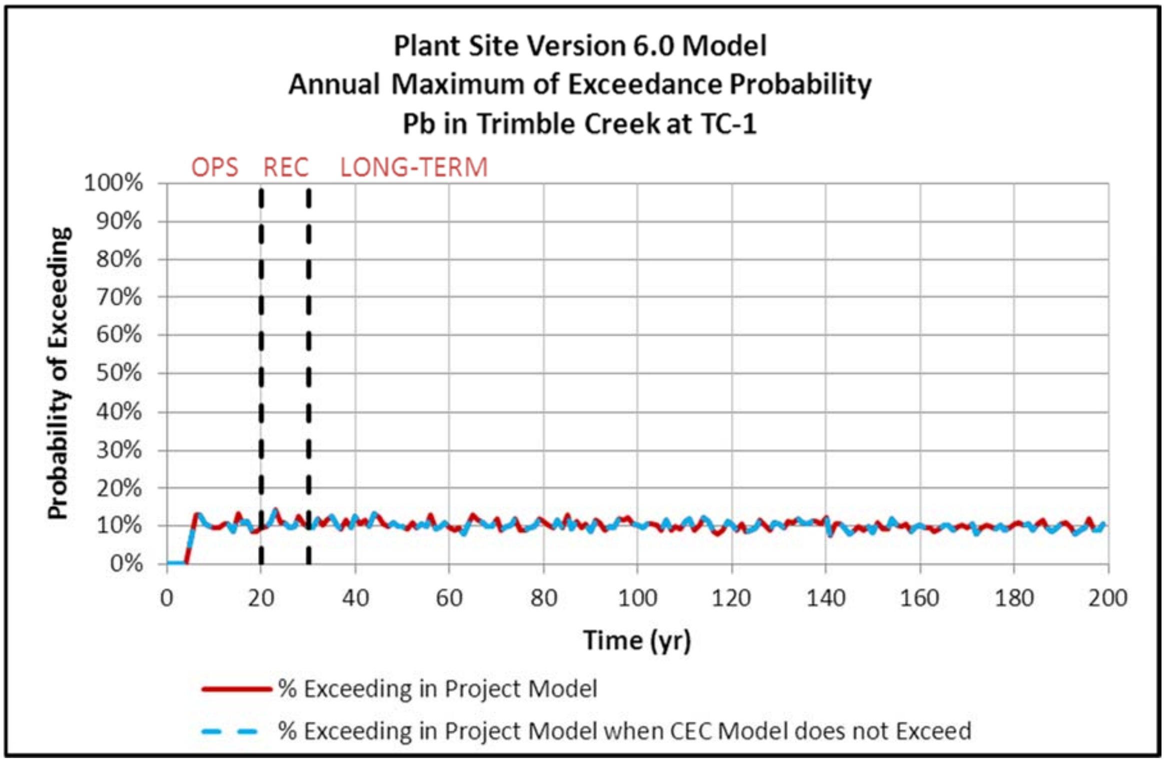


Figure 6-98 Probability of a Lead Exceedance at TC-1 through Time

6.7.3.3 Unnamed Creek (PM-11)

Unnamed Creek shows similar responses in water quality to Trimble Creek (Section 6.7.3.2). Large Figure 26 shows a summary of estimated water quality at PM-11.

A summary of estimated concentrations at PM-11 during operations, reclamation and long-term closure is provided in Large Table 24. In Unnamed Creek, the only constituents where the 90th percentile exceeded the standard are boron in the Continuation of Existing Conditions Scenario Model (Figure 6-99), hardness in the Continuation of Existing Conditions Scenario Model (Figure 6-100), and aluminum (in all years of the Continuation of Existing Conditions Scenario and Project Models). Aluminum is discussed further in Section 6.7.5.1. Similar to Trimble Creek (Section 6.7.3.2), in Unnamed Creek cobalt shows the 90th percentile concentration at or very near the surface water quality standard for a significant portion of the 200-year modeling period (Figure 6-101).

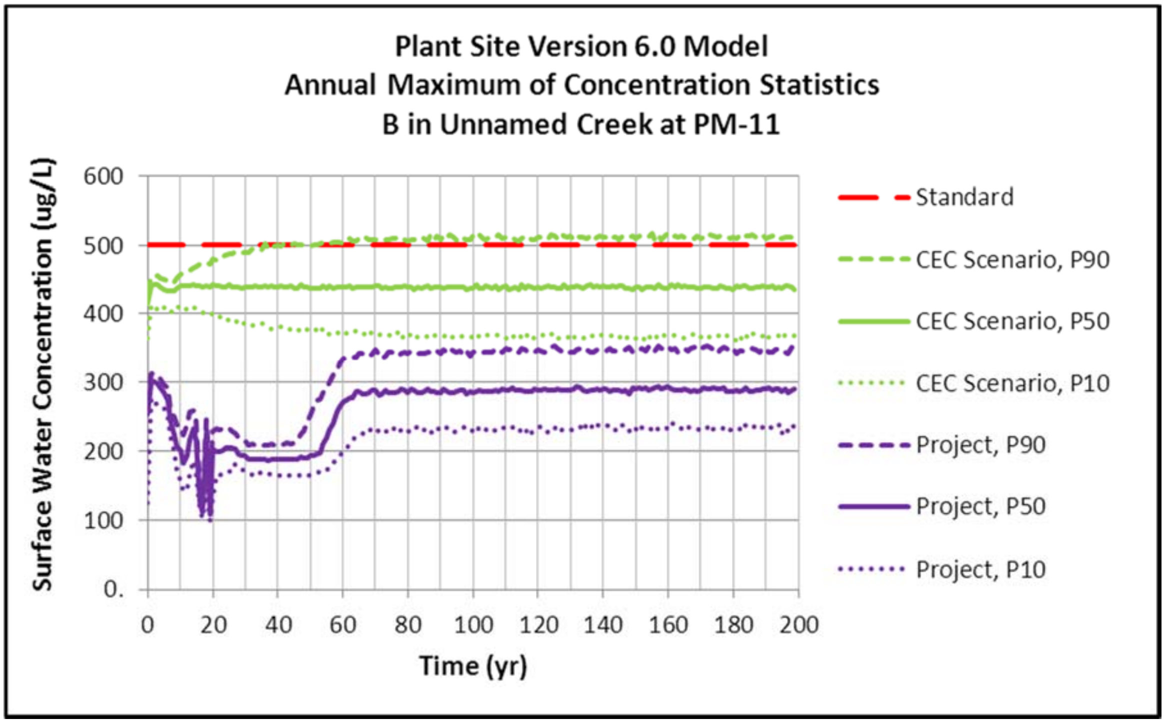


Figure 6-99 Boron Annual Maximum Concentrations in Unnamed Creek at PM-11

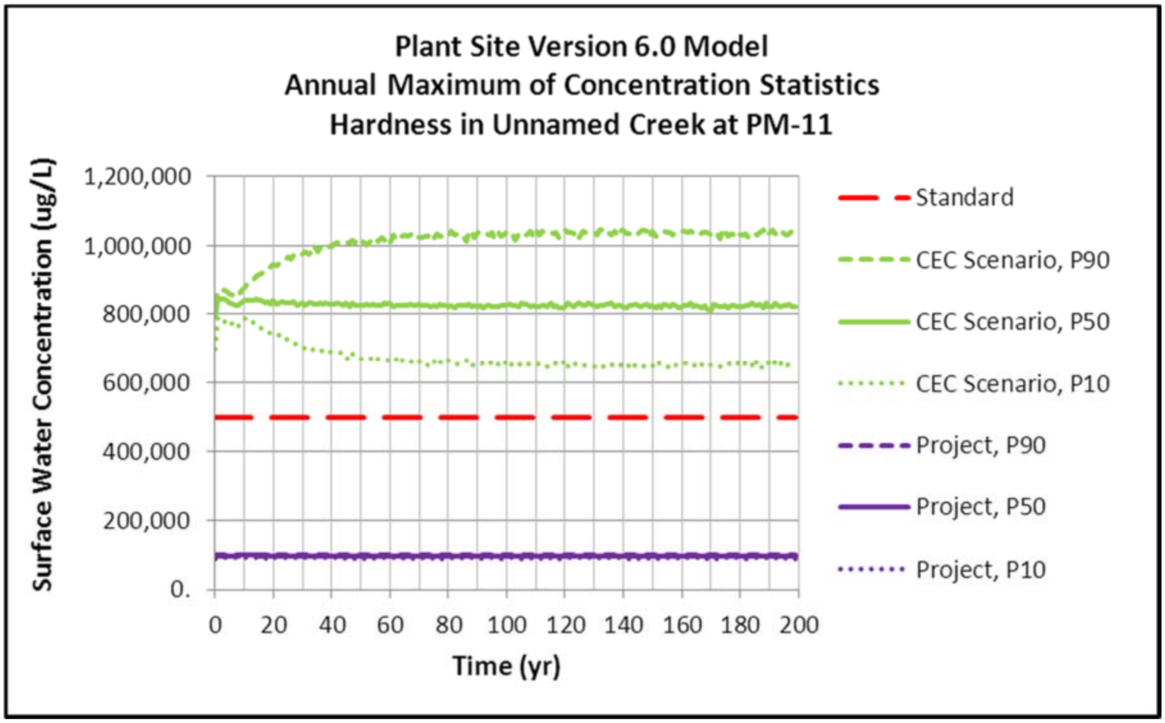


Figure 6-100 Hardness Annual Maximum Concentrations in Unnamed Creek at PM-11

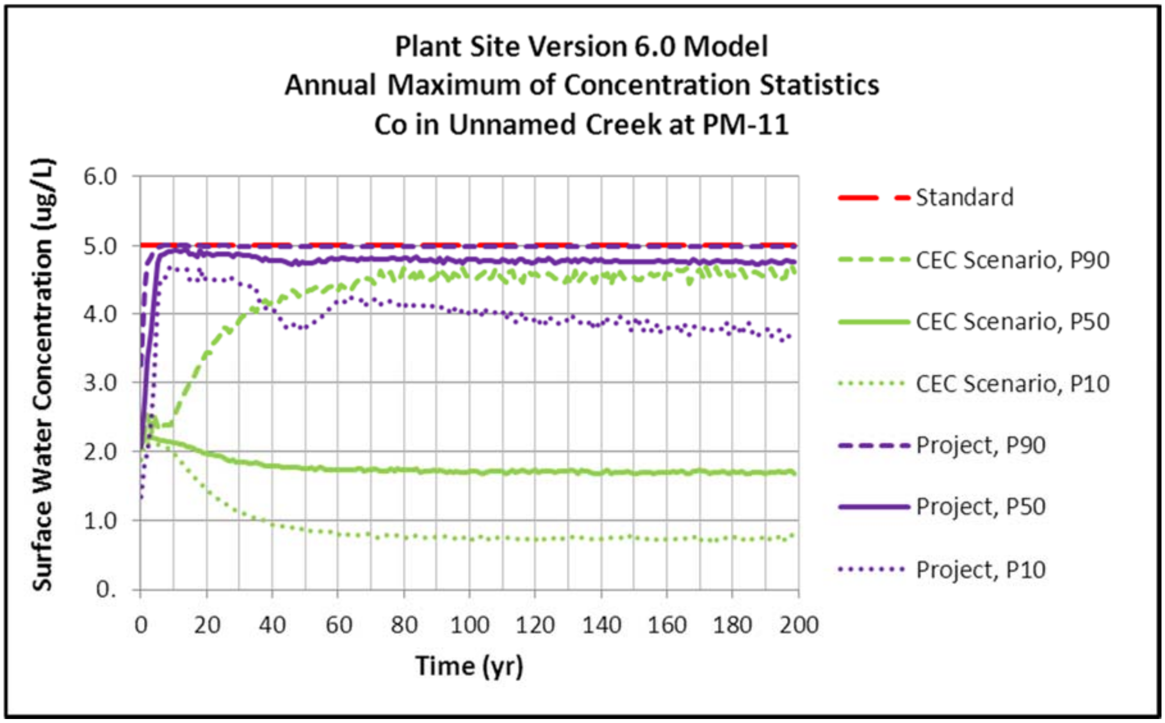


Figure 6-101 Cobalt Annual Maximum Concentrations in Unnamed Creek at PM-11

For the constituents with hardness-based standards, plots of the probability of an exceedance need to be assessed in order to determine whether concentrations are estimated to be above the standard at the modeled hardness. Figure 6-102 shows the probability of a lead exceedance through time. The maximum probability of a lead exceedance is greater than 10%. Lead is discussed further in Section 6.7.5.2. None of the other metals with a hardness-based standard are estimated to have a greater than 10% probability of an exceedance (all are less than 3% probability) as shown in Attachment J.

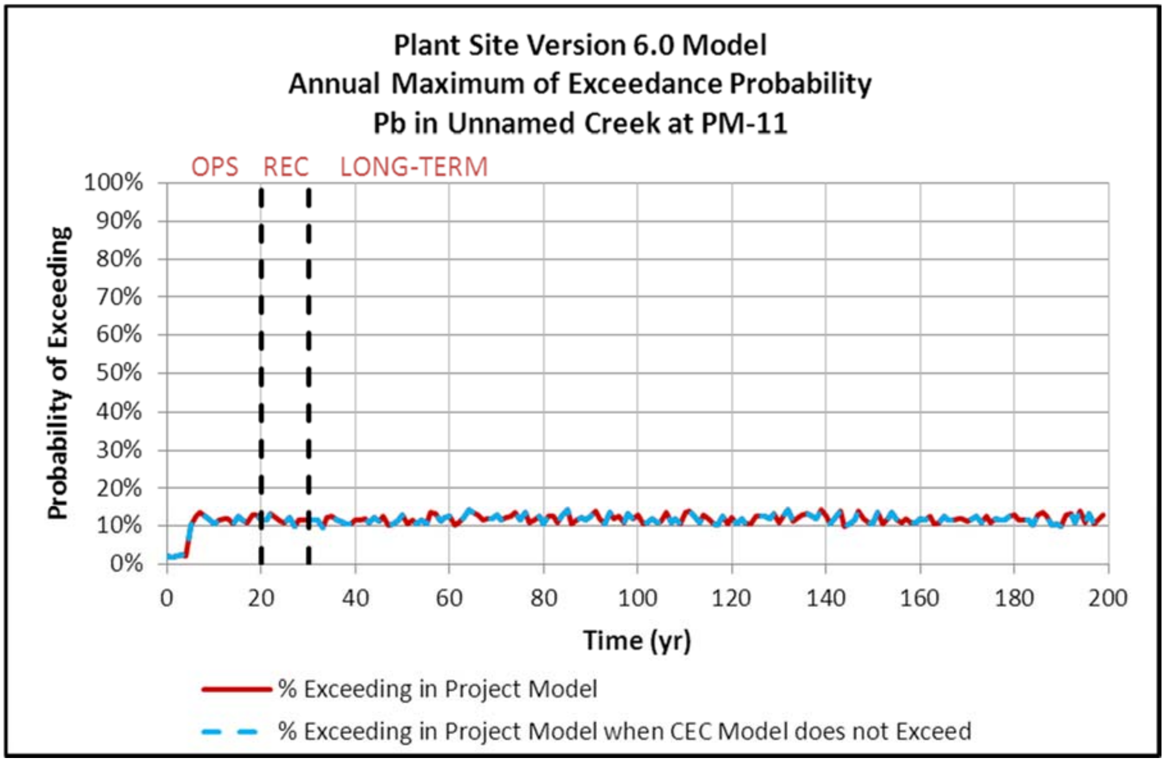


Figure 6-102 Probability of a Lead Exceedance at PM-11 through Time

6.7.4 Embarrass River Downstream of Project Area

There are three evaluation locations on the Embarrass River that are effected by the Project: PM-12.3, PM-12.4 and PM-13. PM-13 is the most downstream evaluation location on the Embarrass River, and is downstream of all modeled impacts from the Project. As such, it is the only location discussed in this section. However, Large Table 25, Large Table 26, and Large Table 27 provide a summary of estimated concentrations for all three locations. Large Figure 27 shows a summary of estimated water quality for this location. There are no estimated exceedances of the surface water standard at the 90th percentile for all constituents except for aluminum. Figure 6-103 shows the surface water concentration of aluminum at PM-13, which is discussed further in Section 6.7.5.1.

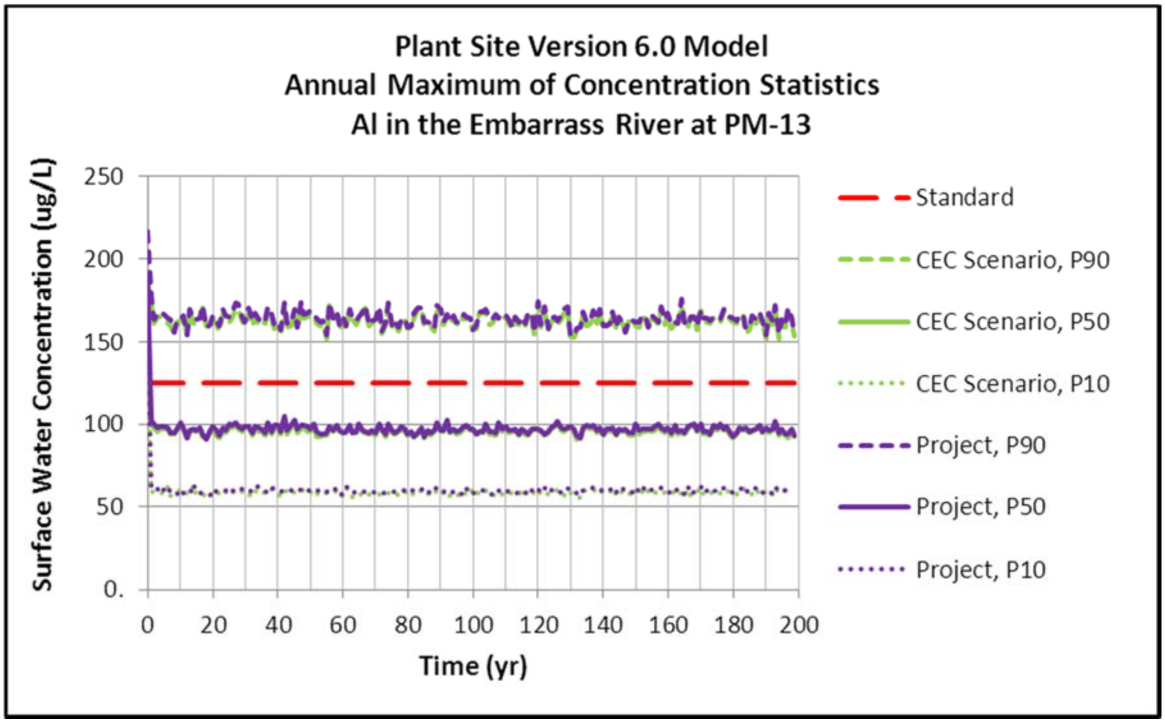


Figure 6-103 Aluminum Annual Maximum Concentrations in the Embarrass River at PM-13

Figure 6-104 through Figure 6-107 show time series plots of the annual maximum of concentration statistics for sulfate, cobalt, copper, and lead at PM-13. As shown in these figures, the 90th percentile concentration does not exceed applicable standards at PM-13 at any time. At PM-13, the hardness-based standard is a constant value because the hardness used to estimate the applicable standard is 117 mg/L, the median of observed hardness at PM-13 (Section 2.1.1).

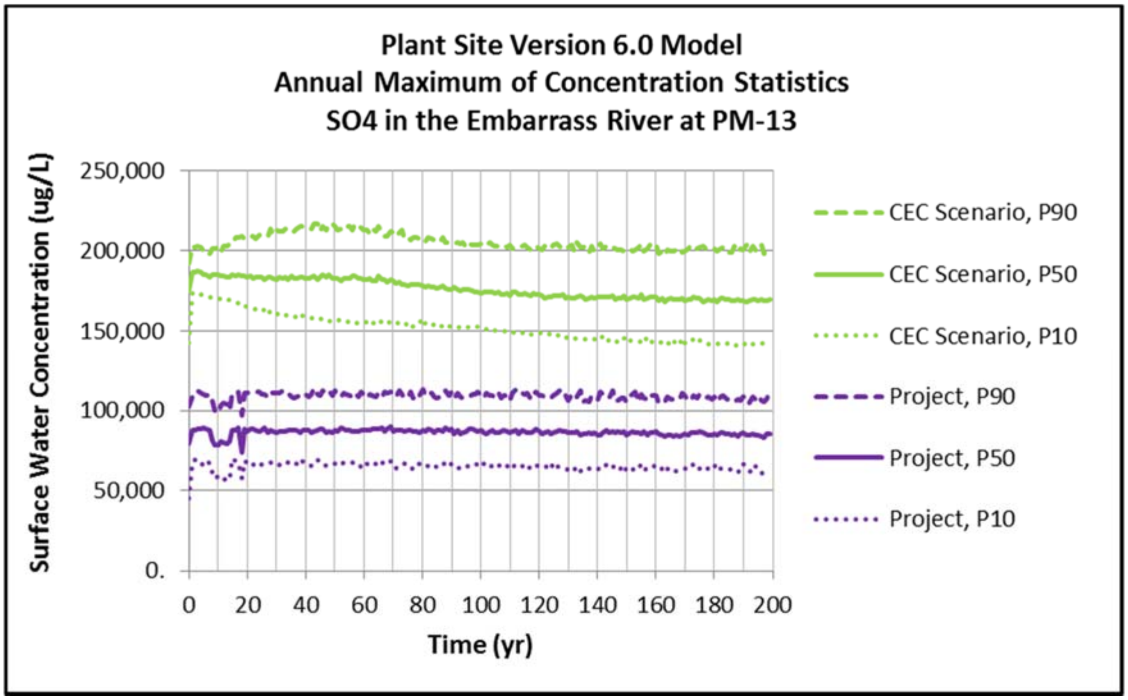


Figure 6-104 Sulfate Annual Maximum Concentrations in the Embarrass River at PM-13

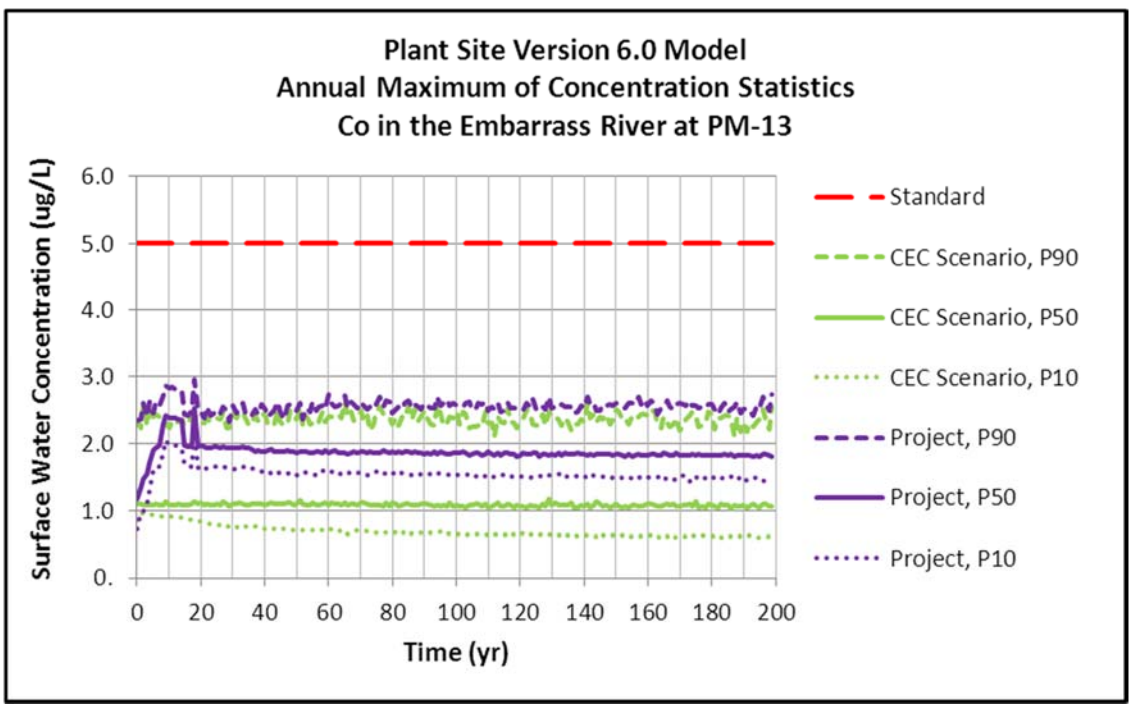


Figure 6-105 Cobalt Annual Maximum Concentrations in the Embarrass River at PM-13

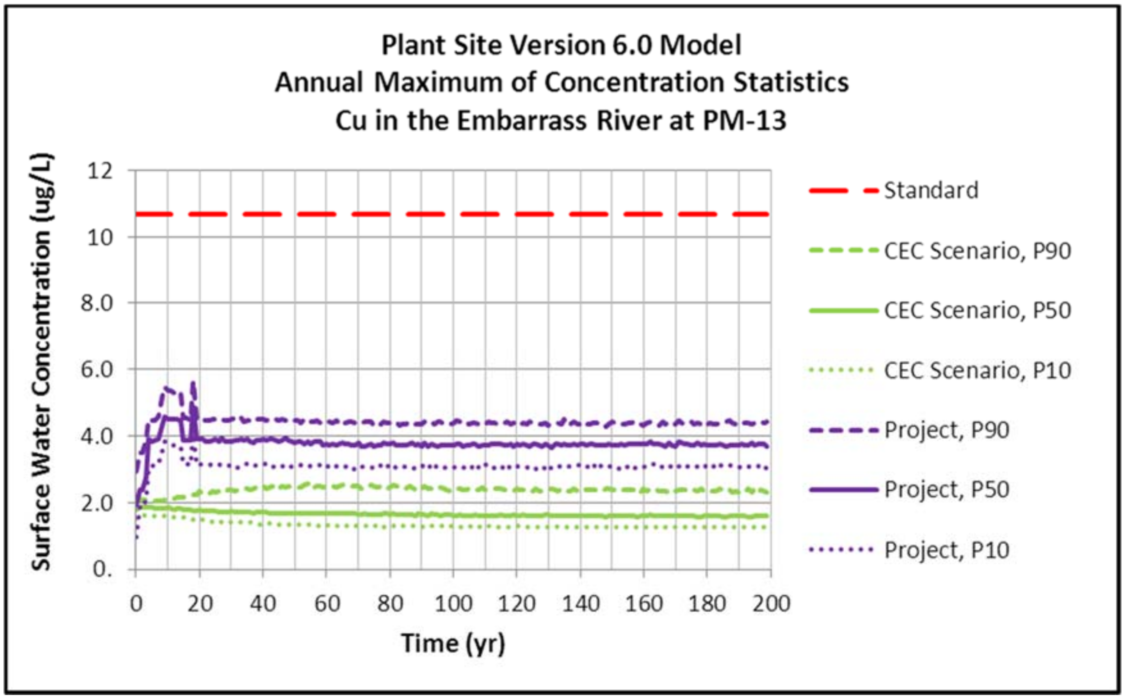


Figure 6-106 Copper Annual Maximum Concentrations in the Embarrass River at PM-13

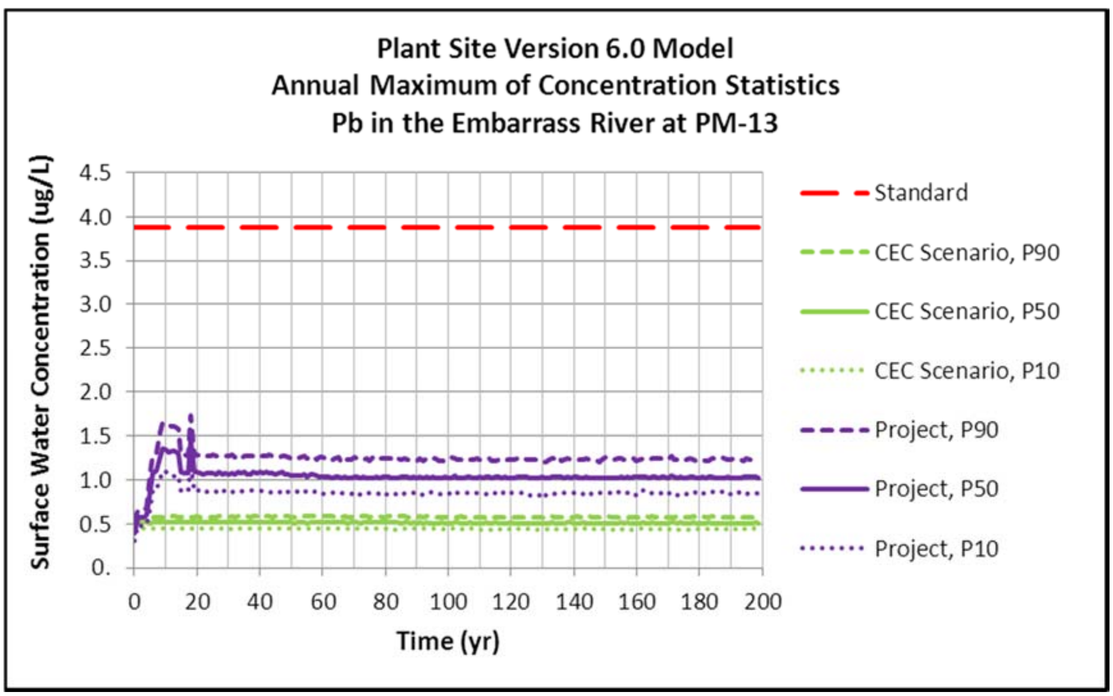


Figure 6-107 Lead Annual Maximum Concentrations in the Embarrass River at PM-13

6.7.5 Discussion of Specific Constituents

Some constituents warrant further discussion. Aluminum is discussed in detail because it is estimated to exceed the standard at all evaluation locations. Lead is discussed because it is estimated have a greater than 10% probability of exceeding the standard at several locations.

Sulfate is discussed, to demonstrate the ability of the Project to meet the MPCA's guidance associated with the wild rice sulfate standard. Finally TDS is discussed because it was not identified as a constituent for inclusion in the GoldSim model, but there is a groundwater standard for TDS that will need to be met by the Project.

6.7.5.1 Aluminum

6.7.5.1.1 Evaluation

Project Model results indicate that the concentration of aluminum at the evaluation locations that are impacted by the Project (locations excluding PM-12 and PM-12.2) will increase slightly relative to the Continuation of Existing Conditions Scenario Model, despite the fact that nearly all of the seepage from the Tailings Basin will be captured. The following explains why this phenomenon occurs:

- The concentrations of aluminum in background surface water in the Plant Site vicinity are estimated to exceed the surface water standard. For example, at evaluation location PM-12, which represents upgradient background conditions and is not impacted by the Project, the annual maximum of aluminum concentration statistics under the Continuation of Existing Conditions Scenario condition is estimated to range from approximately 70 µg/L to 170 µg/L, as shown on Figure 6-86. The concentrations of aluminum at PM-12 are a function of groundwater recharge (i.e., baseflow to the Embarrass River) and surface runoff. Natural groundwater recharge has estimated concentrations of aluminum that are generally below the surface water standard, as shown on Figure 6-108, whereas natural surface runoff is estimated to have a greater than 30% probability of exceeding the surface water standard, as shown on Figure 6-109.

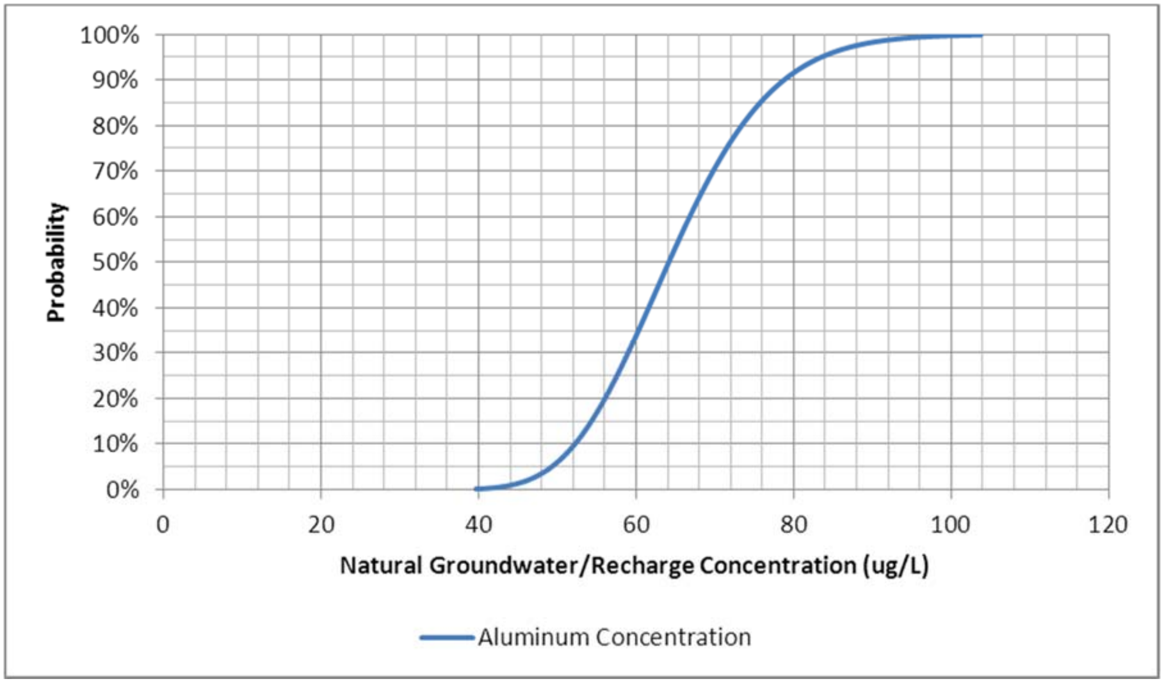


Figure 6-108 Aluminum Concentration in Natural Background Groundwater and Recharge

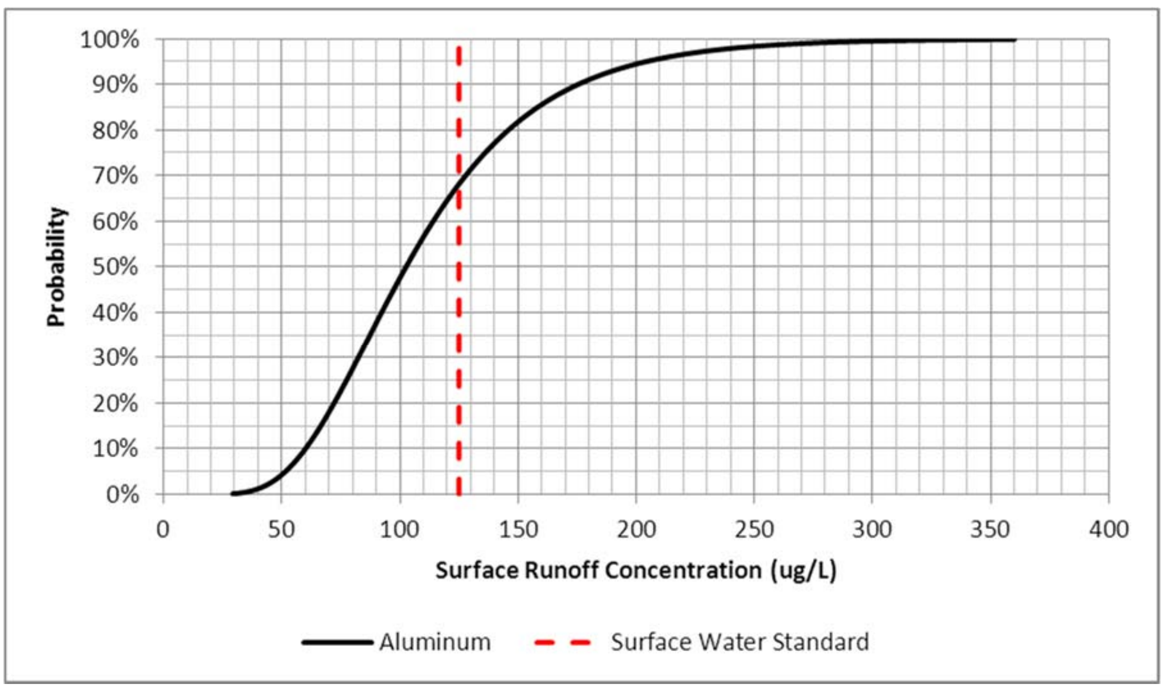


Figure 6-109 Aluminum Concentration in Natural Watershed Runoff

- Seepage from the Tailings Basin is estimated to have much lower concentrations of aluminum (by approximately an order of magnitude) than the ambient groundwater in the vicinity. Figure 6-37 and Figure 6-43 illustrate that seepage from the FTB is estimated to have aluminum concentrations ranging from approximately 5 to 35 µg/L, compared to aluminum concentrations of approximately 50 µg/L to 90 µg/L in ambient groundwater.

- Model results from evaluation locations MLC-3/MLC-2 and TC-1/PM-19 (shown on Figure 6-110, Figure 6-111, Figure 6-112, and Figure 6-113) illustrate how the concentration of aluminum increases with distance from the Tailings Basin in the Continuation of Existing Conditions Scenario model. In the Continuation of Existing Conditions Scenario model, MLC-2 has higher concentrations of aluminum than MLC-3 which is further upstream. Similarly, PM-19, which is downstream of TC-1, has higher concentrations of aluminum than TC-1 in the Continuation of Existing Conditions Scenario model. The estimated concentration of aluminum in surface water generally increases with distance from the Tailings Basin because at upgradient evaluation locations that are closer to the Tailings Basin (MLC-3 and TC-1), a greater proportion of the contributing waters are from the Tailings Basin seepage. Conversely at downgradient evaluation locations that are farther from the Tailings Basin (MLC-2 and PM-19), the diluting effect of seepage from the Tailings Basin is lessened as it mixes with natural background water that has a higher aluminum concentration.

- Under existing conditions (which correspond to the Continuation of Existing Conditions Scenario Model), seepage from the Tailings Basin flows uninterrupted into the Embarrass River and its tributaries. The FTB Containment System which will be installed as part of the Project captures nearly all of the seepage from the Tailings Basin and routes it either to the FTB Pond or the WWTP. Therefore the seepage flow to the tributaries, which has relatively low concentrations of aluminum, is reduced and will no longer dilute the background water quality in the Embarrass River watershed, which has relatively high concentrations of aluminum. Consequently the concentration of aluminum in the Embarrass River and its tributaries increases slightly under the Project. Figure 6-25 and Figure 6-26 are conceptual illustrations of seepage flow from the Tailings Basin under the Continuation of Existing Conditions Scenario Model and the Project Model, respectively.

- Flow augmentation is required to prevent significant hydrologic impacts to the tributaries. Under Project conditions, flow in the tributaries is augmented with treated water from the WWTP, where the modeled aluminum concentration ranges from about 2 µg/L to about 20 µg/L.

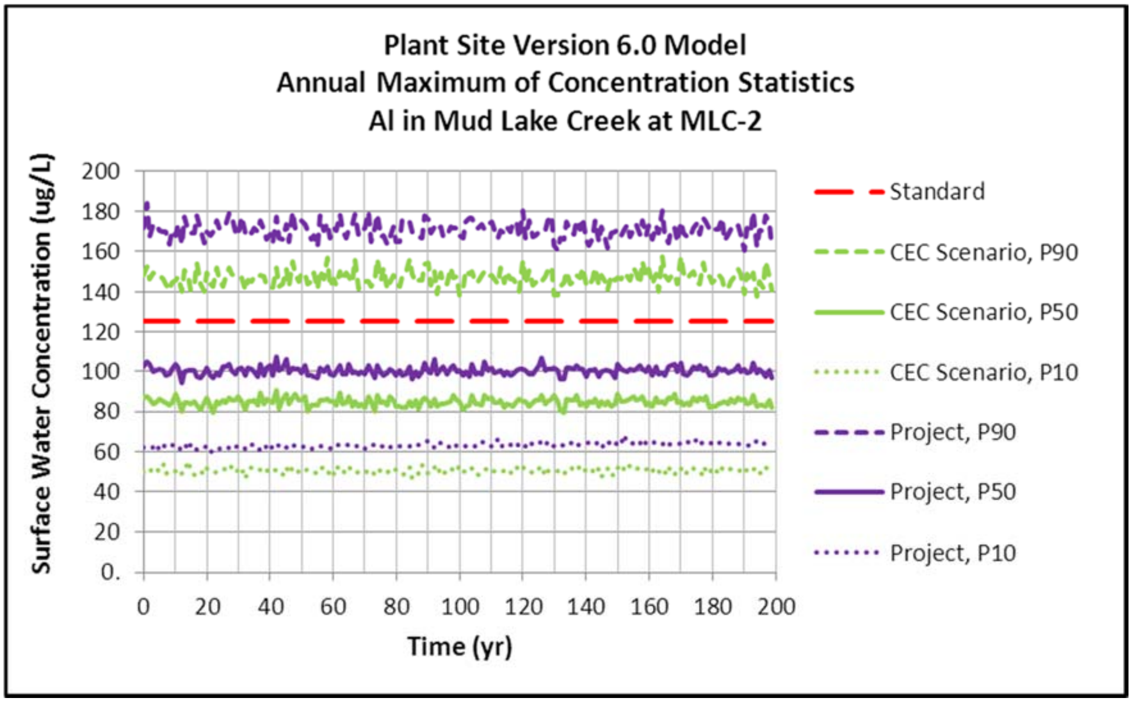


Figure 6-110 Aluminum Annual Maximum Concentrations in Mud Lake Creek at MLC-2

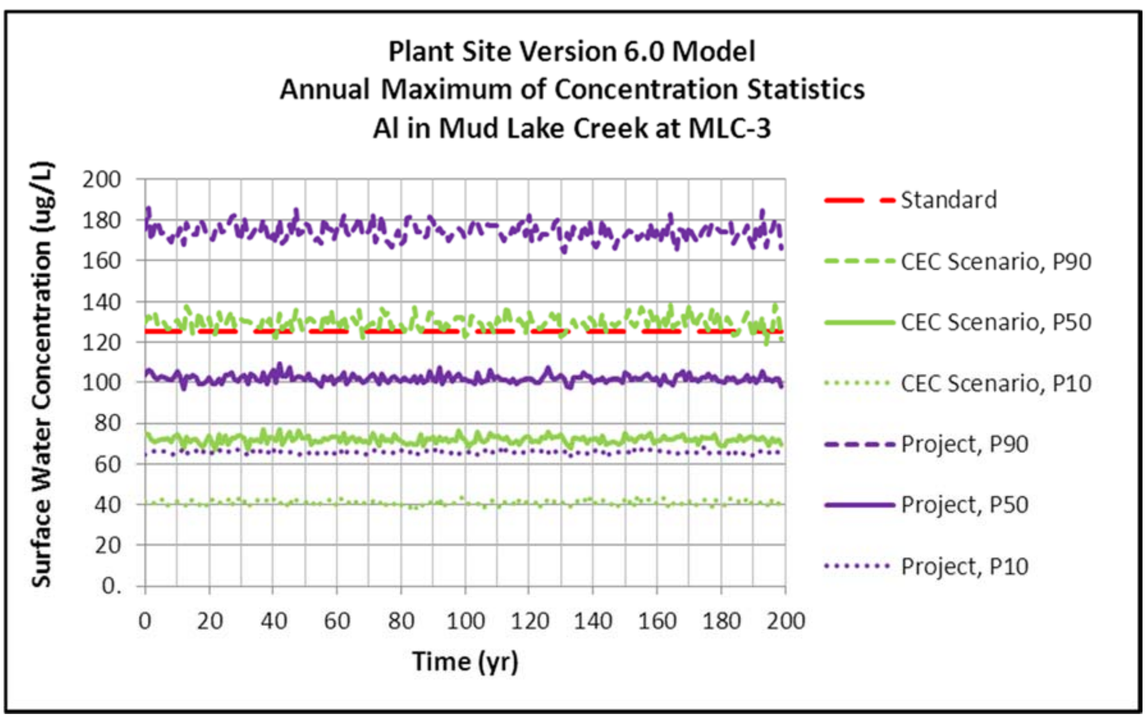


Figure 6-111 Aluminum Annual Maximum Concentrations in Mud Lake Creek at MLC-3

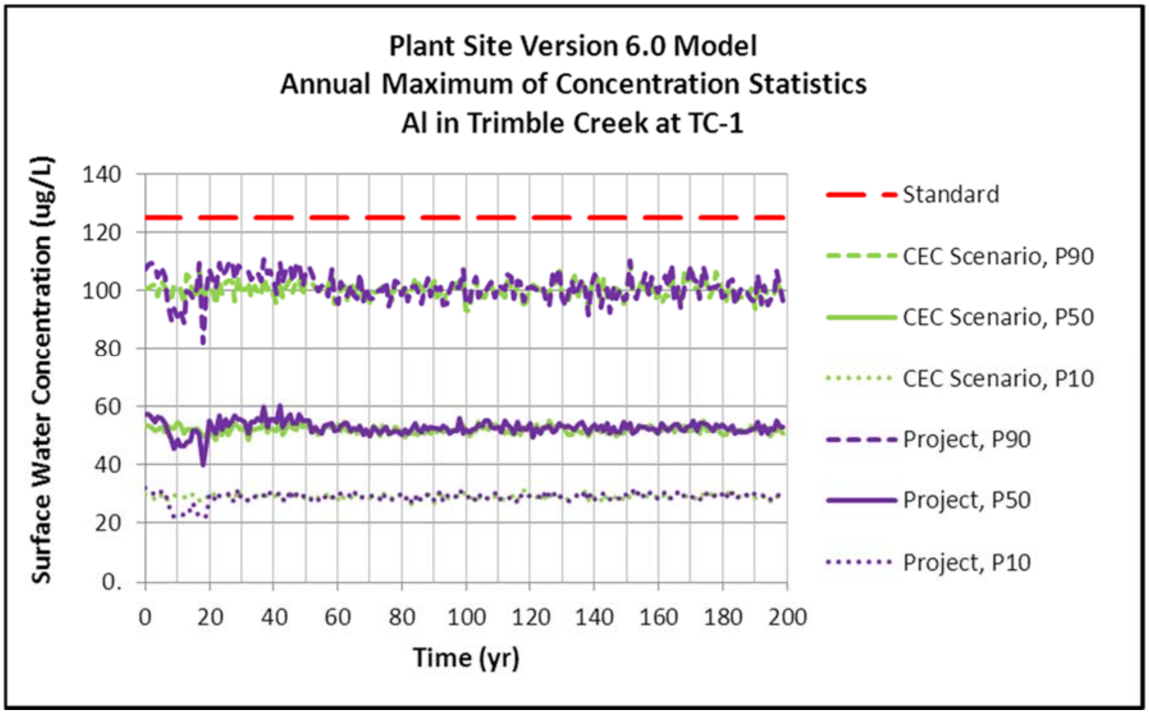


Figure 6-112 Aluminum Annual Maximum Concentrations in Trimble Creek at TC-1

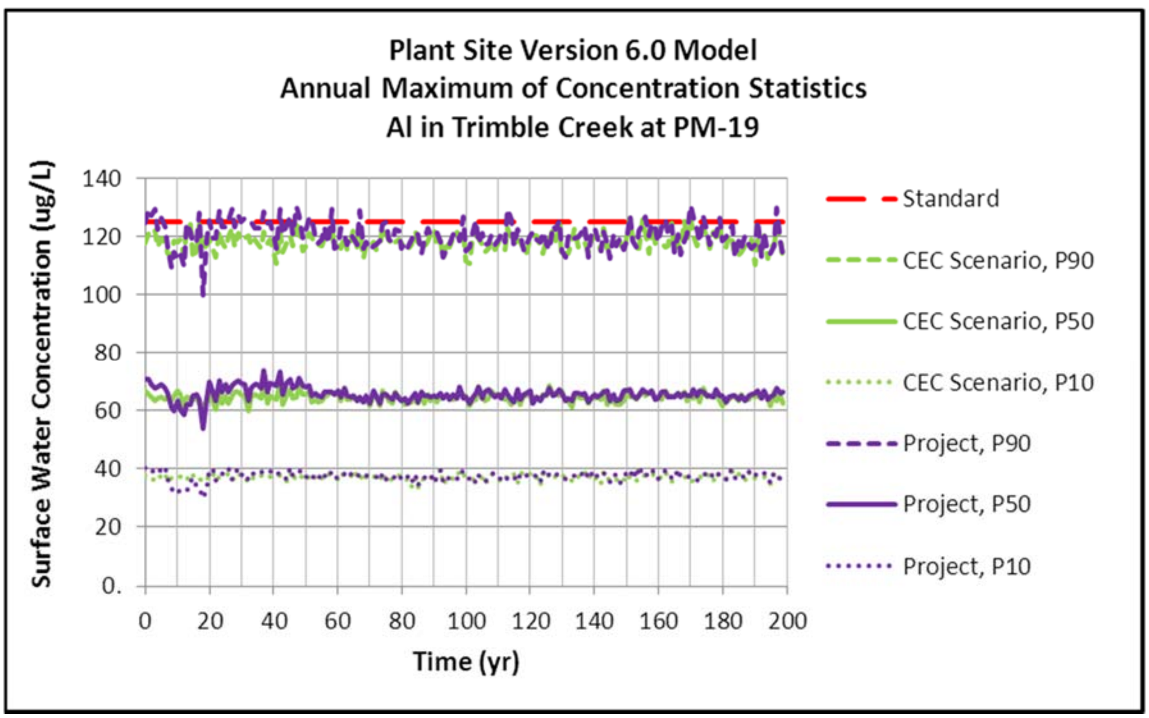


Figure 6-113 Aluminum Annual Maximum Concentrations in Trimble Creek at PM-19

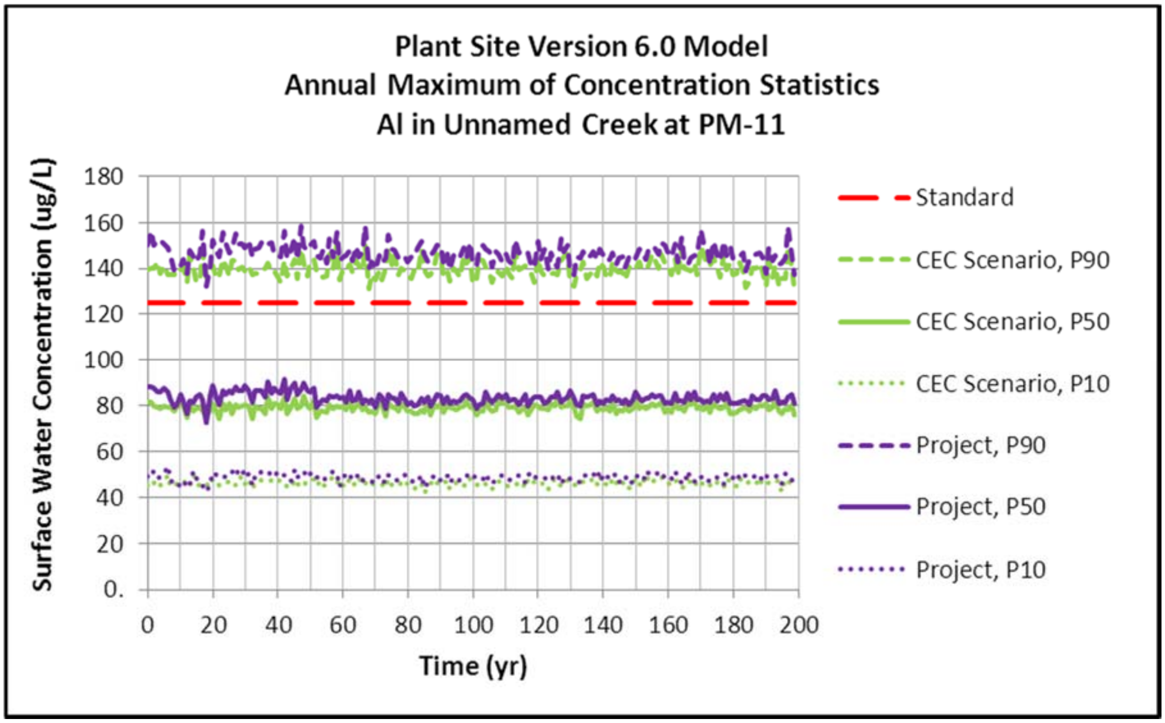


Figure 6-114 Aluminum Annual Maximum Concentrations in Unnamed Creek at PM-11

Table 6-3 compares the number of exceedances of the aluminum standard that occur under two different scenarios:

- Project - Project conditions.
- Containment system only - Project conditions except that stream augmentation is not considered and the WWTP is discharged to a hypothetical offsite location. This scenario examines what would happen if all seepage was cut off from the tributaries and the flow and water quality in the tributaries was controlled by natural runoff and unimpacted groundwater. In essence, this scenario is the modeling equivalent of eliminating the legacy impacts.

Table 6-3 Maximum Number of Aluminum Exceedances in any 3-Year Time Period during Long-Term Closure at the 90th Percentile

Location	Constituent	Project (model v6.0)	Containment System Only
MLC-3	Aluminum	16	16
TC-1	Aluminum	3	25
PM-11	Aluminum	8	25

The maximum number of exceedances in any 3-year time period (36 monthly time steps) was used to generate the information in Table 6-3. This analysis considered the 90% probability during long-term closure (> 30 years) conditions. That is, 90% (450) of modeled realizations had as many or less than the number of exceedances shown in Table 6-3.

The estimated maximum number of exceedances for Mud Lake Creek is the same for both scenarios. For this tributary, there is no WWTP discharge. For the other two tributaries, the number of exceedances of the aluminum standard is estimated to be less than if no Project related water was discharged to the tributaries.

6.7.5.1.2 Conclusion

The estimated increase in aluminum concentrations is a result of the Project intercepting the low-aluminum-concentration Tailings Basin seepage which would otherwise mix with and dilute the natural background water which has relatively high concentrations of aluminum. Therefore, although aluminum concentrations tend to be higher in the Project Model relative to the Continuation of Existing Conditions Scenario Model, the primary impact of the Project is that its features cause the surface water concentrations to move closer to background aluminum concentrations, which are naturally higher than the existing (Tailings Basin-affected) conditions in surface water.

6.7.5.2 Lead

6.7.5.2.1 Evaluation

The Project model estimates that there will be a greater than 10% probability of an exceedance of the lead standard in the Embarrass River tributaries (Section 6.7.2 and Section 6.7.3). Sources of water to the surface water evaluation locations are mainly natural background water (groundwater and watershed runoff), with a few anthropogenic sources (Babbitt WWTP, Area 5NW), and the Project. Figure 6-115 shows the background watershed runoff concentrations used as probabilistic model inputs. The concentrations of lead and hardness for runoff were determined through calibration to observed surface water concentrations, which has been approved by the Co-lead Agencies.

Background watershed runoff is high in lead relative to the range of the lead standard in that watershed runoff. The standard is determined by using the range in calcium and magnesium in background watershed runoff to calculate the range in hardness, which is then used to determine the range in the standard. At any given time, there is approximately a 7% chance that the randomly generated watershed runoff lead concentration will exceed the associated lead standard based on the hardness in the runoff. Note that the Project does not impact these watershed runoff concentrations.

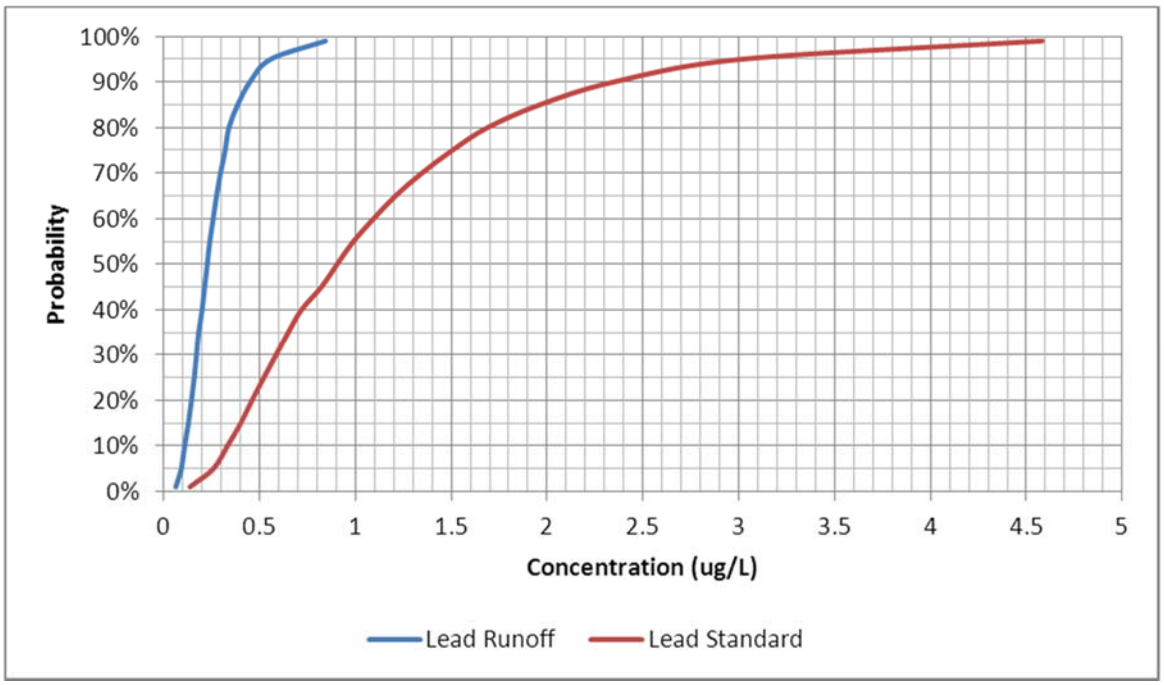


Figure 6-115 Natural Watershed Runoff Quality of Lead and the Hardness-Based Standard in the Natural Watershed Runoff

Background lead groundwater concentrations used as probabilistic model inputs (based on monitoring data) are shown in Figure 6-116. Figure 6-117 shows the range in background groundwater hardness. The concentration of lead in groundwater is approximately 0.25 µg/L and is well below what would be the surface water quality standard (3.2 µg/L to 4.2 µg/L) given the hardness in groundwater.

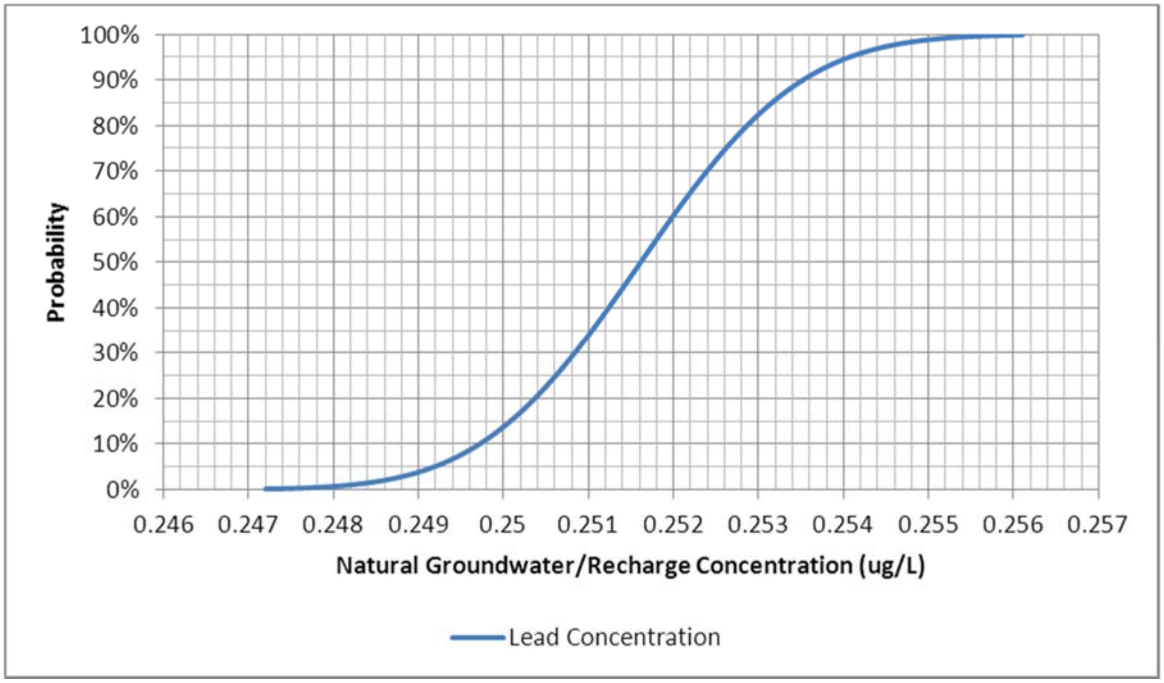


Figure 6-116 Lead Concentrations in Natural Background Groundwater and Recharge

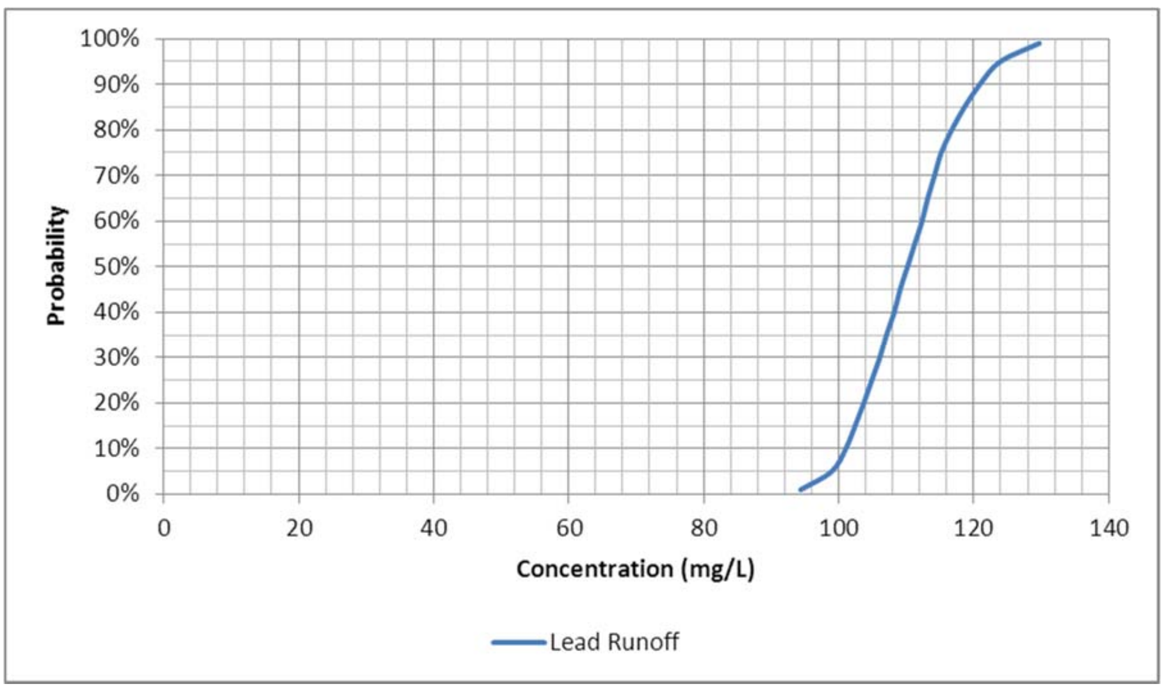


Figure 6-117 Hardness Concentrations in Natural Background Groundwater and Recharge

The following discussion examines the surface water concentrations of lead at selected evaluation locations (not just those where exceedances occur) and uses those findings to explain the observed patterns in lead exceedances. The discussion is ordered from upgradient evaluation locations to downgradient evaluation locations.

PM-12: Lead in Natural Background Waters

PM-12 is a location on the Embarrass River which is upstream of all Project impacts. The only sources of water to PM-12 are baseflow from groundwater, watershed runoff, and discharge from the Babbitt WWTP which, in the model, is assumed to have the same quality as background watershed runoff. Therefore, only natural background water quality influences the overall mixed water quality at PM-12 in the model.

The key observation at PM-12 is that exceedances of the lead standard are modeled to occur naturally, especially in the spring when surface water quality is dominated by natural watershed runoff, due to relatively high background lead concentrations in watershed runoff. However, exceedances here are infrequent because of the benefit of baseflow contributions (Figure 6-87). As described earlier, groundwater quality is well below what would be the hardness based surface water standard in the groundwater discharge. Baseflow contributions tend to raise the hardness-based standard significantly and have minimal impact on the actual lead concentrations in surface water, resulting in fewer exceedances than for runoff alone.

TC-1, PM-11 and MLC-3: Effect of WWTP Effluent Discharge / Stream Augmentation

Trimble Creek (TC-1) and Unnamed Creek (PM-11) will receive WWTP effluent discharge as stream augmentation water. Mud Lake Creek will not receive WWTP effluent

As previously discussed, the randomly generated runoff quality of lead alone can cause an exceedance of the hardness-based standard (Figure 6-115). This is particularly important during high flows when surface runoff dominates the flow at each surface water evaluation location. In addition to these naturally occurring modeled exceedances, there are other times where none of the individual sources of water to the surface water evaluation location exceeds the standard, but the mixed combination of the flows does result in an exceedance. This occurs because the hardness-based standard is exponential, which causes the standard to drop faster than the mixed quality. The following example demonstrates this concept.

Consider PM-11 which receives water from the WWTP effluent and surface runoff during long-term closure (Figure 6-118). For this example, the flow from the WWTP is set at 2.5 cfs, the hardness at 100 mg/L, and the lead concentration at 3 µg/L. The runoff hardness is set at 30 mg/L and the runoff lead concentration at 0.68 µg/L. At a hardness of 100 mg/L (the hardness in the WWTP effluent), the lead standard is 3.2 µg/L so the WWTP effluent itself is not exceeding the standard. Also, at a hardness of 30 mg/L (the hardness in the runoff), the lead standard is 0.69 µg/L, so the runoff quality alone is not exceeding the standard. However, as the flow from surface runoff increases and combines with the WWTP effluent, there is a point when the mixed water exceeds standards.

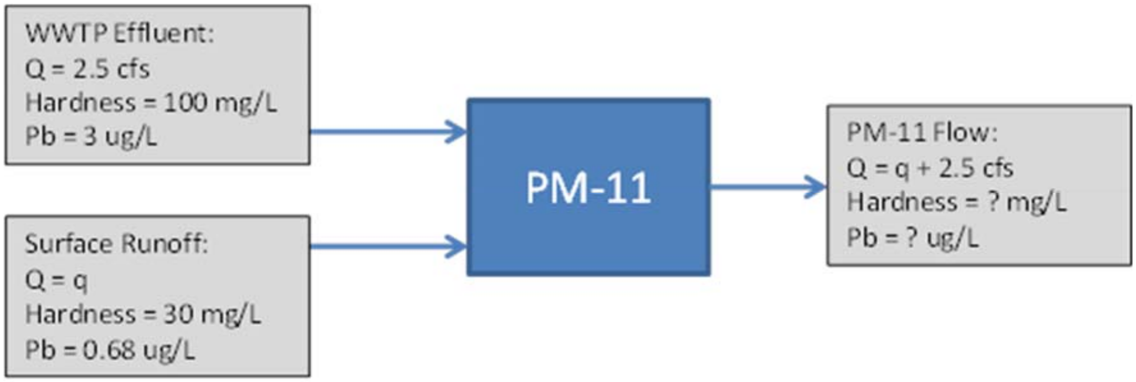


Figure 6-118 Example Flow and Quality Calculation at PM-11

Figure 6-119 shows that, even if the WWTP and surface runoff do not exceed standards individually, the mixed water will exceed standards for any flow from surface runoff that is greater than 2.5 cfs. For PM-11 with a watershed of 2.87 square miles, this flow can be generated with significant frequency in any month from (and including) March through November.

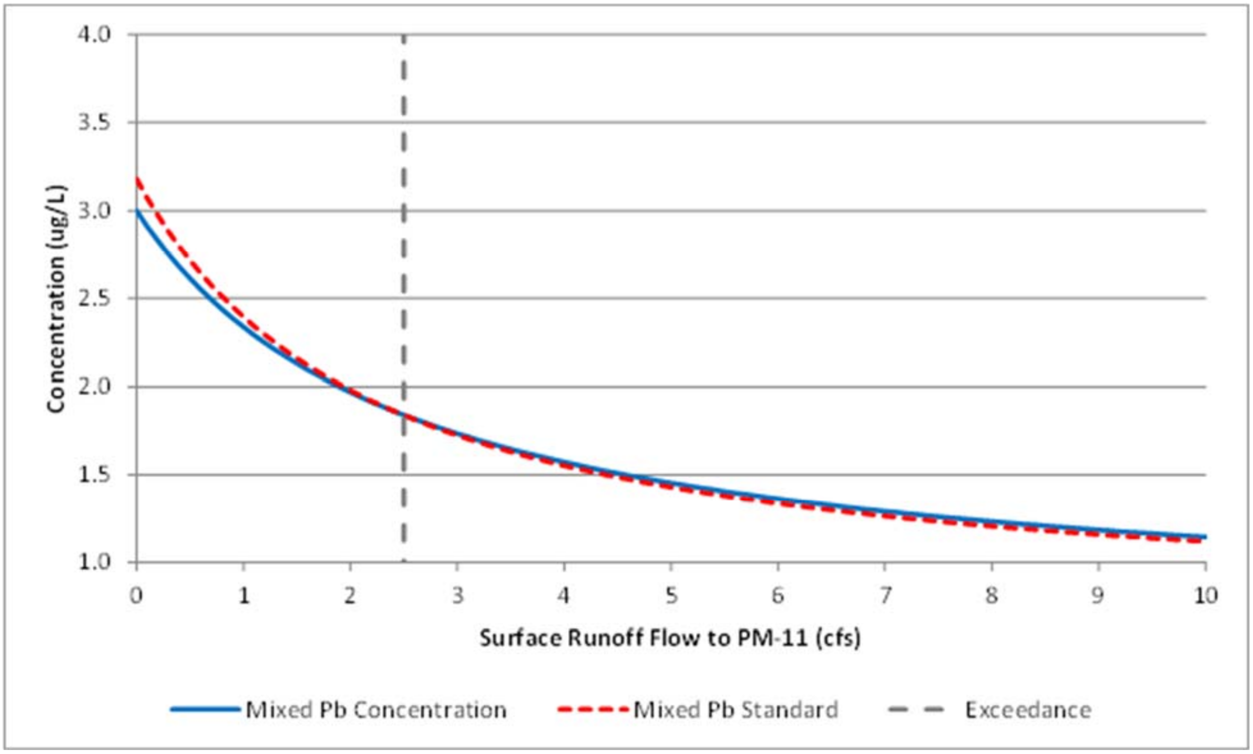


Figure 6-119 Results of Example Calculation Showing Lead Concentrations and the Lead Standard under Various Flows for PM-11

The estimated probability of an exceedance in the tributaries is similar to that estimated for PM-12. However, as discussed above, the probability of an exceedance is influenced by the amount of groundwater a stream segment receives. Each evaluation location receives a different ratio of groundwater and runoff, which makes it difficult to assess whether the estimated frequency of exceedances in the tributaries is greater or less than would occur under natural conditions (that is, PM-12 may not be the same as natural conditions in the tributaries).

To assess this, two different scenarios were evaluated:

- Project - Project conditions.
- Containment system only - Project conditions except that stream augmentation is not considered and the WWTP is discharged to a hypothetical offsite location. This scenario examines what would happen if all high-hardness seepage was cut off from the tributaries and the flow and water quality in the tributaries was controlled by natural runoff and unimpacted groundwater. In essence, this scenario is the modeling equivalent of eliminating the legacy impacts.

Table 6-4 compares the number of exceedances of the lead hardness-based standards for these scenarios. This analysis considered the 90% probability from Mine Year 30 into long-term closure. That is, 90% (450) of modeled realizations had as many or less than the number of exceedances shown in Table 6-4.

The estimated maximum number of exceedances for Mud Lake Creek, which receives no WWTP effluent, is the same for both scenarios. For the other two tributaries, the number of exceedances of the lead standard in the Project Model is estimated to be less than or equal to the number of exceedances if no Project related water was discharged to the tributaries (which represents natural conditions).

Table 6-4 Maximum Number of Lead Exceedances in any 3-Year Time Period during Long-Term Closure at the 90th Percentile

Location	Constituent	Project (model v6.0)	Containment System Only
MLC-3	Lead	4	4
TC-1	Lead	6	9
PM-11	Lead	9	9

PM-13:

Exceedances of the lead standard were not modeled to occur at PM-13. This is mainly due to the groundwater contribution from the Embarrass River watershed, the contributions from Area 5NW, and the constant, relatively high hardness (117 mg/L), used for determining the standard at PM-13.

6.7.5.2.2 Conclusion

The Project causes the surface water concentrations of hardness and lead to move closer to background concentrations. Natural surface runoff is characterized by lower hardness and it frequently exceeds the lead standard. The FTB Containment System captures virtually all of the high-hardness seepage from the Tailings Basin, which causes the hardness-based standards in the tributaries to decrease dramatically, and the Project Model shows frequent lead exceedances. Project discharges are not the root cause of the Project Model lead exceedances; Project discharges from the WWTP will meet the applicable lead standard as currently defined by the MPCA. That is, the concentration of lead in the discharge will be below the standard calculated using the hardness of the discharge. In summary, lead exceedences in downstream surface water in the Project Model occur because the Project prevents existing Tailing Basin seepage from discharging to the tributaries.

It should be noted that there is general agreement among the Co-lead Agencies that the model may be over estimating lead concentrations from the Flotation Tailings. Despite this over-estimation, the estimated number of exceedances in the tributaries is less than would be expected under natural conditions (i.e., without any Tailings Basin seepage).

6.7.5.3 Sulfate

The MPCA has implemented supplemental water quality criteria for sulfate at the Plant Site. These supplemental criteria are presented in Section 2.2. As described below, the Project will achieve the supplemental water quality criteria for sulfate at the Plant Site.

6.7.5.3.1 Evaluation

The MPCA memorandum does not define how "existing conditions" should be determined for the purpose of this evaluation. The GoldSim model overestimates sulfate concentrations downgradient of the Tailings Basin, particularly within the tributaries north of the basin. Data collected at several locations along Spring Mine Creek and the Embarrass River in 2010 and 2011 demonstrates significant sulfate reduction in these waters (Section 4.4.3). This sulfate reduction is not captured in the GoldSim model, resulting in the overestimation of existing and future sulfate concentrations. This overestimation is discussed in the "Summary of Calibration and Corroboration Memo" (Section 2.2.2 of Reference (58)).

Because of the overestimation of existing and future conditions with the model, it is necessary to use the modeled estimates of existing conditions, as defined using the Continuation of Existing Conditions Scenario model, for demonstrating compliance with the supplemental water quality criteria for sulfate.

- No increase in sulfate loading from existing conditions would occur at PM-11 ('Unnamed' Creek), PM-19 (Trimble Creek) and MLC-2 ('Mud Lake Creek').
  - The sulfate loading at evaluation location PM-11 is decreased by approximately an order of magnitude under the Project conditions compared to existing conditions, as shown on Figure 6-120.
  - The sulfate loading at evaluation location PM-19 is decreased by over an order of magnitude under the Project conditions compared to existing conditions, as shown on Figure 6-121.
  - The sulfate loading at evaluation location MLC-2 is decreased by over 50% under the Project conditions compared to existing conditions, as shown on Figure 6-122.

- The concentration of sulfate in the Embarrass River at PM-13 would decrease from existing conditions.
    - Sulfate concentration at evaluation location PM-13 under the Project conditions is decreased compared to the Continuation of Existing Conditions Scenario (existing conditions), as shown on Figure 6-104 and Figure 6-123. The decrease occurs for the 10th percentile, 50th percentile, and 90th percentile concentrations for both the annual maximum concentration of sulfate (Figure 6-104) and the annual average concentration of sulfate (Figure 6-123).
- No statistically significant increase in sulfate would occur in the Embarrass River from upstream of the facility (e.g., PM-12.2) to downstream of the facility (e.g., PM-13).
    - The concentration of sulfate in the Embarrass River not only does not increase from upstream to downstream, but actually decreases for the 10th percentile, 50th percentile, and 90th percentile concentrations at each subsequent downstream evaluation location. That is, the concentration of sulfate at PM-12.2 (shown on Figure 6-124) is greater than at PM-12.3 (shown on Figure 6-125); the concentration of sulfate at PM-12.3 is greater than at PM-12.4 (shown on Figure 6-126); and the concentration of sulfate at PM-12.4 is greater than at PM-13 (shown on Figure 6-127).

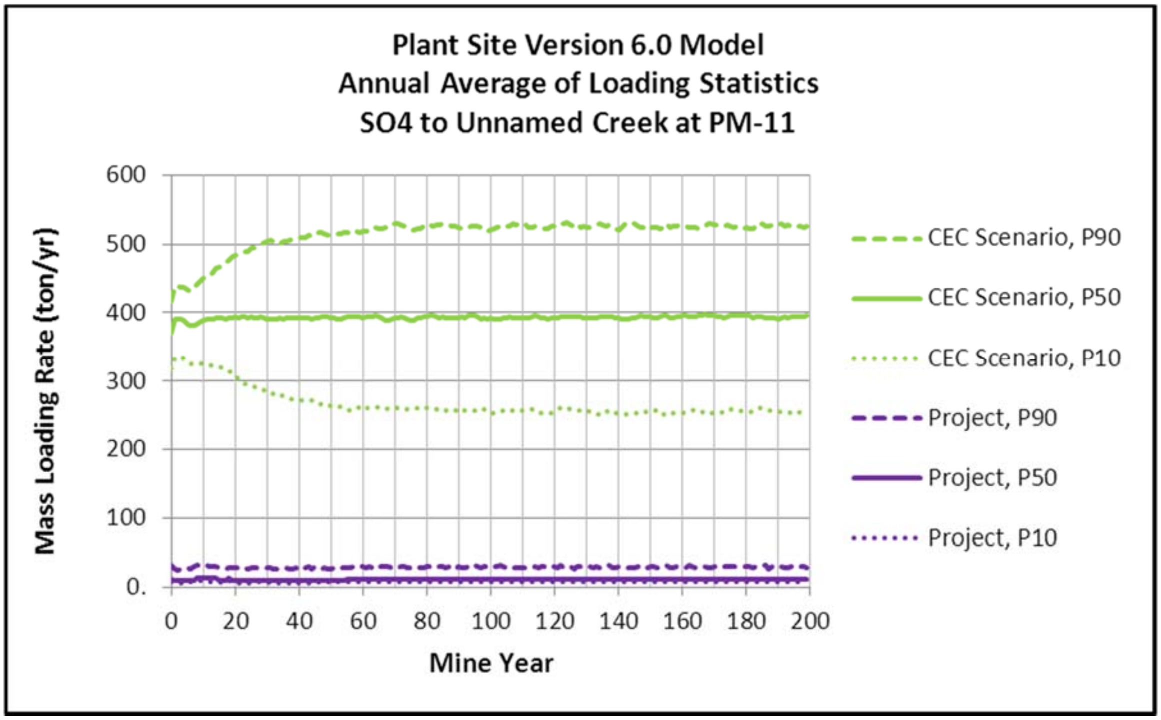


Figure 6-120 Range of Annual Average Sulfate Loading Rates to PM-11; Continuation of Existing Conditions Scenario vs. Project

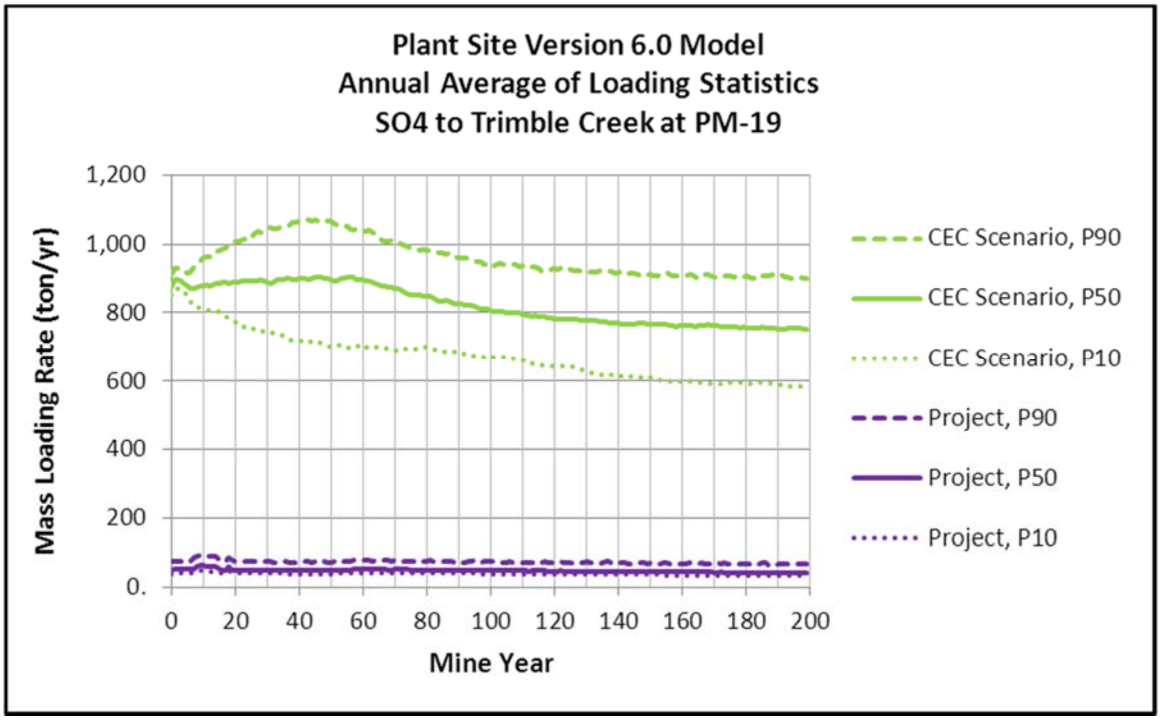


Figure 6-121 Range of Annual Average Sulfate Loading Rates to PM-19; Continuation of Existing Conditions Scenario vs. Project

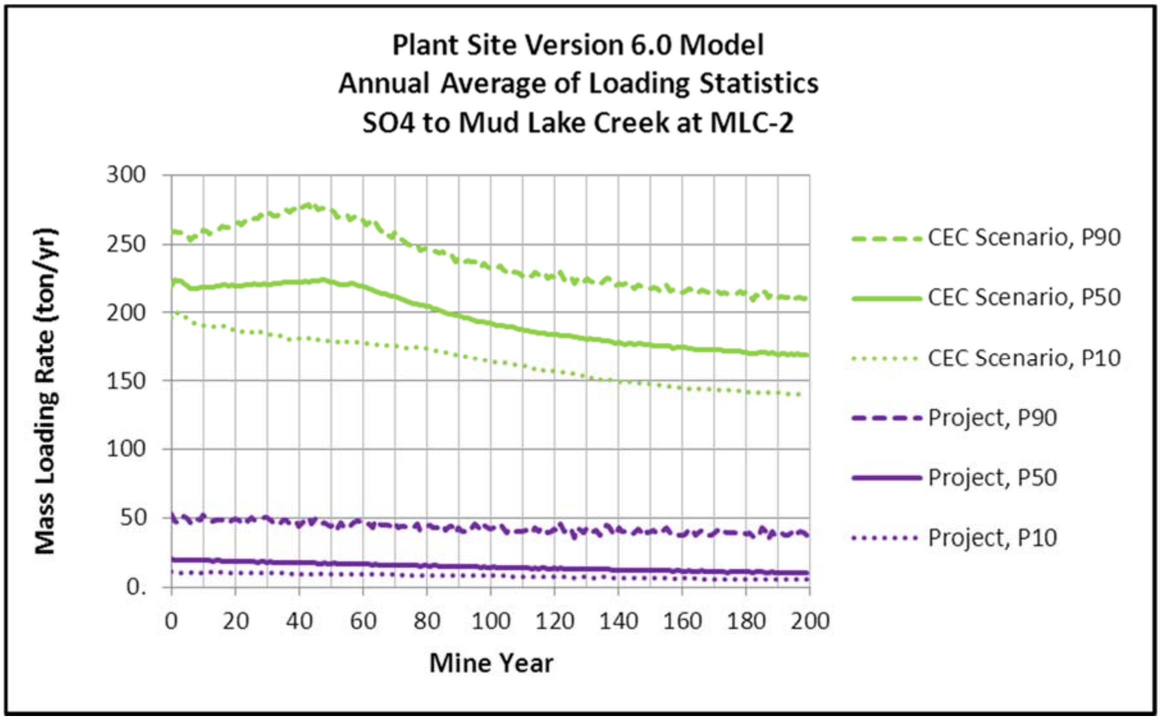


Figure 6-122 Range of Annual Average Sulfate Loading Rates to MLC-2; Continuation of Existing Conditions Scenario vs. Project

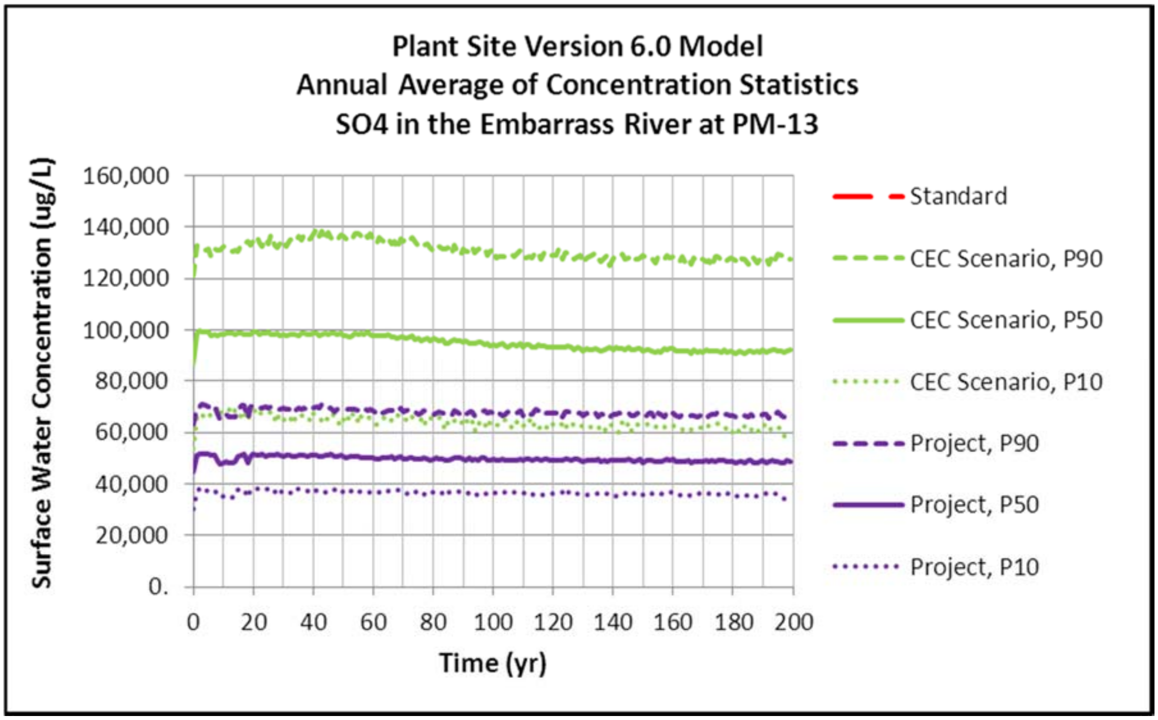


Figure 6-123 Sulfate Annual Average Concentrations in the Embarrass River at PM-13

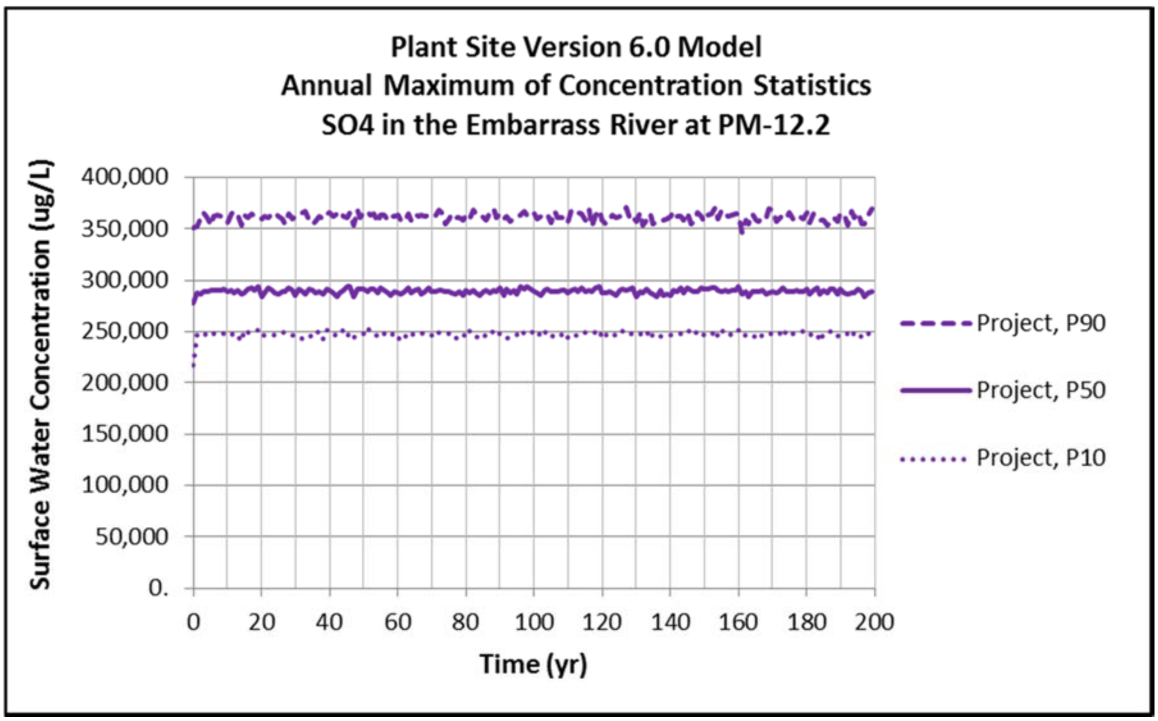


Figure 6-124 Sulfate Annual Maximum Concentrations in the Embarrass River at PM-12.2

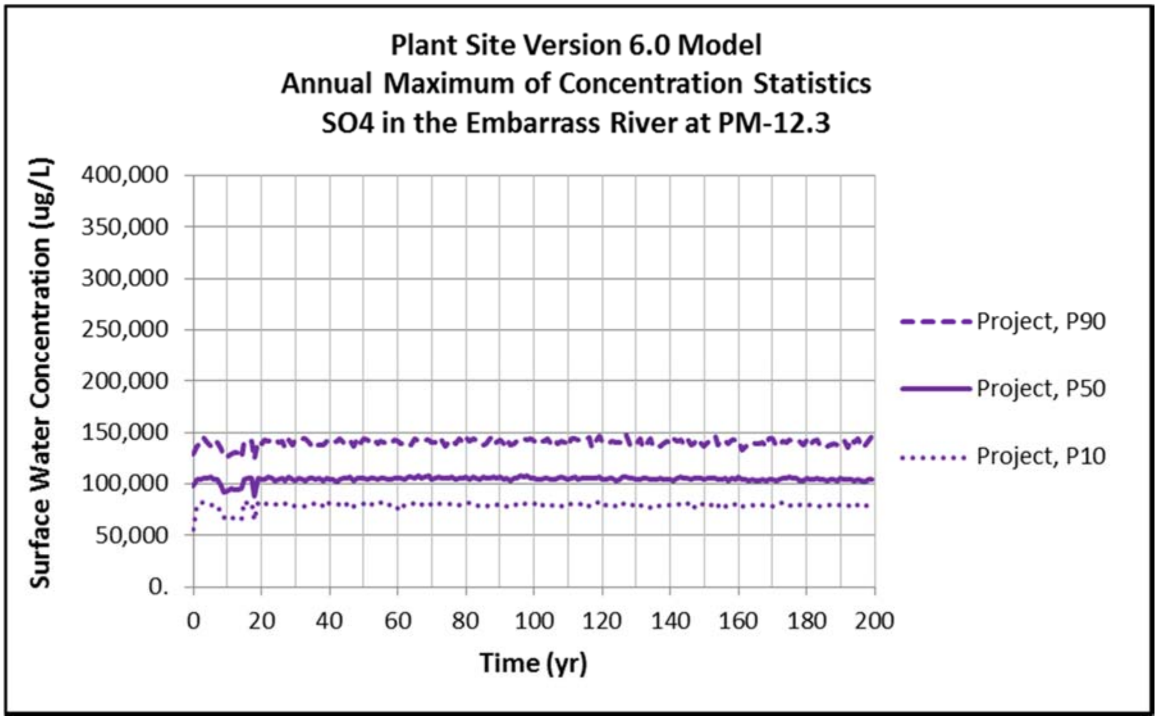


Figure 6-125 Sulfate Annual Maximum Concentrations in the Embarrass River at PM-12.3

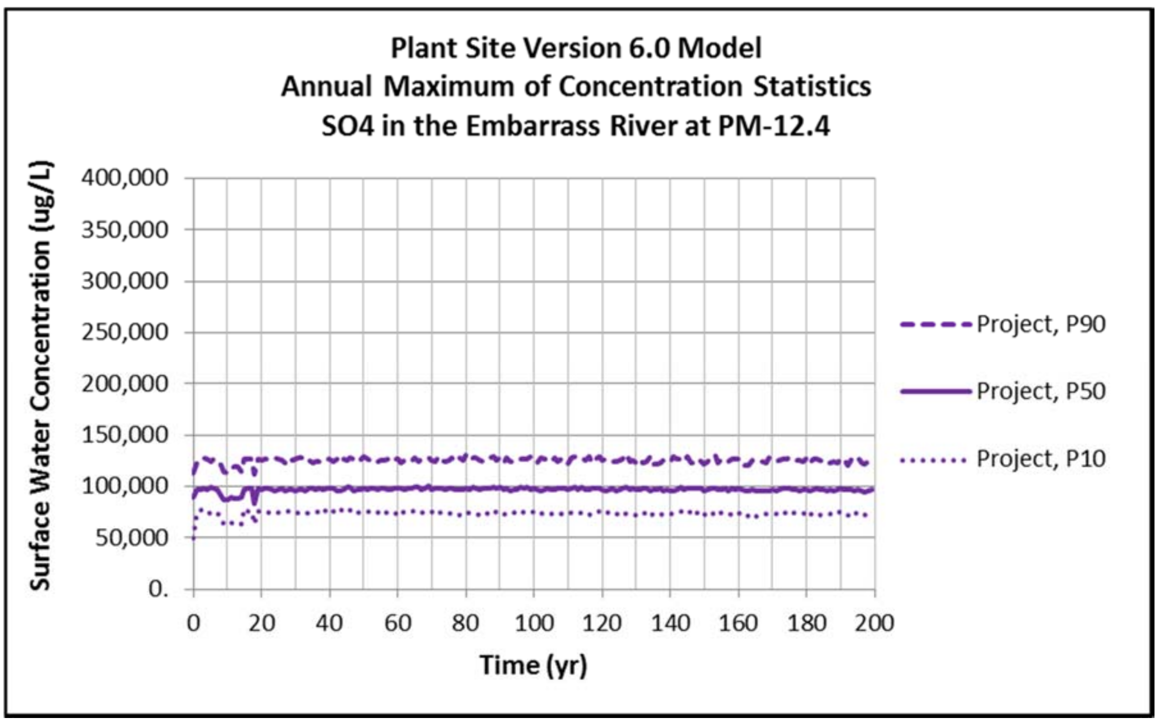


Figure 6-126 Sulfate Annual Maximum Concentrations in the Embarrass River at PM-12.4

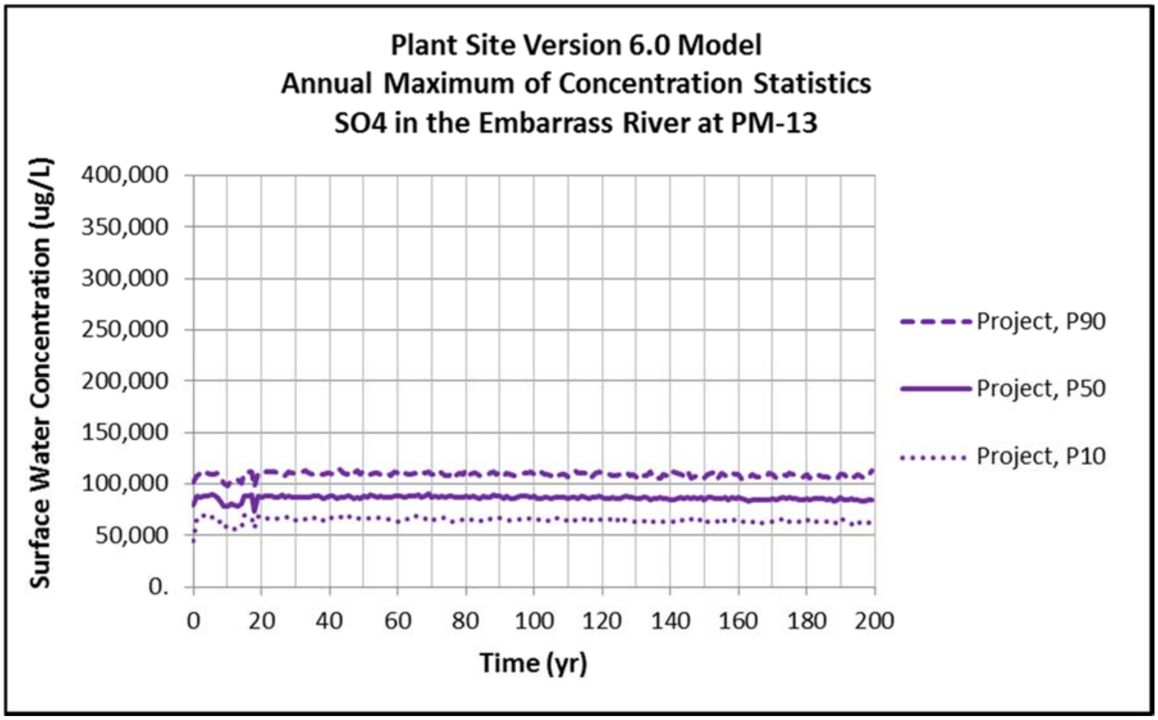


Figure 6-127 Sulfate Annual Maximum Concentrations in the Embarrass River at PM-13

6.7.5.3.2 Conclusion

All three of the MPCA's supplemental criteria for sulfate in surface water at the Plant Site are achieved.

6.7.5.4 Total Dissolved Solids (TDS)

Total dissolved solids is not directly modeled by the probabilistic water quality model. The Plant Site Water Quality Model independently models a suite of 28 constituents (Table 2-1 of Attachment B). This suite of constituents does not include total dissolved solids (TDS). However, there are applicable surface water and groundwater standards for TDS, and the MPCA has requested that model results be compared to the TDS standards for surface water (700 mg/L) and groundwater (500 mg/L).

TDS has been estimated at each time step using the instantaneous concentrations of each of the eight constituents in Equation 6-4, where all concentrations are in units of mg/L (Reference (57)). Estimated TDS concentrations in surface water are presented here and estimated TDS concentrations in groundwater are presented in Section 6.5.3.2.

$$TDS = 0.6 * Alkalinity + Ca + Mg + Na + K + Cl + SO_4 + F \quad \textbf{Equation 6-4}$$

Although TDS is an estimated value, the range of TDS estimates using the model results is reasonably close to the actual range of TDS observed in surface water (Figure 6-128). Surface water evaluation locations in the Embarrass River which have been monitored have not had observed concentrations exceeding the 700 mg/L surface water standard; the tributaries however have been observed to exceed the standard. Unnamed Creek at PM-11 has multiple samples that have exceeded the standard, particularly in 2012 and 2013. Trimble Creek has multiple samples over 600 mg/L and a few samples that exceeded the 700 mg/L standard particularly in 2013. Mud Lake Creek had one sample in 2013 that was over 600 mg/L, supporting the assessment that this tributary is less affected by existing Tailings Basin seepage than Trimble Creek.

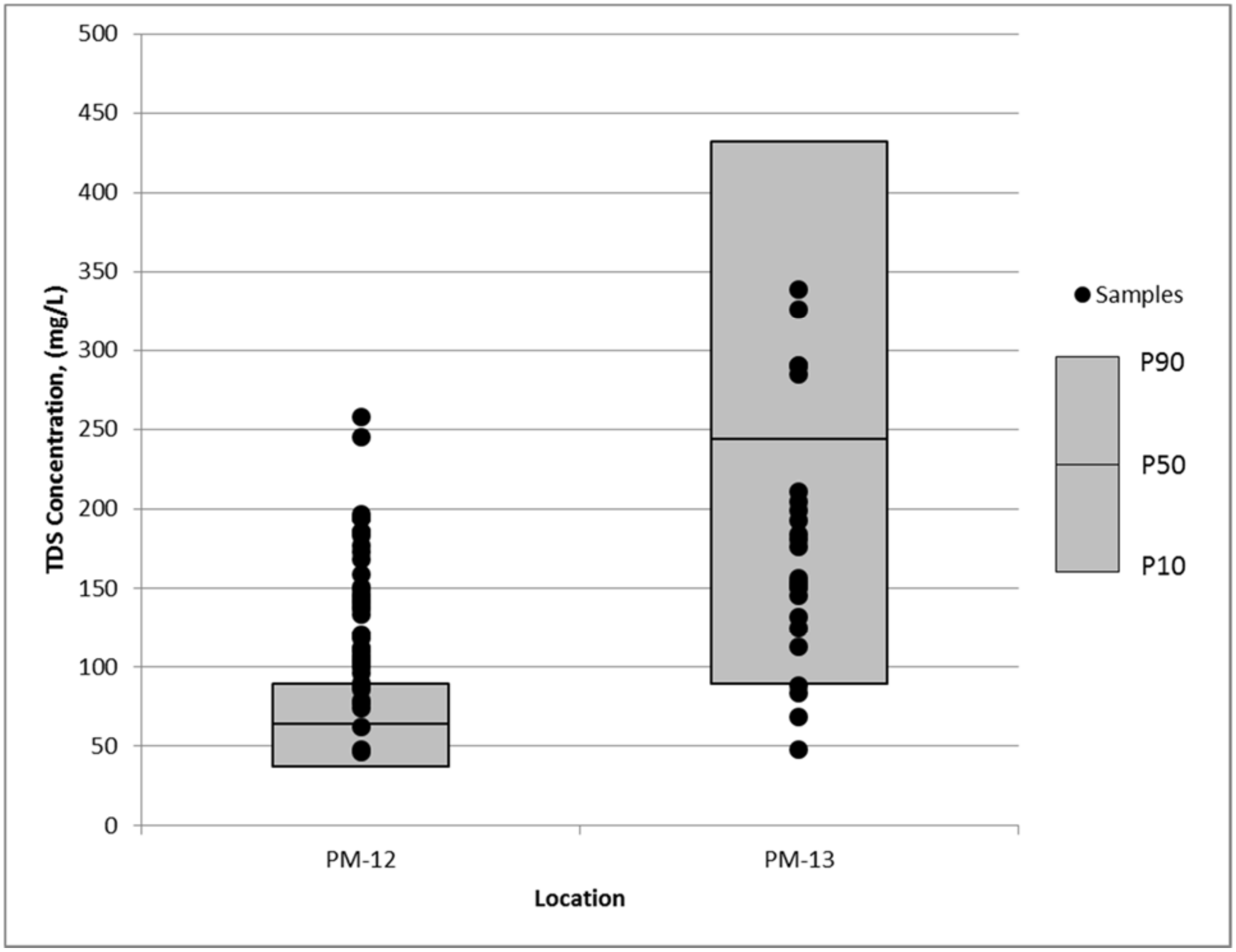


Figure 6-128 Comparison of Modeled and Measured TDS at Two Embarrass River Locations

Results from the Project Model show that the estimated concentrations of TDS at all surface water evaluation locations will meet the TDS standard. Figure 6-129 through Figure 6-138 illustrate the maximum estimated TDS concentrations for evaluation locations PM-12, PM-12.2, PM-12.3, PM-12.4, PM-13, MLC-3, MLC-2, TC-1, PM-19, and PM-11, respectively. The 90th percentile TDS concentration is below the 700 mg/L surface water standard at all surface water evaluation locations at all times. Details regarding the model results at locations of particular interest are provided below:

- Evaluation location PM-12.2 is estimated to have the highest TDS (annual maximum 90th percentile of approximately 590 mg/L) due to contribution from the Area 5 outflow where TDS samples generally range from 1000 to 2000 mg/L. The estimated effect on TDS from the Area 5 outflow is apparent when concentrations at PM-12 (Figure 6-129) are compared to those at PM-12.2 (Figure 6-130). TDS concentrations decrease along the Embarrass River from PM-12.2 to downstream of the facility at PM-13, as shown on Figure 6-130 and Figure 6-133).

- The concentrations at MLC-2 are estimated to steadily decline throughout the modeled 200 years due to the FTB Containment System which reduces Tailings Basin seepage impacts. Figure 6-134 and Figure 6-135 illustrate TDS concentrations at MLC-3 and MLC-2.

- Water quality in Trimble Creek at TC-1 and PM-19 and in Unnamed Creek at PM-11 is dominated by the WWTP effluent quality, which is constant over time (Figure 6-136 through Figure 6-138).

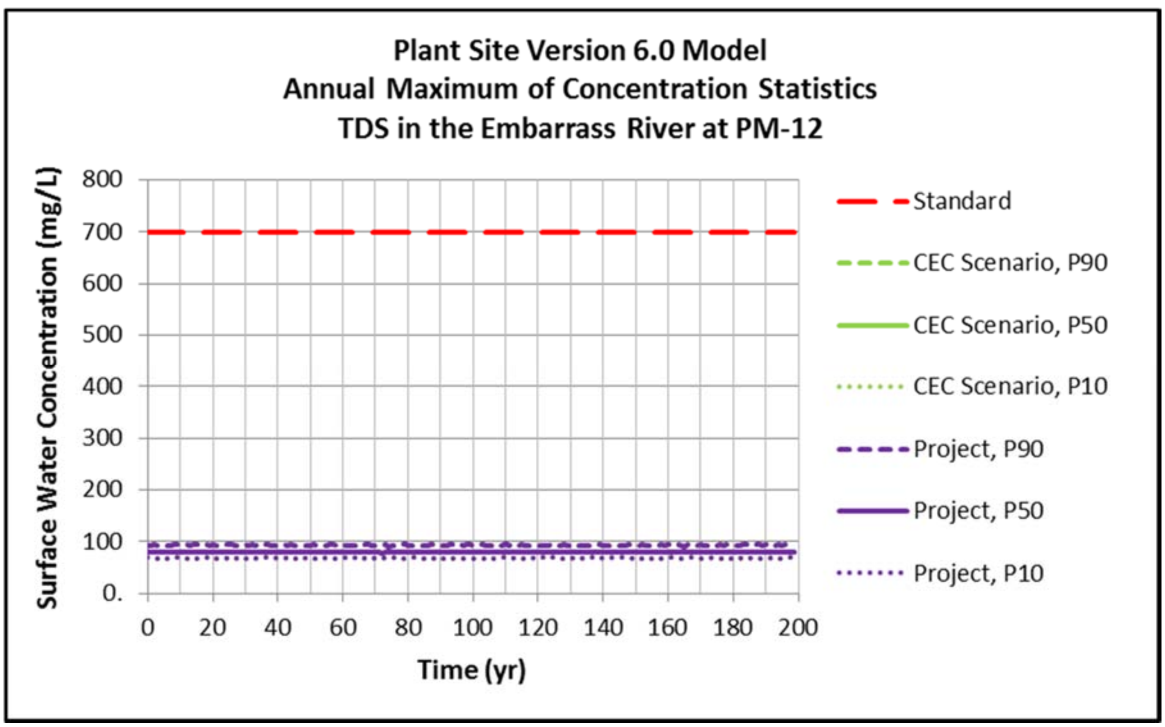


Figure 6-129 TDS Annual Maximum Concentrations in the Embarrass River at PM-12

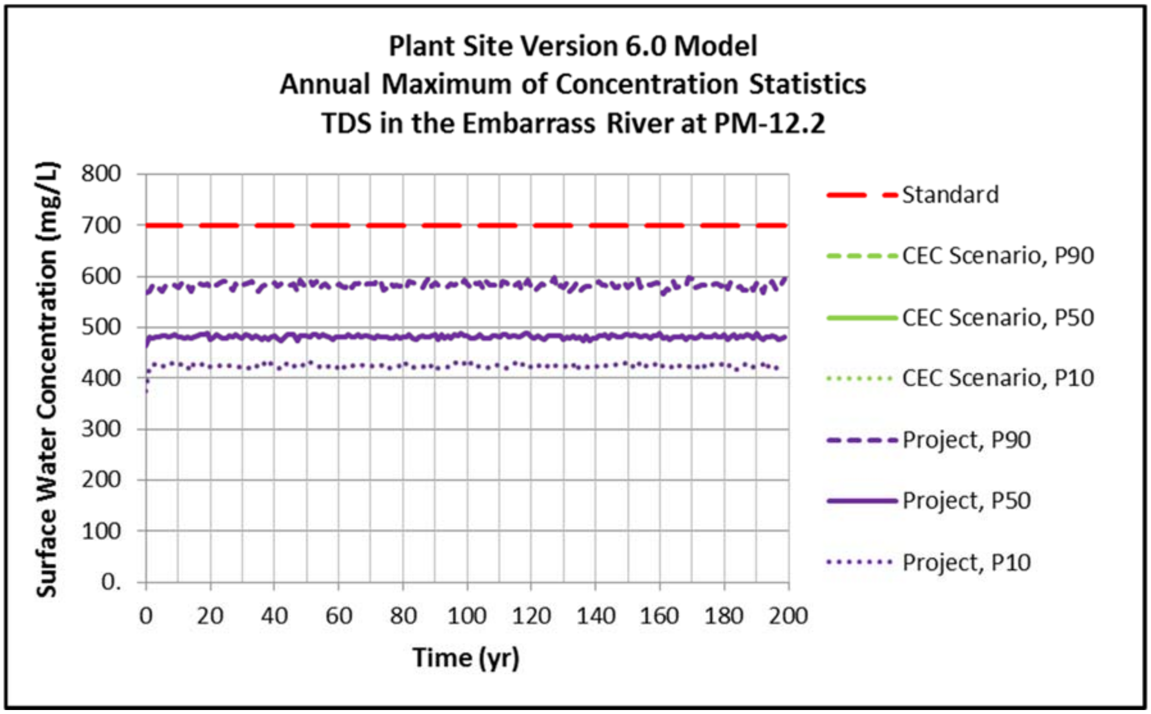


Figure 6-130 TDS Annual Maximum Concentrations in the Embarrass River at PM-12.2

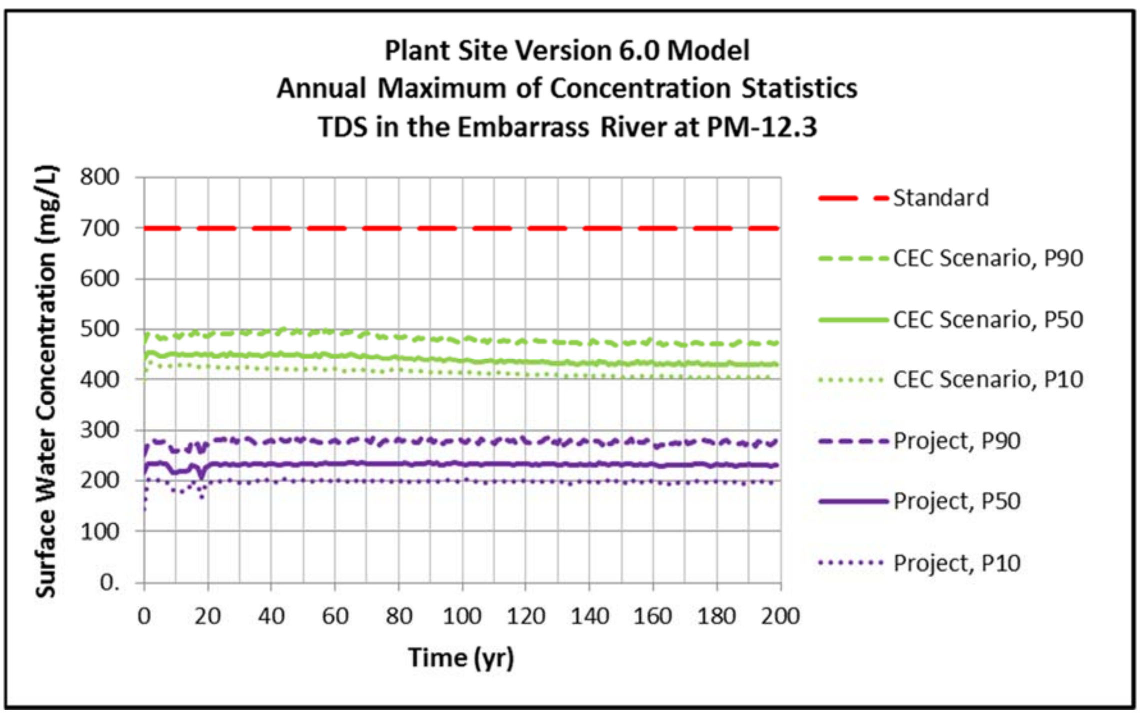


Figure 6-131 TDS Annual Maximum Concentrations in the Embarrass River at PM-12.3

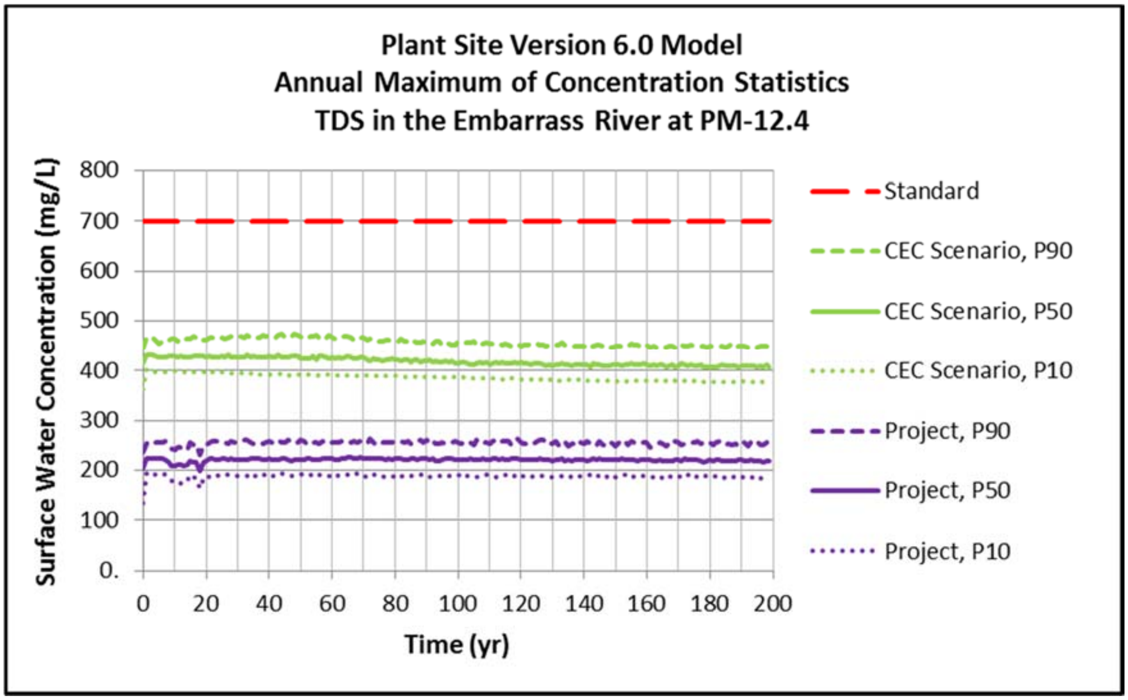


Figure 6-132 TDS Annual Maximum Concentrations in the Embarrass River at PM-12.4

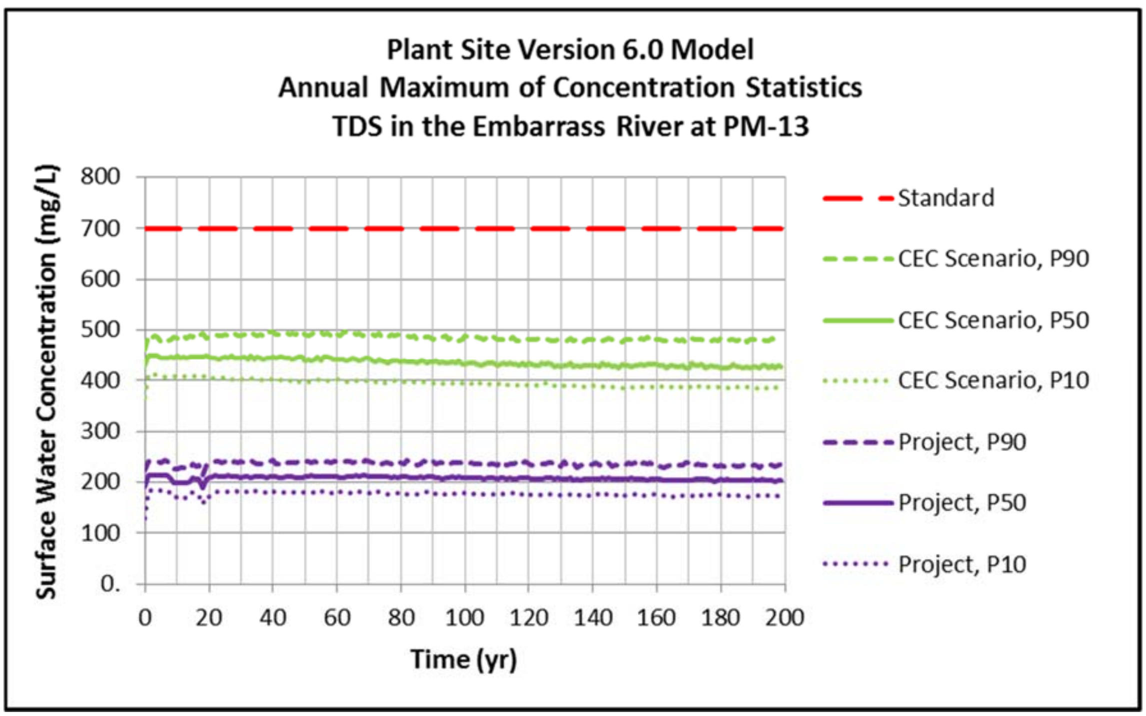


Figure 6-133 TDS Annual Maximum Concentrations in the Embarrass River at PM-13

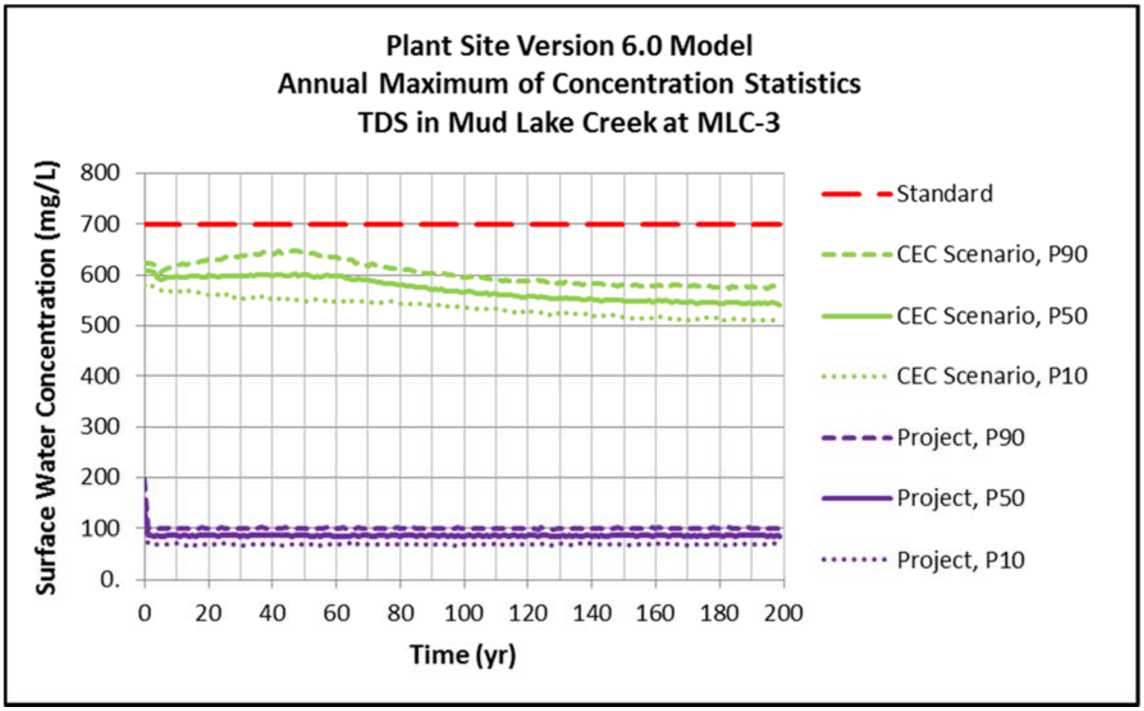


Figure 6-134 TDS Annual Maximum Concentrations in Mud Lake Creek at MLC-3

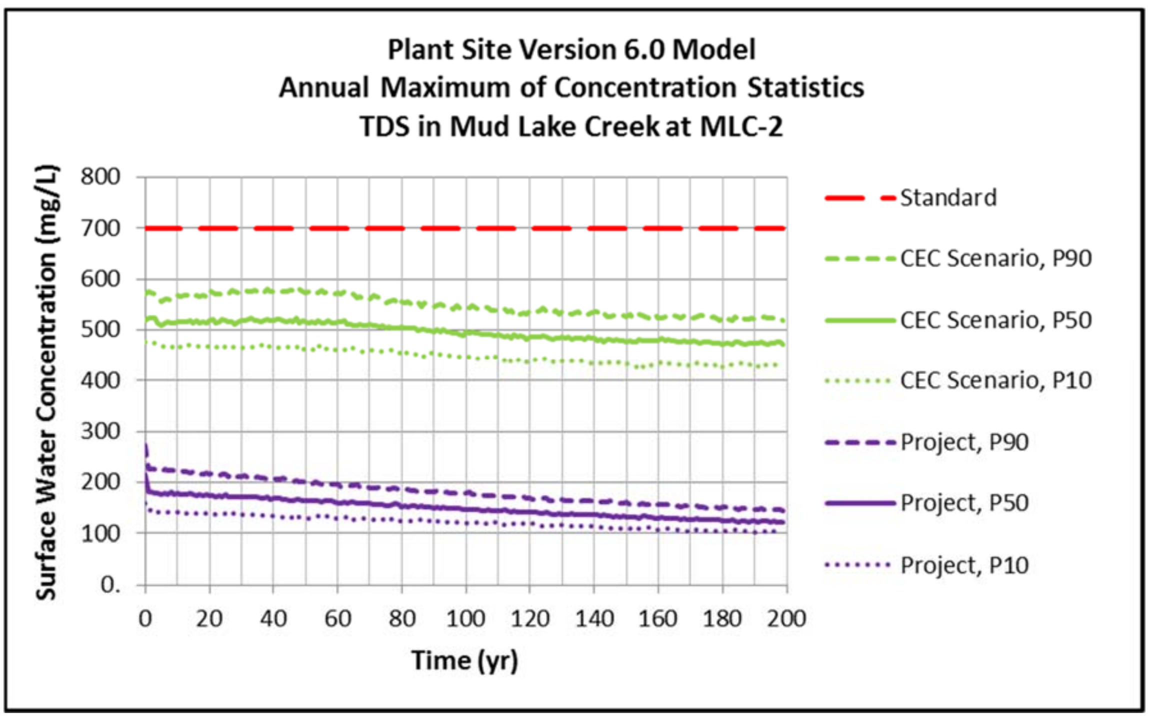


Figure 6-135 TDS Annual Maximum Concentrations in Mud Lake Creek at MLC-2

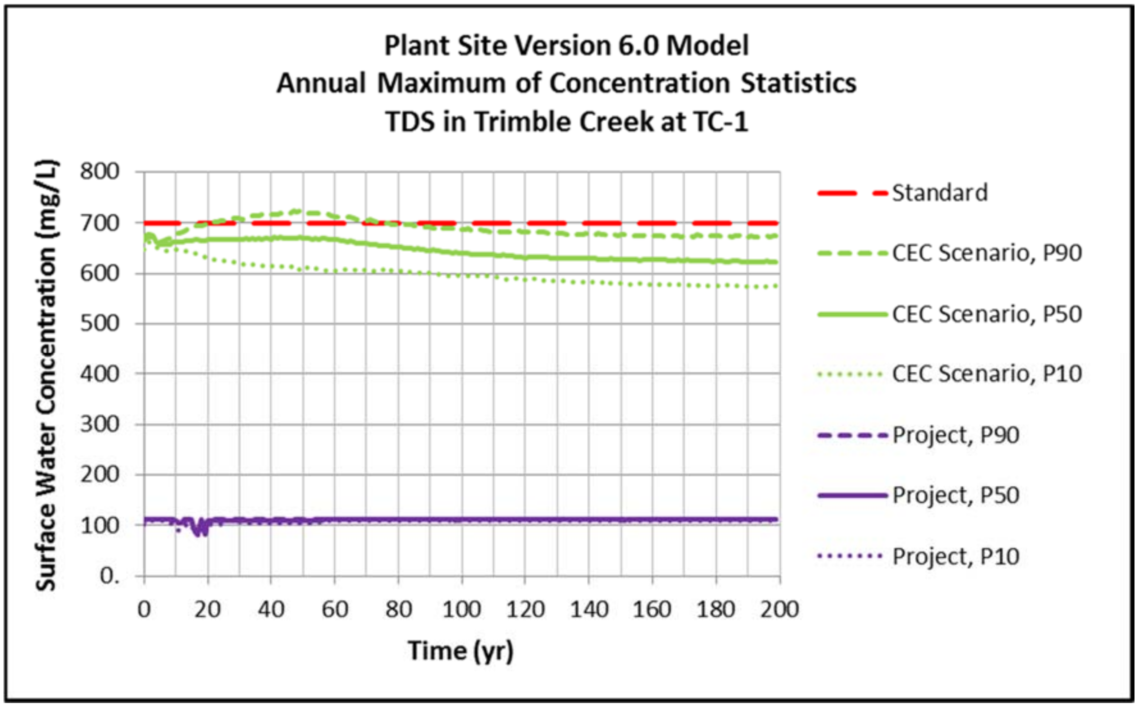


Figure 6-136 TDS Annual Maximum Concentrations in Trimble Creek at TC-1

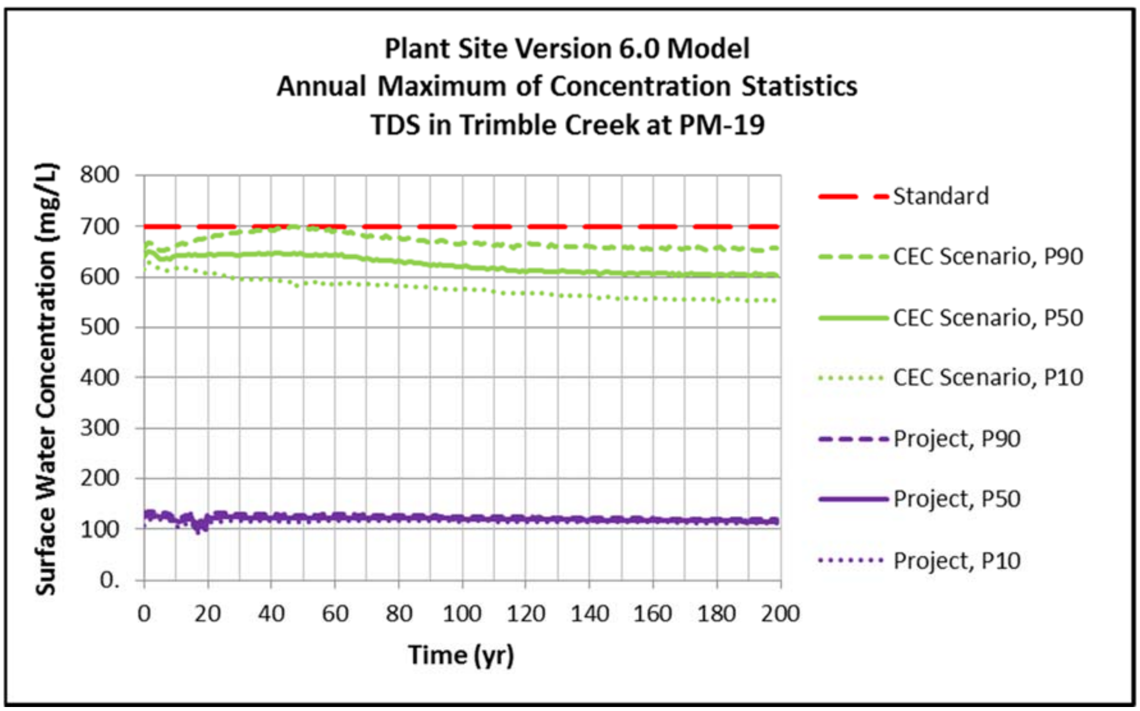


Figure 6-137 TDS Annual Maximum Concentrations in Trimble Creek at PM-19

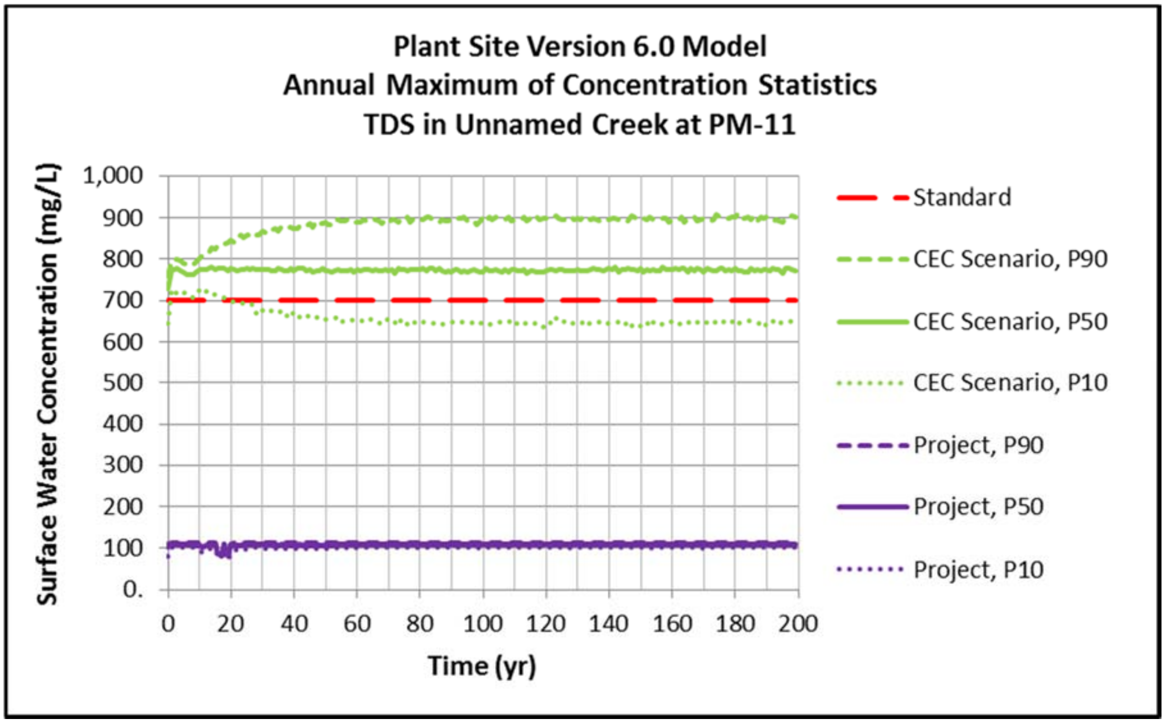


Figure 6-138 TDS Annual Maximum Concentrations in Unnamed Creek at PM-11

Although TDS is not explicitly modeled in the Plant Site Water Quality Model, the 90th percentile TDS concentrations are estimated to be below the surface water standard at all times for all surface water evaluation locations.

6.8 WWTP Influent Quality

The source of water to the WWTP changes through time, as discussed in Section 6.1.4. During operations, the influent is composed solely of water captured by the seepage capture systems. During reclamation, water from the HRF and the FTB Pond is also sent to the WWTP for treatment. In long-term closure the WWTP treats both water captured by the seepage capture systems and the FTB Pond. The mixed water quality of the influent to the WWTP varies over time depending heavily on the unique quantity and quality of the influent sources to the WWTP.

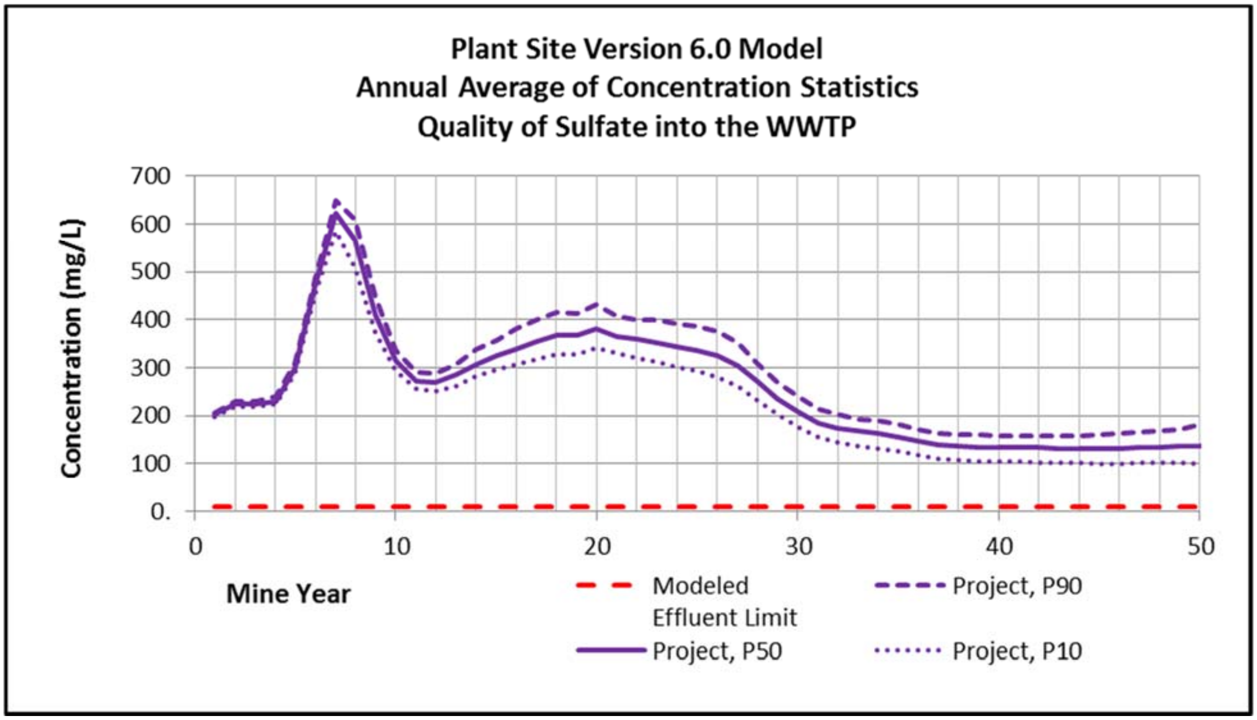
During the initial approximately five years of operations, the influent water quality has limited variability. The travel time through the Tailings Basin causes a delay in any water quality response from the Project at the toes of the Tailings Basin. Any variation in the WWTP influent water quality during these first five years is simply due to the varying quantity of water being sent to the WWTP from the toes of the Tailings Basin.

The concentrations in WWTP influent tend to increase steadily until about Mine Year 15 and then plateau throughout the rest of operations. This increase is mainly due to increases in the amount of water being treated and the increase in concentrations in seepage at the toes of the Tailings Basin.

The modeled WWTP influent water quality during reclamation does not reflect expected concentrations. During reclamation, water from the HRF is being sent to the WWTP. The management strategy for the HRF drainage will be to blend the HRF drainage with the RO retentate and send it to the secondary membrane (VSEP) treatment unit. The water quality model does not include estimations of water quality from the HRF. However, the quality of the HRF drainage (Section 6.1.4 of Reference (5)) is expected to be similar to the WWTP reverse osmosis (RO) retentate (Table 8 of Reference (59)). It is also worth noting that the flow from the HRF to the WWTP will be small, totaling about 4% of the inflow to the WWTP for the ten-year period after operations.

In long-term closure, concentrations generally reach steady state at about Mine Year 75. During long-term closure, the quality of the influent to the WWTP is a combination of the quality of Tailings Basin seepage at four of the five toes (not the east toe as it is pumped back into the FTB Pond) of the Tailings Basin, runoff from the dams and watershed contributing to the seepage capture systems, and the FTB Pond.

Figure 6-139 shows annual averages of the Project Model sulfate concentration statistics for the WWTP influent. Figures for all 27 of the modeled constituents are included in Attachment L. A summary of concentrations at specific snapshots in time is included in Large Table 28.



Does not include the contribution from the HRF during reclamation

Figure 6-139 Sulfate Concentrations into the WWTP through Time

6.9 Mercury Evaluation

As presented in Section 2.1, surface waters near the Plant Site have a water quality standard for total mercury of 1.3 ng/L. Total mercury includes all species of mercury. For this evaluation, unless otherwise specified, 'mercury' refers to total mercury, based on unfiltered samples. While mercury is not explicitly modeled in the GoldSim model, it does need to be demonstrated that the total mercury concentration in the discharge from the WWTP will meet the mercury standard. The following section reviews relevant mercury data and then presents a mercury mass balance. The evaluation focuses on the long-term closure period, because that is the time period when inflows to the WWTP are expected to have the highest mercury concentration.

6.9.1 Mercury From Taconite Tailings Basins

The release of mercury to surface waters and groundwater during taconite ore processing has been a focus of concern by state agencies, resulting in several empirical investigations and experimental studies. An extensive report on the sources and fate of mercury in the taconite mining industry summarized findings from studies showing that wet and dry deposition of mercury, rather than the actual tailings, are the major sources of dissolved mercury in tailings basin water (i.e., pond water) (Reference (60)). While the inputs and outputs of mercury to a tailings basin can vary at different stages of the mining process and especially through extrinsic factors such as precipitation and dry deposition, the interest for the Project is the concentration of total mercury in the FTB seepage. As described by Reference (60), one study reported total mercury concentrations in Minntac tailings basin seepage water of 0.73 ng/L while concentrations in surrounding surface waters were found to be higher (Reference (61)). Also as summarized by Reference (60), one study similarly found lower mercury concentrations in Northshore Mining's tailings basin water compared to the river receiving the discharge water and concluded that the discharge from that tailings basin in fact decreased the concentration of mercury in the river (Reference (62)).

The overall findings in the report by Reference (60) clearly demonstrated that water sampled from tailings basins had mercury concentrations that are lower than the mercury concentrations found in local precipitation and existing background surface waters. The reaction of mercury in the tailings basin (i.e., loss of mercury that is assumed to be through adsorption to solids and then burial in the sediments), results in an overall permanent retention of mercury within the basin and decreases the mercury released to receiving waters. The study notes that average total mercury concentrations ranged from 1.23 to 3.48 ng/L in various Iron Range tailings basin ponds and from 0.72 to 2.44 ng/L in the associated tailings basin seepage waters (Reference (60)).

6.9.2 Mercury Mass Balance Model Overview

6.9.2.1 Project Mercury Mass Balance

In March 2007, a simple mass balance model for the Project was developed to estimate the potential release of mercury from the FTB (Reference (63)). The mass balance model for the Project was used to demonstrate the anticipated fate of the mercury associated with the processing of NorthMet ore. This simple estimation method was preferred over a detailed mechanistic model because it incorporated the important input and removal processes for mercury, it was very transparent with regard to data inputs and it allowed for easy assessment of the effects of changing parameter values on mercury concentrations. All major mercury sources for the mining facility were included in the model; estimates of input and output values were based on measurements taken at each stage of the ore processing during the 2004 SGS Lakefield Pilot Study and 2005 Pilot Plant Study (Reference (64)). The major inputs of mercury resulting from the five-step process that includes mining, ore concentrating, pressure oxidation leaching (to recover the target metals) and product recovery and handling, were included in the mass balance model.

The major outputs of mercury from the Process Plant, identified as part of the March 2007 mass balance model, included (1) residue from the hydrometallurgical process, (2) air emissions (hydrometallurgical process) and (3) tailings (including process water) from the beneficiation process. The concentrate containing the sulfide minerals, derived from the mineral extraction process, is expected to retain 85% to 95% of the mercury that was present in the ore. Because the majority of the mercury remains with the concentrate, only 8% of the mercury that was present in the ore is estimated to be sent to the FTB. Tailings and process water samples from a pilot study conducted with NorthMet ore were found to have mercury concentrations of 0.7 ng/g and 11.2 ng/L, respectively (Reference (64)). Mercury loading to the FTB from solid and liquid outputs from the Process Plant is estimated to be about 16 lb/yr (15.8 lb/year from solids and 0.4 lb/year from process water).

6.9.2.2 LTVSMC Mercury Mass Balance

Data from the Coleraine Minerals Research Laboratory report (Reference (65)) was used to estimate total mercury loading to the Tailings Basin during operation by LTVSMC (Reference (65)). The report provided mass balance information that indicated the final concentrate was about 26% of the feed material from the crusher, with total tailings being about 74% of the feed material from the crusher (percentages on a weight basis). This relationship between the final concentrate and total tailings was used as the starting point in estimating the mass of mercury sent to the Tailings Basin by the taconite plant.

Annual concentrate production data were available in the CMRL report from 1950-1995 (1949 excluded as a start-up year); average for the period of record (46 years) = 6,273,400 tons/year (minimum = 99,977 tons in 1951; maximum = 11,657,631 tons in 1973) (Reference (65)). However, data for mercury concentrations for concentrate and tailings were only available from samples collected in 1996 (Reference (65)). Therefore, the average concentrate production for the 1990-1995 time period was calculated to approximately match concentrate production data to the available mercury concentration data.

For the 1990-1995 time period, average concentrate production was 7,270,479 tons/year (Table 3a of Reference (65)). An estimate of 20,692,903 tons/year of total tailings was then calculated based on the mass balance information that concentrate represented about 26% of the feed from the crusher and tailings represented about 74% of the feed from the crusher. Based on the average tailings mercury concentration of 14.74 ng/g (Reference (65)), the estimated loading of mercury to the Tailings Basin from the taconite plant was about 610 lbs/year.

6.9.2.3 Mercury Mass Balance Comparison

Table 6-5 provides additional comparisons between the LTVSMC operations and the Project that contribute to the difference in estimated loading of mercury to the Tailings Basin and FTB respectively. This shows that the loading of mercury to the facility with the Project will be 2 to 3% of what is was during LTVSMC taconite ore processing.

Table 6-5 Comparison of Selected Data for the LTVSMC Taconite Operations and the Project Operations

Parameter	LTVSMC Operations (Reference (65)) [1]	Project (Reference (63))	Atmospheric Deposition [2]
Ore processing rate	100,000 tons/day	32,000 tons/day	--
Concentrate production (average)	7,270,000 tons/year	406,000 tons/year	--
Mercury in final concentrate (average)	4.3 ng/g	125 ng/g	--
Tailings	20,693,000 tons/year	11,274,000 tons/year	--
Sulfates/sulfides [3]	Rejected with tailings	Sulfide minerals part of concentrate	--
Mercury in tailings (average)	14.74 ng/g	0.7 ng/g	--
Estimated mass of mercury to the Tailings Basin	610 lbs/year	16 lbs/year	0.22 lbs/year

[1] Data and significant figures as reported by Reference (65).
[2] Estimate of atmospheric deposition of mercury to the tailings basin (wet + dry) (runoff from basin watershed not accounted for in the estimate):
Precipitation volume = 0.74 meters, precipitation concentration = 12 ng/L, deposition area = 1400 acres
Wet Deposition: 0.74 m/yr x 12 ng/L x 100 acres x 4,046.87 m^2/acre x 1,000 L/m^3 x 1E-09 g/ng x 1 lb/454 g = 0.11 lb/yr
Dry deposition = wet deposition = 0.11 lbs/yr
[3] Mercury tends to be associated with sulfate and sulfide minerals

6.9.3 Adsorption of Mercury by Copper Nickel Tailings: NTS Bench Study Overview

In 2006, a bench study was conducted by NTS to determine the rate and stability of adsorption of mercury, specifically by Flotation Tailings (Appendix B of Reference (66)). The experimental study involved conducting large-volume (2.5 L) shake flask tests to evaluate mercury adsorption to tailings over time. Process water and tailings were obtained from pilot-testing of NorthMet ore conducted by SGS Lakefield (Reference (64)). A process water control and a treatment flask were used in the study. Additional dissolved mercury was placed into both the treatment flask and the control flask (i.e., each flask was spiked with dissolved mercury). Flotation Tailings were then added only to the treatment flask prior to the start of the experiment. At selected sampling times, an aliquot was removed from each flask filtered (0.45 μm filter) and submitted for analysis of dissolved mercury. Results of the shake-flask tests showed a decrease in the concentration of dissolved mercury in the treatment flask (containing process water and Flotation Tailings) from 3.3 ng/L (at time 0) to 0.9 ng/L (at 480 minutes). By contrast, the concentration of dissolved mercury in the control flask (containing process water only, which contains some fine suspended tailings) ranged from 3.6 ng/L (at time 0) to 2.8 ng/L (at 480 minutes). While the control in this experiment was not a 'true' control (i.e., it contained process water and not distilled water alone), this control was comparable to the treatment flask containing process water and Flotation Tailings. Both the control and the treatment showed a reduction in dissolved mercury concentration, attributable to the adsorption of mercury by Flotation Tailings; however, the treatment flask containing process water and tailings showed a higher adsorption rate compared to the control treatment of just process water with some fine suspended tailings.

This study provides a clear demonstration of the ability of the Flotation Tailings to adsorb mercury and result in a significantly lower final dissolved mercury concentration. While the exact mechanism behind the adsorption process is not yet clearly understood, the ability of the Flotation Tailings to adsorb mercury, in conjunction with the proven ability of taconite tailings to absorb mercury, is expected to result in an overall increase in the adsorption of mercury at the basin with the addition of the Flotation Tailings. Because of the demonstrated adsorption of mercury by Flotation Tailings and by taconite tailings, seepage water from the FTB is expected to have a low concentration of total mercury, less than 1.3 ng/L.

6.9.4 Existing Site Mercury Data for Tailings Basin Water

NPDES surface discharges from the Tailings Basin serve as the best proxy for concentrations of mercury in seepage from the existing Tailings Basin. SD026, located on the south side of the Tailings Basin, and SD004, located northwest of the Tailings Basin, both contain seepage from the Tailings Basin and thus provide representative data for assessing Tailings Basin seepage water chemistry. These sites were sampled four times a year from 2005-2013 for a suite of water chemistry parameters and metal concentrations including total mercury. The overall average total mercury concentration at SD026 and SD004 over the 9 year period was 1.0 ng/L (Table 6-6).

Table 6-6 Concentrations of Total Mercury (ng/L) at SD026 and SD004 from 2005 Through 2013

Sample date	SD026	SD004
Apr-05	1.3	0.7
Jun-05	0.5	0.5
Aug-05	1.3	4.5
Oct-05	0.5	0.5
Apr-06	0.9	0.9
Jun-06	0.5	2
Aug-06	0.5	0.8
Oct-06	2.1	4

Sample date	SD026	SD004
Apr-07	1.3	0.5
Jun-07	4.0	4.0
Aug-07	0.7	0.5
Oct-07	0.5	0.5
Apr-08	0.5	0.5
Jun-08	0.6	0.5
Aug-08	0.5	1.1
Oct-08	0.6	0.8
Apr-09	0.6	--
Jun-09	0.9	--
Aug-09	0.8	0.5
Oct-09	0.8	0.8
Apr-10	0.5	0.5
Jun-10	0.5	0.5
Aug-10	0.6	0.5
Oct-10	0.5	0.5
Apr-11	0.8	0.5
Jun-11	0.7	0.5
Aug-11	0.6	--
Oct-11	0.5	--
Apr-12	0.5	--
Jun-12	0.5	--
Aug-12	0.5	--

Sample date	SD026	SD004
Oct-12	0.5	--
Apr-13	0.47	--
Jun-13	0.38	--
Aug-13	0.69	0.5
Oct-13	0.18	--
Average	0.85	1.1
AVERAGE	1.0	

'--' indicates that data was not available for that time period

In summary, data from discharge locations SD026 and SD004 provide representative data that indicate the existing Tailings Basin continues to retain mercury and that the long-term average total mercury concentration in tailings basin seepage is 1.0 ng/L. Because the Project will send a relatively small amount of mercury to the FTB that is to be constructed on top of the existing taconite tailings, and the demonstrated adsorption and retention of mercury by Flotation Tailings and taconite tailings, the expectation is that the total mercury concentrations of the seepage water in the future will be similar to current concentrations.

6.9.5 Mercury Concentration in the Flotation Tailings Basin (FTB) Seepage in Closure

In the mercury mass balance model, and in the water balance modeling, it is assumed that all seepage from the FTB will have traveled through the taconite tailings and much of it will have also traveled through the copper-nickel tailings. The final mercury concentration of FTB seepage water is estimated to be 1.0 ng/L based on:

- An extensive report on the sources and fate of mercury in the taconite mining industry shows that average total mercury concentrations ranged from 1.23 to 3.48 ng/L in tailings basin ponds and from 0.72 to 2.44 ng/L in tailings basin seepage waters (Reference (60)).

- A comparison of Project and LTVSMC taconite operations mercury mass balances shows loading of mercury to the facility with the Project will be 2 to 3% of what it was during LTVSMC taconite ore processing.

- A bench study has shown that, like taconite tailings, Flotation Tailings have the ability to adsorb mercury, which is expected to result in an overall increase in the adsorption of mercury at the FTB.

- NPDES surface discharges from the Tailings Basin serve as the best proxy for concentrations of mercury in seepage from the existing Tailings Basin and show an average total mercury concentration of 1.0 ng/L.

Because the existing Tailings Basin seepage mercury concentration of 1.0 ng/L is in the range (0.72 to 2.44 ng/L) for taconite tailings basin seepage, the amount of mercury delivered to the facility with the Project is 2 to 3% of what it was during LTVSMC operations and Flotation Tailings has a similar sorbtive capacity to taconite tailings, the existing seepage concentration of 1.0 ng/L is a reasonable and prudent estimate for seepage from the FTB.

6.9.6 Mercury Concentration in the Flotation Tailings Basin (FTB) Pond in Closure

In the long-term closure period, the FTB seepage will be collected and routed to the Plant Site WWTP. In addition, excess FTB pond water will be pumped to the WWTP in order to prevent overflow of the pond. The following discussion reviews available data in order to project mercury concentrations in the FTB Pond during long-term closure. The FTB Pond will be precipitation dominated, with a small and re-vegetated watershed area. It is expected to be a shallow, oligotrophic, clear water system.

Water quality data from the Tailings Basin following cessation of LTVSMC operations is relevant as the residual ponds are shallow, isolated, and primarily fed by precipitation. The average total mercury concentration in pond water in Cells 1E and 2E between 2002 and 2003 was 1.35 ng/L (Reference (67)), although mercury concentrations in these cells may be influenced by seepage water from Cell 2W. Also, the cells may not have reached equilibrium by 2002-2003, since LTVSMC operations had ceased in 2001. Ponds and lakes allow for settling/burial and evasion mechanisms to reduce mercury concentrations relative to those observed in stormwater runoff or rivers (Reference (68)). Therefore, the mercury concentration of the FTB Pond will be expected to be below typical values for stormwater runoff (e.g., below 3.5 ng/L).

To identify a reasonable and representative estimate of mercury concentration for the future FTB Pond, analog data were obtained for northern Minnesota lakes (Reference (69)) and stormwater ponds and wetlands (Reference (70)). Reference (69) provides mercury sampling data from 20 relatively isolated precipitation-dominated lakes in Voyageur's National Park in northern Minnesota, which is summarized in Table 6-7. Subsets of these data were identified according to mean depth (4 meters or less) and clarity (estimated by total organic carbon concentrations at or below 10 mg/L) to be consistent with those attributes of the FTB Pond. The subset of shallow lakes had an average total mercury concentration of 2.46 ng/L, the clear lakes had an average concentration of 1.51 ng/L and the shallow and clear lakes had an average total mercury concentration of 1.79 ng/L (Table 6-7).

Reference (70) provides mercury sampling data from both constructed and naturally occurring stormwater wetland ponds. As shown in Table 6 of Reference (70), the naturally occurring ("reference") wetland ponds had a median total mercury concentration of 1.96 ng/L. Because the reference wetland ponds are isolated and located in rural areas they are considered to represent a relevant analog for the FTB Pond in long-term closure.

In summary, analog data for clear and shallow lakes indicates a concentration in the 1.5 to 2.5 ng/L range, and analog data for isolated ponds in rural areas suggests a concentration of approximately 2.0 ng/L. Given the FTB Pond's anticipated characteristics as an oligotrophic clear water system with a small watershed area, these natural lakes and wetlands higher biological productivity and higher concentrations of organic material (as total organic carbon and/or dissolved organic carbon) and associated total mercury concentrations likely represent conservative analogs for estimating a future FTB Pond total mercury concentration. Finally, the average mercury concentration in pond water in Cells 1E and 2E between 2002 and 2003 was 1.35 ng/L. Therefore, a mercury concentration of 2.0 ng/L is considered a conservative, reasonable, and prudent projection for the FTB Pond in long-term closure.

Table 6-7 Mercury Sampling Data for Northern Minnesota Lakes in 2001 and 2002

Lake Name	Mean Depth (m)	Total Organic Carbon (mg/L as C) (May-2001)	Total Mercury (surface 1 m sample, unfiltered) (ng/L)				
			May-01	Jul-01	Sep-01	May-02	Jul-02
Agnes[1]	2.5	16.0	2.99	2.74	2.43	3.07	3.67
Brown[1,2]	4.2	8.8	2.05	1.83	1.84	1.83	3.07
Cruiser[2]	13.2	3.1	0.44	0.39	0.46	N/A	N/A
Ek[1]	2.4	12.0	1.97	1.92	1.66	1.74	2.66
Fishmouth[1,2]	3.8	7.3	1.49	1.08	0.97	1.00	1.73
Jorgens[1,2]	3.0	9.4	2.07	1.74	1.74	1.82	2.86
Little Shoepack[1]	2.5	11.0	2.54	1.99	2.01	2.08	3.22
Little Trout[2]	13.0	4.0	0.86	0.43	0.41	0.38	0.51
Locator	8.1	11.0	2.72	2.12	2.24	2.26	3.12

Lake Name	Mean Depth (m)	Total Organic Carbon (mg/L as C) (May-2001)	Total Mercury (surface 1 m sample, unfiltered) (ng/L)				
			May-01	Jul-01	Sep-01	May-02	Jul-02
Loiten(2)	7.8	9.0	2.22	2.02	2.15	2.07	3.06
Mukooda	12.2	5.2	0.55	0.52	0.34	0.34	0.43
Net1	2.0	17.0	3.52	N/A	N/A	3.05	3.67
O'Leary(2)	7.1	6.9	0.78	0.68	0.47	0.55	0.72
Oslo(2)	4.7	10.0	2.16	2.74	2.14	2.26	3.53
Peary(1,2)	2.6	9.4	1.77	1.60	1.43	1.51	2.38
Quarter Line(1)	3.1	18.0	3.33	2.79	2.68	3.02	4.32
Quill(2)	6.9	9.2	2.38	1.81	1.75	1.66	2.69
Ryan(1)	2.1	12.0	3.52	2.82	2.85	2.74	4.81
Shoepack(1)	2.9	14.0	2.85	2.56	2.80	3.24	3.83
Tooth	5.9	11.0	3.74	2.48	2.33	2.20	3.26

(1) Average for Shallow Lakes (depth ≤ 4 m): 2.46 ng/L

(2) Average for Clear Lakes (TOC ≤ 10 mg/L): 1.51 ng/L

(1,2) Average for Shallow (depth ≤ 4 m) and Clear (TOC ≤ 10 mg/L) Lakes: 1.79 ng/L

(Source: Goldstein et al., 2004 (Reference (69))

6.9.7 Modeled Estimates of Water Flows to the WWTP and Estimated WWTP Discharge Mercury Concentration

Water balance modeling for the Plant Site was conducted with the GoldSim model (Section 6.1). The results are shown in Figure 6-140 and indicate the estimated flow rates into the WWTP from the FTB Pond and FTB seepage. Figure 6-140 is similar to Figure 6-10 except water collected by the seepage capture systems has been broken up into seepage and runoff.

The modeling results indicate that pumped outflow from the FTB Pond begins in earnest at about Mine Year 27, and reaches equilibrium around Mine Year 60. From this point onward, the long-term average seepage rate is slightly more than 1,600 gpm, while the long-term average pumping rate from the FTB Pond is slightly more than 400 gpm. Runoff collected by the FTB

Containment System is slightly less than 400 gpm. Outflows from the HRF will also be directed to the WWTP for a relatively short time (about Mine Year 20 to 31), but compared to FTB seepage, pond pumping, and runoff, HRF flows are negligible and do not continue in long-term closure.

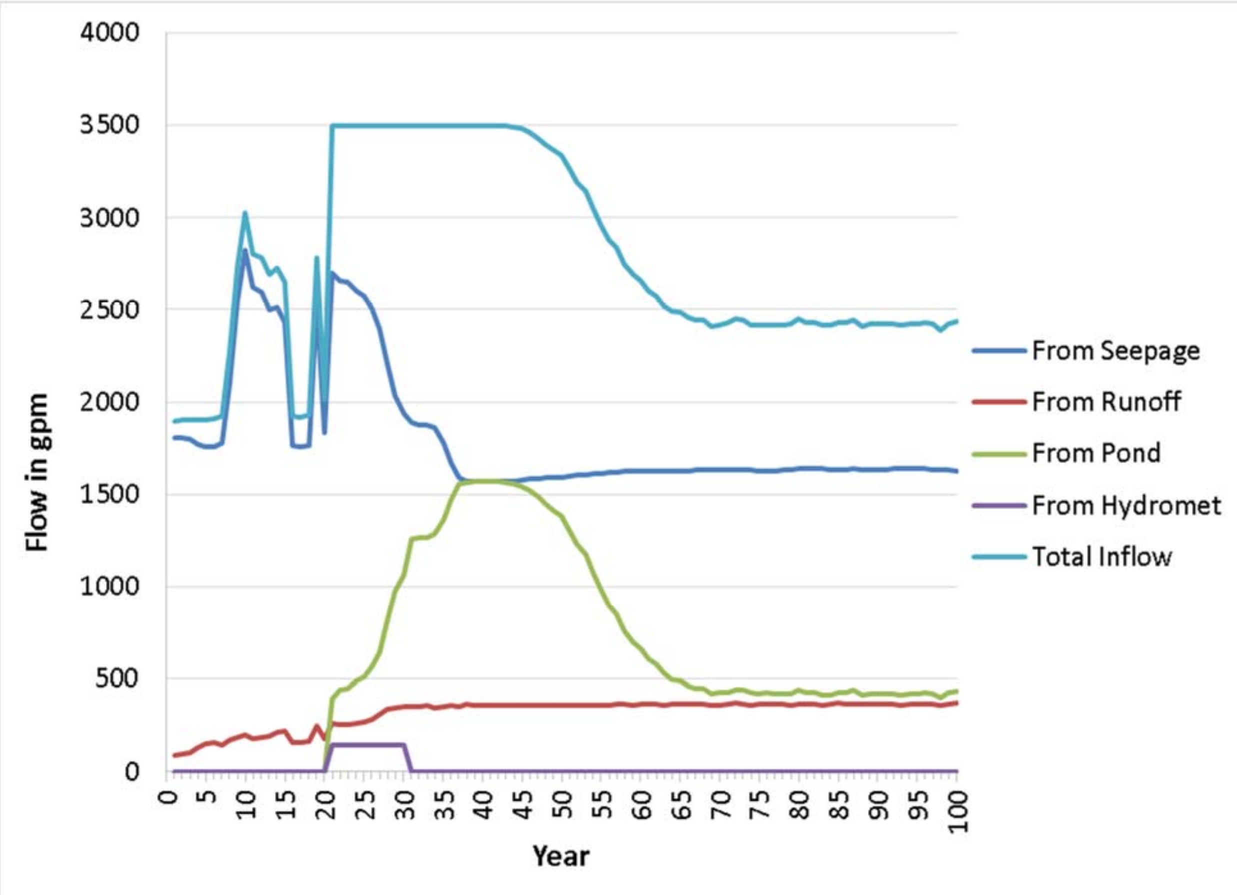


Figure 6-140 Annual Average Flows into the WWTP for Inclusion in the Mercury Evaluation

The anticipated mercury concentration in the FTB seepage that will be pumped to the WWTP is assumed to be 1.0 ng/L, as discussed in Section 6.9.5.

The anticipated concentration in the FTB Pond from which any excess water will be pumped to the WWTP is conservatively assumed to be 2.0 ng/L, as discussed in Section 6.9.6.

Runoff from the exterior slopes and benches of the dams will interact with the LTVSMC tailings prior to capture by the FTB Containment System. Because the dams will be constructed with LTVSMC tailings with broad benches to prevent erosive runoff flow, this interaction will be significant. By the time this water reaches the FTB Containment System, its concentration is estimated to be 1.0 ng/L consistent with FTB seepage. However, the portion of runoff from the small strip of undisturbed land between the toe of the tailings basin and the FTB Containment System is assumed to have a concentration of 3.5 ng/L, based on baseline monitoring for the Project and information from Reference (71). Based on the area of this strip of land of 0.24 mi^2 and the Upper Embarrass River watershed's annual average runoff yield of 0.7 cfs/mi^2 (based on GoldSim modeling), the flow rate for this portion of runoff is estimated at 75 gpm.

As shown in Table 6-8, applying these concentrations to the long-term average flow rates from the GoldSim modeling results in an estimated concentration of 1.3 ng/L for the combined inflow to the WWTP. Any mercury reduction by the WWTP would reduce discharge concentration, providing an additional safety margin. Overall, these screening calculations indicate that the discharge water from the WWTP will comply with the water quality standard of 1.3 ng/L.

Table 6-8 Estimated Mercury Concentration of the Combined Inflows to the Plant Site WWTP

Stream	Flow Rate (gpm)	Mercury Concentration (ng/L)	Total Mercury Flow (ng/yr)
Seepage water	1,635	1.0	3.3E+09
Runoff (interacting with tailings)	290	1.0	5.8E+08
Runoff (not interacting with tailings)	75	3.5	5.3E+08
FTB Pond dewatering	425	2.0	1.7E+09
Combined stream	**2,425**	**1.3**	**6.0E+09**

6.9.8 Summary

The proposed FTB will be constructed atop the existing Tailings Basin. Flotation Tailings will be placed on top of the existing LTVSMC taconite tailings. Flotation Tailings have been tested for their adsorption properties; results from the experimental study by NTS demonstrated the rapid adsorption rate of mercury by Flotation Tailings (Reference (67)). In addition, the underlying taconite tailings have a demonstrated ability to retain mercury, assumed to be through adsorption of mercury to the tailings. Given this "double layer" of tailings, Flotation Tailings overlying taconite tailings, it is anticipated that there will be an equal, if not higher amount of mercury sorption to tailings during Project operations relative to existing and historic conditions.

As shown in Table 6-5, estimated loading of mercury to the Tailings Basin from the Project (16 lbs/year) is about 2 to 3% of the historic loading from the LTVSMC taconite plant (610 lbs/year). In addition, the volume of water (as a water and tailings slurry) expected to be sent to the FTB by the Project is less than what was sent to the Tailings Basin by the LTVSMC taconite operations.

Because loading to the basin will be reduced from historic levels, and both Flotation Tailings and taconite tailings have been demonstrated to sequester mercury, it is reasonable to expect that future mercury concentrations in Tailings Basin pond and seepage will be similar to or less than existing conditions. The values assumed for this evaluation are seepage mercury concentration of 1.0 ng/L, pond mercury concentration of 2.0 ng/L, and runoff concentrations of 1.0 and 3.5 ng/L, depending on whether the runoff interacts with tailings.

The WWTP will use greensand filtration followed by RO technology. RO treatment plants are known to remove mercury, particularly when the RO system is preceded by pretreatment. Specific removal efficiencies when treating waters with low concentrations of mercury (i.e., concentrations less than 1.3 ng/L) are not yet well established in practice, although a recent evaluation (Reference (72)) indicates that RO with pretreatment is capable of controlling mercury to meet the 1.3 ng/L limit. Therefore, in the event that mercury concentrations in WWTP influent flows exceed projections, it is likely that the WWTP would effectively reduce mercury concentration below the 1.3 ng/L water quality standard. Monitoring of the WWTP waters for constituents, including total mercury, will determine whether the treated water can be discharged to surface waters or whether additional treatment is needed.

Given the available information and data, the total mercury concentration of WWTP discharge water is anticipated to meet the applicable water quality standard of 1.3 ng/L.

Revision History

Date	Version	Description
12/17/2010	1	Initial release
07/15/2011	2	Submittal to accompany NorthMet Plant Site Water Modeling Work Plan Major updates to majority of document. New or significantly revised sections have section titles highlighted in gray.
11/11/2011	3	Updated based on agency comments on Version 2. New or significantly revised sections or paragraphs are highlighted in gray. Minor changes have only the affected sentence highlighted in gray.
12/02/2011	4	Updated based on agency comments on Version 3. All highlights removed.

Date	Version	Description
03/14/2012	5	Section 2.4 (Water Appropriations) is now its own section Added text concerning the hydraulic conductivity tests in the surficial wells at the Plant Site in Section 4.3.2.2 Modified calculated numbers in Section 4.5.1 to reflect the updated analysis in Section 4.3.2.2 Updated versions of references (such as the Work Plan Version 4 in Section 5.1) Updated Section 5.3.2 to reflect the recently submitted Calibration report, version 4, and added Reference (73) Refined the definition of recharge to represent "net" recharge in Section 5.4.1, 5.4.5.1 and others Updated the Modified text in Section 5.4.2 to describe how K and R are used in the groundwater flow modeling Added text to Sections 5.4.2, 6.1.3.5, and others concerning the variability of Tailings Basin seepage both through time and between realizations. Added text to Section 5.4.3 to discuss why there is no groundwater flow path towards Heikkilla Lake. Modified text in Section 5.4.5.2 to discuss the methods used to define the uncertainty in hydraulic conductivity based on field data. Updated Table 5-6 in Section 5.5 to reflect CDF051. Added Section 5.9 to discuss the initiation of the Draft Alternative water quality model Added text to Section 6.1.2, 6.1.3.2, 6.1.4, and 6.1.5.2 to discuss plant uptime Added text to Section 6.1.3.1, Figure 6-1, Figure 6-2, and Table 6-3 discussing increased evaporation rates in operations due to heated discharge from the plants Modified text in Section 6.1.3.1 and Table 6-5 to discuss the method by which negative infiltration rates are eliminated from the model. Updated the numbers in section 6.1.3.1.1 to account for model refinement and increased detail with respect to the existing LTVSMC Tailings Basin Modified text in Section 6.1.3.8 discussing the modeling of the buttresses Added text to Section 6.2.3 discussing the leakage rate calculations from the Hydrometallurgical Residue Facility
04/13/2012	6	Edits in response to agency comments
07/02/2012	7	Updated Table 5-6 to reflect CDF051 Updated Section 5.3.2 to reflect CDF053 Updated Section 6.1.2 and Section 6.1.4 to reflect CDF054

Date	Version	Description
02/15/2013	8	General edits to Sections 1-4 to improve readability and constancy within the document and with other documents Edits to Section 2.2 to incorporate 2012 MPCA guidance Edits to Section 2.3 to include the site-specific groundwater evaluation criteria for Be and Mn Edits to Section 3.1 to make consistent with current modeling framework Edits to Section 4.3.2.2 to incorporate additional detail on groundwater flow directions Edits to Section 4.3.4.2 added to provide information of the development of the site-specific groundwater evaluation criteria for Be and Mn Previous Sections 5 and 6 were combined into the new Section 5; Work Plan text and figures were also incorporated into this Section
03/01/2013	9	Section 6, presenting model results, added
01/09/2015	10	Throughout, what was referred to as the “No Action” Model has been changed to the “Continuation of Existing Conditions Scenario” Model to be in agreement with the SDEIS. Section 2 includes minor updates to address comments on the previous version, and includes more significant changes to Section 2.5. Section 4 included updates to the discussion of baseline data because additionally collected water quality data (mainly through 2013) was included in the modeling for the FEIS and therefore in this version of the Water Modeling Data Package. Section 5 was updated to include such Project changes as using only the WWTP to augment the Embarrass River tributaries instead of both the WWTP and Colby Lake, building the drainage swale to the east of the Tailings Basin right away in the Project, and including the Sewage Treatment Plant effluent as a source of water and mass loading to the FTB Pond. The whole of section 6 has been updated with results from the modeling for the FEIS. Large Tables and Large Figures were reordered towards the end to match with the flow of the text. Switched Attachment L (QAPP in Version 9) and Attachment M (WWTP influent water quality in Version 9).

Date	Version	Description
03/13/2015	11	Updated the document to reflect Co-lead Agency comments on version 10. Changes are listed below: Text removed from Section 2.2 regarding the seasonality of the wild rice standard. Text added to section 2.4 regarding water appropriations. Minor text and grammar edits throughout as recommended by the Co-lead Agencies. Added a footnote to Table 5-20 regarding flow through the diversion swale. Added text to section 5.2.2.9.1 regarding the capacitiy of the WWTP. Modified the caption of Figure 6-3. Removed the standard line from Figure 6-104. Added text to sections 4.3.4.1 and 4.4.4.1 to further describe the concentrations that were used to develop baseline conditions.

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Large Table 1
Surface Water Quality Standards
Applicable to the NorthMet Project - Plant Site Modeling

		Standards Applicable to Partridge and Embarrass Rivers and Tributaries			
Constituent	**Units**	**2B Statewide Waters**	**2B Lake Superior Basin**	**3C Statewide Waters**	**4A Statewide Waters**
Ag	mg/L	**0.001**			
Al	mg/L	**0.125**			
Alkalinity	mg/L				
As	mg/L	0.053	**0.053**		
B	mg/L				**0.5**
Ba	mg/L				
Be	mg/L				
Ca	mg/L				
Cd	mg/L	0.0011 + [0.7852, -3.490]	**0.0025 +** [0.7852, -2.715]		
Cl	mg/L	**230**		250	
Co	mg/L	**0.005**			
Cr^6	mg/L	0.011	**0.011**		
Cu	mg/L	0.0098 + [0.62, -0.57]	**0.0093 +** [0.8545, -1.702]		
F	mg/L				
Fe	mg/L				
Hardness	mg/L			**500**	
Hg	ng/L	6.9	**1.3**		
K	mg/L				
Mg	mg/L				
Mn	mg/L				
Na	mg/L				
Ni	mg/L	0.158 + [0.846, 1.1645]	**0.052 +** [0.846, 0.0584]		
Pb	mg/L	**0.0032 +** [1.273, -4.705]			
Sb	mg/L	**0.031**			
Se	mg/L	0.005	**0.005**		
SO_4	mg/L				**10 (at wild rice)**
Tl	mg/L	**0.00056**			
V	mg/L				
Zn	mg/L	0.106 + [0.8473, 0.7615]	**0.12 +** [0.8473, 0.884]		

- Standards in bold are used to evaluate the water quality modeling results of the NorthMet Project. Where standards are defined for both "Statewide Waters" (part 7050) and "Lake Superior Basin Waters" (part 7052), the "Lake Superior Basin Waters" standards govern, even if less stringent.
- Minnesota Class 4B, 5 and 6 Surface Water Quality are applicable for the waterbodies near the NorthMet Project and do not have standards related to the parameters listed above.
- Standards highlighted green were developed to protect against aquatic toxicity. Those highlighted orange were developed to protect human health. Those highlighted blue were developed to protect other uses (irrigation, industrial, aesthetic)
- Numbers in parentheses indicate a Secondary Maximum Contaminant Level.
- Standards marked + assume a total hardness of 100 mg/L for Class 2B and 2Bd. Actual equations take the following form, where the coefficients A and B are shown in brackets: $Standard\left(\frac{ug}{L}\right) = e^{A \times \ln\left(Total\,Hardness\ {}^{mg}/_{L}\right) + B}$

Large Table 2
Groundwater Quality Standards
Applicable to the NorthMet Project - Plant Site Modeling

Constituent	Units	EPA MCL	MDH HRL	EPA sMCL	Evaluation Criteria used for Project
Ag	mg/L		0.03	0.1	0.03
Al	mg/L			0.05 - 0.2	--(1)
Alkalinity	mg/L				--
As	mg/L	0.01			0.01
B	mg/L		1		1
Ba	mg/L	2	2		2
Be	mg/L	0.004	0.00008		0.00054(2)
Ca	mg/L				--
Cd	mg/L	0.005	0.004		0.004
Cl	mg/L			250	250
Co	mg/L				--
Cr^6	mg/L	0.1	0.1		0.1
Cu	mg/L	N/A		1	1
F	mg/L	4		2	2
Fe	mg/L			0.3	--(1)
Hardness	mg/L				--
Hg	mg/L	0.002			0.002
K	mg/L				--
Mg	mg/L				--
Mn	mg/L		0.1	0.05	0.704(2)
Na	mg/L				--
Ni	mg/L		0.1		0.1
Pb	mg/L	N/A			--
Sb	mg/L	0.006	0.006		0.006
Se	mg/L	0.05	0.03		0.03
SO_4	mg/L			250	250
Tl	mg/L	0.002	0.0006		0.0006
V	mg/L		0.05		0.05
Zn	mg/L		2	5	2

(1) Secondary MCLs not considered due to high natural background conditions

(2) Site specific evaluation criteria developed for Be and Mn

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-001	GW-001	GW-001	GW-001	GW-001	GW-001	GW-001
		Date	8/17/2007	10/11/2007	5/6/2009	5/7/2009	5/6/2010	7/26/2010	10/5/2010
		Sample Type	N	N	N	N	N	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	**386 mg/l**	**339 mg/l**	**375 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	--	--	--	--	< 10 mg/l	< 10 mg/l	< 20 mg/l
Alkalinity, total	NA	Lab	**394 mg/l**	**387 mg/l**	**379 mg/l**	**384 mg/l**	**386 mg/l**	**339 mg/l**	**375 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	--	--	--	--	< 2.4 mg/l	< 3 mg/l	< 3 mg/l
Carbon, dissolved organic	NA	Lab	--	--	--	--	**8.9 mg/l**	**8.9 mg/l**	**9.2 mg/l**
Carbon, total organic	NA	Lab	**8.6 mg/l**	**9.1 mg/l**	**8.6 mg/l**	**8.7 mg/l**	**9.0 mg/l**	**8.5 mg/l**	**8.7 mg/l**
Chemical Oxygen Demand	NA	Lab	**48.0 mg/l**	**43 mg/l**	**24.1 mg/l**	**28.1 mg/l**	**34.3 mg/l**	**32.1 mg/l**	**35.2 mg/l**
Chloride	NA	Lab	**26.9 mg/l**	**27.3 mg/l**	**26.9 mg/l**	--	**26.4 mg/l**	**26.4 mg/l**	**27.1 mg/l**
Cyanide	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l	< 0.02 mg/l	< 0.02 mg/l
Dissolved oxygen	NA	Field	**4.11 mg/l**	**1.99 mg/l**	--	**1.74 mg/l**	**5.36 mg/l**	**4.62 mg/l**	**3.0 mg/l**
Fluoride	NA	Lab	< 0.1 mg/l	**0.11 mg/l**	**0.15 mg/l**	--	**0.18 mg/l**	**0.15 mg/l**	**0.19 mg/l**
Hardness, total, as CaCO3	NA	Lab	**367 mg/l**	**352 mg/l**	**371 mg/l**	**352 mg/l**	**369 mg/l**	**328 mg/l**	**384 mg/l**
Nitrate + Nitrite, as N	NA	Lab	--	**0.11 mg/l**	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.15 mg/l**	**0.13 b mg/l**	**0.1 mg/l**	< 0.1 mg/l	**0.13 mg/l**	**0.11 mg/l**	**0.16 mg/l**
Nitrogen, Nitrate as N	NA	Lab	< 0.1 h mg/l	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	< 0.05 h mg/l	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**7.1 pH units**	**7.2 pH units**	**7.1 pH units**	**7.2 pH units**	**7.5 pH units**	**7.7 pH units**	**7.4 pH units**
pH	NA	Field	**6.88 pH units**	**7.22 pH units**	--	**7.31 pH units**	**6.68 pH units**	**6.74 pH units**	**8.00 pH units**
Phosphorus, total	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	**0.11 mg/l**	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	**429 mV**	**554 mV**	--	**454 mV**	**591 mV**	**562 mV**	**560 mV**
Solids, total dissolved	NA	Lab	--	--	--	--	**537 mg/l**	**455 mg/l**	**509 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**831 umhos/cm**	**842 umhos/cm**	--	**885 umhos/cm**	**835 umhos/cm**	**902 umhos/cm**	**753 umhos/cm**
Sulfate	NA	Lab	**36.8 mg/l**	**36.8 mg/l**	**34.3 mg/l**	--	**34 mg/l**	**33.4 mg/l**	**33.3 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**9.1 deg C**	**5.7 deg C**	--	**3.5 deg C**	**7.6 deg C**	**7.9 deg C**	**8.6 deg C**
Turbidity	NA	Field	**48 NTU**	**35.5 NTU**	--	**104 NTU**	**187 NTU**	**146 NTU**	**2.1 NTU**
Water Elevation, ft/MSL	NA	Field	**1486.33**	**1486.37**	**1486.3**	**1486.21**	**1486.17**	--	**1486.15**
Metals									
Aluminum	Dissolved	Lab	< 10 ug/l	< 10 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**1600 ug/l**	**1100 ug/l**	**42.6 ug/l**	**3060 ug/l**	**823 ug/l**	**1080 ug/l**	**342 ug/l**
Antimony	Dissolved	Lab	--	< 0.50 ug/l	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	--	< 2.0 ug/l	< 2 ug/l	--	--	< 1 ug/l	< 1 ug/l
Arsenic	Total	Lab	< 10 ug/l	< 2.0 ug/l	< 2 ug/l	< 2 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	--	**250 ug/l**	--	--	--	--	--
Barium	Total	Lab	**300 ug/l**	**280 ug/l**	**260 ug/l**	**285 ug/l**	**271 ug/l**	**229 ug/l**	**269 ug/l**
Beryllium	Dissolved	Lab	--	< 2.0 ug/l	--	--	--	--	--
Beryllium	Total	Lab	< 1.0 ug/l	< 2.0 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	--	**290 ug/l**	--	--	--	--	--
Boron	Total	Lab	**300 ug/l**	**260 ug/l**	**297 ug/l**	**269 ug/l**	**256 ug/l**	**254 ug/l**	**276 ug/l**
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	**0.98 ug/l**	< 0.2 ug/l	**0.62 ug/l**	< 0.2 ug/l	**0.3 ug/l**	< 0.2 ug/l
Calcium	Dissolved	Lab	--	**71000 ug/l**	--	--	--	--	--
Calcium	Total	Lab	**76000 ug/l**	**71700 ug/l**	**74700 ug/l**	**71100 ug/l**	**74300 ug/l**	**61800 ug/l**	**77500 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	< 2.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	< 5.0 ug/l	**7.7 b ug/l**	< 1 ug/l	**6.4 ug/l**	**1.67 ug/l**	**2.96 ug/l**	**1.4 ug/l**
Cobalt	Dissolved	Lab	--	**0.37 ug/l**	--	--	--	--	--
Cobalt	Total	Lab	**1.4 ug/l**	**1.1 ug/l**	**0.32 ug/l**	**2.5 ug/l**	**0.85 ug/l**	**0.92 ug/l**	**0.5 ug/l**
Copper	Dissolved	Lab	**0.92 b ug/l**	**0.93 ug/l**	**0.83 ug/l**	**1.5 b ug/l**	**1.38 b ug/l**	**5.41 b ug/l**	**1.01 ug/l**
Copper	Total	Lab	**7.9 ug/l**	**7.5 ug/l**	**0.96 ug/l**	**13.6 ug/l**	**5.78 b ug/l**	**9.75 ug/l**	**3.36 ug/l**
Iron	Dissolved	Lab	--	**11000 ug/l**	--	--	--	**7850 ug/l**	**9430 ug/l**
Iron	Total	Lab	**14000 ug/l**	**13000 ug/l**	**10800 ug/l**	**14700 ug/l**	**11600 ug/l**	**8690 ug/l**	**10800 ug/l**
Lead	Dissolved	Lab	--	< 0.60 ug/l	--	--	--	--	--
Lead	Total	Lab	**1.2 ug/l**	**5.6 ug/l**	< 0.5 ug/l	**2.9 ug/l**	**0.64 ug/l**	**1.52 b ug/l**	< 0.5 ug/l
Magnesium	Dissolved	Lab	--	**42000 ug/l**	--	--	--	--	--
Magnesium	Total	Lab	**43000 ug/l**	**42000 ug/l**	**44700 ug/l**	**42500 ug/l**	**44600 ug/l**	**42100 ug/l**	**46400 ug/l**
Manganese	Dissolved	Lab	--	**2200 ug/l**	--	--	**3230 ug/l**	**3620 ug/l**	**3160 ug/l**
Manganese	Total	Lab	**2400 ug/l**	**2300 ug/l**	**2740 ug/l**	**2740 ug/l**	**3610 ug/l**	**2940 ug/l**	**3440 ug/l**
Mercury	Total	Lab	--	**0.0046 ug/l**	--	**0.0025 ug/l**	**0.0031 ug/l**	**0.0031 ug/l**	**0.0009 ug/l**
Mercury methyl	Total	Lab	--	< 0.00005 ug/l	--	**0.00014 b ug/l**	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**8.6 b ug/l**	**8.0 ug/l**	**8.9 ug/l**	**9.5 ug/l**	**9.45 ug/l**	**10.2 ug/l**	**9.64 ug/l**
Molybdenum	Total	Lab	**8.7 ug/l**	**8.0 ug/l**	**9.3 ug/l**	**9.9 ug/l**	**8.82 ug/l**	**9.95 ug/l**	**10.1 ug/l**
Nickel	Dissolved	Lab	**3.1 b ug/l**	**4.4 ug/l**	**2.2 ug/l**	**2.1 ug/l**	**2.04 ug/l**	**2.64 ug/l**	**1.94 ug/l**
Nickel	Total	Lab	**6.6 ug/l**	**7.6 ug/l**	**2.1 ug/l**	**10.9 ug/l**	**3.85 ug/l**	**4.6 ug/l**	**3.12 ug/l**
Palladium	Total	Lab	< 0.3 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	< 0.30 ug/l	--	--	--	--	--
Platinum	Dissolved	Lab	--	< 0.30 ug/l	--	--	--	--	--
Platinum	Total	Lab	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	**3200 ug/l**	--	--	--	--	--
Potassium	Total	Lab	**4000 ug/l**	**3500 ug/l**	**3460 ug/l**	**3600 ug/l**	**3710 ug/l**	**3460 ug/l**	**3260 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 10 ug/l	**1.3 ug/l**	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	**1.09 ug/l**
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	**60000 ug/l**	--	--	--	--	--
Sodium	Total	Lab	**65000 ug/l**	**61000 ug/l**	**50100 ug/l**	**54000 ug/l**	**55500 ug/l**	**51300 ug/l**	**53300 ug/l**
Strontium	Dissolved	Lab	--	**240 ug/l**	--	--	--	--	--
Strontium	Total	Lab	**250 ug/l**	**240 ug/l**	**258 ug/l**	**289 ug/l**	**260 ug/l**	**247 ug/l**	**273 ug/l**
Thallium	Dissolved	Lab	--	< 0.40 ug/l	--	--	--	--	--
Thallium	Total	Lab	< 0.40 ug/l	< 0.40 ug/l	< 0.4 ug/l	< 0.4 ug/l	**0.53 ug/l**	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	**2.8 ug/l**	--	--	--	--	--
Titanium	Total	Lab	**57 ug/l**	**40 ug/l**	< 10 ug/l	**160 ug/l**	**38 ug/l**	**49 ug/l**	**16 ug/l**
Zinc	Dissolved	Lab	**17 ug/l**	**16 ug/l**	< 6 ug/l	**17.6 ug/l**	< 6 ug/l	**50.8 b ug/l**	< 6 ug/l
Zinc	Total	Lab	< 30 ug/l	**33 ug/l**	< 6 ug/l	**27.3 ug/l**	< 6 ug/l	**74.9 ug/l**	**6.46 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-001	GW-001	GW-001	GW-001	GW-001		GW001
		Date	7/19/2011	10/4/2011	11/1/2011	4/25/2012	7/19/2012		10/2/2012
		Sample Type	N	N	N	N	N	FD	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**385 mg/l**	**391 mg/l**	**387 mg/l**	**394 mg/l**	**386 mg/l**	**389 mg/l**	**398 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 20 mg/l	--	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l
Alkalinity, total	NA	Lab	**385 mg/l**	**391 mg/l**	**387 mg/l**	**394 mg/l**	**386 mg/l**	**389 mg/l**	**398 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 3 mg/l	< 4 mg/l	--	< 4.0 mg/l	< 4.0 mg/l	< 4.0 mg/l	< 8.0 mg/l
Carbon, dissolved organic	NA	Lab	**9.1 mg/l**	**9.8 mg/l**	**9.2 mg/l**	**9.2 mg/l**	**8.5 mg/l**	**8.9 mg/l**	**8.4 mg/l**
Carbon, total organic	NA	Lab	**8.9 mg/l**	**9.4 mg/l**	**9.3 mg/l**	**8.9 mg/l**	**8.2 mg/l**	**9.8 mg/l**	**8.7 mg/l**
Chemical Oxygen Demand	NA	Lab	**44.8 mg/l**	**52.9 mg/l**	--	**23.2 mg/l**	**24.6 mg/l**	**23.2 mg/l**	**25.4 mg/l**
Chloride	NA	Lab	**26.3 mg/l**	**26.3 mg/l**	**27 mg/l**	**26.5 mg/l**	**27.7 mg/l**	**27.7 mg/l**	**27.2 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	--	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	**0.0107 mg/l**
Dissolved oxygen	NA	Field	**1.67 mg/l**	**2.4 mg/l**	**879 mg/l**	**1.47 mg/l**	**1.38 mg/l**	--	**1.35 mg/l**
Fluoride	NA	Lab	**0.16 mg/l**	**0.17 mg/l**	**0.15 mg/l**	**0.15 mg/l**	**0.16 mg/l**	**0.16 mg/l**	< 0.10 mg/l
Hardness, total, as CaCO3	NA	Lab	**346 mg/l**	**350 mg/l**	--	**365 mg/l**	**373 mg/l**	**367 mg/l**	**384 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	**0.11 mg/l**	--	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.16 mg/l**	**0.12 mg/l**	**0.16 mg/l**	**0.17 mg/l**	**0.15 mg/l**	**0.17 mg/l**	**0.13 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	< 0.1 mg/l	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	< 0.1 mg/l	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	< 0.02 mg/l	--	--	--	--
pH	NA	Lab	**7.5 pH units**	**7.4 pH units**	--	**5.2 pH units**	**7.2 pH units**	**7.1 pH units**	**7.5 pH units**
pH	NA	Field	**6.45 pH units**	**6.9 pH units**	**7.00 pH units**	**7.01 pH units**	**6.84 pH units**	--	**6.81 pH units**
Phosphorus, total	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**408 mV**	**198 mV**	**152 mV**	**303 mV**	**38 mV**	--	**2 mV**
Solids, total dissolved	NA	Lab	**506 mg/l**	**586 mg/l**	**555 mg/l**	**523 mg/l**	**494 mg/l**	**473 mg/l**	**495 mg/l**
Solids, total suspended	NA	Lab	--	--	**42 mg/l**	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	**640 umhos/cm**	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**803.5 umhos/cm**	**883 umhos/cm**	**879 umhos/cm**	**869 umhos/cm**	**874.3 umhos/cm**	--	**881.1 umhos/cm**
Sulfate	NA	Lab	**31.8 mg/l**	**30.3 mg/l**	**31.6 mg/l**	**29.7 mg/l**	**31.9 mg/l**	**31.8 mg/l**	**30.1 mg/l**
Sulfide	NA	Lab	--	--	< 5.0 mg/l	--	--	--	--
Temperature, degrees C	NA	Field	**7.75 deg C**	**7.3 deg C**	**6.61 deg C**	**7.3 deg C**	**10.19 deg C**	--	**8.08 deg C**
Turbidity	NA	Field	**37.6 NTU**	**32.7 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	--	**0 NTU**
Water Elevation, ft/MSL	NA	Field	**1485.11**	**1484.9**	**1485.45**	**1485.81**	**1485.76**	--	**1485.78**
Metals									
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	--	< 20.0 ug/l	**25.0 ug/l**	**24.6 ug/l**	**22.7 ug/l**
Aluminum	Total	Lab	**484 ug/l**	**1110 ug/l**	**247 ug/l**	< 20.0 ug/l	**35.4 ug/l**	**36.5 ug/l**	**33.5 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	Lab	< 0.5 ug/l	**0.54 ug/l**	--	**0.58 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	**262 e ug/l**	**240 ug/l**	--	--	**239 ug/l**	**236 ug/l**	**230 ug/l**
Barium	Total	Lab	**261 ug/l**	**273 ug/l**	**264 ug/l**	**267 ug/l**	**264 ug/l**	**257 ug/l**	**248 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	**256 ug/l**	**259 ug/l**	--	**258 ug/l**	**263 ug/l**	**267 ug/l**	**266 ug/l**
Boron	Total	Lab	**254 ug/l**	**264 ug/l**	**262 ug/l**	**262 ug/l**	**266 ug/l**	**263 ug/l**	**266 ug/l**
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	**0.34 ug/l**	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**69200 ug/l**	**72200 ug/l**	**75500 ug/l**	**72400 ug/l**	**73600 ug/l**	**71900 ug/l**	**77100 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Chromium	Total	Lab	**1.1 ug/l**	**2.19 ug/l**	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Cobalt	Dissolved	Lab	**0.23 ug/l**	**0.27 ug/l**	--	--	**0.31 ug/l**	**0.29 ug/l**	**0.31 ug/l**
Cobalt	Total	Lab	**0.77 ug/l**	**1.17 ug/l**	--	**0.27 ug/l**	**0.31 ug/l**	**0.31 ug/l**	**0.34 ug/l**
Copper	Dissolved	Lab	< 0.7 ug/l	< 0.7 ug/l	--	**0.58 ug/l**	**0.52 ug/l**	**0.61 ug/l**	**0.52 ug/l**
Copper	Total	Lab	**4.34 ug/l**	**6.61 ug/l**	--	**0.64 ug/l**	**0.56 ug/l**	**0.65 ug/l**	**0.64 ug/l**
Iron	Dissolved	Lab	**7670 ug/l**	**8370 ug/l**	**9440 ug/l**	**9810 ug/l**	**5970 ug/l**	**5950 ug/l**	**7100 ug/l**
Iron	Total	Lab	**11700 ug/l**	**12000 ug/l**	**11400 ug/l**	**10600 ug/l**	**10800 ug/l**	**10700 ug/l**	**11100 ug/l**
Lead	Dissolved	Lab	< 0.5 ug/l	< 0.5 ug/l	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Total	Lab	**0.94 ug/l**	**3.62 ug/l**	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**42200 ug/l**	**41300 ug/l**	**44400 ug/l**	**44700 ug/l**	**46000 ug/l**	**45600 ug/l**	**46500 ug/l**
Manganese	Dissolved	Lab	**3560 ug/l**	**3160 ug/l**	--	**3670 ug/l**	**3580 ug/l**	**3630 ug/l**	**3280 ug/l**
Manganese	Total	Lab	**3280 ug/l**	**3380 ug/l**	**3380 ug/l**	**3640 ug/l**	**3480 ug/l**	**3470 ug/l**	**3360 ug/l**
Mercury	Total	Lab	**0.0016 ug/l**	**0.0026 ug/l**	--	< 0.00050 ug/l	**0.00056 ug/l**	**0.00061 ug/l**	**0.00063 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	--	< 0.0001 ug/l	< 0.00005 ug/l	< 0.00005 ug/l	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	**8.69 ug/l**	**8.91 ug/l**	--	**8.8 ug/l**	**9.1 ug/l**	**8.7 ug/l**	**9.0 ug/l**
Molybdenum	Total	Lab	**8.7 ug/l**	**9.22 ug/l**	--	**8.9 ug/l**	**9.1 ug/l**	**8.8 ug/l**	**8.8 ug/l**
Nickel	Dissolved	Lab	< 0.6 ug/l	< 0.6 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Total	Lab	**2.61 ug/l**	**3.58 ug/l**	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.57 ug/l**
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**2520 ug/l**	**2840 ug/l**	**2930 ug/l**	**2900 ug/l**	**2900 ug/l**	**2800 ug/l**	**3100 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	**26100 ug/l**	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**50000 ug/l**	**49700 ug/l**	**52400 ug/l**	**52200 ug/l**	**52100 ug/l**	**51000 ug/l**	**53400 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**252 ug/l**	**256 ug/l**	**267 ug/l**	**267 ug/l**	**269 ug/l**	**263 ug/l**	**280 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	**25 ug/l**	**50 ug/l**	--	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l
Zinc	Dissolved	Lab	< 6 ug/l	**8.14 ug/l**	--	< 6.0 ug/l	**9.4 ug/l**	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	< 6 ug/l	**9.64 ug/l**	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW001		GW001		GW001	GW001	GW-002
		Date	4/29/2013		7/3/2013		10/3/2013	10/10/2013	8/17/2007
		Sample Type	N	FD	N	FD	N	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**402 mg/l**	**399 mg/l**	**395 mg/l**	--	**405 mg/l**	--	--
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	< 20.0 mg/l	--	< 10.0 mg/l	--	--
Alkalinity, total	NA	Lab	**402 mg/l**	**399 mg/l**	**395 mg/l**	--	**405 mg/l**	--	**46.5 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 4.0 * mg/l	< 4.0 * mg/l	< 2.4 * mg/l	--	--	< 2.4 * mg/l	--
Carbon, dissolved organic	NA	Lab	**8.5 mg/l**	**8.7 mg/l**	**9.3 mg/l**	--	**8.3 mg/l**	--	--
Carbon, total organic	NA	Lab	**8.8 mg/l**	**8.7 mg/l**	**8.3 mg/l**	--	**7.3 mg/l**	--	**1.9 mg/l**
Chemical Oxygen Demand	NA	Lab	**28.2 mg/l**	**29.6 mg/l**	**31.4 mg/l**	--	**37.8 mg/l**	--	< 10 mg/l
Chloride	NA	Lab	**27.8 mg/l**	**27.6 mg/l**	**27.9 mg/l**	--	**28.1 mg/l**	--	**0.65 mg/l**
Cyanide	NA	Lab	**0.0113 mg/l**	**0.0219 mg/l**	< 0.0100 mg/l	--	**0.0104 mg/l**	--	< 0.02 mg/l
Dissolved oxygen	NA	Field	< 0.1 mg/l	--	**0.01 mg/l**	--	< 0.1 mg/l	**2.37 mg/l**	**1.75 mg/l**
Fluoride	NA	Lab	**0.15 mg/l**	**0.15 mg/l**	**0.14 mg/l**	--	**0.19 mg/l**	--	< 0.1 mg/l
Hardness, total, as CaCO3	NA	Lab	**365 mg/l**	**385 mg/l**	**368 mg/l**	--	**371 mg/l**	--	**66 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l	--	--
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.20 mg/l**	**0.19 mg/l**	**0.21 mg/l**	--	**0.18 mg/l**	--	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	< 0.1 h mg/l
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	< 0.05 h mg/l
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**7.6 pH units**	**7.5 pH units**	**4.1 pH units**	--	**7.2 pH units**	--	**7.4 pH units**
pH	NA	Field	**6.91 pH units**	--	**6.83 pH units**	--	**6.88 pH units**	**7.02 pH units**	**7.76 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l	--	**0.37 mg/l**
Redox (oxidation potential)	NA	Field	**101 mV**	--	**274 mV**	--	**139 mV**	**185 mV**	**398 mV**
Solids, total dissolved	NA	Lab	**490 mg/l**	**493 mg/l**	**514 mg/l**	--	**500 mg/l**	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**892.4 umhos/cm**	--	**872.5 umhos/cm**	--	**806.8 umhos/cm**	**883.5 umhos/cm**	**88 umhos/cm**
Sulfate	NA	Lab	**29.2 mg/l**	**29.1 mg/l**	**28.8 mg/l**	--	**30.1 mg/l**	--	**7.74 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**8.89 deg C**	--	**11.01 deg C**	--	**8.35 deg C**	**8.78 deg C**	**11.7 deg C**
Turbidity	NA	Field	**0.1 NTU**	--	**0 NTU**	--	**0 NTU**	**0 NTU**	**57 NTU**
Water Elevation, ft/MSL	NA	Field	**1485.83**	--	**1485.6**	--	**1485.6**	**1485.62**	**1784.71**
Metals			--	--	--	--	--	--	
Aluminum	Dissolved	Lab	**21.0 ug/l**	< 20.0 ug/l	**24.5 ug/l**	--	< 20.0 ug/l	--	**56 ug/l**
Aluminum	Total	Lab	**59.2 ug/l**	**56.4 ug/l**	**113 ug/l**	--	**47.2 ug/l**	--	**9800 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	**0.71 ug/l**	--	< 0.50 ug/l	--	--
Arsenic	Total	Lab	--	--	--	--	--	--	< 10 ug/l
Arsenic III	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	**239 ug/l**	**254 ug/l**	**246 ug/l**	--	**228 ug/l**	--	--
Barium	Total	Lab	**273 ug/l**	**283 ug/l**	**285 ug/l**	--	**245 ug/l**	--	**59 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	--	< 1.0 ug/l
Boron	Dissolved	Lab	**273 ug/l**	**264 ug/l**	**308 ug/l**	--	**293 ug/l**	--	--
Boron	Total	Lab	**265 ug/l**	**277 ug/l**	**296 ug/l**	--	**312 ug/l**	--	< 200 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	--	< 0.20 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	--	**0.44 ug/l**
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**72100 ug/l**	**76200 ug/l**	**72900 ug/l**	--	**74900 ug/l**	--	**15000 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	--	**1.7 ug/l**
Chromium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	--	**17 ug/l**
Cobalt	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	--	--
Cobalt	Total	Lab	**0.23 ug/l**	**0.23 ug/l**	**0.27 ug/l**	--	**0.21 ug/l**	--	**4.2 ug/l**
Copper	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	**1.9 b ug/l**
Copper	Total	Lab	**0.57 ug/l**	**0.55 ug/l**	**1.0 ug/l**	--	**0.68 ug/l**	--	**17 ug/l**
Iron	Dissolved	Lab	**8790 ug/l**	**8660 ug/l**	**9100 ug/l**	--	**9470 ug/l**	--	--
Iron	Total	Lab	**10400 ug/l**	**11100 ug/l**	**10500 ug/l**	--	**10300 ug/l**	--	**12000 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	--
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	**2.6 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**44800 ug/l**	**47200 ug/l**	**45200 ug/l**	--	**44600 ug/l**	--	**7000 ug/l**
Manganese	Dissolved	Lab	**3710 ug/l**	**3960 ug/l**	**3550 ug/l**	--	**3600 ug/l**	--	--
Manganese	Total	Lab	**3820 ug/l**	**3890 ug/l**	**3340 ug/l**	--	**3660 ug/l**	--	**230 ug/l**
Mercury	Total	Lab	**0.0031 b* ug/l**	**0.0011 b* ug/l**	**0.00088 ug/l**	**0.00053 ug/l**	**0.0015 ug/l**	--	--
Mercury methyl	Total	Lab	**0.00005 j ug/l**	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	--	--
Molybdenum	Dissolved	Lab	**9.2 ug/l**	**9.7 ug/l**	**9.1 ug/l**	--	**8.6 ug/l**	--	< 0.30 ug/l
Molybdenum	Total	Lab	**9.6 ug/l**	**9.7 ug/l**	**9.9 ug/l**	--	**8.9 ug/l**	--	**0.33 ug/l**
Nickel	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 1.0 ug/l	--	**1.1 b ug/l**
Nickel	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 1.0 ug/l	--	**15 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	< 0.30 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	< 0.30 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**2900 ug/l**	**3100 ug/l**	**2800 ug/l**	--	**3000 ug/l**	--	**2700 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	--	< 1.0 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	--	< 5.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	--	< 0.20 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	--	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**51500 ug/l**	**54500 ug/l**	**51400 ug/l**	--	**51400 ug/l**	--	**5500 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**270 ug/l**	**285 ug/l**	**265 ug/l**	--	**275 ug/l**	--	**92 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	**0.21 ug/l**	--	< 0.017 ug/l	--	< 0.40 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	--	< 10.0 ug/l	--	**820 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	< 6.0 ug/l	--	< 30 ug/l
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	< 6.0 ug/l	--	< 30 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location			GW-002	GW-002	GW-002	GW-002	GW-002	GW-002	GW-002
Date			10/10/2007	3/18/2009	3/17/2010	5/6/2010	10/6/2010	4/21/2011	7/18/2011
Sample Type			N	N	N	N	N	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**37.7 mg/l**	**21.4 mg/l**	**32.7 mg/l**	**26.6 mg/l**	**29.1 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	--	--	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	**34.1 mg/l**	**26.1 mg/l**	**37.7 mg/l**	**21.4 mg/l**	**32.7 mg/l**	**26.6 mg/l**	**29.1 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	--	--	< 6 mg/l	< 4 mg/l	< 2.4 mg/l	< 4 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	--	--	**4.5 mg/l**	**4.8 mg/l**	**2.7 mg/l**	**7.1 mg/l**	**4.3 mg/l**
Carbon, total organic	NA	Lab	**7.4 mg/l**	**4.4 b mg/l**	**4.2 mg/l**	**4.5 mg/l**	**1.5 mg/l**	**5.6 mg/l**	**3.7 mg/l**
Chemical Oxygen Demand	NA	Lab	**38 mg/l**	**23.1 b mg/l**	**34.2 mg/l**	**19.0 mg/l**	**16.5 mg/l**	**16.8 mg/l**	**16.6 mg/l**
Chloride	NA	Lab	**0.74 mg/l**	< 0.5 mg/l	**0.9 mg/l**	**0.56 mg/l**	< 0.5 mg/l	**1.2 mg/l**	**0.93 mg/l**
Cyanide	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	**0.0054 j mg/l**	< 0.0100 mg/l	< 0.02 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**5.11 mg/l**	**10.94 mg/l**	**3.76 mg/l**	**16.21 mg/l**	**8.2 mg/l**	**9.52 mg/l**	**7.7 mg/l**
Fluoride	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Hardness, total, as CaCO3	NA	Lab	**73.9 mg/l**	**42.3 mg/l**	**70.6 mg/l**	**39.6 mg/l**	**38.6 mg/l**	**38.9 mg/l**	**36.3 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.05 mg/l	< 0.05 mg/l	< 0.1 h mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**7.4 pH units**	**7.5 pH units**	**6.9 pH units**	**7.1 pH units**	**7.0 pH units**	--	**7.0 pH units**
pH	NA	Field	**7.95 pH units**	**8.06 pH units**	**6.96 pH units**	**7.26 pH units**	**5.3 pH units**	**7.59 pH units**	**7.4 pH units**
Phosphorus, total	NA	Lab	**0.41 mg/l**	**0.18 mg/l**	**0.24 mg P/L**	**0.46 mg P/L**	< 0.1 mg P/L	**0.12 h mg P/L**	**0.14 mg P/L**
Redox (oxidation potential)	NA	Field	**504 mV**	**390 mV**	**299 mV**	**638 mV**	**632 mV**	**337 mV**	**436 mV**
Solids, total dissolved	NA	Lab	--	--	--	**96.1 mg/l**	**90 mg/l**	**95 mg/l**	**88 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**122 umhos/cm**	**65 umhos/cm**	**109 umhos/cm**	**84 umhos/cm**	**225 umhos/cm**	**37.9 umhos/cm**	**55 umhos/cm**
Sulfate	NA	Lab	**6.39 mg/l**	**6.18 mg/l**	**7.21 mg/l**	**6.24 mg/l**	**6.56 mg/l**	**6.27 mg/l**	**6.22 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**8.9 deg C**	**6.5 deg C**	**7.7 deg C**	**7 deg C**	**13.6 deg C**	**12.21 deg C**	**16.6 deg C**
Turbidity	NA	Field	**321 NTU**	**786 NTU**	**477 NTU**	**1 NTU**	**16 NTU**	**178.1 NTU**	**6.8 NTU**
Water Elevation, ft/MSL	NA	Field	**1785.05**	**1784.38**	**1784.6**	**1783.9**	**1783.67**	**1785.35**	**1784.9**
Metals									
Aluminum	Dissolved	Lab	**110 ug/l**	< 25 ug/l	**87.5 ug/l**	**86.3 ug/l**	**43.2 ug/l**	**352 ug/l**	**74.6 ug/l**
Aluminum	Total	Lab	**16000 ug/l**	**4600 ug/l**	**11000 ug/l**	**5360 ug/l**	**2150 ug/l**	**6070 ug/l**	**2110 ug/l**
Antimony	Dissolved	Lab	< 0.50 ug/l	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 2.0 ug/l	--	--	--	< 1 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Total	Lab	**2.2 ug/l**	< 2 ug/l	< 2 ug/l	< 1 ug/l	< 1 ug/l	**0.96 ug/l**	< 0.5 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	**6.3 ug/l**	--	--	--	--	**5.96 ug/l**	**6.92 ug/l**
Barium	Total	Lab	**110 ug/l**	**47.1 ug/l**	**84.3 ug/l**	**49.5 ug/l**	**24.2 ug/l**	**56.7 ug/l**	**26.7 ug/l**
Beryllium	Dissolved	Lab	< 2.0 ug/l	--	--	--	--	--	--
Beryllium	Total	Lab	< 2.0 ug/l	< 0.2 ug/l	**0.22 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	< 200 ug/l	--	--	--	--	< 50 ug/l	< 50 ug/l
Boron	Total	Lab	< 200 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.23 ug/l**	< 0.2 ug/l	< 0.2 ug/l	**1.33 ug/l**
Cadmium	Total	Lab	**0.46 ug/l**	< 0.2 ug/l	**0.27 ug/l**	**0.23 ug/l**	< 0.2 ug/l	< 0.2 ug/l	**1.72 ug/l**
Calcium	Dissolved	Lab	**11000 ug/l**	--	--	--	--	--	--
Calcium	Total	Lab	**16600 ug/l**	**11400 ug/l**	**17800 ug/l**	**10300 ug/l**	**9740 ug/l**	**9800 ug/l**	**10500 ug/l**
Chromium	Dissolved	Lab	< 2.0 ug/l	**1.5 ug/l**	**1.5 ug/l**	**1.09 ug/l**	**1.14 ug/l**	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	**31 ug/l**	**13.4 ug/l**	**23.8 ug/l**	**13.8 ug/l**	**6.68 ug/l**	**16.9 ug/l**	**7.58 ug/l**
Cobalt	Dissolved	Lab	< 0.20 ug/l	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Cobalt	Total	Lab	**7.9 ug/l**	**2.8 ug/l**	**5.3 ug/l**	**2.8 ug/l**	**1.25 ug/l**	**3.85 ug/l**	**1.74 ug/l**
Copper	Dissolved	Lab	**4.7 ug/l**	**3.1 ug/l**	**4.3 ug/l**	**3.95 b ug/l**	**2.22 ug/l**	**2.91 b ug/l**	**3.36 ug/l**
Copper	Total	Lab	**32 ug/l**	**12.1 b ug/l**	**18.3 ug/l**	**13.3 ug/l**	**7.25 ug/l**	**14.7 ug/l**	**9.51 ug/l**
Iron	Dissolved	Lab	**100 ug/l**	--	--	--	< 50 ug/l	**288 ug/l**	**62.7 ug/l**
Iron	Total	Lab	**18000 ug/l**	**5170 ug/l**	**13100 ug/l**	**5610 ug/l**	**2320 ug/l**	**6810 ug/l**	**2470 ug/l**
Lead	Dissolved	Lab	< 0.60 ug/l	--	--	--	--	< 0.5 ug/l	< 0.5 ug/l
Lead	Total	Lab	**4.0 ug/l**	**1.8 ug/l**	**3 ug/l**	**1.57 ug/l**	**0.76 ug/l**	**2.11 ug/l**	**1.07 ug/l**
Magnesium	Dissolved	Lab	**1800 ug/l**	--	--	--	--	--	--
Magnesium	Total	Lab	**7880 ug/l**	**3360 ug/l**	**6350 ug/l**	**3360 ug/l**	**3460 ug/l**	**3500 ug/l**	**2450 ug/l**
Manganese	Dissolved	Lab	**12 ug/l**	--	--	**6.64 ug/l**	**1.88 ug/l**	**5.75 ug/l**	**2.56 ug/l**
Manganese	Total	Lab	**340 ug/l**	**102 ug/l**	**170 ug/l**	**87.5 ug/l**	**39.4 ug/l**	**128 ug/l**	**59.6 ug/l**
Mercury	Total	Lab	**0.0077 ug/l**	**0.0042 ug/l**	**0.0093 ug/l**	**0.0065 ug/l**	**0.0025 ug/l**	**0.0078 ug/l**	**0.0023 ug/l**
Mercury methyl	Total	Lab	< 0.00005 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	< 0.30 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.39 ug/l**
Molybdenum	Total	Lab	**0.48 ug/l**	**0.39 ug/l**	**0.41 ug/l**	< 0.2 ug/l	**0.22 ug/l**	< 5 ug/l	< 0.2 ug/l
Nickel	Dissolved	Lab	**2.0 ug/l**	**1.5 ug/l**	**1.1 ug/l**	**1.23 ug/l**	**1 ug/l**	**0.96 ug/l**	**0.94 ug/l**
Nickel	Total	Lab	**32 b ug/l**	**10.6 ug/l**	**19.5 ug/l**	**11.5 ug/l**	**5.35 ug/l**	**13.8 ug/l**	**6.79 ug/l**
Palladium	Total	Lab	< 0.30 ug/l	< 0.30 ug/l	< 0.030 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	< 0.30 ug/l	--	--	--	--	--	--
Platinum	Dissolved	Lab	< 0.30 ug/l	--	--	--	--	--	--
Platinum	Total	Lab	< 0.30 ug/l	< 0.30 ug/l	< 0.0090 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	**410 ug/l**	--	--	--	--	--	--
Potassium	Total	Lab	**4000 ug/l**	**950 ug/l**	**2350 ug/l**	**1170 ug/l**	**930 ug/l**	**1180 ug/l**	**530 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	**2500 ug/l**	--	--	--	--	--	--
Sodium	Total	Lab	**5400 ug/l**	**2190 ug/l**	**3230 ug/l**	**2440 ug/l**	**3330 ug/l**	**2490 ug/l**	**2910 ug/l**
Strontium	Dissolved	Lab	**42 ug/l**	--	--	--	--	--	--
Strontium	Total	Lab	**110 ug/l**	**51.8 ug/l**	**102 ug/l**	**50.7 ug/l**	**43.8 ug/l**	**51.9 ug/l**	**45.2 ug/l**
Thallium	Dissolved	Lab	< 0.40 ug/l	--	--	--	--	--	--
Thallium	Total	Lab	< 0.40 ug/l	< 0.4 ug/l	< 0.4 ug/l	**0.28 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	**5.2 ug/l**	--	--	--	--	--	--
Titanium	Total	Lab	**720 ug/l**	**275 ug/l**	**750 ug/l**	**300 ug/l**	**120 ug/l**	**359 ug/l**	**120 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	**8.7 b ug/l**	**10.3 ug/l**	**7.24 ug/l**	< 6 ug/l	**6.08 b ug/l**	**9.09 ug/l**
Zinc	Total	Lab	**48 ug/l**	**19 b ug/l**	**39.2 ug/l**	**17.7 ug/l**	**8.74 ug/l**	**18.8 ug/l**	**15.5 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-002	GW-002	GW-002	GW002	GW002	GW002	
		Date	10/4/2011	4/11/2012	7/19/2012	10/1/2012	4/29/2013	7/5/2013	
		Sample Type	N	N	N	N	N	N	FD
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**35.0 mg/l**	**17.6 mg/l**	**54.6 mg/l**	**36.3 mg/l**	**30.0 mg/l**	**27.6 mg/l**	--
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	--
Alkalinity, total	NA	Lab	**35.0 mg/l**	**17.6 mg/l**	**54.6 mg/l**	**36.3 mg/l**	**30.0 mg/l**	**27.6 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	Lab	< 4 mg/l	< 4.0 mg/l	< 2.4 mg/l	< 8.0 mg/l	< 4.0 * mg/l	< 4.0 * mg/l	--
Carbon, dissolved organic	NA	Lab	**3.6 mg/l**	**6.7 mg/l**	**2.6 mg/l**	**1.8 mg/l**	**5.2 mg/l**	**5.6 mg/l**	--
Carbon, total organic	NA	Lab	**2.5 mg/l**	**5.3 mg/l**	**3.5 mg/l**	**1.6 b mg/l**	**4.4 mg/l**	**5.2 mg/l**	--
Chemical Oxygen Demand	NA	Lab	**28.7 mg/l**	**27.8 mg/l**	< 10.0 mg/l	< 10.0 mg/l	**32.6 mg/l**	**26.1 mg/l**	--
Chloride	NA	Lab	**0.89 mg/l**	**1.4 mg/l**	< 0.50 mg/l	**0.64 mg/l**	**0.59 mg/l**	< 0.50 mg/l	--
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	--
Dissolved oxygen	NA	Field	**10.9 mg/l**	**10.65 mg/l**	**11.49 mg/l**	**9.37 mg/l**	**10.28 mg/l**	**8.75 mg/l**	--
Fluoride	NA	Lab	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Hardness, total, as CaCO3	NA	Lab	**55.9 mg/l**	**30.4 mg/l**	**37.3 mg/l**	**45.0 mg/l**	**51.3 mg/l**	**50.3 mg/l**	--
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	**0.080 mg/l**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**7.3 pH units**	**7.4 pH units**	**6.7 pH units**	**7.1 pH units**	**7.3 pH units**	**6.7 pH units**	--
pH	NA	Field	**7.9 pH units**	**7.5 pH units**	**6.11 pH units**	**6.7 pH units**	**7.42 pH units**	**7.4 pH units**	--
Phosphorus, total	NA	Lab	**0.48 mg P/L**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	**0.36 mg/l**	**0.32 mg/l**	--
Redox (oxidation potential)	NA	Field	**430 mV**	**416 mV**	**397 mV**	**171 mV**	**418 mV**	**332 mV**	--
Solids, total dissolved	NA	Lab	**117 mg/l**	**90.0 mg/l**	**81.0 mg/l**	**103 mg/l**	**82.0 mg/l**	**83.0 mg/l**	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**82 umhos/cm**	**58.6 umhos/cm**	**68.8 umhos/cm**	**0 umhos/cm**	**63.9 umhos/cm**	**56.5 umhos/cm**	--
Sulfate	NA	Lab	**6.18 mg/l**	**7.6 mg/l**	**6.4 mg/l**	**6.7 mg/l**	**5.5 mg/l**	**5.2 mg/l**	--
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**13.4 deg C**	**13.1 deg C**	**16.23 deg C**	**16.1 deg C**	**14.74 deg C**	**21.72 deg C**	--
Turbidity	NA	Field	**303.8 NTU**	**54.6 NTU**	**19.9 NTU**	**53.8 NTU**	**140.9 NTU**	**185.9 NTU**	--
Water Elevation, ft/MSL	NA	Field	--	**1783.34**	**1784.97**	**1784.48**	**1785.71**	**1784.74**	--
Metals							--	--	--
Aluminum	Dissolved	Lab	**39.3 ug/l**	**97.1 ug/l**	**59.5 ug/l**	**40.8 ug/l**	**100 ug/l**	**76.8 ug/l**	--
Aluminum	Total	Lab	**8340 ug/l**	**2620 ug/l**	**1700 ug/l**	**3190 ug/l**	**5880 ug/l**	**6000 ug/l**	--
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Dissolved	Lab	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Total	Lab	**1.32 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**0.91 ug/l**	--	--	--
Arsenic III	Total	Lab	--	--	--	--	**0.89 ug/l**	**1.4 ug/l**	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	< 10 ug/l	--	**6.3 ug/l**	**7.5 ug/l**	**6.8 ug/l**	**6.0 ug/l**	--
Barium	Total	Lab	**71.3 ug/l**	**25.6 ug/l**	**19.8 ug/l**	**32.1 ug/l**	**56.0 ug/l**	**54.7 ug/l**	--
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Boron	Dissolved	Lab	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	--
Boron	Total	Lab	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	--
Cadmium	Dissolved	Lab	**0.39 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Cadmium	Total	Lab	**0.72 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**13500 ug/l**	**8400 ug/l**	**11300 ug/l**	**11900 ug/l**	**13800 ug/l**	**12900 ug/l**	--
Chromium	Dissolved	Lab	< 1 ug/l	**2.4 ug/l**	**1.3 ug/l**	**1.5 ug/l**	**1.1 ug/l**	< 1.0 ug/l	--
Chromium	Total	Lab	**24.2 ug/l**	**7.2 ug/l**	**5.7 ug/l**	**7.8 ug/l**	**15.5 ug/l**	**18.2 ug/l**	--
Cobalt	Dissolved	Lab	< 0.2 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Cobalt	Total	Lab	**5.87 ug/l**	**1.6 ug/l**	**1.1 ug/l**	**1.8 ug/l**	**4.0 ug/l**	**4.5 ug/l**	--
Copper	Dissolved	Lab	**2.62 ug/l**	**2.9 ug/l**	**1.4 ug/l**	**1.1 ug/l**	**2.1 ug/l**	**1.9 ug/l**	--
Copper	Total	Lab	**20.3 ug/l**	**7.8 ug/l**	**4.7 ug/l**	**7.1 ug/l**	**12.4 ug/l**	**15.0 ug/l**	--
Iron	Dissolved	Lab	< 50 ug/l	**127 ug/l**	< 50.0 ug/l	< 50.0 ug/l	**154 ug/l**	< 50.0 ug/l	--
Iron	Total	Lab	**9020 ug/l**	**2850 ug/l**	**1850 ug/l**	**3310 ug/l**	**6380 ug/l**	**7070 ug/l**	--
Lead	Dissolved	Lab	< 0.5 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Lead	Total	Lab	**3.98 ug/l**	**0.82 ug/l**	**0.50 ug/l**	**0.87 ug/l**	**1.6 ug/l**	**1.9 ug/l**	--
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**5400 ug/l**	**2300 ug/l**	**2200 ug/l**	**3800 ug/l**	**4100 ug/l**	**4400 ug/l**	--
Manganese	Dissolved	Lab	< 10 ug/l	**2.0 ug/l**	**1.3 ug/l**	**1.4 ug/l**	**3.9 ug/l**	**2.9 ug/l**	--
Manganese	Total	Lab	**190 ug/l**	**48.1 ug/l**	**35.2 ug/l**	**58.5 ug/l**	**136 ug/l**	**143 ug/l**	--
Mercury	Total	Lab	**0.0045 ug/l**	**0.0030 ug/l**	**0.0019 ug/l**	**0.0020 ug/l**	**0.0071 ug/l**	**0.0063 ug/l**	**0.0057 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	**0.00007 j ug/l**	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	< 0.2 ug/l	< 0.20 ug/l	**0.41 ug/l**	< 0.20 ug/l	**0.31 ug/l**	< 0.30 ug/l	--
Molybdenum	Total	Lab	**0.39 ug/l**	< 0.20 ug/l	**0.60 ug/l**	**0.20 ug/l**	**0.37 ug/l**	< 0.30 ug/l	--
Nickel	Dissolved	Lab	**1.01 ug/l**	**1.5 ug/l**	**0.66 ug/l**	**0.87 ug/l**	**1.5 ug/l**	**0.95 ug/l**	--
Nickel	Total	Lab	**20.4 ug/l**	**6.9 ug/l**	**4.3 ug/l**	**7.1 ug/l**	**12.7 ug/l**	**15.2 ug/l**	--
Palladium	Total	Lab	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**1700 ug/l**	**640 ug/l**	**530 ug/l**	**850 ug/l**	**1400 ug/l**	**1200 ug/l**	--
Selenium	Dissolved	Lab	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Selenium	Total	Lab	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Silver	Total	Lab	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**4590 ug/l**	**2300 ug/l**	**2900 ug/l**	**4100 ug/l**	**2700 ug/l**	**3500 ug/l**	--
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**71.5 ug/l**	**38.3 ug/l**	**47.0 ug/l**	**57.2 ug/l**	**69.5 ug/l**	**67.2 ug/l**	--
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.20 ug/l	**0.59 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.017 ug/l	--
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	**510 ug/l**	**137 ug/l**	**105 ug/l**	**196 ug/l**	**333 ug/l**	**345 ug/l**	--
Zinc	Dissolved	Lab	**9.75 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**7.2 ug/l**	--
Zinc	Total	Lab	**30.4 ug/l**	**9.5 b ug/l**	**7.2 ug/l**	**10.9 ug/l**	**19.7 ug/l**	**24.5 ug/l**	--

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW002		GW002	GW-005	GW-005	GW-005	GW-005
		Date	10/3/2013		10/10/2013	3/20/2009	5/7/2009	3/17/2010	5/3/2010
		Sample Type	N	FD	N	N	N	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**31.4 mg/l**	--	--	--	--	**376 mg/l**	**439 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	--	--	--	--	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	**31.4 mg/l**	--	--	**337 mg/l**	--	**376 mg/l**	**439 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	--	--	< 2.4 * mg/l	--	--	< 4 mg/l	**13 mg/l**
Carbon, dissolved organic	NA	Lab	**2.3 mg/l**	--	--	--	--	**1.6 mg/l**	**2.2 mg/l**
Carbon, total organic	NA	Lab	**1.8 mg/l**	--	--	**1.5 b mg/l**	--	**1.9 mg/l**	**2.0 mg/l**
Chemical Oxygen Demand	NA	Lab	**10.1 mg/l**	--	--	**35.2 b mg/l**	--	**14 mg/l**	**43.4 mg/l**
Chloride	NA	Lab	< 1.0 mg/l	--	--	**29.6 mg/l**	--	**29.2 mg/l**	**28.9 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	--	--	< 0.02 mg/l	--	< 0.0035 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**8.81 mg/l**	--	--	**0.67 mg/l**	**1.39 mg/l**	**4.23 mg/l**	**2.91 mg/l**
Fluoride	NA	Lab	< 0.10 mg/l	--	--	**2.28 mg/l**	--	**1.98 mg/l**	**1.92 mg/l**
Hardness, total, as CaCO3	NA	Lab	**34.0 mg/l**	--	--	**532 mg/l**	--	**490 mg/l**	**707 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	--	--	< 0.1 mg/l	--	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	--	--	**0.52 mg/l**	--	**0.28 mg/l**	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**8.3 pH units**	--	--	**8.1 pH units**	--	**8.0 pH units**	**8.1 pH units**
pH	NA	Field	**7.34 pH units**	--	--	**7.66 pH units**	**8.47 pH units**	**8 pH units**	**7.57 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	--	--	**0.14 mg/l**	--	< 0.1 mg P/L	**0.62 mg P/L**
Redox (oxidation potential)	NA	Field	**476 mV**	--	--	**338 mV**	**253 mV**	**213 mV**	**469 mV**
Solids, total dissolved	NA	Lab	**90.0 mg/l**	--	--	--	--	--	**694 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**69.4 umhos/cm**	--	--	**1070 umhos/cm**	**885 umhos/cm**	**1140 umhos/cm**	**512 umhos/cm**
Sulfate	NA	Lab	**6.7 mg/l**	--	--	**283 mg/l**	**259 mg/l**	**250 mg/l**	**222 mg/l**
Sulfide	NA	Lab	--	--	--	--	**8 * mg/l**	--	--
Temperature, degrees C	NA	Field	**13.54 deg C**	--	--	**7.2 deg C**	**10.7 deg C**	**9.83 deg C**	**4.3 deg C**
Turbidity	NA	Field	**9.9 NTU**	--	--	**234 NTU**	**165 NTU**	**209 NTU**	**1 NTU**
Water Elevation, ft/MSL	NA	Field	**1784.68**	--	**1784.63**	**1598.76**	**1601.94**	**1602.43**	**1602.18**
Metals			--	--	--				
Aluminum	Dissolved	Lab	**66.5 ug/l**	--	--	< 25 ug/l	--	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**413 ug/l**	--	--	**3200 ug/l**	--	**1040 ug/l**	**21500 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	--	--	< 0.5 ug/l	--	< 0.5 ug/l	< 2.5 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	**6.7 ug/l**	**1.18 ug/l**	< 2 ug/l	**27.1 ug/l**
Arsenic III	Total	Lab	< 0.50 ug/l	--	--	--	**0.22 ug/l**	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	**0.81 ug/l**	--	--
Arsenic V	Total	Lab	--	--	--	--	**0.60 ug/l**	--	--
Barium	Dissolved	Lab	**7.9 ug/l**	--	--	--	--	--	--
Barium	Total	Lab	**10.9 ug/l**	--	--	**71.8 ug/l**	--	**41.8 ug/l**	**193 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	--	--	**0.66 ug/l**	--	< 0.2 ug/l	**2.17 ug/l**
Boron	Dissolved	Lab	< 50.0 ug/l	--	--	--	--	--	--
Boron	Total	Lab	< 50.0 ug/l	--	--	**390 ug/l**	--	**406 ug/l**	**441 ug/l**
Cadmium	Dissolved	Lab	< 0.20 ug/l	--	--	< 0.2 ug/l	--	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	--	--	**0.23 ug/l**	--	< 0.2 ug/l	**1.98 ug/l**
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**10300 ug/l**	--	--	**74400 ug/l**	--	**68000 ug/l**	**122000 ug/l**
Chromium	Dissolved	Lab	**1.3 ug/l**	--	--	< 1 ug/l	--	**1.6 ug/l**	< 1 ug/l
Chromium	Total	Lab	**2.0 ug/l**	--	--	**12.1 ug/l**	--	**22.2 ug/l**	**71.3 ug/l**
Cobalt	Dissolved	Lab	< 0.20 ug/l	--	--	--	--	--	--
Cobalt	Total	Lab	**0.27 ug/l**	--	--	**8.5 ug/l**	--	**2.2 ug/l**	**23.4 ug/l**
Copper	Dissolved	Lab	**1.1 ug/l**	--	--	**1.3 b ug/l**	--	**2.1 ug/l**	**4.03 b ug/l**
Copper	Total	Lab	**1.8 ug/l**	--	--	**26.5 ug/l**	--	**15.3 ug/l**	**89.4 ug/l**
Iron	Dissolved	Lab	**66.4 ug/l**	--	--	--	--	--	--
Iron	Total	Lab	**458 ug/l**	--	--	**67000 ug/l**	--	**12600 ug/l**	**190000 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	--	--	--	--	--	--
Lead	Total	Lab	< 0.50 ug/l	--	--	**4.7 ug/l**	--	**1.5 ug/l**	**20.9 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**2000 ug/l**	--	--	**84000 ug/l**	--	**77700 ug/l**	**97800 ug/l**
Manganese	Dissolved	Lab	**6.4 ug/l**	--	--	--	--	--	**340 ug/l**
Manganese	Total	Lab	**11.1 ug/l**	--	--	**3350 ug/l**	--	**967 ug/l**	**8820 ug/l**
Mercury	Total	Lab	**0.0013 ug/l**	**0.0013 ug/l**	--	**0.0061 ug/l**	--	**0.0082 ug/l**	**0.0181 ug/l**
Mercury methyl	Total	Lab	< 0.00003 ug/l	< 0.00003 ug/l	--	< 0.0001 ug/l	--	**0.00027 ug/l**	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	< 0.30 ug/l	--	--	**14.2 ug/l**	--	**28.3 ug/l**	**35.9 ug/l**
Molybdenum	Total	Lab	< 0.30 ug/l	--	--	**18.2 ug/l**	--	**31.3 ug/l**	**49.8 ug/l**
Nickel	Dissolved	Lab	**0.61 ug/l**	--	--	**4.1 ug/l**	--	**2.4 ug/l**	**3.56 ug/l**
Nickel	Total	Lab	**1.4 ug/l**	--	--	**34.7 ug/l**	--	**15.8 ug/l**	**108 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	--	--	< 0.30 ug/l	--	< 0.030 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	--	--	< 0.30 ug/l	--	**0.026 j ug/l**	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**500 ug/l**	--	--	**14000 ug/l**	--	**12000 ug/l**	**17800 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	--	--	< 1 ug/l	--	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	--	--	< 1 ug/l	--	< 1 ug/l	< 5 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	--	--	< 0.2 ug/l	--	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	--	--	< 0.2 ug/l	--	< 0.2 ug/l	< 1 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**3300 ug/l**	--	--	**99400 ug/l**	--	**91600 ug/l**	**101000 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**42.0 ug/l**	--	--	**350 ug/l**	--	**300 ug/l**	**396 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.017 ug/l	--	--	< 0.4 ug/l	--	< 0.4 ug/l	< 1 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	**17.8 ug/l**	--	--	**43.9 ug/l**	--	< 10 ug/l	**190 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	--	--	< 6 ug/l	--	**8.06 ug/l**	**7.25 ug/l**
Zinc	Total	Lab	< 6.0 ug/l	--	--	**22.8 b ug/l**	--	**16.6 ug/l**	**78.2 ug/l**

		Location	GW-005	GW-005	GW-005		GW-005	GW-005	GW-005
		Date	7/26/2010	10/5/2010	4/21/2011		7/18/2011	10/3/2011	4/26/2012
		Sample Type	N	N	N	FD	N	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**372 mg/l**	**392 mg/l**	**353 mg/l**	**371 mg/l**	**338 mg/l**	**337 mg/l**	**344 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 10 mg/l	< 10 mg/l	< 10.0 mg/l
Alkalinity, total	NA	Lab	**372 mg/l**	**392 mg/l**	**353 mg/l**	**371 mg/l**	**338 mg/l**	**337 mg/l**	**344 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	**4.2 mg/l**	**3.2 mg/l**	< 4 mg/l	< 4 mg/l	< 4 mg/l	< 3 mg/l	< 4.0 mg/l
Carbon, dissolved organic	NA	Lab	**2.0 mg/l**	**2.2 mg/l**	**2.4 h mg/l**	**2.1 mg/l**	**2.2 mg/l**	**2.4 mg/l**	**2.9 mg/l**
Carbon, total organic	NA	Lab	**1.6 mg/l**	**1.4 mg/l**	**1.7 h mg/l**	**1.5 mg/l**	**1.6 mg/l**	**2.1 mg/l**	**2.0 mg/l**
Chemical Oxygen Demand	NA	Lab	**18.7 mg/l**	**17.7 mg/l**	**47.6 h* mg/l**	**14.7 * mg/l**	**18.7 mg/l**	**30.2 mg/l**	< 10.0 mg/l
Chloride	NA	Lab	**31.4 mg/l**	**31.9 mg/l**	**30.8 h mg/l**	**31.4 mg/l**	**30.3 mg/l**	**30.3 mg/l**	**30.0 mg/l**
Cyanide	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**1.93 mg/l**	**1.4 mg/l**	**7.19 mg/l**	--	**2.05 mg/l**	**6.7 mg/l**	**9.57 mg/l**
Fluoride	NA	Lab	**2.04 mg/l**	**2.2 mg/l**	**2.22 h mg/l**	**2.14 mg/l**	**1.95 mg/l**	**1.99 mg/l**	**2.0 mg/l**
Hardness, total, as CaCO3	NA	Lab	**526 mg/l**	**548 mg/l**	**534 mg/l**	**552 mg/l**	**493 mg/l**	**552 mg/l**	**537 mg/l**
Nitrate + Nitrite, as N	NA	Lab	**0.1 mg/l**	< 0.1 mg/l	**0.13 h mg/l**	< 0.1 mg/l	< 0.1 mg/l	**0.16 mg/l**	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.16 mg/l**	**0.21 mg/l**	< 0.1 h mg/l	< 0.1 h mg/l	**0.2 mg/l**	**0.22 mg/l**	**0.23 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**8.0 pH units**	**8.0 pH units**	--	--	**8.1 pH units**	**7.9 pH units**	**8.1 pH units**
pH	NA	Field	**7.63 pH units**	**8.0 pH units**	**7.5 pH units**	--	**7.42 pH units**	**7.2 pH units**	**7.99 pH units**
Phosphorus, total	NA	Lab	**0.13 mg P/L**	< 0.1 mg P/L	< 0.1 h mg P/L	**0.72 h mg P/L**	< 0.1 mg P/L	**0.14 mg P/L**	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**407 mV**	**535 mV**	**368 mV**	--	**448 mV**	**495 mV**	**301 mV**
Solids, total dissolved	NA	Lab	**743 mg/l**	**840 mg/l**	**851 mg/l**	**849 mg/l**	**789 mg/l**	**886 mg/l**	**839 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**1098 umhos/cm**	**1027 umhos/cm**	**1278 umhos/cm**	--	**1115 umhos/cm**	**1294 umhos/cm**	**1359 umhos/cm**
Sulfate	NA	Lab	**265 mg/l**	**284 mg/l**	**323 mg/l**	**322 mg/l**	**298 mg/l**	**353 mg/l**	**333 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**11.99 deg C**	**15.8 deg C**	**14.49 deg C**	--	**18.38 deg C**	**13.2 deg C**	**7.26 deg C**
Turbidity	NA	Field	**150.8 NTU**	**81.4 NTU**	**151 NTU**	--	**78.9 NTU**	**238.7 NTU**	**45.3 NTU**
Water Elevation, ft/MSL	NA	Field	**1602.01**	**1601.97**	--	--	**1601.12**	**1600.27**	**1599.89**
Metals									
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	**40.6 ug/l**	< 20.0 ug/l
Aluminum	Total	Lab	**2940 ug/l**	**1380 ug/l**	**1850 ug/l**	**1640 ug/l**	**853 ug/l**	**2860 ug/l**	**387 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	**0.73 ug/l**	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 1.0 ug/l
Arsenic	Total	Lab	**5.4 ug/l**	**2.73 ug/l**	**1.9 * ug/l**	**3.33 * ug/l**	**1.83 ug/l**	**5.04 ug/l**	**1.2 ug/l**
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	**28.8 ug/l**	**29.4 ug/l**	**28.1 ug/l**	--	--
Barium	Total	Lab	**66.2 ug/l**	**47.7 ug/l**	**50.8 ug/l**	**55.6 ug/l**	**41 ug/l**	**66.1 ug/l**	**36.2 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	**0.47 ug/l**	**0.21 ug/l**	**0.27 ug/l**	**0.27 ug/l**	< 0.2 ug/l	**0.44 ug/l**	< 0.20 ug/l
Boron	Dissolved	Lab	--	--	**413 ug/l**	**408 ug/l**	**422 ug/l**	**419 ug/l**	**443 ug/l**
Boron	Total	Lab	**398 ug/l**	**419 ug/l**	**415 ug/l**	**418 ug/l**	**419 ug/l**	**436 ug/l**	**451 ug/l**
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	**0.48 ug/l**	**0.34 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.57 ug/l**	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**79100 ug/l**	**78000 ug/l**	**71500 ug/l**	**75900 ug/l**	**58600 ug/l**	**72700 ug/l**	**72400 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	**1.52 ug/l**	< 1.0 ug/l
Chromium	Total	Lab	**12.3 ug/l**	**8.92 ug/l**	**9.4 ug/l**	**10.2 ug/l**	**4.6 ug/l**	**15.6 ug/l**	**4.3 ug/l**
Cobalt	Dissolved	Lab	--	--	**0.42 ug/l**	**0.43 ug/l**	**0.24 ug/l**	--	--
Cobalt	Total	Lab	**5.6 ug/l**	**2.5 ug/l**	**3.13 ug/l**	**3.13 ug/l**	**1.77 ug/l**	**5.23 ug/l**	**1.2 ug/l**
Copper	Dissolved	Lab	**5.09 b ug/l**	**1.53 ug/l**	**1.05 b ug/l**	**1.33 b ug/l**	**1.08 ug/l**	**0.96 ug/l**	**1.8 ug/l**
Copper	Total	Lab	**20.8 ug/l**	**11.2 ug/l**	**10.7 ug/l**	**10.5 ug/l**	**6.55 ug/l**	**17.2 ug/l**	**4.7 ug/l**
Iron	Dissolved	Lab	**700 ug/l**	**386 ug/l**	**65.6 ug/l**	< 50 ug/l	< 50 ug/l	**70.8 ug/l**	**86.4 ug/l**
Iron	Total	Lab	**42800 ug/l**	**16000 ug/l**	**20300 ug/l**	**21600 ug/l**	**11100 ug/l**	**32200 ug/l**	**6100 ug/l**
Lead	Dissolved	Lab	--	--	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	--
Lead	Total	Lab	**4.47 ug/l**	**2.14 ug/l**	**2.47 ug/l**	**2.47 ug/l**	**1.33 ug/l**	**4.13 ug/l**	**0.70 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**79900 ug/l**	**85800 ug/l**	**86300 ug/l**	**88000 ug/l**	**84200 ug/l**	**89900 ug/l**	**86600 ug/l**
Manganese	Dissolved	Lab	**480 ug/l**	**433 ug/l**	**267 ug/l**	**344 ug/l**	**92.9 ug/l**	**251 ug/l**	**309 ug/l**
Manganese	Total	Lab	**2560 ug/l**	**1210 ug/l**	**1300 ug/l**	**1450 ug/l**	**685 ug/l**	**1840 ug/l**	**601 ug/l**
Mercury	Total	Lab	**0.0110 ug/l**	**0.0049 ug/l**	**0.0022 ug/l**	**0.0036 ug/l**	**0.0027 ug/l**	**0.0075 ug/l**	**0.0016 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	**0.00011 ug/l**	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**33.9 ug/l**	**31.6 ug/l**	**28.8 ug/l**	**30.7 ug/l**	**24.9 ug/l**	**25.4 ug/l**	**27.0 ug/l**
Molybdenum	Total	Lab	**37.4 ug/l**	**32.8 ug/l**	**31.5 ug/l**	**31.9 ug/l**	**27 ug/l**	**29.4 ug/l**	**27.8 ug/l**
Nickel	Dissolved	Lab	**4.54 ug/l**	**3.31 ug/l**	**3.64 ug/l**	**3.80 ug/l**	**1.29 ug/l**	**4.16 ug/l**	**1.6 b ug/l**
Nickel	Total	Lab	**32.4 ug/l**	**13.7 ug/l**	**14.1 ug/l**	**15.2 ug/l**	**8.5 ug/l**	**24.2 ug/l**	**8.6 ug/l**
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**14000 ug/l**	**13800 ug/l**	**11600 ug/l**	**11700 ug/l**	**10400 ug/l**	**12100 ug/l**	**11500 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**93000 ug/l**	**99000 ug/l**	**105000 ug/l**	**96600 ug/l**	**58700 ug/l**	**99500 ug/l**	**105000 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**315 ug/l**	**311 ug/l**	**316 ug/l**	**330 ug/l**	**290 ug/l**	**336 ug/l**	**330 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	**33 ug/l**	**14 ug/l**	**22 ug/l**	**20.4 ug/l**	**11 ug/l**	**32 ug/l**	< 10.0 ug/l
Zinc	Dissolved	Lab	**22.7 b ug/l**	< 6 ug/l	**6.16 b ug/l**	< 6 ug/l	< 6 ug/l	**7.08 b ug/l**	< 6.0 ug/l
Zinc	Total	Lab	**23 ug/l**	**12.8 ug/l**	**11.4 ug/l**	**11.2 ug/l**	**6.73 ug/l**	**17.8 ug/l**	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-005	GW005	GW005		GW005	GW005	GW-006
		Date	7/19/2012	10/2/2012	4/2/2013		7/5/2013	10/7/2013	8/17/2007
		Sample Type	N	N	N	FD	N	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	321 mg/l	327 mg/l	316 mg/l	--	300 mg/l	319 mg/l	--
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	--	< 10.0 mg/l	< 10.0 mg/l	--
Alkalinity, total	NA	Lab	321 mg/l	327 mg/l	316 mg/l	--	300 mg/l	319 mg/l	576 mg/l
Biochemical Oxygen Demand (5-day)	NA	Lab	< 24.0 mg/l	12.0 mg/l	8.2 mg/l	--	< 6.0 mg/l	4.6 mg/l	--
Carbon, dissolved organic	NA	Lab	4.7 mg/l	5.1 mg/l	2.5 mg/l	--	3.2 mg/l	2.5 mg/l	--
Carbon, total organic	NA	Lab	4.0 mg/l	4.4 mg/l	1.6 mg/l	--	1.8 mg/l	2.5 mg/l	2.8 mg/l
Chemical Oxygen Demand	NA	Lab	< 10.0 mg/l	57.4 mg/l	39.7 mg/l	--	25.0 mg/l	66.3 mg/l	23.0 mg/l
Chloride	NA	Lab	31.2 mg/l	30.6 mg/l	30.4 mg/l	--	30.0 mg/l	29.2 mg/l	22.7 mg/l
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	--	< 0.0100 mg/l	< 0.0100 mg/l	< 0.02 mg/l
Dissolved oxygen	NA	Field	8.96 mg/l	5.05 mg/l	2.24 mg/l	--	8.32 mg/l	1.46 mg/l	0.56 mg/l
Fluoride	NA	Lab	2.1 mg/l	2.0 mg/l	2.0 mg/l	--	2.0 mg/l	1.9 mg/l	2.56 mg/l
Hardness, total, as CaCO3	NA	Lab	624 mg/l	581 mg/l	480 mg/l	--	500 mg/l	510 mg/l	933 mg/l
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	--
Nitrogen, ammonia (NH3), as N	NA	Lab	0.20 mg/l	0.13 mg/l	0.27 mg/l	--	0.27 mg/l	< 1.0 mg/l	0.11 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	< 0.1 h mg/l
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	< 0.05 h mg/l
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	8.1 pH units	8.0 pH units	7.3 pH units	--	8.0 pH units	8.5 pH units	7.5 pH units
pH	NA	Field	7.62 pH units	7.55 pH units	7.57 pH units	--	7.91 pH units	7.8 pH units	7.08 pH units
Phosphorus, total	NA	Lab	0.50 mg/l	0.34 mg/l	0.21 mg/l	--	< 0.10 mg/l	0.11 mg/l	0.11 mg/l
Redox (oxidation potential)	NA	Field	347 mV	173 mV	422 mV	--	318 mV	105 mV	336 mV
Solids, total dissolved	NA	Lab	700 mg/l	743 mg/l	754 mg/l	--	848 mg/l	825 mg/l	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	1266 umhos/cm	1266 umhos/cm	1214 umhos/cm	--	1276 umhos/cm	1213 umhos/cm	1574 umhos/cm
Sulfate	NA	Lab	323 mg/l	325 mg/l	337 mg/l	--	343 mg/l	342 mg/l	430 mg/l
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	18.36 deg C	11.39 deg C	8.61 deg C	--	22.59 deg C	8.39 deg C	9.6 deg C
Turbidity	NA	Field	590 NTU	305.7 NTU	161.4 NTU	--	123.3 NTU	365.5 NTU	1 NTU
Water Elevation, ft/MSL	NA	Field	1608.62	1600.42	1600.19	--	1600.52	1600.82	1486.76
Metals					--	--	--	--	
Aluminum	Dissolved	Lab	23.3 ug/l	23.8 ug/l	< 20.0 ug/l	--	22.6 ug/l	< 20.0 ug/l	< 10 ug/l
Aluminum	Total	Lab	7660 ug/l	6490 ug/l	3330 ug/l	--	1350 ug/l	3640 ug/l	89 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	1.2 ug/l	0.55 ug/l	--	< 0.50 ug/l	0.83 ug/l	--
Arsenic	Total	Lab	15.9 ug/l	11.7 ug/l	--	--	--	--	4.3 ug/l
Arsenic III	Total	Lab	--	--	7.2 ug/l	--	2.4 ug/l	5.7 ug/l	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	7.6 ug/l	20.0 ug/l	10.6 ug/l	--	22.8 ug/l	16.6 ug/l	--
Barium	Total	Lab	122 ug/l	94.3 ug/l	72.3 ug/l	--	47.0 ug/l	64.7 ug/l	110 ug/l
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	1.3 ug/l	0.82 ug/l	0.61 ug/l	--	0.22 ug/l	0.63 ug/l	< 1.0 ug/l
Boron	Dissolved	Lab	456 ug/l	463 ug/l	444 ug/l	--	529 ug/l	482 ug/l	--
Boron	Total	Lab	424 ug/l	418 ug/l	473 ug/l	--	520 ug/l	569 ug/l	540 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	0.34 b ug/l
Cadmium	Total	Lab	0.92 ug/l	0.48 ug/l	0.37 ug/l	--	< 0.20 ug/l	0.37 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	98000 ug/l	92100 ug/l	72600 ug/l	--	78400 ug/l	78700 ug/l	110000 ug/l
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Chromium	Total	Lab	44.5 ug/l	32.8 ug/l	28.6 ug/l	--	11.4 ug/l	26.1 ug/l	< 1.0 ug/l
Cobalt	Dissolved	Lab	0.75 ug/l	0.95 ug/l	0.54 ug/l	--	0.39 ug/l	0.68 ug/l	--
Cobalt	Total	Lab	16.4 ug/l	11.3 ug/l	7.3 ug/l	--	3.2 ug/l	6.8 ug/l	1.9 ug/l
Copper	Dissolved	Lab	1.6 ug/l	1.3 ug/l	0.80 ug/l	--	1.2 ug/l	1.4 ug/l	1.4 b ug/l
Copper	Total	Lab	48.9 ug/l	36.8 ug/l	22.3 ug/l	--	10.6 ug/l	24.8 ug/l	1.4 ug/l
Iron	Dissolved	Lab	51.9 ug/l	< 50.0 ug/l	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	--
Iron	Total	Lab	113000 ug/l	74000 ug/l	37900 ug/l	--	16200 ug/l	40100 ug/l	3000 ug/l
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--
Lead	Total	Lab	12.7 ug/l	8.4 ug/l	5.4 ug/l	--	2.2 ug/l	6.5 ug/l	< 0.60 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	92200 ug/l	85200 ug/l	72700 ug/l	--	73800 ug/l	76000 ug/l	160000 ug/l
Manganese	Dissolved	Lab	239 ug/l	221 ug/l	233 ug/l	--	260 ug/l	247 ug/l	--
Manganese	Total	Lab	6680 ug/l	3820 ug/l	2990 ug/l	--	1280 ug/l	2310 ug/l	1200 ug/l
Mercury	Total	Lab	0.0129 ug/l	0.0113 ug/l	0.0088 ug/l	0.0077 ug/l	0.0050 ug/l	0.0077 ug/l	--
Mercury methyl	Total	Lab	0.00011 ug/l	0.00009 jb ug/l	0.00004 j ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	--
Molybdenum	Dissolved	Lab	23.7 ug/l	22.7 ug/l	24.8 ug/l	--	22.1 ug/l	22.4 ug/l	45 b ug/l
Molybdenum	Total	Lab	30.7 ug/l	28.5 ug/l	30.6 ug/l	--	25.3 ug/l	26.2 ug/l	47 ug/l
Nickel	Dissolved	Lab	6.0 ug/l	7.2 ug/l	3.2 ug/l	--	2.1 ug/l	4.6 ug/l	5.2 b ug/l
Nickel	Total	Lab	77.4 ug/l	47.9 ug/l	37.3 ug/l	--	16.1 ug/l	38.1 ug/l	5.8 ug/l
Palladium	Total	Lab	0.59 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	0.63 ug/l	< 0.30 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.30 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	15300 ug/l	13000 ug/l	13200 ug/l	--	11300 ug/l	14600 ug/l	16000 ug/l
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	0.24 ug/l	0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	100000 ug/l	97100 ug/l	96200 ug/l	--	101000 ug/l	105000 ug/l	80000 ug/l
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	389 ug/l	374 ug/l	317 ug/l	--	337 ug/l	351 ug/l	550 ug/l
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	0.67 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.017 ug/l	< 0.017 ug/l	< 0.40 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	59.6 ug/l	49.3 ug/l	31.7 ug/l	--	14.6 ug/l	27.2 ug/l	6.8 ug/l
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	6.1 ug/l	< 6.0 ug/l	< 30 ug/l
Zinc	Total	Lab	51.2 ug/l	33.2 ug/l	20.9 ug/l	--	15.2 ug/l	28.1 ug/l	< 30 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location			GW-006	GW-006	GW-006	GW-006		GW-006	GW-006	GW-006
Date			10/10/2007	3/20/2009	5/4/2009	3/16/2010		5/3/2010	7/26/2010	10/4/2010
Sample Type			N	N	N	N	FD	N	N	N
	Fraction	Analysis Location								
General Parameters										
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	**712 mg/l**	**711 mg/l**	**693 mg/l**	**654 mg/l**	**654 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	--	--	--	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 20 mg/l
Alkalinity, total	NA	Lab	**521 mg/l**	**769 mg/l**	**736 mg/l**	**712 mg/l**	**711 mg/l**	**693 mg/l**	**654 mg/l**	**654 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	--	--	--	< 6 mg/l	< 3 mg/l	< 2.4 mg/l	< 3 mg/l	< 3 mg/l
Carbon, dissolved organic	NA	Lab	--	--	--	**2.7 mg/l**	**2.6 mg/l**	**2.7 mg/l**	**3.2 mg/l**	**3.5 mg/l**
Carbon, total organic	NA	Lab	**2.4 mg/l**	**2.6 b mg/l**	**2.8 mg/l**	**2.7 mg/l**	**2.7 mg/l**	**2.5 mg/l**	**3.1 mg/l**	**3.2 mg/l**
Chemical Oxygen Demand	NA	Lab	**10 mg/l**	< 10 mg/l	**11.2 mg/l**	**13.3 mg/l**	**11.2 mg/l**	**20.7 mg/l**	**12.8 mg/l**	**12.4 mg/l**
Chloride	NA	Lab	**8.26 mg/l**	**17.7 mg/l**	**17.7 mg/l**	**14 mg/l**	**14.1 mg/l**	**17.5 mg/l**	**18.6 mg/l**	**18.9 mg/l**
Cyanide	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0035 mg/l	**0.0037 jb mg/l**	< 0.0100 mg/l	< 0.02 mg/l	< 0.02 mg/l
Dissolved oxygen	NA	Field	**4.38 mg/l**	**0.56 mg/l**	--	**3.67 mg/l**	--	**1.72 mg/l**	**0.96 mg/l**	**0.6 mg/l**
Fluoride	NA	Lab	**1.67 mg/l**	**2.24 mg/l**	**2.08 mg/l**	**1.75 mg/l**	**1.74 mg/l**	**2.12 mg/l**	**2.16 mg/l**	**2.28 mg/l**
Hardness, total, as CaCO3	NA	Lab	**757 mg/l**	**1290 mg/l**	**1240 mg/l**	**1140 mg/l**	**1100 mg/l**	**1260 mg/l**	**1090 mg/l**	**1160 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	**0.39 mg/l**	**0.11 mg/l**	**0.24 mg/l**	**0.22 mg/l**	**0.19 mg/l**	**0.22 mg/l**	**0.24 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--	--
pH	NA	Lab	**7.4 pH units**	**7.2 pH units**	**7.1 pH units**	**7.4 pH units**	**7.3 pH units**	**8.1 pH units**	**7.8 pH units**	**7.3 pH units**
pH	NA	Field	**7.39 pH units**	**7.55 pH units**	--	**7.10 pH units**	--	**7.22 pH units**	**7.92 pH units**	**6.7 pH units**
Phosphorus, total	NA	Lab	< 0.1 mg/l	**0.13 mg/l**	< 0.1 mg/l	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	**0.19 mg P/L**	**0.12 mg P/L**
Redox (oxidation potential)	NA	Field	**553 mV**	**344 mV**	--	**312 mV**	--	**532 mV**	**371 mV**	**326 mV**
Solids, total dissolved	NA	Lab	--	--	--	--	--	**1310 mg/l**	**1280 mg/l**	**1310 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**1272 umhos/cm**	**1160 umhos/cm**	--	**1718 umhos/cm**	--	**1116 umhos/cm**	**559 umhos/cm**	**1941 umhos/cm**
Sulfate	NA	Lab	**217 mg/l**	**555 mg/l**	**513 mg/l** **496 mg/l**	**475 mg/l**	**471 mg/l**	**485 mg/l**	**525 mg/l**	**519 mg/l**
Sulfide	NA	Lab	--	--	< 2 mg/l	--	--	--	--	--
Temperature, degrees C	NA	Field	**10.1 deg C**	**4.3 deg C**	--	**6.4 deg C**	--	**8.2 deg C**	**12.62 deg C**	**12.5 deg C**
Turbidity	NA	Field	**0.9 NTU**	**2 NTU**	--	**1 NTU**	--	**1 NTU**	**0 NTU**	**1 NTU**
Water Elevation, ft/MSL	NA	Field	**1488.28**	**1487.6**	**1487.98**	**1487.98**	--	**1487.29**	**1486.77**	**1487.12**
Metals										
Aluminum	Dissolved	Lab	< 10 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**33 ug/l**	**66.8 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l	**34.6 ug/l**	**529 ug/l**	< 25 ug/l
Antimony	Dissolved	Lab	< 0.50 ug/l	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	**2.3 ug/l**	--	**2.0 ug/l**	--	--	--	**3.47 ug/l**	**6.5 ug/l**
Arsenic	Total	Lab	**2.0 ug/l**	**4.4 ug/l**	**2.1 ug/l** **3.57 ug/l**	**3.1 ug/l**	**3.2 ug/l**	**4.11 ug/l**	**5.75 ug/l**	**6.62 ug/l**
Arsenic III	Total	Lab	--	--	**0.99 ug/l**	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	**3.19 ug/l**	--	--	--	--	--
Arsenic V	Total	Lab	--	--	**2.21 ug/l**	--	--	--	--	--
Barium	Dissolved	Lab	**71 ug/l**	--	--	--	--	--	--	--
Barium	Total	Lab	**66 ug/l**	**120 ug/l**	**124 ug/l**	**92.5 ug/l**	**95.5 ug/l**	**100 ug/l**	**114 ug/l**	**115 ug/l**
Beryllium	Dissolved	Lab	< 2.0 ug/l	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 2.0 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	**350 ug/l**	--	--	--	--	--	--	--
Boron	Total	Lab	**330 ug/l**	**493 ug/l**	**472 ug/l**	**391 ug/l**	**374 ug/l**	**461 ug/l**	**490 ug/l**	**554 ug/l**
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.32 ug/l**	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	**84000 ug/l**	--	--	--	--	--	--	--
Calcium	Total	Lab	**81900 ug/l**	**129000 ug/l**	**124000 ug/l**	**99700 ug/l**	**96000 ug/l**	**121000 ug/l**	**104000 ug/l**	**109000 ug/l**
Chromium	Dissolved	Lab	< 2.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	< 2.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	**1.89 ug/l**	< 1 ug/l
Cobalt	Dissolved	Lab	**1.6 ug/l**	--	--	--	--	--	--	--
Cobalt	Total	Lab	**1.6 ug/l**	**2.9 ug/l**	**3.1 ug/l**	**2.4 ug/l**	**2.3 ug/l**	**2.51 ug/l**	**2.92 ug/l**	**2.51 ug/l**
Copper	Dissolved	Lab	**11 ug/l**	**1.0 b ug/l**	**1.6 ug/l**	**1.3 b ug/l**	**1.3 b ug/l**	**1.93 b ug/l**	**5.48 b ug/l**	**1.12 ug/l**
Copper	Total	Lab	**1.7 ug/l**	**1.7 b ug/l**	**2.8 ug/l**	**1.4 ug/l**	**1.3 ug/l**	**2.32 ug/l**	**7.27 ug/l**	**1.32 ug/l**
Iron	Dissolved	Lab	**840 ug/l**	--	--	--	--	--	**4200 ug/l**	**4810 ug/l**
Iron	Total	Lab	**830 ug/l**	**4820 ug/l**	**2280 ug/l**	**2240 ug/l**	**2190 ug/l**	**4490 ug/l**	**5770 ug/l**	**4700 ug/l**
Lead	Dissolved	Lab	< 0.60 ug/l	--	--	--	--	--	--	--
Lead	Total	Lab	< 0.60 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Magnesium	Dissolved	Lab	**140000 ug/l**	--	--	--	--	--	--	--
Magnesium	Total	Lab	**134000 ug/l**	**236000 ug/l**	**226000 ug/l**	**216000 ug/l**	**209000 ug/l**	**234000 ug/l**	**202000 ug/l**	**215000 ug/l**
Manganese	Dissolved	Lab	**620 ug/l**	--	--	--	--	**1000 ug/l**	**1150 ug/l**	**1260 ug/l**
Manganese	Total	Lab	**580 ug/l**	**1420 ug/l**	**1340 ug/l**	**921 ug/l**	**940 ug/l**	**1210 ug/l**	**1220 ug/l**	**1160 ug/l**
Mercury	Total	Lab	**0.0014 ug/l**	**0.0025 ug/l**	--	**0.0013 ug/l**	**0.0014 ug/l**	**0.001 ug/l**	**0.0014 ug/l**	**0.0045 ug/l**
Mercury methyl	Total	Lab	< 0.00005 ug/l	< 0.0001 ug/l	--	**0.00012 ug/l**	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**30 ug/l**	**28.5 ug/l**	**31.3 ug/l**	**23.5 ug/l**	**24.7 ug/l**	**26.2 ug/l**	**27.9 ug/l**	**27.5 ug/l**
Molybdenum	Total	Lab	**30 ug/l**	**30.3 ug/l**	**32.3 ug/l**	**22.2 ug/l**	**24.8 ug/l**	**26.9 ug/l**	**27.4 ug/l**	**28.8 ug/l**
Nickel	Dissolved	Lab	**7.0 ug/l**	**3.0 ug/l**	**6.0 ug/l**	**2.7 ug/l**	**2.7 ug/l**	**4.76 ug/l**	**4.91 ug/l**	**4.21 ug/l**
Nickel	Total	Lab	**7.0 ug/l**	**3.3 b ug/l**	**5.9 ug/l**	**2.5 ug/l**	**2.7 ug/l**	**4.2 ug/l**	**5.66 ug/l**	**4.09 ug/l**
Palladium	Total	Lab	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	**0.087 j ug/l**	< 0.030 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	< 0.30 ug/l	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	< 0.30 ug/l	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	**0.018 j ug/l**	< 0.0090 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	**9900 ug/l**	--	--	--	--	--	--	--
Potassium	Total	Lab	**9600 ug/l**	**13400 ug/l**	**11600 ug/l**	**10200 ug/l**	**10200 ug/l**	**12500 ug/l**	**13600 ug/l**	**13600 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	**37000 ug/l**	--	--	--	--	--	--	--
Sodium	Total	Lab	**33000 ug/l**	**62800 ug/l**	**57000 ug/l**	**40500 ug/l**	**44800 ug/l**	**57600 ug/l**	**60100 ug/l**	**63100 ug/l**
Strontium	Dissolved	Lab	**360 ug/l**	--	--	--	--	--	--	--
Strontium	Total	Lab	**350 ug/l**	**721 ug/l**	**685 ug/l**	**545 ug/l**	**538 ug/l**	**606 ug/l**	**613 ug/l**	**579 ug/l**
Thallium	Dissolved	Lab	< 0.40 ug/l	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.40 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	**2.6 ug/l**	--	--	--	--	--	--	--
Titanium	Total	Lab	**4.1 ug/l**	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	**47 ug/l**	< 10 ug/l
Zinc	Dissolved	Lab	**12 ug/l**	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	**8.99 ug/l**	**29.4 b ug/l**	< 6 ug/l
Zinc	Total	Lab	**6.5 ug/l**	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	**8.62 ug/l**	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-006		GW-006		GW-006	GW-006	GW-006
		Date	4/22/2011		7/19/2011		10/4/2011	11/1/2011	4/25/2012
		Sample Type	N	FD	N	FD	N	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	605 mg/l	614 mg/l	616 mg/l	645 mg/l	711 mg/l	698 mg/l	721 mg/l
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 20 mg/l	--	< 20.0 mg/l
Alkalinity, total	NA	Lab	605 mg/l	614 mg/l	616 mg/l	645 mg/l	711 mg/l	698 mg/l	721 mg/l
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 3 mg/l	< 3 mg/l	< 3 mg/l	--	< 3.0 mg/l
Carbon, dissolved organic	NA	Lab	2.9 mg/l	2.8 mg/l	3.4 mg/l	3.3 mg/l	4.4 mg/l	3.6 mg/l	3.5 mg/l
Carbon, total organic	NA	Lab	2.1 mg/l	2.0 mg/l	3.4 mg/l	3.2 mg/l	3.8 mg/l	3.4 mg/l	3.6 mg/l
Chemical Oxygen Demand	NA	Lab	13 mg/l	< 10 mg/l	15.6 mg/l	12.8 mg/l	13.8 mg/l	--	< 10.0 mg/l
Chloride	NA	Lab	17.7 mg/l	17.6 mg/l	17 mg/l	17 mg/l	15.6 mg/l	15.8 mg/l	15.3 mg/l
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	--	< 0.0100 mg/l
Dissolved oxygen	NA	Field	1.3 mg/l	--	2.4 mg/l	--	1.7 mg/l	1.16 mg/l	2.27 mg/l
Fluoride	NA	Lab	1.4 mg/l	1.41 mg/l	1.93 mg/l	1.94 mg/l	1.97 mg/l	2.04 mg/l	1.8 mg/l
Hardness, total, as CaCO3	NA	Lab	1060 mg/l	1040 mg/l	1080 mg/l	1070 mg/l	1130 mg/l	--	1280 mg/l
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	--	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 h mg/l	< 0.1 h mg/l	0.19 mg/l	0.18 mg/l	0.18 mg/l	0.2 mg/l	0.21 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	< 0.1 mg/l	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	< 0.1 mg/l	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	< 0.02 mg/l	--
pH	NA	Lab	--	--	7.8 pH units	7.6 pH units	7.5 pH units	--	7.8 pH units
pH	NA	Field	7.2 pH units	--	7.0 pH units	--	7.1 pH units	7.05 pH units	7.22 pH units
Phosphorus, total	NA	Lab	< 0.1 h mg P/L	< 0.1 h mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	0.1 mg P/L	0.12 mg P/L	0.12 mg/l
Redox (oxidation potential)	NA	Field	452 mV	--	353 mV	--	154 mV	148 mV	332 mV
Solids, total dissolved	NA	Lab	1220 mg/l	1240 mg/l	1204 mg/l	1376 mg/l	1386 mg/l	1520 mg/l	1550 mg/l
Solids, total suspended	NA	Lab	--	--	--	--	--	20 mg/l	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	1600 umhos/cm	--
Specific Conductance @ 25oC	NA	Field	1758 umhos/cm	--	1827 umhos/cm	--	2078 umhos/cm	2111 umhos/cm	2097 umhos/cm
Sulfate	NA	Lab	455 mg/l	455 mg/l	490 mg/l	490 mg/l	524 mg/l	556 mg/l	529 mg/l
Sulfide	NA	Lab	--	--	--	--	--	< 5.0 mg/l	--
Temperature, degrees C	NA	Field	6.44 deg C	--	10.7 deg C	--	12.1 deg C	10.41 deg C	7.01 deg C
Turbidity	NA	Field	0 NTU	--	11.2 NTU	--	2.2 NTU	0.20 NTU	0 NTU
Water Elevation, ft/MSL	NA	Field	1487.88	--	1486.78		1486.66	1486.97	1487.61
Metals									
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	--	< 20.0 ug/l
Aluminum	Total	Lab	< 25 ug/l	< 25 ug/l	572 * ug/l	383 * ug/l	170 ug/l	< 25 ug/l	< 20.0 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l
Arsenic	Dissolved	Lab	0.94 ug/l	0.69 ug/l	0.56 ug/l	0.52 ug/l	0.92 ug/l	--	2.1 ug/l
Arsenic	Total	Lab	0.8 ug/l	0.66 ug/l	3.97 ug/l	3.63 ug/l	5.03 ug/l	--	5.6 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	72.1 ug/l	68.5 ug/l	99.2 ug/l	94.6 ug/l	99.3 ug/l	--	--
Barium	Total	Lab	76.1 ug/l	76.3 ug/l	109 ug/l	106 ug/l	111 ug/l	117 ug/l	106 ug/l
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l
Boron	Dissolved	Lab	422 ug/l	390 ug/l	463 ug/l	463 ug/l	531 ug/l	--	456 ug/l
Boron	Total	Lab	437 ug/l	441 ug/l	466 ug/l	472 ug/l	538 ug/l	532 ug/l	463 ug/l
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	96800 ug/l	97200 ug/l	94300 ug/l	94700 ug/l	102000 ug/l	109000 ug/l	110000 ug/l
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	--	< 1.0 ug/l
Chromium	Total	Lab	< 1 ug/l	< 1 ug/l	2.06 ug/l	1.3 ug/l	< 1 ug/l	--	< 1.0 ug/l
Cobalt	Dissolved	Lab	2.08 ug/l	2.0 ug/l	2.37 ug/l	2.15 ug/l	2.70 ug/l	--	--
Cobalt	Total	Lab	1.96 ug/l	1.95 ug/l	3.03 ug/l	2.76 ug/l	2.88 ug/l	--	3.1 ug/l
Copper	Dissolved	Lab	4.04 ug/l	1.88 ug/l	2.05 ug/l	1.92 ug/l	2.09 ug/l	--	8.5 ug/l
Copper	Total	Lab	1.32 ug/l	1.24 ug/l	3.54 ug/l	2.96 ug/l	2.69 ug/l	--	2.7 ug/l
Iron	Dissolved	Lab	144 ug/l	126 ug/l	563 * ug/l	365 * ug/l	2560 ug/l	4350 ug/l	3320 ug/l
Iron	Total	Lab	148 ug/l	148 ug/l	4490 ug/l	4050 ug/l	5140 ug/l	5150 ug/l	5400 ug/l
Lead	Dissolved	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	--
Lead	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	198000 ug/l	195000 ug/l	204000 ug/l	203000 ug/l	213000 ug/l	230000 ug/l	245000 ug/l
Manganese	Dissolved	Lab	524 ug/l	495 ug/l	1040 ug/l	1020 ug/l	1010 ug/l	--	1140 ug/l
Manganese	Total	Lab	541 ug/l	548 ug/l	1140 ug/l	1100 ug/l	1080 ug/l	1040 ug/l	1120 ug/l
Mercury	Total	Lab	0.0007 ug/l	0.0006 ug/l	0.0022 ug/l	0.0019 ug/l	0.0012 ug/l	--	0.00081 ug/l
Mercury methyl	Total	Lab	< 0.0001 ug/l	0.00027 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	--	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	27.3 ug/l	25.6 ug/l	23.5 ug/l	24.5 ug/l	27.1 ug/l	--	24.2 ug/l
Molybdenum	Total	Lab	27.8 ug/l	27.5 ug/l	25.7 ug/l	25.7 ug/l	26.7 ug/l	--	24.8 ug/l
Nickel	Dissolved	Lab	3.70 ug/l	3.44 ug/l	0.7 ug/l	0.73 ug/l	1.63 ug/l	--	1.3 ug/l
Nickel	Total	Lab	3.48 ug/l	3.83 ug/l	3.61 ug/l	2.9 ug/l	2.01 ug/l	--	1.2 ug/l
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	6840 ug/l	6840 ug/l	10200 ug/l	10200 ug/l	11400 ug/l	11800 ug/l	10700 ug/l
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	--	< 1.0 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	--	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	35300 ug/l	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	54200 ug/l	53600 ug/l	58500 ug/l	58700 ug/l	61000 ug/l	65000 ug/l	65400 ug/l
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	398 ug/l	400 ug/l	536 ug/l	537 ug/l	576 ug/l	611 ug/l	633 ug/l
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	< 0.20 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	< 10 ug/l	< 10 ug/l	42 * ug/l	26 * ug/l	< 10 ug/l	--	< 10.0 ug/l
Zinc	Dissolved	Lab	14.1 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	8.96 ug/l	--	11.5 b ug/l
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	6.02 ug/l	< 6 ug/l	< 6 ug/l	--	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location			GW-006		GW006	GW006	GW006	GW006
Date			7/18/2012		10/1/2012	4/3/2013	7/2/2013	10/4/2013
Sample Type			N	FD	N	N	N	N
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**644 mg/l**	**678 mg/l**	**670 mg/l**	**784 mg/l**	**679 mg/l**	**852 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	< 10.0 mg/l	< 20.0 mg/l	< 50.0 mg/l
Alkalinity, total	NA	Lab	**644 mg/l**	**678 mg/l**	**670 mg/l**	**784 mg/l**	**679 mg/l**	**852 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 8.0 mg/l	< 3.0 mg/l	< 2.4 * mg/l	--
Carbon, dissolved organic	NA	Lab	**3.4 mg/l**	**3.8 mg/l**	**3.2 mg/l**	**3.1 mg/l**	**3.1 mg/l**	**3.6 mg/l**
Carbon, total organic	NA	Lab	**3.1 mg/l**	**3.3 mg/l**	**3.4 b mg/l**	**2.9 mg/l**	**3.2 mg/l**	**3.1 mg/l**
Chemical Oxygen Demand	NA	Lab	< 10.0 mg/l	**11.7 mg/l**	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	**18.9 mg/l**
Chloride	NA	Lab	**14.7 mg/l**	**15.5 mg/l**	**13.7 mg/l**	**14.6 mg/l**	**10.7 mg/l**	**13.7 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	**0.0125 b mg/l**	< 0.0100 mg/l	**0.0157 mg/l**
Dissolved oxygen	NA	Field	**1.28 mg/l**	--	**1.79 mg/l**	< 0.1 mg/l	**0.92 mg/l**	**0.05 mg/l**
Fluoride	NA	Lab	**2.0 mg/l**	**2.0 mg/l**	**1.9 mg/l**	**1.7 mg/l**	**1.3 mg/l**	**1.7 mg/l**
Hardness, total, as CaCO3	NA	Lab	**1160 mg/l**	**1140 mg/l**	**1230 mg/l**	**1360 mg/l**	**1140 mg/l**	**1340 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.20 mg/l**	**0.23 mg/l**	**0.18 mg/l**	**0.22 mg/l**	**0.14 mg/l**	**0.23 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.6 pH units**	**7.6 pH units**	**7.5 pH units**	**7.4 pH units**	**7.4 pH units**	**8.6 pH units**
pH	NA	Field	**7.12 pH units**	--	**7.11 pH units**	**7.08 pH units**	**7.03 pH units**	**7.06 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	**0.15 mg/l**	**0.14 mg/l**	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**-12 mV**	--	**-17 mV**	**126 mV**	**436 mV**	**165 mV**
Solids, total dissolved	NA	Lab	**1330 mg/l**	**1280 mg/l**	**1380 mg/l**	**1610 mg/l**	**1320 mg/l**	**1610 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**1971 umhos/cm**	--	**2117 umhos/cm**	**2277 umhos/cm**	**1864 umhos/cm**	**2254 umhos/cm**
Sulfate	NA	Lab	**485 mg/l**	**487 mg/l**	**561 mg/l**	**633 mg/l**	**478 mg/l**	**659 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**15.88 deg C**	--	**12.85 deg C**	**4.4 deg C**	**12.24 deg C**	**12.58 deg C**
Turbidity	NA	Field	**0 NTU**	--	**0 NTU**	**0.5 NTU**	**0.4 NTU**	**0 NTU**
Water Elevation, ft/MSL	NA	Field	**1486.84**	--	**1486.55**	**1487.44**	**1487.9**	**1486.93**
Metals						--	--	--
Aluminum	Dissolved	Lab	**25.8 ug/l**	**23.4 ug/l**	< 20.0 ug/l	**25.5 ug/l**	**31.2 ug/l**	< 20.0 ug/l
Aluminum	Total	Lab	**27.9 ug/l**	**26.2 ug/l**	**23.4 ug/l**	**39.4 ug/l**	**22.0 ug/l**	< 20.0 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	**1.1 ug/l**	**1.2 ug/l**	**1.5 ug/l**	**2.1 ug/l**	**0.96 ug/l**	**4.2 ug/l**
Arsenic	Total	Lab	**2.7 ug/l**	**2.3 ug/l**	**5.5 ug/l**	--	--	--
Arsenic III	Total	Lab	--	--	--	**5.6 ug/l**	**1.0 ug/l**	**4.2 ug/l**
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	**90.9 ug/l**	**90.5 ug/l**	**96.3 ug/l**	**106 ug/l**	**89.3 ug/l**	**125 ug/l**
Barium	Total	Lab	**96.5 ug/l**	**95.7 ug/l**	**105 ug/l**	**125 ug/l**	**89.8 ug/l**	**127 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	**406 * ug/l**	**465 ug/l**	**519 ug/l**	**464 ug/l**	**441 ug/l**	**494 ug/l**
Boron	Total	Lab	**481 ug/l**	**475 ug/l**	**510 ug/l**	**464 ug/l**	**426 ug/l**	**549 ug/l**
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**99600 ug/l**	**99300 ug/l**	**105000 ug/l**	**111000 ug/l**	**98900 ug/l**	**115000 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Chromium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Cobalt	Dissolved	Lab	**2.7 ug/l**	**2.6 ug/l**	**3.0 ug/l**	**3.5 ug/l**	**2.0 ug/l**	**2.9 ug/l**
Cobalt	Total	Lab	**2.9 ug/l**	**2.8 ug/l**	**2.6 ug/l**	**3.8 ug/l**	**2.4 ug/l**	**2.9 ug/l**
Copper	Dissolved	Lab	**2.4 ug/l**	**2.3 ug/l**	**2.4 ug/l**	**1.7 ug/l**	**1.7 ug/l**	**2.6 ug/l**
Copper	Total	Lab	**2.6 ug/l**	**2.5 ug/l**	**3.2 ug/l**	**1.9 ug/l**	**2.6 ug/l**	**2.6 ug/l**
Iron	Dissolved	Lab	**424 ug/l**	**386 ug/l**	**764 ug/l**	**5400 ug/l**	**517 ug/l**	**5000 ug/l**
Iron	Total	Lab	**2060 ug/l**	**2030 ug/l**	**4410 ug/l**	**6730 ug/l**	**561 ug/l**	**4950 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**220000 ug/l**	**217000 ug/l**	**236000 ug/l**	**262000 ug/l**	**217000 ug/l**	**256000 ug/l**
Manganese	Dissolved	Lab	**1050 ug/l**	**1090 ug/l**	**970 ug/l**	**1100 ug/l**	**702 ug/l**	**1180 ug/l**
Manganese	Total	Lab	**1110 ug/l**	**1110 ug/l**	**1020 ug/l**	**1110 ug/l**	**835 ug/l**	**1150 ug/l**
Mercury	Total	Lab	**0.00080 ug/l**	**0.00073 ug/l**	**0.0010 ug/l**	**0.0010 ug/l**	**0.00089 ug/l**	**0.0012 ug/l**
Mercury methyl	Total	Lab	< 0.00005 ug/l	< 0.00005 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	**24.3 ug/l**	**24.0 ug/l**	**27.9 ug/l**	**27.5 ug/l**	**20.3 ug/l**	**26.9 ug/l**
Molybdenum	Total	Lab	**24.8 ug/l**	**24.4 ug/l**	**28.3 ug/l**	**28.0 ug/l**	**22.0 ug/l**	**26.1 ug/l**
Nickel	Dissolved	Lab	**2.0 ug/l**	**2.0 ug/l**	**1.9 ug/l**	**2.2 ug/l**	**2.0 ug/l**	< 0.50 ug/l
Nickel	Total	Lab	**2.3 ug/l**	**2.1 ug/l**	**1.7 ug/l**	**3.0 ug/l**	**0.90 ug/l**	< 0.50 ug/l
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.81 ug/l**
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**10600 ug/l**	**10400 ug/l**	**11800 ug/l**	**10300 ug/l**	**8300 ug/l**	**11500 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**61400 ug/l**	**60700 ug/l**	**62000 ug/l**	**63400 ug/l**	**45900 ug/l**	**60200 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**559 ug/l**	**552 ug/l**	**635 ug/l**	**679 ug/l**	**509 ug/l**	**685 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.017 ug/l	**0.51 ug/l**
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l
Zinc	Dissolved	Lab	**7.2 ug/l**	**7.3 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW006		GW-007		GW-007		GW-007
		Date	10/10/2013		8/17/2007		10/10/2007		3/18/2009
		Sample Type	N	FD	N	FD	N	FD	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--	--
Alkalinity, carbonate, as CaCO3	NA	Lab	--	--	--	--	--	--	--
Alkalinity, total	NA	Lab	--	--	**274 mg/l**	**279 mg/l**	**280 mg/l**	**281 mg/l**	**283 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 * mg/l	< 2.4 * mg/l	--	--	--	--	--
Carbon, dissolved organic	NA	Lab	--	--	--	--	--	--	--
Carbon, total organic	NA	Lab	--	--	**1.6 mg/l**	**1.7 mg/l**	**1.9 mg/l**	**1.9 mg/l**	**1.7 b mg/l**
Chemical Oxygen Demand	NA	Lab	--	--	**27.0 * mg/l**	**95.4 * mg/l**	**10 mg/l**	**8 mg/l**	< 10 mg/l
Chloride	NA	Lab	--	--	**30 mg/l**	**30 mg/l**	**28.6 mg/l**	**28.7 mg/l**	**29 mg/l**
Cyanide	NA	Lab	--	--	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l
Dissolved oxygen	NA	Field	**1.46 mg/l**	--	**0.53 mg/l**	--	**4.27 mg/l**	--	**0.47 mg/l**
Fluoride	NA	Lab	--	--	**1.79 mg/l**	**1.79 mg/l**	**1.89 mg/l**	**1.89 mg/l**	**1.89 mg/l**
Hardness, total, as CaCO3	NA	Lab	--	--	**390 mg/l**	**392 mg/l**	**416 mg/l**	**408 mg/l**	**411 mg/l**
Nitrate + Nitrite, as N	NA	Lab	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	< 0.1 h mg/l	< 0.1 h mg/l	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	< 0.05 h mg/l	< 0.05 h mg/l	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	--	--	**7.8 pH units**	**7.8 pH units**	**7.7 pH units**	**7.8 pH units**	**7.6 pH units**
pH	NA	Field	**7.07 pH units**	--	**7.51 pH units**	--	**7.23 pH units**	--	**7.12 pH units**
Phosphorus, total	NA	Lab	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Redox (oxidation potential)	NA	Field	**147 mV**	--	**371 mV**	--	**561 mV**	--	**482 mV**
Solids, total dissolved	NA	Lab	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**2371 umhos/cm**	--	**876 umhos/cm**	--	**882 umhos/cm**	--	**858 umhos/cm**
Sulfate	NA	Lab	--	--	**161 mg/l**	**158 mg/l**	**169 mg/l**	**166 mg/l**	**153 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**15.97 deg C**	--	**9.1 deg C**	--	**9.2 deg C**	--	**4.8 deg C**
Turbidity	NA	Field	**0.1 NTU**	--	**2 NTU**	--	**20.5 NTU**	--	**0.9 NTU**
Water Elevation, ft/MSL	NA	Field	**1486.98**	--	**1505.41**	--	**1505.88**	--	**1505.82**
Metals			--	--					
Aluminum	Dissolved	Lab	--	--	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 25 ug/l
Aluminum	Total	Lab	--	--	< 40 ug/l	< 40 ug/l	**12 ug/l**	**14 ug/l**	< 25 ug/l
Antimony	Dissolved	Lab	--	--	--	--	< 0.50 ug/l	< 0.50 ug/l	--
Antimony	Total	Lab	--	--	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	--	--	--	--	**2.6 ug/l**	**2.2 ug/l**	--
Arsenic	Total	Lab	--	--	**4.2 ug/l**	**4.4 ug/l**	**3.3 ug/l**	**3.6 ug/l**	< 2 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	**4.5 ug/l**	**4.3 ug/l**	--
Barium	Total	Lab	--	--	**4.2 ug/l**	**4.5 ug/l**	**4.0 ug/l**	**4.1 ug/l**	**2.1 b ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	< 2.0 ug/l	< 2.0 ug/l	--
Beryllium	Total	Lab	--	--	< 1.0 ug/l	< 1.0 ug/l	< 2.0 ug/l	< 2.0 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	--	--	--	--	**400 ug/l**	**400 ug/l**	--
Boron	Total	Lab	--	--	**430 ug/l**	**430 ug/l**	**410 ug/l**	**400 ug/l**	**371 ug/l**
Cadmium	Dissolved	Lab	--	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	--	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	**54000 ug/l**	**54000 ug/l**	--
Calcium	Total	Lab	--	--	**49000 ug/l**	**50000 ug/l**	**51400 ug/l**	**50300 ug/l**	**50500 ug/l**
Chromium	Dissolved	Lab	--	--	< 1.0 ug/l	**1.5 ug/l**	< 2.0 ug/l	< 2.0 ug/l	< 1 ug/l
Chromium	Total	Lab	--	--	< 1.0 ug/l	< 1.0 ug/l	< 2.0 ug/l	< 2.0 ug/l	**1.1 b ug/l**
Cobalt	Dissolved	Lab	--	--	--	--	**0.83 ug/l**	**0.85 ug/l**	--
Cobalt	Total	Lab	--	--	**0.96 ug/l**	**1.0 ug/l**	**1.0 ug/l**	**1.0 ug/l**	**0.69 ug/l**
Copper	Dissolved	Lab	--	--	**0.76 b ug/l**	< 0.70 ug/l	< 0.70 ug/l	**0.78 ug/l**	**1.7 ug/l**
Copper	Total	Lab	--	--	**0.86 ug/l**	**0.99 ug/l**	**1.2 ug/l**	**1.3 ug/l**	< 0.7 ug/l
Iron	Dissolved	Lab	--	--	--	--	**97 ug/l**	**99 ug/l**	--
Iron	Total	Lab	--	--	**290 ug/l**	**290 ug/l**	**360 ug/l**	**370 ug/l**	**72.2 ug/l**
Lead	Dissolved	Lab	--	--	--	--	< 0.60 ug/l	< 0.60 ug/l	--
Lead	Total	Lab	--	--	< 0.60 ug/l	< 0.60 ug/l	< 0.60 ug/l	< 0.60 ug/l	< 0.5 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	**75000 ug/l**	**75000 ug/l**	--
Magnesium	Total	Lab	--	--	**65000 ug/l**	**67000 ug/l**	**69700 ug/l**	**68500 ug/l**	**69300 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	**1000 ug/l**	**1000 ug/l**	--
Manganese	Total	Lab	--	--	**1200 ug/l**	**1200 ug/l**	**1100 ug/l**	**1100 ug/l**	**1120 ug/l**
Mercury	Total	Lab	--	--	--	--	**0.0010 ug/l**	**0.0009 ug/l**	**0.0006 ug/l**
Mercury methyl	Total	Lab	--	--	--	--	< 0.00005 ug/l	< 0.00005 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	--	--	**34 b ug/l**	< 0.30 ug/l	**30 ug/l**	**30 ug/l**	**29.5 ug/l**
Molybdenum	Total	Lab	--	--	**35 * ug/l**	**34 * ug/l**	**32 ug/l**	**31 ug/l**	**28.2 ug/l**
Nickel	Dissolved	Lab	--	--	**2.5 b ug/l**	< 0.60 ug/l	**3.9 ug/l**	**4.0 ug/l**	**1.2 ug/l**
Nickel	Total	Lab	--	--	**2.5 ug/l**	**2.6 ug/l**	**3.9 ug/l**	**3.8 ug/l**	**1.2 b ug/l**
Palladium	Total	Lab	--	--	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	< 0.30 ug/l	< 0.30 ug/l	--
Platinum	Dissolved	Lab	--	--	--	--	< 0.30 ug/l	< 0.30 ug/l	--
Platinum	Total	Lab	--	--	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l
Potassium	Dissolved	Lab	--	--	--	--	**9100 ug/l**	**9100 ug/l**	--
Potassium	Total	Lab	--	--	**9700 ug/l**	**9800 ug/l**	**9400 ug/l**	**9100 ug/l**	**8520 ug/l**
Selenium	Dissolved	Lab	--	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l
Selenium	Total	Lab	--	--	**1.1 ug/l**	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	--	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l
Silver	Total	Lab	--	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	**46000 ug/l**	**46000 ug/l**	--
Sodium	Total	Lab	--	--	**48000 ug/l**	**48000 ug/l**	**47000 ug/l**	**46000 ug/l**	**46700 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	**330 ug/l**	**330 ug/l**	--
Strontium	Total	Lab	--	--	**310 ug/l**	**310 ug/l**	**330 ug/l**	**330 ug/l**	**286 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	< 0.40 ug/l	< 0.40 ug/l	--
Thallium	Total	Lab	--	--	< 0.40 ug/l	< 0.40 ug/l	< 0.40 ug/l	< 0.40 ug/l	< 0.4 ug/l
Titanium	Dissolved	Lab	--	--	--	--	**1.9 ug/l**	**2.0 ug/l**	--
Titanium	Total	Lab	--	--	< 2.0 ug/l	< 2.0 ug/l	**3.0 ug/l**	**2.7 ug/l**	< 10 ug/l
Zinc	Dissolved	Lab	--	--	< 30 ug/l	< 30 ug/l	**6.8 ug/l**	**7.9 ug/l**	**6.8 b ug/l**
Zinc	Total	Lab	--	--	< 30 ug/l	< 30 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location			GW-007	GW-007	GW-007		GW-007	
Date			5/5/2009	3/16/2010	5/5/2010		7/26/2010	
Sample Type			N	N	N	FD	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**290 mg/l**	**289 mg/l**	**284 mg/l**	**285 mg/l**	**274 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	--	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 20 mg/l
Alkalinity, total	NA	Lab	**295 mg/l**	**290 mg/l**	**289 mg/l**	**284 mg/l**	**285 mg/l**	**274 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	--	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	--	**1.7 mg/l**	**1.5 mg/l**	**1.6 mg/l**	**1.9 mg/l**	**1.7 mg/l**
Carbon, total organic	NA	Lab	**1.8 mg/l**	**1.7 mg/l**	**1.4 mg/l**	**1.4 mg/l**	**2.1 mg/l**	**1.6 mg/l**
Chemical Oxygen Demand	NA	Lab	**6.75 mg/l**	**14 mg/l**	**16.0 mg/l**	< 10 mg/l	**11.5 mg/l**	**10.8 mg/l**
Chloride	NA	Lab	**28.4 mg/l**	**28 mg/l**	**28.9 mg/l**	**28.9 mg/l**	**29.5 mg/l**	**29.5 mg/l**
Cyanide	NA	Lab	< 0.02 mg/l	< 0.0035 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.02 mg/l	< 0.02 mg/l
Dissolved oxygen	NA	Field	--	**0.96 mg/l**	**5 mg/l**	--	**0.57 mg/l**	--
Fluoride	NA	Lab	**1.93 mg/l**	**1.84 mg/l**	**1.94 mg/l**	**1.94 mg/l**	**1.93 mg/l**	**1.94 mg/l**
Hardness, total, as CaCO3	NA	Lab	**438 mg/l**	**409 mg/l**	**434 mg/l**	**420 mg/l**	**413 mg/l**	**412 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	**0.33 mg/l**
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	**0.13 mg/l**	**0.07 mg/l**	**0.06 mg/l**	**0.07 mg/l**	**0.08 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.4 pH units**	**7.7 pH units**	**7.9 pH units**	**8.0 pH units**	**7.7 pH units**	**7.9 pH units**
pH	NA	Field	--	**7.48 pH units**	**6.6 pH units**	--	**7.51 pH units**	--
Phosphorus, total	NA	Lab	< 0.1 mg/l	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	--	**348 mV**	**556 mV**	--	**391 mV**	--
Solids, total dissolved	NA	Lab	--	--	**560 mg/l**	**561 mg/l**	**557 mg/l**	**517 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	--	**880 umhos/cm**	**896 umhos/cm**	--	**531 umhos/cm**	--
Sulfate	NA	Lab	**167 mg/l** **183 mg/l**	**180 mg/l**	**177 mg/l**	**177 mg/l**	**178 mg/l**	**173 mg/l**
Sulfide	NA	Lab	< 2 mg/l	--	--	--	--	--
Temperature, degrees C	NA	Field	--	**5.8 deg C**	**7.2 deg C**	--	**12.5 deg C**	--
Turbidity	NA	Field	--	**1 NTU**	**30 NTU**	--	**13.7 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1505.51**	**1505.66**	**1505.51**	--	**1506.41**	--
Metals								
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	**29.2 * ug/l**	< 25 * ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 2 ug/l	--	--	--	< 1 ug/l	**2.51 ug/l**
Arsenic	Total	Lab	< 2 ug/l **2.76 ug/l**	< 2 ug/l	< 1 ug/l	< 1 ug/l	**1.33 ug/l**	**3.32 ug/l**
Arsenic III	Total	Lab	**0.32 ug/l**	--	--	--	--	--
Arsenic inorganic	Total	Lab	**2.34 ug/l**	--	--	--	--	--
Arsenic V	Total	Lab	**2.02 ug/l**	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	--	--
Barium	Total	Lab	< 10 ug/l	**2.1 ug/l**	**4.68 ug/l**	**4.85 ug/l**	**2.29 * ug/l**	**3.79 * ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	--	--	--	--	--	--
Boron	Total	Lab	**401 ug/l**	**385 ug/l**	**401 ug/l**	**392 ug/l**	**401 ug/l**	**413 ug/l**
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**52600 ug/l**	**48600 ug/l**	**53400 ug/l**	**52000 ug/l**	**51800 ug/l**	**50600 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	**2.5 ug/l**	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**0.92 ug/l**	**0.65 ug/l**	**0.68 ug/l**	**0.7 ug/l**	**0.86 ug/l**	**1 ug/l**
Copper	Dissolved	Lab	**0.76 ug/l**	**0.77 b ug/l**	**1.19 ug/l**	**1.04 ug/l**	**5.16 b* ug/l**	**1.34 b* ug/l**
Copper	Total	Lab	**0.82 ug/l**	**0.75 ug/l**	**1.4 ug/l**	**1.27 ug/l**	**5.84 * ug/l**	**1.58 * ug/l**
Iron	Dissolved	Lab	--	--	--	--	< 50 * ug/l	**132 * ug/l**
Iron	Total	Lab	**128 ug/l**	**85.8 ug/l**	**52.1 ug/l**	**51.0 ug/l**	**401 ug/l**	**536 ug/l**
Lead	Dissolved	Lab	--	--	--	--	--	--
Lead	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**74400 ug/l**	**69800 ug/l**	**73100 ug/l**	**70600 ug/l**	**68900 ug/l**	**69300 ug/l**
Manganese	Dissolved	Lab	--	--	**1280 ug/l**	**1220 ug/l**	**1380 ug/l**	**1300 ug/l**
Manganese	Total	Lab	**1270 ug/l**	**1380 ug/l**	**1450 ug/l**	**1420 ug/l**	**2380 * ug/l**	**1450 * ug/l**
Mercury	Total	Lab	--	< 0.0005 ug/l	**0.0006 ug/l**	**0.0007 ug/l**	< 0.0005 ug/l	**0.0006 ug/l**
Mercury methyl	Total	Lab	--	**0.00015 ug/l**	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**29.7 ug/l**	**28.2 ug/l**	**30.9 ug/l**	**30.5 ug/l**	**32.2 ug/l**	**34.2 ug/l**
Molybdenum	Total	Lab	**30.4 ug/l**	**29.3 ug/l**	**29.8 ug/l**	**30.6 ug/l**	**28.8 ug/l**	**32.2 ug/l**
Nickel	Dissolved	Lab	**2.2 ug/l**	**0.64 ug/l**	**1.85 ug/l**	**1.88 ug/l**	**1.76 ug/l**	**1.91 ug/l**
Nickel	Total	Lab	**4.0 ug/l**	**0.82 ug/l**	**1.75 ug/l**	**1.91 ug/l**	**1.82 ug/l**	**1.51 ug/l**
Palladium	Total	Lab	< 0.30 ug/l	**0.032 j ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.30 ug/l	**0.010 j ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**8010 ug/l**	**8720 ug/l**	**9260 ug/l**	**8920 ug/l**	**9600 ug/l**	**8830 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**47800 ug/l**	**49700 ug/l**	**52100 ug/l**	**50200 ug/l**	**47000 ug/l**	**47200 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**324 ug/l**	**313 ug/l**	**302 ug/l**	**293 ug/l**	**325 ug/l**	**310 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.4 ug/l	< 0.4 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l
Zinc	Dissolved	Lab	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	**18.6 b ug/l**	**21.6 b ug/l**
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-007		GW-007	GW-007	GW-007		GW-007	
		Date	10/4/2010		4/22/2011	7/19/2011	10/4/2011		4/11/2012	
		Sample Type	N	FD	N	N	N	FD	N	FD
	Fraction	Analysis Location								
General Parameters										
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**281 mg/l**	**283 mg/l**	**304 mg/l**	**281 mg/l**	**280 mg/l**	**285 mg/l**	**287 mg/l**	**288 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 20 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10.0 mg/l	< 10.0 mg/l
Alkalinity, total	NA	Lab	**281 mg/l**	**283 mg/l**	**304 mg/l**	**281 mg/l**	**280 mg/l**	**285 mg/l**	**287 mg/l**	**288 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 h mg/l	< 2.4 mg/l	< 2.4 mg/l	< 3 mg/l	< 3 mg/l	< 4.0 mg/l	< 4.0 h mg/l
Carbon, dissolved organic	NA	Lab	**2.3 mg/l**	**1.8 mg/l**	**2.2 mg/l**	**2.4 mg/l**	**3.1 mg/l**	**3.1 mg/l**	**2.6 b mg/l**	**2.0 b mg/l**
Carbon, total organic	NA	Lab	**1.6 mg/l**	**1.8 mg/l**	**1.4 mg/l**	**2.0 mg/l**	**2.3 mg/l**	**2.1 mg/l**	**2.4 mg/l**	**1.8 mg/l**
Chemical Oxygen Demand	NA	Lab	**10 mg/l**	**10.9 mg/l**	< 10 mg/l	**14.8 mg/l**	**33.4 mg/l**	**19.2 mg/l**	**24.5 mg/l**	**20.3 mg/l**
Chloride	NA	Lab	**29.5 mg/l**	**29.7 mg/l**	**27.7 mg/l**	**28.7 mg/l**	**28 mg/l**	**28.4 mg/l**	**28.6 mg/l**	**28.5 mg/l**
Cyanide	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**1.4 mg/l**	--	**1.21 mg/l**	**3.1 mg/l**	**2.6 mg/l**	--	**2.49 mg/l**	--
Fluoride	NA	Lab	**2.04 mg/l**	**2.04 mg/l**	**1.93 mg/l**	**1.86 mg/l**	**1.89 mg/l**	**1.92 mg/l**	**2.0 mg/l**	**2.0 mg/l**
Hardness, total, as CaCO3	NA	Lab	**418 mg/l**	**419 mg/l**	**434 mg/l**	**401 mg/l**	**382 mg/l**	**392 mg/l**	**408 mg/l**	**405 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	**0.16 mg/l**	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.13 mg/l**	**0.06 mg/l**	**0.19 h mg/l**	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	**0.090 mg/l**	**0.17 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--	--
pH	NA	Lab	**7.6 pH units**	**7.6 pH units**	--	**7.9 pH units**	**7.9 pH units**	**7.8 pH units**	**8.0 pH units**	**8.3 pH units**
pH	NA	Field	**7.1 pH units**	--	**7.46 pH units**	**7.35 pH units**	**7.5 pH units**	--	**7.6 pH units**	--
Phosphorus, total	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 h mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**397 mV**	--	**475 mV**	**375 mV**	**365 mV**	--	**419 mV**	--
Solids, total dissolved	NA	Lab	**536 mg/l**	**567 mg/l**	**592 mg/l**	**585 mg/l**	**545 mg/l**	**554 mg/l**	**563 mg/l**	**579 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**916 umhos/cm**	--	**931.3 umhos/cm**	**61.8 umhos/cr**	**911 umhos/cm**	--	**901.7 umhos/cm**	--
Sulfate	NA	Lab	**165 mg/l**	**166 mg/l**	**173 mg/l**	**161 mg/l**	**151 mg/l**	**153 mg/l**	**162 mg/l**	**162 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**11.6 deg C**	--	**5.9 deg C**	**9.78 deg C**	**9.3 deg C**	--	**7.05 deg C**	--
Turbidity	NA	Field	< 1 NTU	--	**0 NTU**	**82.4 NTU**	**80.1 NTU**	--	**0 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1505.64**	--	**1505.56**	**1505.39**	**1505.59**	--	**1505.46**	--
Metals										
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 20.0 ug/l	< 20.0 ug/l
Aluminum	Total	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	**284 ug/l**	**234 ug/l**	**271 ug/l**	< 20.0 ug/l	< 20.0 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	**1.64 ug/l**	**1.71 ug/l**	**0.86 ug/l**	**2.35 ug/l**	**1.32 ug/l**	**1.22 ug/l**	**1.1 ug/l**	**1.2 ug/l**
Arsenic	Total	Lab	**1.58 ug/l**	**1.58 ug/l**	**0.84 ug/l**	**7.06 ug/l**	**5.55 ug/l**	**7.64 ug/l**	**0.90 ug/l**	**1.1 ug/l**
Arsenic III	Total	Lab	--	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	**1.42 ug/l**	**1.95 ug/l**	**1.46 ug/l**	**1.50 ug/l**	--	--
Barium	Total	Lab	**1.52 ug/l**	**1.65 ug/l**	**1.41 ug/l**	**6.84 ug/l**	**4.95 ug/l**	**5.45 ug/l**	**1.6 ug/l**	**1.6 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	--	--	**394 ug/l**	**396 ug/l**	**409 ug/l**	**397 ug/l**	**385 ug/l**	**392 ug/l**
Boron	Total	Lab	**395 ug/l**	**398 ug/l**	**403 ug/l**	**406 ug/l**	**396 ug/l**	**400 ug/l**	**392 ug/l**	**392 ug/l**
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.23 ug/l**	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--	--
Calcium	Total	Lab	**52100 ug/l**	**52200 ug/l**	**52500 ug/l**	**49800 ug/l**	**48200 ug/l**	**49700 ug/l**	**50400 ug/l**	**49800 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l
Chromium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l
Cobalt	Dissolved	Lab	--	--	**0.67 ug/l**	**0.87 ug/l**	**0.72 ug/l**	**0.77 ug/l**	--	--
Cobalt	Total	Lab	**0.56 ug/l**	**0.56 ug/l**	**0.61 ug/l**	**3.94 ug/l**	**2.8 ug/l**	**3.15 ug/l**	**0.84 ug/l**	**0.86 ug/l**
Copper	Dissolved	Lab	**0.8 ug/l**	**0.76 ug/l**	**0.86 ug/l**	**0.86 ug/l**	**2.28 ug/l**	**1.95 ug/l**	**1.2 ug/l**	**1.3 ug/l**
Copper	Total	Lab	**0.92 ug/l**	**0.9 ug/l**	**0.72 ug/l**	**11.6 ug/l**	**6.51 ug/l**	**7.68 ug/l**	**0.82 ug/l**	**0.84 ug/l**
Iron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l
Iron	Total	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	**5970 ug/l**	**4120 ug/l**	**5200 ug/l**	< 50.0 ug/l	< 50.0 ug/l
Lead	Dissolved	Lab	--	--	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	--
Lead	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	**0.89 ug/l**	**1.92 ug/l**	**2.09 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--	--
Magnesium	Total	Lab	**69800 ug/l**	**70200 ug/l**	**73600 ug/l**	**67200 ug/l**	**63600 ug/l**	**65100 ug/l**	**68500 ug/l**	**68200 ug/l**
Manganese	Dissolved	Lab	**1280 ug/l**	**1340 ug/l**	**1270 ug/l**	**1400 ug/l**	**1150 ug/l**	**1120 ug/l**	**1240 ug/l**	**1280 ug/l**
Manganese	Total	Lab	**1260 ug/l**	**1250 ug/l**	**1300 ug/l**	**4130 ug/l**	**3120 ug/l**	**3020 ug/l**	**1320 ug/l**	**1250 ug/l**
Mercury	Total	Lab	< 0.0005 ug/l	**0.0006 ug/l**	< 0.0005 ug/l	**0.0068 ug/l**	**0.0042 ug/l**	**0.0051 ug/l**	< 0.00050 ug/l	< 0.00050 ug/l
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	**0.00011 ug/l**	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**30.7 ug/l**	**31.2 ug/l**	**29.5 ug/l**	**27.7 ug/l**	**30.1 ug/l**	**31.2 ug/l**	**26.6 ug/l**	**27.2 ug/l**
Molybdenum	Total	Lab	**31.7 ug/l**	**33.6 ug/l**	**29.7 ug/l**	**31 ug/l**	**32.4 ug/l**	**31.4 ug/l**	**27.4 ug/l**	**27.1 ug/l**
Nickel	Dissolved	Lab	**1.57 ug/l**	**2.73 ug/l**	**0.66 ug/l**	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	< 0.50 ug/l	**0.60 ug/l**
Nickel	Total	Lab	**1.82 ug/l**	**1.41 ug/l**	< 0.6 ug/l	**1.85 ug/l**	**1.28 ug/l**	**1.33 ug/l**	**0.51 ug/l**	**0.59 ug/l**
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--	--
Potassium	Total	Lab	**9380 ug/l**	**9280 ug/l**	**7630 ug/l**	**7870 ug/l**	**7830 ug/l**	**8030 ug/l**	**7600 ug/l**	**7500 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--	--
Sodium	Total	Lab	**48800 ug/l**	**48600 ug/l**	**50100 ug/l**	**47500 ug/l**	**46200 ug/l**	**47600 ug/l**	**50300 ug/l**	**49600 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--	--
Strontium	Total	Lab	**311 ug/l**	**313 ug/l**	**305 ug/l**	**305 ug/l**	**290 ug/l**	**298 ug/l**	**300 ug/l**	**296 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--	--
Titanium	Total	Lab	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10.0 ug/l	< 10.0 ug/l
Zinc	Dissolved	Lab	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	**6.44 ug/l**	**7.6 ug/l**	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	< 6 ug/l	**6.12 ug/l**	< 6 ug/l	< 6 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-007	GW007		GW007		GW007	
		Date	7/18/2012	10/1/2012		4/3/2013		7/2/2013	
		Sample Type	N	N	FD	N	FD	N	FD
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**298 mg/l**	**288 mg/l**	**295 mg/l**	**279 mg/l**	**287 mg/l**	**307 mg/l**	**307 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 20.0 mg/l
Alkalinity, total	NA	Lab	**298 mg/l**	**288 mg/l**	**295 mg/l**	**287 mg/l**	**287 mg/l**	**307 mg/l**	**307 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 8.0 mg/l	< 8.0 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 * mg/l	< 2.4 * mg/l
Carbon, dissolved organic	NA	Lab	**2.0 mg/l**	**1.7 mg/l**	**1.7 mg/l**	**1.4 mg/l**	**1.4 mg/l**	**2.3 mg/l**	**2.0 mg/l**
Carbon, total organic	NA	Lab	**1.7 mg/l**	< 1.0 mg/l	**1.5 b mg/l**	**1.4 mg/l**	**1.4 mg/l**	**1.8 mg/l**	**1.7 mg/l**
Chemical Oxygen Demand	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l
Chloride	NA	Lab	**29.4 mg/l**	**29.9 mg/l**	**29.8 mg/l**	**29.7 mg/l**	**29.7 mg/l**	**28.6 mg/l**	**28.6 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	**0.0165 mg/l**	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**1.88 mg/l**	**2.15 mg/l**	--	**0.21 mg/l**	--	**0.36 mg/l**	--
Fluoride	NA	Lab	**2.0 mg/l**	**1.9 mg/l**	**1.9 mg/l**	**1.9 mg/l**	**1.9 mg/l**	**1.8 mg/l**	**1.8 mg/l**
Hardness, total, as CaCO3	NA	Lab	**427 mg/l**	**415 mg/l**	**408 mg/l**	**375 mg/l**	**395 mg/l**	**426 mg/l**	**424 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	**0.11 mg/l**	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**7.7 pH units**	**7.8 pH units**	**7.7 pH units**	**7.7 pH units**	**7.8 pH units**	**7.7 pH units**	**7.7 pH units**
pH	NA	Field	**7.35 pH units**	**6.99 pH units**	--	**7.57 pH units**	--	**7.38 pH units**	--
Phosphorus, total	NA	Lab	< 0.10 mg/l	**0.10 mg/l**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**180 mV**	**144 mV**	--	**509 mV**	--	**480 mV**	--
Solids, total dissolved	NA	Lab	**555 mg/l**	**547 mg/l**	**550 mg/l**	**549 mg/l**	**571 mg/l**	**608 mg/l**	**589 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**947 umhos/cm**	**929.2 umhos/cm**	--	**902.8 umhos/cm**	--	**981 umhos/cm**	--
Sulfate	NA	Lab	**176 mg/l**	**162 mg/l**	**162 mg/l**	**163 mg/l**	**164 mg/l**	**171 mg/l**	**171 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**13.19 deg C**	**11.89 deg C**	--	**2.38 deg C**	--	**11.15 deg C**	--
Turbidity	NA	Field	**0 NTU**	**0 NTU**	--	**0.6 NTU**	--	**3.9 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1505.41**	**1505.58**	--	**1505.46**	--	**1505.48**	--
Metals						--	--	--	--
Aluminum	Dissolved	Lab	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	**25.6 ug/l**	**21.2 ug/l**
Aluminum	Total	Lab	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	**1.2 ug/l**	**1.1 ug/l**	**0.95 ug/l**	**0.80 ug/l**	**1.0 ug/l**	**1.2 ug/l**	**1.2 ug/l**
Arsenic	Total	Lab	**1.1 ug/l**	**1.1 ug/l**	**0.97 ug/l**	--	--	--	--
Arsenic III	Total	Lab	--	--	--	**0.94 ug/l**	**0.93 ug/l**	**1.1 ug/l**	**1.3 ug/l**
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	**1.5 ug/l**	**1.3 ug/l**	**1.7 ug/l**	**1.2 ug/l**	**1.2 ug/l**	**1.8 ug/l**	**1.8 ug/l**
Barium	Total	Lab	**1.5 ug/l**	**1.2 ug/l**	**1.2 ug/l**	**1.4 ug/l**	**1.5 ug/l**	**1.9 ug/l**	**2.0 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	**401 ug/l**	**421 ug/l**	**422 ug/l**	**371 ug/l**	**375 ug/l**	**443 ug/l**	**458 ug/l**
Boron	Total	Lab	**417 ug/l**	**424 ug/l**	**412 ug/l**	**353 ug/l**	**354 ug/l**	**442 ug/l**	**450 ug/l**
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**50700 ug/l**	**51400 ug/l**	**50300 ug/l**	**45000 ug/l**	**46700 ug/l**	**51800 ug/l**	**51600 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Chromium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Cobalt	Dissolved	Lab	**0.76 ug/l**	**0.70 ug/l**	**0.67 ug/l**	**0.59 ug/l**	**0.59 ug/l**	**0.72 ug/l**	**0.74 ug/l**
Cobalt	Total	Lab	**0.82 ug/l**	**0.62 ug/l**	**0.61 ug/l**	**0.74 ug/l**	**0.70 ug/l**	**0.87 ug/l**	**0.88 ug/l**
Copper	Dissolved	Lab	**1.1 ug/l**	**0.94 ug/l**	**0.96 ug/l**	**0.56 ug/l**	**0.64 ug/l**	**0.63 ug/l**	**0.68 ug/l**
Copper	Total	Lab	**1.1 ug/l**	**1.1 ug/l**	**1.1 ug/l**	**0.76 ug/l**	**0.77 ug/l**	**0.96 * ug/l**	**3.2 * ug/l**
Iron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Iron	Total	Lab	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**73000 ug/l**	**69700 ug/l**	**68500 ug/l**	**63900 ug/l**	**67700 ug/l**	**72000 ug/l**	**71800 ug/l**
Manganese	Dissolved	Lab	**1260 ug/l**	**1030 ug/l**	**1010 ug/l**	**1300 ug/l**	**1280 ug/l**	**1210 ug/l**	**1270 ug/l**
Manganese	Total	Lab	**1280 ug/l**	**1070 ug/l**	**1070 ug/l**	**1310 ug/l**	**1290 ug/l**	**1360 ug/l**	**1310 ug/l**
Mercury	Total	Lab	< 0.00050 ug/l	< 0.00050 ug/l	< 0.00050 ug/l	**0.00058 ug/l**	**0.00057 ug/l**	< 0.00050 ug/l	< 0.00050 ug/l
Mercury methyl	Total	Lab	< 0.00005 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	**29.9 ug/l**	**29.4 ug/l**	**28.9 ug/l**	**29.2 ug/l**	**29.3 ug/l**	**29.3 ug/l**	**30.1 ug/l**
Molybdenum	Total	Lab	**30.2 ug/l**	**29.6 ug/l**	**29.7 ug/l**	**30.7 ug/l**	**30.0 ug/l**	**32.9 ug/l**	**32.3 ug/l**
Nickel	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Total	Lab	< 0.50 ug/l	**0.63 ug/l**	**0.62 ug/l**	**0.53 ug/l**	**0.59 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**8300 ug/l**	**8300 ug/l**	**8100 ug/l**	**6700 ug/l**	**7100 ug/l**	**8000 ug/l**	**8000 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**49300 ug/l**	**51500 ug/l**	**50300 ug/l**	**48700 ug/l**	**50500 ug/l**	**50500 ug/l**	**50500 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**324 ug/l**	**325 ug/l**	**318 ug/l**	**278 ug/l**	**287 ug/l**	**315 ug/l**	**316 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	**0.35 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.017 ug/l	< 0.017 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW007		GW007	GW-008	GW-008	GW-008		GW-008
		Date	10/4/2013		10/10/2013	8/17/2007	10/10/2007	3/18/2009		3/16/2010
		Sample Type	N	FD	N	N	N	N	FD	N
	Fraction	Analysis Location								
General Parameters										
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**304 mg/l**	**306 mg/l**	--	--	--	--	--	**118 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20.0 mg/l	< 20.0 mg/l	--	--	--	--	--	< 10 mg/l
Alkalinity, total	NA	Lab	**304 mg/l**	**306 mg/l**	--	**158 mg/l**	**135 mg/l**	**122 mg/l**	**125 mg/l**	**118 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	--	--	< 2.4 * mg/l	--	--	--	--	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**1.6 mg/l**	**1.7 mg/l**	--	--	--	--	--	**1.3 mg/l**
Carbon, total organic	NA	Lab	**1.4 mg/l**	**1.3 mg/l**	--	**1.8 mg/l**	**1.6 mg/l**	**1.5 b mg/l**	**1.3 b mg/l**	**1.3 mg/l**
Chemical Oxygen Demand	NA	Lab	**14.5 mg/l**	**14.4 mg/l**	--	< 10 mg/l	**18 mg/l**	< 10 mg/l	< 10 mg/l	< 10 mg/l
Chloride	NA	Lab	**30.4 mg/l**	**30.2 mg/l**	--	**1.16 mg/l**	**1.02 mg/l**	**0.99 mg/l**	**0.93 mg/l**	**1.21 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	--	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0035 mg/l
Dissolved oxygen	NA	Field	**0.25 mg/l**	--	**1.97 mg/l**	**1.37 mg/l**	**2.75 mg/l**	**1.67 mg/l**	--	**3.0 mg/l**
Fluoride	NA	Lab	**1.8 mg/l**	**1.9 mg/l**	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Hardness, total, as CaCO3	NA	Lab	**389 mg/l**	**392 mg/l**	--	**184 mg/l**	**167 mg/l**	**141 mg/l**	**142 mg/l**	**132 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	< 0.1 h mg/l	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	< 0.05 h mg/l	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--	--
pH	NA	Lab	**8.7 pH units**	**8.7 pH units**	--	**7.1 pH units**	**7.0 pH units**	**6.9 pH units**	**7.2 pH units**	**6.9 pH units**
pH	NA	Field	**7.62 pH units**	--	**7.44 pH units**	**6.98 pH units**	**7.35 pH units**	**8.19 pH units**	--	**6.68 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	--	**0.12 mg/l**	**0.12 mg/l**	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	**552 mV**	--	**346 mV**	**344 mV**	**530 mV**	**222 mV**	--	**489 mV**
Solids, total dissolved	NA	Lab	**566 mg/l**	**538 mg/l**	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**881.1 umhos/cm**	--	**912.9 umhos/cm**	**316 umhos/cm**	**307 umhos/cm**	**321 umhos/cm**	--	**238 umhos/cm**
Sulfate	NA	Lab	**168 mg/l**	**170 mg/l**	--	**23.5 mg/l**	**21.3 mg/l**	**17.2 mg/l**	**16.7 mg/l**	**18.1 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**9.57 deg C**	--	**13.49 deg C**	**9.4 deg C**	**10.7 deg C**	**4.6 deg C**	--	**4.1 deg C**
Turbidity	NA	Field	**0 NTU**	--	**0 NTU**	**38 NTU**	**181.6 NTU**	**3 NTU**	--	**2 NTU**
Water Elevation, ft/MSL	NA	Field	**1506.56**	--	**1505.56**	**1557.63**	**1560.34**	**1557.51**	--	**1558.3**
Metals			--	--	--					
Aluminum	Dissolved	Lab	< 20.0 ug/l	< 20.0 ug/l	--	**25 ug/l**	**16 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	< 20.0 ug/l	< 20.0 ug/l	--	**6300 ug/l**	**6600 ug/l**	**195 ug/l**	**218 ug/l**	**42.3 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	< 0.50 ug/l	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.5 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	**0.97 ug/l**	**1.3 ug/l**	--	--	< 2.0 ug/l	--	--	--
Arsenic	Total	Lab	--	--	--	< 2.0 ug/l	< 2.0 ug/l	< 2 ug/l	< 2 ug/l	< 2 ug/l
Arsenic III	Total	Lab	**1.0 ug/l**	**0.94 ug/l**	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--	--
Barium	Dissolved	Lab	**1.3 ug/l**	**1.2 ug/l**	--	--	**34 ug/l**	--	--	--
Barium	Total	Lab	**1.3 ug/l**	**1.4 ug/l**	--	**76 ug/l**	**81 ug/l**	**31.4 ug/l**	**31.8 ug/l**	**28.7 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	< 2.0 ug/l	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 1.0 ug/l	< 2.0 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	**381 ug/l**	**407 ug/l**	--	--	< 200 ug/l	--	--	--
Boron	Total	Lab	**400 ug/l**	**428 ug/l**	--	< 200 ug/l	< 200 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	**24000 ug/l**	--	--	--
Calcium	Total	Lab	**47200 ug/l**	**47700 ug/l**	--	**31000 ug/l**	**26500 ug/l**	**23000 ug/l**	**23200 ug/l**	**21000 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	--	**2.1 ug/l**	**2.9 ug/l**	**2.1 ug/l**	**2.0 ug/l**	**1.3 ug/l**
Chromium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	--	**9.5 ug/l**	**15 b ug/l**	**2.9 b ug/l**	**2.7 b ug/l**	**1.4 ug/l**
Cobalt	Dissolved	Lab	**0.56 ug/l**	**0.57 ug/l**	--	--	**0.20 ug/l**	--	--	--
Cobalt	Total	Lab	**0.58 ug/l**	**0.60 ug/l**	--	**2.5 ug/l**	**3.1 ug/l**	**0.22 ug/l**	< 0.2 ug/l	< 0.2 ug/l
Copper	Dissolved	Lab	**1.3 ug/l**	**1.2 ug/l**	--	**1.8 b ug/l**	**1.9 ug/l**	**0.74 ug/l**	**0.91 ug/l**	**0.7 b ug/l**
Copper	Total	Lab	**1.2 ug/l**	**1.2 ug/l**	--	**9.7 ug/l**	**13 ug/l**	**1.2 b ug/l**	**1.6 b ug/l**	**0.82 ug/l**
Iron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	--	--	**24 ug/l**	--	--	--
Iron	Total	Lab	< 50.0 ug/l	< 50.0 ug/l	--	**6700 ug/l**	**7100 ug/l**	**251 ug/l**	**270 ug/l**	**53.3 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	--	--	< 0.60 ug/l	--	--	--
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	**1.5 ug/l**	**1.9 ug/l**	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	**21000 ug/l**	--	--	--
Magnesium	Total	Lab	**65800 ug/l**	**66400 ug/l**	--	**26000 ug/l**	**24500 ug/l**	**20200 ug/l**	**20400 ug/l**	**19200 ug/l**
Manganese	Dissolved	Lab	**1200 ug/l**	**1200 ug/l**	--	--	**84 ug/l**	--	--	--
Manganese	Total	Lab	**1140 ug/l**	**1190 ug/l**	--	**530 ug/l**	**220 ug/l**	**45.7 b ug/l**	**45.5 b ug/l**	**14.1 b ug/l**
Mercury	Total	Lab	< 0.00050 ug/l	< 0.00050 ug/l	--	--	**0.0085 ug/l**	**0.0006 ug/l**	< 0.0005 ug/l	< 0.0005 ug/l
Mercury methyl	Total	Lab	< 0.00003 ug/l	< 0.00003 ug/l	--	--	< 0.00005 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**31.0 ug/l**	**32.1 ug/l**	--	**0.30 b ug/l**	**0.31 ug/l**	**0.25 b ug/l**	**0.38 b ug/l**	< 0.2 ug/l
Molybdenum	Total	Lab	**29.0 ug/l**	**31.9 ug/l**	--	**0.43 ug/l**	**0.33 ug/l**	**0.24 ug/l**	**0.45 ug/l**	< 0.2 ug/l
Nickel	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	--	**1.7 b ug/l**	**2.5 ug/l**	**1.2 ug/l**	**1.1 ug/l**	**0.84 ug/l**
Nickel	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	**11 ug/l**	**18 b ug/l**	**2.0 b ug/l**	**2.0 b ug/l**	**0.95 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.030 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	< 0.30 ug/l	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	< 0.30 ug/l	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.0090 ug/l
Potassium	Dissolved	Lab	--	--	--	--	**1900 ug/l**	--	--	--
Potassium	Total	Lab	**7800 ug/l**	**7900 ug/l**	--	**3300 ug/l**	**3300 ug/l**	**1540 ug/l**	**1550 ug/l**	**1420 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	**6000 ug/l**	--	--	--
Sodium	Total	Lab	**47500 ug/l**	**48400 ug/l**	--	**7800 ug/l**	**7300 ug/l**	**5040 ug/l**	**5150 ug/l**	**4800 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	**91 ug/l**	--	--	--
Strontium	Total	Lab	**296 ug/l**	**303 ug/l**	--	**130 ug/l**	**110 ug/l**	**80.2 ug/l**	**81.2 ug/l**	**82.8 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	< 0.40 ug/l	--	--	--
Thallium	Total	Lab	< 0.017 ug/l	< 0.017 ug/l	--	< 0.40 ug/l	< 0.40 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l
Titanium	Dissolved	Lab	--	--	--	--	**3.0 ug/l**	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	--	**150 ug/l**	**240 ug/l**	< 10 ug/l	< 10 ug/l	< 10 ug/l
Zinc	Dissolved	Lab	< 6.0 ug/l	**7.4 ug/l**	--	< 30 ug/l	**7.1 ug/l**	**6.6 ug/l**	< 6 ug/l	< 6 ug/l
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	--	< 30 ug/l	**23 ug/l**	< 6 b ug/l	< 6 ug/l	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-008		GW-008	GW-008	GW-008	GW-008
		Date	5/4/2010		7/27/2010	10/4/2010	4/22/2011	7/19/2011
		Sample Type	N	FD	N	N	N	N
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**116 mg/l**	**115 mg/l**	**118 mg/l**	**121 mg/l**	**115 mg/l**	**124 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 20 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	**116 mg/l**	**115 mg/l**	**118 mg/l**	**121 mg/l**	**115 mg/l**	**124 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 3 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 3 mg/l
Carbon, dissolved organic	NA	Lab	**1.1 mg/l**	**1.1 mg/l**	**1.4 mg/l**	**1.9 mg/l**	**2.3 mg/l**	**2.5 mg/l**
Carbon, total organic	NA	Lab	**1.1 mg/l**	**1.0 mg/l**	**1.5 mg/l**	**1.7 mg/l**	**1 mg/l**	**2.1 mg/l**
Chemical Oxygen Demand	NA	Lab	**12.3 mg/l**	**10.2 mg/l**	< 10 mg/l	< 10 mg/l	< 10 mg/l	**26.5 mg/l**
Chloride	NA	Lab	**0.86 mg/l**	**0.87 mg/l**	**0.96 mg/l**	**0.61 mg/l**	**0.8 mg/l**	**0.84 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**1.64 mg/l**	--	**2.03 mg/l**	**2.6 mg/l**	**2.88 mg/l**	**4.1 mg/l**
Fluoride	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Hardness, total, as CaCO3	NA	Lab	**133 mg/l**	**132 mg/l**	**139 mg/l**	**145 mg/l**	**130 mg/l**	**170 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.05 mg/l	< 0.05 mg/l	< 0.1 h mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.4 pH units**	**7.2 pH units**	**7.0 pH units**	**6.8 pH units**	--	**7.3 pH units**
pH	NA	Field	**7.76 pH units**	--	**7.00 pH units**	**6.3 pH units**	**6.67 pH units**	**6.5 pH units**
Phosphorus, total	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 h mg P/L	**0.72 mg P/L**
Redox (oxidation potential)	NA	Field	**525 mV**	--	**433 mV**	**419 mV**	**537 mV**	**467 mV**
Solids, total dissolved	NA	Lab	**170 mg/l**	**168 mg/l**	**151 mg/l**	**194 mg/l**	**163 mg/l**	**197 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**226 umhos/cm**	--	**268 umhos/cm**	**274 umhos/cm**	**232.3 umhos/cm**	**222 umhos/cm**
Sulfate	NA	Lab	**16.7 mg/l**	**16.8 mg/l**	**17.8 mg/l**	**18.2 mg/l**	**15.7 mg/l**	**15.1 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**5.3 deg C**	--	**11.2 deg C**	**11.1 deg C**	**5.21 deg C**	**10.7 deg C**
Turbidity	NA	Field	**21.9 NTU**	--	**2.5 NTU**	**1 NTU**	**0 NTU**	**886.0 NTU**
Water Elevation, ft/MSL	NA	Field	**1557.91**	--	**1556.54**	**1557.72**	**1559.22**	**1557.62**
Metals								
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**305 ug/l**	**302 ug/l**	**1120 ug/l**	< 25 ug/l	< 25 ug/l	**19500 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	--	--	< 1 ug/l	< 1 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 0.5 ug/l	**3.58 ug/l**
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	**27.1 ug/l**	**32.4 ug/l**
Barium	Total	Lab	**34.8 ug/l**	**36.4 ug/l**	**38 ug/l**	**34.3 ug/l**	**29.8 ug/l**	**197 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.45 ug/l**
Boron	Dissolved	Lab	--	--	--	--	< 50 ug/l	< 50 ug/l
Boron	Total	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.39 ug/l**
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**21900 ug/l**	**21900 ug/l**	**23400 ug/l**	**24400 ug/l**	**21800 ug/l**	**26400 ug/l**
Chromium	Dissolved	Lab	**1.1 ug/l**	< 1 ug/l	**1.05 ug/l**	**1.25 ug/l**	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	**1.28 ug/l**	**1.06 ug/l**	**3.12 ug/l**	**1.64 ug/l**	**1.44 ug/l**	**55.6 ug/l**
Cobalt	Dissolved	Lab	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Cobalt	Total	Lab	**0.26 ug/l**	**0.26 ug/l**	**0.66 ug/l**	< 0.2 ug/l	< 0.2 ug/l	**15.5 ug/l**
Copper	Dissolved	Lab	**1.74 ug/l**	**1.56 ug/l**	**2.43 ug/l**	**0.76 ug/l**	**1.76 ug/l**	**1.18 ug/l**
Copper	Total	Lab	**2.28 b ug/l**	**2.32 b ug/l**	**3.41 ug/l**	**0.79 ug/l**	**1.30 ug/l**	**45.4 ug/l**
Iron	Dissolved	Lab	--	--	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l
Iron	Total	Lab	**355 ug/l**	**368 ug/l**	**1040 ug/l**	< 50 ug/l	< 50 ug/l	**25200 ug/l**
Lead	Dissolved	Lab	--	--	--	--	< 0.5 ug/l	< 0.5 ug/l
Lead	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	**7.35 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**19100 ug/l**	**18900 ug/l**	**19600 ug/l**	**20400 ug/l**	**18300 ug/l**	**25300 ug/l**
Manganese	Dissolved	Lab	**47.4 * ug/l**	**75.4 * ug/l**	**60.8 ug/l**	**19.7 ug/l**	**18.3 ug/l**	**55.3 ug/l**
Manganese	Total	Lab	**42.6 ug/l**	**41.9 ug/l**	**58.4 ug/l**	**18.9 ug/l**	**24.4 ug/l**	**866 ug/l**
Mercury	Total	Lab	**0.0006 ug/l**	**0.0006 ug/l**	**0.0006 ug/l**	< 0.0005 ug/l	< 0.0005 ug/l	**0.0144 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	**0.00028 ug/l**	< 0.0001 ug/l	**0.00013 ug/l**	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**0.2 b ug/l**	**0.24 b ug/l**	**0.29 ug/l**	**0.24 ug/l**	**0.2 ug/l**	**0.32 ug/l**
Molybdenum	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	**0.23 ug/l**	**0.21 ug/l**	< 5 ug/l	**0.65 ug/l**
Nickel	Dissolved	Lab	**1.34 ug/l**	**1.39 ug/l**	**1.45 ug/l**	**1.34 ug/l**	**0.88 ug/l**	**0.82 ug/l**
Nickel	Total	Lab	**2.11 ug/l**	**2.05 ug/l**	**3.4 ug/l**	**1.38 ug/l**	**0.85 ug/l**	**60.3 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**1540 ug/l**	**1520 ug/l**	**1800 ug/l**	**1810 ug/l**	**1360 ug/l**	**3460 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**5030 ug/l**	**5000 ug/l**	**5670 ug/l**	**5620 ug/l**	**5070 ug/l**	**7080 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**76.1 ug/l**	**75.5 ug/l**	**84.7 ug/l**	**85.1 ug/l**	**74.3 ug/l**	**124 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	**14 ug/l**	**14 ug/l**	**83 ug/l**	< 10 ug/l	< 10 ug/l	**890 ug/l**
Zinc	Dissolved	Lab	< 6 ug/l	< 6 ug/l	**7.24 ug/l**	< 6 ug/l	**6.41 ug/l**	**6.48 ug/l**
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	**66 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-008		GW-008		GW-008	GW008	
		Date	10/3/2011		4/25/2012		7/18/2012	10/2/2012	
		Sample Type	N	FD	N	FD	N	N	FD
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**137 mg/l**	**132 mg/l**	**134 mg/l**	**130 mg/l**	**131 mg/l**	**148 mg/l**	**148 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l
Alkalinity, total	NA	Lab	**137 mg/l**	**132 mg/l**	**134 mg/l**	**130 mg/l**	**131 mg/l**	**148 mg/l**	**148 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 4.0 mg/l	< 4.0 mg/l	< 2.4 mg/l	< 8.0 mg/l	< 8.0 mg/l
Carbon, dissolved organic	NA	Lab	**3 mg/l**	**2.9 mg/l**	**2.2 mg/l**	**2.5 mg/l**	**1.7 mg/l**	**1.5 mg/l**	**1.5 mg/l**
Carbon, total organic	NA	Lab	**3.2 mg/l**	**2.4 mg/l**	**1.8 mg/l**	**1.7 mg/l**	**1.3 mg/l**	**1.3 mg/l**	**1.2 mg/l**
Chemical Oxygen Demand	NA	Lab	**26.1 mg/l**	**25.4 mg/l**	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l
Chloride	NA	Lab	**0.78 mg/l**	**0.77 mg/l**	**0.56 mg/l**	**0.56 mg/l**	**0.71 mg/l**	**0.75 mg/l**	**0.76 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	**0.0104 mg/l**	**0.0137 mg/l**
Dissolved oxygen	NA	Field	**8.2 mg/l**	--	**3.1 mg/l**	--	**2.95 mg/l**	**3.36 mg/l**	--
Fluoride	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Hardness, total, as CaCO3	NA	Lab	**195 mg/l**	**187 mg/l**	**145 mg/l**	**148 mg/l**	**143 mg/l**	**165 mg/l**	**164 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	**0.14 mg/l**	< 0.050 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**7.3 pH units**	**7.2 pH units**	**5.2 pH units**	**5.2 pH units**	**7.0 pH units**	**7.1 pH units**	**7.0 pH units**
pH	NA	Field	**7.2 pH units**	--	**6.65 pH units**	--	**6.27 pH units**	**6.5 pH units**	--
Phosphorus, total	NA	Lab	**0.81 mg P/L**	**0.86 mg P/L**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**493 mV**	--	**536 mV**	--	**208 mV**	**215 mV**	--
Solids, total dissolved	NA	Lab	**197 mg/l**	**226 mg/l**	**226 mg/l**	**235 mg/l**	**194 mg/l**	**196 mg/l**	**203 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**293 umhos/cm**	--	**272.4 umhos/cm**	--	**276.3 umhos/cm**	**307.9 umhos/cm**	--
Sulfate	NA	Lab	**16 mg/l**	**16 mg/l**	**15.0 mg/l**	**15.0 mg/l**	**15.8 mg/l**	**16.3 mg/l**	**16.2 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**13.8 deg C**	--	**5.45 deg C**	--	**13.38 deg C**	**11.52 deg C**	--
Turbidity	NA	Field	**855.0 NTU**	--	**0 NTU**	--	**0 NTU**	**0 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1557.16**	--	**1558.62**	--	**1557.6**	**1557**	--
Metals									
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l
Aluminum	Total	Lab	**24300 ug/l**	**19800 ug/l**	**49.0 ug/l**	**55.4 ug/l**	**25.5 ug/l**	**23.5 ug/l**	**25.0 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	Lab	**4.17 ug/l**	**3.52 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	**34.4 ug/l**	**35.0 ug/l**	**33.9 ug/l**
Barium	Total	Lab	**234 ug/l**	**225 ug/l**	**32.2 ug/l**	**33.7 ug/l**	**34.3 ug/l**	**35.2 ug/l**	**34.8 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	**0.58 ug/l**	**0.49 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Boron	Total	Lab	< 50 ug/l	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	**0.33 ug/l**	**0.29 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**31800 ug/l**	**30000 ug/l**	**23300 ug/l**	**23800 ug/l**	**23600 ug/l**	**27700 ug/l**	**27400 ug/l**
Chromium	Dissolved	Lab	**1.45 ug/l**	**1.15 ug/l**	**1.9 ug/l**	**1.8 ug/l**	**1.3 ug/l**	**1.7 ug/l**	**1.8 ug/l**
Chromium	Total	Lab	**65.1 ug/l**	**54.7 ug/l**	**1.8 ug/l**	**1.8 ug/l**	**1.5 ug/l**	**1.7 ug/l**	**1.5 ug/l**
Cobalt	Dissolved	Lab	--	--	--	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cobalt	Total	Lab	**16.8 ug/l**	**15.6 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Copper	Dissolved	Lab	**1.64 ug/l**	**2.3 ug/l**	**1.4 ug/l**	**0.90 ug/l**	**0.90 ug/l**	**0.90 ug/l**	**0.84 ug/l**
Copper	Total	Lab	**50 ug/l**	**46.4 ug/l**	**0.99 ug/l**	**1.0 ug/l**	**0.84 ug/l**	**1.1 ug/l**	**0.95 ug/l**
Iron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Iron	Total	Lab	**31000 ug/l**	**25600 ug/l**	**87.2 ug/l**	**82.5 ug/l**	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Lead	Dissolved	Lab	--	--	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Total	Lab	**8.49 ug/l**	**7.02 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**28000 ug/l**	**27200 ug/l**	**21000 ug/l**	**21500 ug/l**	**20500 ug/l**	**23300 ug/l**	**23300 ug/l**
Manganese	Dissolved	Lab	**19.9 ug/l**	**22.6 ug/l**	**8.6 ug/l**	**8.3 ug/l**	**25.1 ug/l**	**19.8 ug/l**	**18.9 ug/l**
Manganese	Total	Lab	**814 ug/l**	**776 ug/l**	**11.9 ug/l**	**11.9 ug/l**	**28.7 ug/l**	**20.8 ug/l**	**20.5 ug/l**
Mercury	Total	Lab	**0.0211 ug/l**	**0.0224 ug/l**	< 0.00050 ug/l	< 0.00050 ug/l	< 0.00050 ug/l	< 0.00050 ug/l	< 0.00050 ug/l
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.00005 ug/l	< 0.00003 ug/l	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	**0.23 ug/l**	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	**0.59 ug/l**	**0.22 ug/l**	**0.21 ug/l**
Molybdenum	Total	Lab	**0.63 ug/l**	**0.51 ug/l**	**0.21 ug/l**	< 0.20 ug/l	**0.54 ug/l**	**0.25 ug/l**	< 0.20 ug/l
Nickel	Dissolved	Lab	**1.08 ug/l**	**1.01 ug/l**	**0.84 ug/l**	**0.85 ug/l**	**0.85 ug/l**	**1.1 ug/l**	**1.2 ug/l**
Nickel	Total	Lab	**67.5 ug/l**	**59.4 ug/l**	**0.94 ug/l**	**1.0 ug/l**	**0.89 ug/l**	**1.3 ug/l**	**1.3 ug/l**
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**4620 ug/l**	**3930 ug/l**	**1400 ug/l**	**1400 ug/l**	**1600 ug/l**	**1900 ug/l**	**1900 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**8640 ug/l**	**7550 ug/l**	**5300 ug/l**	**5400 ug/l**	**5500 ug/l**	**5900 ug/l**	**5900 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**149 ug/l**	**132 ug/l**	**82.8 ug/l**	**84.3 ug/l**	**83.7 ug/l**	**94.3 ug/l**	**94.3 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	**0.44 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	**1100 ug/l**	**850 ug/l**	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l
Zinc	Dissolved	Lab	**7.04 b ug/l**	**6.01 b ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	**77.8 ug/l**	**64.7 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW008		GW008	GW008		GW-009	GW-009	GW-009
		Date	4/16/2013		7/3/2013	10/7/2013		3/19/2009	5/5/2009	3/18/2010
		Sample Type	N	FD	N	N	FD	N	N	N
	Fraction	Analysis Location								
General Parameters										
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**142 mg/l**	--	**134 mg/l**	**148 mg/l**	--	--	--	**225 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	--	< 20.0 mg/l	< 10.0 mg/l	--	--	--	< 10 mg/l
Alkalinity, total	NA	Lab	**142 mg/l**	--	**134 mg/l**	**148 mg/l**	--	**152 mg/l**	**189 mg/l**	**225 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	--	< 2.4 * mg/l	< 4.0 h mg/l	--	--	--	< 4 mg/l
Carbon, dissolved organic	NA	Lab	**1.7 mg/l**	--	**2.1 mg/l**	**1.7 mg/l**	--	--	--	**15.5 mg/l**
Carbon, total organic	NA	Lab	**1.3 mg/l**	--	**1.4 mg/l**	**1.5 mg/l**	--	**15.9 mg/l**	**12.2 mg/l**	**17.6 mg/l**
Chemical Oxygen Demand	NA	Lab	< 10.0 mg/l	--	< 10.0 mg/l	**16.5 mg/l**	--	**81.2 mg/l**	**39.5 mg/l**	**50.2 mg/l**
Chloride	NA	Lab	**0.56 mg/l**	--	**0.64 mg/l**	**1.3 mg/l**	--	**14.5 mg/l**	**9.94 mg/l**	**4.5 mg/l**
Cyanide	NA	Lab	**0.0147 mg/l**	--	< 0.0100 mg/l	**0.0152 mg/l**	--	< 0.02 mg/l	< 0.02 mg/l	**0.010 mg/l**
Dissolved oxygen	NA	Field	**1.06 mg/l**	--	**2.09 mg/l**	**2.26 mg/l**	--	**0.88 mg/l**	--	**1.85 mg/l**
Fluoride	NA	Lab	**0.12 mg/l**	--	< 0.10 mg/l	< 0.10 mg/l	--	**0.16 b mg/l**	**0.23 mg/l**	**0.25 mg/l**
Hardness, total, as CaCO3	NA	Lab	**149 mg/l**	--	**142 mg/l**	**149 mg/l**	--	**346 mg/l**	**250 mg/l**	**292 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	--	< 0.1 mg/l	< 0.1 mg/l	**0.24 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--	--
pH	NA	Lab	**7.1 pH units**	--	**6.9 pH units**	**8.5 pH units**	--	**6.9 pH units**	**6.6 pH units**	**7.5 pH units**
pH	NA	Field	**6.54 pH units**	--	**6.46 pH units**	**6.61 pH units**	--	**8.02 pH units**	--	**7.66 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	--	**0.21 mg/l**	< 0.1 mg/l	**1.02 mg P/L**
Redox (oxidation potential)	NA	Field	**563 mV**	--	**563 mV**	**494 mV**	--	**201 mV**	--	**533 mV**
Solids, total dissolved	NA	Lab	**218 mg/l**	--	**187 mg/l**	**211 mg/l**	--	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**278.4 umhos/cm**	--	**265.8 umhos/cm**	**282.4 umhos/cm**	--	**974 umhos/cm**	--	**981 umhos/cm**
Sulfate	NA	Lab	**15.2 mg/l**	--	**13.6 mg/l**	**15.7 mg/l**	--	**235 mg/l**	**148 mg/l**	**119 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**2.69 deg C**	--	**10.12 deg C**	**9.97 deg C**	--	**4.7 deg C**	--	**4.8 deg C**
Turbidity	NA	Field	**3.7 NTU**	--	**0.9 NTU**	**0 NTU**	--	**792 NTU**	--	**561 NTU**
Water Elevation, ft/MSL	NA	Field	**1556.93**	--	**1558.55**	**1557.19**	--	**1470.79**	**1470.58**	**1470.59**
Metals			--	--	--	--	--			
Aluminum	Dissolved	Lab	< 20.0 ug/l	--	< 20.0 ug/l	< 20.0 ug/l	--	< 25 ug/l	< 25 ug/l	**27.8 ug/l**
Aluminum	Total	Lab	**50.6 ug/l**	--	**41.8 ug/l**	**434 ug/l**	--	**9140 ug/l**	**228 ug/l**	**40800 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	--	< 2 ug/l	--
Arsenic	Total	Lab	--	--	--	--	--	< 2 ug/l	< 2 ug/l	**5.0 ug/l**
Arsenic III	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--	--
Barium	Dissolved	Lab	**33.2 ug/l**	--	**32.3 ug/l**	**34.5 ug/l**	--	--	--	--
Barium	Total	Lab	**33.9 ug/l**	--	**34.0 ug/l**	**39.6 ug/l**	--	**201 ug/l**	**97.1 ug/l**	**224 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	**0.34 ug/l**	< 0.2 ug/l	**0.88 ug/l**
Boron	Dissolved	Lab	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	--	--	--	--
Boron	Total	Lab	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	--	**101 ug/l**	**114 ug/l**	**159 ug/l**
Cadmium	Dissolved	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	**0.47 ug/l**	< 0.2 ug/l	**0.86 ug/l**
Calcium	Dissolved	Lab	--	--	--	--	--	--	--	--
Calcium	Total	Lab	**23700 ug/l**	--	**22900 ug/l**	**24200 ug/l**	--	**66000 ug/l**	**47000 ug/l**	**47000 ug/l**
Chromium	Dissolved	Lab	**1.3 ug/l**	--	**1.5 ug/l**	**1.7 ug/l**	--	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	**1.7 ug/l**	--	**1.4 ug/l**	**1.9 ug/l**	--	**27.3 ug/l**	< 1 ug/l	**61.4 ug/l**
Cobalt	Dissolved	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--
Cobalt	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	**0.33 ug/l**	--	**13.5 ug/l**	**5.6 ug/l**	**15.1 ug/l**
Copper	Dissolved	Lab	**0.86 ug/l**	--	**2.4 ug/l**	**0.79 ug/l**	--	**3.1 b ug/l**	**1.7 ug/l**	**15.9 ug/l**
Copper	Total	Lab	**1.0 ug/l**	--	**0.76 ug/l**	**1.7 ug/l**	--	**17.9 ug/l**	**2.4 ug/l**	**47.3 ug/l**
Iron	Dissolved	Lab	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	--	--	--	--
Iron	Total	Lab	**60.3 ug/l**	--	< 50.0 ug/l	**521 ug/l**	--	**14700 ug/l**	**3060 ug/l**	**69100 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	--	--	--
Lead	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	**3.0 ug/l**	**0.81 ug/l**	**11.7 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--	--
Magnesium	Total	Lab	**21700 ug/l**	--	**20500 ug/l**	**21600 ug/l**	--	**43900 ug/l**	**32200 ug/l**	**42300 ug/l**
Manganese	Dissolved	Lab	**5.4 ug/l**	--	**8.4 ug/l**	**8.8 ug/l**	--	--	--	--
Manganese	Total	Lab	**10.0 ug/l**	--	**15.4 ug/l**	**27.2 ug/l**	--	**2990 ug/l**	**2690 ug/l**	**3730 ug/l**
Mercury	Total	Lab	< 0.00050 ug/l	**0.00054 ug/l**	**0.00051 ug/l**	**0.00076 ug/l**	**0.0010 ug/l**	**0.0162 ug/l**	--	**0.0332 ug/l**
Mercury methyl	Total	Lab	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.0001 ug/l	--	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**0.58 ug/l**	--	< 0.30 ug/l	< 0.30 ug/l	--	**8.3 ug/l**	**9.0 ug/l**	**8.2 ug/l**
Molybdenum	Total	Lab	< 0.30 ug/l	--	< 0.30 ug/l	< 0.30 ug/l	--	**8.5 ug/l**	**9.2 ug/l**	**8.9 ug/l**
Nickel	Dissolved	Lab	**1.0 ug/l**	--	**0.92 ug/l**	**0.63 ug/l**	--	**9.2 ug/l**	**6.4 ug/l**	**3.9 ug/l**
Nickel	Total	Lab	**1.2 ug/l**	--	**0.71 ug/l**	**2.0 ug/l**	--	**28.8 ug/l**	**6.9 ug/l**	**53.2 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	< 0.30 ug/l	< 0.30 ug/l	**0.24 j ug/l**
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	< 0.30 ug/l	< 0.30 ug/l	< 0.0090 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--	--
Potassium	Total	Lab	**1400 ug/l**	--	**1500 ug/l**	**1700 ug/l**	--	**4820 ug/l**	**3770 ug/l**	**8100 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	--	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	--	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--	--
Sodium	Total	Lab	**5300 ug/l**	--	**5400 ug/l**	**5600 ug/l**	--	**55700 ug/l**	**55700 ug/l**	**77400 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--	--
Strontium	Total	Lab	**85.7 ug/l**	--	**82.5 ug/l**	**87.9 ug/l**	--	**254 ug/l**	**183 ug/l**	**283 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	--	< 0.017 ug/l	< 0.017 ug/l	--	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	--	< 10.0 ug/l	**19.6 ug/l**	--	**522 ug/l**	**11 ug/l**	**2600 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	--	**8.3 ug/l**	< 6.0 ug/l	--	**18.4 b ug/l**	< 6 ug/l	**10 ug/l**
Zinc	Total	Lab	< 6.0 ug/l	--	< 6.0 ug/l	< 6.0 ug/l	--	**25.6 b ug/l**	< 6 ug/l	**96 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-009		GW-009		GW-009	GW-009	GW-009
		Date	4/21/2010		5/6/2010		7/28/2010	10/8/2010	5/2/2011
		Sample Type	N	FD	N	FD	N	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**202 mg/l**	**202 mg/l**	**215 mg/l**	**239 mg/l**	**212 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	--	--	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	--	--	**202 mg/l**	**202 mg/l**	**215 mg/l**	**239 mg/l**	**212 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	--	--	< 2.4 mg/l	< 3 mg/l	< 3 mg/l	< 2.4 mg/l	< 4 mg/l
Carbon, dissolved organic	NA	Lab	--	--	**15.0 mg/l**	**14.7 mg/l**	**21.3 mg/l**	**20.2 mg/l**	**15.9 mg/l**
Carbon, total organic	NA	Lab	--	--	**16.7 mg/l**	**17.1 mg/l**	**25.5 mg/l**	**21.0 mg/l**	**15.9 mg/l**
Chemical Oxygen Demand	NA	Lab	--	--	**53.7 mg/l**	**55.1 mg/l**	**60.1 mg/l**	**72 mg/l**	**47.4 mg/l**
Chloride	NA	Lab	--	--	**3.77 mg/l**	**3.7 mg/l**	**2.6 mg/l**	**2.08 mg/l**	**3.16 mg/l**
Cyanide	NA	Lab	--	--	< 0.0100 mg/l	< 0.0100 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**0 mg/l**	--	**2.12 mg/l**	--	**0.42 mg/l**	**3.66 mg/l**	**3.57 mg/l**
Fluoride	NA	Lab	--	--	**0.27 mg/l**	**0.26 mg/l**	**0.28 mg/l**	**0.26 mg/l**	**0.16 mg/l**
Hardness, total, as CaCO3	NA	Lab	--	--	**200 mg/l**	**203 mg/l**	**189 mg/l**	**224 mg/l**	**283 mg/l**
Nitrate + Nitrite, as N	NA	Lab	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	--	--	**0.11 mg/l**	**0.12 mg/l**	**0.26 mg/l**	**0.21 mg/l**	**0.26 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	--	--	**7.2 pH units**	**7.3 pH units**	**7.0 pH units**	**7.0 pH units**	--
pH	NA	Field	**6.89 pH units**	--	**6.64 pH units**	--	**7.49 pH units**	**6.79 pH units**	**6.61 pH units**
Phosphorus, total	NA	Lab	--	--	< 0.1 mg P/L	< 0.1 mg P/L	**0.33 mg P/L**	**0.8 mg P/L**	**1.7 mg P/L**
Redox (oxidation potential)	NA	Field	**283 mV**	--	**408 mV**	--	**381 mV**	**194 mV**	**651 mV**
Solids, total dissolved	NA	Lab	--	--	**417 mg/l**	**443 mg/l**	**396 mg/l**	**396 mg/l**	**358 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**596.0 umhos/cm**	--	**617 umhos/cm**	--	**608 umhos/cm**	**589 umhos/cm**	**538.7 umhos/cm**
Sulfate	NA	Lab	--	--	**120 mg/l**	**120 mg/l**	**92.2 mg/l**	**64.4 mg/l**	**59.7 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**6.06 deg C**	--	**5.7 deg C**	--	**11.97 deg C**	**13.9 deg C**	**3.9 deg C**
Turbidity	NA	Field	**79.3 NTU**	--	**45.9 NTU**	--	**369 NTU**	**175 NTU**	**2543 NTU**
Water Elevation, ft/MSL	NA	Field	**1470.21**	--	**1470.12**	--	**1469.63**	**1469.96**	**1469.89**
Metals									
Aluminum	Dissolved	Lab	--	--	< 25 ug/l	< 25 ug/l	**43.2 ug/l**	**36.9 ug/l**	**29.1 ug/l**
Aluminum	Total	Lab	--	--	**1310 ug/l**	**1450 ug/l**	**6550 ug/l**	**8920 ug/l**	**47800 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	--	--	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	--	--	--	--	< 1 ug/l	< 1 ug/l	**0.77 ug/l**
Arsenic	Total	Lab	--	--	< 1 ug/l	**1.02 ug/l**	**1.56 ug/l**	**2.27 ug/l**	**4.28 ug/l**
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	--	--	**67.6 ug/l** **66.8 ug/l**
Barium	Total	Lab	--	--	**71 ug/l**	**74 ug/l**	**111 ug/l**	**149 ug/l**	**339 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**1 ug/l**
Boron	Dissolved	Lab	--	--	--	--	--	--	--
Boron	Total	Lab	--	--	**106 ug/l**	**109 ug/l**	**188 ug/l**	**187 ug/l**	**65.8 ug/l**
Cadmium	Dissolved	Lab	--	--	**0.2 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	--	--	< 0.2 ug/l	**0.24 ug/l**	**0.29 ug/l**	< 0.2 ug/l	**0.31 ug/l**
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**38700 ug/l**	**39100 ug/l**	**38000 ug/l**	**44000 ug/l**	**51100 ug/l**
Chromium	Dissolved	Lab	--	--	< 1 ug/l	< 1 ug/l	**1.16 ug/l**	**1.48 ug/l**	< 1 ug/l
Chromium	Total	Lab	--	--	**3.17 ug/l**	**4.18 ug/l**	**19.9 ug/l**	**27.1 ug/l**	**123 ug/l**
Cobalt	Dissolved	Lab	--	--	--	--	--	--	**3.1 ug/l** **3.1 ug/l**
Cobalt	Total	Lab	--	--	**3.55 ug/l**	**3.74 ug/l**	**6.41 ug/l**	**8.12 ug/l**	**29.8 ug/l**
Copper	Dissolved	Lab	--	--	**3.2 b ug/l**	**2.76 b ug/l**	**2.17 ug/l**	**20.7 ug/l**	**1.67 ug/l**
Copper	Total	Lab	--	--	**6.73 b ug/l**	**7.27 b ug/l**	**20.1 ug/l**	**23.2 ug/l**	**82.7 ug/l**
Iron	Dissolved	Lab	--	--	--	--	**7390 ug/l**	**1140 ug/l**	**6520 ug/l**
Iron	Total	Lab	--	--	**8890 ug/l**	**9290 ug/l**	**18300 ug/l**	**20300 ug/l**	**83900 ug/l**
Lead	Dissolved	Lab	--	--	--	--	--	--	< 0.5 ug/l < 0.5 ug/l
Lead	Total	Lab	--	--	< 0.5 ug/l	**0.58 ug/l**	**2.28 ug/l**	**2.83 ug/l**	**14.7 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**25200 ug/l**	**25700 ug/l**	**22900 ug/l**	**27600 ug/l**	**37700 ug/l**
Manganese	Dissolved	Lab	--	--	**2920 ug/l**	**2940 ug/l**	**17.3 ug/l**	**3050 ug/l**	**3520 ug/l**
Manganese	Total	Lab	--	--	**3290 ug/l**	**3350 ug/l**	**2940 ug/l**	**3350 ug/l**	**4220 ug/l**
Mercury	Total	Lab	**0.0075 * ug/l**	**0.012 * ug/l**	**0.0031 ug/l**	**0.0025 ug/l**	**0.0034 ug/l**	**0.0481 ug/l**	**0.0325 ug/l**
Mercury methyl	Total	Lab	--	--	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	**0.00011 ug/l**	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	--	--	**7.39 ug/l**	**7.4 ug/l**	**0.26 ug/l**	**7.82 ug/l**	**4.23 ug/l**
Molybdenum	Total	Lab	--	--	**6.46 ug/l**	**6.49 ug/l**	**10.1 ug/l**	**8.76 ug/l**	**6.25 ug/l**
Nickel	Dissolved	Lab	--	--	**4.24 ug/l**	**4.13 ug/l**	**4.5 ug/l**	**4.87 ug/l**	**3.27 ug/l**
Nickel	Total	Lab	--	--	**5.9 ug/l**	**6.61 ug/l**	**18 ug/l**	**24.9 ug/l**	**98.8 ug/l**
Palladium	Total	Lab	--	--	< 0.50 * ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	**0.64 ug/l**
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	--	--	**3140 ug/l**	**3120 ug/l**	**3680 ug/l**	**4640 ug/l**	**7140 ug/l**
Selenium	Dissolved	Lab	--	--	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	--	--	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	--	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	--	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.21 ug/l**
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	--	--	**67000 ug/l**	**67500 ug/l**	**77600 ug/l**	**59800 ug/l**	**46700 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	--	--	**146 ug/l**	**147 ug/l**	**167 ug/l**	**200 ug/l**	**301 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	--	--	< 0.2 ug/l	**0.34 ug/l**	**0.23 ug/l**	< 0.2 ug/l	**0.3 ug/l**
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	--	--	**73 ug/l**	**80 ug/l**	**370 ug/l**	**510 ug/l**	**3350 ug/l**
Zinc	Dissolved	Lab	--	--	**10.9 ug/l**	< 6 ug/l	**8.95 ug/l**	**12.1 ug/l**	**7.5 ug/l**
Zinc	Total	Lab	--	--	< 6 ug/l	**7.29 ug/l**	**19.5 ug/l**	**25.4 ug/l**	**105 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location / Date / Sample Type	Fraction	Analysis Location	GW-009 7/25/2011 N	FD	GW-009 10/14/2011 N	GW-009 4/10/2012 N	FD	GW-009 7/24/2012 N	FD
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**232 mg/l**	**231 mg/l**	**234 mg/l**	**212 mg/l**	**213 mg/l**	**184 b mg/l**	**185 b mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l
Alkalinity, total	NA	Lab	**232 mg/l**	**231 mg/l**	**234 mg/l**	**212 mg/l**	**213 mg/l**	**184 b mg/l**	**185 b mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 4 mg/l	< 4.0 mg/l	< 4.0 h mg/l	< 4.0 mg/l	< 4.0 mg/l
Carbon, dissolved organic	NA	Lab	**21.6 mg/l**	**22.9 mg/l**	**17.8 mg/l**	**11.9 mg/l**	**12.1 mg/l**	**13.9 mg/l**	**13.2 mg/l**
Carbon, total organic	NA	Lab	**22.9 mg/l**	**24.1 mg/l**	**19.0 mg/l**	**11.7 mg/l**	**11.6 mg/l**	**13.4 mg/l**	**13.0 mg/l**
Chemical Oxygen Demand	NA	Lab	**154 mg/l**	**125 mg/l**	**152 mg/l**	**42.8 mg/l**	**44.5 mg/l**	**40.6 mg/l**	**43.7 mg/l**
Chloride	NA	Lab	**2.62 mg/l**	**2.65 mg/l**	**3.8 mg/l**	**4.6 mg/l**	**4.7 mg/l**	**4.1 b mg/l**	**4.1 b mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**7.5 mg/l**	--	**7.6 mg/l**	**2.15 mg/l**	--	**1.42 mg/l**	--
Fluoride	NA	Lab	**0.22 mg/l**	**0.22 mg/l**	**0.21 mg/l**	**0.14 mg/l**	**0.14 mg/l**	**0.17 mg/l**	**0.16 mg/l**
Hardness, total, as CaCO3	NA	Lab	**323 mg/l**	**302 mg/l**	**239 mg/l**	**223 mg/l**	**228 mg/l**	**202 mg/l**	**200 mg/l**
Nitrate + Nitrite, as N	NA	Lab	**0.19 mg/l**	**0.17 mg/l**	**0.13 mg/l**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.36 mg/l**	**0.34 mg/l**	**0.23 mg/l**	**0.19 mg/l**	**0.18 mg/l**	**0.23 mg/l**	< 0.10 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**7.0 pH units**	**7.1 pH units**	**6.8 pH units**	**7.4 pH units**	**8.1 pH units**	**7.1 pH units**	**6.8 pH units**
pH	NA	Field	**6.6 pH units**	--	**6.7 pH units**	**6.74 pH units**	--	**6.36 pH units**	--
Phosphorus, total	NA	Lab	**3.92 mg P/L**	**3.52 mg P/L**	**1.5 mg P/L**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**382 mV**	--	**75 mV**	**284 mV**	--	**34 mV**	--
Solids, total dissolved	NA	Lab	**384 mg/l**	**374 mg/l**	**340.1 mg/l**	**374 mg/l**	**381 mg/l**	**383 mg/l**	**386 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**509 umhos/cm**	--	**582 umhos/cm**	**578.2 umhos/cm**	--	**564.1 umhos/cm**	--
Sulfate	NA	Lab	**46.1 mg/l**	**48.6 mg/l**	**62.4 mg/l**	**81.9 mg/l**	**81.9 mg/l**	**87.7 mg/l**	**86.9 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**19.4 deg C**	--	**10.9 deg C**	**3.59 deg C**	--	**12.35 deg C**	--
Turbidity	NA	Field	**0 NTU**	--	**1678.0 NTU**	**0.2 NTU**	--	**1 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1468.29**	--	**1467.8**	**1469.87**	--	**1469.06**	--
Metals									
Aluminum	Dissolved	Lab	**42.3 ug/l**	**44 ug/l**	< 250 ug/l	< 20.0 ug/l	< 20.0 ug/l	**25.7 ug/l**	< 20.0 ug/l
Aluminum	Total	Lab	**44700 * ug/l**	**31500 * ug/l**	**8490 ug/l**	**42.3 ug/l**	**46.9 ug/l**	**230 ug/l**	**207 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	**1.04 ug/l**	**0.93 ug/l**	**0.94 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**0.58 ug/l**	< 0.50 ug/l
Arsenic	Total	Lab	**7.78 ug/l**	**9.97 ug/l**	**2.02 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**0.84 ug/l**	**0.85 ug/l**
Arsenic III	Total	Lab	--	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	--	**69.7 ug/l**	**68.8 ug/l**
Barium	Total	Lab	**594 ug/l**	**544 ug/l**	**260 ug/l**	**72.0 ug/l**	**73.6 ug/l**	**70.0 ug/l**	**69.0 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	**2.38 ug/l**	**2.72 ug/l**	**0.56 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	**155 ug/l**	**150 ug/l**	< 500 ug/l	**82.7 ug/l**	**75.1 ug/l**	**133 ug/l**	**129 ug/l**
Boron	Total	Lab	**106 ug/l**	< 100 ug/l	< 500 ug/l	**73.7 ug/l**	**71.8 ug/l**	**130 ug/l**	**127 ug/l**
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	**0.91 ug/l**	**0.95 ug/l**	**0.33 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**61300 ug/l**	**58600 ug/l**	**46900 ug/l**	**42800 ug/l**	**43900 ug/l**	**40600 ug/l**	**40100 ug/l**
Chromium	Dissolved	Lab	**1.07 ug/l**	**1.08 ug/l**	**1.12 ug/l**	< 1.0 ug/l	**3.3 ug/l**	**1.5 ug/l**	**1.6 ug/l**
Chromium	Total	Lab	**287 ug/l**	**344 ug/l**	**36.3 ug/l**	< 1.0 ug/l	< 1.0 ug/l	**1.9 ug/l**	**1.2 ug/l**
Cobalt	Dissolved	Lab	--	--	--	--	--	**3.7 ug/l**	**3.6 ug/l**
Cobalt	Total	Lab	**76.1 ug/l**	**81.3 ug/l**	**16.4 ug/l**	**4.3 ug/l**	**4.4 ug/l**	**3.8 ug/l**	**3.8 ug/l**
Copper	Dissolved	Lab	**1.19 b ug/l**	**1.54 b ug/l**	**1.77 ug/l**	**2.5 ug/l**	**3.3 ug/l**	**2.8 ug/l**	**2.6 ug/l**
Copper	Total	Lab	**252 ug/l**	**246 ug/l**	**62.2 ug/l**	**2.9 ug/l**	**2.8 ug/l**	**3.5 ug/l**	**3.5 ug/l**
Iron	Dissolved	Lab	**2510 ug/l**	**1430 ug/l**	**4780 ug/l**	**7150 ug/l**	**7050 ug/l**	**7560 ug/l**	**6660 ug/l**
Iron	Total	Lab	**76000 ug/l**	**58700 ug/l**	**23400 ug/l**	**7280 ug/l**	**7430 ug/l**	**8400 ug/l**	**8290 ug/l**
Lead	Dissolved	Lab	--	--	--	--	--	< 0.50 ug/l	< 0.50 ug/l
Lead	Total	Lab	**38.9 ug/l**	**44.6 ug/l**	**7.72 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**41300 ug/l**	**37900 ug/l**	**29600 ug/l**	**28100 ug/l**	**28700 ug/l**	**24400 ug/l**	**24200 ug/l**
Manganese	Dissolved	Lab	**3270 ug/l**	**3310 ug/l**	**3320 ug/l**	**3550 ug/l**	**3450 ug/l**	**3440 ug/l**	**3490 ug/l**
Manganese	Total	Lab	**4110 ug/l**	**3960 ug/l**	**3770 ug/l**	**3370 ug/l**	**3590 ug/l**	**3500 ug/l**	**3440 ug/l**
Mercury	Total	Lab	**0.0697 ug/l**	**0.0629 ug/l**	**0.0423 ug/l**	**0.0037 ug/l**	**0.0037 ug/l**	**0.0047 ug/l**	**0.0048 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	**0.00005 j ug/l**	< 0.00005 ug/l
Molybdenum	Dissolved	Lab	**5.15 ug/l**	**5.63 ug/l**	**5.32 ug/l**	**3.3 ug/l**	**3.3 ug/l**	**4.6 ug/l**	**4.2 ug/l**
Molybdenum	Total	Lab	**7.69 * ug/l**	**11.1 * ug/l**	**1.9 ug/l**	**3.4 ug/l**	**3.5 ug/l**	**4.5 ug/l**	**4.1 ug/l**
Nickel	Dissolved	Lab	**2.72 ug/l**	**2.95 ug/l**	**2.62 ug/l**	**4.5 ug/l**	**5.5 ug/l**	**3.6 ug/l**	**3.5 ug/l**
Nickel	Total	Lab	**269 ug/l**	**294 ug/l**	**33.8 ug/l**	**4.8 ug/l**	**4.9 ug/l**	**4.1 ug/l**	**3.8 ug/l**
Palladium	Total	Lab	**1.81 ug/l**	**2.11 ug/l**	**0.74 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**6100 ug/l**	**5250 ug/l**	**2820 ug/l**	**2200 ug/l**	**2200 ug/l**	**2600 ug/l**	**2500 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	**1.82 ug/l**	**1.98 ug/l**	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	**0.29 ug/l**	**0.42 ug/l**	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**48700 ug/l**	**47800 ug/l**	**49400 ug/l**	**42000 ug/l**	**43000 ug/l**	**41200 ug/l**	**40800 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**299 ug/l**	**260 ug/l**	**213 ug/l**	**180 ug/l**	**185 ug/l**	**180 ug/l**	**179 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	**0.6 ug/l**	**0.74 ug/l**	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	**0.50 ug/l**	< 0.20 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	**1100 * ug/l**	**210 * ug/l**	**150 ug/l**	< 10.0 ug/l	< 10.0 ug/l	**10.3 ug/l**	< 10.0 ug/l
Zinc	Dissolved	Lab	**10.1 b ug/l**	**6.76 b ug/l**	**6.61 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	**294 ug/l**	**348 ug/l**	**37.9 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location			GW009	GW009	GW009		GW009	GW-010		GW-010
Date			10/3/2012	5/1/2013	7/10/2013		10/11/2013	5/6/2009		5/4/2010
Sample Type			N	N	N	FD	N	N	FD	N
	Fraction	Analysis Location								
General Parameters										
Alkalinity, bicarbonate, as CaCO3	NA	Lab	210 mg/l	168 mg/l	173 mg/l	--	188 mg/l	--	--	289 mg/l
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	--	< 10.0 mg/l	--	--	< 10 mg/l
Alkalinity, total	NA	Lab	210 mg/l	168 mg/l	173 mg/l	--	188 mg/l	259 mg/l	259 mg/l	289 mg/l
Biochemical Oxygen Demand (5-day)	NA	Lab	< 8.0 mg/l	< 4.0 mg/l	< 2.4 * mg/l	--	< 3.0 * mg/l	--	--	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	13.2 mg/l	10.1 mg/l	13.4 mg/l	--	16.3 mg/l	--	--	8.6 mg/l
Carbon, total organic	NA	Lab	13.1 mg/l	10.3 mg/l	13.8 mg/l	--	15.7 mg/l	5.4 mg/l	5.4 mg/l	8.8 mg/l
Chemical Oxygen Demand	NA	Lab	42.8 mg/l	41.5 mg/l	45.4 mg/l	--	59.0 mg/l	16.6 mg/l	16.3 mg/l	30.3 mg/l
Chloride	NA	Lab	4.5 mg/l	6.4 mg/l	7.1 mg/l	--	6.1 mg/l	18.4 mg/l	18.4 mg/l	15.5 mg/l
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	--	0.0446 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	1.13 mg/l	< 0.1 mg/l	0.1 mg/l	--	0.17 mg/l	--	--	2.44 mg/l
Fluoride	NA	Lab	0.11 mg/l	0.14 mg/l	0.14 mg/l	--	0.16 mg/l	0.12 mg/l	0.12 mg/l	< 0.1 mg/l
Hardness, total, as CaCO3	NA	Lab	218 mg/l	199 mg/l	189 mg/l	--	189 mg/l	277 mg/l	271 mg/l	285 mg/l
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	0.21 mg/l	0.15 mg/l	0.23 mg/l	--	0.21 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--	--
pH	NA	Lab	6.8 pH units	7.2 pH units	6.7 pH units	--	7.0 pH units	6.6 pH units	6.8 pH units	7.2 pH units
pH	NA	Field	6.31 pH units	6.52 pH units	6.36 pH units	--	6.56 pH units	--	--	6.52 pH units
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	-13 mV	179 * mV	295 mV	--	225 mV	--	--	537 mV
Solids, total dissolved	NA	Lab	382 mg/l	344 mg/l	346 mg/l	--	338 mg/l	--	--	356 mg/l
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	584.1 umhos/cm	524.1 umhos/cm	529.9 umhos/cm	--	498.7 umhos/cm	--	--	583 umhos/cm
Sulfate	NA	Lab	83.8 mg/l	80.1 mg/l	67.2 mg/l	--	50.3 mg/l	31.7 mg/l	31.6 mg/l	4.47 mg/l
Sulfide	NA	Lab	--	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	13.83 deg C	4.2 deg C	11.36 deg C	--	10.66 deg C	--	--	7.1 deg C
Turbidity	NA	Field	0.6 NTU	5.6 * NTU	29.6 NTU	--	2.6 NTU	--	--	1.4 NTU
Water Elevation, ft/MSL	NA	Field	1468.64	1470.82	1469.94	--	1469.54	1473.57	--	1473.5
Metals				--	--	--	--			
Aluminum	Dissolved	Lab	< 20.0 ug/l	< 20.0 ug/l	22.4 ug/l	--	< 20.0 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	< 40.0 ug/l	1680 ug/l	835 ug/l	--	80.6 ug/l	25.3 ug/l	< 25 ug/l	29.3 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	0.56 ug/l	0.76 ug/l	0.57 ug/l	--	0.96 ug/l	< 2 ug/l	< 2 ug/l	--
Arsenic	Total	Lab	0.84 ug/l	--	--	--	--	< 2 ug/l	< 2 ug/l	1.16 ug/l
Arsenic III	Total	Lab	--	0.84 ug/l	1.0 ug/l	--	1.0 ug/l	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--	--
Barium	Dissolved	Lab	74.0 ug/l	56.2 ug/l	54.4 ug/l	--	63.1 ug/l	--	--	--
Barium	Total	Lab	74.4 ug/l	76.8 ug/l	62.7 ug/l	--	63.2 ug/l	442 ug/l	446 ug/l	1580 ug/l
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	138 ug/l	105 ug/l	135 ug/l	--	164 ug/l	--	--	--
Boron	Total	Lab	151 ug/l	110 ug/l	151 ug/l	--	166 ug/l	150 ug/l	145 ug/l	100 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--	--	--
Calcium	Total	Lab	44900 ug/l	38400 ug/l	37400 ug/l	--	38900 ug/l	58100 ug/l	56600 ug/l	59900 ug/l
Chromium	Dissolved	Lab	1.5 ug/l	< 1.0 ug/l	1.0 ug/l	--	1.2 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	1.0 ug/l	6.5 ug/l	3.3 ug/l	--	1.4 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	Lab	3.5 ug/l	4.7 ug/l	4.3 ug/l	--	4.2 ug/l	--	--	--
Cobalt	Total	Lab	3.5 ug/l	6.6 ug/l	4.7 ug/l	--	4.1 ug/l	4.3 ug/l	4.4 ug/l	3.36 ug/l
Copper	Dissolved	Lab	2.8 ug/l	1.6 ug/l	1.3 ug/l	--	2.6 ug/l	3.5 ug/l	2.5 ug/l	1.65 ug/l
Copper	Total	Lab	3.0 ug/l	5.5 ug/l	3.3 ug/l	--	2.8 ug/l	2.6 ug/l	2.8 ug/l	2.74 b ug/l
Iron	Dissolved	Lab	9120 ug/l	13500 ug/l	11800 ug/l	--	14800 ug/l	--	--	--
Iron	Total	Lab	9210 ug/l	17100 ug/l	15100 ug/l	--	14600 ug/l	1150 ug/l	1210 ug/l	7800 ug/l
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	--	--
Lead	Total	Lab	< 0.50 ug/l	0.62 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--	--
Magnesium	Total	Lab	25700 ug/l	25000 ug/l	23100 ug/l	--	22300 ug/l	32000 ug/l	31600 ug/l	32800 ug/l
Manganese	Dissolved	Lab	3360 ug/l	3910 ug/l	3400 ug/l	--	3440 ug/l	--	--	301 ug/l
Manganese	Total	Lab	3530 ug/l	3810 ug/l	3280 ug/l	--	3300 ug/l	641 ug/l	639 ug/l	295 ug/l
Mercury	Total	Lab	0.0058 ug/l	0.0047 ug/l	0.0029 ug/l	0.0030 ug/l	0.0082 ug/l	--	--	0.0028 ug/l
Mercury methyl	Total	Lab	0.00007 j ug/l	< 0.00006 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	--	--	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	4.0 ug/l	1.9 ug/l	2.2 ug/l	--	2.5 ug/l	1.2 ug/l	1.1 ug/l	0.31 b ug/l
Molybdenum	Total	Lab	4.1 ug/l	2.0 ug/l	2.1 ug/l	--	2.5 ug/l	1.2 ug/l	1.2 ug/l	0.44 ug/l
Nickel	Dissolved	Lab	3.7 ug/l	3.5 ug/l	2.6 ug/l	--	2.7 ug/l	6.9 ug/l	6.8 ug/l	3.49 ug/l
Nickel	Total	Lab	3.7 ug/l	8.1 ug/l	4.8 ug/l	--	2.8 ug/l	6.6 ug/l	6.8 ug/l	3.41 ug/l
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.30 ug/l	< 0.30 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--	--
Potassium	Total	Lab	2600 ug/l	1800 ug/l	2000 ug/l	--	2000 ug/l	2350 ug/l	2540 ug/l	2560 ug/l
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--	--
Sodium	Total	Lab	42700 ug/l	28900 ug/l	31800 ug/l	--	28000 ug/l	30400 ug/l	29900 ug/l	32800 ug/l
Strontium	Dissolved	Lab	--	--	--	--	--	--	--	--
Strontium	Total	Lab	205 ug/l	174 ug/l	173 ug/l	--	177 ug/l	212 ug/l	208 ug/l	205 ug/l
Thallium	Dissolved	Lab	--	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.017 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--	--
Titanium	Total	Lab	< 20.0 ug/l	105 ug/l	45.1 ug/l	--	< 10.0 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	7.3 ug/l	--	< 6.0 ug/l	< 6 ug/l	6 ug/l	< 6 ug/l
Zinc	Total	Lab	< 6.0 ug/l	8.1 ug/l	8.3 ug/l	--	< 6.0 ug/l	< 6 ug/l	6.1 ug/l	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location			GW-010	GW-010		GW-010		GW-010
Date			7/28/2010	10/8/2010		5/2/2011		7/25/2011
Sample Type			N	N	FD	N	FD	N
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**294 mg/l**	**289 mg/l**	**288 mg/l**	**278 mg/l**	**277 mg/l**	**280 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	**294 mg/l**	**289 mg/l**	**288 mg/l**	**278 mg/l**	**277 mg/l**	**280 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 3 mg/l	< 3 mg/l	< 3 mg/l	< 3 mg/l	< 3 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**10.1 mg/l**	**10.2 mg/l**	**9.8 mg/l**	**12.4 mg/l**	**12.5 mg/l**	**11.5 mg/l**
Carbon, total organic	NA	Lab	**10.4 mg/l**	**10.1 mg/l**	**9.8 mg/l**	**11.9 mg/l**	**11.9 mg/l**	**11.3 mg/l**
Chemical Oxygen Demand	NA	Lab	**26.6 mg/l**	**36.8 mg/l**	**35.8 mg/l**	**39.3 mg/l**	**36.7 mg/l**	**36.5 mg/l**
Chloride	NA	Lab	**16.8 mg/l**	**17.2 mg/l**	**17.2 mg/l**	**16.9 mg/l**	**16.8 mg/l**	**19.7 mg/l**
Cyanide	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**0.28 mg/l**	**0.64 mg/l**	--	**1.41 mg/l**	--	**3.0 mg/l**
Fluoride	NA	Lab	< 0.1 mg/l	**0.11 mg/l**	**0.11 mg/l**	< 0.1 mg/l	< 0.1 mg/l	**0.11 mg/l**
Hardness, total, as CaCO3	NA	Lab	**261 mg/l**	**270 mg/l**	**269 mg/l**	**233 mg/l**	**232 mg/l**	**263 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.05 b mg/l**	< 0.05 mg/l	< 0.05 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.0 pH units**	**7.2 pH units**	**7.0 pH units**	--	--	**7.3 pH units**
pH	NA	Field	**7.13 pH units**	**6.49 pH units**	--	**6.72 pH units**	--	**5.8 pH units**
Phosphorus, total	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	**370 mV**	**144 mV**	--	**597 mV**	--	**374 mV**
Solids, total dissolved	NA	Lab	**313 mg/l**	**340 mg/l**	**321 mg/l**	**337 mg/l**	**343 mg/l**	**248 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**535 umhos/cm**	**573 umhos/cm**	--	**574.1 umhos/cm**	--	**559 umhos/cm**
Sulfate	NA	Lab	**2.98 mg/l**	**3.65 mg/l**	**3.66 mg/l**	**1.87 mg/l**	**1.81 mg/l**	**1.75 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**8.2 deg C**	**7.2 deg C**	--	**6.9 deg C**	--	**8.5 deg C**
Turbidity	NA	Field	**14.1 NTU**	**1 NTU**	--	**4.8 NTU**	--	**10.5 NTU**
Water Elevation, ft/MSL	NA	Field	**1473.38**	**1473.45**	--	--	--	**1473.34**
Metals								
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**35.6 ug/l**	< 25 ug/l	< 25 ug/l	**430 ug/l**	**437 ug/l**	**463 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	**1.18 ug/l**	**1.41 ug/l**	**1.46 ug/l**	**2.41 ug/l**	**2.37 ug/l**	**2.13 ug/l**
Arsenic	Total	Lab	**1.25 ug/l**	**1.62 ug/l**	**1.61 ug/l**	**1.84 ug/l**	**1.98 ug/l**	**2.1 ug/l**
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	**1200 e ug/l** **1360 e ug/l**	**1210 e ug/l** **1290 e ug/l**	--
Barium	Total	Lab	**1620 ug/l**	**1310 ug/l**	**1340 ug/l**	**1240 ug/l**	**1240 ug/l**	**1510 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	--	--	--	--	--	**84.6 ug/l**
Boron	Total	Lab	**90.7 ug/l**	**99.2 ug/l**	**98.2 ug/l**	**93.9 ug/l**	**90.9 ug/l**	**85.4 ug/l**
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**54200 ug/l**	**56500 ug/l**	**56400 ug/l**	**48600 ug/l**	**48400 ug/l**	**54000 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	**2.54 ug/l**	**2.62 ug/l**	**3.54 ug/l**
Cobalt	Dissolved	Lab	--	--	--	**2.90 ug/l** **2.83 ug/l**	**1.91 * ug/l** **2.75 * ug/l**	--
Cobalt	Total	Lab	**2.34 ug/l**	**4 ug/l**	**3.82 ug/l**	**3.46 ug/l**	**3.5 ug/l**	**2.03 ug/l**
Copper	Dissolved	Lab	**2.75 ug/l**	**7.19 ug/l**	**8.11 ug/l**	**1.84 ug/l**	**1.8 ug/l**	**1.92 b ug/l**
Copper	Total	Lab	**2.2 ug/l**	**2.91 ug/l**	**3.11 ug/l**	**6.38 ug/l**	**6.4 ug/l**	**6.7 ug/l**
Iron	Dissolved	Lab	**8540 ug/l**	**5960 ug/l**	**5900 ug/l**	**9080 ug/l**	**9040 ug/l**	**9390 ug/l**
Iron	Total	Lab	**8930 ug/l**	**6730 ug/l**	**6800 ug/l**	**9780 ug/l**	**9830 ug/l**	**10200 ug/l**
Lead	Dissolved	Lab	--	--	--	< 0.5 ug/l **0.57 ug/l**	< 0.5 ug/l < 0.5 ug/l	--
Lead	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	**0.54 ug/l**	**0.54 ug/l**	**0.68 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**30600 ug/l**	**31300 ug/l**	**31100 ug/l**	**27100 ug/l**	**27100 ug/l**	**31200 ug/l**
Manganese	Dissolved	Lab	**254 ug/l**	**490 ug/l**	**520 ug/l**	**383 ug/l**	**381 ug/l**	**273 ug/l**
Manganese	Total	Lab	**272 ug/l**	**462 ug/l**	**454 ug/l**	**365 ug/l**	**363 ug/l**	**284 ug/l**
Mercury	Total	Lab	**0.0016 ug/l**	**0.0037 ug/l**	**0.0043 ug/l**	**0.0050 ug/l**	**0.0058 ug/l**	**0.0039 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	**0.00010 ug/l**	**0.00014 ug/l**	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**0.24 ug/l**	**0.27 ug/l**	**0.27 ug/l**	**0.42 ug/l**	**0.38 ug/l**	**0.31 ug/l**
Molybdenum	Total	Lab	**0.22 ug/l**	**0.26 ug/l**	**0.27 ug/l**	**0.34 ug/l**	**0.33 ug/l**	**0.35 ug/l**
Nickel	Dissolved	Lab	**3.1 ug/l**	**3.37 ug/l**	**3.53 ug/l**	**2.26 ug/l**	**2.19 ug/l**	**0.86 ug/l**
Nickel	Total	Lab	**2.76 ug/l**	**3.49 ug/l**	**3.51 ug/l**	**3.99 ug/l**	**3.98 ug/l**	**2.94 ug/l**
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**2450 ug/l**	**2520 ug/l**	**2540 ug/l**	**1990 ug/l**	**1930 ug/l**	**2160 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**33700 ug/l**	**34300 ug/l**	**34400 ug/l**	**34500 ug/l**	**34400 ug/l**	**37200 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**193 ug/l**	**203 ug/l**	**202 ug/l**	**180 ug/l**	**180 ug/l**	**192 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10 ug/l	< 10 ug/l	< 10 ug/l	**32.1 ug/l**	**31.0 ug/l**	**34 ug/l**
Zinc	Dissolved	Lab	**8.16 ug/l**	**7.6 ug/l**	**9.51 ug/l**	< 6 ug/l	< 6 ug/l	< 6 ug/l
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-010		GW-010	GW-010	GW010	
		Date	10/14/2011		4/10/2012	7/24/2012	10/3/2012	
		Sample Type	N	FD	N	N	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**287 mg/l**	**290 mg/l**	**326 mg/l**	**327 mg/l**	**336 mg/l**	**343 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l
Alkalinity, total	NA	Lab	**287 mg/l**	**290 mg/l**	**326 mg/l**	**327 mg/l**	**336 mg/l**	**343 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 3 mg/l	< 4 mg/l	**4.8 mg/l**	< 4.0 mg/l	< 8.0 mg/l	< 8.0 mg/l
Carbon, dissolved organic	NA	Lab	**13.4 mg/l**	**13.1 mg/l**	**15.3 mg/l**	**13.7 mg/l**	**13.9 mg/l**	**14.2 mg/l**
Carbon, total organic	NA	Lab	**12.4 mg/l**	**12.6 mg/l**	**14.9 mg/l**	**14.3 mg/l**	**13.3 mg/l**	**13.5 mg/l**
Chemical Oxygen Demand	NA	Lab	**70 mg/l**	**39.2 mg/l**	**55.2 mg/l**	**40.0 mg/l**	**36.5 mg/l**	**39.6 mg/l**
Chloride	NA	Lab	**18.8 mg/l**	**19 mg/l**	**16.4 mg/l**	**19.5 mg/l**	**19.9 mg/l**	**19.9 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	**0.0190 mg/l**
Dissolved oxygen	NA	Field	**5.5 mg/l**	--	**1.58 mg/l**	**1.12 mg/l**	**0.75 mg/l**	--
Fluoride	NA	Lab	< 0.1 mg/l	**0.1 mg/l**	**0.10 mg/l**	**0.10 mg/l**	< 0.10 mg/l	< 0.10 mg/l
Hardness, total, as CaCO3	NA	Lab	**253 mg/l**	**256 mg/l**	**281 mg/l**	**301 mg/l**	**293 mg/l**	**299 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	**0.10 mg/l**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	**0.050 mg/l**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**6.9 pH units**	**6.9 pH units**	**7.3 pH units**	**7.1 pH units**	**7.0 pH units**	**7.0 pH units**
pH	NA	Field	**6.7 pH units**	--	**6.76 pH units**	**6.66 pH units**	**6.48 pH units**	--
Phosphorus, total	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**66 mV**	--	**253 mV**	**-70 mV**	**-52 mV**	--
Solids, total dissolved	NA	Lab	**284 mg/l**	**298 mg/l**	**400 mg/l**	**414 mg/l**	**387 mg/l**	**405 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**626 umhos/cm**	--	**659.5 umhos/cm**	**705.7 umhos/cm**	**693.8 umhos/cm**	--
Sulfate	NA	Lab	**1.74 mg/l**	**1.79 mg/l**	**2.5 mg/l**	**2.2 b mg/l**	**1.6 mg/l**	**1.6 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**10.6 deg C**	--	**6.41 deg C**	**11.09 deg C**	**10.29 deg C**	--
Turbidity	NA	Field	**4.2 NTU**	--	**0 NTU**	**0 NTU**	**0 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1473.6**	--	**1473.47**	**1473.27**	**1473.32**	--
Metals								
Aluminum	Dissolved	Lab	< 25 ug/l	**37.4 ug/l**	< 20.0 ug/l	**23.8 ug/l**	< 20.0 ug/l	**20.8 ug/l**
Aluminum	Total	Lab	**122 ug/l**	**119 ug/l**	< 20.0 ug/l	**27.6 ug/l**	< 40.0 ug/l	< 40.0 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	**2.67 ug/l**	**2.69 ug/l**	**3.6 ug/l**	**3.8 ug/l**	**4.8 ug/l**	**4.8 ug/l**
Arsenic	Total	Lab	**2.76 ug/l**	**2.79 ug/l**	**3.6 ug/l**	**4.5 ug/l**	**5.0 ug/l**	**5.0 ug/l**
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	**1580 ug/l**	**1530 ug/l**	**1540 ug/l**
Barium	Total	Lab	**1400 ug/l**	**1400 ug/l**	**1510 ug/l**	**1580 ug/l**	**1550 ug/l**	**1540 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	**97.8 ug/l**	**85.6 ug/l**	**109 ug/l**	**108 ug/l**	**96.4 ug/l**	**88.5 ug/l**
Boron	Total	Lab	**81.8 ug/l**	**87 ug/l**	**102 ug/l**	**104 ug/l**	< 100 ug/l	< 100 ug/l
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**53200 ug/l**	**53700 ug/l**	**59100 ug/l**	**62900 ug/l**	**61400 ug/l**	**63400 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	**1.7 ug/l**	**2.0 ug/l**	**1.6 ug/l**	**2.3 ug/l**
Chromium	Total	Lab	< 1 ug/l	**1.24 ug/l**	**1.7 ug/l**	**1.1 ug/l**	**1.7 ug/l**	**1.7 ug/l**
Cobalt	Dissolved	Lab	--	--	--	**1.4 ug/l**	**1.3 ug/l**	**1.3 ug/l**
Cobalt	Total	Lab	**1.75 ug/l**	**1.82 ug/l**	**1.7 ug/l**	**1.3 ug/l**	**1.3 ug/l**	**1.3 ug/l**
Copper	Dissolved	Lab	**1.86 ug/l**	**1.5 ug/l**	**1.4 ug/l**	**1.2 ug/l**	**1.1 ug/l**	**1.6 ug/l**
Copper	Total	Lab	**4.21 ug/l**	**3.95 ug/l**	**1.8 ug/l**	**1.6 ug/l**	**1.8 ug/l**	**1.8 ug/l**
Iron	Dissolved	Lab	**8580 ug/l**	**8230 ug/l**	**9530 ug/l**	**10100 ug/l**	**11000 ug/l**	**10900 ug/l**
Iron	Total	Lab	**8720 ug/l**	**8630 ug/l**	**9580 ug/l**	**11000 ug/l**	**11200 ug/l**	**11200 ug/l**
Lead	Dissolved	Lab	--	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**29300 ug/l**	**29600 ug/l**	**32400 ug/l**	**34900 ug/l**	**33900 ug/l**	**34300 ug/l**
Manganese	Dissolved	Lab	**333 ug/l**	**348 ug/l**	**435 ug/l**	**428 ug/l**	**407 ug/l**	**405 ug/l**
Manganese	Total	Lab	**337 ug/l**	**356 ug/l**	**438 ug/l**	**442 ug/l**	**424 ug/l**	**425 ug/l**
Mercury	Total	Lab	**0.0054 ug/l**	**0.0056 ug/l**	**0.0050 ug/l**	**0.0049 ug/l**	**0.0044 ug/l**	**0.0044 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	**0.00005 j ug/l**	**0.00051 ug/l**	**0.00006 j ug/l**
Molybdenum	Dissolved	Lab	**0.39 ug/l**	**0.43 ug/l**	**0.53 ug/l**	**0.77 ug/l**	**0.68 ug/l**	**0.68 ug/l**
Molybdenum	Total	Lab	**0.33 ug/l**	**0.39 ug/l**	**0.55 ug/l**	**0.77 ug/l**	**0.68 ug/l**	**0.68 ug/l**
Nickel	Dissolved	Lab	**1.55 ug/l**	**1.4 ug/l**	**1.2 ug/l**	**0.78 ug/l**	**0.64 ug/l**	**0.93 ug/l**
Nickel	Total	Lab	**1.95 ug/l**	**1.99 ug/l**	**1.3 ug/l**	**0.59 ug/l**	**1.2 ug/l**	**1.1 ug/l**
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**1950 ug/l**	**2110 ug/l**	**2100 ug/l**	**2400 ug/l**	**2400 ug/l**	**2400 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**35200 ug/l**	**36100 ug/l**	**38900 ug/l**	**39100 ug/l**	**40100 ug/l**	**40600 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**190 ug/l**	**195 ug/l**	**211 ug/l**	**222 ug/l**	**225 ug/l**	**227 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10 ug/l	< 10 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 20.0 ug/l	< 20.0 ug/l
Zinc	Dissolved	Lab	**7.05 ug/l**	< 6 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW010		GW010	GW010		GW-011	GW-011
		Date	5/1/2013		7/10/2013	10/11/2013		5/8/2009	3/18/2010
		Sample Type	N	FD	N	N	FD	N	N
	Fraction	Analysis Location							
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**368 mg/l**	--	**379 mg/l**	**366 mg/l**	**360 mg/l**	--	**48.7 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	--	< 10.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	--	< 10 mg/l
Alkalinity, total	NA	Lab	**368 mg/l**	--	**379 mg/l**	**366 mg/l**	**360 mg/l**	**49.3 mg/l**	**48.7 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 4.0 mg/l	--	< 2.4 * mg/l	**9.3 mg/l**	**5.2 mg/l**	--	< 4 mg/l
Carbon, dissolved organic	NA	Lab	**15.0 mg/l**	--	**14.5 mg/l**	**14.2 mg/l**	**14.6 mg/l**	--	**1.9 mg/l**
Carbon, total organic	NA	Lab	**14.9 mg/l**	--	**14.2 mg/l**	**13.6 mg/l**	**14.1 mg/l**	**1.4 mg/l**	**1.3 mg/l**
Chemical Oxygen Demand	NA	Lab	**45.3 mg/l**	--	**44.2 mg/l**	**52.1 mg/l**	**48.6 mg/l**	< 10 mg/l	< 10 mg/l
Chloride	NA	Lab	**16.6 mg/l**	--	**15.9 mg/l**	**16.8 mg/l**	**16.7 mg/l**	**2.78 mg/l**	**1.32 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	--	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.02 mg/l	< 0.0035 mg/l
Dissolved oxygen	NA	Field	< 0.1 mg/l	--	< 0.1 mg/l	**0.02 mg/l**	--	--	**1.34 mg/l**
Fluoride	NA	Lab	**0.12 mg/l**	--	< 0.10 mg/l	**0.13 mg/l**	**0.13 mg/l**	**0.11 mg/l**	< 0.1 mg/l
Hardness, total, as CaCO3	NA	Lab	**316 mg/l**	--	**329 mg/l**	**325 mg/l**	**323 mg/l**	**67.6 mg/l**	**95 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	**0.15 mg/l**	**0.22 mg/l**
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	--	**0.17 mg/l**	**0.16 mg/l**	**0.16 mg/l**	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--	--
pH	NA	Lab	**7.3 pH units**	--	**7.1 pH units**	**7.2 pH units**	**7.4 pH units**	**6.4 pH units**	**7.2 pH units**
pH	NA	Field	**6.78 pH units**	--	**6.61 pH units**	**6.86 pH units**	--	--	**8.33 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.1 mg/l	**1.14 mg P/L**
Redox (oxidation potential)	NA	Field	**124 * mV**	--	**291 mV**	**159 mV**	--	--	**489 mV**
Solids, total dissolved	NA	Lab	**436 mg/l**	--	**444 mg/l**	**437 mg/l**	**441 mg/l**	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**733.9 umhos/cm**	--	**797.2 umhos/cm**	**750.4 umhos/cm**	--	--	**1103 umhos/cm**
Sulfate	NA	Lab	**2.2 mg/l**	--	**1.8 mg/l**	**3.0 mg/l**	**3.0 mg/l**	**20.8 mg/l**	**6.1 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**6.13 deg C**	--	**9.04 deg C**	**10.23 deg C**	--	--	**5.1 deg C**
Turbidity	NA	Field	**0.6 * NTU**	--	**0 NTU**	**0 NTU**	--	--	**712 NTU**
Water Elevation, ft/MSL	NA	Field	**1473.88**	--	**1472.51**	**1473.44**	--	--	**1467.67**
Metals			--	--	--	--	--		
Aluminum	Dissolved	Lab	**21.8 ug/l**	--	**24.1 ug/l**	< 20.0 ug/l	< 20.0 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**44.7 ug/l**	--	**25.4 ug/l**	< 20.0 ug/l	< 20.0 ug/l	**52.8 ug/l**	**15000 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	**5.3 ug/l**	--	**6.2 ug/l**	**6.1 ug/l**	**5.9 ug/l**	< 2 ug/l	--
Arsenic	Total	Lab	--	--	--	--	--	< 2 ug/l	**3.1 ug/l**
Arsenic III	Total	Lab	**5.5 ug/l**	--	**6.4 ug/l**	**6.4 ug/l**	**6.4 ug/l**	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--	--
Barium	Dissolved	Lab	**1900 ug/l**	--	**1590 ug/l**	**1920 ug/l**	**2030 ug/l**	--	--
Barium	Total	Lab	**1910 ug/l**	--	**1700 ug/l**	**1930 ug/l**	**1930 ug/l**	**37.9 ug/l**	**131 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	**0.36 ug/l**
Boron	Dissolved	Lab	**133 ug/l**	--	**120 ug/l**	**136 ug/l**	**134 ug/l**	--	--
Boron	Total	Lab	**128 ug/l**	--	**137 ug/l**	**138 ug/l**	**135 ug/l**	< 50 ug/l	< 50 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	**0.26 ug/l**
Calcium	Dissolved	Lab	--	--	--	--	--	--	--
Calcium	Total	Lab	**65900 ug/l**	--	**68200 ug/l**	**67500 ug/l**	**67500 ug/l**	**15800 ug/l**	**17600 ug/l**
Chromium	Dissolved	Lab	**2.7 ug/l**	--	**2.7 ug/l**	**1.9 ug/l**	**2.1 ug/l**	< 1 ug/l	**1.4 ug/l**
Chromium	Total	Lab	**3.1 ug/l**	--	**2.7 ug/l**	**2.0 ug/l**	**2.2 ug/l**	< 1 ug/l	**41.8 ug/l**
Cobalt	Dissolved	Lab	**1.0 ug/l**	--	**1.4 ug/l**	**1.0 ug/l**	**1.0 ug/l**	--	--
Cobalt	Total	Lab	**1.1 ug/l**	--	**1.4 ug/l**	**1.1 ug/l**	**1.1 ug/l**	**1.2 ug/l**	**11.2 ug/l**
Copper	Dissolved	Lab	**1.1 ug/l**	--	**1.0 ug/l**	**1.0 ug/l**	**1.1 ug/l**	< 0.7 ug/l	**6.2 ug/l**
Copper	Total	Lab	**1.7 ug/l**	--	**1.2 ug/l**	**1.3 ug/l**	**1.2 ug/l**	**1.2 ug/l**	**32 ug/l**
Iron	Dissolved	Lab	**14200 ug/l**	--	**13400 ug/l**	**13200 ug/l**	**13400 ug/l**	--	--
Iron	Total	Lab	**13900 ug/l**	--	**13600 ug/l**	**13300 ug/l**	**13500 ug/l**	**63.2 ug/l**	**23300 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--
Lead	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	**6.1 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--	--
Magnesium	Total	Lab	**36900 ug/l**	--	**38500 ug/l**	**37900 ug/l**	**37500 ug/l**	**6830 ug/l**	**12400 ug/l**
Manganese	Dissolved	Lab	**394 ug/l**	--	**561 ug/l**	**408 ug/l**	**416 ug/l**	--	--
Manganese	Total	Lab	**473 ug/l**	--	**545 ug/l**	**429 ug/l**	**433 ug/l**	**226 ug/l**	**447 ug/l**
Mercury	Total	Lab	**0.0038 b ug/l**	**0.0039 b ug/l**	**0.0047 ug/l**	**0.0036 ug/l**	**0.0037 ug/l**	--	**0.0033 b ug/l**
Mercury methyl	Total	Lab	< 0.00006 ug/l	< 0.00006 ug/l	< 0.00003 ug/l	**0.00004 j ug/l**	**0.00003 j ug/l**	--	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**1.2 ug/l**	--	**0.95 ug/l**	**0.84 ug/l**	**0.81 ug/l**	**1.4 ug/l**	**0.32 ug/l**
Molybdenum	Total	Lab	**1.0 ug/l**	--	**0.92 ug/l**	**0.88 ug/l**	**0.86 ug/l**	**1.6 ug/l**	**1.2 ug/l**
Nickel	Dissolved	Lab	**0.82 ug/l**	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**4.4 ug/l**	**3.5 ug/l**
Nickel	Total	Lab	< 0.50 ug/l	--	**0.83 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**4.6 ug/l**	**40.3 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.30 ug/l	**0.045 j ug/l**
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.30 ug/l	< 0.0090 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--	--
Potassium	Total	Lab	**2500 ug/l**	--	**2500 ug/l**	**2700 ug/l**	**2600 ug/l**	**1270 ug/l**	**3320 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--	--
Sodium	Total	Lab	**42000 ug/l**	--	**43300 ug/l**	**42900 ug/l**	**42900 ug/l**	**4420 ug/l**	**4200 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--	--
Strontium	Total	Lab	**241 ug/l**	--	**250 ug/l**	**247 ug/l**	**247 ug/l**	**76 ug/l**	**118 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.017 ug/l	< 0.017 ug/l	< 0.4 ug/l	< 0.4 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	--	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10 ug/l	**1300 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6 ug/l	**13.8 ug/l**
Zinc	Total	Lab	< 6.0 ug/l	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6 ug/l	**46.5 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-011	GW-011		GW-011	GW-011	GW-011
		Date	5/4/2010	7/28/2010		10/8/2010	4/28/2011	7/22/2011
		Sample Type	N	N	FD	N	N	N
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**47.6 mg/l**	**46.3 mg/l**	**47.5 mg/l**	**46 mg/l**	**47 mg/l**	**38.2 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	**47.6 mg/l**	**46.3 mg/l**	**47.5 mg/l**	**46 mg/l**	**47 mg/l**	**38.2 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 3 mg/l	< 3 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 4 mg/l
Carbon, dissolved organic	NA	Lab	< 1 mg/l	**1.8 mg/l**	**1.3 mg/l**	**2.5 mg/l**	**1.6 mg/l**	**3.1 mg/l**
Carbon, total organic	NA	Lab	< 1 mg/l	**1.7 mg/l**	**1.6 mg/l**	**1.1 mg/l**	**1.1 mg/l**	**1.9 mg/l**
Chemical Oxygen Demand	NA	Lab	**10.1 mg/l**	< 10 mg/l	< 10 mg/l	**15.6 mg/l**	< 10 mg/l	**75.1 mg/l**
Chloride	NA	Lab	**0.95 mg/l**	**1.01 mg/l**	**0.99 mg/l**	**0.81 mg/l**	**1.42 mg/l**	**1.62 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**6.85 mg/l**	**11.84 mg/l**	--	**7.1 mg/l**	**7.05 mg/l**	**10.0 mg/l**
Fluoride	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Hardness, total, as CaCO3	NA	Lab	**53.1 mg/l**	**70.8 mg/l**	**80.6 mg/l**	**95 mg/l**	**64.7 mg/l**	**236 mg/l**
Nitrate + Nitrite, as N	NA	Lab	**0.16 mg/l**	**0.19 mg/l**	**0.19 mg/l**	**0.19 mg/l**	**0.31 mg/l**	**0.3 mg/l**
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.05 mg/l	< 0.05 mg/l	< 0.05 mg/l	**0.14 mg/l**	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**6.9 pH units**	**6.7 pH units**	**6.7 pH units**	**6.8 pH units**	--	**6.9 pH units**
pH	NA	Field	**7.32 pH units**	**7.16 pH units**	--	**5.5 pH units**	**6.41 pH units**	**6.4 pH units**
Phosphorus, total	NA	Lab	< 0.1 mg P/L	**0.43 mg P/L**	**0.67 mg P/L**	**1.06 mg P/L**	**0.41 mg P/L**	**6 mg P/L**
Redox (oxidation potential)	NA	Field	**529 mV**	**406 mV**	--	**466 mV**	**358 mV**	**515 mV**
Solids, total dissolved	NA	Lab	**101 mg/l**	**65 mg/l**	**78 mg/l**	**100 mg/l**	**94 mg/l**	**116 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**90 umhos/cm**	**102 umhos/cm**	--	**182 umhos/cm**	**72.6 umhos/cm**	**71 umhos/cm**
Sulfate	NA	Lab	**6.53 mg/l**	**5.68 mg/l**	**5.77 mg/l**	**5.54 mg/l**	**6.17 mg/l**	**8.07 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**7.9 deg C**	**11.97 deg C**	--	**14.7 deg C**	**10.54 deg C**	**19.4 deg C**
Turbidity	NA	Field	**19.9 NTU**	**254 NTU**	--	**920 NTU**	**61.5 NTU**	**2458.0 NTU**
Water Elevation, ft/MSL	NA	Field	**1468.02**	**1468.77**	--	**1468.11**	**1468.53**	**1470.56**
Metals								
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	**27.8 ug/l**
Aluminum	Total	Lab	**948 ug/l**	**8350 * ug/l**	**12400 * ug/l**	**13600 ug/l**	**6400 ug/l**	**63500 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	--	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Total	Lab	< 1 ug/l	**1.29 * ug/l**	**2.25 * ug/l**	**4.51 ug/l**	**0.78 ug/l**	**18 ug/l**
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	**27.4 ug/l** **25.1 ug/l**	**19.9 ug/l**
Barium	Total	Lab	**35.6 ug/l**	**86.9 ug/l**	**118 ug/l**	**207 ug/l**	**81.8 ug/l**	**703 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	**0.21 ug/l**	**0.28 ug/l**	**0.49 ug/l**	< 0.2 ug/l	**2.72 ug/l**
Boron	Dissolved	Lab	--	--	--	--	--	< 50 ug/l
Boron	Total	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 100 ug/l
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.67 ug/l**
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**11500 ug/l**	**13600 ug/l**	**14800 ug/l**	**17600 ug/l**	**13700 ug/l**	**41400 ug/l**
Chromium	Dissolved	Lab	**1.06 ug/l**	< 1 ug/l	< 1 ug/l	**1.17 ug/l**	**1.50 ug/l**	**1.35 ug/l**
Chromium	Total	Lab	**3.41 ug/l**	**21.6 ug/l**	**28.4 ug/l**	**51.3 ug/l**	**12.8 ug/l**	**258 ug/l**
Cobalt	Dissolved	Lab	--	--	--	--	< 0.2 ug/l < 0.2 ug/l	< 0.2 ug/l
Cobalt	Total	Lab	**0.75 ug/l**	**5.54 ug/l**	**7.49 ug/l**	**15.1 ug/l**	**4.82 ug/l**	**87.1 ug/l**
Copper	Dissolved	Lab	< 0.7 ug/l	**2.15 ug/l**	**2.24 ug/l**	< 0.7 ug/l	< 0.7 ug/l	**0.92 ug/l**
Copper	Total	Lab	**3.67 b ug/l**	**20.2 ug/l**	**27.6 ug/l**	**52.9 ug/l**	**13.5 ug/l**	**300 ug/l**
Iron	Dissolved	Lab	--	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l
Iron	Total	Lab	**1340 ug/l**	**10600 * ug/l**	**16000 * ug/l**	**18600 ug/l**	**4560 ug/l**	**82600 ug/l**
Lead	Dissolved	Lab	--	--	--	--	< 0.5 ug/l < 0.5 ug/l	< 0.5 ug/l
Lead	Total	Lab	< 0.5 ug/l	**3.56 * ug/l**	**5.24 * ug/l**	**9.98 ug/l**	< 0.5 ug/l	**56.2 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**5920 ug/l**	**8950 ug/l**	**10600 ug/l**	**12400 ug/l**	**7410 ug/l**	**32200 ug/l**
Manganese	Dissolved	Lab	**9.31 ug/l**	**17 ug/l**	**15.9 ug/l**	**2.43 ug/l**	**1.89 ug/l**	**9.9 ug/l**
Manganese	Total	Lab	**29.5 ug/l**	**195 ug/l**	**274 ug/l**	**582 ug/l**	**148 ug/l**	**2140 ug/l**
Mercury	Total	Lab	**0.0006 ug/l**	**0.0055 * ug/l**	**0.0081 * ug/l**	**0.0100 ug/l**	**0.0038 ug/l**	**0.0431 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**0.35 b ug/l**	**0.23 ug/l**	**0.24 ug/l**	< 0.2 ug/l	**0.28 ug/l**	**0.28 ug/l**
Molybdenum	Total	Lab	< 0.2 ug/l	**0.49 ug/l**	**0.56 ug/l**	**0.83 ug/l**	**0.33 ug/l**	**2.87 ug/l**
Nickel	Dissolved	Lab	**3.23 ug/l**	**4.4 ug/l**	**4.35 ug/l**	**3.12 ug/l**	**2.83 ug/l**	**5.64 ug/l**
Nickel	Total	Lab	**6.05 ug/l**	**24.2 ug/l**	**31.2 ug/l**	**56.8 ug/l**	**15.8 ug/l**	**316 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	**1.64 ug/l**
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**1220 ug/l**	**2400 ug/l**	**2930 ug/l**	**3140 ug/l**	**1720 ug/l**	**6130 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	**1.19 ug/l**
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.46 ug/l**
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**3000 ug/l**	**4030 ug/l**	**4490 ug/l**	**4520 ug/l**	**4210 ug/l**	**6920 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**52.4 ug/l**	**81.6 ug/l**	**94 ug/l**	**103 ug/l**	**70.4 ug/l**	**269 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	**0.36 ug/l**	< 0.2 ug/l	< 0.2 ug/l	**0.53 ug/l**
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	**49 ug/l**	**510 ug/l**	**700 ug/l**	**660 ug/l**	**171 ug/l**	**2100 ug/l**
Zinc	Dissolved	Lab	**6.26 ug/l**	**9.05 ug/l**	**8.95 ug/l**	< 6 ug/l	< 6 ug/l	< 6 ug/l
Zinc	Total	Lab	< 6 ug/l	**21.7 ug/l**	**30.6 ug/l**	**60.5 ug/l**	**14.8 ug/l**	**366 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-011		GW011	GW011	
		Date	7/23/2012		10/10/2012	7/18/2013	
		Sample Type	N	FD	N	N	FD
	Fraction	Analysis Location					
General Parameters							
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**96.1 b mg/l**	**50.6 b mg/l**	**46.8 mg/l**	**23.9 mg/l**	--
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l	--
Alkalinity, total	NA	Lab	**96.1 b mg/l**	**50.6 b mg/l**	**46.8 mg/l**	**23.9 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 8.0 mg/l	< 2.4 * mg/l	--
Carbon, dissolved organic	NA	Lab	**1.4 mg/l**	**1.4 mg/l**	**1.3 mg/l**	**1.3 mg/l**	--
Carbon, total organic	NA	Lab	**1.1 mg/l**	**1.1 mg/l**	**1.2 mg/l**	**1.1 mg/l**	--
Chemical Oxygen Demand	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	**25.7 mg/l**	< 10.0 mg/l	--
Chloride	NA	Lab	**1.6 b mg/l**	**1.7 b mg/l**	**1.2 mg/l**	< 0.50 mg/l	--
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	--
Dissolved oxygen	NA	Field	**11.26 mg/l**	--	**10.47 mg/l**	**11.14 mg/l**	--
Fluoride	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Hardness, total, as CaCO3	NA	Lab	**33.1 mg/l**	**32.8 mg/l**	**99.0 mg/l**	**36.2 mg/l**	--
Nitrate + Nitrite, as N	NA	Lab	**0.12 mg/l**	**0.12 mg/l**	**0.21 mg/l**	< 0.10 mg/l	--
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--
pH	NA	Lab	**6.8 pH units**	**6.8 pH units**	**7.0 pH units**	**6.5 pH units**	--
pH	NA	Field	**6.02 pH units**	--	**6.83 pH units**	**6.19 pH units**	--
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	**1.1 mg/l**	< 0.10 mg/l	--
Redox (oxidation potential)	NA	Field	**347 mV**	--	**271 mV**	**583 mV**	--
Solids, total dissolved	NA	Lab	**94.0 mg/l**	**92.0 mg/l**	**109 mg/l**	**77.0 mg/l**	--
Solids, total suspended	NA	Lab	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**73.1 umhos/cm**	--	**101.9 umhos/cm**	**73.3 umhos/cm**	--
Sulfate	NA	Lab	**13.0 mg/l**	**13.2 mg/l**	**10 mg/l**	**15.9 mg/l**	--
Sulfide	NA	Lab	--	--	--	--	--
Temperature, degrees C	NA	Field	**14.31 deg C**	--	**10.15 deg C**	**11.27 deg C**	--
Turbidity	NA	Field	**2.1 NTU**	--	**456 NTU**	**9.1 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1472.27**	--	**1469.17**	**1472.34**	--
Metals						--	--
Aluminum	Dissolved	Lab	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	--
Aluminum	Total	Lab	**30.2 ug/l**	**28.1 ug/l**	**21300 ug/l**	**459 ug/l**	--
Antimony	Dissolved	Lab	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	**4.7 ug/l**	--	--
Arsenic III	Total	Lab	--	--	--	**0.56 ug/l**	--
Arsenic inorganic	Total	Lab	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--
Barium	Dissolved	Lab	**17.8 ug/l**	**17.5 ug/l**	**18.6 ug/l**	**18.0 ug/l**	--
Barium	Total	Lab	**18.5 ug/l**	**18.5 ug/l**	**179 ug/l**	**22.4 ug/l**	--
Beryllium	Dissolved	Lab	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	**0.54 ug/l**	< 0.20 ug/l	--
Boron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	--
Boron	Total	Lab	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	--
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Calcium	Dissolved	Lab	--	--	--	--	--
Calcium	Total	Lab	**7700 ug/l**	**7600 ug/l**	**18200 ug/l**	**8500 ug/l**	--
Chromium	Dissolved	Lab	**1.4 ug/l**	**1.5 ug/l**	**2.1 ug/l**	< 1.0 ug/l	--
Chromium	Total	Lab	**1.3 ug/l**	< 1.0 ug/l	**53.0 ug/l**	**2.0 ug/l**	--
Cobalt	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Cobalt	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	**14.2 ug/l**	**0.36 ug/l**	--
Copper	Dissolved	Lab	**1.5 ug/l**	**1.6 ug/l**	**0.83 b ug/l**	< 0.50 ug/l	--
Copper	Total	Lab	**1.5 ug/l**	**1.5 ug/l**	**50.2 ug/l**	**1.7 ug/l**	--
Iron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	**56.6 ug/l**	< 50.0 ug/l	--
Iron	Total	Lab	**53.4 ug/l**	< 50.0 ug/l	**27300 ug/l**	**570 ug/l**	--
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	**9.9 ug/l**	< 0.50 ug/l	--
Magnesium	Dissolved	Lab	--	--	--	--	--
Magnesium	Total	Lab	**3400 ug/l**	**3400 ug/l**	**13000 ug/l**	**3600 ug/l**	--
Manganese	Dissolved	Lab	**4.4 ug/l**	**4.5 ug/l**	**2.2 ug/l**	**2.1 ug/l**	--
Manganese	Total	Lab	**5.5 ug/l**	**5.5 ug/l**	**435 ug/l**	**12.1 ug/l**	--
Mercury	Total	Lab	< 0.00050 ug/l	< 0.00050 ug/l	**0.0068 ug/l**	**0.00061 b ug/l**	**0.00068 ug/l**
Mercury methyl	Total	Lab	--	--	**0.00004 j ug/l**	< 0.00003 ug/l	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	**0.27 ug/l**	**0.28 ug/l**	**0.21 ug/l**	**0.44 ug/l**	--
Molybdenum	Total	Lab	**0.30 ug/l**	**0.26 ug/l**	**0.82 ug/l**	**0.33 ug/l**	--
Nickel	Dissolved	Lab	**2.6 ug/l**	**2.6 ug/l**	**5.1 ug/l**	**2.1 ug/l**	--
Nickel	Total	Lab	**2.7 ug/l**	**2.7 ug/l**	**57.8 ug/l**	**3.4 ug/l**	--
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Phosphorus, total	Dissolved	Lab	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Potassium	Dissolved	Lab	--	--	--	--	--
Potassium	Total	Lab	**1000 ug/l**	**990 ug/l**	**4000 ug/l**	**970 ug/l**	--
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Silica	Total	Lab	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Sodium	Dissolved	Lab	--	--	--	--	--
Sodium	Total	Lab	**2700 ug/l**	**2700 ug/l**	**5800 ug/l**	**3600 ug/l**	--
Strontium	Dissolved	Lab	--	--	--	--	--
Strontium	Total	Lab	**42.9 ug/l**	**41.8 ug/l**	**131 ug/l**	**49.6 ug/l**	--
Thallium	Dissolved	Lab	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.017 ug/l	--
Titanium	Dissolved	Lab	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	**1270 ug/l**	**21.4 ug/l**	--
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	**58.4 ug/l**	< 6.0 ug/l	--

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW011		GW-012	GW-012	
		Date	10/14/2013		5/8/2009	3/17/2010	
		Sample Type	N	FD	N	N	FD
	Fraction	Analysis Location					
General Parameters							
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**44.0 mg/l**	**43.7 mg/l**	--	**538 mg/l**	**540 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	--	< 20 mg/l	< 20 mg/l
Alkalinity, total	NA	Lab	**44.0 mg/l**	**43.7 mg/l**	**504 mg/l**	**538 mg/l**	**540 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 * mg/l	< 2.4 * mg/l	--	< 4 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**1.0 mg/l**	< 1.0 mg/l	--	**4.4 mg/l**	**4.4 mg/l**
Carbon, total organic	NA	Lab	< 1.0 mg/l	**1.3 mg/l**	**5.0 mg/l**	**4.6 mg/l**	**4.6 mg/l**
Chemical Oxygen Demand	NA	Lab	**11.7 mg/l**	**16.2 b mg/l**	**14.1 mg/l**	**16 mg/l**	**14.3 mg/l**
Chloride	NA	Lab	**1.7 mg/l**	**1.6 mg/l**	**23 mg/l**	**22 mg/l**	**22 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	**0.0150 mg/l**	< 0.02 mg/l	< 0.0035 * mg/l	< 0.0035 * mg/l
Dissolved oxygen	NA	Field	**8.99 mg/l**	--	--	**5.25 mg/l**	--
Fluoride	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	**0.2 mg/l**	**0.17 mg/l**	**0.17 mg/l**
Hardness, total, as CaCO3	NA	Lab	**50.5 mg/l**	**54.4 mg/l**	**685 mg/l**	**694 mg/l**	**670 mg/l**
Nitrate + Nitrite, as N	NA	Lab	**0.17 mg/l**	**0.16 mg/l**	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--
pH	NA	Lab	**7.1 pH units**	**6.9 pH units**	**7.1 pH units**	**7.6 pH units**	**7.5 pH units**
pH	NA	Field	**6.26 pH units**	--	--	**7.46 pH units**	--
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.1 mg/l	< 0.1 mg P/L	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	**487 mV**	--	--	**792 mV**	--
Solids, total dissolved	NA	Lab	**80.0 mg/l**	**97.0 mg/l**	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**107 umhos/cm**	--	--	**1360 umhos/cm**	--
Sulfate	NA	Lab	**11.1 mg/l**	**11.2 mg/l**	**291 mg/l**	**332 mg/l**	**330 mg/l**
Sulfide	NA	Lab	--	--	--	--	--
Temperature, degrees C	NA	Field	**8.15 deg C**	--	--	**8 deg C**	--
Turbidity	NA	Field	**0 NTU**	--	--	**367.4 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1469.37**	--	**1490.74**	**1490.75**	--
Metals			--	--			
Aluminum	Dissolved	Lab	< 20.0 ug/l	< 20.0 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**192 ug/l**	**223 ug/l**	**88.9 ug/l**	**963 * ug/l**	**3960 * ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 2 ug/l	--	--
Arsenic	Total	Lab	--	--	< 2 ug/l	< 2 ug/l	< 2 ug/l
Arsenic III	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--
Barium	Dissolved	Lab	**22.6 ug/l**	**23.0 ug/l**	--	--	--
Barium	Total	Lab	**27.0 ug/l**	**26.1 ug/l**	**156 ug/l**	**190 ug/l**	**229 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	--	--	--
Boron	Total	Lab	< 50.0 ug/l	< 50.0 ug/l	**351 ug/l**	**358 ug/l**	**350 ug/l**
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	**0.21 ug/l**
Calcium	Dissolved	Lab	--	--	--	--	--
Calcium	Total	Lab	**11000 ug/l**	**11900 ug/l**	**132000 ug/l**	**133000 ug/l**	**128000 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	**1.6 ug/l**	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	**1.8 ug/l**	**2.1 ug/l**	< 1 ug/l	**1.3 * ug/l**	**6.0 * ug/l**
Cobalt	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	--	--	--
Cobalt	Total	Lab	**0.25 ug/l**	**0.26 ug/l**	**2.1 ug/l**	**1.2 ug/l**	**1.9 ug/l**
Copper	Dissolved	Lab	**0.61 ug/l**	**0.66 ug/l**	**2.3 ug/l**	**2.7 ug/l**	**2.5 ug/l**
Copper	Total	Lab	**1.5 ug/l**	**1.6 ug/l**	**2.1 ug/l**	**4.6 * ug/l**	**11.4 * ug/l**
Iron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	--	--	--
Iron	Total	Lab	**294 ug/l**	**321 ug/l**	**92.6 ug/l**	**606 * ug/l**	**3140 * ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	--	--	--
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	**0.7 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--
Magnesium	Total	Lab	**5600 ug/l**	**6000 ug/l**	**86400 ug/l**	**88000 ug/l**	**85200 ug/l**
Manganese	Dissolved	Lab	**1.8 ug/l**	**1.8 ug/l**	--	--	--
Manganese	Total	Lab	**10.9 ug/l**	**10.6 ug/l**	**776 ug/l**	**287 ug/l**	**249 ug/l**
Mercury	Total	Lab	**0.00092 ug/l**	**0.00077 ug/l**	--	**0.0031 ug/l**	**0.0034 ug/l**
Mercury methyl	Total	Lab	**0.00005 jb ug/l**	< 0.00003 ug/l	--	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	< 0.30 ug/l	< 0.30 ug/l	**26.5 ug/l**	**33.1 ug/l**	**31.4 ug/l**
Molybdenum	Total	Lab	< 0.30 ug/l	< 0.30 ug/l	**26.3 ug/l**	**30.9 ug/l**	**31.4 ug/l**
Nickel	Dissolved	Lab	**3.5 ug/l**	**3.8 ug/l**	**8.1 ug/l**	**10.7 ug/l**	**10.1 ug/l**
Nickel	Total	Lab	**4.5 ug/l**	**4.4 ug/l**	**8.2 ug/l**	**11.2 ug/l**	**15 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.30 ug/l	< 0.030 ug/l	< 0.030 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.30 ug/l	< 0.0090 ug/l	< 0.0090 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--
Potassium	Total	Lab	**1200 ug/l**	**1200 ug/l**	**3970 ug/l**	**3410 ug/l**	**3680 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--
Sodium	Total	Lab	**3300 ug/l**	**3600 ug/l**	**106000 ug/l**	**111000 ug/l**	**108000 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--
Strontium	Total	Lab	**62.3 ug/l**	**66.8 ug/l**	**707 ug/l**	**723 ug/l**	**702 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--
Thallium	Total	Lab	< 0.017 ug/l	< 0.017 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	**10.8 ug/l**	< 10 ug/l	**26 * ug/l**	**140 * ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6 ug/l	**10 ug/l**	**9.3 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-012		GW-012	GW-012	
		Date	5/3/2010		7/26/2010	10/5/2010	
		Sample Type	N	FD	N	N	FD
	Fraction	Analysis Location					
General Parameters							
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**512 mg/l**	**496 mg/l**	**521 mg/l**	**572 mg/l**	**554 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 20 mg/l
Alkalinity, total	NA	Lab	**512 mg/l**	**496 mg/l**	**521 mg/l**	**572 mg/l**	**554 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 3 mg/l	< 2.4 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**3.9 mg/l**	**4.1 mg/l**	**5.3 mg/l**	**5.2 mg/l**	**5.5 mg/l**
Carbon, total organic	NA	Lab	**4.0 mg/l**	**4.3 mg/l**	**4.2 mg/l**	**4.8 mg/l**	**4.9 mg/l**
Chemical Oxygen Demand	NA	Lab	**17.7 mg/l**	**18.9 mg/l**	**13.2 mg/l**	**18.1 mg/l**	**16.7 mg/l**
Chloride	NA	Lab	**20.9 mg/l**	**21.1 mg/l**	**20.7 mg/l**	**22 mg/l**	**21.9 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l
Dissolved oxygen	NA	Field	**0.17 mg/l**	--	**1.49 mg/l**	**0.4 mg/l**	--
Fluoride	NA	Lab	< 0.13 mg/l	**0.17 mg/l**	**0.19 mg/l**	**0.19 mg/l**	**0.18 mg/l**
Hardness, total, as CaCO3	NA	Lab	**709 mg/l**	**695 mg/l**	**714 mg/l**	**774 mg/l**	**763 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.05 mg/l	< 0.05 mg/l	< 0.05 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--
pH	NA	Lab	**7.9 pH units**	**7.9 pH units**	**7.7 pH units**	**7.6 pH units**	**7.7 pH units**
pH	NA	Field	**6.59 pH units**	--	**7.26 pH units**	**7.5 pH units**	--
Phosphorus, total	NA	Lab	< 0.1 mg P/L	**0.35 mg P/L**	**0.24 mg P/L**	< 0.1 mg P/L	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	**540 mV**	--	**388 mV**	**581 mV**	--
Solids, total dissolved	NA	Lab	**946 mg/l**	**960 mg/l**	**979 mg/l**	**1090 mg/l**	**1110 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**2376 umhos/cm**	--	**573 umhos/cm**	**1445 umhos/cm**	--
Sulfate	NA	Lab	**294 mg/l**	**290 mg/l**	**332 mg/l**	**372 mg/l**	**373 mg/l**
Sulfide	NA	Lab	--	--	--	--	--
Temperature, degrees C	NA	Field	**7.4 deg C**	--	**13.2 deg C**	**12.7 deg C**	--
Turbidity	NA	Field	**363 NTU**	--	**28.5 NTU**	**0 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1490.05**	**1490.05**	**1489.91**	**1490.04**	--
Metals							
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**6320 * ug/l**	**3650 * ug/l**	**9490 ug/l**	**78 ug/l**	**79.8 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	--	--	< 1 ug/l	< 1 ug/l	< 1 ug/l
Arsenic	Total	Lab	**1.37 ug/l**	**1.88 ug/l**	**1.02 ug/l**	< 1 ug/l	< 1 ug/l
Arsenic III	Total	Lab	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	--
Barium	Total	Lab	**254 ug/l**	**275 ug/l**	**303 ug/l**	**241 ug/l**	**237 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--
Beryllium	Total	Lab	**0.2 ug/l**	**0.25 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	--	--	--	--	--
Boron	Total	Lab	**354 ug/l**	**352 ug/l**	**368 ug/l**	**417 ug/l**	**424 ug/l**
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	**0.25 ug/l**	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	**0.3 ug/l**	**0.27 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--
Calcium	Total	Lab	**146000 ug/l**	**144000 ug/l**	**142000 ug/l**	**148000 ug/l**	**144000 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	**15.1 ug/l**	**19.9 ug/l**	**17.1 ug/l**	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	Lab	--	--	--	--	--
Cobalt	Total	Lab	**3.78 ug/l**	**4.69 ug/l**	**3.45 ug/l**	**0.71 ug/l**	**0.69 ug/l**
Copper	Dissolved	Lab	**2.8 b ug/l**	**2.6 b ug/l**	**5.81 b ug/l**	**2.48 ug/l**	**2.5 ug/l**
Copper	Total	Lab	**32.9 ug/l**	**34.7 ug/l**	**30.1 ug/l**	**3.02 ug/l**	**2.86 ug/l**
Iron	Dissolved	Lab	--	--	< 50 ug/l	**88.9 ug/l**	**90.4 ug/l**
Iron	Total	Lab	**5800 * ug/l**	**3790 * ug/l**	**8270 ug/l**	**166 ug/l**	**165 ug/l**
Lead	Dissolved	Lab	--	--	--	--	--
Lead	Total	Lab	**1.85 ug/l**	**2.32 ug/l**	**1.89 b ug/l**	< 0.5 ug/l	< 0.5 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--
Magnesium	Total	Lab	**83700 ug/l**	**81400 ug/l**	**87300 ug/l**	**98100 ug/l**	**97900 ug/l**
Manganese	Dissolved	Lab	**211 ug/l**	**198 ug/l**	**171 ug/l**	**411 ug/l**	**402 ug/l**
Manganese	Total	Lab	**319 ug/l**	**370 ug/l**	**286 ug/l**	**399 ug/l**	**410 ug/l**
Mercury	Total	Lab	**0.0399 * ug/l**	**0.0218 * ug/l**	**0.0080 ug/l**	**0.0018 ug/l**	**0.0022 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**32.6 ug/l**	**32.1 ug/l**	**35.7 ug/l**	**33.3 ug/l**	**33.3 ug/l**
Molybdenum	Total	Lab	**30.9 ug/l**	**30.7 ug/l**	**36.3 ug/l**	**34.2 ug/l**	**32.2 ug/l**
Nickel	Dissolved	Lab	**9.8 ug/l**	**9.54 ug/l**	**12.2 ug/l**	**11.4 ug/l**	**11.7 ug/l**
Nickel	Total	Lab	**23.8 ug/l**	**27.3 ug/l**	**25.9 ug/l**	**10.8 ug/l**	**11 ug/l**
Palladium	Total	Lab	< 0.50 * ug/l	< 0.50 * ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--
Potassium	Total	Lab	**4340 ug/l**	**3870 ug/l**	**4820 ug/l**	**4240 ug/l**	**4420 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	**0.23 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--
Sodium	Total	Lab	**102000 ug/l**	**102000 ug/l**	**106000 ug/l**	**116000 ug/l**	**114000 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--
Strontium	Total	Lab	**702 ug/l**	**692 ug/l**	**766 ug/l**	**750 ug/l**	**735 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--
Titanium	Total	Lab	**280 * ug/l**	**130 * ug/l**	**470 ug/l**	< 10 ug/l	< 10 ug/l
Zinc	Dissolved	Lab	< 6 ug/l	< 6 ug/l	**43.7 b ug/l**	< 6 ug/l	< 6 ug/l
Zinc	Total	Lab	**17 ug/l**	**21.2 ug/l**	**20.5 ug/l**	< 6 ug/l	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location			GW-012		GW-012	GW-012	GW-012	
Date			4/27/2011		7/19/2011	10/4/2011	11/1/2011	
Sample Type			N	FD	N	N	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**654 mg/l**	**641 mg/l**	**637 mg/l**	**598 mg/l**	**587 mg/l**	**613 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20 mg/l	< 20 mg/l	< 20 mg/l	< 20 mg/l	--	--
Alkalinity, total	NA	Lab	**654 mg/l**	**641 mg/l**	**637 mg/l**	**598 mg/l**	**587 mg/l**	**613 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 3 mg/l	< 3 mg/l	--	--
Carbon, dissolved organic	NA	Lab	**5.6 mg/l**	**5.5 mg/l**	**5.9 mg/l**	**7.1 mg/l**	**6.5 mg/l**	**6.2 mg/l**
Carbon, total organic	NA	Lab	**5.3 mg/l**	**5.1 mg/l**	**6.0 mg/l**	**6.8 mg/l**	**6.0 mg/l**	**5.8 mg/l**
Chemical Oxygen Demand	NA	Lab	**16.4 mg/l**	**13.8 mg/l**	**59.1 mg/l**	**32 mg/l**	--	--
Chloride	NA	Lab	**17.4 mg/l**	**17.5 mg/l**	**17.6 mg/l**	**19.3 mg/l**	**19.1 mg/l**	**19 mg/l**
Cyanide	NA	Lab	**0.0221 mg/l**	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	--	--
Dissolved oxygen	NA	Field	**3.55 mg/l**	--	**4.3 mg/l**	**9.4 mg/l**	**3.98 mg/l**	--
Fluoride	NA	Lab	**0.14 mg/l**	**0.14 mg/l**	**0.19 mg/l**	**0.22 mg/l**	**0.19 mg/l**	**0.19 mg/l**
Hardness, total, as CaCO3	NA	Lab	**933 mg/l**	**925 mg/l**	**838 mg/l**	**925 mg/l**	--	--
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	--	--
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l
Orthophosphate, as PO4	NA	Lab	--	--	--	--	**0.02 mg/l**	**0.02 mg/l**
pH	NA	Lab	--	--	**7.4 pH units**	**7.5 pH units**	--	--
pH	NA	Field	**7.05 pH units**	--	**7.0 pH units**	**7.0 pH units**	**6.98 pH units**	--
Phosphorus, total	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	**2.9 mg P/L**	**0.18 mg P/L**	< 0.1 mg P/L	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	**353 mV**	--	**494 mV**	**452 mV**	**362 mV**	--
Solids, total dissolved	NA	Lab	**1250 mg/l**	**1270 mg/l**	**1226 mg/l**	**1347 mg/l**	**1458 mg/l**	**1457 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	**4.8 mg/l**	**5 mg/l**
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	**1500 umhos/cm**	**1500 umhos/cm**
Specific Conductance @ 25oC	NA	Field	**1841 umhos/cm**	--	**1721 umhos/cm**	**1908 umhos/cm**	**1989 umhos/cm**	--
Sulfate	NA	Lab	**433 mg/l**	**435 mg/l**	**395 mg/l**	**472 mg/l**	**500 mg/l**	**498 mg/l**
Sulfide	NA	Lab	--	--	--	--	< 5.0 mg/l	< 5.0 mg/l
Temperature, degrees C	NA	Field	**5.57 deg C**	--	**9.7 deg C**	**13.3 deg C**	**10.00 deg C**	--
Turbidity	NA	Field	**6.8 NTU**	--	**1651.0 NTU**	**128.0 NTU**	**0 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1490.39**	**1490.39**	**1489.69**	**1488.9**	**1489.98**	--
Metals								
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	--	--
Aluminum	Total	Lab	**210 ug/l**	**235 ug/l**	**29000 ug/l**	**6760 ug/l**	< 25 ug/l	< 25 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	--
Arsenic	Dissolved	Lab	**0.66 ug/l**	**0.69 ug/l**	< 0.5 ug/l	< 0.5 ug/l	--	--
Arsenic	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	**3.44 ug/l**	**0.8 ug/l**	--	--
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	**245 e ug/l** **258 e ug/l**	**246 e ug/l** **245 e ug/l**	**277 e ug/l**	**248 ug/l**	--	--
Barium	Total	Lab	**248 e ug/l**	**249 ug/l**	**452 ug/l**	**312 ug/l**	**256 ug/l**	**248 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	**1.02 ug/l**	< 0.2 ug/l	--	--
Boron	Dissolved	Lab	--	--	**382 ug/l**	**411 ug/l**	--	--
Boron	Total	Lab	**378 ug/l**	**380 ug/l**	**313 ug/l**	**416 ug/l**	**426 ug/l**	**417 ug/l**
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**1.1 ug/l**	--	--
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	**0.8 ug/l**	**2 ug/l**	--	--
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**179000 ug/l**	**176000 ug/l**	**173000 ug/l**	**179000 ug/l**	**196000 ug/l**	**189000 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	--	--
Chromium	Total	Lab	< 1 ug/l	< 1 ug/l	**68.2 ug/l**	**15 ug/l**	--	--
Cobalt	Dissolved	Lab	**0.8 ug/l** **0.88 ug/l**	**0.82 ug/l** **0.84 ug/l**	**0.86 ug/l**	**0.74 ug/l**	--	--
Cobalt	Total	Lab	**1.03 ug/l**	**0.98 ug/l**	**17.9 ug/l**	**3.45 ug/l**	--	--
Copper	Dissolved	Lab	**2.76 ug/l**	**2.61 ug/l**	**3.7 ug/l**	**4.48 ug/l**	--	--
Copper	Total	Lab	**3.9 ug/l**	**3.9 ug/l**	**205 ug/l**	**34.5 ug/l**	--	--
Iron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	**62.6 ug/l**	< 50 ug/l
Iron	Total	Lab	**255 ug/l**	**286 ug/l**	**30100 ug/l**	**6430 ug/l**	**114 ug/l**	**89.9 ug/l**
Lead	Dissolved	Lab	< 0.5 ug/l < 0.5 ug/l	< 0.5 ug/l < 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	--
Lead	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	**8.26 ug/l**	**2.75 ug/l**	--	--
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**118000 ug/l**	**118000 ug/l**	**98700 ug/l**	**116000 ug/l**	**121000 ug/l**	**117000 ug/l**
Manganese	Dissolved	Lab	**390 ug/l**	**397 ug/l**	**140 ug/l**	**308 ug/l**	--	--
Manganese	Total	Lab	**404 ug/l**	**405 ug/l**	**695 ug/l**	**444 ug/l**	**358 ug/l**	**284 ug/l**
Mercury	Total	Lab	**0.0024 ug/l**	**0.0023 ug/l**	**0.153 ug/l**	**0.0165 ug/l**	--	--
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	--	--
Molybdenum	Dissolved	Lab	**31.8 ug/l**	**31.9 ug/l**	**33.4 ug/l**	**34 ug/l**	--	--
Molybdenum	Total	Lab	**31.6 ug/l**	**31.6 ug/l**	**19.5 ug/l**	**33 ug/l**	--	--
Nickel	Dissolved	Lab	**11.5 ug/l**	**11.3 ug/l**	**9.34 ug/l**	**9.83 ug/l**	--	--
Nickel	Total	Lab	**12 ug/l**	**11.5 ug/l**	**90.6 ug/l**	**23.6 ug/l**	--	--
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	**1.72 ug/l**	< 0.5 ug/l	--	--
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	--
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**2960 ug/l**	**2920 ug/l**	**5040 ug/l**	**4210 ug/l**	**3480 ug/l**	**3300 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	--	--
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	--	--
Silica	Total	Lab	--	--	--	--	**19300 ug/l**	**18800 ug/l**
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	--
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	**0.2 ug/l**	< 0.2 ug/l	--	--
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**131000 ug/l**	**130000 ug/l**	**122000 ug/l**	**119000 ug/l**	**126000 ug/l**	**122000 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**937 ug/l**	**916 ug/l**	**917 ug/l**	**946 ug/l**	**1000 ug/l**	**955 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	--
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10 ug/l	< 10 ug/l	**780 ug/l**	**280 ug/l**	--	--
Zinc	Dissolved	Lab	< 6 ug/l	< 6 ug/l	< 6 ug/l	**8.38 ug/l**	--	--
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	**94.9 ug/l**	**16.8 ug/l**	--	--

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-012		GW-012	GW012	GW012	
		Date	4/26/2012		7/25/2012	10/10/2012	4/3/2013	
		Sample Type	N	FD	N	N	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**680 mg/l**	**599 mg/l**	**622 mg/l**	**636 mg/l**	**624 mg/l**	--
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	**23.7 mg/l**	--
Alkalinity, total	NA	Lab	**680 mg/l**	**599 mg/l**	**622 mg/l**	**636 mg/l**	**648 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	Lab	< 4.0 mg/l	< 4.0 mg/l	< 4.0 mg/l	< 8.0 mg/l	< 2.4 mg/l	--
Carbon, dissolved organic	NA	Lab	**6.3 * mg/l**	**6.7 mg/l**	**5.3 mg/l**	**5.7 mg/l**	**5.2 mg/l**	--
Carbon, total organic	NA	Lab	**5.8 mg/l**	**6.7 mg/l**	**5.4 mg/l**	**5.5 mg/l**	**4.9 mg/l**	--
Chemical Oxygen Demand	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	**18.3 mg/l**	**15.2 mg/l**	**13.9 mg/l**	--
Chloride	NA	Lab	**15.9 mg/l**	**16.0 mg/l**	**17.0 mg/l**	**17.9 mg/l**	**15.8 mg/l**	--
Cyanide	NA	Lab	**0.0122 mg/l**	< 0.0100 mg/l	< 0.0100 mg/l	**0.0142 mg/l**	< 0.0100 mg/l	--
Dissolved oxygen	NA	Field	**1.84 mg/l**	--	**1.78 mg/l**	**2.57 mg/l**	**0.15 mg/l**	--
Fluoride	NA	Lab	**0.15 mg/l**	**0.13 mg/l**	**0.16 mg/l**	**0.15 mg/l**	**0.16 mg/l**	--
Hardness, total, as CaCO3	NA	Lab	**1090 mg/l**	**1070 mg/l**	**948 mg/l**	**1010 mg/l**	**913 mg/l**	--
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.070 mg/l**	**0.070 mg/l**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.7 pH units**	**7.7 pH units**	**7.5 pH units**	**7.4 pH units**	**7.5 pH units**	--
pH	NA	Field	**6.88 pH units**	--	**6.9 pH units**	**6.97 pH units**	**7.04 pH units**	--
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Redox (oxidation potential)	NA	Field	**503 mV**	--	**242 mV**	**315 mV**	**337 mV**	--
Solids, total dissolved	NA	Lab	**1370 mg/l**	**1390 mg/l**	**1390 mg/l**	**1340 mg/l**	**1230 mg/l**	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**2226 umhos/cm**	--	**1907 umhos/cm**	**1934 umhos/cm**	**1861 umhos/cm**	--
Sulfate	NA	Lab	**507 mg/l**	**505 mg/l**	**460 mg/l**	**504 mg/l**	**440 mg/l**	--
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**7.23 deg C**	--	**13.98 deg C**	**9.38 deg C**	**4.84 deg C**	--
Turbidity	NA	Field	**0.5 NTU**	--	**0 NTU**	**2.1 NTU**	**1.1 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1490.17**	--	**1490.22**	**1490**	**1490.19**	--
Metals							--	--
Aluminum	Dissolved	Lab	< 80.0 ug/l	< 80.0 ug/l	**31.5 ug/l**	**32.4 ug/l**	**37.8 ug/l**	--
Aluminum	Total	Lab	< 20.0 ug/l	< 20.0 ug/l	**54.8 ug/l**	**43.0 ug/l**	**57.0 ug/l**	--
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--
Arsenic III	Total	Lab	--	--	--	--	< 0.50 ug/l	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	**208 ug/l**	**201 ug/l**	**180 ug/l**	--
Barium	Total	Lab	**238 ug/l**	**236 ug/l**	**208 ug/l**	**205 ug/l**	**187 ug/l**	--
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Boron	Dissolved	Lab	**361 ug/l**	**365 ug/l**	**393 ug/l**	**441 ug/l**	**352 ug/l**	--
Boron	Total	Lab	**369 ug/l**	**365 ug/l**	**411 ug/l**	**442 ug/l**	**340 ug/l**	--
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**211000 ug/l**	**204000 ug/l**	**177000 ug/l**	**195000 ug/l**	**170000 ug/l**	--
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Chromium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Cobalt	Dissolved	Lab	--	--	**0.80 ug/l**	**0.69 ug/l**	**0.44 ug/l**	--
Cobalt	Total	Lab	**1.1 ug/l**	**1.2 ug/l**	**0.86 ug/l**	**0.72 ug/l**	**0.53 ug/l**	--
Copper	Dissolved	Lab	**4.0 ug/l**	**4.0 ug/l**	**3.1 ug/l**	**6.2 b ug/l**	**2.4 ug/l**	--
Copper	Total	Lab	**4.1 ug/l**	**4.0 ug/l**	**3.1 ug/l**	**6.8 ug/l**	**3.0 ug/l**	--
Iron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	**95.8 ug/l**	< 50.0 ug/l	**51.8 ug/l**	--
Iron	Total	Lab	**85.4 ug/l**	**77.2 ug/l**	**110 ug/l**	< 100 ug/l	**88.4 ug/l**	--
Lead	Dissolved	Lab	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**136000 ug/l**	**136000 ug/l**	**123000 ug/l**	**128000 ug/l**	**119000 ug/l**	--
Manganese	Dissolved	Lab	**562 ug/l**	**567 ug/l**	**328 ug/l**	**172 ug/l**	**200 ug/l**	--
Manganese	Total	Lab	**563 ug/l**	**570 ug/l**	**343 ug/l**	**173 ug/l**	**208 ug/l**	--
Mercury	Total	Lab	**0.0014 ug/l**	**0.0015 ug/l**	**0.0015 ug/l**	**0.0017 ug/l**	**0.0016 ug/l**	**0.0016 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	--	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	**31.0 ug/l**	**31.2 ug/l**	**32.1 ug/l**	**35.7 ug/l**	**34.9 ug/l**	--
Molybdenum	Total	Lab	**31.3 ug/l**	**31.4 ug/l**	**32.4 ug/l**	**36.4 ug/l**	**34.9 ug/l**	--
Nickel	Dissolved	Lab	**11.8 ug/l**	**11.8 ug/l**	**9.4 ug/l**	**11.2 ug/l**	**11.3 ug/l**	--
Nickel	Total	Lab	**11.3 ug/l**	**11.5 ug/l**	**9.8 ug/l**	**11.8 ug/l**	**12.9 ug/l**	--
Palladium	Total	Lab	< 0.50 ug/l	**0.62 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**0.54 ug/l**	--
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**3300 ug/l**	**3300 ug/l**	**3600 ug/l**	**3400 ug/l**	**2700 ug/l**	--
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**124000 ug/l**	**122000 ug/l**	**113000 ug/l**	**124000 ug/l**	**102000 ug/l**	--
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**1050 ug/l**	**1030 ug/l**	**904 ug/l**	**1010 ug/l**	**924 ug/l**	--
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	--
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

Location			GW012		GW012		GW-013	
Date			7/8/2013		10/17/2013		7/30/2010	
Sample Type			N	FD	N	FD	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**678 mg/l**	**669 mg/l**	**674 mg/l**	--	**17.6 mg/l**	**17 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	--	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	**678 mg/l**	**669 mg/l**	**674 mg/l**	--	**17.6 mg/l**	**17 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 * mg/l	< 2.4 * mg/l	< 2.4 * mg/l	--	< 2.4 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**5.7 mg/l**	**5.7 mg/l**	**5.6 mg/l**	--	**3.5 mg/l**	**3.3 mg/l**
Carbon, total organic	NA	Lab	**5.4 mg/l**	**5.0 mg/l**	**5.0 mg/l**	--	**3.5 mg/l**	**3.4 mg/l**
Chemical Oxygen Demand	NA	Lab	< 10.0 mg/l	**14.8 mg/l**	**20.2 mg/l**	--	< 10 mg/l	< 10 mg/l
Chloride	NA	Lab	**14.8 mg/l**	**14.7 mg/l**	**16.0 mg/l**	--	**0.7 j mg/l**	**0.7 j mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	**0.0289 mg/l**	--	< 0.02 mg/l	< 0.02 mg/l
Dissolved oxygen	NA	Field	**0.14 mg/l**	--	**0.36 mg/l**	--	**8.62 mg/l**	--
Fluoride	NA	Lab	**0.16 mg/l**	**0.16 mg/l**	**0.22 mg/l**	--	**0.56 b mg/l**	**0.06 b mg/l**
Hardness, total, as CaCO3	NA	Lab	**957 mg/l**	**955 mg/l**	**981 mg/l**	--	**19 mg/l**	**19.8 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	**0.16 mg/l**	**0.14 mg/l**
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	< 0.05 mg/l	< 0.05 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.5 pH units**	**7.5 pH units**	**7.4 pH units**	--	**6.9 pH units**	**6.7 pH units**
pH	NA	Field	**6.85 pH units**	--	**6.96 pH units**	--	**6.59 pH units**	--
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	< 0.1 mg P/L	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	**604 mV**	--	**394 mV**	--	**397 mV**	--
Solids, total dissolved	NA	Lab	**1290 mg/l**	**1200 mg/l**	**1330 mg/l**	--	**85 mg/l**	**79 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**1385 umhos/cm**	--	**1992 umhos/cm**	--	**34.4 umhos/cm**	--
Sulfate	NA	Lab	**434 mg/l**	**431 mg/l**	**471 mg/l**	--	**4.1 mg/l**	**4 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**9.91 deg C**	--	**10.5 deg C**	--	**7.87 deg C**	--
Turbidity	NA	Field	**1 NTU**	--	**0 NTU**	--	**45.5 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1490.29**	--	**1490.44**	--	**1461.51**	--
Metals			--	--	--	--		
Aluminum	Dissolved	Lab	**22.4 ug/l**	**24.5 ug/l**	< 20.0 ug/l	--	**93.2 ug/l**	**94.1 ug/l**
Aluminum	Total	Lab	**80.2 ug/l**	**55.7 ug/l**	< 20.0 ug/l	--	**1810 ug/l**	**2120 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 1 ug/l	< 1 ug/l
Arsenic	Total	Lab	--	--	--	--	< 1 ug/l	< 1 ug/l
Arsenic III	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	**198 ug/l**	**196 ug/l**	**224 ug/l**	--	--	--
Barium	Total	Lab	**186 ug/l**	**193 ug/l**	**218 ug/l**	--	**36.8 ug/l**	**39.5 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	**404 ug/l**	**414 ug/l**	**409 ug/l**	--	--	--
Boron	Total	Lab	**422 ug/l**	**425 ug/l**	**429 ug/l**	--	< 50 ug/l	< 50 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**175000 ug/l**	**174000 ug/l**	**188000 ug/l**	--	**4250 ug/l**	**4390 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	**1.32 ug/l**	**1.46 ug/l**
Chromium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	**4.26 ug/l**	**4.98 ug/l**
Cobalt	Dissolved	Lab	**0.51 ug/l**	**0.54 ug/l**	**0.46 ug/l**	--	--	--
Cobalt	Total	Lab	**0.60 ug/l**	**0.59 ug/l**	**0.42 ug/l**	--	**1.2 ug/l**	**1.36 ug/l**
Copper	Dissolved	Lab	**2.0 ug/l**	**2.3 ug/l**	**4.1 ug/l**	--	**5.69 ug/l**	**7.18 ug/l**
Copper	Total	Lab	**2.7 ug/l**	**2.7 ug/l**	**3.6 ug/l**	--	**6.69 ug/l**	**6.92 ug/l**
Iron	Dissolved	Lab	**70.4 ug/l**	**56.7 ug/l**	**66.0 ug/l**	--	**103 ug/l**	**100 ug/l**
Iron	Total	Lab	**142 ug/l**	**121 ug/l**	**88.9 ug/l**	--	**1830 ug/l**	**2090 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--	--
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	**0.6 ug/l**	**0.68 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**126000 ug/l**	**126000 ug/l**	**124000 ug/l**	--	**2030 ug/l**	**2140 ug/l**
Manganese	Dissolved	Lab	**386 ug/l**	**407 ug/l**	**215 ug/l**	--	**29 ug/l**	**28.1 ug/l**
Manganese	Total	Lab	**428 ug/l**	**449 ug/l**	**211 ug/l**	--	**36.4 ug/l**	**39.7 ug/l**
Mercury	Total	Lab	**0.0029 ug/l**	**0.0018 ug/l**	**0.0016 ug/l**	**0.0016 ug/l**	**0.0055 ug/l**	**0.0053 ug/l**
Mercury methyl	Total	Lab	**0.00003 j ug/l**	< 0.00003 ug/l	**0.00006 j ug/l**	< 0.00003 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**33.2 ug/l**	**35.0 ug/l**	**38.2 ug/l**	--	**0.23 ug/l**	**0.23 ug/l**
Molybdenum	Total	Lab	**31.9 ug/l**	**33.7 ug/l**	**37.2 ug/l**	--	**0.3 ug/l**	**0.3 ug/l**
Nickel	Dissolved	Lab	**9.5 ug/l**	**10.5 ug/l**	**10.8 ug/l**	--	**1.69 ug/l**	**1.68 ug/l**
Nickel	Total	Lab	**10.5 ug/l**	**11.0 ug/l**	**9.8 ug/l**	--	**4.34 ug/l**	**5.04 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	**0.62 ug/l**	--	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**3100 ug/l**	**3100 ug/l**	**3200 ug/l**	--	**580 ug/l**	**640 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**108000 ug/l**	**108000 ug/l**	**109000 ug/l**	--	< 2000 ug/l	< 2000 ug/l
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**890 ug/l**	**891 ug/l**	**941 ug/l**	--	**23.5 ug/l**	**24.6 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.017 ug/l	--	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	--	**62 ug/l**	**72 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	**10.9 ug/l**	**12.3 ug/l**
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	< 6 ug/l	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-013		GW-013		GW-013	
		Date	9/2/2010		10/8/2010		4/28/2011	
		Sample Type	N	FD	N	FD	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**17.2 mg/l**	**17.2 mg/l**	**16 mg/l**	**16.1 mg/l**	**12.7 mg/l**	**14.5 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	**17.2 mg/l**	**17.2 mg/l**	**16 mg/l**	**16.1 mg/l**	**12.7 mg/l**	**14.5 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**3.0 mg/l**	**3.1 mg/l**	**2.6 mg/l**	**2.7 mg/l**	**5.2 mg/l**	**5.1 mg/l**
Carbon, total organic	NA	Lab	**2.7 mg/l**	**2.9 mg/l**	**2.5 mg/l**	**2.6 mg/l**	**4.6 mg/l**	**4.5 mg/l**
Chemical Oxygen Demand	NA	Lab	**11.6 mg/l**	**10.2 mg/l**	**11.5 mg/l**	**12 mg/l**	**17.4 mg/l**	**20.4 mg/l**
Chloride	NA	Lab	< 0.5 mg/l	< 0.5 mg/l	< 0.5 mg/l	< 0.5 mg/l	< 0.5 mg/l	< 0.5 mg/l
Cyanide	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**7.81 mg/l**	--	**5.8 mg/l**	--	**9.57 mg/l**	--
Fluoride	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Hardness, total, as CaCO3	NA	Lab	**18.4 mg/l**	**18.4 mg/l**	**16.7 mg/l**	**16.6 mg/l**	**13.3 mg/l**	**14.8 mg/l**
Nitrate + Nitrite, as N	NA	Lab	**0.18 mg/l**	**0.18 mg/l**	**0.18 mg/l**	**0.18 mg/l**	**0.12 mg/l**	**0.11 mg/l**
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.05 mg/l	< 0.05 mg/l	< 0.05 mg/l	< 0.05 mg/l	**0.49 mg/l**	**0.37 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**6.3 pH units**	**6.2 pH units**	**6.4 pH units**	**6.5 pH units**	--	--
pH	NA	Field	**6.84 pH units**	--	**5.6 pH units**	--	**5.45 pH units**	--
Phosphorus, total	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L
Redox (oxidation potential)	NA	Field	**392 mV**	--	**583 mV**	--	**364 mV**	--
Solids, total dissolved	NA	Lab	**28 * mg/l**	**12 * mg/l**	**39 mg/l**	**38 mg/l**	**57 mg/l**	**59 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**37.0 umhos/cm**	--	**35 umhos/cm**	--	**0 umhos/cm**	--
Sulfate	NA	Lab	**2.74 mg/l**	**2.66 mg/l**	**2.64 mg/l**	**2.59 mg/l**	**3.23 mg/l**	**3.31 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**7.86 deg C**	--	**9.6 deg C**	--	**9.57 deg C**	--
Turbidity	NA	Field	**24 NTU**	--	**5.6 NTU**	--	**5 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1459.9**	--	**1461.87**	--	--	--
Metals								
Aluminum	Dissolved	Lab	**38.6 ug/l**	**32.8 ug/l**	**38.1 ug/l**	**39.1 ug/l**	**54.4 ug/l**	**58.1 ug/l**
Aluminum	Total	Lab	**894 * ug/l**	**569 * ug/l**	**124 ug/l**	**122 ug/l**	**385 ug/l**	**312 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	--	**15.0 * ug/l** **14.5 * ug/l**	**15.3 * ug/l** **14.3 * ug/l**
Barium	Total	Lab	**25.8 ug/l**	**25.4 ug/l**	**19.3 ug/l**	**19.2 ug/l**	**18 ug/l**	**18.6 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	--	--	--	--	--	--
Boron	Total	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**4320 ug/l**	**4310 ug/l**	**4050 ug/l**	**4010 ug/l**	**3120 ug/l**	**3430 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	**2.38 ug/l**	**2.19 ug/l**	< 1 ug/l	< 1 ug/l	**1.95 ug/l**	**2.08 ug/l**
Cobalt	Dissolved	Lab	--	--	--	--	**1.28 ug/l** **< 0.2 ug/l**	< 0.2 ug/l < 0.2 ug/l
Cobalt	Total	Lab	**0.59 ug/l**	**0.67 ug/l**	**0.23 ug/l**	**0.22 ug/l**	**0.31 ug/l**	**0.28 ug/l**
Copper	Dissolved	Lab	**3.92 ug/l**	**3.46 ug/l**	**1.41 ug/l**	**1.5 ug/l**	**1.6 ug/l**	**1.57 ug/l**
Copper	Total	Lab	**3.37 ug/l**	**3.39 ug/l**	**1.6 ug/l**	**1.59 ug/l**	**3.16 ug/l**	**2.69 ug/l**
Iron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l
Iron	Total	Lab	**794 ug/l**	**629 ug/l**	**113 ug/l**	**115 ug/l**	**364 ug/l**	**340 ug/l**
Lead	Dissolved	Lab	--	--	--	--	< 0.5 ug/l < 0.5 ug/l	< 0.5 ug/l < 0.5 ug/l
Lead	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	**3.55 ug/l**	< 0.5 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**1860 ug/l**	**1850 ug/l**	**1610 ug/l**	**1600 ug/l**	**1330 ug/l**	**1510 ug/l**
Manganese	Dissolved	Lab	**16.1 ug/l**	**17 ug/l**	**2.82 ug/l**	**3.02 ug/l**	**1.28 ug/l**	**1.36 ug/l**
Manganese	Total	Lab	**13.6 ug/l**	**14.2 ug/l**	**4.36 ug/l**	**4.37 ug/l**	**5.44 ug/l**	**5.39 ug/l**
Mercury	Total	Lab	**0.0040 ug/l**	**0.0035 ug/l**	**0.0025 ug/l**	**0.0025 ug/l**	**0.0037 ug/l**	**0.0038 ug/l**
Mercury methyl	Total	Lab	< 0.0001 * ug/l	< 0.0001 ug/l	**0.00010 ug/l**	**0.00025 ug/l**	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**0.22 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Molybdenum	Total	Lab	**0.25 ug/l**	**0.27 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Nickel	Dissolved	Lab	**1.08 ug/l**	**1.04 ug/l**	**0.79 ug/l**	**0.87 ug/l**	**0.7 ug/l**	**0.66 ug/l**
Nickel	Total	Lab	**2.38 ug/l**	**2.24 ug/l**	**1.14 ug/l**	**1.01 ug/l**	**1.39 ug/l**	**1.37 ug/l**
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**410 ug/l**	**380 ug/l**	**340 ug/l**	**340 ug/l**	**260 ug/l**	**360 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	< 2000 ug/l	< 2000 ug/l	< 2000 ug/l	< 2000 ug/l	< 2000 ug/l	< 2000 ug/l
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**23.9 ug/l**	**24.7 ug/l**	**22.9 ug/l**	**22.5 ug/l**	**15.9 ug/l**	**18.8 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	**33 ug/l**	**25 ug/l**	< 10 ug/l	< 10 ug/l	**17.4 ug/l**	**13.0 ug/l**
Zinc	Dissolved	Lab	**11.6 ug/l**	**8.99 ug/l**	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-013		GW-013		GW-013	GW-013
		Date	7/20/2011		10/7/2011		4/26/2012	7/23/2012
		Sample Type	N	FD	N	FD	N	N
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**16.3 mg/l**	**16.4 mg/l**	**18.8 mg/l**	**18.2 mg/l**	**17.3 mg/l**	< 20.0 mg/l
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10.0 mg/l	< 20.0 mg/l
Alkalinity, total	NA	Lab	**16.3 mg/l**	**16.4 mg/l**	**18.8 mg/l**	**18.2 mg/l**	**17.3 mg/l**	< 20.0 mg/l
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 4.0 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**4.1 mg/l**	**3.9 mg/l**	**4 mg/l**	**3.9 mg/l**	**3.9 mg/l**	**3.8 mg/l**
Carbon, total organic	NA	Lab	**3.5 mg/l**	**3.6 mg/l**	**3.1 mg/l**	**2.6 mg/l**	**3.5 mg/l**	**3.2 mg/l**
Chemical Oxygen Demand	NA	Lab	**23.5 mg/l**	**16.4 mg/l**	**19.4 mg/l**	**20.4 mg/l**	< 10.0 mg/l	**12.6 mg/l**
Chloride	NA	Lab	< 0.5 mg/l	< 0.5 mg/l	< 0.5 mg/l	**0.58 mg/l**	< 0.50 mg/l	< 0.50 mg/l
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**9.85 mg/l**	--	**7.0 mg/l**	--	**10.5 mg/l**	**8.81 mg/l**
Fluoride	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l
Hardness, total, as CaCO3	NA	Lab	**17.6 mg/l**	**17.5 mg/l**	**19.4 mg/l**	**18.8 mg/l**	**13.7 mg/l**	**15.8 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	**0.18 mg/l**	**0.17 mg/l**	**0.14 mg/l**	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.050 mg/l	< 0.10 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**6.3 pH units**	**6.3 pH units**	**6.0 pH units**	**6.3 pH units**	**6.5 pH units**	**6.4 pH units**
pH	NA	Field	**5.66 pH units**	--	**5.7 pH units**	--	**5.87 pH units**	**5.39 pH units**
Phosphorus, total	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.1 mg P/L	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**588 mV**	--	**404 mV**	--	**571 mV**	**410 mV**
Solids, total dissolved	NA	Lab	**53 mg/l**	**49 mg/l**	**56 mg/l**	**37 mg/l**	**59.0 mg/l**	**68.0 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**1 umhos/cm**	--	**43 umhos/cm**	--	**16.6 umhos/cm**	**29.5 umhos/cm**
Sulfate	NA	Lab	**2.62 mg/l**	**2.72 mg/l**	**3.12 mg/l**	**3.3 mg/l**	**2.9 mg/l**	**3.0 b mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**8.79 deg C**	--	**9.1 deg C**	--	**6.89 deg C**	**10.08 deg C**
Turbidity	NA	Field	**71.4 NTU**	--	**49.6 NTU**	--	**0 NTU**	**0 NTU**
Water Elevation, ft/MSL	NA	Field	**1462.11**	--	**1459.73**	--	--	**1461.76**
Metals								
Aluminum	Dissolved	Lab	**52.2 ug/l**	**56.7 ug/l**	**55 ug/l**	**46.6 ug/l**	**58.1 ug/l**	**31.5 ug/l**
Aluminum	Total	Lab	**2450 ug/l**	**2380 ug/l**	**1790 ug/l**	**1690 ug/l**	**76.5 ug/l**	**51.6 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	Lab	**0.83 ug/l**	**0.74 ug/l**	**0.51 ug/l**	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	**17.2 ug/l**	**17.0 ug/l**	**20 ug/l**	**20.2 ug/l**	--	**18.2 ug/l**
Barium	Total	Lab	**50.5 ug/l**	**50.2 ug/l**	**41.7 ug/l**	**40.5 ug/l**	**15.8 ug/l**	**19.0 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l
Boron	Total	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l
Cadmium	Dissolved	Lab	< 0.03 ug/l	**0.04 j ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	**0.05 j ug/l**	**0.04 j ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**3770 ug/l**	**3760 ug/l**	**4350 ug/l**	**4240 ug/l**	**3200 ug/l**	**3700 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	**1.21 ug/l**	< 1 ug/l	**1.0 ug/l**	**1.3 ug/l**
Chromium	Total	Lab	**6.42 ug/l**	**5.95 ug/l**	**4.59 ug/l**	**3.89 ug/l**	< 1.0 ug/l	< 1.0 ug/l
Cobalt	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	**3.30 ug/l**	--	< 0.20 ug/l
Cobalt	Total	Lab	**1.36 ug/l**	**1.23 ug/l**	**0.9 ug/l**	**0.81 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Copper	Dissolved	Lab	**1.37 ug/l**	**1.35 ug/l**	**2.11 ug/l**	**1.45 ug/l**	**1.7 ug/l**	**1.4 ug/l**
Copper	Total	Lab	**7.68 ug/l**	**6.93 ug/l**	**6.07 ug/l**	**5.24 ug/l**	**1.8 ug/l**	**1.5 ug/l**
Iron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	**53.2 ug/l**	< 50 ug/l	**58.4 ug/l**	< 50.0 ug/l
Iron	Total	Lab	**2320 ug/l**	**2280 ug/l**	**1680 ug/l**	**1560 ug/l**	**68.7 ug/l**	**70.6 ug/l**
Lead	Dissolved	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	< 0.50 ug/l
Lead	Total	Lab	**1 ug/l**	**0.96 ug/l**	**0.82 ug/l**	**0.7 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**1990 ug/l**	**1960 ug/l**	**2080 ug/l**	**2000 ug/l**	**1400 ug/l**	**1600 ug/l**
Manganese	Dissolved	Lab	**2.95 ug/l**	**2.9 ug/l**	< 10 ug/l	< 10 ug/l	**1.3 ug/l**	**0.84 ug/l**
Manganese	Total	Lab	**33.7 ug/l**	**31 ug/l**	**23.6 ug/l**	**21.1 ug/l**	**1.5 ug/l**	**1.0 ug/l**
Mercury	Total	Lab	**0.0053 ug/l**	**0.0054 ug/l**	**0.0051 ug/l**	**0.0052 ug/l**	**0.0031 ug/l**	**0.0025 ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	--
Molybdenum	Dissolved	Lab	**0.23 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Molybdenum	Total	Lab	**0.44 ug/l**	**0.24 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Nickel	Dissolved	Lab	**0.74 ug/l**	**0.73 ug/l**	**0.83 ug/l**	**0.82 ug/l**	**0.82 ug/l**	**0.69 ug/l**
Nickel	Total	Lab	**6.93 ug/l**	**6.06 ug/l**	**4.47 ug/l**	**4.32 ug/l**	**0.81 ug/l**	**0.71 ug/l**
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**540 ug/l**	**530 ug/l**	**620 ug/l**	**530 ug/l**	**270 ug/l**	**310 ug/l**
Selenium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 0.2 ug/l	**0.21 j ug/l**	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	< 2000 ug/l	< 2000 ug/l	< 2000 ug/l	< 2000 ug/l	**1400 ug/l**	**1600 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**23.9 ug/l**	**23.7 ug/l**	**27.3 ug/l**	**26 ug/l**	**18.4 ug/l**	**21.2 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	**88 ug/l**	**84 ug/l**	**62 ug/l**	**58 ug/l**	< 10.0 ug/l	< 10.0 ug/l
Zinc	Dissolved	Lab	< 6 ug/l	< 6 ug/l	**7.62 b ug/l**	**6.77 b ug/l**	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	< 6 ug/l	**6.22 ug/l**	**7.25 ug/l**	< 6 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW013	GW013		GW013	GW013	
		Date	10/10/2012	4/30/2013		7/8/2013	10/16/2013	
		Sample Type	N	N	FD	N	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**46.2 mg/l**	**16.6 mg/l**	--	**14.6 mg/l**	**17.5 mg/l**	**17.9 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	< 10.0 mg/l	--	< 10.0 mg/l	< 10.0 mg/l	< 10.0 mg/l
Alkalinity, total	NA	Lab	**46.2 mg/l**	**16.6 mg/l**	--	**14.6 mg/l**	**17.5 mg/l**	**17.9 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 8.0 mg/l	< 2.4 mg/l	--	< 2.4 * mg/l	< 2.4 * mg/l	< 2.4 * mg/l
Carbon, dissolved organic	NA	Lab	**2.8 mg/l**	**4.6 mg/l**	--	**3.8 mg/l**	**2.7 mg/l**	**2.4 mg/l**
Carbon, total organic	NA	Lab	**2.5 mg/l**	**4.0 mg/l**	--	**3.8 mg/l**	**2.4 mg/l**	**2.9 mg/l**
Chemical Oxygen Demand	NA	Lab	< 10.0 mg/l	**13.6 mg/l**	--	**10.3 mg/l**	**13.4 mg/l**	**12.6 mg/l**
Chloride	NA	Lab	< 0.50 mg/l	< 0.50 mg/l	--	< 0.50 mg/l	< 1.0 mg/l	< 1.0 mg/l
Cyanide	NA	Lab	< 0.0100 mg/l	**0.945 mg/l**	--	**0.0231 mg/l**	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**7.23 mg/l**	**6.85 mg/l**	--	**9.15 mg/l**	**6.08 mg/l**	--
Fluoride	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Hardness, total, as CaCO3	NA	Lab	**18.3 mg/l**	**16.7 mg/l**	--	**14.6 mg/l**	**17.5 mg/l**	**17.2 mg/l**
Nitrate + Nitrite, as N	NA	Lab	**0.18 mg/l**	**0.25 mg/l**	--	< 0.10 mg/l	**0.17 mg/l**	**0.16 mg/l**
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**6.7 pH units**	**6.3 pH units**	--	**6.4 pH units**	**6.0 pH units**	**6.7 pH units**
pH	NA	Field	**5.88 pH units**	**5.67 pH units**	--	**5.47 pH units**	**5.78 pH units**	--
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**366 mV**	**523 mV**	--	**635 mV**	**558 mV**	--
Solids, total dissolved	NA	Lab	**84.0 mg/l**	**51.0 mg/l**	--	**55.0 mg/l**	**64.0 mg/l**	**63.0 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**38.4 umhos/cm**	**23.2 umhos/cm**	--	**20.7 umhos/cm**	**34.4 umhos/cm**	--
Sulfate	NA	Lab	**2.8 mg/l**	**3.0 mg/l**	--	**3.4 mg/l**	**3.7 mg/l**	**3.8 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**8.01 deg C**	**5.37 deg C**	--	**6.18 deg C**	**10.56 deg C**	--
Turbidity	NA	Field	**3.9 NTU**	**3.1 NTU**	--	**1.7 NTU**	**0 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1459.19**	**1462.45**	--	**1461.85**	**1460.68**	--
Metals				--	--	--	--	--
Aluminum	Dissolved	Lab	**27.7 ug/l**	**71.0 ug/l**	--	**154 ug/l**	**33.3 b ug/l**	**31.4 b ug/l**
Aluminum	Total	Lab	**72.4 ug/l**	**135 ug/l**	--	**72.1 ug/l**	**114 b ug/l**	**120 b ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	Lab	< 0.50 ug/l	--	--	--	--	--
Arsenic III	Total	Lab	--	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	**20.0 ug/l**	**17.4 ug/l**	--	**16.2 ug/l**	**18.9 ug/l**	**20.0 ug/l**
Barium	Total	Lab	**20.5 ug/l**	**20.1 ug/l**	--	**17.1 ug/l**	**22.1 ug/l**	**21.6 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Boron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Boron	Total	Lab	< 50.0 ug/l	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**4300 ug/l**	**3900 ug/l**	--	**3400 ug/l**	**4100 ug/l**	**4000 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Chromium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Cobalt	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cobalt	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Copper	Dissolved	Lab	**1.7 b ug/l**	**1.7 ug/l**	--	**1.9 ug/l**	**1.4 b ug/l**	**1.9 b ug/l**
Copper	Total	Lab	**1.5 ug/l**	**1.7 ug/l**	--	**1.8 ug/l**	**1.9 b ug/l**	**2.2 b ug/l**
Iron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l
Iron	Total	Lab	**93.2 ug/l**	**92.9 ug/l**	--	**55.6 ug/l**	**125 b ug/l**	**126 b ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**1800 ug/l**	**1700 ug/l**	--	**1500 ug/l**	**1800 ug/l**	**1700 ug/l**
Manganese	Dissolved	Lab	**0.79 ug/l**	**0.78 ug/l**	--	**0.92 ug/l**	**1.6 b ug/l**	**0.92 b ug/l**
Manganese	Total	Lab	**1.5 ug/l**	**1.3 ug/l**	--	**1.3 ug/l**	**2.0 b ug/l**	**2.5 b ug/l**
Mercury	Total	Lab	**0.0018 ug/l**	**0.0040 b ug/l**	**0.0040 b ug/l**	**0.0034 ug/l**	**0.0022 ug/l**	**0.0021 ug/l**
Mercury methyl	Total	Lab	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	**0.00003 j ug/l**	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	< 0.20 ug/l	< 0.30 ug/l	--	**0.44 ug/l**	< 0.30 ug/l	< 0.30 ug/l
Molybdenum	Total	Lab	< 0.20 ug/l	< 0.30 ug/l	--	**0.48 ug/l**	< 0.30 ug/l	< 0.30 ug/l
Nickel	Dissolved	Lab	**0.69 b ug/l**	**0.81 ug/l**	--	**0.66 ug/l**	**0.62 ug/l**	**0.74 ug/l**
Nickel	Total	Lab	**0.92 ug/l**	**1.0 ug/l**	--	**0.77 ug/l**	**0.91 ug/l**	**0.91 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**330 ug/l**	**370 ug/l**	--	**250 ug/l**	**370 ug/l**	**310 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**1600 ug/l**	**1500 ug/l**	--	**1500 ug/l**	**1700 ug/l**	**1700 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**23.0 ug/l**	**22.1 ug/l**	--	**19.5 ug/l**	**23.7 ug/l**	**23.4 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	--	**0.81 ug/l**	< 0.017 ug/l	< 0.017 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	--	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	--	< 6.0 ug/l	< 6.0 ug/l	**11.9 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-014	GW-014	GW-014	GW-014	GW-014	GW-014
		Date	7/30/2010	9/2/2010	10/8/2010	4/27/2011	7/20/2011	10/7/2011
		Sample Type	N	N	N	N	N	N
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	317 mg/l	400 mg/l	507 mg/l	443 mg/l	450 mg/l	420 mg/l
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 20 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	317 mg/l	400 mg/l	507 mg/l	443 mg/l	450 mg/l	420 mg/l
Biochemical Oxygen Demand (5-day)	NA	Lab	9.7 mg/l	9.2 mg/l	3.8 mg/l	< 4 mg/l	8.1 mg/l	< 3 mg/l
Carbon, dissolved organic	NA	Lab	12.4 mg/l	19.3 mg/l	14.9 mg/l	12.3 mg/l	12.8 mg/l	12.8 mg/l
Carbon, total organic	NA	Lab	11.9 mg/l	15.3 mg/l	13.8 mg/l	12.0 mg/l	16.3 mg/l	12.1 mg/l
Chemical Oxygen Demand	NA	Lab	39.3 mg/l	80.6 mg/l	53.5 mg/l	31.8 mg/l	126 mg/l	51.1 mg/l
Chloride	NA	Lab	20.4 mg/l	20.2 mg/l	19.5 mg/l	16.9 mg/l	17.3 mg/l	16 mg/l
Cyanide	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	0.0226 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	3.58 mg/l	5.48 mg/l	2.4 mg/l	1.19 mg/l	3.2 mg/l	4.3 mg/l
Fluoride	NA	Lab	< 0.1 mg/l	0.4 mg/l	0.42 mg/l	0.37 mg/l	0.44 mg/l	0.41 mg/l
Hardness, total, as CaCO3	NA	Lab	631 mg/l	772 mg/l	515 mg/l	500 mg/l	1220 mg/l	432 mg/l
Nitrate + Nitrite, as N	NA	Lab	0.51 mg/l	< 0.1 mg/l	< 0.1 mg/l	0.11 mg/l	0.21 mg/l	0.11 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	0.3 mg/l	0.07 mg/l	0.09 mg/l	0.11 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	7.7 pH units	7.4 pH units	7.3 pH units	--	7.0 pH units	7.0 pH units
pH	NA	Field	7.01 pH units	6.87 pH units	6.9 pH units	6.94 pH units	6.5 pH units	6.1 pH units
Phosphorus, total	NA	Lab	2.78 mg P/L	3.81 mg P/L	0.2 mg P/L	0.54 mg P/L	10.6 mg P/L	1.13 mg P/L
Redox (oxidation potential)	NA	Field	143 mV	3.7 mV	127 mV	208 mV	459 mV	423 mV
Solids, total dissolved	NA	Lab	651 mg/l	578 mg/l	653 mg/l	617 mg/l	632 mg/l	554 mg/l
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	505 umhos/cm	1018 umhos/cm	1022 umhos/cm	1001 umhos/cm	960 umhos/cm	966 umhos/cm
Sulfate	NA	Lab	211 mg/l	129 mg/l	75.2 mg/l	77.9 mg/l	83.9 mg/l	61.2 mg/l
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	11.03 deg C	8.75 deg C	14.9 deg C	3.61 deg C	9.2 deg C	11.3 deg C
Turbidity	NA	Field	530 NTU	1000 > NTU	64 NTU	223 NTU	2458.0 NTU	370.7 NTU
Water Elevation, ft/MSL	NA	Field	1445.2	1446.72	1447.3	1447.74	1446.64	1445.86
Metals								
Aluminum	Dissolved	Lab	232 ug/l	147 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	63700 ug/l	69600 ug/l	3030 ug/l	6080 ug/l	134000 ug/l	16700 ug/l
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	1.85 ug/l	0.98 ug/l	0.7 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 1 ug/l	1.59 ug/l	1.14 ug/l	1.08 ug/l	4.99 ug/l	1.22 ug/l
Arsenic	Total	Lab	4.66 ug/l	9.83 ug/l	1.52 ug/l	1.28 ug/l	26.6 ug/l	2.7 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	--	--	--	128 ug/l 126 ug/l	200 ug/l	169 ug/l
Barium	Total	Lab	474 ug/l	647 ug/l	145 ug/l	184 ug/l	1520 ug/l	320 ug/l
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	1.12 ug/l	2.25 ug/l	< 0.2 ug/l	0.21 ug/l	5.43 ug/l	0.42 ug/l
Boron	Dissolved	Lab	--	--	--	--	196 ug/l	199 ug/l
Boron	Total	Lab	< 200 ug/l	169 ug/l	215 ug/l	183 ug/l	< 500 ug/l	218 ug/l
Cadmium	Dissolved	Lab	< 0.2 ug/l	1.1 ug/l	< 0.2 ug/l	< 0.2 ug/l	0.04 j ug/l	< 0.2 ug/l
Cadmium	Total	Lab	0.56 ug/l	1.98 ug/l	< 0.2 ug/l	< 0.2 ug/l	4.57 ug/l	0.52 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	129000 ug/l	156000 ug/l	99100 ug/l	100000 ug/l	252000 ug/l	87600 ug/l
Chromium	Dissolved	Lab	2.86 ug/l	1.96 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	194 ug/l	356 ug/l	10.3 ug/l	22.6 ug/l	1000 ug/l	56.9 ug/l
Cobalt	Dissolved	Lab	--	--	--	1.04 ug/l 0.96 ug/l	5.0 ug/l	1.37 ug/l
Cobalt	Total	Lab	25.6 ug/l	62.7 ug/l	3.48 ug/l	5.53 ug/l	215 ug/l	10.9 ug/l
Copper	Dissolved	Lab	5.81 ug/l	5.48 ug/l	1.2 ug/l	0.89 ug/l	0.52 j ug/l	1.75 ug/l
Copper	Total	Lab	141 ug/l	178 ug/l	9.64 ug/l	19.3 ug/l	545 ug/l	35.8 ug/l
Iron	Dissolved	Lab	2150 ug/l	3500 ug/l	4770 ug/l	10800 ug/l	2920 ug/l	7300 ug/l
Iron	Total	Lab	87300 ug/l	103000 ug/l	8200 ug/l	19000 ug/l	228000 ug/l	28300 ug/l
Lead	Dissolved	Lab	--	--	--	< 0.5 ug/l < 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Lead	Total	Lab	17.5 ug/l	27.4 ug/l	1.02 ug/l	2.86 ug/l	78.4 ug/l	7.52 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	75100 ug/l	93000 ug/l	65000 ug/l	60800 ug/l	144000 ug/l	51700 ug/l
Manganese	Dissolved	Lab	1750 ug/l	1610 ug/l	1920 ug/l	1810 ug/l	1940 ug/l	1440 ug/l
Manganese	Total	Lab	2600 ug/l	3620 ug/l	1980 ug/l	2050 ug/l	6720 ug/l	1800 ug/l
Mercury	Total	Lab	0.0197 ug/l	0.0302 ug/l	0.0018 ug/l	0.0038 ug/l	0.102 ug/l	0.0097 ug/l
Mercury methyl	Total	Lab	< 0.0001 ug/l	0.00023 ug/l	0.00044 ug/l	0.00014 ug/l	0.00035 ug/l	0.00014 ug/l
Molybdenum	Dissolved	Lab	35.8 ug/l	59 ug/l	40.8 ug/l	16.2 ug/l	53 ug/l	15.5 ug/l
Molybdenum	Total	Lab	45.2 ug/l	90.1 ug/l	41.6 ug/l	15.8 ug/l	130 ug/l	21.7 ug/l
Nickel	Dissolved	Lab	7.83 ug/l	6.94 ug/l	4.45 ug/l	1.61 ug/l	11.2 ug/l	2.07 ug/l
Nickel	Total	Lab	90 ug/l	220 ug/l	12.1 ug/l	17.6 ug/l	620 ug/l	37.9 ug/l
Palladium	Total	Lab	0.85 ug/l	1.71 ug/l	< 0.5 ug/l	< 0.5 ug/l	5.72 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	11000 ug/l	12700 ug/l	5610 ug/l	4400 ug/l	17200 ug/l	5630 ug/l
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	0.47 j ug/l	< 1 ug/l
Selenium	Total	Lab	1.02 ug/l	1.44 ug/l	< 1 ug/l	< 1 ug/l	6.49 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.2 ug/l	0.4 ug/l	< 0.2 ug/l	< 0.2 ug/l	1.05 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	56800 ug/l	57600 ug/l	60700 ug/l	60100 ug/l	79400 ug/l	59100 ug/l
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	549 ug/l	674 ug/l	354 ug/l	386 ug/l	1230 ug/l	408 ug/l
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	0.45 ug/l	< 0.2 ug/l	< 0.2 ug/l	1.15 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	4400 ug/l	5300 ug/l	150 ug/l	345 ug/l	5560 ug/l	1000 ug/l
Zinc	Dissolved	Lab	21.8 ug/l	37.2 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	9.12 b ug/l
Zinc	Total	Lab	137 ug/l	231 ug/l	9.16 ug/l	16.7 ug/l	610 ug/l	42.1 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-014	GW-014	GW014	GW014		GW014
		Date	4/12/2012	7/23/2012	10/4/2012	4/4/2013		7/18/2013
		Sample Type	N	N	N	N	FD	N
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**413 mg/l**	**380 mg/l**	**397 mg/l**	**379 mg/l**	--	**346 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	--	< 20.0 mg/l
Alkalinity, total	NA	Lab	**413 mg/l**	**380 mg/l**	**397 mg/l**	**387 mg/l**	--	**346 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 4.0 mg/l	< 4.0 mg/l	< 8.0 mg/l	< 4.0 mg/l	--	**4.3 mg/l**
Carbon, dissolved organic	NA	Lab	**9.9 mg/l**	**9.4 mg/l**	**10 mg/l**	**10 mg/l**	--	**9.1 mg/l**
Carbon, total organic	NA	Lab	**10.1 mg/l**	**9.3 mg/l**	**9.9 mg/l**	**9.1 mg/l**	--	**9.3 mg/l**
Chemical Oxygen Demand	NA	Lab	**36.4 mg/l**	**23.7 mg/l**	**31.9 mg/l**	**33.2 mg/l**	--	**40.2 mg/l**
Chloride	NA	Lab	**16.5 mg/l**	**18.1 mg/l**	**16.3 mg/l**	**16.0 mg/l**	--	**16.2 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	**0.0149 mg/l**	< 0.0100 mg/l	--	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**6.19 mg/l**	**3.98 mg/l**	**9.81 mg/l**	**0.16 mg/l**	--	**5.94 mg/l**
Fluoride	NA	Lab	**0.36 mg/l**	**0.32 mg/l**	**0.52 mg/l**	**0.32 mg/l**	--	**0.51 mg/l**
Hardness, total, as CaCO3	NA	Lab	**427 mg/l**	**433 mg/l**	**389 mg/l**	**411 mg/l**	--	**349 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.080 mg/l**	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	**0.19 b mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.8 pH units**	**7.2 pH units**	**7.2 pH units**	**7.4 pH units**	--	**7.0 pH units**
pH	NA	Field	**6.72 pH units**	**6.58 pH units**	**7.24 pH units**	**6.7 pH units**	--	**6.71 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	**0.12 mg/l**	--	**0.14 mg/l**
Redox (oxidation potential)	NA	Field	**320 mV**	**185 mV**	**245 mV**	**174 mV**	--	**535 mV**
Solids, total dissolved	NA	Lab	**566 mg/l**	**560 mg/l**	**591 mg/l**	**588 mg/l**	--	**534 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**949.8 umhos/cm**	**998.1 umhos/cm**	**934.3 umhos/cm**	**953.4 umhos/cm**	--	**937.2 umhos/cm**
Sulfate	NA	Lab	**75.3 mg/l**	**103 mg/l**	**84.8 mg/l**	**103 mg/l**	--	**119 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**15.4 deg C**	**19.11 deg C**	**12.23 deg C**	**4.72 deg C**	--	**25.98 deg C**
Turbidity	NA	Field	**37.5 NTU**	**26 NTU**	**73.5 NTU**	**43.9 NTU**	--	**83.4 NTU**
Water Elevation, ft/MSL	NA	Field	**1447.01**	**1445.96**	**1445.79**	**1445.45**	--	**1446.93**
Metals						--	--	--
Aluminum	Dissolved	Lab	< 20.0 ug/l	**33.8 ug/l**	**33.9 ug/l**	**22.0 ug/l**	--	< 20.0 ug/l
Aluminum	Total	Lab	**1080 ug/l**	**582 ug/l**	**877 ug/l**	**2010 ug/l**	--	**2410 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 5.0 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Arsenic	Total	Lab	< 5.0 ug/l	**0.60 ug/l**	**0.60 ug/l**	--	--	--
Arsenic III	Total	Lab	--	--	--	**0.67 ug/l**	--	**1.0 ug/l**
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	--	**168 ug/l**	**155 ug/l**	**163 ug/l**	--	**162 ug/l**
Barium	Total	Lab	**154 ug/l**	**185 ug/l**	**171 ug/l**	**213 ug/l**	--	**194 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 2.0 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Boron	Dissolved	Lab	**180 ug/l**	**199 ug/l**	**209 ug/l**	**177 ug/l**	--	**192 ug/l**
Boron	Total	Lab	**192 ug/l**	**196 ug/l**	**210 ug/l**	**183 ug/l**	--	**189 ug/l**
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Cadmium	Total	Lab	< 2.0 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**90200 ug/l**	**92600 ug/l**	**80200 ug/l**	**87400 ug/l**	--	**71300 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l
Chromium	Total	Lab	< 10.0 ug/l	**1.5 ug/l**	**4.2 ug/l**	**7.2 ug/l**	--	**8.7 ug/l**
Cobalt	Dissolved	Lab	--	**1.5 ug/l**	**1.2 ug/l**	**1.2 ug/l**	--	**1.3 ug/l**
Cobalt	Total	Lab	**2.2 ug/l**	**1.8 ug/l**	**1.8 ug/l**	**2.5 ug/l**	--	**2.8 ug/l**
Copper	Dissolved	Lab	**1.5 ug/l**	**1.5 ug/l**	**5.7 ug/l**	**0.74 ug/l**	--	**1.0 ug/l**
Copper	Total	Lab	**5.6 ug/l**	**4.1 ug/l**	**8.6 ug/l**	**6.7 ug/l**	--	**6.4 ug/l**
Iron	Dissolved	Lab	**5760 ug/l**	**8470 ug/l**	**53.3 ug/l**	**10300 ug/l**	--	< 50.0 ug/l
Iron	Total	Lab	**8410 ug/l**	**11900 ug/l**	**5130 ug/l**	**15700 ug/l**	--	**5750 ug/l**
Lead	Dissolved	Lab	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Lead	Total	Lab	< 5.0 ug/l	< 0.50 ug/l	**0.76 ug/l**	**0.76 ug/l**	--	**1.1 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**49100 ug/l**	**48900 ug/l**	**45800 ug/l**	**46900 ug/l**	--	**41400 ug/l**
Manganese	Dissolved	Lab	**1660 ug/l**	**1700 ug/l**	**1380 ug/l**	**1550 ug/l**	--	**1200 ug/l**
Manganese	Total	Lab	**1700 ug/l**	**1710 ug/l**	**1440 ug/l**	**1750 ug/l**	--	**1190 ug/l**
Mercury	Total	Lab	**0.00081 ug/l**	**0.00094 ug/l**	**0.0015 ug/l**	**0.0016 ug/l**	**0.0015 ug/l**	**0.0021 b ug/l**
Mercury methyl	Total	Lab	< 0.0001 ug/l	--	**0.00006 jb ug/l**	**0.00003 j ug/l**	**0.00004 j ug/l**	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	**12.2 ug/l**	**9.5 ug/l**	**10.3 ug/l**	**8.6 ug/l**	--	**29.9 ug/l**
Molybdenum	Total	Lab	**11.5 ug/l**	**9.8 ug/l**	**11.0 ug/l**	**9.8 ug/l**	--	**29.9 ug/l**
Nickel	Dissolved	Lab	**1.3 ug/l**	**1.4 ug/l**	**1.1 ug/l**	**0.82 ug/l**	--	**2.6 ug/l**
Nickel	Total	Lab	< 5.0 ug/l	**2.6 ug/l**	**3.4 ug/l**	**5.7 ug/l**	--	**8.8 ug/l**
Palladium	Total	Lab	< 5.0 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 5.0 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**3000 ug/l**	**3200 ug/l**	**3700 ug/l**	**2700 ug/l**	--	**3000 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l
Selenium	Total	Lab	< 10.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Silver	Total	Lab	< 2.0 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**56400 ug/l**	**55700 ug/l**	**67700 ug/l**	**54900 ug/l**	--	**73900 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**352 ug/l**	**349 ug/l**	**338 ug/l**	**351 ug/l**	--	**291 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 2.0 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	< 0.017 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	**63.6 ug/l**	**37.2 ug/l**	**44.8 ug/l**	**99.0 ug/l**	--	**153 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	< 6.0 ug/l
Zinc	Total	Lab	< 60.0 ug/l	< 6.0 ug/l	**7.9 ug/l**	**6.4 ug/l**	--	**10 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW014	GW-015	GW-015	GW-015	GW-015
		Date	10/14/2013	7/30/2010	9/2/2010	10/8/2010	5/2/2011
		Sample Type	N	N	N	N	N
	Fraction	Analysis Location					
General Parameters							
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**328 mg/l**	**118 mg/l**	**107 mg/l**	**109 mg/l**	**107 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20.0 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l
Alkalinity, total	NA	Lab	**328 mg/l**	**118 mg/l**	**107 mg/l**	**109 mg/l**	**107 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	**3.2 mg/l**	< 2.4 mg/l	< 2.4 mg/l	< 3 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**12.3 mg/l**	**3.6 mg/l**	**3.3 mg/l**	**3.1 mg/l**	**3.5 mg/l**
Carbon, total organic	NA	Lab	**11.5 mg/l**	**3.7 mg/l**	**2.7 mg/l**	**2.7 mg/l**	**2.8 mg/l**
Chemical Oxygen Demand	NA	Lab	**44.7 b mg/l**	< 10 mg/l	**15.7 mg/l**	**16.2 mg/l**	< 10 mg/l
Chloride	NA	Lab	**9.1 mg/l**	**4.8 mg/l**	**1.15 mg/l**	**1.01 mg/l**	**0.58 mg/l**
Cyanide	NA	Lab	**0.0234 mg/l**	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**4.59 mg/l**	**0 mg/l**	**0.43 mg/l**	**0.75 mg/l**	**1.54 mg/l**
Fluoride	NA	Lab	**0.86 mg/l**	**0.2 b mg/l**	**0.22 mg/l**	**0.23 mg/l**	**0.19 mg/l**
Hardness, total, as CaCO3	NA	Lab	**274 mg/l**	**162 mg/l**	**128 mg/l**	**126 mg/l**	**118 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.11 mg/l**	**0.13 mg/l**	**0.08 mg/l**	**0.08 mg/l**	**0.11 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--
pH	NA	Lab	**7.3 pH units**	**7.9 pH units**	**7.7 pH units**	**7.6 pH units**	--
pH	NA	Field	**7.12 pH units**	**7.60 pH units**	**7.04 pH units**	**7.43 pH units**	**7.41 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	**0.15 mg P/L**	**0.43 mg P/L**	< 0.1 mg P/L	**0.19 mg P/L**
Redox (oxidation potential)	NA	Field	**436 mV**	**35 mV**	**429 mV**	**228 mV**	**472 mV**
Solids, total dissolved	NA	Lab	**421 mg/l**	**212 mg/l**	**124 mg/l**	**143 mg/l**	**151 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**707 umhos/cm**	**312 umhos/cm**	**226 umhos/cm**	**227 umhos/cm**	**199.1 umhos/cm**
Sulfate	NA	Lab	**37.4 mg/l**	**38.6 mg/l**	**11.9 mg/l**	**12.5 mg/l**	**7.13 mg/l**
Sulfide	NA	Lab	--	--	--	--	--
Temperature, degrees C	NA	Field	**11.37 deg C**	**8.69 deg C**	**8.77 deg C**	**7.2 deg C**	**6.1 deg C**
Turbidity	NA	Field	**12.6 NTU**	**66 NTU**	**92 NTU**	**303 NTU**	**161.7 NTU**
Water Elevation, ft/MSL	NA	Field	**1446.58**	**1415.87**	**1416.77**	**1417.23**	--
Metals			--				
Aluminum	Dissolved	Lab	< 20.0 ug/l	**72.4 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l
Aluminum	Total	Lab	**1100 ug/l**	**2690 ug/l**	**2820 ug/l**	**1060 ug/l**	**4870 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	**1 ug/l**
Arsenic	Total	Lab	--	< 1 ug/l	**1.19 ug/l**	**1.29 ug/l**	< 1 ug/l
Arsenic III	Total	Lab	< 0.50 ug/l	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--
Barium	Dissolved	Lab	**60.1 ug/l**	--	--	--	**146 ug/l** **151 ug/l**
Barium	Total	Lab	**77.3 ug/l**	**258 ug/l**	**160 ug/l**	**173 ug/l**	**237 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Dissolved	Lab	**267 ug/l**	--	--	--	--
Boron	Total	Lab	**278 ug/l**	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	**0.26 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--
Calcium	Total	Lab	**47400 ug/l**	**38700 ug/l**	**30500 ug/l**	**30300 ug/l**	**27200 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	**1.04 ug/l**	< 1 ug/l	< 1 ug/l	< 1 ug/l
Chromium	Total	Lab	**4.7 ug/l**	**6.66 ug/l**	**8.13 ug/l**	**2.47 ug/l**	**9.1 ug/l**
Cobalt	Dissolved	Lab	**0.58 ug/l**	--	--	--	< 0.2 ug/l < 0.2 ug/l
Cobalt	Total	Lab	**1.3 ug/l**	**2.25 ug/l**	**2.66 ug/l**	**1.1 ug/l**	**3.52 ug/l**
Copper	Dissolved	Lab	**1.9 ug/l**	**6.49 ug/l**	**3.63 ug/l**	**6.18 ug/l**	< 0.7 ug/l
Copper	Total	Lab	**5.2 ug/l**	**13.7 ug/l**	**14 ug/l**	**6.46 ug/l**	**21.7 ug/l**
Iron	Dissolved	Lab	**1050 ug/l**	**89.6 ug/l**	< 50 ug/l	< 50 ug/l	**62.1 ug/l**
Iron	Total	Lab	**2410 ug/l**	**3230 ug/l**	**3820 ug/l**	**1420 ug/l**	**5800 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	--	--	--	< 0.5 ug/l < 0.5 ug/l
Lead	Total	Lab	**0.56 ug/l**	**1.3 ug/l**	**1.33 ug/l**	**0.56 ug/l**	**2.24 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--
Magnesium	Total	Lab	**37700 ug/l**	**16000 ug/l**	**12500 ug/l**	**12300 ug/l**	**12300 ug/l**
Manganese	Dissolved	Lab	**877 ug/l**	**294 ug/l**	**464 ug/l**	**491 ug/l**	**541 ug/l**
Manganese	Total	Lab	**864 ug/l**	**730 ug/l**	**541 ug/l**	**575 ug/l**	**602 ug/l**
Mercury	Total	Lab	**0.0061 ug/l**	**0.0014 ug/l**	**0.0026 ug/l**	**0.0015 ug/l**	**0.0016 ug/l**
Mercury methyl	Total	Lab	**0.00011 b ug/l**	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**10.8 ug/l**	**3.28 ug/l**	**10.5 ug/l**	**16.6 ug/l**	**5.76 ug/l**
Molybdenum	Total	Lab	**10.7 ug/l**	**8.4 ug/l**	**10.7 ug/l**	**17.1 ug/l**	**5.9 ug/l**
Nickel	Dissolved	Lab	**1.0 ug/l**	**1.6 ug/l**	**1.28 ug/l**	**1.23 ug/l**	**0.65 ug/l**
Nickel	Total	Lab	**4.2 ug/l**	**7.9 ug/l**	**9.22 ug/l**	**3.97 ug/l**	**11.4 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--
Potassium	Total	Lab	**2400 ug/l**	**2430 ug/l**	**2040 ug/l**	**1860 ug/l**	**2410 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Selenium	Total	Lab	< 1.0 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Silica	Total	Lab	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Silver	Total	Lab	< 0.20 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--
Sodium	Total	Lab	**73400 ug/l**	**9760 ug/l**	**5300 ug/l**	**6420 ug/l**	**6030 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--
Strontium	Total	Lab	**230 ug/l**	**275 ug/l**	**208 ug/l**	**235 ug/l**	**263 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--
Thallium	Total	Lab	**0.20 ug/l**	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--
Titanium	Total	Lab	**54.5 ug/l**	**230 ug/l**	**240 ug/l**	**72 ug/l**	**281 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	**12.1 ug/l**	**17.8 ug/l**	< 6 ug/l	< 6 ug/l
Zinc	Total	Lab	< 6.0 ug/l	**11 ug/l**	**19.5 ug/l**	< 6 ug/l	**14.5 ug/l**

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-015		GW-015		GW-015	
		Date	7/22/2011		10/13/2011		4/12/2012	
		Sample Type	N	FD	N	FD	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**106 mg/l**	**106 mg/l**	**103 mg/l**	**104 mg/l**	**106 mg/l**	**105 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10.0 mg/l	< 10.0 mg/l
Alkalinity, total	NA	Lab	**106 mg/l**	**106 mg/l**	**103 mg/l**	**104 mg/l**	**106 mg/l**	**105 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l	< 2.4 mg/l
Carbon, dissolved organic	NA	Lab	**3.3 mg/l**	**3.3 mg/l**	**3.6 mg/l**	**3.6 mg/l**	**3.0 mg/l**	**3.1 mg/l**
Carbon, total organic	NA	Lab	**2.8 mg/l**	**2.7 mg/l**	**2.5 mg/l**	**2.6 mg/l**	**3.0 mg/l**	**2.8 mg/l**
Chemical Oxygen Demand	NA	Lab	**12.2 mg/l**	**11.6 mg/l**	**40.6 mg/l**	**40.6 mg/l**	**25.9 mg/l**	**22.8 mg/l**
Chloride	NA	Lab	**0.55 mg/l**	**0.55 mg/l**	< 0.5 mg/l	**0.61 mg/l**	< 0.50 mg/l	< 0.50 mg/l
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l
Dissolved oxygen	NA	Field	**2.9 mg/l**	--	**3.6 mg/l**	--	**1.48 mg/l**	--
Fluoride	NA	Lab	**0.2 mg/l**	**0.2 mg/l**	**0.2 mg/l**	**0.2 mg/l**	**0.20 mg/l**	**0.20 mg/l**
Hardness, total, as CaCO3	NA	Lab	**118 mg/l**	**117 mg/l**	**112 mg/l**	**114 mg/l**	**113 mg/l**	**116 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	**0.1 mg/l**	**0.080 mg/l**	**0.13 mg/l**
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.6 pH units**	**7.6 pH units**	**7.4 pH units**	**7.5 pH units**	**8.0 pH units**	**7.9 pH units**
pH	NA	Field	**7.2 pH units**	--	**7.2 pH units**	--	**7.45 pH units**	--
Phosphorus, total	NA	Lab	**0.1 mg P/L**	**0.11 mg P/L**	< 0.1 mg P/L	< 0.1 mg P/L	< 0.10 mg/l	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**417 mV**	--	**290 mV**	--	**329 mV**	--
Solids, total dissolved	NA	Lab	**167 mg/l**	**162 mg/l**	**134 mg/l**	**132 mg/l**	**161 mg/l**	**156 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**175 umhos/cm**	--	**222 umhos/cm**	--	**213.3 umhos/cm**	--
Sulfate	NA	Lab	**7.33 mg/l**	**7.32 mg/l**	**7.34 mg/l**	**7.58 mg/l**	**7.4 mg/l**	**7.5 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**6.9 deg C**	--	**7.5 deg C**	--	**7.47 deg C**	--
Turbidity	NA	Field	**92.4 NTU**	--	**56.9 NTU**	--	**0 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1416.93**	--	**1415.85**	--	**1417.14**	--
Metals								
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 20.0 ug/l	< 20.0 ug/l
Aluminum	Total	Lab	**2440 ug/l**	**2080 ug/l**	**1370 ug/l**	**1300 ug/l**	**52.0 ug/l**	**51.6 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 5.0 ug/l
Arsenic	Dissolved	Lab	**0.62 ug/l**	**0.71 ug/l**	**0.62 ug/l**	**0.78 ug/l**	**0.94 ug/l**	**0.90 ug/l**
Arsenic	Total	Lab	**0.99 ug/l**	**0.78 ug/l**	**1.2 ug/l**	**0.87 ug/l**	**0.99 ug/l**	< 5.0 ug/l
Arsenic III	Total	Lab	--	--	--	--	--	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	**150 ug/l**	**152 ug/l**	**168 ug/l**	**164 ug/l**	--	--
Barium	Total	Lab	**204 ug/l**	**200 ug/l**	**200 ug/l**	**196 ug/l**	**200 ug/l**	**209 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 2.0 ug/l
Boron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50.0 ug/l	< 50.0 ug/l
Boron	Total	Lab	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 50 ug/l	< 100 ug/l	< 100 ug/l
Cadmium	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 2.0 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**27400 ug/l**	**27300 ug/l**	**26300 ug/l**	**26500 ug/l**	**28000 ug/l**	**28700 ug/l**
Chromium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l
Chromium	Total	Lab	**5.14 ug/l**	**5.56 ug/l**	**3.58 ug/l**	**3.88 ug/l**	< 1.0 ug/l	< 10.0 ug/l
Cobalt	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	--
Cobalt	Total	Lab	**1.75 ug/l**	**1.65 ug/l**	**1.46 ug/l**	**1.42 ug/l**	**0.21 ug/l**	< 2.0 ug/l
Copper	Dissolved	Lab	< 0.7 ug/l	< 0.7 ug/l	**0.8 ug/l**	**0.73 ug/l**	**0.52 ug/l**	< 0.50 ug/l
Copper	Total	Lab	**10.1 ug/l**	**9.4 ug/l**	**9.13 ug/l**	**8.8 ug/l**	**0.66 ug/l**	< 5.0 ug/l
Iron	Dissolved	Lab	< 50 ug/l	< 50 ug/l	**65.5 ug/l**	**71.0 ug/l**	**121 ug/l**	**114 ug/l**
Iron	Total	Lab	**2640 ug/l**	**2330 ug/l**	**1830 ug/l**	**1860 ug/l**	**186 ug/l**	**188 ug/l**
Lead	Dissolved	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	--
Lead	Total	Lab	**2.03 ug/l**	**1.82 ug/l**	**1 ug/l**	**1.03 ug/l**	< 0.50 ug/l	< 5.0 ug/l
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**12000 ug/l**	**11900 ug/l**	**11300 ug/l**	**11500 ug/l**	**10500 ug/l**	**10700 ug/l**
Manganese	Dissolved	Lab	**527 ug/l**	**542 ug/l**	**553 ug/l**	**552 ug/l**	**617 ug/l**	**624 ug/l**
Manganese	Total	Lab	**588 ug/l**	**589 ug/l**	**578 ug/l**	**588 ug/l**	**639 ug/l**	**628 ug/l**
Mercury	Total	Lab	**0.0017 b ug/l**	**0.0017 b ug/l**	**0.0011 ug/l**	**0.0012 ug/l**	< 0.00050 ug/l	< 0.00050 ug/l
Mercury methyl	Total	Lab	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l	< 0.0001 ug/l
Molybdenum	Dissolved	Lab	**4.48 ug/l**	**4.56 ug/l**	**4.29 ug/l**	**4.16 ug/l**	**2.7 ug/l**	**2.7 ug/l**
Molybdenum	Total	Lab	**4.43 ug/l**	**4.48 ug/l**	**4.18 ug/l**	**4.13 ug/l**	**2.5 ug/l**	**3.6 ug/l**
Nickel	Dissolved	Lab	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Total	Lab	**5.61 ug/l**	**5.24 ug/l**	**4.56 ug/l**	**4.38 ug/l**	< 0.50 ug/l	< 5.0 ug/l
Palladium	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 5.0 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.50 ug/l	< 5.0 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**1800 ug/l**	**1720 ug/l**	**1640 ug/l**	**1620 ug/l**	**1300 ug/l**	**1400 ug/l**
Selenium	Dissolved	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 1.0 ug/l
Selenium	Total	Lab	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1.0 ug/l	< 10.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 0.20 ug/l
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 2.0 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**4730 ug/l**	**4780 ug/l**	**3620 ug/l**	**3630 ug/l**	**3500 ug/l**	**3600 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**248 ug/l**	**247 ug/l**	**231 ug/l**	**232 ug/l**	**248 ug/l**	**252 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.20 ug/l	< 2.0 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	**99 ug/l**	**87 ug/l**	**84 ug/l**	**84 ug/l**	< 20.0 ug/l	< 20.0 ug/l
Zinc	Dissolved	Lab	< 6 ug/l	< 6 ug/l	**6.83 ug/l**	**9.83 ug/l**	< 6.0 ug/l	< 6.0 ug/l
Zinc	Total	Lab	**8.99 ug/l**	**9.83 ug/l**	**7.77 ug/l**	**7.34 ug/l**	< 6.0 ug/l	< 60.0 ug/l

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW-015		GW015		GW015	
		Date	7/25/2012		10/4/2012		5/6/2013	
		Sample Type	N	FD	N	FD	N	FD
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**116 mg/l**	**98.0 mg/l**	**133 mg/l**	**135 mg/l**	**105 mg/l**	--
Alkalinity, carbonate, as CaCO3	NA	Lab	< 20.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	< 20.0 mg/l	< 10.0 mg/l	--
Alkalinity, total	NA	Lab	**116 mg/l**	**98.0 mg/l**	**133 mg/l**	**135 mg/l**	**105 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	Lab	< 4.0 mg/l	< 4.0 mg/l	< 8.0 mg/l	< 8.0 mg/l	< 2.4 mg/l	--
Carbon, dissolved organic	NA	Lab	**2.5 mg/l**	**2.0 mg/l**	**2.3 mg/l**	**2.4 mg/l**	**2.5 mg/l**	--
Carbon, total organic	NA	Lab	**2.0 mg/l**	**1.9 mg/l**	**2.0 mg/l**	**2.1 mg/l**	**1.9 mg/l**	--
Chemical Oxygen Demand	NA	Lab	**10.8 mg/l**	**13.7 mg/l**	**11.4 mg/l**	< 10.0 mg/l	< 10.0 mg/l	--
Chloride	NA	Lab	**0.61 mg/l**	< 0.50 mg/l	**0.62 mg/l**	**0.58 mg/l**	**0.65 mg/l**	--
Cyanide	NA	Lab	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	< 0.0100 mg/l	--
Dissolved oxygen	NA	Field	**2.65 mg/l**	--	**1.5 mg/l**	--	< 0.1 mg/l	--
Fluoride	NA	Lab	**0.18 mg/l**	**0.18 mg/l**	**0.20 mg/l**	**0.20 mg/l**	**0.20 mg/l**	--
Hardness, total, as CaCO3	NA	Lab	**108 mg/l**	**107 mg/l**	**111 mg/l**	**110 mg/l**	**108 mg/l**	--
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	**0.28 mg/l**	--
Nitrogen, ammonia (NH3), as N	NA	Lab	< 0.10 mg/l	**< 0.10 mg/l**	< 0.10 mg/l	< 0.10 mg/l	**0.11 mg/l**	--
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.5 pH units**	**7.6 pH units**	**7.6 pH units**	**7.8 pH units**	**7.7 pH units**	--
pH	NA	Field	**7.35 pH units**	--	**7.28 pH units**	--	**7.31 pH units**	--
Phosphorus, total	NA	Lab	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Redox (oxidation potential)	NA	Field	**225 mV**	--	**151 mV**	--	**262 mV**	--
Solids, total dissolved	NA	Lab	**226 mg/l**	**236 mg/l**	**161 mg/l**	**204 mg/l**	**158 mg/l**	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**207.9 umhos/cm**	--	**216.6 umhos/cm**	--	**200.5 umhos/cm**	--
Sulfate	NA	Lab	**8.1 mg/l**	**7.9 mg/l**	**7.6 mg/l**	**7.4 mg/l**	**7.6 mg/l**	--
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**8.92 deg C**	--	**7.09 deg C**	--	**7.95 deg C**	--
Turbidity	NA	Field	**0 NTU**	--	**0 NTU**	--	**0.1 NTU**	--
Water Elevation, ft/MSL	NA	Field	**1417.2**	--	**1416.43**	--	**1417.84**	--
Metals							--	--
Aluminum	Dissolved	Lab	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	--
Aluminum	Total	Lab	**21.9 ug/l**	**22.0 ug/l**	**81.5 ug/l**	**74.9 ug/l**	**102 ug/l**	--
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Dissolved	Lab	**0.92 ug/l**	**1.3 ug/l**	**1.1 ug/l**	**1.1 ug/l**	**0.85 ug/l**	--
Arsenic	Total	Lab	**0.81 ug/l**	0.96 ug/l	**1.3 ug/l**	**1.1 ug/l**	--	--
Arsenic III	Total	Lab	--	--	--	--	< 0.50 ug/l	--
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	**201 ug/l**	205 ug/l	**211 ug/l**	**220 ug/l**	**236 ug/l**	--
Barium	Total	Lab	**198 ug/l**	**199 ug/l**	**207 ug/l**	**206 ug/l**	**216 ug/l**	--
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Boron	Dissolved	Lab	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	--
Boron	Total	Lab	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	< 50.0 ug/l	--
Cadmium	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Cadmium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**25800 ug/l**	**25600 ug/l**	**26400 ug/l**	**26300 ug/l**	**25000 ug/l**	--
Chromium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Chromium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Cobalt	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Cobalt	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	**0.24 ug/l**	**0.23 ug/l**	**0.21 ug/l**	--
Copper	Dissolved	Lab	**0.60 ug/l**	0.60 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.86 ug/l**	--
Copper	Total	Lab	**0.56 b ug/l**	0.65 b ug/l	**1.1 ug/l**	**0.83 ug/l**	**0.99 ug/l**	--
Iron	Dissolved	Lab	**130 ug/l**	**150 ug/l**	**141 ug/l**	**159 ug/l**	**105 ug/l**	--
Iron	Total	Lab	**163 ug/l**	**161 ug/l**	**249 ug/l**	**240 ug/l**	**210 ug/l**	--
Lead	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**10500 ug/l**	**10600 ug/l**	**10900 ug/l**	**10800 ug/l**	**11000 ug/l**	--
Manganese	Dissolved	Lab	**603 ug/l**	**607 ug/l**	**592 ug/l**	**611 ug/l**	**744 ug/l**	--
Manganese	Total	Lab	**616 ug/l**	**623 ug/l**	**585 ug/l**	**587 ug/l**	**634 ug/l**	--
Mercury	Total	Lab	< 0.00050 ug/l	0.00086 ug/l	**0.00066 ug/l**	< 0.00050 ug/l	< 0.00050 ug/l	< 0.00050 ug/l
Mercury methyl	Total	Lab	--	--	< 0.00003 ug/l	**0.00005 jb ug/l**	< 0.00003 ug/l	< 0.00003 ug/l
Molybdenum	Dissolved	Lab	**2.7 ug/l**	**2.4 ug/l**	**3.1 ug/l**	**3.2 ug/l**	**2.3 ug/l**	--
Molybdenum	Total	Lab	**2.3 ug/l**	**2.4 ug/l**	**3.2 ug/l**	**3.1 ug/l**	**2.1 ug/l**	--
Nickel	Dissolved	Lab	< 0.50 ug/l	0.52 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.62 ug/l**	--
Nickel	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	**0.65 ug/l**	**0.59 ug/l**	**0.57 ug/l**	--
Palladium	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**1400 ug/l**	**1400 ug/l**	**1400 ug/l**	**1400 ug/l**	**1400 ug/l**	--
Selenium	Dissolved	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Silver	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**3300 ug/l**	**3300 ug/l**	**3900 ug/l**	**3800 ug/l**	**3300 ug/l**	--
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**238 ug/l**	**236 ug/l**	**255 ug/l**	**255 ug/l**	**253 ug/l**	--
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	< 10.0 ug/l	**11.1 ug/l**	--
Zinc	Dissolved	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--
Zinc	Total	Lab	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--

Large Table 3
Groundwater Data Summary
Plant Site - Surficial Aquifer

		Location	GW015		GW015	GW016		GW016
		Date	7/9/2013		10/16/2013	8/21/2013		10/14/2013
		Sample Type	N	FD	N	N	FD	N
	Fraction	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**104 mg/l**	--	**103 mg/l**	**32.9 mg/l**	--	**63.8 mg/l**
Alkalinity, carbonate, as CaCO3	NA	Lab	< 10.0 mg/l	--	< 10.0 mg/l	< 10.0 mg/l	--	< 10.0 mg/l
Alkalinity, total	NA	Lab	**104 mg/l**	--	**103 mg/l**	**32.9 mg/l**	--	**63.8 mg/l**
Biochemical Oxygen Demand (5-day)	NA	Lab	< 2.4 * mg/l	--	< 2.4 * mg/l	**4.3 mg/l**	--	**13.0 * mg/l**
Carbon, dissolved organic	NA	Lab	**2.7 mg/l**	--	**2.2 mg/l**	**8.9 mg/l**	--	**20.7 mg/l**
Carbon, total organic	NA	Lab	**2.5 mg/l**	--	**2.0 mg/l**	**6.4 mg/l**	--	**20.4 mg/l**
Chemical Oxygen Demand	NA	Lab	**12.3 mg/l**	--	**11.2 mg/l**	**31.6 mg/l**	--	**89.7 b mg/l**
Chloride	NA	Lab	**0.59 mg/l**	--	< 1.0 mg/l	**1.4 mg/l**	--	**2.4 mg/l**
Cyanide	NA	Lab	< 0.0100 mg/l	--	< 0.0100 mg/l	**0.0211 mg/l**	--	**0.0134 mg/l**
Dissolved oxygen	NA	Field	< 0.1 mg/l	--	< 0.1 mg/l	**5.75 mg/l**	--	**5.5 mg/l**
Fluoride	NA	Lab	**0.18 mg/l**	--	**0.21 mg/l**	**0.13 mg/l**	--	**0.26 mg/l**
Hardness, total, as CaCO3	NA	Lab	**106 mg/l**	--	**107 mg/l**	**32.3 mg/l**	--	**64.7 mg/l**
Nitrate + Nitrite, as N	NA	Lab	< 0.10 mg/l	--	< 0.10 mg/l	**0.16 mg/l**	--	< 0.10 mg/l
Nitrogen, ammonia (NH3), as N	NA	Lab	**0.19 mg/l**	--	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l
Nitrogen, Nitrate as N	NA	Lab	--	--	--	--	--	--
Nitrogen, Nitrite as N	NA	Lab	--	--	--	--	--	--
Orthophosphate, as PO4	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.6 pH units**	--	**7.1 pH units**	**7.5 pH units**	--	**6.8 pH units**
pH	NA	Field	**7.39 pH units**	--	**7.47 pH units**	**6.37 pH units**	--	**6.72 pH units**
Phosphorus, total	NA	Lab	< 0.10 mg/l	--	< 0.10 mg/l	< 0.10 mg/l	--	< 0.10 mg/l
Redox (oxidation potential)	NA	Field	**328 mV**	--	**250 mV**	**228 mV**	--	**469 mV**
Solids, total dissolved	NA	Lab	**166 mg/l**	--	**156 mg/l**	**97.0 mg/l**	--	**126 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Lab	--	--	--	**92 umhos/cm**	--	--
Specific Conductance @ 25oC	NA	Field	**203.5 umhos/cm**	--	**205.1 umhos/cm**	--	--	**157 umhos/cm**
Sulfate	NA	Lab	**7.4 mg/l**	--	**8.1 mg/l**	**6.4 mg/l**	--	**6.8 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**8.18 deg C**	--	**7.52 deg C**	**12.85 deg C**	--	**10.7 deg C**
Turbidity	NA	Field	**2.8 NTU**	--	**0 NTU**	**28.4 NTU**	--	**59.1 NTU**
Water Elevation, ft/MSL	NA	Field	**1417.55**	--	**1417.18**	**1448.25**	--	**1448.31**
Metals			--	--	--	--	--	--
Aluminum	Dissolved	Lab	< 20.0 ug/l	--	**89.9 b ug/l**	**47.0 ug/l**	--	< 20.0 ug/l
Aluminum	Total	Lab	**30.4 ug/l**	--	< 20.0 ug/l	**651 ug/l**	--	**3060 ug/l**
Antimony	Dissolved	Lab	--	--	--	--	--	--
Antimony	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Arsenic	Dissolved	Lab	**0.71 ug/l**	--	**0.87 ug/l**	< 0.50 ug/l	--	**0.64 ug/l**
Arsenic	Total	Lab	--	--	--	--	--	--
Arsenic III	Total	Lab	**1.0 ug/l**	--	**0.74 ug/l**	< 0.50 ug/l	--	**1.1 ug/l**
Arsenic inorganic	Total	Lab	--	--	--	--	--	--
Arsenic V	Total	Lab	--	--	--	--	--	--
Barium	Dissolved	Lab	**200 ug/l**	--	**231 ug/l**	**9.1 ug/l**	--	**19.7 ug/l**
Barium	Total	Lab	**218 ug/l**	--	**241 ug/l**	**15.1 ug/l**	--	**49.9 ug/l**
Beryllium	Dissolved	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Boron	Dissolved	Lab	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	--	< 50.0 ug/l
Boron	Total	Lab	< 50.0 ug/l	--	< 50.0 ug/l	< 50.0 ug/l	--	< 50.0 ug/l
Cadmium	Dissolved	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Cadmium	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Calcium	Dissolved	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**24800 ug/l**	--	**25100 ug/l**	**6900 ug/l**	--	**13100 ug/l**
Chromium	Dissolved	Lab	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l
Chromium	Total	Lab	< 1.0 ug/l	--	< 1.0 ug/l	**2.4 ug/l**	--	**8.6 ug/l**
Cobalt	Dissolved	Lab	< 0.20 ug/l	--	< 0.20 ug/l	**1.5 ug/l**	--	**5.4 ug/l**
Cobalt	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	**2.0 ug/l**	--	**7.5 ug/l**
Copper	Dissolved	Lab	< 0.50 ug/l	--	**0.58 b ug/l**	**1.1 ug/l**	--	**0.99 ug/l**
Copper	Total	Lab	< 0.50 ug/l	--	**1.3 b ug/l**	**3.2 ug/l**	--	**11.9 ug/l**
Iron	Dissolved	Lab	**113 ug/l**	--	**96.0 b ug/l**	**67.6 ug/l**	--	**329 ug/l**
Iron	Total	Lab	**139 ug/l**	--	**112 b ug/l**	**729 ug/l**	--	**3980 ug/l**
Lead	Dissolved	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Lead	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	**1.3 ug/l**
Magnesium	Dissolved	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**10800 ug/l**	--	**10700 ug/l**	**3700 ug/l**	--	**7800 ug/l**
Manganese	Dissolved	Lab	**641 ug/l**	--	**628 ug/l**	**184 ug/l**	--	**828 ug/l**
Manganese	Total	Lab	**683 ug/l**	--	**648 ug/l**	**217 ug/l**	--	**903 ug/l**
Mercury	Total	Lab	**0.00060 ug/l**	< 0.00050 ug/l	**0.00061 ug/l**	**0.0013 ug/l**	**0.0013 ug/l**	**0.0055 ug/l**
Mercury methyl	Total	Lab	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	< 0.00003 ug/l	**0.00012 b ug/l**
Molybdenum	Dissolved	Lab	**2.0 ug/l**	--	**2.2 ug/l**	**1.3 ug/l**	--	**1.2 ug/l**
Molybdenum	Total	Lab	**2.2 ug/l**	--	**2.1 ug/l**	**1.3 ug/l**	--	**1.1 ug/l**
Nickel	Dissolved	Lab	< 0.50 ug/l	--	< 0.50 ug/l	**2.4 ug/l**	--	**7.7 ug/l**
Nickel	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	**4.3 ug/l**	--	**16.3 ug/l**
Palladium	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Phosphorus, total	Dissolved	Lab	--	--	--	--	--	--
Platinum	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Potassium	Dissolved	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**1300 ug/l**	--	**1400 ug/l**	**990 ug/l**	--	**1600 ug/l**
Selenium	Dissolved	Lab	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l
Selenium	Total	Lab	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l
Silica	Total	Lab	--	--	--	--	--	--
Silver	Dissolved	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Silver	Total	Lab	< 0.20 ug/l	--	< 0.20 ug/l	< 0.20 ug/l	--	< 0.20 ug/l
Sodium	Dissolved	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**3300 ug/l**	--	**3300 ug/l**	**3700 ug/l**	--	**8000 ug/l**
Strontium	Dissolved	Lab	--	--	--	--	--	--
Strontium	Total	Lab	**244 ug/l**	--	**245 ug/l**	**32.6 ug/l**	--	**69.0 ug/l**
Thallium	Dissolved	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.20 ug/l	--	< 0.017 ug/l	< 0.20 ug/l	--	< 0.017 ug/l
Titanium	Dissolved	Lab	--	--	--	--	--	--
Titanium	Total	Lab	< 10.0 ug/l	--	< 10.0 ug/l	**28.1 ug/l**	--	**127 ug/l**
Zinc	Dissolved	Lab	< 6.0 ug/l	--	< 6.0 ug/l	< 6.0 ug/l	--	< 6.0 ug/l
Zinc	Total	Lab	< 6.0 ug/l	--	< 6.0 ug/l	< 6.0 ug/l	--	**9.6 ug/l**

Data Qualifiers/Footnotes

Qualifier	Definition
	Not used in water quality modeling for Version 10 of the Water Modeling Data Package - Plant Site
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
f	Sample was collected at a flowrate exceeding the recommended rate of 200 mL/minute.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
i	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
v	Sample was collected under a vacuum of greater than XX inches of mercury.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
DF	Did not flash
EMPC	Estimated maximum possible concentration.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound
BQA	Barr-applied project specific qualifier: extraction and/or analyses conducted using an alternative method and/or procedure.
BQC	Barr-applied project specific qualifier: plant shut down.
BQD	Barr-applied project specific qualifier: equipment malfunction.
BQE	Barr-applied project specific qualifier: equipment adjustment.
BQM	Barr-applied project specific qualifier: manual measurement.
BQN	Barr-applied project specific qualifier: unable to be sampled or measured due to various reasons.
BQP	Barr-applied project specific qualifier: atypical chromatographic pattern.
BQQ	Barr-applied project specific qualifier: some aspect of QA/QC was not met.
BQR	Barr-applied project specific qualifier: location was re-sampled.
BQS	Barr-applied project specific qualifier: data is considered suspect.
BQT	Barr-applied project specific qualifier: summed value not displayed due to insufficient field length.
BQU	Barr-applied project specific qualifier: historical qualifier - definition unknown.
BQV	Barr-applied project specific qualifier: estimated value.
BQX	Barr-applied project specific qualifier: see notes for qualifier definition.
BQZ	Barr-applied project specific qualifier: data is considered unusable.

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		MLC-1		MLC-1		MLC-1	MLC-1	MLC-1	MLC-1
Date		3/17/2011		4/12/2011		7/30/2012	8/27/2012	9/24/2012	10/18/2012
Sample Type		N	FD	N	FD	N	N	N	N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	**394 mg/l**	--	**97.7 mg/l**	--	--	--	**218 mg/l**	--
Alkalinity, total, as CaCO3	NA	**394 mg/l**	--	**97.7 mg/l**	--	--	--	**218 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**15.8 mg/l**	--	**12.1 mg/l**	--	**39.4 mg/l**	**43.8 mg/l**	**25.4 mg/l**	**19.7 mg/l**
Chemical Oxygen Demand	NA	**48.2 mg/l**	--	**38.9 mg/l**	--	--	--	**69.9 mg/l**	--
Chloride	NA	**18.6 mg/l**	--	**4.02 mg/l**	--	**3.2 mg/l**	**3.1 mg/l**	**5.0 mg/l**	**5.7 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	**5.16 mg/l**	**3.56 mg/l**	**4.79 mg/l**	**7.34 mg/l**
Fluoride	NA	**0.31 mg/l**	--	**0.15 mg/l**	--	--	--	--	--
Hardness, as CaCO3	NA	**383 mg/l**	--	**92.6 mg/l**	--	**171 mg/l**	**206 mg/l**	**199 mg/l**	**167 mg/l**
Nitrate + Nitrite, as N	NA	< 0.1 mg/l	--	< 0.1 mg/l	--	--	--	< 0.10 mg/l	--
Nitrogen, ammonia as N	NA	**0.18 mg/l**	--	**0.11 mg/l**	--	--	--	< 0.10 mg/l	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	--	--	--	--	**7.04 pH units**	**7.04 pH units**	**7.26 pH units**	**7.07 pH units**
Phosphorus, total, as P	NA	< 0.1 mg P/L	--	< 0.1 mg P/L	--	--	--	**0.019 mg/l**	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**512 mg/l**	--	**141 mg/l**	--	**297 mg/l**	**371 mg/l**	**283 mg/l**	**239 mg/l**
Solids, total suspended	NA	**4 mg/l**	--	**2 mg/l**	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	--	--	--	--	**326.8 umhos/cm**	**405.5 umhos/cm**	**335.6 umhos/cm**	**364.5 umhos/cm**
Sulfate, as SO4	NA	**35.1 mg/l**	--	**11.9 mg/l**	--	< 1.0 mg/l	**1.1 mg/l**	< 1.0 mg/l	**1.6 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	--	--	--	--	**21.96 deg C**	**23.61 deg C**	**10.15 deg C**	**10.06 deg C**
Turbidity	NA	--	--	--	--	**80.3 NTU**	**4.6 NTU**	**30.2 NTU**	**13.5 NTU**
Metals									
Aluminum	Total	< 25 ug/l	--	< 25 ug/l	--	**58.3 ug/l**	**46.1 ug/l**	**35.2 ug/l**	**48.4 ug/l**
Aluminum	Dissolved	< 25 ug/l	--	< 25 ug/l	--	**51.1 ug/l**	**34.3 ug/l**	**29.6 ug/l**	**28.2 ug/l**
Antimony	Total	--	--	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	--	--	**0.84 ug/l**	**0.79 ug/l**	**5.2 ug/l**	**7.0 ug/l**	**2.7 ug/l**	**1.8 ug/l**
Barium	Total	**34.1 ug/l**	--	**11 ug/l**	--	--	--	**32.5 ug/l**	--
Beryllium	Total	< 0.2 ug/l	--	< 0.2 ug/l	--	--	--	< 0.20 ug/l	--
Boron	Total	**70.5 ug/l**	--	< 50 ug/l	--	--	--	< 50.0 ug/l	--
Cadmium	Total	< 0.03 ug/l	--	< 0.03 ug/l	--	--	--	< 0.20 ug/l	--
Calcium	Total	**58.6 mg/l**	--	**14.5 mg/l**	--	**29.5 mg/l**	**35.6 mg/l**	**32.0 mg/l**	**27.4 mg/l**
Chromium	Total	< 1 ug/l	--	< 1 ug/l	--	--	--	< 1.0 ug/l	--
Cobalt	Total	< 0.2 ug/l	--	< 0.2 ug/l	--	**0.89 ug/l**	**1.1 ug/l**	**0.40 ug/l**	**0.37 ug/l**
Cobalt	Dissolved	< 0.2 ug/l	--	< 0.2 ug/l	--	**0.94 ug/l**	**1.0 ug/l**	**0.38 ug/l**	**0.33 ug/l**
Copper	Total	**0.43 j ug/l**	--	**0.64 j ug/l**	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Copper	Dissolved	**0.68 ug/l**	--	**1.85 ug/l**	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Iron	Total	**1780 ug/l**	--	**817 ug/l**	--	**12000 ug/l**	**19900 ug/l**	**6120 ug/l**	**5130 ug/l**
Iron	Dissolved	**1470 ug/l**	--	**524 ug/l**	--	**9790 ug/l**	**12900 ug/l**	**1870 ug/l**	**2040 ug/l**
Lead	Total	< 0.02 ug/l	--	**0.11 j ug/l**	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	**57.5 mg/l**	--	**13.7 mg/l**	--	**23.7 mg/l**	**28.3 mg/l**	**28.9 mg/l**	**24.0 mg/l**
Manganese	Total	**270 ug/l**	--	**44 ug/l**	--	**816 ug/l**	**1040 ug/l**	**460 ug/l**	**331 ug/l**
Manganese	Dissolved	**270 ug/l**	--	**41.4 ug/l**	--	**802 ug/l**	**1030 ug/l**	**405 ug/l**	**307 ug/l**
Mercury	Total	**1.3 ng/l**	**1.4 ng/l**	**3.8 ng/l**	**3.7 ng/l**	--	--	**1.4 ng/l**	--
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	**1.06 ug/l**	--	**0.68 ug/l**	--	--	--	**0.35 ug/l**	--
Nickel	Total	< 0.6 ug/l	--	< 0.6 ug/l	--	**0.67 ug/l**	**0.92 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	< 0.6 ug/l	--	< 0.6 ug/l	--	< 0.50 ug/l	**0.65 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	**3.2 mg/l**	--	**1.86 mg/l**	--	--	--	**1.6 mg/l**	--
Selenium	Total	**0.53 j ug/l**	--	< 0.2 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	< 0.2 ug/l	--	< 0.2 ug/l	--	--	--	< 0.20 ug/l	--
Sodium	Total	**57.5 mg/l**	--	**15.4 mg/l**	--	--	--	**25.1 mg/l**	--
Strontium	Total	**270 ug/l**	--	**68.8 ug/l**	--	--	--	--	--
Thallium	Total	--	--	< 0.002 ug/l	< 0.002 ug/l	< 0.0004 ug/l	< 0.005 ug/l	< 0.002 ug/l	< 0.0004 ug/l
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	< 3.0 ug/l	--
Zinc	Total	< 6 ug/l	--	< 6 ug/l	--	< 6.0 ug/l	**9.0 ug/l**	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	--	--	--	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		MLC-1	MLC-1		MLC-1	MLC-1		MLC-1
Date		12/12/2012	1/23/2013		2/20/2013	3/20/2013		4/9/2013
Sample Type		N	N	FD	N	N	FD	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	**166 mg/l**	--	--	--	**282 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	**166 mg/l**	--	--	--	**282 mg/l**	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**13.7 mg/l**	**21.4 mg/l**	**20.3 mg/l**	**24.1 mg/l**	**31.3 mg/l**	--	**21.1 mg/l**
Chemical Oxygen Demand	NA	**37.0 mg/l**	--	--	--	**80.2 mg/l**	--	--
Chloride	NA	**9.9 mg/l**	**14.5 mg/l**	**15.7 mg/l**	**12.8 mg/l**	**11.2 mg/l**	--	**21.6 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**7.4 mg/l**	**7.41 mg/l**	--	**7.72 mg/l**	**9.58 mg/l**	--	**11.13 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**138 mg/l**	**242 mg/l**	**242 mg/l**	**241 mg/l**	**240 mg/l**	--	**378 mg/l**
Nitrate + Nitrite, as N	NA	< 0.10 mg/l	--	--	--	< 0.10 mg/l	--	--
Nitrogen, ammonia as N	NA	< 0.10 mg/l	--	--	--	**1.7 mg/l**	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.39 pH units**	**7.37 pH units**	--	**6.66 pH units**	**6.88 pH units**	--	**7.25 pH units**
Phosphorus, total, as P	NA	**0.0066 mg/l**	--	--	--	**0.14 mg/l**	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**225 mg/l**	**336 mg/l**	**344 mg/l**	**374 mg/l**	**371 mg/l**	--	**553 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**249.7 umhos/cm**	**563.6 umhos/cm**	--	**586.2 umhos/cm**	**591.9 umhos/cm**	--	**843.9 umhos/cm**
Sulfate, as SO4	NA	**11.5 mg/l**	**9.5 mg/l**	**9.4 mg/l**	**1.9 mg/l**	**1.2 mg/l**	--	**82.3 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**0.68 deg C**	**1.17 deg C**	--	**0.43 deg C**	**1.64 deg C**	--	**3.35 deg C**
Turbidity	NA	**0 NTU**	**3.2 NTU**	--	**2.4 NTU**	**50.2 NTU**	--	**4.3 NTU**
Metals								
Aluminum	Total	**26.4 ug/l**	**33.9 ug/l**	**34.2 ug/l**	**44.6 ug/l**	**40.6 ug/l**	--	**26.6 ug/l**
Aluminum	Dissolved	< 20.0 ug/l	< 20.0 ug/l	**20.4 ug/l**	**28.9 ug/l**	**31.2 ug/l**	--	**22.5 ug/l**
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Arsenic	Total	**0.61 ug/l**	**2.3 ug/l**	**2.5 ug/l**	**3.8 ug/l**	**7.0 ug/l**	--	**1.0 ug/l**
Barium	Total	**17.7 ug/l**	--	--	--	**93.8 ug/l**	--	--
Beryllium	Total	< 0.20 ug/l	--	--	--	< 0.20 ug/l	--	--
Boron	Total	**67.9 ug/l**	--	--	--	**85.3 ug/l**	--	--
Cadmium	Total	< 0.20 ug/l	--	--	--	< 0.20 ug/l	--	--
Calcium	Total	**20.5 mg/l**	**39.6 mg/l**	**39.7 mg/l**	**42.2 mg/l**	**43.2 mg/l**	--	**52.1 mg/l**
Chromium	Total	< 1.0 ug/l	--	--	--	**1.2 ug/l**	--	--
Cobalt	Total	< 0.20 ug/l	**0.65 ug/l**	**0.67 ug/l**	**0.65 ug/l**	**0.60 ug/l**	--	**0.23 ug/l**
Cobalt	Dissolved	< 0.20 ug/l	**0.67 ug/l**	**0.65 ug/l**	**0.63 ug/l**	**0.62 ug/l**	--	**0.22 ug/l**
Copper	Total	< 0.50 ug/l	**1.1 ug/l**	**1.1 ug/l**	< 0.50 ug/l	< 0.50 ug/l	--	**0.61 ug/l**
Copper	Dissolved	< 0.50 ug/l	**1.6 ug/l**	**0.81 ug/l**	< 0.50 ug/l	< 0.50 ug/l	--	**0.65 ug/l**
Iron	Total	**2060 ug/l**	**17100 ug/l**	**17400 ug/l**	**30400 ug/l**	**37600 ug/l**	--	**1690 ug/l**
Iron	Dissolved	**1480 ug/l**	**15400 ug/l**	**15600 ug/l**	**28900 ug/l**	**35600 ug/l**	--	**1270 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**21.0 mg/l**	**34.8 mg/l**	**34.6 mg/l**	**32.8 mg/l**	**32.1 mg/l**	--	**60.2 mg/l**
Manganese	Total	**130 ug/l**	**779 ug/l**	**789 ug/l**	**858 ug/l**	**817 ug/l**	--	**135 ug/l**
Manganese	Dissolved	**133 ug/l**	**829 ug/l**	**800 ug/l**	**853 ug/l**	**888 ug/l**	--	**141 ug/l**
Mercury	Total	**1.1 ng/l**	--	--	--	**1.7 ng/l**	**2.1 ng/l**	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	**0.47 ug/l**	--	--	--	< 0.30 ug/l	--	--
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.62 ug/l**	--	**0.62 ug/l**
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.90 ug/l**	--	**0.61 ug/l**
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**1.6 mg/l**	--	--	--	**2.1 mg/l**	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l
Silver	Total	< 0.20 ug/l	--	--	--	< 0.20 ug/l	--	--
Sodium	Total	**28.8 mg/l**	--	--	--	**28.2 mg/l**	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.002 ug/l	< 0.0004 ug/l	< 0.0004 ug/l	--	< 0.0004 ug/l	--	**0.012 j ug/l**
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	< 3.0 ug/l	--	--	--	**3.7 ug/l**	--	--
Zinc	Total	< 6.0 ug/l	**6.4 ug/l**	**6.5 ug/l**	**7.6 ug/l**	< 6.0 ug/l	--	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	**9.5 ug/l**	**7.6 ug/l**	**8.6 ug/l**	< 6.0 ug/l	--	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location / Date / Sample Type		MLC-1 5/8/2013 N	MLC-1 6/5/2013 N	MLC-1 7/10/2013 N	MLC-1 8/12/2013 N	MLC-1 10/14/2013 N	MLC-1 11/20/2013 N
Parameter	Total or Dissolved						
General Parameters							
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**189 mg/l**	--	**179 mg/l**	--
Alkalinity, total, as CaCO3	NA	--	--	**189 mg/l**	--	**179 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--
Carbon, total organic	NA	**10.7 mg/l**	**13.2 mg/l**	**27.3 mg/l**	**36.5 mg/l**	**14.0 mg/l**	**11.9 mg/l**
Chemical Oxygen Demand	NA	--	--	**78.5 mg/l**	--	**53.0 mg/l**	--
Chloride	NA	**4.7 mg/l**	**3.8 mg/l**	**2.6 mg/l**	**2.5 mg/l**	**7.5 mg/l**	**8.0 mg/l**
Chloride	Dissolved	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--
Dissolved oxygen	NA	**7.97 mg/l**	**7.92 mg/l**	**4.68 mg/l**	**6.33 mg/l**	**4.27 mg/l**	**10.23 mg/l**
Fluoride	NA	--	--	--	--	--	--
Hardness, as CaCO3	NA	**113 mg/l**	**99.2 mg/l**	**169 mg/l**	**213 mg/l**	**146 mg/l**	**116 mg/l**
Nitrate + Nitrite, as N	NA	--	--	< 0.10 mg/l	--	< 0.10 mg/l	--
Nitrogen, ammonia as N	NA	--	--	< 0.10 mg/l	--	< 0.10 mg/l	--
Nitrogen, total	NA	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--
pH	NA	**6.84 pH units**	**7.06 pH units**	**7.24 pH units**	**6.84 pH units**	**7.01 pH units**	**7.56 pH units**
Phosphorus, total, as P	NA	--	--	**0.040 mg/l**	--	**0.046 mg/l**	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--
Solids, total dissolved	NA	**184 mg/l**	**177 mg/l**	**279 mg/l**	**323 mg/l**	**238 mg/l**	**219 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**271.6 umhos/cm**	**238.7 umhos/cm**	**347.9 umhos/cm**	**447.5 umhos/cm**	**348.2 umhos/cm**	**302.4 umhos/cm**
Sulfate, as SO4	NA	**16.2 mg/l**	**6.4 mg/l**	< 1.0 mg/l	< 1.0 mg/l	**3.8 mg/l**	**7.9 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--
Temperature, ºC	NA	**10.96 deg C**	**10.59 deg C**	**19.45 deg C**	**16.83 deg C**	**9.28 deg C**	**1.75 deg C**
Turbidity	NA	**0.3 NTU**	**1.2 NTU**	**2.4 NTU**	**7.6 NTU**	**8.2 NTU**	**2.6 NTU**
Metals							
Aluminum	Total	**23.6 ug/l**	< 20.0 ug/l	**44.1 ug/l**	**49.0 ug/l**	**24.2 ug/l**	< 20.0 ug/l
Aluminum	Dissolved	< 20.0 ug/l	**28.2 ug/l**	**32.3 ug/l**	**38.3 ug/l**	< 20.0 ug/l	< 20.0 ug/l
Antimony	Total	< 0.50 ug/l	--	< 0.50 ug/l	--	< 0.50 ug/l	--
Arsenic	Total	**1.0 ug/l**	**0.80 ug/l**	**3.2 ug/l**	**4.1 ug/l**	**2.2 ug/l**	**0.65 ug/l**
Barium	Total	--	--	**34.7 ug/l**	--	**28.6 ug/l**	--
Beryllium	Total	--	--	< 0.20 ug/l	--	< 0.20 ug/l	--
Boron	Total	--	--	**60.0 ug/l**	--	**66.6 ug/l**	--
Cadmium	Total	--	--	< 0.20 ug/l	--	< 0.20 ug/l	--
Calcium	Total	**16.4 mg/l**	**15.3 mg/l**	**27.7 mg/l**	**35.3 mg/l**	**22.3 mg/l**	**17.1 mg/l**
Chromium	Total	--	--	< 1.0 ug/l	--	< 1.0 ug/l	--
Cobalt	Total	< 0.20 ug/l	< 0.20 ug/l	**0.71 ug/l**	**0.85 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Cobalt	Dissolved	< 0.20 ug/l	**0.23 ug/l**	**0.70 ug/l**	**0.84 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Copper	Total	< 0.50 ug/l	**0.72 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Copper	Dissolved	< 0.50 ug/l	**0.93 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Iron	Total	**2020 ug/l**	**373 ug/l**	**7090 ug/l**	**11200 ug/l**	**3870 ug/l**	**999 ug/l**
Iron	Dissolved	**1500 ug/l**	**302 ug/l**	**3810 ug/l**	**8740 ug/l**	**2400 ug/l**	**793 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Total	**17.4 mg/l**	**14.8 mg/l**	**24.2 mg/l**	**30.4 mg/l**	**21.8 mg/l**	**17.8 mg/l**
Manganese	Total	**47.4 ug/l**	**14.8 ug/l**	**561 ug/l**	**710 ug/l**	**176 ug/l**	**28.0 ug/l**
Manganese	Dissolved	**44.6 ug/l**	**14.3 ug/l**	**555 ug/l**	**679 ug/l**	**156 ug/l**	**29.8 ug/l**
Mercury	Total	--	--	**4.0 ng/l**	--	**1.8 ng/l**	--
Mercury	Dissolved	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--
Molybdenum	Total	--	--	**0.75 ug/l**	--	**0.96 ug/l**	--
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	**0.64 ug/l**	**1.0 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--
Potassium	Total	--	--	**1.3 mg/l**	--	**2.0 mg/l**	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	< 0.20 ug/l	--	< 0.20 ug/l	--
Sodium	Total	--	--	**20.6 mg/l**	--	**27.0 mg/l**	--
Strontium	Total	--	--	--	--	--	--
Thallium	Total	**0.0141 j* ug/l**	< 0.005 ug/l	< 0.002 ug/l	< 0.005 ug/l	**0.002 j ug/l**	< 0.002 ug/l
Tin	Total	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--
Vanadium	Total	--	--	< 3.0 ug/l	--	< 3.0 ug/l	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	**6.3 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	**8.4 ug/l**	**7.2 ug/l**	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		MLC-1	MLC-2	MLC-2	MLC-2		MLC-2	MLC-2
Date		12/23/2013	5/24/2011	6/30/2011	7/25/2011		7/26/2011	8/24/2011
Sample Type		N	N	N	N	FD	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**81.2 mg/l**	**166 mg/l**	**166 mg/l**	--	**99.4 mg/l**
Alkalinity, total, as CaCO3	NA	--	--	**81.2 mg/l**	**166 mg/l**	**166 mg/l**	--	**99.4 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**12.7 mg/l**	--	**26.1 mg/l**	**43.0 mg/l**	**36.1 mg/l**	--	**26.4 mg/l**
Chemical Oxygen Demand	NA	--	--	**72.6 mg/l**	**95.6 mg/l**	**96.9 mg/l**	--	**70.7 mg/l**
Chloride	NA	**11.7 mg/l**	--	**1.81 mg/l**	**2.66 mg/l**	**2.66 mg/l**	**2.52 mg/l**	**5.48 mg/l** **5.57 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**8.24 mg/l**	**3.42 mg/l**	**3.47 mg/l**	**0.46 mg/l**	--	**0.41 mg/l**	**0.27 mg/l**
Fluoride	NA	--	--	--	**0.33 mg/l**	**0.33 mg/l**	--	--
Hardness, as CaCO3	NA	**208 mg/l**	--	**79.9 mg/l**	**155 mg/l**	**152 mg/l**	--	**95.2 mg/l**
Nitrate + Nitrite, as N	NA	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	--	< 0.1 mg/l
Nitrogen, ammonia as N	NA	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	--	< 0.1 mg/l
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.24 pH units**	**7.28 pH units**	**6.99 pH units**	**6.93 pH units**	--	**6.91 pH units**	**7.08 pH units**
Phosphorus, total, as P	NA	--	--	**0.014 mg P/L**	**0.04 mg P/L**	**0.035 mg P/L**	--	**0.04 mg P/L**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**322 mg/l**	--	**175 mg/l**	**292 mg/l**	**268 mg/l**	--	**173 mg/l**
Solids, total suspended	NA	--	--	--	**2.7 mg/l**	**4 mg/l**	--	--
Specific Conductance @ 25 ºC	NA	**472.6 umhos/cm**	**267.0 umhos/cm**	**197.0 umhos/cm**	**441.0 umhos/cm**	--	**444.0 umhos/cm**	**206.0 umhos/cm**
Sulfate, as SO4	NA	**14.2 mg/l**	--	< 1 mg/l	< 1 mg/l	< 1 mg/l	< 1 mg/l	< 1 mg/l < 1 mg/l
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**0.08 deg C**	**13.50 deg C**	**17.21 deg C**	**17.06 deg C**	--	**12.19 deg C**	**17.40 deg C**
Turbidity	NA	**6.8 NTU**	**5.3 NTU**	**0 NTU**	**0.7 NTU**	--	**1.0 NTU**	**6.9 NTU**
Metals								
Aluminum	Total	**26.2 ug/l**	--	**52.2 ug/l**	**34.6 ug/l**	**33.3 ug/l**	**41.6 ug/l**	< 25 ug/l 27.7 ug/l
Aluminum	Dissolved	< 20.0 ug/l	--	**48 ug/l**	< 25 ug/l	< 25 ug/l	**36.5 ug/l**	< 25 ug/l < 25 ug/l
Antimony	Total	--	--	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	< 0.5 ug/l
Arsenic	Total	< 0.50 ug/l	--	**1.07 ug/l**	**1.68 ug/l**	**1.8 ug/l**	--	**1.45 ug/l**
Barium	Total	--	--	--	**28 ug/l**	**27.8 ug/l**	--	--
Beryllium	Total	--	--	--	< 0.2 ug/l	< 0.2 ug/l	--	--
Boron	Total	--	--	--	< 50 ug/l	< 50 ug/l	--	--
Cadmium	Total	--	--	--	**0.04 j ug/l**	**0.04 j ug/l**	--	--
Calcium	Total	**31.3 mg/l**	--	**14.2 mg/l**	**25.6 mg/l**	**24.7 mg/l**	--	**17 mg/l**
Chromium	Total	--	--	--	< 1 ug/l	< 1 ug/l	--	--
Cobalt	Total	**0.22 ug/l**	--	< 0.2 ug/l	**0.41 ug/l**	**0.39 ug/l**	--	**0.32 ug/l**
Cobalt	Dissolved	**0.24 ug/l**	--	< 0.2 ug/l	**0.35 ug/l**	**0.33 ug/l**	--	**0.29 ug/l**
Copper	Total	< 0.50 ug/l	--	**0.20 j ug/l**	**1.09 ug/l**	**1.11 ug/l**	--	**0.3 jb ug/l**
Copper	Dissolved	< 0.50 ug/l	--	**0.18 j ug/l**	**0.39 j ug/l**	**0.15 j ug/l**	--	< 0.15 ug/l
Iron	Total	**3620 ug/l**	--	**1150 ug/l**	**3450 ug/l**	**3410 ug/l**	--	**4200 ug/l**
Iron	Dissolved	**2950 ug/l**	--	**836 ug/l**	**2200 ug/l**	**2200 ug/l**	--	**2210 ug/l**
Lead	Total	< 0.50 ug/l	--	--	**0.11 j ug/l**	**0.11 j ug/l**	--	--
Lead	Dissolved	< 0.50 ug/l	--	--	--	--	--	--
Magnesium	Total	**31.5 mg/l**	--	**10.8 mg/l**	**22.1 mg/l**	**21.9 mg/l**	--	**12.8 mg/l**
Manganese	Total	**217 ug/l**	--	**37.7 ug/l**	**183 ug/l**	**178 ug/l**	--	**243 ug/l**
Manganese	Dissolved	**222 ug/l**	--	--	**183 ug/l**	--	--	**242 ug/l**
Mercury	Total	--	--	**4.3 ng/l**	**3.8 ng/l**	**4.0 ng/l**	--	**2.7 j ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	**0.90 ng/l**	**0.79 ng/l**	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	**0.44 ug/l**	**0.75 ug/l**	**0.72 ug/l**	--	**0.27 ug/l**
Nickel	Total	< 0.50 ug/l	--	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	--	< 0.6 ug/l
Nickel	Dissolved	< 0.50 ug/l	--	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	--	< 0.6 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	**0.33 mg/l**	**0.83 mg/l**	**0.78 mg/l**	--	**0.64 mg/l**
Selenium	Total	< 1.0 ug/l	--	--	**0.24 j ug/l**	**0.23 j ug/l**	--	--
Silver	Total	--	--	--	< 0.2 ug/l	< 0.2 ug/l	--	--
Sodium	Total	--	--	**11.4 mg/l**	**19 mg/l**	**18.4 mg/l**	--	**10.9 mg/l**
Strontium	Total	--	--	--	**124 ug/l**	**120 ug/l**	--	--
Thallium	Total	< 0.005 ug/l	--	< 0.002 ug/l	< 0.02 ug/l	< 0.02 ug/l	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	< 10 ug/l	< 10 ug/l	--	--
Vanadium	Total	--	--	--	< 10 ug/l	< 10 ug/l	--	--
Zinc	Total	< 6.0 ug/l	--	< 6 ug/l	**9.26 ug/l**	**8.58 ug/l**	--	< 6 ug/l
Zinc	Dissolved	< 6.0 ug/l	--	< 6 ug/l	< 6 ug/l	< 6 ug/l	--	< 6 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	MLC-2		MLC-2	MLC-2		MLC-2	
	Date	9/20/2011		10/20/2011	11/22/2011		12/28/2011	
	Sample Type	N	FD	N	N	FD	N	FD
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	**107 mg/l**	--	**90.3 mg/l**	**98.1 mg/l**	--	**130 mg/l**	**129 mg/l**
Alkalinity, total, as CaCO3	NA	**107 mg/l**	--	**90.3 mg/l**	**98.1 mg/l**	--	**130 mg/l**	**129 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**23.2 mg/l**	--	**20.2 mg/l**	**18.5 mg/l**	--	**21.5 mg/l**	**21.4 mg/l**
Chemical Oxygen Demand	NA	**63.7 mg/l**	--	**60.1 mg/l**	**49.2 mg/l**	--	**59.8 mg/l**	**52.6 mg/l**
Chloride	NA	**6.77 mg/l** **6.68 mg/l**	--	**8.06 mg/l**	**8.75 mg/l**	--	**11 mg/l**	**10.9 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**2.03 mg/l**	--	< 0.1 mg/l	**6.22 mg/l**	--	**7.24 mg/l**	--
Fluoride	NA	**0.23 mg/l**	--	--	**0.2 mg/l**	--	--	--
Hardness, as CaCO3	NA	**102 mg/l**	--	**89.2 mg/l**	**88.2 mg/l**	--	**117 mg/l**	**117 mg/l**
Nitrate + Nitrite, as N	NA	< 0.1 mg/l	--	< 0.1 mg/l	**0.12 mg/l**	--	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia as N	NA	< 0.1 mg/l	--	< 0.1 mg/l	< 0.1 mg/l	--	**0.37 mg/l**	**0.38 mg/l**
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.80 pH units**	--	**6.9 pH units**	**6.48 pH units**	--	**6.58 pH units**	--
Phosphorus, total, as P	NA	**0.072 mg P/L**	--	**0.017 mg P/L**	**0.025 mg P/L**	--	< 0.1 mg P/L	< 0.1 mg P/L
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	**456 mV**	--	--	--	--
Solids, total dissolved	NA	**189 mg/l**	--	**194 mg/l**	**152 mg/l**	--	**203 mg/l**	**206 mg/l**
Solids, total suspended	NA	**7.5 mg/l**	--	**1.6 mg/l**	< 1 mg/l	--	--	--
Specific Conductance @ 25 ºC	NA	**222.0 umhos/cm**	--	**211 umhos/cm**	**230 umhos/cm**	--	**245.0 umhos/cm**	--
Sulfate, as SO4	NA	**2.61 mg/l** **2.54 mg/l**	--	**12.3 mg/l**	**7.87 mg/l**	--	**5.26 mg/l**	**5.3 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**10.92 deg C**	--	**4.8 deg C**	**0.65 deg C**	--	**0.34 deg C**	--
Turbidity	NA	**40.4 NTU**	--	**0 NTU**	**0 NTU**	--	**3.4 NTU**	--
Metals								
Aluminum	Total	**25.6 ug/l** **27 ug/l**	--	< 25 ug/l	< 25 ug/l	--	**104 ug/l**	**97.9 ug/l**
Aluminum	Dissolved	< 25 ug/l < 25 ug/l	--	< 25 ug/l	< 25 ug/l	--	< 25 ug/l	< 25 ug/l
Antimony	Total	< 0.5 ug/l	--	< 0.5 ug/l	< 0.5 ug/l	--	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Total	**1.31 ug/l**	--	**0.64 ug/l**	< 0.5 ug/l	--	**1.16 ug/l**	**1.25 ug/l**
Barium	Total	**32.4 ug/l**	--	--	**12.9 ug/l**	--	--	--
Beryllium	Total	< 0.2 ug/l	--	--	< 0.2 ug/l	--	--	--
Boron	Total	< 50 ug/l	--	--	< 50 ug/l	--	--	--
Cadmium	Total	< 0.03 ug/l	--	--	< 0.03 ug/l	--	--	--
Calcium	Total	**18.6 mg/l**	--	**14.8 mg/l**	**14.2 mg/l**	--	**19.6 mg/l**	**19.6 mg/l**
Chromium	Total	< 1 ug/l	--	--	< 1 ug/l	--	--	--
Cobalt	Total	**0.35 ug/l**	--	< 0.2 ug/l	< 0.2 ug/l	--	**0.63 ug/l**	**0.63 ug/l**
Cobalt	Dissolved	**0.34 ug/l**	--	< 0.2 ug/l	< 0.2 ug/l	--	**0.54 ug/l**	**0.52 ug/l**
Copper	Total	**0.30 j ug/l**	--	**0.58 j ug/l**	**0.28 j ug/l**	--	**0.81 ug/l**	**0.71 ug/l**
Copper	Dissolved	< 0.15 ug/l	--	**0.23 j ug/l**	**0.34 j ug/l**	--	**0.91 ug/l**	< 0.7 ug/l
Iron	Total	**5040 ug/l**	--	**1100 ug/l**	**723 ug/l**	--	**5710 ug/l**	**5680 ug/l**
Iron	Dissolved	**1670 ug/l**	--	**704 ug/l**	**624 ug/l**	--	**3190 ug/l**	**3280 ug/l**
Lead	Total	**0.06 j ug/l**	--	--	**0.06 j ug/l**	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**13.6 mg/l**	--	**12.7 mg/l**	**12.8 mg/l**	--	**16.6 mg/l**	**16.6 mg/l**
Manganese	Total	**437 ug/l**	--	**43.5 ug/l**	**29.8 ug/l**	--	**630 ug/l**	**631 ug/l**
Manganese	Dissolved	**407 ug/l**	--	**41.7 ug/l**	**30.1 ug/l**	--	**566 ug/l**	**582 ug/l**
Mercury	Total	**2.0 ng/l**	**2.0 ng/l**	**1.2 ng/l**	**0.9 ng/l**	**0.9 ng/l**	**2.7 ng/l**	**2.3 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	**0.42 ng/l**	**0.36 ng/l**	--	< 0.1 ng/l	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	**0.23 ug/l**	--	**0.64 ug/l**	**0.65 ug/l**	--	**0.32 ug/l**	**0.32 ug/l**
Nickel	Total	< 0.6 ug/l	--	< 0.6 ug/l	< 0.6 ug/l	--	< 0.6 ug/l	< 0.6 ug/l
Nickel	Dissolved	< 0.6 ug/l	--	< 0.6 ug/l	< 0.6 ug/l	--	< 0.6 ug/l	< 0.6 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**1.36 mg/l**	--	**1.55 mg/l**	**0.93 mg/l**	--	**1.28 mg/l**	**1.26 mg/l**
Selenium	Total	< 0.2 ug/l	--	--	**0.24 j ug/l**	--	--	--
Silver	Total	< 0.2 ug/l	--	--	< 0.2 ug/l	--	--	--
Sodium	Total	**11.9 mg/l**	--	**16.7 mg/l**	**16.7 mg/l**	--	**16.7 mg/l**	**16.6 mg/l**
Strontium	Total	**87.7 ug/l**	--	--	**60.9 ug/l**	--	--	--
Thallium	Total	< 0.020 ug/l	--	< 0.02 ug/l	< 0.02 ug/l	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	< 10 ug/l	--	--	< 10 ug/l	--	--	--
Vanadium	Total	< 10 ug/l	--	--	< 10 ug/l	--	--	--
Zinc	Total	< 6 ug/l	--	< 6 ug/l	< 6 ug/l	--	**42.4 ug/l**	**42.3 ug/l**
Zinc	Dissolved	< 6 ug/l	--	< 6 ug/l	< 6 ug/l	--	**47.4 ug/l**	**44.4 ug/l**

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	MLC-2		MLC-2	MLC-2	MLC-2	MLC-2	MLC-2
	Date	1/25/2012		6/26/2012	7/25/2012	8/28/2012	9/24/2012	10/23/2012
	Sample Type	N	FD	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	**201 mg/l**	--	**76.5 mg/l**	--	--	**130 b mg/l**	--
Alkalinity, total, as CaCO3	NA	**201 mg/l**	--	**76.5 mg/l**	--	--	**130 b mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**38.8 mg/l**	--	**30.4 mg/l**	**48.0 mg/l**	**45.3 mg/l**	**30.3 mg/l**	**18.2 mg/l**
Chemical Oxygen Demand	NA	**111 mg/l**	--	**77.0 b mg/l**	--	--	**83.7 mg/l**	--
Chloride	NA	**12.7 mg/l**	--	**1.7 mg/l**	**3.1 mg/l**	**2.4 mg/l**	**4.6 mg/l**	**5.7 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**7.01 mg/l**	--	**2.85 mg/l**	**0.97 mg/l**	**0.55 mg/l**	**3.17 mg/l**	**5.7 mg/l**
Fluoride	NA	**0.25 mg/l**	--	--	--	--	--	--
Hardness, as CaCO3	NA	**178 mg/l**	--	**72.8 mg/l**	**120 mg/l**	**178 mg/l**	**130 mg/l**	**119 mg/l**
Nitrate + Nitrite, as N	NA	< 0.1 mg/l	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--
Nitrogen, ammonia as N	NA	**2.08 mg/l**	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.83 pH units**	--	**7.48 pH units**	**7.25 pH units**	**7.31 pH units**	**7.58 pH units**	**7.06 pH units**
Phosphorus, total, as P	NA	**0.25 mg P/L**	--	**0.015 b mg/l**	--	--	**0.0090 mg/l**	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**256 mg/l**	--	**156 mg/l**	**268 mg/l**	**281 mg/l**	**199 mg/l**	**178 mg/l**
Solids, total suspended	NA	**24 mg/l**	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**287 umhos/cm**	--	**155.7 umhos/cm**	**211.1 umhos/cm**	**325.2 umhos/cm**	**153.9 umhos/cm**	**230.4 umhos/cm**
Sulfate, as SO4	NA	**1.44 mg/l**	--	**1.5 mg/l**	**1.0 mg/l**	**1.2 mg/l**	**1.2 mg/l**	**2.5 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**0.21 deg C**	--	**15.45 deg C**	**18.93 deg C**	**16.45 deg C**	**8.44 deg C**	**7.22 deg C**
Turbidity	NA	**2.2 NTU**	--	**0 NTU**	**4.9 NTU**	**0.1 NTU**	**5.4 NTU**	**24.9 NTU**
Metals								
Aluminum	Total	**112 ug/l**	--	**67.5 ug/l**	**78.3 ug/l**	**56.6 ug/l**	**34.9 ug/l**	**22.9 ug/l**
Aluminum	Dissolved	**59.3 ug/l**	--	**64.5 ug/l**	**66.7 ug/l**	**44.4 ug/l**	**30.7 ug/l**	**24.8 ug/l**
Antimony	Total	< 0.5 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	**2.54 ug/l**	--	**1.2 ug/l**	**3.1 ug/l**	**3.1 ug/l**	**1.3 ug/l**	**0.72 ug/l**
Barium	Total	**61.6 ug/l**	--	**14.5 ug/l**	--	--	**19.4 ug/l**	--
Beryllium	Total	< 0.2 ug/l	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Boron	Total	< 50 ug/l	--	< 50.0 ug/l	--	--	< 50.0 ug/l	--
Cadmium	Total	< 0.03 ug/l	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Calcium	Total	**31.7 mg/l**	--	**12.7 mg/l**	**22.3 mg/l**	**31.3 mg/l**	**21.9 mg/l**	**19.4 mg/l**
Chromium	Total	< 1 ug/l	--	< 1.0 ug/l	--	--	**1.3 ug/l**	--
Cobalt	Total	**1.17 ug/l**	--	< 0.20 ug/l	**1.1 ug/l**	**1.1 ug/l**	**0.30 ug/l**	< 0.20 ug/l
Cobalt	Dissolved	**1.13 ug/l**	--	< 0.20 ug/l	**1.1 ug/l**	**1.0 ug/l**	**0.29 ug/l**	< 0.20 ug/l
Copper	Total	**0.98 ug/l**	--	**0.52 b ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Copper	Dissolved	**0.69 j ug/l**	--	< 0.50 ug/l	**1.5 ug/l**	**0.70 b ug/l**	< 0.50 ug/l	**0.75 ug/l**
Iron	Total	**27100 ug/l**	--	**1080 ug/l**	**7080 ug/l**	**7810 ug/l**	**2500 ug/l**	**1210 ug/l**
Iron	Dissolved	**26900 ug/l**	--	**941 ug/l**	**5210 ug/l**	**7080 ug/l**	**1700 ug/l**	**840 ug/l**
Lead	Total	**0.22 j ug/l**	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**24 mg/l**	--	**10 mg/l**	**15.7 mg/l**	**24.2 mg/l**	**18.3 mg/l**	**17.2 mg/l**
Manganese	Total	**1310 ug/l**	--	**38.5 ug/l**	**554 ug/l**	**578 ug/l**	**170 ug/l**	**63.3 ug/l**
Manganese	Dissolved	**1310 ug/l**	--	**37.8 b ug/l**	**528 ug/l**	**550 ug/l**	**157 ug/l**	**60.3 ug/l**
Mercury	Total	**6.5 ng/l**	**6.9 ng/l**	**4.8 ng/l**	--	--	**2.0 ng/l**	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	**3.74 ng/l**	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	**0.21 ug/l**	--	**0.57 ug/l**	--	--	**0.58 ug/l**	--
Nickel	Total	**0.67 ug/l**	--	**0.64 ug/l**	**1.7 b ug/l**	**1.0 b ug/l**	**0.88 ug/l**	< 0.50 ug/l
Nickel	Dissolved	< 0.6 ug/l	--	**0.68 b ug/l**	**0.96 ug/l**	**1.0 ug/l**	**0.62 ug/l**	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**1.91 mg/l**	--	**0.51 mg/l**	--	--	**1.0 mg/l**	--
Selenium	Total	**0.28 j ug/l**	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	< 0.2 ug/l	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Sodium	Total	**20.7 mg/l**	--	**9.5 mg/l**	--	--	**12.4 mg/l**	--
Strontium	Total	**136 ug/l**	--	--	--	--	--	--
Thallium	Total	< 0.02 ug/l	--	**0.003 j ug/l**	< 0.0004 ug/l	< 0.005 ug/l	**0.008 j ug/l**	**0.0082 jb ug/l**
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	< 10 ug/l	--	--	--	--	--	--
Vanadium	Total	< 10 ug/l	--	< 3.0 ug/l	--	--	< 3.0 ug/l	--
Zinc	Total	**17.1 ug/l**	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	**11.3 ug/l**	--	**8.0 b ug/l**	**8.8 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		MLC-2	MLC-2	MLC-2	MLC-2	MLC-2	MLC-2	MLC-2
Date		11/21/2012	12/12/2012	1/22/2013	2/20/2013	3/20/2013	4/8/2013	5/7/2013
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	**93.1 mg/l**	--	--	**142 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	--	**93.1 mg/l**	--	--	**142 mg/l**	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**13.3 mg/l**	**12.9 mg/l**	**24.2 mg/l**	**23.6 mg/l**	**23.8 mg/l**	**18.7 mg/l**	**13.2 mg/l**
Chemical Oxygen Demand	NA	--	**34.8 mg/l**	--	--	**71.7 mg/l**	--	--
Chloride	NA	**6.0 mg/l**	**7.2 mg/l**	**11.5 mg/l**	**10.8 mg/l**	**11.4 mg/l**	**8.3 mg/l**	**2.5 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**8.76 mg/l**	**6.28 mg/l**	**7.2 mg/l**	**5.94 mg/l**	**4.09 mg/l**	**3.69 mg/l**	**7.31 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**73.2 mg/l**	**87.5 mg/l**	**98.4 mg/l**	**135 mg/l**	**127 mg/l**	**77.7 mg/l**	**59.9 mg/l**
Nitrate + Nitrite, as N	NA	--	**0.10 mg/l**	--	--	< 0.10 mg/l	--	--
Nitrogen, ammonia as N	NA	--	< 0.10 mg/l	--	--	**1.8 mg/l**	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.65 pH units**	**7.56 pH units**	**7.36 pH units**	**6.67 pH units**	**6.54 pH units**	**6.4 pH units**	**6.58 pH units**
Phosphorus, total, as P	NA	--	< 0.0040 mg/l	--	--	**0.11 mg/l**	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**117 mg/l**	**148 mg/l**	**172 mg/l**	**223 mg/l**	**221 mg/l**	**169 mg/l**	**166 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**58.4 umhos/cm**	**91.5 umhos/cm**	**79.3 umhos/cm**	**322 umhos/cm**	**313.3 umhos/cm**	**201.5 umhos/cm**	**132.9 umhos/cm**
Sulfate, as SO4	NA	**5.0 mg/l**	**6.6 mg/l**	**6.8 mg/l**	**3.3 mg/l**	**2.3 mg/l**	**1.8 mg/l**	**7.6 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**1.28 deg C**	**0.21 deg C**	**-0.01 deg C**	**0.09 deg C**	**1.39 deg C**	**1.96 deg C**	**2.75 deg C**
Turbidity	NA	**0 NTU**	**0 NTU**	**18.7 NTU**	**4.3 NTU**	**102 NTU**	**150.3 NTU**	**2 NTU**
Metals								
Aluminum	Total	< 20.0 ug/l	**31.5 ug/l**	**31.5 ug/l**	**43.9 ug/l**	**56.7 ug/l**	**123 ug/l**	**39.2 ug/l**
Aluminum	Dissolved	< 20.0 ug/l	**32.1 ug/l**	**23.8 ug/l**	**33.2 ug/l**	**26.5 ug/l**	**21.1 ug/l**	**33.0 ug/l**
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	< 0.50 ug/l	< 0.50 ug/l	**1.1 ug/l**	**1.7 ug/l**	**1.7 ug/l**	**2.2 ug/l**	**0.60 ug/l**
Barium	Total	--	**10.5 ug/l**	--	--	**47.5 ug/l**	--	--
Beryllium	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Boron	Total	--	< 50.0 ug/l	--	--	< 50.0 ug/l	--	--
Cadmium	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Calcium	Total	**11.7 mg/l**	**13.6 mg/l**	**17.0 mg/l**	**24.8 mg/l**	**25.0 mg/l**	**15.4 mg/l**	**9.1 mg/l**
Chromium	Total	--	< 1.0 ug/l	--	--	< 1.0 ug/l	--	--
Cobalt	Total	< 0.20 ug/l	< 0.20 ug/l	**0.42 ug/l**	**0.98 ug/l**	**0.74 ug/l**	**0.76 ug/l**	< 0.20 ug/l
Cobalt	Dissolved	< 0.20 ug/l	< 0.20 ug/l	**0.41 ug/l**	**0.96 ug/l**	**0.70 ug/l**	**0.67 ug/l**	< 0.20 ug/l
Copper	Total	< 0.50 ug/l	< 0.50 ug/l	**0.60 ug/l**	**1.3 ug/l**	**0.83 ug/l**	**0.90 ug/l**	< 0.50 ug/l
Copper	Dissolved	< 0.50 ug/l	< 0.50 ug/l	**0.56 ug/l**	**1.0 ug/l**	< 0.50 ug/l	**0.61 ug/l**	**0.54 ug/l**
Iron	Total	**501 ug/l**	**825 ug/l**	**4000 ug/l**	**16700 ug/l**	**21100 ug/l**	**13700 ug/l**	**684 ug/l**
Iron	Dissolved	**380 ug/l**	**723 ug/l**	**2580 ug/l**	**15300 ug/l**	**13600 ug/l**	**8080 ug/l**	**566 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**10.7 mg/l**	**13.0 mg/l**	**13.6 mg/l**	**17.8 mg/l**	**15.6 mg/l**	**9.5 mg/l**	**9.0 mg/l**
Manganese	Total	**11.1 ug/l**	**32.5 ug/l**	**430 ug/l**	**1170 ug/l**	**882 ug/l**	**992 ug/l**	**26.4 ug/l**
Manganese	Dissolved	**11.4 ug/l**	**33.0 ug/l**	**419 ug/l**	**1160 ug/l**	**888 ug/l**	**1010 ug/l**	**24.1 ug/l**
Mercury	Total	--	**1.3 ng/l**	--	--	**2.3 ng/l**	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	**0.42 ug/l**	--	--	< 0.30 ug/l	--	--
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.58 ug/l**	**0.72 ug/l**	**0.77 ug/l**	**0.69 ug/l**
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	**0.62 ug/l**	< 0.50 ug/l	**0.70 ug/l**	**0.56 ug/l**	**1.2 ug/l**
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	**0.99 mg/l**	--	--	**1.5 mg/l**	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Sodium	Total	--	**16.1 mg/l**	--	--	**12.8 mg/l**	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.0004 ug/l	**0.016 j ug/l**	< 0.0004 ug/l	--	< 0.0004 ug/l	< 0.005 ug/l	< 0.002 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	< 3.0 ug/l	--	--	< 3.0 ug/l	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**6.9 ug/l**	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**6.3 ug/l**	< 6.0 ug/l	**7.0 ug/l**	**12.2 b ug/l**

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Location / Date / Sample Type Total or Dissolved	MLC-2 6/5/2013 N	MLC-2 7/10/2013 N	MLC-2 8/12/2013 N	MLC-2 9/12/2013 N	MLC-2 10/14/2013 N	MLC-2 11/20/2013 N	MLC-2 12/23/2013 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	**140 mg/l**	--	--	**149 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	--	**140 mg/l**	--	--	**149 mg/l**	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**15.0 mg/l**	**26.5 mg/l**	**34.5 mg/l**	**26.4 mg/l**	**19.9 mg/l**	**13.3 mg/l**	**12.9 mg/l**
Chemical Oxygen Demand	NA	--	**75.2 mg/l**	--	--	**69.3 mg/l**	--	--
Chloride	NA	**2.4 mg/l**	**2.5 mg/l**	**2.6 mg/l**	**5.6 mg/l**	**5.7 mg/l**	**6.3 mg/l**	**9.2 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**3.76 mg/l**	**2 mg/l**	**1.8 mg/l**	**1.34 mg/l**	**3.79 mg/l**	**7.94 mg/l**	**4.04 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**66.6 mg/l**	**137 mg/l**	**194 mg/l**	**139 mg/l**	**138 mg/l**	**78.7 mg/l**	**124 mg/l**
Nitrate + Nitrite, as N	NA	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--	--
Nitrogen, ammonia as N	NA	--	**0.13 mg/l**	--	--	< 0.10 mg/l	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.65 pH units**	**7.1 pH units**	**6.85 pH units**	**6.99 pH units**	**6.98 pH units**	**7.19 pH units**	**7.41 pH units**
Phosphorus, total, as P	NA	--	**0.028 mg/l**	--	--	**0.018 mg/l**	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**139 mg/l**	**240 mg/l**	**268 mg/l**	**234 mg/l**	**221 mg/l**	**153 mg/l**	**216 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**162 umhos/cm**	**279 umhos/cm**	**412.7 umhos/cm**	**291.2 umhos/cm**	**280.3 umhos/cm**	**195.2 umhos/cm**	**277.3 umhos/cm**
Sulfate, as SO4	NA	**3.5 mg/l**	< 1.0 mg/l	< 1.0 mg/l	**1.0 mg/l**	< 2.0 mg/l	**3.2 mg/l**	**5.2 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**10.72 deg C**	**19.16 deg C**	**14.3 deg C**	**17.16 deg C**	**9.01 deg C**	**2.18 deg C**	**0.03 deg C**
Turbidity	NA	**0 NTU**	**0 NTU**	**3.7 NTU**	**15.3 NTU**	**10.1 NTU**	**3.5 NTU**	**6.8 NTU**
Metals								
Aluminum	Total	**27.3 ug/l**	**52.9 ug/l**	**33.1 ug/l**	**42.1 ug/l**	**31.1 ug/l**	**149 ug/l**	**24.6 ug/l**
Aluminum	Dissolved	**23.2 ug/l**	**39.6 ug/l**	**31.4 ug/l**	**31.1 ug/l**	< 20.0 ug/l	< 20.0 ug/l	**21.2 ug/l**
Antimony	Total	--	< 0.50 ug/l	--	--	< 0.50 ug/l	--	--
Arsenic	Total	**0.59 ug/l**	**1.8 ug/l**	**2.3 ug/l**	**1.8 ug/l**	**1.3 ug/l**	**0.53 ug/l**	< 0.50 ug/l
Barium	Total	--	**30.5 ug/l**	--	--	**25.1 ug/l**	--	--
Beryllium	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Boron	Total	--	< 50.0 ug/l	--	--	< 50.0 ug/l	--	--
Cadmium	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Calcium	Total	**10.9 mg/l**	**23.6 mg/l**	**32.7 mg/l**	**24.5 mg/l**	**22.8 mg/l**	**12.4 mg/l**	**19.4 mg/l**
Chromium	Total	--	< 1.0 ug/l	--	--	< 1.0 ug/l	--	--
Cobalt	Total	< 0.20 ug/l	**0.68 ug/l**	**0.71 ug/l**	**0.53 ug/l**	**0.27 ug/l**	**0.20 ug/l**	< 0.20 ug/l
Cobalt	Dissolved	< 0.20 ug/l	**0.63 ug/l**	**0.64 ug/l**	**0.52 ug/l**	**0.23 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Copper	Total	**0.56 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.69 ug/l**
Copper	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.63 ug/l**
Iron	Total	**266 ug/l**	**3530 ug/l**	**5130 ug/l**	**4550 ug/l**	**2530 ug/l**	**794 ug/l**	**1240 ug/l**
Iron	Dissolved	**212 ug/l**	**2330 ug/l**	**4990 ug/l**	**2690 ug/l**	**1310 ug/l**	**410 ug/l**	**908 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Total	**9.6 mg/l**	**19.0 mg/l**	**27.2 mg/l**	**18.9 mg/l**	**19.7 mg/l**	**11.6 mg/l**	**18.4 mg/l**
Manganese	Total	**8.4 ug/l**	**437 ug/l**	**486 ug/l**	**361 ug/l**	**221 ug/l**	**34.9 ug/l**	**109 ug/l**
Manganese	Dissolved	**7.2 ug/l**	**431 ug/l**	**453 ug/l**	**334 ug/l**	**207 ug/l**	**20.2 ug/l**	**110 ug/l**
Mercury	Total	--	**4.6 ng/l**	--	--	**4.1 ng/l**	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	**0.92 ug/l**	--	--	**0.54 ug/l**	--	--
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**2.2 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	**1.0 mg/l**	--	--	**1.8 mg/l**	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Sodium	Total	--	**16.3 mg/l**	--	--	**17.3 mg/l**	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.005 ug/l	< 0.002 ug/l	**0.006 j ug/l**	< 0.005 ug/l	**0.030 ug/l**	**0.003 j ug/l**	< 0.005 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	< 3.0 ug/l	--	--	< 3.0 ug/l	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	**8.7 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**6.3 ug/l**

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		MLC-3	MLC-3		PM-11	PM-11	PM-11	PM-11	PM-11
Date		11/19/2012	12/26/2012		4/12/2004	5/20/2004	6/23/2004	7/28/2004	8/24/2004
Sample Type		N	N	FD	N	N	N	N	N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	**448 mg/l**	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	**448 mg/l**	--	**108 mg/l**	**150 mg/l**	**228 mg/l**	**309 mg/l**	**344 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**15.0 mg/l**	**14.3 mg/l**	--	**7.4 mg/l**	**9.8 mg/l**	**9.8 mg/l**	**12.4 mg/l**	--
Chemical Oxygen Demand	NA	--	**37.4 mg/l**	--	**22 mg/l**	**21 mg/l**	**17 mg/l**	**37 mg/l**	--
Chloride	NA	**13.2 mg/l**	**22.8 mg/l**	--	**9.5 mg/l**	**12.6 mg/l**	**16.5 mg/l**	**20.1 mg/l**	**25.4 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	< 20 ug/l	< 20 ug/l	< 20 ug/l	< 20 ug/l	--
Dissolved oxygen	NA	**5.2 mg/l**	**4.8 mg/l**	--	**10.4 mg/l**	**10.55 mg/l**	--	--	--
Fluoride	NA	--	--	--	**0.84 mg/l**	**1.1 mg/l**	**1.7 mg/l**	**2 mg/l**	**2.2 mg/l**
Hardness, as CaCO3	NA	**236 mg/l**	**394 mg/l**	--	**109 mg/l**	**149 mg/l**	**223 mg/l**	**323 mg/l**	**314 mg/l**
Nitrate + Nitrite, as N	NA	--	< 0.10 mg/l	--	**110 ug/l**	< 100 ug/l	< 100 ug/l	< 100 ug/l	--
Nitrogen, ammonia as N	NA	--	< 0.10 mg/l	--	< 100 ug/l	< 100 ug/l	< 100 ug/l	< 100 ug/l	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	**7.6 pH units**	**7.07 pH units**	--	**8.3 pH units**	**8.05 pH units**	**8.24 pH units**	**7.81 pH units**	**7.9 pH units**
Phosphorus, total, as P	NA	--	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 1 mg/l	--
Phosphorus, total, as P	Dissolved	--	**0.0050 mg/l**	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**369 mg/l**	**613 mg/l**	--	**186 mg/l**	**254 mg/l**	**389 mg/l**	**402 mg/l**	**465 mg/l**
Solids, total suspended	NA	--	--	--	**1 mg/l**	**1.3 mg/l**	< 1 mg/l	**5 mg/l**	--
Specific Conductance @ 25 ºC	NA	**06.1 umhos/cm**	**85.2 umhos/cm**	--	**333 umhos/cm**	**445 umhos/cm**	**602 umhos/cm**	**730 umhos/cm**	**870 umhos/cm**
Sulfate, as SO4	NA	**17.3 mg/l**	**53.2 mg/l**	--	**45.5 mg/l**	**61.2 mg/l**	**85.6 mg/l**	**72.5 mg/l**	**115 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	**4.3 deg C**	**0.72 deg C**	--	**1.3 deg C**	**12.8 deg C**	**16.2 deg C**	**20.7 deg C**	**14.8 deg C**
Turbidity	NA	**0 NTU**	**0 NTU**	--	**3 NTU**	**1.2 NTU**	--	--	--
Metals				--					
Aluminum	Total	< 20.0 ug/l	< 20.0 ug/l	--	**21.7 ug/l**	**34.2 ug/l**	**35.2 ug/l**	**72.7 ug/l**	--
Aluminum	Dissolved	< 20.0 ug/l	< 20.0 ug/l	--	--	--	--	--	--
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	--	< 3 ug/l	< 3 ug/l	< 3 ug/l	< 3 ug/l	--
Arsenic	Total	< 0.50 ug/l	**0.59 ug/l**	--	< 2 ug/l	< 2 ug/l	< 2 ug/l	< 2 ug/l	--
Barium	Total	--	**37.3 ug/l**	--	**13.4 ug/l**	**18.7 ug/l**	**26.3 ug/l**	**34.6 ug/l**	--
Beryllium	Total	--	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--
Boron	Total	--	**160 ug/l**	--	**129 ug/l**	**180 ug/l**	**240 ug/l**	**307 ug/l**	--
Cadmium	Total	--	< 0.20 ug/l	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--
Calcium	Total	**34500 ug/l**	**59800 ug/l**	--	**19 mg/l**	**25 mg/l**	**35.3 mg/l**	**39.9 mg/l**	**38.2 mg/l**
Chromium	Total	--	< 1.0 ug/l	--	< 1 ug/l	**1.5 ug/l**	< 1 ug/l	**1.4 ug/l**	--
Cobalt	Total	< 0.20 ug/l	**0.20 ug/l**	--	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	--
Cobalt	Dissolved	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--	--	--
Copper	Total	**0.59 ug/l**	**0.53 ug/l**	--	< 5 ug/l	< 5 ug/l	< 5 ug/l	< 3 ug/l	< 0.66 ug/l
Copper	Dissolved	**0.55 ug/l**	< 0.50 ug/l	--	--	--	--	--	--
Iron	Total	**275 ug/l**	**284 ug/l**	--	**590 ug/l**	**330 ug/l**	**220 ug/l**	**480 ug/l**	--
Iron	Dissolved	**136 ug/l**	**231 ug/l**	--	--	--	--	--	--
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	--	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 0.3 ug/l
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	**36400 ug/l**	**59400 ug/l**	--	**19.8 mg/l**	**27.2 mg/l**	**41.3 mg/l**	**54.3 mg/l**	**53 mg/l**
Manganese	Total	**19.1 ug/l**	**402 ug/l**	--	**50 ug/l**	**40 ug/l**	**80 ug/l**	**180 ug/l**	--
Manganese	Dissolved	**19.2 ug/l**	**397 ug/l**	--	--	--	--	--	--
Mercury	Total	--	**0.00099 ug/l**	**0.0013 ug/l**	**0.0016 ug/l**	**0.003 ug/l**	< 0.004 ug/l	< 0.01 ug/l	**0.0038 ug/l**
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	--	**1.7 ug/l**	--	**16.9 ug/l**	**20.2 ug/l**	**28.2 ug/l**	**29.3 ug/l**	--
Nickel	Total	< 0.50 ug/l	**0.59 ug/l**	--	< 5 ug/l	< 5 ug/l	< 5 ug/l	< 5 ug/l	--
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	--	--	--	--	--	--
Palladium	Total	--	--	--	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 0.3 ug/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	< 25 ug/l	< 250 ug/l	< 25 ug/l	< 250 ug/l	< 0.25 ug/l
Potassium	Total	--	**3000 ug/l**	--	**3700 ug/l**	**4800 ug/l**	**5000 ug/l**	**5700 ug/l**	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	--	< 2 ug/l	< 2 ug/l	< 2 ug/l	< 2 ug/l	< 3.6 ug/l
Silver	Total	--	< 0.20 ug/l	--	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 0.24 ug/l
Sodium	Total	--	**63900 ug/l**	--	**18300 ug/l**	**28700 ug/l**	**41400 ug/l**	**57500 ug/l**	**59400 ug/l**
Strontium	Total	--	--	--	**95.1 ug/l**	**139 ug/l**	**206 ug/l**	**229 ug/l**	--
Thallium	Total	< 0.0004 ug/l	< 0.005 ug/l	--	< 2 ug/l	< 2 ug/l	< 2 ug/l	< 2 ug/l	< 0.4 ug/l
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	< 10 ug/l	--	--	--	--
Vanadium	Total	--	< 3.0 ug/l	--	--	--	--	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	--	< 10 ug/l	< 10 ug/l	< 10 ug/l	< 10 ug/l	--
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	PM-11 8/25/2004 N	PM-11 9/28/2004 N	PM-11 10/26/2004 N	PM-11 11/16/2004 N	PM-11 7/11/2006 N	PM-11 5/21/2008 N	PM-11 5/21/2008 FD	PM-11 6/10/2008 N
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	**219 mg/l**	**216 mg/l**	**233 mg/l**	**281 mg/l**	**108 mg/l**	**106 mg/l**	**122 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	--	**14.4 mg/l**	--	**8.6 mg/l**	**15.4 mg/l**	**9.2 mg/l**	**9.2 mg/l**	**12.7 mg/l**
Chemical Oxygen Demand	NA	--	**31 mg/l**	--	**22 mg/l**	**48 mg/l**	--	--	--
Chloride	NA	--	**18.2 mg/l**	**19.5 mg/l**	**20.2 mg/l**	**13.7 mg/l**	**6.3 mg/l**	**6.27 mg/l**	**6.2 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	**6.5 mg/l**	--	--	--
Fluoride	NA	--	**1.9 mg/l**	**1.3 mg/l**	**1.3 mg/l**	**1.48 mg/l**	--	--	--
Hardness, as CaCO3	NA	--	**237 mg/l**	**246 mg/l**	**264 mg/l**	**308 mg/l**	**160 mg/l**	**153 mg/l**	**180 mg/l**
Nitrate + Nitrite, as N	NA	--	< 100 ug/l	--	< 100 ug/l	< 100 ug/l	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	--	**7.61 pH units**	**7.8 pH units**	**7.75 pH units**	**8 pH units** **7.89 pH units**	--	--	**7.22 pH units**
Phosphorus, total, as P	NA	--	**0.2 mg/l**	--	< 0.1 mg/l	< 0.1 mg/l	**0.021 * mg/l**	**0.046 * mg/l**	**0.017 mg/l**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	**355 mg/l**	**370 mg/l**	**382 mg/l**	**421 mg/l**	**206 mg/l**	**222 mg/l**	**226 mg/l**
Solids, total suspended	NA	--	**2 mg/l**	--	**1 mg/l**	**8 mg/l**	**2 b mg/l**	**2 b mg/l**	**3.6 mg/l**
Specific Conductance @ 25 ºC	NA	--	**623 umhos/cm**	**639 umhos/cm**	**676 umhos/cm**	**708 umhos/cm** **743 umhos/cm**	--	--	--
Sulfate, as SO4	NA	--	**76.6 mg/l**	**103 mg/l**	**147 mg/l**	**82 mg/l**	**68.4 mg/l**	**68.1 mg/l**	**62.5 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	--	**13.7 deg C**	**7.1 deg C**	**3 deg C**	**24.4 deg C**	--	--	--
Turbidity	NA	--	--	--	--	**2.3 NTU**	--	--	--
Metals									
Aluminum	Total	**52 ug/l**	**30.8 ug/l**	< 25 ug/l	**26.7 ug/l**	**55.9 ug/l**	**37.5 ug/l**	**37.4 ug/l**	**69.4 ug/l**
Aluminum	Dissolved	--	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--	--
Barium	Total	--	**24 ug/l**	--	**17.8 ug/l**	**34.5 ug/l**	--	--	--
Beryllium	Total	--	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	**0.030 j ug/l**	**0.031 j ug/l**	**0.021 j ug/l**
Calcium	Total	--	**31.2 mg/l**	**32.2 mg/l**	**34.4 mg/l**	**38.5 mg/l**	**22.8 mg/l**	**21.8 mg/l**	**25.6 mg/l**
Chromium	Total	--	--	--	--	--	< 1.0 ug/l	< 1.0 ug/l	**0.33 jb ug/l**
Cobalt	Total	--	< 1 ug/l	--	< 1 ug/l	< 1 ug/l	**0.16 j ug/l**	**0.16 j ug/l**	**0.19 j ug/l**
Cobalt	Dissolved	--	--	--	--	--	--	--	--
Copper	Total	--	**1.2 ug/l**	**1.4 ug/l**	**1 ug/l**	**1.6 ug/l**	**0.79 b ug/l**	**0.73 b ug/l**	**0.80 ug/l**
Copper	Dissolved	--	--	--	--	--	--	--	--
Iron	Total	--	**530 ug/l**	--	**340 ug/l**	**0.21 ug/l**	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--	--
Lead	Total	--	< 0.3 ug/l	< 0.3 ug/l	< 0.3 ug/l	< 0.6 ug/l	**0.092 jb ug/l**	**0.087 jb ug/l**	**0.15 jb ug/l**
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	--	**38.5 mg/l**	**40.1 mg/l**	**43.2 mg/l**	**51.5 mg/l**	**25 mg/l**	**24 mg/l**	**28.2 mg/l**
Manganese	Total	--	**60 ug/l**	--	**40 ug/l**	**118 ug/l**	**47 ug/l**	**47 ug/l**	**60 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	--	--
Mercury	Total	--	< 0.004 ug/l	< 0.01 ug/l	< 0.01 ug/l	**0.003 ug/l**	**0.0020 ug/l**	**0.0019 ug/l**	**0.0027 ug/l**
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	**0.00016 ug/l**	**0.00022 ug/l**	**0.00042 ug/l**
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	--	**18.4 ug/l**	--	**20.4 ug/l**	**15.8 ug/l**	**9.7 ug/l**	**9.6 ug/l**	**11 ug/l**
Nickel	Total	**0.73 ug/l**	**0.78 ug/l**	**0.91 ug/l**	< 0.75 ug/l	**0.9 ug/l**	**1.5 ug/l**	**1.5 ug/l**	**1.2 ug/l**
Nickel	Dissolved	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	< 0.02 mg/l	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	**6500 ug/l**	--	**6900 ug/l**	**4970 ug/l**	--	--	--
Selenium	Total	--	< 3.6 ug/l	< 3.6 ug/l	< 3.6 ug/l	< 1 ug/l	--	--	--
Silver	Total	--	< 0.24 ug/l	< 0.24 ug/l	< 0.24 ug/l	< 0.2 ug/l	--	--	--
Sodium	Total	--	**37300 ug/l**	**40200 ug/l**	**43400 ug/l**	**42800 ug/l**	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l	--	--	--
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--
Zinc	Total	< 10 ug/l	< 10 ug/l	< 10 ug/l	**14.7 ug/l**	**41.2 ug/l**	**1.6 jb ug/l**	**5.7 jb ug/l**	**2.5 jb ug/l**
Zinc	Dissolved	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-11	PM-11	PM-11	PM-11	PM-11	PM-11	PM-11	PM-11	
Date		7/22/2008	8/21/2008	9/16/2008	10/8/2008	10/9/2008	11/12/2008	7/9/2009	7/21/2009	
Sample Type		N	N	N	N	N	N	N	N	FD
Parameter	Total or Dissolved									
General Parameters										
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**288 mg/l**	--	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	**11.7 mg/l**	**9.8 mg/l**	**9.8 mg/l**
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**14.7 mg/l**	**12.8 mg/l**	**10.4 mg/l**	--	**10.6 mg/l**	**8.5 mg/l**	--	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--	--	--
Chloride	NA	**9.2 mg/l**	--	--	--	--	--	**8.71 mg/l**	**10.4 mg/l**	**10.4 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	**7.07 mg/l**	--	--	--	--
Fluoride	NA	--	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**353 mg/l**	--	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l
pH	NA	**7.62 pH units**	**8.21 pH units**	**7.88 pH units**	**7.74 pH units**	**7.74 pH units**	**7.83 pH units**	--	--	--
Phosphorus, total, as P	NA	**0.031 * mg/l**	**0.027 mg/l**	**0.015 mg/l**	--	**0.021 mg/l**	**0.011 mg/l**	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	**0.009 mg/l**	**0.008 mg/l**	**0.007 mg/l**
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**465 mg/l**	--	--	--	--	--	--	--	--
Solids, total suspended	NA	**3.2 mg/l**	--	--	--	--	--	< 1 mg/l	**2.4 mg/l**	**2.4 mg/l**
Specific Conductance @ 25 ºC	NA	--	--	--	--	**937 umhos/cm**	--	--	--	--
Sulfate, as SO4	NA	**106 mg/l**	**122 mg/l**	**167 mg/l**	--	**166 mg/l**	**130 mg/l**	**147 mg/l**	**151 mg/l**	**150 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Temperature, ºC	NA	--	--	--	--	**9.7 deg C**	--	--	--	--
Turbidity	NA	--	--	--	--	**2.0 NTU**	--	--	--	--
Metals										
Aluminum	Total	**26.8 ug/l**	--	--	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--	--	--
Cadmium	Total	**0.069 jb ug/l**	--	--	--	--	--	--	--	--
Calcium	Total	**44.5 mg/l**	--	--	--	--	--	--	--	--
Chromium	Total	**0.57 j ug/l**	--	--	--	--	--	--	--	--
Cobalt	Total	**0.28 ug/l**	--	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--	--	--
Copper	Total	**0.73 b ug/l**	--	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	**106 ug/l**	**80 ug/l**	**86.5 ug/l**
Lead	Total	**0.11 jb ug/l**	--	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--	--	--
Magnesium	Total	**58.7 mg/l**	--	--	--	--	--	--	--	--
Manganese	Total	**130 ug/l**	--	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--	--	--
Mercury	Total	**0.0019 ug/l**	**0.0019 ug/l**	**0.0012 ug/l**	--	**0.0014 ug/l**	**0.0011 ug/l**	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	**0.0014 ug/l**	**0.0019 ug/l**	**0.0014 ug/l**
Methyl Mercury	Total	**0.00046 ug/l**	**0.00020 ug/l**	**0.00018 ug/l**	--	**0.00024 ug/l**	**0.00015 ug/l**	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	**0.00021 ug/l**	< 0.0001 ug/l	**0.00011 ug/l**
Molybdenum	Total	**19 ug/l**	--	--	--	--	--	--	--	--
Nickel	Total	**1.3 ug/l**	--	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--	--
Zinc	Total	**3.0 jb ug/l**	--	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	PM-11		PM-11		PM-11		PM-11	
	Date	7/28/2009		8/20/2009		8/26/2009		9/10/2009	
	Sample Type	N	FD	N	FD	N	FD	N	FD
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	**12.0 mg/l**	**11.0 mg/l**	**12.1 mg/l**	**12.1 mg/l**	**13.3 mg/l**	**13.3 mg/l**	**12.0 mg/l**	**12.6 mg/l**
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--	--
Chloride	NA	**11.5 mg/l**	**11.5 mg/l**	**14.2 mg/l**	**14.3 mg/l**	**14.4 mg/l**	**14.4 mg/l**	**17.4 mg/l**	**17.4 mg/l**
Chloride	Dissolved	--	--	--	--	**14.3 mg/l**	**14.2 mg/l**	--	--
Color	NA	--	--	**70 color units**	**70 color units**	**70 color units**	**70 color units**	**70 color units**	**70 color units**
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	--	--	--	--
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	**0.02 mg/l**	< 0.02 mg/l	< 0.02 mg/l
pH	NA	--	--	--	--	--	--	--	--
Phosphorus, total, as P	NA	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	**0.007 mg/l**	**0.007 mg/l**	**0.013 mg/l**	**0.012 mg/l**	**0.013 mg/l**	**0.011 mg/l**	**0.012 mg/l**	**0.01 mg/l**
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--	--
Solids, total suspended	NA	**4 mg/l**	**2.4 mg/l**	**6 mg/l**	**2.4 mg/l**	< 1 mg/l	**2.8 mg/l**	**1.6 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	--	--	--	--	--	--	--	--
Sulfate, as SO4	NA	**150 mg/l**	**150 mg/l**	**140 mg/l**	**141 mg/l**	**124 mg/l**	--	**155 mg/l**	**155 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	**124 mg/l**	**122 mg/l**	--	--
Sulfide, as S^{2-}	NA	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l
Temperature, ºC	NA	--	--	--	--	--	--	--	--
Turbidity	NA	--	--	--	--	--	--	--	--
Metals									
Aluminum	Total	--	--	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--	--
Iron	Dissolved	**133 ug/l**	**122 ug/l**	**178 ug/l**	**168 ug/l**	**218 ug/l**	**214 ug/l**	**185 ug/l**	**190 ug/l**
Lead	Total	--	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--	--
Mercury	Dissolved	**0.0016 ug/l**	**0.0013 ug/l**	**0.0025 ug/l**	**0.0012 ug/l**	**0.0011 ug/l**	**0.0017 ug/l**	**0.0016 ug/l**	**0.0014 ug/l**
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	**0.00014 ug/l**	**0.00015 ug/l**	**0.30 ng/l**	**0.31 ng/l**	**0.55 ng/l**	**0.24 ng/l**	**0.19 ng/l**	**0.13 ng/l**
Molybdenum	Total	--	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-11		PM-11		PM-11	PM-11	PM-11
Date		10/13/2009		11/3/2009		7/26/2010	8/25/2010	9/9/2010
Sample Type		N	FD	N	FD	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	**340 mg/l**	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	< 3 mg/l	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	**8.7 mg/l**	**8.8 mg/l**	**10.5 mg/l**	**10.6 mg/l**	**14.3 mg/l**	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	**14.5 mg/l**	--	--
Chemical Oxygen Demand	NA	--	--	--	--	**36.8 mg/l**	--	--
Chloride	NA	**25.4 mg/l**	**25.4 mg/l**	**19.9 mg/l**	**19.9 mg/l**	**13.2 mg/l**	**19.3 mg/l**	**18.4 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	**40 color units**	**45 color units**	**75 color units**	**75 color units**	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	**3.28 mg/l**	**4.11 mg/l**	**6.23 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	**417 mg/l**	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	< 0.1 mg/l	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	**1.17 mg/l**	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	**1.17 mg/l**	--	--
Orthophosphate, as PO4	NA	< 0.07 mg/l	< 0.07 mg/l	< 0.02 mg/l	< 0.02 mg/l	--	--	--
pH	NA	--	--	--	--	**7.66 pH units**	**7.85 pH units**	**7.80 pH units**
Phosphorus, total, as P	NA	--	--	--	--	**0.046 mg P/L**	--	--
Phosphorus, total, as P	Dissolved	**0.005 mg/l**	**0.006 mg/l**	**0.007 mg/l**	**0.008 mg/l**	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	**565 mg/l**	--	--
Solids, total suspended	NA	< 1 mg/l	**1.6 mg/l**	**1.6 mg/l**	**2.4 mg/l**	**4 mg/l**	--	--
Specific Conductance @ 25 ºC	NA	--	--	--	--	**912 umhos/cm**	**1055 umhos/cm**	**1003 umhos/cm**
Sulfate, as SO4	NA	**188 mg/l**	**188 mg/l**	**159 mg/l**	**160 mg/l**	**122 mg/l**	**120 mg/l**	**131 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	--	--
Temperature, ºC	NA	--	--	--	--	**21.90 deg C**	**17.17 deg C**	**11.63 deg C**
Turbidity	NA	--	--	--	--	**0 NTU**	**1.8 NTU**	**1.9 NTU**
Metals								
Aluminum	Total	--	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	< 1 ug/l	--	--
Barium	Total	--	--	--	--	**41.6 ug/l**	--	--
Beryllium	Total	--	--	--	--	< 0.2 ug/l	--	--
Boron	Total	--	--	--	--	**270 ug/l**	--	--
Cadmium	Total	--	--	--	--	< 0.2 ug/l	--	--
Calcium	Total	--	--	--	--	**46.8 mg/l**	--	--
Chromium	Total	--	--	--	--	< 1 ug/l	--	--
Cobalt	Total	--	--	--	--	< 0.2 ug/l	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	**0.82 ug/l**	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	**309 ug/l**	--	--
Iron	Dissolved	**81.6 ug/l**	**82.9 ug/l**	**240 * ug/l**	**363 * ug/l**	--	--	--
Lead	Total	--	--	--	--	< 0.5 ug/l	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	**73 mg/l**	--	--
Manganese	Total	--	--	--	--	**138 ug/l**	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	**0.6 ng/l**	**0.8 ng/l**	**1.6 ng/l**	**1.7 ng/l**	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	**0.13 ng/l**	**0.12 ng/l**	**0.19 ng/l**	**0.12 ng/l**	--	--	--
Molybdenum	Total	--	--	--	--	**11.5 ug/l**	--	--
Nickel	Total	--	--	--	--	**1.52 ug/l**	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	**6.23 mg/l**	--	--
Selenium	Total	--	--	--	--	< 1 ug/l	--	--
Silver	Total	--	--	--	--	< 0.2 ug/l	--	--
Sodium	Total	--	--	--	--	**50 mg/l**	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	< 0.2 ug/l	--	--
Tin	Total	--	--	--	--	< 0.5 ug/l	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	< 6 ug/l	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-11	PM-11	PM-11	PM-11	PM-11	PM-11	PM-11
Date		9/14/2010	9/23/2010	10/6/2010	6/2/2011	7/25/2011	7/26/2011	8/24/2011
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	**350 mg/l**	--	**384 mg/l**
Alkalinity, total, as CaCO3	NA	**343 mg/l**	--	--	**222 mg/l**	**350 mg/l**	--	**384 mg/l**
Biochemical Oxygen Demand (5-day)	NA	< 3 mg/l	--	--	< 3 mg/l	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	**11.9 mg/l**	--	--	**12.6 mg/l**	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**10.3 mg/l**	--	--	**12.9 mg/l**	**22.1 mg/l**	--	**16.9 mg/l**
Chemical Oxygen Demand	NA	**35.8 mg/l**	--	--	**38.8 mg/l**	**58.0 mg/l**	--	**44 mg/l**
Chloride	NA	**19.5 mg/l**	**19.6 mg/l**	**19.3 mg/l**	**10.6 mg/l**	**8.04 mg/l**	**8.05 mg/l**	**12.3 mg/l** **12.6 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**6.7 mg/l**	< 0.1 mg/l	**7.35 mg/l**	**6.67 mg/l**	**0.54 mg/l**	**0.51 mg/l**	**0.77 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**441 mg/l**	--	--	**302 mg/l**	**370 mg/l**	--	**383 mg/l**
Nitrate + Nitrite, as N	NA	< 0.1 mg/l	--	--	< 0.1 mg/l	< 0.1 mg/l	--	< 0.1 mg/l
Nitrogen, ammonia as N	NA	--	--	--	--	< 0.1 mg/l	--	< 0.1 mg/l
Nitrogen, total	NA	**1.21 mg/l**	--	--	**1.28 mg/l**	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	**1.11 mg/l**	--	--	**1.28 mg/l**	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.79 pH units**	**7.9 pH units**	**7.83 pH units**	**7.99 pH units**	**7.51 pH units**	**7.49 pH units**	**7.64 pH units**
Phosphorus, total, as P	NA	**0.014 mg P/L**	--	--	**0.018 mg/l**	**0.035 mg P/L**	--	**0.032 mg P/L**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**564 mg/l**	--	--	**403 mg/l**	**491 mg/l**	--	**513 mg/l**
Solids, total suspended	NA	**2.5 mg/l**	--	--	**3.6 mg/l**	--	--	--
Specific Conductance @ 25 ºC	NA	**919.1 umhos/cm**	**978 umhos/cm**	**930 umhos/cm**	**638 umhos/cm**	**808.0 umhos/cm**	**816.0 umhos/cm**	**872.0 umhos/cm**
Sulfate, as SO4	NA	**143 mg/l**	**162 mg/l**	**155 mg/l**	**92.5 mg/l**	**68.8 mg/l**	**67.6 mg/l**	**64.6 mg/l** **66 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**12.23 deg C**	**11.0 deg C**	**10.63 deg C**	**14.12 deg C**	**19.29 deg C**	**19.35 deg C**	**19.36 deg C**
Turbidity	NA	**0 NTU**	**6.7 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**0.1 NTU**	**0 NTU**
Metals								
Aluminum	Total	--	--	--	--	< 25 ug/l	< 25 ug/l	< 25 ug/l < 25 ug/l
Aluminum	Dissolved	--	--	--	--	< 25 ug/l	< 25 ug/l	< 25 ug/l < 25 ug/l
Antimony	Total	--	--	--	< 0.5 ug/l	< 0.5 ug/l	--	< 0.5 ug/l
Arsenic	Total	< 1 ug/l	--	--	< 0.5 ug/l	**1.49 ug/l**	--	**1.66 ug/l**
Barium	Total	**30.4 ug/l**	--	--	**24.9 ug/l**	--	--	--
Beryllium	Total	< 0.2 ug/l	--	--	< 0.2 ug/l	--	--	--
Boron	Total	**251 ug/l**	--	--	**198 ug/l**	--	--	--
Cadmium	Total	**0.03 j ug/l**	--	--	< 0.2 ug/l	--	--	--
Calcium	Total	**47 mg/l**	--	--	**38.5 mg/l**	**42.8 mg/l**	--	**39.8 mg/l**
Chromium	Total	< 1 ug/l	--	--	< 1 ug/l	--	--	--
Cobalt	Total	< 0.2 ug/l	--	--	< 0.2 ug/l	< 0.2 ug/l	--	< 0.2 ug/l
Cobalt	Dissolved	--	--	--	--	< 0.2 ug/l	--	< 0.2 ug/l
Copper	Total	**0.86 ug/l**	--	--	< 0.7 ug/l	**0.59 j ug/l**	--	**0.58 jb ug/l**
Copper	Dissolved	--	--	--	--	**0.34 j ug/l**	--	**0.42 j ug/l**
Iron	Total	**243 ug/l**	--	--	**251 ug/l**	**568 ug/l**	--	**533 ug/l**
Iron	Dissolved	--	--	--	--	**395 ug/l**	--	**381 ug/l**
Lead	Total	**0.06 j ug/l**	--	--	< 0.5 ug/l	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**78.6 mg/l**	--	--	**50 mg/l**	**63.8 mg/l**	--	**68.8 mg/l**
Manganese	Total	**65.1 ug/l**	--	--	**49.5 ug/l**	**384 ug/l**	--	**274 ug/l**
Manganese	Dissolved	--	--	--	--	**321 ug/l**	--	**277 ug/l**
Mercury	Total	--	--	--	--	**1.8 ng/l**	--	**1.6 j ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	**13 ug/l**	--	--	**9.56 ug/l**	**5.65 ug/l**	--	**5.12 ug/l**
Nickel	Total	**1.33 ug/l**	--	--	**1.06 ug/l**	< 0.6 ug/l	--	< 0.6 ug/l
Nickel	Dissolved	--	--	--	--	< 0.6 ug/l	--	< 0.6 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**8.22 mg/l**	--	--	**5.32 mg/l**	**3.74 mg/l**	--	**3.55 mg/l**
Selenium	Total	**0.61 j ug/l**	--	--	--	--	--	--
Silver	Total	< 0.2 ug/l	--	--	< 0.2 ug/l	--	--	--
Sodium	Total	**52 mg/l**	--	--	**31.2 mg/l**	**44.9 mg/l**	--	**43.6 mg/l**
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.2 ug/l	--	--	< 0.2 ug/l	< 0.02 ug/l	--	--
Tin	Total	< 0.5 ug/l	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	< 6 ug/l	--	--	< 6 ug/l	< 6 ug/l	--	< 6 ug/l
Zinc	Dissolved	--	--	--	--	< 6 ug/l	--	< 6 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	PM-11	PM-11		PM-11	PM-11	PM-11	PM-11
	Date	9/20/2011	10/20/2011		11/22/2011	12/28/2011	1/25/2012	2/29/2012
	Sample Type	N	N	FD	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	**407 mg/l**	**312 mg/l**	--	**361 mg/l**	**440 mg/l**	**492 mg/l**	**418 mg/l**
Alkalinity, total, as CaCO3	NA	**407 mg/l**	**312 mg/l**	--	**361 mg/l**	**440 mg/l**	**492 mg/l**	**418 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**17.3 mg/l**	**12.1 mg/l**	--	**9.9 mg/l**	**8.8 mg/l**	**10.3 mg/l**	**6.50 mg/l**
Chemical Oxygen Demand	NA	**46 mg/l**	**41.7 mg/l**	--	**26.3 mg/l**	**26.9 mg/l**	**21.4 mg/l**	**19.8 mg/l**
Chloride	NA	**17.5 mg/l** **17.4 mg/l**	**28.3 mg/l**	**28.6 mg/l**	**28.3 mg/l**	**29.9 mg/l**	**33 mg/l**	**29.9 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**1.54 mg/l**	< 0.1 mg/l	--	**5.60 mg/l**	**6.53 mg/l**	**7.42 mg/l**	**7.76 mg/l**
Fluoride	NA	**1.39 mg/l**	--	--	**1.21 mg/l**	--	--	--
Hardness, as CaCO3	NA	**408 mg/l**	**440 mg/l**	--	**529 mg/l**	**605 mg/l**	**643 mg/l**	**603 mg/l**
Nitrate + Nitrite, as N	NA	< 0.1 mg/l	< 0.1 mg/l	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia as N	NA	< 0.1 mg/l	< 0.1 mg/l	--	< 0.1 mg/l	< 0.1 mg/l	**0.21 mg/l**	**0.15 mg/l**
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.58 pH units**	**6.9 pH units**	--	**6.93 pH units**	**6.97 pH units**	**6.93 pH units**	**7.05 pH units**
Phosphorus, total, as P	NA	**0.033 mg P/L**	**0.014 mg P/L**	--	**0.013 mg P/L**	< 0.1 mg P/L	**0.016 mg P/L**	**0.02 mg P/L**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	**493 mV**	--	--	--	--	--
Solids, total dissolved	NA	**560 mg/l**	**616 mg/l**	--	**720 mg/l**	**815 mg/l**	**782 mg/l**	**831 mg/l**
Solids, total suspended	NA	**4 mg/l**	**2.8 mg/l**	--	**2.4 mg/l**	--	--	--
Specific Conductance @ 25 ºC	NA	**931.0 umhos/cm**	**956 umhos/cm**	--	**1045 umhos/cm**	**1069.0 umhos/cm**	**1156 umhos/cm**	**1190 umhos/cm**
Sulfate, as SO4	NA	**70.8 mg/l** **70.2 mg/l**	**162 mg/l**	**164 mg/l**	**212 mg/l**	**224 mg/l**	**215 mg/l**	**233 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**11.73 deg C**	**5.4 deg C**	--	**1.00 deg C**	**0.53 deg C**	**0.32 deg C**	**0.24 deg C**
Turbidity	NA	**0 NTU**	**0 NTU**	--	**0.5 NTU**	**0.4 NTU**	**0.3 NTU**	**0.1 NTU**
Metals								
Aluminum	Total	< 25 ug/l 28.2 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	**27.8 ug/l**	< 25 ug/l
Aluminum	Dissolved	< 25 ug/l < 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	**26.2 ug/l**	< 25 ug/l
Antimony	Total	< 0.5 ug/l	< 0.5 ug/l	--	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Total	**1.16 ug/l**	**0.54 ug/l**	--	**0.54 ug/l**	**0.68 ug/l**	**0.69 ug/l**	**0.51 ug/l**
Barium	Total	**43.7 ug/l**	--	--	**39.5 ug/l**	--	--	--
Beryllium	Total	< 0.2 ug/l	--	--	< 0.2 ug/l	--	--	--
Boron	Total	**261 ug/l**	--	--	**262 ug/l**	--	--	--
Cadmium	Total	< 0.03 ug/l	--	--	< 0.03 j ug/l	--	--	--
Calcium	Total	**38.8 mg/l**	**49.1 mg/l**	--	**59.3 mg/l**	**67.5 mg/l**	**76.2 mg/l**	**68.4 mg/l**
Chromium	Total	< 1 ug/l	--	--	< 1 ug/l	--	--	--
Cobalt	Total	< 0.2 ug/l	< 0.2 ug/l	--	**0.21 ug/l**	**0.2 ug/l**	**0.29 ug/l**	**0.23 ug/l**
Cobalt	Dissolved	< 0.2 ug/l	< 0.2 ug/l	--	< 0.2 ug/l	< 0.2 ug/l	**0.29 ug/l**	**0.24 ug/l**
Copper	Total	**0.50 j ug/l**	**0.89 ug/l**	--	**0.95 ug/l**	**1.27 ug/l**	**1.45 ug/l**	**1.34 ug/l**
Copper	Dissolved	**0.35 j ug/l**	**0.69 j ug/l**	--	**1.02 ug/l**	**1.26 ug/l**	**1.31 ug/l**	**1.19 ug/l**
Iron	Total	**613 ug/l**	**265 ug/l**	--	**480 ug/l**	**377 ug/l**	**566 ug/l**	**486 ug/l**
Iron	Dissolved	**253 ug/l**	**179 ug/l**	--	**172 ug/l**	**114 ug/l**	**294 ug/l**	**134 ug/l**
Lead	Total	**0.03 j ug/l**	--	--	**0.03 j ug/l**	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**75.5 mg/l**	**77 mg/l**	--	**92.5 mg/l**	**106 mg/l**	**110 mg/l**	**105 mg/l**
Manganese	Total	**159 ug/l**	**36.1 ug/l**	--	**66.8 ug/l**	**155 ug/l**	**1270 ug/l**	**479 ug/l**
Manganese	Dissolved	**149 ug/l**	**30.7 ug/l**	--	**60.7 ug/l**	**151 ug/l**	**1270 ug/l**	**476 ug/l**
Mercury	Total	**1.0 ng/l**	**0.8 ng/l**	**0.9 ng/l**	**1.0 ng/l**	**0.6 ng/l**	**0.7 ng/l**	< 0.5 ng/l
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	**0.29 ng/l**	--	--	**0.24 ng/l**	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	**7.48 ug/l**	**11.4 ug/l**	--	**8.75 ug/l**	**7.52 ug/l**	**6.79 ug/l**	**11.4 ug/l**
Nickel	Total	< 0.6 ug/l	**0.68 ug/l**	--	**0.67 ug/l**	< 0.6 ug/l	< 0.6 ug/l	**0.62 ug/l**
Nickel	Dissolved	< 0.6 ug/l	< 0.6 ug/l	--	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	**0.61 ug/l**
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**4.23 mg/l**	**8.41 mg/l**	--	**6.32 mg/l**	**6.26 mg/l**	**6.48 mg/l**	**6.95 mg/l**
Selenium	Total	**0.24 j ug/l**	--	--	**0.51 j ug/l**	--	--	--
Silver	Total	< 0.2 ug/l	--	--	< 0.2 ug/l	--	--	--
Sodium	Total	**49.6 mg/l**	**45.7 mg/l**	--	**52.4 mg/l**	**53.6 mg/l**	**57.3 mg/l**	**58.8 mg/l**
Strontium	Total	**247 ug/l**	--	--	**327 ug/l**	--	--	--
Thallium	Total	< 0.020 ug/l	< 0.02 ug/l	--	< 0.02 ug/l	--	< 0.02 ug/l	< 0.02 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	< 10 ug/l	--	--	< 10 ug/l	--	--	--
Vanadium	Total	< 10 ug/l	--	--	< 10 ug/l	--	--	--
Zinc	Total	< 6 ug/l	< 6 ug/l	--	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l
Zinc	Dissolved	< 6 ug/l	< 6 ug/l	--	< 6 ug/l	< 6 ug/l	**6.62 ug/l**	< 6 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	PM-11 6/26/2012 N	PM-11 7/25/2012 N	PM-11 8/28/2012 N	PM-11 9/24/2012 N	PM-11 10/23/2012 N	PM-11 11/21/2012 N	PM-11 12/12/2012 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	**170 mg/l**	--	--	**394 mg/l**	--	--	**374 mg/l**
Alkalinity, total, as CaCO3	NA	**170 mg/l**	--	--	**394 mg/l**	--	--	**374 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**16.8 mg/l**	**21.9 mg/l**	**17.2 mg/l**	**14.4 mg/l**	**8.0 mg/l**	**7.7 mg/l**	**9.0 mg/l**
Chemical Oxygen Demand	NA	**39.2 b mg/l**	--	--	**36.5 mg/l**	--	--	**38.1 mg/l**
Chloride	NA	**3.9 mg/l**	**5.4 mg/l**	**13.7 mg/l**	**22.0 mg/l**	**29.0 mg/l**	**23.8 mg/l**	**26.6 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**3.17 mg/l**	**0.4 mg/l**	**0.5 mg/l**	**4.53 mg/l**	**5.31 mg/l**	**8.73 mg/l**	**5.13 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**214 mg/l**	**281 mg/l**	**371 mg/l**	**435 mg/l**	**486 mg/l**	**422 mg/l**	**534 mg/l**
Nitrate + Nitrite, as N	NA	< 0.10 mg/l	--	--	< 0.10 mg/l	--	--	< 0.10 mg/l
Nitrogen, ammonia as N	NA	< 0.10 mg/l	--	--	< 0.10 mg/l	--	--	< 0.10 mg/l
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.58 pH units**	**7.52 pH units**	**7.69 pH units**	**7.62 pH units**	**7.42 pH units**	**7.45 pH units**	**7.01 pH units**
Phosphorus, total, as P	NA	**0.026 b mg/l**	--	--	**0.0080 mg/l**	--	--	< 0.0040 mg/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**301 mg/l**	**363 mg/l**	**448 mg/l**	**549 mg/l**	**611 mg/l**	**526 mg/l**	**694 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**438.2 umhos/cm**	**506 umhos/cm**	**751.1 umhos/cm**	**888.5 umhos/cm**	**986.4 umhos/cm**	**877.8 umhos/cm**	**1031 umhos/cm**
Sulfate, as SO4	NA	**59.7 mg/l**	**17.1 mg/l**	**39.7 mg/l**	**83.0 mg/l**	**159 mg/l**	**178 mg/l**	**191 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**19.34 deg C**	**21.3 deg C**	**18.6 deg C**	**9.69 deg C**	**8.41 deg C**	**2.95 deg C**	**0.93 deg C**
Turbidity	NA	**0 NTU**	**0.9 NTU**	**0.1 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**0 NTU**
Metals								
Aluminum	Total	**27.3 ug/l**	**30.9 ug/l**	**25.5 ug/l**	**34.2 ug/l**	**39.4 ug/l**	< 20.0 ug/l	< 40.0 ug/l
Aluminum	Dissolved	**26.2 ug/l**	< 20.0 ug/l	< 20.0 ug/l	**31.1 ug/l**	**29.1 ug/l**	< 20.0 ug/l	< 20.0 ug/l
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	**1.2 ug/l**	**2.0 ug/l**	**1.9 ug/l**	**1.2 ug/l**	**2.3 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Barium	Total	**28.3 ug/l**	--	--	**33.5 ug/l**	--	--	**40.1 ug/l**
Beryllium	Total	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Boron	Total	**146 ug/l**	--	--	**243 ug/l**	--	--	**236 ug/l**
Cadmium	Total	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Calcium	Total	**29.8 mg/l**	**39.0 mg/l**	**47.3 mg/l**	**52.9 mg/l**	**55.3 mg/l**	**47.3 mg/l**	**59.4 mg/l**
Chromium	Total	< 1.0 ug/l	--	--	**2.3 ug/l**	--	--	< 1.0 ug/l
Cobalt	Total	< 0.20 ug/l	< 0.20 ug/l	**0.24 ug/l**	**0.21 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cobalt	Dissolved	< 0.20 ug/l	< 0.20 ug/l	**0.27 ug/l**	**0.23 ug/l**	< 0.20 ug/l	< 0.20 ug/l	**0.20 ug/l**
Copper	Total	**0.54 b ug/l**	**0.66 ug/l**	**0.63 ug/l**	**0.65 b ug/l**	**0.83 ug/l**	**1.0 ug/l**	**1.0 ug/l**
Copper	Dissolved	**0.92 b ug/l**	**0.79 ug/l**	**1.8 b ug/l**	< 0.50 ug/l	**1.1 ug/l**	**1.5 ug/l**	**1.0 ug/l**
Iron	Total	**762 ug/l**	**1050 ug/l**	**1270 ug/l**	**452 ug/l**	**377 ug/l**	**277 ug/l**	**552 ug/l**
Iron	Dissolved	**639 ug/l**	**766 ug/l**	**252 ug/l**	**196 ug/l**	**138 ug/l**	**162 ug/l**	**179 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**33.9 mg/l**	**44.6 mg/l**	**61.4 mg/l**	**73.6 mg/l**	**84.4 mg/l**	**73.8 mg/l**	**93.6 mg/l**
Manganese	Total	**104 ug/l**	**473 ug/l**	**775 ug/l**	**72.2 ug/l**	**50.6 ug/l**	**19.3 ug/l**	**99.8 ug/l**
Manganese	Dissolved	**94.8 b ug/l**	**437 ug/l**	**788 ug/l**	**62.4 ug/l**	**31.6 ug/l**	**17.3 ug/l**	**102 ug/l**
Mercury	Total	**2.7 ng/l**	--	--	**1.1 ng/l**	--	--	**0.93 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	**6.1 ug/l**	--	--	**9.5 ug/l**	--	--	**8.2 ug/l**
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	**0.81 b ug/l**	**0.78 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	**0.82 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**2.3 mg/l**	--	--	**4.5 mg/l**	--	--	**5.7 mg/l**
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Sodium	Total	**18.4 mg/l**	--	--	**44.8 mg/l**	--	--	**52.5 mg/l**
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.002 ug/l	< 0.0004 ug/l	< 0.005 ug/l	< 0.002 ug/l	**0.0092 jb ug/l**	< 0.0004 ug/l	< 0.002 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	< 3.0 ug/l	--	--	< 3.0 ug/l	--	--	< 3.0 ug/l
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	**6.5 b ug/l**	< 6.0 ug/l	**6.9 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-11	PM-11	PM-11	PM-11	PM-11	PM-11	PM-11
Date		1/23/2013	2/21/2013	3/21/2013	4/9/2013	5/8/2013	6/6/2013	7/9/2013
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**421 mg/l**	--	--	--	**181 mg/l**
Alkalinity, total, as CaCO3	NA	--	--	**421 mg/l**	--	--	--	**181 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**14.1 mg/l**	**8.5 mg/l**	**7.0 mg/l**	**9.1 mg/l**	**10.4 mg/l**	**12.5 mg/l**	**23.3 mg/l**
Chemical Oxygen Demand	NA	--	--	**16.2 mg/l**	--	--	--	**65.8 mg/l**
Chloride	NA	**30.8 mg/l**	**34.1 mg/l**	**29.9 mg/l**	**20.9 mg/l**	**5.7 mg/l**	**8.2 mg/l**	**3.1 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**12.69 mg/l**	**11.98 mg/l**	**12.26 mg/l**	**12.07 mg/l**	**7.07 mg/l**	**4.58 mg/l**	**2.13 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**608 mg/l**	**660 mg/l**	**592 mg/l**	**452 mg/l**	**143 mg/l**	**193 mg/l**	**184 mg/l**
Nitrate + Nitrite, as N	NA	--	--	< 0.10 mg/l	--	--	--	< 0.10 mg/l
Nitrogen, ammonia as N	NA	--	--	**0.17 mg/l**	--	--	--	**0.10 mg/l**
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.16 pH units**	**7.06 pH units**	**7.06 pH units**	**7.33 pH units**	**6.64 pH units**	**6.98 pH units**	**7.27 pH units**
Phosphorus, total, as P	NA	--	--	**0.018 mg/l**	--	--	--	**0.037 mg/l**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**734 mg/l**	**796 mg/l**	**781 mg/l**	**564 mg/l**	**198 mg/l**	**292 mg/l**	**256 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**1139 umhos/cm**	**1250 umhos/cm**	**1123 umhos/cm**	**837 umhos/cm**	**320.6 umhos/cm**	**414.2 umhos/cm**	**374.9 umhos/cm**
Sulfate, as SO4	NA	**197 mg/l**	**229 mg/l**	**218 mg/l**	**155 mg/l**	**46.7 mg/l**	**54.7 mg/l**	**13.5 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**4.06 deg C**	**2.23 deg C**	**4.4 deg C**	**2.1 deg C**	**8.23 deg C**	**11.71 deg C**	**21.46 deg C**
Turbidity	NA	**0.9 NTU**	**2.2 NTU**	**13.5 NTU**	**3.8 NTU**	**0 NTU**	**0 NTU**	**0 NTU**
Metals								
Aluminum	Total	**29.6 ug/l**	**92.1 ug/l**	**35.6 ug/l**	**29.0 ug/l**	**40.1 ug/l**	< 20.0 ug/l	**30.6 ug/l**
Aluminum	Dissolved	< 20.0 ug/l	**23.7 ug/l**	**23.6 ug/l**	**20.8 ug/l**	**27.6 ug/l**	< 20.0 ug/l	**24.1 ug/l**
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Arsenic	Total	**0.93 ug/l**	**0.68 ug/l**	< 0.82 ug/l	**0.62 ug/l**	**0.91 ug/l**	**0.53 ug/l**	**1.2 ug/l**
Barium	Total	--	--	**67.9 ug/l**	--	--	--	**27.9 ug/l**
Beryllium	Total	--	--	< 0.20 ug/l	--	--	--	< 0.20 ug/l
Boron	Total	--	--	**277 ug/l**	--	--	--	**148 ug/l**
Cadmium	Total	--	--	< 0.20 ug/l	--	--	--	< 0.20 ug/l
Calcium	Total	**71.9 mg/l**	**78.0 mg/l**	**69.9 mg/l**	**54.2 mg/l**	**18.2 mg/l**	**25.8 mg/l**	**26.3 mg/l**
Chromium	Total	--	--	< 1.0 ug/l	--	--	--	< 1.0 ug/l
Cobalt	Total	**0.34 ug/l**	**0.38 ug/l**	**0.34 ug/l**	**0.25 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Cobalt	Dissolved	**0.32 ug/l**	**0.36 ug/l**	**0.32 ug/l**	**0.26 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l
Copper	Total	**1.5 ug/l**	**1.3 ug/l**	**0.84 ug/l**	**0.68 ug/l**	**0.89 ug/l**	**0.58 ug/l**	**0.58 ug/l**
Copper	Dissolved	**1.4 ug/l**	**1.4 ug/l**	**0.85 ug/l**	**0.65 ug/l**	**0.70 ug/l**	**0.64 ug/l**	**0.50 ug/l**
Iron	Total	**776 ug/l**	**1230 ug/l**	**549 ug/l**	**836 ug/l**	**1070 ug/l**	**402 ug/l**	**875 ug/l**
Iron	Dissolved	**157 ug/l**	**105 ug/l**	**160 ug/l**	**351 ug/l**	**747 ug/l**	**323 ug/l**	**746 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Total	**104 mg/l**	**113 mg/l**	**101 mg/l**	**76.8 mg/l**	**23.7 mg/l**	**31.3 mg/l**	**28.7 mg/l**
Manganese	Total	**874 ug/l**	**1240 ug/l**	**820 ug/l**	**643 ug/l**	**177 ug/l**	**79.9 ug/l**	**259 ug/l**
Manganese	Dissolved	**868 ug/l**	**1100 ug/l**	**784 ug/l**	**657 ug/l**	**154 ug/l**	**80.9 ug/l**	**256 ug/l**
Mercury	Total	--	--	**0.60 ng/l**	--	--	--	**2.7 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	**8.5 ug/l**	--	--	--	**3.7 ug/l**
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	**1.1 ug/l**	**0.92 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	**0.87 ug/l**	**0.79 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	**6.1 mg/l**	--	--	--	**1.6 mg/l**
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	< 0.20 ug/l	--	--	--	< 0.20 ug/l
Sodium	Total	--	--	**52.9 mg/l**	--	--	--	**13.4 mg/l**
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.0004 ug/l	--	**0.0013 jb ug/l**	**0.008 j ug/l**	**0.0075 j ug/l**	< 0.005 ug/l	< 0.002 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	< 3.0 ug/l	--	--	--	< 3.0 ug/l
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**7.9 ug/l**

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-11	PM-11	PM-11	PM-11	PM-11	PM-12	PM-12
Date		8/13/2013	9/12/2013	10/14/2013	11/20/2013	12/23/2013	4/13/2004	5/20/2004
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**350 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	**350 mg/l**	--	--	**16 mg/l**	**20 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**15.7 mg/l**	**13.5 mg/l**	**10.1 mg/l**	**9.5 mg/l**	**8.0 mg/l**	**14.7 mg/l**	**19.5 mg/l**
Chemical Oxygen Demand	NA	--	--	**38.0 mg/l**	--	--	**52 mg/l**	**27 mg/l**
Chloride	NA	**5.2 mg/l**	**13.6 mg/l**	**21.8 mg/l**	**25.7 mg/l**	**24.7 mg/l**	**2.1 mg/l**	**2.3 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	< 20 ug/l	< 20 ug/l
Dissolved oxygen	NA	**4.27 mg/l**	**4.7 mg/l**	**6.2 mg/l**	**8.98 mg/l**	**9.66 mg/l**	**11.8 mg/l**	**7.71 mg/l**
Fluoride	NA	--	--	--	--	--	**0.1 mg/l**	**0.11 mg/l**
Hardness, as CaCO3	NA	**291 mg/l**	**346 mg/l**	**418 mg/l**	**425 mg/l**	**506 mg/l**	**19 mg/l**	**18.6 mg/l**
Nitrate + Nitrite, as N	NA	--	--	< 0.10 mg/l	--	--	< 100 ug/l	< 100 ug/l
Nitrogen, ammonia as N	NA	--	--	< 0.10 mg/l	--	--	< 100 ug/l	< 100 ug/l
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.35 pH units**	**7.64 pH units**	**7.59 pH units**	**7.39 pH units**	**7.35 pH units**	**7.6 pH units**	**6.7 pH units**
Phosphorus, total, as P	NA	--	--	**0.014 mg/l**	--	--	**0.11 mg/l**	< 0.1 mg/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**361 mg/l**	**452 mg/l**	**508 mg/l**	**544 mg/l**	**657 mg/l**	**46 mg/l**	**62 mg/l**
Solids, total suspended	NA	--	--	--	--	--	**2 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	**610.6 umhos/cm**	**746.4 umhos/cm**	**833.9 umhos/cm**	**883.6 umhos/cm**	**912.1 umhos/cm**	**37 umhos/cm**	**53 umhos/cm**
Sulfate, as SO4	NA	**35.9 mg/l**	**39.4 mg/l**	**96.0 mg/l**	**166 mg/l**	**179 mg/l**	**5.3 mg/l**	**6.9 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**16.16 deg C**	**17.14 deg C**	**9.21 deg C**	**2.87 deg C**	**3.76 deg C**	**2.2 deg C**	**10.5 deg C**
Turbidity	NA	**1.3 NTU** **1.0 NTU**	**4 NTU**	**0.2 NTU**	**0 NTU**	**2 NTU**	**1 NTU**	**1.1 NTU**
Metals								
Aluminum	Total	**28.4 ug/l**	**26.9 ug/l**	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	**122 ug/l**	**121 ug/l**
Aluminum	Dissolved	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	**20.3 ug/l**	--	--
Antimony	Total	--	--	< 0.50 ug/l	--	--	< 3 ug/l	< 3 ug/l
Arsenic	Total	< 1.0 ug/l	**0.93 ug/l**	**0.74 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 2 ug/l	< 2 ug/l
Barium	Total	--	--	**35.1 ug/l**	--	--	< 10 ug/l	< 10 ug/l
Beryllium	Total	--	--	< 0.20 ug/l	--	--	< 0.2 ug/l	< 0.2 ug/l
Boron	Total	--	--	**228 ug/l**	--	--	< 35 ug/l	< 35 ug/l
Cadmium	Total	--	--	< 0.20 ug/l	--	--	< 0.2 ug/l	< 0.2 ug/l
Calcium	Total	**37.9 mg/l**	**44.0 mg/l**	**49.9 mg/l**	**47.0 mg/l**	**56.7 mg/l**	**4.6 mg/l**	**5.3 mg/l**
Chromium	Total	--	--	< 1.0 ug/l	--	--	**2.3 ug/l**	**1.4 ug/l**
Cobalt	Total	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	--
Copper	Total	**0.60 ug/l**	**0.50 ug/l**	**0.64 ug/l**	**0.80 ug/l**	**1.1 ug/l**	< 5 ug/l	< 5 ug/l
Copper	Dissolved	**0.61 ug/l**	< 0.50 ug/l	**0.57 ug/l**	**0.86 ug/l**	**1.1 ug/l**	--	--
Iron	Total	**430 ug/l**	**373 ug/l**	**240 ug/l**	**369 ug/l**	**426 ug/l**	**460 ug/l**	**500 ug/l**
Iron	Dissolved	**253 ug/l**	**260 ug/l**	**153 ug/l**	**239 ug/l**	**192 ug/l**	--	--
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 1 ug/l	< 1 ug/l
Lead	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--
Magnesium	Total	**47.6 mg/l**	**57.3 mg/l**	**71.3 mg/l**	**74.8 mg/l**	**88.4 mg/l**	**2.9 mg/l**	**2.6 mg/l**
Manganese	Total	**217 ug/l**	**164 ug/l**	**66.0 ug/l**	**71.9 ug/l**	**302 ug/l**	**20 ug/l**	**20 ug/l**
Manganese	Dissolved	**190 ug/l**	**146 ug/l**	**53.1 ug/l**	**75.0 ug/l**	**321 ug/l**	--	--
Mercury	Total	--	--	**1.4 ng/l**	--	--	**0.0065 ug/l**	**0.0067 ug/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	**4.5 ug/l**	--	--	< 5 ug/l	< 5 ug/l
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 5 ug/l	< 5 ug/l
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--
Palladium	Total	--	--	--	--	--	< 25 ug/l	< 25 ug/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	< 25 ug/l	< 25 ug/l
Potassium	Total	--	--	**4.2 mg/l**	--	--	**1100 ug/l**	< 500 ug/l
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 2 ug/l	< 2 ug/l
Silver	Total	--	--	< 0.20 ug/l	--	--	< 1 ug/l	< 1 ug/l
Sodium	Total	--	--	**41.8 mg/l**	--	--	**2200 ug/l**	**2500 ug/l**
Strontium	Total	--	--	--	--	--	**17.6 ug/l**	**20.8 ug/l**
Thallium	Total	< 0.005 ug/l	< 0.005 ug/l	**0.002 j ug/l**	< 0.002 ug/l	< 0.005 ug/l	< 2 ug/l	< 2 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	< 10 ug/l	--
Vanadium	Total	--	--	< 3.0 ug/l	--	--	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 10 ug/l	< 10 ug/l
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	PM-12	PM-12	PM-12	PM-12	PM-12	PM-12	PM-12
Date		6/23/2004	7/28/2004	8/25/2004	9/28/2004	10/25/2004	11/16/2004	7/11/2006
Sample Type		N	N	N	N	N	N	N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**41.3 mg/l**	**75.7 mg/l**	**152 mg/l**	**45 mg/l**	**36.8 mg/l**	**47.4 mg/l**	**79 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**24.3 mg/l**	**18.1 mg/l**	--	**29.4 mg/l**	--	**20.4 mg/l**	**21.7 mg/l**
Chemical Oxygen Demand	NA	**47 mg/l**	**46 mg/l**	--	**63.2 mg/l**	--	**41.4 mg/l**	**44 mg/l**
Chloride	NA	**3 mg/l**	**3.4 mg/l**	**4.7 mg/l**	**5.8 mg/l**	**5.1 mg/l**	**3.4 mg/l**	**3.76 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	< 20 ug/l	< 20 ug/l	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	--	--	**3.39 mg/l**
Fluoride	NA	**0.15 mg/l**	**0.2 mg/l**	**0.14 mg/l**	**0.13 mg/l**	**0.1 mg/l**	< 0.1 mg/l	**0.17 mg/l**
Hardness, as CaCO3	NA	**34.1 mg/l**	**77.1 mg/l**	**75.7 mg/l**	**51.1 mg/l**	**39.6 mg/l**	**34.2 mg/l**	**83.4 mg/l**
Nitrate + Nitrite, as N	NA	**120 ug/l**	< 100 ug/l	--	< 100 ug/l	--	< 100 ug/l	< 100 ug/l
Nitrogen, ammonia as N	NA	< 100 ug/l	< 100 ug/l	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.37 pH units**	**7.64 pH units**	**7.13 pH units**	**7.36 pH units**	**6.9 pH units**	**7.81 pH units**	**7.2 pH units** **7.25 pH units**
Phosphorus, total, as P	NA	< 0.1 mg/l	**0.22 mg/l**	--	**0.14 mg/l**	--	< 0.1 mg/l	< 0.1 mg/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**197 mg/l**	**110 mg/l**	**105 mg/l**	**118 mg/l**	**101 mg/l**	**86 mg/l**	**145 mg/l**
Solids, total suspended	NA	**1 mg/l**	**3 mg/l**	--	**2 mg/l**	--	< 1 mg/l	**4 mg/l**
Specific Conductance @ 25 ºC	NA	**87.2 umhos/cm**	**149.2 umhos/cm**	**166.2 umhos/cm**	**115.3 umhos/cm**	**94.4 umhos/cm**	--	**163 umhos/cm** **179.2 umhos/cm**
Sulfate, as SO4	NA	**8.9 mg/l**	**0.5 mg/l**	< 1 mg/l	**1.1 mg/l**	**8.5 mg/l**	**6.5 mg/l**	**2.47 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**14.1 deg C**	**19 deg C**	**19.9 deg C**	**12.3 deg C**	**7.7 deg C**	**0.5 deg C**	**20.9 deg C**
Turbidity	NA	--	--	--	--	--	--	**2.98 NTU**
Metals								
Aluminum	Total	**104 ug/l**	**101 ug/l**	**44.3 ug/l**	**93.5 ug/l**	**85.9 ug/l**	**143 ug/l**	**75.6 ug/l**
Aluminum	Dissolved	--	--	--	--	--	--	--
Antimony	Total	< 3 ug/l	< 3 ug/l	--	--	--	--	--
Arsenic	Total	< 2 ug/l	< 2 ug/l	--	--	--	--	--
Barium	Total	**18 ug/l**	**27.2 ug/l**	--	**18.7 ug/l**	--	< 10 ug/l	**29.9 ug/l**
Beryllium	Total	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--	--
Boron	Total	< 35 ug/l	< 35 ug/l	--	--	< 35 ug/l	--	--
Cadmium	Total	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--	--
Calcium	Total	**11.2 mg/l**	**19.3 mg/l**	**18.9 mg/l**	**12.2 mg/l**	**9.1 mg/l**	**7.9 mg/l**	**21.4 mg/l**
Chromium	Total	< 1 ug/l	**1.5 ug/l**	--	--	--	--	--
Cobalt	Total	< 1 ug/l	< 1 ug/l	--	< 1 ug/l	--	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	< 5 ug/l	< 0.9 ug/l	< 0.66 ug/l	**1 ug/l**	**1.2 ug/l**	**0.91 ug/l**	**1 ug/l**
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**3430 ug/l**	**2260 ug/l**	--	**2550 ug/l**	--	**1140 ug/l**	**1.66 ug/l**
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	< 1 ug/l	< 1 ug/l	< 0.3 ug/l	< 0.3 ug/l	< 0.3 ug/l	< 0.3 ug/l	< 0.6 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**4.2 mg/l**	**7 mg/l**	**6.9 mg/l**	**5 mg/l**	**4.1 mg/l**	**3.5 mg/l**	**7.3 mg/l**
Manganese	Total	**170 ug/l**	**340 ug/l**	--	**100 ug/l**	--	**110 ug/l**	**379 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	< 0.004 ug/l	< 0.01 ug/l	**0.0025 ug/l**	**0.0099 ug/l**	< 0.01 ug/l	< 0.01 ug/l	**0.002 ug/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	< 5 ug/l	< 5 ug/l	--	< 5 ug/l	--	< 5 ug/l	< 5 ug/l
Nickel	Total	< 5 ug/l	< 5 ug/l	**2.2 ug/l**	**1.9 ug/l**	**2.5 ug/l**	**1.1 ug/l**	**2.8 ug/l**
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	< 25 ug/l	< 25 ug/l	< 0.3 ug/l	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	< 0.02 mg/l
Platinum	Total	< 25 ug/l	< 25 ug/l	< 0.25 ug/l	--	--	--	--
Potassium	Total	< 500 ug/l	**1100 ug/l**	--	**900 ug/l**	--	**600 ug/l**	**1260 ug/l**
Selenium	Total	< 10 ug/l	< 2 ug/l	< 3.6 ug/l	< 3.6 ug/l	< 3.6 ug/l	< 3.6 ug/l	< 1 ug/l
Silver	Total	< 1 ug/l	< 1 ug/l	< 0.24 ug/l	< 0.24 ug/l	< 0.24 ug/l	< 0.24 ug/l	< 0.2 ug/l
Sodium	Total	**2700 ug/l**	**3000 ug/l**	**3400 ug/l**	**3400 ug/l**	**3300 ug/l**	**3200 ug/l**	**3290 ug/l**
Strontium	Total	**40.6 ug/l**	**61.9 ug/l**	--	--	--	--	--
Thallium	Total	< 2 ug/l	< 2 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	< 10 ug/l	< 10 ug/l	< 10 ug/l	**13.1 ug/l**	< 10 ug/l	**17.9 ug/l**	**27.1 ug/l**
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12	PM-12	PM-12	PM-12	PM-12	PM-12	PM-12
Date		8/29/2006	9/20/2006	10/13/2006	11/8/2006	3/23/2007	4/24/2007	5/22/2007
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**69.8 mg/l**	**81.4 mg/l**	**58.6 mg/l**	**38.4 mg/l**	**39.1 mg/l**	**21.6 mg/l**	**52.5 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**17.6 mg/l**	**12.1 mg/l**	**14.8 mg/l**	**13.9 mg/l**	**15.7 mg/l**	**28.5 mg/l**	**29.6 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**7.5 mg/l**	**5.59 mg/l**	**7.89 mg/l**	**7.24 mg/l**	**10.4 mg/l**	**3.23 mg/l**	**4.45 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**4.5 mg/l**	**4.8 mg/l**	**8.55 mg/l**	**11.23 mg/l**	**9.34 mg/l**	**10.74 mg/l**	**4.2 mg/l**
Fluoride	NA	< 0.1 mg/l	< 0.1 mg/l	**0.18 mg/l**	**0.1 mg/l**	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Hardness, as CaCO3	NA	**78.5 mg/l**	**87.2 mg/l**	**73.4 mg/l**	**54.8 mg/l**	**41.5 mg/l**	**48.5 mg/l**	**34.1 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.43 pH units**	**7.18 pH units**	**7.92 pH units**	**6.87 pH units**	**7.7 pH units**	**6.58 pH units**	**7.7 pH units**
Phosphorus, total, as P	NA	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**142 mg/l**	**121 mg/l**	**145 mg/l**	**100 mg/l**	**111 mg/l**	**120 mg/l**	**105 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**160.3 umhos/cm**	**181.7 umhos/cm**	**151.4 umhos/cm**	**121.8 umhos/cm**	**126 umhos/cm**	**66.0 umhos/cm**	**777 umhos/cm**
Sulfate, as SO4	NA	**2.3 mg/l**	**1.39 mg/l**	**8.19 mg/l**	**8.41 mg/l**	**3.03 mg/l**	**18.2 mg/l**	**5.78 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**16.6 deg C**	**10.5 deg C**	**2.6 deg C**	**4 deg C**	**0.4 deg C**	**2.5 deg C**	**11.2 deg C**
Turbidity	NA	--	--	--	--	--	--	--
Metals								
Aluminum	Total	--	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	**19.6 mg/l**	**21.5 mg/l**	**18.2 mg/l**	**12.6 mg/l**	**10.1 mg/l**	**9.85 mg/l**	**7.92 mg/l**
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	< 1 ug/l	< 1 ug/l < 1 ug/l	< 1 ug/l	< 1 ug/l < 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	**0.54 ug/l**	**0.7 ug/l** **1.9 ug/l**	**2.8 ug/l**	**1.5 ug/l** **0.51 ug/l**	**1.4 ug/l**	**1.5 ug/l**	**1.5 ug/l**
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**7.17 mg/l**	**8.13 mg/l**	**6.8 mg/l**	**5.67 mg/l**	**3.96 mg/l**	**5.8 mg/l**	**3.48 mg/l**
Manganese	Total	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	**0.0027 ug/l**	< 0.008 ug/l	**0.003 ug/l**	< 0.002 ug/l	**5.3 ng/l**	**9.9 ng/l**	**5.5 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	**0.000323 ug/l**	--	**0.00016 ug/l**	--	--	**0.346 ng/l**
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	**0.97 ug/l**	**1.3 ug/l** **0.85 ug/l**	**0.78 ug/l**	**0.68 ug/l** **0.55 ug/l**	**0.75 ug/l**	**1.0 ug/l**	**1.6 ug/l**
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	< 25 ug/l	< 25 ug/l < 25 ug/l	< 25 ug/l	**104 ug/l** **< 25 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location / Date / Sample Type		PM-12 6/12/2007 N	PM-12 7/24/2007 N	PM-12 8/23/2007 N	PM-12 9/20/2007 N	PM-12 10/25/2007 N	PM-12 11/15/2007 N	PM-12 5/21/2008 N	PM-12 6/10/2008 N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**25 mg/l**	**76.4 mg/l**	**84.2 mg/l**	**45.8 mg/l**	**27.4 mg/l**	**22.9 mg/l**	**15.2 mg/l**	**17.8 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**36.4 mg/l**	**31.4 mg/l**	**27.0 mg/l**	**26.5 mg/l**	**28.1 mg/l**	**21.8 mg/l**	**15.7 mg/l**	**23.4 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--	--
Chloride	NA	**1.98 mg/l**	**3.16 mg/l**	**3.23 mg/l**	**6.15 mg/l**	**2.17 mg/l**	**2.33 mg/l**	**1.74 mg/l**	**1.5 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	**1.8 mg/l**	**4.3 mg/l**	--	**3.23 mg/l**	**8 mg/l**	**9.1 mg/l**	--	--
Fluoride	NA	< 0.1 mg/l	**0.14 mg/l**	< 0.1 mg/l	--	< 0.2 mg/l	< 0.2 mg/l	--	--
Hardness, as CaCO3	NA	**37.5 mg/l**	**77.6 mg/l**	**84.0 mg/l**	**171 mg/l**	**31 mg/l**	**26.7 mg/l**	**21 mg/l**	**31.1 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	**6.4 pH units**	**7.6 pH units**	--	**6.9 pH units**	**7.7 pH units**	**6.8 pH units**	--	**6.10 pH units**
Phosphorus, total, as P	NA	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	**0.009 mg/l**	**0.012 mg/l**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**120 mg/l**	**159 mg/l**	**173 mg/l**	**258 mg/l**	**88 mg/l**	**87 mg/l**	**48 mg/l**	**74 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	**1.6 b mg/l**	**2.8 mg/l**
Specific Conductance @ 25 ºC	NA	**73.5 umhos/cm**	**152 umhos/cm**	--	**361 umhos/cm**	**266 umhos/cm**	**61 umhos/cm**	--	--
Sulfate, as SO4	NA	**2.68 mg/l**	< 1 mg/l	< 1 mg/l	**116 mg/l**	**3.09 mg/l**	**2.72 mg/l**	**2.81 mg/l**	**6.52 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	**18.8 deg C**	**25.3 deg C**	--	**10.4 deg C**	**4.6 deg C**	**1.3 deg C**	--	--
Turbidity	NA	--	--	--	--	--	--	--	--
Metals									
Aluminum	Total	--	--	--	--	--	--	**105 ug/l**	**147 ug/l**
Aluminum	Dissolved	--	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	< 0.20 ug/l	< 0.20 ug/l
Calcium	Total	**9.02 mg/l**	**19.2 mg/l**	**20.2 mg/l**	**23.6 mg/l**	**6.99 mg/l**	**5.95 mg/l**	**4.83 mg/l**	**6.85 mg/l**
Chromium	Total	--	--	--	--	--	--	**0.48 jb ug/l**	**0.96 b ug/l**
Cobalt	Total	< 1 ug/l	**1.2 ug/l**	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	**0.13 j ug/l**	**0.21 ug/l**
Cobalt	Dissolved	--	--	--	--	--	--	--	--
Copper	Total	< 0.7 ug/l	**1.4 ug/l**	**0.86 ug/l**	**1.5 ug/l**	**1.1 ug/l**	**1.1 ug/l**	**1.1 ug/l**	**1.3 ug/l**
Copper	Dissolved	--	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	--	**0.093 jb ug/l**	**0.18 jb ug/l**
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	**3.63 mg/l**	**7.2 mg/l**	**8.15 mg/l**	**27.3 mg/l**	**3.35 mg/l**	**2.88 mg/l**	**2.17 mg/l**	**3.39 mg/l**
Manganese	Total	--	--	--	--	--	--	**19 ug/l**	**32 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	--	--
Mercury	Total	--	**4 ng/l**	**1.9 ng/l**	**7.2 ng/l**	**6.3 ng/l**	**5.6 ng/l**	**0.0045 ug/l**	**0.0065 ug/l**
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	**0.306 ng/l**	--	**0.451 ng/l**	--	**0.654 ng/l**	**0.00034 ug/l**	**0.00064 ug/l**
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	**0.094 j ug/l**	**0.097 j ug/l**
Nickel	Total	**1.8 ug/l**	**2 ug/l**	**1.9 ug/l**	**2 ug/l**	**1.2 ug/l**	**1.1 ug/l**	**0.92 b ug/l**	**1.3 ug/l**
Nickel	Dissolved	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--
Zinc	Total	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	**2.7 jb ug/l**	**4.8 j ug/l**
Zinc	Dissolved	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12		PM-12	PM-12	PM-12	PM-12	PM-12	PM-12
Date		7/22/2008		8/21/2008	9/16/2008	10/8/2008	10/9/2008	11/12/2008	7/9/2009
Sample Type		N	FD	N	N	N	N	N	N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**48.2 mg/l**	**51.8 mg/l**	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	**24.8 mg/l**
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**29.1 mg/l**	**29.0 mg/l**	**19.5 mg/l**	**15.2 mg/l**	--	**22.4 mg/l**	**21.0 mg/l**	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--	--
Chloride	NA	**2.88 mg/l**	**2.89 mg/l**	--	--	--	--	--	**3.85 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	--	**5.82 mg/l**	--	--
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**61 mg/l**	**61.7 mg/l**	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	**0.03 mg/l**
pH	NA	**6.72 pH units**	--	**7.36 pH units**	**6.92 pH units**	**6.77 pH units**	**6.77 pH units**	**6.31 pH units**	--
Phosphorus, total, as P	NA	**0.055 * mg/l**	**0.056 mg/l**	**0.024 mg/l**	**0.024 mg/l**	--	**0.039 mg/l**	**0.014 mg/l**	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	**0.024 mg/l**
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**139 mg/l**	**135 mg/l**	--	--	--	--	--	--
Solids, total suspended	NA	**1.6 mg/l**	**2 mg/l**	--	--	--	--	--	**2.5 mg/l**
Specific Conductance @ 25 ºC	NA	--	--	--	--	--	**116.2 umhos/cm**	--	--
Sulfate, as SO4	NA	< 1 mg/l	< 1 mg/l	**1.05 mg/l**	**11.9 mg/l**	--	**7.66 mg/l**	**4.31 mg/l**	< 1 mg/l
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	< 0.1 mg/l
Temperature, ºC	NA	--	--	--	--	--	**8.5 deg C**	--	--
Turbidity	NA	--	--	--	--	--	**2.3 NTU**	--	--
Metals									
Aluminum	Total	**87.4 ug/l**	**87 ug/l**	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--	--
Cadmium	Total	**0.10 jb ug/l**	**0.036 jb ug/l**	--	--	--	--	--	--
Calcium	Total	**15.1 mg/l**	**15.4 mg/l**	--	--	--	--	--	--
Chromium	Total	**1.0 ug/l**	**0.54 j ug/l**	--	--	--	--	--	--
Cobalt	Total	**1.1 ug/l**	**0.87 ug/l**	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--	--
Copper	Total	**1.9 ug/l**	**0.65 jb ug/l**	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--	**2490 ug/l**
Lead	Total	**0.34 jb ug/l**	**0.18 jb ug/l**	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	**5.66 mg/l**	**5.65 mg/l**	--	--	--	--	--	--
Manganese	Total	**460 ug/l**	**430 ug/l**	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--	--
Mercury	Total	**0.0050 ug/l**	**0.0051 ug/l**	**0.0021 ug/l**	**0.0026 ug/l**	--	**0.005 ug/l**	**0.0043 ug/l**	--
Mercury	Dissolved	--	--	--	--	--	--	--	**0.0033 ug/l**
Methyl Mercury	Total	**0.00128 ug/l**	**0.00138 ug/l**	**0.00020 ug/l**	**0.00045 ug/l**	--	**0.00120 ug/l**	**0.00051 ug/l**	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	**0.00057 ug/l**
Molybdenum	Total	**0.33 ug/l**	**0.26 j ug/l**	--	--	--	--	--	--
Nickel	Total	**1.8 ug/l**	**1.2 ug/l**	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--
Zinc	Total	**5.2 jb ug/l**	**3.0 jb ug/l**	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12	PM-12	PM-12	PM-12	PM-12	PM-12	PM-12
Date		7/21/2009	7/28/2009	8/20/2009	8/26/2009	9/10/2009	10/13/2009	11/3/2009
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	**20.2 mg/l**	**24.4 mg/l**	**27.2 mg/l**	**29.0 mg/l**	**22.8 mg/l**	**15.6 mg/l**	**21.1 mg/l**
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**7.72 mg/l**	**5.05 mg/l**	**5.46 mg/l**	**6.1 mg/l**	**5.86 mg/l**	**7.41 mg/l**	**6 mg/l**
Chloride	Dissolved	--	--	--	**5.9 mg/l**	--	--	--
Color	NA	--	--	**200 color units**	**400 color units**	**200 color units**	**140 color units**	**200 color units**
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	--	--	--
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	**0.03 mg/l**	**0.02 mg/l**	**0.02 mg/l**	**0.03 mg/l**	**0.02 mg/l**	< 0.07 mg/l	< 0.02 mg/l
pH	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	**0.016 mg/l**	**0.016 mg/l**	**0.035 mg/l**	**0.029 mg/l**	**0.026 mg/l**	**0.01 mg/l**	**0.014 mg/l**
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	**2.4 mg/l**	**3.2 mg/l**	**4 mg/l**	**1.2 mg/l**	< 1 mg/l	**2 mg/l**	**1.2 mg/l**
Specific Conductance @ 25 ºC	NA	--	--	--	--	--	--	--
Sulfate, as SO4	NA	< 1 mg/l	**1.05 mg/l**	**1.73 mg/l**	< 1 mg/l	**1.18 mg/l**	**1.4 mg/l**	**3.61 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	**1.07 mg/l**	--	--	--
Sulfide, as S^{2-}	NA	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l
Temperature, ºC	NA	--	--	--	--	--	--	--
Turbidity	NA	--	--	--	--	--	--	--
Metals								
Aluminum	Total	--	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--
Iron	Dissolved	**2090 ug/l**	**2500 ug/l**	**2350 ug/l**	**4290 ug/l**	**3740 ug/l**	**1200 ug/l**	**968 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	**0.0026 ug/l**	**0.0043 ug/l**	**0.0050 ug/l**	**0.0043 ug/l**	**0.0032 ug/l**	**1.5 ng/l**	**3.7 ng/l**
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	**0.00054 ug/l**	**0.00065 ug/l**	**0.63 ng/l**	**2.7 ng/l**	**0.32 ng/l**	**0.21 ng/l**	**0.12 ng/l**
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	PM-12		PM-12	PM-12	PM-12	PM-12	PM-12
	Date	4/22/2010		5/11/2010	6/14/2010	7/13/2010	8/11/2010	8/25/2010
	Sample Type	N	FD	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	--	--	--	--	--	--	**3.43 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**8.10 mg/l**	--	**9.71 mg/l**	**4.72 mg/l**	**2.44 mg/l**	--	**1.20 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.0 pH units**	--	**7.12 pH units**	**7.06 pH units**	**6.62 pH units**	**6.72 pH units**	**6.92 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**71 umhos/cm**	--	**80.0 umhos/cm**	**68.4 umhos/cm**	**135.8 umhos/cm**	**123.3 umhos/cm**	**142 umhos/cm**
Sulfate, as SO4	NA	--	--	--	--	--	--	< 1 mg/l
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**6.17 deg C**	--	**8.31 deg C**	**12.31 deg C**	**18.96 deg C**	**21.5 deg C**	**16.98 deg C**
Turbidity	NA	**0 NTU**	--	**2.1 NTU**	**0.2 NTU**	**2.3 NTU**	--	**2.3 NTU**
Metals								
Aluminum	Total	**64.7 ug/l**	**65.4 ug/l**	**69.3 ug/l**	**136 ug/l**	**128 ug/l**	**142 ug/l**	--
Aluminum	Dissolved	**58.3 ug/l**	**58.1 ug/l**	**58.1 ug/l**	**127 ug/l**	**105 ug/l**	**94.6 ug/l**	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12	PM-12	PM-12	PM-12		PM-12	PM-12
Date		9/9/2010	9/14/2010	9/23/2010	10/6/2010		10/26/2010	6/2/2011
Sample Type		N	N	N	N	FD	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	**50.3 mg/l**	**27.0 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	< 3 mg/l	< 3 mg/l
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	**19.6 mg/l**	**32.3 mg/l**
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	**19.4 mg/l**	**32.5 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	**52.1 mg/l**	**82.5 mg/l**
Chloride	NA	**5.22 mg/l**	--	**2.07 mg/l**	**3.51 mg/l**	**3.53 mg/l**	**4.96 mg/l**	**2.33 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**4.37 mg/l**	**4.47 mg/l**	**1.0 mg/l**	**5.50 mg/l**	--	**6.43 mg/l**	**4.41 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	**56.7 mg/l**	**34.2 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	**1.76 mg/l**	**1.56 mg/l**
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	**1.66 mg/l**	**1.56 mg/l**
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.43 pH units**	**6.39 pH units**	**6.4 pH units**	**6.49 pH units**	--	**6.50 pH units**	**6.57 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	**0.037 mg P/L**	**0.022 mg/l**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	**90 mg/l**	**79.0 mg/l**
Solids, total suspended	NA	--	--	--	--	--	**2 mg/l**	**3.5 mg/l**
Specific Conductance @ 25 ºC	NA	**98.7 umhos/cm**	**130.4 umhos/cm**	**4.0 umhos/cm**	**96.4 umhos/cm**	--	**179 umhos/cm**	**48 umhos/cm**
Sulfate, as SO4	NA	**1.42 mg/l**	--	**1.19 mg/l**	< 1 mg/l	< 1 mg/l	**1.65 mg/l**	< 1 mg/l
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**11.04 deg C**	**11.39 deg C**	**10.5 deg C**	**9.41 deg C**	--	**8.56 deg C**	**12.10 deg C**
Turbidity	NA	**10.11 NTU**	**1.1 NTU**	**92 NTU**	**0.3 NTU**	--	**3.1 NTU**	**0 NTU**
Metals								
Aluminum	Total	--	**104 ug/l**	--	--	--	--	--
Aluminum	Dissolved	--	**74.9 ug/l**	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	< 0.5 ug/l
Arsenic	Total	--	--	--	--	--	< 10 ug/l	**0.53 ug/l**
Barium	Total	--	--	--	--	--	**18.1 ug/l**	**10.9 ug/l**
Beryllium	Total	--	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Boron	Total	--	--	--	--	--	< 50 ug/l	< 50 ug/l
Cadmium	Total	--	--	--	--	--	< 0.02 ug/l	< 0.2 ug/l
Calcium	Total	--	--	--	--	--	**13.8 mg/l**	**8.36 mg/l**
Chromium	Total	--	--	--	--	--	< 1 ug/l	< 1 ug/l
Cobalt	Total	--	--	--	--	--	**0.5 ug/l**	**0.35 ug/l**
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	**0.58 j ug/l**	**1 ug/l**
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	**2150 ug/l**	**1420 ug/l**
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	**0.08 j ug/l**	< 0.5 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	**5.4 mg/l**	**3.25 mg/l**
Manganese	Total	--	--	--	--	--	**184 ug/l**	**71.2 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	**0.25 ug/l**	< 0.2 ug/l
Nickel	Total	--	--	--	--	--	**1.12 ug/l**	**1.36 ug/l**
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	**1.11 mg/l**	**0.29 mg/l**
Selenium	Total	--	--	--	--	--	**0.085 ug/l**	--
Silver	Total	--	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Sodium	Total	--	--	--	--	--	**4.07 mg/l**	**2.88 mg/l**
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Tin	Total	--	--	--	--	--	< 0.5 ug/l	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	< 6 ug/l	< 6 ug/l
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12	PM-12	PM-12	PM-12	PM-12	PM-12	PM-12
Date		7/26/2011	8/24/2011	9/20/2011	6/26/2012	7/25/2012	8/28/2012	9/24/2012
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	**30.4 mg/l**	--	--	**67.8 b mg/l**
Alkalinity, total, as CaCO3	NA	--	--	--	**30.4 mg/l**	--	--	**67.8 b mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	**44.4 mg/l**	**44.7 mg/l**	**41.2 mg/l**	**28.3 mg/l**
Chemical Oxygen Demand	NA	--	--	--	**113 b mg/l**	--	--	**94.7 mg/l**
Chloride	NA	**3.3 mg/l**	**3.94 mg/l**	**4.4 mg/l**	**1.3 mg/l**	**4.1 mg/l**	**3.4 mg/l**	**3.3 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**1.02 mg/l**	**2.12 mg/l**	--	**1.84 mg/l**	**0 mg/l**	**0.51 mg/l**	**4.21 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	**45.0 mg/l**	**69.5 mg/l**	**84.3 mg/l**	**105 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	< 0.10 mg/l	--	--	< 0.10 mg/l
Nitrogen, ammonia as N	NA	--	--	--	< 0.10 mg/l	--	--	< 0.10 mg/l
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.72 pH units**	**6.92 pH units**	--	**7.12 pH units**	**6.82 pH units**	**7.21 pH units**	**7.24 pH units**
Phosphorus, total, as P	NA	--	--	--	**0.056 b mg/l**	--	--	**0.13 mg/l**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	**133 mg/l**	**194 mg/l**	**186 mg/l**	**194 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**135.0 umhos/cm**	**213.0 umhos/cm**	--	**13.5 umhos/cm**	**0 umhos/cm**	**129.8 umhos/cm**	**117.8 umhos/cm**
Sulfate, as SO4	NA	< 1 mg/l	**26.5 mg/l**	**19.8 mg/l**	**5.4 mg/l**	< 1.0 mg/l	**2.9 mg/l**	**22.0 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**17.85 deg C**	**18.19 deg C**	--	**17.43 deg C**	**19.82 deg C**	**17.65 deg C**	**8.79 deg C**
Turbidity	NA	**2.0 NTU**	**1.1 NTU**	--	**0.1 NTU**	**10.2 NTU**	**0.7 NTU**	**9.2 NTU**
Metals								
Aluminum	Total	**130 ug/l**	**64.3 ug/l**	**54.8 ug/l**	**210 ug/l**	**140 ug/l**	**103 ug/l**	**72.5 ug/l**
Aluminum	Dissolved	**112 ug/l**	**68.6 ug/l**	**39.5 ug/l**	**184 ug/l**	**105 ug/l**	**64.5 ug/l**	**55.1 ug/l**
Antimony	Total	--	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	--	--	--	**1.7 ug/l**	**3.8 ug/l**	**3.6 ug/l**	**2.6 ug/l**
Barium	Total	--	--	--	**17.6 ug/l**	--	--	**21.7 ug/l**
Beryllium	Total	--	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Boron	Total	--	--	--	< 50.0 ug/l	--	--	< 50.0 ug/l
Cadmium	Total	--	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Calcium	Total	--	--	--	**10.1 mg/l**	**17.2 mg/l**	**20.2 mg/l**	**21.0 mg/l**
Chromium	Total	--	--	--	< 1.0 ug/l	--	--	< 1.0 ug/l
Cobalt	Total	--	--	--	**1.1 ug/l**	**4.0 ug/l**	**4.1 ug/l**	**1.1 ug/l**
Cobalt	Dissolved	--	--	--	**1.1 b ug/l**	**3.7 ug/l**	**3.3 ug/l**	**0.94 ug/l**
Copper	Total	--	--	--	**1.6 b ug/l**	**0.60 ug/l**	**0.68 ug/l**	**2.3 b ug/l**
Copper	Dissolved	--	--	--	**1.3 b ug/l**	**0.67 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Iron	Total	--	--	--	**3040 ug/l**	**10600 ug/l**	**11200 ug/l**	**8810 ug/l**
Iron	Dissolved	--	--	--	**2230 ug/l**	**7070 ug/l**	**4550 ug/l**	**5030 ug/l**
Lead	Total	--	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	**4.8 mg/l**	**6.5 mg/l**	**8.2 mg/l**	**12.8 mg/l**
Manganese	Total	--	--	--	**431 ug/l**	**1370 ug/l**	**1490 ug/l**	**292 ug/l**
Manganese	Dissolved	--	--	--	**414 b ug/l**	**1340 ug/l**	**1390 ug/l**	**252 ug/l**
Mercury	Total	--	--	--	**9.7 ng/l**	--	--	**2.8 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	**0.26 ug/l**	--	--	**0.38 ug/l**
Nickel	Total	--	--	--	**1.8 ug/l**	**2.0 b ug/l**	**2.1 b ug/l**	**1.3 ug/l**
Nickel	Dissolved	--	--	--	**1.8 b ug/l**	**2.1 ug/l**	**1.9 ug/l**	**1.1 ug/l**
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	**0.98 mg/l**	--	--	**2.0 mg/l**
Selenium	Total	--	--	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Sodium	Total	--	--	--	**2.5 mg/l**	--	--	**6.0 mg/l**
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	**0.011 j ug/l**	< 0.0004 ug/l	< 0.005 ug/l	**0.021 ug/l**
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	< 3.0 ug/l	--	--	< 3.0 ug/l
Zinc	Total	--	--	--	**10.1 ug/l**	< 6.0 ug/l	**6.7 ug/l**	< 6.0 ug/l
Zinc	Dissolved	--	--	--	**12.0 b ug/l**	**8.5 ug/l**	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	PM-12 10/23/2012 N	PM-12 11/21/2012 N	PM-12 12/13/2012 N	PM-12 1/22/2013 N	PM-12 2/20/2013 N	PM-12 3/11/2013 N	PM-12 4/8/2013 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**42.7 mg/l**	--	--	**112 mg/l**	--
Alkalinity, total, as CaCO3	NA	--	--	**42.7 mg/l**	--	--	**112 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**15.8 mg/l**	**18.2 mg/l**	**15.5 mg/l**	**18.7 mg/l**	**13.4 mg/l**	**11.5 mg/l**	**12.4 mg/l**
Chemical Oxygen Demand	NA	--	--	**43.4 mg/l**	--	--	**25.2 mg/l**	--
Chloride	NA	**5.6 mg/l**	**7.3 mg/l**	**5.8 mg/l**	**6.4 mg/l**	**5.5 mg/l**	**5.2 mg/l**	**22.3 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**3.7 mg/l**	**4.97 mg/l**	**3.57 mg/l**	**6.57 mg/l**	**6.24 mg/l**	**5.11 mg/l**	**6.12 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**95.1 mg/l**	**50.8 mg/l**	**48.0 mg/l**	**89.8 mg/l**	**119 mg/l**	**157 mg/l**	**52.6 mg/l**
Nitrate + Nitrite, as N	NA	--	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--
Nitrogen, ammonia as N	NA	--	--	< 0.10 mg/l	--	--	**0.56 * mg/l**	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.92 pH units**	**7.61 pH units**	**6.92 pH units**	**6.59 pH units**	**7.1 pH units**	**6.45 pH units**	**6.64 pH units**
Phosphorus, total, as P	NA	--	--	**0.022 mg/l**	--	--	**0.059 mg/l**	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**149 mg/l**	**96.0 mg/l**	**103 mg/l**	**141 mg/l**	**183 mg/l**	**245 mg/l**	**168 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**216.9 umhos/cm**	**0 umhos/cm**	**0 umhos/cm**	**504.6 umhos/cm**	**244 umhos/cm**	**300 umhos/cm**	**177.1 umhos/cm**
Sulfate, as SO4	NA	**24.9 mg/l**	**3.7 mg/l**	**3.8 mg/l**	**5.4 mg/l**	**18.4 mg/l**	**54.5 mg/l**	**3.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**7.52 deg C**	**1.62 deg C**	**1.77 deg C**	**0.22 deg C**	**4.28 deg C**	**5.53 deg C**	**5.88 deg C**
Turbidity	NA	**22.8 NTU**	**0 NTU**	**1.1 NTU**	**0 NTU**	**14.6 NTU**	**39.5 NTU**	**70.1 NTU**
Metals								
Aluminum	Total	**49.0 ug/l**	**89.2 ug/l**	**77.4 ug/l**	**76.8 ug/l**	**55.8 ug/l**	**44.4 ug/l**	**88.7 ug/l**
Aluminum	Dissolved	**42.9 ug/l**	**64.7 ug/l**	**57.5 ug/l**	**46.0 ug/l**	**32.2 ug/l**	**24.9 ug/l**	**39.8 ug/l**
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	**0.88 ug/l**	**0.93 ug/l**	**0.54 ug/l**	**1.4 ug/l**	**1.5 ug/l**	**1.3 ug/l**	**0.86 ug/l**
Barium	Total	--	--	**19.2 ug/l**	--	--	**55.9 ug/l**	--
Beryllium	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Boron	Total	--	--	< 50.0 ug/l	--	--	< 50.0 ug/l	--
Cadmium	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Calcium	Total	**18.3 mg/l**	**12.1 mg/l**	**11.6 mg/l**	**21.8 mg/l**	**26.6 mg/l**	**29.3 mg/l**	**12.5 mg/l**
Chromium	Total	--	--	< 1.0 ug/l	--	--	< 1.0 ug/l	--
Cobalt	Total	**0.67 ug/l**	**1.4 ug/l**	**0.52 ug/l**	**3.1 ug/l**	**2.3 ug/l**	**1.5 ug/l**	**0.71 ug/l**
Cobalt	Dissolved	**0.60 ug/l**	**1.4 ug/l**	**0.50 ug/l**	**3.1 ug/l**	**2.1 ug/l**	**1.5 ug/l**	**0.69 ug/l**
Copper	Total	**0.67 ug/l**	**0.90 ug/l**	**0.65 ug/l**	**1.0 ug/l**	**0.68 ug/l**	**0.50 ug/l**	**1.1 ug/l**
Copper	Dissolved	**0.64 ug/l**	**0.86 ug/l**	**0.64 ug/l**	**1.5 ug/l**	**0.58 ug/l**	< 0.50 ug/l	**1.0 ug/l**
Iron	Total	**2800 ug/l**	**3800 ug/l**	**2540 ug/l**	**7210 ug/l**	**7950 ug/l**	**6220 ug/l**	**2970 ug/l**
Iron	Dissolved	**1830 ug/l**	**2980 ug/l**	**1860 ug/l**	**4060 ug/l**	**3100 ug/l**	**2110 ug/l**	**1990 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**12.0 mg/l**	**5.0 mg/l**	**4.6 mg/l**	**8.6 mg/l**	**12.8 mg/l**	**20.3 mg/l**	**5.2 mg/l**
Manganese	Total	**253 ug/l**	**463 ug/l**	**170 ug/l**	**1330 ug/l**	**959 ug/l**	**727 ug/l**	**306 ug/l**
Manganese	Dissolved	**230 ug/l**	**467 ug/l**	**164 ug/l**	**1340 ug/l**	**943 ug/l**	**777 ug/l**	**312 ug/l**
Mercury	Total	--	--	**2.5 ng/l**	--	--	**1.4 ng/l**	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	**0.31 ug/l**	--	--	**1.0 ug/l**	--
Nickel	Total	**0.64 ug/l**	**0.89 ug/l**	**0.67 ug/l**	**1.2 ug/l**	**0.92 ug/l**	< 0.50 ug/l	**0.82 ug/l**
Nickel	Dissolved	**0.62 ug/l**	**0.90 ug/l**	**0.64 ug/l**	**1.2 ug/l**	**0.64 ug/l**	< 0.50 ug/l	**1.1 ug/l**
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	**0.69 mg/l**	--	--	**4.0 mg/l**	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Sodium	Total	--	--	**4.0 mg/l**	--	--	**9.0 mg/l**	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	**0.0097 jb ug/l**	< 0.0004 ug/l	< 0.002 ug/l	< 0.0004 ug/l	--	--	**0.006 j ug/l**
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	< 3.0 ug/l	--	--	< 3.0 ug/l	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**6.7 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	**9.0 ug/l**	**7.3 ug/l**	< 6.0 ug/l	**11.2 ug/l**	**7.0 ug/l**	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	PM-12 5/7/2013 N	PM-12 6/6/2013 N	PM-12 6/6/2013 FD	PM-12 7/8/2013 N	PM-12 7/8/2013 FD	PM-12 8/13/2013 N	PM-12 9/11/2013 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	**39.3 mg/l**	**39.4 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	**39.3 mg/l**	**39.4 mg/l**	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**16.1 mg/l**	**23.0 mg/l**	**22.7 mg/l**	**39.1 mg/l**	**37.1 mg/l**	**33.9 mg/l**	**27.3 mg/l**
Chemical Oxygen Demand	NA	--	--	--	**120 mg/l**	**122 mg/l**	--	--
Chloride	NA	**2.2 mg/l**	**2.2 mg/l**	**2.2 mg/l**	**2.3 mg/l**	**2.2 mg/l**	**2.8 mg/l**	**4.6 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**6.7 mg/l**	**4.85 mg/l**	--	**0.88 mg/l**	--	**0.94 mg/l**	**2.54 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**17.8 mg/l**	**26.2 mg/l**	**26.9 mg/l**	**51.5 mg/l**	**48.1 mg/l**	**61.6 mg/l**	**76.6 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	< 0.10 mg/l	< 0.10 mg/l	--	--
Nitrogen, ammonia as N	NA	--	--	--	**0.19 mg/l**	< 0.10 mg/l	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**5.84 pH units**	**5.95 pH units**	--	**6.57 pH units**	--	**6.22 pH units**	**7.07 pH units**
Phosphorus, total, as P	NA	--	--	--	**0.076 mg/l**	**0.080 mg/l**	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**77.0 mg/l**	**101 mg/l**	**114 mg/l**	**153 mg/l**	**148 mg/l**	**138 mg/l**	**185 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**41.3 umhos/cm**	**47.2 umhos/cm**	--	**86.3 umhos/cm**	--	**112.9 umhos/cm**	**149.7 umhos/cm**
Sulfate, as SO4	NA	**2.7 mg/l**	**1.3 mg/l**	**1.3 mg/l**	< 1.0 mg/l	< 1.0 mg/l	< 1.0 mg/l	< 1.0 mg/l
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**5.05 deg C**	**10.75 deg C**	--	**19.98 deg C**	--	**15.57 deg C**	**16.39 deg C**
Turbidity	NA	**4.2 NTU**	**0 NTU**	--	**2.5 NTU**	--	**15.0 NTU** **3000 NTU**	**10.9 NTU**
Metals								
Aluminum	Total	**103 ug/l**	**141 ug/l**	**145 ug/l**	**195 ug/l**	**189 ug/l**	**120 ug/l**	**98.7 ug/l**
Aluminum	Dissolved	**87.8 ug/l**	**126 ug/l**	**129 ug/l**	**144 ug/l**	**143 ug/l**	**91.5 ug/l**	**89.8 ug/l**
Antimony	Total	< 0.50 ug/l	--	--	< 0.50 ug/l	< 0.50 ug/l	--	--
Arsenic	Total	< 0.50 ug/l	**0.66 ug/l**	**0.51 ug/l**	**2.2 ug/l**	**2.1 ug/l**	**2.2 ug/l**	**3.0 ug/l**
Barium	Total	--	--	--	**22.5 ug/l**	**23.1 ug/l**	--	--
Beryllium	Total	--	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--
Boron	Total	--	--	--	< 50.0 ug/l	< 50.0 ug/l	--	--
Cadmium	Total	--	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--
Calcium	Total	**4.1 mg/l**	**6.2 mg/l**	**6.4 mg/l**	**12.7 mg/l**	**11.8 mg/l**	**15.1 mg/l**	**18.5 mg/l**
Chromium	Total	--	--	--	< 1.0 ug/l	< 1.0 ug/l	--	--
Cobalt	Total	< 0.20 ug/l	**0.25 ug/l**	**0.25 ug/l**	**3.2 ug/l**	**3.2 ug/l**	**3.1 ug/l**	**3.4 ug/l**
Cobalt	Dissolved	< 0.20 ug/l	**0.24 ug/l**	**0.24 ug/l**	**3.1 ug/l**	**2.9 ug/l**	**2.8 ug/l**	**3.3 ug/l**
Copper	Total	**1.3 ug/l**	**1.7 ug/l**	**1.3 ug/l**	**0.80 ug/l**	**0.80 ug/l**	**0.61 ug/l**	**0.63 ug/l**
Copper	Dissolved	**1.4 ug/l**	**1.3 ug/l**	**1.3 ug/l**	**0.71 ug/l**	**0.66 ug/l**	< 0.50 ug/l	**0.60 ug/l**
Iron	Total	**663 ug/l**	**1130 ug/l**	**1100 ug/l**	**5980 ug/l**	**5920 ug/l**	**7680 ug/l**	**10500 ug/l**
Iron	Dissolved	**541 ug/l**	**846 ug/l**	**868 ug/l**	**4160 ug/l**	**4140 ug/l**	**5260 ug/l**	**9800 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Total	**1.9 mg/l**	**2.6 mg/l**	**2.7 mg/l**	**4.8 mg/l**	**4.5 mg/l**	**5.8 mg/l**	**7.4 mg/l**
Manganese	Total	**15.0 ug/l**	**38.1 ug/l**	**37.3 ug/l**	**1000 ug/l**	**1040 ug/l**	**964 ug/l**	**1080 ug/l**
Manganese	Dissolved	**13.6 ug/l**	**35.8 ug/l**	**38.1 ug/l**	**971 ug/l**	**927 ug/l**	**848 ug/l**	**1040 ug/l**
Mercury	Total	--	--	--	**7.5 ng/l**	**7.7 ng/l**	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	**0.31 ug/l**	< 0.30 ug/l	--	--
Nickel	Total	**0.78 ug/l**	**1.1 ug/l**	**1.1 ug/l**	**2.0 ug/l**	**2.0 ug/l**	**1.5 ug/l**	**1.8 ug/l**
Nickel	Dissolved	**0.76 ug/l**	**1.1 ug/l**	**1.2 ug/l**	**2.0 ug/l**	**1.9 ug/l**	**1.4 ug/l**	**1.7 ug/l**
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	**0.70 mg/l**	**0.57 mg/l**	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--
Sodium	Total	--	--	--	**2.9 mg/l**	**2.7 mg/l**	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.002 ug/l	< 0.005 ug/l	< 0.005 ug/l	**0.013 j ug/l**	**0.008 j ug/l**	< 0.005 ug/l	**0.008 jb ug/l**
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	< 3.0 ug/l	< 3.0 ug/l	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**7.4 ug/l**	**7.6 ug/l**	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	**13.7 b ug/l**	< 6.0 ug/l	**7.3 ug/l**	**10.7 ug/l**	**9.1 ug/l**	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	PM-12	PM-12	PM-12	PM-12.1	PM-12.1		PM-12.1
	Date	10/10/2013	11/19/2013	12/19/2013	8/25/2010	9/9/2010		9/23/2010
	Sample Type	N	N	N	N	N	FD	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	**50.5 mg/l**	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**50.5 mg/l**	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**22.4 mg/l**	**17.1 mg/l**	**16.9 mg/l**	--	--	--	--
Chemical Oxygen Demand	NA	**77.4 mg/l**	--	--	--	--	--	--
Chloride	NA	**4.9 mg/l**	**5.7 mg/l**	**4.4 mg/l**	**1.42 mg/l**	**2.12 mg/l**	**2.08 mg/l**	**2.01 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**4.53 mg/l**	**9.14 mg/l**	**7.33 mg/l**	**3.19 mg/l**	**7.67 mg/l**	--	< 0.1 mg/l
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**56.0 mg/l**	**35.4 mg/l**	**54.0 mg/l**	--	--	--	--
Nitrate + Nitrite, as N	NA	< 0.10 mg/l	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	< 0.10 mg/l	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.81 pH units**	**7.78 pH units**	**6.86 pH units**	**7.67 pH units**	**7.68 pH units**	--	**7.7 pH units**
Phosphorus, total, as P	NA	**0.026 mg/l**	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**177 mg/l**	**112 mg/l**	**120 mg/l**	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**105 umhos/cm**	**75.8 umhos/cm**	**119.8 umhos/cm**	**823 umhos/cm**	**984.5 umhos/cm**	--	**10.7 umhos/cm**
Sulfate, as SO4	NA	< 2.0 mg/l	< 2.0 mg/l	< 2.0 mg/l	**218 mg/l**	**340 mg/l**	**334 mg/l**	**346 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**11.58 deg C**	**1.28 deg C**	**3.48 deg C**	**13.77 deg C**	**12.83 deg C**	--	**962 deg C**
Turbidity	NA	**8.2 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**22.2 NTU**	--	**6.1 NTU**
Metals								
Aluminum	Total	**61.6 ug/l**	**66.5 ug/l**	**77.7 ug/l**	--	--	--	--
Aluminum	Dissolved	**51.5 ug/l**	**55.9 ug/l**	**57.9 ug/l**	--	--	--	--
Antimony	Total	< 0.50 ug/l	--	--	--	--	--	--
Arsenic	Total	**1.2 ug/l**	**0.60 ug/l**	**0.61 ug/l**	--	--	--	--
Barium	Total	< 20.0 ug/l	--	--	--	--	--	--
Beryllium	Total	< 0.20 ug/l	--	--	--	--	--	--
Boron	Total	< 100 ug/l	--	--	--	--	--	--
Cadmium	Total	< 0.20 ug/l	--	--	--	--	--	--
Calcium	Total	**13.5 mg/l**	**8.2 mg/l**	**12.9 mg/l**	--	--	--	--
Chromium	Total	< 1.0 ug/l	--	--	--	--	--	--
Cobalt	Total	**0.92 ug/l**	< 0.20 ug/l	**0.61 ug/l**	--	--	--	--
Cobalt	Dissolved	**0.91 ug/l**	< 0.20 ug/l	**0.56 ug/l**	--	--	--	--
Copper	Total	< 0.50 ug/l	**0.80 ug/l**	**0.75 ug/l**	--	--	--	--
Copper	Dissolved	< 0.50 ug/l	**0.79 ug/l**	**0.67 ug/l**	--	--	--	--
Iron	Total	**3970 ug/l**	**1260 ug/l**	**4000 ug/l**	--	--	--	--
Iron	Dissolved	**2790 ug/l**	**940 ug/l**	**2850 ug/l**	--	--	--	--
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--	--	--
Lead	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--	--	--
Magnesium	Total	**5.4 mg/l**	**3.6 mg/l**	**5.3 mg/l**	--	--	--	--
Manganese	Total	**276 ug/l**	**35.3 ug/l**	**209 ug/l**	--	--	--	--
Manganese	Dissolved	**288 ug/l**	**32.2 ug/l**	**194 ug/l**	--	--	--	--
Mercury	Total	**3.1 ng/l**	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	< 0.30 ug/l	--	--	--	--	--	--
Nickel	Total	**1.0 ug/l**	**0.76 ug/l**	**0.68 ug/l**	--	--	--	--
Nickel	Dissolved	**0.92 ug/l**	**0.75 ug/l**	**0.61 ug/l**	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**1.3 mg/l**	--	--	--	--	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	--	--	--
Silver	Total	< 0.20 ug/l	--	--	--	--	--	--
Sodium	Total	**3.4 mg/l**	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	**0.006 jb ug/l**	< 0.005 ug/l	< 0.005 ug/l	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	< 3.0 ug/l	--	--	--	--	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	--	--	--
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location / Date / Sample Type		PM-12.1 10/6/2010 N	PM-12.1 10/26/2010 N	PM-12.1 6/2/2011 N	PM-12.1 6/2/2011 FD	PM-12.1 7/26/2011 N	PM-12.1 8/24/2011 N	PM-12.1 9/20/2011 N	PM-12.1 10/20/2011 N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	**159 mg/l**	**120 mg/l**	**119 mg/l**	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	< 2.4 mg/l	< 3 mg/l	< 3 mg/l	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	**10.1 mg/l**	**16.2 mg/l**	**10.5 mg/l**	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	--	**9.6 mg/l**	**16.0 mg/l**	**10.6 mg/l**	--	--	--	--
Chemical Oxygen Demand	NA	--	**24.4 mg/l**	**33.4 mg/l**	**31.4 mg/l**	--	--	--	--
Chloride	NA	**2.15 mg/l**	**2.76 mg/l**	**1.17 mg/l**	**1.39 mg/l**	**1.12 mg/l**	**1.22 mg/l**	**2.2 b mg/l**	**3.56 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	**6.40 mg/l**	**6.82 mg/l**	**7.16 mg/l**	--	**5.33 mg/l**	**5.91 mg/l**	--	< 0.1 mg/l
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	**429 mg/l**	**330 mg/l**	**335 mg/l**	--	--	--	--
Nitrate + Nitrite, as N	NA	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	**1.19 mg/l**	**1.14 mg/l**	**0.74 mg/l**	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	**1.09 mg/l**	**1.14 mg/l**	**0.74 mg/l**	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	**7.98 pH units**	**7.54 pH units**	**7.71 pH units**	--	**7.66 pH units**	**7.71 pH units**	--	**8.6 pH units**
Phosphorus, total, as P	NA	--	**0.024 mg P/L**	**0.022 mg/l**	**0.024 mg/l**	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	**439 mV**
Solids, total dissolved	NA	--	**551 mg/l**	**490 mg/l**	**493 mg/l**	--	--	--	--
Solids, total suspended	NA	--	< 1 mg/l	**2.8 mg/l**	**2 mg/l**	--	--	--	--
Specific Conductance @ 25 ºC	NA	**947 umhos/cm**	**876 umhos/cm**	**685 umhos/cm**	--	**732.0 umhos/cm**	**801.0 umhos/cm**	--	**1134 umhos/cm**
Sulfate, as SO4	NA	**348 mg/l**	**311 mg/l**	**235 mg/l**	**238 mg/l**	**186 mg/l**	**224 mg/l**	**81.6 mg/l**	**438 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	**8.97 deg C**	**9.33 deg C**	**12.76 deg C**	--	**13.68 deg C**	**14.01 deg C**	--	**5.4 deg C**
Turbidity	NA	**0 NTU**	**0 NTU**	**0 NTU**	--	**0 NTU**	**0 NTU**	--	**0 NTU**
Metals									
Aluminum	Total	--	--	--	--	**33.1 ug/l**	< 25 ug/l	**81.2 ug/l**	**30 ug/l**
Aluminum	Dissolved	--	--	--	--	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Antimony	Total	--	--	< 0.5 ug/l	< 0.5 ug/l	--	--	--	--
Arsenic	Total	--	< 1 ug/l	< 0.5 ug/l	< 0.5 ug/l	--	--	--	--
Barium	Total	--	**20.4 ug/l**	**18.5 ug/l**	**19.3 ug/l**	--	--	--	--
Beryllium	Total	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Boron	Total	--	< 50 ug/l	**50.4 ug/l**	**52.1 ug/l**	--	--	--	--
Cadmium	Total	--	< 0.02 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Calcium	Total	--	**39.6 mg/l**	**33 mg/l**	**33.6 mg/l**	--	--	--	--
Chromium	Total	--	< 1 ug/l	< 1 ug/l	< 1 ug/l	--	--	--	--
Cobalt	Total	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--	--
Copper	Total	--	**0.86 j ug/l**	< 0.7 ug/l	< 0.7 ug/l	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--	--
Iron	Total	--	**172 ug/l**	**320 ug/l**	**323 ug/l**	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--	--
Lead	Total	--	**0.04 j ug/l**	< 0.5 ug/l	< 0.5 ug/l	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	--	**80.1 mg/l**	**60.2 mg/l**	**61 mg/l**	--	--	--	--
Manganese	Total	--	**118 ug/l**	**161 ug/l**	**164 ug/l**	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	--	**0.39 ug/l**	**0.46 ug/l**	**0.49 ug/l**	--	--	--	--
Nickel	Total	--	**1.43 ug/l**	**0.88 ug/l**	**0.93 ug/l**	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	**17.8 mg/l**	**12.7 mg/l**	**12.9 mg/l**	--	--	--	--
Selenium	Total	--	**0.096 ug/l**	--	--	--	--	--	--
Silver	Total	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Sodium	Total	--	**32.4 mg/l**	**23 mg/l**	**23.5 mg/l**	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Tin	Total	--	< 0.5 ug/l	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--
Zinc	Total	--	< 6 ug/l	< 6 ug/l	< 6 ug/l	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.1	PM-12.1	PM-12.1	PM-12.1	PM-12.1	PM-12.1	PM-12.1
Date		6/26/2012	7/25/2012	8/28/2012	9/24/2012	10/23/2012	11/21/2012	12/13/2012
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**14.4 mg/l**	**14.1 mg/l**	**10.4 mg/l**	**9.4 mg/l**	**10.0 mg/l**	**6.3 mg/l**	**6.0 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**0.62 mg/l**	**3.1 mg/l**	**2.4 mg/l**	**2.2 mg/l**	**4.0 mg/l**	**3.8 mg/l**	**3.8 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**7.27 mg/l**	**5.72 mg/l**	**6.13 mg/l**	**10.36 mg/l**	**8.48 mg/l**	**9.6 mg/l**	**10.22 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.64 pH units**	**7.64 pH units**	**7.75 pH units**	**8.04 pH units**	**7.36 pH units**	**7.48 pH units**	**7.6 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**644.9 umhos/cm**	**616.6 umhos/cm**	**896.3 umhos/cm**	**664.4 umhos/cm**	**1147 umhos/cm**	**1094 umhos/cm**	**853.7 umhos/cm**
Sulfate, as SO4	NA	**235 mg/l**	**191 mg/l**	**297 mg/l**	**217 mg/l**	**427 mg/l**	**488 mg/l**	**567 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**17.59 deg C**	**18.56 deg C**	**14.46 deg C**	**8.12 deg C**	**8.25 deg C**	**2.14 deg C**	**0.65 deg C**
Turbidity	NA	**0 NTU**	**2.1 NTU**	**0 NTU**	**0 NTU**	**4.8 NTU**	**0 NTU**	**0 NTU**
Metals								
Aluminum	Total	**48.7 ug/l**	**122 ug/l**	**210 ug/l**	**33.3 ug/l**	**69.2 ug/l**	**61.7 ug/l**	**78.1 ug/l**
Aluminum	Dissolved	**21.7 ug/l**	**21.8 ug/l**	< 20.0 ug/l	**20.5 ug/l**	**36.2 ug/l**	< 40.0 ug/l	< 20.0 ug/l
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**448 ug/l**	**749 ug/l**	**186 ug/l**	**265 ug/l**	**231 ug/l**	**202 ug/l**	**222 ug/l**
Iron	Dissolved	**341 ug/l**	**482 ug/l**	**97.5 ug/l**	**145 ug/l**	**142 ug/l**	**114 ug/l**	**110 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**145 ug/l**	**301 ug/l**	**137 ug/l**	**225 ug/l**	**108 ug/l**	**83.7 ug/l**	**191 ug/l**
Manganese	Dissolved	**137 b ug/l**	**261 ug/l**	**120 ug/l**	**201 ug/l**	**96.3 ug/l**	**85.3 ug/l**	**181 ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.1	PM-12.1	PM-12.1	PM-12.1	PM-12.1	PM-12.1	PM-12.1
Date		1/22/2013	2/20/2013	3/11/2013	4/8/2013	5/7/2013	6/6/2013	7/8/2013
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**7.1 mg/l**	**4.5 mg/l**	**4.2 mg/l**	**6.4 mg/l**	**8.0 mg/l**	**9.2 mg/l**	**12.6 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**4.9 mg/l**	**4.2 mg/l**	**4.0 mg/l**	**3.5 mg/l**	**1.2 mg/l**	**1.2 mg/l**	**0.68 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**11 mg/l**	**10.73 mg/l**	**10.76 mg/l**	**11.14 mg/l**	**11.01 mg/l**	**8.82 mg/l**	**5.92 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7 pH units**	**6.68 pH units**	**7.71 pH units**	**7.08 pH units**	**6.93 pH units**	**7.08 pH units**	**7.53 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**1660 umhos/cm**	**1752 umhos/cm**	**1400 umhos/cm**	**1365 umhos/cm**	**513.4 umhos/cm**	**626.8 umhos/cm**	**753 umhos/cm**
Sulfate, as SO4	NA	**944 mg/l**	**882 mg/l**	**815 mg/l**	**640 mg/l**	**188 mg/l**	**230 mg/l**	**263 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**-0.06 deg C**	**0.79 deg C**	**2.11 deg C**	**0.36 deg C**	**3.6 deg C**	**11.45 deg C**	**19.93 deg C**
Turbidity	NA	**0 NTU**	**0.5 NTU**	**497 NTU**	**14.4 NTU**	**6 NTU**	**0 NTU**	**0 NTU**
Metals								
Aluminum	Total	**69.8 ug/l**	**56.9 ug/l**	**36.5 ug/l**	**64.0 ug/l**	**41.4 ug/l**	**45.9 ug/l**	**49.9 ug/l**
Aluminum	Dissolved	**25.4 ug/l**	**24.0 ug/l**	**22.7 ug/l**	**23.9 ug/l**	**23.3 ug/l**	< 20.0 ug/l	< 20.0 ug/l
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**255 ug/l**	**244 ug/l**	**202 ug/l**	**295 ug/l**	**344 ug/l**	**348 ug/l**	**458 ug/l**
Iron	Dissolved	**137 ug/l**	**98.4 ug/l**	**81.0 ug/l**	**158 ug/l**	**258 ug/l**	**239 ug/l**	**366 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**669 ug/l**	**342 ug/l**	**226 ug/l**	**191 ug/l**	**122 ug/l**	**187 ug/l**	**316 ug/l**
Manganese	Dissolved	**664 ug/l**	**346 ug/l**	**227 ug/l**	**187 ug/l**	**118 ug/l**	**160 ug/l**	**274 ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.1	PM-12.1	PM-12.1	PM-12.1	PM-12.1	PM-12.2	PM-12.2
Date		8/13/2013	9/11/2013	10/10/2013	11/19/2013	12/19/2013	8/25/2010	9/9/2010
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**11.3 mg/l**	**12.1 mg/l**	**10.9 mg/l**	**6.8 mg/l**	**5.5 mg/l**	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**1.3 mg/l**	**2.2 mg/l**	**2.9 mg/l**	**3.3 mg/l**	**4.0 mg/l**	**2.64 mg/l**	**3.68 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**6.51 mg/l**	**3.97 mg/l**	**7.93 mg/l**	**11.75 mg/l**	**9.93 mg/l**	**2.75 mg/l**	**3.88 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.36 pH units**	**7.45 pH units**	**7.43 pH units**	**7.62 pH units**	**7.11 pH units**	**7.12 pH units**	**6.91 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**910.3 umhos/cm**	**985.4 umhos/cm**	**1063 umhos/cm**	**1062 umhos/cm**	**1480 umhos/cm**	**322 umhos/cm**	**377.4 umhos/cm**
Sulfate, as SO4	NA	**296 mg/l**	**308 mg/l**	**410 mg/l**	**471 mg/l**	**659 mg/l**	**49.2 mg/l**	**81.2 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**15.07 deg C**	**15.41 deg C**	**11.58 deg C**	**0.71 deg C**	**1.82 deg C**	**18.81 deg C**	**12.2 deg C**
Turbidity	NA	**0.95 NTU** **3000 NTU**	**3.6 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**5.1 NTU**	**5.8 NTU**
Metals								
Aluminum	Total	**32.5 ug/l**	**92.2 ug/l**	< 40.0 ug/l	< 20.0 ug/l	**21.1 ug/l**	--	--
Aluminum	Dissolved	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	--	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**297 ug/l**	**546 ug/l**	**281 ug/l**	**185 ug/l**	**209 ug/l**	--	--
Iron	Dissolved	**221 ug/l**	**385 ug/l**	**170 ug/l**	**124 ug/l**	**88.8 ug/l**	--	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**246 ug/l**	**496 ug/l**	**129 ug/l**	**76.9 ug/l**	**249 ug/l**	--	--
Manganese	Dissolved	**208 ug/l**	**497 ug/l**	**120 ug/l**	**80.1 ug/l**	**249 ug/l**	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	PM-12.2 9/23/2010 N	PM-12.2 10/6/2010 N	PM-12.2 7/26/2011 N	PM-12.2 8/24/2011 N	PM-12.2 9/20/2011 N	PM-12.2 10/20/2011 N	PM-12.2 6/26/2012 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	**46.6 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**3.12 mg/l**	**3.69 mg/l**	**2.09 mg/l**	**1.89 mg/l**	**2.4 b mg/l**	**2.5 mg/l**	**1.3 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**2.2 mg/l**	**4.95 mg/l**	**2.17 mg/l**	**2.18 mg/l**	--	< 0.1 mg/l	**0.17 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.1 pH units**	**6.88 pH units**	**6.95 pH units**	**7.04 pH units**	--	**6.1 pH units**	**7.01 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	**437 mV**	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**11.5 umhos/cm**	**376 umhos/cm**	**316.0 umhos/cm**	**544.0 umhos/cm**	--	**549 umhos/cm**	**124 umhos/cm**
Sulfate, as SO4	NA	**124 mg/l**	**95.4 mg/l**	**53.8 mg/l**	**91.8 mg/l**	**71 mg/l**	**73.1 mg/l**	**30.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**456 deg C**	**10.23 deg C**	**20.15 deg C**	**17.56 deg C**	--	**6.4 deg C**	**18.85 deg C**
Turbidity	NA	**4.8 NTU**	**1.5 NTU**	**7.1 NTU**	**3.1 NTU**	--	**0 NTU**	**1.1 NTU**
Metals								
Aluminum	Total	--	--	**148 ug/l**	**130 ug/l**	**44.7 ug/l**	**36 ug/l**	**170 ug/l**
Aluminum	Dissolved	--	--	**47.4 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l	**160 ug/l**
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	**2640 ug/l**
Iron	Dissolved	--	--	--	--	--	--	**1890 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	**776 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	**795 b ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.2	PM-12.2	PM-12.2	PM-12.2	PM-12.2	PM-12.2
Date		7/25/2012	8/28/2012	9/24/2012	10/23/2012	11/21/2012	12/13/2012
Sample Type		N	N	N	N	N	N
Parameter	Total or Dissolved						
General Parameters							
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--
Carbon, total organic	NA	**44.0 mg/l**	**45.9 mg/l**	**41.8 mg/l**	**35.5 mg/l**	**20.5 mg/l**	**15.9 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--
Chloride	NA	**2.2 mg/l**	**2.7 mg/l**	**2.8 mg/l**	**2.8 mg/l**	**5.2 mg/l**	**5.8 mg/l**
Chloride	Dissolved	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--
Dissolved oxygen	NA	< 0.1 mg/l	**1.76 mg/l**	**1.47 mg/l**	**4.58 mg/l**	**5.08 mg/l**	**2.51 mg/l**
Fluoride	NA	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--
pH	NA	**7.05 pH units**	**7.51 pH units**	**7.74 pH units**	**7.12 pH units**	**7.14 pH units**	**7.2 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**223.3 umhos/cm**	**318.3 umhos/cm**	**356.1 umhos/cm**	**427.9 umhos/cm**	**355.6 umhos/cm**	**447.1 umhos/cm**
Sulfate, as SO4	NA	**39.6 mg/l**	**43.3 mg/l**	**52.8 mg/l**	**52.6 mg/l**	**131 mg/l**	**191 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--
Temperature, ºC	NA	**20.44 deg C**	**19.47 deg C**	**10.25 deg C**	**8.37 deg C**	**2.28 deg C**	**0.81 deg C**
Turbidity	NA	**7.2 NTU**	**0.7 NTU**	**31.4 NTU**	**19.7 NTU**	**0 NTU**	**4.5 NTU**
Metals							
Aluminum	Total	**91.1 ug/l**	**62.4 ug/l**	**174 ug/l**	**48.0 ug/l**	**60.4 ug/l**	**67.4 ug/l**
Aluminum	Dissolved	**77.4 ug/l**	**45.1 ug/l**	**46.9 ug/l**	**33.8 ug/l**	< 40.0 ug/l	**46.5 ug/l**
Antimony	Total	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--
Iron	Total	**3280 ug/l**	**2030 ug/l**	**1640 ug/l**	**982 ug/l**	**2500 ug/l**	**2830 ug/l**
Iron	Dissolved	**3040 ug/l**	**1130 ug/l**	**1310 ug/l**	**862 ug/l**	**1970 ug/l**	**1840 ug/l**
Lead	Total	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--
Manganese	Total	**1440 ug/l**	**1140 ug/l**	**559 ug/l**	**225 ug/l**	**615 ug/l**	**807 ug/l**
Manganese	Dissolved	**1390 ug/l**	**1120 ug/l**	**534 ug/l**	**219 ug/l**	**627 ug/l**	**644 ug/l**
Mercury	Total	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.2	PM-12.2	PM-12.2	PM-12.2	PM-12.2	PM-12.2	PM-12.2
Date		1/22/2013	2/20/2013	3/11/2013	4/8/2013	5/7/2013	6/6/2013	7/8/2013
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**13.7 mg/l**	**8.5 mg/l**	**8.2 mg/l**	**8.7 mg/l**	**15.7 mg/l**	**22.7 mg/l**	**34.1 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**4.0 mg/l**	**4.5 mg/l**	**4.6 mg/l**	**10.3 mg/l**	**2.0 mg/l**	**2.4 mg/l**	**1.9 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**0.37 mg/l**	**9.72 mg/l**	**9.87 mg/l**	**5.94 mg/l**	**5.57 mg/l**	**5.22 mg/l**	**1.36 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**8.09 pH units**	**6.79 pH units**	**7.06 pH units**	**6.78 pH units**	**6.09 pH units**	**6.08 pH units**	**6.9 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**746.6 umhos/cm**	**1166 umhos/cm**	**1600 umhos/cm**	**793.1 umhos/cm**	**150.6 umhos/cm**	**164.2 umhos/cm**	**228 umhos/cm**
Sulfate, as SO4	NA	**157 mg/l**	**490 mg/l**	**434 mg/l**	**318 mg/l**	**41.8 mg/l**	**38.8 mg/l**	**45.7 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**0.09 deg C**	**0.07 deg C**	**1.25 deg C**	**2.64 deg C**	**8.2 deg C**	**11.63 deg C**	**21.48 deg C**
Turbidity	NA	**3.2 NTU**	**5.6 NTU**	**17.4 NTU**	**57.5 NTU**	**2.7 NTU**	**0.6 NTU**	**9.4 NTU**
Metals								
Aluminum	Total	**57.0 ug/l**	**39.8 ug/l**	**41.6 ug/l**	**54.5 ug/l**	**78.4 ug/l**	**119 ug/l**	**143 ug/l**
Aluminum	Dissolved	**31.7 ug/l**	**24.9 ug/l**	**21.5 ug/l**	**30.8 ug/l**	**62.1 ug/l**	**95.5 ug/l**	**110 ug/l**
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**4450 ug/l**	**2230 ug/l**	**2050 ug/l**	**2630 ug/l**	**1090 ug/l**	**1440 ug/l**	**4370 ug/l**
Iron	Dissolved	**1990 ug/l**	**432 ug/l**	**346 ug/l**	**1210 ug/l**	**766 ug/l**	**944 ug/l**	**2970 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**1250 ug/l**	**832 ug/l**	**625 ug/l**	**449 ug/l**	**90.9 ug/l**	**78.9 ug/l**	**1060 ug/l**
Manganese	Dissolved	**1280 ug/l**	**869 ug/l**	**645 ug/l**	**448 ug/l**	**88.1 ug/l**	**75.3 ug/l**	**934 ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.2	PM-12.2	PM-12.2	PM-12.2	PM-12.2	PM-12.2	PM-12.3
Date		8/13/2013	8/13/2013	9/11/2013	10/10/2013	11/19/2013	12/19/2013	8/25/2010
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**27.6 mg/l**	--	**20.4 mg/l**	**15.1 mg/l**	**13.8 mg/l**	**12.4 mg/l**	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**2.3 mg/l**	--	**2.3 mg/l**	**3.6 mg/l**	**5.3 mg/l**	**5.1 mg/l**	**2.87 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	**4.49 mg/l**	**3.86 mg/l**	**8.07 mg/l**	**9.57 mg/l**	**5.72 mg/l**	**4.40 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	--	**6.85 pH units**	**7.43 pH units**	**7.52 pH units**	**7.56 pH units**	**6.68 pH units**	**7.29 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	--	**377.7 umhos/cm**	**500.9 umhos/cm**	**685.9 umhos/cm**	**391.3 umhos/cm**	**746 umhos/cm**	**207 umhos/cm**
Sulfate, as SO4	NA	**85.3 mg/l**	--	**109 mg/l**	**221 mg/l**	**137 mg/l**	**280 mg/l**	**9.71 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	--	**18.59 deg C**	**18.65 deg C**	**13.52 deg C**	**0.86 deg C**	**2.64 deg C**	**19.73 deg C**
Turbidity	NA	**3.7 NTU**	**3000 NTU**	**4.4 NTU**	**5.5 NTU**	**2.1 NTU**	**0 NTU**	**4.0 NTU**
Metals								
Aluminum	Total	**106 ug/l**	--	< 20.0 ug/l	**49.2 ug/l**	**63.6 ug/l**	**51.2 ug/l**	--
Aluminum	Dissolved	**45.9 ug/l**	--	< 20.0 ug/l	< 20.0 ug/l	**38.1 ug/l**	**39.5 ug/l**	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**2690 ug/l**	--	**862 ug/l**	**642 ug/l**	**1070 ug/l**	**2060 ug/l**	--
Iron	Dissolved	**2290 ug/l**	--	**679 ug/l**	**420 ug/l**	**726 ug/l**	**1430 ug/l**	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**375 ug/l**	--	**379 ug/l**	**143 ug/l**	**128 ug/l**	**948 ug/l**	--
Manganese	Dissolved	**307 ug/l**	--	**340 ug/l**	**118 ug/l**	**139 ug/l**	**916 ug/l**	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3
Date		9/9/2010	9/23/2010	10/6/2010	7/26/2011	8/24/2011	9/20/2011	10/20/2011
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**4.97 mg/l**	**3.53 mg/l**	**3.82 mg/l**	**1.67 mg/l**	**2.18 mg/l**	**3.62 b mg/l**	**5.63 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**6.68 mg/l**	**1.0 mg/l**	**6.80 mg/l**	**5.18 mg/l**	**6.68 mg/l**	--	< 0.1 mg/l
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.99 pH units**	**7.3 pH units**	**7.25 pH units**	**7.03 pH units**	**7.52 pH units**	--	**7.2 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	**463 mV**
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**213.7 umhos/cm**	**246 umhos/cm**	**204 umhos/cm**	**173.0 umhos/cm**	**184.0 umhos/cm**	--	**329 umhos/cm**
Sulfate, as SO4	NA	**18 mg/l**	**29.5 mg/l**	**24.3 mg/l**	**7.94 mg/l**	**5.64 mg/l**	**5.86 mg/l**	**8.68 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**11.71 deg C**	**11.5 deg C**	**10.08 deg C**	**20.67 deg C**	**20.01 deg C**	--	**5.4 deg C**
Turbidity	NA	**3.0 NTU**	**6.9 NTU**	**1.5 NTU**	**2.1 NTU**	**0 NTU**	--	**0 NTU**
Metals								
Aluminum	Total	--	--	--	**103 ug/l**	**36 ug/l**	**26.8 ug/l**	**36.2 ug/l**
Aluminum	Dissolved	--	--	--	**65.9 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3
Date		6/26/2012	7/25/2012	8/28/2012	9/24/2012	10/23/2012	11/21/2012	12/13/2012
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**46.3 mg/l**	**39.4 mg/l**	**44.7 mg/l**	**29.4 mg/l**	**19.8 mg/l**	**15.1 mg/l**	**15.9 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**1.5 mg/l**	**2.1 mg/l**	**2.2 mg/l**	**3.3 mg/l**	**4.3 mg/l**	**7.2 mg/l**	**7.5 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**2.96 mg/l**	**4.58 mg/l**	**4.64 mg/l**	**6.5 mg/l**	**8.34 mg/l**	**9.62 mg/l**	**8.21 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.35 pH units**	**7.47 pH units**	**7.79 pH units**	**7.89 pH units**	**7.32 pH units**	**7.46 pH units**	**7.03 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**95.7 umhos/cm**	**114.5 umhos/cm**	**165.8 umhos/cm**	**227.1 umhos/cm**	**277.1 umhos/cm**	**263.2 umhos/cm**	**244.9 umhos/cm**
Sulfate, as SO4	NA	**14.8 mg/l**	**10.7 mg/l**	**8.1 mg/l**	**36.1 mg/l**	**16.7 mg/l**	**78.7 mg/l**	**79.8 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**18.57 deg C**	**22.72 deg C**	**20.75 deg C**	**11.63 deg C**	**8 deg C**	**1.9 deg C**	**0.27 deg C**
Turbidity	NA	**3.1 NTU**	**4.5 NTU**	**0.3 NTU**	**1.5 NTU**	**18.6 NTU**	**2.8 NTU**	**1 NTU**
Metals								
Aluminum	Total	**367 ug/l**	**150 ug/l**	**134 ug/l**	**55.7 ug/l**	**64.3 ug/l**	**283 ug/l**	**84.7 ug/l**
Aluminum	Dissolved	**133 ug/l**	**68.3 ug/l**	**97.3 ug/l**	**42.1 ug/l**	**41.6 ug/l**	< 40.0 ug/l	**47.2 ug/l**
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**2680 ug/l**	**6620 ug/l**	**6590 ug/l**	**1530 ug/l**	**1690 ug/l**	**1560 ug/l**	**2010 ug/l**
Iron	Dissolved	**1900 ug/l**	**6240 ug/l**	**6060 ug/l**	**1330 ug/l**	**1410 ug/l**	**809 ug/l**	**1400 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**402 ug/l**	**1660 ug/l**	**1350 ug/l**	**974 ug/l**	**285 ug/l**	**247 ug/l**	**169 ug/l**
Manganese	Dissolved	**366 b ug/l**	**1640 ug/l**	**1360 ug/l**	**887 ug/l**	**270 ug/l**	**79.2 ug/l**	**319 ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3
Date		1/22/2013	2/20/2013	3/11/2013	4/8/2013	5/7/2013	6/6/2013	7/8/2013
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**14.4 mg/l**	**11.7 mg/l**	**11.2 mg/l**	**9.9 mg/l**	**17.0 mg/l**	**23.1 mg/l**	**32.9 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**9.1 mg/l**	**10.4 mg/l**	**8.9 mg/l**	**11.2 mg/l**	**2.0 mg/l**	**2.5 mg/l**	**2.0 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**11.34 mg/l**	**11.96 mg/l**	**9.65 mg/l**	**9.42 mg/l**	**7.75 mg/l**	**7.45 mg/l**	**4.79 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.85 pH units**	**7.01 pH units**	**6.82 pH units**	**7.11 pH units**	**6.27 pH units**	**6.42 pH units**	**6.86 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**141.4 umhos/cm**	**790.3 umhos/cm**	**400 umhos/cm**	**641.5 umhos/cm**	**105.3 umhos/cm**	**114.8 umhos/cm**	**168 umhos/cm**
Sulfate, as SO4	NA	**115 mg/l**	**221 mg/l**	**200 mg/l**	**177 mg/l**	**17.6 mg/l**	**13.8 mg/l**	**16.3 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**-0.01 deg C**	**0.73 deg C**	**1.61 deg C**	**1.9 deg C**	**6.54 deg C**	**11.66 deg C**	**21.45 deg C**
Turbidity	NA	**6 NTU**	**3.3 NTU**	**8.5 NTU**	**27.6 NTU**	**6 NTU**	**2.2 NTU**	**0.3 NTU**
Metals								
Aluminum	Total	**72.8 ug/l**	**58.9 ug/l**	**63.9 ug/l**	**56.8 ug/l**	**250 ug/l**	**169 ug/l**	**182 ug/l**
Aluminum	Dissolved	**30.0 ug/l**	**26.9 ug/l**	**25.9 ug/l**	**25.7 ug/l**	**27.6 ug/l**	**85.7 ug/l**	**92.3 ug/l**
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**2710 ug/l**	**1690 ug/l**	**1420 ug/l**	**1580 ug/l**	**999 ug/l**	**1570 ug/l**	**4090 ug/l**
Iron	Dissolved	**1590 ug/l**	**630 ug/l**	**659 ug/l**	**800 ug/l**	**556 ug/l**	**1040 ug/l**	**3500 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**828 ug/l**	**838 ug/l**	**458 ug/l**	**450 ug/l**	**43.3 ug/l**	**160 ug/l**	**640 ug/l**
Manganese	Dissolved	**791 ug/l**	**841 ug/l**	**464 ug/l**	**460 ug/l**	**30.5 ug/l**	**138 ug/l**	**590 ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.3	PM-12.4	PM-12.4
Date		8/13/2013	9/11/2013	10/10/2013	11/19/2013	12/19/2013	8/25/2010	9/9/2010
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**29.0 mg/l**	**22.4 mg/l**	**19.1 mg/l**	**14.1 mg/l**	**12.3 mg/l**	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**2.4 mg/l**	**2.7 mg/l**	**5.2 mg/l**	**6.5 mg/l**	**7.0 mg/l**	**3.52 mg/l**	**4.79 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**6.05 mg/l**	**5.29 mg/l**	**8.14 mg/l**	**12.35 mg/l**	**9.18 mg/l**	**5.14 mg/l**	**7.14 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.95 pH units**	**7.38 pH units**	**7.42 pH units**	**7.51 pH units**	**6.51 pH units**	**7.37 pH units**	**6.89 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**234.6 umhos/cm**	**216.2 umhos/cm**	**352.5 umhos/cm**	**283.2 umhos/cm**	**444 umhos/cm**	**214 umhos/cm**	**202.3 umhos/cm**
Sulfate, as SO4	NA	**22.6 mg/l**	**15.7 mg/l**	**43.4 mg/l**	**56.3 mg/l**	**101 mg/l**	**10.4 mg/l**	**14.7 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**17.9 deg C**	**18.12 deg C**	**12.18 deg C**	**0.23 deg C**	**1.96 deg C**	**19.63 deg C**	**11.57 deg C**
Turbidity	NA	**9.5 NTU** **3000 NTU**	**8.6 NTU**	**3.2 NTU**	**0 NTU**	**0 NTU**	**4.6 NTU**	**4.7 NTU**
Metals								
Aluminum	Total	**433 ug/l**	**152 ug/l**	**47.4 ug/l**	**86.7 ug/l**	**83.7 ug/l**	--	--
Aluminum	Dissolved	**65.1 ug/l**	**28.9 ug/l**	< 20.0 ug/l	**28.8 ug/l**	**34.2 ug/l**	--	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**4370 ug/l**	**2910 ug/l**	**1080 ug/l**	**1120 ug/l**	**1690 ug/l**	--	--
Iron	Dissolved	**3480 ug/l**	**2650 ug/l**	**855 ug/l**	**829 ug/l**	**1120 ug/l**	--	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**553 ug/l**	**1020 ug/l**	**255 ug/l**	**88.0 ug/l**	**382 ug/l**	--	--
Manganese	Dissolved	**499 ug/l**	**1030 ug/l**	**240 ug/l**	**85.4 ug/l**	**370 ug/l**	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4
Date		9/23/2010	10/6/2010	7/26/2011	8/24/2011	9/20/2011	10/20/2011	6/26/2012
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	**44.6 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**3.84 mg/l**	**4.13 mg/l**	**2.26 mg/l**	**4.36 mg/l**	**4.57 mg/l**	**3.89 mg/l**	**1.6 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**0.8 mg/l**	**8.11 mg/l**	**5.71 mg/l**	**6.36 mg/l**	--	< 0.1 mg/l	**3.75 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.4 pH units**	**7.27 pH units**	**7.10 pH units**	**7.69 pH units**	--	**7.2 pH units**	**7.41 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	**441 mV**	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**226 umhos/cm**	**211 umhos/cm**	**175.0 umhos/cm**	**334.0 umhos/cm**	--	**228 umhos/cm**	**91.3 umhos/cm**
Sulfate, as SO4	NA	**24.3 mg/l**	**20.9 mg/l**	**7.73 mg/l**	**11.2 mg/l**	**5.67 mg/l**	**9.45 mg/l**	**14.3 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**7.2 deg C**	**10.68 deg C**	**20.25 deg C**	**18.54 deg C**	--	**7.1 deg C**	**19.07 deg C**
Turbidity	NA	**11.3 NTU**	**2.0 NTU**	**1.4 NTU**	**0 NTU**	--	**0 NTU**	**2.8 NTU**
Metals								
Aluminum	Total	--	--	**108 ug/l**	**39.3 ug/l**	< 25 ug/l	**39.6 ug/l**	**318 ug/l**
Aluminum	Dissolved	--	--	**67.4 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l	**133 ug/l**
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	**2390 ug/l**
Iron	Dissolved	--	--	--	--	--	--	**1710 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	**263 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	**243 b ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4
Date		7/25/2012	8/28/2012	9/24/2012	10/23/2012	11/21/2012	12/13/2012	1/22/2013
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**36.2 mg/l**	**35.5 mg/l**	**23.2 mg/l**	**22.4 mg/l**	**16.9 mg/l**	**15.4 mg/l**	**13.6 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**2.4 mg/l**	**3.0 mg/l**	**4.4 mg/l**	**2.6 mg/l**	**5.3 mg/l**	**7.3 mg/l**	**12.3 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**5.26 mg/l**	**5.62 mg/l**	**7.44 mg/l**	**8.4 mg/l**	**10.1 mg/l**	**9.81 mg/l**	**10.87 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.56 pH units**	**7.8 pH units**	**8.13 pH units**	**7.28 pH units**	**7.45 pH units**	**7.73 pH units**	**8.16 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**115.7 umhos/cm**	**171.6 umhos/cm**	**193 umhos/cm**	**241.3 umhos/cm**	**151.1 umhos/cm**	**221.5 umhos/cm**	**358.1 umhos/cm**
Sulfate, as SO4	NA	**12.1 mg/l**	**8.8 mg/l**	**24.9 mg/l**	**22.8 mg/l**	**50.7 mg/l**	**72.2 mg/l**	**103 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**22.95 deg C**	**19.72 deg C**	**10.76 deg C**	**8.08 deg C**	**1.71 deg C**	**0.26 deg C**	**0.16 deg C**
Turbidity	NA	**3.8 NTU**	**0.1 NTU**	**0 NTU**	**18.2 NTU**	**4.3 NTU**	**1.3 NTU**	**12 NTU**
Metals								
Aluminum	Total	**161 ug/l**	**97.2 ug/l**	**130 ug/l**	**54.2 ug/l**	**292 ug/l**	**118 ug/l**	**88.5 ug/l**
Aluminum	Dissolved	**65.6 ug/l**	**65.3 ug/l**	**43.0 ug/l**	**35.6 ug/l**	< 40.0 ug/l	**45.0 ug/l**	**28.7 ug/l**
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**5790 ug/l**	**4830 ug/l**	**1310 ug/l**	**1930 ug/l**	**1720 ug/l**	**1760 ug/l**	**2290 ug/l**
Iron	Dissolved	**5540 ug/l**	**4450 ug/l**	**1070 ug/l**	**1810 ug/l**	**961 ug/l**	**1300 ug/l**	**1570 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**1050 ug/l**	**487 ug/l**	**581 ug/l**	**300 ug/l**	**233 ug/l**	**216 ug/l**	**631 ug/l**
Manganese	Dissolved	**1020 ug/l**	**452 ug/l**	**491 ug/l**	**302 ug/l**	**83.7 ug/l**	**267 ug/l**	**647 ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-12.4
Date		2/20/2013	3/11/2013	4/8/2013	5/8/2013	6/6/2013	7/8/2013	8/13/2013
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**10.9 mg/l**	**9.6 mg/l**	**9.4 mg/l**	**17.1 mg/l**	**22.8 mg/l**	**34.1 mg/l**	**27.5 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**9.9 mg/l**	**8.3 mg/l**	**13.0 mg/l**	**2.5 b mg/l**	**2.9 mg/l**	**2.3 mg/l**	**2.7 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**10.38 mg/l**	**9.74 mg/l**	**10.17 mg/l**	**7.41 mg/l**	**7.93 mg/l**	**5.54 mg/l**	**6.59 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.33 pH units**	**6.67 pH units**	**7.09 pH units**	**6.44 pH units**	**6.52 pH units**	**7.06 pH units**	**7.08 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**664.5 umhos/cm**	**600 umhos/cm**	**574.5 umhos/cm**	**106.7 umhos/cm**	**110.4 umhos/cm**	**167.2 umhos/cm**	**229.6 umhos/cm**
Sulfate, as SO4	NA	**153 mg/l**	**181 mg/l**	**145 mg/l**	**18.7 mg/l**	**12.5 mg/l**	**15.9 mg/l**	**20.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**1.58 deg C**	**1.79 deg C**	**2.31 deg C**	**8.81 deg C**	**11.8 deg C**	**21.46 deg C**	**17.98 deg C**
Turbidity	NA	**5.4 NTU**	**226.4 NTU**	**12.4 NTU**	**9.1 NTU**	**1.1 NTU**	**0.7 NTU**	**3.7 NTU** **3000 NTU**
Metals								
Aluminum	Total	**60.0 ug/l**	**41.3 ug/l**	**67.4 ug/l**	**349 ug/l**	**222 ug/l**	**185 ug/l**	**129 ug/l**
Aluminum	Dissolved	**24.0 ug/l**	**22.8 ug/l**	**26.5 ug/l**	**70.7 ug/l**	**87.2 ug/l**	**97.2 ug/l**	**58.5 ug/l**
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**1500 ug/l**	**1330 ug/l**	**1360 ug/l**	**1130 ug/l**	**1530 ug/l**	**3970 ug/l**	**3850 ug/l**
Iron	Dissolved	**686 ug/l**	**667 ug/l**	**773 ug/l**	**650 ug/l**	**980 ug/l**	**3570 ug/l**	**3650 ug/l**
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	**610 ug/l**	**390 ug/l**	**374 ug/l**	**53.7 ug/l**	**158 ug/l**	**542 ug/l**	**394 ug/l**
Manganese	Dissolved	**625 ug/l**	**406 ug/l**	**375 ug/l**	**35.2 ug/l**	**143 ug/l**	**491 ug/l**	**377 ug/l**
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-12.4	PM-12.4	PM-12.4	PM-12.4	PM-13	PM-13	PM-13
Date		9/11/2013	10/10/2013	11/19/2013	12/19/2013	4/12/2004	5/20/2004	6/23/2004
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	**26 mg/l**	**36 mg/l**	**74.4 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**21.9 mg/l**	**19.0 mg/l**	**13.9 mg/l**	**11.9 mg/l**	**15.1 mg/l**	**18.3 mg/l**	**17.4 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	**21 mg/l**	**40 mg/l**	**36 mg/l**
Chloride	NA	**4.0 mg/l**	**5.0 mg/l**	**6.6 mg/l**	**6.9 mg/l**	**3.8 mg/l**	**4.7 mg/l**	**4.2 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	< 20 ug/l	< 20 ug/l	< 20 ug/l
Dissolved oxygen	NA	**6.04 mg/l**	**8.55 mg/l**	**11.98 mg/l**	**9.92 mg/l**	**9.9 mg/l**	**10.4 mg/l**	--
Fluoride	NA	--	--	--	--	**0.18 mg/l**	**0.22 mg/l**	**0.32 mg/l**
Hardness, as CaCO3	NA	--	--	--	--	**35.6 mg/l**	**37.6 mg/l**	**73.7 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	--	**150 ug/l**	< 100 ug/l	**120 ug/l**
Nitrogen, ammonia as N	NA	--	--	--	--	< 100 ug/l	< 100 ug/l	< 100 ug/l
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.52 pH units**	**7.37 pH units**	**8.13 pH units**	**6.79 pH units**	**8.6 pH units**	**7.92 pH units**	**7.93 pH units**
Phosphorus, total, as P	NA	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	**68 mg/l**	**88 mg/l**	**205 mg/l**
Solids, total suspended	NA	--	--	--	--	**12 mg/l**	**9 mg/l**	**6 mg/l**
Specific Conductance @ 25 ºC	NA	**261.1 umhos/cm**	**325.5 umhos/cm**	**264.5 umhos/cm**	**423.5 umhos/cm**	**94 umhos/cm**	**117 umhos/cm**	**207.2 umhos/cm**
Sulfate, as SO4	NA	**16.7 mg/l**	**37.3 mg/l**	**50.5 mg/l**	**90.7 mg/l**	**17.2 mg/l**	**15.4 mg/l**	**28.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**17.81 deg C**	**11.75 deg C**	**0.15 deg C**	**1.43 deg C**	**1.8 deg C**	**10.8 deg C**	**15.4 deg C**
Turbidity	NA	**17.9 NTU**	**6.6 NTU**	**0.3 NTU**	**0 NTU**	**5 NTU**	**3 NTU**	--
Metals								
Aluminum	Total	**119 ug/l**	**43.8 ug/l**	**62.7 ug/l**	**79.6 ug/l**	**337 ug/l**	**356 ug/l**	**166 ug/l**
Aluminum	Dissolved	**26.8 ug/l**	< 20.0 ug/l	**30.0 ug/l**	**30.7 ug/l**	--	--	--
Antimony	Total	--	--	--	--	< 3 ug/l	< 3 ug/l	< 3 ug/l
Arsenic	Total	--	--	--	--	< 2 ug/l	< 2 ug/l	< 2 ug/l
Barium	Total	--	--	--	--	**14.3 ug/l**	**16.5 ug/l**	**30.7 ug/l**
Beryllium	Total	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Boron	Total	--	--	--	--	**46 ug/l**	< 35 ug/l	**44.9 ug/l**
Cadmium	Total	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l	< 0.2 ug/l
Calcium	Total	--	--	--	--	**7 mg/l**	**8.1 mg/l**	**16.3 mg/l**
Chromium	Total	--	--	--	--	**4.3 ug/l**	**1.5 ug/l**	< 1 ug/l
Cobalt	Total	--	--	--	--	< 1 ug/l	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	< 5 ug/l	< 5 ug/l	< 5 ug/l
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**2380 ug/l**	**1020 ug/l**	**1170 ug/l**	**1540 ug/l**	**730 ug/l**	**720 ug/l**	**1750 ug/l**
Iron	Dissolved	**2130 ug/l**	**855 ug/l**	**835 ug/l**	**1060 ug/l**	--	--	--
Lead	Total	--	--	--	--	< 1 ug/l	< 1 ug/l	< 1 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	**6.1 mg/l**	**6.2 mg/l**	**12 mg/l**
Manganese	Total	**767 ug/l**	**288 ug/l**	**89.4 ug/l**	**292 ug/l**	**30 ug/l**	**40 ug/l**	**170 ug/l**
Manganese	Dissolved	**748 ug/l**	**279 ug/l**	**84.5 ug/l**	**280 ug/l**	--	--	--
Mercury	Total	--	--	--	--	**0.0049 ug/l**	**0.0043 ug/l**	< 0.004 ug/l
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	< 5 ug/l	< 5 ug/l	< 5 ug/l
Nickel	Total	--	--	--	--	< 5 ug/l	< 5 ug/l	< 5 ug/l
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	< 25 ug/l	< 25 ug/l	< 25 ug/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	< 25 ug/l	< 25 ug/l	< 25 ug/l
Potassium	Total	--	--	--	--	**2200 ug/l**	**1500 ug/l**	**2200 ug/l**
Selenium	Total	--	--	--	--	< 2 ug/l	< 2 ug/l	< 2 ug/l
Silver	Total	--	--	--	--	< 1 ug/l	< 1 ug/l	< 1 ug/l
Sodium	Total	--	--	--	--	**5200 ug/l**	**6400 ug/l**	**9900 ug/l**
Strontium	Total	--	--	--	--	**29.1 ug/l**	**34.5 ug/l**	**65.7 ug/l**
Thallium	Total	--	--	--	--	< 2 ug/l	< 2 ug/l	< 2 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	**13 ug/l**	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	< 10 ug/l	< 10 ug/l	< 10 ug/l
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13
Date		7/28/2004	8/24/2004	8/25/2004	9/28/2004	10/26/2004	11/16/2004	7/11/2006
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**130 mg/l**	**174 mg/l**	--	**96.4 mg/l**	**84.7 mg/l**	**80.9 mg/l**	**99.8 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**13.6 mg/l**	--	--	**25.7 mg/l**	--	**16.8 mg/l**	**22.5 mg/l**
Chemical Oxygen Demand	NA	**28 mg/l**	--	--	**56.2 mg/l**	--	**35.3 mg/l**	**59 mg/l**
Chloride	NA	**6.7 mg/l**	**11.5 mg/l**	--	**8.4 mg/l**	**8.1 mg/l**	**8.2 mg/l**	**4.59 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	< 20 ug/l	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	--	--	**5.73 mg/l**
Fluoride	NA	**0.46 mg/l**	**0.81 mg/l**	--	**0.37 mg/l**	**0.31 mg/l**	**0.26 mg/l**	**0.27 mg/l**
Hardness, as CaCO3	NA	**139 mg/l**	**193 mg/l**	--	**102 mg/l**	**87.3 mg/l**	**84.7 mg/l**	**119 mg/l**
Nitrate + Nitrite, as N	NA	< 100 ug/l	--	--	< 100 ug/l	--	< 100 ug/l	< 100 ug/l
Nitrogen, ammonia as N	NA	< 100 ug/l	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.81 pH units**	**7.54 pH units**	--	**7.55 pH units**	**7.84 pH units**	**7.82 pH units**	**8 pH units** **7.6 pH units**
Phosphorus, total, as P	NA	**0.18 mg/l**	--	--	< 0.1 mg/l	--	< 0.1 mg/l	< 0.1 mg/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**176 mg/l**	**290 mg/l**	--	**193 mg/l**	**156 mg/l**	**151 mg/l**	**184 mg/l**
Solids, total suspended	NA	**5 mg/l**	--	--	**13 mg/l**	--	**11 mg/l**	**5 mg/l**
Specific Conductance @ 25 ºC	NA	**305.2 umhos/cm**	**473.8 umhos/cm**	--	**269 umhos/cm**	**242 umhos/cm**	**227 umhos/cm**	**256 umhos/cm** **274.4 umhos/cm**
Sulfate, as SO4	NA	**24.6 mg/l**	**46.6 mg/l**	--	**30 mg/l**	**35.4 mg/l**	**32.6 mg/l**	**27.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**20.7 deg C**	**14.4 deg C**	--	**13.2 deg C**	**6.8 deg C**	**1.1 deg C**	**23 deg C**
Turbidity	NA	--	--	--	--	--	--	**4.48 NTU**
Metals								
Aluminum	Total	**129 ug/l**	--	**43.9 ug/l**	**81.4 ug/l**	**76.2 ug/l**	**433 ug/l**	**76.3 ug/l**
Aluminum	Dissolved	--	--	--	--	--	--	--
Antimony	Total	< 3 ug/l	--	--	--	--	--	--
Arsenic	Total	< 2 ug/l	--	--	--	--	--	--
Barium	Total	**41.7 ug/l**	--	--	**30.6 ug/l**	--	**26.5 ug/l**	**34 ug/l**
Beryllium	Total	< 0.2 ug/l	--	--	--	--	--	--
Boron	Total	**68.9 ug/l**	--	--	--	--	--	--
Cadmium	Total	< 0.2 ug/l	--	--	--	--	--	--
Calcium	Total	**26.2 mg/l**	**31.9 mg/l**	--	**17.2 mg/l**	**14.5 mg/l**	**14.6 mg/l**	**22.8 mg/l**
Chromium	Total	**1.4 ug/l**	--	--	--	--	--	--
Cobalt	Total	< 1 ug/l	--	--	< 1 ug/l	--	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	**1.6 ug/l**	**1.1 ug/l**	--	**1.5 ug/l**	**1.3 ug/l**	**1.2 ug/l**	**1.6 ug/l**
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	**1700 ug/l**	--	--	**1340 ug/l**	--	**1490 ug/l**	**2.08 ug/l**
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	< 1 ug/l	< 0.3 ug/l	--	< 0.3 ug/l	< 0.3 ug/l	**0.63 ug/l**	< 0.6 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**17.8 mg/l**	**27.4 mg/l**	--	**14.4 mg/l**	**12.4 mg/l**	**11.7 mg/l**	**15 mg/l**
Manganese	Total	**200 ug/l**	--	--	**90 ug/l**	--	**140 ug/l**	**93 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	< 0.01 ug/l	**0.003 ug/l**	--	< 0.004 ug/l	< 0.01 ug/l	< 0.01 ug/l	**0.003 ug/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	< 5 ug/l	--	--	< 5 ug/l	--	< 5 ug/l	< 5 ug/l
Nickel	Total	< 5 ug/l	--	**1.7 ug/l**	**1.6 ug/l**	**1.3 ug/l**	**2.5 ug/l**	**2 ug/l**
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	< 25 ug/l	< 0.3 ug/l	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	< 0.02 mg/l
Platinum	Total	< 25 ug/l	< 0.25 ug/l	--	--	--	--	--
Potassium	Total	**2900 ug/l**	--	--	**2900 ug/l**	--	**2380 ug/l**	**2120 ug/l**
Selenium	Total	< 2 ug/l	< 3.6 ug/l	--	< 3.6 ug/l	< 3.6 ug/l	< 3.6 ug/l	< 1 ug/l
Silver	Total	< 1 ug/l	< 0.24 ug/l	--	< 0.24 ug/l	< 0.24 ug/l	< 0.24 ug/l	< 0.2 ug/l
Sodium	Total	**16100 ug/l**	**28300 ug/l**	--	**13600 ug/l**	**12800 ug/l**	**12200 ug/l**	**10200 ug/l**
Strontium	Total	**104 ug/l**	--	--	--	--	--	--
Thallium	Total	< 2 ug/l	< 0.4 ug/l	--	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l	< 0.4 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	< 10 ug/l	--	< 10 ug/l	< 10 ug/l	< 10 ug/l	**17.7 ug/l**	< 25 ug/l
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13
Date		8/29/2006	9/20/2006	10/13/2006	11/8/2006	3/23/2007	4/24/2007	5/22/2007
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**108 mg/l**	**135 mg/l**	**160 mg/l**	**107 mg/l**	**155 mg/l**	**41.0 mg/l**	**53.1 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**19.2 mg/l**	**16.5 mg/l**	**14.8 mg/l**	**14.6 mg/l**	**14.2 mg/l**	**29.2 mg/l**	**24.2 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**5.4 mg/l**	**6.2 mg/l**	**12.7 mg/l**	**94.8 mg/l**	**18.5 mg/l**	**4.95 mg/l**	**6.17 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**7.1 mg/l**	**7.6 mg/l**	**11.25 mg/l**	**12.2 mg/l**	**11.08 mg/l**	**12.20 mg/l**	**4.8 mg/l**
Fluoride	NA	**0.22 mg/l**	**0.24 mg/l**	**0.61 mg/l**	**2.28 mg/l**	**0.4 mg/l**	**0.16 mg/l**	**0.15 mg/l**
Hardness, as CaCO3	NA	**179 mg/l**	**214 mg/l**	**194 mg/l**	**190 mg/l**	**228 mg/l**	**61.6 mg/l**	**70.9 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.6 pH units**	**7.69 pH units**	**8.24 pH units**	**7.27 pH units**	**7.56 pH units**	**6.98 pH units**	**7.5 pH units**
Phosphorus, total, as P	NA	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**290 mg/l**	**339 mg/l**	**326 mg/l**	**285 mg/l**	**48.0 mg/l**	**154 mg/l**	**152 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**424.1 umhos/cm**	**463 umhos/cm**	**450.7 umhos/cm**	**434.8 umhos/cm**	**290.8 umhos/cm**	**93.9 umhos/cm**	**166 umhos/cm**
Sulfate, as SO4	NA	**89.3 mg/l**	**94.7 mg/l**	**52.7 mg/l**	**688 mg/l**	**106 mg/l**	**21.7 mg/l**	**28 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**18.3 deg C**	**11.4 deg C**	**2.5 deg C**	**4.2 deg C**	**0.4 deg C**	**5.3 deg C**	**12.8 deg C**
Turbidity	NA	--	--	--	--	--	--	--
Metals								
Aluminum	Total	--	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	**28.7 mg/l**	**33.4 mg/l**	**30.7 mg/l**	**27.4 mg/l**	**33 mg/l**	**10.8 mg/l**	**12.6 mg/l**
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	< 1 ug/l	< 1 ug/l < 1 ug/l	< 1 ug/l	< 1 ug/l < 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	**1.2 ug/l**	**1.3 ug/l** **1.6 ug/l**	**1.2 ug/l**	**1.1 ug/l** **1.3 ug/l**	**1.5 ug/l**	**2.0 ug/l**	**1.2 ug/l**
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**26 mg/l**	**31.6 mg/l**	**28.4 mg/l**	**29.6 mg/l**	**35.4 mg/l**	**8.39 mg/l**	**9.57 mg/l**
Manganese	Total	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	< 0.002 ug/l	< 0.008 ug/l	< 0.002 ug/l	< 0.002 ug/l	< 4 ng/l	**9.2 ng/l**	< 4 ng/l
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	**0.000176 ug/l**	--	**0.000146 ug/l**	--	--	**0.311 ng/l**
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	**1.5 ug/l**	**1.6 ug/l** **1.6 ug/l**	**1 ug/l**	**1.1 ug/l** **1.2 ug/l**	**0.87 ug/l**	**2.0 ug/l**	**1.4 ug/l**
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	< 25 ug/l	< 25 ug/l < 25 ug/l	< 25 ug/l	**51.2 ug/l** **< 25 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13
	Date	6/12/2007	7/24/2007	8/23/2007	9/20/2007	10/25/2007	11/15/2007	5/21/2008	6/25/2008
	Sample Type	N	N	N	N	N	N	N	N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**44 mg/l**	**115 mg/l**	**122 mg/l**	**28.3 mg/l**	**34.8 mg/l**	**46.0 mg/l**	**27.1 mg/l**	**50.3 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**34.6 mg/l**	**22.8 mg/l**	**14.8 mg/l**	**35.0 mg/l**	**33.0 mg/l**	**21.4 mg/l**	**16.8 mg/l**	**25.4 mg/l**
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--	--
Chloride	NA	**3.49 mg/l**	**6.2 mg/l**	**7.07 mg/l**	**3.23 mg/l**	**8.87 mg/l**	**3.62 mg/l**	**2.48 mg/l**	**2.28 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	**2.1 mg/l**	**3.2 mg/l**	--	**4.6 mg/l**	**6.7 mg/l**	**8.4 mg/l**	--	--
Fluoride	NA	**0.15 mg/l**	**0.23 mg/l**	< 0.1 mg/l	--	< 0.1 mg/l	< 0.2 mg/l	--	--
Hardness, as CaCO3	NA	**62.5 mg/l**	**116 mg/l**	**131 mg/l**	**51.6 mg/l**	**67 mg/l**	**67.1 mg/l**	**45.8 mg/l**	**85.5 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	**6.7 pH units**	**8.4 pH units**	--	**6.9 pH units**	**7.5 pH units**	**7.2 pH units**	--	**7.05 pH units**
Phosphorus, total, as P	NA	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	**0.014 mg/l**	**0.024 mg/l**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**151 mg/l**	**181 mg/l**	**211 mg/l**	**113 mg/l**	**125 mg/l**	**145 mg/l**	**83 mg/l**	**132 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	**4 b mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	**135 umhos/cm**	**277 umhos/cm**	--	**107 umhos/cm**	**145 umhos/cm**	**168 umhos/cm**	--	--
Sulfate, as SO4	NA	**16.5 mg/l**	**18.3 mg/l**	**10.3 mg/l**	**16.6 mg/l**	**23.4 mg/l**	**23.7 mg/l**	**18.4 mg/l**	**31.2 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	**21.1 deg C**	**24.6 deg C**	--	**11.1 deg C**	**6.2 deg C**	**1.8 deg C**	--	--
Turbidity	NA	--	--	--	--	--	--	--	--
Metals									
Aluminum	Total	--	--	--	--	--	--	**188 ug/l**	**256 ug/l**
Aluminum	Dissolved	--	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	< 0.20 ug/l	< 0.20 ug/l
Calcium	Total	**12 mg/l**	**23.7 mg/l**	**32.4 mg/l**	**10.3 mg/l**	**11.9 mg/l**	**11.4 mg/l**	**8.02 mg/l**	**14.8 mg/l**
Chromium	Total	--	--	--	--	--	--	< 1.0 ug/l	**0.85 b ug/l**
Cobalt	Total	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 1 ug/l	< 0.20 ug/l	**0.58 ug/l**
Cobalt	Dissolved	--	--	--	--	--	--	--	--
Copper	Total	**0.77 ug/l**	**2.1 ug/l**	**1.5 ug/l**	**2.3 ug/l**	**1.1 ug/l**	**0.92 ug/l**	< 0.70 ug/l	**1.3 ug/l**
Copper	Dissolved	--	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	--	< 0.60 ug/l	**0.15 jb ug/l**
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	**7.89 mg/l**	**13.7 mg/l**	**12.2 mg/l**	**6.26 mg/l**	**9.05 mg/l**	**9.39 mg/l**	**6.27 mg/l**	**11.8 mg/l**
Manganese	Total	--	--	--	--	--	--	< 0.50 ug/l	**170 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	--	--
Mercury	Total	**8.3 ng/l**	< 2 ng/l	**1.0 ng/l**	**10.2 ng/l**	**6.5 ng/l**	**4.1 ng/l**	**0.0050 ug/l**	**0.0053 ug/l**
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	**0.074 ng/l**	--	**0.497 ng/l**	--	**0.545 ng/l**	**0.00043 ug/l**	**0.0011 ug/l**
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	< 0.30 ug/l	**0.66 ug/l**
Nickel	Total	**2.1 ug/l**	**2.2 ug/l**	**2.2 ug/l**	**2.7 ug/l**	**1.9 ug/l**	**1.6 ug/l**	< 0.60 ug/l	**2.3 ug/l**
Nickel	Dissolved	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--
Zinc	Total	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 6.0 ug/l	**3.8 jb ug/l**
Zinc	Dissolved	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13
Date		7/22/2008	8/21/2008	9/16/2008	10/8/2008	10/9/2008	11/12/2008	7/9/2009	7/21/2009
Sample Type		N	N	N	N	N	N	N	N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**94.1 mg/l**	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	**20.7 mg/l**	**17.6 mg/l**
Carbon, total organic	NA	**25.4 mg/l**	**14.1 mg/l**	**12.1 mg/l**	--	**18.2 mg/l**	**20.1 mg/l**	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--	--
Chloride	NA	**2.93 mg/l**	--	--	--	--	--	**3.08 mg/l**	**4.12 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	**8.07 mg/l**	--	--	--
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**122 mg/l**	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	**0.03 mg/l**	**0.02 mg/l**
pH	NA	**7.36 pH units**	**7.75 pH units**	**7.62 pH units**	**7.43 pH units**	**7.43 pH units**	**7.22 pH units**	--	--
Phosphorus, total, as P	NA	**0.034 mg/l**	**0.019 mg/l**	**0.019 mg/l**	--	**0.038 mg/l**	**0.013 mg/l**	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	**0.018 mg/l**	**0.009 mg/l**
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**199 mg/l**	--	--	--	--	--	--	--
Solids, total suspended	NA	**3.2 mg/l**	--	--	--	--	--	**8 mg/l**	**8.4 mg/l**
Specific Conductance @ 25 ºC	NA	--	--	--	--	**336.6 umhos/cm**	--	--	--
Sulfate, as SO4	NA	**32 mg/l**	**17.4 mg/l**	**58.6 mg/l**	--	**66.3 mg/l**	**50.5 mg/l**	**47.2 mg/l**	**48.3 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l
Temperature, ºC	NA	--	--	--	--	**9.5 deg C**	--	--	--
Turbidity	NA	--	--	--	--	**4.4 NTU**	--	--	--
Metals									
Aluminum	Total	**102 ug/l**	--	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--	--
Cadmium	Total	**0.044 jb ug/l**	--	--	--	--	--	--	--
Calcium	Total	**21.6 mg/l**	--	--	--	--	--	--	--
Chromium	Total	**0.71 j ug/l**	--	--	--	--	--	--	--
Cobalt	Total	**0.47 ug/l**	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--	--
Copper	Total	**1.2 ug/l**	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	**1850 ug/l**	**878 ug/l**
Lead	Total	**0.22 jb ug/l**	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	**16.5 mg/l**	--	--	--	--	--	--	--
Manganese	Total	**150 ug/l**	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--	--
Mercury	Total	**0.0036 ug/l**	**0.0014 ug/l**	**0.0014 ug/l**	--	**0.0027 ug/l**	**0.0036 ug/l**	--	--
Mercury	Dissolved	--	--	--	--	--	--	**0.0029 ug/l**	**0.0031 ug/l**
Methyl Mercury	Total	**0.00076 ug/l**	**0.00017 ug/l**	**0.00013 ug/l**	--	**0.00036 ug/l**	**0.00025 ug/l**	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	**0.00037 ug/l**	**0.00027 ug/l**
Molybdenum	Total	**0.96 ug/l**	--	--	--	--	--	--	--
Nickel	Total	**1.5 ug/l**	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--
Zinc	Total	**3.2 jb ug/l**	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13	PM-13
	Date	7/28/2009	8/20/2009	8/26/2009	9/10/2009	10/13/2009	11/3/2009	4/22/2010
	Sample Type	N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	**22.0 mg/l**	**29.6 mg/l**	**27.2 mg/l**	**24.7 mg/l**	**16.3 mg/l**	**21.5 mg/l**	--
Carbon, total organic	NA	--	--	--	--	--	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	**4.17 mg/l**	**4.03 mg/l**	**4.54 mg/l**	**5.06 mg/l**	**6.81 mg/l**	**6.77 mg/l**	--
Chloride	Dissolved	--	--	**4.55 mg/l**	--	--	--	--
Color	NA	--	**260 color units**	**240 color units**	**200 color units**	**140 color units**	**170 color units**	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	--	--	**9.5 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	**0.03 mg/l**	**0.03 mg/l**	**0.03 mg/l**	**0.03 mg/l**	< 0.07 mg/l	< 0.02 mg/l	--
pH	NA	--	--	--	--	--	--	**7.2 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	**0.012 mg/l**	**0.021 mg/l**	**0.02 mg/l**	**0.018 mg/l**	**0.01 mg/l**	**0.028 mg/l**	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	**8 mg/l**	**6.7 mg/l**	**9.2 mg/l**	**8.8 mg/l**	**2.8 mg/l**	**2.4 mg/l**	--
Specific Conductance @ 25 ºC	NA	--	--	--	--	--	--	**42 umhos/cm**
Sulfate, as SO4	NA	**37.3 mg/l**	**25.9 mg/l**	**31.4 mg/l**	**27.4 mg/l**	**44.2 mg/l**	**45.8 mg/l**	--
Sulfate, as SO4	Dissolved	--	--	**31.4 mg/l**	--	--	--	--
Sulfide, as S^{2-}	NA	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Temperature, ºC	NA	--	--	--	--	--	--	**9.6 deg C**
Turbidity	NA	--	--	--	--	--	--	**1.6 NTU**
Metals								
Aluminum	Total	--	--	--	--	--	--	**173 ug/l**
Aluminum	Dissolved	--	--	--	--	--	--	**33.4 ug/l**
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--
Iron	Dissolved	**1330 ug/l**	--	**1640 ug/l**	**1770 ug/l**	**1010 ug/l**	**812 ug/l**	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	**0.0033 ug/l**	**0.0031 ug/l**	**0.0041 ug/l**	**0.0034 ug/l**	**1.5 ng/l**	**3.5 ng/l**	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	**0.00029 ug/l**	**0.62 ng/l**	**0.76 ng/l**	**0.46 ng/l**	**0.27 ng/l**	**0.23 ng/l**	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13	PM-13	PM-13	PM-13	PM-13		PM-13
Date		5/11/2010	6/14/2010	7/13/2010	8/11/2010	8/25/2010		9/9/2010
Sample Type		N	N	N	N	N	FD	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	--	--	--	--	**3.42 mg/l**	**3.38 mg/l**	**5.17 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**9.50 mg/l**	**6.99 mg/l**	**4.71 mg/l**	--	**4.49 mg/l**	--	**6.98 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.55 pH units**	**7.19 pH units**	**7.29 pH units**	**7.03 pH units**	**7.30 pH units**	--	**7.19 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**185.0 umhos/cm**	**147 umhos/cm**	**223.8 umhos/cm**	**187.3 umhos/cm**	**220 umhos/cm**	--	**215.1 umhos/cm**
Sulfate, as SO4	NA	--	--	--	--	**9.17 mg/l**	**9.17 mg/l**	**11.2 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**8.91 deg C**	**14.02 deg C**	**20.90 deg C**	**23.2 deg C**	**19.17 deg C**	--	**11.66 deg C**
Turbidity	NA	**3.2 NTU**	**0.6 NTU**	**2.1 NTU**	--	--	--	**4.6 NTU**
Metals								
Aluminum	Total	**184 ug/l**	**505 ug/l**	**458 ug/l**	**426 ug/l**	--	--	--
Aluminum	Dissolved	**45.8 ug/l**	**101 ug/l**	**94 ug/l**	**129 ug/l**	--	--	--
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13	PM-13	PM-13	PM-13		PM-13	
Date		9/14/2010	9/23/2010	10/6/2010	7/26/2011		8/24/2011	
Sample Type		N	N	N	N	FD	N	FD
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	--
Chloride	NA	--	**4.62 mg/l**	**5.08 mg/l**	**3.47 mg/l**	**3.47 mg/l**	**5.34 mg/l**	**5.22 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**6.87 mg/l**	**3.0 mg/l**	**7.72 mg/l**	**5.41 mg/l**	--	**7.24 mg/l**	--
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.18 pH units**	**7.4 pH units**	**7.27 pH units**	**7.13 pH units**	--	**7.72 pH units**	--
Phosphorus, total, as P	NA	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**203.1 umhos/cm**	**279 umhos/cm**	**155 umhos/cm**	**206.0 umhos/cm**	--	**358.0 umhos/cm**	--
Sulfate, as SO4	NA	--	**24.4 mg/l**	**21.3 mg/l**	**8.62 mg/l**	**8.7 mg/l**	**10.5 mg/l**	**10.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**12.49 deg C**	**11.8 deg C**	**11.18 deg C**	**20.47 deg C**	--	**19.87 deg C**	--
Turbidity	NA	**3.6 NTU**	**7.1 NTU**	**3.3 NTU**	**1.8 NTU**	--	**1.6 NTU**	--
Metals								
Aluminum	Total	**223 ug/l**	--	--	**121 ug/l**	**155 ug/l**	**60.3 ug/l**	**78.3 ug/l**
Aluminum	Dissolved	**60.6 ug/l**	--	--	**58 ug/l**	**66.5 ug/l**	< 25 ug/l	< 25 ug/l
Antimony	Total	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	--
Barium	Total	--	--	--	--	--	--	--
Beryllium	Total	--	--	--	--	--	--	--
Boron	Total	--	--	--	--	--	--	--
Cadmium	Total	--	--	--	--	--	--	--
Calcium	Total	--	--	--	--	--	--	--
Chromium	Total	--	--	--	--	--	--	--
Cobalt	Total	--	--	--	--	--	--	--
Cobalt	Dissolved	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	--
Copper	Dissolved	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	--
Iron	Dissolved	--	--	--	--	--	--	--
Lead	Total	--	--	--	--	--	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	--
Manganese	Total	--	--	--	--	--	--	--
Manganese	Dissolved	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	--	--	--	--
Nickel	Total	--	--	--	--	--	--	--
Nickel	Dissolved	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	--
Selenium	Total	--	--	--	--	--	--	--
Silver	Total	--	--	--	--	--	--	--
Sodium	Total	--	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	--
Zinc	Dissolved	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13		PM-13		PM-13		PM-13	
Date		9/20/2011		6/26/2012		7/25/2012		8/28/2012	
Sample Type		N	FD	N	FD	N	FD	N	FD
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**51.3 mg/l**	**51.6 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	**51.3 mg/l**	**51.6 mg/l**	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	**46.6 mg/l**	**46.0 mg/l**	**35.2 mg/l**	**33.8 mg/l**	**34.7 mg/l**	**35.5 mg/l**
Chemical Oxygen Demand	NA	--	--	**120 b* mg/l**	< 10.0 * mg/l	--	--	--	--
Chloride	NA	**5.62 mg/l**	**5.6 mg/l**	**2.0 mg/l**	**2.0 mg/l**	**3.6 mg/l**	**3.6 mg/l**	**4.2 mg/l**	**4.2 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	**3.01 mg/l**	--	**4.82 mg/l**	--	**5.81 mg/l**	--
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	**71.4 mg/l**	**72.1 mg/l**	**114 mg/l**	**117 mg/l**	**127 mg/l**	**124 mg/l**
Nitrate + Nitrite, as N	NA	--	--	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	--	--	**7.41 pH units**	--	**7.48 pH units**	--	**7.93 pH units**	--
Phosphorus, total, as P	NA	--	--	**0.059 b* mg/l**	< 0.0040 * mg/l	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	**175 mg/l**	**176 mg/l**	**225 mg/l**	**220 mg/l**	**202 mg/l**	**221 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	--	--	**106.9 umhos/cm**	--	**120.6 umhos/cm**	--	**221.1 umhos/cm**	--
Sulfate, as SO4	NA	**7.56 mg/l**	**7.55 mg/l**	**14.4 mg/l**	**14.4 mg/l**	**11.2 mg/l**	**11.0 mg/l**	**11.7 mg/l**	**11.7 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	--	--	**19.66 deg C**	--	**22.88 deg C**	--	**21.7 deg C**	--
Turbidity	NA	--	--	**5.1 NTU**	--	**17.6 NTU**	--	**1.9 NTU**	--
Metals									
Aluminum	Total	**65.9 ug/l**	**82.2 ug/l**	**231 ug/l**	**207 ug/l**	**301 ug/l**	**295 ug/l**	**178 ug/l**	**187 ug/l**
Aluminum	Dissolved	< 25 ug/l	< 25 ug/l	**138 ug/l**	**135 ug/l**	**64.6 ug/l**	**67.2 ug/l**	**61.5 ug/l**	**59.0 ug/l**
Antimony	Total	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	--	--	**1.8 ug/l**	**1.7 ug/l**	**2.5 ug/l**	**2.9 ug/l**	**2.5 ug/l**	**2.7 ug/l**
Barium	Total	--	--	**29.7 ug/l**	**30.2 ug/l**	--	--	--	--
Beryllium	Total	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--
Boron	Total	--	--	< 50.0 ug/l	< 50.0 ug/l	--	--	--	--
Cadmium	Total	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--
Calcium	Total	--	--	**13.3 mg/l**	**13.4 mg/l**	**22.8 mg/l**	**23.6 mg/l**	**25.6 mg/l**	**24.9 mg/l**
Chromium	Total	--	--	< 1.0 ug/l	< 1.0 ug/l	--	--	--	--
Cobalt	Total	--	--	**0.65 ug/l**	**0.62 ug/l**	**0.84 ug/l**	**0.84 ug/l**	**0.66 ug/l**	**0.65 ug/l**
Cobalt	Dissolved	--	--	**0.57 b ug/l**	< 0.20 ug/l	**0.68 ug/l**	**0.68 ug/l**	**0.53 ug/l**	**0.51 ug/l**
Copper	Total	--	--	**1.7 b ug/l**	**1.8 b ug/l**	**1.5 ug/l**	**1.5 ug/l**	**1.7 ug/l**	**1.6 ug/l**
Copper	Dissolved	--	--	**1.6 b ug/l**	**0.78 b ug/l**	**1.7 ug/l**	**1.5 ug/l**	**1.5 b ug/l**	**1.4 b ug/l**
Iron	Total	--	--	**2290 ug/l**	**2230 ug/l**	**5610 ug/l**	**5700 ug/l**	**5040 ug/l**	**5140 ug/l**
Iron	Dissolved	--	--	**1680 ug/l**	**1660 ug/l**	**4820 ug/l**	**5000 ug/l**	**4420 ug/l**	**4320 ug/l**
Lead	Total	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	--	--	**9.3 mg/l**	**9.4 mg/l**	**14.0 mg/l**	**14.1 mg/l**	**15.2 mg/l**	**15.0 mg/l**
Manganese	Total	--	--	**215 ug/l**	**214 ug/l**	**757 ug/l**	**755 ug/l**	**497 ug/l**	**490 ug/l**
Manganese	Dissolved	--	--	**204 b* ug/l**	< 0.50 * ug/l	**720 ug/l**	**716 ug/l**	**456 ug/l**	**449 ug/l**
Mercury	Total	--	--	**12.4 ng/l**	**12.3 ng/l**	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	--	--	**1.0 ug/l**	**0.99 ug/l**	--	--	--	--
Nickel	Total	--	--	**2.3 ug/l**	**2.4 ug/l**	**2.0 b ug/l**	**1.9 b ug/l**	**2.2 b ug/l**	**2.3 b ug/l**
Nickel	Dissolved	--	--	**2.1 b ug/l**	< 0.50 ug/l	**1.6 ug/l**	**1.6 ug/l**	**1.9 ug/l**	**1.8 ug/l**
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	--	**1.6 mg/l**	**1.6 mg/l**	--	--	--	--
Selenium	Total	--	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--
Sodium	Total	--	--	**5.4 mg/l**	**5.5 mg/l**	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	--	**0.005 j ug/l**	**0.014 j ug/l**	< 0.0004 ug/l	< 0.0004 ug/l	< 0.005 ug/l	< 0.005 ug/l
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	< 3.0 ug/l	< 3.0 ug/l	--	--	--	--
Zinc	Total	--	--	**7.6 ug/l**	**9.1 ug/l**	< 6.0 ug/l	< 6.0 ug/l	**7.4 ug/l**	< 6.0 ug/l
Zinc	Dissolved	--	--	**10.1 b ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13		PM-13		PM-13		PM-13	
Date		9/24/2012		10/23/2012		11/21/2012		12/13/2012	
Sample Type		N	FD	N	FD	N	FD	N	FD
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	**132 b mg/l**	**131 b mg/l**	--	--	--	--	**100 mg/l**	**101 mg/l**
Alkalinity, total, as CaCO3	NA	**132 b mg/l**	**131 b mg/l**	--	--	--	--	**100 mg/l**	**101 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**23.9 mg/l**	**25.0 mg/l**	**21.4 mg/l**	**21.2 mg/l**	**15.0 mg/l**	**15.7 mg/l**	**16.5 mg/l**	**16.7 mg/l**
Chemical Oxygen Demand	NA	**68.4 mg/l**	**67.4 mg/l**	--	--	--	--	**42.1 mg/l**	**47.0 mg/l**
Chloride	NA	**5.5 mg/l**	**5.4 mg/l**	**3.6 mg/l**	**3.6 mg/l**	**5.8 mg/l**	**5.8 mg/l**	**8.2 mg/l**	**8.3 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	**8.74 mg/l**	--	**8.8 mg/l**	--	**10.21 mg/l**	--	**7.97 mg/l**	--
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**163 mg/l**	**161 mg/l**	**112 mg/l**	**112 mg/l**	**120 mg/l**	**120 mg/l**	**148 mg/l**	**144 mg/l**
Nitrate + Nitrite, as N	NA	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--	**0.11 mg/l**	**0.14 mg/l**
Nitrogen, ammonia as N	NA	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--	**0.14 mg/l**	**0.14 mg/l**
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	**7.97 pH units**	--	**7.33 pH units**	--	**7.52 pH units**	--	**6.9 pH units**	--
Phosphorus, total, as P	NA	**0.030 mg/l**	**0.028 mg/l**	--	--	--	--	**0.022 mg/l**	**0.026 mg/l**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**234 mg/l**	**230 mg/l**	**172 mg/l**	**163 mg/l**	**178 mg/l**	**195 mg/l**	**239 mg/l**	**241 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**220 umhos/cm**	--	**222.3 umhos/cm**	--	**169 umhos/cm**	--	**238.9 umhos/cm**	--
Sulfate, as SO4	NA	**24.9 mg/l**	**24.8 mg/l**	**14.5 mg/l**	**14.3 mg/l**	**53.1 mg/l**	**53.1 mg/l**	**70.5 mg/l**	**70.8 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	**11.27 deg C**	--	**8.12 deg C**	--	**1.79 deg C**	--	**0.27 deg C**	--
Turbidity	NA	**25 NTU**	--	**37.9 NTU**	--	**1.5 NTU**	--	**1.4 NTU**	--
Metals									
Aluminum	Total	**111 ug/l**	**108 ug/l**	**99.9 ug/l**	**96.8 ug/l**	**288 * ug/l**	**211 * ug/l**	**132 ug/l**	**139 ug/l**
Aluminum	Dissolved	**39.2 ug/l**	**37.4 ug/l**	**34.3 ug/l**	**34.1 ug/l**	< 40.0 ug/l	< 40.0 ug/l	**45.5 ug/l**	**43.5 ug/l**
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	**1.9 ug/l**	**2.0 ug/l**	**1.1 ug/l**	**1.1 ug/l**	**0.69 ug/l**	< 0.50 ug/l	**0.75 ug/l**	**0.68 ug/l**
Barium	Total	**57.4 ug/l**	**56.9 ug/l**	--	--	--	--	**36.5 ug/l**	**37.0 ug/l**
Beryllium	Total	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--	< 0.20 ug/l	< 0.20 ug/l
Boron	Total	< 50.0 ug/l	< 50.0 ug/l	--	--	--	--	< 50.0 ug/l	< 50.0 ug/l
Cadmium	Total	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--	< 0.20 ug/l	< 0.20 ug/l
Calcium	Total	**33.2 mg/l**	**32.9 mg/l**	**24.9 mg/l**	**25.0 mg/l**	**18.9 mg/l**	**18.8 mg/l**	**22.5 mg/l**	**21.9 mg/l**
Chromium	Total	< 1.0 ug/l	< 1.0 ug/l	--	--	--	--	< 1.0 ug/l	< 1.0 ug/l
Cobalt	Total	**0.42 ug/l**	**0.44 ug/l**	**0.39 ug/l**	**0.39 ug/l**	**0.36 ug/l**	**0.27 ug/l**	**0.36 ug/l**	**0.36 ug/l**
Cobalt	Dissolved	**0.38 ug/l**	**0.37 ug/l**	**0.36 ug/l**	**0.37 ug/l**	< 0.20 ug/l	< 0.20 ug/l	**0.33 ug/l**	**0.33 ug/l**
Copper	Total	**1.5 b ug/l**	**1.4 b ug/l**	**1.2 ug/l**	**1.2 ug/l**	**1.0 ug/l**	**0.96 ug/l**	**1.2 ug/l**	**1.1 ug/l**
Copper	Dissolved	**1.2 b ug/l**	**1.1 b ug/l**	**1.1 ug/l**	**1.0 ug/l**	**0.74 ug/l**	**0.71 ug/l**	**1.0 ug/l**	**0.94 ug/l**
Iron	Total	**2670 ug/l**	**2640 ug/l**	**2500 ug/l**	**2490 ug/l**	**1650 ug/l**	**1470 ug/l**	**2050 ug/l**	**2070 ug/l**
Iron	Dissolved	**2260 ug/l**	**2190 ug/l**	**2310 ug/l**	**2280 ug/l**	**999 ug/l**	**896 ug/l**	**1480 ug/l**	**1430 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	**19.3 mg/l**	**19.1 mg/l**	**12.1 mg/l**	**12.1 mg/l**	**17.8 mg/l**	**17.7 mg/l**	**22.3 mg/l**	**21.7 mg/l**
Manganese	Total	**513 ug/l**	**515 ug/l**	**349 ug/l**	**351 ug/l**	**164 * ug/l**	**119 * ug/l**	**302 ug/l**	**297 ug/l**
Manganese	Dissolved	**465 ug/l**	**448 ug/l**	**337 ug/l**	**350 ug/l**	**88.6 ug/l**	**87.4 ug/l**	**308 ug/l**	**310 ug/l**
Mercury	Total	**1.7 ng/l**	**1.9 ng/l**	--	--	--	--	**2.1 ng/l**	**2.6 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	**0.94 ug/l**	**0.96 ug/l**	--	--	--	--	**0.54 ug/l**	**0.52 ug/l**
Nickel	Total	**0.98 ug/l**	**1.4 ug/l**	**1.2 ug/l**	**1.3 ug/l**	**0.94 ug/l**	**0.80 ug/l**	**0.84 ug/l**	**0.81 ug/l**
Nickel	Dissolved	**1.2 ug/l**	**1.6 ug/l**	**1.2 ug/l**	**1.3 ug/l**	**0.64 ug/l**	**0.62 ug/l**	**0.76 ug/l**	**0.70 ug/l**
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	**3.1 mg/l**	**3.1 mg/l**	--	--	--	--	**3.2 mg/l**	**3.1 mg/l**
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--	< 0.20 ug/l	< 0.20 ug/l
Sodium	Total	**10 mg/l**	**10.1 mg/l**	--	--	--	--	**14.7 mg/l**	**14.4 mg/l**
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	< 0.002 ug/l	< 0.002 ug/l	**0.0070 jb ug/l**	**0.0075 jb ug/l**	< 0.0004 ug/l	< 0.0004 ug/l	< 0.002 ug/l	< 0.002 ug/l
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	< 3.0 ug/l	< 3.0 ug/l	--	--	--	--	< 3.0 ug/l	< 3.0 ug/l
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13	PM-13	PM-13		PM-13	PM-13	
Date		1/22/2013	2/20/2013	3/11/2013		4/8/2013	5/8/2013	
Sample Type		N	N	N	FD	N	N	FD
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**197 mg/l**	**202 mg/l**	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	**197 mg/l**	**202 mg/l**	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**13.0 mg/l**	**10.2 mg/l**	**9.2 mg/l**	**9.4 mg/l**	**9.3 mg/l**	**17.6 mg/l**	**17.1 mg/l**
Chemical Oxygen Demand	NA	--	--	**29.7 mg/l**	**24.6 mg/l**	--	--	--
Chloride	NA	**9.4 mg/l**	**10.0 mg/l**	**9.1 mg/l**	**9.2 mg/l**	**11.9 mg/l**	**2.9 b mg/l**	**2.9 b mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**6.33 mg/l**	**11.09 mg/l**	**9.14 mg/l**	--	**8.57 mg/l**	**6.72 mg/l**	--
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**234 mg/l**	**321 mg/l**	**337 mg/l**	**330 mg/l**	**281 mg/l**	**48.8 mg/l**	**49.1 mg/l**
Nitrate + Nitrite, as N	NA	--	--	**0.23 mg/l**	**0.20 mg/l**	--	--	--
Nitrogen, ammonia as N	NA	--	--	**0.15 mg/l**	**0.17 mg/l**	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.65 pH units**	**6.66 pH units**	**6.7 pH units**	--	**7.05 pH units**	**6.3 pH units**	--
Phosphorus, total, as P	NA	--	--	**0.021 mg/l**	**0.021 mg/l**	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**307 mg/l**	**440 mg/l**	**494 mg/l**	**488 mg/l**	**433 mg/l**	**117 mg/l**	**116 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**391.9 umhos/cm**	**672.2 umhos/cm**	**698.2 BQS umhos/cm**	--	**583.4 umhos/cm**	**113.2 umhos/cm**	--
Sulfate, as SO4	NA	**93.0 mg/l**	**154 mg/l**	**173 mg/l**	**174 mg/l**	**146 mg/l**	**18.9 mg/l**	**18.8 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**0.04 deg C**	**1.71 deg C**	**0.8 deg C**	--	**0.3 deg C**	**9.05 deg C**	--
Turbidity	NA	**10.7 NTU**	**3 NTU**	**7.7 NTU**	--	**21 NTU**	**6.8 NTU**	--
Metals								
Aluminum	Total	**96.5 ug/l**	**99.6 ug/l**	**70.3 ug/l**	**65.7 ug/l**	**57.0 ug/l**	**293 ug/l**	**354 ug/l**
Aluminum	Dissolved	**26.8 ug/l**	**22.1 ug/l**	**21.9 ug/l**	**21.1 ug/l**	**23.2 ug/l**	**68.0 ug/l**	**68.3 ug/l**
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	**0.84 ug/l**	**0.84 ug/l**	**0.66 ug/l**	**0.54 ug/l**	**0.54 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Barium	Total	--	--	**57.5 ug/l**	**56.8 ug/l**	--	--	--
Beryllium	Total	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--	--
Boron	Total	--	--	< 50.0 ug/l	< 50.0 ug/l	--	--	--
Cadmium	Total	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--	--
Calcium	Total	**36.3 mg/l**	**44.4 mg/l**	**44.7 mg/l**	**43.7 mg/l**	**35.0 mg/l**	**8.0 mg/l**	**8.1 mg/l**
Chromium	Total	--	--	< 1.0 ug/l	< 1.0 ug/l	--	--	--
Cobalt	Total	**0.40 ug/l**	**0.37 ug/l**	**0.25 ug/l**	**0.24 ug/l**	**0.30 ug/l**	**0.28 ug/l**	**0.30 ug/l**
Cobalt	Dissolved	**0.36 ug/l**	**0.32 ug/l**	**0.22 ug/l**	**0.24 ug/l**	**0.27 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Copper	Total	**1.0 ug/l**	**1.1 ug/l**	**0.79 ug/l**	**0.77 ug/l**	**1.3 ug/l**	**1.7 ug/l**	**1.7 ug/l**
Copper	Dissolved	**0.93 ug/l**	**1.0 ug/l**	**0.78 ug/l**	**0.79 ug/l**	**0.82 ug/l**	**1.3 ug/l**	**1.3 ug/l**
Iron	Total	**2420 ug/l**	**1630 ug/l**	**1440 ug/l**	**1420 ug/l**	**1340 ug/l**	**1050 ug/l**	**1110 ug/l**
Iron	Dissolved	**1560 ug/l**	**608 ug/l**	**678 ug/l**	**504 ug/l**	**778 ug/l**	**617 ug/l**	**612 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**34.7 mg/l**	**50.9 mg/l**	**54.7 mg/l**	**53.7 mg/l**	**46.9 mg/l**	**7.0 mg/l**	**7.0 mg/l**
Manganese	Total	**517 ug/l**	**512 ug/l**	**380 ug/l**	**380 ug/l**	**399 ug/l**	**52.3 ug/l**	**53.9 ug/l**
Manganese	Dissolved	**502 ug/l**	**486 ug/l**	**390 ug/l**	**386 ug/l**	**385 ug/l**	**39.7 ug/l**	**38.5 ug/l**
Mercury	Total	--	--	**0.84 ng/l**	**1.0 ng/l**	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	**0.70 ug/l**	**0.59 ug/l**	--	--	--
Nickel	Total	**0.74 ug/l**	**0.70 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**0.74 ug/l**	**1.6 b ug/l**	**2.0 b ug/l**
Nickel	Dissolved	**0.82 ug/l**	**1.1 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**0.67 ug/l**	**0.93 ug/l**	**0.94 ug/l**
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	**7.4 mg/l**	**7.2 mg/l**	--	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	< 0.20 ug/l	< 0.20 ug/l	--	--	--
Sodium	Total	--	--	**29.8 mg/l**	**29.1 mg/l**	--	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.0004 ug/l	--	--	--	< 0.005 ug/l	**0.0026 j ug/l**	**0.0027 j ug/l**
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	< 3.0 ug/l	< 3.0 ug/l	--	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**10.2 ug/l**	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-13	PM-13	PM-13		PM-13	
Date		6/6/2013	7/8/2013	8/13/2013		9/11/2013	
Sample Type		N	N	N	FD	N	FD
Parameter	Total or Dissolved						
General Parameters							
Alkalinity, bicarbonate, as CaCO3	NA	--	**73.8 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	**73.8 mg/l**	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--
Carbon, total organic	NA	**26.0 mg/l**	**37.3 mg/l**	**28.9 mg/l**	**28.4 mg/l**	**19.8 mg/l**	**20.9 mg/l**
Chemical Oxygen Demand	NA	--	**117 mg/l**	--	--	--	--
Chloride	NA	**3.5 mg/l**	**2.9 mg/l**	**3.2 mg/l**	**3.2 mg/l**	**3.4 mg/l**	**3.5 mg/l**
Chloride	Dissolved	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--
Dissolved oxygen	NA	**7.93 mg/l**	**4.71 mg/l**	**6.16 mg/l**	--	**5.72 mg/l**	--
Fluoride	NA	--	--	--	--	--	--
Hardness, as CaCO3	NA	**57.2 mg/l**	**94.7 mg/l**	**117 mg/l**	**115 mg/l**	**122 mg/l**	**122 mg/l**
Nitrate + Nitrite, as N	NA	--	**0.13 mg/l**	--	--	--	--
Nitrogen, ammonia as N	NA	--	**0.15 mg/l**	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--
pH	NA	**6.5 pH units**	**6.85 pH units**	**7.03 pH units**	--	**7.31 pH units**	--
Phosphorus, total, as P	NA	--	**0.062 mg/l**	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--
Solids, total dissolved	NA	**145 mg/l**	**199 mg/l**	**206 mg/l**	**196 mg/l**	**272 mg/l**	**229 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**124.2 umhos/cm**	**184.1 umhos/cm**	**243.1 umhos/cm**	--	**261.5 umhos/cm**	--
Sulfate, as SO4	NA	**14.3 mg/l**	**14.6 mg/l**	**19.1 mg/l**	**19.2 mg/l**	**15.8 mg/l**	**15.8 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--
Temperature, ºC	NA	**11.74 deg C**	**21.3 deg C**	**17.9 deg C**	--	**18 deg C**	--
Turbidity	NA	**1.2 NTU**	**3 NTU**	**3000 NTU** **6.6 NTU**	--	**6.5 NTU**	--
Metals							
Aluminum	Total	**213 ug/l**	**242 ug/l**	**252 ug/l**	**262 ug/l**	**110 ug/l**	**88.4 ug/l**
Aluminum	Dissolved	**85.2 ug/l**	**108 ug/l**	**59.3 ug/l**	**57.4 ug/l**	**24.2 ug/l**	**25.3 ug/l**
Antimony	Total	--	< 0.50 ug/l	--	--	--	--
Arsenic	Total	**0.94 ug/l**	**2.5 ug/l**	**1.8 ug/l**	**1.8 ug/l**	**1.5 ug/l**	**1.5 ug/l**
Barium	Total	--	**41.7 ug/l**	--	--	--	--
Beryllium	Total	--	< 0.20 ug/l	--	--	--	--
Boron	Total	--	< 50.0 ug/l	--	--	--	--
Cadmium	Total	--	< 0.20 ug/l	--	--	--	--
Calcium	Total	**10.2 mg/l**	**17.5 mg/l**	**21.7 mg/l**	**21.6 mg/l**	**24.2 mg/l**	**24.2 mg/l**
Chromium	Total	--	< 1.0 ug/l	--	--	--	--
Cobalt	Total	**0.38 ug/l**	**0.89 ug/l**	**0.57 ug/l**	**0.58 ug/l**	**0.46 ug/l**	**0.44 ug/l**
Cobalt	Dissolved	**0.32 ug/l**	**0.76 ug/l**	**0.40 ug/l**	**0.43 ug/l**	**0.41 ug/l**	**0.43 ug/l**
Copper	Total	**1.3 ug/l**	**1.2 ug/l**	**1.4 ug/l**	**1.5 ug/l**	**1.4 ug/l**	**1.4 ug/l**
Copper	Dissolved	**1.3 ug/l**	**1.1 ug/l**	**1.1 ug/l**	**1.2 ug/l**	**1.2 ug/l**	**1.3 ug/l**
Iron	Total	**1400 ug/l**	**5070 ug/l**	**4080 ug/l**	**4120 ug/l**	**2440 ug/l**	**2380 ug/l**
Iron	Dissolved	**959 ug/l**	**3930 ug/l**	**3660 ug/l**	**3560 ug/l**	**2120 ug/l**	**2140 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Total	**7.7 mg/l**	**12.4 mg/l**	**15.2 mg/l**	**14.9 mg/l**	**15.0 mg/l**	**15.0 mg/l**
Manganese	Total	**157 ug/l**	**515 ug/l**	**379 ug/l**	**391 ug/l**	**601 ug/l**	**572 ug/l**
Manganese	Dissolved	**153 ug/l**	**463 ug/l**	**346 ug/l**	**362 ug/l**	**564 ug/l**	**586 ug/l**
Mercury	Total	--	**8.0 ng/l**	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--
Molybdenum	Total	--	**0.94 ug/l**	--	--	--	--
Nickel	Total	**1.4 ug/l**	**2.1 ug/l**	**1.6 ug/l**	**1.6 ug/l**	**1.3 ug/l**	**1.2 ug/l**
Nickel	Dissolved	**1.4 ug/l**	**1.9 ug/l**	**1.2 ug/l**	**1.2 ug/l**	**1.1 ug/l**	**1.2 ug/l**
Palladium	Total	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--
Potassium	Total	--	**1.5 mg/l**	--	--	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	< 0.20 ug/l	--	--	--	--
Sodium	Total	--	**7.0 mg/l**	--	--	--	--
Strontium	Total	--	--	--	--	--	--
Thallium	Total	**0.019 j ug/l**	**0.010 j ug/l**	< 0.005 ug/l	< 0.005 ug/l	< 0.005 ug/l	< 0.005 ug/l
Tin	Total	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--
Vanadium	Total	--	< 3.0 ug/l	--	--	--	--
Zinc	Total	< 6.0 ug/l	**8.5 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	**8.5 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	PM-13		PM-13		PM-13		PM-19	PM-19
	Date	10/10/2013		11/19/2013		12/19/2013		7/9/2009	7/21/2009
	Sample Type	N	FD	N	FD	N	FD	N	N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	**128 mg/l**	**125 mg/l**	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	**128 mg/l**	**125 mg/l**	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	**16.8 mg/l**	**13.7 mg/l**
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**19.2 mg/l**	**19.6 mg/l**	**14.7 mg/l**	**14.3 mg/l**	**12.6 mg/l**	**12.3 mg/l**	--	--
Chemical Oxygen Demand	NA	**63.9 mg/l**	**73.1 mg/l**	--	--	--	--	--	--
Chloride	NA	**5.1 mg/l**	**5.3 mg/l**	**7.6 mg/l**	**7.6 mg/l**	**8.0 mg/l**	**7.9 mg/l**	**9.43 mg/l**	**8.75 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	**8.15 mg/l**	--	**12.13 mg/l**	--	**8.51 mg/l**	--	--	--
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**141 mg/l**	**143 mg/l**	**117 mg/l**	**114 mg/l**	**194 mg/l**	**192 mg/l**	--	--
Nitrate + Nitrite, as N	NA	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--	--	--
Nitrogen, ammonia as N	NA	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	**0.03 mg/l**	**0.02 mg/l**
pH	NA	**7.39 pH units**	--	**7.79 pH units**	--	**6.67 pH units**	--	--	--
Phosphorus, total, as P	NA	**0.026 mg/l**	**0.026 mg/l**	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	**0.022 mg/l**	**0.016 mg/l**
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**242 mg/l**	**272 mg/l**	**212 mg/l**	**225 mg/l**	**315 mg/l**	**280 mg/l**	--	--
Solids, total suspended	NA	--	--	--	--	--	--	**19.5 mg/l**	**2.4 mg/l**
Specific Conductance @ 25 ºC	NA	**302.2 umhos/cm**	--	**272.4 umhos/cm**	--	**434.8 umhos/cm**	--	--	--
Sulfate, as SO4	NA	**29.8 mg/l**	**29.9 mg/l**	**48.4 mg/l**	**48.3 mg/l**	**88.6 mg/l**	**88.7 mg/l**	**10.1 mg/l**	**18.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l
Temperature, ºC	NA	**12.27 deg C**	--	**0.27 deg C**	--	**2.07 deg C**	--	--	--
Turbidity	NA	**8.7 NTU**	--	**0 NTU**	--	**0 NTU**	--	--	--
Metals									
Aluminum	Total	**56.1 ug/l**	**54.2 ug/l**	**128 * ug/l**	**80.5 * ug/l**	**97.5 ug/l**	**87.3 ug/l**	--	--
Aluminum	Dissolved	< 20.0 ug/l	< 20.0 ug/l	**27.3 ug/l**	**30.2 ug/l**	**31.1 ug/l**	**29.9 ug/l**	--	--
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	--	--	--	--	--	--
Arsenic	Total	**0.97 ug/l**	**0.89 ug/l**	**0.58 ug/l**	**0.65 ug/l**	< 0.50 ug/l	< 0.50 ug/l	--	--
Barium	Total	**34.4 ug/l**	**33.9 ug/l**	--	--	--	--	--	--
Beryllium	Total	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--	--	--
Boron	Total	< 50.0 ug/l	< 50.0 ug/l	--	--	--	--	--	--
Cadmium	Total	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--	--	--
Calcium	Total	**23.9 mg/l**	**24.1 mg/l**	**17.6 mg/l**	**17.1 mg/l**	**27.3 mg/l**	**27.3 mg/l**	--	--
Chromium	Total	< 1.0 ug/l	< 1.0 ug/l	--	--	--	--	--	--
Cobalt	Total	**0.26 ug/l**	**0.27 ug/l**	**0.21 ug/l**	< 0.20 ug/l	**0.23 ug/l**	**0.23 ug/l**	--	--
Cobalt	Dissolved	**0.27 ug/l**	**0.33 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--	--
Copper	Total	**0.90 ug/l**	**0.96 ug/l**	**0.88 ug/l**	**0.76 ug/l**	**1.1 ug/l**	**1.0 ug/l**	--	--
Copper	Dissolved	**1.1 ug/l**	**1.0 ug/l**	**0.88 ug/l**	**0.82 ug/l**	**0.96 ug/l**	**1.0 ug/l**	--	--
Iron	Total	**1300 ug/l**	**1310 ug/l**	**1310 ug/l**	**1210 ug/l**	**1800 ug/l**	**1820 ug/l**	--	--
Iron	Dissolved	**1110 ug/l**	**1090 ug/l**	**834 ug/l**	**888 ug/l**	**1150 ug/l**	**1200 ug/l**	**331 ug/l**	**318 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--
Lead	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	--
Magnesium	Total	**19.8 mg/l**	**20.1 mg/l**	**17.6 mg/l**	**17.2 mg/l**	**30.4 mg/l**	**30.1 mg/l**	--	--
Manganese	Total	**295 ug/l**	**304 ug/l**	**97.6 ug/l**	**92.0 ug/l**	**315 ug/l**	**307 ug/l**	--	--
Manganese	Dissolved	**317 ug/l**	**308 ug/l**	**93.8 ug/l**	**98.7 ug/l**	**299 ug/l**	**299 ug/l**	--	--
Mercury	Total	**1.7 ng/l**	**2.3 ng/l**	--	--	--	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	**0.0018 ug/l**	**0.0014 ug/l**
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	**0.00060 ug/l**	**0.00035 ug/l**
Molybdenum	Total	**0.51 ug/l**	**0.52 ug/l**	--	--	--	--	--	--
Nickel	Total	**0.73 ug/l**	**0.74 ug/l**	**0.83 ug/l**	**0.62 ug/l**	< 0.50 ug/l	< 0.50 ug/l	--	--
Nickel	Dissolved	**0.83 ug/l**	**0.91 ug/l**	**0.63 ug/l**	**0.71 ug/l**	< 0.50 ug/l	< 0.50 ug/l	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	**2.8 mg/l**	**2.8 mg/l**	--	--	--	--	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	--
Silver	Total	< 0.20 ug/l	< 0.20 ug/l	--	--	--	--	--	--
Sodium	Total	**13.5 mg/l**	**13.6 mg/l**	--	--	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	**0.018 jb ug/l**	**0.003 jb ug/l**	< 0.005 ug/l	< 0.005 ug/l	< 0.005 ug/l	< 0.005 ug/l	--	--
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	< 3.0 ug/l	< 3.0 ug/l	--	--	--	--	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	--
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	--

Location		PM-19	PM-19	PM-19	PM-19	PM-19	PM-19	PM-19	PM-19
Date		7/28/2009	8/20/2009	8/26/2009	9/10/2009	10/13/2009	11/3/2009	7/26/2010	8/25/2010
Sample Type		N	N	N	N	N	N	N	N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	--	--	--	**286 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	< 3 mg/l	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	**16.2 mg/l**	**17.7 mg/l**	**17.2 mg/l**	**15.7 mg/l**	**11.1 mg/l**	**15.6 mg/l**	**24.5 mg/l**	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	--	--	--	--	--	--	**24.5 mg/l**	--
Chemical Oxygen Demand	NA	--	--	--	--	--	--	**65.5 mg/l**	--
Chloride	NA	**8.95 mg/l**	**9.27 mg/l**	**9.79 mg/l**	**11.4 mg/l**	**17.3 mg/l**	**16.4 mg/l**	**9.98 mg/l**	**12.4 mg/l**
Chloride	Dissolved	--	--	**9.59 mg/l**	--	--	--	--	--
Color	NA	--	**85 color units**	**100 color units**	**70 color units**	**50 color units**	**90 color units**	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	--	--	--	--	--	--	**3.70 mg/l**	**2.97 mg/l**
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	--	--	--	--	--	**249 mg/l**	--
Nitrate + Nitrite, as N	NA	--	--	--	--	--	--	< 0.1 mg/l	--
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	**1.42 mg/l**	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	**1.42 mg/l**	--
Orthophosphate, as PO4	NA	< 0.02 mg/l	**0.02 mg/l**	< 0.02 mg/l	**0.02 mg/l**	< 0.07 mg/l	< 0.02 mg/l	--	--
pH	NA	--	--	--	--	--	--	**7.50 pH units**	**7.68 pH units**
Phosphorus, total, as P	NA	--	--	--	--	--	--	**0.034 mg P/L**	--
Phosphorus, total, as P	Dissolved	**0.015 mg/l**	**0.028 mg/l**	**0.023 mg/l**	**0.02 mg/l**	**0.014 mg/l**	**0.015 mg/l**	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	--	--	--	--	--	**361 mg/l**	--
Solids, total suspended	NA	**2.4 mg/l**	**5.2 mg/l**	< 1 mg/l	< 1 mg/l	**10 mg/l**	**1.2 mg/l**	**3.2 mg/l**	--
Specific Conductance @ 25 ºC	NA	--	--	--	--	--	--	**600 umhos/cm**	**709 umhos/cm**
Sulfate, as SO4	NA	**15.9 mg/l**	**7.82 mg/l**	**6.91 mg/l**	**7.69 mg/l**	**33.6 mg/l**	**40.6 mg/l**	**4.31 mg/l**	**1.89 mg/l**
Sulfate, as SO4	Dissolved	--	--	**8.3 mg/l**	--	--	--	--	--
Sulfide, as S^{2-}	NA	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	--
Temperature, ºC	NA	--	--	--	--	--	--	**20.36 deg C**	**16.75 deg C**
Turbidity	NA	--	--	--	--	--	--	**0 NTU**	**3.0 NTU**
Metals									
Aluminum	Total	--	--	--	--	--	--	--	--
Aluminum	Dissolved	--	--	--	--	--	--	--	--
Antimony	Total	--	--	--	--	--	--	--	--
Arsenic	Total	--	--	--	--	--	--	**1.5 ug/l**	--
Barium	Total	--	--	--	--	--	--	**78.7 ug/l**	--
Beryllium	Total	--	--	--	--	--	--	< 0.2 ug/l	--
Boron	Total	--	--	--	--	--	--	**149 ug/l**	--
Cadmium	Total	--	--	--	--	--	--	< 0.2 ug/l	--
Calcium	Total	--	--	--	--	--	--	**42.2 mg/l**	--
Chromium	Total	--	--	--	--	--	--	< 1 ug/l	--
Cobalt	Total	--	--	--	--	--	--	**0.27 ug/l**	--
Cobalt	Dissolved	--	--	--	--	--	--	--	--
Copper	Total	--	--	--	--	--	--	**0.74 ug/l**	--
Copper	Dissolved	--	--	--	--	--	--	--	--
Iron	Total	--	--	--	--	--	--	**1650 ug/l**	--
Iron	Dissolved	**306 ug/l**	**355 ug/l**	**314 ug/l**	**422 ug/l**	**242 ug/l**	**259 ug/l**	--	--
Lead	Total	--	--	--	--	--	--	< 0.5 ug/l	--
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	--	--	--	--	--	--	**34.8 mg/l**	--
Manganese	Total	--	--	--	--	--	--	**199 ug/l**	--
Manganese	Dissolved	--	--	--	--	--	--	--	--
Mercury	Total	--	--	--	--	--	--	--	--
Mercury	Dissolved	**0.0021 ug/l**	**0.0018 ug/l**	**0.0018 ug/l**	**0.0014 ug/l**	**0.6 ng/l**	**1.9 ng/l**	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	**0.00055 ug/l**	**0.36 ng/l**	**0.67 ng/l**	**0.15 ng/l**	< 0.1 ng/l	< 0.1 ng/l	--	--
Molybdenum	Total	--	--	--	--	--	--	**1.49 ug/l**	--
Nickel	Total	--	--	--	--	--	--	**1.42 ug/l**	--
Nickel	Dissolved	--	--	--	--	--	--	--	--
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	--	--	--	--	--	**2.96 mg/l**	--
Selenium	Total	--	--	--	--	--	--	< 1 ug/l	--
Silver	Total	--	--	--	--	--	--	< 0.2 ug/l	--
Sodium	Total	--	--	--	--	--	--	**42.4 mg/l**	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	--	--	--	--	--	--	< 0.2 ug/l	--
Tin	Total	--	--	--	--	--	--	< 0.5 ug/l	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--	--
Zinc	Total	--	--	--	--	--	--	< 6 ug/l	--
Zinc	Dissolved	--	--	--	--	--	--	--	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-19	PM-19		PM-19	PM-19	PM-19	PM-19
Date		9/9/2010	9/14/2010		9/23/2010	10/6/2010	6/2/2011	7/25/2011
Sample Type		N	N	FD	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	--	--	--	**357 mg/l**
Alkalinity, total, as CaCO3	NA	--	**296 mg/l**	**295 mg/l**	--	--	**197 mg/l**	**357 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	< 3 mg/l	< 3 mg/l	--	--	< 2.4 mg/l	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	**16.6 mg/l**	**16.4 mg/l**	--	--	**16.6 mg/l**	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	**25.2 mg/l**	**25.3 mg/l**	--	--	**17.2 mg/l**	**27.2 mg/l**
Chemical Oxygen Demand	NA	--	**42.4 mg/l**	**42.4 mg/l**	--	--	**52.1 mg/l**	**67.0 mg/l**
Chloride	NA	**12.4 mg/l**	**12.9 mg/l**	**12.9 mg/l**	**13.6 mg/l**	**14.1 mg/l**	**11.3 mg/l**	**9.98 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**5.83 mg/l**	**5.70 mg/l**	--	< 0.1 mg/l	**5.65 mg/l**	**8.93 mg/l**	**1.17 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	--	**262 mg/l**	**264 mg/l**	--	--	**191 mg/l**	**302 mg/l**
Nitrate + Nitrite, as N	NA	--	< 0.1 mg/l	< 0.1 mg/l	--	--	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia as N	NA	--	--	--	--	--	--	< 0.1 mg/l
Nitrogen, total	NA	--	**1.47 mg/l**	**1.76 mg/l**	--	--	**1.27 mg/l**	--
Nitrogen, total kjeldahl (TKN)	NA	--	**1.37 mg/l**	**1.66 mg/l**	--	--	**1.27 mg/l**	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.54 pH units**	**7.59 pH units**	--	**7.7 pH units**	**7.57 pH units**	**7.64 pH units**	**7.51 pH units**
Phosphorus, total, as P	NA	--	**0.02 mg P/L**	**0.02 mg P/L**	--	--	**0.023 mg/l**	**0.056 mg P/L**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	--	**353 mg/l**	**357 mg/l**	--	--	**284 mg/l**	**441 mg/l**
Solids, total suspended	NA	--	**3.2 mg/l**	**2.8 mg/l**	--	--	**2 mg/l**	--
Specific Conductance @ 25 ºC	NA	**573.3 umhos/cm**	**619.6 umhos/cm**	--	**627 umhos/cm**	**596 umhos/cm**	**440 umhos/cm**	**704.0 umhos/cm**
Sulfate, as SO4	NA	**15.1 mg/l**	**10.5 mg/l**	**12.7 mg/l**	**12.5 mg/l**	**19.8 mg/l**	**22 mg/l**	< 1 mg/l
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**11.51 deg C**	**12.44 deg C**	--	**5.6 deg C**	**9.62 deg C**	**11.78 deg C**	**18.76 deg C**
Turbidity	NA	**0.2 NTU**	**0 NTU**	--	**10.8 NTU**	**0 NTU**	**0 NTU**	**1.1 NTU**
Metals								
Aluminum	Total	--	--	--	--	--	--	< 25 ug/l
Aluminum	Dissolved	--	--	--	--	--	--	< 25 ug/l
Antimony	Total	--	--	--	--	--	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Total	--	**1.15 ug/l**	**1.12 ug/l**	--	--	< 0.5 ug/l	**2.49 ug/l**
Barium	Total	--	**62.6 ug/l**	**63 ug/l**	--	--	**52 ug/l**	--
Beryllium	Total	--	< 0.2 ug/l	< 0.2 ug/l	--	--	< 0.2 ug/l	--
Boron	Total	--	**143 ug/l**	**145 ug/l**	--	--	**138 ug/l**	--
Cadmium	Total	--	< 0.02 ug/l	< 0.02 ug/l	--	--	< 0.2 ug/l	--
Calcium	Total	--	**43 mg/l**	**43.4 mg/l**	--	--	**31.7 mg/l**	**48.2 mg/l**
Chromium	Total	--	< 1 ug/l	< 1 ug/l	--	--	< 1 ug/l	--
Cobalt	Total	--	< 0.2 ug/l	< 0.2 ug/l	--	--	< 0.2 ug/l	**0.44 ug/l**
Cobalt	Dissolved	--	--	--	--	--	--	**0.38 ug/l**
Copper	Total	--	**0.77 ug/l**	**0.78 ug/l**	--	--	< 0.7 ug/l	**0.29 j ug/l**
Copper	Dissolved	--	--	--	--	--	--	**0.18 j ug/l**
Iron	Total	--	**596 ug/l**	**610 ug/l**	--	--	**350 ug/l**	**2380 ug/l**
Iron	Dissolved	--	--	--	--	--	--	**1280 ug/l**
Lead	Total	--	**0.05 j ug/l**	**0.09 j ug/l**	--	--	< 0.5 ug/l	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	**37.5 mg/l**	**37.7 mg/l**	--	--	**27.2 mg/l**	**44 mg/l**
Manganese	Total	--	**80.6 ug/l**	**81 ug/l**	--	--	**24.2 ug/l**	**1630 ug/l**
Manganese	Dissolved	--	--	--	--	--	--	**1510 ug/l**
Mercury	Total	--	--	--	--	--	--	**2.0 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	**1.44 ug/l**	**1.46 ug/l**	--	--	**1.6 ug/l**	**2.45 ug/l**
Nickel	Total	--	**1.2 ug/l**	**1.22 ug/l**	--	--	**0.9 ug/l**	< 0.6 ug/l
Nickel	Dissolved	--	--	--	--	--	--	< 0.6 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	**3.01 mg/l**	**3.06 mg/l**	--	--	**2.78 mg/l**	**2.53 mg/l**
Selenium	Total	--	**0.59 j ug/l**	**0.6 j ug/l**	--	--	--	--
Silver	Total	--	< 0.2 ug/l	< 0.2 ug/l	--	--	< 0.2 ug/l	--
Sodium	Total	--	**46.4 mg/l**	**47.7 mg/l**	--	--	**32.2 mg/l**	**48.4 mg/l**
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	--	< 0.2 ug/l	< 0.2 ug/l	--	--	< 0.2 ug/l	< 0.02 ug/l
Tin	Total	--	< 0.5 ug/l	< 0.5 ug/l	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	--	--	--	--
Zinc	Total	--	< 6 ug/l	< 6 ug/l	--	--	< 6 ug/l	< 6 ug/l
Zinc	Dissolved	--	--	--	--	--	--	< 6 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-19	PM-19	PM-19	PM-19	PM-19	PM-19	PM-19
Date		7/26/2011	8/24/2011	9/20/2011	10/20/2011	11/22/2011	12/28/2011	1/25/2012
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	**397 mg/l**	**396 mg/l**	**321 mg/l**	**338 mg/l**	**436 mg/l**	**504 mg/l**
Alkalinity, total, as CaCO3	NA	--	**397 mg/l**	**396 mg/l**	**321 mg/l**	**338 mg/l**	**436 mg/l**	**504 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	--	**21.5 mg/l**	**19.8 mg/l**	**14.8 mg/l**	**12.6 mg/l**	**14.4 mg/l**	**14.6 mg/l**
Chemical Oxygen Demand	NA	--	**55.7 mg/l**	**49 mg/l**	**42.2 mg/l**	**36.8 mg/l**	**35.2 mg/l**	**33.6 mg/l**
Chloride	NA	**10.1 mg/l**	**10.2 mg/l** **10.4 mg/l**	**12.2 mg/l** **12.2 mg/l**	**20.9 mg/l**	**24.9 mg/l**	**28.3 mg/l**	**30 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**1.13 mg/l**	**0.89 mg/l**	**1.76 mg/l**	< 0.1 mg/l	**5.20 mg/l**	**5.97 mg/l**	**7.01 mg/l**
Fluoride	NA	--	--	**0.95 mg/l**	--	**0.87 mg/l**	--	--
Hardness, as CaCO3	NA	--	**322 mg/l**	**329 mg/l**	**302 mg/l**	**333 mg/l**	**407 mg/l**	**489 mg/l**
Nitrate + Nitrite, as N	NA	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Nitrogen, ammonia as N	NA	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	**0.22 mg/l**
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.50 pH units**	**7.57 pH units**	**7.38 pH units**	**6.1 pH units**	**6.67 pH units**	**6.54 pH units**	**6.68 pH units**
Phosphorus, total, as P	NA	--	**0.063 mg P/L**	**0.036 mg P/L**	**0.014 mg P/L**	**0.01 mg P/L**	< 0.1 mg P/L	**0.021 mg P/L**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	**468 mV**	--	--	--
Solids, total dissolved	NA	--	**476 mg/l**	**513 mg/l**	**467 mg/l**	**522 mg/l**	**626 mg/l**	**644 mg/l**
Solids, total suspended	NA	--	--	**6.8 mg/l**	**3.6 mg/l**	**1.2 mg/l**	--	--
Specific Conductance @ 25 ºC	NA	**710.0 umhos/cm**	**775.0 umhos/cm**	**769.0 umhos/cm**	**735 umhos/cm**	**813 umhos/cm**	**854.0 umhos/cm**	**900 umhos/cm**
Sulfate, as SO4	NA	**1.01 mg/l**	< 1 mg/l < 1 mg/l	**3.47 mg/l** **3.47 mg/l**	**40.9 mg/l**	**79 mg/l**	**67 mg/l**	**78.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**18.81 deg C**	**18.39 deg C**	**10.97 deg C**	**4.7 deg C**	**0.02 deg C**	**0.01 deg C**	**0.01 deg C**
Turbidity	NA	**1.4 NTU**	**4.0 NTU**	**3.4 NTU**	**0 NTU**	**0 NTU**	**0.3 NTU**	**0.1 NTU**
Metals								
Aluminum	Total	< 25 ug/l	< 25 ug/l < 25 ug/l	**31.2 ug/l** **< 25 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l	**27.2 ug/l**
Aluminum	Dissolved	< 25 ug/l	< 25 ug/l < 25 ug/l	< 25 ug/l < 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Antimony	Total	--	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l	< 0.5 ug/l
Arsenic	Total	--	**2.67 ug/l**	**1.13 ug/l**	**0.64 ug/l**	< 0.5 ug/l	**0.55 ug/l**	**0.77 ug/l**
Barium	Total	--	--	**107 ug/l**	--	**70.9 ug/l**	--	--
Beryllium	Total	--	--	< 0.2 ug/l	--	< 0.2 ug/l	--	--
Boron	Total	--	--	**122 ug/l**	--	**132 ug/l**	--	--
Cadmium	Total	--	--	< 0.03 ug/l	--	< 0.03 ug/l	--	--
Calcium	Total	--	**53.4 mg/l**	**52.9 mg/l**	**46.7 mg/l**	**49.2 mg/l**	**60 mg/l**	**71.7 mg/l**
Chromium	Total	--	--	< 1 ug/l	--	< 1 ug/l	--	--
Cobalt	Total	--	**0.35 ug/l**	**0.2 ug/l**	< 0.2 ug/l	< 0.2 ug/l	**0.22 ug/l**	**0.36 ug/l**
Cobalt	Dissolved	--	**0.31 ug/l**	**0.25 ug/l**	< 0.2 ug/l	< 0.2 ug/l	**0.21 ug/l**	**0.36 ug/l**
Copper	Total	--	**0.37 jb ug/l**	**0.35 j ug/l**	**0.47 j ug/l**	**0.47 j ug/l**	**0.98 ug/l**	**0.78 ug/l**
Copper	Dissolved	--	< 0.15 ug/l	**0.82 ug/l**	**0.29 j ug/l**	**0.44 j ug/l**	< 0.7 ug/l	**0.59 j ug/l**
Iron	Total	--	**2530 ug/l**	**1610 ug/l**	**274 ug/l**	**244 ug/l**	**502 ug/l**	**939 ug/l**
Iron	Dissolved	--	**363 ug/l**	**264 ug/l**	**185 ug/l**	**154 ug/l**	**180 ug/l**	**486 ug/l**
Lead	Total	--	--	< 0.02 ug/l	--	< 0.02 ug/l	--	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	--	**45.7 mg/l**	**47.8 mg/l**	**45.1 mg/l**	**51.1 mg/l**	**62.4 mg/l**	**75.3 mg/l**
Manganese	Total	--	**1060 ug/l**	**491 ug/l**	**43.5 ug/l**	**76.8 ug/l**	**318 ug/l**	**1430 ug/l**
Manganese	Dissolved	--	**1070 ug/l**	**468 ug/l**	**40.8 ug/l**	**77.5 ug/l**	**317 ug/l**	**1460 ug/l**
Mercury	Total	--	**1.5 j ng/l**	**1.0 ng/l**	**0.9 ng/l**	**0.5 ng/l**	**1.3 ng/l**	**0.6 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	**0.16 ng/l**	--	< 0.1 ng/l	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	**1.79 ug/l**	**1.86 ug/l**	**1.22 ug/l**	**2.03 ug/l**	**0.69 ug/l**	**0.48 ug/l**
Nickel	Total	--	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	**0.62 ug/l**
Nickel	Dissolved	--	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l	< 0.6 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	**2.35 mg/l**	**2.48 mg/l**	**3.68 mg/l**	**2.99 mg/l**	**3.71 mg/l**	**4.09 mg/l**
Selenium	Total	--	--	**0.37 j ug/l**	--	**0.47 j ug/l**	--	--
Silver	Total	--	--	< 0.2 ug/l	--	< 0.2 ug/l	--	--
Sodium	Total	--	**50 mg/l**	**52.2 mg/l**	**52.2 mg/l**	**60 mg/l**	**61 mg/l**	**74.2 mg/l**
Strontium	Total	--	--	**242 ug/l**	--	**220 ug/l**	--	--
Thallium	Total	--	--	< 0.020 ug/l	< 0.02 ug/l	< 0.02 ug/l	--	< 0.02 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	< 10 ug/l	--	< 10 ug/l	--	--
Vanadium	Total	--	--	< 10 ug/l	--	< 10 ug/l	--	--
Zinc	Total	--	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l
Zinc	Dissolved	--	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l	< 6 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	PM-19 2/29/2012 N	PM-19 2/29/2012 FD	PM-19 6/26/2012 N	PM-19 7/25/2012 N	PM-19 8/28/2012 N	PM-19 9/24/2012 N	PM-19 10/23/2012 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	**494 mg/l**	--	**190 mg/l**	--	--	**311 mg/l**	--
Alkalinity, total, as CaCO3	NA	**494 mg/l**	--	**190 mg/l**	--	--	**311 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**13.5 mg/l**	--	**33.7 mg/l**	**25.3 mg/l**	**33.0 mg/l**	**17.2 mg/l**	**12.3 mg/l**
Chemical Oxygen Demand	NA	**45.5 mg/l**	--	**79.7 b mg/l**	--	--	**55.4 mg/l**	--
Chloride	NA	**30.2 mg/l**	--	**6.8 mg/l**	**8.3 mg/l**	**8.2 mg/l**	**11.9 mg/l**	**19.7 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**7.45 mg/l**	--	**2.71 mg/l**	**1.19 mg/l**	**0.62 mg/l**	**6.04 mg/l**	**6.31 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**487 mg/l**	--	**173 mg/l**	**281 mg/l**	**272 mg/l**	**267 mg/l**	**276 mg/l**
Nitrate + Nitrite, as N	NA	< 0.1 mg/l	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--
Nitrogen, ammonia as N	NA	**0.39 mg/l**	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**6.97 pH units**	--	**7.41 pH units**	**7.55 pH units**	**7.53 pH units**	**7.49 pH units**	**7.23 pH units**
Phosphorus, total, as P	NA	**0.022 mg P/L**	--	**0.037 b mg/l**	--	--	**0.027 mg/l**	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**665 mg/l**	--	**291 mg/l**	**403 mg/l**	**395 mg/l**	**371 mg/l**	**419 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**957 umhos/cm**	--	**379.8 umhos/cm**	**574.9 umhos/cm**	**572.2 umhos/cm**	**551.6 umhos/cm**	**665.8 umhos/cm**
Sulfate, as SO4	NA	**80.2 mg/l**	--	**12.1 mg/l**	**5.9 mg/l**	**1.6 mg/l**	**9.3 mg/l**	**56.7 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**0.09 deg C**	--	**16.23 deg C**	**19.74 deg C**	**17.09 deg C**	**8.02 deg C**	**7.26 deg C**
Turbidity	NA	**0 NTU**	--	**0 NTU**	**9.8 NTU**	**0.5 NTU**	**3.1 NTU**	**0 NTU**
Metals								
Aluminum	Total	**33.2 ug/l**	--	**58.9 ug/l**	**63.5 ug/l**	**31.6 ug/l**	**32.4 ug/l**	**26.0 ug/l**
Aluminum	Dissolved	< 25 ug/l	--	**51.2 ug/l**	**28.5 ug/l**	< 20.0 ug/l	**37.4 ug/l**	**27.8 ug/l**
Antimony	Total	< 0.5 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	**0.57 ug/l**	--	**1.5 ug/l**	**3.9 ug/l**	**3.9 ug/l**	**1.6 ug/l**	**0.64 ug/l**
Barium	Total	--	--	**55.1 ug/l**	--	--	**87.6 ug/l**	--
Beryllium	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Boron	Total	--	--	**128 ug/l**	--	--	**111 ug/l**	--
Cadmium	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Calcium	Total	**73.6 mg/l**	--	**28.5 mg/l**	**48.7 mg/l**	**46.5 mg/l**	**42.5 mg/l**	**41.4 mg/l**
Chromium	Total	--	--	< 1.0 ug/l	--	--	< 1.0 ug/l	--
Cobalt	Total	**0.32 ug/l**	--	**0.23 ug/l**	**0.78 ug/l**	**0.98 ug/l**	**0.30 ug/l**	< 0.20 ug/l
Cobalt	Dissolved	**0.31 ug/l**	--	**0.22 b ug/l**	**0.71 ug/l**	**0.86 ug/l**	**0.32 ug/l**	< 0.20 ug/l
Copper	Total	**0.87 ug/l**	--	< 0.50 ug/l	**0.53 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**0.55 ug/l**
Copper	Dissolved	**0.78 ug/l**	--	**0.99 b ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.63 ug/l**
Iron	Total	**660 ug/l**	--	**1460 ug/l**	**5360 ug/l**	**5830 ug/l**	**1470 ug/l**	**334 ug/l**
Iron	Dissolved	**235 ug/l**	--	**1390 ug/l**	**2130 ug/l**	**2560 ug/l**	**506 ug/l**	**224 ug/l**
Lead	Total	--	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**73.7 mg/l**	--	**24.7 mg/l**	**38.8 mg/l**	**37.9 mg/l**	**39.2 mg/l**	**41.8 mg/l**
Manganese	Total	**1190 ug/l**	--	**143 ug/l**	**3810 ug/l**	**3990 ug/l**	**820 ug/l**	**90.1 ug/l**
Manganese	Dissolved	**1190 ug/l**	--	**139 b ug/l**	**3620 ug/l**	**4140 ug/l**	**815 ug/l**	**84.9 ug/l**
Mercury	Total	**0.9 ng/l**	**0.8 ng/l**	**3.9 ng/l**	--	--	**1.4 ng/l**	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	**0.39 ug/l**	--	**1.5 ug/l**	--	--	**1.0 ug/l**	--
Nickel	Total	**1 ug/l**	--	**0.52 ug/l**	< 0.50 ug/l	**0.84 b ug/l**	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	**0.63 ug/l**	--	**0.58 b ug/l**	< 0.50 ug/l	**0.60 ug/l**	**0.80 ug/l**	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**4.24 mg/l**	--	**1.4 mg/l**	--	--	**2.4 mg/l**	--
Selenium	Total	--	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Sodium	Total	**76.2 mg/l**	--	**26.9 mg/l**	--	--	**41.5 mg/l**	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.02 ug/l	--	< 0.002 ug/l	< 0.0004 ug/l	< 0.005 ug/l	**0.003 j ug/l**	**0.0588 b ug/l**
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	< 3.0 ug/l	--	--	< 3.0 ug/l	--
Zinc	Total	< 6 ug/l	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6 ug/l	--	**7.1 b ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		PM-19	PM-19	PM-19	PM-19	PM-19	PM-19	PM-19
Date		11/21/2012	12/12/2012	1/18/2013	2/20/2013	3/20/2013	4/8/2013	5/7/2013
Sample Type		N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	**332 mg/l**	--	--	**514 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	--	**332 mg/l**	--	--	**514 mg/l**	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**11.1 mg/l**	**11.1 mg/l**	**15.7 mg/l**	**10.9 mg/l**	**11.2 mg/l**	**10.9 mg/l**	**13.1 mg/l**
Chemical Oxygen Demand	NA	--	**29.8 mg/l**	--	--	**32.5 mg/l**	--	--
Chloride	NA	**21.7 mg/l**	**26.7 mg/l**	**33.3 mg/l**	**29.3 mg/l**	**27.2 mg/l**	**55.1 mg/l**	**7.9 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**9.01 mg/l**	**6.4 mg/l**	**3.51 mg/l**	**10.81 mg/l**	**9.64 mg/l**	**10.18 mg/l**	**6.3 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**249 mg/l**	**371 mg/l**	**442 mg/l**	**530 mg/l**	**502 mg/l**	**278 mg/l**	**123 mg/l**
Nitrate + Nitrite, as N	NA	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--	--
Nitrogen, ammonia as N	NA	--	< 0.10 mg/l	--	--	**0.31 mg/l**	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.54 pH units**	**7.07 pH units**	**7.29 pH units**	**6.65 pH units**	**7.1 pH units**	**7.07 pH units**	**6.69 pH units**
Phosphorus, total, as P	NA	--	< 0.0040 mg/l	--	--	**0.019 mg/l**	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**367 mg/l**	**549 mg/l**	**631 mg/l**	**708 mg/l**	**705 mg/l**	**455 mg/l**	**195 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**558.8 umhos/cm**	**703.4 umhos/cm**	**1008 umhos/cm**	**990.3 umhos/cm**	**1058 umhos/cm**	**696.5 umhos/cm**	**285.3 umhos/cm**
Sulfate, as SO4	NA	**72.3 mg/l**	**94.1 mg/l**	**81.1 mg/l**	**117 mg/l**	**113 mg/l**	**51.2 mg/l**	**24.0 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**1.05 deg C**	**0.2 deg C**	**0.78 deg C**	**0.33 deg C**	**3.54 deg C**	**1.91 deg C**	**4.31 deg C**
Turbidity	NA	**0 NTU**	**0 NTU**	**0.7 NTU**	**1.3 NTU**	**18.8 NTU**	**40.4 NTU**	**3.5 NTU**
Metals								
Aluminum	Total	< 20.0 ug/l	< 40.0 ug/l	**31.5 ug/l**	**63.8 ug/l**	**37.1 ug/l**	**184 ug/l**	**68.2 ug/l**
Aluminum	Dissolved	**23.8 ug/l**	< 20.0 ug/l	**22.1 ug/l**	**27.2 ug/l**	**25.9 ug/l**	**26.1 ug/l**	**66.3 ug/l**
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.52 ug/l**	< 0.82 ug/l	< 0.50 ug/l	< 0.50 ug/l
Barium	Total	--	**87.0 ug/l**	--	--	**129 ug/l**	--	--
Beryllium	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Boron	Total	--	**142 ug/l**	--	--	**157 ug/l**	--	--
Cadmium	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Calcium	Total	**35.7 mg/l**	**53.6 mg/l**	**65.7 mg/l**	**77.1 mg/l**	**73.9 mg/l**	**45.8 mg/l**	**18.5 mg/l**
Chromium	Total	--	< 1.0 ug/l	--	--	< 1.0 ug/l	--	--
Cobalt	Total	< 0.20 ug/l	**0.22 ug/l**	**0.37 ug/l**	**0.38 ug/l**	**0.34 ug/l**	**0.35 ug/l**	< 0.20 ug/l
Cobalt	Dissolved	< 0.20 ug/l	**0.22 ug/l**	**0.37 ug/l**	**0.36 ug/l**	**0.38 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Copper	Total	**0.62 ug/l**	**0.55 ug/l**	**0.99 ug/l**	**0.80 ug/l**	**1.6 ug/l**	**2.4 ug/l**	**0.61 ug/l**
Copper	Dissolved	**0.81 ug/l**	**0.60 ug/l**	**0.95 ug/l**	**0.84 ug/l**	**1.3 ug/l**	**1.7 ug/l**	**0.57 ug/l**
Iron	Total	**226 ug/l**	**381 ug/l**	**654 ug/l**	**669 ug/l**	**477 ug/l**	**862 ug/l**	**776 ug/l**
Iron	Dissolved	**2150 ug/l**	**212 ug/l**	**224 ug/l**	**181 ug/l**	**128 ug/l**	**240 ug/l**	**633 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**38.9 mg/l**	**57.7 mg/l**	**67.5 mg/l**	**81.8 mg/l**	**77.2 mg/l**	**39.6 mg/l**	**18.6 mg/l**
Manganese	Total	**29.2 ug/l**	**297 ug/l**	**1130 ug/l**	**1290 ug/l**	**673 ug/l**	**504 ug/l**	**100 ug/l**
Manganese	Dissolved	**36.2 ug/l**	**295 ug/l**	**1130 ug/l**	**1300 ug/l**	**698 ug/l**	**489 ug/l**	**93.1 ug/l**
Mercury	Total	--	**1.1 ng/l**	--	--	**0.80 ng/l**	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	**1.3 ug/l**	--	--	**0.93 ug/l**	--	--
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**1.2 ug/l**	**1.4 ug/l**	< 0.50 ug/l
Nickel	Dissolved	**3.3 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**1.4 ug/l**	**1.0 ug/l**	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	**3.4 mg/l**	--	--	**4.7 mg/l**	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Sodium	Total	--	**63.8 mg/l**	--	--	**69.1 mg/l**	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.0004 ug/l	< 0.002 ug/l	< 0.0004 ug/l	--	< 0.0004 ug/l	**0.008 j ug/l**	< 0.002 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	< 3.0 ug/l	--	--	< 3.0 ug/l	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**31.2 ug/l**	< 6.0 ug/l
Zinc	Dissolved	**7.2 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	**21.7 ug/l**	**9.3 b ug/l**

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	PM-19	PM-19	PM-19	PM-19	PM-19	PM-19	PM-19
	Date	6/5/2013	7/10/2013	8/12/2013	9/12/2013	10/14/2013	11/20/2013	12/23/2013
	Sample Type	N	N	N	N	N	N	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	**270 mg/l**	--	--	**321 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	--	**270 mg/l**	--	--	**321 mg/l**	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**15.6 mg/l**	**24.9 mg/l**	**24.0 mg/l**	**18.8 mg/l**	**14.6 mg/l**	**12.0 mg/l**	**11.9 mg/l**
Chemical Oxygen Demand	NA	--	**71.8 mg/l**	--	--	**50.8 mg/l**	--	--
Chloride	NA	**10.3 mg/l**	**8.3 mg/l**	**7.2 mg/l**	**9.8 mg/l**	**15.2 mg/l**	**20.9 mg/l**	**25.1 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**4.75 mg/l**	**3.63 mg/l**	**3.25 mg/l**	**1.96 mg/l**	**8.25 mg/l**	**8.77 mg/l**	**8.33 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**166 mg/l**	**244 mg/l**	**262 mg/l**	**266 mg/l**	**282 mg/l**	**258 mg/l**	**406 mg/l**
Nitrate + Nitrite, as N	NA	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--	--
Nitrogen, ammonia as N	NA	--	**0.12 mg/l**	--	--	< 0.10 mg/l	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.09 pH units**	**7.37 pH units**	**7.17 pH units**	**7.47 pH units**	**7.58 pH units**	**7.27 pH units**	**6.3 pH units**
Phosphorus, total, as P	NA	--	**0.039 mg/l**	--	--	**0.017 mg/l**	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**278 mg/l**	**389 mg/l**	**372 mg/l**	**402 mg/l**	**390 mg/l**	**389 mg/l**	**539 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**401.7 umhos/cm**	**516.3 umhos/cm**	**596.5 umhos/cm**	**642.3 umhos/cm**	**643.2 umhos/cm**	**618.6 umhos/cm**	**790.1 umhos/cm**
Sulfate, as SO4	NA	**23.5 mg/l**	**3.9 mg/l**	< 1.0 mg/l	**8.0 mg/l**	**17.8 mg/l**	**62.2 mg/l**	**72.9 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**10.36 deg C**	**19.41 deg C**	**15.35 deg C**	**16.04 deg C**	**8.83 deg C**	**1.81 deg C**	**0.19 deg C**
Turbidity	NA	**0 NTU**	**0 NTU**	**5.7 NTU**	**8.5 NTU**	**2.5 NTU**	**0 NTU**	**0.8 NTU**
Metals								
Aluminum	Total	**38.9 ug/l**	**45.7 ug/l**	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	**25.9 ug/l**
Aluminum	Dissolved	**23.0 ug/l**	**29.8 ug/l**	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l
Antimony	Total	--	< 0.50 ug/l	--	--	< 0.50 ug/l	--	--
Arsenic	Total	**0.83 ug/l**	**1.5 ug/l**	**2.0 ug/l**	**1.8 ug/l**	**1.1 ug/l**	**0.53 ug/l**	< 0.50 ug/l
Barium	Total	--	**87.1 ug/l**	--	--	**72.5 ug/l**	--	--
Beryllium	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Boron	Total	--	**148 ug/l**	--	--	**128 ug/l**	--	--
Cadmium	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Calcium	Total	**25.7 mg/l**	**40.0 mg/l**	**43.8 mg/l**	**44.6 mg/l**	**42.9 mg/l**	**37.1 mg/l**	**58.3 mg/l**
Chromium	Total	--	< 1.0 ug/l	--	--	< 1.0 ug/l	--	--
Cobalt	Total	< 0.20 ug/l	**0.34 ug/l**	**0.41 ug/l**	**0.52 ug/l**	< 0.20 ug/l	< 0.20 ug/l	**0.21 ug/l**
Cobalt	Dissolved	< 0.20 ug/l	**0.31 ug/l**	**0.39 ug/l**	**0.44 ug/l**	< 0.20 ug/l	< 0.20 ug/l	**0.21 ug/l**
Copper	Total	**0.54 ug/l**	**0.51 ug/l**	< 0.50 ug/l	**0.51 ug/l**	**0.56 ug/l**	**0.54 ug/l**	**0.84 ug/l**
Copper	Dissolved	< 0.50 ug/l	**0.50 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.50 ug/l**	**0.76 ug/l**
Iron	Total	**409 ug/l**	**1230 ug/l**	**2910 ug/l**	**2330 ug/l**	**572 ug/l**	**261 ug/l**	**585 ug/l**
Iron	Dissolved	**314 ug/l**	**919 ug/l**	**1810 ug/l**	**873 ug/l**	**305 ug/l**	**161 ug/l**	**155 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Magnesium	Total	**24.7 mg/l**	**34.9 mg/l**	**37.1 mg/l**	**37.4 mg/l**	**42.5 mg/l**	**40.2 mg/l**	**63.2 mg/l**
Manganese	Total	**57.9 ug/l**	**544 ug/l**	**1530 ug/l**	**2700 ug/l**	**240 ug/l**	**62.5 ug/l**	**348 ug/l**
Manganese	Dissolved	**50.0 ug/l**	**518 ug/l**	**1320 ug/l**	**2810 ug/l**	**217 ug/l**	**63.7 ug/l**	**356 ug/l**
Mercury	Total	--	**3.8 ng/l**	--	--	**1.7 ng/l**	--	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	**1.7 ug/l**	--	--	**0.64 ug/l**	--	--
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.70 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	**2.2 mg/l**	--	--	**2.7 mg/l**	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--	--
Sodium	Total	--	**33.6 mg/l**	--	--	**48.4 mg/l**	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.005 ug/l	< 0.002 ug/l	< 0.005 ug/l	< 0.005 ug/l	< 0.002 ug/l	< 0.002 ug/l	< 0.005 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	< 3.0 ug/l	--	--	< 3.0 ug/l	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	**19.5 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	TC-1 7/30/2012 N	TC-1 8/27/2012 N	TC-1 9/24/2012 N	TC-1 10/18/2012 N	TC-1A 11/19/2012 N	TC-1A 12/12/2012 N	TC-1A 12/12/2012 FD
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**335 mg/l**	--	--	**355 mg/l**	--
Alkalinity, total, as CaCO3	NA	--	--	**335 mg/l**	--	--	**355 mg/l**	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**31.8 mg/l**	**30.0 mg/l**	**15.3 mg/l**	**14.8 mg/l**	**11.3 mg/l**	**11.0 mg/l**	--
Chemical Oxygen Demand	NA	--	--	**45.8 mg/l**	--	--	**31.0 mg/l**	--
Chloride	NA	**7.5 mg/l**	**9.1 mg/l**	**13.0 mg/l**	**17.2 mg/l**	**22.8 mg/l**	**27.9 mg/l**	--
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**2.65 mg/l**	**1.46 mg/l**	**5.78 mg/l**	**6.43 mg/l**	**10.53 mg/l**	**4.63 mg/l**	--
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**231 mg/l**	**299 mg/l**	**285 mg/l**	**278 mg/l**	**265 mg/l**	**370 mg/l**	--
Nitrate + Nitrite, as N	NA	--	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--
Nitrogen, ammonia as N	NA	--	--	< 0.10 mg/l	--	--	< 0.10 mg/l	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.4 pH units**	**7.46 pH units**	**7.69 pH units**	**7.38 pH units**	**7.79 pH units**	**6.98 pH units**	--
Phosphorus, total, as P	NA	--	--	**0.028 mg/l**	--	--	< 0.0040 mg/l	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**366 mg/l**	**416 mg/l**	**406 mg/l**	**410 mg/l**	**445 mg/l**	**542 mg/l**	--
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**492.2 umhos/cm**	**646.5 umhos/cm**	**608.8 umhos/cm**	**651.9 umhos/cm**	**598.9 umhos/cm**	**825.4 umhos/cm**	--
Sulfate, as SO4	NA	**1.9 mg/l**	**1.3 mg/l**	**9.8 mg/l**	**36.6 mg/l**	**75.3 mg/l**	**94.1 mg/l**	--
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**19.42 deg C**	**17.32 deg C**	**7.18 deg C**	**7.04 deg C**	**1.76 deg C**	**0.21 deg C**	--
Turbidity	NA	**15.3 NTU**	**3.4 NTU**	**0.7 NTU**	**2.4 NTU**	**0 NTU**	**0 NTU**	--
Metals								
Aluminum	Total	**50.6 ug/l**	**82.5 ug/l**	**26.5 ug/l**	< 40.0 ug/l	< 20.0 ug/l	< 40.0 ug/l	--
Aluminum	Dissolved	**42.8 ug/l**	**25.6 ug/l**	**30.5 ug/l**	**48.0 ug/l**	< 20.0 ug/l	< 20.0 ug/l	--
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Total	**2.8 ug/l**	**5.2 ug/l**	**1.3 ug/l**	**0.98 ug/l**	< 0.50 ug/l	< 0.50 ug/l	--
Barium	Total	--	--	**95.2 ug/l**	--	--	**88.1 ug/l**	--
Beryllium	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Boron	Total	--	--	**137 ug/l**	--	--	**142 ug/l**	--
Cadmium	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Calcium	Total	**38.2 mg/l**	**49.8 mg/l**	**44.6 mg/l**	**41.7 mg/l**	**37.4 mg/l**	**52.9 mg/l**	--
Chromium	Total	--	--	< 1.0 ug/l	--	--	< 1.0 ug/l	--
Cobalt	Total	**0.53 ug/l**	**1.4 ug/l**	**0.29 ug/l**	**0.25 ug/l**	< 0.20 ug/l	< 0.20 ug/l	--
Cobalt	Dissolved	**0.59 ug/l**	**1.2 ug/l**	**0.30 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	--
Copper	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.53 ug/l**	**0.53 ug/l**	**0.55 ug/l**	--
Copper	Dissolved	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.85 ug/l**	**0.51 ug/l**	**0.59 ug/l**	--
Iron	Total	**2540 ug/l**	**8330 ug/l**	**941 ug/l**	**1210 ug/l**	**317 ug/l**	**232 ug/l**	--
Iron	Dissolved	**2130 ug/l**	**3070 ug/l**	**395 ug/l**	**329 ug/l**	**177 ug/l**	**140 ug/l**	--
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Lead	Dissolved	--	--	--	--	--	--	--
Magnesium	Total	**33.0 mg/l**	**42.3 mg/l**	**42.2 mg/l**	**42.2 mg/l**	**41.8 mg/l**	**57.7 mg/l**	--
Manganese	Total	**888 ug/l**	**3670 ug/l**	**461 ug/l**	**202 ug/l**	**46.6 ug/l**	**157 ug/l**	--
Manganese	Dissolved	**906 ug/l**	**3430 ug/l**	**423 ug/l**	**111 ug/l**	**40.9 ug/l**	**157 ug/l**	--
Mercury	Total	--	--	**1.1 ng/l**	--	--	**0.90 ng/l**	**0.94 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	**0.89 ug/l**	--	--	**1.4 ug/l**	--
Nickel	Total	< 0.50 ug/l	**0.88 ug/l**	**0.68 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Nickel	Dissolved	< 0.50 ug/l	**0.84 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	**2.3 mg/l**	--	--	**3.3 mg/l**	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--
Silver	Total	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l	--
Sodium	Total	--	--	**47.0 mg/l**	--	--	**64.4 mg/l**	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.0004 ug/l	< 0.005 ug/l	< 0.002 ug/l	< 0.0004 ug/l	< 0.0004 ug/l	< 0.002 ug/l	--
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	< 3.0 ug/l	--	--	< 3.0 ug/l	--
Zinc	Total	< 6.0 ug/l	**8.9 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	Location: TC-1A Date: 1/18/2013 Sample Type: N	TC-1A 2/20/2013 N	TC-1A 3/20/2013 N	TC-1A 4/8/2013 N	TC-1A 5/8/2013 N	TC-1A 6/5/2013 N
General Parameters							
Alkalinity, bicarbonate, as CaCO3	NA	--	--	**243 mg/l**	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	**243 mg/l**	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--
Carbon, total organic	NA	**14.6 mg/l**	**11.0 mg/l**	**10.6 mg/l**	**11.9 mg/l**	**11.0 mg/l**	**14.3 mg/l**
Chemical Oxygen Demand	NA	--	--	**31.0 mg/l**	--	--	--
Chloride	NA	**33.5 mg/l**	**29.0 mg/l**	**27.1 mg/l**	**24.5 mg/l**	**8.3 mg/l**	**11.2 mg/l**
Chloride	Dissolved	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--
Dissolved oxygen	NA	**2.17 mg/l**	**9.35 mg/l**	**9.7 mg/l**	**5.1 mg/l**	**6.26 mg/l**	**4.75 mg/l**
Fluoride	NA	--	--	--	--	--	--
Hardness, as CaCO3	NA	**443 mg/l**	**532 mg/l**	**510 mg/l**	**402 mg/l**	**147 mg/l**	**188 mg/l**
Nitrate + Nitrite, as N	NA	--	--	< 0.10 mg/l	--	--	--
Nitrogen, ammonia as N	NA	--	--	**0.31 mg/l**	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--
pH	NA	**7.34 pH units**	**7.42 pH units**	**7.07 pH units**	**7.02 pH units**	**6.85 pH units**	**7.1 pH units**
Phosphorus, total, as P	NA	--	--	**0.016 mg/l**	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--
Solids, total dissolved	NA	**604 mg/l**	**722 mg/l**	**719 mg/l**	**576 mg/l**	**231 mg/l**	**312 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**1011 umhos/cm**	**1076 umhos/cm**	**1078 umhos/cm**	**847.1 umhos/cm**	**345.6 umhos/cm**	**461.5 umhos/cm**
Sulfate, as SO4	NA	**76.6 mg/l**	**119 mg/l**	**111 mg/l**	**85.7 mg/l**	**27.9 mg/l**	**28.9 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--
Temperature, ºC	NA	**-0.04 deg C**	**0.63 deg C**	**1.79 deg C**	**0.01 deg C**	**4.09 deg C**	**10.47 deg C**
Turbidity	NA	**0.6 NTU**	**0.5 NTU**	**10.4 NTU**	**2.4 NTU**	**0 NTU**	**12.4 NTU**
Metals							
Aluminum	Total	**29.3 ug/l**	**32.1 ug/l**	**37.1 ug/l**	**37.4 ug/l**	**31.9 ug/l**	**22.3 ug/l**
Aluminum	Dissolved	**22.5 ug/l**	**26.0 ug/l**	**26.1 ug/l**	**22.7 ug/l**	< 20.0 ug/l	< 20.0 ug/l
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--
Arsenic	Total	**0.70 ug/l**	**0.50 ug/l**	< 0.82 ug/l	< 0.50 ug/l	< 0.50 ug/l	**0.79 ug/l**
Barium	Total	--	--	**137 ug/l**	--	--	--
Beryllium	Total	--	--	< 0.20 ug/l	--	--	--
Boron	Total	--	--	**163 ug/l**	--	--	--
Cadmium	Total	--	--	< 0.20 ug/l	--	--	--
Calcium	Total	**66.1 mg/l**	**77.6 mg/l**	**75.4 mg/l**	**59.5 mg/l**	**22.1 mg/l**	**28.6 mg/l**
Chromium	Total	--	--	< 1.0 ug/l	--	--	--
Cobalt	Total	**0.42 ug/l**	**0.36 ug/l**	**0.33 ug/l**	**0.27 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Cobalt	Dissolved	**0.42 ug/l**	**0.35 ug/l**	**0.34 ug/l**	**0.24 ug/l**	< 0.20 ug/l	< 0.20 ug/l
Copper	Total	**0.56 ug/l**	**0.72 ug/l**	**0.85 ug/l**	**0.66 ug/l**	< 0.50 ug/l	**0.73 ug/l**
Copper	Dissolved	**0.61 ug/l**	**0.88 ug/l**	**0.72 ug/l**	**0.57 ug/l**	< 0.50 ug/l	**1.2 ug/l**
Iron	Total	**604 ug/l**	**420 ug/l**	**409 ug/l**	**693 ug/l**	**620 ug/l**	**326 ug/l**
Iron	Dissolved	**238 ug/l**	**162 ug/l**	**102 ug/l**	**334 ug/l**	**386 ug/l**	**378 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	< 0.50 ug/l
Magnesium	Total	**67.4 mg/l**	**82.1 mg/l**	**78.2 mg/l**	**61.6 mg/l**	**22.3 mg/l**	**28.4 mg/l**
Manganese	Total	**1630 ug/l**	**1250 ug/l**	**697 ug/l**	**776 ug/l**	**51.9 ug/l**	**61.8 ug/l**
Manganese	Dissolved	**1650 ug/l**	**1250 ug/l**	**730 ug/l**	**769 ug/l**	**37.0 ug/l**	**56.8 ug/l**
Mercury	Total	--	--	**0.91 ng/l**	--	--	--
Mercury	Dissolved	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--
Molybdenum	Total	--	--	**0.91 ug/l**	--	--	--
Nickel	Total	< 0.50 ug/l	**0.58 ug/l**	**1.2 ug/l**	**0.52 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	**1.4 ug/l**	**0.56 ug/l**	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--
Potassium	Total	--	--	**4.7 mg/l**	--	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	< 0.20 ug/l	--	--	--
Sodium	Total	--	--	**70.0 mg/l**	--	--	--
Strontium	Total	--	--	--	--	--	--
Thallium	Total	< 0.0004 ug/l	--	< 0.0004 ug/l	< 0.005 ug/l	< 0.0004 ug/l	< 0.005 ug/l
Tin	Total	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--
Vanadium	Total	--	--	< 3.0 ug/l	--	--	--
Zinc	Total	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

	Location	TC-1A		TC-1A	TC-1A	TC-1A		TC-1A
	Date	7/10/2013		8/12/2013	9/12/2013	10/14/2013		11/20/2013
	Sample Type	N	FD	N	N	N	FD	N
Parameter	Total or Dissolved							
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	**284 mg/l**	--	--	--	**338 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	**284 mg/l**	--	--	--	**338 mg/l**	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**21.2 mg/l**	--	**23.2 mg/l**	**16.7 mg/l**	**13.1 mg/l**	--	**11.6 mg/l**
Chemical Oxygen Demand	NA	**59.6 mg/l**	--	--	--	**44.4 mg/l**	--	--
Chloride	NA	**8.7 mg/l**	--	**7.4 mg/l**	**11.3 mg/l**	**16.1 mg/l**	--	**22.2 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**2.71 mg/l**	--	**2.5 mg/l**	**3.6 mg/l**	**6.2 mg/l**	--	**9.11 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**246 mg/l**	--	**270 mg/l**	**290 mg/l**	**307 mg/l**	--	**274 mg/l**
Nitrate + Nitrite, as N	NA	< 0.10 mg/l	--	--	--	< 0.10 mg/l	--	--
Nitrogen, ammonia as N	NA	**0.14 mg/l**	--	--	--	< 0.10 mg/l	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.36 pH units**	--	**7.05 pH units**	**7.51 pH units**	**7.44 pH units**	--	**7.42 pH units**
Phosphorus, total, as P	NA	**0.048 mg/l**	--	--	--	**0.016 mg/l**	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**405 mg/l**	--	**368 mg/l**	**406 mg/l**	**428 mg/l**	--	**427 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**543.5 umhos/cm**	--	**627.5 umhos/cm**	**687.3 umhos/cm**	**676.8 umhos/cm**	--	**675.8 umhos/cm**
Sulfate, as SO4	NA	**4.8 mg/l**	--	**1.0 mg/l**	**2.0 mg/l**	**22.7 mg/l**	--	**69.4 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**18.67 deg C**	--	**14.58 deg C**	**14.9 deg C**	**7.71 deg C**	--	**1.61 deg C**
Turbidity	NA	**7.4 NTU**	--	**42.4 NTU**	**7.8 NTU**	**3.2 NTU**	--	**0 NTU**
Metals								
Aluminum	Total	**37.0 ug/l**	--	**21.6 ug/l**	< 20.0 ug/l	< 20.0 ug/l	--	< 20.0 ug/l
Aluminum	Dissolved	**24.6 ug/l**	--	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l	--	< 20.0 ug/l
Antimony	Total	< 0.50 ug/l	--	--	--	< 0.50 ug/l	--	--
Arsenic	Total	**1.9 ug/l**	--	**2.7 ug/l**	**1.5 ug/l**	**0.98 ug/l**	--	< 0.50 ug/l
Barium	Total	**119 ug/l**	--	--	--	**83.2 ug/l**	--	--
Beryllium	Total	< 0.20 ug/l	--	--	--	< 0.20 ug/l	--	--
Boron	Total	**173 ug/l**	--	--	--	**142 ug/l**	--	--
Cadmium	Total	< 0.20 ug/l	--	--	--	< 0.20 ug/l	--	--
Calcium	Total	**40.2 mg/l**	--	**44.1 mg/l**	**46.3 mg/l**	**46.1 mg/l**	--	**39.1 mg/l**
Chromium	Total	< 1.0 ug/l	--	--	--	< 1.0 ug/l	--	--
Cobalt	Total	**0.56 ug/l**	--	**0.66 ug/l**	**0.32 ug/l**	< 0.20 ug/l	--	< 0.20 ug/l
Cobalt	Dissolved	**0.51 ug/l**	--	**0.61 ug/l**	**0.22 ug/l**	< 0.20 ug/l	--	< 0.20 ug/l
Copper	Total	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	**0.51 ug/l**
Copper	Dissolved	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Iron	Total	**1930 ug/l**	--	**4040 ug/l**	**1380 ug/l**	**475 ug/l**	--	**261 ug/l**
Iron	Dissolved	**1180 ug/l**	--	**2990 ug/l**	**566 ug/l**	**252 ug/l**	--	**163 ug/l**
Lead	Total	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Lead	Dissolved	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Magnesium	Total	**35.3 mg/l**	--	**38.9 mg/l**	**42.3 mg/l**	**46.6 mg/l**	--	**42.9 mg/l**
Manganese	Total	**1580 ug/l**	--	**1660 ug/l**	**689 ug/l**	**122 ug/l**	--	**43.9 ug/l**
Manganese	Dissolved	**1350 ug/l**	--	**1490 ug/l**	**585 ug/l**	**110 ug/l**	--	**43.7 ug/l**
Mercury	Total	**5.1 ng/l**	**4.7 ng/l**	--	--	**2.9 ng/l**	**2.9 ng/l**	--
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	**1.5 ug/l**	--	--	--	**0.63 ug/l**	--	--
Nickel	Total	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Nickel	Dissolved	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	**2.4 mg/l**	--	--	--	**2.8 mg/l**	--	--
Selenium	Total	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l
Silver	Total	< 0.20 ug/l	--	--	--	< 0.20 ug/l	--	--
Sodium	Total	**36.3 mg/l**	--	--	--	**51.7 mg/l**	--	--
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.002 ug/l	--	< 0.005 ug/l	< 0.005 ug/l	< 0.002 ug/l	--	< 0.002 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	< 3.0 ug/l	--	--	--	< 3.0 ug/l	--	--
Zinc	Total	**6.6 ug/l**	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	< 6.0 ug/l
Zinc	Dissolved	**6.4 ug/l**	--	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	--	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Parameter	Total or Dissolved	TC-1A 12/23/2013 N	UC-1 7/30/2012 N	UC-1 8/27/2012 N	UC-1 9/24/2012 N	UC-1 10/18/2012 N	UC-1 11/19/2012 N	UC-1 12/12/2012 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	**471 mg/l**	--	--	**399 mg/l**
Alkalinity, total, as CaCO3	NA	--	--	--	**471 mg/l**	--	--	**399 mg/l**
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--
Carbon, total organic	NA	**11.9 mg/l**	**15.4 mg/l**	**18.0 mg/l**	**14.9 mg/l**	**11.1 mg/l**	**9.4 * mg/l**	**11.1 mg/l**
Chemical Oxygen Demand	NA	--	--	--	**45.3 mg/l**	--	--	**30.7 mg/l**
Chloride	NA	**25.4 mg/l**	**11.0 mg/l**	**15.7 mg/l**	**26.5 mg/l**	**28.8 mg/l**	**27.6 mg/l**	**29.5 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--
Dissolved oxygen	NA	**7.61 mg/l**	**4.66 mg/l**	**3.48 mg/l**	**5.73 mg/l**	**7.21 mg/l**	**4.46 mg/l**	**0.8 mg/l**
Fluoride	NA	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**399 mg/l**	**456 mg/l**	**483 mg/l**	**542 mg/l**	**533 mg/l**	**479 mg/l**	**547 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	< 0.10 mg/l	--	--	< 0.10 mg/l
Nitrogen, ammonia as N	NA	--	--	--	< 0.10 mg/l	--	--	**0.24 mg/l**
Nitrogen, total	NA	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--
pH	NA	**7.48 pH units**	**7.59 pH units**	**7.65 pH units**	**7.75 pH units**	**7.63 pH units**	**7.45 pH units**	**6.97 pH units**
Phosphorus, total, as P	NA	--	--	--	**0.0080 mg/l**	--	--	**0.045 mg/l**
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--
Solids, total dissolved	NA	**553 mg/l**	**518 mg/l**	**558 mg/l**	**621 mg/l**	**616 mg/l**	**645 mg/l**	**691 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**382.2 umhos/cm**	**843.3 umhos/cm**	**957.5 umhos/cm**	**1054 umhos/cm**	**1025 umhos/cm**	**887.3 umhos/cm**	**1093 umhos/cm**
Sulfate, as SO4	NA	**71.1 mg/l**	**83.7 mg/l**	**67.5 mg/l**	**96.8 mg/l**	**134 mg/l**	**180 mg/l**	**175 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--
Temperature, ºC	NA	**-0.09 deg C**	**21.19 deg C**	**20.77 deg C**	**9.71 deg C**	**10.06 deg C**	**2.95 deg C**	**2.8 deg C**
Turbidity	NA	**3.8 NTU**	**2 NTU**	**0 NTU**	**2.9 NTU**	**2.5 NTU**	**0 NTU**	**3.4 NTU**
Metals								
Aluminum	Total	**23.3 ug/l**	**26.4 ug/l**	< 20.0 ug/l	**30.6 ug/l**	**27.9 ug/l**	< 20.0 ug/l	< 40.0 ug/l
Aluminum	Dissolved	**20.8 ug/l**	**21.5 ug/l**	< 20.0 ug/l	**29.8 ug/l**	**30.3 ug/l**	< 20.0 ug/l	< 20.0 ug/l
Antimony	Total	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	< 0.50 ug/l	**1.1 ug/l**	**1.6 ug/l**	**1.6 ug/l**	**0.74 ug/l**	< 0.50 ug/l	**1.3 ug/l**
Barium	Total	--	--	--	**45.3 ug/l**	--	--	**59.5 ug/l**
Beryllium	Total	--	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Boron	Total	--	--	--	**333 ug/l**	--	--	**228 ug/l**
Cadmium	Total	--	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Calcium	Total	**57.4 mg/l**	**53.5 mg/l**	**56.7 mg/l**	**62.1 mg/l**	**60.0 mg/l**	**51.9 mg/l**	**63.0 mg/l**
Chromium	Total	--	--	--	< 1.0 ug/l	--	--	< 1.0 ug/l
Cobalt	Total	< 0.20 ug/l	**0.22 ug/l**	**0.23 ug/l**	< 0.20 ug/l	< 0.20 ug/l	< 0.20 ug/l	**0.24 ug/l**
Cobalt	Dissolved	< 0.20 ug/l	< 0.20 ug/l	**0.28 ug/l**	**0.20 ug/l**	< 0.20 ug/l	< 0.20 ug/l	**0.23 ug/l**
Copper	Total	**0.70 ug/l**	< 0.50 ug/l	< 0.50 ug/l	**0.61 b ug/l**	**0.82 ug/l**	**1.1 ug/l**	**0.81 ug/l**
Copper	Dissolved	**0.59 ug/l**	**0.79 ug/l**	**0.60 ug/l**	**0.54 b ug/l**	**0.70 ug/l**	**1.1 ug/l**	**0.84 ug/l**
Iron	Total	**480 ug/l**	**188 ug/l**	**254 ug/l**	**263 ug/l**	**199 ug/l**	**351 ug/l**	**1590 ug/l**
Iron	Dissolved	**164 ug/l**	**79.3 ug/l**	**65.4 ug/l**	**108 ug/l**	**73.0 ug/l**	**180 ug/l**	**1050 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	< 0.50 ug/l	--	--	--	--	--	--
Magnesium	Total	**62.0 mg/l**	**78.2 mg/l**	**83.0 mg/l**	**94.0 mg/l**	**93.2 mg/l**	**84.9 mg/l**	**94.6 mg/l**
Manganese	Total	**194 ug/l**	**78.2 ug/l**	**607 ug/l**	**158 ug/l**	**157 ug/l**	**129 ug/l**	**1520 ug/l**
Manganese	Dissolved	**205 ug/l**	**27.9 ug/l**	**370 ug/l**	**103 ug/l**	**98.7 ug/l**	**129 ug/l**	**1520 ug/l**
Mercury	Total	--	--	--	**1.0 ng/l**	--	--	**1.4 ng/l**
Mercury	Dissolved	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	**4.4 ug/l**	--	--	**5.2 ug/l**
Nickel	Total	< 0.50 ug/l	< 0.50 ug/l	**0.74 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Nickel	Dissolved	< 0.50 ug/l	< 0.50 ug/l	**0.69 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--
Potassium	Total	--	--	--	**4.7 mg/l**	--	--	**4.1 mg/l**
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	--	< 0.20 ug/l	--	--	< 0.20 ug/l
Sodium	Total	--	--	--	**45.9 mg/l**	--	--	**44.7 mg/l**
Strontium	Total	--	--	--	--	--	--	--
Thallium	Total	< 0.005 ug/l	< 0.0004 ug/l	< 0.005 ug/l	< 0.002 ug/l	< 0.0004 ug/l	< 0.0004 ug/l	< 0.002 ug/l
Tin	Total	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	< 3.0 ug/l	--	--	< 3.0 ug/l
Zinc	Total	**11.5 ug/l**	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l
Zinc	Dissolved	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Location		UC-1	UC-1		UC-1		UC-1		UC-1
Date		1/18/2013	2/21/2013		3/21/2013		4/9/2013		5/8/2013
Sample Type		N	N	FD	N	FD	N	FD	N
Parameter	Total or Dissolved								
General Parameters									
Alkalinity, bicarbonate, as CaCO3	NA	--	--	--	**442 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	--	--	--	**442 mg/l**	--	--	--	--
Biochemical Oxygen Demand (5-day)	NA	--	--	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	NA	--	--	--	--	--	--	--	--
Carbon, dissolved organic	Dissolved	--	--	--	--	--	--	--	--
Carbon, total organic	NA	**11.2 mg/l**	**10.3 mg/l**	**9.5 mg/l**	**7.7 mg/l**	--	**9.5 mg/l**	**9.0 mg/l**	**7.1 mg/l**
Chemical Oxygen Demand	NA	--	--	--	**22.7 mg/l**	--	--	--	--
Chloride	NA	**39.1 mg/l**	**43.9 mg/l**	**42.3 mg/l**	**34.6 mg/l**	--	**17.5 mg/l**	**17.4 mg/l**	**11.7 mg/l**
Chloride	Dissolved	--	--	--	--	--	--	--	--
Color	NA	--	--	--	--	--	--	--	--
Cyanide	NA	--	--	--	--	--	--	--	--
Dissolved oxygen	NA	**0.68 mg/l**	**9.01 mg/l**	--	**12.03 mg/l**	--	**11.66 mg/l**	--	**7.76 mg/l**
Fluoride	NA	--	--	--	--	--	--	--	--
Hardness, as CaCO3	NA	**686 mg/l**	**844 mg/l**	**837 mg/l**	**714 mg/l**	--	**367 mg/l**	**396 mg/l**	**313 mg/l**
Nitrate + Nitrite, as N	NA	--	--	--	< 0.10 mg/l	--	--	--	--
Nitrogen, ammonia as N	NA	--	--	--	**0.11 mg/l**	--	--	--	--
Nitrogen, total	NA	--	--	--	--	--	--	--	--
Nitrogen, total kjeldahl (TKN)	NA	--	--	--	--	--	--	--	--
Orthophosphate, as PO4	NA	--	--	--	--	--	--	--	--
pH	NA	**7.01 pH units**	**7.03 pH units**	--	**7.21 pH units**	--	**7.57 pH units**	--	**7.32 pH units**
Phosphorus, total, as P	NA	--	--	--	**0.027 mg/l**	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	**844 mg/l**	**1030 mg/l**	**1030 mg/l**	**912 mg/l**	--	**486 mg/l**	**475 mg/l**	**410 mg/l**
Solids, total suspended	NA	--	--	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	**1293 umhos/cm**	**1558 umhos/cm**	--	**1263 umhos/cm**	--	**688.4 umhos/cm**	--	**573.1 umhos/cm**
Sulfate, as SO4	NA	**333 mg/l**	**380 mg/l**	**373 mg/l**	**311 mg/l**	--	**151 mg/l**	**152 mg/l**	**123 mg/l**
Sulfate, as SO4	Dissolved	--	--	--	--	--	--	--	--
Sulfide, as S^{2-}	NA	--	--	--	--	--	--	--	--
Temperature, ºC	NA	**1.69 deg C**	**3.43 deg C**	--	**3.15 deg C**	--	**2.42 deg C**	--	**4.81 deg C**
Turbidity	NA	**1.2 NTU**	**1 NTU**	--	**3.3 NTU**	--	**0.8 NTU**	--	**0 NTU**
Metals									
Aluminum	Total	**33.8 ug/l**	**47.3 ug/l**	**40.9 ug/l**	**36.0 ug/l**	--	**44.2 ug/l**	**34.2 ug/l**	< 20.0 ug/l
Aluminum	Dissolved	**28.2 ug/l**	**29.5 ug/l**	**27.9 ug/l**	**28.1 ug/l**	--	< 20.0 ug/l	< 20.0 ug/l	< 20.0 ug/l
Antimony	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Arsenic	Total	**0.79 ug/l**	< 0.50 ug/l	< 0.50 ug/l	< 0.82 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Barium	Total	--	--	--	**54.3 ug/l**	--	--	--	--
Beryllium	Total	--	--	--	< 0.20 ug/l	--	--	--	--
Boron	Total	--	--	--	**270 ug/l**	--	--	--	--
Cadmium	Total	--	--	--	< 0.20 ug/l	--	--	--	--
Calcium	Total	**80.8 mg/l**	**91.7 mg/l**	**90.5 mg/l**	**79.8 mg/l**	--	**44.1 mg/l**	**47.1 mg/l**	**35.9 mg/l**
Chromium	Total	--	--	--	< 1.0 ug/l	--	--	--	--
Cobalt	Total	**0.32 ug/l**	**0.34 ug/l**	**0.32 ug/l**	**0.33 ug/l**	--	< 0.20 ug/l	**0.20 ug/l**	< 0.20 ug/l
Cobalt	Dissolved	**0.34 ug/l**	**0.34 ug/l**	**0.34 ug/l**	**0.29 ug/l**	--	< 0.20 ug/l	< 0.20 ug/l	**0.21 ug/l**
Copper	Total	**2.2 ug/l**	**3.2 ug/l**	**2.7 ug/l**	**1.4 ug/l**	--	**3.8 ug/l**	**4.4 ug/l**	**0.65 ug/l**
Copper	Dissolved	**1.9 ug/l**	**3.5 ug/l**	**2.8 ug/l**	**1.3 ug/l**	--	**3.7 ug/l**	**3.7 ug/l**	**0.61 ug/l**
Iron	Total	**1080 ug/l**	**501 ug/l**	**475 ug/l**	**477 ug/l**	--	**281 ug/l**	**229 ug/l**	**269 ug/l**
Iron	Dissolved	**727 ug/l**	**129 ug/l**	**123 ug/l**	**169 ug/l**	--	**80.1 ug/l**	**80.5 ug/l**	**166 ug/l**
Lead	Total	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 0.50 ug/l	< 0.50 ug/l
Lead	Dissolved	--	--	--	--	--	--	--	--
Magnesium	Total	**118 mg/l**	**149 mg/l**	**148 mg/l**	**125 mg/l**	--	**62.4 mg/l**	**67.6 mg/l**	**54.2 mg/l**
Manganese	Total	**593 ug/l**	**249 ug/l**	**247 ug/l**	**245 ug/l**	--	**154 ug/l**	**182 ug/l**	**174 ug/l**
Manganese	Dissolved	**578 ug/l**	**240 ug/l**	**241 ug/l**	**212 ug/l**	--	**150 ug/l**	**149 ug/l**	**157 ug/l**
Mercury	Total	--	--	--	**1.0 ng/l**	**1.1 ng/l**	--	--	--
Mercury	Dissolved	--	--	--	--	--	--	--	--
Methyl Mercury	Total	--	--	--	--	--	--	--	--
Methyl Mercury	Dissolved	--	--	--	--	--	--	--	--
Molybdenum	Total	--	--	--	**7.6 ug/l**	--	--	--	--
Nickel	Total	< 0.50 ug/l	**0.55 ug/l**	< 0.50 ug/l	**1.4 ug/l**	--	**1.2 ug/l**	**0.92 ug/l**	< 0.50 ug/l
Nickel	Dissolved	< 0.50 ug/l	**1.1 ug/l**	< 0.50 ug/l	**0.94 ug/l**	--	**0.91 ug/l**	**0.89 ug/l**	< 0.50 ug/l
Palladium	Total	--	--	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	--	--	--	--	--	--	--	--
Platinum	Total	--	--	--	--	--	--	--	--
Potassium	Total	--	--	--	**6.3 mg/l**	--	--	--	--
Selenium	Total	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 1.0 ug/l	< 1.0 ug/l
Silver	Total	--	--	--	< 0.20 ug/l	--	--	--	--
Sodium	Total	--	--	--	**52.3 mg/l**	--	--	--	--
Strontium	Total	--	--	--	--	--	--	--	--
Thallium	Total	< 0.0004 ug/l	--	--	**0.0012 jb ug/l**	--	**0.006 j ug/l**	**0.006 j ug/l**	< 0.0004 ug/l
Tin	Total	--	--	--	--	--	--	--	--
Titanium	Total	--	--	--	--	--	--	--	--
Vanadium	Total	--	--	--	< 3.0 ug/l	--	--	--	--
Zinc	Total	**6.2 ug/l**	**25.4 ug/l**	**13.2 ug/l**	< 6.0 ug/l	--	**30.3 ug/l**	**30.0 ug/l**	< 6.0 ug/l
Zinc	Dissolved	**7.9 ug/l**	**26.0 ug/l**	**14.7 ug/l**	**6.3 ug/l**	--	**30.3 ug/l**	**30.4 ug/l**	< 6.0 ug/l

Large Table 4
Surface Water Data Summary
Embarrass River Watershed

Data Footnotes and Qualifiers

Footnote	
--	Not analyzed/not available.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
NA	NA (not applicable) indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound
Validated	Laboratory data has been evaluated following Barr QA/QC procedures and/or project-specific data review requirements. Field data has been verified for transcription errors, consistency and completeness. Data transferred from the previous database (9/2009) were categorized as validated, but may be comprised of any one of the following data status categories: Validated, SSource, No QC or Legacy.
No QC	Laboratory data has been excluded from Barr QA/QC procedures.
SSource	Laboratory and/or field data obtained from a secondary source external to Barr. Second source QA/QC evaluation procedures may or may not have been performed beyond the original data generator.
Legacy	Historical laboratory data (internal at Barr). QA/QC evaluation procedures may or may not have been performed beyond the original data generator

Qualifier	
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
f	Sample was collected at a flowrate exceeding the recommended rate of 200 mL/minute.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
i	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
t	Sample positive for total coliforms but negative for *E. coli.*
v	Sample was collected under a vacuum of greater than XX inches of mercury.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
AT	Sample chromatogram is noted to be atypical of a petroleum product.
EMPC	Estimated maximum possible concentration.
BQA	Barr-applied project specific qualifier: extraction and/or analyses conducted using an alternative method and/or procedure.
BQC	Barr-applied project specific qualifier: plant shut down.
BQD	Barr-applied project specific qualifier: equipment malfunction.
BQE	Barr-applied project specific qualifier: equipment adjustment.
BQM	Barr-applied project specific qualifier: manual measurement.
BQN	Barr-applied project specific qualifier: unable to be sampled or measured due to various reasons.
BQP	Barr-applied project specific qualifier: atypical chromatographic pattern.
BQQ	Barr-applied project specific qualifier: some aspect of QA/QC was not met.
BQR	Barr-applied project specific qualifier: location was re-sampled.
BQS	Barr-applied project specific qualifier: data is considered suspect.
BQT	Barr-applied project specific qualifier: summed value not displayed due to insufficient field length.
BQU	Barr-applied project specific qualifier: historical qualifier - definition unknown.
BQV	Barr-applied project specific qualifier: estimated value.
BQX	Barr-applied project specific qualifier: see notes for qualifier definition.
BQZ	Barr-applied project specific qualifier: data is considered unusable.

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
		Date	Jun-01	6/06/2001	Sep-01	9/12/2001	Mar-02	3/05/2002
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	621 mg/l	--	430 mg/l
Alkalinity, bicarbonate, as HCO3	NA	Lab	434 mg/l	--	621 mg/l	--	430 mg/l	--
Alkalinity, total, as CaCO3	NA	Lab	--	434 mg/l	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	0.23 mgd 6.9 MG	0.228 mgd	0.00072 mgd 0.0216 MG	0.00072 mgd	0.061 mgd 1.891 MG	0.061 mgd
Fluoride	NA	Lab	3.1 mg/l	3.1 mg/l	2.8 mg/l	2.8 mg/l	2.3 mg/l	2.3 mg/l
Hardness, as CaCO3	NA	Lab	434 mg/l	634 mg/l 434 mg/l	1050 mg/l	1050 mg/l	631 mg/l	631 mg/l
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	7.7 pH units	7.70 pH units	7.56 pH units	7.56 pH units	7.75 pH units	7.75 pH units
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	10.7 mg/l	10.7 mg/l	28.5 mg/l	28.5 mg/l	2.4 mg/l	2.4 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	1320 umhos/cm	1320 umhos/cm	1180 umhos/cm	1180 umhos/cm	1210 umhos/cm	1210 umhos/cm
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	7.3 deg C	--	9.8 deg C	--	5.7 deg C
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	26.5 NTU	26.5 NTU	134 NTU	134 NTU	16.9 NTU	16.9 NTU
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	566 ug/l	566 ug/l	529 ug/l	529 ug/l	633 ug/l	633 ug/l
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	71900 ug/l	115000 ug/l	115000 ug/l	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	3 ug/l	3 ug/l	< 1 ug/l	--	< 1 ug/l	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	100 ug/l	100 ug/l	50 ug/l	50 ug/l	170 ug/l	170 ug/l
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	111000 ug/l	186000 ug/l	186000 ug/l	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	910 ug/l	910 ug/l	760 ug/l	760 ug/l	690 ug/l	690 ug/l
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	15000 ug/l	15000 ug/l	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	68700 ug/l	68700 ug/l	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	Jun-02	6/06/2002	6/17/2002	Aug-02	8/15/2002	Sep-02
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**394 mg/l**	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**394 mg/l**	--	--	--	--	**386 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.033 mgd** **0.99 MG**	**0.033 mgd**	--	--	--	**0.102 mgd** **3.06 MG**
Fluoride	NA	Lab	**3.2 mg/l**	**3.2 mg/l**	--	--	--	**3.2 mg/l**
Hardness, as CaCO3	NA	Lab	**515 mg/l**	**515 mg/l**	--	--	--	**509 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.6 pH units** **7.89 pH units**	**7.59 pH units**	**7.89 pH units**	--	**7.62 pH units**	**7.61 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**10 mg/l** **12 mg/l**	**12 mg/l**	**8 mg/l**	--	**4.8 mg/l**	**8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1450 umhos/cm** **1800 umhos/cm**	**1100 umhos/cm**	**1800 umhos/cm**	--	**890 umhos/cm**	**1060 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	**277 mg/l**	--	**251 mg/l**	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**9.5 deg C**	**9.7 deg C**	--	**16.1 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**73.2 NTU**	**73.2 NTU**	--	--	--	**60 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**615 ug/l**	**615 ug/l**	--	--	--	**609 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	**64700 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	< 1 ug/l	--	--	--	--	**1.1 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 30 ug/l	--	--	--	--	< 30 ug/l
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	**84500 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**850 ug/l**	**850 ug/l**	--	--	--	**730 ug/l**
Mercury	Total	Lab	< 0.0005 ug/l	--	--	**0.0009 ug/l**	**0.0009 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	**16200 ug/l**
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	**86300 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	9/17/2002	Oct-02	10/21/2002	Dec-02	12/03/2002	Mar-03
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**386 mg/l**	--	--	--	**392 mg/l**	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	**392 mg/l**	--	**374 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	--	--	**0.00144 mgd** **0.0464 MG**	**0.001 mgd**	**0.0022 mgd** **0.0671 MG**
Fluoride	NA	Lab	**3.2 mg/l**	--	--	**2.6 mg/l**	**2.6 mg/l**	**2.5 mg/l**
Hardness, as CaCO3	NA	Lab	**509 mg/l**	--	--	**482 mg/l**	**482 mg/l**	**488 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	--	--	**7.91 pH units**	**7.4 pH units**	**7.40 pH units**	**7.43 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**8 mg/l**	--	**15.5 mg/l**	**7.6 mg/l**	**7.6 mg/l**	**3.2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	--	**499 umhos/cm**	**1245 umhos/cm**	**1245 umhos/cm**	**1254 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	**262 mg/l**	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	**7.10 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**60 NTU**	--	--	**55 NTU**	**55 NTU**	**45 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**609 ug/l**	--	--	**612 ug/l**	**612 ug/l**	**572 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**64700 ug/l**	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**1.1 ug/l**	--	--	**1.2 ug/l**	**1.2 ug/l**	**1.6 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	**3490 ug/l**	--	**3210 ug/l**
Iron	Total	Lab	--	--	--	--	**3490 ug/l**	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**84500 ug/l**	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**730 ug/l**	--	--	**800 ug/l**	**800 ug/l**	**720 ug/l**
Mercury	Total	Lab	--	**0.004 ug/l**	**0.004 ug/l**	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**16200 ug/l**	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**86300 ug/l**	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	3/05/2003	Apr-03	4/02/2003	Jun-03	6/04/2003	Aug-03
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**374 mg/l**	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	**372 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	--	--	**0.0432 mgd** **1.296 MG**	--	--
Fluoride	NA	Lab	**2.5 mg/l**	--	--	**3 mg/l**	**3 mg/l**	--
Hardness, as CaCO3	NA	Lab	**488 mg/l**	--	--	**480 mg/l**	**480 mg/l**	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.42 pH units**	--	**7.90 pH units**	**7.7 pH units**	**7.7 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**3.2 mg/l**	--	**6 mg/l**	**20 mg/l**	**20 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1254 umhos/cm**	--	**1050 umhos/cm**	**1062 umhos/cm**	**1062 umhos/cm**	--
Sulfate, as SO4	NA	Lab	--	--	**230 mg/l**	--	**236 mg/l**	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**5.50 deg C**	--	**5.50 deg C**	--	**14.1 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**45 NTU**	--	--	**70 NTU**	**70 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**572 ug/l**	--	--	**522 ug/l**	**522 ug/l**	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**1.6 ug/l**	--	--	< 1 ug/l	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	**3680 ug/l**	--	--
Iron	Total	Lab	**3210 ug/l**	--	--	--	**3680 ug/l**	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**720 ug/l**	--	--	**770 ug/l**	**770 ug/l**	--
Mercury	Total	Lab	--	**0.0024 ug/l**	**0.0024 ug/l**	< 0.002 ug/l	--	< 0.0005 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
		Date	8/06/2003	Sep-03	9/08/2003	9/17/2003	Oct-03	10/06/2003
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**362 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	**0.0011 mgd** **0.03 MG**	**0.00108 mgd**	**0.102 mgd**	--	--
Fluoride	NA	Lab	--	**2.9 mg/l**	**2.9 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**455 mg/l**	**455 mg/l**	--	--	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**8.3 pH units**	**8.1 pH units**	**8.1 pH units**	**7.61 pH units**	--	**7.63 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**46.4 mg/l**	**3 mg/l**	**3 mg/l**	--	--	**5.5 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**924 umhos/cm**	**880 umhos/cm**	**880 umhos/cm**	**1060 umhos/cm**	--	**722 umhos/cm**
Sulfate, as SO4	NA	Lab	**274 mg/l**	--	--	--	--	**247 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	**8.8 deg C**	**9.70 deg C**	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	**45 NTU**	**45 NTU**	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**543 ug/l**	**543 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**59300 ug/l**	**59300 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	**1 ug/l**	**1 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	**3120 ug/l**	--	--	--	--
Iron	Total	Lab	--	--	**3120 ug/l**	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**74700 ug/l**	**74700 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**670 ug/l**	**670 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	--	< 0.0005 ug/l	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	**13100 ug/l**	**13100 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	**81900 ug/l**	**81900 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
		Date	Dec-03	12/09/2003	Mar-04	3/18/2004	Apr-04	4/06/2004
		Sample Type	N	N	N	N	N	N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**360 mg/l**	--	**372 mg/l**	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**1.94 mgd 60.1 MG**	**3.0 cfs 1.94 mgd**	**0.0216 mgd 0.67 MG**	--	--	--
Fluoride	NA	Lab	**2.6 mg/l**	**2.6 mg/l**	**2.7 mg/l**	**2.7 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	**454 mg/l**	**454 mg/l**	**468 mg/l**	**468 mg/l**	--	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**8.4 pH units**	**8.4 pH units**	**7.9 pH units**	**7.9 pH units**	--	**7.65 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**4.8 mg/l**	**4.8 mg/l**	**5.6 mg/l**	**5.6 mg/l**	--	**6.5 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**790 umhos/cm**	**790 umhos/cm**	**1730 umhos/cm**	**1130 umhos/cm**	--	**1040 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**7.0 deg C**	--	**3.6 deg C**	--	**5.6 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**45 NTU**	**45 NTU**	**50 NTU**	**50 NTU**	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**511 ug/l**	**511 ug/l**	**567 ug/l**	**567 ug/l**	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**1 ug/l**	**1 ug/l**	< 1 ug/l	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**2240 ug/l**	--	**1630 ug/l**	--	--	--
Iron	Total	Lab	--	**2240 ug/l**	--	**1630 ug/l**	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**660 ug/l**	**660 ug/l**	**640 ug/l**	**640 ug/l**	--	--
Mercury	Total	Lab	--	--	--	--	< 0.0005 ug/l	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	4/16/2004	Jun-04	6/11/2004	Aug-04	8/10/2004	Sep-04
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**384 mg/l**	--	--	--	**398 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	**0.0058 mgd 0.17 MG**	**0.0058 mgd**	--	**0.0043 mgd**	**0.003 mgd 0.09 MG**
Fluoride	NA	Lab	--	**2.5 mg/l**	**2.5 mg/l**	--	--	**2.8 mg/l**
Hardness, as CaCO3	NA	Lab	--	**500 mg/l**	**500 mg/l**	--	--	**523 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	--	**7.77 pH units**	**7.77 pH units**	--	**7.4 pH units**	**7.4 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**3 mg/l**	**9 mg/l**	**9 mg/l**	--	**9.5 mg/l**	**9 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**767 umhos/cm**	**767 umhos/cm**	--	**1179 umhos/cm**	**1301 umhos/cm**
Sulfate, as SO4	NA	Lab	**247 mg/l**	--	--	--	**248 mg/l**	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	**8.0 deg C**	--	**9.0 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	**44.7 NTU**	**44.7 NTU**	--	--	**36 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**492 ug/l**	**492 ug/l**	--	--	**510 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	**66200 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 1 ug/l	--	--	--	**1 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	**3100 ug/l**	--	--	--	**3460 ug/l**
Iron	Total	Lab	--	--	**3100 ug/l**	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	**86900 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**650 ug/l**	**650 ug/l**	--	--	**690 ug/l**
Mercury	Total	Lab	--	< 0.0005 ug/l	--	**0.001 ug/l**	**0.001 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	**12600 ug/l**
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	**84100 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	9/13/2004	Oct-04	10/08/2004	Dec-04	12/01/2004	Mar-05
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	**416 mg/l**	--	**409 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.0029 mgd**	--	--	**0.001 mgd** **0.04 MG**	--	**0.002 mgd** **0.07 MG**
Fluoride	NA	Lab	**2.8 mg/l**	--	--	**2.6 mg/l**	**2.6 mg/l**	**2.4 mg/l**
Hardness, as CaCO3	NA	Lab	**523 mg/l**	--	--	**159 mg/l**	**159 mg/l**	**409 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.4 pH units**	--	--	**7.81 pH units**	--	**8 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**9 mg/l**	--	**14 mg/l**	**6.8 mg/l**	**6.8 mg/l**	**20 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1301 umhos/cm**	--	--	**1280 umhos/cm**	--	**1130 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	**286 mg/l**	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**9.9 deg C**	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**36 NTU**	--	--	**57.3 NTU**	**57.3 NTU**	**80 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**510 ug/l**	--	--	**528 ug/l**	**528 ug/l**	**491 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**66200 ug/l**	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**1 ug/l**	--	--	< 1 ug/l	--	**2.3 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	**3260 ug/l**	--	**880 ug/l**
Iron	Total	Lab	**3490 ug/l**	--	--	--	**3260 ug/l**	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**86900 ug/l**	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**690 ug/l**	--	--	**660 ug/l**	**660 ug/l**	**630 ug/l**
Mercury	Total	Lab	--	**0.008 ug/l**	**0.0008 ug/l**	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**12600 ug/l**	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**84100 ug/l**	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	3/08/2005	Apr-05	4/01/2005	Jun-05	6/07/2005	Aug-05
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**409 mg/l**	--	--	--	**397 mg/l**	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	**397 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Lab	**404 mg/l**	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**31.8 mg/l**	--	--	--	--	--
Flow	NA	Field	**0.002 mgd**	--	**0.007 mgd**	**0.004 mgd** **0.13 MG**	**0.004 mgd**	--
Fluoride	NA	Lab	**2.4 mg/l**	--	--	**2.6 mg/l**	**2.6 mg/l**	--
Hardness, as CaCO3	NA	Lab	**409 mg/l** **155 mg/l**	--	--	**397 mg/l**	**397 mg/l** **494 mg/l**	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**8 pH units**	--	**7.27 pH units**	**6.91 pH units**	**6.91 pH units**	--
Phosphorus, total, as P	NA	Lab	**0.1 mg/l**	--	--	--	--	--
Solids, total dissolved	NA	Lab	**777 mg/l**	--	--	--	--	--
Solids, total suspended	NA	Lab	**20 mg/l**	--	**8 mg/l**	**5.6 mg/l**	**5.6 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1130 umhos/cm**	--	**1284 umhos/cm**	**1178 umhos/cm**	**1178 umhos/cm**	--
Sulfate, as SO4	NA	Lab	**269 mg/l**	--	**264 mg/l**	--	**335 mg/l**	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**1.7 deg C**	--	**6.4 deg C**	--	**9.1 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**80 NTU**	--	--	**29 NTU**	**29 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	**25 ug/l**	--	--	--	--	--
Antimony	Total	Lab	**3 ug/l**	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	**5.3 ug/l**	--	--	--	--	--
Barium	Total	Lab	**30.2 ug/l**	--	--	--	--	--
Beryllium	Total	Lab	**0.2 ug/l**	--	--	--	--	--
Boron	Total	Lab	**491 ug/l**	--	--	**521 ug/l**	**521 ug/l**	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**69700 ug/l** **0.2 ug/l**	--	--	--	--	--
Chromium	Total	Lab	**2.1 ug/l**	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**2.3 ug/l**	--	--	< 2.5 ug/l	**2.5 ug/l**	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	**2 ug/l**	--	--	--	--	--
Iron	Dissolved	Lab	**880 ug/l**	--	--	**2820 ug/l**	**2820 ug/l**	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	**1 ug/l**	--	--	--	--	--
Lithium	Total	Lab	**43.5 ug/l**	--	--	--	--	--
Magnesium	Total	Lab	**98600 ug/l**	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**630 ug/l**	--	--	**610 ug/l**	**610 ug/l**	--
Mercury	Total	Lab	--	**0.0007 ug/l**	**0.0007 ug/l**	< 0.0005 ug/l	**0.0005 ug/l**	**0.0045 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	**58.4 ug/l**	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	**2 ug/l**	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**11600 ug/l**	--	--	--	--	--
Selenium	Total	Lab	**2 ug/l**	--	--	--	--	--
Silver	Total	Lab	**1 ug/l**	--	--	--	--	--
Sodium	Total	Lab	**69900 ug/l**	--	--	--	--	--
Strontium	Total	Lab	**387 ug/l**	--	--	--	--	--
Thallium	Total	Lab	**2 ug/l**	--	--	--	--	--
Tin	Total	Lab	**10 ug/l**	--	--	--	--	--
Titanium	Total	Lab	**10 ug/l**	--	--	--	--	--
Vanadium	Total	Lab	**4 ug/l**	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	**10 ug/l**	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	8/03/2005	Sep-05	9/07/2005	Oct-05	10/04/2005	Dec-05
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**427 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**427 mg/l**	--	--	--	**426 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.003 mgd**	**0.003 mgd** **0.09 MG**	**0.003 mgd**	--	**0.004 mgd**	**0.004 mgd** **0.12 MG**
Fluoride	NA	Lab	--	**2.1 mg/l**	**2.1 mg/l**	--	--	**2.3 mg/l**
Hardness, as CaCO3	NA	Lab	--	**427 mg/l**	**427 mg/l** **637 mg/l**	--	--	**426 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.4 pH units**	**7.6 pH units**	**7.6 pH units**	--	**7.68 pH units**	**7.6 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**12 mg/l**	**9.2 mg/l**	**9.2 mg/l**	--	**7.2 mg/l**	**4.4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1250 umhos/cm**	**1283 umhos/cm**	**1283 umhos/cm**	--	**1363 umhos/cm**	**1380 umhos/cm**
Sulfate, as SO4	NA	Lab	**332 mg/l**	--	--	--	**307 mg/l**	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**10.6 deg C**	--	**11.5 deg C**	--	**9.7 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	**33.4 NTU**	**33.4 NTU**	--	--	**5.4 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**520 ug/l**	**520 ug/l**	--	--	**511 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**72100 ug/l**	**72100 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	< 2.5 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	**3470 ug/l**	**3470 ug/l**	--	--	**3700 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**111000 ug/l**	**111000 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**630 ug/l**	**630 ug/l**	--	--	**640 ug/l**
Mercury	Total	Lab	**0.0045 ug/l**	--	--	< 0.0005 ug/l	**0.0005 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	**11900 ug/l**	**11900 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	**68200 ug/l**	**68200 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	12/08/2005	Mar-06	3/02/2006	Apr-06	4/13/2006	Jun-06
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**426 mg/l**	--	**403 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**403 mg/l**	--	--	--	**432 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.004 mgd**	**0.003 mgd 0.09 MG**	**0.003 mgd**	--	**0.003 mgd**	**0.0036 mgd 0.11 MG**
Fluoride	NA	Lab	**2.3 mg/l**	**2.3 mg/l**	**2.3 mg/l**	--	--	**2.2 mg/l**
Hardness, as CaCO3	NA	Lab	**426 mg/l 692 mg/l**	**403 mg/l**	**403 mg/l 154 mg/l**	--	--	**432 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.6 pH units**	**7.5 pH units**	**7.5 pH units**	--	**7.6 pH units**	**7.8 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**4.4 mg/l**	**9.2 mg/l**	**9.2 mg/l**	--	**7.2 mg/l**	**14 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1380 umhos/cm**	**1290 umhos/cm**	**1290 umhos/cm**	--	**1246 umhos/cm**	**838 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	**297 mg/l**	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**7.2 deg C**	--	**6.9 deg C**	--	**7.5 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**5.4 NTU**	**38 NTU**	**38 NTU**	--	--	**11 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**511 ug/l**	**547 ug/l**	**547 ug/l**	--	--	**495 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**2.5 ug/l**	< 2.5 ug/l	**2.5 ug/l**	--	--	< 2.5 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**3700 ug/l**	**2870 ug/l**	**2870 ug/l**	--	--	**2570 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**640 ug/l**	**590 ug/l**	**590 ug/l**	--	--	**600 ug/l**
Mercury	Total	Lab	--	--	--	**0.0009 ug/l**	**0.0009 ug/l**	< 0.002 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA
		Date	6/06/2006	Aug-06	8/23/2006	Sep-06	9/06/2006	Oct-06
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**432 mg/l**	--	--	--	**440 mg/l**	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	**440 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**27.9 mg/l**	--	--	--	--	--
Flow	NA	Field	**0.0036 mgd**	--	--	**0.003 mgd** **2 MG**	**0.003 mgd**	--
Fluoride	NA	Lab	**2.2 mg/l**	--	--	**0.6 mg/l**	**0.6 mg/l**	--
Hardness, as CaCO3	NA	Lab	**432 mg/l** **147 mg/l**	--	--	**440 mg/l**	**440 mg/l** **671 mg/l**	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.8 pH units**	--	--	**7.7 pH units**	**7.7 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**14 mg/l**	--	--	**16 mg/l**	**16 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**838 umhos/cm**	--	--	**1376 umhos/cm**	**1376 umhos/cm**	--
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**10.8 deg C**	--	--	--	**11.1 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**11 NTU**	--	--	**23 NTU**	**23 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**495 ug/l**	--	--	**493 ug/l**	**493 ug/l**	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	**69500 ug/l**	**69500 ug/l**	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**2.5 ug/l**	--	--	< 1 ug/l	**1 ug/l**	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**2570 ug/l**	--	--	**2450 ug/l**	**2450 ug/l**	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	**121000 ug/l**	**121000 ug/l**	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**600 ug/l**	--	--	**620 ug/l**	**620 ug/l**	--
Mercury	Total	Lab	**0.002 ug/l**	**0.0008 ug/l**	**0.0008 ug/l**	--	--	< 0.004 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	**56.4 ug/l**	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	**11500 ug/l**	**11500 ug/l**	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	**69500 ug/l**	**69500 ug/l**	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Location			HIST-SD-004-NTS	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
Date			10/03/2006	10/04/2006	Dec-06	12/08/2006	Mar-07	3/06/2007
Sample Type			N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	**435 mg/l**	--	**430 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**435 mg/l**	--	**430 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	**28 mg/l**	--	--
Flow	NA	Field	--	**0.002 mgd**	**0.003 mgd** **0.09 MG**	**0.003 mgd**	**0.003 mgd** **0.09 MG**	**0.003 mgd**
Fluoride	NA	Lab	--	--	**2.02 mg/l**	**2.02 mg/l**	**2.08 mg/l**	**2.08 mg/l**
Hardness, as CaCO3	NA	Lab	--	--	**435 mg/l**	**435 mg/l** **650 mg/l**	**430 mg/l**	**430 mg/l** **703 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	--	**7.54 pH units**	**7.4 pH units**	**7.4 pH units**	**7.4 pH units**	**7.4 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	**79.2 mg/l**	**15.2 mg/l**	**15.2 mg/l**	**6.4 mg/l**	**6.4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**7.54 umhos/cm**	**1463 umhos/cm**	**1301 umhos/cm**	**1301 umhos/cm**	**1311 umhos/cm**	**1311 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**323 mg/l**	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**9.6 deg C**	--	**8.9 deg C**	--	**6.1 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	**56.2 NTU**	**56.2 NTU**	**25.9 NTU**	**25.9 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**514 ug/l**	**514 ug/l**	**503 ug/l**	**503 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	**73900 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**1.6 ug/l**	**1.6 ug/l**	< 1 ug/l	**1 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	**2920 ug/l**	**2920 ug/l**	**2760 ug/l**	**2760 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	**126000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**590 ug/l**	**590 ug/l**	**564 ug/l**	**564 ug/l**
Mercury	Total	Lab	--	**0.004 ug/l**	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	**50 ug/l**	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
		Date	Apr-07	4/06/2007	Jun-07	6/06/2007	Aug-07	8/07/2007
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	**420 mg/l**	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**420 mg/l**	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	**0.003 mgd**	**0.006 mgd** **0.17 MG**	**0.006 mgd**	--	**0.014 mgd**
Fluoride	NA	Lab	--	--	**2.25 mg/l**	**2.25 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	--	--	**420 mg/l**	**420 mg/l** **651 mg/l**	--	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	--	**7.2 pH units**	**7.3 pH units**	**7.3 pH units**	--	**7.6 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	**10 mg/l**	**4 mg/l**	**4 mg/l**	--	**2.8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**1408 umhos/cm**	**1325 umhos/cm**	**1325 umhos/cm**	--	**1496 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**310 mg/l**	--	--	--	**338 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**5.7 deg C**	--	**11.5 deg C**	--	**10.4 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	**22 NTU**	**22 NTU**	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**453 ug/l**	**453 ug/l**	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	**66200 ug/l**	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**1.1 ug/l**	**1.1 ug/l**	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	**2510 ug/l**	**2510 ug/l**	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	**118000 ug/l**	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**538 ug/l**	**538 ug/l**	--	--
Mercury	Total	Lab	< 0.0005 ug/l	**0.0005 ug/l**	< 0.004 ug/l	**0.004 ug/l**	< 0.0005 ug/l	**0.0005 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
		Date	Sep-07	9/05/2007	Oct-07	10/03/2007	Dec-07	12/03/2007
		Sample Type	N	N	N	N	N	N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**460 mg/l**	--	--	--	**514 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	**460 mg/l**	--	--	--	**514 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.03 mgd** **0.86 MG**	**0.029 mgd**	--	**0.029 mgd**	**0.003 mgd** **0.09 MG**	**0.003 mgd**
Fluoride	NA	Lab	**1.92 mg/l**	**1.92 mg/l**	--	--	**1.31 mg/l**	**1.31 mg/l**
Hardness, as CaCO3	NA	Lab	**460 mg/l**	**460 mg/l** **717 mg/l**	--	--	**514 mg/l**	**514 mg/l** **828 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.4 pH units**	**7.4 pH units**	--	**7.5 pH units**	**7.5 pH units**	**7.5 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2.5 mg/l**	**2.5 mg/l**	--	**21.2 mg/l**	**7.2 mg/l**	**7.2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1518 umhos/cm**	**1518 umhos/cm**	--	**1385 umhos/cm**	**1575 umhos/cm**	**1575 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	**331 mg/l**	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**9.9 deg C**	--	**9.7 deg C**	--	**7.8 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**8.6 NTU**	**8.6 NTU**	--	--	**39.8 NTU**	**39.8 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**479 ug/l**	**479 ug/l**	--	--	**504 ug/l**	**504 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**71300 ug/l**	**71300 ug/l**	--	--	--	**79400 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	< 1 ug/l	**1 ug/l**	--	--	**1.3 ug/l**	**1.3 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**2680 ug/l**	**2680 ug/l**	--	--	**2840 ug/l**	**2840 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**131000 ug/l**	**131000 ug/l**	--	--	--	**153000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**549 ug/l**	**549 ug/l**	--	--	**620 ug/l**	**620 ug/l**
Mercury	Total	Lab	--	--	< 0.0005 ug/l	**0.0005 ug/l**	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**11000 ug/l**	**11000 ug/l**	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**66200 ug/l**	**66200 ug/l**	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
		Date	Mar-08	3/11/2008	Apr-08	4/10/2008	Jun-08	6/09/2008
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**553 mg/l**	--	--	--	**562 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	**553 mg/l**	--	--	--	**562 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.022 mgd** **0.67 MG**	**0.022 mgd**	--	--	**0.01 mgd** **0.32 MG**	**0.01 mgd**
Fluoride	NA	Lab	**1.96 mg/l**	**1.96 mg/l**	--	--	**2.29 mg/l**	**2.29 mg/l**
Hardness, as CaCO3	NA	Lab	**553 mg/l**	**553 mg/l** **838 mg/l**	--	--	**562 mg/l**	**562 mg/l** **871 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.5 pH units**	**7.5 pH units**	--	**7 pH units**	**7.5 pH units**	**7.5 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**8.4 mg/l**	**8.4 mg/l**	--	**9.2 mg/l**	**8 mg/l**	**8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1487 umhos/cm**	**1487 umhos/cm**	--	**1652 umhos/cm**	**1576 umhos/cm**	**1576 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	**382 mg/l**	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**3.9 deg C**	--	**6.3 deg C**	--	**9.09 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**49.2 NTU**	**49.2 NTU**	--	--	**65.1 NTU**	**65.1 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**496 ug/l**	**496 ug/l**	--	--	**476 ug/l**	**476 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**79800 ug/l**	--	--	--	**78400 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	< 2 ug/l	**2 ug/l**	--	--	< 2 ug/l	**2 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**4140 ug/l**	**4140 ug/l**	--	--	**4610 ug/l**	**4610 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**155000 ug/l**	--	--	--	**164000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**632 ug/l**	**632 ug/l**	--	--	**657 ug/l**	**657 ug/l**
Mercury	Total	Lab	--	--	**0.0005 ug/l**	**0.0005 ug/l**	< 0.0005 ug/l	**0.0005 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Location / Date / Sample Type			HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
Date			Aug-08	8/14/2008	Sep-08	9/03/2008	Oct-08	10/02/2008
Sample Type			N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	**563 mg/l**	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**563 mg/l**	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	**0.012 mgd**	**0.01 mgd** **0.324 MG**	**0.01 mgd**	--	**0.005 mgd**
Fluoride	NA	Lab	--	--	**1.77 mg/l**	**1.77 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	--	--	**563 mg/l**	**563 mg/l** **850 mg/l**	--	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	--	**7.12 pH units**	**7.3 pH units**	**7.3 pH units**	--	**7.36 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	**13 mg/l**	**12.4 mg/l**	**12.4 mg/l**	--	**11 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**1651 umhos/cm**	**1601 umhos/cm**	**1601 umhos/cm**	--	**1646 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**374 mg/l**	--	--	--	**373 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**12.58 deg C**	--	**8.92 deg C**	--	**9.4 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	**92.9 NTU**	**92.9 NTU**	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**488 ug/l**	**488 ug/l**	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**78400 ug/l**	**78400 ug/l**	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	< 2 ug/l	**2 ug/l**	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	**5540 ug/l**	**5540 ug/l**	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**159000 ug/l**	**159000 ug/l**	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**586 ug/l**	**586 ug/l**	--	--
Mercury	Total	Lab	**0.0011 ug/l**	**0.0011 ug/l**	--	--	**0.0008 ug/l**	**0.0008 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	**10200 ug/l**	**10200 ug/l**	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	**64800 ug/l**	**64800 ug/l**	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
		Date	Dec-08	12/11/2008	Mar-09	3/17/2009	Aug-09	8/07/2009
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**546 mg/l**	--	**555 mg/l**	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**546 mg/l**	--	**555 mg/l**	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.005 mgd 0.018 MG**	**0.005 mgd**	**0.004 mgd 0.12 MG**	**0.004 mgd**	--	**0.005 mgd**
Fluoride	NA	Lab	**1.84 mg/l**	**1.84 mg/l**	**1.9 mg/l**	**1.9 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	**546 mg/l**	**546 mg/l 914 mg/l**	**555 mg/l**	**555 mg/l 936 mg/l**	--	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.28 pH units**	**7.28 pH units**	**7.25 pH units**	**7.25 pH units**	--	**7.11 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**20.4 mg/l**	**20.4 mg/l**	**13 mg/l**	**13 mg/l**	--	**15.3 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1656 umhos/cm**	**1656 umhos/cm**	**1675 umhos/cm**	**1675 umhos/cm**	--	**1736 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	**448 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**7.6 deg C**	--	**5.8 deg C**	--	**10.3 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**99.4 NTU**	**99.4 NTU**	**89.3 NTU**	**89.3 NTU**	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**526 ug/l**	**526 ug/l**	**515 ug/l**	**515 ug/l**	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**85500 ug/l**	--	**86100 ug/l**	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	< 2 ug/l	**2 ug/l**	< 2 ug/l	**2 ug/l**	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**5970 ug/l**	**5970 ug/l**	**6440 ug/l**	**6440 ug/l**	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**170000 ug/l**	--	**175000 ug/l**	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**619 ug/l**	**619 ug/l**	**613 ug/l**	**613 ug/l**	--	--
Mercury	Total	Lab	--	--	--	--	< 0.0005 ug/l	**0.0005 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Location			HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS	HIST-SD-004-MPCA	HIST-SD-004-NTS
Date			Sep-09	9/15/2009	Oct-09	10/12/2009	Dec-09	12/01/2009
Sample Type			N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**556 mg/l**	--	--	--	**610 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	**556 mg/l**	--	--	--	**610 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.005 mgd 0.15 MG**	**0.005 mgd**	--	**0.005 mgd**	**0.005 mgd 0.16 MG**	**0.005 mgd**
Fluoride	NA	Lab	**1.88 mg/l**	**1.88 mg/l**	--	--	**1.89 mg/l**	**1.89 mg/l**
Hardness, as CaCO3	NA	Lab	**556 mg/l**	**556 mg/l 1040 mg/l**	--	--	**610 mg/l**	**610 mg/l 1020 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**6.7 pH units**	**6.73 pH units**	--	**6.96 pH units**	**7.2 pH units**	**7.2 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**16 mg/l**	**16 mg/l**	--	**15.5 mg/l**	**19.2 mg/l**	**19.2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1751 umhos/cm**	**1751 umhos/cm**	--	**1812 umhos/cm**	**830 umhos/cm**	**830 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	**449 mg/l**	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**10 deg C**	--	**6.2 deg C**	--	**7.6 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**88.6 NTU**	**88.6 NTU**	--	--	**113 NTU**	**113 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**518 ug/l**	**518 ug/l**	--	--	**470 ug/l**	**470 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**92400 ug/l**	**92400 ug/l**	--	--	--	**89500 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**1.2 ug/l**	**1.2 ug/l**	--	--	**1.2 ug/l**	**1.2 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**6230 ug/l**	**6230 ug/l**	--	--	**6890 ug/l**	**6890 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**196000 ug/l**	**196000 ug/l**	--	--	--	**194000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**620 ug/l**	**620 ug/l**	--	--	**602 ug/l**	**602 ug/l**
Mercury	Total	Lab	--	--	**0.0008 ug/l**	**0.0008 ug/l**	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**11900 ug/l**	**11900 ug/l**	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**74500 ug/l**	**74500 ug/l**	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-MPCA	HIST-SD-004-MPCA	HIST-SD-004-MPCA	HIST-SD-004-MPCA	HIST-SD-004-MPCA	HIST-SD-004-MPCA
		Date	Mar-10	Apr-10	Jun-10	Aug-10	Sep-10	Oct-10
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**567 mg/l**	--	**525 mg/l**	--	**549 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.005 mgd 0.16 MG**	--	**0.0043 mgd 0.13 MG**	--	**0.0043 mgd 0.13 MG**	--
Fluoride	NA	Lab	**1.77 mg/l**	--	**1.8 mg/l**	--	**1.9 mg/l**	--
Hardness, as CaCO3	NA	Lab	**567 mg/l**	--	**525 mg/l**	--	**549 mg/l**	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.4 pH units**	--	**7.2 pH units**	--	**7.3 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**17.3 mg/l**	--	**19 mg/l**	--	**13 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1765 umhos/cm**	--	**1715 umhos/cm**	--	**1740 umhos/cm**	--
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**95 NTU**	--	**103 NTU**	--	**100 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**431 ug/l**	--	**520 ug/l 548 ug/l**	--	**536 ug/l**	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	**91000 ug/l**	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**1.2 ug/l**	--	**1.2 ug/l**	--	**1.1 ug/l**	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**2000 ug/l**	--	**6600 ug/l**	--	**6500 ug/l**	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	**184000 ug/l**	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**599 ug/l**	--	**593 ug/l**	--	**595 ug/l**	--
Mercury	Total	Lab	--	< 0.0005 ug/l	< 0.0005 ug/l	< 0.0005 ug/l	--	< 0.0005 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	**12000 ug/l**	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	**70000 ug/l**	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-004-MPCA	HIST-SD-004-MPCA	HIST-SD-004-MPCA	HIST-SD-004-MPCA	HIST-SD-004-MPCA	HIST-SD-026-MPCA
		Date	Dec-10	Mar-11	Apr-11	Jun-11	Aug-13	Jul-99
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**518 mg/l**	**521 mg/l**	--	**537 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.0043 mgd** **0.13 MG**	**0.0043 mgd** **0.13 MG**	--	**0.0058 mgd** **0.17 MG**	--	**2.47 mgd** **2.62 mgd** **76.6 mgd**
Fluoride	NA	Lab	**1.8 mg/l**	**1.7 mg/l**	--	**1.7 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	**518 mg/l**	**521 mg/l**	--	**537 mg/l**	--	--
pH	NA	Lab	--	--	--	--	--	**8 pH units** **7.7 pH units**
pH	NA	Field	**7.4 pH units**	**7.4 pH units**	--	**7.3 pH units**	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**16 mg/l**	**23 mg/l**	--	**18 mg/l**	--	**5.5 mg/l** **8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	**751 umhos/cm** **782 umhos/cm**
Specific Conductance @ 25 ºC	NA	Field	**1686 umhos/cm**	**1702 umhos/cm**	--	**1745 umhos/cm**	--	--
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	**47 deg F**
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**92 NTU**	**90 NTU**	--	**80 NTU**	--	**3.7 NTU** **4.1 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**509 ug/l**	**491 ug/l**	--	**523 ug/l**	--	**211 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	< 0.2 ug/l
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**1 ug/l**	**0.93 ug/l**	--	**1.2 ug/l**	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	< 1 ug/l
Iron	Dissolved	Lab	**600 ug/l**	**5600 ug/l**	--	**5700 ug/l**	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	< 1 ug/l
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**570 ug/l**	**542 ug/l**	--	**600 ug/l**	--	--
Mercury	Total	Lab	--	--	< 0.0005 ug/l	< 0.0005 ug/l	< 0.0005 ug/l	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	**14 ug/l**

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99	Jan-00
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**1.018 mgd 1.64 mgd 31.5 mgd**	**0.41 mgd 12.3 mgd**	**0.49 mgd 15.2 mgd**	**0.45 mgd 0.48 mgd 13.5 mgd**	**0.22 mgd 0.32 mgd 6.8 mgd**	**0.12 mgd 3.7 mgd**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**8 pH units 8.3 pH units**	**7.8 pH units**	**7.8 pH units 7.9 pH units**	**7.9 pH units 8 pH units**	**7.7 pH units 8.1 pH units**	**7.2 pH units 7.6 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**3.3 mg/l 3.5 mg/l**	**2.8 mg/l 4 mg/l**	**4 mg/l 5 mg/l**	**2 mg/l 4 mg/l**	**2 mg/l 2.5 mg/l**	**0.8 mg/l 1.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	**1065 umhos/cm 1090 umhos/cm**	**1211 umhos/cm 1241 umhos/cm**	**1129 umhos/cm 1150 umhos/cm**	**1205 umhos/cm 1270 umhos/cm**	**1285 umhos/cm 1320 umhos/cm**	**1215 umhos/cm 1240 umhos/cm**
Specific Conductance @ 25 ºC	NA	Field	--	--	--	--	--	--
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	**48 deg F 49 deg F**	**59 deg F 64 deg F**	**46 deg F 48 deg F**	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**1.9 NTU 2.2 NTU**	**0.82 NTU 0.85 NTU**	**0.84 NTU 0.88 NTU**	**0.98 NTU 1.02 NTU**	**0.78 NTU 0.79 NTU**	**0.68 NTU 0.75 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**274 ug/l**	--	--	**233 ug/l**
Cadmium	Total	Lab	--	--	< 0.2 ug/l	--	--	< 0.2 ug/l
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	**1.1 ug/l**	--	--	< 1 ug/l
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	< 1 ug/l	--	--	< 1 ug/l
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	**10 ug/l**	--	--	< 10 ug/l

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-MPCA Mar-00 N	HIST-SD-026-MPCA Apr-00 N	HIST-SD-026-MPCA May-00 N	HIST-SD-026-MPCA Jun-00 N	HIST-SD-026-MPCA Jul-00 N	HIST-SD-026-MPCA Aug-00 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.13 mgd** **0.14 mgd** **4 mgd**	**0.14 mgd** **0.15 mgd** **4.2 mgd**	**0.22 mgd** **0.23 mgd** **6.82 mgd**	**0.55 mgd** **0.87 mgd** **16.5 mgd**	**0.19 mgd** **0.2 mgd** **5.9 mgd**	**0.235 mgd** **0.32 mgd** **7.29 mgd**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.2 pH units** **7.4 pH units**	**7.2 pH units** **7.8 pH units**	**7.4 pH units** **7.8 pH units**	**7.7 pH units**	**7.7 pH units** **7.9 pH units**	**7.8 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2.1 mg/l** **2.8 mg/l**	**1.6 mg/l** **2 mg/l**	**0.6 mg/l** **1.2 mg/l**	**1.8 mg/l** **2.4 mg/l**	< 1 mg/l	**1 mg/l** **2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	**1160 umhos/cm** **1190 umhos/cm**	**1115 umhos/cm** **1180 umhos/cm**	**1060 umhos/cm** **1070 umhos/cm**	**1038 umhos/cm** **1130 umhos/cm**	**1200 umhos/cm** **1240 umhos/cm**	**1265 umhos/cm** **1320 umhos/cm**
Specific Conductance @ 25 ºC	NA	Field	--	--	--	--	--	--
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	**45 deg F** **48 deg F**	**46 deg F** **47 deg F**	**55 deg F** **57 deg F**	**55 deg F** **59 deg F**	**53 deg F**	**66 deg F** **72 deg F**
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.78 NTU** **1.3 NTU**	**2.34 NTU** **3.7 NTU**	**1.15 NTU** **1.2 NTU**	**1.85 NTU** **2.1 NTU**	**1.6 NTU** **1.7 NTU**	**1.55 NTU** **1.6 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**197 ug/l**	--	--	**250 ug/l**	--
Cadmium	Total	Lab	--	< 0.2 ug/l	--	--	< 0.2 ug/l	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	< 1 ug/l	--	--	< 2 ug/l	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	< 1 ug/l	--	--	< 1 ug/l	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	< 10 ug/l	--	--	< 10 ug/l	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-MPCA Sep-00 N	HIST-SD-026-MPCA Oct-00 N	HIST-SD-026-MPCA Nov-00 N	HIST-SD-026-MPCA Dec-00 N	HIST-SD-026-MPCA Jan-01 N	HIST-SD-026-MPCA Feb-01 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.435 mgd 0.49 mgd 13.05 mgd**	**0.14 mgd 0.17 mgd 4.2 mgd**	**0.08 mgd 0.09 mgd 2.4 mgd**	**0.56 mgd 0.73 mgd 17.4 mgd**	**0.11 mgd 3.41 mgd**	**0.15 mgd 0.16 mgd 4.2 mgd**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
pH	NA	Lab	**7.7 pH units 7.9 pH units**	**7.8 pH units 7.9 pH units**	**7.7 pH units 7.8 pH units**	**8.1 pH units**	**7.8 pH units 8.4 pH units**	**7.8 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	< 1 mg/l	**0.8 mg/l 1.6 mg/l**	**1.6 mg/l**	**2.4 mg/l 2.8 mg/l**	**0.6 mg/l 1.2 mg/l**	**2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	**967 umhos/cm 990 umhos/cm**	**1001 umhos/cm 1020 umhos/cm**	**966 umhos/cm 982 umhos/cm**	**1041 umhos/cm 1070 umhos/cm**	**1003 umhos/cm 1010 umhos/cm**	**1084 umhos/cm 1156 umhos/cm**
Specific Conductance @ 25 ºC	NA	Field	--	--	--	--	--	--
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	**47 deg F 49 deg F**	**46 deg F**	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**2.4 NTU 2.5 NTU**	**2.05 NTU 2.1 NTU**	**3.8 NTU 5 NTU**	**2.8 NTU 3.2 NTU**	**2.4 NTU 2.8 NTU**	**2.05 NTU 2.1 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**230 ug/l**	--	--	**311 ug/l**	--
Cadmium	Total	Lab	--	< 0.2 ug/l	--	--	< 0.2 ug/l	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	< 2 ug/l	--	--	< 2 ug/l	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	< 1 ug/l	--	--	< 1 ug/l	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	< 10 ug/l	--	--	< 10 ug/l	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	**404 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.15 mgd** **0.18 mgd** **4.495 mgd**	**0.6 mgd** **0.96 mgd** **18 mgd**	**0.8 mgd** **24.8 MG**	**1.23 mgd** **36.9 MG**	**1.228 mgd** **38.1 MG**	**1.803 mgd** **55.9 MG**
Fluoride	NA	Lab	--	--	--	**2.8 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	--	--	--	**500 mg/l**	--	--
pH	NA	Lab	**7.8 pH units** **8.1 pH units**	**7.8 pH units** **8.1 pH units**	**7.9 pH units**	**7.6 pH units**	**8.39 pH units**	**8.2 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**3.3 mg/l** **4.4 mg/l**	**3.2 mg/l** **4 mg/l**	**1.2 mg/l**	**8 mg/l**	**2.8 mg/l**	**2.7 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	**1125 umhos/cm** **1150 umhos/cm**	**727 umhos/cm** **835 umhos/cm**	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	--	**979 umhos/cm**	**1102 umhos/cm**	**940 umhos/cm**	**106 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	**39 deg F**	**46 deg F** **56 deg F**	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**2.4 NTU**	**2.8 NTU** **3.7 NTU**	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**125 ug/l**	--	**302 ug/l**	--	--
Cadmium	Total	Lab	--	< 0.2 ug/l	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	< 1 ug/l	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	< 2 ug/l	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	< 1 ug/l	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	**110 ug/l**	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	**19.1 ug/l**	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	**10.5 ug/l**	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Sep-01	Oct-01	Nov-01	Dec-01	Jan-02	Feb-02
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**476 mg/l**	--	--	**446 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**1 mgd 30 MG**	**1.141 mgd 35.371 MG**	**3.274 mgd 98.22 MG**	**3.032 mgd 93.99 MG**	**3.586 mgd 111.2 MG**	**1.104 mgd 30.91 MG**
Fluoride	NA	Lab	**3.5 mg/l**	--	--	**3.4 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	**616 mg/l**	--	--	**570 mg/l**	--	--
pH	NA	Lab	**8.08 pH units**	**8.12 pH units**	**8.34 pH units**	**7.53 pH units**	**7.48 pH units**	**7.52 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2 mg/l**	**1.2 mg/l**	< 1 mg/l	**2.7 mg/l**	**3.2 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**780 umhos/cm**	**700 umhos/cm**	**758 umhos/cm**	**1000 umhos/cm**	**1060 umhos/cm**	**1030 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**210 ug/l**	--	--	**304 ug/l**	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**90300 ug/l**	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	< 1 ug/l	--	--	< 1 ug/l	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**94900 ug/l**	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**170 ug/l**	--	--	**680 ug/l**	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	**22.2 ug/l**	--	--	**15.7 ug/l**	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**11700 ug/l**	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**62700 ug/l**	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Apr-02	May-02	Jun-02	Jul-02	Aug-02	Sep-02
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**448 mg/l**	--	--	**372 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.991 mgd 29.73 MG**	**1.009 mgd 31.3 MG**	**1.066 mgd 31.98 MG**	**0.98 mgd 30.38 MG**	**0.934 mgd 28.96 MG**	**1.216 mgd 36.48 MG**
Fluoride	NA	Lab	--	--	**3.2 mg/l**	--	--	**3.1 mg/l**
Hardness, as CaCO3	NA	Lab	--	--	**505 mg/l**	--	--	**444 mg/l**
pH	NA	Lab	**8 pH units**	**7.9 pH units**	**7.8 pH units 7.9 pH units**	**8.7 pH units**	**7.96 pH units**	**7.89 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**3.6 mg/l**	**2.8 mg/l**	**1.2 mg/l < 1.1 mg/l**	**2.8 mg/l**	**13.3 mg/l**	**1.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1132 umhos/cm**	**940 umhos/cm**	**960 umhos/cm 1010 umhos/cm**	**522 umhos/cm**	**850 umhos/cm**	**487 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**280 ug/l**	--	--	**221 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	**79500 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	< 5 ug/l	--	--	< 1 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	**78800 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**170 ug/l**	--	--	**350 ug/l**
Mercury	Total	Lab	**0.0013 ug/l**	--	**0.0006 ug/l**	--	**0.0013 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**22.7 ug/l**	--	--	**25.4 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	**11500 ug/l**
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	**60900 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**476 mg/l**	--	--	**464 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.8832 mgd 27.38 MG**	**0.675 mgd 20.25 MG**	**0.478 mgd 14.81 MG**	**0.6643 mgd 20.59 MG**	**0.4939 mgd 13.83 MG**	**0.8528 mgd 26.44 MG**
Fluoride	NA	Lab	--	--	**4.2 mg/l**	--	--	**3.7 mg/l**
Hardness, as CaCO3	NA	Lab	--	--	**284 mg/l**	--	--	**540 mg/l**
pH	NA	Lab	**8.1 pH units**	**8.1 pH units**	**8 pH units**	**8.15 pH units**	**8.03 pH units**	**8.25 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2 mg/l**	**2.4 mg/l**	**1.6 mg/l**	< 1 mg/l	**2 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**451 umhos/cm**	**868 umhos/cm**	**940 umhos/cm**	**1062 umhos/cm**	**1070 umhos/cm**	**1393 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**298 ug/l**	--	--	**270 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	< 1 ug/l	--	--	< 1 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**1160 ug/l**	--	--	**1010 ug/l**
Mercury	Total	Lab	< 0.0005 ug/l	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**23.8 ug/l**	--	--	**23 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**430 mg/l**	--	--	**448 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.7178 mgd 21.54 MG**	**0.4932 mgd 15.3 MG**	**0.3266 mgd 9.8 MG**	**0.6905 mgd 21.4 MG**	**0.7632 mgd 23.66 MG**	**0.6792 mgd 20.37 MG**
Fluoride	NA	Lab	--	--	**3.6 mg/l**	--	--	**3.7 mg/l**
Hardness, as CaCO3	NA	Lab	--	--	**500 mg/l**	--	--	**521 mg/l**
pH	NA	Lab	**8.2 pH units**	**8 pH units**	**8.1 pH units**	**7.9 pH units**	**7.91 pH units**	**7.9 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2.4 mg/l**	**4.8 mg/l**	**4 mg/l**	< 1 mg/l	**2 mg/l**	**2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**945 umhos/cm**	**820 umhos/cm**	**1017 umhos/cm**	**1010 umhos/cm**	**722 umhos/cm**	**1170 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**275 ug/l**	--	--	**266 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	**74400 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	< 1 ug/l	--	--	< 1 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	**81500 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**210 ug/l**	--	--	**230 ug/l**
Mercury	Total	Lab	**0.0006 ug/l**	--	< 0.002 ug/l	--	**0.001 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**22.5 ug/l**	--	--	**26.6 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	**9500 ug/l**
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	**61500 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-MPCA Oct-03 N	HIST-SD-026-MPCA Nov-03 N	HIST-SD-026-MPCA Dec-03 N	HIST-SD-026-MPCA Jan-04 N	HIST-SD-026-MPCA Feb-04 N	HIST-SD-026-MPCA Mar-04 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**418 mg/l**	--	--	**432 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.8122 mgd 25.18 MG**	**0.29 mgd 8.68 MG**	**0.061 mgd 1.89 MG**	**0.08 mgd 2.52 MG**	**0.08 mgd 2.36 MG**	**0.64 mgd 19.8 MG**
Fluoride	NA	Lab	--	--	**3.2 mg/l**	--	--	**3.8 mg/l**
Hardness, as CaCO3	NA	Lab	--	--	**475 mg/l**	--	--	**500 mg/l**
pH	NA	Lab	**8.18 pH units**	**8.4 pH units**	**8.5 pH units**	**8.1 pH units**	**7.7 pH units**	**7.2 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**4.7 mg/l**	**1.6 mg/l**	**6.8 mg/l**	**4 mg/l**	**1.6 mg/l**	**1.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**764 umhos/cm**	**872 umhos/cm**	**1130 umhos/cm**	**920 umhos/cm**	**860 umhos/cm**	**1170 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**234 ug/l**	--	--	**287 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	< 1 ug/l	--	--	< 1 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**720 ug/l**	--	--	**470 ug/l**
Mercury	Total	Lab	**0.0011 ug/l**	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**21.1 ug/l**	--	--	**23.5 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-MPCA Apr-04 N	HIST-SD-026-MPCA May-04 N	HIST-SD-026-MPCA Jun-04 N	HIST-SD-026-MPCA Jul-04 N	HIST-SD-026-MPCA Aug-04 N	HIST-SD-026-MPCA Sep-04 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**374 mg/l**	--	--	**408 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**1.02 mgd 31.47 MG**	**1.16 mgd 36 MG**	**0.75 mgd 22.5 MG**	**0.58 mgd 17.94 MG**	**0.73 mgd 22.7 MG**	**0.58 mgd 17.5 MG**
Fluoride	NA	Lab	--	--	**2.7 mg/l**	--	--	**3.8 mg/l**
Hardness, as CaCO3	NA	Lab	--	--	**454 mg/l**	--	--	**175 mg/l**
pH	NA	Lab	**7.9 pH units**	**8.1 pH units**	**8.22 pH units**	**8 pH units**	**8.1 pH units**	**7.92 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**3.5 mg/l**	**3.2 mg/l**	< 1 mg/l	**1 mg/l**	**1.5 mg/l**	**1.5 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**690 umhos/cm**	**1030 umhos/cm**	**988 umhos/cm**	**1077 umhos/cm**	**1010 umhos/cm**	**1075 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**230 ug/l**	--	--	**256 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	**69800 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	< 1 ug/l	--	--	< 1 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	**70700 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**300 ug/l**	--	--	**200 ug/l**
Mercury	Total	Lab	**0.0013 ug/l**	--	< 0.01 ug/l	--	**0.0008 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**23 ug/l**	--	--	**30 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	**9100 ug/l**
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	**54300 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	Oct-04	Nov-04	Dec-04	Jan-05	1/04/2005	Feb-05
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**428 mg/l**	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.6605 mgd** **20.5 MG**	**0.23 mgd** **6.83 MG**	**0.74 mgd** **23 MG**	**0.27 mgd** **8.24 MG**	--	**0.55 mgd** **17 MG**
Fluoride	NA	Lab	--	--	**3.3 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	--	**456 mg/l**	--	--	--
pH	NA	Lab	**8.09 pH units**	**8.09 pH units**	**8.13 pH units** **8.55 pH units**	**7.81 pH units**	--	**8.4 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**1 mg/l**	**2 mg/l**	< 1 mg/l	**2.4 mg/l**	**2.4 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1102 umhos/cm**	**1018 umhos/cm**	**1067 umhos/cm**	**992 umhos/cm**	--	**1108 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**233 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	< 1 ug/l	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**450 ug/l**	--	--	--
Mercury	Total	Lab	**0.0012 ug/l**	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**28.1 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	2/01/2005	Mar-05	3/02/2005	Apr-05	4/04/2005	May-05
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**433 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**433 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**416 mg/l**	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**18.3 mg/l**	--	--	--	--	--
Flow	NA	Field	**0.55 mgd**	**0.18 mgd** **5.7 MG**	**0.18 mgd**	**1.09 mgd** **32.6 MG**	**1.09 mgd**	**1 mgd** **31 MG**
Fluoride	NA	Lab	**3.3 mg/l**	**3.6 mg/l**	**3.6 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**433 mg/l**	**433 mg/l** **493 mg/l**	--	--	--
pH	NA	Lab	--	**7.6 pH units**	--	**7.89 pH units**	--	**8.03 pH units**
pH	NA	Field	**8.4 pH units**	--	**7.6 pH units**	--	**7.89 pH units**	--
Phosphorus, total, as P	NA	Lab	**0.11 mg/l**	--	--	--	--	--
Solids, total dissolved	NA	Lab	**650 mg/l**	--	--	--	--	--
Solids, total suspended	NA	Lab	**1 mg/l**	**2.5 mg/l**	**2.5 mg/l**	**2.5 mg/l**	**2.5 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1108 umhos/cm** **1080 umhos/cm**	**898 umhos/cm**	**898 umhos/cm**	**777 umhos/cm**	**777 umhos/cm**	**1053 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.9 NTU**	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	**25 ug/l**	--	--	--	--	--
Antimony	Total	Lab	**3 ug/l**	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	**2 ug/l**	--	--	--	--	--
Barium	Total	Lab	**20.6 ug/l**	--	--	--	--	--
Beryllium	Total	Lab	**0.2 ug/l**	--	--	--	--	--
Boron	Total	Lab	**248 ug/l**	**252 ug/l**	**252 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**76200 ug/l** **0.2 ug/l**	--	--	--	--	--
Chromium	Total	Lab	**1.1 ug/l**	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	**1 ug/l**	< 1 ug/l	**1 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	**2 ug/l**	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	**200 ug/l**	--	--	--	--	--
Lead	Total	Lab	**1 ug/l**	--	--	--	--	--
Lithium	Total	Lab	**25.6 ug/l**	--	--	--	--	--
Magnesium	Total	Lab	**81800 ug/l**	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**350 ug/l**	**350 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	**0.0013 ug/l**	**0.0013 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	**25.9 ug/l**	**27.2 ug/l**	**27.2 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	**5 ug/l**	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**9300 ug/l** **9300 ug/l**	--	--	--	--	--
Selenium	Total	Lab	**2 ug/l**	--	--	--	--	--
Silver	Total	Lab	**1 ug/l**	--	--	--	--	--
Sodium	Total	Lab	**57200 ug/l**	--	--	--	--	--
Strontium	Total	Lab	**291 ug/l**	--	--	--	--	--
Thallium	Total	Lab	**2 ug/l**	--	--	--	--	--
Tin	Total	Lab	**10 ug/l**	--	--	--	--	--
Titanium	Total	Lab	**10 ug/l**	--	--	--	--	--
Vanadium	Total	Lab	**4 ug/l**	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	**10 ug/l**	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	5/04/2005	Jun-05	6/06/2005	Jul-05	7/07/2005	Aug-05
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**346 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**346 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**1 mgd**	**1.1 mgd 33.1 MG**	**1.1 mgd**	**0.65 mgd 20.2 MG**	**0.65 mgd**	**0.65 mgd 20.2 MG**
Fluoride	NA	Lab	--	**2.5 mg/l**	**2.5 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**346 mg/l**	**346 mg/l 460 mg/l**	--	--	--
pH	NA	Lab	--	**8.04 pH units**	--	**7.97 pH units**	--	**8.08 pH units**
pH	NA	Field	**8.03 pH units**	--	**8.04 pH units**	--	**7.97 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**1 mg/l**	< 1 mg/l	**1 mg/l**	**1.5 mg/l**	**1.5 mg/l**	**16 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1053 umhos/cm**	**881 umhos/cm**	**881 umhos/cm**	**1075 umhos/cm**	**1075 umhos/cm**	**1080 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**212 ug/l**	**212 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**270 ug/l**	**270 ug/l**	--	--	--
Mercury	Total	Lab	--	**0.0005 ug/l**	**0.0005 ug/l**	--	--	**0.0013 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**21.6 ug/l**	**21.6 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	8/04/2005	Sep-05	9/08/2005	Oct-05	10/06/2005	Nov-05
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**446 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**446 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.65 mgd**	**0.57 mgd** **17.16 MG**	**0.57 mgd**	**0.65 mgd** **20.2 MG**	**0.65 mgd**	**0.59 mgd** **17.55 MG**
Fluoride	NA	Lab	--	**2.7 mg/l**	**2.7 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**446 mg/l**	**446 mg/l** **593 mg/l**	--	--	--
pH	NA	Lab	--	**8.1 pH units**	--	**8.1 pH units**	--	**8.04 pH units**
pH	NA	Field	**8.08 pH units**	--	**8.1 pH units**	--	**8.1 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**16 mg/l**	**2 mg/l**	**2 mg/l**	< 1 mg/l	**1 mg/l**	**2.4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1080 umhos/cm**	**1089 umhos/cm**	**1089 umhos/cm**	**1039 umhos/cm**	**1039 umhos/cm**	**1010 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**281 ug/l**	**281 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**84600 ug/l**	**84600 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**92700 ug/l**	**92700 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**320 ug/l**	**320 ug/l**	--	--	--
Mercury	Total	Lab	**0.0013 ug/l**	--	--	< 0.0005 ug/l	**0.0005 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**31.8 ug/l**	**31.8 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	**9900 ug/l**	**9900 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	**52900 ug/l**	**52900 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	11/01/2005	Dec-05	12/05/2005	Jan-06	1/06/2006	Feb-06
		Sample Type	N	N	N	N	N	N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**439 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**439 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.59 mgd**	**0.51 mgd** **15.8 MG**	**0.51 mgd**	**0.44 mgd** **13.5 MG**	**0.67 cfs** **0.44 mgd**	**0.39 mgd** **10.9 MG**
Fluoride	NA	Lab	--	**3.4 mg/l**	**3.4 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**439 mg/l**	**439 mg/l** **780 mg/l**	--	--	--
pH	NA	Lab	--	**8.1 pH units**	--	**8.2 pH units**	--	**8.3 pH units**
pH	NA	Field	**8.04 pH units**	--	**8.1 pH units**	--	**8.2 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2.4 mg/l**	**2.4 mg/l**	**2.4 mg/l**	**2.8 mg/l**	**2.8 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1010 umhos/cm**	**1004 umhos/cm**	**1004 umhos/cm**	**1012 umhos/cm**	**1012 umhos/cm**	**1088 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**248 ug/l**	**248 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**1000 ug/l**	**1000 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**28.2 ug/l**	**28.2 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	**14800 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	2/08/2006	Mar-06	3/06/2006	Apr-06	4/03/2006	May-06
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**431 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**431 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.39 mgd**	**0.41 mgd 12.8 MG**	**0.41 mgd**	**1.25 mgd 37.6 MG**	**1.25 mgd 1.94 cfs**	**0.7 mgd 21.6 MG**
Fluoride	NA	Lab	--	**3.1 mg/l**	**3.1 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**431 mg/l**	**431 mg/l 518 mg/l**	--	--	--
pH	NA	Lab	--	**8.2 pH units**	--	**8.3 pH units**	--	**8.1 pH units**
pH	NA	Field	**8.3 pH units**	--	**8.2 pH units**	--	**8.3 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**1 mg/l**	**1.6 mg/l**	**1.6 mg/l**	**2 mg/l**	**2 mg/l**	**2.8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1088 umhos/cm**	**1103 umhos/cm**	**1103 umhos/cm**	**989 umhos/cm**	**989 umhos/cm**	**1048 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**0.3 deg C**	--	--	--	**2.9 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**279 ug/l**	**279 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**0.73 ug/l**	**0.73 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	**0.0009 ug/l**	**0.0009 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**27.8 ug/l**	**27.8 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-NTS 5/04/2006 N	HIST-SD-026-MPCA Jun-06 N	HIST-SD-026-NTS 6/12/2006 N	HIST-SD-026-MPCA Jul-06 N	HIST-SD-026-NTS 7/05/2006 N	HIST-SD-026-MPCA Aug-06 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**401 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**401 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.7 mgd 1.08 cfs**	**0.59 mgd 17.6 MG**	**0.59 mgd**	**0.64 mgd 19.72 MG**	**0.64 mgd**	**0.55 mgd 16.9 MG**
Fluoride	NA	Lab	--	**2.2 mg/l**	**2.2 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**401 mg/l**	**401 mg/l 448 mg/l**	--	--	--
pH	NA	Lab	--	**7.8 pH units**	--	**7.9 pH units**	--	**8.1 pH units**
pH	NA	Field	**8.1 pH units**	--	**7.8 pH units**	--	**7.9 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2.8 mg/l**	**2.4 mg/l**	**2.4 mg/l**	**3.6 mg/l**	**3.6 mg/l**	**24 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**1097 umhos/cm**	**1097 umhos/cm 1048 umhos/cm**	**1162 umhos/cm**	**1162 umhos/cm**	**1166 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	**15.3 deg C**	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**227 ug/l**	**227 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**310 ug/l**	**310 ug/l**	--	--	--
Mercury	Total	Lab	--	**0.0005 ug/l**	**0.0005 ug/l**	--	--	< 0.0005 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**28.5 ug/l**	**28.5 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	8/02/2006	Sep-06	9/05/2006	Oct-06	10/05/2006	Nov-06
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**465 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**465 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.55 mgd**	**0.42 mgd** **12.74 MG**	**0.42 mgd**	**0.52 mgd** **16.2 MG**	**0.52 mgd**	**0.61 mgd** **18.22 MG**
Fluoride	NA	Lab	--	**3.2 mg/l**	**3.2 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**465 mg/l**	**465 mg/l** **569 mg/l**	--	--	--
pH	NA	Lab	--	**8 pH units**	--	**8.2 pH units**	--	**8.2 pH units**
pH	NA	Field	**8.1 pH units**	--	**8 pH units**	--	**8.2 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2.4 mg/l**	**2 mg/l**	**2 mg/l**	**1.6 mg/l**	**1.6 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1166 umhos/cm**	**1183 umhos/cm**	**1183 umhos/cm**	**1140 umhos/cm**	**1140 umhos/cm**	**1080 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**18.3 deg C**	--	**14.2 deg C**	--	**7.4 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**234 ug/l**	**234 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**76100 ug/l**	**76100 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 25 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**92200 ug/l**	**92200 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**161 ug/l**	**161 ug/l**	--	--	--
Mercury	Total	Lab	**0.0005 ug/l**	--	--	**0.0021 ug/l**	**0.0021 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**32.5 ug/l**	**32.5 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	**9420 ug/l**	**9420 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	**524000 ug/l**	**52400 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	11/08/2006	Dec-06	12/05/2006	Jan-07	1/04/2007	Feb-07
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**465 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**465 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.61 mgd**	**0.49 mgd** **15.06 MG**	**0.49 mgd**	**0.43 mgd** **13.2 MG**	**0.66 cfs** **0.43 mgd**	**0.32 mgd** **9 MG**
Fluoride	NA	Lab	--	**2.78 mg/l**	**2.78 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**465 mg/l**	**465 mg/l** **568 mg/l**	--	--	--
pH	NA	Lab	--	**8.1 pH units**	--	**8.2 pH units**	--	**8.1 pH units**
pH	NA	Field	**8.2 pH units**	--	**8.1 pH units**	--	**8.2 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**1 mg/l**	**2 mg/l**	**2 mg/l**	**2 mg/l**	**2 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1080 umhos/cm**	**1011 umhos/cm**	**1011 umhos/cm**	**1028 umhos/cm**	**1028 umhos/cm**	**1001 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**262 ug/l**	**262 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**1520 ug/l**	**1520 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**28 ug/l**	**28 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	**11300 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	2/06/2007	Mar-07	3/07/2007	Apr-07	4/02/2007	May-07
		Sample Type	N	N	N	N	N	N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**468 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**468 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.32 mgd 0.5 cfs**	**0.382 mgd 11.83 MG**	**0.38 mgd 0.59 cfs**	**0.6 mgd 17.97 MG**	**0.6 mgd 0.93 cfs**	**0.78 mgd 24.3 MG**
Fluoride	NA	Lab	--	**3.01 mg/l**	**3.01 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**468 mg/l**	**468 mg/l 648 mg/l**	--	--	--
pH	NA	Lab	--	**8.2 pH units**	--	**7.8 pH units**	--	**7.7 pH units**
pH	NA	Field	**8.1 pH units**	--	**8.2 pH units**	--	**7.8 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**1 mg/l**	**1.2 mg/l**	**1.2 mg/l**	**1.2 mg/l**	**1.2 mg/l**	**2.4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1001 umhos/cm**	**1018 umhos/cm**	**1018 umhos/cm**	**995 umhos/cm**	**995 umhos/cm**	**1011 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**0.8 deg C**	--	--	--	**4.2 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**286 ug/l**	**286 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**89600 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 1 ug/l	**1 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**103000 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**856 ug/l**	**856 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	**0.0013 ug/l**	**0.0013 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**34 ug/l**	**34 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	5/03/2007	Jun-07	6/07/2007	Jul-07	7/06/2007	Aug-07
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**277 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**277 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.784 mgd 1.21 cfs**	**1.49 mgd 44.6 MG**	**1.49 mgd 2.3 cfs**	**0.64 mgd 19.77 MG**	**0.64 mgd 0.99 cfs**	**0.57 mgd 17.74 MG**
Fluoride	NA	Lab	--	**1.53 mg/l**	**1.53 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**277 mg/l**	**277 mg/l 361 mg/l**	--	--	--
pH	NA	Lab	--	**7.3 pH units**	--	**7.9 pH units**	--	**8.1 pH units**
pH	NA	Field	**7.7 pH units**	--	**7.3 pH units**	--	**7.9 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2.4 mg/l**	**2.4 mg/l**	**2.4 mg/l**	**4 mg/l**	**4 mg/l**	**5 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1011 umhos/cm**	**728 umhos/cm**	**728 umhos/cm**	**1104 umhos/cm**	**1104 umhos/cm**	**1247 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	**15.1 deg C**	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**158 ug/l**	**158 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**53200 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**55500 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**300 ug/l**	**300 ug/l**	--	--	--
Mercury	Total	Lab	--	< 0.004 ug/l	**0.004 ug/l**	--	--	**0.0007 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**14.2 ug/l**	**14.2 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	**8/03/2007**	**Sep-07**	**9/06/2007**	**Oct-07**	**10/02/2007**	**Nov-07**
		Sample Type	**N**	**N**	**N**	**N**	**N**	**N**
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**463 mg/l**	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**463 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.57 mgd**	**0.48 mgd** **14.4 MG**	**0.48 mgd**	**1.82 mgd** **56.3 MG**	**1.82 mgd**	**0.71 mgd** **21.38 MG**
Fluoride	NA	Lab	--	**2.7 mg/l**	**2.7 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**463 mg/l**	**463 mg/l** **622 mg/l**	--	--	--
pH	NA	Lab	--	**8.1 pH units**	--	**8 pH units**	--	**7.6 pH units**
pH	NA	Field	**8.1 pH units**	--	**8.1 pH units**	--	**8 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**5 mg/l**	**2 mg/l**	**2 mg/l**	**2 mg/l**	**2 mg/l**	**2.4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1247 umhos/cm**	**1227 umhos/cm**	**1227 umhos/cm**	**1051 umhos/cm**	**1051 umhos/cm**	**1099 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	--	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**18.5 deg C**	--	**18.2 deg C**	--	**13.2 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**270 ug/l**	**270 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**84300 ug/l**	**84300 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**100000 ug/l**	**100000 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**394 ug/l**	**394 ug/l**	--	--	--
Mercury	Total	Lab	**0.0007 ug/l**	--	--	< 0.0005 ug/l	**0.0005 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**38.6 ug/l**	**38.6 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	**8550 ug/l**	**8550 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	**48800 ug/l**	**48800 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	11/08/2007	Dec-07	12/10/2007	Jan-08	1/15/2008	Feb-08
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	**461 mg/l**	--	**465 mg/l**	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**461 mg/l**	--	**465 mg/l**	--	**481 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	**16.7 mg/l**	**16.7 mg/l**	**15.5 mg/l**
Flow	NA	Field	**0.71 mgd**	**0.61 mgd** **19.1 MG**	**0.61 mgd**	**0.39 mgd** **12.22 MG**	**0.3943 mgd**	**0.42 mgd** **12.2 MG**
Fluoride	NA	Lab	--	**1.66 mg/l**	**1.66 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	--	**461 mg/l**	**461 mg/l** **618 mg/l**	**465 mg/l**	**612 mg/l** **465 mg/l**	**481 mg/l**
pH	NA	Lab	--	**8 pH units**	--	**8.2 pH units**	--	**8.2 pH units**
pH	NA	Field	**7.6 pH units**	--	**8 pH units**	--	**8.2 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	**774 mg/l**	**774 mg/l**	**775 mg/l**
Solids, total suspended	NA	Lab	**2.4 mg/l**	**2 mg/l**	**2 mg/l**	< 1 mg/l	**1 mg/l**	**1.2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1099 umhos/cm**	**1169 umhos/cm**	**1169 umhos/cm**	**1119 umhos/cm**	**1119 umhos/cm**	**1144 umhos/cm**
Sulfate, as SO4	NA	Lab	--	--	--	**216 mg/l**	**216 mg/l**	**209 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	**0.5 deg C**	--	**0.3 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**238 ug/l**	**238 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**84100 ug/l**	--	**82600 ug/l**	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2.5 ug/l	**2.5 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**99100 ug/l**	--	**98500 ug/l**	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**818 ug/l**	**818 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**22.5 ug/l**	**22.5 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	2/08/2008	Mar-08	3/12/2008	Apr-08	4/01/2008	May-08
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**481 mg/l**	--	**472 mg/l**	--	**254 mg/l**	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**472 mg/l**	--	**254 mg/l**	--	**311 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**15.5 mg/l**	**15.7 mg/l**	**15.7 mg/l**	**15.9 mg/l**	**15.9 mg/l**	**12.2 mg/l**
Flow	NA	Field	**0.42 mgd** **0.65 cfs**	**0.51 mgd** **15.77 MG**	**0.5088 mgd** **0.7872 cfs**	**0.56 mgd** **16.8 MG**	**0.5597 mgd**	**0.97 MG** **29.97 mgd**
Fluoride	NA	Lab	--	**2.41 mg/l**	**2.41 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	**481 mg/l** **632 mg/l**	**472 mg/l**	**472 mg/l** **586 mg/l**	**254 mg/l**	**254 mg/l** **647 mg/l**	**311 mg/l**
pH	NA	Lab	--	**8.3 pH units**	--	**8.1 pH units**	--	**7.8 pH units**
pH	NA	Field	**8.2 pH units**	--	**8.3 pH units**	--	**8.1 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**775 mg/l**	**723 mg/l**	**723 mg/l**	**752 mg/l**	**752 mg/l**	**485 mg/l**
Solids, total suspended	NA	Lab	**1.2 mg/l**	**3.5 mg/l**	**3.5 mg/l**	< 1 mg/l	**1 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1144 umhos/cm**	**1197 umhos/cm**	**1197 umhos/cm**	**1187 umhos/cm**	**1187 umhos/cm**	**924 umhos/cm**
Sulfate, as SO4	NA	Lab	**209 mg/l**	**190 mg/l**	**190 mg/l**	**190 mg/l**	**190 mg/l**	**149 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**0.4 deg C**	--	**0.4 deg C**	--	**2.3 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**242 ug/l**	**242 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**84800 ug/l**	--	**78900 ug/l**	--	**87600 ug/l**	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2 ug/l	**2 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**102000 ug/l**	--	**94500 ug/l**	--	**104000 ug/l**	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**729 ug/l**	**729 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	< 0.0005 ug/l	**0.0005 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**22.5 ug/l**	**22.5 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	5/15/2008	Jun-08	6/11/2008	Jul-08	7/25/2008	Aug-08
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**311 mg/l**	--	**390 mg/l**	--	**449 mg/l**	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**390 mg/l**	--	**449 mg/l**	--	**687 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**12.2 mg/l**	**12.5 mg/l**	**12.5 mg/l**	**14.3 mg/l**	**14.3 mg/l**	**15.1 mg/l**
Flow	NA	Field	**0.9667 mgd**	**0.73 mgd 21.9 MG**	**0.73 mgd**	**0.027 mgd 0.85 MG**	**0.027300350000 mgd**	**0.7 mgd 21.7 MG**
Fluoride	NA	Lab	--	**2.62 mg/l**	**2.62 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	**311 mg/l 481 mg/l**	**390 mg/l**	**390 mg/l 502 mg/l**	**449 mg/l**	**449 mg/l 602 mg/l**	**626 mg/l**
pH	NA	Lab	--	**7.9 pH units**	--	**7.8 pH units**	--	**7.8 pH units**
pH	NA	Field	**7.8 pH units**	--	**7.87 pH units**	--	**7.78 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**485 mg/l**	**596 mg/l**	**596 mg/l**	**684 mg/l**	**684 mg/l**	**748 mg/l**
Solids, total suspended	NA	Lab	**1 mg/l**	< 1 mg/l	**1 mg/l**	**1.2 mg/l**	**1.2 mg/l**	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**924 umhos/cm**	**954 umhos/cm**	**954 umhos/cm**	**1191 umhos/cm**	**1191 umhos/cm**	**1243 umhos/cm**
Sulfate, as SO4	NA	Lab	**149 mg/l**	**175 mg/l**	**175 mg/l**	**194 mg/l**	**194 mg/l**	**198 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**8.8 deg C**	--	**10.44 deg C**	--	**16.3 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**188 ug/l**	**188 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**68300 ug/l**	--	**69200 ug/l**	--	**81000 ug/l**	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2 ug/l	**2 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**75400 ug/l**	--	**80000 ug/l**	--	**97100 ug/l**	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**391 ug/l**	**391 ug/l**	--	--	--
Mercury	Total	Lab	--	**0.0006 ug/l**	**0.0006 ug/l**	--	--	< 0.0005 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**18.3 ug/l**	**18.3 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	8/12/2008	Sep-08	9/04/2008	Oct-08	10/01/2008	Nov-08
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**687 mg/l**	--	**461 mg/l**	--	**458 mg/l**	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**461 mg/l**	--	**458 mg/l**	--	**441 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**15.1 mg/l**	**15.4 mg/l**	**15.4 mg/l**	**14.8 mg/l**	**14.8 mg/l**	**15.2 mg/l**
Flow	NA	Field	**0.7 mgd**	**0.66 mgd** **19.84 MG**	**0.66 mgd**	**0.78 mgd** **24.25 MG**	**0.78 mgd**	**0.956 mgd** **28.7 MG**
Fluoride	NA	Lab	--	**2.16 mg/l**	**2.16 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	**626 mg/l** **626 mg/l**	**461 mg/l**	**461 mg/l** **620 mg/l**	**458 mg/l**	**458 mg/l** **631 mg/l**	**441 mg/l**
pH	NA	Lab	--	**7.98 pH units**	--	**8.06 pH units**	--	**8.05 pH units**
pH	NA	Field	**7.81 pH units**	--	**7.98 pH units**	--	**8.06 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**748 mg/l**	**719 mg/l**	**719 mg/l**	**701 mg/l**	**701 mg/l**	**693 mg/l**
Solids, total suspended	NA	Lab	**1 mg/l**	< 1 mg/l	**1 mg/l**	< 1 mg/l	**1 mg/l**	**1.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1243 umhos/cm**	**1166 umhos/cm**	**1166 umhos/cm**	**1184 umhos/cm**	**1184 umhos/cm**	**1160 umhos/cm**
Sulfate, as SO4	NA	Lab	**198 mg/l**	**193 mg/l**	**193 mg/l**	**194 mg/l**	**194 mg/l**	**194 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**14.8 deg C**	--	**12.88 deg C**	--	**9.2 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	**222 ug/l**	**222 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**82700 ug/l**	**81600 ug/l**	**81600 ug/l**	--	**84400 ug/l**	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	< 2 ug/l	**2 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**102000 ug/l**	**101000 ug/l**	**101000 ug/l**	--	**102000 ug/l**	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**279 ug/l**	**279 ug/l**	--	--	--
Mercury	Total	Lab	**0.0005 ug/l**	--	--	**0.0006 ug/l**	**0.0006 ug/l**	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**28.2 ug/l**	**28.2 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	**8410 ug/l**	**8410 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	**44200 ug/l**	**44200 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-NTS	HIST-SD-026-MPCA
		Date	11/05/2008	11/10/2008	Dec-08	12/08/2008	12/09/2008	Jan-09
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**441 mg/l**	--	--	--	**456 mg/l**	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**456 mg/l**	--	--	**488 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**15.2 mg/l**	--	**14.8 mg/l**	--	**14.8 mg/l**	**14.5 mg/l**
Flow	NA	Field	**0.96 mgd**	--	**0.67 mgd** **20.69 MG**	--	**0.667 mgd**	**0.648 mgd** **20.1 MG**
Fluoride	NA	Lab	--	--	**2.17 mg/l**	--	**2.17 mg/l**	--
Hardness, as CaCO3	NA	Lab	**441 mg/l** **639 mg/l**	--	**456 mg/l**	**648 mg/l**	**456 mg/l**	**488 mg/l**
pH	NA	Lab	--	--	**7.98 pH units**	--	--	**7.88 pH units**
pH	NA	Field	**8.05 pH units**	--	--	--	**7.98 pH units**	--
Phosphorus, total, as P	NA	Lab	--	**0.014 mg/l**	--	--	--	--
Solids, total dissolved	NA	Lab	**693 mg/l**	--	**765 mg/l**	--	**765 mg/l**	**732 mg/l**
Solids, total suspended	NA	Lab	**1.6 mg/l**	--	**2 mg/l**	--	**2 mg/l**	**1.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1160 umhos/cm**	--	**1260 umhos/cm**	--	**1260 umhos/cm**	**1298 umhos/cm**
Sulfate, as SO4	NA	Lab	**194 mg/l**	--	**206 mg/l**	--	**206 mg/l**	**206 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**9.2 deg C**	--	--	**0.6 deg C**	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	**2 ug/l**	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**240 ug/l**	--	**240 ug/l**	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**86200 ug/l**	--	--	--	**86400 ug/l**	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	< 2 ug/l	--	**2 ug/l**	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	**2 ug/l**	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	**480 ug/l**	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**103000 ug/l**	--	--	--	**105000 ug/l**	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**1060 ug/l**	--	**1060 ug/l**	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**25.4 ug/l**	--	**25.4 ug/l**	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	**2 ug/l**	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	**2 ug/l**	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	**25 ug/l**	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-NTS	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS
		Date	1/08/2009	1/09/2009	Feb-09	2/05/2009	Mar-09	3/09/2009
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**488 mg/l**	--	**512 mg/l**	--	**492 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	**512 mg/l**	--	**492 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	**488 mg/l**	--	--	**512 mg/l**	--	**492 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	**14.5 mg/l**	**14.8 mg/l**	**14.8 mg/l**	**14.3 mg/l**	**14.3 mg/l**
Flow	NA	Field	--	**0.648 mgd**	**0.587 mgd 16.4 MG**	**0.59 mgd**	**0.59 mgd 18 MG**	**0.585 mgd**
Fluoride	NA	Lab	--	--	--	--	**2.23 mg/l**	**2.23 mg/l**
Hardness, as CaCO3	NA	Lab	**675 mg/l**	**488 mg/l**	**512 mg/l**	**512 mg/l 654 mg/l**	**492 mg/l**	**492 mg/l 681 mg/l**
pH	NA	Lab	--	--	**7.92 pH units**	--	**8.09 pH units**	--
pH	NA	Field	--	**7.88 pH units**	--	**7.92 pH units**	--	**8.09 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	**732 mg/l**	**794 mg/l**	**794 mg/l**	**825 mg/l**	**825 mg/l**
Solids, total suspended	NA	Lab	--	**1.6 mg/l**	**2 mg/l**	**2 mg/l**	**1.2 mg/l**	**1.2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**1298 umhos/cm**	**1322 umhos/cm**	**1322 umhos/cm**	**1251 umhos/cm**	**1251 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**206 mg/l**	**216 mg/l**	**216 mg/l**	**199 mg/l**	**199 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**0.3 deg C**	--	--	**0.3 deg C**	--	**2.2 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	**251 ug/l**	**251 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**88800 ug/l**	--	**87000 ug/l**	--	**88200 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	< 2 ug/l	**2 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**110000 ug/l**	--	**106000 ug/l**	--	**112000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	**682 ug/l**	**682 ug/l**
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	**24.5 ug/l**	**24.5 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS
		Date	Apr-09	4/06/2009	May-09	5/07/2009	Jun-09	6/03/2009
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**418 mg/l**	--	**338 mg/l**	--	**445 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	**418 mg/l**	--	**338 mg/l**	--	**445 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	--	**418 mg/l**	--	**338 mg/l**	--	**445 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**13 mg/l**	**13 mg/l**	**10.3 mg/l**	**10.3 mg/l**	**11.8 mg/l**	**11.8 mg/l**
Flow	NA	Field	**0.74 mgd** **22 MG**	**0.74 mgd**	**0.95 mgd** **29 MG**	**0.95 mgd**	**0.8 mgd** **24 MG**	**0.8 mgd**
Fluoride	NA	Lab	--	--	--	--	**1.86 mg/l**	**1.86 mg/l**
Hardness, as CaCO3	NA	Lab	**418 mg/l**	**418 mg/l** **574 mg/l**	**338 mg/l**	**338 mg/l** **508 mg/l**	**445 mg/l**	**445 mg/l** **609 mg/l**
pH	NA	Lab	**8.04 pH units**	--	**7.79 pH units**	--	**8 pH units**	--
pH	NA	Field	--	**8.04 pH units**	--	**7.79 pH units**	--	**7.96 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**679 mg/l**	**679 mg/l**	**582 mg/l**	**582 mg/l**	**716 mg/l**	**716 mg/l**
Solids, total suspended	NA	Lab	**2.8 mg/l**	**2.8 mg/l**	**1.6 mg/l**	**1.6 mg/l**	**1.6 mg/l**	**1.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1104 umhos/cm**	**1104 umhos/cm**	**915 umhos/cm**	**915 umhos/cm**	**1140 umhos/cm**	**1140 umhos/cm**
Sulfate, as SO4	NA	Lab	**185 mg/l**	**185 mg/l**	**155 mg/l**	**155 mg/l**	**186 mg/l**	**186 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**4.7 deg C**	--	**9.6 deg C**	--	**11.5 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	**222 ug/l**	**222 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**76400 ug/l**	--	**69800 ug/l**	--	**80200 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	< 2 ug/l	**2 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**93000 ug/l**	--	**81100 ug/l**	--	**99200 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	**241 ug/l**	**241 ug/l**
Mercury	Total	Lab	**0.0006 ug/l**	**0.0006 ug/l**	--	--	**0.0009 ug/l**	**0.0009 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	**23.6 ug/l**	**23.6 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS
		Date	Jul-09	7/06/2009	Aug-09	8/05/2009	Sep-09	9/03/2009
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**491 mg/l**	--	**489 mg/l**	--	**529 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	**491 mg/l**	--	**489 mg/l**	--	**529 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	--	**491 mg/l**	--	**489 mg/l**	--	**529 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**12 mg/l**	**12 mg/l**	**12.6 mg/l**	**12.6 mg/l**	**12.9 mg/l**	**12.9 mg/l**
Flow	NA	Field	**0.68 mgd 21 MG**	**0.68 mgd**	**0.66 mgd 21 MG**	**0.66 mgd**	**0.65 mgd 19 MG**	**0.65 mgd**
Fluoride	NA	Lab	--	--	--	--	**2.05 mg/l**	**2.05 mg/l**
Hardness, as CaCO3	NA	Lab	**491 mg/l**	**491 mg/l 660 mg/l**	**489 mg/l**	**489 mg/l 680 mg/l**	**529 mg/l**	**529 mg/l 709 mg/l**
pH	NA	Lab	**8 pH units**	--	**7.9 pH units**	--	**7.8 pH units**	--
pH	NA	Field	--	**8 pH units**	--	**7.92 pH units**	--	**7.76 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**798 mg/l**	**798 mg/l**	**713 mg/l**	**713 mg/l**	**845 mg/l**	**845 mg/l**
Solids, total suspended	NA	Lab	**2.8 mg/l**	**2.8 mg/l**	**1.2 mg/l**	**1.2 mg/l**	< 1 mg/l	**1 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1225 umhos/cm**	**1225 umhos/cm**	**1220 umhos/cm**	**1220 umhos/cm**	**1249 umhos/cm**	**1249 umhos/cm**
Sulfate, as SO4	NA	Lab	**214 mg/l**	**214 mg/l**	**206 mg/l**	**206 mg/l**	**212 mg/l**	**212 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**15.9 deg C**	--	**13.6 deg C**	--	**14 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	**232 ug/l**	**232 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**84600 ug/l**	--	**86200 ug/l**	**89400 ug/l**	**89400 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	< 2 ug/l	**2 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**109000 ug/l**	--	**113000 ug/l**	**118000 ug/l**	**118000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	**244 ug/l**	**244 ug/l**
Mercury	Total	Lab	--	--	**0.0008 ug/l**	**0.0008 ug/l**	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	**29.3 ug/l**	**29.3 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	**8400 ug/l**	**8400 ug/l**
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	**50000 ug/l**	**50000 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS	HIST-SD-026-MPCA	HIST-SD-026-NTS
		Date	Oct-09	10/02/2009	Nov-09	11/05/2009	Dec-09	12/07/2009
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**536 mg/l**	--	**494 mg/l**	--	**510 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	**536 mg/l**	--	**494 mg/l**	--	**510 mg/l**	--
Alkalinity, total, as CaCO3	NA	Lab	--	**536 mg/l**	--	**494 mg/l**	--	**510 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**13.3 mg/l**	**13.3 mg/l**	**13 mg/l**	**13 mg/l**	**12.7 mg/l**	**12.7 mg/l**
Flow	NA	Field	**0.7 mgd** **21 MG**	**0.7 mgd**	**0.74 mgd** **22 MG**	**0.74 mgd**	**0.73 mgd** **22 MG**	**0.73 mgd**
Fluoride	NA	Lab	--	--	--	--	**2.01 mg/l**	**2.01 mg/l**
Hardness, as CaCO3	NA	Lab	**536 mg/l**	**536 mg/l** **663 mg/l**	**494 mg/l**	**494 mg/l** **665 mg/l**	**510 mg/l**	**510 mg/l** **683 mg/l**
pH	NA	Lab	**8.3 pH units**	--	**7.7 pH units**	--	**7.8 pH units**	--
pH	NA	Field	--	**8.29 pH units**	--	**7.7 pH units**	--	**7.8 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**782 mg/l**	**782 mg/l**	**866 mg/l**	**866 mg/l**	**784 mg/l**	**784 mg/l**
Solids, total suspended	NA	Lab	**1.6 mg/l**	**1.6 mg/l**	**4 mg/l**	**4 mg/l**	**3 mg/l**	**3 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1273 umhos/cm**	**1273 umhos/cm**	**1197 umhos/cm**	**1197 umhos/cm**	**1322 umhos/cm**	**1322 umhos/cm**
Sulfate, as SO4	NA	Lab	**215 mg/l**	**215 mg/l**	**360 mg/l**	**360 mg/l**	**214 mg/l**	**214 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**8 deg C**	--	**3.4 deg C**	--	**0.6 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	**248 ug/l**	**248 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	**82500 ug/l**	--	**85000 ug/l**	--	**85700 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	**0.61 ug/l**	**0.61 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**111000 ug/l**	--	**110000 ug/l**	--	**114000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	**963 ug/l**	**963 ug/l**
Mercury	Total	Lab	**0.0008 ug/l**	**0.0008 ug/l**	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	**21.8 ug/l**	**21.8 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**528 mg/l**	**537 mg/l**	**521 mg/l**	**458 mg/l**	**476 mg/l**	**466 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**12.3 mg/l**	**12 mg/l**	**11.8 mg/l**	**10.9 mg/l**	**11.2 mg/l**	**11 mg/l**
Flow	NA	Field	**0.615 mgd 19.06 MG**	**0.74 mgd 20.58 MG**	**0.94 mgd 29 MG**	**0.76 mgd 23 MG**	**0.64 mgd 20 MG**	--
Fluoride	NA	Lab	--	--	**1.94 mg/l**	--	--	**2 mg/l**
Hardness, as CaCO3	NA	Lab	**528 mg/l**	**537 mg/l**	**521 mg/l**	**458 mg/l**	**476 mg/l**	**466 mg/l**
pH	NA	Lab	**7.8 pH units**	**7.9 pH units**	**8 pH units**	**8.1 pH units**	**8.2 pH units**	**8.1 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**791 mg/l**	**851 mg/l**	**815 mg/l**	**740 mg/l**	**732 mg/l**	**811 mg/l**
Solids, total suspended	NA	Lab	< 1 mg/l	**8 mg/l**	**2.4 mg/l**	**2.4 mg/l**	**3 mg/l**	**2.8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1298 umhos/cm**	**1350 umhos/cm**	**1316 umhos/cm**	**1170 umhos/cm**	**1175 umhos/cm**	**1190 umhos/cm**
Sulfate, as SO4	NA	Lab	**201 mg/l**	**207 mg/l**	**195 mg/l**	**173 mg/l**	**171 mg/l**	**167 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**265 ug/l**	--	--	**250 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.7 ug/l**	--	--	**0.49 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**980 ug/l**	--	--	**178 ug/l**
Mercury	Total	Lab	--	--	--	< 0.0005 ug/l	--	< 0.0005 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**22.9 ug/l**	--	--	**53 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**485 mg/l**	**471 mg/l**	**497 mg/l**	**494 mg/l**	**472 mg/l**	**495 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**11 mg/l**	**11 mg/l**	**12 mg/l**	**11 mg/l**	**11 mg/l**	**11 mg/l**
Flow	NA	Field	**0.52 mgd 16 MG**	**1.1 mgd 35 MG**	**0.64 mgd 20 MG**	**0.64 mgd 20 MG**	**0.64 mgd 19 MG**	**0.61 mgd 19 MG**
Fluoride	NA	Lab	--	--	**2.1 mg/l**	--	--	**1.9 mg/l**
Hardness, as CaCO3	NA	Lab	**485 mg/l**	**471 mg/l**	**497 mg/l**	**494 mg/l**	**472 mg/l**	**495 mg/l**
pH	NA	Lab	**8.1 pH units**	**7.9 pH units**	**8.1 pH units**	**8.1 pH units**	**8.2 pH units**	**8 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**744 mg/l**	**737 mg/l**	**741 mg/l**	**767 mg/l**	**706 mg/l**	**714 mg/l**
Solids, total suspended	NA	Lab	**4 mg/l**	**4 mg/l**	**2 mg/l**	**1 mg/l**	**2 mg/l**	**4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1181 umhos/cm**	**1190 umhos/cm**	**1215 umhos/cm**	**1170 umhos/cm**	**1141 umhos/cm**	**1211 umhos/cm**
Sulfate, as SO4	NA	Lab	**164 mg/l**	**153 mg/l**	**163 mg/l**	**162 mg/l**	**159 mg/l**	**157 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**257 ug/l**	--	--	**241 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**82000 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.27 ug/l**	--	--	< 1 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**106000 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**259 ug/l**	--	--	**707 ug/l**
Mercury	Total	Lab	--	**0.0006 ug/l**	--	< 0.0005 ug/l	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**38 ug/l**	--	--	**21 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	**8600 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	**44000 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-MPCA Jan-11 N	HIST-SD-026-MPCA Feb-11 N	HIST-SD-026-MPCA Mar-11 N	HIST-SD-026-MPCA Apr-11 N	HIST-SD-026-MPCA May-11 N	HIST-SD-026-MPCA Jun-11 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**533 mg/l**	**474 mg/l**	**496 mg/l**	**294 mg/l**	**364 mg/l**	**458 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**11 mg/l**	**11 mg/l**	**11 mg/l**	**7.5 mg/l**	**9.2 mg/l**	**9.4 mg/l**
Flow	NA	Field	**0.58 mgd 18 MG**	**0.55 mgd 15.3 MG**	**0.46 mgd 14 MG**	**1.6 mgd 46 MG**	**1 mgd 31 MG**	**0.3 mgd 8.9 MG**
Fluoride	NA	Lab	--	--	**1.8 mg/l**	--	--	**1.6 mg/l**
Hardness, as CaCO3	NA	Lab	**533 mg/l**	**474 mg/l**	**496 mg/l**	**294 mg/l**	**364 mg/l**	**458 mg/l**
pH	NA	Lab	**8.1 pH units**	**7.9 pH units**	**8 pH units**	**7.8 pH units**	**8.3 pH units**	**8 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**735 mg/l**	**750 mg/l**	**748 mg/l**	**483 mg/l**	**645 mg/l**	**667 mg/l**
Solids, total suspended	NA	Lab	**3 mg/l**	**3 mg/l**	**2 mg/l**	**4 mg/l**	**3 mg/l**	**7 mg/l 8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1182 umhos/cm**	**1233 umhos/cm**	**1254 umhos/cm**	**832 umhos/cm**	**885 umhos/cm**	**1094 umhos/cm**
Sulfate, as SO4	NA	Lab	**154 mg/l**	**152 mg/l**	**154 mg/l**	**122 mg/l**	**142 mg/l**	**153 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**236 ug/l**	--	--	**228 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.35 ug/l**	--	--	< 0.2 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**544 ug/l**	--	--	**172 ug/l**
Mercury	Total	Lab	--	--	--	**0.0008 ug/l**	--	**0.0007 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**23 ug/l**	--	--	**22 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Location			HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
Date			Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11
Sample Type			N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**455 mg/l**	**394 mg/l**	**438 mg/l**	**359 mg/l**	**356 mg/l**	**420 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**10.3 mg/l**	**11.1 mg/l**	**12.2 mg/l**	**15 mg/l**	**14.4 mg/l**	**14.5 mg/l**
Flow	NA	Field	**0.78 mgd** **24 MG**	**0.31 mgd** **9.6 MG**	**0.14 mgd** **4.1 MG**	**0.14 mgd** **4.3 MG**	**0.18 mgd** **5.5 MG**	**0.15 mgd** **4.7 MG**
Fluoride	NA	Lab	--	--	**1.56 mg/l**	--	--	**1.28 mg/l**
Hardness, as CaCO3	NA	Lab	**455 mg/l**	**394 mg/l**	**438 mg/l**	**359 mg/l**	**356 mg/l**	**420 mg/l**
pH	NA	Lab	**7.9 pH units**	**7.9 pH units**	**8.1 pH units**	**7.8 pH units**	**8 pH units**	**7.3 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**747 mg/l**	**629 mg/l**	**716 mg/l**	**685 mg/l**	**725 mg/l**	**790 mg/l**
Solids, total suspended	NA	Lab	< 1 mg/l	**8.4 mg/l**	**3.2 mg/l**	**3 mg/l**	**4 mg/l**	**8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1137 umhos/cm**	**908 umhos/cm**	**1075 umhos/cm**	**1015 umhos/cm**	**1037 umhos/cm** **1109 umhos/cm**	**1160 umhos/cm**
Sulfate, as SO4	NA	Lab	**168 mg/l**	**134 mg/l**	**148 mg/l**	**193 mg/l**	**211 mg/l**	**234 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**231 ug/l**	--	--	**140 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**73700 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.37 ug/l**	--	--	**0.93 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**98600 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**508 ug/l**	--	--	**2190 ug/l**
Mercury	Total	Lab	--	**0.0006 ug/l**	--	< 0.0005 ug/l	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**25 ug/l**	--	--	**18 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	**6390 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	**35700 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-MPCA Jan-12 N	HIST-SD-026-MPCA Feb-12 N	HIST-SD-026-MPCA Mar-12 N	HIST-SD-026-MPCA Apr-12 N	HIST-SD-026-MPCA May-12 N	HIST-SD-026-MPCA Jun-12 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**428 mg/l**	**442 mg/l**	**256 mg/l**	**268 mg/l**	**237 mg/l**	**229 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**13.2 mg/l**	**13 mg/l**	**12.2 mg/l**	**21.5 mg/l**	**17.6 mg/l**	**11.4 mg/l**
Flow	NA	Field	**0.11 mgd** **3.3 MG**	**0.13 mgd** **3.8 MG**	**0.2 mgd** **6.2 MG**	**0.13 mgd** **3.9 MG**	**0.08 mgd** **2.5 MG**	**0.4 mgd** **12 MG**
Fluoride	NA	Lab	--	--	**1.22 mg/l**	--	--	**0.7 mg/l**
Hardness, as CaCO3	NA	Lab	**631 mg/l**	**442 mg/l**	**256 mg/l**	**268 mg/l**	**237 mg/l**	**229 mg/l**
pH	NA	Lab	**8 pH units**	**7.9 pH units**	**7.9 pH units**	**7.7 pH units**	**7.6 pH units**	**7.3 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**770 mg/l**	**748 mg/l**	**769 mg/l**	**611 mg/l**	**549 mg/l**	**471 mg/l**
Solids, total suspended	NA	Lab	**7 mg/l**	**5 mg/l**	**4 mg/l**	< 1.2 mg/l	**2 mg/l**	**4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1160 umhos/cm**	**1196 umhos/cm**	**816 umhos/cm**	**923 umhos/cm**	**825 umhos/cm**	**693 umhos/cm**
Sulfate, as SO4	NA	Lab	**218 mg/l**	**226 mg/l**	**216 mg/l**	**226 mg/l**	**181 mg/l**	**145 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**171 ug/l**	--	--	**127 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.72 ug/l**	--	--	< 2 ug/l
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**1770 ug/l**	--	--	**874 ug/l**
Mercury	Total	Lab	--	--	--	< 0.0005 ug/l	--	< 0.0005 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**14.6 ug/l**	--	--	< 10 ug/l
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
		Sample Type	N	N	N	N	N	N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**349 mg/l**	**309 mg/l**	**397 mg/l**	**403 mg/l**	**716 mg/l**	**359 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**9.6 mg/l**	**11 mg/l**	**12.2 mg/l**	**13 mg/l**	**14.5 mg/l**	**14.2 mg/l**
Flow	NA	Field	**0.3 mgd 9.2 MG**	**0.08 mgd 2.6 MG**	**0.12 mgd 3.7 MG**	**0.08 mgd 2.6 MG**	**0.17 mgd 5.1 MG**	**4.5 MG 0.15 mgd**
Fluoride	NA	Lab	--	--	**1.2 mg/l**	--	--	**1 mg/l**
Hardness, as CaCO3	NA	Lab	**349 mg/l**	**309 mg/l**	**397 mg/l**	**403 mg/l**	**531 mg/l**	**359 mg/l**
pH	NA	Lab	**7.8 pH units**	**7.7 pH units**	**8 pH units**	**7.7 pH units**	**7.4 pH units**	**7.7 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**620 mg/l**	**520 mg/l**	**675 mg/l**	**738 mg/l**	**730 mg/l**	**729 mg/l**
Solids, total suspended	NA	Lab	**7 mg/l**	**3 mg/l**	**3 mg/l**	**3 mg/l**	**2 mg/l**	**3 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**954 umhos/cm**	**854 umhos/cm**	**1019 umhos/cm**	**1017 umhos/cm 1039 umhos/cm**	**1033 umhos/cm**	**979 umhos/cm**
Sulfate, as SO4	NA	Lab	**163 mg/l**	**141 mg/l**	**184 mg/l**	**236 mg/l**	**246 mg/l**	**242 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**176 ug/l**	--	--	**127 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**88300 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.28 ug/l**	--	--	**0.39 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**92100 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**272 ug/l**	--	--	**971 ug/l**
Mercury	Total	Lab	--	< 0.0005 ug/l	--	< 0.0005 ug/l	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**16.9 ug/l**	--	--	**9 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	**6300 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	**31100 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**449 mg/l**	**478 mg/l**	**447 mg/l**	**344 mg/l**	**210 mg/l**	**214 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**13.6 mg/l**	**12.9 mg/l**	**12.1 mg/l**	**12.1 mg/l**	**9.8 mg/l**	**8.1 mg/l**
Flow	NA	Field	**0.09 mgd** **2.8 MG**	**0.06 mgd** **1.8 MG**	**0.09 mgd** **2.8 MG**	**0.01 mgd** **0.3 MG**	**0.34 mgd** **10.6 MG**	**0.41 mgd** **12.4 MG**
Fluoride	NA	Lab	--	--	**1.1 mg/l**	--	--	**0.58 mg/l**
Hardness, as CaCO3	NA	Lab	**449 mg/l**	**478 mg/l**	**447 mg/l**	**344 mg/l**	**210 mg/l**	**214 mg/l**
pH	NA	Lab	**7.6 pH units**	**7.6 pH units**	**7.4 pH units**	**7.3 pH units**	**7.1 pH units**	**7.2 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**780 mg/l**	**748 mg/l**	**748 mg/l**	**594 mg/l**	**395 mg/l**	**419 mg/l**
Solids, total suspended	NA	Lab	**3 mg/l**	**3 mg/l**	**9 mg/l**	**4 mg/l**	**2 mg/l**	**4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1173 umhos/cm** **1204 umhos/cm**	**1129 umhos/cm** **1139 umhos/cm**	**1110 umhos/cm**	**925 umhos/cm**	**621 umhos/cm**	**630 umhos/cm**
Sulfate, as SO4	NA	Lab	**251 mg/l**	**243 mg/l**	**230 mg/l**	**173 mg/l**	**126 mg/l**	**126 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**166 ug/l**	--	--	**121 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.76 ug/l**	--	--	**0.19 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**1380 ug/l**	--	--	**495 ug/l**
Mercury	Total	Lab	--	--	--	**0.00047 ug/l**	--	**0.00038 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**14 ug/l**	--	--	**5.1 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA	HIST-SD-026-MPCA
		Date	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**233 mg/l**	**280 mg/l**	**315 mg/l**	**351 mg/l**	**336 mg/l**	**351 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**6 mg/l**	**7.3 mg/l**	**9.4 mg/l**	**10.6 mg/l**	**11.4 mg/l**	**10.2 mg/l**
Flow	NA	Field	**0.26 mgd** **8 MG**	**0.06 mgd** **1.8 MG**	**0.15 mgd** **4.4 MG**	**0.15 mgd** **4.7 MG**	**0.08 mgd** **2.4 MG**	**0.028 mgd** **0.87 MG**
Fluoride	NA	Lab	--	--	**0.72 mg/l**	--	--	**0.66 mg/l**
Hardness, as CaCO3	NA	Lab	**233 mg/l**	**280 mg/l**	**315 mg/l**	**351 mg/l**	**336 mg/l**	**351 mg/l**
pH	NA	Lab	**7.1 pH units**	**7.6 pH units**	**7.3 pH units**	**7.6 pH units**	**7.7 pH units**	**7.4 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**428 mg/l**	**485 mg/l**	**593 mg/l**	**595 mg/l**	**583 mg/l**	**633 mg/l**
Solids, total suspended	NA	Lab	**3 mg/l**	**2 mg/l**	**5 mg/l**	**3 mg/l**	**3 mg/l**	**4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**660 umhos/cm**	**766 umhos/cm**	**822 umhos/cm**	**967 umhos/cm**	**890 umhos/cm**	**984 umhos/cm**
Sulfate, as SO4	NA	Lab	**118 mg/l**	**129 mg/l**	**150 mg/l**	**193 mg/l**	**191 mg/l**	**199 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**143 ug/l**	--	--	**117 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	**72200 ug/l**	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.29 ug/l**	--	--	**0.39 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	**67400 ug/l**	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**1010 ug/l**	--	--	**1180 ug/l**
Mercury	Total	Lab	--	**0.00069 ug/l**	--	< 0.00018 ug/l	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**8.4 ug/l**	--	--	**7.7 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	**4900 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	--	--	**19800 ug/l**	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-026-MPCA Jan-14 N	HIST-SD-026-MPCA Feb-14 N	HIST-SD-026-MPCA Mar-14 N	HIST-SD-026-MPCA Apr-14 N	SD026 7/26/2010 N	SD026 9/14/2010 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**397 mg/l**	**433 mg/l**	**389 mg/l**	**211 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	< 10 mg/l	**479 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**11.6 mg/l**	**11.3 mg/l**	**11.2 mg/l**	**7.6 mg/l**	**11.4 mg/l**	**11 mg/l**
Flow	NA	Field	**0.015 mgd** **0.47 MG**	**0.095 mgd** **2.7 MG**	**0.38 mgd** **12 MG**	**0.3 mgd** **9 MG**	--	--
Fluoride	NA	Lab	--	--	**0.82 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	**184 mg/l**	**433 mg/l**	**389 mg/l**	**211 mg/l**	**652 mg/l**	**621 mg/l**
pH	NA	Lab	**7.7 pH units**	**7.4 pH units** **7.9 pH units**	**7.7 pH units**	**7.5 pH units**	--	--
pH	NA	Field	--	--	--	--	**8.04 pH units**	**7.95 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	**0.042 mg P/L**	**0.009 mg P/L**
Solids, total dissolved	NA	Lab	**478 mg/l**	**706 mg/l**	**708 mg/l**	**426 mg/l**	**747 mg/l**	**685 mg/l**
Solids, total suspended	NA	Lab	**6 mg/l**	**3 mg/l**	**3 mg/l**	**4 mg/l**	**26.5 mg/l**	**3.5 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1070 umhos/cm** **1080 umhos/cm**	**1130 umhos/cm** **1150 umhos/cm**	**1040 umhos/cm** **1130 umhos/cm**	**664 umhos/cm**	**1231 umhos/cm**	**1152 umhos/cm**
Sulfate, as SO4	NA	Lab	**226 mg/l**	**239 mg/l**	**227 mg/l**	**115 mg/l**	**170 mg/l**	**158 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	**20.43 deg C**	**11.08 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	**3.1 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	**1.8 ug/l**	**1.09 ug/l**
Barium	Total	Lab	--	--	--	--	**38.9 ug/l**	**15.5 ug/l**
Beryllium	Total	Lab	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Boron	Total	Lab	--	--	**159 ug/l**	--	**262 ug/l**	**220 ug/l**
Cadmium	Total	Lab	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Calcium	Total	Lab	--	--	--	--	**81500 ug/l**	**82100 ug/l**
Chromium	Total	Lab	--	--	--	--	< 1 ug/l	< 1 ug/l
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.5 ug/l**	--	**0.89 ug/l**	**0.21 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	**2.02 ug/l**	**0.75 ug/l**
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	**1980 ug/l**	**279 ug/l**
Lead	Total	Lab	--	--	--	--	< 0.5 ug/l	< 0.5 ug/l
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	**109000 ug/l**	**101000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**981 ug/l**	--	**1370 ug/l**	**193 ug/l**
Mercury	Total	Lab	--	--	--	**0.00095 ug/l**	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**9.9 ug/l**	--	**36.2 ug/l**	**26.1 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	**2.5 ug/l**	**2.08 ug/l**
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	**8860 ug/l**	**7270 ug/l**
Selenium	Total	Lab	--	--	--	--	< 1 ug/l	< 1 ug/l
Silver	Total	Lab	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	**46900 ug/l**	**41100 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Tin	Total	Lab	--	--	--	--	< 0.5 ug/l	< 0.5 ug/l
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	**9.76 ug/l**	< 6 ug/l

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	SD026	SD026	SD026	SD026	SD026	SD026
		Date	10/26/2010	6/02/2011	5/15/2013	6/03/2013	6/18/2013	7/02/2013
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	**214 mg/l**	--	**233 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**474 mg/l**	**429 mg/l**	--	**214 mg/l**	--	**233 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	**214 mg/l**	--	**233 mg/l**
Chloride	NA	Lab	**12.8 mg/l**	**9.43 mg/l**	--	**8.1 mg/l**	**7.2 mg/l**	**6.0 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	**0.58 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	**617 mg/l**	**591 mg/l**	--	**369 mg/l**	**352 mg/l**	**365 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.91 pH units**	**8.04 pH units**	**7.14 pH units**	**7.17 pH units**	**7.32 pH units**	**7.09 pH units**
Phosphorus, total, as P	NA	Lab	**0.014 mg P/L**	**0.016 mg/l**	--	--	--	--
Solids, total dissolved	NA	Lab	**637 mg/l**	**646 mg/l**	--	**419 mg/l**	**454 mg/l**	**428 mg/l**
Solids, total suspended	NA	Lab	**2.4 mg/l**	**5.6 mg/l**	--	**3.6 mg/l**	--	**3.0 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1141 umhos/cm**	**1055 umhos/cm**	**621.2 umhos/cm**	**630 umhos/cm**	**666.2 umhos/cm**	**659.5 umhos/cm**
Sulfate, as SO4	NA	Lab	**155 mg/l**	**150 mg/l**	--	**126 mg/l**	**125 mg/l**	**118 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**9.33 deg C**	**10.29 deg C**	--	--	**11.68 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0 NTU**	**0 NTU**	--	--	**328 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	< 20.0 ug/l	--
Aluminum	Total	Lab	--	--	--	--	**27.7 ug/l**	--
Antimony	Total	Lab	--	< 0.5 ug/l	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	< 0.50 ug/l	--
Arsenic	Total	Lab	< 1 ug/l	< 0.5 ug/l	--	--	**0.54 ug/l**	--
Barium	Total	Lab	**17.6 ug/l**	**16.4 ug/l**	--	--	--	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Boron	Total	Lab	**239 ug/l**	**214 ug/l**	--	**121 ug/l**	--	--
Cadmium	Total	Lab	**0.05 j ug/l**	< 0.2 ug/l	--	--	--	--
Calcium	Total	Lab	**79000 ug/l**	**77600 ug/l**	--	**60400 ug/l**	**58800 ug/l**	**61000 ug/l**
Chromium	Total	Lab	< 1 ug/l	< 1 ug/l	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	**0.30 ug/l**	--
Cobalt	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	**0.19 j ug/l**	**0.40 ug/l**	--
Copper	Dissolved	Lab	--	--	--	--	**1.2 ug/l**	--
Copper	Total	Lab	**0.91 ug/l**	< 0.7 ug/l	--	--	**1.3 ug/l**	--
Iron	Dissolved	Lab	--	--	--	--	**376 ug/l**	--
Iron	Total	Lab	**185 ug/l**	**325 ug/l**	--	--	**1320 ug/l**	--
Lead	Total	Lab	< 0.03 ug/l	< 0.5 ug/l	--	--	< 0.50 ug/l	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**102000 ug/l**	**96400 ug/l**	--	**52900 ug/l**	**49800 ug/l**	**51600 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	**729 ug/l**	--
Manganese	Total	Lab	**121 ug/l**	**173 ug/l**	--	**495 ug/l**	**820 ug/l**	--
Mercury	Total	Lab	--	--	--	**0.00038 j ug/l**	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	**24 ug/l**	**20.6 ug/l**	--	**5.1 ug/l**	--	--
Nickel	Dissolved	Lab	--	--	--	--	< 0.50 ug/l	--
Nickel	Total	Lab	**2.46 ug/l**	**1.58 ug/l**	--	--	< 0.50 ug/l	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**8640 ug/l**	**6570 ug/l**	--	--	--	--
Selenium	Total	Lab	**0.037 j ug/l**	--	--	--	< 1.0 ug/l	--
Silver	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Sodium	Total	Lab	**42100 ug/l**	**34900 ug/l**	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	--	< 0.005 ug/l	--
Tin	Total	Lab	< 0.5 ug/l	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	**13.2 ug/l**	--
Zinc	Total	Lab	< 6 ug/l	< 6 ug/l	--	--	**13.8 ug/l**	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	SD026	SD026	SD026	SD026	SD026	SD026
		Date	7/22/2013	8/07/2013	8/20/2013	9/05/2013	9/18/2013	9/18/2013
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**266 mg/l**	**280 mg/l**	--	**315 mg/l**	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**266 mg/l**	**280 mg/l**	--	**315 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	**280 mg/l**	--	**315 mg/l**	--	--
Chloride	NA	Lab	**6.7 mg/l**	**7.3 mg/l**	**9.0 mg/l**	**9.4 mg/l**	**9.8 mg/l**	--
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	**0.72 mg/l**	--	--
Hardness, as CaCO3	NA	Lab	**403 mg/l**	**420 mg/l**	**457 mg/l**	**458 mg/l**	**477 mg/l**	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.37 pH units**	**7.58 pH units**	**7.86 pH units**	**7.34 pH units**	--	**7.52 pH units**
Phosphorus, total, as P	NA	Lab	**0.038 mg/l**	--	--	--	--	--
Solids, total dissolved	NA	Lab	**476 mg/l**	**485 mg/l**	**620 mg/l**	**593 mg/l**	**611 mg/l**	--
Solids, total suspended	NA	Lab	--	**2.0 mg/l**	--	**5.2 mg/l**	--	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**717 umhos/cm**	**766.3 umhos/cm**	**879.1 umhos/cm**	**822.3 umhos/cm**	--	**920.5 umhos/cm**
Sulfate, as SO4	NA	Lab	**114 mg/l**	**129 mg/l**	**160 mg/l**	**150 mg/l**	**169 mg/l**	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**15.82 deg C**	--	**17.18 deg C**	--	--	**13.56 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**11.2 NTU**	--	**15 NTU**	--	--	**3.3 NTU**
Metals								
Aluminum	Dissolved	Lab	< 20.0 ug/l	--	< 20.0 ug/l	--	< 20.0 ug/l	--
Aluminum	Total	Lab	**27.4 ug/l**	--	< 20.0 ug/l	--	< 20.0 ug/l	--
Antimony	Total	Lab	< 0.50 ug/l	--	--	--	--	--
Arsenic	Dissolved	Lab	**0.68 ug/l**	--	**0.69 ug/l**	--	< 0.50 ug/l	--
Arsenic	Total	Lab	**0.66 ug/l**	--	**1.0 ug/l**	--	**0.56 ug/l**	--
Barium	Total	Lab	**34.0 ug/l**	--	--	--	--	--
Beryllium	Total	Lab	< 0.20 ug/l	--	--	--	--	--
Boron	Total	Lab	**129 ug/l**	--	--	**143 ug/l**	--	--
Cadmium	Total	Lab	< 0.20 ug/l	--	--	--	--	--
Calcium	Total	Lab	**67200 ug/l**	**69100 ug/l**	**73000 ug/l**	**72200 ug/l**	**73100 ug/l**	--
Chromium	Total	Lab	< 1.0 ug/l	--	--	--	--	--
Cobalt	Dissolved	Lab	**0.22 ug/l**	--	**0.31 ug/l**	--	< 0.20 ug/l	--
Cobalt	Total	Lab	**0.24 ug/l**	--	**0.33 ug/l**	**0.29 ug/l**	< 0.20 ug/l	--
Copper	Dissolved	Lab	**0.62 ug/l**	--	**0.82 ug/l**	--	**0.87 ug/l**	--
Copper	Total	Lab	**0.66 ug/l**	--	**0.92 ug/l**	--	**0.88 ug/l**	--
Iron	Dissolved	Lab	**511 ug/l**	--	**376 ug/l**	--	**87.8 ug/l**	--
Iron	Total	Lab	**1240 ug/l**	--	**1810 ug/l**	--	**1250 ug/l**	--
Lead	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	--	< 0.50 ug/l	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**57100 ug/l**	**60200 ug/l**	**66700 ug/l**	**67400 ug/l**	**71600 ug/l**	--
Manganese	Dissolved	Lab	**641 ug/l**	--	**1010 ug/l**	--	**690 ug/l**	--
Manganese	Total	Lab	**644 ug/l**	--	**1120 ug/l**	**1010 ug/l**	**678 ug/l**	--
Mercury	Total	Lab	**0.00057 ug/l**	**0.00069 ug/l**	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	**7.2 ug/l**	--	--	**8.4 ug/l**	--	--
Nickel	Dissolved	Lab	< 0.50 ug/l	--	< 0.50 ug/l	--	< 1.0 ug/l	--
Nickel	Total	Lab	< 0.50 ug/l	--	< 0.50 ug/l	--	< 1.0 ug/l	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**4300 ug/l**	--	--	**4900 ug/l**	--	--
Selenium	Total	Lab	< 1.0 ug/l	--	< 1.0 ug/l	--	< 1.0 ug/l	--
Silver	Total	Lab	< 0.20 ug/l	--	--	--	--	--
Sodium	Total	Lab	**16500 ug/l**	--	--	**19800 ug/l**	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	**0.003 j ug/l**	--	< 0.002 ug/l	--	**0.002 jb ug/l**	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	< 3.0 ug/l	--	--	--	--	--
Zinc	Dissolved	Lab	**7.6 ug/l**	--	**8.4 ug/l**	--	**7.3 ug/l**	--
Zinc	Total	Lab	**7.6 ug/l**	--	**9.8 ug/l**	--	< 6.0 ug/l	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	SD026 10/02/2013 N	SD026 10/28/2013 N	SD026 11/06/2013 N	SD026 11/27/2013 N	SD026 12/09/2013 N	SD026 12/18/2013 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	**326 mg/l**	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	**326 mg/l**	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	**11.3 mg/l**	--	**10.8 mg/l**	--	**11.5 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	**508 mg/l**	--	**530 mg/l**	--	**555 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.55 pH units**	**7.6 pH units**	**7.68 pH units**	**7.44 pH units**	**7.35 pH units**	**7.26 pH units**
Phosphorus, total, as P	NA	Lab	--	**0.016 mg/l**	--	--	--	--
Solids, total dissolved	NA	Lab	--	**613 mg/l**	--	**647 mg/l**	--	**713 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**966.8 umhos/cm**	**783.3 umhos/cm**	**889.7 umhos/cm**	**950.7 umhos/cm**	**983.7 umhos/cm**	**980.9 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**191 mg/l**	--	**200 mg/l**	--	**219 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**2.67 deg C**	--	**0.66 deg C**	--	**1.19 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	**7.4 NTU**	--	**11.6 NTU**	--	**2.8 NTU**
Metals								
Aluminum	Dissolved	Lab	--	< 20.0 ug/l	--	**31.0 ug/l**	--	< 20.0 ug/l
Aluminum	Total	Lab	--	< 20.0 ug/l	--	< 20.0 ug/l	--	**28.9 ug/l**
Antimony	Total	Lab	--	< 0.50 ug/l	--	--	--	--
Arsenic	Dissolved	Lab	--	**0.57 ug/l**	--	< 0.50 ug/l	--	< 0.50 ug/l
Arsenic	Total	Lab	--	**0.59 ug/l**	--	< 0.50 ug/l	--	< 0.50 ug/l
Barium	Total	Lab	--	**43.3 ug/l**	--	--	--	--
Beryllium	Total	Lab	--	< 0.20 ug/l	--	--	--	--
Boron	Total	Lab	--	**122 ug/l**	--	--	--	--
Cadmium	Total	Lab	--	< 0.20 ug/l	--	--	--	--
Calcium	Total	Lab	--	**72900 ug/l**	--	**73400 ug/l**	--	**74800 ug/l**
Chromium	Total	Lab	--	< 1.0 ug/l	--	--	--	--
Cobalt	Dissolved	Lab	--	**0.35 ug/l**	--	**0.42 ug/l**	--	**0.42 ug/l**
Cobalt	Total	Lab	--	**0.45 ug/l**	--	**0.37 ug/l**	--	**0.39 ug/l**
Copper	Dissolved	Lab	--	**1.8 ug/l**	--	**1.4 ug/l**	--	**1.3 ug/l**
Copper	Total	Lab	--	**1.3 ug/l**	--	**1.5 ug/l**	--	**1.7 ug/l**
Iron	Dissolved	Lab	--	**417 ug/l**	--	**628 ug/l**	--	**487 ug/l**
Iron	Total	Lab	--	**1520 ug/l**	--	**1580 ug/l**	--	**1310 ug/l**
Lead	Total	Lab	--	< 0.50 ug/l	--	< 0.50 ug/l	--	< 0.50 ug/l
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**79100 ug/l**	--	**84200 ug/l**	--	**89400 ug/l**
Manganese	Dissolved	Lab	--	**1050 ug/l**	--	**1210 ug/l**	--	**1110 ug/l**
Manganese	Total	Lab	--	**1170 ug/l**	--	**1200 ug/l**	--	**1210 ug/l**
Mercury	Total	Lab	--	< 0.00050 ug/l	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**7.6 ug/l**	--	--	--	--
Nickel	Dissolved	Lab	--	< 0.50 ug/l	--	< 0.50 ug/l	--	< 0.50 ug/l
Nickel	Total	Lab	--	< 0.50 ug/l	--	< 0.50 ug/l	--	< 1.0 ug/l
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	**5000 ug/l**	--	--	--	--
Selenium	Total	Lab	--	< 1.0 ug/l	--	< 1.0 ug/l	--	< 1.0 ug/l
Silver	Total	Lab	--	< 0.20 ug/l	--	--	--	--
Sodium	Total	Lab	--	**22400 ug/l**	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	< 0.002 ug/l	--	< 0.0020 ug/l	--	< 0.002 ug/l
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	< 3.0 ug/l	--	--	--	--
Zinc	Dissolved	Lab	--	**9.1 ug/l**	--	**9.0 ug/l**	--	**10.0 ug/l**
Zinc	Total	Lab	--	< 6.0 ug/l	--	**7.4 ug/l**	--	**9.4 ug/l**

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location Date Sample Type	SD026 1/28/2014 N	SD026 2/18/2014 N	SD026 3/05/2014 N	SD026 3/11/2014 N	PM-7 4/12/2004 N	PM-7 5/19/2004 N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**416 mg/l**	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**416 mg/l**	--	--	--	**346 mg/l**	**372 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**11.1 mg/l**	**11.2 mg/l**	--	**10.2 mg/l**	**17.2 mg/l**	**19.7 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	--	**2.7 mg/l**	**3.4 mg/l**
Hardness, as CaCO3	NA	Lab	**616 mg/l**	**598 mg/l**	--	**582 mg/l**	**349 mg/l**	**364 mg/l**
pH	NA	Lab	--	--	--	--	**7.8 pH units**	**8.23 pH units**
pH	NA	Field	**8.31 pH units**	**7.85 pH units**	**7.73 pH units**	**7.6 pH units**	--	--
Phosphorus, total, as P	NA	Lab	**0.081 mg/l**	--	--	--	< 0.1 mg/l	< 0.1 mg/l
Solids, total dissolved	NA	Lab	**686 mg/l**	**723 mg/l**	--	**661 mg/l**	**533 mg/l**	**541 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	< 1 mg/l	**10 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	**891 umhos/cm**	**951 umhos/cm**
Specific Conductance @ 25 ºC	NA	Field	**1068 umhos/cm**	**1050 umhos/cm**	**1126 umhos/cm**	**1030 umhos/cm**	--	--
Sulfate, as SO4	NA	Lab	**211 mg/l**	**233 mg/l**	--	**209 mg/l**	**131 mg/l**	**138 mg/l**
Temperature	NA	Lab	--	--	--	--	**3.6 deg C**	**11.9 deg C**
Temperature	NA	Field	**1.4 deg C**	**2.58 deg C**	--	**0.94 deg C**	--	--
Turbidity	NA	Lab	--	--	--	--	**2 NTU**	**1 NTU**
Turbidity	NA	Field	**6.3 * NTU**	**0 NTU**	--	**4.3 NTU**	--	--
Metals								
Aluminum	Dissolved	Lab	< 20.0 ug/l	< 20.0 ug/l	--	< 20.0 ug/l	--	--
Aluminum	Total	Lab	< 20.0 ug/l	< 20.0 ug/l	--	**23.7 ug/l**	**11.6 ug/l**	< 10 ug/l
Antimony	Total	Lab	< 0.50 ug/l	--	--	< 0.50 ug/l	< 3 ug/l	< 3 ug/l
Arsenic	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	--
Arsenic	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 2 ug/l	< 2 ug/l
Barium	Total	Lab	**42.0 ug/l**	--	--	--	**15.6 ug/l**	**19.5 ug/l**
Beryllium	Total	Lab	< 0.20 ug/l	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Boron	Total	Lab	**157 ug/l**	--	--	--	**198 ug/l**	**225 ug/l**
Cadmium	Total	Lab	< 0.20 ug/l	--	--	--	< 0.2 ug/l	< 0.2 ug/l
Calcium	Total	Lab	**80100 ug/l**	**79100 ug/l**	--	**76900 ug/l**	**62200 ug/l**	**64000 ug/l**
Chromium	Total	Lab	< 1.0 ug/l	--	--	--	**1.2 ug/l**	< 1 ug/l
Cobalt	Dissolved	Lab	**0.43 ug/l**	**0.45 ug/l**	--	**0.39 ug/l**	--	--
Cobalt	Total	Lab	**0.40 ug/l**	**0.46 ug/l**	--	**0.47 ug/l**	< 1 ug/l	< 1 ug/l
Copper	Dissolved	Lab	**1.1 ug/l**	**1.3 ug/l**	--	**1.0 ug/l**	--	--
Copper	Total	Lab	**1.2 ug/l**	**1.4 ug/l**	--	**1.6 ug/l**	< 5 ug/l	< 5 ug/l
Iron	Dissolved	Lab	**72.0 ug/l**	**135 ug/l**	--	**161 ug/l**	--	--
Iron	Total	Lab	**960 ug/l**	**599 ug/l**	--	**841 ug/l**	**200 ug/l**	**250 ug/l**
Lead	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 1 ug/l	< 1 ug/l
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**101000 ug/l**	**97300 ug/l**	--	**94600 ug/l**	**62200 ug/l**	**65300 ug/l**
Manganese	Dissolved	Lab	**893 ug/l**	**910 ug/l**	--	**715 ug/l**	--	--
Manganese	Total	Lab	**879 ug/l**	**955 ug/l**	--	**840 ug/l**	**300 ug/l**	**180 ug/l**
Mercury	Total	Lab	< 0.00050 ug/l	--	--	--	**0.0007 ug/l**	**0.0014 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	**9.2 ug/l**	--	--	--	**20.4 ug/l**	**22.5 ug/l**
Nickel	Dissolved	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	--	--
Nickel	Total	Lab	< 0.50 ug/l	< 0.50 ug/l	--	< 0.50 ug/l	< 5 ug/l	< 5 ug/l
Palladium	Total	Lab	--	--	--	--	< 25 ug/l	< 250 ug/l
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	< 25 ug/l	< 25 ug/l
Potassium	Total	Lab	**5000 ug/l**	--	--	--	**8000 ug/l**	**8500 ug/l**
Selenium	Total	Lab	< 1.0 ug/l	< 1.0 ug/l	--	< 1.0 ug/l	< 2 ug/l	< 2 ug/l
Silver	Total	Lab	< 0.20 ug/l	--	--	--	< 1 ug/l	< 1 ug/l
Sodium	Total	Lab	**28500 ug/l**	--	--	--	**44700 ug/l**	**48100 ug/l**
Strontium	Total	Lab	--	--	--	--	**232 ug/l**	**259 ug/l**
Thallium	Total	Lab	< 0.005 ug/l	< 0.005 ug/l	--	< 0.005 ug/l	< 2 ug/l	< 2 ug/l
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	< 10 ug/l	--
Vanadium	Total	Lab	< 3.0 ug/l	--	--	--	--	--
Zinc	Dissolved	Lab	**7.0 ug/l**	**6.4 ug/l**	--	**7.4 ug/l**	--	--
Zinc	Total	Lab	**6.2 ug/l**	< 6.0 ug/l	--	< 6.0 ug/l	< 10 ug/l	< 10 ug/l

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	PM-7	PM-7	PM-7	PM-7	PM-7	PM-7
		Date	6/22/2004	7/29/2004	8/24/2004	8/25/2004	9/27/2004	10/26/2004
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**422 mg/l**	**420 mg/l**	**424 mg/l**	--	**414 mg/l**	**405 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**20.5 mg/l**	**20.7 mg/l**	**19.7 mg/l**	--	**21 mg/l**	**19.1 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	**3.2 mg/l**	**3.3 mg/l**	**3.7 mg/l**	--	**3.3 mg/l**	**3.2 mg/l**
Hardness, as CaCO3	NA	Lab	**437 mg/l**	**506 mg/l**	**510 mg/l**	--	**481 mg/l**	**486 mg/l**
pH	NA	Lab	**8.23 pH units**	**8.09 pH units**	**7.88 pH units**	--	**7.88 pH units**	**7.84 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	--	--	< 0.1 mg/l	--
Solids, total dissolved	NA	Lab	**726 mg/l**	**615 mg/l**	**685 mg/l**	--	**632 mg/l**	**632 mg/l**
Solids, total suspended	NA	Lab	< 1 mg/l	**1 mg/l**	--	--	**4 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	**977 umhos/cm**	**1006 umhos/cm**	**1143 umhos/cm**	--	**1107 umhos/cm**	**1063 umhos/cm**
Specific Conductance @ 25 ºC	NA	Field	--	--	--	--	--	--
Sulfate, as SO4	NA	Lab	**156 mg/l**	**154 mg/l**	**149 mg/l**	--	< 1 mg/l	**196 mg/l**
Temperature	NA	Lab	**13.9 deg C**	**15.8 deg C**	**12.8 deg C**	--	**12.5 deg C**	**6.1 deg C**
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	**18.4 ug/l**	**46.4 ug/l**	--	**63.7 ug/l**	< 25 ug/l	< 25 ug/l
Antimony	Total	Lab	< 3 ug/l	< 3 ug/l	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	< 2 ug/l	< 2 ug/l	--	--	--	--
Barium	Total	Lab	**23.7 ug/l**	**22 ug/l**	--	--	**21.2 ug/l**	--
Beryllium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Boron	Total	Lab	**246 ug/l**	**248 ug/l**	--	--	--	--
Cadmium	Total	Lab	< 0.2 ug/l	< 0.2 ug/l	--	--	--	--
Calcium	Total	Lab	**75100 ug/l**	**72500 ug/l**	**75600 ug/l**	--	**71900 ug/l**	**70400 ug/l**
Chromium	Total	Lab	**1.7 ug/l**	< 1 ug/l	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	< 1 ug/l	< 1 ug/l	--	--	< 1 ug/l	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	< 5 ug/l	< 0.8 ug/l	**0.68 ug/l**	--	< 0.66 ug/l	**0.67 ug/l**
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	**280 ug/l**	**160 ug/l**	--	--	**90 ug/l**	--
Lead	Total	Lab	< 1 ug/l	< 1 ug/l	< 0.3 ug/l	--	< 0.3 ug/l	< 0.3 ug/l
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**78800 ug/l**	**78800 ug/l**	**77800 ug/l**	--	**73200 ug/l**	**75200 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**180 ug/l**	**130 ug/l**	--	--	**160 ug/l**	--
Mercury	Total	Lab	< 0.004 ug/l	< 0.005 ug/l	**0.0011 ug/l**	--	< 0.008 ug/l	< 0.01 ug/l
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	**26.6 ug/l**	**27 ug/l**	--	--	**29.9 ug/l**	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	< 5 ug/l	< 5 ug/l	--	**1.9 ug/l**	**1.2 ug/l**	**1 ug/l**
Palladium	Total	Lab	< 250 ug/l	< 25 ug/l	< 0.3 ug/l	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	< 25 ug/l	< 250 ug/l	< 0.25 ug/l	--	--	--
Potassium	Total	Lab	**8400 ug/l**	**9400 ug/l**	--	--	**8600 ug/l**	--
Selenium	Total	Lab	< 2 ug/l	< 2 ug/l	< 3.6 ug/l	--	< 3.6 ug/l	< 3.6 ug/l
Silver	Total	Lab	< 1 ug/l	< 1 ug/l	< 0.24 ug/l	--	< 0.24 ug/l	< 0.24 ug/l
Sodium	Total	Lab	**51600 ug/l**	**58100 ug/l**	**58700 ug/l**	--	**57400 ug/l**	**50100 ug/l**
Strontium	Total	Lab	**321 ug/l**	**287 ug/l**	--	--	--	--
Thallium	Total	Lab	< 2 ug/l	< 2 ug/l	**0.54 ug/l**	--	< 0.4 ug/l	< 0.4 ug/l
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	< 10 ug/l	< 10 ug/l	--	**20.6 ug/l**	**19.6 ug/l**	**42 ug/l**

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location Date Sample Type	PM-7 11/15/2004 N	PM-7 7/10/2006 N	PM-7 8/28/2006 N	PM-7 9/19/2006 N	PM-7 10/12/2006 N	PM-7 11/07/2006 N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**420 mg/l**	**446 mg/l**	**453 mg/l**	**457 mg/l**	**453 mg/l**	**451 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**21 mg/l**	**19.4 mg/l**	**18.6 mg/l**	**17.8 mg/l**	**17.7 mg/l**	**17.9 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	**3.3 mg/l**	**3.16 mg/l**	**2.64 mg/l**	**2.76 mg/l**	**2.85 mg/l**	**2.73 mg/l**
Hardness, as CaCO3	NA	Lab	**536 mg/l**	**564 mg/l**	**603 mg/l**	**578 mg/l**	**583 mg/l**	**595 mg/l**
pH	NA	Lab	**7.75 pH units**	**8.2 pH units**	**8.06 pH units**	**7.99 pH units**	**8.34 pH units**	**7.48 pH units**
pH	NA	Field	--	**7.94 pH units**	--	--	--	--
Phosphorus, total, as P	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	--	--	--	--
Solids, total dissolved	NA	Lab	**651 mg/l**	**707 mg/l**	**1540 mg/l**	**785 mg/l**	**759 mg/l**	**774 mg/l**
Solids, total suspended	NA	Lab	**2 mg/l**	**8 mg/l**	**3 mg/l**	**4 mg/l**	**1 mg/l**	**1 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	**1088 umhos/cm**	**1120 umhos/cm**	**1229 umhos/cm**	**1140 umhos/cm**	**1163 umhos/cm**	**1125 umhos/cm**
Specific Conductance @ 25 ºC	NA	Field	--	**1190 umhos/cm**	--	--	--	--
Sulfate, as SO4	NA	Lab	**234 mg/l**	**184 mg/l**	**196 mg/l**	**185 mg/l**	**197 mg/l**	**191 mg/l**
Temperature	NA	Lab	**2.1 deg C**	**17.9 deg C**	**15.9 deg C**	**9.2 deg C**	**2.5 deg C**	**6.8 deg C**
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	**2 NTU**	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	< 25 ug/l	**37.2 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	**21.8 ug/l**	**26.2 ug/l**	**25.2 ug/l**	**23.7 ug/l**	**22 ug/l**	**25 ug/l**
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	**255 ug/l**	**230 ug/l**	**267 ug/l**	**246 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**77200 ug/l**	**79100 ug/l**	**83300 ug/l**	**77700 ug/l**	**78500 ug/l**	**82400 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	< 1 ug/l	< 1 ug/l	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	**0.92 ug/l**	**1.8 ug/l**	**0.6 ug/l**	**1 ug/l**	**1.1 ug/l**	**0.72 ug/l**
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	**150 ug/l**	**0.18 ug/l**	**324 ug/l**	**269 ug/l**	**236 ug/l**	**234 ug/l**
Lead	Total	Lab	< 0.3 ug/l	< 0.6 ug/l	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**83300 ug/l**	**89000 ug/l**	**96000 ug/l**	**93300 ug/l**	**93900 ug/l**	**94600 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**360 ug/l**	**410 ug/l**	**230 ug/l**	**255 ug/l**	**362 ug/l**	**586 ug/l**
Mercury	Total	Lab	< 0.005 ug/l	< 0.002 ug/l	**0.0005 ug/l**	**0.0006 ug/l**	< 0.002 ug/l	< 0.004 ug/l
Methyl Mercury	Total	Lab	--	--	--	< 0.000025 ug/l	--	**0.000124 ug/l**
Molybdenum	Total	Lab	**26.6 ug/l**	**35.4 ug/l**	**33.5 ug/l**	**31.8 ug/l**	**32.6 ug/l**	**30 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	**1 ug/l**	**1.4 ug/l**	**1.1 ug/l**	**0.73 ug/l**	**1 ug/l**	**1.1 ug/l**
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	< 20 ug/l	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**10700 ug/l**	**8280 ug/l**	**9180 ug/l**	**9270 ug/l**	**9360 ug/l**	**8500 ug/l**
Selenium	Total	Lab	< 3.6 ug/l	< 1 ug/l	--	--	--	--
Silver	Total	Lab	< 0.24 ug/l	< 0.2 ug/l	--	--	--	--
Sodium	Total	Lab	**52400 ug/l**	**47900 ug/l**	**55000 ug/l**	**50800 ug/l**	**52900 ug/l**	**50500 ug/l**
Strontium	Total	Lab	--	--	**361 ug/l**	**315 ug/l**	**292 ug/l**	**333 ug/l**
Thallium	Total	Lab	< 0.4 ug/l	< 0.4 ug/l	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	**17.6 ug/l**	**82.5 ug/l**	< 25 ug/l	< 25 ug/l	< 25 ug/l	< 25 ug/l

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location Date Sample Type	PM-7 3/22/2007 N	PM-7 4/23/2007 N	PM-7 5/21/2007 N	PM-7 6/11/2007 N	PM-7 7/23/2007 N	PM-7 8/22/2007 N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**421 mg/l**	**353 mg/l**	**316 mg/l**	**333 mg/l**	**466 mg/l**	**477 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**15.6 mg/l**	**13.6 mg/l**	**12.5 mg/l**	**12.1 mg/l**	**16 mg/l**	**18.7 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	**2.49 mg/l**	**2.15 mg/l**	**2.04 mg/l**	**2.04 mg/l**	**2.76 mg/l**	**2.73 mg/l**
Hardness, as CaCO3	NA	Lab	**556 mg/l**	**491 mg/l**	**411 mg/l**	**437 mg/l**	**578 mg/l**	**617 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**8.17 pH units**	**8.06 pH units**	**8 pH units**	**7.4 pH units**	**7.7 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**665 mg/l**	**583 mg/l**	**512 mg/l**	**554 mg/l**	**720 mg/l**	**723 mg/l**
Solids, total suspended	NA	Lab	**4.4 mg/l**	**5.2 mg/l**	**8 mg/l**	< 1 mg/l	**5 mg/l**	**1.2 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1017 umhos/cm**	**899 umhos/cm**	**817 umhos/cm**	**885 umhos/cm**	**1126 umhos/cm**	--
Sulfate, as SO4	NA	Lab	**169 mg/l**	**139 mg/l**	**132 mg/l**	**138 mg/l**	**176 mg/l**	**182 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**4.6 deg C**	**11.6 deg C**	**8.9 deg C**	**16.7 deg C**	**22.7 deg C**	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	**34.7 ug/l**	**30.1 ug/l**	**41.7 ug/l**	< 10 ug/l	**27.4 ug/l**	**30.5 ug/l**
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	**27.2 ug/l**	**22.1 ug/l**	**20.4 ug/l**	**24 ug/l**	**34.3 ug/l**	**33.5 ug/l**
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**242 ug/l**	**214 ug/l**	**186 ug/l**	**195 ug/l**	**264 ug/l**	**244 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**77900 ug/l**	**71500 ug/l**	**59100 ug/l**	**63500 ug/l**	**79700 ug/l**	**81900 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	**1.3 ug/l**	< 0.5 ug/l	**0.71 ug/l**	< 1 ug/l	**0.9 ug/l**	< 5 ug/l
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	**0.47 ug/l**	**0.466 ug/l**	**0.691 ug/l**	**221 ug/l**	**454 ug/l**	**482 ug/l**
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**87800 ug/l**	**75900 ug/l**	**64000 ug/l**	**67500 ug/l**	**92200 ug/l**	**100000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**582 ug/l**	**423 ug/l**	**493 ug/l**	**172 ug/l**	**377 ug/l**	**483 ug/l**
Mercury	Total	Lab	< 0.0001 ug/l	< 0.0036 ug/l	< 0.002 ug/l	< 0.001 ug/l	< 0.001 ug/l	**0.0010 ug/l**
Methyl Mercury	Total	Lab	--	--	< 0.01 ug/l	--	**0.00003 ug/l**	--
Molybdenum	Total	Lab	**23 ug/l**	**23 ug/l**	**18.7 ug/l**	**20.6 ug/l**	**33 ug/l**	**33.9 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	**1.2 ug/l**	**1.1 ug/l**	**1.4 ug/l**	**1.2 ug/l**	< 0 ug/l	**3.5 ug/l**
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**8430 ug/l**	**7110 ug/l**	**6270 ug/l**	**6380 ug/l**	**8180 ug/l**	**8800 ug/l**
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	--
Sodium	Total	Lab	**46800 ug/l**	**39900 ug/l**	**34200 ug/l**	**34400 ug/l**	**51100 ug/l**	**53200 ug/l**
Strontium	Total	Lab	**290 ug/l**	**270 ug/l**	**232 ug/l**	**266 ug/l**	**346 ug/l**	**326 ug/l**
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	< 2.5 ug/l	< 0.24 ug/l	< 10 ug/l	< 10 ug/l	< 1 ug/l	< 10 ug/l

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	PM-7	PM-7	PM-7	PM-7	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	9/19/2007	10/24/2007	11/14/2007	5/20/2008	Jun-01	Aug-01
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	**355 mg/l**	**406 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	**365 mg/l**	**362 mg/l**	**381 mg/l**	**346 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**14.9 mg/l**	**13.7 mg/l**	**14.2 mg/l**	**12.7 mg/l**	--	--
Flow	NA	Field	--	--	--	--	**2.66 mgd** **79.8 MG**	**1.018 mgd** **31.6 MG**
Fluoride	NA	Lab	**2.15 mg/l**	**0.63 mg/l**	**1.08 mg/l**	--	--	--
Hardness, as CaCO3	NA	Lab	**529 mg/l**	**547 mg/l**	**561 mg/l**	**472 mg/l**	**1140 mg/l**	**1220 mg/l**
pH	NA	Lab	--	--	--	--	**7.91 pH units**	**8.3 pH units**
pH	NA	Field	**7.6 pH units**	**8.1 pH units**	**8.1 pH units**	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	**0.006 mg/l**	--	--
Solids, total dissolved	NA	Lab	**600 mg/l**	**633 mg/l**	**662 mg/l**	**587 mg/l**	--	--
Solids, total suspended	NA	Lab	**2 mg/l**	**4 mg/l**	**2 mg/l**	< 1 mg/l	**4 mg/l**	**4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**991 umhos/cm**	**1083 umhos/cm**	**1077 umhos/cm**	--	**2300 umhos/cm**	**210 umhos/cm**
Sulfate, as SO4	NA	Lab	**186 mg/l**	**185 mg/l**	**201 mg/l**	**176 mg/l**	**1320 mg/l**	**1080 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**12.6 deg C**	**6.8 deg C**	**4 deg C**	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	--	--	**0.28 NTU**	**0.52 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	< 10 ug/l	< 0.4 ug/l	< 1 ug/l	< 25 ug/l	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	**25.8 ug/l**	**25.3 ug/l**	**23.5 ug/l**	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	**210 ug/l**	**216 ug/l**	**206 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	--	**0.097 j ug/l**	--	--
Calcium	Total	Lab	**74800 ug/l**	**80100 ug/l**	**76000 ug/l**	**67200 ug/l**	--	--
Chromium	Total	Lab	--	--	--	< 1.0 ug/l	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	**0.42 ug/l**	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	< 10 ug/l	< 1 ug/l	**0.96 ug/l**	**0.72 ug/l**	--	--
Iron	Dissolved	Lab	--	--	--	--	< 30 ug/l	< 30 ug/l
Iron	Total	Lab	**336 ug/l**	**260 ug/l**	**241 ug/l**	--	--	--
Lead	Total	Lab	--	--	--	**0.083 jb ug/l**	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**83200 ug/l**	**84400 ug/l**	**90300 ug/l**	**74000 ug/l**	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	**389 ug/l**	**527 ug/l**	**455 ug/l**	**270 ug/l**	--	--
Mercury	Total	Lab	< 0.001 ug/l	**0.0011 ug/l**	< 0.025 ug/l	< 0.0005 ug/l	--	--
Methyl Mercury	Total	Lab	< 0.005 ug/l	--	< 0.025 ug/l	< 0.0001 ug/l	--	--
Molybdenum	Total	Lab	**25.5 ug/l**	**21.5 ug/l**	**20.6 ug/l**	**22 ug/l**	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	**4 ug/l**	**3.9 ug/l**	**4.9 ug/l**	**3.9 ug/l**	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**8140 ug/l**	**7280 ug/l**	**7700 ug/l**	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	< 1 ug/l	--
Sodium	Total	Lab	**42000 ug/l**	**42500 ug/l**	**42700 ug/l**	--	--	--
Strontium	Total	Lab	**314 ug/l**	**308 ug/l**	**299 ug/l**	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	< 0.4 ug/l	< 1 ug/l	< 10 ug/l	**2.0 jb ug/l**	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Sep-01	Oct-01	Dec-01	Feb-02	Mar-02	Apr-02
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**391 mg/l**	**340 mg/l**	**484 mg/l**	--	**172 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	**1.119 mgd** **34.689 MG**	**0.8 mgd** **24.8 MG**	**0.311 mgd** **8.71 MG**	--	**0.657 mgd** **19.1 MG**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	**1160 mg/l**	**1090 mg/l**	**570 mg/l**	--	**1120 mg/l**
pH	NA	Lab	--	**8.09 pH units**	**7.23 pH units**	**7.84 pH units**	--	**7.8 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	**3 mg/l**	**2.4 mg/l**	< 1 mg/l	--	**1.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**1400 umhos/cm**	**1940 umhos/cm**	**1060 umhos/cm**	--	**2380 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**1050 mg/l**	**1020 mg/l**	**170 mg/l**	--	**565 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	**0.32 NTU**	**0.78 NTU**	**3.27 NTU**	--	**0.3 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	< 30 ug/l	< 30 ug/l	< 30 ug/l	--	< 30 ug/l
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	--	--	**0.0051 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 1 ug/l	--	< 1 ug/l	--	**1.1 ug/l**	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-033-MPCA Jun-02 N	HIST-SD-033-MPCA Aug-02 N	HIST-SD-033-MPCA Sep-02 N	HIST-SD-033-MPCA Oct-02 N	HIST-SD-033-MPCA Dec-02 N	HIST-SD-033-MPCA Feb-03 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**356 mg/l**	**384 mg/l**	--	**390 mg/l**	**372 mg/l**	**352 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**1.268 mgd 38.04 MG**	**1.279 mgd 39.65 MG**	--	**0.8518 mgd 26.41 MG**	**1.103 mgd 34.2 MG**	**1.0091 mgd 28.26 MG**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**1160 mg/l**	**1110 mg/l**	--	**1100 mg/l**	**1240 mg/l**	**1250 mg/l**
pH	NA	Lab	**7.9 pH units 7.97 pH units**	**8 pH units**	--	**7.6 pH units**	**7.8 pH units**	**7.9 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**1.8 mg/l 2 mg/l**	< 1 mg/l	--	**3 mg/l**	< 1 mg/l	**3.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1930 umhos/cm**	**1700 umhos/cm**	--	**340 umhos/cm**	**372 umhos/cm**	**2720 umhos/cm**
Sulfate, as SO4	NA	Lab	**1050 mg/l**	**966 mg/l**	--	**1110 mg/l**	**1550 mg/l**	**1200 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.59 NTU**	**0.05 NTU**	--	**0.65 NTU**	**0.6 NTU**	**1.6 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**30 ug/l**	< 30 ug/l	--	< 30 ug/l	**30 ug/l**	**90 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0007 ug/l**	**0.0006 ug/l**	--	< 0.0005 ug/l	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 1 ug/l	--	< 0.1 ug/l	--	< 0.1 ug/l	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Mar-03	Apr-03	Jun-03	Aug-03	Sep-03	Oct-03
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**322 mg/l**	**354 mg/l**	**360 mg/l**	--	**384 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	**0.6322 mgd 18.97 MG**	**1.5225 mgd 45.67 MG**	**0.723 mgd 22.41 MG**	--	**0.7689 mgd 23.84 MG**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	**1050 mg/l**	**1110 mg/l**	**1170 mg/l**	--	**1270 mg/l**
pH	NA	Lab	--	**8.1 pH units**	**7.9 pH units**	**7.9 pH units**	--	**8.03 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	**4 mg/l**	**4 mg/l**	**3.6 mg/l**	--	< 1 mg/l
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**1930 umhos/cm**	**2070 umhos/cm**	**1630 umhos/cm**	--	**2100 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**827 mg/l**	**1110 mg/l**	**1140 mg/l**	--	**1090 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	**2.1 NTU**	**0.7 NTU**	**0.5 NTU**	--	**0.4 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	< 30 ug/l	< 30 ug/l	**300 ug/l**	--	< 30 ug/l
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	**0.001 ug/l**	< 0.002 ug/l	**0.0014 ug/l**	--	**0.001 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 0.1 ug/l	--	< 0.002 ug/l	--	< 0.1 ug/l	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Location			HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
Date			Dec-03	Feb-04	Mar-04	Apr-04	Jun-04	Aug-04
Sample Type			N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**366 mg/l**	**352 mg/l**	--	**296 mg/l**	**360 mg/l**	**394 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**0.22 mgd 6.83 MG**	**0.1774 mgd 5.14 MG**	--	**1.53 mgd 45.87 MG**	**1.24 mgd 37.2 MG**	**0.64 mgd 14.95 MG**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**1180 mg/l**	**1240 mg/l**	--	**760 mg/l**	**196 mg/l**	**235 mg/l**
pH	NA	Lab	**7.9 pH units**	**7.8 pH units**	--	**8.6 pH units**	**8.42 pH units**	**7.92 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**1.2 mg/l**	< 1 mg/l	--	**4 mg/l**	**4.6 mg/l**	**1 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1740 umhos/cm**	**1630 umhos/cm**	--	**1500 umhos/cm**	**2258 umhos/cm**	**2381 umhos/cm**
Sulfate, as SO4	NA	Lab	**1130 mg/l**	**1240 mg/l**	--	**754 mg/l**	**1080 mg/l**	**1130 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.45 NTU**	**0.7 NTU**	--	**2.3 NTU**	**0.74 NTU**	**0.65 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 30 ug/l	**130 ug/l**	--	< 30 ug/l	**30 ug/l**	< 30 ug/l
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	**0.0021 ug/l**	< 0.01 ug/l	**0.0017 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 0.1 ug/l	--	< 0.1 ug/l	--	< 0.1 ug/l	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Sep-04	Oct-04	Dec-04	Feb-05	Mar-05	Apr-05
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**415 mg/l**	**376 mg/l**	**346 mg/l**	--	**375 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	**0.594 mgd** **18.4 MG**	**0.61 mgd** **18.8 MG**	**1.17 mgd** **36.4 MG**	--	**4.7 mgd** **141 MG**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	**167 mg/l**	**232 mg/l**	**346 mg/l**	--	**375 mg/l**
pH	NA	Lab	--	**7.96 pH units**	**8.33 pH units** **8.68 pH units**	**8.4 pH units**	--	**8.11 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	**2 mg/l**	< 1 mg/l	**4 mg/l**	--	**1.5 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**2491 umhos/cm**	**2360 umhos/cm**	**2430 umhos/cm**	--	**1919 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**1140 mg/l**	**1140 mg/l**	**1160 mg/l**	--	**724 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	< 0.05 NTU	**0.78 NTU**	**0.18 NTU**	--	**2.2 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	**30 ug/l**	< 30 ug/l	**30 ug/l**	--	**50 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	< 0.004 ug/l	--	--	--	**0.0056 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 0.1 ug/l	--	< 0.1 ug/l	--	< 0.2 ug/l	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Jun-05	Aug-05	Sep-05	Oct-05	Dec-05	Feb-06
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**346 mg/l**	**398 mg/l**	--	**368 mg/l**	**372 mg/l**	**347 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**2.17 mgd 65.2 MG**	**1.1 mgd 34 MG**	--	**0.73 mgd 22.6 MG**	**0.96 mgd 29.8 MG**	**0.82 mgd 23 MG**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**346 mg/l**	**398 mg/l**	--	**368 mg/l**	**372 mg/l**	**347 mg/l**
pH	NA	Lab	**7.35 pH units**	**7.87 pH units**	--	**7.84 pH units**	**8.4 pH units**	**8.4 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	< 1 mg/l	**6 mg/l**	--	**4.4 mg/l**	**3.2 mg/l**	**2.8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2028 umhos/cm**	**2450 umhos/cm**	--	**2481 umhos/cm**	**2335 umhos/cm**	**2312 umhos/cm**
Sulfate, as SO4	NA	Lab	**940 mg/l**	**1360 mg/l**	--	**994 mg/l**	**1100 mg/l**	**1120 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	< 0.05 NTU	**0.55 NTU**	--	**1 NTU**	**0.6 NTU**	**0.57 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**50 ug/l**	< 50 ug/l	--	**70 ug/l**	< 50 ug/l	**110 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0021 ug/l**	**0.0016 ug/l**	--	**0.001 ug/l**	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 0.2 ug/l	--	< 0.2 ug/l	--	< 0.2 ug/l	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Mar-06	Apr-06	Jun-06	Aug-06	Sep-06	Oct-06
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**369 mg/l**	**363 mg/l**	**389 mg/l**	--	**364 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	--	**1.74 mgd** **52.3 MG**	**2.18 mgd** **65.4 MG**	**1.22 mgd** **37.8 MG**	--	**1.33 mgd** **41.21 MG**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	**369 mg/l**	**363 mg/l**	**389 mg/l**	--	**364 mg/l**
pH	NA	Lab	--	**8.5 pH units**	**7.9 pH units**	**8.12 pH units**	--	**8.1 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	**3.3 mg/l**	< 1 mg/l	**2.4 mg/l**	--	**7 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**2011 umhos/cm**	**2286 umhos/cm**	**2455 umhos/cm**	--	**2372 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**841 mg/l**	**1300 mg/l**	**1230 mg/l**	--	**1090 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	< 0.05 NTU	**0.8 NTU**	**1 NTU**	--	**0.19 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	**90 ug/l**	< 50 ug/l	**52.7 ug/l**	--	**62.7 ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	**0.0015 ug/l**	**0.002 ug/l**	**0.0007 ug/l**	--	**0.002 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 0.2 ug/l	--	< 0.2 ug/l	--	< 0.2 ug/l	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Dec-06	Feb-07	Mar-07	Apr-07	Jun-07	Aug-07
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**363 mg/l**	**352 mg/l**	--	**337 mg/l**	**327 mg/l**	**386 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	--	--
Flow	NA	Field	**1.15 mgd 35.6 MG**	**0.56 mgd 15.6 MG**	--	**0.5 mgd 14.9 MG**	**4.94 mgd 148 MG**	**0.66 mgd 20.6 MG**
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**363 mg/l**	**352 mg/l**	--	**337 mg/l**	**327 mg/l**	**386 mg/l**
pH	NA	Lab	**8.1 pH units**	**8.2 pH units**	--	**7.7 pH units**	**7.7 pH units**	**7.9 pH units**
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**4 mg/l**	**1.6 mg/l**	--	**1.6 mg/l**	**5.2 mg/l**	**4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2218 umhos/cm**	**2188 umhos/cm**	--	**1920 umhos/cm**	**1992 umhos/cm**	**2401 umhos/cm**
Sulfate, as SO4	NA	Lab	**1200 mg/l**	**2520 mg/l**	--	**894 mg/l**	**884 mg/l**	**1180 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**1 NTU**	**0.53 NTU**	--	< 0.05 NTU	**0.53 NTU**	**1.5 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**70 ug/l**	**119 ug/l**	--	< 50 ug/l	**50 ug/l**	< 50 ug/l
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	**0.0021 ug/l**	< 0.004 ug/l	**0.0012 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 0.2 ug/l	--	< 0.2 ug/l	--	< 0.2 ug/l	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-033-MPCA Sep-07 N	HIST-SD-033-MPCA Oct-07 N	HIST-SD-033-MPCA Dec-07 N	HIST-SD-033-MPCA Jan-08 N	HIST-SD-033-MPCA Feb-08 N	HIST-SD-033-MPCA Mar-08 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	**365 mg/l**	**357 mg/l**	**375 mg/l**	**346 mg/l**	**343 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	**5.19 mg/l**	**5.51 mg/l**	**5.5 mg/l**
Flow	NA	Field	--	**4.25 mgd 131.8 MG**	**0.6 mgd 18.6 MG**	--	**0.46 mgd 13.3 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	**365 mg/l**	**357 mg/l**	**375 mg/l**	**346 mg/l**	**343 mg/l**
pH	NA	Lab	--	**7.8 pH units**	**8.2 pH units**	--	**8.1 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	**1960 mg/l**	**2070 mg/l**	**1980 mg/l**
Solids, total suspended	NA	Lab	--	**2 mg/l**	**1.6 mg/l**	--	**3.2 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	--	**507 umhos/cm**	**1691 umhos/cm**	**1631 umhos/cm**	**1688 umhos/cm**	**1601 umhos/cm**
Sulfate, as SO4	NA	Lab	--	**1050 mg/l**	**1180 mg/l**	**1170 mg/l**	**1190 mg/l**	**1160 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	**0.37 NTU**	**0.8 NTU**	--	**1.1 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	**78.3 ug/l**	**75.8 ug/l**	--	**87.2 ug/l**	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	**0.0009 ug/l**	--	**0.0008 ug/l**	**0.0008 ug/l**	**0.0007 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	< 0.2 ug/l	--	< 0.2 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Location / Date / Sample Type			HIST-SD-033-MPCA Apr-08 N	HIST-SD-033-MPCA May-08 N	HIST-SD-033-MPCA Jun-08 N	HIST-SD-033-MPCA Jul-08 N	HIST-SD-033-MPCA Aug-08 N	HIST-SD-033-MPCA Sep-08 N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**337 mg/l**	**293 mg/l**	**325 mg/l**	**349 mg/l**	**353 mg/l**	**334 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**5.54 mg/l**	**3.89 mg/l**	**4.12 mg/l**	**4.9 mg/l**	**4.94 mg/l**	**4.62 mg/l**
Flow	NA	Field	**1.99 mgd 59.7 MG**	--	**1.9 mgd 56.9 MG**	--	**1.55 mgd 48 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**337 mg/l**	**293 mg/l**	**325 mg/l**	**349 mg/l**	**353 mg/l**	**334 mg/l**
pH	NA	Lab	**8.1 pH units**	--	**8.4 pH units**	--	**7.8 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**2050 mg/l**	**1480 mg/l**	**1630 mg/l**	**1920 mg/l**	**1910 mg/l**	**1760 mg/l**
Solids, total suspended	NA	Lab	< 1 mg/l	--	< 1 mg/l	--	**1.2 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1803 umhos/cm**	**2013 umhos/cm**	**2100 umhos/cm**	**2477 umhos/cm**	**2490 umhos/cm**	**2234 umhos/cm**
Sulfate, as SO4	NA	Lab	**1180 mg/l**	**908 mg/l**	**1060 mg/l**	**1170 mg/l**	**1190 mg/l**	**1070 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.73 NTU**	--	**0.5 NTU**	--	**0.8 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 50 ug/l	--	< 50 ug/l	--	**112 ug/l**	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0006 ug/l**	**0.0018 ug/l**	**0.0013 ug/l**	**0.001 ug/l**	**0.0009 ug/l**	**0.0009 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	< 2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**358 mg/l**	**354 mg/l**	**332 mg/l**	**323 mg/l**	**324 mg/l**	**287 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**4.47 mg/l**	**4.82 mg/l**	**4.86 mg/l**	**4.81 mg/l**	**4.79 mg/l**	**3.53 mg/l**
Flow	NA	Field	**4.77 mgd 148 MG**	--	**2.59 mgd 80.43 MG**	--	**1.01 mgd 28.2 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**358 mg/l**	**354 mg/l**	**332 mg/l**	**323 mg/l**	**324 mg/l**	**287 mg/l**
pH	NA	Lab	**8 pH units**	--	**8.12 pH units**	--	**8.09 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1740 mg/l**	**1730 mg/l**	**1800 mg/l**	**1870 mg/l**	**1830 mg/l**	**1210 mg/l**
Solids, total suspended	NA	Lab	**2 mg/l**	--	< 1 mg/l	--	< 1 mg/l	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2307 umhos/cm**	**2301 umhos/cm**	**2297 umhos/cm**	**2286 umhos/cm**	**2327 umhos/cm**	**3000 umhos/cm**
Sulfate, as SO4	NA	Lab	**916 mg/l**	**1060 mg/l**	**1080 mg/l**	**1060 mg/l**	**1140 mg/l**	**725 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.5 NTU**	--	**1.01 NTU**	--	**0.63 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 50 ug/l	--	< 50 ug/l	--	< 50 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.002 ug/l**	**0.0017 ug/l**	**0.0009 ug/l**	**0.0007 ug/l**	**0.0007 ug/l**	**0.002 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.1 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-033-MPCA Apr-09 N	HIST-SD-033-MPCA May-09 N	HIST-SD-033-MPCA Jun-09 N	HIST-SD-033-MPCA Jul-09 N	HIST-SD-033-MPCA Aug-09 N	HIST-SD-033-MPCA Sep-09 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**306 mg/l**	**296 mg/l**	**330 mg/l**	**327 mg/l**	**339 mg/l**	**343 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**4.08 mg/l**	**3.57 mg/l**	**3.85 mg/l**	**4.16 mg/l**	**3.94 mg/l**	**4.82 mg/l**
Flow	NA	Field	**1.6 mgd** **48 MG**	--	**2 mgd** **59 MG**	--	**0.82 mgd** **25 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**306 mg/l**	**296 mg/l**	**330 mg/l**	**327 mg/l**	**339 mg/l**	**343 mg/l**
pH	NA	Lab	**8.05 pH units** **8.16 pH units**	--	**8.1 pH units**	--	**7.9 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1480 mg/l**	**1480 mg/l**	**1620 mg/l**	**1770 mg/l**	**1870 mg/l**	**1860 mg/l**
Solids, total suspended	NA	Lab	**1.2 mg/l**	--	**3.6 mg/l**	--	**4 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2010 umhos/cm**	**1951 umhos/cm**	**2240 umhos/cm**	**2270 umhos/cm**	**2218 umhos/cm**	**2319 umhos/cm**
Sulfate, as SO4	NA	Lab	**946 mg/l**	**904 mg/l**	**994 mg/l**	**1130 mg/l**	**1050 mg/l**	**1180 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**1.15 NTU** **2.3 NTU**	--	**0.12 NTU**	--	**0.23 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 50 ug/l	--	< 50 ug/l	--	< 50 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0011 ug/l**	**0.002 ug/l**	**0.0022 ug/l**	**0.0014 ug/l**	**0.0011 ug/l**	**0.0013 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-033-MPCA Oct-09 N	HIST-SD-033-MPCA Nov-09 N	HIST-SD-033-MPCA Dec-09 N	HIST-SD-033-MPCA Jan-10 N	HIST-SD-033-MPCA Feb-10 N	HIST-SD-033-MPCA Mar-10 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**328 mg/l**	**362 mg/l**	**341 mg/l**	**318 mg/l**	**318 mg/l**	**317 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**4.61 mg/l**	**4.56 mg/l**	**4.62 mg/l**	**4.7 mg/l**	**4.17 mg/l**	**4.51 mg/l**
Flow	NA	Field	**0.19 mgd 6 MG**	--	**0.4 mgd 12 MG**	--	**0.28 mgd 7.74 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**328 mg/l**	**362 mg/l**	**341 mg/l**	**318 mg/l**	**318 mg/l**	**317 mg/l**
pH	NA	Lab	**7.4 pH units**	--	**7.9 pH units**	--	**7.9 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1890 mg/l**	**1730 mg/l**	**1750 mg/l**	**1850 mg/l**	**2140 mg/l**	**1850 mg/l**
Solids, total suspended	NA	Lab	< 1 mg/l	--	**3 mg/l**	--	**3.2 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2265 umhos/cm**	**2211 umhos/cm**	**2282 umhos/cm**	**2271 umhos/cm**	**2333 umhos/cm**	**2534 umhos/cm**
Sulfate, as SO4	NA	Lab	**1130 mg/l**	**1150 mg/l**	**1090 mg/l**	**1220 mg/l**	**1260 mg/l**	**1160 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.51 NTU**	--	**0.47 NTU**	--	**0.4 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 50 ug/l	--	< 50 ug/l	--	< 50 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0009 ug/l**	**0.0013 ug/l**	**0.0009 ug/l**	**0.0011 ug/l**	**0.0007 ug/l**	**0.0006 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**294 mg/l**	**327 mg/l**	**333 mg/l**	**340 mg/l**	**337 mg/l**	**347 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**3.58 mg/l**	**4.04 mg/l**	**4.2 mg/l**	**4.1 mg/l**	**4 mg/l**	**4.1 mg/l**
Flow	NA	Field	**0.8 mgd 24 MG**	--	**0.7 mgd 4.2 MG**	--	**0.38 mgd 12 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**294 mg/l**	**327 mg/l**	**333 mg/l**	**340 mg/l**	**337 mg/l**	**347 mg/l**
pH	NA	Lab	**8.1 pH units**	--	**8 pH units**	--	**8 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1540 mg/l**	**1680 mg/l**	**1810 mg/l**	**1720 mg/l**	**1840 mg/l**	**1810 mg/l**
Solids, total suspended	NA	Lab	**5.2 mg/l**	--	**5.6 mg/l**	--	**4 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1926 umhos/cm**	**2204 umhos/cm**	**2242 umhos/cm**	**2175 umhos/cm**	**2265 umhos/cm**	**2381 umhos/cm**
Sulfate, as SO4	NA	Lab	**922 mg/l**	**1060 mg/l**	**1030 mg/l**	**1050 mg/l**	**1080 mg/l**	**1100 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**1 NTU**	--	**0.53 NTU**	--	**1 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 100 ug/l	--	**100 ug/l**	--	**100 ug/l**	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.001 ug/l**	**0.0008 ug/l**	**0.0008 ug/l**	**0.0011 ug/l**	**0.0009 ug/l**	**0.0011 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.4 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**367 mg/l**	**359 mg/l**	**346 mg/l**	**344 mg/l**	**338 mg/l**	**338 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**4.3 mg/l**	**4.4 mg/l**	**4.6 mg/l**	**5.2 mg/l**	**5 mg/l**	**4.6 mg/l**
Flow	NA	Field	**0.45 mgd** **14 MG**	--	**0.28 mgd** **8.7 MG**	--	**0.81 mgd** **23 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**367 mg/l**	**359 mg/l**	**342 mg/l**	**350 mg/l**	**342 mg/l**	**337 mg/l**
pH	NA	Lab	**7.9 pH units**	--	**8 pH units** **8.3 pH units**	--	**7.8 pH units** **7.9 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1770 mg/l**	**1710 mg/l**	**1955 mg/l**	**1925 mg/l**	**1962 mg/l**	**1980 mg/l**
Solids, total suspended	NA	Lab	**5 mg/l**	--	**3 mg/l**	--	**3 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2191 umhos/cm**	**1865 umhos/cm**	**1900 umhos/cm**	**2639 umhos/cm**	**2429 umhos/cm**	**2459 umhos/cm**
Sulfate, as SO4	NA	Lab	**1090 mg/l**	**1060 mg/l**	**1090 mg/l**	**1120 mg/l**	**1118 mg/l**	**1115 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**1 NTU**	--	**1 NTU**	--	**1 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 50 ug/l	--	< 50 ug/l	--	< 50 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0011 ug/l**	**0.0009 ug/l**	**0.00035 ug/l**	**0.0006 ug/l**	**0.0007 ug/l**	**0.0005 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-033-MPCA Apr-11 N	HIST-SD-033-MPCA May-11 N	HIST-SD-033-MPCA Jun-11 N	HIST-SD-033-MPCA Jul-11 N	HIST-SD-033-MPCA Aug-11 N	HIST-SD-033-MPCA Sep-11 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**330 mg/l**	**316 mg/l**	**351 mg/l**	**360 mg/l**	**349 mg/l**	**339 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**2.7 mg/l**	**3.8 mg/l**	**4 mg/l**	**4.1 mg/l**	**4 mg/l**	**4.3 mg/l**
Flow	NA	Field	**4.6 mgd 137 MG**	--	**0.45 mgd 13.6 MG**	--	**0.93 mgd 23.7 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**309 mg/l**	**313 mg/l**	**351 mg/l**	**360 mg/l**	**349 mg/l**	**339 mg/l**
pH	NA	Lab	**8 pH units 8.1 pH units**	--	**8 pH units 8.2 pH units**	--	**7.9 pH units 8 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1390 mg/l**	**1575 mg/l**	**1824 mg/l**	**1810 mg/l**	**1957 mg/l**	**2057 mg/l**
Solids, total suspended	NA	Lab	**4 mg/l**	--	**3 mg/l**	--	**5.2 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1897 umhos/cm**	**1968 umhos/cm**	**2340 umhos/cm**	**2158 umhos/cm**	**2299 umhos/cm**	**2252 umhos/cm**
Sulfate, as SO4	NA	Lab	**760 mg/l**	**930 mg/l**	**1030 mg/l**	**1060 mg/l**	**1125 mg/l**	**1150 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**2 NTU**	--	< 1 NTU	--	**0.4 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 50 ug/l	--	< 100 ug/l	--	< 50 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0027 ug/l**	**0.0008 ug/l**	**0.001 ug/l**	**0.001 ug/l**	**0.0008 ug/l**	**0.0011 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**332 mg/l**	**331 mg/l**	**336 mg/l**	**330 mg/l**	**333 mg/l**	**268 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**4.3 mg/l**	**4.3 mg/l**	**4.7 mg/l**	**4.92 mg/l**	**4.62 mg/l**	**4.52 mg/l**
Flow	NA	Field	**1.96 mgd 59.1 MG**	--	**0.43 mgd 13.3 MG**	--	**0.32 mgd 9.2 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**332 mg/l**	**331 mg/l**	**336 mg/l**	**1330 mg/l**	**333 mg/l**	**268 mg/l**
pH	NA	Lab	**7.8 pH units**	--	**8 pH units**	--	**7.9 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**2044 mg/l**	**2066 mg/l**	**2001 mg/l**	**2070 mg/l**	**2000 mg/l**	**2060 mg/l**
Solids, total suspended	NA	Lab	**4 mg/l**	--	**4.8 mg/l**	--	**4 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1811 umhos/cm**	**2452 umhos/cm**	**2334 umhos/cm**	**2440 umhos/cm**	**2450 umhos/cm**	**1605 umhos/cm**
Sulfate, as SO4	NA	Lab	**1090 mg/l**	**1130 mg/l**	**1140 mg/l**	**1120 mg/l**	**1170 mg/l**	**1120 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	< 1 NTU	--	**1.2 NTU**	--	**0.7 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 50 ug/l	--	**57 ug/l**	--	< 60 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0006 ug/l**	< 0.0005 ug/l	**0.0006 ug/l**	**0.0005 ug/l**	**0.0008 ug/l**	**0.0006 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-033-MPCA Apr-12 N	HIST-SD-033-MPCA May-12 N	HIST-SD-033-MPCA Jun-12 N	HIST-SD-033-MPCA Jul-12 N	HIST-SD-033-MPCA Aug-12 N	HIST-SD-033-MPCA Sep-12 N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**338 mg/l**	**327 mg/l**	**337 mg/l**	**362 mg/l**	**367 mg/l**	**382 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**3.8 mg/l**	**3.7 mg/l**	**3.7 mg/l**	**3.7 mg/l**	**4.2 mg/l**	**4.3 mg/l**
Flow	NA	Field	**0.54 mgd 16.3 MG**	--	**1.28 mgd 38.4 MG**	--	**0.72 mgd 22.5 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**338 mg/l**	**327 mg/l**	**337 mg/l**	**362 mg/l**	**367 mg/l**	**382 mg/l**
pH	NA	Lab	**7.9 pH units**	--	**8.1 pH units**	--	**7.8 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1760 mg/l**	**1750 mg/l**	**1640 mg/l**	**1880 mg/l**	**1870 mg/l**	**1990 mg/l**
Solids, total suspended	NA	Lab	**3 mg/l**	--	**2 mg/l**	--	**3 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2129 umhos/cm**	**2193 umhos/cm**	**1532 umhos/cm**	**2384 umhos/cm**	**2518 umhos/cm**	**2547 umhos/cm**
Sulfate, as SO4	NA	Lab	**992 mg/l**	**909 mg/l**	**985 mg/l**	**1100 mg/l**	**1180 mg/l**	**1180 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**1 NTU**	--	**0.3 NTU**	--	**1 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**60 ug/l**	--	< 100 ug/l	--	< 100 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.00088 ug/l**	**0.00071 ug/l**	**0.0013 ug/l**	**0.00093 ug/l**	**0.00077 ug/l**	**0.0023 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**369 mg/l**	**328 mg/l**	**357 mg/l**	**346 mg/l**	**328 mg/l**	**336 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**4.3 mg/l**	**4.4 mg/l**	**4.6 mg/l**	**4.8 mg/l**	**4.5 mg/l**	**4.3 mg/l**
Flow	NA	Field	**1.23 mgd** **38.1 MG**	--	**0.35 mgd** **11 MG**	--	**0.25 mgd** **7.1 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**369 mg/l**	**328 mg/l**	**357 mg/l**	**346 mg/l**	**328 mg/l**	**336 mg/l**
pH	NA	Lab	**7.6 pH units**	--	**7.4 pH units**	--	**7.6 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1940 mg/l**	**1840 mg/l**	**2170 mg/l**	**1890 mg/l**	**1960 mg/l**	**1980 mg/l**
Solids, total suspended	NA	Lab	**2 mg/l**	--	**4 mg/l**	--	**8 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2204 umhos/cm**	**2340 umhos/cm**	**2540 umhos/cm**	**2672 umhos/cm**	**2359 umhos/cm**	**2357 umhos/cm**
Sulfate, as SO4	NA	Lab	**1190 mg/l**	**1180 mg/l**	**1240 mg/l**	**1200 mg/l**	**1230 mg/l**	**1180 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.26 NTU**	--	**1.4 NTU**	--	**0.75 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 100 ug/l	--	< 50 ug/l	--	< 100 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.00084 ug/l**	**0.00062 ug/l**	**0.00065 ug/l**	**0.00063 ug/l**	< 0.0005 ug/l	**0.00062 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	< 0.1 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
		Sample Type	N	N	N	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**323 mg/l**	**247 mg/l**	**312 mg/l**	**332 mg/l**	**354 mg/l**	**335 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**4.5 mg/l**	**2.4 mg/l**	**3.4 mg/l**	**3.2 mg/l**	**3.7 mg/l**	**4.1 mg/l**
Flow	NA	Field	**1.6 mgd** **44.8 MG**	--	**0.74 mgd** **22.1 MG**	--	**0.38 mgd** **11.8 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**323 mg/l**	**247 mg/l**	**315 mg/l**	**332 mg/l**	**354 mg/l**	**335 mg/l**
pH	NA	Lab	**7 pH units**	--	**7.6 pH units**	--	**7.9 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1790 mg/l**	**1210 mg/l**	**1680 mg/l**	**1630 mg/l**	**1810 mg/l**	**1920 mg/l**
Solids, total suspended	NA	Lab	**3 mg/l**	--	**3 mg/l**	--	< 1 mg/l	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2270 umhos/cm**	**1581 umhos/cm**	**2120 umhos/cm**	**2190 umhos/cm**	**2340 umhos/cm**	**2310 umhos/cm**
Sulfate, as SO4	NA	Lab	**1150 mg/l**	**717 mg/l**	**993 mg/l**	**957 mg/l**	**1130 mg/l**	**1140 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.75 NTU**	--	< 1 NTU	--	**0.5 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	**0 ug/l**	--	**0 ug/l**	--	< 100 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	< 0.00055 ug/l	**0.0012 ug/l**	**0.00097 ug/l**	**0.0013 ug/l**	**0.0012 ug/l**	**0.00098 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.1 ug/l	--	--	< 0.1 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Parameter	Total or Dissolved	Analysis Location	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA	HIST-SD-033-MPCA
		Date	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14
		Sample Type	N	N	N	N	N	N
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**342 mg/l**	**355 mg/l**	**322 mg/l**	**372 mg/l**	**315 mg/l**	**294 mg/l**
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**3.6 mg/l**	**3.5 mg/l**	**3.7 mg/l**	**4.8 mg/l**	**4.1 mg/l**	**3.9 mg/l**
Flow	NA	Field	**0.84 mgd 26 MG**	--	**0.53 mgd 16 MG**	--	**0.44 mgd 12 MG**	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**342 mg/l**	**366 mg/l**	**322 mg/l**	**327 mg/l**	**315 mg/l**	**294 mg/l**
pH	NA	Lab	**7.9 pH units**	--	**7.7 pH units**	--	**8.1 pH units**	--
pH	NA	Field	--	--	--	--	--	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1850 mg/l**	**1870 mg/l**	**3770 mg/l**	**1750 mg/l**	**1810 mg/l**	**1990 mg/l**
Solids, total suspended	NA	Lab	**4 mg/l**	--	**7 mg/l**	--	**2 mg/l**	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2160 umhos/cm**	**2300 umhos/cm**	**2300 umhos/cm**	**2360 umhos/cm**	**2320 umhos/cm**	**2320 umhos/cm**
Sulfate, as SO4	NA	Lab	**1140 mg/l**	**1130 mg/l**	**1140 mg/l**	**1190 mg/l**	**1190 mg/l**	**1160 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0.32 NTU**	--	**3 NTU**	--	**1 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	--	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	< 100 ug/l	--	**400 ug/l**	--	< 100 ug/l	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	--	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.00096 ug/l**	**0.0017 ug/l**	**0.00083 ug/l**	**0.00046 ug/l**	**0.00065 ug/l**	**0.00053 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.1 ug/l	--	--	< 0.1 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location Date Sample Type	HIST-SD-033-MPCA Apr-14 N	SD033 7/26/2010 N	SD033 8/04/2010 N	SD033 8/25/2010 N	SD033 9/09/2010 N	SD033 9/14/2010 N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	**248 mg/l**	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	**336 mg/l**	**348 mg/l**	--	--	**365 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	**275 mg/l**	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**3.6 mg/l**	**4.33 mg/l**	**4.46 mg/l**	**4.32 mg/l**	**3.9 mg/l**	**3.9 mg/l**
Flow	NA	Field	**0.79 mgd** **24 MG**	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**248 mg/l**	**1300 mg/l**	**1220 mg/l**	--	--	**1200 mg/l**
pH	NA	Lab	**7.5 pH units**	--	--	--	--	--
pH	NA	Field	--	**7.82 pH units**	**7.12 pH units**	**7.92 pH units**	**8.03 pH units**	**7.88 pH units**
Phosphorus, total, as P	NA	Lab	--	**0.025 mg P/L**	< 0.1 mg P/L	--	--	**0.008 mg P/L**
Solids, total dissolved	NA	Lab	**1750 mg/l**	**1880 mg/l**	**1790 mg/l**	--	--	**1770 mg/l**
Solids, total suspended	NA	Lab	**1 mg/l**	**3.6 mg/l**	--	--	--	**2.4 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2150 umhos/cm**	**2350 umhos/cm**	**1722 umhos/cm**	**2434 umhos/cm**	**2174 umhos/cm**	**2306 umhos/cm**
Sulfate, as SO4	NA	Lab	**1050 mg/l**	**1110 mg/l**	**1060 mg/l**	**1050 mg/l**	**949 mg/l**	**1040 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	**13.00 deg C**	**14.07 deg C**	**14.56 deg C**	**10.82 deg C**	**11.98 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**1.6 NTU**	**0 NTU**	--	**0 NTU**	**0 NTU**	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	< 1 ug/l	--	--	--	**1.58 ug/l**
Barium	Total	Lab	--	**3.2 ug/l**	--	--	--	**3.39 ug/l**
Beryllium	Total	Lab	--	< 0.2 ug/l	--	--	--	< 0.2 ug/l
Boron	Total	Lab	--	**169 ug/l**	--	--	--	**158 ug/l**
Cadmium	Total	Lab	--	< 0.2 ug/l	--	--	--	< 0.02 ug/l
Calcium	Total	Lab	--	**99300 ug/l**	**87200 ug/l**	--	--	**81800 ug/l**
Chromium	Total	Lab	--	< 1 ug/l	--	--	--	< 1 ug/l
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	**0.37 ug/l**	--	--	--	**0.35 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	**1.61 ug/l**	--	--	--	**1.86 ug/l**
Iron	Dissolved	Lab	**100 ug/l**	--	--	--	--	--
Iron	Total	Lab	--	< 50 ug/l	**60.4 ug/l**	--	--	< 50 ug/l
Lead	Total	Lab	--	< 0.5 ug/l	--	--	--	**0.05 j ug/l**
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	**255000 ug/l**	**244000 ug/l**	--	--	**243000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	**326 ug/l**	--	--	--	**846 ug/l**
Mercury	Total	Lab	**0.00076 ug/l**	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	**3.32 ug/l**	--	--	--	**4.68 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	**3.63 ug/l**	--	--	--	**3.35 ug/l**
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	**57400 ug/l**	**57300 ug/l**	--	--	**58200 ug/l**
Selenium	Total	Lab	--	< 1 ug/l	--	--	--	**1.12 ug/l**
Silver	Total	Lab	--	< 0.2 ug/l	--	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	**95300 ug/l**	**100000 ug/l**	--	--	**91300 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	< 0.2 ug/l	--	--	--	< 0.2 ug/l
Tin	Total	Lab	--	< 0.5 ug/l	--	--	--	< 0.5 ug/l
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	< 6 ug/l	--	--	--	< 6 ug/l

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	SD033		SD033	SD033		SD033
		Date	9/23/2010		10/06/2010	10/25/2010		10/26/2010
		Sample Type	N	FD	N	N	FD	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	**362 mg/l**	**361 mg/l**	**363 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**4.22 mg/l**	**4.22 mg/l**	**4.37 mg/l**	**4.54 mg/l**	**4.36 mg/l**	**4.9 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	--	--	**1280 mg/l**	**1290 mg/l**	**1350 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.7 pH units**	--	**7.61 pH units**	**5.35 pH units**	--	**7.83 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	< 0.1 mg P/L	< 0.1 mg P/L	**0.013 mg P/L**
Solids, total dissolved	NA	Lab	--	--	--	**1830 mg/l**	**1900 mg/l**	**1880 mg/l**
Solids, total suspended	NA	Lab	--	--	--	--	--	**3.6 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2364 umhos/cm**	--	**2450 umhos/cm**	**2275 umhos/cm**	--	**2450 umhos/cm**
Sulfate, as SO4	NA	Lab	**1110 mg/l**	**1110 mg/l**	**1140 mg/l**	**1110 mg/l**	**1110 mg/l**	**1140 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**12.4 deg C**	--	**13.41 deg C**	**9.86 deg C**	--	**10.17 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	**0 NTU**	--	**0 NTU**	--	--	**0 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	**1.47 ug/l**
Barium	Total	Lab	--	--	--	--	--	**4.61 ug/l**
Beryllium	Total	Lab	--	--	--	--	--	< 0.2 ug/l
Boron	Total	Lab	--	--	--	--	--	**155 ug/l**
Cadmium	Total	Lab	--	--	--	--	--	< 0.02 ug/l
Calcium	Total	Lab	--	--	--	**87500 ug/l**	**87100 ug/l**	**98200 ug/l**
Chromium	Total	Lab	--	--	--	--	--	< 1 ug/l
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	**0.58 ug/l**
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	**2.14 ug/l**
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	**159 ug/l**	**169 ug/l**	**150 ug/l**
Lead	Total	Lab	--	--	--	--	--	< 0.03 ug/l
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	**259000 ug/l**	**260000 ug/l**	**269000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	**1700 ug/l**
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	**3.72 ug/l**
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	**5.06 ug/l**
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	**56800 ug/l**	**57200 ug/l**	**53400 ug/l**
Selenium	Total	Lab	--	--	--	--	--	**0.452 ug/l**
Silver	Total	Lab	--	--	--	--	--	< 0.2 ug/l
Sodium	Total	Lab	--	--	--	**96300 ug/l**	**96200 ug/l**	**95000 ug/l**
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	< 0.2 ug/l
Tin	Total	Lab	--	--	--	--	--	< 0.5 ug/l
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	< 6 ug/l

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	SD033		SD033	SD033		SD033
		Date	4/19/2011		6/02/2011	6/14/2011		7/25/2011
		Sample Type	N	FD	N	N	FD	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**230 mg/l**	**229 mg/l**	**341 mg/l**	**357 mg/l**	**348 mg/l**	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	--	--	--
Chloride	NA	Lab	**2.6 mg/l**	**2.57 mg/l**	**3.88 mg/l**	**4.24 * mg/l**	**9.83 * mg/l**	**4.17 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**770 mg/l**	**744 mg/l**	**1260 mg/l**	**1350 mg/l**	**1320 mg/l**	--
pH	NA	Lab	**8.1 pH units**	**8.1 pH units**	--	**8.2 pH units**	**8.1 pH units**	--
pH	NA	Field	**8.61 pH units**	--	**8.23 pH units**	**7.95 pH units**	--	**7.97 pH units**
Phosphorus, total, as P	NA	Lab	< 0.1 mg P/L	< 0.1 mg P/L	**0.02 mg/l**	**0.008 mg/l**	**0.008 mg/l**	--
Solids, total dissolved	NA	Lab	**1110 mg/l**	**1120 mg/l**	**1780 mg/l**	**1819 mg/l**	**1842 mg/l**	--
Solids, total suspended	NA	Lab	--	--	**4.8 mg/l**	--	--	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**1473 umhos/cm**	--	**2241 umhos/cm**	**2408 umhos/cm**	--	**2414.0 umhos/cm**
Sulfate, as SO4	NA	Lab	**629 mg/l**	**631 mg/l**	**961 mg/l**	**1040 mg/l**	**1060 mg/l**	**1110 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**4.14 deg C**	--	**6.47 deg C**	**10.21 deg C**	--	**11.55 deg C**
Turbidity	NA	Lab	--	--	--	--	--	--
Turbidity	NA	Field	--	--	**0 NTU**	--	--	**0 NTU**
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	< 25 ug/l
Aluminum	Total	Lab	--	--	--	--	--	< 25 ug/l
Antimony	Total	Lab	--	--	< 0.5 ug/l	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	**0.93 ug/l**	--	--	--
Barium	Total	Lab	--	--	**3.09 ug/l**	--	--	--
Beryllium	Total	Lab	--	--	< 0.2 ug/l	--	--	--
Boron	Total	Lab	--	--	**158 ug/l**	--	--	--
Cadmium	Total	Lab	--	--	< 0.2 ug/l	--	--	--
Calcium	Total	Lab	**52700 ug/l**	**52200 ug/l**	**85800 ug/l**	**96000 ug/l**	**90400 ug/l**	--
Chromium	Total	Lab	--	--	< 1 ug/l	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	**0.31 ug/l**	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	**1.62 ug/l**	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--
Iron	Total	Lab	**54.1 ug/l**	**51.6 ug/l**	**148 ug/l**	**122 ug/l**	**117 ug/l**	--
Lead	Total	Lab	--	--	< 0.5 ug/l	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**155000 ug/l**	**149000 ug/l**	**253000 ug/l**	**270000 ug/l**	**267000 ug/l**	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	**344 ug/l**	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	**3.63 ug/l**	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	**2.46 ug/l**	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	**32800 ug/l**	**31300 ug/l**	**49500 ug/l**	**50800 ug/l**	**49600 ug/l**	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	< 0.2 ug/l	--	--	--
Sodium	Total	Lab	**57300 ug/l**	**54900 ug/l**	**89200 ug/l**	**91700 ug/l**	**89900 ug/l**	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	< 0.2 ug/l	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	< 6 ug/l	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location Date Sample Type	SD033 8/23/2011 N	SD033 9/19/2011 N	SD033 10/19/2011 N	SD033 4/02/2013 N	SD033 5/15/2013 N	SD033 6/03/2013 N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	--	--	--	**323 mg/l**	--	**312 mg/l**
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	--	--	--	**323 mg/l**	--	**315 mg/l**
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	--	--	--	**323 mg/l**	--	**315 mg/l**
Chloride	NA	Lab	**4.14 mg/l**	**4.56 mg/l**	**4.09 mg/l**	**4.5 b mg/l**	--	**3.4 mg/l**
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	--	--	--	**1280 mg/l**	--	**1190 mg/l**
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	**7.85 pH units**	--	**8.04 pH units**	**6.98 pH units**	--	**7.56 pH units**
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	**1790 mg/l**	--	**1680 mg/l**
Solids, total suspended	NA	Lab	--	--	--	**3.2 mg/l**	--	**2.8 mg/l**
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2427 umhos/cm**	--	**2328 umhos/cm**	**2270 umhos/cm**	**1581 umhos/cm**	**2120 umhos/cm**
Sulfate, as SO4	NA	Lab	**1130 mg/l**	**1170 mg/l**	**1120 mg/l**	**1150 mg/l**	--	**993 mg/l**
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	**12.73 deg C**	--	**8.68 deg C**	--	--	--
Turbidity	NA	Lab	--	--	--	**0.75 NTU**	--	**0.25 NTU**
Turbidity	NA	Field	**0 NTU**	--	**0 NTU**	--	--	--
Metals								
Aluminum	Dissolved	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	--	--	--
Aluminum	Total	Lab	< 25 ug/l	< 25 ug/l	< 25 ug/l	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	--	--	--	**95700 ug/l**	--	**81700 ug/l**
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	**36.0 j ug/l**	--	**41.3 jb ug/l**
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	--	--	--	**253000 ug/l**	--	**240000 ug/l**
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	**0.00055 ug/l**	--	**0.00097 ug/l**
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	--	--	< 0.10 ug/l
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

		Location	SD033	SD033		SD033	SD033	SD033
		Date	7/02/2013	8/07/2013		9/05/2013	11/06/2013	3/05/2014
		Sample Type	N	N	FD	N	N	N
Parameter	Total or Dissolved	Analysis Location						
General Parameters								
Alkalinity, bicarbonate, as CaCO3	NA	Lab	**332 mg/l**	**354 mg/l**	--	**335 mg/l**	--	--
Alkalinity, bicarbonate, as HCO3	NA	Lab	--	--	--	--	--	--
Alkalinity, total, as CaCO3	NA	Lab	**332 mg/l**	**354 mg/l**	--	**335 mg/l**	--	--
Alkalinity, total, as CaCO3	NA	Field	--	--	--	--	--	--
Calcium Hardness, as CaCO3	NA	Lab	**332 mg/l**	**354 mg/l**	--	**335 mg/l**	--	--
Chloride	NA	Lab	**3.2 mg/l**	**3.7 mg/l**	--	**4.1 b mg/l**	--	--
Flow	NA	Field	--	--	--	--	--	--
Fluoride	NA	Lab	--	--	--	--	--	--
Hardness, as CaCO3	NA	Lab	**1170 mg/l**	**1300 mg/l**	--	**1250 mg/l**	--	--
pH	NA	Lab	--	--	--	--	--	--
pH	NA	Field	--	**7.89 pH units**	--	--	**8.23 pH units**	--
Phosphorus, total, as P	NA	Lab	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	**1630 mg/l**	**1810 mg/l**	--	**1920 mg/l**	--	--
Solids, total suspended	NA	Lab	--	< 1.0 mg/l	--	--	--	--
Specific Conductance @ 25 ºC	NA	Lab	--	--	--	--	--	--
Specific Conductance @ 25 ºC	NA	Field	**2190 umhos/cm**	**2343 umhos/cm**	--	**2310 umhos/cm**	**2298 umhos/cm**	**2324 umhos/cm**
Sulfate, as SO4	NA	Lab	**957 mg/l**	**1130 mg/l**	--	**1140 mg/l**	--	--
Temperature	NA	Lab	--	--	--	--	--	--
Temperature	NA	Field	--	--	--	--	--	--
Turbidity	NA	Lab	--	**0.50 NTU**	--	--	--	--
Turbidity	NA	Field	--	--	--	--	--	--
Metals								
Aluminum	Dissolved	Lab	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--
Antimony	Total	Lab	--	--	--	--	--	--
Arsenic	Dissolved	Lab	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--
Barium	Total	Lab	--	--	--	--	--	--
Beryllium	Total	Lab	--	--	--	--	--	--
Boron	Total	Lab	--	--	--	--	--	--
Cadmium	Total	Lab	--	--	--	--	--	--
Calcium	Total	Lab	**79100 ug/l**	**90000 ug/l**	--	**89800 ug/l**	--	--
Chromium	Total	Lab	--	--	--	--	--	--
Cobalt	Dissolved	Lab	--	--	--	--	--	--
Cobalt	Total	Lab	--	--	--	--	--	--
Copper	Dissolved	Lab	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--
Iron	Dissolved	Lab	--	**57.1 ug/l**	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--
Lead	Total	Lab	--	--	--	--	--	--
Lithium	Total	Lab	--	--	--	--	--	--
Magnesium	Total	Lab	**237000 ug/l**	**261000 ug/l**	--	**248000 ug/l**	--	--
Manganese	Dissolved	Lab	--	--	--	--	--	--
Manganese	Total	Lab	--	--	--	--	--	--
Mercury	Total	Lab	**0.0013 b ug/l**	**0.0012 ug/l**	**0.00098 ug/l**	**0.00098 ug/l**	--	--
Methyl Mercury	Total	Lab	--	--	--	--	--	--
Molybdenum	Total	Lab	--	--	--	--	--	--
Nickel	Dissolved	Lab	--	--	--	--	--	--
Nickel	Total	Lab	--	--	--	--	--	--
Palladium	Total	Lab	--	--	--	--	--	--
Phosphorus, total, as P	Dissolved	Lab	--	--	--	--	--	--
Platinum	Total	Lab	--	--	--	--	--	--
Potassium	Total	Lab	--	--	--	--	--	--
Selenium	Total	Lab	--	--	--	--	--	--
Silver	Total	Lab	--	--	--	< 0.10 ug/l	--	--
Sodium	Total	Lab	--	--	--	--	--	--
Strontium	Total	Lab	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--
Tin	Total	Lab	--	--	--	--	--	--
Titanium	Total	Lab	--	--	--	--	--	--
Vanadium	Total	Lab	--	--	--	--	--	--
Zinc	Dissolved	Lab	--	--	--	--	--	--
Zinc	Total	Lab	--	--	--	--	--	--

Large Table 5
Surface Water Data Summary
SD004, SD026, PM-7, and SD033

Data Footnotes and Qualifiers

Footnote	
--	Not analyzed/not available.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
NA	NA (not applicable) indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound
Validated	Laboratory data has been evaluated following Barr QA/QC procedures and/or project-specific data review requirements. Field data has been verified for transcription errors, consistency and completeness. Data transferred from the previous database (9/2009) were categorized as validated, but may be comprised of any one of the following data status categories: Validated, SSource, No QC or Legacy.
No QC	Laboratory data has been excluded from Barr QA/QC procedures.
SSource	Laboratory and/or field data obtained from a secondary source external to Barr. Second source QA/QC evaluation procedures may or may not have been performed beyond the original data generator.
Legacy	Historical laboratory data (internal at Barr). QA/QC evaluation procedures may or may not have been performed beyond the original data generator

Qualifier	
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
f	Sample was collected at a flowrate exceeding the recommended rate of 200 mL/minute.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
i	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
t	Sample positive for total coliforms but negative for *E. coli.*
v	Sample was collected under a vacuum of greater than XX inches of mercury.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
AT	Sample chromatogram is noted to be atypical of a petroleum product.
EMPC	Estimated maximum possible concentration.
BQA	Barr-applied project specific qualifier: extraction and/or analyses conducted using an alternative method and/or procedure.
BQC	Barr-applied project specific qualifier: plant shut down.
BQD	Barr-applied project specific qualifier: equipment malfunction.
BQE	Barr-applied project specific qualifier: equipment adjustment.
BQM	Barr-applied project specific qualifier: manual measurement.
BQN	Barr-applied project specific qualifier: unable to be sampled or measured due to various reasons.
BQP	Barr-applied project specific qualifier: atypical chromatographic pattern.
BQQ	Barr-applied project specific qualifier: some aspect of QA/QC was not met.
BQR	Barr-applied project specific qualifier: location was re-sampled.
BQS	Barr-applied project specific qualifier: data is considered suspect.
BQT	Barr-applied project specific qualifier: summed value not displayed due to insufficient field length.
BQU	Barr-applied project specific qualifier: historical qualifier - definition unknown.
BQV	Barr-applied project specific qualifier: estimated value.
BQX	Barr-applied project specific qualifier: see notes for qualifier definition.
BQZ	Barr-applied project specific qualifier: data is considered unusable.

Large Table 6
Surface Water Data Summary
Embarrass River Chain of Lakes

		Sys Loc Code	EL-1	EL-1	EL-1		EL-1		EL-1	EL-1		EL-1		EL-1	EL-1	EL-2	EL-2	EL-2	EL-2
		Sample Date	8/20/2009	8/24/2010	9/8/2010		9/20/2010		10/4/2010	7/27/2011		8/25/2011		9/21/2011	10/21/2011	8/20/2009	8/24/2010	8/24/2010	8/24/2010
		Depth Interval															0 m	1.5 m	3 m
		Sample Type Code	N	N	N	FD	N	FD	N	N	FD	N	FD	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location																	
General Parameters																			
Carbon, dissolved organic	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, total organic	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	NA	Lab	--	**4.59 mg/l**	**4.58 mg/l**	**4.58 mg/l**	**4.6 mg/l**	**4.62 mg/l**	**4.6 mg/l**	**3.92 mg/l**	**3.93 mg/l**	**4.03 mg/l**	**3.91 mg/l**	**4.79 mg/l**	**6.12 mg/l**	--	**5.3 mg/l**	**5.37 mg/l**	**5.33 mg/l**
Dissolved oxygen	NA	Field	--	**6.31 mg/l**	**7.14 mg/l**	--	**7.39 mg/l**	--	**7.43 mg/l**	**7.20 mg/l**	--	**7.65 mg/l**	--	**8.21 mg/l**	**10.98 mg/l**	--	**6.83 mg/l**	--	--
pH	NA	Field	--	**7.65 pH units**	**7.59 pH units**	--	**7.27 pH units**	--	**7.41 pH units**	**7.29 pH units**	--	**7.35 pH units**	--	**7.43 pH units**	**7.44 pH units**	--	**7.99 pH units**	--	--
Phosphate, Ortho as PO4	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, total	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	--	**203 umhos/cm**	**211 umhos/cm**	--	**214 umhos/cm**	--	**223 umhos/cm**	**148.0 umhos/cm**	--	**158.1 umhos/cm**	--	**169.0 umhos/cm**	**207.1 umhos/cm**	--	**222 umhos/cm**	--	--
Sulfate	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NA	Lab	**21.3 mg/l**	**18.6 mg/l**	**21 mg/l**	**21.1 mg/l**	**22.3 mg/l**	**22.6 mg/l**	**23.4 mg/l**	**14 mg/l**	**14 mg/l**	**14 mg/l**	**13.7 mg/l**	**15.5 mg/l**	**18.8 mg/l**	**21.2 mg/l**	**22.9 mg/l**	**23.1 mg/l**	**23 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	--	**20.88 deg C**	**16.49 deg C**	--	**12.93 deg C**	--	**12.01 deg C**	**20.67 deg C**	--	**19.78 deg C**	--	**13.59 deg C**	**7.86 deg C**	--	**22.34 deg C**	--	--
Turbidity	NA	Field	--	**0 NTU**	**0 NTU**	--	**0.8 NTU**	--	**0.8 NTU**	**0 NTU**	--	**0 NTU**	--	**0 NTU**	**1.1 NTU**	--	**0.1 NTU**	--	--
Metals																			
Aluminum	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury methyl	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Large Table 6
Surface Water Data Summary
Embarrass River Chain of Lakes

Sys Loc Code			EL-2	EL-2	EL-2	EL-2	EL-2	EL-2	EL-2		PM-21		PM-21	PM-21	PM-21	PM-21	PM-21	PM-21
Sample Date			9/8/2010	9/20/2010	10/4/2010	7/27/2011	8/25/2011	9/21/2011	10/21/2011		7/9/2009		7/9/2009	7/9/2009	7/29/2009	7/29/2009	7/29/2009	7/29/2009
Depth Interval			0 m	0 m	0 m						0 m	0 m	6.5 m	9.5 m	0 m	5 m	7 m	10.5 m
Sample Type Code			N	N	N	N	N	N	N	FD	N	FD	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location																
General Parameters																		
Carbon, dissolved organic	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, total organic	NA	Lab	--	--	--	--	--	--	--	--	**19.1 mg/l**	**19.0 mg/l**	**19.3 mg/l**	**19.0 mg/l**	**17.4 mg/l**	**18.0 mg/l**	**18.3 mg/l**	**19.0 mg/l**
Chloride	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	NA	Lab	**5.37 mg/l**	**5.4 mg/l**	**5.49 mg/l**	**4.55 mg/l**	**4.88 mg/l**	**5.39 mg/l**	**5.91 mg/l**	**5.89 mg/l**	**2.97 mg/l**	**2.99 mg/l**	**2.85 mg/l**	**2.73 mg/l**	**3.14 mg/l**	**3.13 mg/l**	**2.95 mg/l**	**2.81 mg/l**
Dissolved oxygen	NA	Field	--	**7.40 mg/l**	**8.44 mg/l**	**7.65 mg/l**	**7.58 mg/l**	**8.72 mg/l**	**11.48 mg/l**	--	--	--	--	--	--	--	--	--
pH	NA	Field	--	**7.27 pH units**	**7.74 pH units**	**7.39 pH units**	**7.41 pH units**	**7.53 pH units**	**7.57 pH units**	--	--	--	--	--	--	--	--	--
Phosphate, Ortho as PO4	NA	Lab	--	--	--	--	--	--	--	--	< 0.02 mg/l	**0.02 mg/l**	**0.02 mg/l**	**0.02 mg/l**	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l
Phosphorus, total	NA	Lab	--	--	--	--	--	--	--	--	**0.015 mg/l**	**0.014 mg/l**	**0.018 mg/l**	**0.03 mg/l**	**0.014 mg/l**	**0.016 mg/l**	**0.019 mg/l**	**0.022 mg/l**
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--	**2 mg/l**	**2.5 mg/l**	**1.2 mg/l**	**2 mg/l**	**3.2 mg/l**	**1.2 mg/l**	**2.4 mg/l**	**2.8 mg/l**
Specific Conductance @ 25oC	NA	Field	--	**219 umhos/cm**	**226 umhos/cm**	**158.0 umhos/cm**	**160.1 umhos/cm**	**179.0 umhos/cm**	**225.7 umhos/cm**	--	--	--	--	--	--	--	--	--
Sulfate	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NA	Lab	**23.4 mg/l**	**23.7 mg/l**	**24.2 mg/l**	**15.6 mg/l**	**15.5 mg/l**	**15.8 mg/l**	**18.9 mg/l**	**18.8 mg/l**	**22.5 mg/l**	**23.8 mg/l**	**20.2 mg/l**	**15.8 mg/l**	**24 mg/l**	**24.3 mg/l**	**22.3 mg/l**	**16.1 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Temperature, degrees C	NA	Field	--	**13.09 deg C**	**12.50 deg C**	**22.38 deg C**	**19.98 deg C**	**13.72 deg C**	**7.68 deg C**	--	--	--	--	--	--	--	--	--
Turbidity	NA	Field	--	**1.3 NTU**	**1.3 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**1.2 NTU**	--	--	--	--	--	--	--	--	--
Metals																		
Aluminum	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--	--	--	**1390 ug/l**	**1420 ug/l**	**1650 ug/l**	**1100 ug/l**	**1330 ug/l**	**1520 ug/l**	**1720 ug/l**	**1270 ug/l**
Mercury	Total	Lab	--	--	--	--	--	--	--	--	**0.0055 ug/l**	**0.0040 ug/l**	**0.0077 b ug/l**	**0.0073 b ug/l**	**0.0032 ug/l**	**0.0053 b ug/l**	**0.0050 b ug/l**	**0.0064 b ug/l**
Mercury methyl	Total	Lab	--	--	--	--	--	--	--	--	**0.00050 ug/l**	**0.00026 ug/l**	**0.00036 ug/l**	**0.00037 ug/l**	**0.00034 ug/l**	**0.00024 ug/l**	**0.00025 ug/l**	**0.00031 ug/l**
Thallium	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Large Table 6
Surface Water Data Summary
Embarrass River Chain of Lakes

		Sys Loc Code	PM-21	PM-21	PM-21	PM-21	PM-21	PM-21		PM-21	PM-21	PM-21	PM-21	PM-21	PM-21	PM-21
		Sample Date	8/21/2009	8/21/2009	8/21/2009	8/21/2009	9/23/2009	9/23/2009		9/23/2009	9/23/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	4/21/2010
		Depth Interval	0 m	6 m	7 m	10.5 m	5 m	0 m	0 m	7 m	10 m	0 m	6 m	9 m	11 m	
		Sample Type Code	N	N	N	N	N	N	FD	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location														
General Parameters																
Carbon, dissolved organic	NA	Lab	--	--	--	--	--	--	--	--	--	**16.2 mg/l**	**15.9 mg/l**	**17.6 mg/l**	**15.9 mg/l**	--
Carbon, total organic	NA	Lab	**19.0 mg/l**	**19.2 mg/l**	**19.3 mg/l**	**20.7 mg/l**	**18.7 mg/l**	**18.2 mg/l**	**18.3 mg/l**	**19.6 mg/l**	**19.7 mg/l**	**16.6 mg/l**	**16.8 mg/l**	**16.2 mg/l**	**16.8 mg/l**	--
Chloride	Dissolved	Lab	--	--	--	--	**3.78 mg/l**	**3.56 mg/l**	**3.76 mg/l**	**3.65 mg/l**	**3.1 mg/l**	--	--	--	--	--
Chloride	NA	Lab	**3.55 mg/l**	**3.64 mg/l**	**3.39 mg/l**	**3.08 mg/l**	**3.91 mg/l**	**4 mg/l**	**3.94 mg/l**	**3.81 mg/l**	**3.25 mg/l**	**5.2 mg/l**	**5.23 mg/l**	**5.23 mg/l**	**5.25 mg/l**	--
Dissolved oxygen	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	**10.84 mg/l**
pH	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	**7.62 pH units**
Phosphate, Ortho as PO4	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.07 mg/l	< 0.07 mg/l	< 0.07 mg/l	< 0.07 mg/l	< 0.07 mg/l	**0.02 mg/l**	**0.02 mg/l**	**0.02 mg/l**	**0.02 mg/l**	--
Phosphorus, total	NA	Lab	**0.018 mg/l**	**0.024 mg/l**	**0.029 mg/l**	**0.023 mg/l**	**0.032 mg/l**	**0.025 mg/l**	**0.017 mg/l**	**0.035 mg/l**	**0.017 mg/l**	**0.028 mg/l**	**0.035 mg/l**	**0.021 mg/l**	**0.028 mg/l**	--
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**2 mg/l**	**2.4 mg/l**	**3.2 mg/l**	**1.6 mg/l**	**2.4 mg/l**	**1.5 mg/l**	**2.8 mg/l**	**4.4 mg/l**	< 1 mg/l	**6 mg/l**	**2.8 mg/l**	**2.8 mg/l**	**2.4 mg/l**	--
Specific Conductance @ 25oC	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	**254.8 umhos/cm**
Sulfate	Dissolved	Lab	--	--	--	--	**25 mg/l**	**22.4 mg/l**	**24.3 mg/l**	**24 mg/l**	**14.9 mg/l**	--	--	--	--	--
Sulfate	NA	Lab	**27 mg/l**	**26.8 mg/l**	**24.1 mg/l**	**15.2 mg/l**	**26.2 mg/l**	**25.7 mg/l**	**25.7 mg/l**	**25.1 mg/l**	**15.8 mg/l**	**33.5 mg/l**	**34.1 mg/l**	**33.7 mg/l**	**33.6 mg/l**	--
Sulfide	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--
Temperature, degrees C	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	**12.12 deg C**
Turbidity	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	**0 NTU**
Metals																
Aluminum	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	< 25 ug/l
Aluminum	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	**36.4 ug/l**
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	**1260 ug/l**	**1420 ug/l**	**1430 ug/l**	**984 ug/l**	**1520 ug/l**	**1230 ug/l**	**1210000 ug/l**	**1890 ug/l**	**450 ug/l**	**1510 ug/l**	**1530 ug/l**	--	**1480 ug/l**	--
Mercury	Total	Lab	**0.0021 ug/l**	**0.0038 b ug/l**	**0.0033 b ug/l**	**0.0046 b ug/l**	**0.6 b ug/l**	**0.0022 ug/l**	**0.0024 ug/l**	**0.52 b ug/l**	**0.36 b ug/l**	**0.0033 ug/l**	**0.0026 b ug/l**	**0.0023 b ug/l**	**0.0029 b ug/l**	--
Mercury methyl	Total	Lab	**0.00018 ug/l**	**0.00019 ug/l**	**0.00014 ug/l**	**0.00026 ug/l**	**0.00027 ug/l**	**0.00011 ug/l**	**0.00014 ug/l**	**0.00017 ug/l**	**0.00035 ug/l**	**0.00016 ug/l**	**0.00011 ug/l**	**0.00017 ug/l**	**0.00019 ug/l**	--
Thallium	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Large Table 6
Surface Water Data Summary
Embarrass River Chain of Lakes

Sys Loc Code / Sample Date / Depth Interval / Sample Type Code			PM-21 5/12/2010 N	PM-21 6/16/2010 N	PM-21 7/27/2010 N	PM-21 8/23/2010 N	PM-21 8/24/2010 0 m N	PM-21 8/24/2010 5 m N	PM-21 8/24/2010 10 m N	PM-21 9/8/2010 0 m N	PM-21 9/8/2010 6 m N	PM-21 9/8/2010 11 m N	PM-21 9/20/2010 N	PM-21 9/20/2010 0 m N	PM-21 9/20/2010 6 m N	PM-21 9/20/2010 11 m N
Chemical Name	Total or Dissolved	Analysis Location														
General Parameters																
Carbon, dissolved organic	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, total organic	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	NA	Lab	--	--	--	--	**3.76 mg/l**	**4.4 mg/l**	**5.48 mg/l**	**3.79 mg/l**	**3.79 mg/l**	**5.3 mg/l**	--	**4.09 mg/l**	**4.1 mg/l**	**5.35 mg/l**
Dissolved oxygen	NA	Field	**9.28 mg/l**	**8.13 mg/l**	**5.84 mg/l**	**5.41 mg/l**	**5.50 mg/l**	**5.26 mg/l**	**0.10 mg/l**	**6.08 mg/l**	**5.49 mg/l**	**0.13 mg/l**	**7.12 mg/l**	**7.12 mg/l**	**7.20 mg/l**	**4.01 mg/l**
pH	NA	Field	**7.85 pH units**	**7.65 pH units**	**7.54 pH units**	**7.37 pH units**	**7.35 pH units**	**7.34 pH units**	**7.08 pH units**	**7.65 pH units**	**7.68 pH units**	**7.19 pH units**	**7.15 pH units**	**7.15 pH units**	**7.57 pH units**	**7.22 pH units**
Phosphate, Ortho as PO4	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, total	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	**233.7 umhos/cm**	**179 umhos/cm**	**191.8 umhos/cm**	**191.2 umhos/cm**	**191 umhos/cm**	**225 umhos/cm**	**253 umhos/cm**	**197 umhos/cm**	**197 umhos/cm**	**273 umhos/cm**	**202 umhos/cm**	**201.9 umhos/cm**	**202.8 umhos/cm**	**278.2 umhos/cm**
Sulfate	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NA	Lab	--	--	--	--	**12.5 mg/l**	**19.2 mg/l**	**28.7 mg/l**	**13.3 mg/l**	**13.7 mg/l**	**29.1 mg/l**	--	**14 mg/l**	**14.2 mg/l**	**26.3 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**10.71 deg C**	**16.94 deg C**	**23.13 deg C**	**20.30 deg C**	**20.24 deg C**	**20.09 deg C**	**9.35 deg C**	**17.30 deg C**	**17.31 deg C**	**9.03 deg C**	**14.52 deg C**	**14.52 deg C**	**13.88 deg C**	**10.89 deg C**
Turbidity	NA	Field	**0.1 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**0.8 NTU**	**0 NTU**	**4.7 NTU**	**4.3 NTU**	**1.6 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**0 NTU**
Metals																
Aluminum	Dissolved	Lab	< 25 ug/l	**45.5 ug/l**	**42.1 ug/l**	**51.3 ug/l**	--	--	--	--	--	--	**32.7 ug/l**	--	--	--
Aluminum	Total	Lab	**50.1 ug/l**	**73.6 ug/l**	**72.1 ug/l**	**59.7 ug/l**	--	--	--	--	--	--	**72.4 ug/l**	--	--	--
Arsenic	Total	Lab	--	--	**1.1 ug/l**	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury methyl	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	Total	Lab	--	--	**0.025 ug/l**	--	--	--	--	--	--	--	--	--	--	--

Large Table 6
Surface Water Data Summary
Embarrass River Chain of Lakes

		Sys Loc Code	**PM-21**		**PM-21**	**PM-21**	**PM-21**	**PM-21**	**PM-21**		**PM-21**	**PM-22**	**PM-22**	**PM-22**	**PM-22**	**PM-22**	**PM-22**	**PM-22**
		Sample Date	**10/4/2010**		**10/4/2010**	**10/4/2010**	**7/27/2011**	**8/25/2011**	**9/21/2011**		**10/21/2011**	**7/9/2009**	**7/9/2009**	**7/9/2009**	**7/29/2009**	**7/29/2009**	**7/29/2009**	**7/29/2009**
		Depth Interval	**0 m**	**0 m**	**5 m**	**10 m**						**0 m**	**6.5 - 5.5 m**	**9.5 m**	**0 m**	**5.5 m**	**7 m**	**13 m**
		Sample Type Code	**N**	**FD**	**N**	**N**	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Chemical Name	Total or Dissolved	Analysis Location																
General Parameters																		
Carbon, dissolved organic	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, total organic	NA	Lab	--	--	--	--	--	--	--	--	--	**17.8 mg/l**	**17.3 mg/l**	**14.0 mg/l**	**16.3 mg/l**	**16.6 mg/l**	**16.3 mg/l**	**11.5 mg/l**
Chloride	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	NA	Lab	**4.32 mg/l**	**4.32 mg/l**	**4.31 mg/l**	**4.31 mg/l**	**3.18 mg/l**	**2.82 mg/l**	**3.15 mg/l**	**3.14 mg/l**	**3.26 mg/l**	**3.06 mg/l**	**3.08 mg/l**	**4.14 mg/l**	**3.16 mg/l**	**3.15 mg/l**	**3.34 mg/l**	**4.64 mg/l**
Dissolved oxygen	NA	Field	**7.56 mg/l**	--	**7.46 mg/l**	**7.45 mg/l**	**7.10 mg/l**	**7.14 mg/l**	**8.39 mg/l**	--	**10.70 mg/l**	--	--	--	--	--	--	--
pH	NA	Field	**7.26 pH units**	--	**7.35 pH units**	**7.38 pH units**	**7.38 pH units**	**7.28 pH units**	**7.55 pH units**	--	**7.63 pH units**	--	--	--	--	--	--	--
Phosphate, Ortho as PO4	NA	Lab	--	--	--	--	--	--	--	--	--	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l
Phosphorus, total	NA	Lab	--	--	--	--	--	--	--	--	--	**0.011 mg/l**	**0.01 mg/l**	**0.011 mg/l**	**0.008 mg/l**	**0.008 mg/l**	**0.008 mg/l**	**0.008 mg/l**
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--	--	**1.5 mg/l**	**1.2 mg/l**	< 1 mg/l	< 1 mg/l	< 1 mg/l	< 1 mg/l	< 1 mg/l
Specific Conductance @ 25oC	NA	Field	**209 umhos/cm**	--	**209 umhos/cm**	**209 umhos/cm**	**157.0 umhos/cm**	**164.1 umhos/cm**	**165.0 umhos/cm**	--	**183.4 umhos/cm**	--	--	--	--	--	--	--
Sulfate	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NA	Lab	**16.8 mg/l**	**16.8 mg/l**	**16.8 mg/l**	**16.9 mg/l**	**11.9 mg/l**	**10.2 mg/l**	**10.1 mg/l**	**10.1 mg/l**	**10.2 mg/l**	**18.2 mg/l**	**19.7 mg/l**	**37.7 mg/l**	**19.5 mg/l**	**19.7 mg/l**	**23 mg/l**	**46.1 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Temperature, degrees C	NA	Field	**12.02 deg C**	--	**11.88 deg C**	**11.83 deg C**	**21.96 deg C**	**21.92 deg C**	**12.73 deg C**	--	**8.70 deg C**	--	--	--	--	--	--	--
Turbidity	NA	Field	**3.8 NTU**	--	**4.1 NTU**	**5.0 NTU**	**0.6 NTU**	**0.1 NTU**	**0 NTU**	--	**1.1 NTU**	--	--	--	--	--	--	--
Metals																		
Aluminum	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--	--	--	--	**720 ug/l**	**502 ug/l**	**370 ug/l**	**696 ug/l**	**686 ug/l**	**494 ug/l**	**263 ug/l**
Mercury	Total	Lab	--	--	--	--	--	--	--	--	--	**0.0050 ug/l**	**0.0094 b ug/l**	**0.0079 b ug/l**	**0.0036 ug/l**	**0.0070 b ug/l**	**0.0067 b ug/l**	**0.0054 b ug/l**
Mercury methyl	Total	Lab	--	--	--	--	--	--	--	--	--	**0.00030 ug/l**	**0.00039 ug/l**	**0.00016 ug/l**	**0.00025 ug/l**	**0.00016 ug/l**	**0.00016 ug/l**	**0.00012 ug/l**
Thallium	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Large Table 6
Surface Water Data Summary
Embarrass River Chain of Lakes

Sys Loc Code			PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22		PM-22	PM-22
Sample Date			8/21/2009	8/21/2009	8/21/2009	8/21/2009	9/22/2009	9/22/2009	9/22/2009	9/22/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	8/24/2010		8/24/2010	8/24/2010
Depth Interval			0 m	5.5 m	8 m	11 m	5 m	0 m	7 m	11 m	0 m	6 m	9 m	11 m	0 m	0 m	5 m	10 m
Sample Type Code			N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N
Chemical Name	Total or Dissolved	Analysis Location																
General Parameters																		
Carbon, dissolved organic	NA	Lab	--	--	--	--	--	--	--	--	15.2 mg/l	15.4 mg/l	15.2 mg/l	14.6 mg/l	--	--	--	--
Carbon, total organic	NA	Lab	17.0 mg/l	16.4 mg/l	14.4 mg/l	12.6 mg/l	15.8 mg/l	16.4 mg/l	14.1 mg/l	11.3 mg/l	15.6 mg/l	15.3 mg/l	14.7 mg/l	15.2 mg/l	--	--	--	--
Chloride	Dissolved	Lab	--	--	--	--	3.63 mg/l	3.81 mg/l	3.99 mg/l	4.87 mg/l	--	--	--	--	--	--	--	--
Chloride	NA	Lab	3.55 mg/l	3.54 mg/l	4.18 mg/l	4.83 mg/l	3.81 mg/l	3.6 mg/l	4.19 mg/l	5.15 mg/l	4.07 mg/l	4.04 mg/l	4.03 mg/l	3.98 mg/l	4.25 mg/l	4.27 mg/l	5.35 mg/l	5.48 mg/l
Dissolved oxygen	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	6.72 mg/l	--	1.16 mg/l	0.52 mg/l
pH	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	7.76 pH units	--	7.04 pH units	6.96 pH units
Phosphate, Ortho as PO4	NA	Lab	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.07 mg/l	< 0.07 mg/l	< 0.07 mg/l	< 0.07 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	< 0.02 mg/l	--	--	--	--
Phosphorus, total	NA	Lab	0.013 mg/l	0.013 mg/l	0.012 mg/l	0.013 mg/l	0.009 mg/l	0.008 mg/l	0.012 mg/l	0.014 mg/l	0.017 mg/l	0.025 mg/l	0.021 mg/l	0.014 mg/l	--	--	--	--
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	1.2 mg/l	< 1 mg/l	< 1 mg/l	1.2 mg/l	< 1 mg/l	< 1 mg/l	1.2 mg/l	1.6 mg/l	1.2 mg/l	1.6 mg/l	< 1 mg/l	1.6 mg/l	--	--	--	--
Specific Conductance @ 25oC	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	200 umhos/cm	--	2.59 umhos/cm	293 umhos/cm
Sulfate	Dissolved	Lab	--	--	--	--	23.9 mg/l	23.2 mg/l	29.7 mg/l	45.4 mg/l	--	--	--	--	--	--	--	--
Sulfate	NA	Lab	22.3 mg/l	22.4 mg/l	33.9 mg/l	44.5 mg/l	25.3 mg/l	24.8 mg/l	31.5 mg/l	47.7 mg/l	29 mg/l	28.2 mg/l	28 mg/l	27 mg/l	18.4 mg/l	18.5 mg/l	40.8 mg/l	44.3 mg/l
Sulfide	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--
Temperature, degrees C	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	21.97 deg C	--	14.32 deg C	8.20 deg C
Turbidity	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	0 NTU	--	0 NTU	0.3 NTU
Metals																		
Aluminum	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	699 ug/l	649 ug/l	358 ug/l	265 ug/l	648 ug/l	668 ug/l	386 ug/l	562 ug/l	703 ug/l	735 ug/l	762 ug/l	786 ug/l	--	--	--	--
Mercury	Total	Lab	0.0022 ug/l	0.0030 b ug/l	0.0031 b ug/l	0.0025 b ug/l	0.13 b ug/l	0.0028 ug/l	0.34 b ug/l	0.065 b ug/l	0.002 b ug/l	0.0025 b ug/l	0.0022 b ug/l	0.0022 b ug/l	--	--	--	--
Mercury methyl	Total	Lab	0.00022 ug/l	< 0.0001 ug/l	0.00021 ug/l	0.00011 ug/l	0.00020 ug/l	0.00017 ug/l	0.00021 ug/l	0.00018 ug/l	0.00011 ug/l	0.00014 ug/l	0.00012 ug/l	0.00016 ug/l	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Large Table 6
Surface Water Data Summary
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		Sys Loc Code	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-22	PM-23
		Sample Date	9/8/2010	9/8/2010	9/8/2010	9/20/2010	9/20/2010	9/20/2010	10/4/2010	10/4/2010	10/4/2010	7/27/2011	8/25/2011	9/21/2011	10/21/2011	7/9/2009
		Depth Interval	0 m	7 m	10 m	0 m	6 m	11 m	0 m	5 m	10 m					0 m
		Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location														
General Parameters																
Carbon, dissolved organic	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, total organic	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	**19.9 mg/l**
Chloride	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	NA	Lab	**4.33 mg/l**	**5.25 mg/l**	**5.33 mg/l**	**4.43 mg/l**	**4.38 mg/l**	**5.34 mg/l**	**4.46 mg/l**	**4.47 mg/l**	**5.3 mg/l**	**3.62 mg/l**	**3.87 mg/l**	**4.11 mg/l**	**4.38 mg/l**	**2.76 mg/l**
Dissolved oxygen	NA	Field	**6.48 mg/l**	**1.54 mg/l**	**0.24 mg/l**	**6.89 mg/l**	**6.68 mg/l**	**3.18 mg/l**	**7.15 mg/l**	**6.96 mg/l**	**0.16 mg/l**	**7.27 mg/l**	**6.91 mg/l**	**8.02 mg/l**	**9.84 mg/l**	--
pH	NA	Field	**7.59 pH units**	**7.09 pH units**	**6.79 pH units**	**7.33 pH units**	**7.54 pH units**	**6.96 pH units**	**7.47 pH units**	**7.36 pH units**	**6.79 pH units**	**7.27 pH units**	**7.37 pH units**	**7.34 pH units**	**7.43 pH units**	--
Phosphate, Ortho as PO4	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.02 mg/l**
Phosphorus, total	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.024 mg/l**
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	**3.2 mg/l**
Specific Conductance @ 25oC	NA	Field	**210 umhos/cm**	**275 umhos/cm**	**300 umhos/cm**	**213.5 umhos/cm**	**212.1 umhos/cm**	**298.6 umhos/cm**	**220 umhos/cm**	**219 umhos/cm**	**306 umhos/cm**	**145.0 umhos/cm**	**151.4 umhos/cm**	**161.0 umhos/cm**	**202.3 umhos/cm**	--
Sulfate	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NA	Lab	**21.5 mg/l**	**42.1 mg/l**	**44.4 mg/l**	**22.3 mg/l**	**22.2 mg/l**	**44.4 mg/l**	**23.4 mg/l**	**23.6 mg/l**	**43.2 mg/l**	**14.1 mg/l**	**14.2 mg/l**	**16 mg/l**	**21.7 mg/l**	**34.7 mg/l**
Sulfide	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	**17.37 deg C**	**10.46 deg C**	**8.17 deg C**	**14.87 deg C**	**14.79 deg C**	**9.45 deg C**	**12.95 deg C**	**12.42 deg C**	**8.28 deg C**	**21.54 deg C**	**22.17 deg C**	**13.79 deg C**	**8.86 deg C**	--
Turbidity	NA	Field	**0 NTU**	**0 NTU**	**0.09 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**0 NTU**	**0.3 NTU**	**0 NTU**	**0.1 NTU**	**0 NTU**	**2.3 NTU**	--
Metals																
Aluminum	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	**3090 ug/l**
Mercury	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0027 ug/l**
Mercury methyl	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00032 ug/l**
Thallium	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Large Table 6
Surface Water Data Summary
Embarrass River Chain of Lakes

		Sys Loc Code	PM-23	PM-23		PM-23	PM-23	PM-23	PM-23	PM-23	PM-23	PM-23	PM-23	PM-23	PM-23	PM-24	PM-24
		Sample Date	7/28/2009	8/21/2009		9/23/2009	11/4/2009	8/24/2010	9/8/2010	9/20/2010	10/4/2010	7/27/2011	8/25/2011	9/21/2011	10/21/2011	7/9/2009	7/28/2009
		Depth Interval	0 m	0 m	0 m	0 m	0 m									0 m	0 m
		Sample Type Code	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location															
General Parameters																	
Carbon, dissolved organic	NA	Lab	--	--	--	--	**21.9 mg/l**	--	--	--	--	--	--	--	--	--	--
Carbon, total organic	NA	Lab	**20.5 mg/l**	**26.1 mg/l**	**25.1 mg/l**	**16.3 mg/l**	**22.1 mg/l**	--	--	--	--	--	--	--	--	**24.4 mg/l**	**18.6 mg/l**
Chloride	Dissolved	Lab	--	--	--	**3.9 mg/l**	--	--	--	--	--	--	--	--	--	--	--
Chloride	NA	Lab	**4.34 mg/l**	**4.62 mg/l**	**4.65 mg/l**	**4.03 mg/l**	**6.33 mg/l**	**4.38 mg/l**	**4.18 mg/l**	**4.37 mg/l**	**4.8 mg/l**	**2.66 mg/l**	**3.09 mg/l**	**3.28 mg/l**	**4.53 mg/l**	**1.18 mg/l**	**0.96 mg/l**
Dissolved oxygen	NA	Field	--	--	--	--	--	**6.46 mg/l**	**7.45 mg/l**	**8.21 mg/l**	**8.87 mg/l**	**4.88 mg/l**	**5.93 mg/l**	**6.30 mg/l**	**9.17 mg/l**	--	--
pH	NA	Field	--	--	--	--	--	**7.61 pH units**	**7.68 pH units**	**7.41 pH units**	**7.35 pH units**	**6.98 pH units**	**7.20 pH units**	**7.28 pH units**	**7.76 pH units**	--	--
Phosphate, Ortho as PO4	NA	Lab	**0.02 mg/l**	**0.02 mg/l**	**0.02 mg/l**	< 0.07 mg/l	**0.03 mg/l**	--	--	--	--	--	--	--	--	**0.02 mg/l**	< 0.02 mg/l
Phosphorus, total	NA	Lab	**0.022 mg/l**	**0.035 mg/l**	**0.035 mg/l**	**0.029 mg/l**	**0.043 mg/l**	--	--	--	--	--	--	--	--	**0.032 mg/l**	**0.026 mg/l**
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**4.4 mg/l**	**8.4 mg/l**	**8.4 mg/l**	**4 mg/l**	**15.2 mg/l**	--	--	--	--	--	--	--	--	**2 mg/l**	**2.4 mg/l**
Specific Conductance @ 25oC	NA	Field	--	--	--	--	--	**211 umhos/cm**	**216 umhos/cm**	**224 umhos/cm**	**219 umhos/cm**	**198.0 umhos/cm**	**258.4 umhos/cm**	**215.0 umhos/cm**	**230 umhos/cm**	--	--
Sulfate	Dissolved	Lab	--	--	--	**13.8 mg/l**	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NA	Lab	**32.9 mg/l**	**26.9 mg/l**	**26.9 mg/l**	**14.4 mg/l**	**39.5 mg/l**	**7.91 mg/l**	**6.68 mg/l**	**21 mg/l**	**19.7 mg/l**	**7.94 mg/l**	**7.03 mg/l**	**5.14 mg/l**	**13.4 mg/l**	**1.76 mg/l**	**1.83 mg/l**
Sulfide	NA	Lab	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--	--	--	--	--	< 0.1 mg/l	< 0.1 mg/l
Temperature, degrees C	NA	Field	--	--	--	--	--	**21.16 deg C**	**12.84 deg C**	**11.44 deg C**	**9.71 deg C**	**19.67 deg C**	**17.29 deg C**	**11.42 deg C**	**7.47 deg C**	--	--
Turbidity	NA	Field	--	--	--	--	--	**6.6 NTU**	**10.6 NTU**	**1.4 NTU**	**11.9 NTU**	**1.4 NTU**	**1.6 NTU**	**36.0 NTU**	**6.2 NTU**	--	--
Metals																	
Aluminum	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	**2250 ug/l**	**2920 ug/l**	**2920 ug/l**	**3320 ug/l**	**2090 ug/l**	--	--	--	--	--	--	--	--	**1980 ug/l**	**1970 ug/l**
Mercury	Total	Lab	**0.0031 ug/l**	**0.0038 ug/l**	**0.0031 ug/l**	**0.0019 ug/l**	**0.0048 ug/l**	--	--	--	--	--	--	--	--	**0.0043 ug/l**	**0.0034 ug/l**
Mercury methyl	Total	Lab	**0.00024 ug/l**	**0.00061 ug/l**	**0.00065 ug/l**	**0.00012 ug/l**	**0.00023 ug/l**	--	--	--	--	--	--	--	--	**0.00089 ug/l**	**0.00039 ug/l**
Thallium	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

		Sys Loc Code	PM-24	PM-24	PM-24	PM-24	PM-24	PM-24	PM-24	PM-24	PM-24	PM-24	PM-24
		Sample Date	8/21/2009	9/23/2009	11/4/2009	8/24/2010	9/8/2010	9/20/2010	10/4/2010	7/27/2011	8/25/2011	9/21/2011	10/21/2011
		Depth Interval	0 m	0 m	0 m								
		Sample Type Code	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location											
General Parameters													
Carbon, dissolved organic	NA	Lab	--	--	**17 mg/l**	--	--	--	--	--	--	--	--
Carbon, total organic	NA	Lab	**20.9 mg/l**	**22.9 mg/l**	**16.9 mg/l**	--	--	--	--	--	--	--	--
Chloride	Dissolved	Lab	--	**1.56 mg/l**	--	--	--	--	--	--	--	--	--
Chloride	NA	Lab	**0.95 mg/l**	**1.69 mg/l**	**0.61 mg/l**	**3.83 mg/l**	**3.81 mg/l**	**4.06 mg/l**	**4.24 mg/l**	**3.12 mg/l**	**3.2 mg/l**	**3.49 mg/l**	**4.08 mg/l**
Dissolved oxygen	NA	Field	--	--	--	**5.89 mg/l**	**5.88 mg/l**	**6.94 mg/l**	**7.83 mg/l**	**6.84 mg/l**	**6.55 mg/l**	**7.06 mg/l**	**10.11 mg/l**
pH	NA	Field	--	--	--	**7.54 pH units**	**7.41 pH units**	**7.38 pH units**	**7.52 pH units**	**7.26 pH units**	**7.36 pH units**	**7.50 pH units**	**7.62 pH units**
Phosphate, Ortho as PO4	NA	Lab	**0.02 mg/l**	< 0.07 mg/l	< 0.02 mg/l	--	--	--	--	--	--	--	--
Phosphorus, total	NA	Lab	**0.042 mg/l**	**0.034 mg/l**	**0.021 mg/l**	--	--	--	--	--	--	--	--
Redox (oxidation potential)	NA	Field	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**8.8 mg/l**	**2 mg/l**	**2 mg/l**	--	--	--	--	--	--	--	--
Specific Conductance @ 25oC	NA	Field	--	--	--	**191 umhos/cm**	**193 umhos/cm**	**200 umhos/cm**	**205 umhos/cm**	**154.0 umhos/cm**	**159.5 umhos/cm**	**163.0 umhos/cm**	**181.1 umhos/cm**
Sulfate	Dissolved	Lab	--	**3.03 mg/l**	--	--	--	--	--	--	--	--	--
Sulfate	NA	Lab	**2.14 mg/l**	**3.29 mg/l**	**3.03 mg/l**	**12.9 mg/l**	**13.4 mg/l**	**13.5 mg/l**	**15.8 mg/l**	**11.6 mg/l**	**10.5 mg/l**	**10.1 mg/l**	**16.8 mg/l**
Sulfide	NA	Lab	< 0.1 mg/l	< 0.10 mg/l	< 0.10 mg/l	--	--	--	--	--	--	--	--
Temperature, degrees C	NA	Field	--	--	--	**21.41 deg C**	**17.20 deg C**	**14.53 deg C**	**12.21 deg C**	**22.10 deg C**	**20.84 deg C**	**13.68 deg C**	**9.35 deg C**
Turbidity	NA	Field	--	--	--	**2.6 NTU**	**1.1 NTU**	**0.3 NTU**	**3.3 NTU**	**0.2 NTU**	**0.1 NTU**	**0 NTU**	**2.1 NTU**
Metals													
Aluminum	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--
Aluminum	Total	Lab	--	--	--	--	--	--	--	--	--	--	--
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--
Iron	Total	Lab	**3270 ug/l**	**2170 ug/l**	**929 ug/l**	--	--	--	--	--	--	--	--
Mercury	Total	Lab	**0.0032 b ug/l**	**0.0035 ug/l**	**0.0034 ug/l**	--	--	--	--	--	--	--	--
Mercury methyl	Total	Lab	**0.00077 ug/l**	**0.00053 ug/l**	**0.00019 ug/l**	--	--	--	--	--	--	--	--
Thallium	Total	Lab	--	--	--	--	--	--	--	--	--	--	--

Data Qualifiers/Footnotes

Qualifier	Definition
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
I	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
s	Potential false positive value based on statistical analysis of blank sample data.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
DF	Did not flash
EMPC	Estimated maximum possible concentration.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound
BQA	Barr-applied project specific qualifier: extraction and/or analyses conducted using an alternative method and/or procedure.
BQC	Barr-applied project specific qualifier: plant shut down.
BQD	Barr-applied project specific qualifier: equipment malfunction.
BQE	Barr-applied project specific qualifier: equipment adjustment.
BQM	Barr-applied project specific qualifier: manual measurement.
BQN	Barr-applied project specific qualifier: unable to be sampled or measured due to various reasons.
BQP	Barr-applied project specific qualifier: atypical chromatographic pattern.
BQQ	Barr-applied project specific qualifier: some aspect of QA/QC was not met.
BQR	Barr-applied project specific qualifier: location was re-sampled.
BQS	Barr-applied project specific qualifier: data is considered suspect.
BQT	Barr-applied project specific qualifier: summed value not displayed due to insufficient field length.
BQU	Barr-applied project specific qualifier: historical qualifier - definition unknown.
BQV	Barr-applied project specific qualifier: estimated value.
BQX	Barr-applied project specific qualifier: see notes for qualifier definition.
BQZ	Barr-applied project specific qualifier: data is considered unusable.

Large Table 7
Existing Tailings Basin Ponds
Surface Water Data Summary

		Sys Loc Code	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E
		Sample Date	4/24/2001	5/24/2001	6/27/2001	7/12/2001	7/24/2001	8/1/2001	8/18/2001	9/7/2001	9/17/2001	10/1/2001	10/17/2001	11/6/2001
		Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location												
General Parameters														
Alkalinity, bicarbonate as CaCO3	NA	Lab	--	--	235 mg/l	190 mg/l	250 mg/l	254 mg/l	193 mg/l	207 mg/l	207 mg/l	234 mg/l	186 mg/l	288 mg/l
Alkalinity, total	NA	Lab	206 mg/l	228 mg/l	--	--	--	--	--	--	--	--	--	--
Cations	NA	Lab	--	144 meq/l	141 meq/l	154 meq/l	151 meq/l	15.2 meq/l	13.2 meq/l	8 meq/l	8.42 meq/l	16.2 meq/l	--	8.7 meq/l
Chloride	NA	Lab	21.5 mg/l	20.6 mg/l	22.5 mg/l	22 mg/l	21.1 mg/l	21.7 mg/l	20.4 mg/l	21.5 mg/l	21.5 mg/l	22.6 mg/l	21.8 mg/l	21.8 mg/l
Fluoride	NA	Lab	6.8 mg/l	13 mg/l	6.9 mg/l	5.8 mg/l	6.3 mg/l	6.5 mg/l	8.1 mg/l	6.5 mg/l	6.5 mg/l	6.1 mg/l	4.4 mg/l	5.4 mg/l
Hardness, total as CaCO3	NA	Lab	182 mg/l	208 mg/l	186 mg/l	197 mg/l	196 mg/l	190 mg/l	193 mg/l	219 mg/l	244 mg/l	235 mg/l	229 mg/l	260 mg/l
pH	NA	Field	7.9 pH units	9 pH units	8.80 pH units	8.50 pH units	9.1 pH units	6.32 pH units	8.99 pH units	9.23 pH units	8.91 pH units	8.4 pH units	9.04 pH units	8.58 pH units
Salinity	NA	Lab	0.2 salinity unit	0.2 salinity unit	0.2 salinity unit	0.3 salinity unit	0.3 salinity unit	0.3 salinity unit	0.3 salinity unit	0.3 salinity unit	0.3 salinity unit	0.3 salinity unit	0.3 salinity unit	0.3 salinity unit
Sodium, % of Total Cations	NA	Lab	--	50.5 %	56.9 %	58.2 %	58.3 %	56.6 %	48.3 %	50.3 %	48.3 %	48.6 %	--	47.8 %
Solids, total dissolved	NA	Lab	420 mg/l	369 mg/l	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	9 mg/l	13.2 mg/l	1.2 mg/l	2.7 mg/l	3.3 mg/l	2.4 mg/l	5.2 mg/l	3.2 mg/l	4 mg/l	6 mg/l	3.2 mg/l	18.7 mg/l
Specific Conductance @ 25oC	NA	Field	679 umhos/cm	667 umhos/cm	669 umhos/cm	610 umhos/cm	600 umhos/cm	510 umhos/cm	638 umhos/cm	750 umhos/cm	694 umhos/cm	707 umhos/cm	435 umhos/cm	758 umhos/cm
Sulfate	NA	Lab	105 mg/l	100 mg/l	73.4 mg/l	68 mg/l	82.7 mg/l	66.6 mg/l	82.9 mg/l	82.6 mg/l	80 mg/l	85.2 mg/l	94.3 mg/l	93.5 mg/l
Temperature, degrees C	NA	Field	--	--	21.8 deg C	--	23.7 deg C	20.5 deg C	24.6 deg C	19.3 deg C	16.7 deg C	14.0 deg C	7.2 deg C	6.0 deg C
Turbidity	NA	Field	0.73 NTU	3.97 NTU	1.7 NTU	0.58 NTU	0.68 NTU	4.26 NTU	15.7 NTU	1.69 NTU	1.62 NTU	2.1 NTU	2.14 NTU	14 NTU
Metals														
Arsenic	Total	Lab	2.3 ug/l	7.1 ug/l	--	--	--	--	--	--	--	--	--	--
Boron	Total	Lab	199 ug/l	207 ug/l	185 ug/l	198 ug/l	200 ug/l	199 ug/l	193 ug/l	245 ug/l	263 ug/l	263 ug/l	228 ug/l	247 ug/l
Calcium	Total	Lab	19700 ug/l	23900 ug/l	19800 ug/l	21200 ug/l	21000 ug/l	19900 ug/l	19200 ug/l	21200 ug/l	25600 ug/l	24800 ug/l	25000 ug/l	27600 ug/l
Cobalt	Total	Lab	--	1 ug/l	1.1 ug/l	--	--	--	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	70 ug/l	--	--	--	30 ug/l	40 ug/l	--	--	--	--
Magnesium	Total	Lab	31000 ug/l	36000 ug/l	33200 ug/l	35000 ug/l	34900 ug/l	34000 ug/l	35200 ug/l	40500 ug/l	43900 ug/l	42100 ug/l	40600 ug/l	46400 ug/l
Manganese	Total	Lab	120 ug/l	130 ug/l	20 ug/l	10 ug/l	10 ug/l	10 ug/l	20 ug/l	10 ug/l	10 ug/l	10 ug/l	--	60 ug/l
Mercury	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	Total	Lab	156 ug/l	128 ug/l	186 ug/l	168.8 ug/l	181.6 ug/l	148 ug/l	134 ug/l	113 ug/l	148 ug/l	101 ug/l	129 ug/l	157 ug/l
Nickel	Total	Lab	--	--	--	--	--	--	--	--	--	--	3.4 ug/l	--
Potassium	Total	Lab	7400 ug/l	11100 ug/l	7900 ug/l	8400 ug/l	7500 ug/l	7200 ug/l	7800 ug/l	9600 ug/l	8900 ug/l	8800 ug/l	--	9000 ug/l
Sodium	Total	Lab	89300 ug/l	72400 ug/l	80200 ug/l	89600 ug/l	88000 ug/l	79200 ug/l	58000 ug/l	72500 ug/l	73500 ug/l	72000 ug/l	72100 ug/l	76000 ug/l

Large Table 7
Existing Tailings Basin Ponds
Surface Water Data Summary

		Sys Loc Code	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E
		Sample Date	11/21/2001	12/3/2001	1/9/2002	1/14/2002	2/5/2002	2/19/2002	3/5/2002	3/22/2002	4/16/2002	5/2/2002	6/6/2002	6/17/2002	7/10/2002
		Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location													
General Parameters															
Alkalinity, bicarbonate as CaCO3	NA	Lab	276 mg/l	276 mg/l	306 mg/l	308 mg/l	336 mg/l	304 mg/l	384 mg/l	330 mg/l	--	266 mg/l	270 mg/l	--	238 mg/l
Alkalinity, total	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Cations	NA	Lab	9 meq/l	7.8 meq/l	--	--	--	--	12.2 meq/l	--	--	8.5 meq/l	9.4 meq/l	--	7.5 meq/l
Chloride	NA	Lab	21.3 mg/l	21.6 mg/l	24.3 mg/l	24.4 mg/l	24.2 mg/l	26 mg/l	31.3 mg/l	26.2 mg/l	--	21.7 mg/l	21.5 mg/l	--	18.8 mg/l
Fluoride	NA	Lab	2.3 mg/l	5.6 mg/l	7.14 mg/l	6 mg/l	6.5 mg/l	7 mg/l	6.3 mg/l	5 mg/l	--	4.3 mg/l	5.1 mg/l	--	5 mg/l
Hardness, total as CaCO3	NA	Lab	280 mg/l	239 mg/l	323 mg/l	283 mg/l	306 mg/l	322 mg/l	368 mg/l	330 mg/l	--	274 mg/l	305 mg/l	--	230 mg/l
pH	NA	Field	8.42 pH units	7.31 pH units	7.92 pH units	8.48 pH units	7.57 pH units	7.75 pH units	7.91 pH units	--	--	8.20 pH units	8.41 pH units	8.43 pH units	9.22 pH units
Salinity	NA	Lab	0.3 salinity unit	0.3 salinity unit	0.4 salinity unit	0.3 salinity unit	0.4 salinity unit	0.4 salinity unit	0.4 salinity unit	0.4 salinity unit	--	0.3 salinity unit	0.3 salinity unit	--	0.3 salinity unit
Sodium, % of Total Cations	NA	Lab	45.6 %	46.1 %	--	--	--	--	46.2 %	--	--	32 %	33 %	--	36 %
Solids, total dissolved	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	12 mg/l	8.7 mg/l	155 mg/l	--	--	2.8 mg/l	2.4 mg/l	12 mg/l	--	24 mg/l	1 mg/l	--	--
Specific Conductance @ 25oC	NA	Field	873 umhos/cm	623 umhos/cm	784 umhos/cm	980 umhos/cm	890 umhos/cm	729 umhos/cm	930 umhos/cm	--	--	684 umhos/cm	810 umhos/cm	750 umhos/cm	705 umhos/cm
Sulfate	NA	Lab	90.3 mg/l	88.8 mg/l	95.1 mg/l	106 mg/l	103 mg/l	104 mg/l	123 mg/l	105 mg/l	--	78.5 mg/l	104 mg/l	106 mg/l	153 mg/l
Temperature, degrees C	NA	Field	4.6 deg C	0.4 deg C	2.9 deg C	0.4 deg C	0.5 deg C	1.0 deg C	0.4 deg C	--	--	5.0 deg C	16.5 deg C	17.9 deg C	22.5 deg C
Turbidity	NA	Field	16.6 NTU	8.68 NTU	1.09 NTU	3.02 NTU	1.9 NTU	2.68 NTU	2.06 NTU	10.3 NTU	--	12.2 NTU	1.3 NTU	--	1.2 NTU
Metals															
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	Total	Lab	258 ug/l	241 ug/l	269 ug/l	254 ug/l	270 ug/l	294 ug/l	328 ug/l	319 ug/l	--	194 ug/l	441 ug/l	--	222 ug/l
Calcium	Total	Lab	30500 ug/l	26700 ug/l	36600 ug/l	30200 ug/l	33800 ug/l	34100 ug/l	39100 ug/l	35700 ug/l	--	31800 ug/l	35200 ug/l	--	20600 ug/l
Cobalt	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	2.4 ug/l	1.1 ug/l	1.5 ug/l	--	3.7 ug/l	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	Total	Lab	49500 ug/l	42000 ug/l	56300 ug/l	50400 ug/l	53800 ug/l	57600 ug/l	65800 ug/l	58100 ug/l	--	47400 ug/l	52800 ug/l	--	43200 ug/l
Manganese	Total	Lab	60 ug/l	20 ug/l	--	--	--	--	210 ug/l	--	--	130 ug/l	10 ug/l	--	--
Mercury	Total	Lab	--	--	--	--	--	--	--	--	0.0009 ug/l	--	--	0.0009 ug/l	--
Molybdenum	Total	Lab	142 ug/l	163 ug/l	170 ug/l	166 ug/l	171 ug/l	163 ug/l	167 ug/l	134 ug/l	--	123 ug/l	124 ug/l	--	63.5 ug/l
Nickel	Total	Lab	--	--	--	--	--	--	2 ug/l	--	--	--	3.8 ug/l	--	--
Potassium	Total	Lab	8400 ug/l	7300 ug/l	--	--	--	--	13800 ug/l	--	--	9200 ug/l	8600 ug/l	--	8600 ug/l
Sodium	Total	Lab	74300 ug/l	65000 ug/l	84000 ug/l	78000 ug/l	88400 ug/l	101000 ug/l	102000 ug/l	96000 ug/l	--	63100 ug/l	70100 ug/l	--	62400 ug/l

Large Table 7
Existing Tailings Basin Ponds
Surface Water Data Summary

		Sys Loc Code	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 1E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E
		Sample Date	8/2/2002	8/28/2002	10/25/2002	12/3/2002	2/5/2003	4/14/2003	4/22/2003	11/10/2003	5/7/2004	4/24/2001	5/24/2001	6/27/2001	7/12/2001
		Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location													
General Parameters															
Alkalinity, bicarbonate as CaCO3	NA	Lab	**185 mg/l**	--	**331 mg/l**	**244 mg/l**	**280 mg/l**	--	--	--	--	--	--	**275 mg/l**	**285 mg/l**
Alkalinity, total	NA	Lab	--	--	--	--	--	--	--	--	--	**250 mg/l**	**244 mg/l**	--	--
Cations	NA	Lab	**7.6 meq/l**	--	--	--	--	--	--	--	--	--	**143 meq/l**	**156 meq/l**	**184 meq/l**
Chloride	NA	Lab	**19.1 mg/l**	--	--	--	--	--	--	--	--	**18.3 mg/l**	**19.9 mg/l**	**20.3 mg/l**	**9.9 mg/l**
Fluoride	NA	Lab	**5.2 mg/l**	--	**3.6 mg/l**	**5.3 mg/l**	**7 mg/l**	--	--	**3.9 mg/l**	**3.4 mg/l**	**3.2 mg/l**	**4.5 mg/l**	**3.9 mg/l**	**4.3 mg/l**
Hardness, total as CaCO3	NA	Lab	**226 mg/l**	--	**418 mg/l**	**267 mg/l**	**291 mg/l**	--	--	**210 mg/l**	**229 mg/l**	**250 mg/l**	**208 mg/l**	**263 mg/l**	**296 mg/l**
pH	NA	Field	**9.01 pH units**	**9.37 pH units**	**8.5 pH units**	**9.10 pH units**	**8.41 pH units**	--	--	**9.14 pH units**	--	**8 pH units**	**8.68 pH units**	**8.11 pH units**	**8.3 pH units**
Salinity	NA	Lab	**0.2 salinity unit**	--	--	--	--	--	--	--	--	**0.3 salinity unit**	**0.3 salinity unit**	**0.3 salinity unit**	**0.3 salinity unit**
Sodium, % of Total Cations	NA	Lab	**38 %**	--	--	--	--	--	--	--	--	--	**50.1 %**	**45.2 %**	**47.1 %**
Solids, total dissolved	NA	Lab	--	--	--	--	--	--	--	--	--	**360 mg/l**	**374 mg/l**	--	--
Solids, total suspended	NA	Lab	**3.6 mg/l**	--	--	--	--	--	**4 mg/l**	--	--	**16 mg/l**	**38.4 mg/l**	**2.8 mg/l**	**7.3 mg/l**
Specific Conductance @ 25oC	NA	Field	**673 umhos/cm**	**525 umhos/cm**	**300 umhos/cm**	**732 umhos/cm**	**746 umhos/cm**	--	--	**817 umhos/cm**	--	**698 umhos/cm**	**691 umhos/cm**	**780 umhos/cm**	**1050 umhos/cm**
Sulfate	NA	Lab	**91.2 mg/l**	--	**145 mg/l**	**79 mg/l**	**103 mg/l**	--	**61.4 mg/l**	**89.6 mg/l**	**79.1 mg/l**	**109 mg/l**	**54.4 mg/l**	**90 mg/l**	**115 mg/l**
Temperature, degrees C	NA	Field	**21.0 deg C**	**18.5 deg C**	--	--	--	--	--	**0.4 deg C**	--	--	--	**8.63 deg C**	--
Turbidity	NA	Field	**5.7 NTU**	--	--	--	--	--	--	--	--	**0.51 NTU**	**10.4 NTU**	**2.1 NTU**	**1.36 NTU**
Metals															
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	**3.9 ug/l**	**6.8 ug/l**	--	--
Boron	Total	Lab	**205 ug/l**	--	**337 ug/l**	**269 ug/l**	**267 ug/l**	--	--	**208 ug/l**	**183 ug/l**	**220 ug/l**	**203 ug/l**	**219 ug/l**	**256 ug/l**
Calcium	Total	Lab	**17900 ug/l**	--	**27600 ug/l**	**20500 ug/l**	**22600 ug/l**	--	--	**13400 ug/l**	**17700 ug/l**	**31800 ug/l**	**24000 ug/l**	**31200 ug/l**	**35400 ug/l**
Cobalt	Total	Lab	--	--	--	--	--	--	--	--	--	--	**1.8 ug/l**	**1 ug/l**	--
Copper	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	**100 ug/l**	**30 ug/l**	**50 ug/l**
Magnesium	Total	Lab	**44100 ug/l**	--	**85000 ug/l**	**52600 ug/l**	**56900 ug/l**	--	--	**42900 ug/l**	**44900 ug/l**	**42900 ug/l**	**36100 ug/l**	**45000 ug/l**	**50500 ug/l**
Manganese	Total	Lab	**10 ug/l**	--	--	--	--	--	--	--	--	**360 ug/l**	**210 ug/l**	**10 ug/l**	**120 ug/l**
Mercury	Total	Lab	--	--	--	--	--	**0.001 ug/l**	--	--	--	--	--	--	--
Molybdenum	Total	Lab	**130 ug/l**	--	**72.4 ug/l**	**131 ug/l**	**130 ug/l**	--	--	**92.2 ug/l**	**88.5 ug/l**	**64 ug/l**	**140 ug/l**	**58.4 ug/l**	**102 ug/l**
Nickel	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	Total	Lab	**7600 ug/l**	--	--	--	--	--	--	--	--	**7500 ug/l**	**11100 ug/l**	**9600 ug/l**	**11100 ug/l**
Sodium	Total	Lab	**65900 ug/l**	--	--	--	--	--	--	--	--	**66100 ug/l**	**71700 ug/l**	**70600 ug/l**	**86600 ug/l**

Large Table 7
Existing Tailings Basin Ponds
Surface Water Data Summary

		Sys Loc Code	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E
		Sample Date	7/24/2001	8/1/2001	8/18/2001	9/7/2001	9/17/2001	10/1/2001	11/6/2001	11/21/2001	12/3/2001	1/9/2002	3/5/2002	3/22/2002	4/16/2002
		Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location													
General Parameters															
Alkalinity, bicarbonate as CaCO3	NA	Lab	339 mg/l	327 mg/l	290 mg/l	322 mg/l	21 mg/l	341 mg/l	364 mg/l	378 mg/l	382 mg/l	336 mg/l	504 mg/l	--	--
Alkalinity, total	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Cations	NA	Lab	187 meq/l	19 meq/l	16.9 meq/l	10.2 meq/l	11.3 meq/l	21.9 meq/l	11.7 meq/l	11.8 meq/l	10.3 meq/l	--	16 meq/l	--	--
Chloride	NA	Lab	21.8 mg/l	22.1 mg/l	21.1 mg/l	22.4 mg/l	23.6 mg/l	24.4 mg/l	23.4 mg/l	22.2 mg/l	23.7 mg/l	32.2 mg/l	33.5 mg/l	--	--
Fluoride	NA	Lab	5.6 mg/l	5.4 mg/l	6 mg/l	5.4 mg/l	4.7 mg/l	4.4 mg/l	3.7 mg/l	1.6 mg/l	3.8 mg/l	7.62 mg/l	5.42 mg/l	--	--
Hardness, total as CaCO3	NA	Lab	307 mg/l	295 mg/l	286 mg/l	349 mg/l	379 mg/l	368 mg/l	397 mg/l	413 mg/l	354 mg/l	327 mg/l	535 mg/l	--	--
pH	NA	Field	8.9 pH units	6.64 pH units	8.69 pH units	8.87 pH units	8.57 pH units	8.1 pH units	8.54 pH units	8.72 pH units	7.36 pH units	7.53 pH units	7.87 pH units	7.97 pH units	--
Salinity	NA	Lab	0.3 salinity unit	0.4 salinity unit	0.3 salinity unit	0.4 salinity unit	0.4 salinity unit	0.4 salinity unit	0.4 salinity unit	0.4 salinity unit	0.4 salinity unit	0.4 salinity unit	0.6 salinity unit	--	--
Sodium, % of Total Cations	NA	Lab	46.7 %	45.3 %	39 %	40 %	39.7 %	40.5 %	39.4 %	36.6 %	38.5 %	--	30.4 %	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	4 mg/l	6.4 mg/l	53.6 mg/l	10 mg/l	10 mg/l	5.6 mg/l	12 mg/l	8 mg/l	5.3 mg/l	26.4 mg/l	--	--	--
Specific Conductance @ 25oC	NA	Field	1200 umhos/cm	790 umhos/cm	786 umhos/cm	500 umhos/cm	903 umhos/cm	932 umhos/cm	690 umhos/cm	800 umhos/cm	942 umhos/cm	874 umhos/cm	1210 umhos/cm	587 umhos/cm	--
Sulfate	NA	Lab	119 mg/l	122 mg/l	112 mg/l	136 mg/l	118 mg/l	138 mg/l	138 mg/l	139 mg/l	137 mg/l	148 mg/l	190 mg/l	--	--
Temperature, degrees C	NA	Field	24.8 deg C	23.1 deg C	22.8 deg C	20.0 deg C	15.5 deg C	15.5 deg C	7.3 deg C	3.3 deg C	0.6 deg C	2.4 deg C	0.7 deg C	0.7 deg C	--
Turbidity	NA	Field	5.6 NTU	6.81 NTU	1.9 NTU	5.02 NTU	5.5 NTU	3.1 NTU	19.6 NTU	6.72 NTU	6.02 NTU	6.15 NTU	1.48 NTU	--	--
Metals															
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	Total	Lab	257 ug/l	268 ug/l	255 ug/l	348 ug/l	343 ug/l	351 ug/l	322 ug/l	332 ug/l	292 ug/l	392 ug/l	461 ug/l	--	--
Calcium	Total	Lab	35600 ug/l	30100 ug/l	26700 ug/l	32200 ug/l	33300 ug/l	33400 ug/l	36100 ug/l	40600 ug/l	34600 ug/l	44700 ug/l	60300 ug/l	--	--
Cobalt	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Dissolved	Lab	--	30 ug/l	--	--	--	--	--	--	--	--	--	--	--
Magnesium	Total	Lab	53000 ug/l	53500 ug/l	53300 ug/l	65400 ug/l	71900 ug/l	69100 ug/l	74500 ug/l	75900 ug/l	65000 ug/l	52400 ug/l	93400 ug/l	--	--
Manganese	Total	Lab	20 ug/l	20 ug/l	170 ug/l	30 ug/l	30 ug/l	30 ug/l	90 ug/l	70 ug/l	40 ug/l	--	20 ug/l	--	--
Mercury	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	0.0036 ug/l
Molybdenum	Total	Lab	114 ug/l	90.4 ug/l	9.7 ug/l	74 ug/l	96.4 ug/l	65.2 ug/l	105 ug/l	74.2 ug/l	83 ug/l	192 ug/l	119 ug/l	--	--
Nickel	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	Total	Lab	11500 ug/l	10000 ug/l	11400 ug/l	13400 ug/l	12800 ug/l	13000 ug/l	12000 ug/l	12000 ug/l	10400 ug/l	--	18600 ug/l	--	--
Sodium	Total	Lab	87300 ug/l	77500 ug/l	58500 ug/l	74000 ug/l	77400 ug/l	79000 ug/l	80000 ug/l	74200 ug/l	69000 ug/l	113000 ug/l	112000 ug/l	--	--

Large Table 7
Existing Tailings Basin Ponds
Surface Water Data Summary

Sys Loc Code			HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E	HIST-Cell 2E
Sample Date			5/2/2002	6/6/2002	6/17/2002	7/10/2002	8/2/2002	8/28/2002	10/25/2002	12/3/2002	2/5/2003	4/14/2003	4/22/2003	11/10/2003	5/7/2004
Sample Type Code			N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total or Dissolved	Analysis Location													
General Parameters															
Alkalinity, bicarbonate as CaCO3	NA	Lab	**368 mg/l**	**374 mg/l**	--	**340 mg/l**	**310 mg/l**	--	**226 mg/l**	**386 mg/l**	**558 mg/l**	--	--	--	--
Alkalinity, total	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Cations	NA	Lab	**11 meq/l**	**12 meq/l**	--	**11 meq/l**	**10 meq/l**	--	--	--	--	--	--	--	--
Chloride	NA	Lab	**22.6 mg/l**	**23.6 mg/l**	--	**22 mg/l**	**21.2 mg/l**	--	--	--	--	--	--	--	--
Fluoride	NA	Lab	**3.6 mg/l**	**4.1 mg/l**	--	**3.6 mg/l**	**3.3 mg/l**	--	**4.6 mg/l**	**4.2 mg/l**	**6.8 mg/l**	--	--	**3.3 mg/l**	**2.4 mg/l**
Hardness, total as CaCO3	NA	Lab	**397 mg/l**	**455 mg/l**	--	**349 mg/l**	**375 mg/l**	--	**240 mg/l**	**460 mg/l**	**608 mg/l**	--	--	**342 mg/l**	**289 mg/l**
pH	NA	Field	**8.30 pH units**	**8.31 pH units**	**8.32 pH units**	**9.05 pH units**	**8.87 pH units**	**8.90 pH units**	**8.90 pH units**	**8.90 pH units**	**8.35 pH units**	--	--	**8.96 pH units**	--
Salinity	NA	Lab	**0.4 salinity unit**	**0.4 salinity unit**	--	**0.4 salinity unit**	**0.4 salinity unit**	--	--	--	--	--	--	--	--
Sodium, % of Total Cations	NA	Lab	**24 %**	**25 %**	--	**33 %**	**25 %**	--	--	--	--	--	--	--	--
Solids, total dissolved	NA	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, total suspended	NA	Lab	**10 mg/l**	**5 mg/l**	**2.8 mg/l**	**2.8 mg/l**	**2 mg/l**	--	--	--	--	--	**12 mg/l**	--	--
Specific Conductance @ 25oC	NA	Field	**923 umhos/cm**	**1040 umhos/cm**	**1050 umhos/cm**	**945 umhos/cm**	**901 umhos/cm**	**800 umhos/cm**	**1600 umhos/cm**	**1051 umhos/cm**	**1400 umhos/cm**	--	--	**810 umhos/cm**	--
Sulfate	NA	Lab	**108 mg/l**	**148 mg/l**	**154 mg/l**	**144 mg/l**	**124 mg/l**	--	**86 mg/l**	**162 mg/l**	**211 mg/l**	--	**61.4 mg/l**	**148 mg/l**	**95.6 mg/l**
Temperature, degrees C	NA	Field	**6.7 deg C**	**16.9 deg C**	**21.2 deg C**	**23.6 deg C**	**21.1 deg C**	**21.9 deg C**	--	--	--	--	--	**0.4 deg C**	--
Turbidity	NA	Field	**5.33 NTU**	**4.5 NTU**	--	**2.9 NTU**	**3.4 NTU**	--	--	--	--	--	--	--	--
Metals															
Arsenic	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	Total	Lab	**230 ug/l**	**411 ug/l**	--	**326 ug/l**	**283 ug/l**	--	**206 ug/l**	**331 ug/l**	**450 ug/l**	--	--	**310 ug/l**	**216 ug/l**
Calcium	Total	Lab	**43700 ug/l**	**43900 ug/l**	--	**27300 ug/l**	**23400 ug/l**	--	**17600 ug/l**	**32300 ug/l**	**54000 ug/l**	--	--	**13200 ug/l**	**23300 ug/l**
Cobalt	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	Dissolved	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	Total	Lab	**70300 ug/l**	**84000 ug/l**	--	**68400 ug/l**	**76900 ug/l**	--	**47600 ug/l**	**92300 ug/l**	**115000 ug/l**	--	--	**75100 ug/l**	**56200 ug/l**
Manganese	Total	Lab	**140 ug/l**	**40 ug/l**	--	**10 ug/l**	**20 ug/l**	--	--	--	--	--	--	--	--
Mercury	Total	Lab	--	--	**0.0007 ug/l**	--	--	--	--	--	--	**0.001 ug/l**	--	--	--
Molybdenum	Total	Lab	**75 ug/l**	**70 ug/l**	--	**64.8 ug/l**	**67 ug/l**	--	**108 ug/l**	**67.4 ug/l**	**92.4 ug/l**	--	--	**54.6 ug/l**	**32.1 ug/l**
Nickel	Total	Lab	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	Total	Lab	**10700 ug/l**	**11300 ug/l**	--	**13700 ug/l**	**9100 ug/l**	--	--	--	--	--	--	--	--
Sodium	Total	Lab	**60300 ug/l**	**71400 ug/l**	--	**82500 ug/l**	**60300 ug/l**	--	--	--	--	--	--	--	--

Large Table 8
Water Balance of the Capture Systems and the WWTP

Mine Year	A	B	C	D	E	F	G	H	I	J	K	L	M
	Water Captured by Capture Systems	Captured Water Returned to FTB Pond	Captured Water Sent to WWTP	Captured Water to Blended Water	FTB Pond to WWTP	HRF Water to WWTP	WWTP Total Inflow	WWTP Concentrate	Filter Backwash	WWTP Effluent Discharged to Tributaries	WWTP Effluent to Blended Water	Blended Water Send to FTB Pond	Blended Water Sent to Mine Site
			(A-B)	(A-B-C)			(C+E+F)	(5% of G)	(5% of G)		(G-H-I-J)		(D+K-L)
	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)
1	3072	1173	1900	0	0	0	1900	95	95	1710	0	0	0
2	3075	1172	1903	0	0	0	1903	95	95	1713	0	0	0
3	3086	1182	1904	0	0	0	1904	95	95	1714	0	0	0
4	3090	1185	1905	0	0	0	1905	95	95	1715	0	0	0
5	3029	1123	1906	0	0	0	1906	95	95	1715	0	0	0
6	3014	1102	1911	0	0	0	1911	96	96	1720	0	0	0
7	3243	1320	1923	0	0	0	1923	96	96	1731	0	0	0
8	3655	1376	2278	0	0	0	2278	114	114	2050	0	0	0
9	3987	1252	2735	0	0	0	2735	137	137	2462	0	0	0
10	4194	1168	3026	0	0	0	3026	151	151	2724	0	0	0
11	4284	1402	2882	0	0	0	2882	144	144	2594	0	0	0
12	4225	1352	2873	0	0	0	2873	144	144	2586	0	0	0
13	4032	1286	2746	0	0	0	2746	137	137	2472	0	0	0
14	3870	1108	2762	0	0	0	2762	138	138	2486	0	0	0
15	3805	1138	2667	0	0	0	2667	133	133	2401	0	0	0
16	3806	1877	1928	0	0	0	1928	96	96	1736	0	0	0
17	3820	1904	1917	0	0	0	1917	96	96	1725	0	0	0
18	3844	1911	1933	0	0	0	1933	97	97	1740	0	0	0
19	3864	1075	2789	0	0	0	2789	139	139	2510	0	0	0
20	3884	1871	2013	0	0	0	2013	101	101	1812	0	0	0
21	3891	201	2960	730	397	143	3500	175	175	1700	1450	21	2158
22	3892	221	2915	756	441	143	3500	175	175	1700	1450	19	2187
23	3862	240	2910	712	447	143	3500	175	175	1700	1450	17	2144
24	3837	269	2868	699	489	143	3500	175	175	1700	1450	18	2131
25	3784	307	2843	634	514	143	3500	175	175	1700	1450	22	2062
26	3633	322	2788	523	568	143	3500	175	175	1700	1450	42	1930
27	3306	283	2710	313	646	143	3500	175	175	1700	1450	164	1598
28	2918	215	2542	161	815	143	3500	175	175	1700	1450	400	1211
29	2629	158	2383	88	973	143	3500	175	175	1700	1450	627	910
30	2493	128	2293	72	1064	143	3500	175	175	1700	1450	735	787
31	2438	116	2239	83	1261	0	3500	175	175	1700	1450	677	856
32	2423	112	2231	80	1269	0	3500	175	175	1700	1450	673	857
33	2423	110	2232	82	1269	0	3500	175	175	1700	1450	658	874
34	2386	106	2211	69	1289	0	3500	175	175	1700	1450	717	802
35	2291	96	2135	60	1365	0	3500	175	175	1700	1450	789	722
36	2147	80	2024	43	1476	0	3500	175	175	1700	1450	903	590
37	2049	69	1946	34	1554	0	3500	175	175	1700	1450	994	490
38	2030	64	1932	33	1568	0	3500	175	175	1700	1450	1007	477
39	2022	61	1931	30	1570	0	3500	175	175	1700	1450	1016	464
40	2015	58	1927	30	1573	0	3500	175	175	1700	1450	1033	447
50	2013	30	1953	30	1384	0	3337	167	167	1786	1217	826	421
60	2015	12	1995	8	665	0	2660	133	133	2069	325	238	95
80	2023	11	2008	4	440	0	2448	122	122	2164	39	39	4

Large Table 9 Annual Summary of Concentration Statistics for the FTB Pond

Constituent	Mine Year	5			15			20			30			60			100		
	Percentile	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]
	Units																		
Ag (Silver)	µg/L	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	9.89E-02	1.12E-01	1.27E-01	5.36E-02	6.35E-02	8.43E-02	5.35E-02	6.18E-02	7.37E-02
Al (Aluminum)	µg/L	4.76E+00	6.12E+00	7.87E+00	4.76E+00	6.12E+00	7.87E+00	4.76E+00	6.12E+00	7.87E+00	4.76E+00	6.12E+00	7.87E+00	4.76E+00	6.12E+00	7.87E+00	4.76E+00	6.12E+00	7.87E+00
Alkalinity	mg/L	4.24E+01	5.23E+01	6.50E+01	4.24E+01	5.19E+01	6.42E+01	4.24E+01	5.23E+01	6.50E+01	4.23E+01	5.19E+01	6.31E+01	4.02E+01	4.69E+01	5.81E+01	3.81E+01	4.40E+01	5.11E+01
As (Arsenic)	µg/L	4.33E+00	4.92E+00	5.97E+00	8.92E+00	9.80E+00	1.11E+01	1.19E+01	1.38E+01	1.62E+01	1.90E+01	2.07E+01	2.29E+01	1.30E+01	1.68E+01	2.01E+01	1.76E+01	2.00E+01	2.27E+01
B (Boron)	µg/L	1.00E+02	1.00E+02	1.00E+02	9.99E+01	1.00E+02	1.00E+02	1.00E+02	1.00E+02	1.00E+02	9.17E+01	9.95E+01	1.00E+02	5.03E+01	7.13E+01	9.95E+01	3.78E+01	4.90E+01	6.74E+01
Ba (Barium)	µg/L	2.44E+01	2.48E+01	2.53E+01	2.22E+01	2.26E+01	2.31E+01	2.03E+01	2.25E+01	2.32E+01	6.95E+00	7.71E+00	8.43E+00	3.00E+00	3.53E+00	4.00E+00	2.61E+00	3.02E+00	3.57E+00
Be (Beryllium)	µg/L	3.58E-01	3.86E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	3.59E-01	3.99E-01	4.00E-01	2.65E-01	3.04E-01	3.53E-01	1.81E-01	2.22E-01	2.92E-01	1.78E-01	2.06E-01	2.44E-01
Ca (Calcium)	mg/L	3.92E+01	4.08E+01	4.24E+01	5.21E+01	5.72E+01	6.18E+01	6.09E+01	6.88E+01	7.84E+01	3.87E+01	4.45E+01	5.13E+01	1.80E+01	2.17E+01	2.61E+01	1.54E+01	1.78E+01	2.11E+01
Cd (Cadmium)	µg/L	3.11E-01	8.81E-01	1.12E+00	3.11E-01	8.88E-01	1.89E+00	3.11E-01	6.79E-01	9.71E-01	3.06E-01	4.88E-01	8.99E-01	7.61E-02	1.27E-01	2.41E-01	4.85E-02	6.32E-02	9.12E-02
Cl (Chloride)	mg/L	2.22E+01	2.48E+01	2.89E+01	2.99E+01	3.30E+01	3.78E+01	2.11E+01	2.52E+01	3.13E+01	4.70E+00	5.52E+00	6.68E+00	9.69E-01	1.13E+00	1.36E+00	9.17E-01	1.10E+00	1.35E+00
Co (Cobalt)	µg/L	4.65E+00	9.25E+00	1.75E+01	6.73E+00	1.18E+01	2.18E+01	8.09E+00	1.48E+01	2.74E+01	4.05E+00	6.06E+00	9.73E+00	8.65E-01	1.50E+00	2.87E+00	3.70E-01	5.39E-01	7.94E-01
Cr (Chromium)	µg/L	1.45E+00	1.57E+00	1.71E+00	3.97E+00	4.26E+00	4.57E+00	2.11E+00	2.39E+00	2.66E+00	2.14E+00	2.44E+00	2.72E+00	4.67E-01	6.25E-01	9.33E-01	3.32E-01	4.02E-01	4.99E-01
Cu (Copper)	µg/L	2.39E+01	3.97E+01	1.19E+02	2.39E+01	3.97E+01	1.22E+02	2.39E+01	3.97E+01	1.22E+02	2.39E+01	3.87E+01	7.40E+01	5.32E+00	6.39E+00	7.71E+00	3.11E+00	3.68E+00	4.39E+00
F (Fluoride)	mg/L	6.59E-01	7.19E-01	7.82E-01	9.37E-01	1.01E+00	1.09E+00	4.13E-01	4.78E-01	5.43E-01	1.94E-01	2.25E-01	2.53E-01	4.57E-02	5.17E-02	6.03E-02	4.82E-02	5.45E-02	6.20E-02
Fe (Iron)	µg/L	2.38E+01	3.92E+01	5.37E+01	2.38E+01	3.92E+01	5.37E+01	2.38E+01	3.92E+01	5.37E+01	2.38E+01	3.92E+01	5.37E+01	2.38E+01	3.92E+01	5.37E+01	2.38E+01	3.92E+01	5.37E+01
K (Potassium)	mg/L	1.38E+01	1.51E+01	1.64E+01	3.85E+01	4.16E+01	4.44E+01	1.99E+01	2.44E+01	2.93E+01	8.35E+00	9.23E+00	1.03E+01	1.65E+00	2.84E+00	3.63E+00	3.15E+00	3.55E+00	3.98E+00
Mg (Magnesium)	mg/L	5.07E+01	5.32E+01	5.55E+01	4.88E+01	5.75E+01	6.42E+01	6.24E+01	6.93E+01	7.69E+01	1.56E+01	1.76E+01	2.00E+01	3.08E+00	3.88E+00	5.32E+00	3.58E+00	4.35E+00	5.56E+00
Mn (Manganese)	µg/L	1.45E+02	2.13E+02	2.75E+02	1.45E+02	2.13E+02	2.75E+02	1.45E+02	2.13E+02	2.75E+02	1.45E+02	2.13E+02	2.75E+02	4.55E+01	5.96E+01	8.57E+01	4.99E+01	6.58E+01	9.02E+01
Na (Sodium)	mg/L	6.80E+01	7.46E+01	8.16E+01	1.19E+02	1.30E+02	1.42E+02	6.31E+01	7.56E+01	8.86E+01	1.44E+01	1.63E+01	1.85E+01	1.59E+00	1.80E+00	2.31E+00	1.46E+00	1.74E+00	2.19E+00
Ni (Nickel)	µg/L	7.68E+01	1.63E+02	3.07E+02	1.09E+02	2.10E+02	3.50E+02	1.17E+02	2.39E+02	3.98E+02	5.05E+01	8.13E+01	1.27E+02	8.80E+00	1.54E+01	2.89E+01	3.43E+00	5.00E+00	7.45E+00
Pb (Lead)	µg/L	3.93E+00	4.64E+00	5.85E+00	1.08E+01	1.19E+01	1.35E+01	9.71E+00	1.18E+01	1.45E+01	8.09E+00	9.47E+00	1.12E+01	8.23E-01	1.11E+00	1.80E+00	2.51E-01	3.52E-01	5.01E-01
Sb (Antimony)	µg/L	7.51E+00	8.32E+00	9.16E+00	1.39E+01	1.55E+01	1.70E+01	6.06E+00	7.13E+00	8.15E+00	5.75E+00	6.62E+00	7.54E+00	3.37E+00	3.89E+00	4.42E+00	3.63E+00	4.11E+00	4.63E+00
Se (Selenium)	µg/L	1.52E+00	1.66E+00	1.83E+00	2.55E+00	2.78E+00	3.03E+00	1.51E+00	1.73E+00	2.04E+00	1.21E+00	1.49E+00	1.84E+00	3.05E-01	3.92E-01	5.58E-01	2.50E-01	2.97E-01	3.70E-01
SO4 (Sulfate)	mg/L	1.88E+02	2.00E+02	2.10E+02	2.50E+02	2.65E+02	2.81E+02	2.34E+02	2.55E+02	2.77E+02	6.11E+01	6.83E+01	7.69E+01	1.21E+01	1.66E+01	2.15E+01	1.73E+01	2.01E+01	2.37E+01
Tl (Thallium)	µg/L	8.58E-02	9.38E-02	1.04E-01	1.62E-01	1.75E-01	1.89E-01	9.20E-02	1.05E-01	1.22E-01	7.50E-02	8.45E-02	9.80E-02	2.79E-02	3.49E-02	5.15E-02	2.35E-02	2.83E-02	3.57E-02
V (Vanadium)	µg/L	3.89E+00	5.31E+00	8.05E+00	7.28E+00	8.96E+00	1.00E+01	4.61E+00	6.44E+00	9.67E+00	3.05E+00	3.45E+00	3.88E+00	3.46E-01	6.50E-01	1.30E+00	1.14E-01	2.00E-01	3.35E-01
Zn (Zinc)	µg/L	3.30E+01	6.86E+01	8.52E+01	3.30E+01	6.86E+01	8.52E+01	3.30E+01	5.65E+01	7.12E+01	3.04E+01	4.09E+01	5.97E+01	5.21E+00	8.74E+00	1.71E+01	2.74E+00	3.64E+00	5.39E+00

Notes

[1] Values shown are the average of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the average of the monthly P90 values for the referenced Mine Year.

Large Table 10 Annual Summary of Concentration Statistics for the North Toe of the Tailings Basin

Constituent	Mine Year	5			15			20			30			60			100		
	Percentile Units	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]
Ag (Silver)	µg/L	1.64E-01	1.67E-01	1.69E-01	2.03E-01	2.05E-01	2.12E-01	1.91E-01	1.93E-01	1.96E-01	1.78E-01	1.83E-01	1.90E-01	1.52E-01	1.61E-01	1.79E-01	1.50E-01	1.60E-01	1.82E-01
Al (Aluminum)	µg/L	1.15E+01	1.15E+01	1.16E+01	2.28E+00	2.72E+00	3.18E+00	1.47E+00	1.79E+00	2.16E+00	2.23E+00	3.44E+00	4.54E+00	2.80E+00	5.68E+00	8.69E+00	2.92E+00	6.35E+00	9.87E+00
Alkalinity	mg/L	2.43E+02	2.44E+02	2.45E+02	5.82E+01	6.36E+01	6.89E+01	4.91E+01	5.50E+01	6.00E+01	7.05E+01	8.59E+01	9.54E+01	7.89E+01	8.93E+01	9.91E+01	7.81E+01	8.90E+01	9.95E+01
As (Arsenic)	µg/L	4.91E+00	5.01E+00	5.15E+00	3.62E+01	4.27E+01	5.05E+01	4.97E+01	5.29E+01	5.57E+01	1.96E+01	2.14E+01	2.38E+01	2.38E+01	2.63E+01	2.89E+01	2.57E+01	2.83E+01	3.10E+01
B (Boron)	µg/L	2.97E+02	2.98E+02	2.99E+02	1.30E+02	1.34E+02	1.40E+02	1.10E+02	1.13E+02	1.18E+02	1.33E+02	1.42E+02	1.56E+02	1.64E+02	1.81E+02	1.99E+02	1.74E+02	1.95E+02	2.15E+02
Ba (Barium)	µg/L	1.63E+02	1.64E+02	1.64E+02	2.33E+01	2.39E+01	2.47E+01	2.02E+01	2.09E+01	2.18E+01	2.22E+01	2.29E+01	2.46E+01	2.67E+01	2.76E+01	2.91E+01	2.99E+01	3.10E+01	3.23E+01
Be (Beryllium)	µg/L	2.87E-01	2.88E-01	2.90E-01	4.17E-01	4.27E-01	4.38E-01	3.93E-01	4.00E-01	4.07E-01	3.85E-01	4.12E-01	4.40E-01	3.49E-01	4.21E-01	4.95E-01	3.47E-01	4.37E-01	5.23E-01
Ca (Calcium)	mg/L	4.56E+01	4.59E+01	4.63E+01	9.95E+01	1.29E+02	1.68E+02	1.48E+02	1.99E+02	2.67E+02	1.04E+02	1.28E+02	1.48E+02	7.75E+01	9.12E+01	1.06E+02	7.70E+01	9.11E+01	1.08E+02
Cd (Cadmium)	µg/L	1.88E-01	1.94E-01	2.08E-01	9.39E-01	1.30E+00	2.84E+00	1.18E+00	1.79E+00	3.85E+00	1.16E+00	1.45E+00	2.00E+00	6.79E-01	8.74E-01	1.81E+00	4.89E-01	6.54E-01	1.56E+00
Cl (Chloride)	mg/L	2.23E+01	2.24E+01	2.26E+01	2.04E+01	2.25E+01	2.66E+01	2.55E+01	2.80E+01	3.25E+01	2.14E+01	2.35E+01	2.76E+01	1.46E+01	1.59E+01	1.78E+01	1.20E+01	1.30E+01	1.44E+01
Co (Cobalt)	µg/L	2.32E+00	2.55E+00	2.99E+00	9.86E+00	2.00E+01	4.04E+01	1.32E+01	2.78E+01	6.53E+01	9.73E+00	1.93E+01	3.47E+01	5.67E+00	1.09E+01	2.20E+01	4.64E+00	9.26E+00	2.07E+01
Cr (Chromium)	µg/L	6.77E-01	7.21E-01	7.76E-01	6.64E+00	6.91E+00	7.20E+00	5.97E+00	6.28E+00	6.58E+00	3.07E+00	3.28E+00	3.71E+00	2.83E+00	3.07E+00	3.34E+00	2.40E+00	2.63E+00	2.89E+00
Cu (Copper)	µg/L	1.60E+01	2.18E+01	2.98E+01	3.16E+02	4.81E+02	6.54E+02	3.10E+02	4.74E+02	6.50E+02	2.83E+02	4.26E+02	5.92E+02	2.46E+02	3.76E+02	5.15E+02	2.48E+02	3.76E+02	5.10E+02
F (Fluoride)	mg/L	3.72E+00	3.74E+00	3.75E+00	1.09E+00	1.15E+00	1.23E+00	1.11E+00	1.18E+00	1.26E+00	7.02E-01	7.59E-01	8.88E-01	4.22E-01	4.50E-01	4.96E-01	3.11E-01	3.29E-01	3.51E-01
Fe (Iron)	µg/L	3.84E+03	3.87E+03	3.89E+03	5.30E+02	6.25E+02	7.12E+02	1.49E+02	1.79E+02	2.06E+02	2.26E+02	3.15E+02	3.95E+02	4.12E+02	6.52E+02	8.52E+02	4.37E+02	7.18E+02	9.46E+02
K (Potassium)	mg/L	1.01E+01	1.02E+01	1.03E+01	2.55E+01	2.92E+01	3.30E+01	3.40E+01	3.52E+01	3.63E+01	2.50E+01	2.66E+01	2.83E+01	2.06E+01	2.21E+01	2.36E+01	1.79E+01	1.94E+01	2.07E+01
Mg (Magnesium)	mg/L	7.98E+01	8.03E+01	8.07E+01	6.65E+01	7.15E+01	7.84E+01	7.54E+01	8.45E+01	9.63E+01	7.23E+01	7.95E+01	8.75E+01	6.00E+01	6.99E+01	8.09E+01	5.61E+01	6.72E+01	8.03E+01
Mn (Manganese)	µg/L	3.69E+02	3.91E+02	4.15E+02	4.61E+02	6.13E+02	8.72E+02	4.44E+02	6.30E+02	8.64E+02	4.79E+02	6.81E+02	8.79E+02	5.67E+02	7.38E+02	9.27E+02	6.07E+02	7.81E+02	9.67E+02
Na (Sodium)	mg/L	7.03E+01	7.08E+01	7.12E+01	6.89E+01	7.37E+01	7.87E+01	9.86E+01	1.05E+02	1.13E+02	7.73E+01	8.22E+01	8.84E+01	4.82E+01	5.23E+01	5.66E+01	3.77E+01	4.18E+01	4.59E+01
Ni (Nickel)	µg/L	8.24E+00	1.24E+01	2.05E+01	1.51E+02	3.10E+02	5.99E+02	2.08E+02	4.25E+02	8.93E+02	1.45E+02	2.99E+02	5.55E+02	8.19E+01	1.60E+02	3.08E+02	6.51E+01	1.32E+02	2.66E+02
Pb (Lead)	µg/L	1.74E+00	1.89E+00	2.11E+00	4.28E+01	5.30E+01	6.12E+01	5.15E+01	5.47E+01	5.78E+01	1.99E+01	2.18E+01	2.43E+01	2.23E+01	2.49E+01	2.78E+01	2.13E+01	2.44E+01	2.79E+01
Sb (Antimony)	µg/L	6.73E-01	7.06E-01	7.39E-01	1.00E+01	1.12E+01	1.28E+01	1.36E+01	1.63E+01	1.90E+01	9.55E+00	1.06E+01	1.18E+01	6.15E+00	6.78E+00	7.60E+00	5.28E+00	5.89E+00	6.66E+00
Se (Selenium)	µg/L	7.63E-01	7.71E-01	7.81E-01	2.75E+00	3.26E+00	3.81E+00	3.92E+00	4.82E+00	5.75E+00	2.66E+00	3.15E+00	3.75E+00	1.59E+00	1.83E+00	2.13E+00	1.33E+00	1.55E+00	1.82E+00
SO4 (Sulfate)	mg/L	3.36E+02	3.38E+02	3.40E+02	2.80E+02	3.03E+02	3.33E+02	3.43E+02	3.77E+02	4.24E+02	2.62E+02	2.87E+02	3.18E+02	1.60E+02	1.82E+02	2.02E+02	1.35E+02	1.56E+02	1.77E+02
Tl (Thallium)	µg/L	1.80E-01	1.81E-01	1.82E-01	1.93E-01	1.97E-01	2.02E-01	1.89E-01	1.91E-01	1.93E-01	1.73E-01	1.77E-01	1.83E-01	1.49E-01	1.57E-01	1.69E-01	1.49E-01	1.56E-01	1.69E-01
V (Vanadium)	µg/L	4.36E+00	4.42E+00	4.52E+00	9.61E+00	9.69E+00	9.76E+00	9.35E+00	9.45E+00	9.54E+00	8.49E+00	8.67E+00	8.85E+00	7.33E+00	7.61E+00	7.90E+00	7.37E+00	7.63E+00	7.90E+00
Zn (Zinc)	µg/L	1.45E+01	1.50E+01	1.57E+01	9.78E+01	1.19E+02	1.96E+02	1.29E+02	1.60E+02	2.57E+02	1.22E+02	1.41E+02	1.71E+02	6.80E+01	8.12E+01	1.29E+02	4.70E+01	5.77E+01	1.05E+02

Notes

[1] Values shown are the average of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the average of the monthly P90 values for the referenced Mine Year.

Large Table 11 Annual Summary of Concentration Statistics for the Northwest Toe of the Tailings Basin

Constituent	Mine Year	5			15			20			30			60			100		
	Percentile / Units	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]
Ag (Silver)	µg/L	1.01E-01	1.02E-01	1.02E-01	1.16E-01	1.32E-01	1.82E-01	9.54E-02	1.18E-01	1.91E-01	6.09E-02	8.70E-02	1.76E-01	3.66E-02	8.22E-02	2.28E-01	3.23E-02	8.52E-02	2.50E-01
Al (Aluminum)	µg/L	2.13E+01	2.13E+01	2.14E+01	1.69E+01	2.05E+01	2.41E+01	1.65E+01	2.21E+01	2.78E+01	1.08E+01	1.77E+01	2.47E+01	9.59E+00	2.15E+01	3.35E+01	8.76E+00	2.21E+01	3.55E+01
Alkalinity	mg/L	2.29E+02	2.30E+02	2.30E+02	2.11E+02	2.22E+02	2.33E+02	2.22E+02	2.38E+02	2.55E+02	1.69E+02	1.89E+02	2.09E+02	1.94E+02	2.27E+02	2.61E+02	1.94E+02	2.32E+02	2.71E+02
As (Arsenic)	µg/L	1.31E+00	1.31E+00	1.32E+00	3.92E+00	4.39E+00	4.96E+00	5.85E+00	6.61E+00	7.50E+00	5.20E+00	6.00E+00	6.94E+00	1.40E+00	1.89E+00	2.85E+00	1.41E+00	1.99E+00	3.00E+00
B (Boron)	µg/L	4.66E+02	4.67E+02	4.69E+02	4.36E+02	4.57E+02	4.79E+02	4.57E+02	4.88E+02	5.22E+02	3.49E+02	3.88E+02	4.27E+02	4.00E+02	4.66E+02	5.31E+02	4.03E+02	4.76E+02	5.51E+02
Ba (Barium)	µg/L	2.39E+01	2.40E+01	2.41E+01	2.38E+01	2.44E+01	2.52E+01	2.43E+01	2.50E+01	2.63E+01	1.88E+01	1.96E+01	2.10E+01	2.10E+01	2.21E+01	2.45E+01	2.13E+01	2.25E+01	2.51E+01
Be (Beryllium)	µg/L	5.18E-01	5.19E-01	5.21E-01	4.69E-01	5.61E-01	6.56E-01	4.36E-01	5.86E-01	7.30E-01	2.82E-01	4.61E-01	6.40E-01	2.25E-01	5.32E-01	8.39E-01	2.02E-01	5.45E-01	8.82E-01
Ca (Calcium)	mg/L	9.43E+01	9.47E+01	9.50E+01	9.61E+01	1.01E+02	1.07E+02	1.09E+02	1.18E+02	1.27E+02	8.62E+01	9.67E+01	1.06E+02	8.18E+01	9.56E+01	1.10E+02	8.20E+01	9.79E+01	1.14E+02
Cd (Cadmium)	µg/L	1.15E-01	1.16E-01	1.17E-01	3.06E-01	3.82E-01	4.82E-01	2.77E-01	3.64E-01	5.62E-01	1.31E-01	2.20E-01	4.30E-01	5.12E-02	1.09E-01	2.58E-01	4.21E-02	1.07E-01	2.79E-01
Cl (Chloride)	mg/L	2.10E+01	2.10E+01	2.11E+01	2.26E+01	2.34E+01	2.43E+01	2.35E+01	2.46E+01	2.57E+01	1.74E+01	1.84E+01	1.95E+01	1.90E+01	2.07E+01	2.26E+01	1.92E+01	2.12E+01	2.31E+01
Co (Cobalt)	µg/L	2.13E+00	2.15E+00	2.19E+00	3.34E+00	4.63E+00	6.78E+00	3.49E+00	5.41E+00	9.68E+00	2.60E+00	4.55E+00	8.48E+00	1.08E+00	2.12E+00	4.76E+00	9.54E-01	2.11E+00	5.13E+00
Cr (Chromium)	µg/L	5.86E-01	5.88E-01	5.90E-01	9.88E-01	1.05E+00	1.11E+00	1.14E+00	1.23E+00	1.34E+00	9.65E-01	1.07E+00	1.18E+00	5.49E-01	6.63E-01	7.68E-01	5.44E-01	6.68E-01	7.89E-01
Cu (Copper)	µg/L	3.83E+00	6.17E+00	8.59E+00	5.22E+01	7.80E+01	1.11E+02	4.23E+01	6.26E+01	8.75E+01	2.94E+01	4.46E+01	5.94E+01	7.15E+00	1.06E+01	1.44E+01	6.89E+00	1.06E+01	1.48E+01
F (Fluoride)	mg/L	1.26E-01	1.27E-01	1.28E-01	1.85E-01	1.99E-01	2.15E-01	1.59E-01	1.74E-01	1.90E-01	9.17E-02	1.00E-01	1.12E-01	4.47E-02	4.66E-02	4.89E-02	4.35E-02	4.54E-02	4.77E-02
Fe (Iron)	µg/L	4.77E+03	4.79E+03	4.81E+03	4.73E+03	5.33E+03	5.85E+03	4.43E+03	5.23E+03	5.84E+03	3.25E+03	4.26E+03	5.01E+03	3.59E+03	5.14E+03	6.42E+03	3.62E+03	5.39E+03	6.76E+03
K (Potassium)	mg/L	9.85E+00	9.89E+00	9.92E+00	1.18E+01	1.26E+01	1.33E+01	1.29E+01	1.40E+01	1.51E+01	9.79E+00	1.11E+01	1.23E+01	8.16E+00	1.02E+01	1.23E+01	8.04E+00	1.04E+01	1.27E+01
Mg (Magnesium)	mg/L	1.61E+02	1.62E+02	1.62E+02	1.50E+02	1.61E+02	1.74E+02	1.56E+02	1.73E+02	1.94E+02	1.17E+02	1.36E+02	1.61E+02	1.24E+02	1.59E+02	2.02E+02	1.24E+02	1.62E+02	2.09E+02
Mn (Manganese)	µg/L	1.14E+03	1.14E+03	1.14E+03	1.10E+03	1.19E+03	1.28E+03	1.11E+03	1.24E+03	1.38E+03	8.27E+02	9.79E+02	1.13E+03	8.80E+02	1.14E+03	1.41E+03	8.76E+02	1.17E+03	1.47E+03
Na (Sodium)	mg/L	5.49E+01	5.51E+01	5.53E+01	5.92E+01	6.30E+01	6.70E+01	6.23E+01	6.80E+01	7.35E+01	4.37E+01	4.99E+01	5.62E+01	4.37E+01	5.46E+01	6.52E+01	4.34E+01	5.54E+01	6.76E+01
Ni (Nickel)	µg/L	5.02E+00	5.43E+00	6.23E+00	2.34E+01	4.20E+01	7.56E+01	2.80E+01	5.43E+01	1.03E+02	2.20E+01	4.29E+01	8.94E+01	5.15E+00	9.10E+00	1.57E+01	4.46E+00	8.71E+00	1.54E+01
Pb (Lead)	µg/L	1.98E-01	2.02E-01	2.09E-01	3.23E+00	3.69E+00	4.25E+00	4.95E+00	5.63E+00	6.49E+00	4.61E+00	5.39E+00	6.29E+00	7.93E-01	9.30E-01	1.12E+00	7.62E-01	9.16E-01	1.12E+00
Sb (Antimony)	µg/L	3.54E-01	3.59E-01	3.63E-01	1.82E+00	2.01E+00	2.24E+00	1.92E+00	2.29E+00	2.70E+00	1.09E+00	1.34E+00	1.69E+00	2.73E-01	4.13E-01	7.86E-01	2.45E-01	4.07E-01	8.27E-01
Se (Selenium)	µg/L	4.39E-01	4.41E-01	4.43E-01	7.43E-01	8.30E-01	1.00E+00	8.18E-01	9.75E-01	1.24E+00	5.81E-01	7.33E-01	1.06E+00	2.44E-01	3.97E-01	8.99E-01	2.31E-01	4.02E-01	9.69E-01
SO4 (Sulfate)	mg/L	3.13E+02	3.14E+02	3.15E+02	3.42E+02	3.82E+02	4.17E+02	3.29E+02	3.81E+02	4.24E+02	2.40E+02	3.06E+02	3.58E+02	2.34E+02	3.35E+02	4.17E+02	2.36E+02	3.52E+02	4.42E+02
Tl (Thallium)	µg/L	7.24E-02	7.27E-02	7.29E-02	8.90E-02	9.94E-02	1.33E-01	7.41E-02	8.80E-02	1.34E-01	4.74E-02	6.46E-02	1.19E-01	2.66E-02	5.49E-02	1.41E-01	2.35E-02	5.54E-02	1.54E-01
V (Vanadium)	µg/L	8.86E-01	9.00E-01	9.08E-01	2.19E+00	2.31E+00	2.43E+00	1.83E+00	1.96E+00	2.09E+00	1.30E+00	1.42E+00	1.55E+00	7.15E-01	8.84E-01	1.05E+00	7.11E-01	9.01E-01	1.09E+00
Zn (Zinc)	µg/L	3.69E+00	3.75E+00	3.85E+00	2.66E+01	3.13E+01	3.71E+01	2.26E+01	2.67E+01	3.63E+01	9.75E+00	1.33E+01	2.30E+01	3.82E+00	5.03E+00	6.77E+00	3.47E+00	4.82E+00	6.60E+00

Notes

[1] Values shown are the average of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the average of the monthly P90 values for the referenced Mine Year.

Large Table 12 Annual Summary of Concentration Statistics for the West Toe of the Tailings Basin

	Mine Year	5			15			20			30			60			100		
	Percentile	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]
Constituent	Units																		
Ag (Silver)	µg/L	1.09E-01	1.09E-01	1.09E-01	1.10E-01	1.24E-01	1.67E-01	1.05E-01	1.28E-01	2.04E-01	6.73E-02	9.62E-02	1.91E-01	4.06E-02	9.02E-02	2.50E-01	3.68E-02	9.37E-02	2.74E-01
Al (Aluminum)	µg/L	2.13E+01	2.14E+01	2.14E+01	1.45E+01	1.78E+01	2.11E+01	1.43E+01	1.98E+01	2.56E+01	1.00E+01	1.71E+01	2.44E+01	9.28E+00	2.12E+01	3.33E+01	8.59E+00	2.18E+01	3.50E+01
Alkalinity	mg/L	2.30E+02	2.31E+02	2.32E+02	1.84E+02	1.94E+02	2.04E+02	2.00E+02	2.17E+02	2.33E+02	1.65E+02	1.85E+02	2.06E+02	1.91E+02	2.25E+02	2.59E+02	1.92E+02	2.30E+02	2.68E+02
As (Arsenic)	µg/L	1.42E+00	1.42E+00	1.43E+00	5.92E+00	6.85E+00	8.02E+00	1.10E+01	1.24E+01	1.40E+01	4.96E+00	5.65E+00	6.47E+00	1.81E+00	2.35E+00	3.44E+00	1.87E+00	2.52E+00	3.64E+00
B (Boron)	µg/L	4.65E+02	4.66E+02	4.67E+02	3.82E+02	4.01E+02	4.20E+02	4.16E+02	4.47E+02	4.81E+02	3.40E+02	3.80E+02	4.21E+02	3.95E+02	4.62E+02	5.26E+02	3.99E+02	4.71E+02	5.45E+02
Ba (Barium)	µg/L	2.63E+01	2.63E+01	2.64E+01	2.26E+01	2.32E+01	2.40E+01	2.36E+01	2.44E+01	2.57E+01	1.90E+01	1.99E+01	2.16E+01	2.05E+01	2.18E+01	2.44E+01	2.09E+01	2.21E+01	2.49E+01
Be (Beryllium)	µg/L	5.17E-01	5.19E-01	5.20E-01	4.27E-01	5.09E-01	5.93E-01	4.19E-01	5.66E-01	7.11E-01	2.80E-01	4.67E-01	6.52E-01	2.23E-01	5.31E-01	8.39E-01	2.03E-01	5.43E-01	8.78E-01
Ca (Calcium)	mg/L	9.36E+01	9.39E+01	9.42E+01	8.90E+01	9.51E+01	1.01E+02	1.10E+02	1.21E+02	1.33E+02	8.16E+01	9.16E+01	1.01E+02	8.15E+01	9.56E+01	1.10E+02	8.18E+01	9.78E+01	1.13E+02
Cd (Cadmium)	µg/L	1.23E-01	1.24E-01	1.24E-01	3.18E-01	3.98E-01	5.82E-01	3.73E-01	5.06E-01	8.74E-01	2.05E-01	2.89E-01	4.74E-01	6.78E-02	1.33E-01	3.00E-01	5.63E-02	1.29E-01	3.19E-01
Cl (Chloride)	mg/L	2.09E+01	2.09E+01	2.10E+01	2.06E+01	2.13E+01	2.23E+01	2.39E+01	2.51E+01	2.65E+01	1.82E+01	1.93E+01	2.05E+01	1.90E+01	2.07E+01	2.25E+01	1.90E+01	2.10E+01	2.30E+01
Co (Cobalt)	µg/L	2.30E+00	2.31E+00	2.33E+00	3.42E+00	5.19E+00	8.19E+00	4.54E+00	7.48E+00	1.37E+01	2.85E+00	4.63E+00	8.23E+00	1.24E+00	2.44E+00	5.38E+00	1.12E+00	2.43E+00	5.74E+00
Cr (Chromium)	µg/L	5.81E-01	5.83E-01	5.85E-01	1.32E+00	1.46E+00	1.63E+00	1.68E+00	1.83E+00	1.99E+00	9.77E-01	1.07E+00	1.16E+00	5.86E-01	7.01E-01	8.08E-01	5.75E-01	6.97E-01	8.16E-01
Cu (Copper)	µg/L	2.66E+00	2.74E+00	3.09E+00	6.64E+01	9.97E+01	1.41E+02	7.21E+01	1.08E+02	1.51E+02	4.38E+01	6.67E+01	9.03E+01	1.21E+01	1.80E+01	2.43E+01	1.19E+01	1.81E+01	2.46E+01
F (Fluoride)	mg/L	1.68E-01	1.69E-01	1.70E-01	2.19E-01	2.42E-01	2.76E-01	2.59E-01	2.86E-01	3.15E-01	1.27E-01	1.36E-01	1.47E-01	5.22E-02	5.45E-02	5.72E-02	4.86E-02	5.08E-02	5.32E-02
Fe (Iron)	µg/L	5.21E+03	5.22E+03	5.24E+03	3.95E+03	4.48E+03	4.90E+03	4.01E+03	4.87E+03	5.55E+03	3.17E+03	4.32E+03	5.20E+03	3.68E+03	5.50E+03	7.06E+03	3.75E+03	5.84E+03	7.45E+03
K (Potassium)	mg/L	9.78E+00	9.81E+00	9.84E+00	1.19E+01	1.27E+01	1.34E+01	1.53E+01	1.65E+01	1.77E+01	1.05E+01	1.18E+01	1.31E+01	8.38E+00	1.04E+01	1.25E+01	8.18E+00	1.05E+01	1.28E+01
Mg (Magnesium)	mg/L	1.60E+02	1.60E+02	1.61E+02	1.32E+02	1.42E+02	1.54E+02	1.46E+02	1.62E+02	1.83E+02	1.14E+02	1.34E+02	1.60E+02	1.23E+02	1.58E+02	2.00E+02	1.23E+02	1.60E+02	2.06E+02
Mn (Manganese)	µg/L	1.13E+03	1.13E+03	1.13E+03	9.72E+02	1.05E+03	1.13E+03	1.05E+03	1.18E+03	1.31E+03	8.22E+02	9.82E+02	1.14E+03	8.76E+02	1.14E+03	1.40E+03	8.73E+02	1.17E+03	1.45E+03
Na (Sodium)	mg/L	5.48E+01	5.50E+01	5.51E+01	5.48E+01	5.82E+01	6.18E+01	6.62E+01	7.19E+01	7.77E+01	4.61E+01	5.28E+01	5.95E+01	4.38E+01	5.48E+01	6.54E+01	4.33E+01	5.52E+01	6.72E+01
Ni (Nickel)	µg/L	5.23E+00	5.41E+00	5.79E+00	2.88E+01	5.45E+01	1.00E+02	4.48E+01	8.75E+01	1.67E+02	2.45E+01	4.69E+01	8.61E+01	7.38E+00	1.24E+01	2.09E+01	6.24E+00	1.15E+01	1.99E+01
Pb (Lead)	µg/L	1.99E-01	2.01E-01	2.03E-01	5.72E+00	6.78E+00	8.15E+00	1.03E+01	1.17E+01	1.33E+01	4.38E+00	5.01E+00	5.68E+00	1.15E+00	1.32E+00	1.55E+00	1.10E+00	1.29E+00	1.55E+00
Sb (Antimony)	µg/L	3.65E-01	3.67E-01	3.69E-01	2.17E+00	2.42E+00	2.73E+00	3.14E+00	3.68E+00	4.33E+00	1.50E+00	1.75E+00	2.07E+00	4.03E-01	5.62E-01	9.72E-01	3.57E-01	5.37E-01	1.01E+00
Se (Selenium)	µg/L	4.74E-01	4.76E-01	4.78E-01	7.96E-01	9.02E-01	1.06E+00	1.10E+00	1.31E+00	1.58E+00	5.98E-01	7.40E-01	1.07E+00	2.80E-01	4.53E-01	9.99E-01	2.64E-01	4.57E-01	1.09E+00
SO4 (Sulfate)	mg/L	3.41E+02	3.42E+02	3.43E+02	3.02E+02	3.38E+02	3.67E+02	3.31E+02	3.87E+02	4.37E+02	2.39E+02	3.16E+02	3.77E+02	2.42E+02	3.61E+02	4.61E+02	2.46E+02	3.83E+02	4.88E+02
Tl (Thallium)	µg/L	7.90E-02	7.93E-02	7.95E-02	8.77E-02	9.70E-02	1.25E-01	8.64E-02	1.01E-01	1.48E-01	5.46E-02	7.25E-02	1.33E-01	3.01E-02	6.14E-02	1.56E-01	2.75E-02	6.19E-02	1.69E-01
V (Vanadium)	µg/L	8.39E-01	8.43E-01	8.50E-01	2.45E+00	2.61E+00	2.80E+00	2.62E+00	2.80E+00	2.99E+00	1.72E+00	1.85E+00	1.98E+00	8.46E-01	1.02E+00	1.19E+00	8.49E-01	1.04E+00	1.22E+00
Zn (Zinc)	µg/L	3.75E+00	3.78E+00	3.81E+00	2.83E+01	3.30E+01	4.33E+01	3.34E+01	3.95E+01	6.00E+01	1.79E+01	2.13E+01	2.97E+01	5.43E+00	6.93E+00	9.24E+00	4.68E+00	6.30E+00	8.50E+00

Notes

1 Values shown are the average of the monthly P10 values for the referenced Mine Year.

2 Values shown are the average of the monthly P50 values for the referenced Mine Year.

3 Values shown are the average of the monthly P90 values for the referenced Mine Year.

Large Table 13 Annual Summary of Concentration Statistics for the South Toe of the Tailings Basin

	Mine Year	5			15			20			30			60			100		
	Percentile	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]
Constituent	Units																		
Ag (Silver)	µg/L	1.23E-01	1.27E-01	1.29E-01	2.26E-01	2.45E-01	2.97E-01	1.98E-01	2.00E-01	2.03E-01	1.64E-01	1.73E-01	1.85E-01	1.27E-01	1.42E-01	1.59E-01	1.25E-01	1.41E-01	1.61E-01
Al (Aluminum)	µg/L	1.03E+01	1.03E+01	1.03E+01	7.24E+00	1.03E+01	1.38E+01	1.24E+00	1.36E+00	1.49E+00	2.72E+00	4.51E+00	6.13E+00	3.50E+00	7.79E+00	1.27E+01	3.58E+00	8.55E+00	1.37E+01
Alkalinity	mg/L	2.03E+02	2.03E+02	2.04E+02	1.15E+02	1.34E+02	1.55E+02	3.94E+01	4.21E+01	4.47E+01	8.08E+01	9.93E+01	1.13E+02	8.95E+01	1.04E+02	1.21E+02	9.04E+01	1.07E+02	1.27E+02
As (Arsenic)	µg/L	3.94E+00	3.98E+00	4.04E+00	4.54E+01	5.58E+01	6.66E+01	9.69E+01	9.84E+01	9.94E+01	7.37E+01	7.87E+01	8.36E+01	5.93E+01	6.55E+01	7.11E+01	5.90E+01	6.49E+01	7.06E+01
B (Boron)	µg/L	2.58E+02	2.58E+02	2.59E+02	2.57E+02	2.92E+02	3.32E+02	1.05E+02	1.06E+02	1.08E+02	1.45E+02	1.59E+02	1.76E+02	1.91E+02	2.20E+02	2.55E+02	1.99E+02	2.35E+02	2.70E+02
Ba (Barium)	µg/L	1.54E+02	1.54E+02	1.54E+02	3.43E+01	3.66E+01	3.88E+01	1.79E+01	1.88E+01	1.97E+01	1.80E+01	1.94E+01	2.14E+01	2.87E+01	3.05E+01	3.28E+01	3.01E+01	3.20E+01	3.42E+01
Be (Beryllium)	µg/L	2.61E-01	2.63E-01	2.65E-01	5.12E-01	5.87E-01	6.75E-01	4.00E-01	4.04E-01	4.09E-01	3.71E-01	4.10E-01	4.50E-01	3.28E-01	4.40E-01	5.53E-01	3.27E-01	4.55E-01	5.75E-01
Ca (Calcium)	mg/L	3.91E+01	3.92E+01	3.94E+01	1.37E+02	1.80E+02	2.41E+02	1.97E+02	2.81E+02	3.93E+02	2.31E+02	3.21E+02	4.68E+02	1.33E+02	1.85E+02	2.48E+02	1.38E+02	1.91E+02	2.64E+02
Cd (Cadmium)	µg/L	1.47E-01	1.57E-01	1.63E-01	4.52E-01	1.11E+00	3.09E+00	5.39E-01	1.69E+00	5.34E+00	4.56E-01	1.28E+00	4.90E+00	8.04E-02	4.71E-01	3.35E+00	8.47E-02	5.35E-01	3.19E+00
Cl (Chloride)	mg/L	2.14E+01	2.16E+01	2.18E+01	2.37E+01	2.61E+01	2.99E+01	2.76E+01	3.06E+01	3.60E+01	1.62E+01	2.00E+01	2.56E+01	5.55E+00	6.71E+00	8.23E+00	6.18E+00	7.51E+00	8.93E+00
Co (Cobalt)	µg/L	1.46E+00	1.70E+00	2.18E+00	1.12E+01	2.24E+01	5.14E+01	1.69E+01	3.74E+01	9.67E+01	1.61E+01	3.87E+01	1.10E+02	3.73E+00	1.57E+01	5.23E+01	3.92E+00	1.60E+01	5.60E+01
Cr (Chromium)	µg/L	5.24E-01	5.31E-01	5.39E-01	8.74E+00	8.97E+00	9.17E+00	9.82E+00	9.91E+00	9.99E+00	7.54E+00	8.10E+00	8.66E+00	6.16E+00	6.76E+00	7.30E+00	6.13E+00	6.69E+00	7.24E+00
Cu (Copper)	µg/L	5.19E+00	7.37E+00	1.66E+01	2.94E+02	4.59E+02	6.17E+02	3.29E+02	5.11E+02	6.95E+02	2.60E+02	4.01E+02	5.49E+02	2.14E+02	3.37E+02	4.62E+02	2.12E+02	3.35E+02	4.59E+02
F (Fluoride)	mg/L	4.03E+00	4.05E+00	4.06E+00	1.00E+00	1.10E+00	1.23E+00	1.33E+00	1.42E+00	1.51E+00	7.43E-01	8.67E-01	1.03E+00	3.01E-01	3.50E-01	3.98E-01	3.02E-01	3.43E-01	3.98E-01
Fe (Iron)	µg/L	1.85E+03	1.85E+03	1.86E+03	2.90E+03	3.73E+03	4.69E+03	1.62E+02	1.91E+02	2.21E+02	3.95E+02	5.22E+02	6.73E+02	3.85E+02	5.77E+02	7.66E+02	4.14E+02	6.37E+02	8.49E+02
K (Potassium)	mg/L	8.68E+00	8.76E+00	8.83E+00	3.00E+01	3.44E+01	3.90E+01	4.57E+01	4.66E+01	4.74E+01	3.61E+01	3.87E+01	4.10E+01	3.08E+01	3.37E+01	3.62E+01	3.08E+01	3.38E+01	3.64E+01
Mg (Magnesium)	mg/L	6.77E+01	6.79E+01	6.81E+01	1.07E+02	1.24E+02	1.44E+02	8.59E+01	9.91E+01	1.18E+02	1.05E+02	1.24E+02	1.51E+02	6.58E+01	8.22E+01	1.01E+02	6.90E+01	8.84E+01	1.12E+02
Mn (Manganese)	µg/L	3.30E+02	3.65E+02	4.02E+02	7.35E+02	9.35E+02	1.19E+03	4.16E+02	6.04E+02	8.93E+02	4.84E+02	6.53E+02	8.56E+02	5.35E+02	7.65E+02	9.69E+02	5.59E+02	7.94E+02	1.01E+03
Na (Sodium)	mg/L	6.79E+01	6.84E+01	6.88E+01	7.60E+01	8.32E+01	9.04E+01	1.12E+02	1.21E+02	1.32E+02	6.46E+01	7.67E+01	9.18E+01	2.27E+01	2.87E+01	3.57E+01	2.11E+01	2.78E+01	3.40E+01
Ni (Nickel)	µg/L	6.37E+00	1.11E+01	2.06E+01	1.58E+02	3.22E+02	6.85E+02	2.66E+02	5.52E+02	1.25E+03	2.49E+02	5.61E+02	1.38E+03	4.62E+01	2.09E+02	6.28E+02	4.76E+01	2.15E+02	6.55E+02
Pb (Lead)	µg/L	1.32E+00	1.36E+00	1.42E+00	5.20E+01	6.23E+01	7.70E+01	9.77E+01	9.87E+01	9.95E+01	7.30E+01	7.78E+01	8.26E+01	5.90E+01	6.54E+01	7.09E+01	5.89E+01	6.48E+01	7.05E+01
Sb (Antimony)	µg/L	5.98E-01	6.41E-01	6.82E-01	9.93E+00	1.16E+01	1.37E+01	1.63E+01	2.02E+01	2.49E+01	1.01E+01	1.38E+01	1.87E+01	3.84E+00	5.51E+00	7.93E+00	3.95E+00	5.60E+00	8.17E+00
Se (Selenium)	µg/L	5.84E-01	5.93E-01	6.04E-01	2.98E+00	3.72E+00	4.58E+00	4.94E+00	6.36E+00	7.89E+00	4.41E+00	5.99E+00	8.05E+00	2.00E+00	2.69E+00	3.54E+00	2.03E+00	2.76E+00	3.69E+00
SO4 (Sulfate)	mg/L	1.97E+02	1.98E+02	1.99E+02	4.34E+02	5.03E+02	5.92E+02	4.14E+02	4.76E+02	5.53E+02	4.00E+02	4.70E+02	5.76E+02	1.52E+02	1.83E+02	2.27E+02	1.57E+02	1.91E+02	2.35E+02
Tl (Thallium)	µg/L	1.47E-01	1.48E-01	1.49E-01	2.12E-01	2.23E-01	2.57E-01	1.98E-01	2.00E-01	2.01E-01	1.55E-01	1.65E-01	1.76E-01	1.25E-01	1.38E-01	1.51E-01	1.24E-01	1.37E-01	1.52E-01
V (Vanadium)	µg/L	4.05E+00	4.13E+00	4.28E+00	9.01E+00	9.22E+00	9.39E+00	9.81E+00	9.91E+00	9.99E+00	7.44E+00	7.92E+00	8.38E+00	6.18E+00	6.78E+00	7.30E+00	6.18E+00	6.74E+00	7.29E+00
Zn (Zinc)	µg/L	1.36E+01	1.43E+01	1.48E+01	4.16E+01	7.85E+01	1.86E+02	5.83E+01	1.19E+02	3.17E+02	4.64E+01	1.03E+02	2.66E+02	7.33E+00	3.69E+01	2.09E+02	7.10E+00	3.78E+01	2.06E+02

Notes

[1] Values shown are the average of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the average of the monthly P90 values for the referenced Mine Year.

Large Table 14 Annual Summary of Concentration Statistics for the East Toe of the Tailings Basin

Constituent	Mine Year	5			15			20			30			60			100		
	Percentile	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]
	Units																		
Ag (Silver)	µg/L	7.50E-02	7.50E-02	7.50E-02	1.96E-01	2.06E-01	2.19E-01	1.93E-01	1.97E-01	2.02E-01	1.87E-01	1.91E-01	1.95E-01	2.15E-02	3.15E-02	4.46E-02	2.49E-03	7.52E-03	2.28E-02
Al (Aluminum)	µg/L	6.42E+01	6.42E+01	6.42E+01	2.42E+00	3.05E+00	3.80E+00	1.34E+00	1.66E+00	2.07E+00	2.06E+00	3.15E+00	4.20E+00	6.76E+00	1.77E+01	2.81E+01	8.52E+00	2.25E+01	3.66E+01
Alkalinity	mg/L	8.49E+01	8.49E+01	8.49E+01	4.69E+01	5.30E+01	5.98E+01	4.76E+01	5.37E+01	5.96E+01	6.83E+01	8.24E+01	9.09E+01	1.56E+02	1.88E+02	2.20E+02	1.96E+02	2.37E+02	2.77E+02
As (Arsenic)	µg/L	4.60E-01	4.60E-01	4.60E-01	1.82E+01	2.40E+01	3.12E+01	2.88E+01	3.64E+01	4.65E+01	3.81E+01	4.22E+01	4.65E+01	8.61E+00	1.16E+01	1.57E+01	5.51E-02	1.06E-01	2.02E-01
B (Boron)	µg/L	2.84E+01	2.84E+01	2.84E+01	1.30E+02	1.40E+02	1.49E+02	1.08E+02	1.12E+02	1.18E+02	1.32E+02	1.41E+02	1.54E+02	3.25E+02	3.86E+02	4.46E+02	4.07E+02	4.84E+02	5.65E+02
Ba (Barium)	µg/L	5.91E+01	5.91E+01	5.91E+01	2.04E+01	2.65E+01	3.59E+01	2.24E+01	2.75E+01	3.24E+01	2.35E+01	2.45E+01	2.64E+01	3.83E+01	4.19E+01	4.65E+01	4.74E+01	5.07E+01	5.53E+01
Be (Beryllium)	µg/L	1.80E-01	1.80E-01	1.80E-01	3.22E-01	3.60E-01	4.00E-01	3.97E-01	4.07E-01	4.19E-01	4.03E-01	4.27E-01	4.52E-01	1.98E-01	4.72E-01	7.53E-01	1.90E-01	5.47E-01	9.08E-01
Ca (Calcium)	mg/L	2.63E+01	2.63E+01	2.63E+01	6.03E+01	7.34E+01	9.22E+01	7.87E+01	9.61E+01	1.20E+02	1.17E+02	1.52E+02	1.93E+02	8.66E+01	1.04E+02	1.23E+02	8.09E+01	9.78E+01	1.15E+02
Cd (Cadmium)	µg/L	1.20E-01	1.20E-01	1.20E-01	6.08E-01	9.06E-01	1.68E+00	8.97E-01	1.40E+00	2.54E+00	9.99E-01	1.30E+00	2.86E+00	2.22E-02	1.01E-01	5.76E-01	2.17E-03	7.86E-03	2.42E-02
Cl (Chloride)	mg/L	1.75E+00	1.75E+00	1.75E+00	1.79E+01	1.99E+01	2.36E+01	2.61E+01	2.90E+01	3.40E+01	2.00E+01	2.27E+01	2.73E+01	1.48E+01	1.66E+01	1.84E+01	1.93E+01	2.14E+01	2.35E+01
Co (Cobalt)	µg/L	1.40E-01	1.40E-01	1.40E-01	6.99E+00	1.30E+01	2.32E+01	9.57E+00	1.81E+01	3.27E+01	1.08E+01	2.24E+01	4.68E+01	7.80E-01	3.09E+00	9.89E+00	6.12E-02	1.63E-01	4.44E-01
Cr (Chromium)	µg/L	9.90E-01	9.90E-01	9.90E-01	7.37E+00	7.82E+00	8.24E+00	6.98E+00	7.47E+00	7.91E+00	5.06E+00	5.43E+00	5.91E+00	1.30E+00	1.62E+00	2.04E+00	4.76E-01	5.99E-01	7.26E-01
Cu (Copper)	µg/L	2.14E+00	2.14E+00	2.14E+00	2.88E+02	4.18E+02	5.53E+02	3.21E+02	4.91E+02	6.70E+02	3.05E+02	4.62E+02	6.34E+02	3.63E+01	5.78E+01	9.21E+01	6.41E-02	1.66E-01	5.05E-01
F (Fluoride)	mg/L	1.47E-01	1.47E-01	1.47E-01	1.44E+00	1.60E+00	1.79E+00	1.52E+00	1.65E+00	1.81E+00	7.94E-01	8.79E-01	1.01E+00	7.52E-02	9.36E-02	1.16E-01	3.70E-02	3.89E-02	4.15E-02
Fe (Iron)	µg/L	5.89E+01	5.90E+01	5.92E+01	7.11E+02	9.03E+02	1.13E+03	8.30E+01	8.71E+01	9.14E+01	1.00E+02	1.09E+02	1.20E+02	2.89E+02	3.86E+02	4.86E+02	3.65E+02	4.86E+02	5.97E+02
K (Potassium)	mg/L	1.81E+00	1.81E+00	1.81E+00	1.68E+01	1.99E+01	2.34E+01	3.35E+01	3.66E+01	3.92E+01	3.09E+01	3.29E+01	3.46E+01	1.09E+01	1.32E+01	1.60E+01	7.61E+00	1.01E+01	1.25E+01
Mg (Magnesium)	mg/L	1.09E+01	1.09E+01	1.09E+01	4.78E+01	5.24E+01	5.77E+01	5.93E+01	6.54E+01	7.17E+01	7.61E+01	8.57E+01	9.59E+01	1.01E+02	1.32E+02	1.70E+02	1.24E+02	1.63E+02	2.14E+02
Mn (Manganese)	µg/L	2.71E+02	2.71E+02	2.71E+02	3.51E+02	4.62E+02	6.74E+02	3.82E+02	5.27E+02	8.08E+02	4.85E+02	6.67E+02	8.92E+02	7.41E+02	9.75E+02	1.22E+03	8.82E+02	1.18E+03	1.49E+03
Na (Sodium)	mg/L	4.57E+00	4.57E+00	4.57E+00	5.06E+01	5.57E+01	6.06E+01	9.46E+01	1.02E+02	1.10E+02	7.22E+01	7.95E+01	8.86E+01	3.56E+01	4.52E+01	5.57E+01	4.33E+01	5.55E+01	6.73E+01
Ni (Nickel)	µg/L	4.32E+00	4.32E+00	4.32E+00	1.05E+02	2.04E+02	3.64E+02	1.45E+02	2.87E+02	5.09E+02	1.62E+02	3.39E+02	6.55E+02	8.89E+00	3.91E+01	1.21E+02	1.69E-01	4.07E-01	9.23E-01
Pb (Lead)	µg/L	2.50E-01	2.50E-01	2.50E-01	2.38E+01	3.33E+01	4.39E+01	3.84E+01	5.05E+01	6.37E+01	4.01E+01	4.43E+01	4.85E+01	8.53E+00	1.15E+01	1.57E+01	6.62E-03	1.48E-02	2.86E-02
Sb (Antimony)	µg/L	3.60E-01	3.60E-01	3.60E-01	6.92E+00	7.95E+00	8.98E+00	1.23E+01	1.36E+01	1.49E+01	9.45E+00	1.09E+01	1.26E+01	6.89E-01	1.01E+00	1.50E+00	1.03E-02	2.48E-02	6.21E-02
Se (Selenium)	µg/L	8.00E-01	8.00E-01	8.00E-01	1.88E+00	2.16E+00	2.45E+00	2.74E+00	3.09E+00	3.48E+00	2.80E+00	3.38E+00	4.05E+00	3.46E-01	5.23E-01	7.29E-01	1.75E-02	3.25E-02	8.40E-02
SO4 (Sulfate)	mg/L	7.37E+00	7.38E+00	7.39E+00	2.16E+02	2.37E+02	2.61E+02	2.60E+02	2.79E+02	3.01E+02	2.67E+02	2.96E+02	3.33E+02	4.09E+01	5.22E+01	6.64E+01	2.35E+01	3.15E+01	3.87E+01
Tl (Thallium)	µg/L	1.70E-01	1.70E-01	1.70E-01	1.64E-01	1.86E-01	2.04E-01	1.91E-01	1.95E-01	2.00E-01	1.82E-01	1.86E-01	1.90E-01	2.09E-02	2.81E-02	3.91E-02	1.73E-03	4.77E-03	1.49E-02
V (Vanadium)	µg/L	5.41E+00	5.41E+00	5.41E+00	9.25E+00	9.57E+00	9.87E+00	9.52E+00	9.73E+00	9.95E+00	9.07E+00	9.26E+00	9.44E+00	1.42E+00	1.75E+00	2.14E+00	5.51E-01	7.50E-01	9.49E-01
Zn (Zinc)	µg/L	1.39E+01	1.39E+01	1.39E+01	6.60E+01	7.83E+01	1.17E+02	1.00E+02	1.20E+02	1.78E+02	1.02E+02	1.25E+02	2.04E+02	1.75E+00	7.36E+00	3.55E+01	2.15E-01	3.01E-01	4.19E-01

Notes

[1] Values shown are the average of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the average of the monthly P90 values for the referenced Mine Year.

Large Table 15 Annual Summary of Concentration Statistics for the North Groundwater Flow Path at the Property Boundary

Constituent	Mine Year		1			50			100			120			160			200		
	Percentile		Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]
	Units	WQ Standard																		
Ag (Silver)	µg/L	30	1.00E-01	1.11E-01	1.19E-01	9.08E-02	1.01E-01	1.10E-01	8.32E-02	9.40E-02	1.04E-01	8.13E-02	9.24E-02	1.02E-01	8.00E-02	9.08E-02	1.02E-01	7.84E-02	9.04E-02	1.02E-01
Al (Aluminum)[5]	µg/L	--	2.23E+01	3.00E+01	4.01E+01	3.00E+01	3.88E+01	5.00E+01	3.63E+01	4.57E+01	5.86E+01	3.85E+01	4.79E+01	6.10E+01	4.13E+01	5.12E+01	6.47E+01	4.29E+01	5.30E+01	6.64E+01
Alkalinity	mg/L	--	1.82E+02	2.15E+02	2.41E+02	1.52E+02	1.81E+02	2.08E+02	1.24E+02	1.52E+02	1.82E+02	1.12E+02	1.41E+02	1.73E+02	9.32E+01	1.21E+02	1.55E+02	8.47E+01	1.02E+02	1.36E+02
As (Arsenic)	µg/L	10	2.48E+00	3.21E+00	3.76E+00	2.47E+00	3.21E+00	3.75E+00	2.46E+00	3.20E+00	3.74E+00	2.46E+00	3.20E+00	3.74E+00	2.45E+00	3.19E+00	3.73E+00	2.45E+00	3.18E+00	3.72E+00
B (Boron)	µg/L	1000	1.63E+02	2.11E+02	2.48E+02	1.24E+02	1.62E+02	2.02E+02	8.54E+01	1.22E+02	1.64E+02	7.21E+01	1.08E+02	1.50E+02	5.39E+01	8.38E+01	1.28E+02	4.68E+01	6.69E+01	1.03E+02
Ba (Barium)	µg/L	2000	1.31E+02	1.57E+02	1.78E+02	1.08E+02	1.32E+02	1.55E+02	8.57E+01	1.11E+02	1.36E+02	7.67E+01	1.02E+02	1.29E+02	5.86E+01	8.60E+01	1.17E+02	5.04E+01	7.07E+01	1.04E+02
Be (Beryllium)[4]	µg/L	0.54	1.83E-01	1.92E-01	2.00E-01	1.75E-01	1.88E-01	2.00E-01	1.70E-01	1.85E-01	2.01E-01	1.69E-01	1.86E-01	2.05E-01	1.71E-01	1.91E-01	2.17E-01	1.76E-01	1.99E-01	2.33E-01
Ca (Calcium)	mg/L	--	3.33E+01	3.62E+01	3.83E+01	3.08E+01	3.36E+01	3.61E+01	2.87E+01	3.16E+01	3.47E+01	2.83E+01	3.13E+01	3.51E+01	2.89E+01	3.25E+01	4.09E+01	2.96E+01	3.46E+01	4.36E+01
Cd (Cadmium)	µg/L	4	1.24E-01	1.28E-01	1.31E-01	1.20E-01	1.26E-01	1.32E-01	1.19E-01	1.27E-01	1.37E-01	1.20E-01	1.29E-01	1.67E-01	1.24E-01	1.51E-01	2.77E-01	1.36E-01	1.99E-01	3.38E-01
Cl (Chloride)	mg/L	250	1.18E+01	1.53E+01	1.80E+01	8.90E+00	1.17E+01	1.47E+01	6.08E+00	8.72E+00	1.18E+01	5.28E+00	7.79E+00	1.09E+01	4.21E+00	6.41E+00	9.31E+00	3.50E+00	5.33E+00	8.05E+00
Co (Cobalt)	µg/L	--	7.87E-01	1.02E+00	1.20E+00	5.99E-01	7.88E-01	9.79E-01	4.46E-01	6.26E-01	8.38E-01	4.38E-01	6.32E-01	1.10E+00	4.83E-01	7.96E-01	3.01E+00	5.86E-01	1.33E+00	3.86E+00
Cr (Chromium)	µg/L	100	6.18E-01	6.83E-01	7.86E-01	6.82E-01	7.66E-01	8.70E-01	7.33E-01	8.40E-01	9.74E-01	7.56E-01	8.79E-01	1.09E+00	8.26E-01	1.01E+00	1.42E+00	9.41E-01	1.19E+00	1.52E+00
Cu (Copper)	µg/L	--	1.93E+00	2.04E+00	2.19E+00	1.93E+00	2.05E+00	2.19E+00	1.93E+00	2.05E+00	2.19E+00	1.93E+00	2.05E+00	2.19E+00	1.93E+00	2.05E+00	2.19E+00	1.93E+00	2.05E+00	2.19E+00
F (Fluoride)	mg/L	2	**2.13E+00**	**2.84E+00**	**3.38E+00**	1.56E+00	**2.11E+00**	**2.71E+00**	9.92E-01	1.53E+00	**2.14E+00**	7.76E-01	1.31E+00	1.95E+00	4.07E-01	9.19E-01	1.59E+00	2.20E-01	5.49E-01	1.21E+00
Fe (Iron)[5]	µg/L	--	1.12E+03	1.50E+03	1.78E+03	8.10E+02	1.11E+03	1.42E+03	5.16E+02	7.98E+02	1.12E+03	4.23E+02	6.95E+02	1.02E+03	2.44E+02	5.07E+02	8.48E+02	1.51E+02	3.26E+02	6.66E+02
K (Potassium)	mg/L	--	5.88E+00	7.27E+00	8.37E+00	4.63E+00	5.83E+00	6.93E+00	3.53E+00	4.68E+00	5.80E+00	3.32E+00	4.44E+00	5.66E+00	3.25E+00	4.32E+00	5.92E+00	3.34E+00	4.46E+00	6.52E+00
Mg (Magnesium)	mg/L	--	4.15E+01	5.25E+01	6.08E+01	3.22E+01	4.15E+01	5.02E+01	2.39E+01	3.24E+01	4.16E+01	2.15E+01	2.94E+01	3.88E+01	1.88E+01	2.53E+01	3.40E+01	1.72E+01	2.30E+01	3.05E+01
Mn (Manganese)[4,5]	µg/L	704	2.40E+02	2.64E+02	2.89E+02	2.30E+02	2.65E+02	3.02E+02	2.22E+02	2.69E+02	3.14E+02	2.21E+02	2.74E+02	3.23E+02	2.28E+02	2.87E+02	3.52E+02	2.41E+02	3.09E+02	3.84E+02
Na (Sodium)	mg/L	--	3.76E+01	4.96E+01	5.84E+01	2.81E+01	3.74E+01	4.73E+01	1.87E+01	2.76E+01	3.78E+01	1.61E+01	2.45E+01	3.47E+01	1.29E+01	2.00E+01	2.94E+01	1.04E+01	1.63E+01	2.53E+01
Ni (Nickel)	µg/L	100	3.36E+00	3.58E+00	3.94E+00	3.36E+00	3.58E+00	3.95E+00	3.36E+00	3.58E+00	3.95E+00	3.36E+00	3.58E+00	3.96E+00	3.36E+00	3.59E+00	3.96E+00	3.37E+00	3.59E+00	3.96E+00
Pb (Lead)	µg/L	--	8.00E-01	9.98E-01	1.15E+00	6.41E-01	7.96E-01	9.60E-01	5.25E-01	6.79E-01	8.73E-01	5.28E-01	6.99E-01	1.63E+00	5.96E-01	1.24E+00	4.57E+00	8.42E-01	2.67E+00	5.81E+00
Sb (Antimony)	µg/L	6	3.25E-01	3.52E-01	3.90E-01	3.23E-01	3.52E-01	3.91E-01	3.22E-01	3.52E-01	3.93E-01	3.22E-01	3.52E-01	3.93E-01	3.21E-01	3.52E-01	3.95E-01	3.20E-01	3.52E-01	3.96E-01
Se (Selenium)	µg/L	30	6.43E-01	6.76E-01	7.23E-01	6.65E-01	7.09E-01	7.67E-01	6.80E-01	7.41E-01	8.17E-01	6.88E-01	7.57E-01	8.82E-01	7.10E-01	8.25E-01	1.07E+00	7.67E-01	9.26E-01	1.10E+00
SO4 (Sulfate)	mg/L	250	1.19E+02	1.58E+02	1.88E+02	8.63E+01	1.18E+02	1.51E+02	5.62E+01	8.54E+01	1.19E+02	4.80E+01	7.71E+01	1.09E+02	3.76E+01	6.37E+01	9.42E+01	2.95E+01	5.17E+01	8.20E+01
Tl (Thallium)	µg/L	0.6	1.58E-01	1.70E-01	1.82E-01	1.54E-01	1.69E-01	1.88E-01	1.50E-01	1.69E-01	1.93E-01	1.49E-01	1.69E-01	1.95E-01	1.47E-01	1.69E-01	1.97E-01	1.45E-01	1.69E-01	1.98E-01
V (Vanadium)	µg/L	50	4.75E+00	4.88E+00	5.07E+00	4.83E+00	5.02E+00	5.24E+00	4.92E+00	5.15E+00	5.41E+00	4.95E+00	5.20E+00	5.50E+00	5.03E+00	5.36E+00	5.82E+00	5.19E+00	5.55E+00	5.97E+00
Zn (Zinc)	µg/L	2000	1.21E+01	1.27E+01	1.37E+01	1.21E+01	1.30E+01	1.42E+01	1.21E+01	1.35E+01	1.53E+01	1.23E+01	1.38E+01	1.73E+01	1.29E+01	1.62E+01	2.75E+01	1.44E+01	2.08E+01	3.11E+01

Notes

[1] Values shown are the maximum of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the maximum of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

[4] Evaluated against the site-specific evaluation criteria shown.

[5] Constituent not evaluated against the secondary groundwater standard

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 16 Annual Summary of Concentration Statistics for the Northwest Groundwater Flow Path at the Property Boundary

	Mine Year		1			50			100			120			160			200		
	Percentile		Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]
Constituent	Units	WQ Standard																		
Ag (Silver)	µg/L	30	9.09E-02	9.85E-02	1.04E-01	8.43E-02	9.24E-02	9.85E-02	7.88E-02	8.73E-02	9.48E-02	7.71E-02	8.60E-02	9.36E-02	7.39E-02	8.39E-02	9.29E-02	7.05E-02	8.16E-02	9.52E-02
Al (Aluminum)[5]	µg/L	--	2.52E+01	3.17E+01	4.14E+01	3.25E+01	4.03E+01	5.00E+01	3.78E+01	4.75E+01	5.84E+01	3.98E+01	4.99E+01	6.10E+01	4.30E+01	5.28E+01	6.48E+01	4.51E+01	5.48E+01	6.69E+01
Alkalinity	mg/L	--	1.62E+02	1.85E+02	2.05E+02	1.37E+02	1.59E+02	1.80E+02	1.15E+02	1.37E+02	1.59E+02	1.09E+02	1.30E+02	1.52E+02	1.00E+02	1.19E+02	1.40E+02	9.63E+01	1.13E+02	1.32E+02
As (Arsenic)	µg/L	10	8.35E-01	9.48E-01	1.04E+00	8.33E-01	9.46E-01	1.04E+00	8.32E-01	9.45E-01	1.04E+00	8.32E-01	9.44E-01	1.04E+00	8.30E-01	9.43E-01	1.04E+00	8.29E-01	9.42E-01	1.04E+00
B (Boron)	µg/L	1000	2.58E+02	3.24E+02	3.83E+02	1.85E+02	2.46E+02	3.05E+02	1.22E+02	1.80E+02	2.43E+02	1.03E+02	1.59E+02	2.24E+02	8.18E+01	1.28E+02	1.88E+02	7.25E+01	1.10E+02	1.66E+02
Ba (Barium)	µg/L	2000	3.00E+01	3.65E+01	4.64E+01	3.35E+01	4.23E+01	5.43E+01	3.66E+01	4.75E+01	6.15E+01	3.74E+01	4.90E+01	6.38E+01	3.83E+01	5.08E+01	6.72E+01	3.89E+01	5.17E+01	6.87E+01
Be (Beryllium)[4]	µg/L	0.54	1.83E-01	1.92E-01	2.00E-01	1.76E-01	1.88E-01	2.00E-01	1.71E-01	1.85E-01	2.02E-01	1.71E-01	1.88E-01	2.08E-01	1.74E-01	1.95E-01	2.34E-01	1.77E-01	2.06E-01	2.62E-01
Ca (Calcium)	mg/L	--	6.22E+01	7.28E+01	8.18E+01	5.07E+01	6.04E+01	6.97E+01	4.10E+01	5.03E+01	6.00E+01	3.85E+01	4.71E+01	5.70E+01	3.53E+01	4.26E+01	5.16E+01	3.35E+01	3.97E+01	4.86E+01
Cd (Cadmium)	µg/L	4	1.11E-01	1.14E-01	1.19E-01	1.11E-01	1.17E-01	1.23E-01	1.12E-01	1.19E-01	1.27E-01	1.13E-01	1.21E-01	1.32E-01	1.16E-01	1.25E-01	1.45E-01	1.15E-01	1.28E-01	1.50E-01
Cl (Chloride)	mg/L	250	1.18E+01	1.47E+01	1.72E+01	8.65E+00	1.12E+01	1.38E+01	5.91E+00	8.33E+00	1.11E+01	5.12E+00	7.45E+00	1.03E+01	4.16E+00	6.18E+00	8.76E+00	3.77E+00	5.35E+00	7.76E+00
Co (Cobalt)	µg/L	--	1.18E+00	1.49E+00	1.76E+00	8.62E-01	1.13E+00	1.40E+00	5.82E-01	8.36E-01	1.13E+00	5.33E-01	7.70E-01	1.07E+00	4.63E-01	7.06E-01	1.03E+00	3.89E-01	6.55E-01	1.07E+00
Cr (Chromium)	µg/L	100	6.76E-01	7.33E-01	8.19E-01	7.27E-01	8.05E-01	8.96E-01	7.66E-01	8.57E-01	9.72E-01	7.79E-01	8.78E-01	1.00E+00	8.11E-01	9.22E-01	1.05E+00	8.30E-01	9.38E-01	1.06E+00
Cu (Copper)	µg/L	--	2.11E+00	2.25E+00	2.37E+00	2.11E+00	2.25E+00	2.37E+00	2.11E+00	2.25E+00	2.37E+00	2.11E+00	2.25E+00	2.37E+00	2.11E+00	2.25E+00	2.37E+00	2.11E+00	2.24E+00	2.37E+00
F (Fluoride)	mg/L	2	8.99E-02	9.97E-02	1.12E-01	1.00E-01	1.12E-01	1.26E-01	1.09E-01	1.23E-01	1.38E-01	1.12E-01	1.27E-01	1.43E-01	1.18E-01	1.34E-01	1.48E-01	1.20E-01	1.34E-01	1.49E-01
Fe (Iron)[5]	µg/L	--	2.54E+03	3.26E+03	3.90E+03	1.76E+03	2.42E+03	3.05E+03	1.08E+03	1.70E+03	2.38E+03	8.70E+02	1.48E+03	2.17E+03	6.48E+02	1.14E+03	1.81E+03	5.46E+02	9.65E+02	1.55E+03
K (Potassium)	mg/L	--	6.01E+00	7.25E+00	8.32E+00	4.70E+00	5.81E+00	6.88E+00	3.57E+00	4.63E+00	5.79E+00	3.26E+00	4.26E+00	5.40E+00	2.91E+00	3.75E+00	4.87E+00	2.71E+00	3.44E+00	4.54E+00
Mg (Magnesium)	mg/L	--	8.97E+01	1.13E+02	1.33E+02	6.45E+01	8.56E+01	1.05E+02	4.25E+01	6.26E+01	8.46E+01	3.62E+01	5.53E+01	7.77E+01	2.90E+01	4.49E+01	6.60E+01	2.60E+01	3.99E+01	5.83E+01
Mn (Manganese)[4,5]	µg/L	704	**7.23E+02**	**8.60E+02**	**9.74E+02**	5.76E+02	7.02E+02	**8.22E+02**	4.47E+02	5.76E+02	**7.08E+02**	4.08E+02	5.35E+02	6.70E+02	3.59E+02	4.72E+02	6.06E+02	3.36E+02	4.39E+02	5.59E+02
Na (Sodium)	mg/L	--	3.08E+01	3.83E+01	4.50E+01	2.24E+01	2.94E+01	3.61E+01	1.53E+01	2.19E+01	2.91E+01	1.33E+01	1.95E+01	2.69E+01	1.09E+01	1.62E+01	2.32E+01	9.63E+00	1.42E+01	2.06E+01
Ni (Nickel)	µg/L	100	4.45E+00	4.73E+00	4.96E+00	4.45E+00	4.72E+00	4.96E+00	4.45E+00	4.72E+00	4.96E+00	4.45E+00	4.72E+00	4.96E+00	4.45E+00	4.72E+00	4.96E+00	4.45E+00	4.72E+00	4.96E+00
Pb (Lead)	µg/L	--	2.11E-01	2.18E-01	2.26E-01	2.20E-01	2.27E-01	2.34E-01	2.27E-01	2.35E-01	2.59E-01	2.30E-01	2.42E-01	4.03E-01	2.40E-01	3.48E-01	7.38E-01	2.86E-01	4.71E-01	7.31E-01
Sb (Antimony)	µg/L	6	3.05E-01	3.31E-01	3.69E-01	3.04E-01	3.32E-01	3.70E-01	3.04E-01	3.33E-01	3.72E-01	3.03E-01	3.33E-01	3.72E-01	3.03E-01	3.34E-01	3.74E-01	3.03E-01	3.34E-01	3.76E-01
Se (Selenium)	µg/L	30	5.18E-01	5.64E-01	6.33E-01	5.69E-01	6.24E-01	7.00E-01	6.07E-01	6.78E-01	7.69E-01	6.24E-01	6.97E-01	7.93E-01	6.52E-01	7.32E-01	8.25E-01	6.64E-01	7.46E-01	8.41E-01
SO4 (Sulfate)	mg/L	250	1.66E+02	2.12E+02	**2.53E+02**	1.16E+02	1.58E+02	1.99E+02	7.32E+01	1.13E+02	1.56E+02	6.03E+01	9.86E+01	1.42E+02	4.69E+01	7.82E+01	1.20E+02	3.96E+01	6.69E+01	1.06E+02
Tl (Thallium)	µg/L	0.6	8.93E-02	1.03E-01	1.25E-01	1.03E-01	1.20E-01	1.45E-01	1.12E-01	1.34E-01	1.63E-01	1.16E-01	1.38E-01	1.68E-01	1.21E-01	1.45E-01	1.76E-01	1.23E-01	1.49E-01	1.81E-01
V (Vanadium)	µg/L	50	1.80E+00	2.39E+00	3.12E+00	2.58E+00	3.21E+00	3.85E+00	3.17E+00	3.88E+00	4.49E+00	3.38E+00	4.09E+00	4.69E+00	3.74E+00	4.42E+00	4.95E+00	3.98E+00	4.56E+00	5.06E+00
Zn (Zinc)	µg/L	2000	5.52E+00	6.89E+00	8.86E+00	7.22E+00	8.67E+00	1.07E+01	8.44E+00	1.03E+01	1.24E+01	8.87E+00	1.09E+01	1.33E+01	9.88E+00	1.21E+01	1.44E+01	1.07E+01	1.26E+01	1.48E+01

Notes

1 Values shown are the maximum of the monthly P10 values for the referenced Mine Year.

2 Values shown are the maximum of the monthly P50 values for the referenced Mine Year.

3 Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

4 Evaluated against the site-specific evaluation criteria shown.

5 Constituent not evaluated against the secondary groundwater standard

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 17 Annual Summary of Concentration Statistics for the West Groundwater Flow Path at the Property Boundary

Constituent	Mine Year		1			50			100			120			160			200		
	Percentile		Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]	Max P10[1]	Max P50[2]	Max P90[3]
	Units	WQ Standard																		
Ag (Silver)	µg/L	30	8.95E-02	9.99E-02	1.07E-01	8.44E-02	9.42E-02	1.02E-01	7.90E-02	8.90E-02	9.81E-02	7.71E-02	8.73E-02	9.66E-02	7.38E-02	8.45E-02	9.42E-02	7.17E-02	8.26E-02	9.26E-02
Al (Aluminum)[5]	µg/L	--	2.96E+01	3.74E+01	4.83E+01	3.53E+01	4.37E+01	5.52E+01	3.95E+01	4.92E+01	6.15E+01	4.08E+01	5.09E+01	6.36E+01	4.33E+01	5.40E+01	6.68E+01	4.53E+01	5.63E+01	6.97E+01
Alkalinity	mg/L	--	1.43E+02	1.68E+02	1.90E+02	1.29E+02	1.48E+02	1.70E+02	1.13E+02	1.31E+02	1.54E+02	1.07E+02	1.25E+02	1.48E+02	9.80E+01	1.16E+02	1.38E+02	9.21E+01	1.08E+02	1.29E+02
As (Arsenic)	µg/L	10	8.30E-01	9.69E-01	1.11E+00	8.29E-01	9.68E-01	1.11E+00	8.28E-01	9.67E-01	1.10E+00	8.27E-01	9.66E-01	1.10E+00	8.26E-01	9.66E-01	1.10E+00	8.25E-01	9.65E-01	1.10E+00
B (Boron)	µg/L	1000	2.01E+02	2.73E+02	3.39E+02	1.59E+02	2.14E+02	2.79E+02	1.14E+02	1.64E+02	2.28E+02	9.79E+01	1.47E+02	2.10E+02	7.38E+01	1.19E+02	1.80E+02	6.14E+01	9.57E+01	1.53E+02
Ba (Barium)	µg/L	2000	3.54E+01	4.22E+01	5.38E+01	3.74E+01	4.64E+01	5.98E+01	3.89E+01	4.99E+01	6.54E+01	3.93E+01	5.11E+01	6.70E+01	4.01E+01	5.30E+01	7.02E+01	4.06E+01	5.38E+01	7.21E+01
Be (Beryllium)[4]	µg/L	0.54	1.78E-01	1.89E-01	2.00E-01	1.73E-01	1.86E-01	2.00E-01	1.68E-01	1.83E-01	2.00E-01	1.67E-01	1.83E-01	2.01E-01	1.66E-01	1.83E-01	2.06E-01	1.68E-01	1.88E-01	2.17E-01
Ca (Calcium)	mg/L	--	5.29E+01	6.39E+01	7.40E+01	4.66E+01	5.50E+01	6.49E+01	3.95E+01	4.72E+01	5.74E+01	3.69E+01	4.46E+01	5.46E+01	3.31E+01	4.01E+01	4.99E+01	3.14E+01	3.70E+01	4.64E+01
Cd (Cadmium)	µg/L	4	1.17E-01	1.21E-01	1.27E-01	1.16E-01	1.22E-01	1.28E-01	1.15E-01	1.22E-01	1.30E-01	1.15E-01	1.22E-01	1.31E-01	1.15E-01	1.23E-01	1.35E-01	1.16E-01	1.26E-01	1.42E-01
Cl (Chloride)	mg/L	250	9.21E+00	1.24E+01	1.52E+01	7.48E+00	9.89E+00	1.27E+01	5.47E+00	7.66E+00	1.04E+01	4.73E+00	6.91E+00	9.67E+00	3.79E+00	5.64E+00	8.35E+00	3.21E+00	4.74E+00	7.23E+00
Co (Cobalt)	µg/L	--	1.00E+00	1.36E+00	1.70E+00	7.93E-01	1.07E+00	1.40E+00	5.72E-01	8.22E-01	1.14E+00	4.88E-01	7.38E-01	1.05E+00	4.07E-01	6.08E-01	9.14E-01	3.55E-01	5.49E-01	8.33E-01
Cr (Chromium)	µg/L	100	7.03E-01	7.79E-01	8.78E-01	7.44E-01	8.26E-01	9.30E-01	7.72E-01	8.69E-01	9.91E-01	7.82E-01	8.83E-01	1.01E+00	8.01E-01	9.12E-01	1.05E+00	8.19E-01	9.39E-01	1.08E+00
Cu (Copper)	µg/L	--	2.15E+00	2.34E+00	2.52E+00	2.14E+00	2.34E+00	2.52E+00	2.14E+00	2.34E+00	2.52E+00	2.14E+00	2.34E+00	2.52E+00	2.14E+00	2.34E+00	2.52E+00	2.14E+00	2.34E+00	2.52E+00
F (Fluoride)	mg/L	2	1.62E-01	1.73E-01	1.83E-01	1.56E-01	1.67E-01	1.78E-01	1.49E-01	1.62E-01	1.74E-01	1.47E-01	1.60E-01	1.73E-01	1.43E-01	1.57E-01	1.71E-01	1.37E-01	1.53E-01	1.69E-01
Fe (Iron)[5]	µg/L	--	2.07E+03	2.91E+03	3.68E+03	1.58E+03	2.22E+03	2.99E+03	1.05E+03	1.64E+03	2.39E+03	8.66E+02	1.43E+03	2.17E+03	5.83E+02	1.11E+03	1.83E+03	4.45E+02	8.41E+02	1.51E+03
K (Potassium)	mg/L	--	4.96E+00	6.26E+00	7.44E+00	4.24E+00	5.20E+00	6.31E+00	3.35E+00	4.26E+00	5.41E+00	3.06E+00	3.97E+00	5.09E+00	2.65E+00	3.47E+00	4.52E+00	2.46E+00	3.15E+00	4.07E+00
Mg (Magnesium)	mg/L	--	6.90E+01	9.29E+01	1.15E+02	5.53E+01	7.35E+01	9.50E+01	4.01E+01	5.63E+01	7.81E+01	3.45E+01	5.05E+01	7.19E+01	2.66E+01	4.08E+01	6.17E+01	2.20E+01	3.34E+01	5.31E+01
Mn (Manganese)[4,5]	µg/L	704	6.12E+02	**7.44E+02**	**8.66E+02**	5.19E+02	6.30E+02	**7.54E+02**	4.23E+02	5.38E+02	6.62E+02	3.89E+02	5.04E+02	6.30E+02	3.45E+02	4.47E+02	5.72E+02	3.12E+02	4.10E+02	5.26E+02
Na (Sodium)	mg/L	--	2.44E+01	3.27E+01	4.02E+01	1.96E+01	2.59E+01	3.35E+01	1.44E+01	2.01E+01	2.75E+01	1.26E+01	1.82E+01	2.54E+01	9.96E+00	1.49E+01	2.22E+01	8.39E+00	1.26E+01	1.91E+01
Ni (Nickel)	µg/L	100	4.51E+00	4.86E+00	5.17E+00	4.51E+00	4.86E+00	5.17E+00	4.50E+00	4.86E+00	5.17E+00	4.50E+00	4.86E+00	5.17E+00	4.50E+00	4.86E+00	5.17E+00	4.50E+00	4.85E+00	5.17E+00
Pb (Lead)	µg/L	--	2.16E-01	2.24E-01	2.32E-01	2.23E-01	2.31E-01	2.37E-01	2.29E-01	2.36E-01	2.43E-01	2.30E-01	2.38E-01	2.45E-01	2.34E-01	2.44E-01	3.62E-01	2.39E-01	2.87E-01	5.91E-01
Sb (Antimony)	µg/L	6	3.15E-01	3.53E-01	3.99E-01	3.15E-01	3.53E-01	4.01E-01	3.14E-01	3.53E-01	4.02E-01	3.14E-01	3.53E-01	4.02E-01	3.14E-01	3.53E-01	4.02E-01	3.14E-01	3.53E-01	4.03E-01
Se (Selenium)	µg/L	30	5.73E-01	6.26E-01	6.95E-01	6.06E-01	6.66E-01	7.38E-01	6.35E-01	7.02E-01	7.85E-01	6.44E-01	7.14E-01	8.00E-01	6.64E-01	7.36E-01	8.28E-01	6.76E-01	7.59E-01	8.44E-01
SO4 (Sulfate)	mg/L	250	1.38E+02	1.93E+02	2.43E+02	1.06E+02	1.48E+02	1.98E+02	7.21E+01	1.10E+02	1.60E+02	6.03E+01	9.67E+01	1.45E+02	4.24E+01	7.58E+01	1.22E+02	3.30E+01	5.96E+01	1.02E+02
Tl (Thallium)	µg/L	0.6	1.03E-01	1.21E-01	1.43E-01	1.12E-01	1.31E-01	1.56E-01	1.19E-01	1.41E-01	1.69E-01	1.21E-01	1.44E-01	1.73E-01	1.25E-01	1.49E-01	1.81E-01	1.27E-01	1.53E-01	1.86E-01
V (Vanadium)	µg/L	50	2.32E+00	2.99E+00	3.73E+00	2.92E+00	3.54E+00	4.14E+00	3.41E+00	4.04E+00	4.62E+00	3.57E+00	4.21E+00	4.79E+00	3.89E+00	4.51E+00	5.04E+00	4.14E+00	4.72E+00	5.20E+00
Zn (Zinc)	µg/L	2000	6.83E+00	8.39E+00	1.04E+01	8.07E+00	9.61E+00	1.14E+01	8.99E+00	1.07E+01	1.26E+01	9.33E+00	1.12E+01	1.31E+01	9.98E+00	1.19E+01	1.41E+01	1.05E+01	1.27E+01	1.48E+01

Notes

1 Values shown are the maximum of the monthly P10 values for the referenced Mine Year.

2 Values shown are the maximum of the monthly P50 values for the referenced Mine Year.

3 Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

4 Evaluated against the site-specific evaluation criteria shown.

5 Constituent not evaluated against the secondary groundwater standard

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 18 Annual Summary of Concentration Statistics for the Embarrass River at PM-12

	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
Constituent	Units	WQ Standard																		
Ag (Silver)	µg/L	1	8.62E-02	1.06E-01	1.25E-01	8.64E-02	1.06E-01	1.26E-01	8.60E-02	1.06E-01	1.25E-01	8.63E-02	1.06E-01	1.26E-01	8.63E-02	1.06E-01	1.25E-01	8.68E-02	1.06E-01	1.25E-01
Al (Aluminum)	µg/L	125	6.06E+01	9.37E+01	**1.85E+02**	5.99E+01	9.39E+01	**1.71E+02**	5.90E+01	9.21E+01	**1.65E+02**	6.15E+01	9.25E+01	**1.72E+02**	6.16E+01	9.33E+01	**1.66E+02**	6.28E+01	9.35E+01	**1.72E+02**
Alkalinity	mg/L	--	9.81E+00	4.33E+01	8.56E+01	9.57E+00	4.37E+01	8.44E+01	1.02E+01	4.29E+01	8.48E+01	9.86E+00	4.35E+01	9.11E+01	1.04E+01	4.31E+01	8.41E+01	9.54E+00	4.32E+01	8.74E+01
As (Arsenic)	µg/L	53	3.95E-01	1.04E+00	3.48E+00	3.67E-01	1.05E+00	3.68E+00	3.70E-01	1.03E+00	3.78E+00	3.94E-01	1.06E+00	3.61E+00	3.82E-01	1.07E+00	4.36E+00	4.00E-01	1.04E+00	3.65E+00
B (Boron)	µg/L	500	1.61E+01	2.19E+01	2.62E+01	1.59E+01	2.18E+01	2.62E+01	1.61E+01	2.19E+01	2.63E+01	1.64E+01	2.19E+01	2.64E+01	1.61E+01	2.18E+01	2.61E+01	1.61E+01	2.19E+01	2.63E+01
Ba (Barium)	µg/L	--	5.08E+00	1.66E+01	4.75E+01	5.04E+00	1.67E+01	4.72E+01	5.07E+00	1.70E+01	4.75E+01	5.06E+00	1.69E+01	4.72E+01	5.07E+00	1.68E+01	4.78E+01	5.07E+00	1.67E+01	4.71E+01
Be (Beryllium)	µg/L	--	7.43E-02	9.65E-02	1.47E-01	7.41E-02	9.66E-02	1.48E-01	7.43E-02	9.70E-02	1.49E-01	7.42E-02	9.69E-02	1.47E-01	7.40E-02	9.65E-02	1.48E-01	7.42E-02	9.65E-02	1.47E-01
Ca (Calcium)	mg/L	--	3.93E+00	1.28E+01	2.27E+01	3.65E+00	1.30E+01	2.25E+01	3.57E+00	1.29E+01	2.31E+01	3.78E+00	1.29E+01	2.23E+01	3.60E+00	1.30E+01	2.31E+01	3.82E+00	1.28E+01	2.22E+01
Cd (Cadmium)[4]	µg/L	--	7.51E-02	9.13E-02	1.12E-01	7.52E-02	9.13E-02	1.12E-01	7.47E-02	9.14E-02	1.12E-01	7.52E-02	9.15E-02	1.12E-01	7.50E-02	9.13E-02	1.12E-01	7.49E-02	9.12E-02	1.12E-01
Cl (Chloride)	mg/L	230	2.50E+00	4.24E+00	8.95E+00	2.54E+00	4.26E+00	9.17E+00	2.55E+00	4.24E+00	8.98E+00	2.50E+00	4.23E+00	8.96E+00	2.49E+00	4.27E+00	9.15E+00	2.56E+00	4.18E+00	8.95E+00
Co (Cobalt)	µg/L	5	3.77E-01	8.50E-01	2.31E+00	3.85E-01	8.37E-01	2.47E+00	3.87E-01	8.49E-01	2.36E+00	3.91E-01	8.40E-01	2.42E+00	3.75E-01	8.41E-01	2.50E+00	3.81E-01	8.48E-01	2.45E+00
Cr (Chromium)	µg/L	11	1.97E-01	6.65E-01	1.45E+00	1.93E-01	6.69E-01	1.51E+00	1.89E-01	6.67E-01	1.69E+00	2.01E-01	6.70E-01	1.53E+00	2.04E-01	6.65E-01	1.61E+00	1.90E-01	6.72E-01	1.63E+00
Cu (Copper)[4]	µg/L	--	2.25E-01	9.89E-01	1.87E+00	1.97E-01	9.91E-01	1.88E+00	2.07E-01	9.79E-01	1.85E+00	2.22E-01	9.83E-01	1.91E+00	2.29E-01	9.84E-01	1.95E+00	2.24E-01	9.77E-01	1.90E+00
F (Fluoride)	mg/L	--	2.36E-02	8.85E-02	1.76E-01	2.43E-02	8.67E-02	1.92E-01	2.56E-02	8.90E-02	1.86E-01	2.22E-02	8.84E-02	1.77E-01	2.26E-02	8.72E-02	1.97E-01	2.43E-02	8.80E-02	1.78E-01
Fe (Iron)	µg/L	--	1.15E+03	3.31E+03	1.08E+04	1.15E+03	3.23E+03	1.13E+04	1.19E+03	3.25E+03	1.13E+04	1.14E+03	3.21E+03	1.05E+04	1.16E+03	3.27E+03	1.08E+04	1.24E+03	3.27E+03	1.08E+04
K (Potassium)	mg/L	--	1.94E-01	9.09E-01	1.89E+00	1.95E-01	9.28E-01	1.88E+00	1.89E-01	9.23E-01	1.97E+00	2.08E-01	9.34E-01	2.08E+00	1.82E-01	9.10E-01	2.07E+00	1.79E-01	9.28E-01	1.97E+00
Mg (Magnesium)	mg/L	--	1.54E+00	5.69E+00	1.04E+01	1.40E+00	5.62E+00	1.04E+01	1.52E+00	5.62E+00	1.12E+01	1.44E+00	5.64E+00	1.06E+01	1.29E+00	5.67E+00	1.06E+01	1.43E+00	5.62E+00	1.03E+01
Mn (Manganese)	µg/L	--	6.50E+01	2.89E+02	1.14E+03	7.29E+01	2.92E+02	1.11E+03	6.93E+01	2.90E+02	1.10E+03	6.92E+01	2.91E+02	1.03E+03	7.41E+01	2.89E+02	9.72E+02	7.61E+01	2.91E+02	1.06E+03
Na (Sodium)	mg/L	--	1.99E+00	3.53E+00	5.00E+00	2.00E+00	3.54E+00	5.08E+00	1.98E+00	3.56E+00	4.88E+00	1.95E+00	3.56E+00	5.13E+00	1.95E+00	3.53E+00	4.79E+00	2.02E+00	3.55E+00	4.99E+00
Ni (Nickel)[4]	µg/L	--	4.57E-01	1.30E+00	3.13E+00	4.55E-01	1.31E+00	3.14E+00	4.53E-01	1.32E+00	3.17E+00	4.55E-01	1.32E+00	3.15E+00	4.54E-01	1.30E+00	3.11E+00	4.56E-01	1.30E+00	3.16E+00
Pb (Lead)[4]	µg/L	--	1.22E-01	2.40E-01	4.42E-01	1.19E-01	2.39E-01	4.42E-01	1.13E-01	2.39E-01	4.48E-01	1.23E-01	2.36E-01	4.51E-01	1.19E-01	2.40E-01	4.57E-01	1.17E-01	2.39E-01	4.54E-01
Sb (Antimony)	µg/L	31	2.11E-01	2.42E-01	3.47E-01	2.11E-01	2.42E-01	3.49E-01	2.11E-01	2.43E-01	3.45E-01	2.11E-01	2.43E-01	3.49E-01	2.11E-01	2.42E-01	3.48E-01	2.11E-01	2.42E-01	3.48E-01
Se (Selenium)	µg/L	5	2.66E-01	5.31E-01	7.41E-01	2.54E-01	5.30E-01	7.42E-01	2.68E-01	5.31E-01	7.48E-01	2.60E-01	5.33E-01	7.51E-01	2.50E-01	5.29E-01	7.51E-01	2.72E-01	5.32E-01	7.45E-01
SO4 (Sulfate)	mg/L	--	7.39E-01	3.94E+00	1.08E+01	6.97E-01	3.97E+00	1.22E+01	6.42E-01	3.99E+00	1.22E+01	6.28E-01	3.91E+00	1.10E+01	6.56E-01	3.95E+00	1.17E+01	6.55E-01	3.96E+00	1.04E+01
Tl (Thallium)	µg/L	0.56	2.90E-03	4.34E-02	1.28E-01	2.42E-03	4.38E-02	1.27E-01	2.81E-03	4.46E-02	1.25E-01	2.66E-03	4.43E-02	1.24E-01	2.41E-03	4.39E-02	1.27E-01	2.56E-03	4.40E-02	1.27E-01
V (Vanadium)	µg/L	--	1.99E-01	1.35E+00	3.61E+00	1.95E-01	1.36E+00	3.66E+00	1.96E-01	1.38E+00	3.65E+00	1.96E-01	1.38E+00	3.61E+00	1.94E-01	1.36E+00	3.58E+00	1.94E-01	1.36E+00	3.58E+00
Zn (Zinc)[4]	µg/L	--	1.10E+00	6.80E+00	1.50E+01	1.26E+00	6.88E+00	1.73E+01	1.31E+00	6.87E+00	1.58E+01	1.29E+00	6.76E+00	1.89E+01	1.31E+00	6.79E+00	1.66E+01	1.23E+00	6.80E+00	1.65E+01
Hardness	mg/L	500	2.15E+01	5.77E+01	9.41E+01	1.94E+01	5.75E+01	9.37E+01	2.00E+01	5.78E+01	9.55E+01	2.02E+01	5.78E+01	9.35E+01	2.14E+01	5.77E+01	9.35E+01	2.07E+01	5.74E+01	9.24E+01

Notes

[1] Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

[4] Standard is hardness-based and variable. See Section 6.7.2 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 19 Annual Summary of Concentration Statistics for the Embarrass River at PM-12.2

	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
Constituent	Units	WQ Standard																		
Ag (Silver)	µg/L	1	1.01E-01	1.13E-01	1.26E-01	1.02E-01	1.14E-01	1.27E-01	1.01E-01	1.13E-01	1.26E-01	1.01E-01	1.13E-01	1.27E-01	1.01E-01	1.14E-01	1.26E-01	1.01E-01	1.13E-01	1.26E-01
Al (Aluminum)	µg/L	125	5.39E+01	8.31E+01	**1.78E+02**	5.54E+01	8.27E+01	**1.64E+02**	5.43E+01	8.10E+01	**1.59E+02**	5.39E+01	8.16E+01	**1.65E+02**	5.38E+01	8.25E+01	**1.59E+02**	5.40E+01	8.25E+01	**1.65E+02**
Alkalinity	mg/L	--	1.28E+01	4.83E+01	8.69E+01	1.27E+01	4.85E+01	8.36E+01	1.34E+01	4.78E+01	8.57E+01	1.33E+01	4.84E+01	9.28E+01	1.36E+01	4.79E+01	8.15E+01	1.24E+01	4.79E+01	8.47E+01
As (Arsenic)	µg/L	53	4.33E-01	1.07E+00	3.38E+00	4.02E-01	1.07E+00	3.57E+00	4.00E-01	1.06E+00	3.75E+00	4.18E-01	1.08E+00	3.42E+00	4.24E-01	1.10E+00	4.15E+00	4.26E-01	1.07E+00	3.53E+00
B (Boron)	µg/L	500	2.22E+01	4.15E+01	6.74E+01	2.21E+01	4.16E+01	6.89E+01	2.23E+01	4.18E+01	6.92E+01	2.21E+01	4.16E+01	6.93E+01	2.21E+01	4.17E+01	6.88E+01	2.23E+01	4.15E+01	6.94E+01
Ba (Barium)	µg/L	--	5.03E+00	1.39E+01	3.71E+01	4.99E+00	1.39E+01	3.81E+01	5.02E+00	1.41E+01	3.74E+01	5.01E+00	1.40E+01	3.71E+01	5.02E+00	1.40E+01	3.76E+01	5.02E+00	1.39E+01	3.77E+01
Be (Beryllium)	µg/L	--	7.53E-02	9.54E-02	1.37E-01	7.52E-02	9.54E-02	1.38E-01	7.51E-02	9.59E-02	1.38E-01	7.51E-02	9.57E-02	1.39E-01	7.50E-02	9.54E-02	1.38E-01	7.52E-02	9.54E-02	1.37E-01
Ca (Calcium)	mg/L	--	7.29E+00	2.32E+01	4.00E+01	7.25E+00	2.34E+01	4.07E+01	7.12E+00	2.34E+01	4.09E+01	7.21E+00	2.33E+01	4.08E+01	7.16E+00	2.34E+01	4.07E+01	7.38E+00	2.33E+01	4.10E+01
Cd (Cadmium)[4]	µg/L	--	7.62E-02	9.18E-02	1.10E-01	7.63E-02	9.18E-02	1.10E-01	7.56E-02	9.19E-02	1.10E-01	7.62E-02	9.20E-02	1.09E-01	7.61E-02	9.17E-02	1.10E-01	7.60E-02	9.17E-02	1.10E-01
Cl (Chloride)	mg/L	230	2.72E+00	4.33E+00	8.69E+00	2.81E+00	4.35E+00	8.97E+00	2.78E+00	4.33E+00	8.80E+00	2.65E+00	4.33E+00	8.73E+00	2.79E+00	4.36E+00	8.96E+00	2.72E+00	4.27E+00	8.82E+00
Co (Cobalt)	µg/L	5	4.06E-01	8.10E-01	2.22E+00	3.96E-01	7.97E-01	2.38E+00	3.95E-01	8.09E-01	2.29E+00	4.00E-01	8.02E-01	2.33E+00	3.85E-01	7.96E-01	2.41E+00	3.92E-01	8.12E-01	2.38E+00
Cr (Chromium)	µg/L	11	2.08E-01	6.26E-01	1.41E+00	2.03E-01	6.31E-01	1.47E+00	2.03E-01	6.30E-01	1.64E+00	2.13E-01	6.34E-01	1.49E+00	2.16E-01	6.29E-01	1.53E+00	2.00E-01	6.34E-01	1.58E+00
Cu (Copper)[4]	µg/L	--	2.92E-01	1.07E+00	1.87E+00	2.67E-01	1.08E+00	1.90E+00	2.68E-01	1.07E+00	1.85E+00	2.87E-01	1.07E+00	1.90E+00	3.01E-01	1.07E+00	1.91E+00	2.85E-01	1.07E+00	1.88E+00
F (Fluoride)	mg/L	--	2.89E-02	9.47E-02	1.72E-01	3.01E-02	9.36E-02	1.84E-01	3.09E-02	9.55E-02	1.83E-01	2.72E-02	9.49E-02	1.74E-01	2.79E-02	9.37E-02	1.91E-01	3.05E-02	9.45E-02	1.75E-01
Fe (Iron)	µg/L	--	9.86E+02	2.92E+03	1.01E+04	9.43E+02	2.87E+03	1.04E+04	9.47E+02	2.88E+03	1.10E+04	9.03E+02	2.87E+03	9.84E+03	9.35E+02	2.92E+03	1.02E+04	9.63E+02	2.94E+03	1.03E+04
K (Potassium)	mg/L	--	2.27E+00	8.31E+00	1.77E+01	2.26E+00	8.38E+00	1.80E+01	2.25E+00	8.32E+00	1.81E+01	2.26E+00	8.31E+00	1.83E+01	2.21E+00	8.34E+00	1.81E+01	2.25E+00	8.35E+00	1.83E+01
Mg (Magnesium)	mg/L	--	1.16E+01	4.04E+01	8.38E+01	1.10E+01	4.04E+01	8.65E+01	1.14E+01	4.04E+01	8.73E+01	1.12E+01	4.02E+01	8.66E+01	1.11E+01	4.04E+01	8.62E+01	1.12E+01	4.03E+01	8.75E+01
Mn (Manganese)	µg/L	--	9.97E+01	3.69E+02	1.13E+03	1.07E+02	3.69E+02	1.07E+03	1.01E+02	3.71E+02	1.09E+03	1.03E+02	3.71E+02	1.04E+03	1.04E+02	3.68E+02	9.53E+02	1.07E+02	3.73E+02	1.05E+03
Na (Sodium)	mg/L	--	5.60E+00	1.59E+01	3.15E+01	5.59E+00	1.59E+01	3.21E+01	5.63E+00	1.60E+01	3.25E+01	5.62E+00	1.59E+01	3.26E+01	5.65E+00	1.59E+01	3.21E+01	5.69E+00	1.59E+01	3.25E+01
Ni (Nickel)[4]	µg/L	--	5.74E-01	1.57E+00	3.31E+00	5.70E-01	1.58E+00	3.33E+00	5.70E-01	1.59E+00	3.36E+00	5.69E-01	1.58E+00	3.34E+00	5.69E-01	1.58E+00	3.30E+00	5.69E-01	1.57E+00	3.33E+00
Pb (Lead)[4]	µg/L	--	1.22E-01	2.24E-01	4.31E-01	1.20E-01	2.22E-01	4.28E-01	1.15E-01	2.24E-01	4.39E-01	1.23E-01	2.20E-01	4.34E-01	1.20E-01	2.24E-01	4.41E-01	1.18E-01	2.23E-01	4.40E-01
Sb (Antimony)	µg/L	31	2.12E-01	2.41E-01	3.27E-01	2.13E-01	2.41E-01	3.23E-01	2.12E-01	2.41E-01	3.23E-01	2.12E-01	2.41E-01	3.27E-01	2.12E-01	2.41E-01	3.26E-01	2.13E-01	2.41E-01	3.27E-01
Se (Selenium)	µg/L	5	2.85E-01	5.47E-01	7.34E-01	2.73E-01	5.46E-01	7.36E-01	2.84E-01	5.47E-01	7.34E-01	2.82E-01	5.48E-01	7.37E-01	2.70E-01	5.44E-01	7.35E-01	2.94E-01	5.47E-01	7.35E-01
SO4 (Sulfate)	mg/L	--	4.16E+01	1.59E+02	3.52E+02	4.18E+01	1.61E+02	3.63E+02	4.18E+01	1.61E+02	3.67E+02	4.20E+01	1.60E+02	3.66E+02	4.12E+01	1.61E+02	3.64E+02	4.11E+01	1.60E+02	3.67E+02
Tl (Thallium)	µg/L	0.56	6.94E-03	4.88E-02	1.23E-01	6.19E-03	4.94E-02	1.24E-01	6.54E-03	5.01E-02	1.20E-01	6.43E-03	4.98E-02	1.20E-01	6.10E-03	4.92E-02	1.24E-01	6.27E-03	4.94E-02	1.22E-01
V (Vanadium)	µg/L	--	3.89E-01	1.85E+00	4.16E+00	3.87E-01	1.87E+00	4.19E+00	3.79E-01	1.88E+00	4.22E+00	3.81E-01	1.88E+00	4.18E+00	3.77E-01	1.87E+00	4.16E+00	3.81E-01	1.86E+00	4.17E+00
Zn (Zinc)[4]	µg/L	--	1.17E+00	5.97E+00	1.35E+01	1.31E+00	6.05E+00	1.70E+01	1.39E+00	6.06E+00	1.46E+01	1.37E+00	5.95E+00	1.83E+01	1.36E+00	5.96E+00	1.59E+01	1.29E+00	6.02E+00	1.55E+01
Hardness	mg/L	500	7.14E+01	2.25E+02	4.40E+02	6.98E+01	2.25E+02	4.55E+02	7.09E+01	2.26E+02	4.57E+02	7.02E+01	2.25E+02	4.56E+02	7.05E+01	2.26E+02	4.54E+02	6.99E+01	2.25E+02	4.61E+02

Notes

[1] Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

[4] Standard is hardness-based and variable. See Section 6.7.2 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 20 **Annual Summary of Concentration Statistics for Mud Lake Creek at MLC-3**

Constituent	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
	Units	WQ Standard																		
Ag (Silver)	µg/L	1	7.83E-02	1.06E-01	1.25E-01	7.88E-02	1.06E-01	1.26E-01	7.86E-02	1.06E-01	1.25E-01	7.79E-02	1.06E-01	1.26E-01	7.89E-02	1.06E-01	1.26E-01	7.86E-02	1.06E-01	1.26E-01
Al (Aluminum)	µg/L	125	5.88E+01	9.27E+01	**1.86E+02**	5.88E+01	9.29E+01	**1.72E+02**	5.74E+01	9.05E+01	**1.68E+02**	5.89E+01	9.15E+01	**1.74E+02**	6.11E+01	9.24E+01	**1.69E+02**	6.07E+01	9.22E+01	**1.74E+02**
Alkalinity	mg/L	--	8.79E+00	4.31E+01	8.76E+01	8.79E+00	4.36E+01	8.74E+01	9.46E+00	4.27E+01	8.80E+01	9.22E+00	4.32E+01	9.41E+01	9.73E+00	4.28E+01	8.80E+01	8.85E+00	4.29E+01	9.04E+01
As (Arsenic)	µg/L	53	3.71E-01	9.78E-01	3.55E+00	3.58E-01	9.96E-01	3.71E+00	3.43E-01	9.83E-01	3.85E+00	3.64E-01	9.99E-01	3.73E+00	3.53E-01	1.02E+00	4.51E+00	3.85E-01	9.92E-01	3.73E+00
B (Boron)	µg/L	500	1.59E+01	2.19E+01	2.77E+01	1.58E+01	2.18E+01	2.76E+01	1.59E+01	2.20E+01	2.76E+01	1.63E+01	2.19E+01	2.80E+01	1.58E+01	2.19E+01	2.76E+01	1.60E+01	2.19E+01	2.77E+01
Ba (Barium)	µg/L	--	4.94E+00	1.66E+01	5.68E+01	4.91E+00	1.67E+01	5.81E+01	4.93E+00	1.70E+01	5.91E+01	4.93E+00	1.69E+01	5.67E+01	4.94E+00	1.68E+01	5.74E+01	4.94E+00	1.67E+01	5.75E+01
Be (Beryllium)	µg/L	--	7.39E-02	9.65E-02	1.67E-01	7.38E-02	9.66E-02	1.67E-01	7.39E-02	9.71E-02	1.66E-01	7.39E-02	9.70E-02	1.69E-01	7.37E-02	9.65E-02	1.68E-01	7.39E-02	9.65E-02	1.66E-01
Ca (Calcium)	mg/L	--	3.68E+00	1.27E+01	2.52E+01	3.40E+00	1.29E+01	2.53E+01	3.33E+00	1.30E+01	2.56E+01	3.59E+00	1.30E+01	2.52E+01	3.34E+00	1.29E+01	2.55E+01	3.63E+00	1.27E+01	2.48E+01
Cd (Cadmium)[4]	µg/L	--	7.46E-02	9.14E-02	1.20E-01	7.47E-02	9.13E-02	1.20E-01	7.41E-02	9.15E-02	1.21E-01	7.47E-02	9.16E-02	1.19E-01	7.46E-02	9.12E-02	1.20E-01	7.43E-02	9.12E-02	1.20E-01
Cl (Chloride)	mg/L	230	2.04E+00	4.15E+00	9.14E+00	2.13E+00	4.19E+00	9.34E+00	2.12E+00	4.13E+00	9.08E+00	2.14E+00	4.15E+00	9.10E+00	2.16E+00	4.19E+00	9.25E+00	2.18E+00	4.09E+00	9.12E+00
Co (Cobalt)	µg/L	5	2.75E-01	8.22E-01	2.34E+00	2.62E-01	8.09E-01	2.53E+00	2.69E-01	8.10E-01	2.39E+00	2.63E-01	8.12E-01	2.45E+00	2.57E-01	8.10E-01	2.59E+00	2.69E-01	8.20E-01	2.53E+00
Cr (Chromium)	µg/L	11	1.78E-01	6.57E-01	1.46E+00	1.77E-01	6.60E-01	1.58E+00	1.82E-01	6.57E-01	1.71E+00	1.89E-01	6.59E-01	1.54E+00	1.94E-01	6.57E-01	1.65E+00	1.76E-01	6.63E-01	1.66E+00
Cu (Copper)[4]	µg/L	--	2.05E-01	9.86E-01	2.10E+00	1.81E-01	9.86E-01	2.11E+00	1.92E-01	9.76E-01	2.09E+00	1.95E-01	9.78E-01	2.11E+00	2.02E-01	9.73E-01	2.14E+00	2.04E-01	9.75E-01	2.12E+00
F (Fluoride)	mg/L	--	2.17E-02	8.73E-02	1.85E-01	2.21E-02	8.62E-02	1.95E-01	2.40E-02	8.86E-02	1.91E-01	2.10E-02	8.80E-02	1.80E-01	2.10E-02	8.61E-02	2.04E-01	2.22E-02	8.77E-02	1.82E-01
Fe (Iron)	µg/L	--	6.73E+02	3.15E+03	1.10E+04	6.44E+02	3.06E+03	1.15E+04	6.58E+02	3.11E+03	1.13E+04	5.92E+02	3.08E+03	1.08E+04	6.19E+02	3.11E+03	1.10E+04	6.55E+02	3.14E+03	1.09E+04
K (Potassium)	mg/L	--	1.75E-01	9.06E-01	1.94E+00	1.78E-01	9.19E-01	1.93E+00	1.70E-01	9.14E-01	2.02E+00	1.87E-01	9.21E-01	2.16E+00	1.61E-01	8.96E-01	2.08E+00	1.58E-01	9.26E-01	1.99E+00
Mg (Magnesium)	mg/L	--	1.40E+00	5.64E+00	1.09E+01	1.30E+00	5.58E+00	1.09E+01	1.39E+00	5.57E+00	1.16E+01	1.28E+00	5.62E+00	1.09E+01	1.22E+00	5.65E+00	1.10E+01	1.31E+00	5.59E+00	1.08E+01
Mn (Manganese)	µg/L	--	6.01E+01	2.73E+02	1.15E+03	6.22E+01	2.74E+02	1.10E+03	6.43E+01	2.77E+02	1.15E+03	6.24E+01	2.73E+02	1.05E+03	6.70E+01	2.76E+02	1.00E+03	6.72E+01	2.77E+02	1.09E+03
Na (Sodium)	mg/L	--	1.92E+00	3.53E+00	5.07E+00	1.94E+00	3.54E+00	5.09E+00	1.93E+00	3.57E+00	4.95E+00	1.88E+00	3.56E+00	5.15E+00	1.92E+00	3.52E+00	4.85E+00	1.97E+00	3.55E+00	5.10E+00
Ni (Nickel)[4]	µg/L	--	4.47E-01	1.31E+00	3.83E+00	4.45E-01	1.31E+00	3.84E+00	4.44E-01	1.32E+00	3.88E+00	4.44E-01	1.32E+00	3.91E+00	4.44E-01	1.30E+00	3.80E+00	4.45E-01	1.30E+00	3.88E+00
Pb (Lead)[4]	µg/L	--	1.17E-01	2.39E-01	4.46E-01	1.12E-01	2.37E-01	4.45E-01	1.10E-01	2.37E-01	4.51E-01	1.18E-01	2.33E-01	4.58E-01	1.15E-01	2.38E-01	4.59E-01	1.13E-01	2.37E-01	4.61E-01
Sb (Antimony)	µg/L	31	2.10E-01	2.42E-01	3.79E-01	2.11E-01	2.42E-01	3.75E-01	2.11E-01	2.43E-01	3.76E-01	2.10E-01	2.43E-01	3.78E-01	2.10E-01	2.42E-01	3.78E-01	2.10E-01	2.42E-01	3.81E-01
Se (Selenium)	µg/L	5	2.57E-01	5.33E-01	7.97E-01	2.44E-01	5.33E-01	7.99E-01	2.59E-01	5.31E-01	7.98E-01	2.54E-01	5.34E-01	8.00E-01	2.45E-01	5.29E-01	7.93E-01	2.67E-01	5.31E-01	8.01E-01
SO4 (Sulfate)	mg/L	--	6.37E-01	3.88E+00	1.17E+01	5.92E-01	3.90E+00	1.34E+01	5.46E-01	3.91E+00	1.24E+01	5.47E-01	3.82E+00	1.10E+01	5.77E-01	3.88E+00	1.20E+01	5.48E-01	3.87E+00	1.08E+01
Tl (Thallium)	µg/L	0.56	2.20E-03	4.31E-02	1.52E-01	1.88E-03	4.37E-02	1.58E-01	2.18E-03	4.47E-02	1.55E-01	2.02E-03	4.43E-02	1.52E-01	1.92E-03	4.33E-02	1.57E-01	2.07E-03	4.37E-02	1.54E-01
V (Vanadium)	µg/L	--	1.84E-01	1.36E+00	4.58E+00	1.82E-01	1.37E+00	4.63E+00	1.82E-01	1.38E+00	4.62E+00	1.82E-01	1.38E+00	4.62E+00	1.80E-01	1.36E+00	4.54E+00	1.81E-01	1.36E+00	4.56E+00
Zn (Zinc)[4]	µg/L	--	9.91E-01	6.70E+00	1.55E+01	1.10E+00	6.78E+00	1.77E+01	1.18E+00	6.80E+00	1.67E+01	1.14E+00	6.63E+00	1.91E+01	1.13E+00	6.70E+00	1.70E+01	1.07E+00	6.73E+00	1.65E+01
Hardness	mg/L	500	4.54E+01	1.27E+02	2.23E+02	4.29E+01	1.27E+02	2.28E+02	4.33E+01	1.24E+02	2.18E+02	4.24E+01	1.27E+02	2.30E+02	4.29E+01	1.27E+02	2.29E+02	4.35E+01	1.26E+02	2.28E+02

Notes

[1] Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

[4] Standard is hardness-based and variable. See Section 6.7.3.1 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 21 Annual Summary of Concentration Statistics for Mud Lake Creek at MLC-2

	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
Constituent	Units	WQ Standard																		
Ag (Silver)	µg/L	1	8.72E-02	1.07E-01	1.25E-01	8.71E-02	1.07E-01	1.26E-01	8.60E-02	1.07E-01	1.25E-01	8.53E-02	1.07E-01	1.26E-01	8.54E-02	1.07E-01	1.25E-01	8.33E-02	1.06E-01	1.25E-01
Al (Aluminum)	µg/L	125	5.31E+01	8.54E+01	**1.84E+02**	5.34E+01	8.53E+01	**1.70E+02**	5.44E+01	8.35E+01	**1.64E+02**	5.39E+01	8.44E+01	**1.72E+02**	5.44E+01	8.58E+01	**1.66E+02**	5.64E+01	8.64E+01	**1.72E+02**
Alkalinity	mg/L	--	1.19E+01	6.40E+01	1.32E+02	1.09E+01	6.43E+01	1.31E+02	1.18E+01	6.30E+01	1.28E+02	1.19E+01	6.33E+01	1.28E+02	1.20E+01	6.15E+01	1.25E+02	1.07E+01	5.80E+01	1.12E+02
As (Arsenic)	µg/L	53	4.24E-01	1.32E+00	3.51E+00	4.05E-01	1.31E+00	3.70E+00	4.02E-01	1.30E+00	3.82E+00	4.22E-01	1.32E+00	3.69E+00	4.23E-01	1.34E+00	4.44E+00	4.12E-01	1.31E+00	3.68E+00
B (Boron)	µg/L	500	1.82E+01	4.12E+01	9.45E+01	1.79E+01	4.11E+01	9.28E+01	1.82E+01	4.12E+01	9.13E+01	1.78E+01	4.02E+01	8.91E+01	1.74E+01	3.90E+01	8.45E+01	1.76E+01	3.46E+01	6.85E+01
Ba (Barium)	µg/L	--	5.68E+00	3.14E+01	9.24E+01	5.59E+00	3.16E+01	9.26E+01	5.67E+00	3.21E+01	9.15E+01	5.64E+00	3.13E+01	9.03E+01	5.59E+00	3.05E+01	8.95E+01	5.49E+00	2.79E+01	8.14E+01
Be (Beryllium)	µg/L	--	7.48E-02	1.07E-01	1.79E-01	7.47E-02	1.07E-01	1.81E-01	7.47E-02	1.08E-01	1.82E-01	7.46E-02	1.07E-01	1.82E-01	7.45E-02	1.07E-01	1.79E-01	7.46E-02	1.07E-01	1.79E-01
Ca (Calcium)	mg/L	--	4.26E+00	1.55E+01	2.90E+01	4.06E+00	1.57E+01	2.89E+01	3.86E+00	1.57E+01	2.97E+01	4.01E+00	1.57E+01	2.92E+01	3.83E+00	1.55E+01	2.90E+01	3.99E+00	1.52E+01	2.82E+01
Cd (Cadmium)[4]	µg/L	--	7.55E-02	9.55E-02	1.25E-01	7.58E-02	9.55E-02	1.26E-01	7.53E-02	9.58E-02	1.26E-01	7.57E-02	9.58E-02	1.26E-01	7.55E-02	9.55E-02	1.26E-01	7.54E-02	9.53E-02	1.25E-01
Cl (Chloride)	mg/L	230	2.81E+00	5.65E+00	9.31E+00	2.90E+00	5.64E+00	9.31E+00	2.86E+00	5.61E+00	9.18E+00	2.75E+00	5.53E+00	9.27E+00	2.88E+00	5.48E+00	9.24E+00	2.73E+00	4.96E+00	9.07E+00
Co (Cobalt)	µg/L	5	4.16E-01	8.53E-01	2.32E+00	4.50E-01	8.43E-01	2.48E+00	4.55E-01	8.47E-01	2.36E+00	4.31E-01	8.37E-01	2.41E+00	4.29E-01	8.30E-01	2.51E+00	3.77E-01	8.10E-01	2.44E+00
Cr (Chromium)	µg/L	11	1.94E-01	6.64E-01	1.45E+00	1.92E-01	6.70E-01	1.52E+00	1.91E-01	6.67E-01	1.70E+00	2.00E-01	6.75E-01	1.53E+00	2.04E-01	6.71E-01	1.60E+00	1.90E-01	6.89E-01	1.64E+00
Cu (Copper)[4]	µg/L	--	2.33E-01	1.11E+00	2.12E+00	2.09E-01	1.11E+00	2.11E+00	2.14E-01	1.11E+00	2.13E+00	2.30E-01	1.11E+00	2.13E+00	2.43E-01	1.11E+00	2.15E+00	2.36E-01	1.11E+00	2.16E+00
F (Fluoride)	mg/L	--	4.88E-02	3.81E-01	1.13E+00	4.78E-02	3.77E-01	1.10E+00	5.05E-02	3.76E-01	1.09E+00	4.66E-02	3.66E-01	1.05E+00	4.44E-02	3.45E-01	9.74E-01	4.00E-02	2.79E-01	7.42E-01
Fe (Iron)	µg/L	--	8.83E+02	2.98E+03	1.05E+04	8.64E+02	2.90E+03	1.10E+04	8.46E+02	2.93E+03	1.12E+04	8.10E+02	2.88E+03	1.03E+04	7.88E+02	2.93E+03	1.07E+04	7.34E+02	2.89E+03	1.07E+04
K (Potassium)	mg/L	--	2.48E-01	1.65E+00	3.78E+00	2.52E-01	1.66E+00	3.68E+00	2.56E-01	1.65E+00	3.68E+00	2.69E-01	1.62E+00	3.64E+00	2.40E-01	1.56E+00	3.48E+00	2.21E-01	1.45E+00	2.97E+00
Mg (Magnesium)	mg/L	--	2.06E+00	1.09E+01	2.59E+01	1.81E+00	1.08E+01	2.51E+01	2.01E+00	1.09E+01	2.48E+01	1.88E+00	1.06E+01	2.44E+01	1.72E+00	1.04E+01	2.34E+01	1.76E+00	9.30E+00	1.99E+01
Mn (Manganese)	µg/L	--	6.69E+01	2.74E+02	1.14E+03	7.05E+01	2.78E+02	1.07E+03	6.79E+01	2.79E+02	1.09E+03	6.77E+01	2.77E+02	1.03E+03	7.24E+01	2.78E+02	9.79E+02	7.33E+01	2.79E+02	1.05E+03
Na (Sodium)	mg/L	--	2.53E+00	8.39E+00	2.10E+01	2.52E+00	8.33E+00	2.05E+01	2.51E+00	8.34E+00	2.02E+01	2.45E+00	8.14E+00	1.95E+01	2.45E+00	7.78E+00	1.83E+01	2.36E+00	6.72E+00	1.45E+01
Ni (Nickel)[4]	µg/L	--	4.64E-01	1.54E+00	3.84E+00	4.62E-01	1.54E+00	3.91E+00	4.64E-01	1.57E+00	3.95E+00	4.63E-01	1.56E+00	3.91E+00	4.62E-01	1.55E+00	3.87E+00	4.63E-01	1.55E+00	3.98E+00
Pb (Lead)[4]	µg/L	--	1.32E-01	3.36E-01	5.42E-01	1.28E-01	3.33E-01	5.36E-01	1.23E-01	3.31E-01	5.27E-01	1.34E-01	3.28E-01	5.22E-01	1.29E-01	3.23E-01	5.04E-01	1.26E-01	3.01E-01	4.65E-01
Sb (Antimony)	µg/L	31	2.12E-01	2.53E-01	3.79E-01	2.12E-01	2.54E-01	3.84E-01	2.12E-01	2.55E-01	3.86E-01	2.12E-01	2.55E-01	3.85E-01	2.11E-01	2.55E-01	3.87E-01	2.12E-01	2.54E-01	3.89E-01
Se (Selenium)	µg/L	5	2.70E-01	5.52E-01	7.82E-01	2.55E-01	5.52E-01	7.88E-01	2.65E-01	5.54E-01	7.86E-01	2.65E-01	5.55E-01	7.85E-01	2.52E-01	5.52E-01	7.96E-01	2.76E-01	5.56E-01	8.04E-01
SO4 (Sulfate)	mg/L	--	2.04E+00	2.06E+01	6.30E+01	1.74E+00	2.08E+01	6.13E+01	1.86E+00	2.05E+01	6.06E+01	1.75E+00	1.96E+01	5.81E+01	1.70E+00	1.88E+01	5.40E+01	1.43E+00	1.48E+01	4.10E+01
Tl (Thallium)	µg/L	0.56	3.69E-03	5.73E-02	1.65E-01	3.13E-03	5.80E-02	1.70E-01	3.57E-03	5.90E-02	1.65E-01	3.32E-03	5.87E-02	1.65E-01	3.14E-03	5.80E-02	1.69E-01	3.17E-03	5.79E-02	1.68E-01
V (Vanadium)	µg/L	--	2.11E-01	1.72E+00	4.84E+00	2.07E-01	1.74E+00	4.84E+00	2.12E-01	1.77E+00	4.89E+00	2.11E-01	1.76E+00	4.89E+00	2.11E-01	1.75E+00	4.82E+00	2.08E-01	1.77E+00	4.88E+00
Zn (Zinc)[4]	µg/L	--	1.15E+00	7.48E+00	1.51E+01	1.32E+00	7.61E+00	1.77E+01	1.35E+00	7.59E+00	1.61E+01	1.37E+00	7.45E+00	1.90E+01	1.40E+00	7.51E+00	1.66E+01	1.22E+00	7.64E+00	1.65E+01
Hardness	mg/L	500	4.28E+01	1.20E+02	2.09E+02	4.02E+01	1.20E+02	2.13E+02	4.08E+01	1.18E+02	2.05E+02	3.98E+01	1.20E+02	2.12E+02	4.03E+01	1.20E+02	2.13E+02	4.09E+01	1.19E+02	2.12E+02

Notes

1 Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

2 Values shown are the average of the monthly P50 values for the referenced Mine Year.

3 Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

4 Standard is hardness-based and variable. See Section 6.7.3.1 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 22 Annual Summary of Concentration Statistics for Trimble Creek at TC-1

	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
Constituent	Units	WQ Standard																		
Ag (Silver)	µg/L	1	1.14E-01	1.20E-01	1.25E-01	1.75E-01	2.63E-01	3.33E-01	1.42E-01	1.79E-01	2.05E-01	1.24E-01	1.48E-01	1.86E-01	7.17E-02	9.47E-02	1.39E-01	6.45E-02	9.71E-02	1.94E-01
Al (Aluminum)	µg/L	125	1.26E+01	2.85E+01	1.09E+02	8.58E+00	2.37E+01	9.56E+01	4.18E+00	1.97E+01	8.88E+01	6.17E+00	2.36E+01	1.05E+02	7.81E+00	2.72E+01	1.07E+02	8.20E+00	2.87E+01	1.07E+02
Alkalinity	mg/L	--	3.97E+01	8.90E+01	1.00E+02	4.18E+01	8.92E+01	1.00E+02	3.80E+01	7.33E+01	1.00E+02	3.79E+01	7.53E+01	1.00E+02	3.65E+01	8.54E+01	1.00E+02	4.40E+01	8.98E+01	1.00E+02
As (Arsenic)	µg/L	53	1.92E+00	4.09E+00	5.10E+00	3.67E+00	8.65E+00	1.00E+01	3.97E+00	8.84E+00	1.00E+01	3.36E+00	8.56E+00	1.00E+01	3.22E+00	8.56E+00	1.00E+01	3.79E+00	8.77E+00	1.00E+01
B (Boron)	µg/L	500	9.10E+01	2.48E+02	3.14E+02	9.11E+01	1.99E+02	2.63E+02	6.61E+01	1.48E+02	2.45E+02	6.58E+01	1.46E+02	2.42E+02	6.25E+01	1.59E+02	2.15E+02	1.10E+02	2.26E+02	3.56E+02
Ba (Barium)	µg/L	--	4.67E+00	4.93E+00	5.00E+00	4.69E+00	4.93E+00	5.00E+00	4.71E+00	4.94E+00	5.00E+00	4.67E+00	4.93E+00	5.00E+00	4.67E+00	4.93E+00	5.00E+00	4.70E+00	4.94E+00	5.00E+00
Be (Beryllium)	µg/L	--	1.22E-01	2.24E-01	2.72E-01	1.90E-01	3.71E-01	4.60E-01	1.92E-01	3.75E-01	4.78E-01	1.60E-01	3.34E-01	4.98E-01	1.29E-01	2.75E-01	4.51E-01	1.46E-01	3.24E-01	6.37E-01
Ca (Calcium)	mg/L	--	1.42E+01	3.07E+01	3.51E+01	1.43E+01	3.12E+01	3.51E+01	1.58E+01	3.16E+01	3.51E+01	1.35E+01	3.07E+01	3.51E+01	1.31E+01	3.07E+01	3.51E+01	1.48E+01	3.13E+01	3.51E+01
Cd (Cadmium)[4]	µg/L	--	9.47E-02	1.30E-01	1.76E-01	2.28E-01	5.37E-01	9.24E-01	3.09E-01	8.04E-01	1.67E+00	2.57E-01	8.55E-01	1.98E+00	1.39E-01	3.19E-01	6.74E-01	1.40E-01	2.81E-01	6.49E-01
Cl (Chloride)	mg/L	230	1.30E+00	1.89E+00	5.58E+00	1.30E+00	1.84E+00	5.48E+00	1.30E+00	1.79E+00	5.59E+00	1.30E+00	1.88E+00	5.84E+00	1.30E+00	1.91E+00	5.75E+00	1.30E+00	1.79E+00	5.10E+00
Co (Cobalt)	µg/L	5	1.07E+00	2.61E+00	4.85E+00	2.10E+00	4.43E+00	5.00E+00	2.30E+00	4.49E+00	5.00E+00	1.96E+00	4.37E+00	5.00E+00	1.80E+00	4.33E+00	5.00E+00	2.06E+00	4.41E+00	5.00E+00
Cr (Chromium)	µg/L	11	3.48E-01	5.86E-01	1.04E+00	1.48E+00	3.68E+00	4.80E+00	2.19E+00	5.17E+00	6.59E+00	1.58E+00	4.24E+00	5.44E+00	6.49E-01	1.43E+00	1.81E+00	7.24E-01	1.38E+00	1.76E+00
Cu (Copper)[4]	µg/L	--	1.18E+00	4.74E+00	8.86E+00	2.93E+00	7.68E+00	9.00E+00	3.27E+00	7.80E+00	9.00E+00	2.59E+00	7.56E+00	9.00E+00	2.57E+00	7.54E+00	9.00E+00	3.13E+00	7.75E+00	9.00E+00
F (Fluoride)	mg/L	--	3.27E-02	5.06E-02	1.18E-01	3.48E-02	5.05E-02	1.08E-01	3.60E-02	5.07E-02	1.13E-01	3.35E-02	5.08E-02	1.13E-01	3.21E-02	5.04E-02	1.14E-01	3.38E-02	5.07E-02	1.08E-01
Fe (Iron)	µg/L	--	3.00E+02	9.16E+02	5.66E+03	3.00E+02	8.63E+02	5.91E+03	3.00E+02	8.03E+02	5.57E+03	2.72E+02	8.98E+02	5.93E+03	3.00E+02	9.12E+02	6.18E+03	3.00E+02	8.30E+02	6.04E+03
K (Potassium)	mg/L	--	3.02E-01	4.99E-01	1.18E+00	3.13E-01	5.00E-01	1.09E+00	3.13E-01	4.99E-01	1.07E+00	3.08E-01	5.00E-01	1.23E+00	2.85E-01	4.99E-01	1.30E+00	3.17E-01	5.01E-01	1.14E+00
Mg (Magnesium)	mg/L	--	2.07E+00	3.02E+00	6.52E+00	1.97E+00	3.01E+00	6.06E+00	2.12E+00	3.02E+00	6.36E+00	1.94E+00	3.01E+00	6.94E+00	1.88E+00	3.01E+00	6.32E+00	1.99E+00	3.01E+00	5.86E+00
Mn (Manganese)	µg/L	--	5.00E+01	7.82E+01	7.12E+02	4.98E+01	7.76E+01	5.99E+02	5.00E+01	7.41E+01	5.07E+02	4.97E+01	8.02E+01	5.68E+02	5.00E+01	7.98E+01	5.69E+02	5.00E+01	7.43E+01	5.88E+02
Na (Sodium)	mg/L	--	1.93E+00	2.15E+00	3.59E+00	1.94E+00	2.13E+00	3.53E+00	1.95E+00	2.12E+00	3.56E+00	1.92E+00	2.15E+00	3.80E+00	1.93E+00	2.15E+00	3.62E+00	1.96E+00	2.13E+00	3.52E+00
Ni (Nickel)[4]	µg/L	--	3.03E+00	1.51E+01	4.62E+01	1.44E+01	4.20E+01	5.00E+01	1.62E+01	4.28E+01	5.00E+01	1.24E+01	4.13E+01	5.00E+01	1.18E+01	4.11E+01	5.00E+01	1.52E+01	4.22E+01	5.00E+01
Pb (Lead)[4]	µg/L	--	4.89E-01	1.12E+00	1.32E+00	1.00E+00	2.56E+00	3.00E+00	1.12E+00	2.60E+00	3.00E+00	8.88E-01	2.51E+00	3.00E+00	8.91E-01	2.51E+00	3.00E+00	1.07E+00	2.58E+00	3.00E+00
Sb (Antimony)	µg/L	31	2.79E-01	5.96E-01	1.99E+00	1.37E+00	4.07E+00	7.33E+00	2.72E+00	7.32E+00	1.11E+01	2.45E+00	8.84E+00	1.35E+01	1.12E+00	3.49E+00	6.28E+00	1.03E+00	3.11E+00	6.08E+00
Se (Selenium)	µg/L	5	3.95E-01	5.61E-01	6.72E-01	7.77E-01	1.43E+00	1.91E+00	9.53E-01	1.84E+00	2.45E+00	1.15E+00	2.82E+00	4.26E+00	4.78E-01	7.68E-01	1.20E+00	4.58E-01	6.88E-01	1.33E+00
SO4 (Sulfate)	mg/L	--	3.44E+00	8.09E+00	9.66E+00	3.63E+00	8.22E+00	1.08E+01	4.00E+00	8.25E+00	9.82E+00	3.36E+00	8.07E+00	9.64E+00	3.29E+00	8.07E+00	1.02E+01	3.61E+00	8.21E+00	9.39E+00
Tl (Thallium)	µg/L	0.56	4.47E-02	1.34E-01	1.64E-01	7.11E-02	1.77E-01	2.40E-01	5.68E-02	1.41E-01	1.78E-01	3.77E-02	1.17E-01	1.64E-01	1.81E-02	5.50E-02	1.00E-01	2.50E-02	5.94E-02	1.35E-01
V (Vanadium)	µg/L	--	1.19E+00	3.62E+00	4.45E+00	1.89E+00	5.22E+00	6.98E+00	2.71E+00	6.79E+00	8.72E+00	1.64E+00	5.43E+00	7.07E+00	6.91E-01	2.06E+00	2.61E+00	9.73E-01	2.19E+00	3.01E+00
Zn (Zinc)[4]	µg/L	--	4.70E+00	1.10E+01	1.42E+01	1.55E+01	3.89E+01	6.12E+01	2.81E+01	6.75E+01	9.95E+01	2.12E+01	6.87E+01	1.00E+02	9.84E+00	2.48E+01	4.46E+01	8.65E+00	1.85E+01	4.09E+01
Hardness	mg/L	500	4.14E+01	1.17E+02	2.04E+02	3.86E+01	1.16E+02	2.06E+02	3.97E+01	1.15E+02	1.97E+02	3.84E+01	1.17E+02	2.03E+02	3.92E+01	1.16E+02	2.04E+02	3.92E+01	1.14E+02	2.02E+02

Notes

[1] Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

[4] Standard is hardness-based and variable. See Section 6.7.3.2 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 23 Annual Summary of Concentration Statistics for Trimble Creek at PM-19

	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
Constituent	**Units**	**WQ Standard**																		
Ag (Silver)	µg/L	1	1.11E-01	1.19E-01	1.25E-01	1.51E-01	2.41E-01	3.16E-01	1.31E-01	1.69E-01	2.00E-01	1.19E-01	1.42E-01	1.80E-01	7.44E-02	9.71E-02	1.36E-01	6.77E-02	9.91E-02	1.87E-01
Al (Aluminum)	µg/L	125	1.36E+01	3.65E+01	**1.29E+02**	1.01E+01	3.21E+01	1.16E+02	5.94E+00	2.74E+01	1.10E+02	8.41E+00	3.22E+01	1.23E+02	1.00E+01	3.56E+01	1.25E+02	1.14E+01	3.61E+01	**1.27E+02**
Alkalinity	mg/L	--	3.06E+01	8.59E+01	1.04E+02	3.12E+01	8.66E+01	1.04E+02	3.07E+01	7.27E+01	1.02E+02	2.89E+01	7.39E+01	1.03E+02	2.79E+01	8.25E+01	1.03E+02	3.34E+01	8.60E+01	1.02E+02
As (Arsenic)	µg/L	53	1.39E+00	3.67E+00	4.76E+00	2.52E+00	7.60E+00	9.71E+00	2.76E+00	7.88E+00	9.79E+00	2.36E+00	7.47E+00	9.70E+00	2.25E+00	7.45E+00	9.69E+00	2.60E+00	7.76E+00	9.67E+00
B (Boron)	µg/L	500	6.20E+01	2.21E+02	3.12E+02	6.33E+01	1.81E+02	2.60E+02	4.96E+01	1.40E+02	2.41E+02	5.01E+01	1.34E+02	2.39E+02	4.59E+01	1.45E+02	2.12E+02	7.38E+01	2.02E+02	3.37E+02
Ba (Barium)	µg/L	--	4.94E+00	6.65E+00	9.05E+00	4.95E+00	6.56E+00	9.07E+00	4.96E+00	6.32E+00	8.43E+00	4.97E+00	6.72E+00	9.16E+00	4.97E+00	6.75E+00	9.17E+00	4.98E+00	6.71E+00	1.01E+01
Be (Beryllium)	µg/L	--	1.03E-01	2.06E-01	2.69E-01	1.43E-01	3.34E-01	4.46E-01	1.46E-01	3.40E-01	4.64E-01	1.24E-01	3.00E-01	4.75E-01	1.07E-01	2.49E-01	4.32E-01	1.21E-01	2.91E-01	5.99E-01
Ca (Calcium)	mg/L	--	1.10E+01	2.96E+01	3.66E+01	1.11E+01	3.01E+01	3.65E+01	1.21E+01	3.05E+01	3.62E+01	1.05E+01	2.96E+01	3.65E+01	1.02E+01	2.95E+01	3.63E+01	1.15E+01	2.98E+01	3.59E+01
Cd (Cadmium)[4]	µg/L	--	8.79E-02	1.24E-01	1.69E-01	1.69E-01	4.73E-01	8.72E-01	2.26E-01	7.11E-01	1.63E+00	1.84E-01	7.34E-01	1.86E+00	1.15E-01	2.84E-01	6.38E-01	1.17E-01	2.52E-01	6.21E-01
Cl (Chloride)	mg/L	230	1.56E+00	2.55E+00	6.60E+00	1.56E+00	2.47E+00	6.72E+00	1.48E+00	2.35E+00	6.82E+00	1.54E+00	2.52E+00	6.86E+00	1.57E+00	2.52E+00	6.80E+00	1.50E+00	2.26E+00	6.09E+00
Co (Cobalt)	µg/L	5	8.74E-01	2.38E+00	4.54E+00	1.57E+00	3.97E+00	4.88E+00	1.72E+00	4.07E+00	4.91E+00	1.45E+00	3.89E+00	4.87E+00	1.36E+00	3.84E+00	4.85E+00	1.53E+00	3.96E+00	4.85E+00
Cr (Chromium)	µg/L	11	3.01E-01	5.93E-01	1.15E+00	1.02E+00	3.25E+00	4.49E+00	1.50E+00	4.58E+00	6.31E+00	1.08E+00	3.72E+00	5.17E+00	5.03E-01	1.32E+00	1.75E+00	5.56E-01	1.29E+00	1.75E+00
Cu (Copper)[4]	µg/L	--	8.72E-01	4.15E+00	8.34E+00	1.94E+00	6.75E+00	8.79E+00	2.16E+00	6.95E+00	8.84E+00	1.68E+00	6.58E+00	8.78E+00	1.73E+00	6.57E+00	8.76E+00	2.10E+00	6.84E+00	8.76E+00
F (Fluoride)	mg/L	--	3.07E-02	5.51E-02	1.33E-01	3.20E-02	5.46E-02	1.25E-01	3.31E-02	5.44E-02	1.33E-01	3.04E-02	5.53E-02	1.32E-01	3.01E-02	5.50E-02	1.30E-01	3.14E-02	5.53E-02	1.26E-01
Fe (Iron)	µg/L	--	3.52E+02	1.27E+03	6.93E+03	3.53E+02	1.19E+03	7.44E+03	3.37E+02	1.11E+03	7.39E+03	3.46E+02	1.23E+03	7.27E+03	3.50E+02	1.25E+03	7.67E+03	3.32E+02	1.12E+03	7.33E+03
K (Potassium)	mg/L	--	3.30E-01	7.37E-01	1.45E+00	3.38E-01	7.22E-01	1.38E+00	3.30E-01	6.80E-01	1.33E+00	3.31E-01	7.29E-01	1.51E+00	3.04E-01	7.15E-01	1.61E+00	3.19E-01	6.62E-01	1.47E+00
Mg (Magnesium)	mg/L	--	3.00E+00	6.50E+00	9.41E+00	2.76E+00	6.15E+00	9.06E+00	2.88E+00	5.61E+00	8.82E+00	2.64E+00	6.25E+00	8.85E+00	2.53E+00	6.08E+00	8.67E+00	2.50E+00	5.16E+00	8.04E+00
Mn (Manganese)	µg/L	--	6.89E+01	1.20E+02	8.78E+02	6.95E+01	1.16E+02	7.58E+02	6.32E+01	1.08E+02	6.73E+02	6.86E+01	1.21E+02	6.84E+02	7.01E+01	1.19E+02	7.05E+02	6.26E+01	1.08E+02	7.43E+02
Na (Sodium)	mg/L	--	2.42E+00	3.37E+00	4.45E+00	2.38E+00	3.26E+00	4.41E+00	2.36E+00	3.06E+00	4.34E+00	2.35E+00	3.30E+00	4.57E+00	2.38E+00	3.24E+00	4.33E+00	2.24E+00	2.90E+00	4.12E+00
Ni (Nickel)[4]	µg/L	--	2.01E+00	1.28E+01	4.18E+01	8.63E+00	3.61E+01	4.86E+01	9.88E+00	3.74E+01	4.89E+01	7.33E+00	3.51E+01	4.85E+01	7.07E+00	3.49E+01	4.84E+01	9.21E+00	3.65E+01	4.84E+01
Pb (Lead)[4]	µg/L	--	3.63E-01	9.83E-01	1.28E+00	6.72E-01	2.22E+00	2.91E+00	7.57E-01	2.30E+00	2.94E+00	5.98E-01	2.17E+00	2.91E+00	6.00E-01	2.17E+00	2.90E+00	7.21E-01	2.26E+00	2.90E+00
Sb (Antimony)	µg/L	31	2.52E-01	5.38E-01	1.77E+00	8.96E-01	3.51E+00	6.74E+00	1.71E+00	6.38E+00	1.02E+01	1.48E+00	7.52E+00	1.24E+01	7.38E-01	2.99E+00	5.69E+00	6.97E-01	2.69E+00	5.58E+00
Se (Selenium)	µg/L	5	3.59E-01	5.57E-01	6.93E-01	5.94E-01	1.30E+00	1.84E+00	7.33E-01	1.67E+00	2.36E+00	8.27E-01	2.46E+00	4.00E+00	4.10E-01	7.34E-01	1.17E+00	4.26E-01	6.66E-01	1.27E+00
SO4 (Sulfate)	mg/L	--	3.97E+00	1.32E+01	1.93E+01	4.01E+00	1.29E+01	1.92E+01	4.20E+00	1.20E+01	1.76E+01	3.72E+00	1.28E+01	1.81E+01	3.72E+00	1.25E+01	1.74E+01	3.45E+00	1.10E+01	1.55E+01
Tl (Thallium)	µg/L	0.56	2.88E-02	1.20E-01	1.63E-01	4.51E-02	1.59E-01	2.29E-01	3.61E-02	1.29E-01	1.76E-01	2.37E-02	1.07E-01	1.62E-01	1.28E-02	5.45E-02	1.03E-01	1.76E-02	5.83E-02	1.35E-01
V (Vanadium)	µg/L	--	7.87E-01	3.25E+00	4.39E+00	1.20E+00	4.64E+00	6.72E+00	1.72E+00	6.05E+00	8.43E+00	1.03E+00	4.81E+00	6.82E+00	4.95E-01	1.94E+00	2.68E+00	6.77E-01	2.09E+00	3.10E+00
Zn (Zinc)[4]	µg/L	--	3.45E+00	1.04E+01	1.41E+01	1.04E+01	3.43E+01	5.76E+01	1.83E+01	5.94E+01	9.53E+01	1.40E+01	5.91E+01	9.55E+01	6.69E+00	2.22E+01	4.24E+01	6.43E+00	1.70E+01	3.83E+01
Hardness	mg/L	500	2.04E+01	5.77E+01	1.02E+02	1.80E+01	5.76E+01	1.04E+02	1.90E+01	5.78E+01	1.05E+02	1.90E+01	5.77E+01	1.05E+02	2.02E+01	5.78E+01	1.04E+02	2.02E+01	5.75E+01	1.04E+02

Notes

[1] Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

[4] Standard is hardness-based and variable. See Section 6.7.3.2 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 24 Annual Summary of Concentration Statistics for Unnamed Creek at PM-11

	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
Constituent	Units	WQ Standard																		
Ag (Silver)	µg/L	1	1.10E-01	1.19E-01	1.26E-01	1.30E-01	2.21E-01	3.25E-01	1.20E-01	1.62E-01	2.03E-01	1.14E-01	1.39E-01	1.82E-01	7.55E-02	1.02E-01	1.38E-01	7.03E-02	1.04E-01	1.91E-01
Al (Aluminum)	µg/L	125	1.28E+01	4.93E+01	**1.56E+02**	8.97E+00	4.49E+01	**1.46E+02**	4.96E+00	3.99E+01	**1.38E+02**	7.79E+00	4.51E+01	**1.51E+02**	8.87E+00	4.85E+01	**1.46E+02**	1.06E+01	4.78E+01	**1.51E+02**
Alkalinity	mg/L	--	1.83E+01	7.19E+01	1.00E+02	1.82E+01	7.35E+01	1.00E+02	1.85E+01	6.28E+01	9.98E+01	1.80E+01	6.20E+01	1.00E+02	1.77E+01	6.89E+01	9.99E+01	1.96E+01	7.39E+01	1.00E+02
As (Arsenic)	µg/L	53	8.93E-01	3.33E+00	4.86E+00	1.44E+00	6.61E+00	9.99E+00	1.52E+00	6.92E+00	1.00E+01	1.40E+00	6.48E+00	9.99E+00	1.35E+00	6.44E+00	9.99E+00	1.45E+00	6.77E+00	9.98E+00
B (Boron)	µg/L	500	3.56E+01	1.77E+02	3.13E+02	3.62E+01	1.47E+02	2.59E+02	3.12E+01	1.14E+02	2.38E+02	2.98E+01	1.07E+02	2.35E+02	2.92E+01	1.16E+02	2.08E+02	4.10E+01	1.66E+02	3.39E+02
Ba (Barium)	µg/L	--	4.58E+00	4.82E+00	5.00E+00	4.58E+00	4.83E+00	5.00E+00	4.59E+00	4.84E+00	5.00E+00	4.58E+00	4.82E+00	5.00E+00	4.57E+00	4.82E+00	5.00E+00	4.58E+00	4.84E+00	5.00E+00
Be (Beryllium)	µg/L	--	8.49E-02	1.77E-01	2.71E-01	1.01E-01	2.84E-01	4.56E-01	1.03E-01	2.93E-01	4.69E-01	9.33E-02	2.54E-01	4.83E-01	8.66E-02	2.11E-01	4.34E-01	9.37E-02	2.44E-01	6.14E-01
Ca (Calcium)	mg/L	--	7.02E+00	2.41E+01	3.51E+01	6.74E+00	2.49E+01	3.51E+01	7.40E+00	2.57E+01	3.51E+01	6.46E+00	2.42E+01	3.51E+01	6.35E+00	2.42E+01	3.51E+01	7.00E+00	2.52E+01	3.50E+01
Cd (Cadmium)[4]	µg/L	--	8.09E-02	1.15E-01	1.60E-01	1.17E-01	4.03E-01	8.64E-01	1.42E-01	6.02E-01	1.63E+00	1.22E-01	6.11E-01	1.91E+00	9.46E-02	2.45E-01	6.48E-01	9.55E-02	2.18E-01	6.28E-01
Cl (Chloride)	mg/L	230	1.31E+00	2.75E+00	7.67E+00	1.31E+00	2.68E+00	7.96E+00	1.30E+00	2.58E+00	7.99E+00	1.31E+00	2.74E+00	8.01E+00	1.31E+00	2.78E+00	8.18E+00	1.31E+00	2.58E+00	7.45E+00
Co (Cobalt)	µg/L	5	6.62E-01	2.16E+00	4.39E+00	1.03E+00	3.53E+00	5.00E+00	1.13E+00	3.64E+00	5.00E+00	9.58E-01	3.46E+00	4.99E+00	9.26E-01	3.40E+00	4.99E+00	1.02E+00	3.56E+00	4.98E+00
Cr (Chromium)	µg/L	11	2.30E-01	5.67E-01	1.33E+00	5.80E-01	2.78E+00	4.41E+00	8.09E-01	3.90E+00	6.42E+00	6.05E-01	3.18E+00	5.34E+00	3.45E-01	1.19E+00	1.74E+00	3.44E-01	1.17E+00	1.74E+00
Cu (Copper)[4]	µg/L	--	5.05E-01	3.41E+00	8.16E+00	1.01E+00	5.66E+00	8.98E+00	1.12E+00	5.89E+00	9.00E+00	8.85E-01	5.48E+00	8.99E+00	8.89E-01	5.45E+00	8.98E+00	1.08E+00	5.76E+00	8.97E+00
F (Fluoride)	mg/L	--	2.35E-02	5.25E-02	1.50E-01	2.46E-02	5.20E-02	1.51E-01	2.60E-02	5.24E-02	1.61E-01	2.23E-02	5.29E-02	1.54E-01	2.32E-02	5.20E-02	1.45E-01	2.52E-02	5.26E-02	1.47E-01
Fe (Iron)	µg/L	--	3.06E+02	1.80E+03	9.25E+03	3.07E+02	1.71E+03	9.39E+03	3.02E+02	1.61E+03	9.57E+03	3.06E+02	1.76E+03	8.79E+03	3.06E+02	1.80E+03	9.80E+03	3.13E+02	1.67E+03	8.88E+03
K (Potassium)	mg/L	--	1.92E-01	5.00E-01	1.58E+00	2.02E-01	5.04E-01	1.57E+00	1.96E-01	4.98E-01	1.49E+00	2.07E-01	5.04E-01	1.67E+00	1.77E-01	4.99E-01	1.78E+00	1.92E-01	5.05E-01	1.72E+00
Mg (Magnesium)	mg/L	--	1.50E+00	3.09E+00	8.91E+00	1.40E+00	3.06E+00	7.84E+00	1.53E+00	3.06E+00	8.81E+00	1.40E+00	3.07E+00	8.83E+00	1.30E+00	3.07E+00	8.54E+00	1.39E+00	3.07E+00	8.25E+00
Mn (Manganese)	µg/L	--	5.01E+01	1.24E+02	1.04E+03	5.01E+01	1.22E+02	9.47E+02	5.00E+01	1.15E+02	9.03E+02	5.01E+01	1.28E+02	8.58E+02	5.02E+01	1.27E+02	8.33E+02	4.99E+01	1.19E+02	9.15E+02
Na (Sodium)	mg/L	--	1.86E+00	2.38E+00	4.42E+00	1.89E+00	2.35E+00	4.46E+00	1.90E+00	2.34E+00	4.44E+00	1.84E+00	2.38E+00	4.65E+00	1.88E+00	2.39E+00	4.34E+00	1.92E+00	2.34E+00	4.25E+00
Ni (Nickel)[4]	µg/L	--	1.04E+00	9.85E+00	3.82E+01	3.72E+00	2.98E+01	4.99E+01	4.29E+00	3.13E+01	5.00E+01	3.14E+00	2.87E+01	4.99E+01	3.03E+00	2.84E+01	4.99E+01	4.00E+00	3.01E+01	4.98E+01
Pb (Lead)[4]	µg/L	--	2.42E-01	8.56E-01	1.31E+00	3.83E-01	1.88E+00	3.00E+00	4.33E-01	1.97E+00	3.00E+00	3.48E-01	1.83E+00	3.00E+00	3.37E-01	1.82E+00	2.99E+00	4.02E-01	1.93E+00	2.99E+00
Sb (Antimony)	µg/L	31	2.28E-01	4.64E-01	1.55E+00	4.88E-01	2.92E+00	6.42E+00	8.35E-01	5.32E+00	9.74E+00	7.17E-01	6.19E+00	1.20E+01	4.22E-01	2.48E+00	5.40E+00	4.10E-01	2.25E+00	5.25E+00
Se (Selenium)	µg/L	5	3.00E-01	5.30E-01	7.00E-01	4.22E-01	1.15E+00	1.88E+00	4.91E-01	1.46E+00	2.40E+00	5.21E-01	2.09E+00	4.10E+00	3.25E-01	6.77E-01	1.17E+00	3.44E-01	6.20E-01	1.26E+00
SO4 (Sulfate)	mg/L	--	1.56E+00	6.61E+00	1.04E+01	1.35E+00	6.81E+00	1.20E+01	1.64E+00	6.95E+00	1.12E+01	1.41E+00	6.61E+00	1.04E+01	1.42E+00	6.63E+00	1.14E+01	1.46E+00	6.86E+00	9.86E+00
Tl (Thallium)	µg/L	0.56	1.22E-02	9.41E-02	1.64E-01	1.89E-02	1.28E-01	2.32E-01	1.52E-02	1.05E-01	1.76E-01	9.81E-03	8.43E-02	1.60E-01	5.11E-03	4.07E-02	9.81E-02	7.37E-03	4.46E-02	1.30E-01
V (Vanadium)	µg/L	--	3.86E-01	2.53E+00	4.38E+00	5.59E-01	3.70E+00	6.77E+00	7.75E-01	4.93E+00	8.51E+00	4.87E-01	3.83E+00	6.85E+00	2.67E-01	1.46E+00	2.54E+00	3.44E-01	1.61E+00	2.93E+00
Zn (Zinc)[4]	µg/L	--	2.21E+00	9.16E+00	1.45E+01	5.21E+00	2.94E+01	5.82E+01	8.77E+00	5.01E+01	9.74E+01	7.31E+00	4.89E+01	9.92E+01	3.71E+00	1.91E+01	4.27E+01	3.63E+00	1.47E+01	3.83E+01
Hardness	mg/L	500	2.49E+01	8.54E+01	1.75E+02	2.28E+01	8.49E+01	1.71E+02	2.31E+01	8.56E+01	1.73E+02	2.29E+01	8.45E+01	1.71E+02	2.39E+01	8.30E+01	1.65E+02	2.22E+01	7.76E+01	1.49E+02

Notes

1 Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

2 Values shown are the average of the monthly P50 values for the referenced Mine Year.

3 Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

4 Standard is hardness-based and variable. See Section 6.7.3.3 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 25 Annual Summary of Concentration Statistics for the Embarrass River at PM-12.3

Constituent	Units	WQ Standard	2 Min P10[1]	2 Avg P50[2]	2 Max P90[3]	8 Min P10[1]	8 Avg P50[2]	8 Max P90[3]	13 Min P10[1]	13 Avg P50[2]	13 Max P90[3]	25 Min P10[1]	25 Avg P50[2]	25 Max P90[3]	40 Min P10[1]	40 Avg P50[2]	40 Max P90[3]	100 Min P10[1]	100 Avg P50[2]	100 Max P90[3]
Ag (Silver)	µg/L	1	1.02E-01	1.12E-01	1.25E-01	1.10E-01	1.38E-01	1.85E-01	1.10E-01	1.25E-01	1.47E-01	1.08E-01	1.17E-01	1.28E-01	8.94E-02	1.08E-01	1.26E-01	8.76E-02	1.09E-01	1.28E-01
Al (Aluminum)	µg/L	125	4.30E+01	7.80E+01	**1.78E+02**	4.16E+01	7.62E+01	**1.63E+02**	3.54E+01	7.17E+01	**1.54E+02**	4.20E+01	7.57E+01	**1.65E+02**	4.17E+01	7.75E+01	**1.60E+02**	4.47E+01	7.66E+01	**1.63E+02**
Alkalinity	mg/L	--	1.29E+01	5.43E+01	9.19E+01	1.24E+01	5.52E+01	9.21E+01	1.34E+01	5.25E+01	9.05E+01	1.29E+01	5.21E+01	9.34E+01	1.32E+01	5.32E+01	8.94E+01	1.23E+01	5.45E+01	8.92E+01
As (Arsenic)	µg/L	53	5.15E-01	1.67E+00	3.47E+00	6.00E-01	2.55E+00	4.70E+00	6.47E-01	2.87E+00	5.64E+00	6.05E-01	2.49E+00	4.60E+00	6.12E-01	2.48E+00	4.54E+00	6.34E-01	2.60E+00	4.94E+00
B (Boron)	µg/L	500	2.25E+01	6.80E+01	1.54E+02	2.23E+01	6.19E+01	1.31E+02	2.16E+01	5.75E+01	1.35E+02	2.13E+01	5.19E+01	1.16E+02	2.12E+01	5.36E+01	1.08E+02	2.34E+01	6.58E+01	1.46E+02
Ba (Barium)	µg/L	--	5.09E+00	1.39E+01	3.34E+01	5.05E+00	1.38E+01	3.38E+01	5.08E+00	1.33E+01	3.10E+01	5.07E+00	1.40E+01	3.30E+01	5.09E+00	1.39E+01	3.39E+01	5.07E+00	1.37E+01	3.41E+01
Be (Beryllium)	µg/L	--	7.63E-02	1.17E-01	1.95E-01	7.82E-02	1.44E-01	2.67E-01	7.85E-02	1.55E-01	3.00E-01	7.72E-02	1.36E-01	2.64E-01	7.65E-02	1.25E-01	2.43E-01	7.78E-02	1.34E-01	2.90E-01
Ca (Calcium)	mg/L	--	5.97E+00	1.99E+01	3.34E+01	5.75E+00	2.03E+01	3.37E+01	5.75E+00	2.07E+01	3.43E+01	5.69E+00	2.00E+01	3.35E+01	5.63E+00	1.99E+01	3.36E+01	5.82E+00	2.02E+01	3.31E+01
Cd (Cadmium)[4]	µg/L	--	7.69E-02	9.81E-02	1.26E-01	8.36E-02	1.68E-01	3.72E-01	8.79E-02	2.37E-01	7.04E-01	8.54E-02	2.18E-01	7.13E-01	8.00E-02	1.29E-01	2.84E-01	8.02E-02	1.23E-01	2.66E-01
Cl (Chloride)	mg/L	230	2.42E+00	4.01E+00	8.60E+00	2.43E+00	3.98E+00	8.95E+00	2.26E+00	3.85E+00	8.65E+00	2.43E+00	4.00E+00	8.73E+00	2.43E+00	4.03E+00	8.96E+00	2.41E+00	3.83E+00	8.72E+00
Co (Cobalt)	µg/L	5	4.80E-01	1.19E+00	2.32E+00	5.73E-01	1.55E+00	2.60E+00	5.76E-01	1.71E+00	2.86E+00	5.62E-01	1.52E+00	2.44E+00	5.69E-01	1.50E+00	2.59E+00	5.81E-01	1.56E+00	2.61E+00
Cr (Chromium)	µg/L	11	2.06E-01	6.29E-01	1.41E+00	2.73E-01	1.22E+00	2.23E+00	3.06E-01	1.63E+00	3.45E+00	2.79E-01	1.31E+00	2.52E+00	2.29E-01	7.87E-01	1.57E+00	2.30E-01	7.98E-01	1.63E+00
Cu (Copper)[4]	µg/L	--	3.03E-01	1.64E+00	3.55E+00	3.73E-01	2.22E+00	4.63E+00	3.88E-01	2.48E+00	5.39E+00	3.64E-01	2.14E+00	4.60E+00	3.71E-01	2.13E+00	4.63E+00	4.02E-01	2.25E+00	4.48E+00
F (Fluoride)	mg/L	--	2.80E-02	9.47E-02	1.72E-01	2.88E-02	9.34E-02	1.81E-01	2.98E-02	9.20E-02	1.80E-01	2.67E-02	9.45E-02	1.74E-01	2.65E-02	9.26E-02	1.88E-01	2.86E-02	8.95E-02	1.69E-01
Fe (Iron)	µg/L	--	7.75E+02	2.75E+03	1.02E+04	7.34E+02	2.70E+03	1.03E+04	6.60E+02	2.61E+03	1.08E+04	7.14E+02	2.71E+03	9.74E+03	7.27E+02	2.76E+03	1.03E+04	7.39E+02	2.70E+03	1.03E+04
K (Potassium)	mg/L	--	1.10E+00	3.54E+00	7.15E+00	1.08E+00	3.55E+00	7.30E+00	1.07E+00	3.31E+00	6.92E+00	1.10E+00	3.53E+00	7.55E+00	1.03E+00	3.55E+00	7.45E+00	1.09E+00	3.50E+00	7.60E+00
Mg (Magnesium)	mg/L	--	5.95E+00	1.84E+01	3.60E+01	5.61E+00	1.82E+01	3.66E+01	5.81E+00	1.72E+01	3.39E+01	5.72E+00	1.83E+01	3.72E+01	5.58E+00	1.82E+01	3.72E+01	5.57E+00	1.78E+01	3.74E+01
Mn (Manganese)	µg/L	--	8.15E+01	2.77E+02	1.12E+03	8.75E+01	2.77E+02	1.05E+03	8.18E+01	2.67E+02	1.07E+03	8.10E+01	2.78E+02	1.02E+03	8.58E+01	2.80E+02	9.33E+02	8.66E+01	2.75E+02	1.01E+03
Na (Sodium)	mg/L	--	3.53E+00	8.09E+00	1.42E+01	3.63E+00	8.06E+00	1.45E+01	3.53E+00	7.69E+00	1.35E+01	3.50E+00	8.08E+00	1.48E+01	3.53E+00	8.06E+00	1.44E+01	3.54E+00	7.87E+00	1.47E+01
Ni (Nickel)[4]	µg/L	--	5.96E-01	3.40E+00	1.16E+01	9.24E-01	8.27E+00	2.19E+01	1.00E+00	9.88E+00	2.69E+01	8.45E-01	7.89E+00	2.16E+01	8.34E-01	7.75E+00	2.15E+01	9.64E-01	8.35E+00	2.09E+01
Pb (Lead)[4]	µg/L	--	1.44E-01	3.96E-01	6.71E-01	1.73E-01	6.46E-01	1.36E+00	1.78E-01	7.40E-01	1.65E+00	1.72E-01	6.28E-01	1.33E+00	1.62E-01	6.27E-01	1.33E+00	1.76E-01	6.56E-01	1.30E+00
Sb (Antimony)	µg/L	31	2.15E-01	2.97E-01	5.78E-01	2.48E-01	8.86E-01	2.02E+00	2.94E-01	1.66E+00	4.36E+00	2.77E-01	1.66E+00	4.43E+00	2.38E-01	7.75E-01	1.92E+00	2.39E-01	7.40E-01	2.00E+00
Se (Selenium)	µg/L	5	2.79E-01	5.41E-01	7.22E-01	3.00E-01	7.05E-01	1.14E+00	3.19E-01	8.19E-01	1.46E+00	3.23E-01	9.25E-01	1.87E+00	2.74E-01	5.79E-01	8.66E-01	2.93E-01	5.69E-01	8.74E-01
SO4 (Sulfate)	mg/L	--	1.81E+01	6.25E+01	1.36E+02	1.79E+01	6.21E+01	1.40E+02	1.79E+01	5.83E+01	1.31E+02	1.80E+01	6.20E+01	1.43E+02	1.78E+01	6.25E+01	1.41E+02	1.76E+01	6.11E+01	1.44E+02
Tl (Thallium)	µg/L	0.56	6.08E-03	5.97E-02	1.45E-01	6.35E-03	6.96E-02	1.71E-01	6.35E-03	6.60E-02	1.48E-01	5.48E-03	5.84E-02	1.40E-01	4.47E-03	4.78E-02	1.19E-01	5.04E-03	4.94E-02	1.25E-01
V (Vanadium)	µg/L	--	3.09E-01	1.87E+00	4.28E+00	3.28E-01	2.19E+00	5.10E+00	3.53E-01	2.61E+00	5.96E+00	3.17E-01	2.20E+00	5.15E+00	2.86E-01	1.63E+00	3.61E+00	3.03E-01	1.66E+00	3.78E+00
Zn (Zinc)[4]	µg/L	--	1.29E+00	7.20E+00	1.40E+01	2.06E+00	1.27E+01	2.75E+01	2.79E+00	1.94E+01	4.81E+01	2.41E+00	1.71E+01	4.25E+01	1.83E+00	9.89E+00	2.16E+01	1.70E+00	9.03E+00	1.93E+01
Hardness	mg/L	500	4.95E+01	9.07E+01	1.00E+02	5.00E+01	9.13E+01	1.00E+02	5.35E+01	9.25E+01	1.00E+02	4.68E+01	9.05E+01	1.00E+02	4.60E+01	9.04E+01	1.00E+02	5.04E+01	9.18E+01	1.00E+02

Column headings: Mine Year (2, 8, 13, 25, 40, 100); Percentile.

Notes

1 Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

2 Values shown are the average of the monthly P50 values for the referenced Mine Year.

3 Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

4 Standard is hardness-based and variable. See Section 6.7.4 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 26 Annual Summary of Concentration Statistics for the Embarrass River at PM-12.4

	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
Constituent	Units	WQ Standard																		
Ag (Silver)	µg/L	1	1.01E-01	1.11E-01	1.25E-01	1.10E-01	1.35E-01	1.75E-01	1.10E-01	1.24E-01	1.43E-01	1.08E-01	1.16E-01	1.27E-01	8.97E-02	1.08E-01	1.25E-01	8.80E-02	1.09E-01	1.27E-01
Al (Aluminum)	µg/L	125	4.52E+01	8.01E+01	**1.79E+02**	4.41E+01	7.85E+01	**1.64E+02**	3.80E+01	7.39E+01	**1.55E+02**	4.45E+01	7.79E+01	**1.66E+02**	4.47E+01	7.99E+01	**1.61E+02**	4.64E+01	7.87E+01	**1.64E+02**
Alkalinity	mg/L	--	1.24E+01	5.27E+01	9.14E+01	1.20E+01	5.36E+01	9.16E+01	1.30E+01	5.13E+01	9.00E+01	1.26E+01	5.08E+01	9.33E+01	1.29E+01	5.18E+01	8.84E+01	1.21E+01	5.29E+01	8.83E+01
As (Arsenic)	µg/L	53	5.01E-01	1.60E+00	3.47E+00	5.81E-01	2.38E+00	4.27E+00	6.17E-01	2.69E+00	5.19E+00	5.82E-01	2.32E+00	4.16E+00	5.88E-01	2.31E+00	4.50E+00	6.15E-01	2.44E+00	4.63E+00
B (Boron)	µg/L	500	2.20E+01	6.31E+01	1.40E+02	2.17E+01	5.76E+01	1.22E+02	2.12E+01	5.39E+01	1.28E+02	2.07E+01	4.86E+01	1.07E+02	2.06E+01	5.01E+01	9.96E+01	2.27E+01	6.09E+01	1.34E+02
Ba (Barium)	µg/L	--	5.09E+00	1.40E+01	3.46E+01	5.04E+00	1.40E+01	3.50E+01	5.08E+00	1.36E+01	3.25E+01	5.07E+00	1.41E+01	3.45E+01	5.09E+00	1.42E+01	3.51E+01	5.07E+00	1.39E+01	3.49E+01
Be (Beryllium)	µg/L	--	7.61E-02	1.14E-01	1.90E-01	7.78E-02	1.38E-01	2.54E-01	7.80E-02	1.48E-01	2.85E-01	7.68E-02	1.31E-01	2.52E-01	7.63E-02	1.21E-01	2.33E-01	7.74E-02	1.29E-01	2.74E-01
Ca (Calcium)	mg/L	--	5.76E+00	1.90E+01	3.26E+01	5.55E+00	1.94E+01	3.29E+01	5.49E+00	1.99E+01	3.37E+01	5.41E+00	1.91E+01	3.28E+01	5.39E+00	1.91E+01	3.28E+01	5.63E+00	1.93E+01	3.22E+01
Cd (Cadmium)[4]	µg/L	--	7.67E-02	9.72E-02	1.24E-01	8.30E-02	1.59E-01	3.45E-01	8.65E-02	2.22E-01	6.49E-01	8.47E-02	2.03E-01	6.54E-01	7.96E-02	1.24E-01	2.60E-01	7.97E-02	1.19E-01	2.47E-01
Cl (Chloride)	mg/L	230	2.45E+00	4.07E+00	8.62E+00	2.46E+00	4.05E+00	8.98E+00	2.28E+00	3.92E+00	8.69E+00	2.47E+00	4.06E+00	8.76E+00	2.47E+00	4.10E+00	8.98E+00	2.43E+00	3.90E+00	8.74E+00
Co (Cobalt)	µg/L	5	4.76E-01	1.15E+00	2.32E+00	5.60E-01	1.47E+00	2.55E+00	5.65E-01	1.63E+00	2.66E+00	5.55E-01	1.44E+00	2.44E+00	5.62E-01	1.42E+00	2.55E+00	5.70E-01	1.49E+00	2.58E+00
Cr (Chromium)	µg/L	11	2.04E-01	6.28E-01	1.42E+00	2.62E-01	1.16E+00	2.10E+00	2.96E-01	1.54E+00	3.22E+00	2.70E-01	1.23E+00	2.35E+00	2.25E-01	7.67E-01	1.57E+00	2.28E-01	7.80E-01	1.63E+00
Cu (Copper)[4]	µg/L	--	2.92E-01	1.58E+00	3.33E+00	3.54E-01	2.07E+00	4.38E+00	3.65E-01	2.32E+00	5.09E+00	3.52E-01	1.99E+00	4.31E+00	3.60E-01	1.99E+00	4.30E+00	3.88E-01	2.11E+00	4.18E+00
F (Fluoride)	mg/L	--	2.74E-02	9.35E-02	1.74E-01	2.83E-02	9.21E-02	1.84E-01	2.94E-02	9.13E-02	1.81E-01	2.61E-02	9.33E-02	1.74E-01	2.60E-02	9.14E-02	1.89E-01	2.83E-02	8.89E-02	1.69E-01
Fe (Iron)	µg/L	--	8.15E+02	2.85E+03	1.03E+04	7.72E+02	2.80E+03	1.04E+04	7.06E+02	2.70E+03	1.08E+04	7.37E+02	2.82E+03	9.79E+03	7.62E+02	2.85E+03	1.03E+04	7.69E+02	2.79E+03	1.04E+04
K (Potassium)	mg/L	--	9.94E-01	3.28E+00	6.52E+00	9.76E-01	3.29E+00	6.62E+00	9.70E-01	3.08E+00	6.28E+00	1.00E+00	3.27E+00	6.77E+00	9.46E-01	3.29E+00	6.73E+00	9.81E-01	3.25E+00	6.88E+00
Mg (Magnesium)	mg/L	--	5.49E+00	1.71E+01	3.32E+01	5.14E+00	1.70E+01	3.38E+01	5.31E+00	1.62E+01	3.16E+01	5.26E+00	1.70E+01	3.39E+01	5.08E+00	1.71E+01	3.41E+01	5.12E+00	1.66E+01	3.41E+01
Mn (Manganese)	µg/L	--	8.05E+01	2.81E+02	1.13E+03	8.61E+01	2.81E+02	1.05E+03	8.04E+01	2.71E+02	1.07E+03	7.89E+01	2.82E+02	1.03E+03	8.45E+01	2.83E+02	9.34E+02	8.52E+01	2.78E+02	1.02E+03
Na (Sodium)	mg/L	--	3.36E+00	7.65E+00	1.31E+01	3.45E+00	7.64E+00	1.33E+01	3.35E+00	7.32E+00	1.25E+01	3.33E+00	7.65E+00	1.35E+01	3.36E+00	7.62E+00	1.33E+01	3.37E+00	7.45E+00	1.35E+01
Ni (Nickel)[4]	µg/L	--	5.82E-01	3.15E+00	9.73E+00	8.68E-01	7.46E+00	1.99E+01	9.39E-01	9.00E+00	2.48E+01	7.99E-01	7.10E+00	1.96E+01	7.89E-01	6.99E+00	1.96E+01	9.04E-01	7.56E+00	1.84E+01
Pb (Lead)[4]	µg/L	--	1.42E-01	3.79E-01	6.27E-01	1.67E-01	6.02E-01	1.22E+00	1.71E-01	6.92E-01	1.53E+00	1.69E-01	5.86E-01	1.21E+00	1.58E-01	5.85E-01	1.21E+00	1.71E-01	6.11E-01	1.15E+00
Sb (Antimony)	µg/L	31	2.15E-01	2.91E-01	5.11E-01	2.44E-01	8.14E-01	1.84E+00	2.84E-01	1.53E+00	3.99E+00	2.69E-01	1.50E+00	4.04E+00	2.35E-01	7.13E-01	1.75E+00	2.36E-01	6.84E-01	1.77E+00
Se (Selenium)	µg/L	5	2.78E-01	5.37E-01	7.22E-01	2.97E-01	6.82E-01	1.10E+00	3.14E-01	7.89E-01	1.38E+00	3.15E-01	8.82E-01	1.76E+00	2.71E-01	5.70E-01	8.53E-01	2.91E-01	5.63E-01	8.58E-01
SO4 (Sulfate)	mg/L	--	1.61E+01	5.67E+01	1.23E+02	1.59E+01	5.65E+01	1.26E+02	1.60E+01	5.33E+01	1.20E+02	1.61E+01	5.62E+01	1.28E+02	1.58E+01	5.68E+01	1.27E+02	1.57E+01	5.52E+01	1.29E+02
Tl (Thallium)	µg/L	0.56	5.80E-03	5.73E-02	1.44E-01	5.95E-03	6.61E-02	1.67E-01	5.93E-03	6.33E-02	1.47E-01	5.18E-03	5.63E-02	1.40E-01	4.21E-03	4.69E-02	1.20E-01	4.74E-03	4.82E-02	1.24E-01
V (Vanadium)	µg/L	--	2.96E-01	1.79E+00	4.22E+00	3.13E-01	2.08E+00	4.97E+00	3.34E-01	2.47E+00	5.79E+00	3.03E-01	2.10E+00	5.01E+00	2.75E-01	1.59E+00	3.62E+00	2.90E-01	1.61E+00	3.77E+00
Zn (Zinc)[4]	µg/L	--	1.26E+00	7.07E+00	1.40E+01	1.99E+00	1.20E+01	2.60E+01	2.61E+00	1.82E+01	4.43E+01	2.30E+00	1.59E+01	3.95E+01	1.77E+00	9.45E+00	2.05E+01	1.65E+00	8.76E+00	1.83E+01
Hardness	mg/L	500	4.57E+01	1.01E+02	1.27E+02	4.50E+01	1.01E+02	1.26E+02	4.72E+01	9.98E+01	1.21E+02	4.20E+01	1.00E+02	1.24E+02	4.15E+01	9.93E+01	1.22E+02	4.31E+01	9.67E+01	1.17E+02

Notes

[1] Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

[3] Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

[4] Standard is hardness-based and variable. See Section 6.7.4 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 27 Annual Summary of Concentration Statistics for the Embarrass River at PM-13

Constituent	Mine Year		2			8			13			25			40			100		
	Percentile		Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]	Min P10[1]	Avg P50[2]	Max P90[3]
	Units	WQ Standard																		
Ag (Silver)	µg/L	1	1.02E-01	1.11E-01	1.25E-01	1.10E-01	1.37E-01	1.81E-01	1.10E-01	1.25E-01	1.45E-01	1.08E-01	1.17E-01	1.28E-01	8.88E-02	1.08E-01	1.25E-01	8.67E-02	1.08E-01	1.27E-01
Al (Aluminum)	µg/L	125	4.40E+01	7.96E+01	**1.79E+02**	4.26E+01	7.77E+01	**1.63E+02**	3.65E+01	7.29E+01	**1.54E+02**	4.32E+01	7.72E+01	**1.66E+02**	4.32E+01	7.91E+01	**1.61E+02**	4.54E+01	7.80E+01	**1.64E+02**
Alkalinity	mg/L	--	1.27E+01	5.38E+01	9.29E+01	1.23E+01	5.48E+01	9.36E+01	1.32E+01	5.22E+01	9.16E+01	1.27E+01	5.16E+01	9.33E+01	1.30E+01	5.26E+01	9.01E+01	1.22E+01	5.36E+01	8.92E+01
As (Arsenic)	µg/L	53	5.18E-01	1.65E+00	3.47E+00	6.00E-01	2.51E+00	4.51E+00	6.46E-01	2.84E+00	5.49E+00	6.03E-01	2.44E+00	4.40E+00	6.13E-01	2.43E+00	4.52E+00	6.33E-01	2.57E+00	4.77E+00
B (Boron)	µg/L	500	2.22E+01	6.77E+01	1.51E+02	2.20E+01	6.15E+01	1.32E+02	2.13E+01	5.73E+01	1.36E+02	2.10E+01	5.14E+01	1.16E+02	2.09E+01	5.31E+01	1.07E+02	2.30E+01	6.44E+01	1.44E+02
Ba (Barium)	µg/L	--	5.09E+00	1.38E+01	3.32E+01	5.05E+00	1.37E+01	3.34E+01	5.08E+00	1.33E+01	3.10E+01	5.07E+00	1.38E+01	3.29E+01	5.09E+00	1.38E+01	3.31E+01	5.07E+00	1.36E+01	3.36E+01
Be (Beryllium)	µg/L	--	7.63E-02	1.16E-01	1.94E-01	7.82E-02	1.42E-01	2.63E-01	7.85E-02	1.53E-01	2.96E-01	7.71E-02	1.35E-01	2.61E-01	7.65E-02	1.24E-01	2.41E-01	7.77E-02	1.32E-01	2.87E-01
Ca (Calcium)	mg/L	--	5.76E+00	1.92E+01	3.30E+01	5.50E+00	1.95E+01	3.32E+01	5.50E+00	2.00E+01	3.39E+01	5.46E+00	1.92E+01	3.30E+01	5.35E+00	1.91E+01	3.30E+01	5.56E+00	1.92E+01	3.21E+01
Cd (Cadmium)[4]	µg/L	2.79	7.69E-02	9.77E-02	1.25E-01	8.35E-02	1.66E-01	3.67E-01	8.79E-02	2.35E-01	6.93E-01	8.54E-02	2.14E-01	7.00E-01	8.00E-02	1.28E-01	2.71E-01	8.01E-02	1.22E-01	2.60E-01
Cl (Chloride)	mg/L	230	2.60E+00	4.14E+00	8.61E+00	2.60E+00	4.11E+00	8.97E+00	2.38E+00	3.97E+00	8.67E+00	2.55E+00	4.13E+00	8.74E+00	2.59E+00	4.15E+00	8.98E+00	2.50E+00	3.92E+00	8.73E+00
Co (Cobalt)	µg/L	5	4.81E-01	1.20E+00	2.36E+00	5.75E-01	1.55E+00	2.57E+00	5.78E-01	1.71E+00	2.81E+00	5.68E-01	1.51E+00	2.45E+00	5.72E-01	1.49E+00	2.58E+00	5.83E-01	1.56E+00	2.61E+00
Cr (Chromium)	µg/L	11	2.06E-01	6.26E-01	1.41E+00	2.73E-01	1.20E+00	2.19E+00	3.05E-01	1.62E+00	3.36E+00	2.78E-01	1.28E+00	2.48E+00	2.31E-01	7.74E-01	1.57E+00	2.29E-01	7.91E-01	1.63E+00
Cu (Copper)[4]	µg/L	10.7	2.97E-01	1.63E+00	3.48E+00	3.68E-01	2.18E+00	4.58E+00	3.85E-01	2.45E+00	5.29E+00	3.59E-01	2.09E+00	4.51E+00	3.66E-01	2.08E+00	4.49E+00	3.98E-01	2.22E+00	4.37E+00
F (Fluoride)	mg/L	--	2.73E-02	9.11E-02	1.74E-01	2.81E-02	8.95E-02	1.83E-01	2.91E-02	8.87E-02	1.80E-01	2.59E-02	9.08E-02	1.74E-01	2.58E-02	8.89E-02	1.87E-01	2.81E-02	8.67E-02	1.69E-01
Fe (Iron)	µg/L	--	8.60E+02	2.87E+03	1.03E+04	8.16E+02	2.81E+03	1.03E+04	7.25E+02	2.71E+03	1.08E+04	7.82E+02	2.83E+03	9.77E+03	8.12E+02	2.87E+03	1.03E+04	7.89E+02	2.79E+03	1.03E+04
K (Potassium)	mg/L	--	9.21E-01	2.97E+00	5.77E+00	9.00E-01	2.98E+00	5.87E+00	8.99E-01	2.79E+00	5.43E+00	9.20E-01	2.95E+00	5.95E+00	8.71E-01	2.97E+00	5.92E+00	9.00E-01	2.92E+00	5.96E+00
Mg (Magnesium)	mg/L	--	5.16E+00	1.63E+01	3.08E+01	4.86E+00	1.62E+01	3.11E+01	4.98E+00	1.53E+01	2.86E+01	4.91E+00	1.62E+01	3.09E+01	4.78E+00	1.61E+01	3.09E+01	4.79E+00	1.55E+01	3.07E+01
Mn (Manganese)	µg/L	--	8.14E+01	2.80E+02	1.12E+03	8.55E+01	2.79E+02	1.04E+03	7.98E+01	2.68E+02	1.07E+03	7.88E+01	2.80E+02	1.02E+03	8.37E+01	2.80E+02	9.34E+02	8.42E+01	2.74E+02	1.01E+03
Na (Sodium)	mg/L	--	3.23E+00	7.32E+00	1.22E+01	3.32E+00	7.29E+00	1.23E+01	3.24E+00	6.99E+00	1.15E+01	3.22E+00	7.29E+00	1.23E+01	3.24E+00	7.25E+00	1.21E+01	3.25E+00	7.00E+00	1.21E+01
Ni (Nickel)[4]	µg/L	59.6	5.87E-01	3.34E+00	1.02E+01	9.19E-01	8.08E+00	2.12E+01	9.98E-01	9.75E+00	2.59E+01	8.37E-01	7.69E+00	2.08E+01	8.27E-01	7.57E+00	2.09E+01	9.58E-01	8.20E+00	1.97E+01
Pb (Lead)[4]	µg/L	3.89	1.45E-01	3.92E-01	6.55E-01	1.73E-01	6.38E-01	1.30E+00	1.78E-01	7.34E-01	1.60E+00	1.72E-01	6.20E-01	1.28E+00	1.62E-01	6.20E-01	1.29E+00	1.76E-01	6.51E-01	1.22E+00
Sb (Antimony)	µg/L	31	2.15E-01	2.96E-01	5.30E-01	2.48E-01	8.75E-01	1.96E+00	2.94E-01	1.66E+00	4.21E+00	2.77E-01	1.63E+00	4.37E+00	2.38E-01	7.61E-01	1.88E+00	2.39E-01	7.33E-01	1.89E+00
Se (Selenium)	µg/L	5	2.78E-01	5.34E-01	7.19E-01	2.98E-01	6.94E-01	1.12E+00	3.19E-01	8.10E-01	1.42E+00	3.22E-01	9.11E-01	1.83E+00	2.72E-01	5.71E-01	8.55E-01	2.92E-01	5.61E-01	8.56E-01
SO4 (Sulfate)	mg/L	--	1.46E+01	5.13E+01	1.08E+02	1.43E+01	5.11E+01	1.10E+02	1.46E+01	4.82E+01	1.05E+02	1.46E+01	5.08E+01	1.11E+02	1.44E+01	5.12E+01	1.11E+02	1.41E+01	4.92E+01	1.11E+02
Tl (Thallium)	µg/L	0.56	5.84E-03	5.78E-02	1.43E-01	6.10E-03	6.73E-02	1.68E-01	6.06E-03	6.40E-02	1.47E-01	5.20E-03	5.64E-02	1.39E-01	4.15E-03	4.59E-02	1.18E-01	4.72E-03	4.75E-02	1.22E-01
V (Vanadium)	µg/L	--	2.92E-01	1.78E+00	4.16E+00	3.12E-01	2.09E+00	4.95E+00	3.36E-01	2.52E+00	5.86E+00	3.01E-01	2.10E+00	5.01E+00	2.70E-01	1.54E+00	3.49E+00	2.85E-01	1.57E+00	3.66E+00
Zn (Zinc)[4]	µg/L	137	1.28E+00	7.09E+00	1.40E+01	2.06E+00	1.24E+01	2.71E+01	2.79E+00	1.92E+01	4.64E+01	2.41E+00	1.68E+01	4.17E+01	1.82E+00	9.69E+00	2.13E+01	1.69E+00	8.91E+00	1.89E+01
Hardness	mg/L	500	2.99E+01	7.61E+01	1.00E+02	2.88E+01	7.72E+01	1.00E+02	3.17E+01	7.91E+01	1.00E+02	2.79E+01	7.63E+01	1.00E+02	2.78E+01	7.61E+01	1.00E+02	2.83E+01	7.81E+01	1.00E+02

Notes

1 Values shown are the minimum of the monthly P10 values for the referenced Mine Year.

2 Values shown are the average of the monthly P50 values for the referenced Mine Year.

3 Values shown are the maximum of the monthly P90 values for the referenced Mine Year.

4 Standard is hardness-based and evaluated at a hardness of 117 mg/L. See Section 6.7.4 for discussion.

2.00E+02 Values above the applicable water quality standard are shown in bold with light red shading.

Large Table 28 Annual Summary of Influent Concentration Statistics for the WWTP

Constituent	Mine Year		5			10			15			20			30			60		
	Percentile		Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]	Avg P10[1]	Avg P50[2]	Avg P90[3]
	Units	Modeled Effluent Limit																		
Ag (Silver)	µg/L	1	**1.43E-01**	**1.46E-01**	**1.50E-01**	**1.88E-01**	**2.08E-01**	**2.21E-01**	**1.68E-01**	**1.90E-01**	**2.09E-01**	**1.73E-01**	**1.81E-01**	**1.86E-01**	**1.01E-01**	**1.14E-01**	**1.51E-01**	**6.57E-02**	**8.84E-02**	**1.61E-01**
Al (Aluminum)	µg/L	125	**1.13E+01**	**1.20E+01**	**1.41E+01**	**4.37E+00**	**6.34E+00**	**9.97E+00**	**4.50E+00**	**6.95E+00**	**1.14E+01**	**1.68E+00**	**2.41E+00**	**5.11E+00**	**7.33E+00**	**1.05E+01**	**1.49E+01**	**7.79E+00**	**1.39E+01**	**2.20E+01**
Alkalinity	mg/L	100	2.18E+02	2.23E+02	2.27E+02	**6.91E+01**	**8.28E+01**	1.02E+02	**7.44E+01**	**9.14E+01**	1.11E+02	**4.42E+01**	**4.90E+01**	**5.86E+01**	**8.89E+01**	1.02E+02	1.13E+02	**9.93E+01**	1.28E+02	1.54E+02
As (Arsenic)	µg/L	10	**4.62E+00**	**5.55E+00**	**8.35E+00**	1.39E+01	1.82E+01	2.42E+01	2.78E+01	3.65E+01	4.57E+01	5.59E+01	6.23E+01	6.75E+01	1.40E+01	1.57E+01	1.81E+01	1.09E+01	1.26E+01	1.51E+01
B (Boron)	µg/L	400	**2.74E+02**	**2.82E+02**	**2.89E+02**	**1.56E+02**	**1.80E+02**	**2.17E+02**	**1.61E+02**	**1.93E+02**	**2.29E+02**	**1.02E+02**	**1.06E+02**	**1.23E+02**	**1.74E+02**	**1.97E+02**	**2.17E+02**	**1.96E+02**	**2.56E+02**	**3.10E+02**
Ba (Barium)	µg/L	5	1.43E+02	1.47E+02	1.48E+02	2.46E+01	2.56E+01	2.65E+01	2.38E+01	2.52E+01	2.63E+01	1.88E+01	1.97E+01	2.07E+01	1.46E+01	1.56E+01	1.66E+01	1.31E+01	1.79E+01	2.08E+01
Be (Beryllium)	µg/L	4	**2.69E-01**	**2.81E-01**	**2.93E-01**	**4.03E-01**	**4.17E-01**	**4.33E-01**	**4.08E-01**	**4.40E-01**	**4.75E-01**	**3.63E-01**	**3.77E-01**	**3.94E-01**	**2.83E-01**	**3.57E-01**	**4.40E-01**	**2.20E-01**	**3.74E-01**	**5.35E-01**
Ca (Calcium)	mg/L	35.1	4.70E+01	5.36E+01	6.93E+01	6.67E+01	7.65E+01	9.03E+01	1.03E+02	1.29E+02	1.69E+02	1.58E+02	2.13E+02	2.89E+02	7.71E+01	8.98E+01	1.04E+02	5.91E+01	7.89E+01	9.73E+01
Cd (Cadmium)	µg/L	2	**1.94E-01**	**2.44E-01**	**3.58E-01**	**4.75E-01**	**7.08E-01**	**1.25E+00**	**7.17E-01**	**1.10E+00**	2.35E+00	**9.49E-01**	**1.67E+00**	4.01E+00	**4.98E-01**	**6.56E-01**	**1.08E+00**	**2.37E-01**	**3.70E-01**	**6.68E-01**
Cl (Chloride)	mg/L	1.3	2.01E+01	2.06E+01	2.10E+01	1.98E+01	2.15E+01	2.45E+01	1.95E+01	2.13E+01	2.44E+01	2.37E+01	2.63E+01	3.06E+01	1.27E+01	1.40E+01	1.55E+01	8.72E+00	1.26E+01	1.49E+01
Co (Cobalt)	µg/L	5	**4.74E+00**	7.01E+00	1.48E+01	8.91E+00	1.48E+01	2.44E+01	1.19E+01	2.14E+01	4.07E+01	1.75E+01	3.39E+01	7.59E+01	7.72E+00	1.32E+01	2.16E+01	5.26E+00	9.02E+00	1.66E+01
Cr (Chromium)	µg/L	11	**8.16E-01**	**1.02E+00**	**1.12E+00**	**4.37E+00**	**5.31E+00**	**6.03E+00**	**4.99E+00**	**6.22E+00**	**7.14E+00**	**6.57E+00**	**7.20E+00**	**7.57E+00**	**2.15E+00**	**2.35E+00**	**2.57E+00**	**1.36E+00**	**1.61E+00**	**1.83E+00**
Cu (Copper)	µg/L	9	1.97E+01	2.83E+01	5.11E+01	1.89E+02	2.87E+02	3.95E+02	2.45E+02	3.78E+02	5.34E+02	2.92E+02	4.45E+02	6.02E+02	9.64E+01	1.41E+02	1.85E+02	6.08E+01	9.49E+01	1.39E+02
F (Fluoride)	mg/L	0.05	3.35E+00	3.44E+00	3.52E+00	1.03E+00	1.24E+00	1.40E+00	8.28E-01	1.03E+00	1.19E+00	1.14E+00	1.25E+00	1.37E+00	3.36E-01	3.78E-01	4.48E-01	1.63E-01	2.25E-01	2.94E-01
Fe (Iron)	µg/L	300	3.28E+03	3.37E+03	3.47E+03	2.23E+03	2.50E+03	2.85E+03	1.22E+03	1.72E+03	2.36E+03	**1.69E+02**	**2.17E+02**	5.47E+02	1.20E+03	1.62E+03	2.03E+03	1.58E+03	2.44E+03	3.42E+03
K (Potassium)	mg/L	0.5	9.80E+00	1.10E+01	1.15E+01	1.53E+01	1.77E+01	2.10E+01	2.21E+01	2.64E+01	3.11E+01	3.44E+01	3.71E+01	3.87E+01	1.36E+01	1.48E+01	1.59E+01	8.37E+00	1.18E+01	1.41E+01
Mg (Magnesium)	mg/L	3	7.51E+01	7.87E+01	8.47E+01	6.71E+01	7.65E+01	8.70E+01	7.72E+01	8.80E+01	9.94E+01	7.50E+01	8.51E+01	9.85E+01	6.21E+01	7.39E+01	8.65E+01	5.65E+01	8.57E+01	1.15E+02
Mn (Manganese)	µg/L	50	3.74E+02	4.02E+02	4.32E+02	5.30E+02	6.59E+02	8.30E+02	5.60E+02	7.06E+02	8.98E+02	4.19E+02	5.83E+02	8.14E+02	4.80E+02	5.75E+02	6.63E+02	4.47E+02	6.78E+02	8.77E+02
Na (Sodium)	mg/L	2	6.45E+01	6.70E+01	7.37E+01	5.82E+01	6.28E+01	6.90E+01	6.31E+01	6.97E+01	7.77E+01	9.44E+01	1.03E+02	1.13E+02	4.03E+01	4.48E+01	5.12E+01	2.44E+01	3.74E+01	4.83E+01
Ni (Nickel)	µg/L	50	**4.25E+01**	7.82E+01	1.63E+02	1.19E+02	2.09E+02	3.44E+02	1.67E+02	2.99E+02	5.64E+02	2.66E+02	4.86E+02	9.66E+02	1.04E+02	1.73E+02	2.80E+02	6.74E+01	1.11E+02	1.87E+02
Pb (Lead)	µg/L	3	**1.51E+00**	**1.64E+00**	**1.86E+00**	1.60E+01	2.25E+01	3.17E+01	3.19E+01	4.27E+01	5.39E+01	5.67E+01	6.31E+01	6.78E+01	1.06E+01	1.18E+01	1.32E+01	5.82E+00	8.06E+00	9.97E+00
Sb (Antimony)	µg/L	31	**1.05E+00**	**2.08E+00**	**3.96E+00**	**5.11E+00**	**6.31E+00**	**8.00E+00**	**7.86E+00**	**1.02E+01**	**1.29E+01**	**1.38E+01**	**1.73E+01**	**2.07E+01**	**5.16E+00**	**6.31E+00**	**7.77E+00**	**2.83E+00**	**3.83E+00**	**5.42E+00**
Se (Selenium)	µg/L	5	**6.68E-01**	**6.90E-01**	**8.80E-01**	**1.39E+00**	**1.63E+00**	**1.96E+00**	**2.14E+00**	**2.75E+00**	**3.50E+00**	**3.87E+00**	**4.86E+00**	6.03E+00	**1.35E+00**	**1.63E+00**	**2.04E+00**	**6.01E-01**	**7.84E-01**	**1.18E+00**
SO4 (Sulfate)	mg/L	9	2.89E+02	2.99E+02	3.11E+02	2.94E+02	3.13E+02	3.36E+02	2.95E+02	3.25E+02	3.58E+02	3.41E+02	3.80E+02	4.32E+02	1.76E+02	2.08E+02	2.40E+02	1.30E+02	1.94E+02	2.60E+02
Tl (Thallium)	µg/L	0.56	**1.55E-01**	**1.59E-01**	**1.66E-01**	**1.42E-01**	**1.61E-01**	**1.74E-01**	**1.52E-01**	**1.75E-01**	**1.94E-01**	**1.69E-01**	**1.79E-01**	**1.85E-01**	**8.58E-02**	**9.48E-02**	**1.20E-01**	**5.25E-02**	**6.93E-02**	**1.16E-01**
V (Vanadium)	µg/L	50	**4.10E+00**	**4.29E+00**	**4.41E+00**	**5.88E+00**	**7.07E+00**	**7.97E+00**	**6.71E+00**	**8.18E+00**	**9.17E+00**	**8.53E+00**	**9.13E+00**	**9.36E+00**	**3.82E+00**	**4.04E+00**	**4.26E+00**	**2.16E+00**	**2.64E+00**	**2.98E+00**
Zn (Zinc)	µg/L	100	**1.44E+01**	**1.70E+01**	**2.25E+01**	**4.18E+01**	**5.71E+01**	**8.66E+01**	**7.04E+01**	**9.33E+01**	1.63E+02	**9.91E+01**	1.36E+02	2.54E+02	**4.66E+01**	**5.61E+01**	**7.41E+01**	**1.91E+01**	**2.63E+01**	**4.29E+01**

Notes

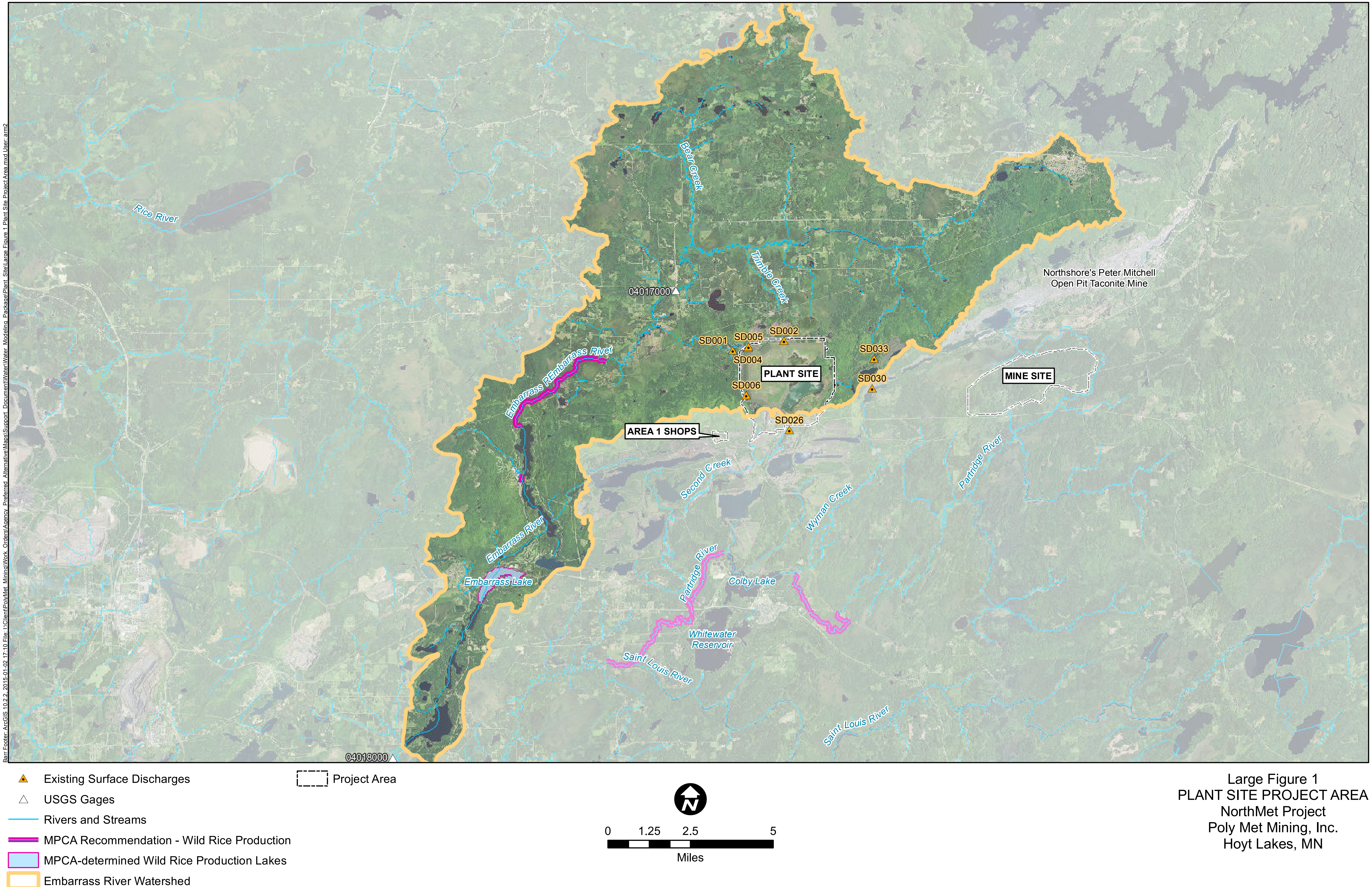
[1] Values shown are the average of the monthly P10 values for the referenced Mine Year.

[2] Values shown are the average of the monthly P50 values for the referenced Mine Year.

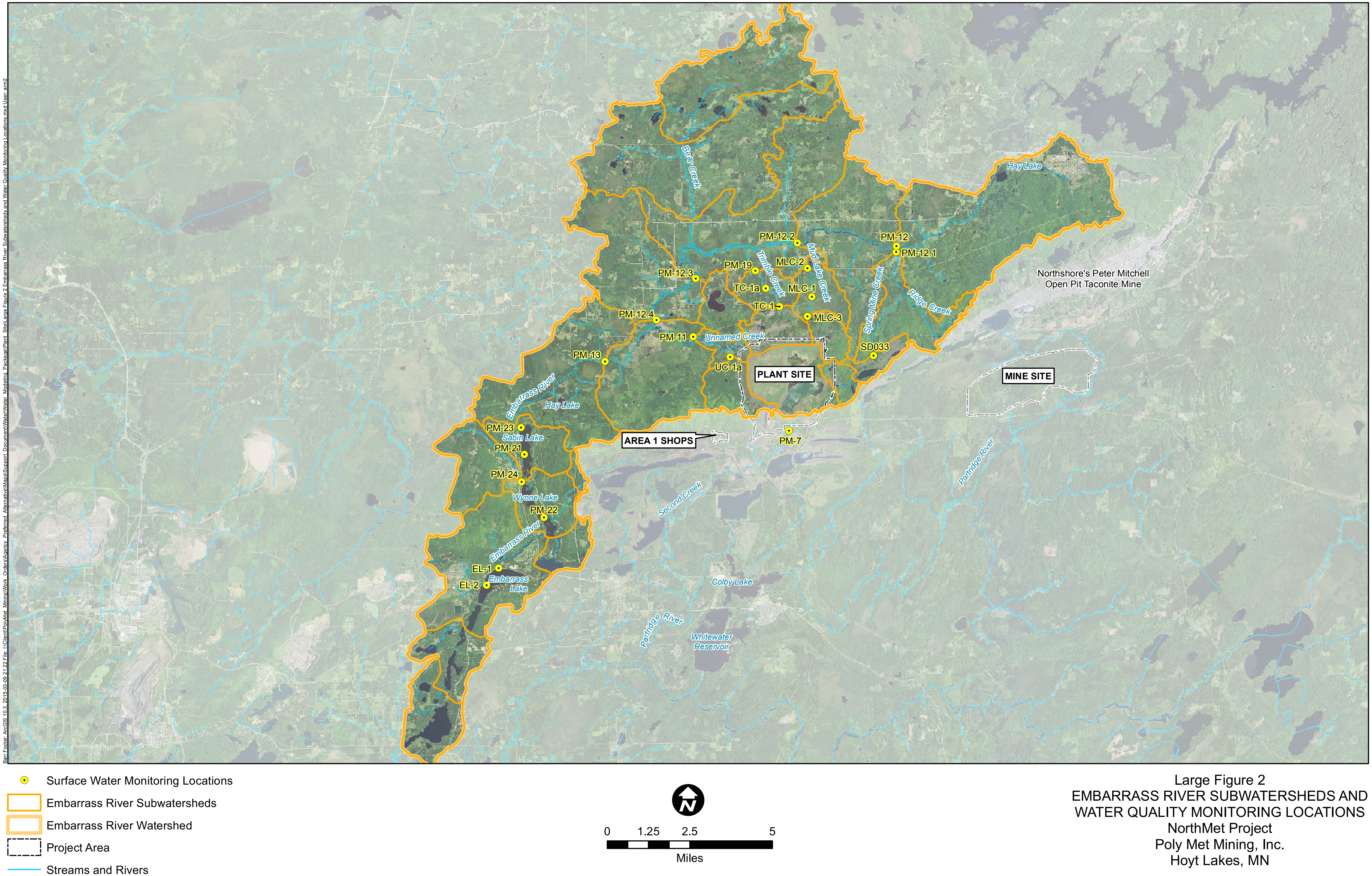
[3] Values shown are the average of the monthly P90 values for the referenced Mine Year.

2.00E+02 Values below the modeled WWTP effluent limit are shown in bold with light blue shading as not treated.

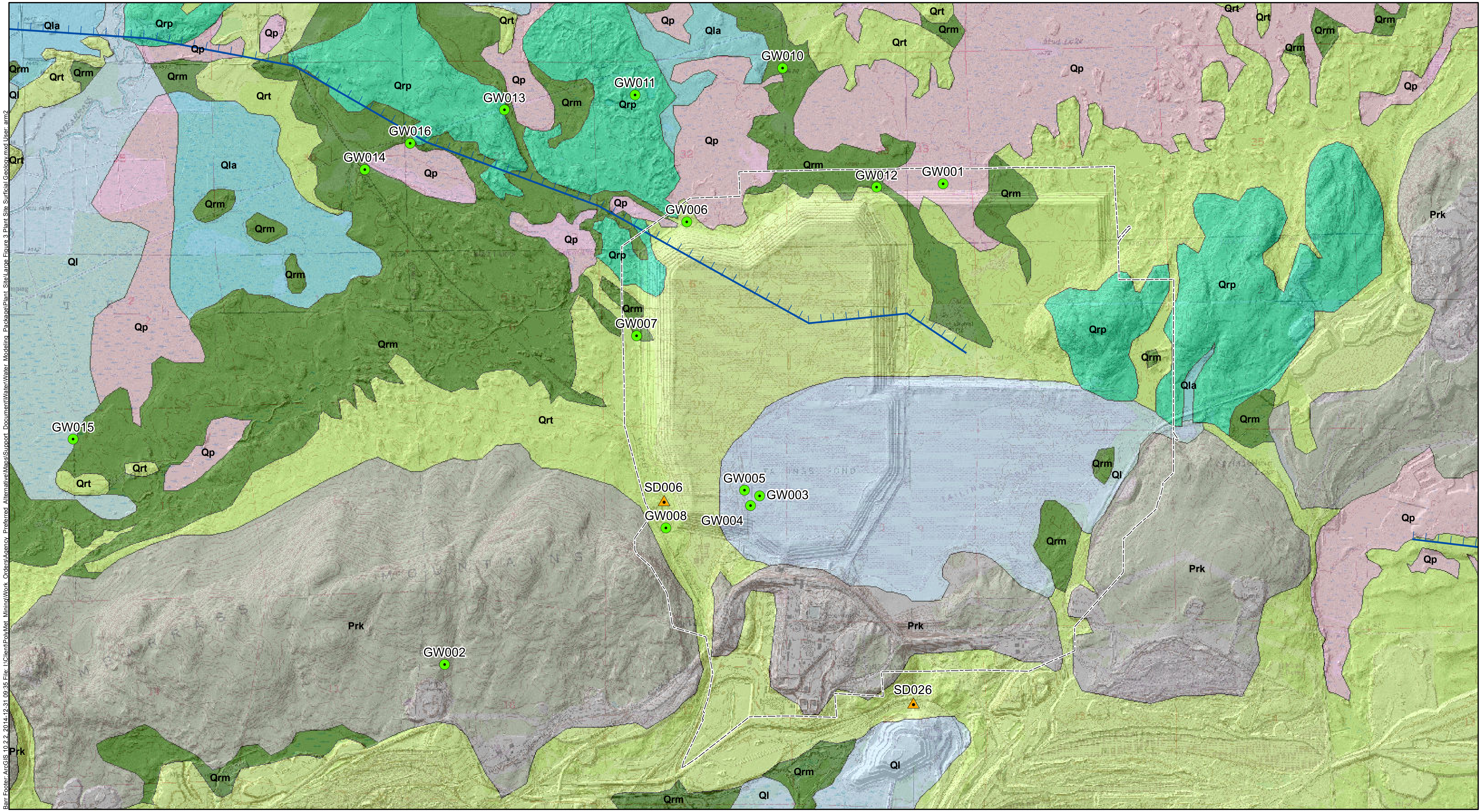
Large Figures



Large Figure 1
PLANT SITE PROJECT AREA
NorthMet Project
Poly Met Mining, Inc.
Hoyt Lakes, MN



Large Figure 2
EMBARRASS RIVER SUBWATERSHEDS AND WATER QUALITY MONITORING LOCATIONS
NorthMet Project
Poly Met Mining, Inc.
Hoyt Lakes, MN



▲ Existing Surface Discharge

● Groundwater Well

Project Area

Ice Margins

0 1,250 2,500
Feet

Quaternary Postglacial Deposits[1]

Qp — **Peat -** Organic material in various stages of decomposition.

Ql — **Lake Sediment -** Predominantly silt, clay and organic material that have settled to the bottom of modern lakes.

Deposits of Glacial-Age Lakes[1]

Qla — **Lacustrine Sediment -** predominantly silt and clay but also includes sand.

Quaternary Deposits Associated with the Rainy Lobe (Rainy Provenance)[1]

Qrt — **Rainy Lobe Till -** Chiefly sandy loam matrix texture (48 to 87 percent sand, 9 to 40 perent silt, 0 to 13 percent clay); variable color; unsorted sediment with common pebbles, cobbles, and boulders.

Qrm — **Till -** As above, but eroded by water, producing a less rugged surface expression and possibly concentrating coarse-grained clasts as a lag at the surface.

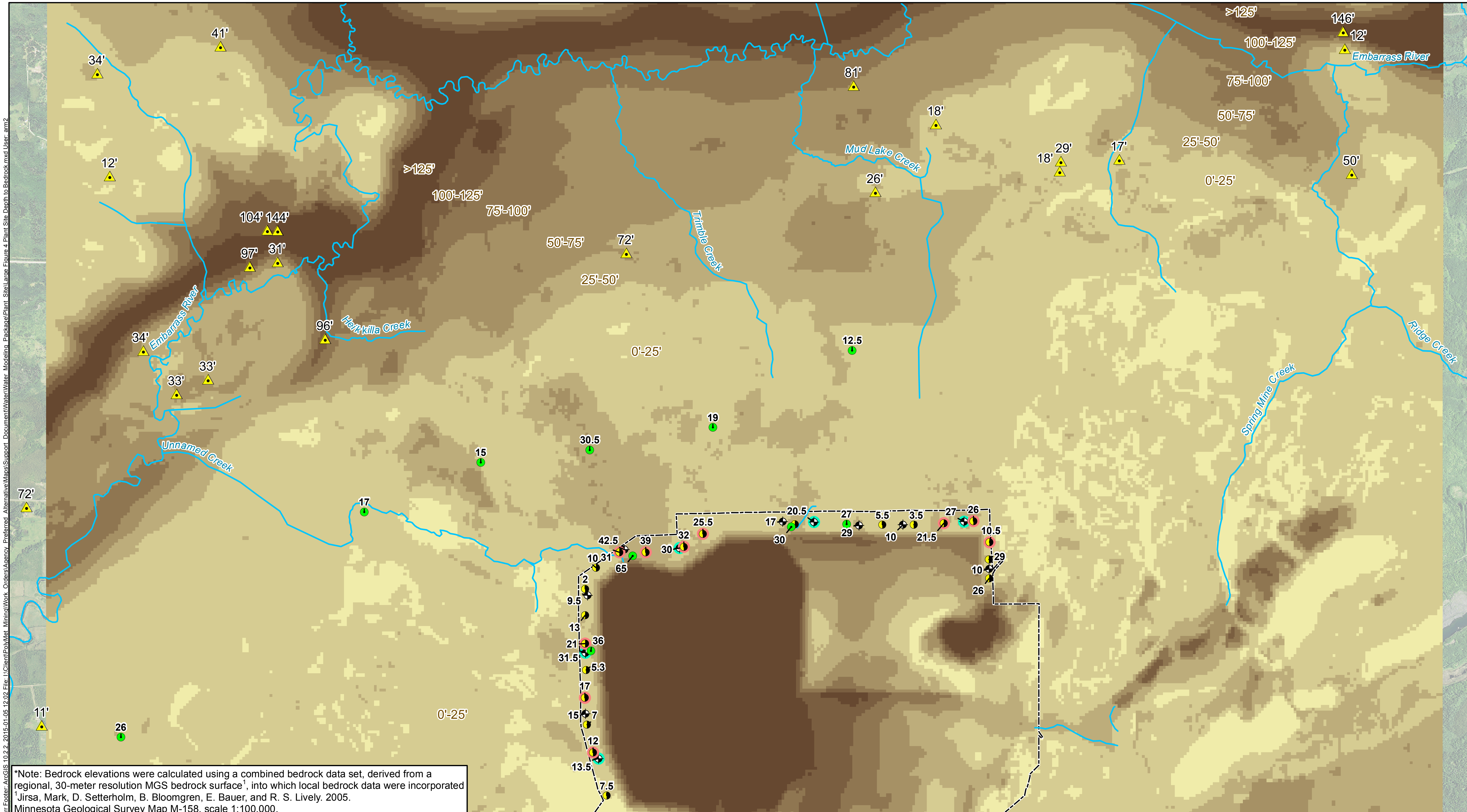
Qrp — **Till, Re-Sedimented Till, and Sorted Sediment -** Forms distinct but discontinuous highlands aligned with other features that mark the transition from a glacial to a proglacial setting (for example ice-contact delta fronts).

Mesozoic, Paleoproterozoic and Archean[1]

Prk — **Bedrock at or Near the Surface**

[1] Jennings, C. and W. Reynolds. 2005. Minnesota Geological Survey Miscellaneous Map M-164, scale 1:100,000.

Large Figure 3
PLANT SITE SURFICIAL GEOLOGY
JENNINGS AND REYNOLDS, 2005
NorthMet Project
Poly Met Mining, Inc.
Hoyt Lakes, MN



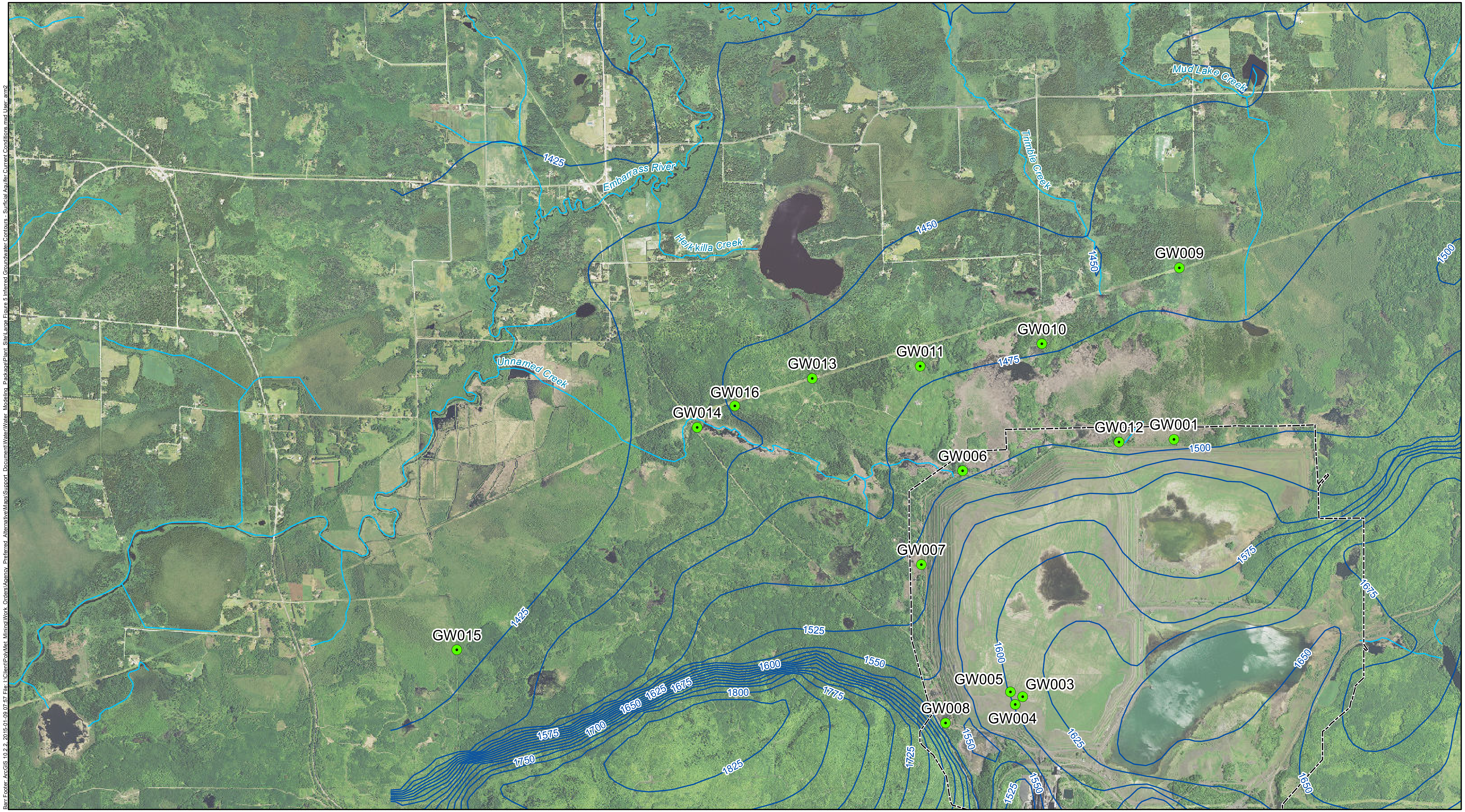
*Note: Bedrock elevations were calculated using a combined bedrock data set, derived from a regional, 30-meter resolution MGS bedrock surface[1], into which local bedrock data were incorporated
[1]Jirsa, Mark, D. Setterholm, B. Bloomgren, E. Bauer, and R. S. Lively. 2005.
Minnesota Geological Survey Map M-158, scale 1:100,000.

- Groundwater Wells
- Rotasonic Location
- Rotasonic Location with a Piezometer
- Boring Locations
- Boring Locations with Packer
- Residential Wells from County Well Index
- Project Area
- Rivers and Streams

*Depth to Bedrock
- < 0
- 0 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 125
- \>125

0 1,500 3,000 6,000
Feet

Large Figure 4
PLANT SITE
DEPTH TO BEDROCK
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN



- Groundwater Wells
- Project Areas
- Groundwater Elevation Contours
- Streams/Rivers

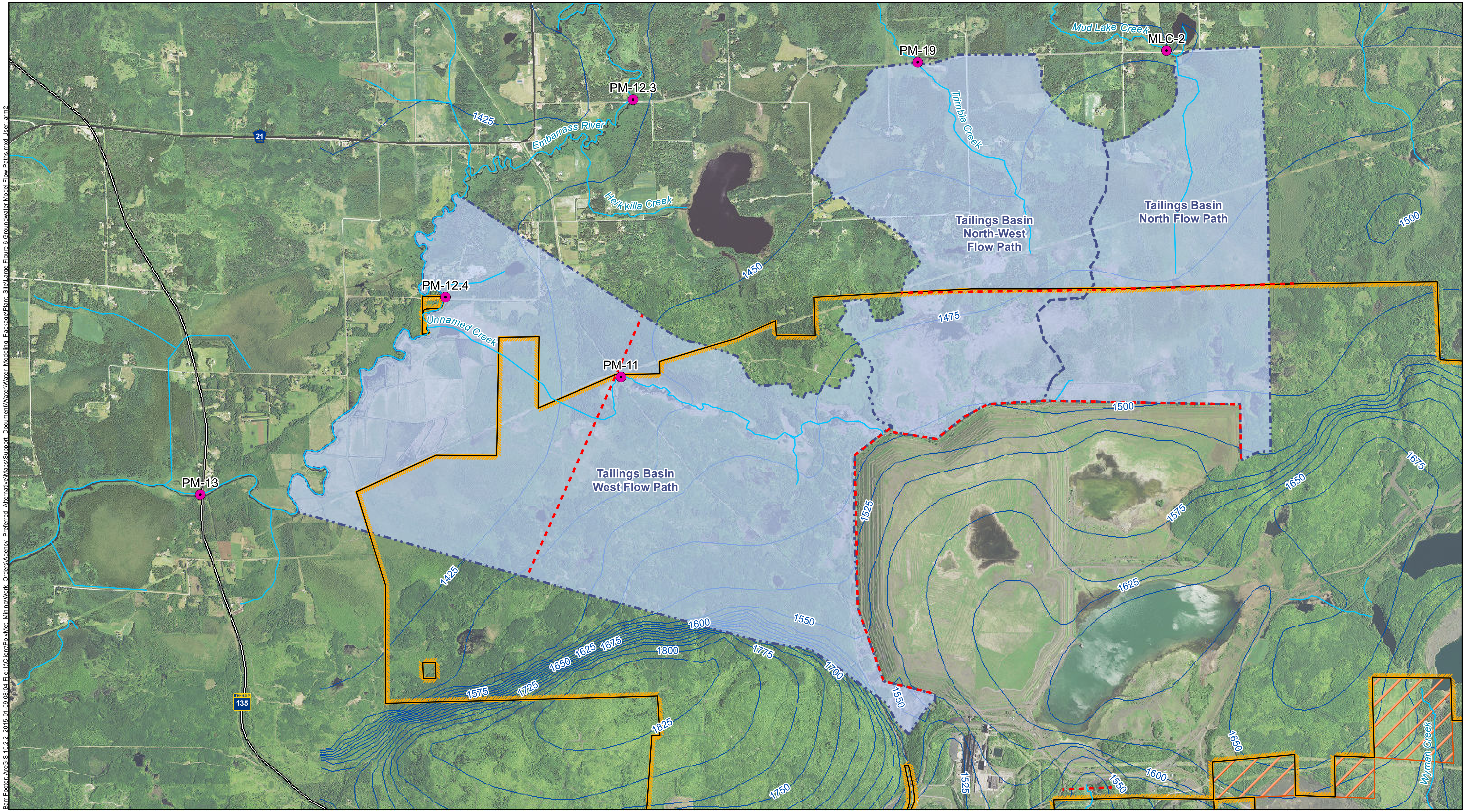
[1]Inferred water table contours were developed using a combination of measured groundwater elevations in site monitoring wells and contours from the Plant Site MODFLOW model.

N

0 1,500 3,000 6,000

Feet

Large Figure 5
INFERRED GROUNDWATER CONTOURS - SURFICIAL AQUIFER, CURRENT CONDITIONS
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN



- Select Surface Water Evaluation Location
- Rivers and Streams
- Groundwater Elevation Contours
- Groundwater Evaluation Distance
- Groundwater Flow Path
- Area Owned by PolyMet
- Area Leased by PolyMet

0 1,500 3,000 6,000
Feet

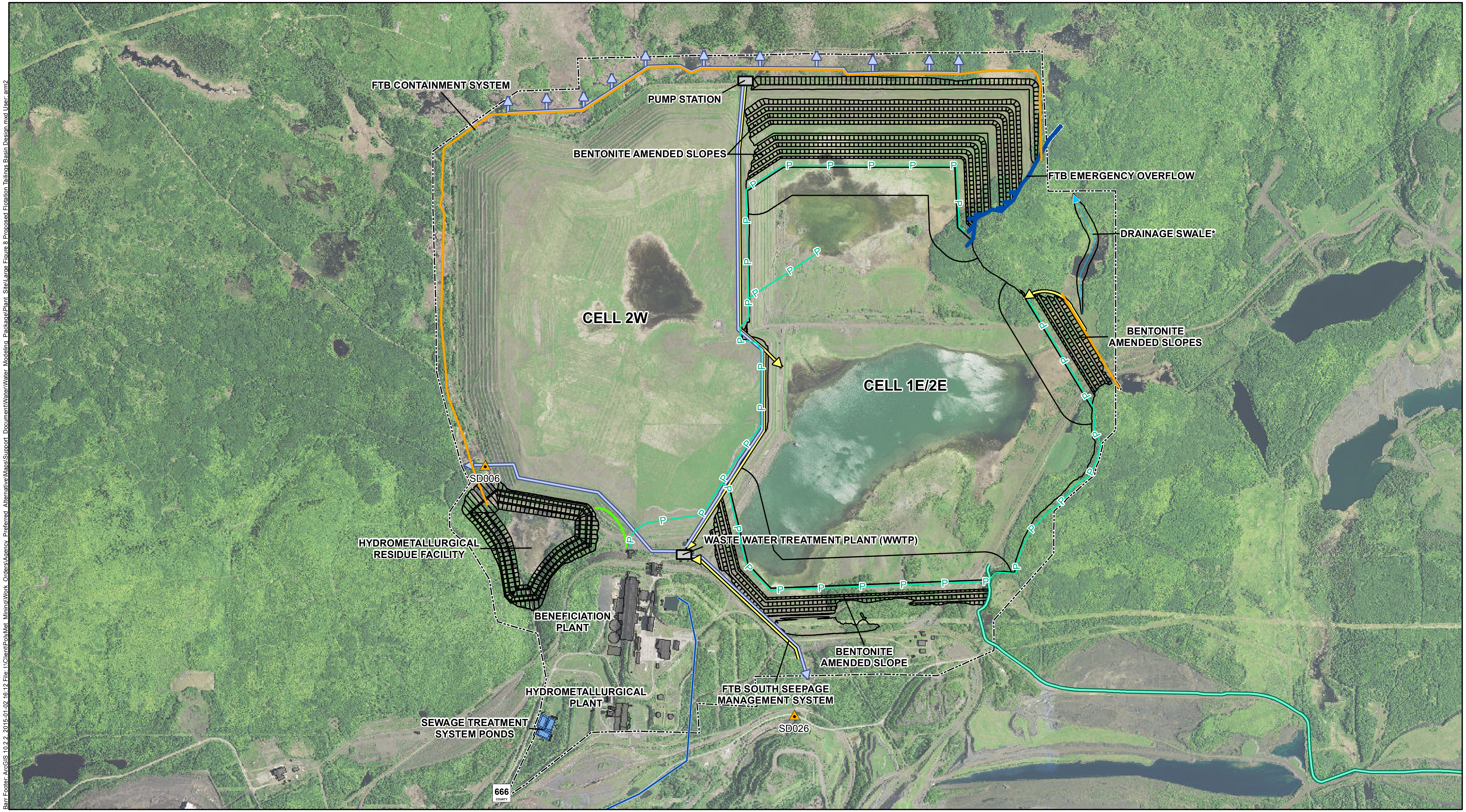
[1]Inferred water table contours were developed using a combination of measured groundwater elevations in site monitoring wells and contours from the Plant Site MODFLOW model.

Large Figure 6
GROUNDWATER MODEL FLOW PATHS
NorthMet Project
Poly Met Mining, Inc.
Hoyt Lakes, MN

Surface Water Evaluation Locations
Streams and Rivers
Project Areas

0 2,000 4,000 8,000
Feet

Large Figure 7
SURFACE WATER MODEL
EVALUATION POINTS
NorthMet Project
Poly Met Mining, Inc.
Hoyt Lakes, MN

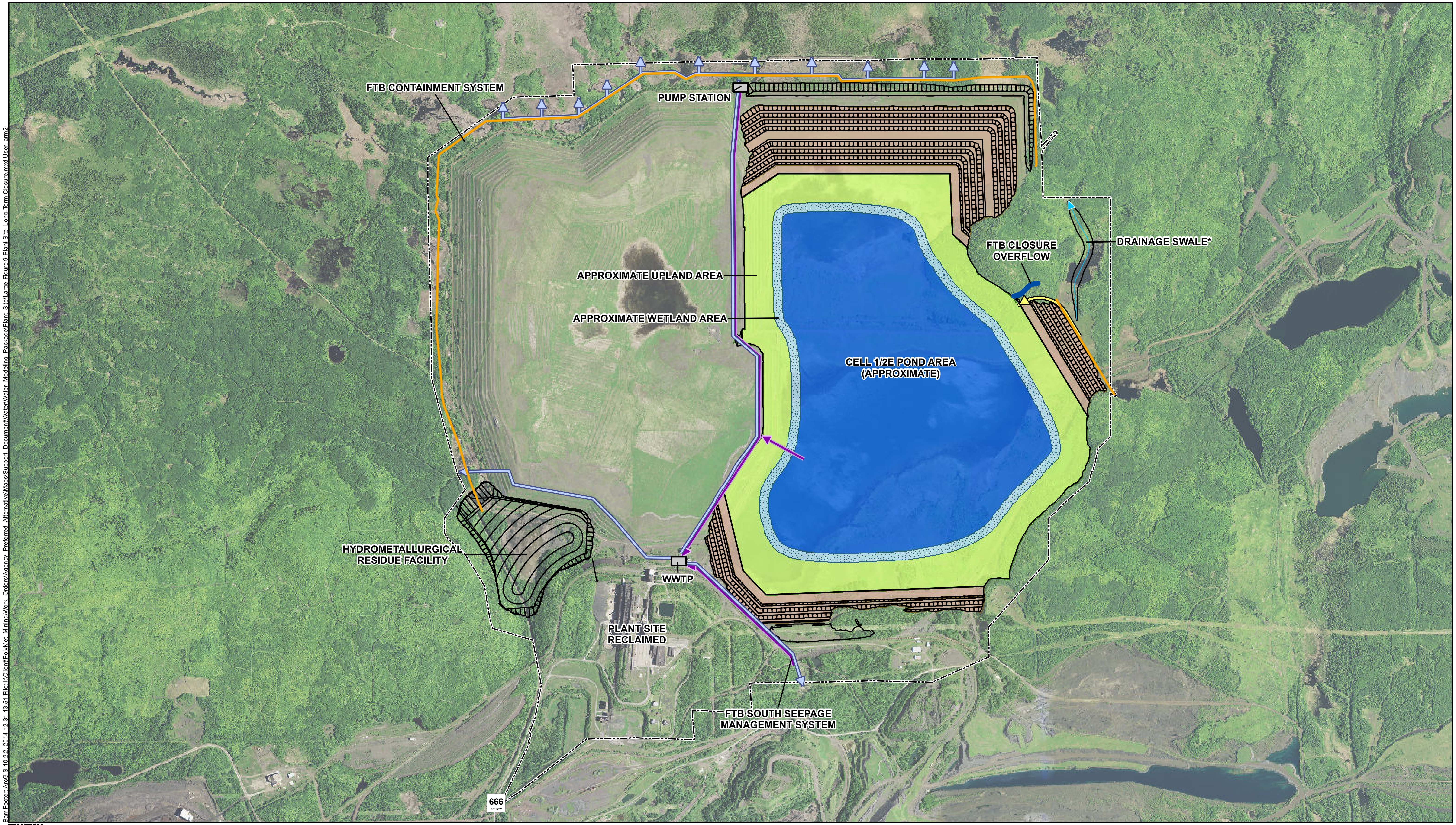


Existing NPDES Discharge Stations
Treated Water Discharge Pipe
Seepage Water Pipe
Flotation Tailings Pipeline
FTB Containment System
Hydrometallurgical Residue Pipeline
Plant Site
Treated Water Pipeline
Drainage Flow Direction

*The drainage swale drains stormwater away from the toe of the dam.

0 2,000 4,000
Feet

Large Figure 8
PROPOSED FLOTATION TAILINGS BASIN DESIGN
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

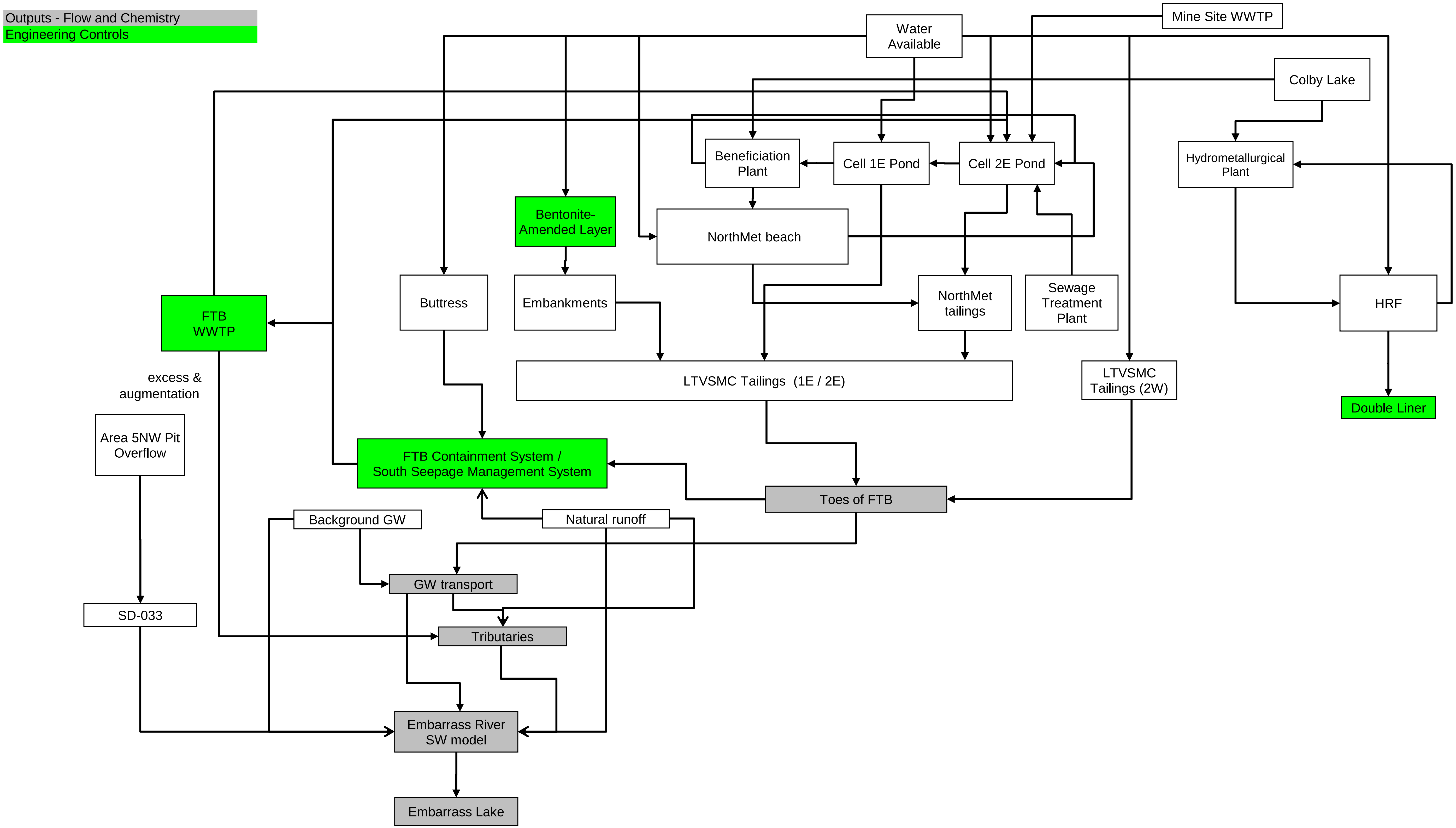


Plant Site
Pond
Wetland Area
Upland Area
Embankment
FTB Containment System
Treated Water Discharge Pipe
Pipes to Treatment Plant
Seepage Water Pipe
Drainage Flow Direction
*The drainage swale drains stormwater away from the toe of the dam.

0 2,000 4,000
Feet

Large Figure 9
PLANT SITE LONG-TERM CLOSURE
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

Large Figure 10 - Tailings Basin Water Modeling - Operations (early years)



Probabilistic Aspects

Mine Site model output

precipitation, evaporation, watershed runoff

water quality of Colby Lake

plant and pond flow and chemistry

runoff, evaporation, infiltration

O2 diffusion, sulfate generation rates, scale up, metal release ratios, NM tailings permeability

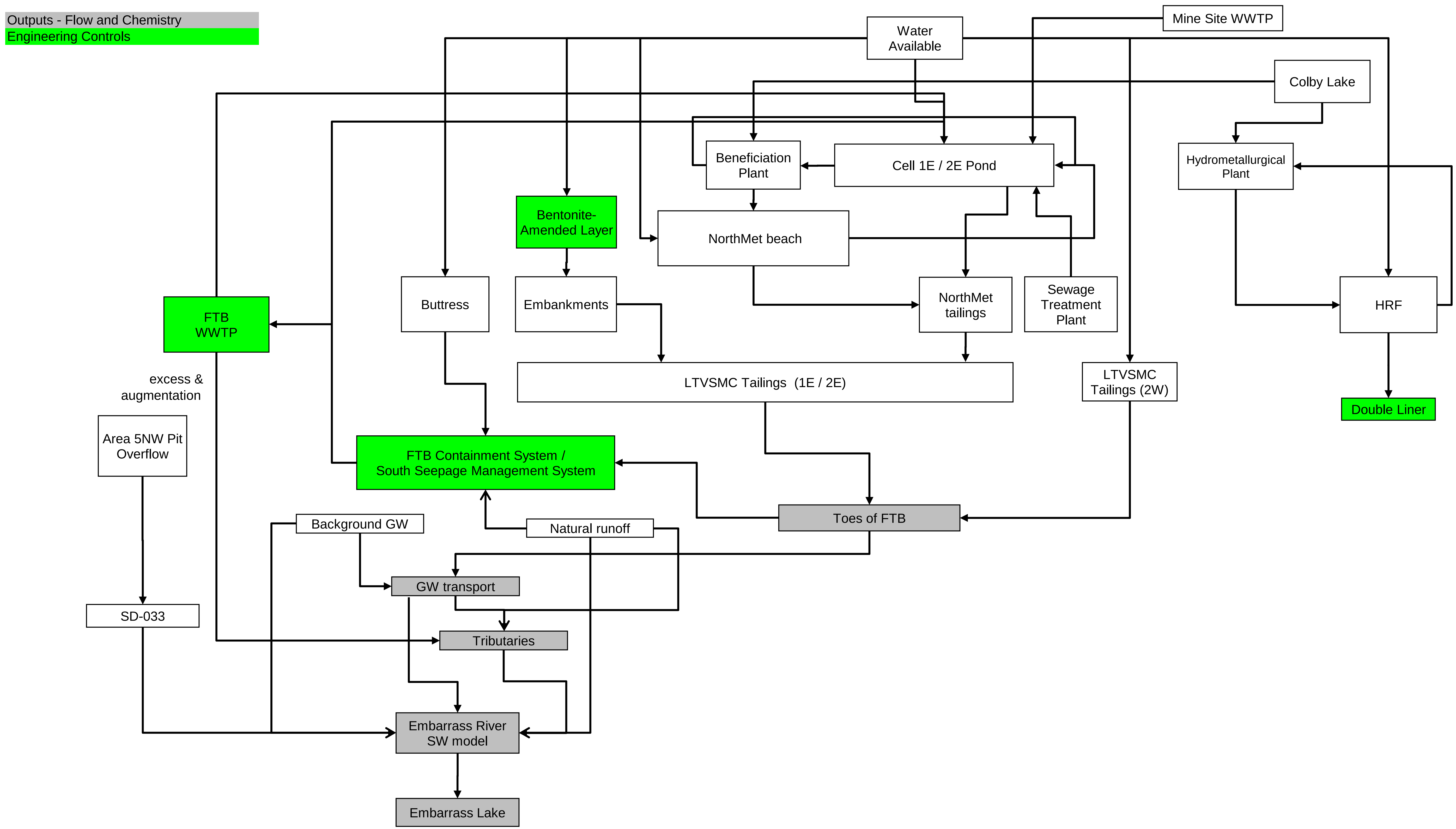
soluble loading, LTVSMC tailings permeability

metals sorption, recharge rate, dilution

SW & GW input flow and chemistry

flow and chemistry

Large Figure 11 - Tailings Basin Water Modeling - Operations (later years)



Probabilistic Aspects

Mine Site model output

precipitation, evaporation, watershed runoff

water quality of Colby Lake

plant and pond flow and chemistry

runoff, evaporation, infiltration

O2 diffusion, sulfate generation rates, scale up, metal release ratios, NM tailings permeability

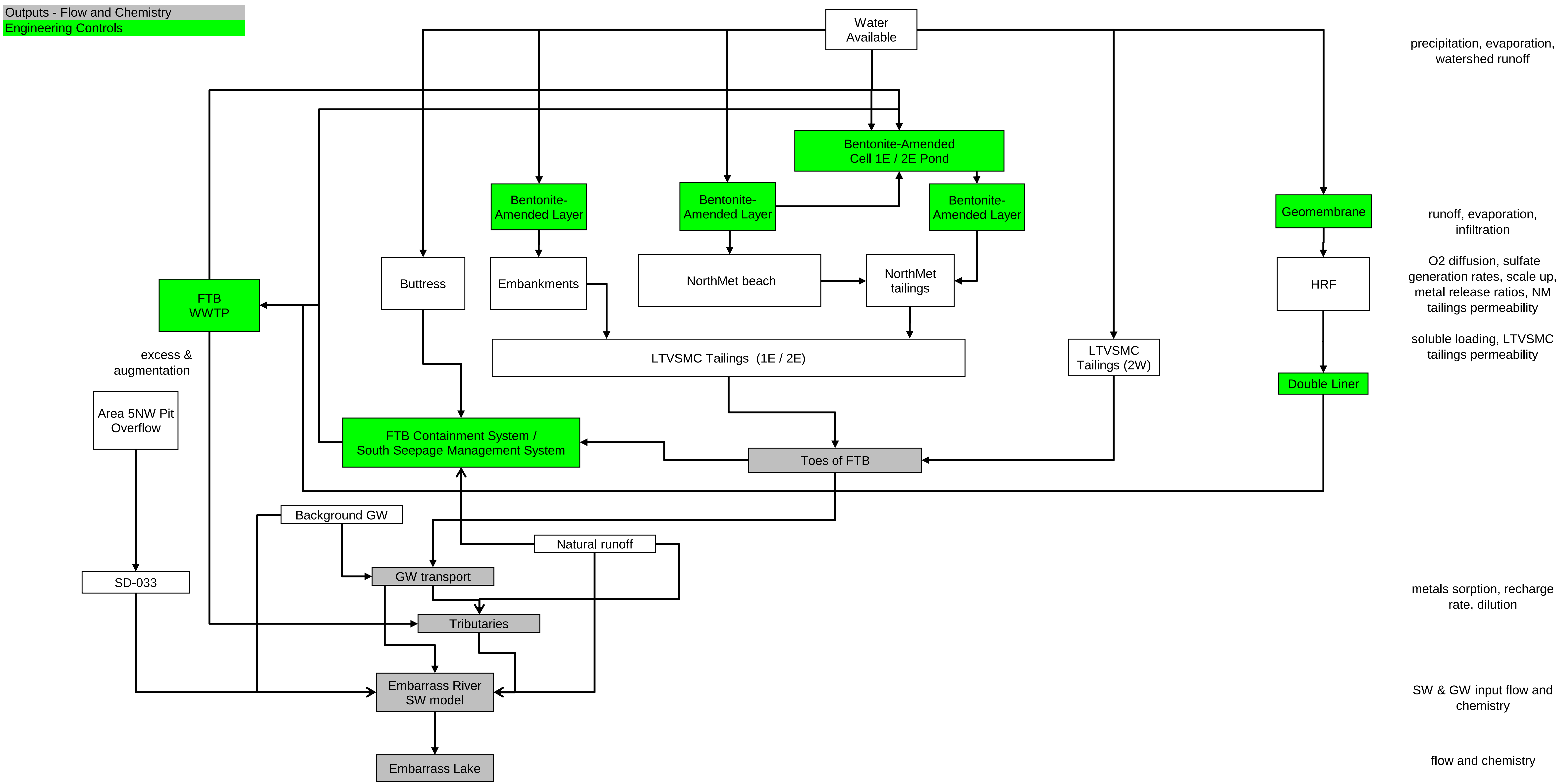
soluble loading, LTVSMC tailings permeability

metals sorption, recharge rate, dilution

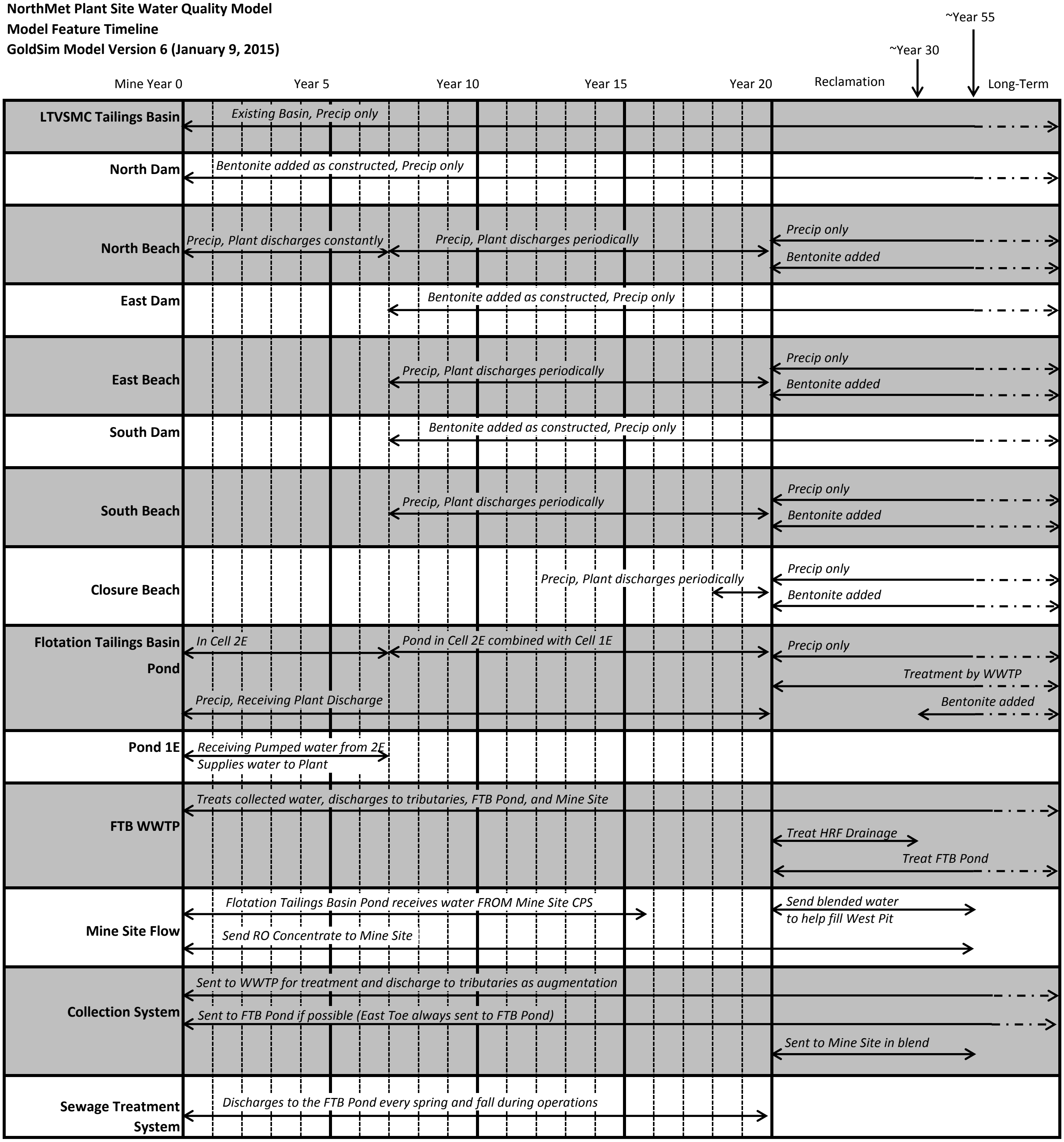
SW & GW input flow and chemistry

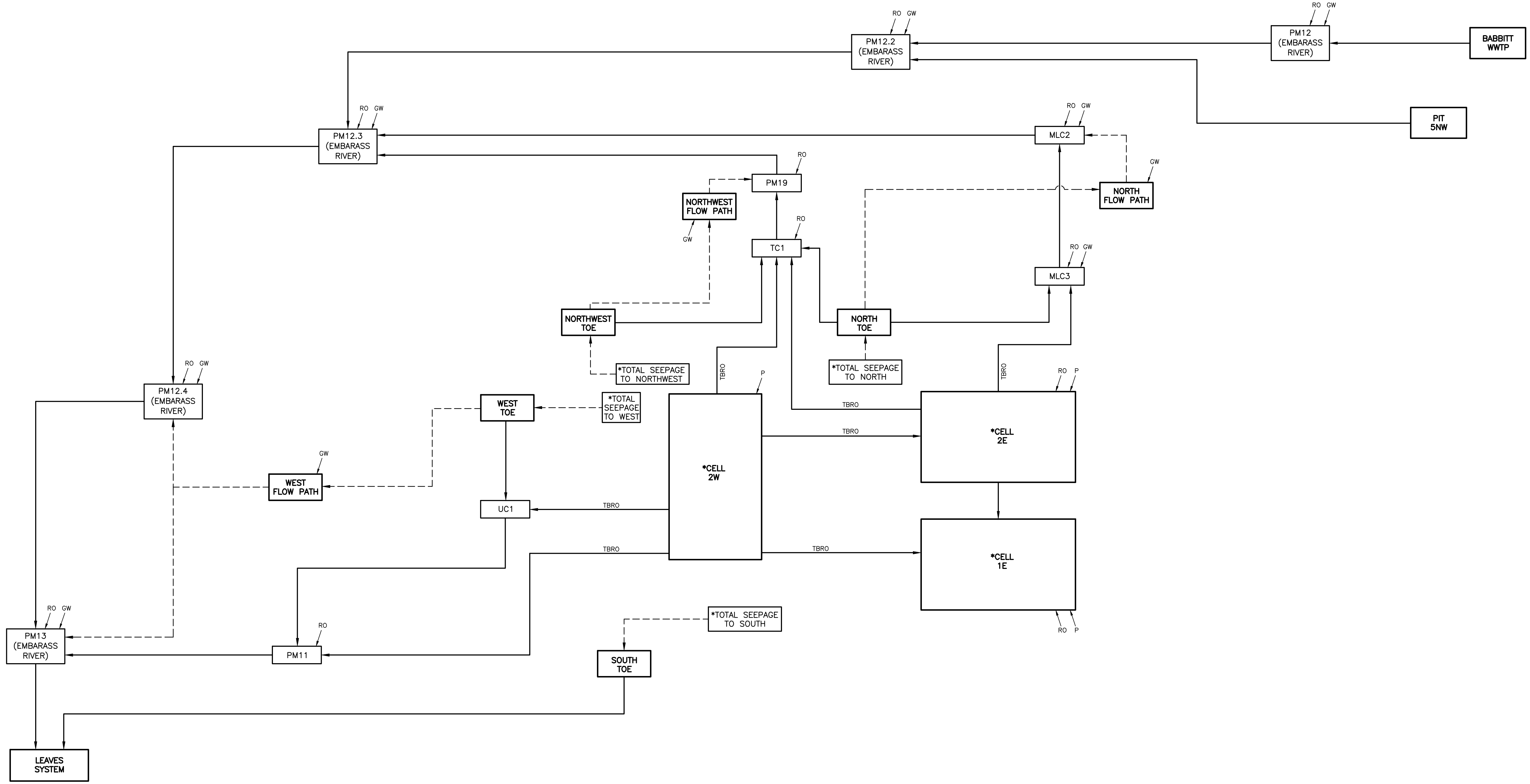
flow and chemistry

Large Figure 12 - Tailings Basin Water Modeling - Long-Term Closure



Large Figure 13
NorthMet Plant Site Water Quality Model
Model Feature Timeline
GoldSim Model Version 6 (January 9, 2015)





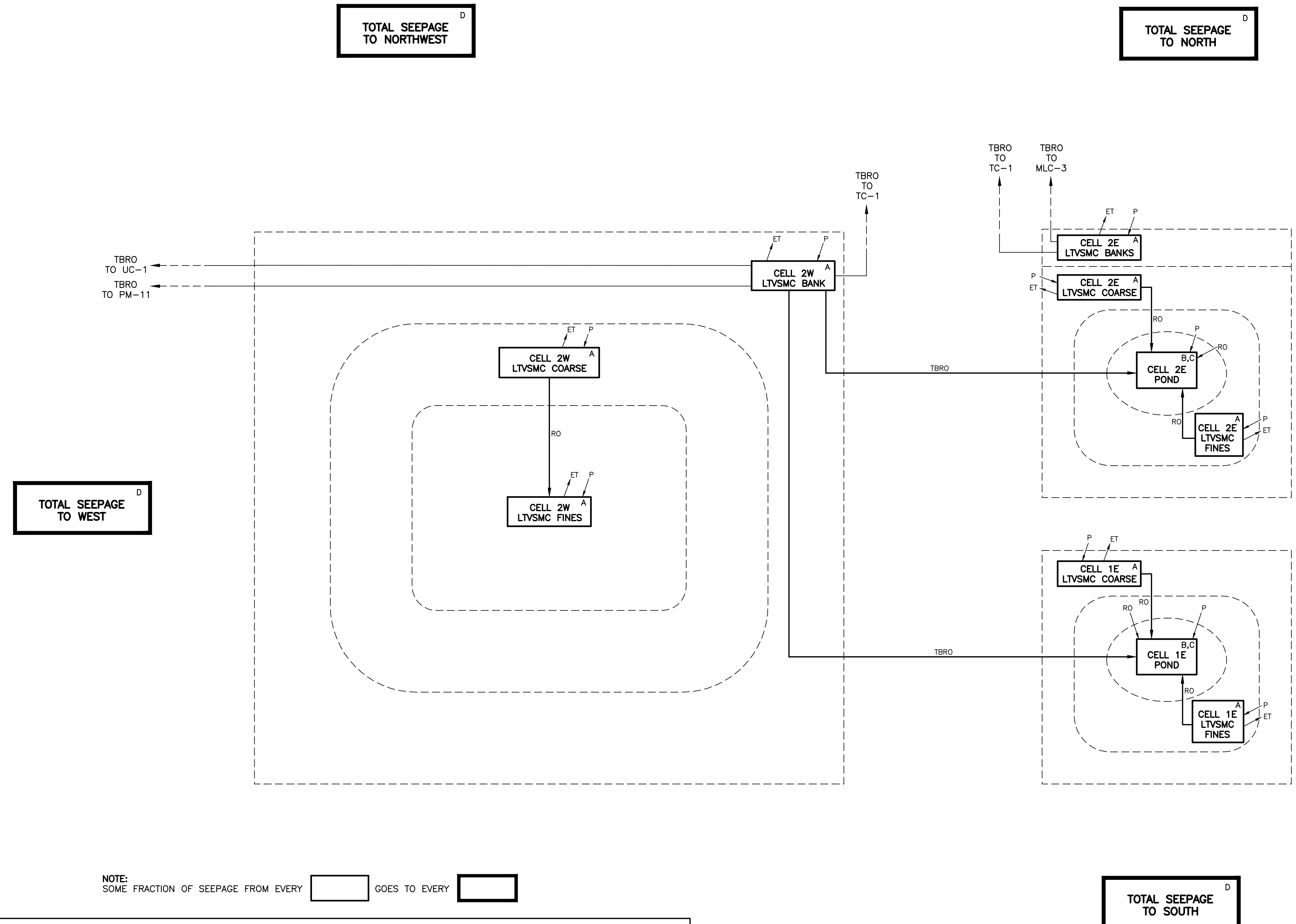
LEGEND

WATER FLOW
SEEPAGE OR GROUNDWATER FLOW
MASS ADDITION TO OR REMOVAL FROM THE SYSTEM
RO BACKGROUND RUNOFF INPUT (FLOW AND LOAD)
GW BACKGROUND GROUNDWATER INPUT (FLOW AND LOAD)
P PRECIPITATION INPUT (FLOW)
ET EVAPOTRANSPIRATION OUTPUT (FLOW)
TBRO TAILINGS BASIN RUNOFF (FLOW)

* SEE NO ACTION MODEL DETAILED FLOW CHART.

LARGE FIGURE 14

NORTHMET PLANT SITE WATER QUALITY MODEL
CONTINUATION OF EXISTING CONDITIONS SCENARIO MODEL
FLOWCHART
GOLDSIM MODEL VERSION 6

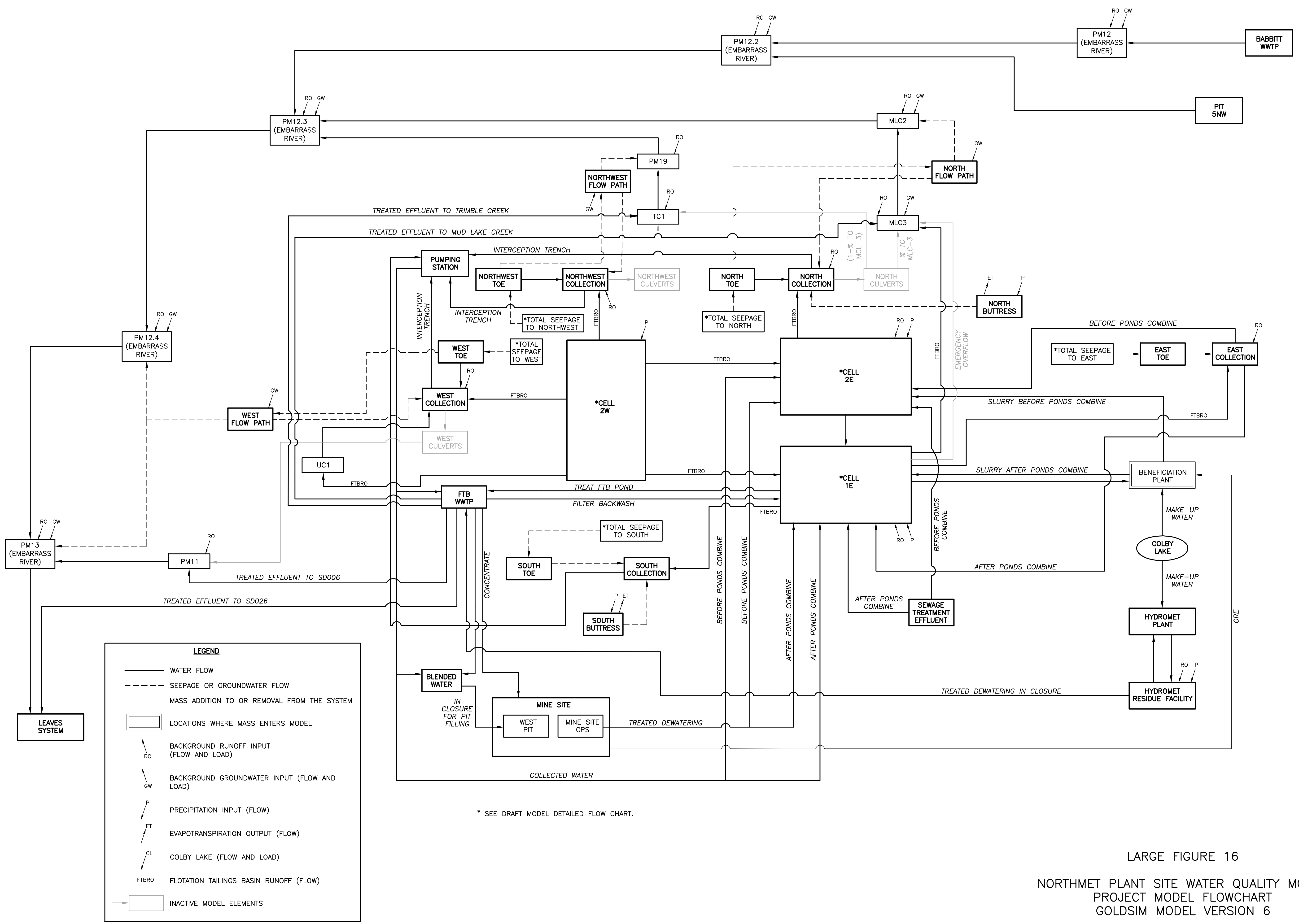


LEGEND

WATER FLOW	A UNSATURATED TAILINGS GENERATE CONSTITUENT LOAD WHERE OXYGEN IS PRESENT.
MASS ADDITION TO OR REMOVAL FROM THE SYSTEM	B OXYGENATED SEEPAGE GENERATES CONSTITUENT LOAD IN THE FULLY SATURATED TAILINGS BELOW THE POND.
RO BACKGROUND RUNOFF INPUT (FLOW AND LOAD)	C LOAD FROM THE POND IS CARRIED TO THE TOES VIA SEEPAGE.
P PRECIPITATION INPUT (FLOW)	D ALL LOADS AND FLOWS TO THIS TOE ARE SUMMED TOGETHER TO CALCULATE THE TOTAL LOADING, TOTAL FLOW, AND SEEPAGE CONCENTRATION AT THIS TOE.
ET EVAPOTRANSPIRATION OUTPUT (FLOW)	
TBRO TAILINGS BASIN RUNOFF (FLOW)	

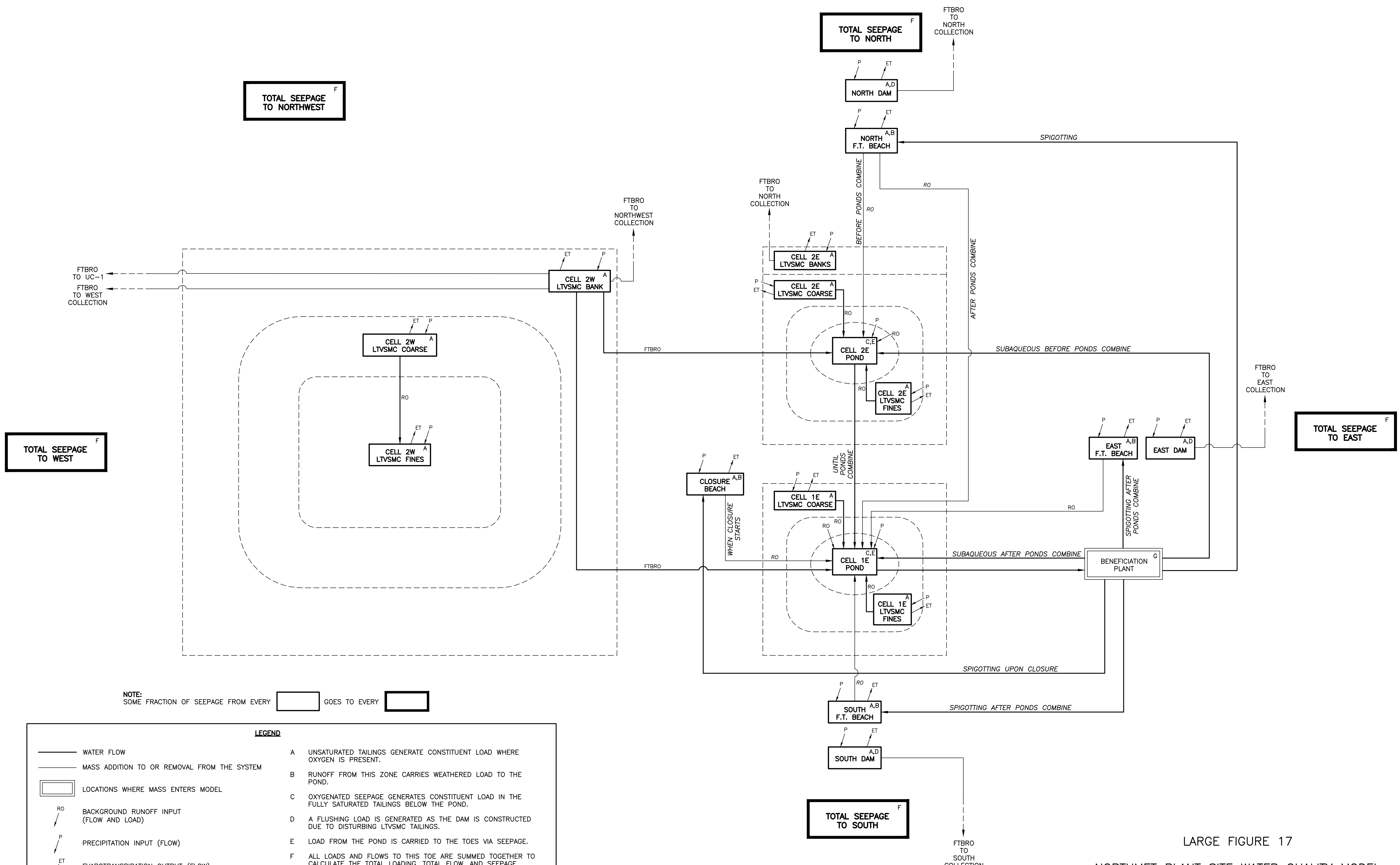
LARGE FIGURE 15

NORTHMET PLANT SITE WATER QUALITY MODEL
CONTINUATION OF EXISTING CONDITIONS SCENARIO MODEL
DETAILED FLOWCHART
GOLDSIM MODEL VERSION 6



LARGE FIGURE 16

NORTHMET PLANT SITE WATER QUALITY MODEL
PROJECT MODEL FLOWCHART
GOLDSIM MODEL VERSION 6



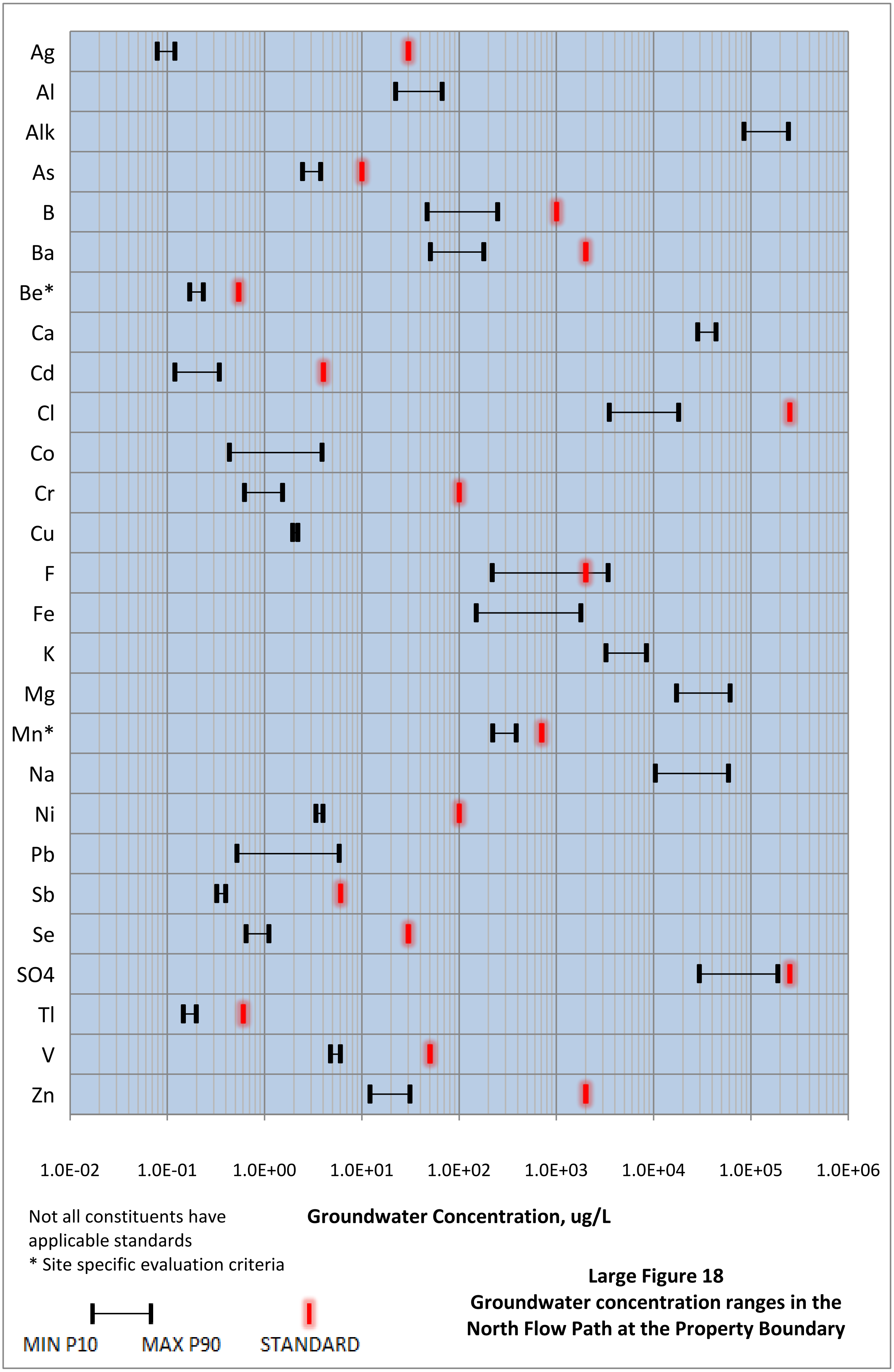
LEGEND

———	WATER FLOW	A	UNSATURATED TAILINGS GENERATE CONSTITUENT LOAD WHERE OXYGEN IS PRESENT.
———	MASS ADDITION TO OR REMOVAL FROM THE SYSTEM	B	RUNOFF FROM THIS ZONE CARRIES WEATHERED LOAD TO THE POND.
[double box]	LOCATIONS WHERE MASS ENTERS MODEL	C	OXYGENATED SEEPAGE GENERATES CONSTITUENT LOAD IN THE FULLY SATURATED TAILINGS BELOW THE POND.
RO	BACKGROUND RUNOFF INPUT (FLOW AND LOAD)	D	A FLUSHING LOAD IS GENERATED AS THE DAM IS CONSTRUCTED DUE TO DISTURBING LTVSMC TAILINGS.
P	PRECIPITATION INPUT (FLOW)	E	LOAD FROM THE POND IS CARRIED TO THE TOES VIA SEEPAGE.
ET	EVAPOTRANSPIRATION OUTPUT (FLOW)	F	ALL LOADS AND FLOWS TO THIS TOE ARE SUMMED TOGETHER TO CALCULATE THE TOTAL LOADING, TOTAL FLOW, AND SEEPAGE CONCENTRATION AT THIS TOE.
FTBRO	FLOTATION TAILINGS BASIN RUNOFF (FLOW)	G	LOAD IS ADDED TO THE SYSTEM AS WEATHERED ORE IS PROCESSED IN THE PLANT.

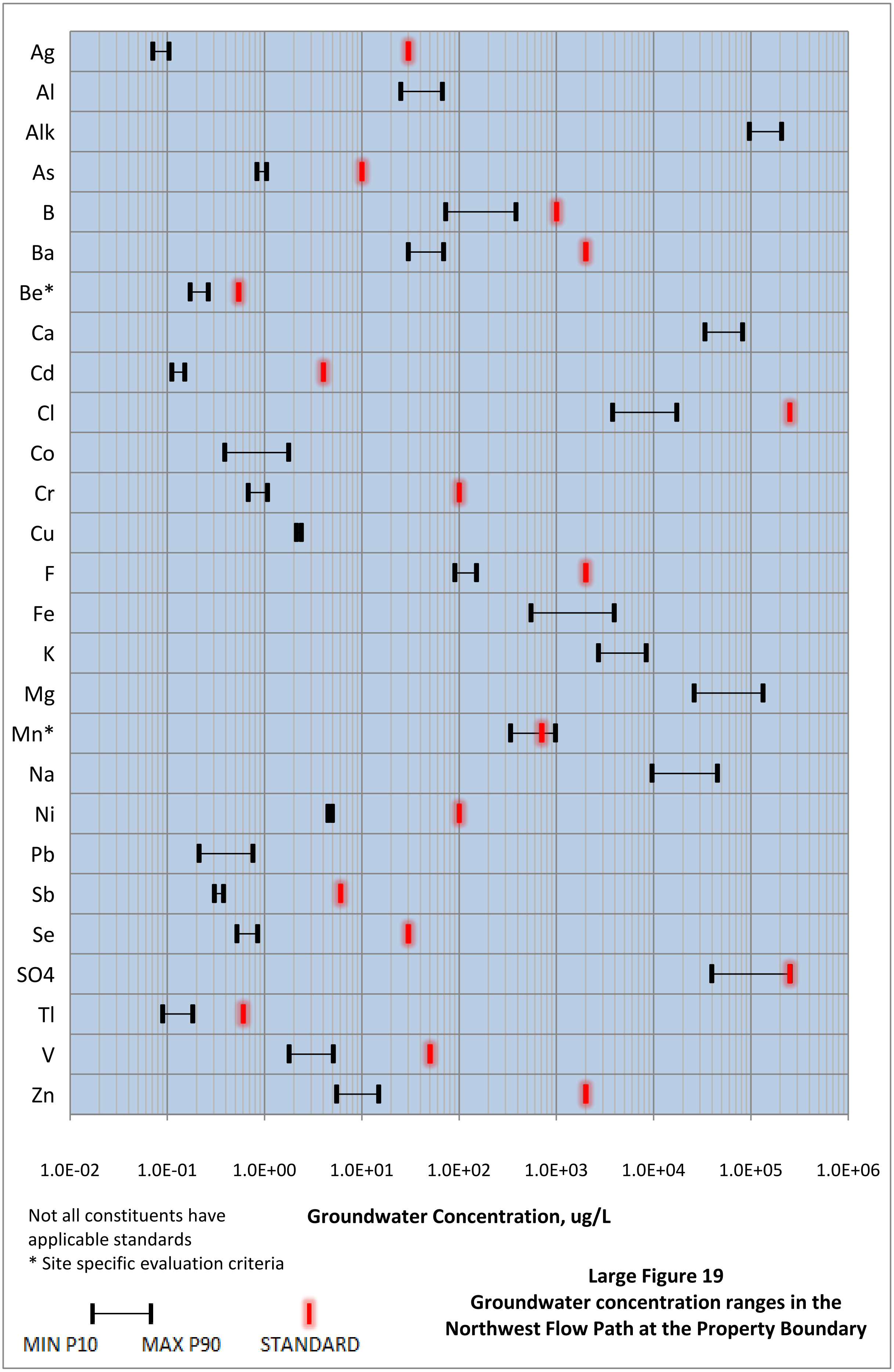
LARGE FIGURE 17

NORTHMET PLANT SITE WATER QUALITY MODEL
PROJECT MODEL DETAILED FLOWCHART
GOLDSIM MODEL VERSION 6

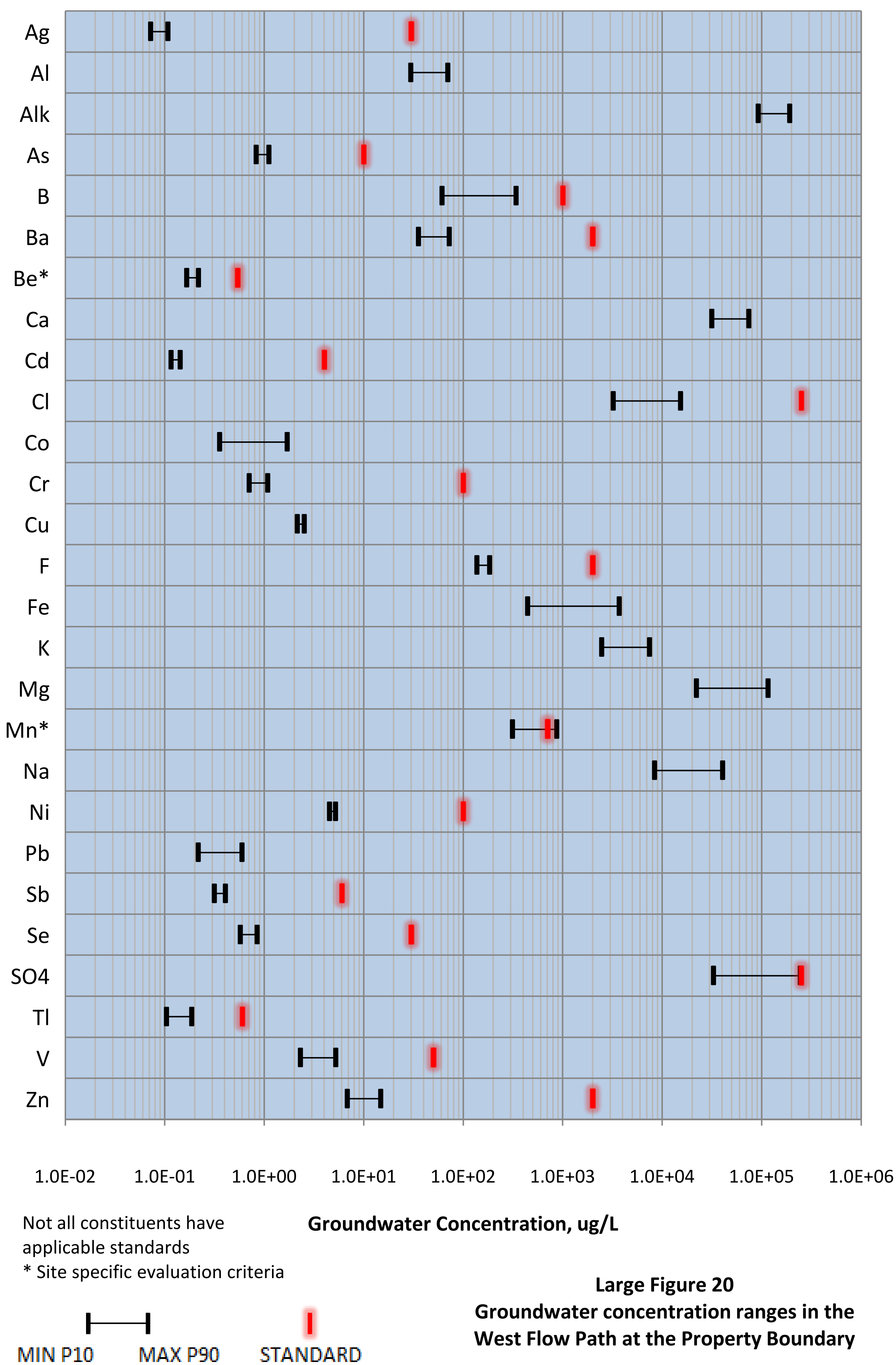
CADD USER: Rick Gustner FILE: M:\ADEPTWORK\RLG\2369086200_NORTHMET PLANT SITE WQ MODEL DETAILED FLOWCHART GOLDSIM MODEL VERSION 6.DWG PLOT SCALE: 1:2 PLOT DATE: 12/22/2014 3:16 PM



Large Figure 18
Groundwater concentration ranges in the North Flow Path at the Property Boundary



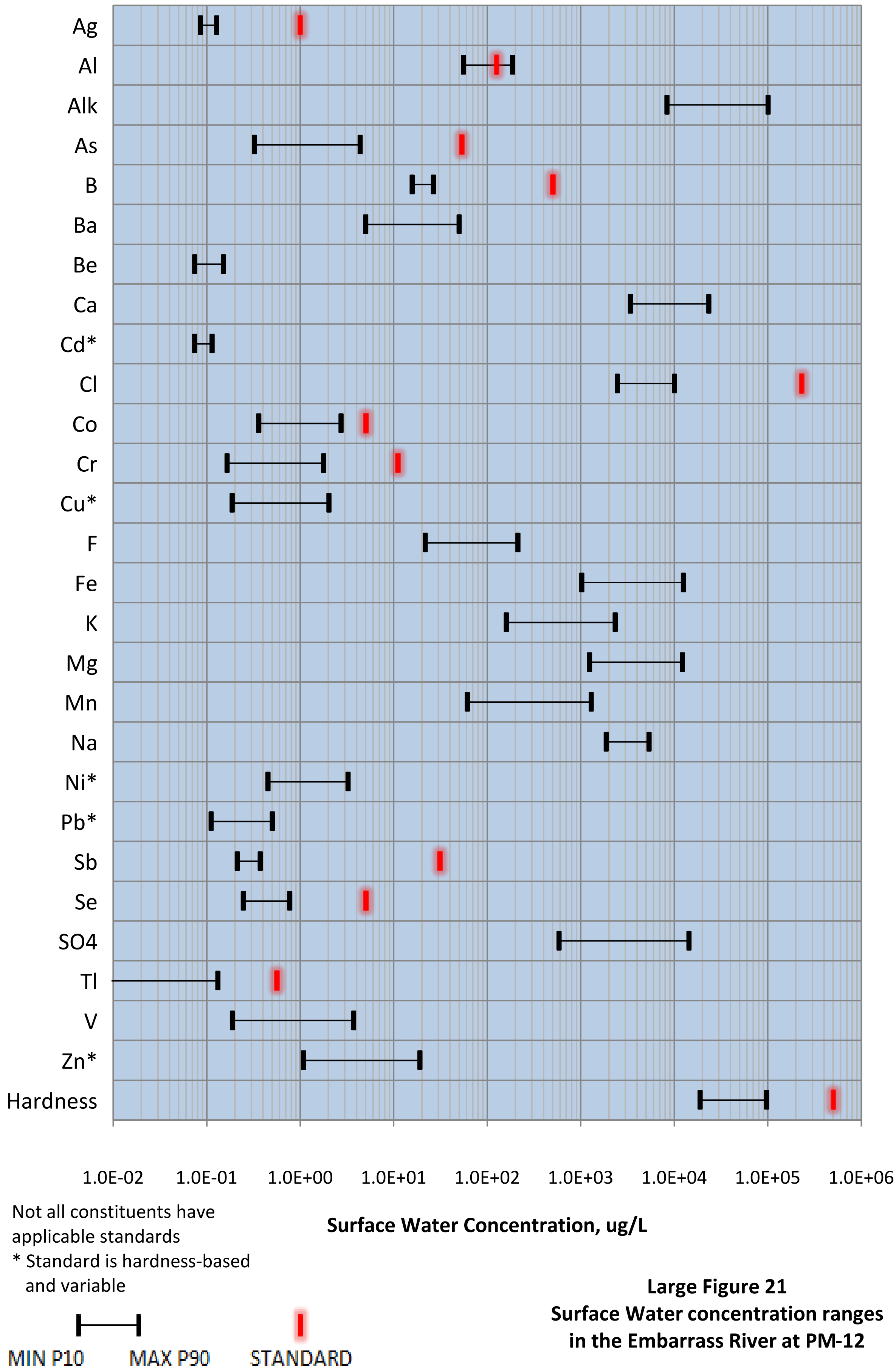
Large Figure 19
Groundwater concentration ranges in the Northwest Flow Path at the Property Boundary



Not all constituents have applicable standards

* Site specific evaluation criteria

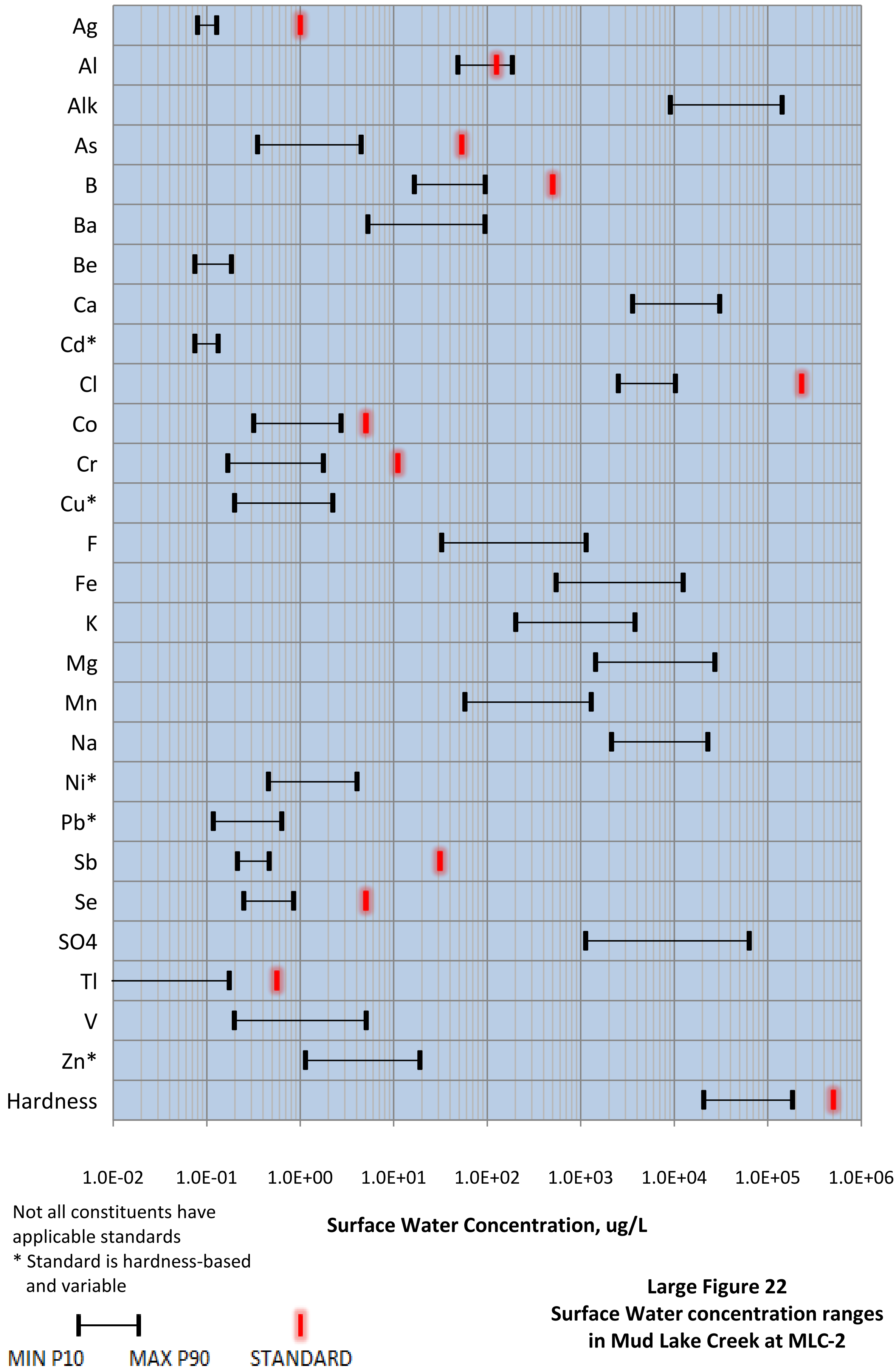
Large Figure 20
Groundwater concentration ranges in the West Flow Path at the Property Boundary



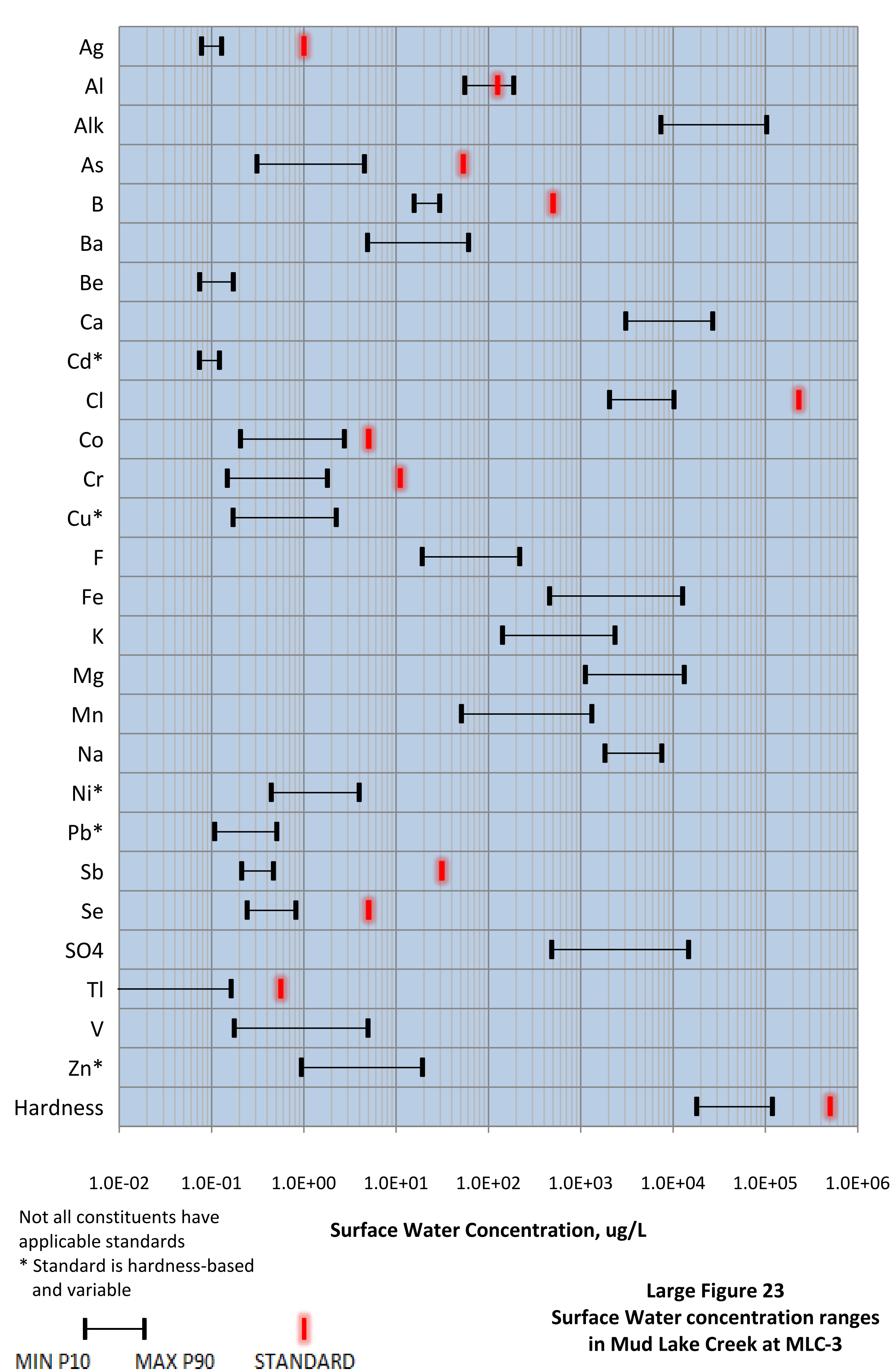
Not all constituents have applicable standards

* Standard is hardness-based and variable

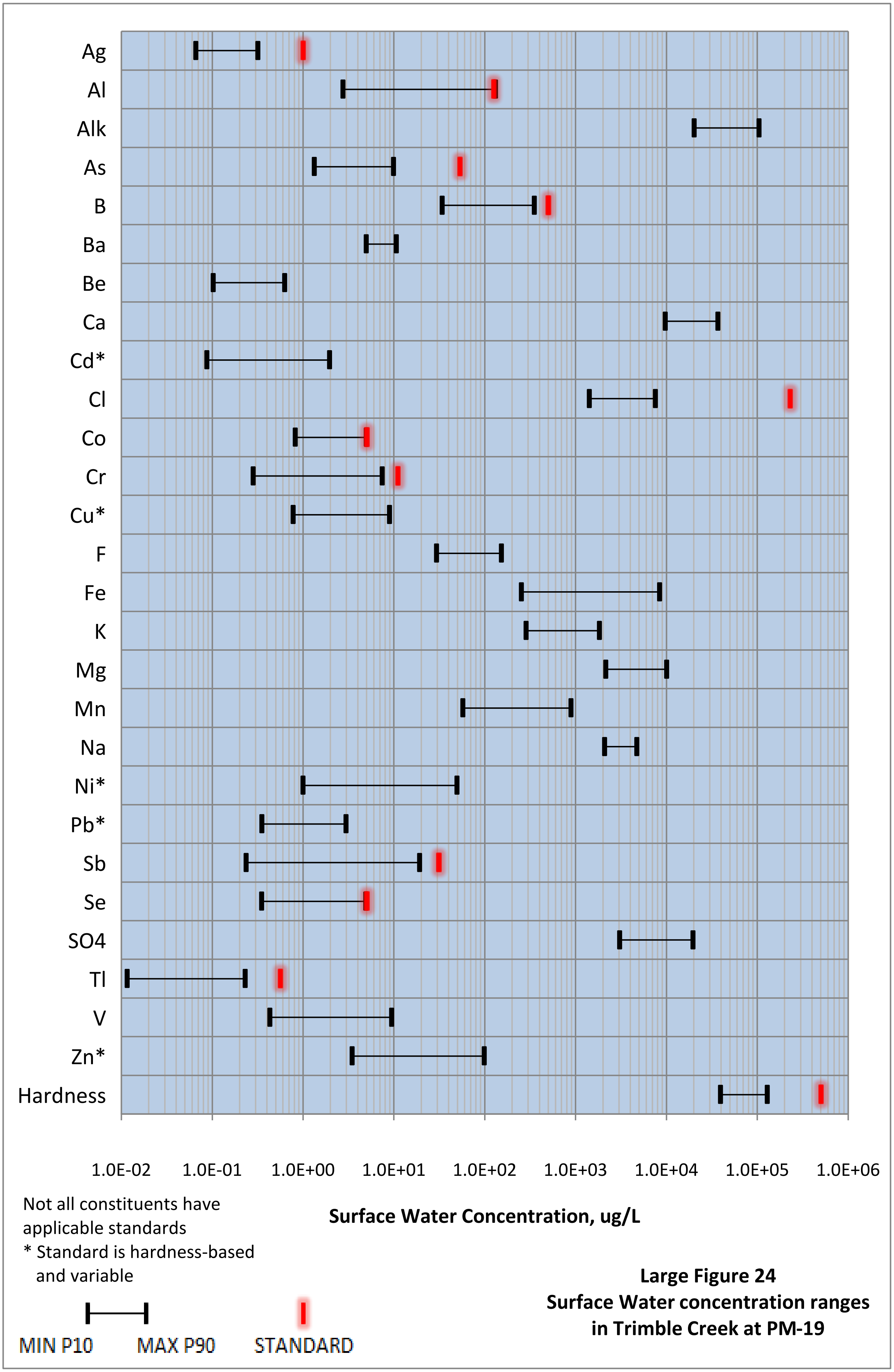
Large Figure 21
Surface Water concentration ranges in the Embarrass River at PM-12



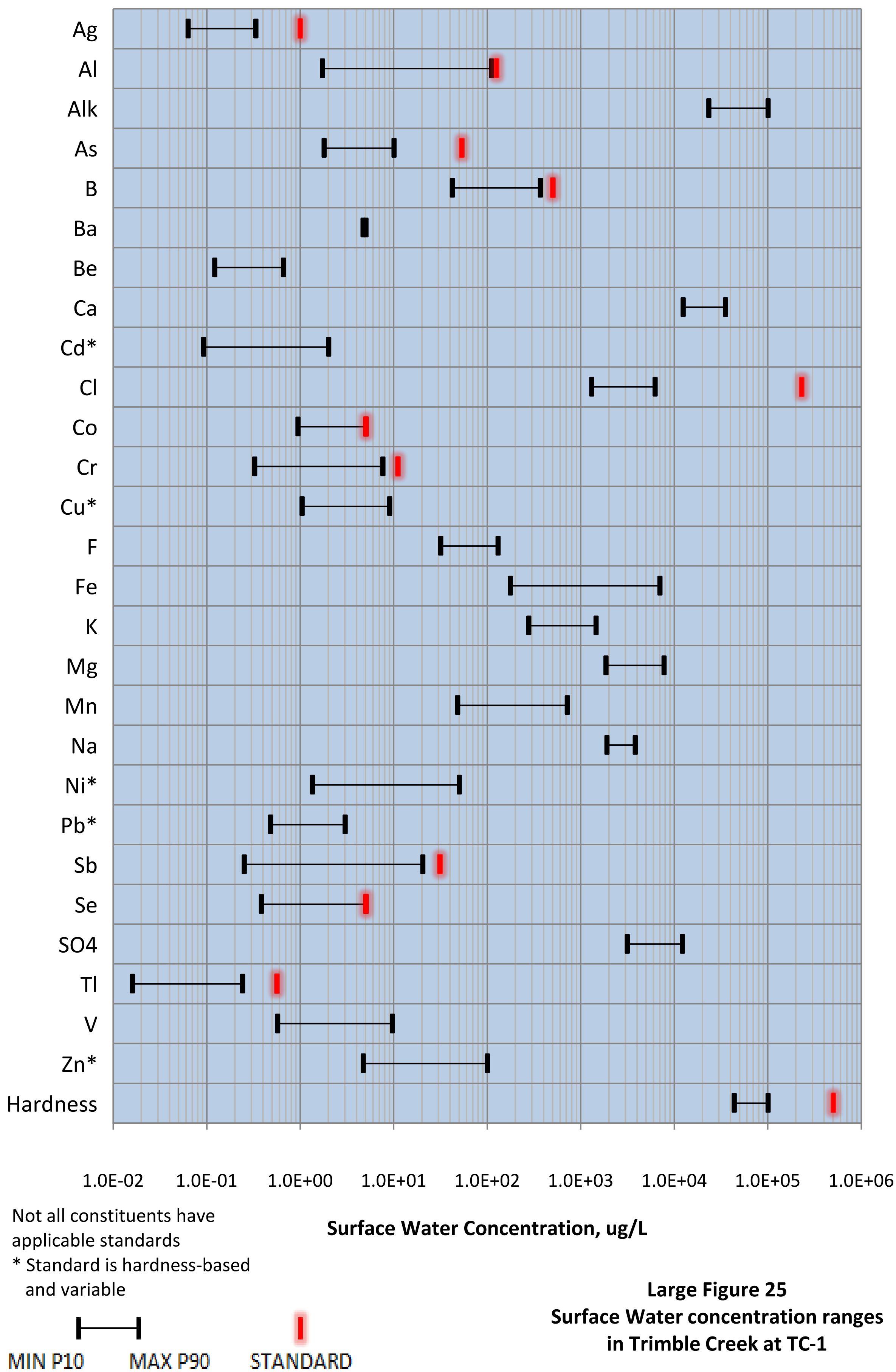
Large Figure 22
Surface Water concentration ranges in Mud Lake Creek at MLC-2



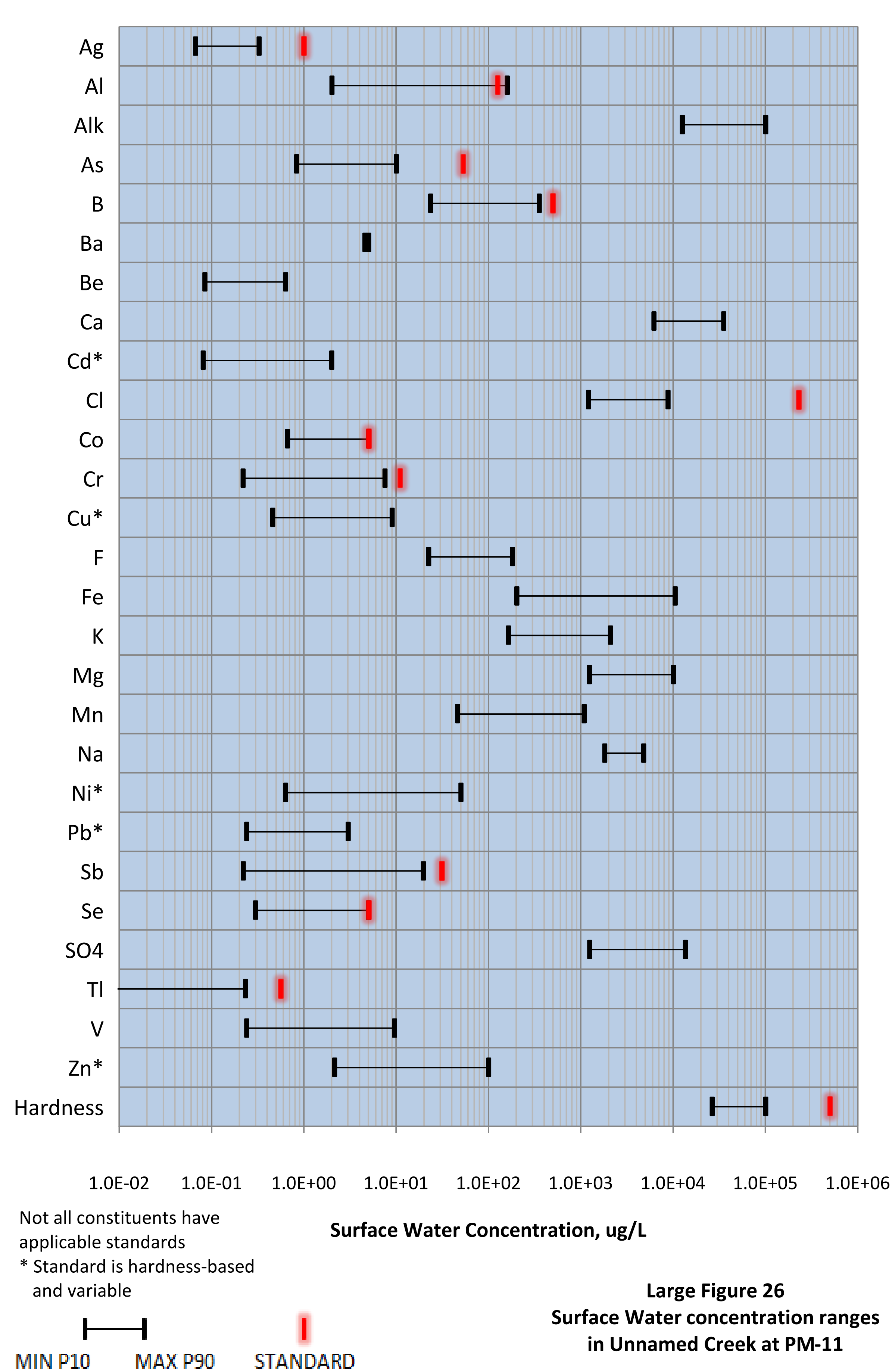
Large Figure 23
Surface Water concentration ranges in Mud Lake Creek at MLC-3



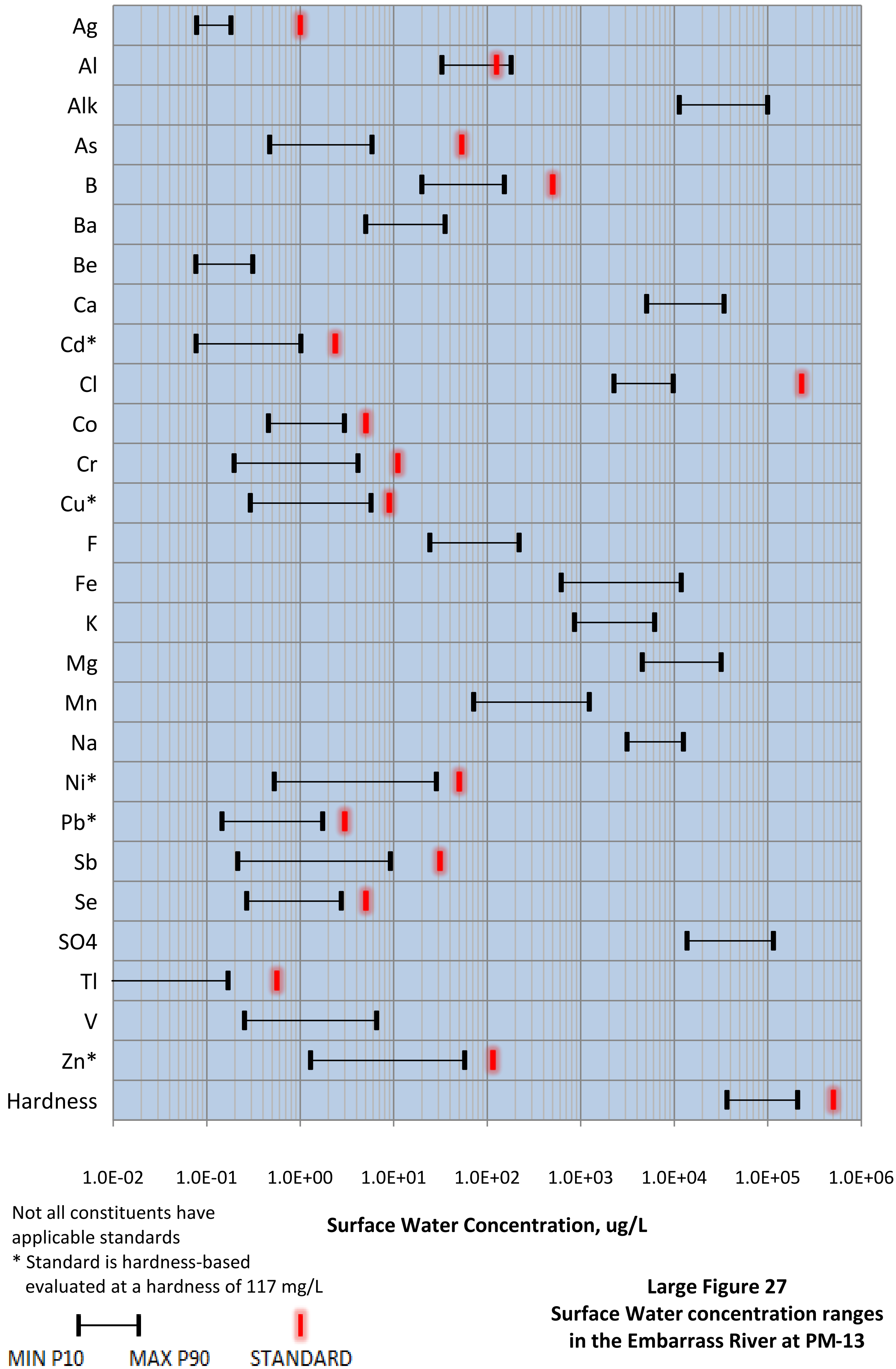
Large Figure 24
Surface Water concentration ranges in Trimble Creek at PM-19



Large Figure 25
Surface Water concentration ranges in Trimble Creek at TC-1



Large Figure 26
Surface Water concentration ranges in Unnamed Creek at PM-11



Large Figure 27
Surface Water concentration ranges in the Embarrass River at PM-13

Attachments

Attachment A

Groundwater Modeling of the NorthMet Plant Site

Groundwater Modeling of the NorthMet Plant Site

Supporting Document for Water Modeling Data Package Volume 2 – Plant Site

Prepared for
Poly Met Mining Inc.

January 2015

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Groundwater Modeling of the NorthMet Plant Site

January 2015

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Acronyms and Abbreviations

Acronym Abbreviation, or Unit	Description
CDSM	cement deep soil mixing
cfs	cubic feet per second
DEIS	Draft Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FTB	Flotation Tailings Basin
gpm	gallons per minute
HRF	Hydrometallurgical Residue Facility
LTVSMC	LTV Steel Mining Company
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MSL	mean sea level
SDEIS	Supplemental Draft Environmental Impact Statement
USGS	U.S. Geological Survey

1.0 Introduction

This report describes the technical approach, rationale, and scope for groundwater flow modeling that was conducted for the Poly Met Mining Inc. (PolyMet) NorthMet Project (Project) Plant Site. The groundwater modeling was completed to support the probabilistic modeling used to estimate Project water balances and water quality impacts presented in the NorthMet Project Water Modeling Data Package Volume 2 – Plant Site (Reference (1)). This report describes the objectives of the groundwater modeling, the site conceptual model, the modeling methodology, and the modeling results. The modeling was based on the current understanding of the Plant Site conditions and the project description (Reference (2)) developed for the Final Environmental Impact Statement (FEIS).

In this report, the Flotation Tailings Basin (FTB) is the newly constructed Flotation Tailings impoundment and the Tailings Basin is the existing LTV Steel Mining Company (LTVSMC) Tailings Basin as well as the combined LTVSMC Tailings Basin and the FTB.

1.1 Objectives

The primary objectives for the Plant Site groundwater flow modeling were to:

- estimate the seepage loss from the LTVSMC Tailings Basin ponds under current conditions and the FTB pond(s) during operations and long-term closure
- estimate the average annual infiltration rate throughout the Tailings Basin under current conditions
- estimate the discharge rate of seepage entering each of the five groundwater flow paths represented in the GoldSim model (Reference (1), Reference (3) during current conditions, operations and long-term closure
- estimate what proportion of the water that infiltrates the various material types present at the surface of the Tailings Basin ultimately reports to each of the GoldSim groundwater flow paths
- estimate the depth of the phreatic surface within each of the material types present at the surface of the Tailings Basin

A series of groundwater models were developed to meet these objectives. These models were designed to simulate current conditions, conditions during operations, and conditions during long-term closure.

1.2 Background

The Tailings Basin, covering an area of approximately 2,600 acres (about 4 square miles), was previously used by LTVSMC and its predecessor Erie Mining Company for disposal of taconite tailings. The facility is unlined and was constructed in stages beginning in the 1950's. Taconite tailings were deposited from 1957 to January of 2001, when the Tailings Basin was shut down. It has been inactive since then except for reclamation activities consistent with the Minnesota Department of Natural Resources (MDNR) approved closure plan currently managed by Cliffs Erie, and more recently, activities associated with the April 6, 2010, Consent Decree between Cliffs Erie and the Minnesota Pollution Control Agency (MPCA).There are three discrete cells in the LTVSMC Tailings Basin, Cells 1E, 2E, and 2W, as shown on Large Figure 1. Cell 2W is the largest (1,447 acres) and has the highest elevation of the three cells, with an average fill height of 200 feet (approximately 1,725 feet mean sea level (MSL)). Cell 2W is currently the driest of the cells and has gradually lost the ponded water that remained following taconite processing. Cell 1E is approximately 980 acres and rises approximately 125 feet above the surrounding ground level (approximately 1,650 feet MSL); Cell 2E is about 620 acres and has the lowest elevation of all of the existing cells, rising approximately 60 feet above surrounding ground level (approximately 1,555 feet). Cells 1E and 2E currently contain ponded water. The existing Tailings Basin does not have an overflow or discharge structure.

Ore processing associated with the Project will produce two types of mineral waste: Hydrometallurgical Residue and Flotation Tailings. These two wastes will be disposed of in separate facilities. Hydrometallurgical Residue will be stored in the Hydrometallurgical Residue Facility (HRF), a lined basin constructed on top of the Emergency Basin located near the southwestern corner of the Tailings Basin (Reference (4)). The FTB will be constructed in stages atop existing Cells 1E and 2E of the Tailings Basin for disposal of Flotation Tailings. FTB staging and sequencing is described in Reference (5). The FTB design includes seepage capture systems (the FTB Containment System and the FTB South Seepage Management System), as described in Reference (6).

During the Draft Environmental Impact Statement (DEIS) process, a series of numerical groundwater flow models were developed for the Tailings Basin (Attachment A-6 of Reference (7), Attachment A-6 of Reference (7)). The DEIS versions of the model calibrations were steady-state and did not simulate changes in water levels within the basin. However, after LTVSMC operations and deposition of tailings ceased in 2001, the groundwater mound beneath the Tailings Basin began to dissipate, and the quantity of seepage leaving the Tailings Basin area has decreased. As part of the modeling effort for the Supplemental Draft Environmental Impact Statement (SDEIS), the calibration of the groundwater model was updated to represent transient conditions following LTVSMC closure until present, and to simulate the observed dissipation of the groundwater mound beneath the basin. For the FEIS modeling effort, the groundwater models were updated to incorporate groundwater elevation data collected through 2013 and changes as recommended by the Co-lead Agencies. This report documents the current version of the models developed for the FEIS.

FTB seepage capture systems were not simulated using the models described in this report. Additional groundwater modeling was conducted to support the design of the FTB Containment System. That modeling used results from the groundwater flow modeling described in this report and is described under separate cover in Attachment C of Reference (6).

1.3 Report Organization

This report is organized into five sections, including this introduction. Section 2.0 presents the conceptual model of hydrogeology at the Plant Site. Section 3.0 discusses the modeling approach and calibration methods and results. Predictive simulations of operations and long-term closure conditions are presented in Section 4.0. A report summary and conclusions are presented in Section 5.0.

2.0 Conceptual Model

A *hydrogeologic conceptual model* is a schematic description of how water enters, flows through, and leaves the groundwater system. Its purpose is to describe the major sources and sinks of water, the grouping or division of hydrostratigraphic units into aquifers and aquitards, the direction of groundwater flow, the interflow of groundwater between aquifers, and the interflow of water between surface waters and groundwater. The hydrogeologic conceptual model is both scale-dependent (e.g., local conditions may not be identical to regional conditions) and dependent upon the objectives. It is important when developing a conceptual model to strive for an effective balance: the model should be kept as simple as possible while still adequately representing the system to analyze the objectives at hand.

2.1 Geologic Units

This section provides an overview of the Plant Site geology and the hydraulic properties of each geologic unit, particularly as they pertain to the development of the groundwater flow models. A more detailed summary of the current understanding of bedrock structure and hydrogeology at the Mine Site and the Plant Site, and description of the regional and local bedrock geology and hydrogeology, including the nature of fractured bedrock, can be found in Reference (8).

2.1.1 Native Unconsolidated Deposits

The native unconsolidated deposits in the vicinity of Plant Site are a relatively thin mantle of Quaternary-age glacial till and associated reworked sediments, most of which were deposited and reworked by the retreating Rainy Lobe during the last glacial period in association with the development of the Vermillion moraine complex (Reference (9))). Near the Tailings Basin, unconsolidated deposits have been characterized based on soil borings and monitoring wells, which have been completed to the north and west of the Tailings Basin. The unconsolidated deposits generally consist of discontinuous lenses of silty sand to poorly graded sand with silt, to poorly graded sand with gravel. Very little silt or clay has been encountered, with the exception of the soil boring drilled near monitoring well GW006, where several feet of silt is interbedded with silty sand (Reference (10)). In places, the till is overlain by organic peat deposits. Depth to bedrock in the area surrounding the Tailings Basin is generally less than 50 feet. The unconsolidated deposits generally thicken in a northerly direction toward the Embarrass River. Wetland areas also become more common to the north, off the northern flank of the Giant's Range, the granite outcrops located adjacent to the Tailings Basin. These wetland areas are underlain by thin glacial drift and lacustrine deposits, which were deposited by the retreating Rainy Lobe and associated lakes that were trapped between the retreating ice margin and the Giant's Range.

Siegel and Ericson (Reference (11)) indicate that the till of the Rainy Lobe has an estimated hydraulic conductivity range of 0.1 to 30 feet/day. In-situ pumping tests were conducted at monitoring wells GW001, GW006, GW007, GW009, GW010, GW011, and GW012 to estimate hydraulic conductivity, as described in detail in Attachment F of Reference (12). The data collected during the tests was used to estimate the hydraulic conductivity of the unconsolidated deposits using three different methods; the Moench solution (Reference (13)), the Theis solution (Reference (14)), and using specific capacity data (Reference (15)). The hydraulic conductivity estimates from each solution are different at each location.

Not only is there spatial variability, shown by differences between wells, but there is uncertainty in the hydraulic conductivity at any given well, shown by the differences in the estimates at each well. Table 2-1 shows the estimates of hydraulic conductivity at each well (Reference (10)). GW009 generally has the lowest estimates of hydraulic conductivity (around 0.5 feet/day) and GW010 generally has the highest estimates of hydraulic conductivity (around 50 feet/day). The arithmetic and geometric means of the average hydraulic conductivity at the test locations are approximately 13 feet/day and 5 feet/day, respectively.

Table 2-1 Hydraulic Conductivity Measured During Single-Well Pumping Tests in Unconsolidated Materials.

Monitoring Well	Moench Solution(1) (feet/day)	Theis Solution(2) (feet/day)	Specific Capacity (feet/day)
GW001	1.3	1.8	1.6
GW006	9.6	5.7	10.7
GW007	11.5	30.4	14.8
GW009	0.4	0.5	0.6
GW010	52.0	31.9	64.8
GW011	8.6	15.9	11.4
GW012	0.7	2.4	0.7

(1) Reference (13)
(2) Reference (14)

Additional characterization of hydraulic properties of the unconsolidated deposits was conducted as part of a geotechnical investigation during 2014 (Attachment F of Reference (12)). Slug tests were conducted in ten standpipe piezometers and two monitoring wells screened in the native unconsolidated deposits: R14-04, R14-06, R14-08, R14-12, R14-13, R14-15, R14-16, R14-26, R14-27, R14-28, GW001, and GW012. Hydraulic conductivity estimates from the slug tests ranged from 0.15 to 132 feet/day. The results of those analyses are shown in Table 2-2.

Table 2-2 Hydraulic Conductivity Measured in 2014 in Unconsolidated Materials Using Slug Tests

Well	Test	K feet/day
R14-04	test 3 - in	2.86
	test 3 - out	3.57
R14-06	test 2 - out	131.76
	test 3 - out	88.13
R14-08	test 1 - in	1.19
	test 2 - out	1.42
R14-12	test 1 - out	0.15
	test 2 - out	0.16
R14-13	test 2 - out	2.12
	test 3 - in	1.53
R14-15	test 1 - in	20.84
	test 2 - out	31.04
R14-16	test 2 - out	18.52
	test 3 - in	16.77
R14-26	test 2 - out	51.65
	test 3 - in	24.45
R14-27	test 2 - out	114.65
	test 3 - out	104.54
R14-28	test 1 - in	0.38
	test 2 - out	0.77
GW001	test 1 - in	0.99
	test 3 - out	1.24
GW012	test 1 - in	0.44
	test 2 - in	0.33

2.1.2 Non-Native Deposits

The Tailings Basin is composed of interbedded layers of LTVSMC tailings, which are generally coarser near the dams and finer in the center of the cells. The hydraulic properties of the LTVSMC tailings vary over several orders of magnitude and are primarily a function of the grain-size distribution of the deposits. The hydraulic properties of LTVSMC tailings have been estimated using multiple methods and are described in additional detail in Reference (12). Geotechnical modeling used hydraulic conductivity estimates of 0.057 feet/day for LTVSMC fine tailings and 6.9 feet/day for coarse tailings (Reference (12)).

The hydraulic conductivity of the Flotation Tailings has been estimated using falling-head permeability testing conducted at a range of confining pressures. As shown on Large Figure 2, testing results indicate that hydraulic conductivity decreases significantly with increasing confining pressure. Geotechnical modeling of the FTB uses three representative values of hydraulic conductivity for the Flotation Tailings: 0.5 feet/day for "shallow" tailings, 0.2 feet/day for "intermediate" tailings, and 0.06 feet/day for "deep" tailings (Reference (12)). As described in Section 4.1.3, the relationship between hydraulic conductivity and depth shown on Large Figure 2 was used to define the hydraulic conductivity of the Flotation Tailings in the MODFLOW models.

2.1.3 Bedrock

The uppermost bedrock at the Plant Site consists of quartz monzonite and monzodiorite of the Neoarchean Giant's Range batholith. These pink to dark-greenish gray, hornblende-bearing, coarse-grained rocks are referred to collectively as the "Giant's Range granite". The granite locally outcrops as a northeast-southwest trending ridge and drainage divide that makes up the highest topography in the area; the Giant's Range. The Giant's Range granite has been scoured by glaciers, creating local depressions and linear valleys. In this report, "bedrock hills" is used to describe the Giant's Range granite outcrops located adjacent to the Tailings Basin.

Groundwater flow within the bedrock is primarily through fractures and other secondary porosity features, as the rock has low primary hydraulic conductivity. The upper portions of the rock are more likely than rock at depth to contain a fracture network capable of transmitting water. The literature-based assessment of the upper fractured zone suggests that groundwater flow in the Giants Range granite likely occurs mostly in the upper 300 feet of the bedrock; however, the site-specific fracture data indicate that the amount of fracturing decreases significantly in the upper 20 feet of the bedrock surface (Reference (8)).

Siegel and Ericson (Reference (11)) measured specific capacity in one well in the upper 200 feet of the Giant's Range granite and measured hydraulic conductivity of 2.6×10^{-2} feet/day. This well was located less than 1 mile to the east of the Plant Site. Specific capacity data from a residential well located north of the Plant Site suggests that the hydraulic conductivity of the upper 47 feet of the granite at that location is approximately 42 feet/day. The log for this well indicates that the top of bedrock is at 18 feet below grade, and the casing also extends to 18 feet below grade. Because the well casing apparently does not extend into bedrock, it is possible that the higher hydraulic conductivity estimate at this well may reflect some degree of hydraulic connection with the unconsolidated deposits.

Packer testing was conducted at five boreholes in the uppermost portions (<20 feet) of the Giant's Range granite during a 2014 geotechnical investigation in the Plant Site area (Appendix F of Reference (12)). The results from that testing are shown on Table 2-3. Hydraulic conductivity values for the upper portion of the Giant's Range granite at the Plant Site range from effectively zero (i.e., no water was produced in three of the packer test intervals) to 3 feet/day, with a geometric mean of 0.14 feet/day (for the purposes of calculating a geometric mean, the lowest hydraulic conductivity value measured during the investigation was used for the three intervals that did not produce water).

Table 2-3 Hydraulic conductivity measured in bedrock during packer tests.

Boring	Test Interval (feet)	K_r feet/day
B14- 36	14 - 18.5	<0.0041[1]
	20.5 - 26.5	0.0041
B14-55	37 - 41.5	3.1
	41.5 - 46.5	<0.0041[1]
	46 - 50.5	<0.0041[1]
B14-44	34 - 42	0.11
	42 - 46	0.23
B14-65	24 - 30	0.15
	27.5 - 33.5	0.65
B14-76	37 - 42	0.29

(1) For packer test results where zero inflow was observed during testing, permeability values were selected based on inference from lowest packer test result obtained.

2.2 Sources and Sinks for Water

The Tailings Basin receives water from direct precipitation and runoff from watershed areas to the east. Water falling within the Tailings Basin watershed collects in the ponds in Cell 1E and Cell 2E or infiltrates through dams and beaches. The ponds lose water to evaporation from the water surface and to seepage through the pond bottom. Most groundwater in the Plant Site vicinity flows to the north and northwest toward the Embarrass River; however, some portion of the water entering the Tailings Basin flows south and discharges to Second Creek, a tributary of the Partridge River.

2.3 Local Flow System

Regionally, groundwater flows primarily northward, from the bedrock hills to the Embarrass River (Reference (11)). Groundwater elevations in the network of monitoring wells located around the Tailings Basin indicate that groundwater in the unconsolidated deposits flows primarily to the north and northwest, toward the Embarrass River. Groundwater flow to the south and east is constricted by bedrock outcrops of the Giant's Range granite (Reference (5)). However, a gap in the bedrock hills near the southern end of the Tailings Basin allows some water to flow southward (south seeps), forming the headwaters of Second Creek (also known locally as Knox Creek), a tributary to the lower Partridge River. A second gap in the bedrock hills is present near the eastern side of the Tailings Basin. Under current conditions, seepage does not flow from the Tailings Basin to the east, because the Cell 1E pond is topographically lower than the surface water features to the east. Groundwater in the native unconsolidated material currently flows to the northwest toward the Tailings Basin. Following the completion of the FTB East Dam, groundwater within the unconsolidated deposits is generally expected to continue to flow from the east toward the Tailings Basin. The presence of the FTB Pond will not alter the existing regional groundwater flow direction, but may result in radial flow away from the Tailings Basin area on a local scale. Some water could seep through the unconsolidated material below the East Dam. Based on topography and the inferred groundwater divides to the area east of the Tailings Basin, this seepage would likely discharge near the toe of the East Dam, and it is not anticipated to flow east toward the Area 5NW pit or Spring Mine Lake (Reference (16)). As part of the Project, a seepage containment system will be constructed in this area to capture any seepage that would discharge in this area (Reference (6)).

As the Tailings Basin was built up over time, a groundwater mound formed beneath the basin due to seepage from the basin ponds, altering local flow directions and rates. Therefore, the Tailings Basin determines patterns of runoff and infiltration at the Plant Site. Under current conditions, water that infiltrates through the Tailings Basin (from precipitation and seepage from the existing ponds) seeps downward to the native unconsolidated deposits.

Beneath the unconsolidated deposits, low-permeability crystalline bedrock impedes further downward groundwater flow; based on the contrast in hydraulic conductivity between the unconsolidated deposits and bedrock described above, groundwater flow through the bedrock is likely negligible relative to flow through the unconsolidated deposits. Because the unconsolidated deposits are thin and have relatively low hydraulic conductivity, and because the water table is close to the ground surface (which effectively limits the hydraulic gradient), the unconsolidated deposits have a limited capacity to transport Tailings Basin seepage. Therefore, a large portion of that seepage discharges to wetland areas near the Tailings Basin dams, while a small portion remains in the unconsolidated deposits and flows away from the basin laterally as groundwater.

2.4 Hydrologic Model Selection

Groundwater flow was simulated with the numerical code MODFLOW-SURFACT (Reference (17)), a flow and transport code based on the U.S. Geological Survey (USGS) groundwater modeling code MODFLOW. MODFLOW was developed by the USGS and is in the public domain. Advantages of MODFLOW-SURFACT over MODFLOW that are pertinent to this modeling work include simulation of unsaturated flow, which reduces model instability due to dry model cells, and adaptive time stepping, which improves solver convergence. MODFLOW-SURFACT simulates the three-dimensional movement of water in a variably saturated system using Equation 1:

$$\frac{\partial}{\partial x}\left(K_{xx}k_{rw}\frac{\partial h}{\partial x}\right)+\frac{\partial}{\partial y}\left(K_{yy}k_{rw}\frac{\partial h}{\partial y}\right)+\frac{\partial}{\partial z}\left(K_{zz}k_{rw}\frac{\partial h}{\partial z}\right)-W=\Phi\frac{\partial S_w}{\partial t}+S_wS_s\frac{\partial h}{\partial t}$$ **Equation 1**

Where:

x, y, and z are Cartesian coordinates (L)
K_{xx}, K_{yy}, and K_{zz} are the principal components of hydraulic conductivity along the x, y, and z axes, respectively (LT^{-1})
k_{rw} is the relative permeability, which is a function of water saturation
h is the hydraulic head (L)
W is a volumetric flux per unit volume and represents source and/or sinks of water (T^{-1})
Φ is the drainable porosity taken to be equal to the specific yield, S_y
S_w is the degree of saturation of water, which is a function of the pressure head
S_s is the specific storage of the porous material (L^{-1})
t is time (T)

Pseudo-soil relations were used to define the relative permeability (k_{rw}) and the degree of saturation (S_w). It is not necessary to explicitly include information on soil water retention to use pseudo-soil relations.

The particle-tracking code MODPATH (Reference (18)) was used in the predictive simulations. MODPATH uses output files from MODFLOW simulations to compute three-dimensional flow paths by tracking particles throughout the model domain until they reach a boundary, enter an internal source or sink, or are terminated in a process specified by the modeler. MODPATH also tracks the time-of-travel for simulated particles as they move though the model domain.

The graphical user interface Groundwater Vistas (Versions 6) (Reference (19)) was used to support the development of the MODFLOW models, although some elements of the models were developed outside of Groundwater Vistas.

3.0 Model Construction and Calibration

The conceptual model of the Tailings Basin hydrogeology outlined in Section 2.0 was used to develop a series of numerical simulations for this study. A simulation of conditions since LTVSMC operations ceased in 2001 through December 2013 was used to calibrate model parameters. This simulation is referred to as the "current conditions model" in the discussion that follows. Separate predictive simulations (i.e., forward simulations) were developed for various stages of operations and for long-term closure conditions.

3.1 Model Grid and Layers

The active area of the finite-difference grid covers approximately 18 square miles (Large Figure 3), extending from the Embarrass River in the north and west, to the south and east of the former LTVSMC mine pits. The model area is sufficiently large that the model boundaries do not meaningfully affect the model results at the Tailings Basin (Attachment A-6 of Reference (20)). The model grid was refined in the area of interest, with the final grid coarser at the boundaries and outside of the area of interest (cells of approximately 820 feet on a side) and more refined at the Tailings Basin (cells of approximately 100 to 200 feet on a side).

The current conditions models have two layers. Layer 1 is modeled as unconfined and represents the LTVSMC tailings. Layer 2 is modeled as confined and represents the native unconsolidated deposits (glacial drift and peat) and the bedrock hills adjacent to the Tailings Basin. The portions of Layer 1 outside of the footprint of the Tailings Basin were inactivated (i.e., converted to no-flow cells). The bedrock was assumed to have a significantly lower value of hydraulic conductivity than the native unconsolidated deposits and, as such, was treated as a no-flow boundary. The exception to this was in the area of the bedrock hills, where the water table is likely located within the bedrock. In this area, the bottom of Layer 2 was lowered, and the bedrock was simulated as a zone of low hydraulic conductivity. This was necessary to prevent dry cells in Layer 2.

The top elevation for Layer 1 is flat and set at an elevation of 1968.5 feet MSL (or 600 meters, an even increment in metric units, the standard units used to develop the models), which is above the highest elevation in the active model domain. Because Layer 1 is defined as unconfined, the water levels calculated by the model (rather than the top of Layer 1) are used to calculate transmissivity, so the elevation of the top of Layer 1 has no bearing on the simulation results. The bottom elevation for Layer 1 (equal to the top of Layer 2) was defined as the pre-mining topography, using topographic information from the USGS (Reference (21), Reference (22), Reference (23), Reference (24)). The bottom elevation for Layer 2 was defined as the top of bedrock. Bedrock elevations were calculated using a combined bedrock data set, derived from a regional, 30-meter resolution MGS bedrock surface (Reference (25)), into which local bedrock data were incorporated. Groundwater wells and borings completed in the vicinity of the Tailings Basin, at which estimated bedrock elevations were available, were buffered a distance of 3,280.8 feet (or, 1,000 meters, an even increment in metric units, the standard units used to develop the models). The area within the buffer was then clipped from the MGS bedrock surface. Finally, the coordinates of each well, its associated bedrock elevation, and the remaining regional grid data were provided as input to a new surface interpolation. The resulting surface matches the regional grid outside the 3,280.8-feet buffer and within, smoothly transitions to match the field-measured site data. In areas where top of bedrock elevations were above 1,587 feet MSL, (which occurred in bedrock outcrop areas), the bottom of Layer 2 was assigned an elevation of 1,587 feet MSL. In addition, the bottom of Layer 2 was lowered in some areas of the model so that cells in Layer 2 had a minimum thickness of 16.4 feet. The thickness of Layer 2 is presented in Large Figure 4.

3.2 Boundary Conditions

Boundary conditions were used to represent surface-water features within the model domain (Large Figure 5). Streams and rivers were simulated as specified-head boundaries in Layer 2 with elevations obtained from USGS 7.5' quadrangle maps (Reference (21), Reference (22), Reference (23), Reference (24)). The ponds in Cells 1E and 2E were simulated as specified-head boundaries in Layer 1, using water levels reported in the East Range Hydrology Study (Reference (26)) for the current conditions simulation and FTB design elevations for the future conditions simulations. The Cell 1E pond elevation was set at 1,653 feet MSL and Cell 2E pond elevation was set at 1,560 feet MSL for part of the current conditions simulation and allowed to vary between stress periods as calibration parameters for the remainder of the simulation (see Section 3.5 for calibration details). The allowed range of elevations was within the observed elevation range for each pond (Reference (26)).

The River Package in MODFLOW was used to simulate the wetlands surrounding the Tailings Basin as head-dependent flux boundaries. River cells allow water to flow into and out of the boundary, with the flux dependent on a user-specified conductance and the head gradient between the boundary (a constant, user-specified stage) and the aquifer. The extent of wetlands areas was set based on delineated wetlands, including the results of site surveys, where available (Reference (27)), and National Wetland Inventory data (NWI) for the remainder of the model domain. A model cell was assigned as a river cell if at least 20% of the cell area was covered by wetlands greater than 5 acres in area. River cell stages were set at the average ground surface elevation within the model cell, calculated from regional LiDAR data (Reference (28)). The bottom elevation for each river cell was set at 3.3 feet below the assigned stage. Conductance was treated as an adjustable parameter during model calibration. In MODFLOW, the conductance of a river cell is defined by Equation 2 (Reference (29)):

$$C_{RIV} = \frac{KA}{M} \qquad \text{Equation 2}$$

Where:

K = Vertical hydraulic conductivity of wetland sediment [L/T]
A = Area covered by wetlands within model cell [L^2]
M = Thickness of wetland bottom sediment [L]

An initial conductance value was assigned as the cell area by assuming the thickness (M) term of the equation was equal to 3.28 feet (thickness of 1 meter in the standard model units), and the hydraulic conductivity term (K) was assigned a value of 3.28 feet/day (1 meter/day in the standard model units). During calibration, the vertical hydraulic conductivity of the wetland sediment (K) was varied, and the initial conductance value was multiplied by the updated value of the vertical hydraulic conductivity to calculate the conductance for each river cell.

Two wetland zones were defined in the model: one for cells where wetlands overlay native unconsolidated deposits, and one for cells where wetlands overlay bedrock. The vertical hydraulic conductivity values of the wetland sediments for the two zones were allowed to vary independently during model calibration to allow for different hydraulic characteristics.

The south seeps were simulated using the Drain Package in MODFLOW, with the elevation of the drain cells set equal to the current elevation of the seeps, and the conductance value adjusted during calibration. Additional drain cells, representing potential seeps from bedrock outcrops, were added along the northern side of the bedrock hills. Each drain cell was assigned a head value equal to the average ground surface within that cell as calculated from regional LiDAR data (Reference (28)). Conductance values of the drain cells were adjusted during model calibration. Assuming the hydraulic conductivity values of all drain cells representing potential bedrock seeps were equal, the conductance values were proportional to the drain cell area. During model calibration, the conductance for cells with an area of 51,260 ft^2 (i.e., the majority of the drain cells representing potential bedrock seeps) was adjusted, and the conductance for the remaining drain cells representing bedrock seeps were tied to the calibrated value (i.e., conductance was scaled based on cell area).

3.3 Hydraulic Conductivity and Storage

A total of eight zones were used in the current conditions model to simulate the varying geologic materials and LTVSMC tailings. The spatial distribution of hydraulic conductivity and storage zones coincided. A separate zone was used to represent the fine and coarse LTVSMC tailings in each of the three tailings basin cells (Large Figure 6), for a total of six zones in Layer 1. The fine tailings zones were generally within the centers of the cells, and the coarse tailings zones were generally around the cell perimeters in beach and dam areas. In Layer 2, one zone was used to represent the native unconsolidated deposits, and one zone was used to represent the bedrock hills (Large Figure 7). The location of the hydraulic conductivity zone defining the bedrock hills is consistent with Attachment A-6 of Reference (20) and includes gaps in the bedrock to the east and south of the Tailings Basin.

Horizontal and vertical hydraulic conductivity and storage values for all eight zones were adjusted during model calibration. The LTVSMC tailings, native unconsolidated deposits, and bedrock were simulated as anisotropic. Specific yield and storativity were assigned for the LTVSMC tailings zones in Layer 1 because Layer 1 was simulated as unconfined. Because Layer 2 is defined as confined, storativity was the only storage parameter assigned to the native unconsolidated deposits and bedrock in Layer 2.

3.4 Recharge

The MODFLOW Recharge Package was used to simulate the infiltration of precipitation within the model domain. Recharge was applied to the uppermost active layer. Five zones were used in the steady-state model to simulate spatially variable recharge (Large Figure 8). Two zones were used to represent recharge to the fine and coarse LTVSMC tailings in Cell 2W. One zone was used to represent the coarse LTVSMC tailings in Cell 1E, Cell 2E, and the native unconsolidated deposits. The pond footprints in Cells 1E and 2E were represented with a zone receiving 0 inches/year of recharge, because pond seepage occurs via flux to and from the specified head cells used to simulate the ponds. The bedrock hills were represented with a single recharge zone, which matched the spatial extent used for hydraulic conductivity and storage.

In the steady-state portion of the current conditions model, the two zones used to represent Cell 2W (coarse and fine tailings) were assigned higher recharge rates than during the transient portion of the simulation to reproduce the groundwater mound beneath the basin that formed during LTVSMC operations as new tailings were deposited. In the transient current conditions model, these zones were replaced with separate zones of identical extent, but lower recharge rates. The recharge applied to Cell 2W during the transient portion of the current conditions simulation was representative of conditions in Cell 2W following the end of LTVSMC operations. The recharge rates applied to Cell 2W during the steady-state portion of the simulation may not be representative of actual recharge rates during that time period; rather, they were calibrated to obtain the initial conditions for the transient portion of the simulation. The other three recharge zones and values were the same in the steady-state and transient models. Recharge rates for all zones, except the one representing the Cell 1E and Cell 2E ponds, were allowed to vary during the model calibration process.

3.5 Current Conditions Model Calibration

The current conditions model simulates: (1) conditions shortly after LTVSMC operations ceased, when a larger groundwater mound was present beneath the Tailings Basin and (2) the subsequent transient dissipation of the groundwater mound over a period of approximately twelve years. The initial stress period in the simulation was steady-state, though the steady-state stress period is simulating a system that was not actually at a steady state. The steady-state simulation was used to establish the initial conditions for the transient portion of the simulation. The steady-state portion of the calibration uses groundwater elevation data from February 2002, which are representative of the period shortly after LTVSMC operations at the Tailings Basin ceased and coincides with the time period that was evaluated as part of the East Range Hydrology Project (Reference (26)).

The heads from the steady-state portion of the current conditions simulation were then used as the initial heads for the transient portion of the simulation. The transient portion of the simulation spans 3,729 days (11.9 years) between February 1, 2002 and December 31, 2013 and is subdivided into seven stress periods (Table 3-1). The stress periods were defined based on measured pond elevations from the East Range Hydrology Study (Reference (26)), which includes data through 2003, and were chosen to coincide with periods of time with minimal pond level fluctuation. The period from 2003 to the end of 2013 was simulated using a single stress period.

Table 3-1 Transient Calibration Stress Periods

Stress Period	Length (days)	Interval (years)
1	132	0 – 0.36
2	22	0.36 – 0.42
3	19	0.42 – 0.47
4	302	0.47 – 1.30
5	75	13.0 – 1.51
6	72	1.51 – 1.70
7	3729	1.70 – 11.91

Model calibration was completed using the automated calibration software PEST (Reference (30), Reference (31)), providing the starting point for the predictive simulations discussed in Section 4.0. Through systematic adjustment of model parameters within a user-specified range, PEST attempts to minimize the difference between observed and modeled values.

3.5.1 Calibration Objective

The objective of the model calibration was to minimize the difference between observed and simulated values (i.e., residuals) for a variety of different types of calibration observations. When using PEST, the difference between observed and simulated values is quantified as the sum of squared weighted residuals and is termed the objective function or "phi." Therefore, the goal of the calibration was to minimize the objective function. Calibration observations were grouped by type (i.e., steady-state head, transient head, drawdown, and seepage), and observations were assigned weights so that the contribution of each observation group to the initial objective function was roughly equal.

In addition to minimizing the objective function, the model calibration was considered acceptable if the following criteria were met:

- the absolute residual mean was less than 15% of the observed range in heads
- the modeled seepage rates approximated estimates of seepage from the ponds in Cells 1E and 2E and the discharge from the south seeps
- widespread areas of simulated heads significantly above the ground surface in the model area of interest did not result

3.5.2 Calibration Parameters

The calibration included 54 adjustable parameters in the following seven parameter groups:

- horizontal hydraulic conductivity of tailings material, native unconsolidated deposits, and bedrock – 8 parameters

- vertical hydraulic conductivity of tailings material, native unconsolidated deposits, and bedrock – 8 parameters
- vertical hydraulic conductivity of wetland sediment overlaying native unconsolidated deposits and bedrock – 2 parameters
- recharge – 6 parameters (2 recharge zones were only adjusted during the first transient stress period and then applied for the remaining stress periods, 4 recharge zones were adjusted during the first transient stress period and the steady-state portion of the simulation)
- storage properties of tailings material, native unconsolidated deposits, and bedrock – 14 parameters (the spatial distribution of storage zones coincided with the hydraulic conductivity zones)
- heads in the specified-head cells representing the ponds for each transient stress period – 14 parameters
- conductance of the drain cells representing the south seeps and drain cells representing potential seeps from bedrock outcrops (as noted above, conductance was adjusted for one cell size, and the remaining cell conductance values were scaled by cell area) – 2 parameters

Large Table 1 contains a summary of the parameters adjusted during calibration, as well as user-supplied upper and lower limits applied by PEST and the optimized value for each parameter.

3.5.3 Calibration Data Sets

The calibration observation data set included a total of 1,199 observations placed in the following 5 groups:

- steady-state heads
- transient heads
- transient drawdowns
- estimated seepage from the ponds in Cell 1E and 2E in the steady-state stress period
- discharge from the south seeps
- ground surface elevation data to constrain heads to be below the ground surface

Monitoring wells and piezometers with head and drawdown observations used for calibration are shown on Large Figure 9. The steady-state head observations included groundwater elevation measurements collected on or around February 2002 from monitoring wells and piezometers within and outside the footprint of the Tailings Basin (Large Table 2). The transient head observation group primarily included groundwater elevations measured in monitoring wells located outside the footprint of the Tailings Basin (GW001, GW002, GW006 through GW016) after February 2002 through 2013 (Large Table 3). Systematic drawdown was not observed at these wells because they are not located within the Tailings Basin, so they were not included in the drawdown group. Transient head observations were included for GW005, which is located within the footprint of the Tailings Basin, to help constrain head values in this area of the model. The transient drawdown observations group included drawdown calculated based on water levels measured since 2002 in a total of 29 monitoring wells and piezometers located within the footprint of the Tailings Basin (Large Table 4).

In addition to measured heads and drawdowns, the model calibration attempted to match estimated seepage losses from the ponds within Cell 1E and Cell 2E and measured seepage rates at the south seeps. The East Range Hydrology Project (Reference (26)) used a water-balance model, WATBUD, to simulate the hydrology of the Cell 1E and Cell 2E ponds. Net groundwater seepage losses were estimated to be 1.53 cubic feet per second (cfs) and 2.00 cfs for Cells 1E and 2E, respectively. While the East Range Hydrology Project included data through 2003, the seepage estimates were assumed to be representative of the period that coincided with the steady-state stress period of the MODFLOW model (Reference (26)). Seepage rates for the two main seeps located south of Cell 1E have been measured periodically since 2002. A flow rate of 471 gallons per minute (gpm), which represents an average seepage rate based on data collected from NPDES permit monitoring location SD026 (located downstream of the south seeps) between February 2002 and June 2011, was used for the seepage estimate in the calibration. Measured flow rates at SD026 after June 2011 are not representative of the conditions being modeled because a pump-back system was installed in July 2011, which collects water from the south seeps and returns it to the pond in Cell 1E.

Calibration observations were assigned weights so that the contribution of each observation group to the initial objective function was roughly equal. Some observations were assigned slightly higher weights in order to produce a calibrated model that better simulated those observations. Weights were varied between individual observations within some observation groups to reflect differing levels of data quality. Of the original 1,199 observations, a total of 90 were assigned zero weight, which removes them from consideration during the calibration (i.e., PEST does not attempt to match them). All of the zero-weight observations were in the transient drawdown group. The drawdown observations that were assigned zero weight are shown on transient drawdown plots (discussed below) and generally represent observations that are inconsistent with other observations at that location. In some cases, all observations at a given location were assigned a zero weight because observations were inconsistent with nearby locations or the observations were otherwise anomalous and could not be matched by the model. For example, water levels observed at piezometer DH96-30 were consistent with other piezometers within the footprint of the Tailings Basin from 2002 until mid-2004, but starting in mid-2004, an abrupt increase in water levels was observed, which is inconsistent with other nearby piezometers. Therefore, these observations were assigned zero weight. Water levels at P3H1-99 did not decrease over time, unlike nearby piezometers, so all observations from this location were assigned zero weight.

Information was also added to the calibration to minimize areas with simulated heads significantly above the ground surface. Head observations (i.e., control points) were added at seventeen locations across the model domain (Large Figure 9) with the target head set equal to the estimated ground surface (top elevation of Layer 2). One steady-state and one transient head observation (at the end of the transient simulation) were assigned at each location.

3.5.4 Regularization and Prior Information

In addition to observations and estimates based on field data, automated calibration using PEST may be guided by additional user-supplied information related to the calibration parameters, known as "regularization information" and "prior information." Regularization and prior information do not impose a hard constraint on the parameter values; rather, PEST will attempt to honor the information to the extent possible and a "penalty" will be added to the objective function if the values deviate from the preferred values. Regularization information is not based directly on site-specific measurements, but reflects constraints that the calibration should honor, if possible. Prior information consists of independent estimates of parameter values based on measurements made within the model domain. The following additional information was incorporated into the calibration:

- Regularization information specifying that the ratio of vertical hydraulic conductivity to horizontal hydraulic conductivity in each hydraulic conductivity zone should be less than or equal to one. Initial attempts at calibration without this constraint resulted in optimized vertical hydraulic conductivity values for some materials that far exceeded the horizontal hydraulic conductivity, which is not realistic in settings where deposits are horizontally stratified.

- Prior information specifying that the horizontal hydraulic conductivity of the native unconsolidated deposits should be equal to 13.1 feet/day, the average hydraulic conductivity value estimated from in-situ pumping tests conducted in onsite wells in 2009 (Section 2.1.1).

- Prior information specifying that the horizontal hydraulic conductivity of the fine and coarse LTVSMC tailings material should be equal to 0.056 feet/day and 6.9 feet/day, respectively. These hydraulic conductivity estimates are based on values used in geotechnical modeling of the Tailings Basin as described in Section 2.1.2 and Reference (12).

- An "observation" of mass balance error during the calibration process. Following each model run, the maximum absolute value of the mass balance error for each time step and stress period reported in the model output files was provided to PEST as an observation with a specified value of zero. Therefore, if non-zero mass balance error was observed during the calibration process, it contributed to the objective function, which PEST attempted to minimize.

3.5.5 Calibration Results

Optimized calibration parameter values are summarized in Large Table 1. Table 3-2 summarizes the key calibration statistics for steady-state head, transient head, and drawdown observations, while full lists of observations are given in Large Table 2 through Large Table 4. For this calibration, the fit to head observations was deemed acceptable if the absolute residual mean was less than 15% of the observed range in heads across the model domain. The absolute residual mean for the transient heads is lower than for the steady-state heads and is only 1.4% of the range of observed transient heads, compared to 3.3% for steady-state heads.

Table 3-2 Calibration Statistics for Observations

Statistics	Steady-state Head	Transient Head	Drawdown
Range in Observed Data (feet)	298.9	380.0	27.3
Residual Mean (feet)	0.9	1.0	1.1
Abs Residual Mean (feet)	9.7	5.3	2.1
Max Abs Residual (feet)	25.1	26.3	12.9
Abs Residual Mean / Range (%)	3.3	1.4	7.7

Simulated groundwater contours from the calibrated model for Layers 1 and 2 at the end of the transient simulation are shown on Large Figure 10 and Large Figure 11, respectively. The current conditions simulation generally matches the expected flow directions (north to northwest) in both the unconsolidated deposits and the bedrock. A scatter plot of modeled and measured steady-state head and transient head values is presented on Figure 3-1. The head scatter plot on Figure 3-1 shows limited bias in the simulated steady-state and transient heads, with most observations plotting close to the 1:1 line.

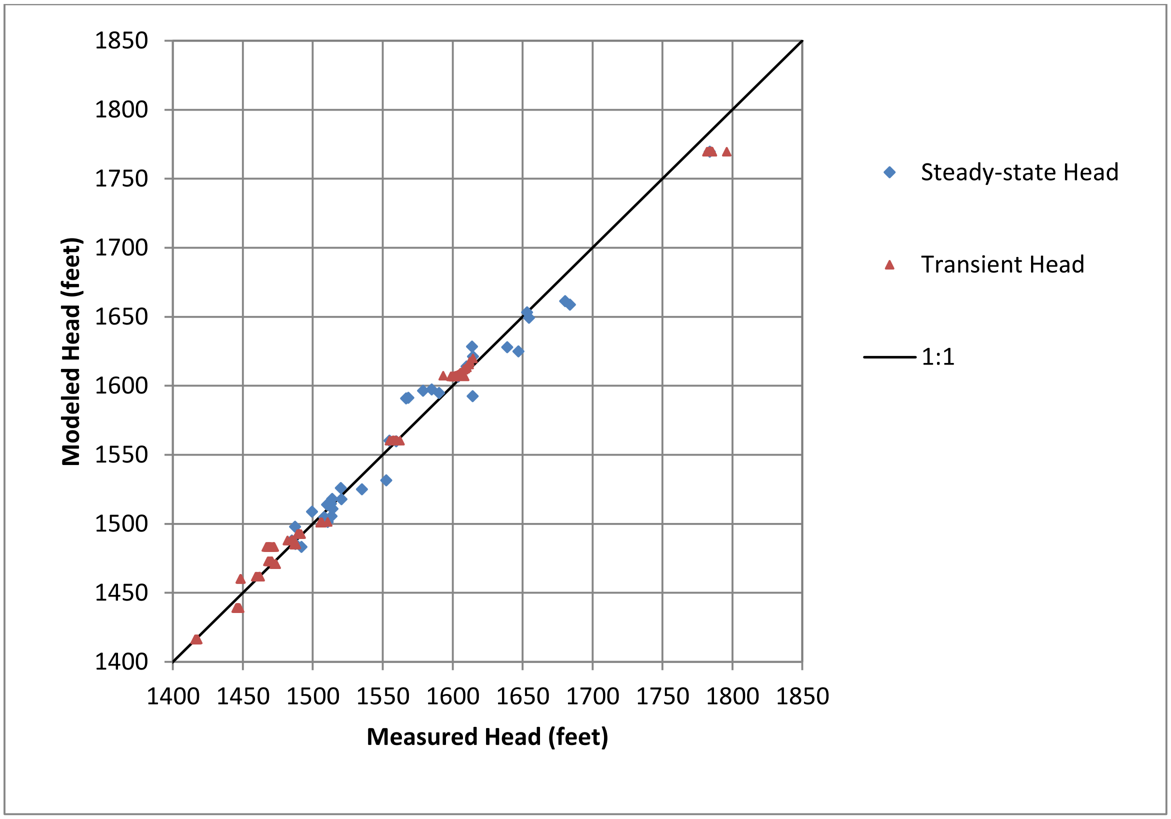

Figure 3-1 Comparison of Modeled and Measured Steady-State and Transient Heads

As shown in Table 3-2, the absolute residual mean of drawdown observations is 7.7% of the observed range in drawdowns. Drawdown time-series plots in Large Figure 12 through Large Figure 18 show general agreement between observations and model results, with the model matching the drawdown trend for most wells, but differing in magnitude at some locations (e.g., DH96-28). Observations that were assigned a weight of zero during the calibration are noted on the plots. A scatter plot of modeled and measured transient drawdown values is presented on Figure 3-2. The scatter plot shows limited bias in the simulated drawdowns, with heads falling both above and below the 1:1 line.

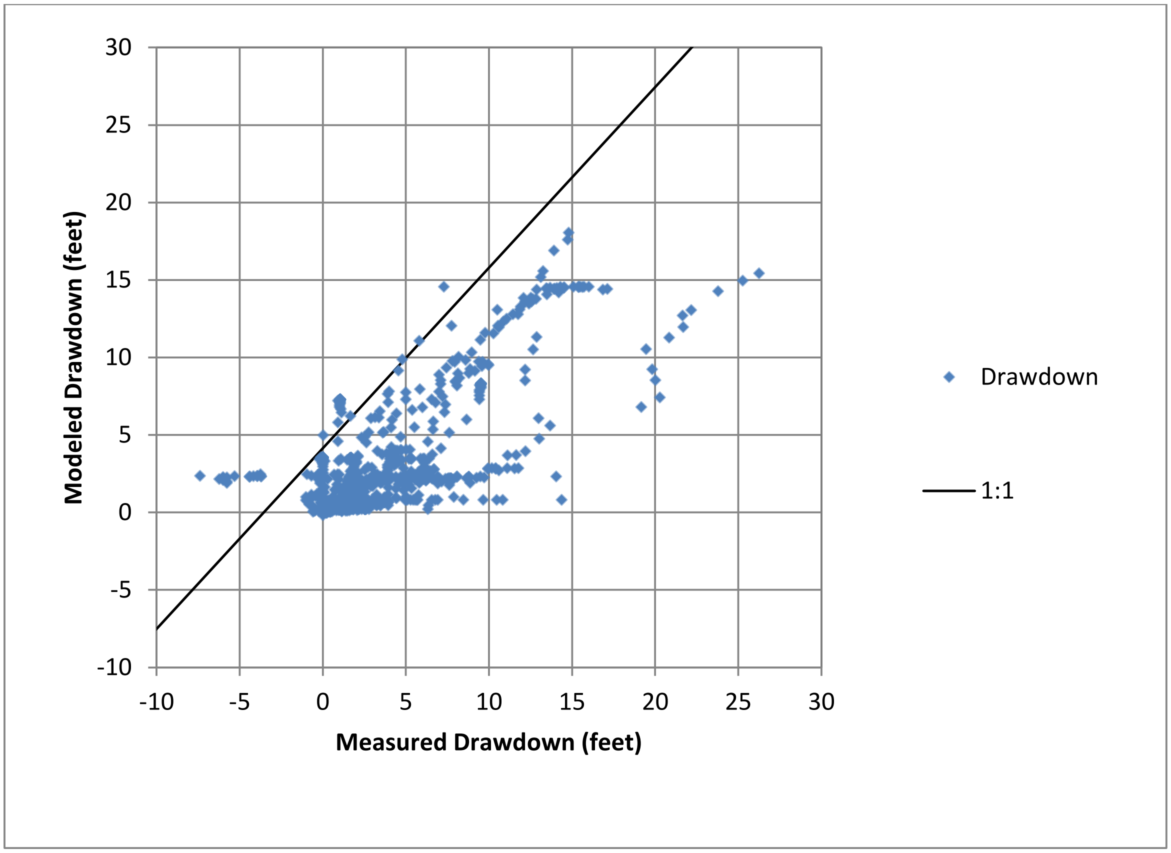

Figure 3-2 Comparison of Modeled and Measured Drawdown at Tailings Basin Piezometers

Estimated seepage rates to each of the GoldSim groundwater flow paths from the end of the transient simulation are shown in Table 3-3. Under current conditions, the majority of the seepage from the Tailings Basin discharges to the north flow path. Influenced by the regional flow conditions, groundwater flows into the Tailings Basin from the east, resulting in no discharge of Tailings Basin seepage to the east flow path under current conditions.

Table 3-3 Estimated Seepage Rates to GoldSim Groundwater Flow Paths from Current Conditions Simulation

	North Flow Path	Northwest Flow Path	West Flow Path	South Seeps	East Flow Path	Total Seepage From Basin
Model-Estimated Seepage Rate (gpm)	1100	460	870	450	0	2880

Table 3-4 compares the observed and simulated seepage rates for the south seeps and the Cell 1E and 2E ponds. The model closely matched the estimates of seepage from the pond in Cells 1E and the discharge from the south seeps. Cell 2E seepage was not matched as closely as the other flow observations. There is a significant head difference between the Cell 1E and 2E ponds and a steep hydraulic gradient toward the Cell 2E pond. This results in groundwater discharge and removal of water from the model domain in the southern portion of the Cell 2E pond. The observed Cell 2E seepage rate is compared to the net simulated seepage rate from the model, and the significant inflow into the southern portion of the Cell 2E pond results in lower net seepage. In addition, the pond seepage rates are strongly correlated with tailings basin material properties, particularly horizontal and vertical hydraulic conductivity of the LTVSMC tailings. Prior information on hydraulic conductivity was weighted such that matching those estimates was preferred over exact matches to seepage estimates.

Table 3-4 Flow Calibration Observations and Simulated Values

Location	Observed Seepage Rate, gpm	Simulated Seepage Rate, gpm
South Seeps	470	450
Cell 1E Pond	900	860
Cell 2E Pond	690	470

Simulated discharge to the drain cells representing potential seeps at bedrock outcrops was also evaluated. A flow of approximately 2 gpm discharges to the drain cells representing potential seeps at bedrock outcrops in the steady-state and transient simulations. Therefore, the drain cells remove a minimal amount of water from the groundwater flow system at the potential seeps at bedrock outcrops.

The overall mass balance error of the calibration simulation was 1%, consistent with the guidance provided in Reference (32), which states that "Ideally the error in the water balance is less than 0.1%" and "error of around 1%, however, is usually considered acceptable."

The calibration was deemed acceptable, given the objectives and intended uses of the model. The model is a simplification of the actual system and is not intended to represent the complex, small-scale heterogeneity present within the Tailings Basin. Therefore, some degree of mismatch between the model results and observations is expected and acceptable.

3.5.6 Assumptions and Limitations of the Model

The groundwater flow models that were constructed and calibrated for this evaluation are a necessary simplification of groundwater flow in the vicinity of the Plant Site. The models have limitations that are the result of assumptions and simplifications that are inherent in any groundwater modeling:

- The assumption of homogeneity within large zones of tailings and native unconsolidated deposits represent a substantial simplification. In reality, these materials likely have significant spatial variability in their hydraulic properties.

- The use of a conventional porous media modeling code can accurately simulate flow within the bedrock outcrops near the Tailings Basin, which is assumed to be primarily through interconnected fractures, at the scale of this study. It is assumed that the fractures are sufficiently interconnected such that the fractured rock medium behaves similar to a porous medium.
- The validity of the modeling results is based on the assumption that the conceptual model is a reasonable representation of the groundwater flow system. The conceptual model, in turn, is based on the data that were collected at the Plant Site and the interpretation of those data. Errors in the data or data interpretation that affect the groundwater flow model's conceptualization may result in errors in the flow simulation.
- The artificially high recharge rates applied to Cell 2W tailings for the steady-state portion of the simulation were necessary to reproduce observed conditions prior to the transient portion of the simulation but do not reflect actual recharge rates anticipated during that time period. Using a steady-state simulation to set the initial conditions for a transient simulation is standard practice (Reference (32)).
- The groundwater flow model was designed with the specific goals summarized in Section 1.1. If the model is to be used for other purposes, the validity of the model for that purpose must be carefully evaluated.

4.0 Predictive Simulations

The calibrated current conditions models were used to develop Tailings Basin simulations representing operations conditions (Mine Year 1 through Mine Year 20) and long-term closure conditions (after Mine Year 55, when reclamation activities are complete). The primary objectives of the predictive simulations were to estimate the quantity of seepage from the Tailings Basin and Tailings Basin ponds, estimate the contribution of infiltration from each the various areas of the Tailings Basin to each of the groundwater flow paths simulated in the GoldSim model, and estimate the unsaturated zone thickness at the Tailings Basin to support calculations of oxygen penetration depth in the GoldSim model (Reference (1)).

A series of steady-state simulations were set up to represent conditions within the Tailings Basin at key times during operations:

- **Mine Year 1 (Large Figure 19).** Tailings deposition will begin in Cell 2E in the first year of operations. Tailings will be deposited both on the exposed beaches and within the pond.
- **Mine Year 7 (Large Figure 20).** Mine Year 7 represents the last year in which tailings will be deposited only in Cell 2E.
- **Mine Year 8 (Large Figure 21).** After approximately seven years of depositing tailings in Cell 2E, the elevation of the cell will reach the elevation of Cell 1E, and the two will merge. From approximately Mine Year 8 through Mine Year 20, tailings will be deposited in the merged cells (FTB Pond).
- **Mine Year 18 (Large Figure 22).** The dams are expanded in Mine Year 18, and the beach fully encompasses the FTB Pond.
- **Mine Year 20 (Large Figure 22).** The Tailings Basin reaches its final height in Mine Year 20.

The model results at the end of the Mine Year 20 simulation were used as the starting point for simulations to evaluate long-term closure conditions. Achieving water quality objectives at the Tailings Basin during long-term closure will depend in part on maintaining proper moisture conditions and oxygen exclusion in the Flotation Tailings. This will be accomplished by maintenance of a pond above much of the Flotation Tailings following closure (Section 5.0 of Reference (33)). The pond will simultaneously prevent oxygen intrusion from the tailings surface, while also providing water to maintain elevated saturation conditions in tailings below the pond. Because the seepage through the Flotation Tailings in combination with the small area providing surface water runoff to the basin may make it difficult to maintain a pond during some portions of the year, the permeability of the tailings at the surface will be modified by bentonite addition as needed to reduce the hydraulic conductivity of the tailings. The reduced hydraulic conductivity will limit seepage through the tailings and will result in maintenance of a pond above the tailings after basin closure.

Predictive simulations of operation conditions were steady-state. Linear interpolation was used between the simulated years to provide estimates on an annual basis for inputs to the GoldSim model. Two simulations of long-term closure conditions were completed: a steady-state simulation to provide input for the GoldSim model and a transient simulation to estimate the time required for the system to reach a steady state following closure. The following sections describe the aspects of the current conditions model that were modified to set up the predictive simulations.

4.1 Modifications to the Current Conditions Model

4.1.1 Model Layers

Model layers were added to the current conditions model to represent the increasing thickness of Flotation Tailings as they will be deposited during operations. In general, Flotation Tailings thickness will increase more rapidly in earlier years compared to later years, in part because the area of Flotation tailings deposition is smaller prior to Mine Year 8 when the tailings are deposited exclusively in Cell 2E. For the Mine Year 1 simulation, two additional layers were added, resulting in a total of four model layers. For the Mine Year 7 simulation, an additional three model layers were added to the Mine Year 1 simulation (for a total of seven model layers). No additional model layers were added for the Mine Year 8 simulation. One additional layer was added for the Mine Year 18, Mine Year 20, and long-term closure conditions simulations, resulting in a total of eight layers. As with the current conditions models, the bottom model layer for the predictive simulations represents the native unconsolidated deposits and bedrock hills.

For each new model layer added in all simulations, the extent of active cells was defined based on the Tailings Basin design as shown on Large Figure 19 through Large Figure 22.

4.1.2 Boundary Conditions

During operations, the ponds in Cell 1E and 2E (and the combined FTB Pond starting in Mine Year 8) were represented using specified-head boundaries. For the closure simulation, the pond was represented using river cells. The use of river cell boundaries to simulate the pond following closure was based on the assumption that the pond will be lined with an 18-inch-thick layer of bentonite that has distinct properties from the underlying tailings (Section 5.0 of Reference (33)). River cells were used instead of specified-head cells in closure because river cells can simulate the flux through a low hydraulic conductivity pond bottom without requiring the addition of a new layer to explicitly represent it. The bottom elevation of the river cells was defined so that the pond depth in closure would be 8 feet. The vertical hydraulic conductivity of the river cells was assigned as 2.8×10^{-4} feet/day to simulate the anticipated hydraulic conductivity of the bentonite layer (Reference (33)).

For each predictive simulation, the spatial extent of the specified-head cells or river cells and the head assigned to each pond were based on the current version of the FTB design (Reference (5))). The specified-head cells representing the FTB design for each year simulated is shown on Large Figure 23 through Large Figure 26. The pond elevation was assumed to be 9.25 feet below the top of dam elevation for each of the years simulated. Table 4-1 summarizes the elevations applied to the specified-head cells or river cells representing the ponds for each simulation. Large Figure 27 shows the boundary conditions in the bottom model layer for each predictive simulation.

Table 4-1 Pond Elevations Used for Predictive Simulations

Simulation	Cell 1E (feet MSL)	Cell 2E (feet MSL)
Mine Year 1	1656.8	1578.75
Mine Year 7	1656.8	1651.75
Mine Year 8	1660.25	
Mine Year 18	1710.25	
Mine Year 20	1717.25	
Closure	1717.25	

4.1.3 Hydraulic Conductivity

The hydraulic conductivity values for native unconsolidated materials, bedrock outcrops, and LTVSMC tailings were set at the calibrated parameter values in the predictive simulations. New hydraulic conductivity zones were added to each predictive simulation to represent the Flotation Tailings. Separate zones were defined for the dam material, tailings deposited in the beach areas, and tailings deposited beneath the pond. To account for the observed decrease in hydraulic conductivity with increasing confining pressure (Section 2.1.2), the hydraulic conductivity of the zones representing material beneath the pond was decreased in deeper layers of the model. The burial depth for each zone in each model layer was calculated by taking the difference between the current pond elevation and the average midpoint elevation of the cells that defined the zone. Based on this average burial depth, the horizontal hydraulic conductivity was calculated for each zone based on the functional relationships developed between hydraulic conductivity and effective depth (Large Figure 2). Large Table 5 summarizes the hydraulic conductivity values used for each zone representing Flotation Tailings for each simulation. For the zones representing Flotation Tailings, the ratio of vertical hydraulic conductivity to horizontal hydraulic conductivity was set equal to 0.34. This ratio is based on the area-weighted average of the calibrated horizontal and vertical hydraulic conductivity values for the LTVSMC tailings from the current conditions model. The hydraulic conductivity of the beach and dam material remained constant regardless of model layer.

Cement deep soil mixing (CDSM) will be used to enhance the shear strength of select zones of the existing LTVSMC fine tailings/slimes and peat layers (Reference (12)). CDSM is a well-established in-situ soil stabilization method that mixes soil with cement, such as hydrated Portland cement, or another suitable stabilizing agent. Shear walls will be created using CDSM by augering multiple, overlapping, 3-foot diameter columns. The tailings and peat encountered within the auger path are mixed with cement to create the overlapping columns (shear walls). The shear walls will be 5 to 50 feet long, 55 feet tall, 3 feet thick (the column diameter), and oriented perpendicular to the dam axis, with spacing of 10 feet. While the addition of cement during the CDSM will reduce the hydraulic conductivity of the fine tailings/slimes and peat layers, the hydraulic conductivity after mixing will still be about 70% of its original value before mixing. Because the shear walls will be narrow (i.e., at most, 3% of a model cell width), oriented approximately in the direction of groundwater flow, and have hydraulic conductivity similar to the materials prior to mixing, the shear walls were not simulated in the groundwater model as they are not expected to have a significant impact on the key model predictions.

4.1.4 Recharge

For the predictive simulations, the following recharge zones were added to the model:

- a zone representing infiltration through the exterior FTB dams, which will be covered with bentonite starting in Mine Year 1
- a zone representing infiltration through the beach areas during operations
- a zone representing infiltration through the beach areas during long-term closure, after they have been amended with bentonite

The spatial extent of each zone in each simulation was determined using the FTB design. Recharge rates for the zone representing infiltration through the beach areas for each simulation were calculated as an area- and time-weighted average that accounts for the infiltration from the tailings slurry and natural infiltration rates from precipitation estimated using the Meyer Model (Reference (20)). A more detailed description of the procedure follows.

The procedure for calculating infiltration rates to inactive beach areas and the covered dams are described in Section 5.2.2.2.2 of Reference (1)). In those areas, infiltration is equal to precipitation less runoff and evapotranspiration. For the inactive beaches during operations, the infiltration rate averages approximately 7.7 in/yr. For the beaches in closure and the dams at all times, the infiltration rate averages about 5.85 in/yr. At any time, the Beneficiation Plant (Plant) will discharge along the dams to form tailings beaches. As the Plant discharges to a beach, the slurry spreads over a portion of a delta that is assumed to cover 2.06 acres (Section 5.2.2.2.2 of Reference (1)). The slurry discharge rate to the beach is high enough that the infiltration rate over the 2.06 acres is assumed to be equal to the saturated hydraulic conductivity of the beach tailings, which is about 2.8 feet/day (see Section 10.3.2 of Reference (34)). Equation 3 represents the spatial average infiltration rate of a beach that is receiving Plant slurry discharge.

$$I_A = \frac{K_{sat}A_D + I_C(A_i - A_D)}{A_i} \qquad \textbf{Equation 3}$$

Where:

I_A is the spatially averaged infiltration rate [L/T]
K_{sat} is the saturated hydraulic conductivity [L/T]
I_C is the average infiltration rate due to natural climate [L/T]
A_i is the entire area of a single beach [L^2], and A_D is the area of the delta with flowing slurry [L^2].

Equation 3 will approach I_C as A_i gets very large.

Because the Plant will discharge to one beach at a time, there are times during the year when I_A will be very high and other times when it will be equal to I_C (because A_D = 0 acres). Equation 4 is used to determine the portion of the year (%) that a particular beach is receiving Plant slurry discharge; assuming that the Plant discharge duration to a particular beach is proportional to its length relative to the lengths of all of the beaches (and assuming a constant width for all beaches).

$$\% = \frac{A_i}{\sum A_i}$$ **Equation 4**

Because each MODFLOW model represents a snapshot in time, the infiltration rate to a given beach was also averaged temporally. Equation 5 represents the time-averaged infiltration rate, I.

$$I = \% * \ I_A + (1 - \%) * I_C$$ **Equation 5**

Finally, plugging Equation 3 and Equation 4 into Equation 5 results in Equation 6 shown below. Equation 6 states that the overall spatially and temporally averaged infiltration rate at any given time is, at a minimum, the naturally occurring infiltration rate, I_C. Any additional infiltration due to Plant slurry discharge is applied to the area of the flowing slurry in the delta, and the total infiltration rate is proportional to the flowing delta area relative to the total FTB beach area.

$$I = I_C + \frac{A_D(K_{sat} - I_C)}{\sum A_i}$$ **Equation 6**

The recharge rates used in the predictive simulations are listed in Table 4-2. In Mine Year 1 and Mine Year 7, there is only one beach; the North Beach. Therefore, the ratio of A_D to the total FTB beach area is higher than during later years. This causes the average infiltration rate, *I*, to be higher during Mine Year 1 and Mine Year 7. Mine Year 8 introduces the beaches along the East and South Dams, increasing the total beach area. Between Mine Year 18 and Mine Year 20, the Closure Beach is formed, which adds more beach area, creating a continuous beach around the FTB Pond rather than separate beach segments. In long-term closure, the Plant discharge ceases (A_D = 0 acres), and the naturally occurring infiltration (I_C) decreases due to the decreased K_{sat} (0.016 feet/day, see Section 10.3.2 of Reference (34)) of the bentonite-amended tailings.

Table 4-2 Recharge Rates Used for Predictive Simulations

Model Area	Mine Year(s)	Recharge (in/yr)
Beaches	1	288
Beaches	7	318
Beaches	8	140
Beaches	18, 20	72.8
Beaches	Closure	5.85
Dams	All	5.85
Native unconsolidated	All	6.00
Bedrock	All	0.23

4.2 Predictive Simulation Results

The predictive simulations were completed, and key model results are summarized. The maximum model mass balance error for the predictive simulations was 0.01%, and the seepage estimates, contribution of infiltration from each the various areas of the Tailings Basin to each of the groundwater flow paths, and estimates of the unsaturated zone thickness at the Tailings Basin are presented in the following sections.

4.2.1 Pond Seepage and Discharge to GoldSim Groundwater Flow Paths

The USGS program ZONEBUDGET (Reference (35)) was used to estimate the seepage rates from the pond(s) and the volume of groundwater discharging to each GoldSim groundwater flow path. ZONEBUDGET uses cell-by-cell flow data written by MODFLOW to calculate water budgets from user-defined sub-regions of the model area. To calculate the groundwater discharge leaving the Tailings Basin interior and entering each flow path, zones were defined that coincided with the upstream end of each groundwater flow path and the drain cells representing the south seeps. In addition, zones were defined that coincided with the pond area for each simulation. The seepage rate from the pond(s) was then reported in the ZONEBUDGET output file as the flow rate from the specified head cells to the model. The estimated flow rates based on the ZONEBUDGET analysis are summarized in Table 4-3 and shown on Figure 4-1.

Table 4-3 Estimated Seepage Rates From Current Conditions and Predictive Simulations

Mine Year	Net Cell 2E Pond Seepage (gpm)	Net Cell 1E Pond Seepage (gpm)	Discharge to North Flow Path (gpm)	Discharge to Northwest Flow Path (gpm)	Discharge to West Flow Path (gpm)	Discharge to South Seeps (gpm)	Discharge to East Flow Path (gpm)	Total Seepage From Basin (gpm)
0	500	880	1100	460	870	450	0	2880
1	-340	960	1690	520	900	480	0	3590
7	400	700	1600	580	960	450	0	3590
8	510		1090	530	880	540	80	3120
18	570		990	560	990	480	350	3370
20	580		990	550	980	490	360	3370
Long – Term Closure	330		570	410	690	220	0	1890

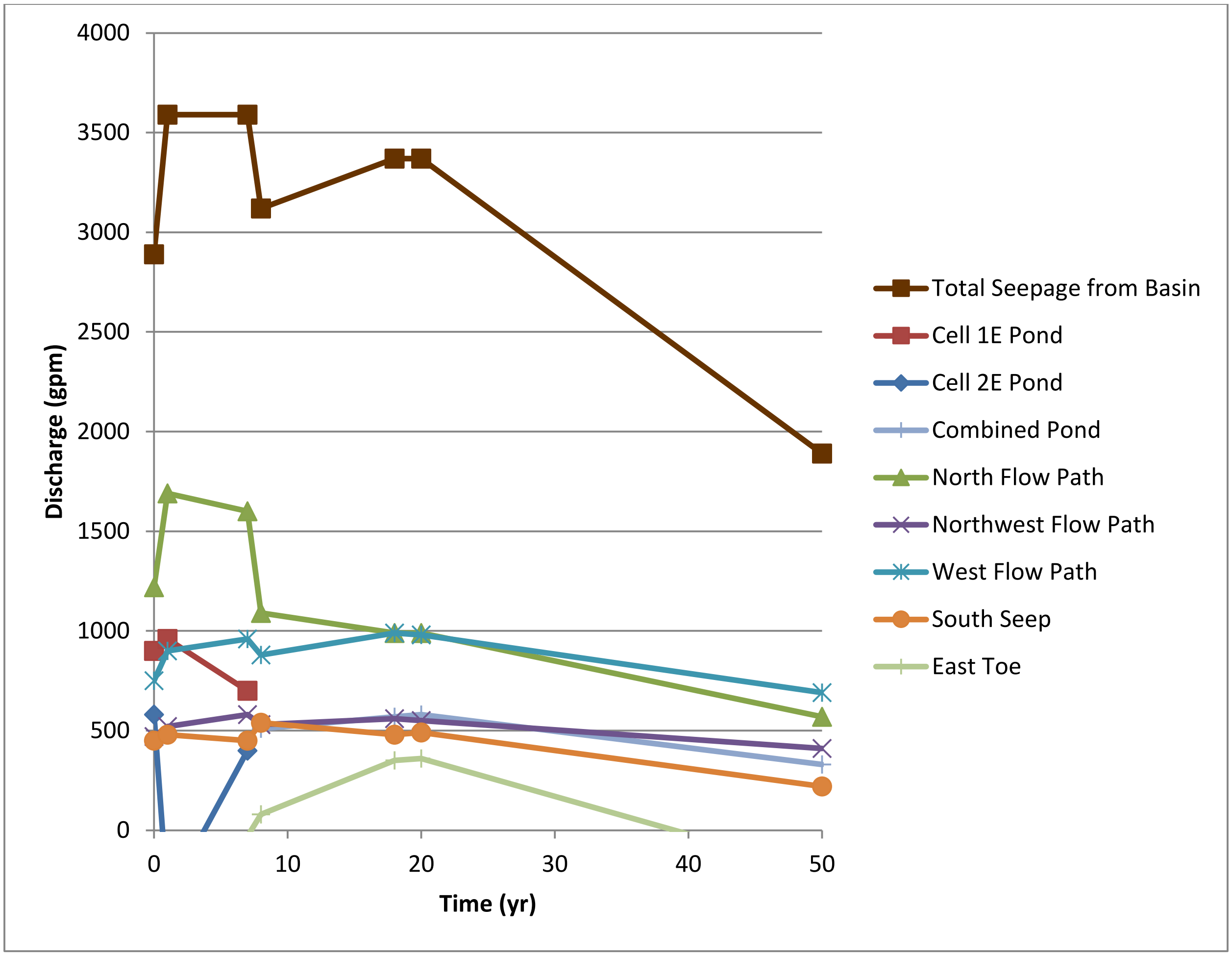

Figure 4-1 Summary of Estimated Tailings Basin Flow Rates

In Mine Year 1, the modeled net seepage at the Cell 2E pond was into the pond (represented by the negative value in Table 4-3) due to high water levels in the Tailings Basin between Cell 1E and Cell 2E. Groundwater flow in the unconsolidated deposits within the gap in the bedrock to the east of the Tailings Basin is towards the Tailings Basin (represented by the zero values in Table 4-3) until Mine Year 8. Note that the planned seepage capture system along the East Dam is not simulated in the MODFLOW models, and estimates of flow into the Tailings Basin footprint are not provided for this reason. Though flow into the Tailings Basin footprint is possible in the model, in reality, the regional groundwater flow toward the Tailings Basin from the east will not enter the Tailings Basin footprint, because it will be blocked by the collection system cutoff wall and will drain to the north through the constructed swale. During long-term closure the bentonite-amended pond bottom is expected to reduce the seepage from the pond, which results in lower water levels within the Tailings Basin than during the later stages of operations. Water levels are lowered sufficiently to once again allow groundwater flow towards the Tailings Basin (represented by the zero value in Table 4-3) from the eastern bedrock valley. Seepage to the north flow path will be highest near the beginning of mine operations, when tailings are deposited only within Cell 2E. The reduction of hydraulic conductivity due to increasing effective burial depth as tailings are deposited likely reduces the seepage from the tailings basin over time.

4.2.2 Particle Tracking Simulations

The USGS particle-tracking code MODPATH (Reference (18)) was used to evaluate the proportion of the discharge to each GoldSim groundwater flow path that originates from the various areas of the Tailings Basin (coarse tailings, fine tailings, ponds, etc.). In the GoldSim model, water from each of these sources has a different chemical composition, which will contribute different amounts of chemical load to the overall load leaving the Tailings Basin. In MODPATH, a particle was started at the phreatic surface in each cell in the uppermost model layer and tracked forward in time. A MODPATH simulation was completed for each steady-state predictive simulation. Zones were defined in MODPATH via the boundary (IBOUND) array that coincided with each material type and the locations of the groundwater flow paths, so that the starting and ending locations of particles were reported. The results of the MODPATH runs were post-processed to determine which particle traces entered each flow path. Each particle was assigned a representative area equal to the area of the model cell in which it originated and a flow rate equal to the recharge or pond seepage rate in that cell. In this way, the contribution of the infiltration entering each model cell to each flow path was calculated. The results of particle tracking analysis are summarized in Table 4-4, Table 4-5, and Large Table 6, and shown graphically on Large Figure 28 through Large Figure 34.

Table 4-4 Percentage of FTB Pond Seepage Discharging to Each GoldSim Groundwater Flow Path

Mine Year	North Flow Path	Northwest Flow Path	West Flow Path	South Flow Path	East Flow Path
1	83.2	16.8	0.0	0.0	0.0
7	78.6	21.4	0.0	0.0	0.0
8	75.1	9.2	15.7	0.0	0.0
18	77.6	1.5	10.5	0.0	10.4
20	79.1	1.8	10.0	0.0	9.1
Long –Term Closure	93.6	1.4	5.0	0.0	0.0

Table 4-5 Percentage of FTB Dam Infiltration Discharging to Each GoldSim Groundwater Flow Path

Mine Year	North Dam		East Dam				South Dam		
	North Flow Path	North-west Flow Path	North Flow Path	West Flow Path	South Flow Path	East Flow Path	North Flow Path	West Flow Path	South Flow Path
1	100.0	0.0	--	--	--	--	--	--	--
7	100.0	0.0	--	--	--	--	--	--	--
8	99.5	0.5	0.0	0.0	0.0	100.0	0.0	29.6	70.4
18	99.2	0.8	0.0	0.0	0.0	100.0	23.0	13.1	63.9
20	99.2	0.8	0.0	0.0	0.0	100.0	23.0	13.1	63.9
Long-Term Closure	100.0	0.0	87.5	2.5	8.8	1.3	0.0	5.5	94.5

4.2.3 Thickness of Unsaturated Zones

The depth to the phreatic surface within the different material types was used to calculate oxidation rates and subsequent chemical load generation in the GoldSim model. To calculate the average depth to the phreatic surface within each material zone, topographic surfaces were developed for each simulation based on the FTB design. ArcGIS (Reference (36)) was used to calculate an average topographic elevation for each groundwater model cell. The modeled phreatic surface elevation for each model cell for each simulation was subtracted from the corresponding topographic elevation, and an area-weighted average was calculated for each material type. The results of this analysis are summarized in Table 4-6 and Table 4-7.

Table 4-6 Estimated Depth of Unsaturated Material in FTB Dams and Beaches

Mine Year	North		East		South		Other[1]
	Dam (ft)	Beach (ft)	Dam (ft)	Beach (ft)	Dam (ft)	Beach (ft)	Beach (ft)
1	44.0	4.2	--	--	--	--	--
7	79.7	10.8	--	--	--	--	--
8	94.3	16.3	0.2	0.0	46.0	13.2	--
18	100.4	19.7	17.0	4.6	52.3	11.4	7.2
20	101.1	23.8	18.0	6.0	55.0	13.8	9.6
Long-Term Closure	130.6	94.8	38.6	7.5	86.3	34.4	36.1

(1) Beach material not adjacent to the North, East, or South Dams

Table 4-7 Estimated Depth of Unsaturated Material below LTVSMC Tailings

Mine Year	Cell 2W			Cell 1E		Cell 2E		
	Coarse Tailings (ft)	Fine Tailings (ft)	Dams (ft)	Coarse Tailings (ft)	Fine Tailings (ft)	Coarse Tailings (ft)	Fine Tailings (ft)	Dams (ft)
0	103.5	106.0	88.3	49.9	9.2	17.6	58.9	40.2
1	111.7	121.8	91.9	51.1	9.3	13.1	87.2	33.2
7	102.3	111.9	89.7	41.3	7.6	--	74.0	34.8
8	108.1	115.4	93.7	22.4	--	--	92.8	41.7
18	95.7	106.9	96.4	38.7	--	--	84.2	44.0
20	96.3	107.3	96.5	38.8	--	--	64.2	44.0
Long-Term Closure	126.6	128.9	107.8	66.5	--	--	115.3	49.7

5.0 Summary and Conclusions

Groundwater modeling of the Plant Site was conducted to support the GoldSim water quantity and quality modeling. The objectives of the MODFLOW predictive simulations were to estimate:

- seepage rates from the Tailings Basin ponds
- average annual infiltration rate throughout the Tailings Basin under current conditions
- seepage rates entering the five groundwater flow paths represented in the GoldSim model
- the proportion of the discharge to each GoldSim groundwater flow path originating from the various areas of the Tailings Basin
- the depth of the phreatic surface with each material type in the Tailings Basin

A groundwater model encompassing an area of approximately 18 square miles from the Embarrass River to the former LTVSMC mine pits to the south of the Tailings Basin was constructed and calibrated to steady-state conditions (represented by February 2002) to establish initial conditions and transient conditions (from February 2002 through December 2013). A total of 1,199 data points representing steady-state heads, transient heads, transient drawdown, estimated pond seepage, discharge from the south seeps, and control points were used during the calibration.

Calibration objectives were met: the objective function was minimized, the absolute residual mean was less than 4% of the observed range in steady-state heads and less than 2% of the observed range in transient heads, simulated seepage from the ponds and the south seeps was within an acceptable margin of the corresponding observations, and the model generally did not estimate widespread heads above the ground surface in the primary model area of interest.

Transient model realizations simulating the Tailings Basin in various stages of development were constructed. The stages of development are based on the Project description. The results of the transient model realizations provide inputs for water balance/quantity and water quality purposes within the GoldSim model. The following conclusions can be drawn from the modeling described in this report:

- Simulated net seepage rates from the Tailings Basin Ponds during operations range from a maximum of 1,100 gpm during Mine Year 7 to a minimum of 510 gpm during Mine Year 8. Total seepage from the ponds under long-term closure conditions is estimated to be 330 gpm.
- Total seepage from the Tailings Basin ranges from a minimum of 1,890 gpm during long-term closure to a maximum of 3,590 gpm during Mine Year 1 and Mine Year 7. The largest proportion of total seepage from the Tailings Basin reports to the north flow path. Seepage contributes 1,690 gpm to the north flow path in Mine Year 1. In general, discharge to groundwater flow paths peaks from Mine Year 1 to Mine Year 7 and declines thereafter due to the reduction in hydraulic conductivity of the Flotation Tailings as consolidation pressure increases.

- The particle tracking simulations were used to evaluate the discharge location of infiltration to the Tailings Basin and seepage from the ponds. The proportion of the discharge to each GoldSim groundwater flow path originating from the various areas of the Tailings Basin (coarse tailings, fine tailings, ponds, etc.) was tabulated for use as input to the GoldSim model.

- The depth to the phreatic surface within the different material types was calculated for operations and long-term closure conditions for use in estimating oxidation rates and subsequent chemical load generation in the GoldSim model. Depths to the phreatic surface fluctuate during operations and increase following closure, due to dissipation of the groundwater mound that develops during operations.

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Large Tables

Large Table 1   Calibration Parameters, Parameter Bounds, and Optimized Values

Parameter	Parameter ID	Units	Optimized	Lower Bound	Upper Bound	Preferred Value	Anisotropy Ratio
Horizontal hydraulic conductivity of native unconsolidated	kx1	ft/d	68.04	3.30E-04	131.2	13.1	0.48
Vertical hydraulic conductivity of native unconsolidated	kz1	ft/d	32.53	3.30E-04	131.2	--	
Horizontal hydraulic conductivity of 2W fine tailings	kx2	ft/d	0.2	3.30E-04	246.1	0.056	0.25
Vertical hydraulic conductivity of 2W fine tailings	kz2	ft/d	0.05	3.30E-04	246.1	--	
Horizontal hydraulic conductivity of 2W coarse tailings	kx3	ft/d	4.02	3.30E-04	246.1	6.9	0.017
Vertical hydraulic conductivity of 2W coarse tailings	kz3	ft/d	0.07	3.30E-04	246.1	--	
Horizontal hydraulic conductivity of 1E fine tailings	kx4	ft/d	0.06	3.30E-04	246.1	0.056	0.23
Vertical hydraulic conductivity of 1E fine tailings	kz4	ft/d	0.0135	3.30E-04	246.1	--	
Horizontal hydraulic conductivity of 1E coarse tailings	kx5	ft/d	12.55	3.30E-04	246.1	6.9	0.72
Vertical hydraulic conductivity of 1E coarse tailings	kz5	ft/d	8.98	3.30E-04	246.1	--	
Horizontal hydraulic conductivity of 2E fine tailings	kx6	ft/d	1.07	3.30E-04	246.1	0.056	0.72
Vertical hydraulic conductivity of 2E fine tailings	kz6	ft/d	0.77	3.30E-04	246.1	--	
Horizontal hydraulic conductivity of 2E coarse tailings	kx7	ft/d	4.98	3.30E-04	246.1	6.9	0.71
Vertical hydraulic conductivity of 2E coarse tailings	kz7	ft/d	3.56	3.30E-04	246.1	--	
Horizontal hydraulic conductivity of bedrock outcrops	kx12	ft/d	2.17E-02	1.40E-04	141.1	--	0.028

Parameter	Parameter ID	Units	Optimized	Lower Bound	Upper Bound	Preferred Value	Anisotropy Ratio
Vertical hydraulic conductivity of bedrock outcrops	kz12	ft/d	6.02E-04	1.40E-04	141.1	--	
Vertical hydraulic conductivity term of river cells overlying surficial deposits	kz_riv_1	ft/d	35.6	3.28E-06	131.2	--	0.076
Vertical hydraulic conductivity term of river cells overlying bedrock	kz_riv_12	ft/d	2.7	3.28E-06	131.2	--	
Steady-state recharge applied to 2W coarse tailings[1]	ss_r3	in/yr	28.4	6	100.7	--	--
Steady-state recharge applied to 2W fine tailings[1]	ss_r4	in/yr	19.7	2	100.7	--	--
Transient and steady-state recharge to native unconsolidated	r1	in/yr	6	6	12	--	--
Transient recharge to 2W coarse tailings	r3	in/yr	18	6	18	--	--
Transient recharge to 2W fine tailings	r4	in/yr	17.5	2	18	--	--
Transient and steady-state recharge to bedrock outcrops	r5	in/yr	0.2	1.00E-04	1	--	--
Storativity of native unconsolidated	s1	--	1.80E-04	1.00E-07	0.2	--	--
Storativity of 2W fine tailings	s2	--	1.20E-05	1.00E-07	0.2	--	--
Specific yield of 2W fine tailings	sy2	--	0.033	0.01	0.3	--	--
Storativity of 2W coarse tailings	s3	--	1.30E-04	1.00E-07	0.2	--	--
Specific yield of 2W coarse tailings	sy3	--	0.07	0.01	0.3	--	--
Storativity of 1E fine tailings	s4	--	2.00E-05	1.00E-07	0.2	--	--
Specific yield of 1E fine tailings	sy4	--	0.01	0.01	0.3	--	--
Storativity of 1E coarse tailings	s5	--	8.40E-05	1.00E-07	0.2	--	--
Specific yield of 1E coarse tailings	sy5	--	0.3	0.01	0.3	--	--
Storativity of 2E fine tailings	s6	--	3.70E-04	1.00E-07	0.2	--	--
Specific yield of 2E fine tailings	sy6	--	0.015	0.01	0.3	--	--
Storativity of 2E coarse tailings	s7	--	1.10E-03	1.00E-07	0.2	--	--

Parameter	Parameter ID	Units	Optimized	Lower Bound	Upper Bound	Preferred Value	Anisotropy Ratio
Specific yield of 2E coarse tailings	sy7	--	0.024	0.01	0.3	--	--
Storativity of bedrock outcrops	s8	--	2.10E-04	1.00E-07	0.2	--	--
Head in Cell 1E pond during stress period 1	1e_h1	ft MSL	1650.3	1650.3	1656.8	--	--
Head in Cell 1E pond during stress period 2	1e_h2	ft MSL	1650.7	1650.3	1656.8	--	--
Head in Cell 1E pond during stress period 3	1e_h3	ft MSL	1653.9	1650.3	1656.8	--	--
Head in Cell 1E pond during stress period 4	1e_h4	ft MSL	1654.2	1650.3	1656.8	--	--
Head in Cell 1E pond during stress period 5	1e_h5	ft MSL	1653.4	1650.3	1656.8	--	--
Head in Cell 1E pond during stress period 6	1e_h6	ft MSL	1650.3	1650.3	1656.8	--	--
Head in Cell 1E pond during stress period 7	1e_h7	ft MSL	1650.3	1650.3	1656.8	--	--
Head in Cell 2E pond during stress period 1	2e_h1	ft MSL	1558.4	1558.4	1565	--	--
Head in Cell 2E pond during stress period 2	2e_h2	ft MSL	1558.4	1558.4	1565	--	--
Head in Cell 2E pond during stress period 3	2e_h3	ft MSL	1558.4	1558.4	1565	--	--
Head in Cell 2E pond during stress period 4	2e_h4	ft MSL	1558.4	1558.4	1565	--	--
Head in Cell 2E pond during stress period 5	2e_h5	ft MSL	1558.4	1558.4	1565	--	--
Head in Cell 2E pond during stress period 6	2e_h6	ft MSL	1558.4	1558.4	1565	--	--
Head in Cell 2E pond during stress period 7	2e_h7	ft MSL	1558.4	1558.4	1565	--	--
Conductance of drain simulating south seeps	dr0	ft MSL	1.07E+04	10.8	5.40E+05	--	--
Conductance of bedrock drains	dr1	ft2/d	2837.49	1.10E-03	5.40E+05	--	--
Conductance of bedrock drains (tied)	dr2	ft2/d	1418.75	1.10E-03	5.40E+05	--	--
Conductance of bedrock drains (tied)	dr3	ft2/d	709.37	1.10E-03	5.40E+05	--	--
Conductance of bedrock drains (tied)	dr4	ft2/d	5674.98	1.10E-03	5.40E+05	--	--

(1) Calibrated recharge rates for Cell 2W during the steady-state portion of the simulation may not be representative of actual recharge rates during that time period. In the steady-state portion of the simulation, Cell 2W was assigned higher recharge rates than during the transient portion to reproduce the groundwater mound beneath the basin that formed during LTVSMC for the purpose of setting initial conditions for the transient portion of the simulation.

Large Table 2 Steady-State Calibration Observations and Simulated Values

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
1	ss_head	1614.20	1592.46	21.74
2	ss_head	1638.91	1627.99	10.92
3	ss_head	1683.85	1658.77	25.08
3A	ss_head	1680.37	1661.32	19.05
4	ss_head	1654.56	1649.24	5.32
6	ss_head	1584.97	1597.24	-12.27
5	ss_head	1646.99	1624.93	22.06
A-1	ss_head	1491.92	1483.17	8.75
A-3	ss_head	1499.50	1508.74	-9.24
A-9	ss_head	1552.56	1531.45	21.11
B-2	ss_head	1508.06	1504.85	3.21
CELL_1E	ss_head	1653.17	1653.18	-0.01
CELL_2E	ss_head	1559.69	1559.68	0.01
D-1	ss_head	1578.71	1596.44	-17.73
D-4	ss_head	1603.98	1606.68	-2.70
DH96-10	ss_head	1566.66	1590.76	-24.09
DH96-11	ss_head	1568.20	1591.35	-23.15
DH96-30	ss_head	1520.38	1517.85	2.53
DH96-32	ss_head	1535.14	1524.90	10.24
DH96-37	ss_head	1487.31	1497.93	-10.63
E-5	ss_head	1590.16	1594.80	-4.64
F-2	ss_head	1520.13	1525.91	-5.78
G-2	ss_head	1514.00	1510.85	3.15
GW001	ss_head	1484.90	1487.93	-3.03
GW002	ss_head	1783.81	1769.52	14.29
GW003	ss_head	1613.85	1628.38	-14.53
GW004	ss_head	1609.91	1614.02	-4.11
GW005	ss_head	1614.50	1621.29	-6.79
GW006	ss_head	1487.46	1485.29	2.17
GW007	ss_head	1510.57	1501.27	9.30
GW008	ss_head	1554.72	1560.17	-5.45
P1H1-99	ss_head	1513.95	1517.94	-3.99
P1H-99	ss_head	1512.93	1514.57	-1.64
P2HA-99	ss_head	1510.09	1513.92	-3.83
PN1J-99	ss_head	1513.29	1505.60	7.69

Large Table 3 Transient Head Calibration Observations and Simulated Values

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW001-1	tr_head	1481.73	1487.91	-6.19
GW001-2	tr_head	1484.91	1487.85	-2.94
GW001-3	tr_head	1485.47	1487.84	-2.38
GW001-4	tr_head	1484.45	1487.84	-3.39
GW001-5	tr_head	1481.96	1487.84	-5.88
GW001-6	tr_head	1485.53	1487.84	-2.31
GW001-7	tr_head	1485.96	1487.84	-1.88
GW001-8	tr_head	1486.02	1487.83	-1.81
GW001-9	tr_head	1486.35	1487.83	-1.48
GW001-10	tr_head	1485.96	1487.83	-1.88
GW001-11	tr_head	1485.53	1487.83	-2.30
GW001-12	tr_head	1486.19	1487.83	-1.65
GW001-13	tr_head	1486.19	1487.83	-1.65
GW001-14	tr_head	1486.09	1487.83	-1.74
GW001-15	tr_head	1486.12	1487.83	-1.71
GW001-16	tr_head	1485.83	1487.83	-2.01
GW001-17	tr_head	1485.40	1487.83	-2.43
GW001-18	tr_head	1486.32	1487.83	-1.51
GW001-19	tr_head	1485.53	1487.83	-2.30
GW001-20	tr_head	1485.47	1487.83	-2.37
GW001-21	tr_head	1485.99	1487.83	-1.84
GW001-22	tr_head	1485.93	1487.83	-1.91
GW001-23	tr_head	1486.29	1487.83	-1.55
GW001-24	tr_head	1486.22	1487.83	-1.61
GW001-25	tr_head	1486.19	1487.83	-1.64
GW001-26	tr_head	1485.93	1487.83	-1.91
GW001-27	tr_head	1486.15	1487.83	-1.68
GW001-28	tr_head	1485.10	1487.83	-2.73
GW001-29	tr_head	1484.91	1487.83	-2.92
GW001-30	tr_head	1485.47	1487.83	-2.37
GW001-31	tr_head	1485.79	1487.83	-2.04
GW001-32	tr_head	1485.76	1487.83	-2.07
GW001-33	tr_head	1485.79	1487.83	-2.04
GW001-34	tr_head	1485.83	1487.83	-2.01
GW001-35	tr_head	1485.60	1487.83	-2.24
GW001-36	tr_head	1485.60	1487.83	-2.24

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW001-37	tr_head	1485.63	1487.83	-2.20
GW002-1	tr_head	1783.83	1769.52	14.31
GW002-2	tr_head	1784.32	1769.52	14.80
GW002-3	tr_head	1785.07	1769.52	15.55
GW002-4	tr_head	1781.69	1769.52	12.17
GW002-5	tr_head	1795.87	1769.52	26.35
GW002-6	tr_head	1785.60	1769.52	16.08
GW002-7	tr_head	1785.47	1769.52	15.95
GW002-8	tr_head	1785.10	1769.52	15.58
GW002-9	tr_head	1785.33	1769.52	15.81
GW002-10	tr_head	1785.37	1769.52	15.85
GW002-11	tr_head	1785.14	1769.52	15.62
GW002-12	tr_head	1784.06	1769.52	14.54
GW002-13	tr_head	1784.81	1769.52	15.29
GW002-14	tr_head	1784.61	1769.52	15.09
GW002-15	tr_head	1784.58	1769.52	15.06
GW002-16	tr_head	1782.74	1769.52	13.22
GW002-17	tr_head	1784.71	1769.52	15.19
GW002-18	tr_head	1785.04	1769.52	15.52
GW002-19	tr_head	1785.10	1769.52	15.59
GW002-20	tr_head	1785.27	1769.52	15.75
GW002-21	tr_head	1784.65	1769.52	15.13
GW002-22	tr_head	1784.38	1769.52	14.86
GW002-23	tr_head	1784.94	1769.52	15.42
GW002-24	tr_head	1784.97	1769.52	15.45
GW002-25	tr_head	1784.65	1769.52	15.13
GW002-26	tr_head	1784.61	1769.52	15.09
GW002-27	tr_head	1783.89	1769.52	14.37
GW002-28	tr_head	1783.66	1769.52	14.14
GW002-29	tr_head	1785.33	1769.52	15.82
GW002-30	tr_head	1784.91	1769.52	15.39
GW002-31	tr_head	1783.33	1769.52	13.81
GW002-32	tr_head	1784.97	1769.52	15.45
GW002-33	tr_head	1784.48	1769.52	14.96
GW002-34	tr_head	1782.22	1769.52	12.70
GW002-35	tr_head	1782.25	1769.52	12.73
GW002-36	tr_head	1785.70	1769.52	16.18

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW002-37	tr_head	1785.27	1769.52	15.75
GW002-38	tr_head	1784.74	1769.52	15.22
GW002-39	tr_head	1784.68	1769.52	15.16
GW002-40	tr_head	1784.65	1769.52	15.13
GW005-1	tr_head	1614.50	1619.71	-5.20
GW005-2	tr_head	1612.34	1617.55	-5.21
GW005-3	tr_head	1611.75	1615.32	-3.57
GW005-4	tr_head	1610.07	1613.33	-3.26
GW005-5	tr_head	1608.92	1612.40	-3.48
GW005-6	tr_head	1607.97	1611.58	-3.61
GW005-7	tr_head	1606.10	1609.70	-3.59
GW005-8	tr_head	1605.38	1609.25	-3.87
GW005-9	tr_head	1604.46	1608.51	-4.04
GW005-10	tr_head	1605.41	1608.22	-2.81
GW005-11	tr_head	1603.97	1608.01	-4.04
GW005-12	tr_head	1603.31	1607.68	-4.36
GW005-13	tr_head	1603.25	1607.54	-4.29
GW005-14	tr_head	1603.35	1607.42	-4.07
GW005-15	tr_head	1602.43	1607.23	-4.80
GW005-16	tr_head	1593.14	1607.16	-14.01
GW005-17	tr_head	1601.67	1607.09	-5.42
GW005-18	tr_head	1601.71	1606.99	-5.28
GW005-19	tr_head	1601.67	1606.95	-5.28
GW005-20	tr_head	1599.02	1606.92	-7.90
GW005-21	tr_head	1598.75	1606.87	-8.12
GW005-22	tr_head	1602.00	1606.86	-4.86
GW005-23	tr_head	1601.94	1606.86	-4.92
GW005-24	tr_head	1602.43	1606.84	-4.42
GW005-25	tr_head	1602.43	1606.82	-4.40
GW005-26	tr_head	1601.84	1606.80	-4.96
GW005-27	tr_head	1602.23	1606.80	-4.56
GW005-28	tr_head	1601.57	1606.79	-5.22
GW005-29	tr_head	1601.41	1606.78	-5.37
GW005-30	tr_head	1601.38	1606.77	-5.39
GW005-31	tr_head	1602.23	1606.76	-4.52
GW005-32	tr_head	1600.52	1606.75	-6.22
GW005-33	tr_head	1600.26	1606.74	-6.48

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW005-34	tr_head	1599.90	1606.73	-6.83
GW005-35	tr_head	1608.63	1606.73	1.90
GW005-36	tr_head	1600.43	1606.73	-6.30
GW005-37	tr_head	1600.20	1606.72	-6.52
GW005-38	tr_head	1600.52	1606.72	-6.19
GW005-39	tr_head	1600.82	1606.72	-5.90
GW006-1	tr_head	1487.47	1485.27	2.20
GW006-2	tr_head	1487.20	1485.24	1.97
GW006-3	tr_head	1487.83	1485.21	2.62
GW006-4	tr_head	1487.89	1485.18	2.71
GW006-5	tr_head	1487.50	1485.17	2.33
GW006-6	tr_head	1487.43	1485.15	2.28
GW006-7	tr_head	1487.76	1485.14	2.63
GW006-8	tr_head	1486.98	1485.13	1.85
GW006-9	tr_head	1487.30	1485.12	2.18
GW006-10	tr_head	1487.86	1485.11	2.75
GW006-11	tr_head	1486.71	1485.11	1.60
GW006-12	tr_head	1487.14	1485.11	2.03
GW006-13	tr_head	1487.66	1485.10	2.56
GW006-14	tr_head	1486.58	1485.10	1.48
GW006-15	tr_head	1486.84	1485.10	1.75
GW006-16	tr_head	1487.27	1485.10	2.17
GW006-17	tr_head	1486.52	1485.10	1.42
GW006-18	tr_head	1486.75	1485.09	1.65
GW006-19	tr_head	1487.99	1485.09	2.90
GW006-20	tr_head	1488.22	1485.09	3.13
GW006-21	tr_head	1486.98	1485.09	1.88
GW006-22	tr_head	1486.98	1485.09	1.88
GW006-23	tr_head	1487.60	1485.09	2.51
GW006-24	tr_head	1487.83	1485.09	2.74
GW006-25	tr_head	1487.99	1485.09	2.90
GW006-26	tr_head	1486.81	1485.09	1.72
GW006-27	tr_head	1486.84	1485.09	1.75
GW006-28	tr_head	1487.99	1485.09	2.90
GW006-29	tr_head	1487.30	1485.09	2.21
GW006-30	tr_head	1486.78	1485.09	1.69
GW006-31	tr_head	1487.11	1485.09	2.02

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW006-32	tr_head	1487.89	1485.09	2.80
GW006-33	tr_head	1486.78	1485.09	1.69
GW006-34	tr_head	1486.65	1485.09	1.56
GW006-35	tr_head	1486.98	1485.09	1.89
GW006-36	tr_head	1487.60	1485.09	2.51
GW006-37	tr_head	1486.84	1485.09	1.75
GW006-38	tr_head	1486.55	1485.09	1.46
GW006-39	tr_head	1487.43	1485.09	2.35
GW006-40	tr_head	1487.43	1485.09	2.35
GW006-41	tr_head	1487.89	1485.09	2.80
GW006-42	tr_head	1486.94	1485.09	1.85
GW006-43	tr_head	1486.98	1485.09	1.89
GW007-1	tr_head	1510.56	1501.24	9.33
GW007-2	tr_head	1505.58	1501.19	4.39
GW007-3	tr_head	1506.59	1501.14	5.46
GW007-4	tr_head	1506.59	1501.09	5.51
GW007-5	tr_head	1505.87	1501.06	4.81
GW007-6	tr_head	1506.30	1501.04	5.26
GW007-7	tr_head	1506.20	1501.00	5.20
GW007-8	tr_head	1506.00	1500.99	5.01
GW007-9	tr_head	1506.23	1500.98	5.26
GW007-10	tr_head	1506.07	1500.96	5.11
GW007-11	tr_head	1505.91	1500.95	4.95
GW007-12	tr_head	1506.17	1500.95	5.22
GW007-13	tr_head	1505.94	1500.94	5.00
GW007-14	tr_head	1505.81	1500.93	4.87
GW007-15	tr_head	1506.10	1500.93	5.17
GW007-16	tr_head	1506.10	1500.92	5.18
GW007-17	tr_head	1505.81	1500.92	4.88
GW007-18	tr_head	1505.41	1500.92	4.49
GW007-19	tr_head	1506.20	1500.92	5.28
GW007-20	tr_head	1506.10	1500.92	5.18
GW007-21	tr_head	1505.71	1500.92	4.79
GW007-22	tr_head	1505.81	1500.92	4.89
GW007-23	tr_head	1505.81	1500.91	4.89
GW007-24	tr_head	1505.87	1500.91	4.96
GW007-25	tr_head	1505.51	1500.91	4.60

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW007-26	tr_head	1505.41	1500.91	4.50
GW007-27	tr_head	1505.77	1500.91	4.86
GW007-28	tr_head	1506.04	1500.91	5.12
GW007-29	tr_head	1505.68	1500.91	4.76
GW007-30	tr_head	1505.51	1500.91	4.60
GW007-31	tr_head	1506.40	1500.91	5.49
GW007-32	tr_head	1505.64	1500.91	4.73
GW007-33	tr_head	1505.54	1500.91	4.63
GW007-34	tr_head	1505.38	1500.91	4.47
GW007-35	tr_head	1505.58	1500.91	4.67
GW007-36	tr_head	1505.45	1500.91	4.54
GW007-37	tr_head	1505.41	1500.91	4.50
GW007-38	tr_head	1505.58	1500.91	4.67
GW007-39	tr_head	1505.77	1500.91	4.86
GW007-40	tr_head	1505.45	1500.91	4.54
GW007-41	tr_head	1505.48	1500.91	4.57
GW007-42	tr_head	1506.56	1500.91	5.65
GW007-43	tr_head	1505.54	1500.91	4.63
GW008-1	tr_head	1554.72	1560.17	-5.44
GW008-2	tr_head	1556.99	1560.16	-3.18
GW008-3	tr_head	1562.43	1560.16	2.27
GW008-4	tr_head	1558.17	1560.16	-1.99
GW008-5	tr_head	1557.55	1560.16	-2.61
GW008-6	tr_head	1555.09	1560.15	-5.07
GW008-7	tr_head	1559.42	1560.15	-0.73
GW008-8	tr_head	1557.91	1560.15	-2.24
GW008-9	tr_head	1558.46	1560.15	-1.68
GW008-10	tr_head	1559.51	1560.15	-0.63
GW008-11	tr_head	1557.32	1560.15	-2.83
GW008-12	tr_head	1557.58	1560.15	-2.57
GW008-13	tr_head	1559.22	1560.14	-0.93
GW008-14	tr_head	1557.45	1560.14	-2.70
GW008-15	tr_head	1557.61	1560.14	-2.53
GW008-16	tr_head	1557.94	1560.14	-2.20
GW008-17	tr_head	1557.68	1560.14	-2.47
GW008-18	tr_head	1557.64	1560.14	-2.50
GW008-19	tr_head	1560.33	1560.14	0.19

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW008-20	tr_head	1559.22	1560.14	-0.92
GW008-21	tr_head	1557.58	1560.14	-2.56
GW008-22	tr_head	1557.51	1560.14	-2.63
GW008-23	tr_head	1557.51	1560.14	-2.63
GW008-24	tr_head	1559.19	1560.14	-0.96
GW008-25	tr_head	1559.06	1560.14	-1.09
GW008-26	tr_head	1557.51	1560.14	-2.63
GW008-27	tr_head	1558.30	1560.14	-1.84
GW008-28	tr_head	1557.91	1560.14	-2.24
GW008-29	tr_head	1556.53	1560.14	-3.61
GW008-30	tr_head	1557.71	1560.14	-2.43
GW008-31	tr_head	1559.22	1560.14	-0.92
GW008-32	tr_head	1557.61	1560.14	-2.53
GW008-33	tr_head	1557.15	1560.14	-2.99
GW008-34	tr_head	1558.63	1560.14	-1.51
GW008-35	tr_head	1557.61	1560.14	-2.53
GW008-36	tr_head	1556.99	1560.14	-3.15
GW008-37	tr_head	1557.02	1560.14	-3.12
GW008-38	tr_head	1556.92	1560.14	-3.22
GW008-39	tr_head	1558.56	1560.14	-1.58
GW008-40	tr_head	1557.19	1560.14	-2.96
GW009-1	tr_head	1470.80	1472.92	-2.12
GW009-2	tr_head	1470.57	1472.92	-2.35
GW009-3	tr_head	1470.60	1472.92	-2.31
GW009-4	tr_head	1470.21	1472.92	-2.71
GW009-5	tr_head	1470.11	1472.92	-2.81
GW009-6	tr_head	1469.62	1472.92	-3.30
GW009-7	tr_head	1469.95	1472.92	-2.97
GW009-8	tr_head	1469.88	1472.92	-3.04
GW009-9	tr_head	1468.27	1472.92	-4.64
GW009-10	tr_head	1467.88	1472.92	-5.04
GW009-11	tr_head	1469.95	1472.92	-2.97
GW009-12	tr_head	1469.06	1472.92	-3.86
GW009-13	tr_head	1468.64	1472.92	-4.28
GW009-14	tr_head	1470.83	1472.92	-2.08
GW009-15	tr_head	1469.95	1472.92	-2.97
GW009-16	tr_head	1469.55	1472.92	-3.36

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW010-1	tr_head	1473.56	1470.77	2.79
GW010-2	tr_head	1473.49	1470.77	2.72
GW010-3	tr_head	1473.39	1470.77	2.63
GW010-4	tr_head	1473.46	1470.77	2.69
GW010-5	tr_head	1473.33	1470.77	2.56
GW010-6	tr_head	1473.59	1470.77	2.82
GW010-7	tr_head	1473.46	1470.77	2.69
GW010-8	tr_head	1473.26	1470.77	2.50
GW010-9	tr_head	1473.33	1470.77	2.56
GW010-10	tr_head	1473.88	1470.77	3.12
GW010-11	tr_head	1472.51	1470.77	1.74
GW010-12	tr_head	1473.43	1470.77	2.66
GW011-1	tr_head	1471.52	1483.14	-11.62
GW011-2	tr_head	1471.72	1483.14	-11.42
GW011-3	tr_head	1467.68	1483.14	-15.46
GW011-4	tr_head	1468.01	1483.14	-15.13
GW011-5	tr_head	1468.77	1483.14	-14.37
GW011-6	tr_head	1468.11	1483.14	-15.03
GW011-7	tr_head	1468.54	1483.14	-14.60
GW011-8	tr_head	1470.57	1483.14	-12.57
GW011-9	tr_head	1472.28	1483.14	-10.86
GW011-10	tr_head	1469.16	1483.14	-13.98
GW011-11	tr_head	1466.73	1483.14	-16.41
GW011-12	tr_head	1467.26	1483.14	-15.88
GW011-13	tr_head	1472.34	1483.14	-10.80
GW011-14	tr_head	1469.91	1483.14	-13.23
GW011-15	tr_head	1469.36	1483.14	-13.78
GW012-1	tr_head	1491.73	1492.49	-0.75
GW012-2	tr_head	1490.75	1492.49	-1.74
GW012-3	tr_head	1490.75	1492.48	-1.74
GW012-4	tr_head	1490.06	1492.48	-2.43
GW012-5	tr_head	1489.90	1492.48	-2.59
GW012-6	tr_head	1490.03	1492.48	-2.46
GW012-7	tr_head	1490.39	1492.48	-2.10
GW012-8	tr_head	1489.70	1492.48	-2.79
GW012-9	tr_head	1488.91	1492.48	-3.57
GW012-10	tr_head	1489.99	1492.48	-2.49

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW012-11	tr_head	1490.16	1492.48	-2.33
GW012-12	tr_head	1490.22	1492.48	-2.26
GW012-13	tr_head	1489.99	1492.48	-2.49
GW012-14	tr_head	1490.19	1492.48	-2.29
GW012-15	tr_head	1490.29	1492.48	-2.19
GW012-16	tr_head	1490.45	1492.48	-2.03
GW013-1	tr_head	1461.52	1461.59	-0.08
GW013-2	tr_head	1459.91	1461.59	-1.68
GW013-3	tr_head	1461.88	1461.59	0.28
GW013-4	tr_head	1462.11	1461.59	0.51
GW013-5	tr_head	1459.74	1461.59	-1.85
GW013-6	tr_head	1461.75	1461.59	0.15
GW013-7	tr_head	1459.19	1461.59	-2.41
GW013-8	tr_head	1462.43	1461.59	0.84
GW013-9	tr_head	1461.84	1461.59	0.25
GW013-10	tr_head	1460.70	1461.59	-0.90
GW014-1	tr_head	1445.21	1439.02	6.19
GW014-2	tr_head	1446.72	1439.02	7.70
GW014-3	tr_head	1447.31	1439.02	8.29
GW014-4	tr_head	1447.74	1439.02	8.72
GW014-5	tr_head	1446.65	1439.02	7.64
GW014-6	tr_head	1445.87	1439.02	6.85
GW014-7	tr_head	1447.01	1439.02	8.00
GW014-8	tr_head	1445.96	1439.02	6.95
GW014-9	tr_head	1445.80	1439.02	6.78
GW014-10	tr_head	1445.44	1439.02	6.42
GW014-11	tr_head	1446.92	1439.02	7.90
GW014-12	tr_head	1446.42	1439.02	7.41
GW014-13	tr_head	1446.59	1439.02	7.57
GW015-1	tr_head	1415.88	1416.15	-0.27
GW015-2	tr_head	1416.77	1416.15	0.61
GW015-3	tr_head	1417.22	1416.15	1.07
GW015-4	tr_head	1416.93	1416.15	0.77
GW015-5	tr_head	1415.85	1416.15	-0.31
GW015-6	tr_head	1417.13	1416.15	0.97
GW015-7	tr_head	1417.19	1416.15	1.04
GW015-8	tr_head	1416.44	1416.15	0.28

Observation ID	Group ID	Observed, ft MSL	Simulated, ft MSL	Residual, ft
GW015-9	tr_head	1417.85	1416.15	1.69
GW015-10	tr_head	1417.55	1416.15	1.40
GW015-11	tr_head	1417.19	1416.15	1.04
GW016-1	tr_head	1448.69	1460.02	-11.34
GW016-2	tr_head	1448.26	1460.02	-11.76
GW016-3	tr_head	1448.10	1460.02	-11.93
GW016-4	tr_head	1448.29	1460.02	-11.73

Large Table 4 Transient Drawdown Calibration Observations and Simulated Values

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
A-1-1	drawdown	0.00	0.01	-0.01
A-1-2	drawdown	0.16	0.05	0.12
A-1-3	drawdown	0.33	0.06	0.26
A-1-4	drawdown	0.46	0.08	0.38
A-1-5	drawdown	0.49	0.09	0.40
A-1-6	drawdown	1.15	0.10	1.04
A-1-7	drawdown	0.95	0.14	0.81
A-1-8	drawdown	0.66	0.18	0.48
A-1-9	drawdown	1.05	0.20	0.85
A-1-10	drawdown	1.38	0.21	1.16
A-1-11	drawdown	1.35	0.25	1.09
A-1-12	drawdown	1.48	0.28	1.20
A-1-13	drawdown	1.64	0.29	1.35
A-1-14	drawdown	1.67	0.30	1.38
A-1-15	drawdown	1.64	0.30	1.34
A-1-16	drawdown	1.64	0.31	1.33
A-1-17	drawdown	1.90	0.31	1.59
A-1-18	drawdown	1.90	0.32	1.59
A-1-19	drawdown	1.41	0.32	1.09
A-1-20	drawdown	1.74	0.32	1.42
A-1-21	drawdown	1.84	0.32	1.52
A-1-22	drawdown	1.74	0.32	1.42
A-1-23	drawdown	2.17	0.32	1.84
A-1-24	drawdown	2.30	0.32	1.97
A-1-25	drawdown	2.66	0.32	2.33
A-1-26	drawdown	2.66	0.32	2.33
A-1-27	drawdown	2.07	0.32	1.74
A-1-28	drawdown	2.20	0.32	1.87
A-1-29	drawdown	2.10	0.33	1.77
A-3-1	drawdown	0.00	0.00	0.00
A-3-2	drawdown	0.56	0.07	0.49
A-3-3	drawdown	0.82	0.12	0.70
A-3-4	drawdown	0.98	0.17	0.81
A-3-5	drawdown	1.18	0.22	0.96
A-3-6	drawdown	1.77	0.29	1.48
A-3-7	drawdown	2.00	0.52	1.49

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
A-3-8	drawdown	1.61	0.83	0.77
A-3-9	drawdown	1.94	1.07	0.87
A-3-10	drawdown	2.30	1.31	0.98
A-3-11	drawdown	3.12	2.02	1.09
A-3-12	drawdown	3.15	2.49	0.66
A-3-13	drawdown	2.53	2.76	-0.24
A-3-14	drawdown	3.90	3.07	0.83
A-3-15	drawdown	4.04	3.28	0.76
A-3-16	drawdown	4.04	3.44	0.59
A-3-17	drawdown	4.33	3.61	0.73
A-3-18	drawdown	4.33	3.70	0.63
A-3-19	drawdown	3.84	3.80	0.04
A-3-20	drawdown	4.10	3.86	0.24
A-3-21	drawdown	4.17	3.92	0.25
A-3-22	drawdown	4.30	3.95	0.35
A-3-23	drawdown	4.40	3.98	0.42
A-3-24	drawdown	4.49	4.00	0.49
A-3-25	drawdown	4.72	4.02	0.71
A-3-26	drawdown	4.69	4.03	0.66
A-3-27	drawdown	5.02	4.04	0.98
A-3-28	drawdown	5.25	4.06	1.19
A-9-1	drawdown	0.00	0.15	-0.15
A-9-2	drawdown	0.62	1.04	-0.42
A-9-3	drawdown	0.72	1.48	-0.76
A-9-4	drawdown	0.85	1.81	-0.95
A-9-5	drawdown	0.95	2.13	-1.18
A-9-6	drawdown	1.80	2.48	-0.67
A-9-7	drawdown	0.95	3.34	-2.39
A-9-8	drawdown	0.92	4.59	-3.67
A-9-9	drawdown	0.03	4.98	-4.94
A-9-10	drawdown	0.92	5.81	-4.89
A-9-11	drawdown	1.67	6.23	-4.55
A-9-12	drawdown	1.12	6.44	-5.32
A-9-13	drawdown	1.08	6.67	-5.58
A-9-14	drawdown	1.02	6.81	-5.79
A-9-15	drawdown	1.02	6.92	-5.90
A-9-16	drawdown	1.05	7.02	-5.97

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
A-9-17	drawdown	1.05	7.08	-6.03
A-9-18	drawdown	1.02	7.14	-6.12
A-9-19	drawdown	1.05	7.18	-6.13
A-9-20	drawdown	0.92	7.21	-6.29
A-9-21	drawdown	1.02	7.23	-6.21
A-9-22	drawdown	1.02	7.25	-6.23
A-9-23	drawdown	1.05	7.26	-6.21
A-9-24	drawdown	1.05	7.27	-6.22
A-9-25	drawdown	1.05	7.28	-6.23
A-9-26	drawdown	1.05	7.29	-6.24
A-9-27	drawdown	1.05	7.29	-6.24
A-9-28	drawdown	1.05	7.29	-6.24
A-9-29	drawdown	1.05	7.30	-6.25
B-2-1	drawdown	0.00	0.16	-0.16
B-2-2	drawdown	-0.46	0.19	-0.65
B-2-3	drawdown	0.10	0.22	-0.12
B-2-4	drawdown	0.23	0.30	-0.07
B-2-5	drawdown	-0.10	0.38	-0.47
B-2-6	drawdown	0.49	0.42	0.07
B-2-7	drawdown	0.36	0.47	-0.11
B-2-8	drawdown	0.39	0.57	-0.17
B-2-9	drawdown	-0.07	0.61	-0.68
B-2-10	drawdown	0.43	0.64	-0.21
B-2-11	drawdown	0.30	0.67	-0.37
B-2-12	drawdown	0.30	0.68	-0.39
B-2-13	drawdown	0.39	0.69	-0.30
B-2-14	drawdown	0.39	0.71	-0.31
B-2-15	drawdown	0.43	0.71	-0.28
B-2-16	drawdown	0.33	0.72	-0.39
B-2-17	drawdown	0.30	0.72	-0.43
B-2-18	drawdown	2.99	0.72	2.26
B-2-19	drawdown	0.39	0.73	-0.33
B-2-20	drawdown	0.36	0.73	-0.37
B-2-21	drawdown	2.40	0.73	1.67
B-2-22	drawdown	1.38	0.73	0.65
B-2-23	drawdown	2.69	0.73	1.96
B-2-24	drawdown	0.39	0.73	-0.34

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
B-2-25	drawdown	0.43	0.73	-0.31
B-2-26	drawdown	0.39	0.73	-0.34
D-1-1	drawdown	0.00	-0.03	0.03
D-1-2	drawdown	1.48	0.10	1.37
D-1-3	drawdown	2.36	0.28	2.09
D-1-4	drawdown	2.72	0.43	2.29
D-1-5	drawdown	2.53	0.54	1.98
D-1-6	drawdown	3.35	0.61	2.74
D-1-7	drawdown	3.58	0.72	2.85
D-1-8	drawdown	2.99	0.84	2.14
D-1-9	drawdown	3.44	0.86	2.58
D-1-10	drawdown	4.43	0.92	3.51
D-1-11	drawdown	5.02	1.03	3.99
D-1-12	drawdown	5.35	1.55	3.80
D-1-13	drawdown	5.18	1.79	3.39
D-1-14	drawdown	5.81	1.90	3.91
D-1-15	drawdown	5.84	1.99	3.85
D-1-16	drawdown	6.20	2.05	4.15
D-1-17	drawdown	6.20	2.09	4.11
D-1-18	drawdown	7.51	2.12	5.39
D-1-19	drawdown	7.51	2.14	5.37
D-1-20	drawdown	6.27	2.16	4.11
D-1-21	drawdown	5.87	2.17	3.71
D-1-22	drawdown	5.91	2.18	3.73
D-1-23	drawdown	6.63	2.18	4.45
D-1-24	drawdown	6.56	2.18	4.38
D-1-25	drawdown	7.55	2.19	5.36
D-1-26	drawdown	6.99	2.19	4.80
D-1-27	drawdown	7.71	2.19	5.52
D-1-28	drawdown	8.66	2.19	6.47
D-1-29	drawdown	7.71	2.19	5.52
D-1-30	drawdown	7.71	2.19	5.52
D-1-31	drawdown	3.84	2.19	1.64
D-4-1	drawdown	0.00	0.29	-0.29
D-4-2	drawdown	-0.59	0.38	-0.97
D-4-3	drawdown	0.26	0.40	-0.14
D-4-4	drawdown	-0.82	0.53	-1.35

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
D-4-5	drawdown	1.35	0.95	0.39
D-4-6	drawdown	2.07	1.66	0.41
D-4-7	drawdown	1.84	1.96	-0.12
D-4-8	drawdown	2.36	2.09	0.27
D-4-9	drawdown	1.57	2.22	-0.64
D-4-10	drawdown	1.61	2.29	-0.68
D-4-11	drawdown	1.61	2.34	-0.73
D-4-12	drawdown	5.68	2.38	3.30
D-4-13	drawdown	5.68	2.40	3.28
D-4-14	drawdown	1.94	2.42	-0.49
D-4-15	drawdown	-0.20	2.43	-2.63
D-4-16	drawdown	0.98	2.44	-1.46
D-4-17	drawdown	0.69	2.45	-1.76
D-4-18	drawdown	1.84	2.46	-0.62
D-4-19	drawdown	1.71	2.46	-0.75
D-4-20	drawdown	0.89	2.46	-1.58
D-4-21	drawdown	1.80	2.46	-0.66
D-4-22	drawdown	3.28	2.47	0.82
D-4-23	drawdown	-0.95	2.47	-3.42
D-4-24	drawdown	-3.74	2.47	-6.21
DH96-28-1	drawdown	0.00	0.00	0.00
DH96-28-2	drawdown	0.23	0.01	0.22
DH96-28-3	drawdown	1.15	0.07	1.08
DH96-28-4	drawdown	1.38	0.11	1.27
DH96-28-5	drawdown	2.07	0.16	1.91
DH96-28-6	drawdown	1.15	0.22	0.93
DH96-28-7	drawdown	2.07	0.29	1.78
DH96-28-8	drawdown	2.07	0.51	1.56
DH96-28-9	drawdown	3.94	0.77	3.16
DH96-28-10	drawdown	4.40	0.95	3.45
DH96-28-11	drawdown	5.77	1.12	4.66
DH96-28-12	drawdown	4.40	1.52	2.87
DH96-28-13	drawdown	7.61	1.75	5.86
DH96-28-14	drawdown	6.92	1.87	5.06
DH96-28-15	drawdown	7.15	1.99	5.16
DH96-28-16	drawdown	7.61	2.07	5.54
DH96-28-17	drawdown	7.84	2.13	5.71

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
DH96-28-18	drawdown	7.38	2.18	5.20
DH96-28-19	drawdown	7.61	2.21	5.40
DH96-28-20	drawdown	9.25	2.24	7.01
DH96-28-21	drawdown	9.71	2.26	7.45
DH96-28-22	drawdown	5.09	2.28	2.81
DH96-28-23	drawdown	8.79	2.28	6.51
DH96-28-24	drawdown	8.79	2.29	6.50
DH96-28-25	drawdown	8.79	2.30	6.50
DH96-28-26	drawdown	4.40	2.30	2.09
DH96-28-27	drawdown	8.07	2.31	5.77
DH96-28-28	drawdown	8.07	2.31	5.76
DH96-28-29	drawdown	6.46	2.31	4.15
DH96-28-30	drawdown	9.48	2.31	7.17
DH96-28-31	drawdown	6.92	2.31	4.61
DH96-30-1	drawdown	0.00	0.00	0.00
DH96-30-2	drawdown	0.46	0.03	0.43
DH96-30-3	drawdown	1.15	0.14	1.01
DH96-30-4	drawdown	1.15	0.19	0.96
DH96-30-5	drawdown	0.92	0.26	0.66
DH96-30-6	drawdown	0.92	0.34	0.58
DH96-30-7	drawdown	1.38	0.43	0.95
DH96-30-8	drawdown	1.84	0.69	1.15
DH96-30-9	drawdown	3.71	0.98	2.73
DH96-30-10	drawdown	3.94	1.16	2.78
DH96-30-11	drawdown	2.53	1.32	1.21
DH96-30-12	drawdown	3.02	1.70	1.32
DH96-30-13	drawdown	-5.77	1.90	-7.67
DH96-30-14	drawdown	-5.77	1.99	-7.77
DH96-30-15	drawdown	-6.00	2.10	-8.10
DH96-30-16	drawdown	-6.23	2.16	-8.39
DH96-30-17	drawdown	-6.00	2.21	-8.21
DH96-30-18	drawdown	-5.77	2.25	-8.03
DH96-30-19	drawdown	-6.00	2.28	-8.28
DH96-30-20	drawdown	-4.40	2.30	-6.70
DH96-30-21	drawdown	-3.71	2.31	-6.02
DH96-30-22	drawdown	-4.40	2.33	-6.72
DH96-30-23	drawdown	-4.17	2.33	-6.50

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
DH96-30-24	drawdown	-3.94	2.34	-6.28
DH96-30-25	drawdown	-3.71	2.34	-6.05
DH96-30-26	drawdown	-5.31	2.35	-7.66
DH96-30-27	drawdown	-3.94	2.35	-6.29
DH96-30-28	drawdown	-13.85	2.35	-16.20
DH96-30-29	drawdown	-7.38	2.35	-9.74
DH96-30-30	drawdown	-0.69	2.35	-3.04
DH96-30-31	drawdown	4.86	2.36	2.50
DH96-32-1	drawdown	0.00	0.05	-0.05
DH96-32-2	drawdown	0.23	0.13	0.10
DH96-32-3	drawdown	1.61	0.34	1.26
DH96-32-4	drawdown	2.53	0.43	2.10
DH96-32-5	drawdown	3.02	0.53	2.48
DH96-32-6	drawdown	2.30	0.64	1.66
DH96-32-7	drawdown	2.76	0.76	2.00
DH96-32-8	drawdown	2.30	1.08	1.21
DH96-32-9	drawdown	4.86	1.42	3.43
DH96-32-10	drawdown	3.94	1.62	2.31
DH96-32-11	drawdown	4.86	1.80	3.05
DH96-32-12	drawdown	5.54	2.21	3.34
DH96-32-13	drawdown	5.54	2.41	3.13
DH96-32-14	drawdown	6.00	2.51	3.50
DH96-32-15	drawdown	5.77	2.61	3.16
DH96-32-16	drawdown	6.46	2.67	3.79
DH96-32-17	drawdown	6.00	2.72	3.28
DH96-32-18	drawdown	6.69	2.76	3.93
DH96-32-19	drawdown	6.69	2.79	3.91
DH96-32-20	drawdown	9.94	2.81	7.13
DH96-32-21	drawdown	10.40	2.82	7.58
DH96-32-22	drawdown	11.55	2.83	8.71
DH96-32-23	drawdown	9.94	2.84	7.10
DH96-32-24	drawdown	10.40	2.85	7.55
DH96-32-25	drawdown	6.00	2.85	3.15
DH96-32-26	drawdown	3.94	2.85	1.08
DH96-32-27	drawdown	6.23	2.86	3.38
DH96-32-28	drawdown	4.86	2.86	2.00
DH96-32-29	drawdown	10.17	2.86	7.31

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
DH96-32-30	drawdown	11.78	2.86	8.92
DH96-32-31	drawdown	11.09	2.86	8.23
DH96-37-1	drawdown	0.00	-0.03	0.03
DH96-37-2	drawdown	1.61	0.12	1.49
DH96-37-3	drawdown	1.84	0.18	1.65
DH96-37-4	drawdown	1.84	0.25	1.58
DH96-37-5	drawdown	0.23	0.28	-0.05
DH96-37-6	drawdown	0.46	0.30	0.16
DH96-37-7	drawdown	0.23	0.33	-0.10
DH96-37-8	drawdown	1.38	0.36	1.02
DH96-37-9	drawdown	1.84	0.38	1.46
DH96-37-10	drawdown	2.30	0.39	1.91
DH96-37-11	drawdown	2.53	0.42	2.10
DH96-37-12	drawdown	2.30	0.44	1.86
DH96-37-13	drawdown	1.61	0.45	1.16
DH96-37-14	drawdown	2.30	0.45	1.84
DH96-37-15	drawdown	2.53	0.46	2.07
DH96-37-16	drawdown	2.07	0.46	1.61
DH96-37-17	drawdown	2.53	0.46	2.06
DH96-37-18	drawdown	1.84	0.47	1.37
DH96-37-19	drawdown	2.76	0.47	2.29
DH96-37-20	drawdown	3.94	0.47	3.47
DH96-37-21	drawdown	0.92	0.47	0.45
DH96-37-22	drawdown	3.25	0.47	2.78
DH96-37-23	drawdown	3.48	0.47	3.01
DH96-37-24	drawdown	3.48	0.47	3.01
DH96-37-25	drawdown	2.07	0.47	1.60
DH96-37-26	drawdown	3.25	0.47	2.78
DH96-37-27	drawdown	1.38	0.47	0.91
DH96-37-28	drawdown	0.92	0.47	0.45
DH96-37-29	drawdown	2.07	0.47	1.60
DH96-37-30	drawdown	0.92	0.47	0.45
DNR-1-1	drawdown	0.26	0.19	0.07
DNR-1-2	drawdown	0.98	0.44	0.55
DNR-1-3	drawdown	1.15	0.92	0.23
DNR-1-4	drawdown	1.41	1.40	0.01
DNR-1-5	drawdown	1.44	2.00	-0.56

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
DNR-1-6	drawdown	1.54	2.03	-0.48
DNR-1-7	drawdown	1.57	2.19	-0.61
DNR-1-8	drawdown	1.74	2.72	-0.98
DNR-1-9	drawdown	2.03	3.29	-1.26
DNR-1-10	drawdown	2.13	3.61	-1.48
DNR-1-11	drawdown	7.12	4.13	2.99
DNR-1-12	drawdown	6.33	4.56	1.77
DNR-1-13	drawdown	6.63	5.36	1.26
DNR-1-14	drawdown	6.66	5.87	0.79
DNR-1-15	drawdown	6.00	6.79	-0.78
DNR-1-16	drawdown	6.56	7.30	-0.74
DNR-1-17	drawdown	6.99	7.79	-0.80
DNR-1-18	drawdown	7.09	8.29	-1.20
DNR-1-19	drawdown	7.09	8.53	-1.44
DNR-1-20	drawdown	7.45	9.34	-1.89
DNR-1-21	drawdown	7.81	9.77	-1.96
DNR-1-22	drawdown	8.17	10.05	-1.88
DNR-2-1	drawdown	0.39	0.69	-0.30
DNR-2-2	drawdown	0.98	1.44	-0.46
DNR-2-3	drawdown	1.67	2.65	-0.98
DNR-2-4	drawdown	2.10	3.66	-1.56
DNR-2-5	drawdown	2.33	4.83	-2.50
DNR-2-6	drawdown	2.53	4.87	-2.35
DNR-2-7	drawdown	2.76	5.17	-2.41
DNR-2-8	drawdown	3.38	6.12	-2.74
DNR-2-9	drawdown	3.94	7.11	-3.17
DNR-2-10	drawdown	3.90	7.64	-3.73
DNR-2-11	drawdown	12.17	8.50	3.67
DNR-2-12	drawdown	12.17	9.22	2.95
DNR-2-13	drawdown	12.66	10.51	2.15
DNR-2-14	drawdown	12.86	11.32	1.54
DNR-2-15	drawdown	11.75	12.79	-1.04
DNR-2-16	drawdown	12.17	13.61	-1.44
DNR-2-17	drawdown	12.86	14.39	-1.53
DNR-2-18	drawdown	13.12	15.19	-2.07
DNR-2-19	drawdown	13.25	15.58	-2.33
DNR-2-20	drawdown	13.91	16.90	-2.99

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
DNR-2-21	drawdown	14.73	17.60	-2.87
DNR-2-22	drawdown	14.80	18.06	-3.26
DNR-3-1	drawdown	2.03	0.75	1.28
DNR-3-2	drawdown	2.46	1.58	0.88
DNR-3-3	drawdown	2.95	2.90	0.05
DNR-3-4	drawdown	3.28	3.96	-0.68
DNR-3-5	drawdown	3.61	5.15	-1.54
DNR-3-6	drawdown	3.67	5.19	-1.52
DNR-3-7	drawdown	4.10	5.48	-1.37
DNR-3-8	drawdown	4.43	6.38	-1.95
DNR-3-9	drawdown	4.99	7.28	-2.30
DNR-3-10	drawdown	4.99	7.75	-2.76
DNR-3-11	drawdown	7.97	8.44	-0.46
DNR-3-12	drawdown	8.14	8.96	-0.83
DNR-3-13	drawdown	8.60	9.83	-1.24
DNR-3-14	drawdown	8.96	10.33	-1.37
DNR-3-15	drawdown	9.48	11.14	-1.66
DNR-3-16	drawdown	10.27	11.56	-1.29
DNR-3-17	drawdown	10.60	11.94	-1.34
DNR-3-18	drawdown	10.86	12.31	-1.45
DNR-3-19	drawdown	11.06	12.49	-1.44
DNR-3-20	drawdown	11.84	13.10	-1.26
DNR-3-21	drawdown	12.40	13.47	-1.07
DNR-3-22	drawdown	12.83	13.78	-0.95
DNR-4-1	drawdown	6.36	0.46	5.90
DNR-4-2	drawdown	7.87	0.99	6.88
DNR-4-3	drawdown	8.86	1.91	6.95
DNR-4-4	drawdown	10.60	2.71	7.88
DNR-4-5	drawdown	11.12	3.67	7.45
DNR-4-6	drawdown	11.65	3.71	7.94
DNR-4-7	drawdown	12.20	3.96	8.25
DNR-4-8	drawdown	13.02	4.76	8.26
DNR-4-9	drawdown	13.68	5.61	8.07
DNR-4-10	drawdown	12.99	6.07	6.93
DNR-4-11	drawdown	19.16	6.80	12.36
DNR-4-12	drawdown	20.28	7.41	12.86
DNR-4-13	drawdown	20.01	8.53	11.48

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
DNR-4-14	drawdown	19.82	9.24	10.58
DNR-4-15	drawdown	19.46	10.54	8.92
DNR-4-16	drawdown	20.83	11.27	9.56
DNR-4-17	drawdown	21.69	11.97	9.71
DNR-4-18	drawdown	21.65	12.70	8.95
DNR-4-19	drawdown	22.18	13.06	9.12
DNR-4-20	drawdown	23.79	14.28	9.50
DNR-4-21	drawdown	25.26	14.96	10.30
DNR-4-22	drawdown	26.25	15.43	10.82
DNR-5-1	drawdown	0.66	0.78	-0.12
DNR-5-2	drawdown	1.31	1.67	-0.36
DNR-5-3	drawdown	2.03	3.19	-1.16
DNR-5-4	drawdown	2.62	4.51	-1.89
DNR-5-5	drawdown	2.89	6.08	-3.19
DNR-5-6	drawdown	3.15	6.13	-2.98
DNR-5-7	drawdown	3.44	6.53	-3.09
DNR-5-8	drawdown	4.00	7.82	-3.82
DNR-5-9	drawdown	4.56	9.16	-4.60
DNR-5-10	drawdown	4.79	9.88	-5.09
DNR-5-11	drawdown	5.81	11.07	-5.26
DNR-5-12	drawdown	7.74	12.05	-4.31
DNR-5-13	drawdown	12.07	13.83	-1.76
DNR-6-1	drawdown	0.00	0.41	-0.41
DNR-6-2	drawdown	0.39	0.47	-0.08
DNR-6-3	drawdown	-0.03	0.57	-0.60
DNR-6-4	drawdown	-0.13	0.63	-0.76
DNR-6-5	drawdown	-0.92	0.73	-1.65
DNR-6-6	drawdown	-1.02	0.80	-1.81
DNR-6-7	drawdown	-0.69	0.92	-1.61
DNR-6-8	drawdown	-1.02	0.99	-2.01
DNR-6-9	drawdown	-0.43	1.06	-1.49
DNR-6-10	drawdown	-0.69	1.14	-1.83
DNR-6-11	drawdown	-0.36	1.18	-1.54
DNR-6-12	drawdown	0.07	1.32	-1.25
DNR-6-13	drawdown	0.79	1.43	-0.64
DNR-6-14	drawdown	1.08	1.52	-0.44
E-5-1	drawdown	0.00	0.03	-0.03

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
E-5-2	drawdown	1.57	0.34	1.23
E-5-3	drawdown	2.20	0.55	1.65
E-5-4	drawdown	2.59	0.73	1.86
E-5-5	drawdown	2.62	0.92	1.70
E-5-6	drawdown	3.25	1.14	2.10
E-5-7	drawdown	4.56	1.83	2.73
E-5-8	drawdown	5.31	2.66	2.66
E-5-9	drawdown	6.10	3.20	2.90
E-5-10	drawdown	6.59	3.73	2.86
E-5-11	drawdown	7.61	5.15	2.46
E-5-12	drawdown	8.66	6.00	2.66
E-5-13	drawdown	7.32	6.46	0.85
E-5-14	drawdown	7.38	6.97	0.41
E-5-15	drawdown	9.42	7.29	2.13
E-5-16	drawdown	9.42	7.54	1.87
E-5-17	drawdown	9.42	7.77	1.64
E-5-18	drawdown	9.42	7.90	1.52
E-5-19	drawdown	9.51	8.03	1.48
E-5-20	drawdown	9.51	8.11	1.40
E-5-21	drawdown	9.48	8.18	1.30
E-5-22	drawdown	9.45	8.22	1.23
E-5-23	drawdown	9.51	8.26	1.26
E-5-24	drawdown	9.51	8.28	1.23
E-5-25	drawdown	9.51	8.30	1.21
E-5-26	drawdown	9.51	8.32	1.20
E-5-27	drawdown	9.51	8.33	1.18
F-2-1	drawdown	0.00	-0.18	0.18
F-2-2	drawdown	1.51	0.29	1.22
F-2-3	drawdown	1.57	0.59	0.99
F-2-4	drawdown	1.71	0.78	0.93
F-2-5	drawdown	1.61	0.80	0.81
F-2-6	drawdown	2.43	0.80	1.63
F-2-7	drawdown	2.53	0.80	1.72
F-2-8	drawdown	0.69	0.80	-0.11
F-2-9	drawdown	1.87	0.80	1.07
F-2-10	drawdown	1.57	0.81	0.77
F-2-11	drawdown	2.26	0.81	1.46

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
F-2-12	drawdown	2.56	0.81	1.75
F-2-13	drawdown	3.15	0.81	2.34
F-2-14	drawdown	3.22	0.81	2.41
F-2-15	drawdown	4.95	0.81	4.14
F-2-16	drawdown	5.09	0.81	4.28
F-2-17	drawdown	5.02	0.81	4.21
F-2-18	drawdown	5.28	0.81	4.47
F-2-19	drawdown	5.45	0.81	4.64
F-2-20	drawdown	5.64	0.81	4.83
F-2-21	drawdown	5.54	0.81	4.73
F-2-22	drawdown	5.71	0.81	4.90
F-2-23	drawdown	8.46	0.81	7.65
F-2-24	drawdown	6.76	0.81	5.95
F-2-25	drawdown	6.56	0.81	5.75
F-2-26	drawdown	6.92	0.81	6.11
F-2-27	drawdown	14.37	0.81	13.56
F-2-28	drawdown	10.83	0.81	10.02
F-2-29	drawdown	9.65	0.81	8.83
F-2-30	drawdown	10.47	0.81	9.66
G-2-1	drawdown	0.00	-0.03	0.03
G-2-2	drawdown	0.39	0.06	0.33
G-2-3	drawdown	0.46	0.13	0.33
G-2-4	drawdown	0.52	0.19	0.34
G-2-5	drawdown	1.08	0.20	0.88
G-2-6	drawdown	1.57	0.20	1.37
G-2-7	drawdown	1.48	0.20	1.27
G-2-8	drawdown	0.85	0.21	0.65
G-2-9	drawdown	1.38	0.21	1.17
G-2-10	drawdown	1.67	0.21	1.47
G-2-11	drawdown	1.35	0.21	1.14
G-2-12	drawdown	1.48	0.21	1.27
G-2-13	drawdown	1.02	0.21	0.81
G-2-14	drawdown	1.05	0.21	0.84
G-2-15	drawdown	2.17	0.21	1.96
G-2-16	drawdown	2.17	0.21	1.96
G-2-17	drawdown	2.59	0.21	2.38
G-2-18	drawdown	2.59	0.21	2.38

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
G-2-19	drawdown	1.54	0.21	1.33
G-2-20	drawdown	1.74	0.21	1.53
G-2-21	drawdown	1.84	0.21	1.63
G-2-22	drawdown	1.51	0.21	1.30
G-2-23	drawdown	2.53	0.21	2.32
G-2-24	drawdown	2.53	0.21	2.32
G-2-25	drawdown	2.33	0.21	2.12
G-2-26	drawdown	2.53	0.21	2.32
G-2-27	drawdown	-17.59	0.21	-17.79
G-2-28	drawdown	-14.73	0.21	-14.94
G-2-29	drawdown	6.33	0.21	6.12
G-2-30	drawdown	2.79	0.21	2.58
GW004-1DD	drawdown	1.12	0.71	0.41
GW004-2DD	drawdown	2.59	1.72	0.87
GW004-3DD	drawdown	2.72	2.94	-0.22
GW004-4DD	drawdown	4.13	4.23	-0.09
GW004-5DD	drawdown	4.69	4.88	-0.19
GW004-6DD	drawdown	5.51	5.50	0.01
GW004-7DD	drawdown	5.38	6.62	-1.24
GW004-8DD	drawdown	6.79	7.08	-0.29
GW004-9DD	drawdown	7.22	7.49	-0.27
GW004-10DD	drawdown	8.07	8.19	-0.12
GW004-11DD	drawdown	8.01	8.47	-0.46
GW004-12DD	drawdown	8.23	8.67	-0.43
GW004-13DD	drawdown	8.79	9.00	-0.20
GW004-14DD	drawdown	9.15	9.13	0.02
GW004-15DD	drawdown	8.86	9.25	-0.39
GW004-16DD	drawdown	9.58	9.43	0.15
GW004-17DD	drawdown	9.97	9.51	0.47
GW004-18DD	drawdown	9.94	9.57	0.37
GW004-19DD	drawdown	9.61	9.67	-0.06
GW004-20DD	drawdown	9.61	9.70	-0.09
GW004-21DD	drawdown	9.38	9.74	-0.35
GW005-1DD	drawdown	1.41	1.58	-0.17
GW005-2DD	drawdown	3.58	3.74	-0.16
GW005-3DD	drawdown	4.17	5.97	-1.80
GW005-4DD	drawdown	5.84	7.96	-2.12

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
GW005-5DD	drawdown	6.99	8.89	-1.90
GW005-6DD	drawdown	7.94	9.71	-1.77
GW005-7DD	drawdown	9.78	11.59	-1.81
GW005-8DD	drawdown	10.53	12.04	-1.51
GW005-9DD	drawdown	11.45	12.78	-1.33
GW005-10DD	drawdown	10.50	13.07	-2.57
GW005-11DD	drawdown	11.91	13.28	-1.37
GW005-12DD	drawdown	12.57	13.61	-1.05
GW005-13DD	drawdown	12.63	13.75	-1.12
GW005-14DD	drawdown	12.53	13.87	-1.34
GW005-15DD	drawdown	13.48	14.06	-0.57
GW005-16DD	drawdown	14.21	14.19	0.01
GW005-17DD	drawdown	14.17	14.30	-0.12
GW005-18DD	drawdown	14.21	14.34	-0.13
GW005-19DD	drawdown	16.86	14.37	2.50
GW005-20DD	drawdown	17.13	14.42	2.71
GW005-21DD	drawdown	13.91	14.42	-0.51
GW005-22DD	drawdown	13.94	14.43	-0.49
GW005-23DD	drawdown	13.48	14.44	-0.96
GW005-24DD	drawdown	13.45	14.46	-1.01
GW005-25DD	drawdown	14.07	14.49	-0.42
GW005-26DD	drawdown	13.68	14.49	-0.81
GW005-27DD	drawdown	14.30	14.50	-0.19
GW005-28DD	drawdown	14.50	14.51	-0.01
GW005-29DD	drawdown	14.53	14.52	0.02
GW005-30DD	drawdown	14.30	14.53	-0.23
GW005-31DD	drawdown	15.39	14.54	0.85
GW005-32DD	drawdown	15.62	14.55	1.07
GW005-33DD	drawdown	16.01	14.56	1.45
GW005-34DD	drawdown	7.28	14.56	-7.28
GW005-35DD	drawdown	15.49	14.56	0.92
GW005-36DD	drawdown	15.72	14.57	1.15
GW005-37DD	drawdown	15.39	14.57	0.82
GW005-38DD	drawdown	15.09	14.57	0.52
P1H1-99-1	drawdown	0.00	0.00	0.00
P1H1-99-2	drawdown	0.07	0.01	0.05
P1H1-99-3	drawdown	0.26	0.08	0.19

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
P1H1-99-4	drawdown	0.49	0.15	0.35
P1H1-99-5	drawdown	0.66	0.21	0.45
P1H1-99-6	drawdown	0.72	0.28	0.44
P1H1-99-7	drawdown	0.92	0.37	0.55
P1H1-99-8	drawdown	1.05	0.65	0.40
P1H1-99-9	drawdown	1.77	1.01	0.76
P1H1-99-10	drawdown	1.90	1.26	0.65
P1H1-99-11	drawdown	2.40	1.50	0.89
P1H1-99-12	drawdown	2.89	2.13	0.75
P1H1-99-13	drawdown	3.74	2.51	1.23
P1H1-99-14	drawdown	3.94	2.70	1.24
P1H1-99-15	drawdown	3.90	2.91	0.99
P1H1-99-16	drawdown	4.30	3.05	1.25
P1H1-99-17	drawdown	4.40	3.15	1.24
P1H1-99-18	drawdown	4.56	3.25	1.31
P1H1-99-19	drawdown	4.66	3.30	1.36
P1H1-99-20	drawdown	4.40	3.36	1.04
P1H1-99-21	drawdown	4.23	3.39	0.85
P1H1-99-22	drawdown	4.27	3.42	0.85
P1H1-99-23	drawdown	4.72	3.43	1.29
P1H1-99-24	drawdown	5.18	3.45	1.74
P1H1-99-25	drawdown	5.35	3.46	1.89
P1H1-99-26	drawdown	5.28	3.47	1.82
P1H1-99-27	drawdown	5.87	3.47	2.40
P1H1-99-28	drawdown	6.04	3.48	2.56
P1H1-99-29	drawdown	6.10	3.48	2.62
P1H1-99-30	drawdown	6.40	3.48	2.92
P1H1-99-31	drawdown	5.31	3.48	1.83
P1H-99-1	drawdown	0.00	0.00	0.00
P1H-99-2	drawdown	0.16	0.01	0.15
P1H-99-3	drawdown	0.23	0.06	0.17
P1H-99-4	drawdown	0.30	0.13	0.17
P1H-99-5	drawdown	0.43	0.19	0.24
P1H-99-6	drawdown	0.69	0.25	0.44
P1H-99-7	drawdown	1.31	0.33	0.99
P1H-99-8	drawdown	1.35	0.55	0.79
P1H-99-9	drawdown	1.35	0.82	0.53

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
P1H-99-10	drawdown	1.54	0.98	0.56
P1H-99-11	drawdown	1.80	1.13	0.67
P1H-99-12	drawdown	2.17	1.49	0.67
P1H-99-13	drawdown	2.89	1.69	1.20
P1H-99-14	drawdown	2.92	1.78	1.14
P1H-99-15	drawdown	3.48	1.88	1.59
P1H-99-16	drawdown	3.51	1.95	1.56
P1H-99-17	drawdown	3.58	2.00	1.58
P1H-99-18	drawdown	3.81	2.04	1.77
P1H-99-19	drawdown	3.87	2.06	1.81
P1H-99-20	drawdown	3.41	2.09	1.32
P1H-99-21	drawdown	3.41	2.10	1.31
P1H-99-22	drawdown	3.54	2.11	1.43
P1H-99-23	drawdown	4.04	2.12	1.91
P1H-99-24	drawdown	4.49	2.13	2.37
P1H-99-25	drawdown	4.79	2.13	2.66
P1H-99-26	drawdown	5.05	2.14	2.92
P1H-99-27	drawdown	5.28	2.14	3.14
P1H-99-28	drawdown	5.58	2.14	3.44
P1H-99-29	drawdown	5.64	2.14	3.50
P1H-99-30	drawdown	6.07	2.14	3.93
P1H-99-31	drawdown	4.92	2.14	2.78
P2H1-99-1	drawdown	0.00	0.00	0.00
P2H1-99-2	drawdown	0.13	0.01	0.12
P2H1-99-3	drawdown	0.33	0.08	0.25
P2H1-99-4	drawdown	0.39	0.14	0.25
P2H1-99-5	drawdown	0.49	0.21	0.28
P2H1-99-6	drawdown	0.89	0.28	0.61
P2H1-99-7	drawdown	1.54	0.37	1.17
P2H1-99-8	drawdown	0.72	0.65	0.07
P2H1-99-9	drawdown	1.61	1.01	0.59
P2H1-99-10	drawdown	1.61	1.07	0.53
P2H1-99-11	drawdown	1.74	1.26	0.48
P2H1-99-12	drawdown	1.94	1.51	0.42
P2H1-99-13	drawdown	2.20	2.15	0.04
P2H1-99-14	drawdown	2.13	2.54	-0.41
P2H1-99-15	drawdown	1.84	2.73	-0.89

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
P2H1-99-16	drawdown	1.87	2.95	-1.08
P2H1-99-17	drawdown	1.87	3.08	-1.21
P2H1-99-18	drawdown	1.87	3.19	-1.32
P2H1-99-19	drawdown	1.87	3.29	-1.42
P2H1-99-20	drawdown	1.64	3.34	-1.70
P2H1-99-21	drawdown	1.48	3.40	-1.92
P2H1-99-22	drawdown	1.71	3.43	-1.72
P2H1-99-23	drawdown	1.08	3.46	-2.38
P2H1-99-24	drawdown	1.64	3.48	-1.84
P2H1-99-25	drawdown	1.64	3.49	-1.85
P2H1-99-26	drawdown	1.64	3.50	-1.86
P2H1-99-27	drawdown	1.67	3.51	-1.84
P2H1-99-28	drawdown	1.71	3.51	-1.81
P2H1-99-29	drawdown	1.64	3.52	-1.88
P2H1-99-30	drawdown	1.71	3.52	-1.82
P2H1-99-31	drawdown	1.71	3.53	-1.82
P2H1-99-32	drawdown	1.71	3.53	-1.82
P2HA-99-1	drawdown	0.00	0.00	0.00
P2HA-99-2	drawdown	0.20	0.01	0.19
P2HA-99-3	drawdown	0.13	0.06	0.07
P2HA-99-4	drawdown	0.20	0.11	0.08
P2HA-99-5	drawdown	0.30	0.17	0.13
P2HA-99-6	drawdown	0.52	0.23	0.30
P2HA-99-7	drawdown	1.05	0.30	0.75
P2HA-99-8	drawdown	0.89	0.52	0.36
P2HA-99-9	drawdown	1.28	0.79	0.49
P2HA-99-10	drawdown	1.38	0.97	0.41
P2HA-99-11	drawdown	1.71	1.13	0.57
P2HA-99-12	drawdown	2.07	1.54	0.52
P2HA-99-13	drawdown	2.69	1.77	0.92
P2HA-99-14	drawdown	2.62	1.88	0.74
P2HA-99-15	drawdown	3.18	2.01	1.17
P2HA-99-16	drawdown	3.31	2.08	1.23
P2HA-99-17	drawdown	3.71	2.14	1.56
P2HA-99-18	drawdown	3.97	2.20	1.77
P2HA-99-19	drawdown	4.13	2.23	1.91
P2HA-99-20	drawdown	3.41	2.26	1.15

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
P2HA-99-21	drawdown	3.44	2.27	1.17
P2HA-99-22	drawdown	3.48	2.29	1.19
P2HA-99-23	drawdown	4.13	2.30	1.83
P2HA-99-24	drawdown	4.69	2.31	2.38
P2HA-99-25	drawdown	5.05	2.31	2.74
P2HA-99-26	drawdown	5.28	2.32	2.96
P2HA-99-27	drawdown	5.18	2.32	2.86
P2HA-99-28	drawdown	14.04	2.32	11.72
P2HA-99-29	drawdown	5.91	2.32	3.58
P2HA-99-30	drawdown	5.09	2.33	2.76
P2HB-99-1	drawdown	0.00	0.00	0.00
P2HB-99-2	drawdown	0.13	0.01	0.12
P2HB-99-3	drawdown	-0.23	0.07	-0.30
P2HB-99-4	drawdown	-0.20	0.13	-0.33
P2HB-99-5	drawdown	-0.10	0.19	-0.29
P2HB-99-6	drawdown	0.20	0.25	-0.06
P2HB-99-7	drawdown	0.66	0.33	0.33
P2HB-99-8	drawdown	0.69	0.57	0.12
P2HB-99-9	drawdown	-0.16	0.85	-1.01
P2HB-99-10	drawdown	-0.20	1.03	-1.23
P2HB-99-11	drawdown	-0.20	1.21	-1.41
P2HB-99-12	drawdown	0.13	1.64	-1.51
P2HB-99-13	drawdown	-0.16	1.88	-2.04
P2HB-99-14	drawdown	-0.13	1.99	-2.13
P2HB-99-15	drawdown	-0.26	2.12	-2.38
P2HB-99-16	drawdown	-0.20	2.20	-2.40
P2HB-99-17	drawdown	-0.16	2.26	-2.43
P2HB-99-18	drawdown	-0.20	2.32	-2.52
P2HB-99-19	drawdown	-0.13	2.35	-2.48
P2HB-99-20	drawdown	-0.13	2.38	-2.51
P2HB-99-21	drawdown	-0.13	2.40	-2.53
P2HB-99-22	drawdown	-0.13	2.42	-2.55
P2HB-99-23	drawdown	-0.30	2.43	-2.72
P2HB-99-24	drawdown	-0.20	2.44	-2.63
P2HB-99-25	drawdown	-0.26	2.44	-2.70
P2HB-99-26	drawdown	-0.13	2.45	-2.58
P2HB-99-27	drawdown	-0.13	2.45	-2.58

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
P2HB-99-28	drawdown	-0.13	2.45	-2.58
P2HB-99-29	drawdown	-0.13	2.45	-2.58
P2HB-99-30	drawdown	-0.13	2.46	-2.59
P3H1-99-1	drawdown	0.00	1.01	-1.01
P3H1-99-2	drawdown	0.07	1.26	-1.19
P3H1-99-3	drawdown	-0.03	1.51	-1.54
P3H1-99-4	drawdown	0.30	2.16	-1.87
P3H1-99-5	drawdown	0.03	2.55	-2.52
P3H1-99-6	drawdown	0.03	2.75	-2.72
P3H1-99-7	drawdown	0.00	2.97	-2.97
P3H1-99-8	drawdown	0.00	3.11	-3.11
P3H1-99-9	drawdown	-0.03	3.22	-3.25
P3H1-99-10	drawdown	0.13	3.31	-3.18
P3H1-99-11	drawdown	0.03	3.37	-3.34
P3H1-99-12	drawdown	-0.20	3.43	-3.62
P3H1-99-13	drawdown	0.00	3.46	-3.46
P3H1-99-14	drawdown	0.00	3.49	-3.49
P3H1-99-15	drawdown	0.00	3.51	-3.51
P3H1-99-16	drawdown	-0.10	3.52	-3.62
P3H1-99-17	drawdown	-0.07	3.53	-3.60
P3H1-99-18	drawdown	0.00	3.54	-3.54
P3H1-99-19	drawdown	0.00	3.55	-3.55
P3H1-99-20	drawdown	-0.10	3.55	-3.65
P3H1-99-21	drawdown	0.00	3.56	-3.56
P3H1-99-22	drawdown	0.00	3.56	-3.56
P3H1-99-23	drawdown	0.00	3.56	-3.56
P3H-99-1	drawdown	0.00	0.00	0.00
P3H-99-2	drawdown	0.07	0.01	0.06
P3H-99-3	drawdown	-0.59	0.04	-0.63
P3H-99-4	drawdown	-0.52	0.09	-0.61
P3H-99-5	drawdown	-0.46	0.13	-0.59
P3H-99-6	drawdown	0.43	0.19	0.24
P3H-99-7	drawdown	1.05	0.25	0.80
P3H-99-8	drawdown	0.52	0.46	0.06
P3H-99-9	drawdown	0.85	0.72	0.13
P3H-99-10	drawdown	0.79	0.76	0.03
P3H-99-11	drawdown	1.02	0.89	0.13

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
P3H-99-12	drawdown	1.12	1.05	0.06
P3H-99-13	drawdown	1.18	1.46	-0.28
P3H-99-14	drawdown	1.35	1.70	-0.35
P3H-99-15	drawdown	1.67	1.81	-0.14
P3H-99-16	drawdown	2.13	1.93	0.20
P3H-99-17	drawdown	2.26	2.01	0.25
P3H-99-18	drawdown	3.31	2.07	1.24
P3H-99-19	drawdown	2.62	2.13	0.50
P3H-99-20	drawdown	3.22	2.16	1.06
P3H-99-21	drawdown	2.07	2.19	-0.12
P3H-99-22	drawdown	2.82	2.21	0.61
P3H-99-23	drawdown	2.92	2.23	0.69
P3H-99-24	drawdown	2.92	2.23	0.69
P3H-99-25	drawdown	3.67	2.24	1.43
P3H-99-26	drawdown	3.44	2.25	1.20
P3H-99-27	drawdown	3.35	2.25	1.09
P3H-99-28	drawdown	3.67	2.26	1.42
P3H-99-29	drawdown	3.67	2.26	1.42
P3H-99-30	drawdown	3.67	2.26	1.41
P3H-99-31	drawdown	3.67	2.26	1.41
P3H-99-32	drawdown	3.67	2.26	1.41
PN1J-99-1	drawdown	0.00	-0.05	0.05
PN1J-99-2	drawdown	0.23	-0.03	0.26
PN1J-99-3	drawdown	0.23	0.14	0.09
PN1J-99-4	drawdown	0.46	0.19	0.27
PN1J-99-5	drawdown	0.92	0.28	0.63
PN1J-99-6	drawdown	1.61	0.39	1.22
PN1J-99-7	drawdown	1.61	0.43	1.18
PN1J-99-8	drawdown	1.84	0.45	1.39
PN1J-99-9	drawdown	1.61	0.49	1.12
PN1J-99-10	drawdown	3.25	0.53	2.72
PN1J-99-11	drawdown	3.25	0.53	2.72
PN1J-99-12	drawdown	3.25	0.61	2.64
PN1J-99-13	drawdown	3.25	0.63	2.62
PN1J-99-14	drawdown	3.25	0.64	2.61
PN1J-99-15	drawdown	3.25	0.64	2.60
PN1J-99-16	drawdown	3.48	0.65	2.83

Observation ID	Group ID	Observed, ft	Simulated, ft	Residual, ft
PN1J-99-17	drawdown	3.94	0.65	3.28
PN1J-99-18	drawdown	3.71	0.66	3.05
PN1J-99-19	drawdown	3.71	0.66	3.05
PN1J-99-20	drawdown	3.71	0.66	3.05
PN1J-99-21	drawdown	3.71	0.66	3.04
PN1J-99-22	drawdown	3.94	0.66	3.27
PN1J-99-23	drawdown	3.94	0.66	3.27
PN1J-99-24	drawdown	3.71	0.66	3.04
PN1J-99-25	drawdown	3.71	0.66	3.04
PN1J-99-26	drawdown	3.71	0.67	3.04
PN1J-99-27	drawdown	3.02	0.67	2.35
PN1J-99-28	drawdown	3.02	0.67	2.35

Large Table 5 Hydraulic Conductivity Values Used for Flotation Tailings in Predictive Simulations

Material Type	Mine Year	Model Layer	Kx (ft/d)	Kz (ft/d)
Embankments	All	1-6	2.3E-01	7.7E-02
Beaches	1-20	1-6	3.0E+00	1.0E+00
Beaches	Long-Term Closure	1	1.6E-02	5.4E-03
Pond	1	1	6.1E-01	2.1E-01
Pond	1	2	1.1E-01	3.7E-02
Pond	7	1	4.4E-01	1.5E-01
Pond	7	2	1.0E-01	3.5E-02
Pond	7	3	5.5E-02	1.9E-02
Pond	7	4	3.9E-02	1.3E-02
Pond	7	5	3.1E-02	1.1E-02
Pond	8	1	2.4E-01	8.2E-02
Pond	8	2	7.6E-02	2.6E-02
Pond	8	3	4.8E-02	1.6E-02
Pond	8	4	3.6E-02	1.2E-02
Pond	8	5	2.9E-02	1.0E-02
Pond	18	1	4.3E-01	1.5E-01
Pond	18	2	6.2E-02	2.1E-02
Pond	18	3	3.5E-02	1.2E-02
Pond	18	4	2.9E-02	9.9E-03
Pond	18	5	2.5E-02	8.6E-03
Pond	18	6	2.2E-02	7.6E-03
Pond	20	1	1.6E-01	5.5E-02
Pond	20/Long-Term Closure	2	5.3E-02	1.8E-02
Pond	20/Long-Term Closure	3	3.3E-02	1.1E-02
Pond	20/Long-Term Closure	4	2.8E-02	9.5E-03
Pond	20/Long-Term Closure	5	2.4E-02	8.2E-03
Pond	20/Long-Term Closure	6	2.2E-02	7.4E-03
Pond	Long-Term Closure	1	1.6E-02	5.4E-03

Large Table 6 Beach Seepage Directions by Percent of Flow to Each Flow Path

Mine Year	North Beach		East Beach			South Beach			Other Beach[1]				
	North Flow Path	Northwest Flow Path	North Flow Path	South Flow Path	East Flow Path	North Flow Path	West Flow Path	South Flow Path	North Flow Path	Northwest Flow Path	West Flow Path	South Flow Path	East Flow Path
0	--	--	--	--	--	--	--	--	--	--	--	--	--
1	100.0	0.0	--	--	--	--	--	--	--	--	--	--	--
7	98.9	1.1	--	--	--	--	--	--	--	--	--	--	--
8	97.7	2.3	57.4	0.0	42.6	7.7	15.3	77.0	--	--	--	--	--
18	95.3	4.7	25.4	0.0	74.6	6.2	8.2	85.6	24.8	20.8	25.9	1.4	27.1
20	95.3	4.7	25.4	0.0	74.6	5.9	7.9	86.1	25.8	20.1	25.6	0.9	27.6
Long-term Closure	100.0	0.0	98.6	1.4	0.0	0.0	0.0	100.0	43.7	4.1	8.3	43.9	0.0

(1) Beach material not adjacent to the North, East, or South Dams

Large Figures

Barr Footer: ArcGIS 10.2.2, 2015-01-02 15:07 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Support Document\Water\Water Modeling Package\Plant Site\MODFLOW Model Document\Large Figure 1 Site Layout.mxd User: arm2

Ground Surface Elevation Contour

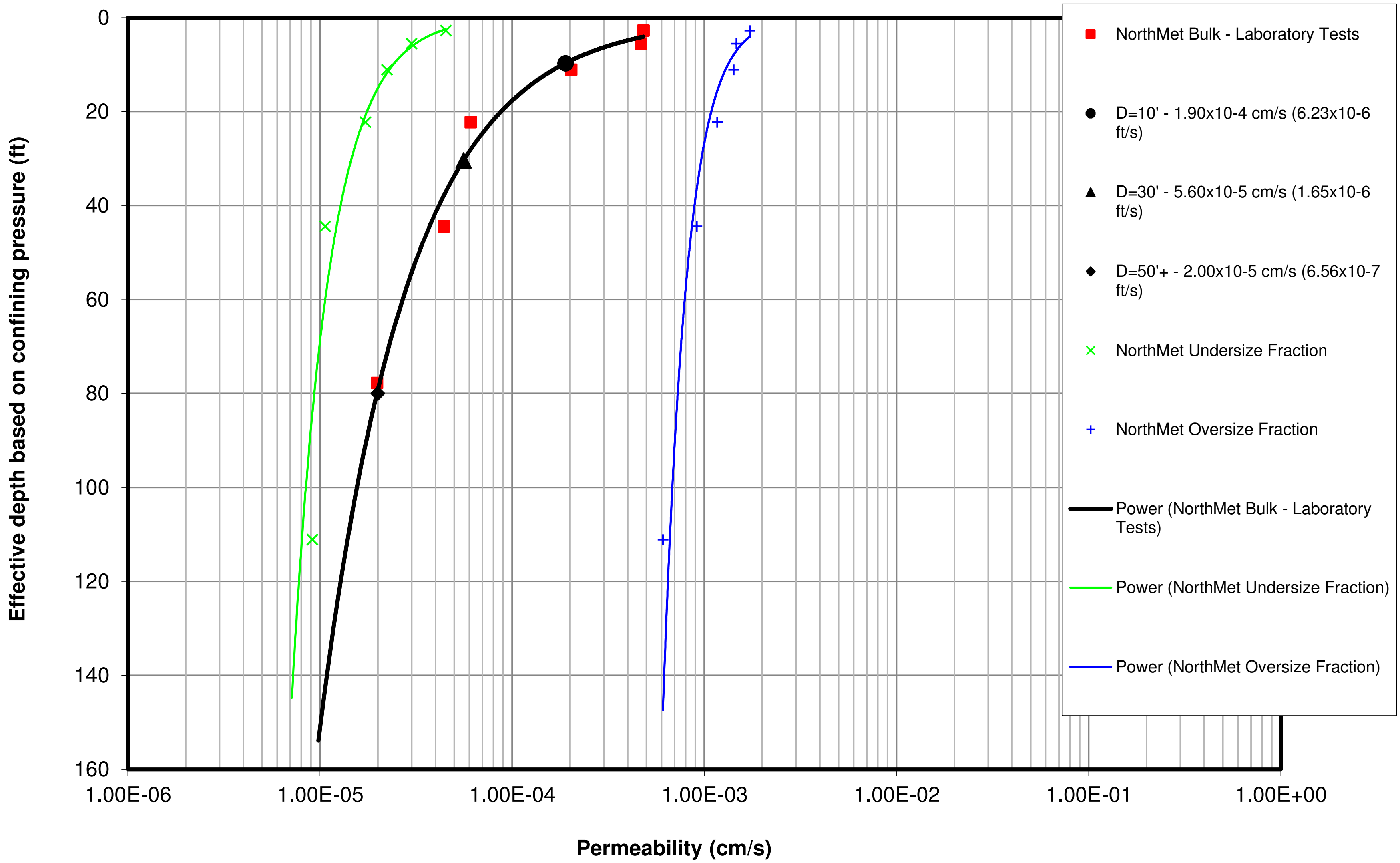
50 Foot Contour

10 Foot contour

0 2,000 4,000

Feet

Large Figure 1
SITE LAYOUT
NorthMet Project
Poly Met Mining, Inc.



Large Figure 2 NorthMet Bulk Tailings 2005 Permeability Test Results

P:\Mpls\23 MN\69\2369862\WorkFiles\APA\Support Docs\Water Modeling Package Doc\Attachment\Plant Site\Attachment A - MODFLOW\Figures\Large Figure 2 Copy of PolyMet Permeability vs Eff Confining Pres.xls

Project Areas

LTVSMC Tailings Basin
DNR Mine Features, 2011

Model Extent

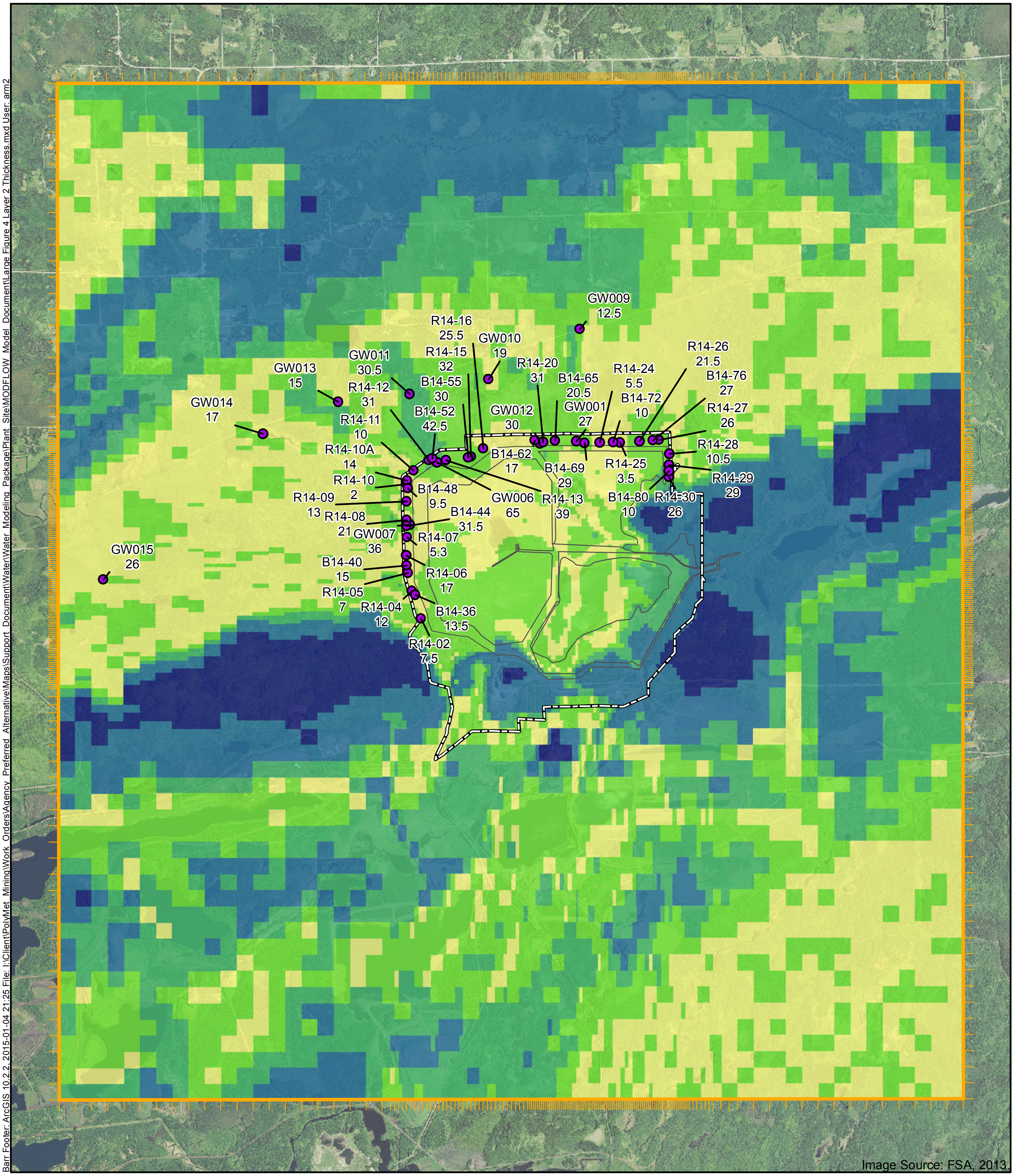
Model Grid

N

0 0.625 1.25 2.5

Miles

Large Figure 3
MODEL DOMAIN
AND GRID
NorthMet Project
Poly Met Mining, Inc.



Boring Location with Measured Depth to Bedrock in Feet

Project Areas

LTVSMC Tailings Basin DNR Mine Features, 2011

Model Extent

Model Grid

Layer 2 Thickness (ft)

0.01 - 4.99

5.00 - 10

10.01 - 20

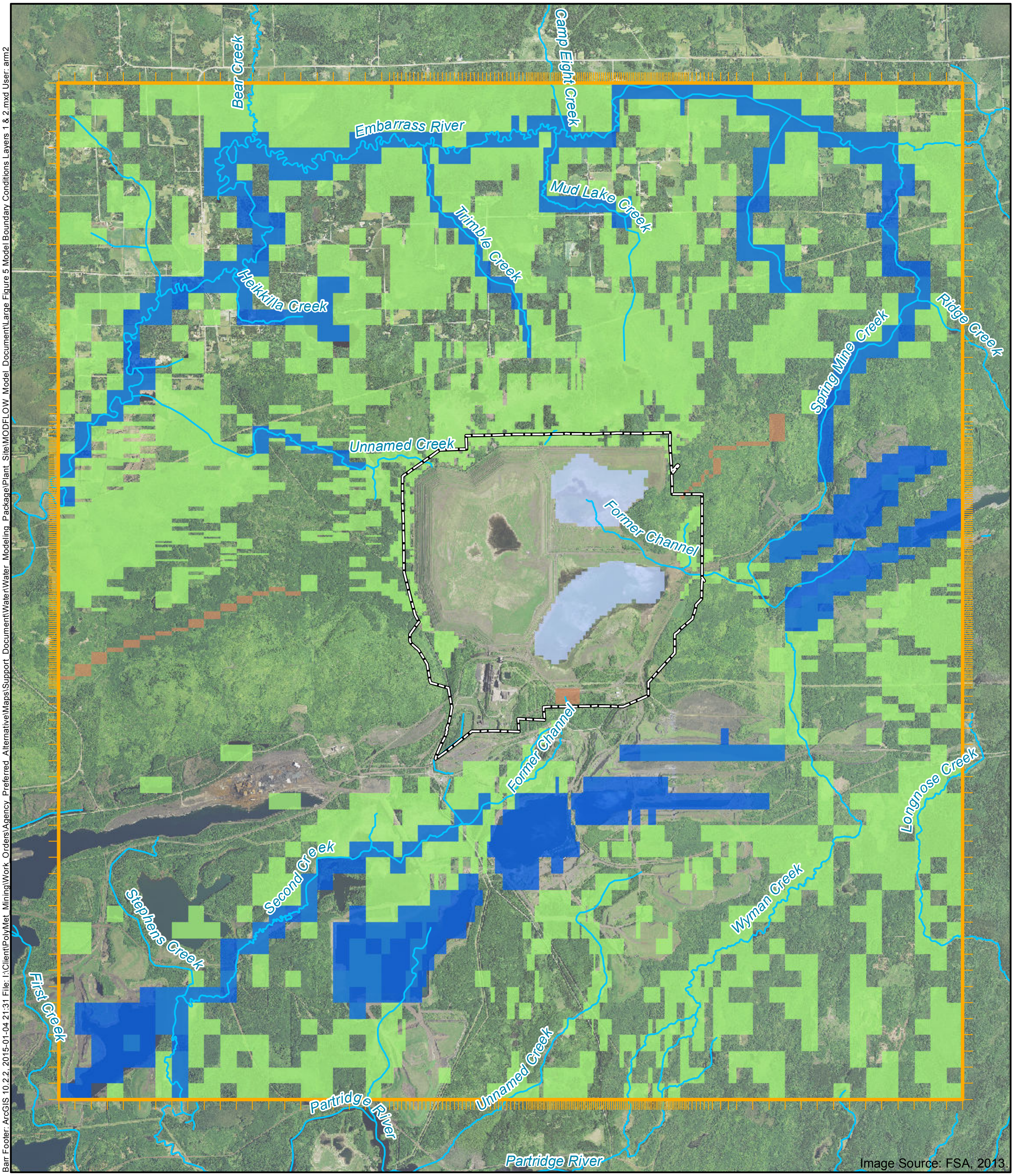
20.01 - 50

50.01 - 107

0 0.625 1.25 2.5

Miles

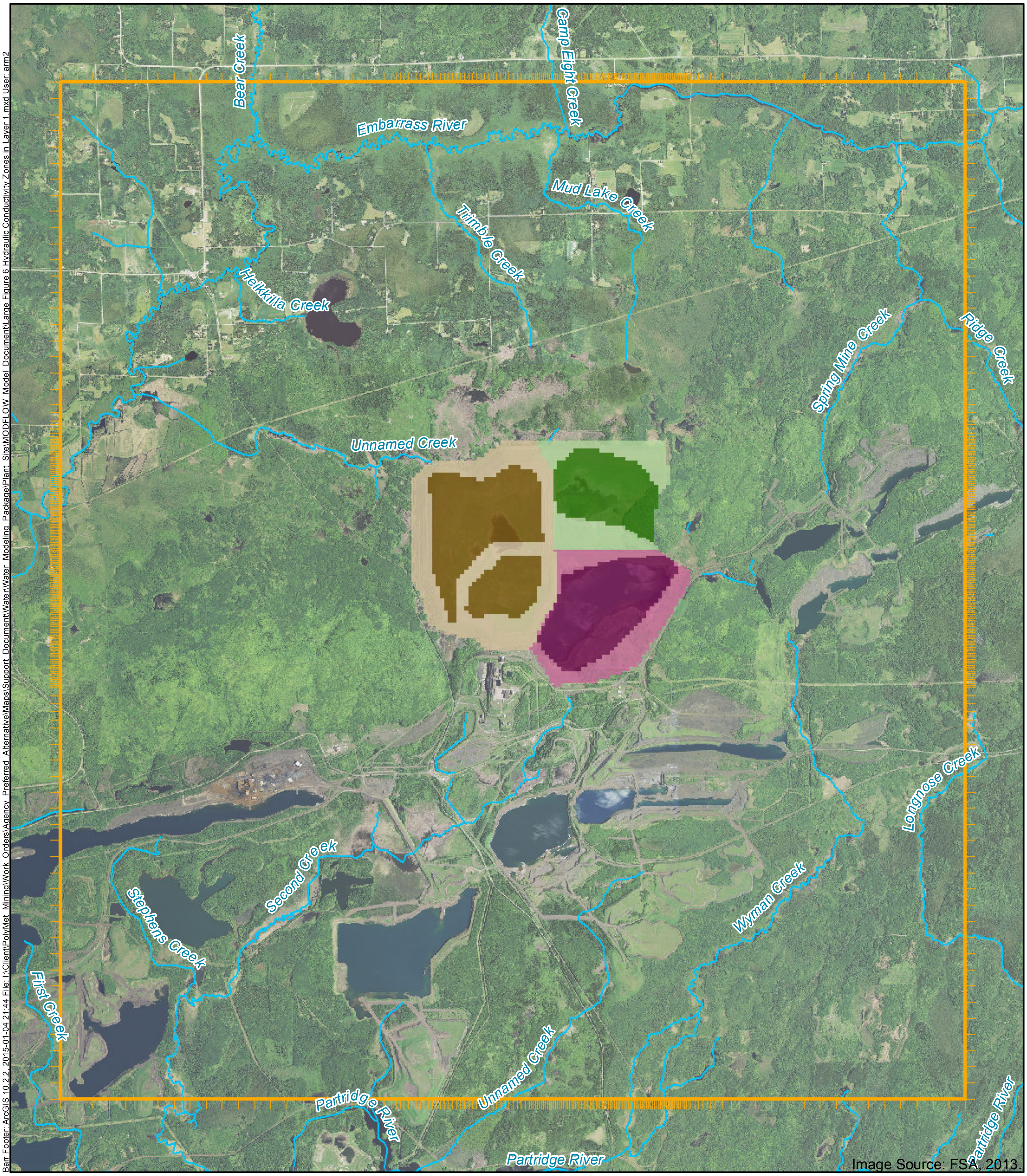
Large Figure 4
LAYER 2 THICKNESS
NorthMet Project
Poly Met Mining, Inc.



Project Areas
River Cells (Wetlands) - Layer 2
Drain Cells - Layer 2
Constant-Head Cells - Layer 2
Constant-Head Cells - Layer 1
Model Extent
Model Grid

0 0.625 1.25 2.5
Miles

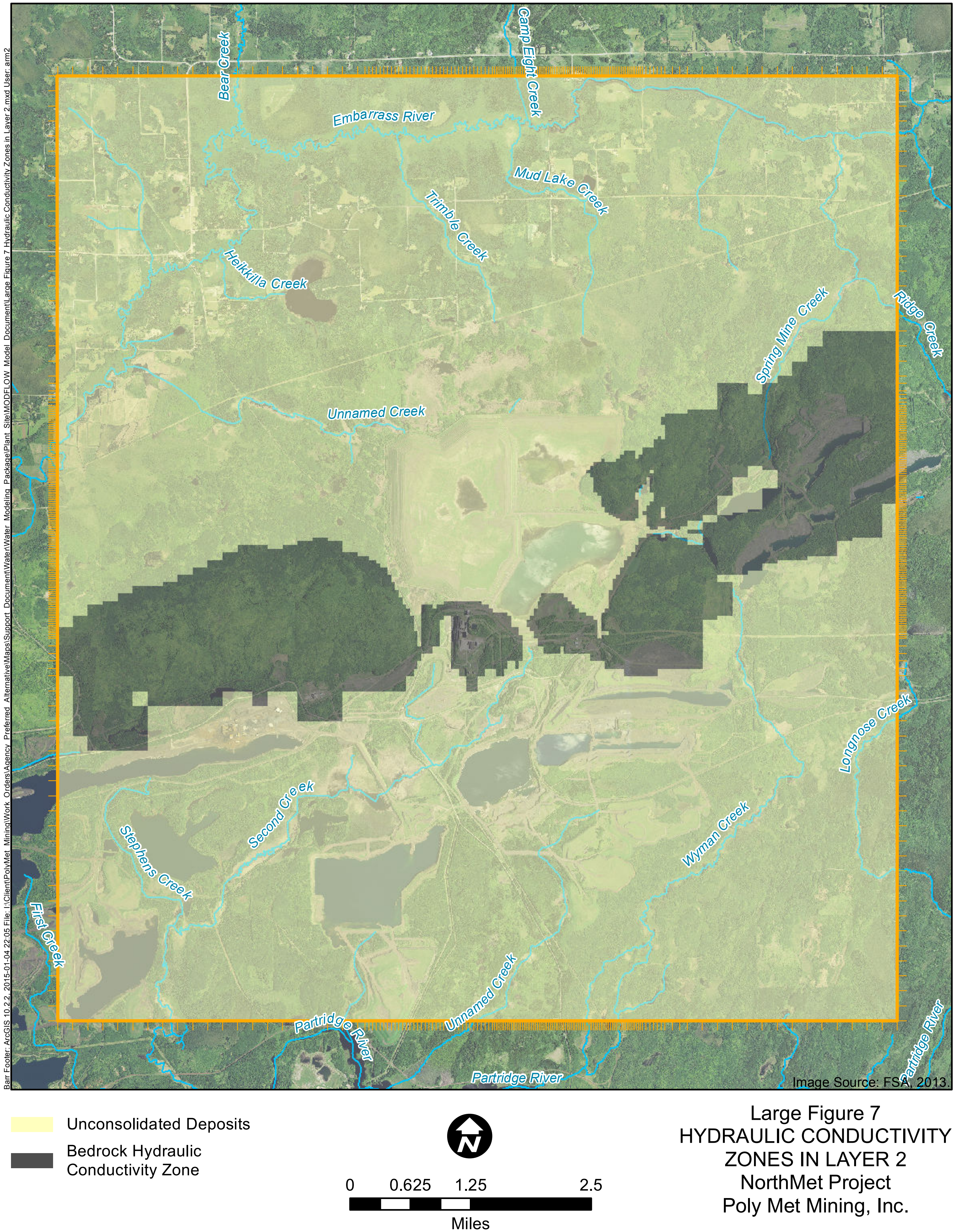
Large Figure 5
MODEL BOUNDARY CONDITIONS
LAYERS 1 AND 2
NorthMet Project
Poly Met Mining, Inc.



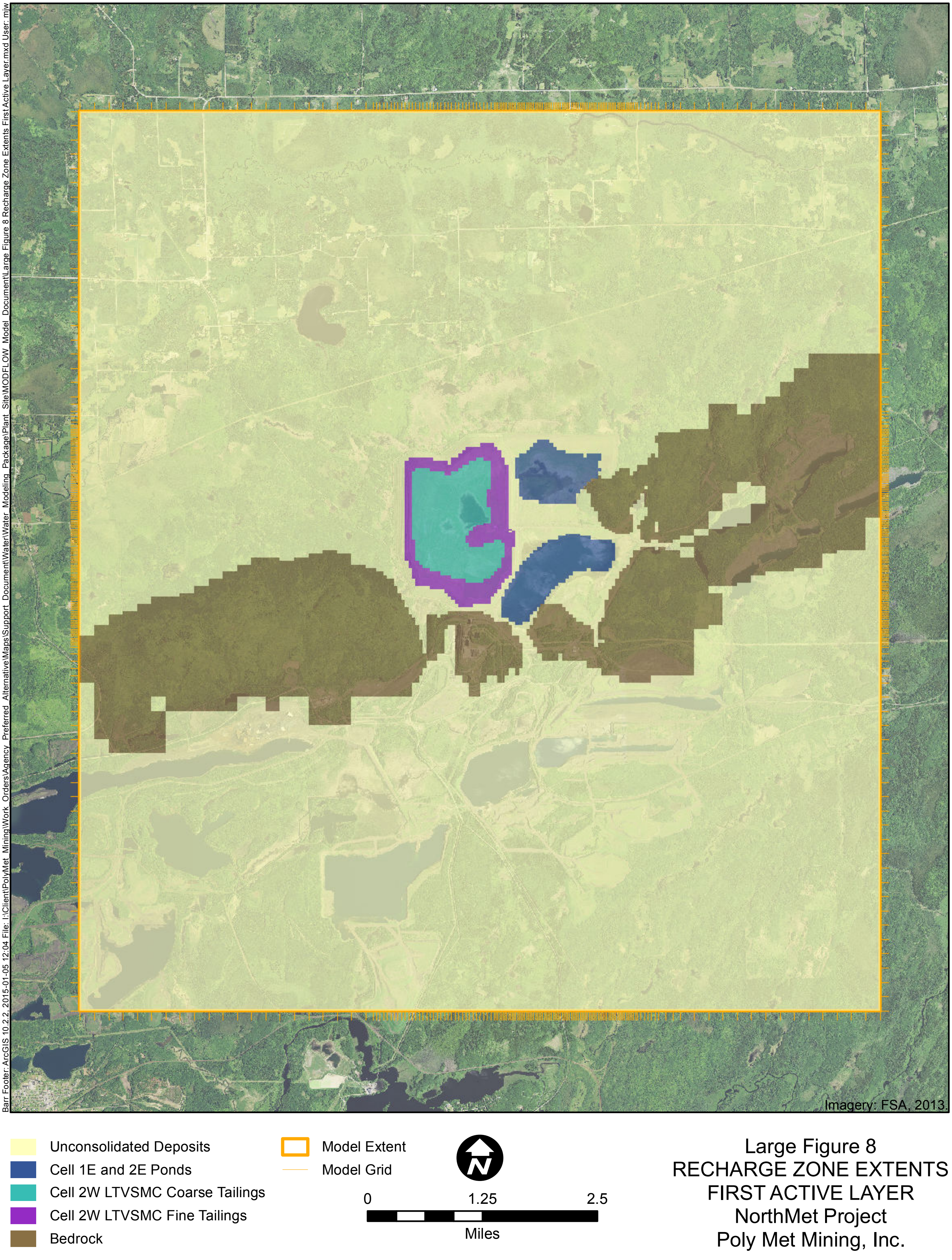
- Cell 1E LTVSMC Fine Tailings
- Cell 1E LTVSMC Coarse
- Cell 2E LTVSMC Fine Tailings
- Cell 2E LTVSMC Fine Tailings
- Cell 2W LTVSMC Fine Tailings
- Cell 2W LTVSMC Coarse
- Model Extent
- Model Grid

0 0.625 1.25 2.5
Miles

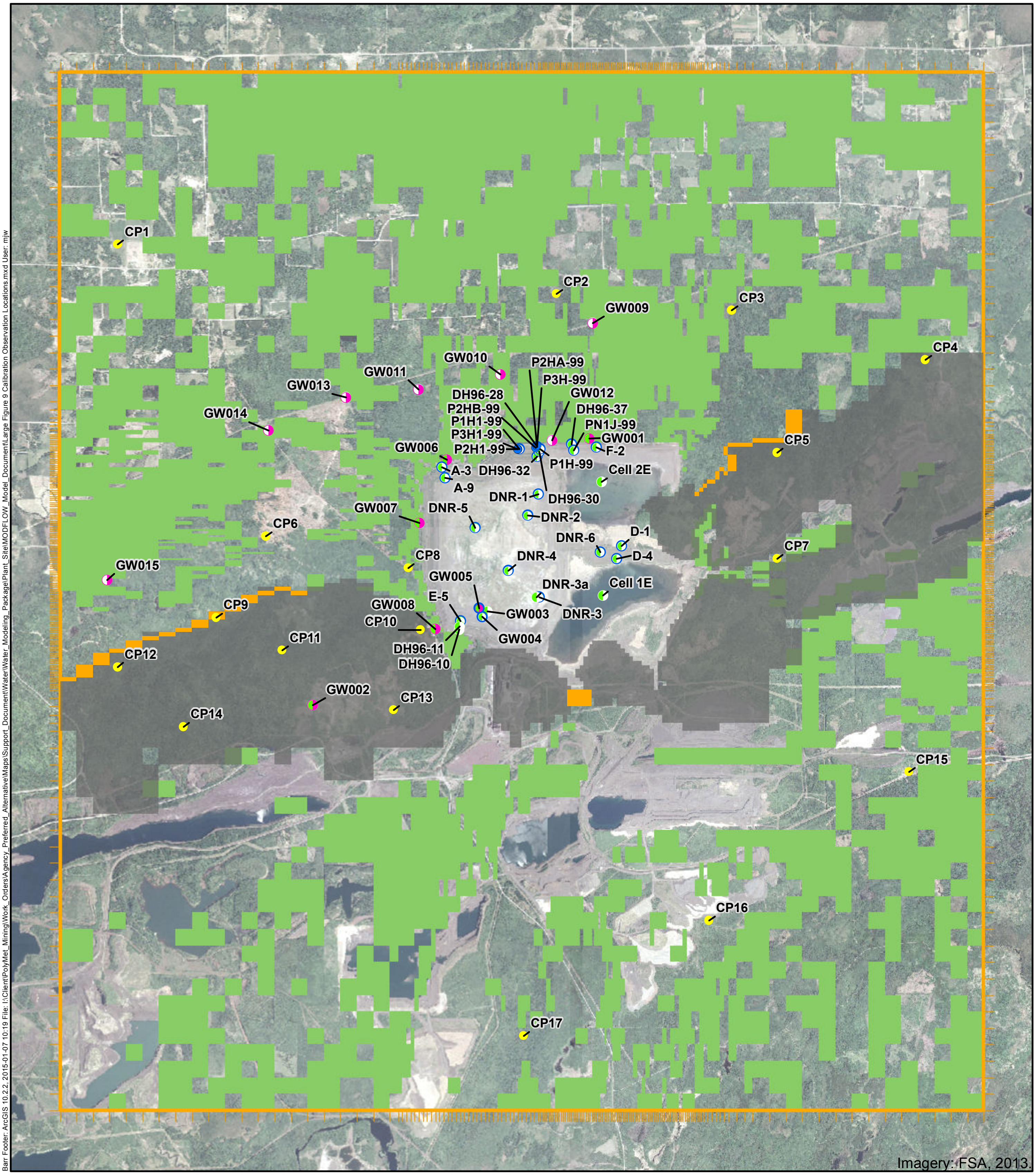
Large Figure 6
HYDRAULIC CONDUCTIVITY ZONES IN LAYER 1
NorthMet Project
Poly Met Mining, Inc.



Large Figure 7
HYDRAULIC CONDUCTIVITY ZONES IN LAYER 2
NorthMet Project
Poly Met Mining, Inc.



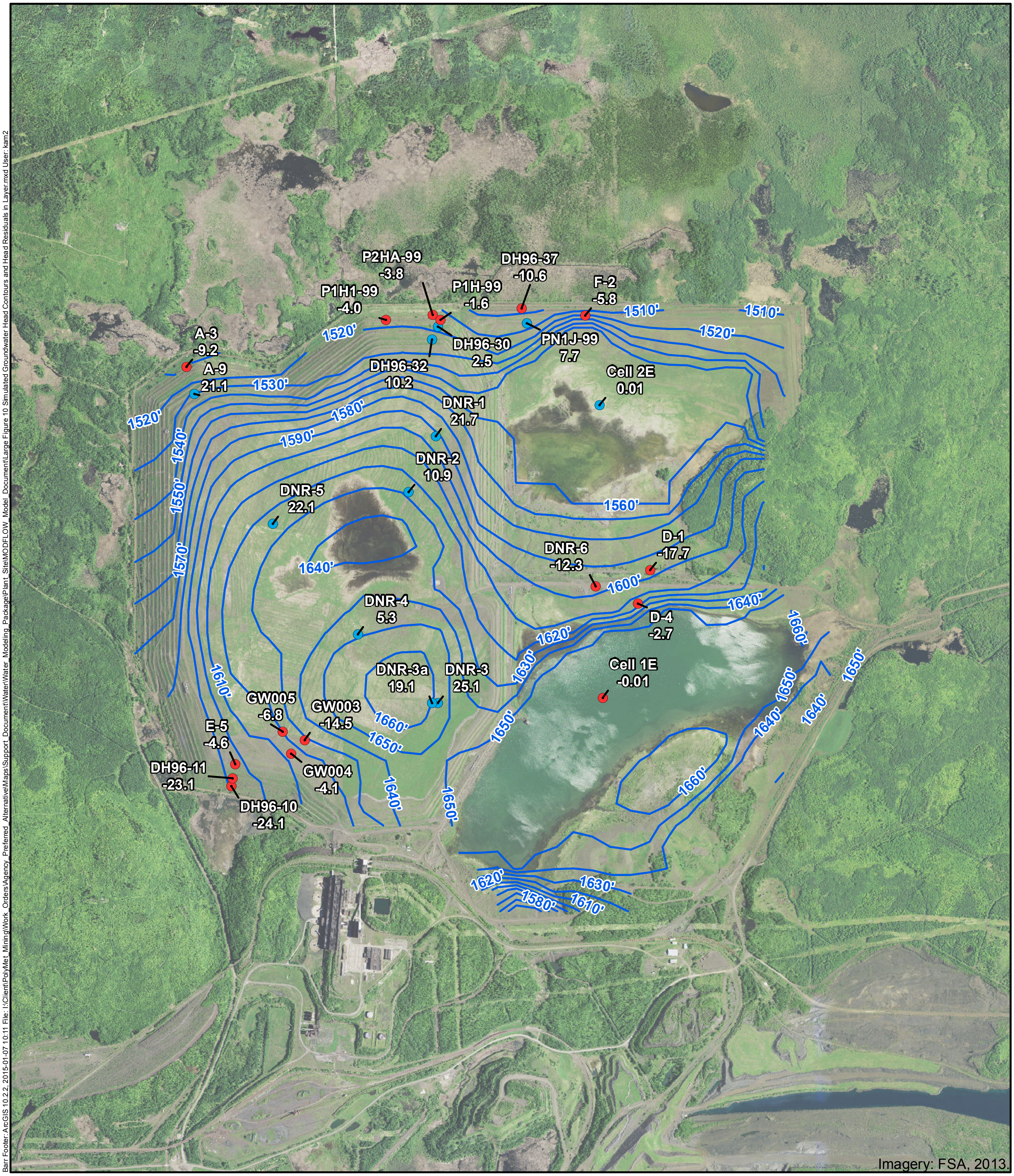
Large Figure 8
RECHARGE ZONE EXTENTS
FIRST ACTIVE LAYER
NorthMet Project
Poly Met Mining, Inc.



River Cells
Drain Cells
Bedrock Hydraulic Conductivity Zone
Control Point
Drawdown Observation
Transient Head Observation
Steady-State Head Observation
Model Extent
Model Grid

0 0.625 1.25 2.5
Miles

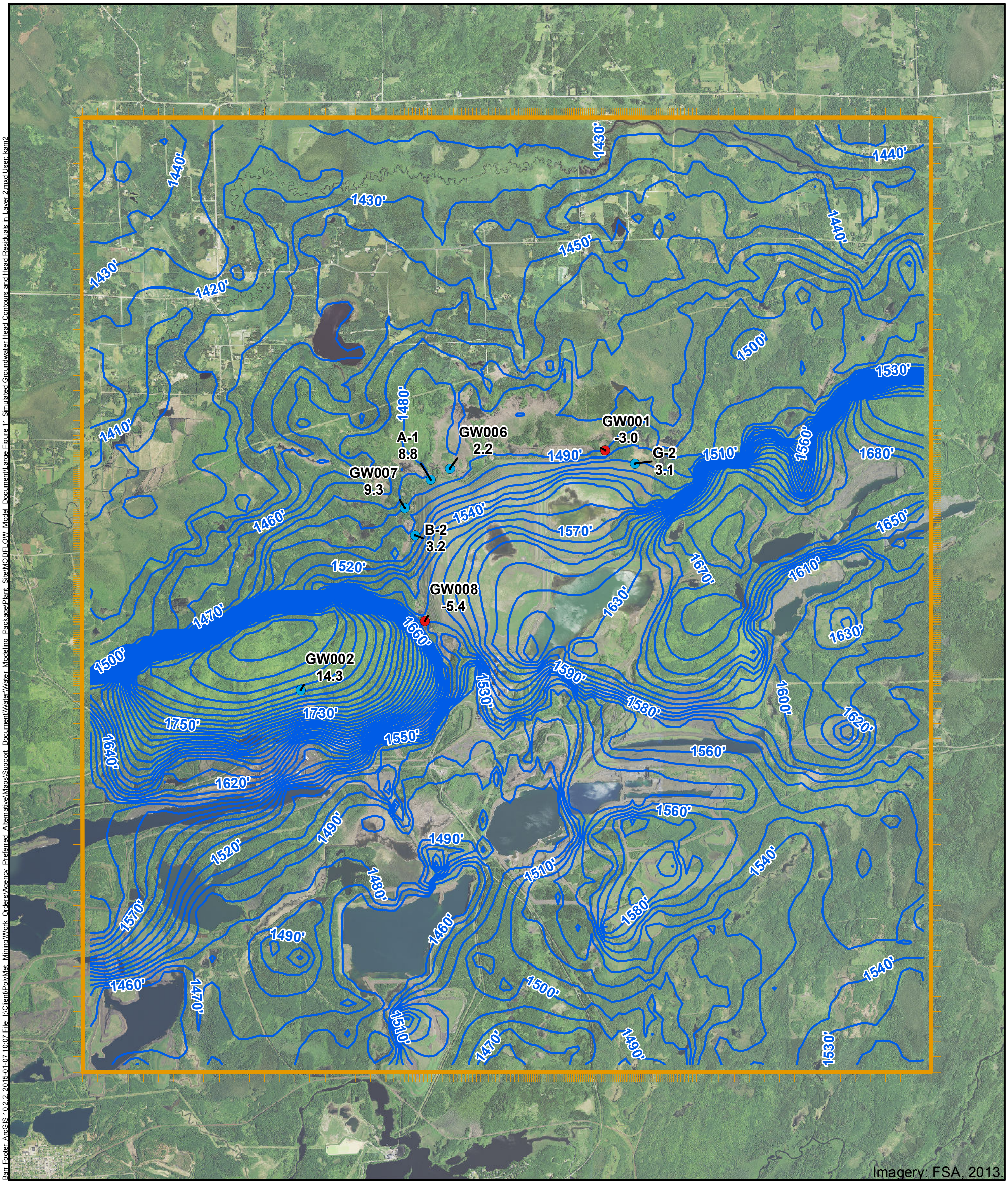
Large Figure 9
CALIBRATION OBSERVATION LOCATIONS
NorthMet Project
Poly Met Mining, Inc.



- Steady-State Head Observations with Negative Head Residuals in Feet
- Steady-State Head Observations with Positive Head Residuals in Feet
- Simulated Groundwater Contours (ft)

0 0.25 0.5 1
Miles

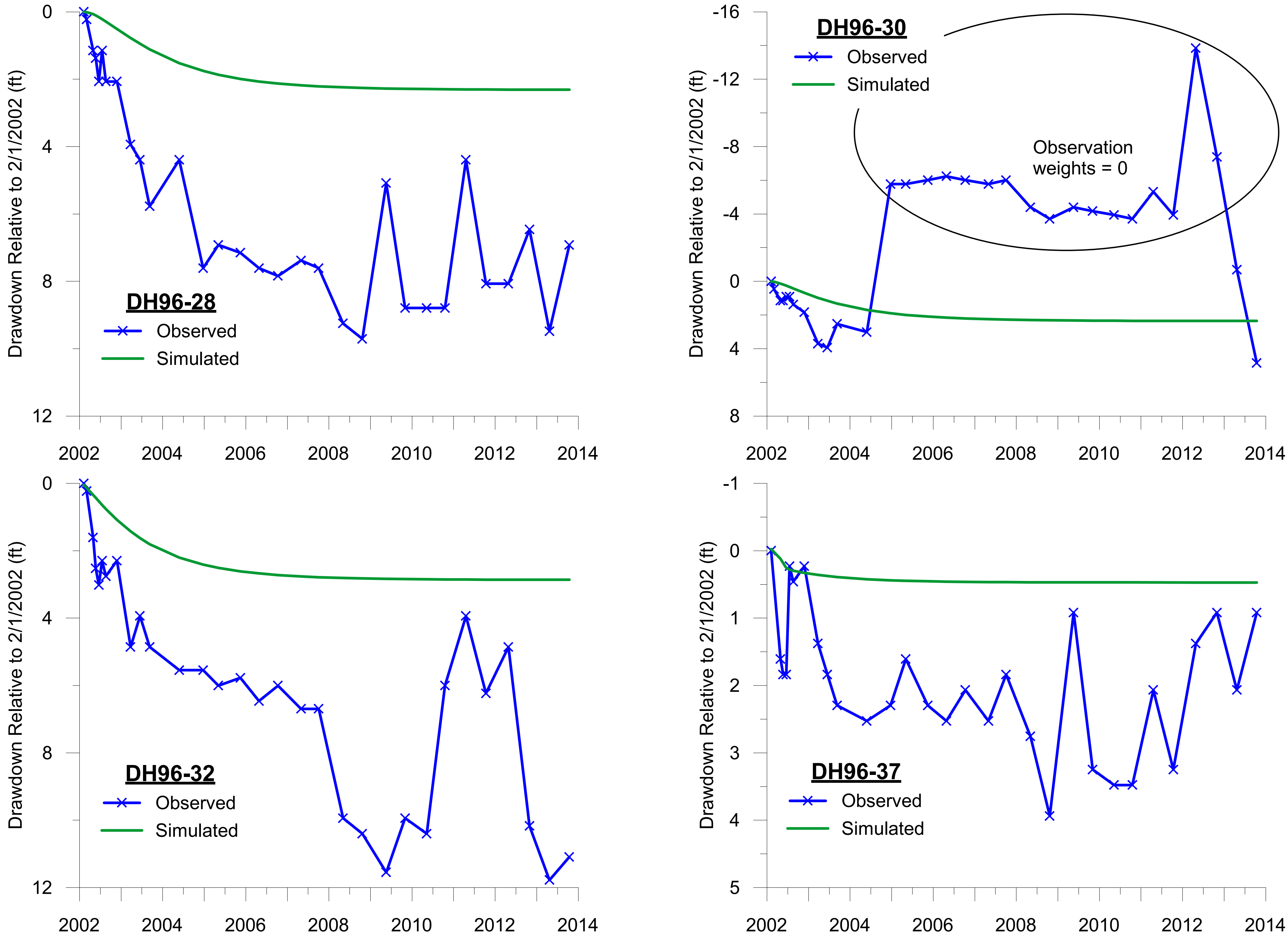
Large Figure 10
SIMULATED GROUNDWATER HEAD CONTOURS AND HEAD RESIDUALS MODEL LAYER 1
NorthMet Project
Poly Met Mining, Inc.



- Steady-State Head Observation with Negative Head Residual in Feet
- Steady-State Head Observation with Positive Head Residual in Feet
- Simulated Groundwater Contours (ft)
- Model Extent
- Model Grid

0 0.5 1 2
Miles

Large Figure 11
SIMULATED GROUNDWATER HEAD CONTOURS AND HEAD RESIDUALS
MODEL LAYER 2
NorthMet Project
Poly Met Mining, Inc.



Large Figure 12
OBSERVED AND SIMULATED DRAWDOWN:
DH96-28, DH96-30, DH96-32, DH96-37
NorthMet Project
Poly Met Mining, Inc.

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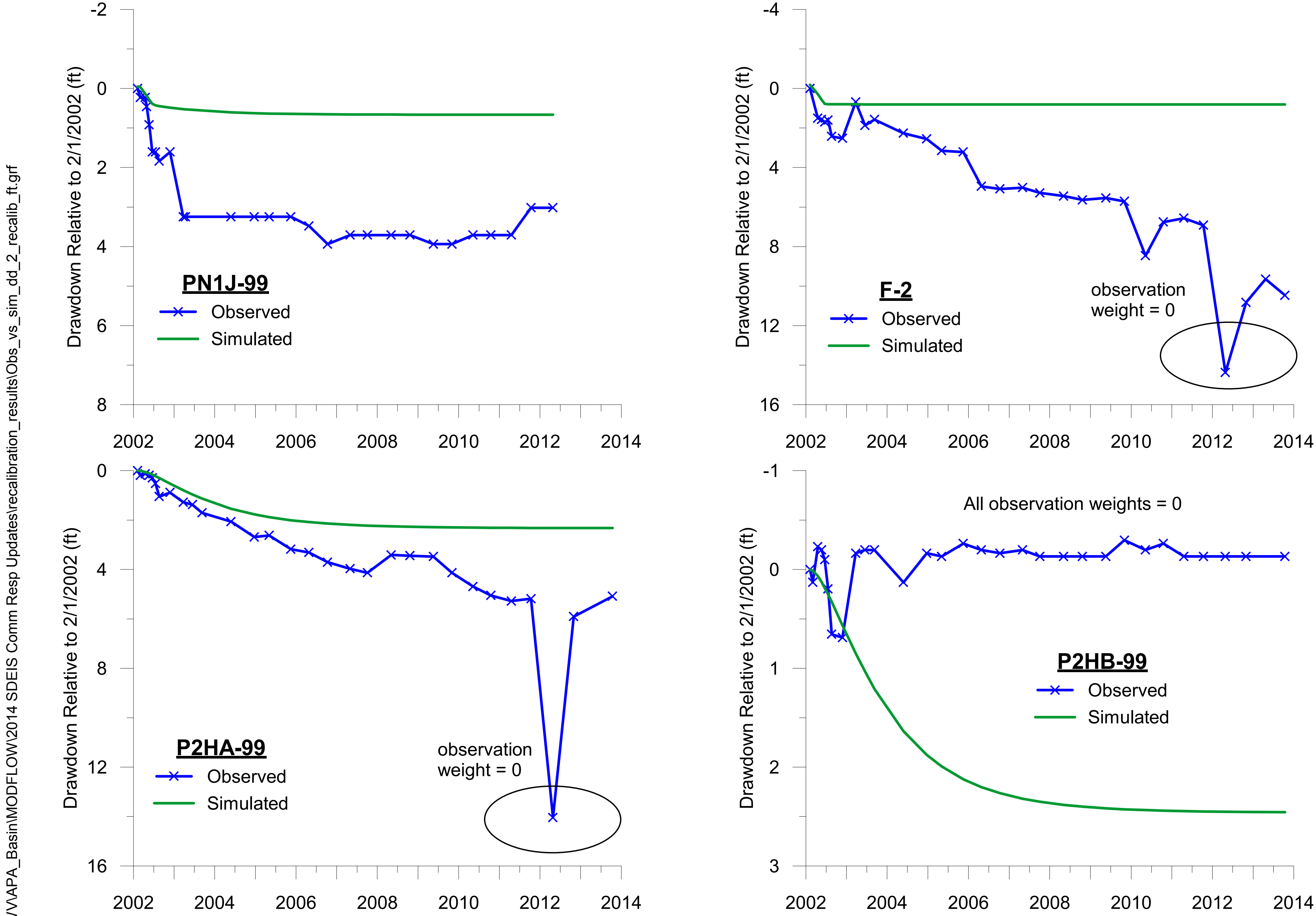
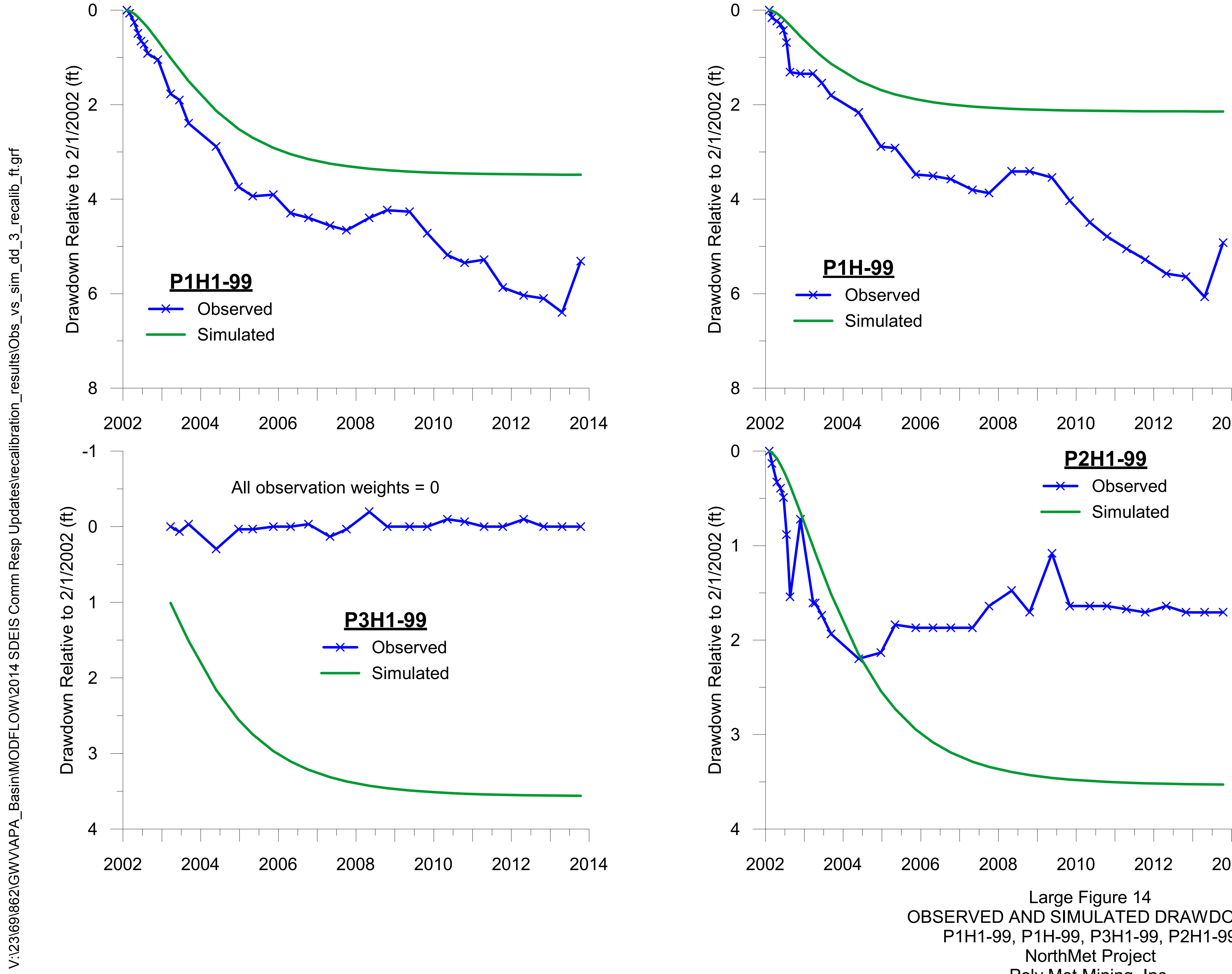
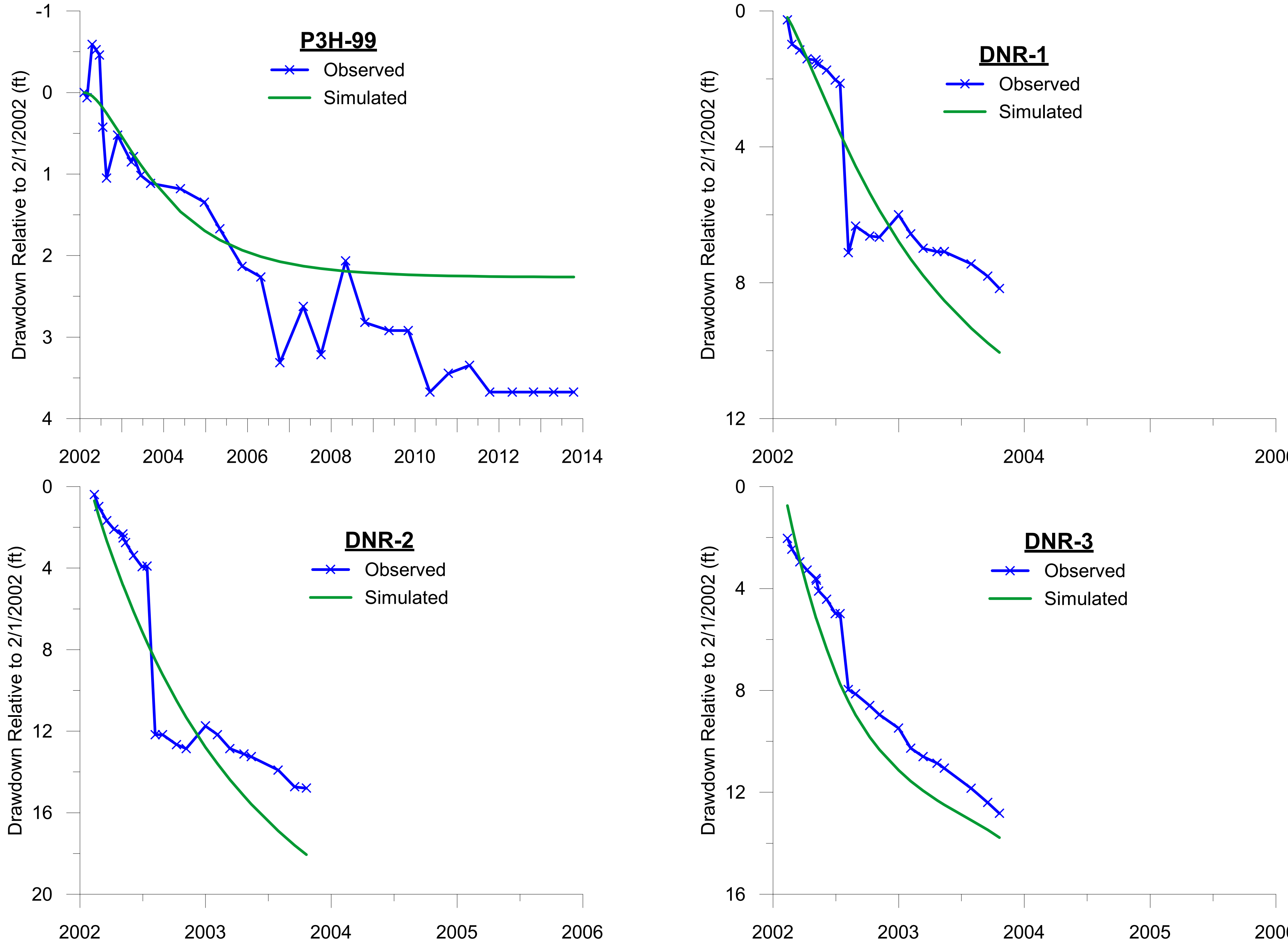


Large Figure 13
OBSERVED AND SIMULATED DRAWDOWN:
PN1J-99, F-2, P2HA-99, P2HB-99
NorthMet Project
Poly Met Mining, Inc.

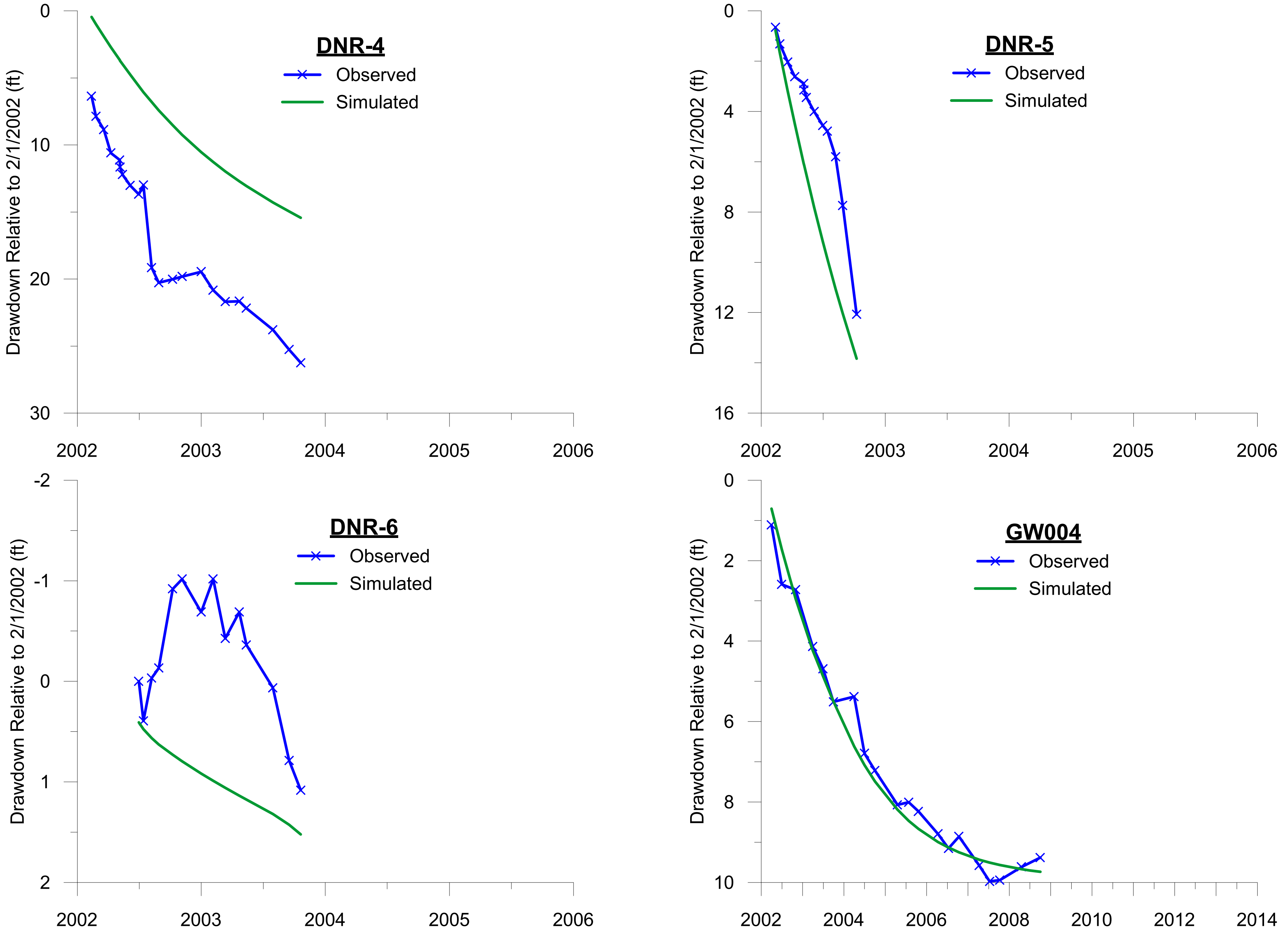


Large Figure 14
OBSERVED AND SIMULATED DRAWDOWN:
P1H1-99, P1H-99, P3H1-99, P2H1-99
NorthMet Project
Poly Met Mining, Inc.

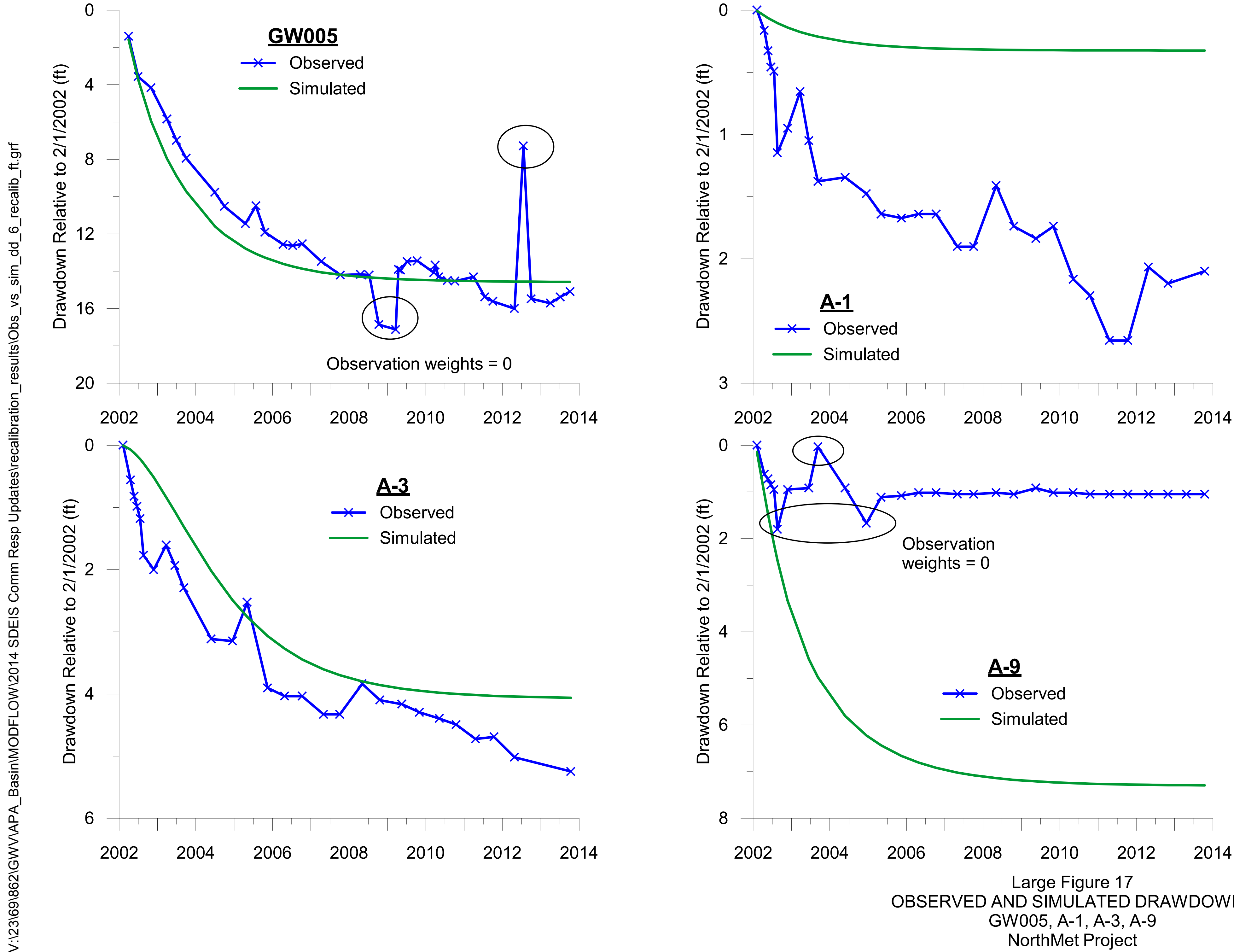


Large Figure 15
OBSERVED AND SIMULATED DRAWDOWN:
P3H-99, DNR-1, DNR-2, DNR-3
NorthMet Project
Poly Met Mining, Inc.

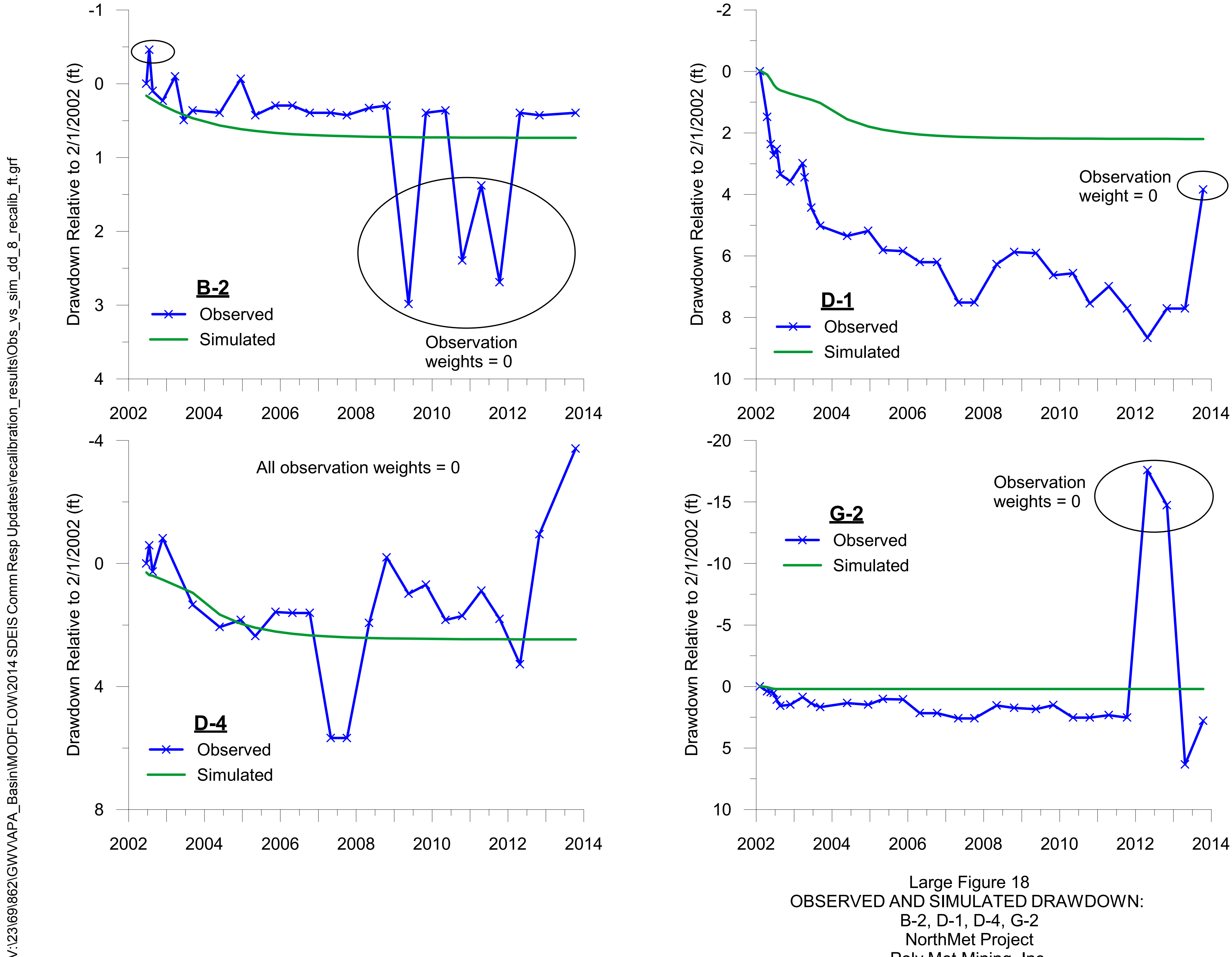
V:\23\69\862\GWV\APA_Basin\MODFLOW\2014 SDEIS Comm Resp Updates\recalibration_results\Obs_vs_sim_dd_4_recalib_ft.grf



Large Figure 16
OBSERVED AND SIMULATED DRAWDOWN:
DNR-4, DNR-5, DNR-6, GW004
NorthMet Project
Poly Met Mining, Inc.



Large Figure 17
OBSERVED AND SIMULATED DRAWDOWN:
GW005, A-1, A-3, A-9
NorthMet Project
Poly Met Mining, Inc.



Large Figure 18
OBSERVED AND SIMULATED DRAWDOWN:
B-2, D-1, D-4, G-2
NorthMet Project
Poly Met Mining, Inc.

Dam
Beach
Pond

0 0.25 0.5 1
Miles

Large Figure 19
FLOTATION TAILINGS BASIN
CONFIGURATION - MINE YEAR 1
NorthMet Project
Poly Met Mining, Inc.

Dam

Beach

Pond

0 0.25 0.5 1

Miles

Large Figure 20
FLOTATION TAILINGS BASIN CONFIGURATION - MINE YEAR 7
NorthMet Project
Poly Met Mining, Inc.

Large Figure 21
FLOTATION TAILINGS BASIN CONFIGURATION - MINE YEAR 8
NorthMet Project
Poly Met Mining, Inc.

Dam
Beach
Pond

0 0.25 0.5 1
Miles

Large Figure 22
FLOTATION TAILINGS BASIN CONFIGURATION - MINE YEARS 18, 20 AND LONG-TERM CLOSURE
NorthMet Project
Poly Met Mining, Inc.

Project Areas
Specified-Head Cells
LTVSMC Tailings Basin DNR Mine Features, 2011

0 0.25 0.5 1
Miles

Large Figure 23
MINE YEAR 1 BOUNDARY CONDITIONS - LAYER 1
NorthMet Project
Poly Met Mining, Inc.

Barr Footer: ArcGIS 10.2.2, 2015-01-07 09:53 File: I:\Client\PolyMet_Mining\Work_Orders\Agency_Preferred_Alternative\Maps\Support_Document\Water\Water_Modeling_Package\Plant_Site\MODFLOW_Model_Document\Large Figure 24 Layer 1 Boundary Conditions - Mine Year 7.mxd User: kam2

Project Areas

Specified-Head Cells

LTVSMC Tailings Basin
DNR Mine Features, 2011

0 0.25 0.5 1

Miles

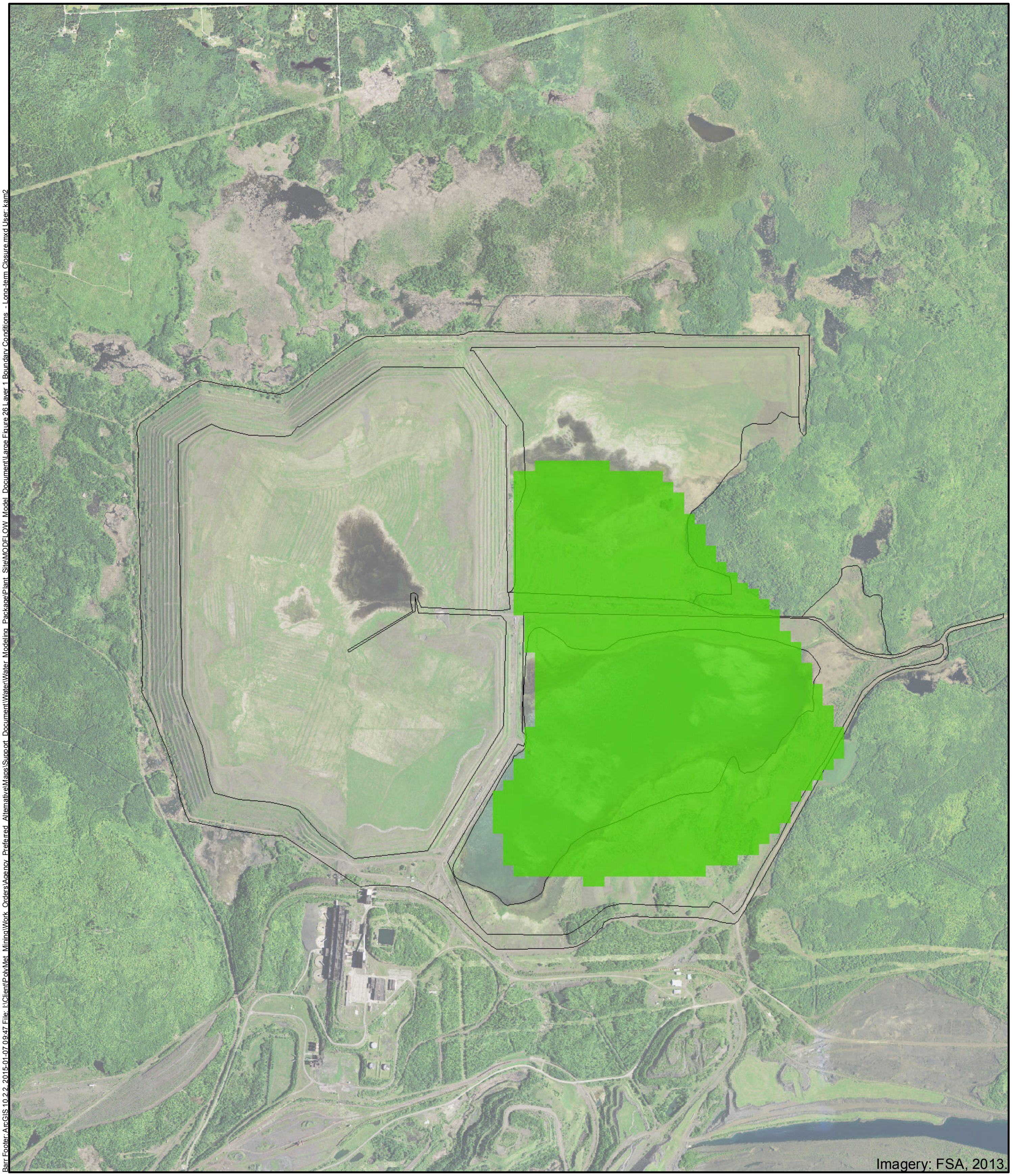
Large Figure 24
MINE YEAR 7 BOUNDARY CONDITIONS - LAYER 1
NorthMet Project
Poly Met Mining, Inc.

Project Areas
Specified-Head Cells
LTVSMC Tailings Basin
DNR Mine Features, 2011

0 0.25 0.5 1
Miles

Large Figure 25
MINE YEAR 8 BOUNDARY CONDITIONS - LAYER 1
NorthMet Project
Poly Met Mining, Inc.

Barr Footer: ArcGIS 10.2.2, 2015-01-07 09:44 File: I:\Client\PolyMet_Mining\Work_Orders\Agency_Preferred_Alternative\Maps\Support_Document\Water\Water_Modeling_Package\Plant_Site\MODFLOW_Model_Document\Large Figure 25 Layer 1 Boundary Conditions - Mine Year 8.mxd User: kam2



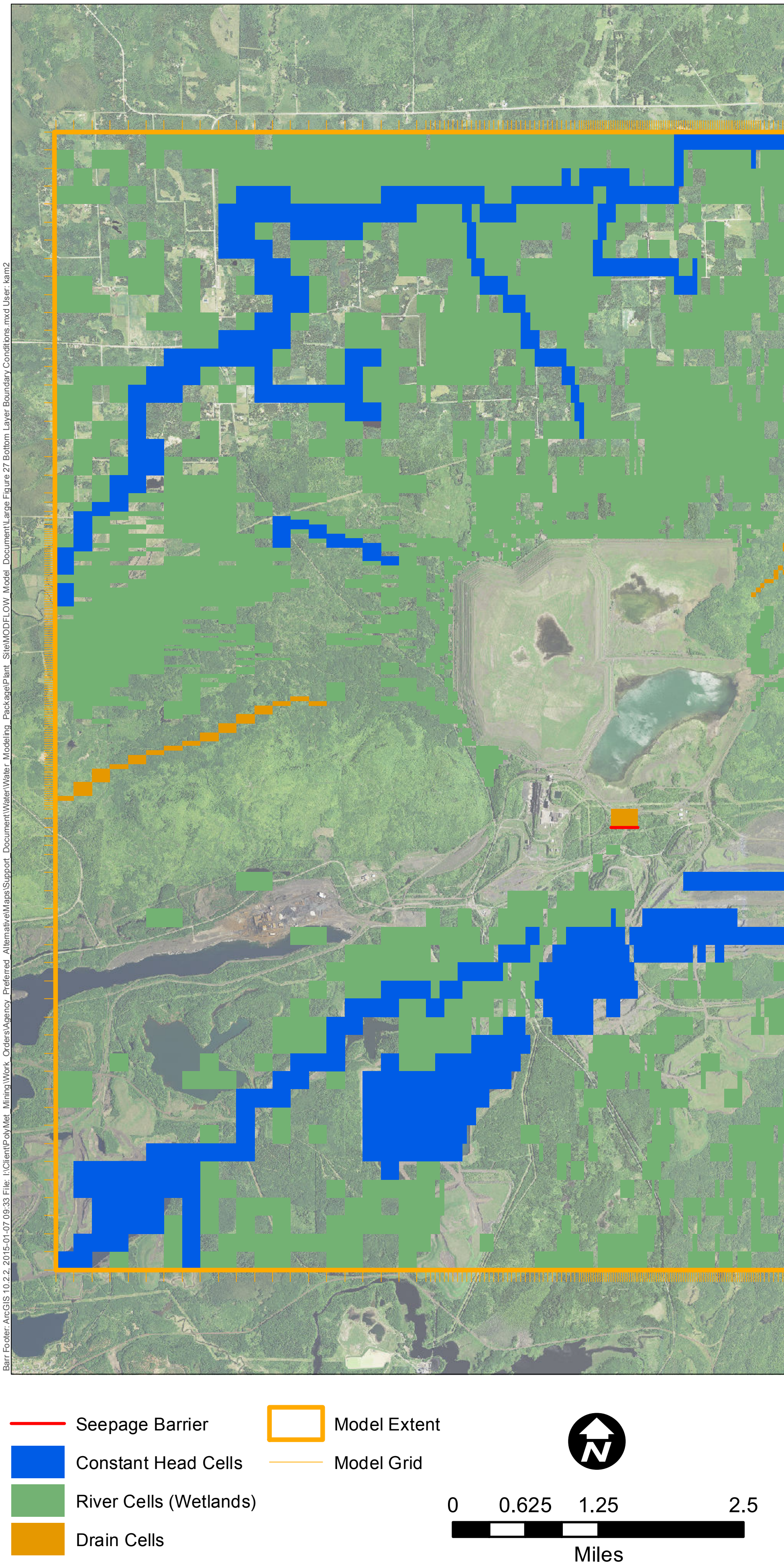
Head-Dependent Boundary Cells

LTVSMC Tailings Basin DNR Mine Features, 2011

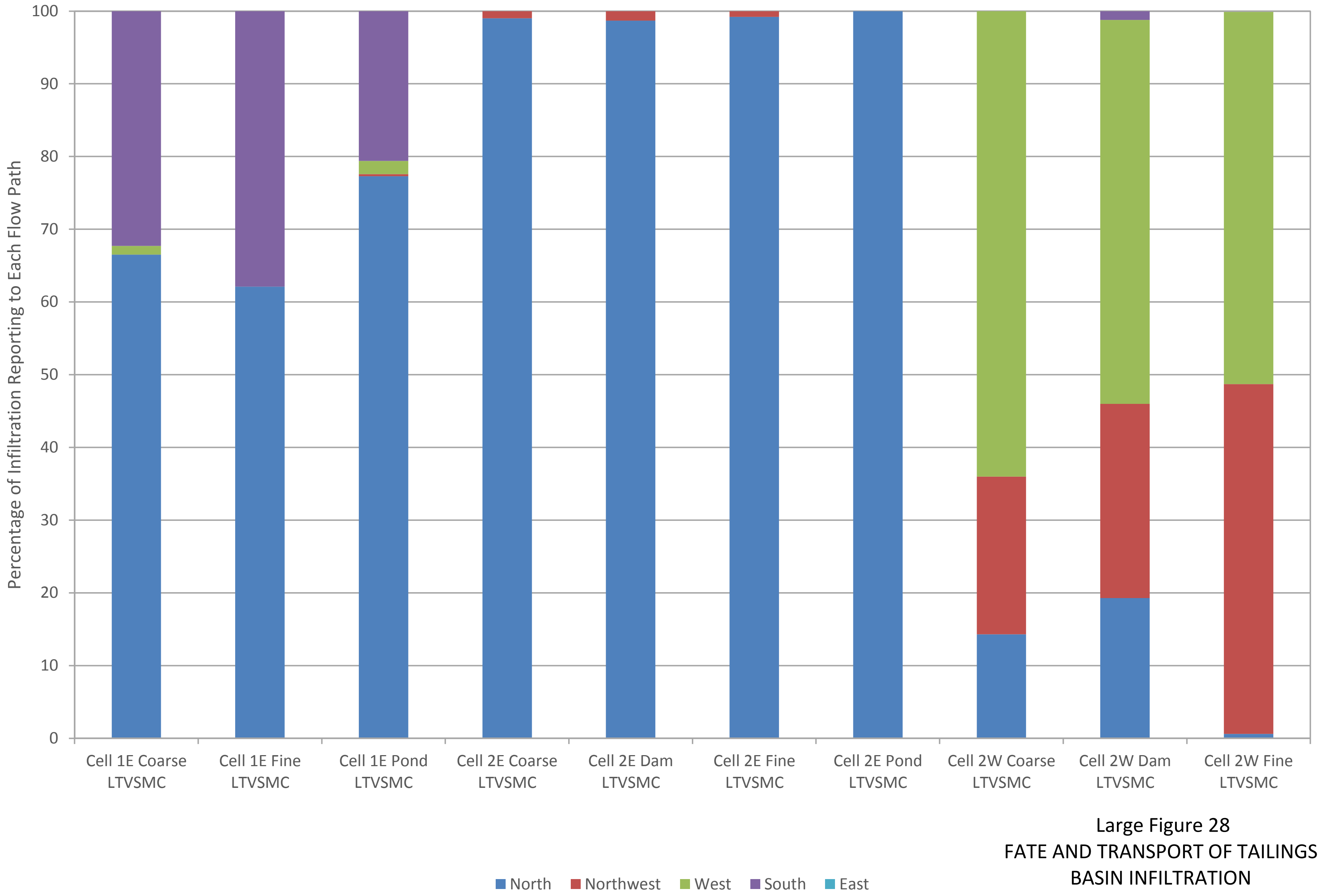
0 0.25 0.5 1

Miles

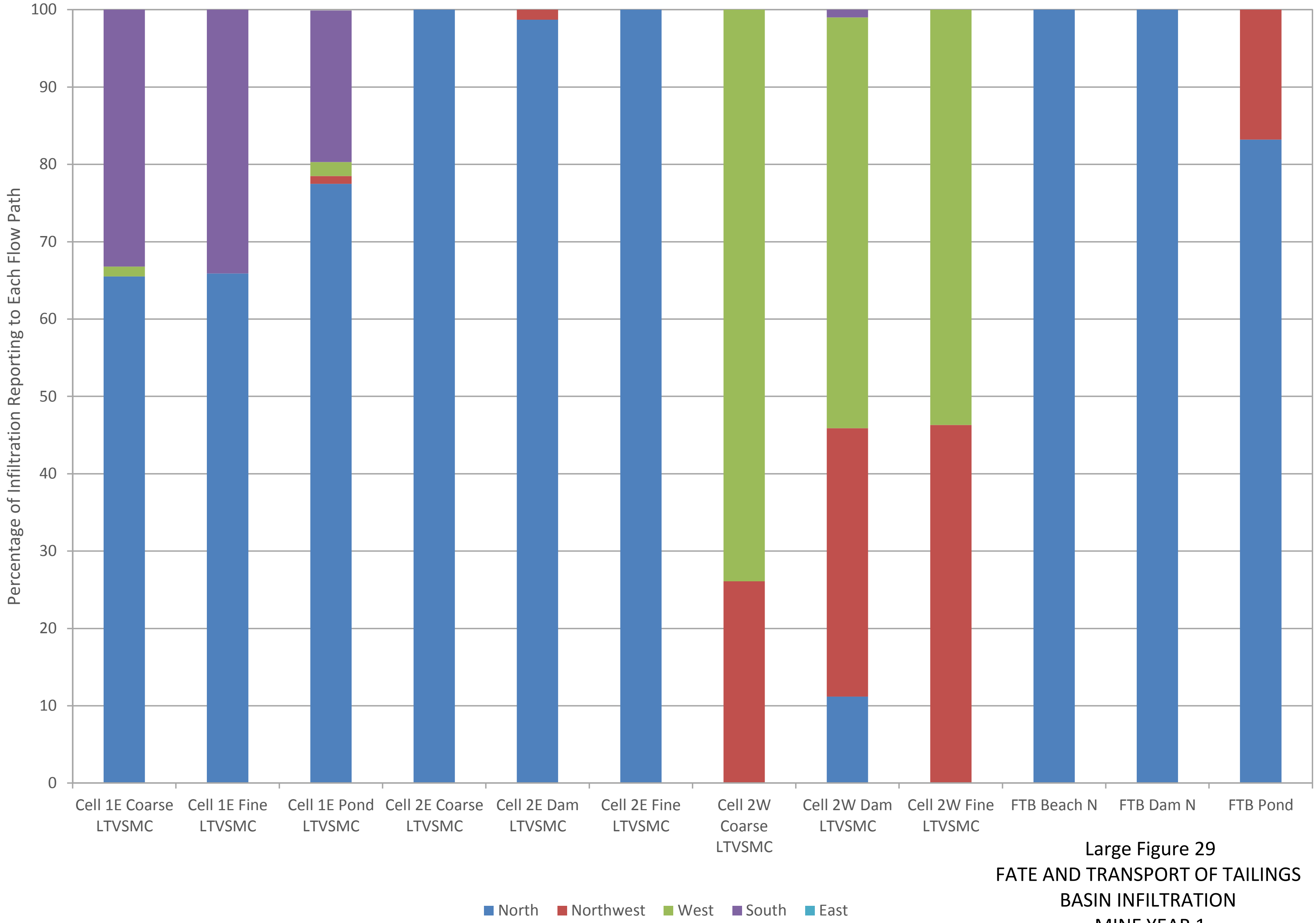
Large Figure 26
LONG-TERM CLOSURE BOUNDARY CONDITIONS - LAYER 1
NorthMet Project
Poly Met Mining, Inc.



Large Figure 27
BOTTOM LAYER
BOUNDARY CONDITIONS -
PREDICTIVE SIMULATIONS
NorthMet Project
Poly Met Mining, Inc.



Large Figure 28
FATE AND TRANSPORT OF TAILINGS
BASIN INFILTRATION
CURRENT CONDITIONS
NorthMet Project
Poly Met Mining, Inc.



Large Figure 29
FATE AND TRANSPORT OF TAILINGS BASIN INFILTRATION
MINE YEAR 1
NorthMet Project
Poly Met Mining, Inc.

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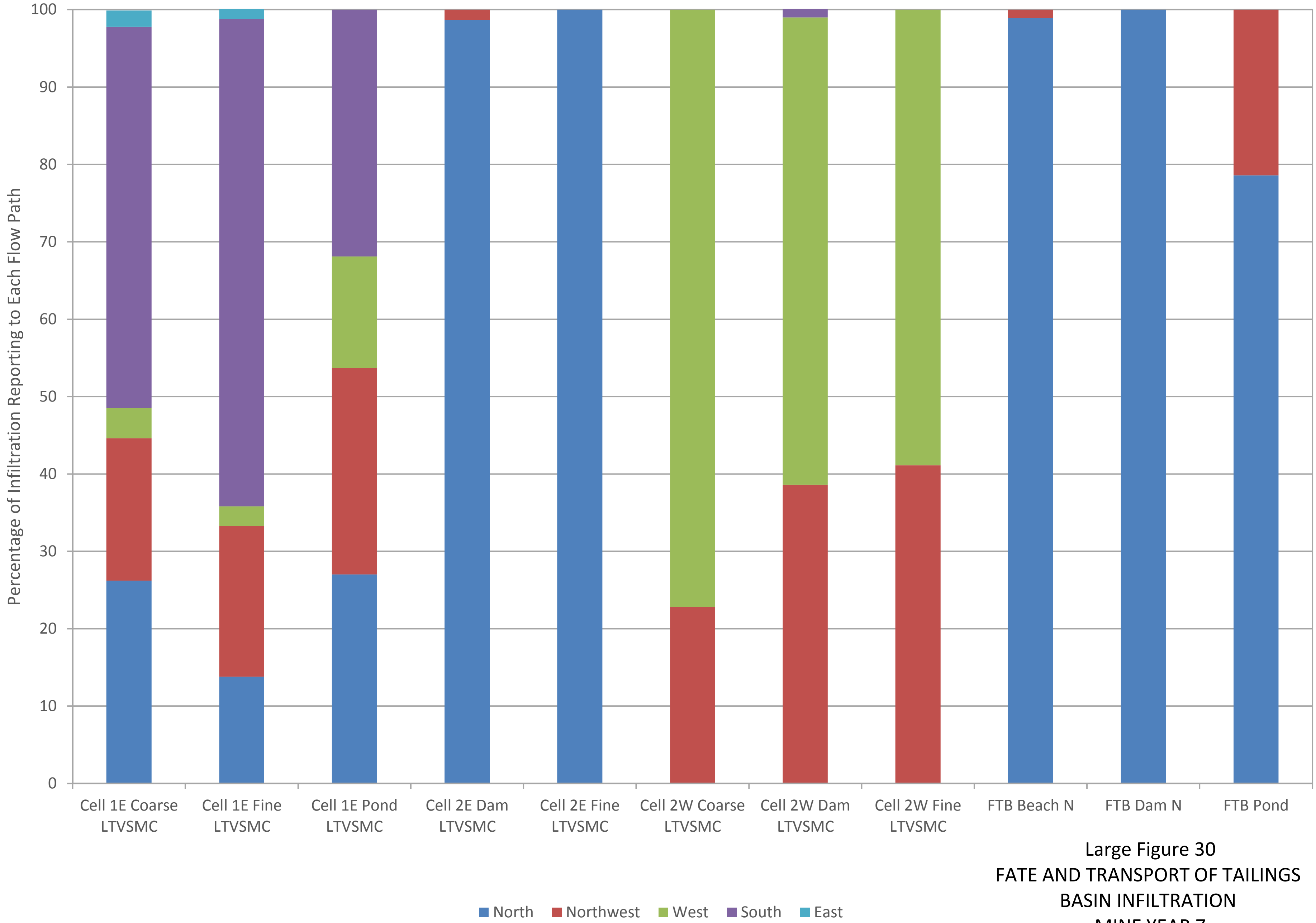
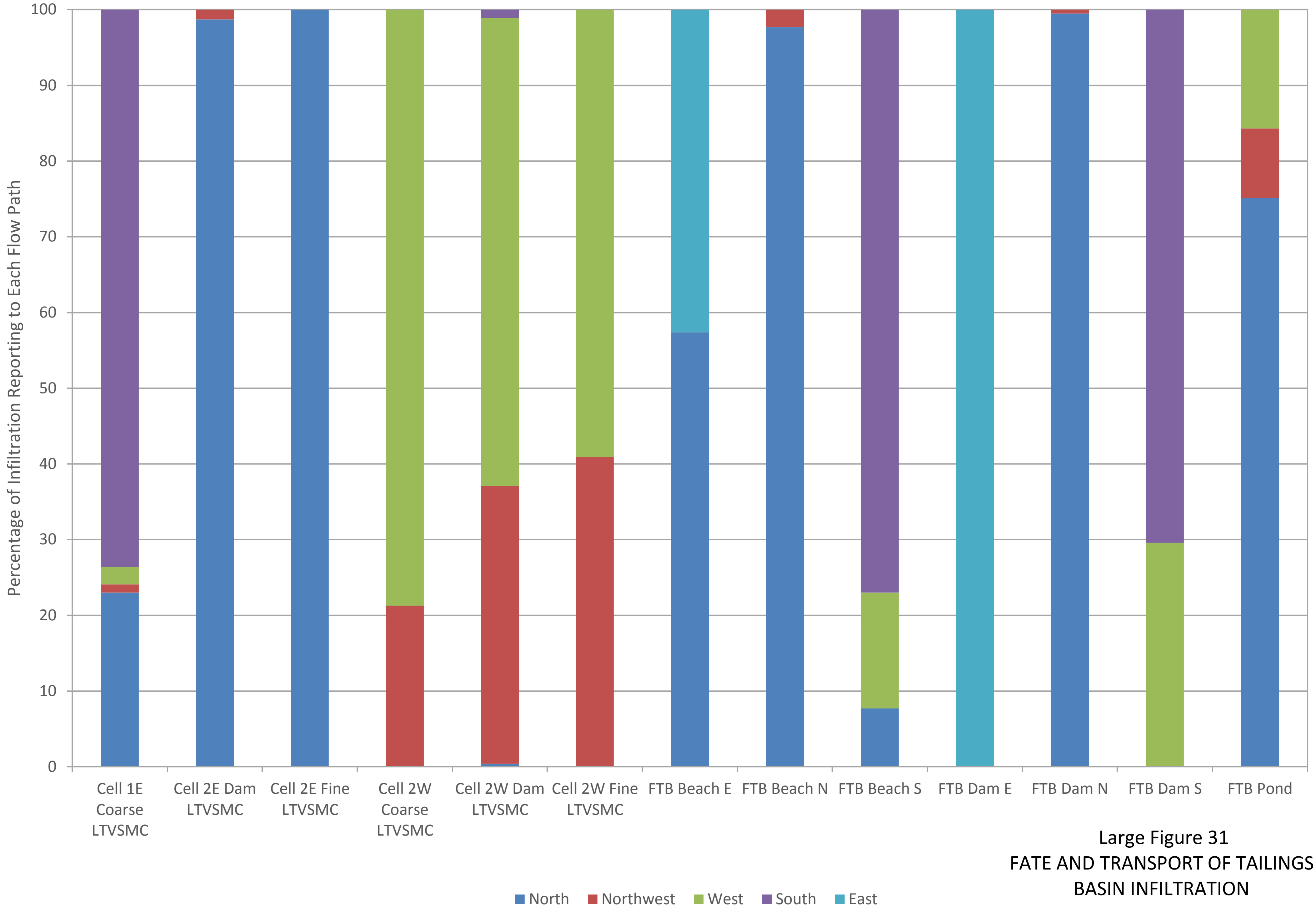


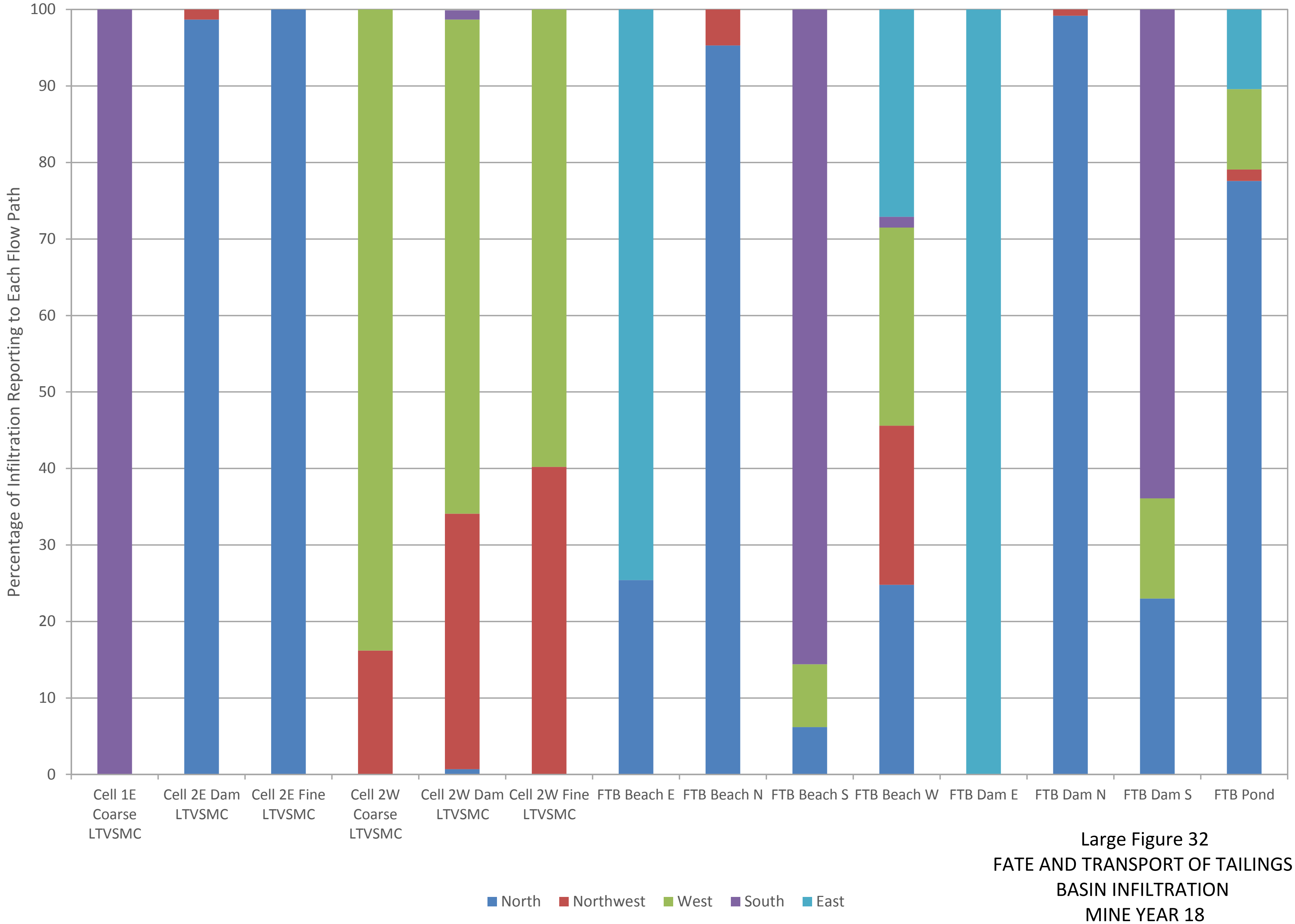
Large Figure 30
FATE AND TRANSPORT OF TAILINGS
BASIN INFILTRATION
MINE YEAR 7
NorthMet Project
Poly Met Mining, Inc.

V:\23\69\862\GWV\APA_Basin\MODFLOW\2014 SDEIS Comm Resp Updates\model_postprocessing\Contributing_Area_Analysis\Summary_Table.xlsx



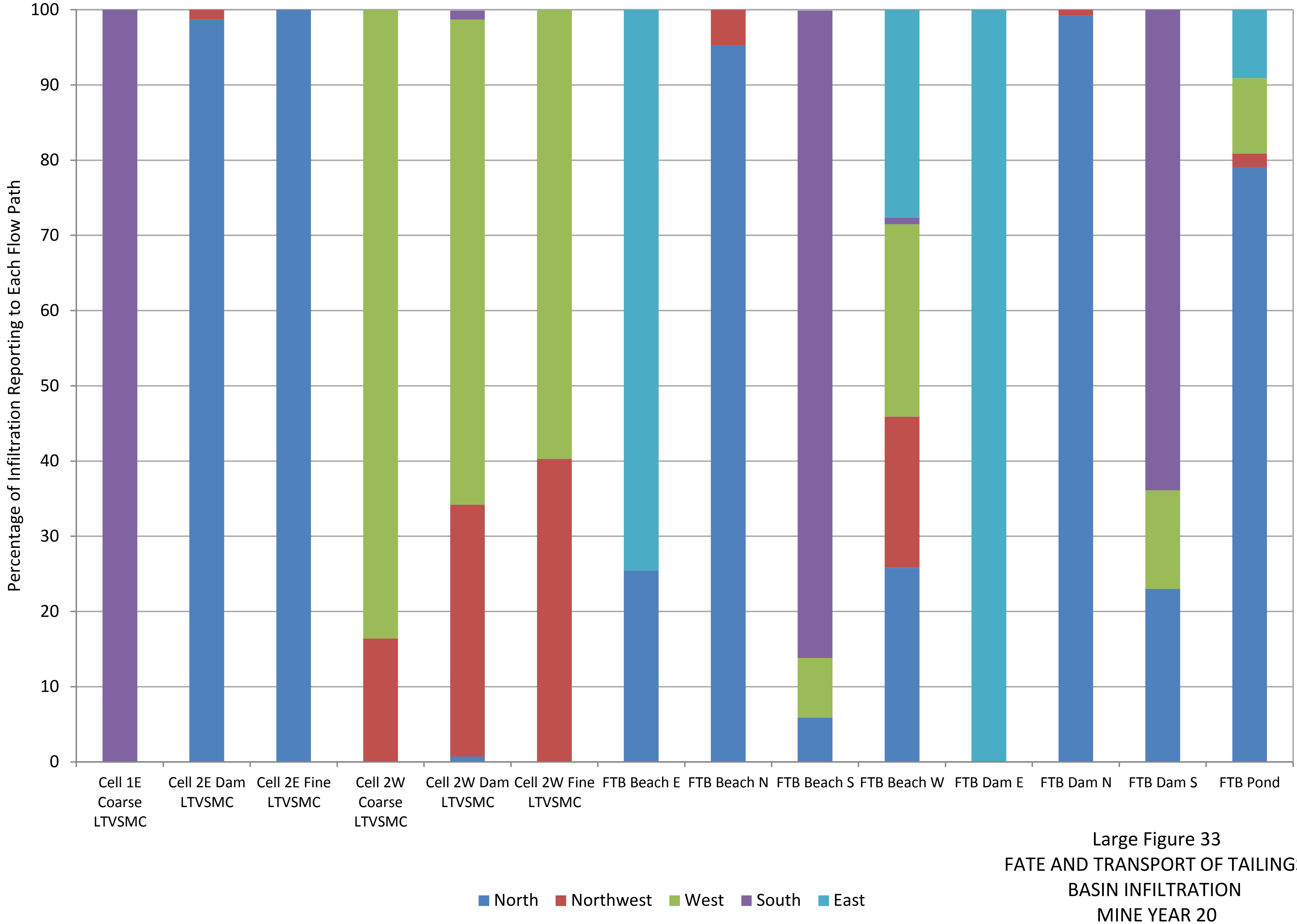
Large Figure 31
FATE AND TRANSPORT OF TAILINGS
BASIN INFILTRATION
MINE YEAR 8
NorthMet Project
Poly Met Mining, Inc.

V:\23\69\862\GWV\APA_Basin\MODFLOW\2014 SDEIS Comm Resp Updates\model_postprocessing\Contributing_Area_Analysis\Summary_Table.xlsx



Large Figure 32
FATE AND TRANSPORT OF TAILINGS
BASIN INFILTRATION
MINE YEAR 18
NorthMet Project
Poly Met Mining, Inc.

V:\23\69\862\GWV\APA_Basin\MODFLOW\2014 SDEIS Comm Resp Updates\model_postprocessing\Contributing_Area_Analysis\Summary_Table.xlsx



Large Figure 33
FATE AND TRANSPORT OF TAILINGS
BASIN INFILTRATION
MINE YEAR 20
NorthMet Project
Poly Met Mining, Inc.

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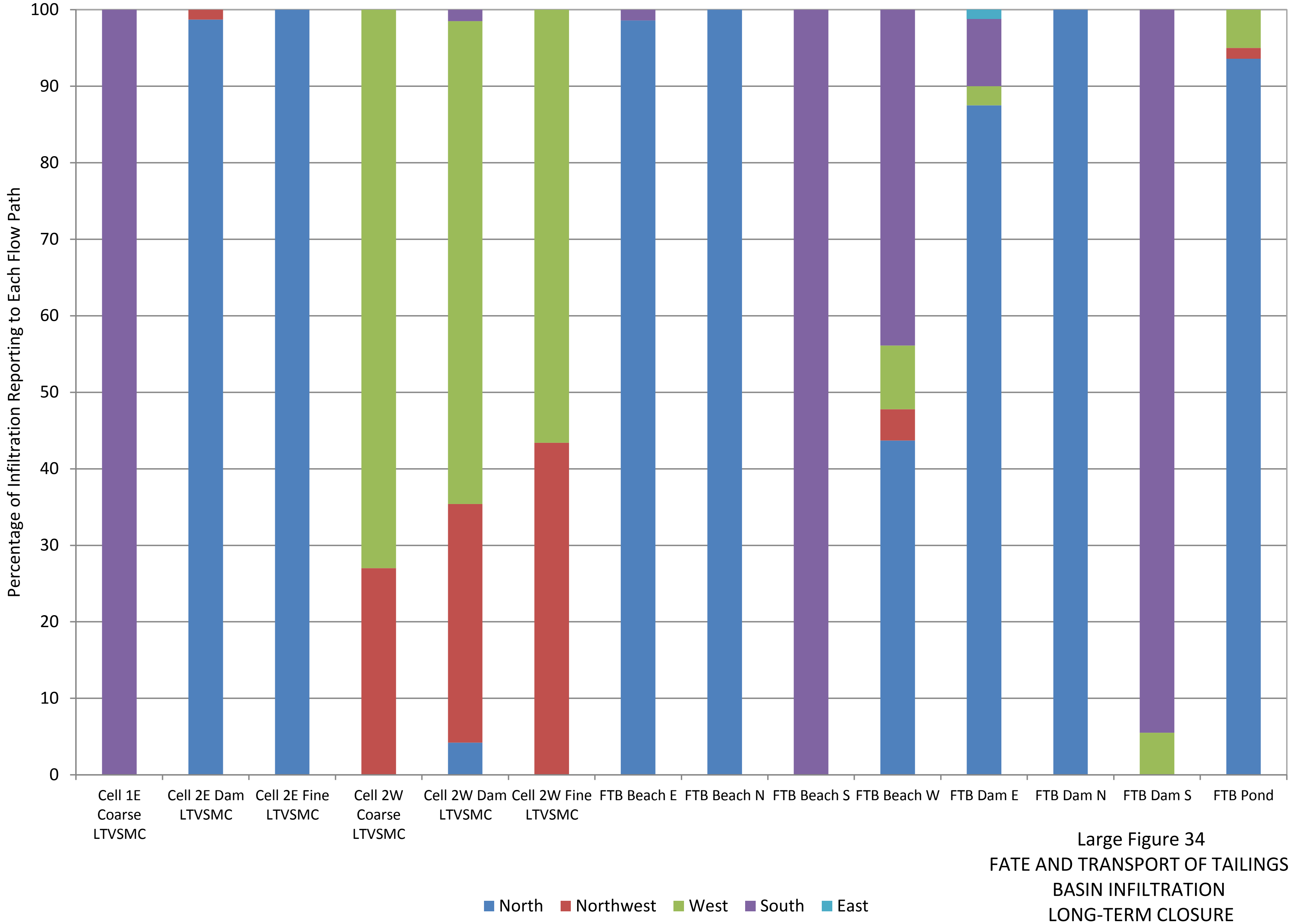

Large Figure 34
FATE AND TRANSPORT OF TAILINGS
BASIN INFILTRATION
LONG-TERM CLOSURE
NorthMet Project
Poly Met Mining, Inc.

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Attachment B

Input Variables for the Plant Site Model

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Water Quality Standards											
Surface_Constant_Standards	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-2				Constant surface water quality standards applicable to the project	MN Rules 7050 and 7052	Water Section 2.1 - *Minnesota Surface Water Quality Standards*
SW_Hardness_Standard	[mg/L]	Deterministic	N/A	Constant	500	N/A	N/A	N/A	Constant surface water standard for hardness	MN Rule 7050	Water Section 2.1 - *Minnesota Surface Water Quality Standards*
Surface_Hardness_Standards	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-3				Hardness-dependent surface water quality standards applicable to the project	MN Rules 7050 and 7052	Water Section 2.1 - *Minnesota Surface Water Quality Standards*
Ground_Primary_Standards	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-4				Constant Primary groundwater quality standards applicable to the project	MN Rules 7060 and 4717	Water Section 2.3 - *Minnesota Groundwater Standards*
Prim_GW_Hardness_Stand	[mg/L]	Deterministic	N/A	Constant	999999	N/A	N/A	N/A	Placeholder input to model; indicating that there is no applicable standard	MN Rules 7060 and 4717	Water Section 2.3 - *Minnesota Groundwater Standards*
Ground_Secondary_Standards	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-4				Constant Secondary groundwater quality standards presented for reference	MN Rules 7060 and 4717	Water Section 2.3 - *Minnesota Groundwater Standards*
Sec_GW_Hardness_Stand	[mg/L]	Deterministic	N/A	Constant	999999	N/A	N/A	N/A	Placeholder input to model; indicating that there is no applicable standard	MN Rules 7060 and 4717	Water Section 2.3 - *Minnesota Groundwater Standards*
PM13_Hardness_Stndrd	[mg/L]	Deterministic	N/A	Constant	117	N/A	N/A	N/A	Median hardness at PM-13 used for the hardness-based standards at PM-13	Median value of monitoring data at PM-13 between 4/12/04 and 12/19/13	Water Section 2.1.1 - *Hardness-based Standards*
General Engineering Variables											
Closure_Year	[yr]	Deterministic	N/A	Constant	20	N/A	N/A	N/A	Year when operations cease	Project Description	Water Section 5.1.2 - *Project Model*
Water_Depth	[in]	Deterministic	N/A	Constant	0.1	N/A	N/A	N/A	Average depth of water at the bottom of stockpile (for volume calculation)	See Mine Site Work Plan Tables	None
Tiny_Area	[acre]	Deterministic	N/A	Constant	0.001	N/A	N/A	N/A	Tiny area to prevent dividing by zero	See Mine Site Work Plan Tables	None
Tiny_Mass	[kg]	Deterministic	N/A	Constant	0.001	N/A	N/A	N/A	Tiny mass to prevent dividing by zero	See Mine Site Work Plan Tables	None
Tiny_Volume	[m^3]	Deterministic	N/A	Constant	0.001	N/A	N/A	N/A	Tiny volume to prevent dividing by zero	See Mine Site Work Plan Tables	None

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Plant Site Hydrology											
Precip_cuberoot	[--]	Uncertain	Annually	Normal	3.03	0.15	N/A	N/A	Cubed root of the annual precipitation in inches	HiDen Climate network for Mine Site (1981-2010 climate normal)	Water Section 5.2.1.1.1 - *Precipitation*
Annual_P_Variation	[yr/mon]	Deterministic	N/A	Constant	Vector by month. Reference Table 1-51				Fraction of annual precipitation that falls each month	HiDen Climate network for Mine Site (1981-2010 climate normal)	Water Section 5.2.1.1.1 - *Precipitation*
Open_Water_Evap_OPS_Early	[in/yr]	Uncertain	Annually	Normal	32.5	0.56	N/A	N/A	Evaporation rate from open water in Cell 2E only during operations (artificially heated water)	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Open_Water_Evap_OPS_Late	[in/yr]	Uncertain	Annually	Normal	30.8	0.69	N/A	N/A	Evaporation rate from open water in combined Cell2E and 1E during operations (artificially heated water)	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Open_Water_Evap_CLSR	[in/yr]	Uncertain	Annually	Normal	17.1	2.16	N/A	N/A	Evaporation rate from open water after operations (normal temperature water)	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.1.1.2 - *Evaporation (Open Water)*
Annual_E_Variation	[yr/mon]	Deterministic	N/A	Constant	Vector by month. Reference Table 1-51				Fraction of annual evaporation that occurs each month	HiDen Climate network for Mine Site (1981-2010 climate normal)	Water Section 5.2.1.1.2 - *Evaporation (Open Water)*
Beach_Evap_Frac	[--]	Uncertain	Annually	Normal	0.528	0.046	N/A	N/A	Fraction of precipitation that evaporates from the Flotation Tailings beaches	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Beach_RO_Frac	[--]	Uncertain	Annually	Normal	0.195	0.043	N/A	N/A	Fraction of precipitation that becomes runoff from the beaches	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Delta_Evap	[in/yr]	Uncertain	Annually	Normal	46.0	0.69	N/A	N/A	Evaporation rate from the active delta in the Flotation Tailings beach	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Beach_BNT_Evap_Frac	[--]	Uncertain	Annually	Normal	0.662	0.073	N/A	N/A	Fraction of precipitation that evaporates from the bentonite-amended Flotation Tailings beaches	HELP modeling conducted by Golder	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Beach_BNT_RO_Frac	[--]	Uncertain	Annually	Trunc. Normal	0.126	0.063	0	N/A	Fraction of precip that runs off the amended beaches	HELP modeling conducted by Golder	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Rec_Bank_Evap_Frac	[--]	Uncertain	Annually	Normal	0.662	0.073	N/A	N/A	Fraction of precipitation that evaporates from the bentonite-amended dams	HELP modeling conducted by Golder	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Rec_Bank_RO_Frac	[--]	Uncertain	Annually	Trunc. Normal	0.126	0.063	0	N/A	Fraction of precip that runs off the amended dams	HELP modeling conducted by Golder	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
LTVSMC_Tailings_Evap_Frac	[--]	Uncertain	Annually	Normal	0.367	0.037	N/A	N/A	Fraction of precipitation that evaporates from the LTVSMC tailings in Cells 1E, 2E, & 2W	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.1 - *Evapotranspiration, Runoff and Infiltration – Cell 2W*
Cell2W_RO_Frac	[--]	Uncertain	Annually	Normal	0.003	0.0005	N/A	N/A	Fraction of precip that runs off the coarse tailings in Cell 2W	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.1 - *Evapotranspiration, Runoff and Infiltration – Cell 2W*
Cell1E_Coarse_RO_Frac	[--]	Uncertain	Annually	Normal	0.480	0.073	N/A	N/A	Fraction of precip that runs off the coarse tailings in Cell 1E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell1E_Fines_RO_Frac	[--]	Uncertain	Annually	Normal	0.469	0.072	N/A	N/A	Fraction of precip that runs off the fine tailings in Cell 1E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2E_Coarse_RO_Frac	[--]	Uncertain	Annually	Normal	0.423	0.065	N/A	N/A	Fraction of precip that runs off the coarse tailings in Cell 2E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2E_Fines_RO_Frac	[--]	Uncertain	Annually	Normal	0.498	0.076	N/A	N/A	Fraction of precip that runs off the fine tailings in Cell 2E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2E_Bank_Evap_Frac	[--]	Uncertain	Annually	Normal	0.538	0.054	N/A	N/A	Fraction of precip that evaporates from the banks of Cell 2E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2W_Bank_Evap_Frac	[--]	Uncertain	Annually	Normal	0.425	0.043	N/A	N/A	Fraction of precip that evaporates from the banks of Cell 2W	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2W_Bank_RO_Frac	[--]	Uncertain	Annually	Normal	0.248	0.038	N/A	N/A	Fraction of precipitation that becomes runoff from the embankments of Cell 2W	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Min_Climate_Infiltration	[in/yr]	Deterministic	N/A	Constant	0.1	N/A	N/A	N/A	Minimum infiltration allowed in the tailings beaches and dams for model stability purposes (eliminate divide by zero)	Assumed	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Bare_ET	[--]	Uncertain	Realization	Normal	0.524	0.020	N/A	N/A	ET from bare waste rock as a fraction of precipitation	See Mine Site Work Plan Tables	None
Bare_RO	[--]	Deterministic	N/A	Constant	0	N/A	N/A	N/A	Runoff from bare waste rock as a fraction of precipitation	See Mine Site Work Plan Tables	None
SnowMelt_Start	[--]	Deterministic	N/A	Constant	4	N/A	N/A	N/A	Month of the year when snow melt starts	Analysis of flow record and watershed yield	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
SnowMelt_Stop	[--]	Deterministic	N/A	Constant	5	N/A	N/A	N/A	Final snow melt month of the year	Analysis of flow record and watershed yield	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Frozen_Period	[mon]	Uncertain	Annually	Triangular	3.4	N/A	2.4	4.4	Number of months each year that the inactive tailings are frozen and limit oxygen diffusion	Analysis of site specific temperature data	Waste Section 10.2 - *Lab to Field Scale Up*

Plant Site Chemistry

GW_Alpha_Rand (see Table 1-5)	[--]	Uncertain	Realization	Normal	GW_Alpha_Mean	GW_Alpha_Stdev	N/A	N/A	Vector by constituent, mean of the LN transformed baseline groundwater quality	Analysis of groundwater on-site groundwater wells	Water Section 5.2.1.3.5 - *Background Groundwater Quality*
GW_Beta	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-5				Standard Deviation of the LN transformed baseline groundwater quality	Analysis of groundwater on-site groundwater wells	Water Section 5.2.1.3.5 - *Background Groundwater Quality*
SW_RO_Concentration (see Table 1-6)	[ug/L]	Uncertain	Timestep	Lognormal	RO_Mean	RO_StDev	N/A	N/A	Concentration of surface runoff in the un-impacted watershed	Calibration to existing water quality in the Embarrass River	Water Section 5.2.1.4.5 - *Background Watershed Runoff Quality*
INIT_Concs	[mg/L]	Deterministic	N/A	Constant	Matrix by constituent and location. Reference Table 1-7				Initial Concentrations in the surface water evaluation locations	Sampled water quality data	Water Section 5.2.3.3 - *Surface Water Initiation*

Mine Site Water

Mine_Site_Flow_Rate	[gpm]	Uncertain	Timestep	Trunc. Normal	Reference Table 1-8		0	1E+10	Flow at any point in time from the Mine Site WWTF to the FTB, auto-correlated (0.9) per data package	Mine Site probabilistic water quality model	Water Section 5.2.2.2.1 - *Inflow from Mine Site WWTF*
Mine_Site_Conc	[mg/L]	Uncertain	Timestep	Trunc. Normal	Table 1-9	Table 1-10	0	1E+10	Concentration for all constituents at any time in the water from the Mine Site WWTF to the FTB	Mine Site probabilistic water quality model	Water Section 5.2.2.2.1 - *Inflow from Mine Site WWTF*

Colby Lake

CL_Quality (see Table 1-44)	[mg/L]	Uncertain	Timestep	Lognormal	CL_Mean	CL_SD	N/A	N/A	Concentration for all constituents at any time in the water from Colby Lake	Sampled Surface Water Data, CDF062	Water Section 5.2.2.8.2 - *Colby Lake*

Table 1-1 Input Variables for the Plant Site Model

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
NorthMet Tailings Hydraulic Properties											
NM_SG	[--]	Deterministic	N/A	Constant	3.0	N/A	N/A	N/A	Specific gravity of the NorthMet tailings (both coarse and fine fractions)	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
Beach_Porosity	[cm^3/cm^3]	Uncertain	Annually	Triangular	0.4012	N/A	0.3668	0.4685	Porosity of the tailings in the NorthMet beaches	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Pond_Porosity	[cm^3/cm^3]	Uncertain	Annually	Triangular	0.5602	N/A	0.4049	0.5696	Porosity of the tailings under the Flotation Tailings Basin pond	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Mean_Perc_Fines	[%]	Deterministic	N/A	Constant	35	N/A	N/A	N/A	Average percentage of the flotation tailings beach that is made up of fine flotation tailings	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Perc_Fines_Retained	[%]	Uncertain	Annually	Normal	Mean_Perc_Fines	3.04	N/A	N/A	Percent of the NorthMet tailings in the beaches that are from the fine fraction (by mass)	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Perc_Coarse_Feed	[%]	Uncertain	Annually	Normal	38	1.82	N/A	N/A	Percent of the NorthMet tailings feed that is in the coarse fraction (by mass)	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Ksat_Coeff	[--]	Deterministic	N/A	Constant	Function coefficients. Reference Table 1-11				Function coefficients to determine the saturated hydraulic conductivty of the NorthMet tailings	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
ResMoist_Coeff	[--]	Deterministic	N/A	Constant	Function coefficients. Reference Table 1-11				Function coefficients to determine the residual moisture content of the NorthMet tailings	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
AirSuct_Coeff	[--]	Deterministic	N/A	Constant	Function coefficients. Reference Table 1-11				Function coefficients to determine the air entry suction parameter of the NorthMet tailings	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
VGBeta_Coeff	[--]	Deterministic	N/A	Constant	Function coefficients. Reference Table 1-11				Function coefficients to determine the Van Genuchten parameter β of the NorthMet tailings	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_SG	[--]	Deterministic	N/A	Constant	3.0	N/A	N/A	N/A	Specific gravity of the bentonite amended tailings	The same as the specific gravity of the NorthMet Flotation Tailings	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_Porosity	[cm^3/cm^3]	Deterministic	N/A	Constant	0.36	N/A	N/A	N/A	Porosity of the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_Ksat	[cm/s]	Deterministic	N/A	Constant	5.56E-06	N/A	N/A	N/A	Saturated hydraulic conductivity of the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_ResMoist	[cm^3/cm^3]	Deterministic	N/A	Constant	0.07	N/A	N/A	N/A	Residual moisture content of the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_AirSuct	[1/cm]	Deterministic	N/A	Constant	0.005	N/A	N/A	N/A	Air entry suction parameter for the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_VGBeta	[--]	Deterministic	N/A	Constant	1.09	N/A	N/A	N/A	Van Genuchten Beta parameter for the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC Tailings Hydraulic Properties											
LTVSMC_SG	[--]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Specific gravity of the different classes of the LTVSMC tailings	Unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_Porosity	[cm^3/cm^3]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Porosity of the different classes of the LTVSMC tailings	Unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_Ksat	[cm/s]	Deterministic	N/A	Constant	Matrix by tailings and Cell. Reference Table 1-12a & Table 1-12b				Saturated hydraulic conductivity of the LTVSMC tailings	Unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_ResMoist	[cm^3/cm^3]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Residual moisture content of the LTVSMC tailings	Unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_AirSuct	[1/cm]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Air entry suction parameter for the LTVSMC tailings	Fitted curves to data from the unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_VGBeta	[--]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Van Genuchten Beta parameter for the LTVSMC tailings	Fitted curves to data from the unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Saturation-Diffusion Inputs											
O2_Air_Diff	$[m^2/s]$	Deterministic	N/A	Constant	1.80E-05	N/A	N/A	N/A	Free diffusion coefficient of oxygen in air	Cussler, 1997	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
O2_Water_Diff	$[m^2/s]$	Deterministic	N/A	Constant	2.20E-09	N/A	N/A	N/A	Free diffusion coefficient of oxygen in water	Cussler, 1997	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
Tortuosity	[--]	Deterministic	N/A	Constant	0.273	N/A	N/A	N/A	Tortuosity factor	Elberling, 1993	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
C	[--]	Deterministic	N/A	Constant	3.28	N/A	N/A	N/A	Empirical coefficient in the Elberling equation	Elberling, 1993	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
KH	[--]	Deterministic	N/A	Constant	33.9	N/A	N/A	N/A	Henry's constant for oxygen	Known value	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
O2_Conc_Air	$[mol/m^3]$	Deterministic	N/A	Constant	8.89	N/A	N/A	N/A	Concentration of oxygen in the air (boundary condition)	Known value	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
Pond_DO (see Table 1-18)	[mg/L]	Uncertain	Monthly	Normal	Pond_DO_Mean	Pond_DO_SD	N/A	N/A	Oxygen concentration in the tailings basin ponds which seeps into the tailings generating chemical load	DO saturation at expected yet conservative pond water temperatures	Waste Section 10.6.1 - *Oxidation of Saturated Tailings*
NorthMet Tailings Chemical Loading											
NM_Fines_Release	[varies]	Uncertain	Realization	Varies	Vector by constituent. Reference Table 1-13				Distribution parameters for constituent release rates and ratios from the fine fraction of the NorthMet tailings	Analysis of HCT, Aqua Regia, and Microprobe data	Waste Section 10.1.1 - *NorthMet Tailings*
NM_Coarse_Release	[varies]	Uncertain	Realization	Varies	Vector by constituent. Reference Table 1-14				Distribution parameters for constituent release rates and ratios from the coarse fraction of the NorthMet tailings	Analysis of HCT, Aqua Regia, and Microprobe data	Waste Section 10.1.1 - *NorthMet Tailings*
Ratio_or_Conc_NM	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-13 & Table 1-14				Defines whether a release rate is from a release ratio (1) or from a concentration (0)	Release Method	Waste Section 10.1.1 - *NorthMet Tailings*
Atmospheric_pH	[--]	Uncertain	Realization	Uniform	N/A	N/A	7.8	8.1	Estimate of the pH in the areas of the FTB dominated by advection of surface water	See Mine Site Work Plan Tables	Waste Section 10.4 - *Concentration Caps*
Enriched_pH	[--]	Uncertain	Realization	Discrete	7.1	N/A	N/A	N/A	Estimate of the pH in the CO2 enriched areas of the FTB	CDF056	Waste Section 10.4 - *Concentration Caps*
NM_Solubility	[mg/L]	Uncertain	Realization	Varies	Vector by constituent. Reference Table 1-15				Concentration cap distributions for each constituent in the NorthMet Tailings	Category 1 Waste Rock	Waste Section 10.4 - *Solubility Limits*
NM_Content	[mg/kg]	Deterministic	N/A	Constant	Matrix by Constituent and Tailings Class. Reference Table 1-16				Whole tailings content for depletion modeling	Aqua Regia data	Waste Section 10.6.6 - *Depletion*
NM_Tailings_Weathering	$[mg/m^2/mon]$	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-17				Weathering rate by the NorthMet tailings beaches	RS46	Waste Section 10.6.2 - *Tailings Weathering*
LTVSMC Tailings Chemical Loading											
Dist_Params_LTVSMC_Release	[varies]	Uncertain	Realization	Varies	Matrix by constituent and parameter. Reference Table 1-19				Distribution parameters for the release rates from the existing LTVSMC tailings	Analysis of HCT, Aqua Regia, and Microprobe data	Waste Section 10.1.2 - *LTVSMC Tailings*
LTVSMC_Flush	[mg/kg]	Uncertain	Realization	Beta	Matrix by constituent and parameter. Reference Table 1-20				One-time loading from the disturbed LTVSMC tailings as the dams are constructed	Analysis of HCT, Aqua Regia, and Microprobe data	Waste Section 10.1.2 - *LTVSMC Tailings*
Coarse_Calib_Fact	[--]	Deterministic	N/A	Constant	0.2	N/A	N/A	N/A	Calibration factor to modify the SO4 release rate from the coarse LTVSMC tailings	Calibration of the existing conditions / No Action Model	Waste Section 10.2.1 - *Scaling / Calibration of LTVSMC Lab Data to Field Data*
Fine_Calib_Fact	[--]	Deterministic	N/A	Constant	0.7	N/A	N/A	N/A	Calibration factor to modify the SO4 release rate from the fine LTVSMC tailings	Calibration of the existing conditions / No Action Model	Waste Section 10.2.1 - *Scaling / Calibration of LTVSMC Lab Data to Field Data*
LTVSMC_Calib_Fact	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-21				Calibration factor applied to each constituent so that the theoretical loading matches the observed seepage data	Calibration of the existing conditions / No Action Model	Waste Section 10.2.1 - *Scaling / Calibration of LTVSMC Lab Data to Field Data*
Ratio_or_Conc_LTV	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-21				Defines whether a release rate is from a release ratio (1) or from a concentration (0)	Release Method	Waste Section 10.2.1 - *Scaling / Calibration of LTVSMC Lab Data to Field Data*
LTVSMC_Content	[mg/kg]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-22				Whole tailings content for depletion modeling	Aqua Regia data	Waste Section 10.6.6 - *Depletion*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Geochemical Parameters for Scaling											
Activation_energy	[kJ/mol]	Uncertain	Realization	Uniform	N/A	N/A	47	63	Activation energy of pyrrhotite for the Arrhenius equation	Literature-reported range	Waste Section 8.3 - *Lab to Field Scale Up*
Contact_factor	[--]	Uncertain	Realization	Triangular	0.5	N/A	0.1	0.9	Fraction of Ore contacted by water	Professional judgement	Waste Section 8.3 - *Lab to Field Scale Up*
Field_temp	[C]	Uncertain	Annually	Normal	2.004	1.388	N/A	N/A	Average annual site air temperature, assumed the same temperature as the Ore and tailings	HiDen Climate data for 1981-2010	Waste Section 8.3 - *Lab to Field Scale Up*
O2_Mol_Weight	[g/mol]	Deterministic	N/A	Constant	32.00	N/A	N/A	N/A	Molecular weight of oxygen	Known value	Waste Section 10.1.1 - *NorthMet Tailings*
SO4_Mol_Weight	[g/mol]	Deterministic	N/A	Constant	96.07	N/A	N/A	N/A	Molecular weight of sulfate	Known value	Waste Section 10.1.1 - *NorthMet Tailings*
S_Mol_Weight	[g/mol]	Deterministic	N/A	Constant	32.07	N/A	N/A	N/A	Molecular weight of sulfide	Known value	Waste Section 10.1.1 - *NorthMet Tailings*
Lab_temp	[C]	Deterministic	N/A	Constant	20	N/A	N/A	N/A	Laboratory temperature (known)	RS 53/42	Waste Section 8.3 - *Lab to Field Scale Up*
Size_factor	[--]	Uncertain	Realization	Trunc. Normal	0.18	0.061	0	1.00E+10	Scaling factor to adjust to field scale Ore	Analysis of Equity Silver Mine data	Waste Section 8.3 - *Lab to Field Scale Up*
Scale_Factor_LAM	[--]	Uncertain	Annually	Beta	0.128	0.085	0.019	0.687	Scaling factor for buttress material	MDNR Analysis of Dunka Mine Data	Waste Section 10.6.5 - *Buttress Material*
Sulfate_gen_ratio	[mol SO4 / mol O2]	Deterministic	N/A	Constant	0.444	N/A	N/A	N/A	Ratio of the number of moles of sulfate produced for every mole of oxygen consumed	Pyrrhotite reaction stoichiometry	Waste Section 10.3 - *Saturation and Oxygen Diffusion*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Engineered Dam Characteristics											
Dam_Volume	[$yard^3$]	Deterministic	N/A	Time Series	Time series by dam. Reference Table 1-23				Cumulative volume of bulk LTVSMC tailings used to construct the FTB dams through time	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Dam_Outer_Area	[acre]	Deterministic	N/A	Time Series	Time series by dam. Reference Table 1-23				The surface area of the outer slope of the dams of the FTB	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Crest_Elevation	[ft]	Deterministic	N/A	Time Series	Time series. Reference Table 1-24				The elevation of the top of the dams of the FTB	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Crest_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-24				The plan-view area within the dam crest (helps define the storage volume within the FTB)	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Beach_Elevation	[ft]	Deterministic	N/A	Time Series	Time series. Reference Table 1-24				Elevation of the NorthMet tailings beach where it meets the constructed dams of the FTB	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Beach_Areas	[acres]	Deterministic	N/A	Time Series	Time series by dam. Reference Table 1-24				Areas of the NorthMet tailings beaches that are contributing load to the seepage	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Beach_Slope	[%]	Deterministic	N/A	Constant	1.0	N/A	N/A	N/A	The slope of the beach formed using NorthMet tailings from the dam to the pond's edge	Flotation Tailings Basin design, validated by SAFL Deposition study	Waste Section 5.1.3.1 - *Depositional Study*
Beach_Width	[ft]	Deterministic	N/A	Constant	625	N/A	N/A	N/A	The width of the beach formed using NorthMet tailings from the dam to the pond's edge	Flotation Tailings Basin design	Water Section 5.2.2.3 - *Beneficiation Plant Slurry and Beach Development*
Delta_Angle	[deg]	Deterministic	N/A	Constant	75	N/A	N/A	N/A	The angle at which spigotted water and tailings will spread as they flow down the NorthMet tailings beach	Value carried forward from RS-13B	Water Section 5.2.2.3 - *Beneficiation Plant Slurry and Beach Development*
Delta_Flow_Frac	[%]	Deterministic	N/A	Constant	30	N/A	N/A	N/A	The fraction of the delta area that is receiving active flow	Value carried forward from RS-13B	Water Section 5.2.2.3 - *Beneficiation Plant Slurry and Beach Development*
Dam_Flow_Direction	[%]	Deterministic	N/A	Time Series	Time series by dam and by toe. Reference Table 1-25				Time series of the proportion of water that flows through the dams that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Dam_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by dam and by toe. Reference Table 1-26				Time series of the proportion of water that flows through the dams that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Beach_Flow_Direction	[%]	Deterministic	N/A	Time Series	Time series by dam and by toe. Reference Table 1-27				Time series of the proportion of water that flows through the beaches that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Beach_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by dam and by toe. Reference Table 1-28				Time series of the proportion of water that flows through the beaches that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Dam_WT_Depth	[ft]	Deterministic	N/A	Time Series	Time series by Dam. Reference Table 1-29				Time series of the depth to the phreatic surface under each Dam (where chemical production would cease)	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Beach_WT_Depth	[ft]	Deterministic	N/A	Time Series	Time series by Dam. Reference Table 1-29				Time series of the depth to the phreatic surface under each NorthMet tailings beach	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Buttresses											
N_Buttress_Volume	[$yard^3$]	Deterministic	N/A	Time Series	Time series by buttress. Reference Table 1-23				Volume of the north buttress	Flotation Tailings Management Plan, CDF064	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*
N_Buttress_Area	[acres]	Deterministic	N/A	Time Series	Time series by buttress. Reference Table 1-23				Area of the North Buttress	CAD drawing of the proposed Flotation Tailings Basin, CDF064	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*
S_Buttress_Volume	[$yard^3$]	Deterministic	N/A	Time Series	Time series by buttress. Reference Table 1-23				Volume of the south buttress	Flotation Tailings Management Plan	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*
S_Buttress_Area	[acres]	Deterministic	N/A	Time Series	Time series by buttress. Reference Table 1-23				Area of the South Buttress	CAD drawing of the proposed Flotation Tailings Basin	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*
Buttress_Sulfur	[%]	Deterministic	N/A	Constant	0.063	N/A	N/A	N/A	Mass-weighted average sulfur content of the buttresses	See Mine Site Work Plan Tables	Waste Section 4.3.2 - *Sulfur Content*
Buttress_Content	[mg/kg]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-16				Content of constituent of concern in waste rock	Analysis of Aqua Regia Data	Waste Section 8.4.1 - *Depletion*
Buttress_Bulk_Density	[lbs/ft^3]	Deterministic	N/A	Constant	140	N/A	N/A	N/A	Bulk density of the material used to form the buttresses	Geotechnical design group	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Flotation Tailings Basin Details											
Pond_Bottom_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-30				The plan-view area of the bottom of the FTB pond	Flotation Tailings Basin design	Water Section 5.1.2.2.4 - *FTB Pond Conceptual model*
Pond_Top_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-30				The plan-view area of the top of the FTB pond (where optimum depth is reached and the slope breaks)	Flotation Tailings Basin design	Water Section 5.1.2.2.4 - *FTB Pond Conceptual model*
Design_Depth	[ft]	Deterministic	N/A	Constant	8	N/A	N/A	N/A	Designed optimum depth of the FTB pond	Flotation Tailings Basin design	Water Section 5.1.2.2.4 - *FTB Pond Conceptual model*
Pond_Slope	[%]	Deterministic	N/A	Constant	3	N/A	N/A	N/A	The slope of the NorthMet tailings under the FTB pond water surface	Flotation Tailings Basin design	Water Section 5.1.2.2.4 - *FTB Pond Conceptual model*
Pond_Seepage_Rate	[in/yr]	Deterministic	N/A	Time Series	Time series. Reference Table 1-31				Seepage rate of water from the FTB pond into the saturated NorthMet tailings	MODFLOW model of the FTB through time	Water Section 5.2.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Pond_Seepage_Direction	[%]	Deterministic	N/A	Time Series	Time series by toe. Reference Table 1-31				Time series of the proportion of water that seeps from the pond that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Pond_Saturated_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series. Reference Table 1-31				Time series of the volume of saturated tailings below the NorthMet Flotation Tailings pond	MODFLOW model of the FTB through time	Water Section 5.2.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Initial_Pond_Volume	[acre-ft]	Deterministic	N/A	Constant	1800	N/A	N/A	N/A	Volume of the water that is currently in Cell 2E where the FTB pond will begin	Using the area of the pond from the MODFLOW model and assuming a 3 meter depth	Water Section 5.1.1.1 - *Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model*
Pond_1E_Volume	[acre-ft]	Deterministic	N/A	Constant	3700	N/A	N/A	N/A	Volume of the water that is currently in Cell 1E	Using the area of the pond from the MODFLOW model and assuming a 3 meter depth	Water Section 5.1.1.1 - *Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model*
Cell1E_Pond_Surf_Area	[m^2]	Deterministic	N/A	Constant	1513672	N/A	N/A	N/A	Existing surface area of the pond in Cell 1E	MODFLOW model of the Tailings Basin	Water Section 5.1.1.1 - *Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model*
Contr_Embank_Area	[acres]	Deterministic	N/A	Time Series	Time series. Reference Table 1-32				Area contributing runoff to Cells 1E & 2E from the embankments of Cell 2W	Contour data and Flotation Tailings Basin Design	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Contr_Watershed	[acres]	Deterministic	N/A	Time Series	Time series. Reference Table 1-32				Area contributing runoff to Cells 1E & 2E from the surrounding forested areas	Contour data and Flotation Tailings Basin Design	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Pond_Transport_Time	[yr]	Deterministic	N/A	Constant	5	N/A	N/A	N/A	Transport time for flow and load from under the ponds in the FTB	Assumed value in RS74B, September 2008, Figure 8-11	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Interior_Transport_Time	[yr]	Deterministic	N/A	Constant	7	N/A	N/A	N/A	Transport time for flow and load from the NorthMet beaches and the coarse and fine interior LTVSMC tailings	Assumed value in RS74B, September 2008, Figure 8-10	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Dam_Transport_Time	[yr]	Deterministic	N/A	Constant	10	N/A	N/A	N/A	Transport time for flow and load from the dams of the FTB	Assumed value in RS74B, September 2008, Figure 8-9	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Erlang_Dispersion	[--]	Deterministic	N/A	Constant	25	N/A	N/A	N/A	A value greater than or equal to 1 representing some amount of dispersion where 1 is the maximum amount of dispersion.	Assumed	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Existing LTVSMC Tailings Basin											
Cell_Areas	[m^2]	Deterministic	N/A	Time Series	Time series by Cell and by tailings class. Reference Table 1-33				Reactive areas of the tailings in the existing Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.1.2.2.6 - *Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model*
Cell_WT_Depths	[ft]	Deterministic	N/A	Time Series	Time series by Cell and by tailings class. Reference Table 1-34				Depth to the phreatic surface in the existing Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell2W_Seepage_Direction	[%]	Deterministic	N/A	Time Series	Time series by Cell and by tailings class. Reference Table 1-35				Percent of seepage within each zone of Cell 2W that reports to each toe of the Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell2W_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-36				Saturated volume of tailings below each zone in Cell 2W that reports to each toe of the Tailigns Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell2E_Seepage_Direction	[%]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-37				Percent of seepage within each zone of Cell 2E that reports to each toe of the Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell2E_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-38				Saturated volume of tailings below each zone in Cell 2E that reports to each toe of the Tailigns Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell1E_Seepage_Direction	[%]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-39				Percent of seepage within each zone of Cell 1E that reports to each toe of the Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell1E_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-40				Saturated volume of tailings below each zone in Cell 1E that reports to each toe of the Tailigns Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Initial_Pond_Concs_2E	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-44				Initial concentrations in the pond water in Cell 2E	Samples where available, model calibration of existing conditions at the toes.	Waste Section 10.2.1 - *Scaling / Calibration to LTVSMC Field Data*
Initial_Pond_Concs_1E	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-44				Initial concentrations in the pond water in Cell 1E	Samples where available, model calibration of existing conditions at the toes.	Waste Section 10.2.1 - *Scaling / Calibration to LTVSMC Field Data*
Cell2E_Exist_Seepage	[in/yr]	Deterministic	N/A	Constant	61.5	N/A	N/A	N/A	Seepage rate from the existing pond in Cell 2E	MODFLOW Model of the existing Tailings Basin	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell1E_Exist_Seepage	[in/yr]	Deterministic	N/A	Constant	46.6	N/A	N/A	N/A	Seepage rate from the existing pond in Cell 1E	MODFLOW Model of the existing Tailings Basin	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Hydrometallurgical Residue Facility											
V_El	[acre-ft]	Deterministic	N/A	Time Series	Lookup Table. Reference Table 1-41				Volume as a function of elevation of the final constructed HRF	CAD design of the facility	Water Section 5.2.2.5 - *Hydrometallurgical Residue Facility (HRF) Details*
A_El	[acre]	Deterministic	N/A	Time Series	Lookup Table. Reference Table 1-41				Area as a function of elevation of the final constructed HRF	CAD design of the facility	Water Section 5.2.2.5 - *Hydrometallurgical Residue Facility (HRF) Details*
Crest_El	[ft]	Deterministic	N/A	Time Series	Time series. Reference Table 1-42				Crest elevation of the dams constructed to form the HRF	CAD design of the facility	Water Section 5.2.2.5 - *Hydrometallurgical Residue Facility (HRF) Details*
Forest_WS_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-42				Area of the forested contributing watershed to the south-west of the HRF	CAD design of the facility	Water Section 5.2.2.5.1 - *Climate Inputs; Precipitation, Evaporation, and Runoff*
Cell2W_WS_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-42				Area of Cell 2W that contributes runoff to the HRF	CAD design of the facility	Water Section 5.2.2.5.1 - *Climate Inputs; Precipitation, Evaporation, and Runoff*
Residue_Porosity	[cm^3/cm^3]	Uncertain	Realization	Triangular	0.57	N/A	0.53	0.61	Porosity of the hydrometallurgical residue	RS13, March 2007	Water Section 5.2.2.5.3 - *Entrainment*
Residue_Sp_Gr	[--]	Deterministic	N/A	Constant	2.76	N/A	N/A	N/A	Specific gravity of the hydrometallurgical residue	Bateman MetSim model	Water Section 5.2.2.5.3 - *Entrainment*
Residue_Sat_K	[cm/s]	Deterministic	N/A	Constant	3.40E-05	N/A	N/A	N/A	Saturated hydraulic conductivity of the hydrometallurgical residue	NorthMet Data Package - Geotechnical, Volume 2	Water Section 5.2.2.5.4 - *Leakage*
Geomembrane_Defect_Size	[cm]	Deterministic	N/A	Constant	1	N/A	N/A	N/A	Assumed diameter of a circular defect in the upper geomembrane liner under the HRF	Values assumed for the same geomembrane liners at the Mine Site used to determine leakage rates	Water Section 5.2.2.5.4 - *Leakage*
Defects_Per_Acre	[1/acre]	Uncertain	Realization	Lognormal	2	1.82	N/A	N/A	Number of defects per acre in the geomembrane liner	Values assumed for the same geomembrane liners at the Mine Site used to determine leakage rates	Water Section 5.2.2.5.4 - *Leakage*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Beneficiation Plant											
Clean_H2O_Demand	[gpm]	Deterministic	N/A	Constant	3.29	N/A	N/A	N/A	Clean water demand from the concentrator process	RS13B, Attachment A-7, applying Plant_Uptime	Water Section 5.2.2.1 - *Beneficiation Plant*
Total_H2O_Demand	[gal/yr]	Deterministic	N/A	Constant	7.5901E+09	N/A	N/A	N/A	Total flow rate of water needed by the concentrator plant	Bateman Water Balance (June 2011)	Water Section 5.2.2.1 - *Beneficiation Plant*
Process_H2O_Discharge	[gal/yr]	Deterministic	N/A	Constant	7.9217E+09	N/A	N/A	N/A	Flow rate of water discharged from the concentrator process	Bateman Water Balance (June 2011)	Water Section 5.2.2.1 - *Beneficiation Plant*
Other_H2O_Discharge	[gpm]	Deterministic	N/A	Constant	26.3	N/A	N/A	N/A	Flow rate of water discharged to the FTB from other water uses	RS13B, Attachment A-7, applying Plant_Uptime	Water Section 5.2.2.1 - *Beneficiation Plant*
Solids_Discharge	[ton/yr]	Deterministic	N/A	Constant	1.235E+07	N/A	N/A	N/A	Flow rate of solids from the concentrator plant to the FTB	Flotation Tailings Management Plan	Water Section 5.2.2.1 - *Beneficiation Plant*
Reagant_Load	[g/ton]	Deterministic	N/A	Constant	55	N/A	N/A	N/A	Grams CuSO4 per ton of ore processed	RS46, July 2007	Waste Section 10.6.4 - *Process Water Loading to Pond*
Ore_Processing_Rate	[ton/day]	Deterministic	N/A	Constant	30,860	N/A	N/A	N/A	Tons per day of ore processed by the Beneficiation Plant	Mine Plan	Waste Section 10.6.4 - *Process Water Loading to Pond*
SO4_S_Regression	[mg/kg/week/%]	Uncertain	Realization	Normal	13.92	0.581	N/A	N/A	Sulfate release as a function of sulfur content (%S)	See Mine Site Work Plan Table 1-27	Waste Section 8.1.1.1.2 - *Correction for Non-Constant Variance*
OSP_Sulfur	[%]	Deterministic	N/A	Constant	0.608	N/A	N/A	N/A	Mass-weighted average sulfur content of stockpile	See Mine Site Work Plan Tables	Waste Section 4.3.2 - *Sulfur Content*
Ore_Storage_Time	[mon]	Uncertain	Realization	Uniform	N/A	N/A	1	6	Length of time that any unit of ore is stored in in-pit stockpiles	Assumed	Waste Section 10.6.3.1 *Ore Leaching Load*
Plant_Uptime	[%]	Deterministic	N/A	Constant	91.26	N/A	N/A	N/A	Annual average percent of time the plant is running	Bateman Water Balance (June 2011)	Water Section 5.2.2.1 - *Beneficiation Plant*
Hydrometallurgical Plant											
Clean_H2O_Demand	[gpm]	Deterministic	N/A	Constant	124.9	N/A	N/A	N/A	Clean water demand from the hydrometallurgical process	RS13B, Attachment A-7, applying Plant_Uptime	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*
Total_H2O_Demand	[gal/yr]	Deterministic	N/A	Constant	2.342E+08	N/A	N/A	N/A	Total flow rate of water needed by the hydromet plant	Bateman Water Balance (June 2011)	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*
Process_H2O_Discharge	[gal/yr]	Deterministic	N/A	Constant	1.144E+08	N/A	N/A	N/A	Flow rate of water discharged from the hydromet process	Bateman Water Balance (June 2011)	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*
Other_H2O_Discharge	[gpm]	Deterministic	N/A	Constant	26.3	N/A	N/A	N/A	Flow rate of water discharged to the HRF from other water uses	RS13B, Attachment A-7, applying Plant_Uptime	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*
Solids_Discharge	[ton/yr]	Deterministic	N/A	Constant	3.342E+05	N/A	N/A	N/A	Flow rate of solids from the hydrometallurgical plant to the HRF	Residue Management Plan	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Flotation Tailings Basin Waste Water Treatment Plant											
Effluent_Perc_Influent	[%]	Deterministic	N/A	Constant	95	N/A	N/A	N/A	Percent of the influent flow to the FTB WWTP that is discharged to SD026 and SD006	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
MaxFlow_SD026	[gpm]	Deterministic	N/A	Constant	500	N/A	N/A	N/A	Maximum flow to existing outfall SD026 from the FTB WWTP	Refined Embarrass Lake Wild Rice Mitigation Memo, June 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Backwash_Perc_Influent	[%]	Deterministic	N/A	Constant	5	N/A	N/A	N/A	Percent of the influent flow required for backwashing the greensand filter	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Effluent_Conc	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-43				Quality of the discharge from the Flotation Tailings Basin WWTP	CDF060	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Fe_Backwash_Conc	[mg/L]	Deterministic	N/A	Constant	4	N/A	N/A	N/A	Iron concentration in the greensand filter backwash	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Mn_Backwash_Conc	[mg/L]	Deterministic	N/A	Constant	30	N/A	N/A	N/A	Manganese concentration in the greensand filter backwash	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
K_Backwash_Conc	[mg/L]	Deterministic	N/A	Constant	11	N/A	N/A	N/A	Potassium concentration in the greensand filter backwash	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Babbitt WWTP											
Babbitt_Flow	[cfs]	Deterministic	N/A	Constant	0.33	N/A	N/A	N/A	Flow from the Babbitt WWTP	RS74B	Water Section 5.2.1.4.9 - *Babbitt WWTP*
Area 5NW											
Area5_Summer	[cfs]	Uncertain	Timestep	Lognormal	1.87	1.49	N/A	N/A	Flow from Area 5NW during summer months	Analysis of measured flow data at SD033	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Area5_Winter	[cfs]	Uncertain	Timestep	Lognormal	0.97	0.65	N/A	N/A	Flow from Area 5NW during winter months	Analysis of measured flow data at SD033	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Area5_Snowmelt	[cfs]	Uncertain	Timestep	Beta	2.91	1.78	0.75	8.1	Flow from Area 5NW during snowmelt months	Analysis of measured flow data at SD033	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Area5NW_Conc	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-44				Concentration of water that discharges from the Area 5NW Pit	RS74B	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Sewage Treatment Plant											
STP_Discharge_Vol	[gal]	Deterministic	N/A	Constant	5618000	N/A	N/A	N/A	Volume of water discharged from the sewage treatment plant to the FTB, essentially 210 days of storage	DON	
STP_Discharge_Spring_Dur	[mon]	Uncertain	Annual	Uniform	N/A	N/A	1	4	Integer number of months where the sewage treatment plant is discharging to the FTB in the Spring	DON	
STP_Discharge_Fall_Dur	[mon]	Uncertain	Annual	Uniform	N/A	N/A	1	4	Integer number of months where the sewage treatment plant is discharging to the FTB in the Fall	DON	
STP_Effluent_AddConc	[mg/L]	Uncertain	Annual	Uniform	Vector by constituent. Reference Table 1-45				Additional concentration added to the modeled water quality of Colby Lake from domestic water use	DON	

Table 1-1 Input Variables for the Plant Site Model

Variable Name	Units	Deterministic/ Uncertain	Sampling/ Calculation Frequency	Distribution	Mean or Mode	Standard Deviation	Minimum	Maximum	Description	Source of Input Data	Modeling Package Section
Groundwater Flow Path Characteristics											
D	[m]	Deterministic	N/A	Constant	7	N/A	N/A	N/A	Aquifer thickness	Average thickness of the saturated material	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
La	[m]	Deterministic	N/A	Constant	Vector by flowpath. Reference Table 1-46				Total flow path length	GIS data/calculations	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
w	[m]	Deterministic	N/A	Constant	Vector by flowpath. Reference Table 1-46				Average flow path width	GIS data/calculations	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Init_Grad	[--]	Deterministic	N/A	Constant	Vector by flowpath. Reference Table 1-46				Initial hydraulic gradient (determines flow capacity)	GIS data/calculations	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Eval_Loc1	[m]	Deterministic	N/A	Constant	Vector by flowpath. Reference Table 1-46				Length from the upstream end to the first evaluation location on the flow path	GIS data/calculations	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Recharge	[in/yr]	Uncertain	Realization	Triangular	0.6	N/A	0.3	1.5	Uniformly distributed recharge rate to the flow path	Most likely based on baseflow estimates, bounds based on using 1/2 the mode and 2.5 times the mode	Water Section 5.2.1.3.2 - *Recharge*
Perc_Flow_to_PM12_4	[%]	Deterministic	N/A	Constant	7.21	N/A	N/A	N/A	Percent of the groundwater flow path discharge that goes to PM-12.4; 0.44 mi2 / 6.10 mi2	CDF051	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Groundwater Flow Variables											
Surficial_Porosity	[--]	Deterministic	N/A	Constant	0.3	N/A	N/A	N/A	Porosity of the surficial aquifer	Assumed value, e.g. Fetter, 2001	Water Section 4.3.3 - *Water Quantity*
K_Surficial	[m/d]	Uncertain	Realization	Lognormal	4.0	1.6	N/A	N/A	Hydraulic Conductivity of the surficial aquifer	Mean based on aquifer tests, minimum value based on the limits of the recharge distribution	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Surficial_Density	[kg/m^3]	Deterministic	N/A	Constant	1,500	N/A	N/A	N/A	Dry (bulk) Density of the surficial deposits	USDA St. Louis County Soil Survey Database	Water Section 5.2.1.3.3 - *Sorption*
As_Kd	[L/kg]	Deterministic	N/A	Constant	25	N/A	N/A	N/A	Sorption coefficients for As in the surficial aquifer	EPA screening-level values	Water Section 5.2.1.3.3 - *Sorption*
Cu_Kd	[L/kg]	Deterministic	N/A	Constant	22	N/A	N/A	N/A	Sorption coefficients for Cu in the surficial aquifer	EPA screening-level values	Water Section 5.2.1.3.3 - *Sorption*
Ni_Kd	[L/kg]	Deterministic	N/A	Constant	16	N/A	N/A	N/A	Sorption coefficients for Ni in the surficial aquifer	EPA screening-level values	Water Section 5.2.1.3.3 - *Sorption*
Sb_Kd	[L/kg]	Uncertain	Realization	Triangular	1.6	N/A	1.3	6.1	Sorption coefficients for Sb in the surficial aquifer	EPA screening-level values	Water Section 5.2.1.3.3 - *Sorption*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Stream Reach Characteristics											
Flow_Control	[--]	Deterministic	N/A	Constant	Matrix, location by location. Reference Table 1-47				Controls which nodes contribute flow to other nodes	Surface water layout and stream order	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
XS_Area	[m^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-48				Cross sectional area of each river reach	RS26 geomorphic surveys	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Lengths	[m]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-48				Incremental length upstream of each model node	GIS data	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
GW_Contr_Areas	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Un-impacted area contributing groundwater to the surface water evaluation nodes	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Flowpath_Area	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Area of the modeled flow paths	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
SW_Contr_Areas	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Runoff contributing watershed area to each model node	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
FTBRO_Area	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Cell 2W area that runs off to the adjacent tributaries	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Cell2EFTBRO	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Cell 2E area that runs off to the adjacent tributaries	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Perc_NToe_MLC3	[%]	Deterministic	N/A	Constant	25	N/A	N/A	N/A	Percentage of the north toe surface seepage that travels to MLC-3 (the remainder goes to TC-1)	CDF051	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Stream Flow Variables											
Watershed_Yield	[cfs/mi^2]	Deterministic	Monthly	User-defined	User-defined Look-up Table by month. Reference Table 1-50				Randomly sampled daily total watershed yield as a function of month	USGS gage data	Water Section 5.2.1.4.3 - *Developing Model Inputs (Watershed Yield)*
Embarrass_Baseflow	[cfs/mi^2]	Deterministic	N/A	Constant	0.045	N/A	N/A	N/A	Baseflow added to Embarrass River nodes	Watershed wide average minimum 30-day flow	Water Section 5.2.1.4.4 - *Watershed Runoff Quantity*
Model Initiation											
Initial_Mass_LTVSMC_Basin	[tonne]	Deterministic	N/A	Constant	Matrix by constituent and location. Reference Table 1-52				Initial mass of each constituent in each zone of existing Tailings Basin features	Average, steady-state results of the existing conditions GoldSim model	Water Section 5.2.3.1 - *Tailings Basin Initiation*
Initial_Mass_Rate	[kg/day]	Deterministic	N/A	Constant	Matrix by constituent and location. Reference Table 1-53				Initial rate at which constituent load is leaving areas of the existing Tailings Basin	Average, steady-state results of the existing conditions GoldSim model	Water Section 5.2.3.1 - *Tailings Basin Initiation*
Expected_Toe_Conc	[ug/L]	Deterministic	N/A	Constant	Matrix by constituent and location. Reference Table 1-54				Expected existing concentrations at the toes of the Tailings Basin to initiate groundwater concentrations	Average, steady-state results of the existing conditions GoldSim model	Water Section 5.2.3.2 - *Groundwater Flow Path Initiation*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Additional Inputs											
Max_Vol_To_Mine	[acre-ft]	Deterministic	N/A	Constant	50000	N/A	N/A	N/A	Maximum volume that can be sent to the Mine Site, determined by the Mine Site model	Model determination	Water Section 5.2.2.3 - *FTB Containment System and South Seepage Management System*
HRF_Drainage_Period	[yr]	Deterministic	N/A	Constant	10	N/A	N/A	N/A	Time it takes to drain the HRF	Residue Management Plan	Water Section 5.2.2.5.1 - *Climate Inputs; Precipitation, Evaporation, and Runoff*
OPS_Treatment_Capacity	[gpm]	Deterministic	N/A	Constant	4000	N/A	N/A	N/A	Treatment capacity of the FTB WWTP during operations; capacity during years 1-7 is half this size.	Model determination	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
CLSR_Treatment_Capacity	[gpm]	Deterministic	N/A	Constant	3500	N/A	N/A	N/A	Design flow to the treatment plant during reclamation	Model determination	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
GW_Capture_Eff	[%]	Deterministic	N/A	Constant	90	N/A	N/A	N/A	Efficiency of the groundwater containment system	AWMP	Water Section 5.2.2.3 - *FTB Containment System and South Seepage Management System*
Min_to_Tribs	[gpm]	Deterministic	N/A	Constant	1700	N/A	N/A	N/A	Minimum flow to the four tributaries (including SD026)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[N]	[%]	Deterministic	N/A	Constant	0.00	N/A	N/A	N/A	Demand from each tributary to not have significant hydrologic impacts (to Mud Lake Creek)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[NW]	[%]	Deterministic	N/A	Constant	69.38	N/A	N/A	N/A	Demand from each tributary to not have significant hydrologic impacts (to Trimble Creek)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[W]	[%]	Deterministic	N/A	Constant	19.79	N/A	N/A	N/A	Demand from each tributary to not have significant hydrologic impacts (to Unnamed Creek)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[S]	[%]	Deterministic	N/A	Constant	10.83	N/A	N/A	N/A	Demand from each tributary to not have significant hydrologic impacts (to Second Creek)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[E]	[%]	Deterministic	N/A	Constant	0.00	N/A	N/A	N/A	Percent of WWTP effluent to the east of the Basin; should be zero because there is no discharge that direction.	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*

Table 1-2 Constant Surface Water Quality Standards (modeled constituents only)

Constituent	*Surface_Constant_Standards (mg/L)*
Ag	0.001
Al	0.125
Alk	*999999*
As*	0.053
B	0.5
Ba	*999999*
Be	*999999*
Ca	*999999*
Cd†	*999999*
Cl	230
Co	0.005
Cr*	0.011
Cu†	*999999*
F	*999999*
Fe	*999999*
K	*999999*
Mg	*999999*
Mn	*999999*
Na	*999999*
Ni†	*999999*
Pb†	*999999*
Sb	0.031
Se*	0.005
SO_4 (non-wild rice areas)	*999999*
Tl	0.00056
V	*999999*
Zn†	*999999*

Notes

* From MN Rules 7052; all others from MN Rules 7050

** A value of 999999 indicates that there is no applicable fixed standard

† See Table 1-3 for hardness-based standards

Table 1-3 Coefficients for Hardness-Dependent Surface Water Quality Standards (modeled constituents only)

Constituent	***A***	***B***
Cd*	0.7852	-2.715
Cu*	0.8545	-1.702
Ni*	0.846	0.0584
Pb	1.273	-4.705
Zn*	0.8473	0.884

<u>Notes</u>

Standard [mg/L] = exp(A*ln(total hardness [mg/L])+B)/1000

* From MN Rules 7052; all others from MN Rules 7050

$$Std\left(\frac{mg}{L}\right) = \frac{e^{A\cdot\ln\left(Hardness\left(\frac{mg}{L}\right)\right)+B}}{1000}$$

Table 1-4 Groundwater Quality Standards (modeled constituents only)

Constituent	*Ground_Primary_Standards** (mg/L)*	*Ground_Secondary_Standards** (mg/L)*
Ag*	0.03	0.1
Al†	*999999*	0.2
Alk	*999999*	*999999*
As	0.01	*999999*
B*	1	*999999*
Ba	2	*999999*
Be*	0.00008	*999999*
Ca	*999999*	*999999*
Cd*	0.004	*999999*
Cl	*999999*	250
Co	*999999*	*999999*
Cr	0.1	*999999*
Cu	*999999*	999999
F	4	2
Fe†	*999999*	0.3
K	*999999*	*999999*
Mg	*999999*	*999999*
Mn*†	0.1	0.05
Na	*999999*	*999999*
Ni*	0.1	*999999*
Pb	999999	*999999*
Sb	0.006	*999999*
Se*	0.03	*999999*
SO_4	*999999*	250
Tl*	0.0006	*999999*
V*	0.05	*999999*
Zn*	2	*5*

Notes

* Primary standard from MN Rules 4717 (HRLs); all others from MN Rules 7060 (EPA MCLs)

** A value of 999999 indicates that there is no applicable standard

† Secondary standards presented for reference but not used for impact assessment

Table 1-5 Average Background Groundwater Quality Distributions *

Constituent	Source	*Surficial Aquifer*		
		GW_Alpha_Mean	**GW_Beta**	**GW_Alpha_Stdev**
Ag	All	-3.154	1.058	0.107
Al	All	3.004	1.522	0.160
Alk	All	11.020	0.811	0.083
As	PolyMet	-0.927	0.552	0.083
B	PolyMet	3.302	0.302	0.043
Ba	PolyMet	3.225	1.307	0.235
Be	PolyMet	-1.999	0.722	0.102
Ca	All	9.716	0.959	0.098
Cd	PolyMet	-2.214	0.483	0.068
Cl	All	6.889	1.075	0.110
Co	PolyMet	-2.149	0.606	0.109
Cr	All	-0.592	1.082	0.109
Cu	PolyMet	0.311	0.948	0.134
F	All	4.686	0.776	0.082
Fe	PolyMet	3.806	0.733	0.112
K	All	7.068	0.932	0.095
Mg	All	8.841	0.950	0.097
Mn**	PolyMet	271	0.000	56
Na	All	8.210	0.660	0.067
Ni	All	0.766	1.181	0.119
Pb	PolyMet	-1.380	0.033	0.006
Sb	All	-2.329	1.611	0.191
Se	All	-0.467	0.704	0.084
SO_4	PolyMet	8.757	0.542	0.077
Tl	PolyMet	-2.333	1.052	0.149
V	All	1.660	0.239	0.046
Zn	All	1.976	1.143	0.116

Notes

* Units of values shown here are all natural logarithm of the concentration in micrograms per liter [ug/L] except for manganese, which are purely in micrograms per liter.

** Manganese is treated differently from the rest because of it's poor fit to a lognormal distribution. Instead, "GW_Alpha_Mean" represents the mean of a normal distribution, and "GW_Alpha_Stdev" represents the standard deviation of a normal distribution. GW_Beta (0.000) is not used.

Table 1-6 **Existing Watershed Runoff Concentrations**

Constituent	*RO_Mean (ug/L)*	*RO_StDev (ug/L)*
Ag	1.17E-01	7.9E-03
Al	1.12E+02	4.9E+01
Alk	3.82E+04	4.8E+04
As	1.76E+00	2.0E+00
B	1.96E+01	3.3E+00
Ba	4.58E+00	4.6E-02
Be	7.35E-02	7.4E-04
Ca	9.47E+03	7.9E+03
Cd	8.11E-02	6.3E-03
Cl	5.68E+03	2.9E+03
Co	1.33E+00	1.0E+00
Cr	7.22E-01	8.0E-01
Cu	7.55E-01	8.9E-01
F	8.51E+01	9.0E+01
Fe	5.56E+03	5.0E+03
K	8.48E+02	1.2E+03
Mg	4.84E+03	5.4E+03
Mn	4.85E+02	8.0E+02
Na	3.30E+03	1.3E+03
Ni	4.18E-01	4.2E-03
Pb	2.60E-01	1.5E-01
Sb	2.11E-01	2.1E-03
Se	4.55E-01	2.0E-01
SO_4	4.79E+03	1.0E+04
Tl	1.33E-02	1.2E-01
V	1.45E-01	1.5E-03
Zn	6.58E+00	1.1E+01

Table 1-7 Initial Concentrations in the Embarrass River (mg/L)

Constituent	Embarrass River Evaluation Point (including tributaries of concern)										
	PM-12	***PM-12.2***	***PM-12.3***	***PM-12.4***	***PM-13***	***MLC-3***	***MLC-2***	***TC-1***	***PM-19***	***UC-1***	***PM-11***
Ag	**0.0001**	*0.0001*	*0.0001*	*0.0001*	**0.0001**	*0.0001*	**0.0001**	*0.0001*	**0.0001**	*0.0001*	**0.0001**
Al	**0.107**	*0.328*	*0.328*	*0.328*	**0.328**	*0.0125*	**0.0125**	*0.328*	*0.328*	*0.328*	*0.328*
Alk	**50.3**	*57.2*	*57.2*	*57.2*	**57.2**	*246*	**246**	*291*	**291**	*341*	**341**
As	**0.005**	*0.001*	*0.001*	*0.001*	**0.001**	*0.0008*	**0.0008**	*0.0013*	**0.0013**	*0.0005*	**0.0005**
B	**0.025**	*0.0443*	*0.0443*	*0.0443*	**0.0443**	*0.048*	**0.048**	*0.146*	**0.146**	*0.2605*	**0.2605**
Ba	**0.018**	*0.0304*	*0.0304*	*0.0304*	**0.0304**	*0.023*	**0.023**	*0.071*	**0.071**	*0.036*	**0.036**
Be	**0.0001**	*0.0001*	*0.0001*	*0.0001*	**0.0001**	*0.0001*	**0.0001**	*0.0001*	**0.0001**	*0.0001*	**0.0001**
Ca	**13.8**	*14.8*	*14.8*	*14.8*	**14.8**	*36.6*	**36.6**	*42.6*	**42.6**	*46.9*	**46.9**
Cd	**0.00001**	*0.00008*	*0.00008*	*0.00008*	**0.00008**	*0.00002*	**0.00002**	*0.00006*	**0.00006**	*0.00007*	**0.00007**
Cl	**3.84**	**3.28**	**3.8**	**4.07**	**4.57**	*11.3*	**11.3**	*12.56*	**12.56**	*18.2*	**18.2**
Co	**0.0005**	*0.0004*	*0.0004*	*0.0004*	**0.0004**	*0.0001*	**0.0001**	*0.0002*	**0.0002**	*0.0001*	**0.0001**
Cr	**0.0005**	*0.0007*	*0.0007*	*0.0007*	**0.0007**	*0.0005*	**0.0005**	*0.0005*	**0.0005**	*0.0005*	**0.0005**
Cu	**0.0006**	*0.001*	*0.001*	*0.001*	**0.001**	*0.0005*	**0.0005**	*0.0008*	**0.0008**	*0.0008*	**0.0008**
F	*0.724*	*0.724*	*0.724*	*0.724*	**0.724**	*0.23*	**0.23**	*0.724*	*0.724*	*0.724*	*0.724*
Fe	**2.15**	*1.29*	*1.29*	*1.29*	**1.29**	*1.3*	**1.3**	*1.123*	**1.123**	*0.276*	**0.276**
K	**1.11**	*2.12*	*2.12*	*2.12*	**2.12**	*2.53*	**2.53**	*2.99*	**2.99**	*7.23*	**7.23**
Mg	**5.4**	*11.52*	*11.52*	*11.52*	**11.52**	*35.6*	**35.6**	*36.15*	**36.15**	*75.8*	**75.8**
Mn	**0.184**	*0.107*	*0.107*	*0.107*	**0.107**	*0.157*	**0.157**	*0.14*	**0.14**	*0.102*	**0.102**
Na	**4.07**	*10.2*	*10.2*	*10.2*	**10.2**	*36.45*	**36.45**	*44.4*	**44.4**	*51*	**51**
Ni	**0.0012**	*0.0014*	*0.0014*	*0.0014*	**0.0014**	*0.0003*	**0.0003**	*0.0013*	**0.0013**	*0.0014*	**0.0014**
Pb	**0.00008**	*0.00022*	*0.00022*	*0.00022*	**0.00022**	*0.00006*	**0.00006**	*0.00015*	**0.00015**	*0.00016*	**0.00016**
Sb	*0.0015*	*0.0015*	*0.0015*	*0.0015*	**0.0015**	*0.0015*	*0.0015*	*0.0015*	*0.0015*	*0.0015*	*0.0015*
Se	**0.00009**	*0.0005*	*0.0005*	*0.0005*	**0.0005**	*0.0003*	**0.0003**	*0.0006*	**0.0006**	*0.0006*	**0.0006**
SO_4	**1.05**	**87.5**	**20.4**	**17.6**	**16.5**	*23.5*	**23.5**	*10.7*	**10.7**	*138.8*	**138.8**
Tl	**0.0001**	*0.0002*	*0.0002*	*0.0002*	**0.0002**	*0.000001*	**0.000001**	*0.0001*	**0.0001**	*0.0001*	**0.0001**
V*	*0.0054*	*0.0054*	*0.0054*	*0.0054*	*0.0054*	*0.0054*	*0.0054*	*0.0054*	*0.0054*	*0.0054*	*0.0054*
Zn	**0.003**	*0.0033*	*0.0033*	*0.0033*	**0.0033**	*0.003*	**0.003**	*0.003*	**0.003**	*0.003*	**0.003**

Notes

Source: Surface water monitoring, mean values from the most recent year of available data (bold values)

* Surface water data not available for V, mean groundwater value assumed

For unavailable data (data in italics), the nearest downstream value was assumed

Table 1-8 Flow Rates from the Mine Site WWTF

Time (yrs)	*Flow Mean (gpm)*	*Flow Standard Deviation (gpm)*
0	586	70
1	742	87
2	854	93
3	966	118
4	1149	122
5	1313	134
6	1410	180
7	1391	171
8	1590	198
9	1753	220
10	1357	217
11	1397	222
12	1496	150
13	1772	219
14	1686	167
15	151	15
16	0	0
17	95	74
18	291	142
19	191	98
20	0	0
500	0	0

Notes

Source: Mine Site probabilistic water quality model

Table 1-9 Mean Concentration in the Water from the Mine Site CPS (mg/L)

	Time (yrs)																				
Constituent	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***	***500***
Ag	0.000893	0.000817	0.000886	0.00095	0.000913	0.000854	0.00094	0.000987	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000983	0	0
Al	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0	0
Alk	733	556	493	419	293	158	91	52.9	40.7	36.1	34.5	39.9	42.3	39.4	39.9	31.8	36.8	38.9	66.5	37.2	0	0
As	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0
B	0.153	0.139	0.143	0.144	0.135	0.122	0.12	0.118	0.114	0.105	0.103	0.111	0.118	0.108	0.106	0.0903	0.103	0.1	0.111	0.0831	0	0
Ba	0.813	0.605	0.54	0.46	0.317	0.159	0.0928	0.075	0.0727	0.0664	0.066	0.0695	0.0745	0.0501	0.0486	0.0536	0.0842	0.0841	0.112	0.0944	0	0
Be	0.000877	0.000735	0.000792	0.000889	0.000827	0.000745	0.000823	0.000979	0.00112	0.00119	0.00134	0.00121	0.00136	0.00112	0.00115	0.00167	0.0021	0.00191	0.00147	0.000794	0	0
Ca	25.4	34	38	41	43.6	43.7	45.3	44.2	42.4	42.6	44.4	52.1	53.4	55.8	56.5	55.2	56.1	57.1	52.8	58.8	0	0
Cd	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.00389	0.00301	0	0
Cl	105	75.7	69.5	59.3	49.6	42.1	41	46.2	50.1	47.1	51.4	66.1	69.8	43.7	41.5	47.8	92.3	104	139	120	0	0
Co	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0	0
Cr	0.00441	0.00447	0.00459	0.00508	0.00505	0.00475	0.00511	0.0051	0.00491	0.00451	0.00521	0.00777	0.00796	0.0082	0.00798	0.00666	0.00711	0.00678	0.00608	0.00516	0	0
Cu	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0	0
F	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0
Fe	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0	0
K	55.8	49.4	48.4	47.9	44.9	40.6	43.8	47.5	52.2	50.5	61.1	92	104	81.3	83.4	91.6	156	168	212	200	0	0
Mg	45.5	40.3	37.8	36	34.4	34.3	33.3	34	35.1	35	33.9	29.2	28.4	26.9	26.6	27.3	26.8	26.2	28.8	25.1	0	0
Mn	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0	0
Na	315	264	250	235	213	177	175	183	193	176	208	323	331	239	218	236	404	443	602	557	0	0
Ni	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0
Pb	0.0133	0.0112	0.0129	0.0149	0.014	0.0143	0.0187	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0	0
Sb	0.0307	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.0308	0.0241	0	0
Se	0.00488	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.00498	0.00474	0	0
SO_4	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	0	0
Tl	0.000159	0.000206	0.000213	0.000223	0.000224	0.000219	0.00025	0.000297	0.000323	0.00032	0.000317	0.000285	0.000293	0.000272	0.000278	0.000304	0.000361	0.000325	0.000262	0.000163	0	0
V	0.00933	0.00927	0.00948	0.00956	0.00982	0.00971	0.00994	0.0107	0.0112	0.0112	0.011	0.0125	0.0132	0.0118	0.012	0.0123	0.0149	0.0144	0.0126	0.0108	0	0
Zn	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.384	0.348	0	0

Notes

Source: Mine Site probabilistic water quality model

Table 1-10 Standard Deviation of the Concentration in the Water from the Mine Site WWTF (mg/L)

	Time (yrs)																					
Constituent	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***	***500***
Ag	0.0000834	0.000142	0.0000892	0.0000392	0.000068	0.000114	0.0000468	0.0000098	0	0	0	0	0	0	0	0	0	0	0	0.0000102	0	0
Al	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alk	64.1	61.2	57.8	45.3	26.5	17.8	13.1	9.43	8.74	8.12	7.38	7.88	8.94	9.74	9.91	5.86	4.53	5.82	13.8	5.17	0	0
As	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0.0228	0.0204	0.0231	0.0249	0.0232	0.02	0.0199	0.0194	0.0189	0.0173	0.0169	0.0137	0.013	0.00855	0.0089	0.0109	0.0135	0.0128	0.0148	0.0115	0	0
Ba	0.0707	0.0659	0.0585	0.0485	0.031	0.0175	0.0114	0.00817	0.0113	0.0111	0.0125	0.0152	0.0156	0.00868	0.00776	0.0054	0.00734	0.00733	0.0134	0.00717	0	0
Be	0.000304	0.000205	0.000223	0.000272	0.000232	0.000181	0.000219	0.000263	0.000271	0.000303	0.000354	0.000302	0.000305	0.000256	0.00026	0.0004	0.000472	0.00049	0.000407	0.000264	0	0
Ca	4.01	4.6	4.79	4.57	4.72	4.26	4.4	4.64	4.39	4.51	4.98	6.16	6.31	6.93	6.5	7	6.45	5.81	5.33	5.59	0	0
Cd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0000894	0.000666	0	0
Cl	17.5	12	13.1	10.3	8.86	8.27	7.34	8.54	11.3	12.2	13.5	18.4	19.9	11.3	10.2	9.24	14.2	19.8	10	9.51	0	0
Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cr	0.00105	0.000636	0.000572	0.000528	0.000608	0.000527	0.000617	0.000604	0.000579	0.000503	0.000572	0.000375	0.000408	0.000361	0.000475	0.00062	0.000469	0.000492	0.000506	0.000492	0	0
Cu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	0.00339	0	0	0	0	0	0	0	0	0	0	0
Fe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	6.96	4.35	4.25	4.08	3.78	3.39	4.29	6	8.18	9.81	11.2	16.7	19.2	11.9	10.9	10.6	18	18.8	28.3	19.1	0	0
Mg	2.44	2.81	2.92	2.79	2.88	2.6	2.68	2.83	2.68	2.75	3.03	3.75	3.85	4.22	3.96	4.27	3.93	3.54	3.25	3.41	0	0
Mn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Na	34.9	37.9	36.4	36.6	31.6	30.1	29.7	33	38.3	35.9	45.6	61.1	69.4	56.7	53.5	42	48.2	61.1	78.8	62.6	0	0
Ni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pb	0.00263	0.00332	0.00325	0.00255	0.00301	0.00269	0.000237	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sb	0.000204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000164	0.00527	0	0
Se	0.0000924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0000193	0.000203	0	0
SO_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tl	0.0000279	0.0000298	0.0000321	0.0000346	0.0000296	0.0000303	0.000049	0.0000702	0.0000718	0.000067	0.0000715	0.000054	0.0000431	0.0000379	0.0000368	0.0000538	0.0000589	0.0000456	0.0000622	0.0000405	0	0
V	0.00154	0.000702	0.000749	0.000715	0.000727	0.000631	0.000671	0.000881	0.00089	0.000781	0.000865	0.00103	0.00103	0.000549	0.000603	0.000608	0.000783	0.00107	0.000926	0.000639	0	0
Zn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00317	0.0288	0	0

Notes

Source: Mine Site probabilistic water quality model

Table 1-11 Function Coefficients to Determine Van Genuchten Parameters

	Coefficient			
Parameter	***mm***	***bm***	***mb***	***bb***
Ksat_Coeff (cm/s)	2.793	2.4585	-3.6293	-3.1175
ResMoist_Coeff (cm^3/cm^3)	-0.2417	0.0543	0.1173	-0.0155
AirSuct_Coeff (1/cm)	0.002036	0.008121	-0.015927	0.010728
VGBeta_Coeff (--)	-31.3442	8.6015	14.6871	-1.4748

Notes

Source: NorthMet Project, Waste Characterization Data Package, Section 10.3 Saturation and Oxygen Diffusion

$$\log(K_{sat}) = m_m(F)(\theta) + b_m(\theta) + m_b(F) + b_b$$

$$\alpha, \beta, \theta_r = m_m(F)(\theta) + b_m(\theta) + m_b(F) + b_b$$

Table 1-12a Hydraulic Properties of Different Classes of the LTVSMC Tailings

		Tailings Class		
Parameter	***Units***	***Coarse***	***Fine***	***Bulk (Other)***
LTVSMC_SG*	*(--)*	2.80	2.90	2.85
LTVSMC_Porosity*	*(cm^3/cm^3)*	0.412	0.493	0.440
LTVSMC_Ksat*	*(cm/s)*	SEE TABLE 1-12b	SEE TABLE 1-12b	8.02E-05
LTVSMC_ResMoist*	*(cm^3/cm^3)*	0.041	0.059	0.048
LTVSMC_AirSuct†	*(1/cm)*	0.024	0.001	0.011
LTVSMC_VGBeta†	*(--)*	2.0	1.6	2.0

Notes

* Source: Unsaturated modeling by the geotechnical group

† Source: CDF055

Table 1-12b Saturated Conductivity of LTVSMC Tailings in Each Cell*

		Tailings Class		
Cell	***Units***	***Coarse***	***Fine***	***Bulk (Other)***
Cell 1E	*(cm/s)*	4.43E-03	2.12E-05	SEE TABLE 1-12a
Cell 2E	*(cm/s)*	1.76E-03	3.77E-04	SEE TABLE 1-12a
Cell 2W	*(cm/s)*	1.42E-03	7.06E-05	SEE TABLE 1-12a

Notes

* Source: Calibrated MODFLOW model of existing conditions from November, 2014

Table 1-13 Distribution Parameters for Flotation Fine Tailings Release

Distribution Fit to Humidity Cell Data

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Ca	SO_4 rate ratio	HCT	mg Ca / mg SO_4	Beta	1.18E+00	3.03E-01	8.17E-01	3.46E+00
K	SO_4 rate ratio	HCT	mg K / mg SO_4	Beta	2.63E-01	6.37E-02	1.71E-01	7.51E-01
Mg	SO_4 rate ratio	HCT	mg Mg / mg SO_4	Beta	2.18E-01	4.69E-02	1.62E-01	7.94E-01
Mn	Ni rate ratio	HCT	mg Mn / mg Ni	Beta	4.68E+00	2.08E+00	2.07E+00	9.31E+00
Na	SO_4 rate ratio	HCT	mg Na / mg SO_4	Beta	8.20E-02	1.77E-02	6.03E-02	2.64E-01
Se	SO_4 rate ratio	HCT	mg Se / mg SO_4	Beta	1.79E-05	5.29E-06	1.29E-05	6.09E-05
SO_4	Rate	HCT	mg SO_4/kg/week	Beta	1.88E+01	2.87E+00	2.66E+00	2.32E+01

Distribution Fit to Aqua Regia Data

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Ag	S ratio	Aqua Regia	mg Ag / mg S	Beta	1.54E-04	1.49E-05	1.35E-04	2.54E-04
As	S ratio	Aqua Regia	mg As / mg S	Beta	1.96E-03	2.53E-04	1.67E-03	4.89E-03
Ba	K ratio	Aqua Regia	mg Ba / mg K	Beta	2.66E-02	1.27E-03	1.83E-02	3.06E-02
Be	K ratio	Aqua Regia	mg Be / mg K	Beta	1.03E-04	1.51E-05	8.13E-05	2.32E-04
Cu	S ratio	Aqua Regia	mg Cu / mg S	Beta	9.30E-02	1.46E-02	5.29E-02	1.46E-01
Pb	S ratio	Aqua Regia	mg Pb / mg S	Beta	2.67E-03	6.16E-04	1.93E-03	9.32E-03
Sb	S ratio	Aqua Regia	mg Sb / mg S	Beta	1.08E-04	3.50E-05	6.67E-05	1.99E-04
Tl	S ratio	Aqua Regia	mg Tl / mg S	Beta	7.15E-05	7.35E-06	5.97E-05	1.41E-04
V	K ratio	Aqua Regia	mg V / mg K	Beta	2.53E-02	2.61E-03	7.01E-03	3.17E-02

Distribution Fit to Waste Rock Humidity Cell Data

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Cd	Zn rate ratio	2/3 HCT (2)	mg Cd / mg Zn	Beta	1.65E-02	1.20E-02	1.01E-03	5.84E-02
Co	Ni rate ratio	2/3 HCT (2)	mg Co / mg Ni	Beta	8.29E-02	3.91E-02	2.24E-02	2.06E-01
Zn	Ni rate ratio	2/3 HCT (2)	mg Zn / mg Ni	Beta	3.35E-01	3.70E-01	3.31E-02	1.60E+00

Distribution Fit to Microprobe Data or Mineral Formula

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Al	Ca ratio	Anorthite Formula	mg Al / mg Ca	Constant	1.35E+00	--	--	--
	Na ratio	Albite Formula	mg Al / mg Na	Constant	1.17E+00	--	--	--
Fe	S ratio	Pyrrhotite microprobe	mg Fe / mg S	Beta	1.62E+00	8.72E-02	1.49E+00	1.92E+00
	Mg ratio	Olivine microprobe	mg Fe / mg Mg	Beta	1.87E+00	6.75E-01	1.19E+00	4.51E+00
Ni	S ratio	Pyrrhotite microprobe	mg Ni / mg S	Beta	5.63E-03	6.65E-03	5.65E-04	4.00E-02

Distribution From Defined Concentration Cap

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Cl	No release	N/A	mg/L	Constant	0	--	--	--
B	Cap	Whistle Mine	mg/L	Constant	1.00E-01	--	--	--
Cr	Cap	Whistle Mine	mg/L	Constant	1.00E-02	--	--	--

Notes

- HCT indicates average rates from tailings humidity cells over the entire testing period.
- Aqua Regia indicates ratios from whole tailings testing.
- Cat 2/3 HCT (2) indicates average rates from Category 2/3 humidity cells over Condition 2, as defined in Large Table 1.
- All distributions from humidity cell data and aqua regia data represent the full range of the observed values, with no weighting. Distributions are shown in Large Figure 42 to Large Figure 45.
- Distributions from microprobe data represent the full range of the observed ratios for each mineral, with no weighting. Distributions are shown in Large Figure 21 and Large Figure 22.
- Constituents not shown above are modeled according to the mineral solubility methods described in Section 10.1.1.

Table 1-14 Distribution Parameters for Flotation Coarse Tailings Release

Distribution Fit to Humidity Cell Data

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Ca	SO_4 rate ratio	HCT	mg Ca / mg SO_4	Beta	9.58E-01	3.34E-01	3.00E-01	1.60E+00
K	SO_4 rate ratio	HCT	mg K / mg SO_4	Beta	2.60E-01	8.16E-02	0.00E+00	4.91E-01
Mg	SO_4 rate ratio	HCT	mg Mg / mg SO_4	Beta	1.82E-01	3.32E-02	9.68E-02	5.46E-01
Mn	Ni rate ratio	HCT	mg Mn / mg Ni	Beta	3.37E+00	1.32E+00	1.80E+00	1.00E+01
Na	SO_4 rate ratio	HCT	mg Na / mg SO_4	Beta	6.86E-02	2.40E-02	3.58E-02	2.57E-01
Se	SO_4 rate ratio	HCT	mg Se / mg SO_4	Beta	1.75E-05	3.51E-06	0.00E+00	2.41E-05
SO_4	Rate	HCT	mg SO_4/kg/week	Beta	1.19E+01	2.55E+00	4.37E+00	2.13E+01

Distribution Fit to Aqua Regia Data

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Ag	S ratio	Aqua Regia	mg Ag / mg S	Beta	2.05E-04	3.41E-05	1.42E-04	5.45E-04
As	S ratio	Aqua Regia	mg As / mg S	Beta	1.82E-03	3.31E-04	9.17E-04	5.09E-03
Ba	K ratio	Aqua Regia	mg Ba / mg K	Beta	2.74E-02	1.81E-03	2.01E-02	4.02E-02
Be	K ratio	Aqua Regia	mg Be / mg K	Beta	9.77E-05	9.41E-06	5.71E-05	1.53E-04
Cu	S ratio	Aqua Regia	mg Cu / mg S	Beta	2.11E-01	5.25E-02	2.95E-03	7.00E-01
Pb	S ratio	Aqua Regia	mg Pb / mg S	Beta	2.88E-03	7.68E-04	1.18E-03	1.08E-02
Sb	S ratio	Aqua Regia	mg Sb / mg S	Beta	1.10E-04	3.06E-05	5.45E-05	2.50E-04
Tl	S ratio	Aqua Regia	mg Tl / mg S	Beta	9.44E-05	1.27E-05	6.67E-05	1.86E-04
V	K ratio	Aqua Regia	mg V / mg K	Beta	1.81E-02	2.66E-03	1.81E-03	3.00E-02

Distribution Fit to Waste Rock Humidity Cell Data

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Cd	Zn rate ratio	2/3 HCT (2)	mg Cd / mg Zn	Beta	1.65E-02	1.20E-02	1.01E-03	5.84E-02
Co	Ni rate ratio	2/3 HCT (2)	mg Co / mg Ni	Beta	8.29E-02	3.91E-02	2.24E-02	2.06E-01
Zn	Ni rate ratio	2/3 HCT (2)	mg Zn / mg Ni	Beta	3.35E-01	3.70E-01	3.31E-02	1.60E+00

Distribution Fit to Microprobe Data or Mineral Formula

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Al	Ca ratio	Anorthite Formula	mg Al / mg Ca	Constant	1.35E+00	--	--	--
	Na ratio	Albite Formula	mg Al / mg Na	Constant	1.17E+00	--	--	--
Fe	S ratio	Pyrrhotite microprobe	mg Fe / mg S	Beta	1.62E+00	8.72E-02	1.49E+00	1.92E+00
	Mg ratio	Olivine microprobe	mg Fe / mg Mg	Beta	1.87E+00	6.75E-01	1.19E+00	4.51E+00
Ni	S ratio	Pyrrhotite microprobe	mg Ni / mg S	Beta	5.63E-03	6.65E-03	5.65E-04	4.00E-02

Distribution From Defined Concentration Cap

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Cl	No release	N/A	mg/L	Constant	0	--	--	--
B	Cap	Whistle Mine	mg/L	Constant	1.00E-01	--	--	--
Cr	Cap	Whistle Mine	mg/L	Constant	1.00E-02	--	--	--

Notes

- HCT indicates average rates from tailings humidity cells over the entire testing period.
- Aqua Regia indicates ratios from whole tailings testing.
- Cat 2/3 HCT (2) indicates average rates from Category 2/3 humidity cells over Condition 2, as defined in Large Table 1.
- All distributions from humidity cell data and aqua regia data represent the full range of the observed values, with no weighting. Distributions are shown in Large Figure 46 to Large Figure 49.
- Distributions from microprobe data represent the full range of the observed ratios for each mineral, with no weighting. Distributions are shown in Large Figure 21 and Large Figure 22.
- Constituents not shown above are modeled according to the mineral solubility methods described in Section 10.1.1.

Table 1-15 Category 1 Concentration Cap Distributions (Applied to the NorthMet Flotation Tailings and Buttress)

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Ag	Limit	Dunka Seep	mg/L	Constant	0.0002	N/A	N/A	N/A
Al	Function pH (Solubility equation)		mg/L		N/A	N/A	N/A	N/A
Alkalinity	Function pH (AMAX data)		mg/L		N/A	N/A	N/A	N/A
As	Limit	Whistle Mine	mg/L	Constant	0.1	N/A	N/A	N/A
B	Limit	Whistle Mine	mg/L	Constant	0.1	N/A	N/A	N/A
Ba	Solubility equation				N/A	N/A	N/A	N/A
Be	Limit	Dunka Seep	mg/L	Constant	0.0004	N/A	N/A	N/A
Ca	Solubility equation				N/A	N/A	N/A	N/A
Cd	Function Zn limit, Cd/Zn release ratio				N/A	N/A	N/A	N/A
Cl	No limit				N/A	N/A	N/A	N/A
Co	Function pH (AMAX data)				N/A	N/A	N/A	N/A
Cr	Limit	Whistle Mine	mg/L	Constant	0.01	N/A	N/A	N/A
Cu	Function pH (AMAX data)				N/A	N/A	N/A	N/A
F	Solubility equation				N/A	N/A	N/A	N/A
Fe	Function pH (AMAX data)		mg/L		N/A	N/A	N/A	N/A
K	Function pH (AMAX data)		mg/L		N/A	N/A	N/A	N/A
Mg	Function Ca limit, Mg/Ca release ratio				N/A	N/A	N/A	N/A
Mn	Function pH (AMAX data)		mg/L		N/A	N/A	N/A	N/A
Na	Function pH (AMAX data)		mg/L		N/A	N/A	N/A	N/A
Ni	Function pH (AMAX data)		mg/L		N/A	N/A	N/A	N/A
Pb	Limit	Whistle Mine	mg/L	Constant	0.1	N/A	N/A	N/A
Sb	Limit	NorthMet Lab	mg/L	Uniform	N/A	N/A	0.0083	0.1
Se	Function SO4 limit, Se/SO4 release ratio				N/A	N/A	N/A	N/A
SO4	Solubility equation				N/A	N/A	N/A	N/A
Tl	Limit	Dunka Seep	mg/L	Constant	0.0002	N/A	N/A	N/A
V	Limit	Whistle Mine	mg/L	Constant	0.01	N/A	N/A	N/A
Zn	Function pH (AMAX data)		mg/L		N/A	N/A	N/A	N/A

N/A = not used

pH-based Range from AMAX Data
(95th percentile values, all units mg/L)

pH	Alkalinity	Co	Cu	Fe	K	Mn	Na	Ni	Zn
7.0	2.60E+01	2.80E-01	5.20E-01	4.00E-02	3.99E+01	3.08E-01	1.32E+02	5.91E+00	4.05E-01
7.1	3.45E+01	2.33E-01	2.85E-01	7.50E-02	4.61E+01	3.86E-01	1.38E+02	4.31E+00	2.93E-01
7.2	3.55E+01	1.36E-01	1.78E-01	1.01E-01	4.28E+01	1.75E-01	1.73E+02	2.08E+00	1.70E-01
7.3	3.59E+01	9.30E-02	2.00E-01	5.00E-02	5.04E+01	2.00E-01	2.31E+02	1.62E+00	1.33E-01
7.4	4.92E+01	7.00E-02	9.68E-02	4.20E-02	4.28E+01	1.72E-01	2.19E+02	1.28E+00	7.00E-02
7.5	4.82E+01	5.00E-02	1.00E-01	4.00E-02	4.60E+01	2.27E-01	2.18E+02	9.05E-01	9.64E-02
7.6	5.07E+01	4.00E-02	1.54E-01	7.75E-02	4.72E+01	2.10E-01	3.10E+02	4.55E-01	1.19E-01
7.7	5.04E+01	4.36E-02	1.23E-01	6.35E-02	4.37E+01	3.19E-01	4.68E+02	4.85E-01	1.15E-01
7.8	5.73E+01	6.00E-02	1.31E-01	5.50E-02	3.95E+01	2.05E-01	3.70E+02	3.75E-01	6.50E-02
7.9	4.00E+01	7.58E-02	5.73E-02	3.80E-02	4.80E+01	2.88E-01	3.90E+02	5.26E-01	8.88E-02
8.0	5.45E+01	1.00E-02	2.00E-02	2.00E-02	4.30E+01	1.40E-01	1.15E+02	2.00E-01	5.20E-02
8.1	6.90E+01	3.95E-02	3.95E-02	5.80E-02	4.57E+01	1.59E-01	3.13E+02	4.55E-01	2.48E-02

pH-based Range from AMAX Data
(maximum values, all units mg/L)

pH	Alkalinity	Co	Cu	Fe	K	Mn	Na	Ni	Zn
7.0	4.30E+01	6.20E-01	2.30E+00	4.00E-02	4.30E+01	3.80E-01	2.60E+02	1.30E+01	5.50E-01
7.1	4.10E+01	3.10E-01	7.50E-01	8.00E-02	4.80E+01	9.70E-01	5.91E+02	7.02E+00	3.70E-01
7.2	4.50E+01	1.50E-01	3.40E-01	7.00E-01	4.43E+01	2.40E-01	2.00E+02	3.42E+00	2.30E-01
7.3	3.60E+01	1.20E-01	2.60E-01	6.00E-02	5.90E+01	3.00E-01	2.60E+02	2.29E+00	2.30E-01
7.4	5.40E+01	8.00E-02	1.80E-01	6.00E-02	5.32E+01	1.90E-01	3.22E+02	1.35E+00	1.12E-01
7.5	5.27E+01	5.00E-02	1.30E-01	7.00E-02	6.00E+01	2.40E-01	3.13E+02	1.70E+00	1.00E-01
7.6	5.90E+01	6.00E-02	1.90E-01	2.10E-01	5.20E+01	2.30E-01	3.39E+02	1.07E+00	1.34E-01
7.7	5.10E+01	5.20E-02	1.31E-01	7.00E-02	5.00E+01	3.40E-01	5.55E+02	5.90E-01	1.20E-01
7.8	5.90E+01	7.00E-02	1.70E-01	6.00E-02	4.00E+01	2.40E-01	3.72E+02	4.20E-01	7.00E-02
7.9	4.00E+01	9.00E-02	6.00E-02	4.00E-02	4.90E+01	2.90E-01	3.95E+02	5.65E-01	9.00E-02
8.0	5.50E+01	1.00E-02	2.00E-02	2.00E-02	4.30E+01	1.40E-01	1.15E+02	2.00E-01	5.20E-02
8.1	7.00E+01	4.00E-02	4.00E-02	6.00E-02	4.60E+01	1.60E-01	3.17E+02	4.60E-01	2.50E-02

Notes
- All distributions from Whistle Mine data represent the detection limit used for nonacidic conditions.
- All distributions from Vangorda Mine data represent the highest observed concentration under acidic conditions.
- All distributions from AMAX data represent a uniform distribution between the 95th percentile and maximum observed value at the referenced pH for AMAX piles with 0.64% S. Data for pH values above 7.5 are used for Flotation Tailings as discussed in Section 10.4 (not for Category 1 waste rock).
- Concentration caps for all constituents not shown are calculated from the equations shown in Section 8.3.1.
- Distributions shown as constant indicate zero detections in the referenced data set, the detection limit is set as the concentration cap.

Table 1-16 **Flotation Tailings Constituent Content**

Constituent	*Units*	*NM_Content.Coarse_Content*	*NM_Content.Fine_Content*	*Buttress_Content*
Ag	mg/kg tailings	1.86E-01	2.13E-01	1.35E-01
Al	mg/kg tailings	3.56E+04	3.60E+04	4.07E+04
Alkalinity*	mg/kg tailings	1.00E+20	1.00E+20	1.00E+20
As	mg/kg tailings	2.43E+00	2.19E+00	2.47E+00
B	mg/kg tailings	5.00E+00	5.00E+00	7.94E+00
Ba	mg/kg tailings	4.86E+01	5.36E+01	4.07E+01
Be	mg/kg tailings	1.87E-01	1.84E-01	2.43E-01
Ca	mg/kg tailings	2.04E+04	1.98E+04	2.22E+04
Cd	mg/kg tailings	6.29E-02	6.50E-02	4.19E-01
Cl*	mg/kg tailings	1.00E+20	1.00E+20	1.00E+20
Co	mg/kg tailings	5.51E+01	4.56E+01	4.83E+01
Cr	mg/kg tailings	1.08E+02	9.89E+01	1.01E+02
Cu	mg/kg tailings	1.10E+02	2.22E+02	2.15E+02
F*	mg/kg tailings	1.00E+20	1.00E+20	1.00E+20
Fe	mg/kg tailings	6.78E+04	5.39E+04	6.17E+04
K	mg/kg tailings	1.83E+03	1.94E+03	1.40E+03
Mg	mg/kg tailings	4.08E+04	3.30E+04	4.00E+04
Mn	mg/kg tailings	7.52E+02	6.02E+02	7.01E+02
Na	mg/kg tailings	4.53E+03	4.69E+03	5.80E+03
Ni	mg/kg tailings	2.89E+02	2.46E+02	2.55E+02
Pb	mg/kg tailings	3.39E+00	3.21E+00	2.45E+00
Sb	mg/kg tailings	1.29E-01	1.21E-01	1.34E+00
Se	mg/kg tailings	5.20E-01	4.30E-01	1.00E+20
S	mg/kg tailings	1.21E+03	1.05E+03	1.90E+03
Tl	mg/kg tailings	8.86E-02	1.00E-01	4.78E+00
V	mg/kg tailings	4.54E+01	3.47E+01	3.32E+01
Zn	mg/kg tailings	7.04E+01	5.79E+01	6.83E+01

Notes

* Whole tailings content data not available. A high value of 1e20 ppm is used.

Table 1-17 Weathering Rates from the NorthMet Tailings

Constituent	*NM_Tailings_Weathering.Coarse_Weathering (mg/m² /month)*	*NM_Tailings_Weathering.Fines_Weathering (mg/m² /month)*
Ag	0.003	0.003
Al	7.1	7.5
Alk (as CaCO3)	2400	2500
As	2	0.096
B	2.1	1.8
Ba	0.12	0.14
Be	0.012	0.012
Ca	940	1100
Cd	0.0024	0.0024
Cl	26	25
Co	0.009	0.011
Cr	0.016	0.018
Cu	0.23	0.17
F	2.9	3
Fe	1.2	2
K	230	240
Mg	210	190
Mn	0.71	0.8
Na	75	67
Ni	0.16	0.15
Pb	0.012	0.0094
Sb	0.28	0.25
Se	0.014	0.013
SO_4	1000	1600
Tl	0.0016	0.0012
V*	0	0
Zn	0.11	0.11

Notes

Data is from RS-46 (Waste Water Modeling - Tailings NorthMet Project; July 20, 2007)

* No data available for V, weathering load assumed to be zero

Table 1-18 Dissolved Oxygen Concentration in the FTB Pond

Month	***Distribution***	***Pond_DO_Mean (mg/L)***	***Pond_DO_SD (mg/L)***
January	Normal	14.2	0
February	Normal	14.2	0
March	Normal	14.2	0
April	Normal	13.5	0.5
May	Normal	11.4	0.5
June	Normal	10.2	0.5
July	Normal	9.7	0.5
August	Normal	9.9	0.5
September	Normal	11	0.5
October	Normal	13.1	0.5
November	Normal	14.2	0
December	Normal	14.2	0

Table 1-19 Distribution Parameters for LTVSMC Tailings Release

Distribution Fit to Humidity Cell Data

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Se	SO_4 rate ratio	HCT	mg Se / mg SO_4	Beta	7.22E-05	4.63E-05	3.04E-05	3.04E-04
SO_4	Rate	HCT	mg SO_4/kg/week	Beta	1.87E+00	5.02E-01	8.13E-01	2.54E+00
Zn	SO_4 rate ratio	HCT	mg Zn / mg SO_4	Beta	5.32E-05	9.20E-06	4.28E-05	8.33E-05

Distribution Fit to Aqua Regia Data

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Ag	S ratio	Aqua Regia	mg Ag / mg S	Beta	1.85E-04	1.51E-04	3.47E-05	1.99E-03
As	S ratio	Aqua Regia	mg As / mg S	Beta	1.11E-01	5.43E-02	2.85E-02	8.75E-01
Cd	S ratio	Aqua Regia	mg Cd / mg S	Beta	7.69E-05	6.83E-05	8.21E-06	4.62E-03
Co	S ratio	Aqua Regia	mg Co / mg S	Beta	4.10E-02	3.17E-02	9.94E-03	3.75E-01
Cu	S ratio	Aqua Regia	mg Cu / mg S	Beta	4.26E-02	3.66E-02	7.95E-03	7.00E-01
Ni	S ratio	Aqua Regia	mg Ni / mg S	Beta	1.71E-02	1.10E-02	3.46E-03	1.92E-01
Pb	S ratio	Aqua Regia	mg Pb / mg S	Beta	6.66E-03	3.95E-03	1.12E-03	4.17E-02
Sb	S ratio	Aqua Regia	mg Sb / mg S	Beta	3.44E-04	2.34E-04	8.93E-05	2.92E-03
Tl	S ratio	Aqua Regia	mg Tl / mg S	Beta	9.04E-05	7.48E-05	1.95E-05	8.33E-04

Distribution Fit to Microprobe Data

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Fe	S ratio	Pyrite microprobe	mg Fe / mg S	Beta	8.85E-01	1.36E-02	8.50E-01	9.06E-01

Distribution Fit to Observed Seepage Data

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Al	Cap	Well Data	mg/L	Uniform	--	--	5.00E-03	4.00E-02
B	Cap	Well Data	mg/L	Trunc. Normal	4.84E-01	6.0E-02	0.00E+00	1.00E+10
Be	Cap	Well Data	mg/L	Uniform	--	--	1.00E-04	1.00E-03
Ca	Cap	Well Data	mg/L	Trunc. Normal	9.77E+01	1.3E+01	0.00E+00	1.00E+10
Cl	Cap	Well Data	mg/L	Trunc. Normal	2.14E+01	1.6E+00	0.00E+00	1.00E+10
Cr	Cap	Well Data	mg/L	Trunc. Normal	6.00E-04	1.0E-04	0.00E+00	1.00E+10
K	Cap	Well Data	mg/L	Trunc. Normal	1.01E+01	1.9E+00	0.00E+00	1.00E+10
Mg	Ca ratio	Well Data	mg Mg / mg Ca	Trunc. Normal	1.71E+00	2.7E-01	0.00E+00	1.00E+10
Mn	Cap	Well Data	mg/L	Trunc. Normal	1.18E+00	2.4E-01	0.00E+00	1.00E+10
Na	Cap	Well Data	mg/L	Trunc. Normal	5.60E+01	9.9E+00	0.00E+00	1.00E+10
V	Cap	Well Data	mg/L	Uniform	--	--	5.00E-04	1.00E-03

Notes
- HCT indicates average rates from tailings humidity cells over the entire testing period.
- Aqua Regia indicates ratios from whole tailings testing.
- Cat 2/3 HCT (2) indicates average rates from Category 2/3 humidity cells over Condition 2, as defined in Large Table 1.
- All distributions from humidity cell data, aqua regia and microprobe data represent the full range of the observed values, with no weighting. Distributions are shown in Large Figure 50 to Large Figure 52.
- All distributions from well data represent calibrated distributions so that modeled concentrations at the Tailings Basin toes are best fits to observed data in GW001, GW006, GW007, GW012, SD004, SD026, and PM-7. Distributions are shown in Large Figure 53 to Large Figure 55.
- Constituents not shown above are modeled according to the mineral solubility methods described in Section 10.1.2.

Table 1-20 Distribution Parameters for LTVSMC Tailings Disturbed Flushing Load

Distribution Fit to Leach Extraction Test Data

Constituent	*Method*	*Source*	*Units*	*Distribution*	*Mean/Mode*	*St. Dev.*	*Minimum*	*Maximum*
Ag	Load	Leach tests	mg/kg tailings	Beta	2.09E-05	4.85E-06	1.16E-05	3.73E-05
Al	Load	Leach tests	mg/kg tailings	Beta	2.16E-03	1.25E-03	1.26E-04	7.43E-03
Alkalinity	Load	Leach tests	mg/kg tailings	Beta	9.88E+01	2.62E+01	0.00E+00	1.27E+02
As	Load	Leach tests	mg/kg tailings	Beta	2.10E-03	2.96E-03	1.56E-04	2.15E-02
B	Load	Leach tests	mg/kg tailings	Beta	5.51E-02	1.98E-02	3.04E-02	1.90E-01
Ba	Load	Leach tests	mg/kg tailings	Beta	1.86E-03	2.96E-03	5.00E-05	2.00E-02
Be	Load	Leach tests	mg/kg tailings	Beta	7.50E-05	1.44E-05	5.00E-05	1.00E-04
Ca	Load	Leach tests	mg/kg tailings	Beta	1.79E+01	6.21E+00	9.30E+00	4.21E+01
Cd	Load	Leach tests	mg/kg tailings	Beta	1.50E-05	2.89E-06	1.00E-05	2.00E-05
Cl	Leach Load of Chloride is assumed to be 0 mg/kg			Beta	-1.00E+00	5.90E-02	-1.10E+00	-9.00E-01
Co	Load	Leach tests	mg/kg tailings	Beta	1.38E-04	1.00E-04	3.95E-05	4.97E-04
Cr	Load	Leach tests	mg/kg tailings	Beta	6.08E-04	6.87E-04	6.56E-05	4.00E-03
Cu	Load	Leach tests	mg/kg tailings	Beta	1.77E-03	1.13E-03	6.61E-04	8.00E-03
F	Load	Leach tests	mg/kg tailings	Beta	2.52E-01	2.08E-01	5.40E-02	1.53E+00
Fe	Load	Leach tests	mg/kg tailings	Beta	1.66E-02	1.20E-02	2.12E-03	4.88E-02
K	Load	Leach tests	mg/kg tailings	Beta	2.02E+00	2.15E+00	4.17E-01	1.00E+01
Mg	Load	Leach tests	mg/kg tailings	Beta	1.64E+01	8.20E+00	1.56E+00	6.28E+01
Mn	Load	Leach tests	mg/kg tailings	Beta	2.43E-02	3.33E-02	4.72E-04	2.51E-01
Na	Load	Leach tests	mg/kg tailings	Beta	3.67E+00	6.70E+00	2.33E-01	4.03E+01
Ni	Load	Leach tests	mg/kg tailings	Beta	5.98E-04	3.61E-04	1.91E-04	1.70E-03
Pb	Load	Leach tests	mg/kg tailings	Beta	3.75E-05	2.82E-05	1.67E-05	2.00E-04
Sb	Load	Leach tests	mg/kg tailings	Beta	7.50E-05	5.52E-05	3.33E-05	3.19E-04
Se	Load	Leach tests	mg/kg tailings	Beta	6.61E-04	6.73E-04	9.70E-05	4.93E-03
SO_4	Load	Leach tests	mg/kg tailings	Beta	2.14E+01	3.09E+01	1.27E+00	1.92E+02
Tl	Load	Leach tests	mg/kg tailings	Beta	7.50E-06	1.44E-06	5.00E-06	1.00E-05
V	Load	Leach tests	mg/kg tailings	Beta	8.01E-05	1.51E-05	3.74E-05	1.02E-04
Zn	Load	Leach tests	mg/kg tailings	Beta	1.08E-03	8.48E-05	4.00E-04	4.00E-03

Notes
- All distributions from leach extraction testing represent the full range of observed data.
- Distributions for constituents with no detections range from LOD/2 to LOD with a uniform distribution.
- Distributions are shown in Large Figure 56 to Large Figure 60.

Table 1-21 Calibration Factor for LTVSMC Metal Release Ratios

Constituent	*LTVSMC_Calib_Factor (--)*	*Ratio_or_Conc_LTV (--)*
Ag	0.0053	1
Al	1	0
Alk	1	0
As	0.0001	1
B	1	0
Ba	1	0
Be	1	0
Ca	1	0
Cd	0.0135	1
Cl	1	0
Co	0.0005	1
Cr	1	0
Cu	0.0005	1
F	1	0
Fe	0.0524	1
K	1	0
Mg	1	0
Mn	1	0
Na	1	0
Ni	0.0027	1
Pb	0.0002	1
Sb	0.0086	1
Se	0.0189	1
SO_4	1	1
Tl	0.0071	1
V	1	0
Zn	0.1849	1

Notes

If the value is 1, the method of release is not by a release ratio to S (see Table 1-19).

Table 1-22 LTVSMC Tailings Constituent Content

Constituent	*Units*	*LTVSMC_Content*
Ag	mg/kg tailings	7.33E-02
Al	mg/kg tailings	1.92E+03
Alkalinity*	mg/kg tailings	1.00E+20
As	mg/kg tailings	2.82E+01
B	mg/kg tailings	5.15E+00
Ba	mg/kg tailings	1.03E+01
Be	mg/kg tailings	6.92E-01
Ca	mg/kg tailings	1.45E+04
Cd	mg/kg tailings	5.74E-02
Cl*	mg/kg tailings	1.00E+20
Co	mg/kg tailings	8.22E+00
Cr	mg/kg tailings	8.50E+01
Cu	mg/kg tailings	9.72E+00
F*	mg/kg tailings	1.00E+20
Fe	mg/kg tailings	9.88E+04
K	mg/kg tailings	6.24E+02
Mg	mg/kg tailings	8.09E+03
Mn	mg/kg tailings	4.61E+03
Na	mg/kg tailings	1.27E+02
Ni	mg/kg tailings	4.23E+00
Pb	mg/kg tailings	1.54E+00
Sb	mg/kg tailings	8.08E-02
Se	mg/kg tailings	4.94E-01
S	mg/kg tailings	3.29E+02
Tl	mg/kg tailings	2.00E-02
V	mg/kg tailings	1.00E+01
Zn	mg/kg tailings	9.67E+00

Notes

* Data not available. A high value of 1e20 ppm is assumed.

Table 1-23 Flotation Tailings Basin Dam Construction

	North Dam		East Dam		South Dam		North Buttress		South Buttress	
Time (yrs)	*Cumulative Volume (CY)*	*Outer Area (acres)*	*Cumulative Volume (CY)*	*Outer Area (acres)*	*Cumulative Volume (CY)*	*Outer Area (acres)*	*Cumulative Volume (CY)*	*Area (acres)*	*Cumulative Volume (CY)*	*Area (acres)*
0	0	0	0	0	0	0	0	0	0	0
0.001	2,480	55	0	0	0	0	573	45	0	0
1	2,480,000	55	0	0	0	0	572,950	45	0	0
2	3,330,000	55	0	0	0	0	1,145,900	45	0	0
3	4,180,000	69	0	0	0	0	2,291,800	80	0	0
4	5,010,000	82	0	0	0	0	3,437,700	115	0	0
5	5,840,000	95	0	0	0	0	3,437,700	115	0	0
6	6,640,000	108	0	0	0	0	3,437,700	115	0	0
7	7,440,000	133	0	0	0	0	3,437,700	115	0	0
7.001	7,440,679	147	64	15	64	15	3,437,700	115	109	15
8	8,119,298	160	63,684	15	63,684	15	3,437,700	115	108,500	15
9	8,807,046	174	123,144	15	123,144	15	3,437,700	115	217,000	15
10	9,502,192	187	178,904	15	178,904	15	3,437,700	115	325,500	15
11	10,122,932	193	234,529	17	249,040	22	3,437,700	115	325,500	15
12	10,723,773	198	293,703	20	335,524	29	3,437,700	115	325,500	15
13	11,306,931	204	356,030	22	436,538	35	3,437,700	115	325,500	15
14	11,874,271	209	421,179	24	550,549	42	3,437,700	115	325,500	15
15	12,532,555	215	501,645	26	703,050	50	3,437,700	115	325,500	15
16	13,173,732	221	584,518	29	870,250	58	3,437,700	115	325,500	15
17	13,799,473	226	669,564	31	1,050,713	65	3,437,700	115	325,500	15
18	14,411,219	232	756,579	33	1,243,202	73	3,437,700	115	325,500	15
18.001	14,411,793	232	756,666	33	1,243,398	73	3,437,700	115	325,500	15
19	14,985,672	241	843,762	37	1,439,065	82	3,437,700	115	325,500	15
20	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
20.001	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
21	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
22	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
23	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
24	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
25	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
30	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
35	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
40	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
45	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
50	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15
500	15,547,561	249	934,025	40	1,644,414	91	3,437,700	115	325,500	15

Table 1-24 Flotation Tailings Basin Dam Elevations and Areas

Time (yrs)	*Crest Elevation* (feet)*	*Crest Area † (acres)*	*Beach Elevation ‡ (feet)*	*North Beach Area (acres)*	*East Beach Area (acres)*	*South Beach Area (acres)*	*Closure Beach (acres)*
0	1588.0	516.9	1570.0	0.00	0.00	0.00	0.00
0.001	1588.0	516.9	1570.0	96.06	0.00	0.00	0.00
1	1588.0	516.9	1585.0	95.40	0.00	0.00	0.00
2	1600.0	518.5	1597.0	94.73	0.00	0.00	0.00
3	1612.0	520.1	1609.0	93.40	0.00	0.00	0.00
4	1625.0	521.7	1622.0	92.07	0.00	0.00	0.00
5	1636.0	522.5	1633.0	90.57	0.00	0.00	0.00
6	1649.0	523.4	1646.0	89.07	0.00	0.00	0.00
7	1661.0	529.4	1658.0	86.82	0.00	0.00	0.00
7.001	1661.0	1271.2	1658.0	86.81	20.78	103.34	0.00
8	1669.0	1271.2	1666.0	78.62	20.78	103.34	0.00
9	1677.0	1300.2	1674.0	80.10	23.43	103.50	0.00
10	1681.5	1329.2	1678.5	81.58	26.07	103.65	0.00
11	1686.5	1335.6	1683.5	82.24	26.68	102.66	0.00
12	1691.5	1341.9	1688.5	82.91	27.29	101.67	0.00
13	1696.0	1348.2	1693.0	83.57	27.89	100.67	0.00
14	1700.5	1354.5	1697.5	84.23	28.50	99.68	0.00
15	1705.5	1351.1	1702.5	84.83	30.50	100.17	0.00
16	1710.0	1347.6	1707.0	85.42	32.51	100.67	0.00
17	1715.0	1344.1	1712.0	86.02	34.51	101.16	0.00
18	1719.5	1340.7	1716.5	86.61	36.51	101.65	0.00
18.001	1719.5	1340.7	1716.5	86.61	36.51	101.65	188.64
19	1723.0	1331.6	1720.0	88.42	41.06	102.37	188.64
20	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
20.001	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
21	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
22	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
23	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
24	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
25	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
30	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
35	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
40	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
45	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
50	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64
500	1727.0	1322.5	1724.0	90.23	45.61	103.08	188.64

Notes

* Elevation of the top of the dams (maximum water surface elevation)

† Plan view area created by a closed contour at the crest elevation

‡ Elevation at the point where the NorthMet tailings beaches meet the FTB dams

Table 1-25 Percentage of Seepage from Each Dam that Flows to Each Toe of the Tailings Basin

	North Dam					East Dam					South Dam				
Time (yrs)	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.001	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.001	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	29.6	70.4	0.0
8	99.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	29.6	70.4	0.0
9	99.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	2.3	0.0	28.0	69.8	0.0
10	99.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	4.6	0.0	26.3	69.1	0.0
11	99.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	6.9	0.0	24.7	68.5	0.0
12	99.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	9.2	0.0	23.0	67.8	0.0
13	99.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	11.5	0.0	21.4	67.2	0.0
14	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	13.8	0.0	19.7	66.5	0.0
15	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	16.1	0.0	18.1	65.9	0.0
16	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	18.4	0.0	16.4	65.2	0.0
17	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	20.7	0.0	14.8	64.6	0.0
18	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
18.001	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
19	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
20	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
20.001	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
21	99.2	0.8	0.0	0.0	0.0	2.9	0.0	0.1	0.3	96.7	22.2	0.0	12.8	64.9	0.0
22	99.3	0.7	0.0	0.0	0.0	5.8	0.0	0.2	0.6	93.4	21.5	0.0	12.6	65.9	0.0
23	99.3	0.7	0.0	0.0	0.0	8.8	0.0	0.3	0.9	90.1	20.7	0.0	12.3	67.0	0.0
24	99.3	0.7	0.0	0.0	0.0	11.7	0.0	0.3	1.2	86.8	19.9	0.0	12.1	68.0	0.0
25	99.3	0.7	0.0	0.0	0.0	14.6	0.0	0.4	1.5	83.5	19.2	0.0	11.8	69.0	0.0
30	99.5	0.5	0.0	0.0	0.0	29.2	0.0	0.8	2.9	67.1	15.3	0.0	10.6	74.1	0.0
35	99.6	0.4	0.0	0.0	0.0	43.8	0.0	1.3	4.4	50.6	11.5	0.0	9.3	79.2	0.0
40	99.7	0.3	0.0	0.0	0.0	58.3	0.0	1.7	5.9	34.1	7.7	0.0	8.0	84.3	0.0
45	99.9	0.1	0.0	0.0	0.0	72.9	0.0	2.1	7.3	17.7	3.8	0.0	6.8	89.4	0.0
50	100.0	0.0	0.0	0.0	0.0	87.5	0.0	2.5	8.8	1.2	0.0	0.0	5.5	94.5	0.0
500	100.0	0.0	0.0	0.0	0.0	87.5	0.0	2.5	8.8	1.2	0.0	0.0	5.5	94.5	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Tan cells indicate that the feature does not exist at that time.

Table 1-26 Volume of saturated tailings within the Flotation Tailings Basin Dams

Time (yrs)	North Dam (acre-ft)					East Dam (acre-ft)					South Dam (acre-ft)				
	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	284	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	751	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.001	831	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	374	2	0	0	0	0	0	0	0	38	0	0	0	0	0
9	1046	6	0	0	0	0	0	0	0	89	0	0	0	0	0
10	1486	8	0	0	0	0	0	0	0	115	0	0	0	0	0
11	1954	12	0	0	0	0	0	0	0	163	0	0	0	0	0
12	2436	15	0	0	0	0	0	0	0	231	0	0	0	0	0
13	2903	19	0	0	0	0	0	0	0	292	0	0	0	0	0
14	3377	23	0	0	0	0	0	0	0	359	0	0	0	0	0
15	3942	28	0	0	0	0	0	0	0	439	0	0	0	0	0
16	4477	33	0	0	0	0	0	0	0	539	5	0	5	18	0
17	5069	39	0	0	0	0	0	0	0	637	36	0	26	112	0
18	5650	46	0	0	0	0	0	0	0	734	77	0	44	215	0
18.001	5650	46	0	0	0	0	0	0	0	734	77	0	44	215	0
19	6246	50	0	0	0	0	0	0	0	879	107	0	61	297	0
20	6904	56	0	0	0	0	0	0	0	1020	147	0	83	407	0
20.001	6904	56	0	0	0	0	0	0	0	1020	147	0	83	407	0
21	6784	53	0	0	0	29	0	1	3	973	131	0	76	383	0
22	6665	50	0	0	0	58	0	2	6	927	116	0	68	357	0
23	6545	47	0	0	0	86	0	2	9	882	102	0	61	331	0
24	6425	45	0	0	0	113	0	3	11	838	89	0	54	304	0
25	6305	42	0	0	0	139	0	4	14	795	77	0	47	276	0
30	5705	31	0	0	0	257	0	7	26	592	25	0	17	120	0
35	5103	20	0	0	0	356	0	10	36	412	0	0	0	0	0
40	4499	12	0	0	0	435	0	12	44	254	0	0	0	0	0
45	3894	5	0	0	0	493	0	14	50	120	0	0	0	0	0
50	3287	0	0	0	0	532	0	15	54	7	0	0	0	0	0
500	3287	0	0	0	0	532	0	15	54	7	0	0	0	0	0

Notes

The top of the LTVSMC tailings in Cell 2W is approximated as 1727 feet

The base of the LTVSMC Tailings Basin is approximated as 1500 feet.

Table 1-27 Percentage of Seepage from Each NorthMet Tailings Beach that Flows to Each Toe of the Tailings Basin

	North Beach					*East Beach*					*South Beach*					*Closure Beach*				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.001	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	99.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	99.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	99.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	99.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	98.9	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.001	98.9	1.1	0.0	0.0	0.0	57.4	0.0	0.0	0.0	42.6	7.7	0.0	15.3	77.0	0.0	0.0	0.0	0.0	0.0	0.0
8	97.7	2.3	0.0	0.0	0.0	57.4	0.0	0.0	0.0	42.6	7.7	0.0	15.3	77.0	0.0	0.0	0.0	0.0	0.0	0.0
9	97.5	2.5	0.0	0.0	0.0	54.2	0.0	0.0	0.0	45.8	7.6	0.0	14.6	77.9	0.0	0.0	0.0	0.0	0.0	0.0
10	97.2	2.8	0.0	0.0	0.0	51.0	0.0	0.0	0.0	49.0	7.4	0.0	13.9	78.7	0.0	0.0	0.0	0.0	0.0	0.0
11	97.0	3.0	0.0	0.0	0.0	47.8	0.0	0.0	0.0	52.2	7.3	0.0	13.2	79.6	0.0	0.0	0.0	0.0	0.0	0.0
12	96.7	3.3	0.0	0.0	0.0	44.6	0.0	0.0	0.0	55.4	7.1	0.0	12.5	80.4	0.0	0.0	0.0	0.0	0.0	0.0
13	96.5	3.5	0.0	0.0	0.0	41.4	0.0	0.0	0.0	58.6	7.0	0.0	11.8	81.3	0.0	0.0	0.0	0.0	0.0	0.0
14	96.3	3.7	0.0	0.0	0.0	38.2	0.0	0.0	0.0	61.8	6.8	0.0	11.0	82.2	0.0	0.0	0.0	0.0	0.0	0.0
15	96.0	4.0	0.0	0.0	0.0	35.0	0.0	0.0	0.0	65.0	6.7	0.0	10.3	83.0	0.0	0.0	0.0	0.0	0.0	0.0
16	95.8	4.2	0.0	0.0	0.0	31.8	0.0	0.0	0.0	68.2	6.5	0.0	9.6	83.9	0.0	0.0	0.0	0.0	0.0	0.0
17	95.5	4.5	0.0	0.0	0.0	28.6	0.0	0.0	0.0	71.4	6.4	0.0	8.9	84.7	0.0	0.0	0.0	0.0	0.0	0.0
18	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.2	0.0	8.2	85.6	0.0	0.0	0.0	0.0	0.0	0.0
18.001	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.2	0.0	8.2	85.6	0.0	24.8	20.8	25.9	1.4	27.1
19	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.1	0.0	8.1	85.9	0.0	25.3	20.5	25.8	1.2	27.4
20	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.0	0.0	7.9	86.1	0.0	25.8	20.1	25.6	0.9	27.6
20.001	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.0	0.0	7.9	86.1	0.0	25.8	20.1	25.6	0.9	27.6
21	95.5	4.5	0.0	0.0	0.0	27.8	0.0	0.0	0.0	72.1	5.8	0.0	7.6	86.6	0.0	26.4	19.6	25.0	2.3	26.7
22	95.6	4.4	0.0	0.0	0.0	30.3	0.0	0.0	0.1	69.6	5.6	0.0	7.4	87.0	0.0	27.0	19.0	24.4	3.8	25.8
23	95.8	4.2	0.0	0.0	0.0	32.7	0.0	0.0	0.1	67.1	5.4	0.0	7.1	87.5	0.0	27.6	18.5	23.9	5.2	24.8
24	95.9	4.1	0.0	0.0	0.0	35.2	0.0	0.0	0.2	64.7	5.2	0.0	6.8	88.0	0.0	28.2	18.0	23.3	6.6	23.9
25	96.1	3.9	0.0	0.0	0.0	37.6	0.0	0.0	0.2	62.2	5.0	0.0	6.6	88.4	0.0	28.8	17.4	22.7	8.1	23.0
30	96.9	3.1	0.0	0.0	0.0	49.8	0.0	0.0	0.5	49.7	4.0	0.0	5.3	90.7	0.0	31.8	14.8	19.8	15.2	18.4
35	97.7	2.4	0.0	0.0	0.0	62.0	0.0	0.0	0.7	37.3	3.0	0.0	4.0	93.1	0.0	34.8	12.1	17.0	22.4	13.8
40	98.4	1.6	0.0	0.0	0.0	74.2	0.0	0.0	0.9	24.9	2.0	0.0	2.6	95.4	0.0	37.7	9.4	14.1	29.6	9.2
45	99.2	0.8	0.0	0.0	0.0	86.4	0.0	0.0	1.2	12.4	1.0	0.0	1.3	97.7	0.0	40.7	6.8	11.2	36.7	4.6
50	100.0	0.0	0.0	0.0	0.0	98.6	0.0	0.0	1.4	0.0	0.0	0.0	0.0	100.0	0.0	43.7	4.1	8.3	43.9	0.0
500	100.0	0.0	0.0	0.0	0.0	98.6	0.0	0.0	1.4	0.0	0.0	0.0	0.0	100.0	0.0	43.7	4.1	8.3	43.9	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Tan cells indicate that the feature (unsaturated fine tailings, dams, and the existing pond in Cell 1E) does not exist at that time.

Table 1-28 Volume of saturated tailings within the Flotation Tailings Basin Beaches

	North Beach (acre-ft)					East Beach (acre-ft)					South Beach (acre-ft)					Closure Beach (acre-ft)				
Time (yrs)	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1030	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2052	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3034	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4075	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4891	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	5851	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	6629	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.001	6628	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	6122	144	0	0	0	60	0	0	0	44	0	0	0	0	0	0	0	0	0	0
9	6820	178	0	0	0	163	0	0	0	138	23	0	45	240	0	0	0	0	0	0
10	7259	208	0	0	0	228	0	0	0	219	59	0	110	625	0	0	0	0	0	0
11	7671	239	0	0	0	281	0	0	0	307	96	0	174	1049	0	0	0	0	0	0
12	8088	273	0	0	0	327	0	0	0	406	130	0	228	1474	0	0	0	0	0	0
13	8468	307	0	0	0	360	0	0	0	510	159	0	269	1858	0	0	0	0	0	0
14	8851	344	0	0	0	387	0	0	0	626	186	0	301	2242	0	0	0	0	0	0
15	9271	384	0	0	0	431	0	0	0	801	217	0	337	2708	0	0	0	0	0	0
16	9653	425	0	0	0	462	0	0	0	992	244	0	361	3145	0	0	0	0	0	0
17	10079	471	0	0	0	489	0	0	0	1221	272	0	382	3636	0	0	0	0	0	0
18	10466	516	0	0	0	500	0	0	0	1468	297	0	393	4098	0	0	0	0	0	0
18.001	10466	516	0	0	0	500	0	0	0	1468	297	0	393	4098	0	0	0	0	0	0
19	10807	533	0	0	0	591	0	0	0	1737	308	0	407	4342	0	0	0	0	0	0
20	11196	552	0	0	0	695	0	0	0	2042	323	0	425	4633	0	0	0	0	0	0
20.001	11196	552	0	0	0	695	0	0	0	2042	323	0	425	4633	0	0	0	0	0	0
21	11010	524	0	0	0	761	0	0	1	1972	308	0	406	4597	0	0	0	0	0	0
22	10824	497	0	0	0	827	0	0	3	1902	293	0	386	4560	0	0	0	0	0	0
23	10637	470	0	0	0	893	0	0	4	1833	279	0	367	4522	0	0	0	0	0	0
24	10450	444	0	0	0	959	0	0	5	1763	265	0	349	4484	0	0	0	0	0	0
25	10262	418	0	0	0	1025	0	0	6	1694	251	0	331	4445	0	0	0	0	0	0
30	9311	301	0	0	0	1351	0	0	13	1350	187	0	246	4240	0	0	0	0	0	0
35	8344	201	0	0	0	1675	0	0	19	1008	130	0	171	4019	0	0	0	0	0	0
40	7360	117	0	0	0	1997	0	0	25	669	79	0	104	3781	0	0	0	0	0	0
45	6359	50	0	0	0	2315	0	0	31	333	36	0	48	3528	0	0	0	0	0	0
50	5342	0	0	0	0	2631	0	0	37	0	0	0	0	3257	0	0	0	0	0	0
500	5342	0	0	0	0	2631	0	0	37	0	0	0	0	3257	0	0	0	0	0	0

Notes

The top of the LTVSMC tailings in Cell 2E is approximated as 1570 feet

The top of the LTVSMC tailings in Cell 1E is approximated as 1658 feet

Table 1-29 Average Depth to the Phreatic Surface Within Unsaturated Areas

Time (yrs)	North Dam Dam (feet)	North Dam Beach (feet)	East Dam Dam (feet)	East Dam Beach (feet)	South Dam Dam (feet)	South Dam Beach (feet)	Closure Beach (feet)
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.001	44.0	4.2	0.0	0.0	0.0	0.0	0.0
1	44.0	4.2	0.0	0.0	0.0	0.0	0.0
2	50.0	5.3	0.0	0.0	0.0	0.0	0.0
3	55.9	6.4	0.0	0.0	0.0	0.0	0.0
4	61.9	7.5	0.0	0.0	0.0	0.0	0.0
5	67.8	8.6	0.0	0.0	0.0	0.0	0.0
6	73.8	9.7	0.0	0.0	0.0	0.0	0.0
7	79.7	10.8	0.0	0.0	0.0	0.0	0.0
7.001	79.7	10.8	6.0	3.0	46.0	13.2	0.0
8	94.3	16.3	6.0	3.0	46.0	13.2	0.0
9	94.9	16.6	7.1	3.2	46.6	13.0	0.0
10	95.5	17.0	8.2	3.3	47.3	12.8	0.0
11	96.1	17.3	9.3	3.5	47.9	12.7	0.0
12	96.7	17.7	10.4	3.6	48.5	12.5	0.0
13	97.4	18.0	11.5	3.8	49.2	12.3	0.0
14	98.0	18.3	12.6	4.0	49.8	12.1	0.0
15	98.6	18.7	13.7	4.1	50.4	11.9	0.0
16	99.2	19.0	14.8	4.3	51.0	11.8	0.0
17	99.8	19.4	15.9	4.4	51.7	11.6	0.0
18	100.4	19.7	17.0	4.6	52.3	11.4	0.0
18.001	100.4	19.7	17.0	4.6	52.3	11.4	7.2
19	100.8	21.8	17.5	5.3	53.7	12.6	4.8
20	101.1	23.8	18.0	6.0	55.0	13.8	9.6
20.001	101.1	23.8	18.0	6.0	55.0	13.8	9.6
21	102.1	26.2	18.7	6.1	56.0	14.5	10.5
22	103.1	28.5	19.4	6.1	57.1	15.2	11.4
23	104.1	30.9	20.1	6.2	58.1	15.9	12.3
24	105.0	33.3	20.7	6.2	59.2	16.5	13.1
25	106.0	35.6	21.4	6.3	60.2	17.2	14.0
30	110.9	47.5	24.9	6.5	65.4	20.7	18.4
35	115.9	59.3	28.3	6.8	70.7	24.1	22.9
40	120.8	71.1	31.7	7.0	75.9	27.5	27.3
45	125.7	83.0	35.2	7.3	81.1	31.0	31.7
50	130.6	94.8	38.6	7.5	86.3	34.4	36.1
500	130.6	94.8	38.6	7.5	86.3	34.4	36.1

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities.

Tan cells indicate that the feature (unsaturated fine tailings, dams, and the existing pond in Cell 1E) does not exist at that time.

A minimum value of 3 feet in the beaches and 6 feet in the dams was used

Table 1-30 Areas of the Flotation Tailings Pond

Time (yrs)	*Pond_Top_Area (acres)*	*Pond_Bottom_Area (acres)*
0	182.80	142.50
0.001	420.80	305.71
1	420.80	305.71
2	423.75	307.63
3	426.69	309.56
4	429.63	311.87
5	431.96	313.73
6	434.28	318.06
7	442.54	326.80
7.001	1068.44	883.55
8	1068.44	883.55
9	1093.19	908.45
10	1117.94	933.56
11	1123.99	943.18
12	1130.04	952.85
13	1136.09	957.62
14	1142.14	962.40
15	1135.58	956.55
16	1129.02	950.70
17	1122.47	943.84
18	1115.91	936.99
18.001	905.32	758.01
19	905.32	758.01
20	905.32	758.01
500	905.32	758.01

Notes

* Areas at Year 0 represent the areas of the existing pond in Cell 2E

Table 1-31 Seepage Quantity and Direction from the NorthMet Flotation Tailings Pond

Time (yrs)	*Pond_Seepage_Rate (in/yr)*	*Pond_Seepage_Direction[N] (%)*	*Pond_Seepage_Direction[NW] (%)*	*Pond_Seepage_Direction[W] (%)*	*Pond_Seepage_Direction[S] (%)*	*Pond_Seepage_Direction[E] (%)*	*Pond_Saturated_Volume (acre-ft)*
0	61.5	100.0	0.0	0.0	0.0	0.0	12796
0.001	5.2	83.2	16.8	0.0	0.0	0.0	23460
1	5.2	83.2	16.8	0.0	0.0	0.0	29772
2	7.6	82.4	17.6	0.0	0.0	0.0	35065
3	9.9	81.7	18.3	0.0	0.0	0.0	40429
4	12.3	80.9	19.1	0.0	0.0	0.0	46293
5	14.6	80.1	19.9	0.0	0.0	0.0	51295
6	17.0	79.4	20.6	0.0	0.0	0.0	57216
7	19.3	78.6	21.4	0.0	0.0	0.0	63615
7.001	19.3	78.6	21.4	0.0	0.0	0.0	153589
8	12.6	75.1	9.2	15.7	0.0	0.0	162136
9	12.7	75.4	8.4	15.2	0.0	1.0	174637
10	12.9	75.6	7.7	14.7	0.0	2.1	183622
11	13.0	75.9	6.9	14.1	0.0	3.1	190235
12	13.1	76.1	6.1	13.6	0.0	4.2	196909
13	13.3	76.4	5.4	13.1	0.0	5.2	203076
14	13.4	76.6	4.6	12.6	0.0	6.2	209297
15	13.5	76.9	3.8	12.1	0.0	7.3	213773
16	13.6	77.1	3.0	11.5	0.0	8.3	217619
17	13.8	77.4	2.3	11.0	0.0	9.4	221968
18	13.9	77.6	1.5	10.5	0.0	10.4	225692
18.001	13.9	77.6	1.5	10.5	0.0	10.4	183101
19	14.6	78.4	1.7	10.3	0.0	9.8	186270
20	15.2	79.1	1.8	10.0	0.0	9.1	189891
30	15.2	79.1	1.8	10.0	0.0	9.1	189891
30.001	6.5	79.1	1.8	10.0	0.0	9.1	189891
50	6.5	93.6	1.4	5.0	0.0	0.0	189891
500	6.5	93.6	1.4	5.0	0.0	0.0	189891

Notes

Values at year 0 represent the existing conditions of the pond in Cell 2E

Table 1-32 Areas Contributing Runoff to the Tailings Basin as it Develops

Time (yrs)	*Contr_Embank_Area_2E (acres)*	*Contr_Embank_Area_1E (acres)*	*Contr_Watershed_2E (acres)*	*Contr_Watershed_1E (acres)*
0	86.6	49.4	112.0	230.7
2	83.8	46.7	100.1	230.7
4	72.0	46.7	72.3	230.7
6	61.8	46.7	62.5	230.7
7	50.5	46.7	51.0	230.7
7.001	0.0	97.2	0.0	281.7
10	0.0	75.7	0.0	245.5
14	0.0	48.4	0.0	194.8
18	0.0	26.4	0.0	159.2
20	0.0	19.1	0.0	138.5
500	0.0	19.1	0.0	138.5

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge,

Year 18 represents the beginning of closure activities, Year 20 represents final closure.

The area contributing runoff to Cell 2E is added to the area contributing to Cell 1E in years after the two cells have merged

Table 1-33 **Areas of the Existing LTVSMC Tailings Zones**

Time (yrs)	Cell 2W			Cell 1E			Cell 2E		
	Coarse Tailings (m^2)	*Fine Tailings (m^2)*	*Other (m^2)*	*Coarse Tailings (m^2)*	*Fine Tailings (m^2)*	*Other (m^2)*	*Coarse Tailings (m^2)*	*Fine Tailings (m^2)*	*Other (m^2)*
0	890,625	3,027,344	1,845,703	1,173,828	824,219	0	810,547	687,966	304,688
0.001	890,625	3,027,344	1,845,692	1,173,703	824,219	0	50,781	0	304,688
1	890,625	3,027,344	1,834,574	1,048,828	824,219	0	50,781	0	304,688
2	890,625	3,027,344	1,823,445	1,034,505	824,219	0	42,318	0	304,688
3	890,625	3,027,344	1,799,569	1,020,182	824,219	0	33,854	0	304,688
4	890,625	3,027,344	1,775,693	1,005,859	824,219	0	25,391	0	304,688
5	890,625	3,027,344	1,755,054	991,536	824,219	0	16,927	0	304,688
6	890,625	3,027,344	1,734,415	977,214	824,219	0	8,464	0	304,688
7	890,625	3,027,344	1,688,685	962,891	824,219	0	0	0	304,688
7.001	890,625	3,027,344	1,688,656	31,250	0	0	0	0	304,688
8	890,625	3,027,344	1,659,683	31,250	0	0	0	0	304,688
9	890,625	3,027,344	1,630,680	29,492	0	0	0	0	304,688
10	890,625	3,027,344	1,601,678	27,734	0	0	0	0	304,688
11	890,625	3,027,344	1,574,058	25,977	0	0	0	0	304,688
12	890,625	3,027,344	1,546,438	24,219	0	0	0	0	304,688
13	890,625	3,027,344	1,518,818	22,461	0	0	0	0	304,688
14	890,625	3,027,344	1,491,199	20,703	0	0	0	0	304,688
15	890,625	3,027,344	1,468,941	18,945	0	0	0	0	304,688
16	890,625	3,027,344	1,446,683	17,188	0	0	0	0	304,688
17	890,625	3,027,344	1,424,425	15,430	0	0	0	0	304,688
18	890,625	3,027,344	1,402,168	13,672	0	0	0	0	304,688
18.001	890,625	3,027,344	1,402,153	13,672	0	0	0	0	304,688
19	890,625	3,027,344	1,387,397	13,672	0	0	0	0	304,688
20	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
20.001	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
21	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
22	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
23	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
24	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
25	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
30	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
35	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
40	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
45	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
50	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688
500	890,625	3,027,344	1,372,626	13,672	0	0	0	0	304,688

Notes

Tan cells indicate that the feature is not present.

Table 1-34 **Depth to the Water Table in the Existing LTVSMC tailings**

Time (yrs)	Cell 2W			Cell 1E			Cell 2E		
	Coarse Tailings (ft)	Fine Tailings (ft)	Other (ft)	Coarse Tailings (ft)	Fine Tailings (ft)	Other (ft)	Coarse Tailings (ft)	Fine Tailings (ft)	Other (ft)
0	103.5	106.0	88.3	49.9	9.2	0.0	17.6	58.9	40.2
0.001	103.5	106.0	88.3	49.9	9.2	0.0	17.6	58.9	40.2
1	111.7	121.8	91.9	51.1	9.3	0.0	13.1	87.2	33.2
2	110.1	120.2	91.5	49.5	9.0	0.0	10.9	85.0	33.5
3	108.6	118.5	91.2	47.8	8.7	0.0	8.7	82.8	33.7
4	107.0	116.9	90.8	46.2	8.5	0.0	6.6	80.6	34.0
5	105.4	115.2	90.4	44.6	8.2	0.0	4.4	78.4	34.3
6	103.9	113.6	90.1	42.9	7.9	0.0	2.2	76.2	34.5
7	102.3	111.9	89.7	41.3	7.6	0.0	0.0	74.0	34.8
7.001	102.3	111.9	89.7	41.3	7.6	0.0	0.0	74.0	34.8
8	108.1	115.4	93.7	22.4	0.0	0.0	0.0	92.8	41.7
9	106.9	114.6	94.0	24.0	0.0	0.0	0.0	91.9	41.9
10	105.6	113.7	94.2	25.7	0.0	0.0	0.0	91.1	42.2
11	104.4	112.9	94.5	27.3	0.0	0.0	0.0	90.2	42.4
12	103.1	112.0	94.8	28.9	0.0	0.0	0.0	89.4	42.6
13	101.9	111.2	95.1	30.6	0.0	0.0	0.0	88.5	42.9
14	100.7	110.3	95.3	32.2	0.0	0.0	0.0	87.6	43.1
15	99.4	109.5	95.6	33.8	0.0	0.0	0.0	86.8	43.3
16	98.2	108.6	95.9	35.4	0.0	0.0	0.0	85.9	43.5
17	96.9	107.8	96.1	37.1	0.0	0.0	0.0	85.1	43.8
18	95.7	106.9	96.4	38.7	0.0	0.0	0.0	84.2	44.0
18.001	95.7	106.9	96.4	38.7	0.0	0.0	0.0	84.2	44.0
19	96.0	107.1	96.5	38.8	0.0	0.0	0.0	74.3	44.0
20	96.3	107.3	96.5	38.8	0.0	0.0	0.0	64.3	44.0
20.001	96.3	107.3	96.5	38.8	0.0	0.0	0.0	64.3	44.0
21	97.3	108.0	96.9	39.7	0.0	0.0	0.0	66.0	44.2
22	98.3	108.7	97.3	40.6	0.0	0.0	0.0	67.7	44.4
23	99.3	109.5	97.6	41.6	0.0	0.0	0.0	69.4	44.6
24	100.3	110.2	98.0	42.5	0.0	0.0	0.0	71.1	44.8
25	101.4	110.9	98.4	43.4	0.0	0.0	0.0	72.8	45.0
30	106.4	114.5	100.3	48.0	0.0	0.0	0.0	81.3	45.9
35	111.5	118.1	102.2	52.7	0.0	0.0	0.0	89.8	46.9
40	116.5	121.7	104.0	57.3	0.0	0.0	0.0	98.3	47.8
45	121.6	125.3	105.9	61.9	0.0	0.0	0.0	106.8	48.8
50	126.6	128.9	107.8	66.5	0.0	0.0	0.0	115.3	49.7
500	126.6	128.9	107.8	66.5	0.0	0.0	0.0	115.3	49.7

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Tan cells indicate that the feature does not exist at that time.

Table 1-35 Seepage Direction from each zone in Cell 2W

Time (yrs)	Coarse Tailings (%)					Fine Tailings (%)					Other (%)				
	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	14.3	21.7	64.0	0.0	0.0	0.7	48.1	51.2	0.0	0.0	19.3	26.7	52.8	1.2	0.0
0.001	14.3	21.7	64.0	0.0	0.0	0.7	48.1	51.2	0.0	0.0	19.3	26.7	52.8	1.2	0.0
1	0.0	26.1	73.9	0.0	0.0	0.0	46.3	53.7	0.0	0.0	11.2	34.7	53.1	1.0	0.0
2	0.0	25.6	74.5	0.0	0.0	0.0	45.4	54.6	0.0	0.0	9.3	35.4	54.3	1.0	0.0
3	0.0	25.0	75.0	0.0	0.0	0.0	44.6	55.4	0.0	0.0	7.5	36.0	55.5	1.0	0.0
4	0.0	24.5	75.6	0.0	0.0	0.0	43.7	56.3	0.0	0.0	5.6	36.7	56.8	1.0	0.0
5	0.0	23.9	76.1	0.0	0.0	0.0	42.8	57.2	0.0	0.0	3.7	37.3	58.0	1.0	0.0
6	0.0	23.4	76.7	0.0	0.0	0.0	42.0	58.0	0.0	0.0	1.9	38.0	59.2	1.0	0.0
7	0.0	22.8	77.2	0.0	0.0	0.0	41.1	58.9	0.0	0.0	0.0	38.6	60.4	1.0	0.0
7.001	0.0	22.8	77.2	0.0	0.0	0.0	41.1	58.9	0.0	0.0	0.0	38.6	60.4	1.0	0.0
8	0.0	21.3	78.7	0.0	0.0	0.0	40.9	59.1	0.0	0.0	0.4	36.7	61.8	1.1	0.0
9	0.0	20.8	79.2	0.0	0.0	0.0	40.8	59.2	0.0	0.0	0.4	36.4	62.1	1.1	0.0
10	0.0	20.3	79.7	0.0	0.0	0.0	40.8	59.2	0.0	0.0	0.5	36.0	62.4	1.1	0.0
11	0.0	19.8	80.2	0.0	0.0	0.0	40.7	59.3	0.0	0.0	0.5	35.7	62.6	1.2	0.0
12	0.0	19.3	80.7	0.0	0.0	0.0	40.6	59.4	0.0	0.0	0.5	35.4	62.9	1.2	0.0
13	0.0	18.8	81.3	0.0	0.0	0.0	40.6	59.5	0.0	0.0	0.6	35.1	63.2	1.2	0.0
14	0.0	18.2	81.8	0.0	0.0	0.0	40.5	59.5	0.0	0.0	0.6	34.7	63.5	1.2	0.0
15	0.0	17.7	82.3	0.0	0.0	0.0	40.4	59.6	0.0	0.0	0.6	34.4	63.8	1.2	0.0
16	0.0	17.2	82.8	0.0	0.0	0.0	40.3	59.7	0.0	0.0	0.6	34.1	64.0	1.3	0.0
17	0.0	16.7	83.3	0.0	0.0	0.0	40.3	59.7	0.0	0.0	0.7	33.7	64.3	1.3	0.0
18	0.0	16.2	83.8	0.0	0.0	0.0	40.2	59.8	0.0	0.0	0.7	33.4	64.6	1.3	0.0
18.001	0.0	16.2	83.8	0.0	0.0	0.0	40.2	59.8	0.0	0.0	0.7	33.4	64.6	1.3	0.0
19	0.0	16.3	83.7	0.0	0.0	0.0	40.3	59.8	0.0	0.0	0.7	33.5	64.6	1.3	0.0
20	0.0	16.4	83.6	0.0	0.0	0.0	40.3	59.7	0.0	0.0	0.7	33.5	64.5	1.3	0.0
20.001	0.0	16.4	83.6	0.0	0.0	0.0	40.3	59.7	0.0	0.0	0.7	33.5	64.5	1.3	0.0
21	0.0	16.8	83.2	0.0	0.0	0.0	40.4	59.6	0.0	0.0	0.8	33.4	64.5	1.3	0.0
22	0.0	17.1	82.9	0.0	0.0	0.0	40.5	59.5	0.0	0.0	0.9	33.3	64.4	1.3	0.0
23	0.0	17.5	82.5	0.0	0.0	0.0	40.6	59.4	0.0	0.0	1.1	33.3	64.4	1.3	0.0
24	0.0	17.8	82.2	0.0	0.0	0.0	40.7	59.3	0.0	0.0	1.2	33.2	64.3	1.3	0.0
25	0.0	18.2	81.8	0.0	0.0	0.0	40.8	59.2	0.0	0.0	1.3	33.1	64.3	1.3	0.0
30	0.0	19.9	80.1	0.0	0.0	0.0	41.3	58.7	0.0	0.0	1.9	32.7	64.0	1.4	0.0
35	0.0	21.7	78.3	0.0	0.0	0.0	41.9	58.2	0.0	0.0	2.5	32.4	63.8	1.4	0.0
40	0.0	23.5	76.5	0.0	0.0	0.0	42.4	57.6	0.0	0.0	3.0	32.0	63.6	1.4	0.0
45	0.0	25.2	74.8	0.0	0.0	0.0	42.9	57.1	0.0	0.0	3.6	31.6	63.3	1.5	0.0
50	0.0	27.0	73.0	0.0	0.0	0.0	43.4	56.6	0.0	0.0	4.2	31.2	63.1	1.5	0.0
500	0.0	27.0	73.0	0.0	0.0	0.0	43.4	56.6	0.0	0.0	4.2	31.2	63.1	1.5	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Table 1-36 **Volume of saturated tailings under each zone of Cell 2W**

	Coarse Tailings (acre-ft)					Fine Tailings (acre-ft)					Embankments (acre-ft)				
Time (yrs)	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	3887	5898	17395	0	0	634	43539	46345	0	0	6104	8445	16700	380	0
0.001	3887	5898	17395	0	0	634	43539	46345	0	0	6104	8445	16700	380	0
1	0	6623	18752	0	0	0	36437	42260	0	0	3465	10734	16426	309	0
2	0	6571	19148	0	0	0	36316	43616	0	0	2907	11009	16916	311	0
3	0	6516	19548	0	0	0	36173	44993	0	0	2352	11338	17490	315	0
4	0	6457	19952	0	0	0	36009	46391	0	0	1783	11671	18072	318	0
5	0	6394	20360	0	0	0	35823	47811	0	0	1200	11994	18640	322	0
6	0	6328	20771	0	0	0	35617	49252	0	0	606	12320	19214	325	0
7	0	6257	21187	0	0	0	35388	50715	0	0	0	12757	19962	331	0
7.001	0	6257	21187	0	0	0	35388	50715	0	0	0	12758	19963	331	0
8	0	5574	20594	0	0	0	34145	49340	0	0	130	11946	20117	358	0
9	0	5497	20943	0	0	0	34347	49774	0	0	141	11941	20383	368	0
10	0	5417	21296	0	0	0	34547	50210	0	0	152	11935	20651	378	0
11	0	5335	21651	0	0	0	34746	50646	0	0	164	11922	20912	387	0
12	0	5250	22009	0	0	0	34945	51084	0	0	175	11908	21176	397	0
13	0	5162	22370	0	0	0	35142	51522	0	0	187	11892	21443	407	0
14	0	5072	22733	0	0	0	35339	51961	0	0	198	11875	21712	417	0
15	0	4978	23099	0	0	0	35535	52401	0	0	210	11836	21944	427	0
16	0	4882	23469	0	0	0	35730	52842	0	0	222	11795	22178	436	0
17	0	4783	23840	0	0	0	35924	53284	0	0	233	11754	22414	446	0
18	0	4681	24215	0	0	0	36117	53726	0	0	245	11712	22652	456	0
18.001	0	4681	24215	0	0	0	36117	53726	0	0	245	11712	22652	456	0
19	0	4699	24131	0	0	0	36102	53592	0	0	247	11785	22742	458	0
20	0	4717	24047	0	0	0	36086	53458	0	0	248	11859	22833	460	0
20.001	0	4717	24047	0	0	0	36086	53458	0	0	248	11859	22833	460	0
21	0	4782	23760	0	0	0	35961	53044	0	0	289	11810	22775	462	0
22	0	4845	23475	0	0	0	35835	52632	0	0	329	11762	22718	463	0
23	0	4906	23192	0	0	0	35708	52221	0	0	370	11714	22660	465	0
24	0	4965	22910	0	0	0	35579	51811	0	0	410	11666	22602	466	0
25	0	5024	22629	0	0	0	35450	51401	0	0	450	11617	22545	468	0
30	0	5291	21251	0	0	0	34785	49373	0	0	649	11378	22259	475	0
35	0	5518	19912	0	0	0	34093	47372	0	0	844	11142	21974	482	0
40	0	5707	18612	0	0	0	33373	45399	0	0	1035	10908	21690	489	0
45	0	5856	17351	0	0	0	32625	43454	0	0	1223	10676	21408	496	0
50	0	5966	16130	0	0	0	31850	41536	0	0	1406	10447	21128	502	0
500	0	5966	16130	0	0	0	31850	41536	0	0	1406	10447	21128	502	0

Notes

The top of the LTVSMC tailings in Cell 2W is approximated as 1727 feet

The base of the LTVSMC Tailings Basin is approximated as 1500 feet.

Table 1-37 **Seepage Direction from each zone in Cell 2E**

	Coarse Tailings (%)					Fine Tailings (%)					Dams (%)				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	99.0	1.0	0.0	0.0	0.0	99.2	0.8	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
0.001	99.0	1.0	0.0	0.0	0.0	99.2	0.8	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
1	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
2	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
3	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
4	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
5	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
6	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
7	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
7.001	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
8	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
9	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
10	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
11	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
12	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
13	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
14	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
15	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
16	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
17	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
18	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
18.001	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
19	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
20	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
20.001	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
21	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
22	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
23	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
24	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
25	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
30	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
35	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
40	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
45	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
50	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
500	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Table 1-38 **Volume of saturated tailings under each zone of Cell 2E**

	Coarse Tailings (acre-ft)					*Fine Tailings (acre-ft)*					*Embankments (acre-ft)*				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	10390	105	0	0	0	1872	15	0	0	0	2214	29	0	0	0
0.001	13661	138	0	0	0	11805	95	0	0	0	2214	29	0	0	0
1	13856	0	0	0	0	11900	0	0	0	0	2735	36	0	0	0
2	13906	0	0	0	0	11900	0	0	0	0	2715	36	0	0	0
3	13947	0	0	0	0	11900	0	0	0	0	2695	35	0	0	0
4	13979	0	0	0	0	11900	0	0	0	0	2675	35	0	0	0
5	14002	0	0	0	0	11900	0	0	0	0	2655	35	0	0	0
6	14016	0	0	0	0	11900	0	0	0	0	2636	35	0	0	0
7	14020	0	0	0	0	11900	0	0	0	0	2616	34	0	0	0
7.001	14020	0	0	0	0	11900	0	0	0	0	2616	34	0	0	0
8	14020	0	0	0	0	11900	0	0	0	0	2103	28	0	0	0
9	14020	0	0	0	0	11900	0	0	0	0	2086	27	0	0	0
10	14020	0	0	0	0	11900	0	0	0	0	2069	27	0	0	0
11	14020	0	0	0	0	11900	0	0	0	0	2052	27	0	0	0
12	14020	0	0	0	0	11900	0	0	0	0	2035	27	0	0	0
13	14020	0	0	0	0	11900	0	0	0	0	2018	27	0	0	0
14	14020	0	0	0	0	11900	0	0	0	0	2000	26	0	0	0
15	14020	0	0	0	0	11900	0	0	0	0	1983	26	0	0	0
16	14020	0	0	0	0	11900	0	0	0	0	1966	26	0	0	0
17	14020	0	0	0	0	11900	0	0	0	0	1949	26	0	0	0
18	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
18.001	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
19	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
20	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
20.001	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
21	14020	0	0	0	0	11900	0	0	0	0	1918	25	0	0	0
22	14020	0	0	0	0	11900	0	0	0	0	1904	25	0	0	0
23	14020	0	0	0	0	11900	0	0	0	0	1890	25	0	0	0
24	14020	0	0	0	0	11900	0	0	0	0	1876	25	0	0	0
25	14020	0	0	0	0	11900	0	0	0	0	1861	25	0	0	0
30	14020	0	0	0	0	11900	0	0	0	0	1791	24	0	0	0
35	14020	0	0	0	0	11900	0	0	0	0	1720	23	0	0	0
40	14020	0	0	0	0	11900	0	0	0	0	1650	22	0	0	0
45	14020	0	0	0	0	11900	0	0	0	0	1579	21	0	0	0
50	14020	0	0	0	0	11900	0	0	0	0	1509	20	0	0	0
500	14020	0	0	0	0	11900	0	0	0	0	1509	20	0	0	0

Notes

The top of the LTVSMC tailings in Cell 2E is approximated as 1570 feet

The base of the LTVSMC Tailings Basin is approximated as 1500 feet.

Table 1-39 Seepage Direction from each zone in Cell 1E

	Coarse Tailings (%)					*Fine Tailings (%)*					*Dams (%)*					*Pond (%)*				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	66.5	0.0	1.2	32.3	0.0	62.1	0.0	0.0	37.9	0.0	0.0	0.0	0.0	0.0	0.0	77.3	0.3	1.8	20.6	0.0
0.001	66.5	0.0	1.2	32.3	0.0	62.1	0.0	0.0	37.9	0.0	0.0	0.0	0.0	0.0	0.0	77.3	0.3	1.8	20.6	0.0
1	65.5	0.0	1.3	33.2	0.0	65.9	0.0	0.0	34.1	0.0	0.0	0.0	0.0	0.0	0.0	77.5	1.0	1.8	19.7	0.0
2	59.0	3.1	1.7	35.9	0.4	57.2	3.3	0.4	38.9	0.2	0.0	0.0	0.0	0.0	0.0	69.1	5.3	3.9	21.7	0.0
3	52.4	6.1	2.2	38.6	0.7	48.5	6.5	0.8	43.7	0.4	0.0	0.0	0.0	0.0	0.0	60.7	9.6	6.0	23.8	0.0
4	45.9	9.2	2.6	41.3	1.1	39.9	9.8	1.3	48.6	0.6	0.0	0.0	0.0	0.0	0.0	52.3	13.9	8.1	25.8	0.0
5	39.3	12.3	3.0	44.0	1.4	31.2	13.0	1.7	53.4	0.8	0.0	0.0	0.0	0.0	0.0	43.8	18.1	10.2	27.8	0.0
6	32.8	15.3	3.5	46.7	1.8	22.5	16.3	2.1	58.2	1.0	0.0	0.0	0.0	0.0	0.0	35.4	22.4	12.3	29.9	0.0
7	26.2	18.4	3.9	49.4	2.1	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
7.001	26.2	18.4	3.9	49.4	2.1	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
8	23.0	1.1	2.3	73.6	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
9	20.7	1.0	2.1	76.2	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
10	18.4	0.9	1.8	78.9	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
11	16.1	0.8	1.6	81.5	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
12	13.8	0.7	1.4	84.2	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
13	11.5	0.6	1.2	86.8	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
14	9.2	0.4	0.9	89.4	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
15	6.9	0.3	0.7	92.1	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
16	4.6	0.2	0.5	94.7	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
17	2.3	0.1	0.2	97.4	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
18	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
18.001	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
19	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
20	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
20.001	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
21	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
22	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
23	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
24	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
25	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
30	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
35	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
40	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
45	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
50	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
500	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Gray cells indicate that the feature (unsaturated fine tailings, dams, and the existing pond in Cell 1E) does not exist at that time.

Table 1-40 **Volume of saturated tailings under each zone of Cell 1E**

Time (yrs)	Coarse Tailings (acre-ft)					Fine Tailings (acre-ft)					Embankments (acre-ft)				
	North	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	20851	0	376	10128	0	18820	0	0	11486	0	0	0	0	0	0
0.001	20852	0	376	10128	0	18820	0	0	11486	0	0	0	0	0	0
1	21344	0	424	10818	0	19958	0	0	10327	0	0	0	0	0	0
2	19562	1018	575	11913	116	17361	986	126	11809	61	0	0	0	0	0
3	17696	2071	732	13036	236	14755	1976	253	13295	122	0	0	0	0	0
4	15748	3160	893	14185	361	12138	2970	381	14788	183	0	0	0	0	0
5	13720	4282	1059	15360	489	9511	3967	509	16286	244	0	0	0	0	0
6	11614	5438	1229	16561	621	6874	4968	637	17789	306	0	0	0	0	0
7	9433	6624	1404	17785	756	4227	5973	766	19298	368	0	0	0	0	0
7.001	11924	8374	1775	22482	956	4441	6275	804	20273	386	0	0	0	0	0
8	10501	502	1050	33603	0	4441	6275	804	20273	386	0	0	0	0	0
9	9450	452	945	34807	0	4441	6275	804	20273	386	0	0	0	0	0
10	8400	402	840	36011	0	4441	6275	804	20273	386	0	0	0	0	0
11	7350	352	735	37217	0	4441	6275	804	20273	386	0	0	0	0	0
12	6301	301	630	38424	0	4441	6275	804	20273	386	0	0	0	0	0
13	5251	251	525	39633	0	4441	6275	804	20273	386	0	0	0	0	0
14	4201	201	420	40843	0	4441	6275	804	20273	386	0	0	0	0	0
15	3151	151	315	42054	0	4441	6275	804	20273	386	0	0	0	0	0
16	2101	100	210	43267	0	4441	6275	804	20273	386	0	0	0	0	0
17	1051	50	105	44482	0	4441	6275	804	20273	386	0	0	0	0	0
18	0	0	0	45699	0	4441	6275	804	20273	386	0	0	0	0	0
18.001	0	0	0	45699	0	4441	6275	804	20273	386	0	0	0	0	0
19	0	0	0	45698	0	4441	6275	804	20273	386	0	0	0	0	0
20	0	0	0	45698	0	4441	6275	804	20273	386	0	0	0	0	0
20.001	0	0	0	45698	0	4441	6275	804	20273	386	0	0	0	0	0
21	0	0	0	45695	0	4441	6275	804	20273	386	0	0	0	0	0
22	0	0	0	45692	0	4441	6275	804	20273	386	0	0	0	0	0
23	0	0	0	45689	0	4441	6275	804	20273	386	0	0	0	0	0
24	0	0	0	45686	0	4441	6275	804	20273	386	0	0	0	0	0
25	0	0	0	45683	0	4441	6275	804	20273	386	0	0	0	0	0
30	0	0	0	45667	0	4441	6275	804	20273	386	0	0	0	0	0
35	0	0	0	45651	0	4441	6275	804	20273	386	0	0	0	0	0
40	0	0	0	45636	0	4441	6275	804	20273	386	0	0	0	0	0
45	0	0	0	45620	0	4441	6275	804	20273	386	0	0	0	0	0
50	0	0	0	45605	0	4441	6275	804	20273	386	0	0	0	0	0
500	0	0	0	45605	0	4441	6275	804	20273	386	0	0	0	0	0

Notes

The top of the LTVSMC tailings in Cell 1E is approximated as 1658 feet

The base of the LTVSMC Tailings Basin is approximated as 1500 feet.

Table 1-41 Stage-Area-Storage Relationship in the HRF

Elevation (ft)	*Area (acres)*	*Volume (acre-ft)*
1570	34.07	0.00
1572	35.06	69.13
1574	36.04	140.23
1576	37.02	213.29
1578	38.01	288.32
1580	38.99	365.33
1582	39.98	444.29
1584	40.96	525.23
1586	41.94	608.13
1588	42.93	693.01
1590	43.91	779.85
1592	44.90	868.66
1594	45.88	959.43
1596	46.86	1052.18
1598	47.85	1146.89
1600	53.05	1244.83
1602	54.33	1352.22
1604	55.61	1462.16
1606	56.89	1574.66
1608	58.17	1689.71
1610	59.45	1807.33
1612	60.73	1927.50
1614	62.00	2050.23
1616	63.28	2175.52
1618	64.56	2303.37
1620	65.84	2433.77
1622	67.12	2566.73
1624	68.40	2702.25
1626	69.68	2840.33
1628	70.96	2980.97
1630	77.08	3125.62
1632	78.49	3281.19
1634	79.91	3439.59
1636	81.32	3600.82
1638	82.74	3764.88
1640	84.15	3931.77
1642	85.57	4101.50
1644	86.99	4274.06
1646	88.40	4449.44
1648	89.82	4627.66
1650	96.54	4810.30

Table 1-42 Hydrometallurgical Residue Facility Evolution

Time (yrs)	*Crest_El (ft)*	*Forest_WS_Area (acres)*	*Cell2W_WS_Area (acres)*
0	1570	0.0	0.0
3	1600	42.0	14.9
6	1630	24.1	0.0
13	1650	25.3	0.0
500	1650	25.3	0.0

Table 1-43 FTB WWTP Effluent Concentration

Constituent	*Effluent_Conc (mg/L)*
Ag	0.001
Al	0.125
Alk (as CaCO3)	100
As	0.01
B	0.4
Ba	0.005
Be	0.004
Ca*	35.1
Cd	0.002
Cl	1.3
Co	0.005
Cr	0.011
Cu	0.009
F	0.05
Fe	0.3
K	0.5
Mg*	3
Mn	0.05
Na	2
Ni	0.05
Pb	0.003
Sb	0.031
Se	0.005
SO_4	9
Tl	0.00056
V	0.05
Zn	0.1

Notes

Effluent concentrations are based on the expected effluent of the chosen RO system

* Calcium and Magnesium value set so that the effluent hardness is 100 mg/L

Table 1-44 Other Surface Water Quality Inputs

Constituent	*Area5NW_Conc* (mg/L)*	*Initial_Pond_Concs_1E** (mg/L)*	*Initial_Pond_Concs_2E** (mg/L)*	*CL_Mean (mg/L)*	*CL_SD (mg/L)*
Ag	0.00015	0.0001	0.0001	0.0001	0
Al	0.0125	0.01	0.01	0.094	0.028
Alk (as CaCO3)	96	260	340	47.9	0
As	0.0011	0.0047	0.0054	0.00098	0.00037
B	0.16	0.25	0.3	0.061	0
Ba	0.0036	0.25	0.25	0.008	0
Be	0.0001	0.0002	0.0002	0.0001	0
Ca	86.3	26	34	19.6	4.1
Cd	0.0001	0.0001	0.0001	0.0001	0
Cl	4.28	23	23	4.03	0
Co	0.0004	0.0006	0.0006	0.00033	0
Cr	0.0005	0.0005	0.0005	0.0005	0
Cu	0.0018	0.0013	0.001	0.0041	0
F	0.17	5.9	4.4	0.09	0
Fe	0.093	0.025	0.03	1.52	0.9
K	51.9	8.7	12	1.27	0
Mg	245	47	66	9.06	1.16
Mn	0.804	0.048	0.079	0.103	0.063
Na	89.2	78	77	5.03	0
Ni	0.0036	0.0013	0.001	0.0021	0
Pb	0.00014	0.0016	0.0016	0.0006	0
Sb	0.00025	0.00025	0.00025	0.00025	0
Se	0.0007	0.0005	0.0005	0.0007	0
SO_4	1084	95	130	28.7	13.8
Tl	0.0001	0.00017	0.00017	0.00002	0.00002
V	0.00541	0.00541	0.00541	0.0013	0
Zn	0.003	0.013	0.013	0.0053	0

Notes

Source: Surface Water Samples for Area_5NW_Effluent_Conc from SD-033 through 08/23/2011

* Data not available for Alkalinity, F and V; GW values assumed

** Data not available for Ag, Al, Ba, Be, Cd, Cr, Pb, Sb, Se, Tl, V, & Zn; average concentrations at the North Toe (GW001 & GW012) assumed

Table 1-45 Sewage Treatment Plant Effluent Concentration

Constituent	*Additional_Quality_Lower (mg/L)*	*Additional_Quality_Upper (mg/L)*
Ag*	0	0
Al	0.1	0.2
Alk (as CaCO3)	60	120
As*	0	0
B	0.1	0.4
Ba*	0	0
Be*	0	0
Ca	6	16
Cd*	0	0
Cl	20	50
Co*	0	0
Cr*	0	0
Cu*	0	0
F	0.2	0.4
Fe*	0	0
K	7	15
Mg	4	10
Mn	0.2	0.4
Na	40	70
Ni*	0	0
Pb*	0	0
Sb*	0	0
Se*	0	0
SO_4	15	30
Tl*	0	0
V*	0	0
Zn*	0	0

<u>Notes</u>

Typical mineral increase from domestic water use. Adapted from Metcalf and Eddy (1991) Wastewater Engineering. Treatment Disposal Reuse, G. Tchobanoglous and F.L. Burton (Eds.), 1820 pp. New York: McGraw-Hill.

* Constituents with an asterisk are not considered to increase appreciably due to domestic water use.

Table 1-46 Groundwater Flow Path Characteristics

Variable Name	*Units*	*Description*	*Groundwater Flow Path*				
			[N]	*[NW]*	*[W]*	*[S]**	*[E]**
La	[m]	Total flow path length	3260	3715	5410	1	1
w	[m]	Average flow path width	1920	2090	2920	0	0
Init_Grad	[--]	Initial hydraulic gradient (determines flow capacity)	-0.00444	-0.00514	-0.00736	0	0
Eval_Loc1	[m]	Length from the upstream end (basin toe) to the first evaluation location on the flow path	1205	1325	3110	0	0

Notes

* South [S] and East [E] flow paths not actually modeled.

Table 1-47 Flow_Control, 1 if the SW location in the row contributes flow to the SW location in the column

Location	*PM12*	*PM12_2*	*PM12_3*	*PM12_4*	*PM13*	*MLC3*	*MLC2*	*TC1*	*PM19*	*UC1*	*PM11*
PM12	1	1	1	1	1	0	0	0	0	0	0
PM12_2	0	1	1	1	1	0	0	0	0	0	0
PM12_3	0	0	1	1	1	0	0	0	0	0	0
PM12_4	0	0	0	1	1	0	0	0	0	0	0
PM13	0	0	0	0	1	0	0	0	0	0	0
MLC3	0	0	1	1	1	1	1	0	0	0	0
MLC2	0	0	1	1	1	0	1	0	0	0	0
TC1	0	0	1	1	1	0	0	1	1	0	0
PM19	0	0	1	1	1	0	0	0	1	0	0
UC1	0	0	0	0	0*	0	0	0	0	1	0*
PM11	0	0	0	0	1	0	0	0	0	0	1

* 1 for the No Action Model

Table 1-48 **Surface Water Characteristics**

Surface Water Evaluation Point	*Lengths (m)*	*XS_Area (m^2)*
PM-12	6381	10
PM-12.2	6324	30
PM-12.3	14343	30
PM-12.4	5865	30
PM-13	5892	30
MLC-3	1210	5
MLC-2	2575	5
TC-1	1325	5
PM-19	2554	5
UC-1	10	5
PM-11	3300	5

Notes

Lengh based on GIS data

Area based on modeling assumptions

Table 1-49a Contributing Areas to each Surface Water Evaluation Point, Existing Conditions

Surface Water Evaluation Point	*Incremental Tributary Area (sq mi)**				
	Surface Water			*Groundwater*	
	Natural Areas	*Cell 2W Dams*	*Cell 2E Dams*	*Non-Modeled Flow Path*	*Modeled Flow Path*
PM-12	18.97	0	0	18.97	0
PM-12.2	14.12	0	0	14.12	0
PM-12.3	41.28	0	0	41.28	0
PM-12.4	11.38	0	0	10.94	0.44
PM-13	8.91	0	0	6.22	5.66
MLC-3	1.36	0	0.04	0.73	0.00
MLC-2	2.17	0	0	1.08	2.42
TC-1	1.94	0.16	0.08	0	0
PM-19	1.76	0	0	0	3.00
UC-1	0	0.03	0	0	0
PM-11	2.97	0.37	0	0	0

Table 1-49b Contributing Areas to each Surface Water Evaluation Point, Project Conditions

Surface Water Evaluation Point	*Incremental Tributary Area (sq mi)**				
	Surface Water			*Groundwater*	
	Natural Areas	*Cell 2W Dams*	*Cell 2E Dams*	*Non-Modeled Flow Path*	*Modeled Flow Path*
PM-12	18.97	0	0	18.97	0
PM-12.2	14.12	0	0	14.12	0
PM-12.3	41.28	0	0	41.28	0
PM-12.4	11.38	0	0	10.94	0.43
PM-13	8.91	0	0	6.22	5.57
MLC-3	2.24	0	0	1.61	0.00
MLC-2	2.17	0	0	1.08	2.34
TC-1	1.83	0	0	0	0
PM-19	1.76	0	0	0	2.95
UC-1**	0	0.03	0	0	0
PM-11	2.87	0	0	0	0
Containment System	*Incremental Tributary Area (sq mi)**				
	Surface Water			*Groundwater*	
	Natural Areas	*Cell 2W Dams*	*Cell 2E Dams*	*Non-Modeled Flow Path*	*Modeled Flow Path*
North	0.08	0	0.12	0	0.08
NorthWest	0.05	0.16	0	0	0.05
West	0.1	0.37	0	0	0.1
South	0	0	0	0	0
East	0.01	0	0	0.01	0

Notes

* Surface runoff areas are equal to or greater than the sum of groundwater areas. This is due to runoff from the Tailings Basin, where recharge is not applied because it is accounted for in seepage.

** All flow leaving UC-1 flows to the West containment system.

Table 1-50 Distribution of Watershed Yield by Month

Percentile	Watershed_Yield (cfs per square mile)											
	January	***February***	***March***	***April***	***May***	***June***	***July***	***August***	***September***	***October***	***November***	***December***
MIN	0.010	0.010	0.016	0.029	0.238	0.040	0.041	0.020	0.025	0.029	0.055	0.039
1%	0.012	0.010	0.016	0.040	0.306	0.043	0.045	0.023	0.029	0.033	0.062	0.040
5%	0.036	0.017	0.025	0.057	0.464	0.099	0.062	0.036	0.036	0.062	0.106	0.052
10%	0.041	0.027	0.032	0.113	0.578	0.204	0.077	0.045	0.050	0.094	0.136	0.062
20%	0.046	0.034	0.041	0.433	0.759	0.340	0.113	0.066	0.087	0.147	0.159	0.084
35%	0.057	0.045	0.051	0.838	1.099	0.555	0.204	0.101	0.170	0.215	0.215	0.108
50%	0.069	0.054	0.057	1.501	1.529	0.832	0.340	0.159	0.272	0.306	0.283	0.125
65%	0.084	0.062	0.071	2.197	2.069	1.268	0.540	0.249	0.430	0.408	0.385	0.170
80%	0.100	0.070	0.113	3.237	3.024	1.989	0.883	0.498	0.725	0.634	0.510	0.227
90%	0.109	0.085	0.249	4.470	4.222	2.797	1.785	0.861	1.373	1.119	0.736	0.294
95%	0.147	0.102	0.860	6.288	5.956	3.487	3.030	1.443	1.789	1.669	0.963	0.362
99%	0.227	0.113	4.596	10.622	14.760	6.320	5.443	2.660	5.614	4.417	1.538	0.530
MAX	0.249	0.159	8.766	16.874	19.479	12.344	8.947	3.216	8.935	5.130	1.880	0.566

Notes

* Based on USGS gage 04017000 data and 88.3 sq. mile drainage area

Table 1-51 Variation in Precipitation and Evaporation Throughout Each Year

Month	***Annual_P_Variation (yr/mon)***	***Annual_E_Variation (yr/mon)***
January	0.028	0.000
February	0.023	0.000
March	0.034	0.033
April	0.062	0.093
May	0.112	0.136
June	0.146	0.145
July	0.139	0.165
August	0.134	0.164
September	0.139	0.134
October	0.097	0.093
November	0.052	0.037
December	0.034	0.000

Notes

* Based on National Weather Service (NWS) sites closest to the Plant Site using the Minnesota Climatology Working Group’s High Density Network (HiDen)

Table 1-52 Initial_Mass_LTVSMC_Basin, Initial Mass in the LTVSMC Tailings Basin

Constituent	Toes[N] (tonnes)	Toes[NW] (tonnes)	Toes[W] (tonnes)	Toes[S] (tonnes)	Toes[E] (tonnes)	UnsatFine2W (tonnes)	UnsatCoarse2W (tonnes)	UnsatBanks2W (tonnes)	UnsatFine1E (tonnes)	UnsatCoarse1E (tonnes)	UnsatFine2E (tonnes)	UnsatCoarse2E (tonnes)	UnsatBanks2E (tonnes)
Ag	7.20E-07	6.08E-07	9.33E-07	1.37E-06	1.15E-07	2.90E-03	4.87E-04	1.28E-03	9.70E-05	4.03E-04	2.28E-03	3.14E-05	5.96E-05
Al	6.64E-05	1.34E-04	1.85E-04	1.43E-04	9.84E-05	7.76E-01	9.40E-02	1.50E-01	1.81E-02	4.09E-02	6.42E-02	1.19E-02	1.02E-02
Alkalinity	1.58E+00	1.44E+00	2.01E+00	2.96E+00	1.30E-01	8.30E+03	9.89E+02	1.58E+03	1.90E+02	4.31E+02	6.83E+02	1.25E+02	1.08E+02
As	2.60E-05	7.58E-06	1.23E-05	4.95E-05	7.05E-07	3.49E-02	6.12E-03	1.61E-02	1.21E-03	5.06E-03	2.69E-02	3.99E-04	7.48E-04
B	1.72E-03	2.92E-03	4.03E-03	3.40E-03	4.35E-05	1.69E+01	2.02E+00	3.23E+00	3.88E-01	8.82E-01	1.39E+00	2.56E-01	2.20E-01
Ba	1.16E-03	1.49E-04	2.42E-04	2.39E-03	9.06E-05	8.43E-01	9.13E-02	1.24E-01	1.82E-02	3.42E-02	3.56E-02	1.47E-02	9.87E-03
Be	1.38E-06	3.24E-06	4.49E-06	3.08E-06	2.76E-07	1.88E-02	2.30E-03	3.66E-03	4.42E-04	1.00E-03	1.56E-03	2.91E-04	2.51E-04
Ca	2.29E-01	5.91E-01	8.12E-01	4.57E-01	4.03E-02	3.43E+03	4.08E+02	6.53E+02	7.85E+01	1.78E+02	2.82E+02	5.17E+01	4.45E+01
Cd	7.20E-07	6.81E-07	1.05E-06	1.43E-06	1.84E-07	3.19E-03	5.59E-04	1.46E-03	1.12E-04	4.59E-04	2.47E-03	3.59E-05	6.81E-05
Cl	1.26E-01	1.29E-01	1.81E-01	2.63E-01	2.68E-03	7.47E+02	8.95E+01	1.43E+02	1.72E+01	3.90E+01	6.16E+01	1.13E+01	9.75E+00
Co	8.31E-06	1.31E-05	1.98E-05	1.48E-05	2.15E-07	6.21E-02	1.05E-02	2.77E-02	2.09E-03	8.67E-03	4.74E-02	6.87E-04	1.28E-03
Cr	2.88E-06	3.61E-06	5.03E-06	6.00E-06	1.52E-06	2.09E-02	2.50E-03	4.00E-03	4.81E-04	1.09E-03	1.73E-03	3.17E-04	2.73E-04
Cu	1.11E-05	1.43E-05	2.20E-05	2.25E-05	3.28E-06	6.70E-02	1.18E-02	3.12E-02	2.36E-03	9.86E-03	5.10E-02	7.74E-04	1.45E-03
F	2.38E-02	4.57E-04	1.65E-03	5.55E-02	2.25E-04	1.36E+00	1.63E-01	2.60E-01	3.13E-02	7.11E-02	1.12E-01	2.07E-02	1.78E-02
Fe	1.26E-02	2.98E-02	4.51E-02	2.16E-02	9.01E-05	1.41E+02	2.44E+01	6.41E+01	4.84E+00	2.01E+01	1.11E+02	1.58E+00	2.98E+00
K	5.65E-02	6.08E-02	8.47E-02	1.04E-01	2.77E-03	3.51E+02	4.21E+01	6.72E+01	8.08E+00	1.84E+01	2.90E+01	5.33E+00	4.59E+00
Mg	4.15E-01	1.01E+00	1.39E+00	8.05E-01	1.67E-02	5.85E+03	6.98E+02	1.12E+03	1.34E+02	3.04E+02	4.81E+02	8.84E+01	7.60E+01
Mn	1.44E-03	7.13E-03	9.75E-03	3.02E-03	4.15E-04	4.14E+01	4.92E+00	7.86E+00	9.45E-01	2.15E+00	3.41E+00	6.23E-01	5.36E-01
Na	4.09E-01	3.38E-01	4.76E-01	8.54E-01	7.01E-03	1.94E+03	2.34E+02	3.73E+02	4.49E+01	1.02E+02	1.61E+02	2.96E+01	2.55E+01
Ni	1.77E-05	2.89E-05	4.38E-05	3.27E-05	6.62E-06	1.38E-01	2.33E-02	6.15E-02	4.61E-03	1.92E-02	1.08E-01	1.52E-03	2.84E-03
Pb	7.75E-06	9.54E-07	1.71E-06	1.57E-05	3.83E-07	4.23E-03	7.29E-04	1.92E-03	1.45E-04	5.97E-04	3.30E-03	4.71E-05	8.92E-05
Sb	1.94E-06	1.99E-06	3.06E-06	3.78E-06	5.52E-07	9.35E-03	1.64E-03	4.32E-03	3.26E-04	1.37E-03	7.09E-03	1.07E-04	2.01E-04
Se	3.38E-06	2.64E-06	4.07E-06	6.58E-06	1.23E-06	1.25E-02	2.13E-03	5.61E-03	4.28E-04	1.76E-03	9.93E-03	1.37E-04	2.60E-04
SO4	1.33E+00	1.93E+00	2.94E+00	2.27E+00	1.13E-02	9.17E+03	1.57E+03	4.14E+03	3.13E+02	1.30E+03	7.14E+03	1.02E+02	1.92E+02
Tl	9.41E-07	4.34E-07	6.86E-07	1.90E-06	2.61E-07	2.02E-03	3.49E-04	9.23E-04	6.96E-05	2.91E-04	1.58E-03	2.28E-05	4.27E-05
V	2.55E-05	4.70E-06	7.37E-06	5.24E-05	8.29E-06	2.61E-02	3.13E-03	5.00E-03	6.02E-04	1.37E-03	2.16E-03	3.97E-04	3.41E-04
Zn	6.76E-05	1.95E-05	3.16E-05	1.35E-04	2.13E-05	9.05E-02	1.53E-02	4.05E-02	3.05E-03	1.27E-02	7.03E-02	9.97E-04	1.88E-03

Notes

Table 1-53 Initial_Mass_Rate, Initial Mass Transport Rate in the LTVSMC Tailings Basin

Constituent	Cell2W_Fines (kg/day)	Cell2W_Coarse (kg/day)	Cell2W_Banks (kg/day)	Cell1E_Fines (kg/day)	Cell1E_Coarse (kg/day)	Cell1E_Pond (kg/day)	Cell2E_Fines (kg/day)	Cell2E_Coarses (kg/day)	Cell2E_Banks (kg/day)	Cell2E_Pond (kg/day)
Ag	3.09E-04	1.27E-04	2.22E-04	3.25E-05	8.00E-05	5.17E-04	1.66E-04	1.97E-05	1.68E-05	3.33E-04
Al	8.26E-02	2.45E-02	2.62E-02	6.12E-03	8.25E-03	4.91E-02	4.49E-03	7.49E-03	2.89E-03	3.16E-02
Alkalinity	8.89E+02	2.58E+02	2.76E+02	6.44E+01	8.70E+01	1.28E+03	4.76E+01	7.88E+01	3.05E+01	1.08E+03
As	3.71E-03	1.59E-03	2.80E-03	4.12E-04	1.01E-03	2.34E-02	2.03E-03	2.46E-04	2.12E-04	1.73E-02
B	1.81E+00	5.26E-01	5.64E-01	1.31E-01	1.78E-01	1.23E+00	9.73E-02	1.61E-01	6.23E-02	9.49E-01
Ba	9.02E-02	2.38E-02	2.18E-02	6.15E-03	6.92E-03	1.23E+00	2.49E-03	9.24E-03	2.79E-03	7.91E-01
Be	1.99E-03	5.99E-04	6.40E-04	1.50E-04	2.02E-04	9.81E-04	1.09E-04	1.83E-04	7.09E-05	6.33E-04
Ca	3.67E+02	1.06E+02	1.14E+02	2.66E+01	3.59E+01	1.28E+02	1.97E+01	3.26E+01	1.26E+01	1.08E+02
Cd	3.40E-04	1.46E-04	2.56E-04	3.74E-05	9.32E-05	5.19E-04	1.86E-04	2.25E-05	1.93E-05	3.35E-04
Cl	7.99E+01	2.33E+01	2.50E+01	5.81E+00	7.86E+00	1.13E+02	4.30E+00	7.13E+00	2.76E+00	7.28E+01
Co	6.62E-03	2.73E-03	4.82E-03	7.02E-04	1.72E-03	3.50E-03	3.51E-03	4.22E-04	3.62E-04	2.26E-03
Cr	2.23E-03	6.52E-04	7.00E-04	1.63E-04	2.20E-04	2.45E-03	1.21E-04	1.99E-04	7.73E-05	1.58E-03
Cu	7.11E-03	3.07E-03	5.38E-03	7.93E-04	1.94E-03	6.95E-03	3.87E-03	4.76E-04	4.06E-04	3.54E-03
F	1.45E-01	4.25E-02	4.55E-02	1.06E-02	1.44E-02	2.89E+01	7.83E-03	1.30E-02	5.03E-03	1.39E+01
Fe	1.50E+01	6.33E+00	1.11E+01	1.63E+00	4.01E+00	1.39E+00	8.26E+00	9.81E-01	8.41E-01	9.10E-01
K	3.75E+01	1.10E+01	1.18E+01	2.73E+00	3.70E+00	4.27E+01	2.02E+00	3.36E+00	1.30E+00	3.80E+01
Mg	6.26E+02	1.82E+02	1.95E+02	4.53E+01	6.13E+01	2.31E+02	3.35E+01	5.57E+01	2.15E+01	2.09E+02
Mn	4.43E+00	1.28E+00	1.37E+00	3.20E-01	4.32E-01	2.35E-01	2.38E-01	3.92E-01	1.52E-01	2.50E-01
Na	2.08E+02	6.09E+01	6.52E+01	1.52E+01	2.05E+01	3.83E+02	1.12E+01	1.86E+01	7.20E+00	2.44E+02
Ni	1.46E-02	6.06E-03	1.07E-02	1.56E-03	3.84E-03	7.64E-03	7.97E-03	9.36E-04	8.06E-04	3.98E-03
Pb	4.52E-04	1.89E-04	3.33E-04	4.85E-05	1.20E-04	7.88E-03	2.49E-04	2.94E-05	2.51E-05	5.09E-03
Sb	9.90E-04	4.26E-04	7.42E-04	1.11E-04	2.68E-04	1.31E-03	5.33E-04	6.61E-05	5.64E-05	8.43E-04
Se	1.33E-03	5.57E-04	9.79E-04	1.42E-04	3.55E-04	2.56E-03	7.36E-04	8.65E-05	7.42E-05	1.65E-03
SO4	9.77E+02	4.09E+02	7.20E+02	1.05E+02	2.59E+02	5.48E+02	5.50E+02	6.34E+01	5.44E+01	4.64E+02
Tl	2.16E-04	9.07E-05	1.61E-04	2.32E-05	5.74E-05	8.51E-04	1.18E-04	1.41E-05	1.20E-05	5.49E-04
V	2.79E-03	8.16E-04	8.74E-04	2.04E-04	2.76E-04	2.65E-02	1.50E-04	2.50E-04	9.67E-05	1.71E-02
Zn	9.66E-03	3.99E-03	7.03E-03	1.02E-03	2.53E-03	6.46E-02	5.23E-03	6.18E-04	5.30E-04	4.16E-02

Notes

Table 1-54 Expected_Toe_Conc, Expected Existing Constituent Concentrations at the Toes of the Tailings Basin

Constituent	Expected_Toe_Conc[N] (ug/L)	Expected_Toe_Conc[NW] (ug/L)	Expected_Toe_Conc[W] (ug/L)	Expected_Toe_Conc[S] (ug/L)	Expected_Toe_Conc[E]* (ug/L)
Ag	0.13	0.11	0.12	0.12	0.075
Al	12	22	22	12	64.2
Alkalinity	286000	238000	238000	255000	84900
As	4.7	1.2	1.4	4.3	0.46
B	310	480	480	290	28.4
Ba	210	24.5	29	210	59.1
Be	0.25	0.5	0.5	0.25	0.18
Ca	41400	97200	95800	39100	26300
Cd	0.13	0.11	0.12	0.12	0.12
Cl	22700	21400	21400	22700	1750
Co	1.5	2.2	2.4	1.3	0.14
Cr	0.52	0.6	0.6	0.52	0.99
Cu	2	2.3	2.5	1.9	2.14
F	4300	75	195	4800	147
Fe	2270	4950	5320	1870	58.8
K	10200	10100	10000	9000	1810
Mg	75000	166000	163000	69000	10900
Mn	260	1170	1140	260	271
Na	73800	56100	56500	74000	4570
Ni	3.2	4.9	5.3	2.9	4.32
Pb	1.4	0.2	0.2	1.4	0.25
Sb	0.35	0.32	0.35	0.32	0.36
Se	0.61	0.44	0.48	0.57	0.8
SO4	240000	320000	350000	200000	7360
Tl	0.17	0.07	0.08	0.16	0.17
V	4.6	0.8	0.9	4.6	5.41
Zn	12.2	3.2	3.7	11.8	13.9

Notes

* East toe values are the average background groundwater concentration since the LTVSMC Tailings Basin is not currently affecting this toe.

Table 2-1 **Output Constituents for the Plant Site Model**

Constituent
Ag
Al
Alk
As
B
Ba
Be
Ca
Cd
Cl
Co
Cr
Cu
F
Fe
Hardness
K
Mg
Mn
Na
Ni
Pb
Sb
Se
SO_4
Tl
V
Zn

Table 2-2 Output Locations for the Plant Site Model

Surface Water Evaluation Locations

Evaluation Location	*Applicable Standards*
PM-12	SW
PM-12.2	SW
PM-12.3	SW
PM-12.4	SW
PM-13	SW
MLC-3	SW
MLC-2	SW
TC-1	SW
PM-19	SW
UC-1*	SW
PM-11	SW

Groundwater Evaluation Locations

Flowpath	*Evaluation Locations*	*Applicable Standards*	*Receiving Surface Water Node*
North	Prop. Bound.	GW	MLC-2
North-West	Prop. Bound.	GW	PM-19
West	Prop. Bound.	GW	PM-12.4, PM-13

Notes

* Only applicable for the No Action Model; the FTB Containment System contains UC-1 in the Project Model

Attachment C

Calibration of the Existing Natural Watershed at the Plant Site

Calibration of the Existing Natural Watershed at the Plant Site

NorthMet Project

Prepared for
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January 2015

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Calibration of the Existing Natural Watershed at the Plant Site

January 2015

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1.0 Introduction

1.1 Overview

This document presents an update on the calibration of natural watershed surface runoff water quality that will be used in the modeling being conducted for the Final Environmental Impacts Assessment (FEIS) for the NorthMet Project (Project). The original calibration was presented in March, 2012 (Reference (1)). This recalibration was conducted at the request of the Co-lead Agencies and incorporates additional water quality data collected since the previous calibration. The exact same methodology was used for this calibration as was used for the 2012 calibration.

1.2 Explanation of Plots

There is one type of plot used in this document. The following section describes this plot.

1.2.1 Model Calibration at PM-12

The plot used in this document compares model estimates and water quality monitoring data at PM-12 (Figure 1). PM-12 is the location assumed to reflect un-impacted conditions in terms of both groundwater and surface water runoff. In the plot, the horizontal axis is concentration and the vertical axis is the percentage of samples or model estimates that are less than a given concentration. The brown line shows the distribution of background groundwater concentrations used in the model. The blue line represents water quality monitoring data at PM-12. The green line represents model estimates of surface water quality at PM-12. The vertical black dotted line is the average of the model results and the vertical grey dashed line is the average of the monitoring data.

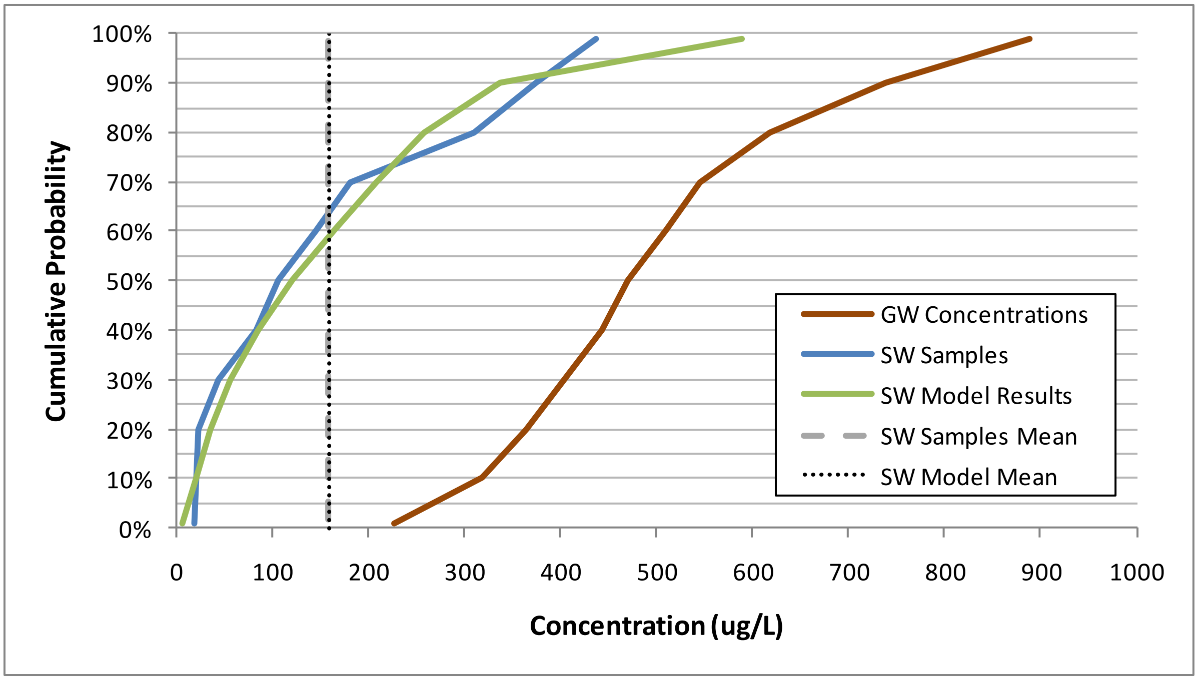


Figure 1 **Example plot of the surface water calibration at PM-12**

The amount of concurrent flow and concentration data available at PM-12 is insufficient to form relationships between flow and data or to isolate samples which may be influenced most by groundwater. Therefore, the calibration was performed using the entire set of available data and the entire set of model results, which include the full range of flow scenarios.

2.0 Model Calibration

2.1 Calibration Steps

The calibration process consists of the following steps:

Step 1: Select an initial groundwater distribution. The process for selecting an initial groundwater distribution for water quality is presented in Section 5.3.1 of Reference (2), and is summarized here. Two groundwater distributions were developed for each constituent, one using Poly Met Mining Inc. (PolyMet) data from groundwater monitoring wells generally un-impacted by the Tailings Basin (referred to as the PolyMet Only data distribution), and one using this same PolyMet Only data along with regional data (referred to as the PolyMet plus Regional data distribution). Table 1 provides an example of how these distributions were developed. The PolyMet Only dataset was created with data collected through December 2013 from wells GW002, GW011, GW013 and GW015. See Large Figure 5 of the Water Modeling Data Package Volume 2 – Plant Site, Version 9, for the locations of these wells (Reference (2)). The PolyMet plus Regional dataset was created using the same data from the NorthMet wells as the PolyMet Only dataset, as well as regional data from the USGS and the MPCA. The distribution with the higher mean concentration was selected as the initial groundwater distribution. When sufficient data was available, dissolved concentrations (i.e., from filtered samples) were used to develop the groundwater distributions. When sufficient dissolved data was not available, total concentrations (i.e., from unfiltered samples) were used. The first column of Table 2 shows whether the data used is from filtered or unfiltered water samples. For the re-calibration performed in 2014, the distribution choice (PolyMet Only vs. PolyMet plus Regional) was unchanged from what was chosen during the surface runoff calibration in 2012.

Step 2: Determine the optimal mean surface runoff concentration. The mean surface runoff concentrations were determined by minimizing the error in the mean constituent concentrations modeled at PM-12. Prior to this comparison, high non-detect data points were removed from the dataset of measured concentrations (high non-detects where there are non-detects at lower detection limits will skew the model calibration). Due to the limited or non-existent filtered surface water quality data at PM-12, all surface water samples used in this report are unfiltered samples.

Step 3: If necessary, recalculate the optimal mean surface runoff concentration with the PolyMet Only groundwater distribution. If the optimal mean surface runoff concentration was less than or equal to 0 μg/L using a groundwater distribution based on the PolyMet plus Regional data, the PolyMet Only data distribution was selected for use in the model and Step 2 was performed again.

Step 4: Optimize the standard deviation of surface runoff concentrations. The optimal standard deviation of surface runoff concentration was calculated by minimizing the root-mean-square (RMS) error at the 10th, 50th and 90th percentiles when comparing the model results and the sampled data at PM-12. To determine the minimum RMS error for each constituent, the model was run 11 times with different input values for the standard deviation of surface runoff concentration. The RMS error was calculated for each of the 11 model runs and the values were plotted. Then, the standard deviation value that resulted in the minimum error was chosen as the optimum value. Figure 2 shows an example from the analysis of calcium.

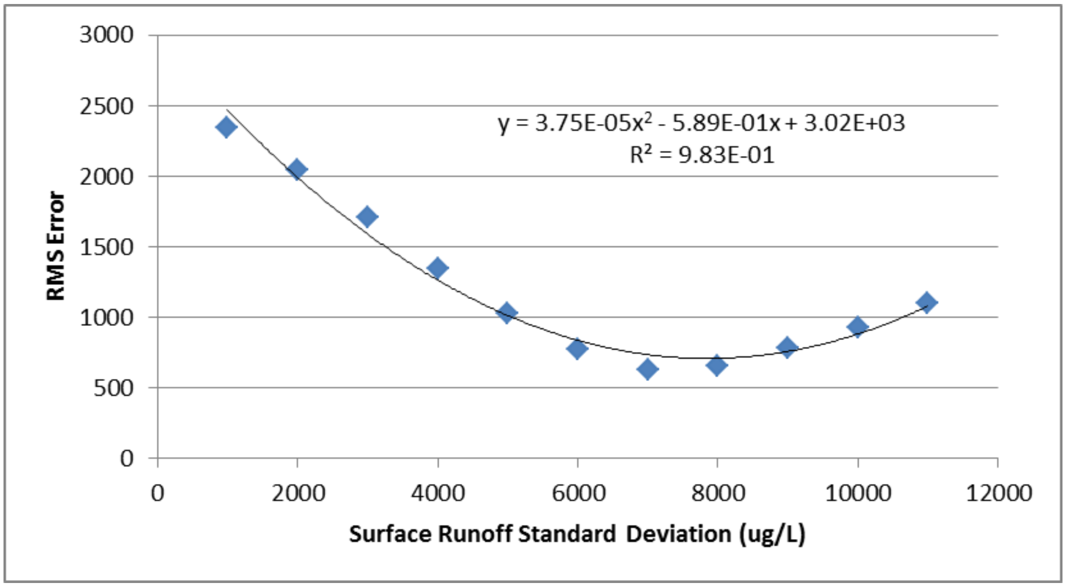


Figure 2 Optimization of the standard deviation of surface runoff concentration for calcium at PM-12

There are some constituents where there is no clear optimal value for the standard deviation of surface runoff concentration. For example, all twelve of the samples of beryllium are non-detects and have been assumed to be 0.1 µg/L. Therefore, based on the surface water samples, there is zero variability. The model will have some variation in beryllium results at PM-12, even if there is no variability in the input for surface runoff concentration, simply due to variability in other inputs. Therefore, there is no clear minimum to the RMS error and the standard deviation is automatically set to 1% of the estimated mean surface runoff concentration (Figure 3).

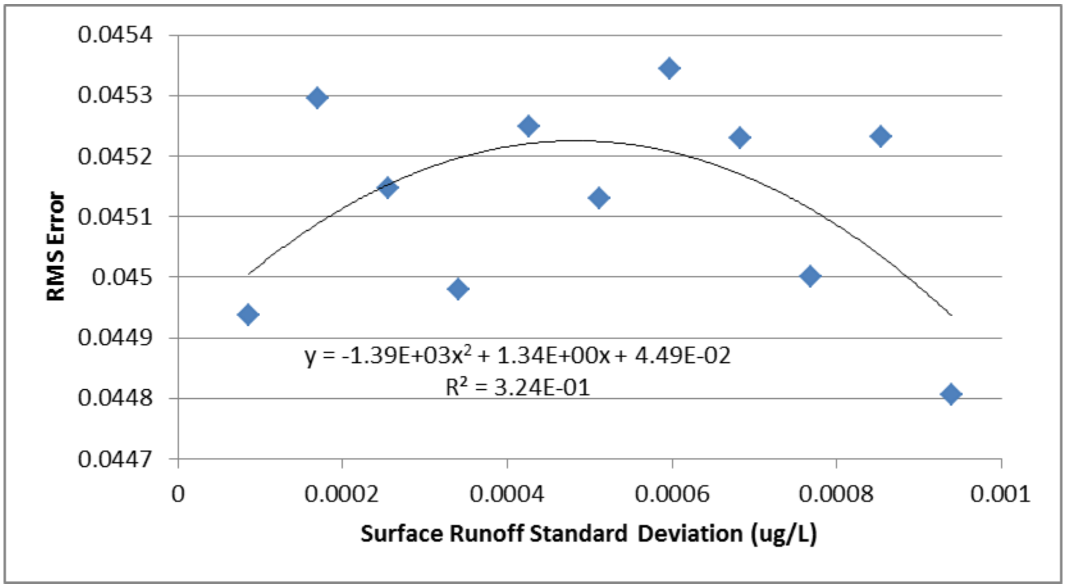


Figure 3 Optimization of the standard deviation of surface runoff concentration for beryllium at PM-12

A log-normal distribution has been assumed to describe surface runoff concentrations. The log-normal distribution was agreed upon in the IAP process for representing uncertainty in existing groundwater quality because this simple distribution can reasonably represent the right-skewed groundwater data and allow for the occasionally observed high concentrations. The same reasoning was applied to the surface runoff concentration distributions. Additionally, the log-normal distribution does not allow for unrealistic negative values that a normal distribution might generate.

Figure 4 below is a schematic flow diagram detailing the calibration process described here.

The results of Step 1 are presented below in Section 2.2. The remaining calibration steps are then presented for each constituent on a constituent by constituent basis. Calibration will be considered acceptable if the optimal mean of surface runoff concentrations is greater than zero. If the optimal mean is less than or equal to zero, the modeling of the constituent may need to be further evaluated during model review.

Attachment A has been added to this document to show the difference between the SDEIS and FEIS distributions representing mean background groundwater quality. Attachment B has been added to this document to show the difference between the SDEIS and FEIS distributions representing surface runoff water quality from the natural, unimpacted watershed.

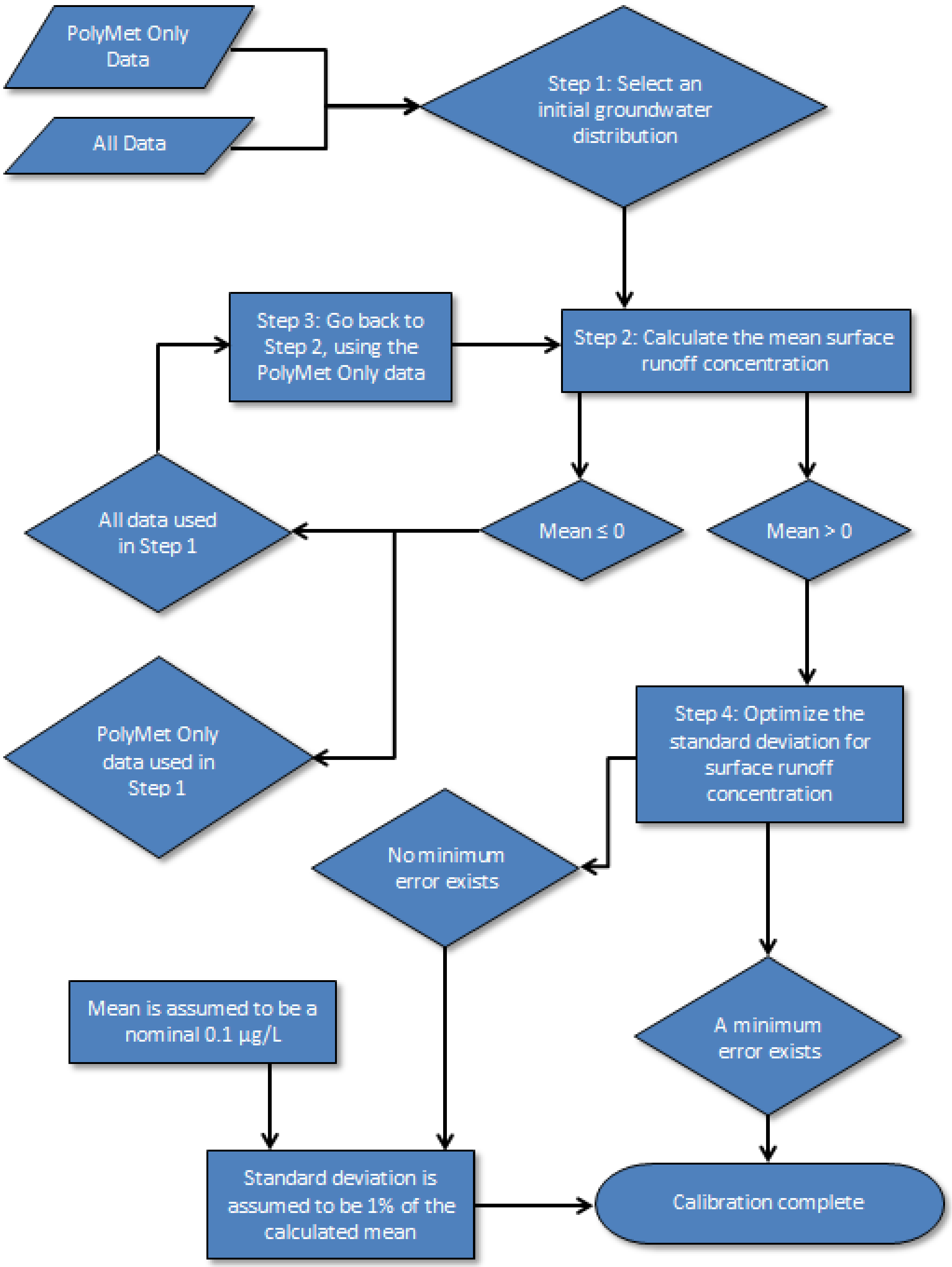


Figure 4 **Calibration Flow Chart**

Table 1 provides an example of calculating the groundwater distribution parameters α_{mean}, β, and α_{stdev} based on the 25 measured groundwater samples for manganese.

Table 1 Example data for calculating the groundwater distribution parameters using site-specific PolyMet Only data

Sample #	GW002 Conc. (µg/L)	GW002 ln(Conc.) (µg/L)	GW011 Conc. (µg/L)	GW011 ln(Conc.) (µg/L)	GW013 Conc. (µg/L)	GW013 ln(Conc.) (µg/L)	GW015 Conc. (µg/L)	GW015 ln(Conc.) (µg/L)
1	230	*5.44*	226	*5.42*	38.1	*3.64*	730	*6.59*
2	340	*5.83*	447	*6.10*	13.9	*2.63*	541	*6.29*
3	102	*4.62*	29.5	*3.38*	4.37	*1.47*	575	*6.35*
4	170	*5.14*	235	*5.46*	5.42	*1.69*	602	*6.40*
5	87.5	*4.47*	582	*6.37*	32.4	*3.48*	589	*6.38*
6	39.4	*3.67*	148	*5.00*	--	--	--	--
7	128	*4.85*	2140	*7.67*	--	--	--	--
8	59.6	*4.09*	--	--	--	--	--	--

The average of the natural logarithm of the sampled data is 4.90, which is the parameter α_{mean}. The standard deviation of the natural logarithm of the sampled data is 1.58, which is parameter β. The standard error of α_{mean} (α_{stdev}) is 0.316, which is calculated by dividing β by the square root of the number of samples (25). Each of these parameters is shown in Table 2 and Table 3 to describe the groundwater distribution based on PolyMet Only data.

All three parameters, α_{mean}, α_{stdev}, and β, are used to generate the long-term, site-wide average groundwater concentration in the model. First, the parameter α is randomly selected from a normal distribution with mean α_{mean} and standard deviation α_{stdev}. Second, the long-term, site-wide average groundwater concentration is calculated by using the randomly generated parameter α, and the constant parameter β using Eq. 1. The resulting concentration, *C*, is used to represent the quality of recharge to the surficial aquifer and the quality of groundwater in un-impacted areas.

$$C = e^{\left(\alpha + \frac{\beta^2}{2}\right)} \qquad \text{Eq. 1}$$

2.2 Results of Calibration Step 1

Table 2 details the background groundwater quality distribution parameters developed using each of the data sets considered: PolyMet Only data and PolyMet plus Regional data. The distribution chosen in Step 1 of the calibration process is also shown.

Table 2 Distribution parameters and the chosen groundwater distribution for Step 1 of the calibration process

	PolyMet Only (PolyMet) data				PolyMet + Regional (All) data				Distribution Chosen (Step 1)
Constituent	α_{mean}	α_{stdev}	β	Mean (µg/L)	α_{mean}	α_{stdev}	β	Mean (µg/L)	
Ag[(1)], Filtered	-2.303	0.000	0.000	**0.10**	-3.154	0.107	1.058	**0.07**	All
Al, Filtered	3.425	0.135	0.955	**48.5**	3.004	0.160	1.522	**64.1**	All
Alkalinity, Total	10.587	0.101	0.712	**51,056**	11.020	0.083	0.811	**84,874**	All
As, Filtered	-0.927	0.083	0.552	**0.46**	-0.686	0.147	1.182	**1.01**	All
B, Total	3.302	0.043	0.302	**28.4**	3.242	0.053	0.449	**28.3**	PolyMet
Ba, Filtered	3.225	0.235	1.307	**59.1**	3.400	0.166	1.193	**61.1**	All
Be, Total	-1.999	0.102	0.722	**0.18**	-2.619	0.152	1.282	**0.17**	PolyMet
Ca, Total	9.363	0.105	0.746	**15,378**	9.716	0.098	0.959	**26,266**	All
Cd, Filtered	-2.214	0.068	0.483	**0.12**	-2.244	0.134	1.329	**0.26**	All
Cl, Total	6.394	0.104	0.736	**784.4**	6.889	0.110	1.075	**1,748**	All
Co, Filtered	-2.149	0.109	0.606	**0.14**	-1.156	0.179	1.587	**1.11**	All
Cr, Filtered	-0.233	0.072	0.511	**0.90**	-0.592	0.109	1.082	**0.99**	All
Cu, Filtered	0.311	0.134	0.948	**2.14**	1.049	0.144	1.423	**7.86**	All
F, Total	4.297	0.090	0.634	**89.9**	4.686	0.082	0.776	**146.5**	All
Fe, Filtered	3.806	0.112	0.733	**58.8**	4.516	0.204	1.898	**553.7**	All
K, Total	6.982	0.113	0.796	**1,479**	7.068	0.095	0.932	**1,812**	All
Mg, Total	8.491	0.117	0.826	**6,853**	8.841	0.097	0.950	**10,849**	All
Mn, Total	4.289	0.299	2.114	**680.2**	4.562	0.211	2.062	**803. 2**	All
Na, Total	7.983	0.081	0.575	**3,458**	8.210	0.067	0.660	**4,572**	All
Ni, Filtered	0.074	0.116	0.823	**1.51**	0.766	0.119	1.181	**4.32**	All
Pb, Filtered	-1.380	0.006	0.033	**0.25**	-0.993	0.173	1.540	**1.21**	All
Sb, Total	-1.352	0.034	0.241	**0.27**	-2.329	0.191	1.611	**0.36**	All
Se, Filtered	-0.725	0.032	0.228	**0.50**	-0.467	0.084	0.704	**0.80**	All
SO4, Total	8.757	0.077	0.542	**7,357**	8.568	0.148	1.439	**14,809**	All

	PolyMet Only (PolyMet) data				PolyMet + Regional (All) data				Distribution Chosen (Step 1)
Constituent	α_{mean}	α_{stdev}	β	Mean (µg/L)	α_{mean}	α_{stdev}	β	Mean (µg/L)	
Tl, Total	-2.333	0.149	1.052	**0.17**	-3.266	0.204	1.719	**0.17**	PolyMet
V, Total	--	--	--	**--**	1.66	0.046	0.24	**5.41**	All
Zn, Filtered	1.492	0.082	0.581	**5.26**	1.976	0.116	1.143	**13.9**	All

(1) Even though, according to Step 1, the distribution chosen should be the PolyMet distribution because of the higher mean, the distribution based on All data was chosen because there was zero variability in the PolyMet data. A distribution with variability could not be formed based on the PolyMet data alone.

2.3 Calibration by Constituent

The following sections describe the calibration process in detail for each constituent. Table 3 is a summary of the calibration of the existing natural watersheds at the Plant Site, including the groundwater distribution chosen for calibration after Step 3 of the calibration process.

Table 3 **Summary of the parameters used in the GoldSim model to represent existing natural surface runoff quality and groundwater quality**

	Existing Natural Groundwater					Existing Natural Surface Runoff		
Constituent	GW Data Source	α_{mean}	α_{stdev}	β	Mean (µg/L)	Min. Error Exists?	True Mean (µg/L)	True St. Dev. (µg/L)
Ag	All	-3.154	0.107	1.058	**0.07**	Yes	1.17E-01	7.9E-03
Al	All	3.004	0.160	1.522	**64.1**	Yes	1.12E+02	4.9E+01
Alkalinity	All	11.02	0.083	0.811	**84,874**	Yes	3.82E+04	4.8E+04
As	PolyMet	-0.927	0.083	0.552	**0.46**	Yes	1.76E+00	2.0E+00
B	PolyMet	3.302	0.043	0.302	**28.4**	Yes	1.96E+01	3.3E+00
Ba	PolyMet	3.225	0.235	1.307	**59.1**	No	4.58E+00	4.6E-02
Be	PolyMet	-1.999	0.102	0.722	**0.18**	No	7.35E-02	7.4E-04
Ca	All	9.716	0.098	0.959	**26,266**	Yes	9.47E+03	7.9E+03
Cd	PolyMet	-2.214	0.068	0.483	**0.12**	Yes	8.11E-02	6.3E-03
Cl	All	6.889	0.110	1.075	**1,748**	Yes	5.68E+03	2.9E+03
Co	PolyMet	-2.149	0.109	0.606	**0.14**	Yes	1.33E+00	1.0E+00
Cr	All	-0.592	0.109	1.082	**0.99**	Yes	7.22E-01	8.0E-01
Cu	PolyMet	0.311	0.134	0.948	**2.14**	Yes	7.55E-01	8.9E-01
F	All	4.686	0.082	0.776	**146.5**	Yes	8.51E+01	9.0E+01
Fe	PolyMet	3.806	0.112	0.733	**58.8**	Yes	5.56E+03	5.0E+03
K	All	7.068	0.095	0.932	**1,812**	Yes	8.48E+02	1.2E+03
Mg	All	8.841	0.097	0.950	**10,849**	Yes	4.84E+03	5.4E+03
Mn(1)	PolyMet	271	56	--	**271**	Yes	4.85E+02	8.0E+02
Na	All	8.210	0.067	0.660	**4,572**	Yes	3.30E+03	1.3E+03
Ni	All	0.766	0.119	1.181	**4.32**	No	4.18E-01	4.2E-03
Pb	PolyMet	-1.380	0.006	0.033	**0.25**	Yes	2.60E-01	1.5E-01
Sb	All	-2.329	0.191	1.611	**0.36**	No	2.11E-01	2.1E-03
Se	All	-0.467	0.084	0.704	**0.80**	Yes	4.55E-01	2.0E-01
SO4	PolyMet	8.757	0.077	0.542	**7,357**	Yes	4.79E+03	1.0E+04
Tl	PolyMet	-2.333	0.149	1.052	**0.17**	Yes	1.33E-02	1.2E-01
V(2)	All	1.660	0.046	0.239	**5.41**	No	1.45E-01	1.5E-03
Zn	All	1.976	0.116	1.143	**13.9**	Yes	6.58E+00	1.1E+01

(1) Manganese groundwater data did not fit a lognormal distribution as was assumed. The parameters α_{mean} and α_{stdev} represent the mean and standard deviation respectively of a normal distribution in units of µg/L; the parameter β is not used for manganese in groundwater.

(2) There is no V data from the PolyMet wells. The groundwater distribution is automatically based on All data.

2.3.1 Constituents Calibrated Using the Initial Groundwater Distribution

For several constituents, presented below, calibration was achieved using the initial groundwater distribution. For these solutes, a mean surface water concentration greater than 0 µg/L was calculated and the model was able to capture the mean and variability of observed surface water concentrations at PM-12.

2.3.1.1 Silver

There are 17 silver surface water samples at PM-12 and all of them are non-detects with different detection limits. Four samples from 2004 were removed because of a high detection limit (1 µg/L) to eliminate any artificial skew in the surface water data. Using all of the available data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for silver is an estimated 0.117 µg/L. Using this value, the means of the model estimates and the monitoring data match at 0.106 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For silver, the optimized standard deviation of surface runoff concentration is 0.0079 µg/L. The surface water standard for silver is 1 µg/L.

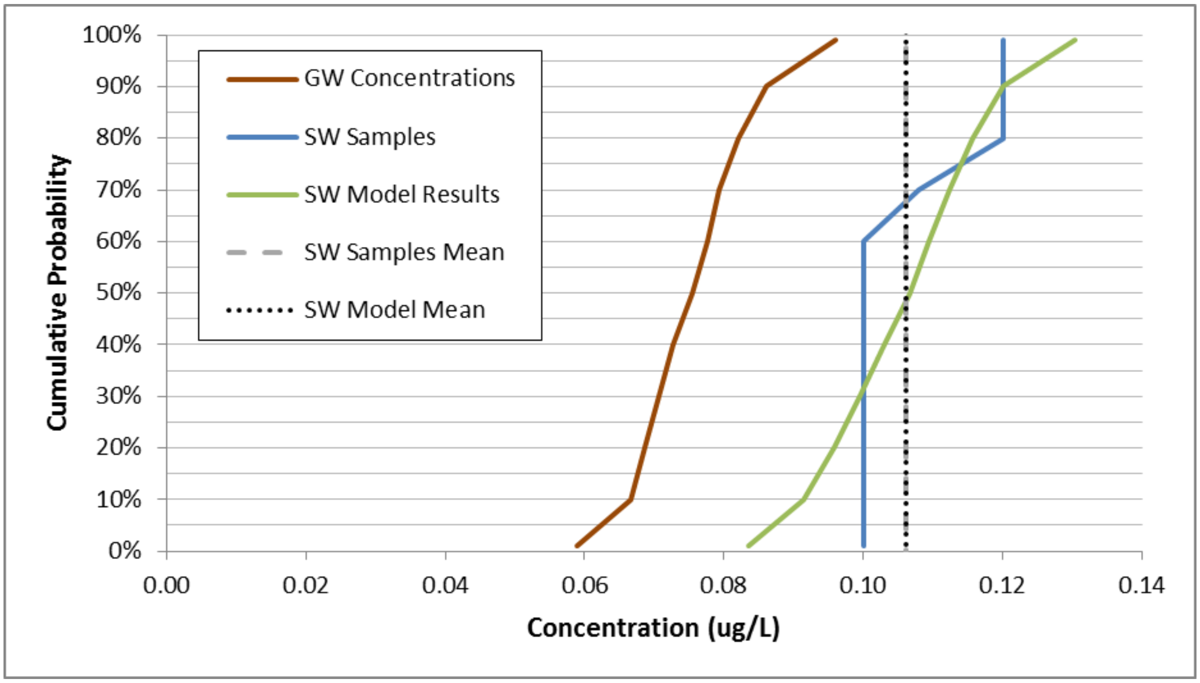


Figure 5 **Surface runoff concentration calibration for Silver**

This is considered to be an acceptable calibration of silver concentrations at PM-12.

2.3.1.2 Aluminum

There are 40 samples of aluminum at PM-12 and all of them were detected. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for aluminum is an estimated 112 µg/L. Using this value, the means of the model estimates and the monitoring data match at 100 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For aluminum, the optimized standard deviation of surface runoff concentration is 49 µg/L. The surface water standard for aluminum is 125 µg/L.

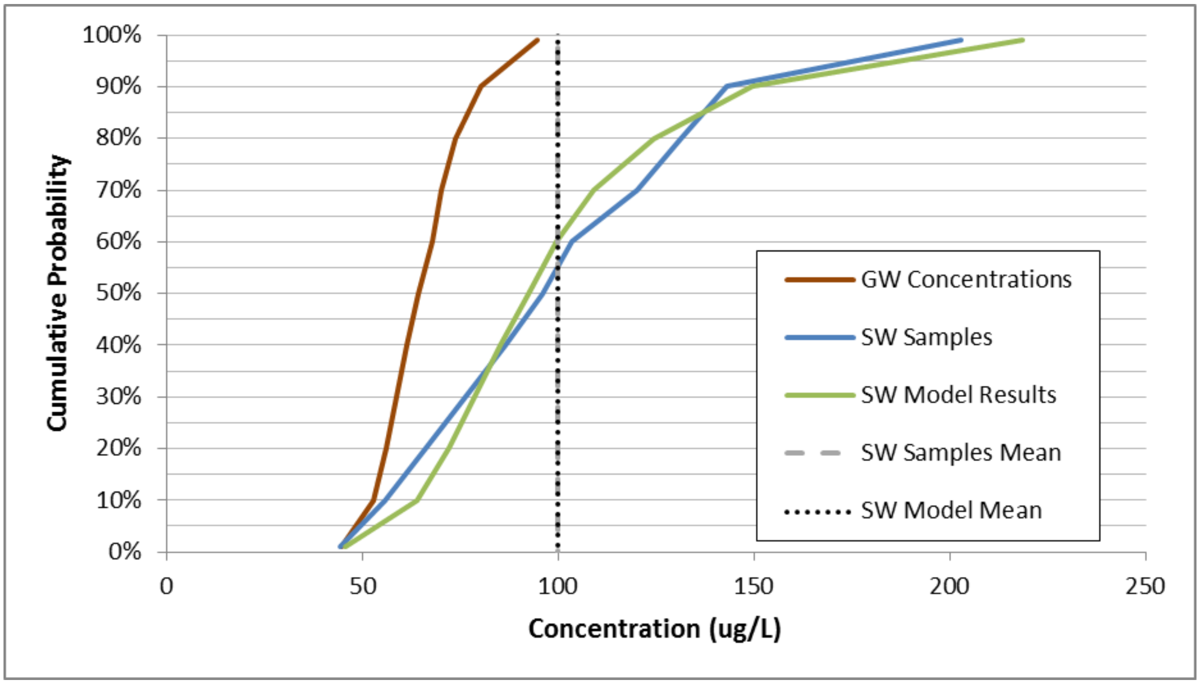


Figure 6 Surface runoff concentration calibration for Aluminum

This is considered to be an acceptable calibration of aluminum concentrations at PM-12.

2.3.1.3 Alkalinity (total, as $CaCO_3$)

There are 33 samples of alkalinity at PM-12 and all of them were detected. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for alkalinity is an estimated 38.2 mg/L. Using this value, the means of the model estimates and the monitoring data match at 50.3 mg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For alkalinity, the optimized standard deviation of surface runoff concentration is 48 mg/L. There is no surface water standard for alkalinity.

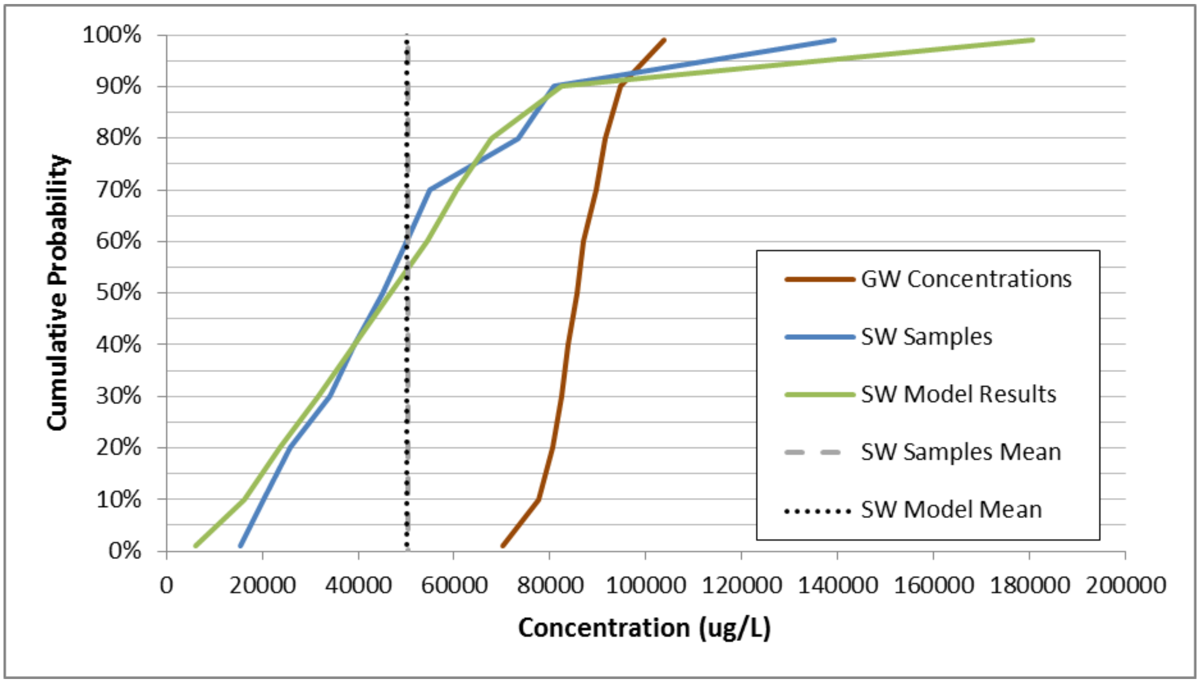


Figure 7 Surface runoff concentration calibration for Alkalinity

This is considered to be an acceptable calibration of total alkalinity as $CaCO_3$ at PM-12.

2.3.1.4 Boron

There are 13 boron surface water samples at PM-12 and all of them are non-detects with different detection limits. One sample from 2013 was removed because of a high detection limit (100 µg/L) to eliminate any artificial skew in the surface water data. Using only the PolyMet data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for boron is an estimated 19.6 µg/L. Using this value, the means of the model estimates and the monitoring data match at 21.9 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For boron, the optimized standard deviation of surface runoff concentration is 3.3 µg/L. The surface water standard for boron is 500 µg/L.

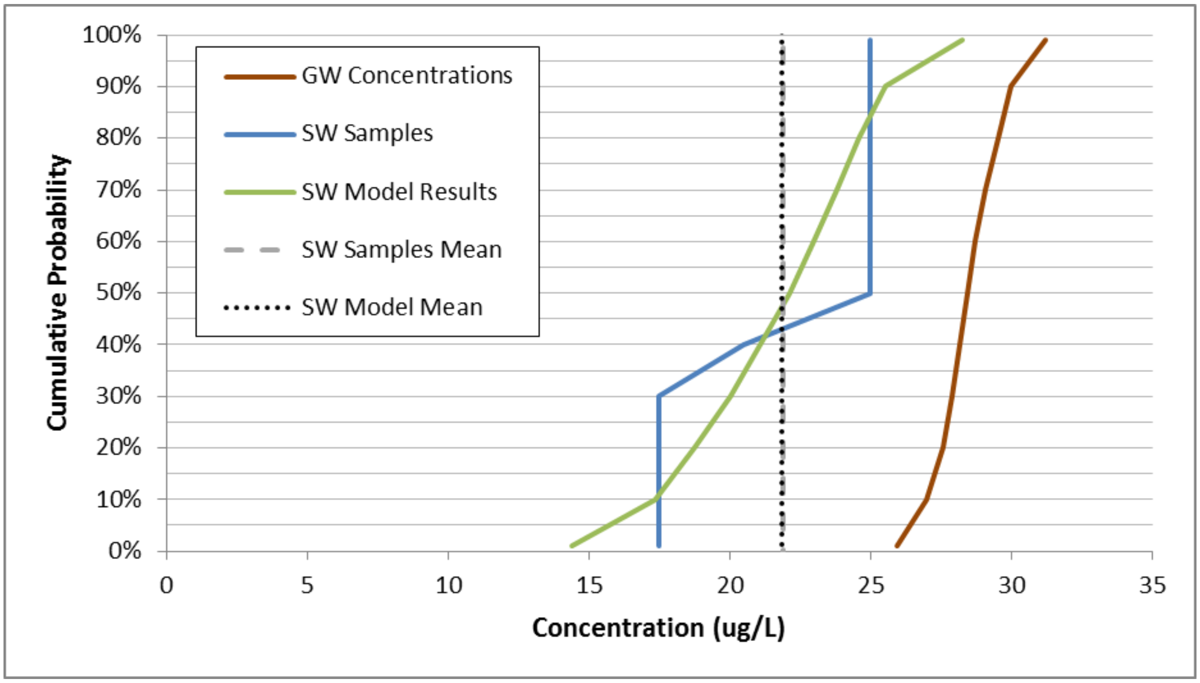


Figure 8 Surface runoff concentration calibration for Boron

This is considered to be an acceptable calibration of boron concentrations at PM-12.

2.3.1.5 Beryllium

There are 12 beryllium surface water samples at PM-12 and all of them are non-detects with the same detection limit of 0.2 µg/L. Using the PolyMet Only data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for beryllium is estimated as 0.0735 µg/L. Using this value, the means of the model estimates and the monitoring data match at 0.100 µg/L. There is no surface water standard for beryllium.

No minimum error was found when the standard deviation of surface runoff concentration was attempted to be optimized. This is because, even with no variability in the input for surface runoff concentration, there is more variation in model results at PM-12 than has been sampled at that location. Therefore, the standard deviation of surface runoff concentration was set at 0.00074 µg/L, which is 1% of the optimal mean concentration.

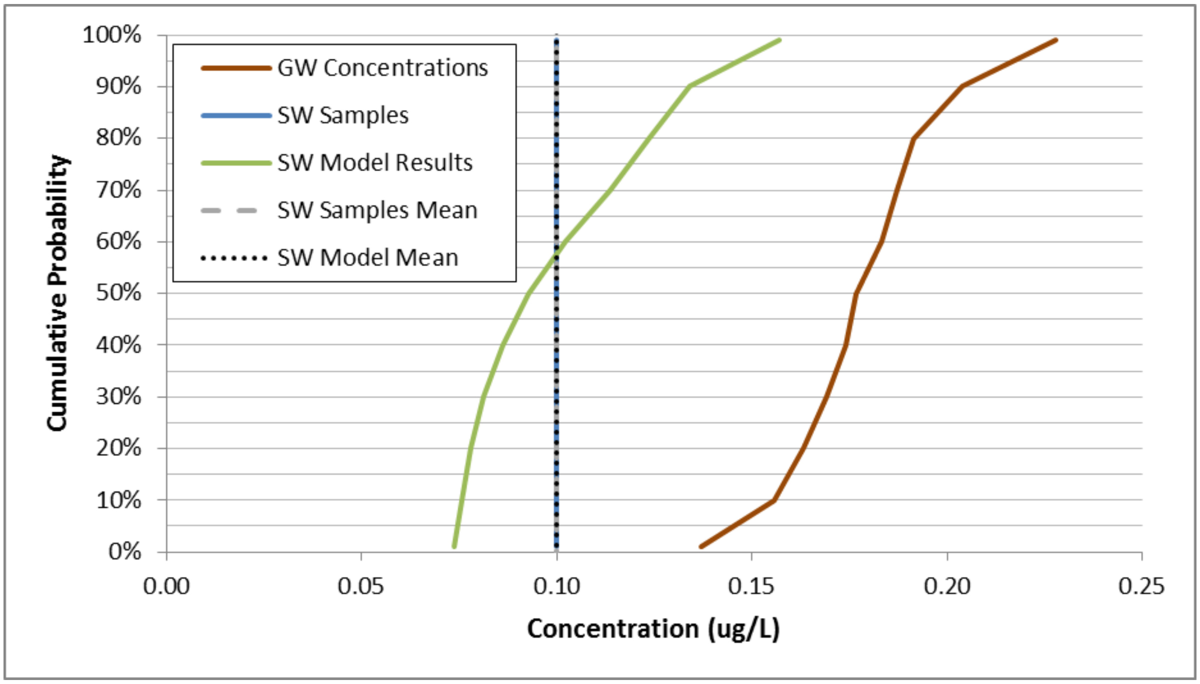


Figure 9 Surface runoff concentration calibration for Beryllium

This is considered to be an acceptable calibration of beryllium concentrations at PM-12.

2.3.1.6 Calcium

There are 46 calcium samples at PM-12, all of which had calcium detected. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for calcium is an estimated 9.47 mg/L. Using this value, the means of the model estimates and the monitoring data match at 13.8 mg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For calcium, the optimized standard deviation of surface runoff concentration is 7.9 mg/L. There is no surface water standard for calcium.

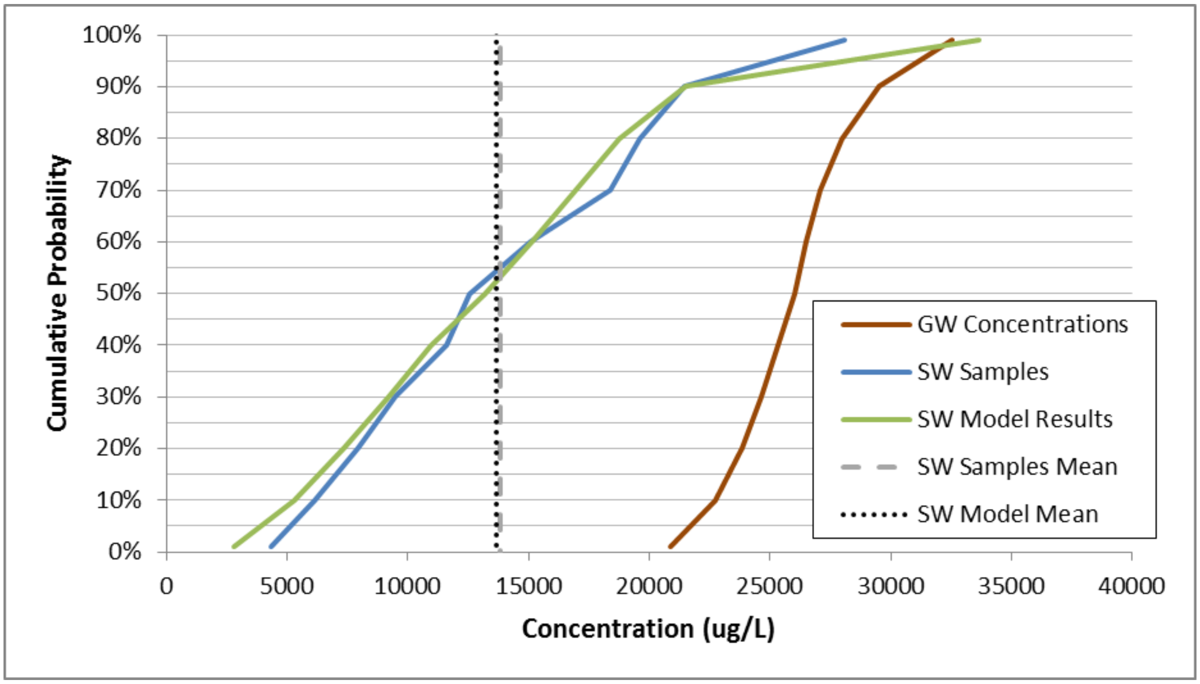


Figure 10 Surface runoff concentration calibration for Calcium

This is considered to be an acceptable calibration of calcium concentrations at PM-12.

2.3.1.7 Chloride

There are 61 samples of chloride at PM-12 and all of them were detected. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for chloride is an estimated 5.68 mg/L. Using this value, the means of the model estimates and the monitoring data match 4.67 mg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For chloride, the optimized standard deviation of surface runoff concentration is 2.9 mg/L. The surface water standard for chloride is 230 mg/L.

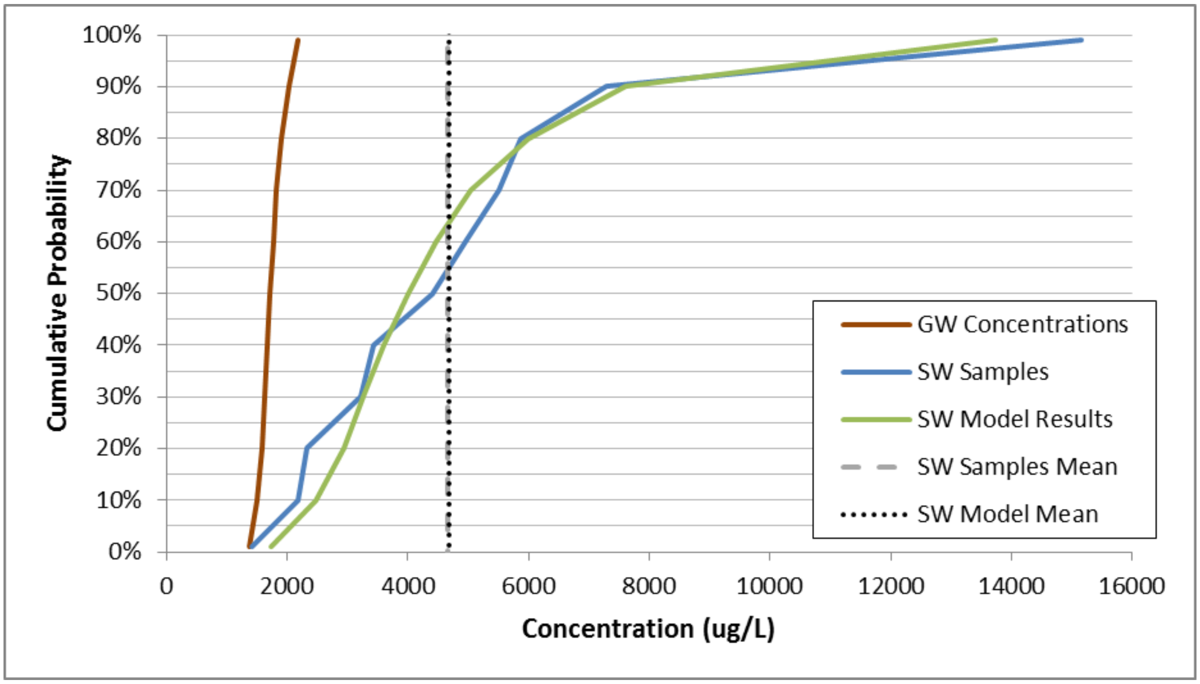


Figure 11 Surface runoff concentration calibration for Chloride

This is considered to be an acceptable calibration of chloride concentrations at PM-12.

2.3.1.8 Chromium

There are 15 samples of chromium at PM-12, 10 of which are non-detects. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for chromium is an estimated 0.722 µg/L. Using this value, the means of the model estimates and the monitoring data match at 0.79 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For chromium, the optimized standard deviation of surface runoff concentration is 0.80 µg/L. The surface water standard for chromium is 11 µg/L.

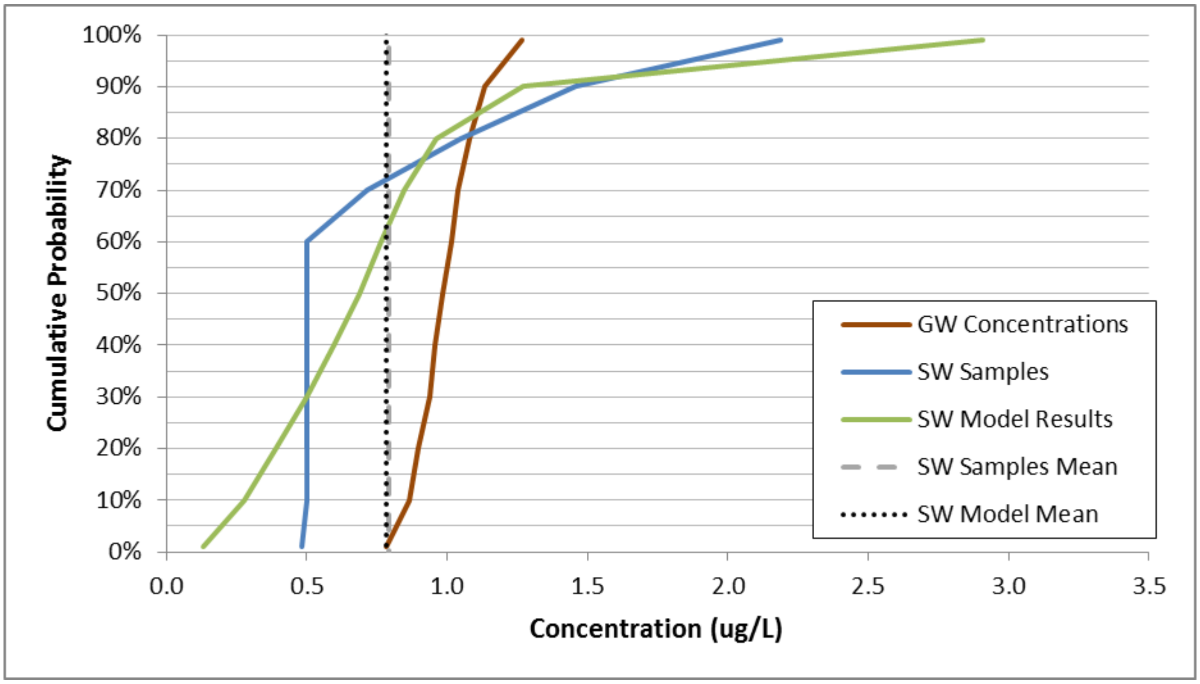


Figure 12 Surface runoff concentration calibration for Chromium

This is considered to be an acceptable calibration of chromium concentrations at PM-12.

2.3.1.9 Fluoride

There are 21 samples of fluoride at PM-12, 10 of which are non-detects. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for fluoride is an estimated 85.1 µg/L. Using this value, the means of the model estimates and the monitoring data match at 101 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For fluoride, the optimized standard deviation of surface runoff concentration is 90 µg/L. There is no surface water standard for fluoride.

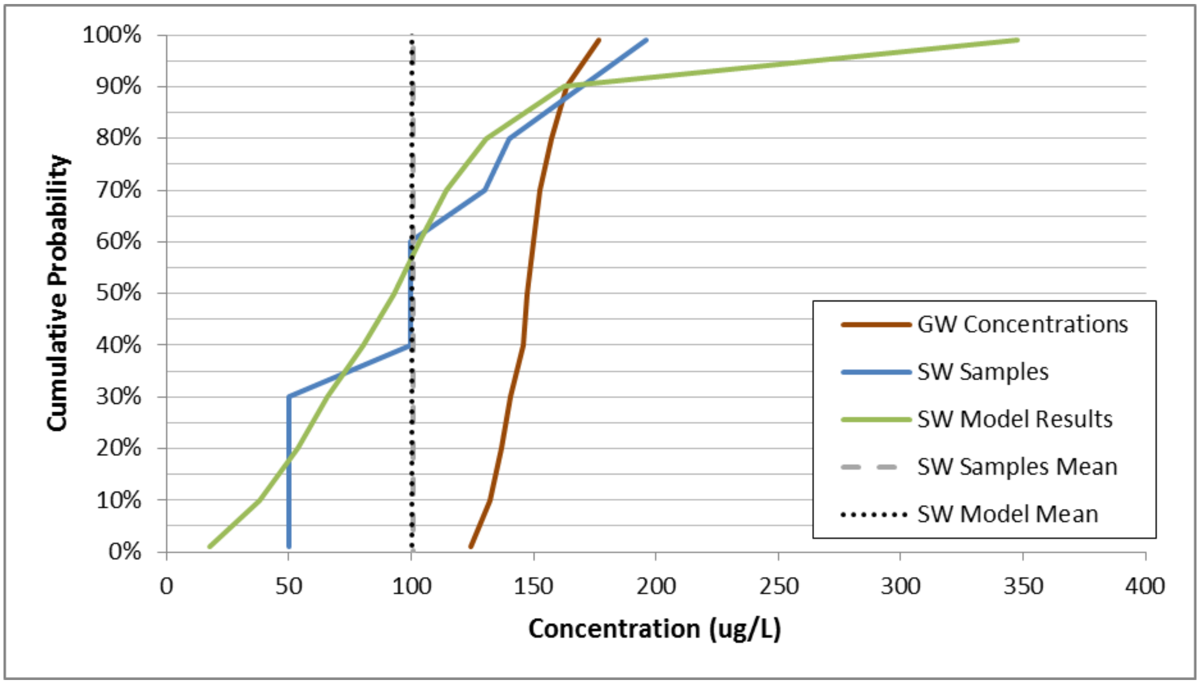


Figure 13 Surface runoff concentration calibration for Fluoride

This is considered to be an acceptable calibration of fluoride concentrations at PM-12.

2.3.1.10 Potassium

There are 15 samples of potassium at PM-12, 2 of which are non-detects with a detection limit of 500 µg/L. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for potassium is an estimated 848 µg/L. Using this value, the means of the model estimates and the monitoring data match at 1,100 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For potassium, the optimized standard deviation of surface runoff concentration is 1,200 µg/L. There is no surface water standard for potassium.

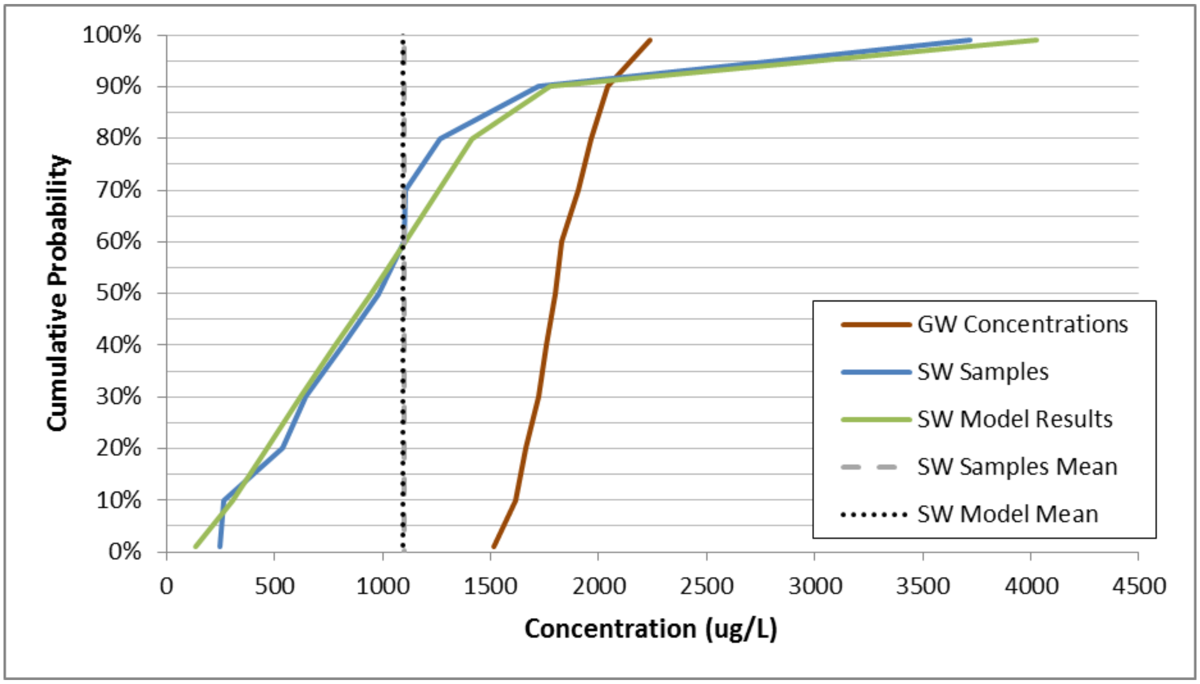


Figure 14 Surface runoff concentration calibration for Potassium

This is considered to be an acceptable calibration of potassium concentrations at PM-12.

2.3.1.11 Magnesium

There are 46 samples at PM-12, all of which had magnesium detected. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for magnesium is an estimated 4.84 mg/L. Using this value, the means of the model estimates and the monitoring data match at 6.40 mg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For magnesium, the optimized standard deviation of surface runoff concentration is 5.40 mg/L. There is no surface water standard for magnesium.

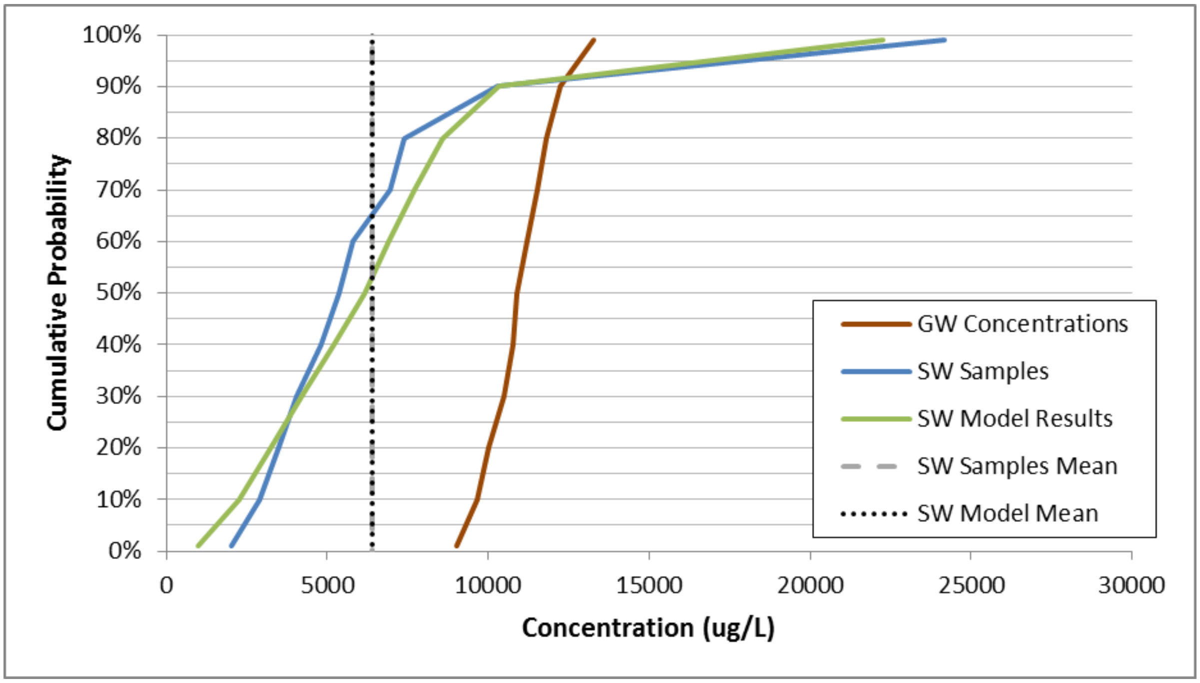


Figure 15 Surface runoff concentration calibration for Magnesium

This is considered to be an acceptable calibration of magnesium concentrations at PM-12.

2.3.1.12 Sodium

There are 17 samples of sodium at PM-12 with zero non-detects. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for sodium is estimated as 3.30 mg/L. Using this value, the means of the model estimates and the monitoring data match at 3.63 mg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For sodium, the optimized standard deviation of surface runoff concentration is 1.3 mg/L. There is no surface water standard for sodium.

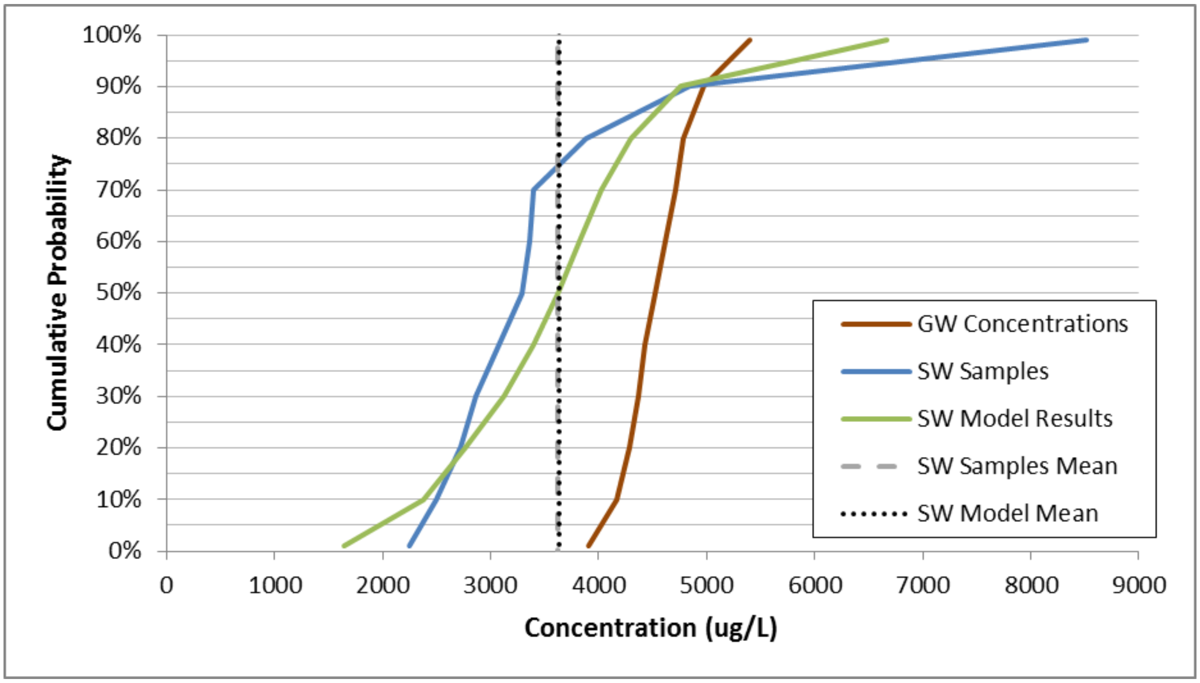


Figure 16 Surface runoff concentration calibration for Sodium

This is considered to be an acceptable calibration of sodium concentrations at PM-12.

2.3.1.13 Nickel

There are 46 nickel samples at PM-12, five of which are non-detects at multiple detection limits. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for nickel is an estimated 0.418 µg/L. Using this value, the means of the model estimates and the monitoring data match at 1.43 µg/L. The surface water standard for nickel is hardness based and, assuming a hardness of 100 mg/L, the standard is about 52 µg/L.

No minimum error was found when the standard deviation of surface runoff concentration was attempted to be optimized. This is because, even with no variability in the input for surface runoff concentration, there is more variation in model results at PM-12 than has been sampled at that location. Therefore, the standard deviation of surface runoff concentration was set at 0.0042 µg/L, which is 1% of the optimal mean concentration.

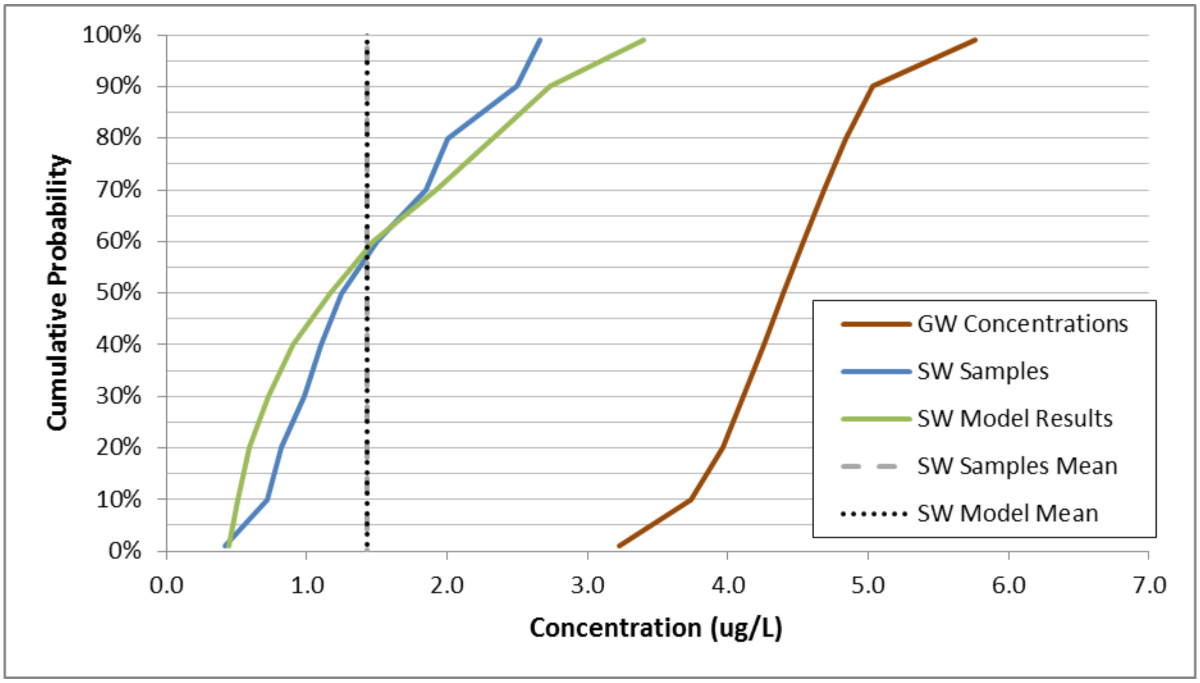


Figure 17 Surface runoff concentration calibration for Nickel

This is considered to be an acceptable calibration of nickel concentrations at PM-12.

2.3.1.14 Antimony

There are 19 samples for antimony at PM-12, all of which were non-detects with different detection limits. Four non-detect samples were removed with a higher detection limit of 3 µg/L. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for antimony is an estimated 0.211 µg/L. Using this value, the means of the model estimates and the monitoring data match at 0.25 µg/L. The surface water standard for antimony is 31 µg/L.

No minimum error was found when the standard deviation of surface runoff concentration was attempted to be optimized. This is because, even with no variability in the input for surface runoff concentration, there is more variation in model results at PM-12 than has been sampled at that location. Therefore, the standard deviation of surface runoff concentration was set at 0.0021 µg/L, which is 1% of the optimal mean concentration.

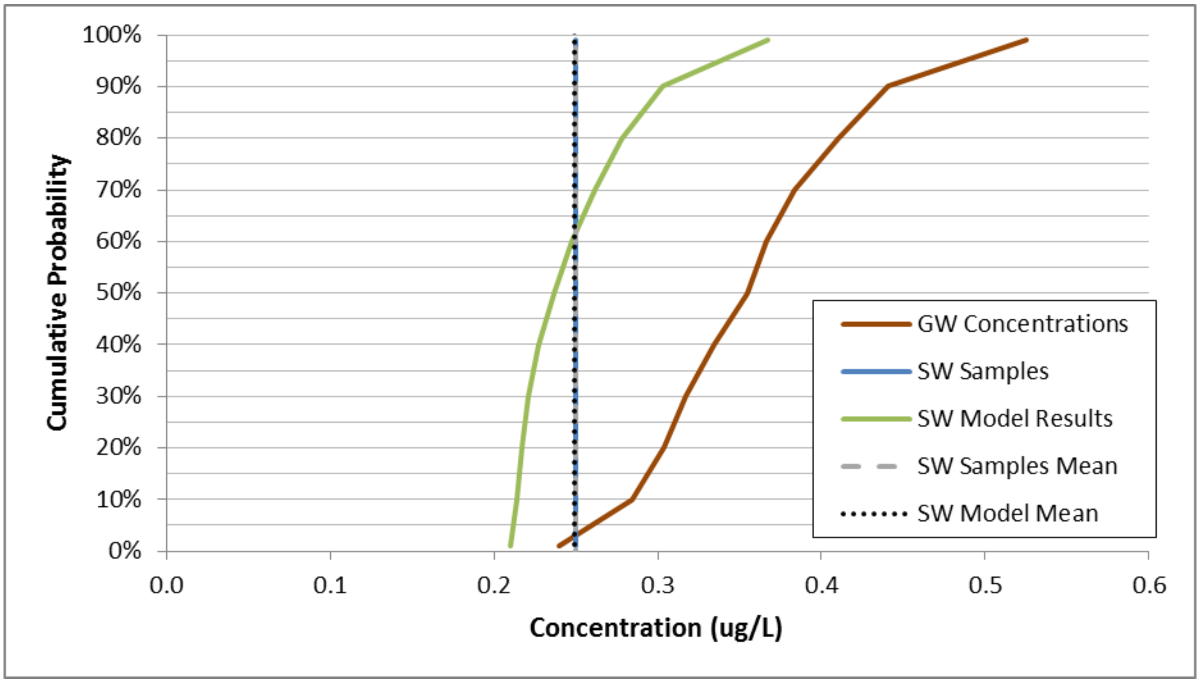


Figure 18 Surface runoff concentration calibration for Antimony

This is considered to be an acceptable calibration of antimony concentrations at PM-12.

2.3.1.15 Selenium

There are 29 samples of selenium at PM-12, 28 of which are non-detects. The one sample that was detected is 0.085 µg/L. Five samples with high detection limits (one at 10 µg/L and four at 3.6 µg/L) were eliminated from the surface water data to remove any artificial skew in the surface water calibration. Using all of the available groundwater data to describe the initial groundwater quality, the optimal mean surface runoff concentration for selenium is an estimated 0.455 µg/L. Using this value, the means of the model estimates and the monitoring data match at 0.545 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For selenium, the optimized standard deviation of surface runoff concentration is 0.20 µg/L. The surface water standard for selenium is 5 µg/L.

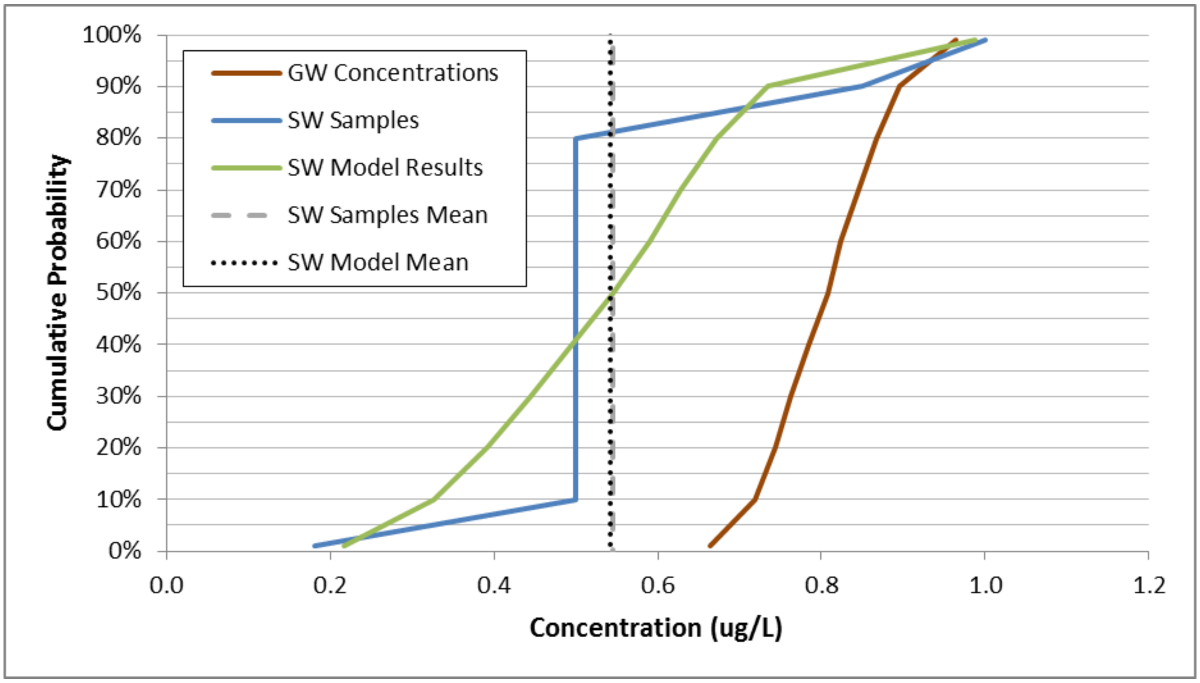


Figure 19 Surface runoff concentration calibration for Selenium

This is considered to be an acceptable calibration of selenium concentrations at PM-12.

2.3.1.16 Thallium

There are 28 samples of thallium, 20 of which are non-detects. Four of the samples from 2004 were ignored because of a high detection limit of 2 µg/L. Using the PolyMet Only groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for thallium is an estimated 0.0133 µg/L. Using this value, the means of the model estimates and the monitoring data match at 0.054 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For thallium, the optimized standard deviation of surface runoff concentration is 0.12 µg/L. The surface water standard for thallium is 0.56 µg/L.

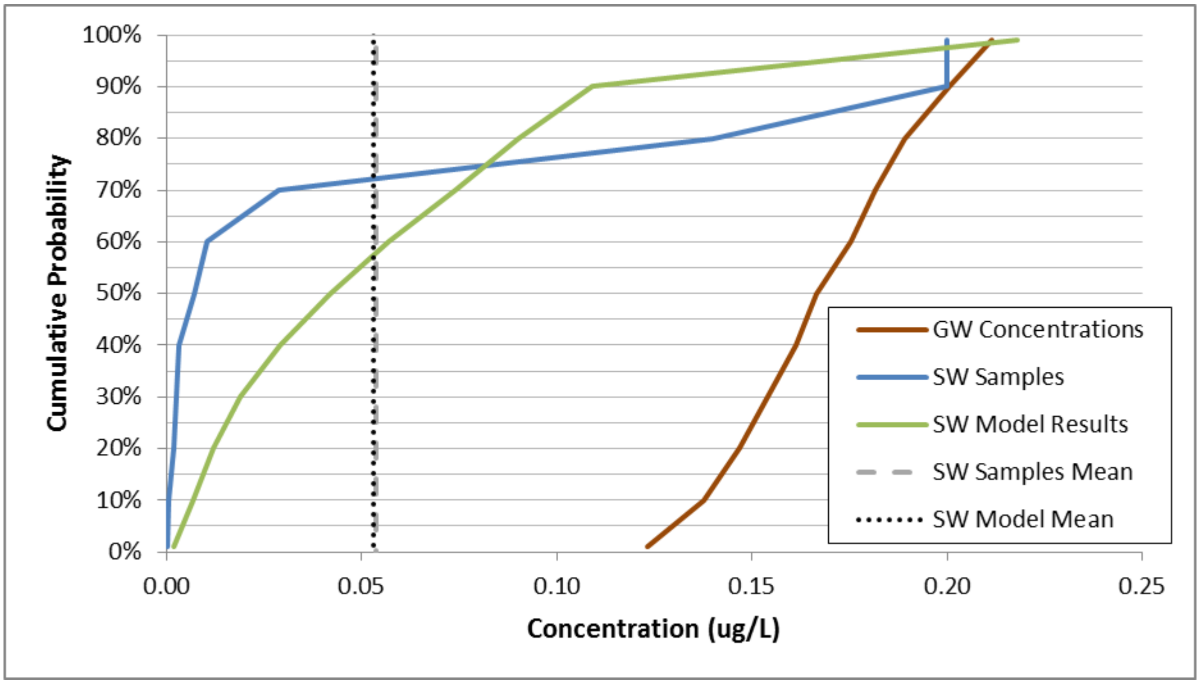


Figure 20 Surface runoff concentration calibration for Thallium

This is considered to be an acceptable calibration of thallium concentrations at PM-12.

2.3.1.17 Vanadium

Vanadium was not previously calibrated because there was no available surface water quality vanadium data at PM-12. Quarterly sampling began in June, 2012. There are six samples of vanadium, all of which are non-detects with a detection limit of 3.0 µg/L. Using all of the available data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for vanadium is an estimated 0.145 µg/L. Using this value, the means of the model estimates and the monitoring data match at 1.5 µg/L. There is no surface water standard for vanadium.

No minimum error was found when the standard deviation of surface runoff concentration was attempted to be optimized. This is because, even with no variability in the input for surface runoff concentration, there is more variation in model results at PM-12 than has been sampled at that location. Therefore, the standard deviation of surface runoff concentration was set at 0.0015 µg/L, which is 1% of the optimal mean concentration.

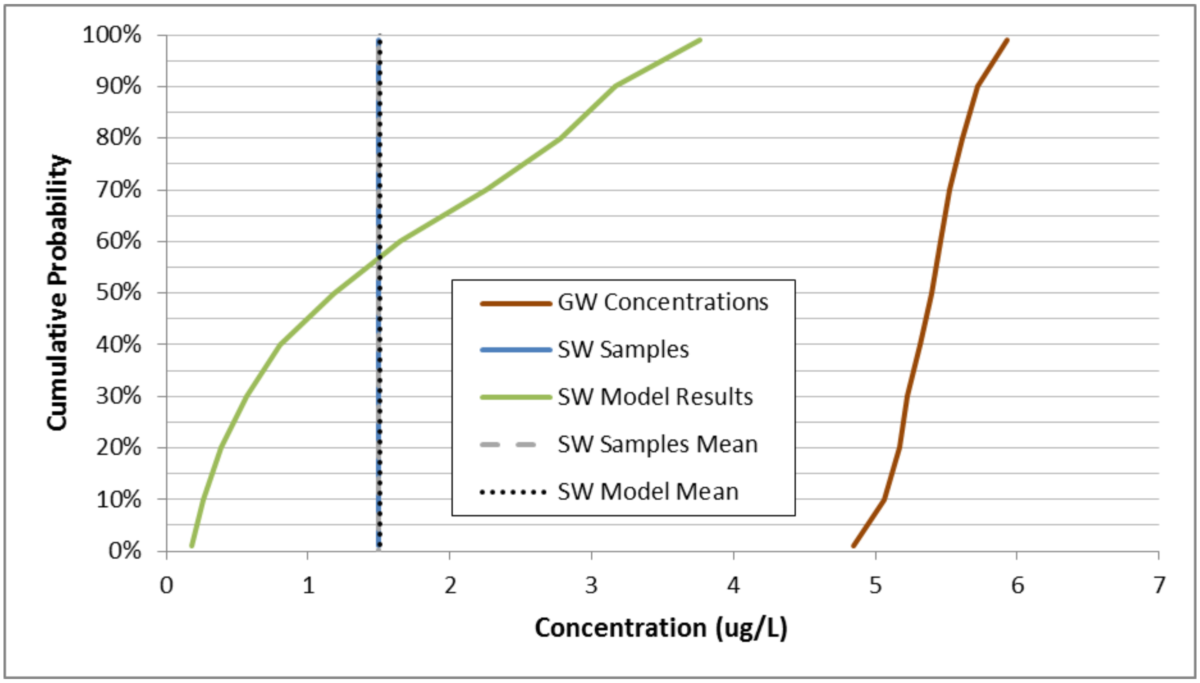


Figure 21 Surface runoff concentration calibration for Thallium

This is considered to be an acceptable calibration of vanadium concentrations at PM-12.

2.3.1.18 Zinc

There are 46 samples of zinc at PM-12, 34 of which are non-detects. Using all of the available groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for zinc is an estimated 6.58 µg/L. Using this value, the means of the model estimates and the monitoring data match at 8.48 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For zinc, the optimized standard deviation of surface runoff concentration is 11 µg/L. The surface water standard for zinc is hardness based and, assuming a hardness of 100 mg/L, the standard is about 120 µg/L.

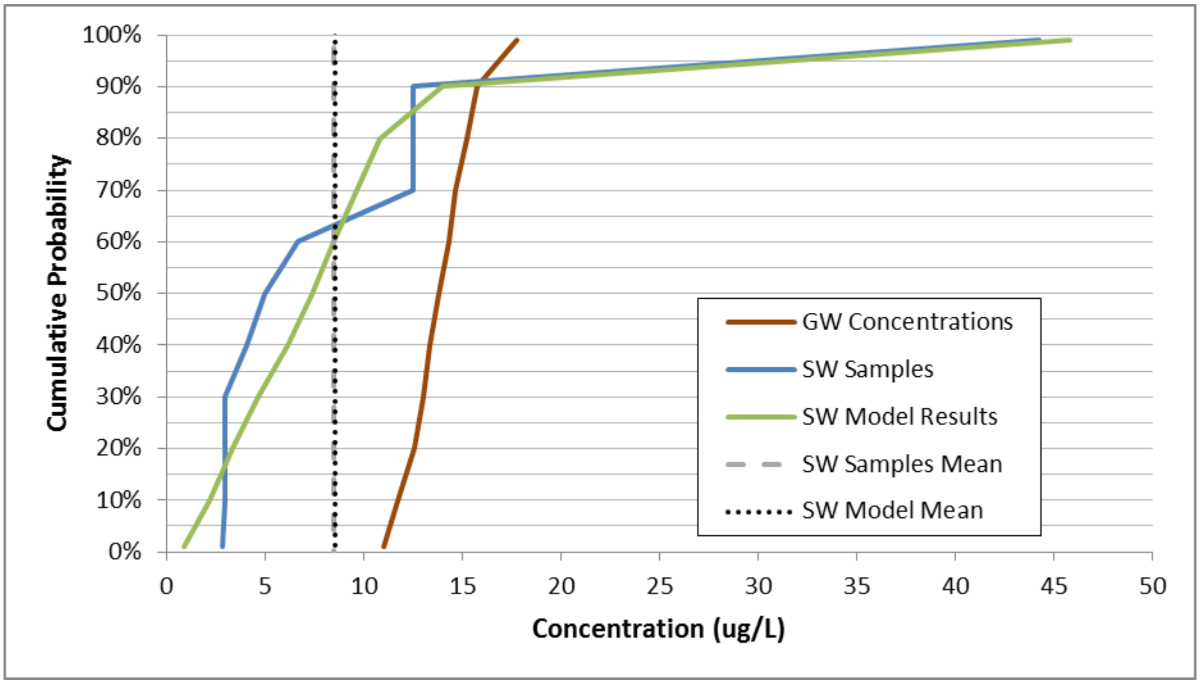


Figure 22 Surface runoff concentration calibration for Zinc

This is considered to be an acceptable calibration of zinc concentrations at PM-12.

2.3.2 Constituents Requiring the Site-Specific PolyMet Only Groundwater Distribution

For some constituents, use of the initial, more conservative, groundwater distribution developed in Step 1 based on the PolyMet plus Regional data resulted in an optimal mean surface runoff concentration of less than or equal to 0 µg/L, which is unrealistic. For these solutes, the groundwater distribution developed using the PolyMet Only data was used instead and a new optimal mean surface runoff concentration was calculated. For these constituents, the model was then able to capture the mean and variability of observed surface water concentrations at PM-12.

2.3.2.1 Arsenic

There are 25 surface water samples of arsenic at PM-12 and six of them are non-detects with different detection limits. One sample was eliminated because of a high detection limit of 10 µg/L. Using all of the available filtered PolyMet groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for arsenic is estimated as 1.76 µg/L. Using this value, the means of the model estimates and the monitoring data match at 1.43 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For arsenic, the optimized standard deviation of surface runoff concentration is 2.0 µg/L. The surface water standard for arsenic is 53 µg/L.

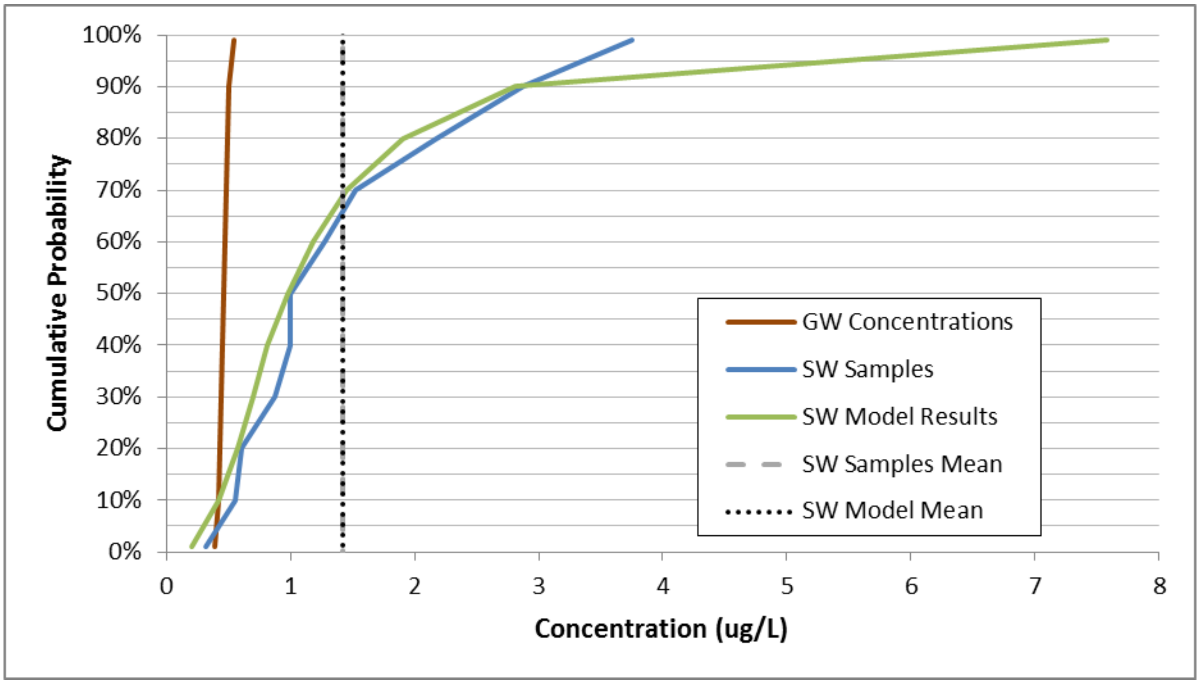


Figure 23 Surface runoff concentration calibration for Arsenic

This is considered to be an acceptable calibration of arsenic concentrations at PM-12.

2.3.2.2 Barium

There are 15 samples of barium at PM-12, four of which were non-detects with different detection limits. Using all of the available filtered PolyMet groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for barium is an estimated 4.58 µg/L. Using this value, the means of the model estimates and the monitoring data match at 19.0 µg/L. There is no surface water standard for barium.

No minimum error was found when the standard deviation of surface runoff concentration was attempted to be optimized. This is because, even with no variability in the input for surface runoff concentration, there is more variation in model results at PM-12 than has been sampled at that location. Therefore, the standard deviation of surface runoff concentration was set at 0.046 µg/L, which is 1% of the optimal mean concentration.

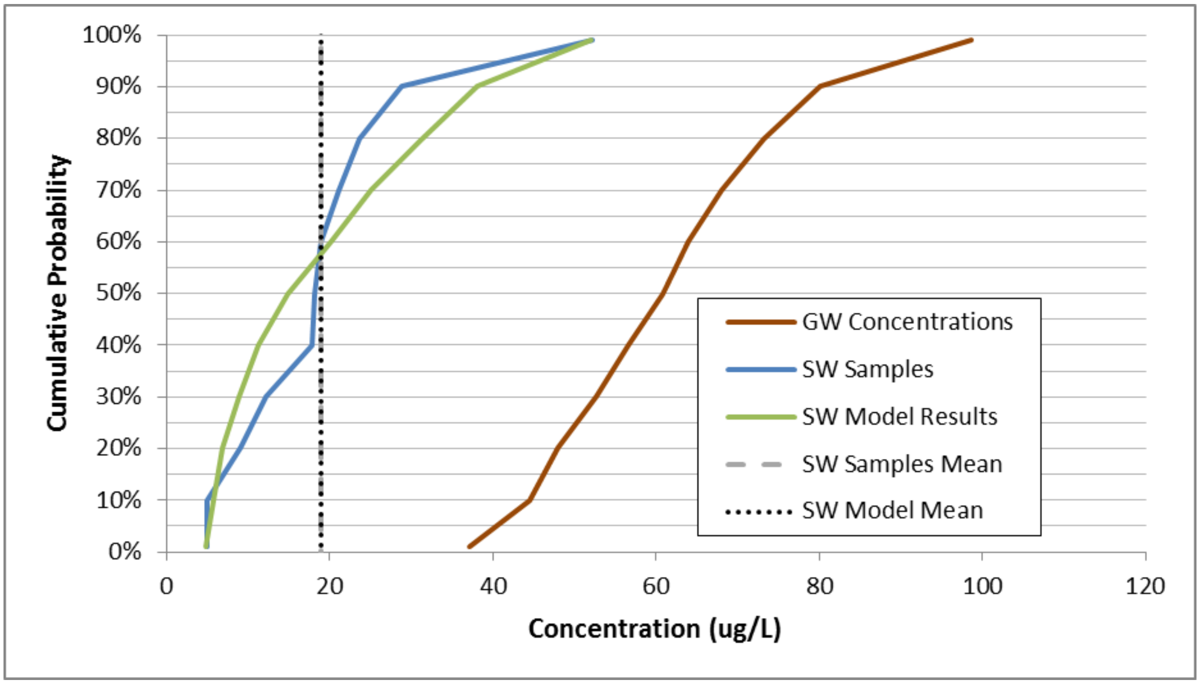


Figure 24 Surface runoff concentration calibration for Barium

This is considered to be an acceptable calibration of barium concentrations at PM-12.

2.3.2.3 Cadmium

Using all of the available groundwater data to describe the initial groundwater distribution, the optimal mean concentration of surface runoff was less than 0 µg/L. A surface runoff concentration of 0 µg/L is not a realistic value. Therefore, the groundwater distribution derived using the PolyMet Only data was selected for use in the model.

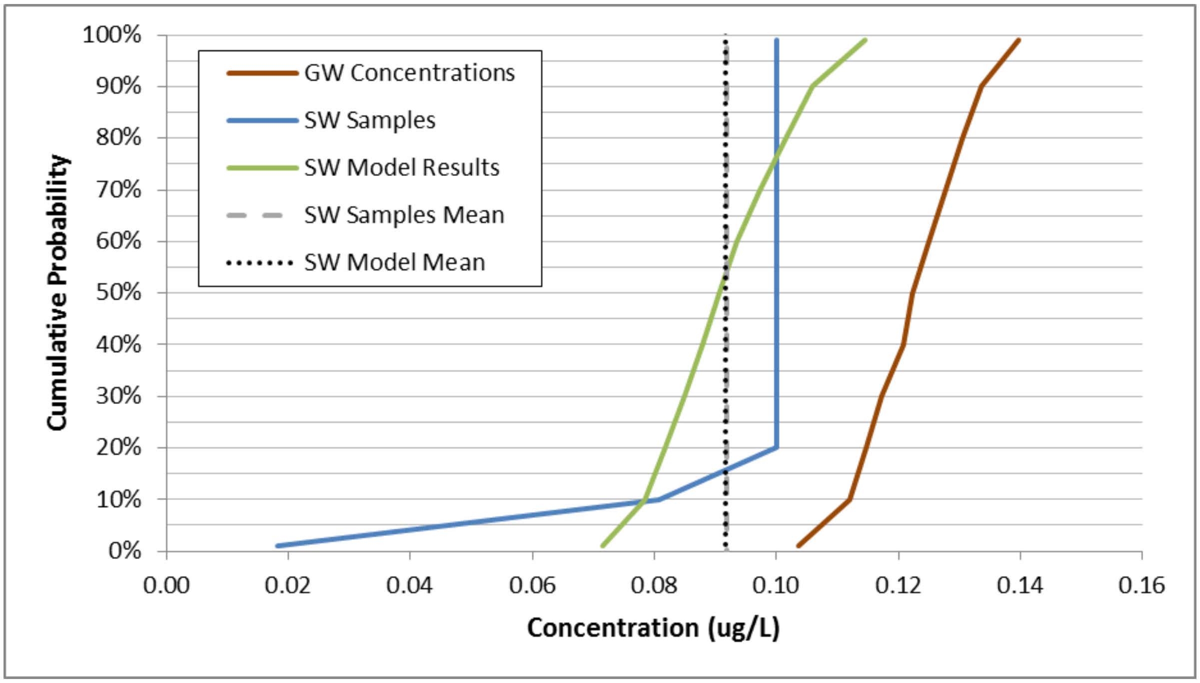


Figure 25 Surface runoff concentration calibration for Cadmium

There are 15 samples of cadmium at PM-12, 14 of which are non-detects with different detection limits. Using all of the available filtered PolyMet groundwater data to describe the initial groundwater quality distribution, the surface runoff concentration for cadmium is estimated as 0.0811 µg/L (Figure 25). Using this value, the means of the model estimates and the monitoring data match at 0.092 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For cadmium, the optimized standard deviation of surface runoff concentration is 0.0063 µg/L. The surface water standard for cadmium is hardness based and, assuming a hardness of 100 mg/L, the standard is about 2.5 µg/L. This is considered to be an acceptable calibration of cadmium concentrations at PM-12.

2.3.2.4 Cobalt

There are 44 samples of cobalt at PM-12, 21 of which are non-detects. Using all of the available filtered PolyMet groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for cobalt is an estimated 1.33 μg/L. Using this value, the means of the model estimates and the monitoring data match at 1.02 μg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. However, for cobalt, the optimized standard deviation of surface runoff concentration did not capture the range well and overestimated the upper percentiles. Therefore, an intermediate value of 1.0 μg/L was used for the standard deviation of surface runoff concentration to properly capture the full range of observed data and avoid from significantly overestimating percentiles above 90%. The surface water standard for cobalt is 5 μg/L.

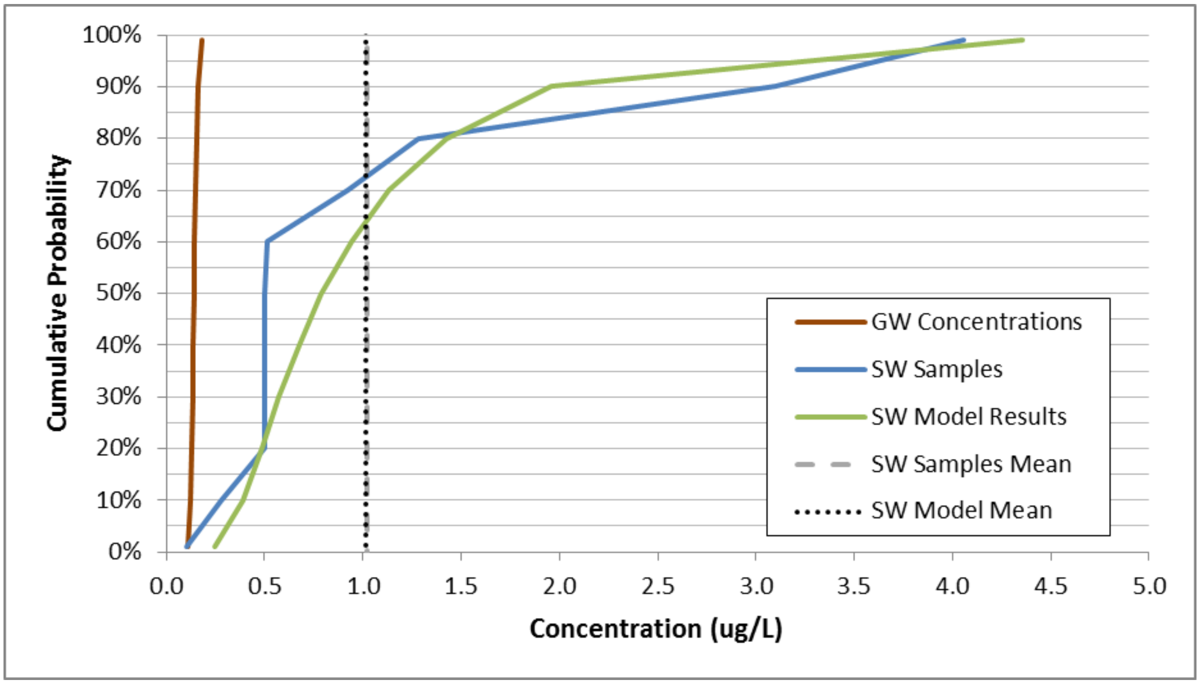


Figure 26 Surface runoff calibration for Cobalt

This is considered to be an acceptable calibration of cobalt concentrations at PM-12.

2.3.2.5 Copper

Using all of the available groundwater data to describe the initial groundwater distribution, the optimal mean concentration of surface runoff was less than 0 µg/L. A surface runoff concentration of 0 µg/L is not a realistic value. Therefore, the groundwater distribution derived using the PolyMet Only data was selected for use in the model.

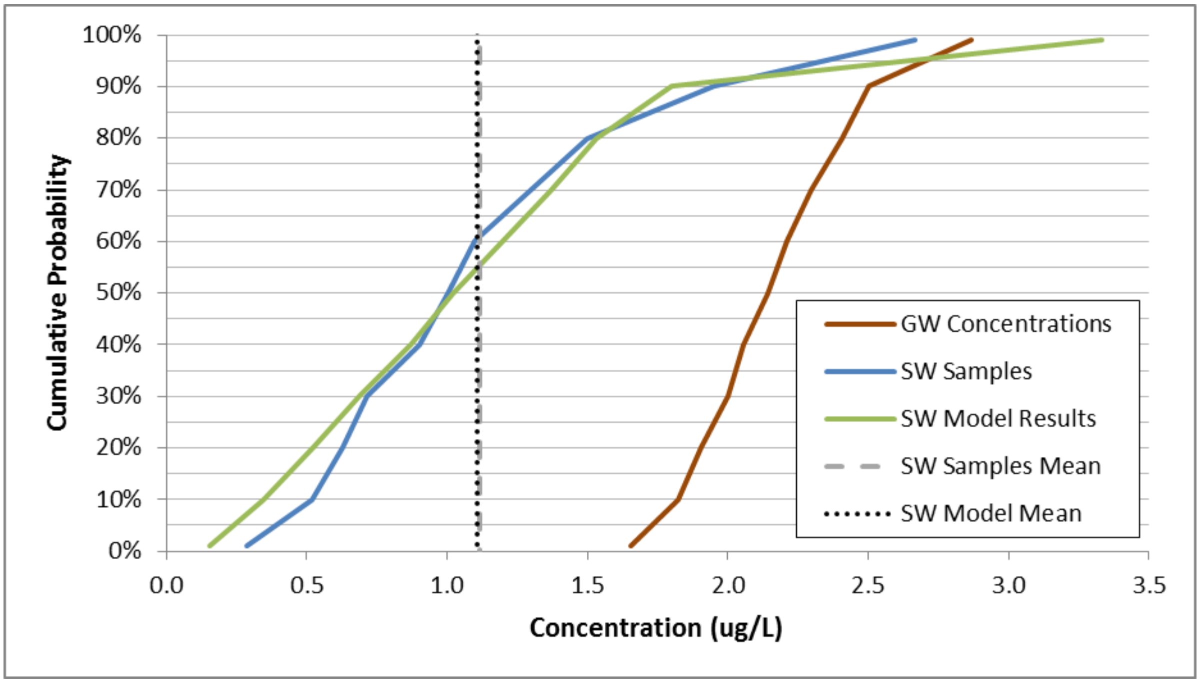


Figure 27 Surface runoff concentration calibration for Copper

There are 46 samples of copper at PM-12, seven of which are non-detects with different detection limits. Using all of the available filtered PolyMet groundwater data to describe the initial groundwater quality distribution, the surface runoff concentration for copper is estimated as 0.755 µg/L (Figure 27). Using this value, the means of the model estimates and the monitoring data match at 1.12 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For copper, the optimized standard deviation of surface runoff concentration is 0.89 µg/L. The surface water standard for copper is hardness based and, assuming a hardness of 100 mg/L, the standard is about 9.3 µg/L. This is considered to be an acceptable calibration of copper concentrations at PM-12.

2.3.2.6 Iron

There are 28 samples of iron at PM-12 and all of them were detected. Using all of the available filtered PolyMet groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for iron is an estimated 5,560 μg/L. Using this value, the means of the model estimates and the monitoring data match at 4,150 μg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For iron, the optimized standard deviation of surface runoff concentration is 5,000 μg/L. There is no surface water standard for iron.

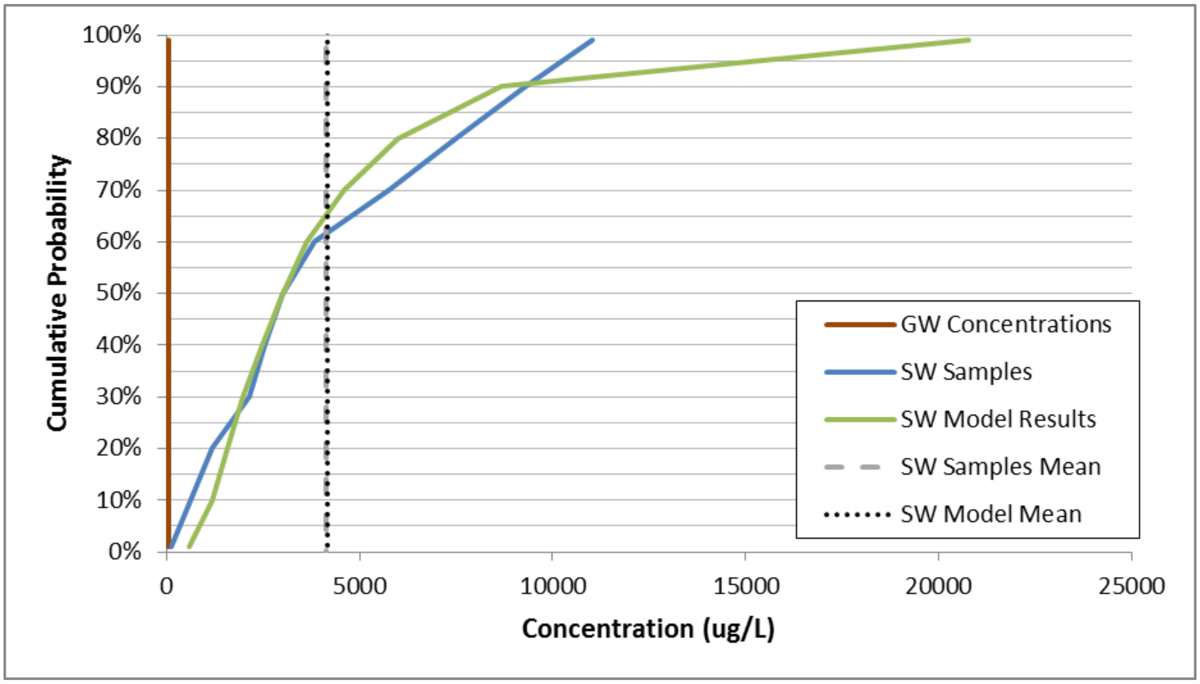


Figure 28 Surface runoff calibration for Iron

This is considered to be an acceptable calibration of iron concentrations at PM-12.

2.3.2.7 Manganese

Using all of the available groundwater data to describe the initial groundwater distribution, the optimal mean concentration of surface runoff was less than 0 µg/L. A surface runoff concentration of 0 µg/L is not a realistic value. Therefore, the groundwater distribution derived using the PolyMet Only data was selected for use in the model.

Groundwater quality distributions for all constituents were estimated by assuming that the background data were lognormally distributed. This method for representing background water quality worked well for all constituents except manganese. For manganese, the available data did not fit the assumed lognormal distribution statistically and resulted in erroneous estimations of the mean groundwater quality. Figure 29 shows the sampled data from the four background wells (black dots) along with the estimated lognormal distribution fit to the data (red line). For reference, the mean manganese concentration of the sampled data is 271 µg/L.

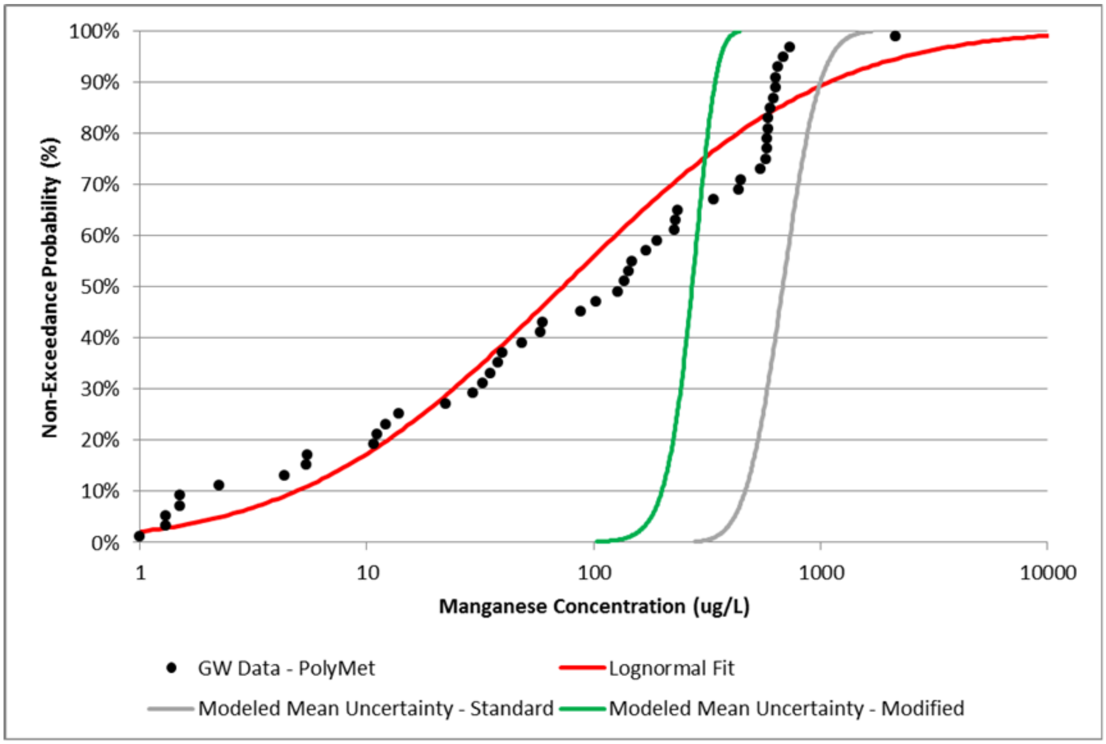


Figure 29 Fit of lognormal distribution to background groundwater manganese data

Using the standard approach to estimating mean water quality, which assumes a lognormal distribution (red line), results in a modeled mean water quality value of nearly 700 µg/L (gray line) based on the poorly fitting parameters of the red line. Section 5.2.1.3.5 of Reference (2) discusses the intent of modeling the uncertainty in the mean groundwater quality. It is clearly seen in Figure 29 that the standard method for modeling the uncertainty in the mean groundwater quality (gray line) does not actually represent the mean of the sampled groundwater quality data. This is due to the poor fit of a lognormal distribution to the sampled data.

The measured manganese data show a better fit to a gamma distribution, which is similar to a normal distribution. Using the fitted parameters from a gamma distribution and assuming a normal distribution to describe manganese concentrations in groundwater, the resulting distribution to describe the uncertainty in the mean groundwater quality is shown by the green line in Figure 29. This approach produces a calculated mean concentration of 271 µg/L, in much better agreement with the measured data. The calibration of natural surface runoff water quality (Figure 30) was then carried out with this modified background groundwater quality distribution.

Many of the high manganese concentrations were from well GW015, which shows consistently higher manganese concentrations than the other background wells. This is believed to be due to a local reducing environment, as described in Section **Error! Reference source not found.** of Reference (2), rather than impact from Tailings Basin seepage. The lack of impact from Tailings Basin seepage is supported by the observed chloride data from GW015, with most samples below 1 mg/L and many below the detection limit of 0.5 mg/L. Reducing environments are prevalent in the watershed around the Tailings Basin and should be captured by the model as best as they can be. Therefore, it is appropriate to include this high concentration data in the data set for estimating background manganese concentrations in groundwater.

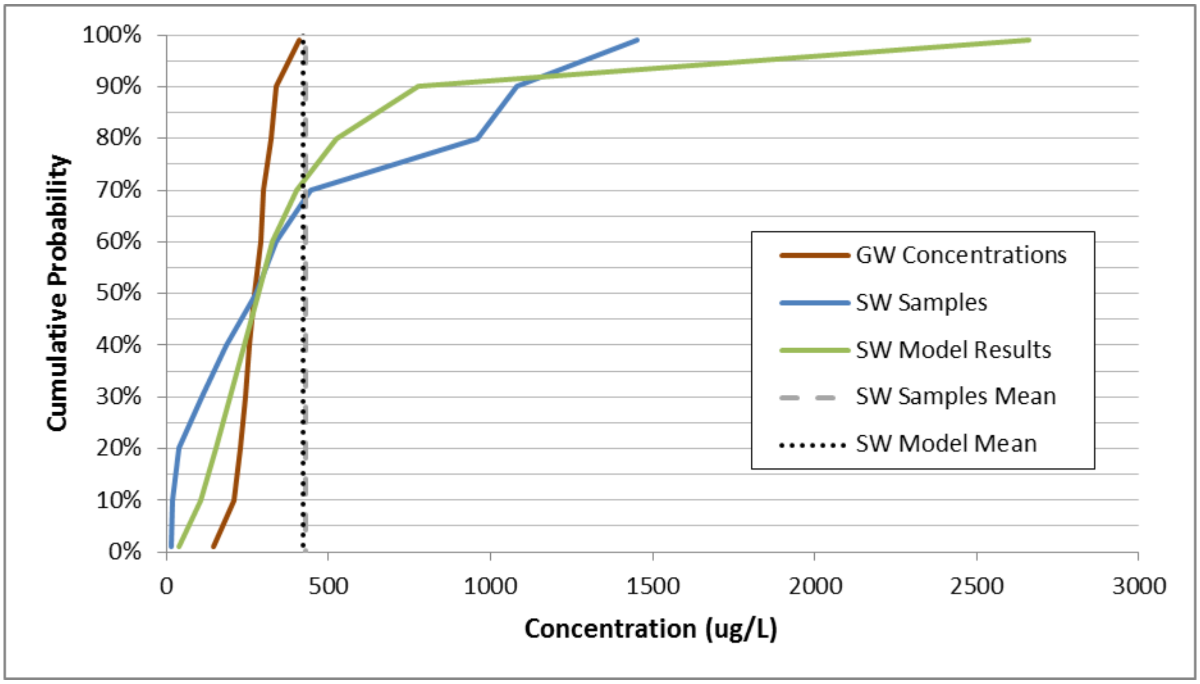


Figure 30 Surface runoff concentration calibration for Manganese

There are 31 samples of manganese at PM-12, all of which were detected. Using the groundwater quality distribution from the PolyMet Only data, the mean surface runoff concentration for manganese is estimated as 485 µg/L (Figure 30). Using this value, the means of the model estimates and the monitoring data match at 430 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For manganese, the optimized standard deviation of surface runoff concentration is 800 µg/L. This is considered to be an acceptable calibration of manganese concentrations at PM-12.

2.3.2.8 Lead

There are 33 samples of lead at PM-12, 29 of which are non-detects. Using all of the available filtered PolyMet groundwater data to describe the initial groundwater quality distribution, the optimal mean surface runoff concentration for lead is an estimated 0.260 µg/L. Using this value, the means of the model estimates and the monitoring data match at 0.26 µg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For lead, the optimized standard deviation of surface runoff concentration is 0.15 µg/L. The surface water standard for lead is hardness based and, assuming a hardness of 100 mg/L, the standard is about 3.2 µg/L.

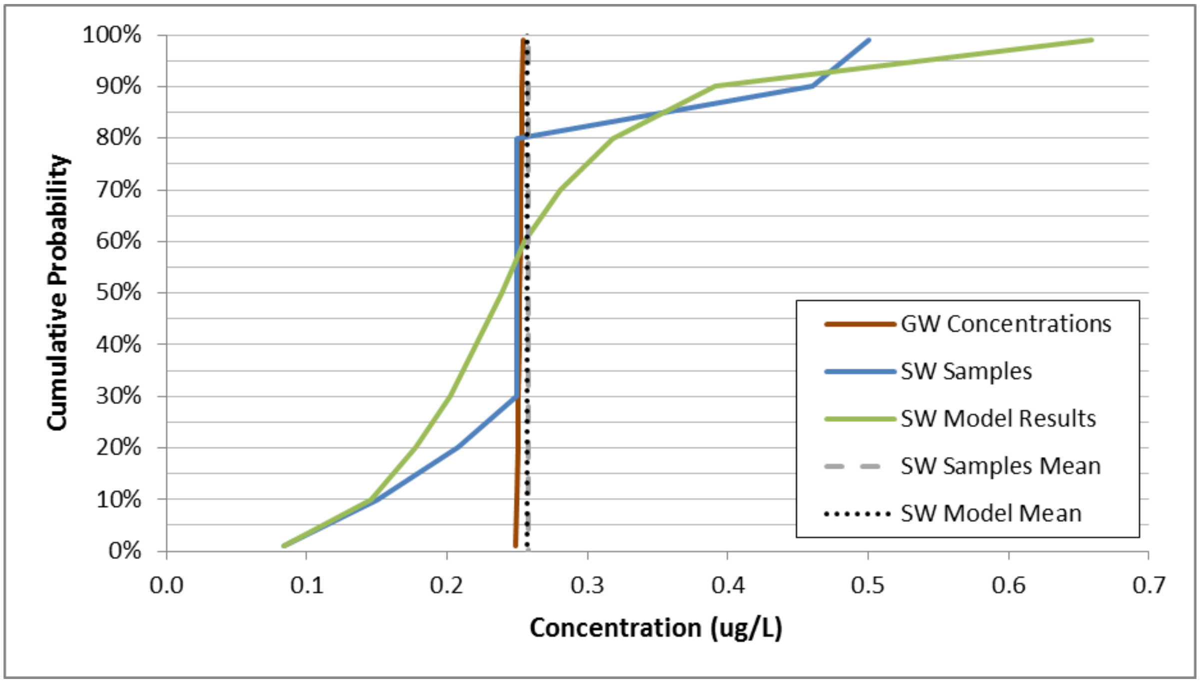


Figure 31 Surface runoff calibration for Lead

This is considered to be an acceptable calibration of lead concentrations at PM-12.

2.3.2.9 Sulfate

There are 65 samples of sulfate at PM-12, 18 of which are non-detects. One sample is recorded at 116 mg/L. This sample stands out as an outlier considering the average of the rest of the samples is around 5 mg/L and the next highest sample is 26.5 mg/L. Therefore, this sample was considered an error and was ignored for the calibration. Using all of the available groundwater data to describe the initial groundwater distribution, the optimal mean concentration of surface runoff was less than 0 µg/L. A surface runoff concentration of 0 µg/L is not a realistic value. Therefore, the groundwater distribution derived using the PolyMet Only data was selected for use in the model.

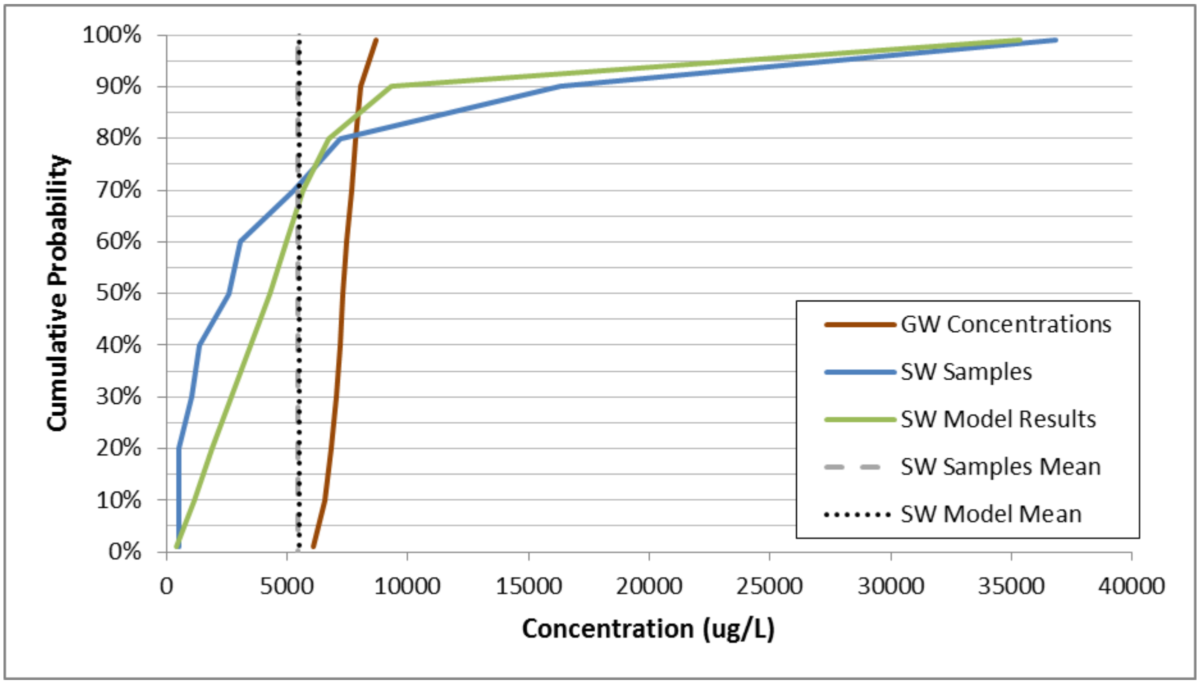


Figure 32 Surface runoff concentration calibration for Sulfate

Using the groundwater quality distribution from the PolyMet Only data, the mean surface runoff concentration for sulfate is estimated as 4.79 mg/L (Figure 32). Using this value, the means of the model estimates and the monitoring data match at 5.45 mg/L. The standard deviation of surface runoff concentration was altered until the RMS error at the 10th, 50th and 90th percentiles was minimized. For sulfate, the optimized standard deviation of surface runoff concentration is 10 mg/L. This is considered to be an acceptable calibration of sulfate concentrations at PM-12.

3.0 References

1. **Poly Met Mining, Inc.** *Calibration of the Existing Natural Watershed at the Plant Site*. 2012.

2. —. *NorthMet Project, Water Modeling Data Package Volume 2 - Plant Site (v9)*. December 2013.

Attachments

Attachment A

Comparison of SDEIS groundwater distributions and FEIS groundwater distributions

Attachment A Comparison of SDEIS groundwater distributions and FEIS groundwater distributions

Attachment A presents a comparison of the groundwater distributions used for the SDEIS modeling and the groundwater distributions that will be used for the FEIS modeling based on additional collected data. The distributions here represent the variation in mean groundwater quality. Generally the distributions have narrowed because more data has been collected and the standard error of the mean has decreased.

A plot for vanadium is not included here because there has been no change in the distribution. The distribution is still based on the regional USGS and MPCA data because there is no available data from the on-site unimpacted wells.

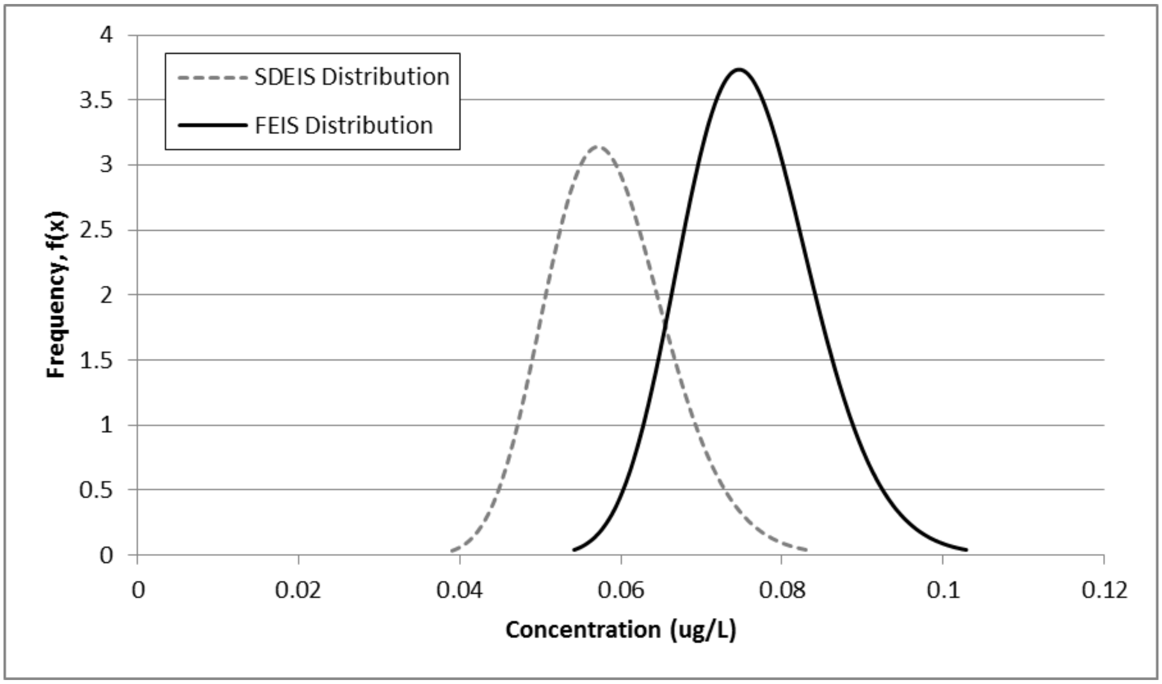


Figure A-1 Comparison of silver groundwater quality distributions

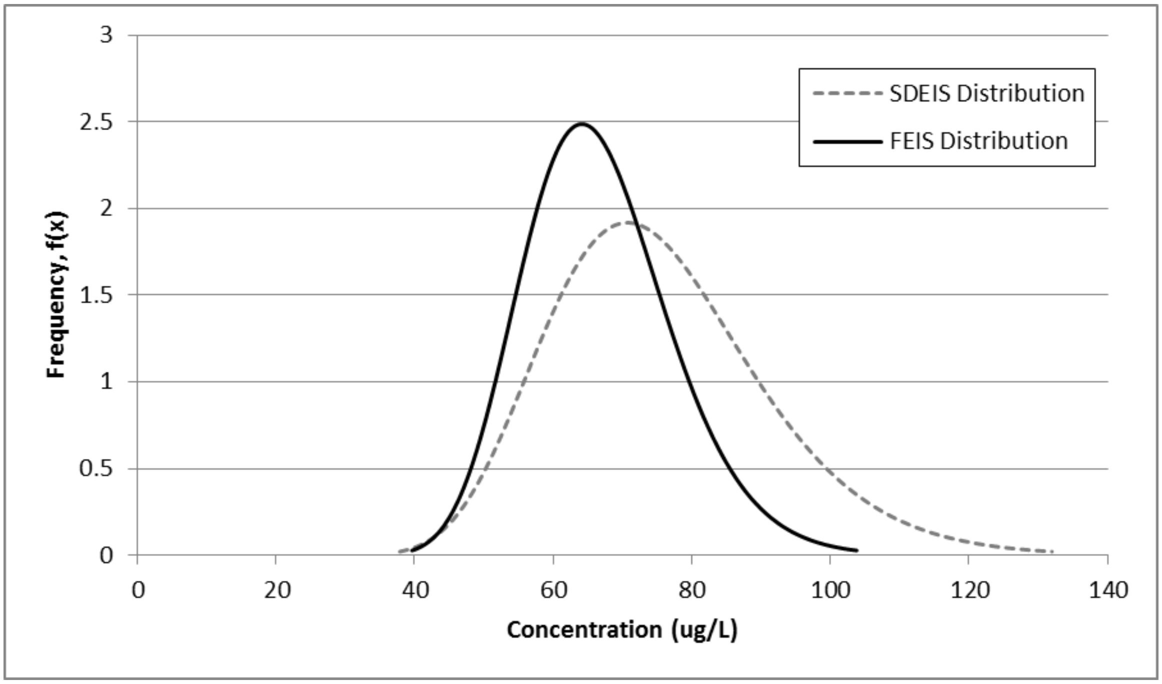


Figure A-2 Comparison of aluminum groundwater quality distributions

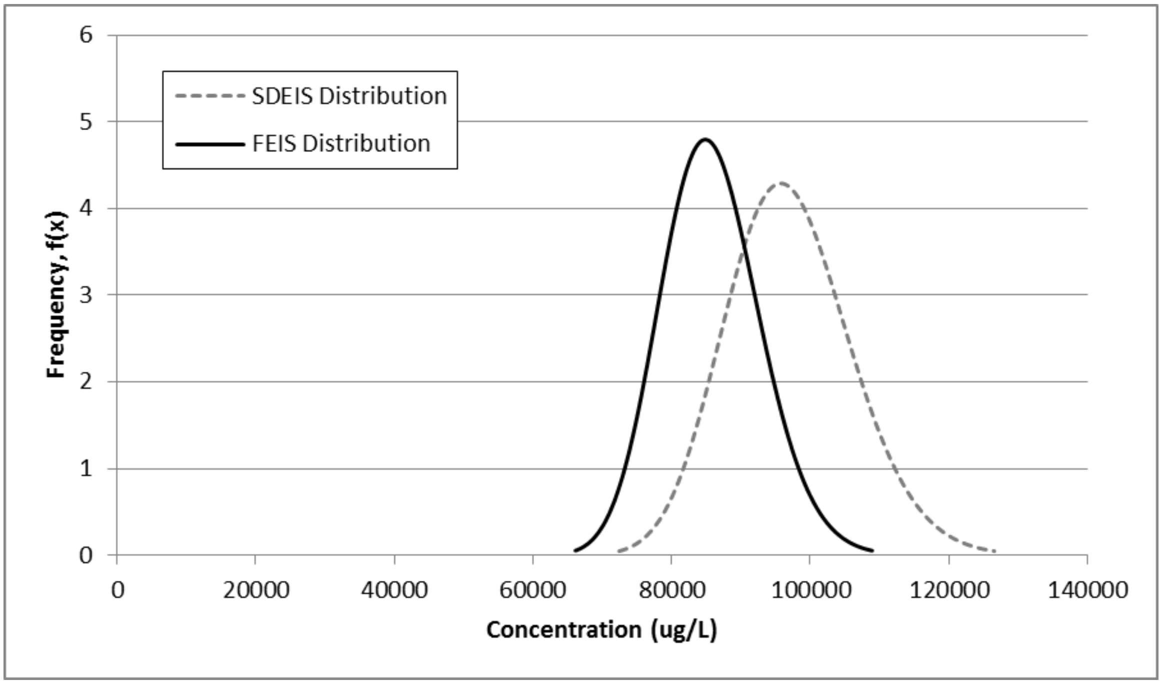


Figure A-3 Comparison of alkalinity groundwater quality distributions

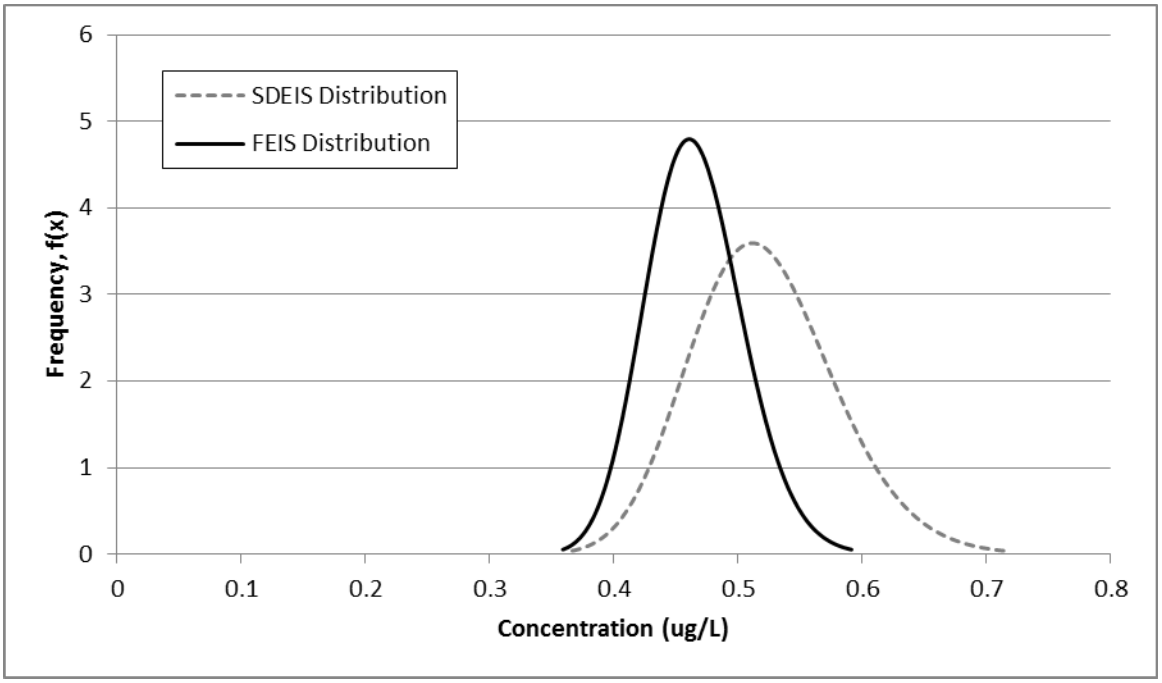


Figure A-4 Comparison of arsenic groundwater quality distributions

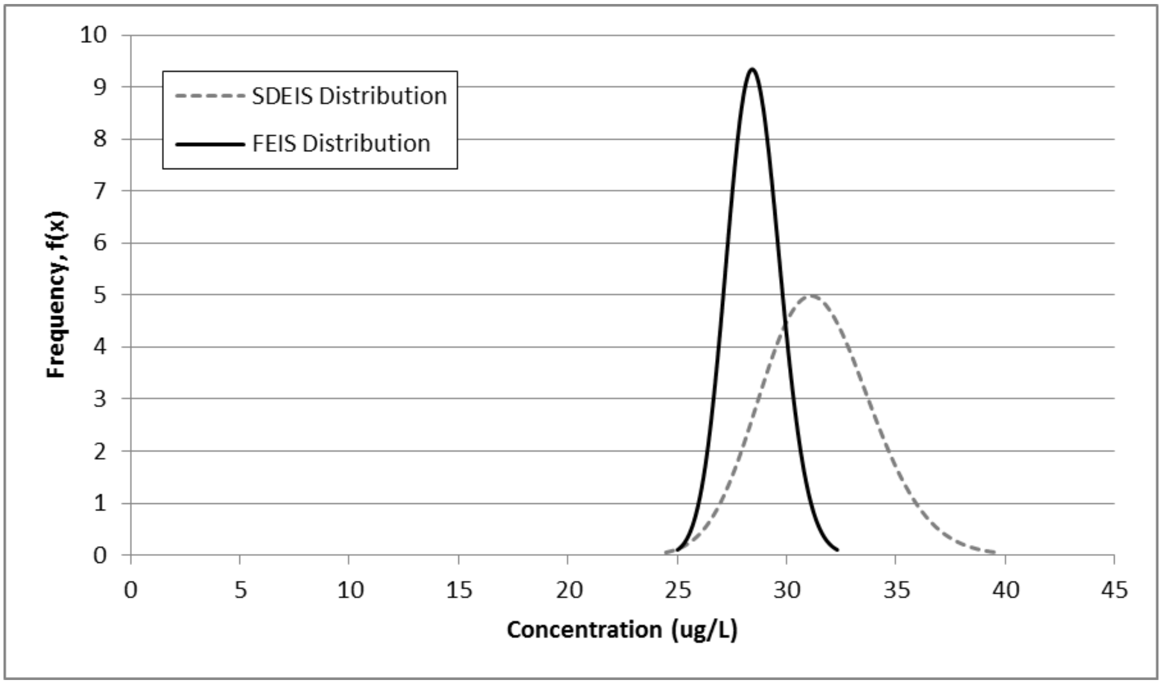


Figure A-5 Comparison of boron groundwater quality distributions

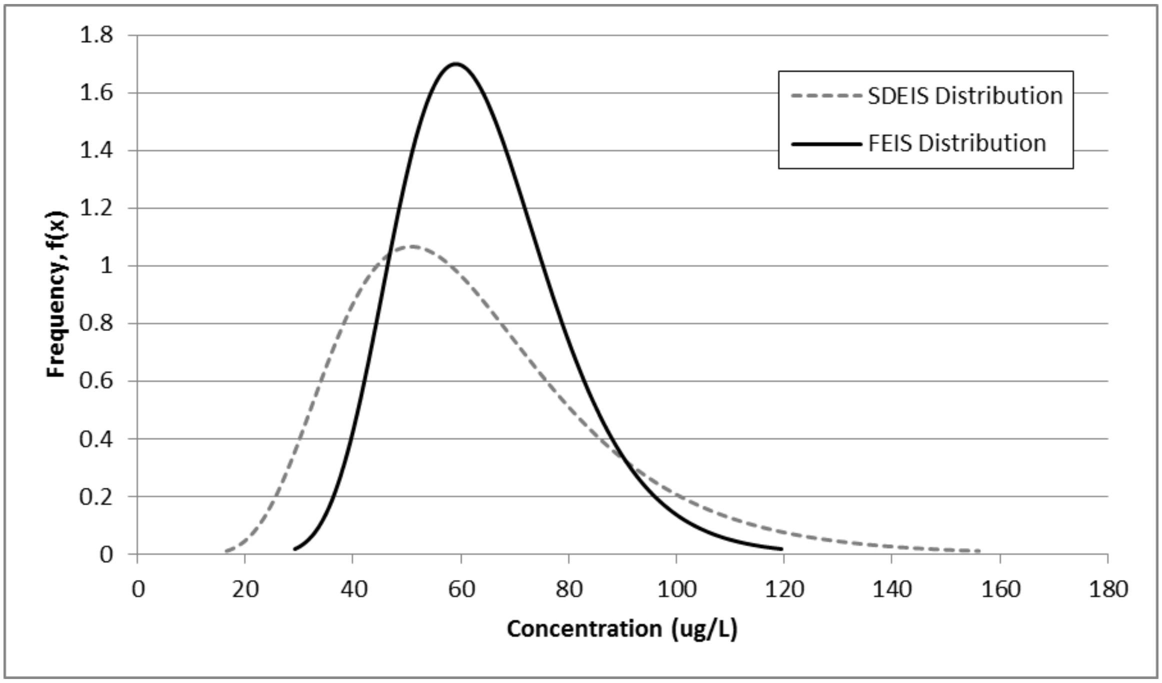


Figure A-6 Comparison of barium groundwater quality distributions

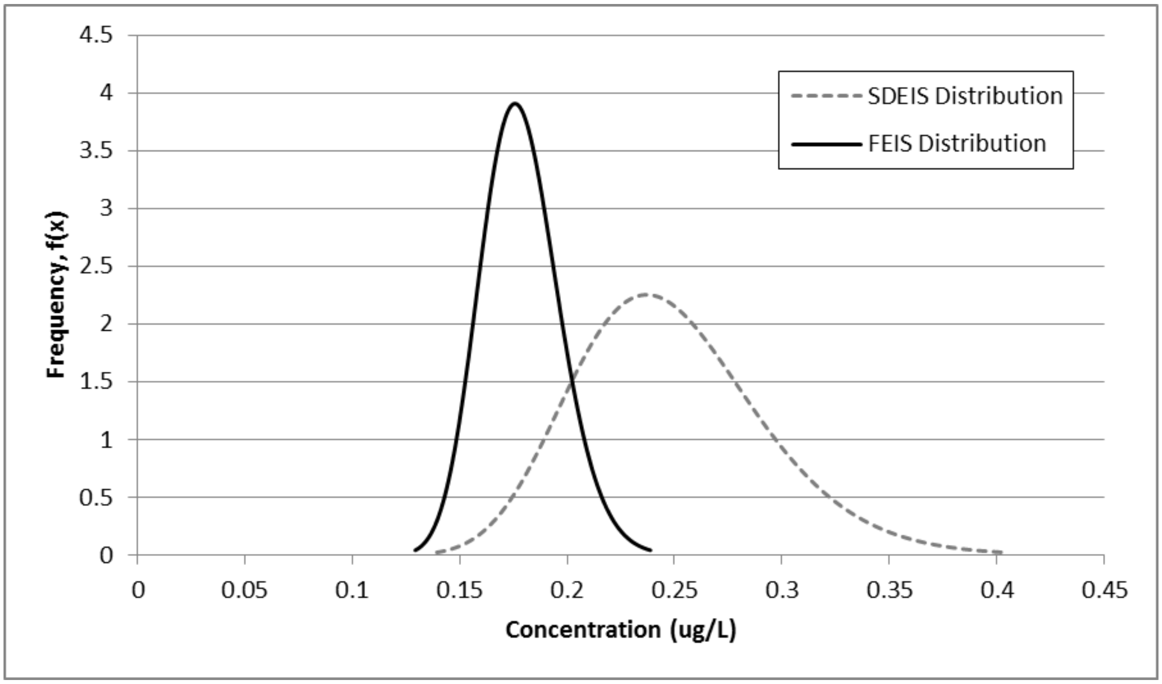


Figure A-7 Comparison of beryllium groundwater quality distributions

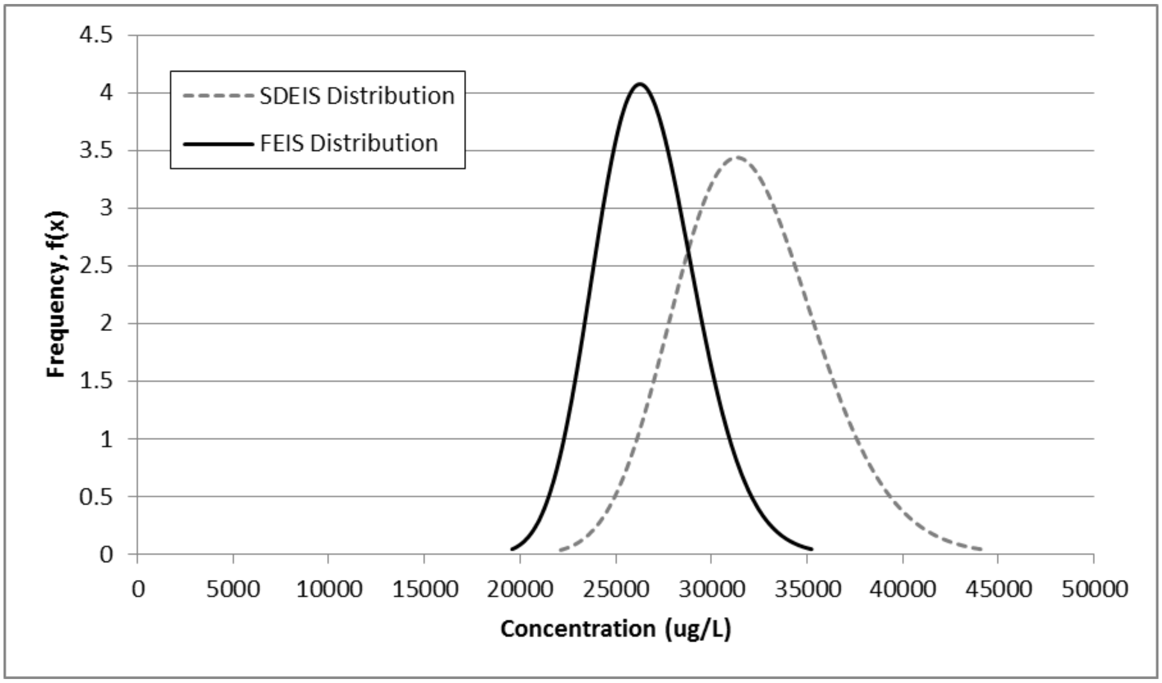


Figure A-8 Comparison of calcium groundwater quality distributions

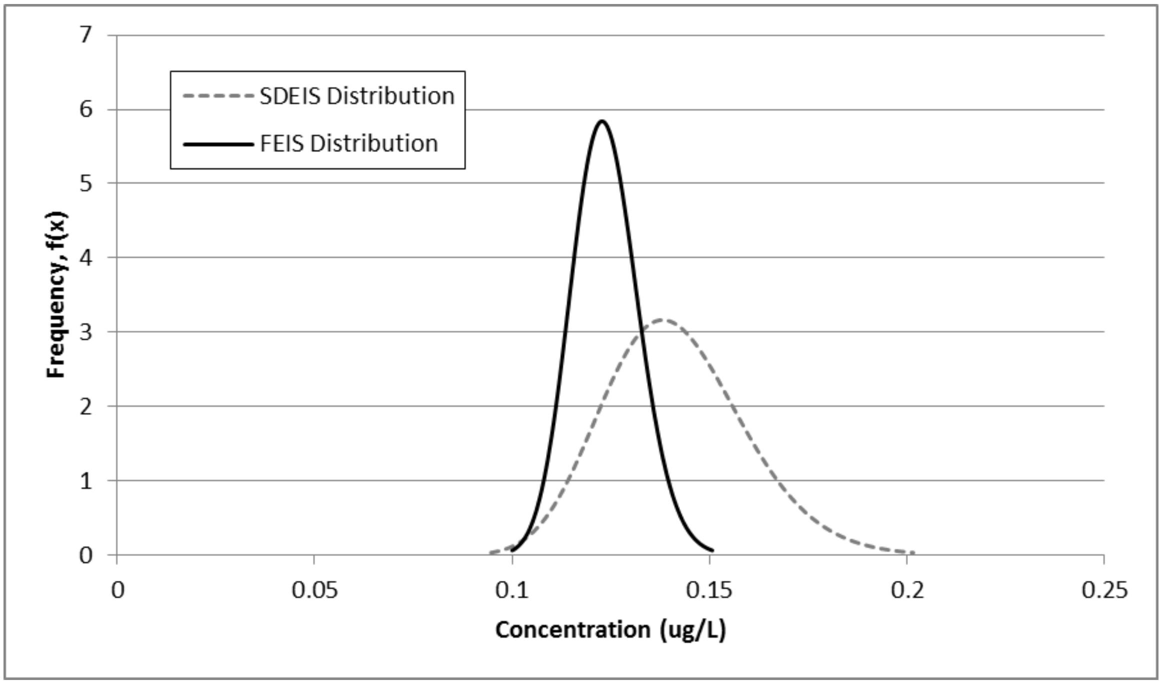


Figure A-9 Comparison of cadmium groundwater quality distributions

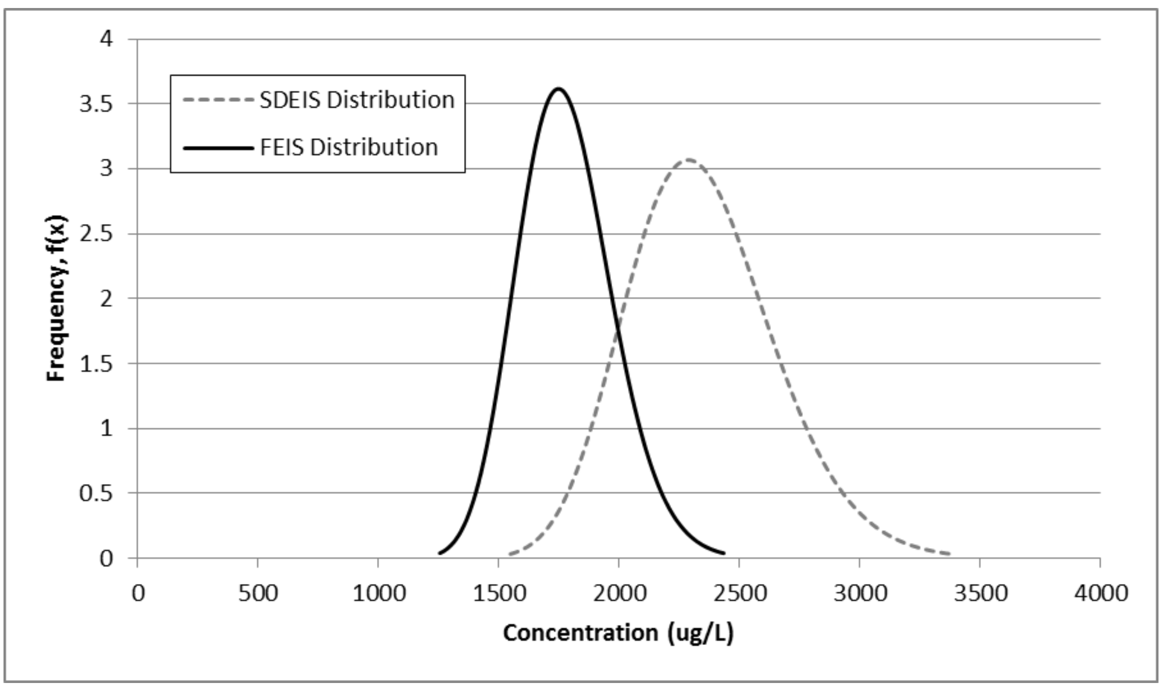


Figure A-10 Comparison of chloride groundwater quality distributions

Cobalt exhibits a larger difference than for most of the other constituents. This is simply due to many more samples available, all of which are non-detects with a detection limit of 0.2 μg/L. The mean has been shifted much closer to 0.1 μg/L (half of the 0.2 μg/L) and the range has decreased because of the significant number of additional samples.

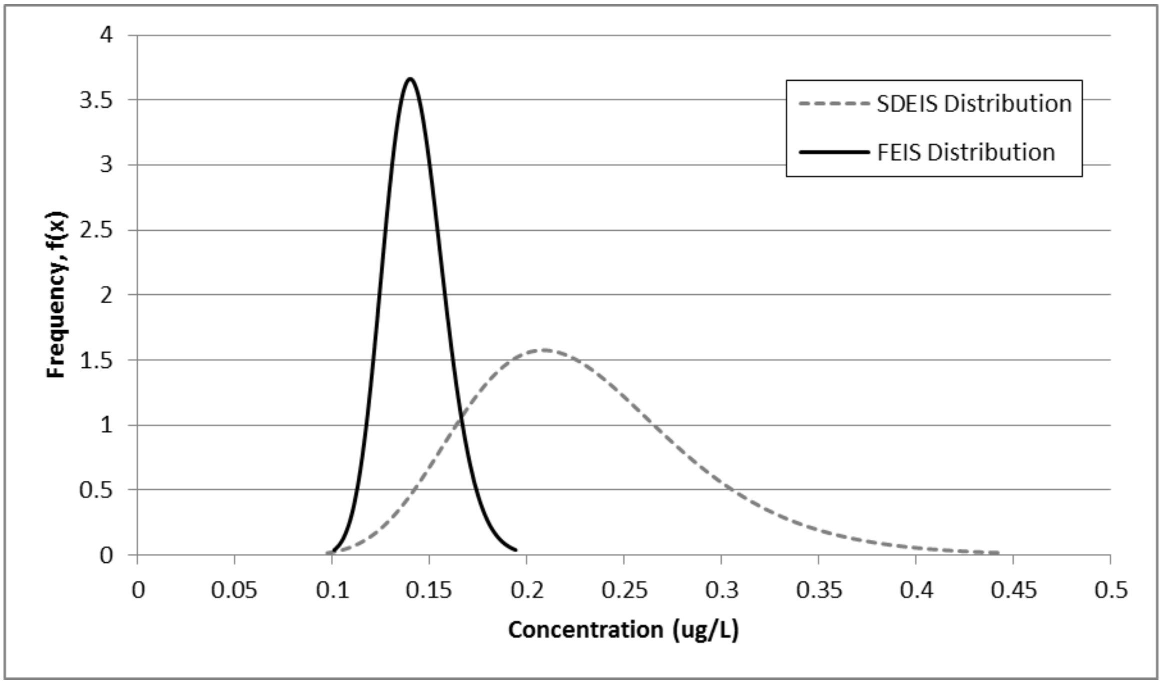


Figure A-11 Comparison of cobalt groundwater quality distributions

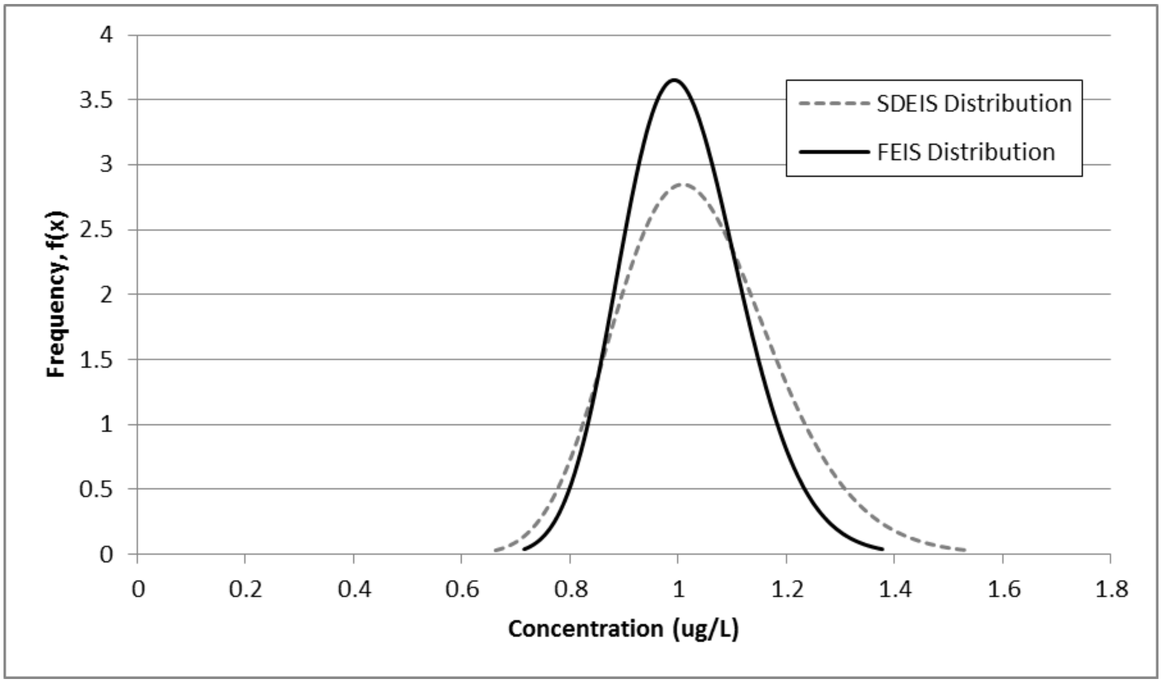


Figure A-12 Comparison of chromium groundwater quality distributions

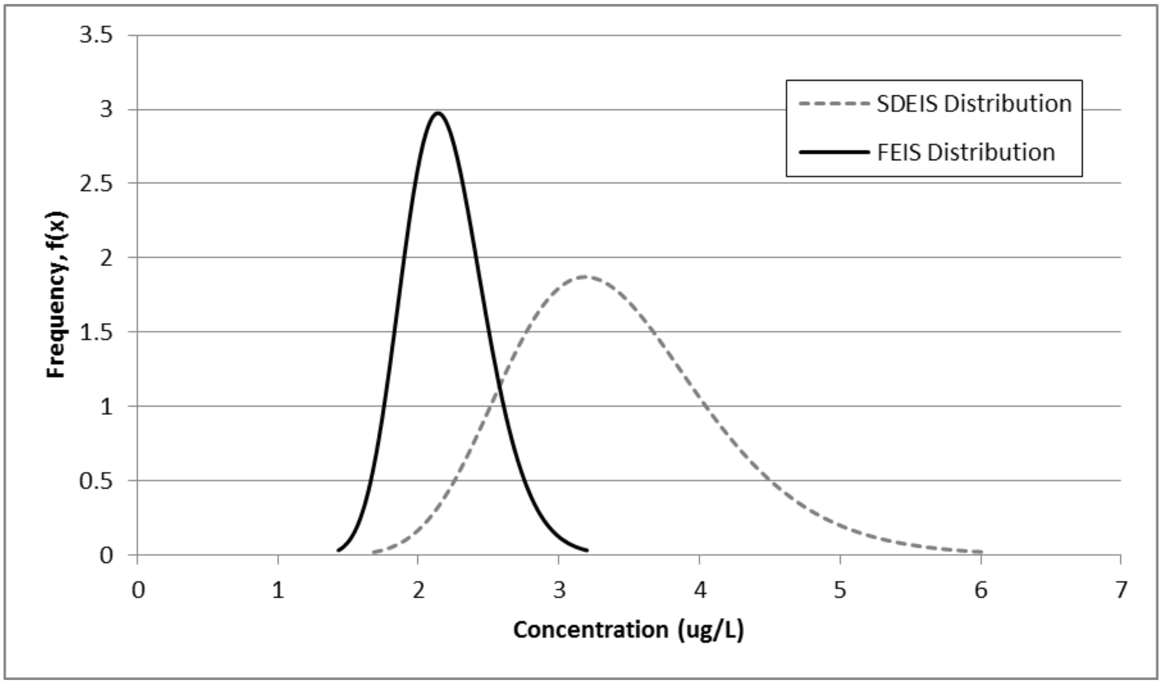


Figure A-13 Comparison of copper groundwater quality distributions

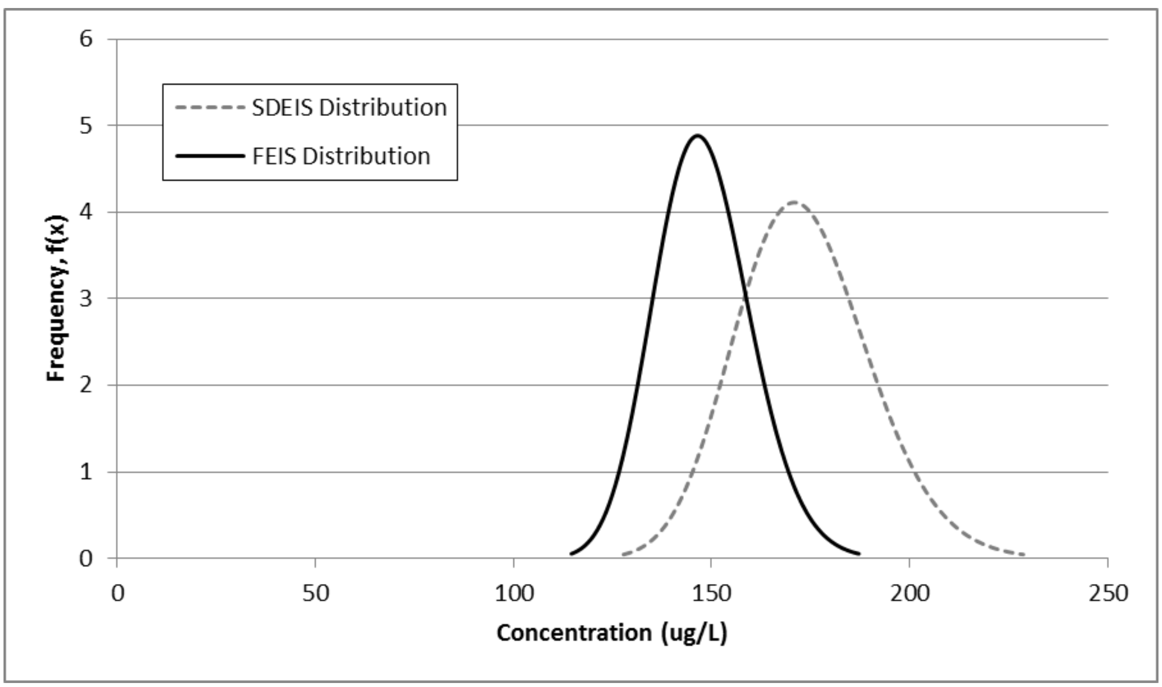


Figure A-14 Comparison of fluoride groundwater quality distributions

The distribution representing mean iron quality in unimpacted groundwater has increased (shifted right) and narrowed. The increase is mainly due to the additional samples collected in well GW015 which has shown more frequent detects than the other wells used. The other wells continued to show numerous non-detects with detection limits of 50 μg/L.

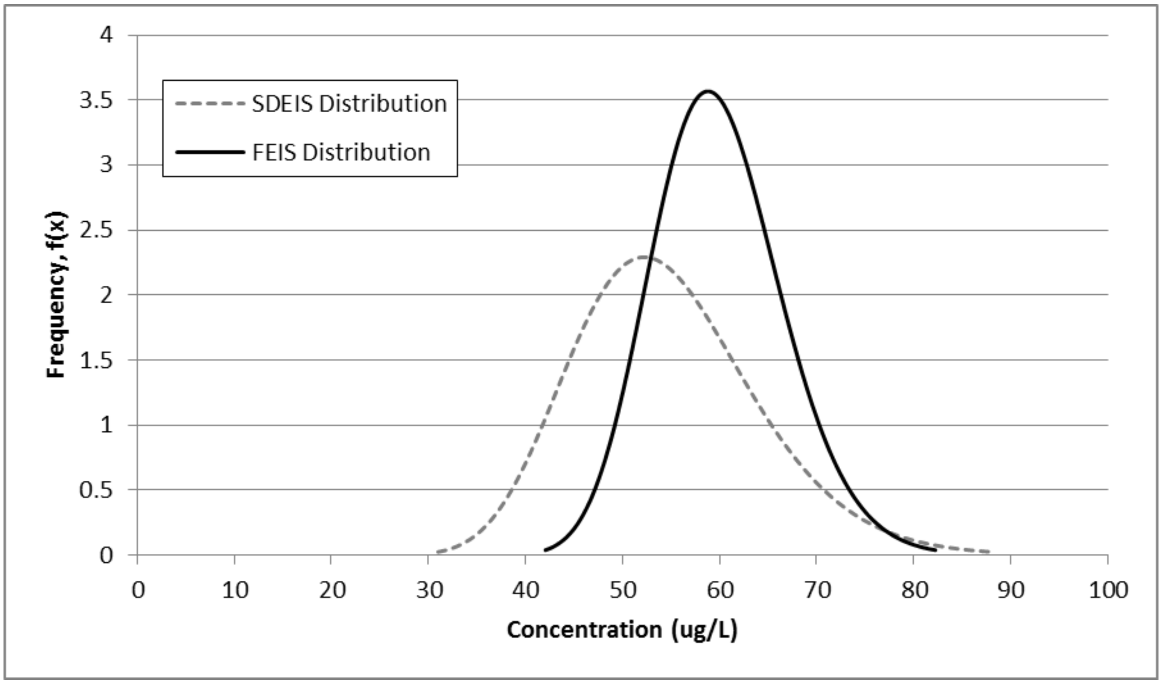


Figure A-15 Comparison of iron groundwater quality distributions

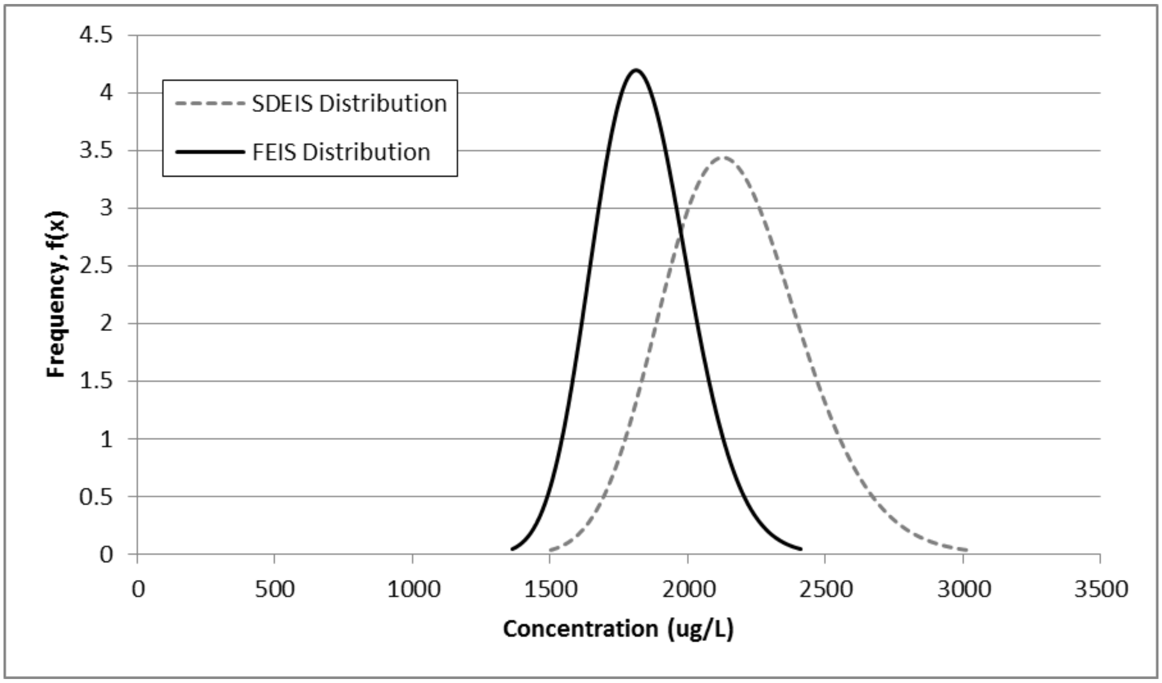


Figure A-16 Comparison of potassium groundwater quality distributions

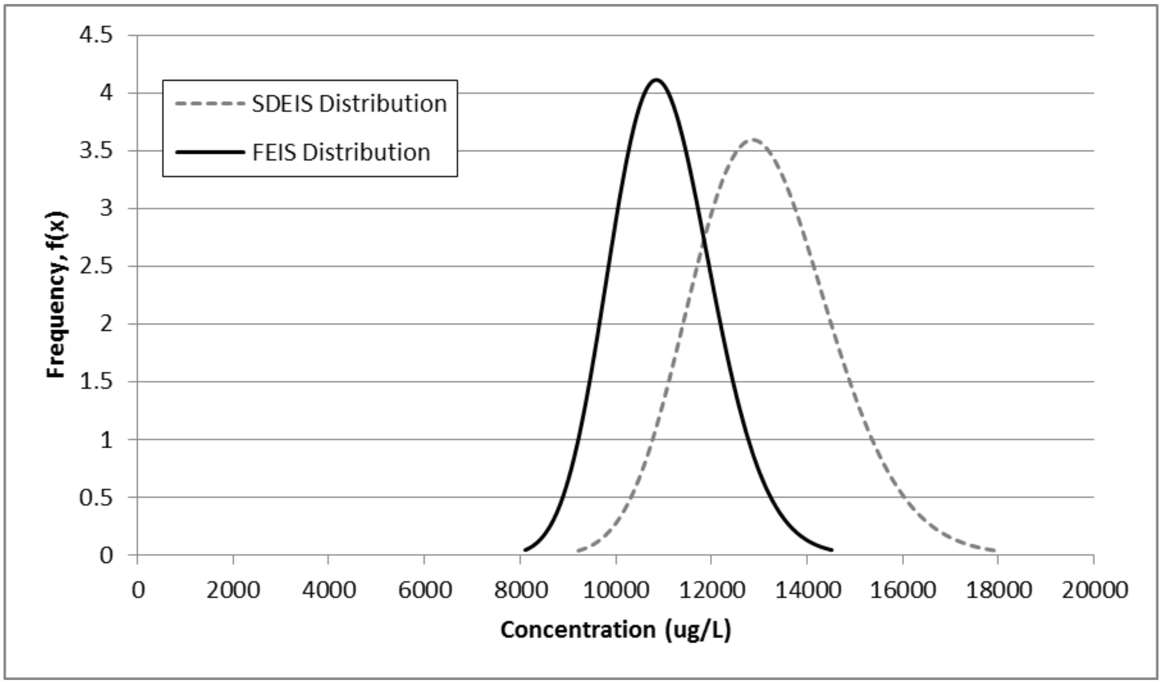


Figure A-17 Comparison of magnesium groundwater quality distributions

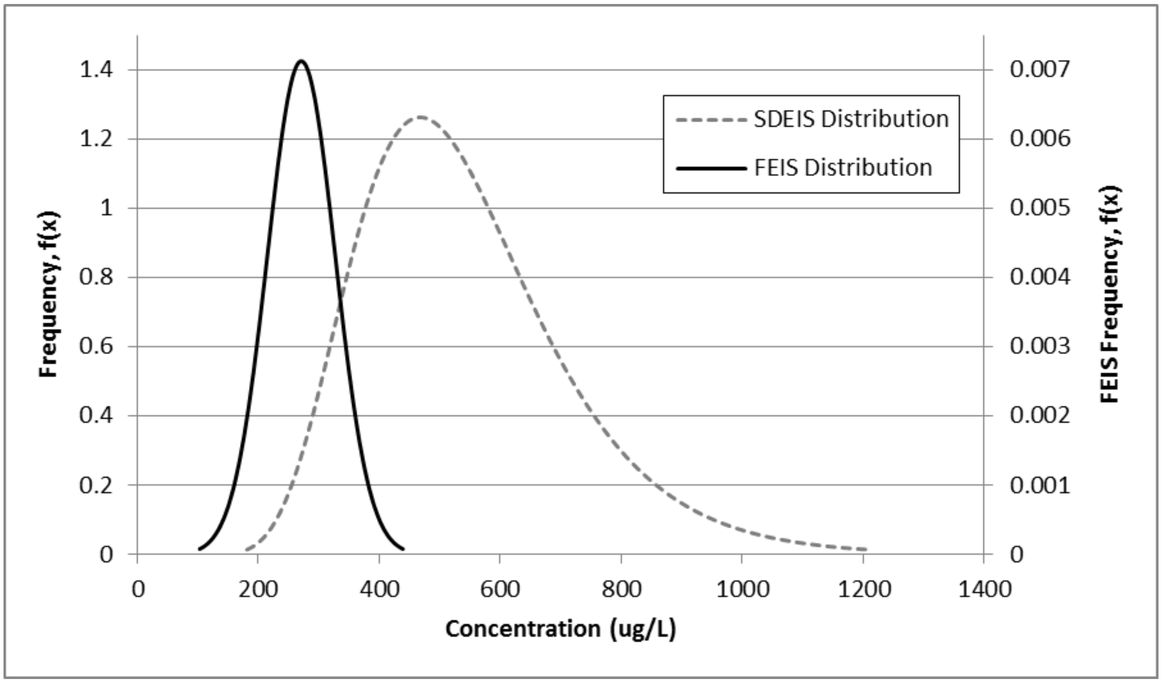


Figure A-18 Comparison of manganese groundwater quality distributions

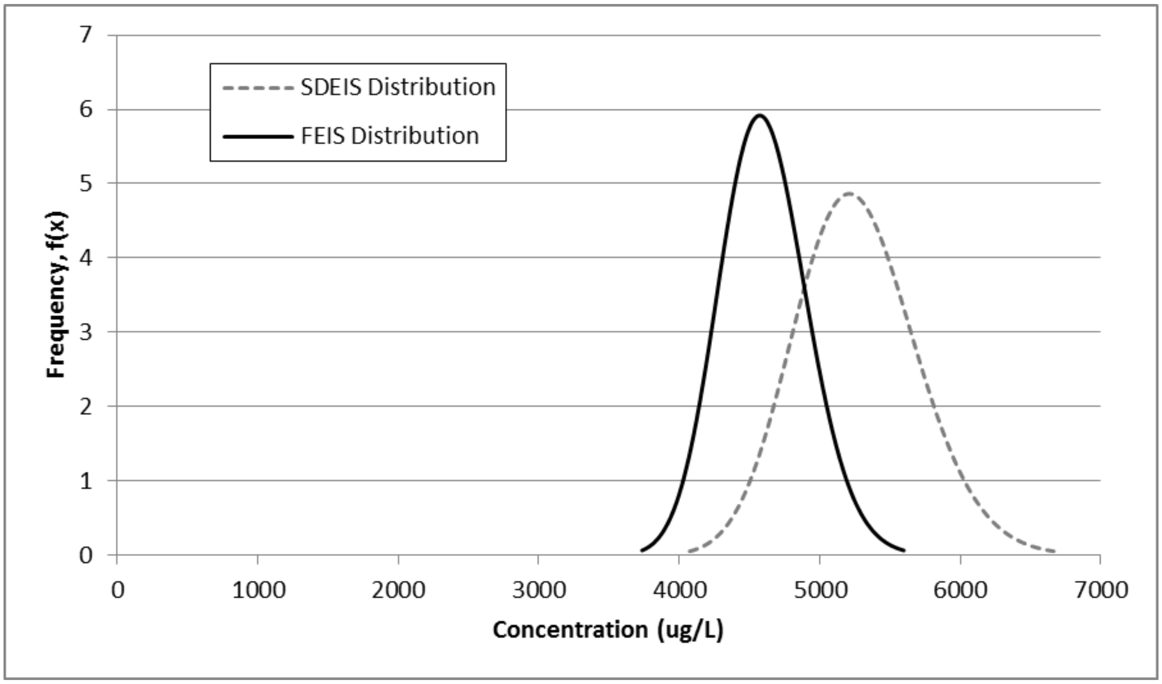


Figure A-19 Comparison of sodium groundwater quality distributions

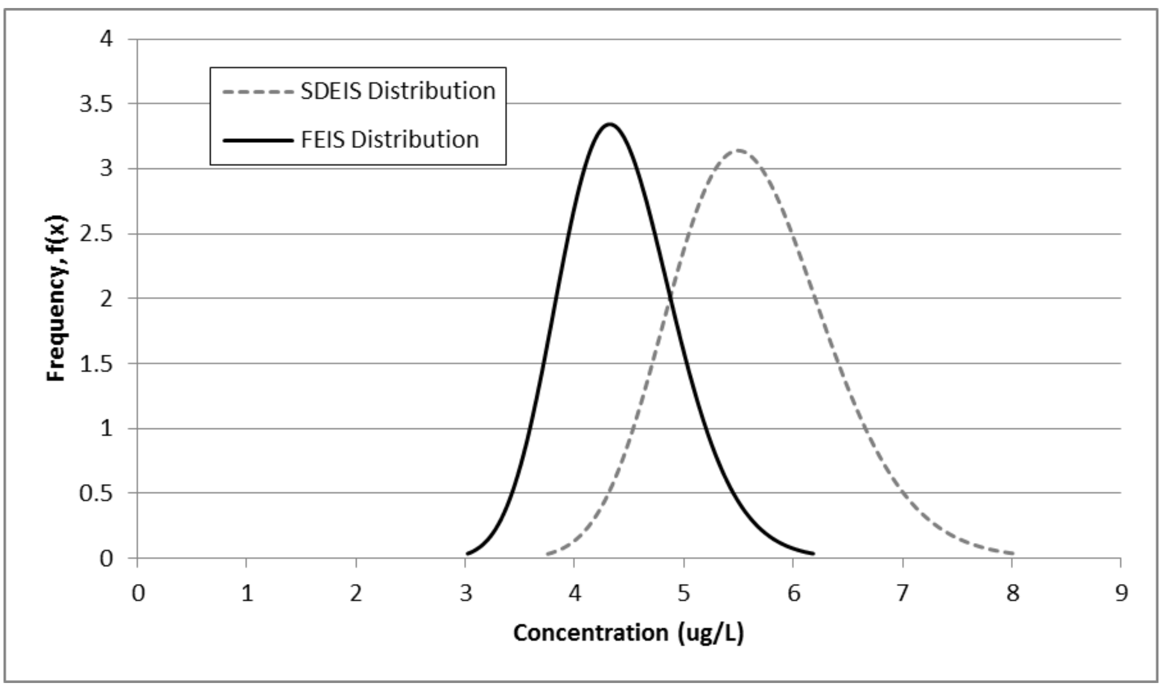


Figure A-20 Comparison of nickel groundwater quality distributions

Lead is shown below and appears to show a significant difference in the distribution. Variation was imposed in the distribution for the SDEIS because all of the filtered PolyMet groundwater samples were non-detects at a detection limit of 0.6 µg/L. The current data set includes additional non-detects at different detection limits. Therefore, lead was not treated uniquely anymore by manually imposing variation. The distribution shown for the FEIS modeling follows the procedure for developing groundwater distributions that has been approved for the previous modeling. What is important is that a reasonable calibration has been achieved at PM-12 as described in Section 2.3.2.8 with the FEIS groundwater distribution.

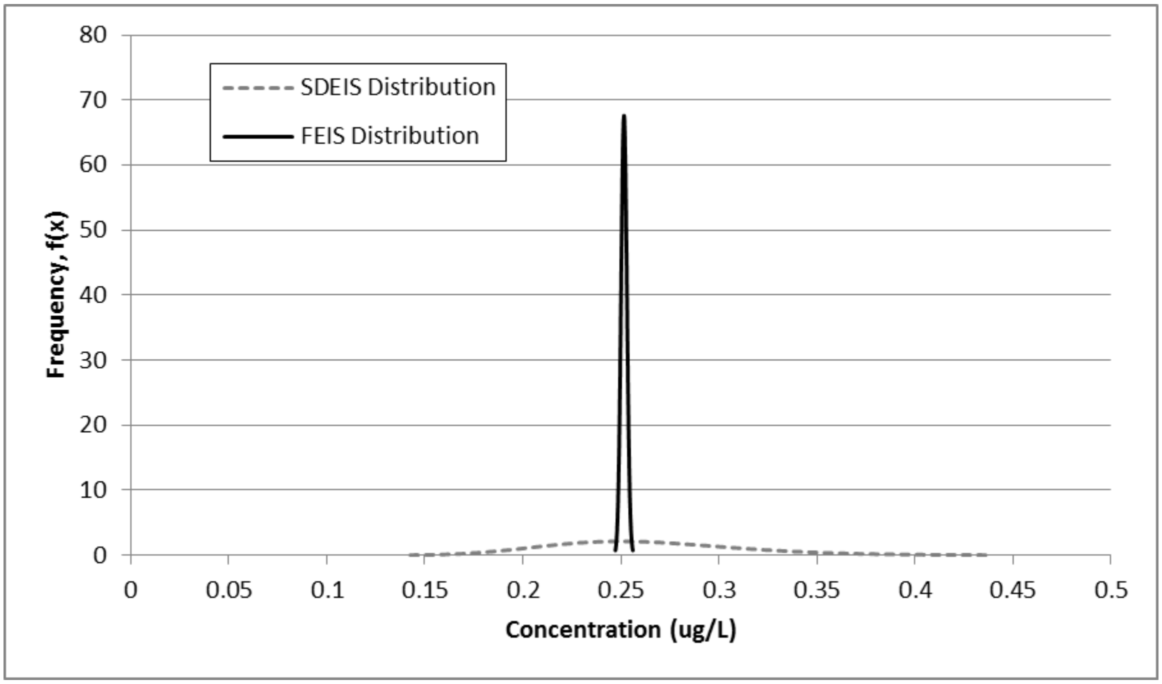


Figure A-21 Comparison of lead groundwater quality distributions

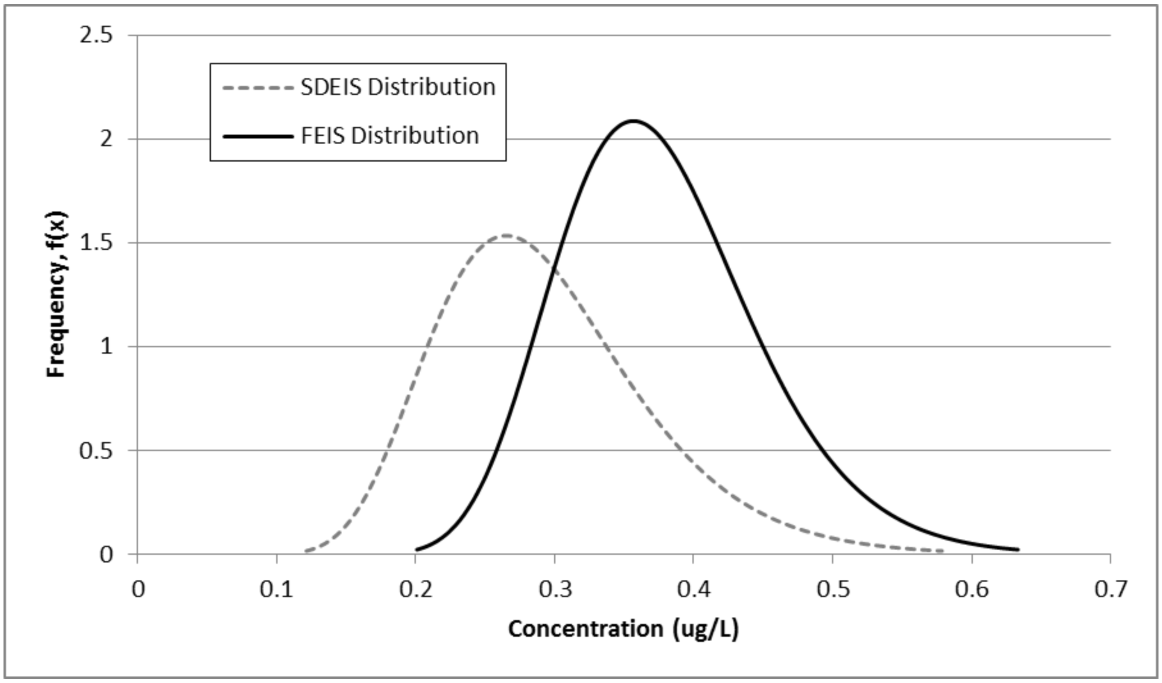


Figure A-22 Comparison of antimony groundwater quality distributions

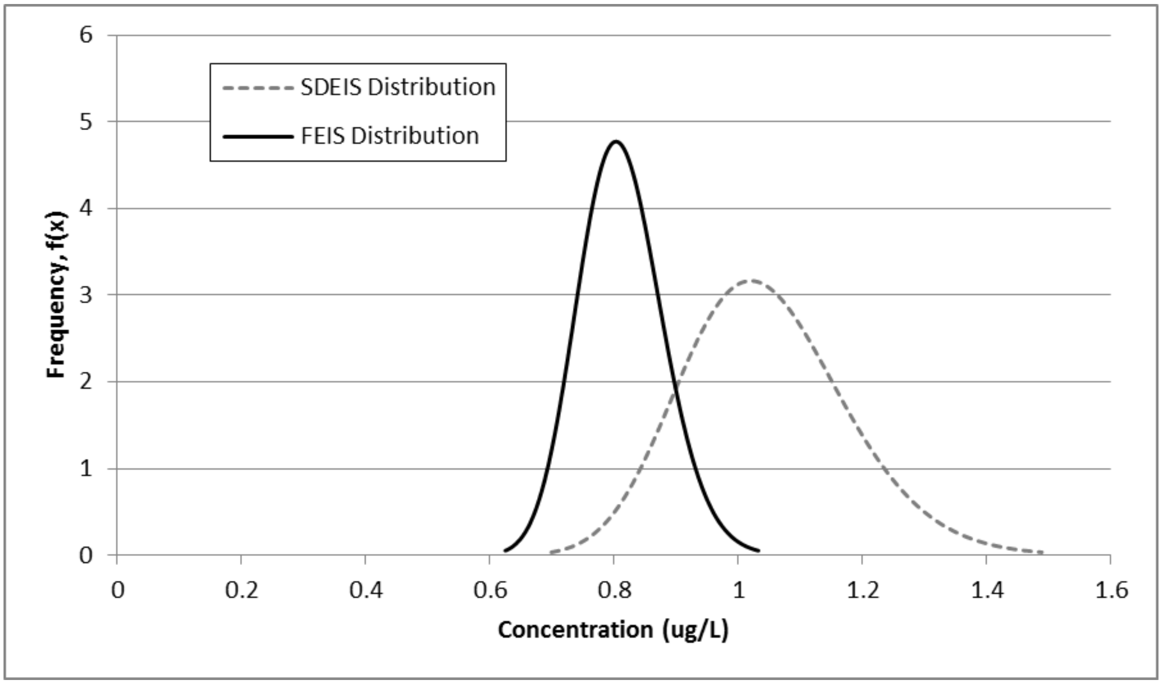


Figure A-23 Comparison of selenium groundwater quality distributions

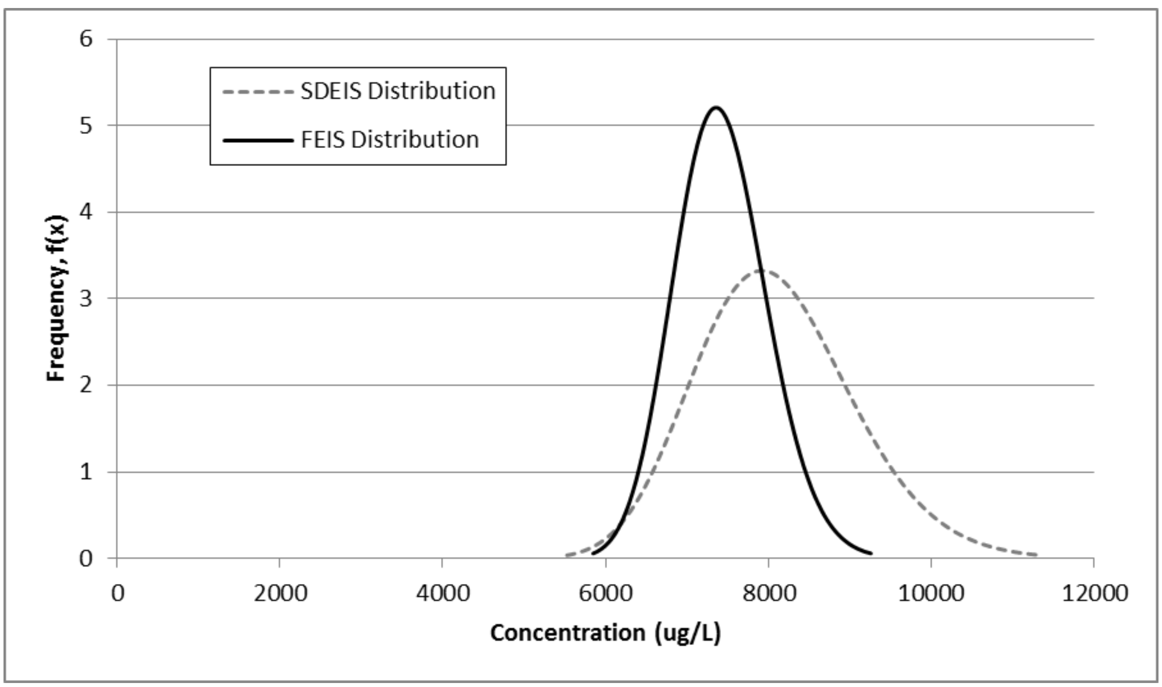


Figure A-24 Comparison of sulfate groundwater quality distributions

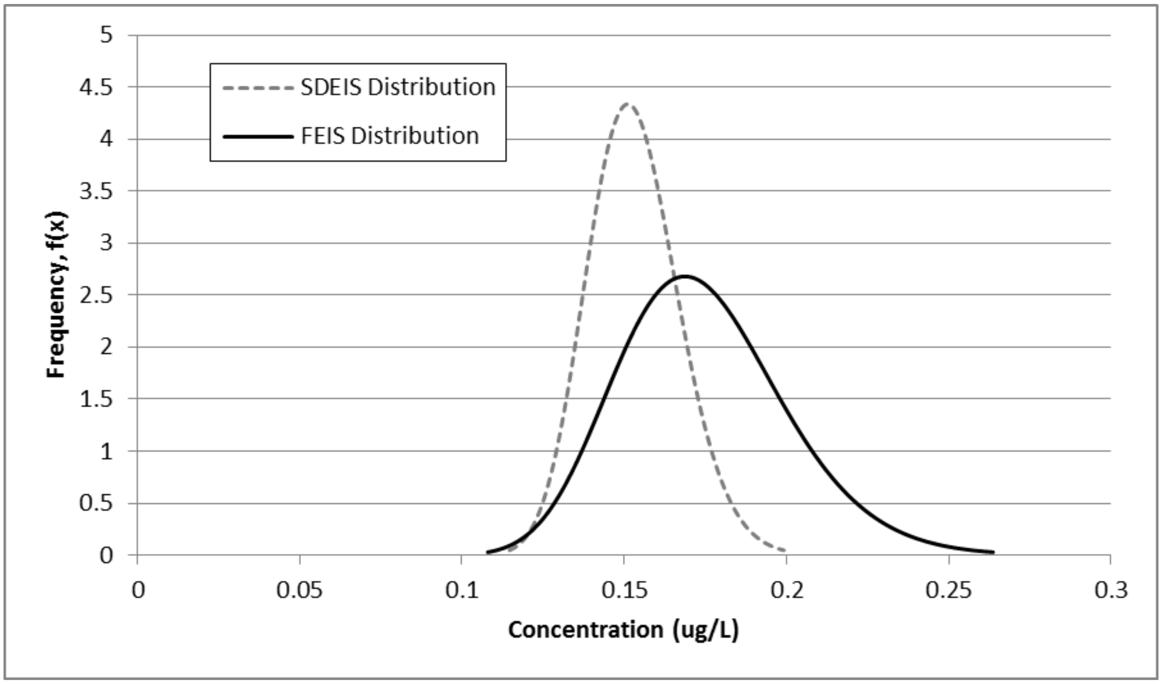


Figure A-25 Comparison of thallium groundwater quality distributions

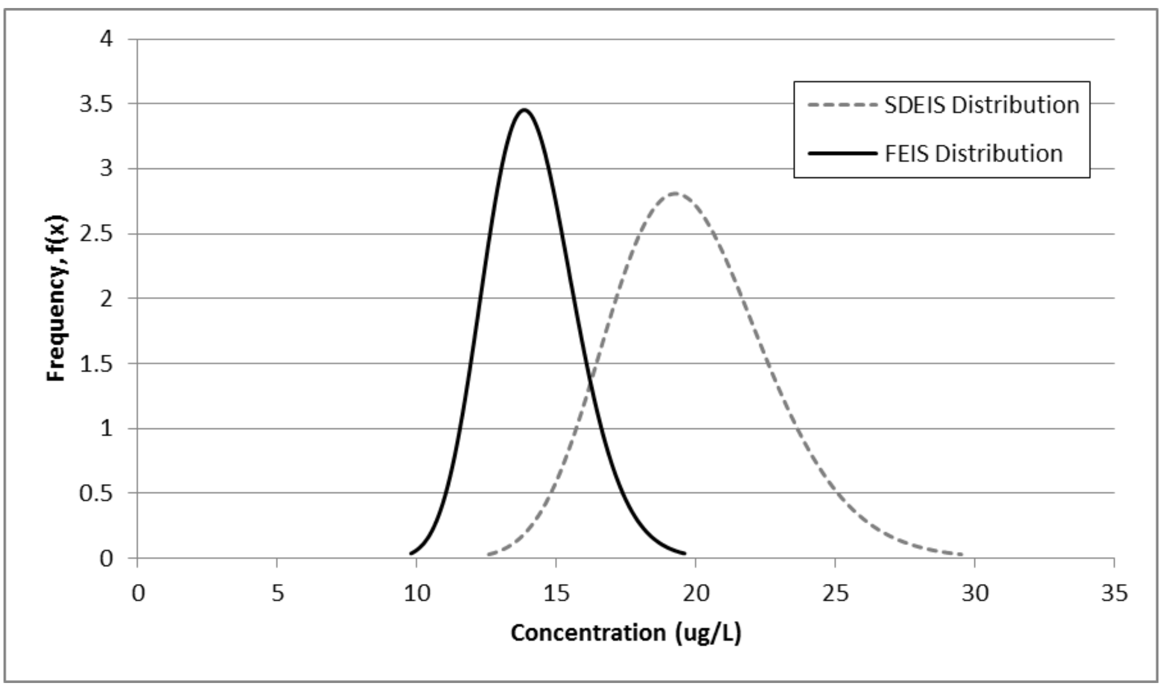


Figure A-26 Comparison of zinc groundwater quality distributions

Attachment B

Comparison of SDEIS surface runoff distributions and FEIS surface runoff distributions

Attachment B Comparison of SDEIS surface runoff distributions and FEIS surface runoff distributions

Attachment B presents a comparison of the calibrated surface runoff distributions used for the SDEIS modeling and the calibrated surface runoff distributions that will be used for the FEIS modeling based on additional collected data. Brief explanations are provided where the changes appear more significant than expected or may be non-intuitive.

The center of the distribution for silver surface runoff water quality has decreased (shifted left) to offset the increase in the groundwater concentrations shown in Attachment A.

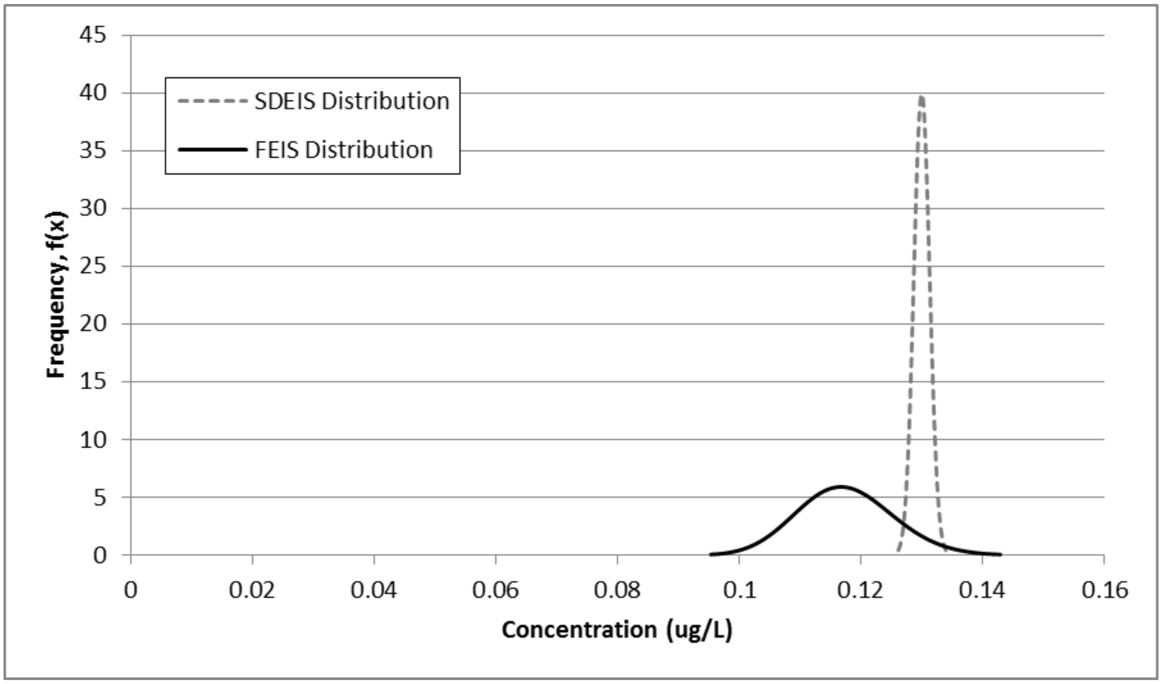


Figure B-1 Comparison of silver surface runoff quality distributions

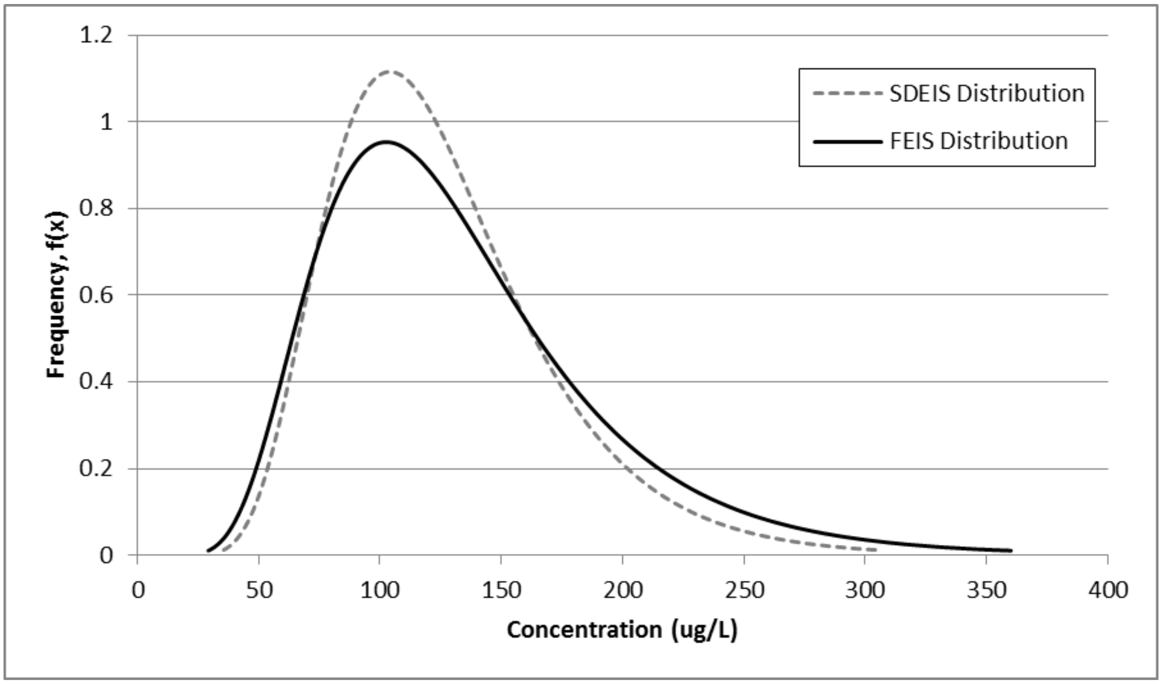


Figure B-2 Comparison of aluminum surface runoff quality distributions

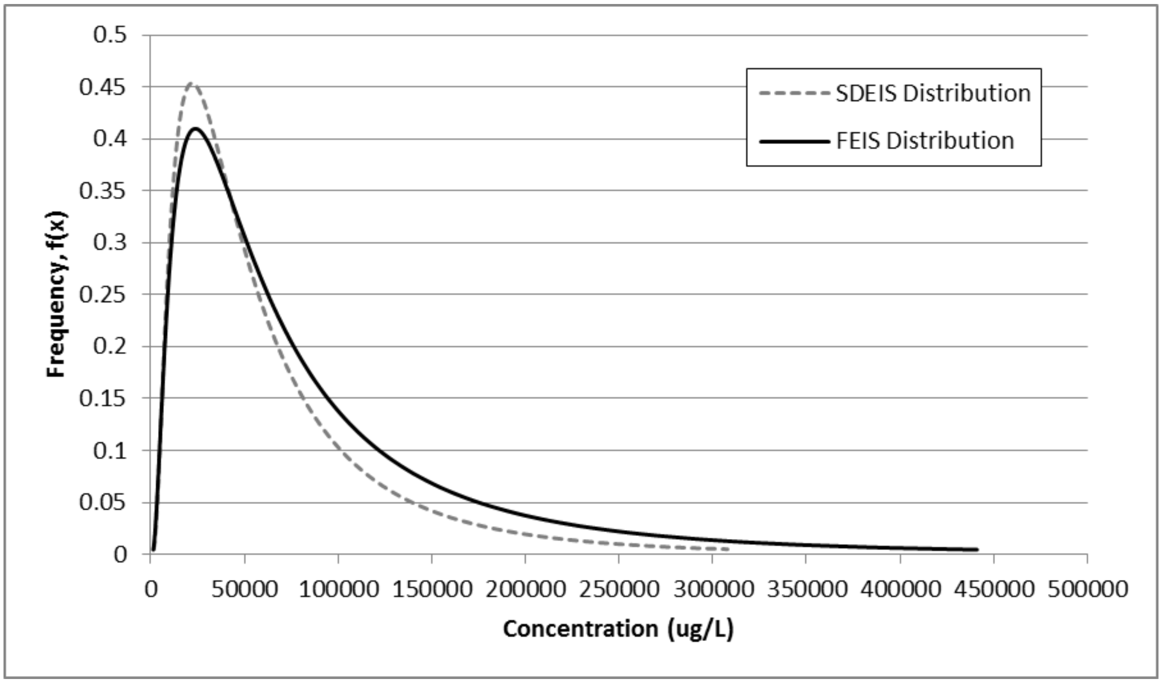


Figure B-3 Comparison of alkalinity surface runoff quality distributions

The distribution for arsenic has significantly changed for two main reasons. First, the highest sample of arsenic observed at PM-12 in the previous calibration was a non-detect at 2 µg/L. With the additional data included, there have been numerous samples with higher observed concentrations, particularly in the dry summers of 2012 and 2013. The surface runoff distribution therefore needed to include significantly higher concentrations to match observations at PM-12. The second reason is that the groundwater distribution decreased slightly, requiring more of an increase in the runoff distribution to offset the decrease. Section 2.3.2.1 appears to show a good calibration at PM-12 however.

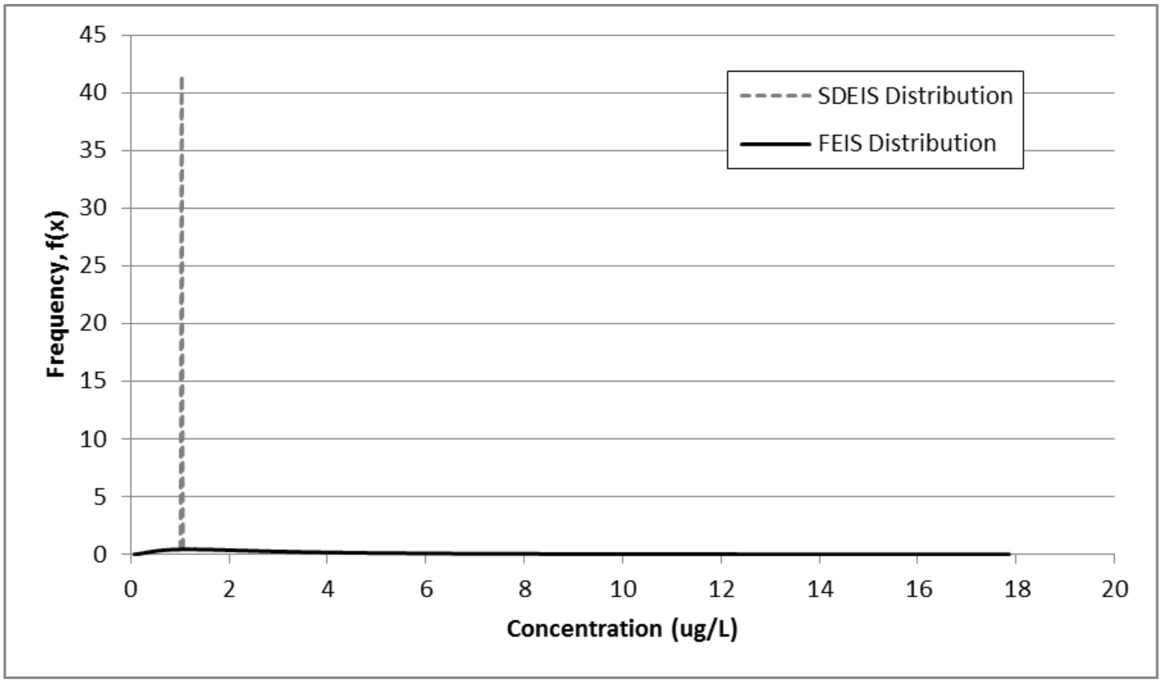


Figure B-4 Comparison of arsenic surface runoff quality distributions

The distribution for boron has changed mainly to offset the narrowing and decreased mean of the groundwater distribution. Many of the additional surface water samples collected at PM-12 continued to be non-detects at detection limits around 50 µg/L. Section 2.3.1.4 appears to show a good calibration at PM-12 however.

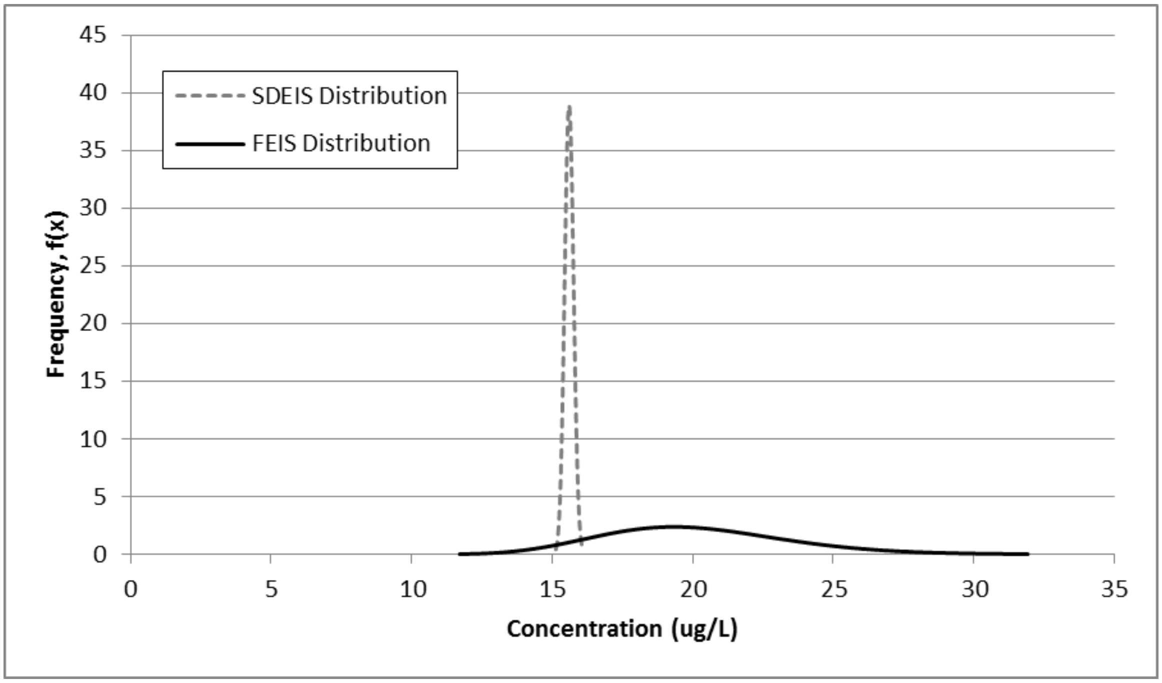


Figure B-5 Comparison of boron surface runoff quality distributions

The distribution for barium has changed mainly due to two reasons. First, the distribution has shifted to the right significantly because the groundwater distribution mean decreased, and because the target surface water mean has increased in the observed data. The range of the surface runoff distribution therefore decreased to offset the significant increase in the mean.

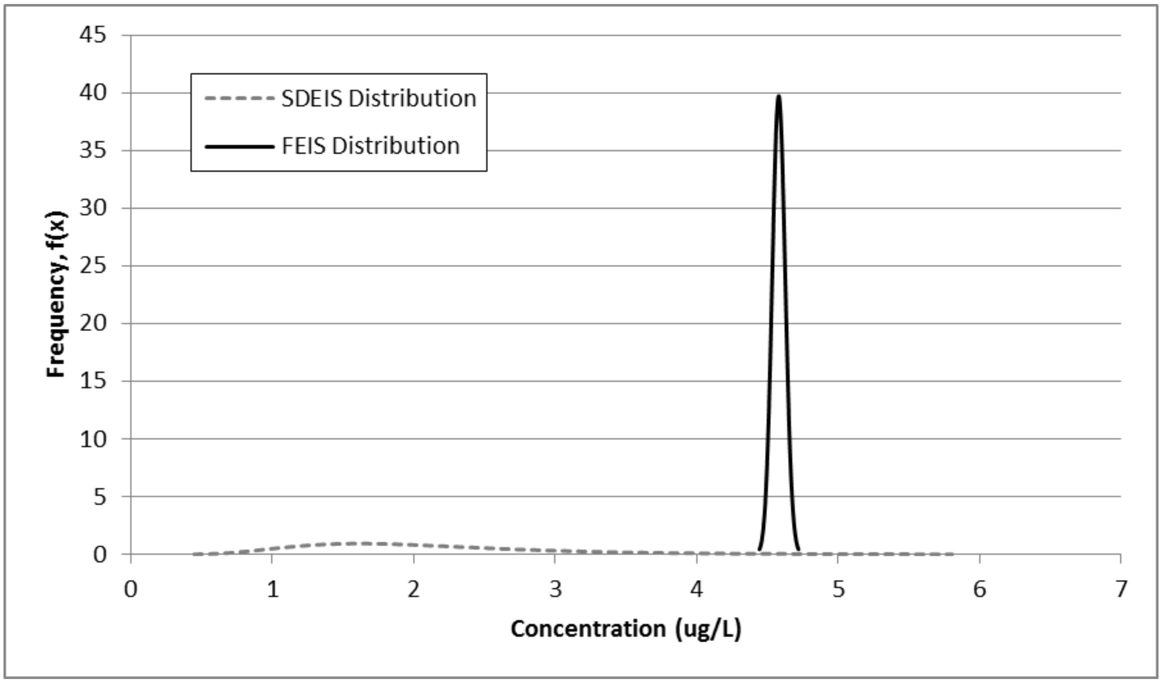


Figure B-6 Comparison of barium surface runoff quality distributions

The only real difference in the distributions for beryllium surface runoff is the mean value. This is because the mean groundwater distribution decreased and the target mean for surface runoff stayed the same at 0.1 µg/L.

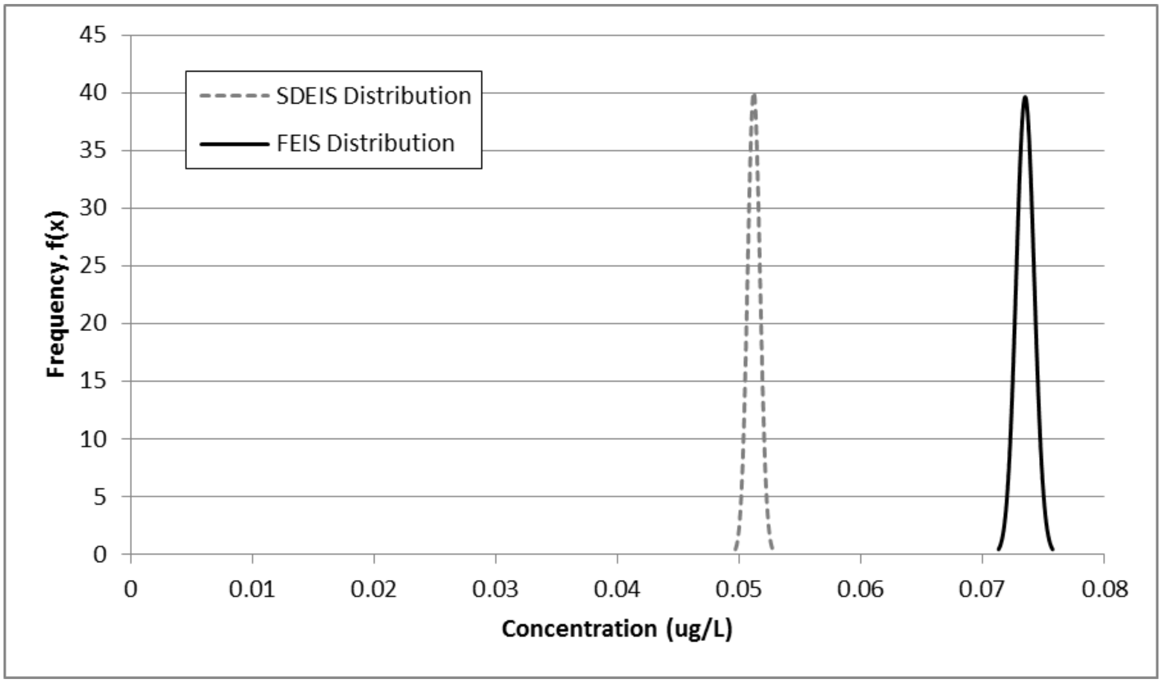


Figure B-7 Comparison of beryllium surface runoff quality distributions

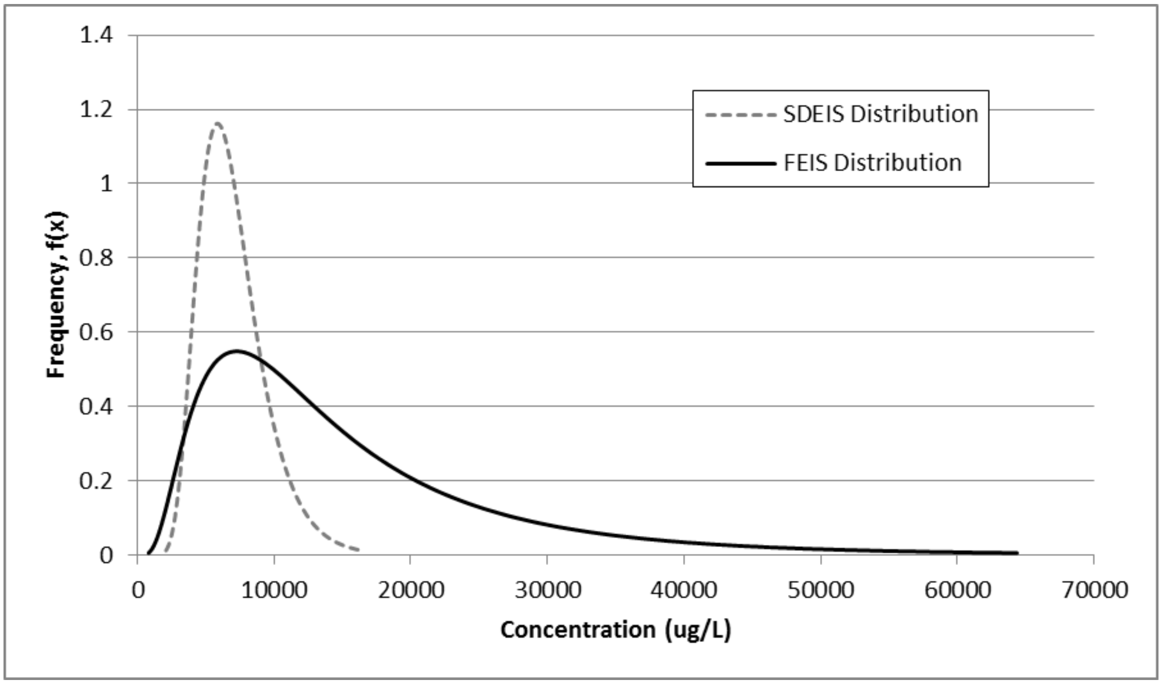


Figure B-8 Comparison of calcium surface runoff quality distributions

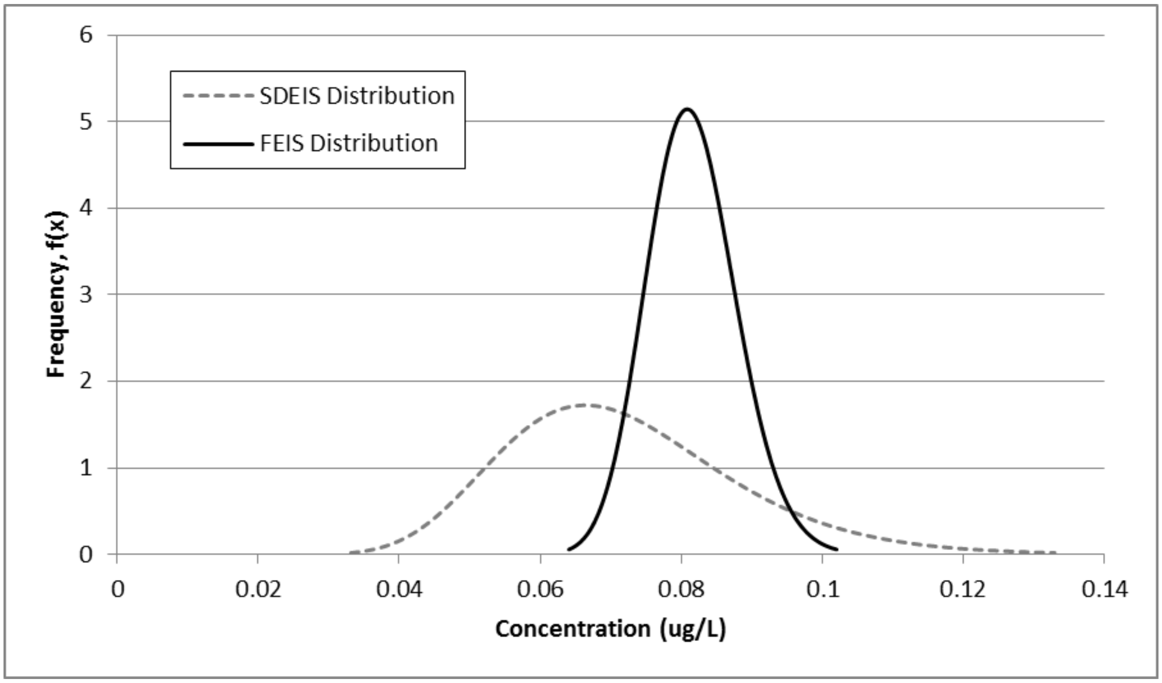


Figure B-9 Comparison of cadmium surface runoff quality distributions

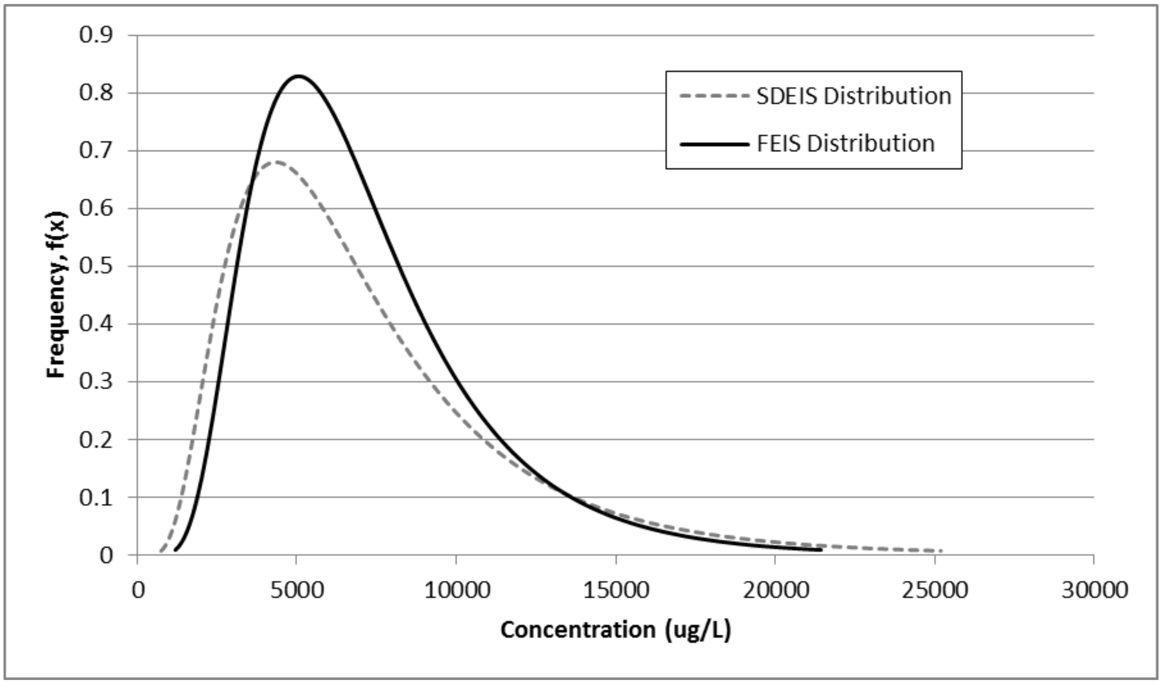


Figure B-10 Comparison of chloride surface runoff quality distributions

The range of the distribution for cobalt has increased mainly because of the observed data in the summers of 2012 and 2013. Prior to that period, the highest observed at PM-12 was 1.2 μg/L. Since then, there have been multiple samples greater than 3 μg/L, and a couple of samples greater than 4 μg/L. The range of the surface runoff distribution had to increase to capture the range in the observed data.

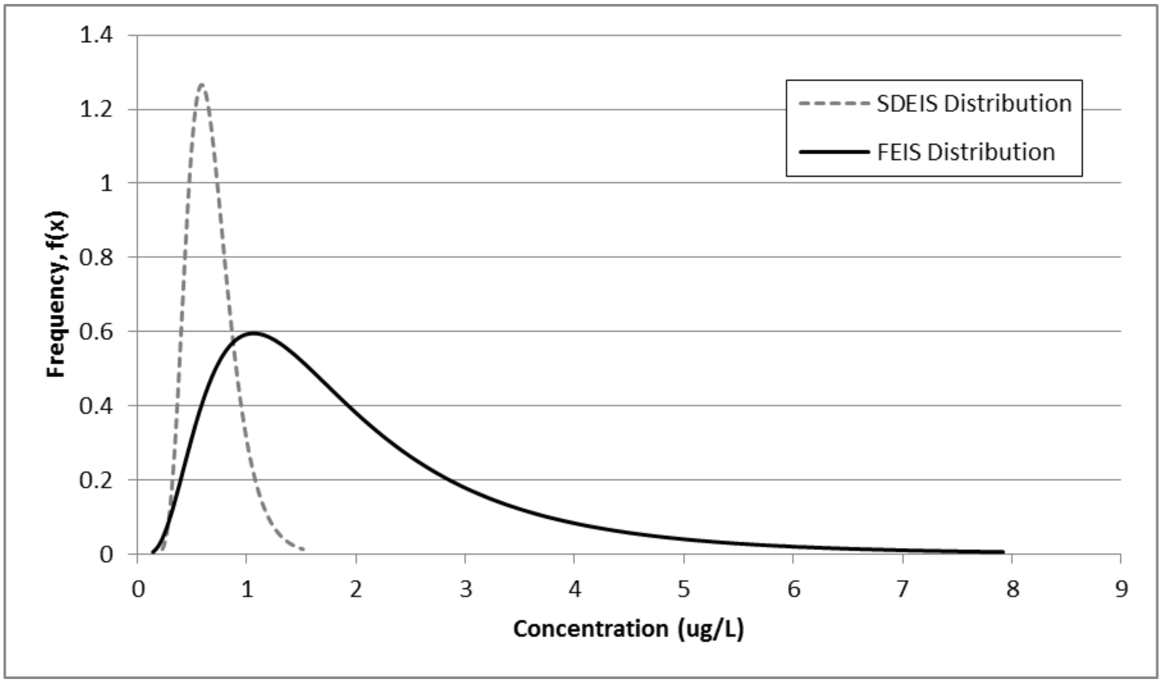


Figure B-11 Comparison of cobalt surface runoff quality distributions

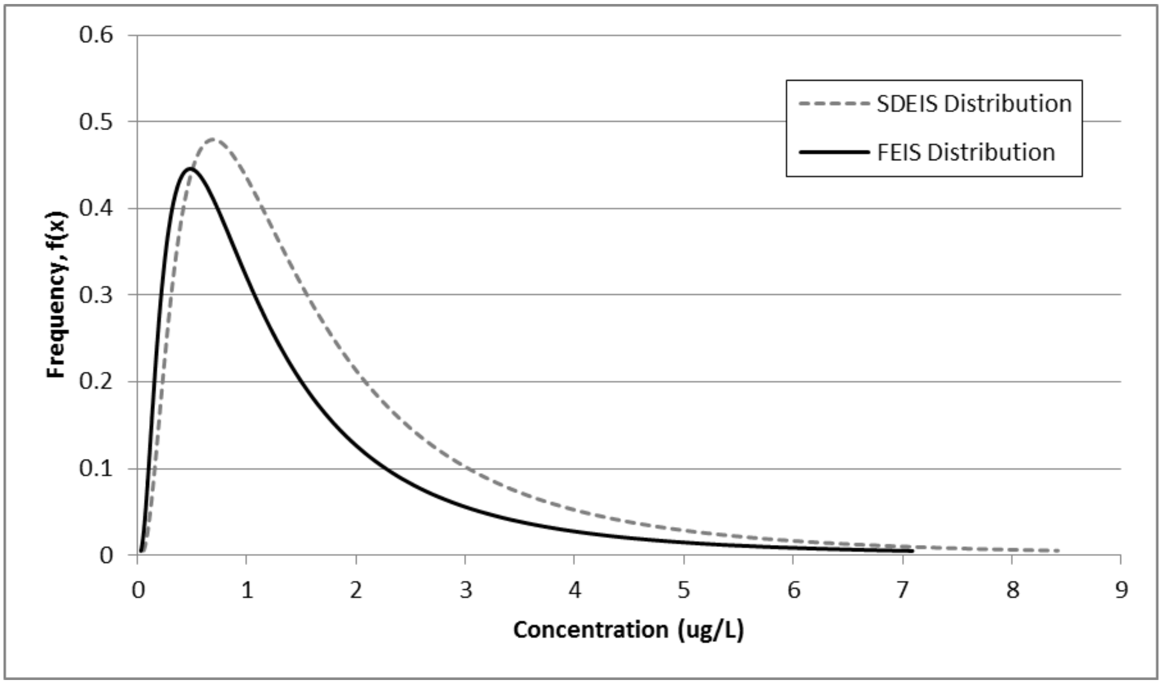


Figure B-12 Comparison of chromium surface runoff quality distributions

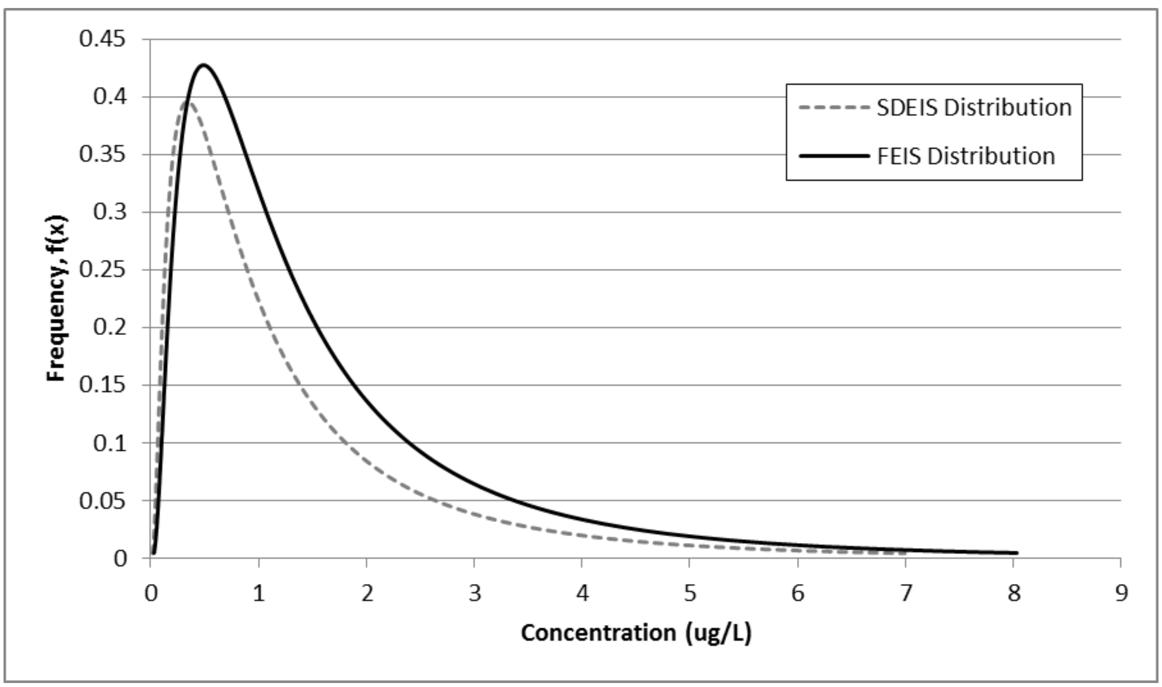


Figure B-13 Comparison of copper surface runoff quality distributions

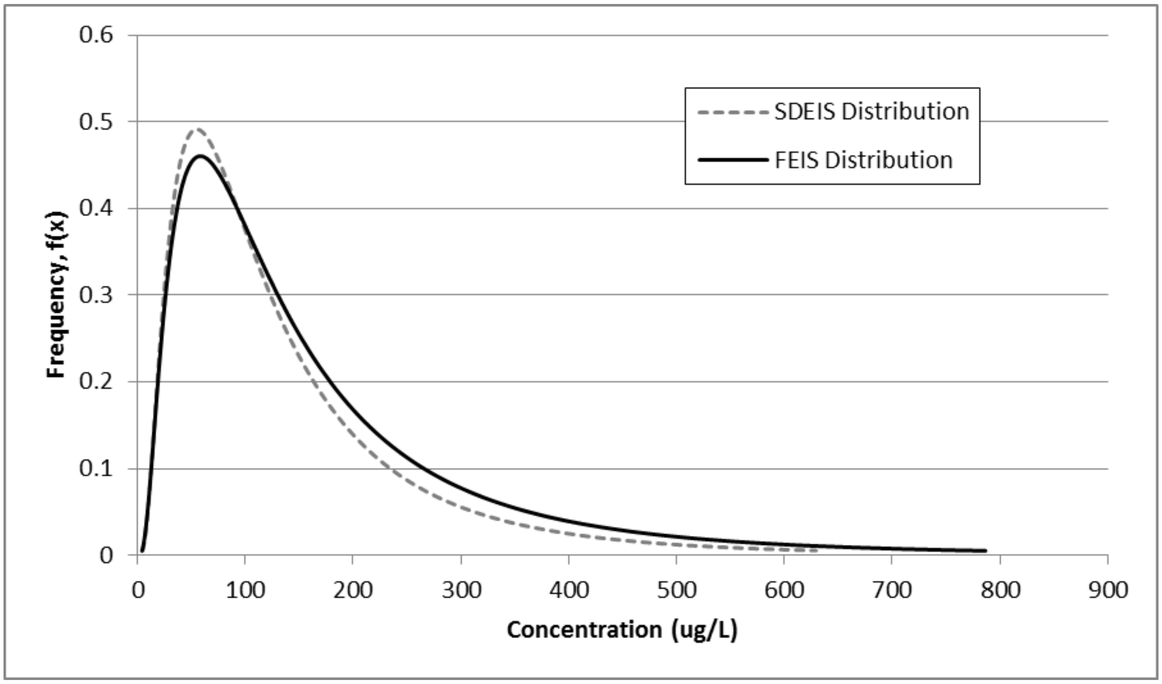


Figure B-14 Comparison of fluoride surface runoff quality distributions

The difference in the distribution for iron is similar to that for arsenic in cobalt. Mainly, the range has increased because of the observed data in the summers of 2012 and 2013. Prior to that period, the highest observed at PM-12 was around 3.4 mg/L. Since then, samples have been as high as 11 mg/L. The range of the surface runoff distribution had to increase to capture the range in the observed data.

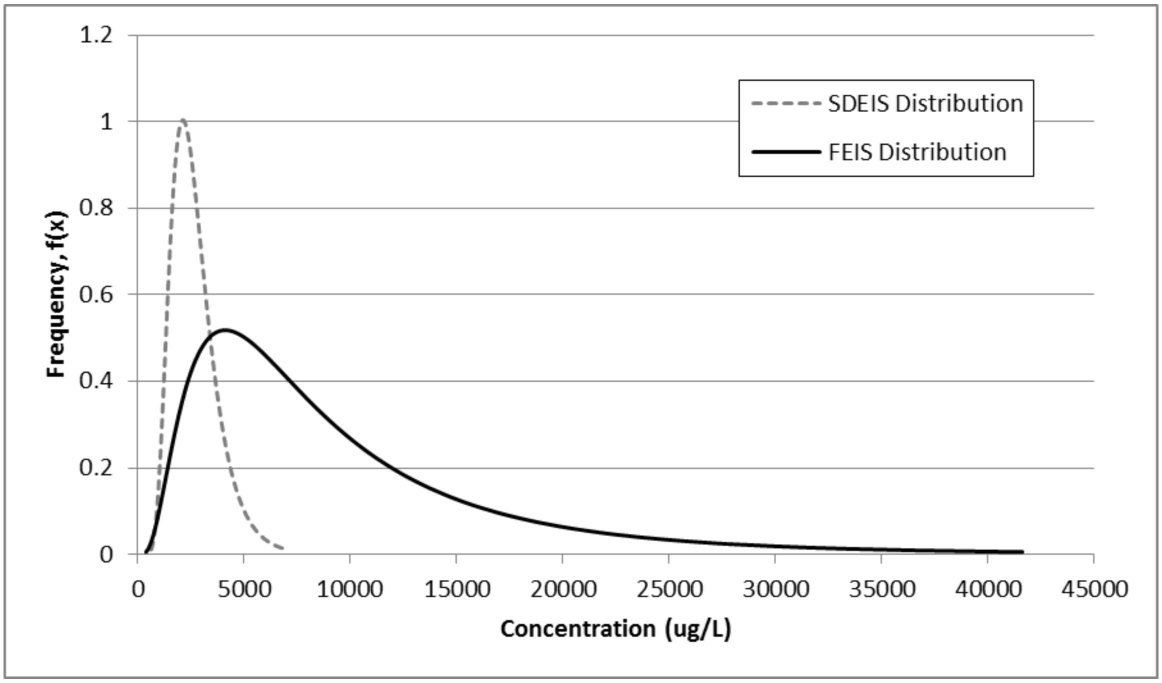


Figure B-15 Comparison of iron surface runoff quality distributions

The same difference is generally true for the following parameters: potassium, magnesium, manganese, and sodium. Potassium, magnesium, and sodium all showed similar decreases in the mean groundwater distribution. Additionally, higher concentrations were observed in 2012 and 2013 than were previously observed at PM-12. Even though the manganese groundwater distribution did increase, the mean and range surface runoff distribution also had to increase because of the significantly higher observations in manganese at PM-12 in the additional data.

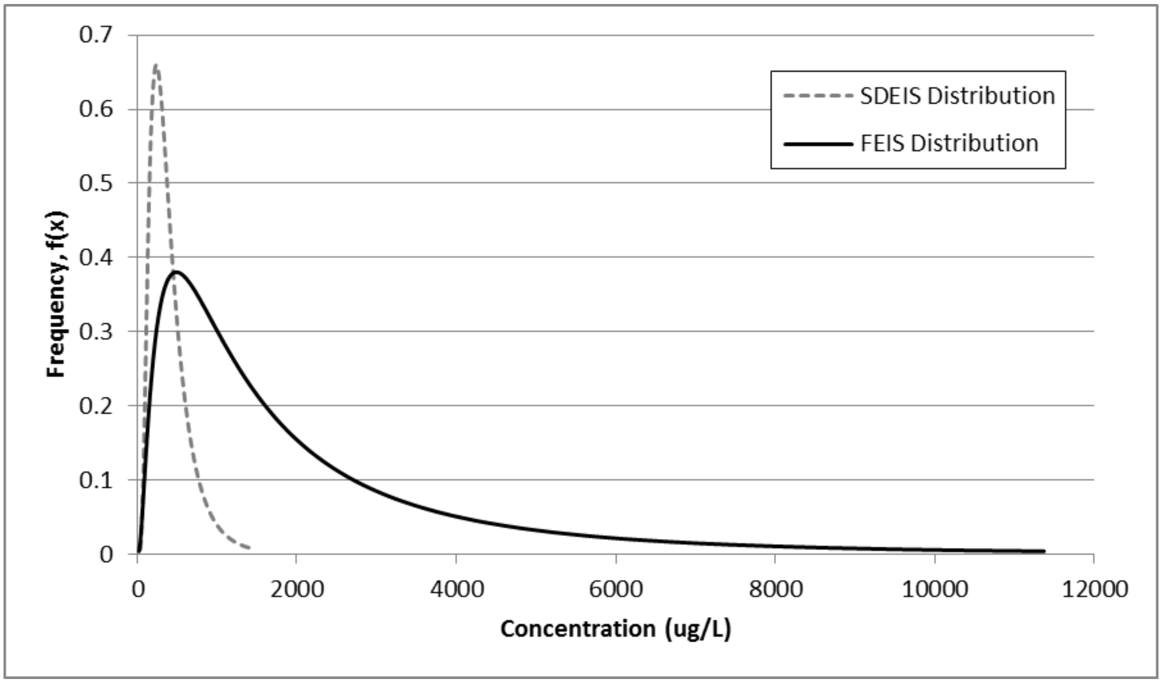


Figure B-16 Comparison of potassium surface runoff quality distributions

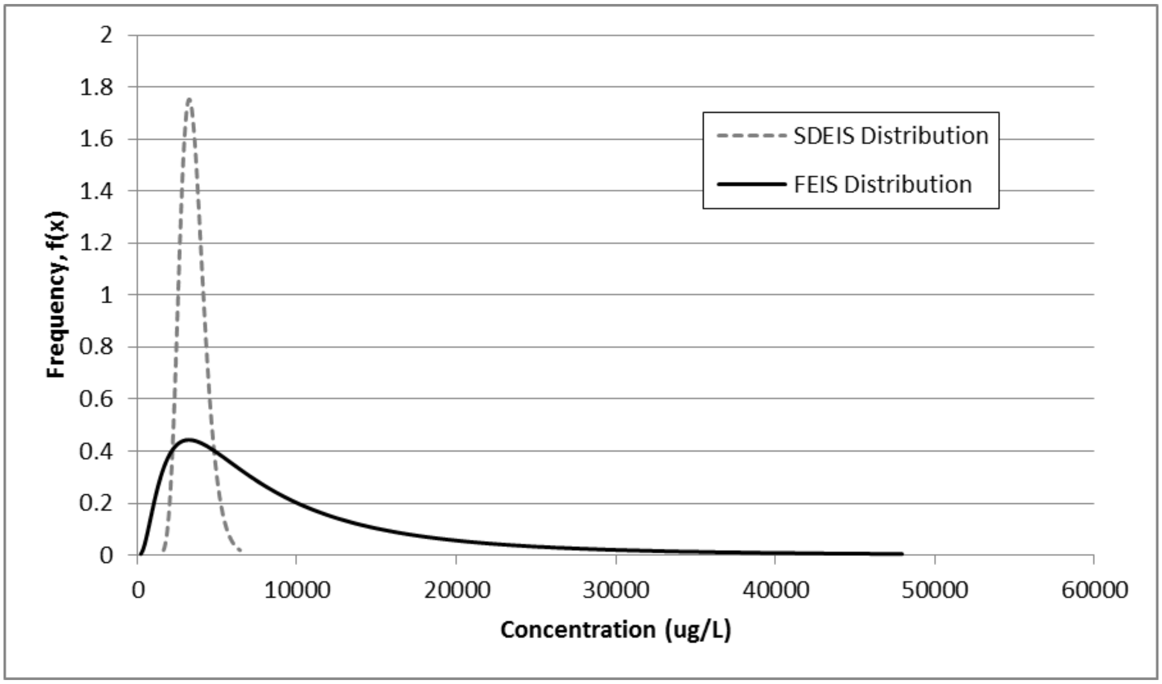


Figure B-17 Comparison of magnesium surface runoff quality distributions

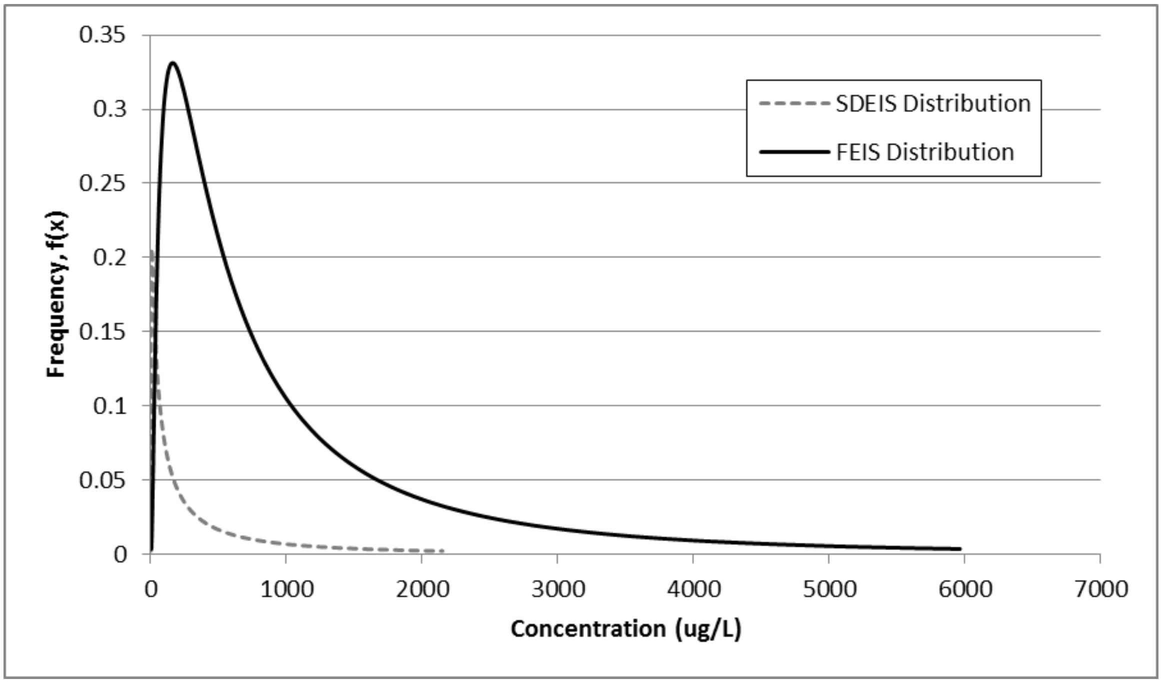


Figure B-18 Comparison of manganese surface runoff quality distributions

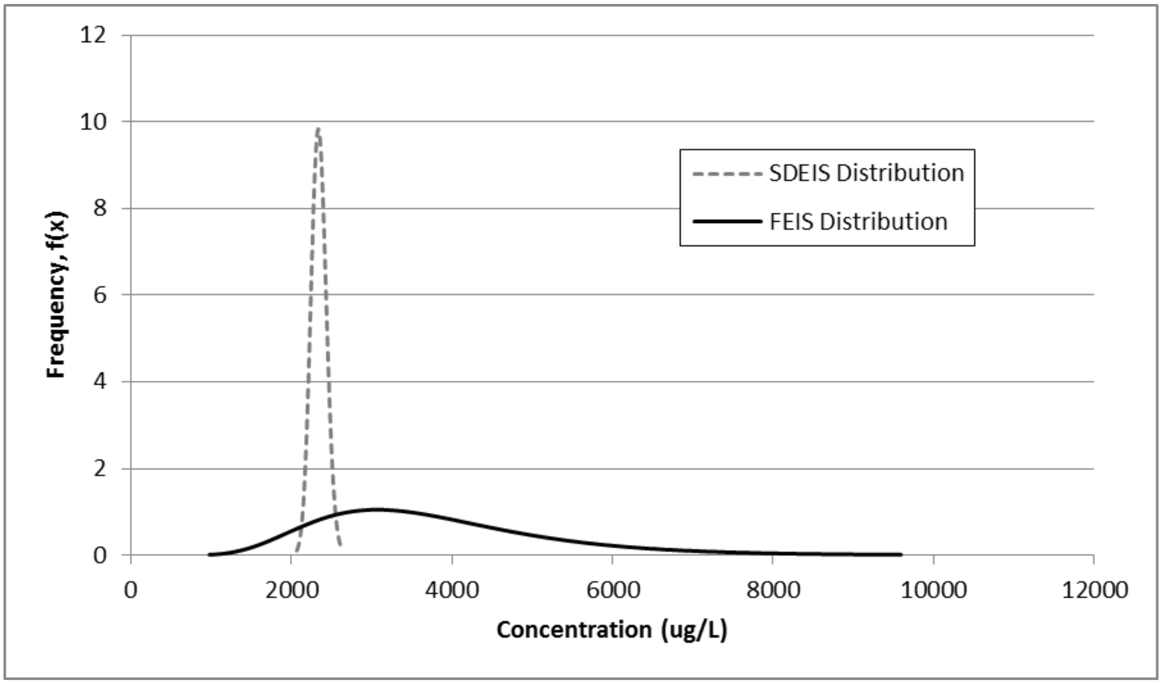


Figure B-19 Comparison of sodium surface runoff quality distributions

The only real difference in the distributions for nickel surface runoff is the mean value. This is because the mean groundwater distribution decreased and the target mean for surface runoff stayed nearly the same at around 1.5 μg/L.

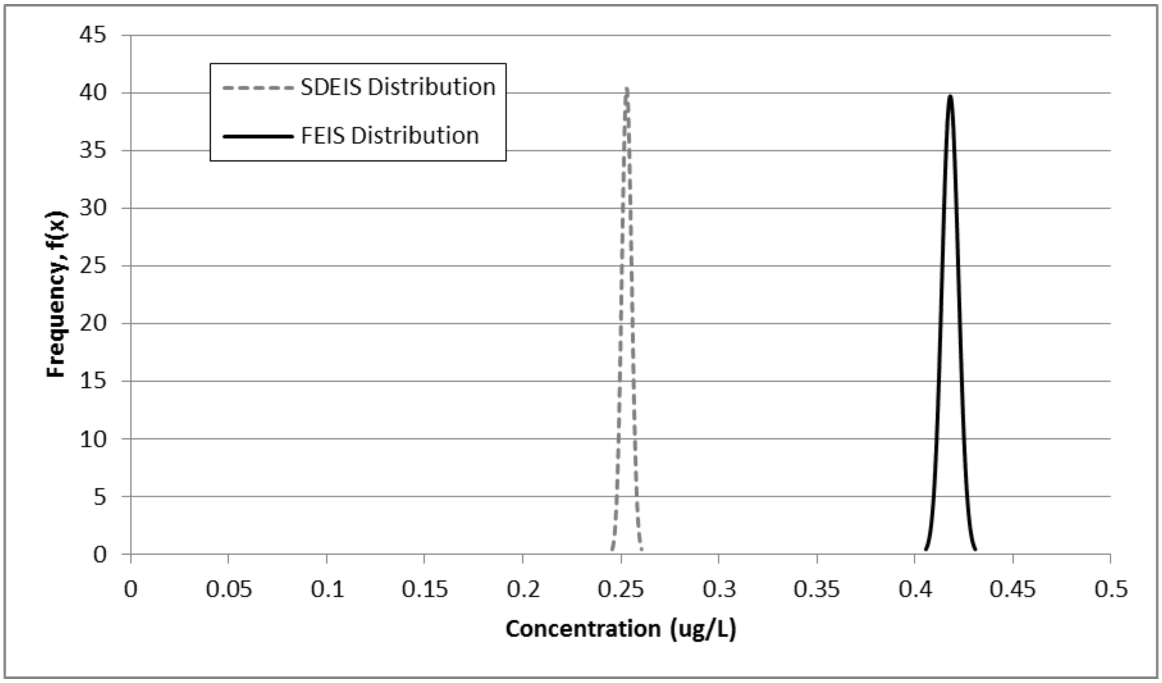


Figure B-20 Comparison of nickel surface runoff quality distributions

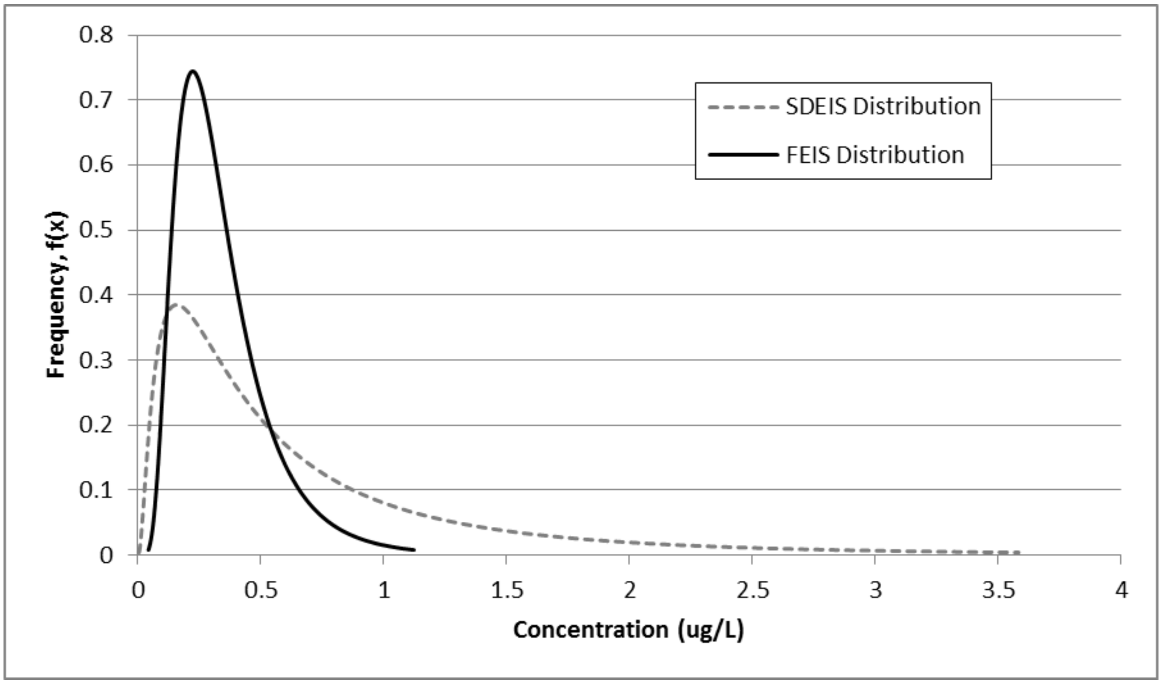


Figure B-21 Comparison of lead surface runoff quality distributions

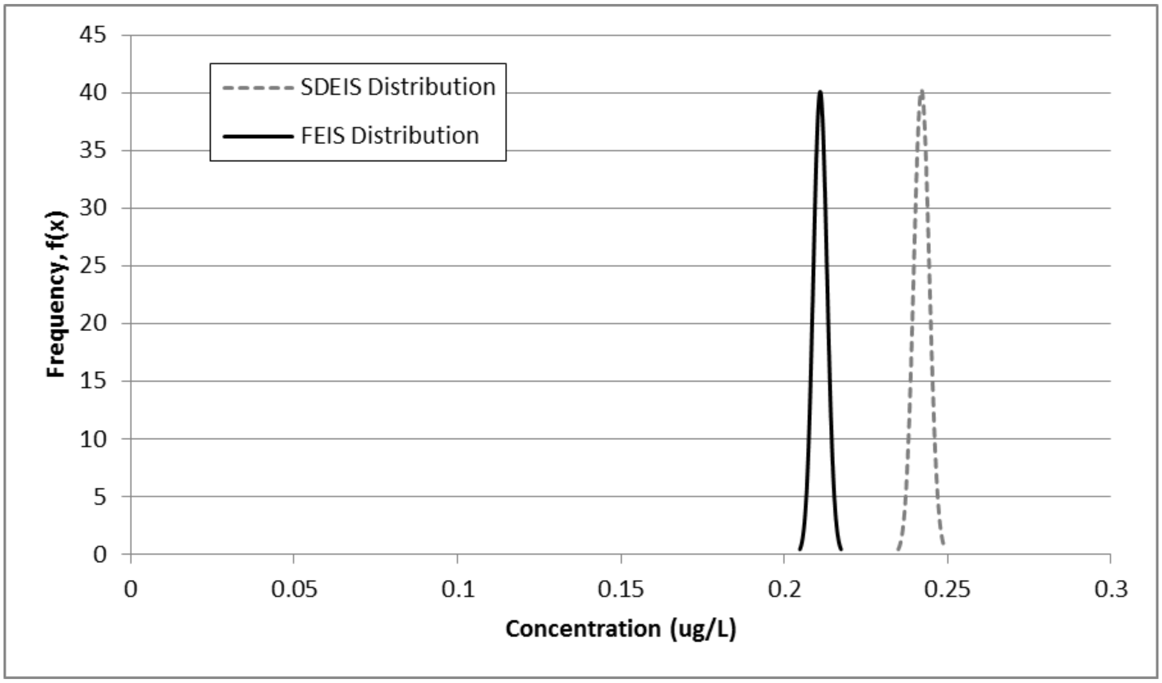


Figure B-22 Comparison of antimony surface runoff quality distributions

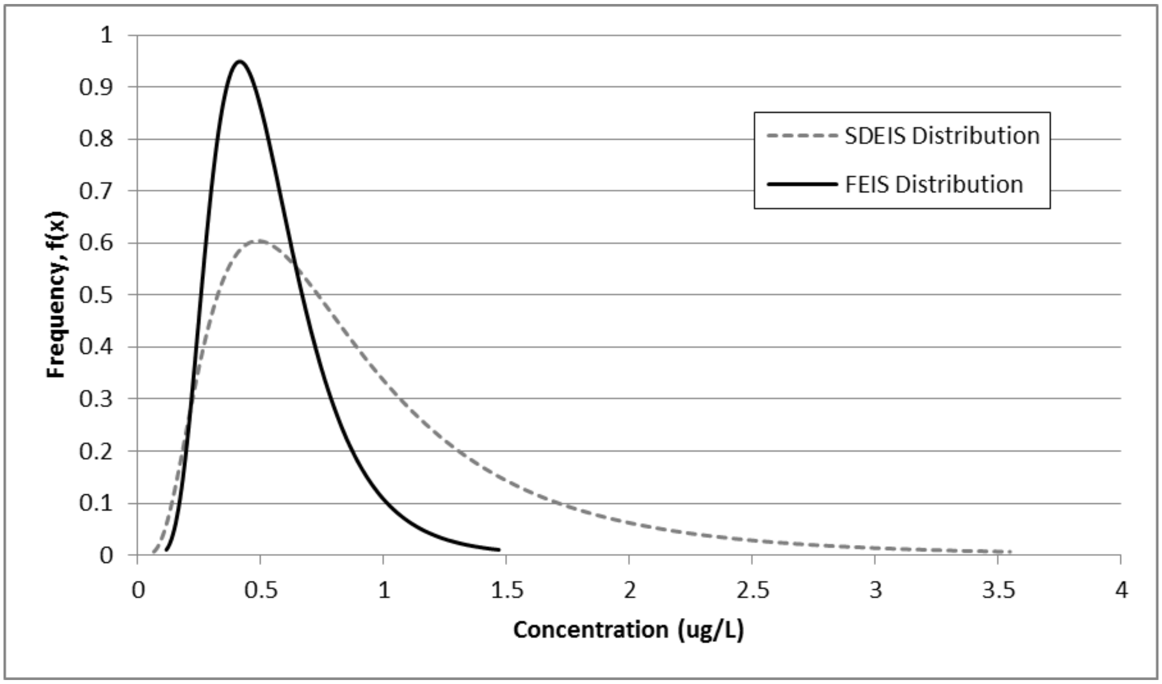


Figure B-23 Comparison of selenium surface runoff quality distributions

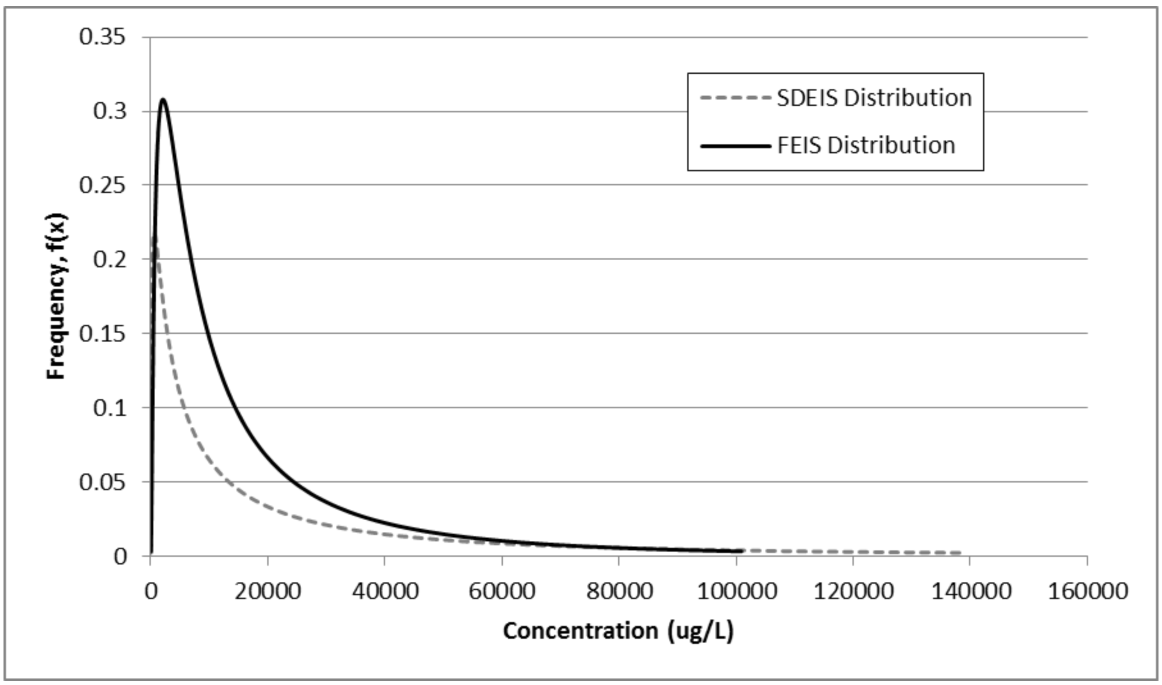


Figure B-24 Comparison of sulfate surface runoff quality distributions

Thallium has changed mostly because the detection limit continues to decrease significantly. Samples continue to be non-detects, or detected at very low concentrations. Therefore, the distribution of the observed data continues to shift lower and lower.

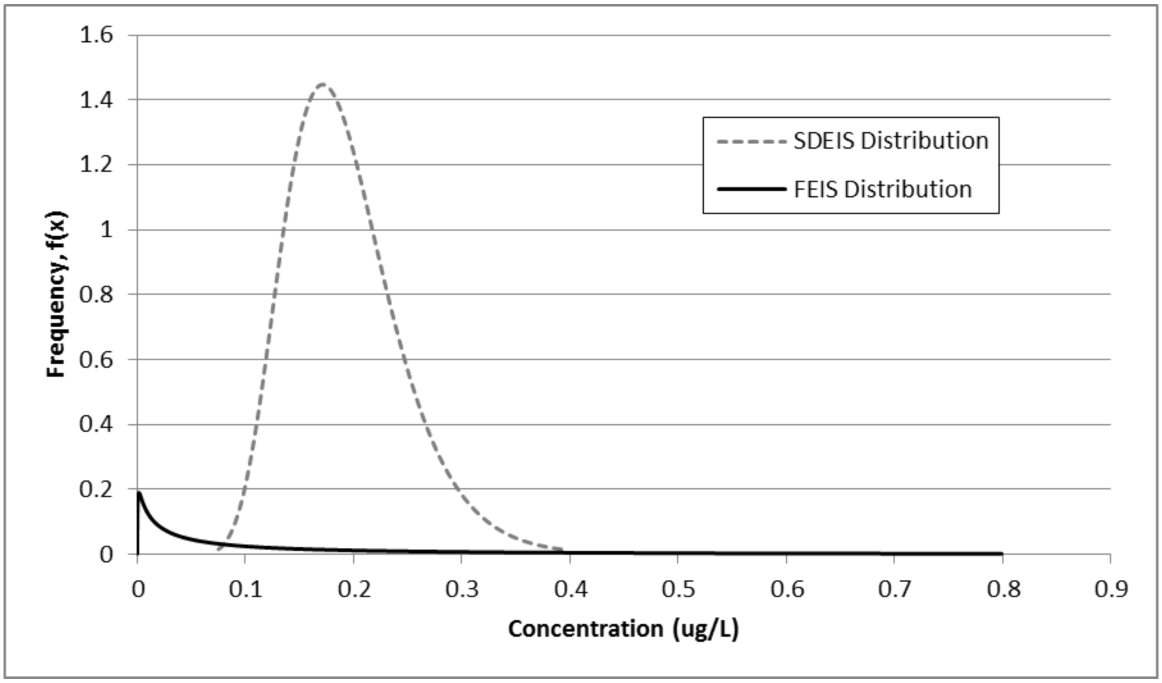


Figure B-25 Comparison of thallium surface runoff quality distributions

Vanadium shows a significant change because it was not previously calibrated. The distribution was assumed to have the same mean as the groundwater distribution with little variation. However, recently collected samples all were non-detects with a detection limit of 3 µg/L. To match the observed surface water data, the surface runoff quality had to decrease significantly.

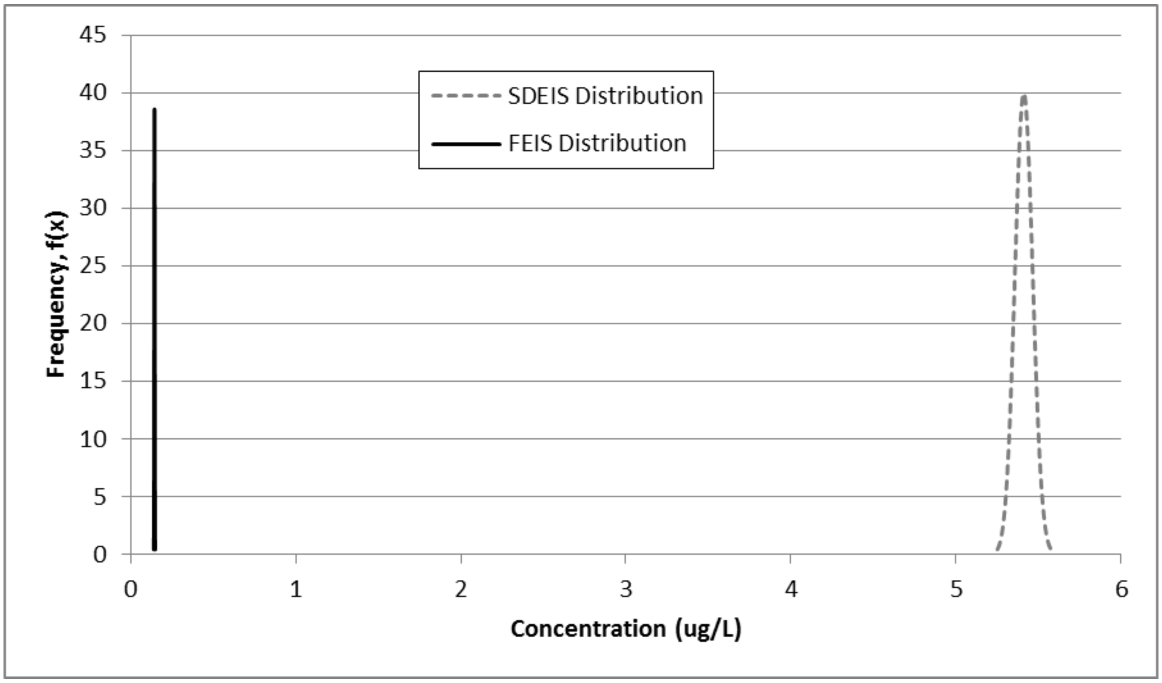


Figure B-26 Comparison of vanadium surface runoff quality distributions

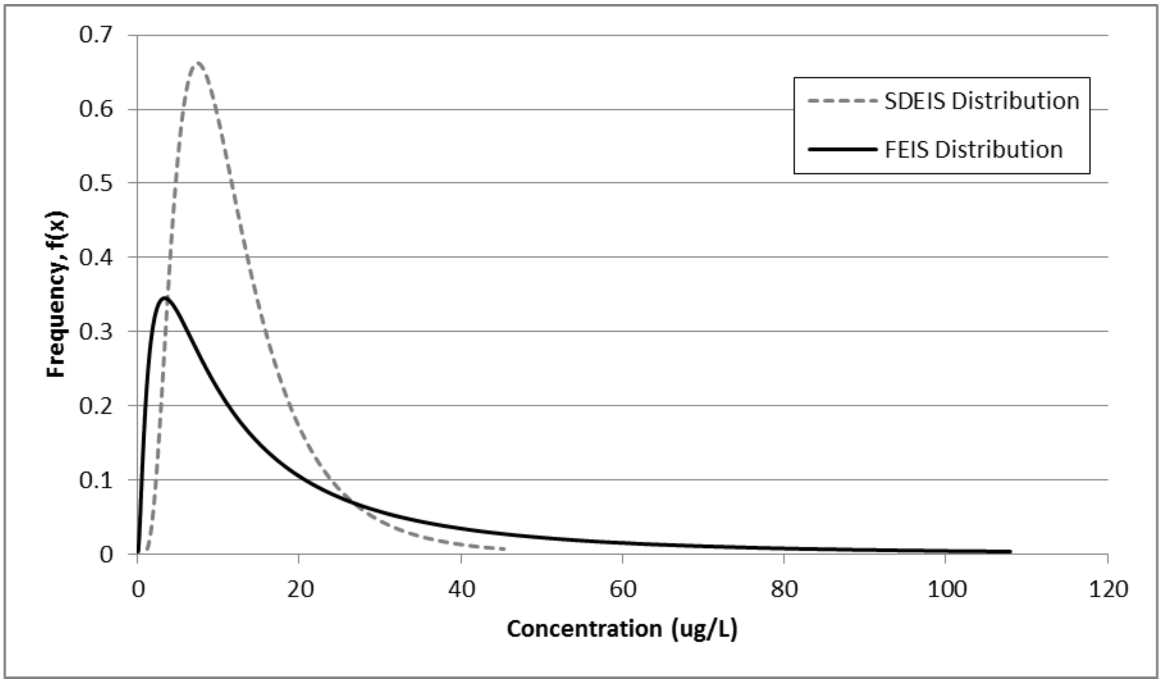


Figure B-27 Comparison of zinc surface runoff quality distributions

Attachment D

Concentration Statistics in the FTB Pond

Attachment D Concentration Statistics in the FTB Pond

Estimated FTB Pond water quality is shown in this attachment using a series of concentration statistic plots. Data for these plots were created as follows:

- The probabilistic GoldSim model was run at monthly time steps for 200 years (2401 time steps including the initial time zero). At each time step, the concentration in the FTB Pond for each constituent was individually recorded.

- After one realization (i.e., one model run) was completed, the process was repeated until 500 model realizations were completed. The result is 500 estimated concentrations in the FTB Pond of each constituent at every time step.

- At every time step, and for every constituent, the 500 estimated concentrations were sorted smallest-to-largest and 3 single values were chosen to represent the statistics at that particular time step.

- From the 500 estimate concentrations, sorted smallest-to-largest, the 50th value was chosen to represent the 10th percentile (P10), the 250th value was chosen to represent the median (P50), and the 450th value was chosen to represent the 90th percentile (P90). This indicates that at any time, 10% of the model results are less than or equal to the P10 value, 50% are less than or equal to the P50 value, and 90% are less than or equal to the P90 value.

- This process was repeated for all time steps, resulting in 3 time series lines representing the 10th, 50th, and 90th percentiles of concentrations in the FTB Pond at every time step (monthly results).

- For plotting the FTB Pond results over the entire 200 years of the simulation, the data was summarized by year to make the plots legible. The monthly model outputs for the 10th, 50th, and 90th percentiles are plotted on an annual basis by taking the maximum value of each percentile for a given year (i.e., the highest 90th percentile value).

The figure numbering convention is "**Figure W-XX-YY.Z**" where:

- **W** indicates the Attachment.

- **XX** is a counter indicating the location; in this attachment it will always be "01" because there is one FTB Pond.

- **YY** is a counter indicating the constituent; in this attachment it will count from "01" to "27" to show the 27 independently modeled constituents.

- **Z** is a numerical value, 1 or 2. A value of 1 indicates that the annual maximum has been plotted and a value of 2 indicates that the annual average has been plotted. In this attachment, only the annual maximum (1) has been plotted.

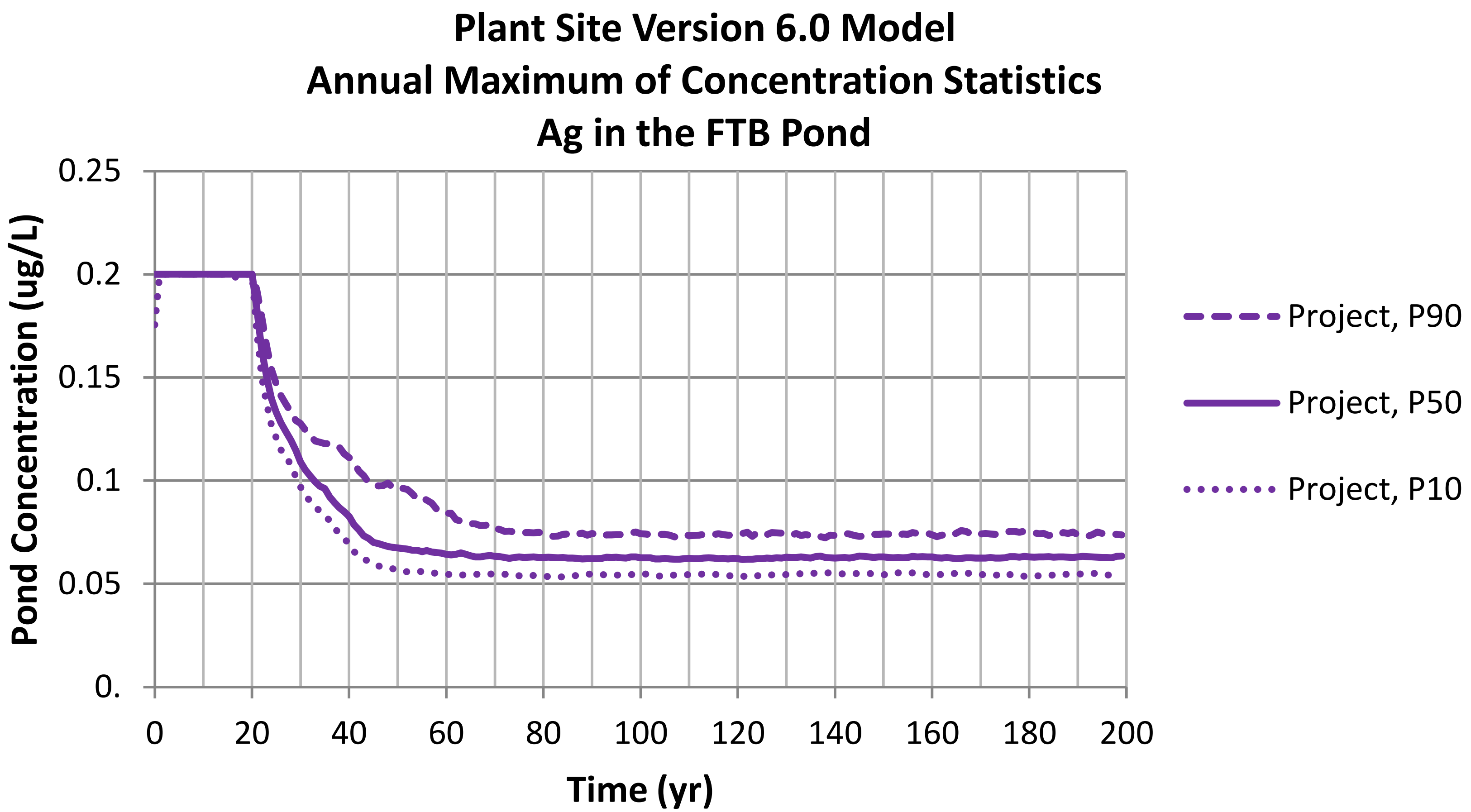


Figure D-01-01.1

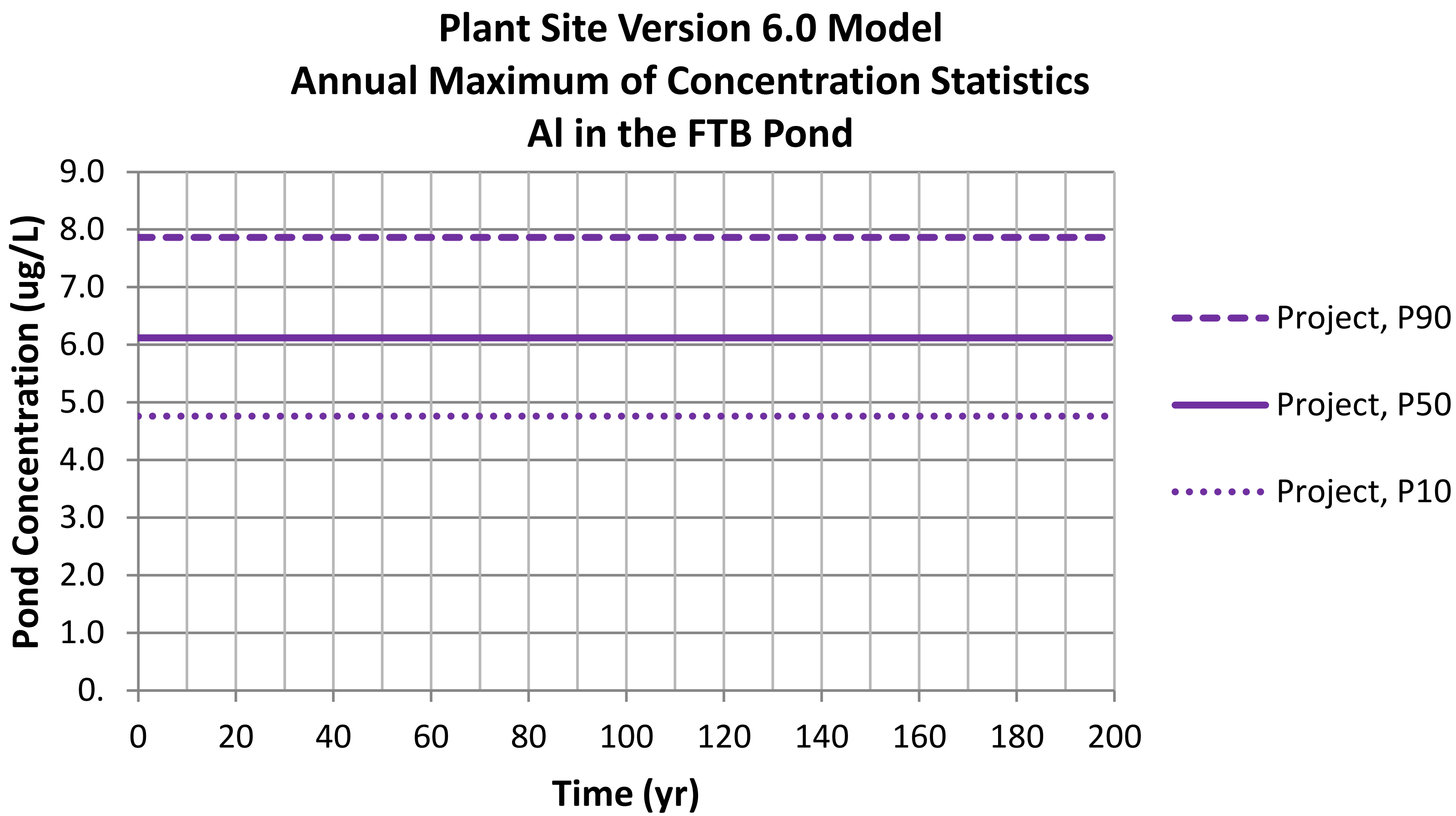


Figure D-01-02.1

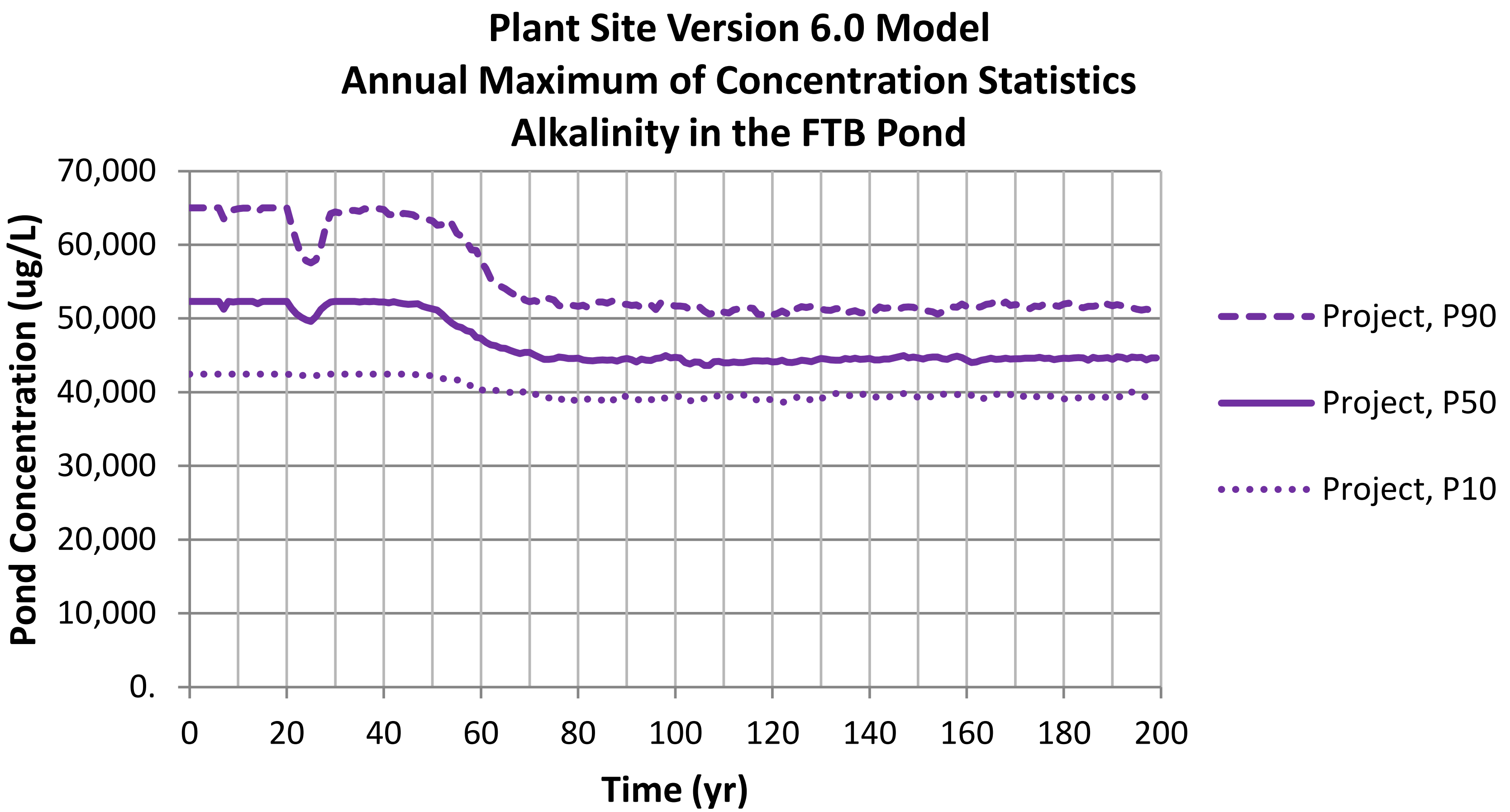


Figure D-01-03.1

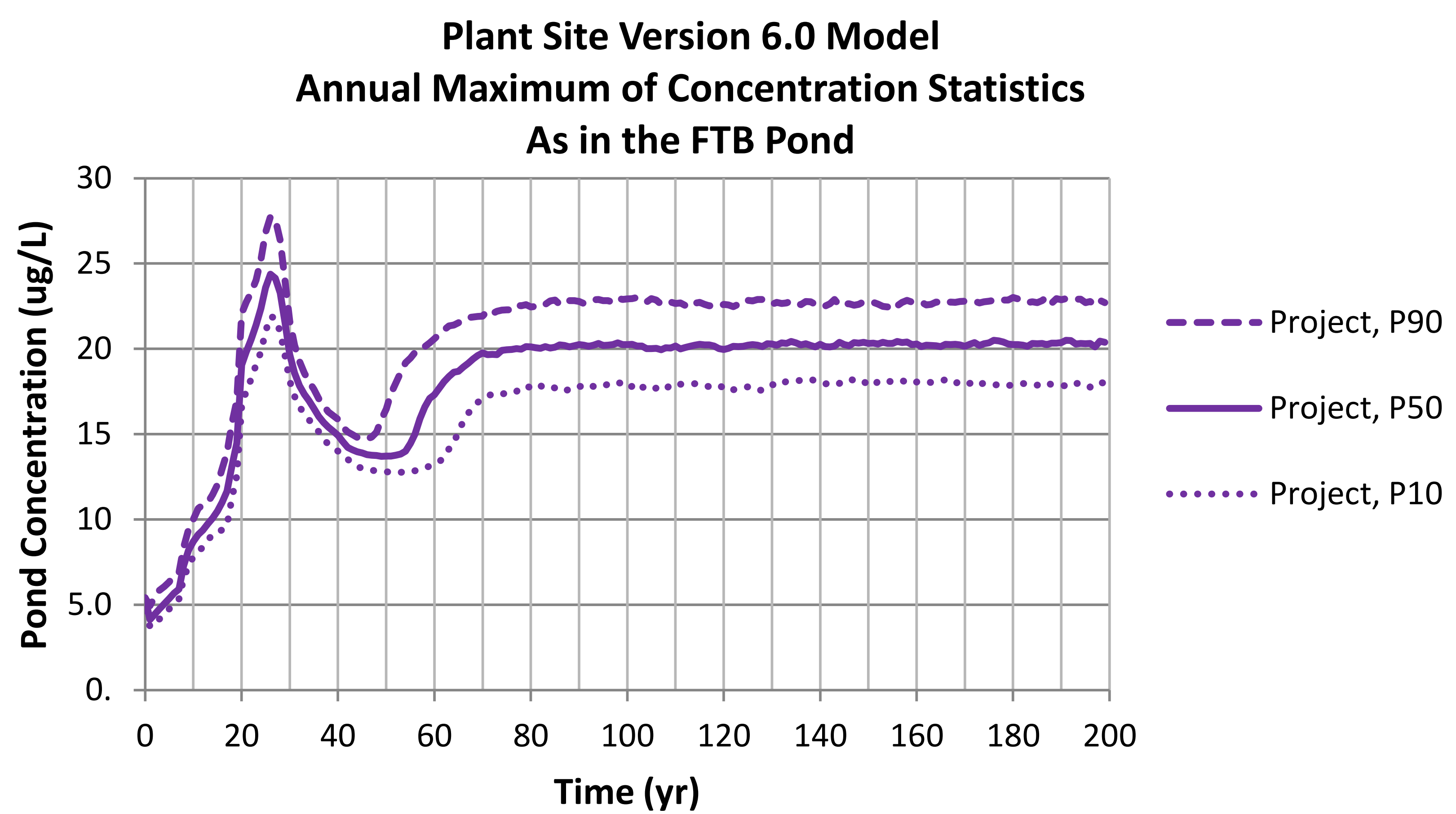


Figure D-01-04.1

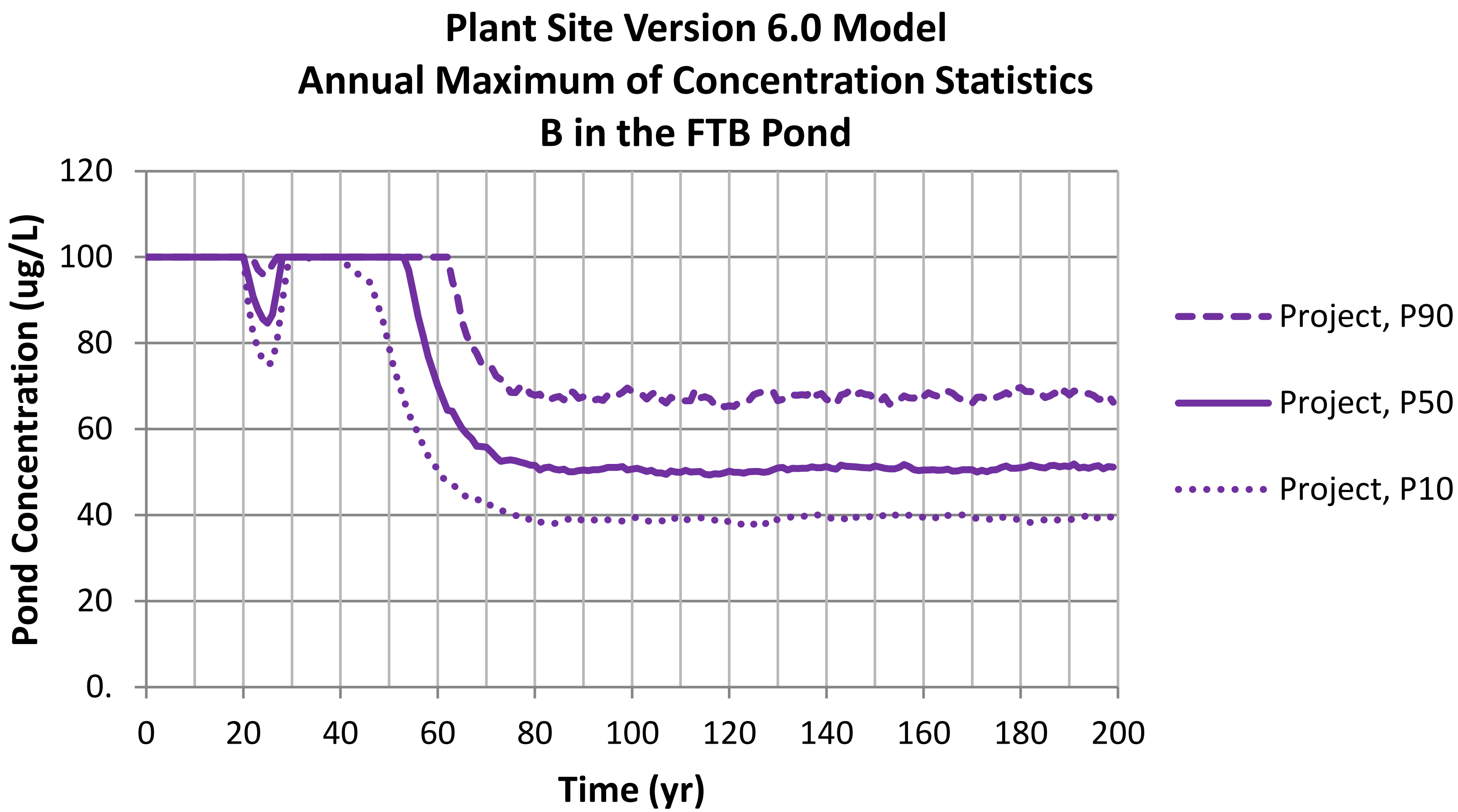


Figure D-01-05.1

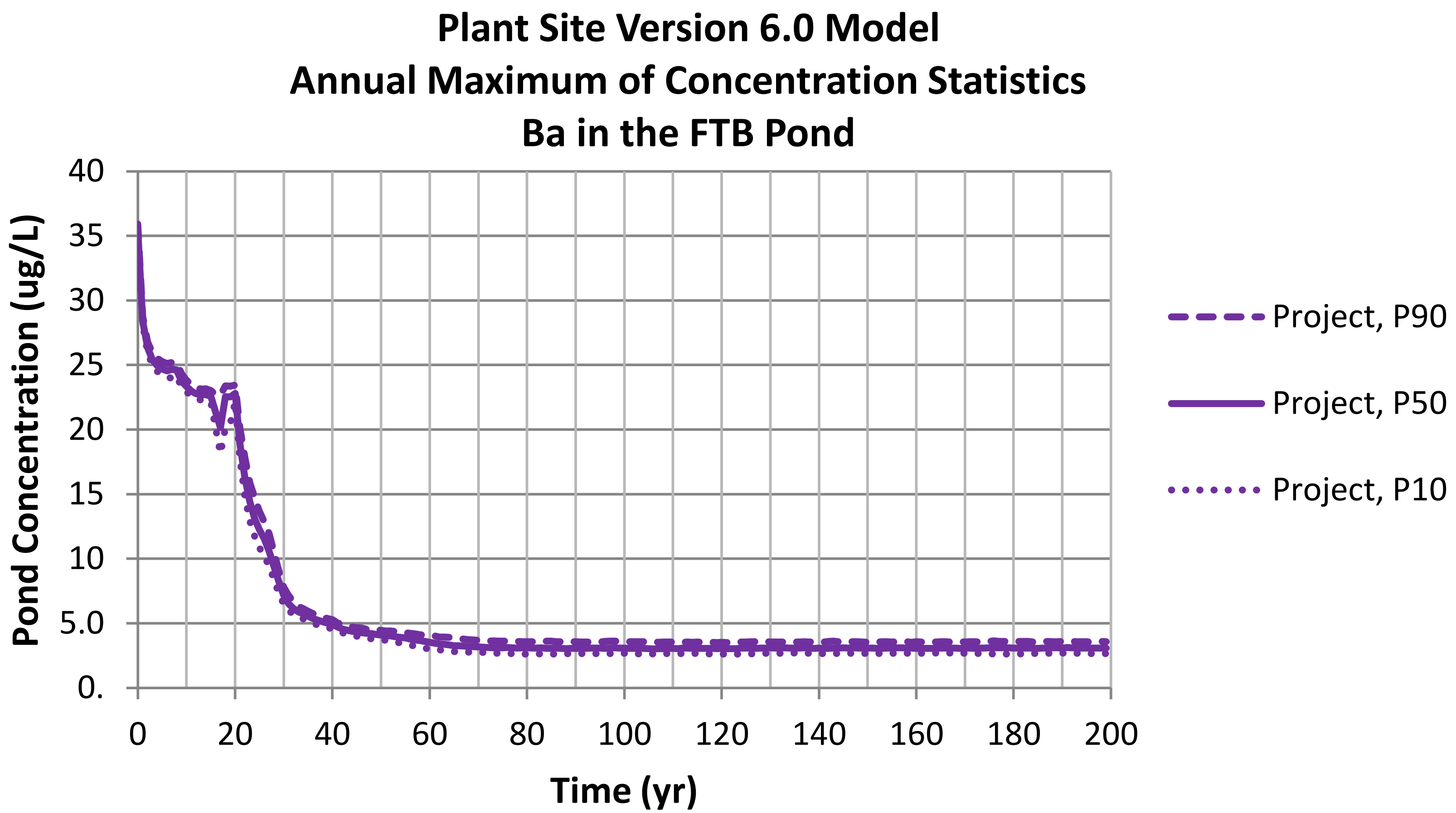


Figure D-01-06.1

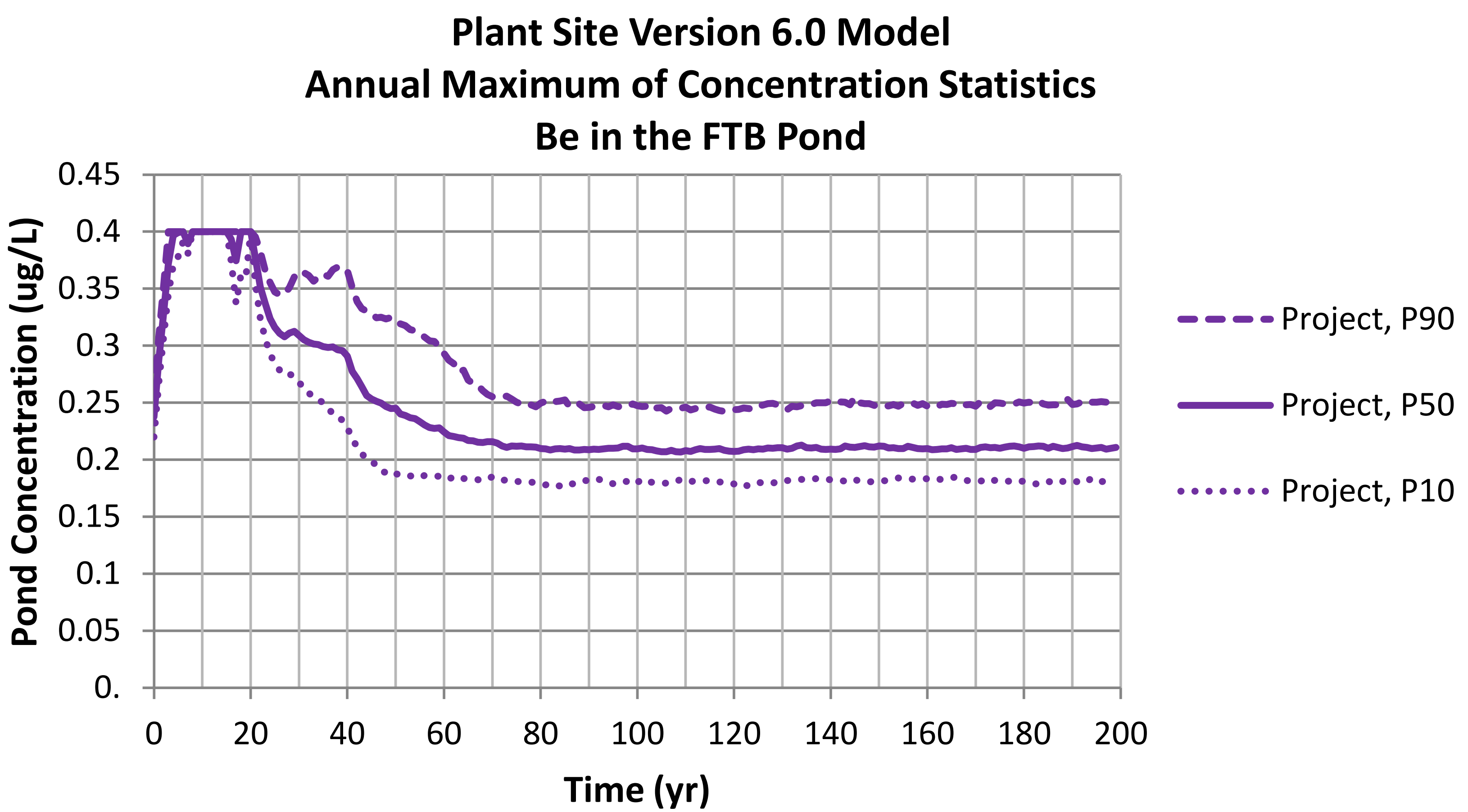
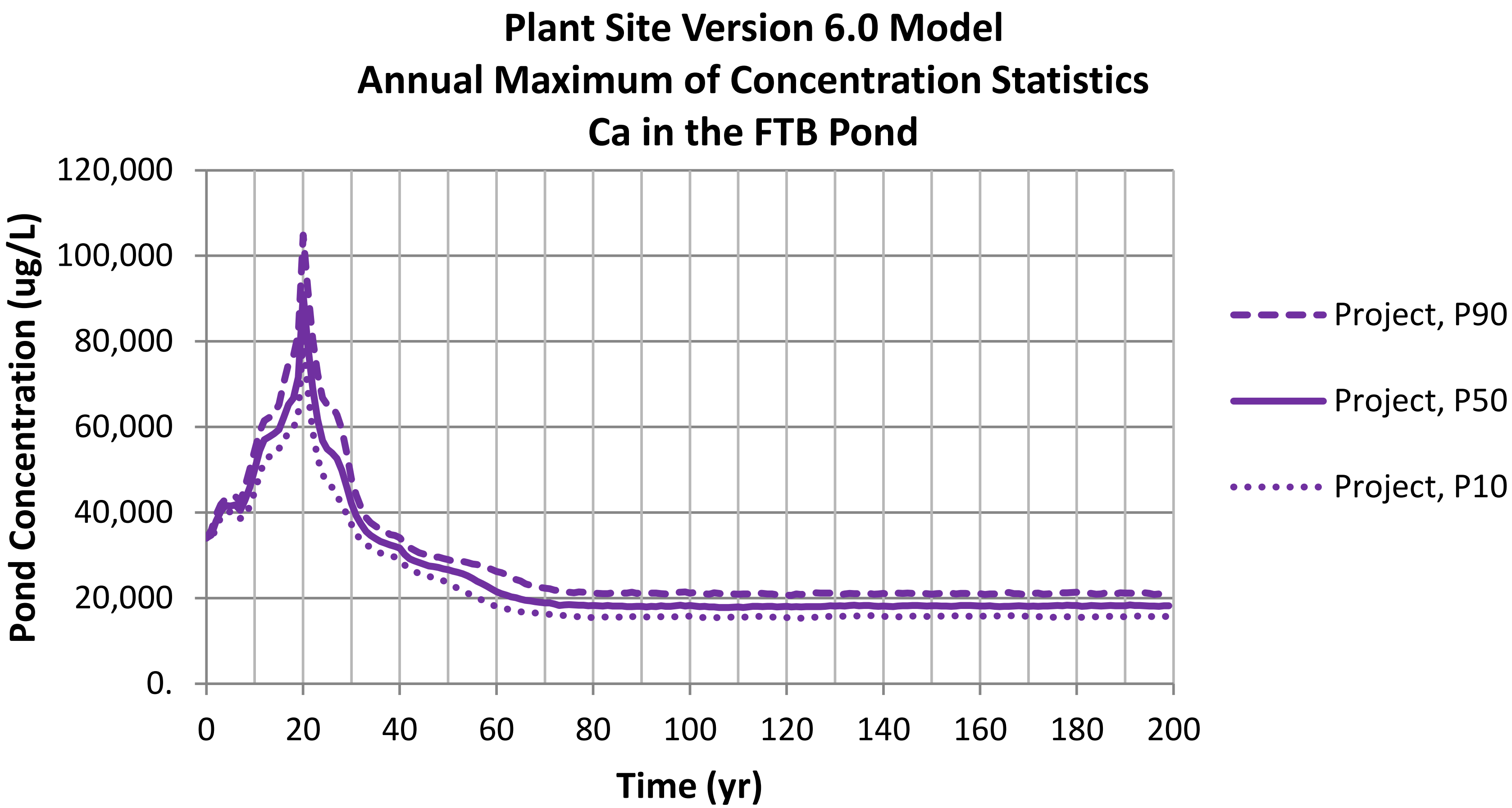


Figure D-01-07.1



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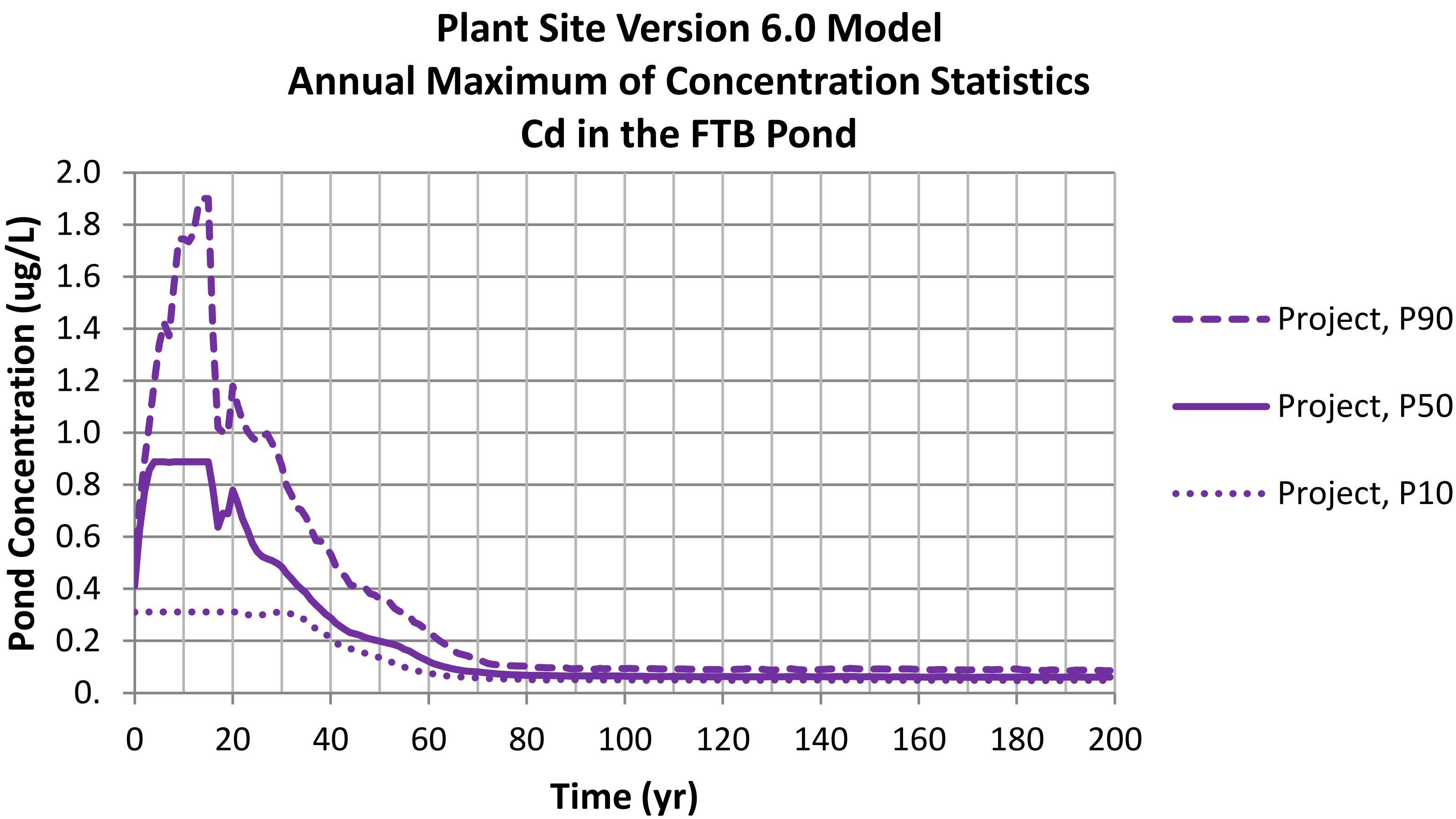


Figure D-01-09.1

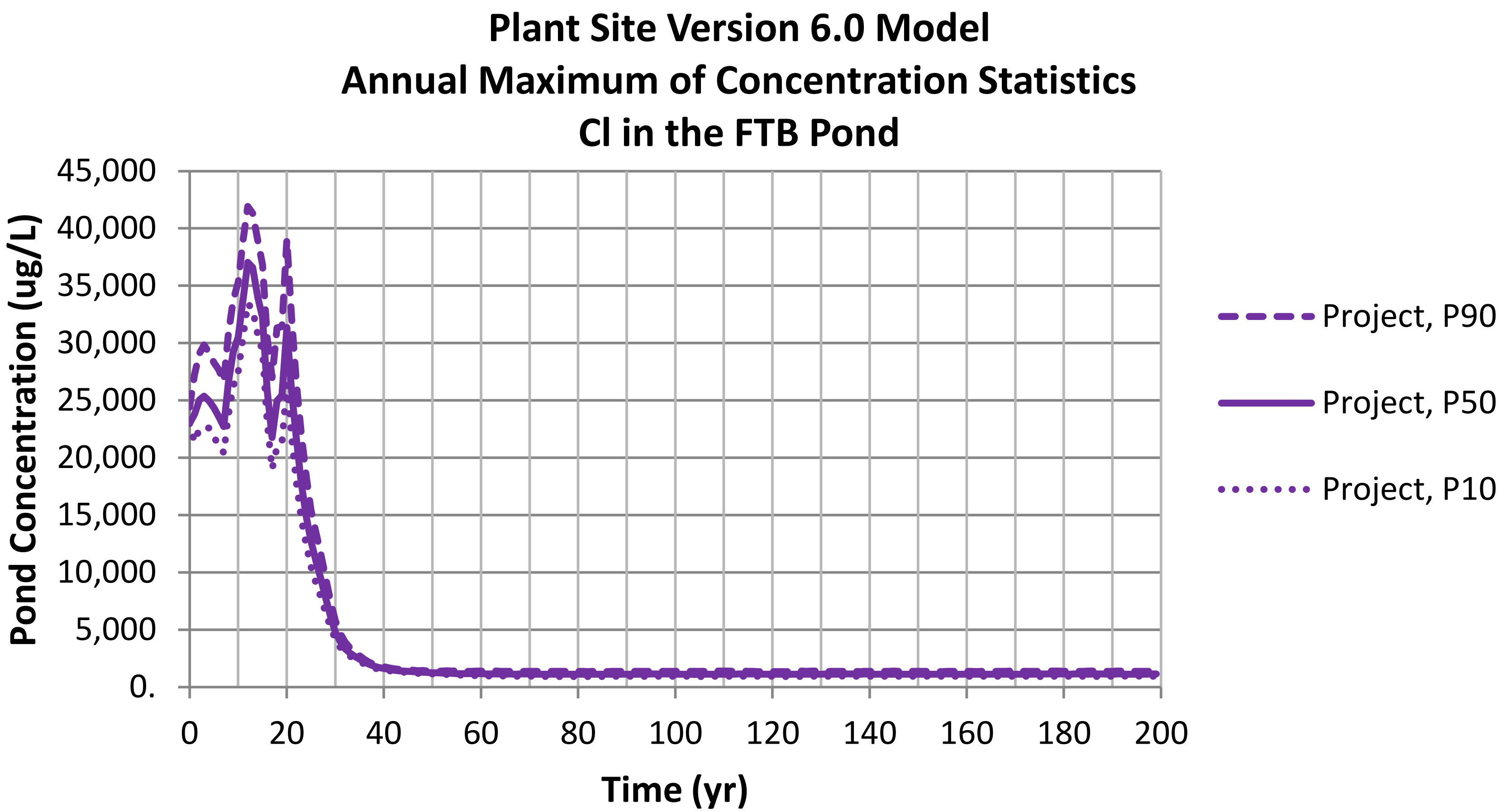
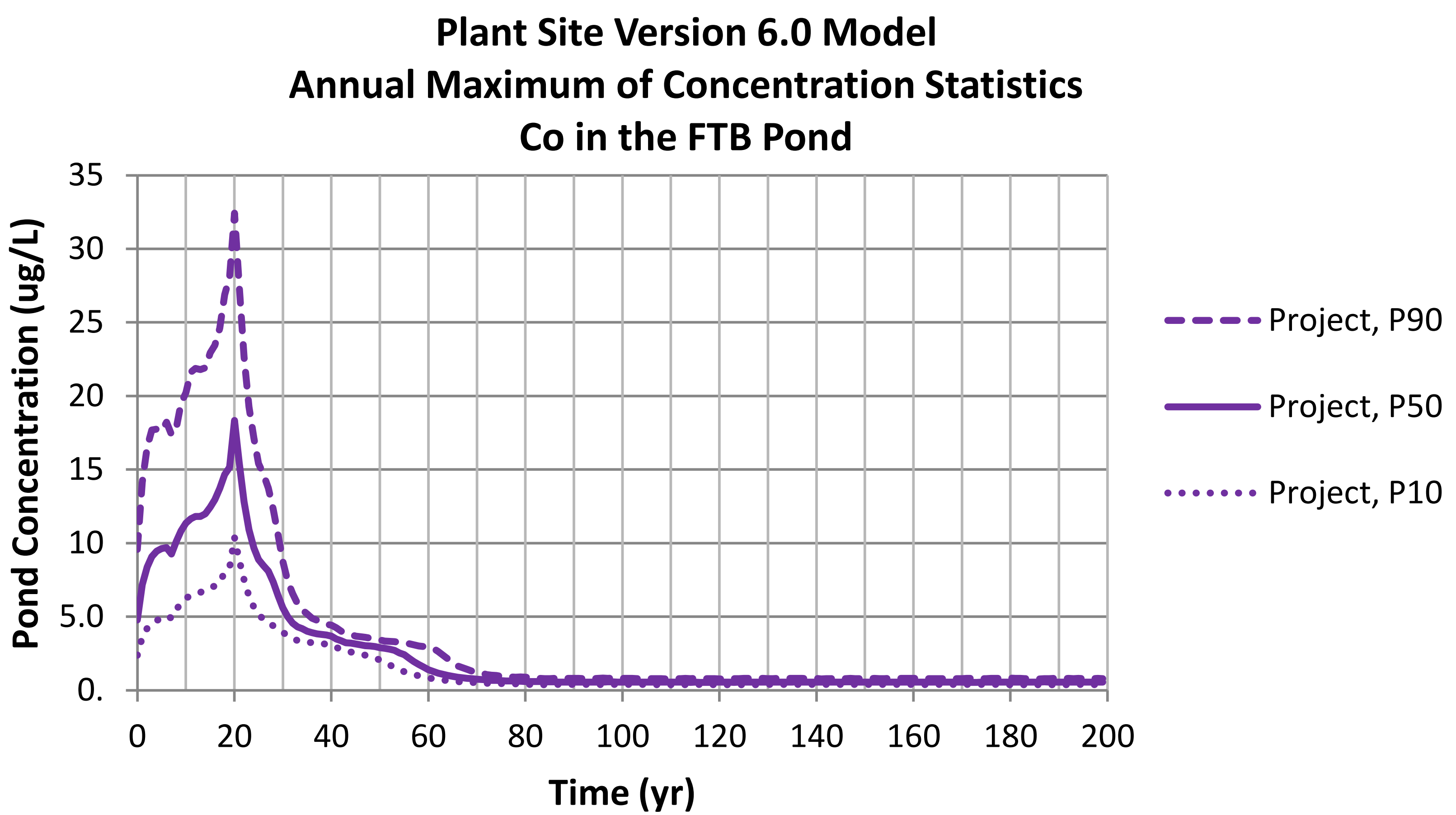


Figure D-01-10.1



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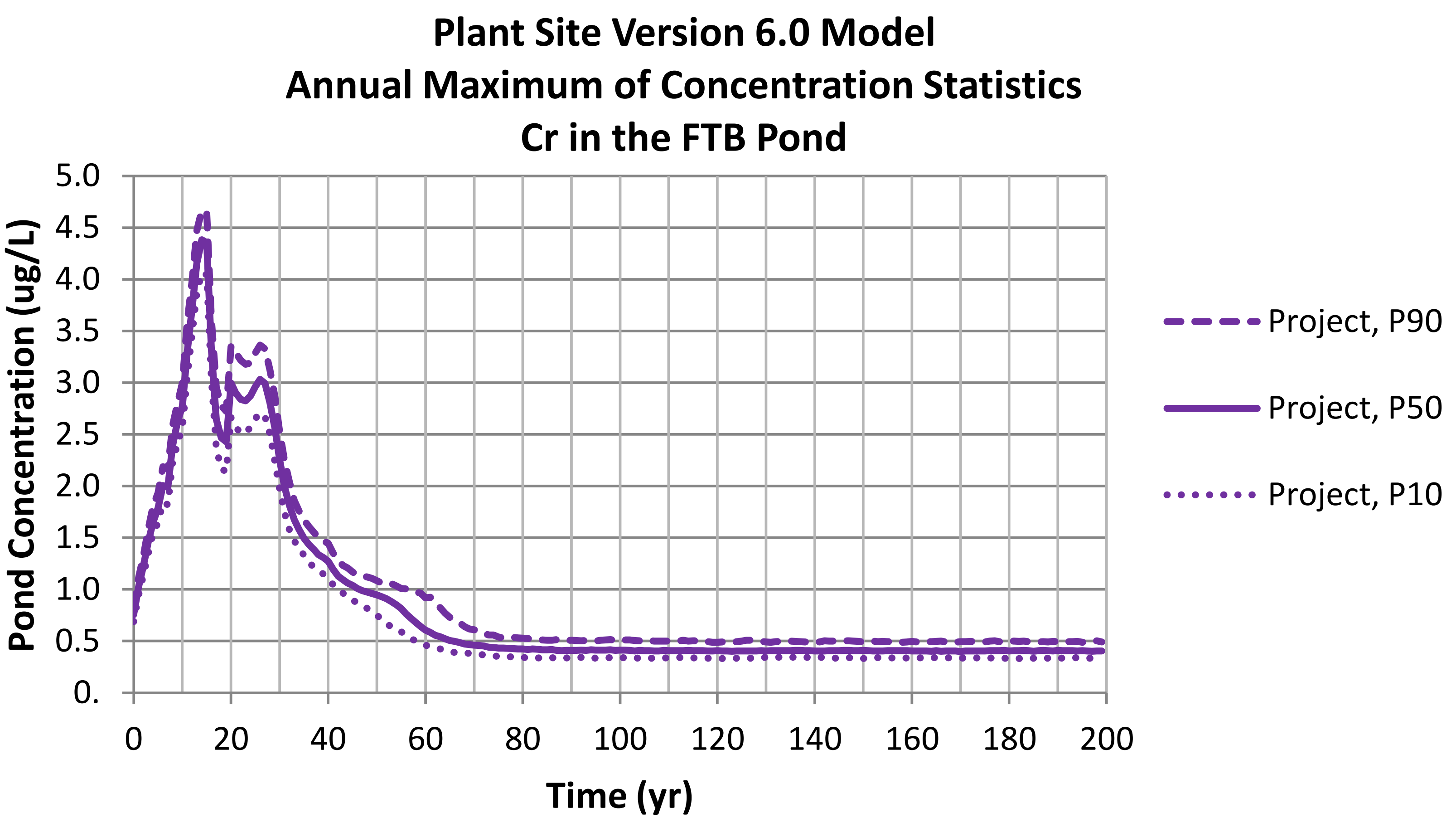


Figure D-01-12.1

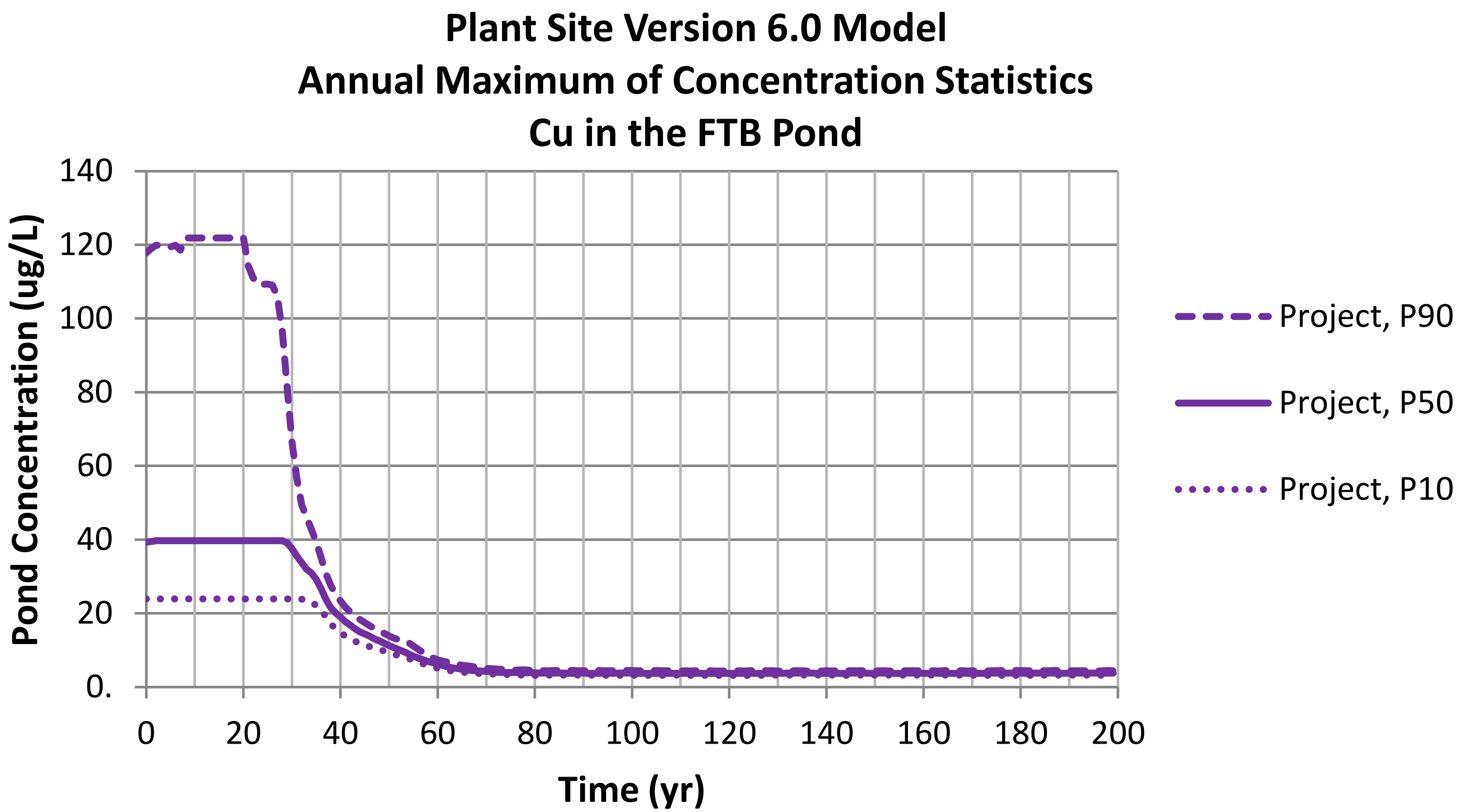


Figure D-01-13.1

Plant Site Version 6.0 Model
Annual Maximum of Concentration Statistics
F in the FTB Pond

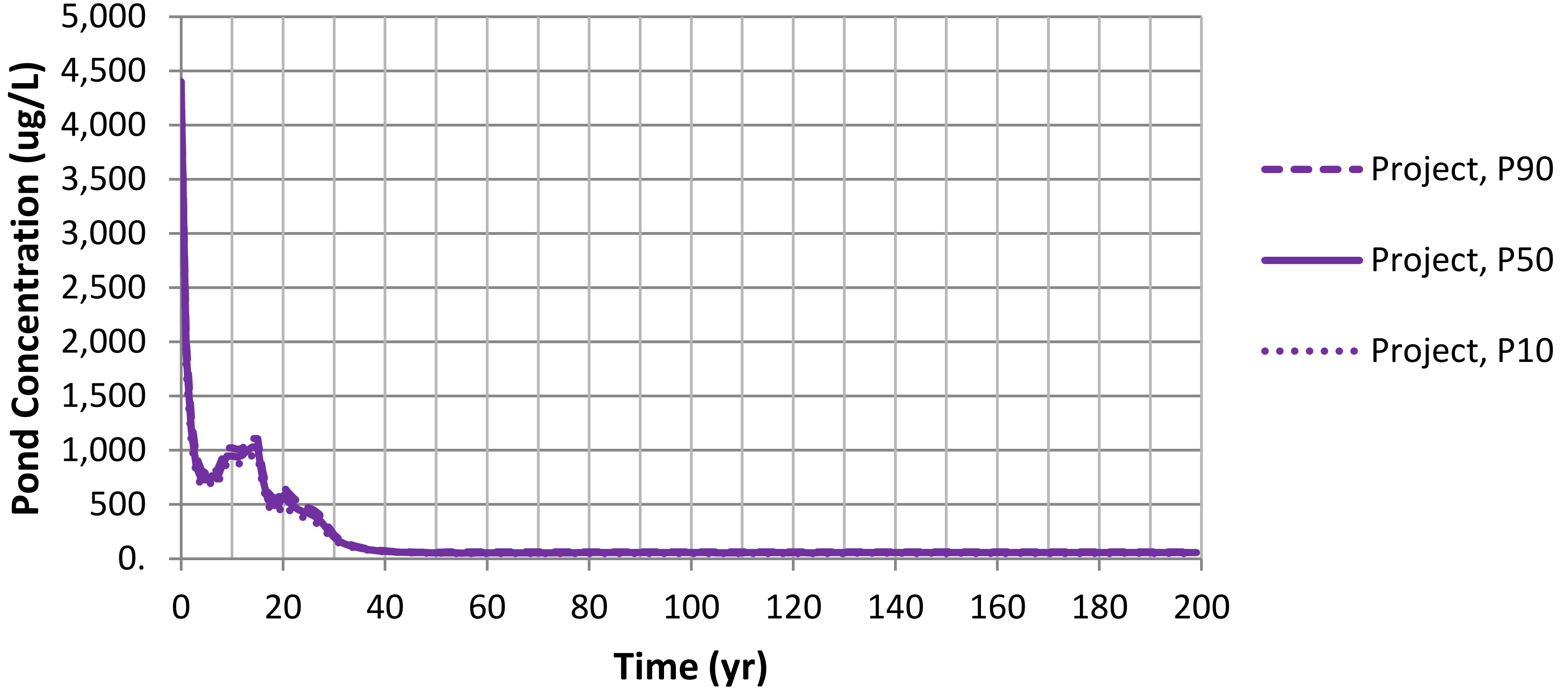


Figure D-01-14.1

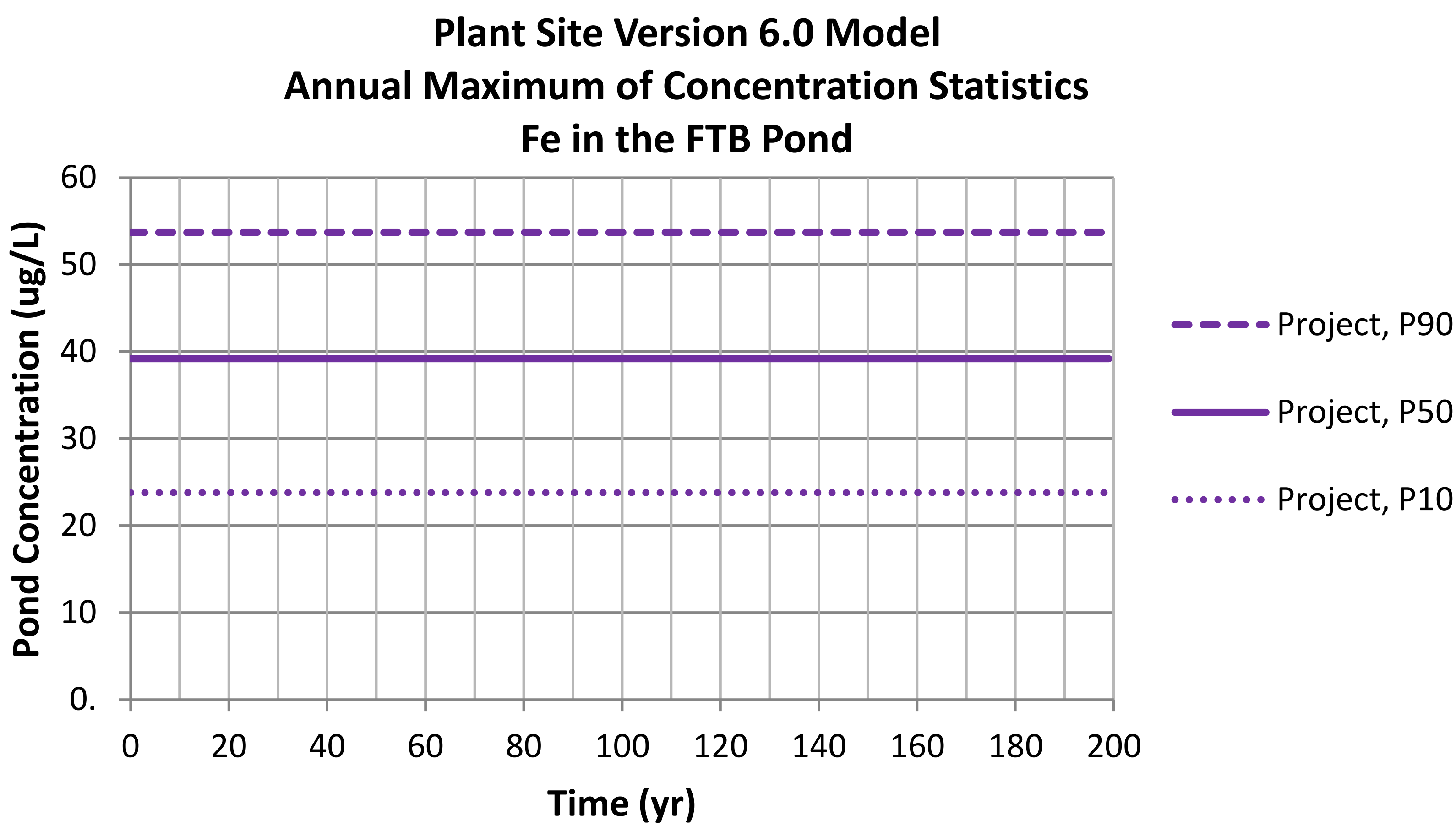


Figure D-01-15.1

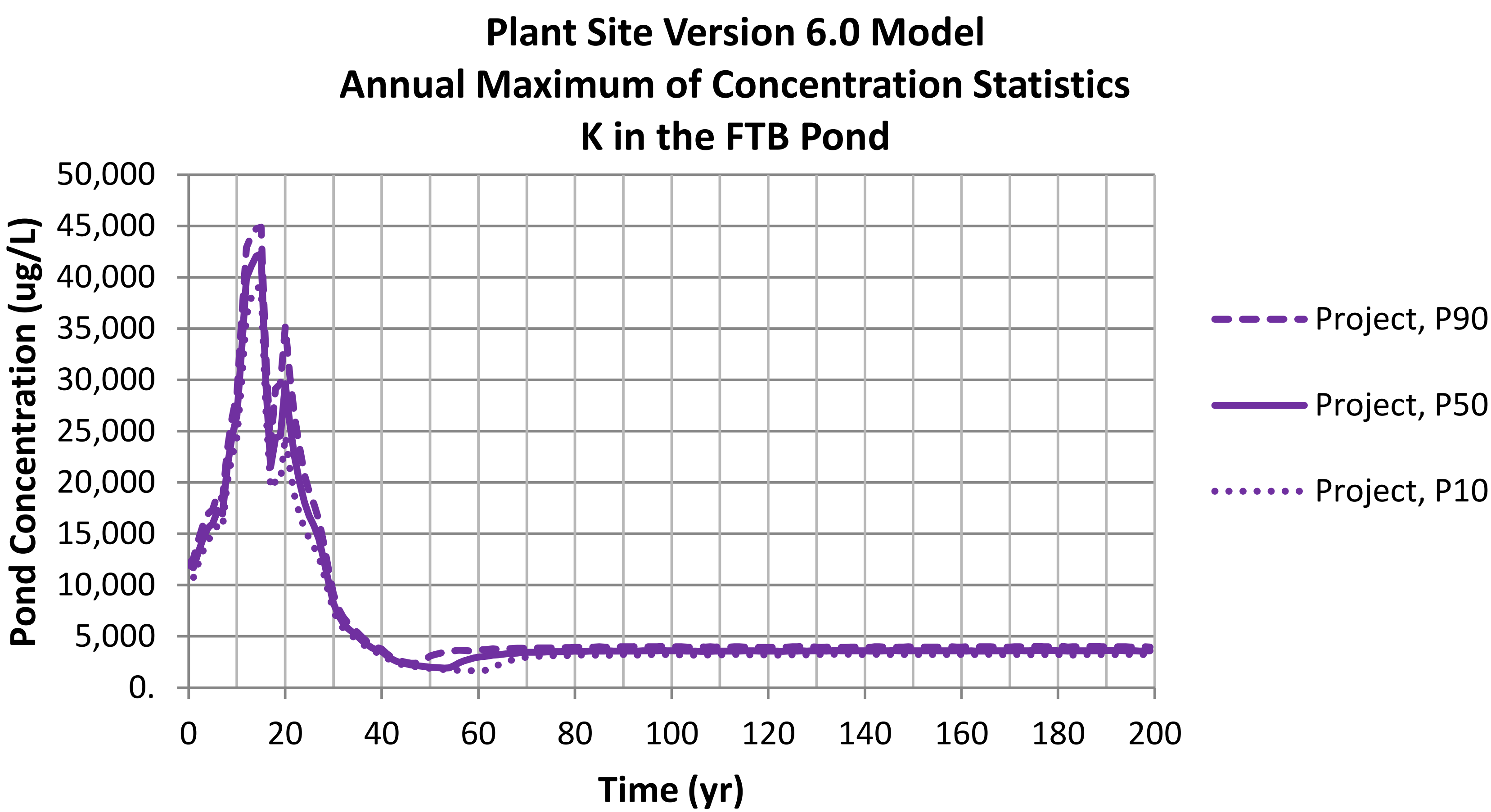
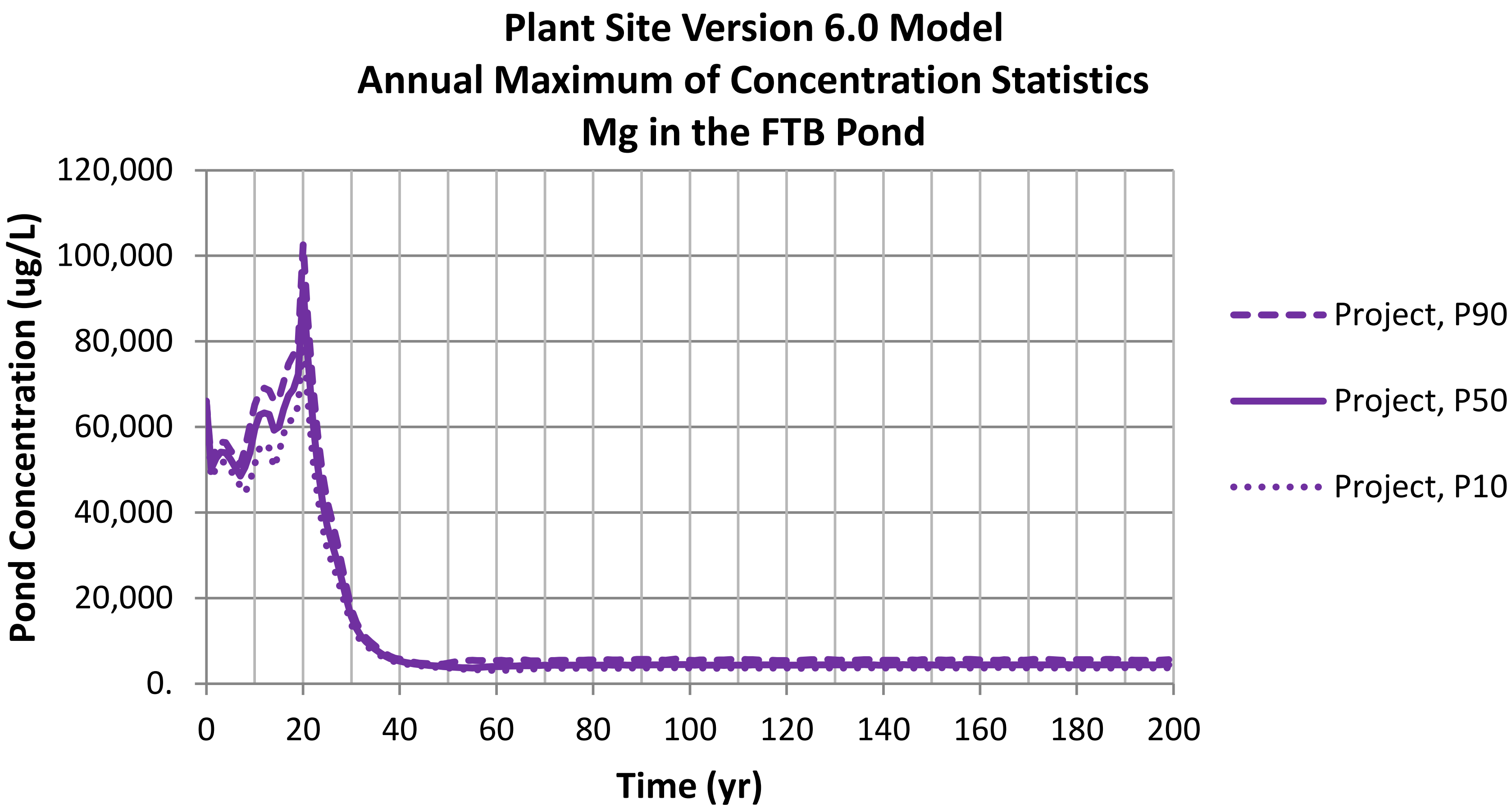


Figure D-01-16.1



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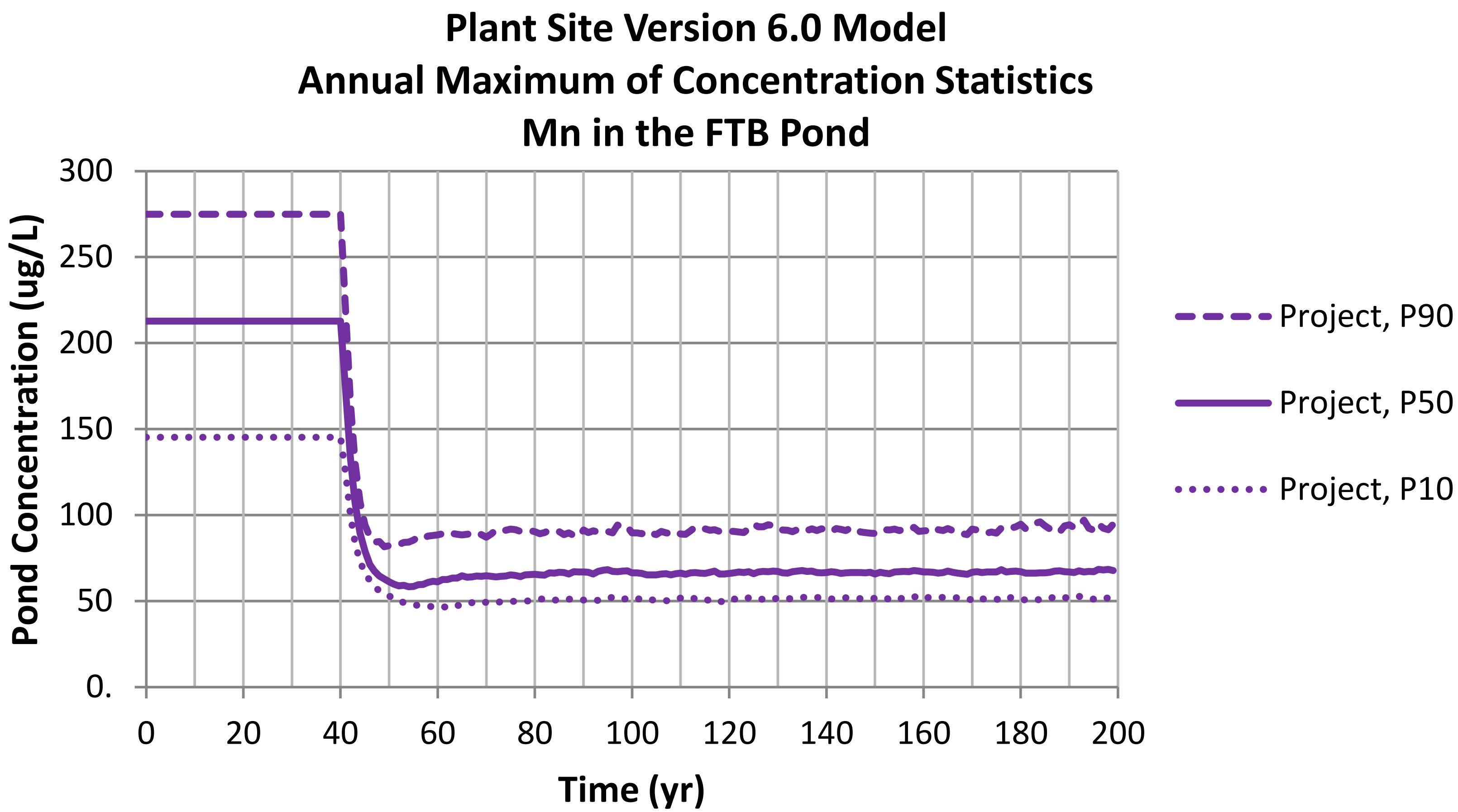

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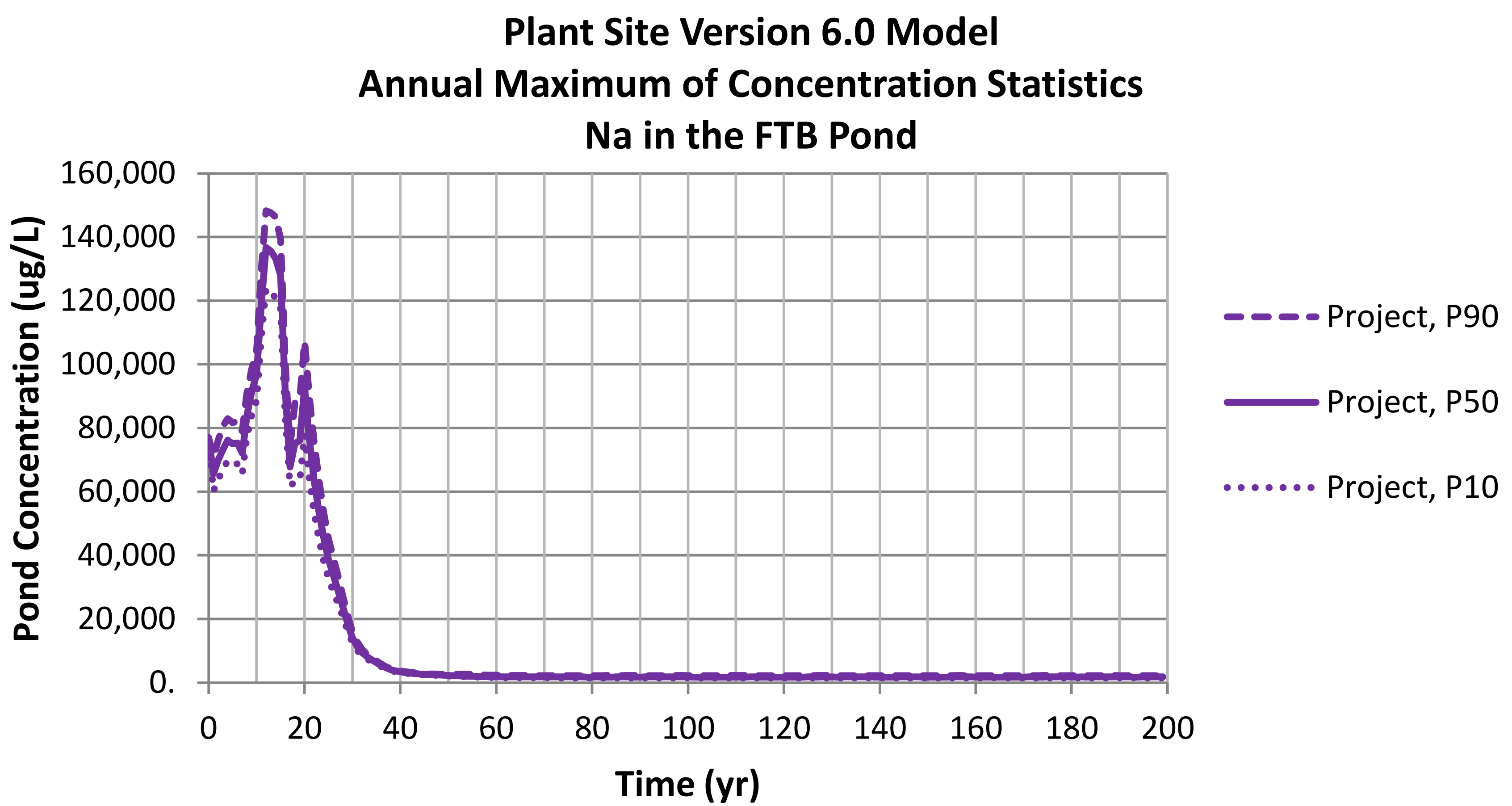

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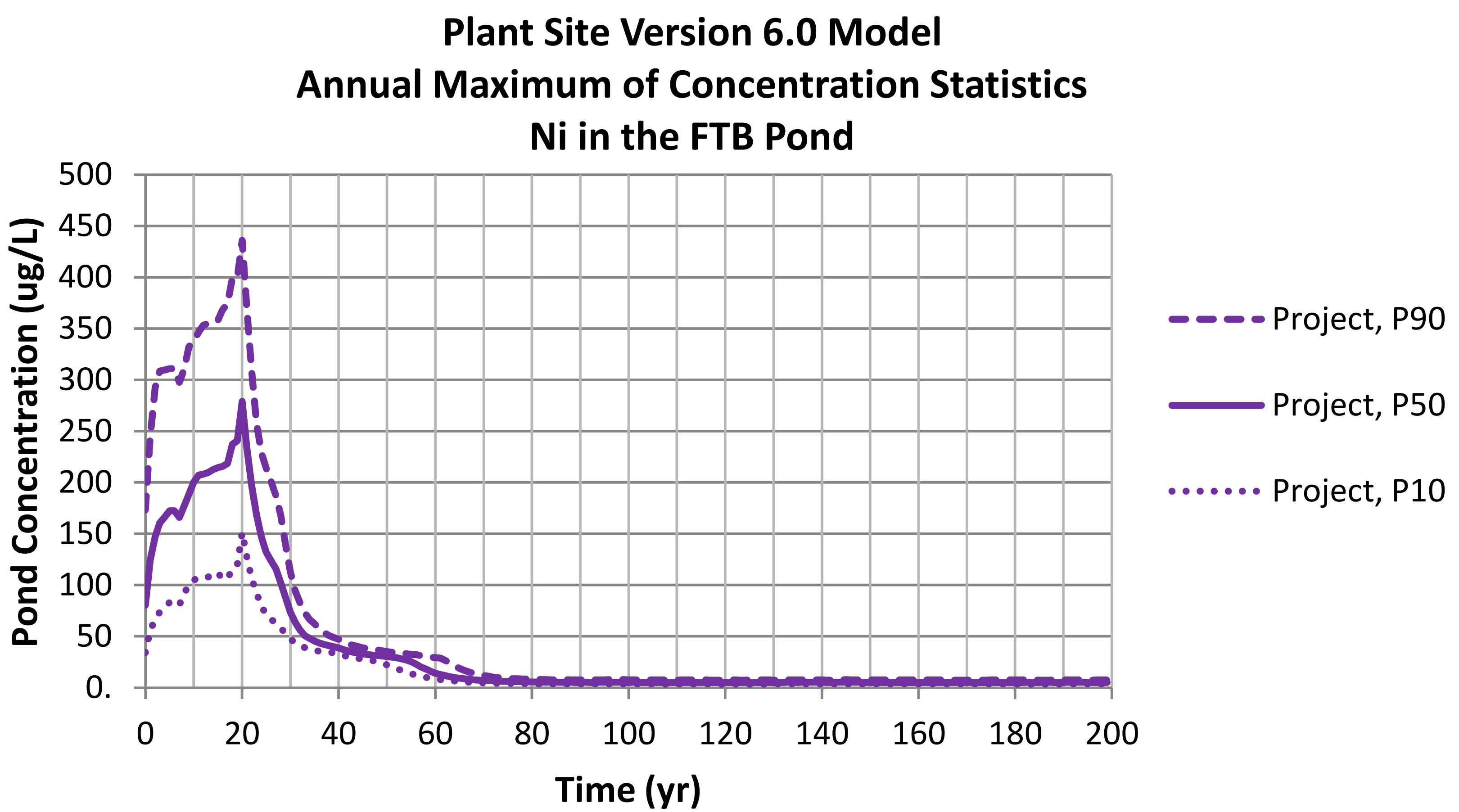

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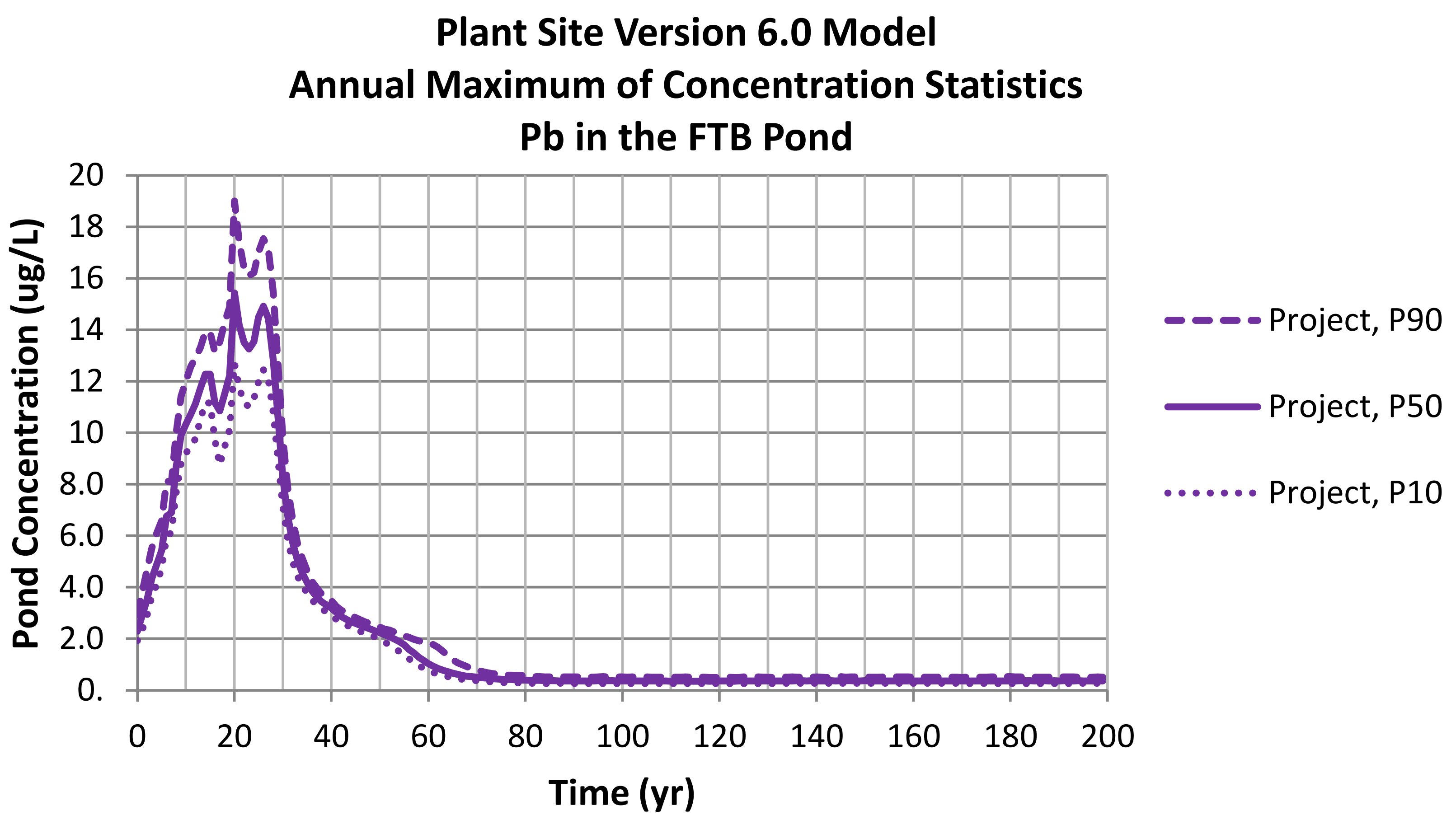

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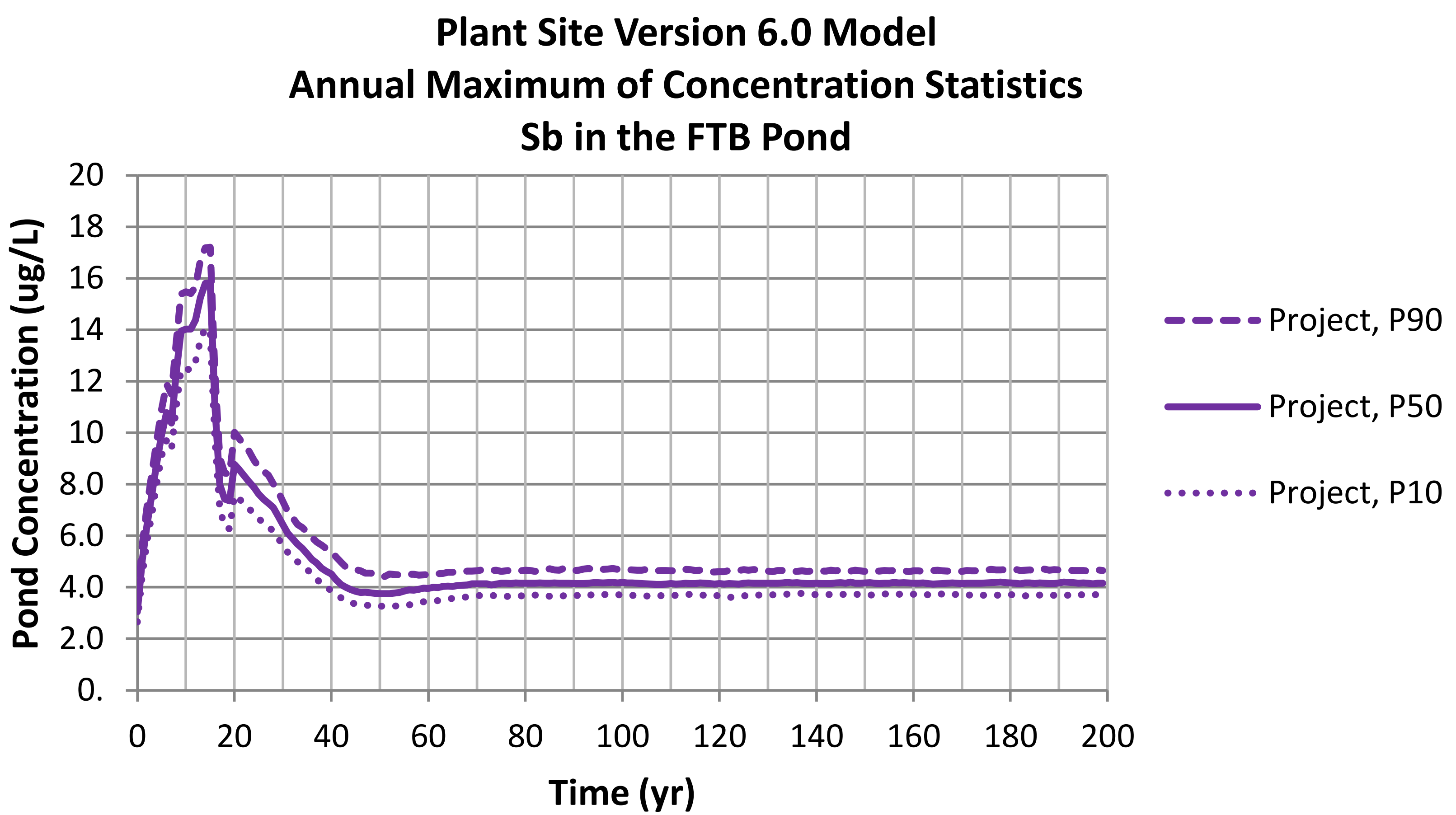

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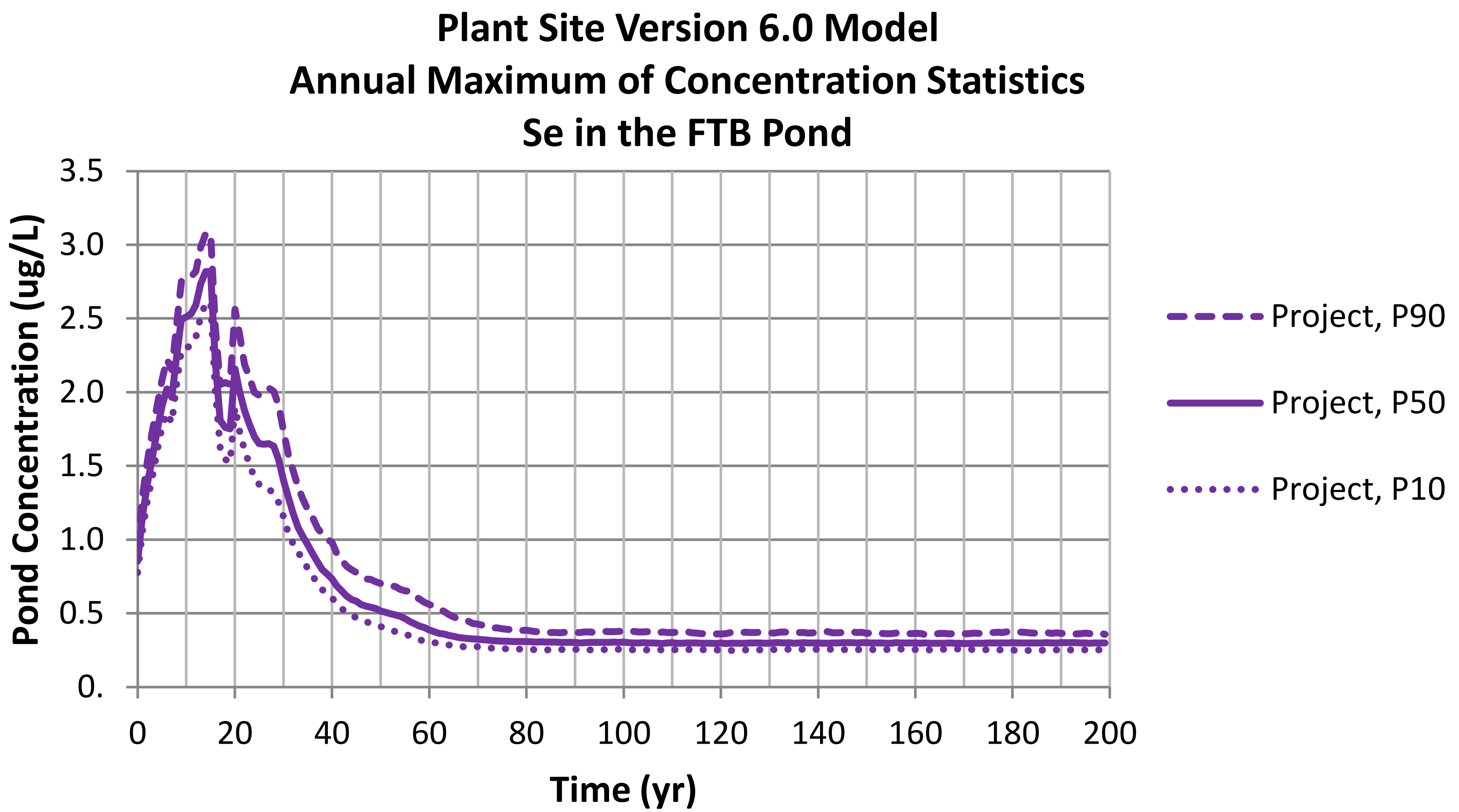

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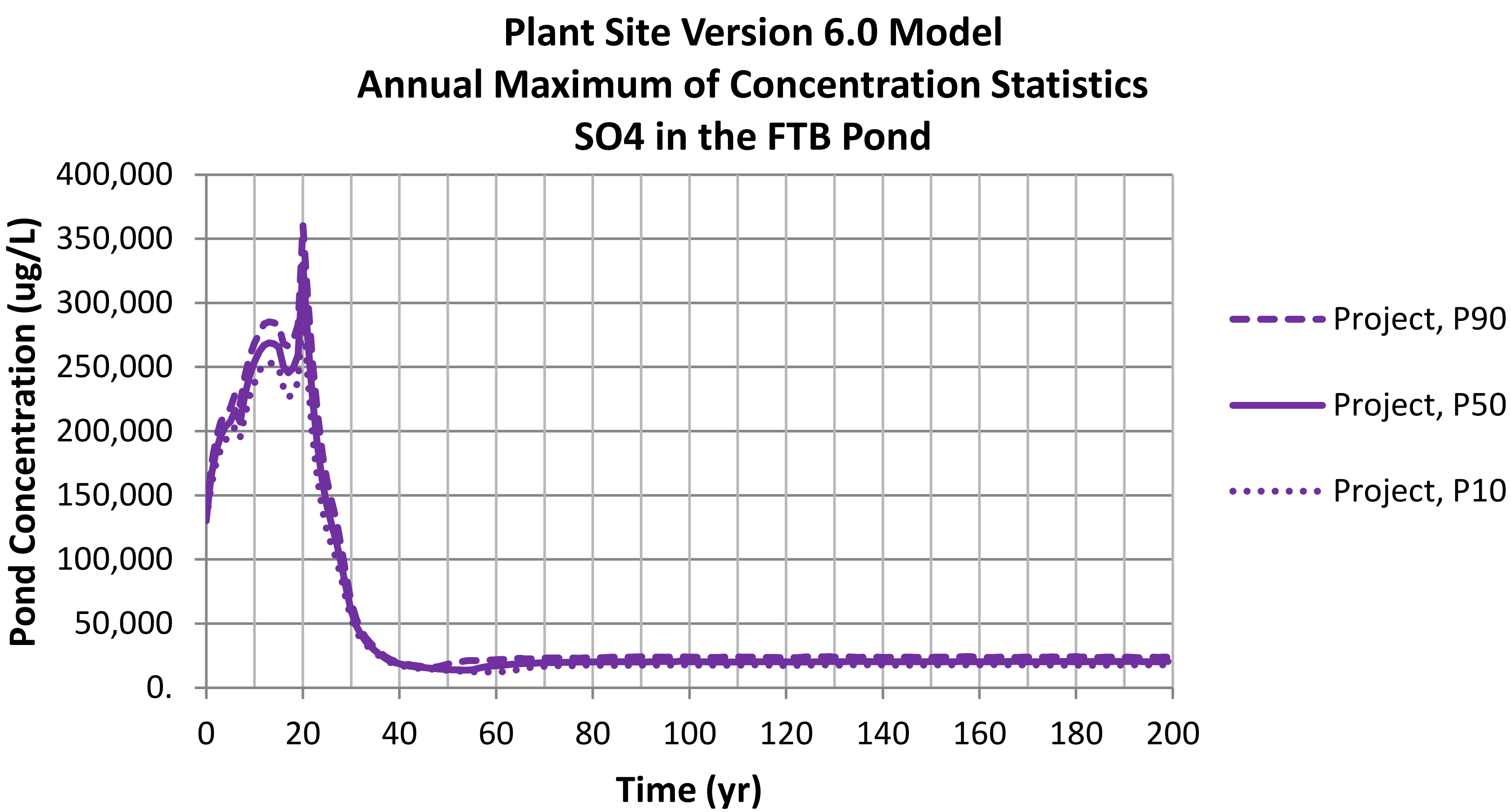

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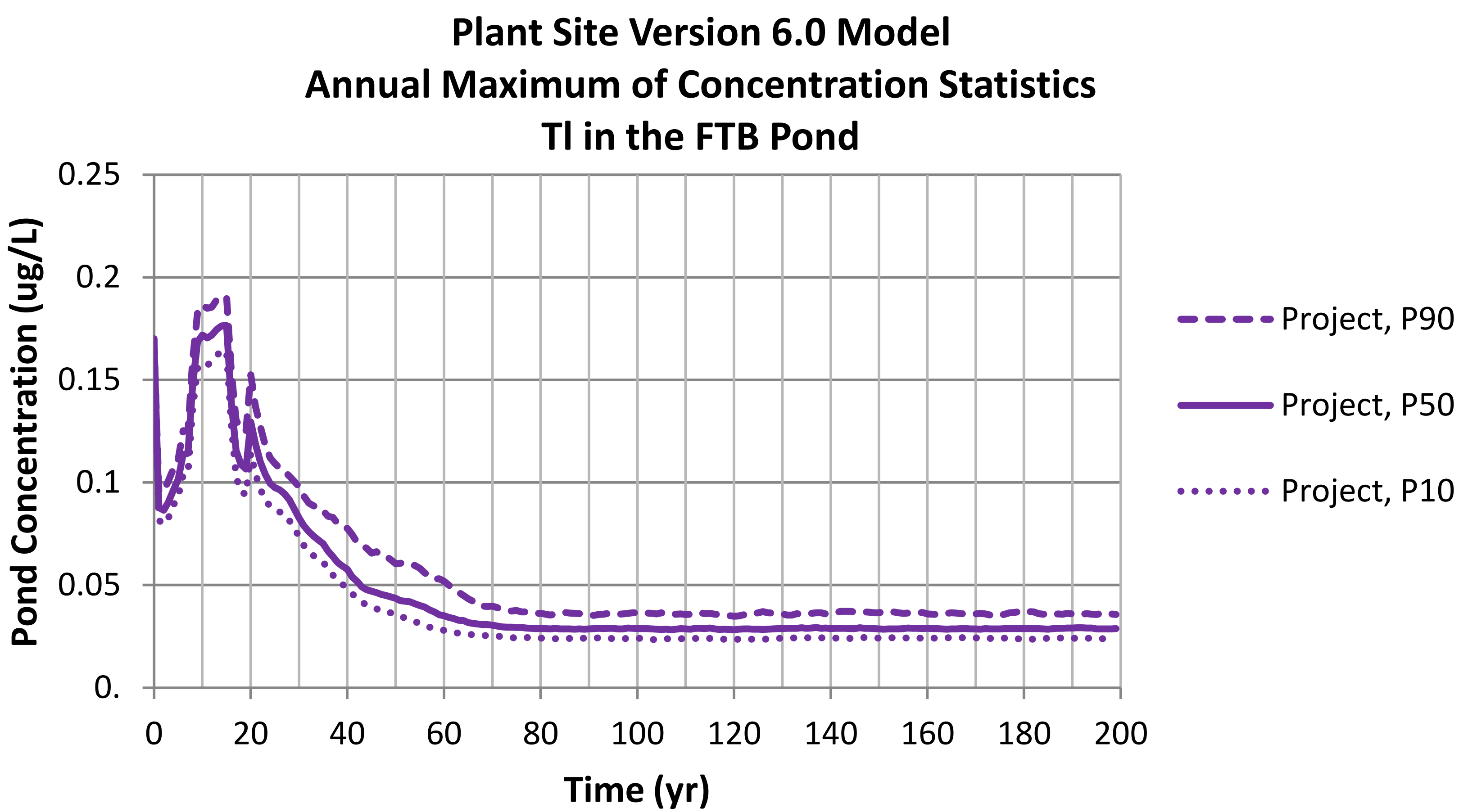

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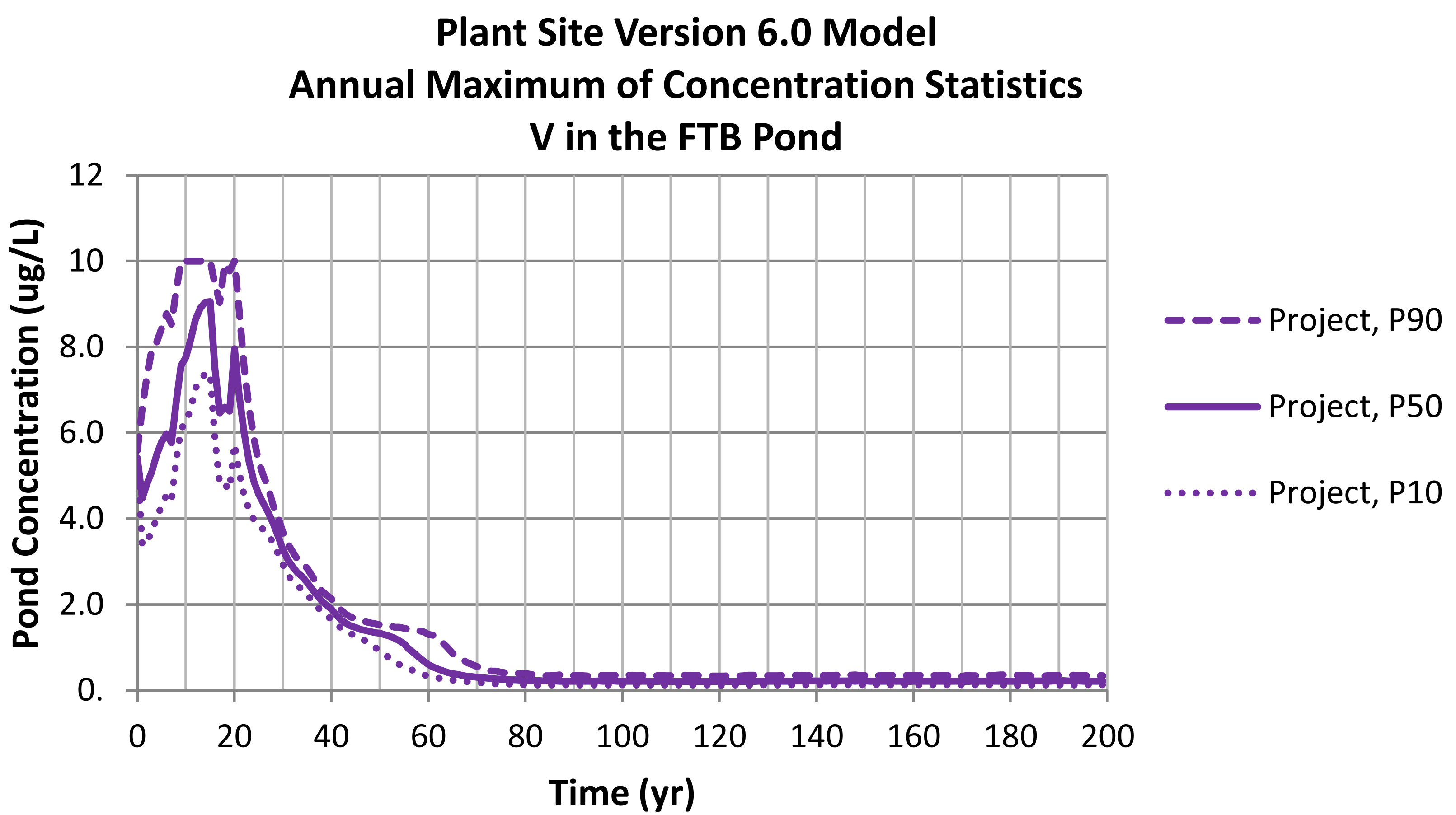

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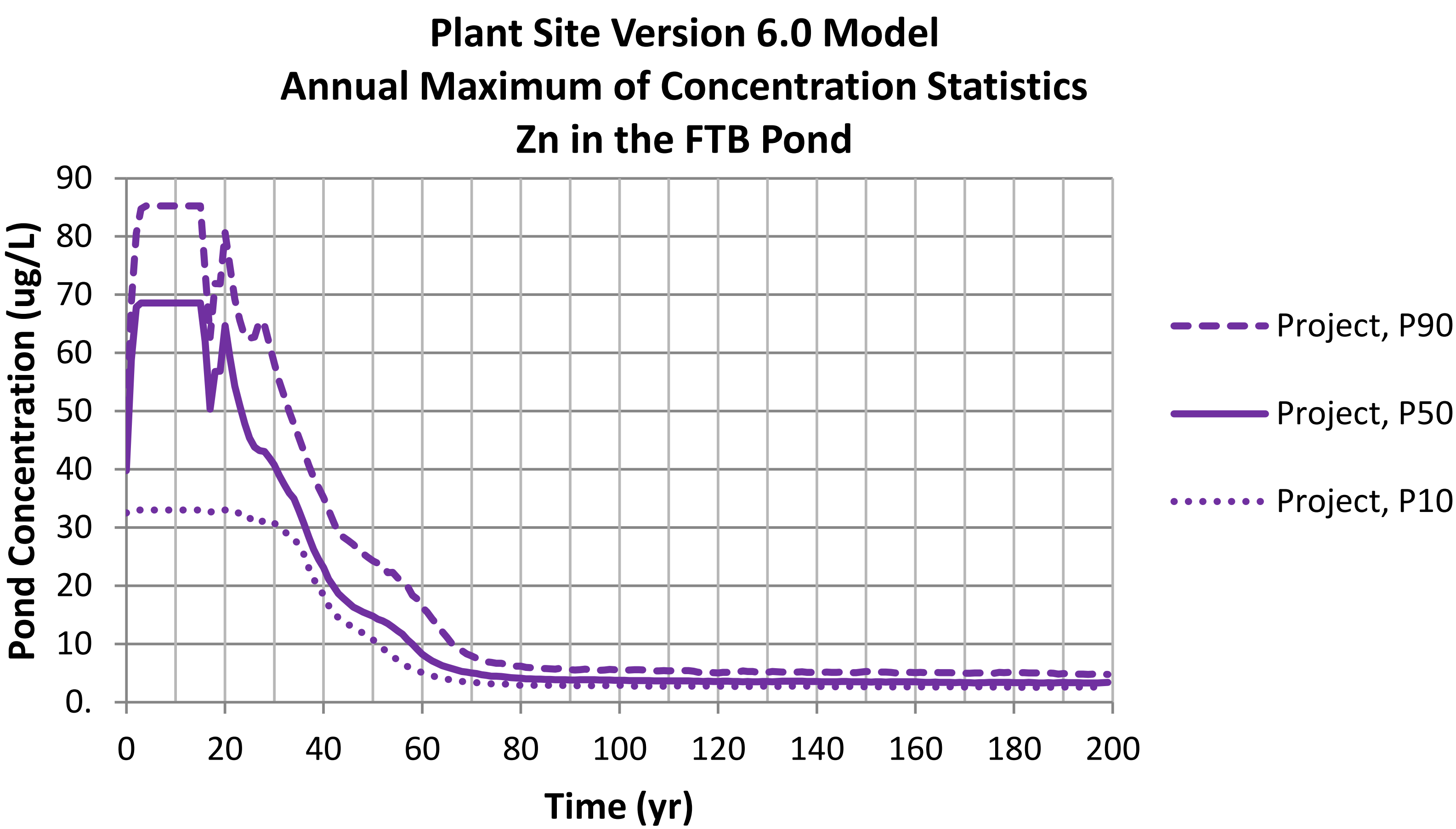


Figure D-01-27.1

Attachment E

Median Loading Rates to the FTB Pond (Culpability Analysis)

Attachment E Median Loading Rates to the FTB Pond (Culpability Analysis)

The plots in this attachment were created by taking the following steps:

- At any given time step, the mass loading rate (tonnes/yr) from every source contributing mass load to the FTB Pond is calculated and stored. These sources are itemized in the legend of each figure.

- Once the 500 realizations are complete, at every monthly time step the loading rates of a particular constituent from a particular source were sorted minimum to maximum and the median value (250th) was chosen. This step was performed for all sources and all constituents.

- The monthly median loading rates of each constituent from each source were annualized by taking the average of the twelve monthly median loading rates each year. This results in one representative average annual median loading rate of each constituent from each source.

- A stacked bar graph is used to directly compare the average annual median loading rates from each source for any constituent to the FTB Pond. The source (uniquely colored in each figure) which covers the most area of the graph at any given time is therefore the most culpable source. Showing a time series graph of loading rates also helps show how the culpable source may change through time.

The figure numbering convention is "**Figure W-XX-YY**" where:

- **W** indicates the Attachment.

- **XX** is a counter indicating the location; in this attachment it will always be "01" because there is one FTB Pond.

- **YY** is a counter indicating the constituent; in this attachment it will count from "01" to "27" to show the 27 independently modeled constituents.

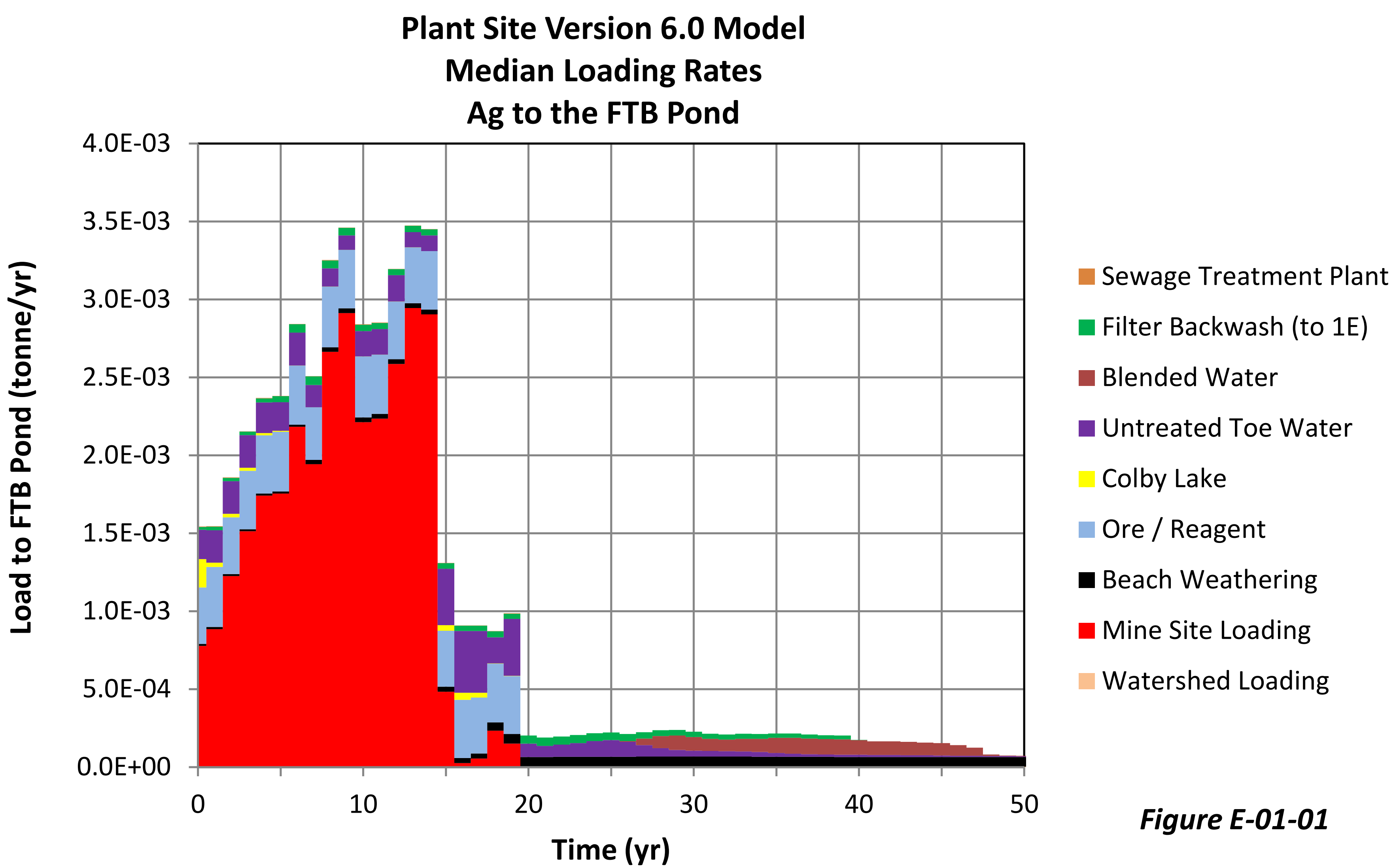
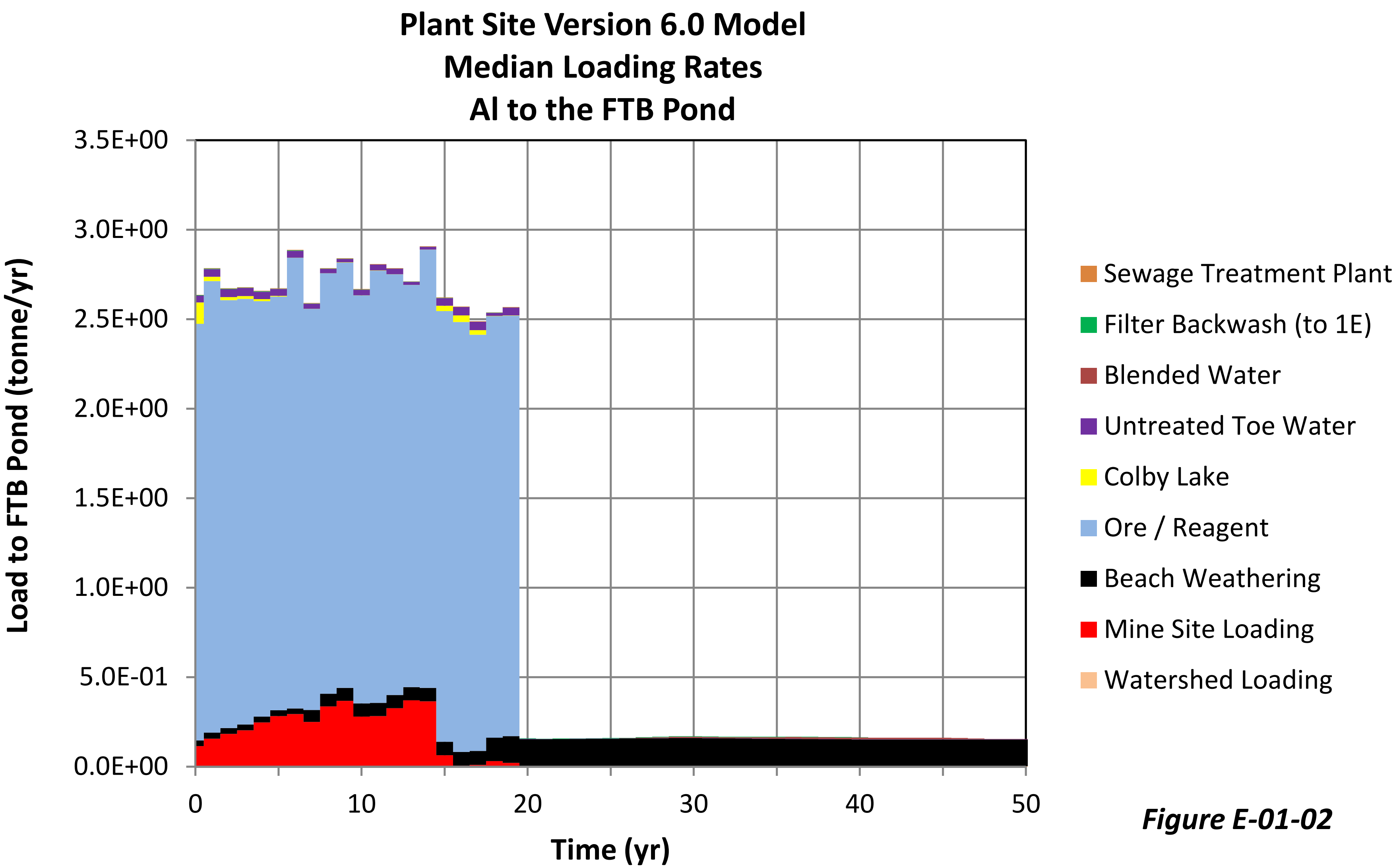


Figure E-01-01



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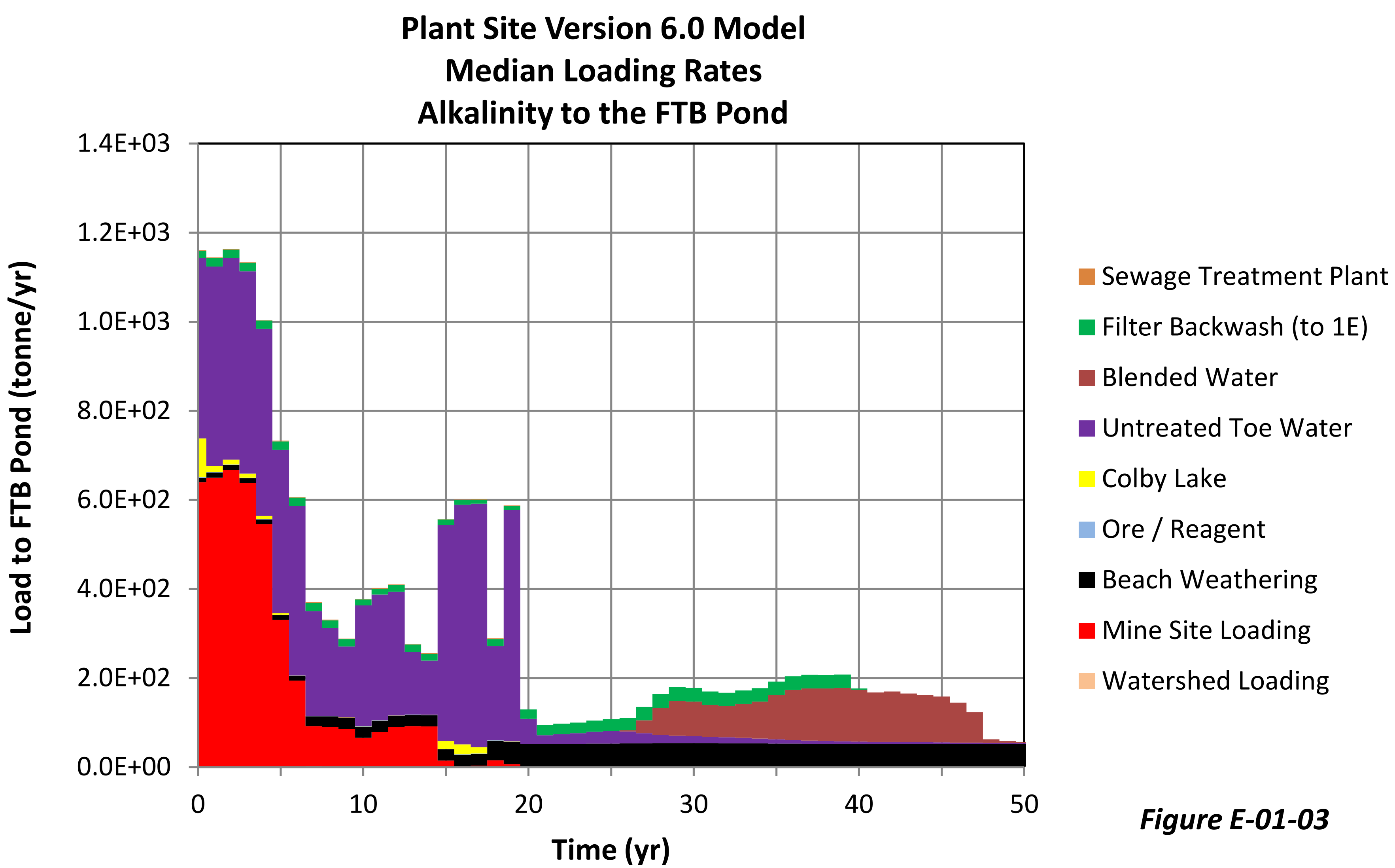

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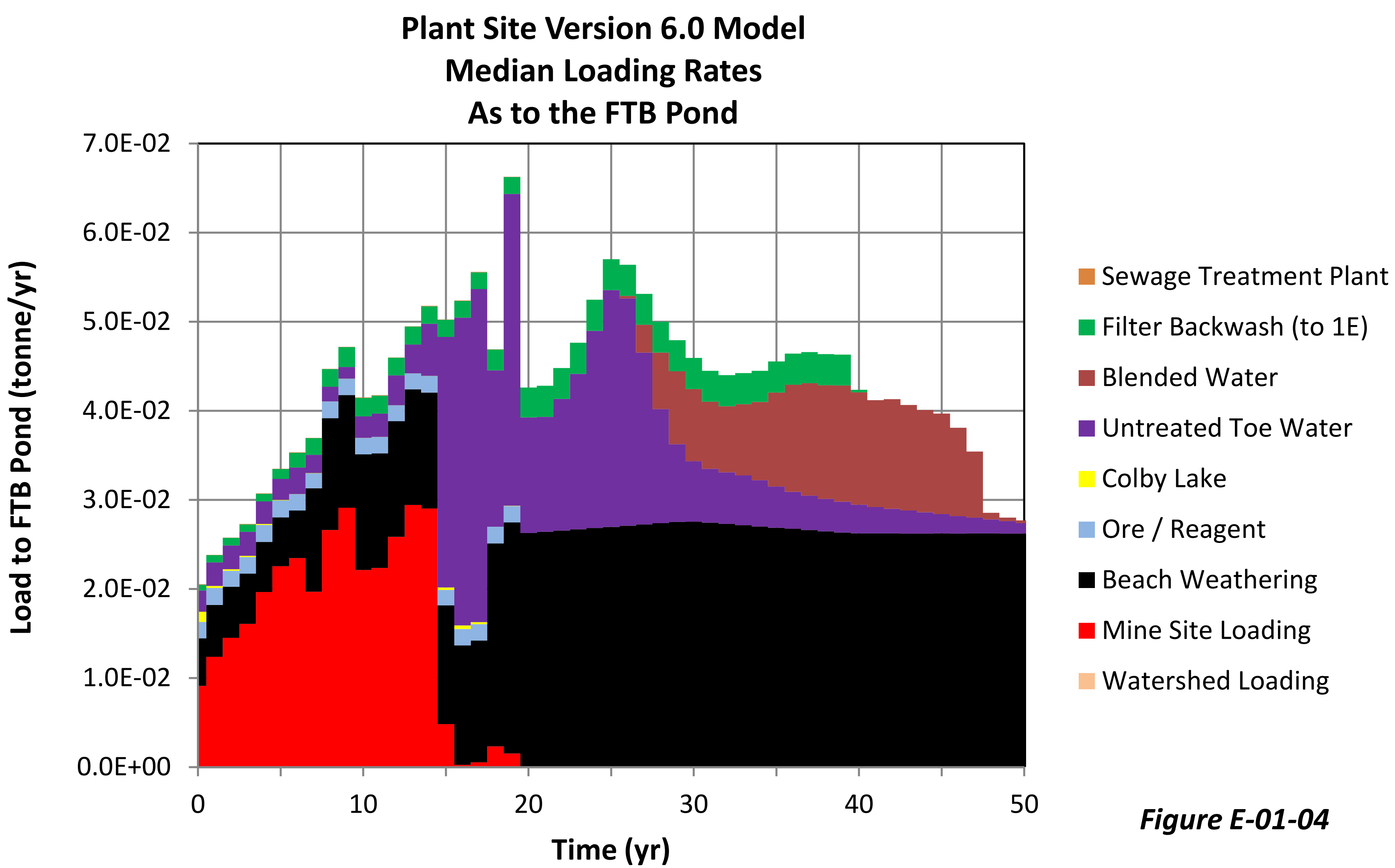

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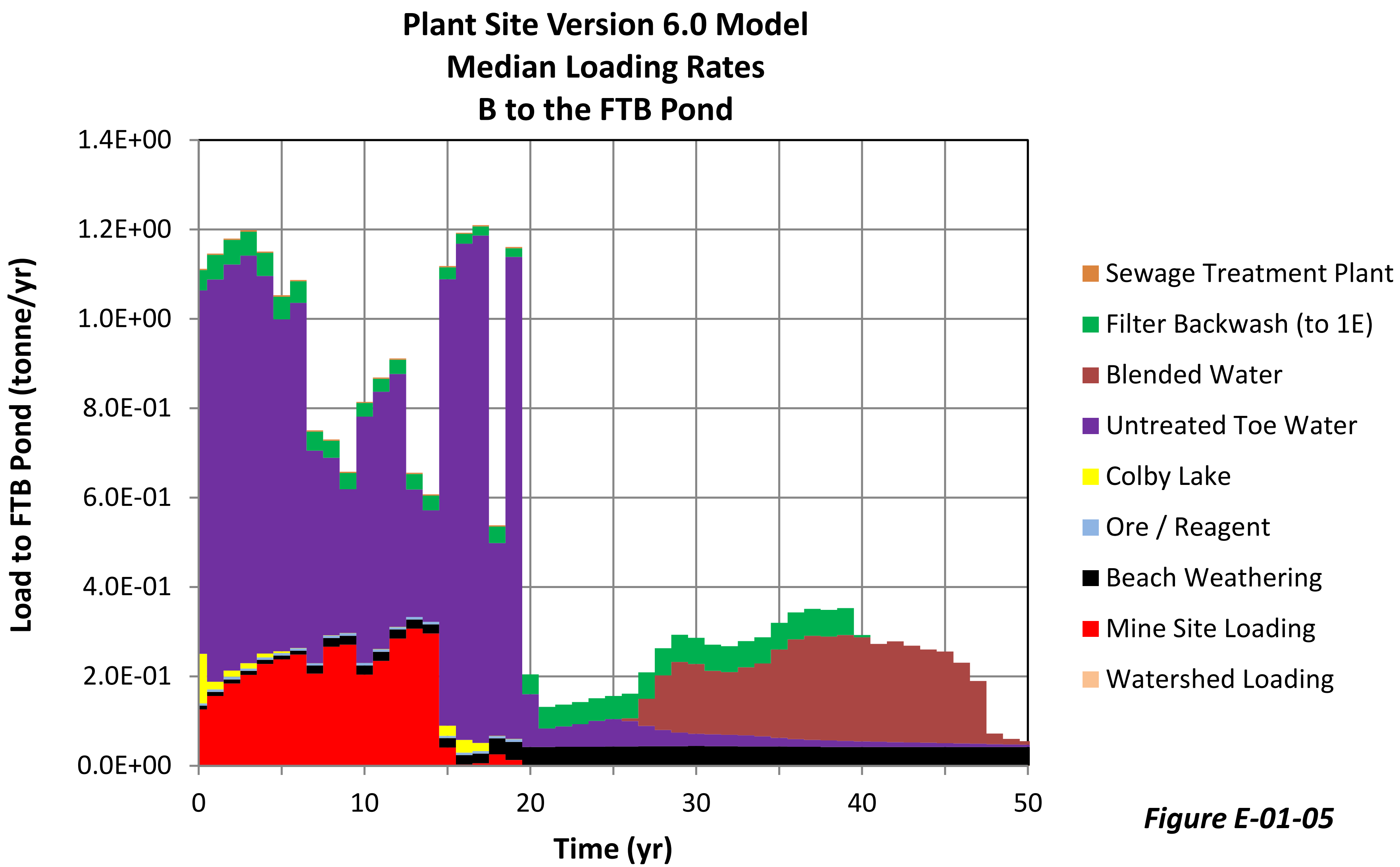

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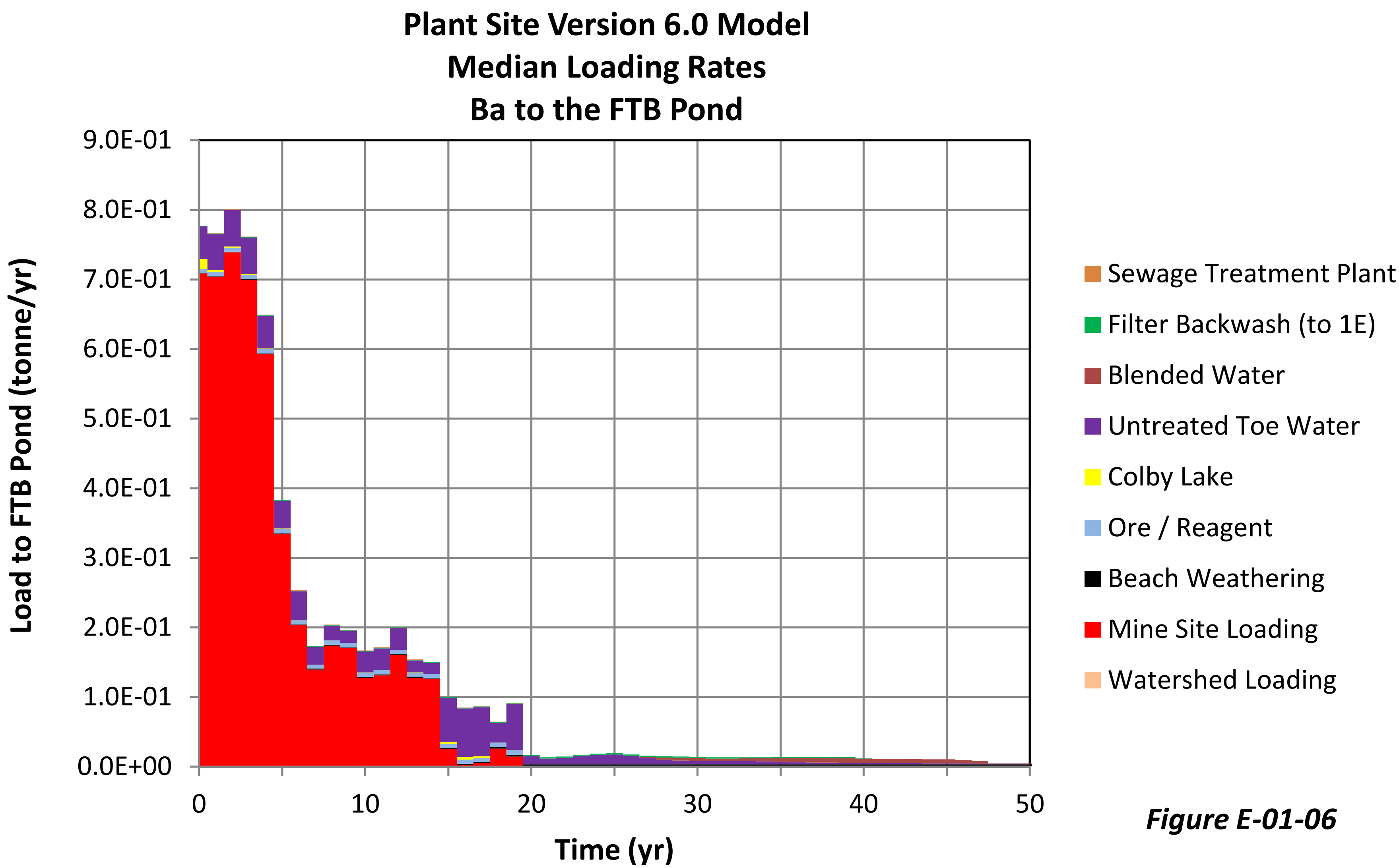

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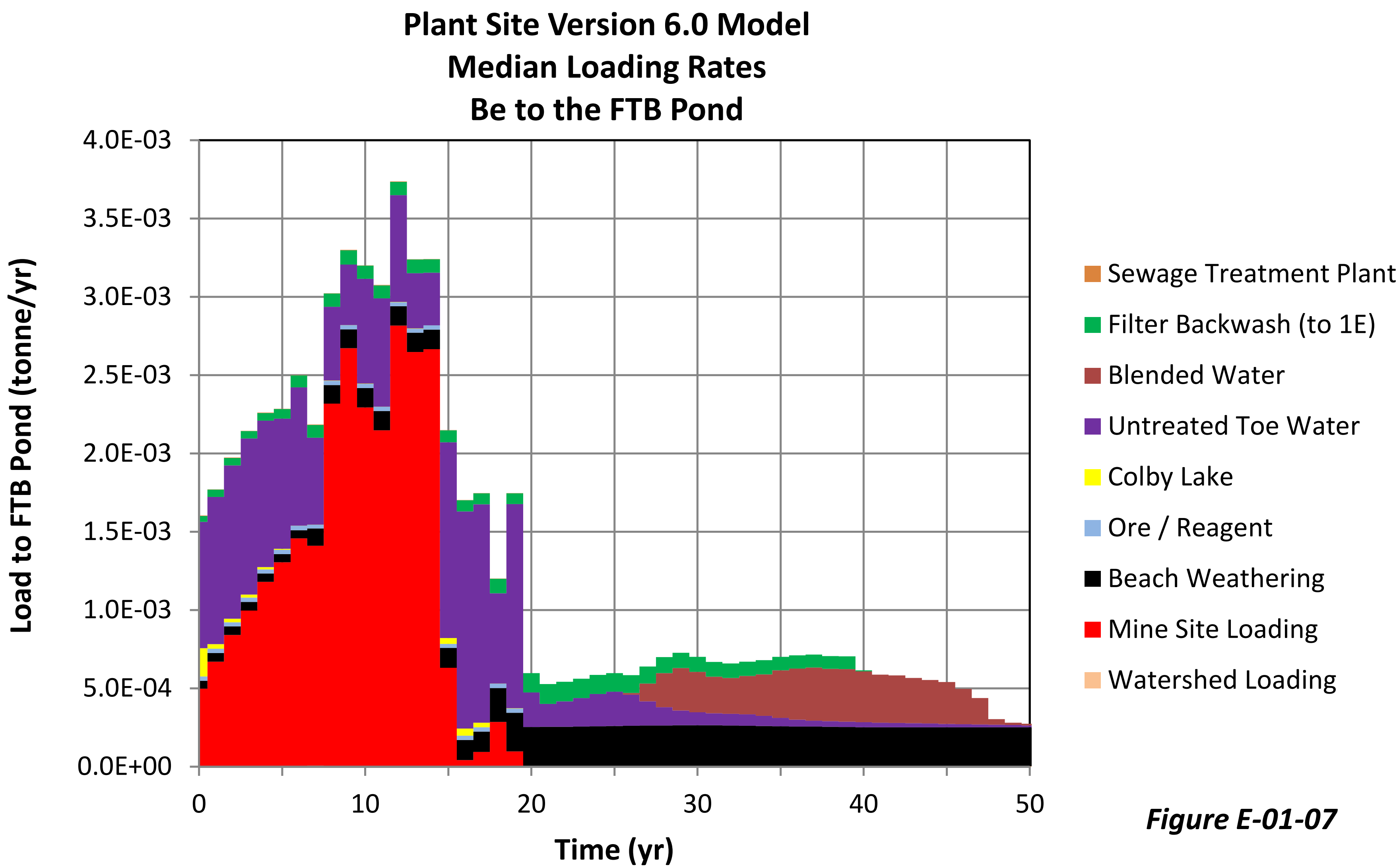

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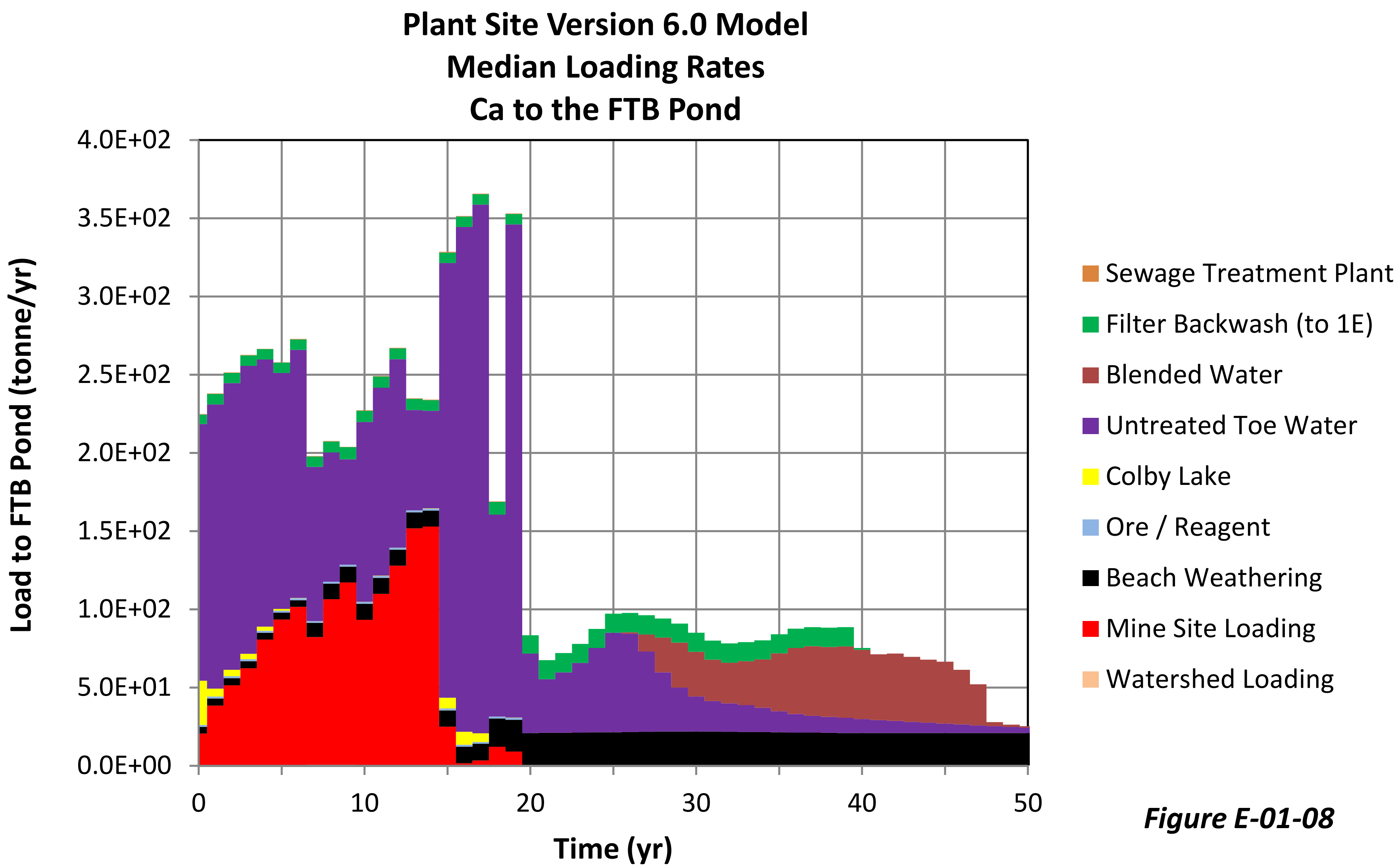

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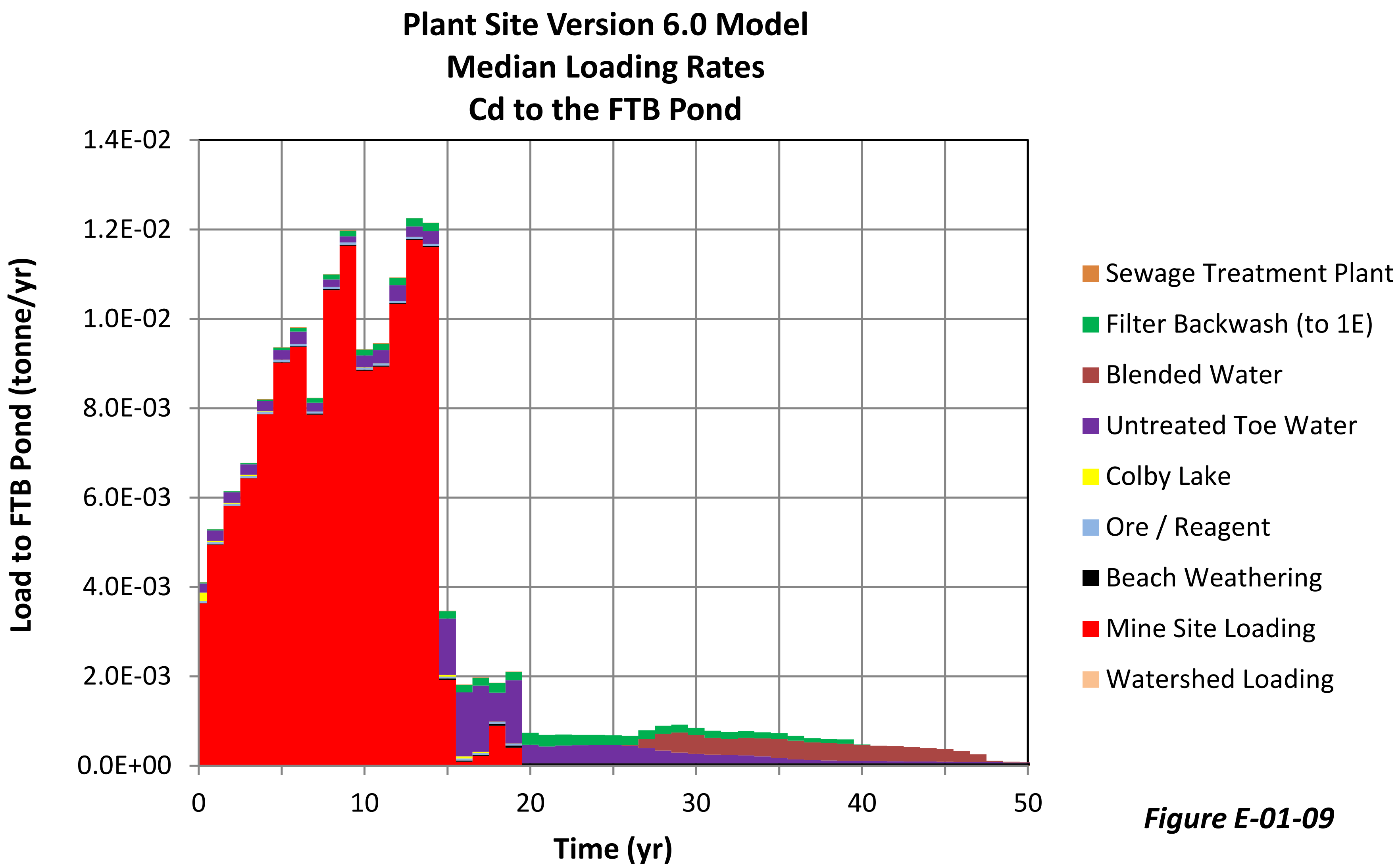

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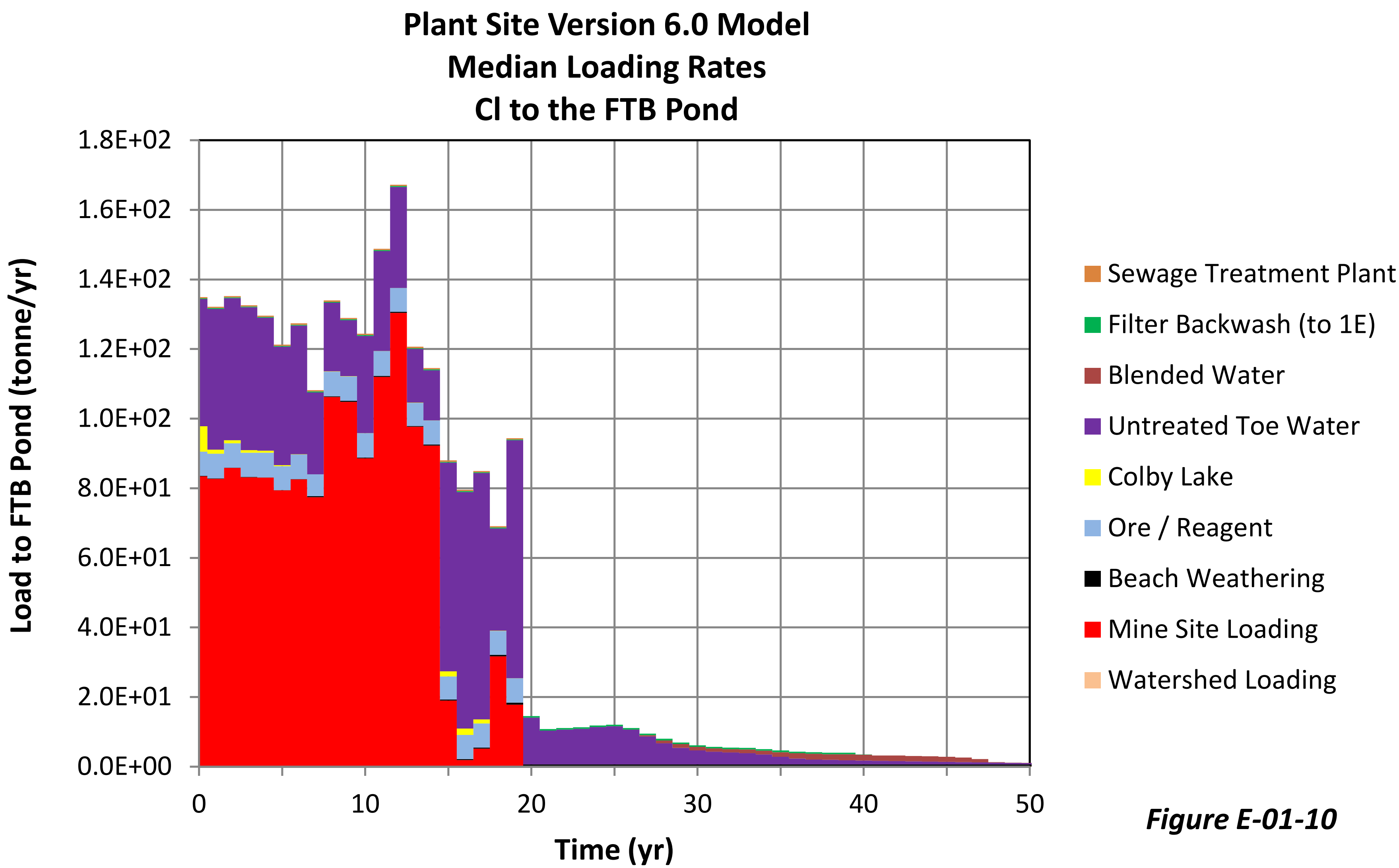

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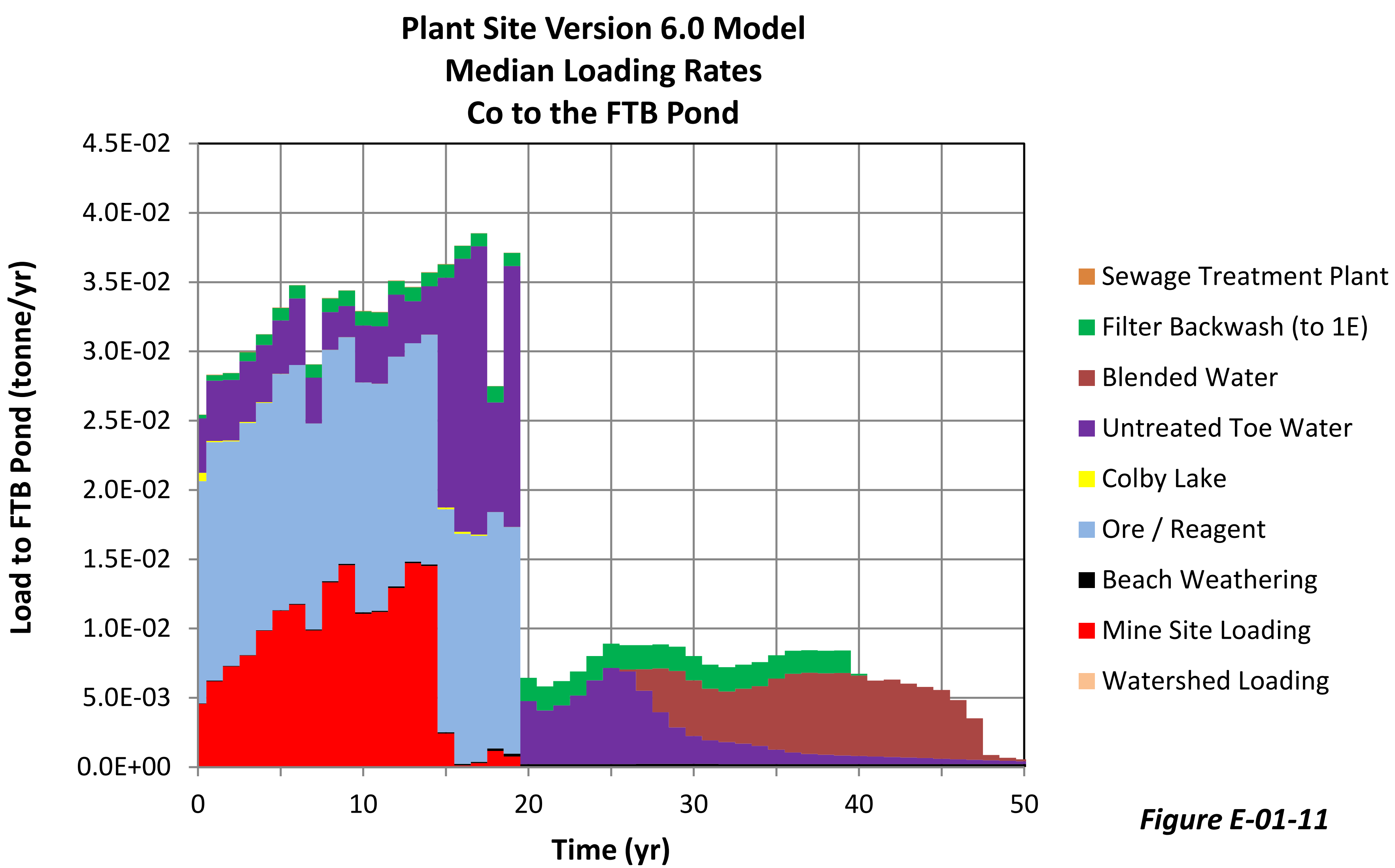

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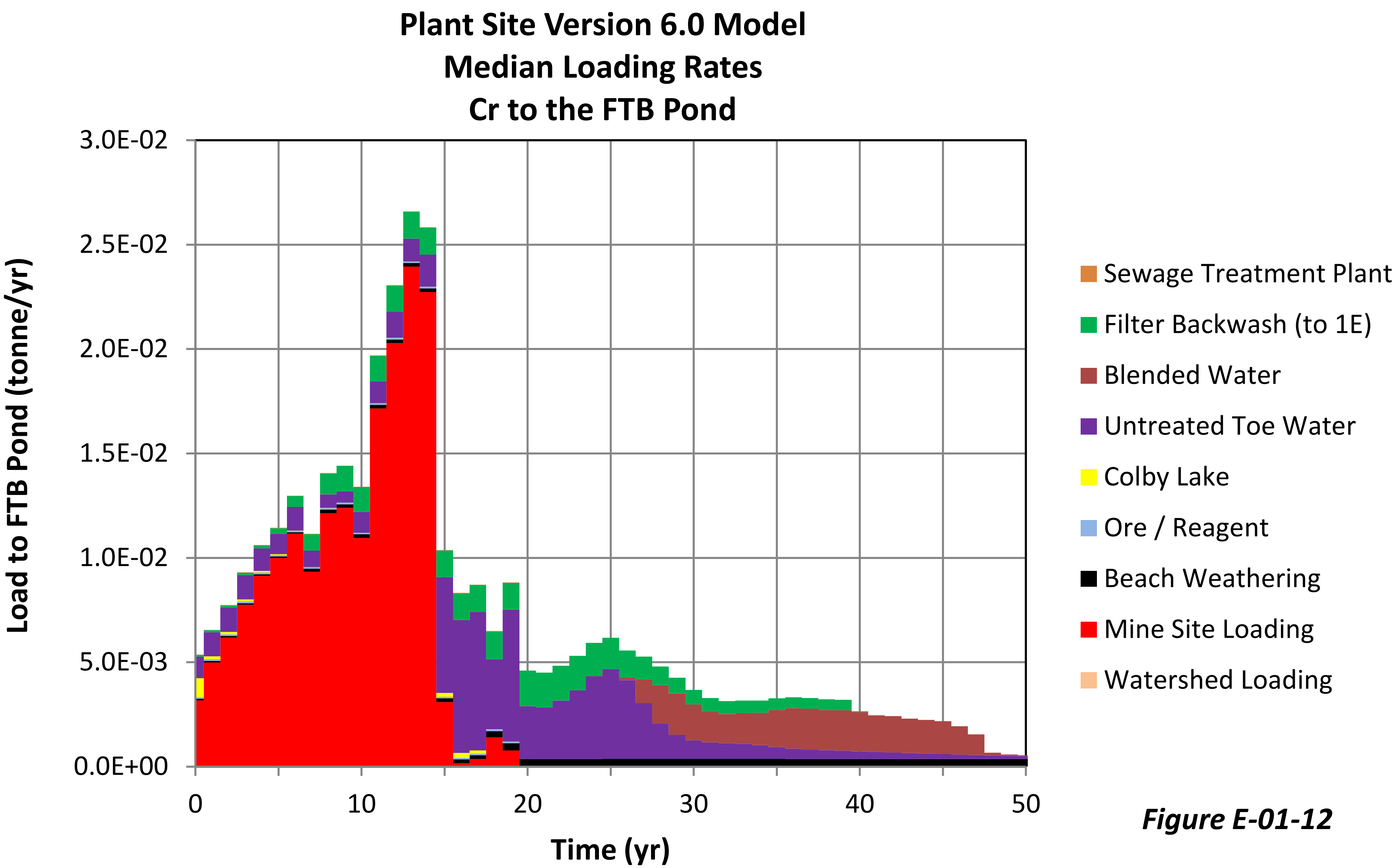

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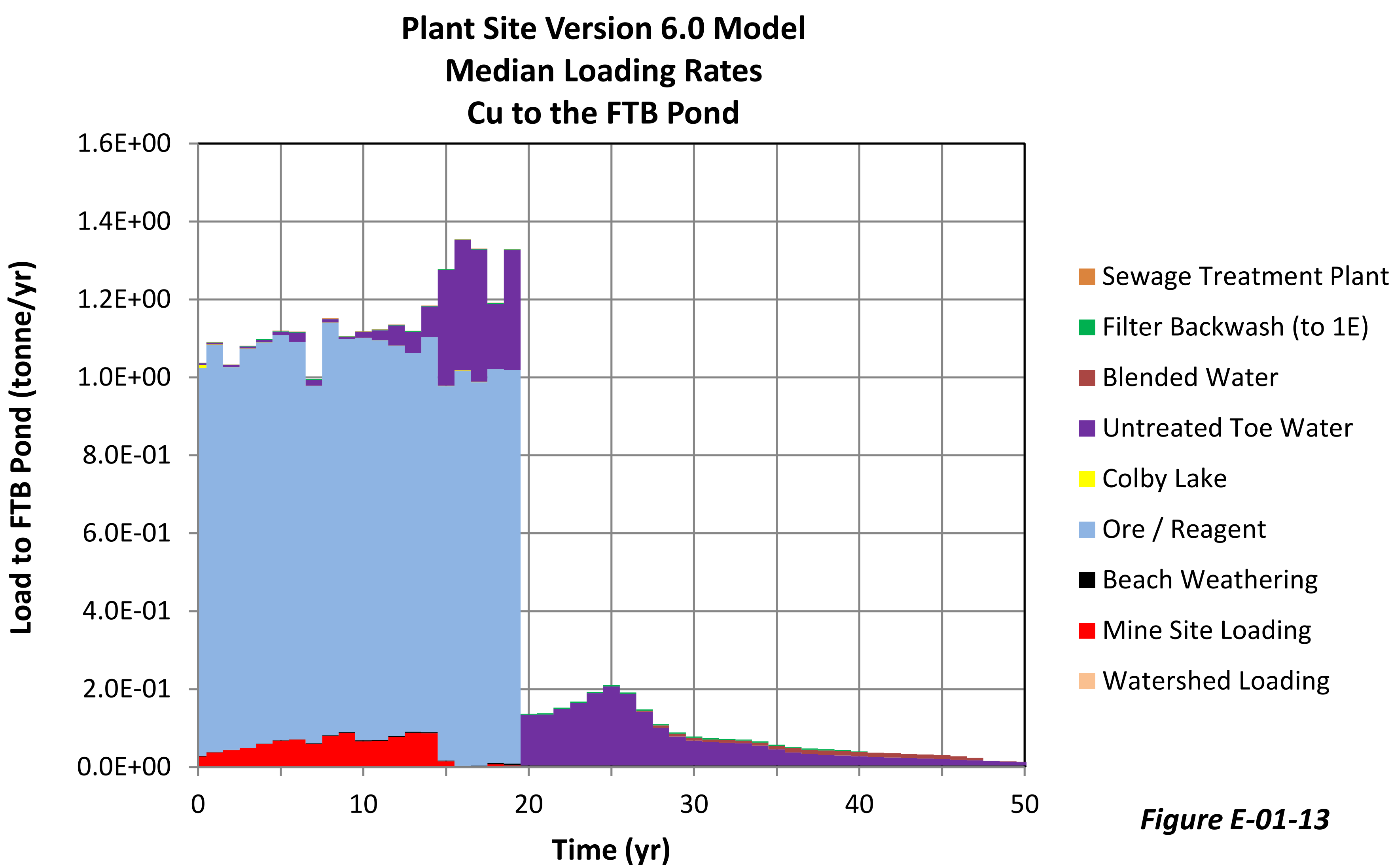

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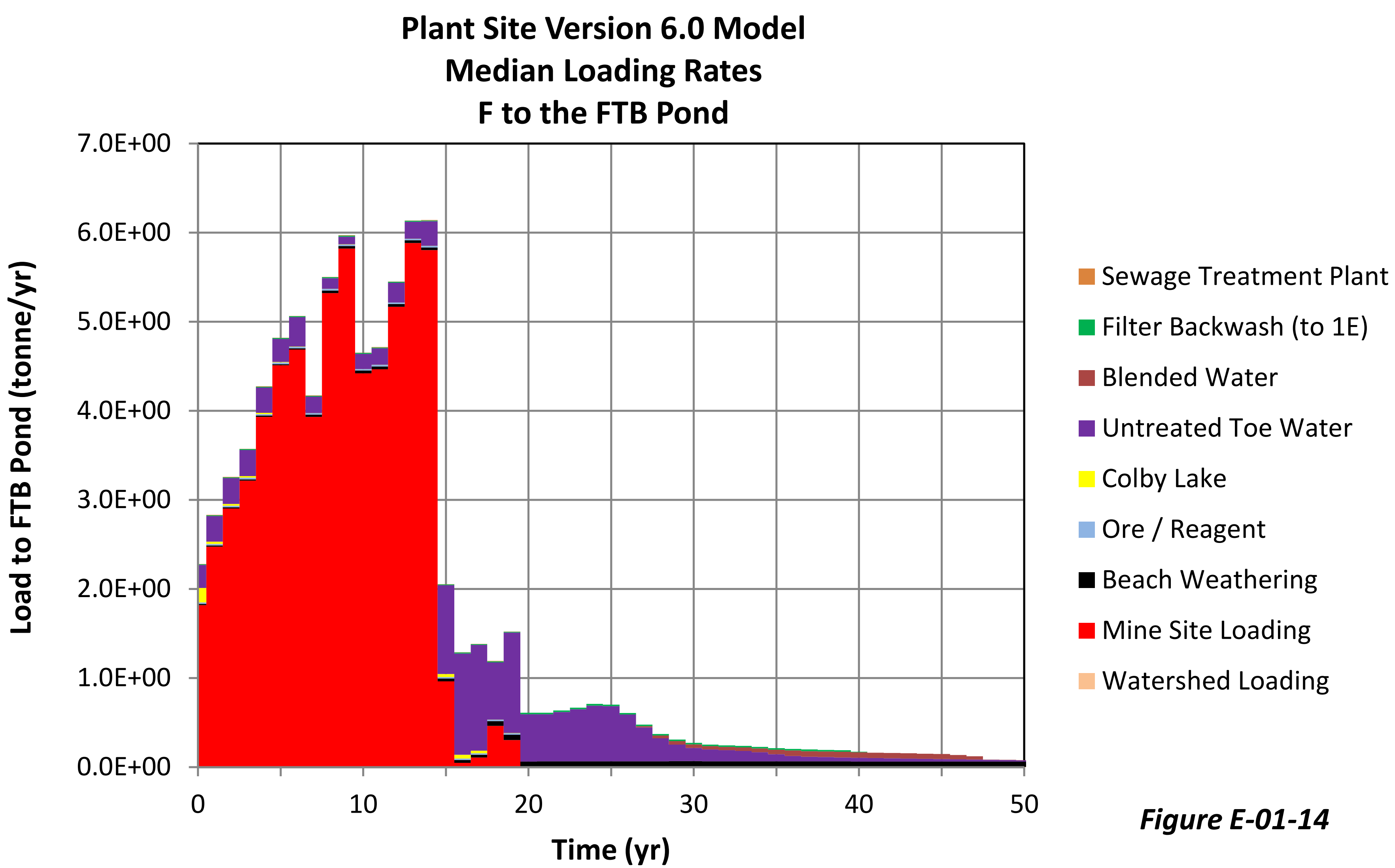

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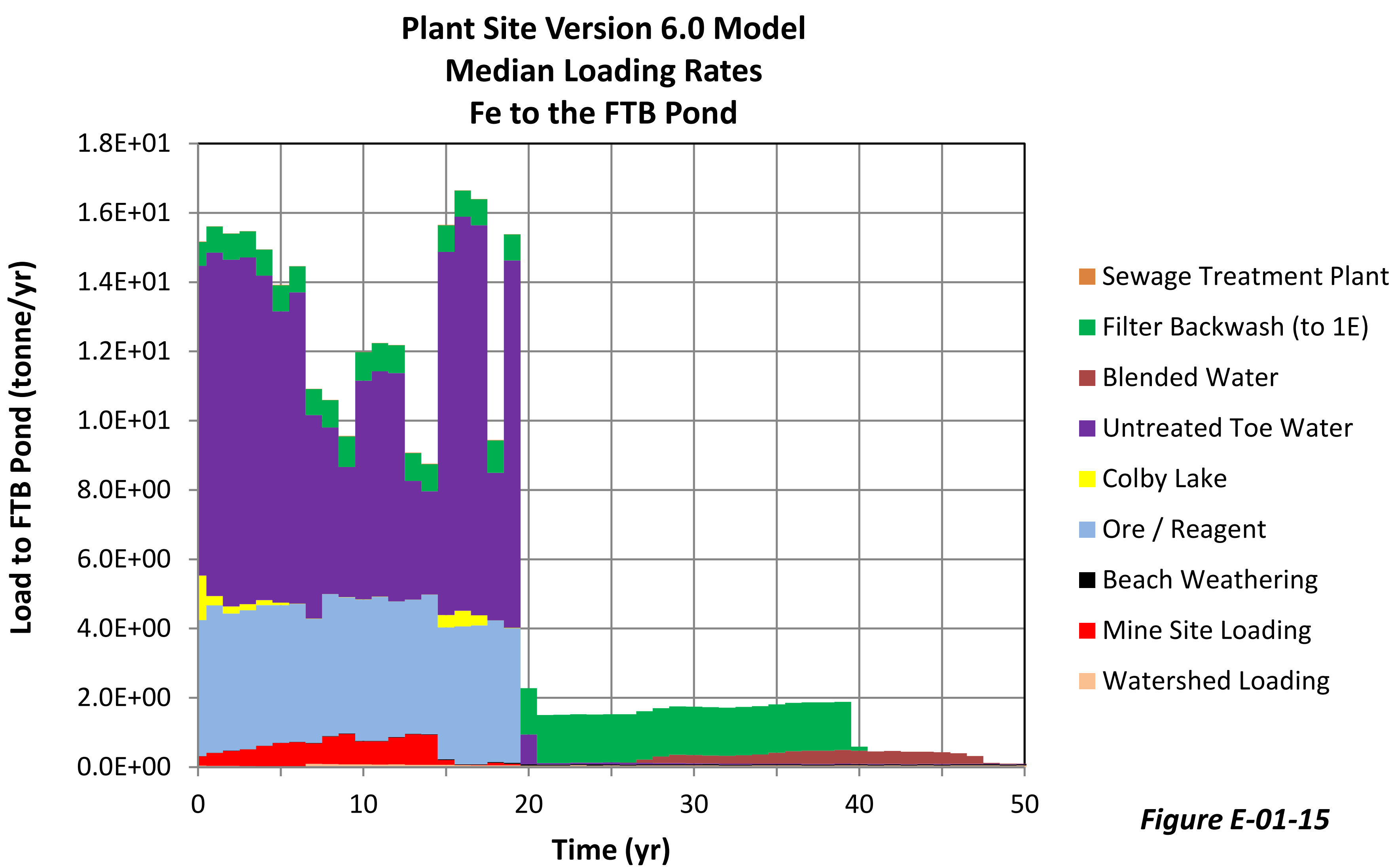

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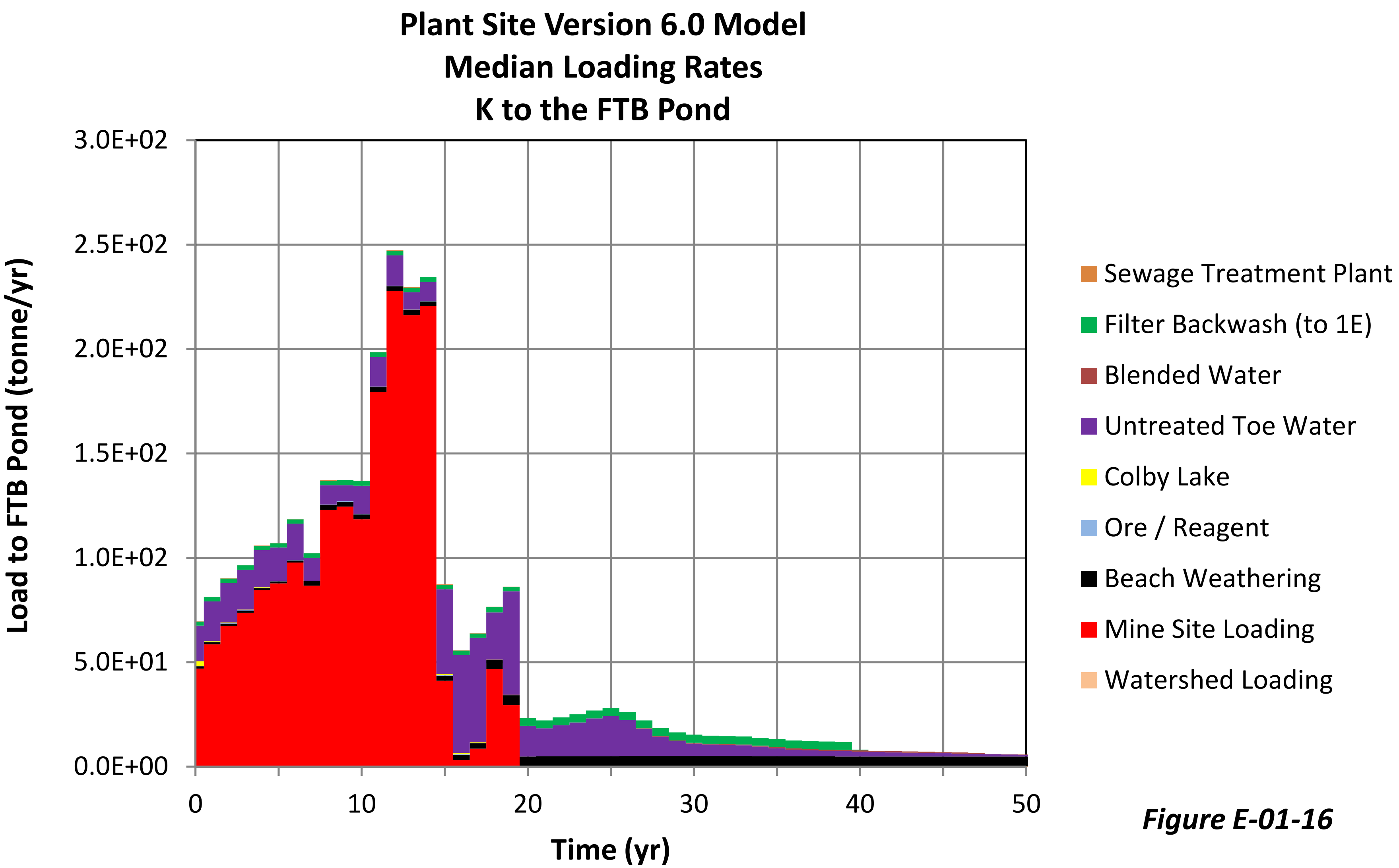

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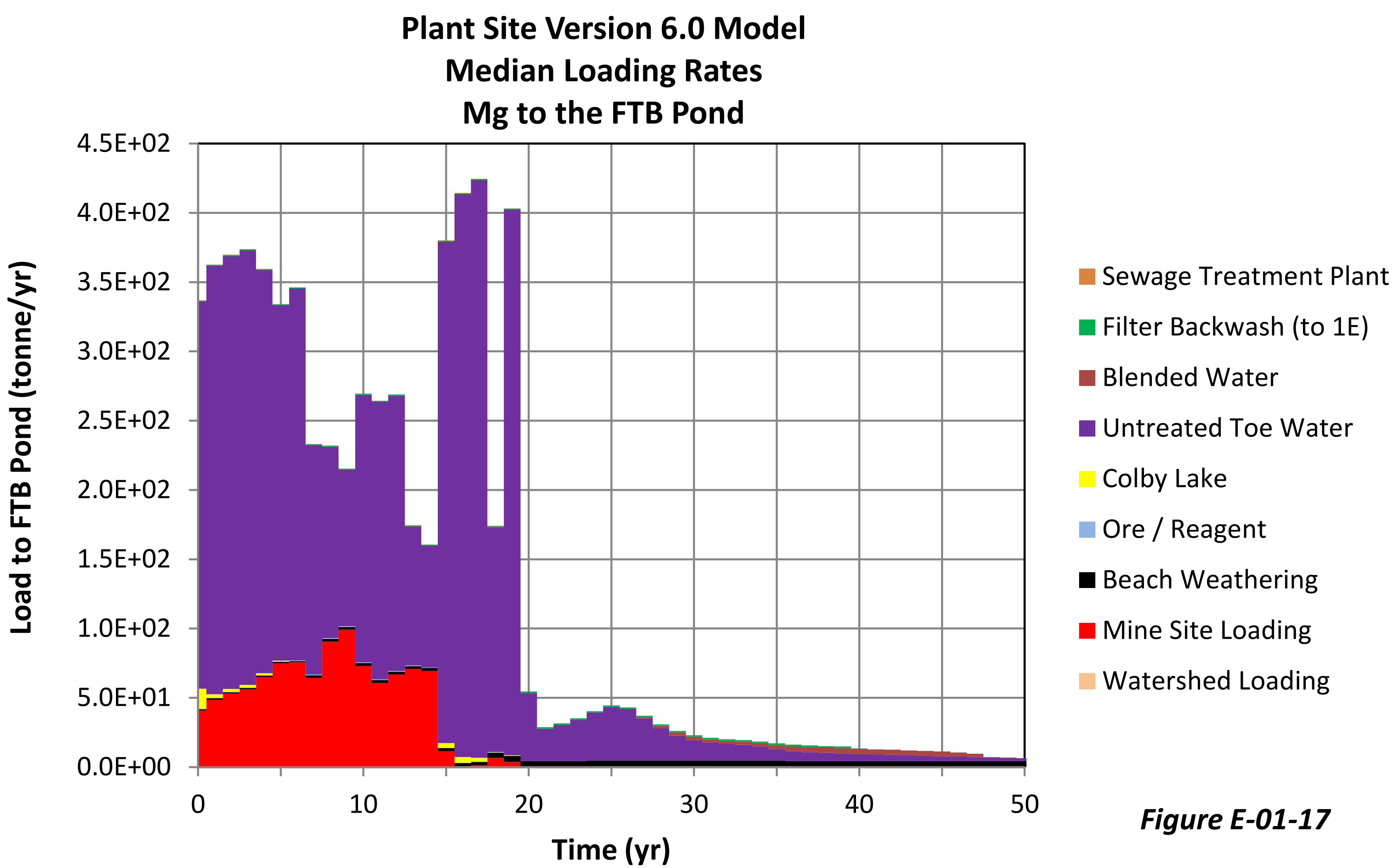

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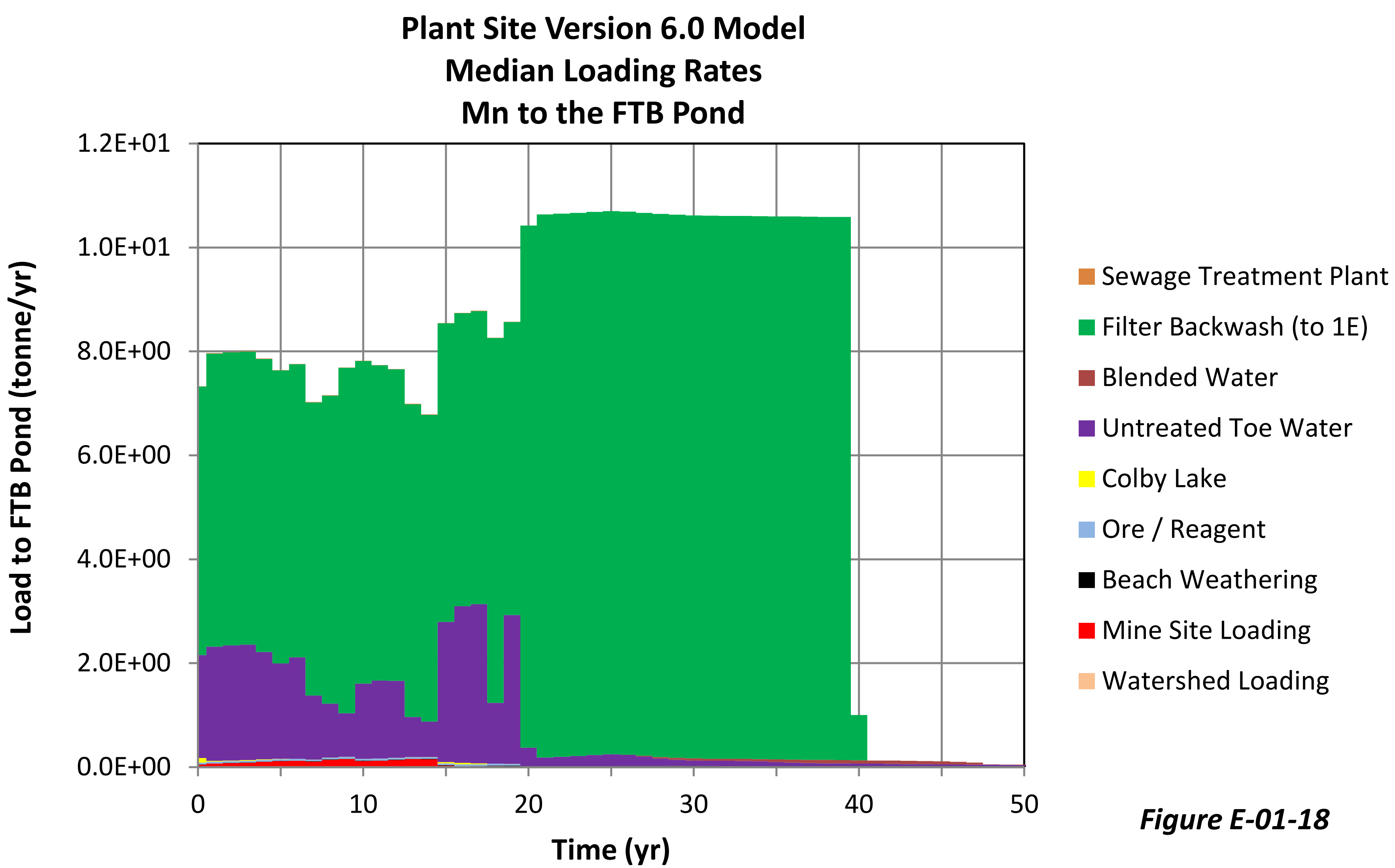

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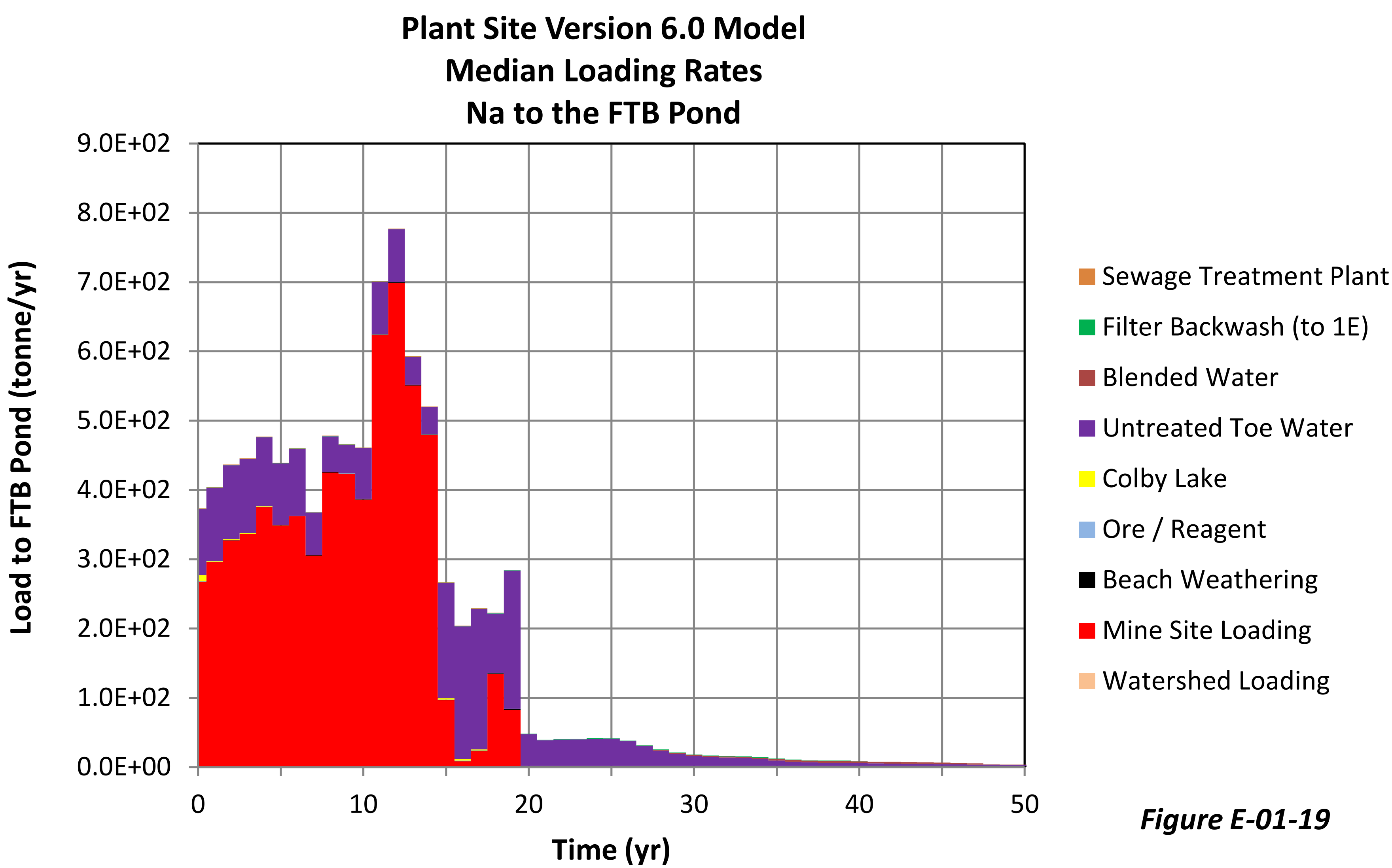

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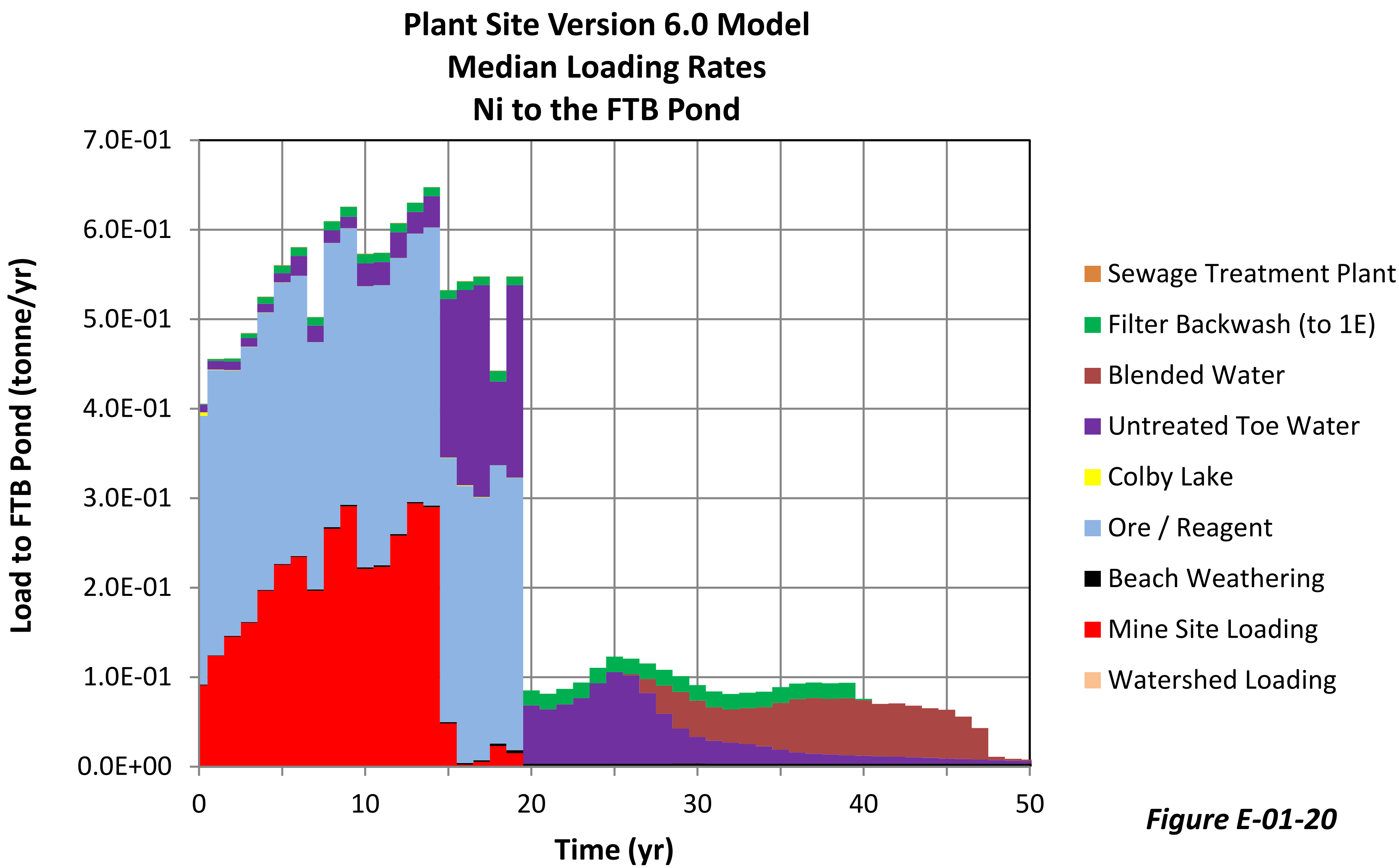

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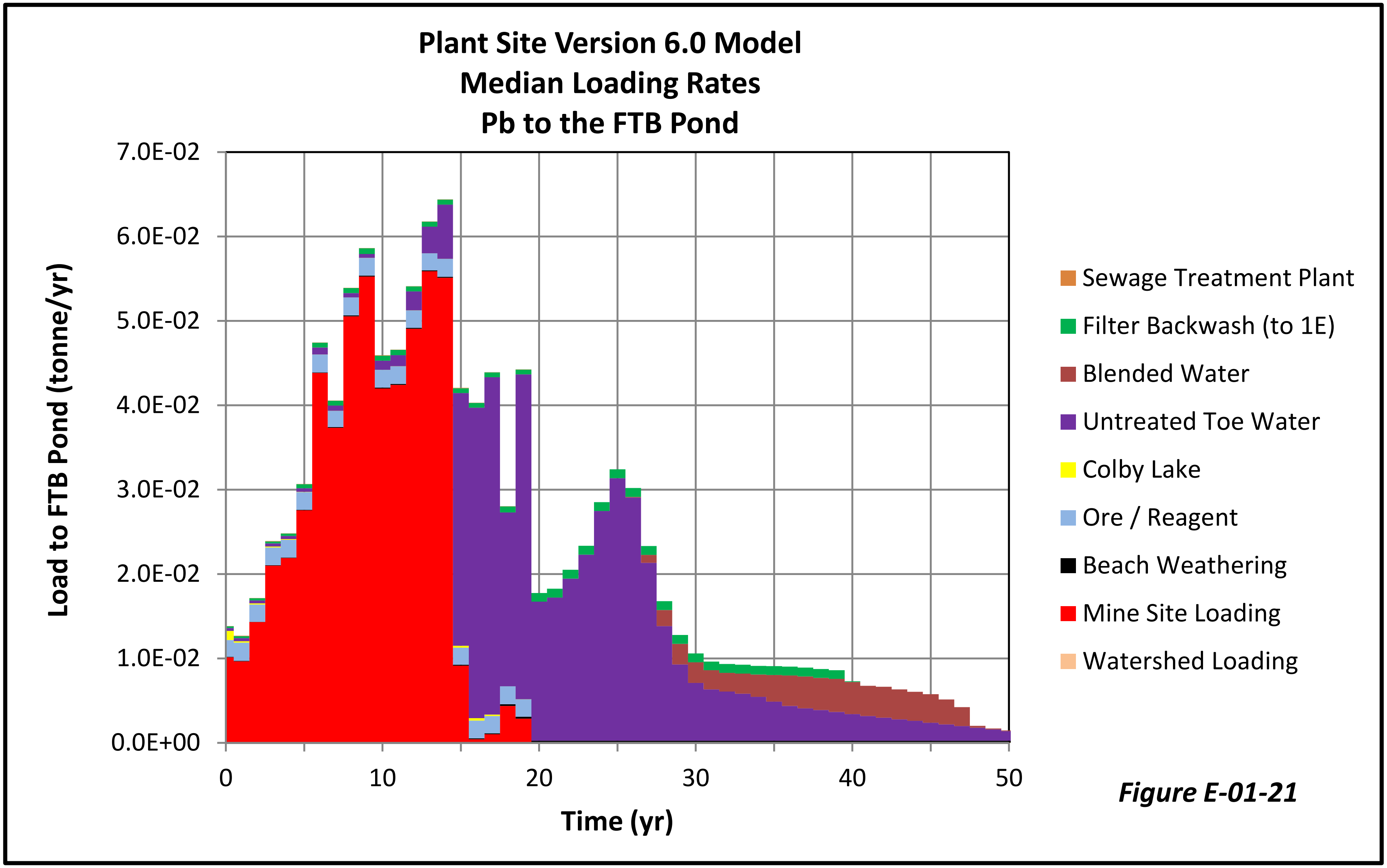
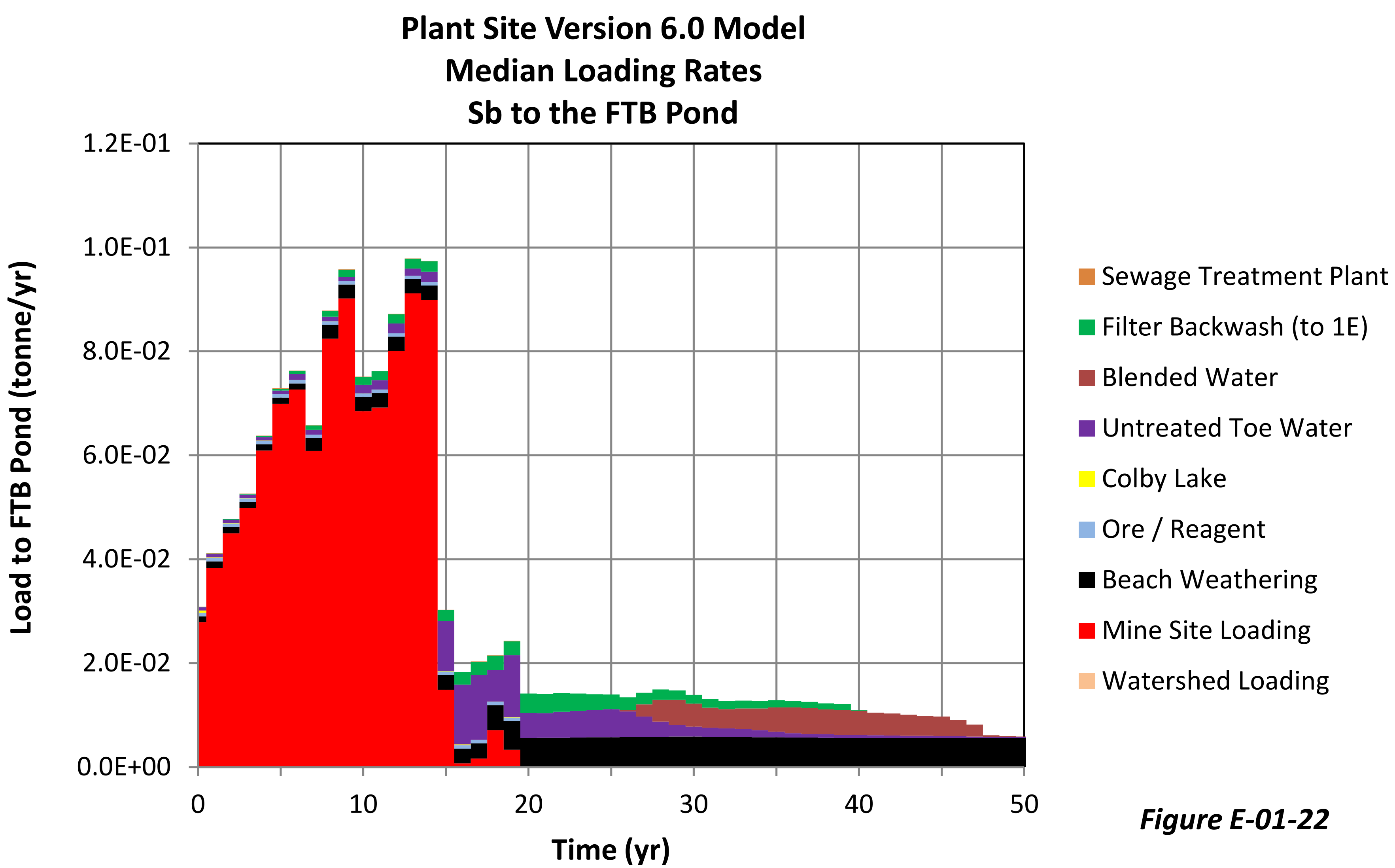

Plant Site Version 6.0 Model
Median Loading Rates
Pb to the FTB Pond
Load to FTB Pond (tonne/yr)
7.0E-02
6.0E-02
5.0E-02
4.0E-02
3.0E-02
2.0E-02
1.0E-02
0.0E+00
0
10
20
30
40
50
Time (yr)
Sewage Treatment Plant
Filter Backwash (to 1E)
Blended Water
Untreated Toe Water
Colby Lake
Ore / Reagent
Beach Weathering
Mine Site Loading
Watershed Loading
Figure E-01-21



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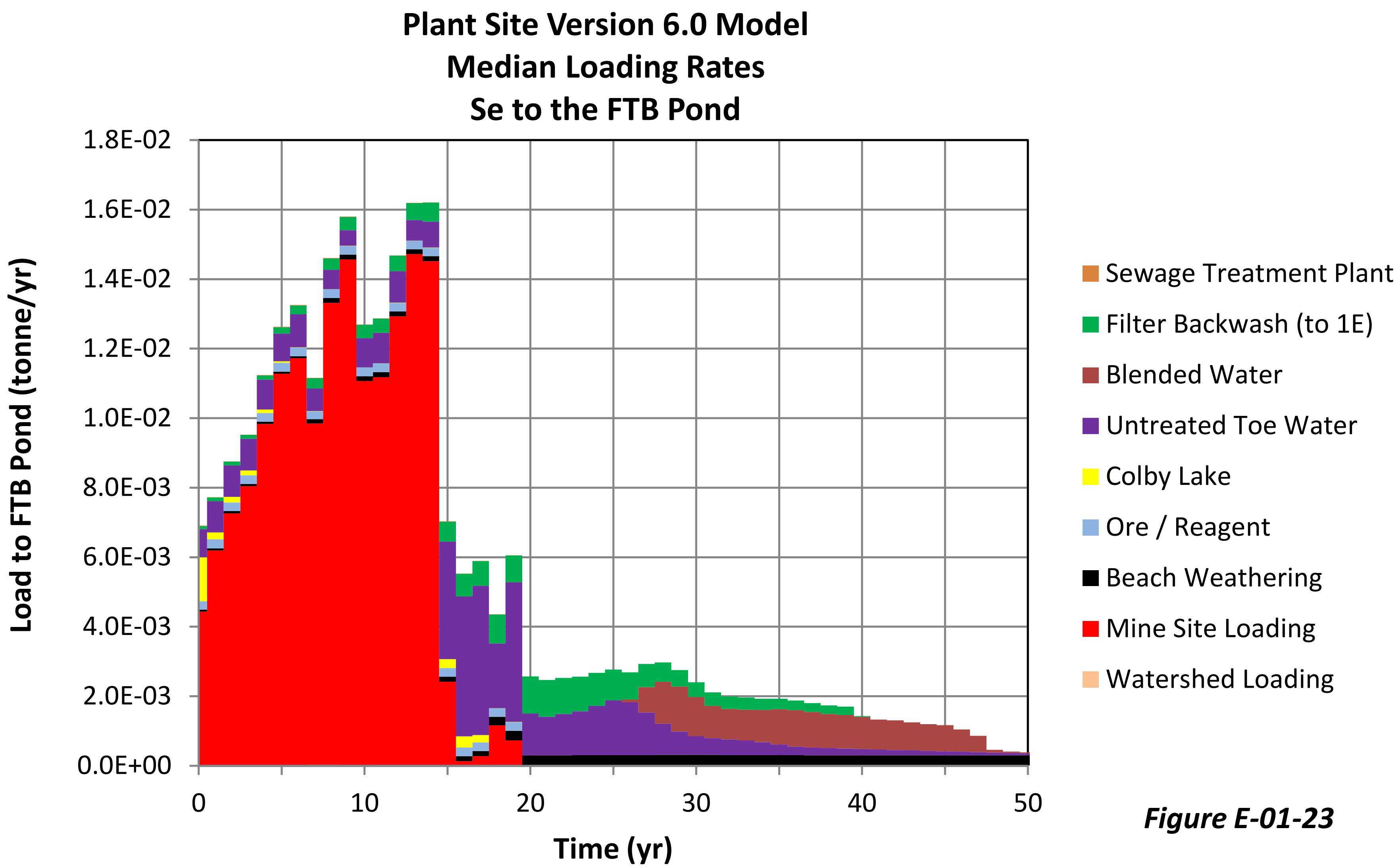

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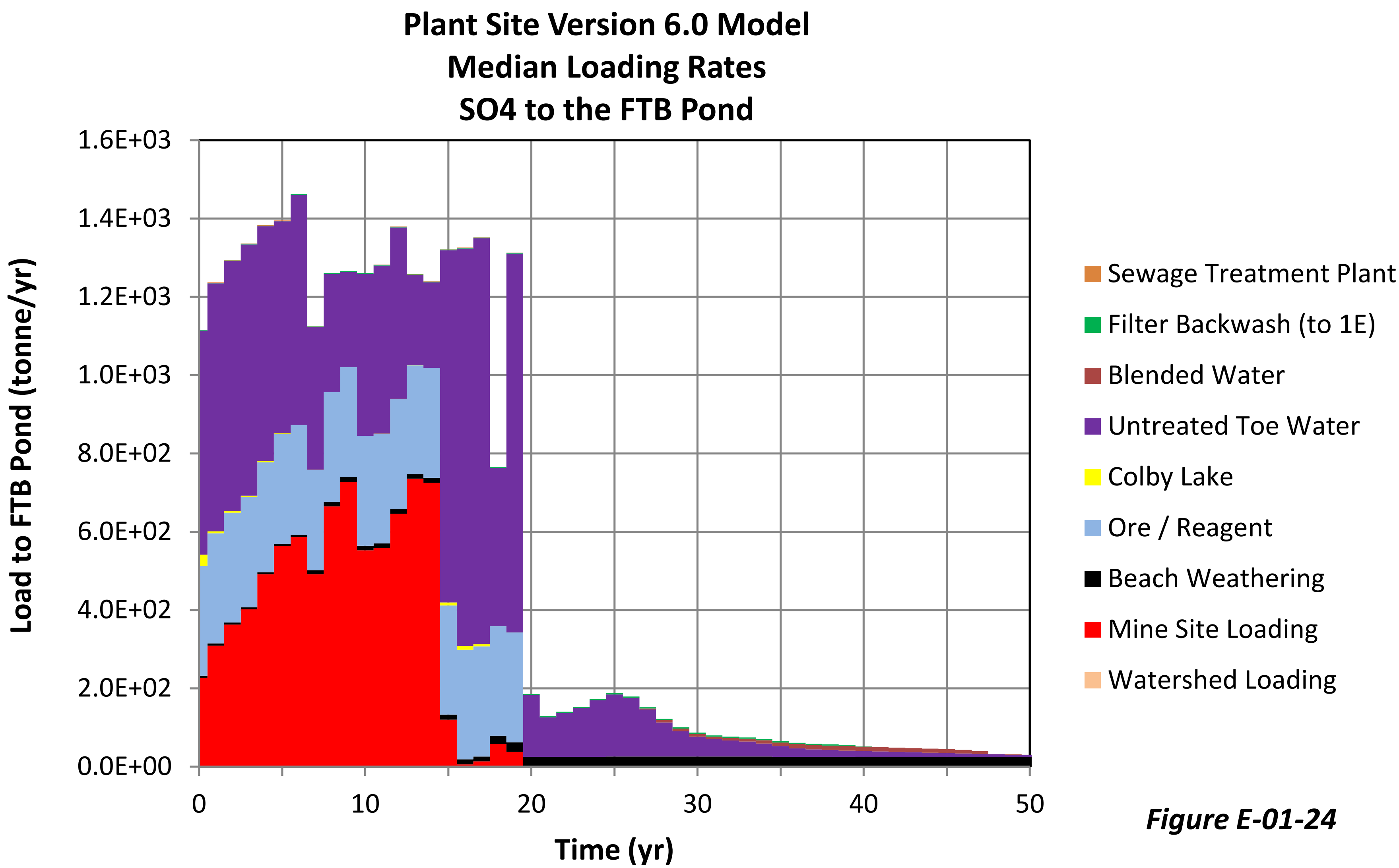

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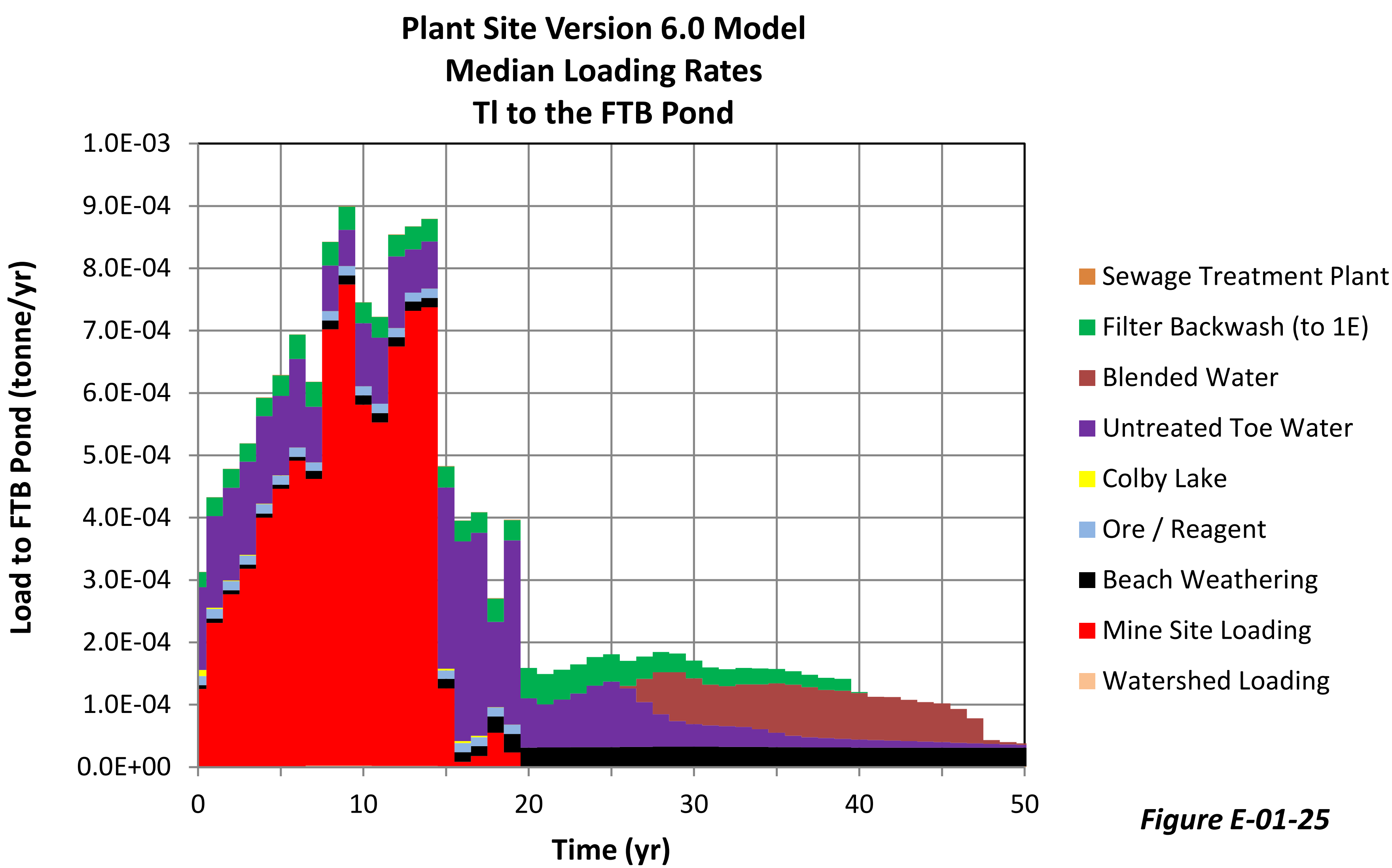

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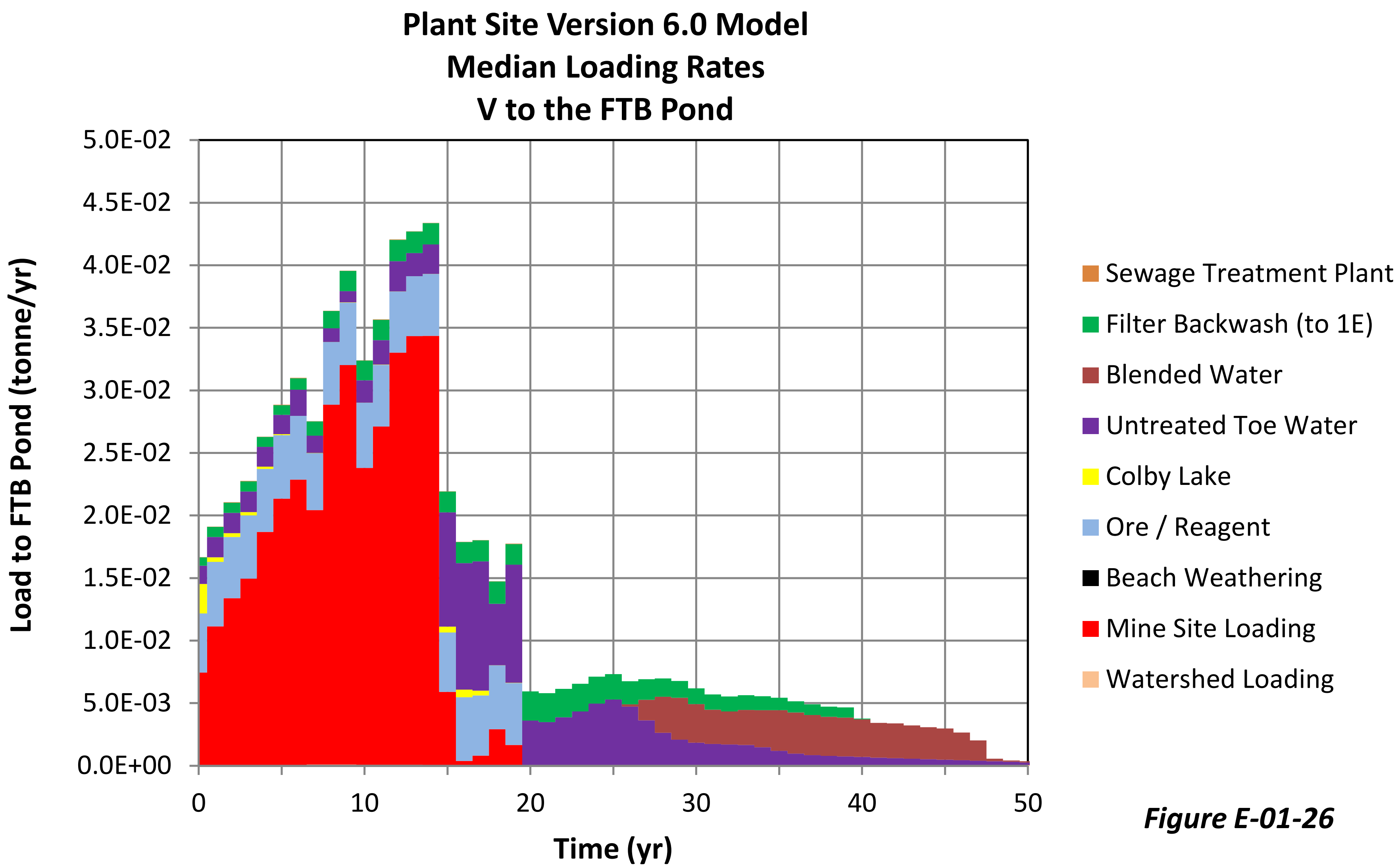

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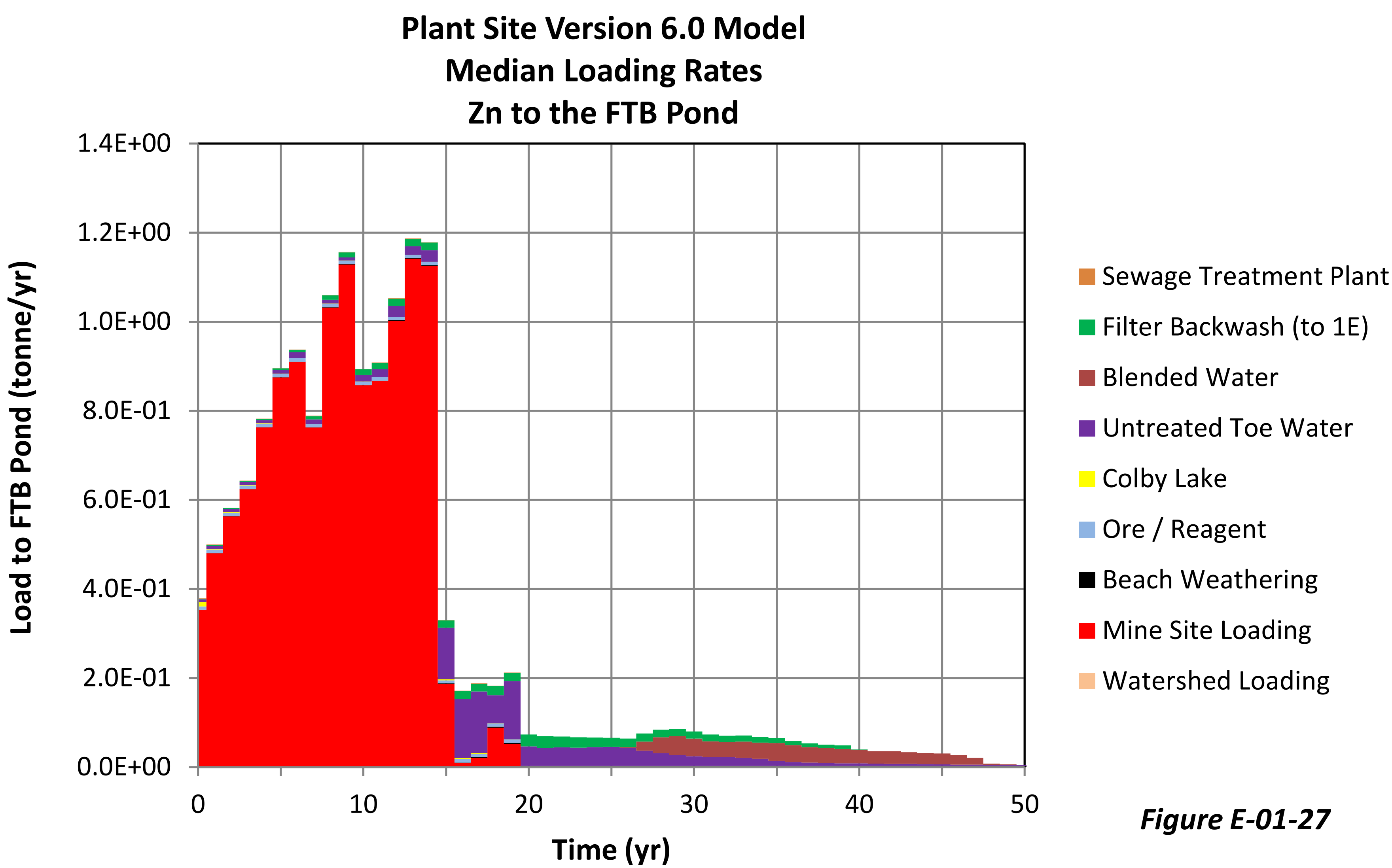


Figure E-01-27

Attachment F

Concentration Statistics at the Toes of the Tailings Basin

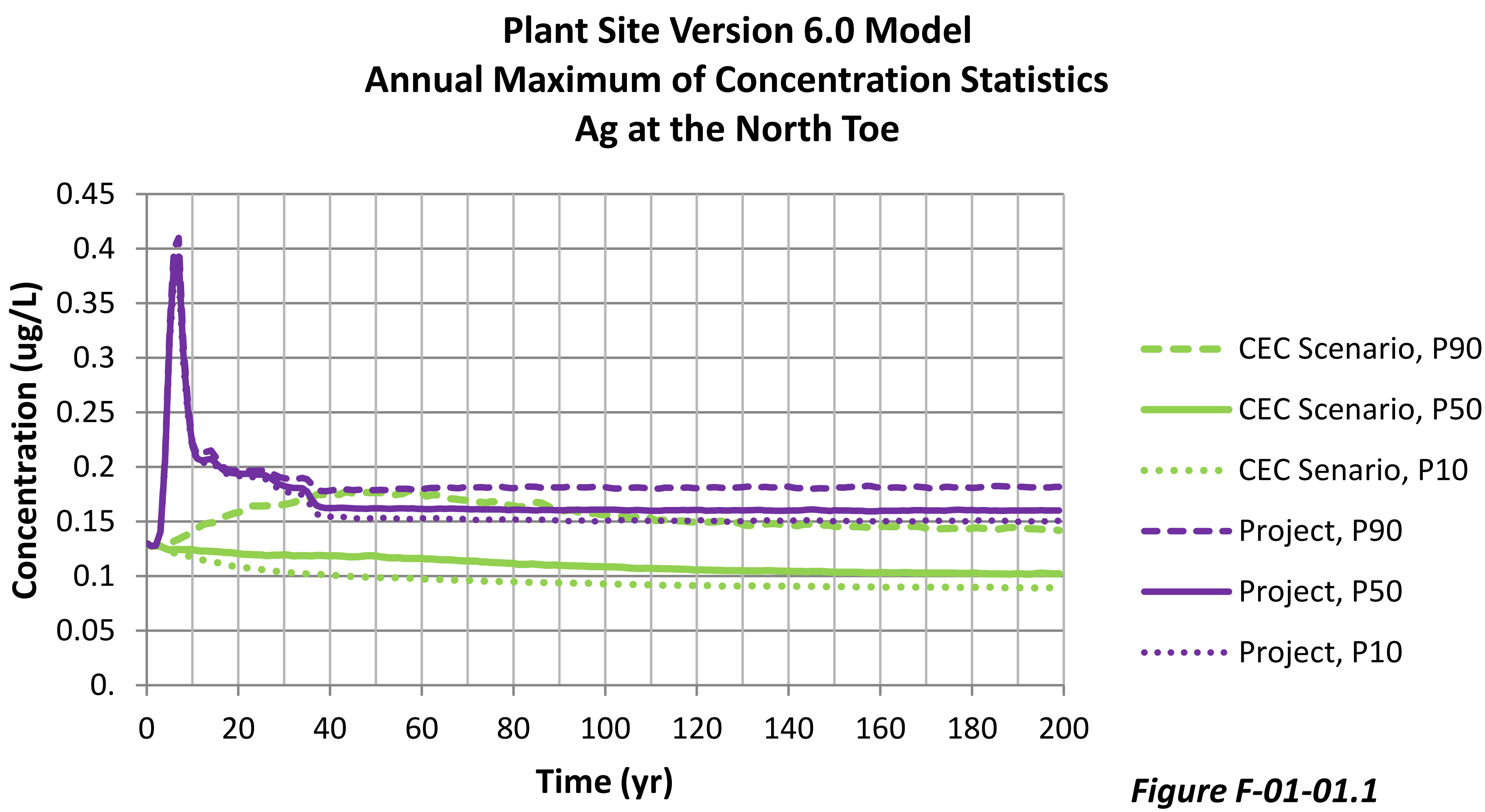
Attachment F Concentration Statistics at the Toes of the Tailings Basin

Estimated Tailings Basin toe water quality is shown in this attachment using a series of concentration statistic plots. Data for these plots were created as follows:

- The probabilistic GoldSim model was run at monthly time steps for 200 years (2401 time steps including the initial time zero). At each time step, the concentration at each toe of the Tailings Basin for each constituent was individually recorded.
- After one realization (i.e., one model run) was completed, the process was repeated until 500 model realizations were completed. The result is 500 estimated concentrations of each constituent at each Tailings Basin toe at every time step.
- At every time step, and for every constituent, the 500 estimated concentrations were sorted smallest-to-largest and 3 single values were chosen to represent the statistics at that particular time step. This step was performed at each of the Tailings Basin toes.
- From the 500 estimate concentrations, sorted smallest-to-largest, the 50th value was chosen to represent the 10th percentile (P10), the 250th value was chosen to represent the median (P50), and the 450th value was chosen to represent the 90th percentile (P90). This indicates that at any time, 10% of the model results are less than or equal to the P10 value, 50% are less than or equal to the P50 value, and 90% are less than or equal to the P90 value.
- This process was repeated for all constituents at each Tailings Basin toe, resulting in 3 time series lines representing the 10th, 50th, and 90th percentiles of concentrations at every time step (monthly results).
- For plotting the Tailings Basin toe results over the entire 200 years of the simulation, the data was summarized by year to make the plots legible. The monthly model outputs for the 10th, 50th, and 90th percentiles are plotted on an annual basis by taking the maximum value of each percentile for a given year (i.e., the highest 90th percentile value). Because of the integrated nature of the toe concentrations, the annual maximum is not significantly different than the annual average.

The figure numbering convention is "**Figure W-XX-YY.Z**" where:

- **W** indicates the Attachment.
- **XX** is a counter indicating the location; in this attachment it will count from "01" to "04" to account for the north toe, northwest toe, south toe, and west toe in that order.
- **YY** is a counter indicating the constituent; in this attachment it will count from "01" to "27" to show the 27 independently modeled constituents.
- **Z** is a numerical value, 1 or 2. A value of 1 indicates that the annual maximum has been plotted and a value of 2 indicates that the annual average has been plotted. In this attachment, only the annual maximum (1) has been plotted.



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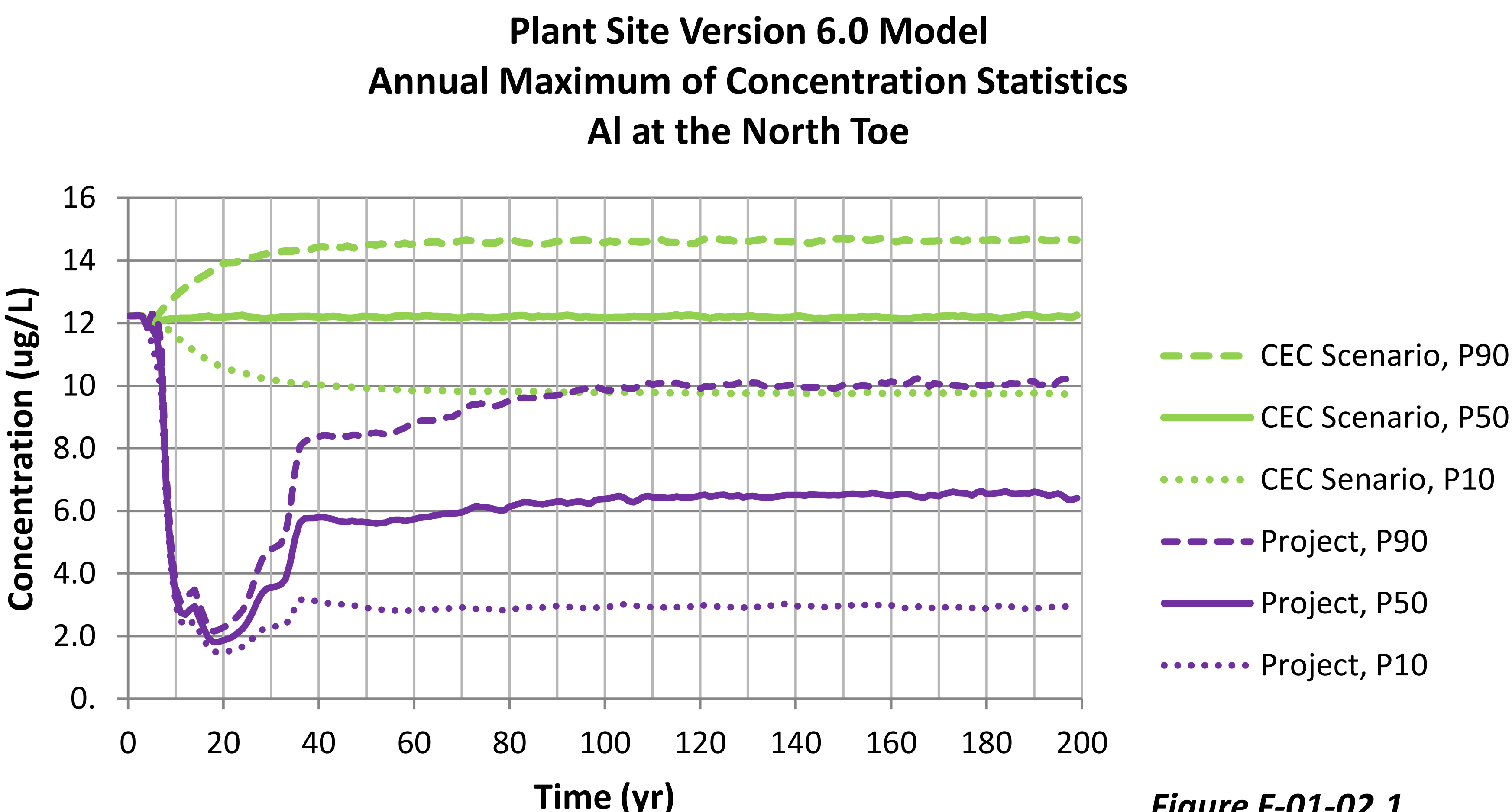

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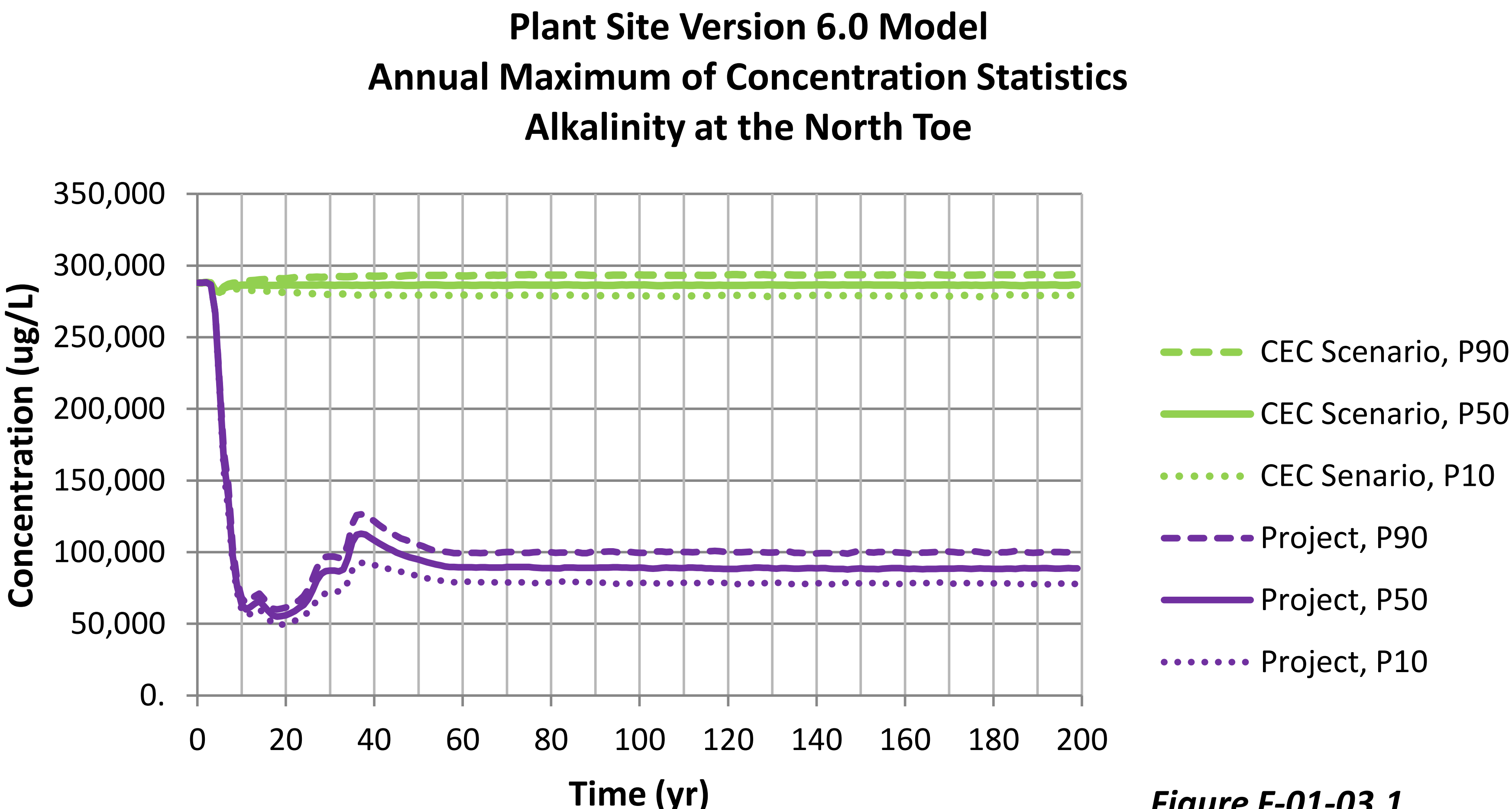

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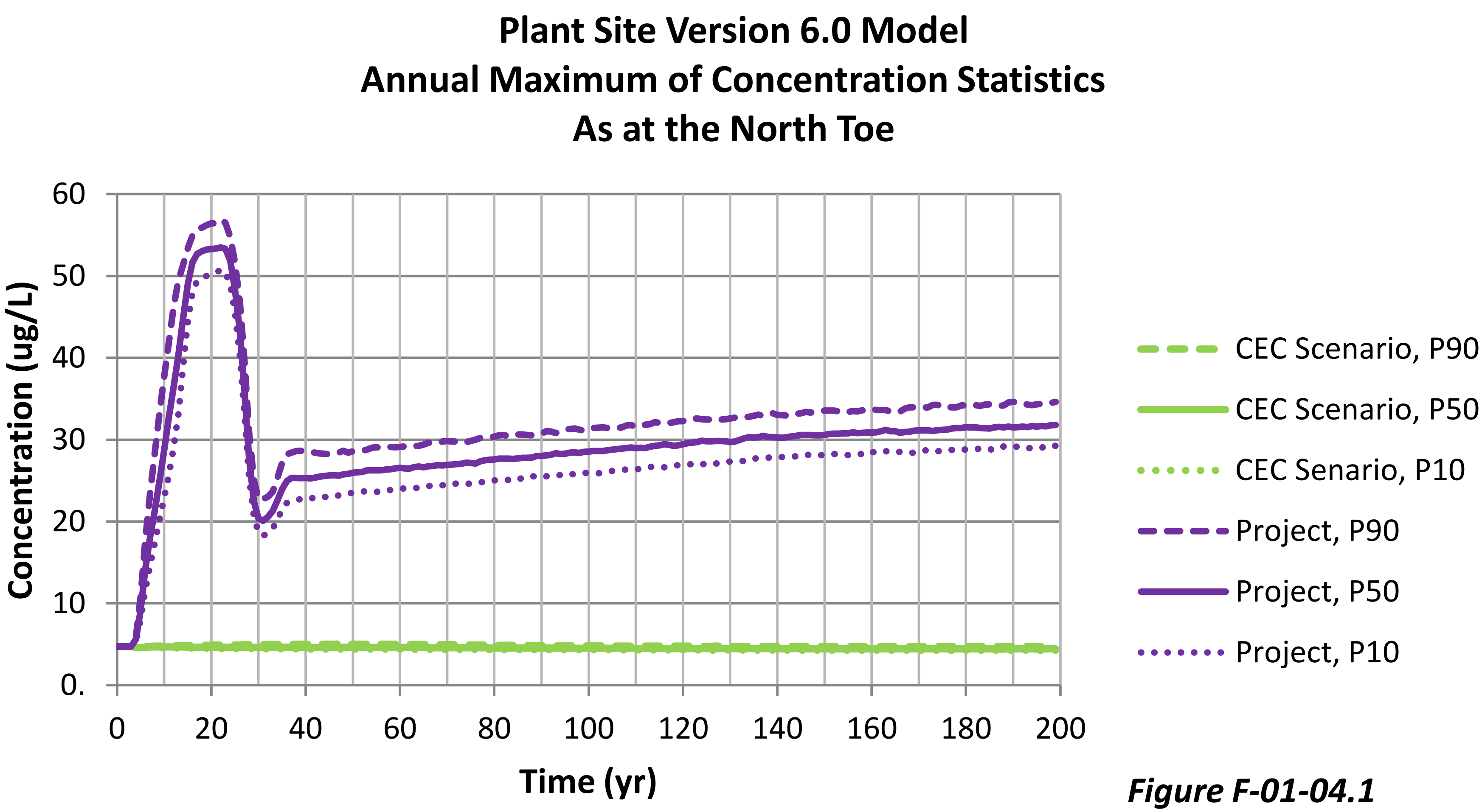

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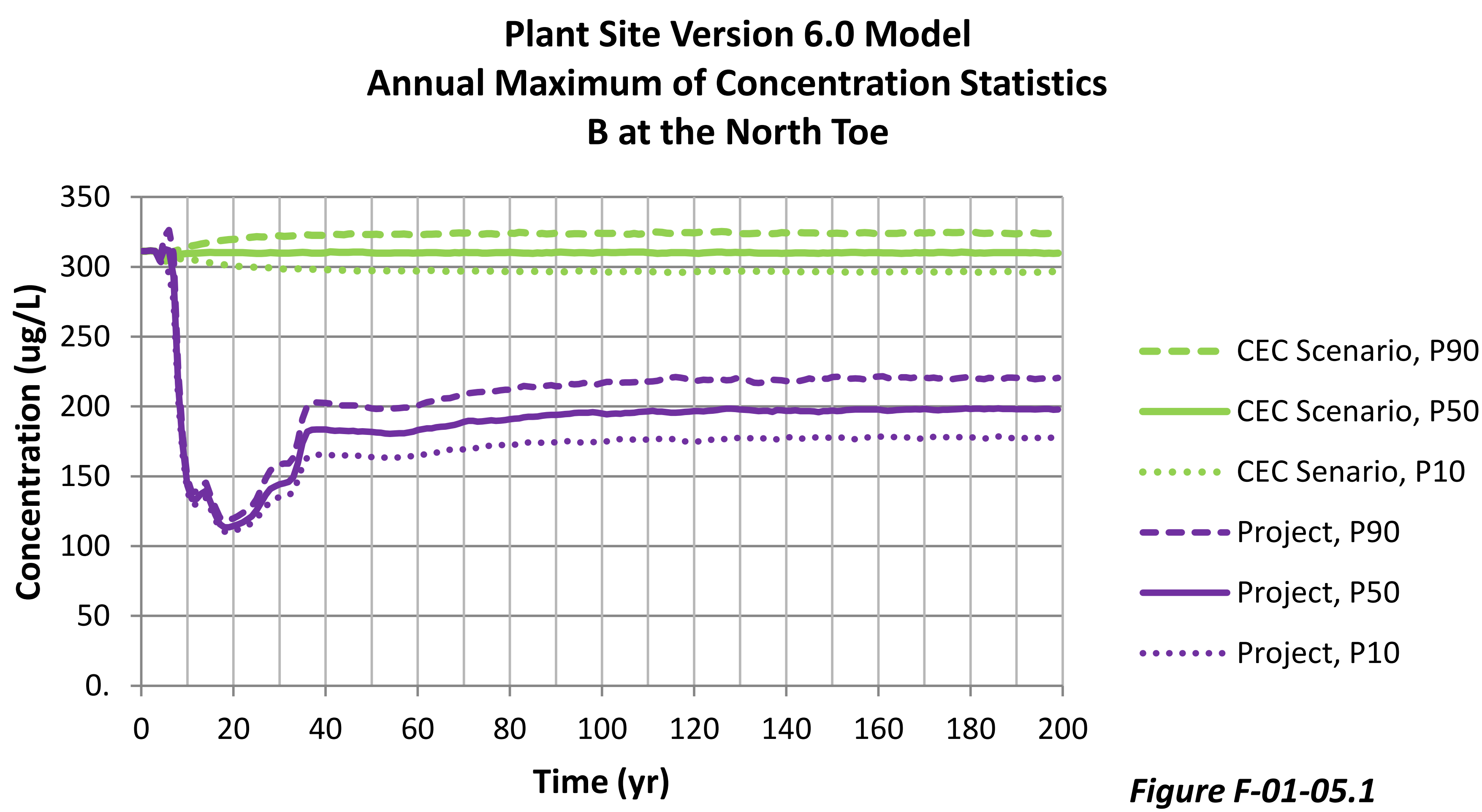

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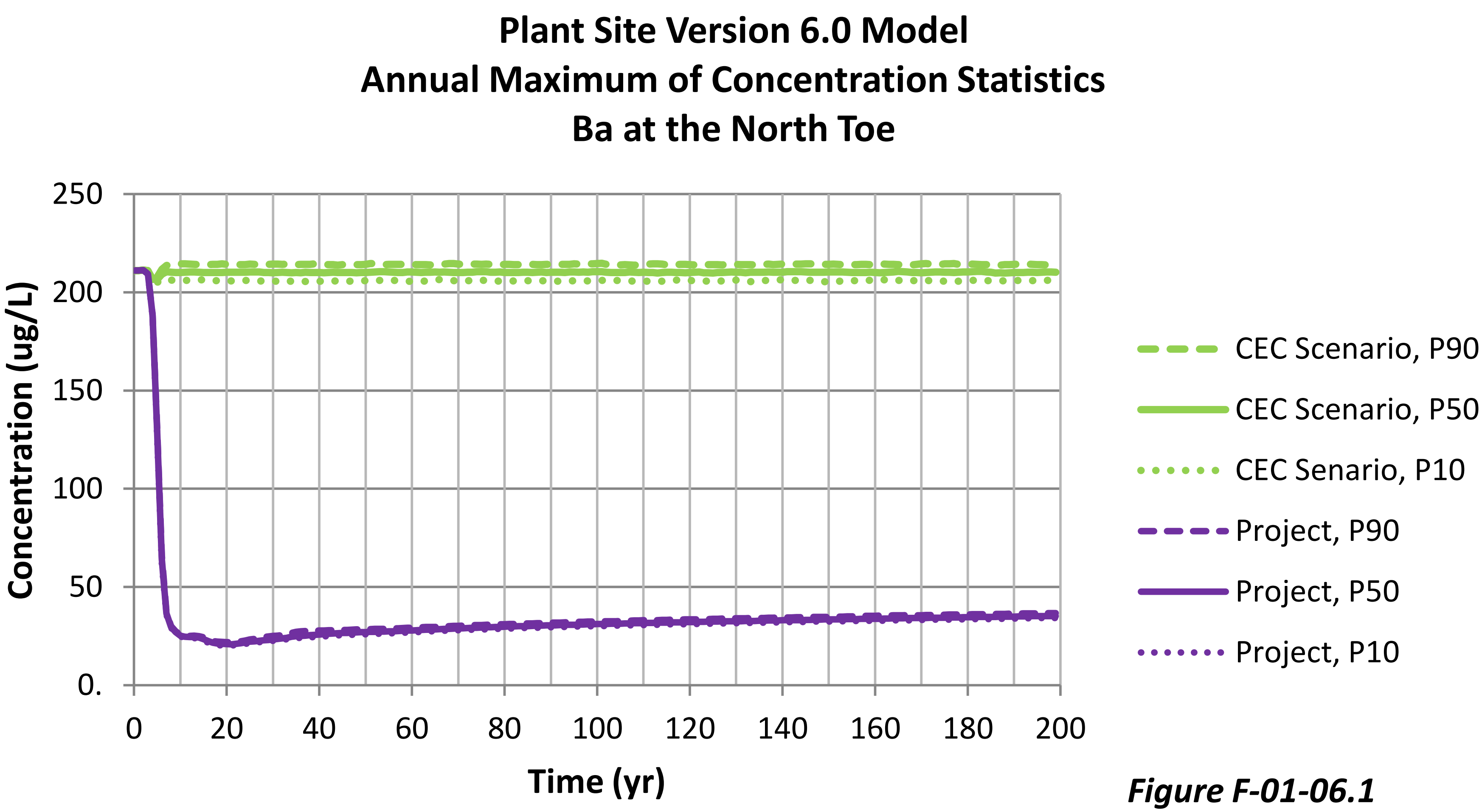

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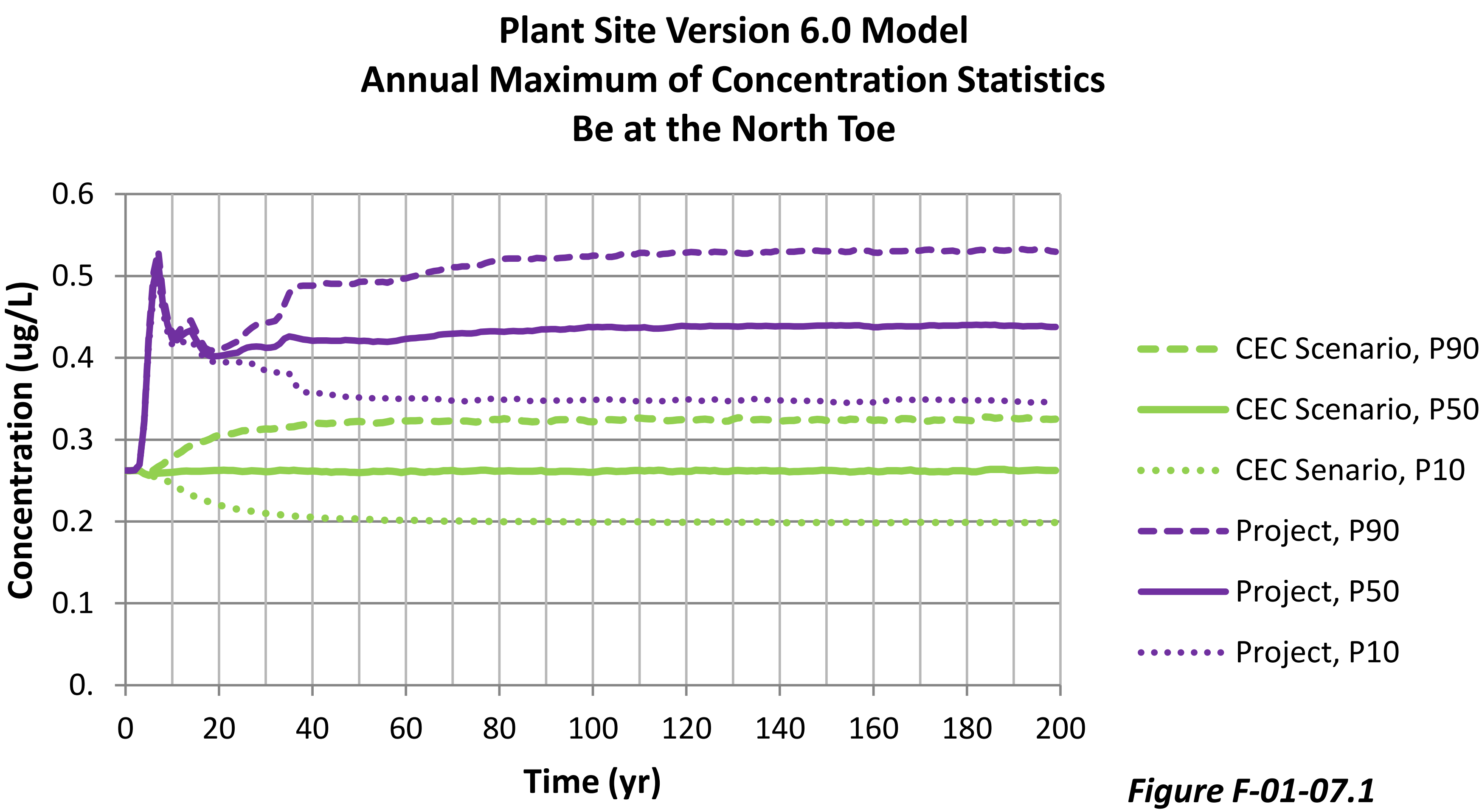

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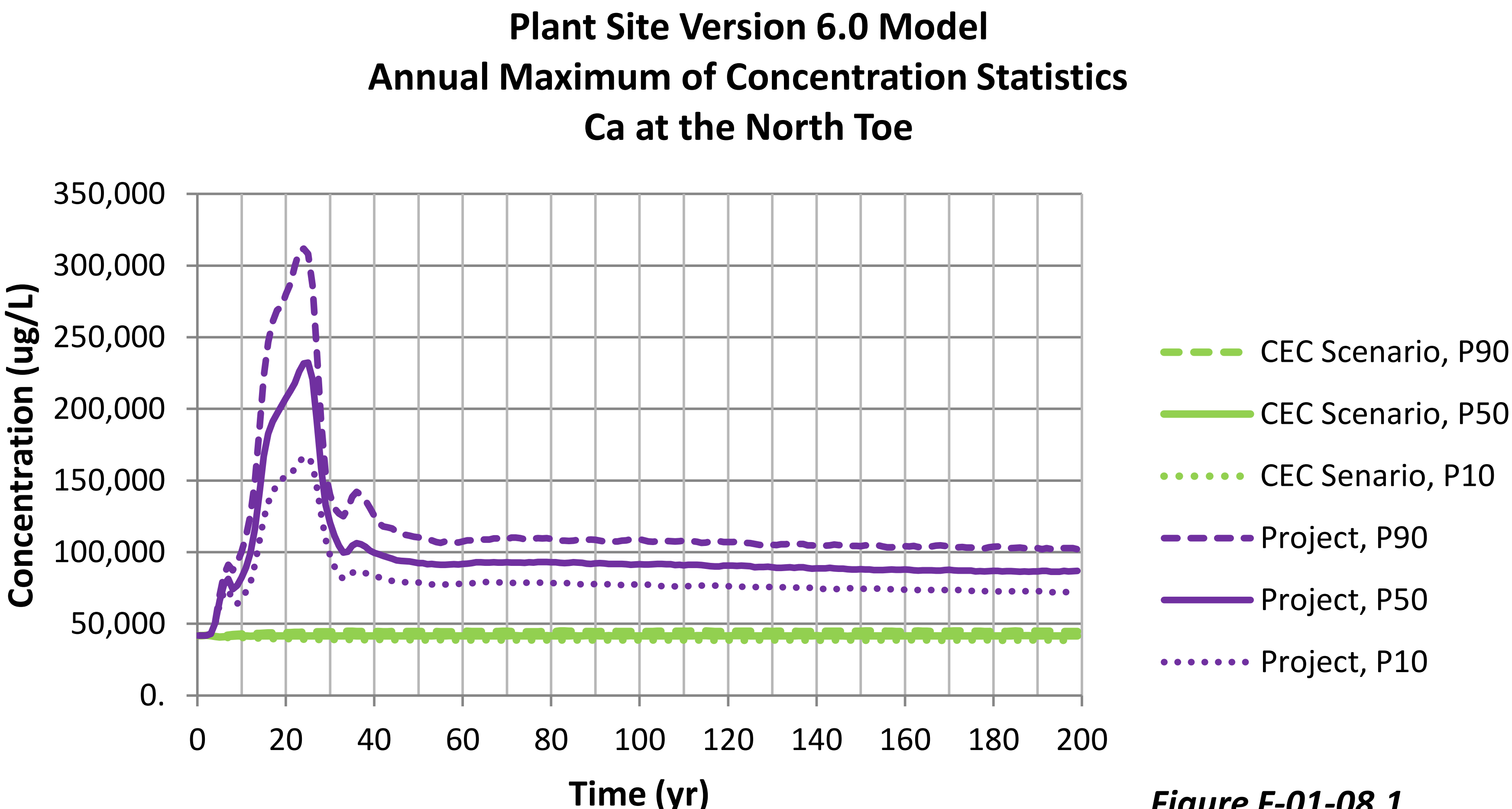

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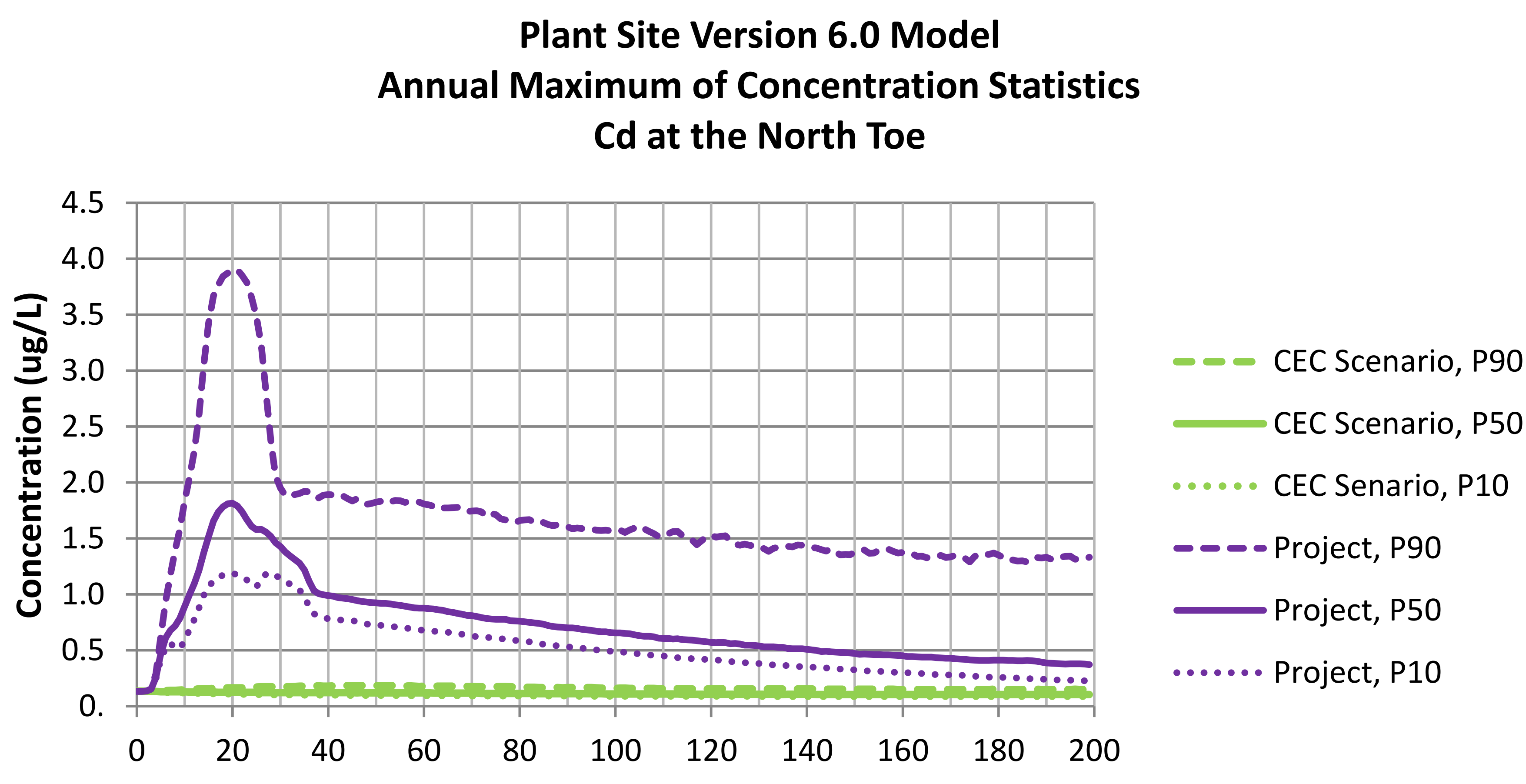

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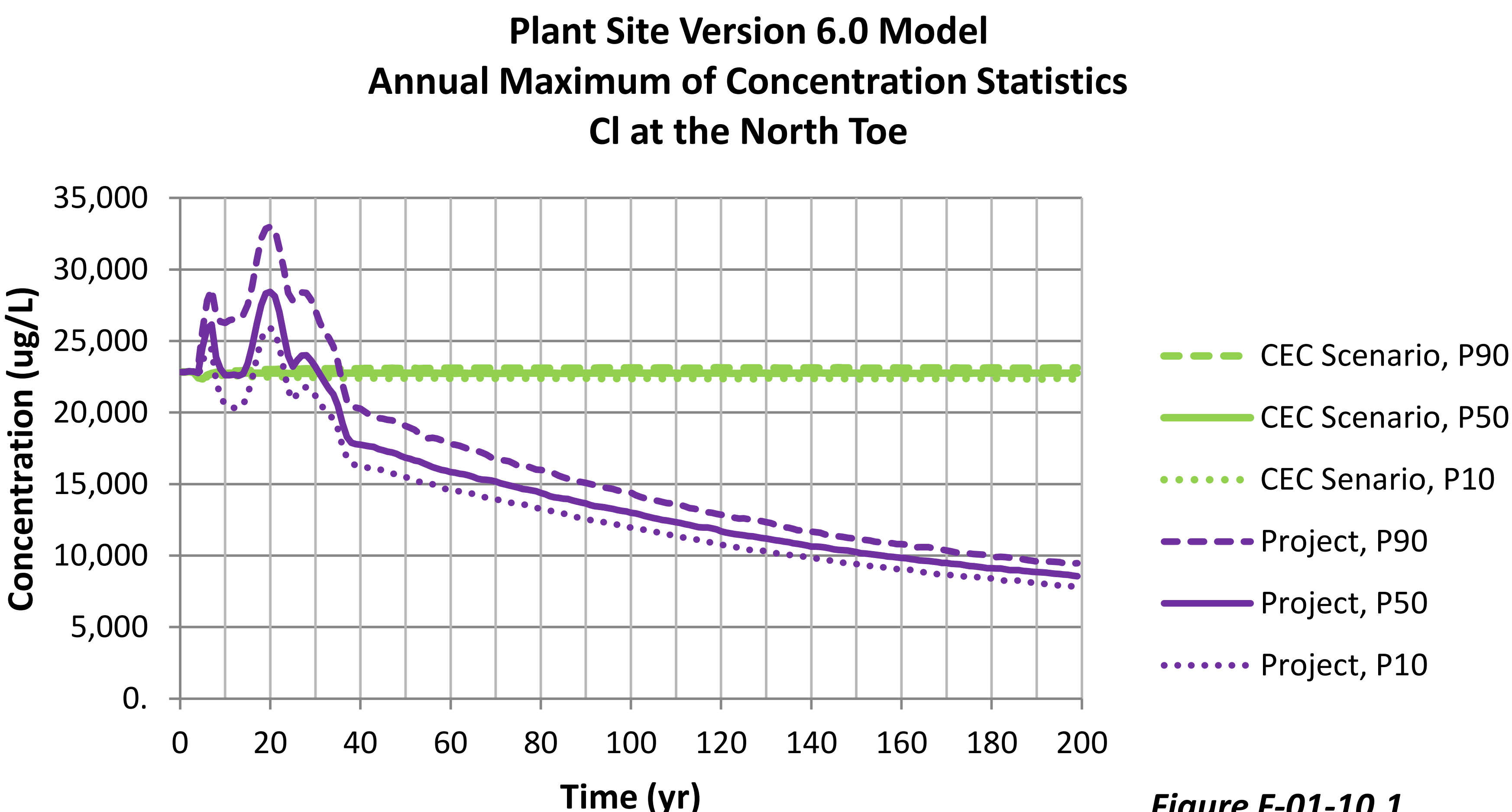

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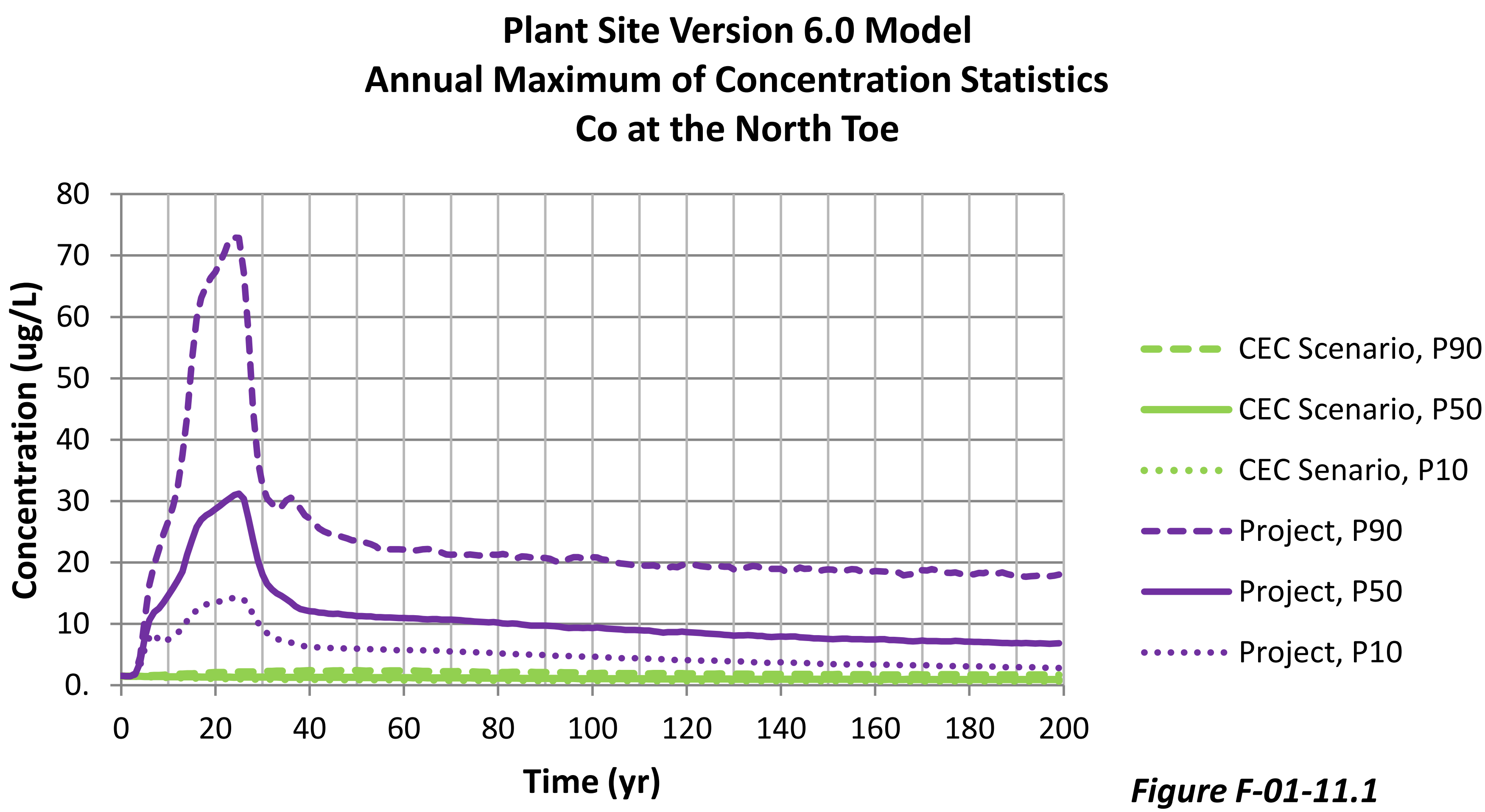

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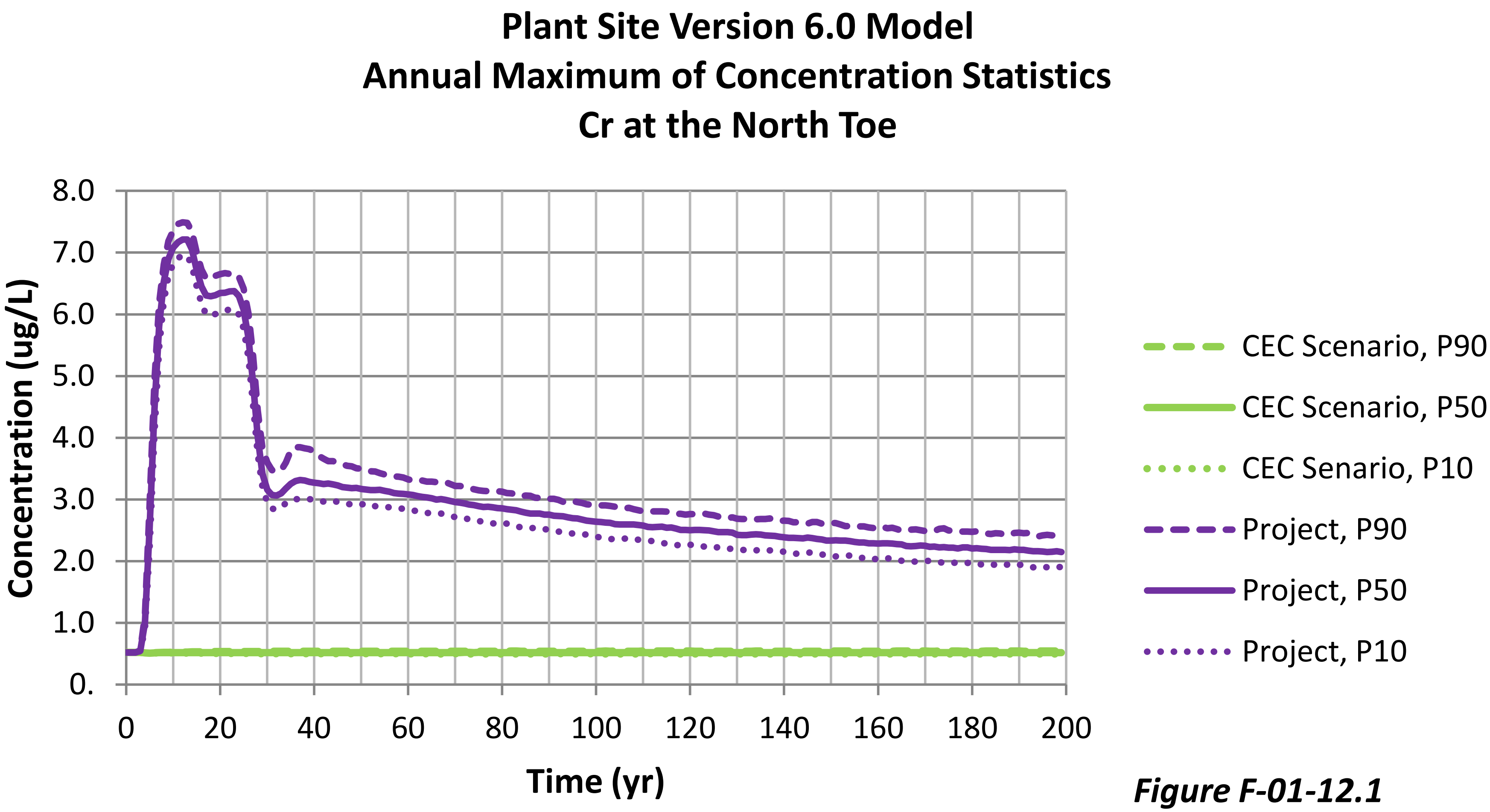

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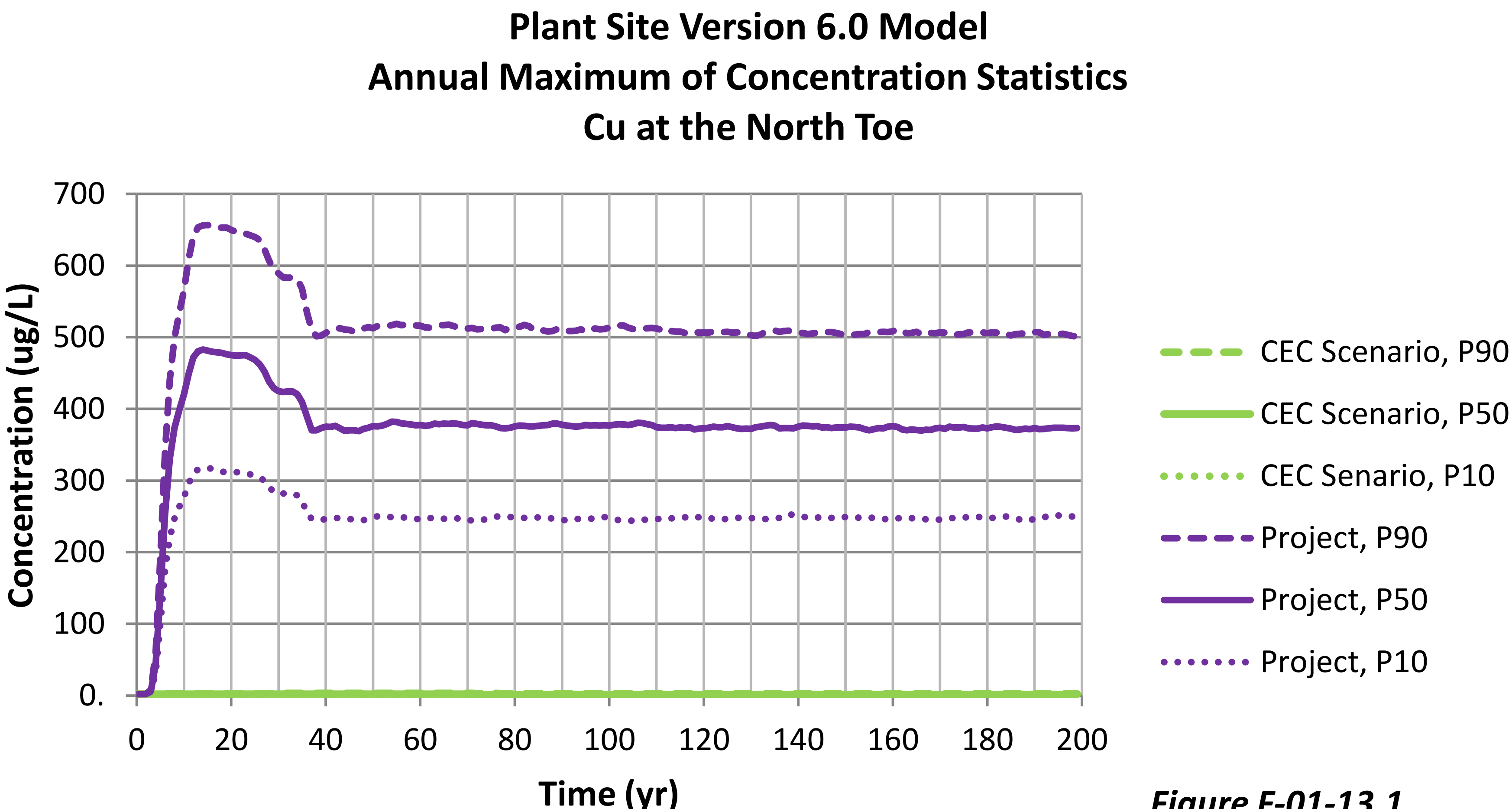

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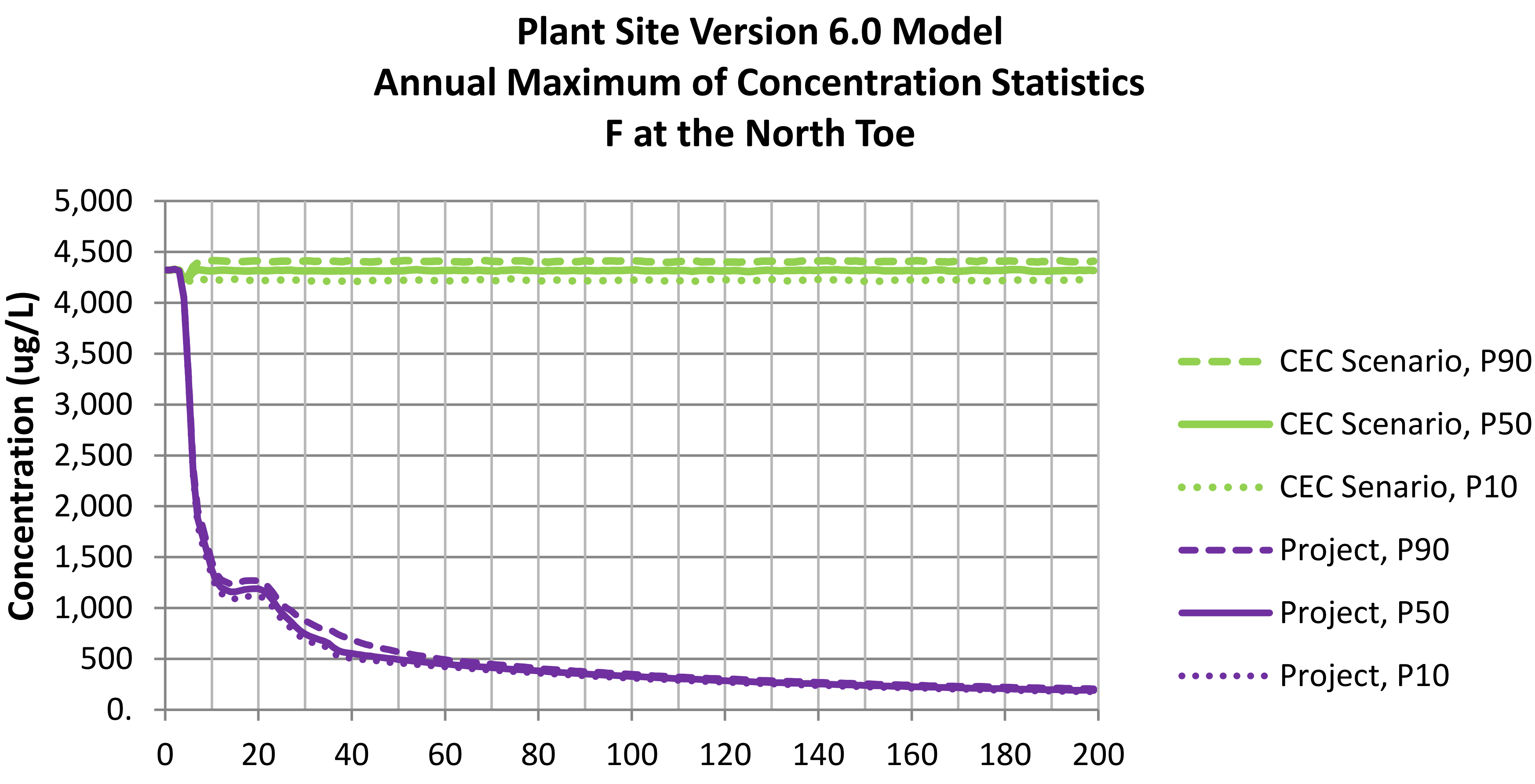

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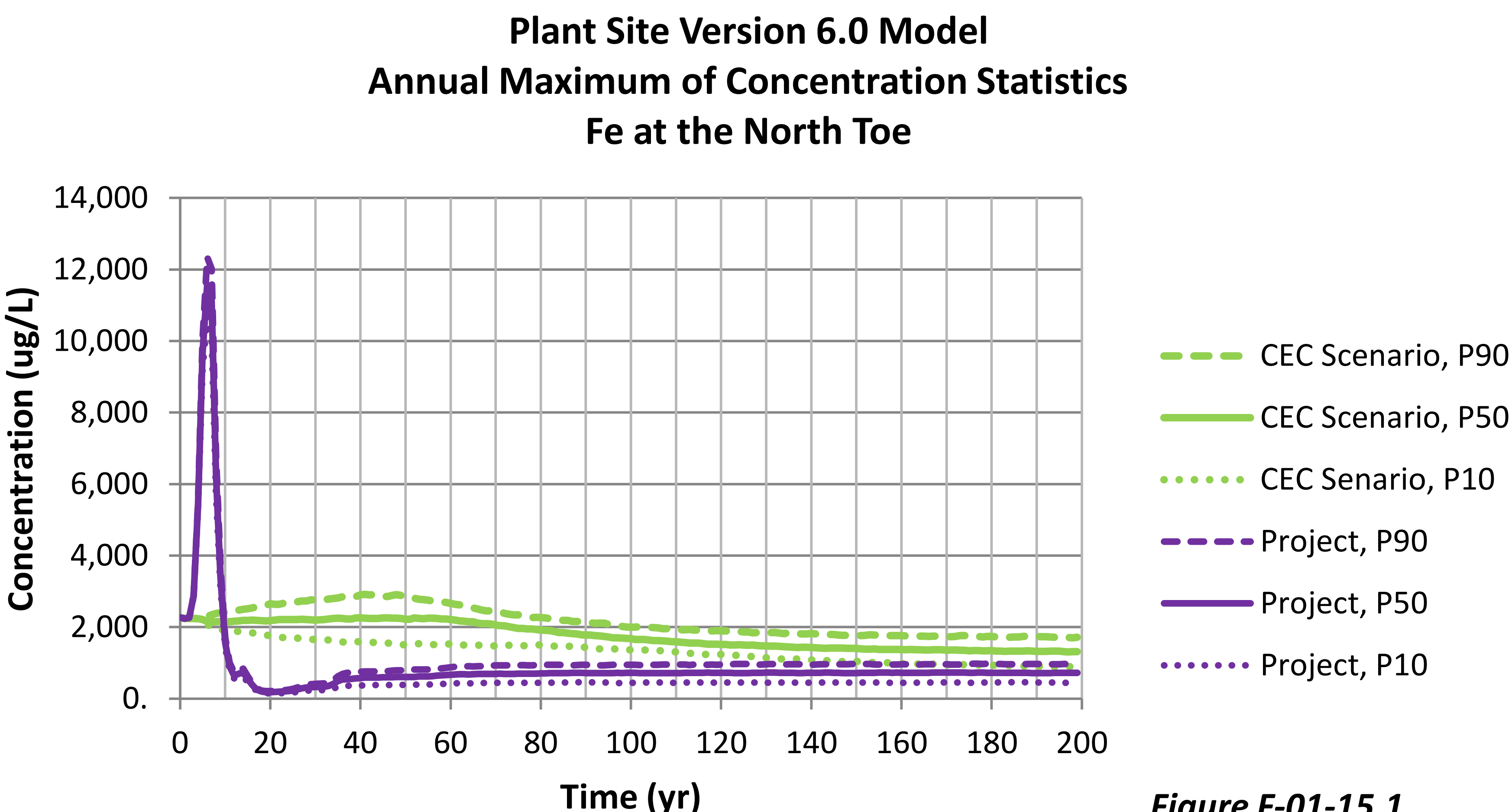

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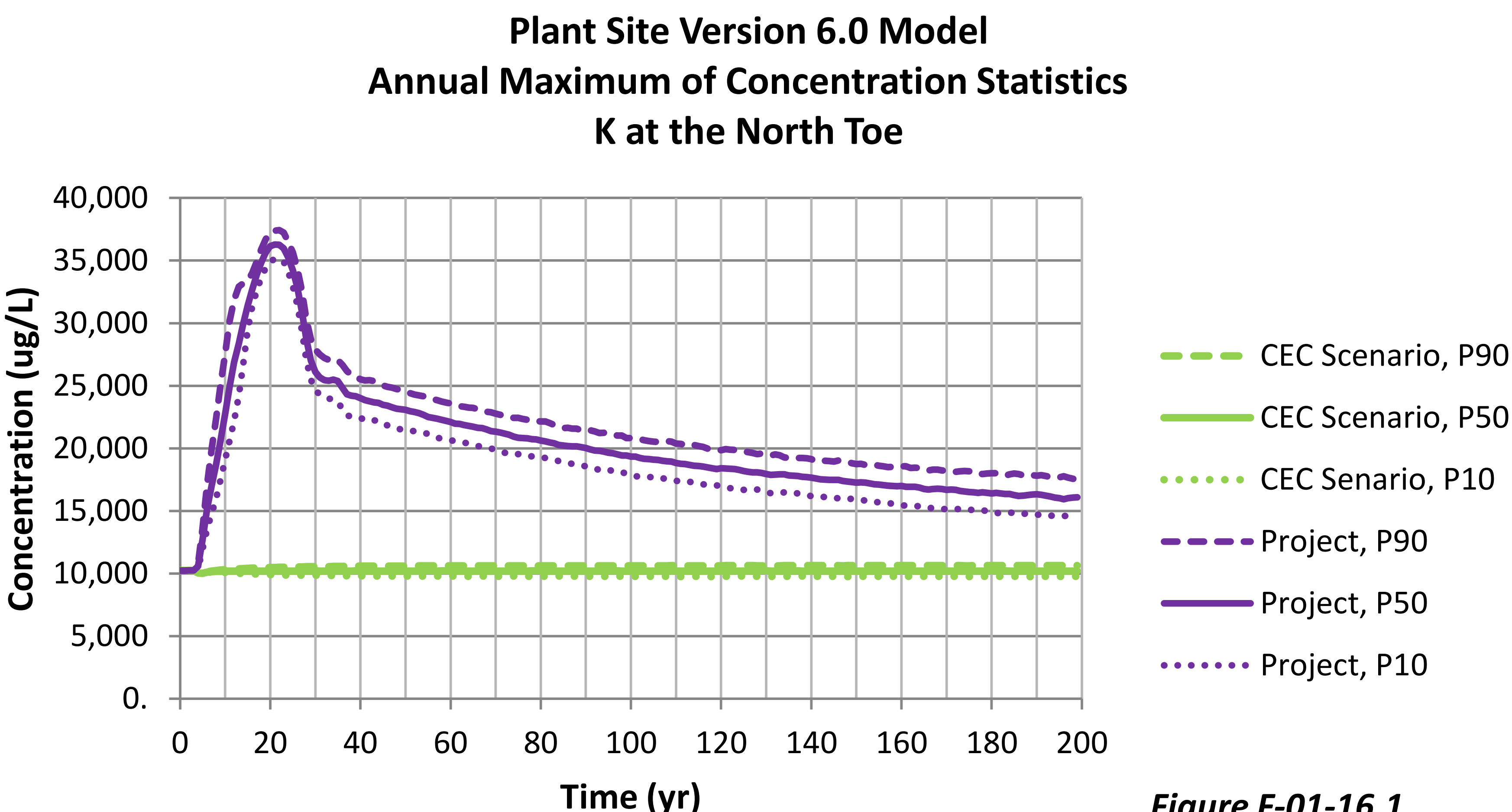

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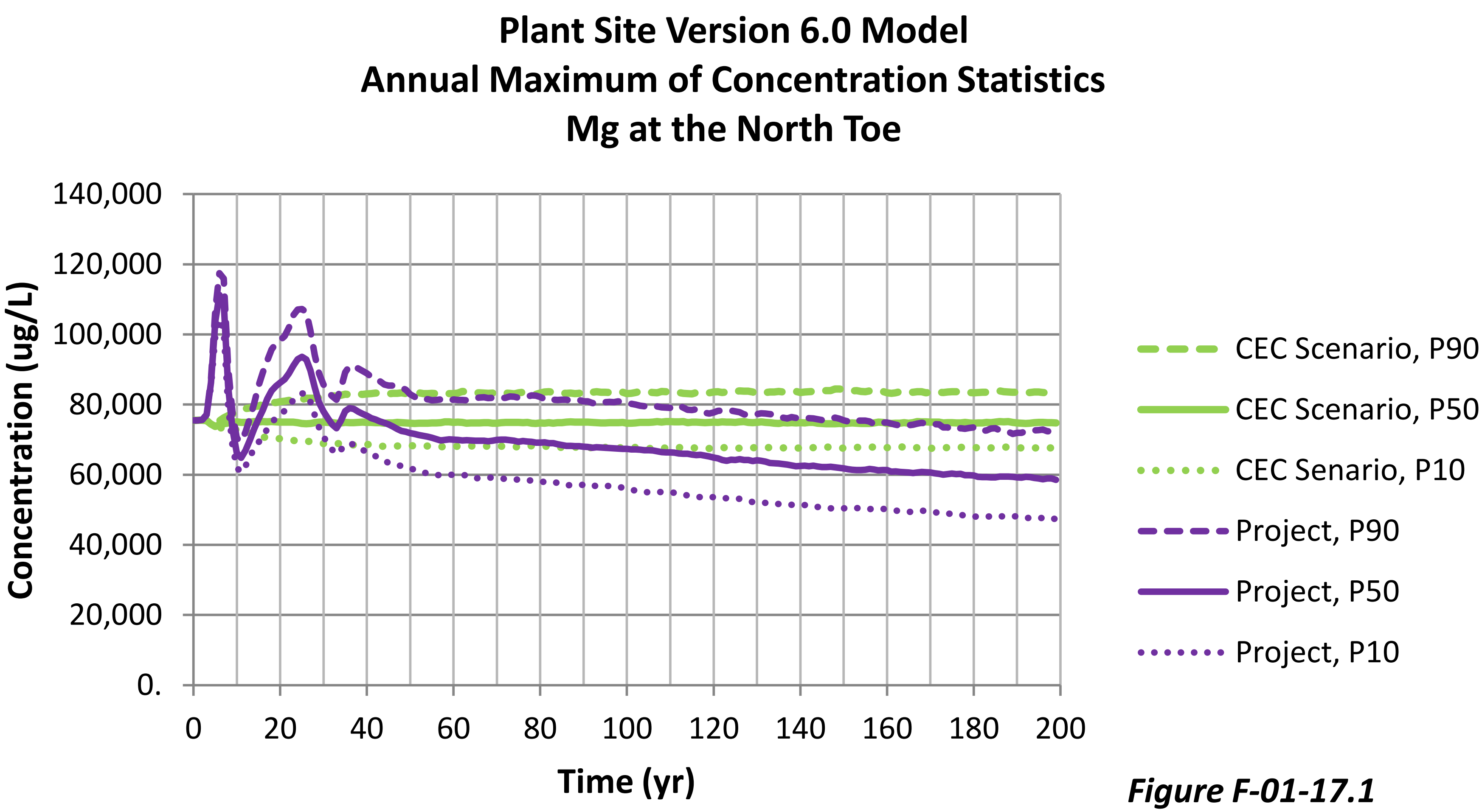

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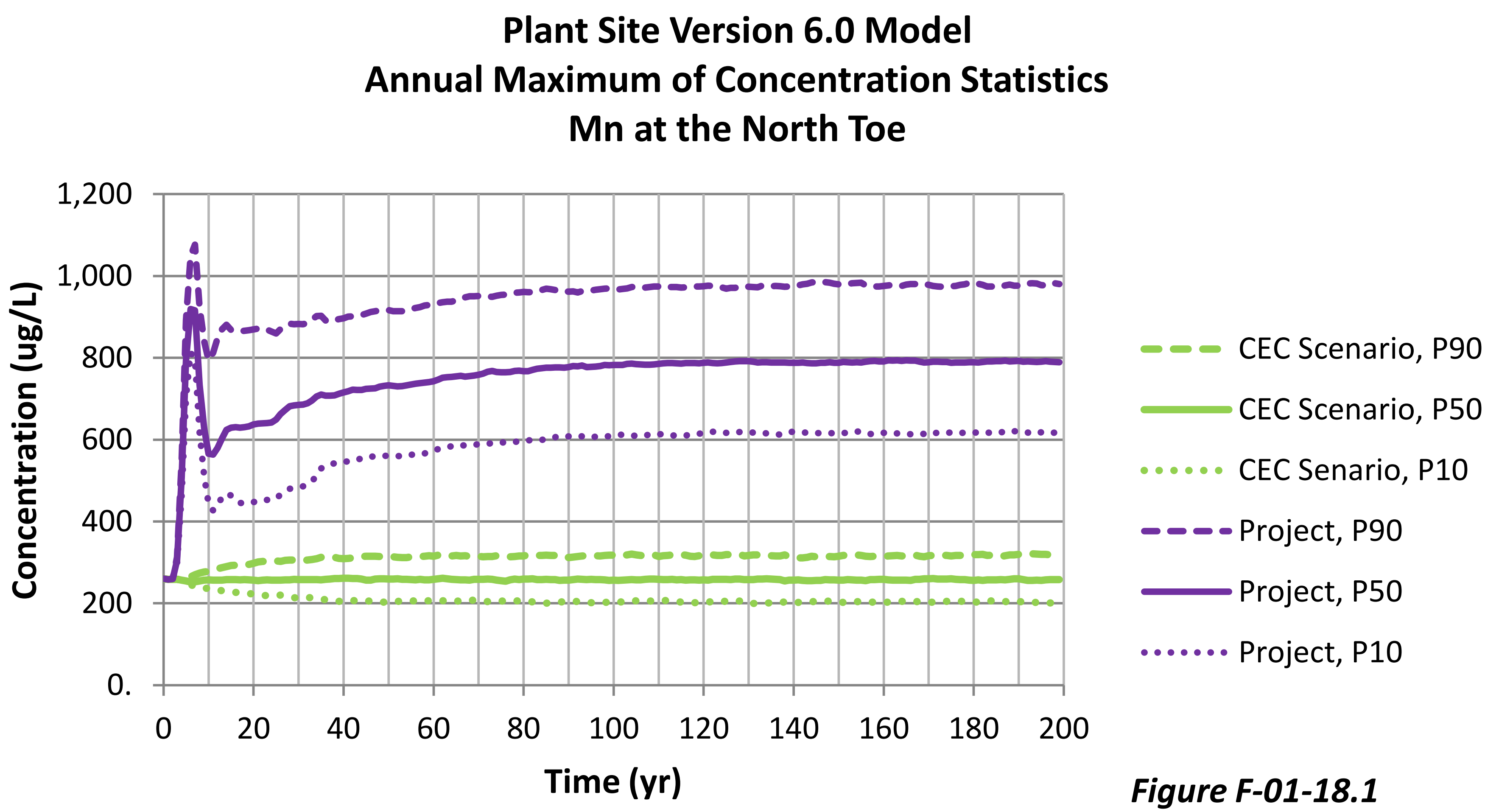

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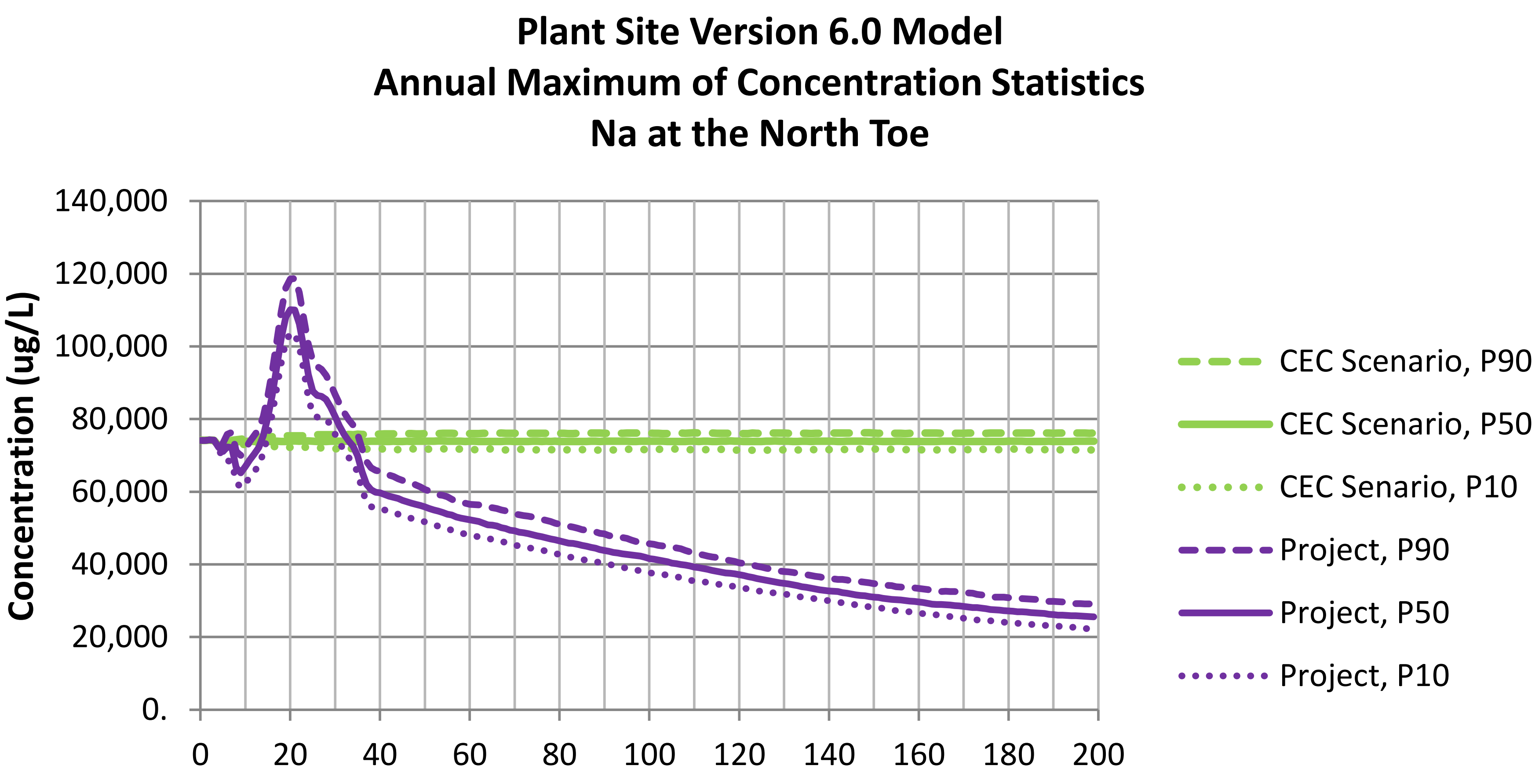

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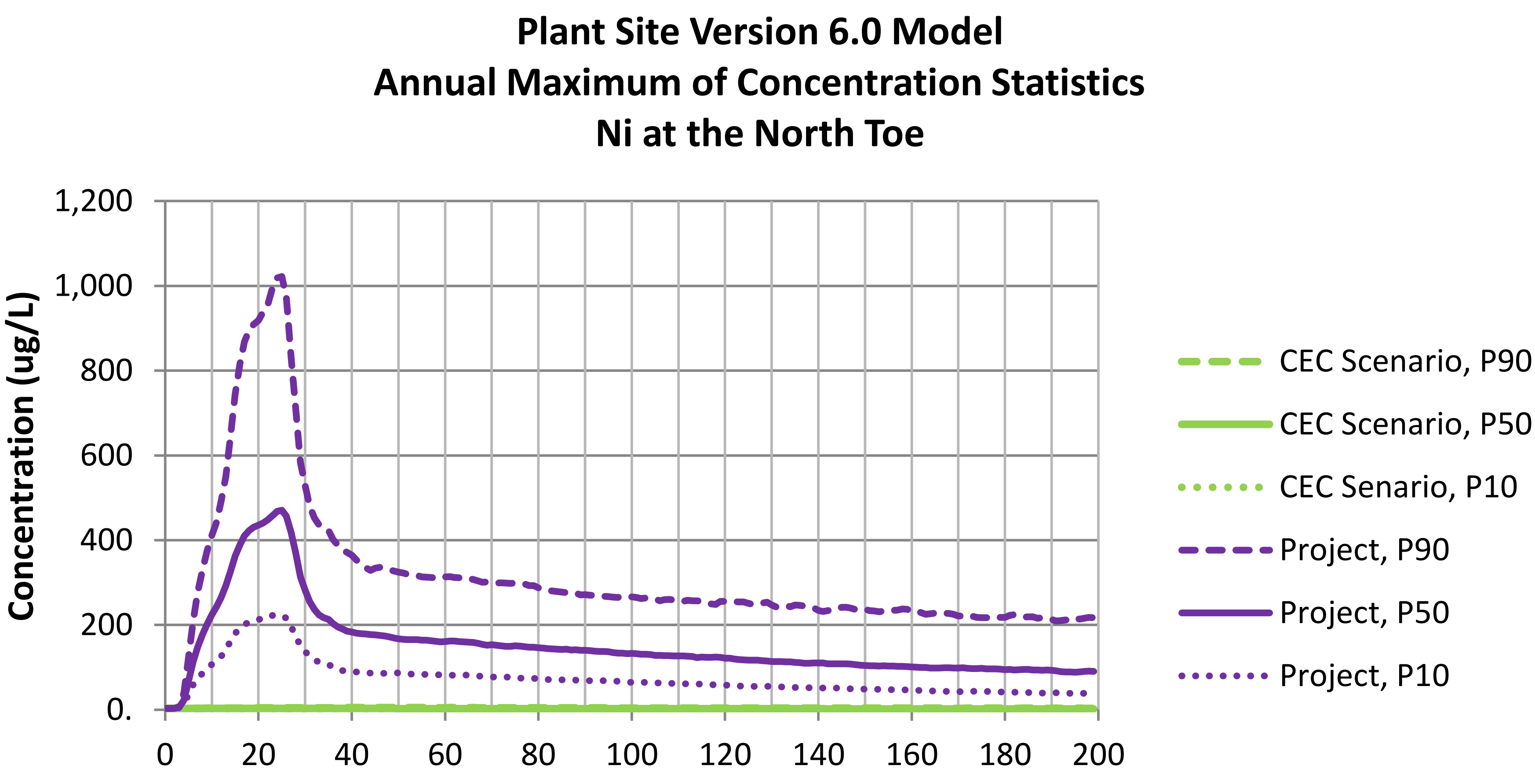

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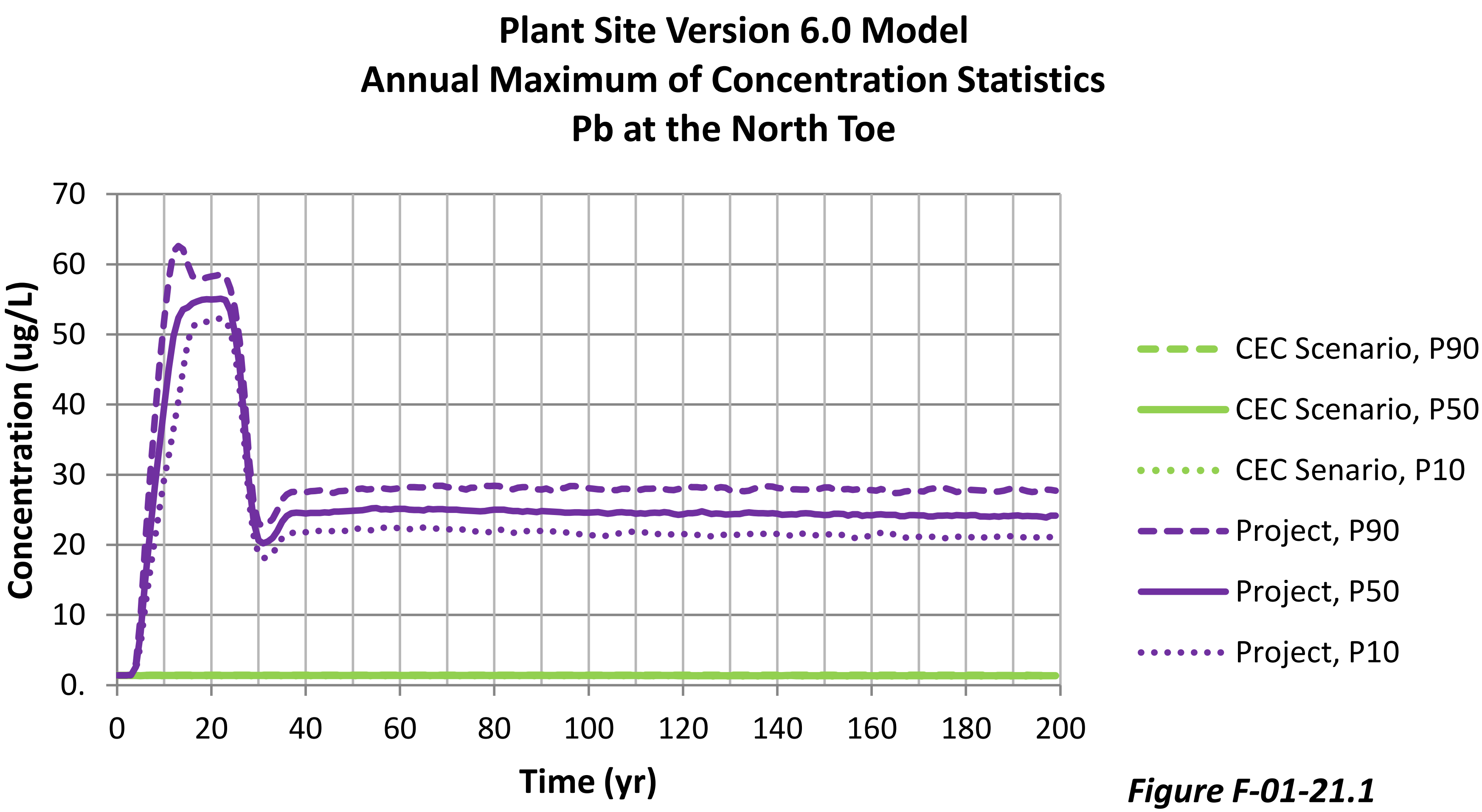

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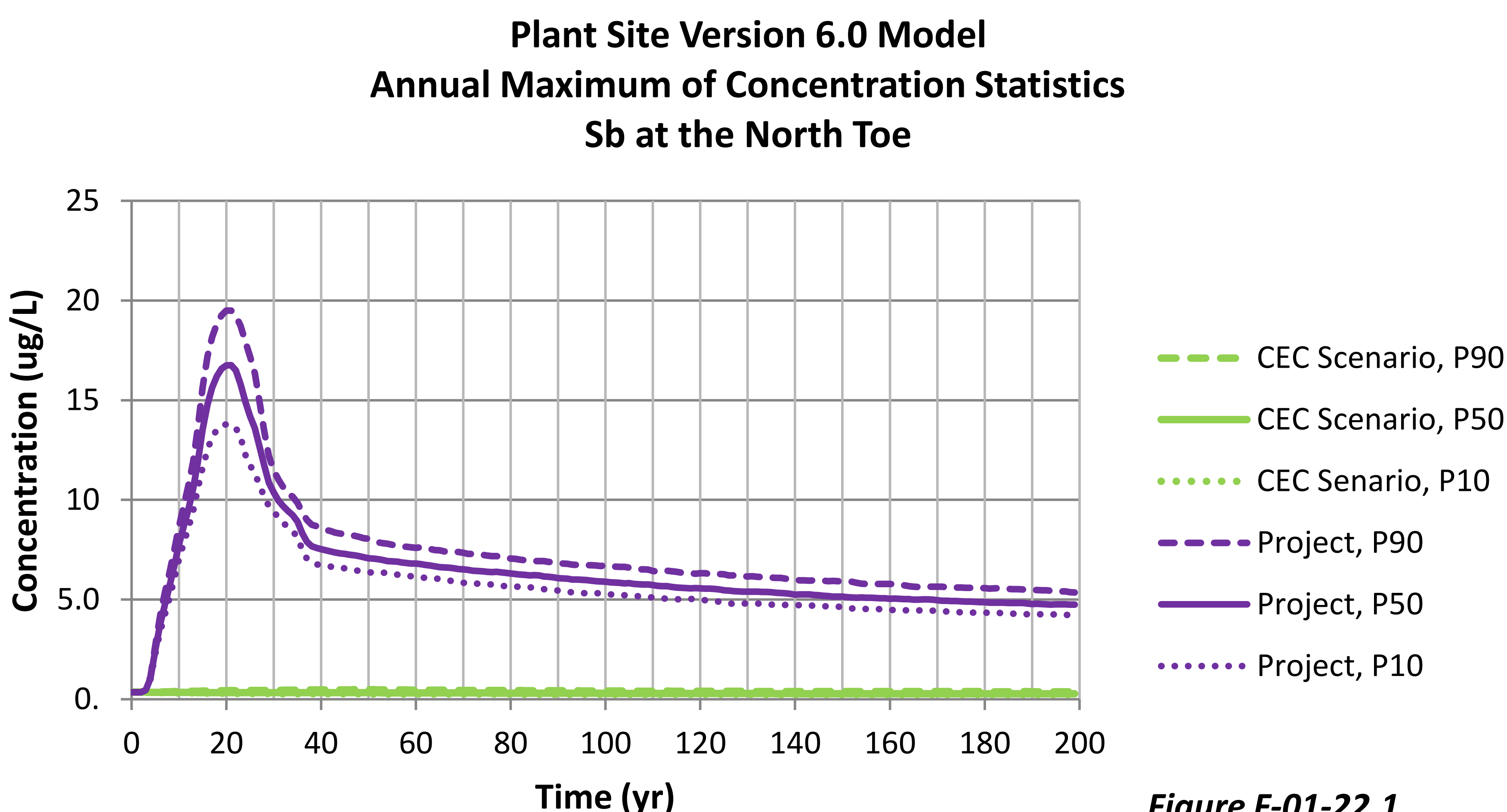

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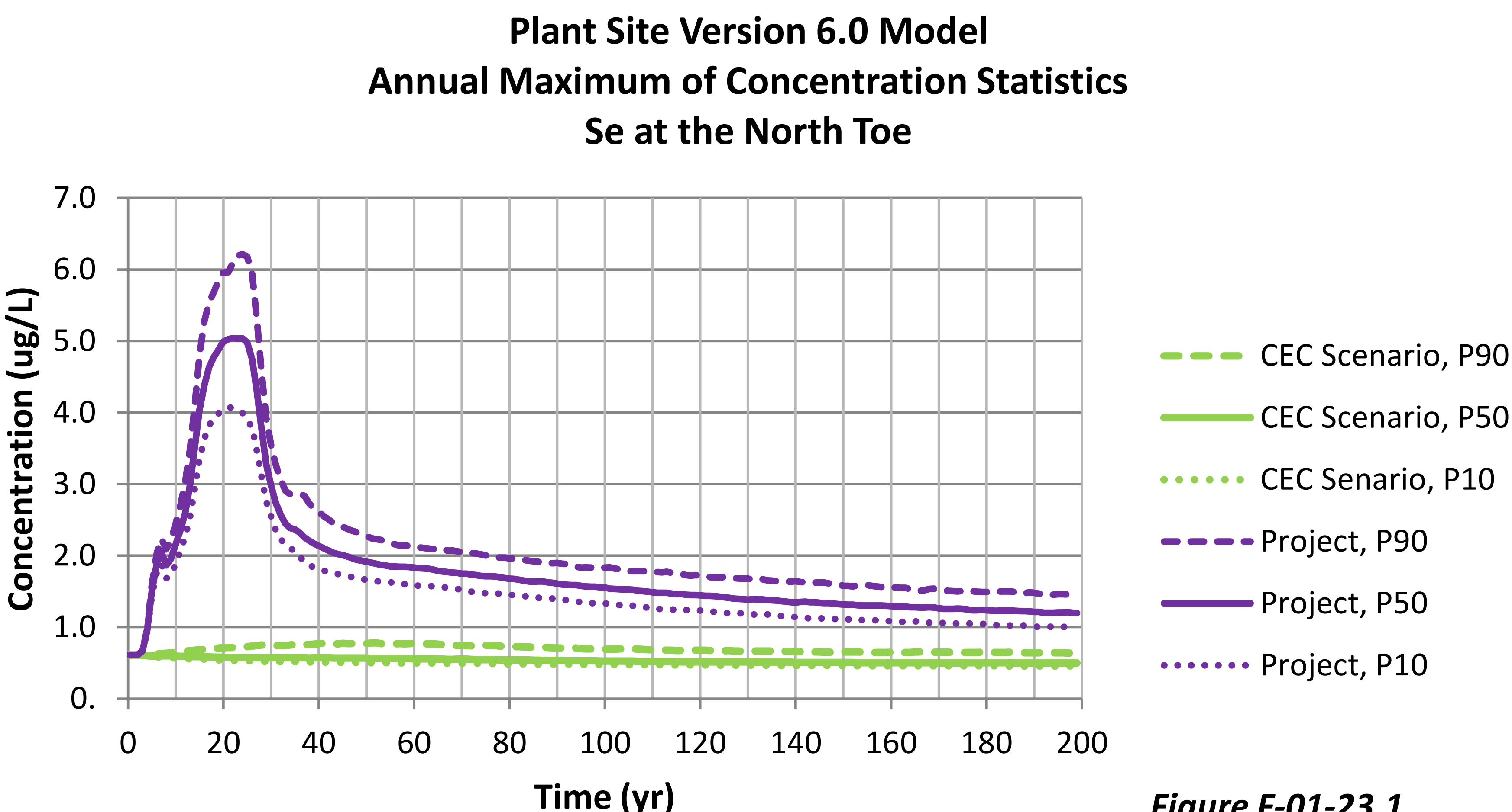

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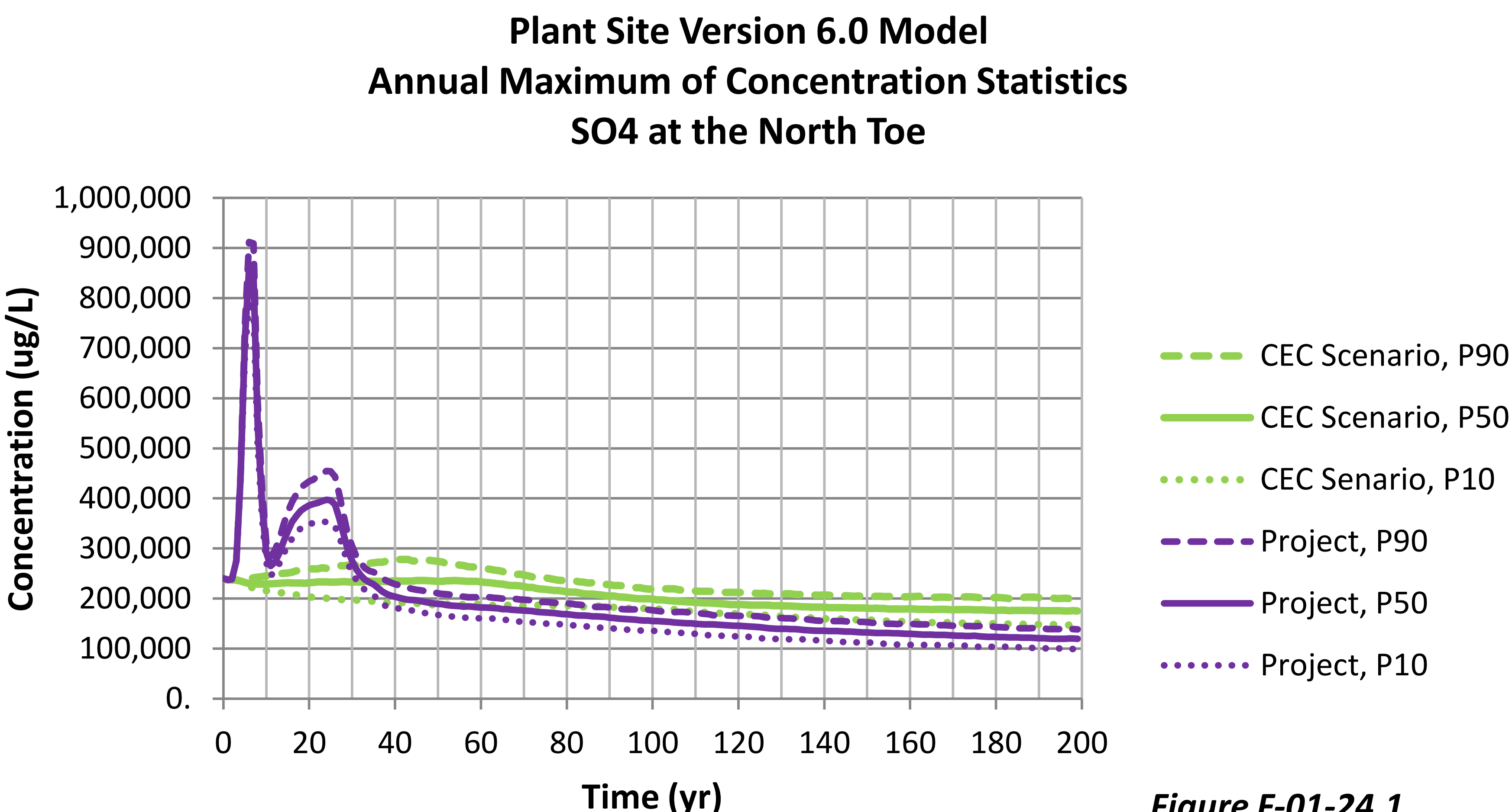

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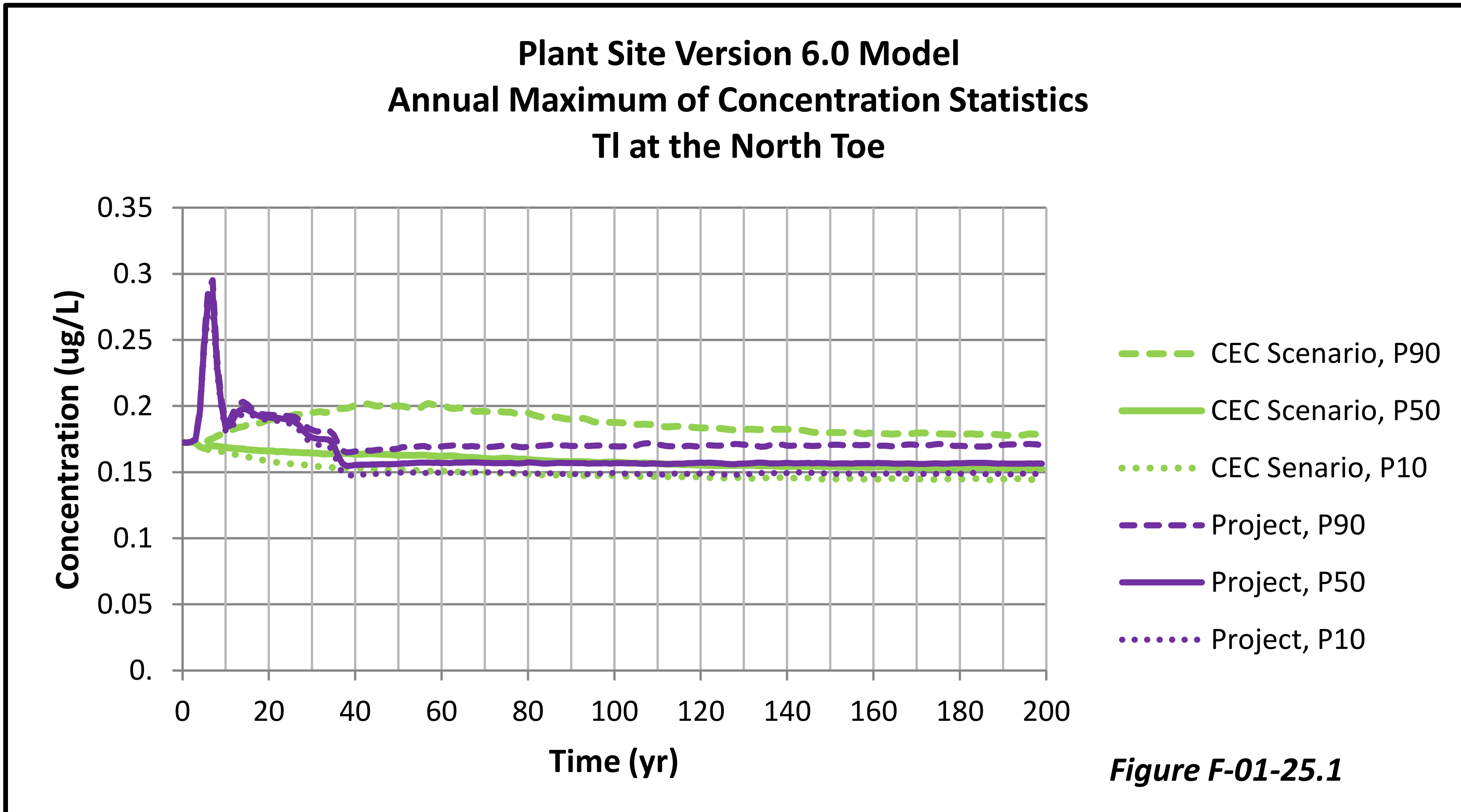

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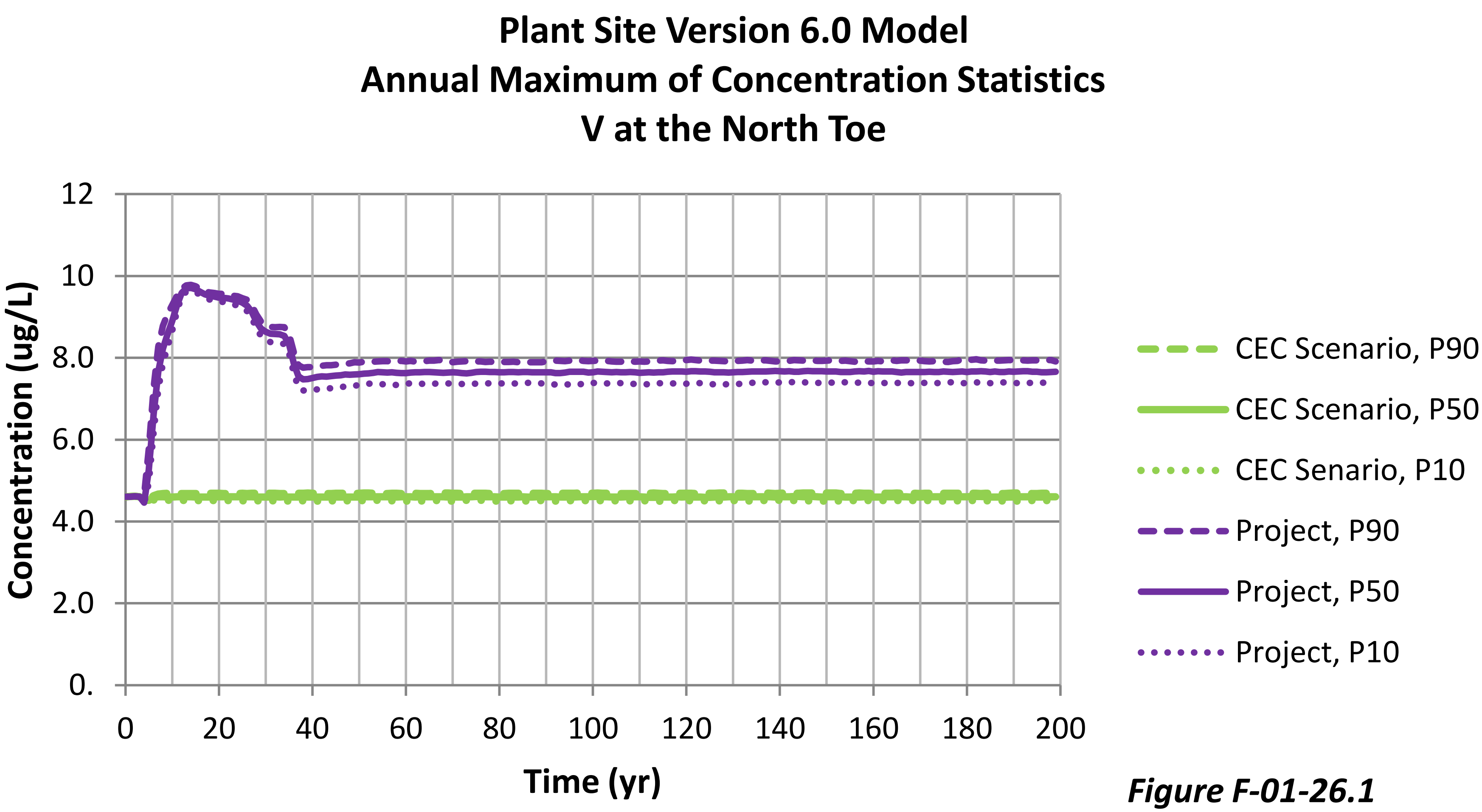

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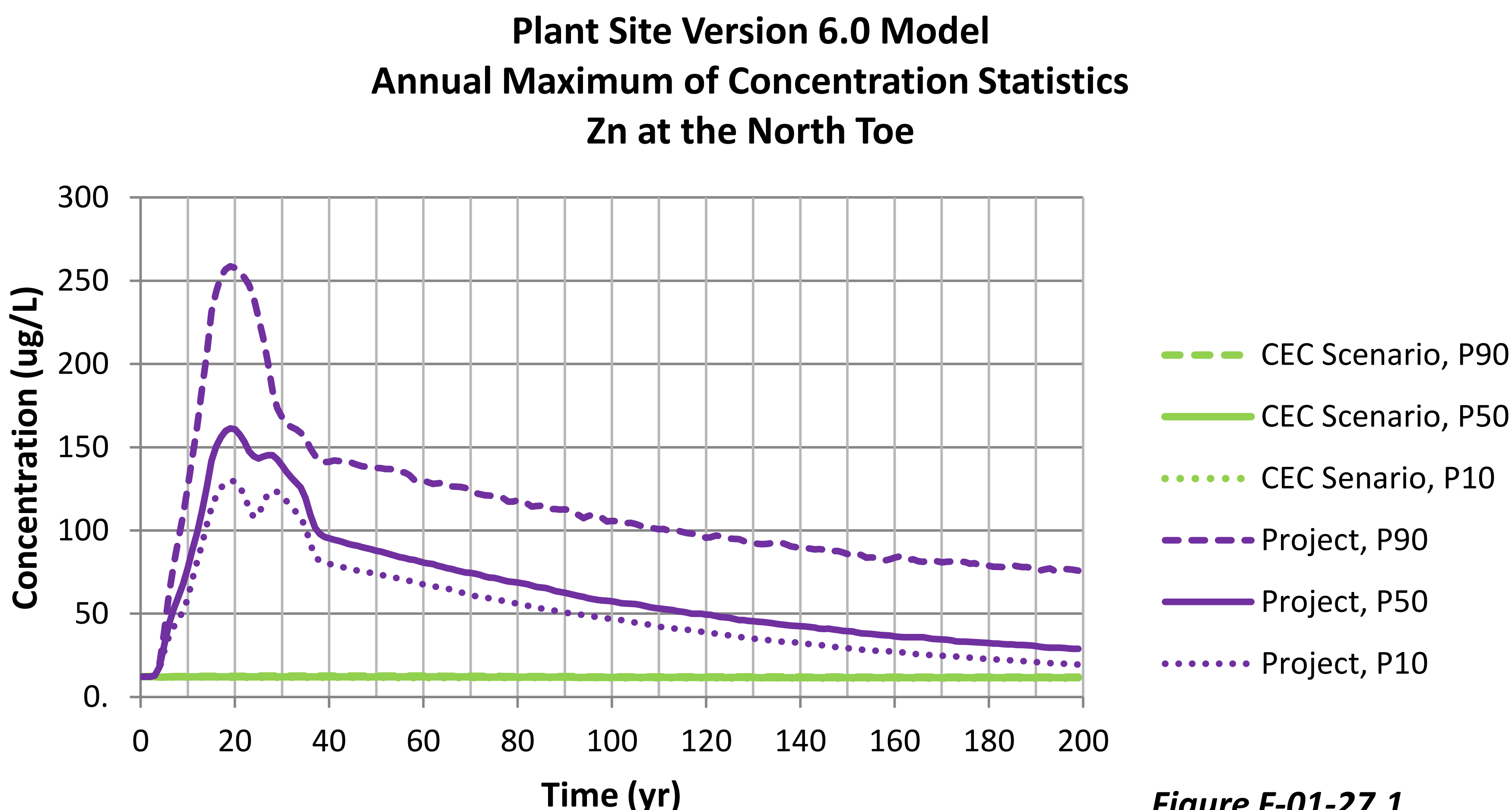

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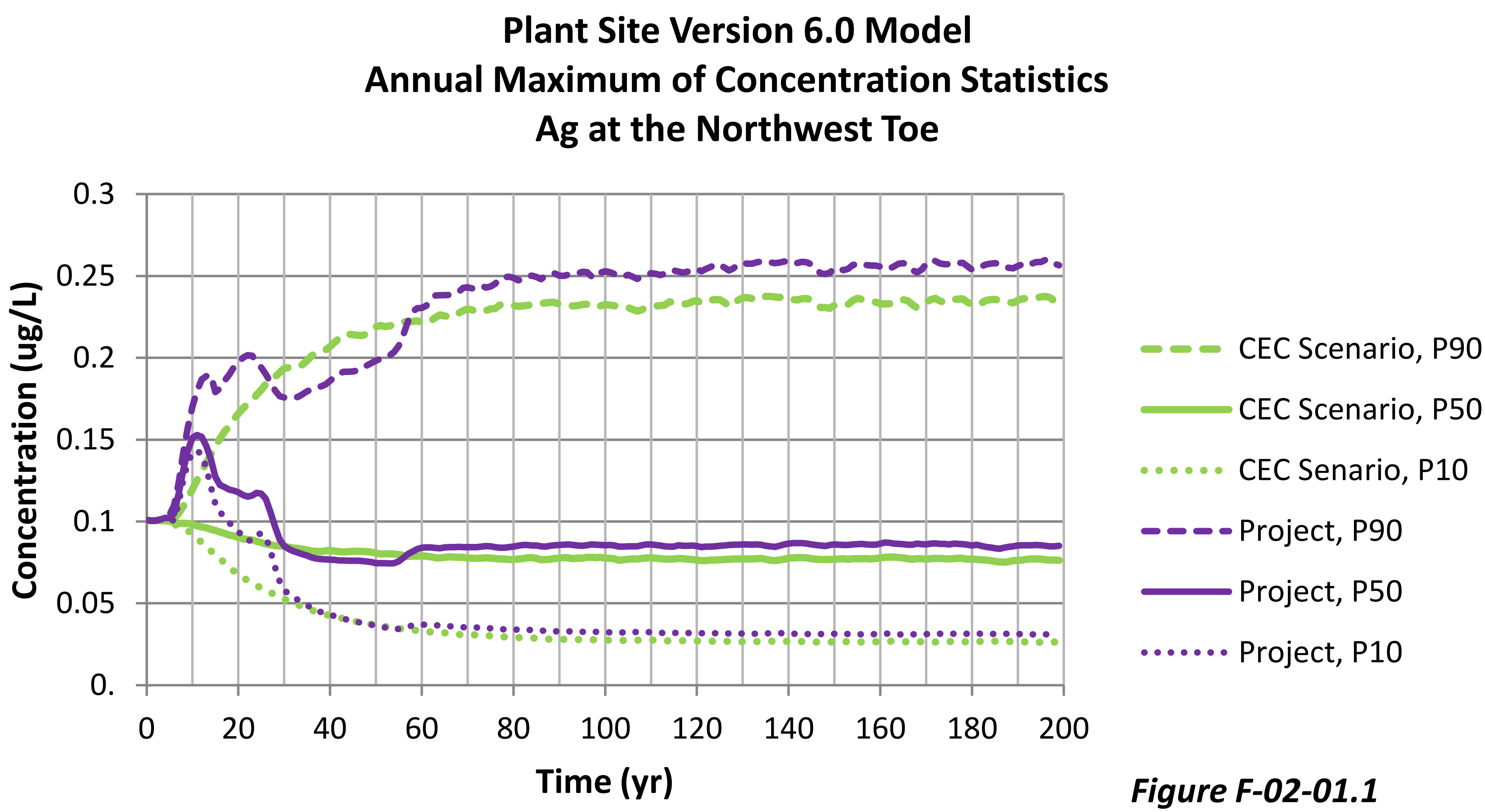

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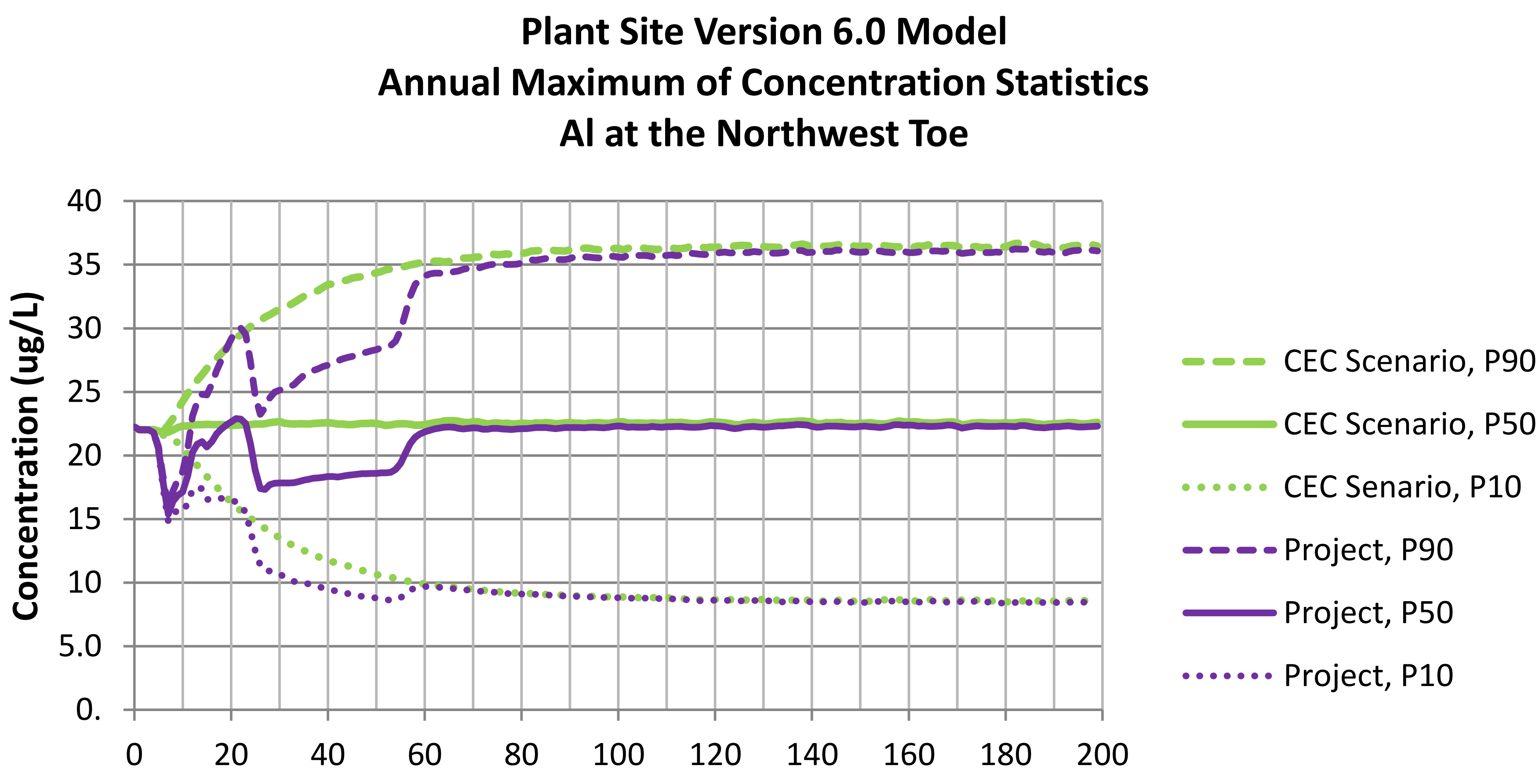

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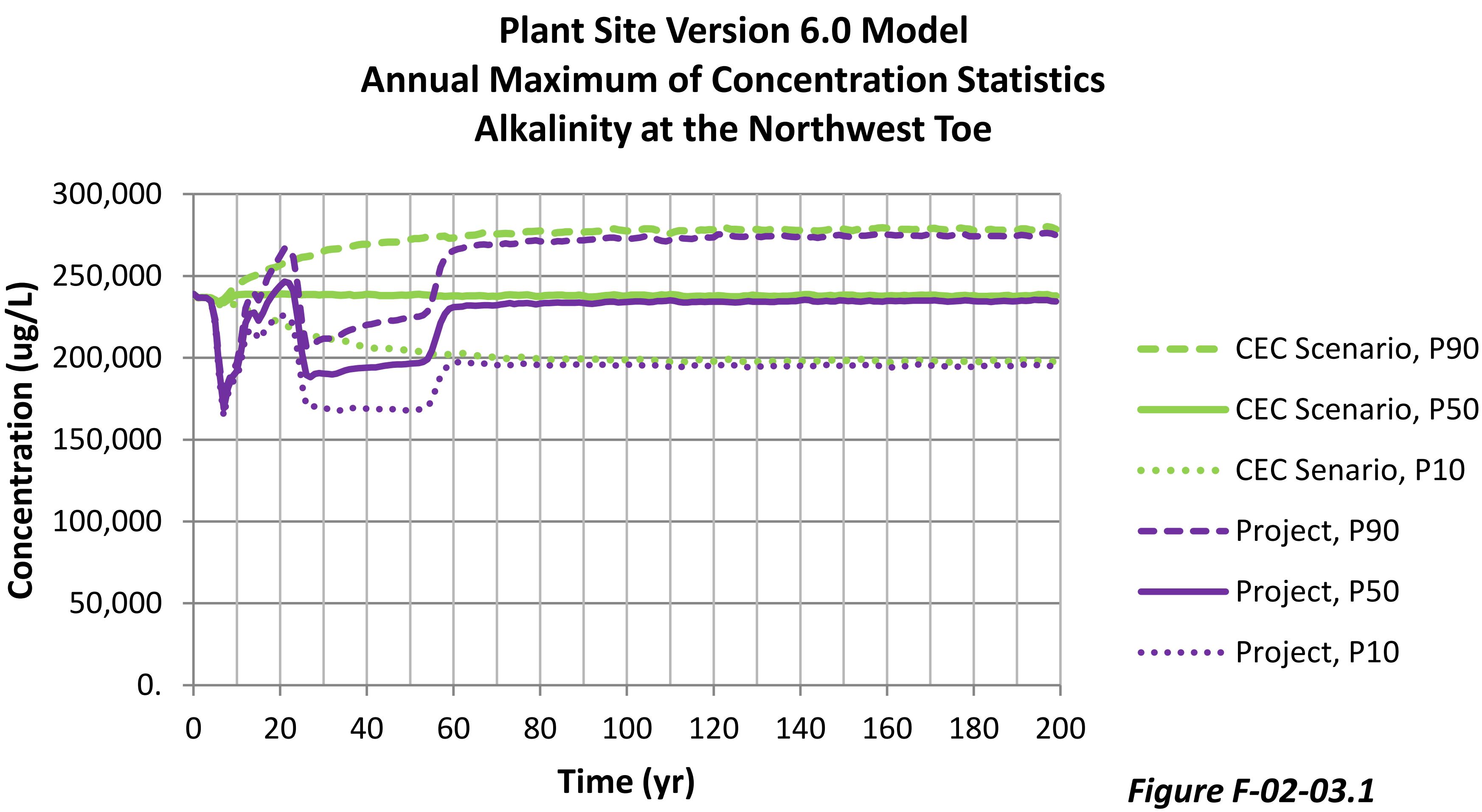

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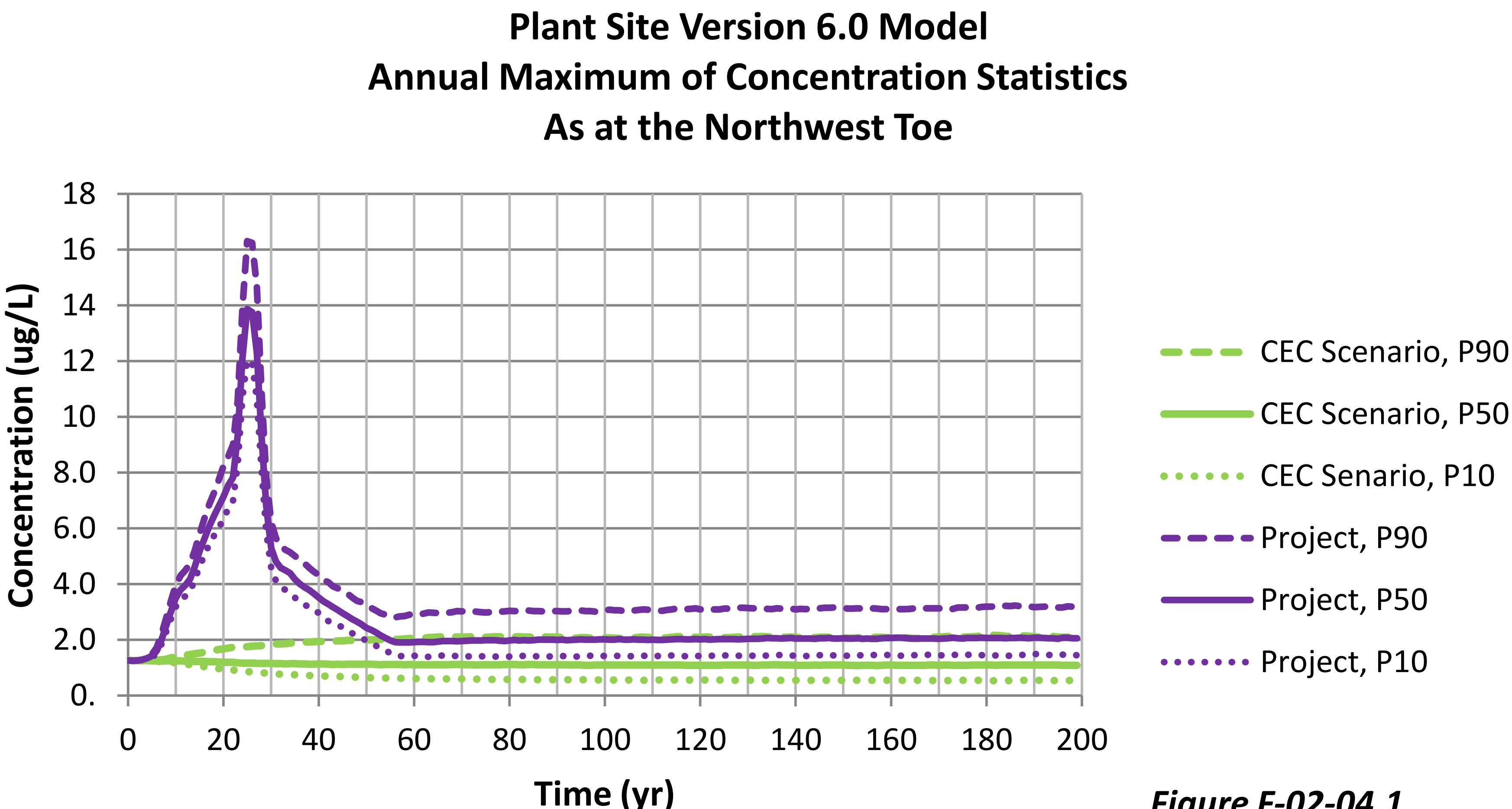

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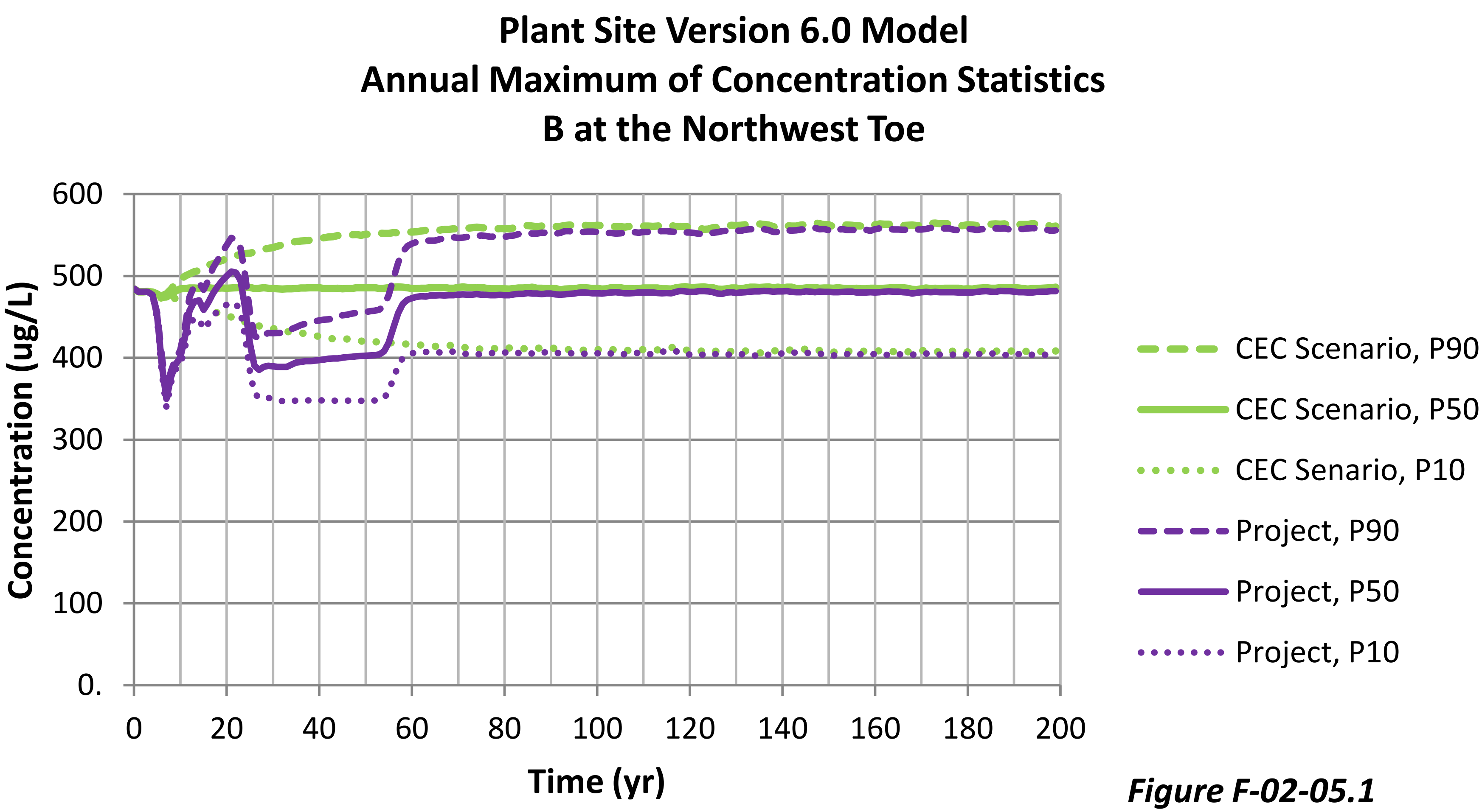

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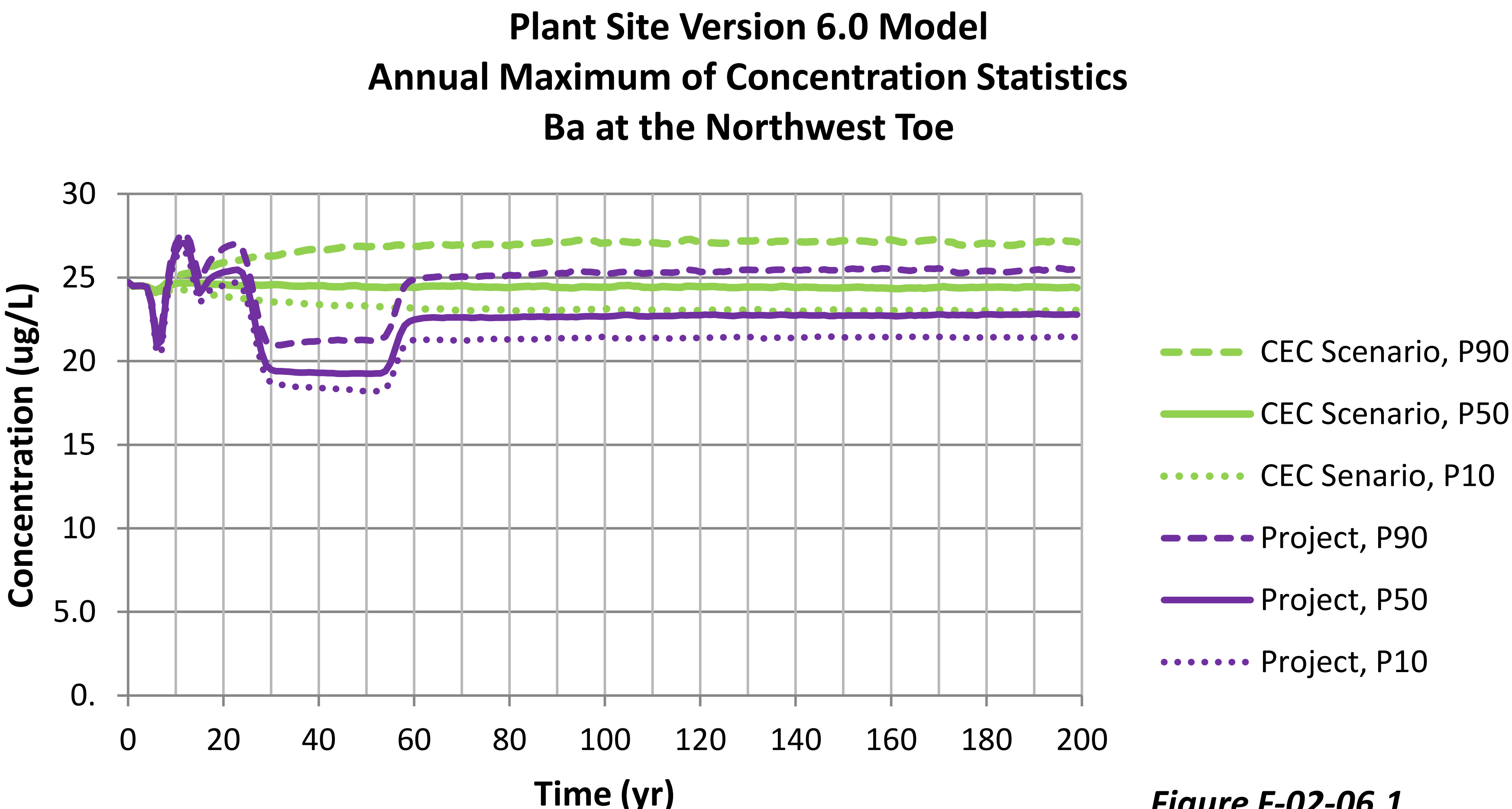

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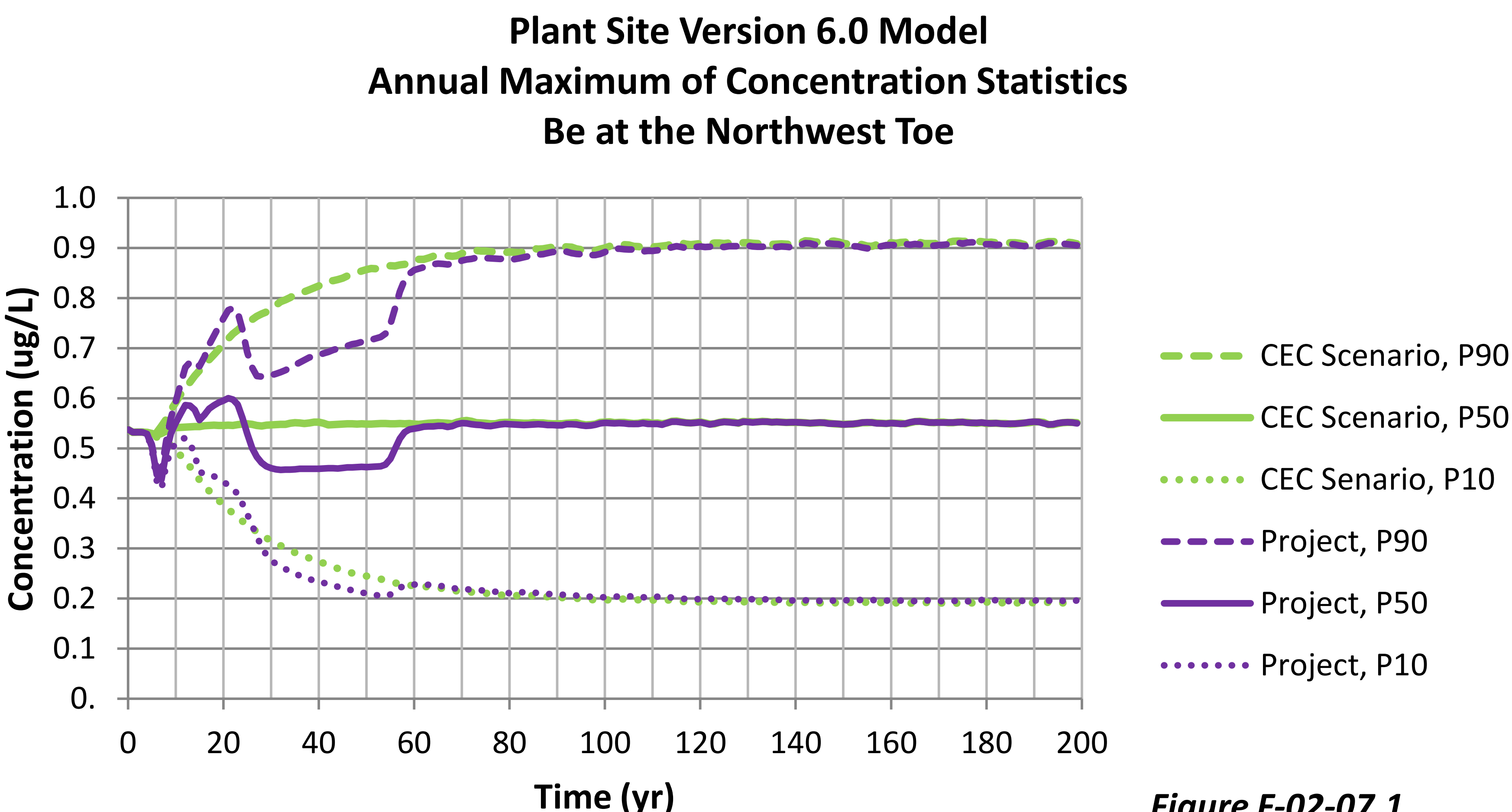

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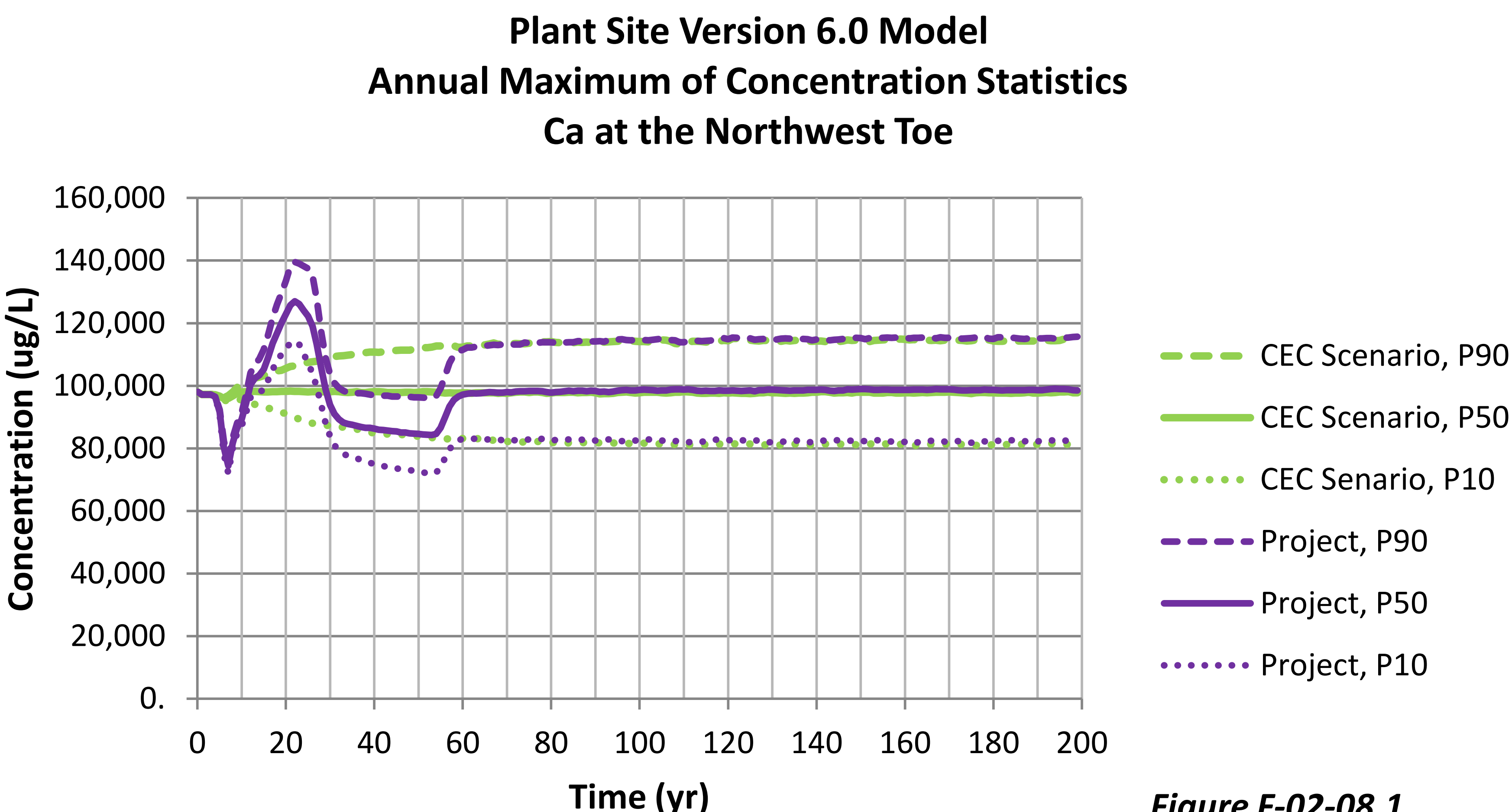

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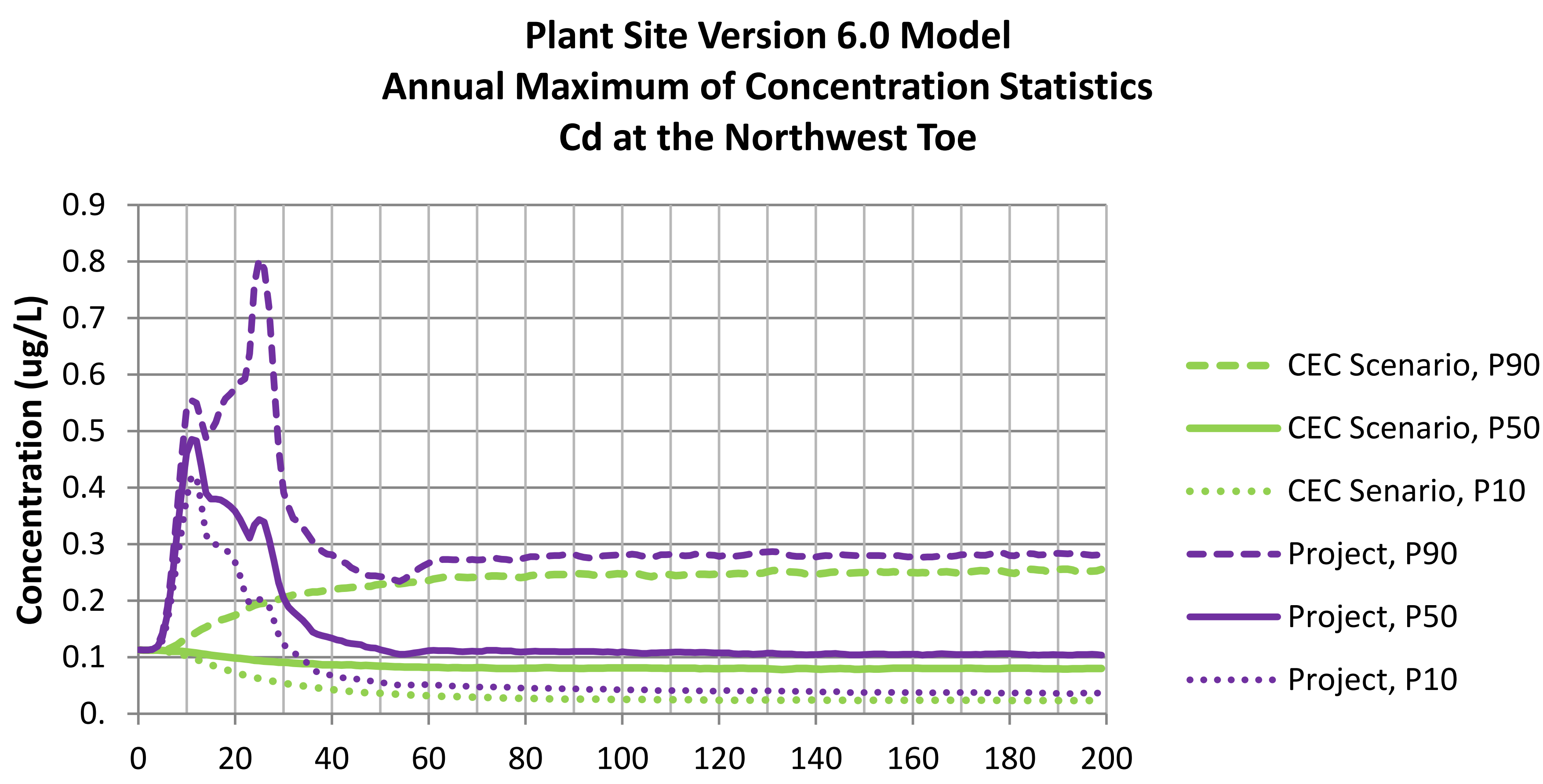

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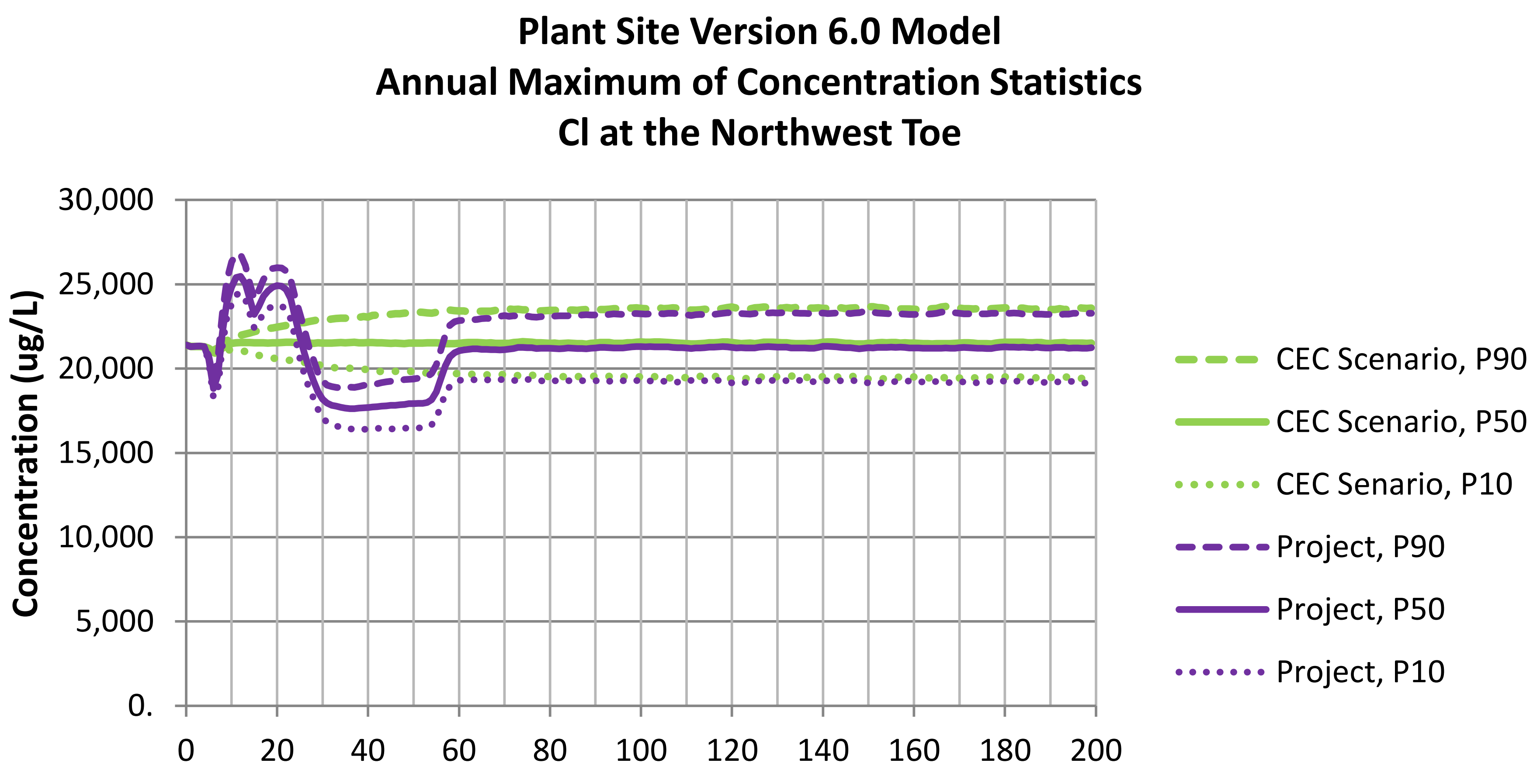

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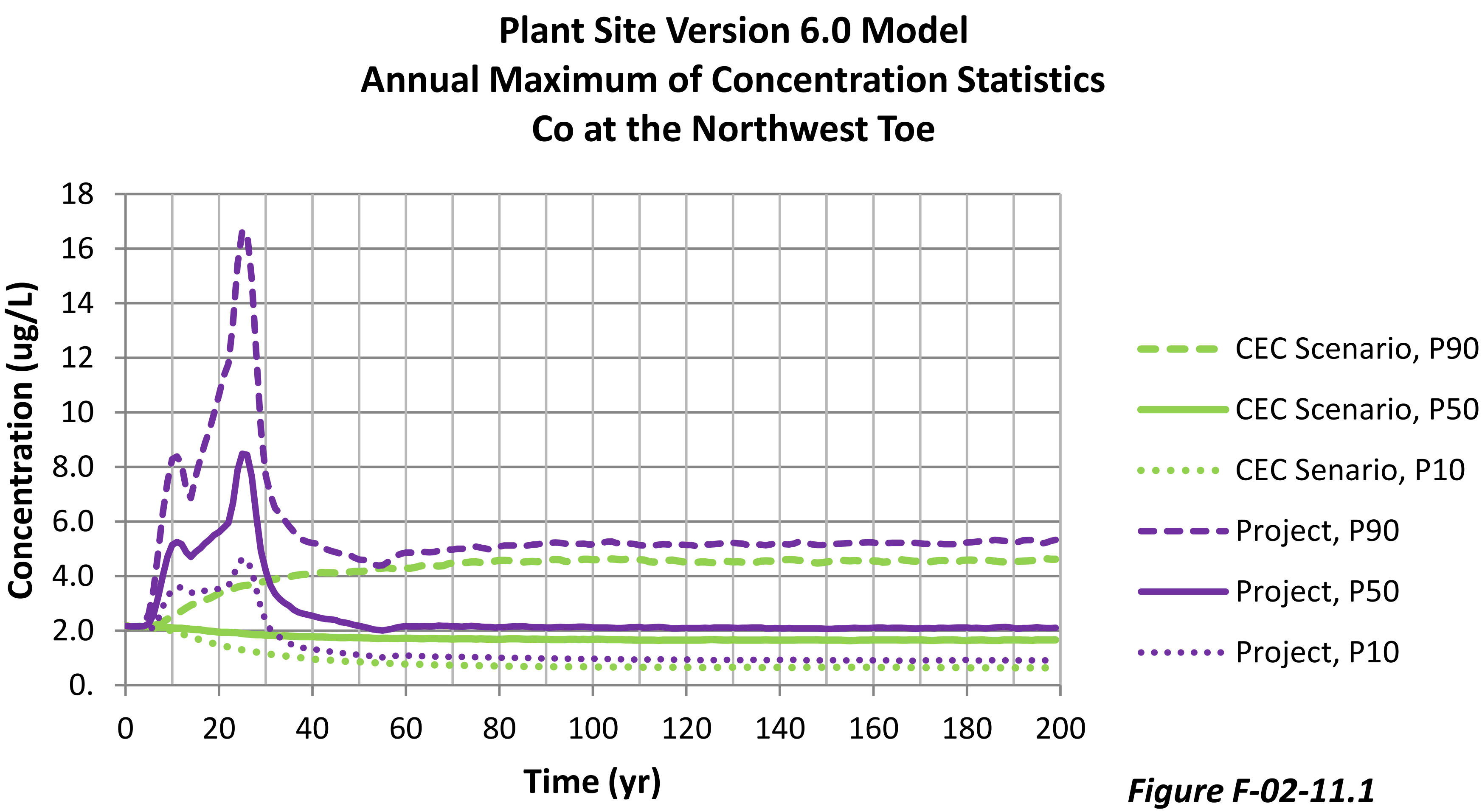

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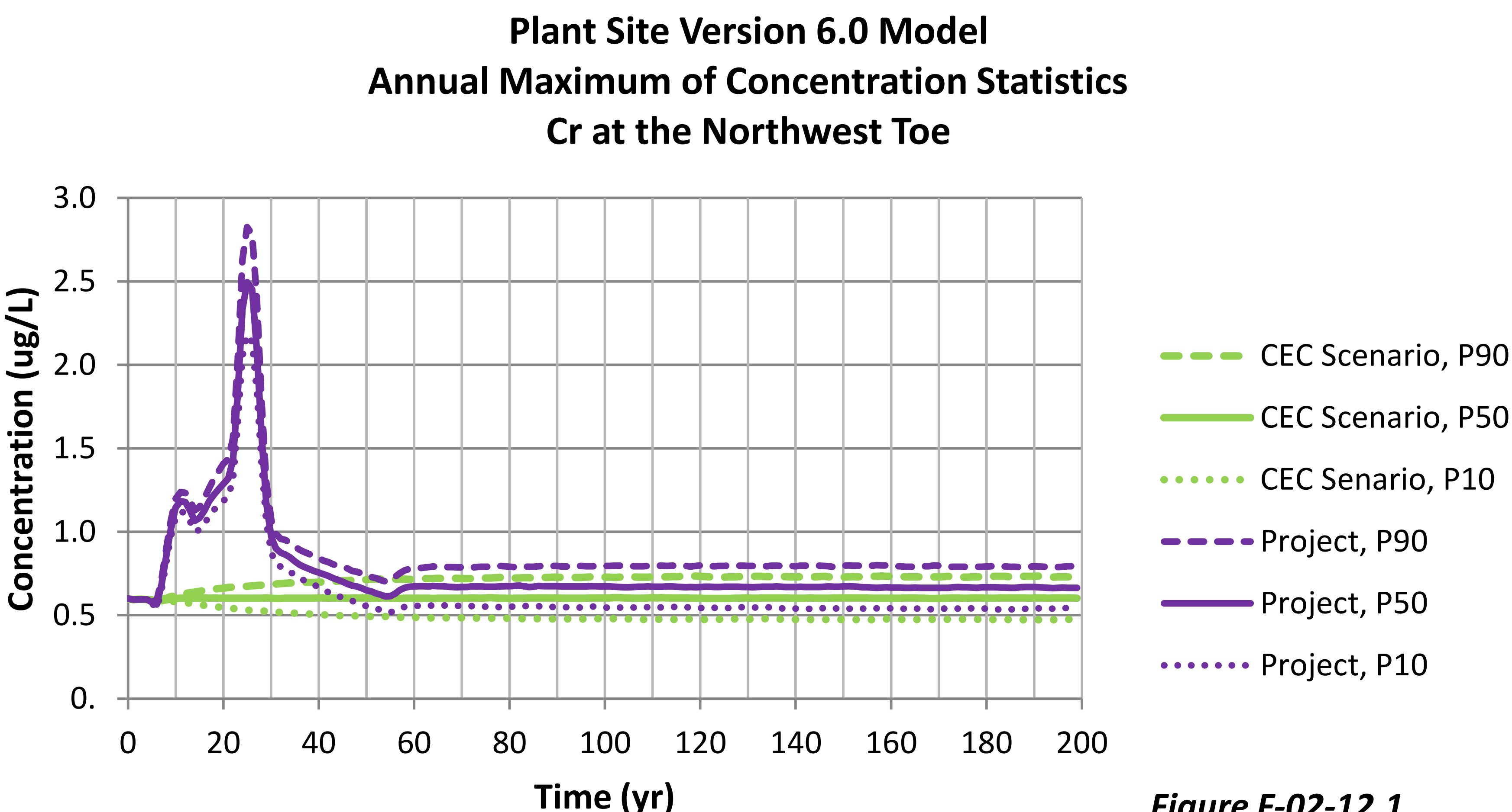

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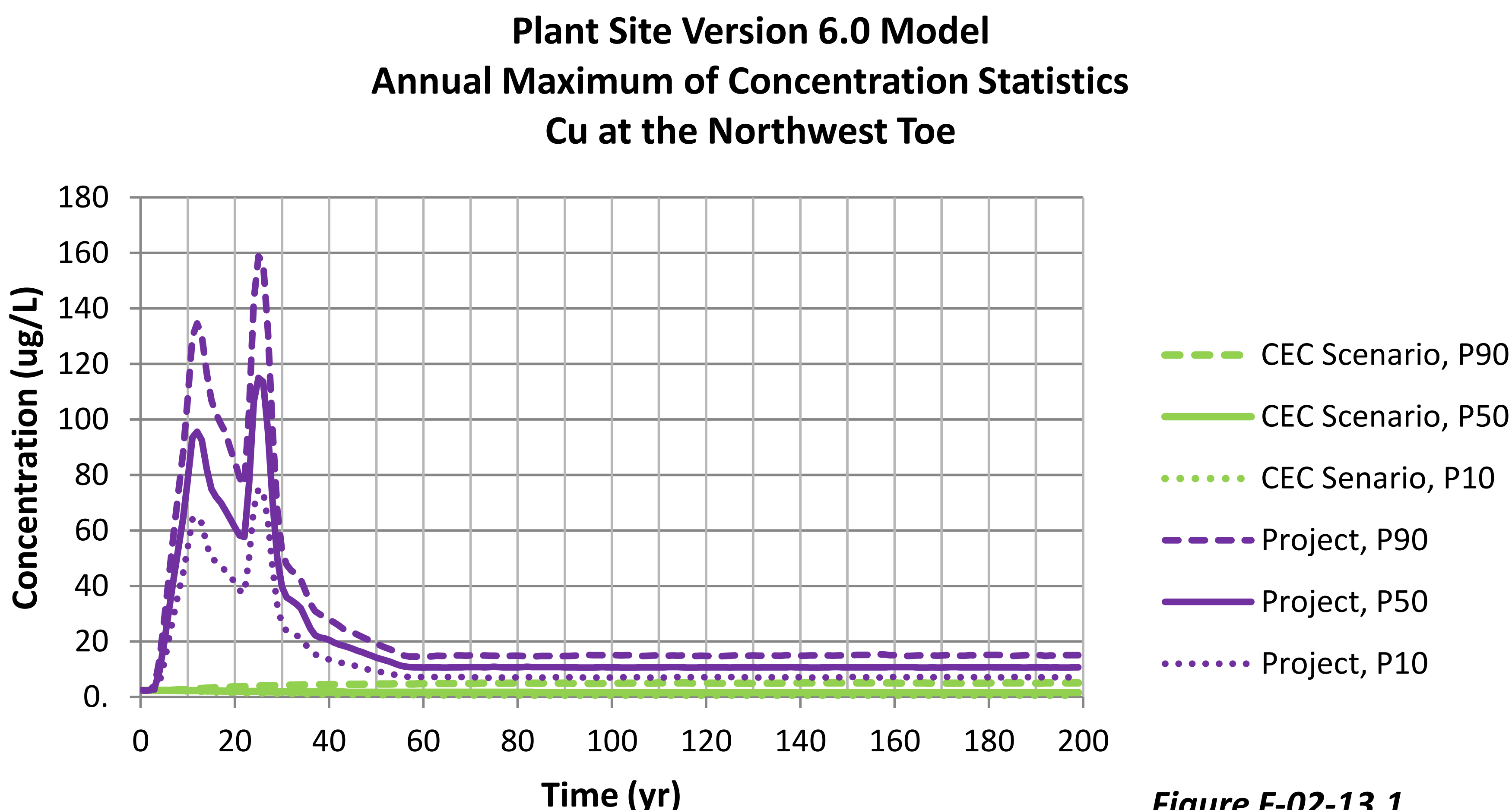

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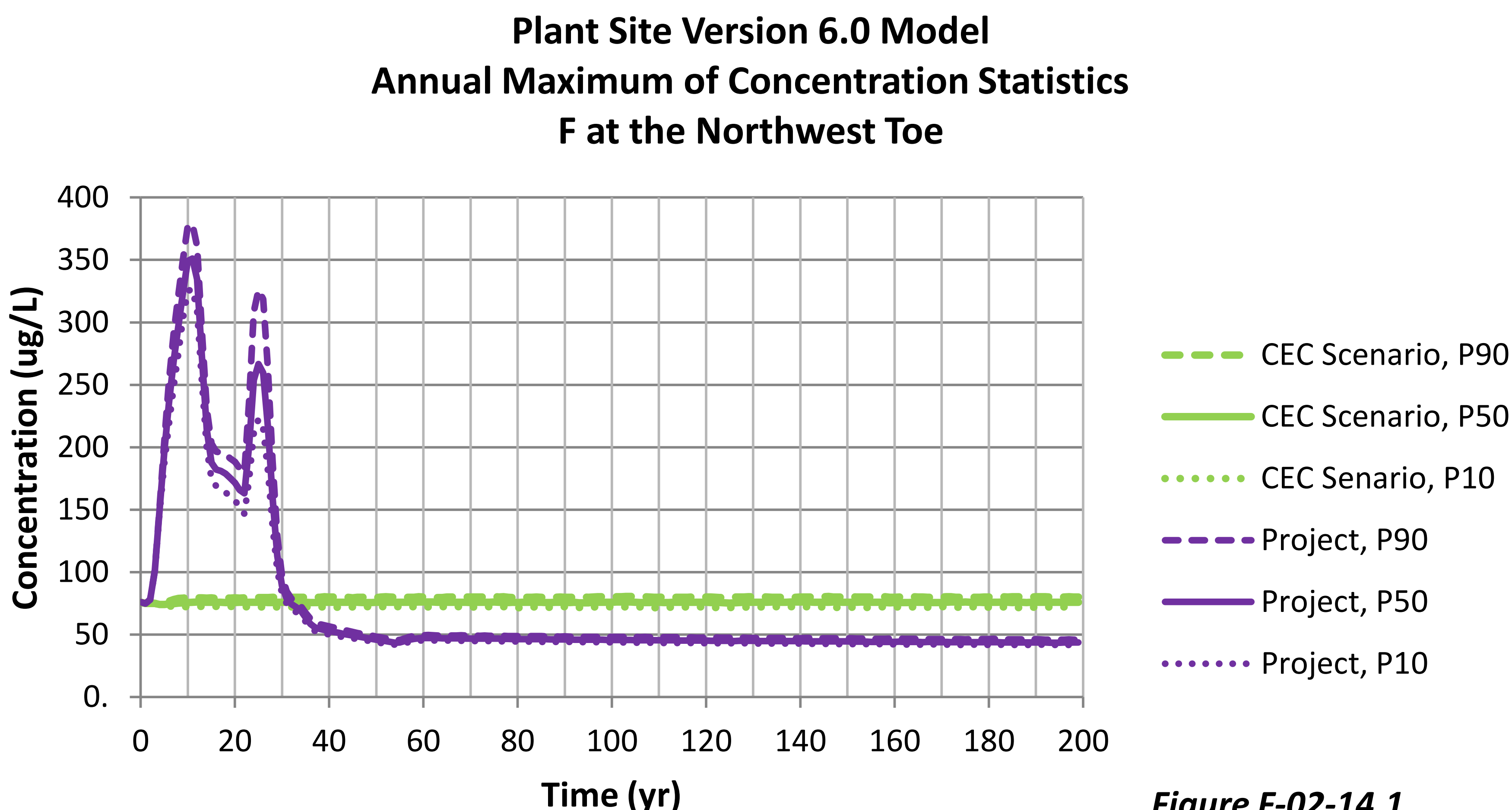

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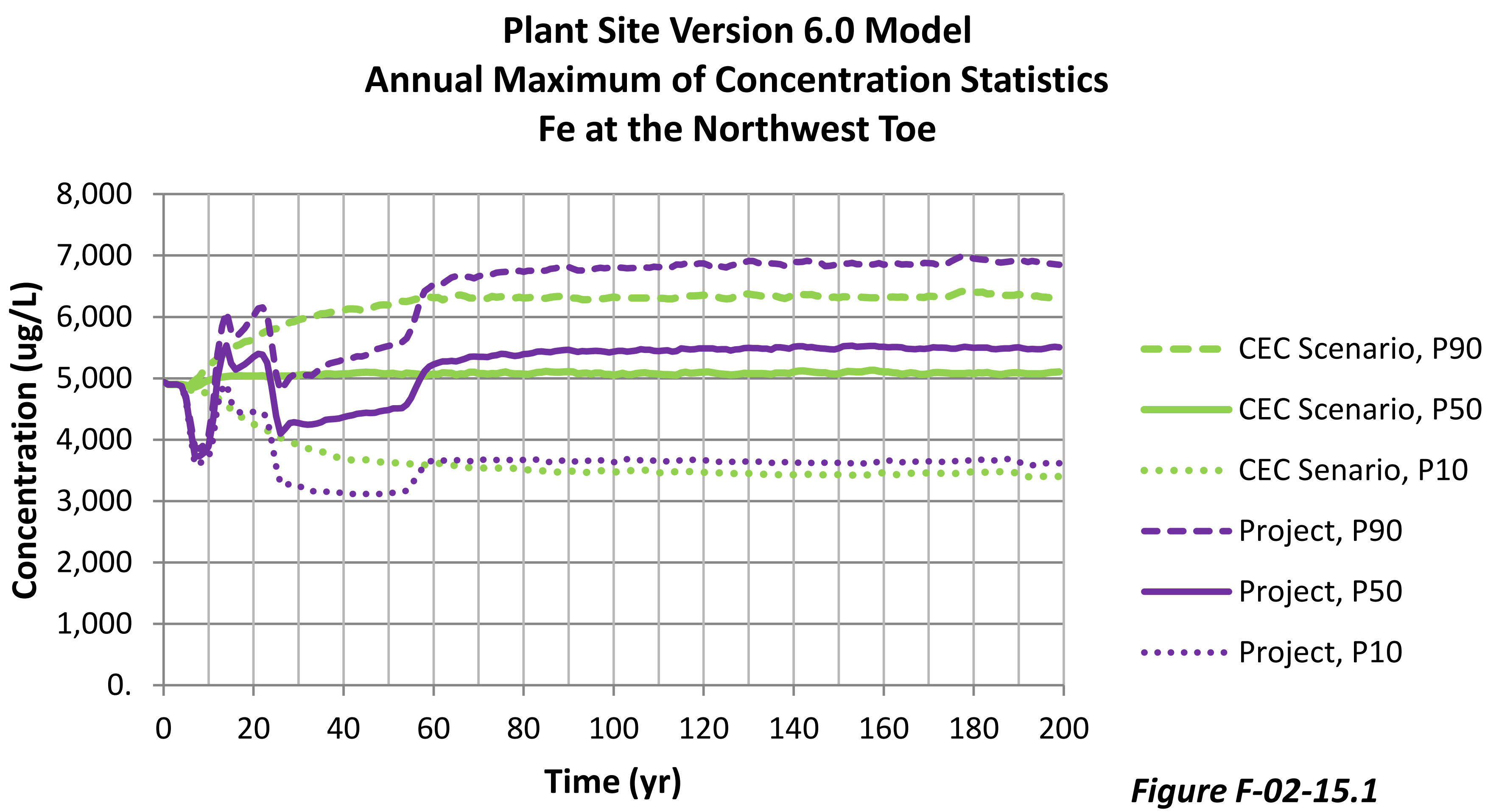

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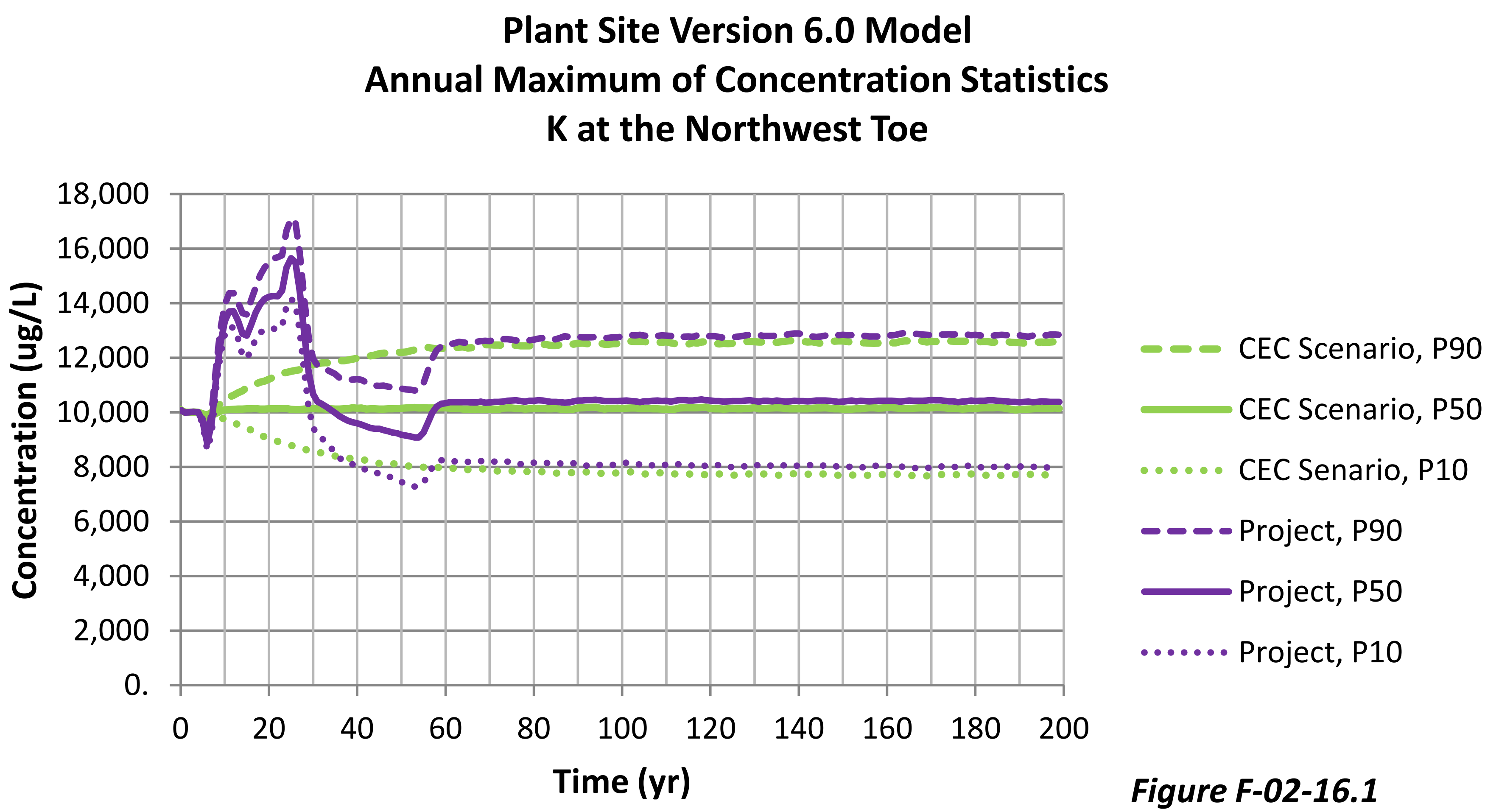

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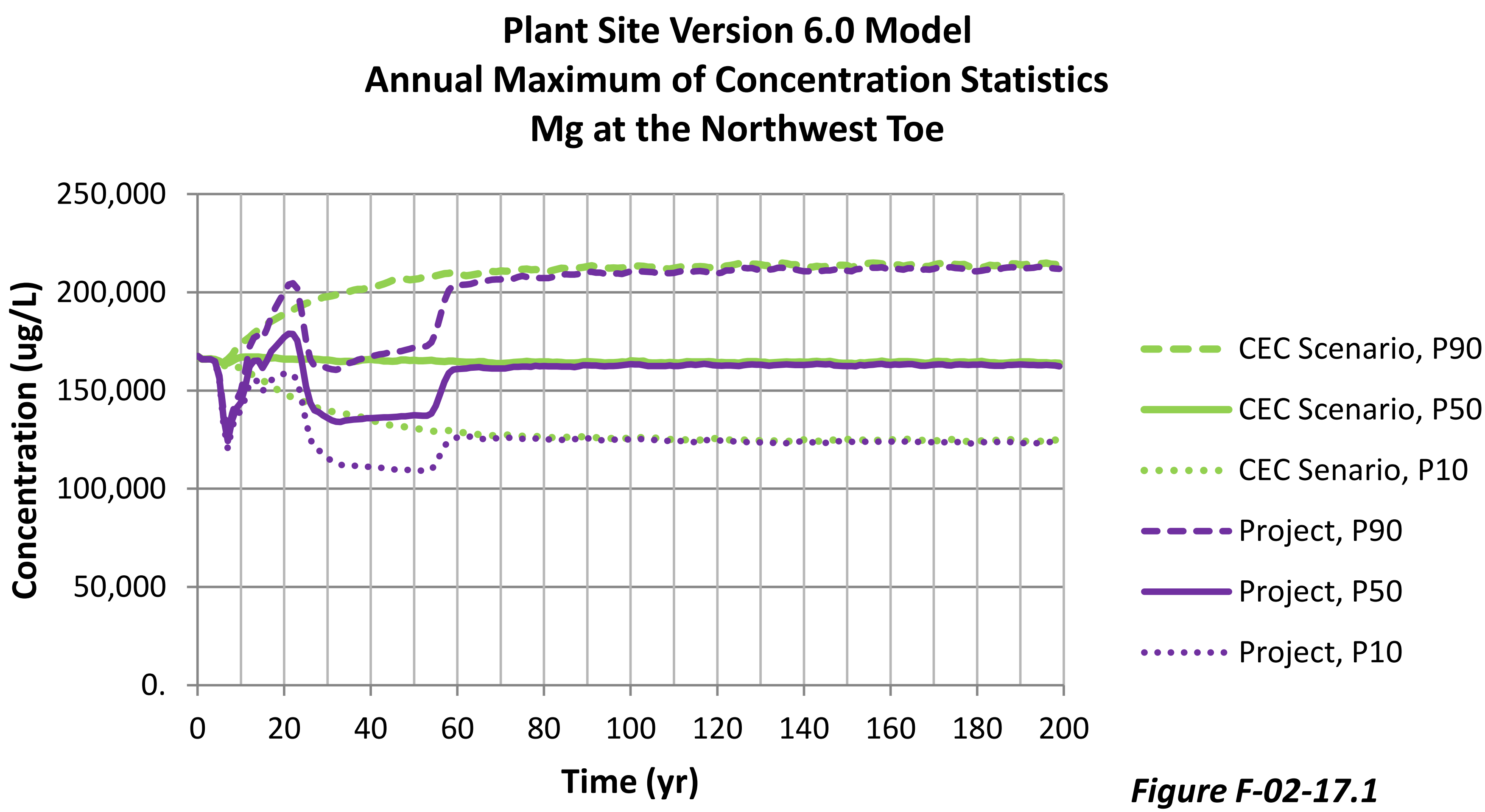

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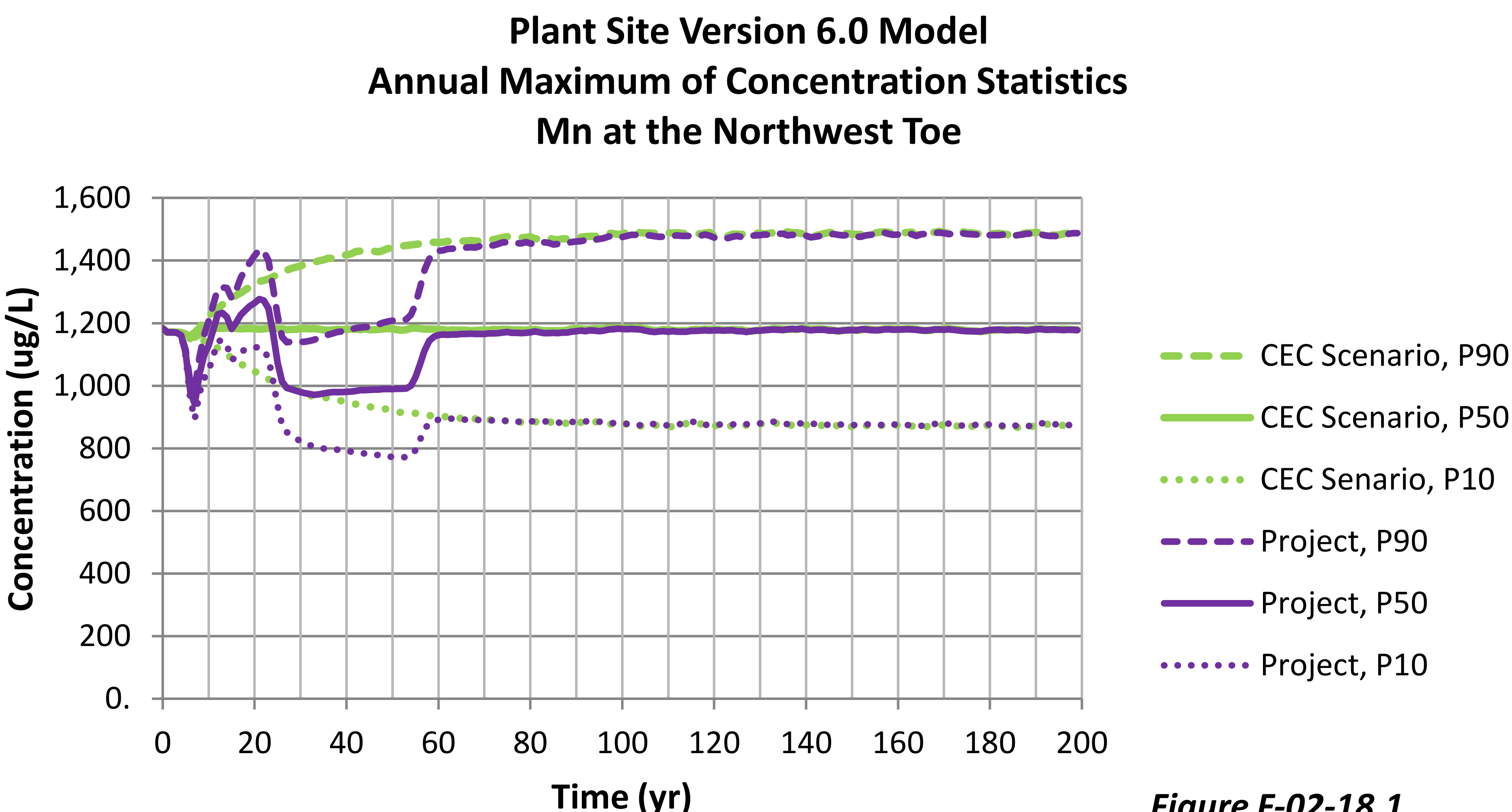

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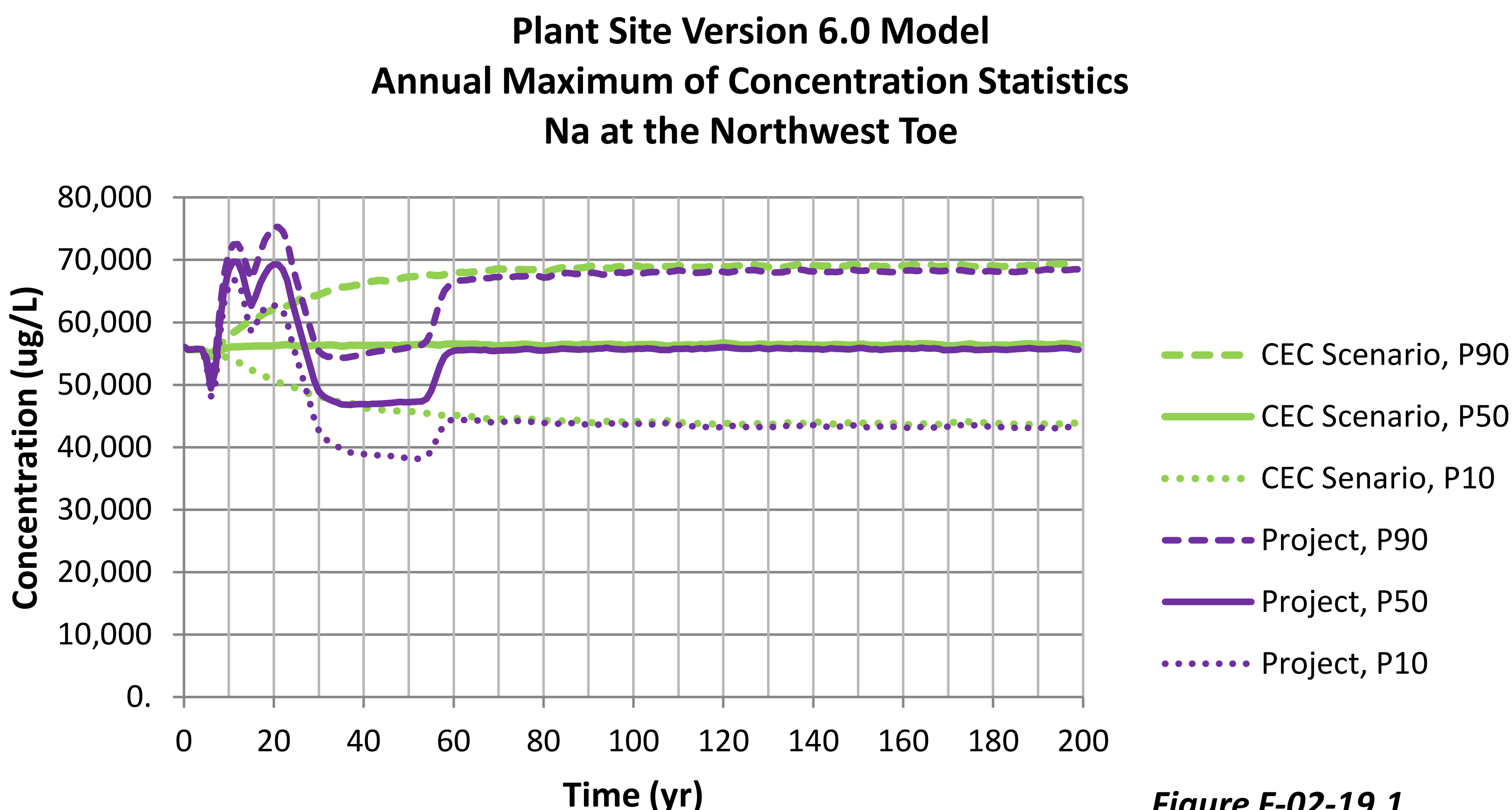

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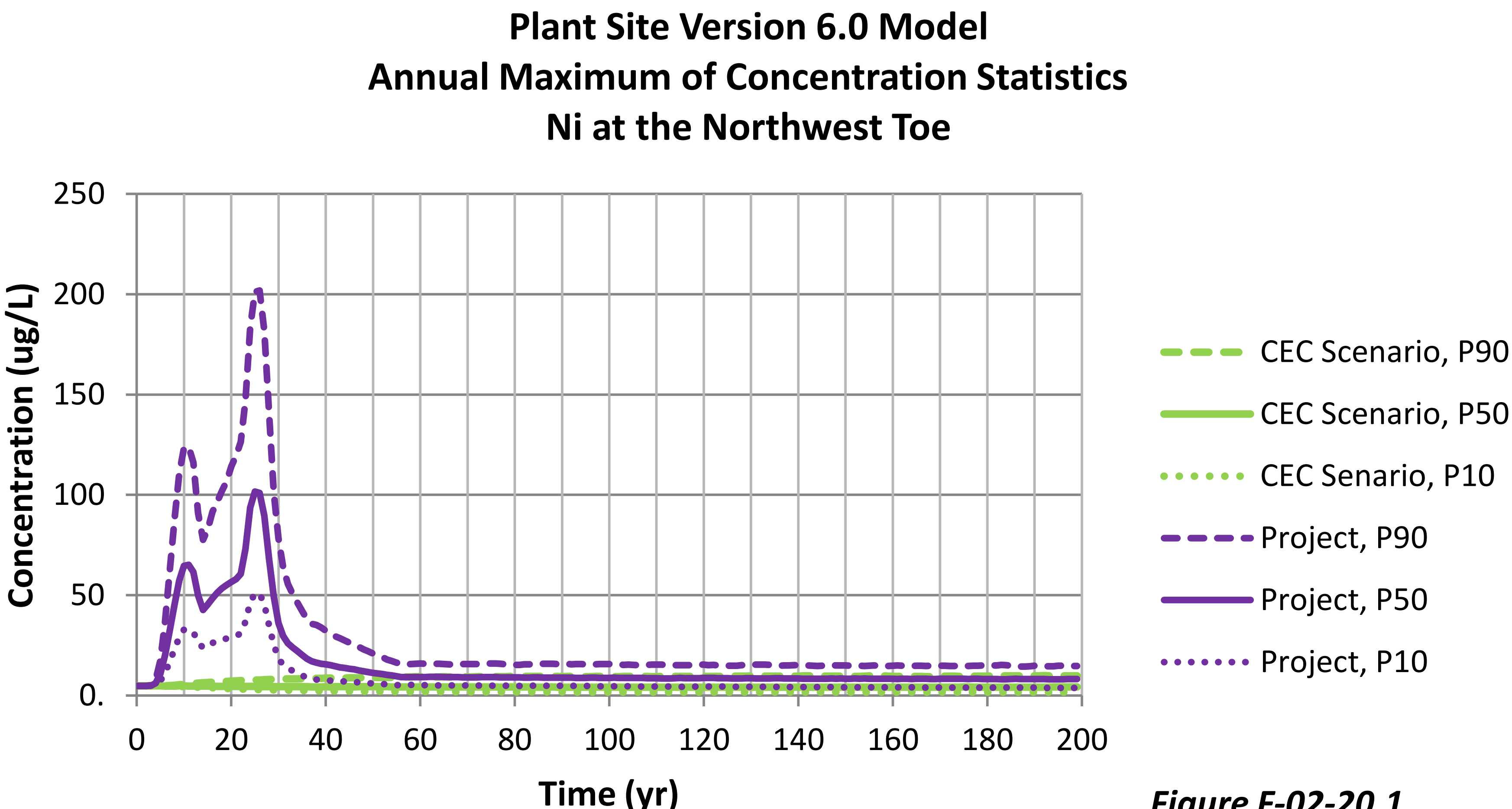

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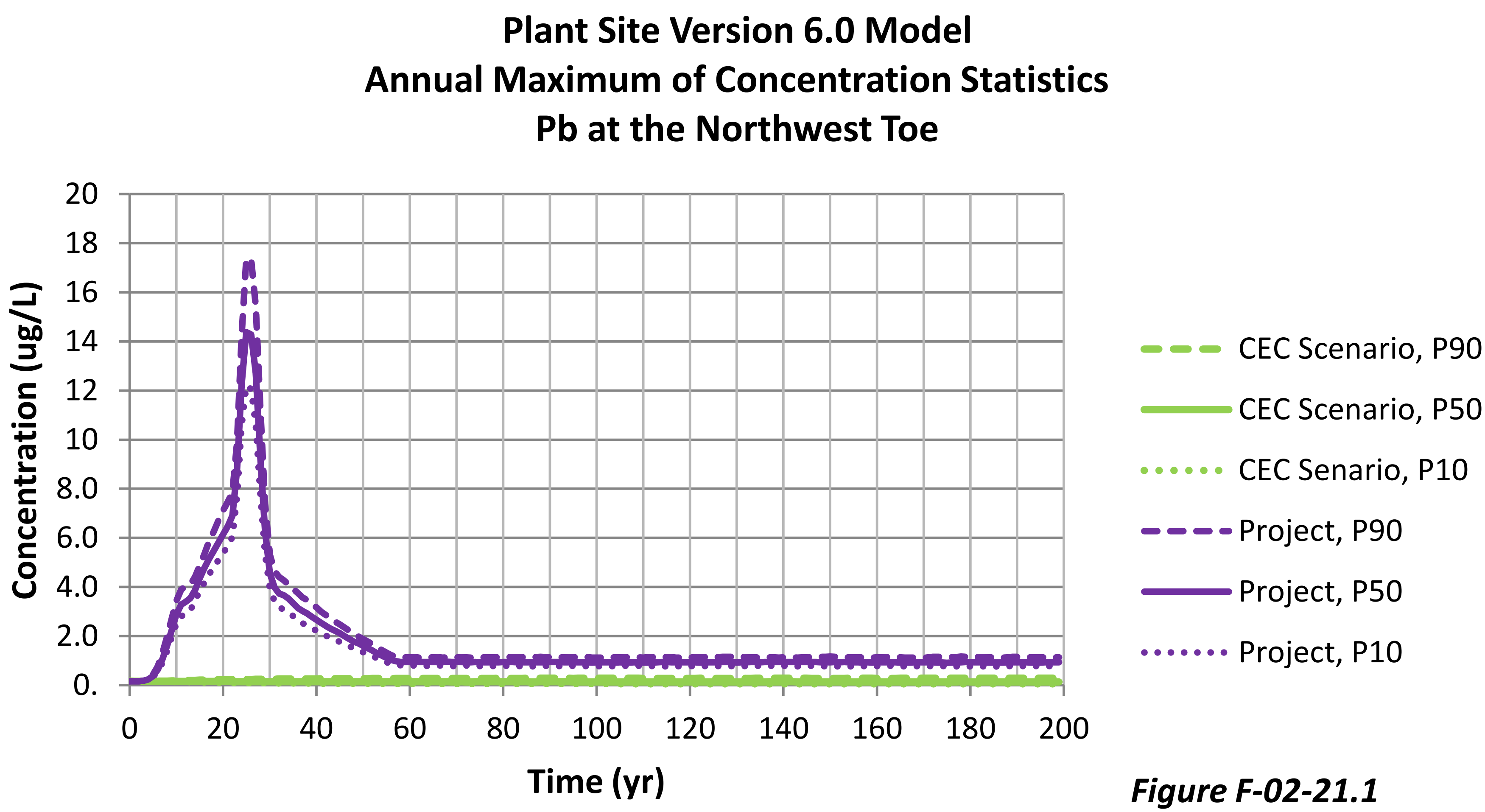

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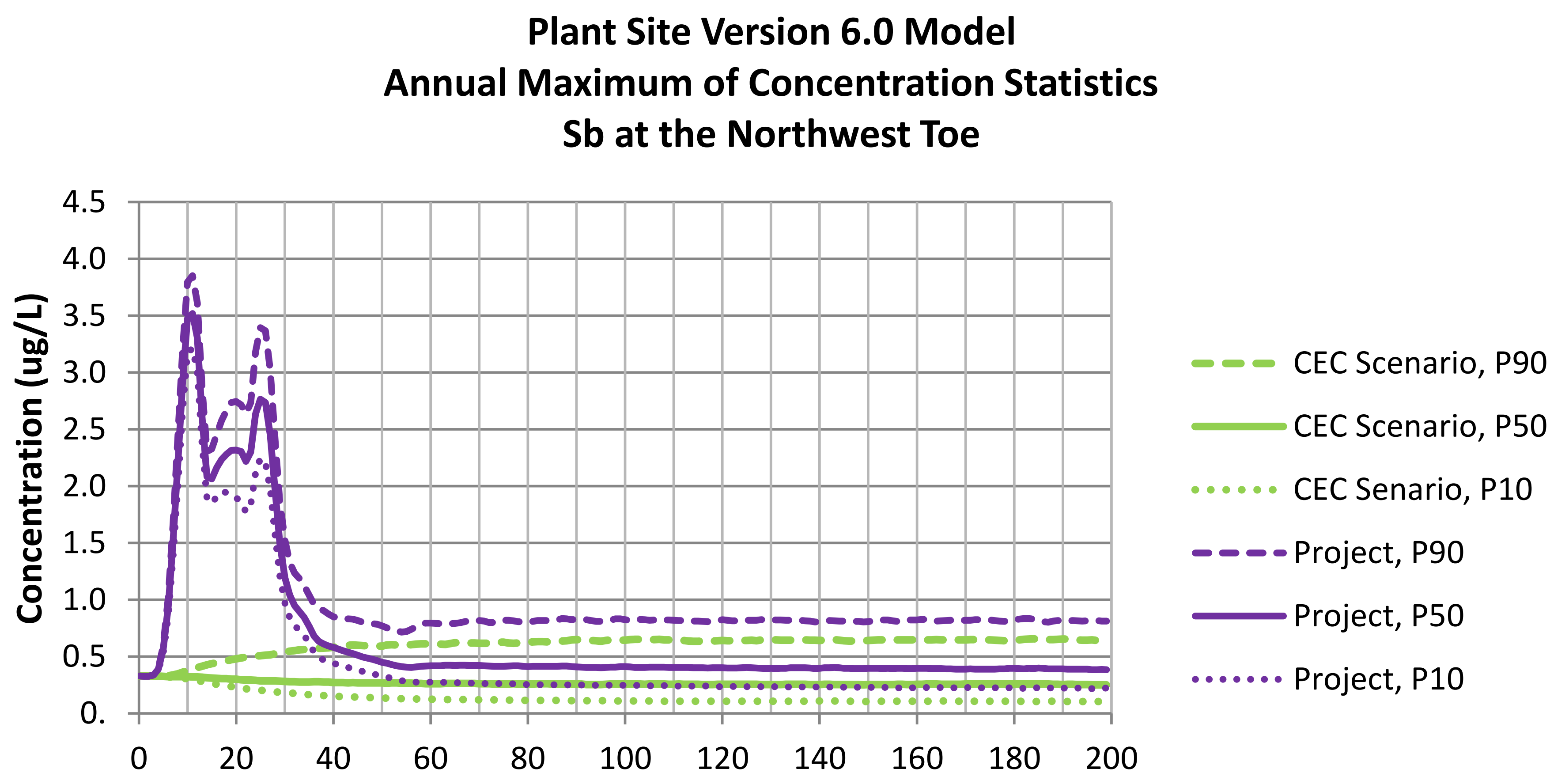

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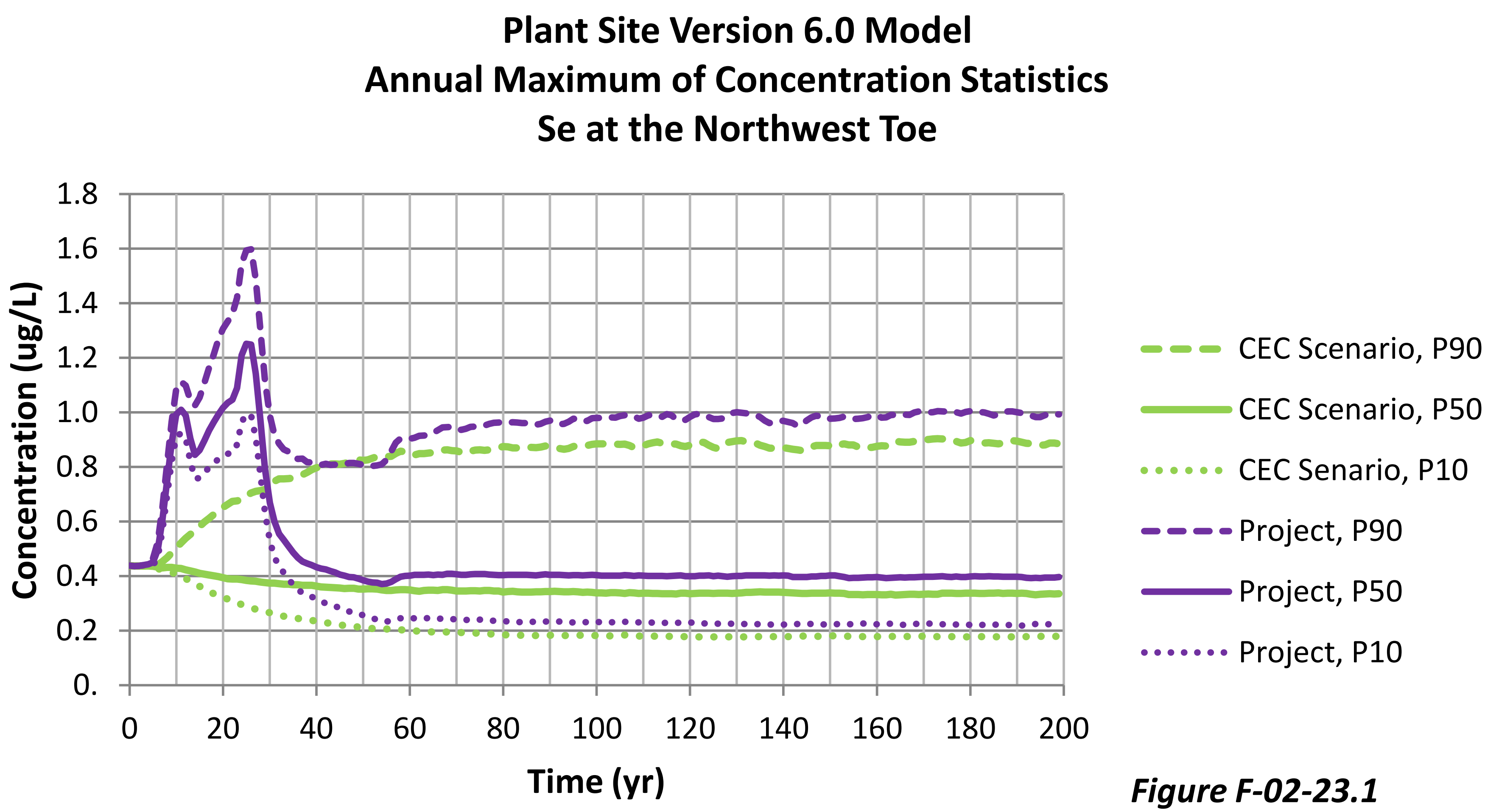

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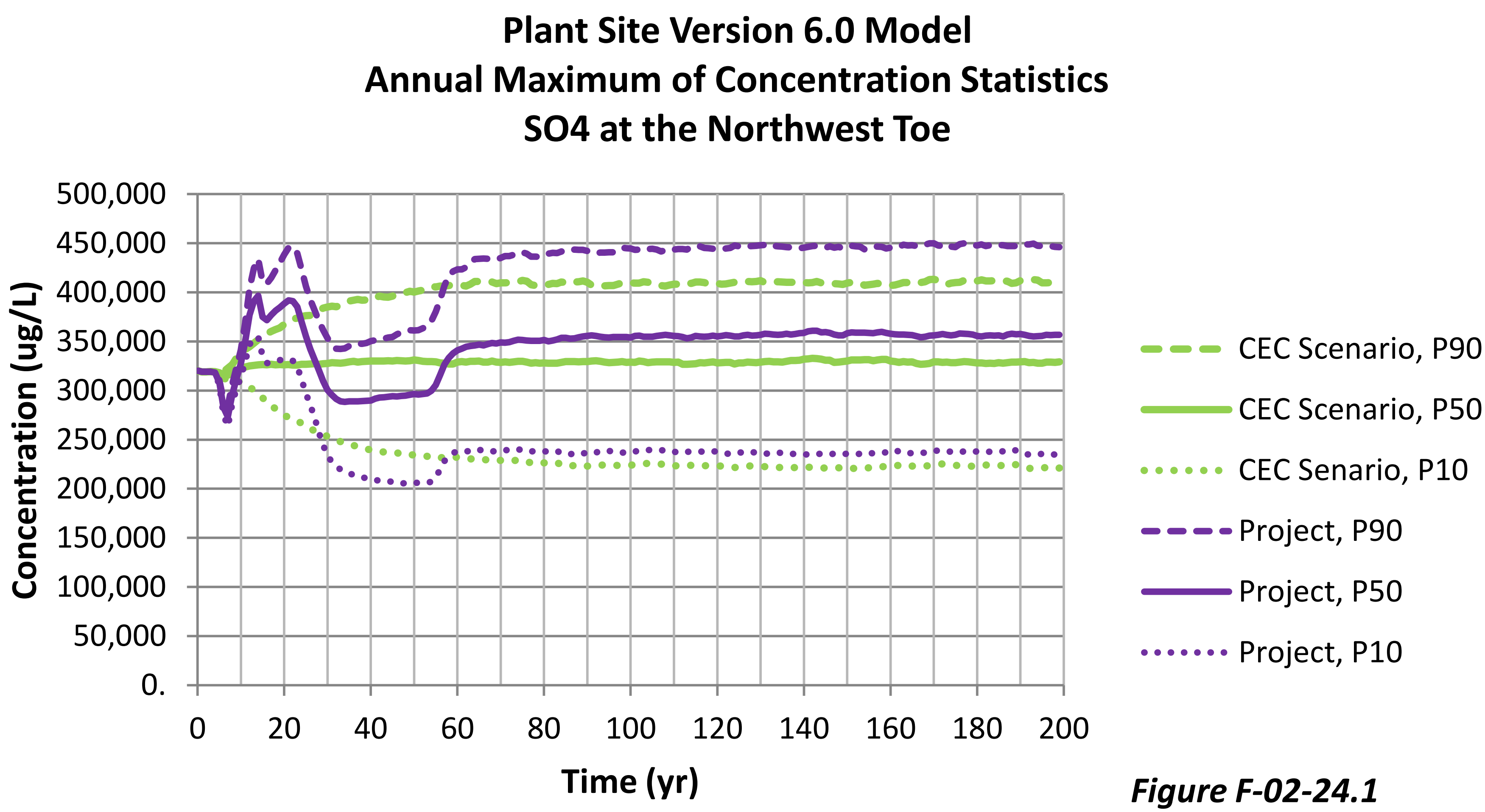

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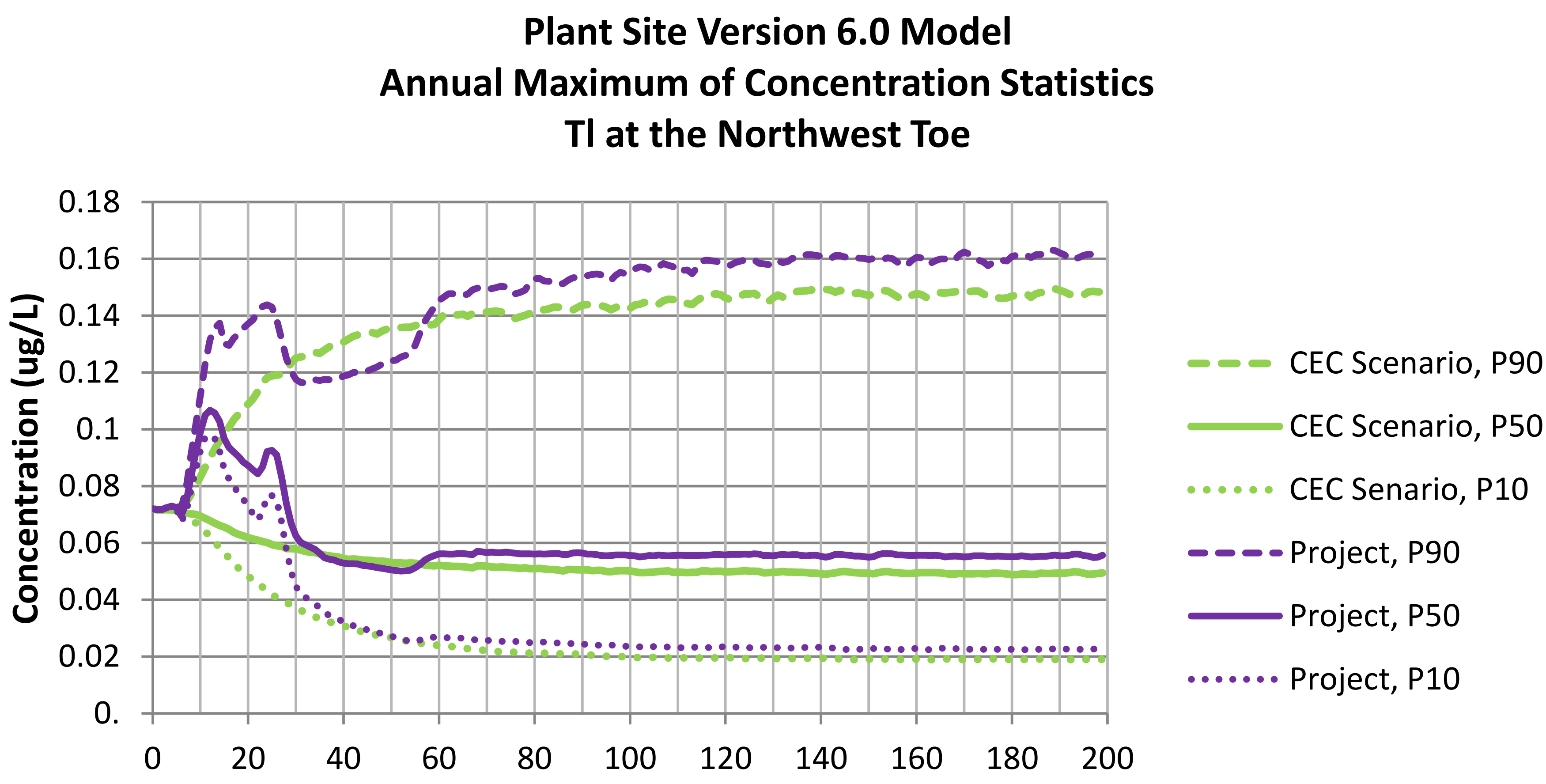

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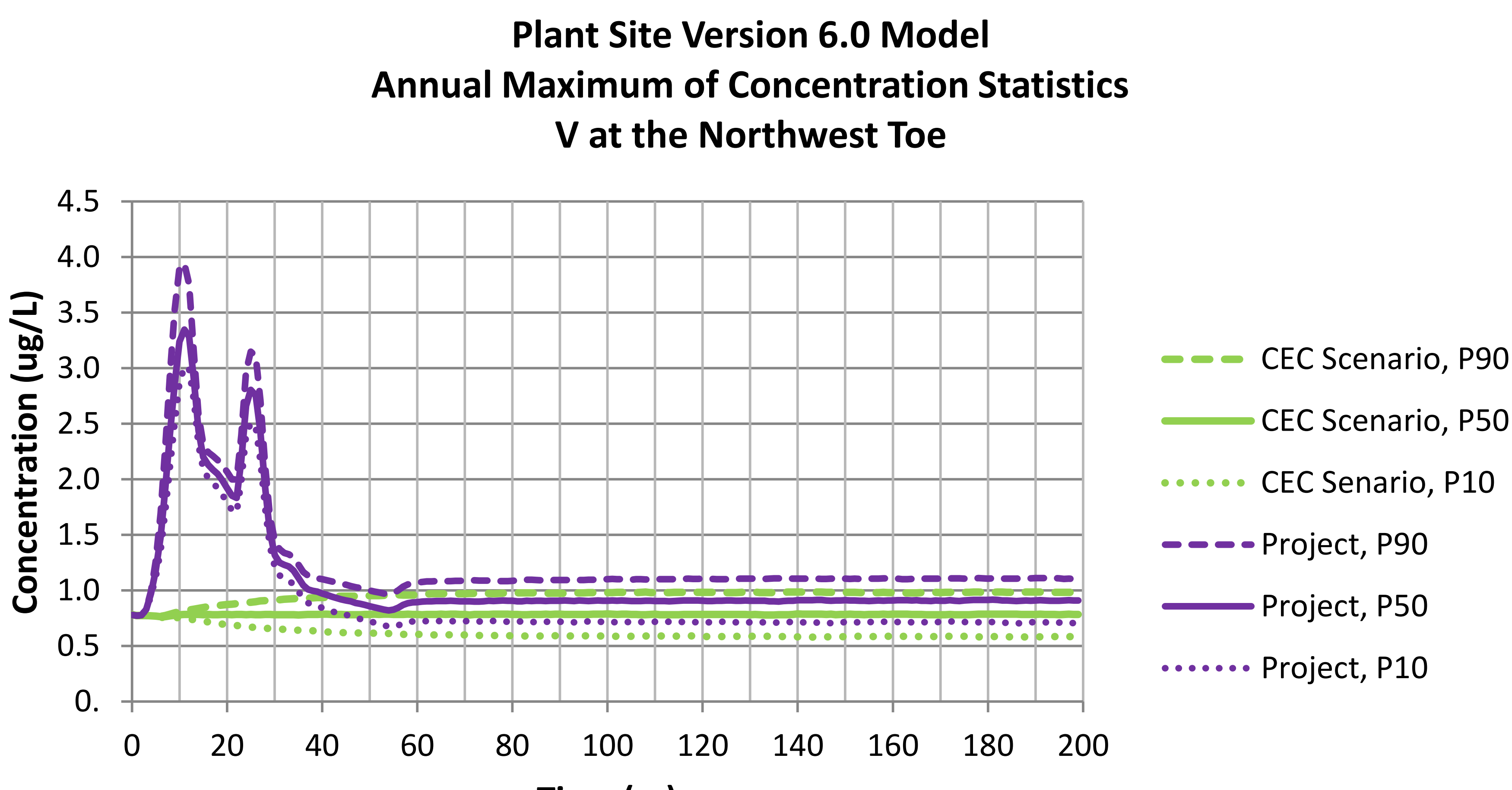

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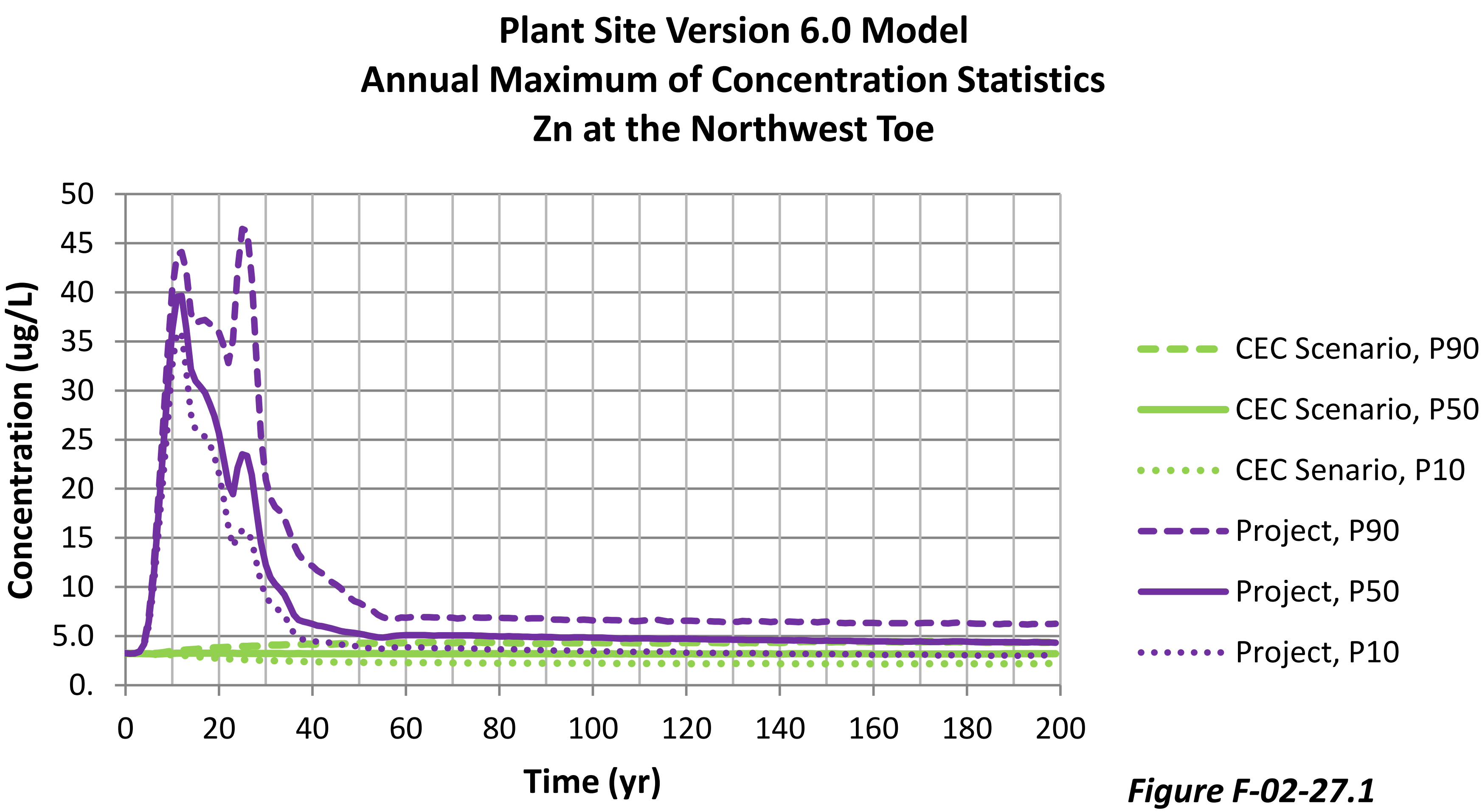

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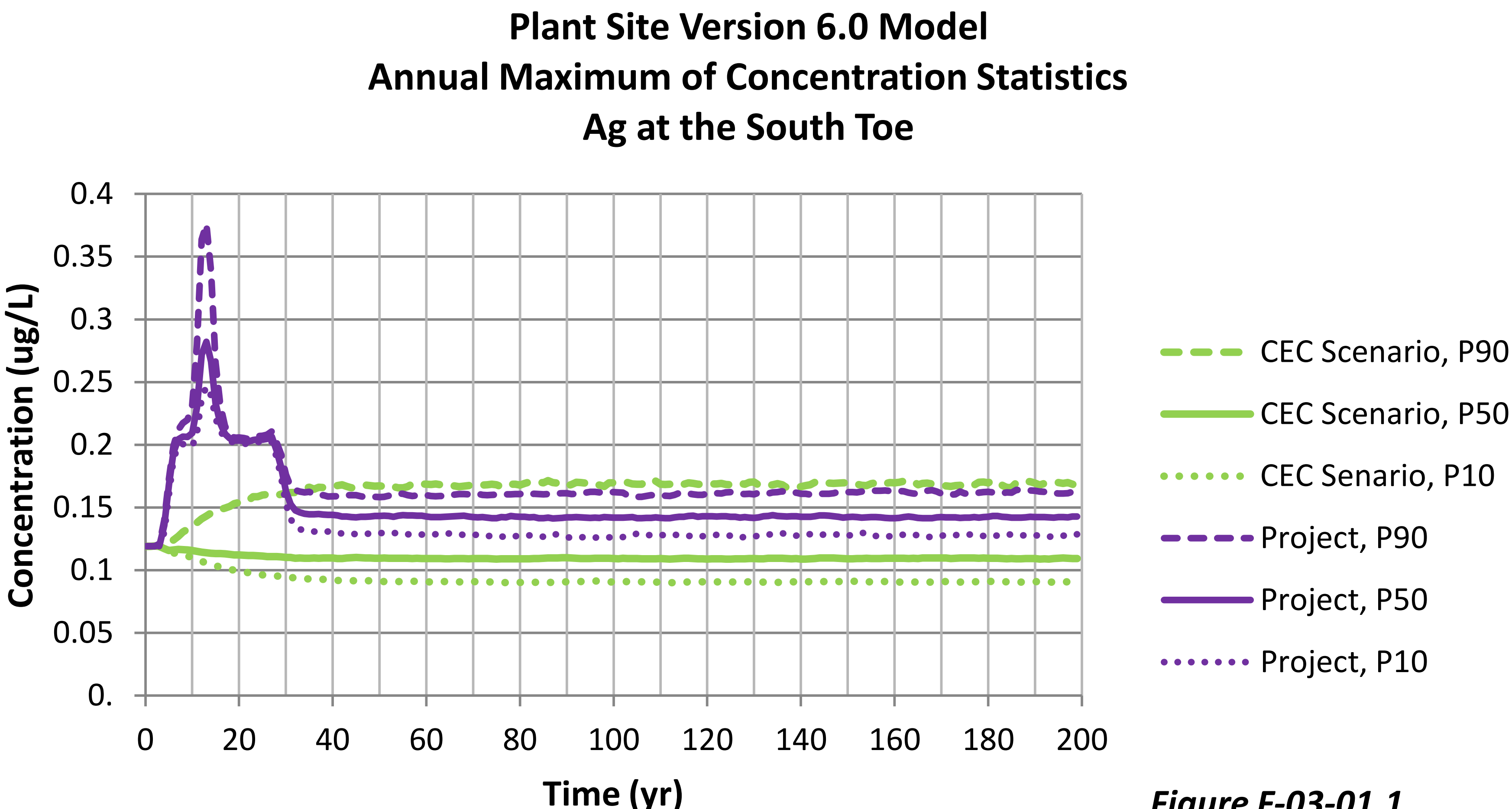

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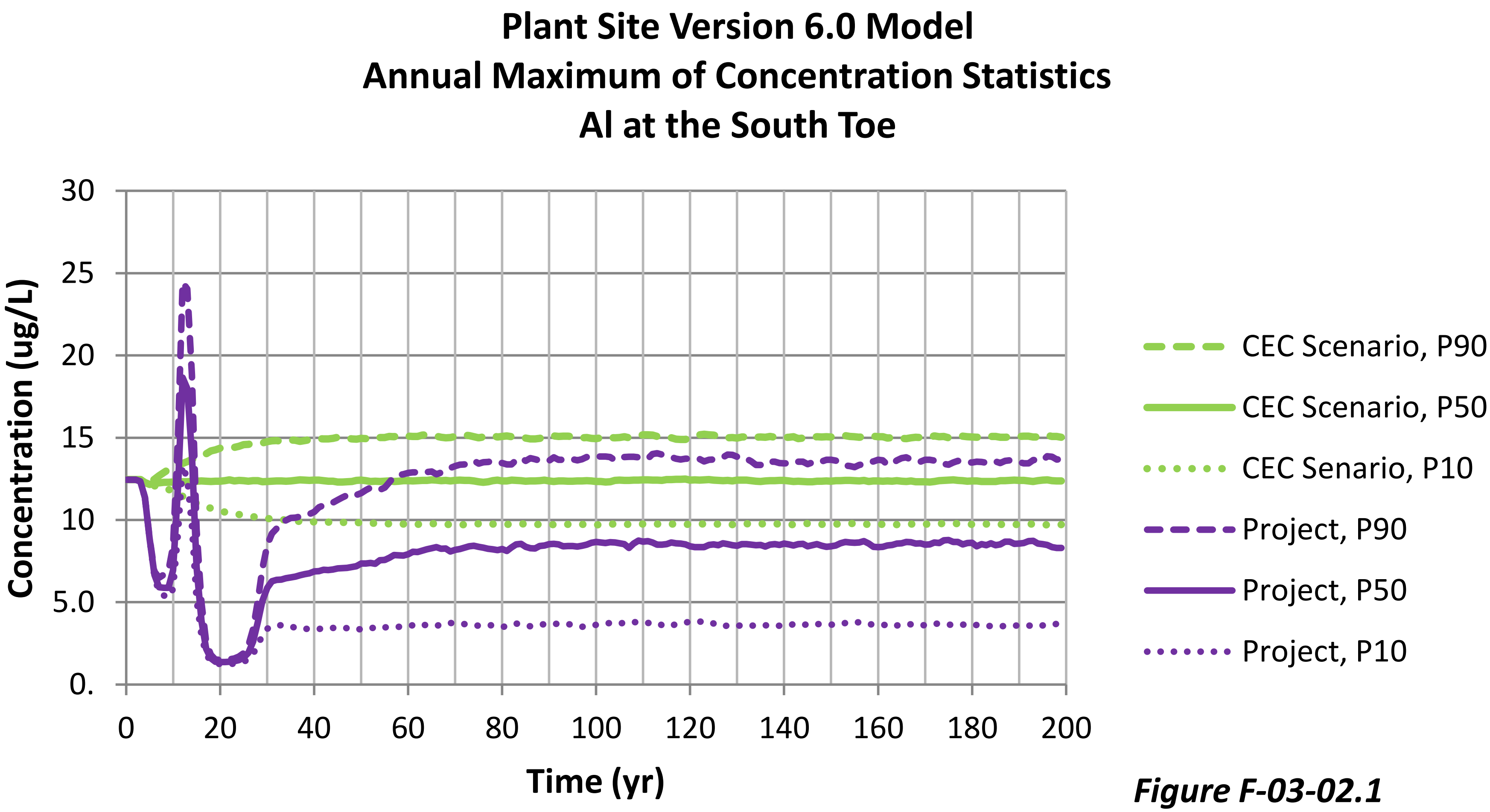

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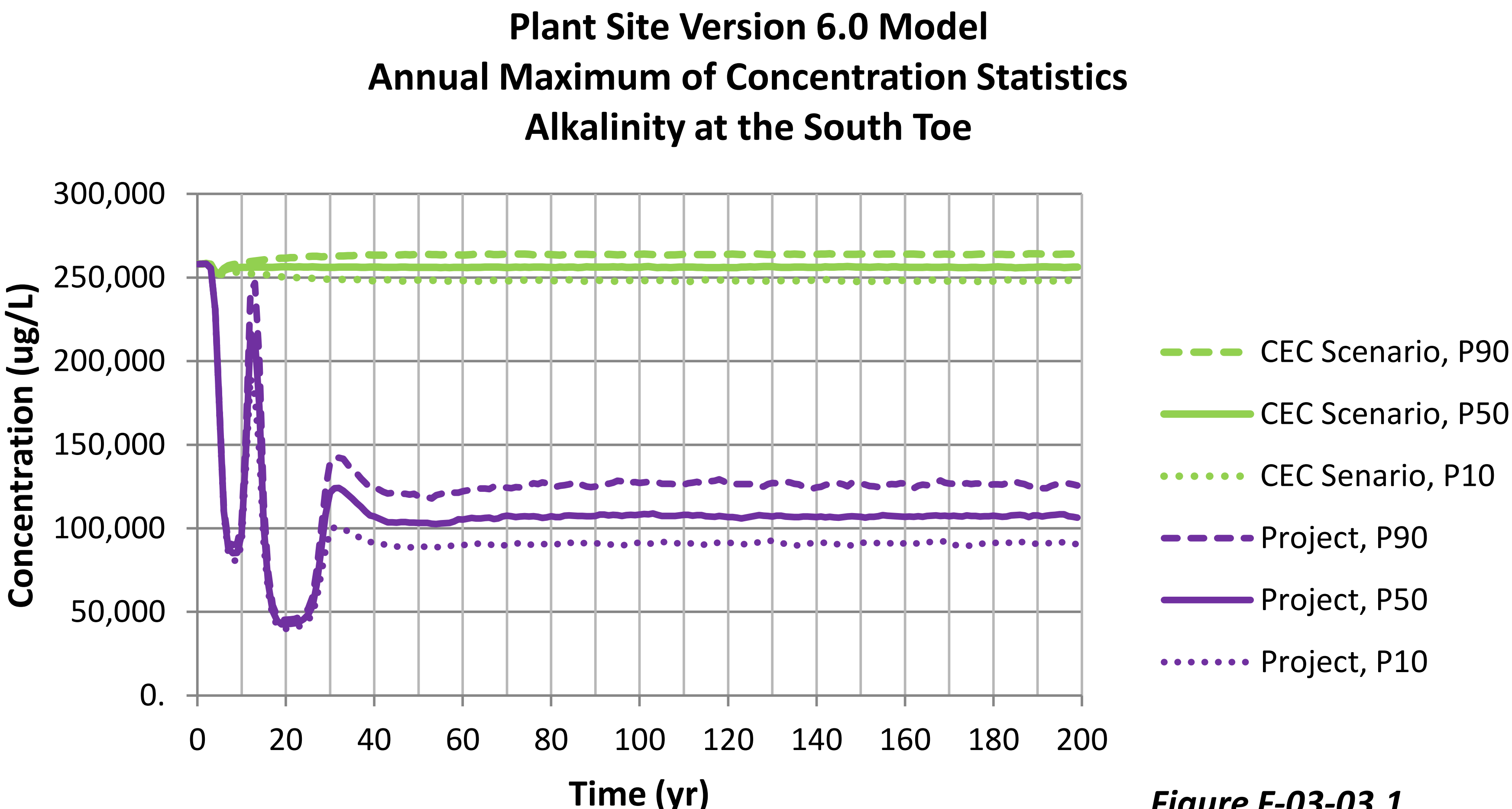

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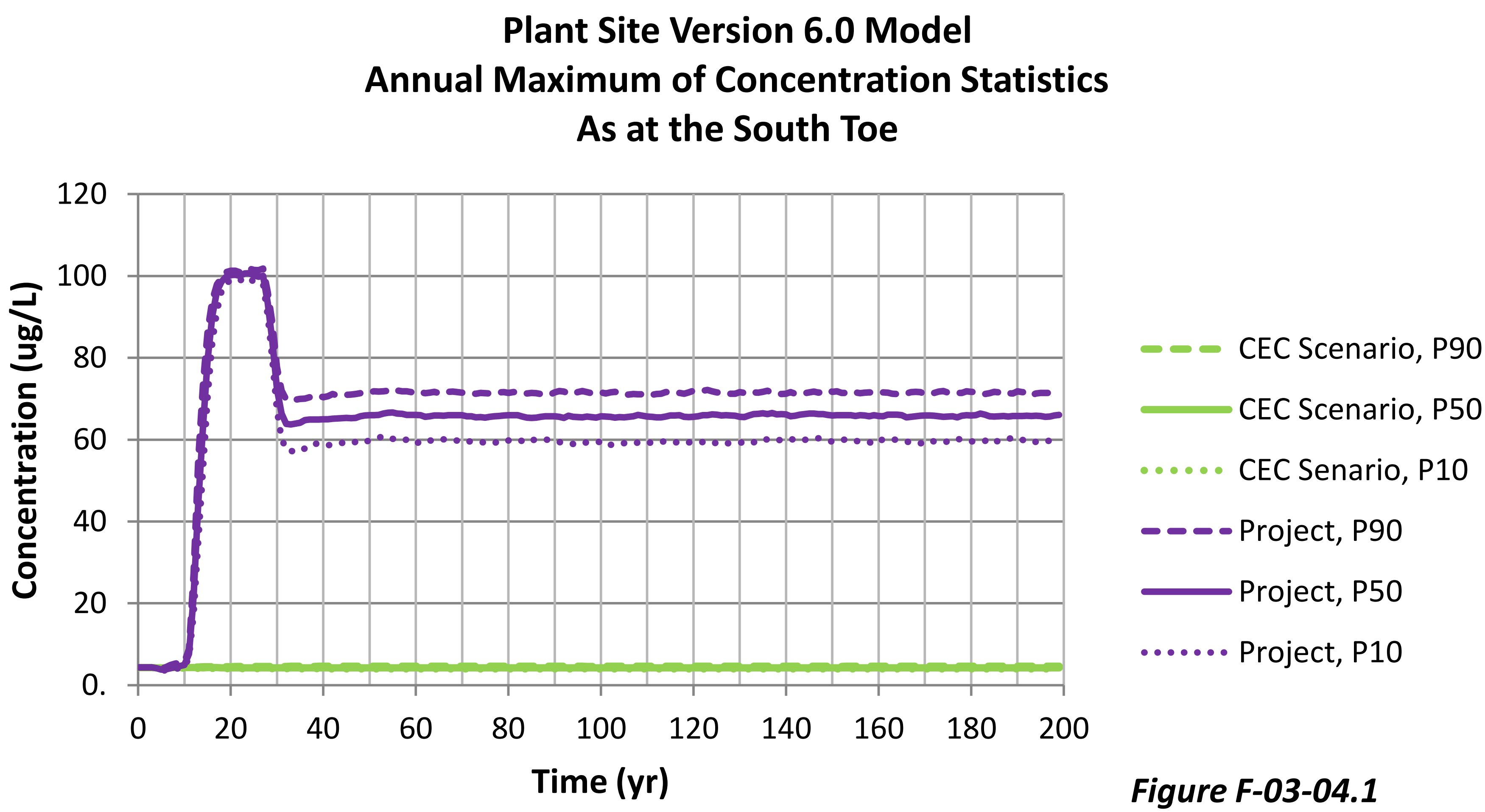

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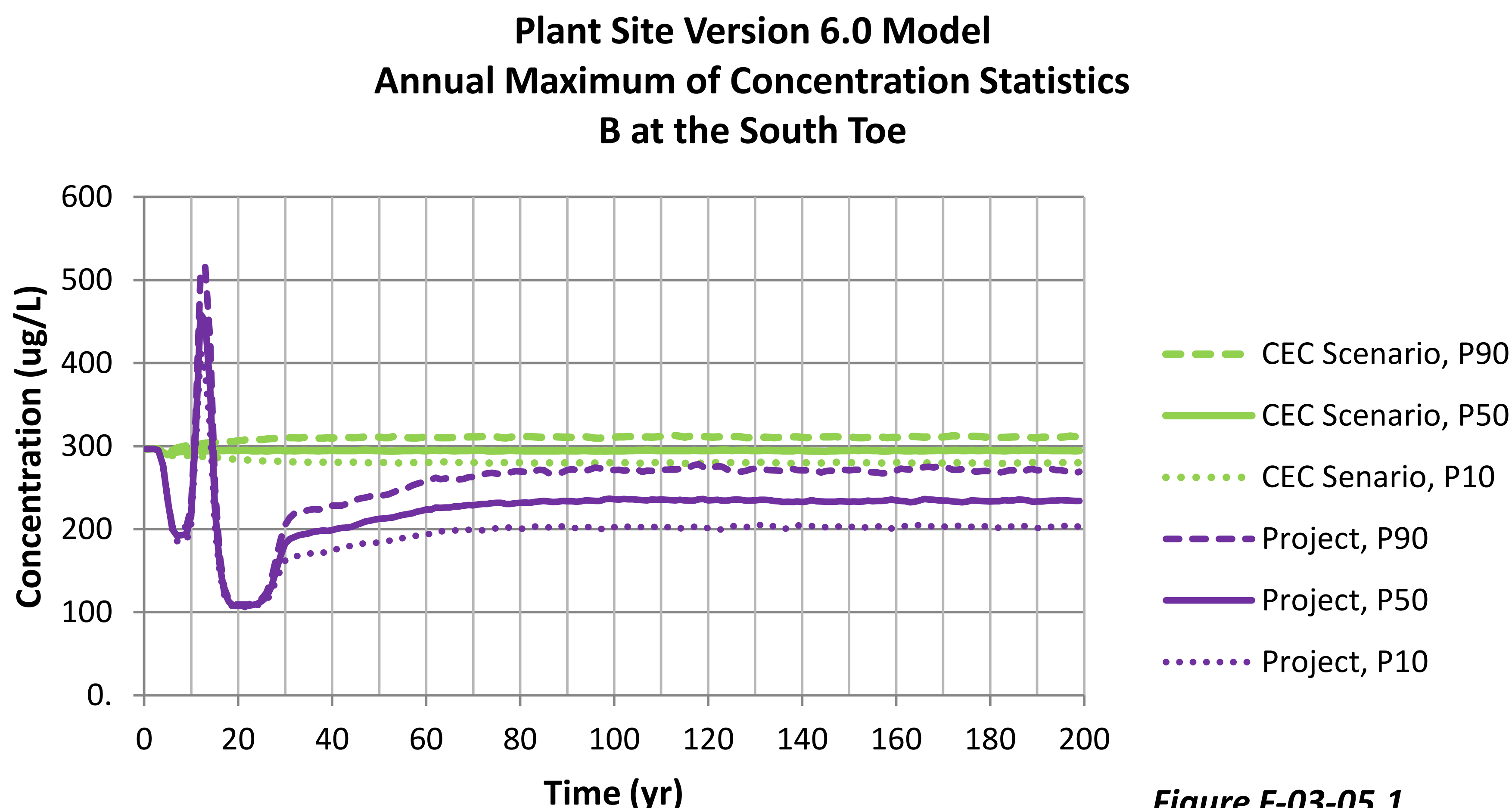

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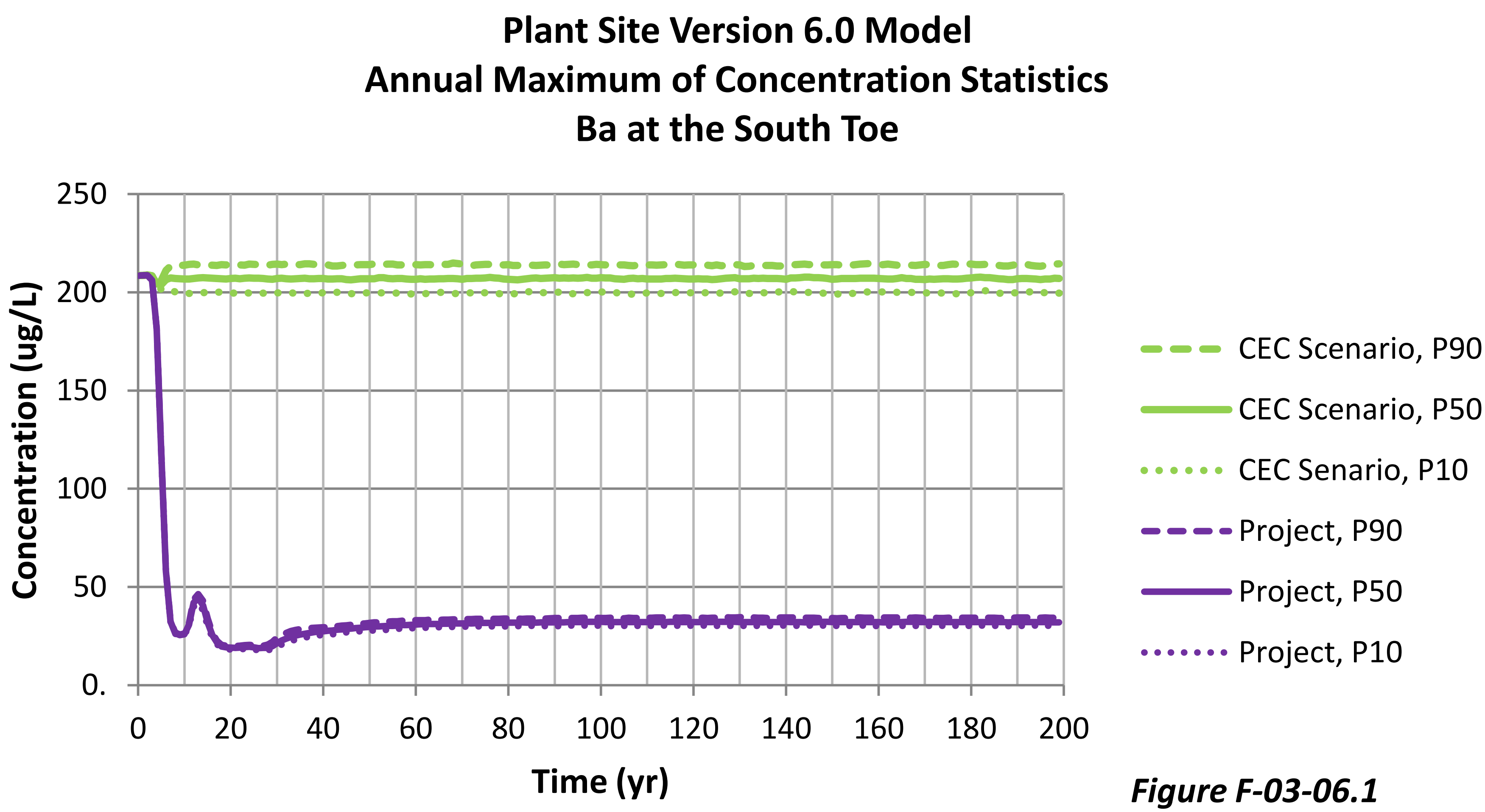

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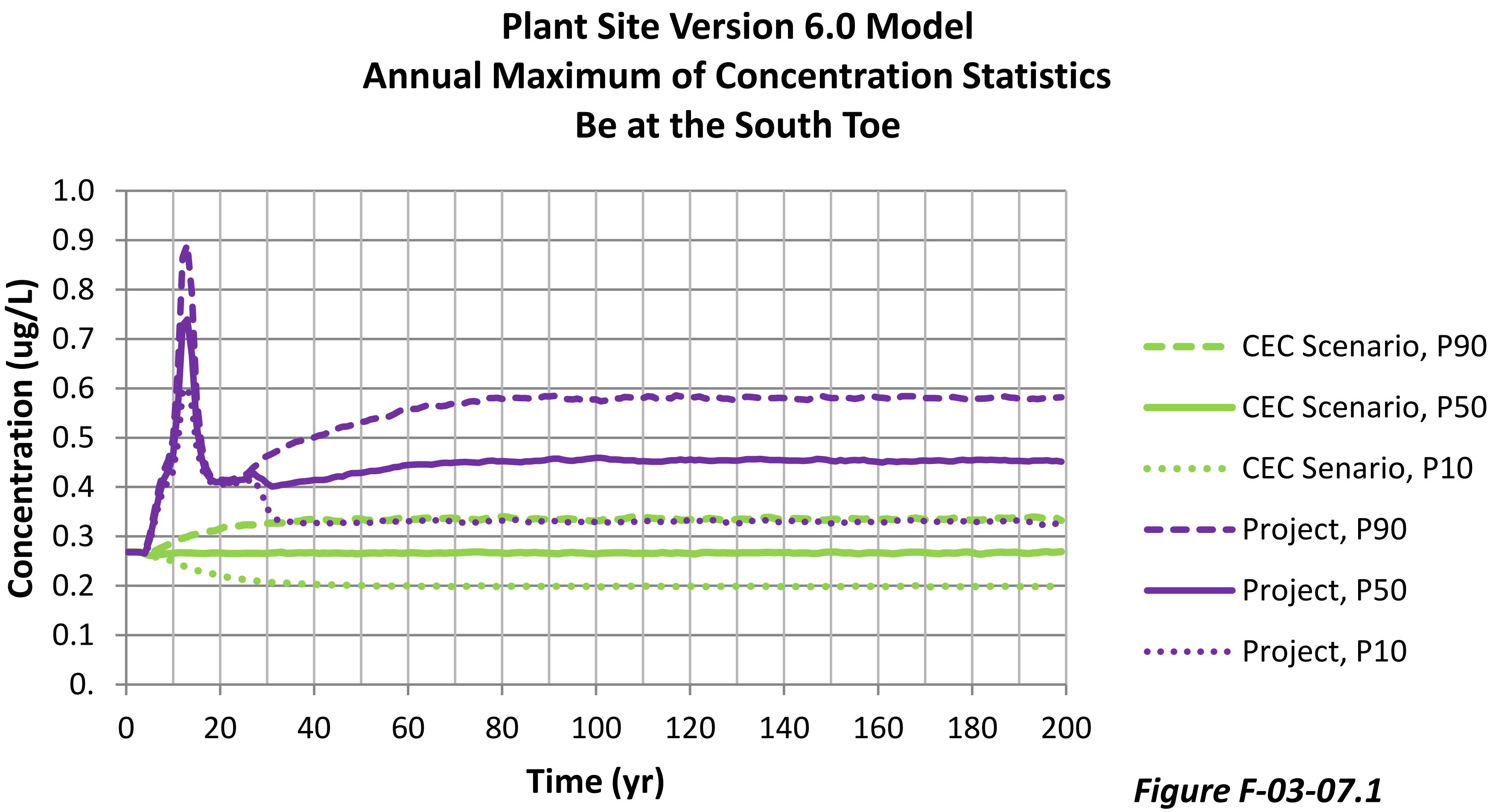

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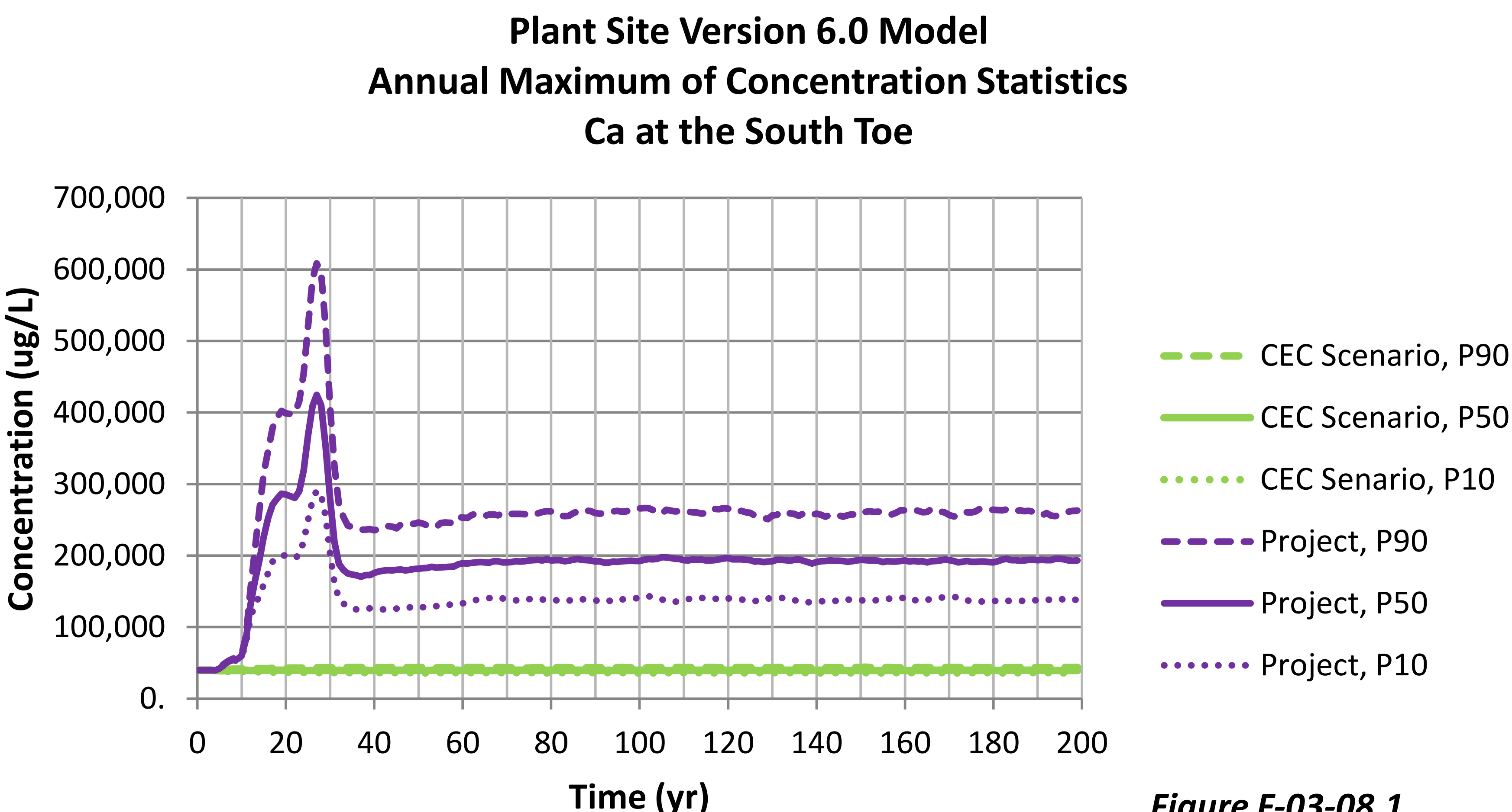

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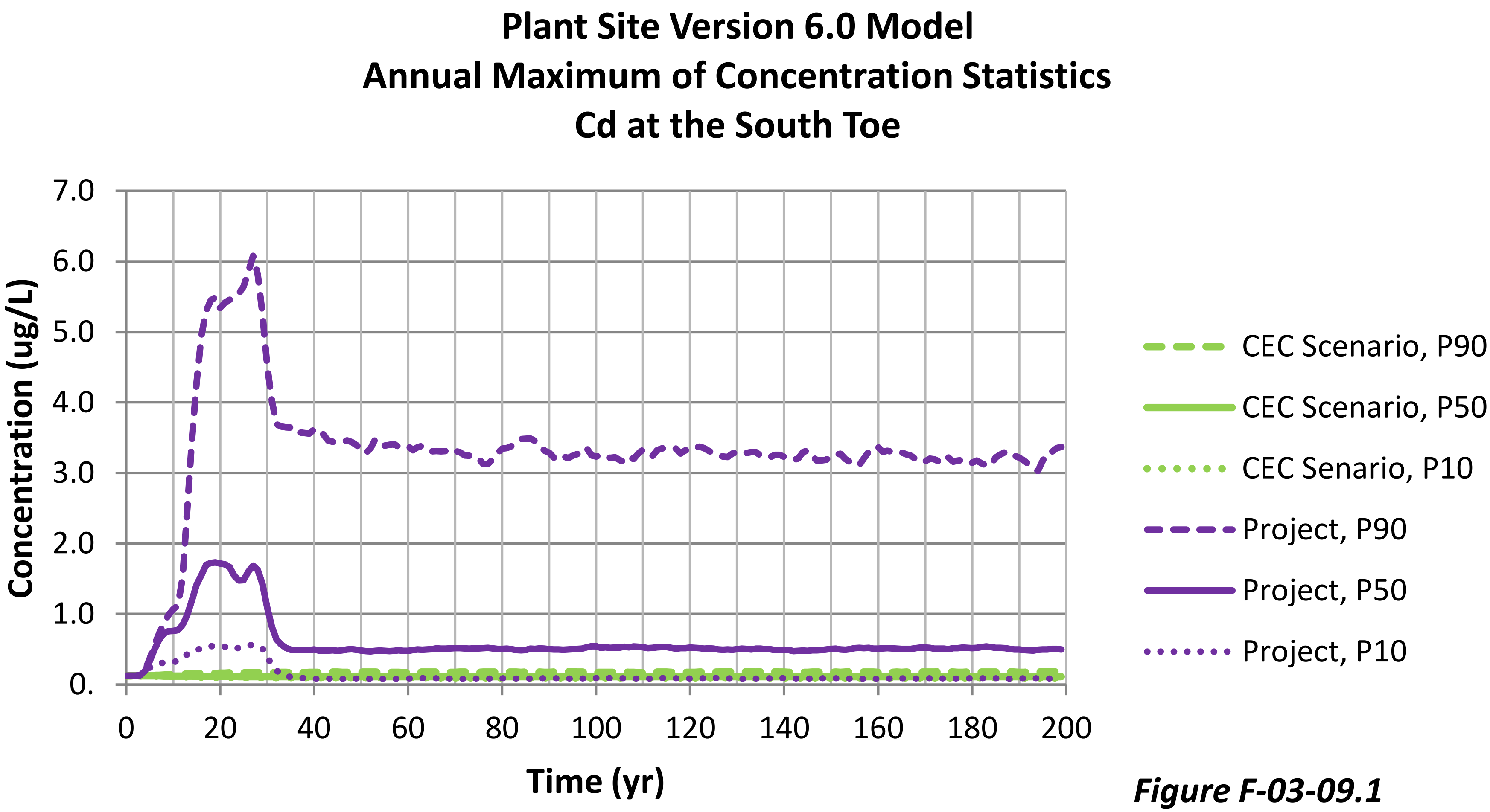

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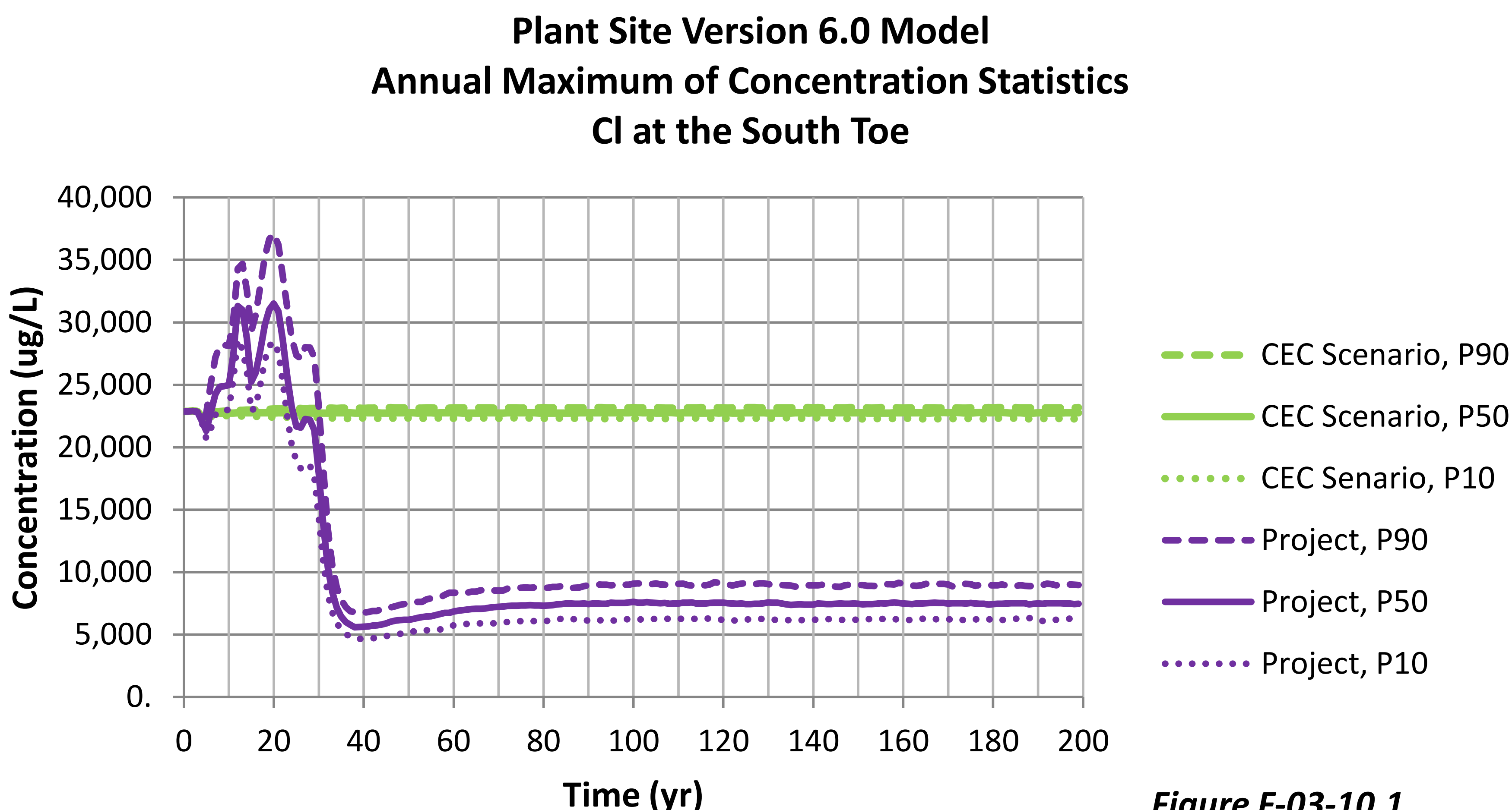

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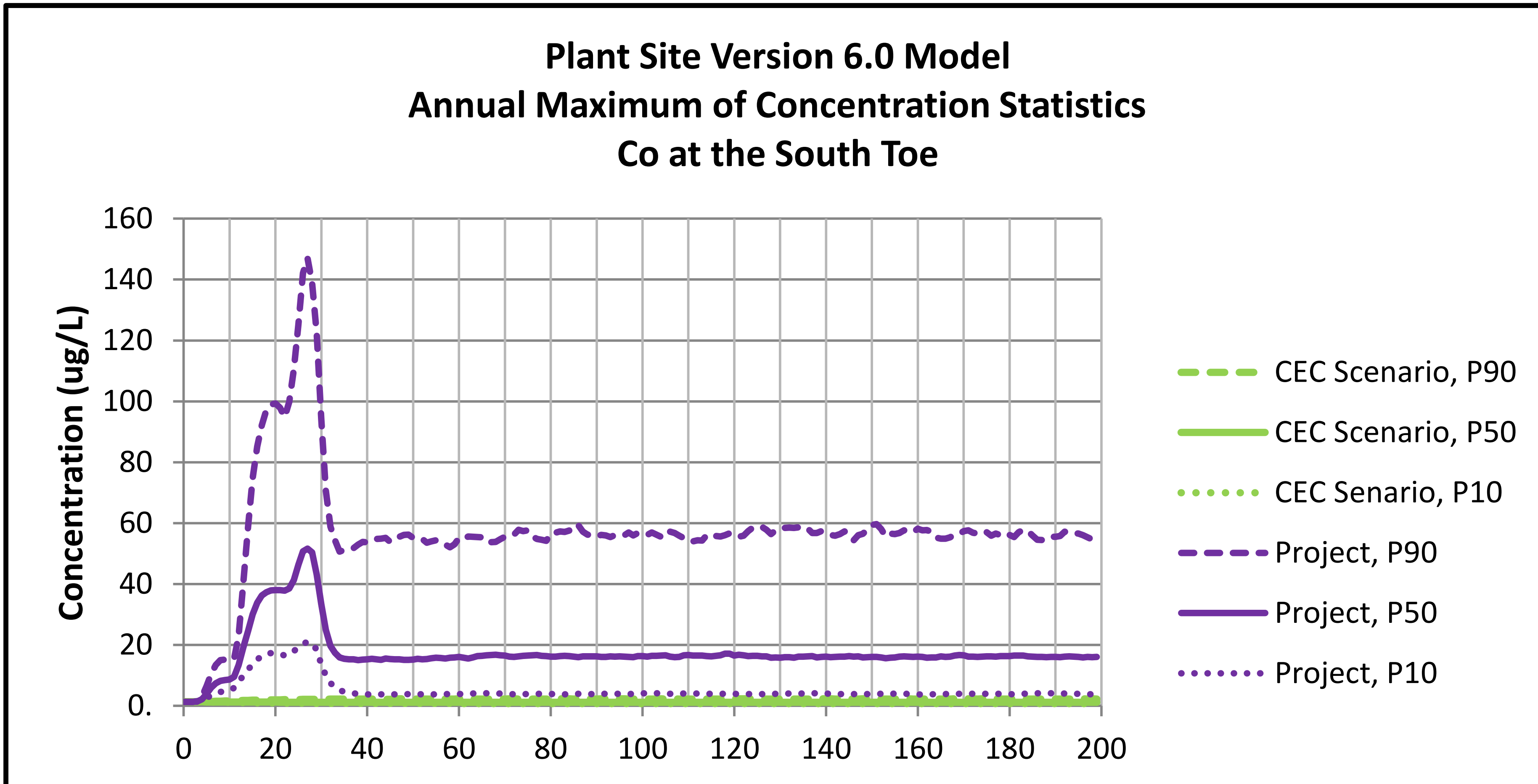

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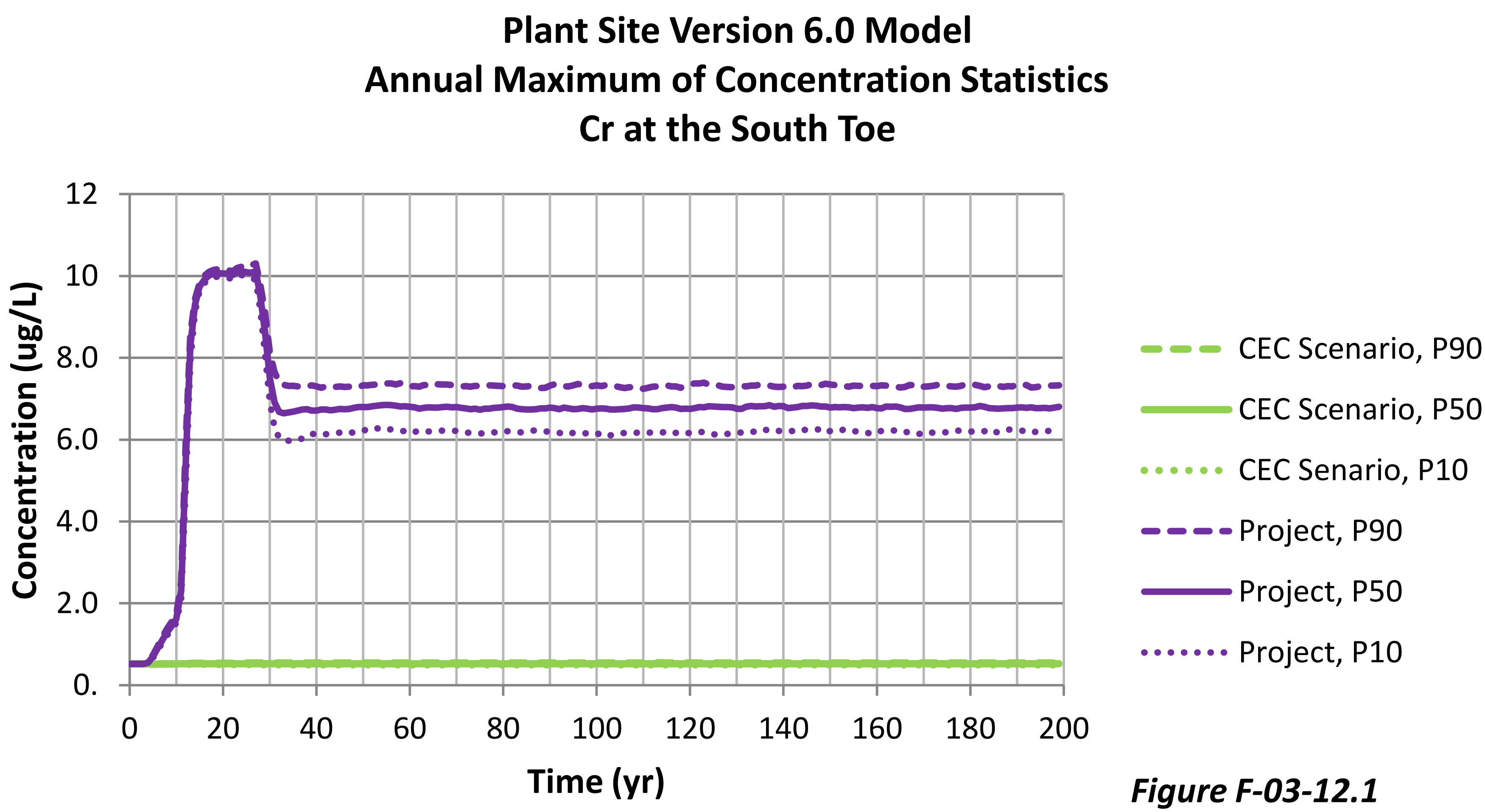

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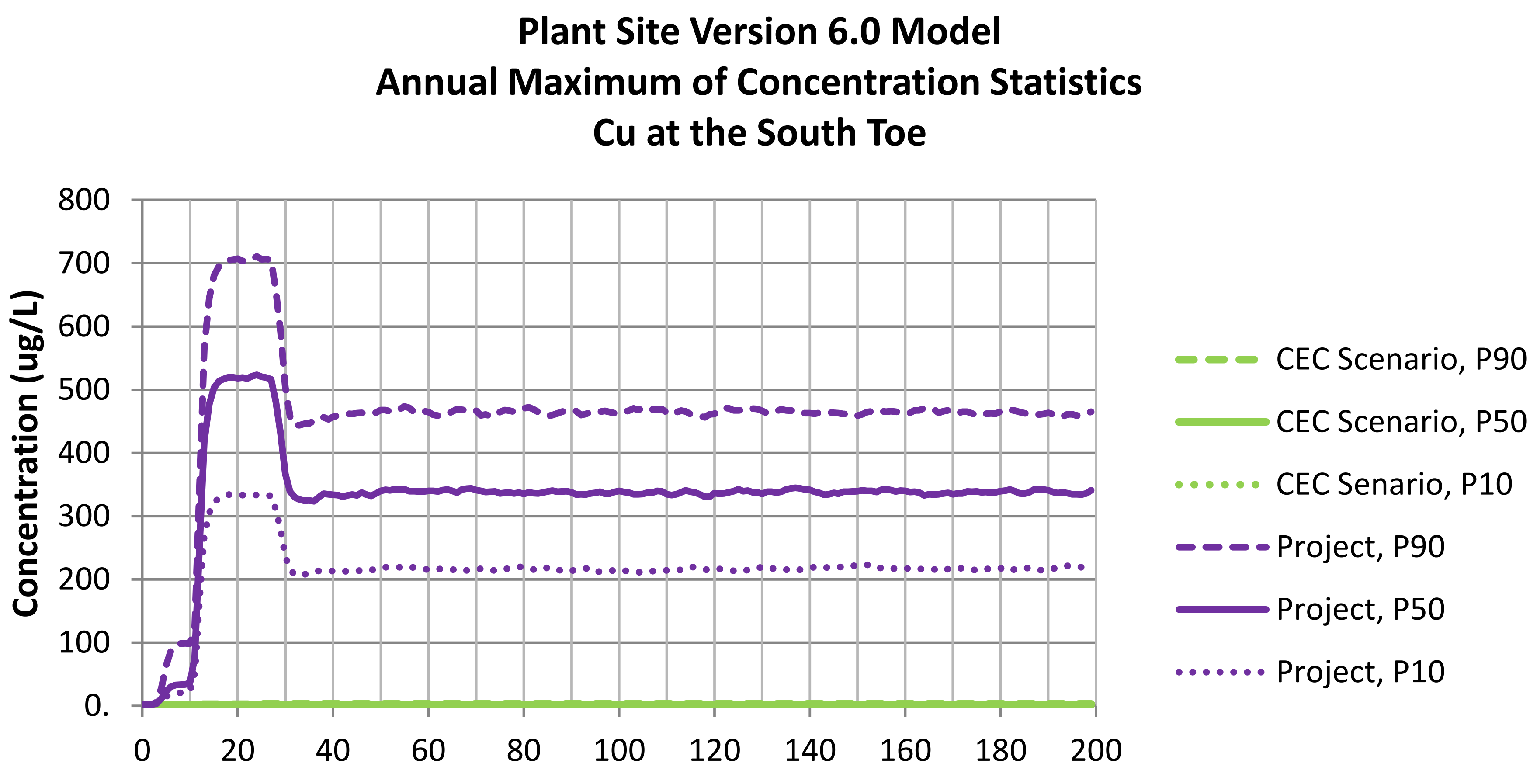

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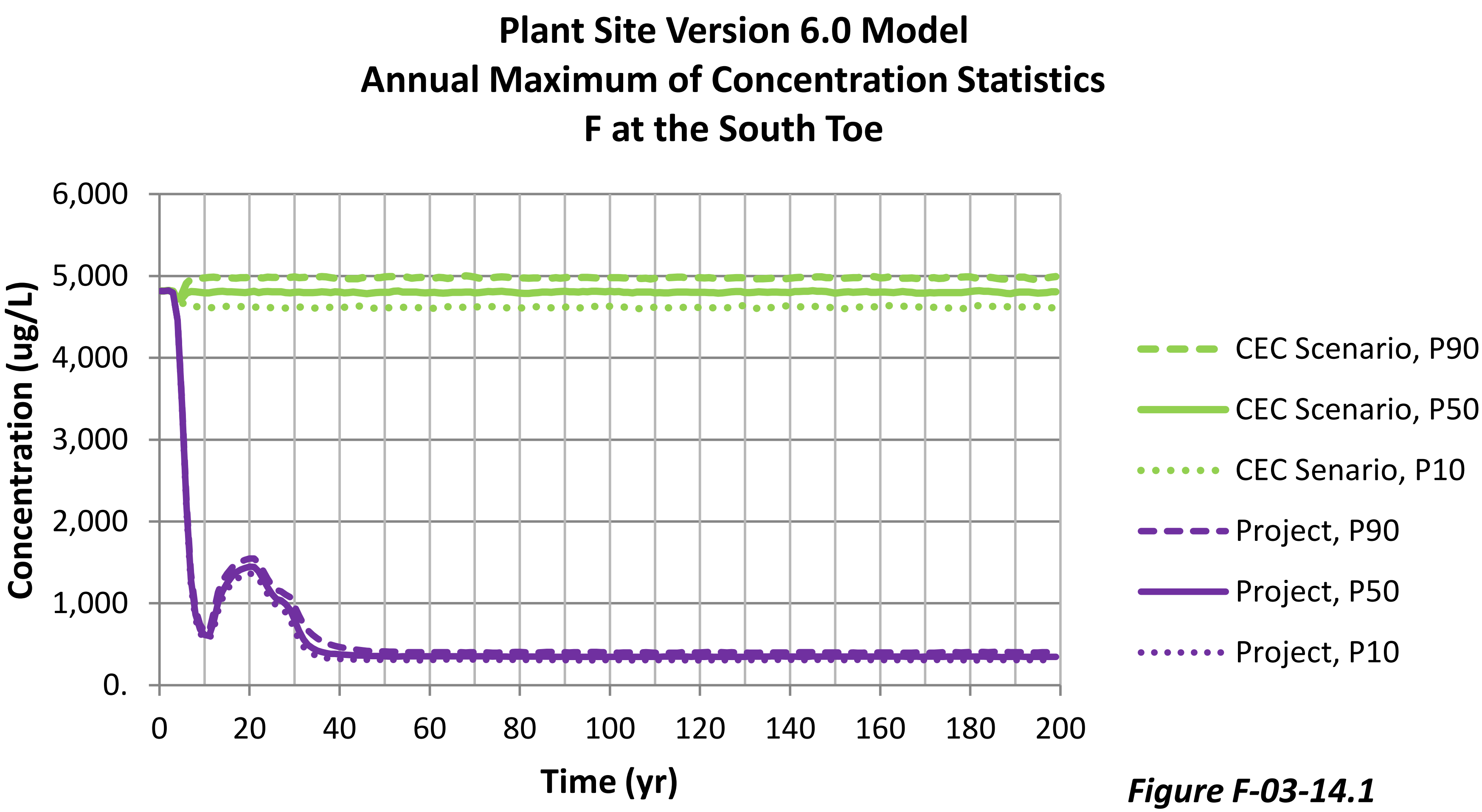

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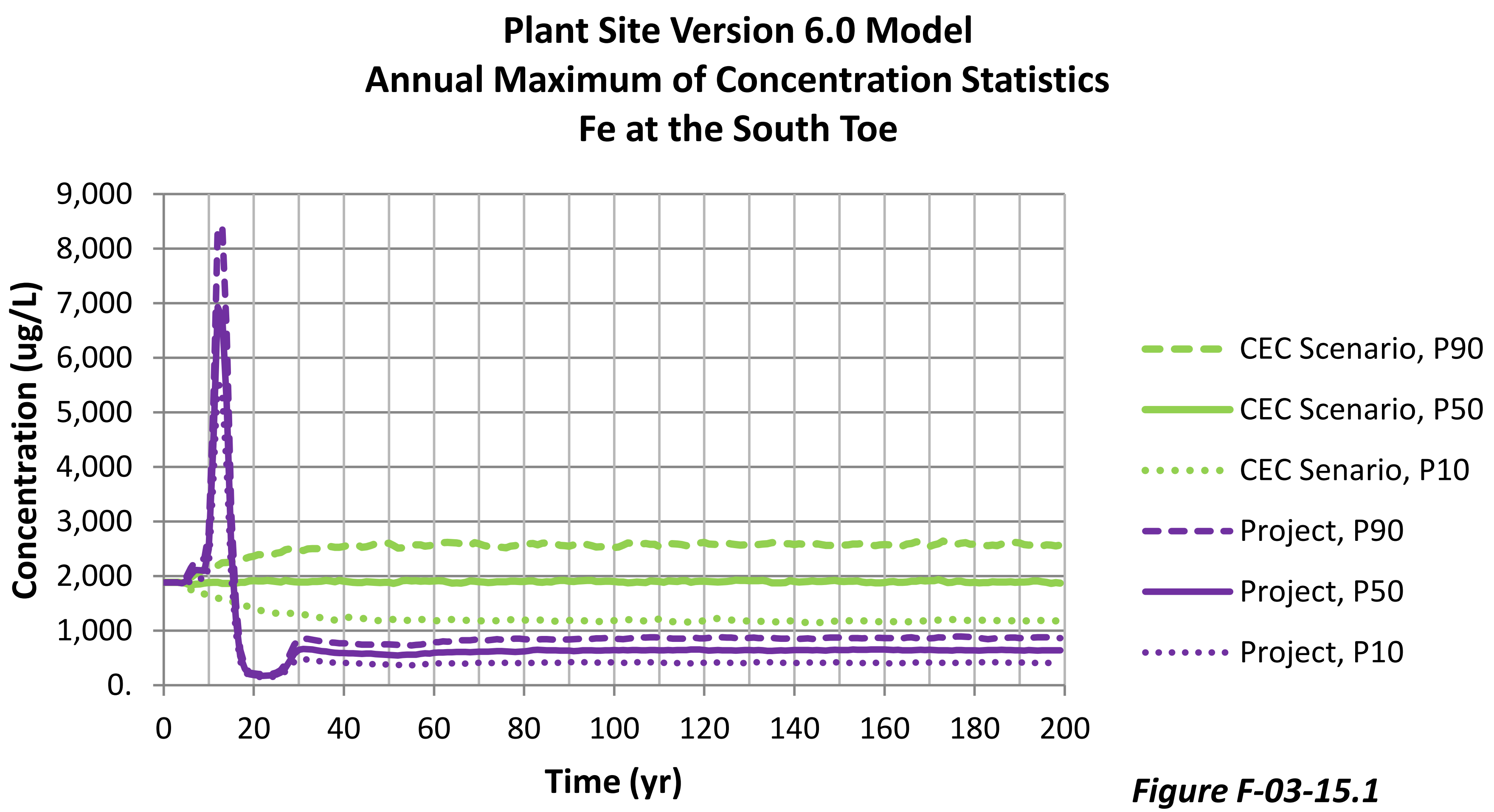

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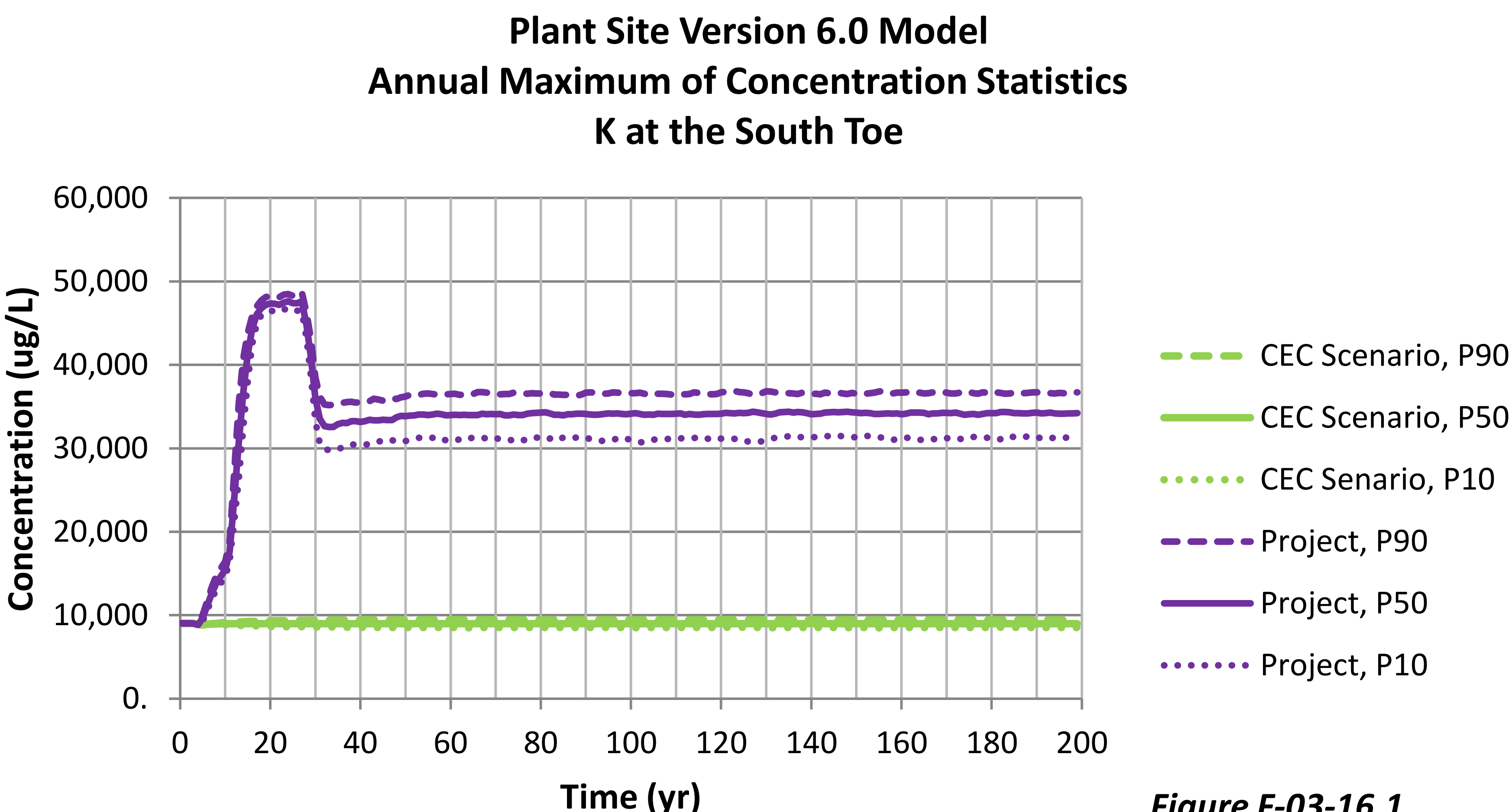

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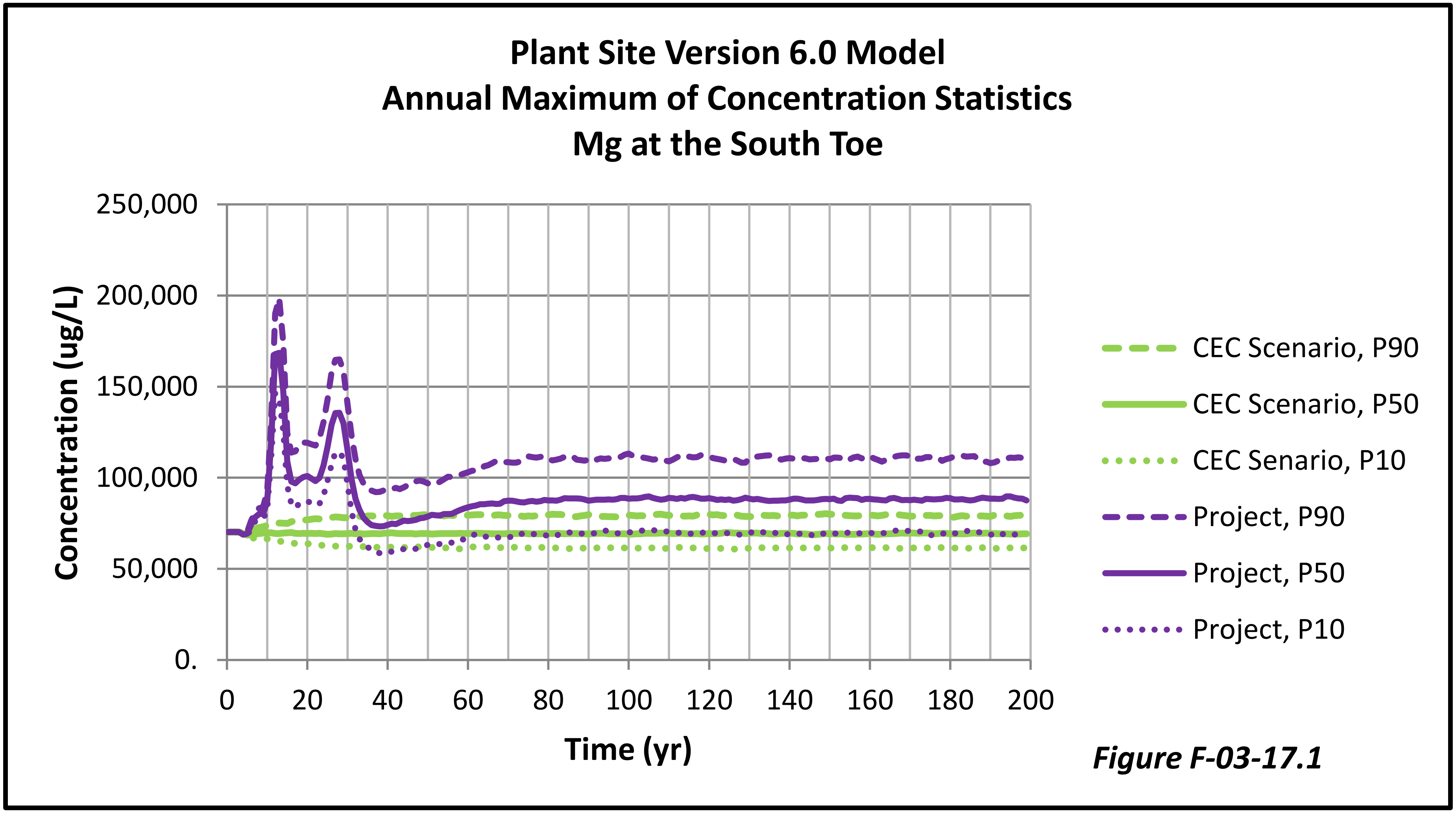
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Annual Maximum of Concentration Statistics
Mg at the South Toe
Concentration (ug/L)
250,000
200,000
150,000
100,000
50,000
0.
0
20
40
60
80
100
120
140
160
180
200
Time (yr)
CEC Scenario, P90
CEC Scenario, P50
CEC Senario, P10
Project, P90
Project, P50
Project, P10
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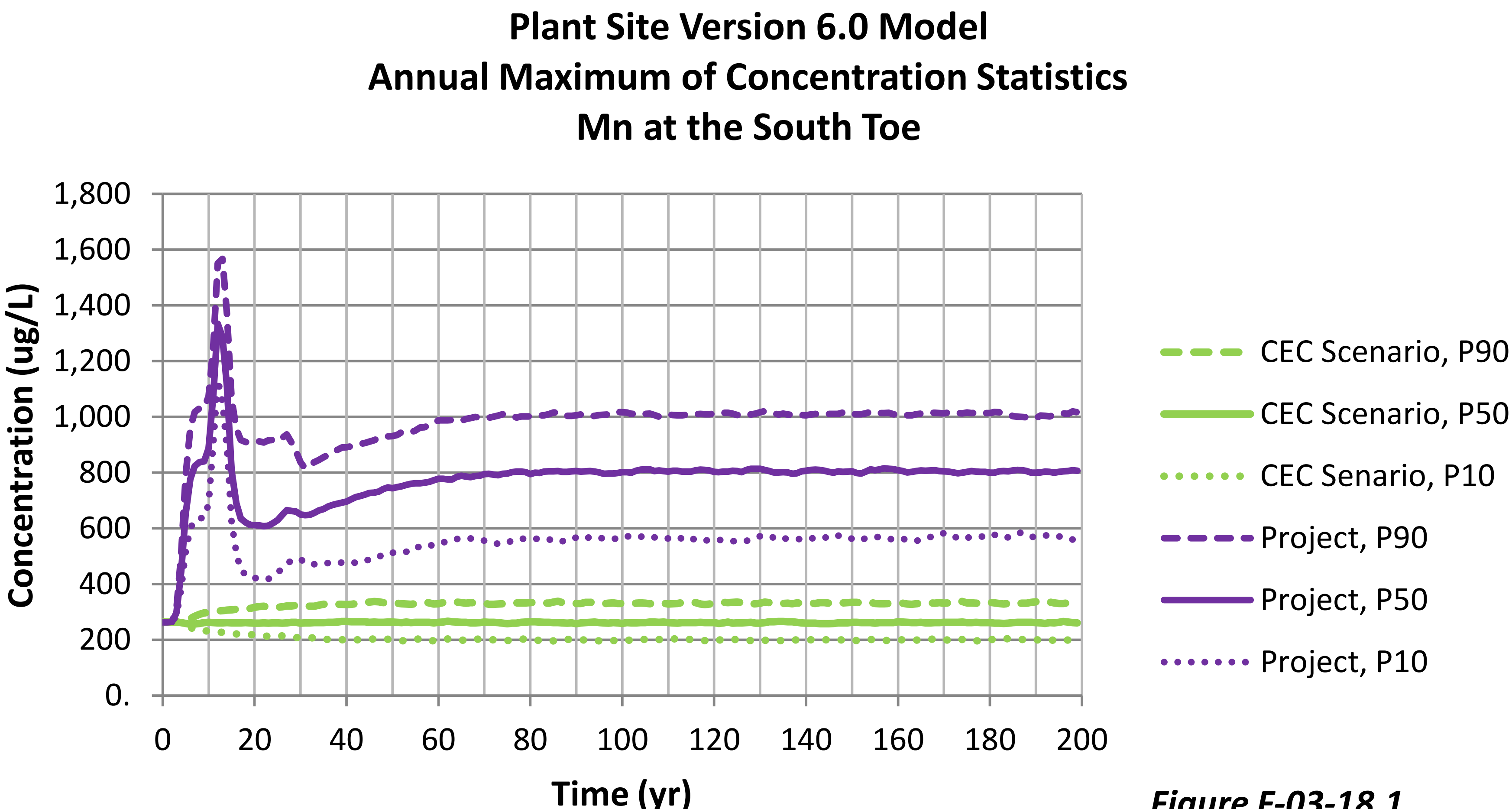

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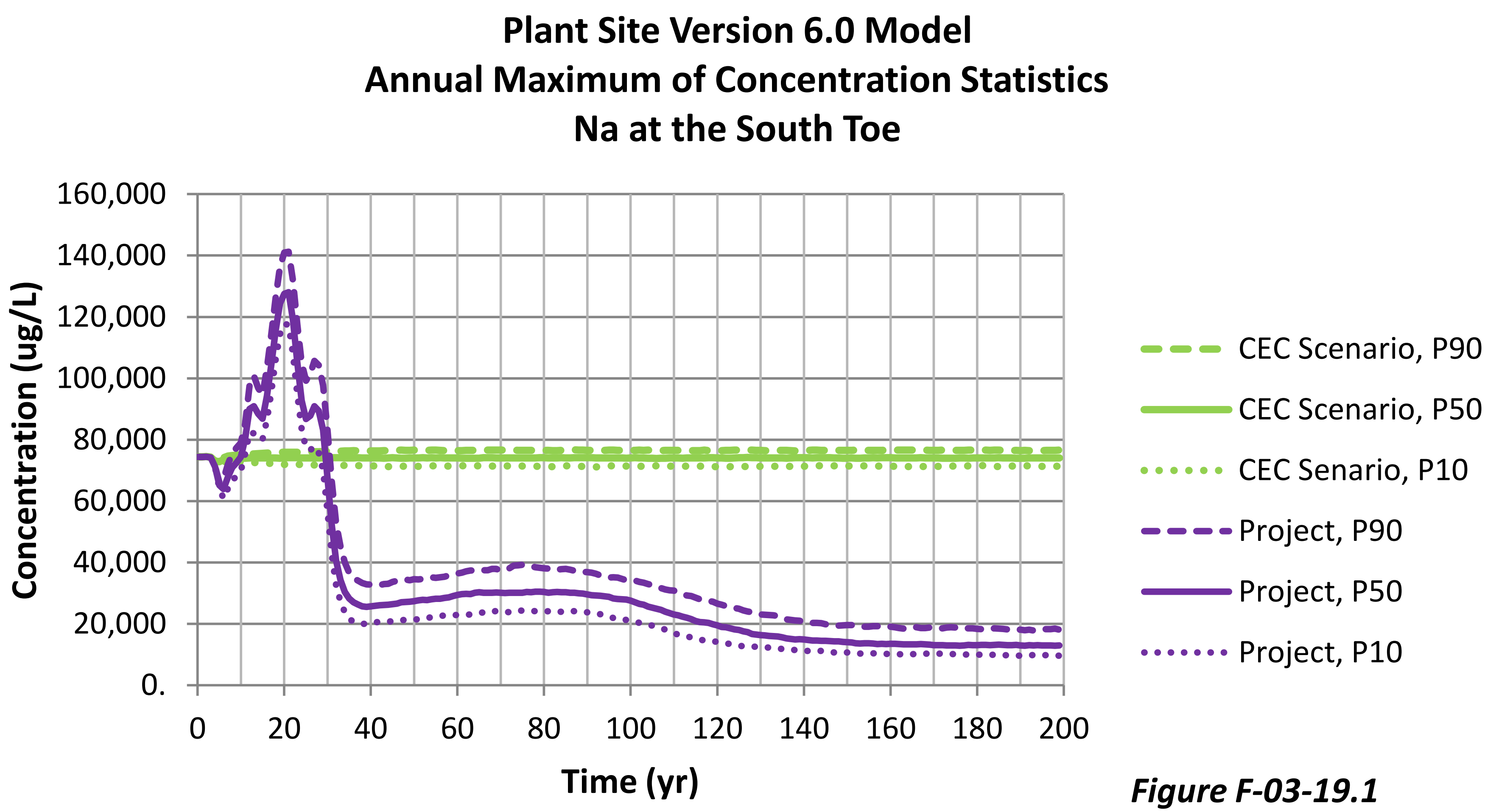

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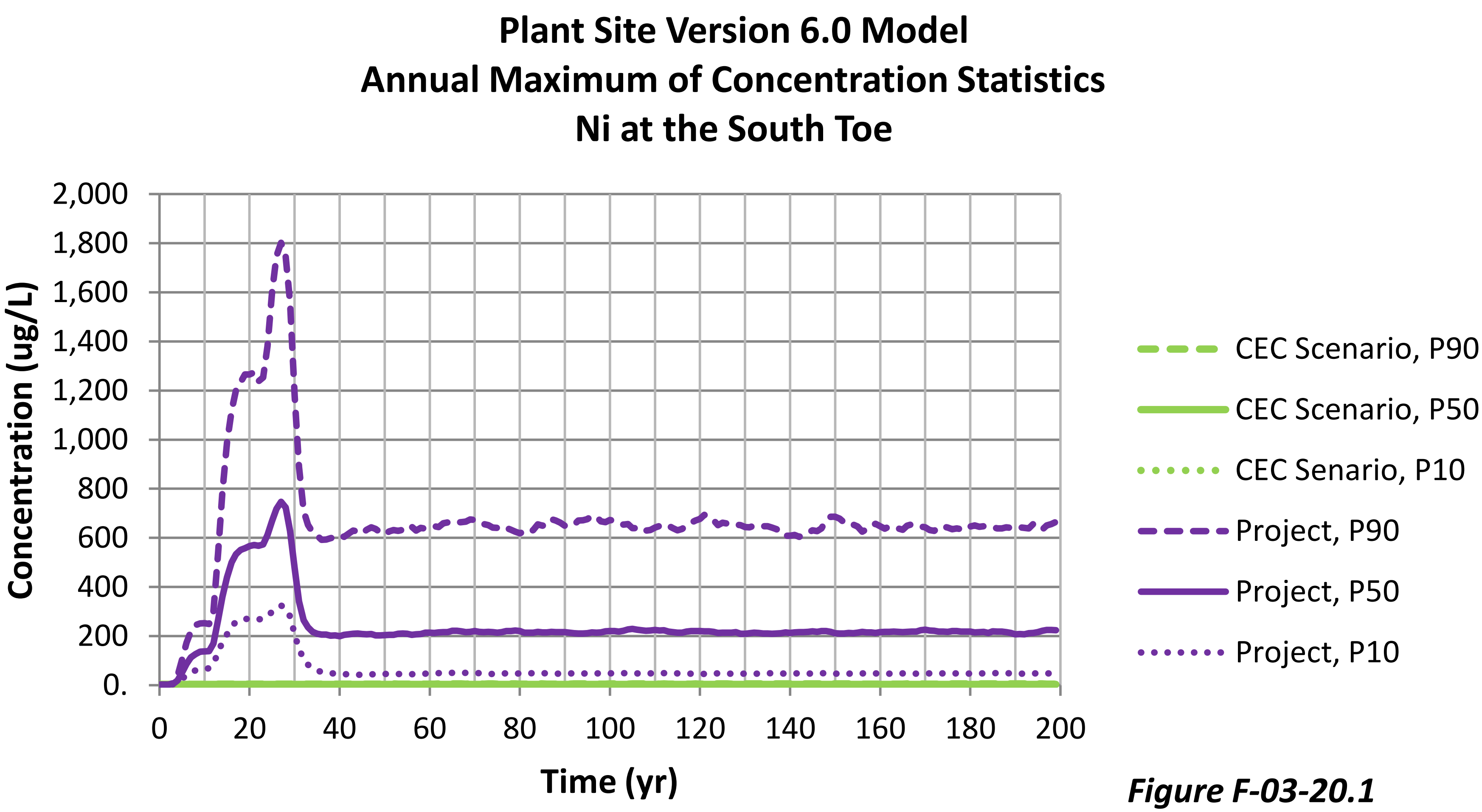

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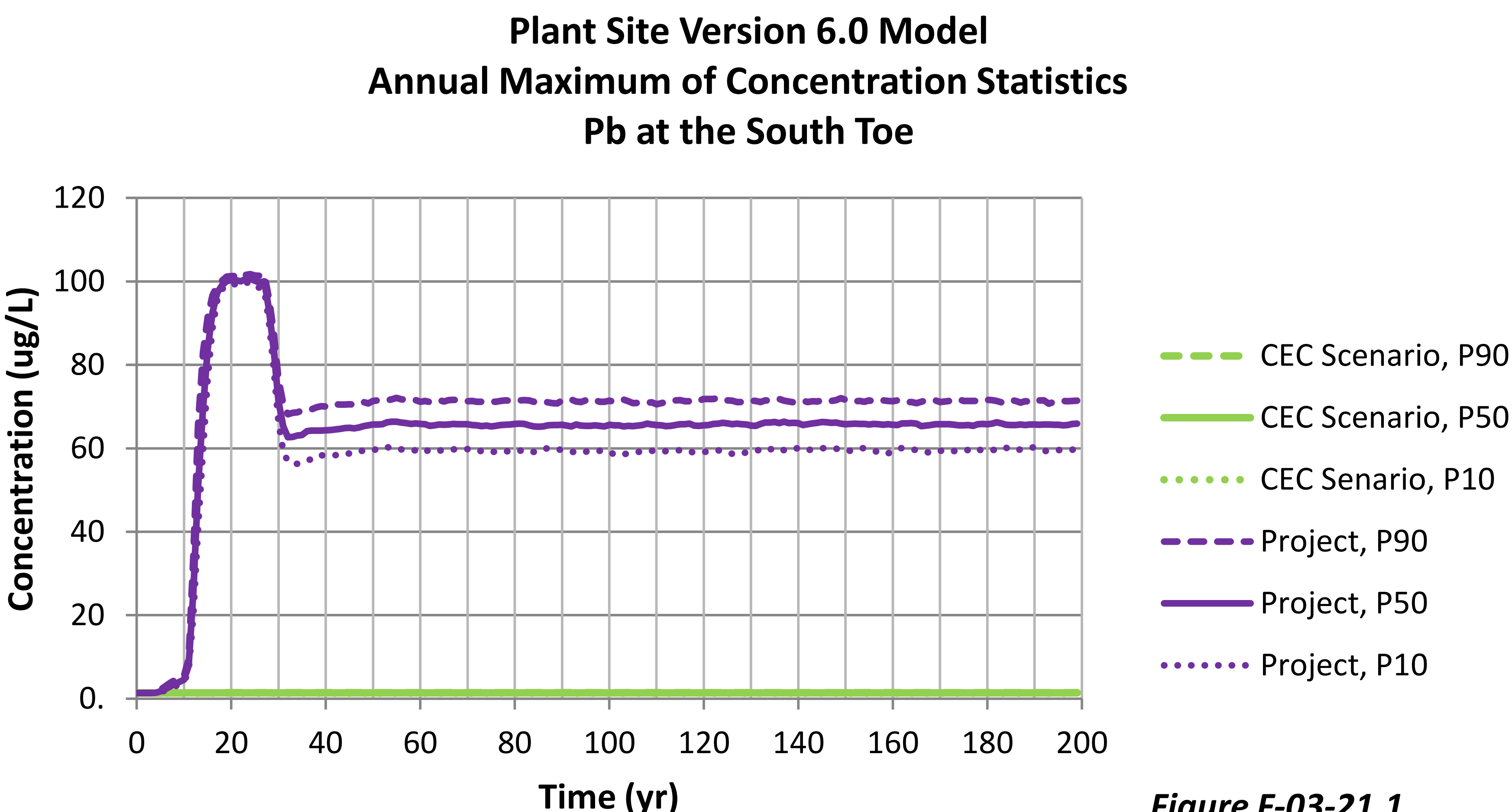

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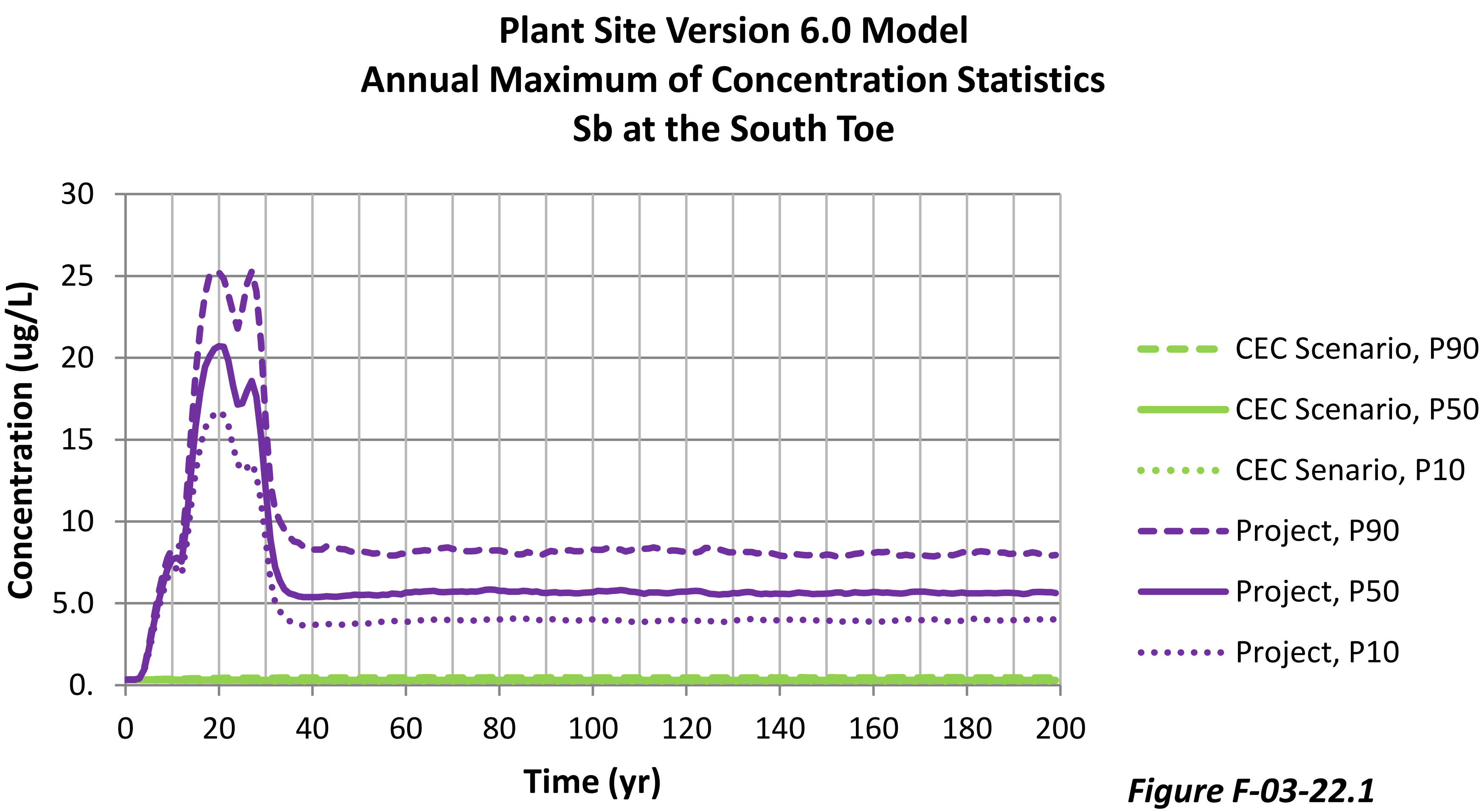

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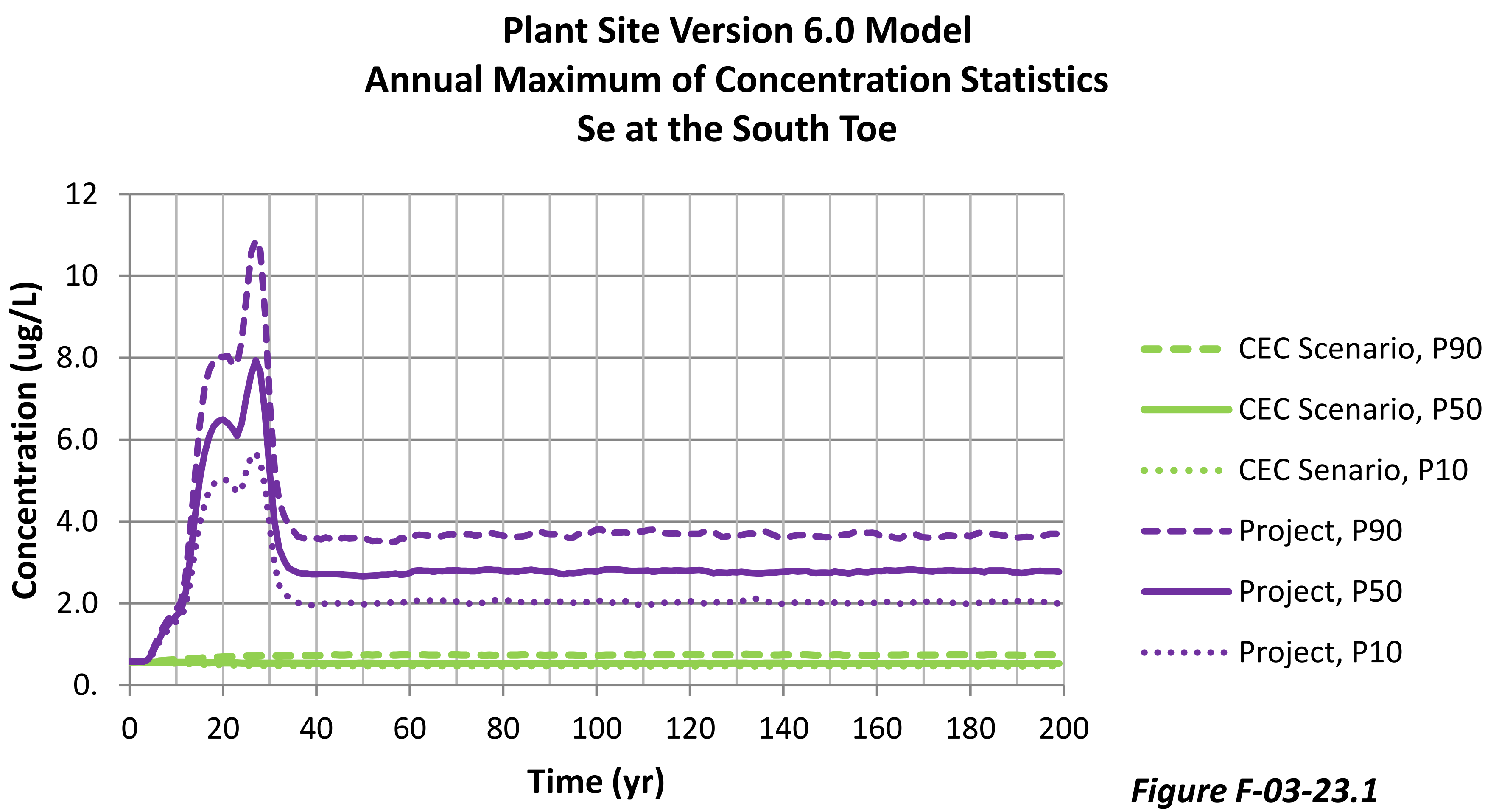

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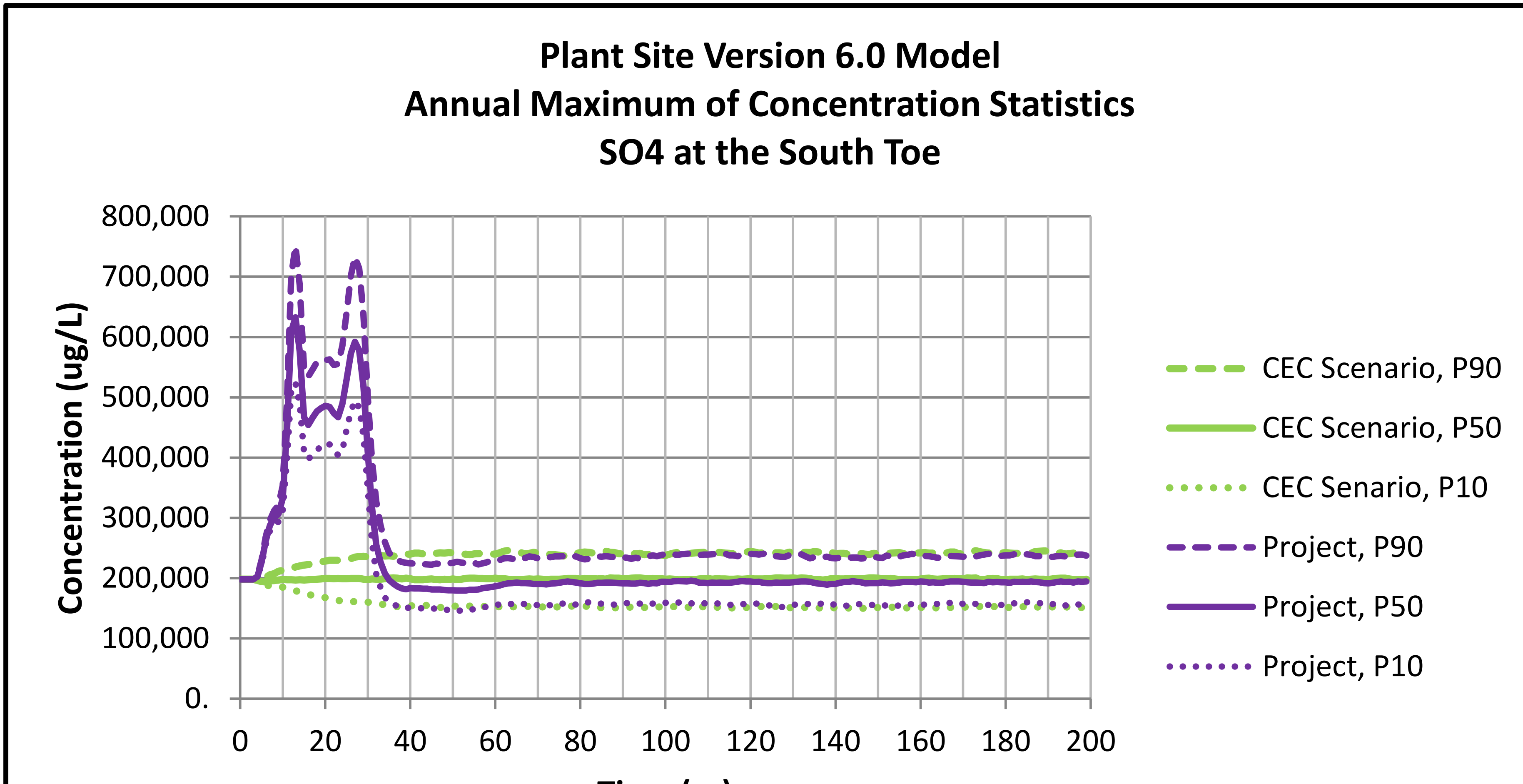

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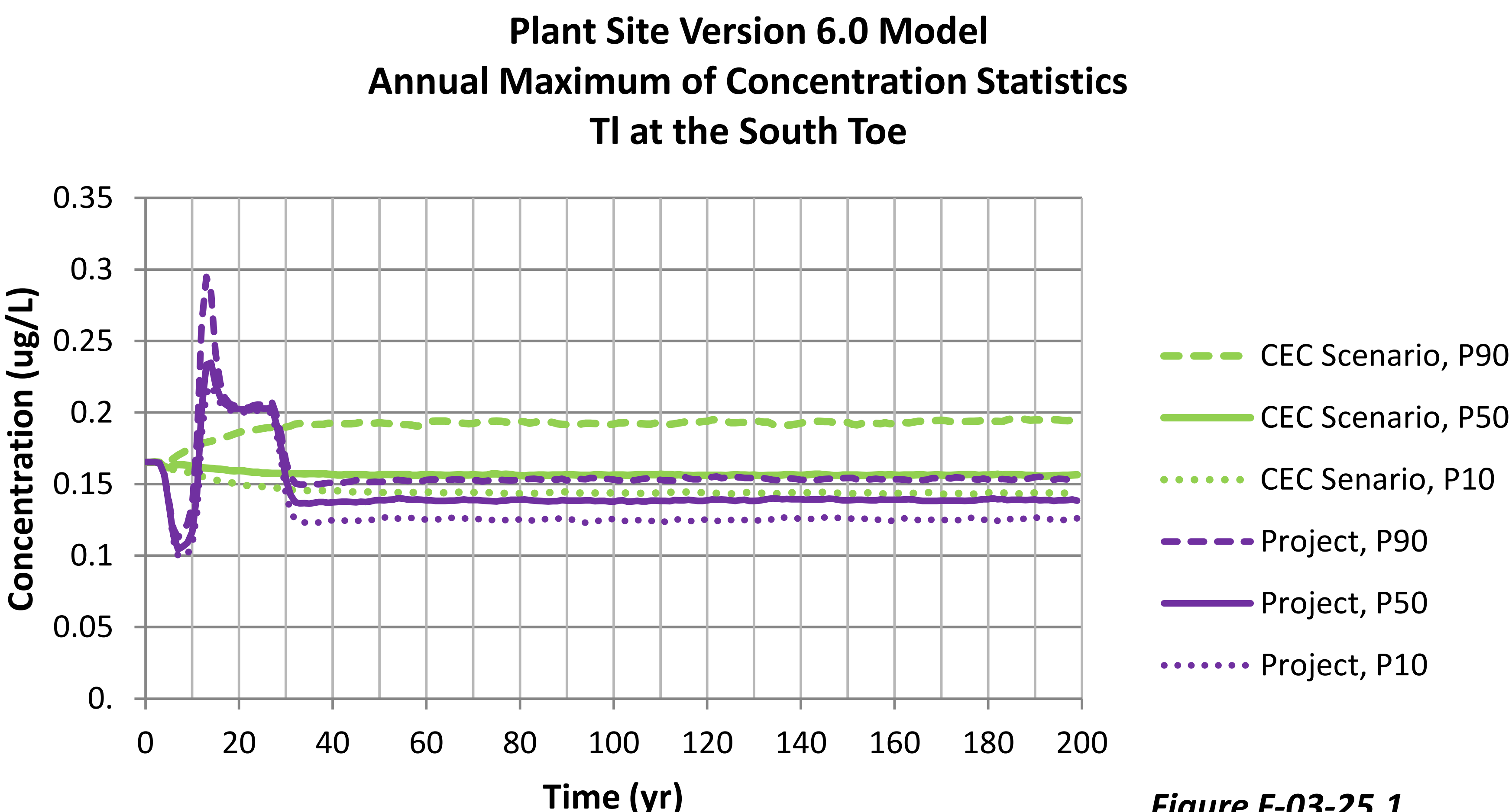

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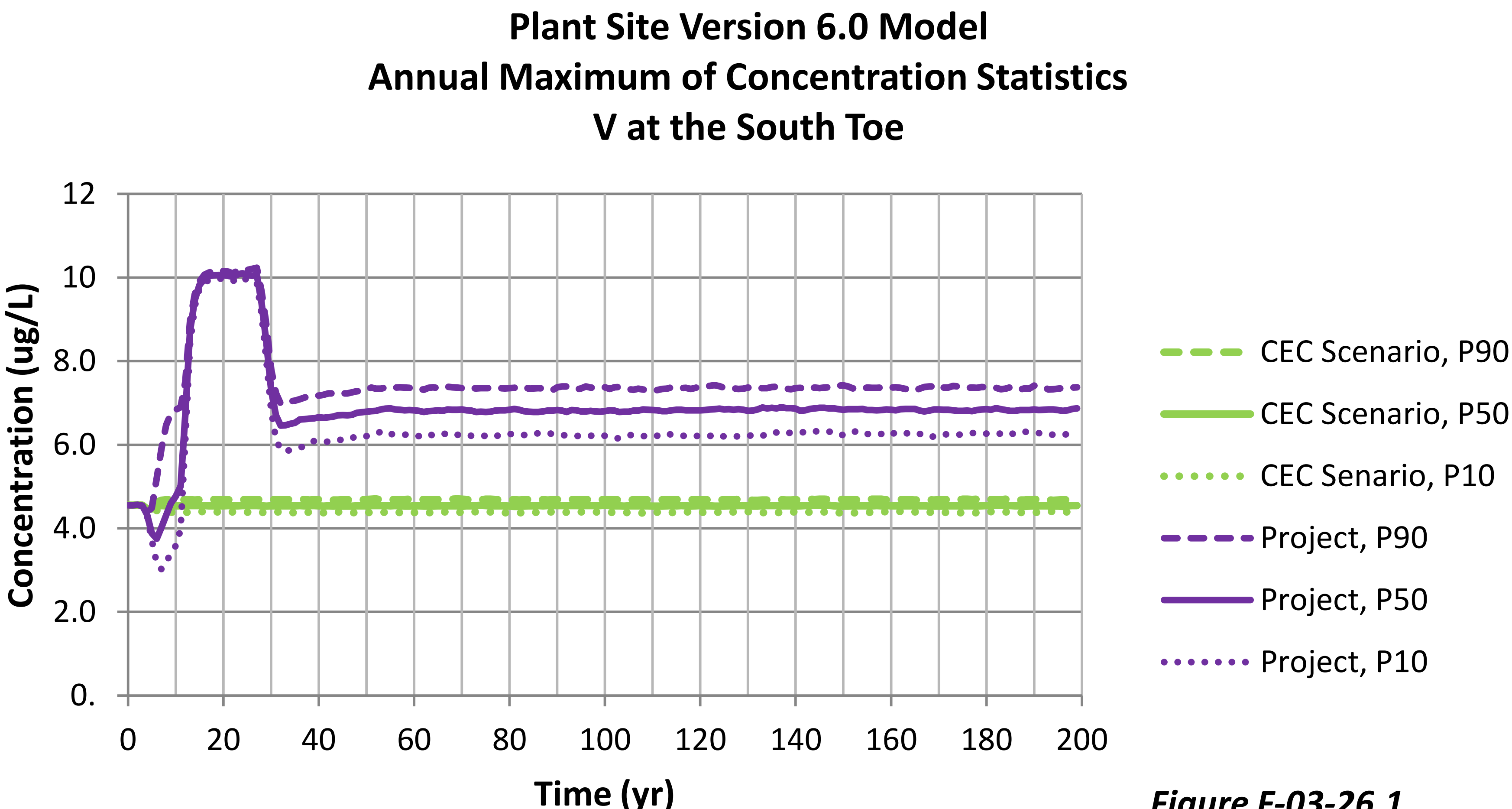

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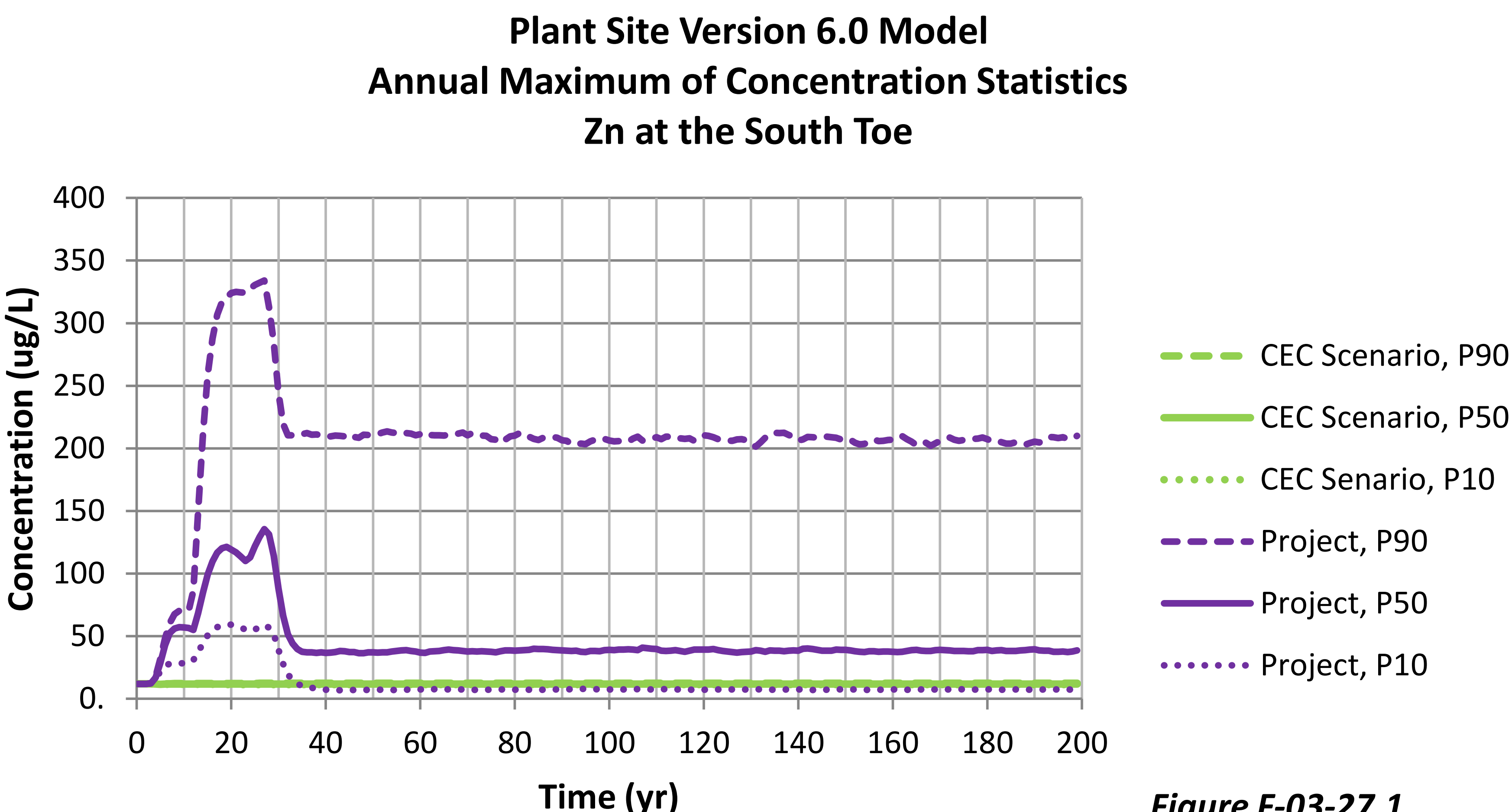

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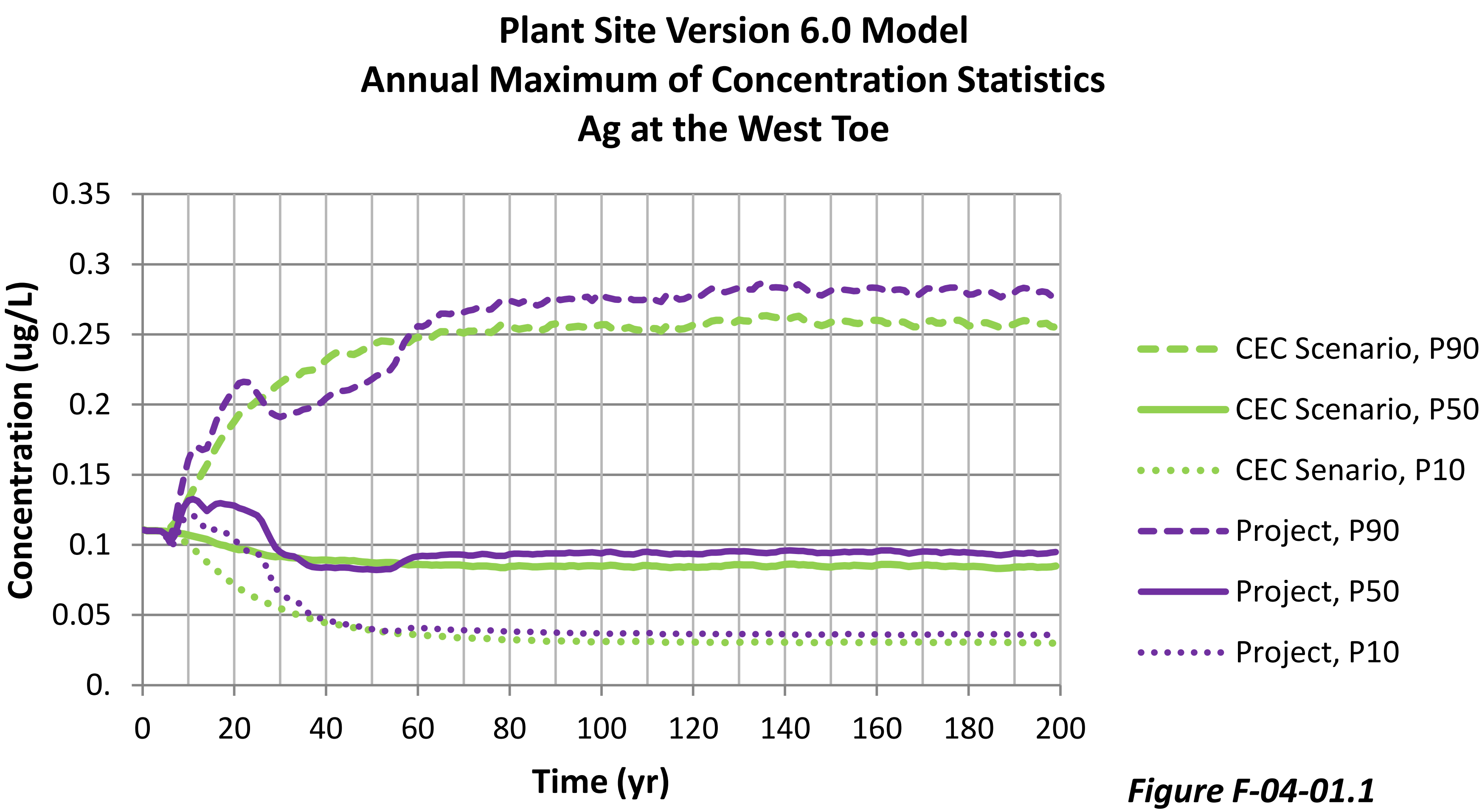

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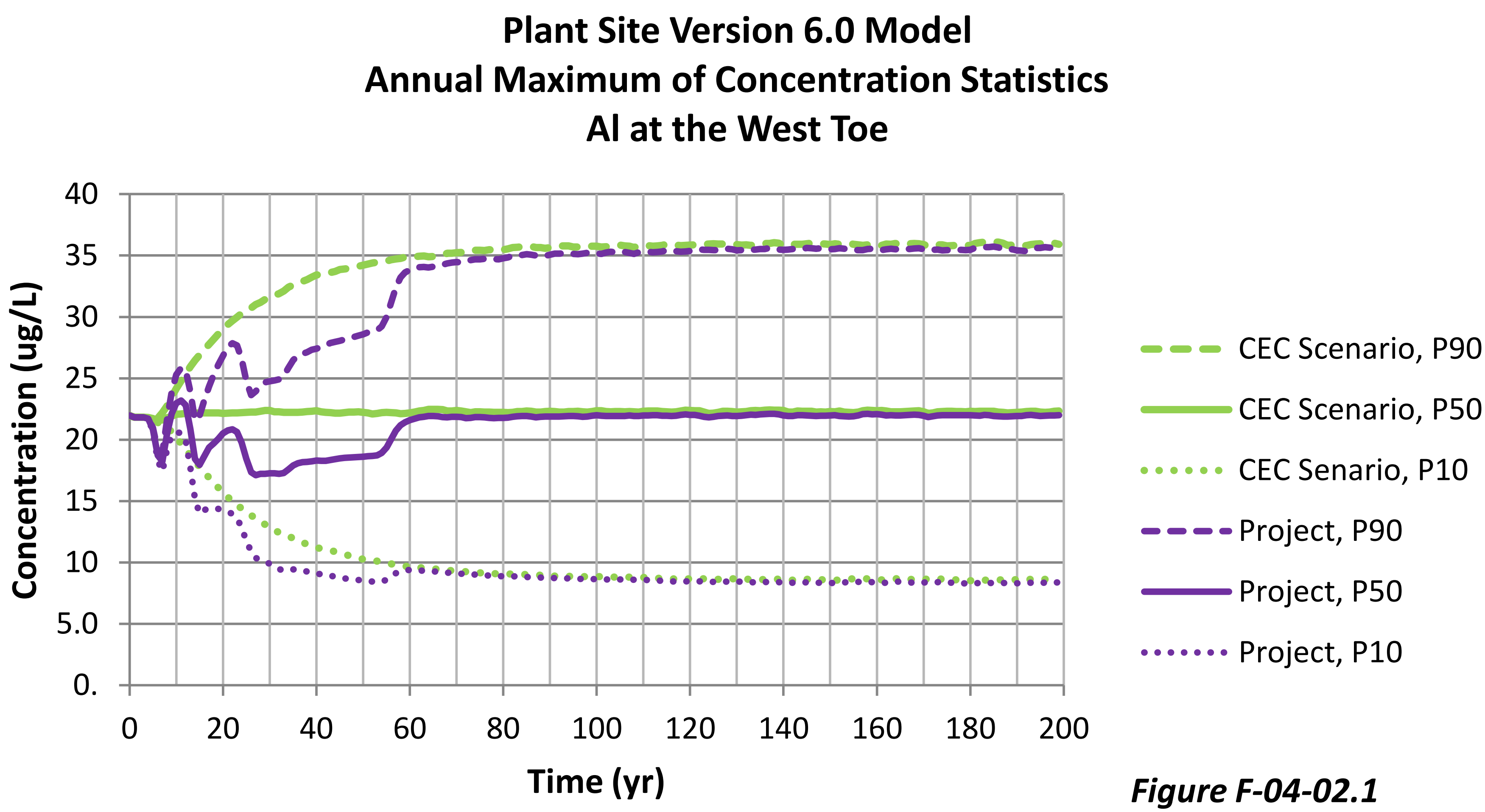

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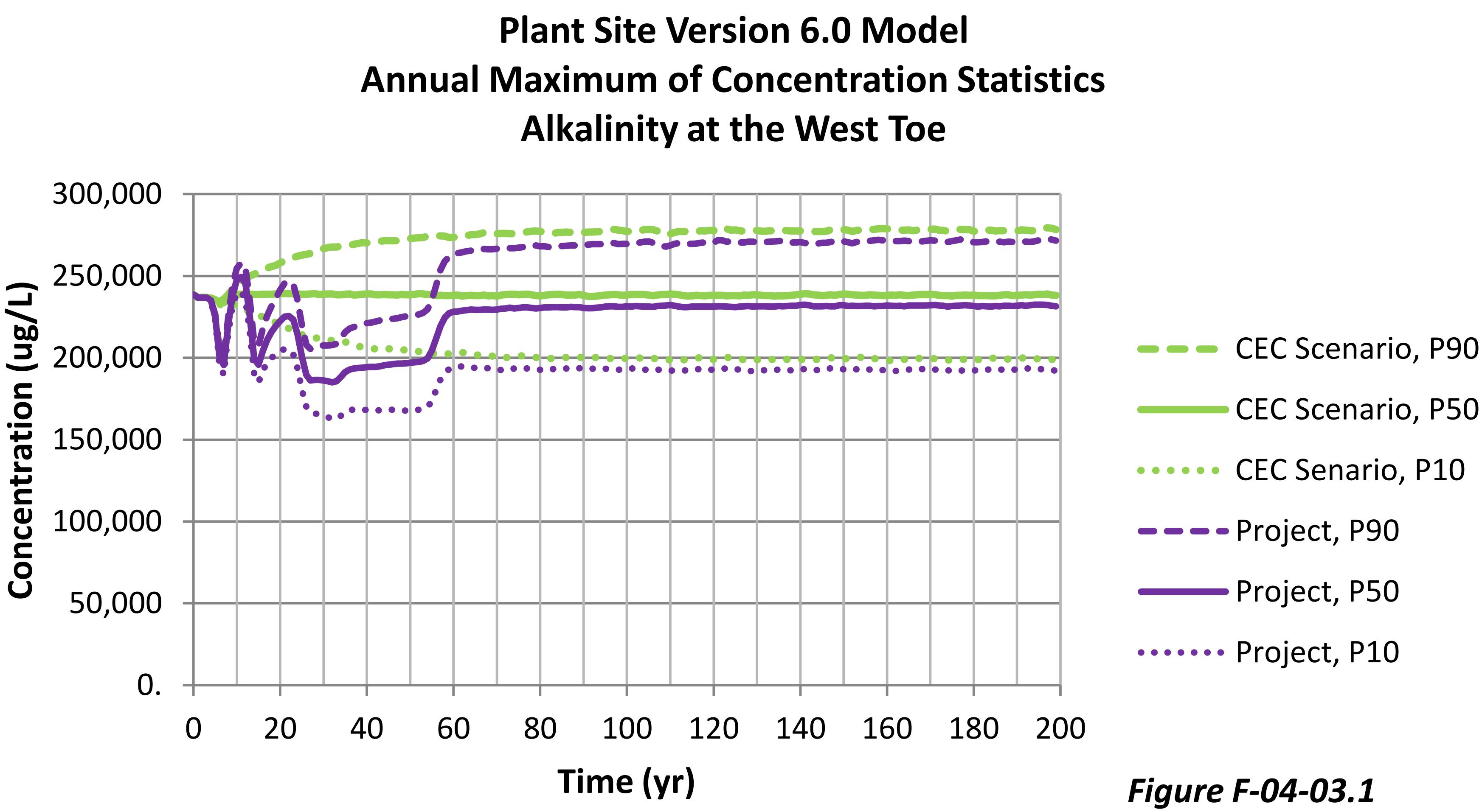

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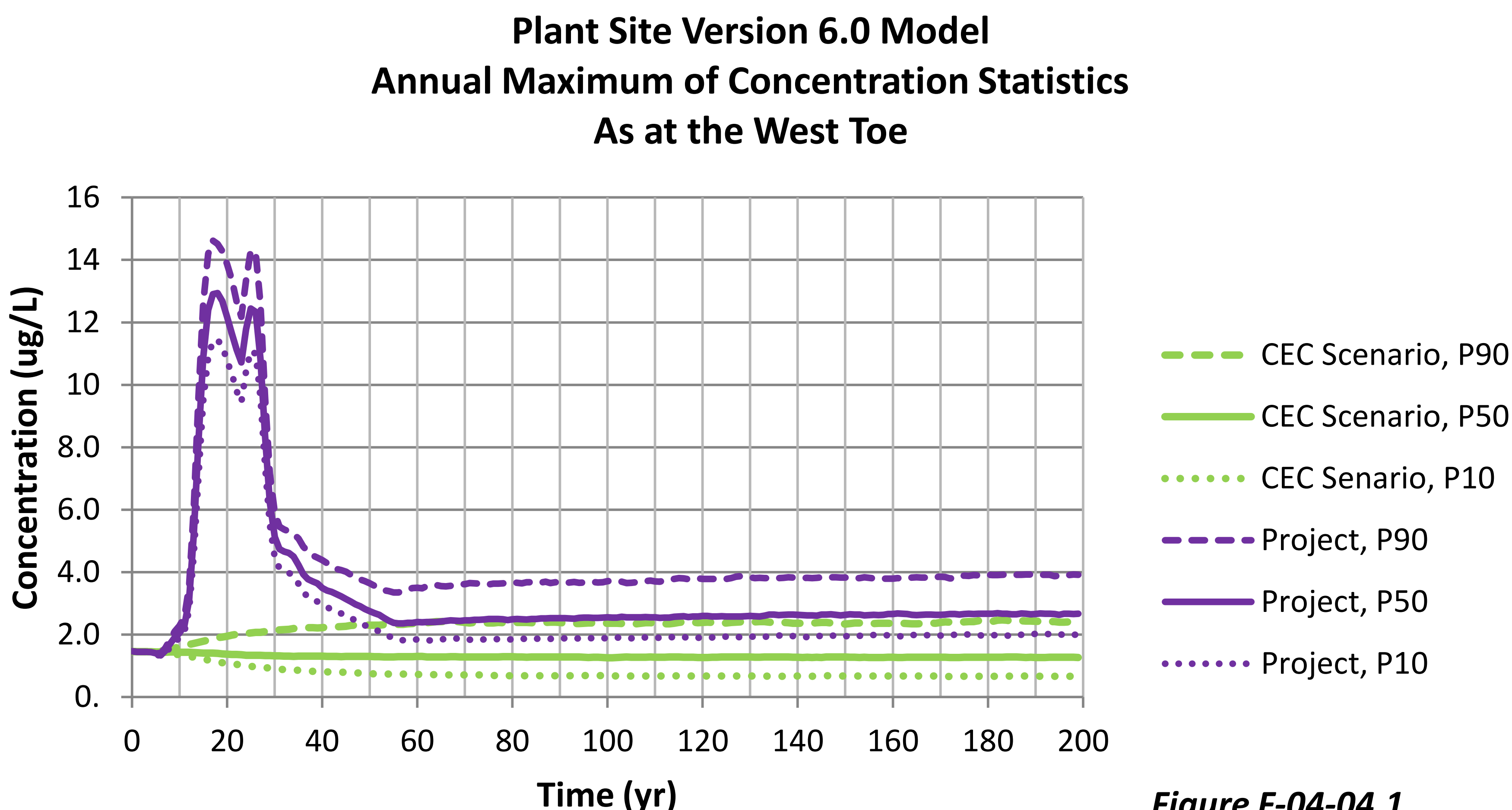

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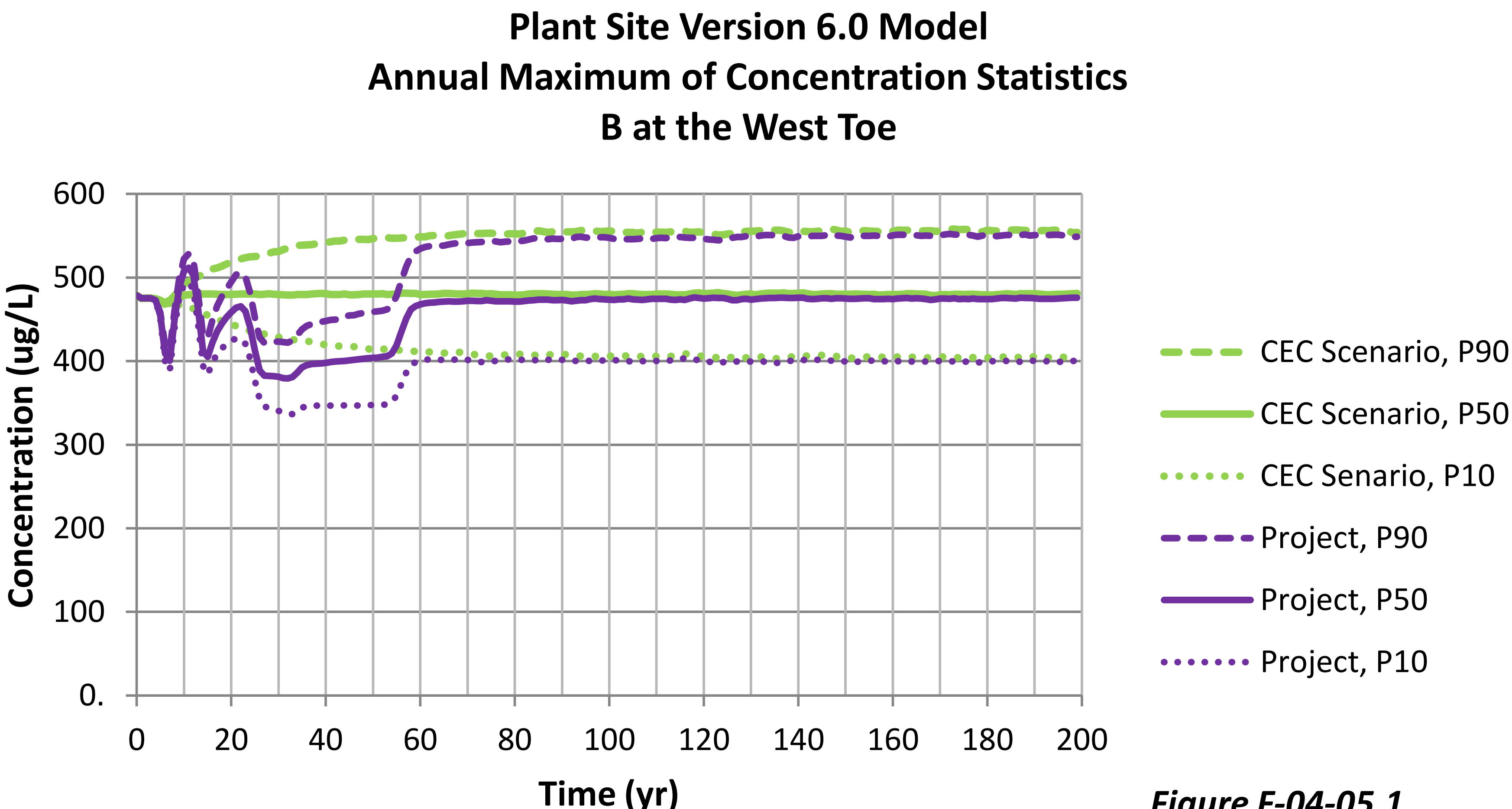

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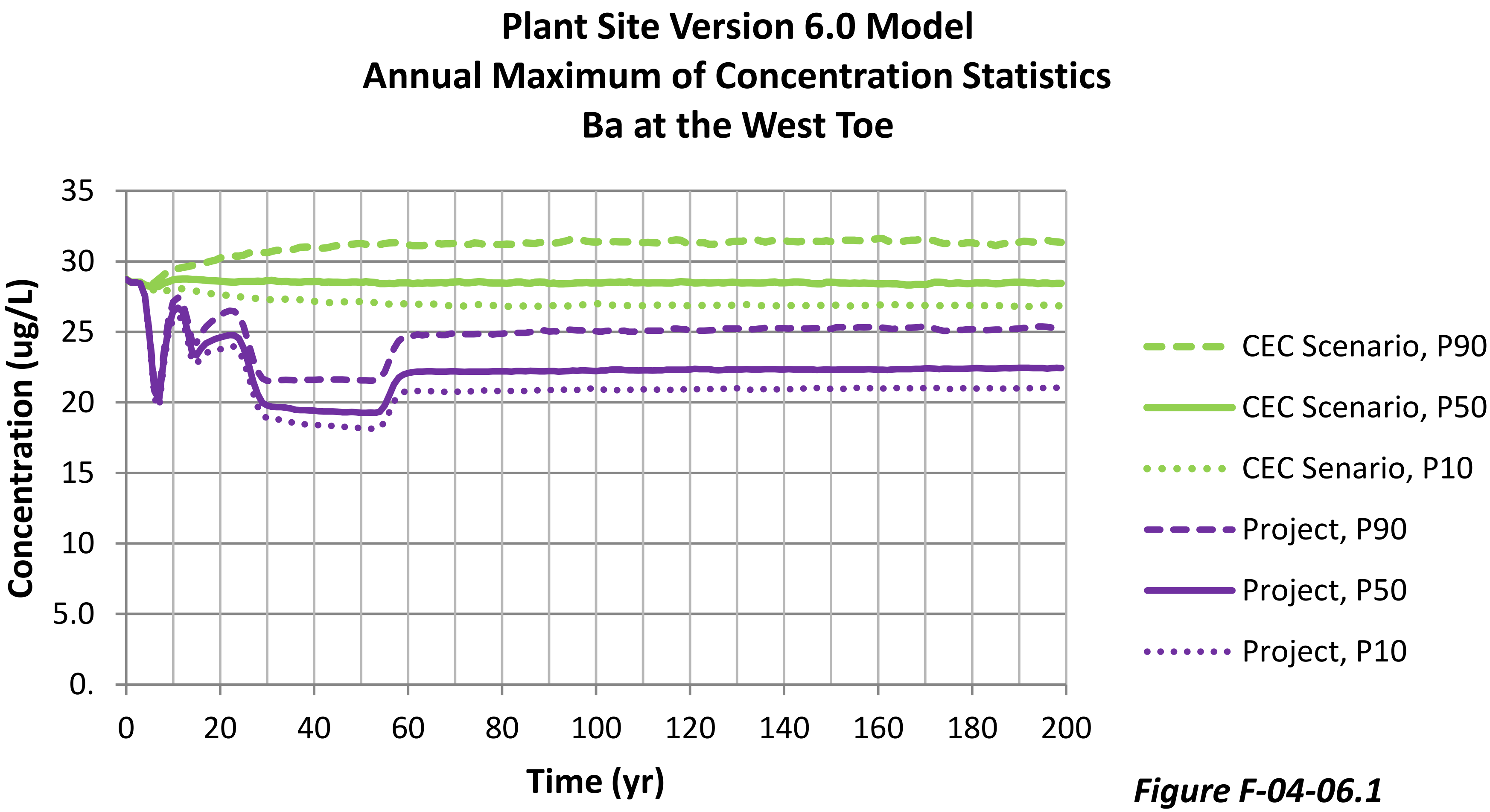

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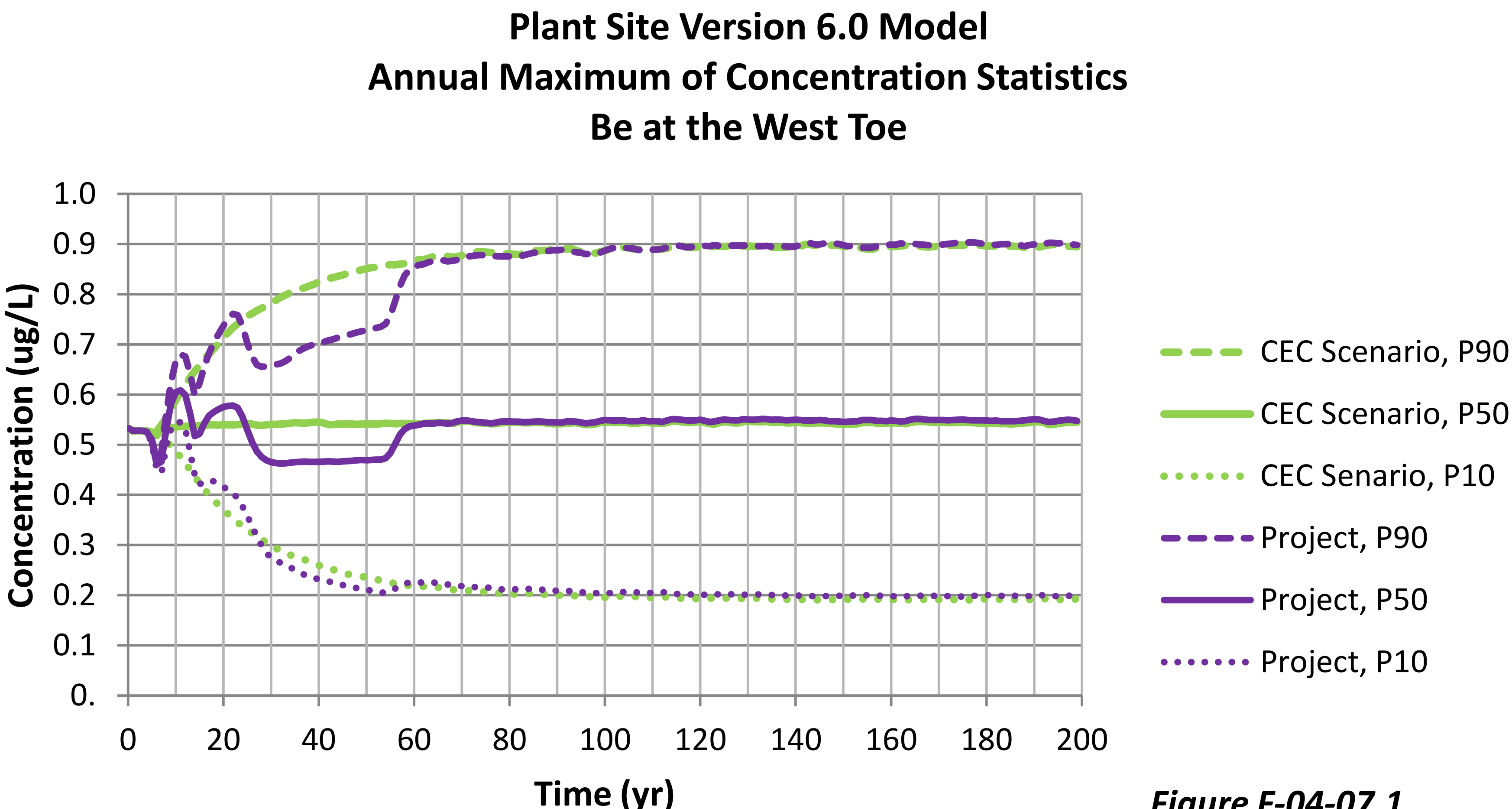

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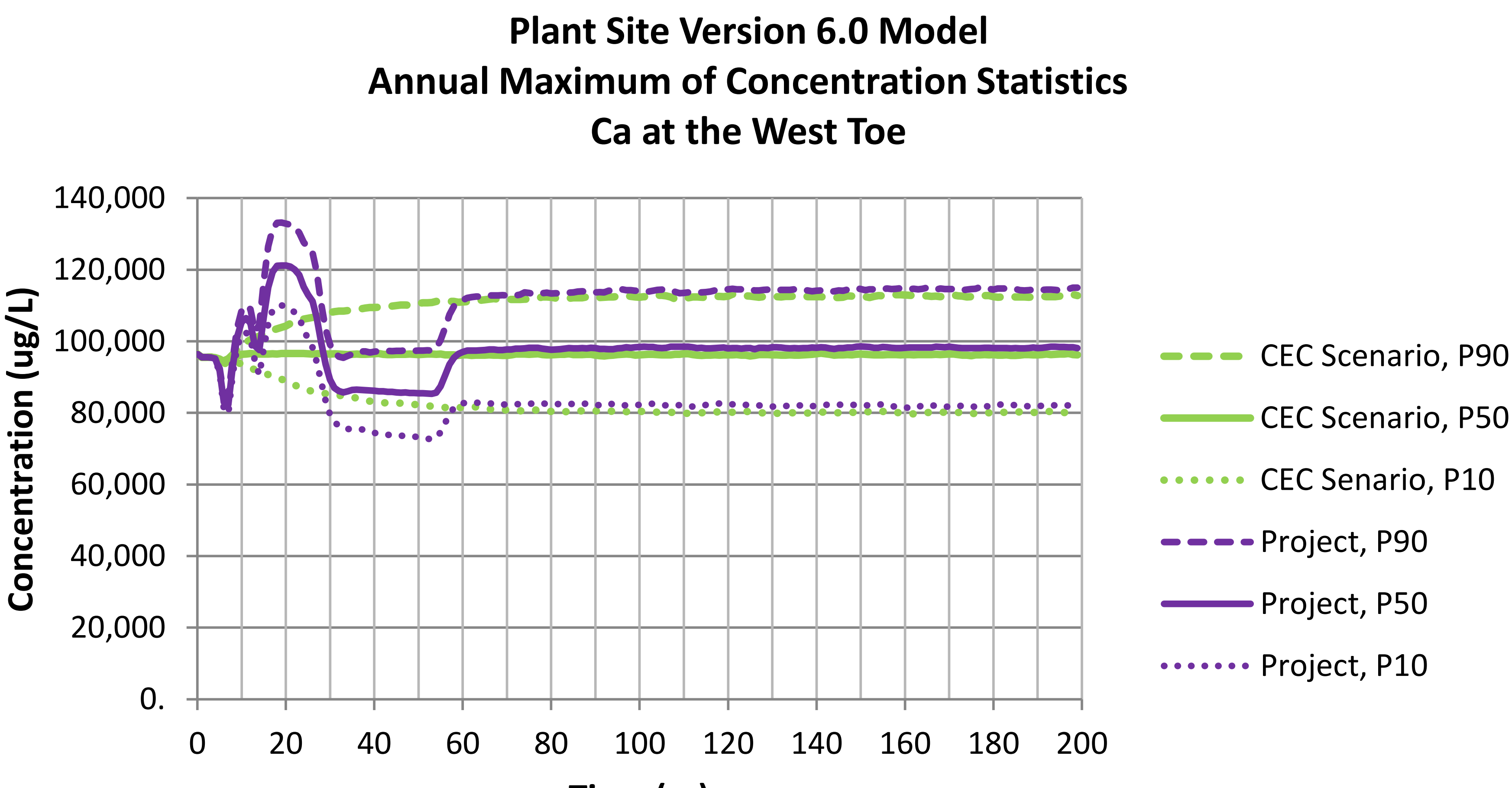

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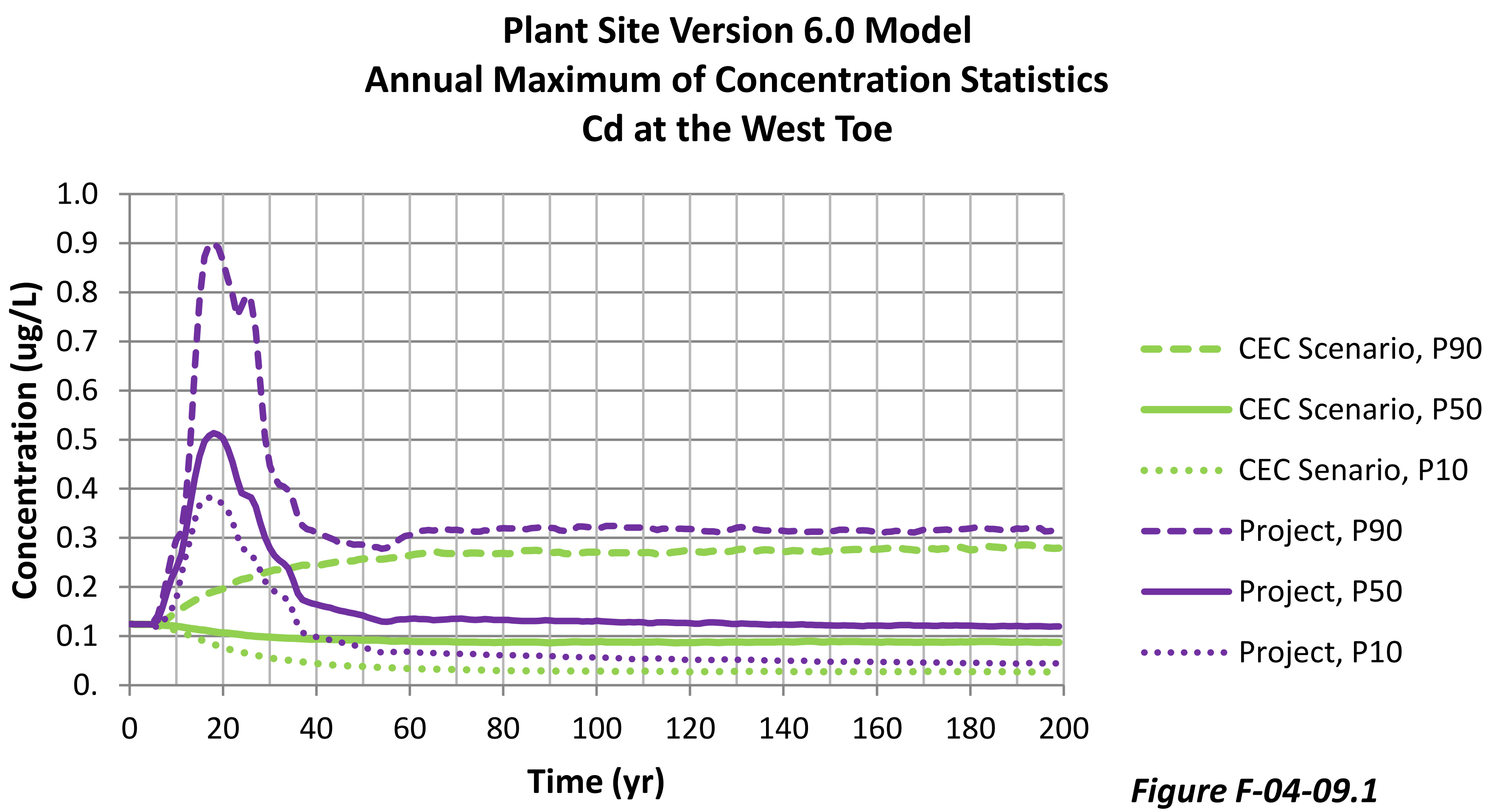

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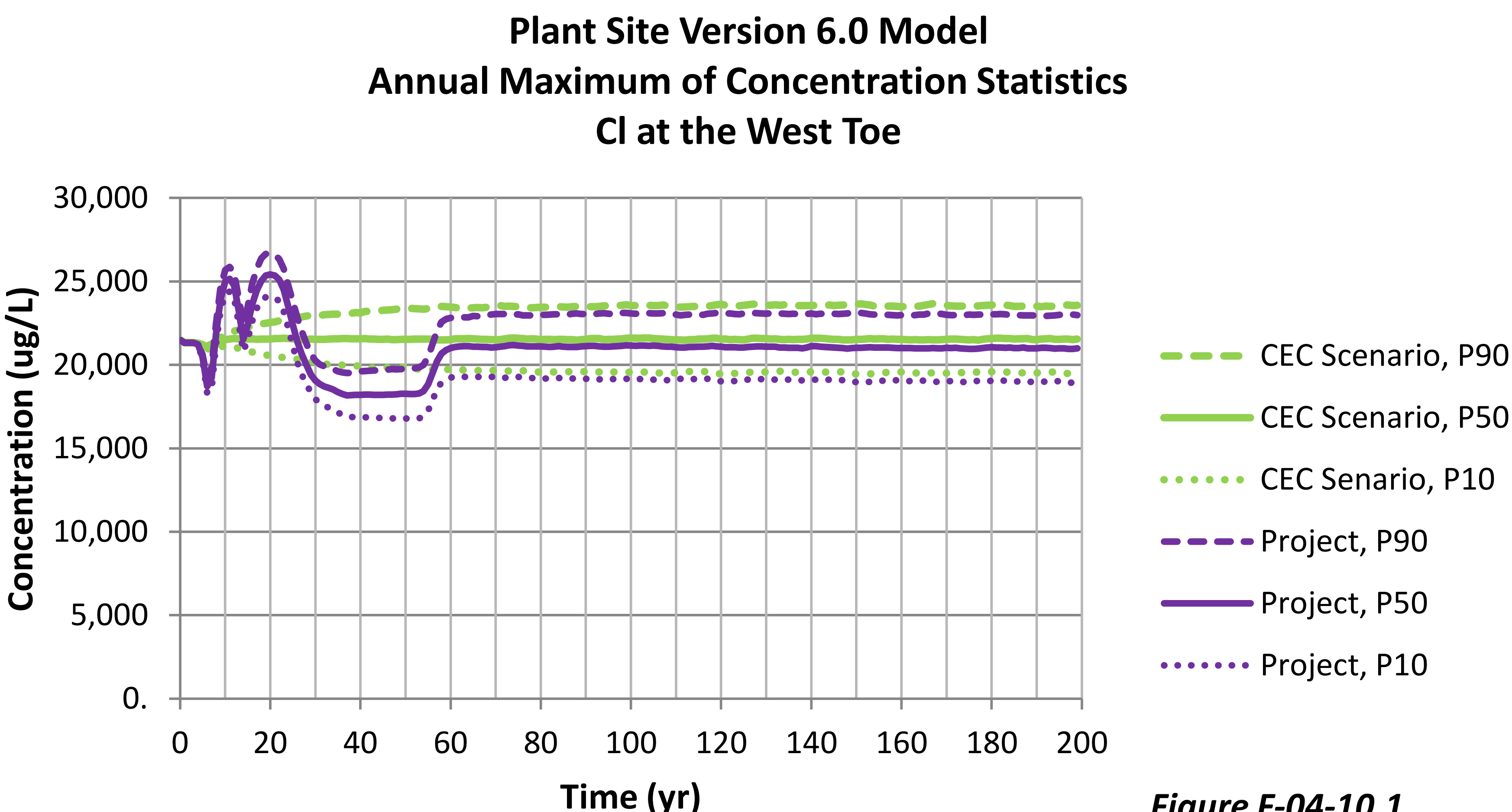


Figure F-04-10.1

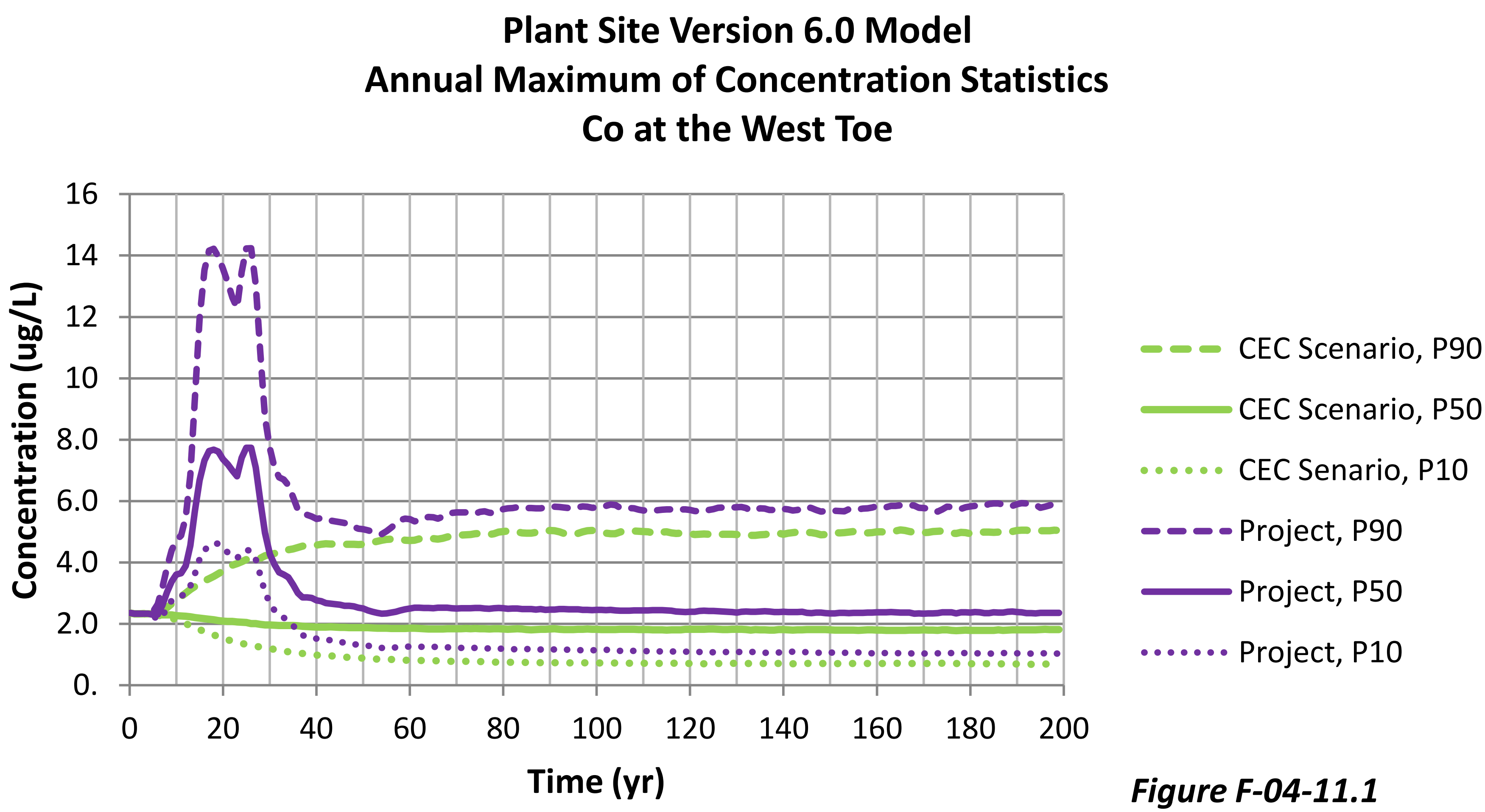


Figure F-04-11.1

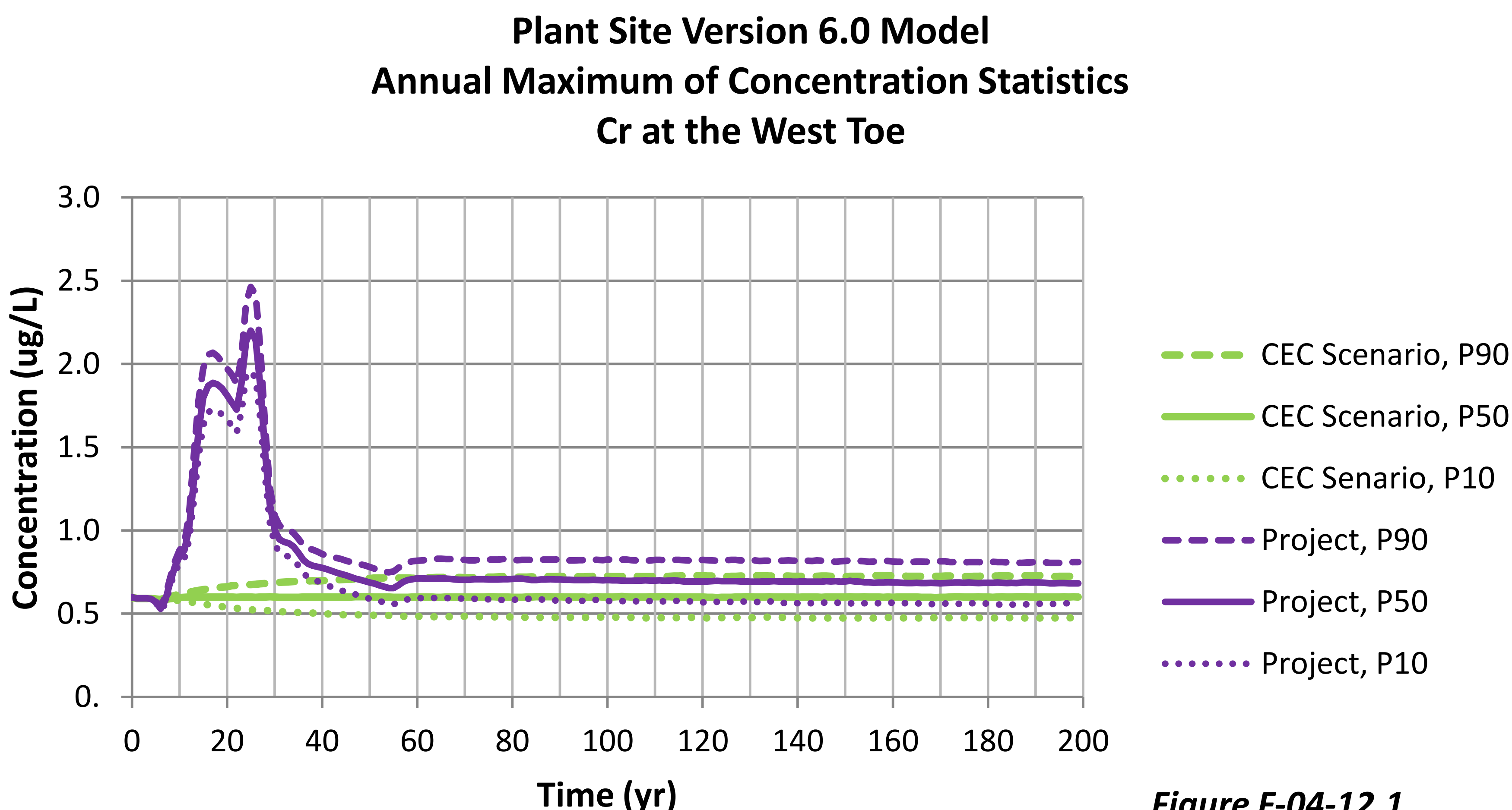


Figure F-04-12.1

Plant Site Version 6.0 Model
Annual Maximum of Concentration Statistics
Cu at the West Toe

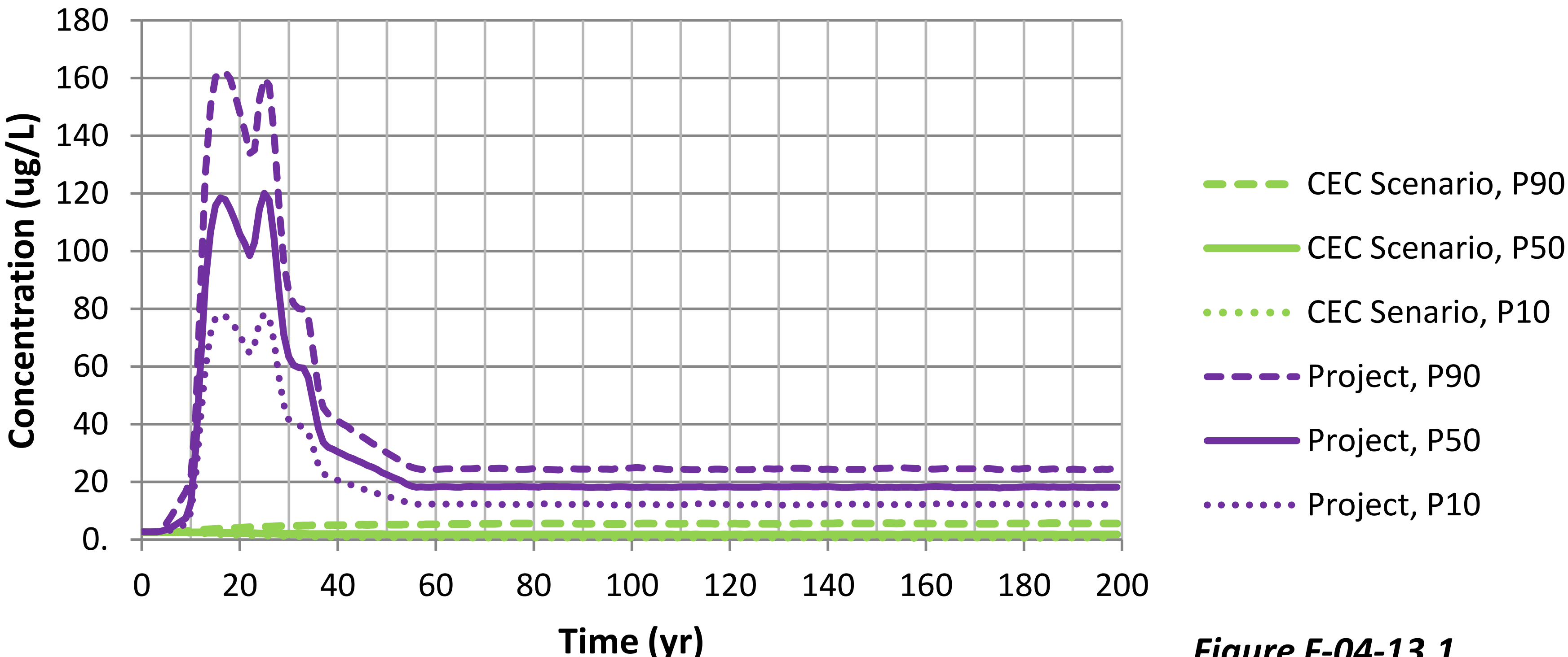


Figure F-04-13.1

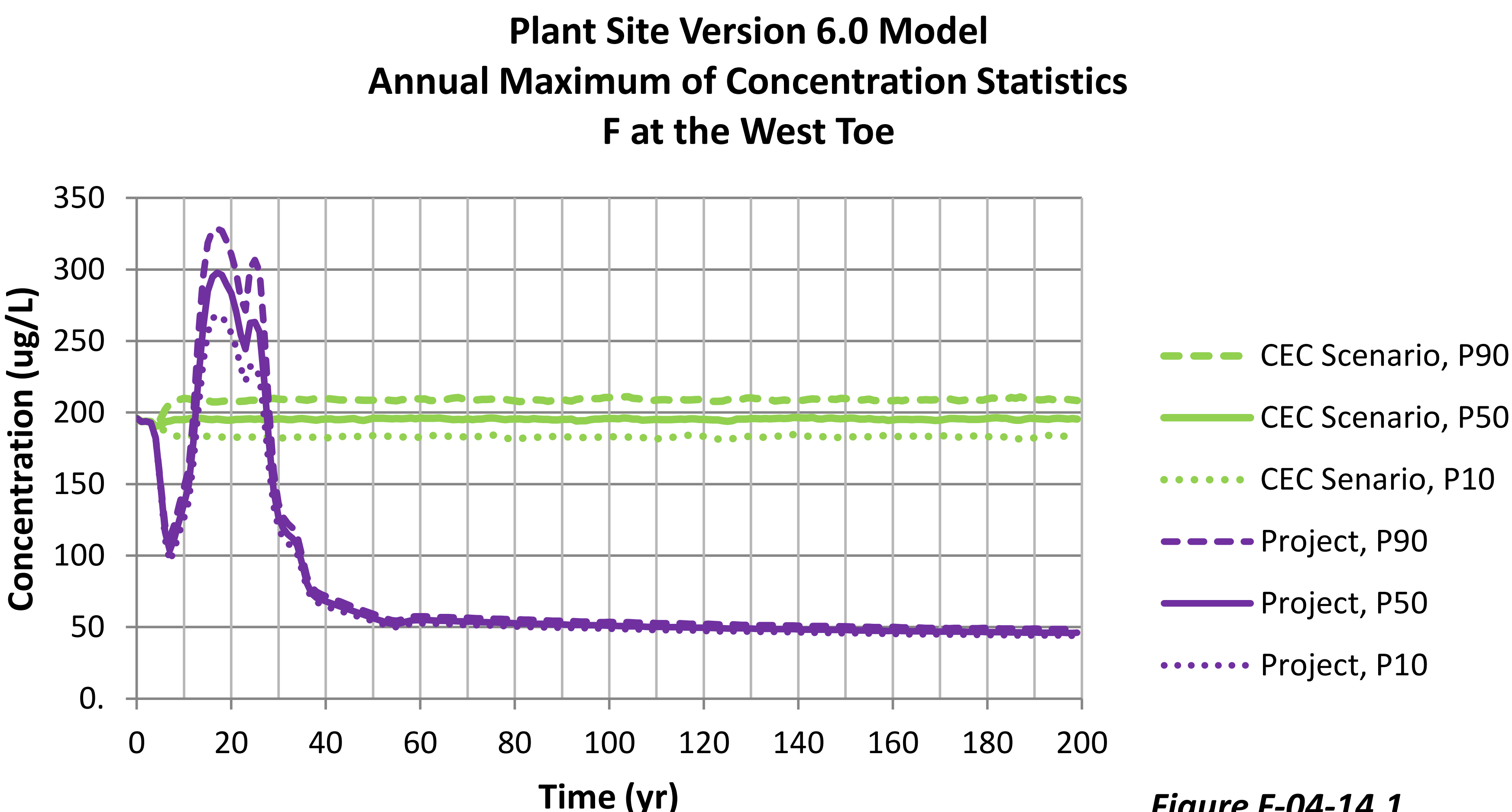
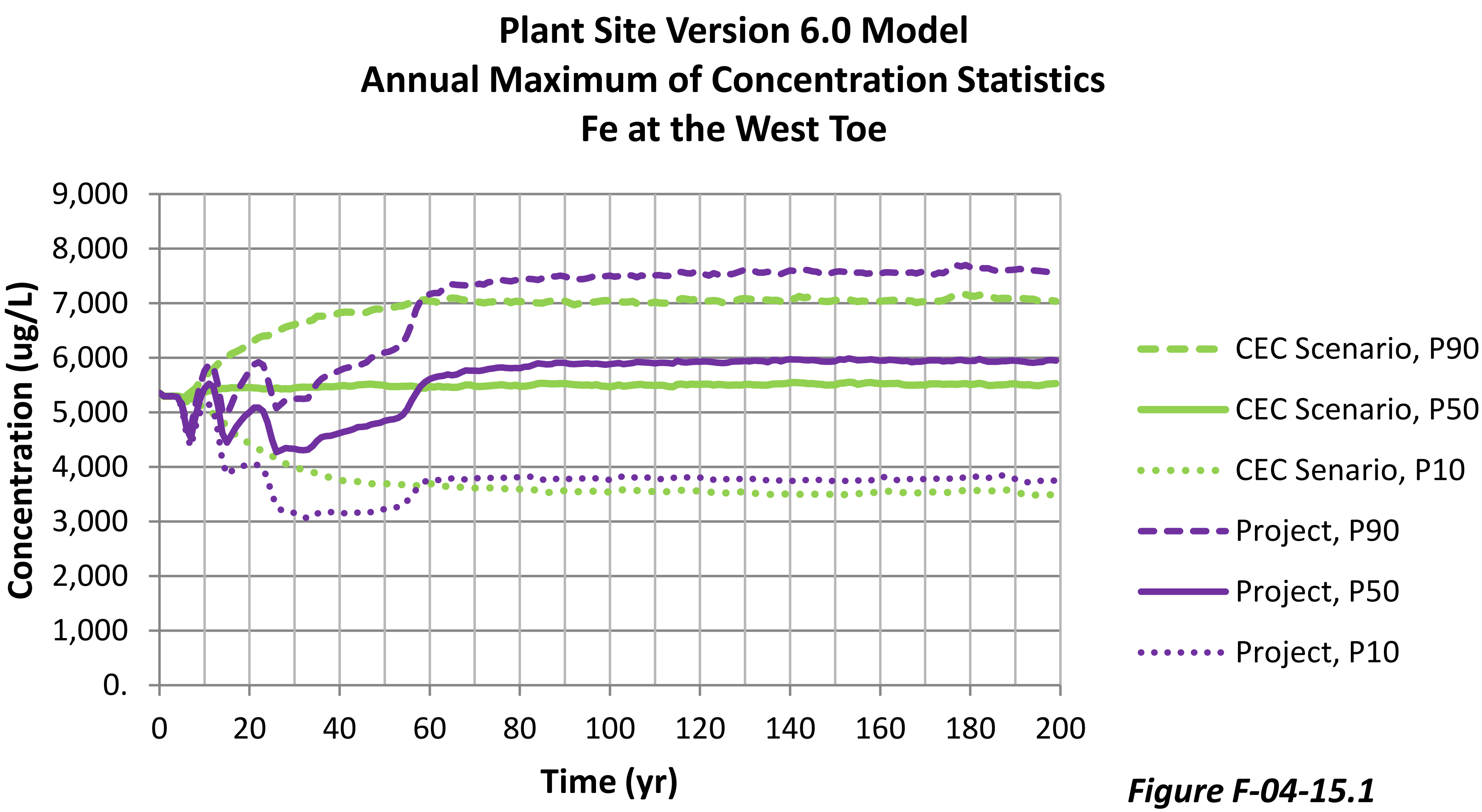


Figure F-04-14.1



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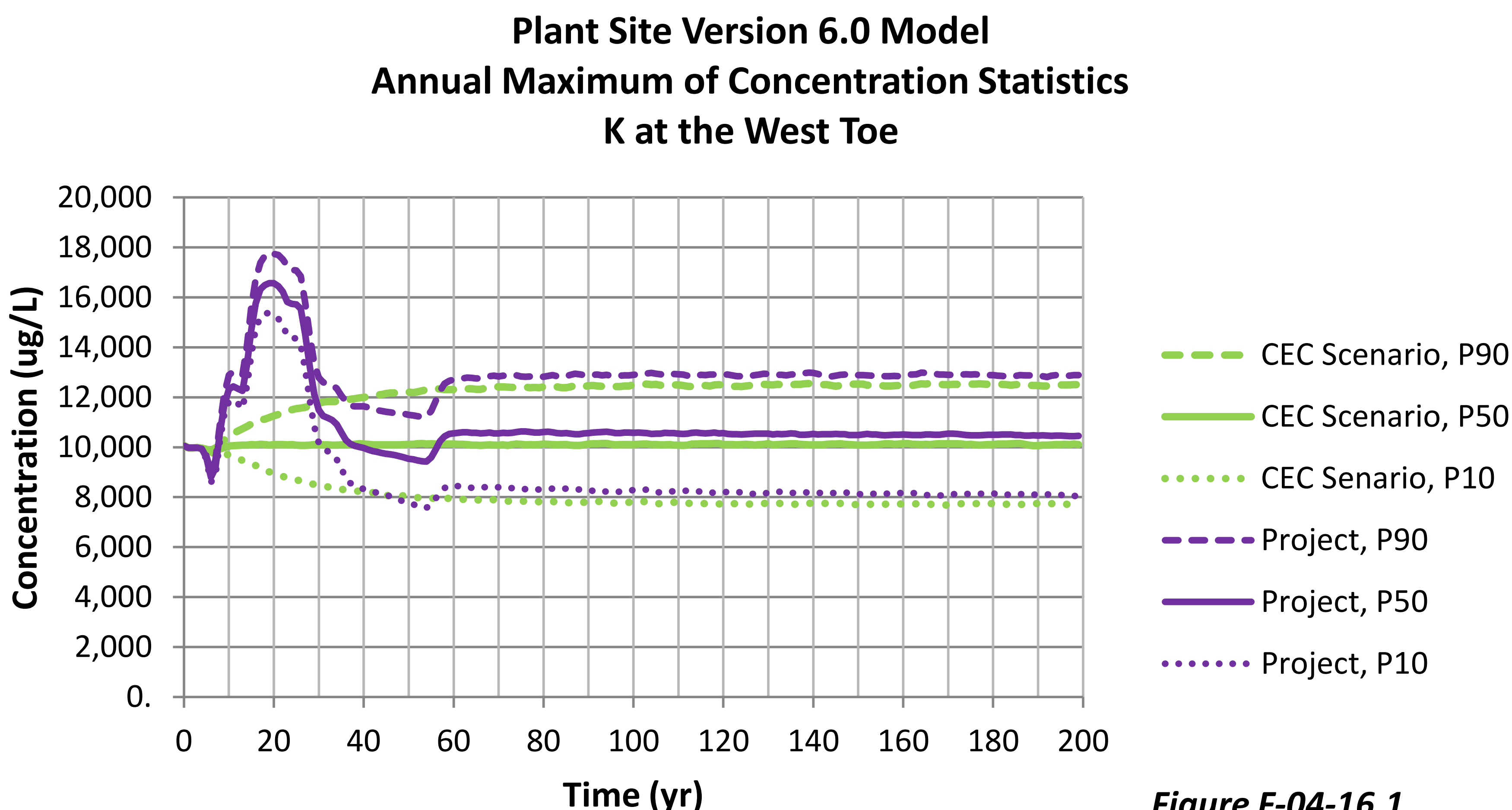

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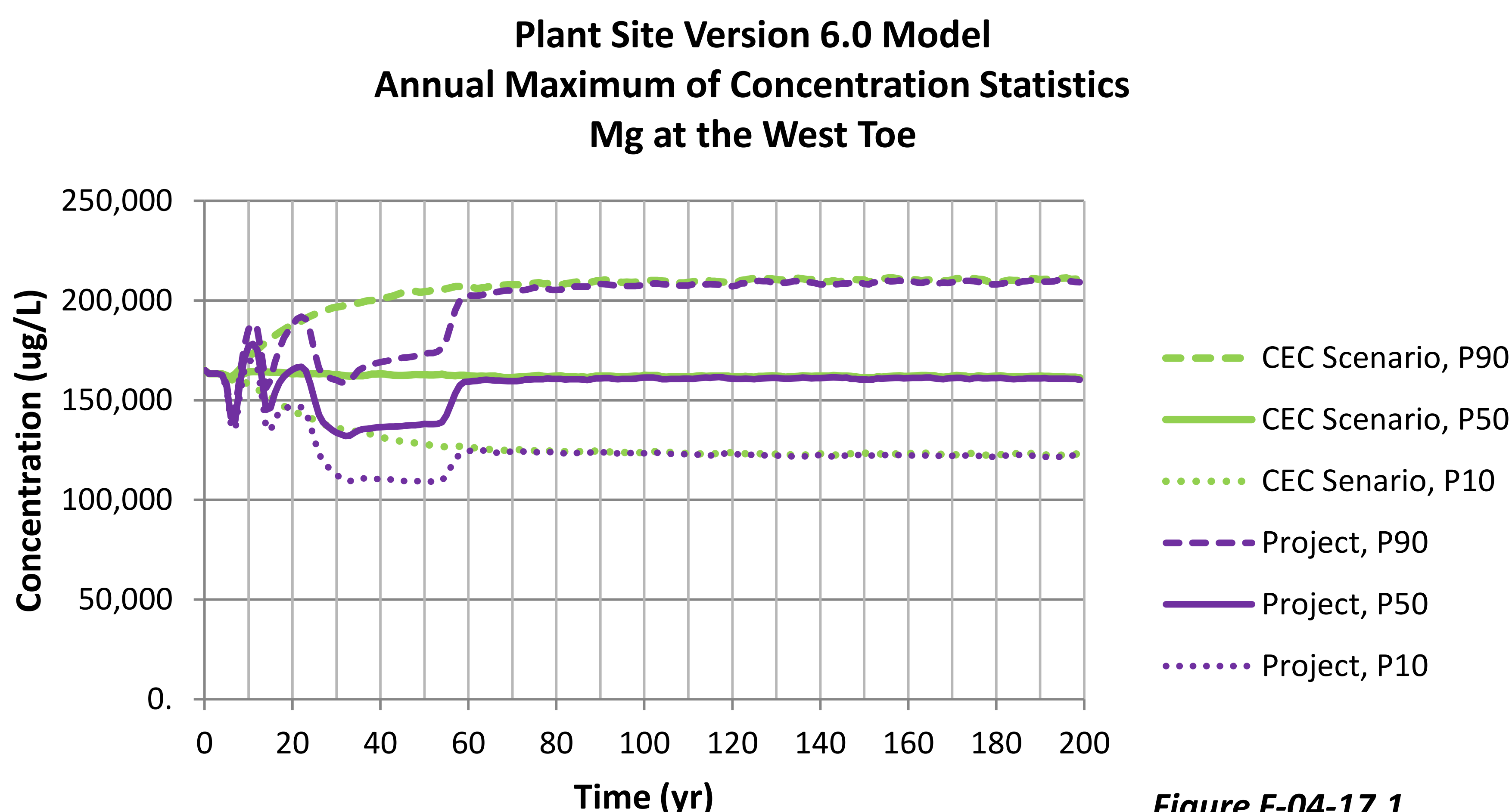

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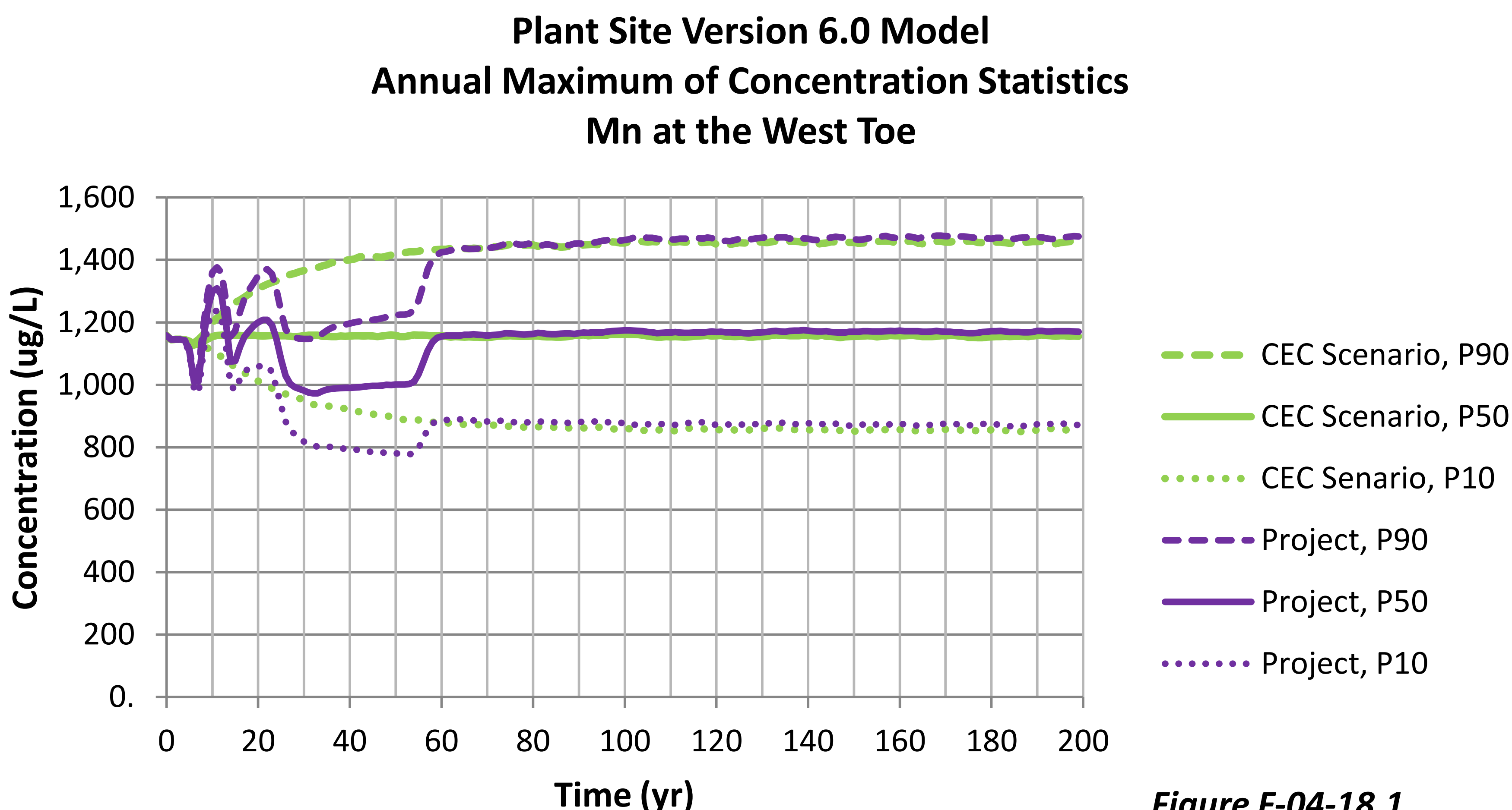

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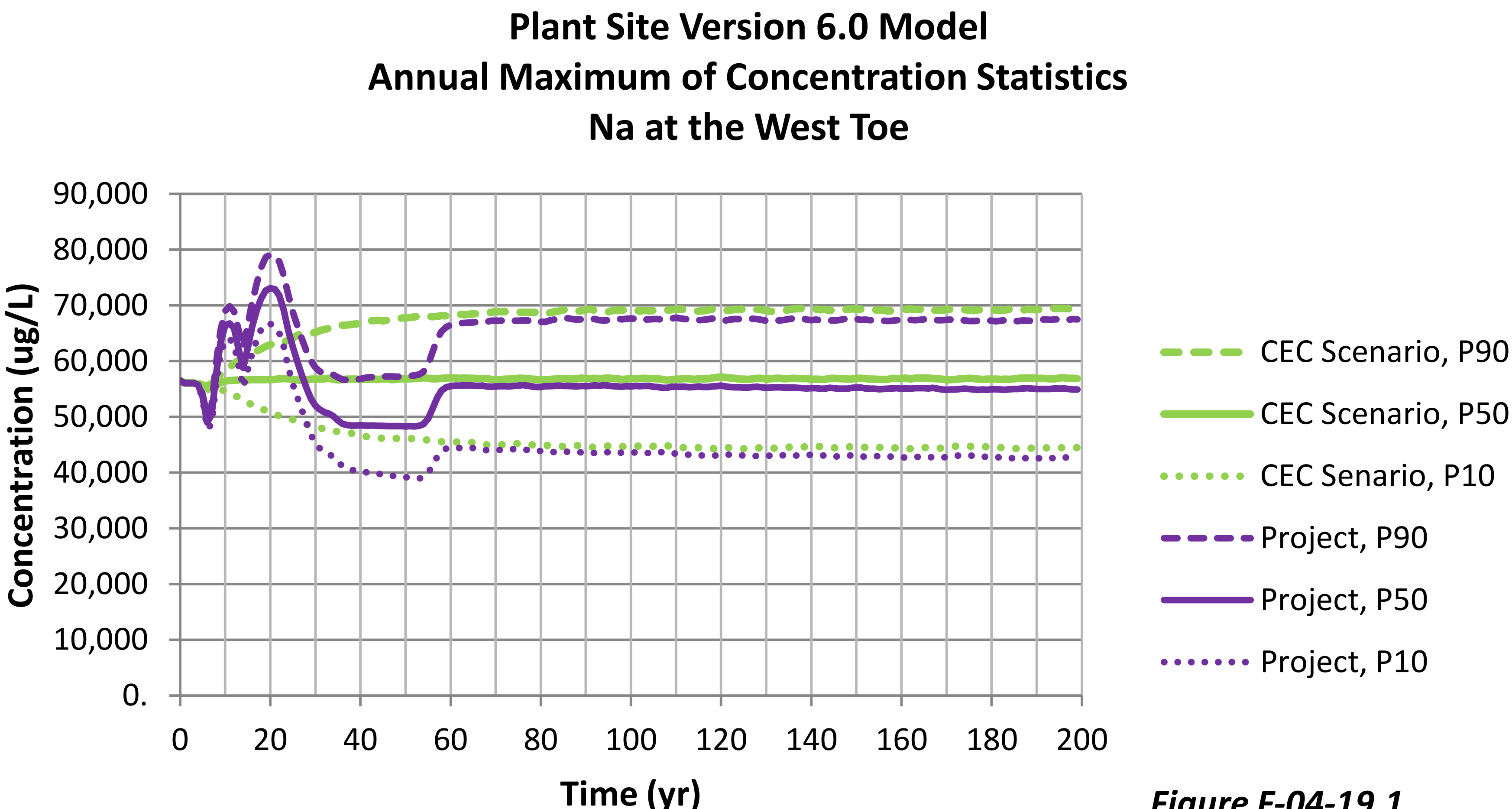

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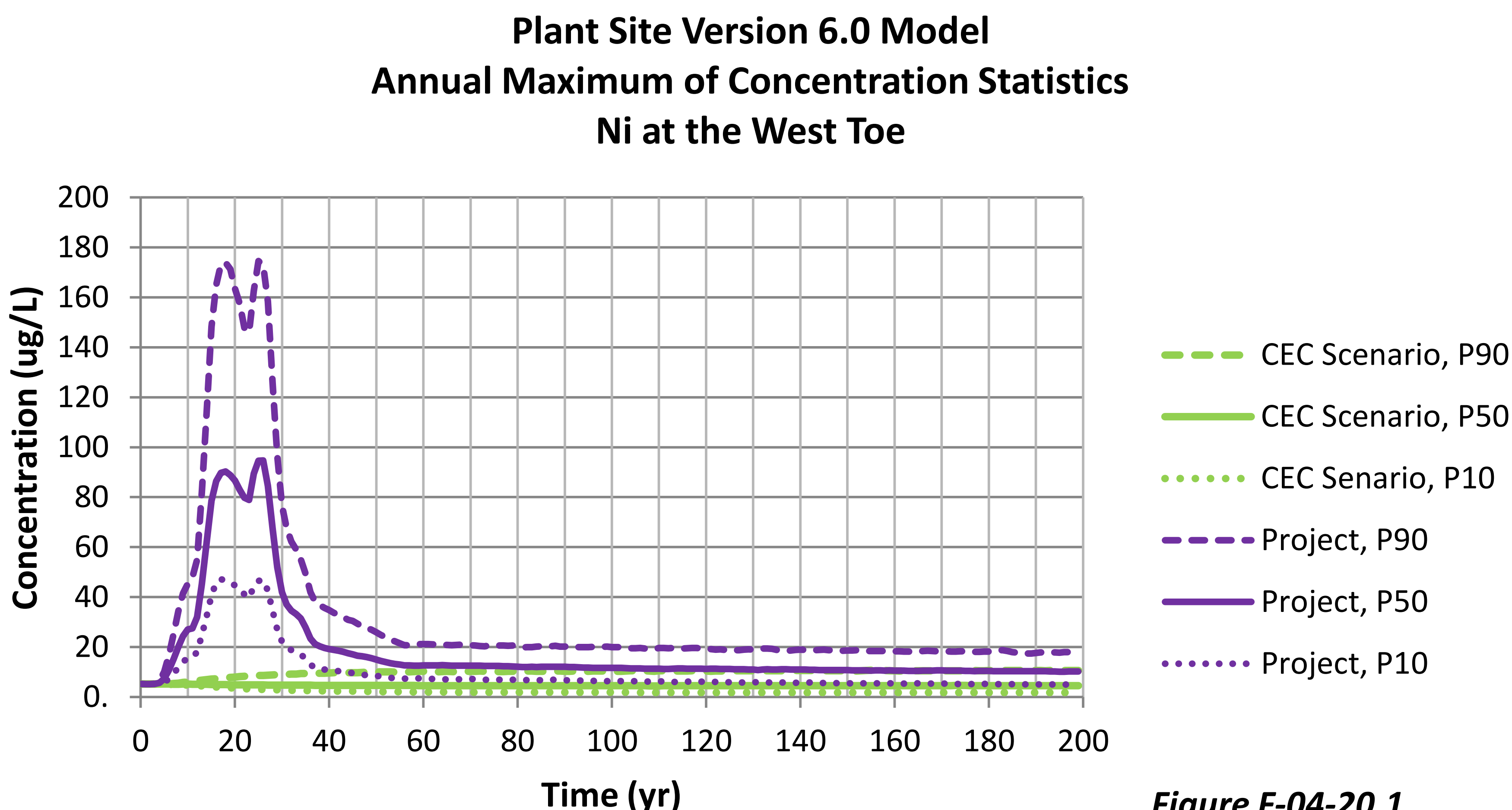

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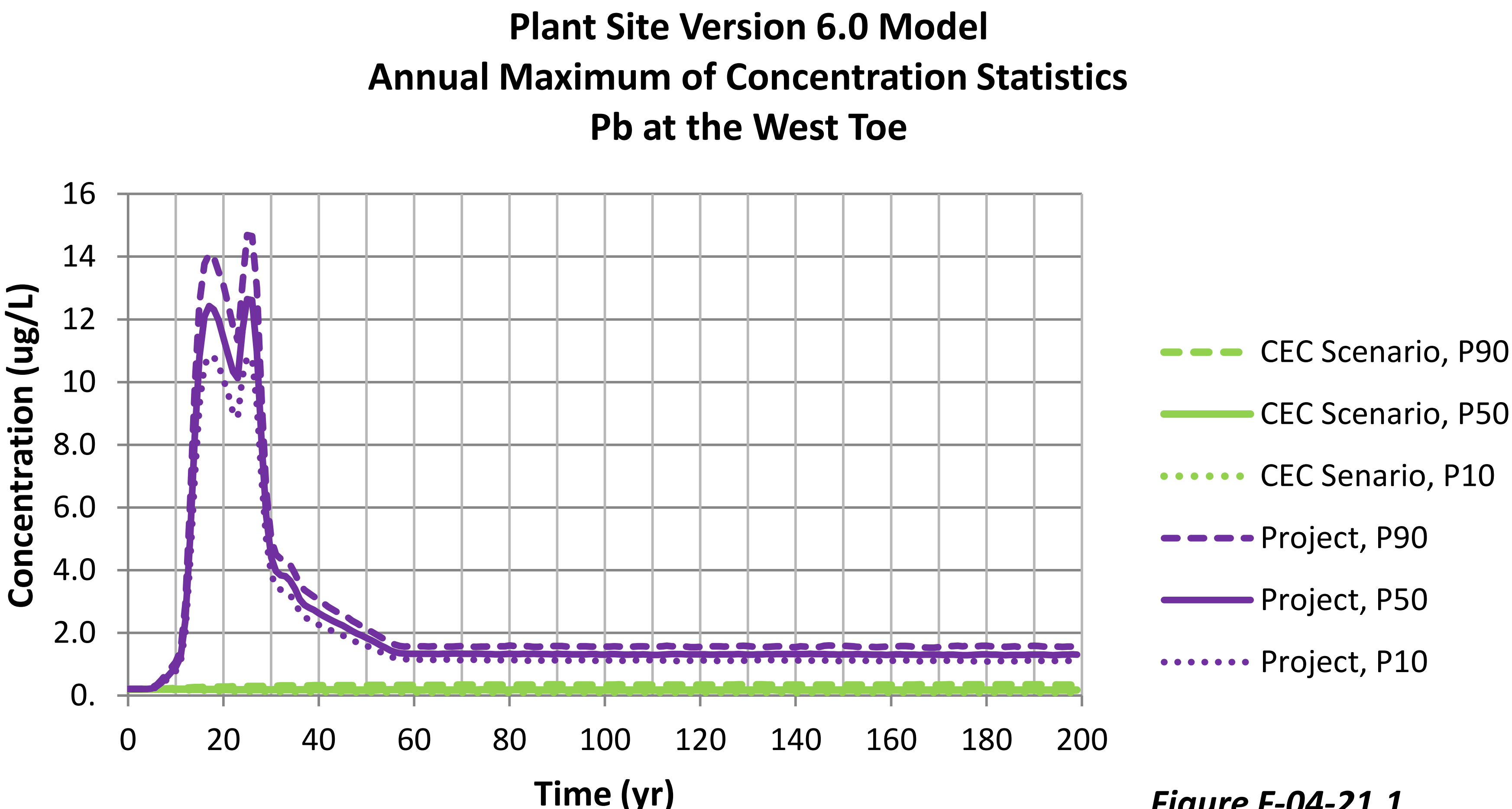

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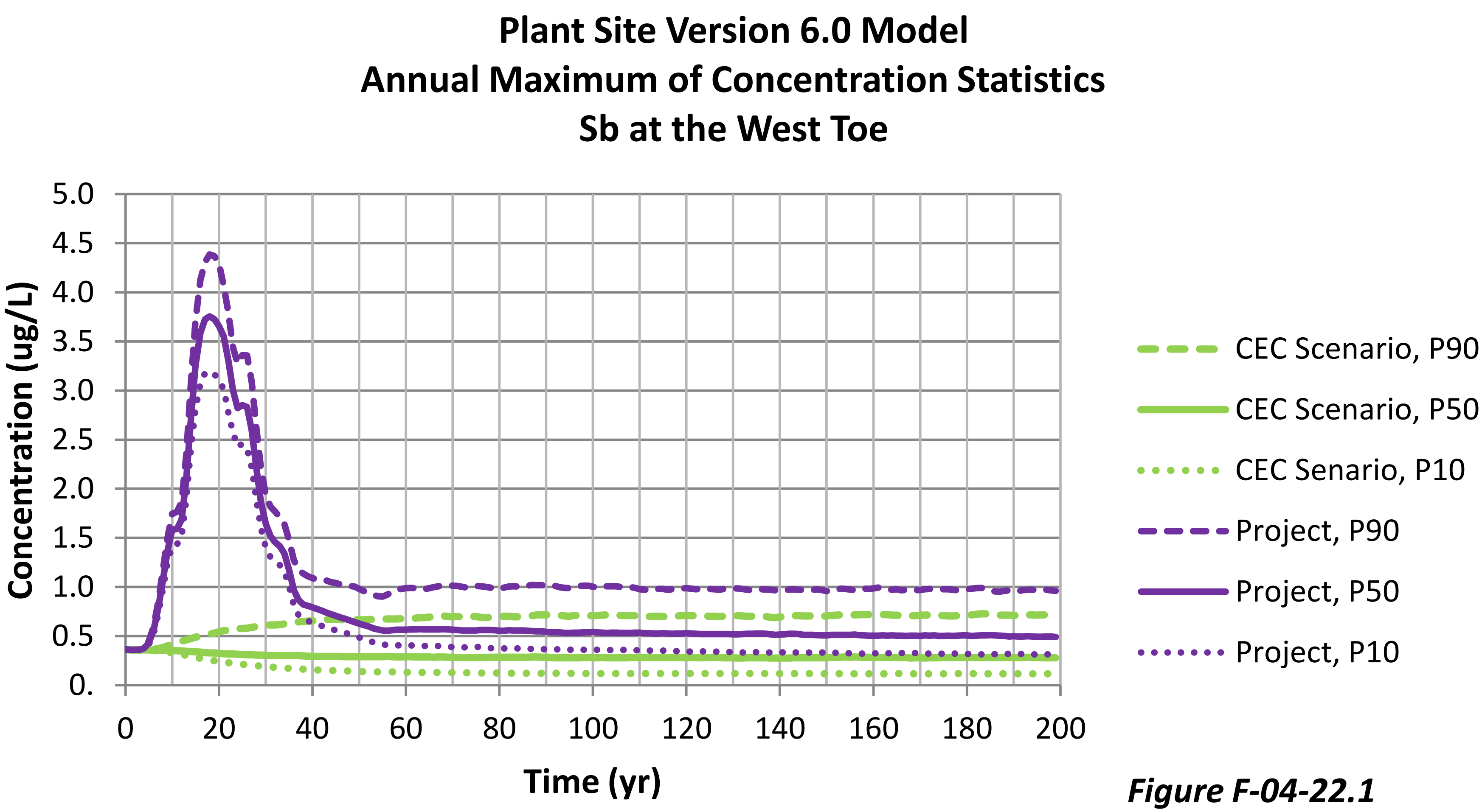

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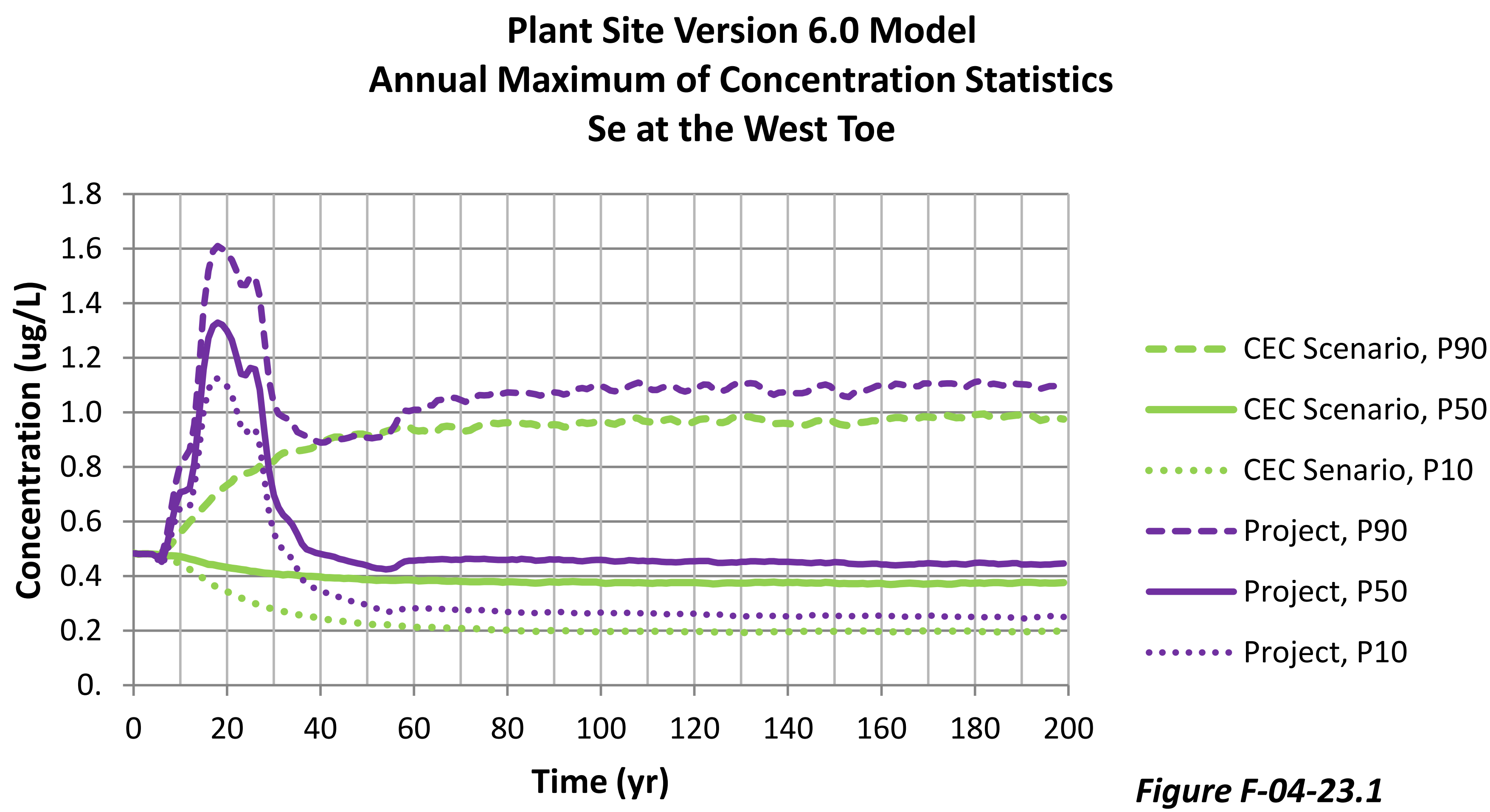

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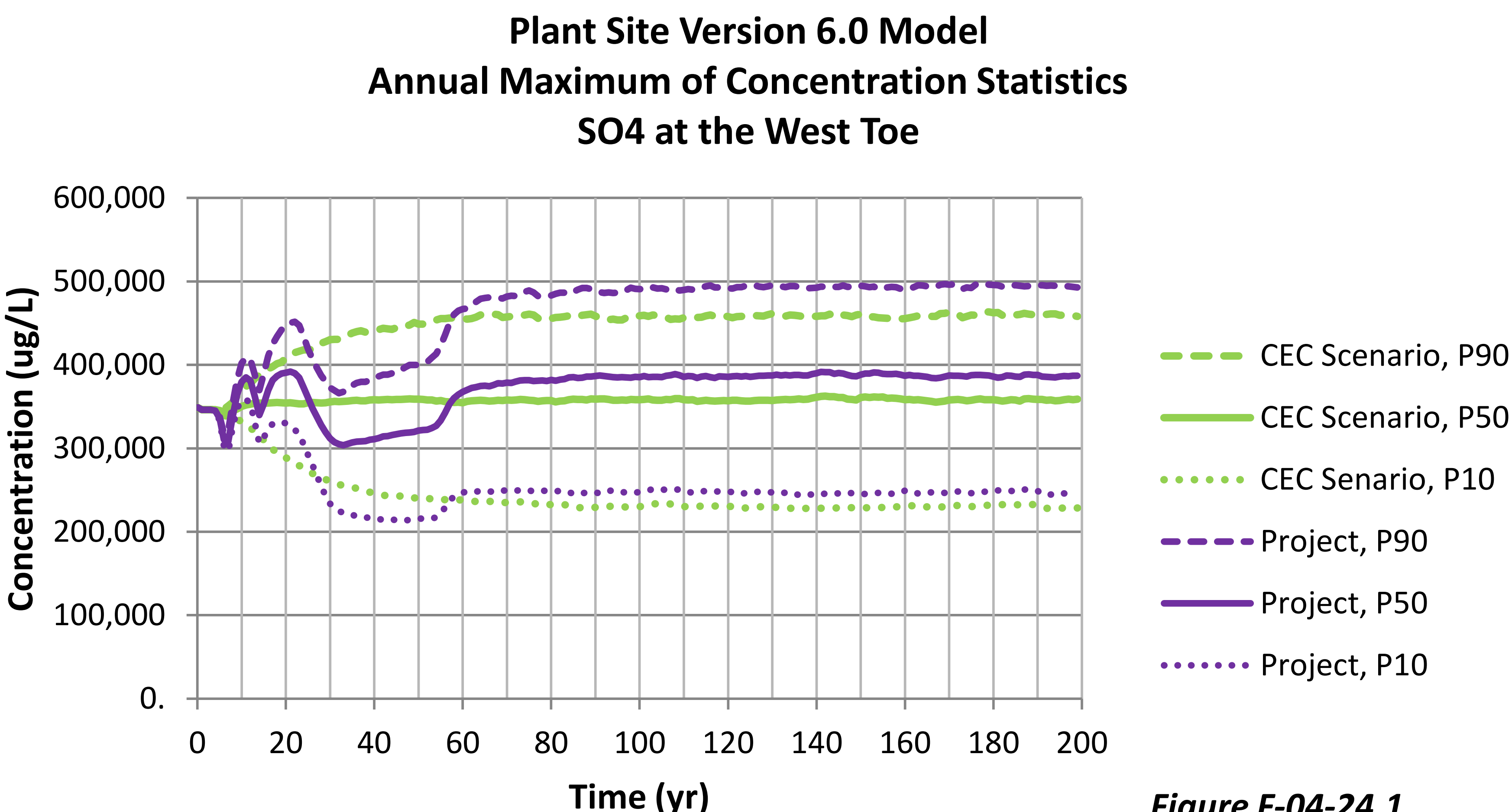

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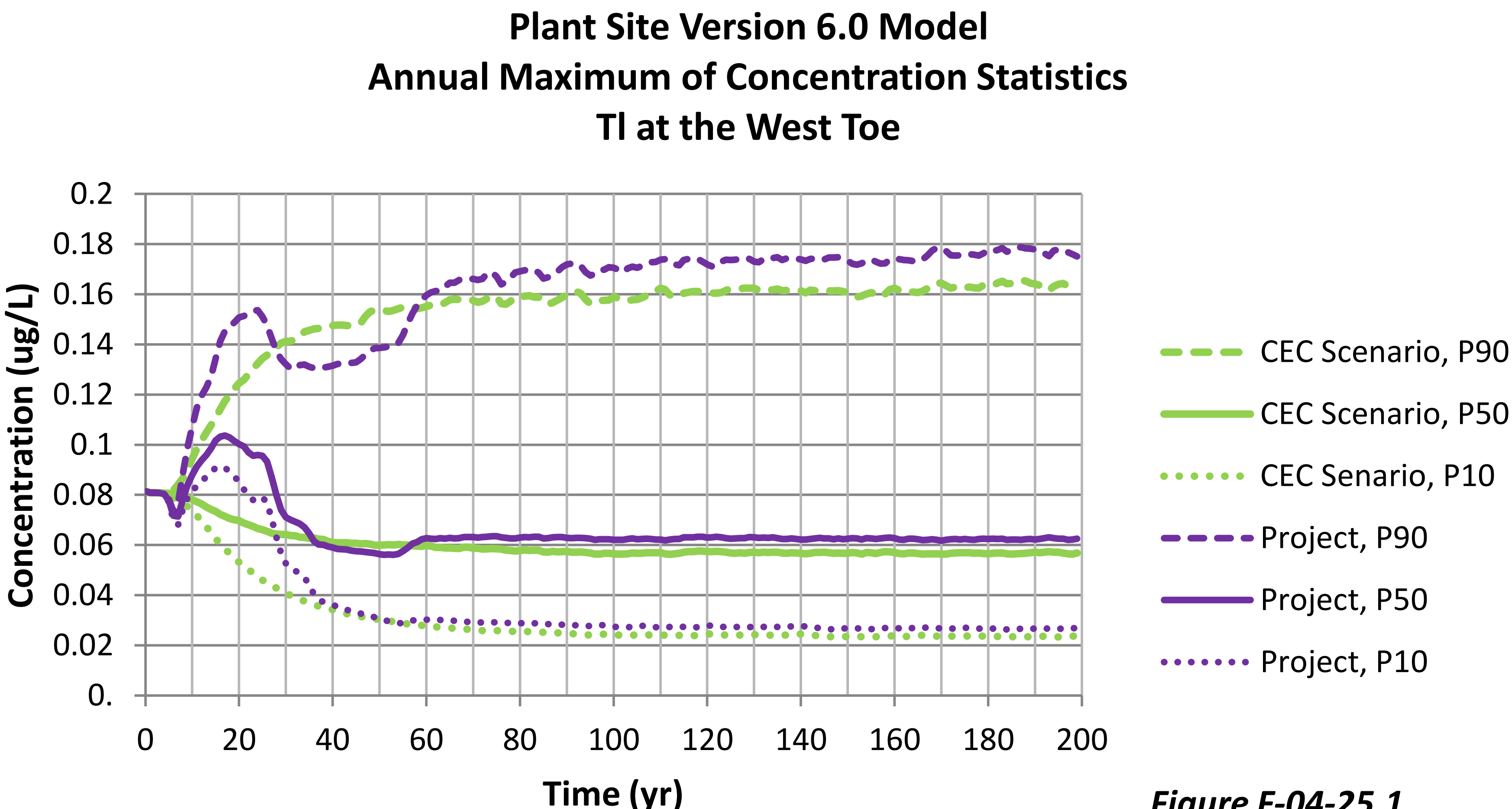

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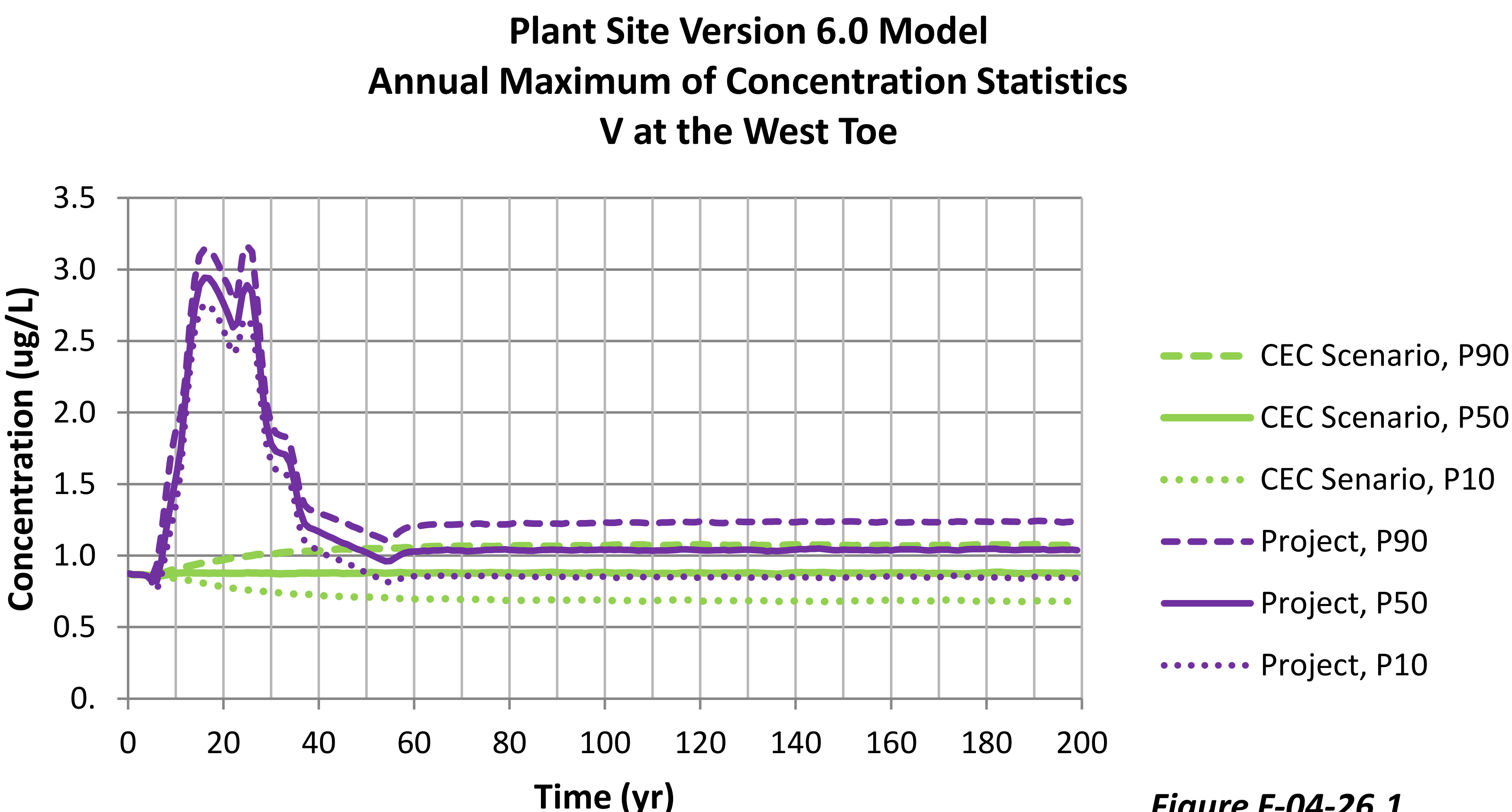

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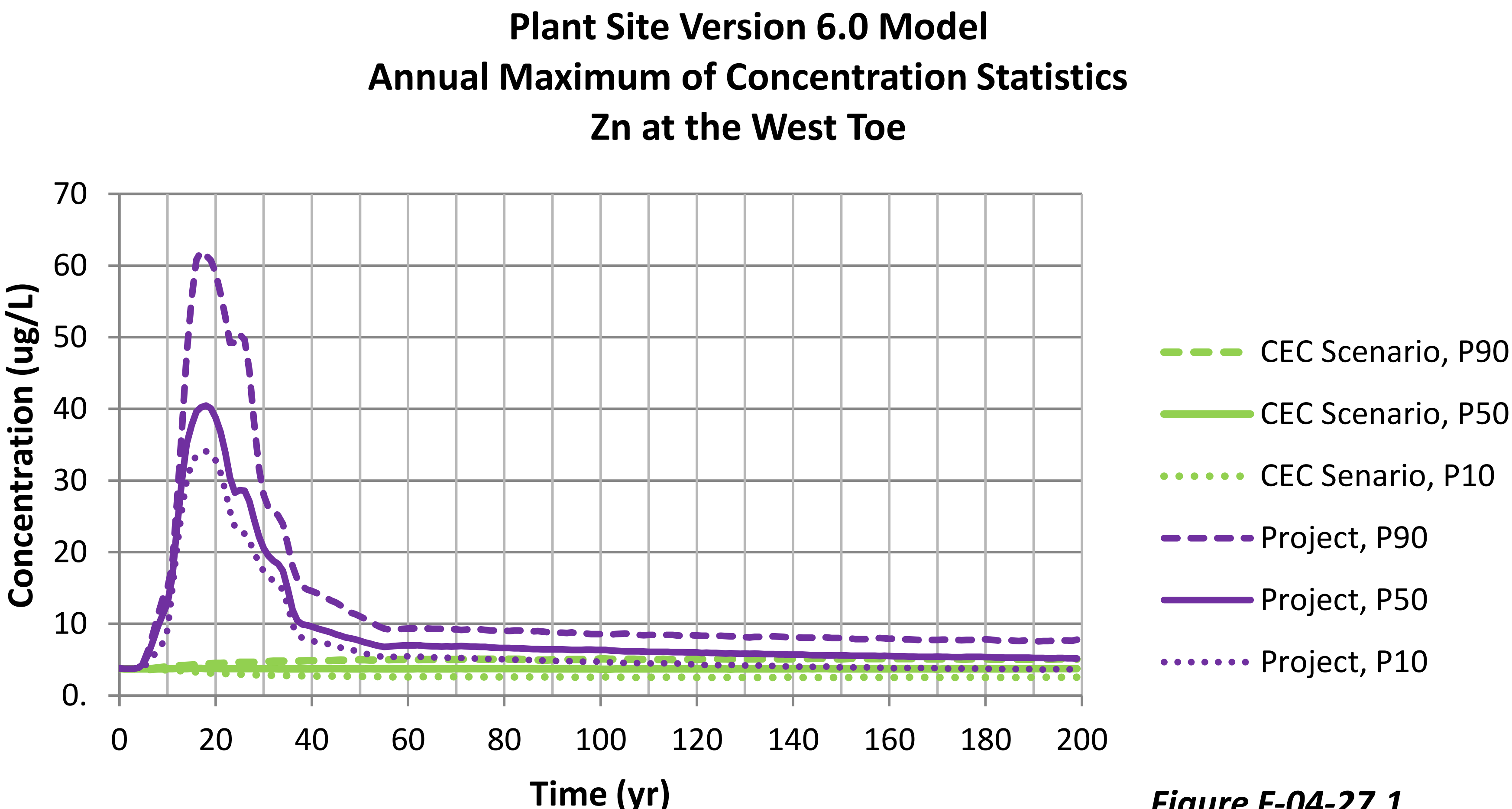

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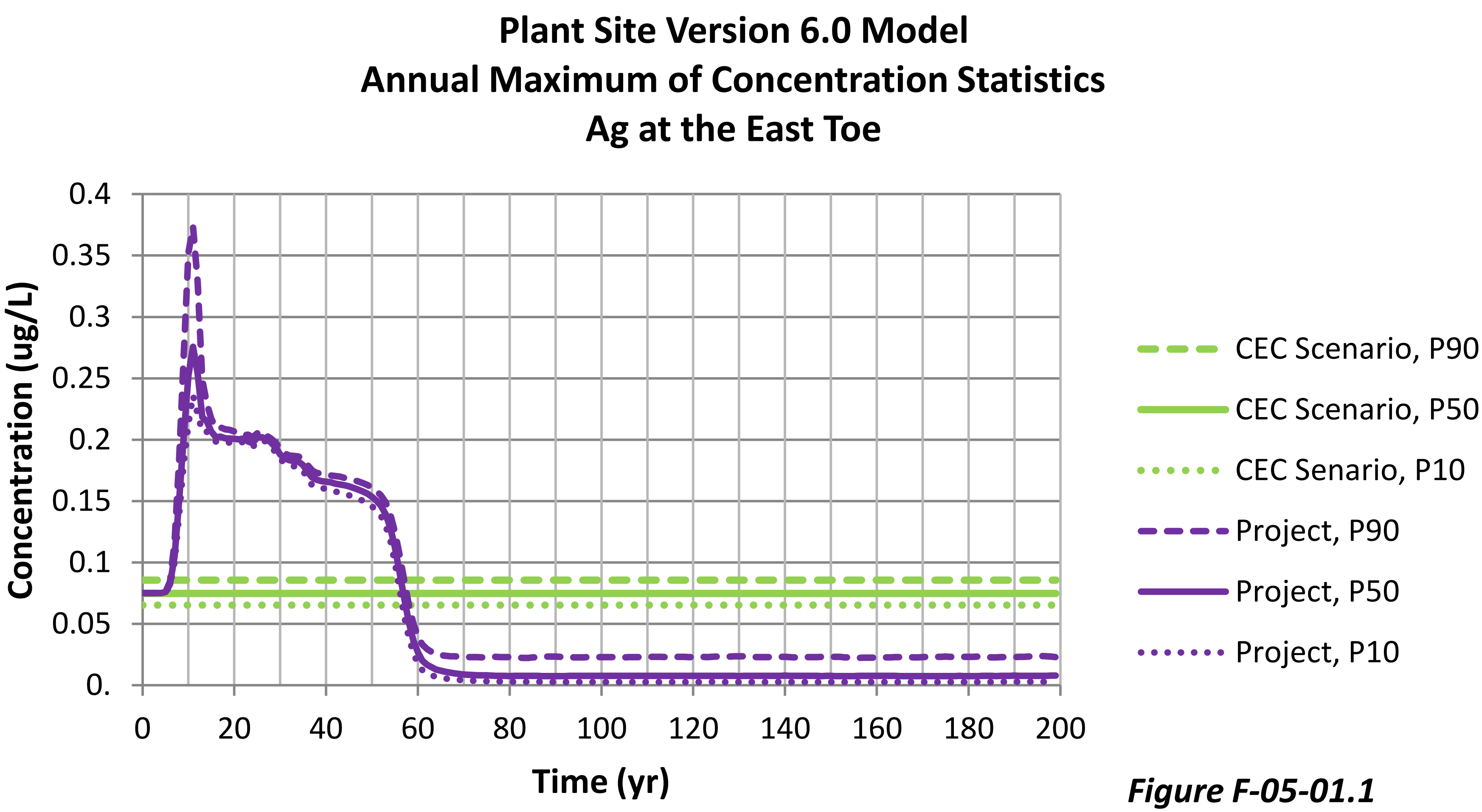

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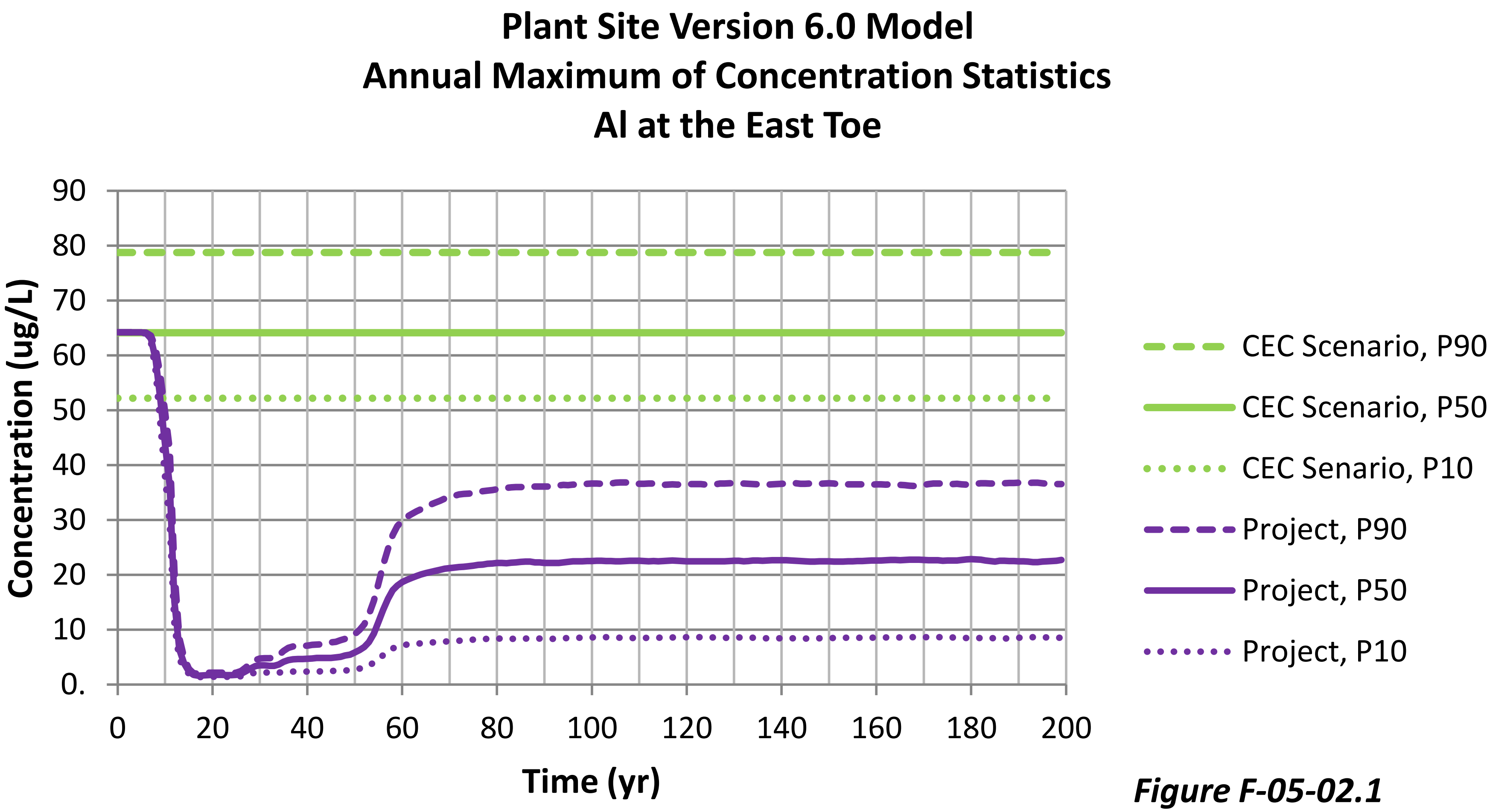

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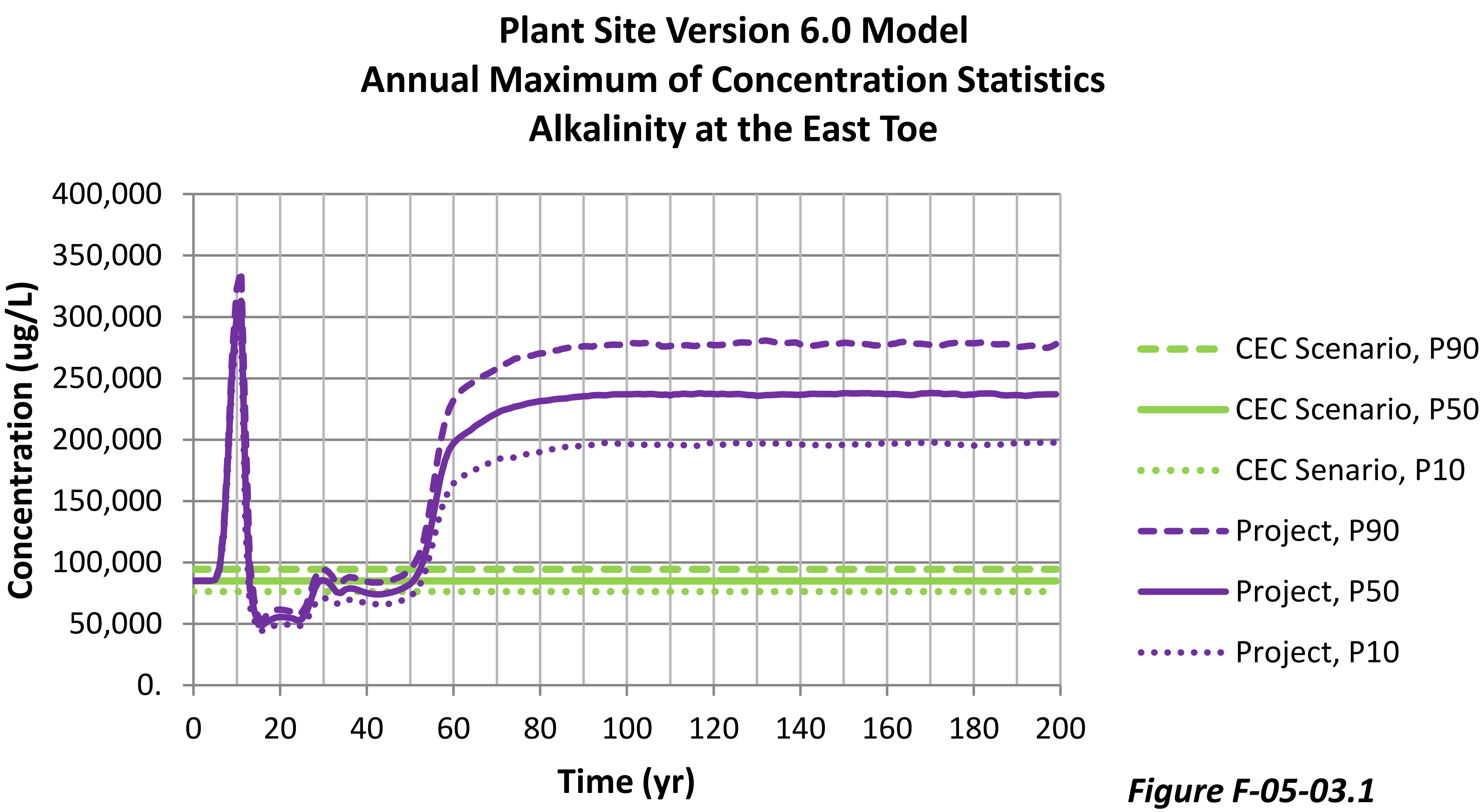

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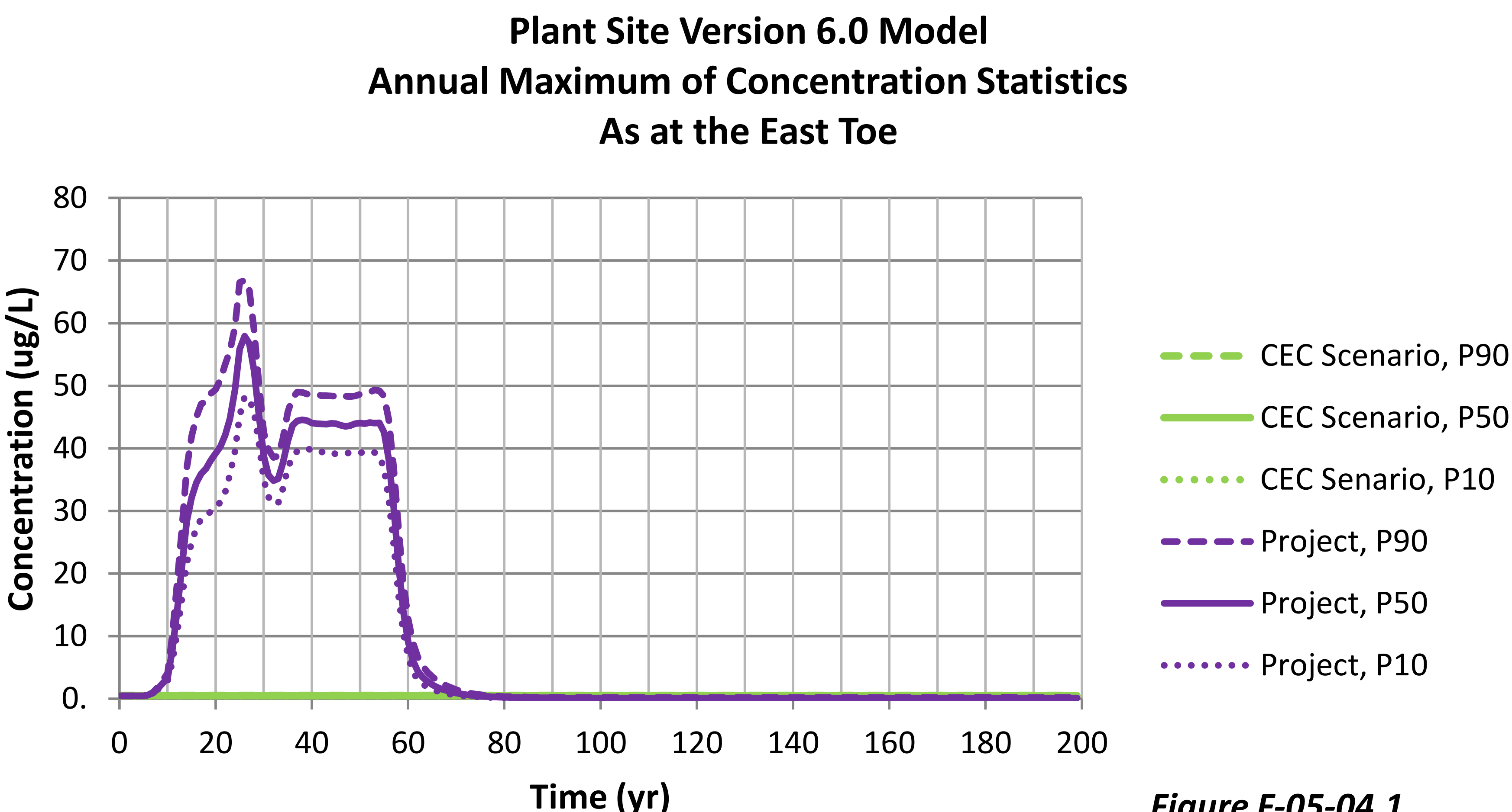

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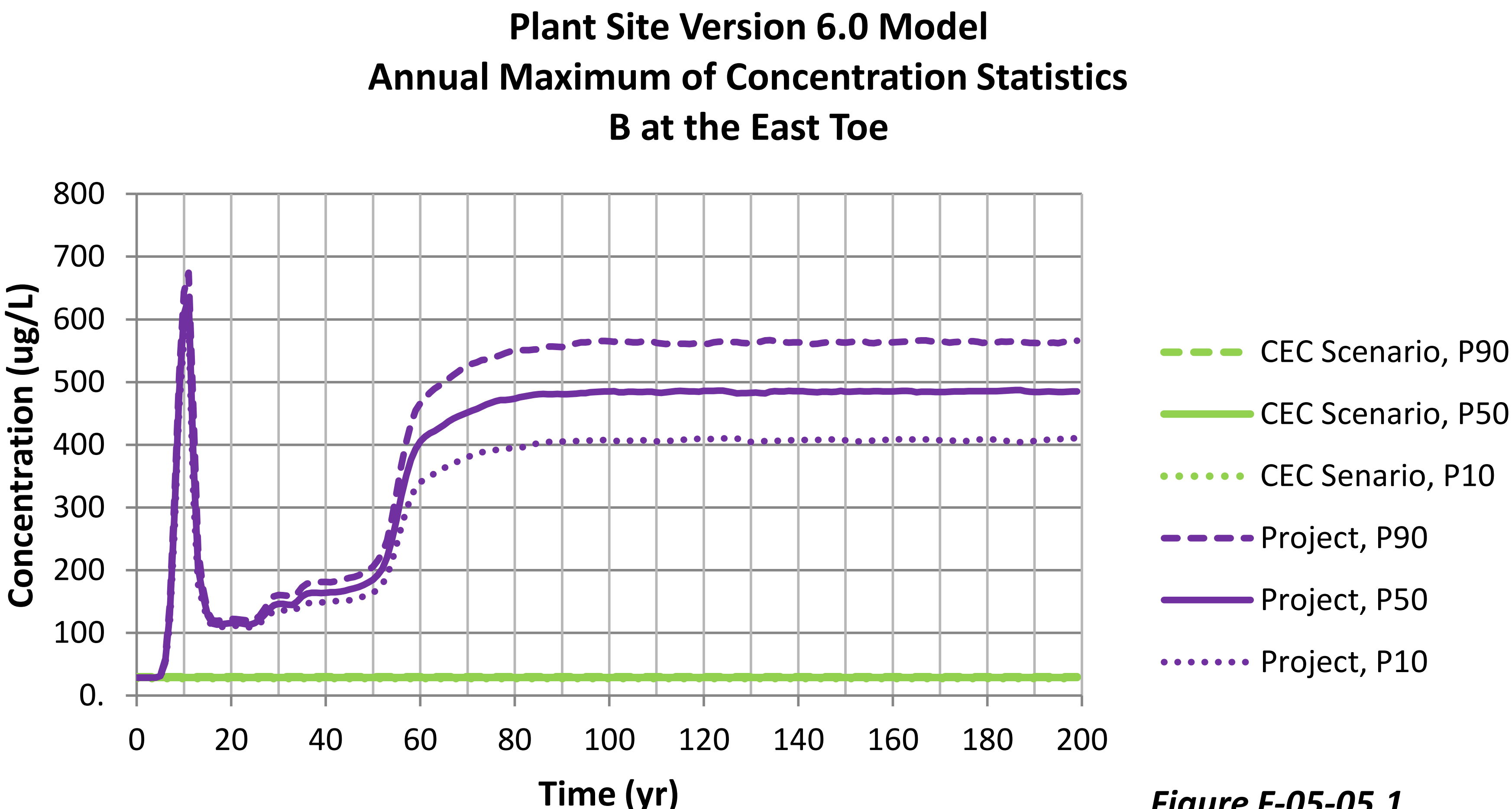

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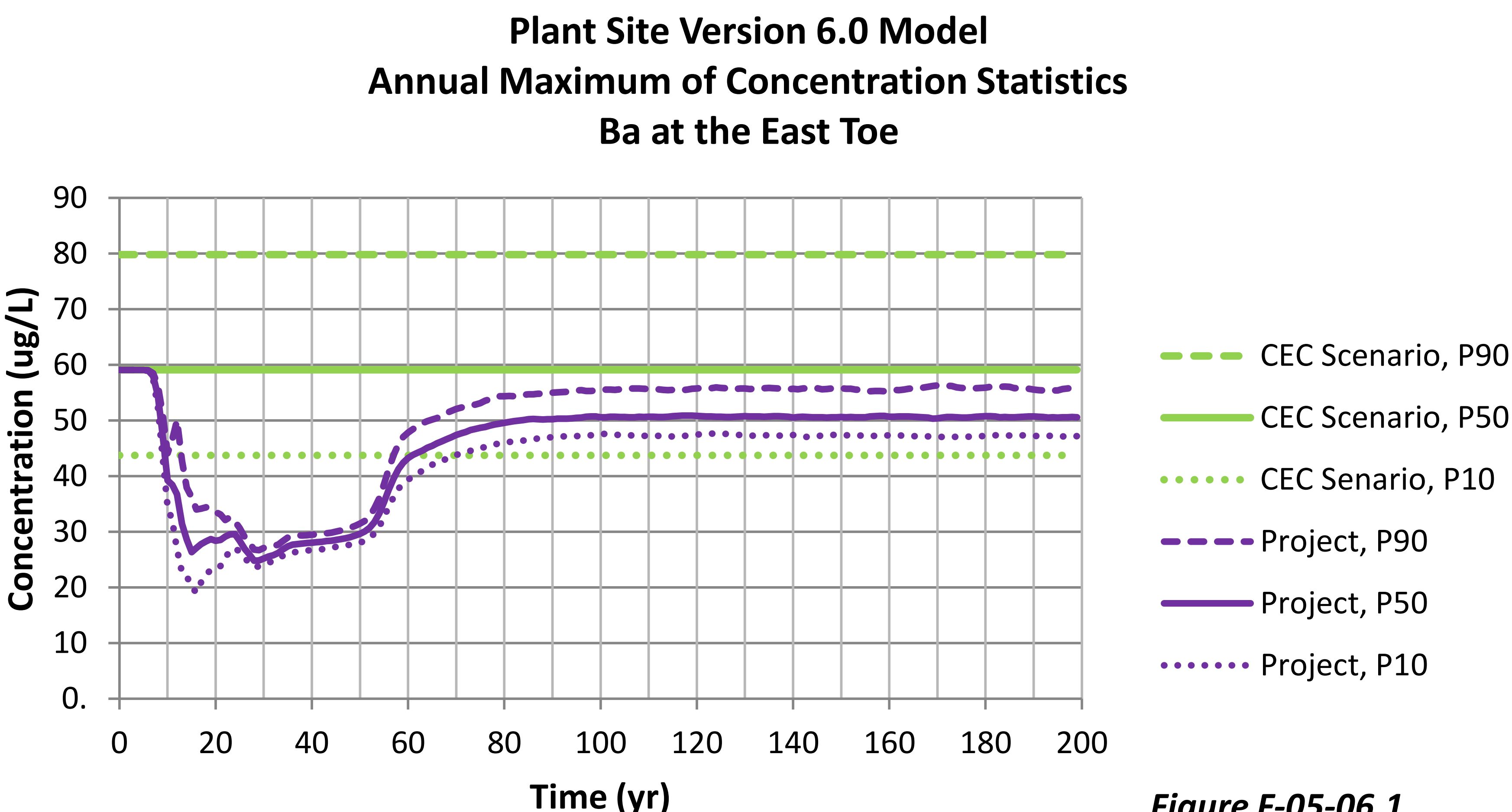

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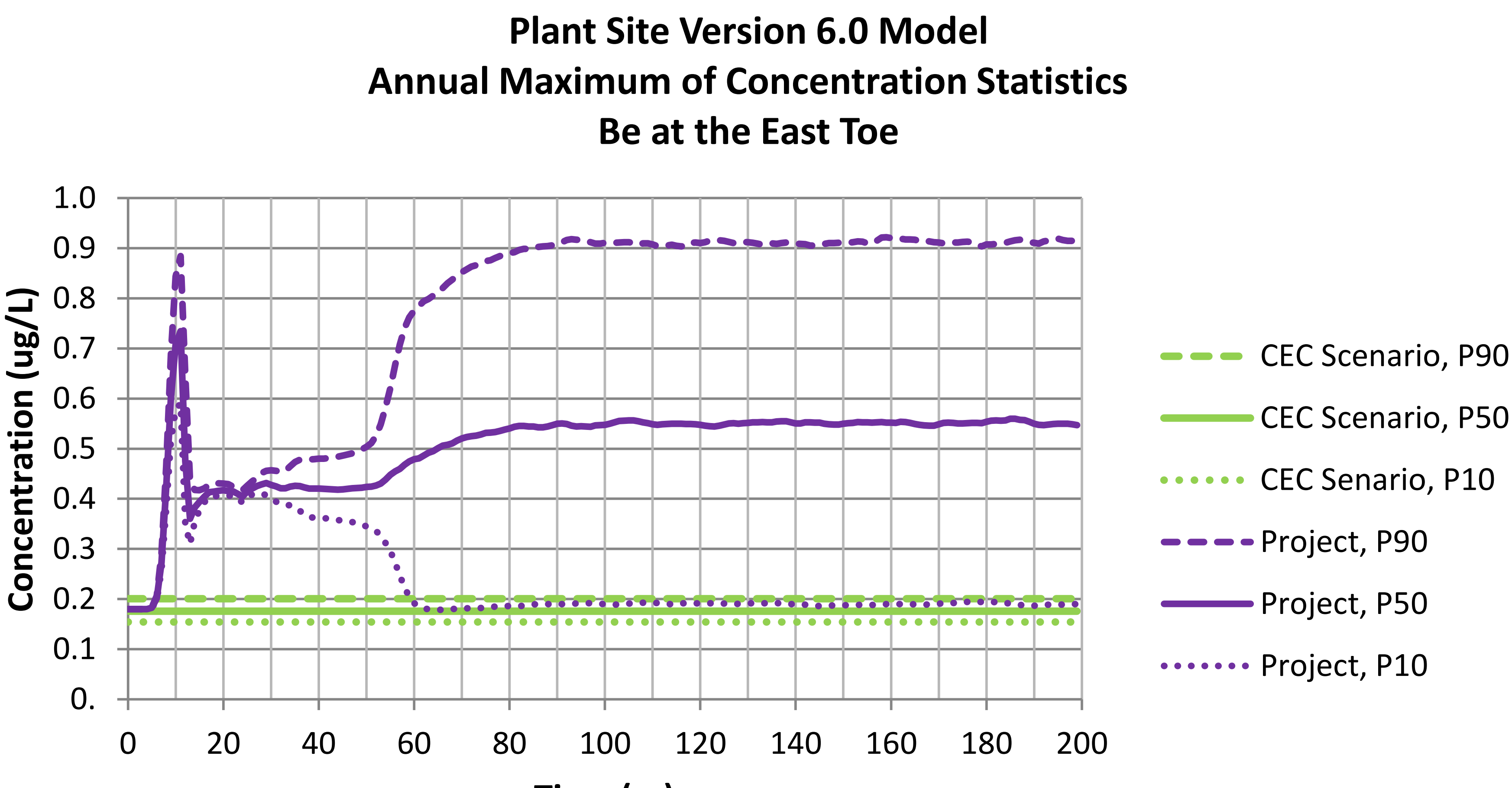

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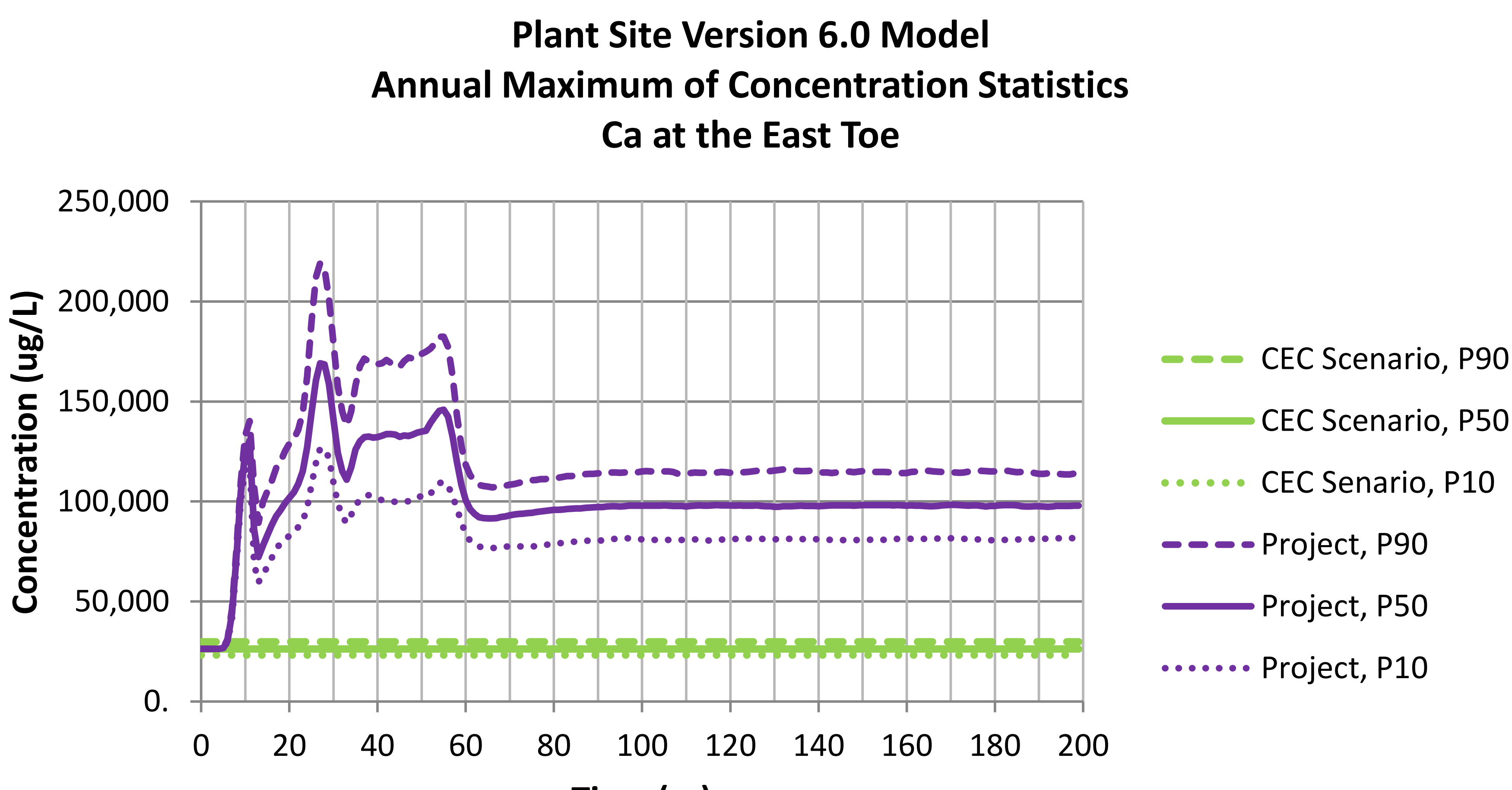

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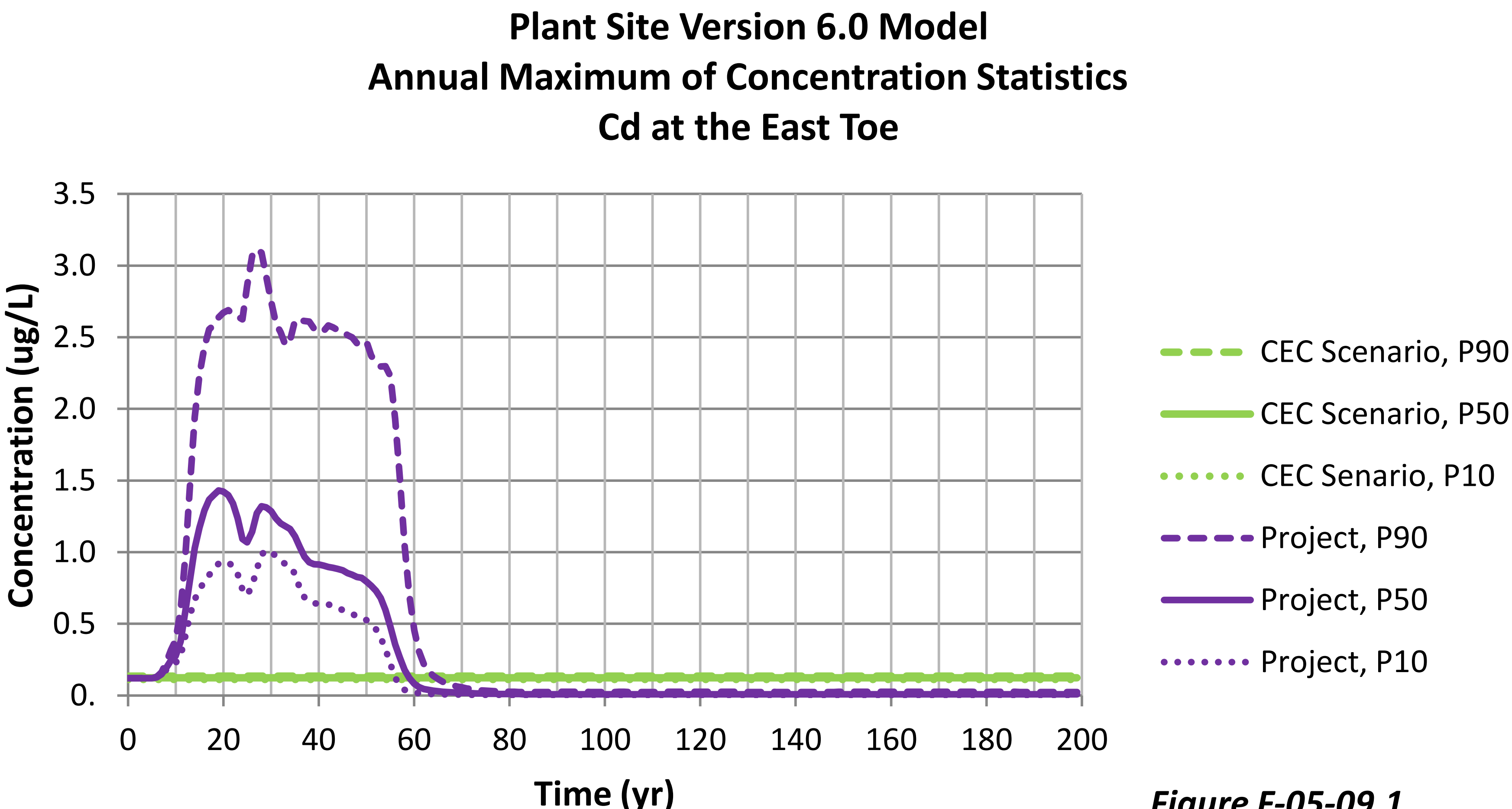

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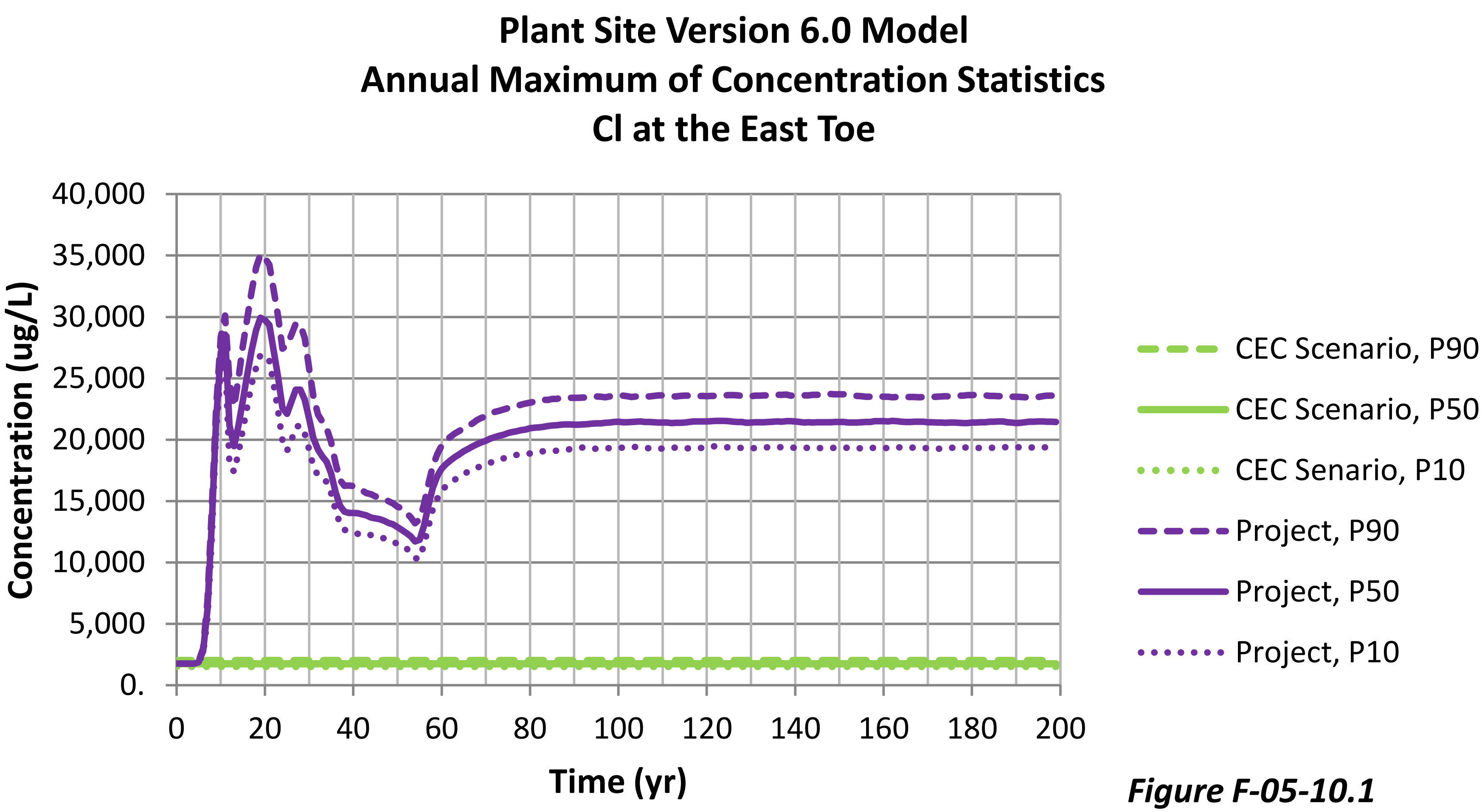

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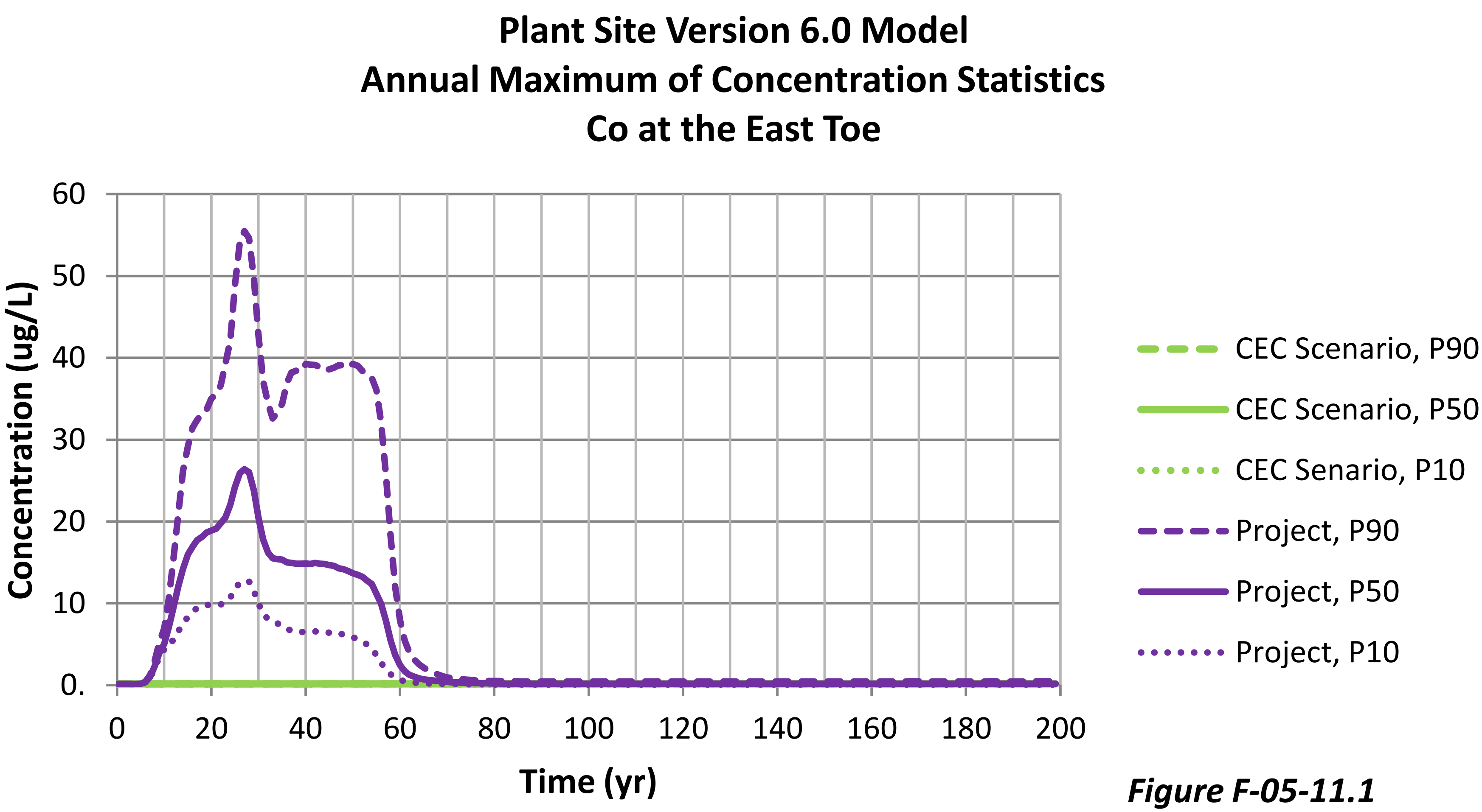

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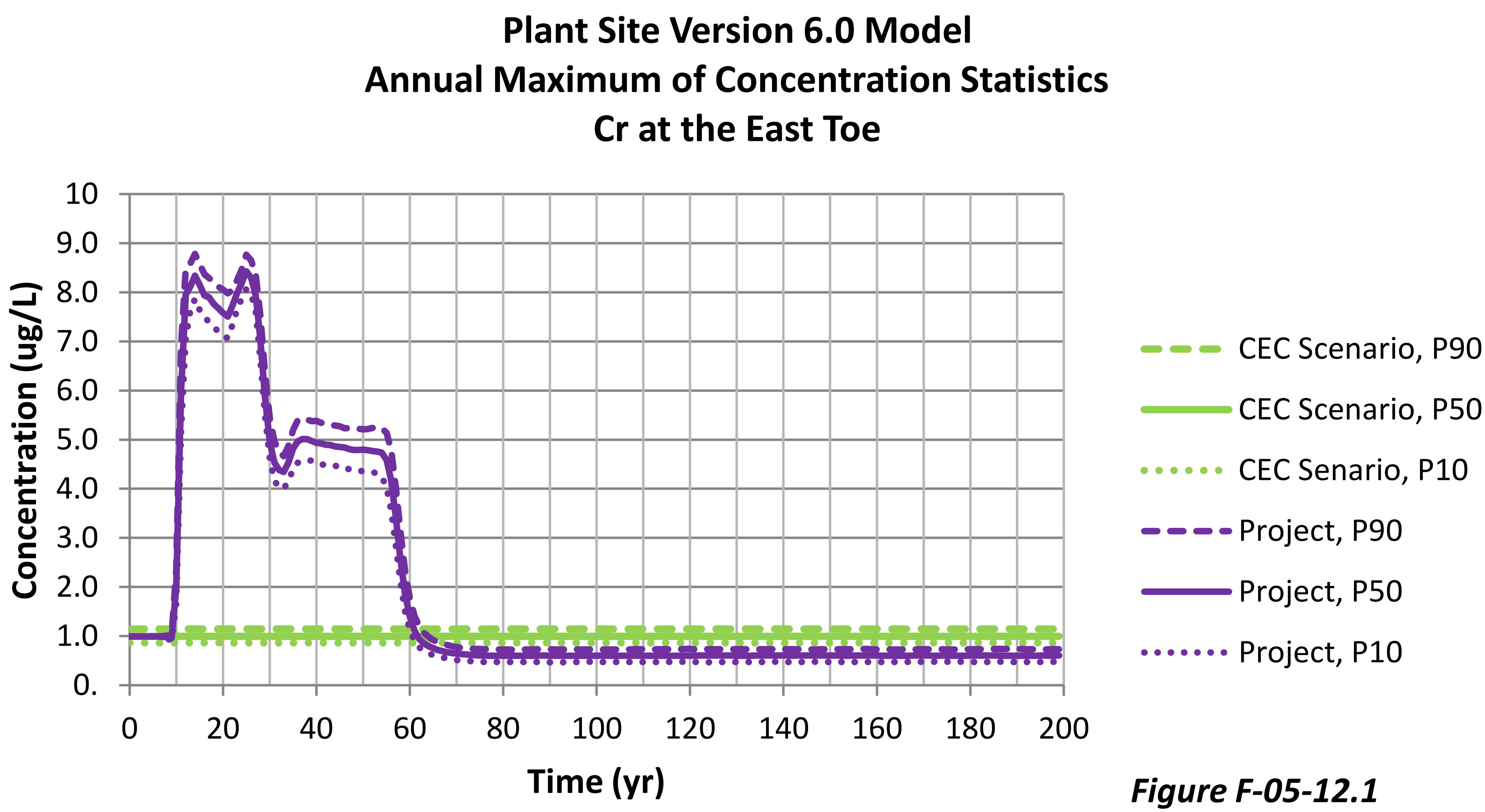
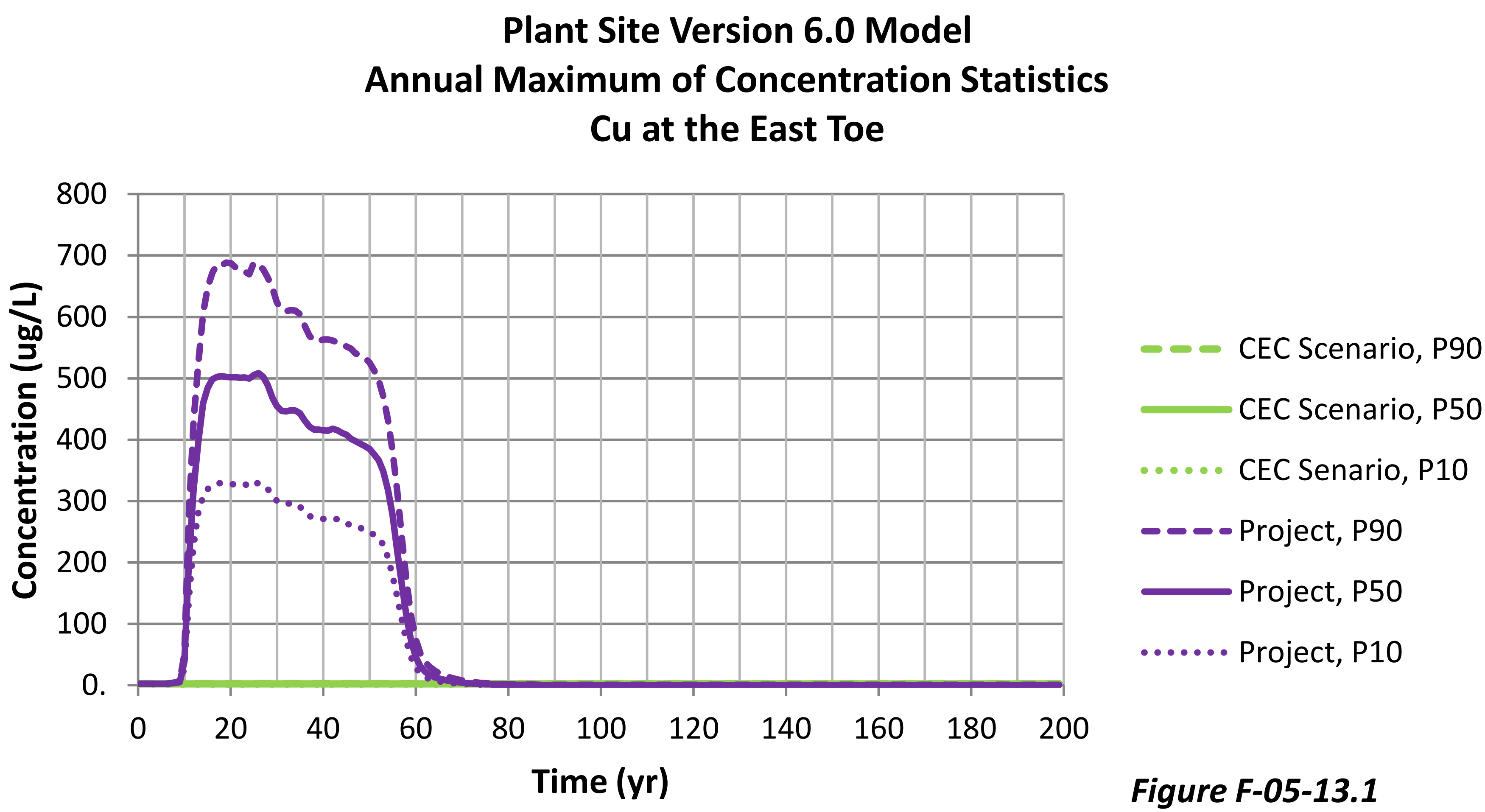


Figure F-05-12.1



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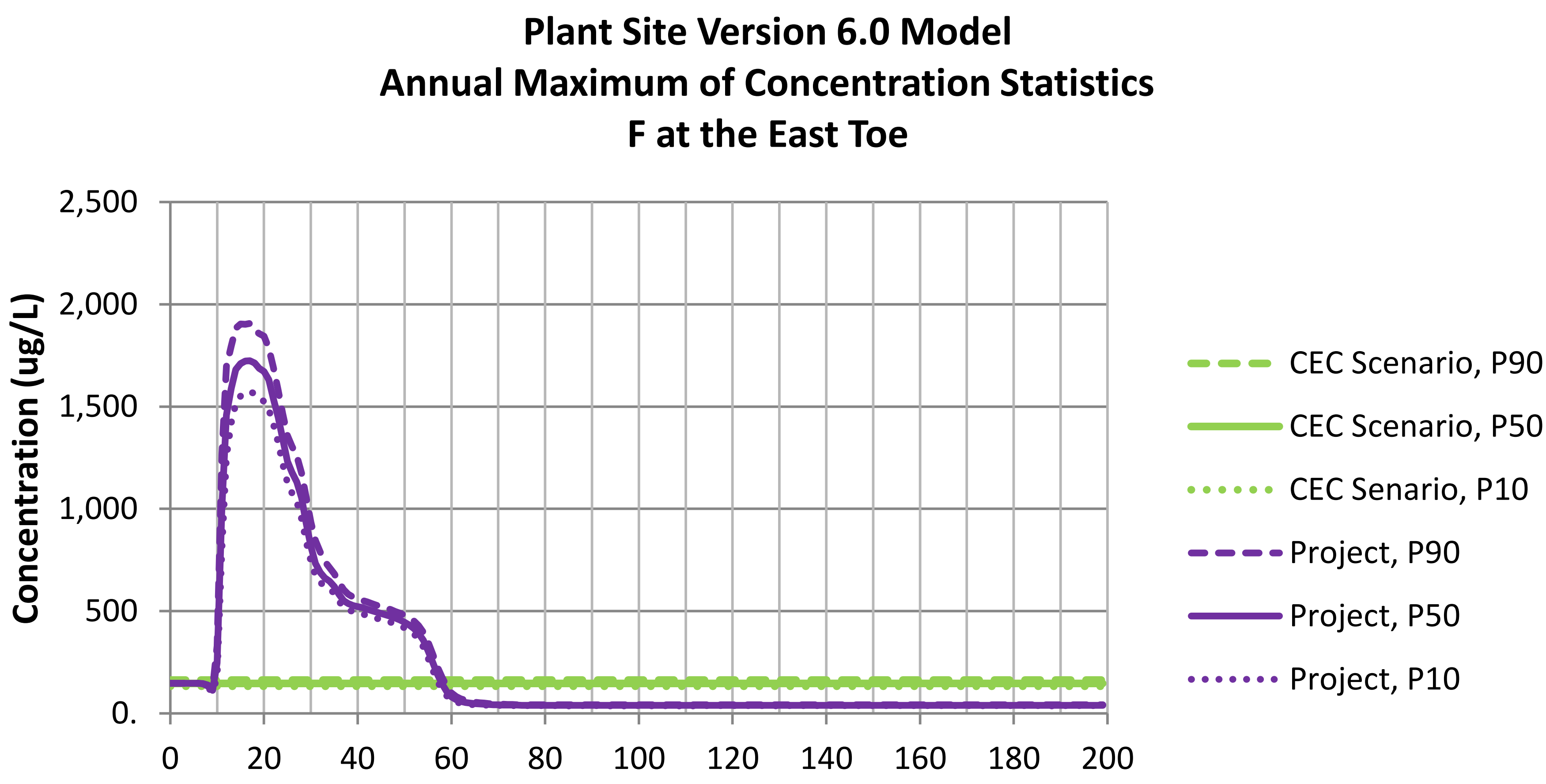

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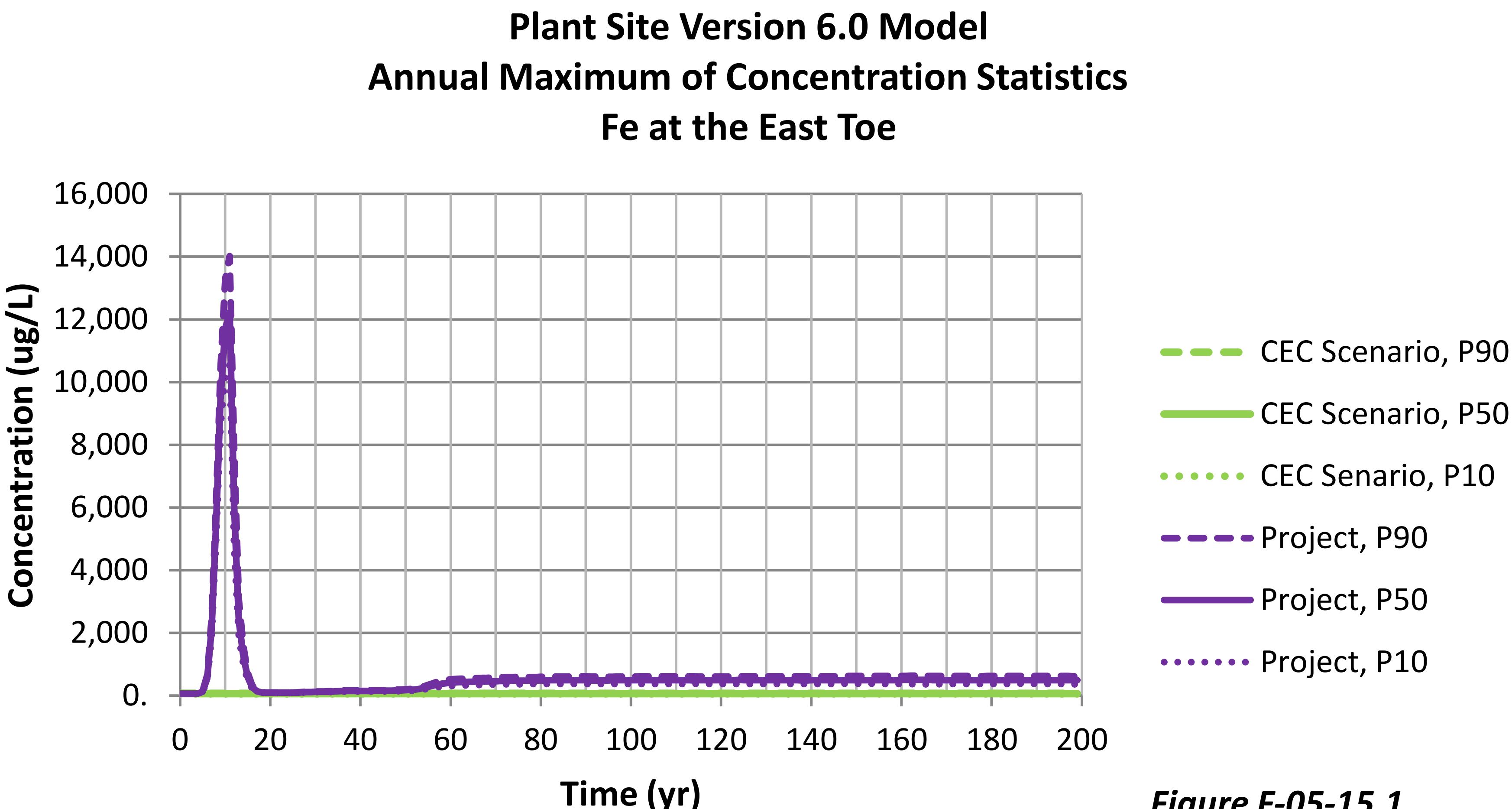

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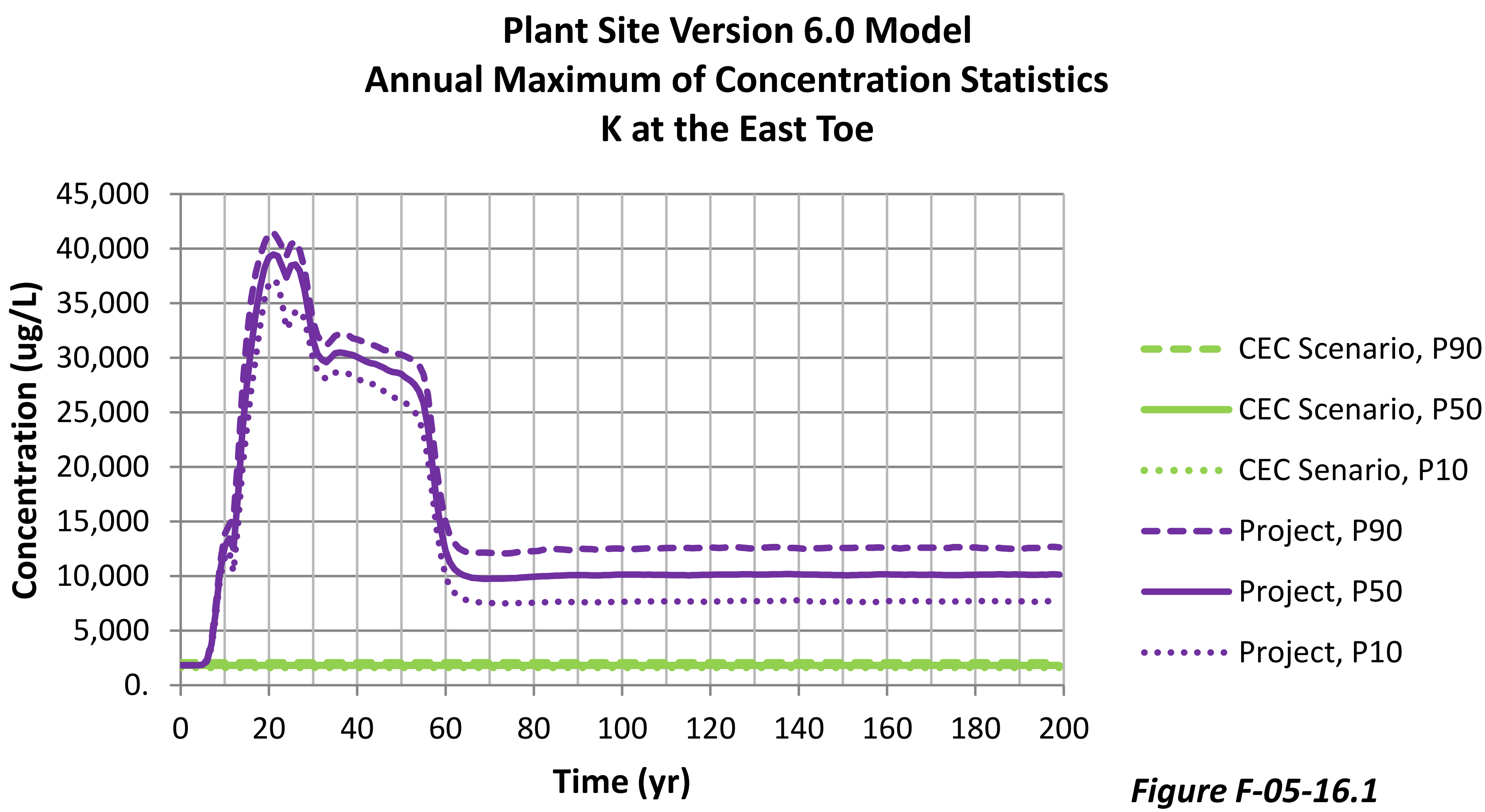

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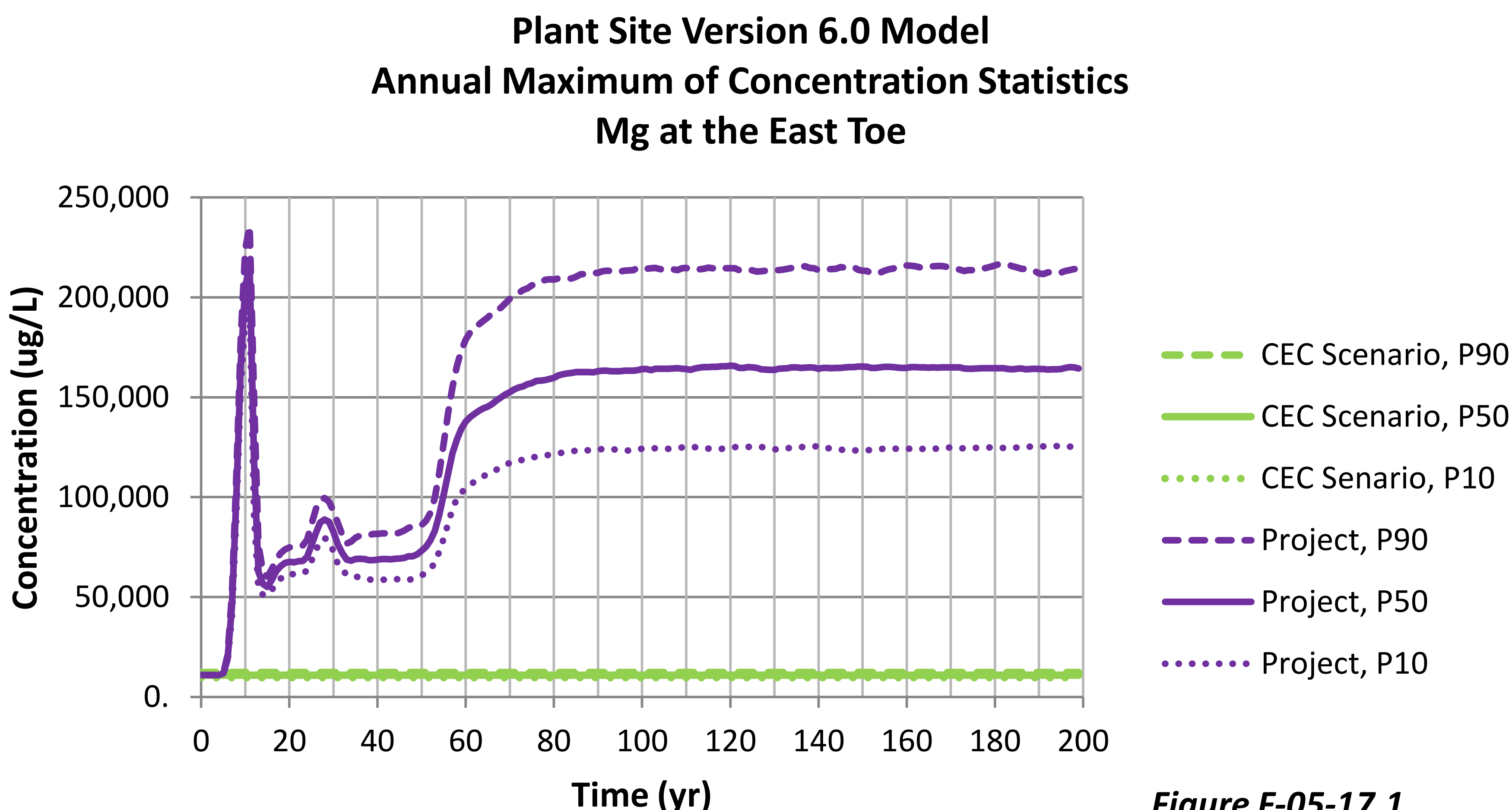

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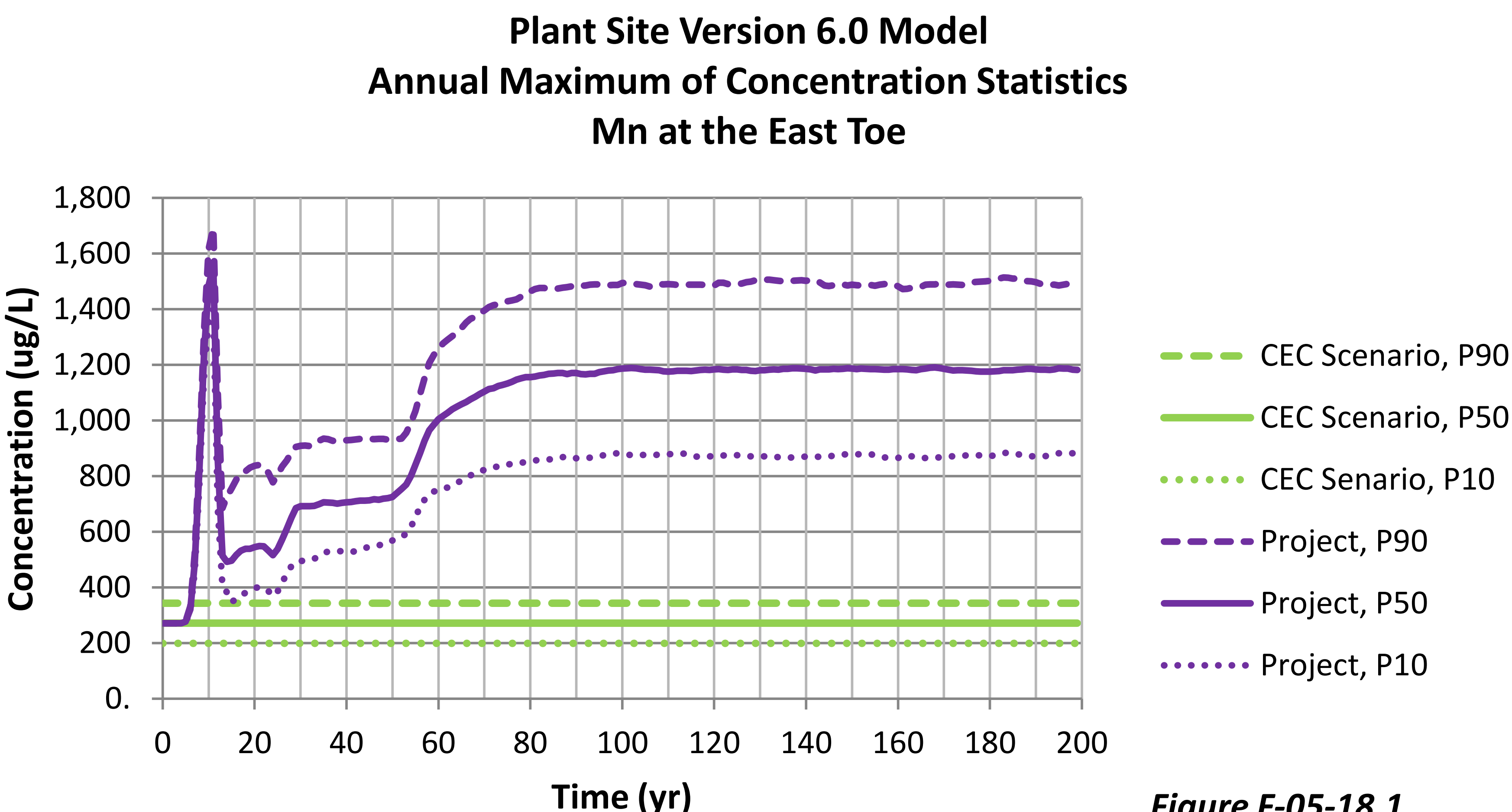

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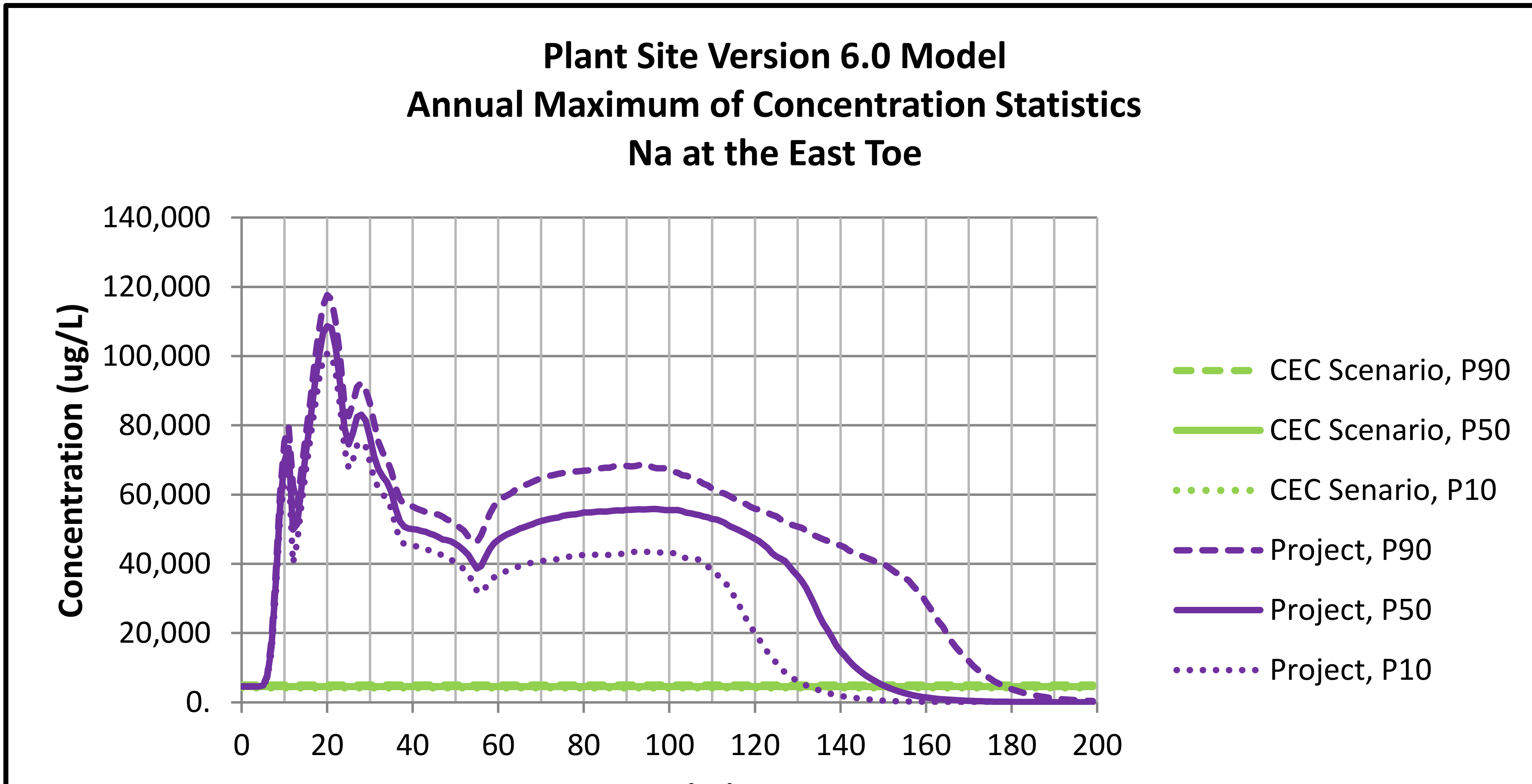

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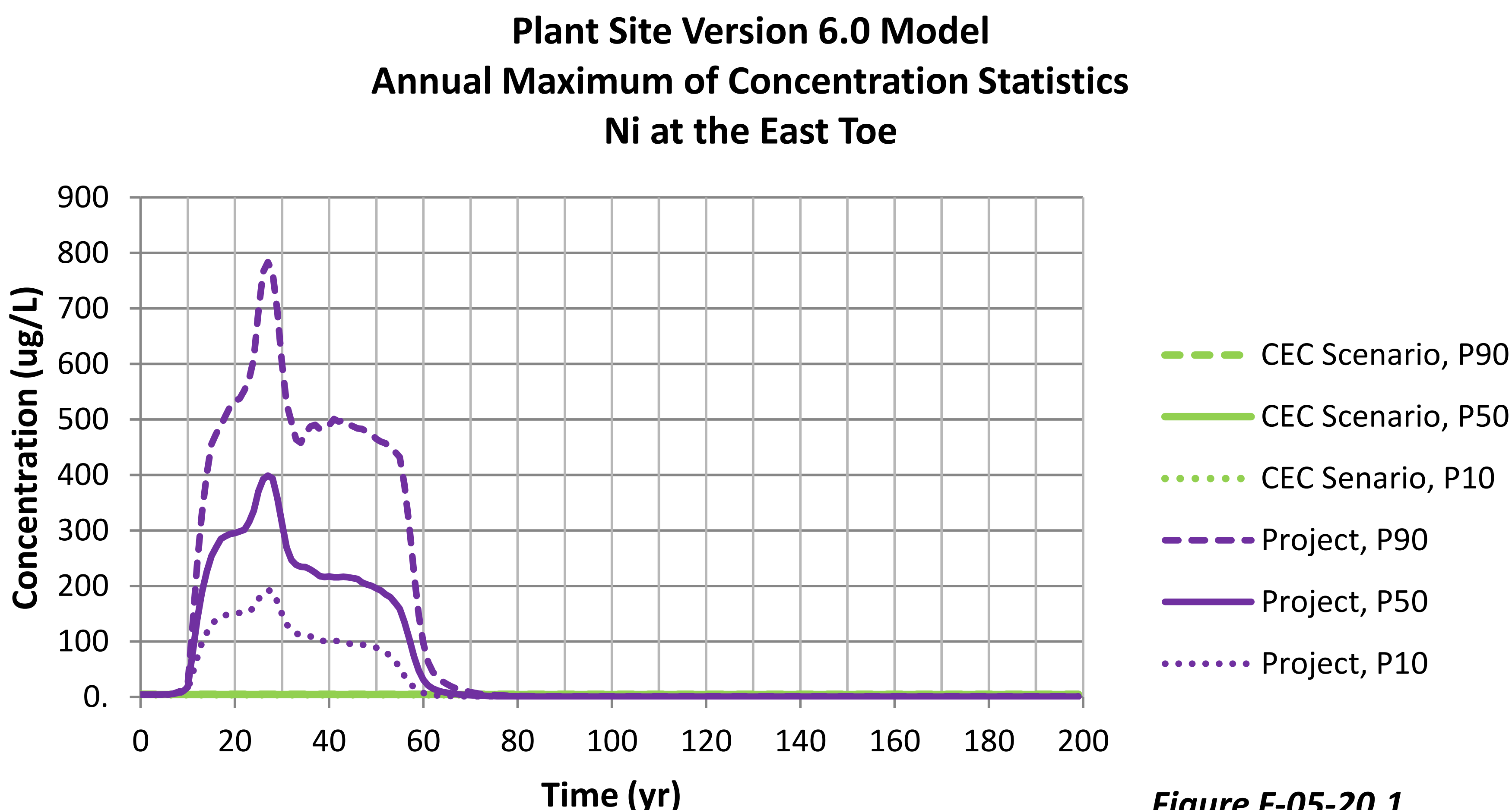

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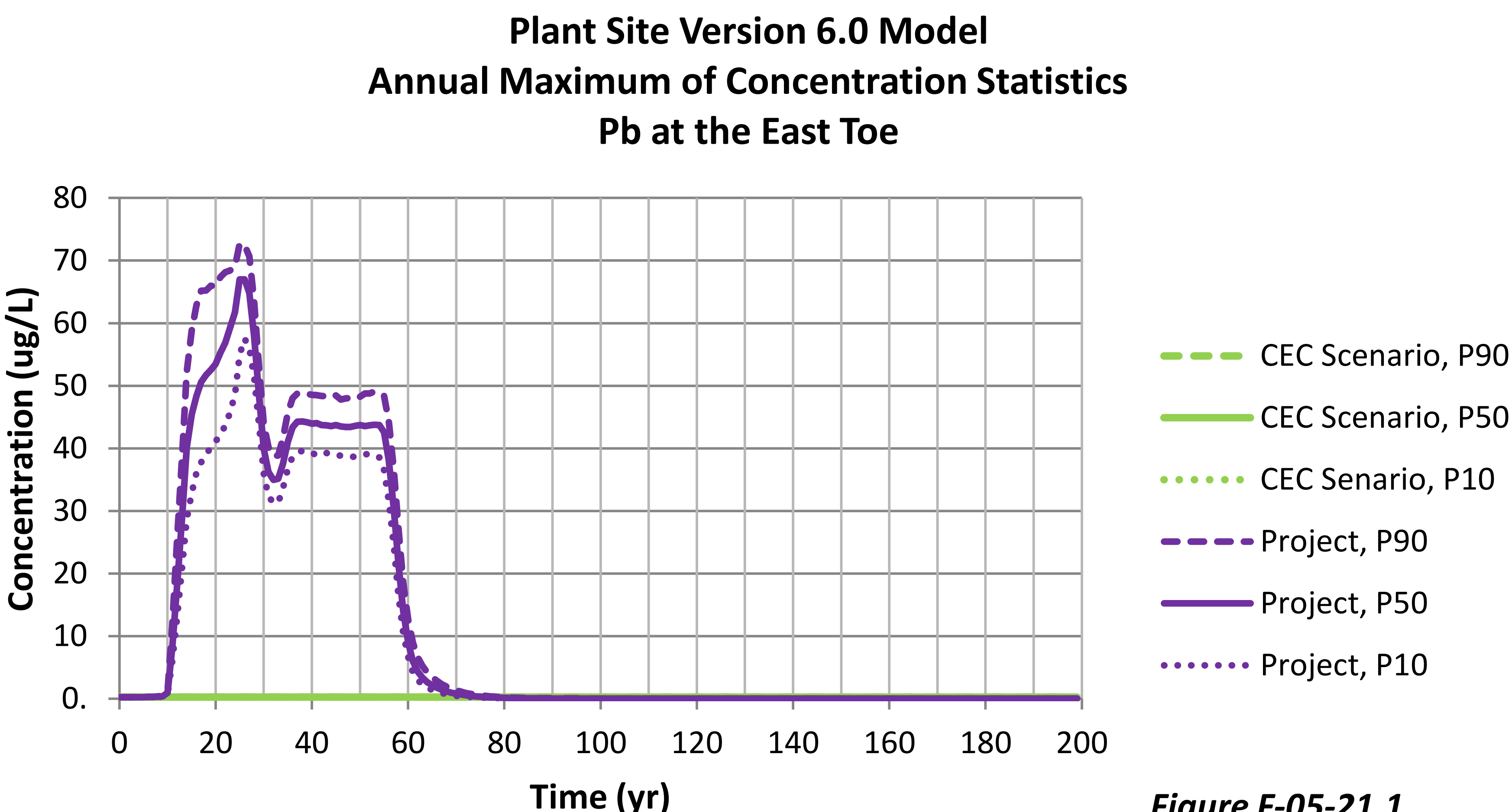

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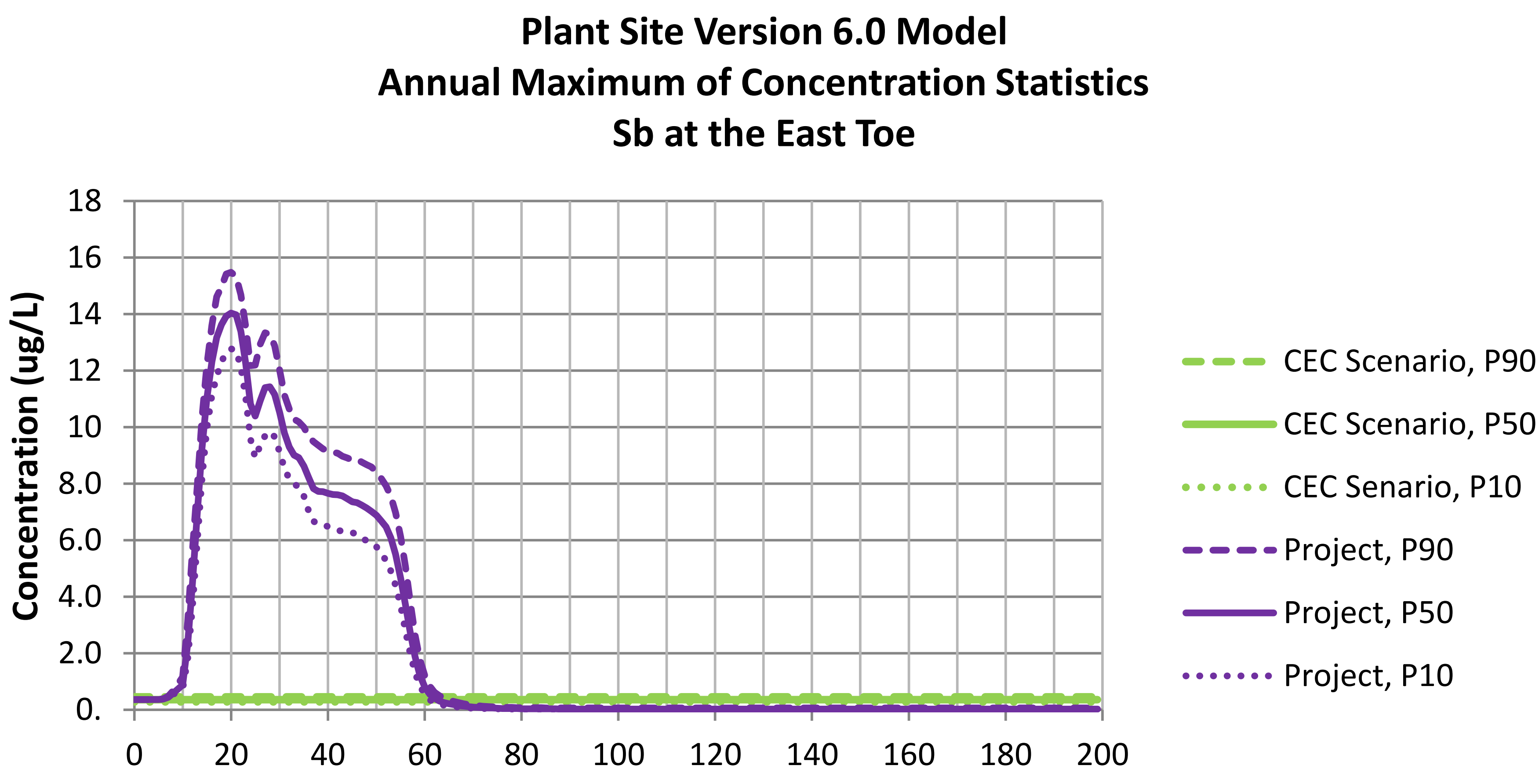
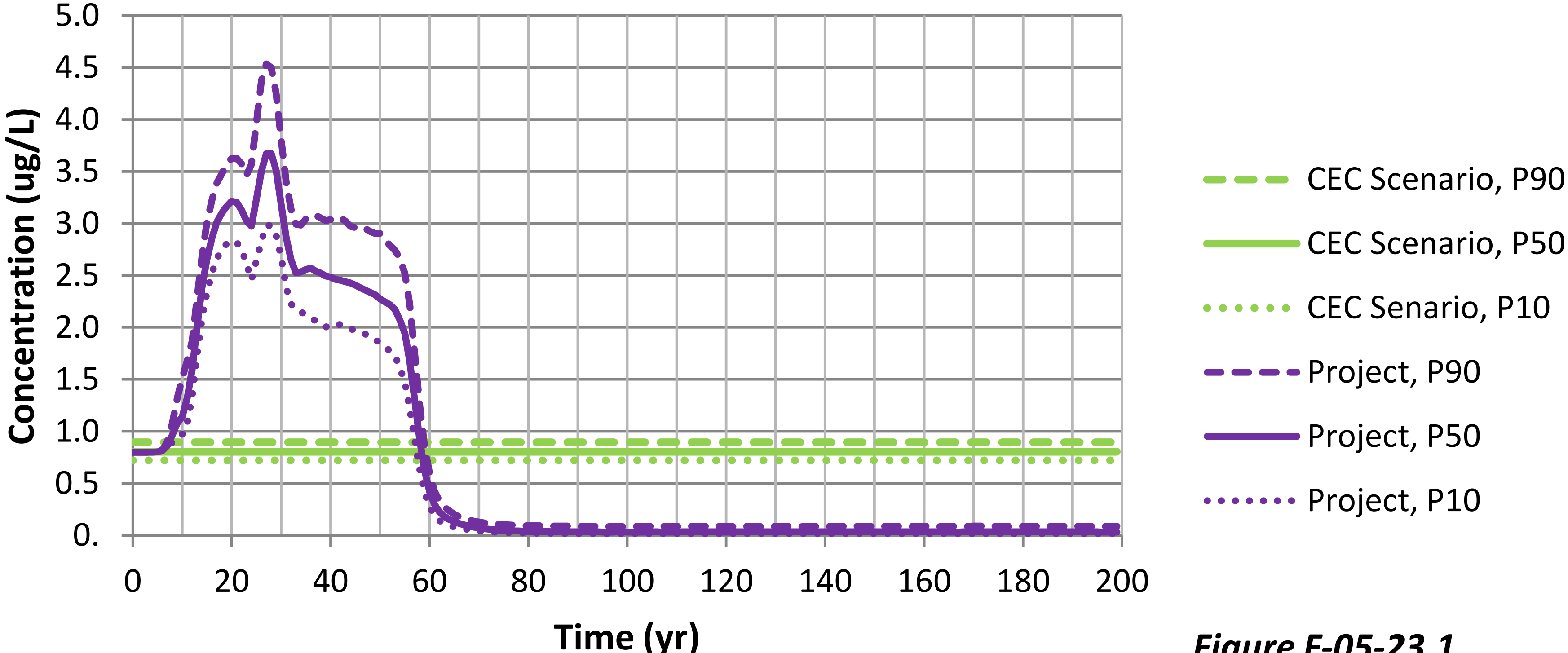


Figure F-05-22.1

Plant Site Version 6.0 Model
Annual Maximum of Concentration Statistics
Se at the East Toe



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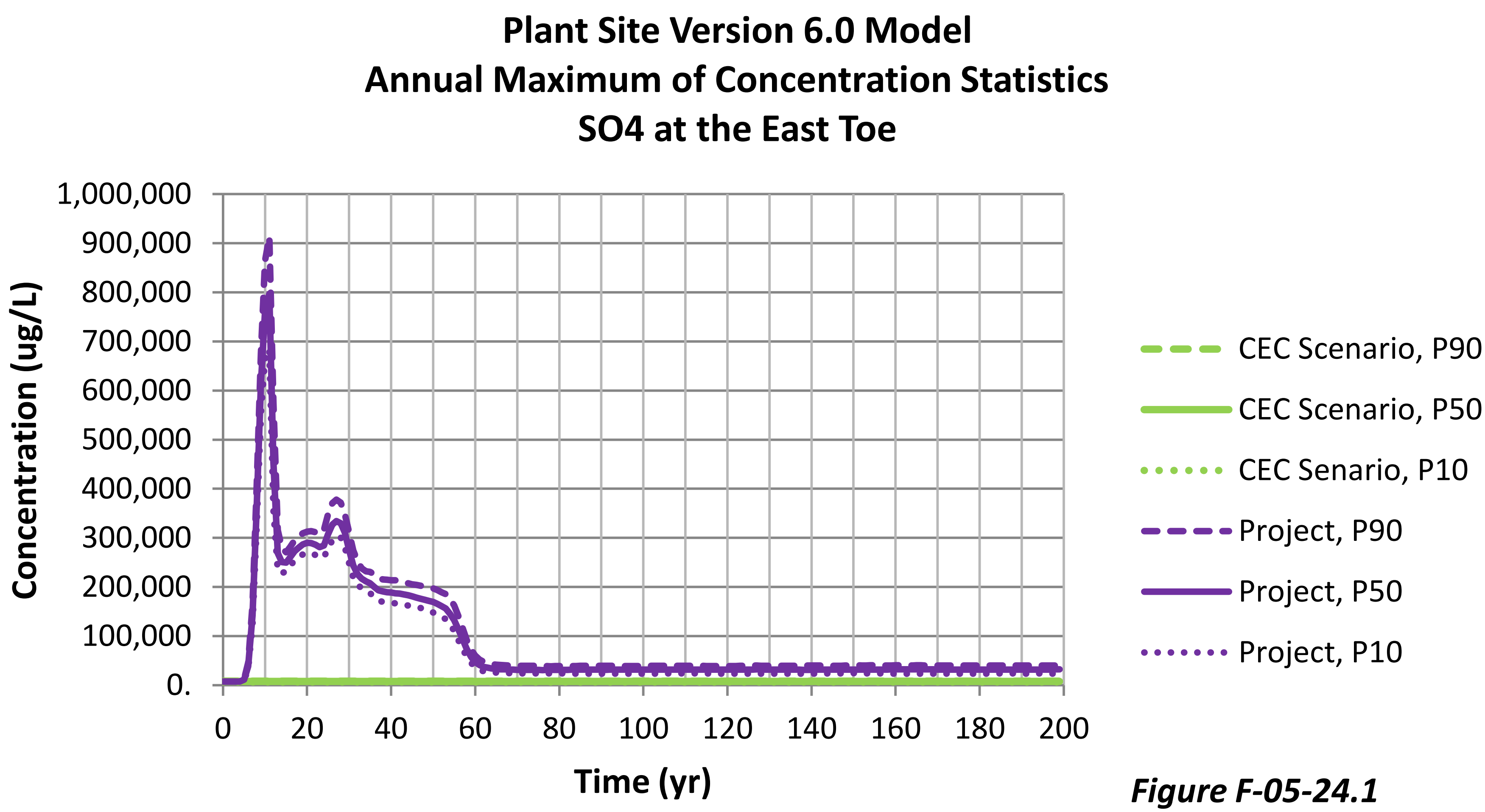


Figure F-05-24.1

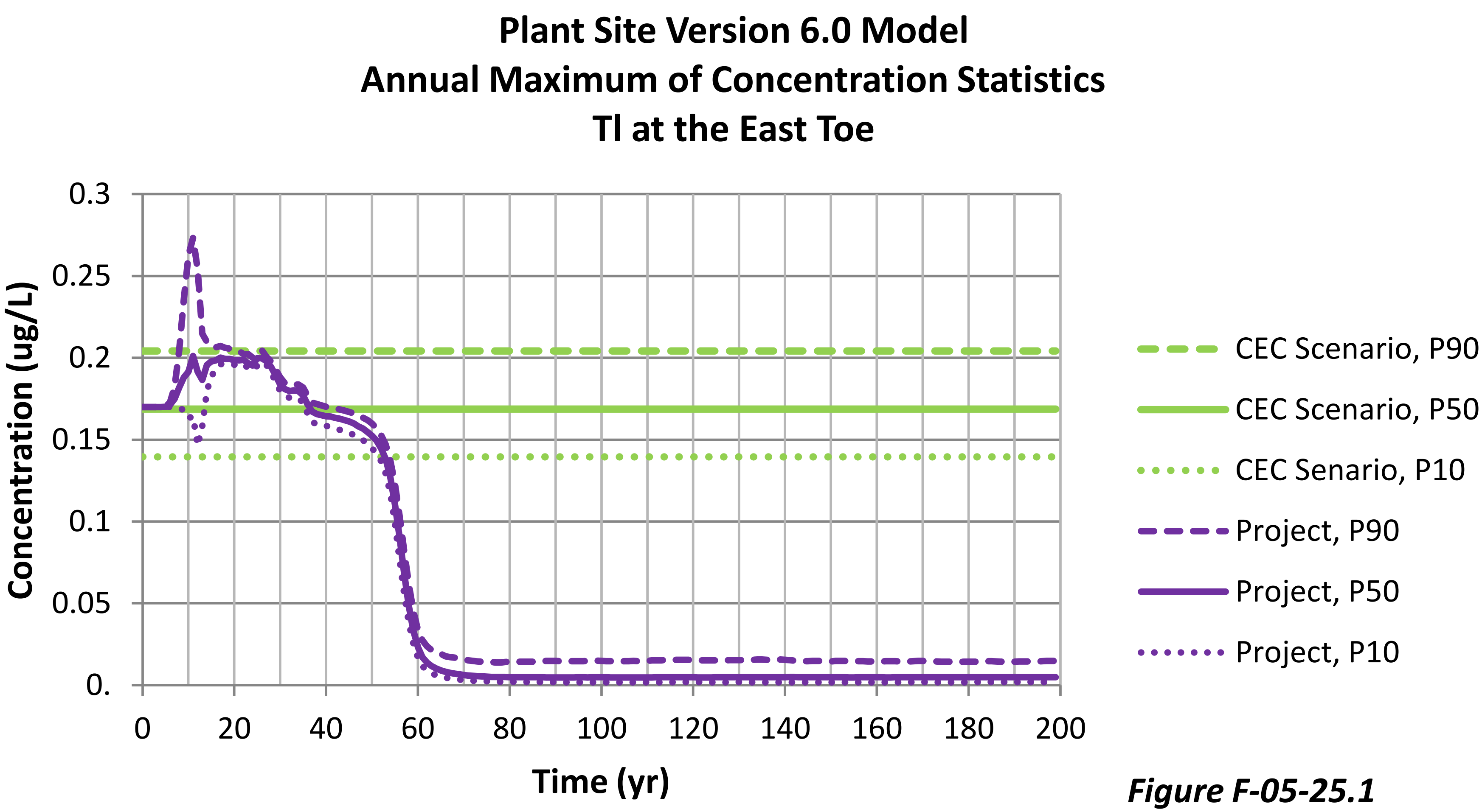
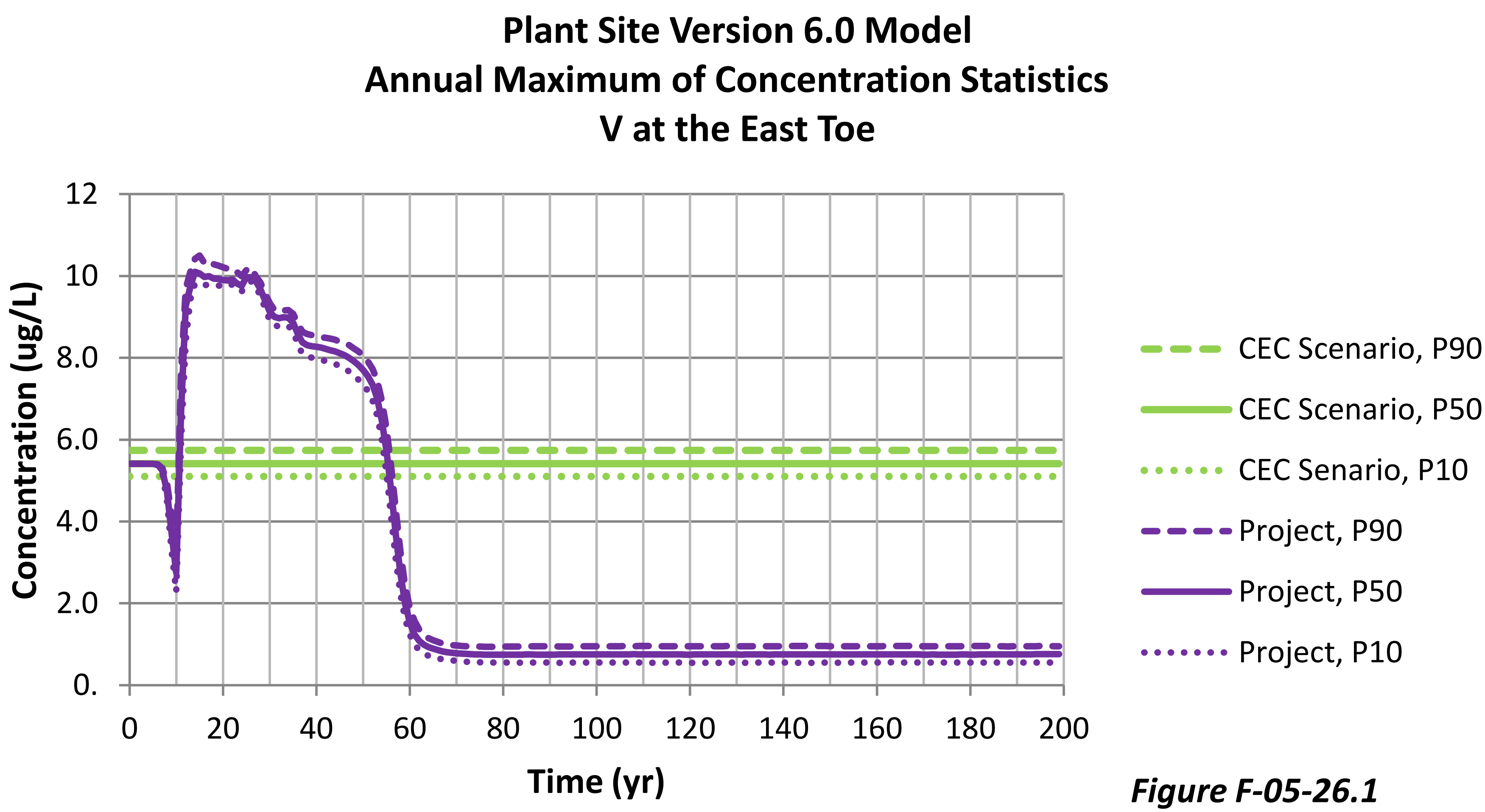


Figure F-05-25.1



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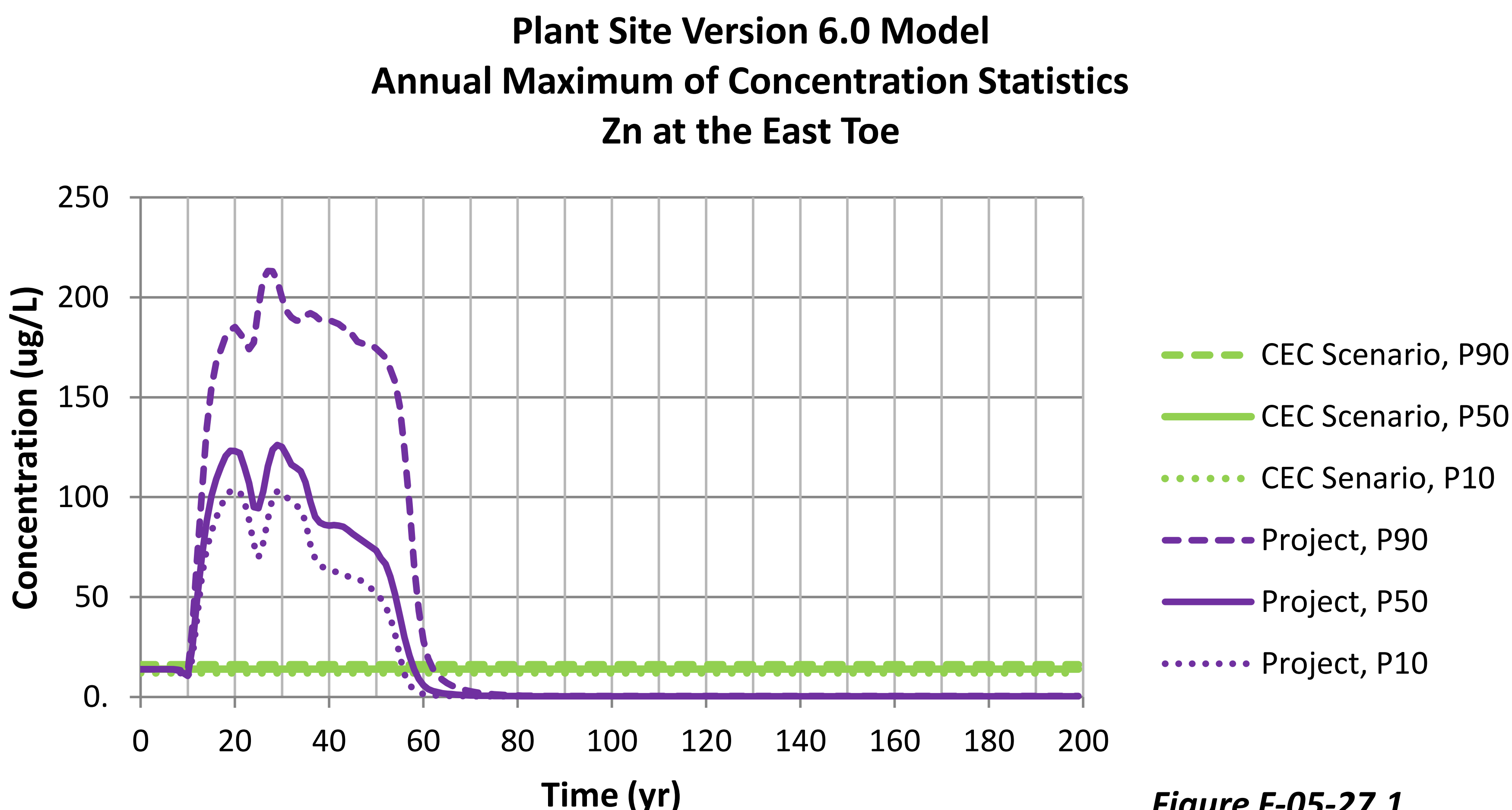


Figure F-05-27.1

Attachment G

Median Loading Rates to the Toes of the Tailings Basin (Culpability Analysis)

Attachment G Median Loading Rates to the Toes of the Tailings Basin (Culpability Analysis)

The plots in this attachment were created by taking the following steps:

- At any given time step, the mass loading rate (tonnes/yr) from every source contributing mass load to each of the Tailings Basin toes is calculated and stored. These sources are itemized in the legend of each figure.

- Once the 500 realizations are complete, at every monthly time step the loading rates of a particular constituent from a particular source were sorted minimum to maximum and the median value (250th) was chosen. This step was performed for all sources and all constituents.

- The monthly median loading rates of each constituent from each source were annualized by taking the average of the twelve monthly median loading rates each year. This results in one representative average annual median loading rate of each constituent from each source.

- A stacked bar graph is used to directly compare the average annual median loading rates from each source for any constituent to each of the four Tailings Basin toes. The source (uniquely colored in each figure) which covers the most area of the graph at any given time is therefore the most culpable source. Showing a time series graph of loading rates also helps show how the culpable source may change through time.

The figure numbering convention is "**Figure W-XX-YY**" where:

- **W** indicates the Attachment.

- **XX** is a counter indicating the location; in this attachment it will count from "01" to "04" to account for the north toe, northwest toe, south toe, and west toe in that order.

- **YY** is a counter indicating the constituent; in this attachment it will count from "01" to "27" to show the 27 independently modeled constituents.

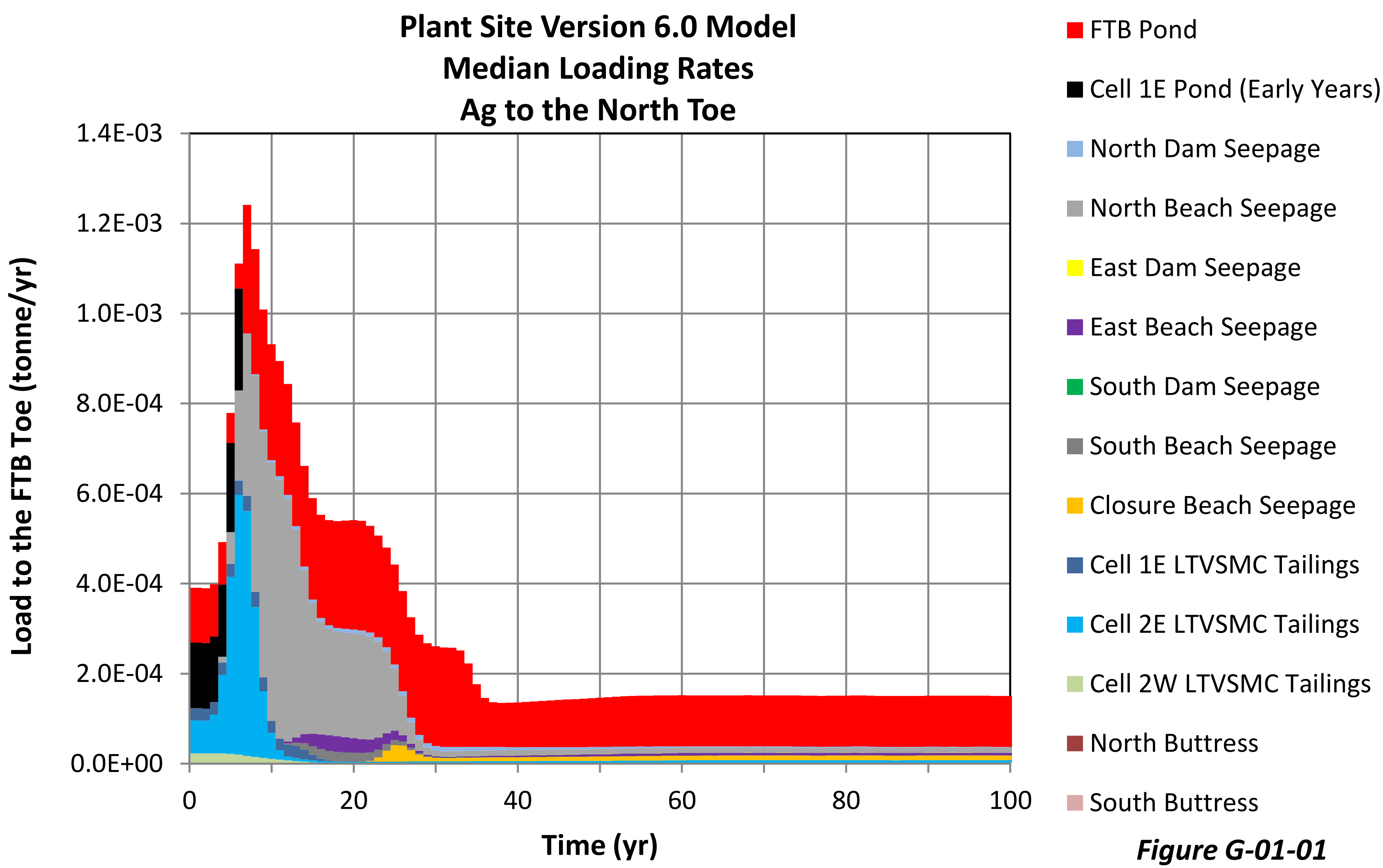


Figure G-01-01

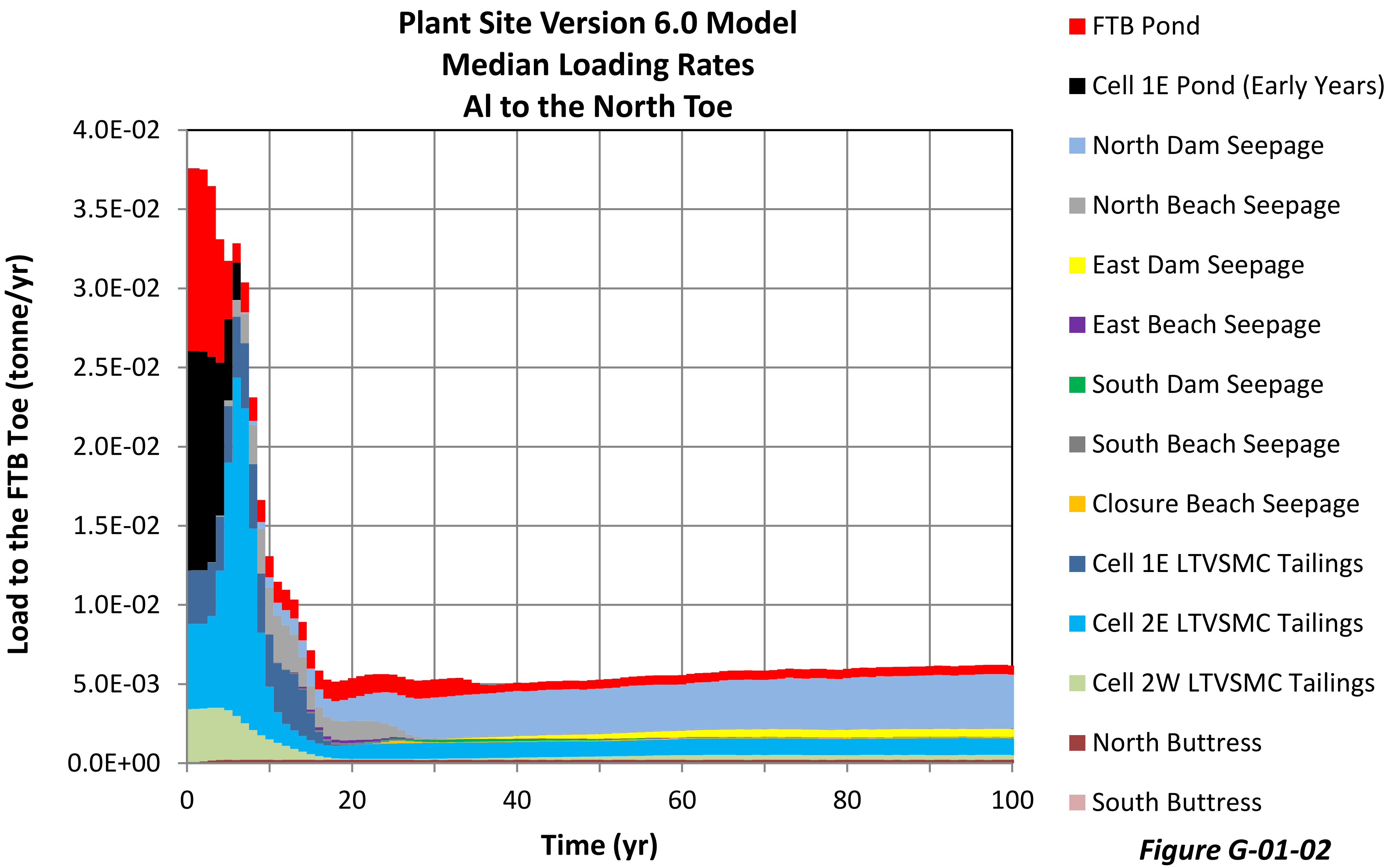


Figure G-01-02

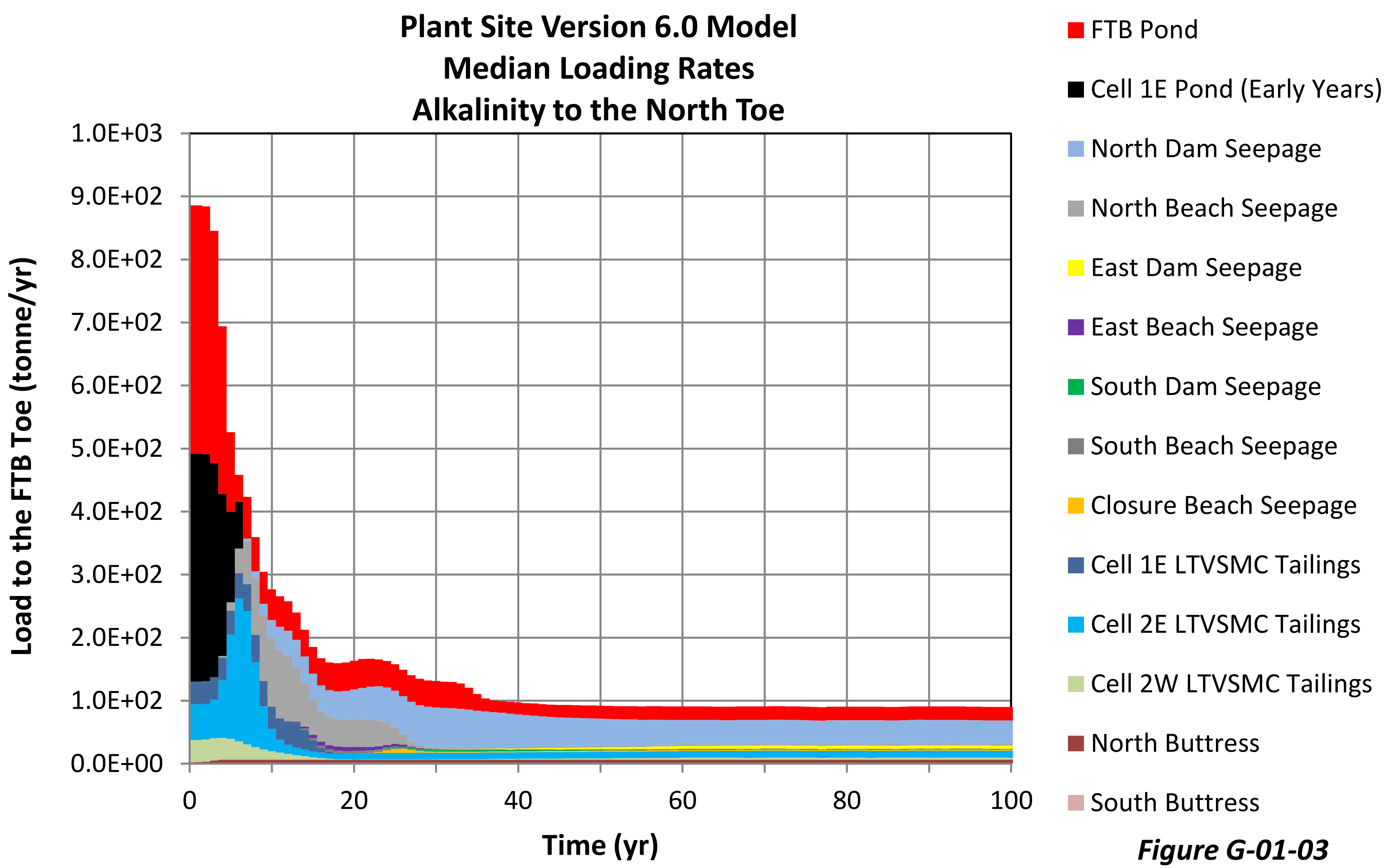


Figure G-01-03

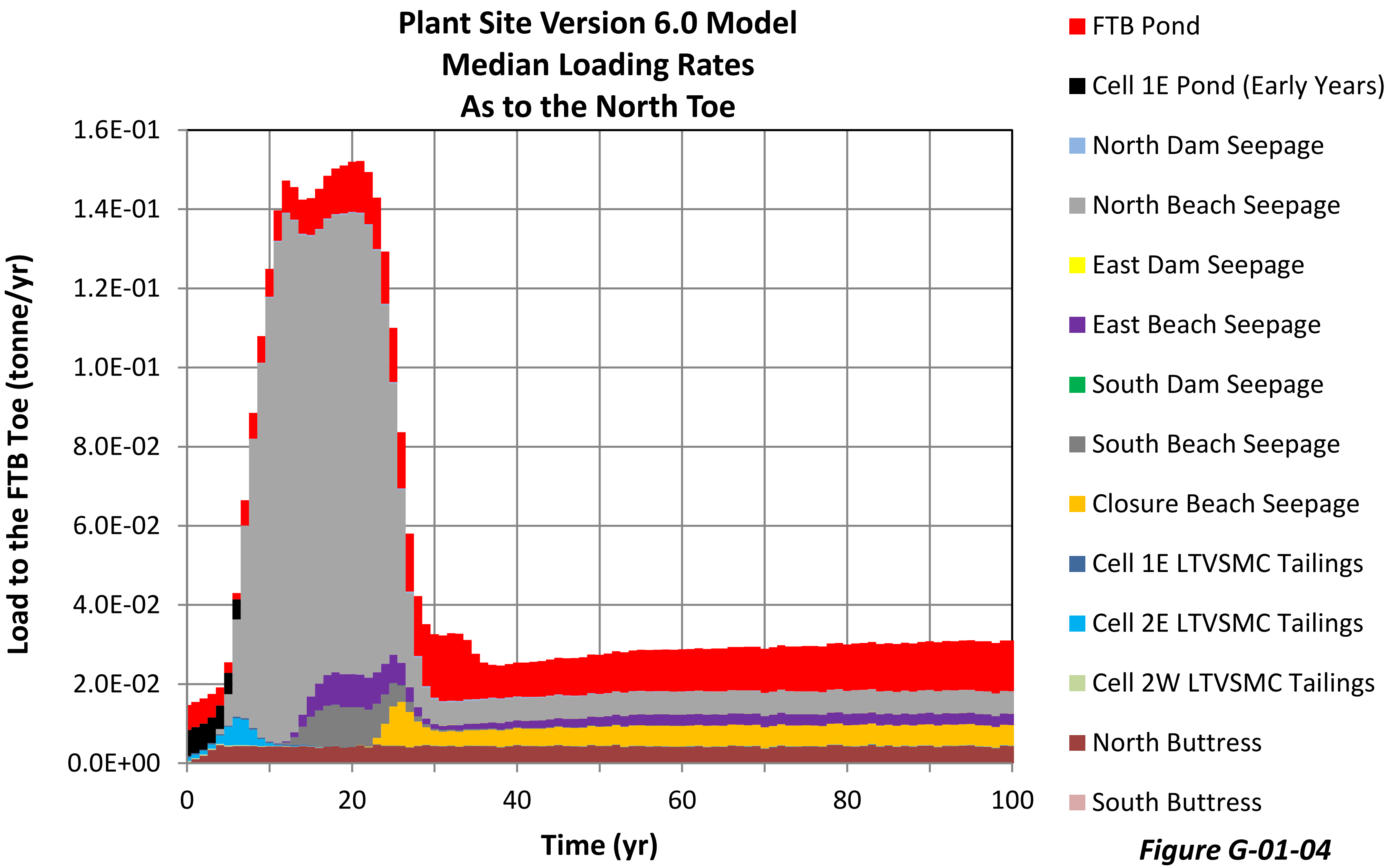


Figure G-01-04

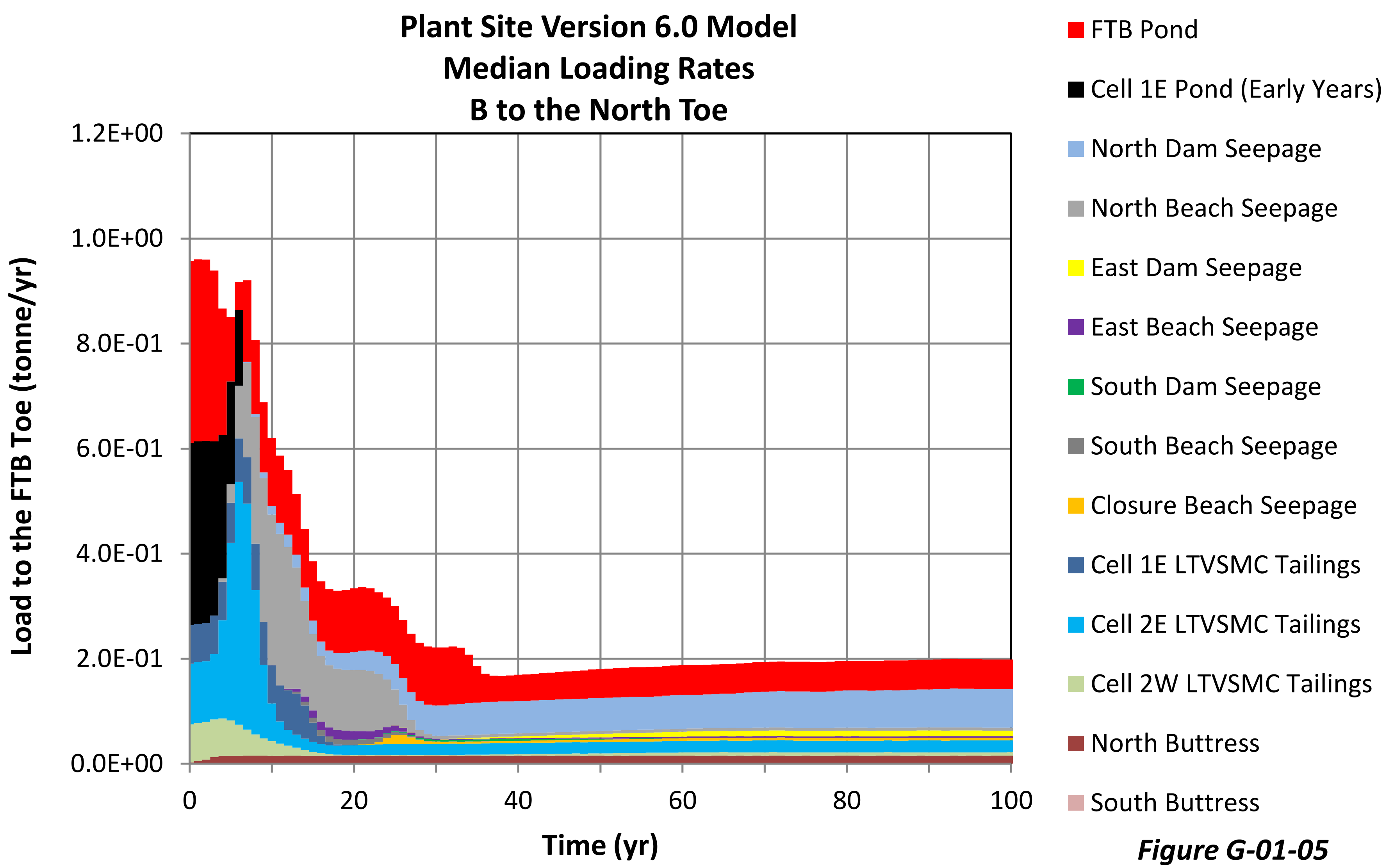


Figure G-01-05

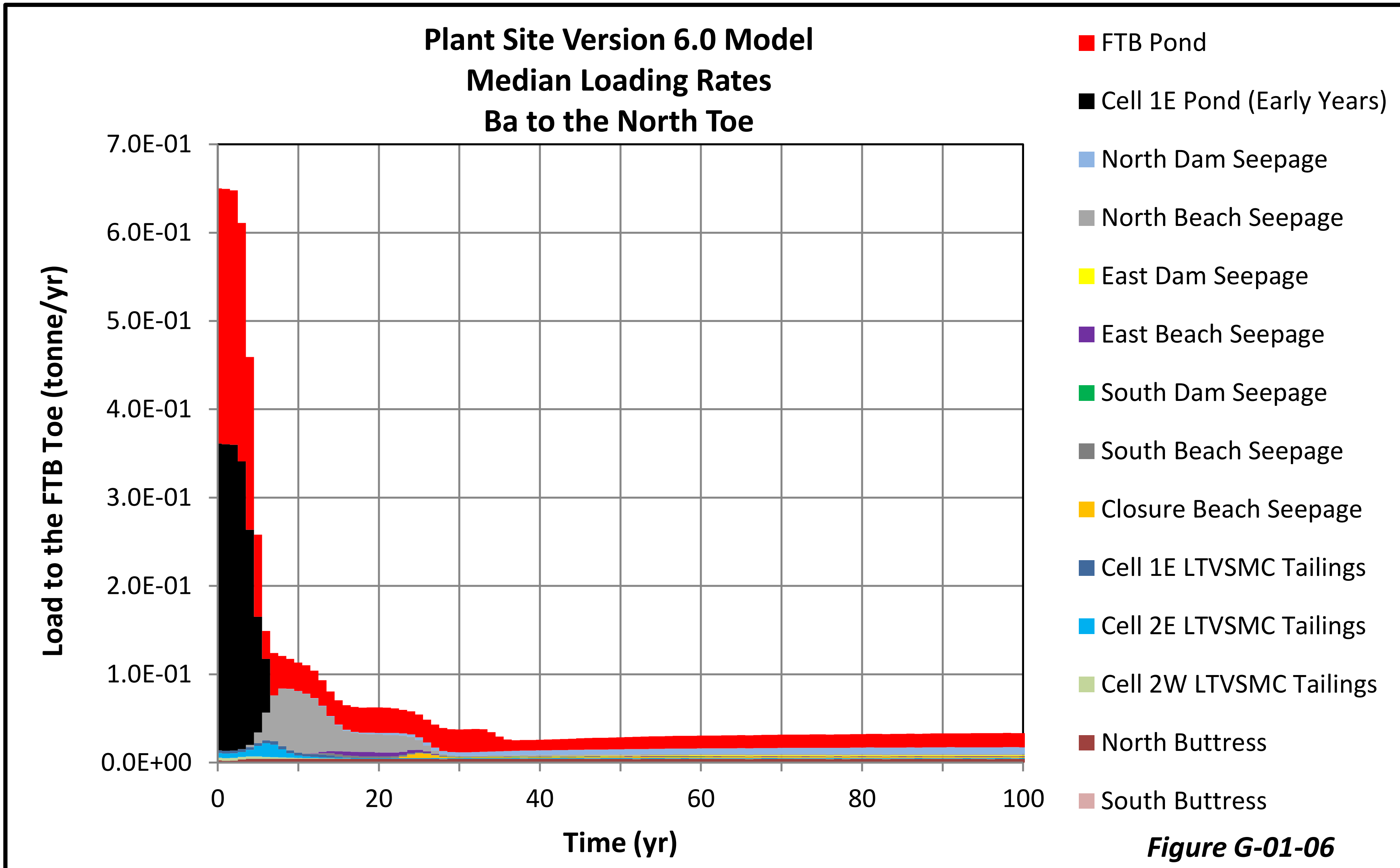
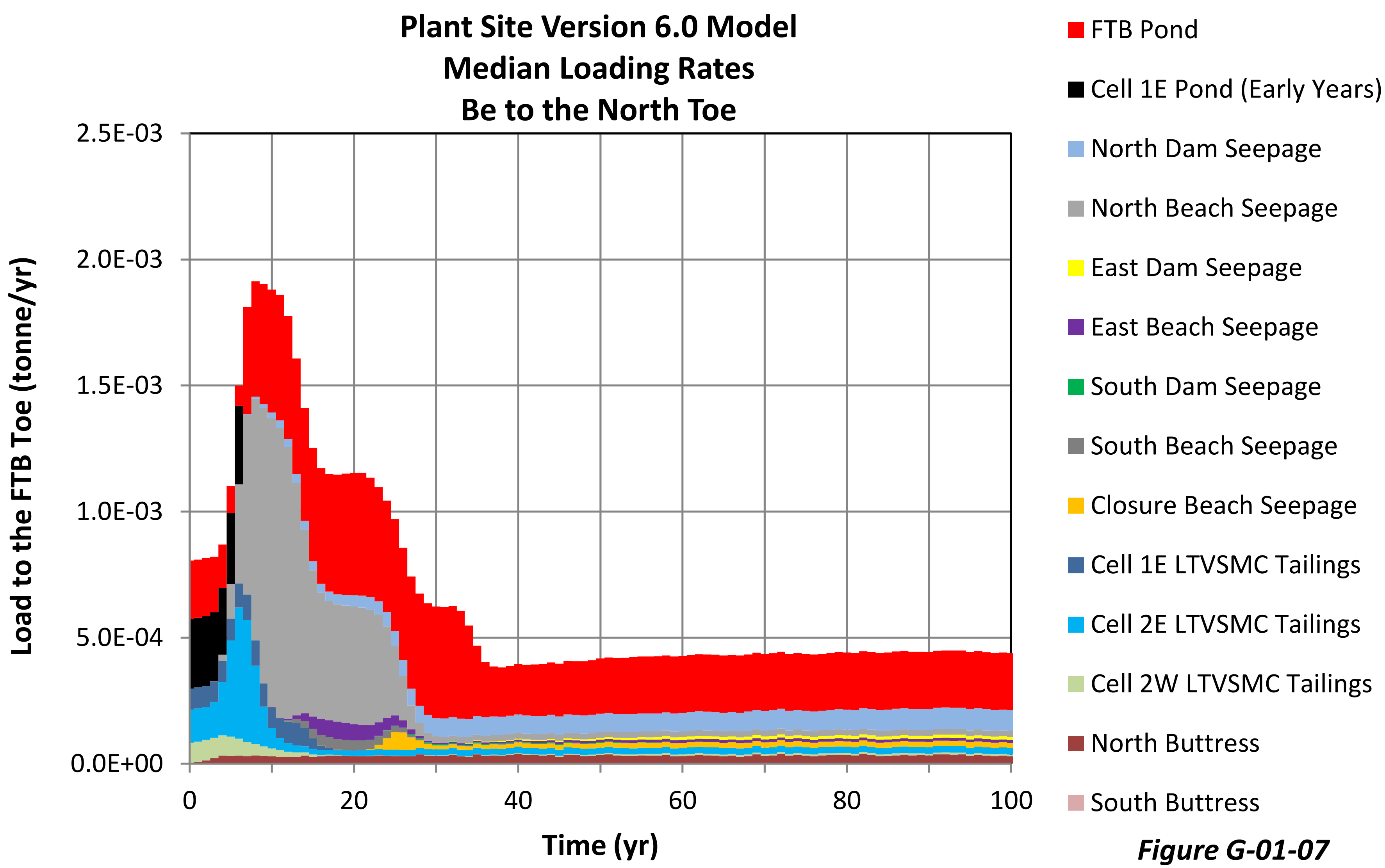


Figure G-01-06



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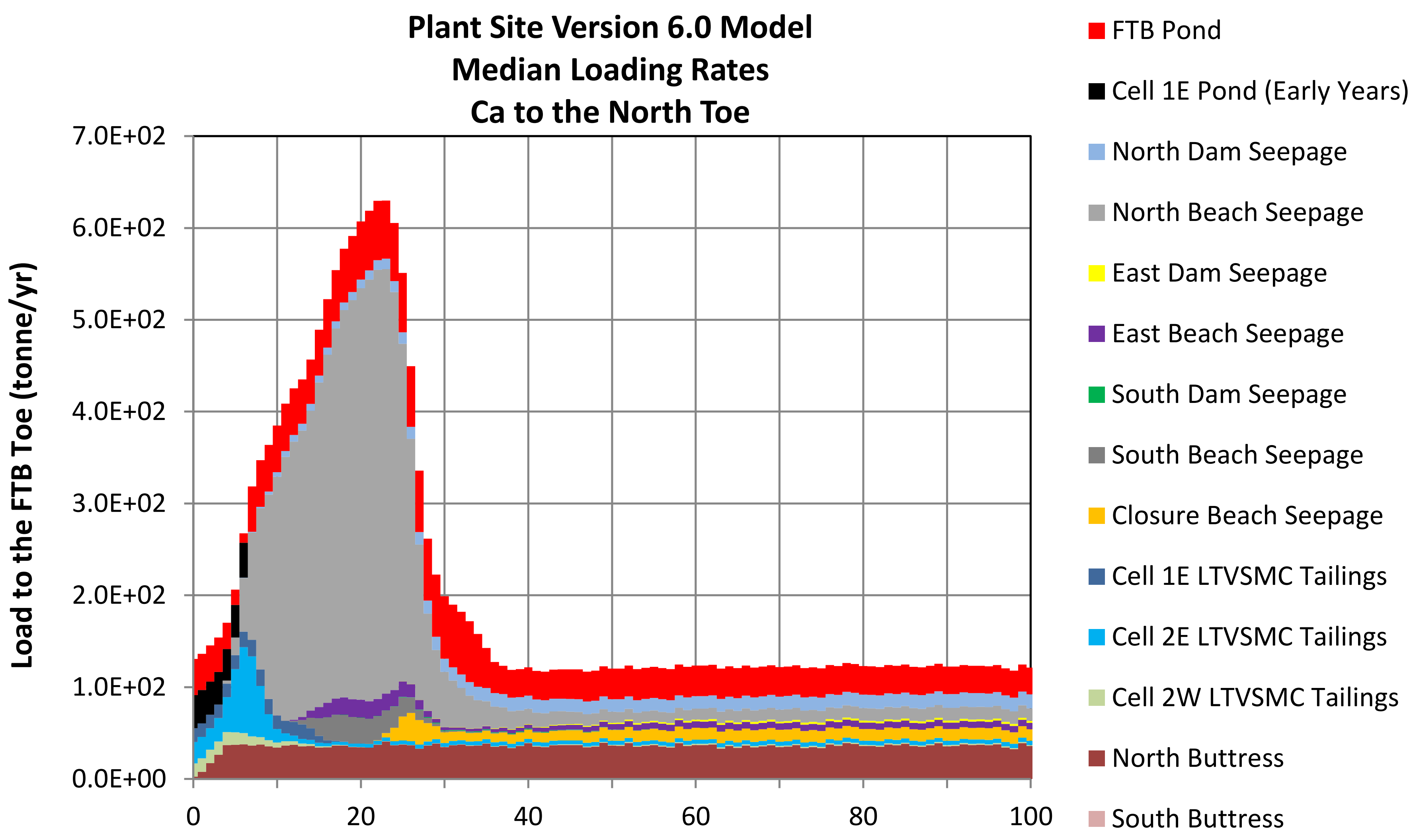
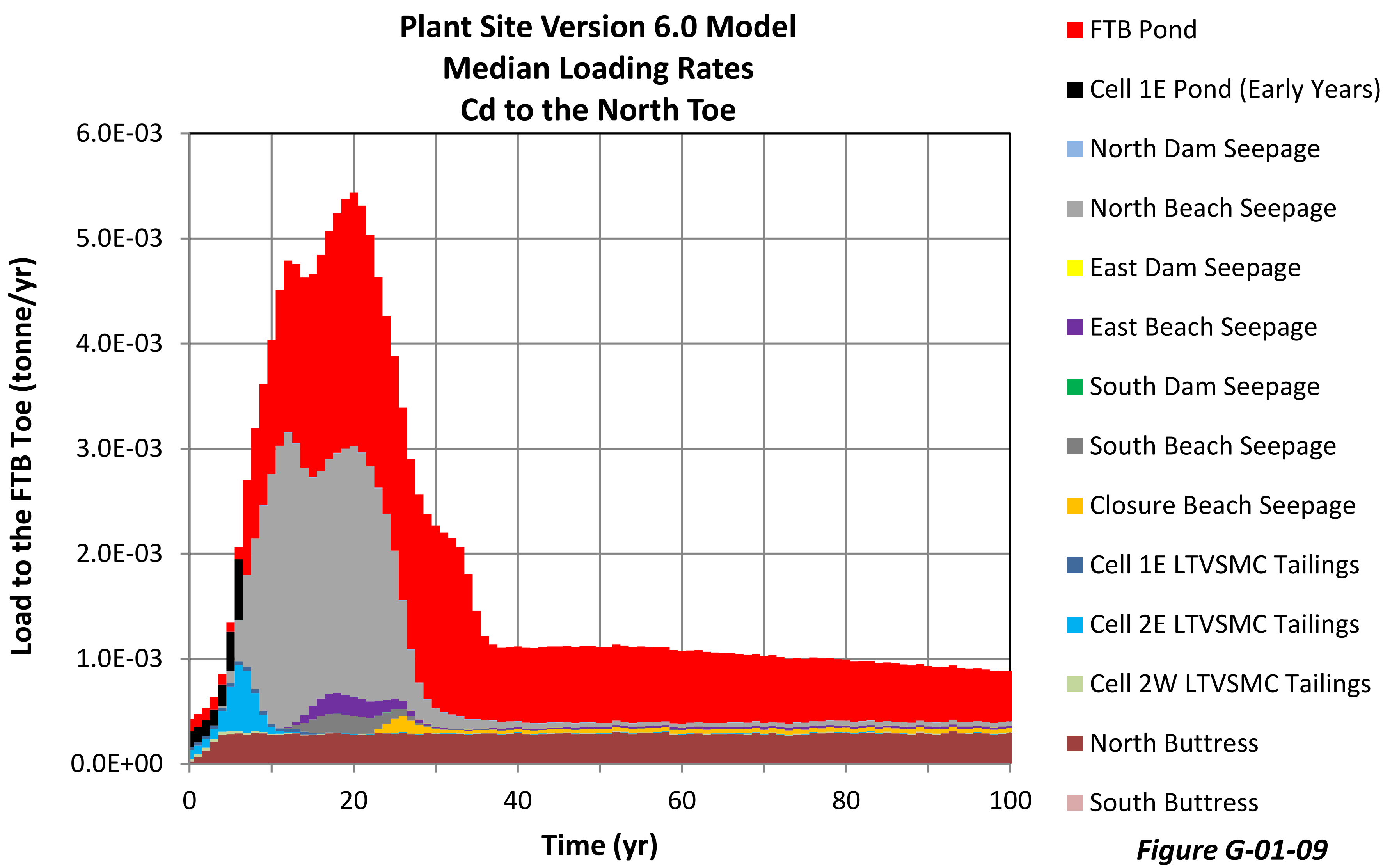


Figure G-01-08



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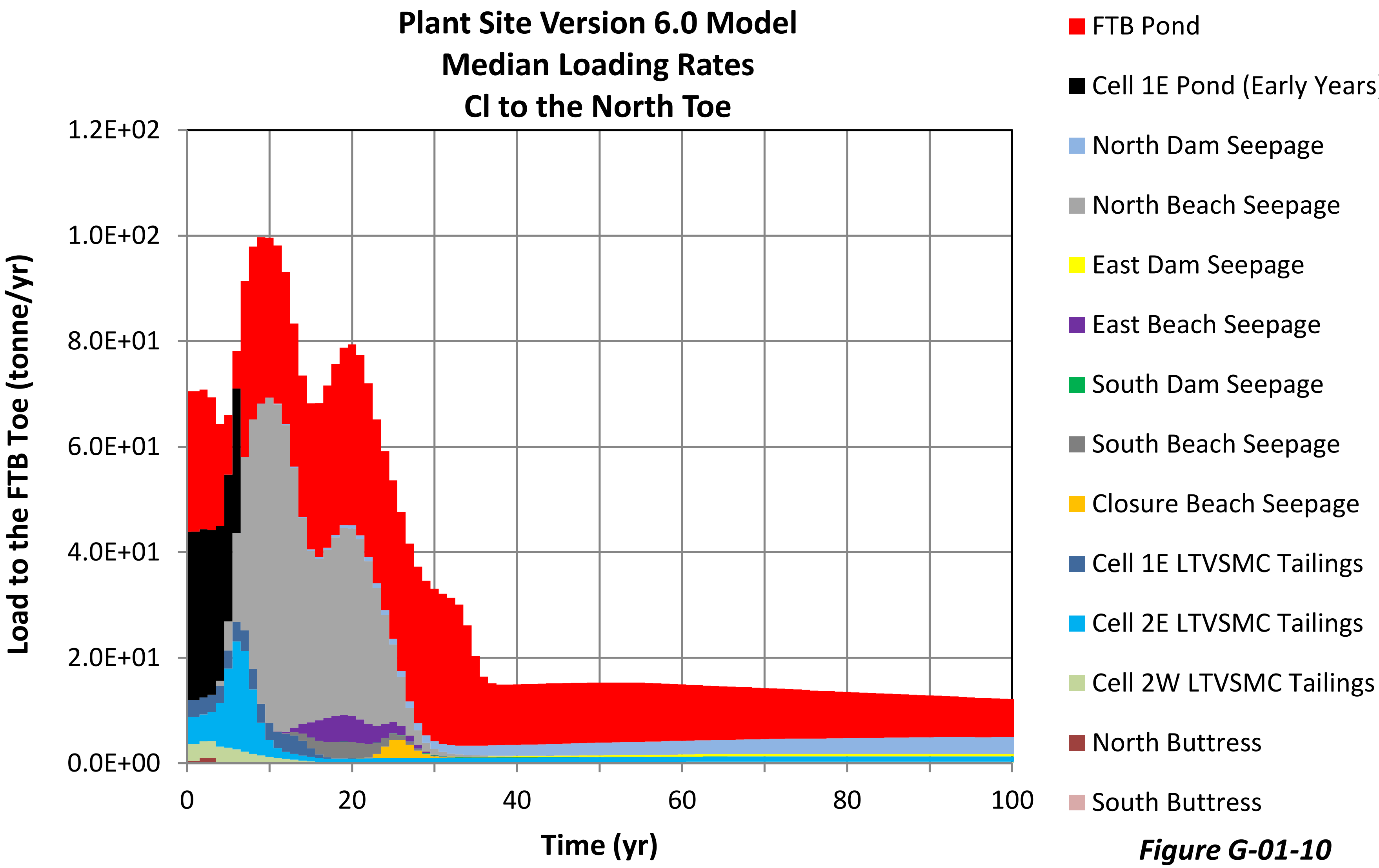


Figure G-01-10

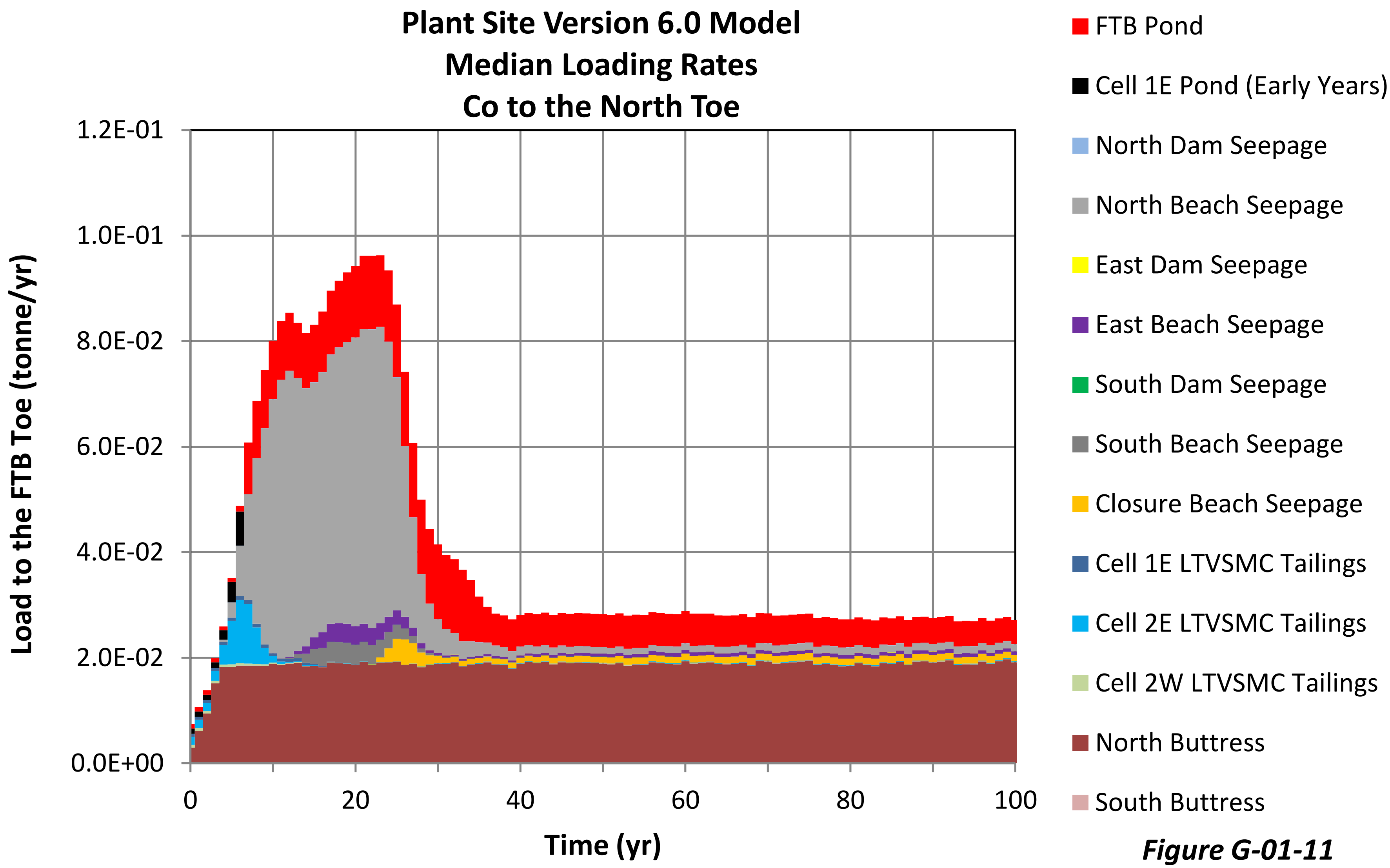


Figure G-01-11

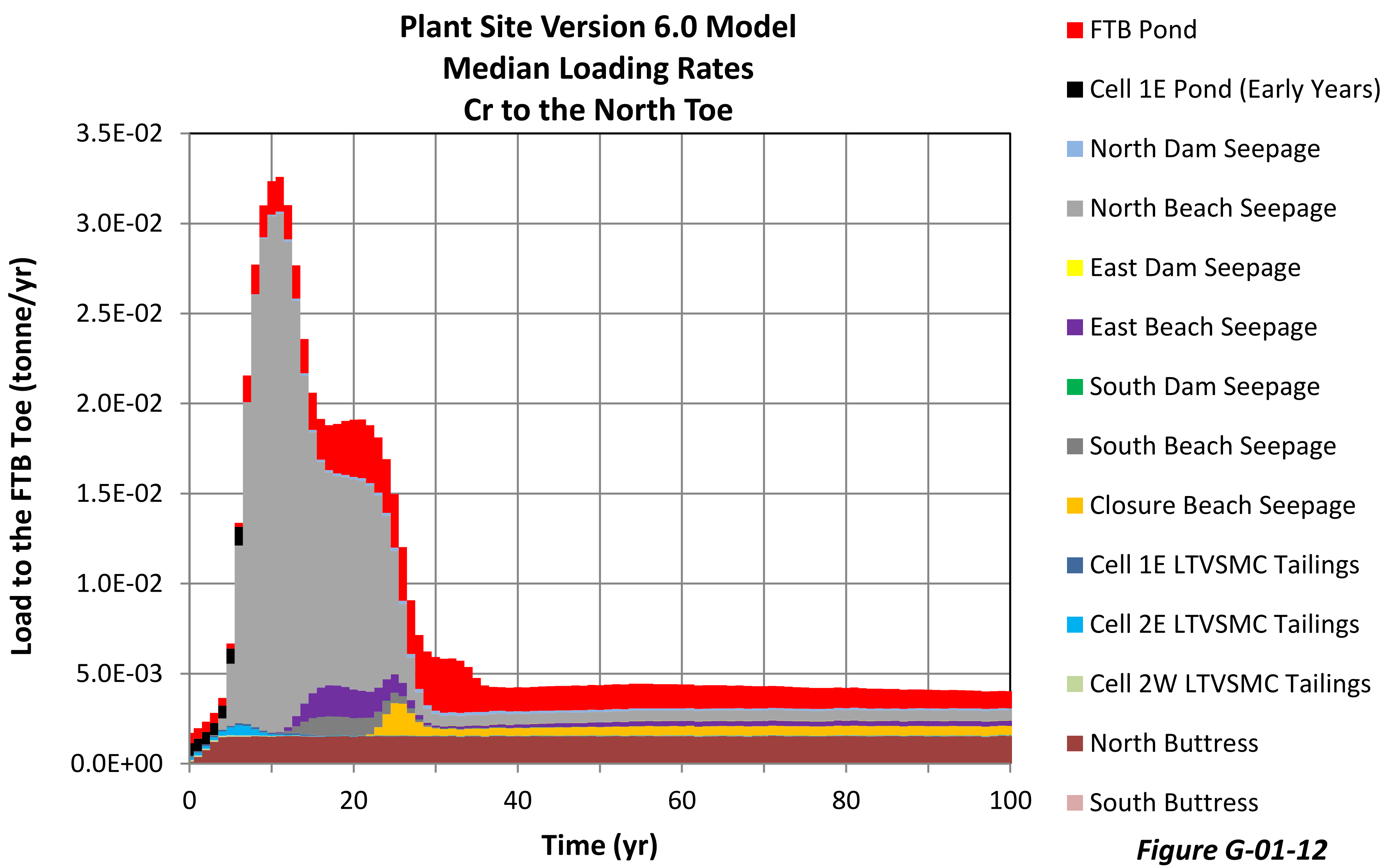


Figure G-01-12

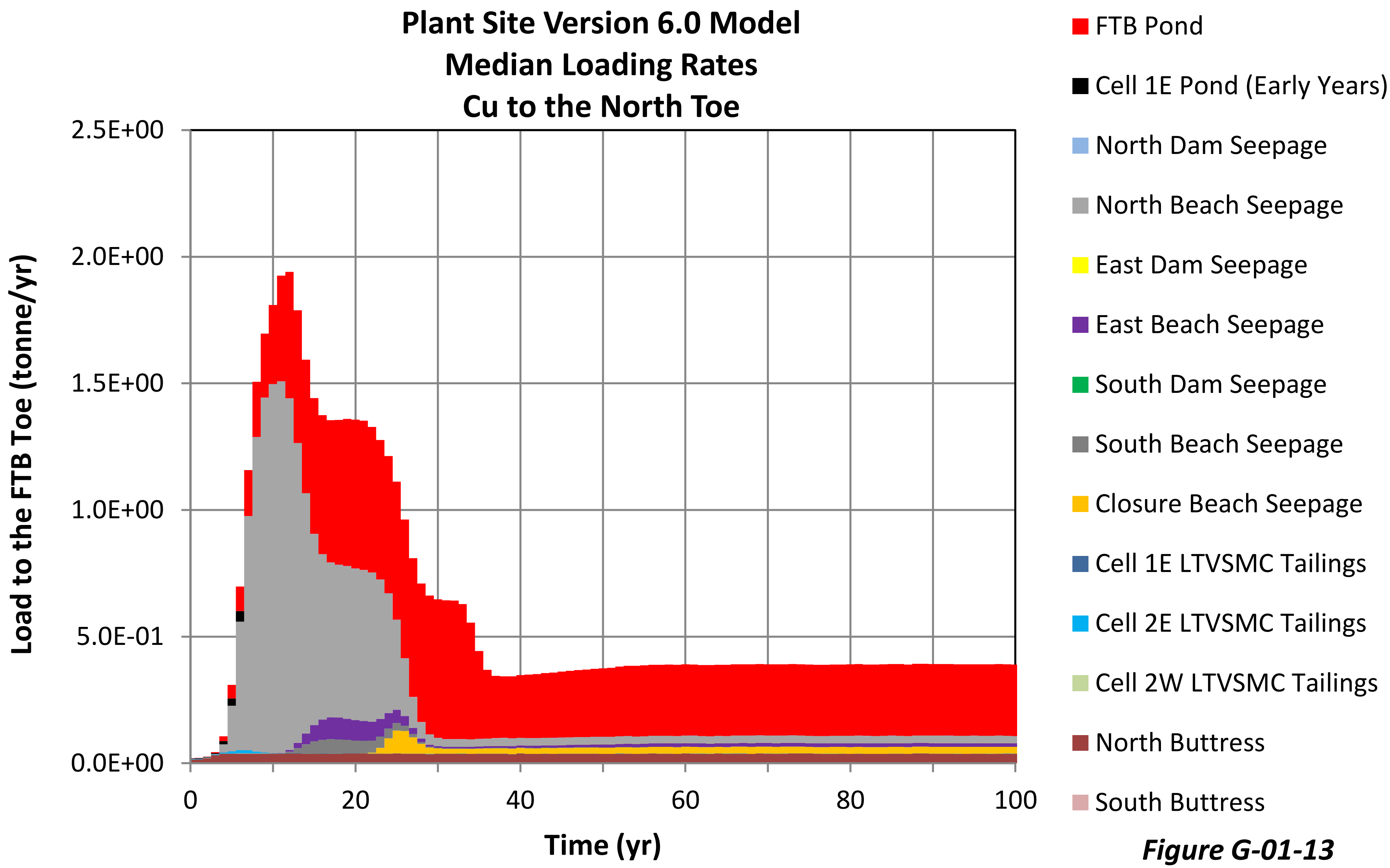


Figure G-01-13

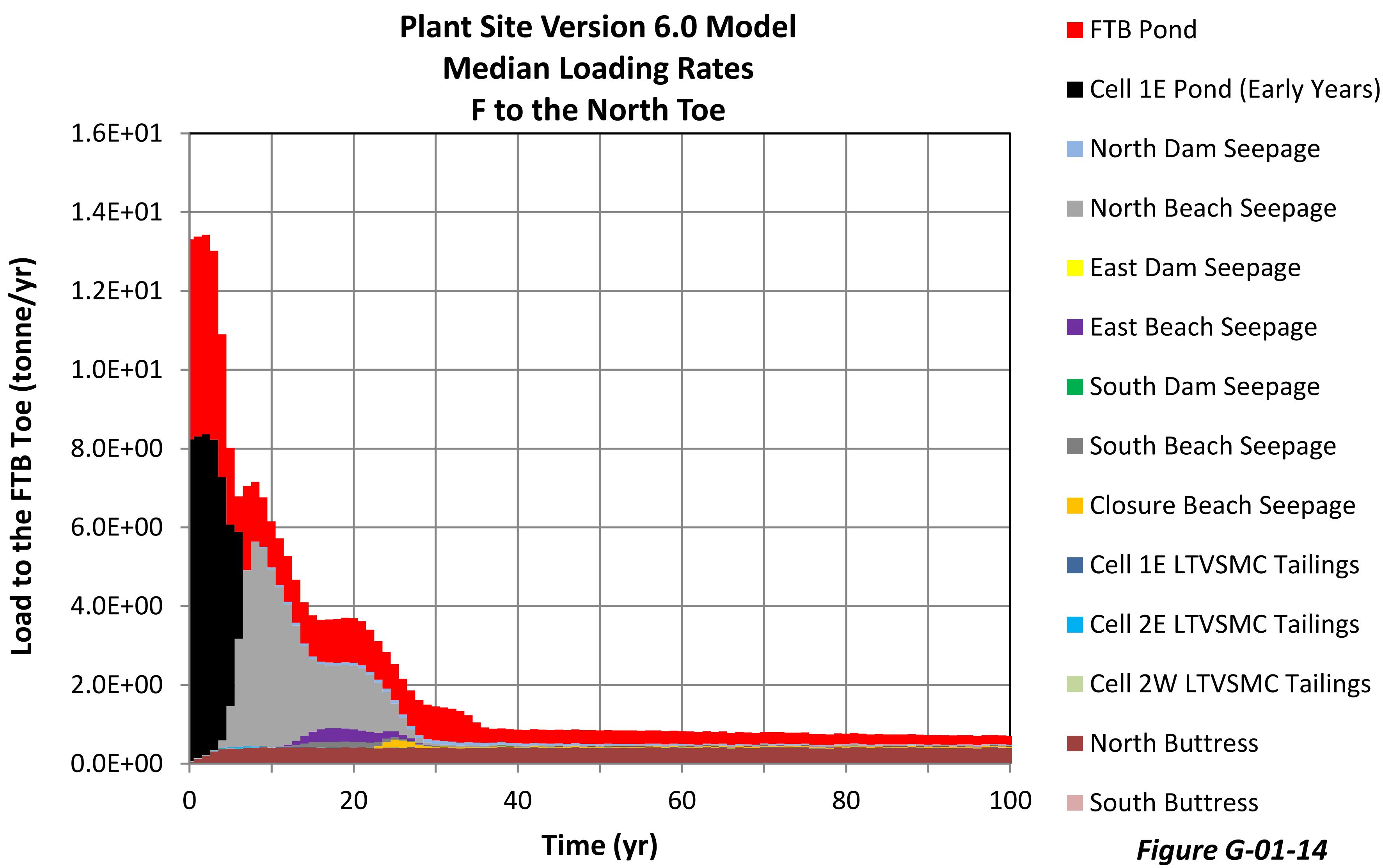


Figure G-01-14

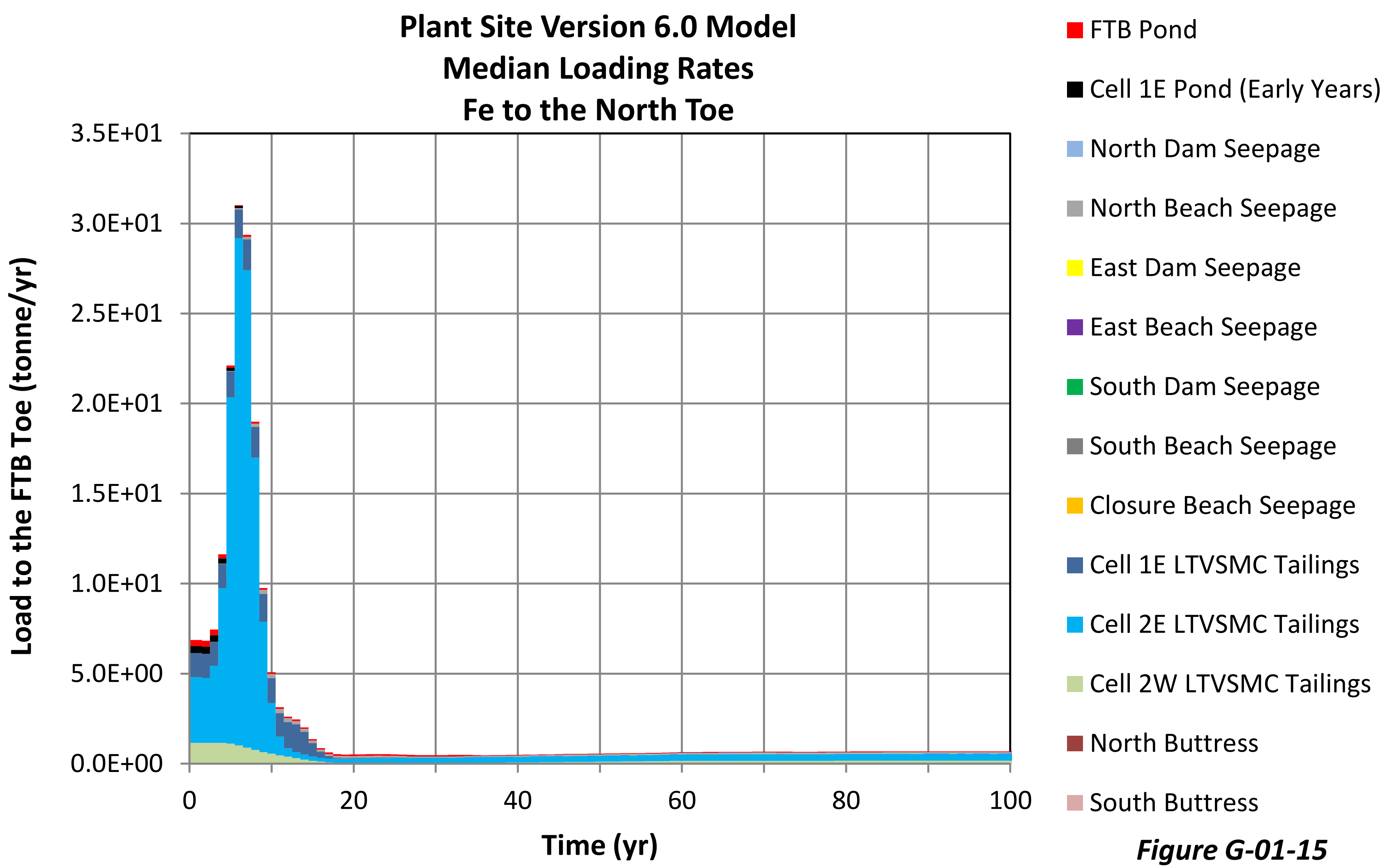


Figure G-01-15

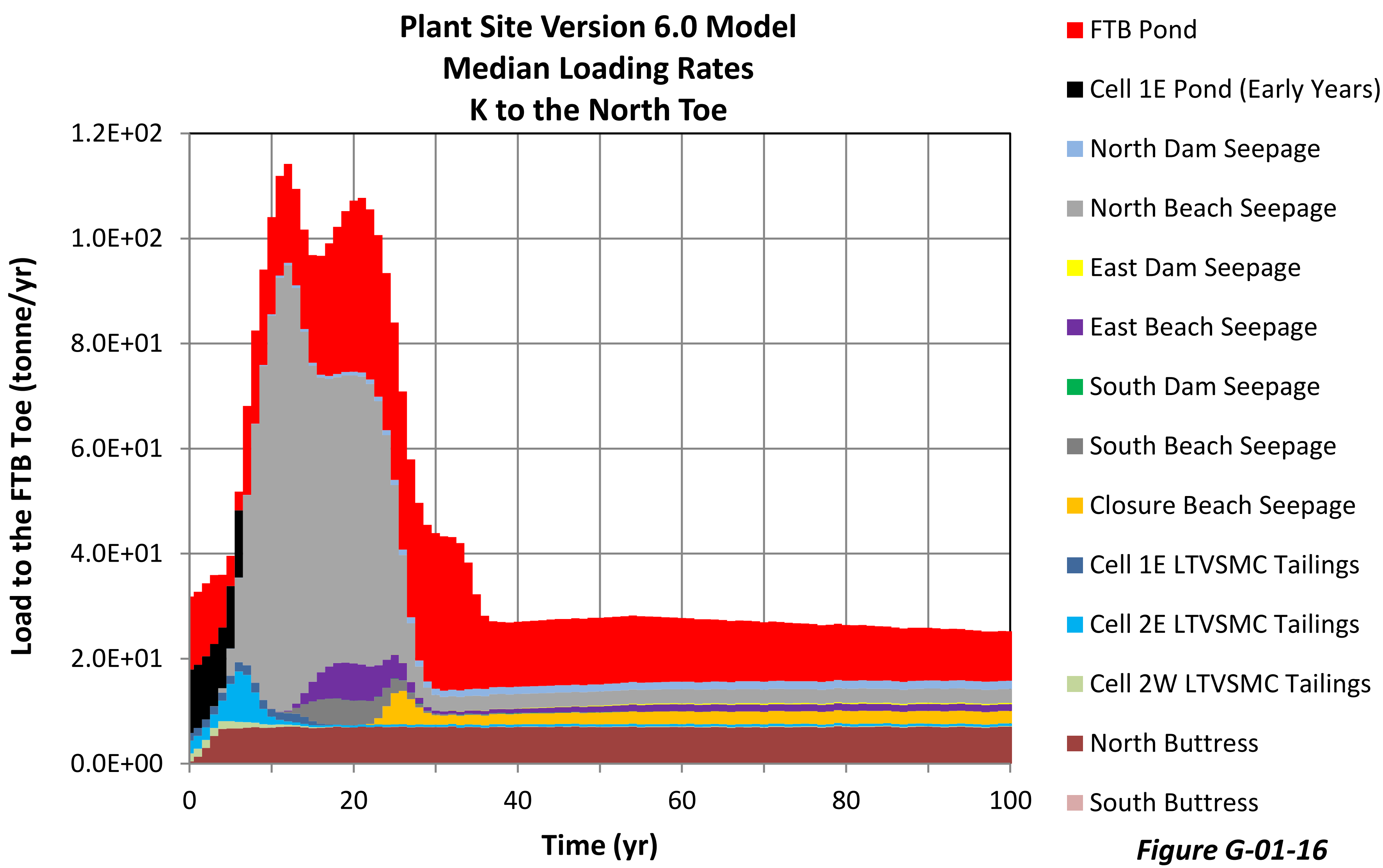


Figure G-01-16

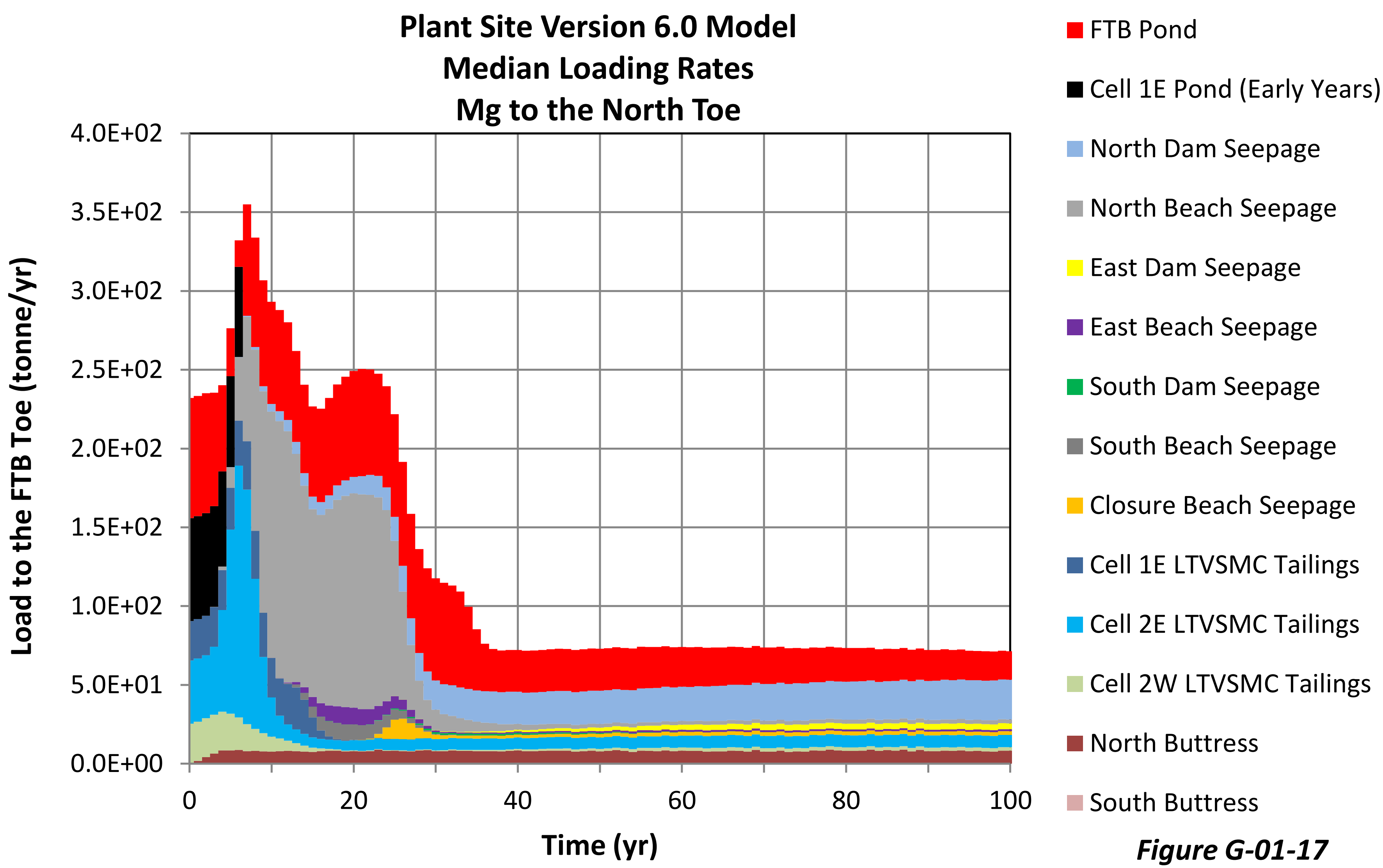


Figure G-01-17

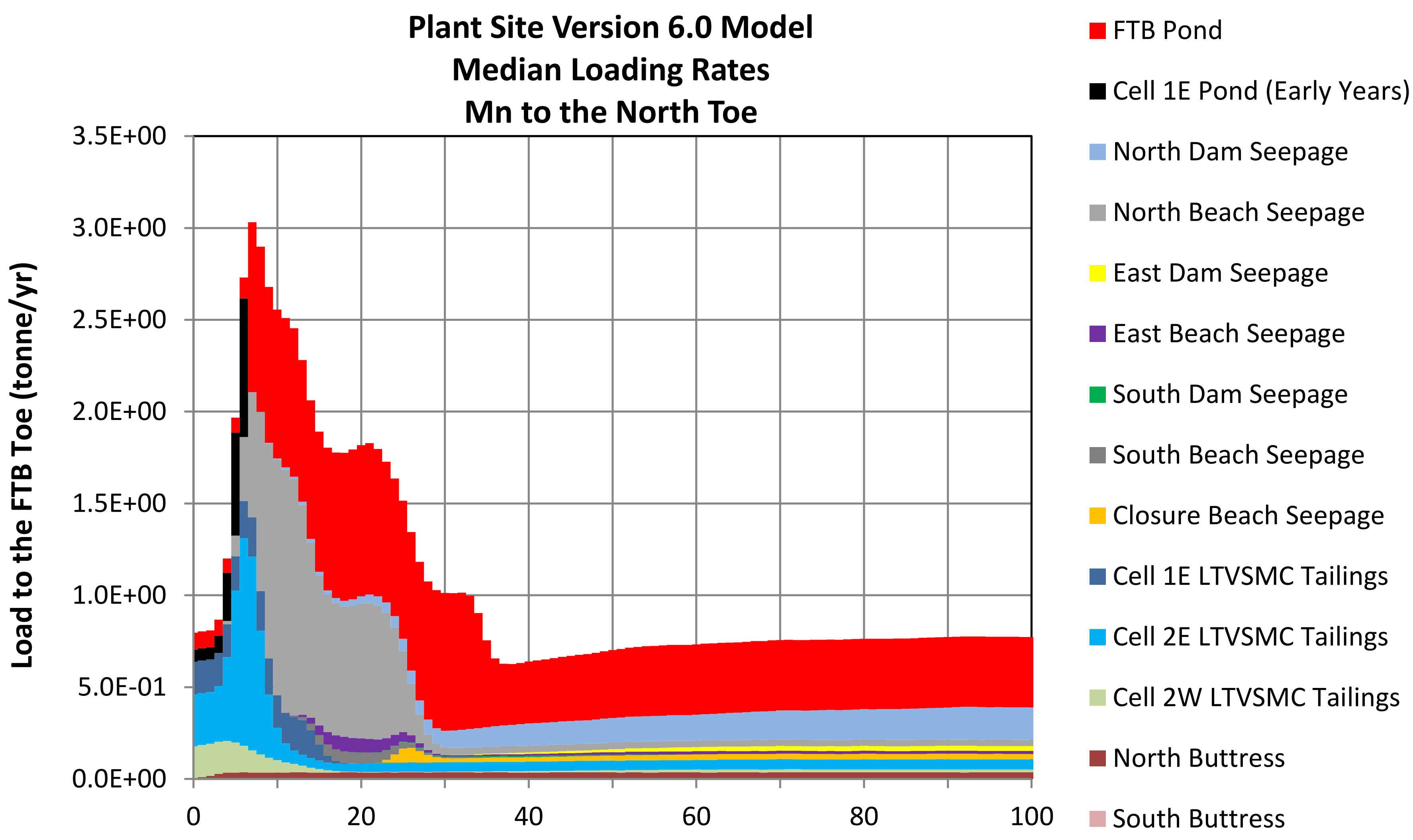


Figure G-01-18

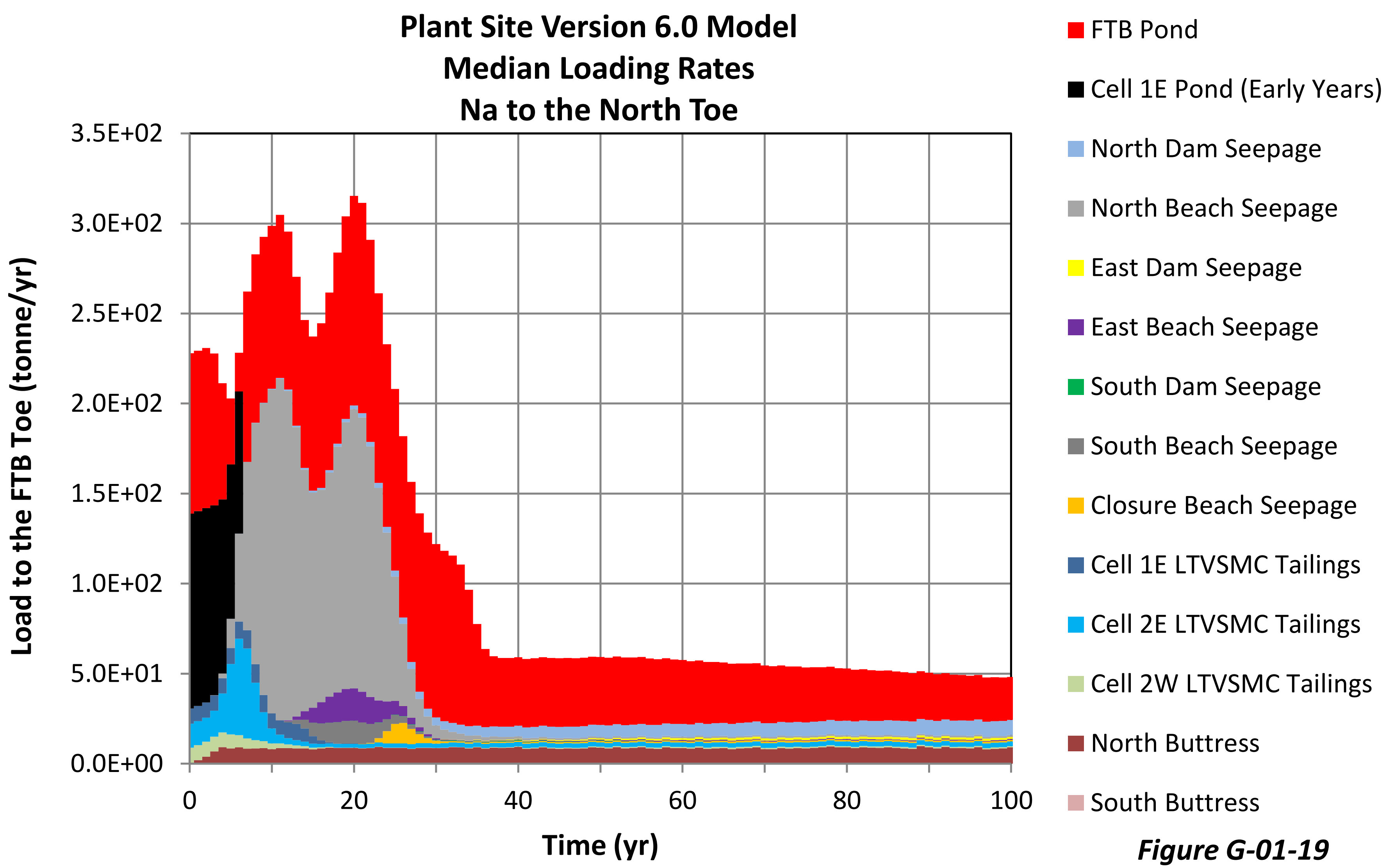


Figure G-01-19

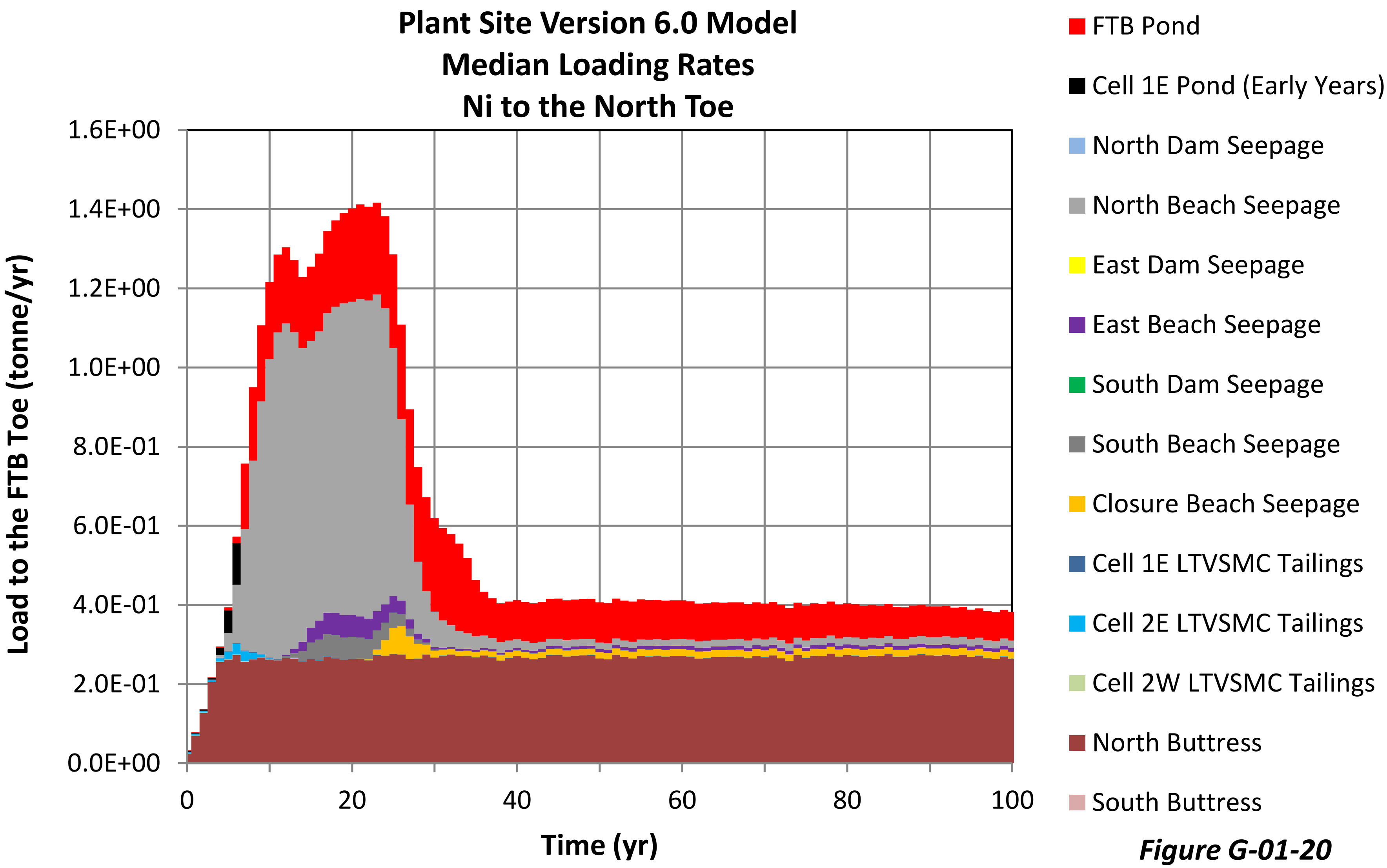


Figure G-01-20

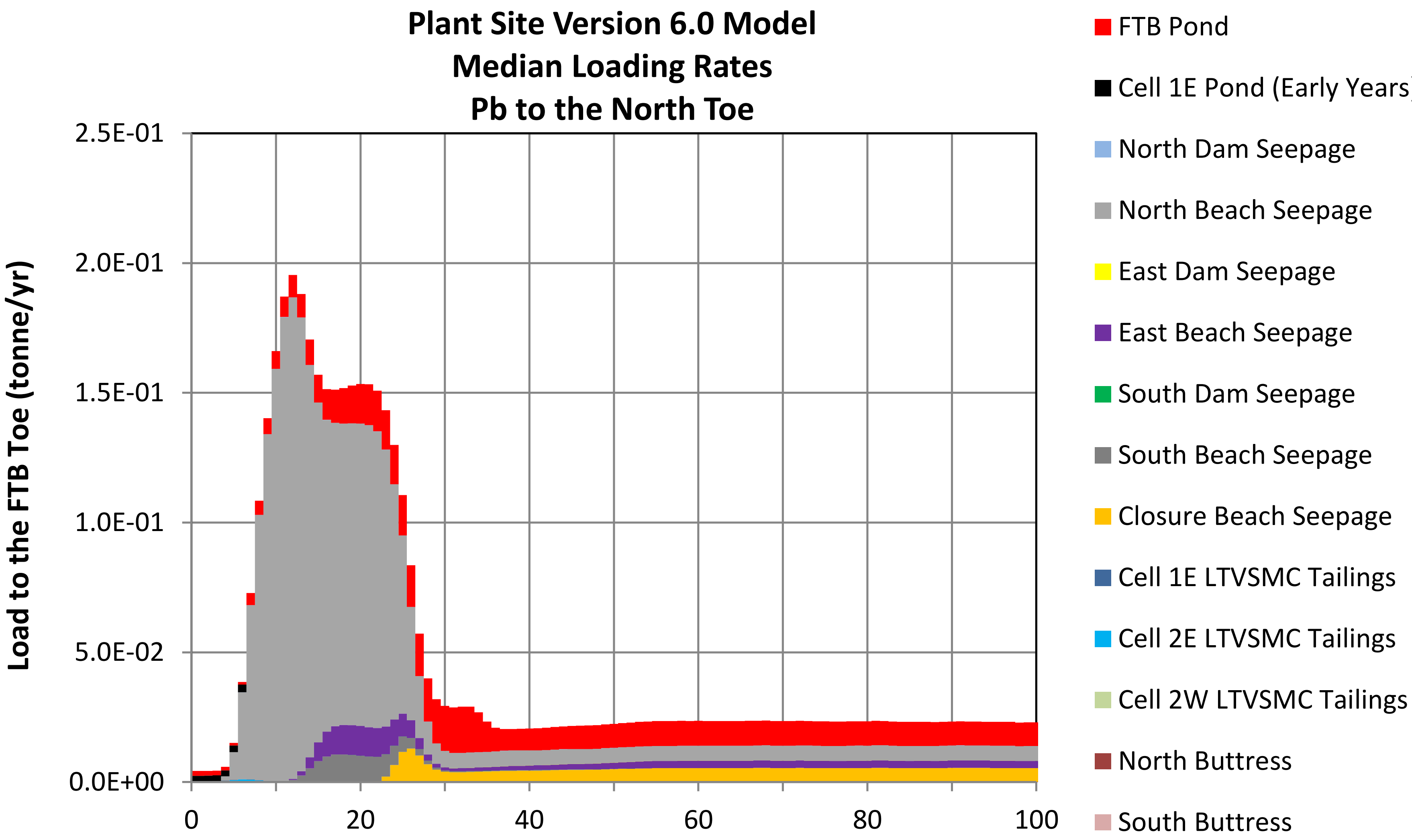


Figure G-01-21

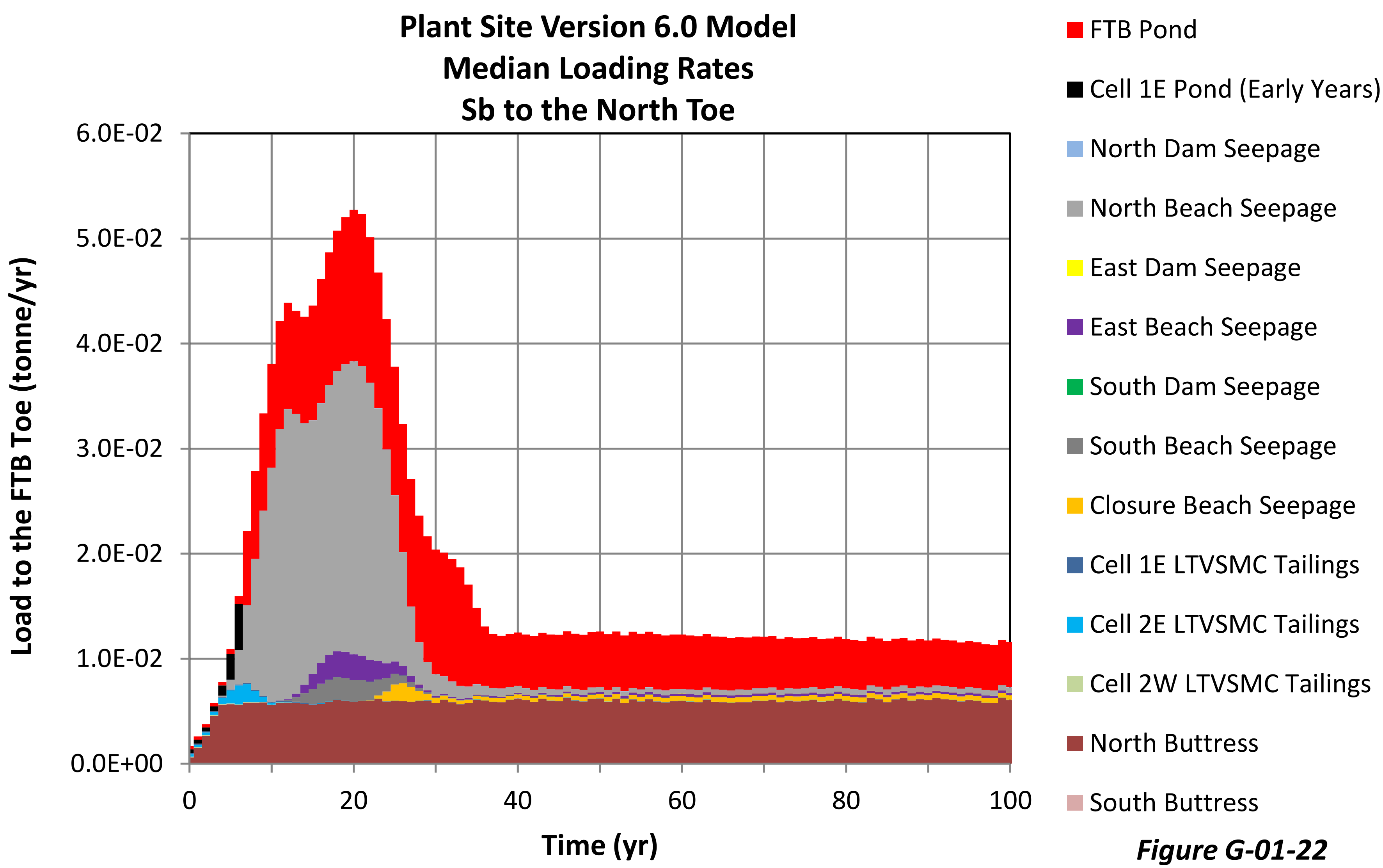
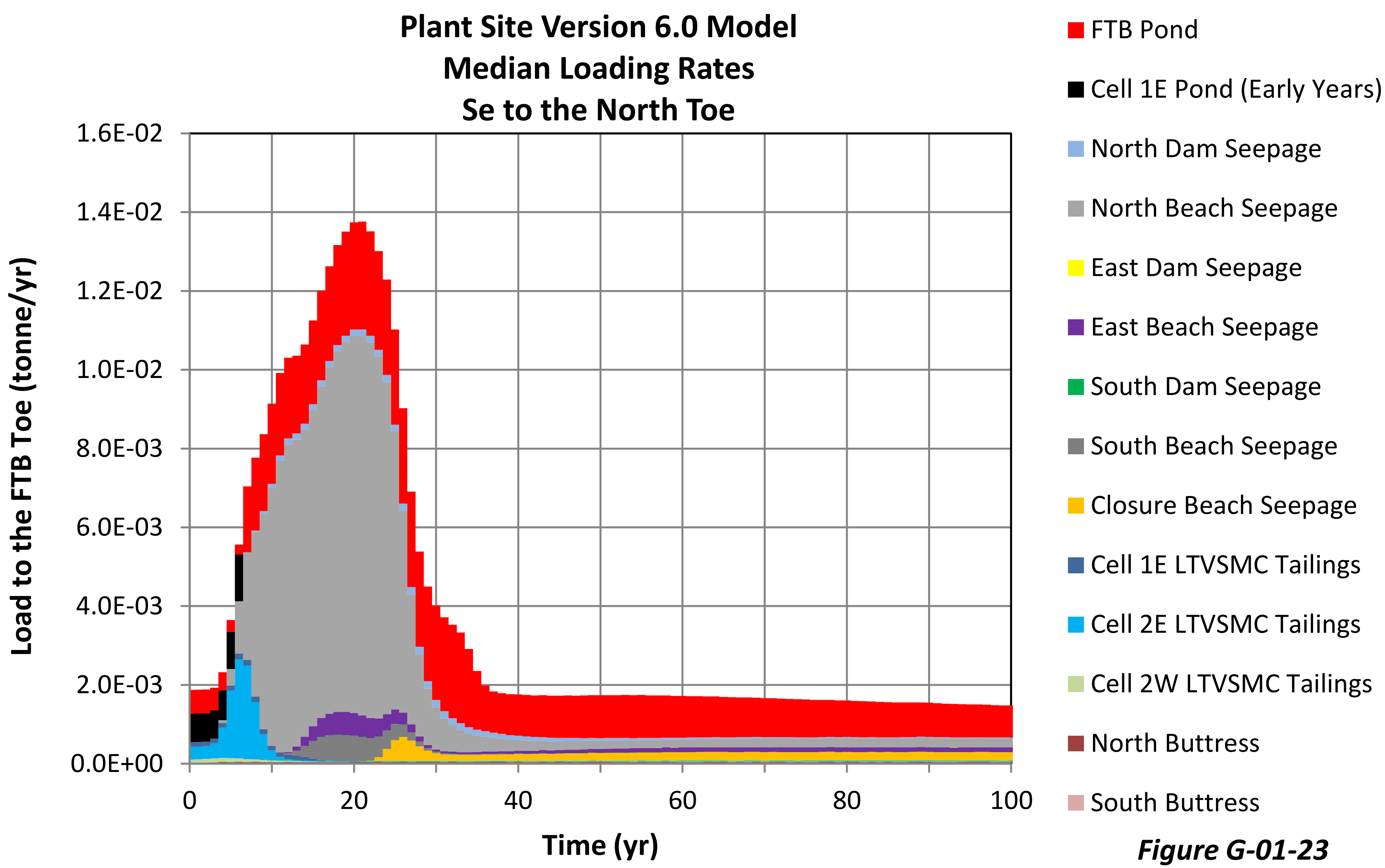


Figure G-01-22



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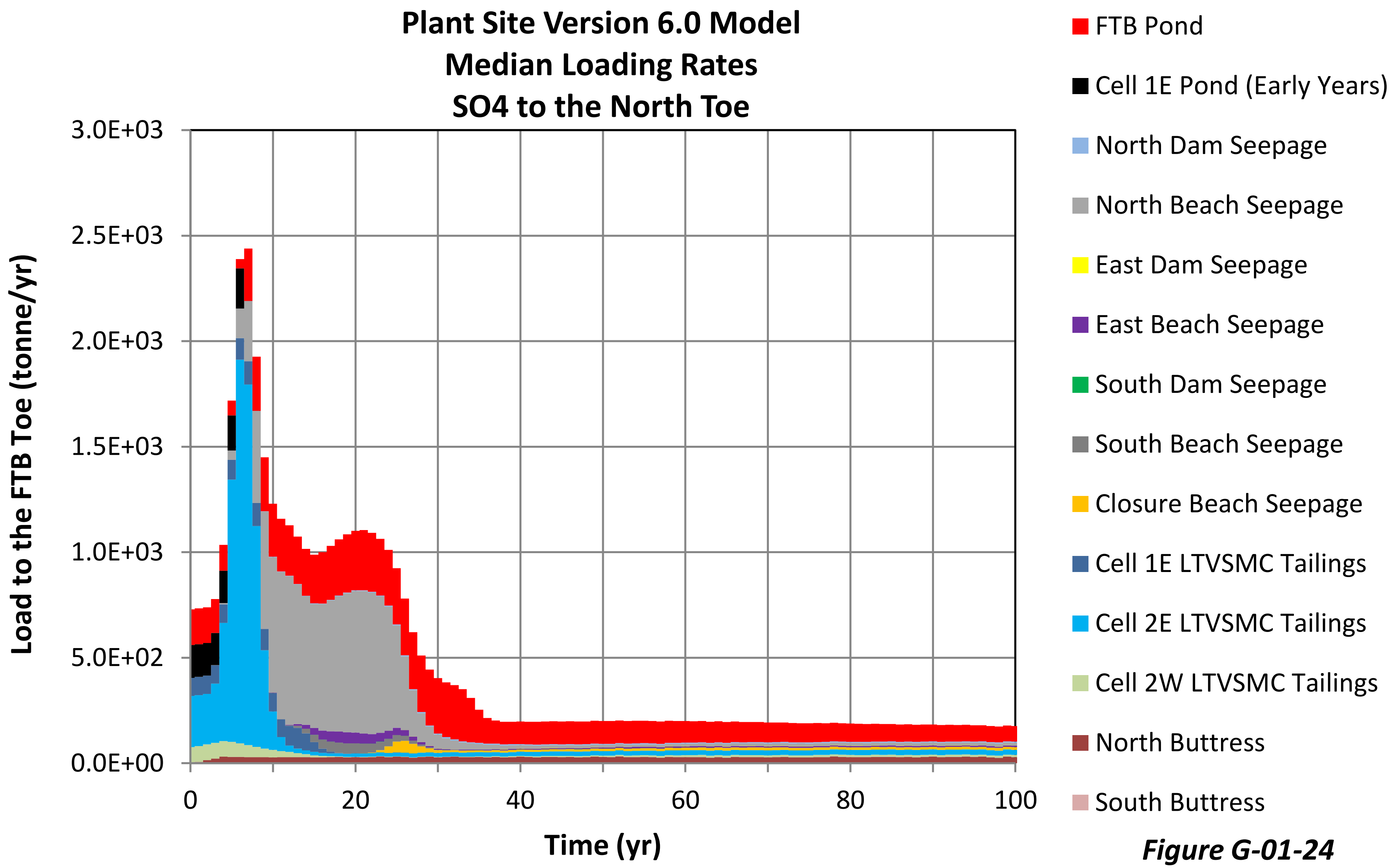

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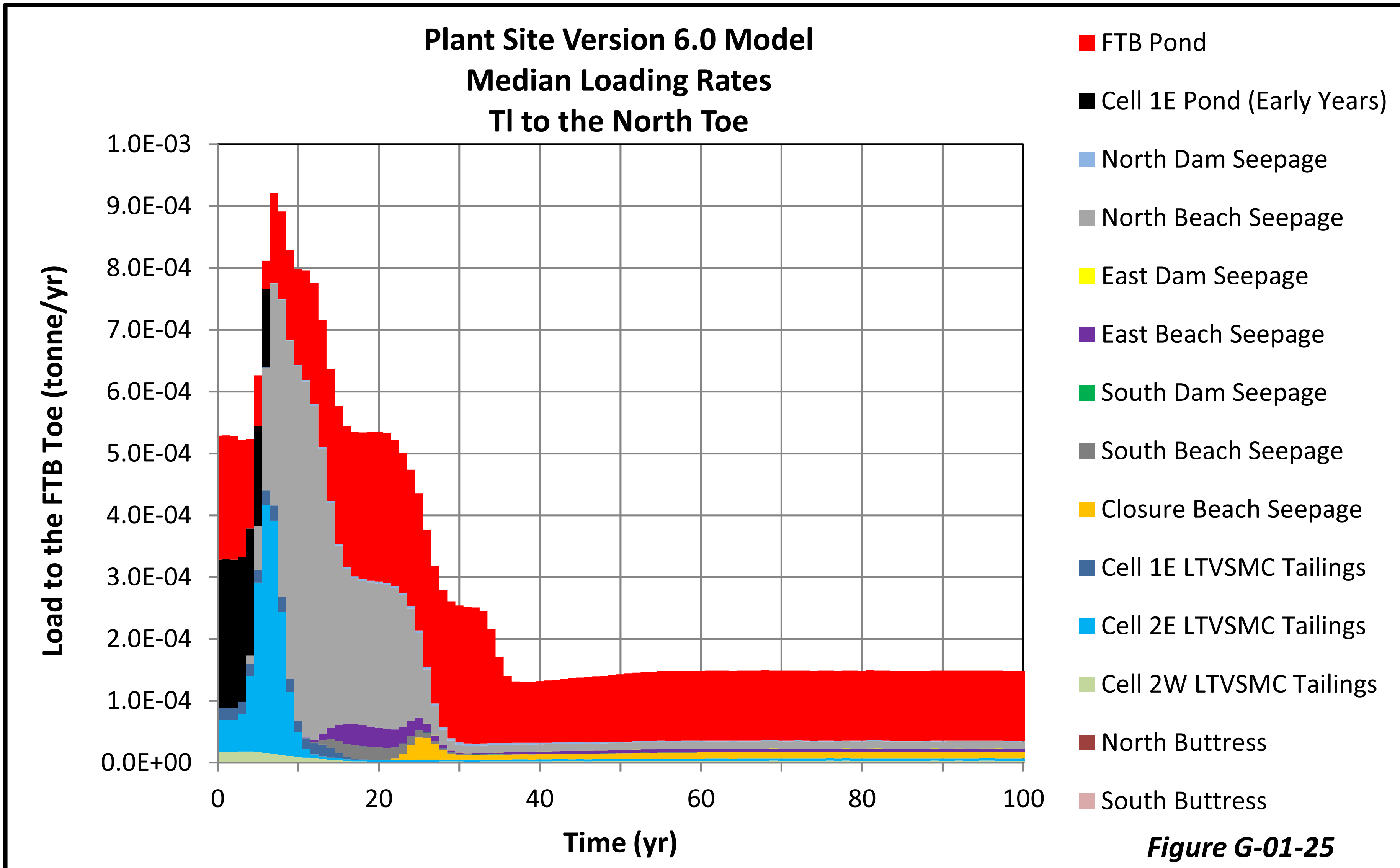

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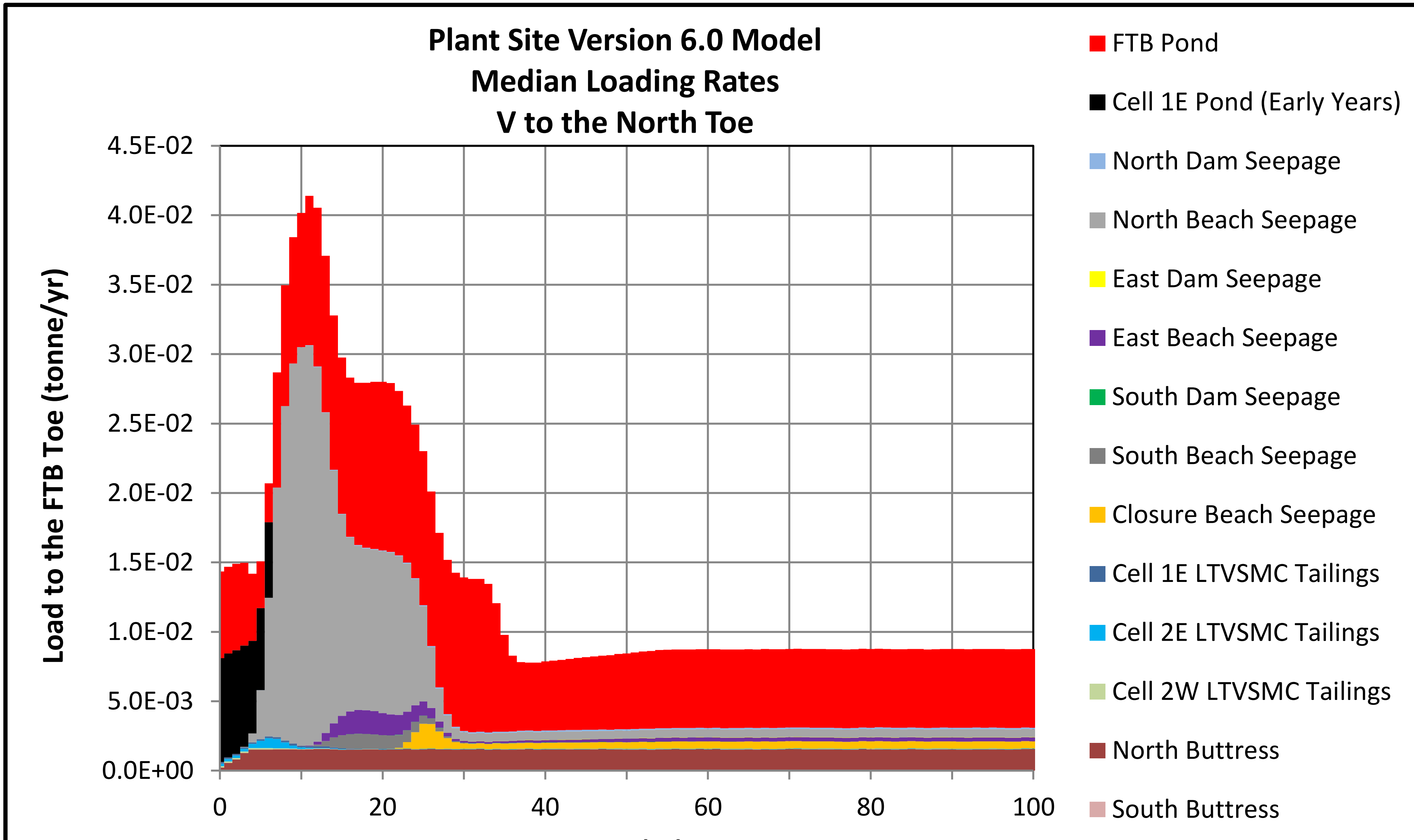

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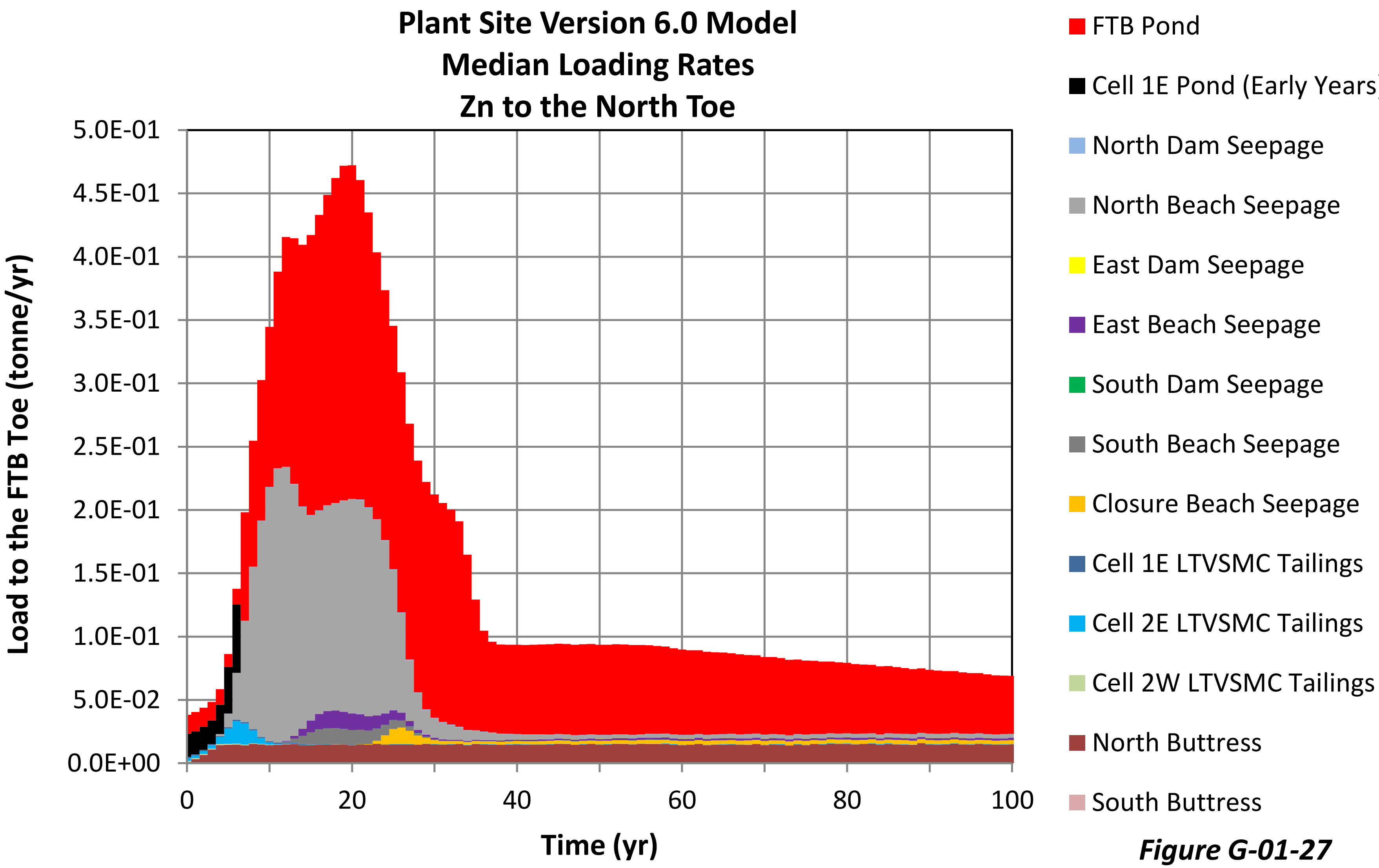

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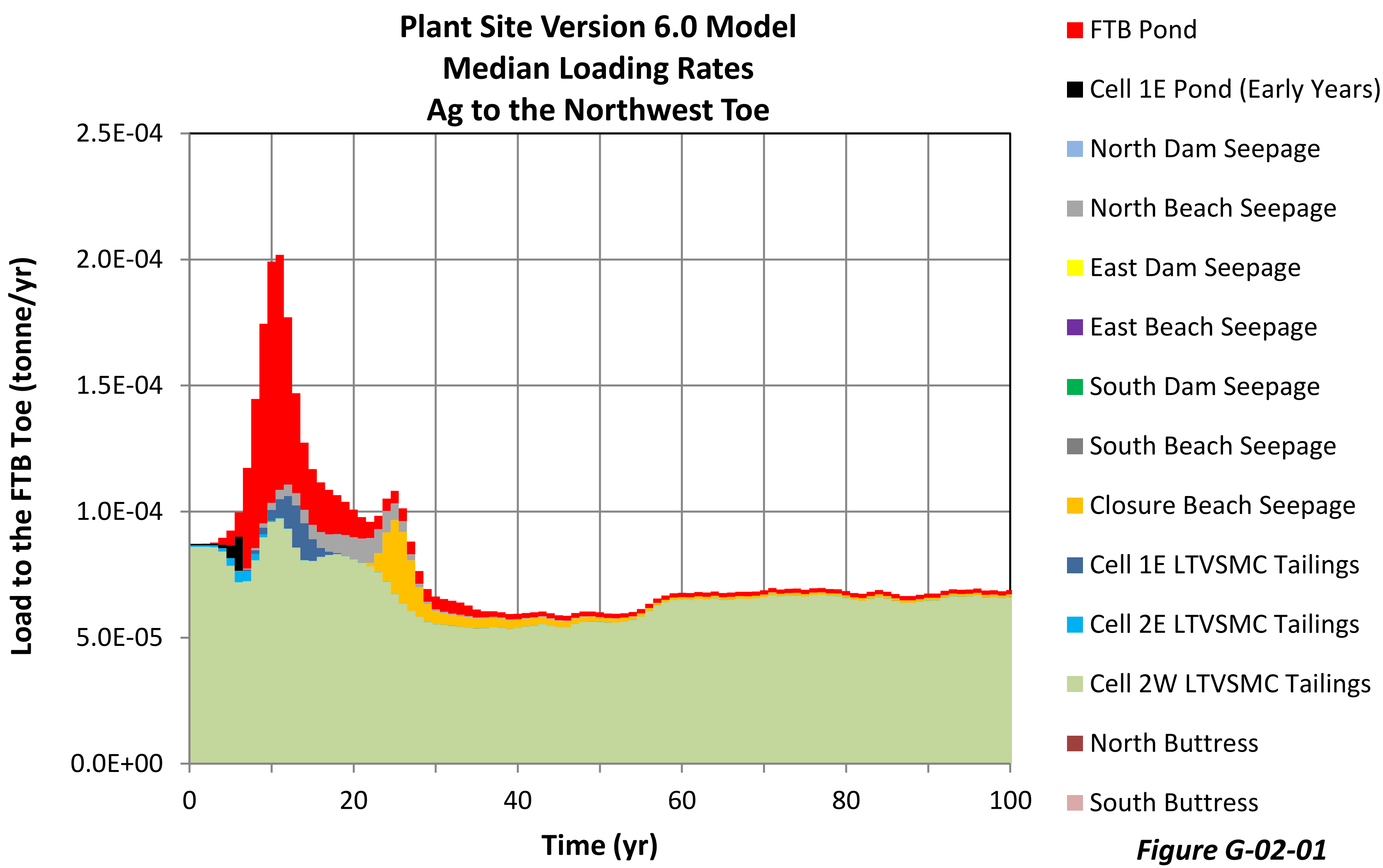

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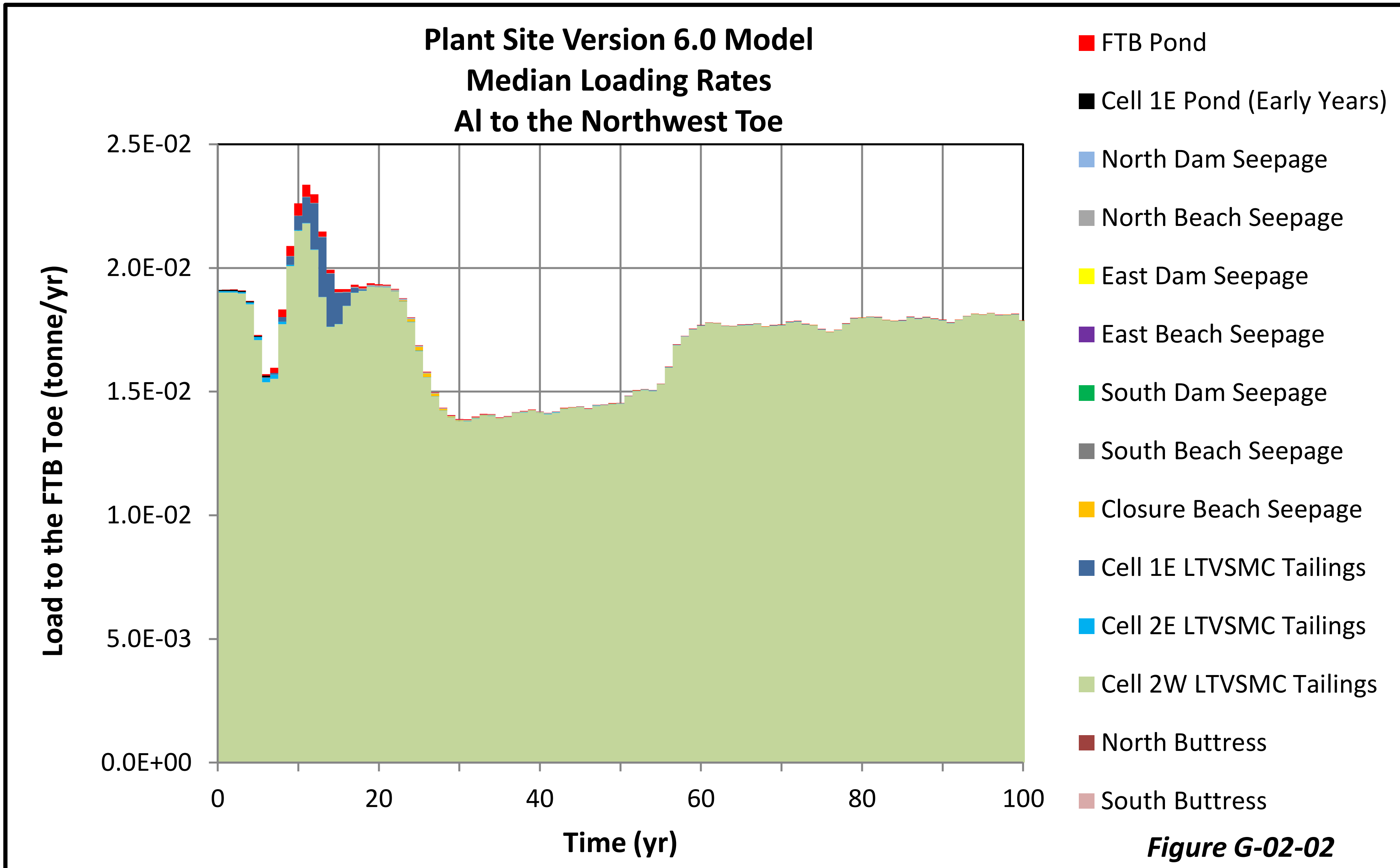

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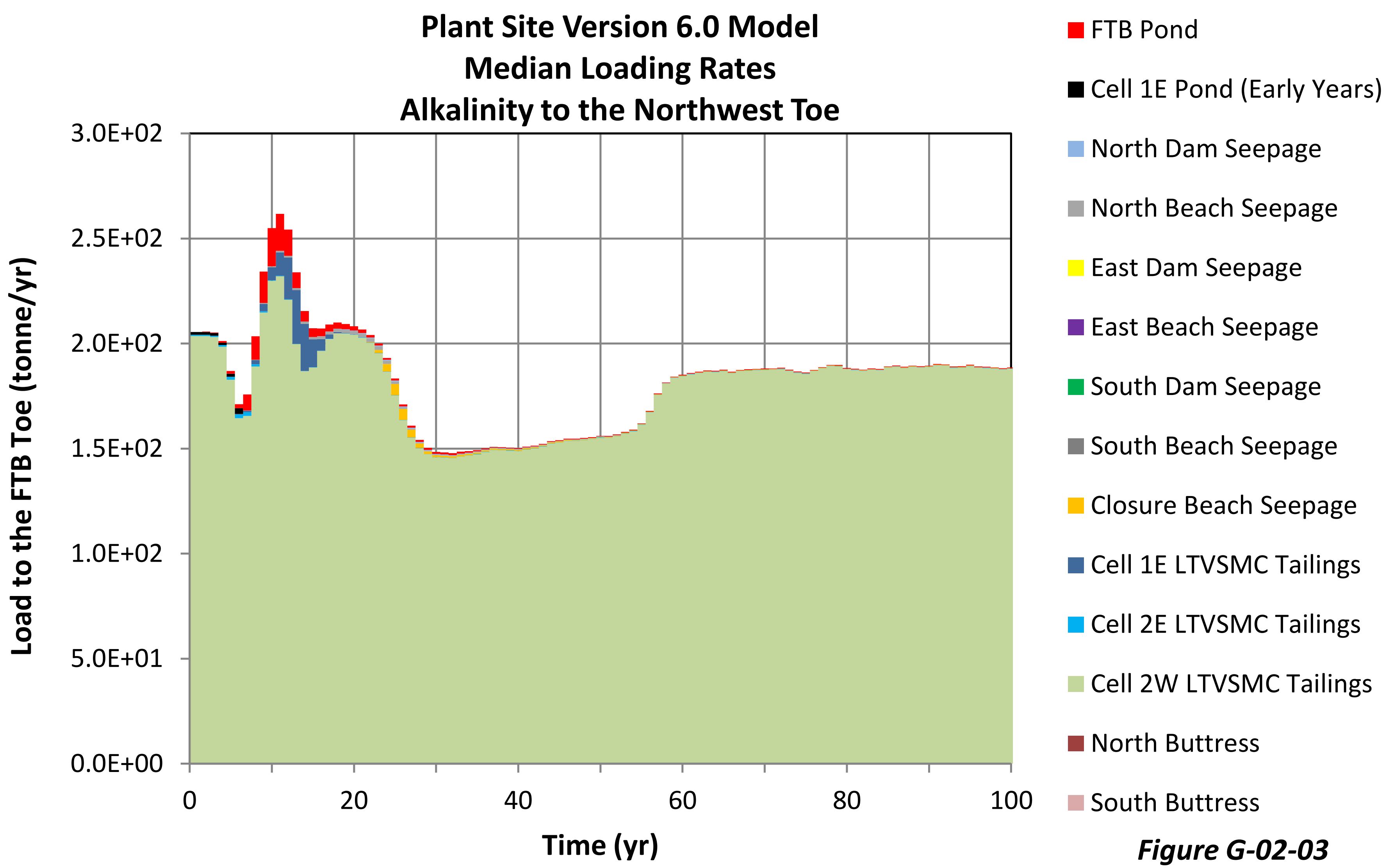

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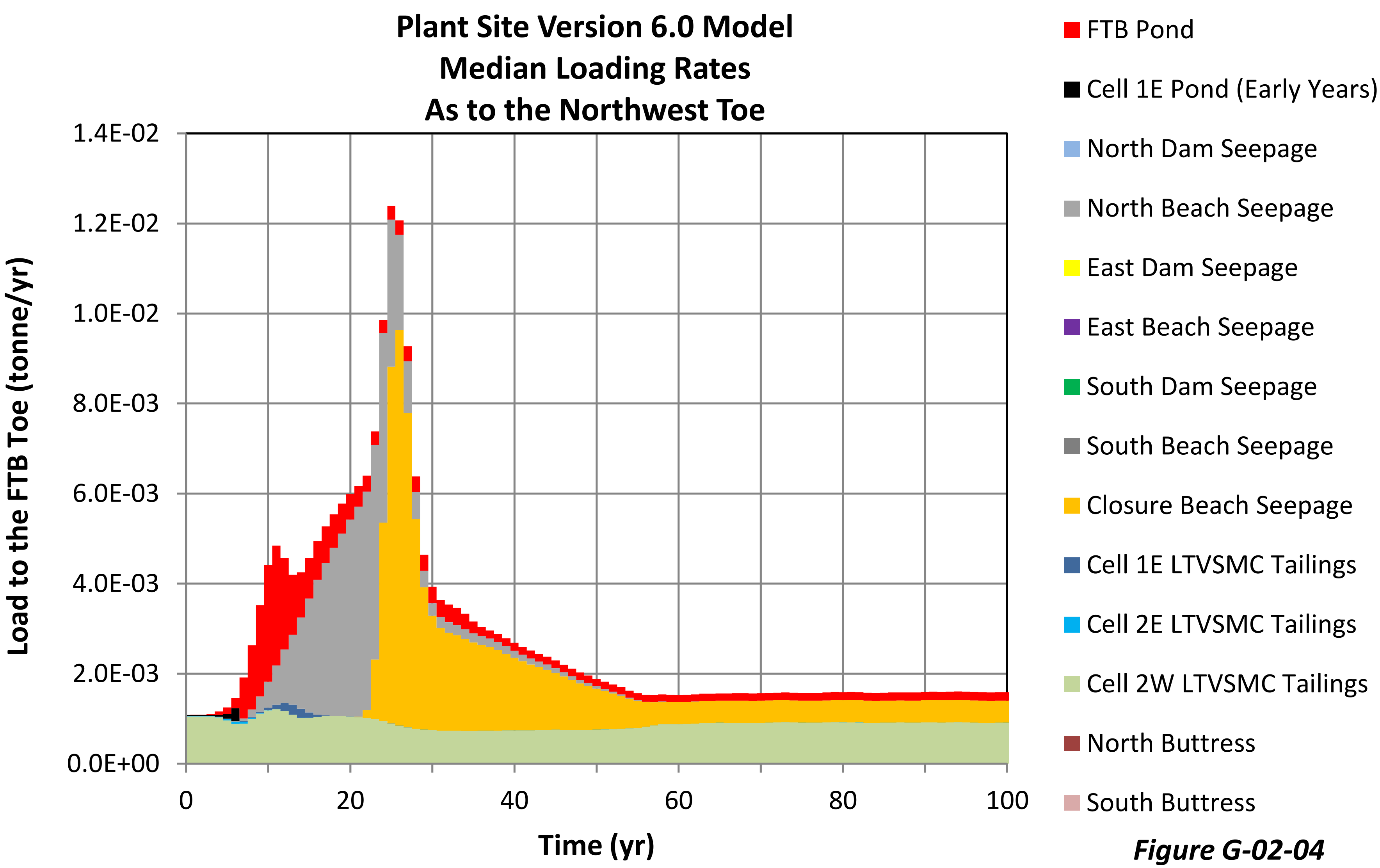

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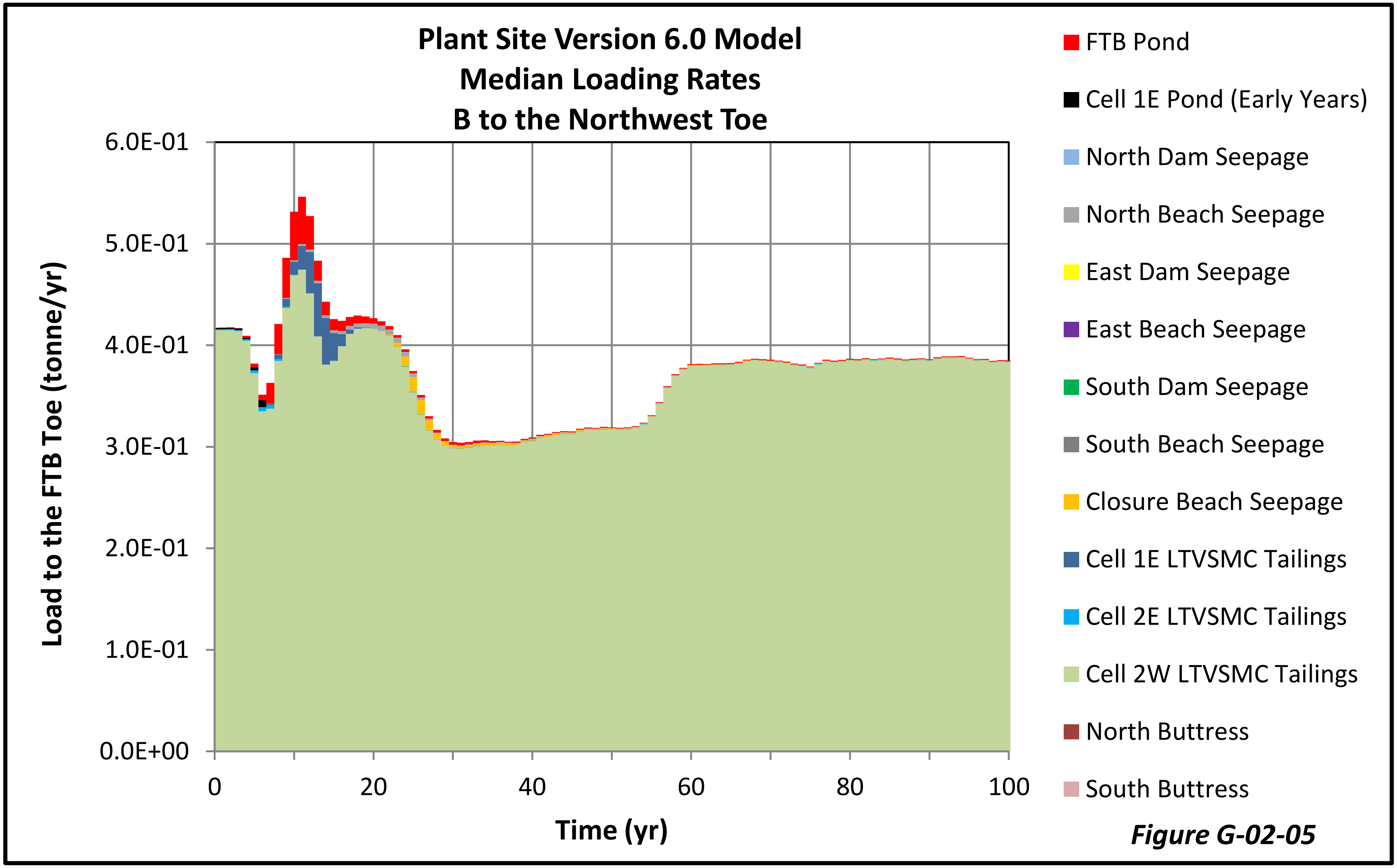

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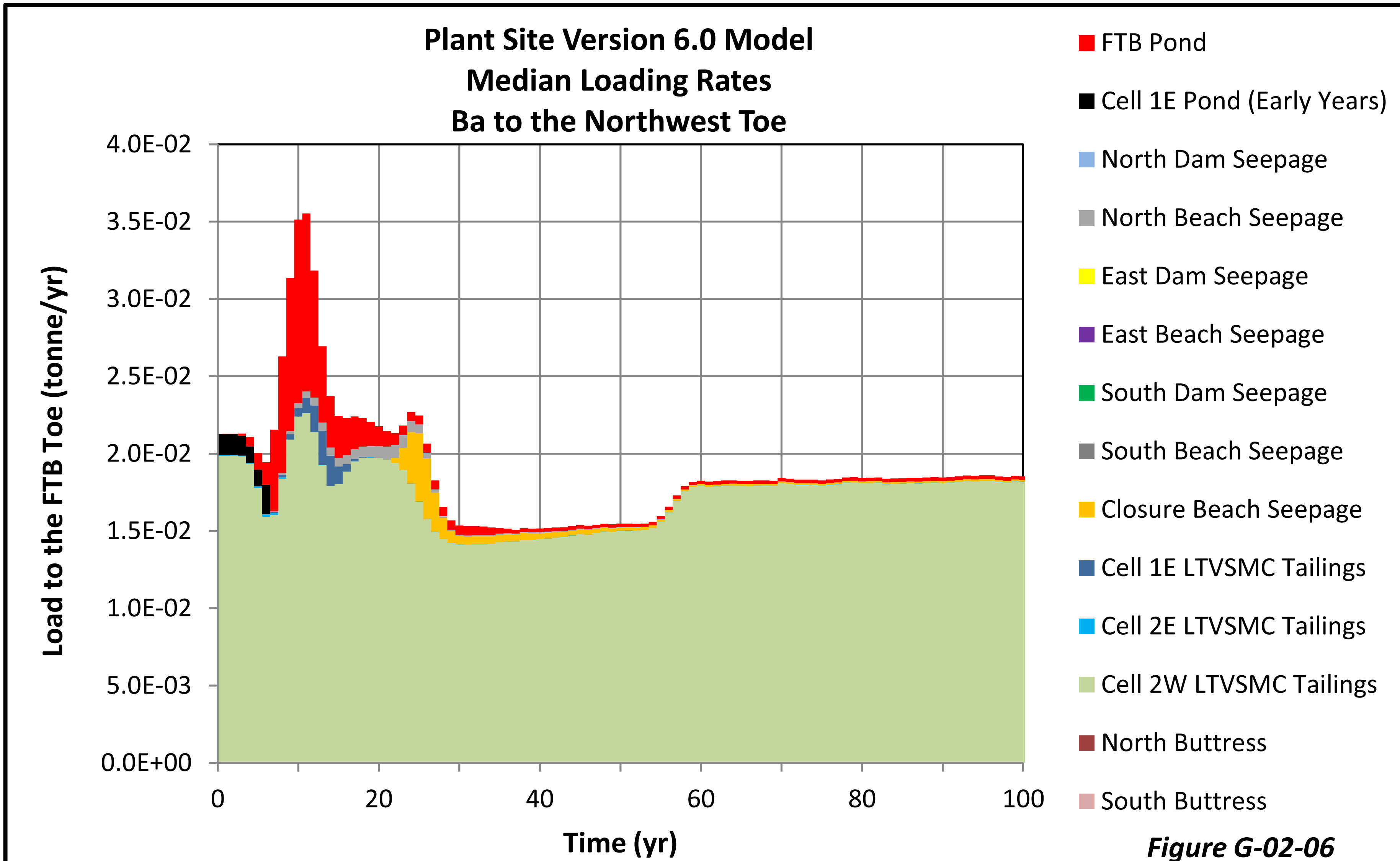

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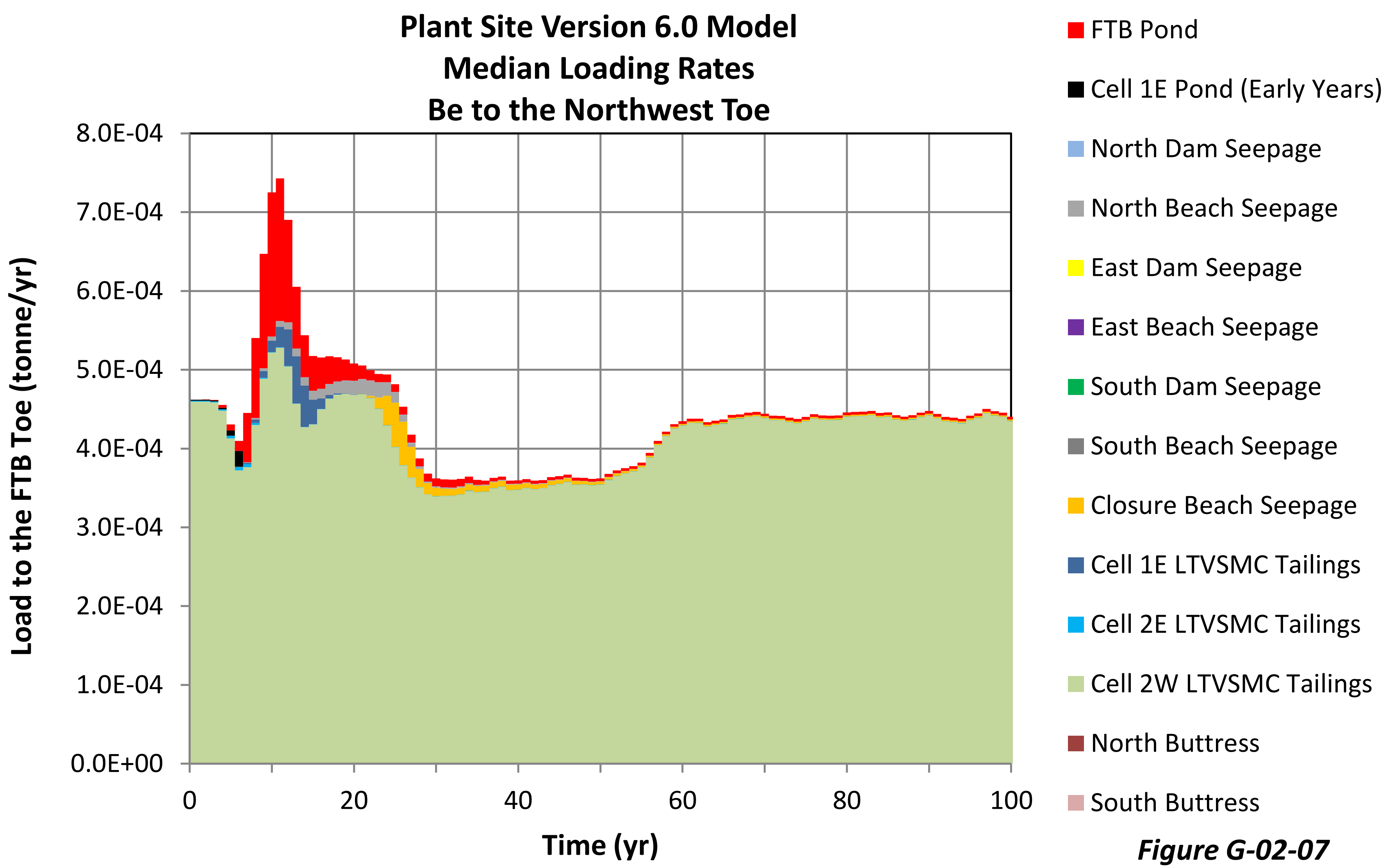

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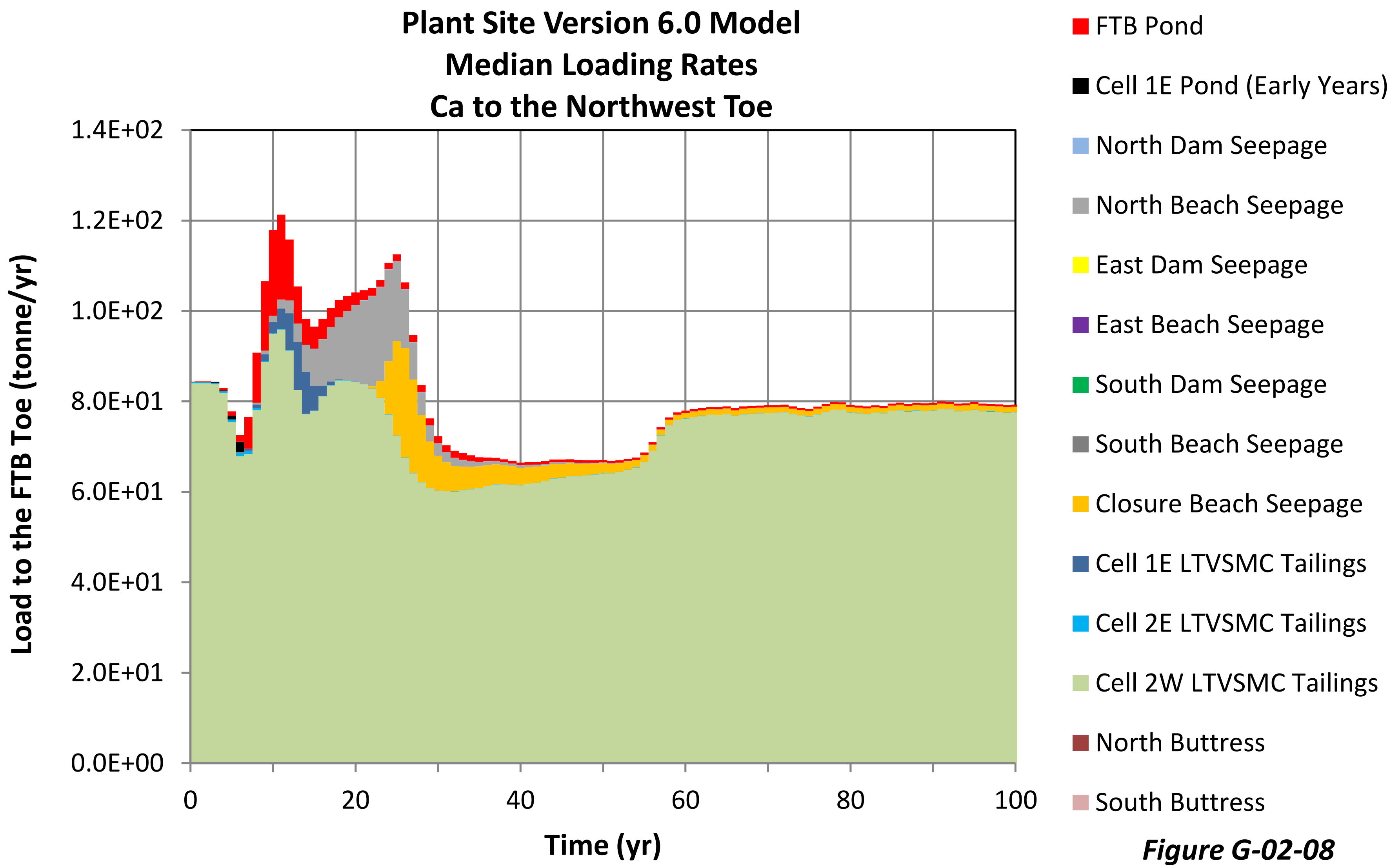

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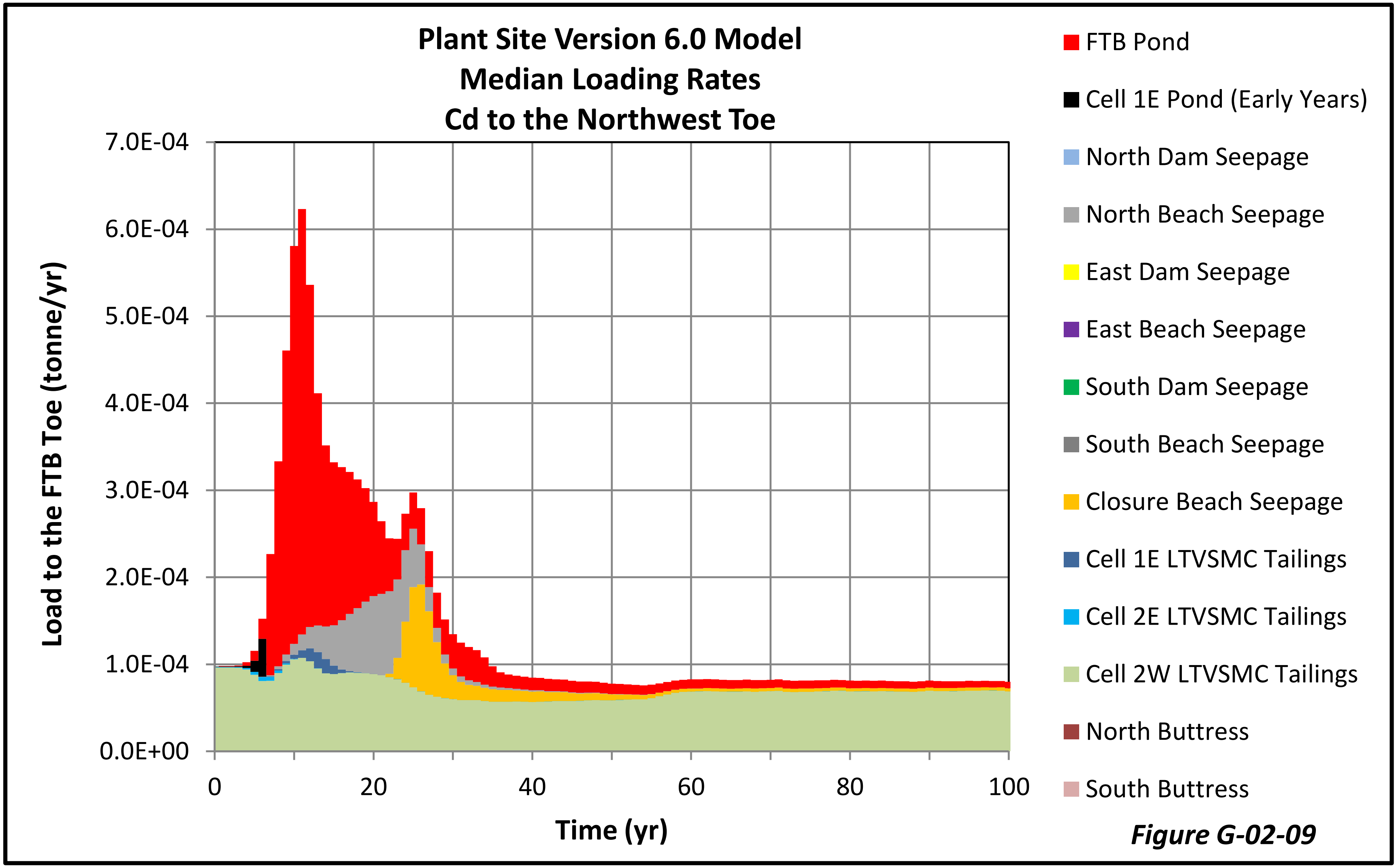

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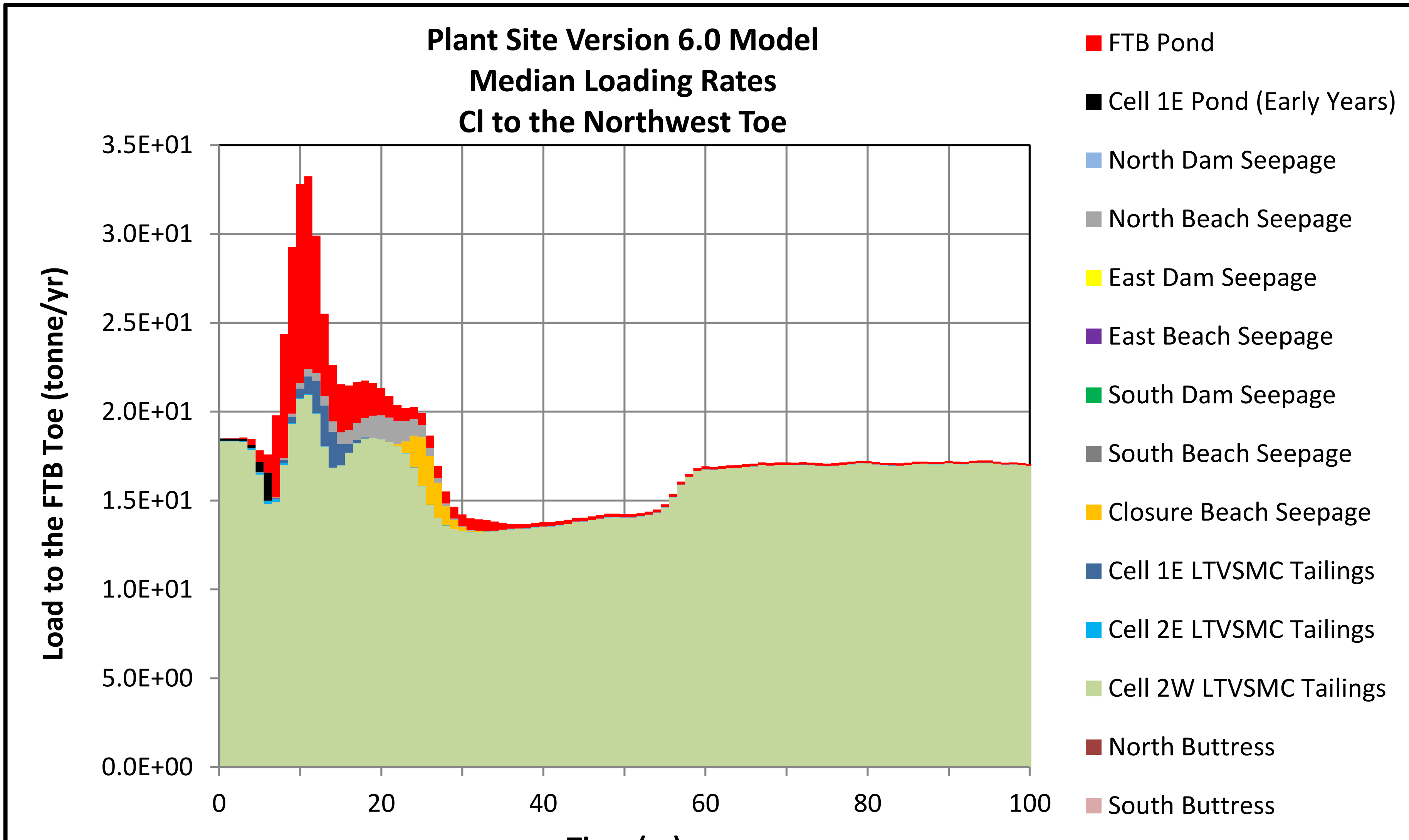

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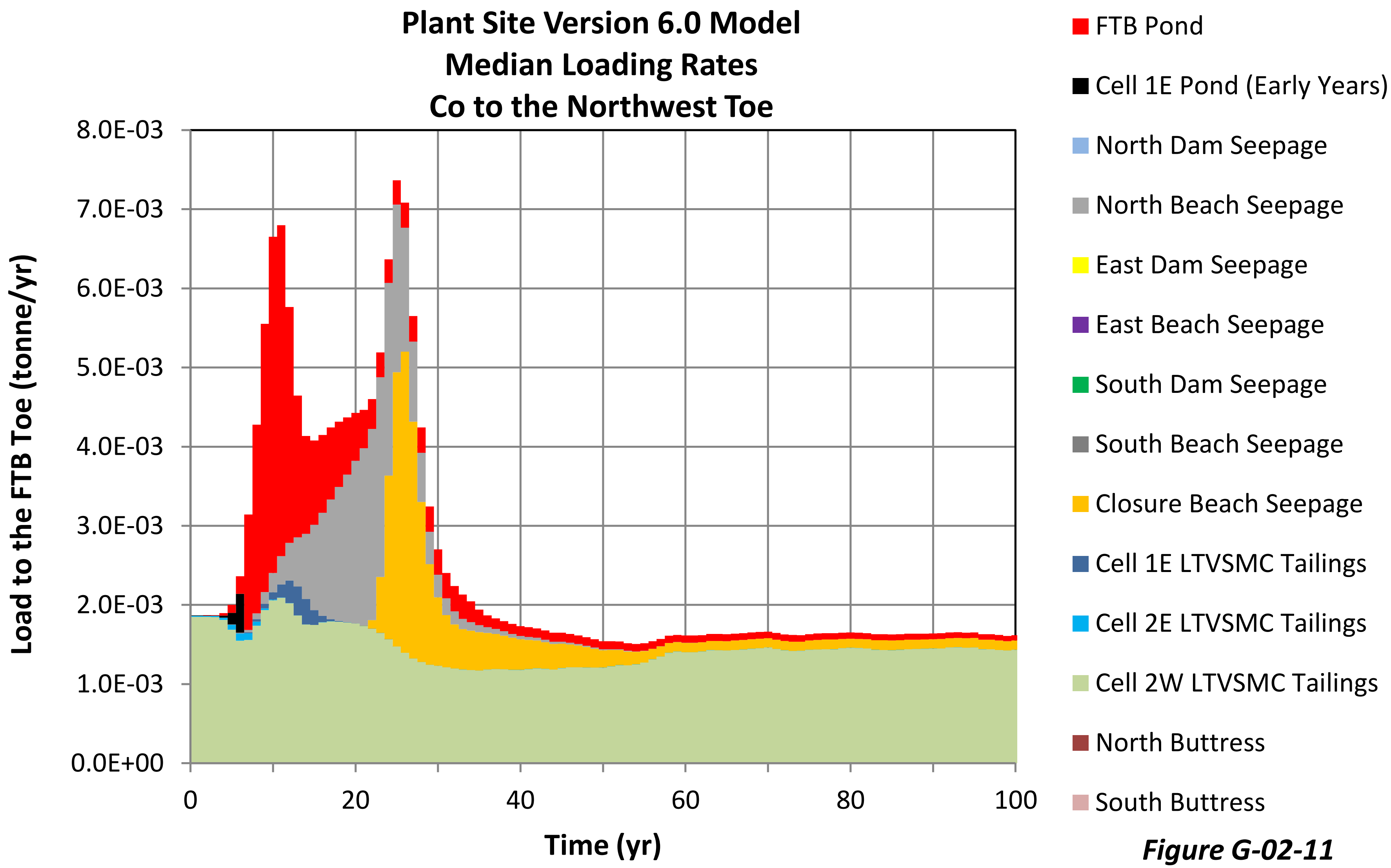

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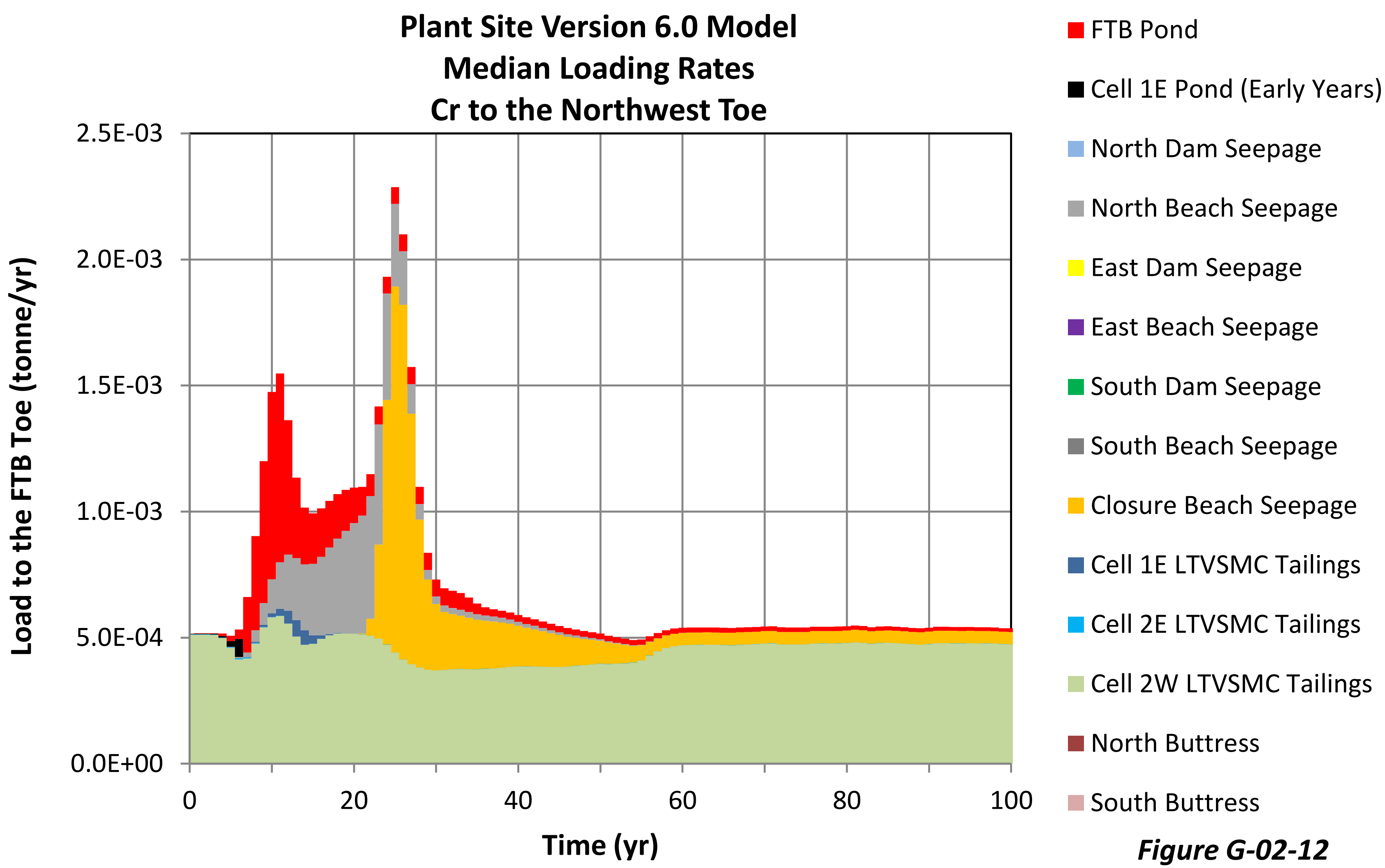

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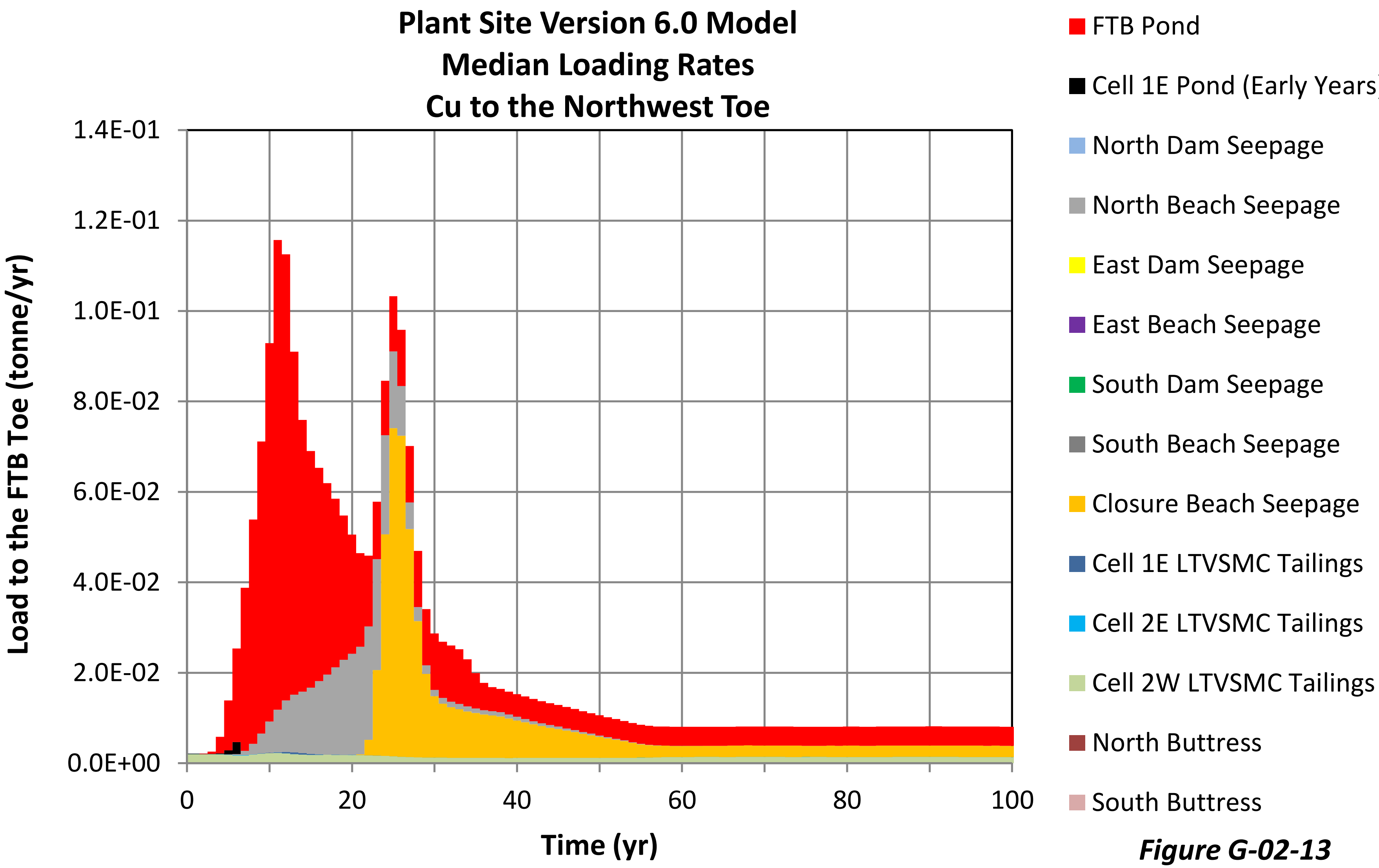

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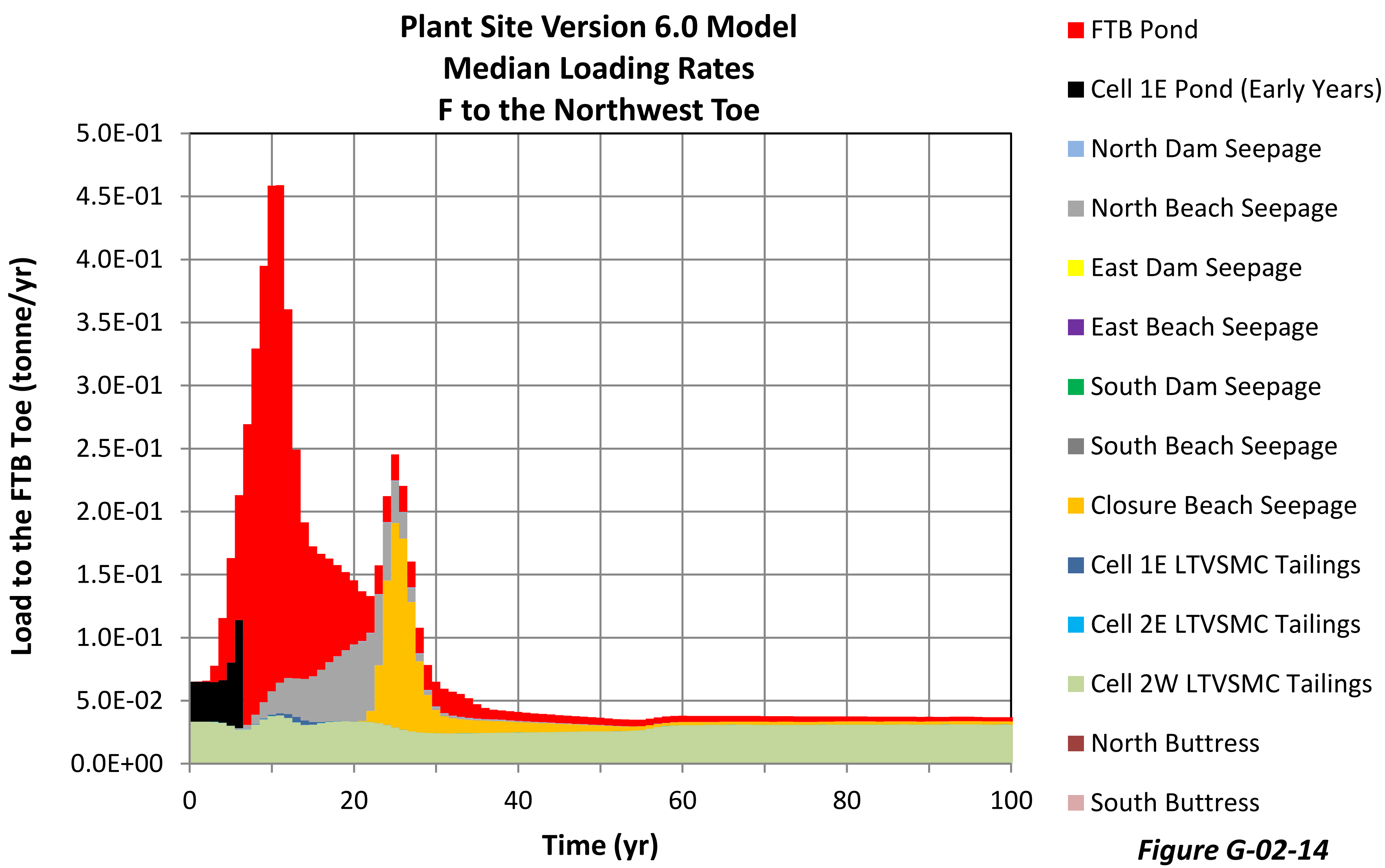

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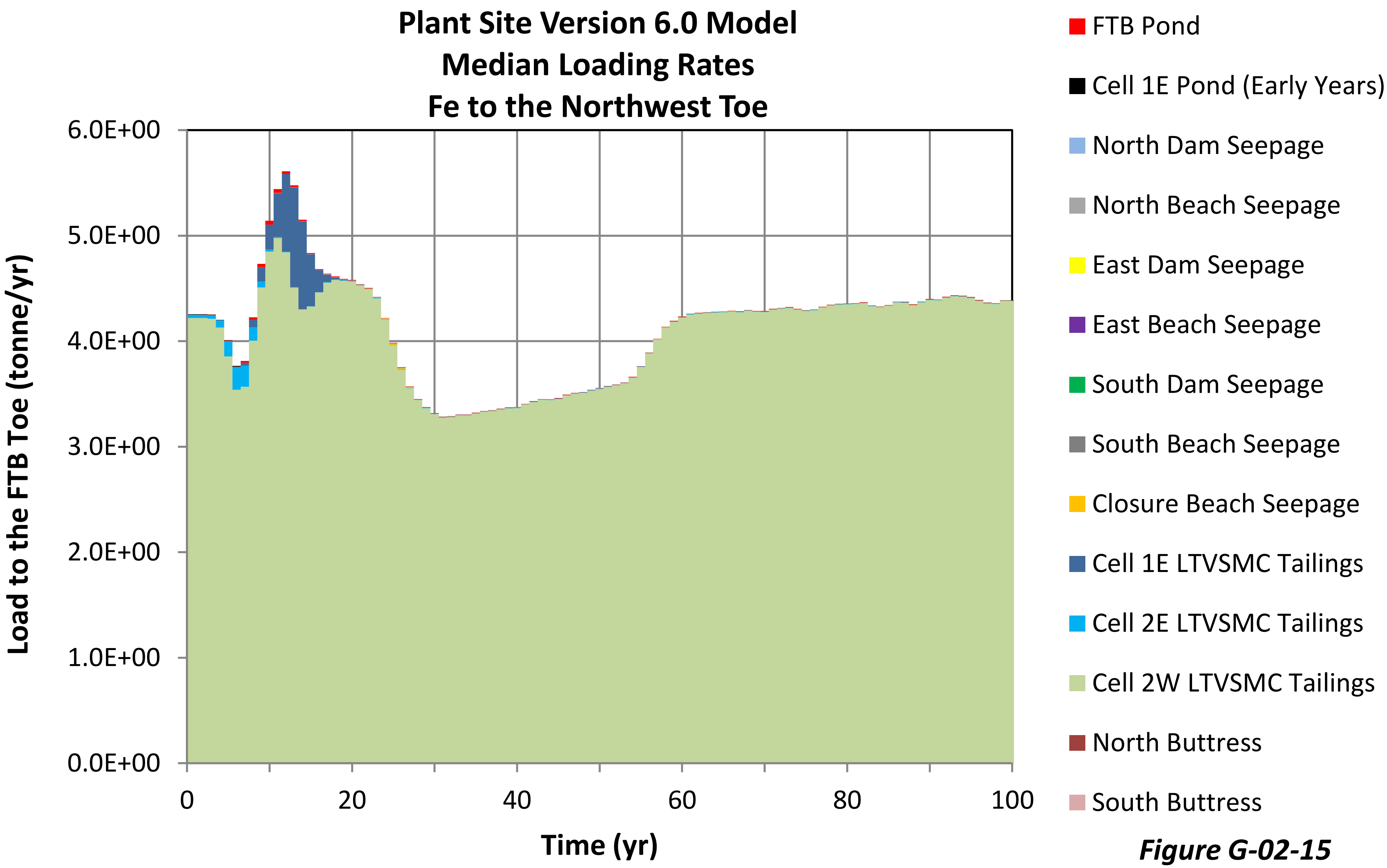

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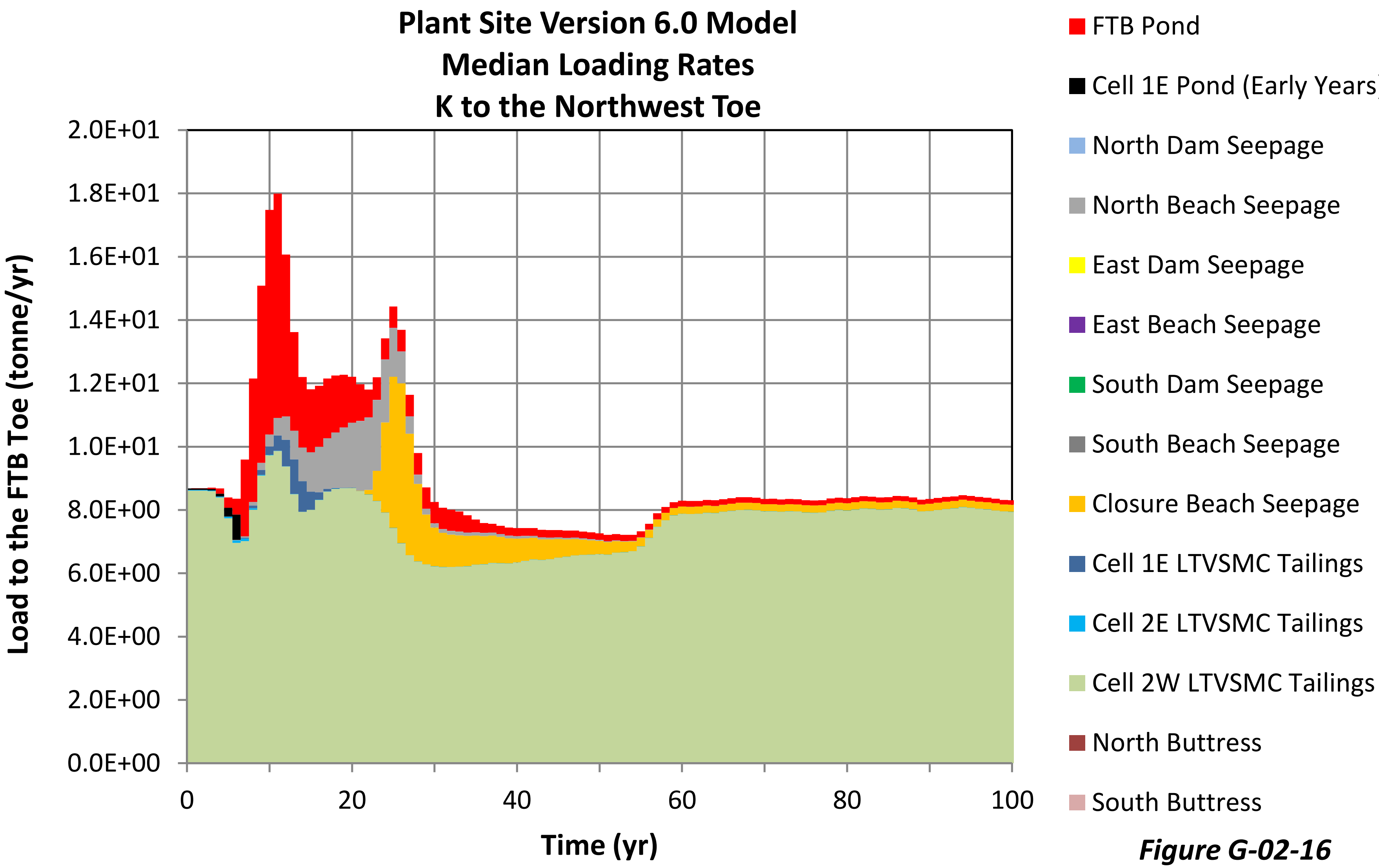

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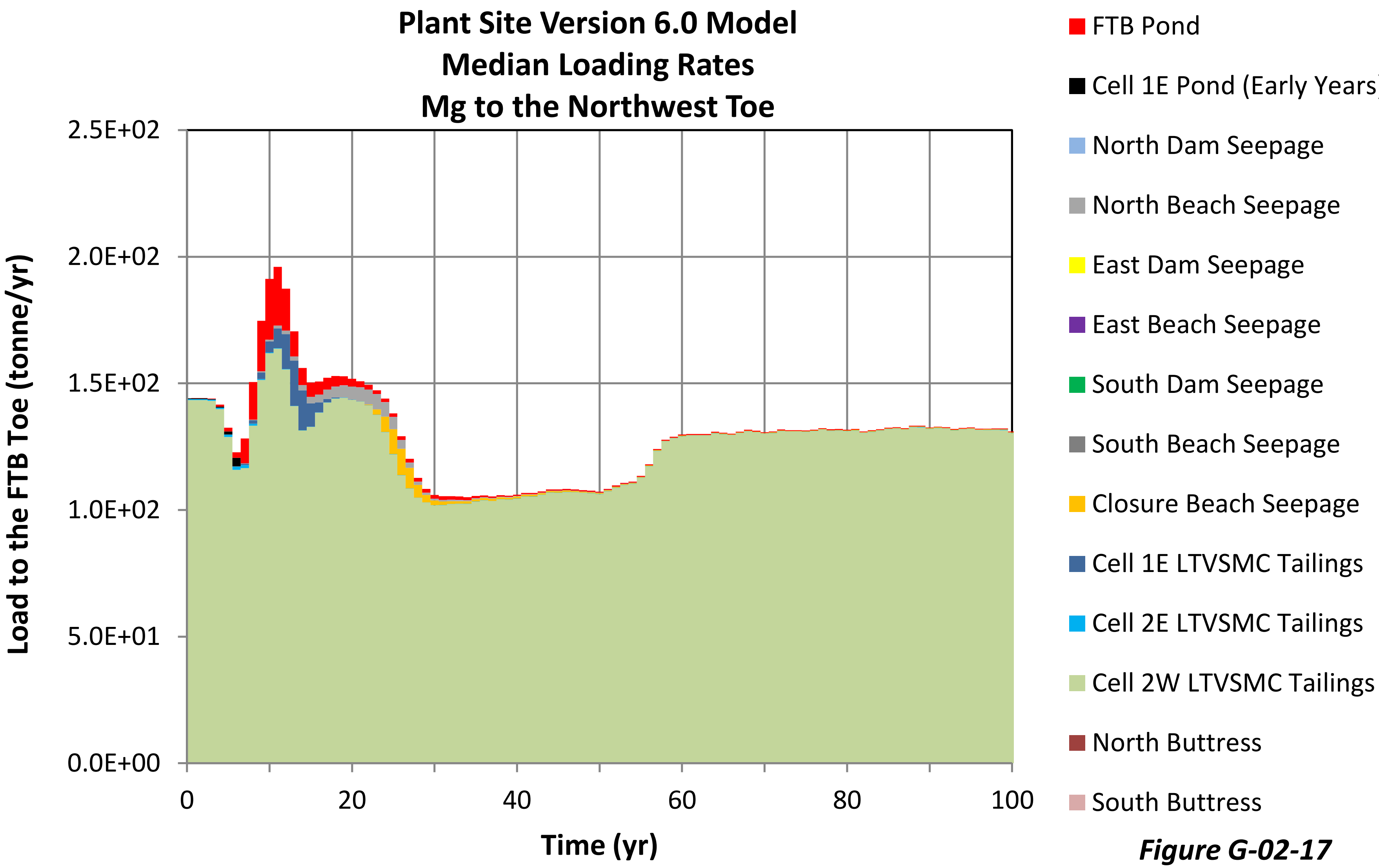

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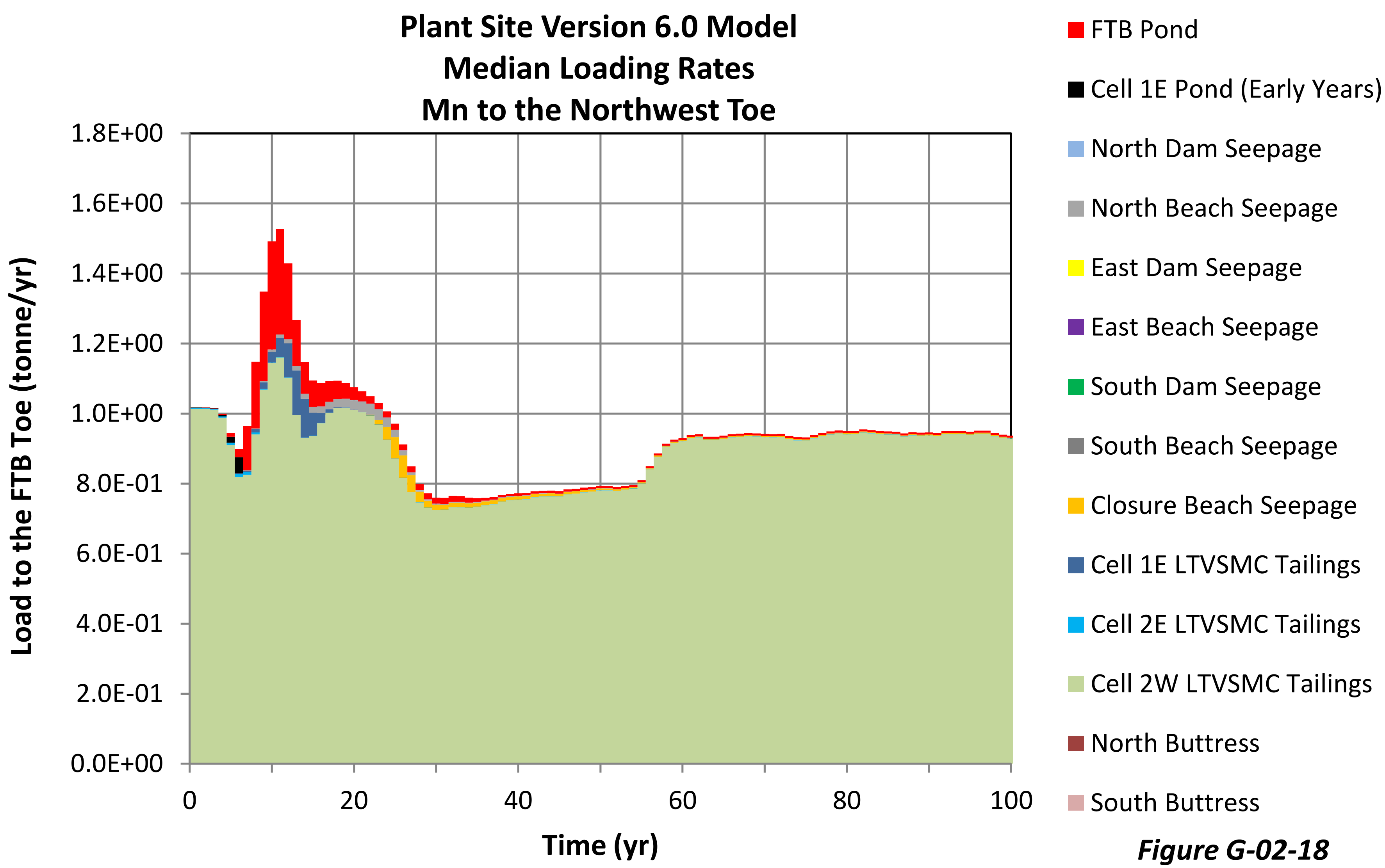

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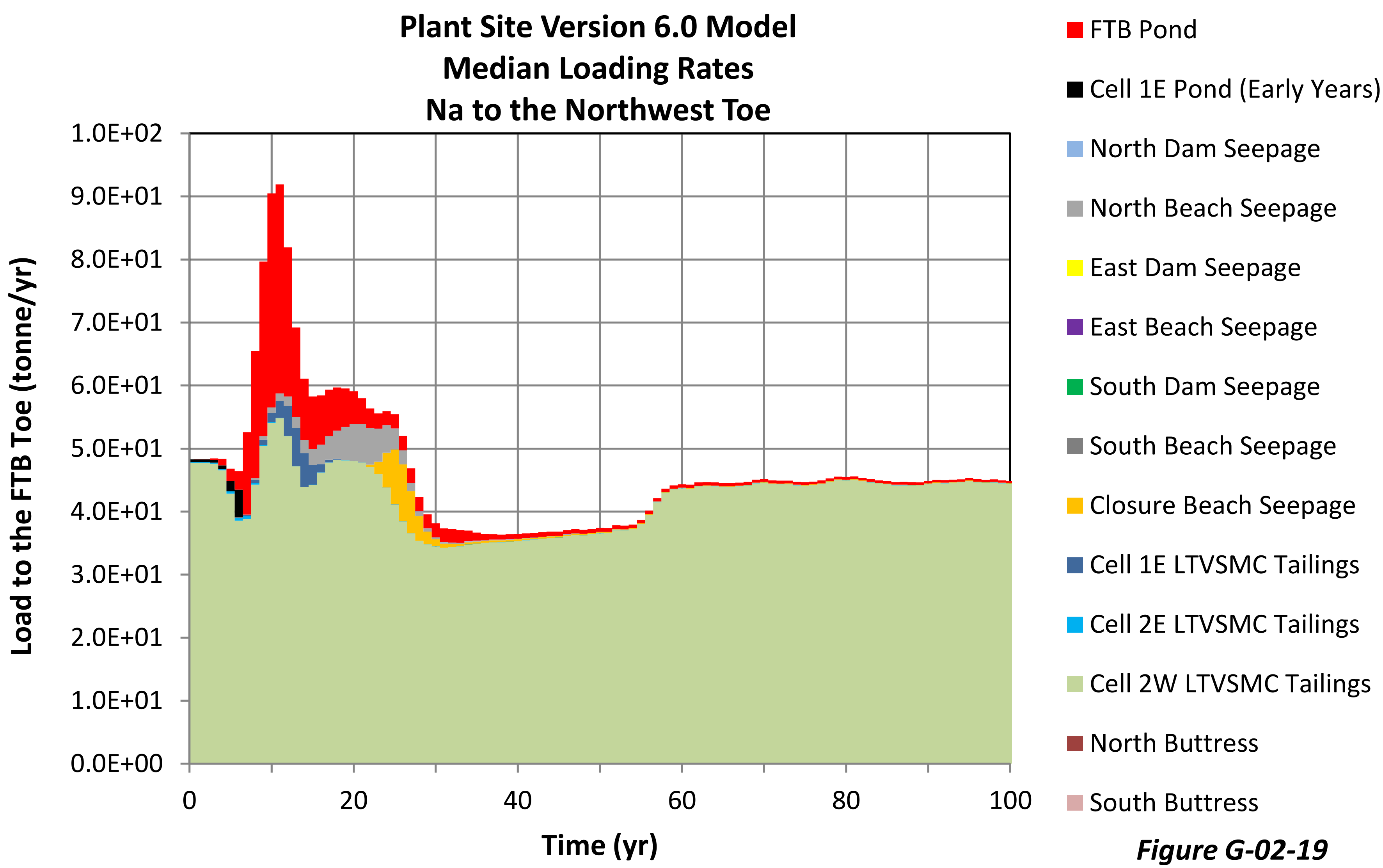

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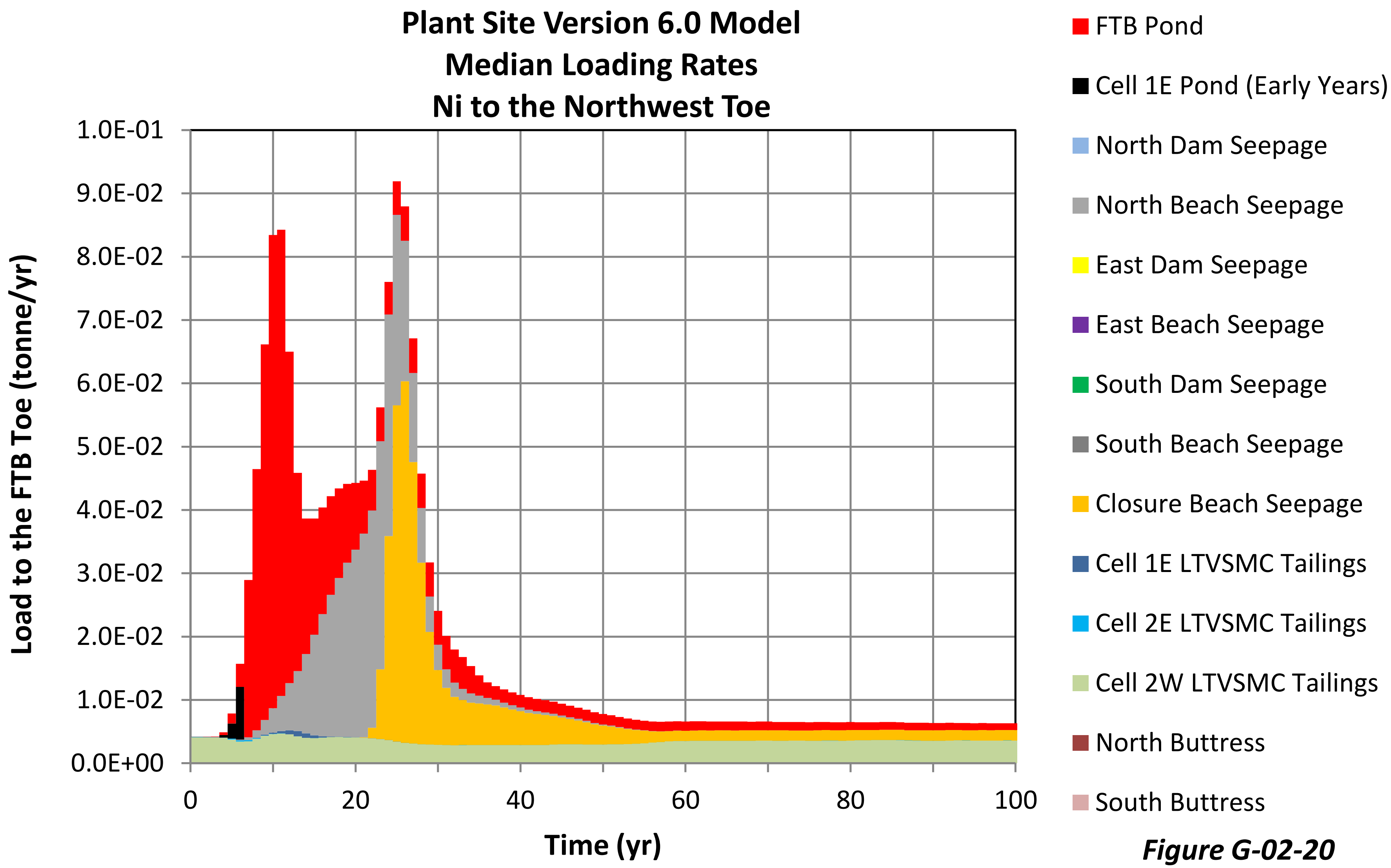

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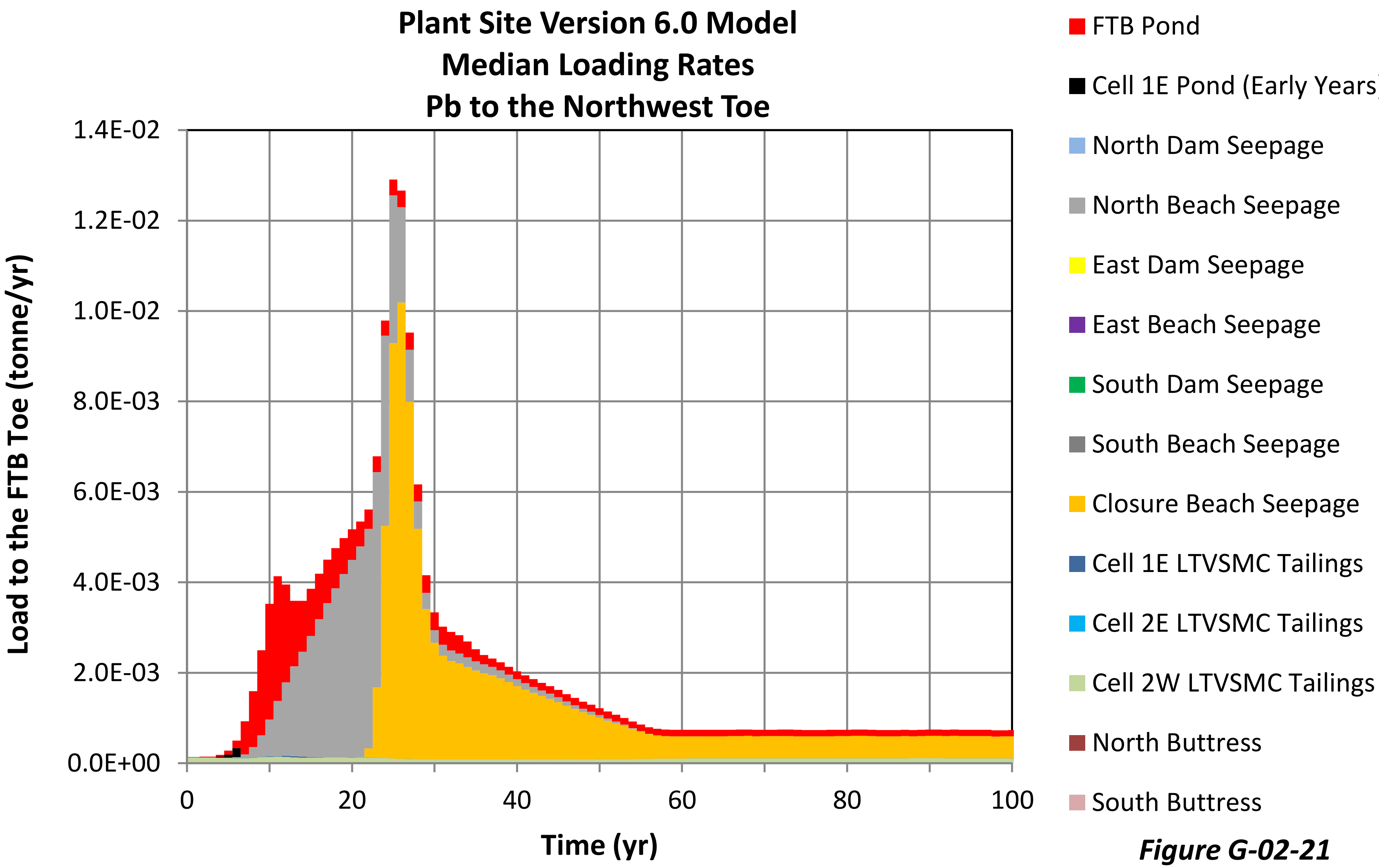

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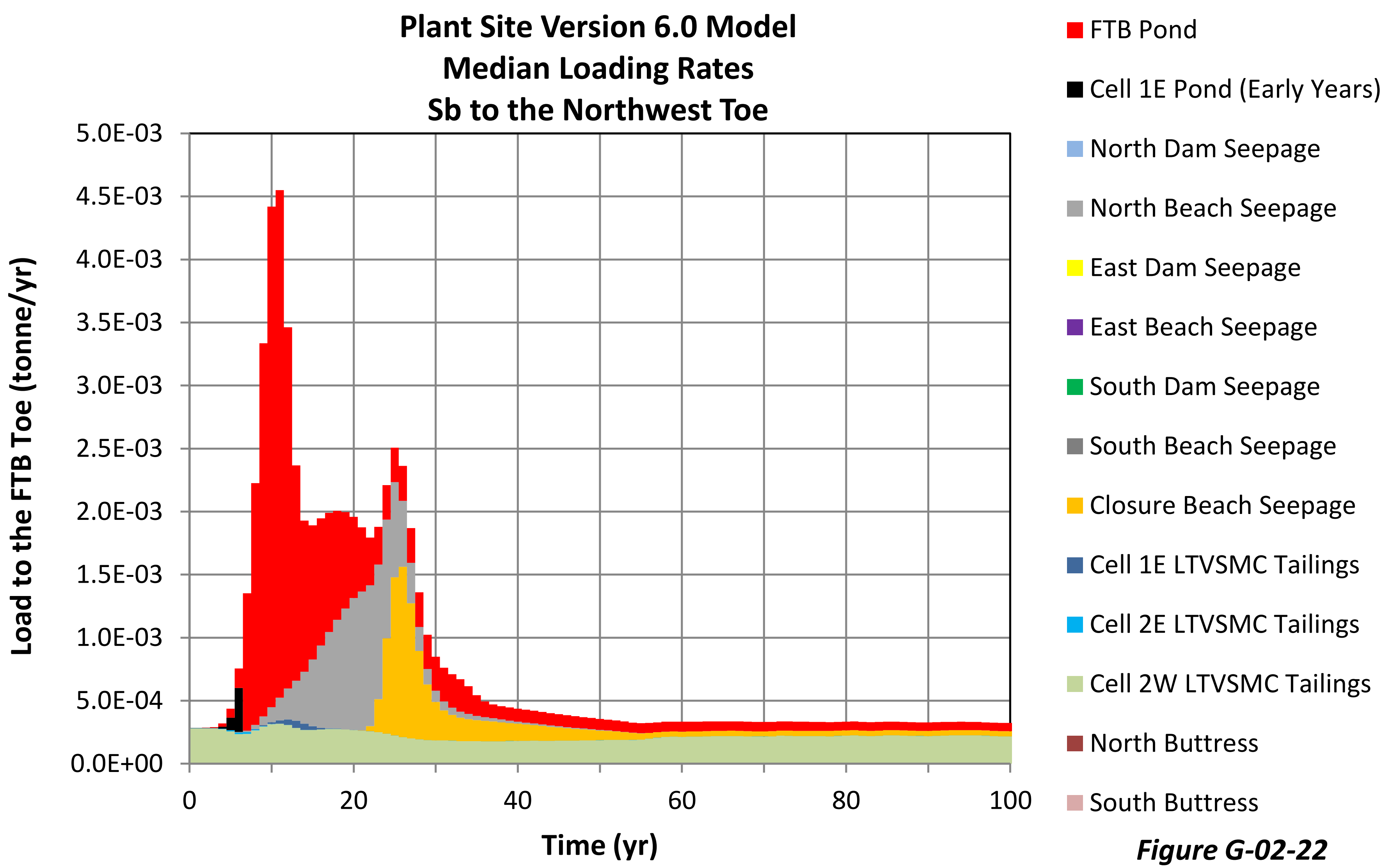

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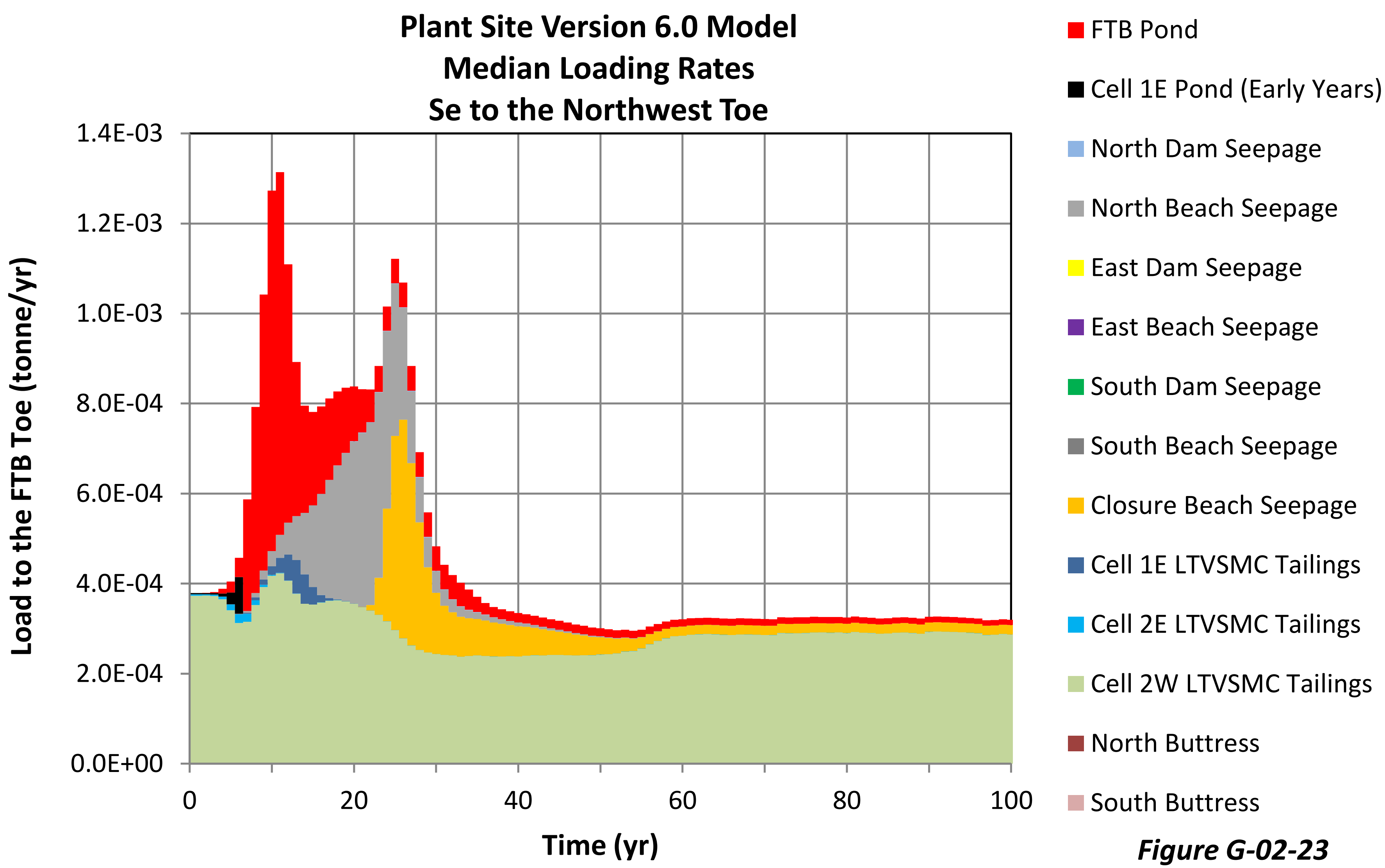

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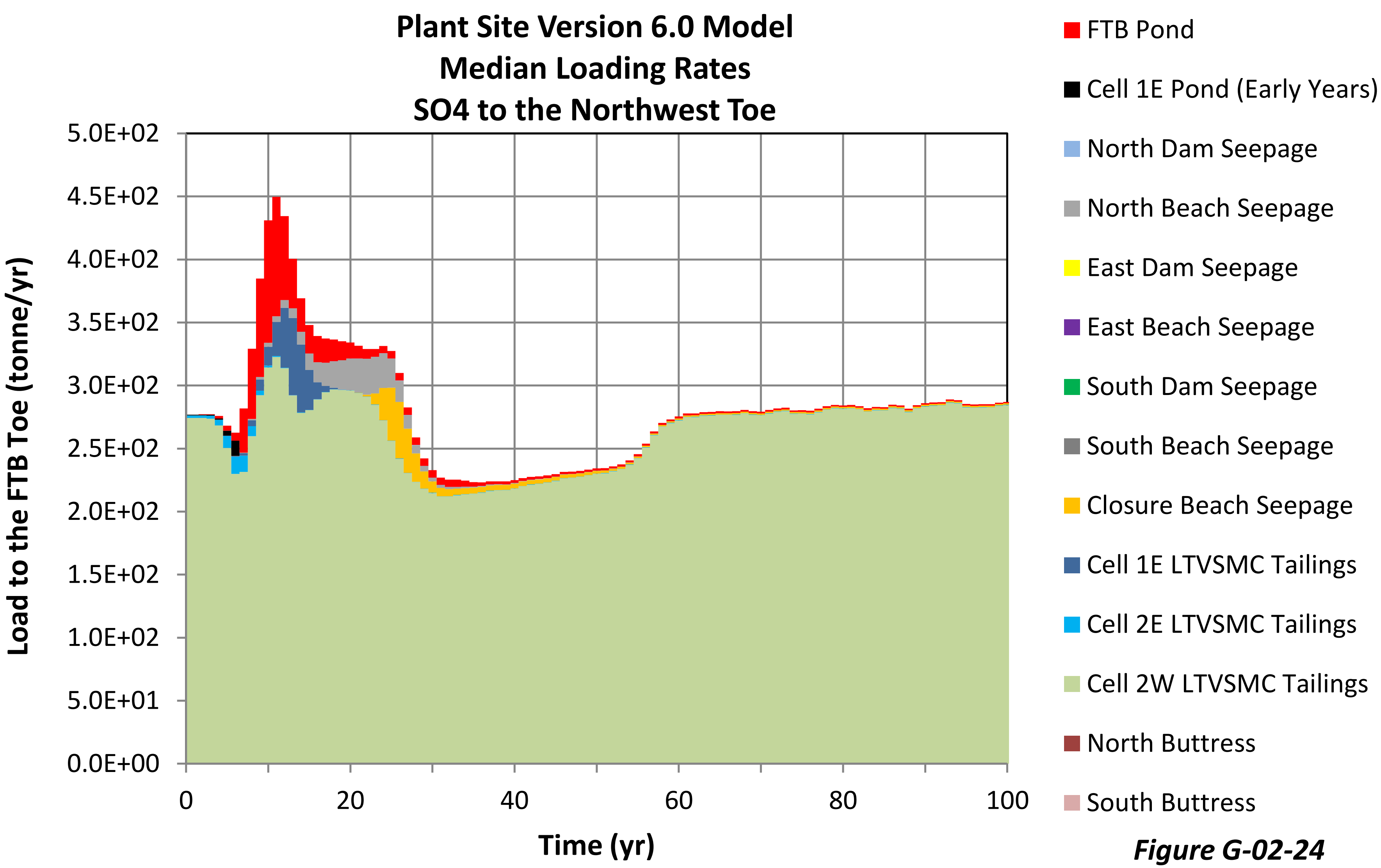

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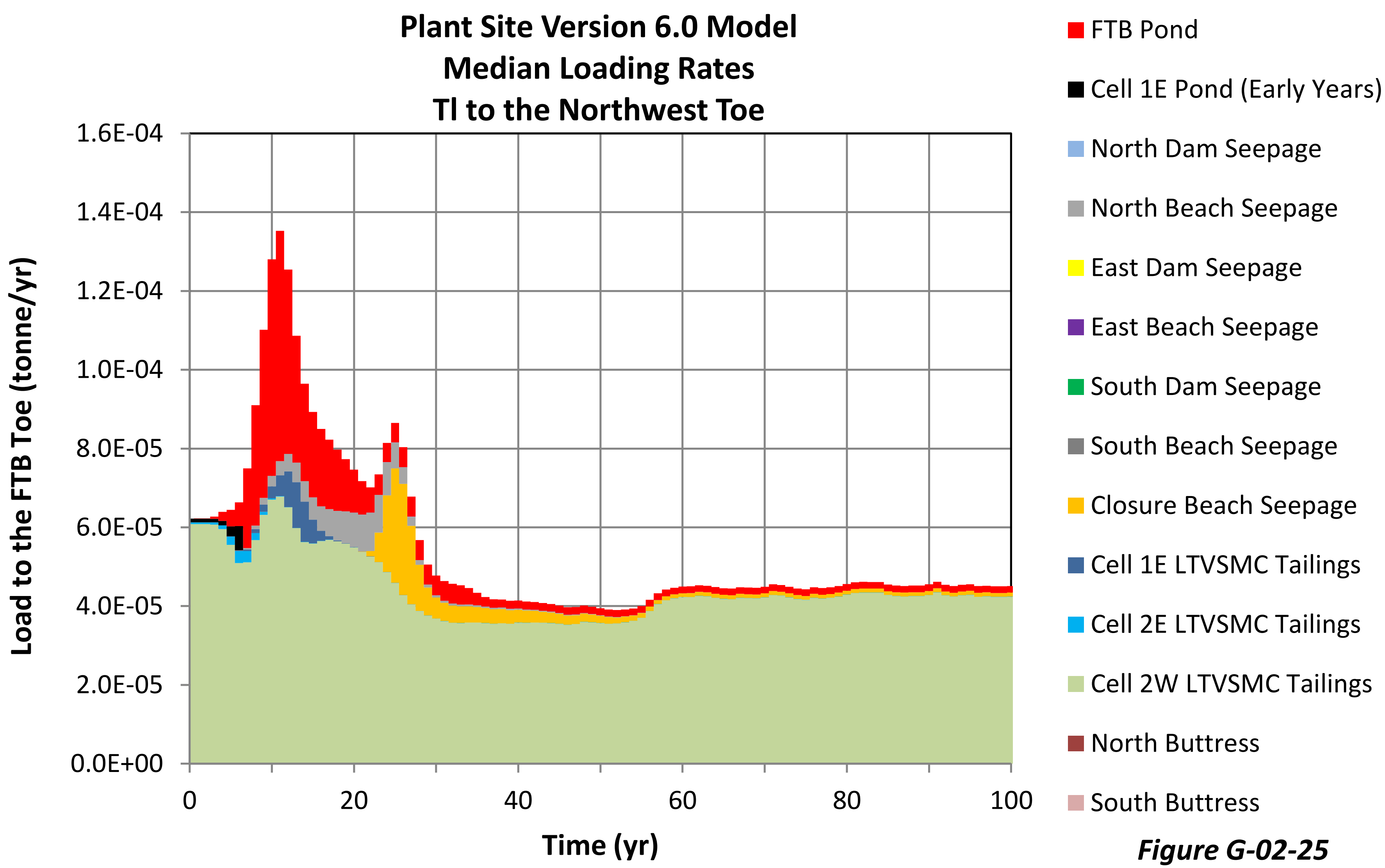

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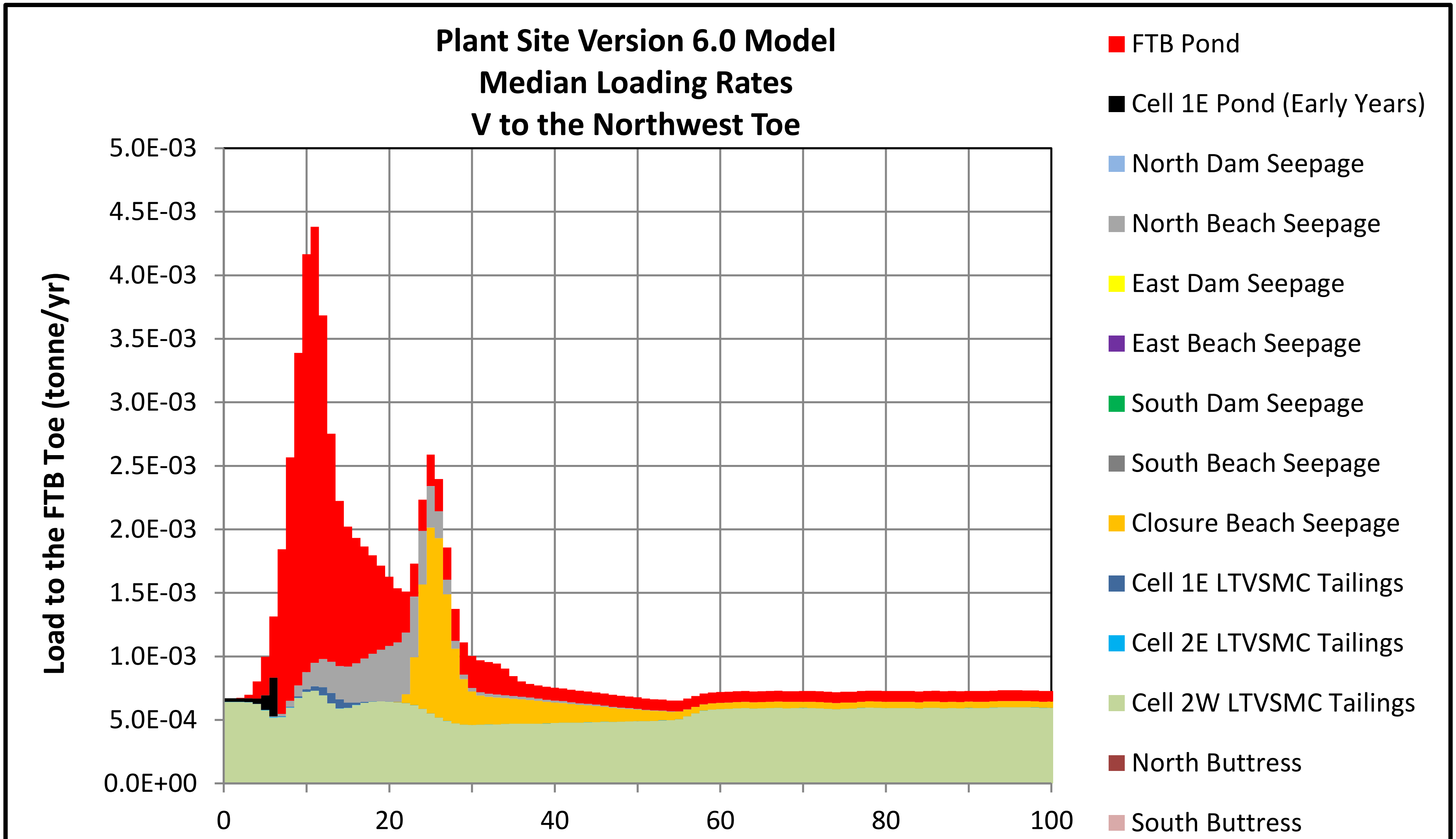

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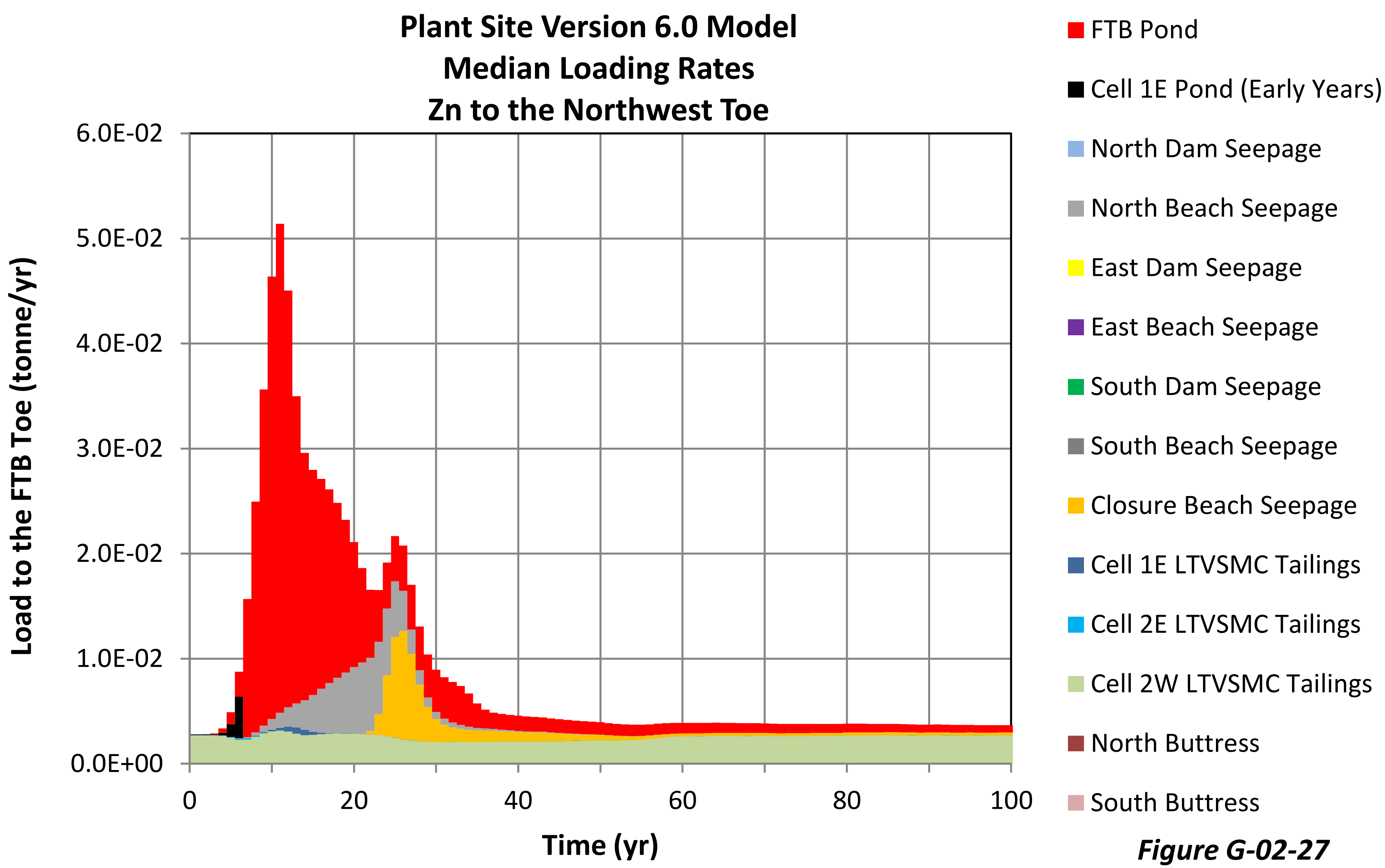

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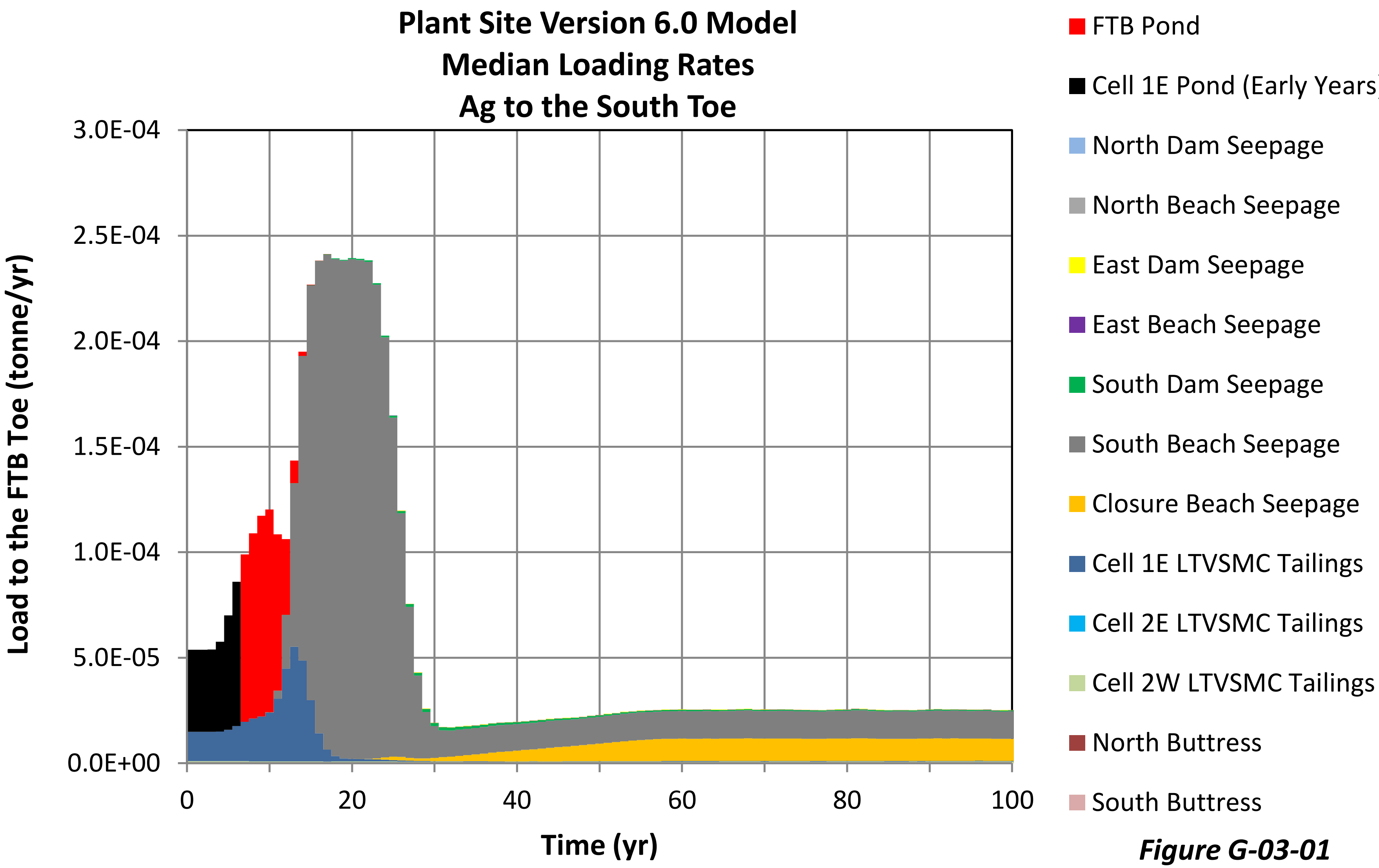

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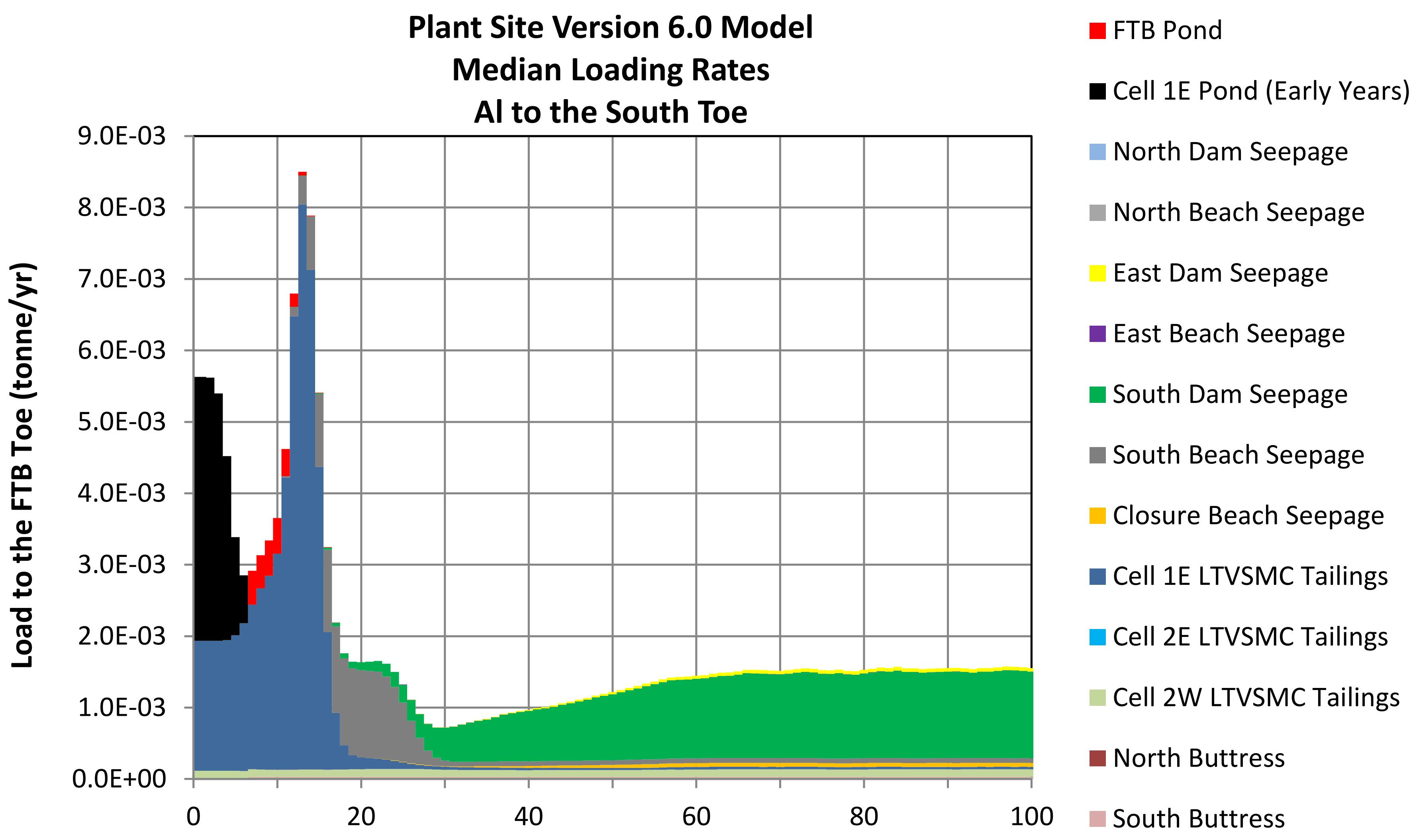

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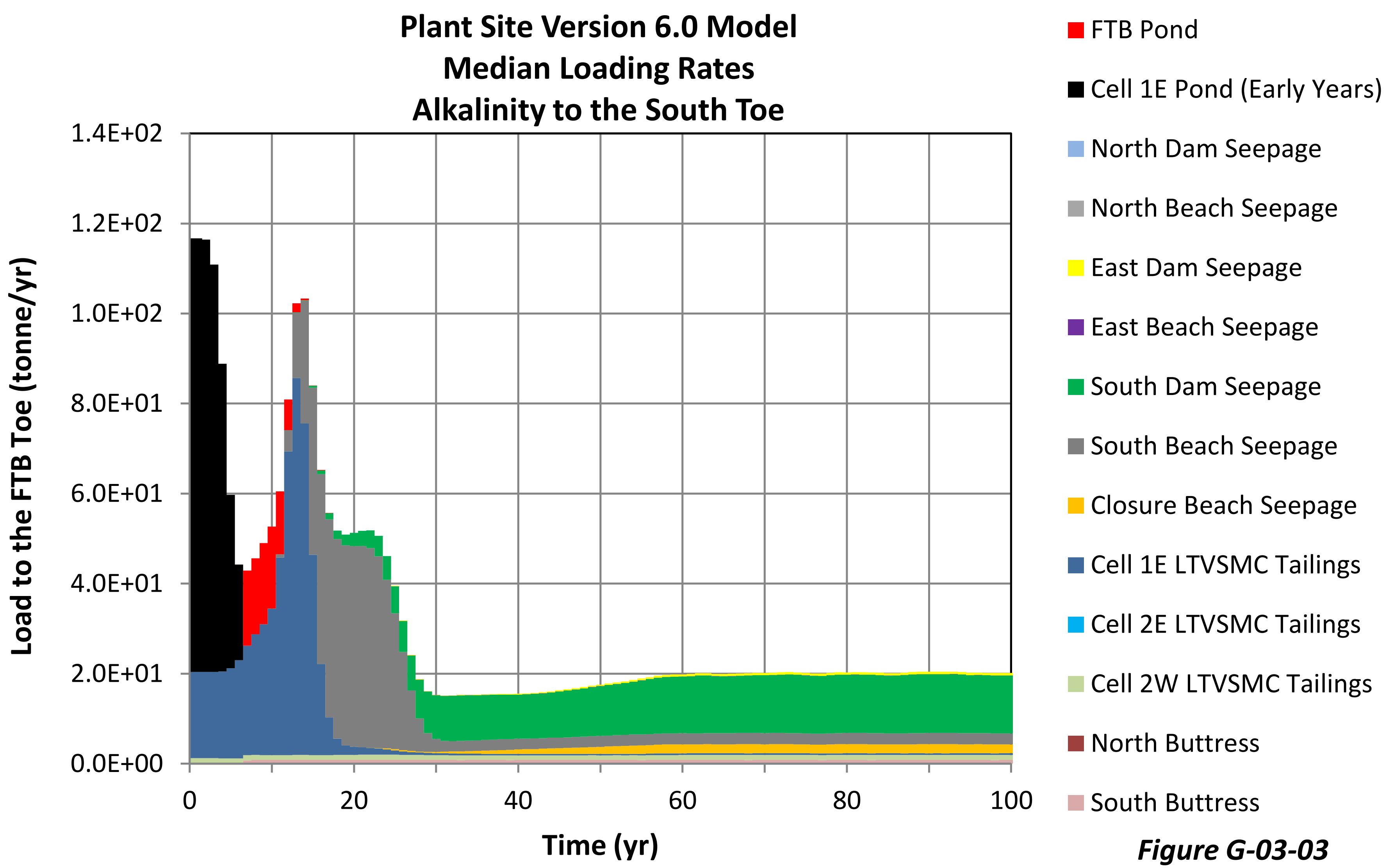

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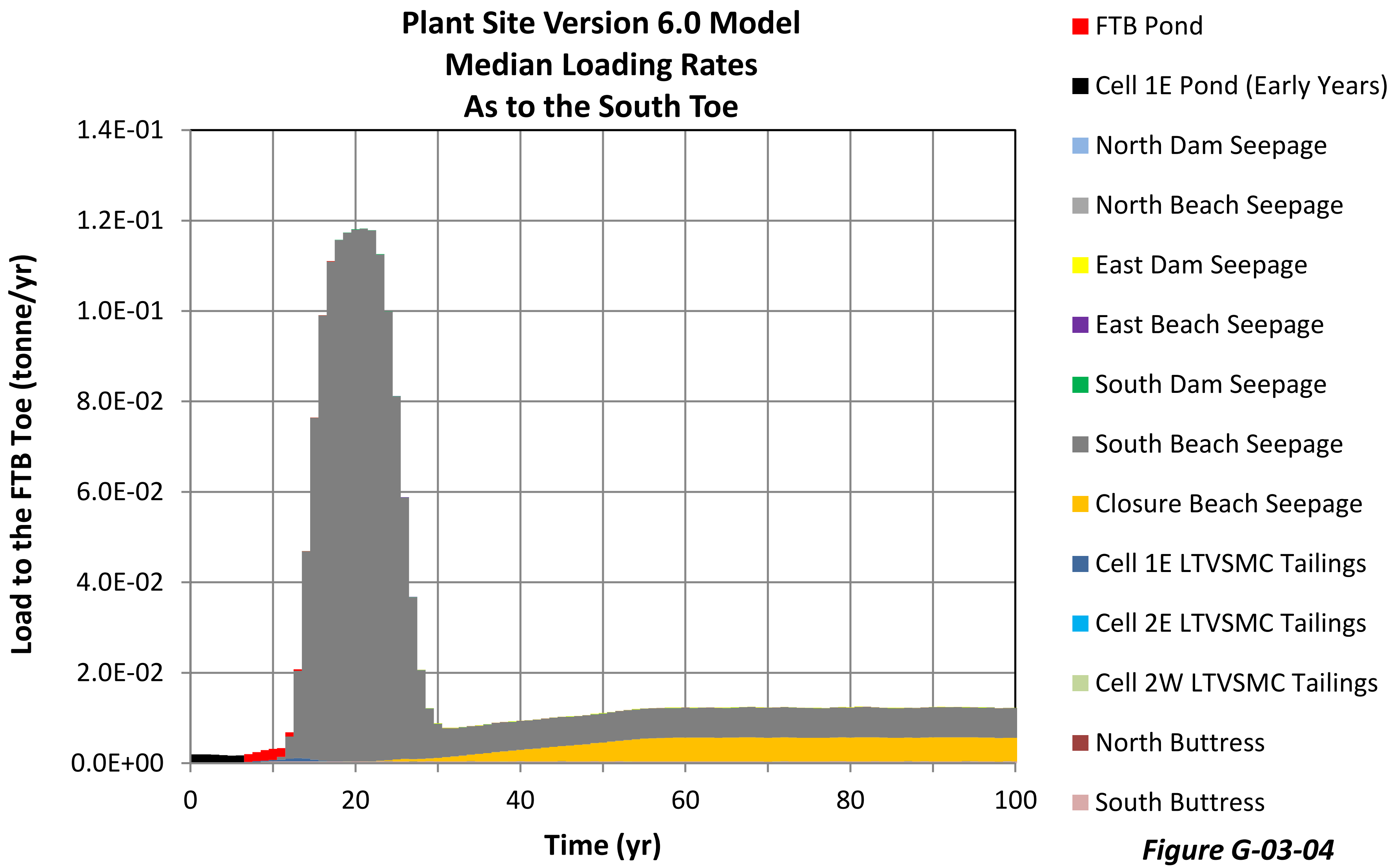

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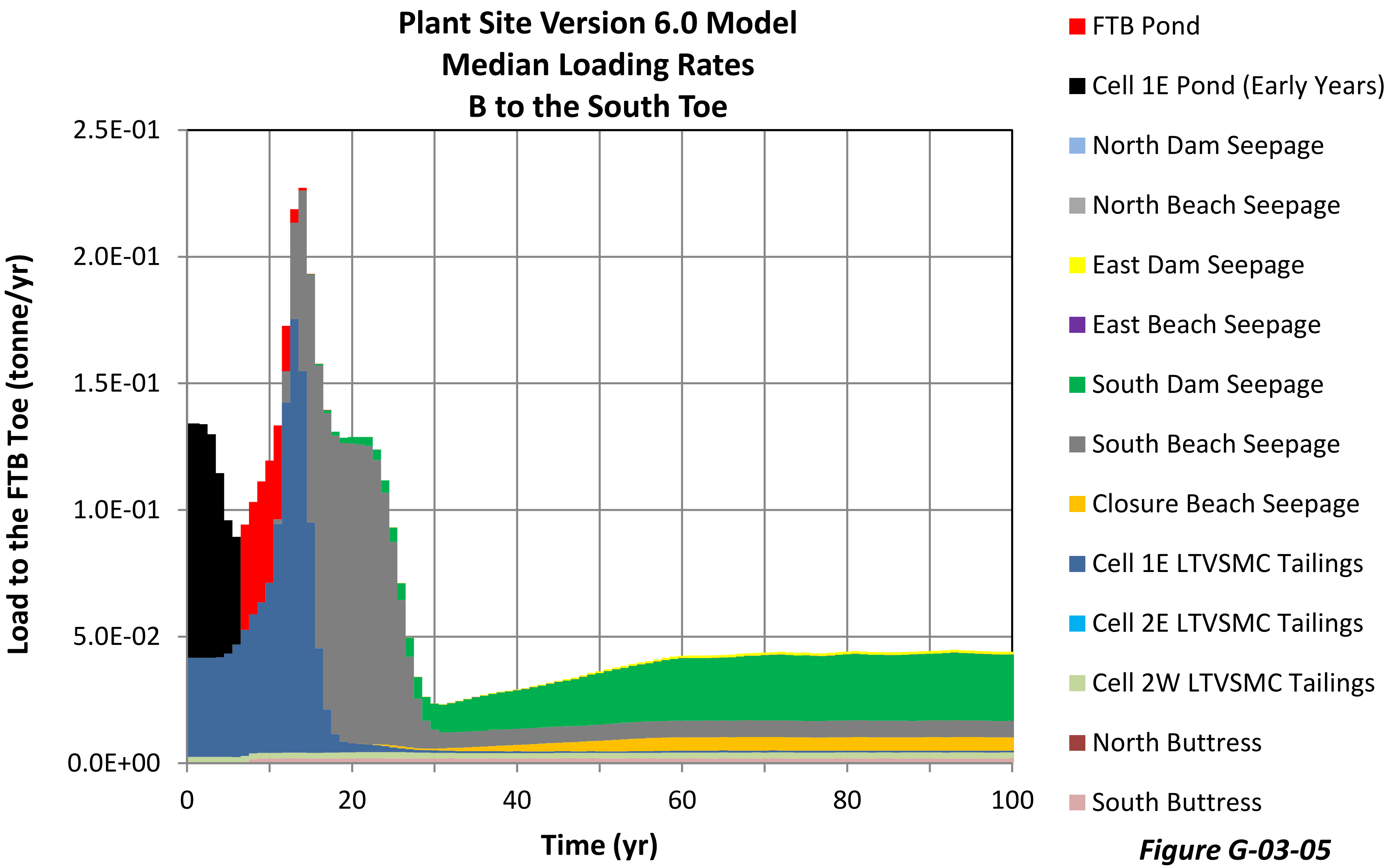

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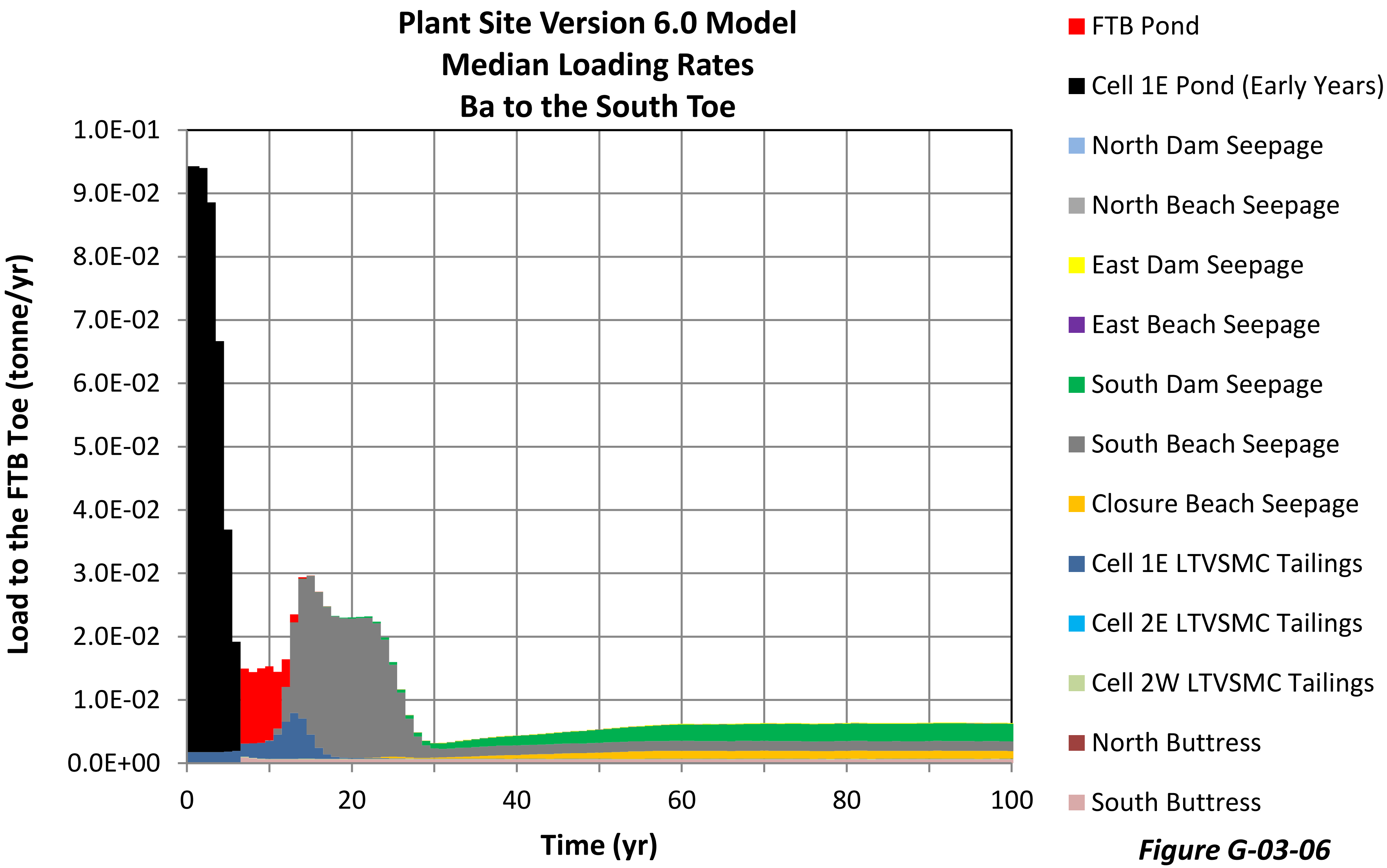

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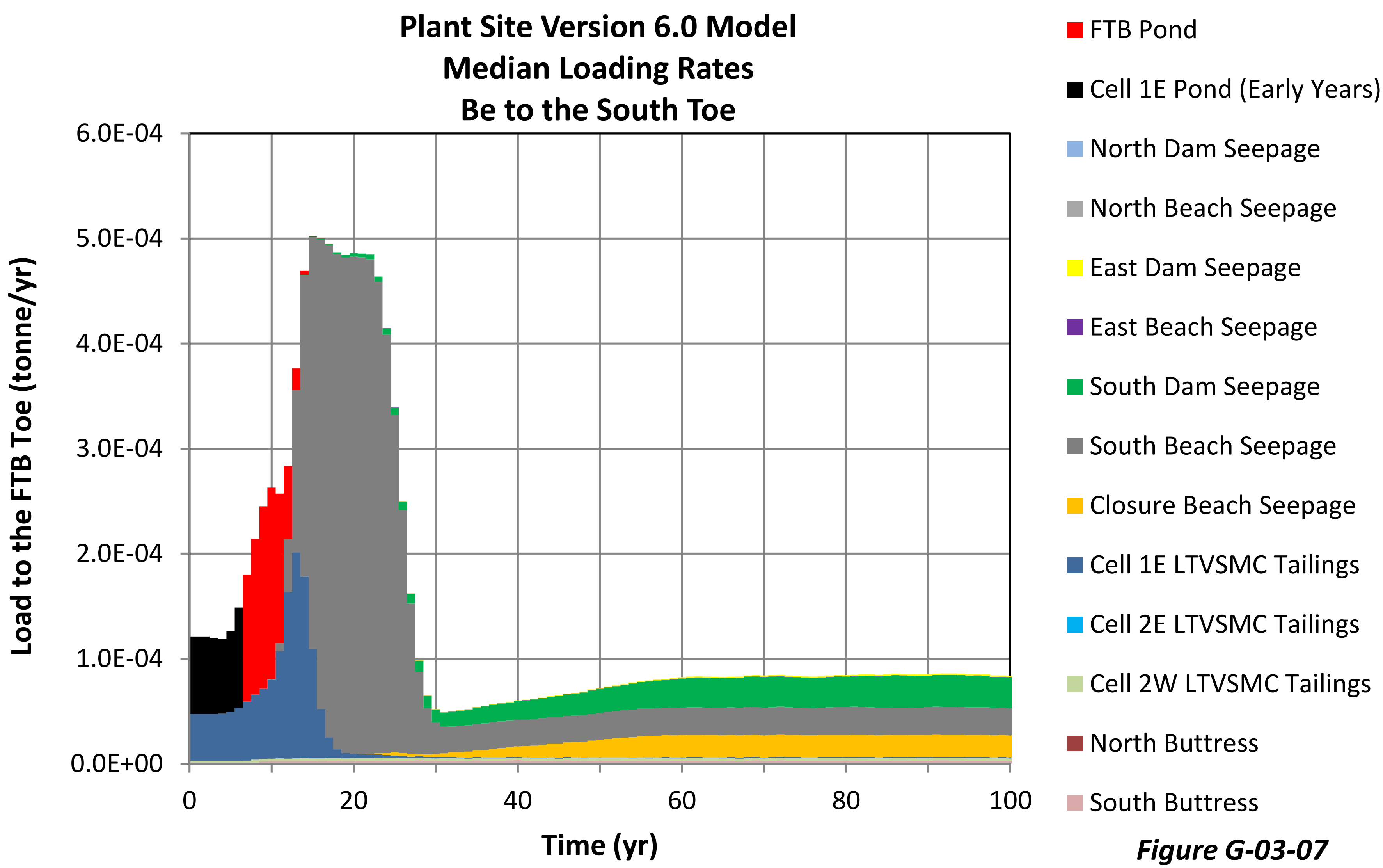

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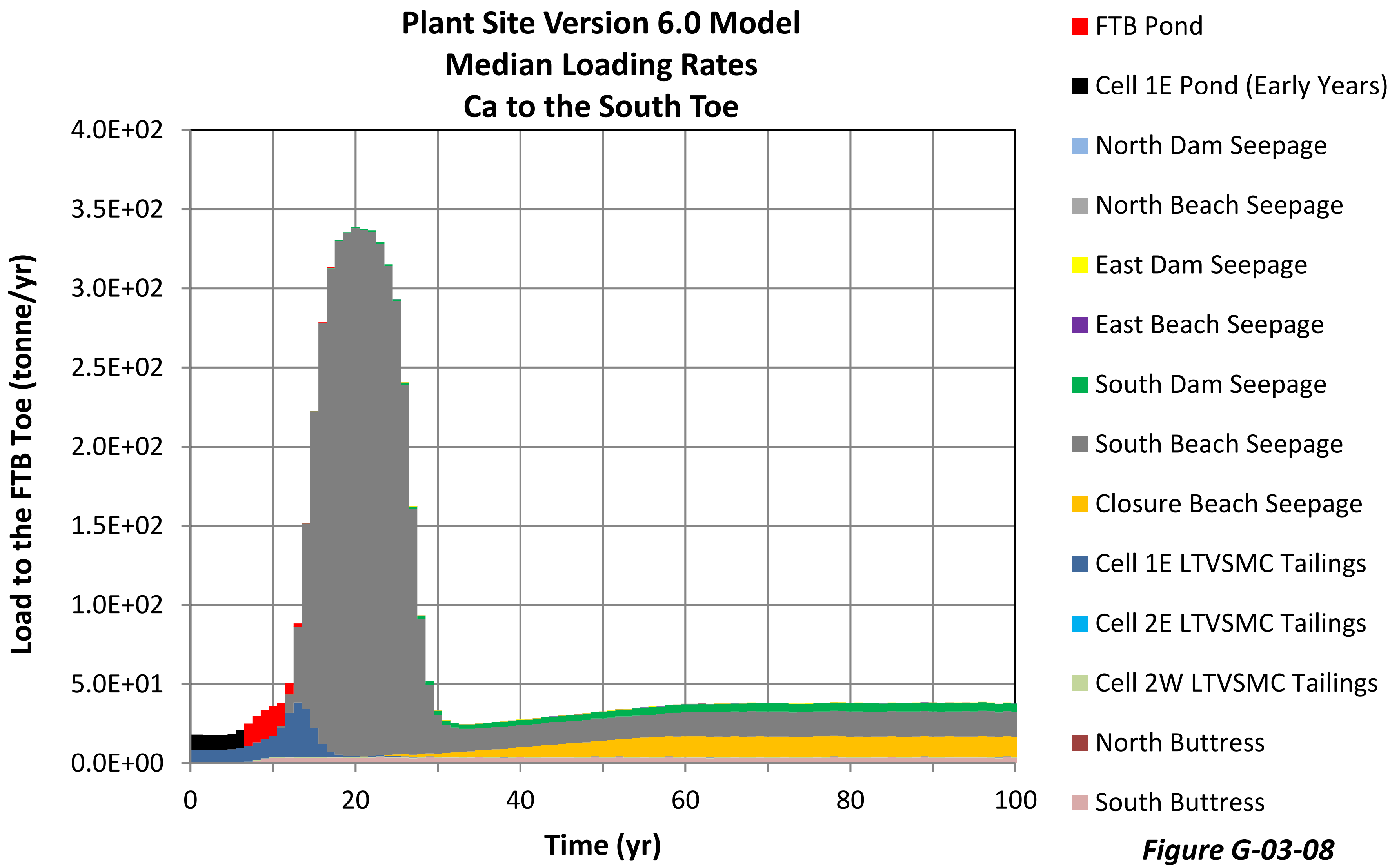

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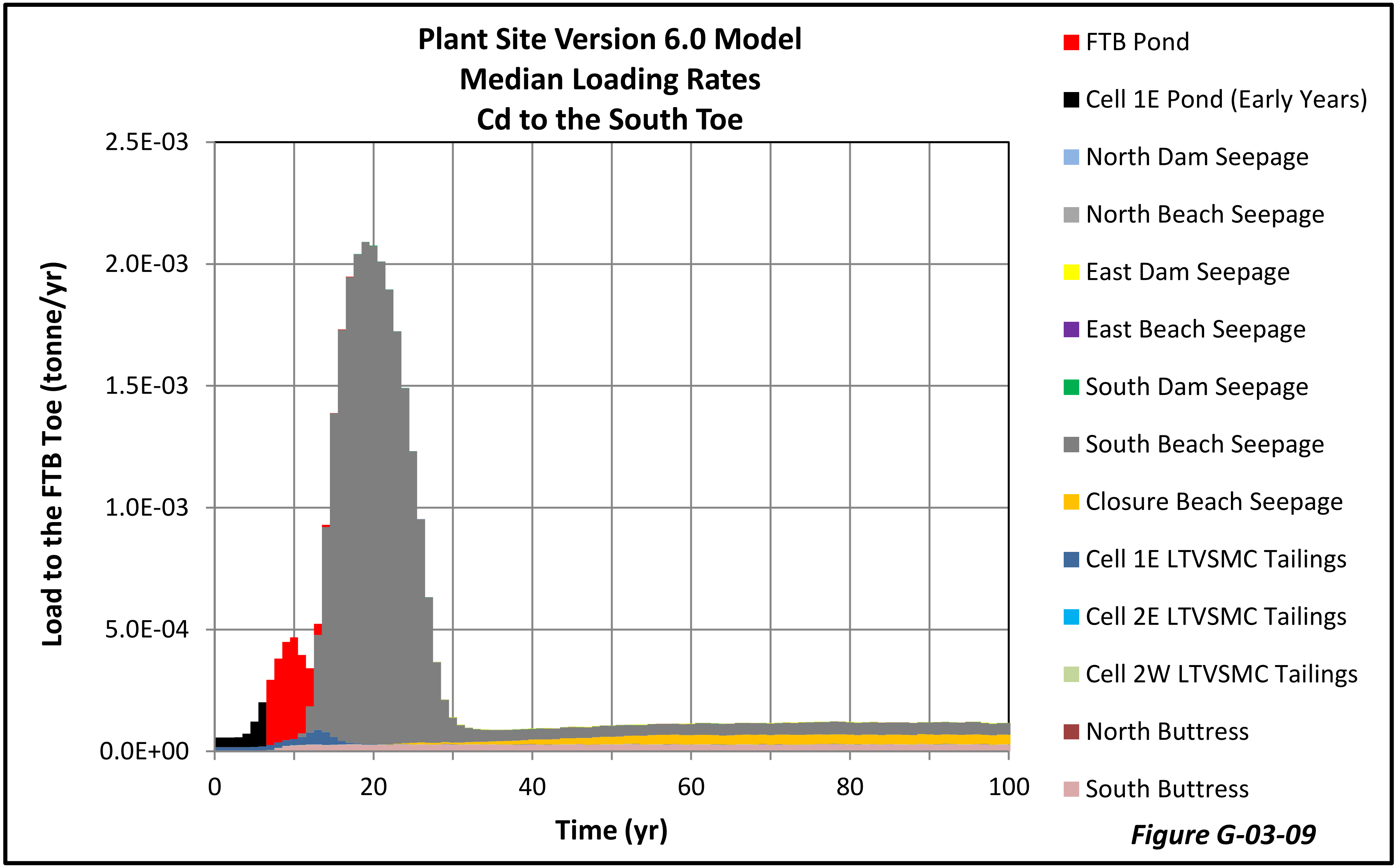

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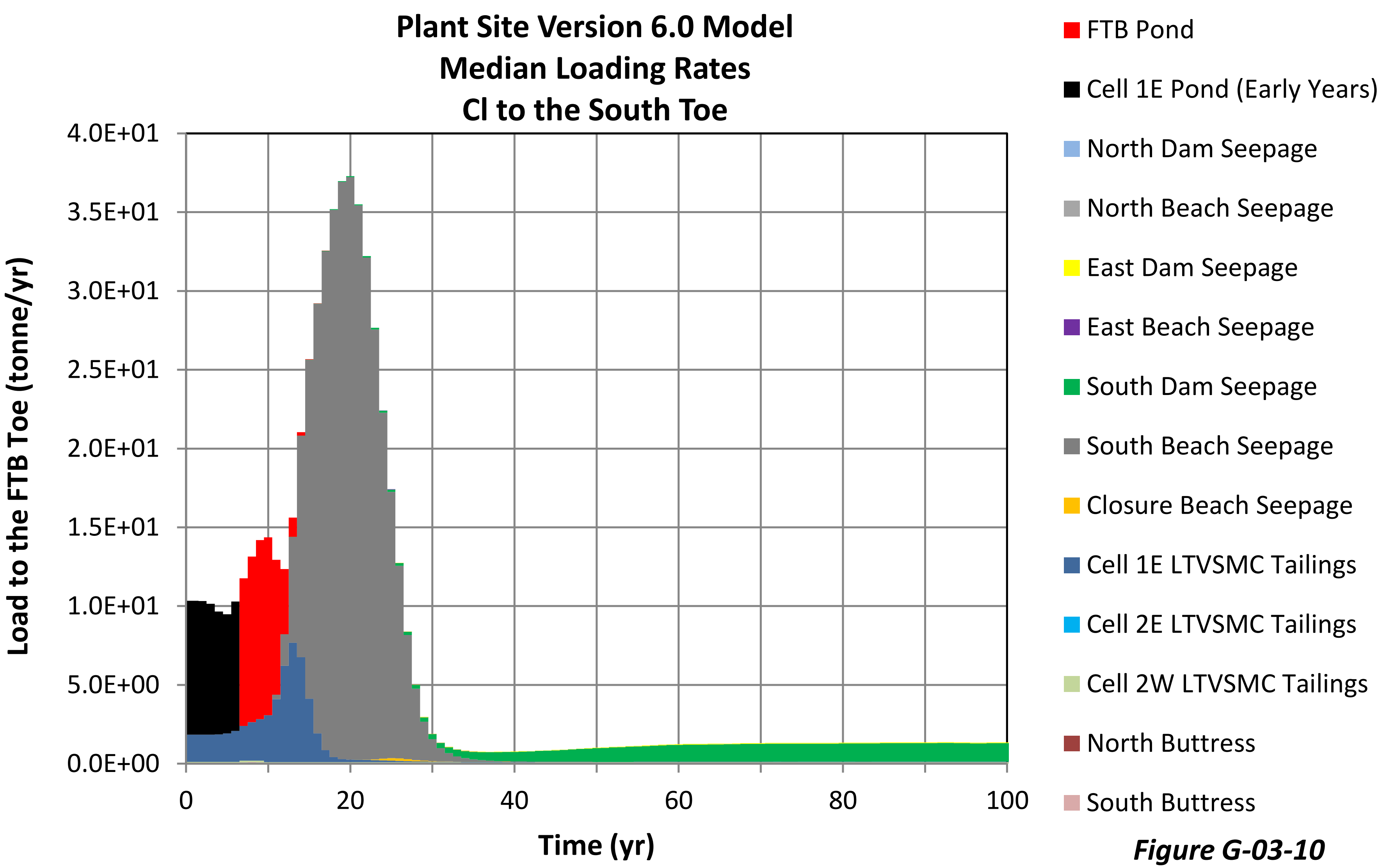

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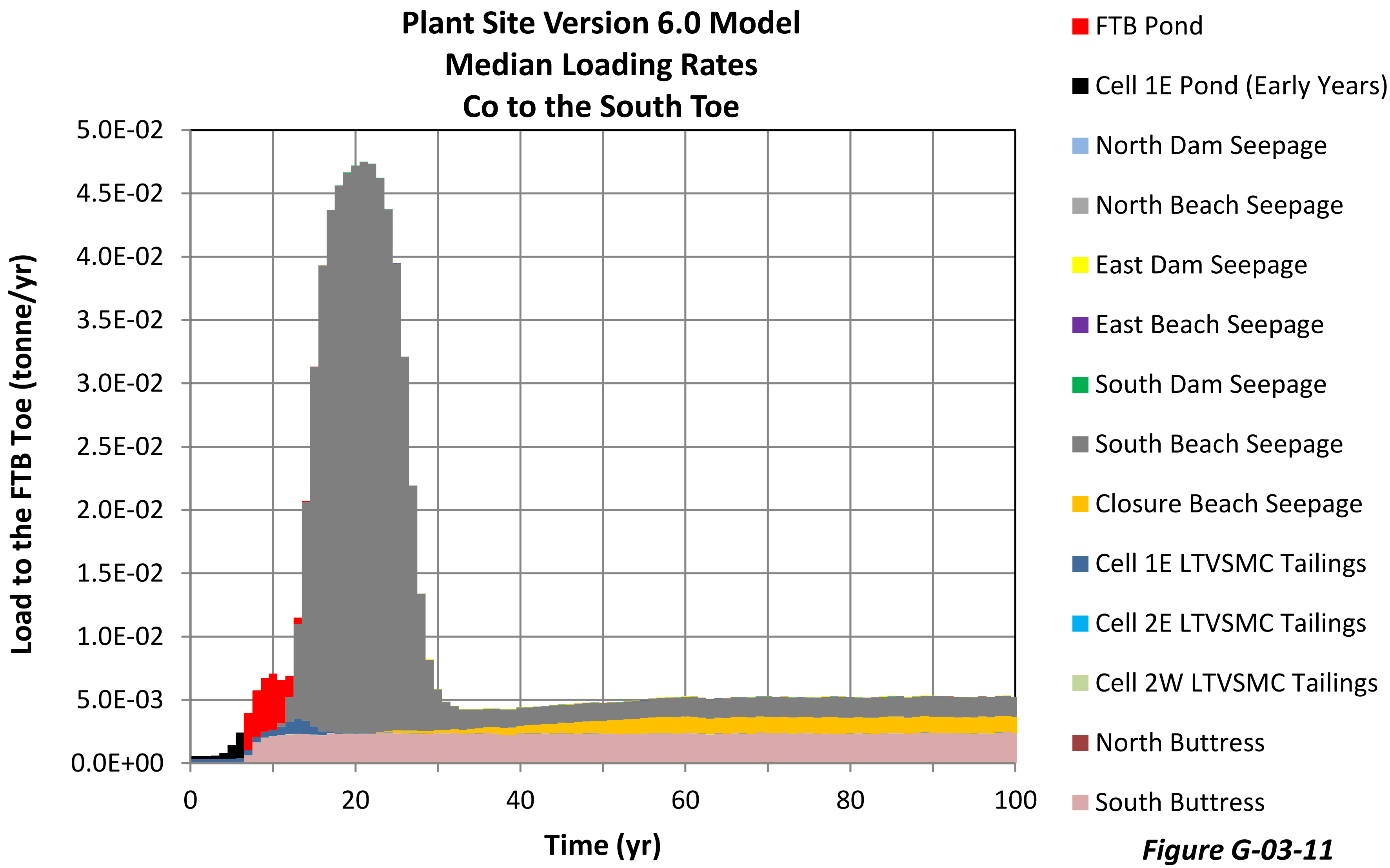

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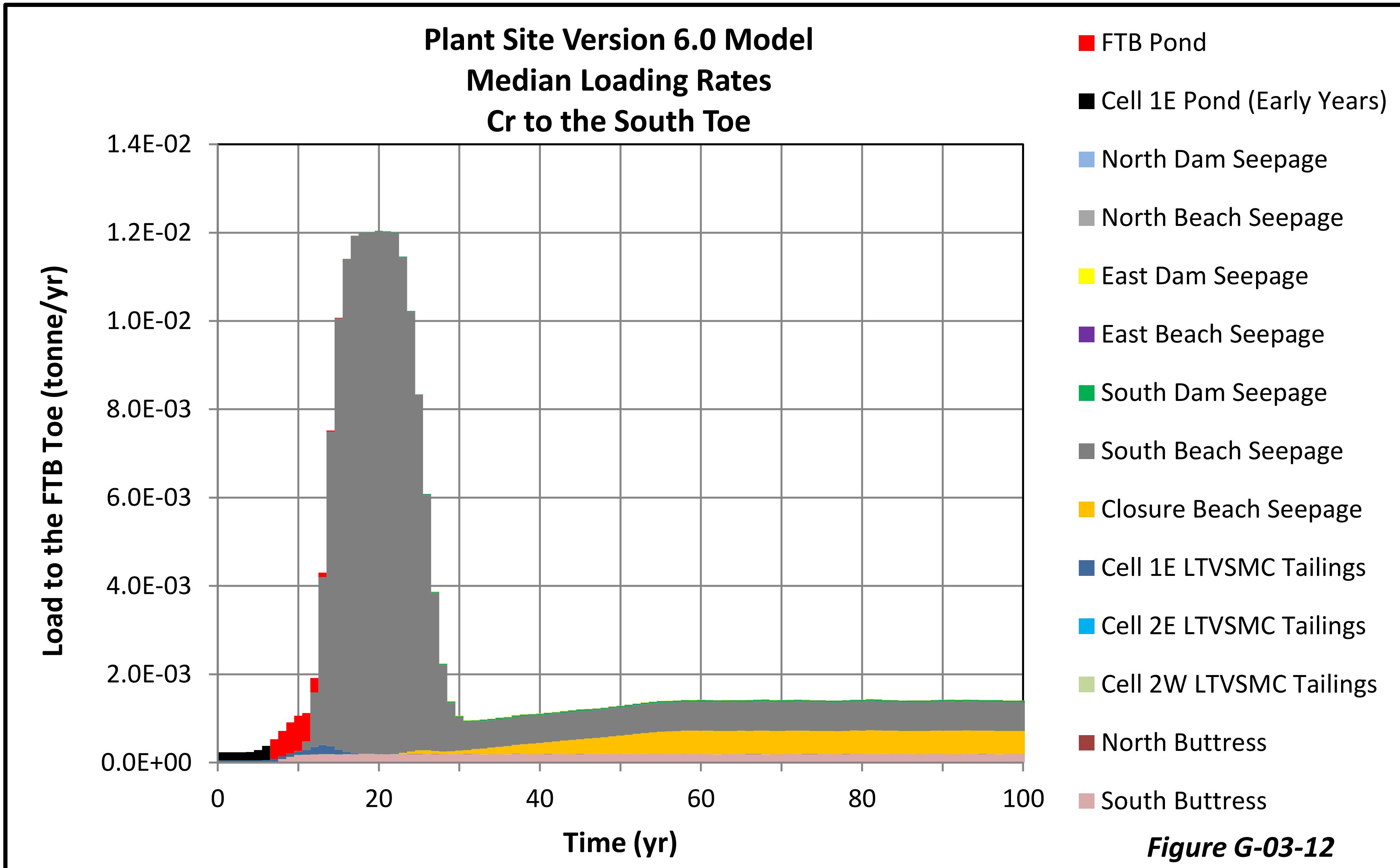

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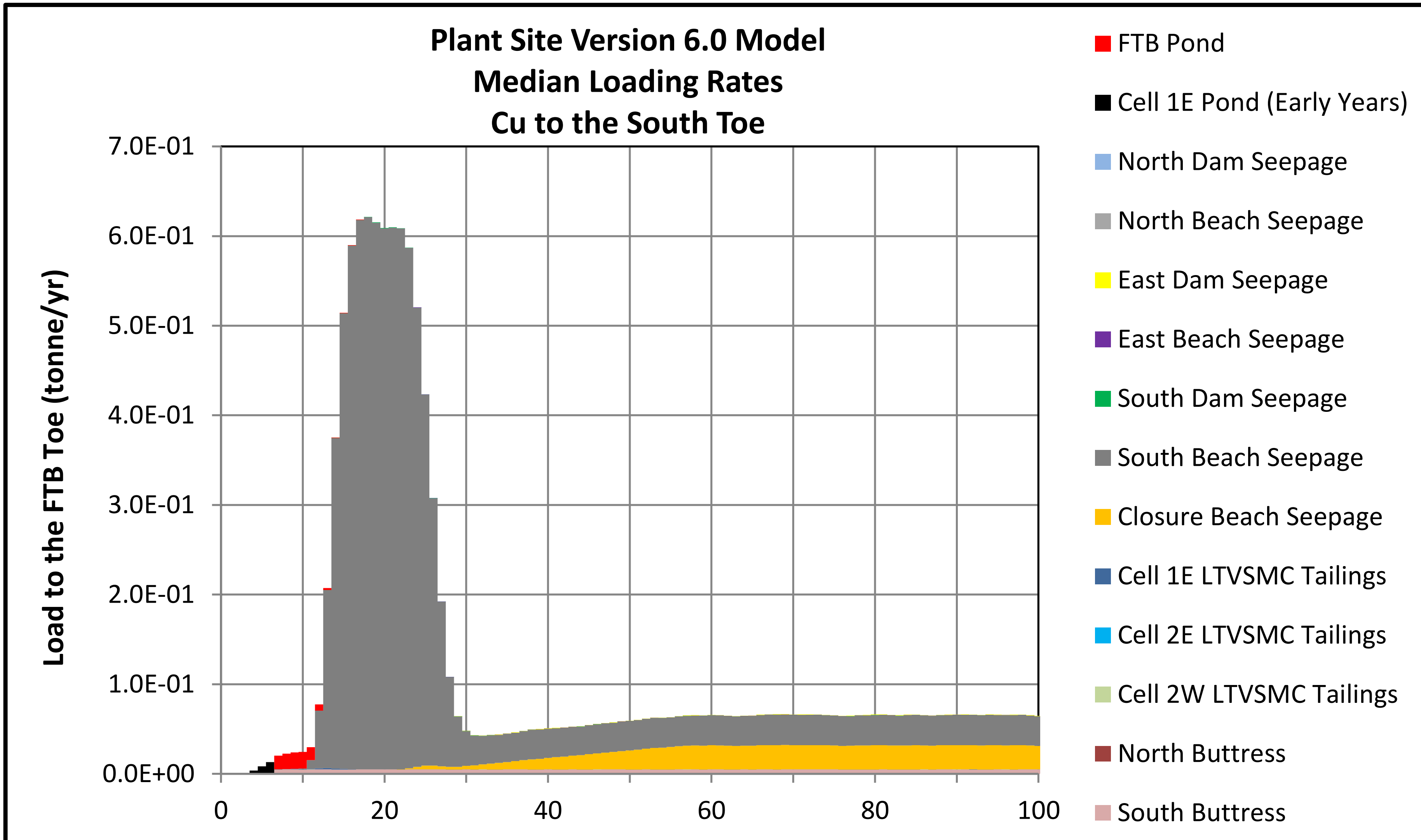

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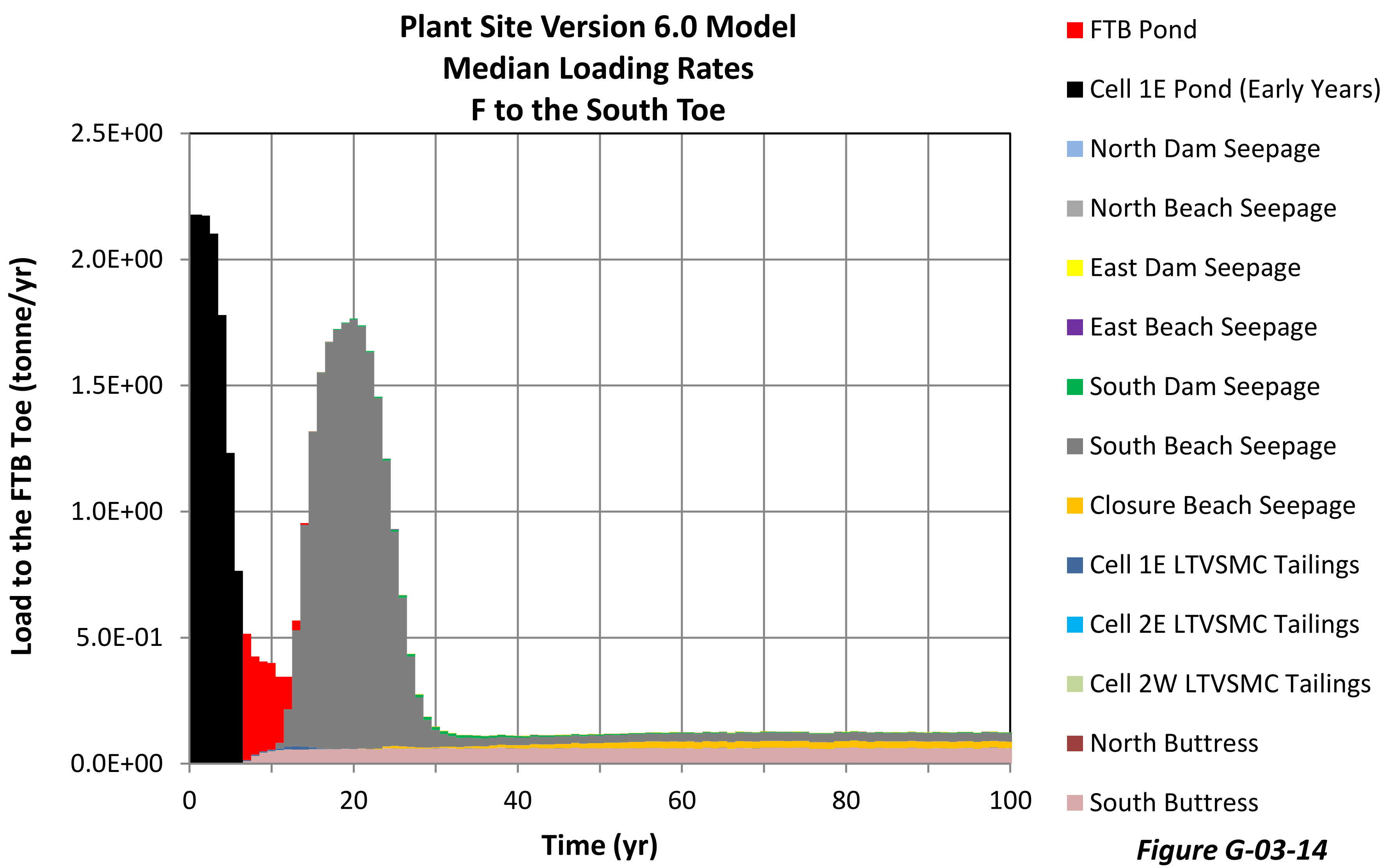

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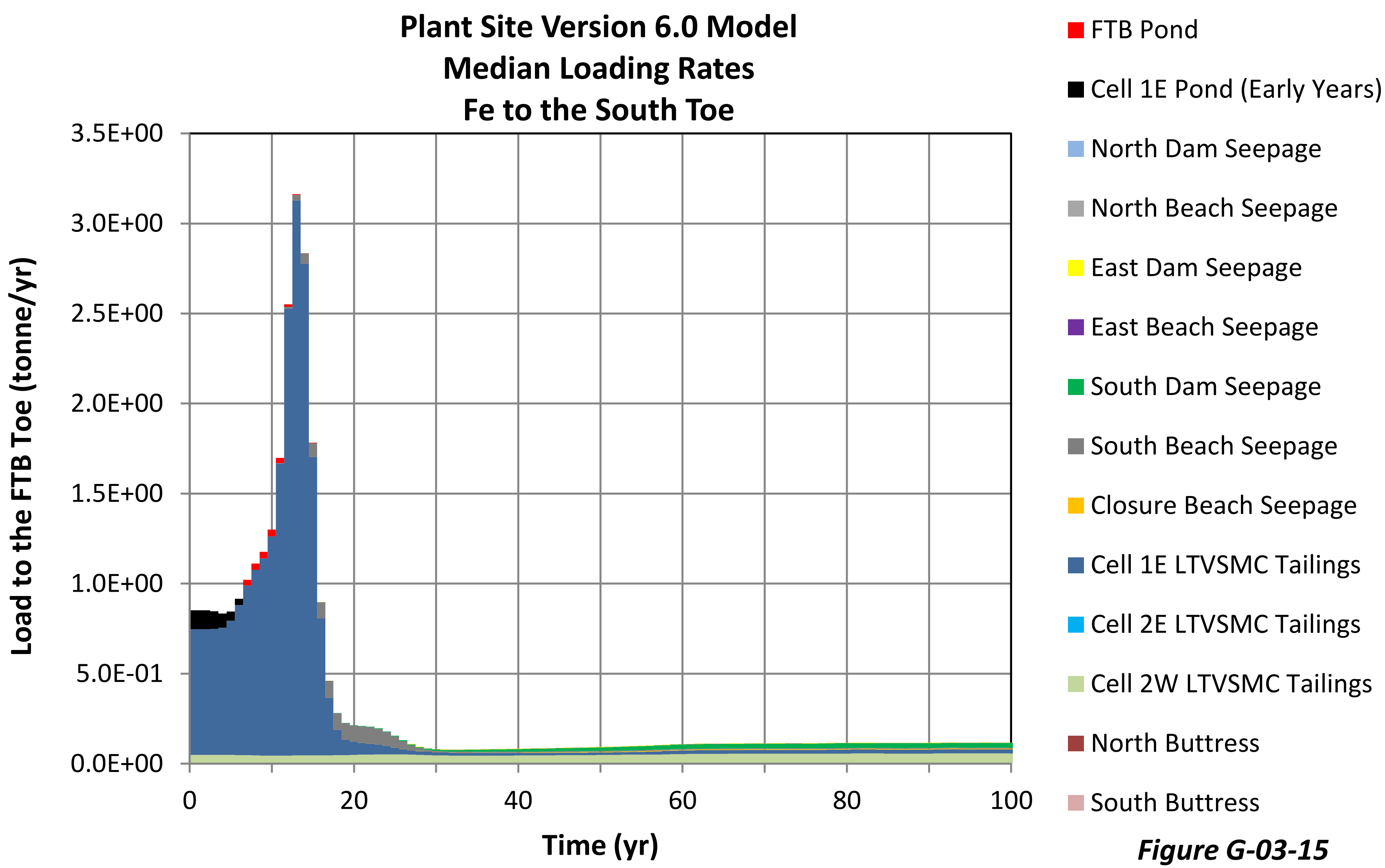

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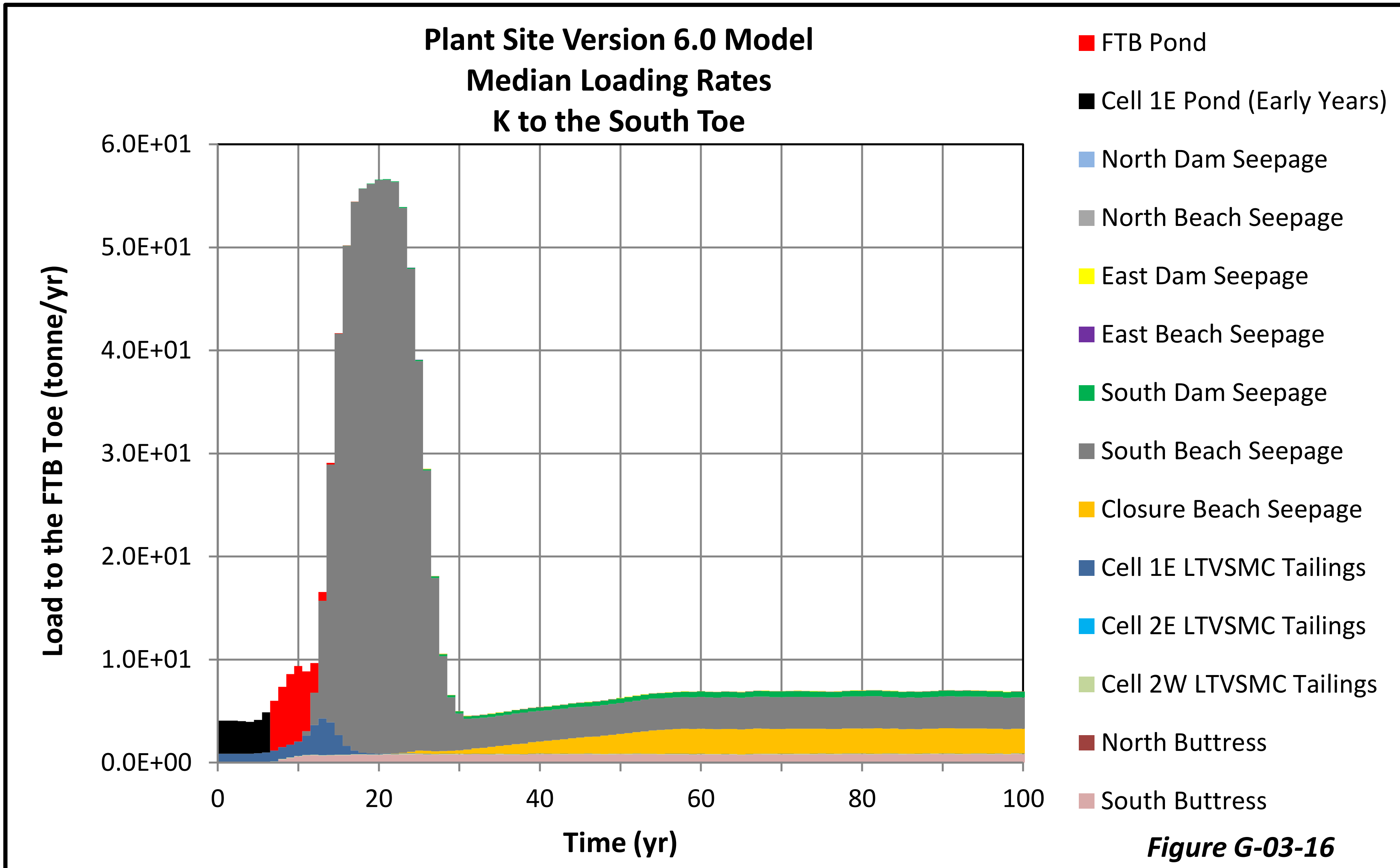

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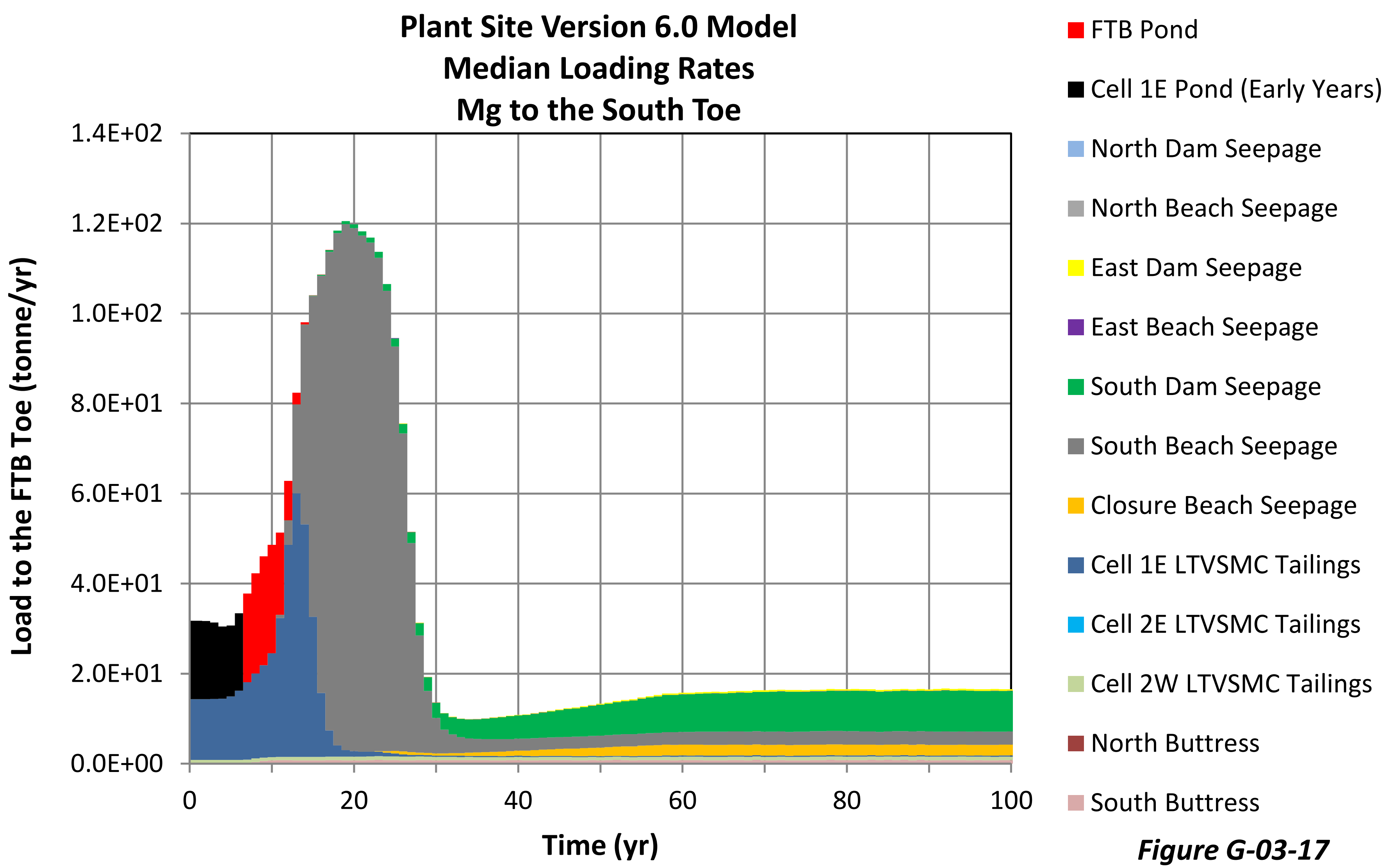

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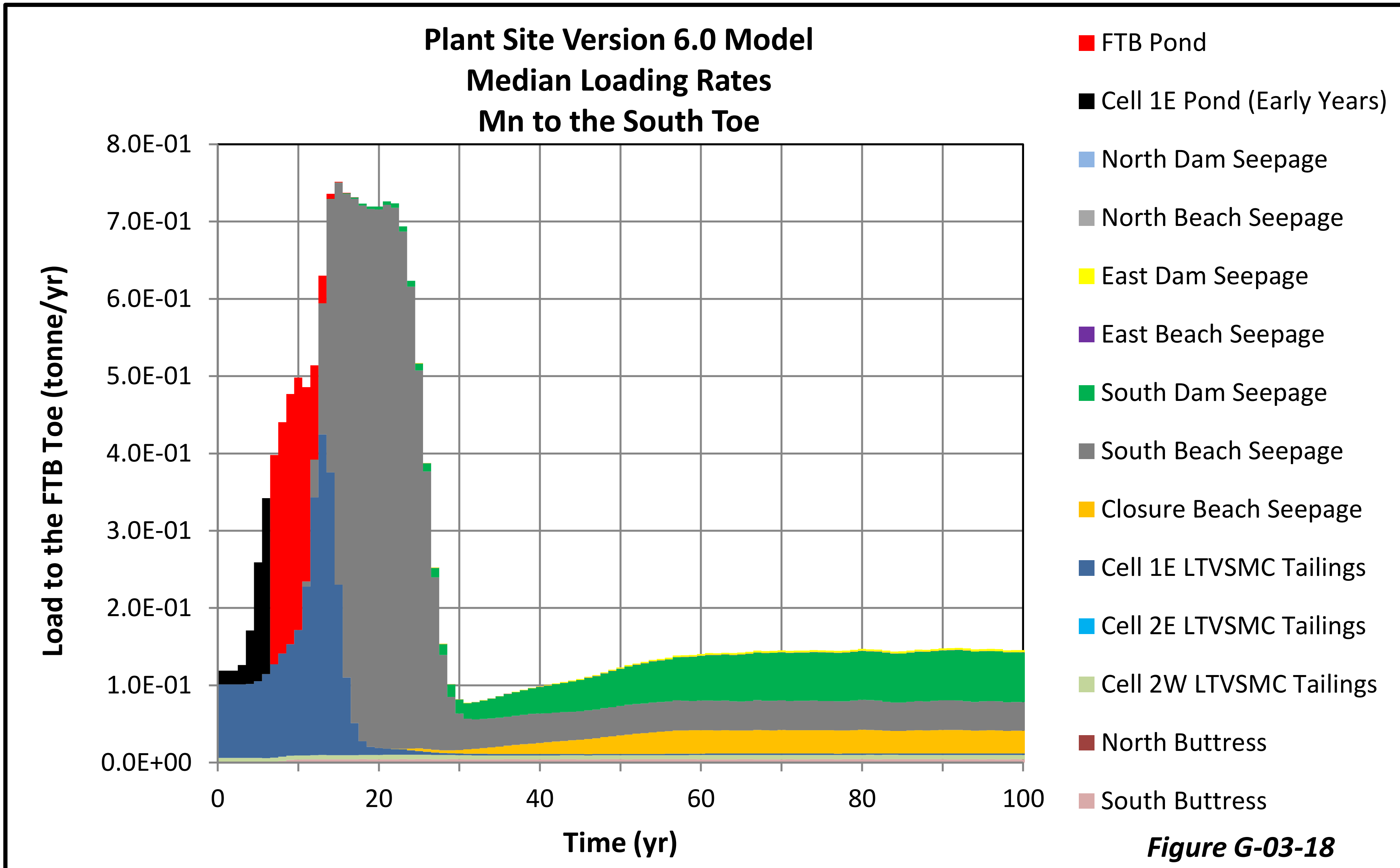

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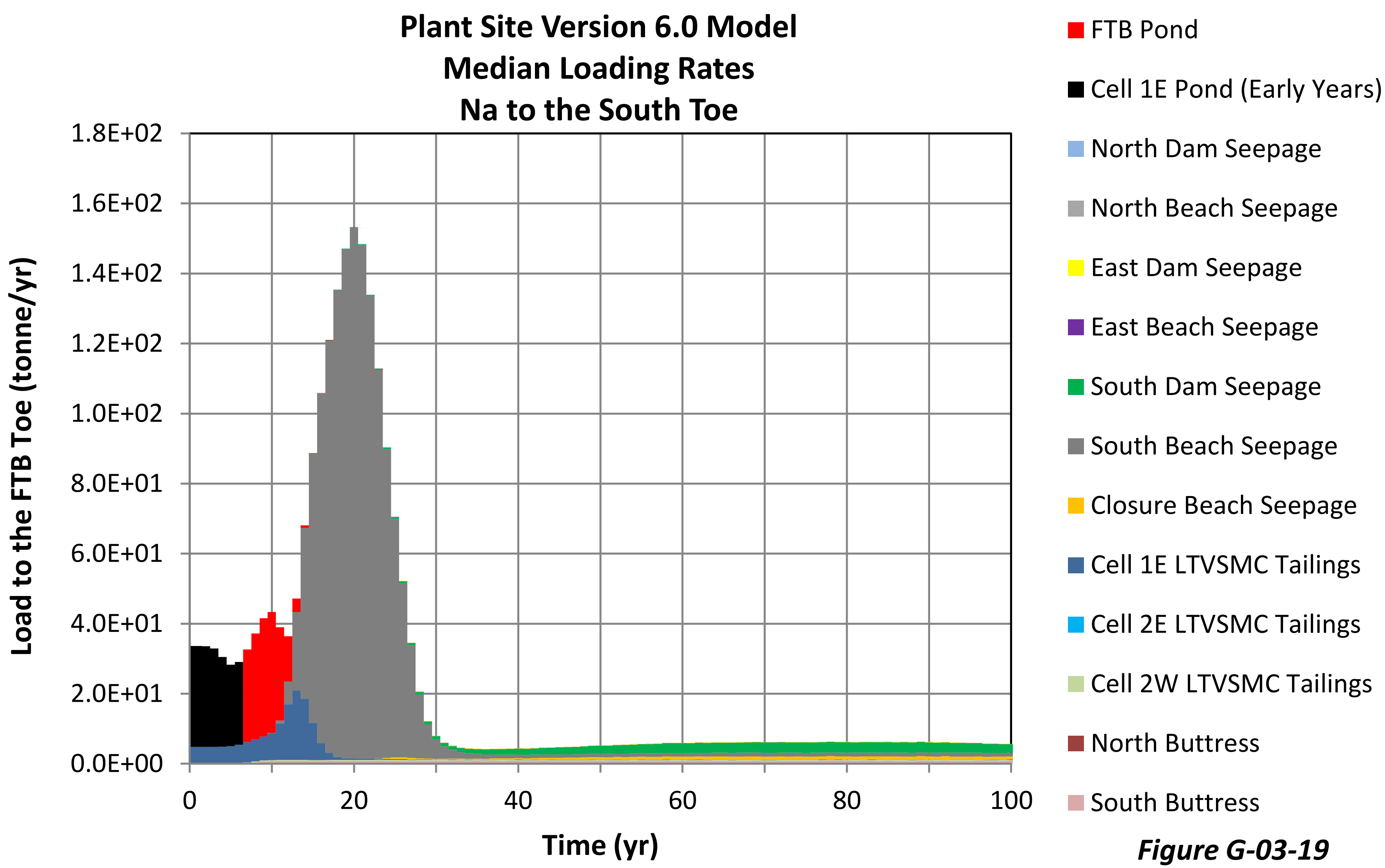

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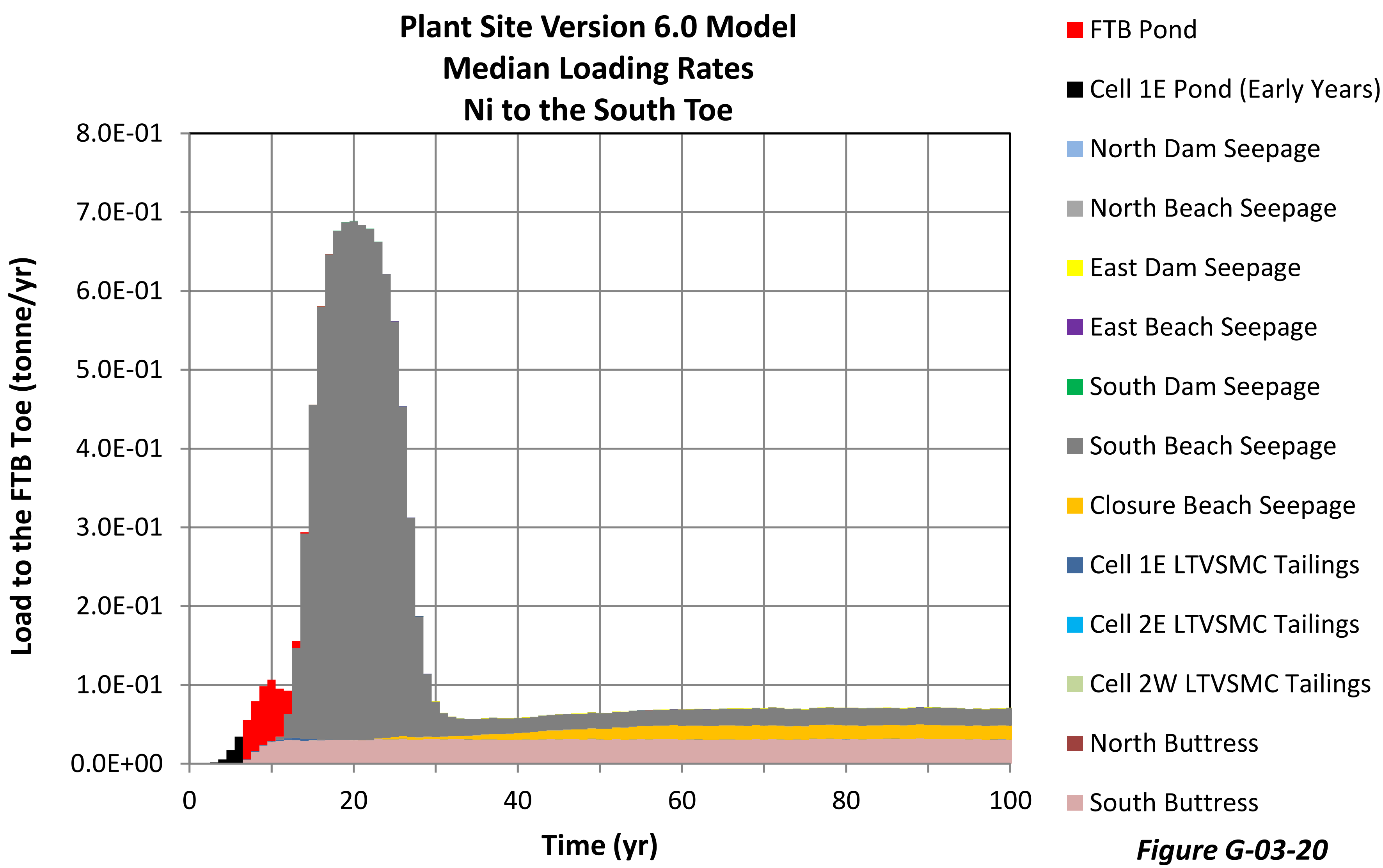

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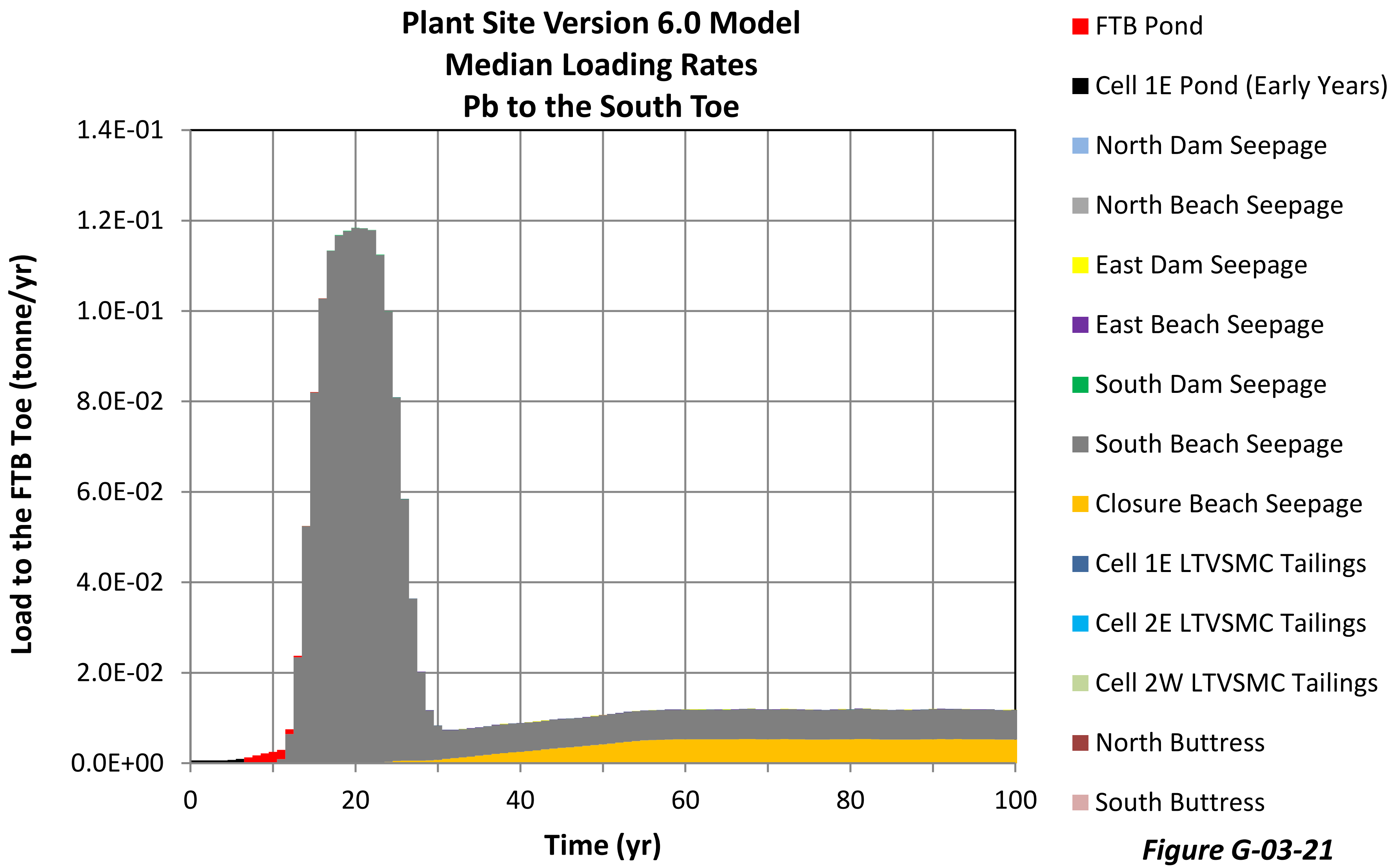

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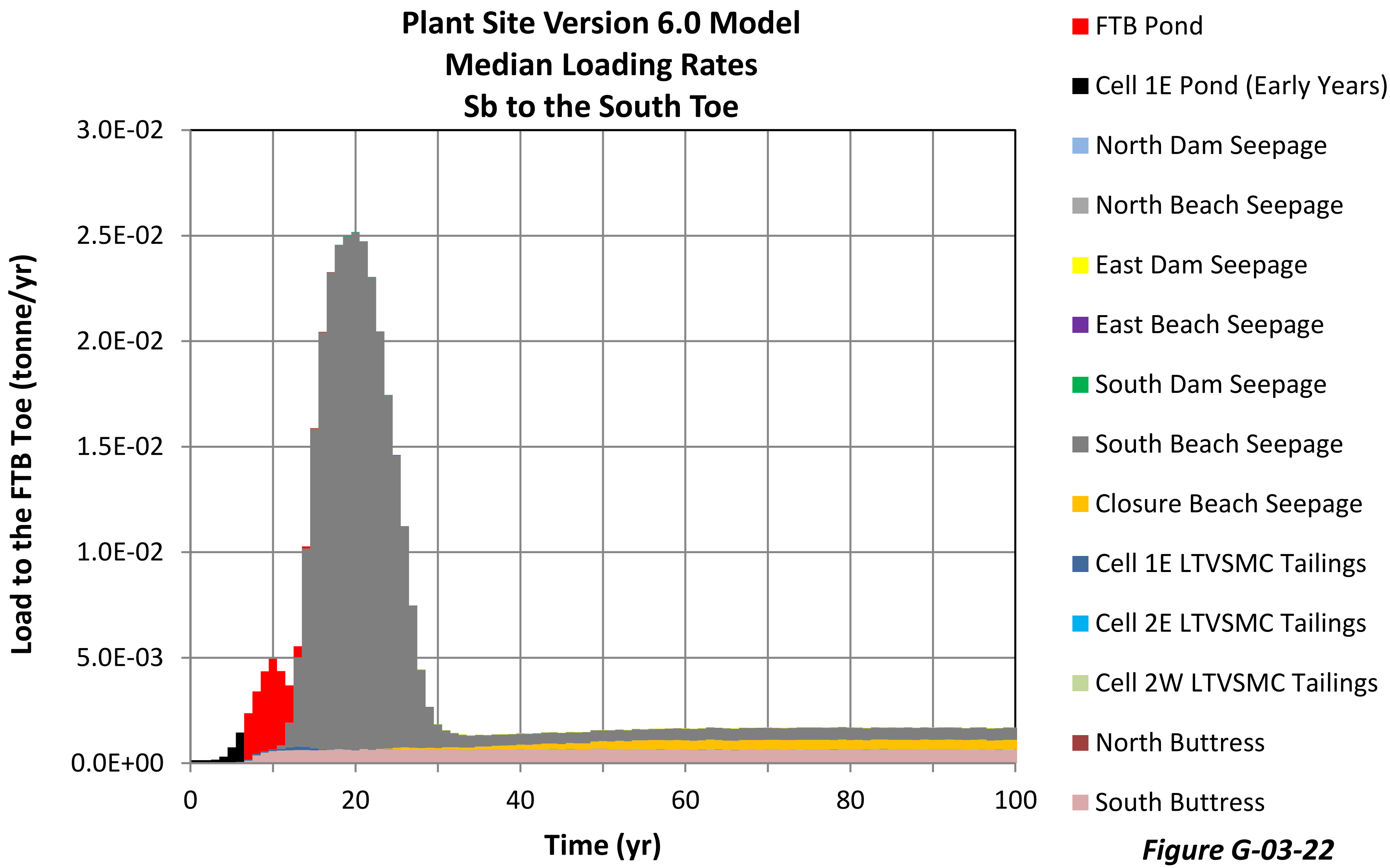

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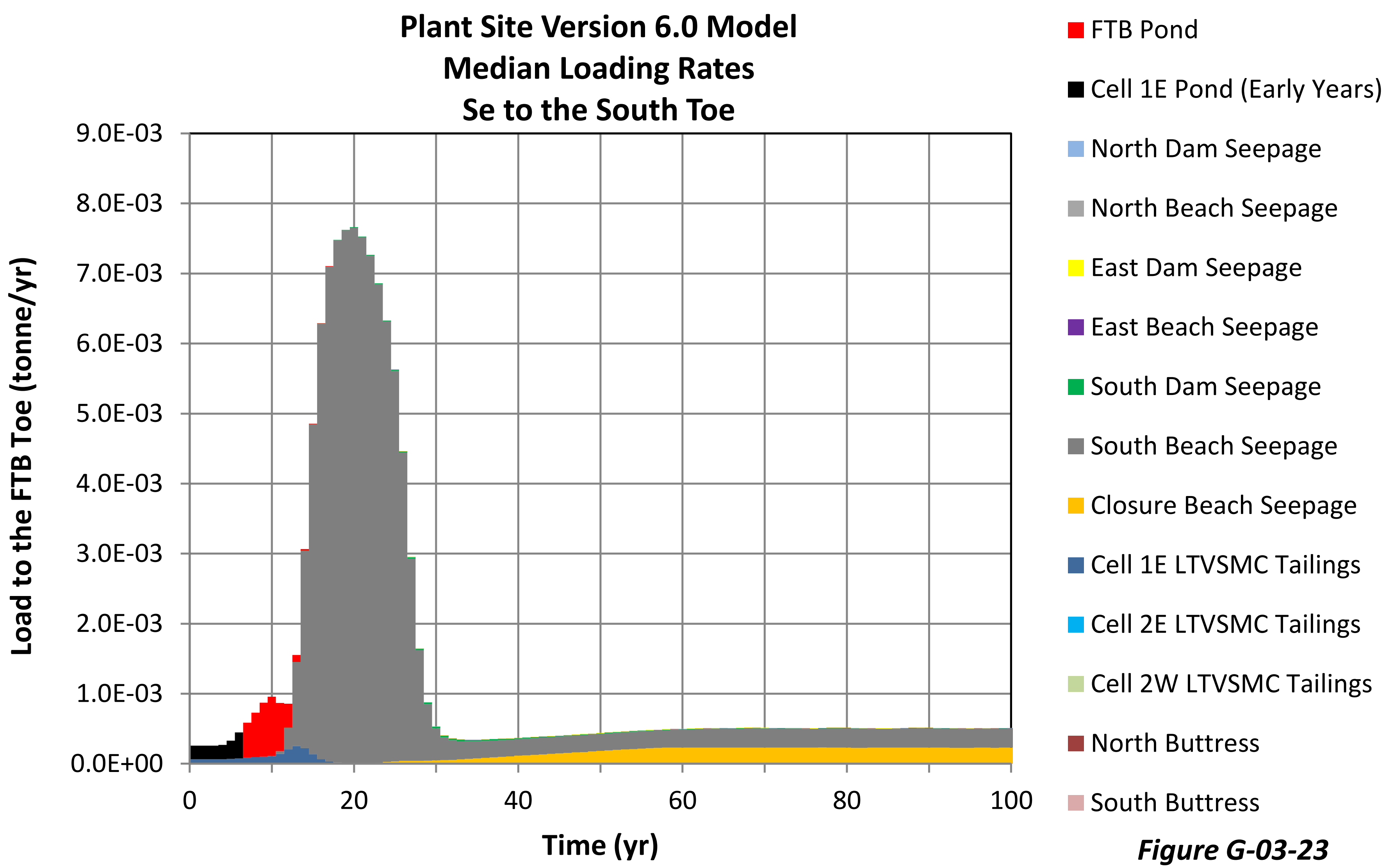

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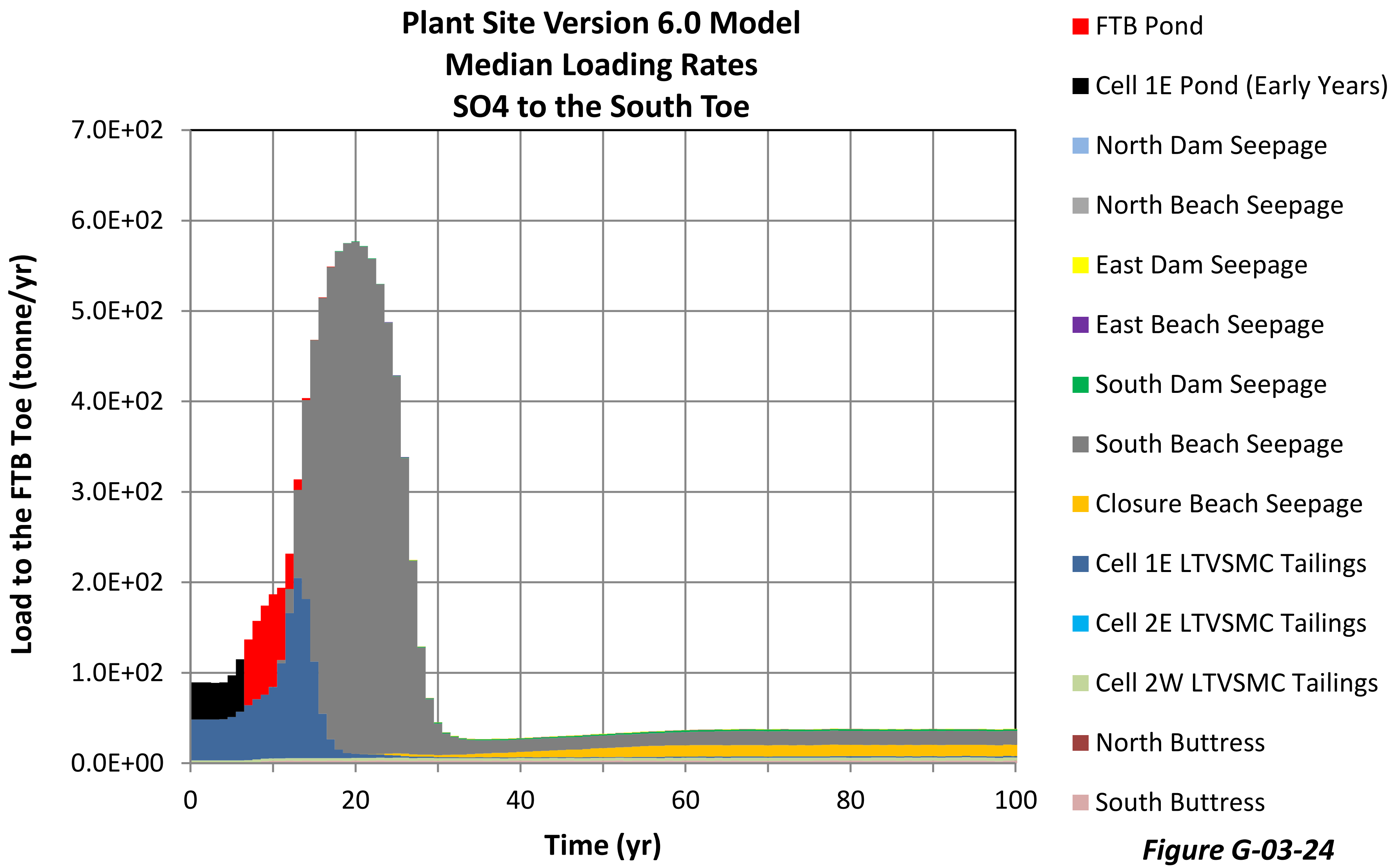

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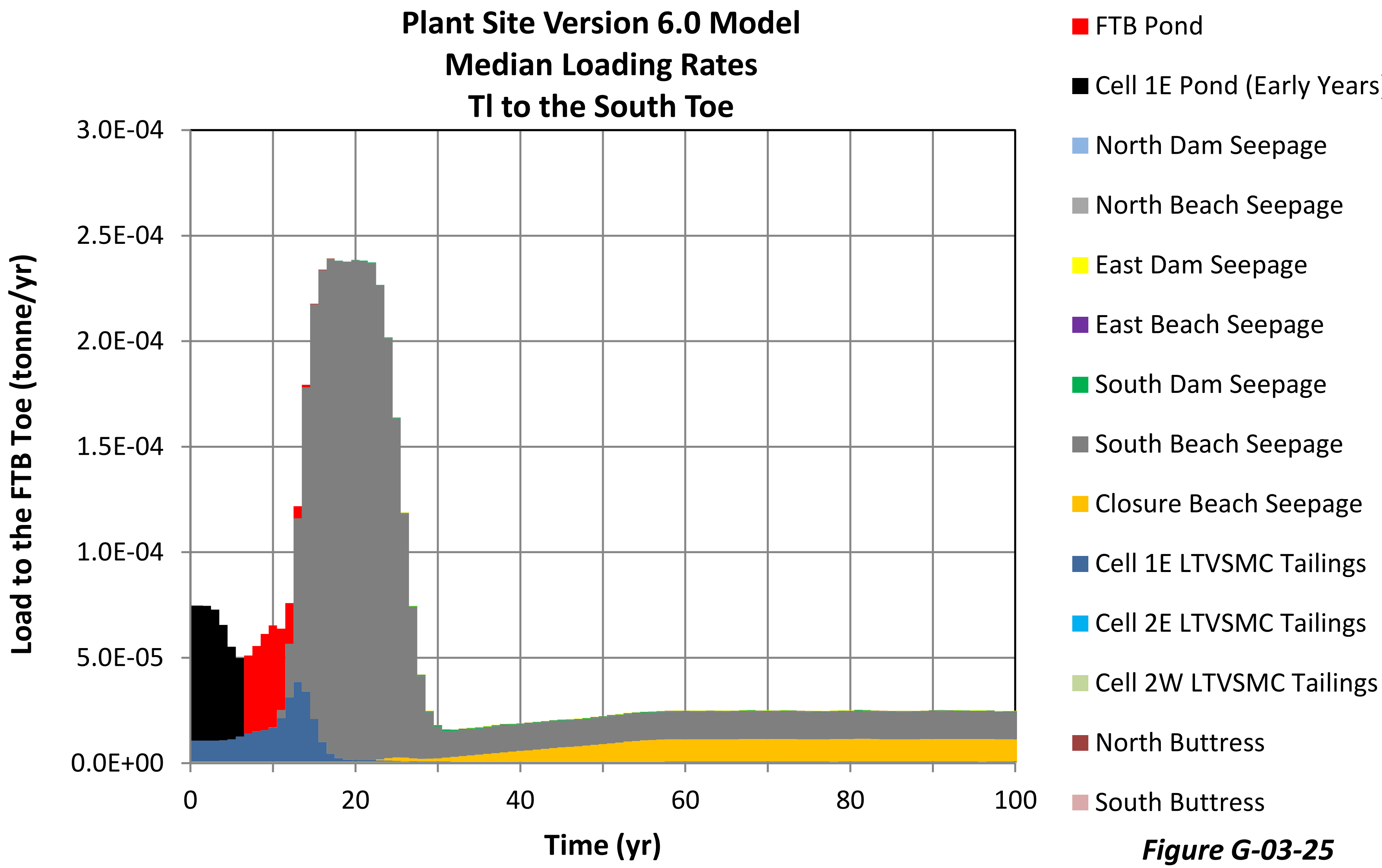

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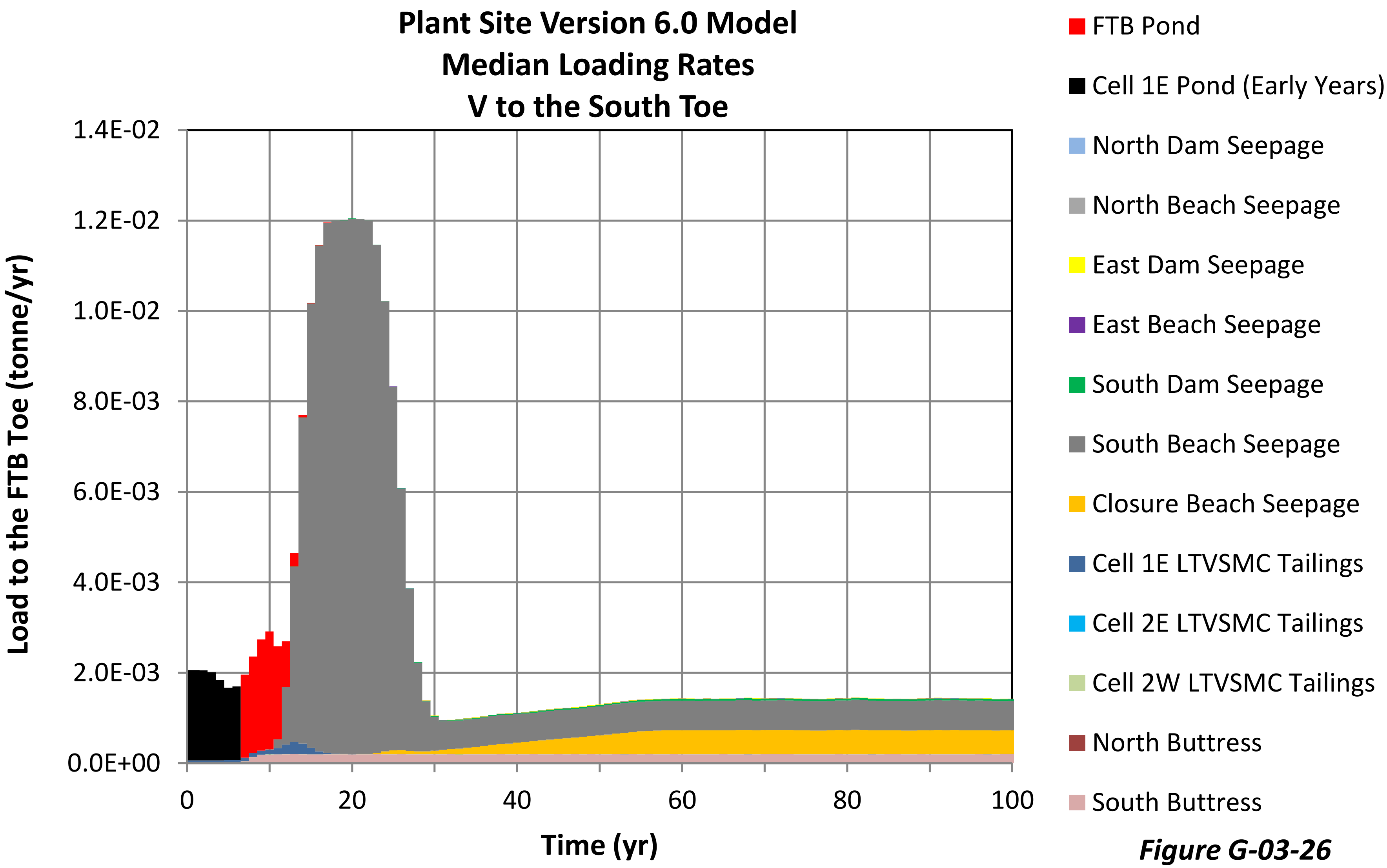

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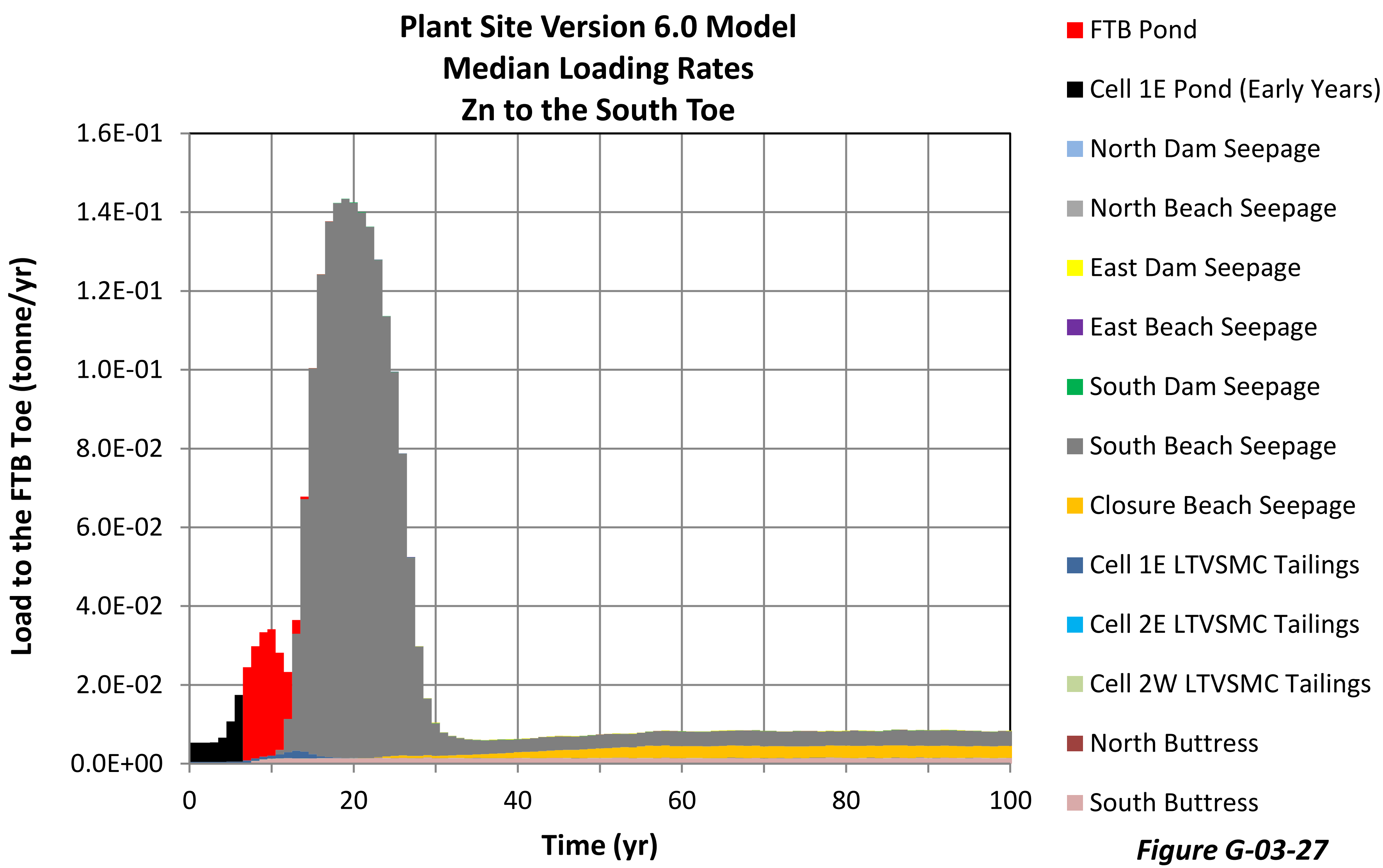

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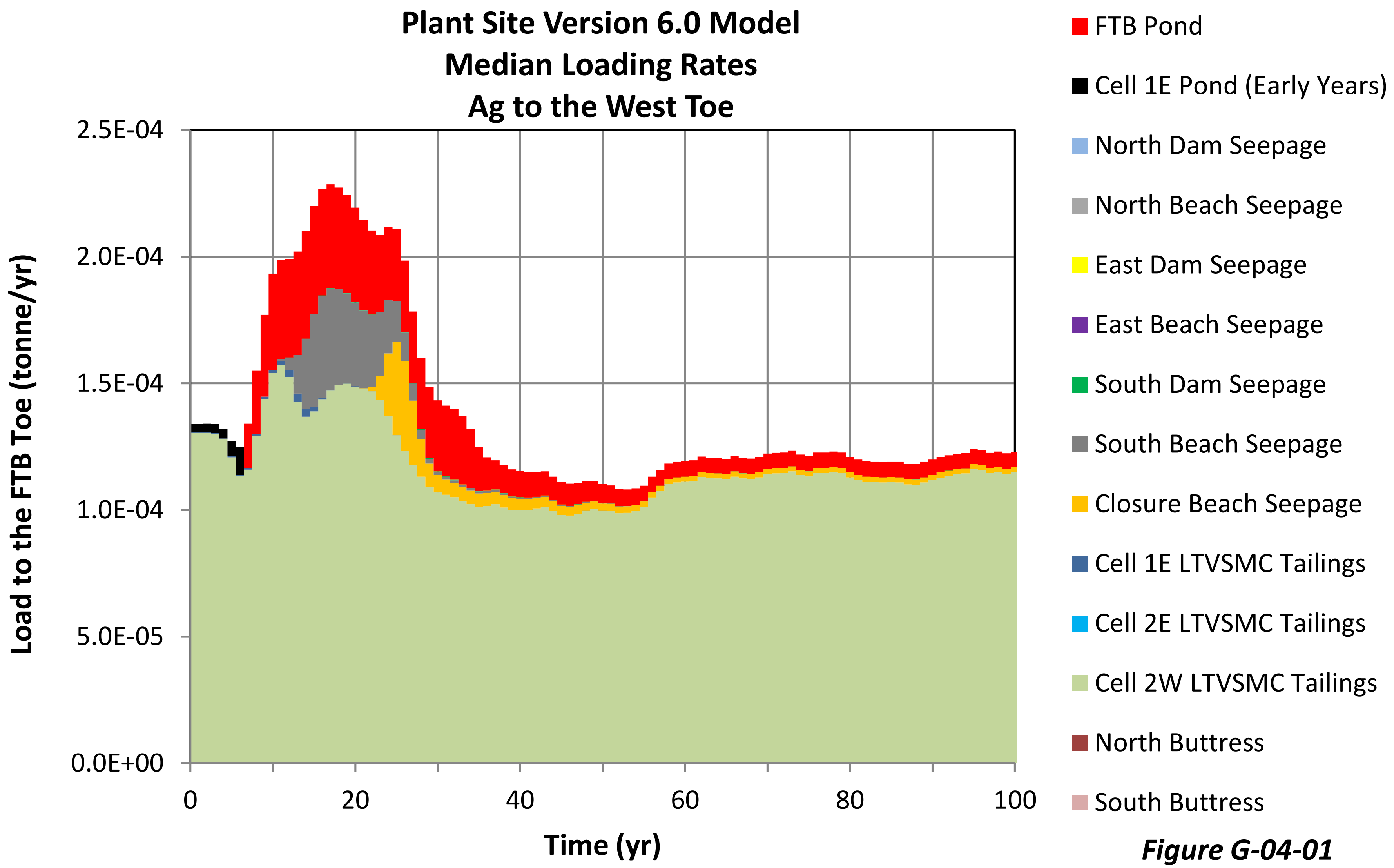

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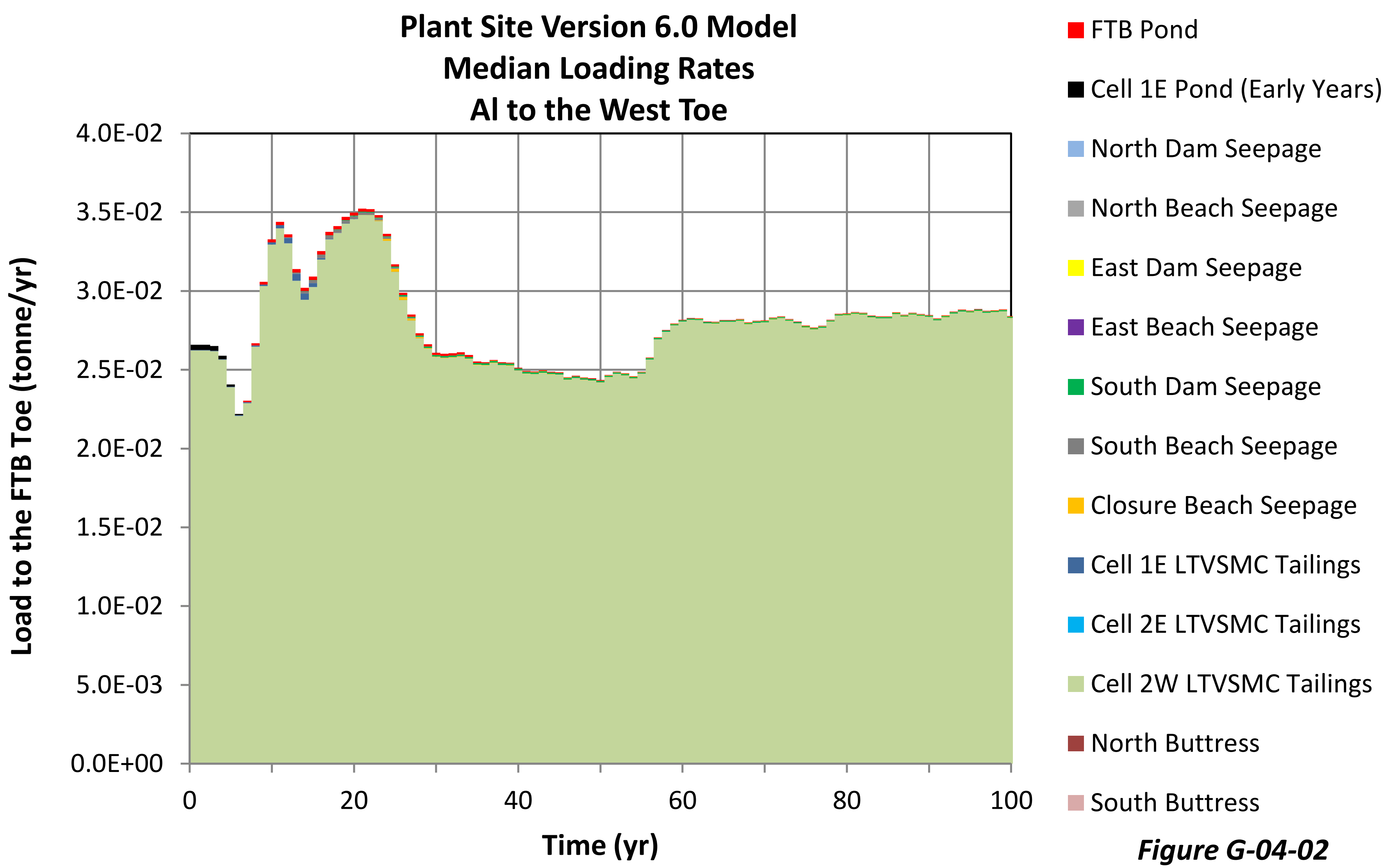

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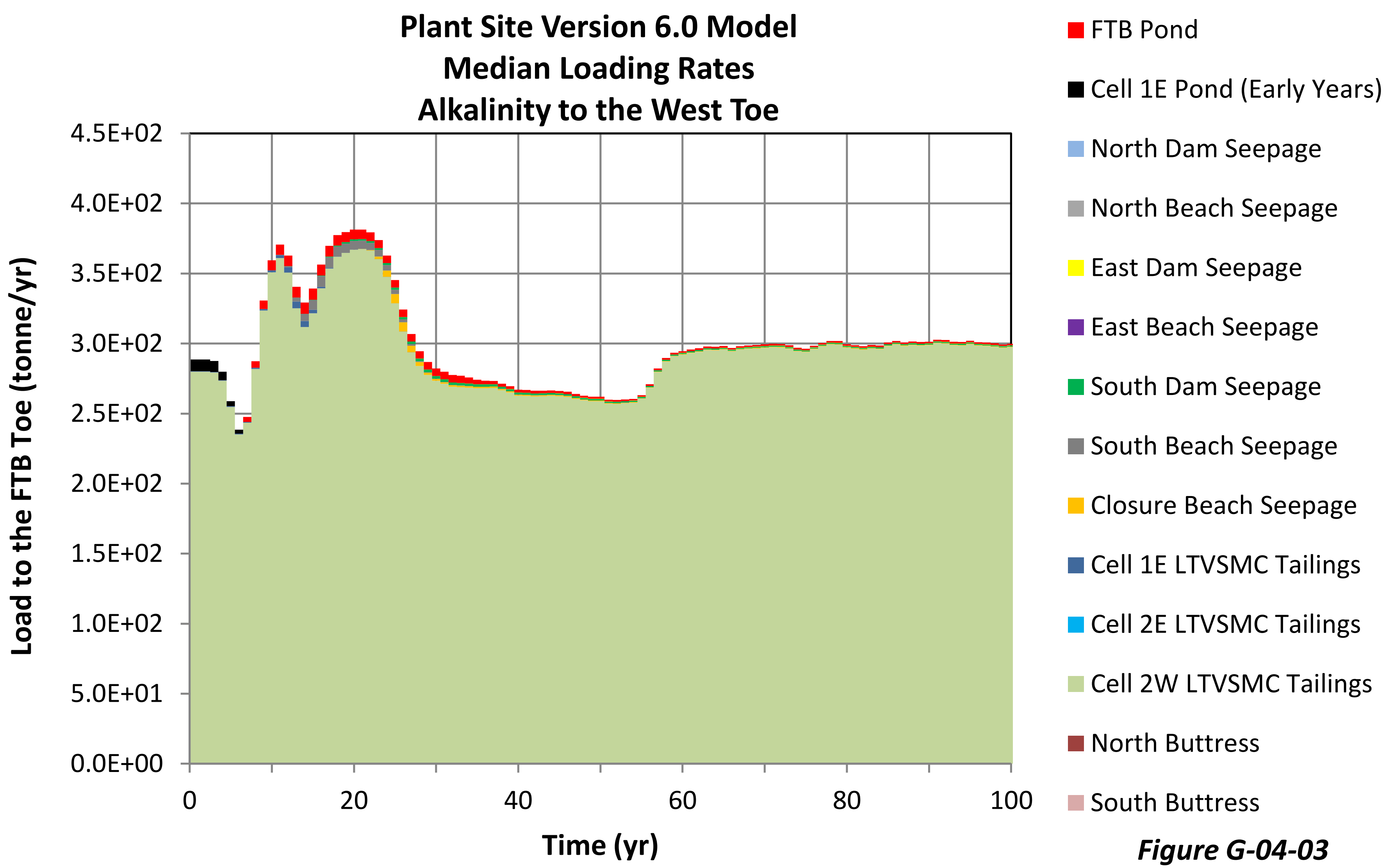

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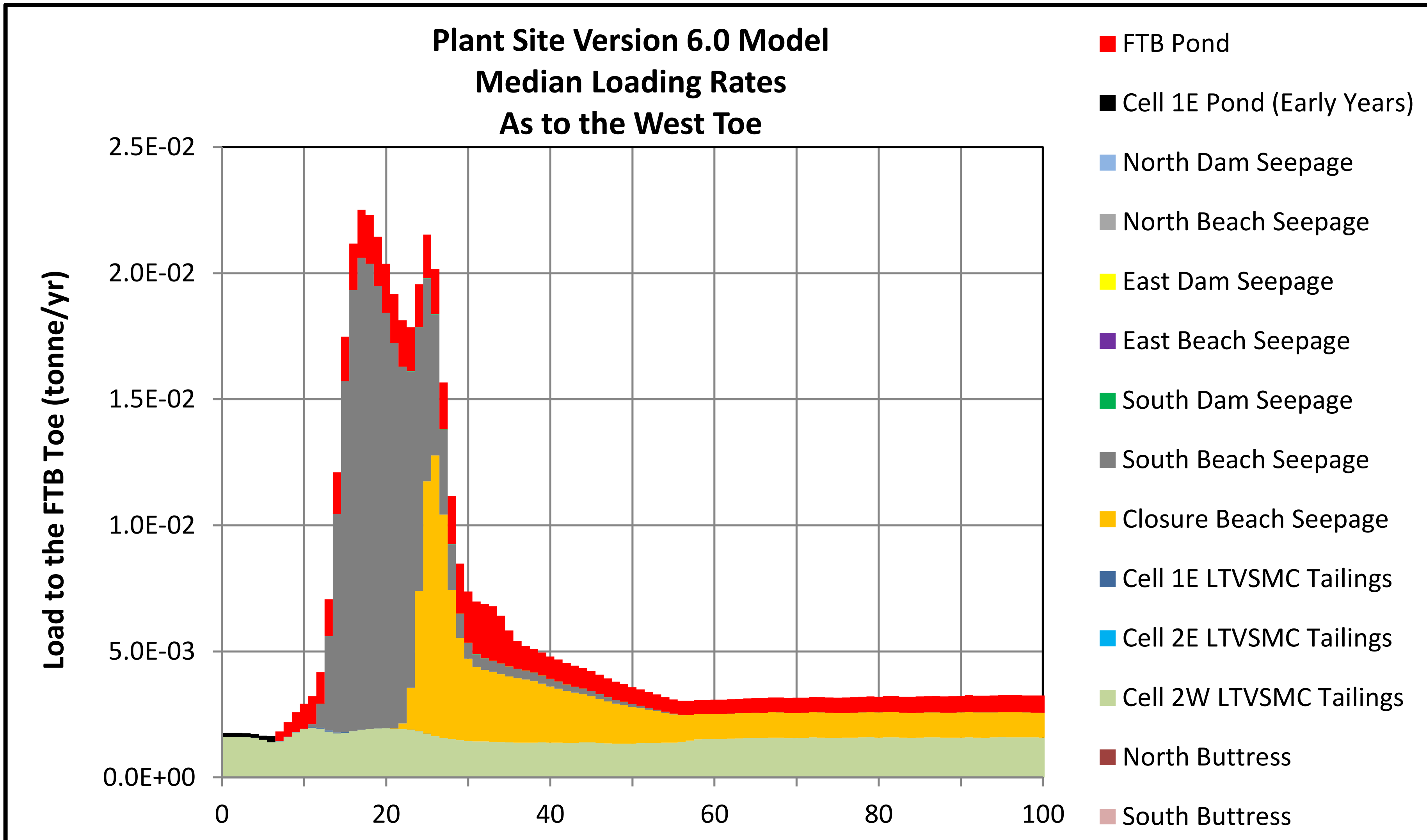

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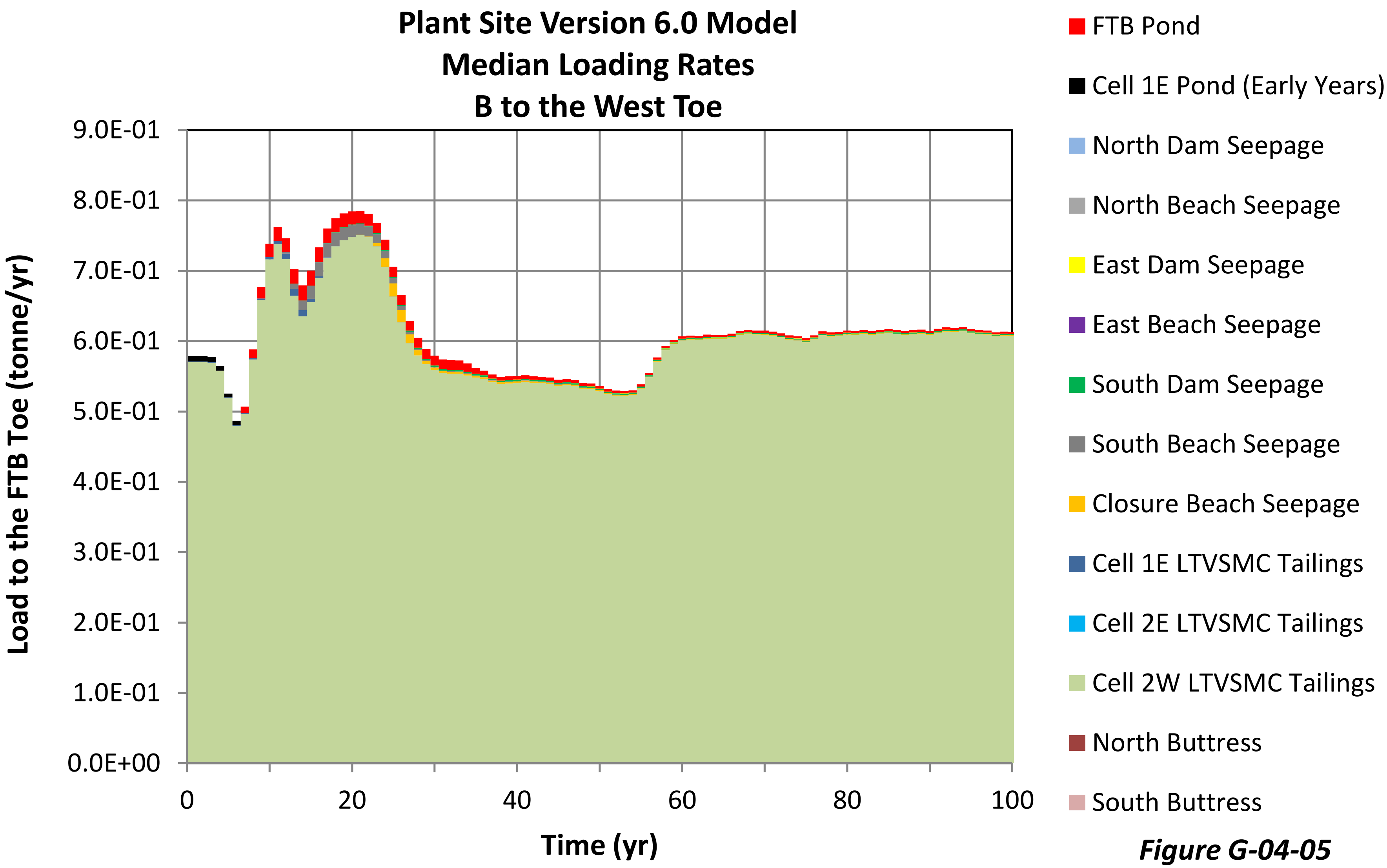

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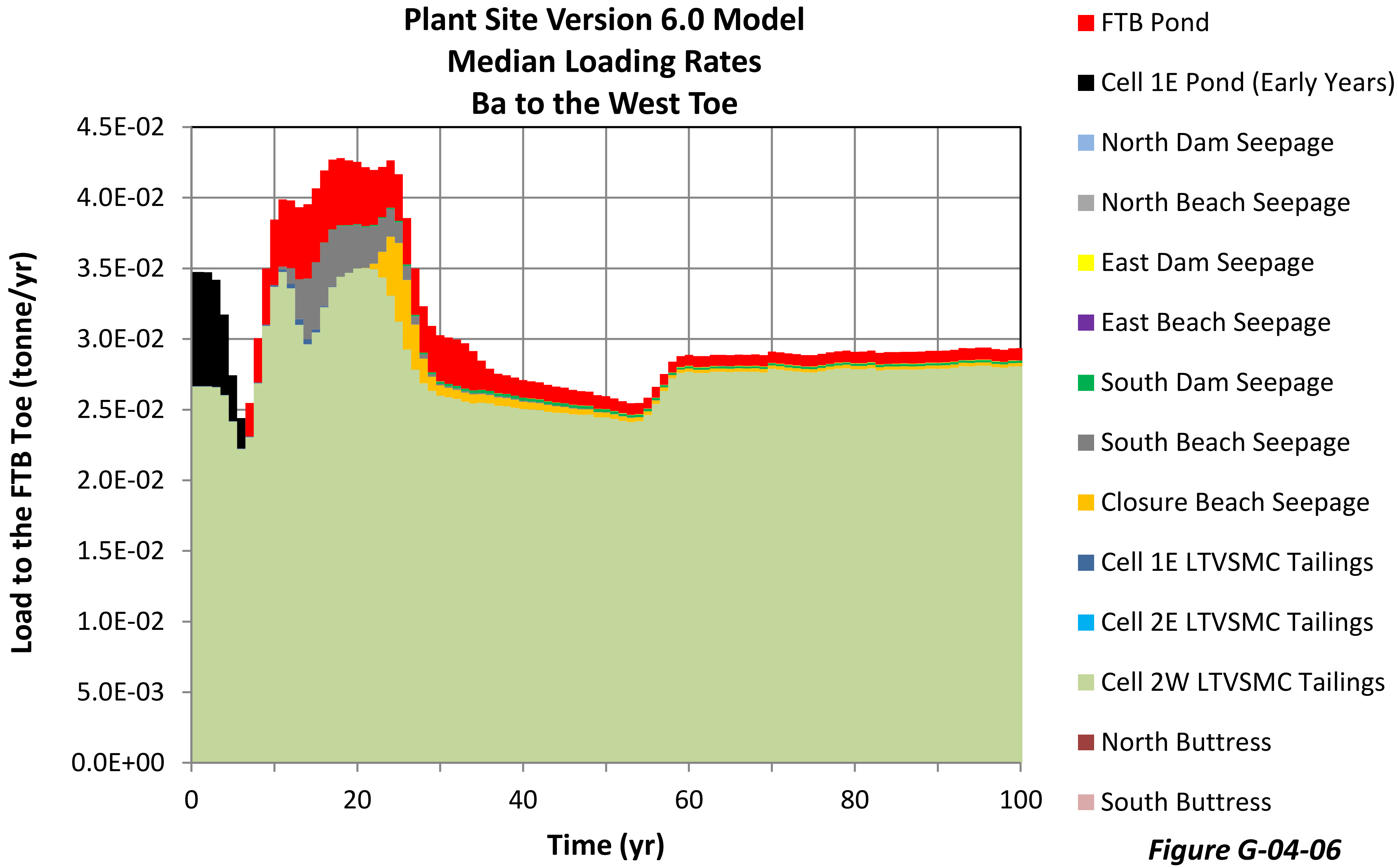

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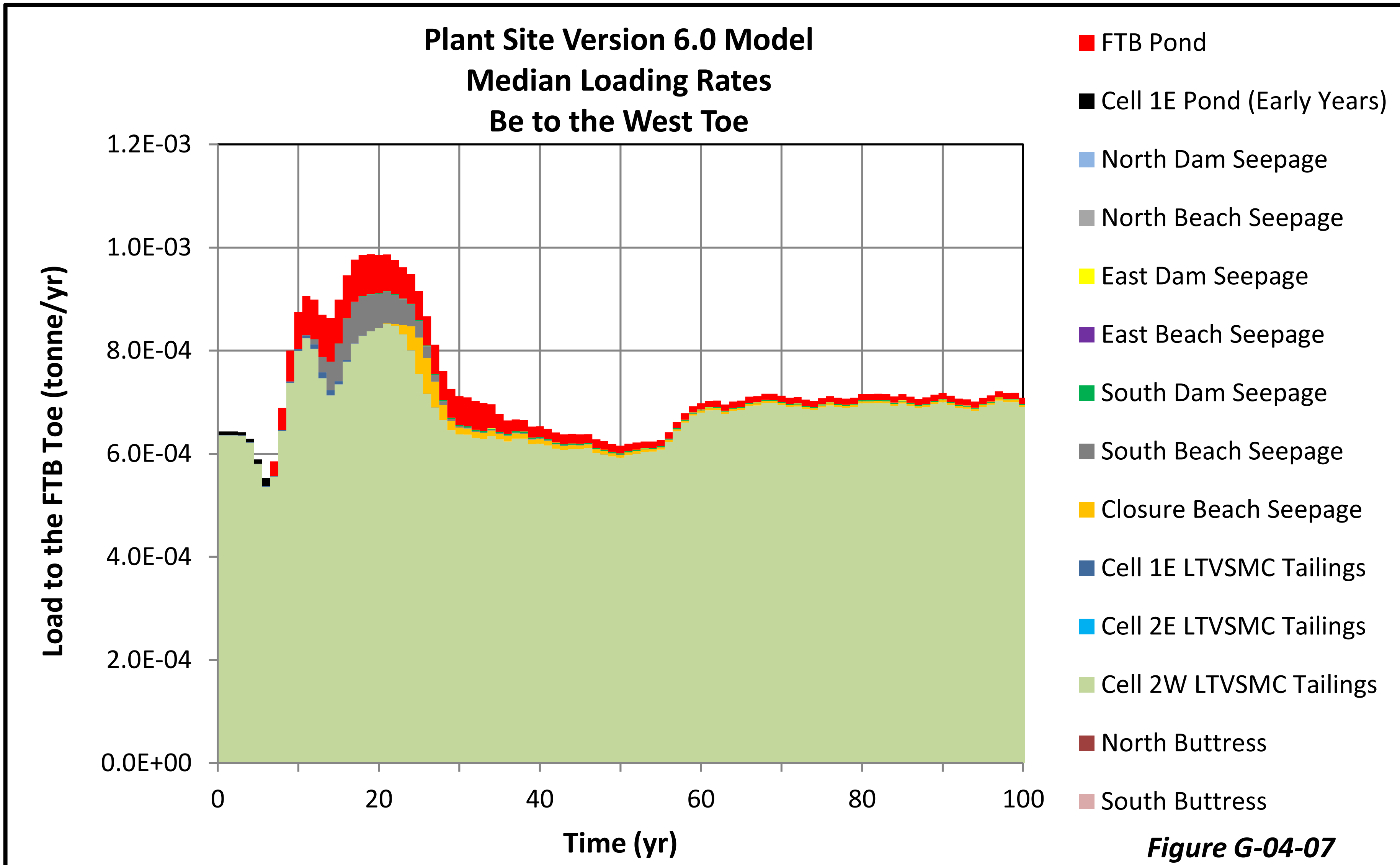

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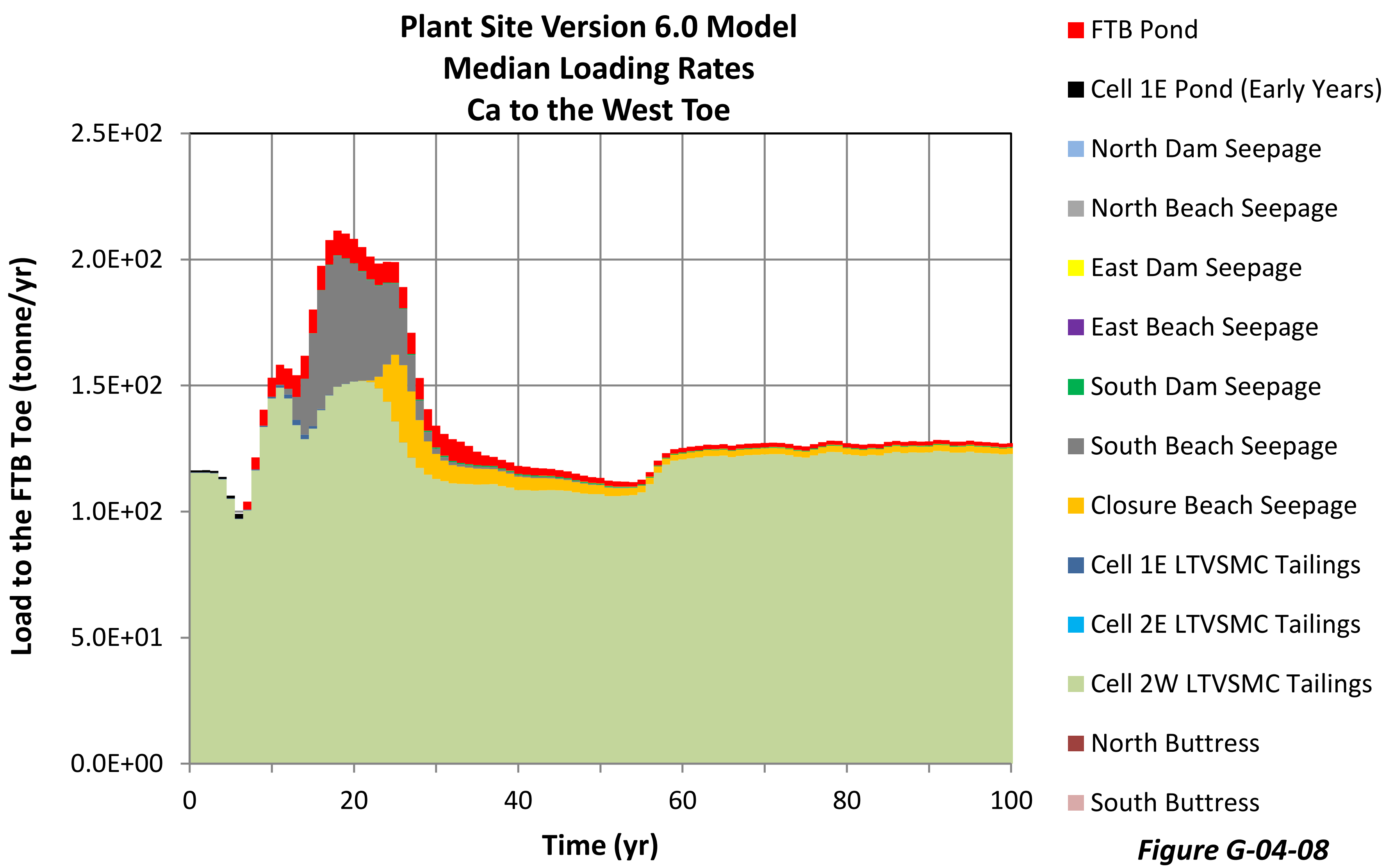

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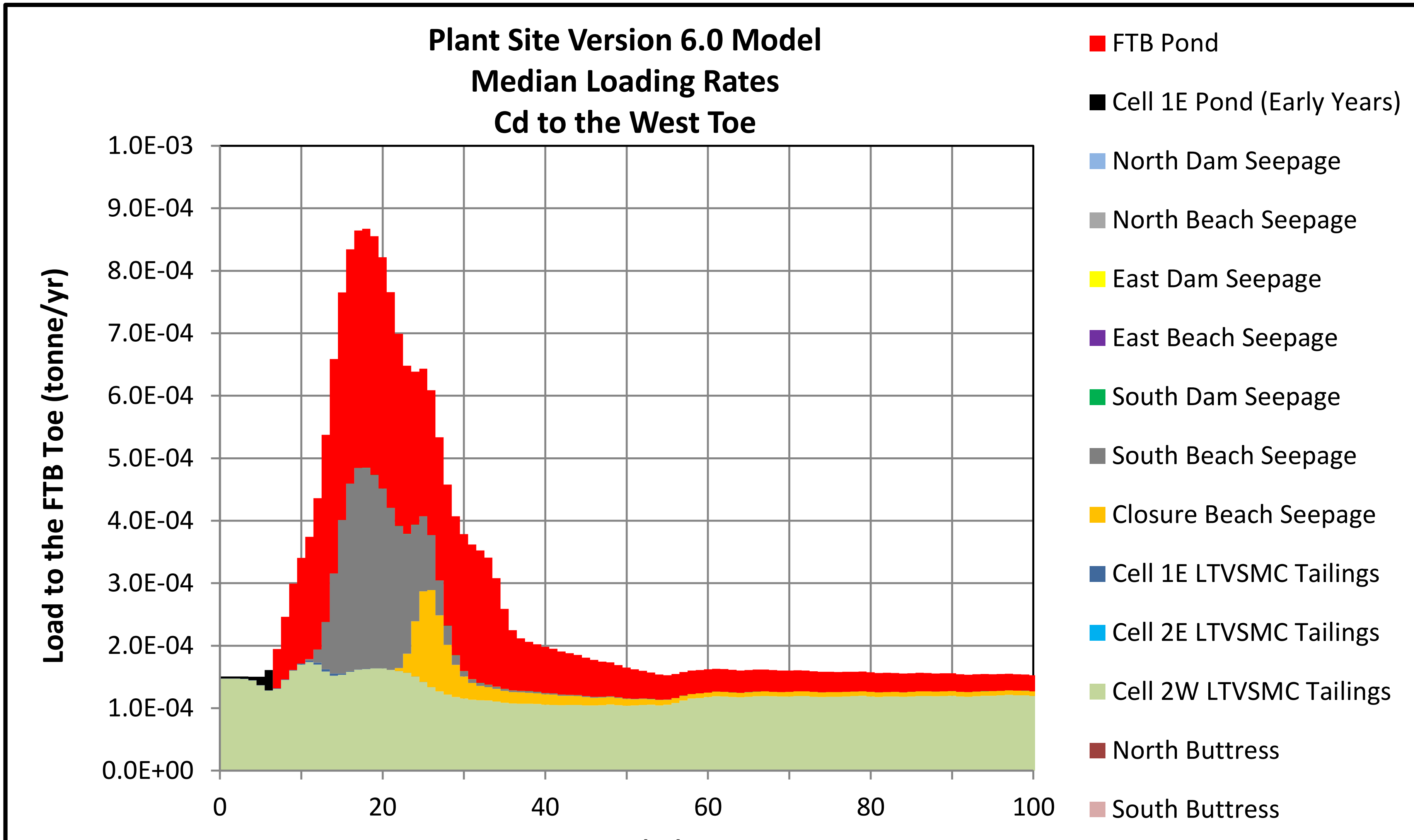

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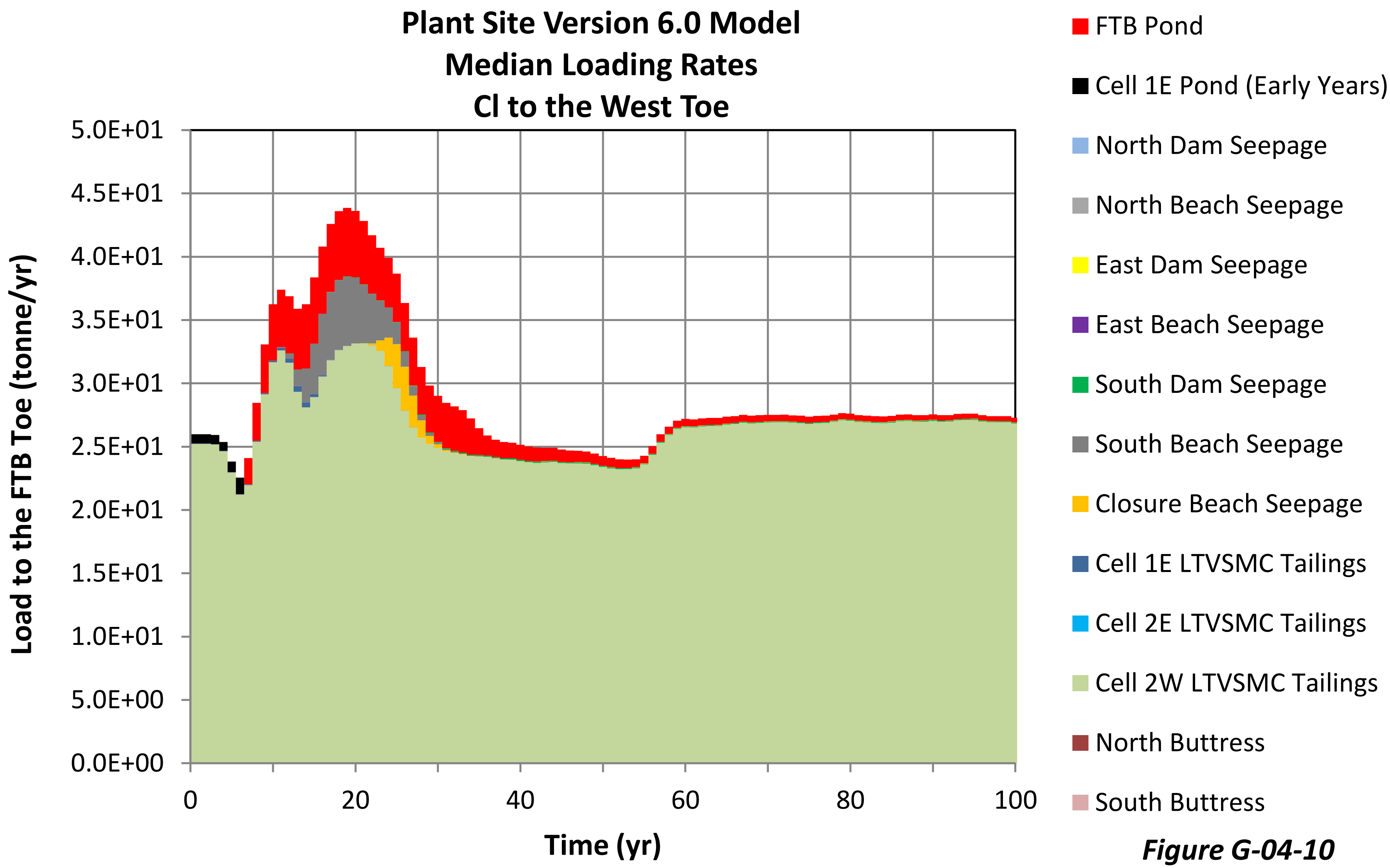

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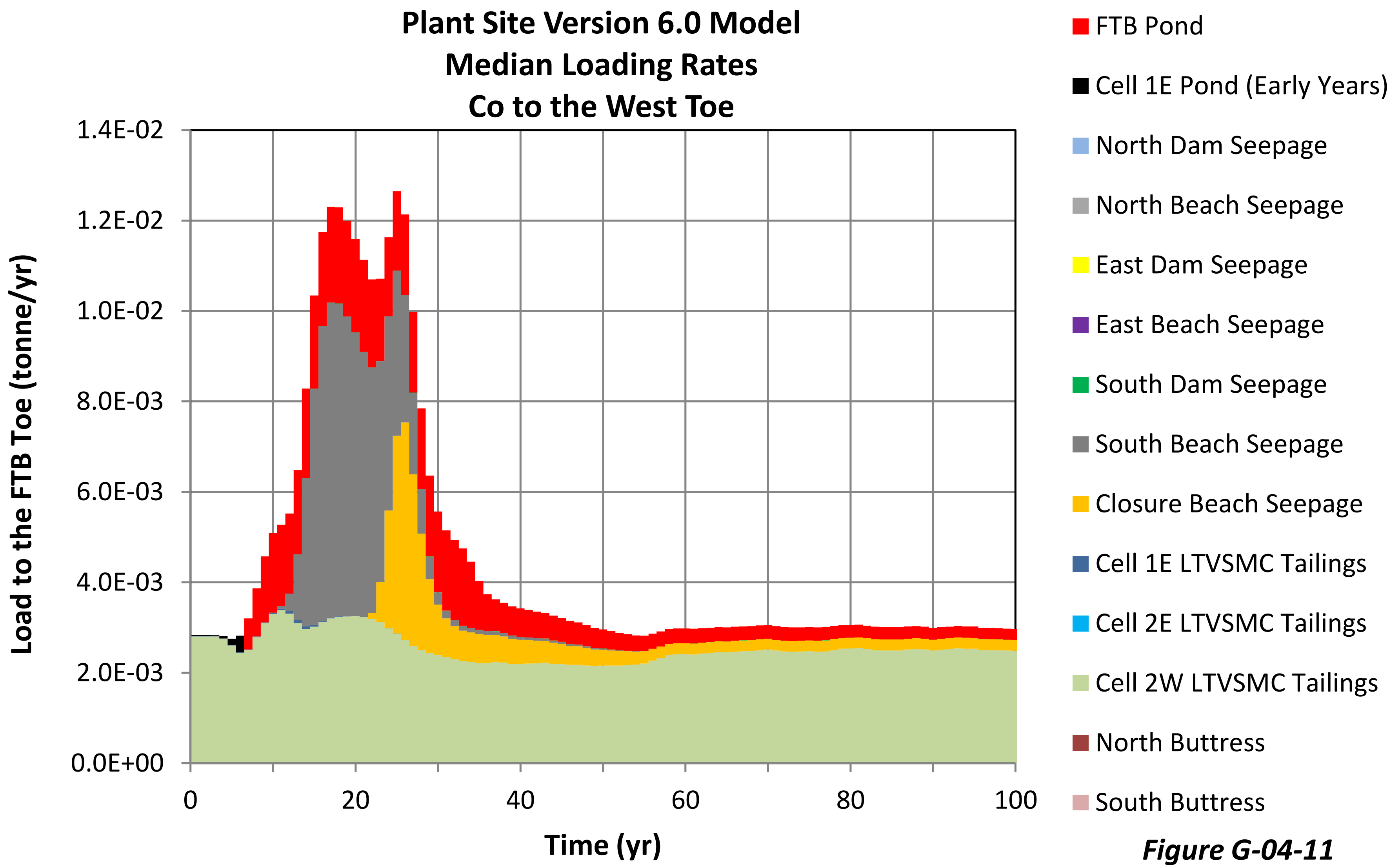

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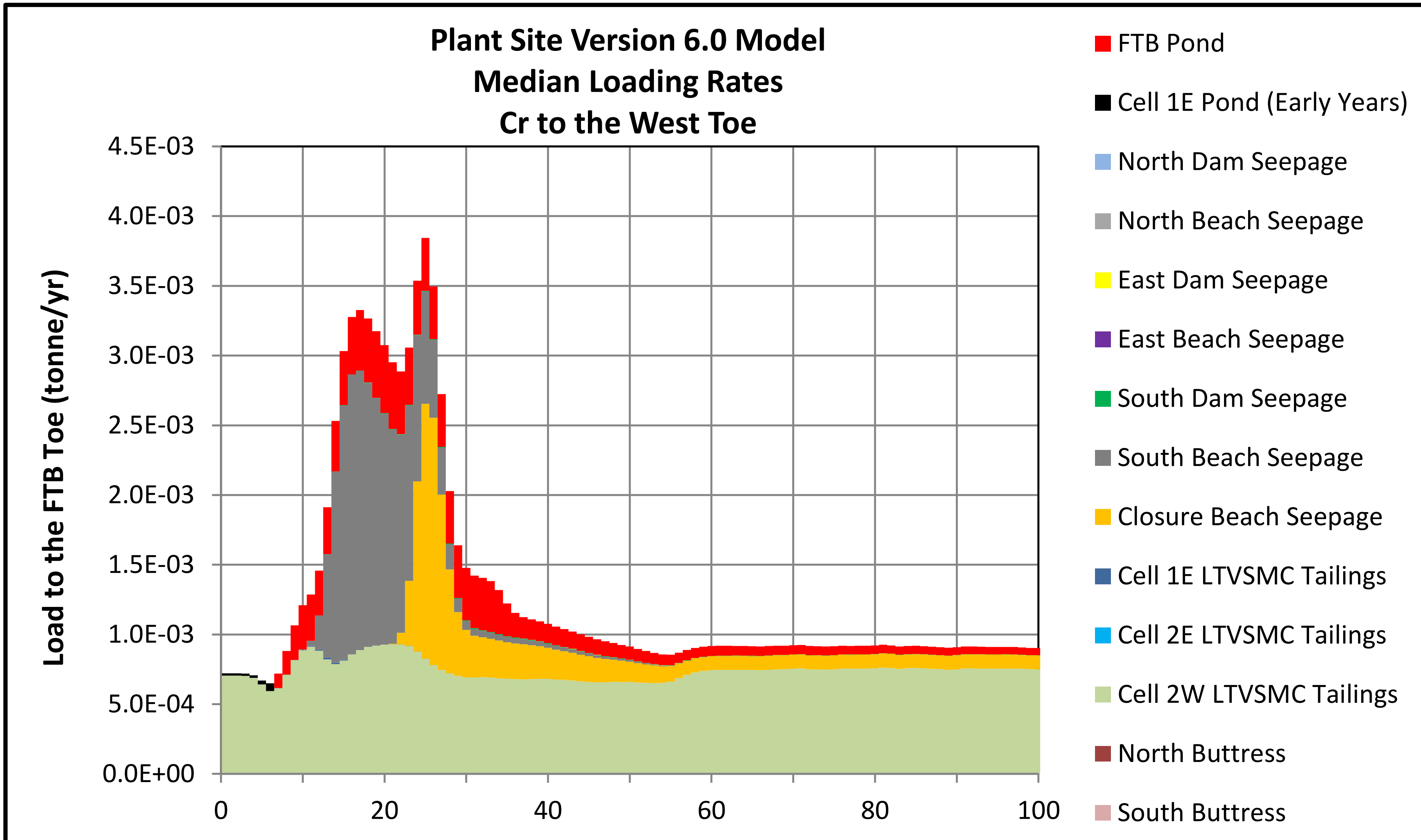

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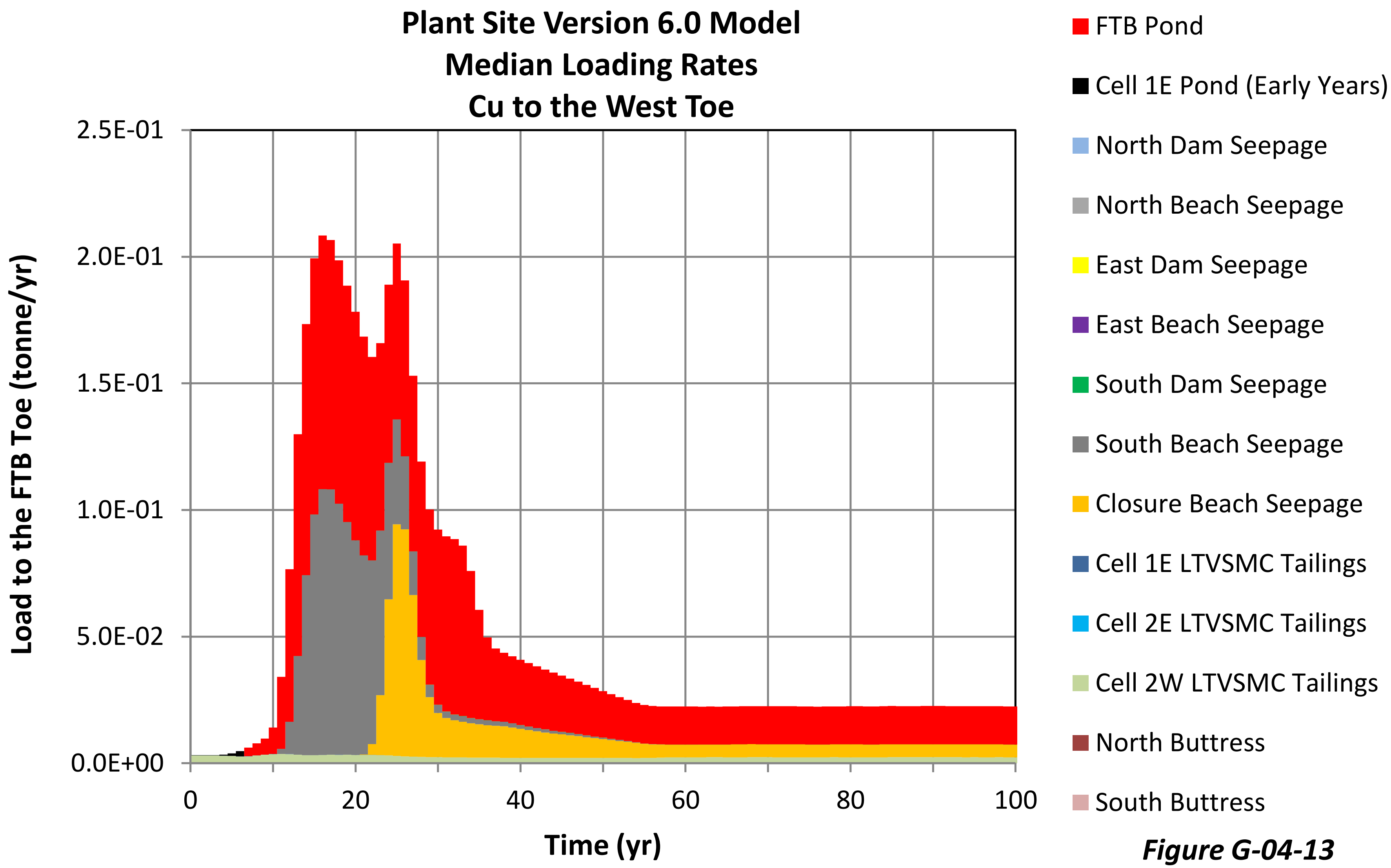

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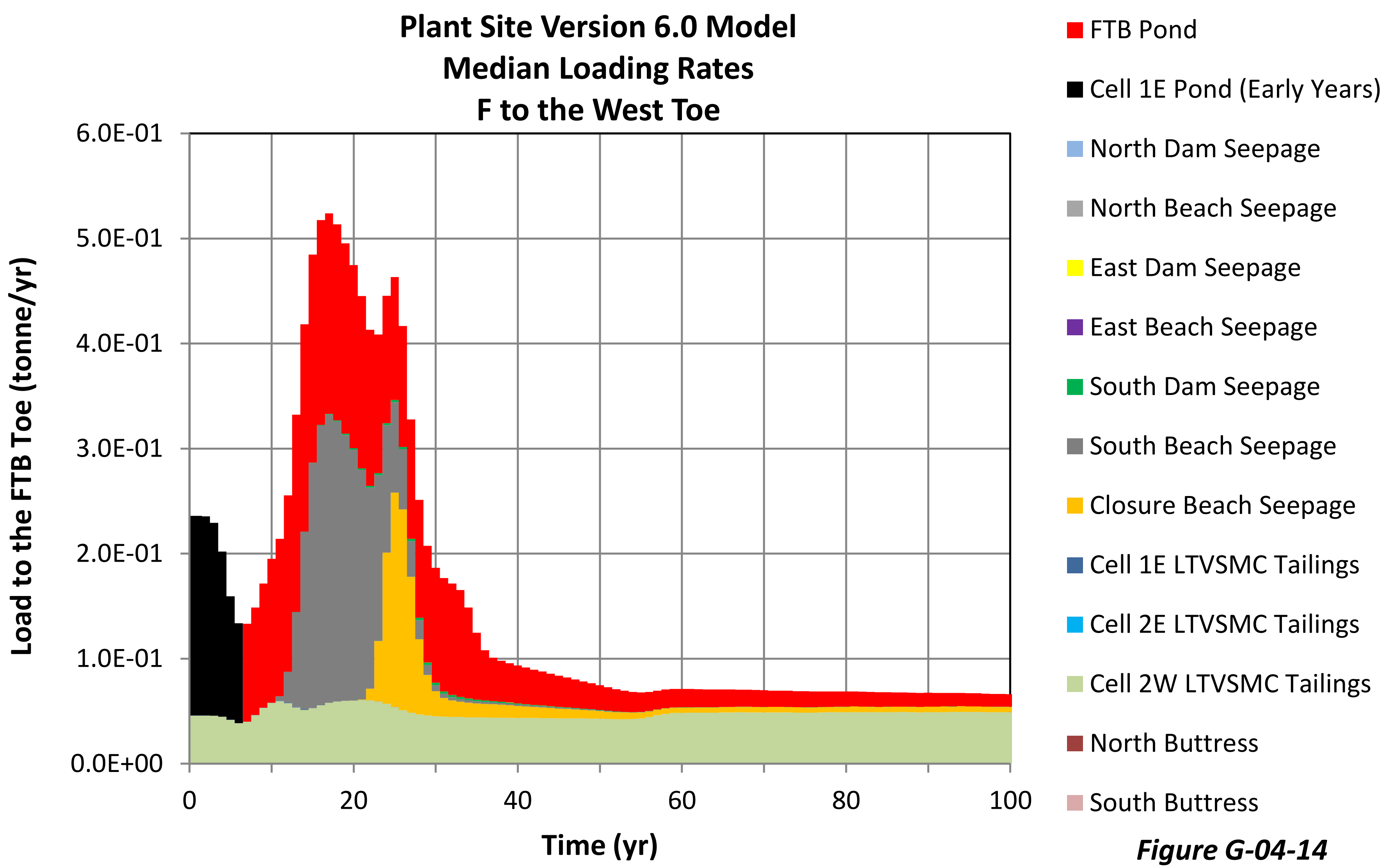

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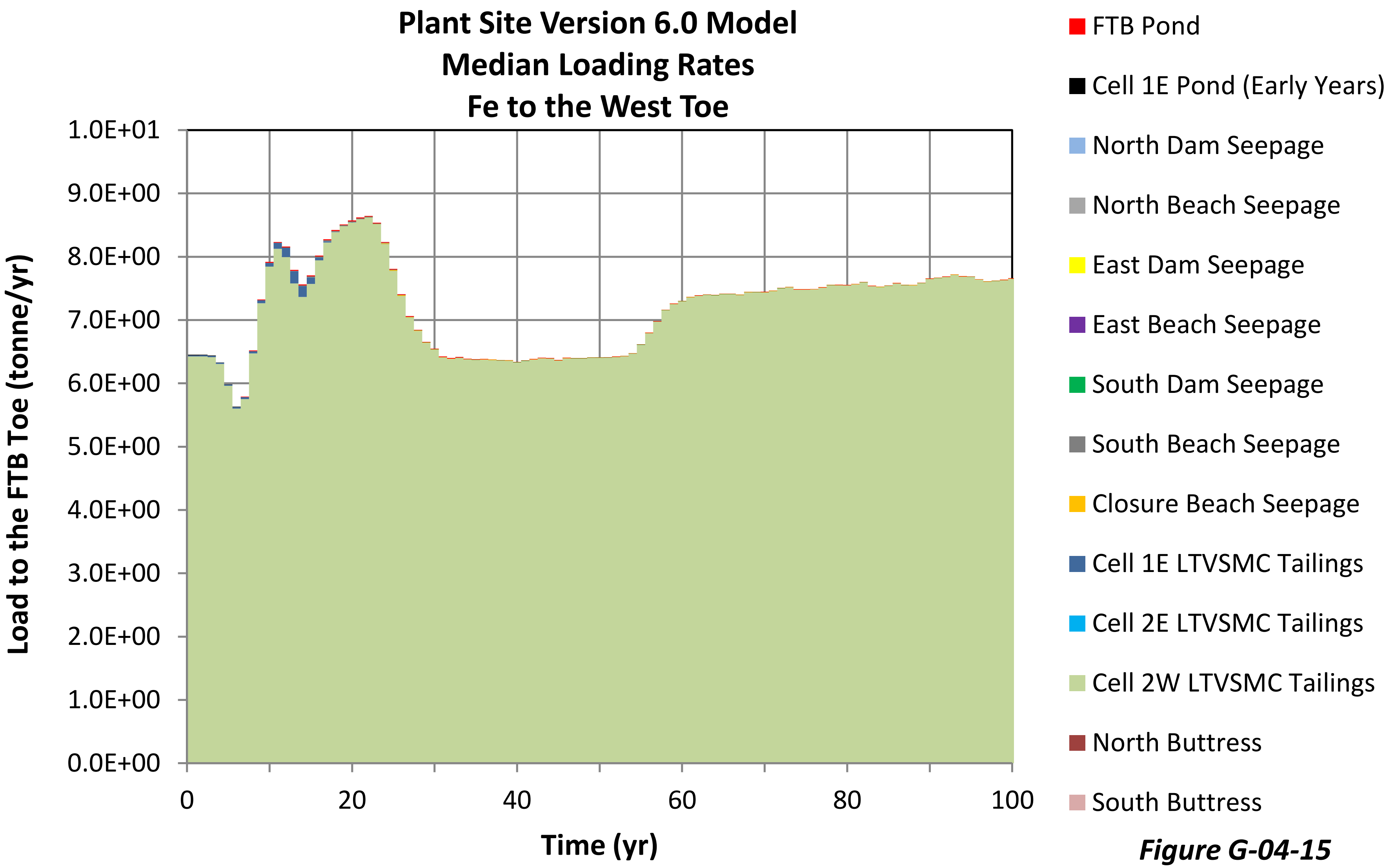

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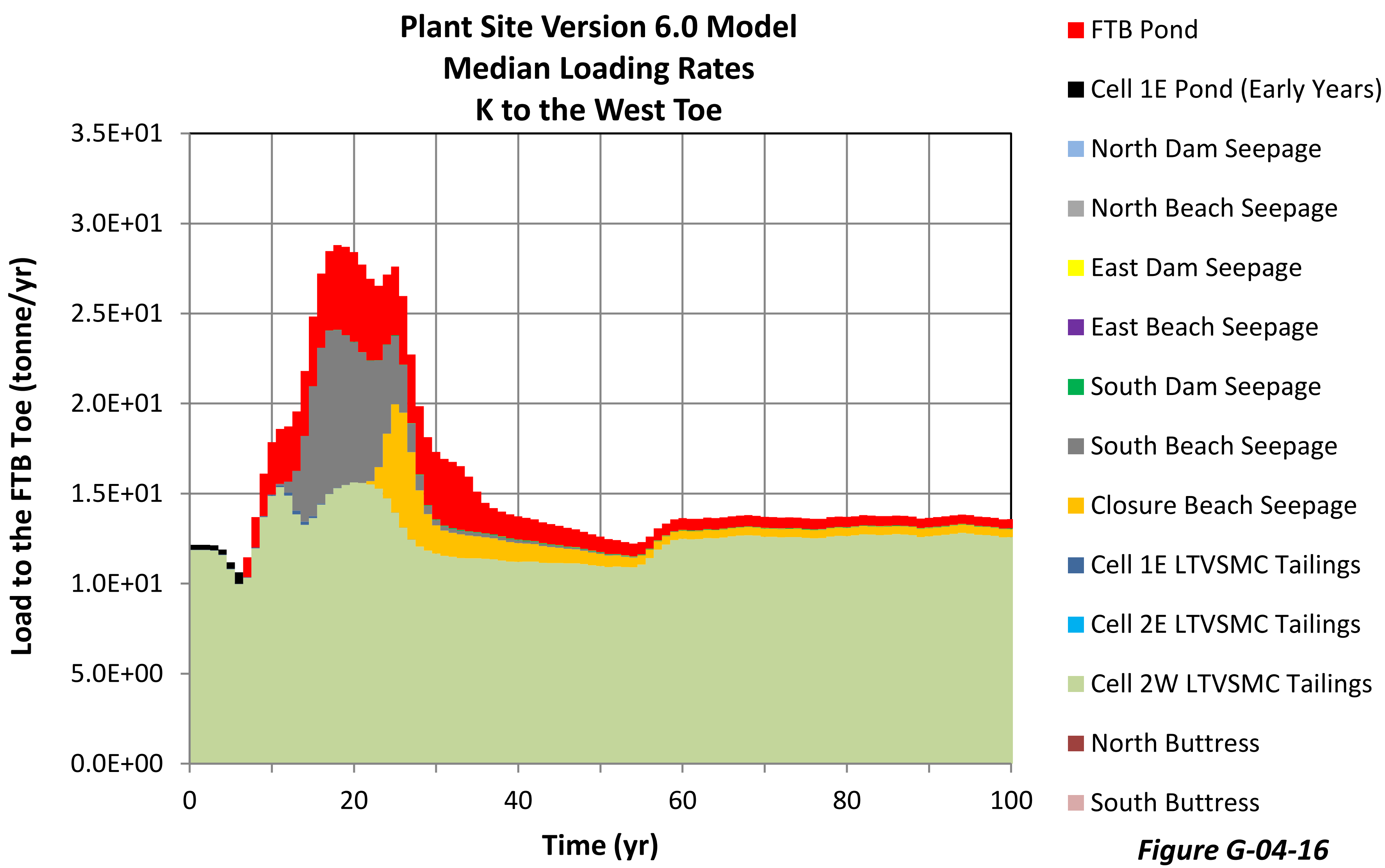

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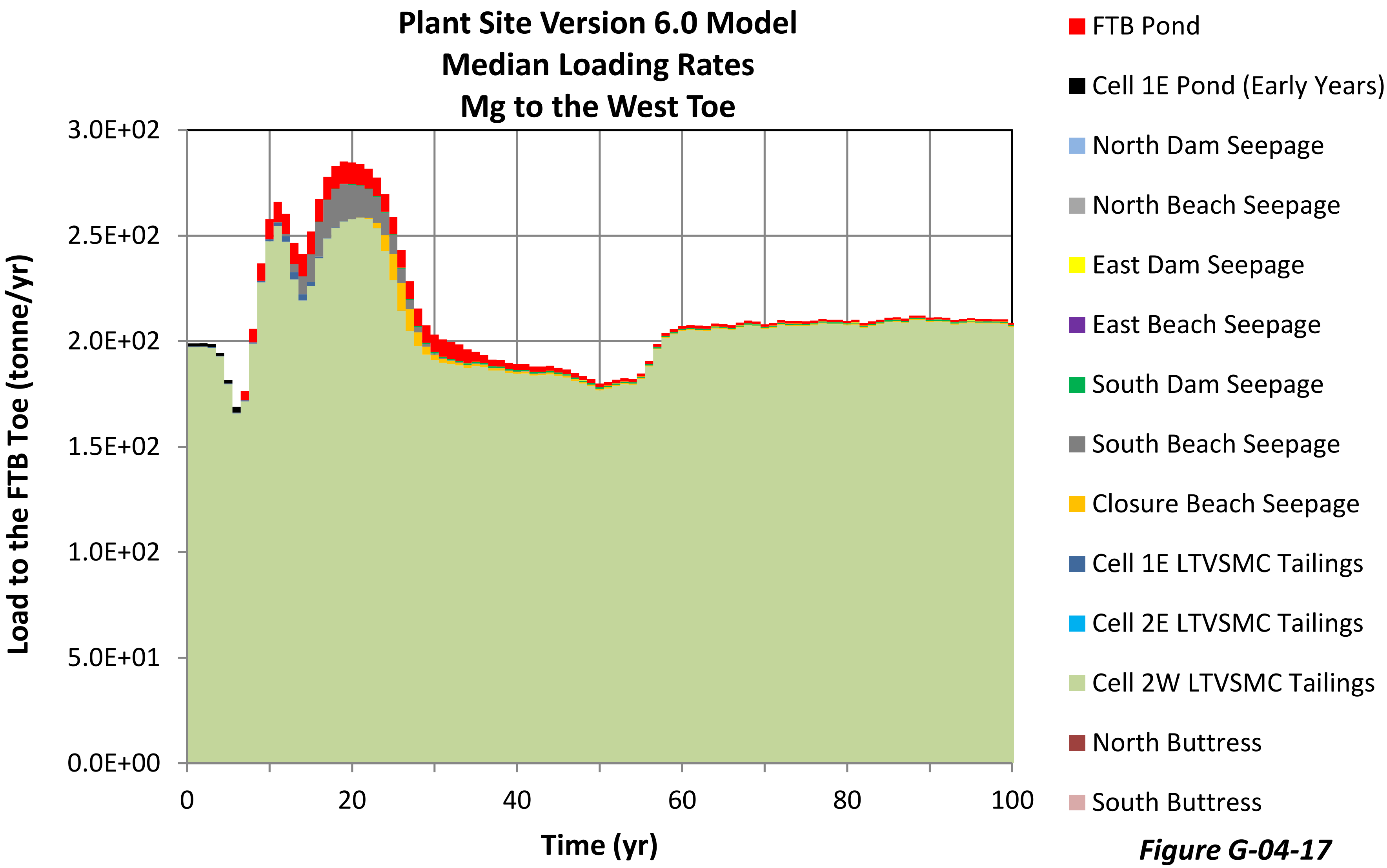

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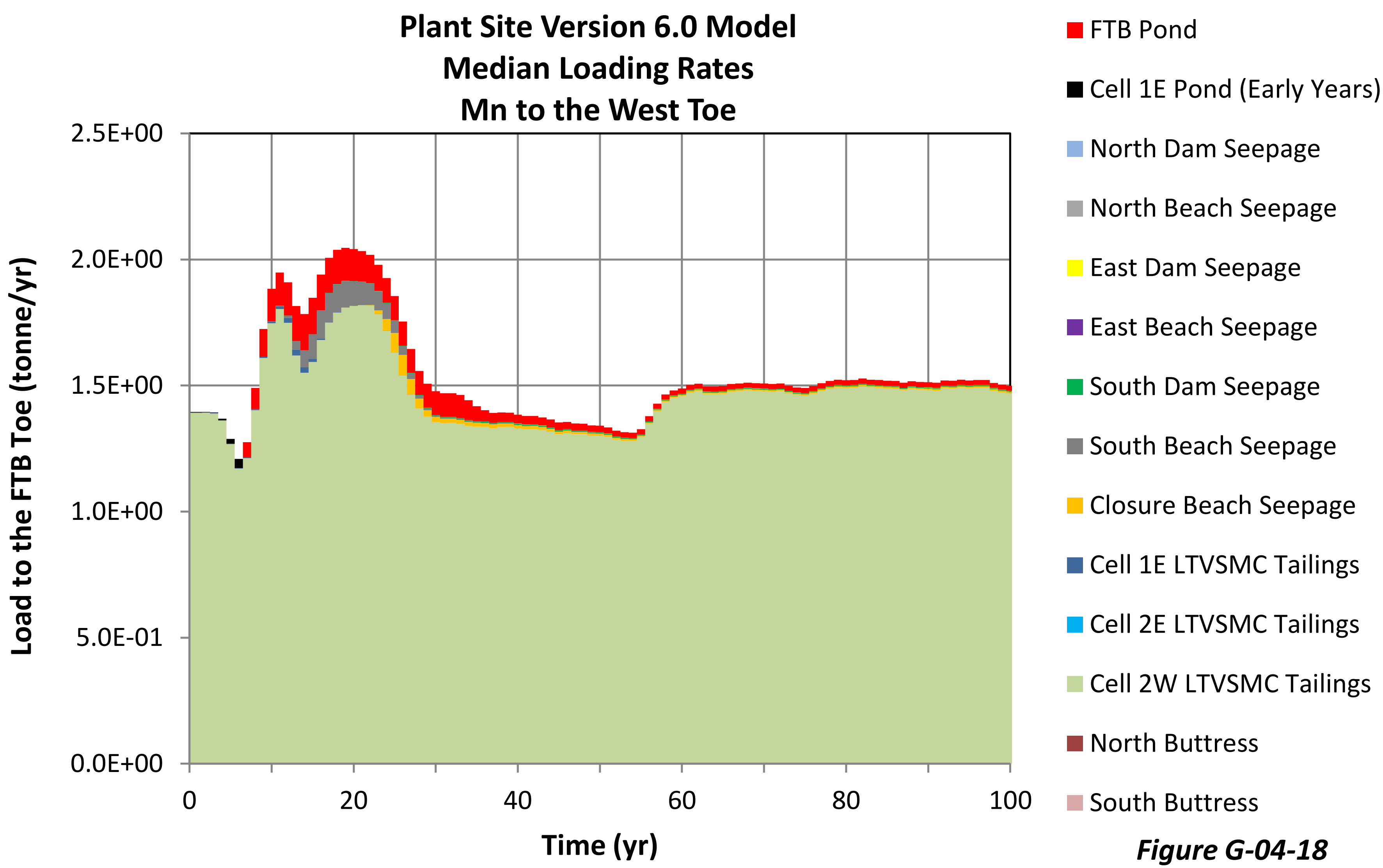

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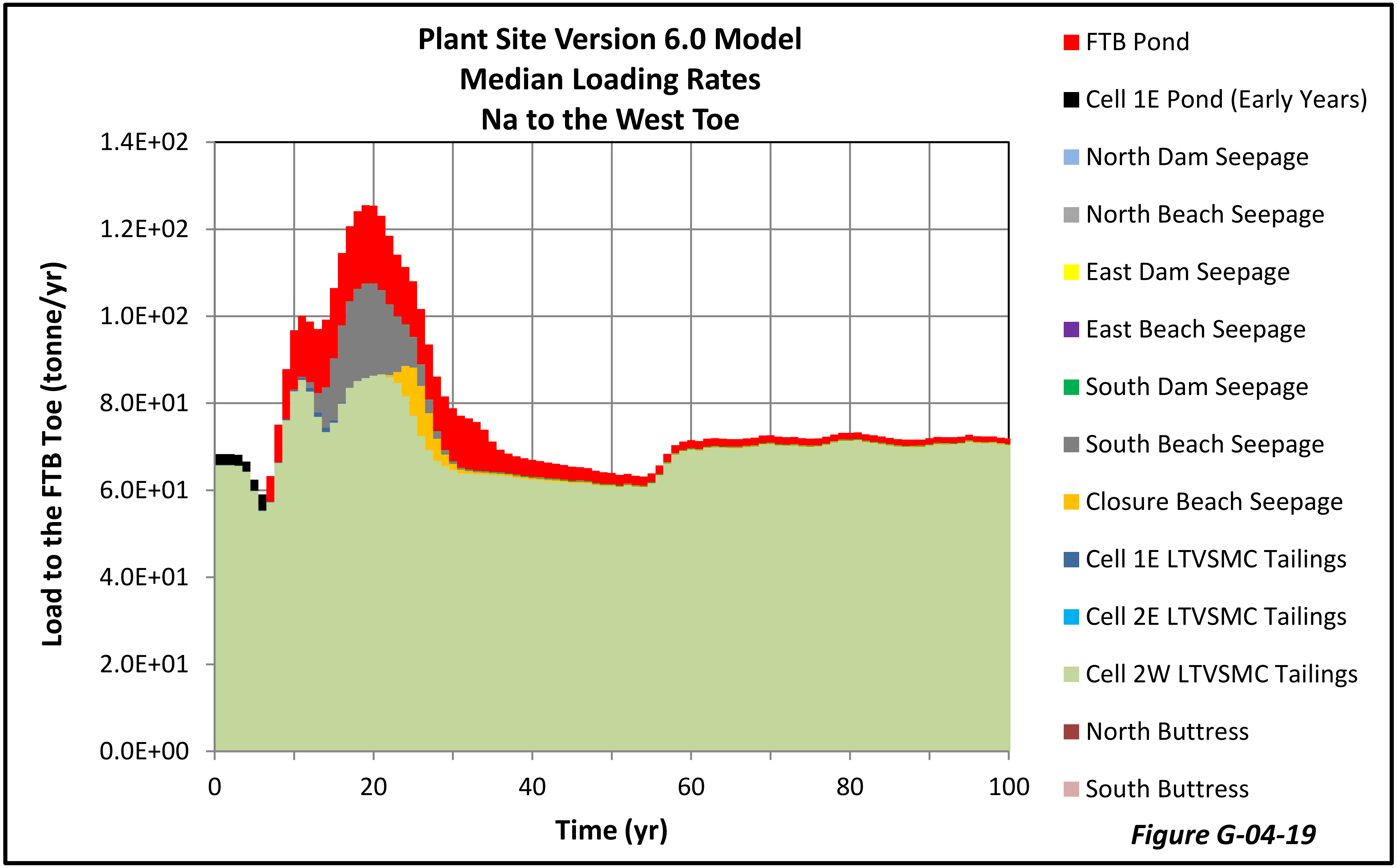

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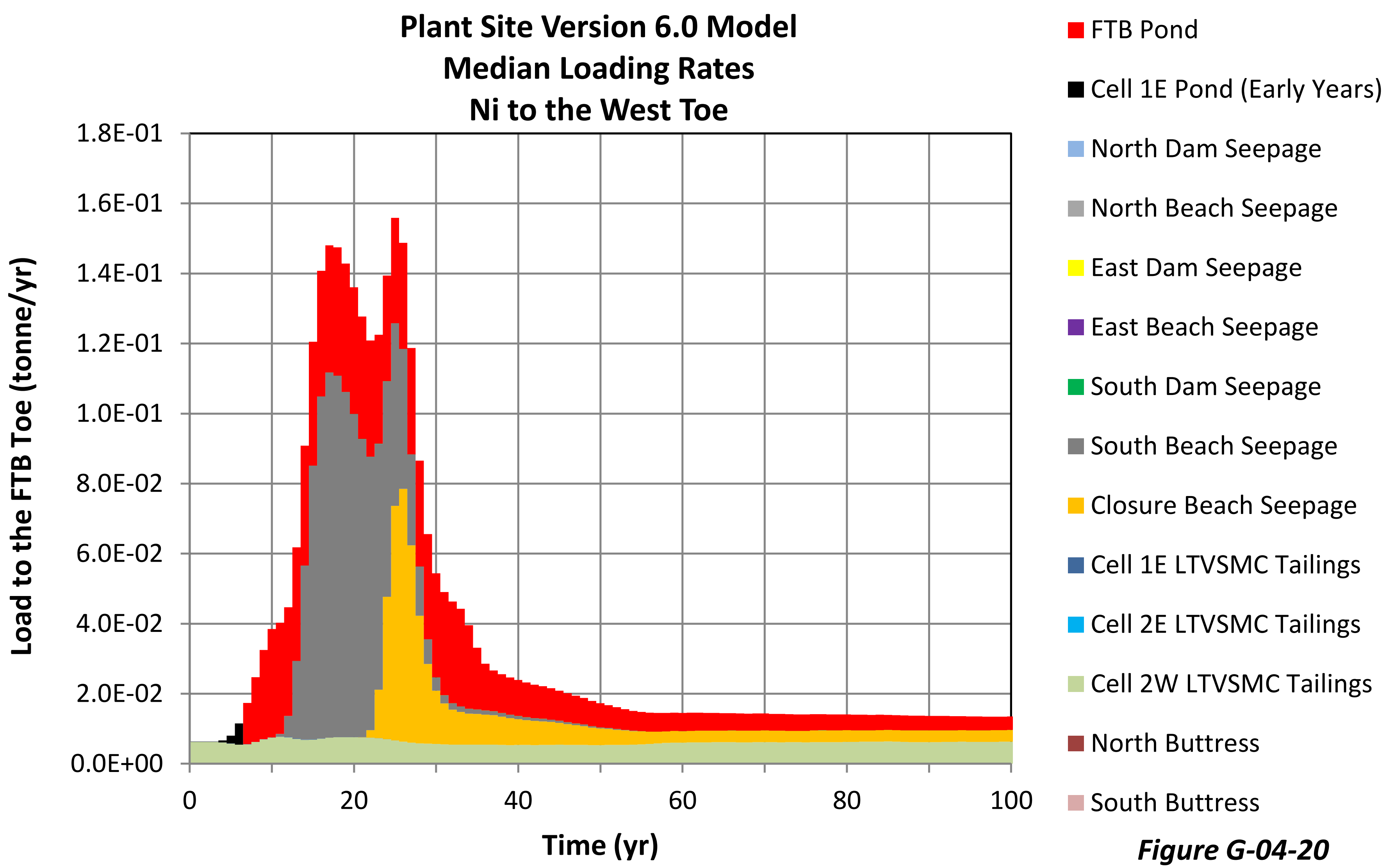

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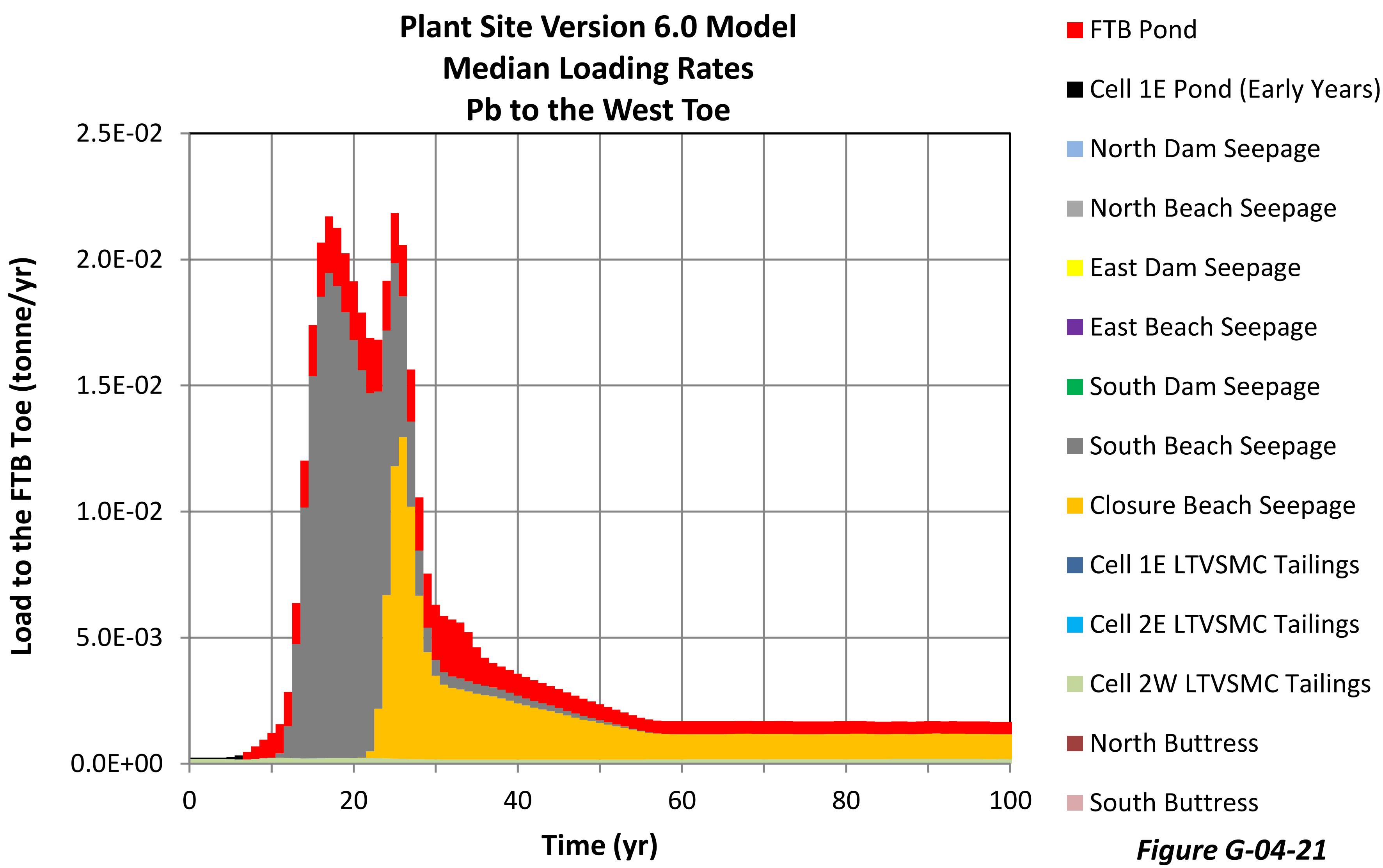

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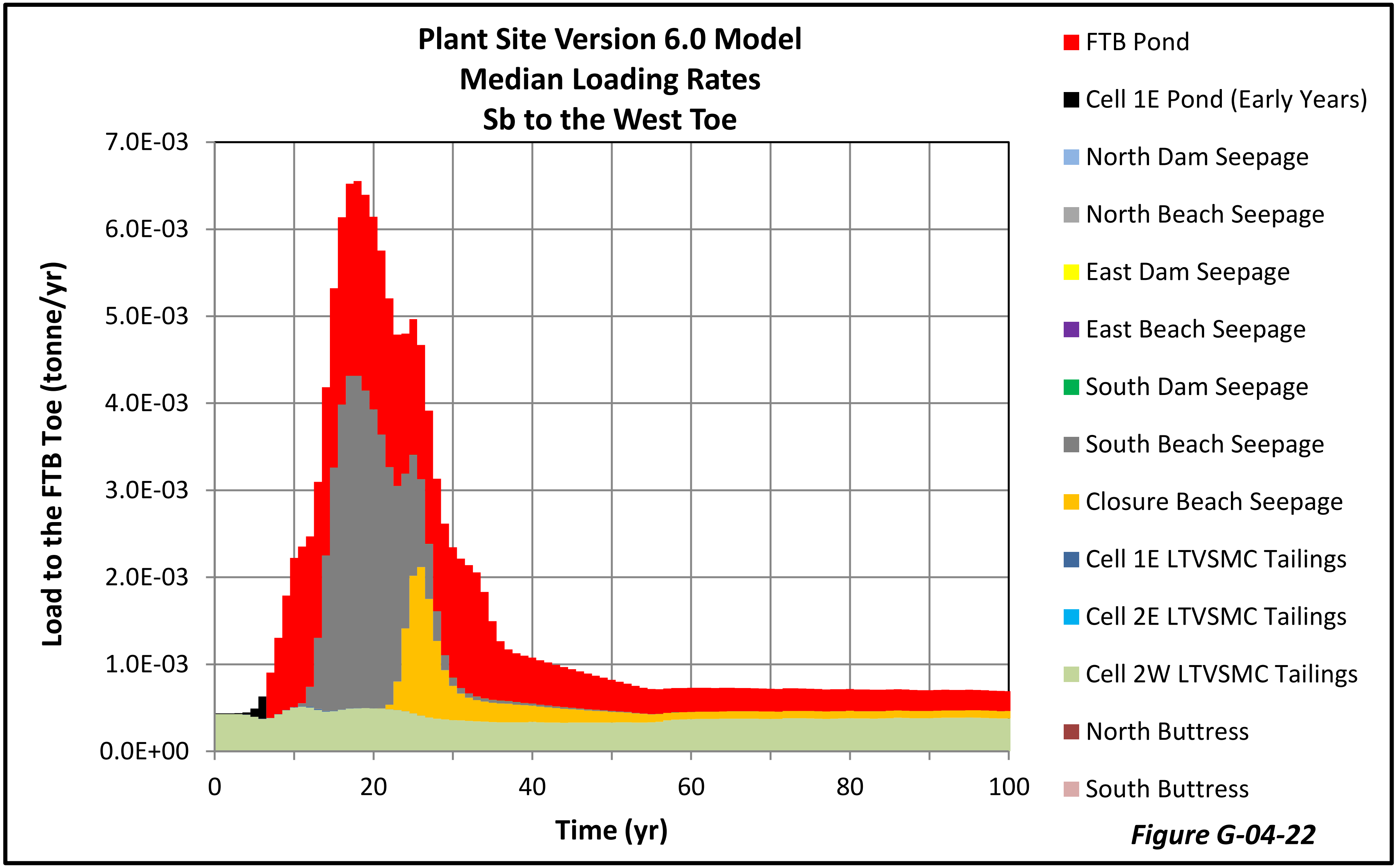

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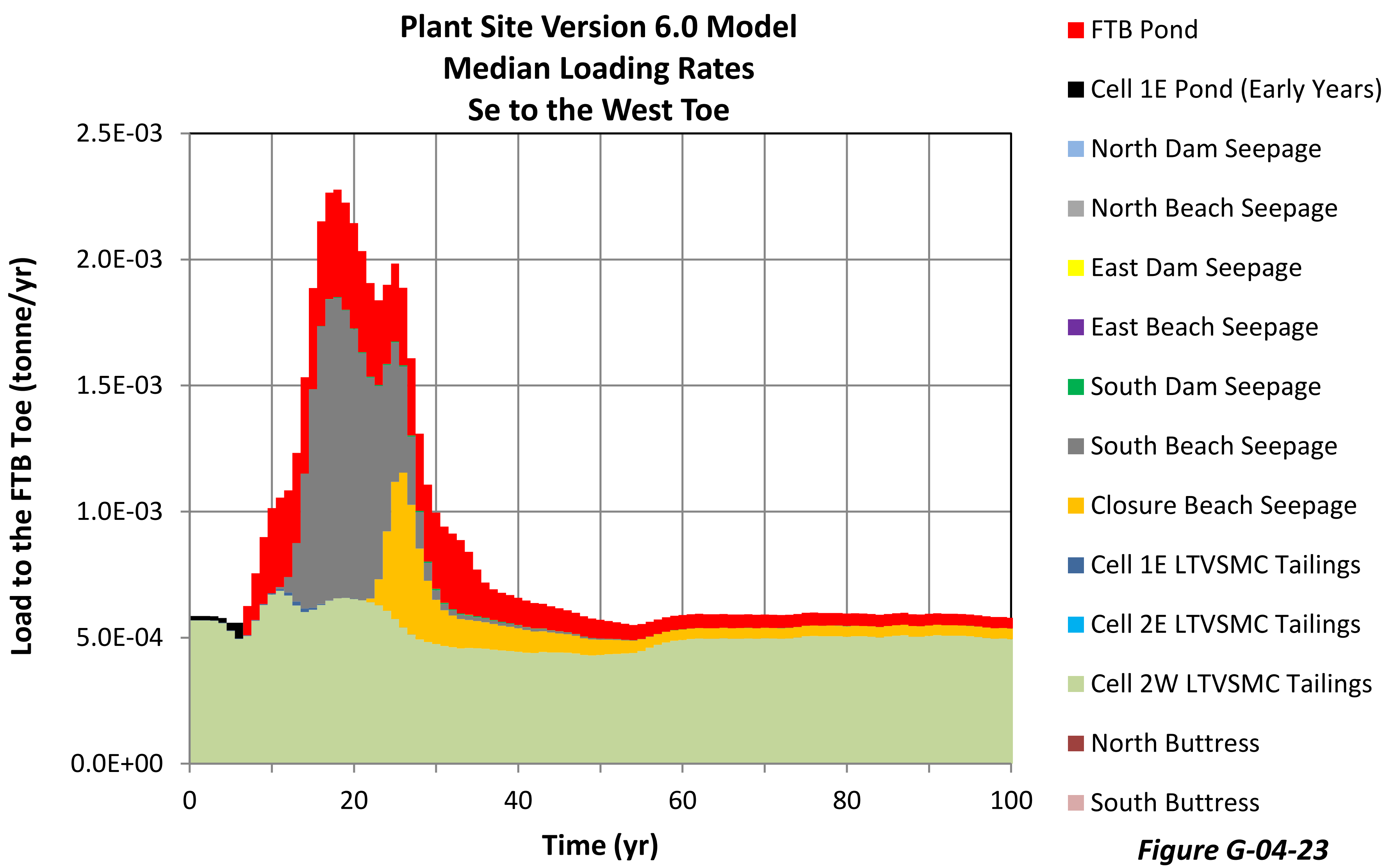

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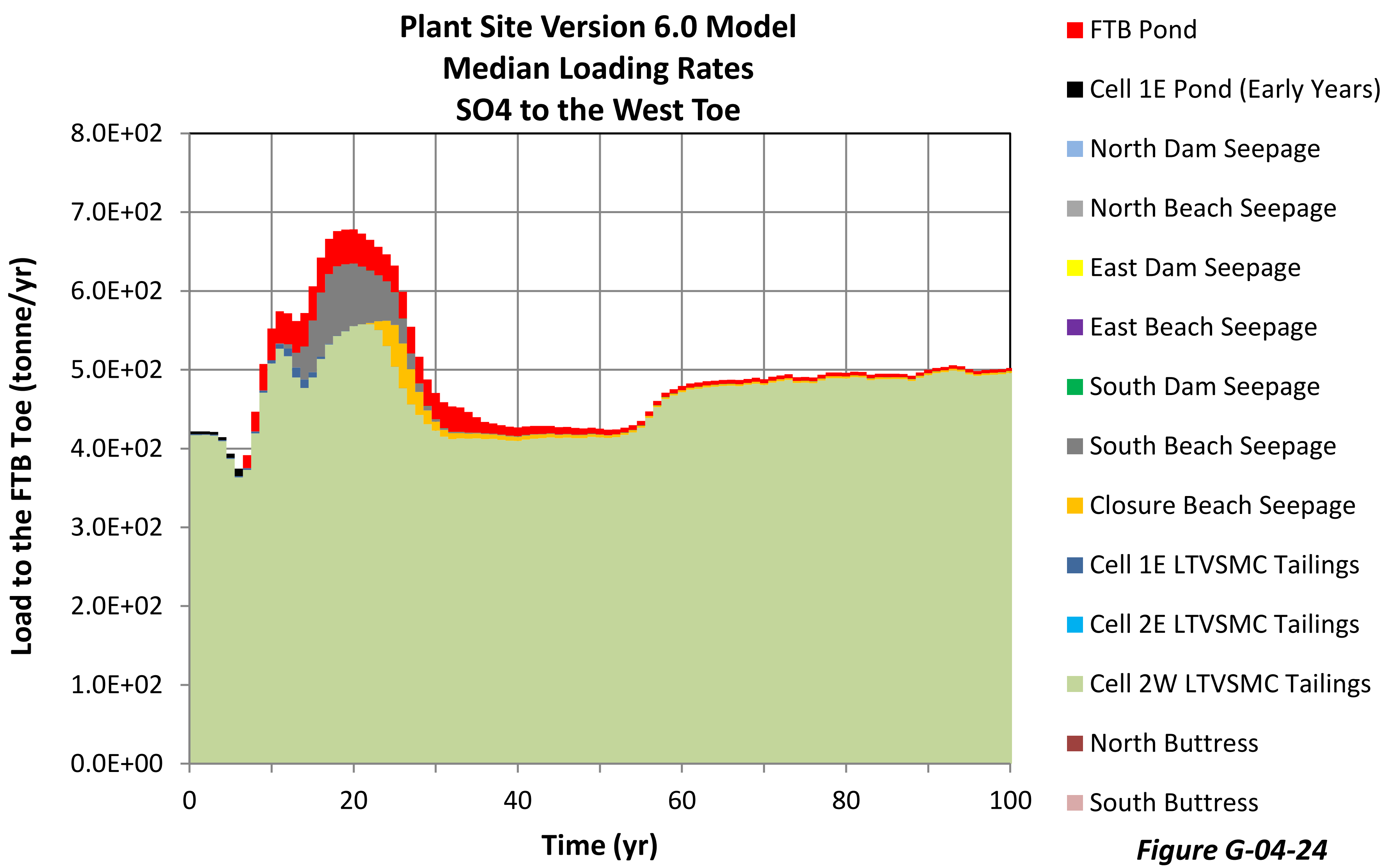

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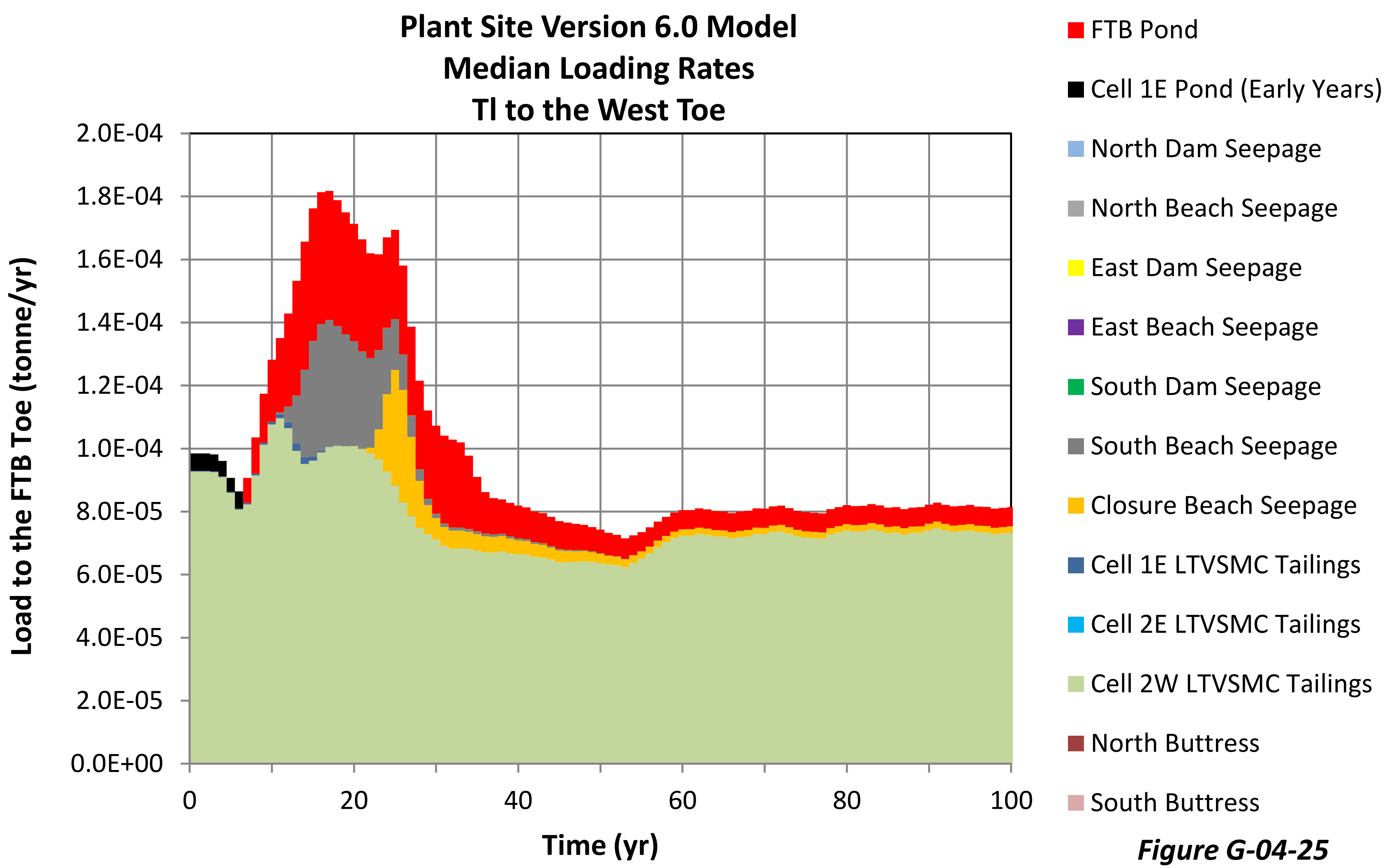

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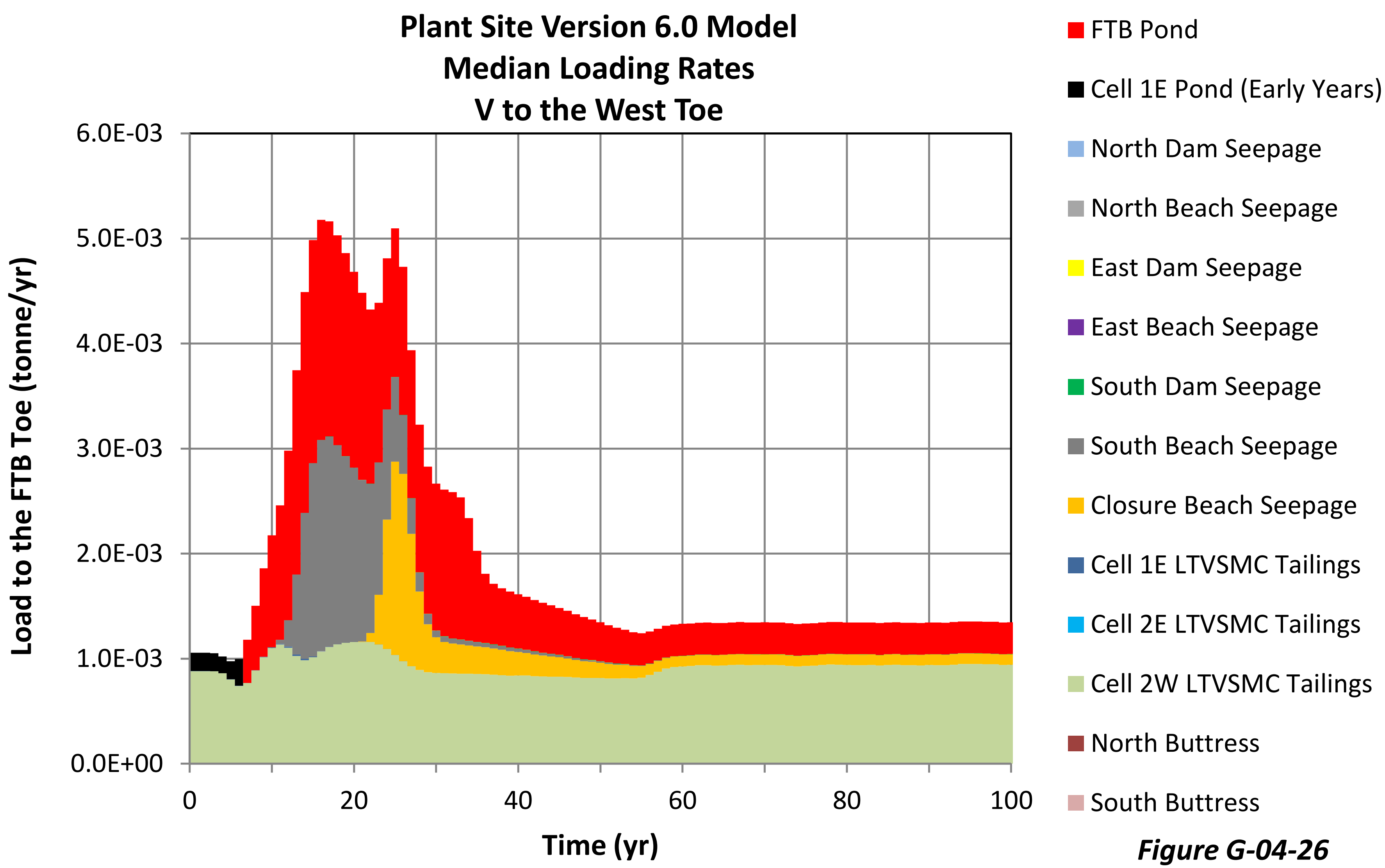

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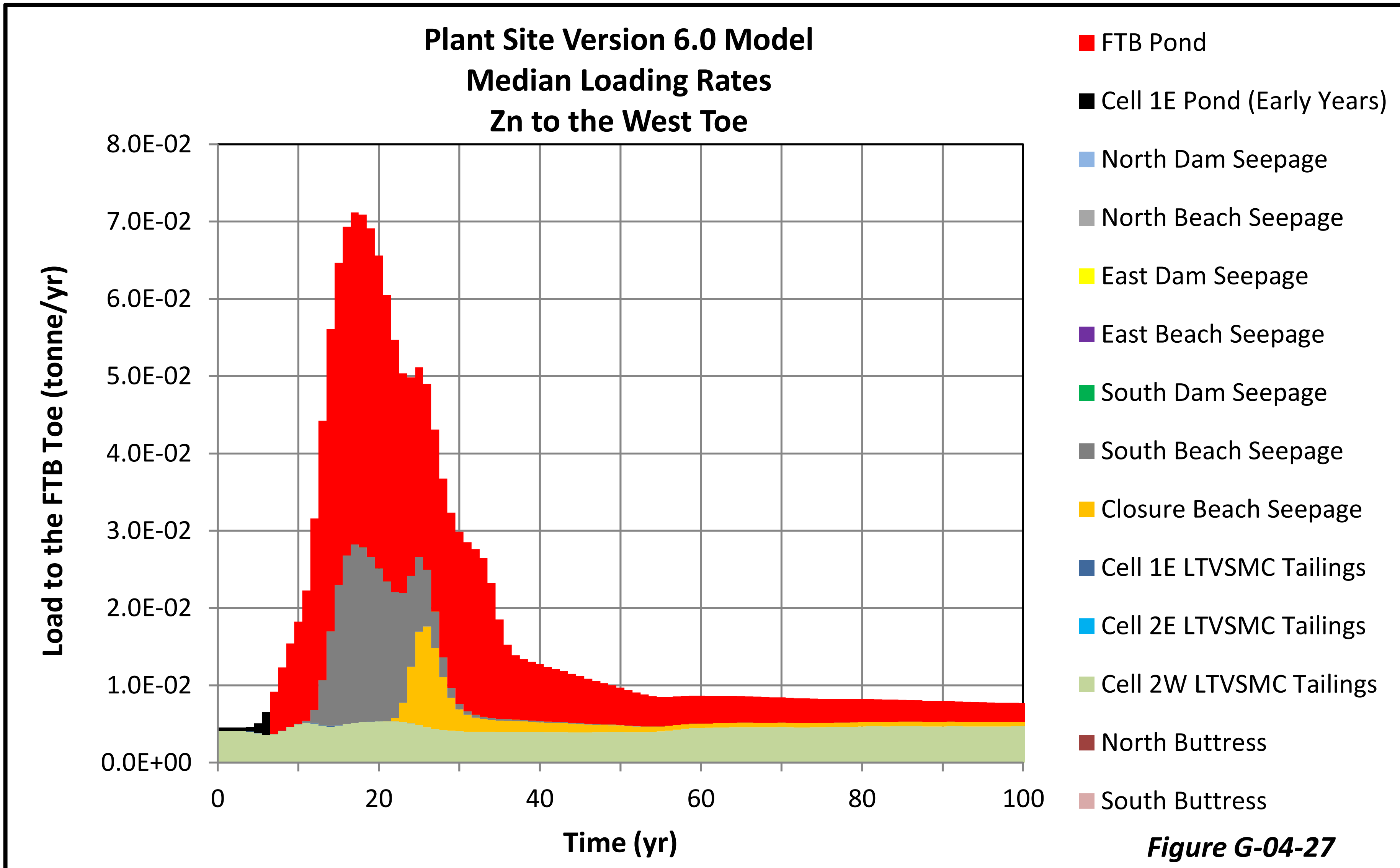

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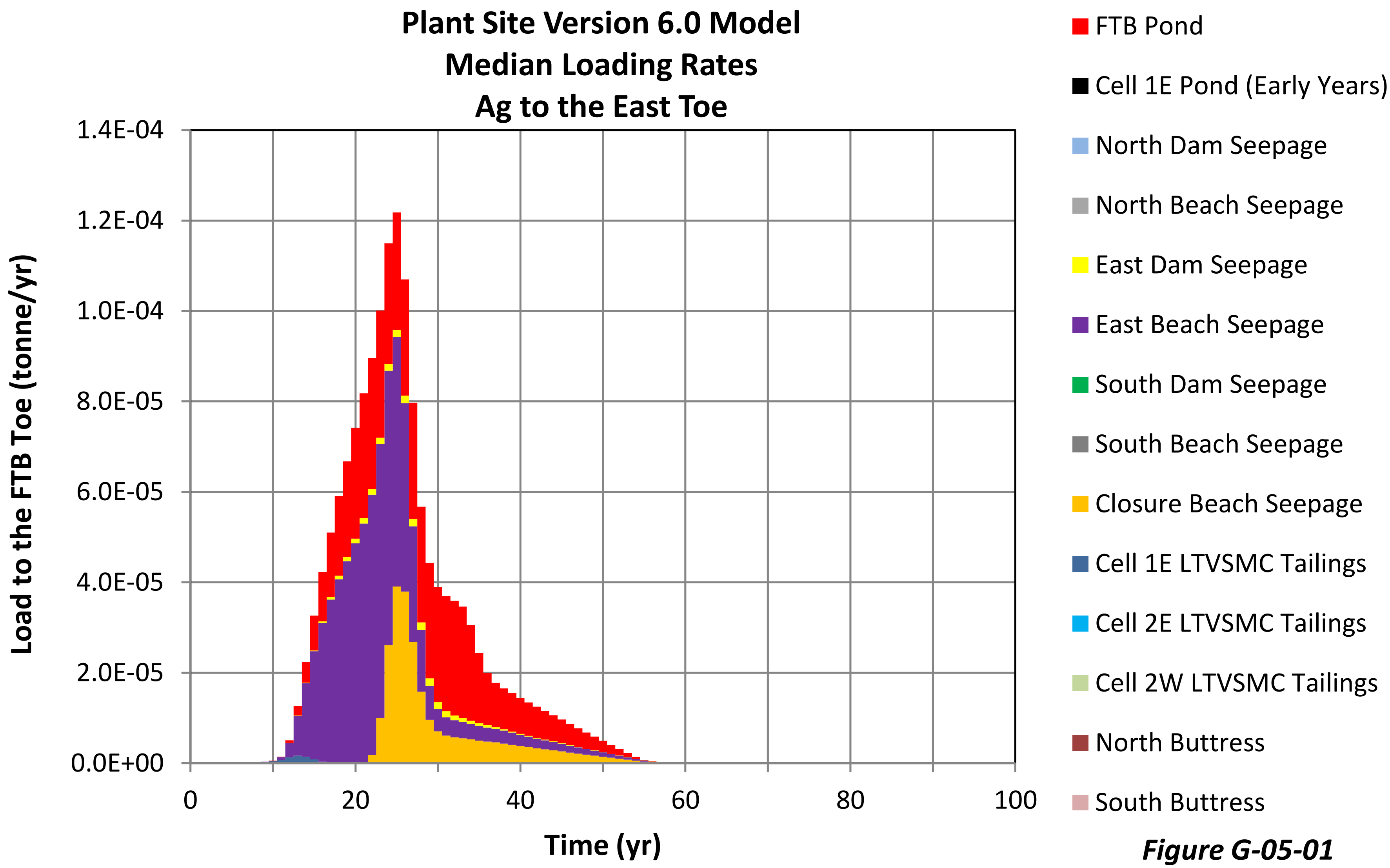

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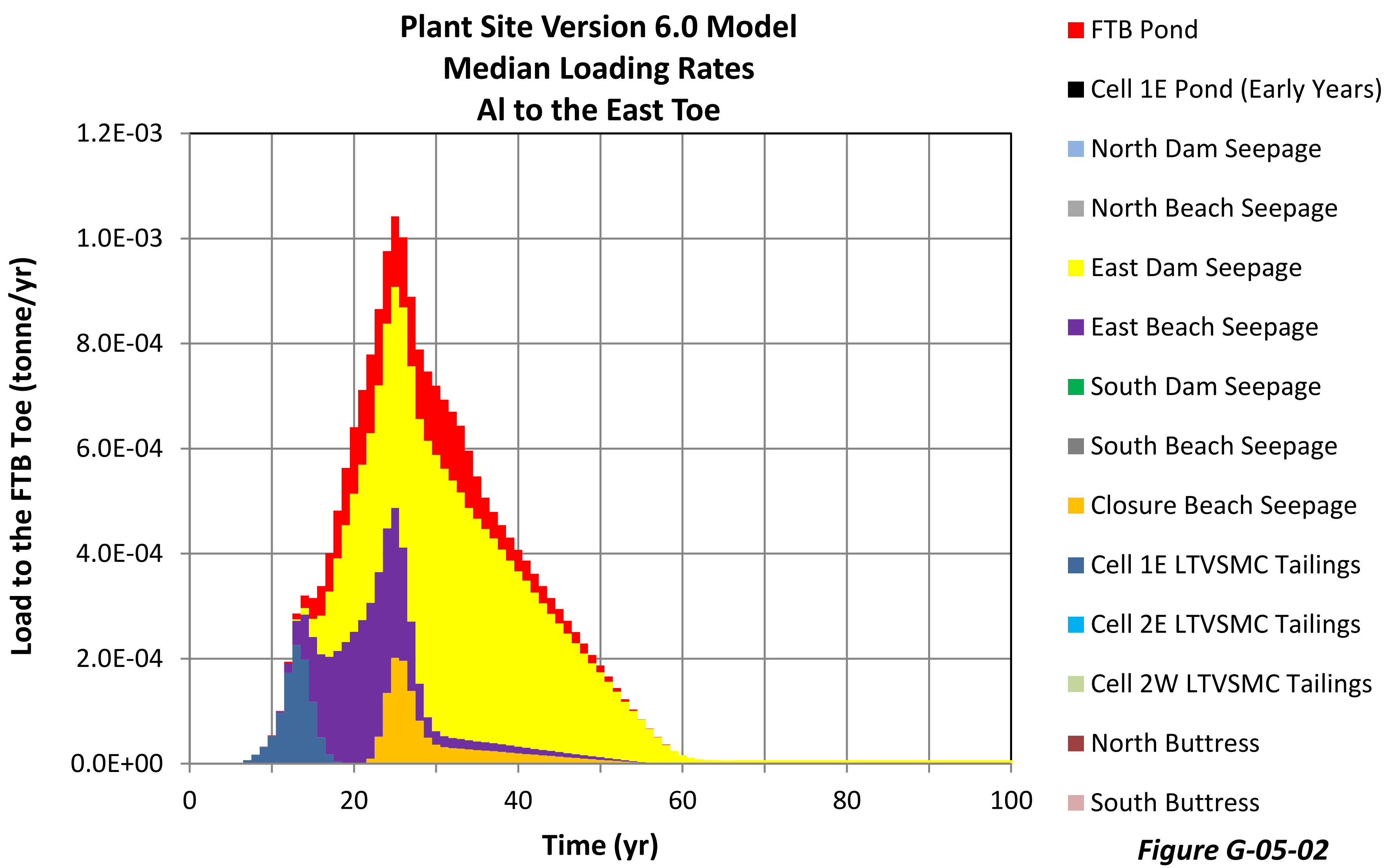

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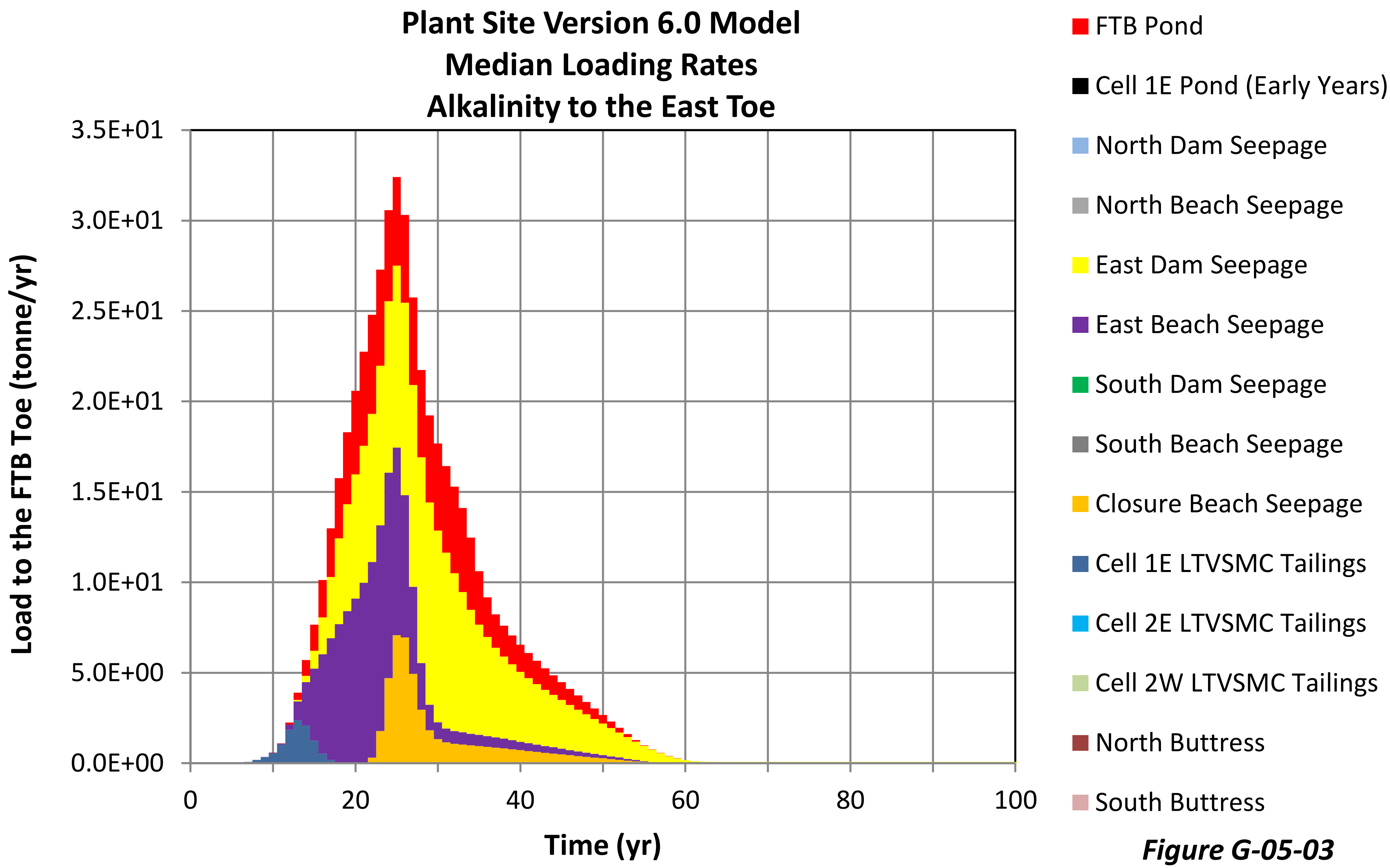

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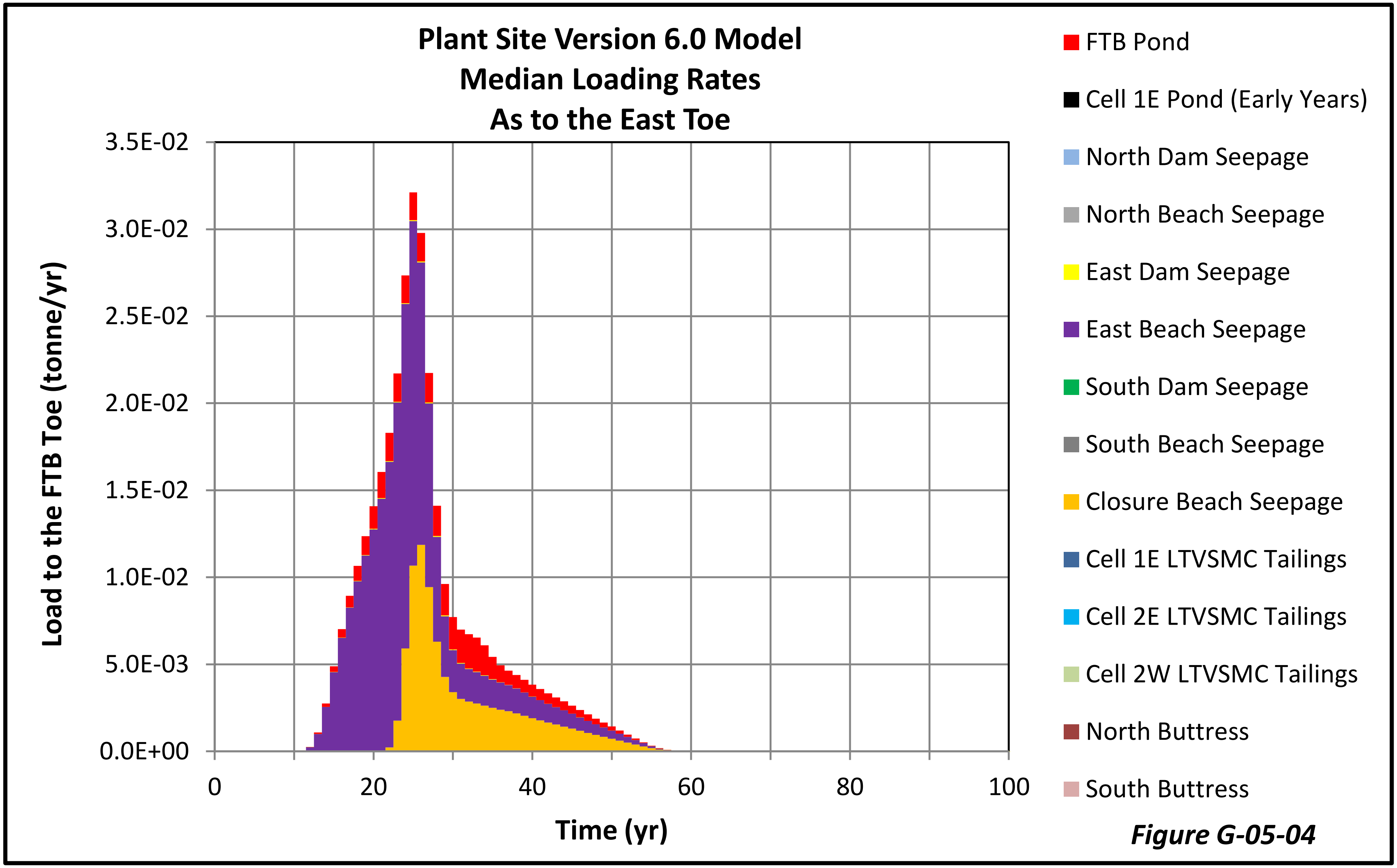

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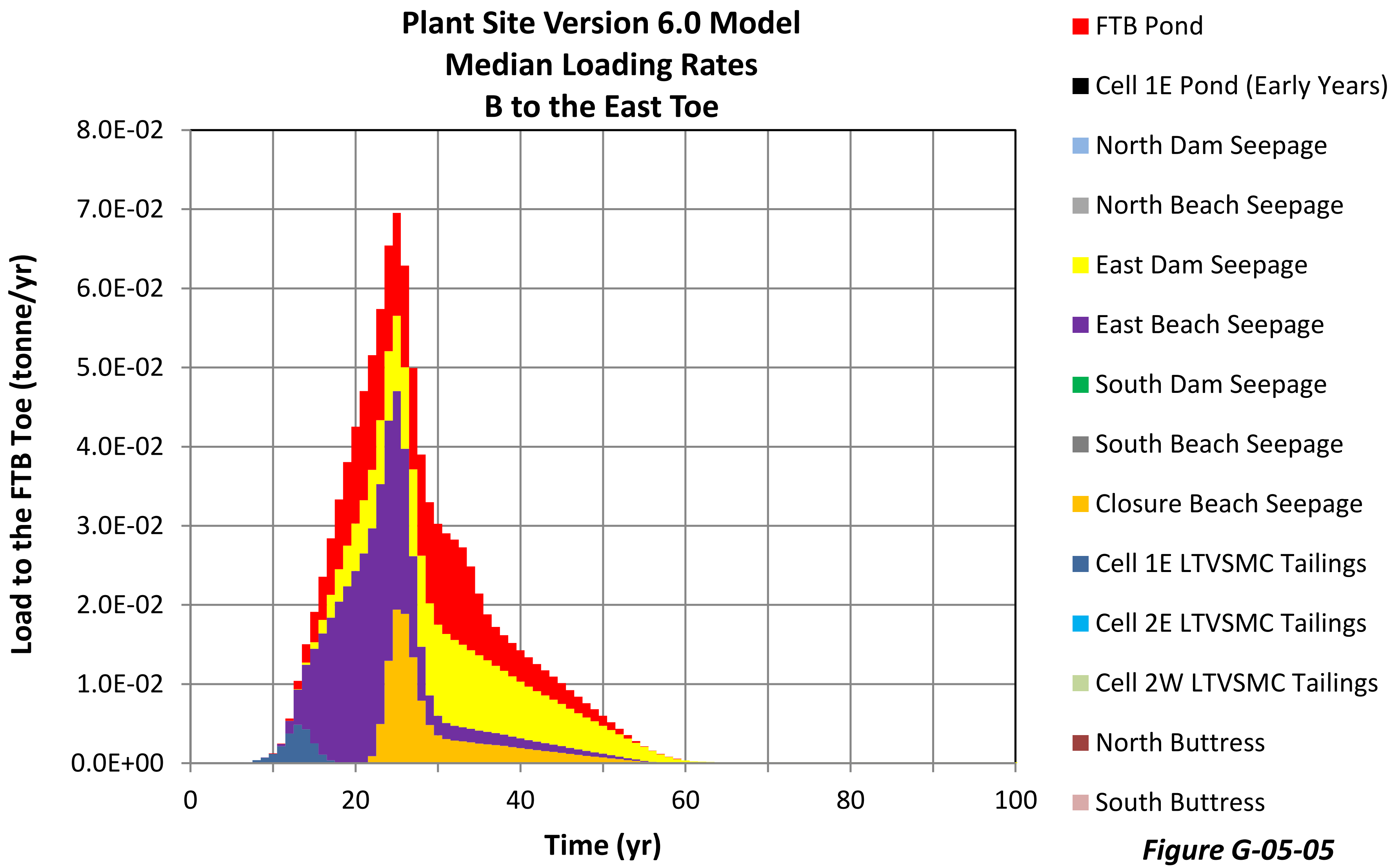

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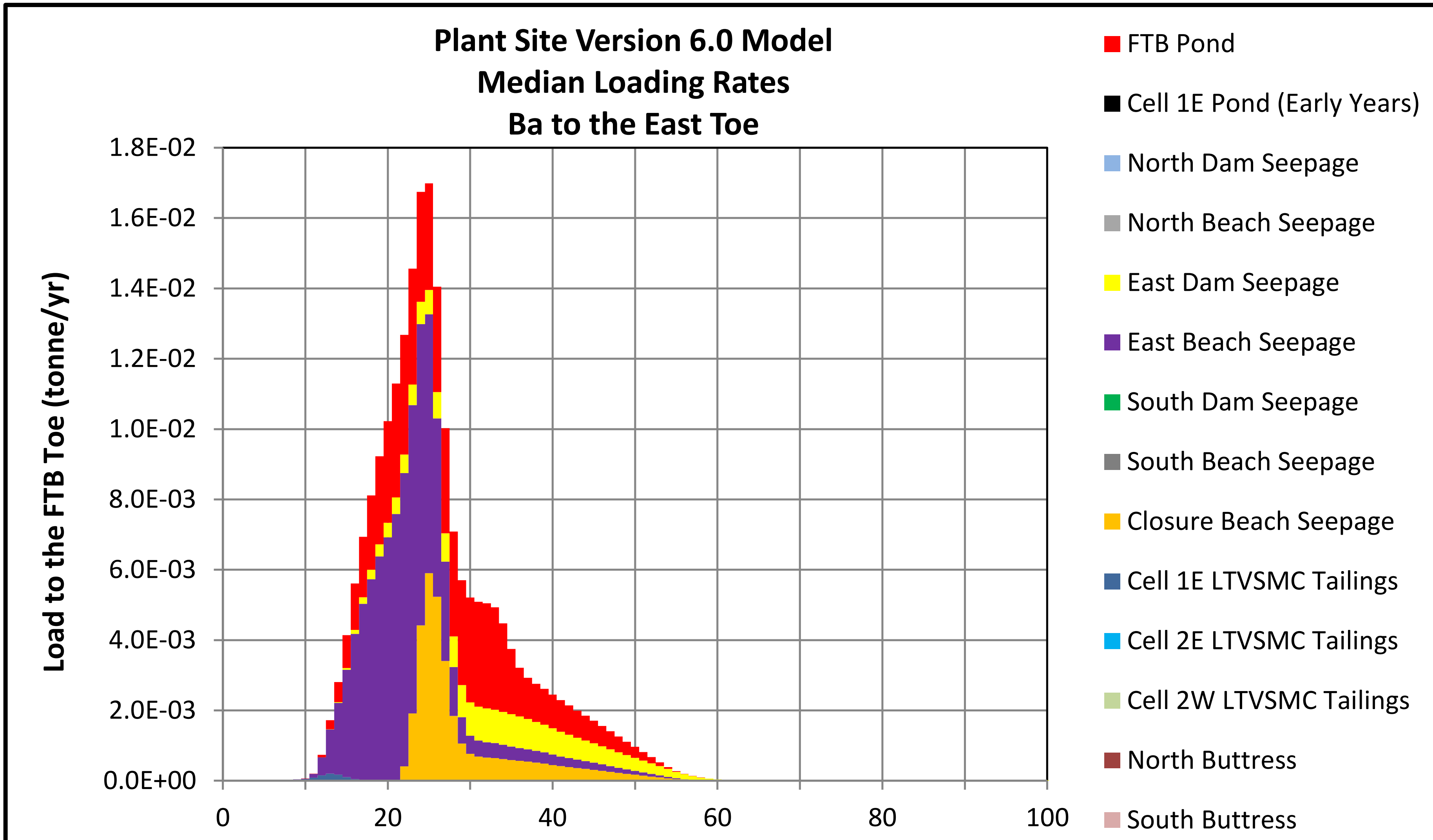

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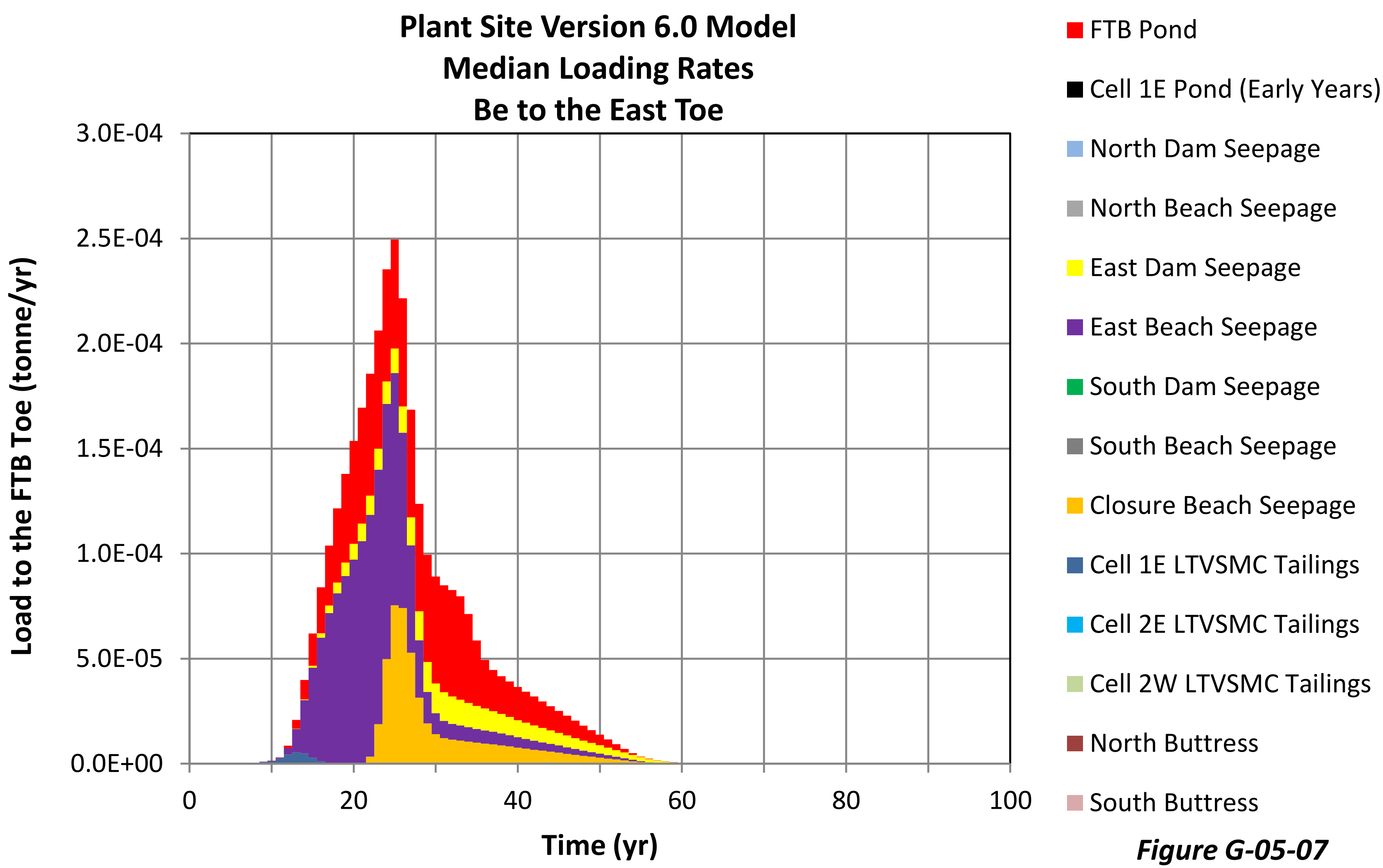

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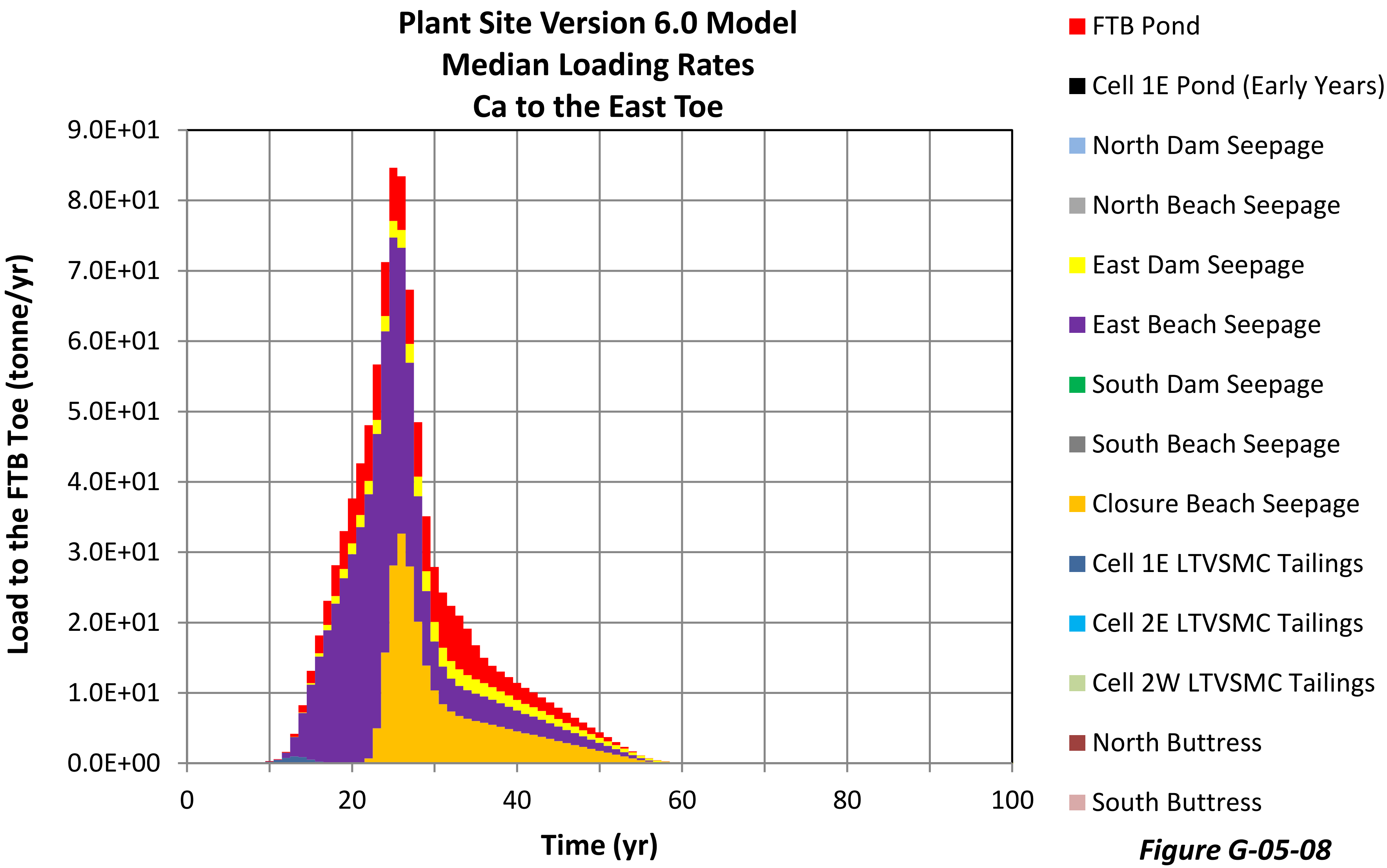

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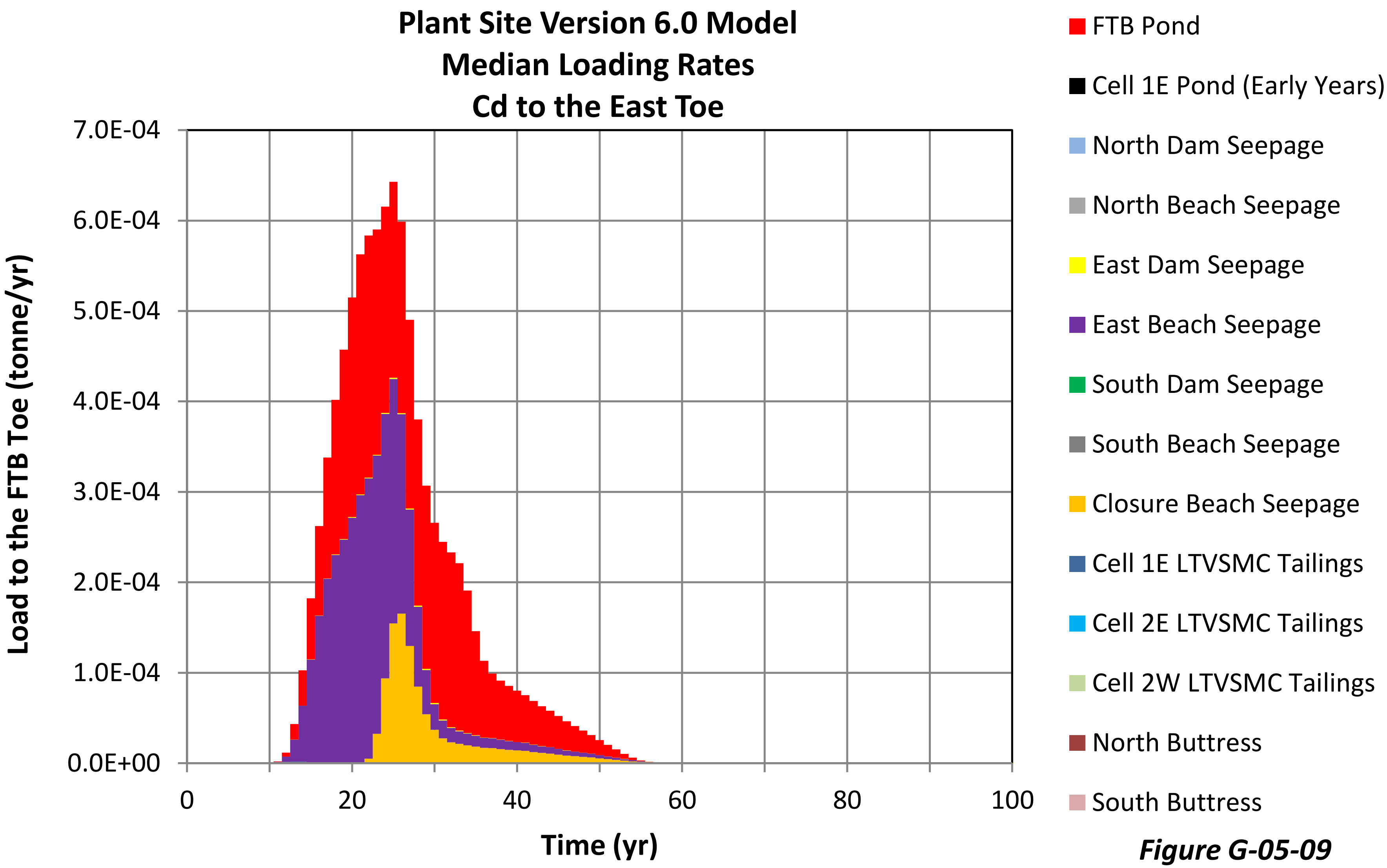

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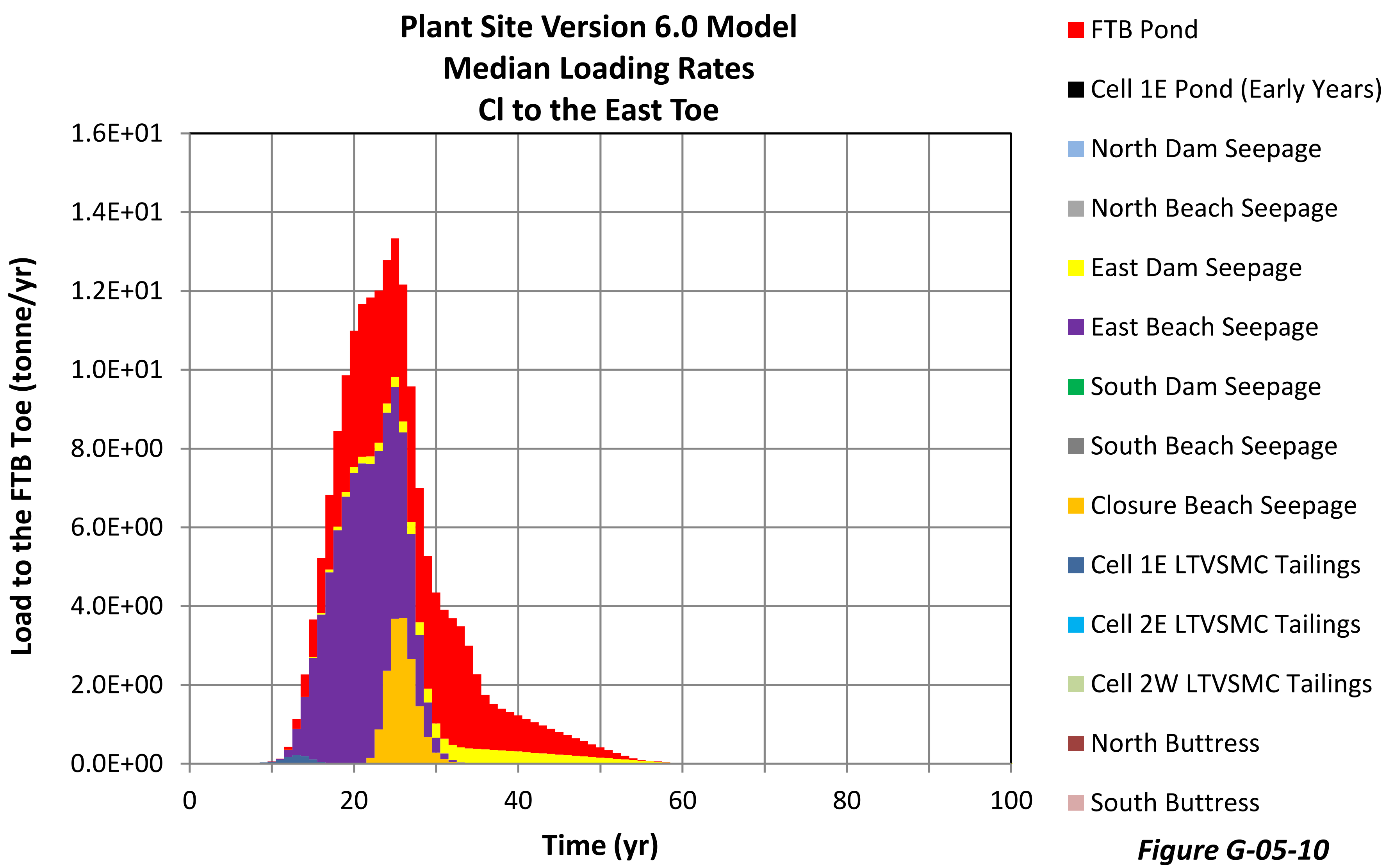

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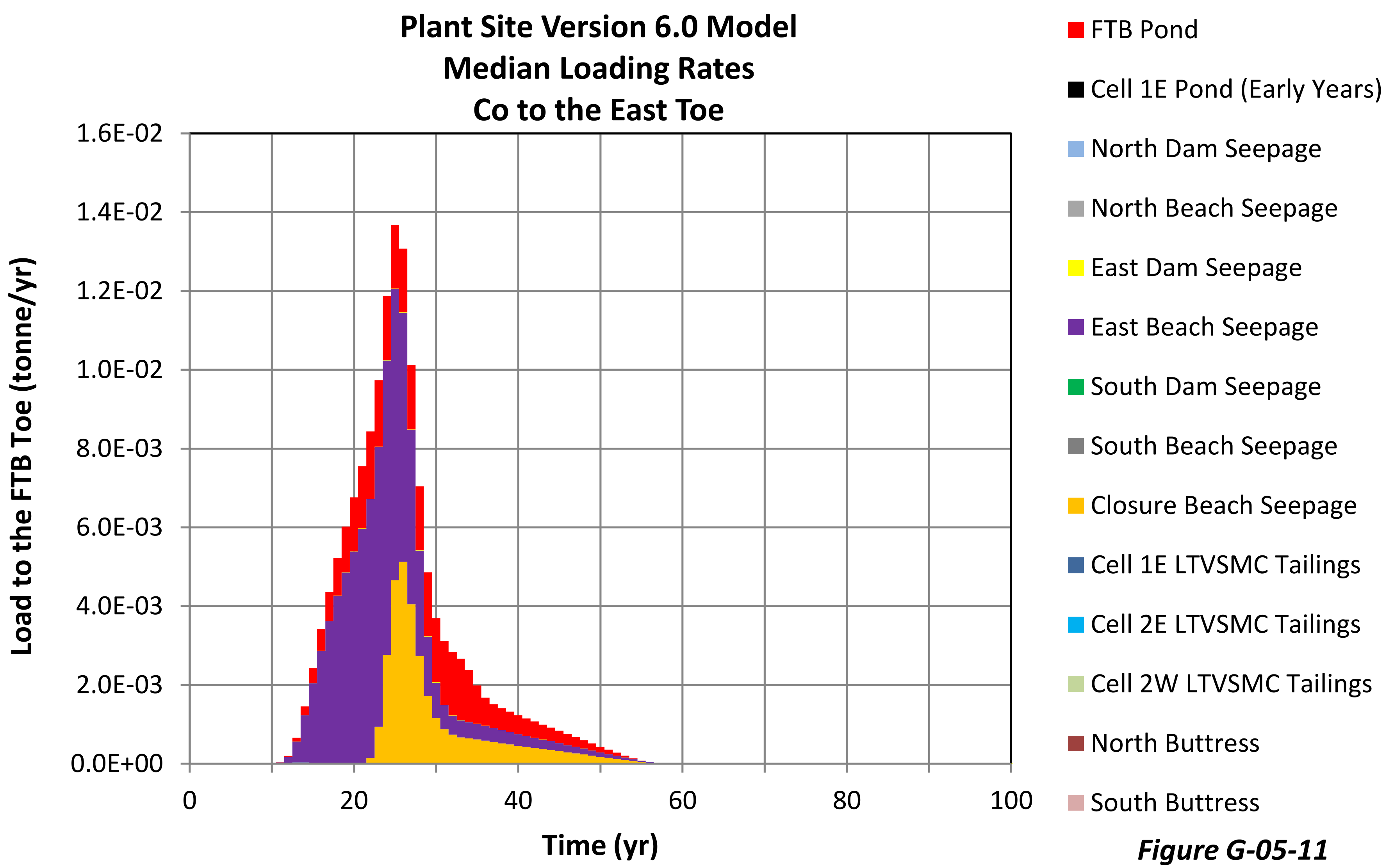

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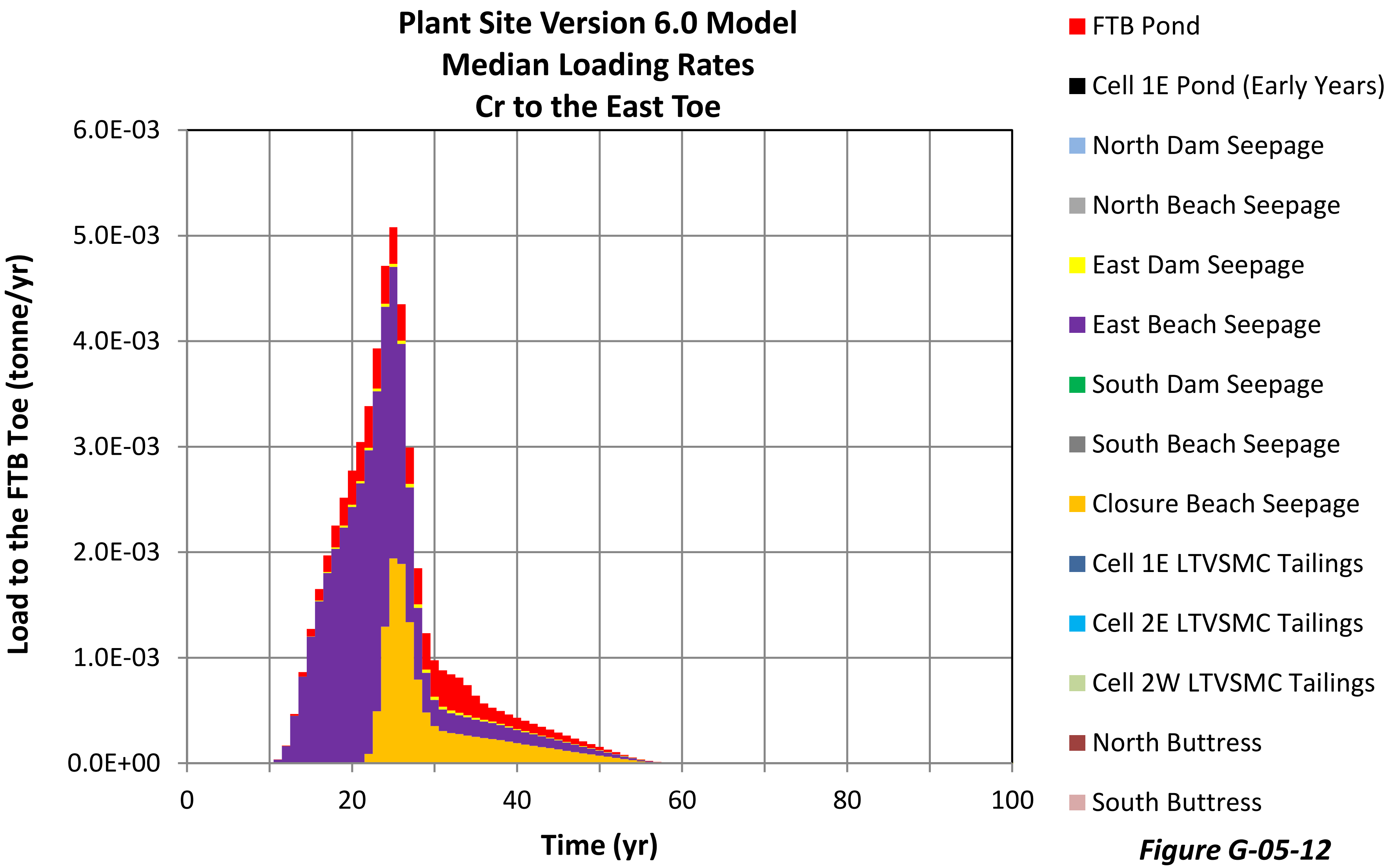

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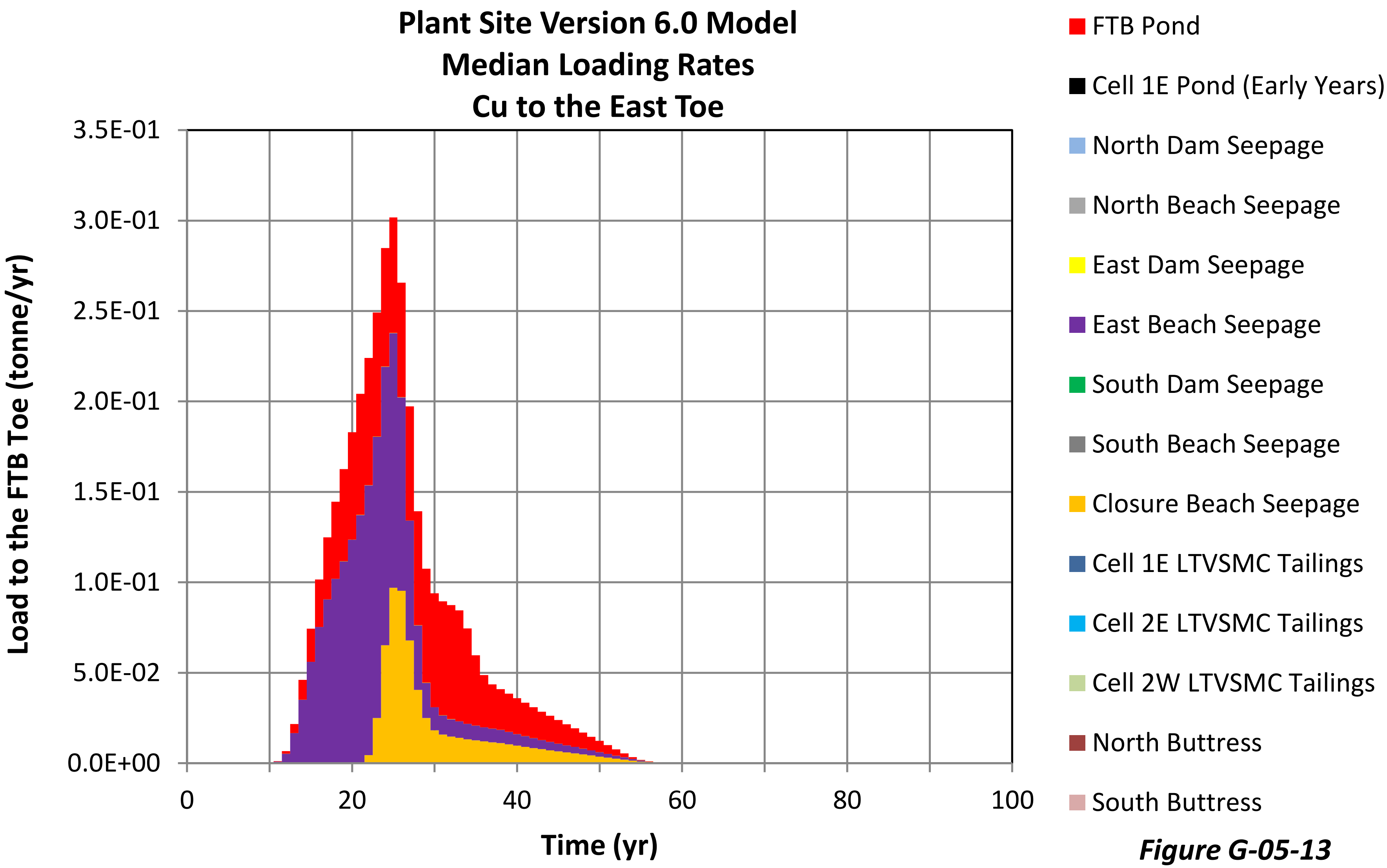

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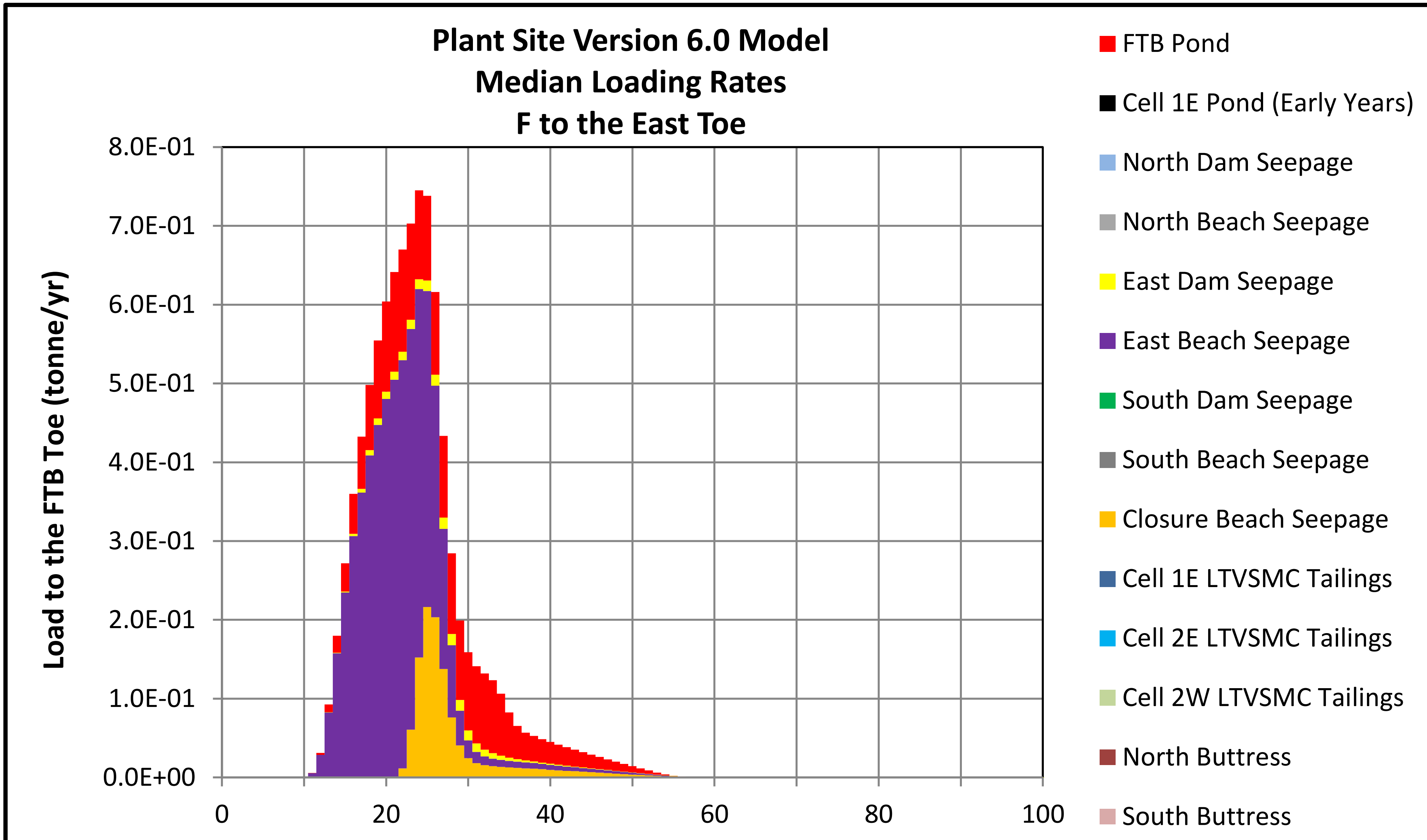

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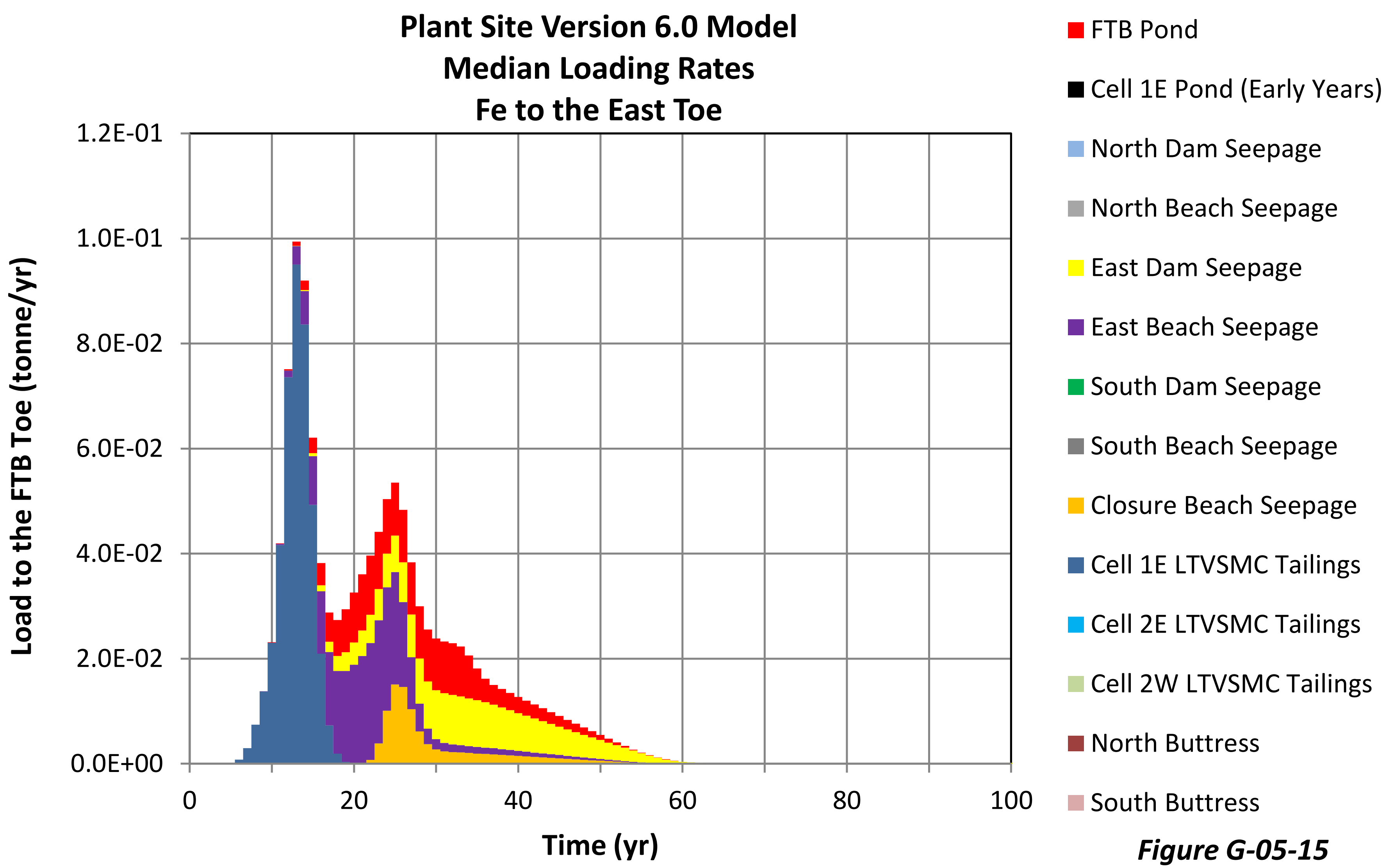

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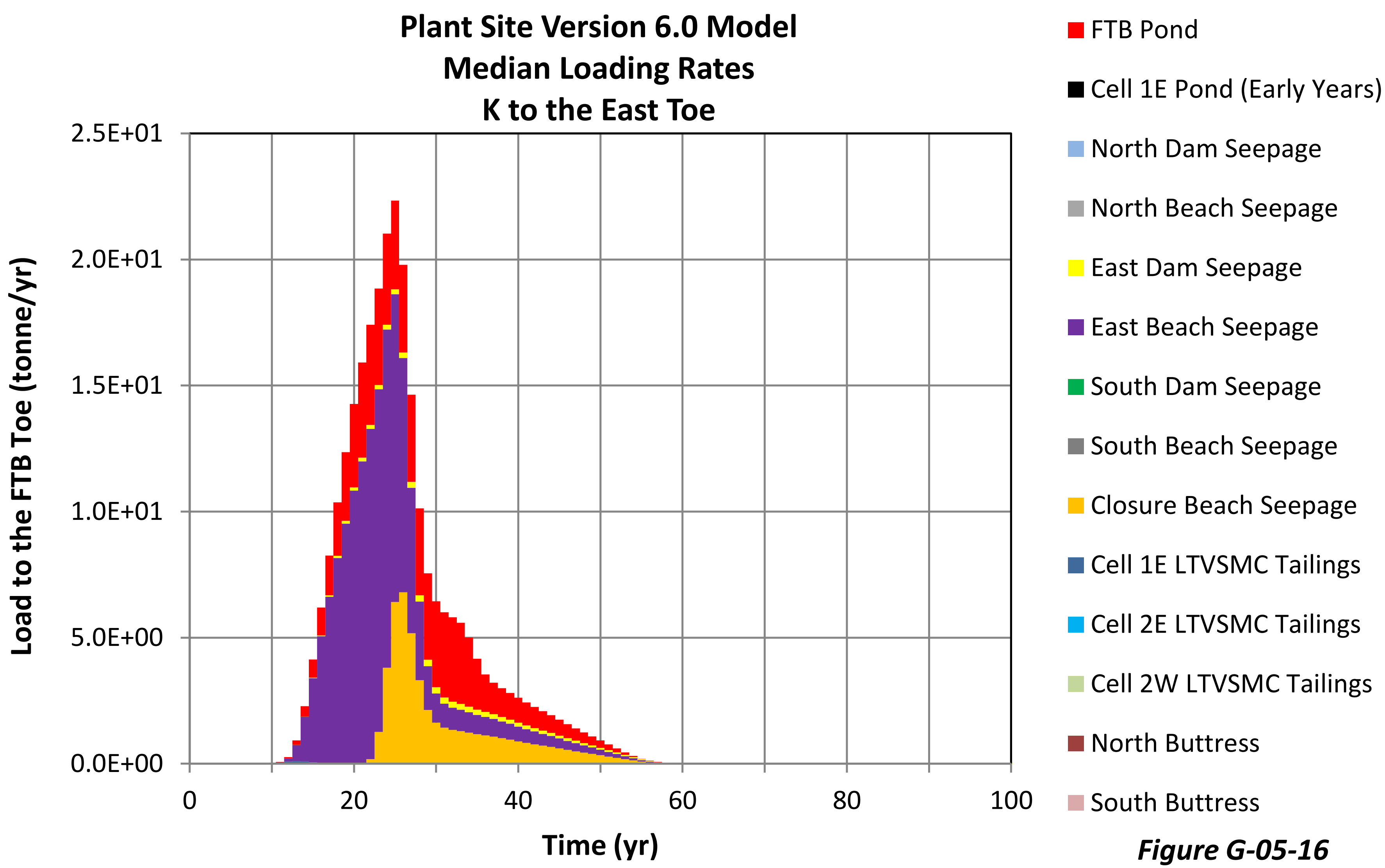

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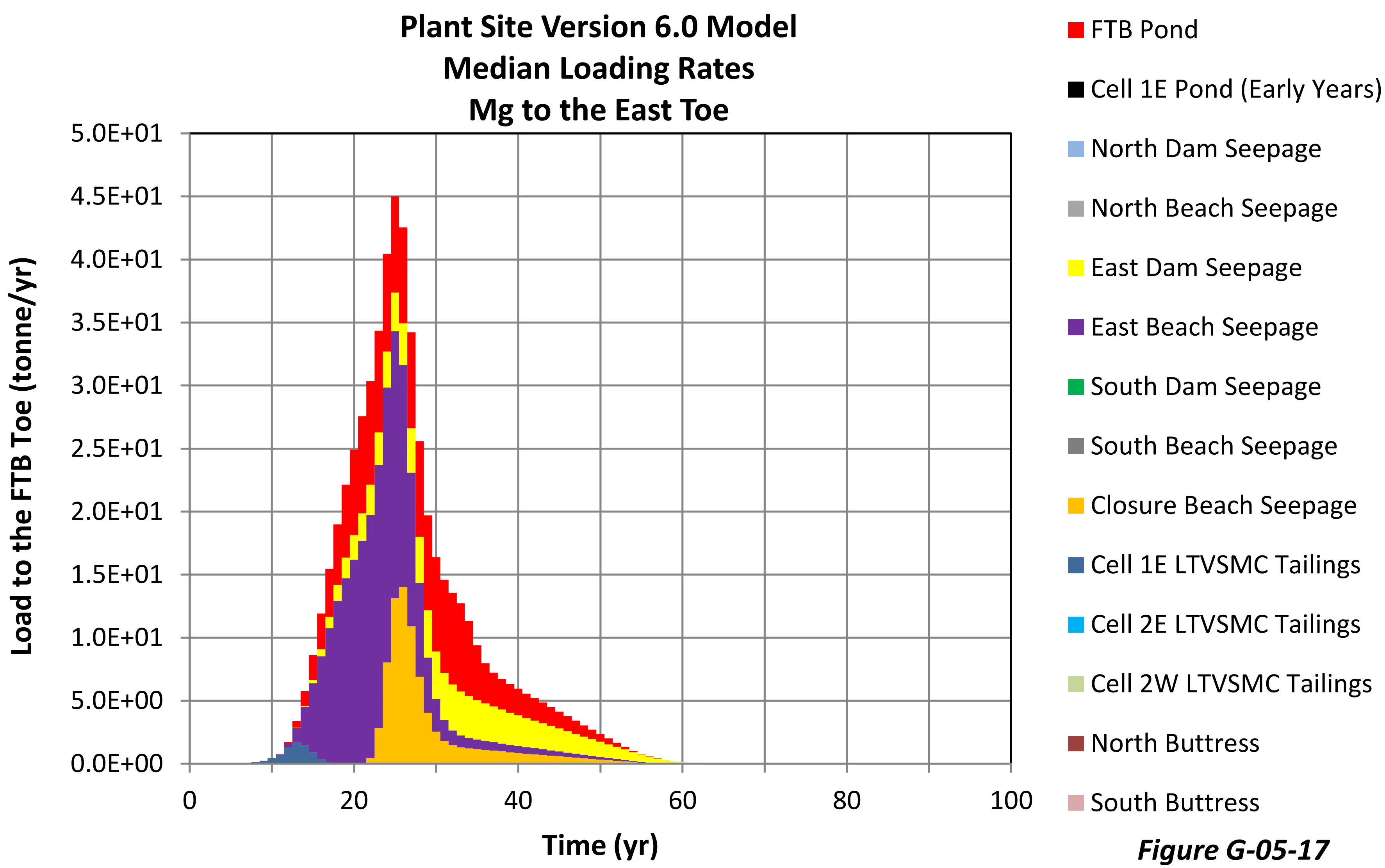

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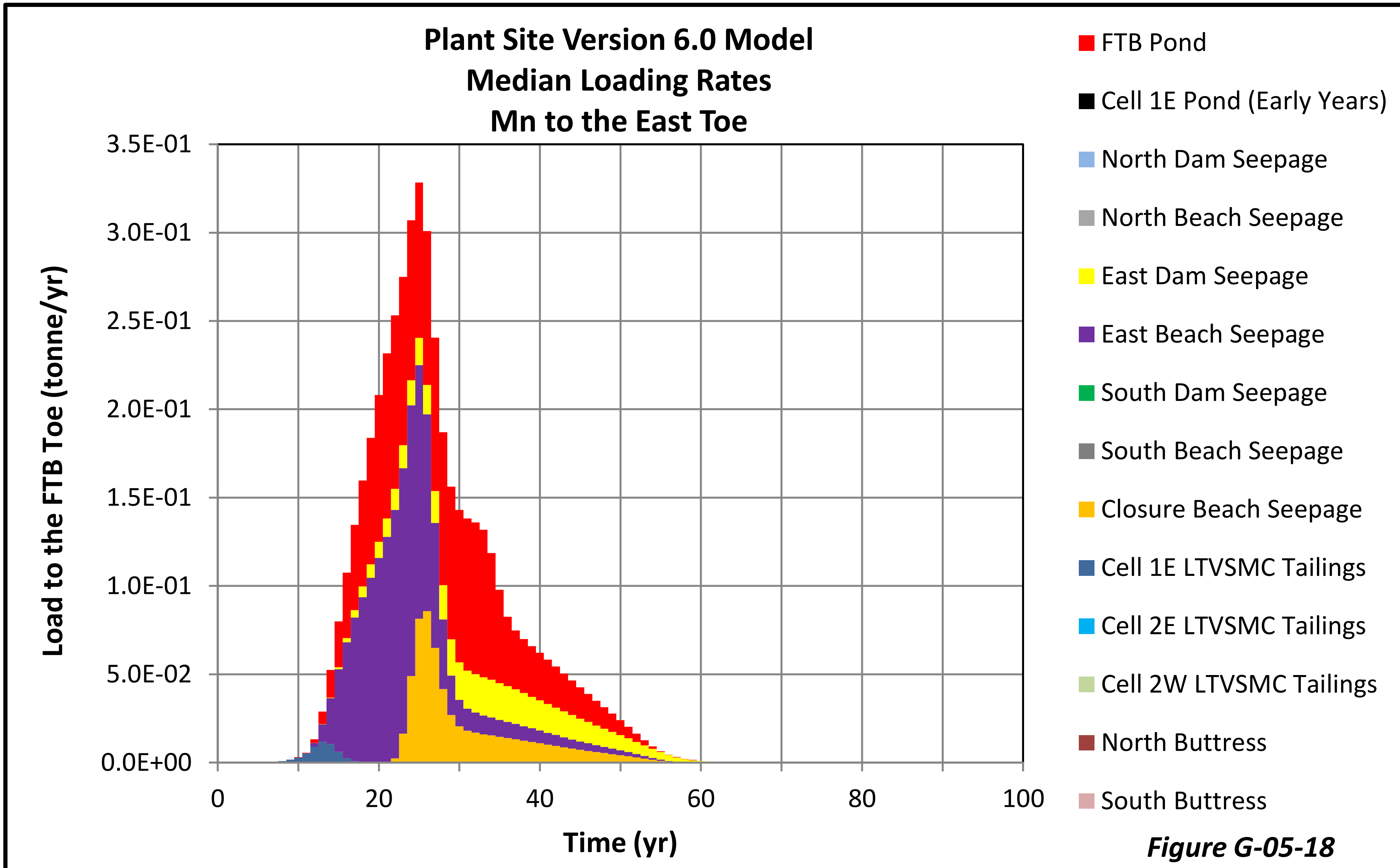

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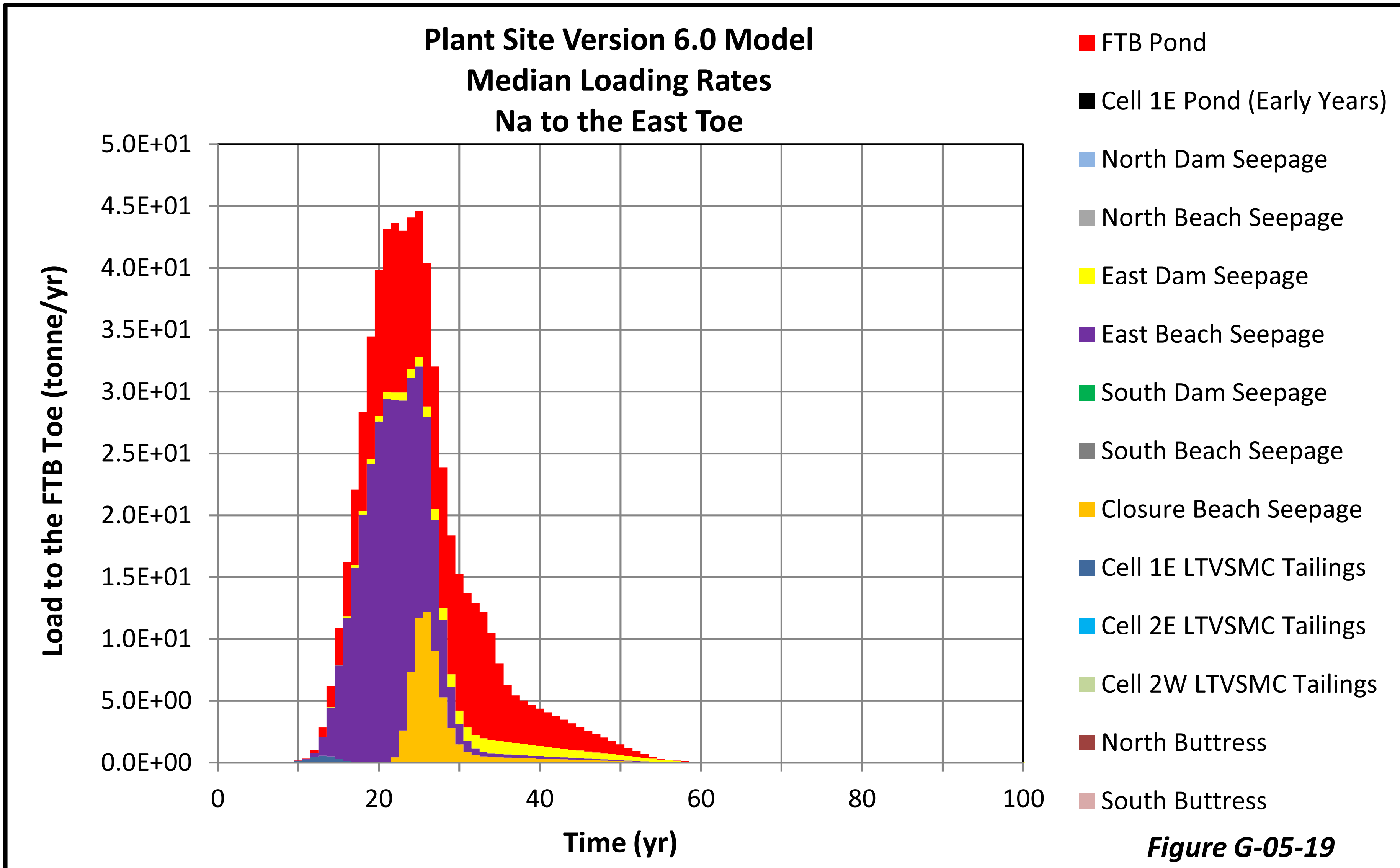

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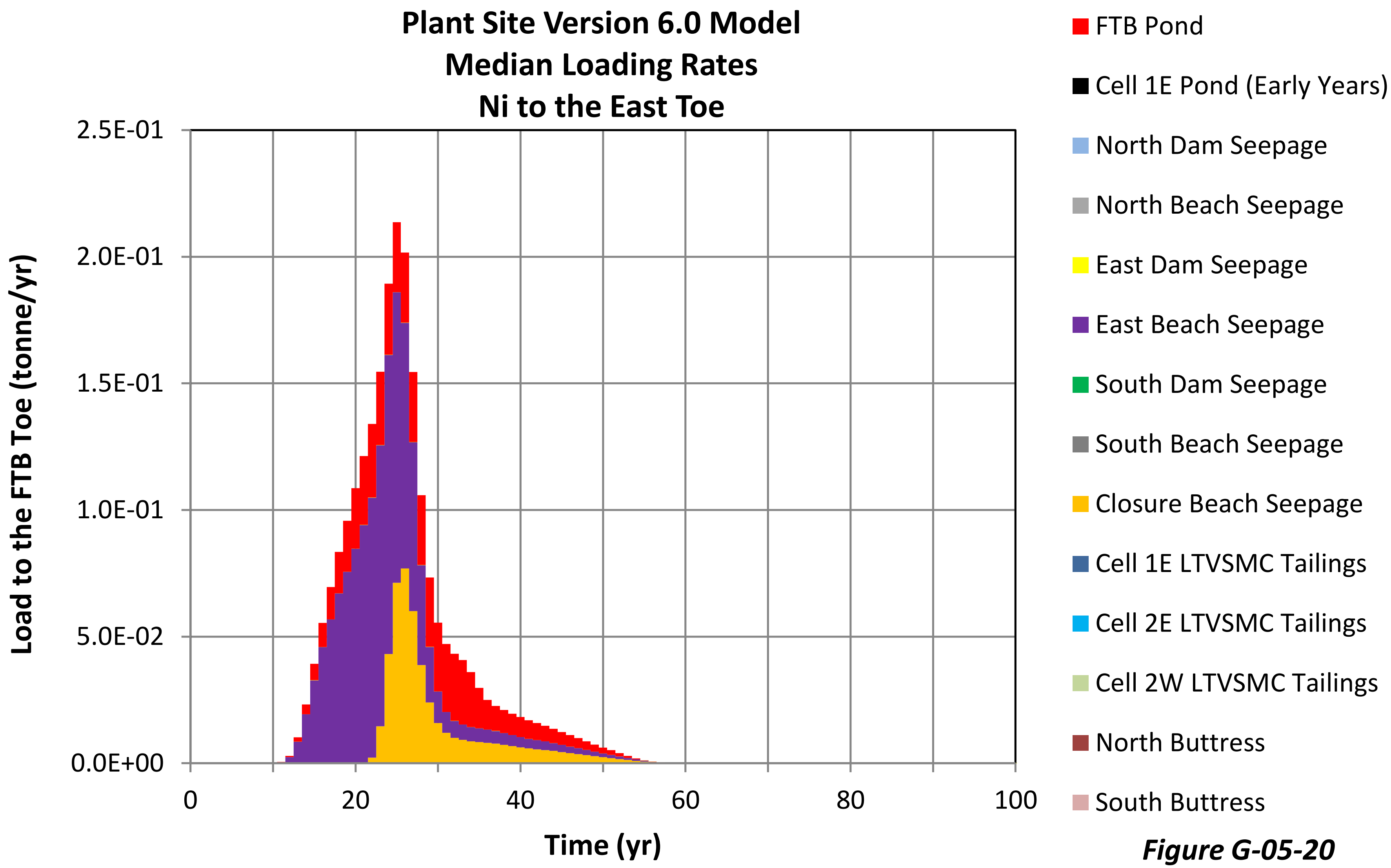

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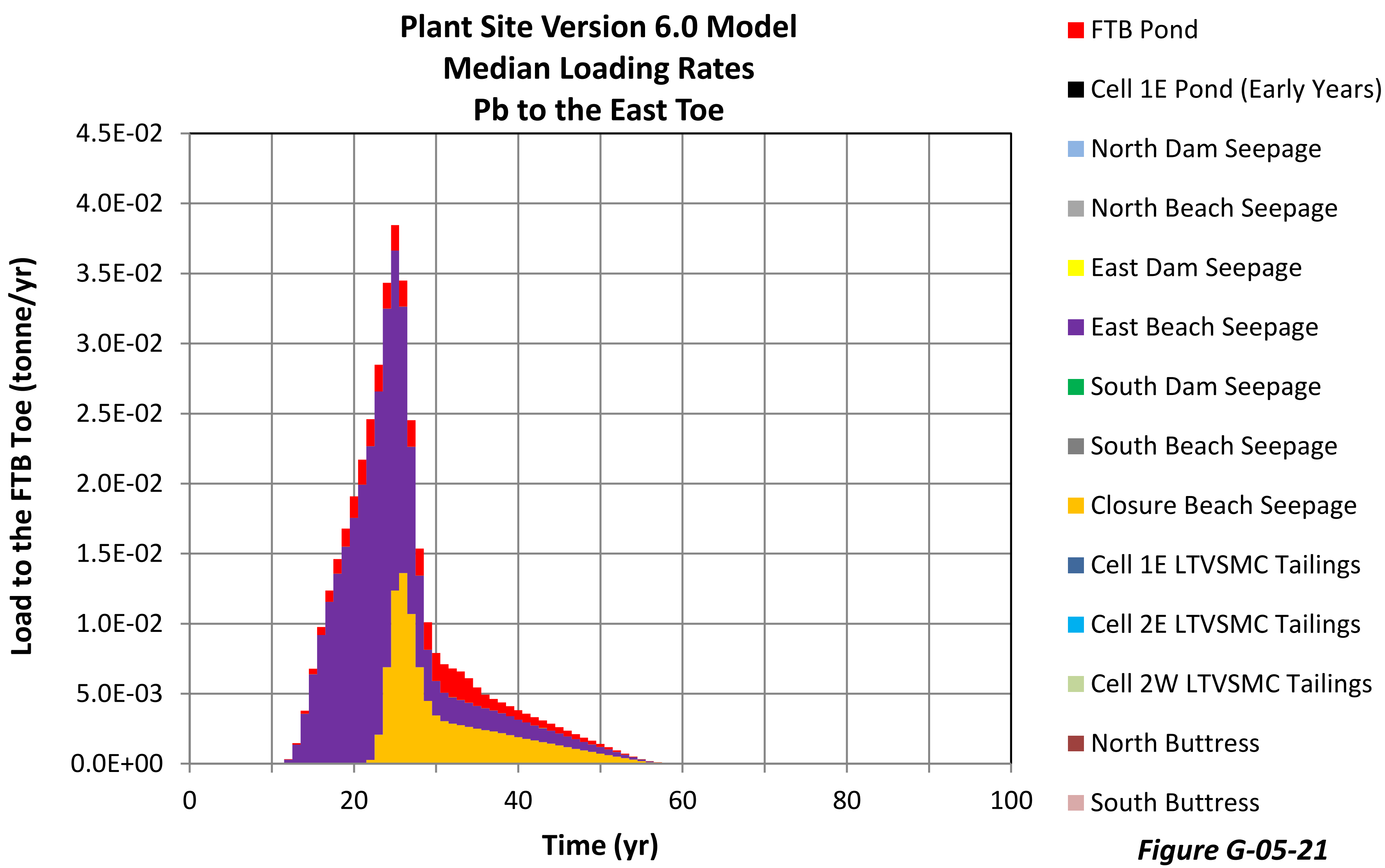

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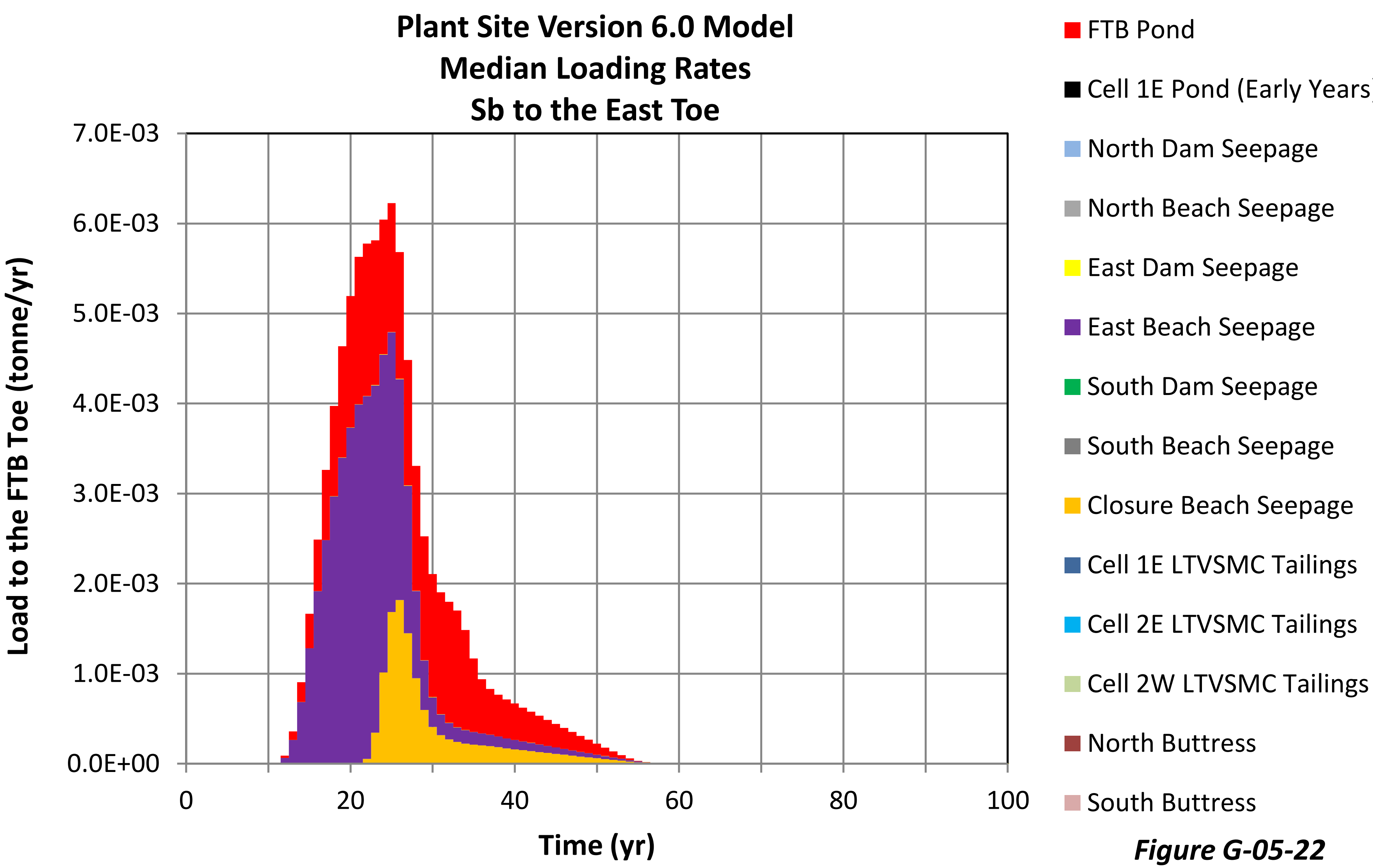

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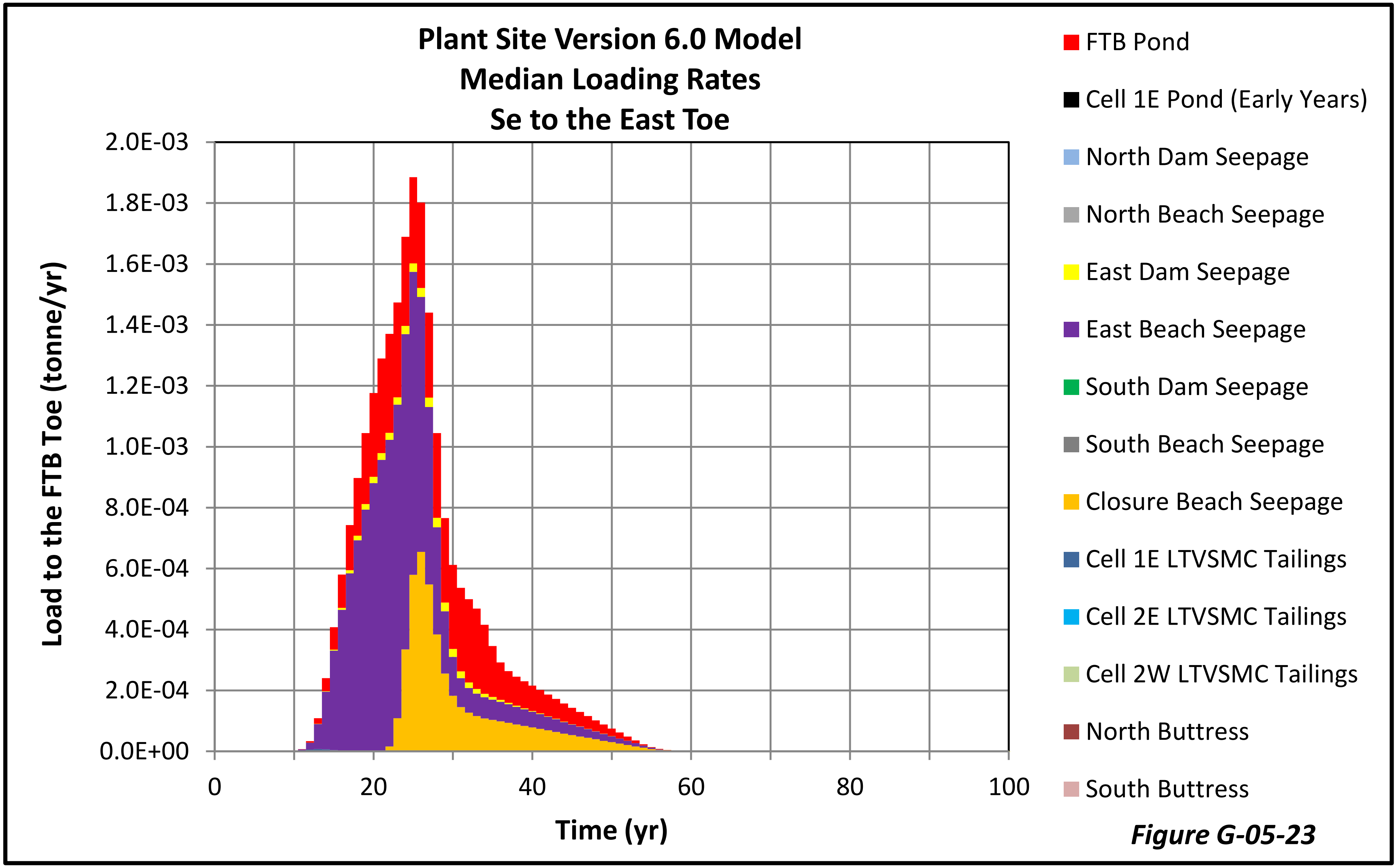

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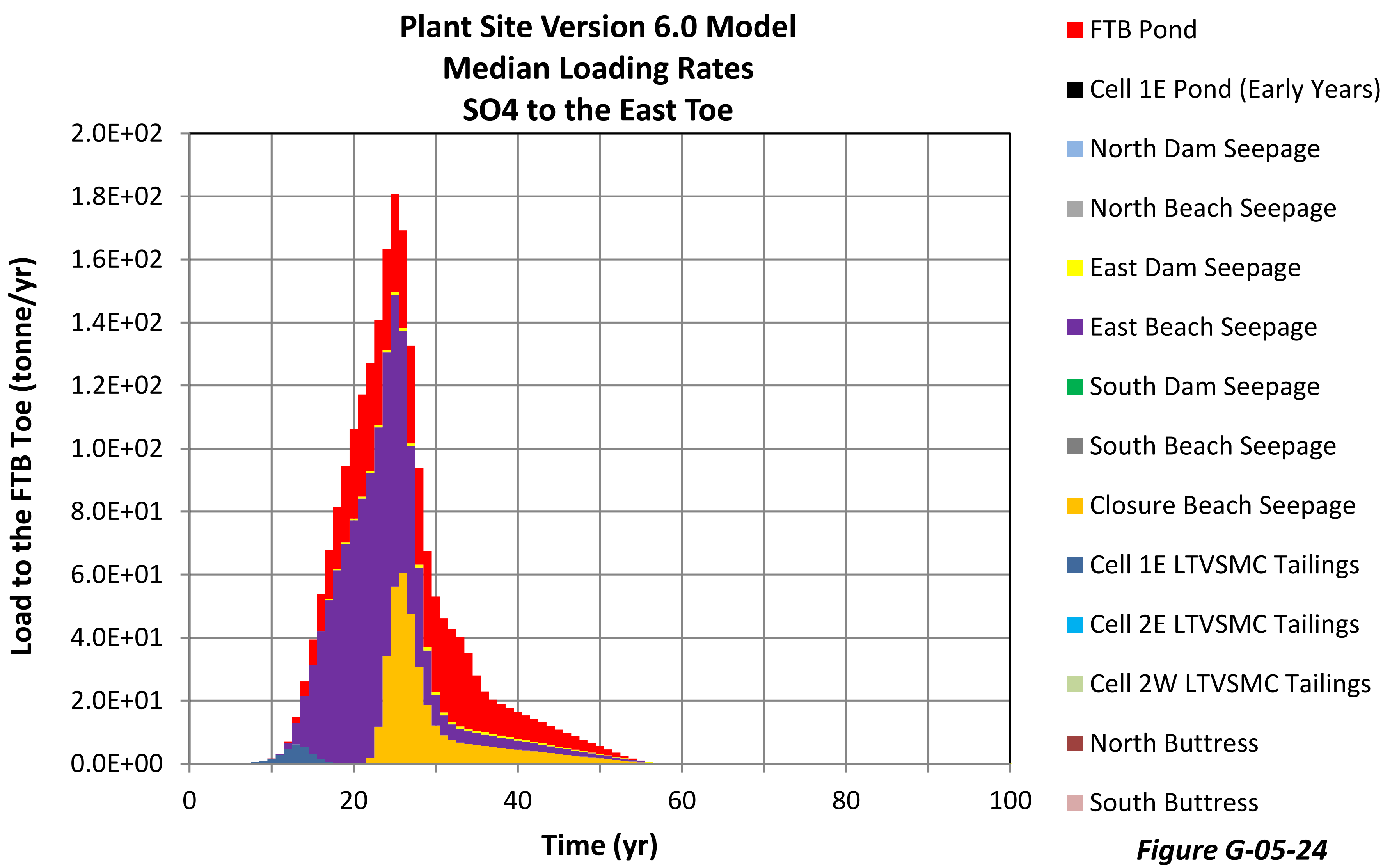

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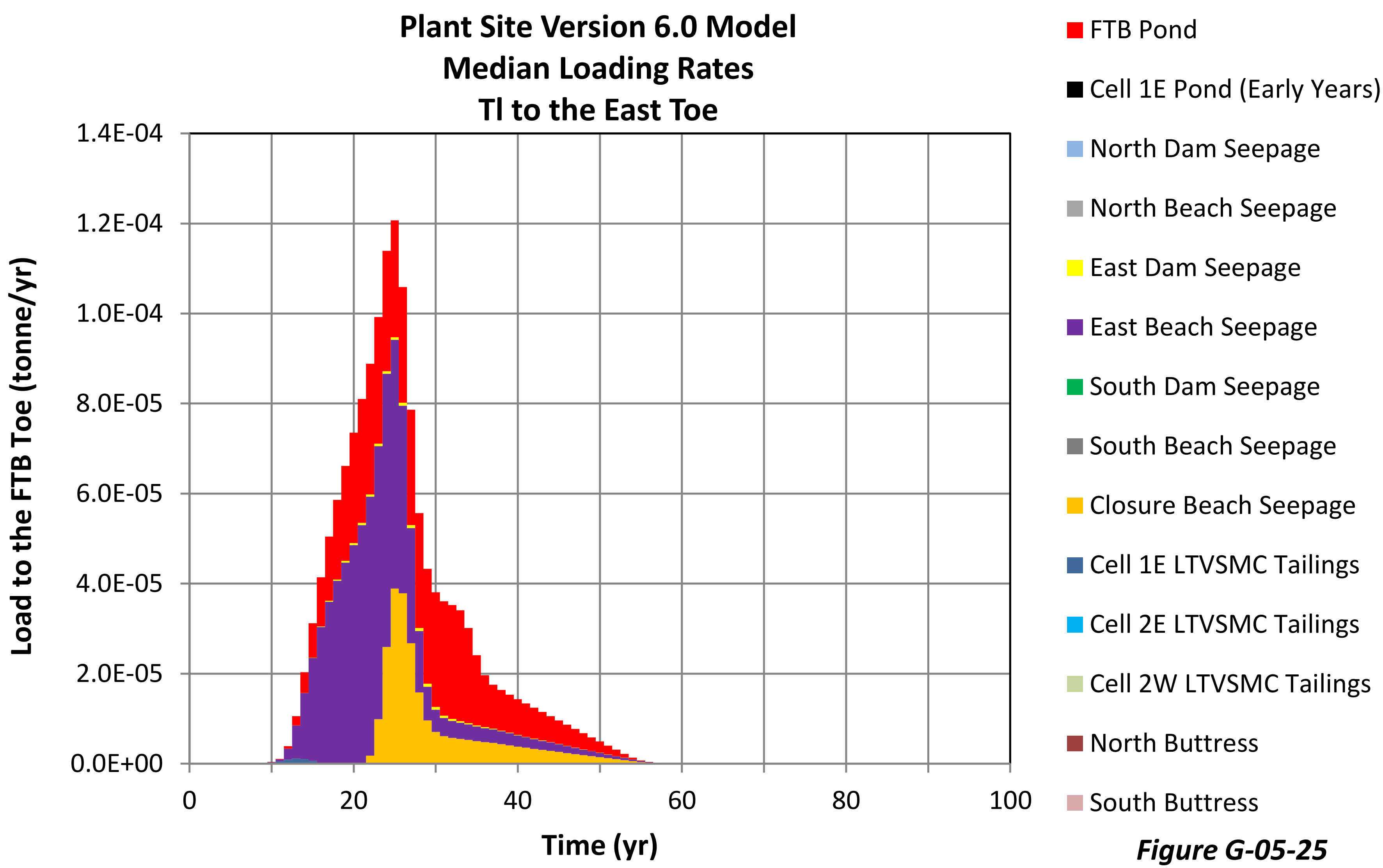

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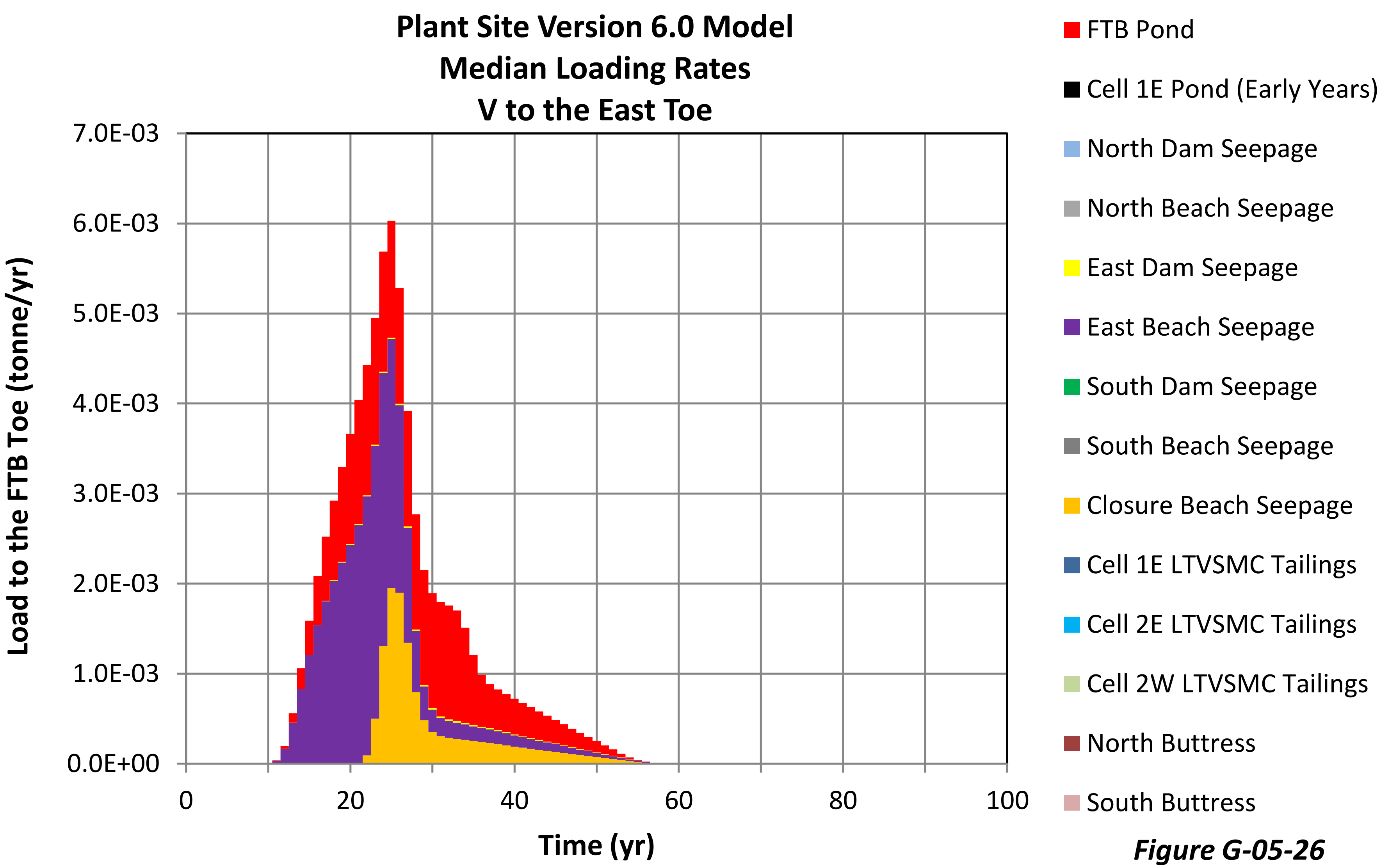

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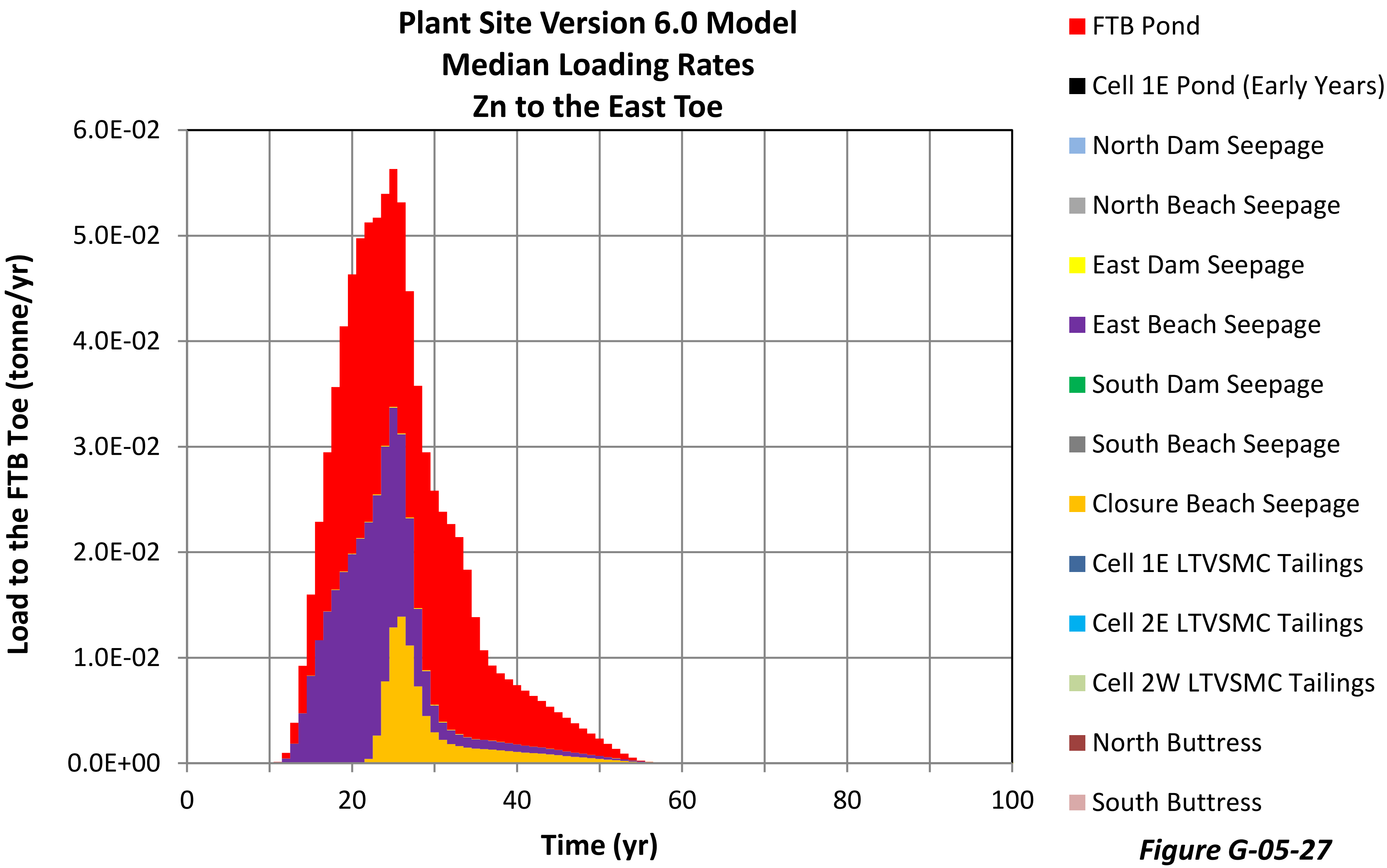


Figure G-05-27

Attachment H

Concentration Statistics in Groundwater at the Property Boundary

Attachment H Concentration Statistics in Groundwater at the Property Boundary

Estimated groundwater quality (always at the Property Boundary) is shown in this attachment using a series of concentration statistic plots. Data for these plots were created as follows:

- The probabilistic GoldSim model was run at monthly time steps for 200 years (2401 time steps including the initial time zero). At each time step, the concentration in each groundwater flow path for each constituent was individually recorded.

- After one realization (i.e., one model run) was completed, the process was repeated until 500 model realizations were completed. The result is 500 estimated concentrations of each constituent in each groundwater flow path at every time step.

- At every time step, and for every constituent, the 500 estimated concentrations were sorted smallest-to-largest and 3 single values were chosen to represent the statistics at that particular time step. This step was performed in each groundwater flow path.

- From the 500 estimate concentrations, sorted smallest-to-largest, the 50th value was chosen to represent the 10th percentile (P10), the 250th value was chosen to represent the median (P50), and the 450th value was chosen to represent the 90th percentile (P90). This indicates that at any time, 10% of the model results are less than or equal to the P10 value, 50% are less than or equal to the P50 value, and 90% are less than or equal to the P90 value.

- This process was repeated for all constituents in each groundwater flow path, resulting in 3 time series lines representing the 10th, 50th, and 90th percentiles of concentrations at every time step (monthly results).

- For plotting the groundwater quality results over the entire 200 years of the simulation, the data was summarized by year to make the plots legible. The monthly model outputs for the 10th, 50th, and 90th percentiles are plotted on an annual basis by taking the maximum value of each percentile for a given year (i.e., the highest 90th percentile value). Because of the integrated nature of the groundwater concentrations, the annual maximum is not significantly different than the annual average.

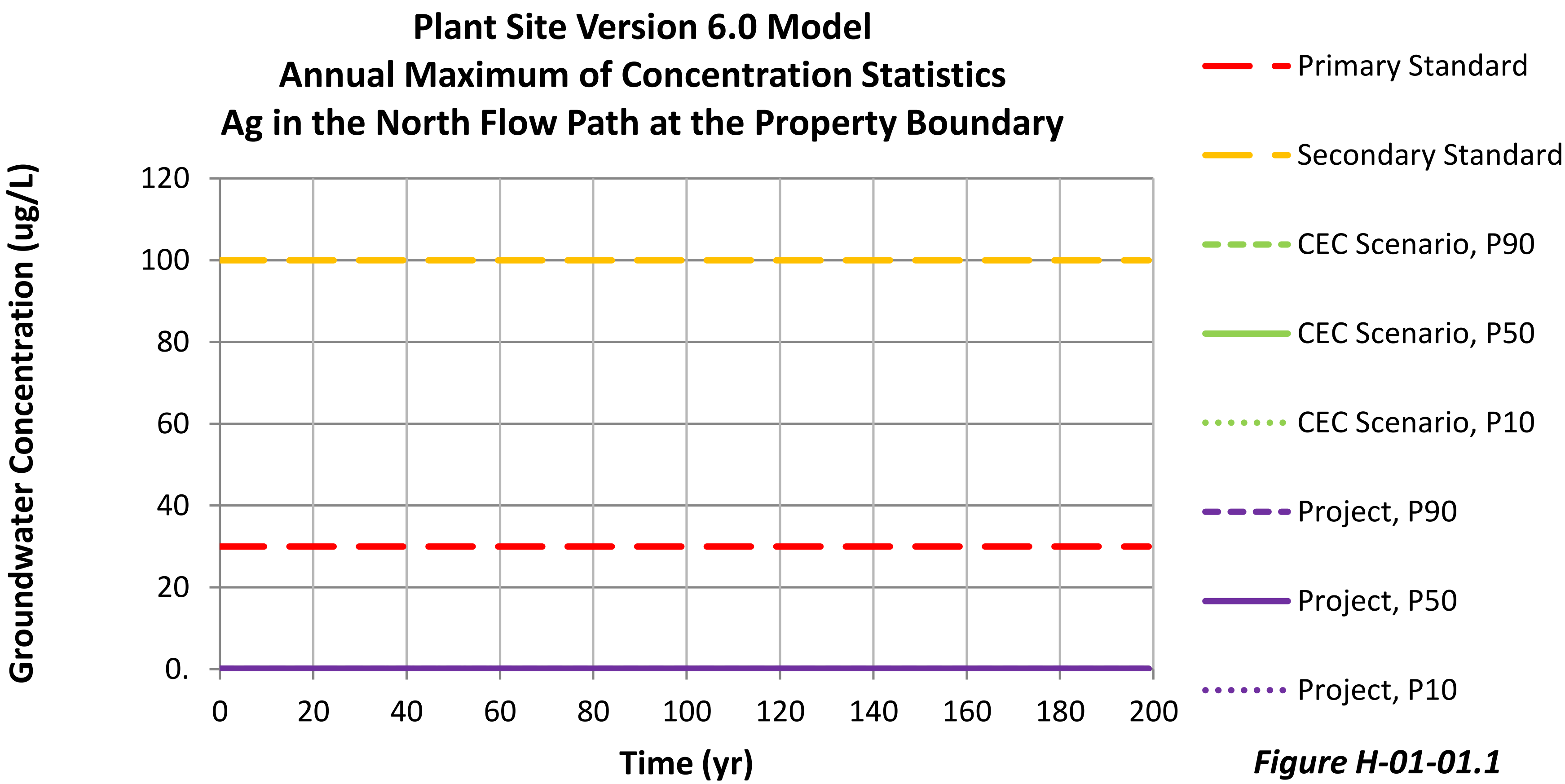
The figure numbering convention is “**Figure W-XX-YY.Z**” where:

- **W** indicates the Attachment.

- **XX** is a counter indicating the location; in this attachment it will count from “01” to “03” to account for the north flow path, northwest flow path, and west flow path in that order.

- **YY** is a counter indicating the constituent; in this attachment it will count from “01” to “27” to show the 27 independently modeled constituents.

- Z is a numerical value, 1 or 2. A value of 1 indicates that the annual maximum has been plotted and a value of 2 indicates that the annual average has been plotted. In this attachment, only the annual maximum (1) has been plotted.



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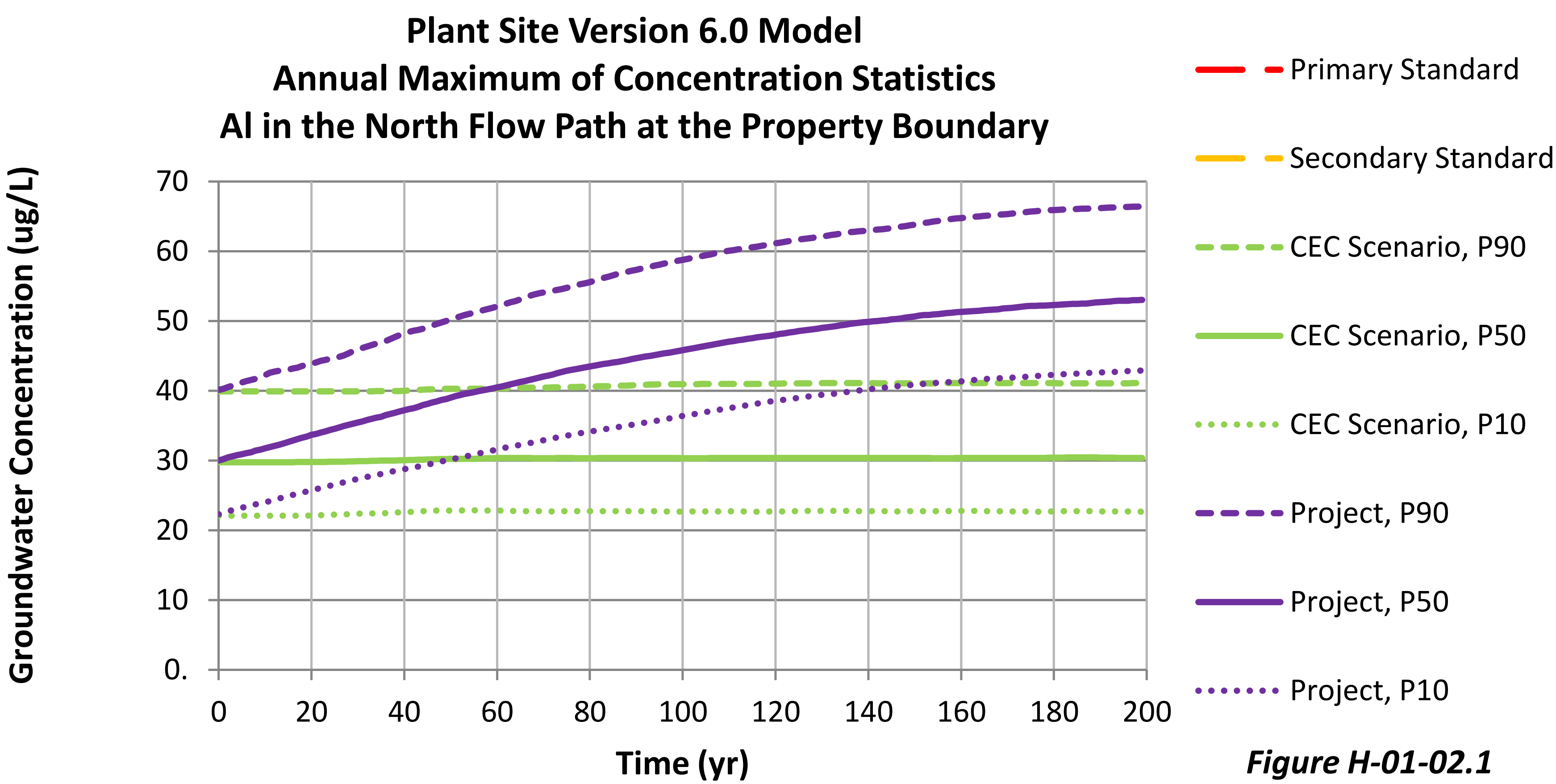

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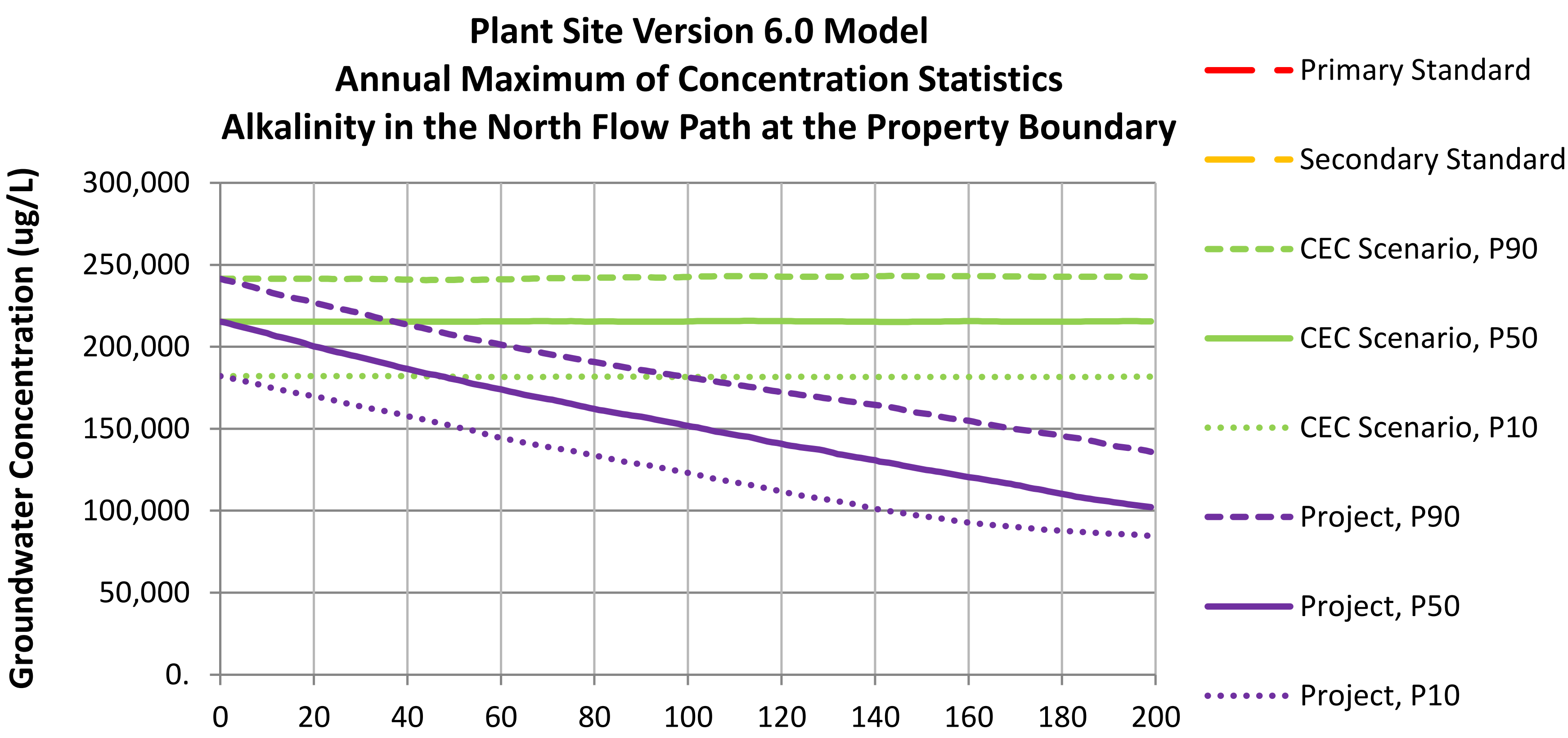

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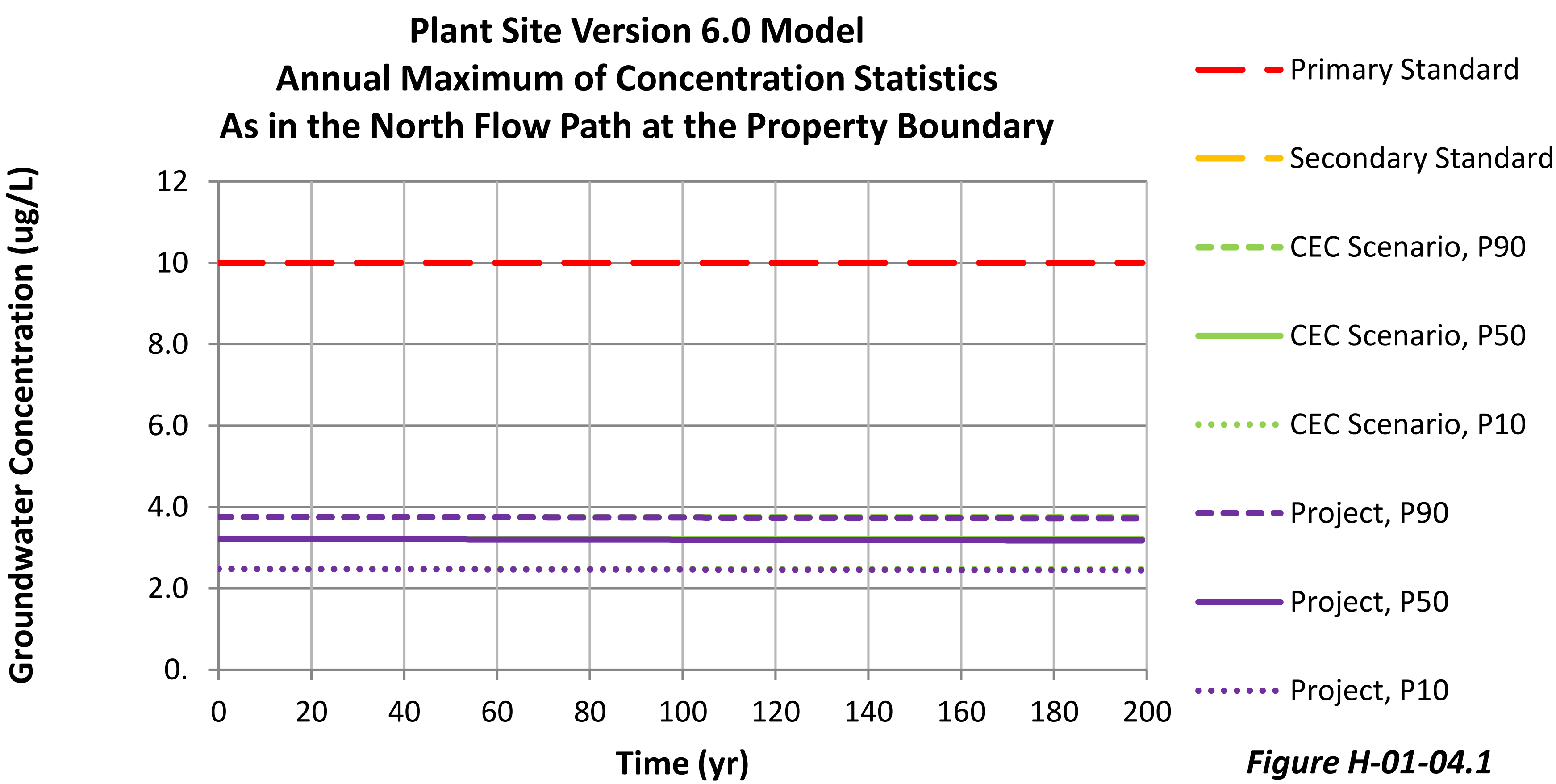

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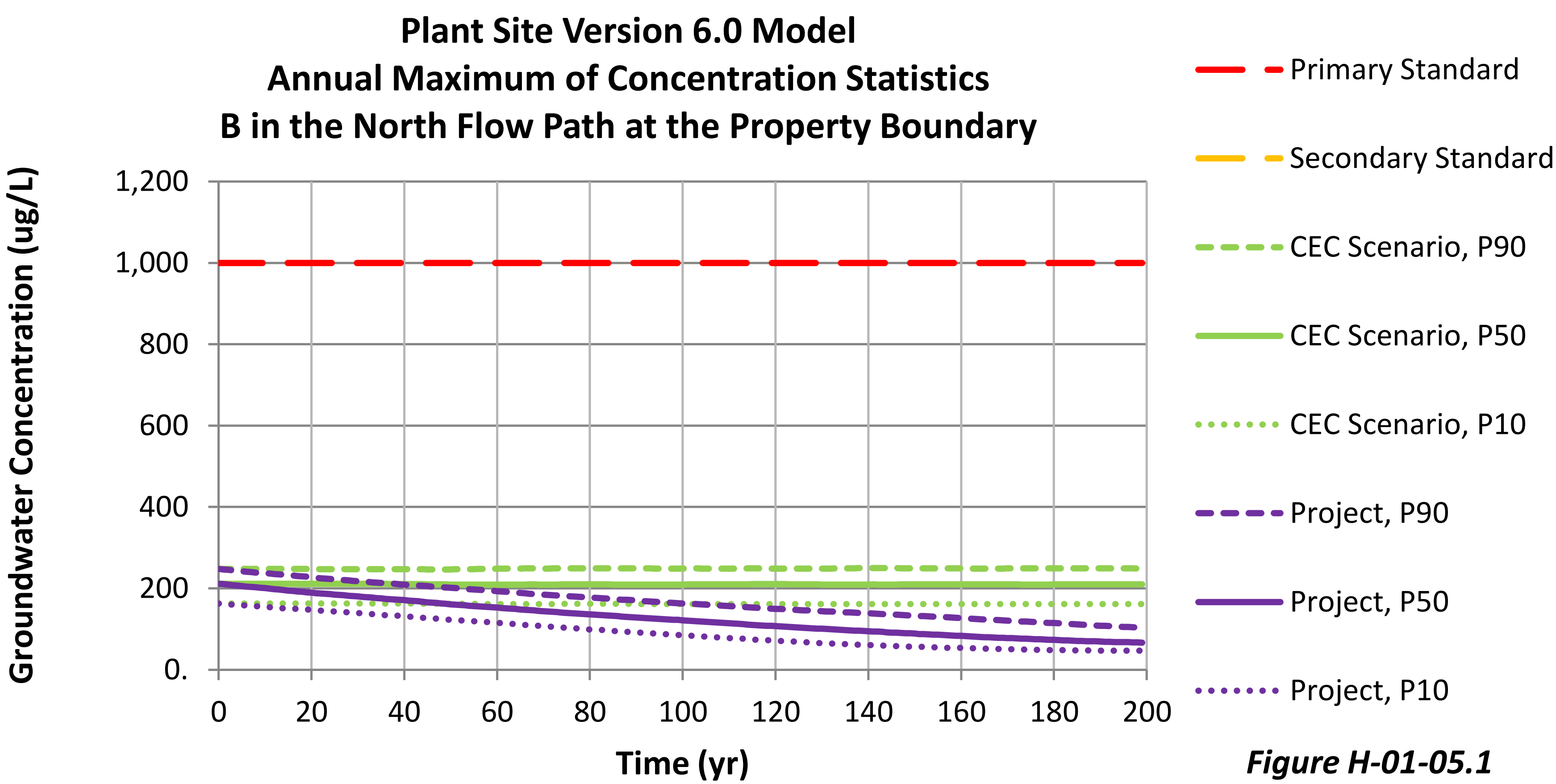

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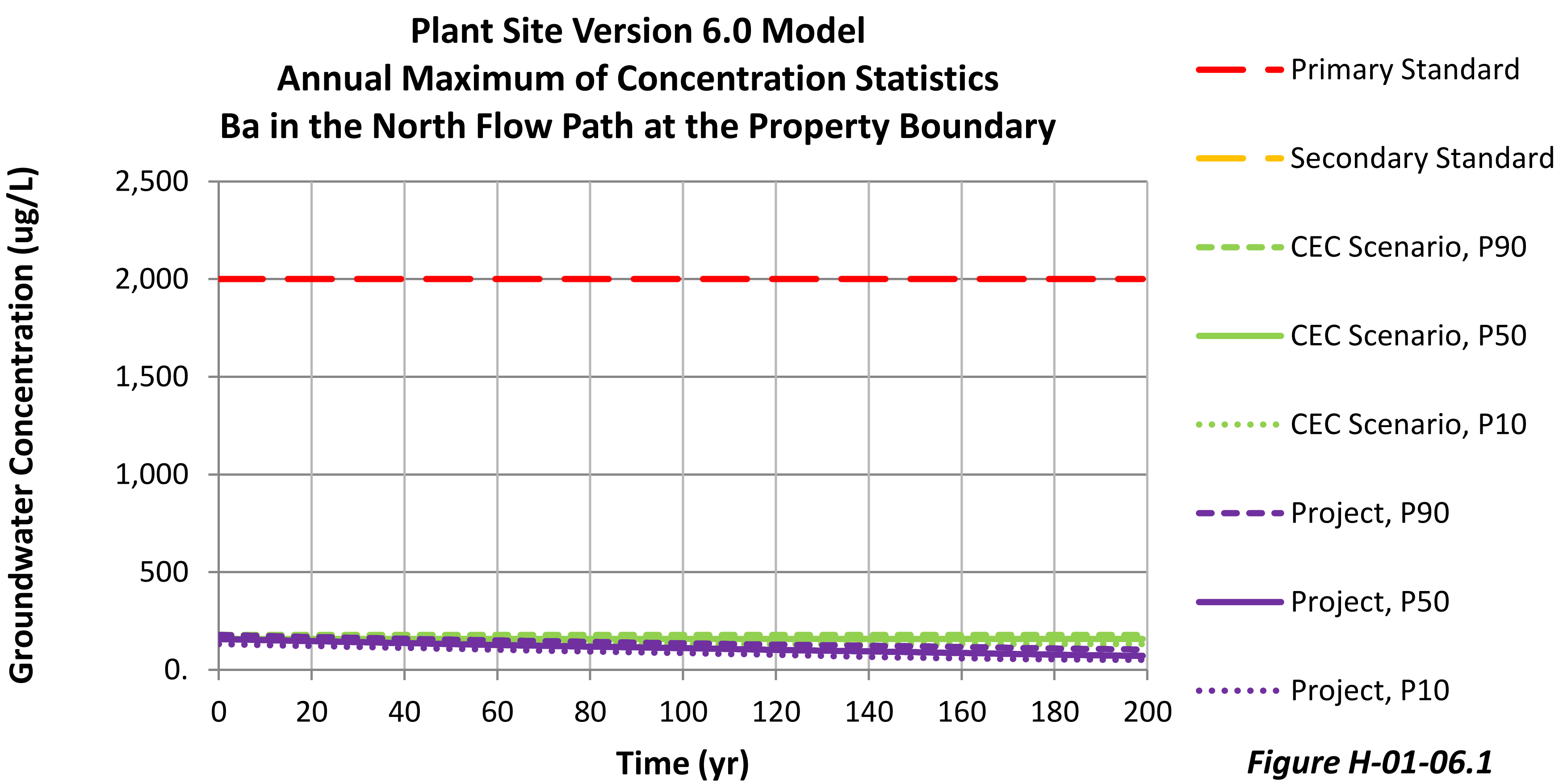

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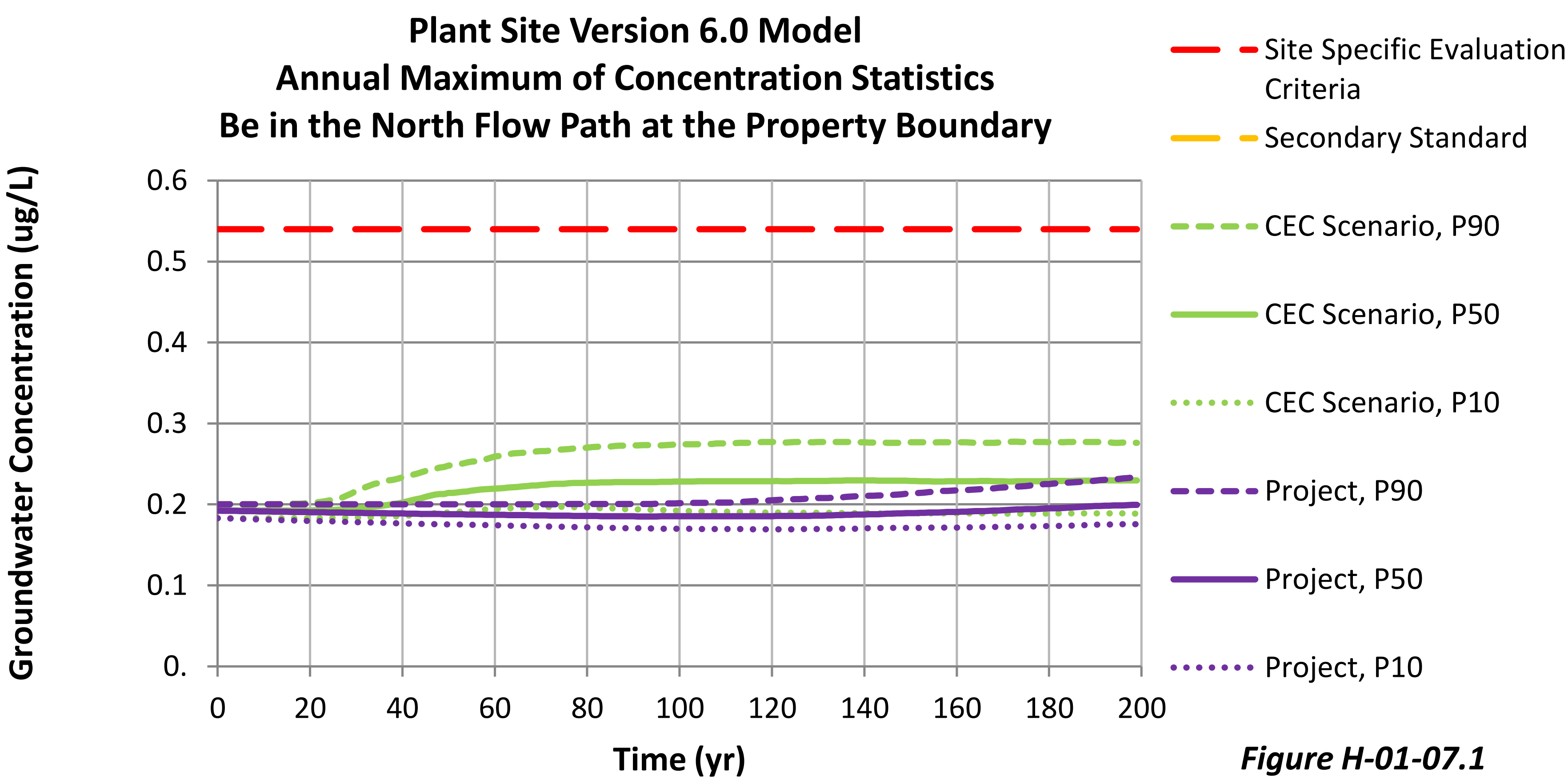

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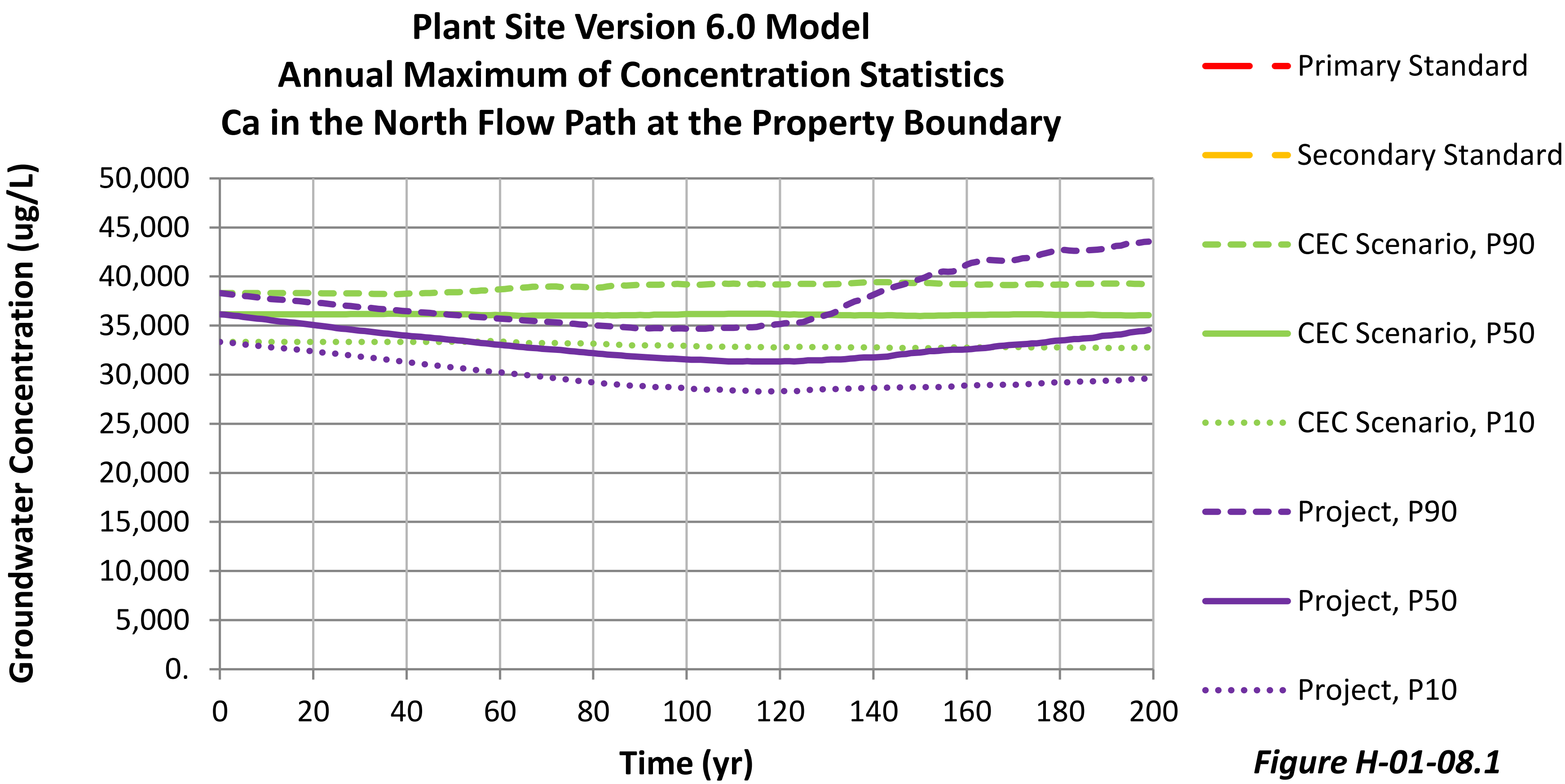

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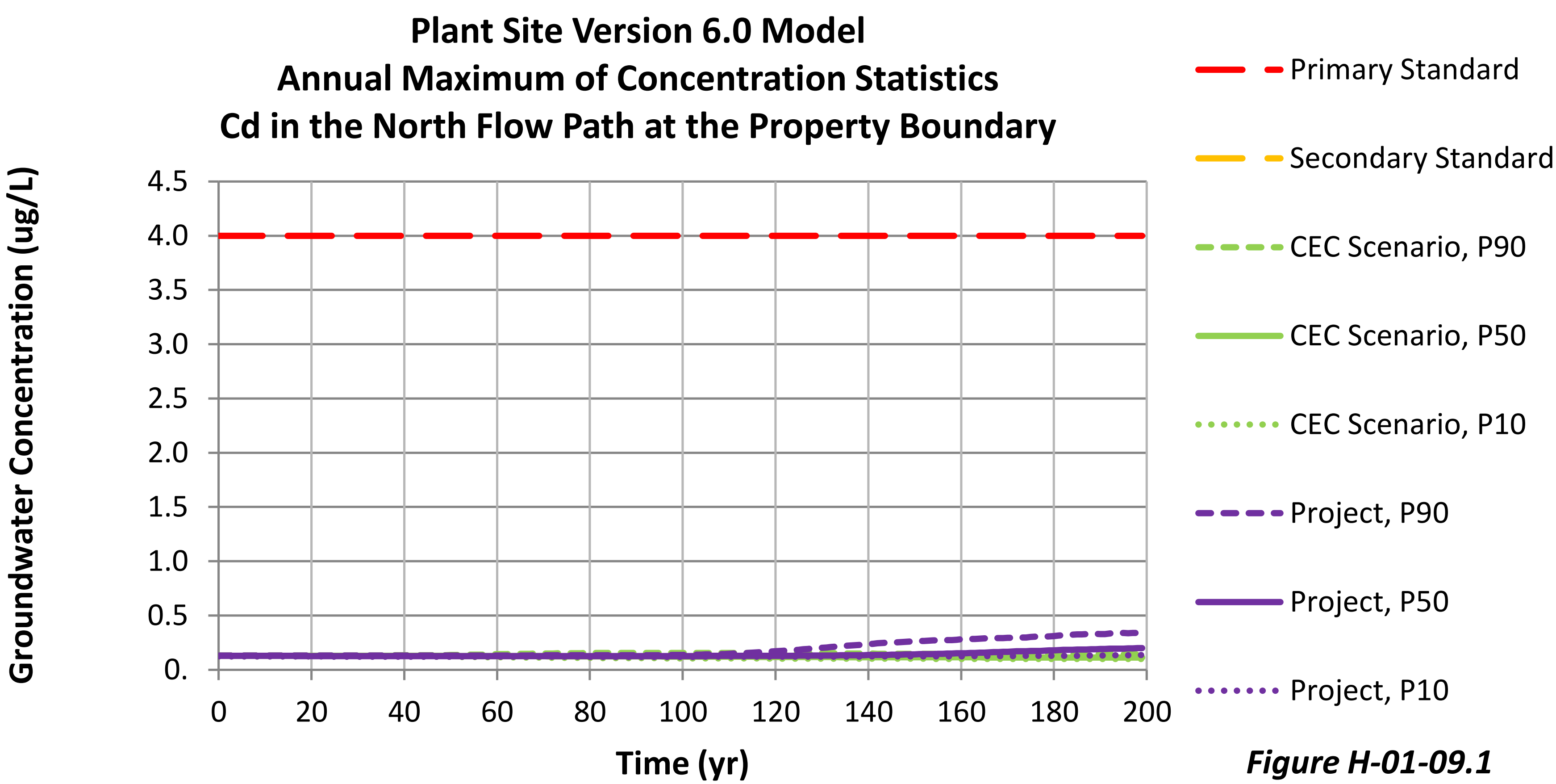

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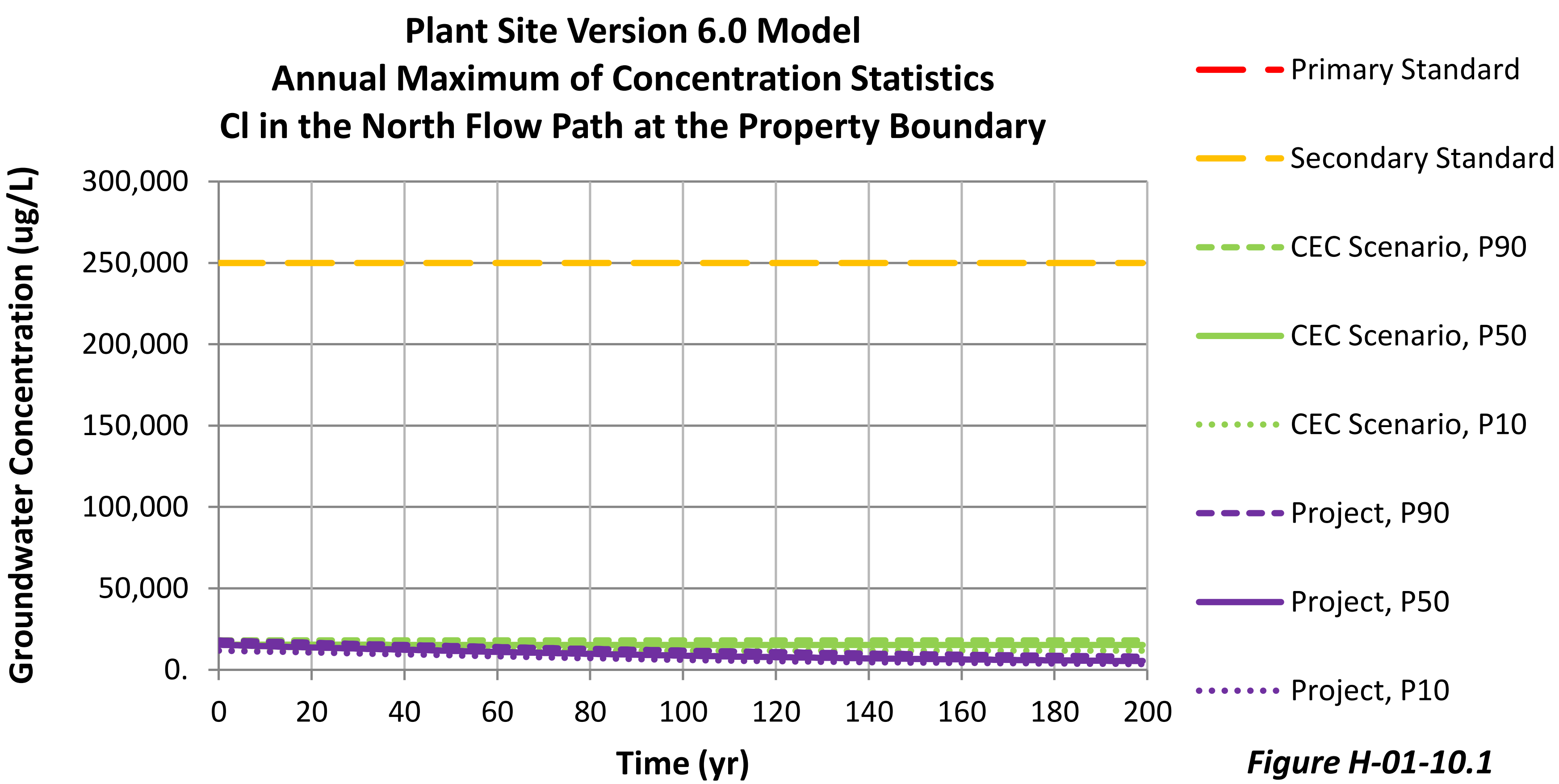

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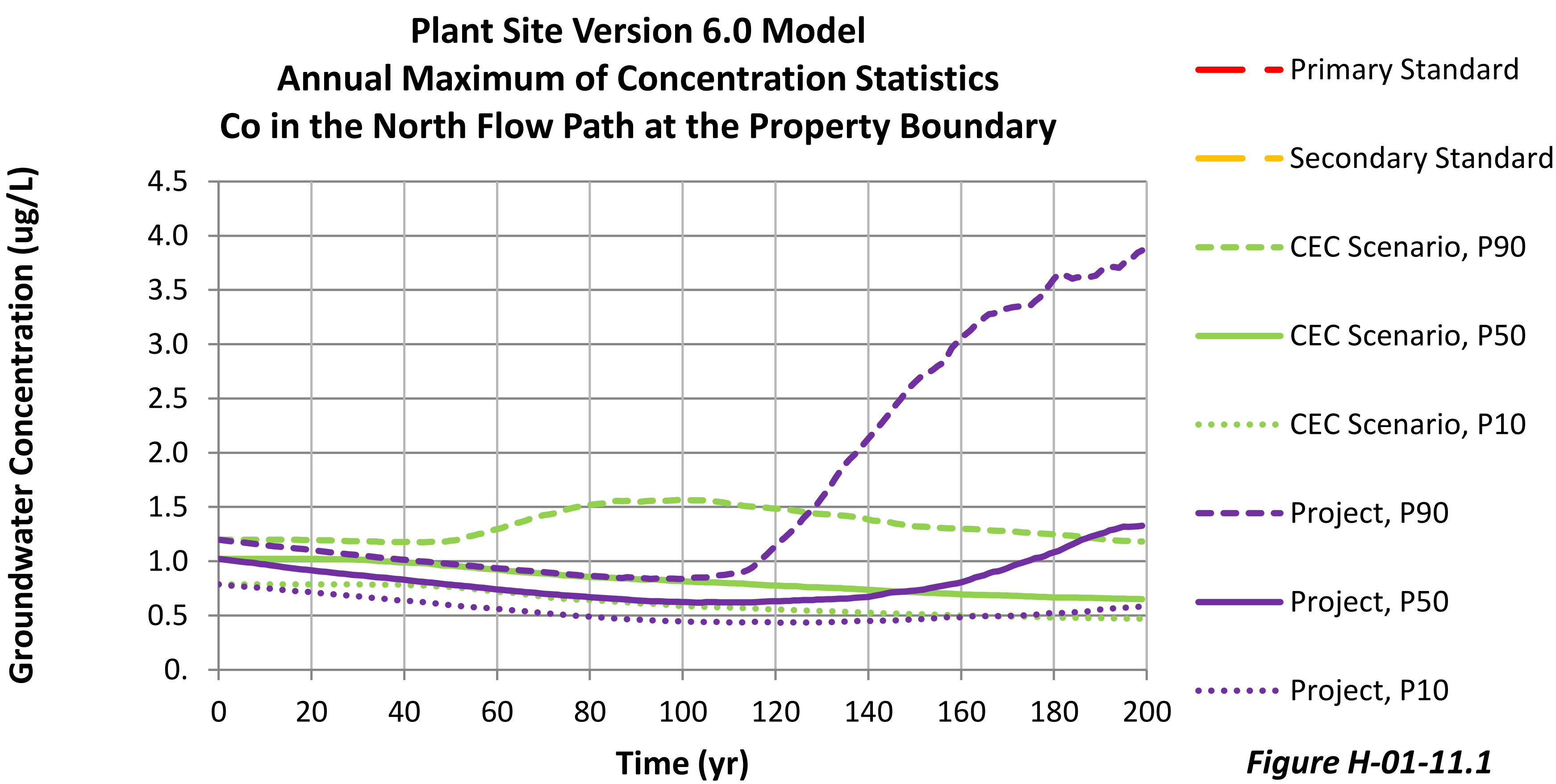

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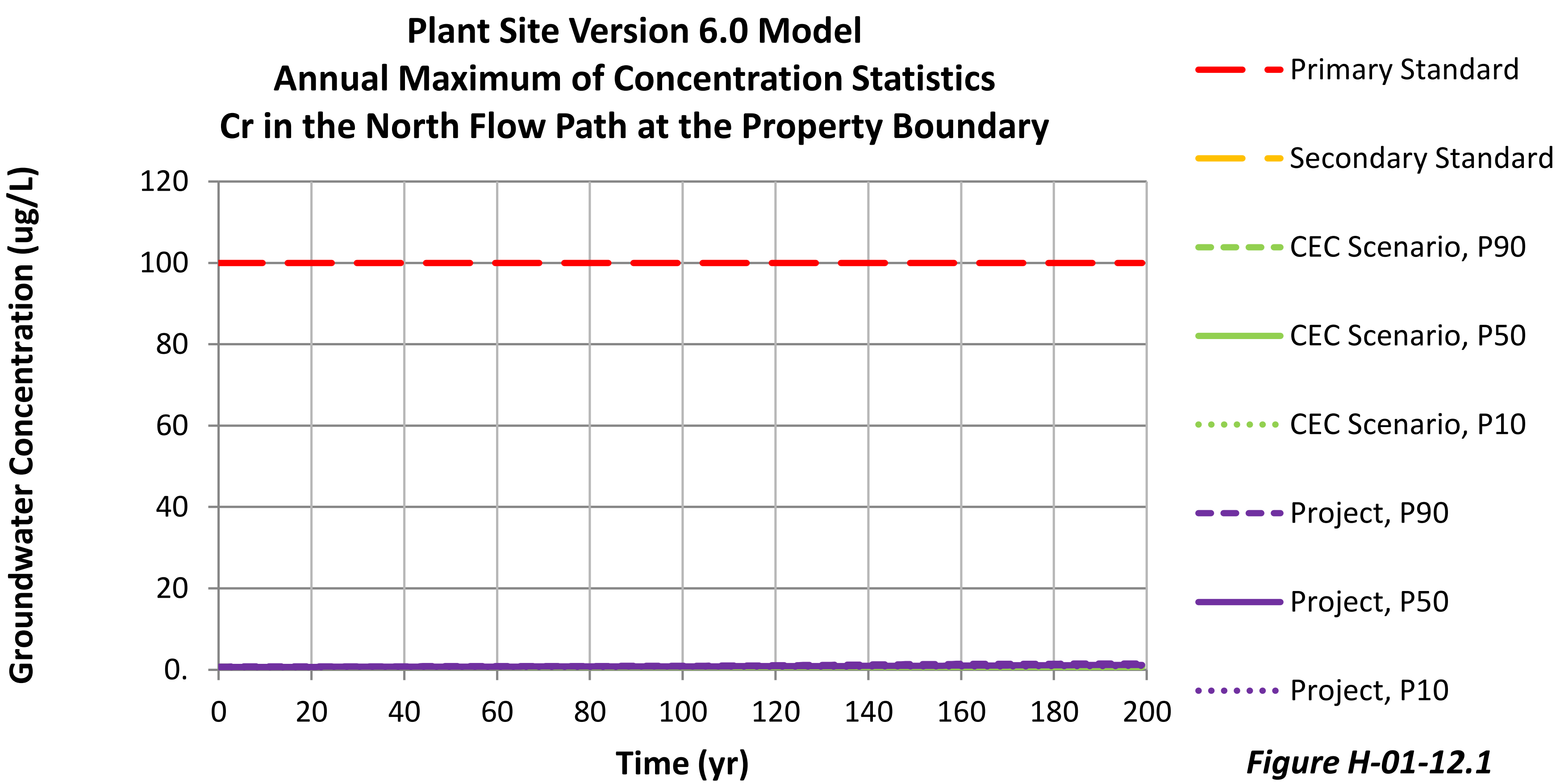

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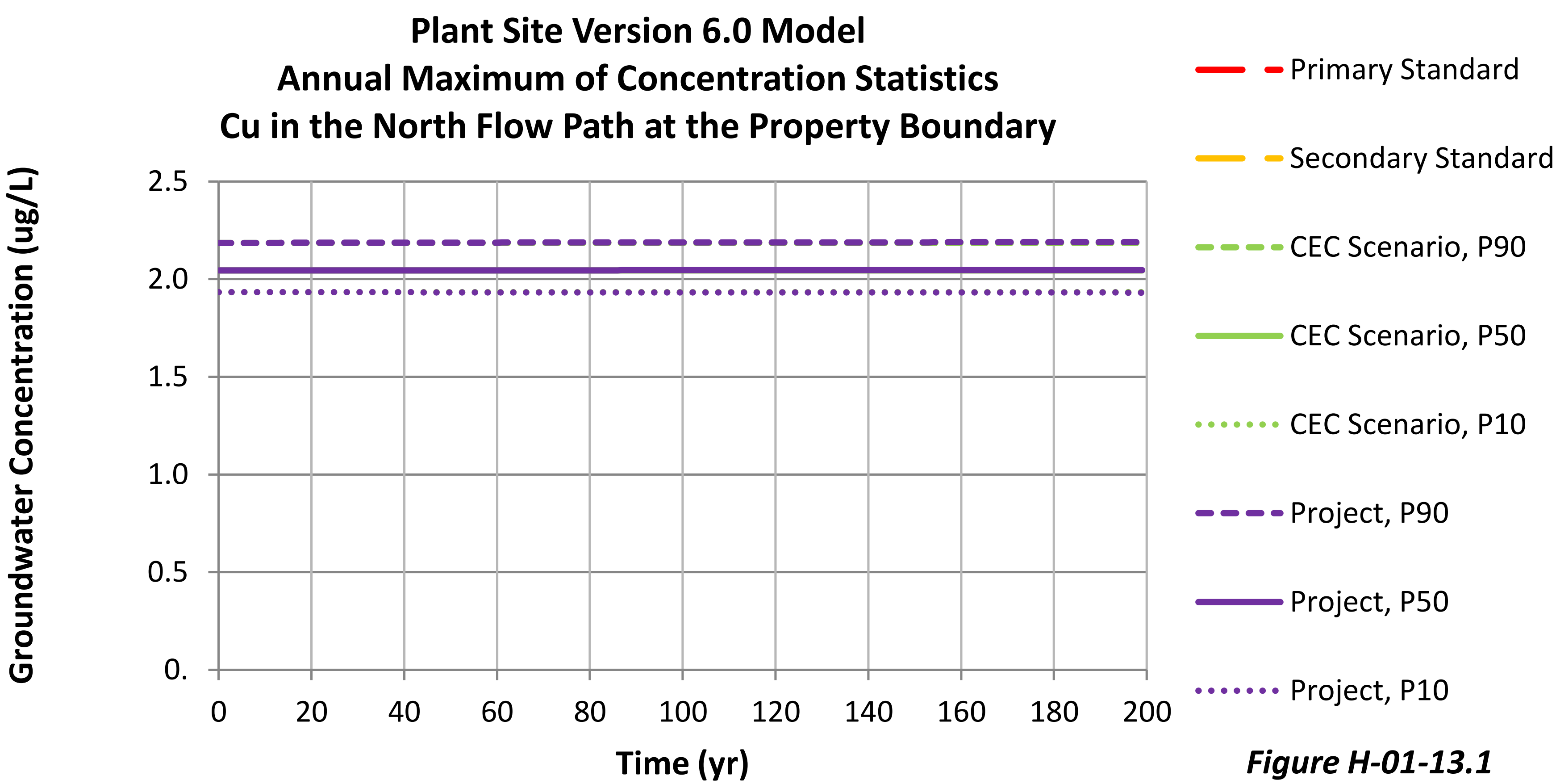

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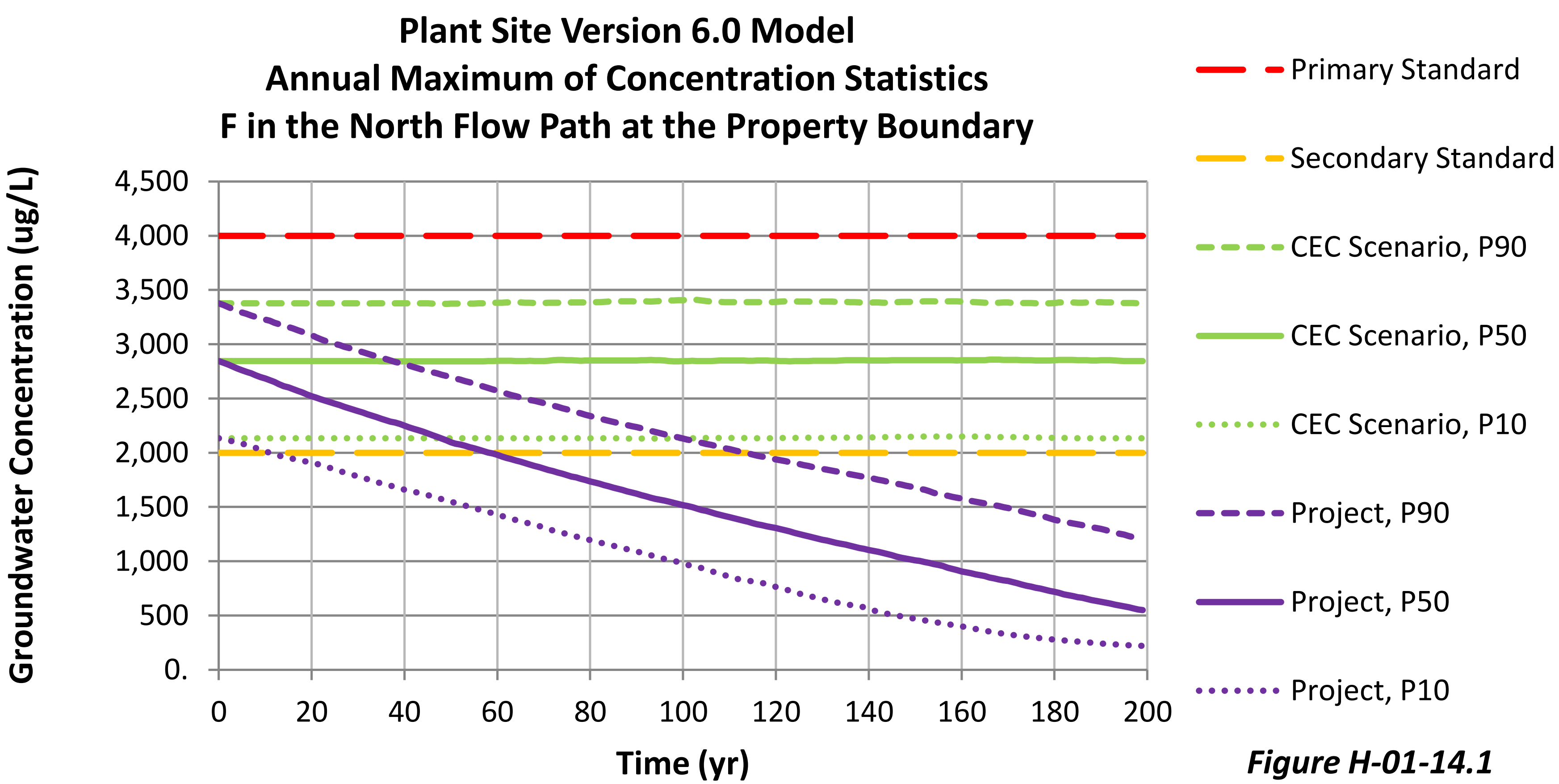

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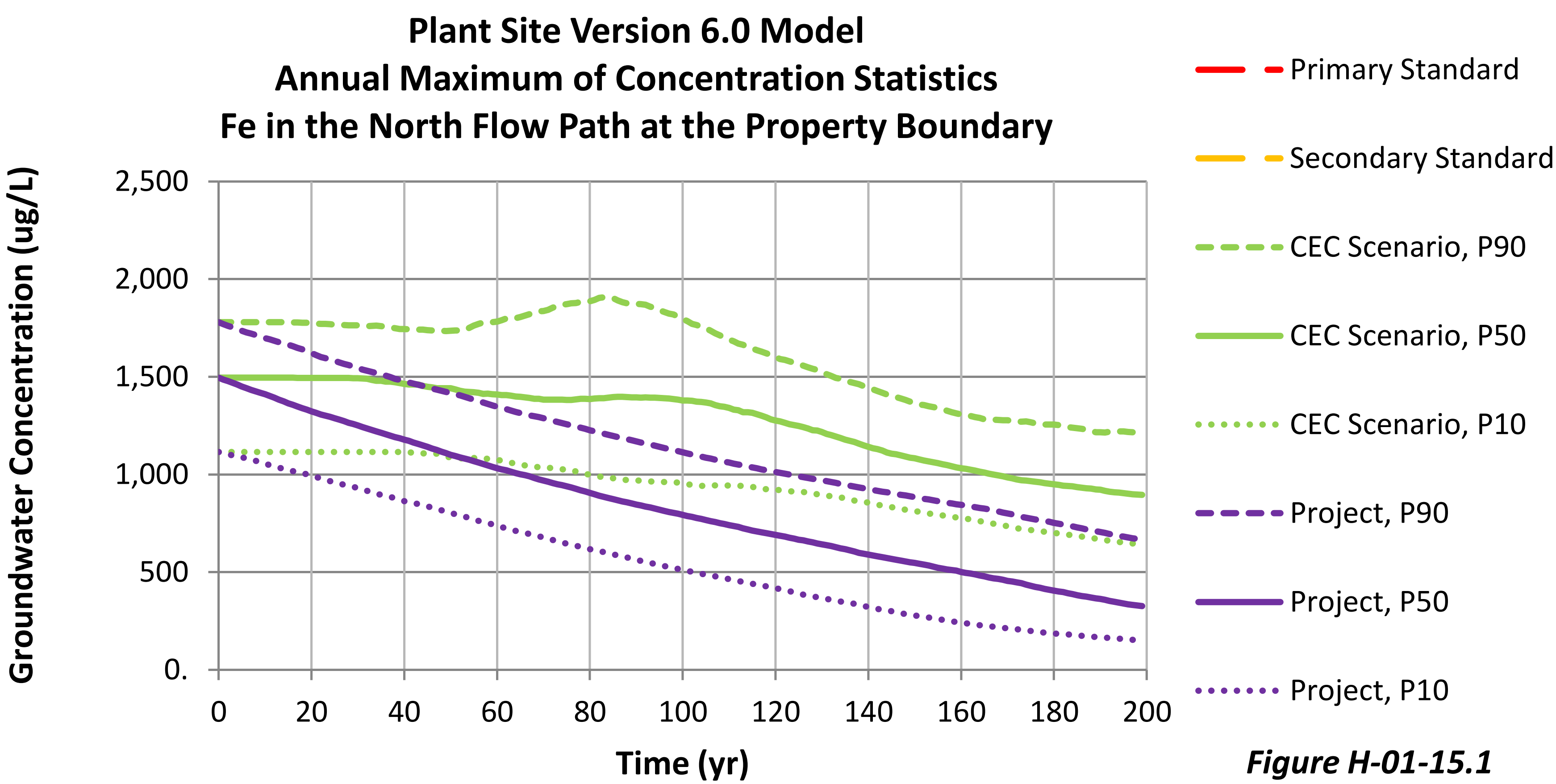

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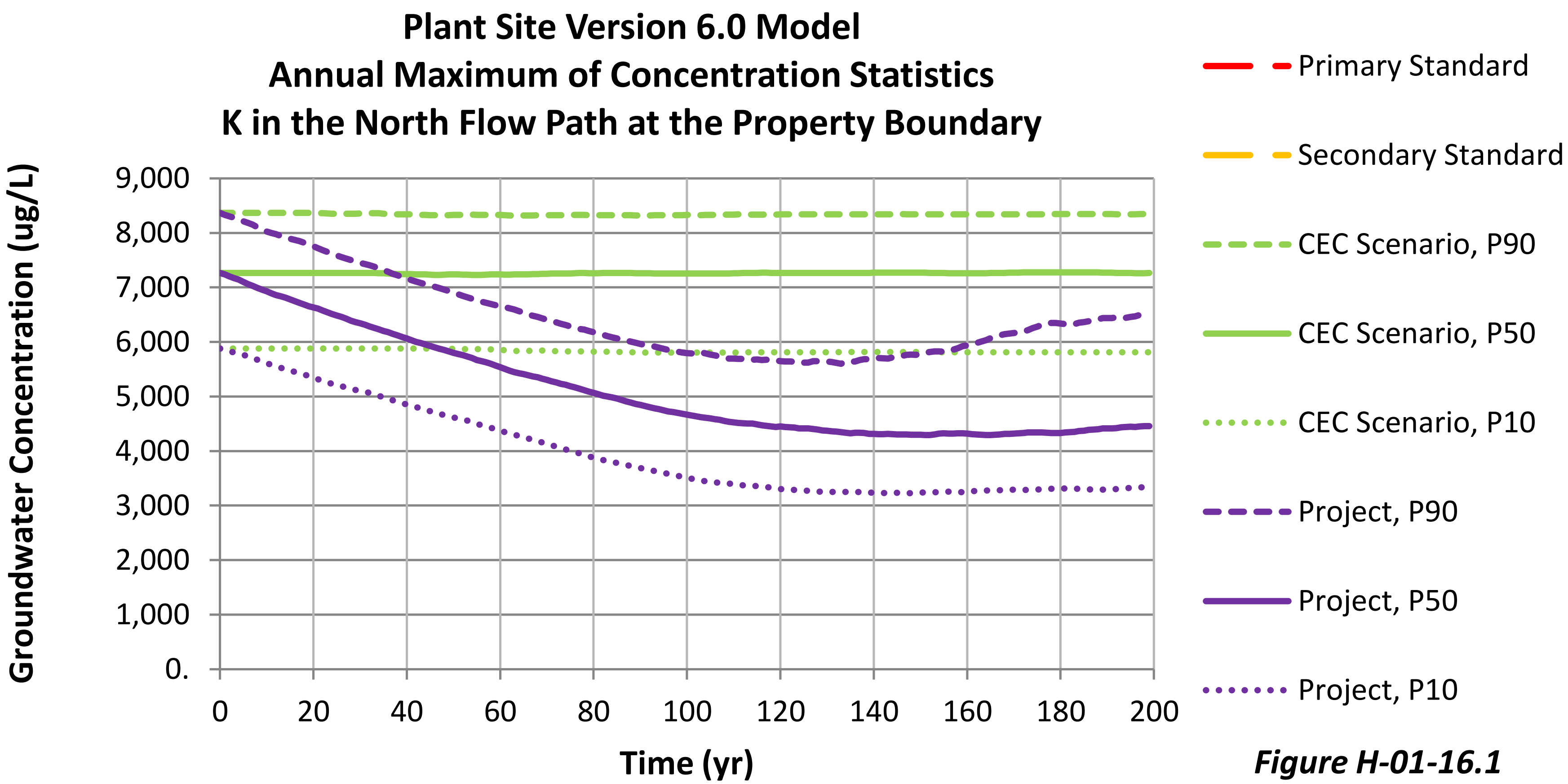

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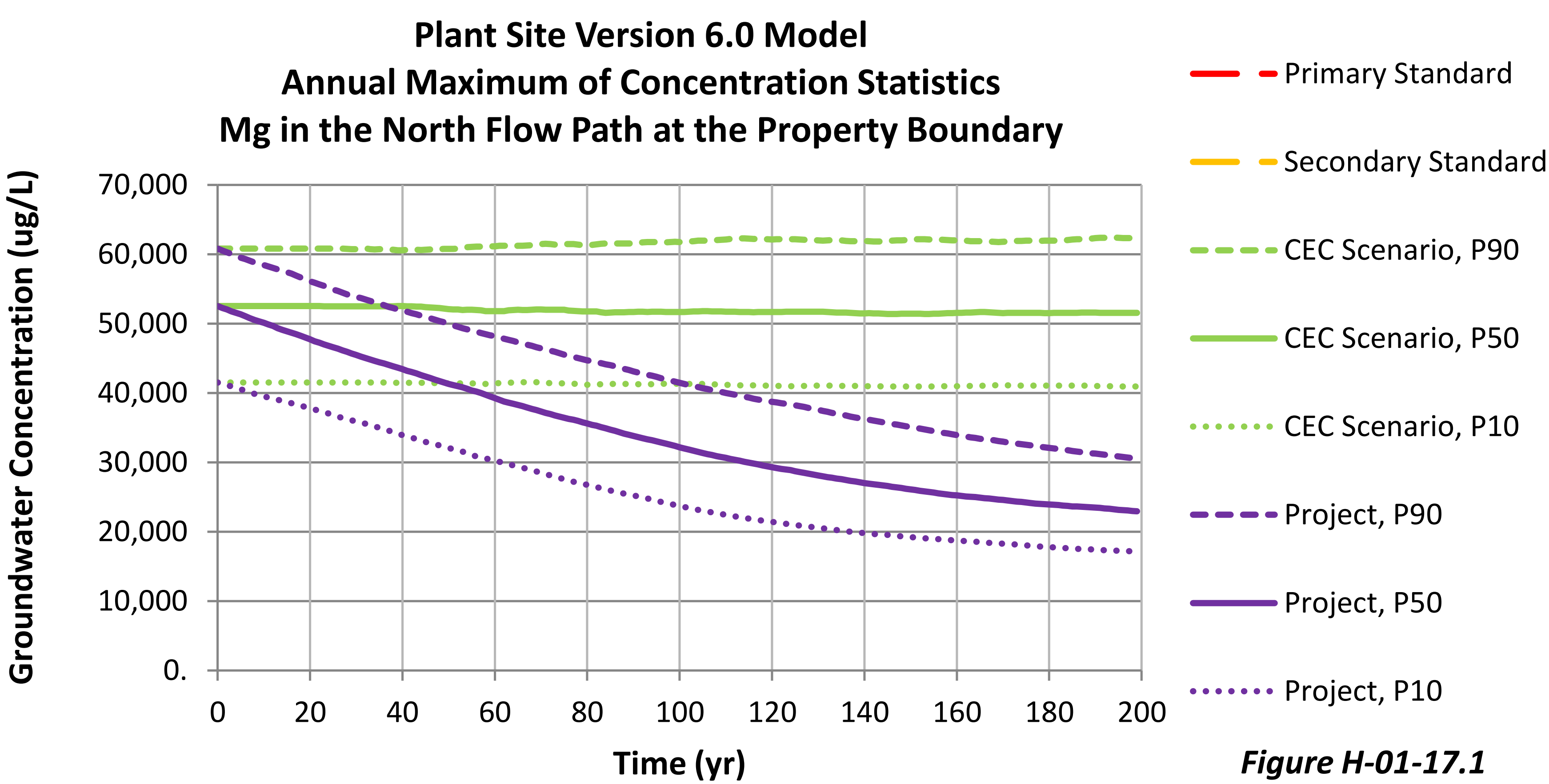

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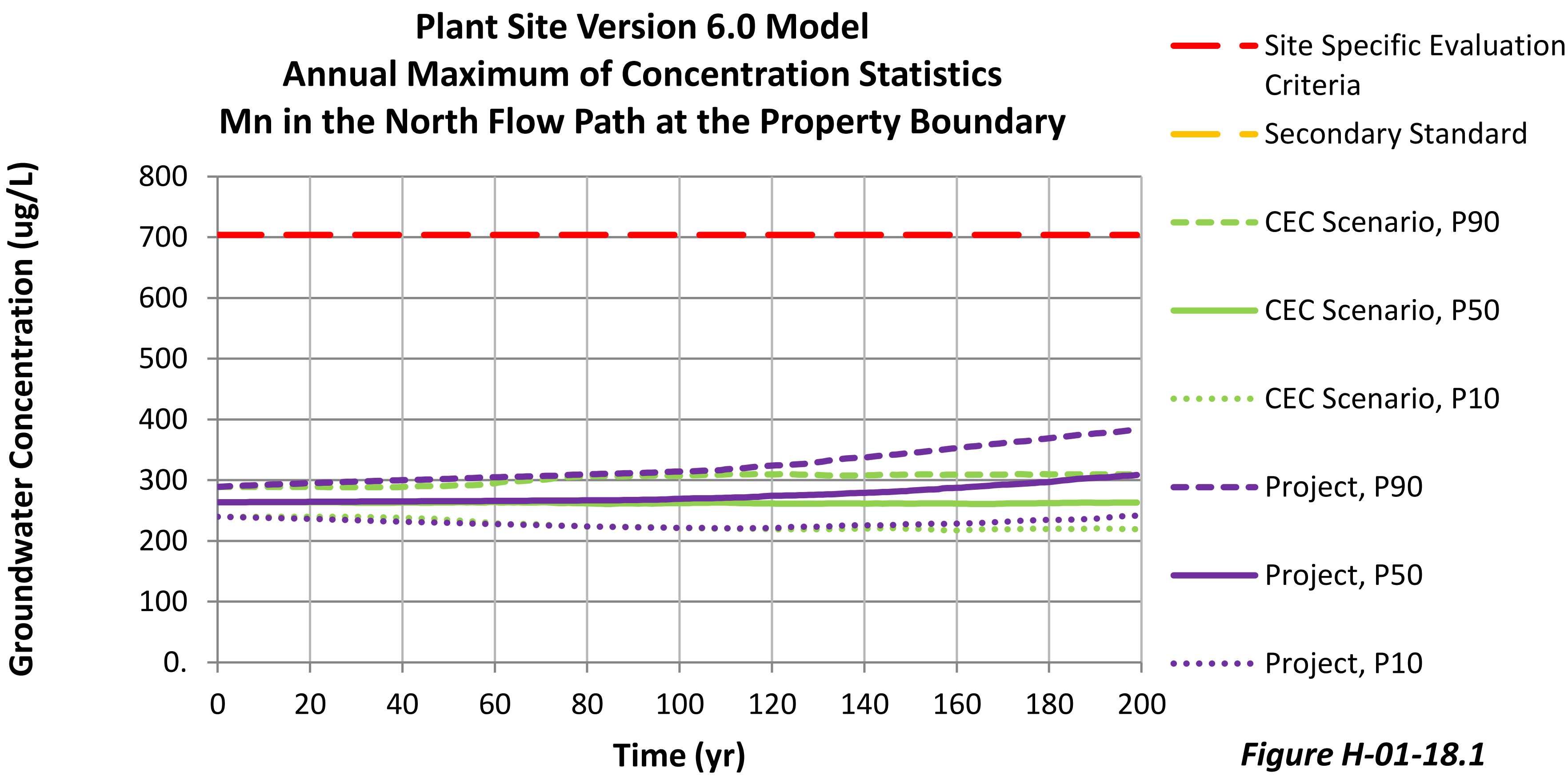

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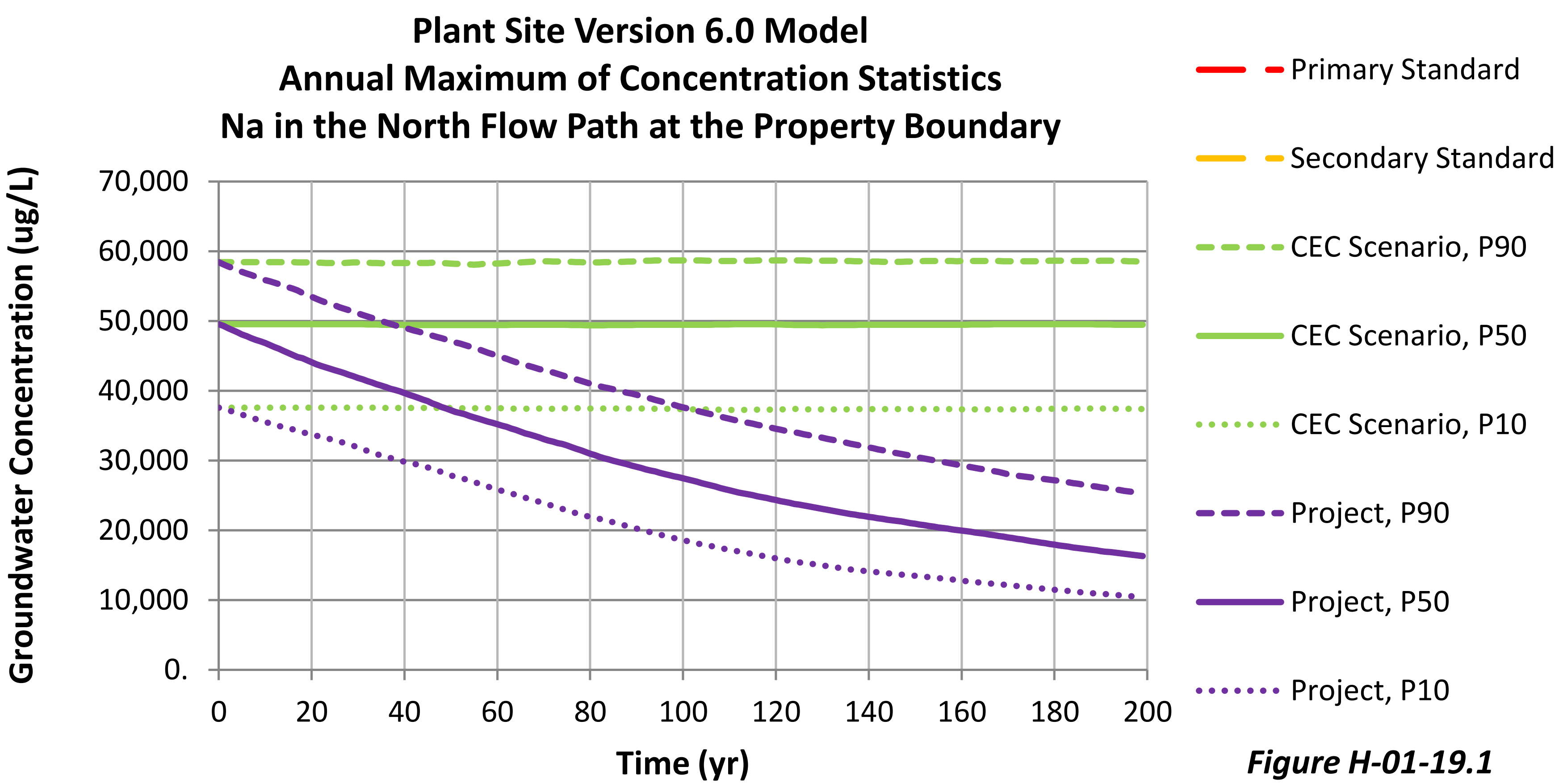

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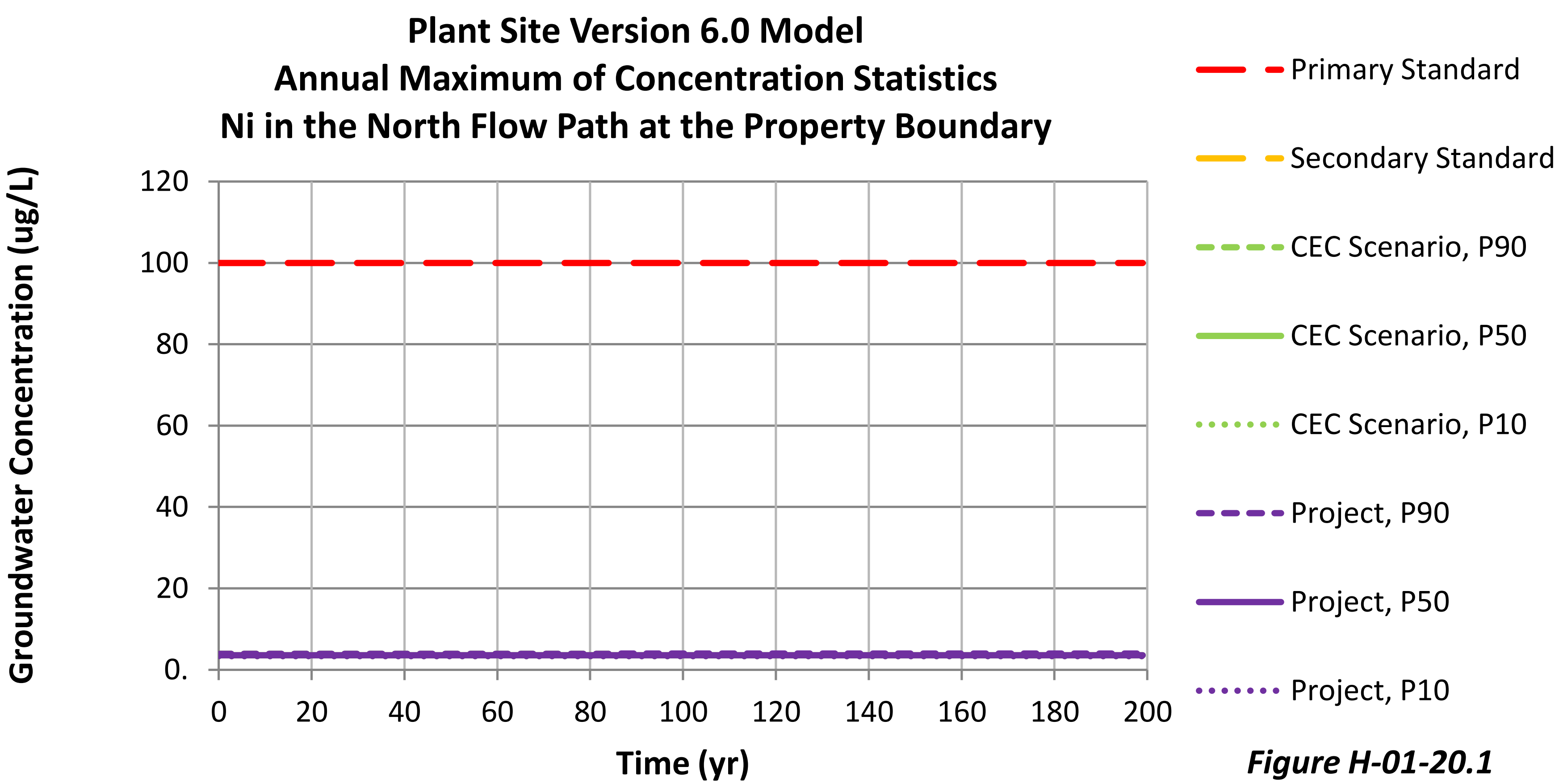

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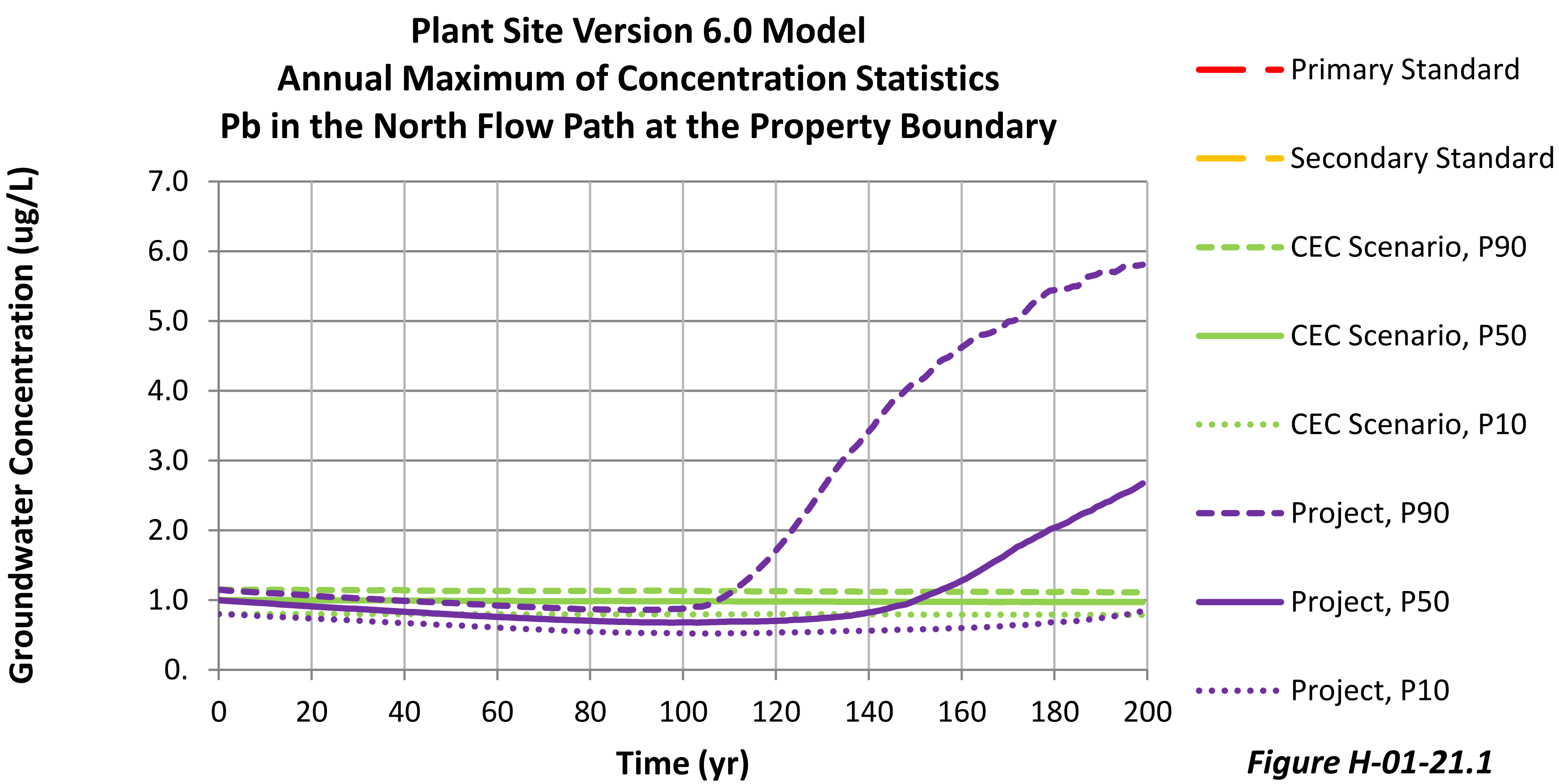

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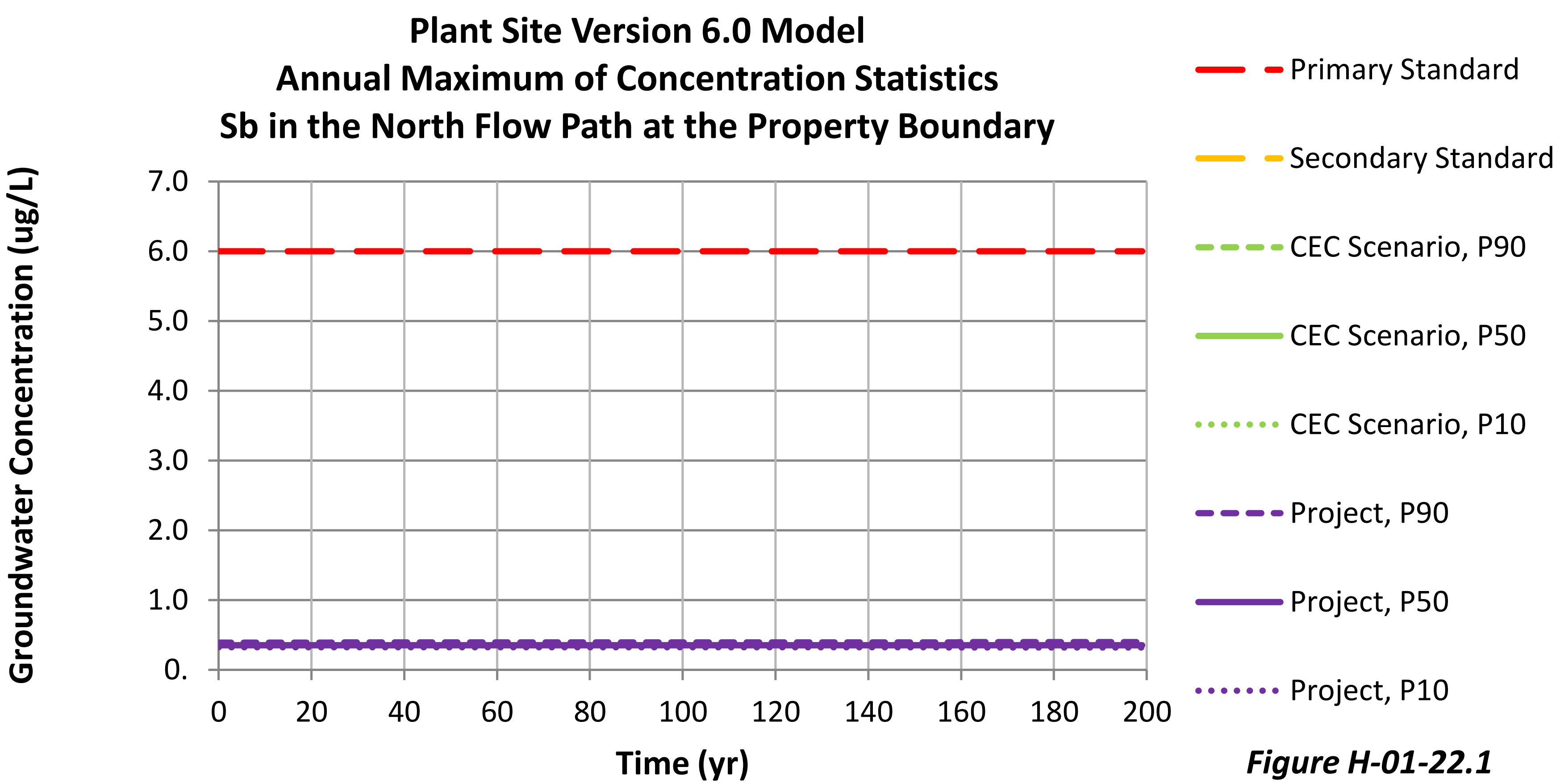

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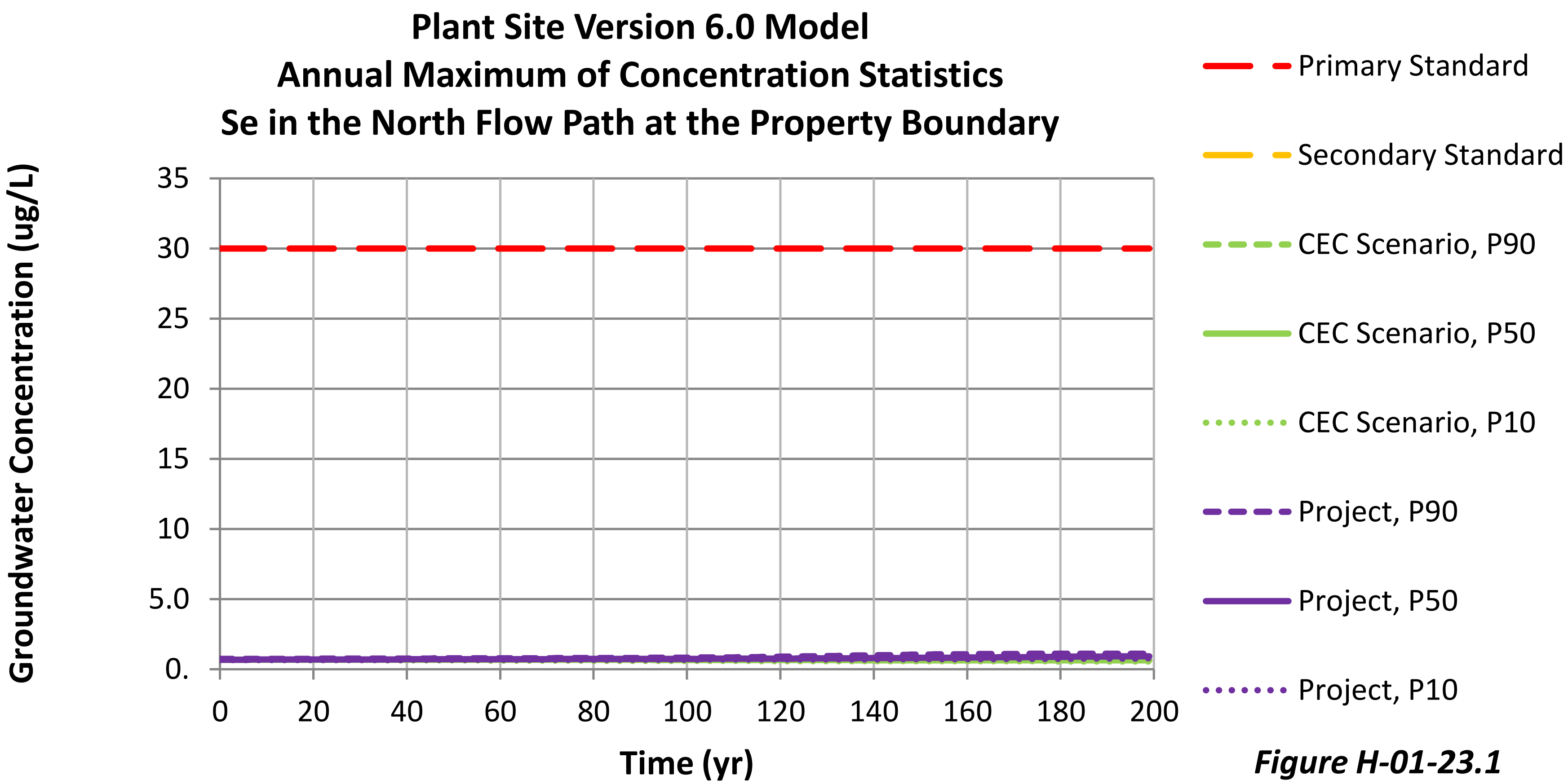

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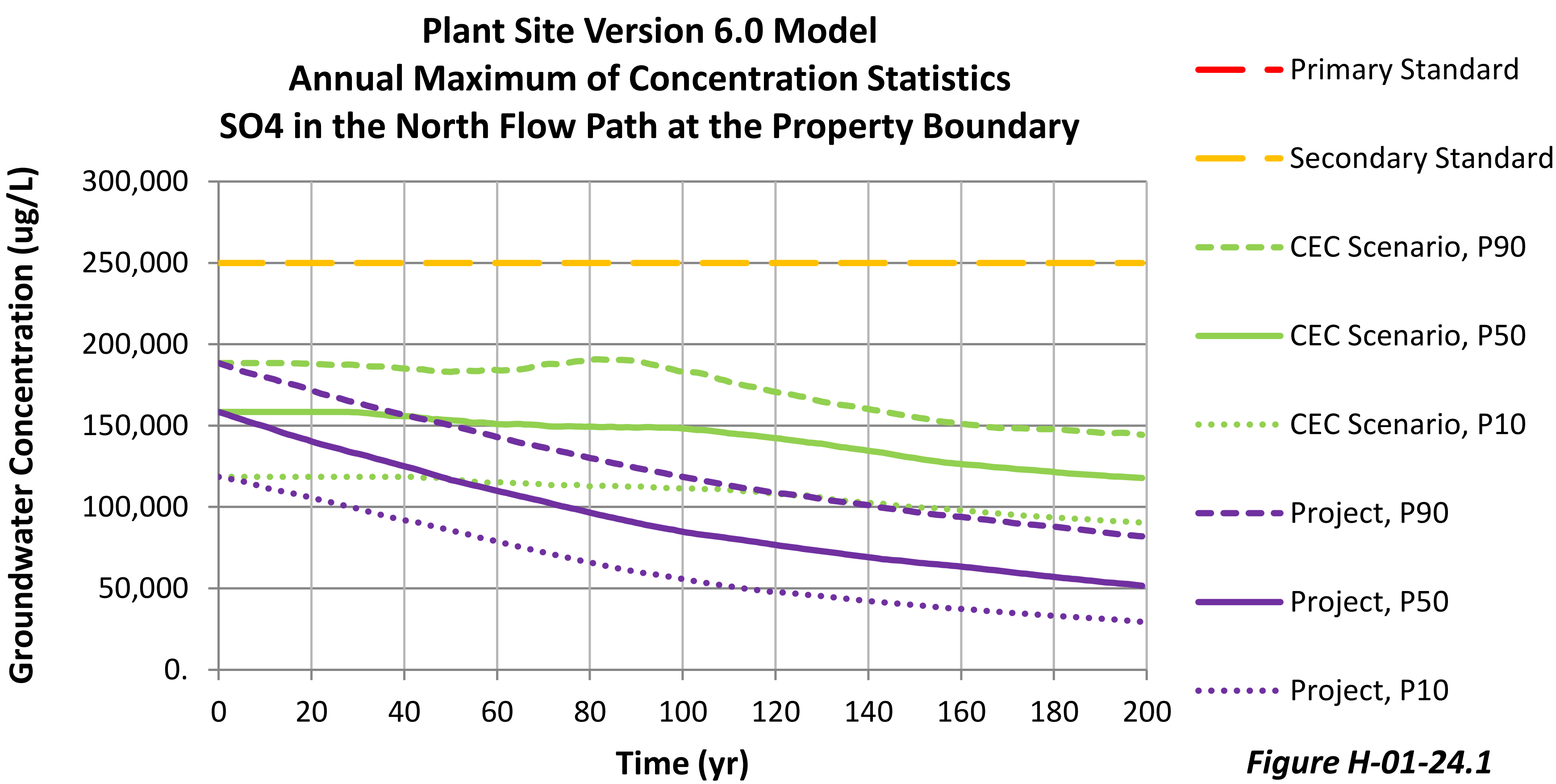

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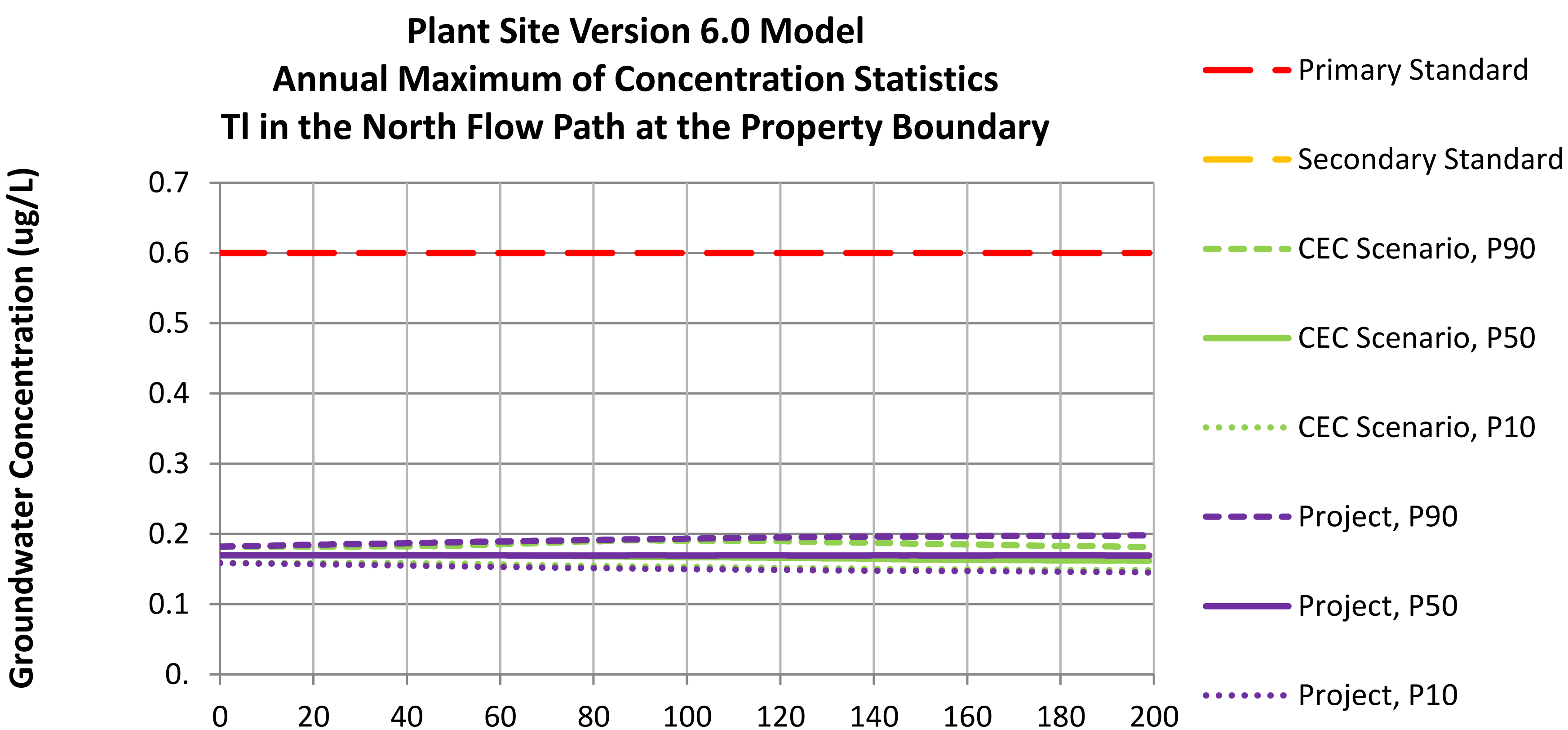

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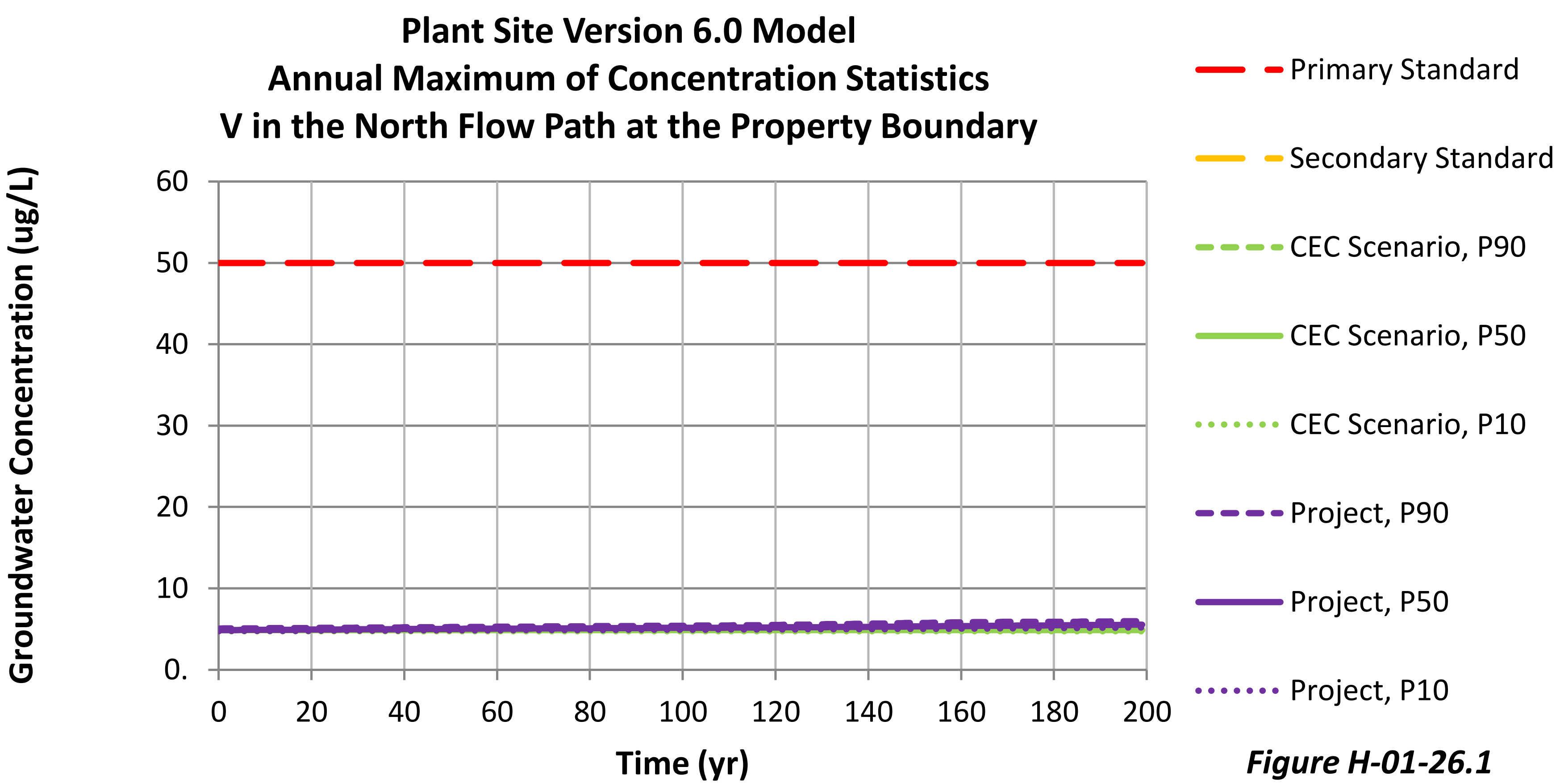

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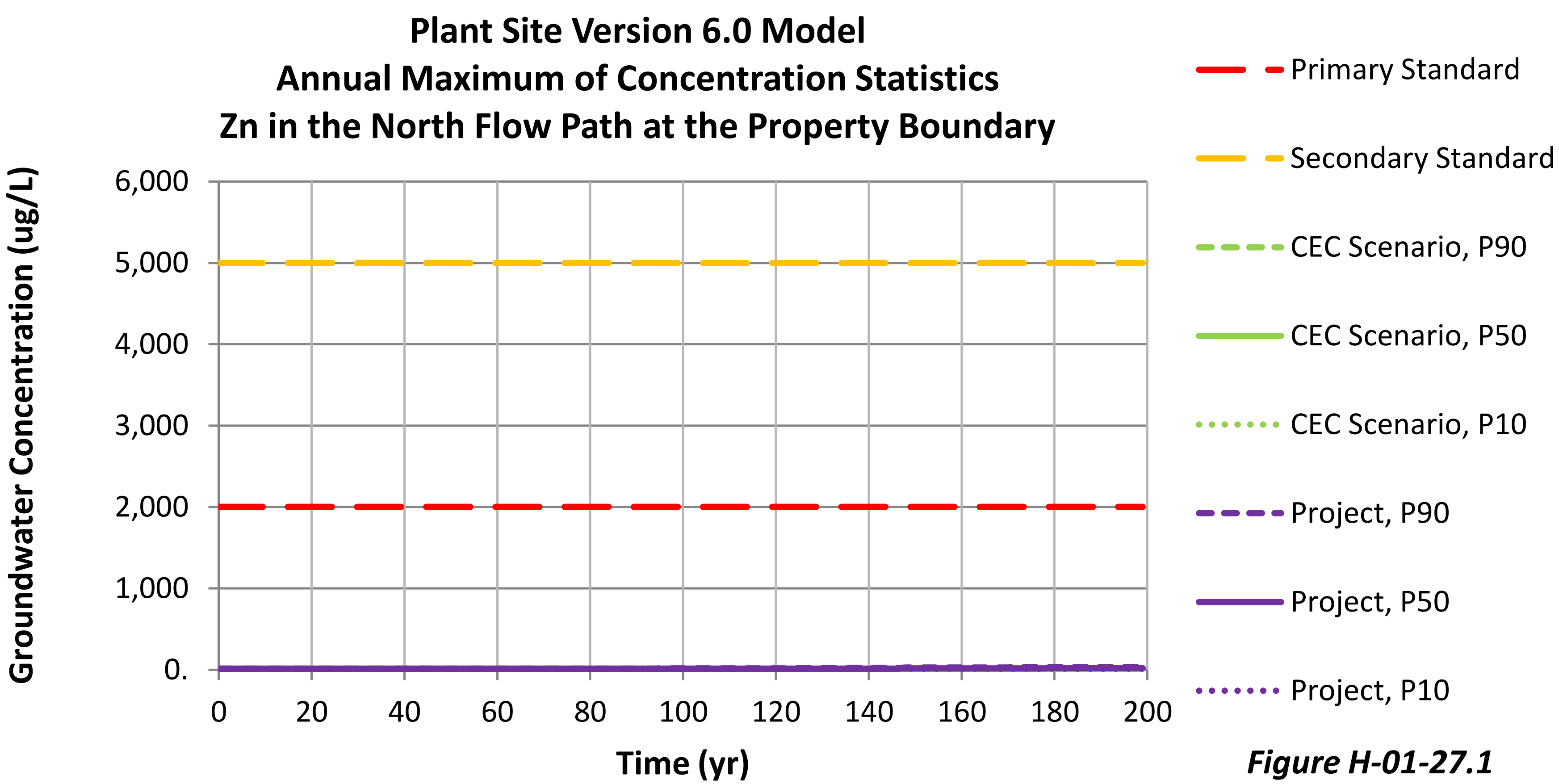

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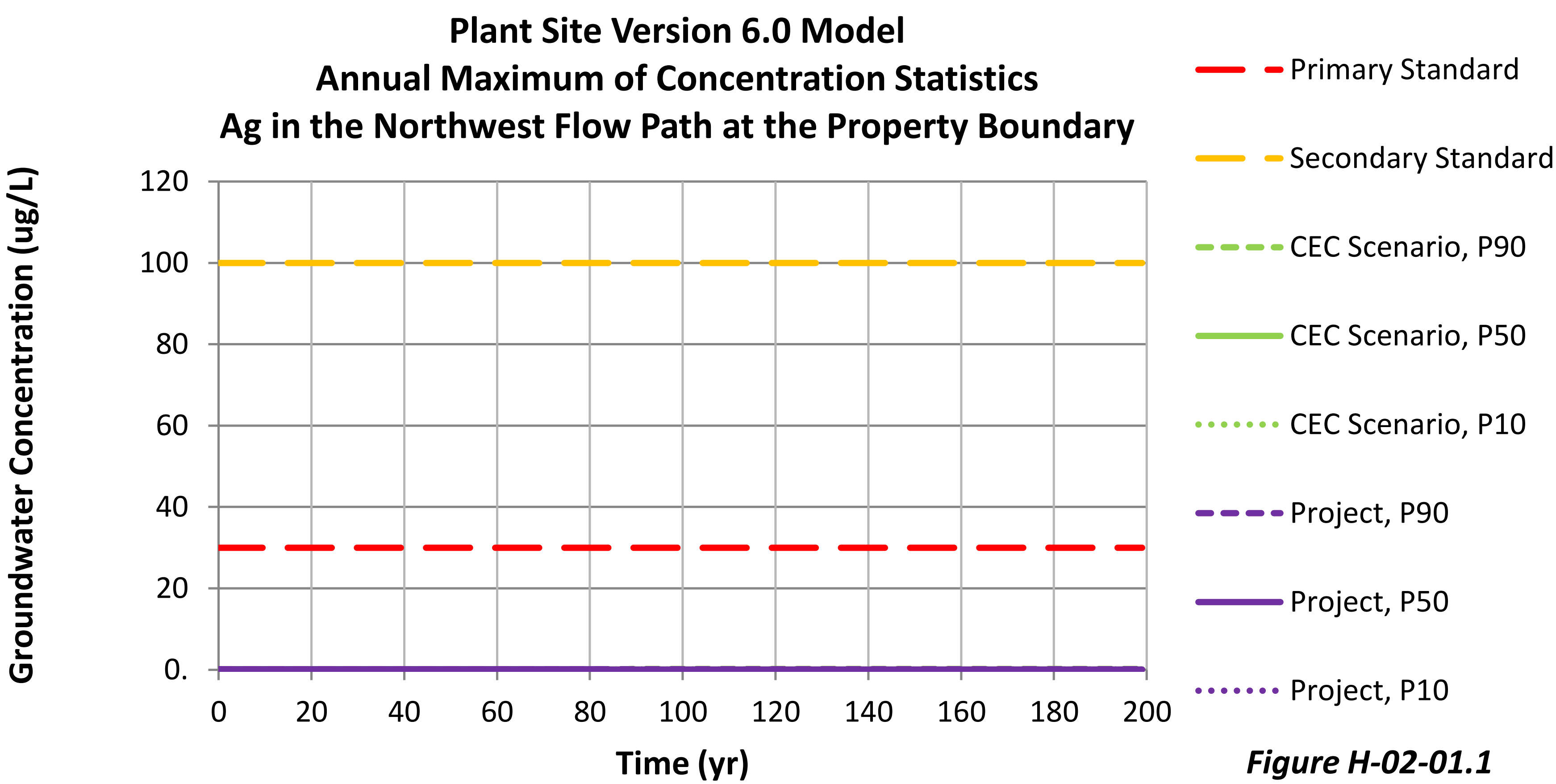

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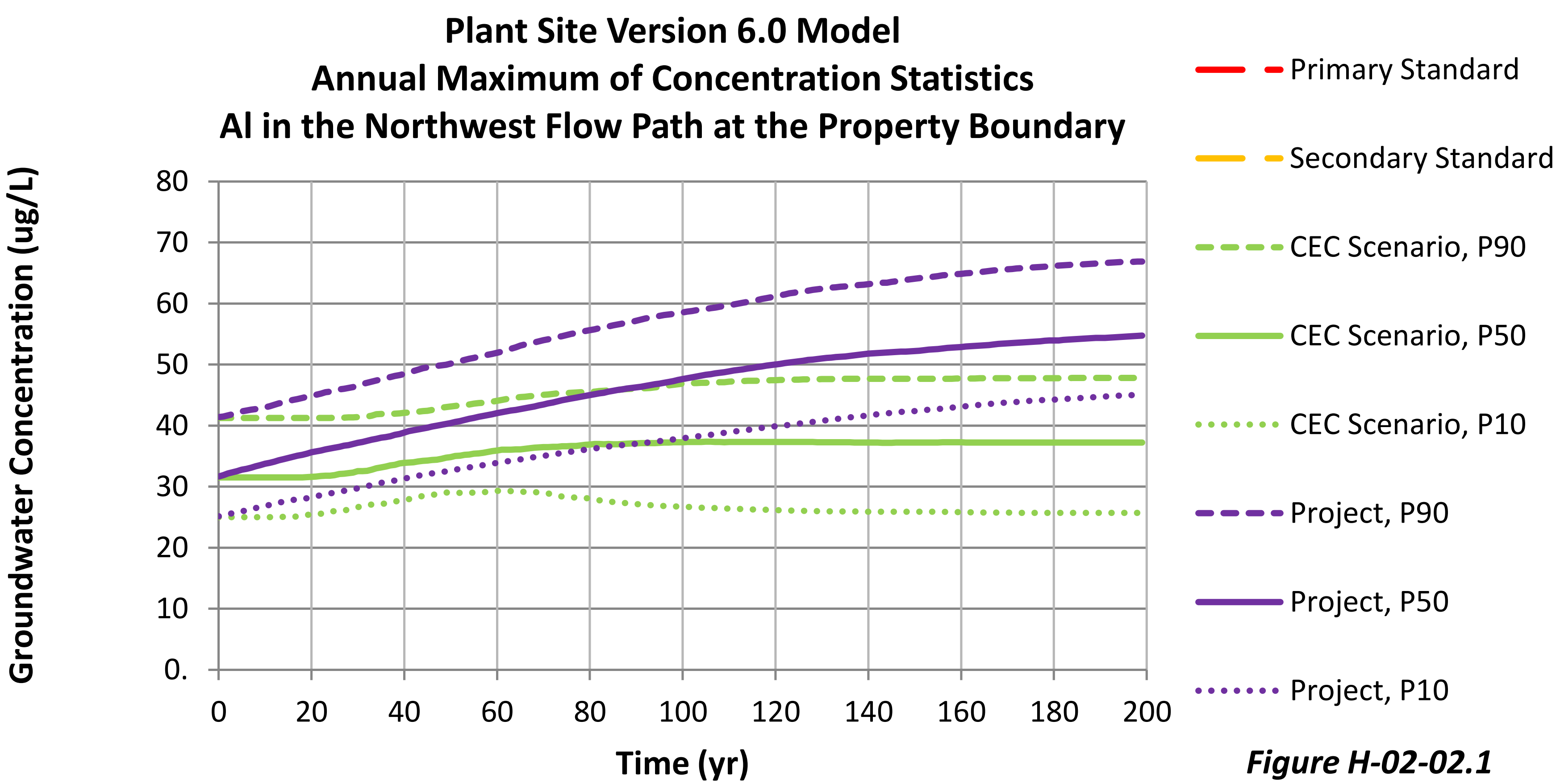

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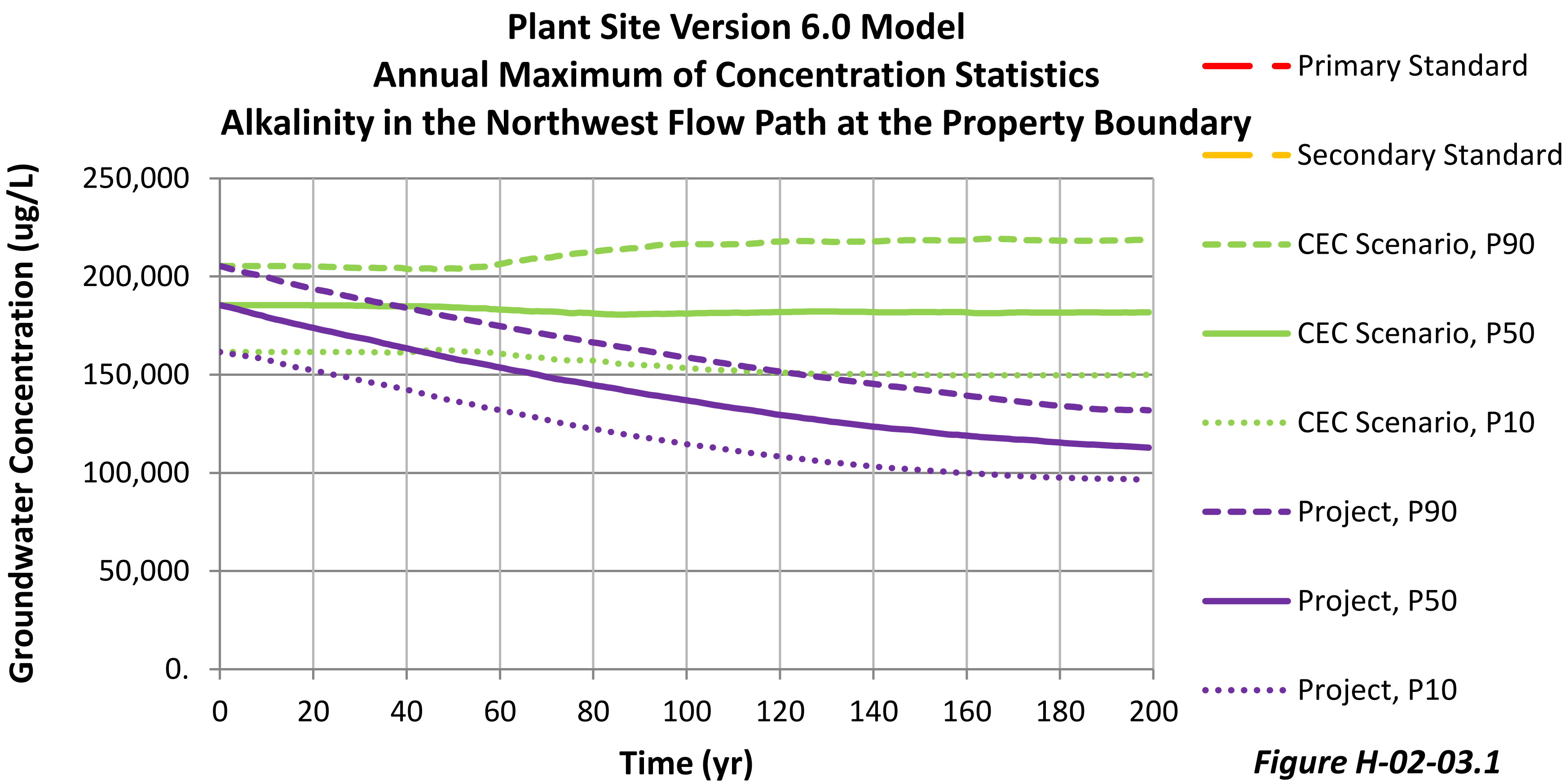

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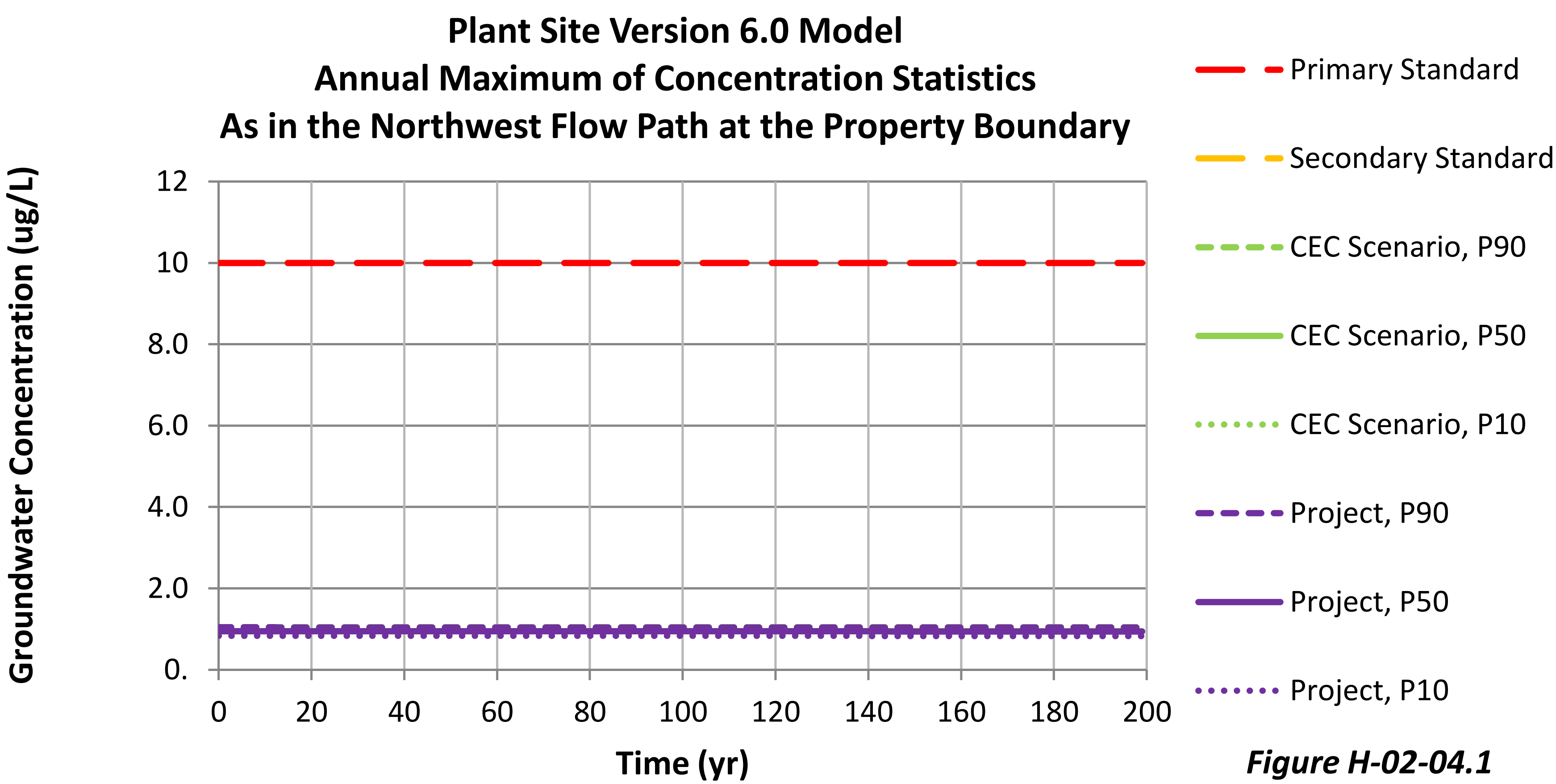

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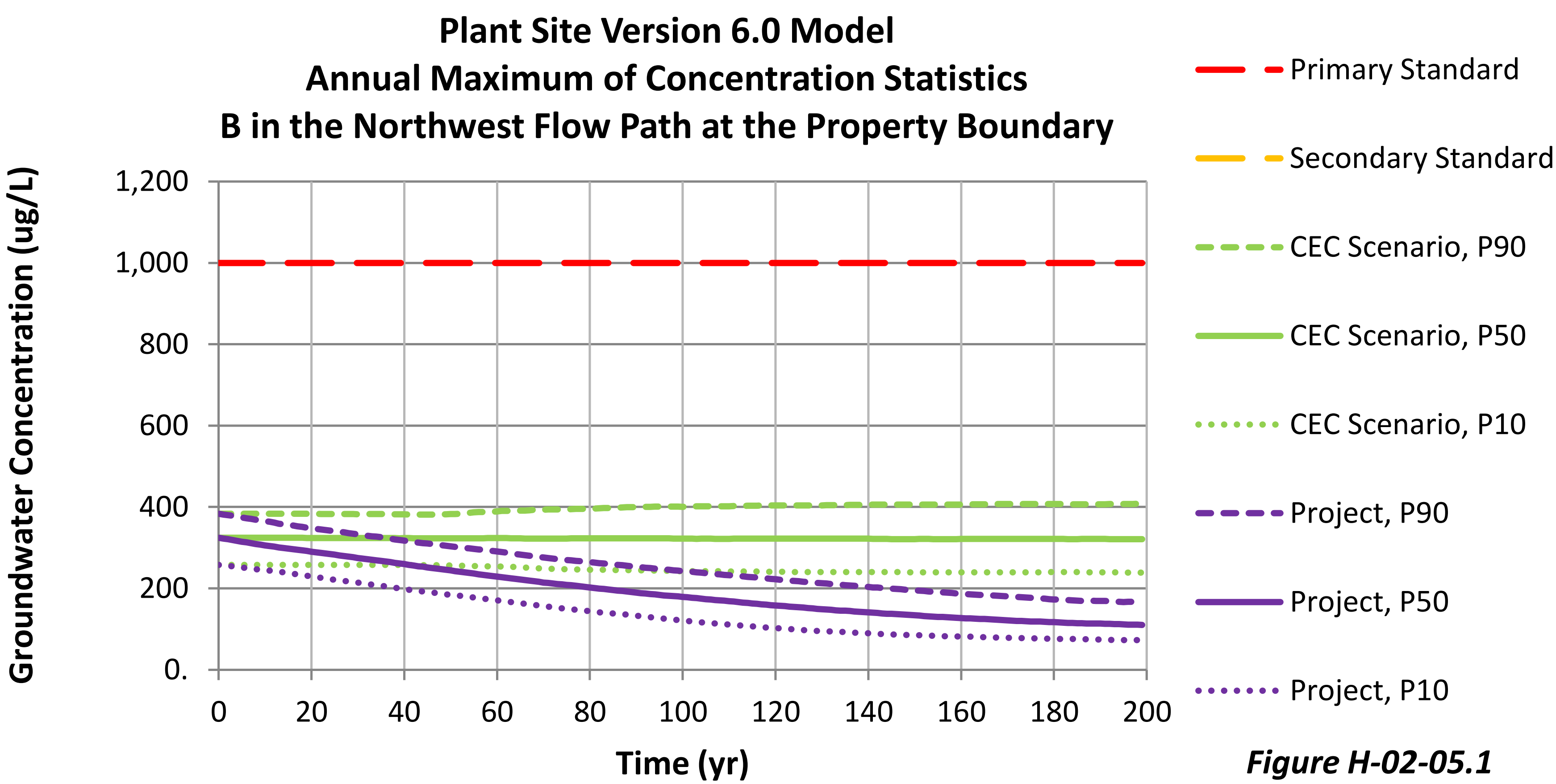

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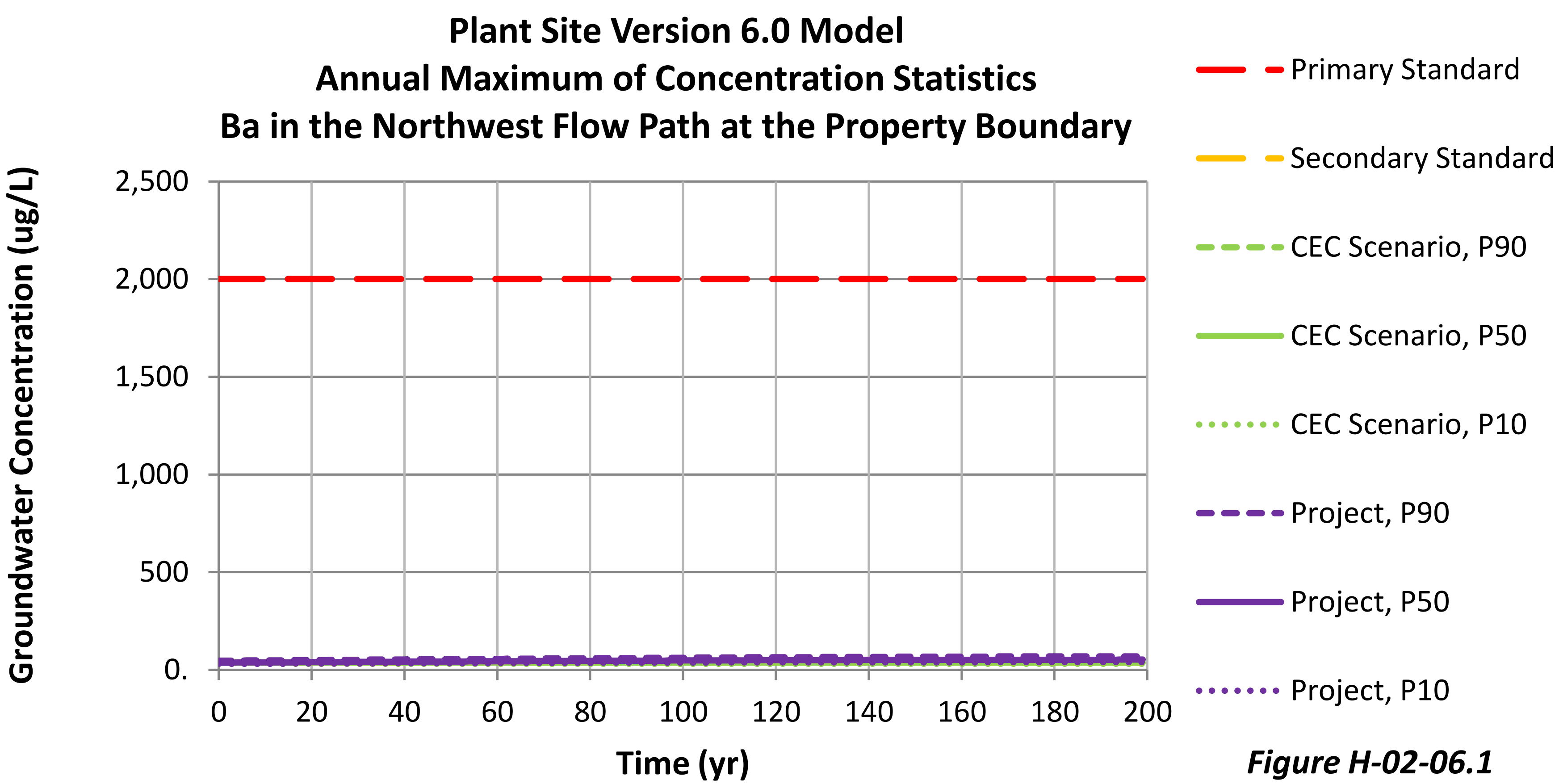

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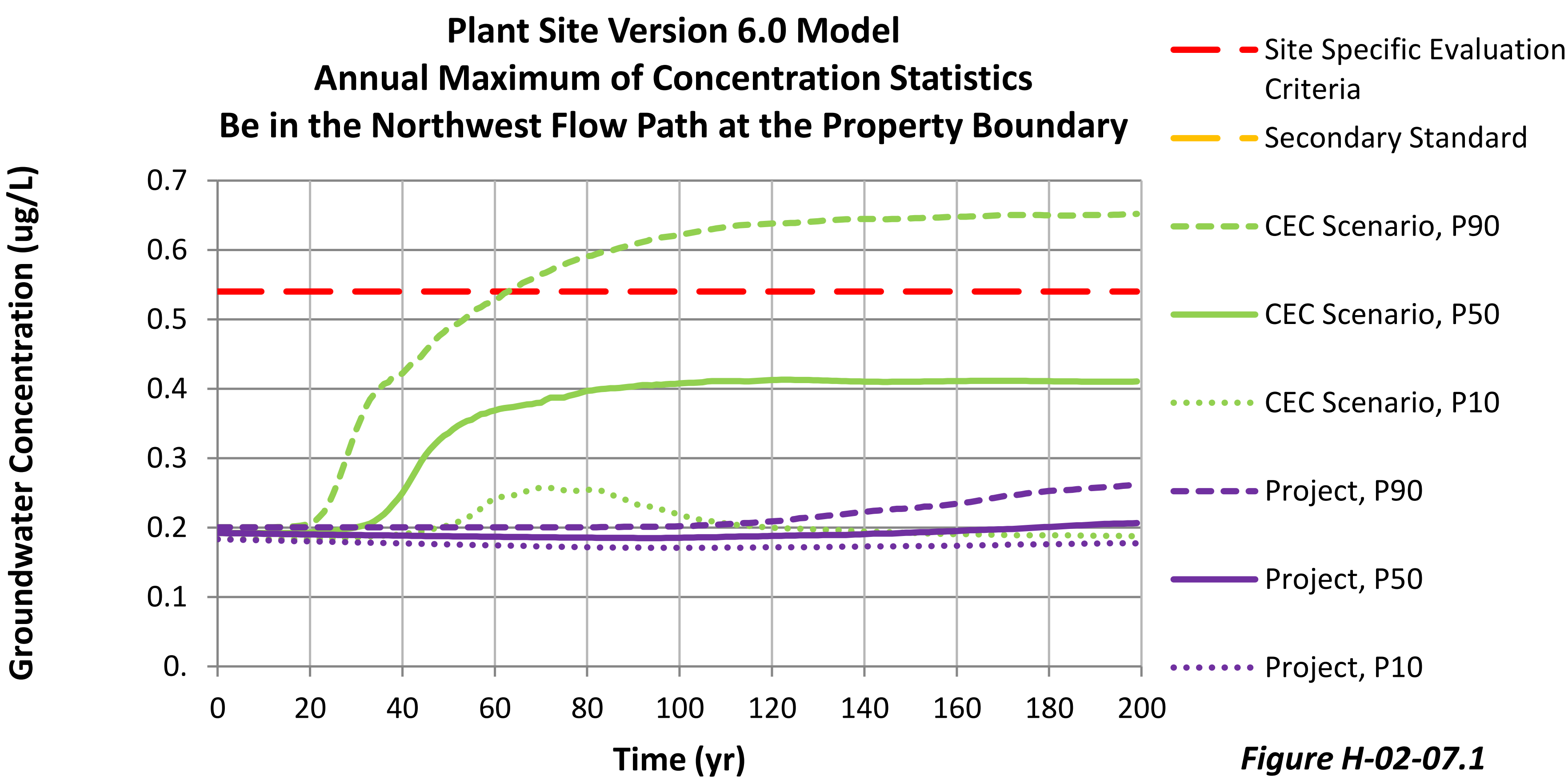

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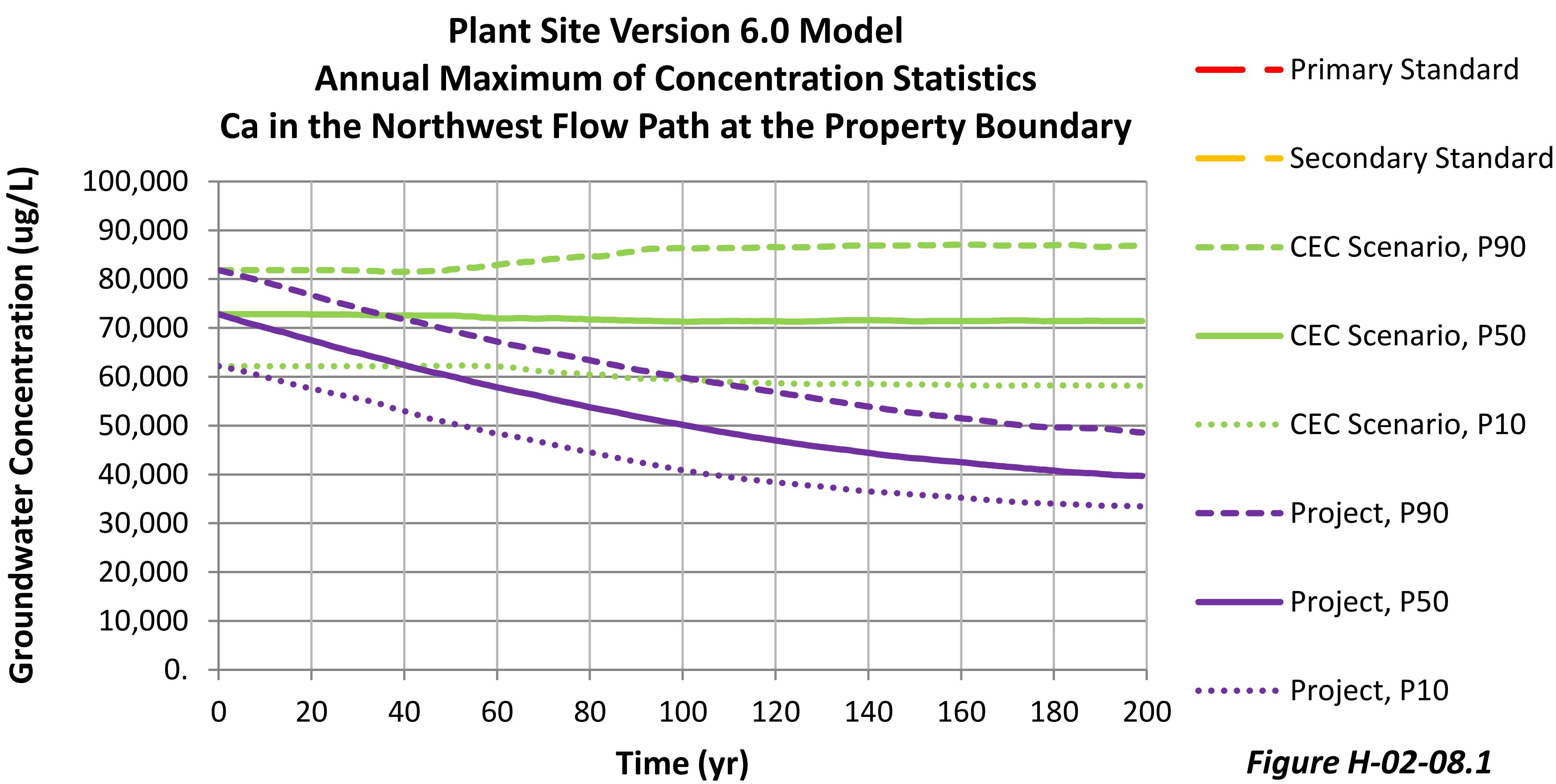

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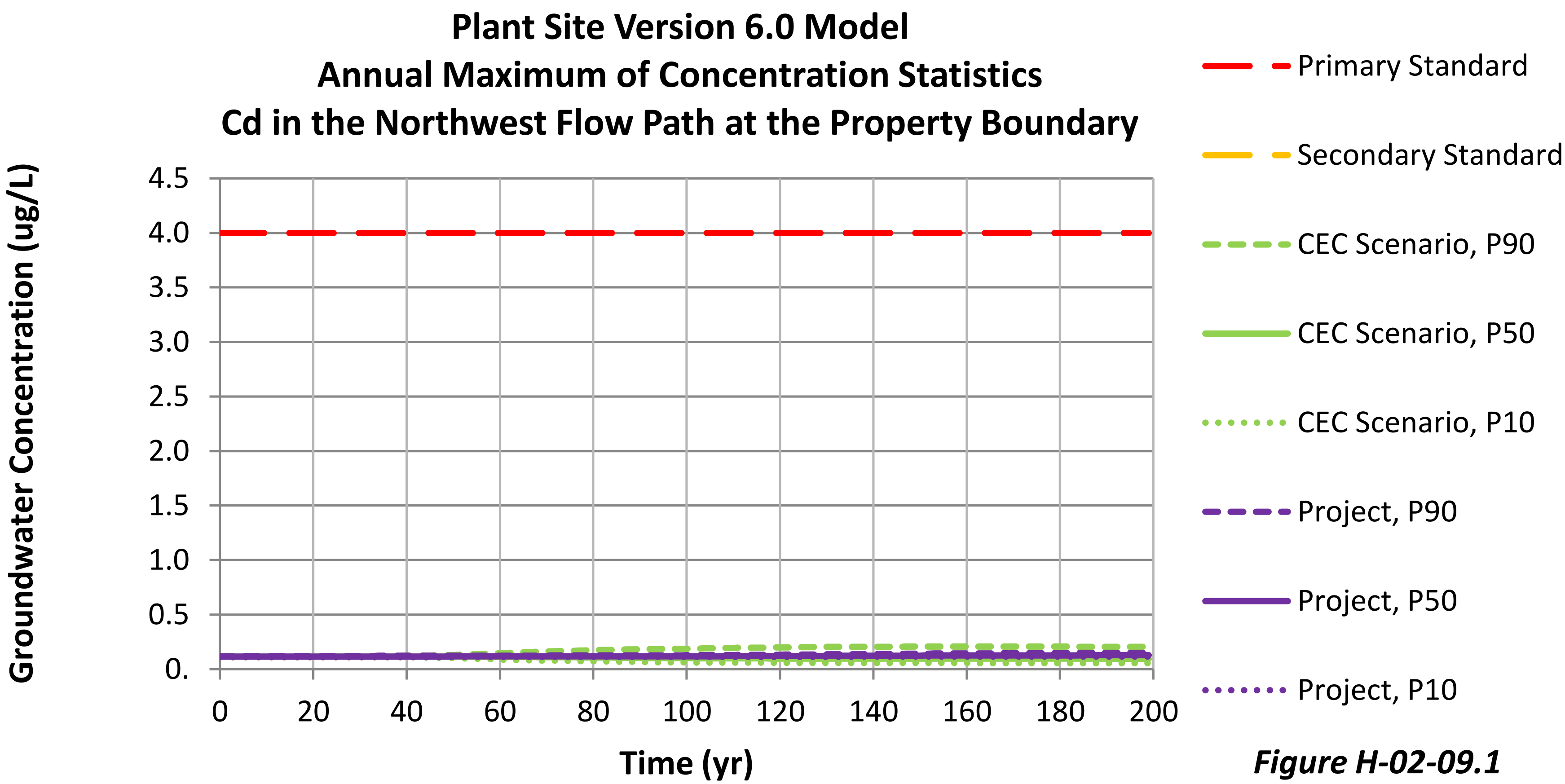

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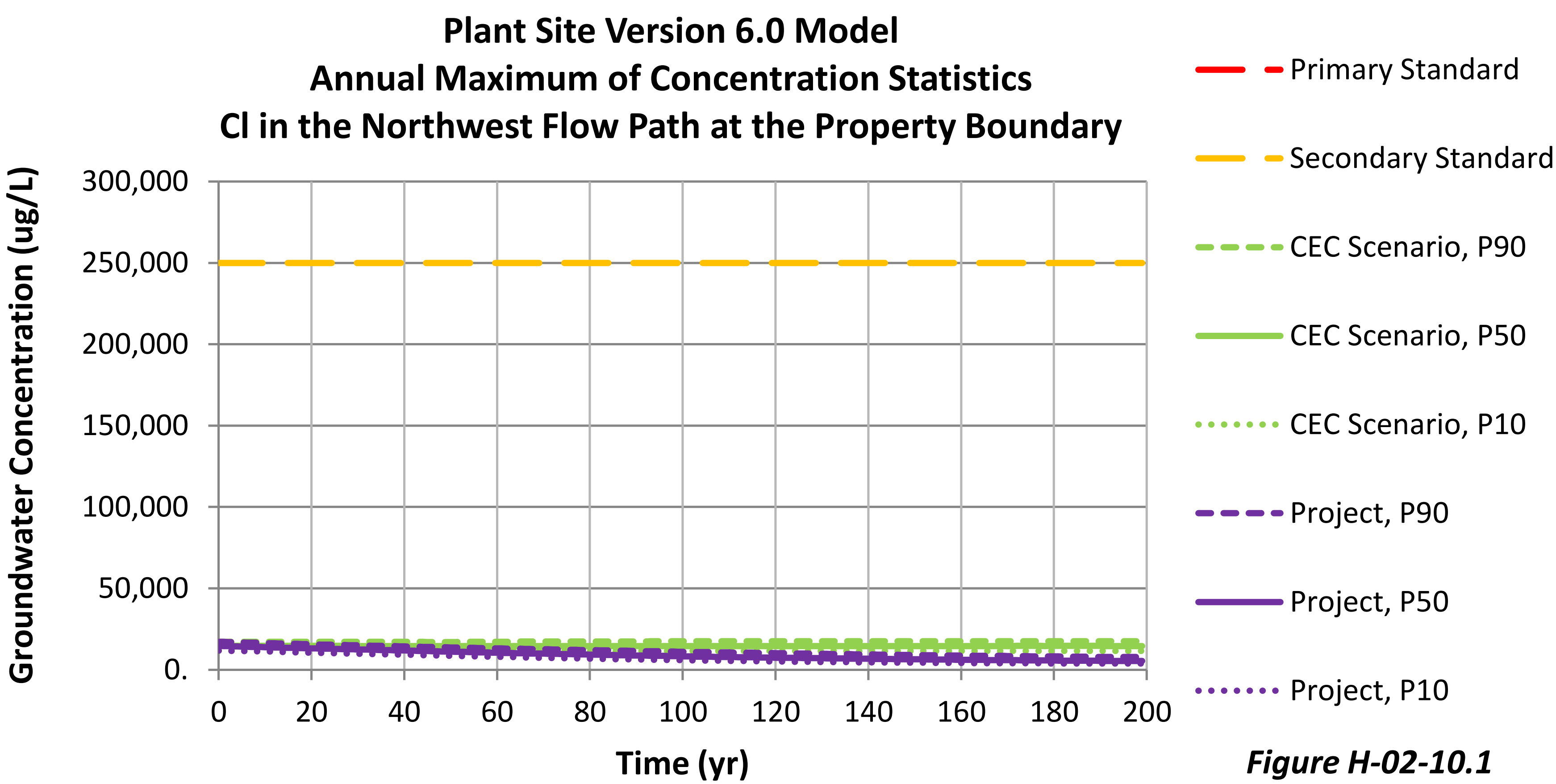

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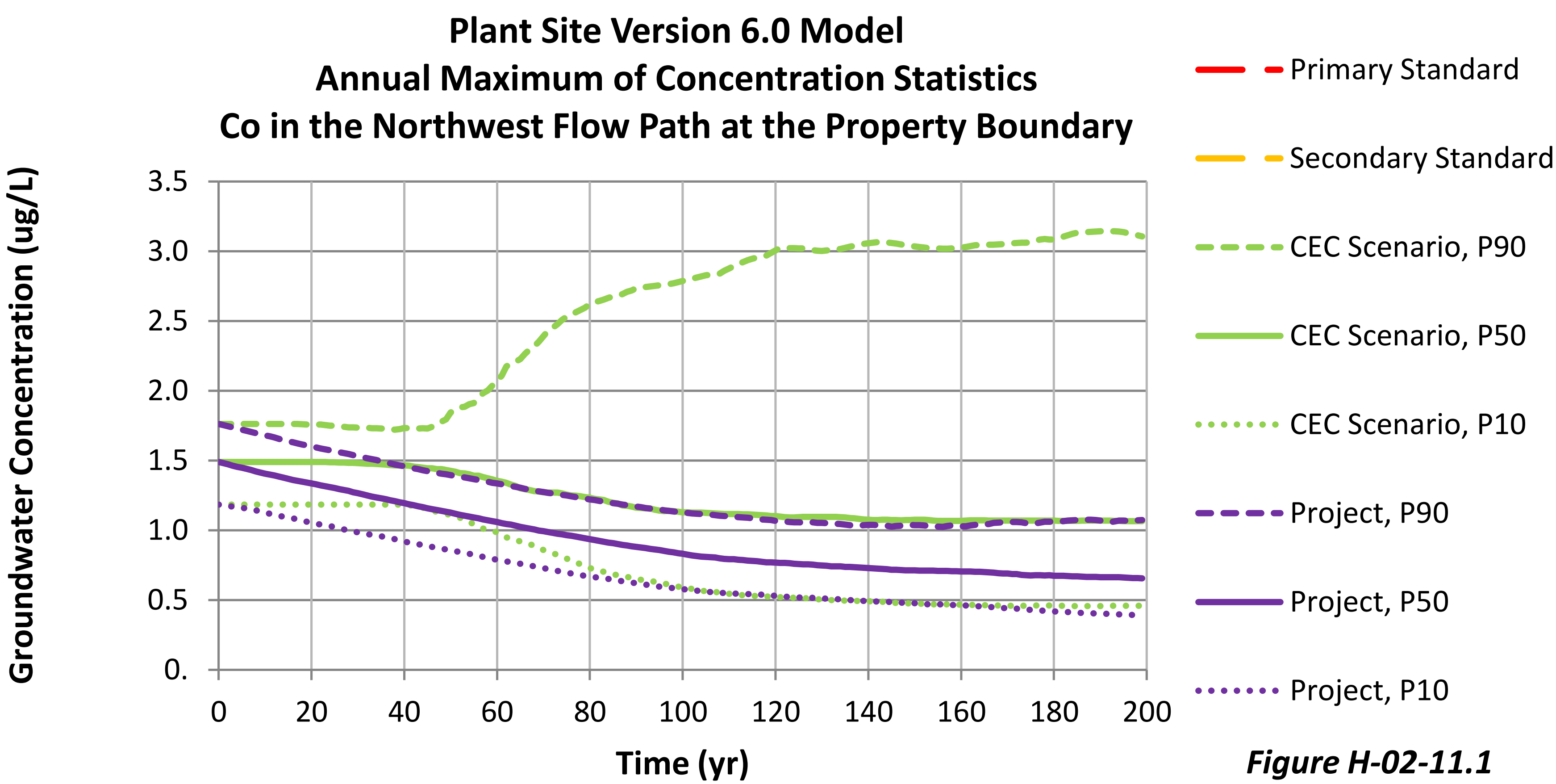

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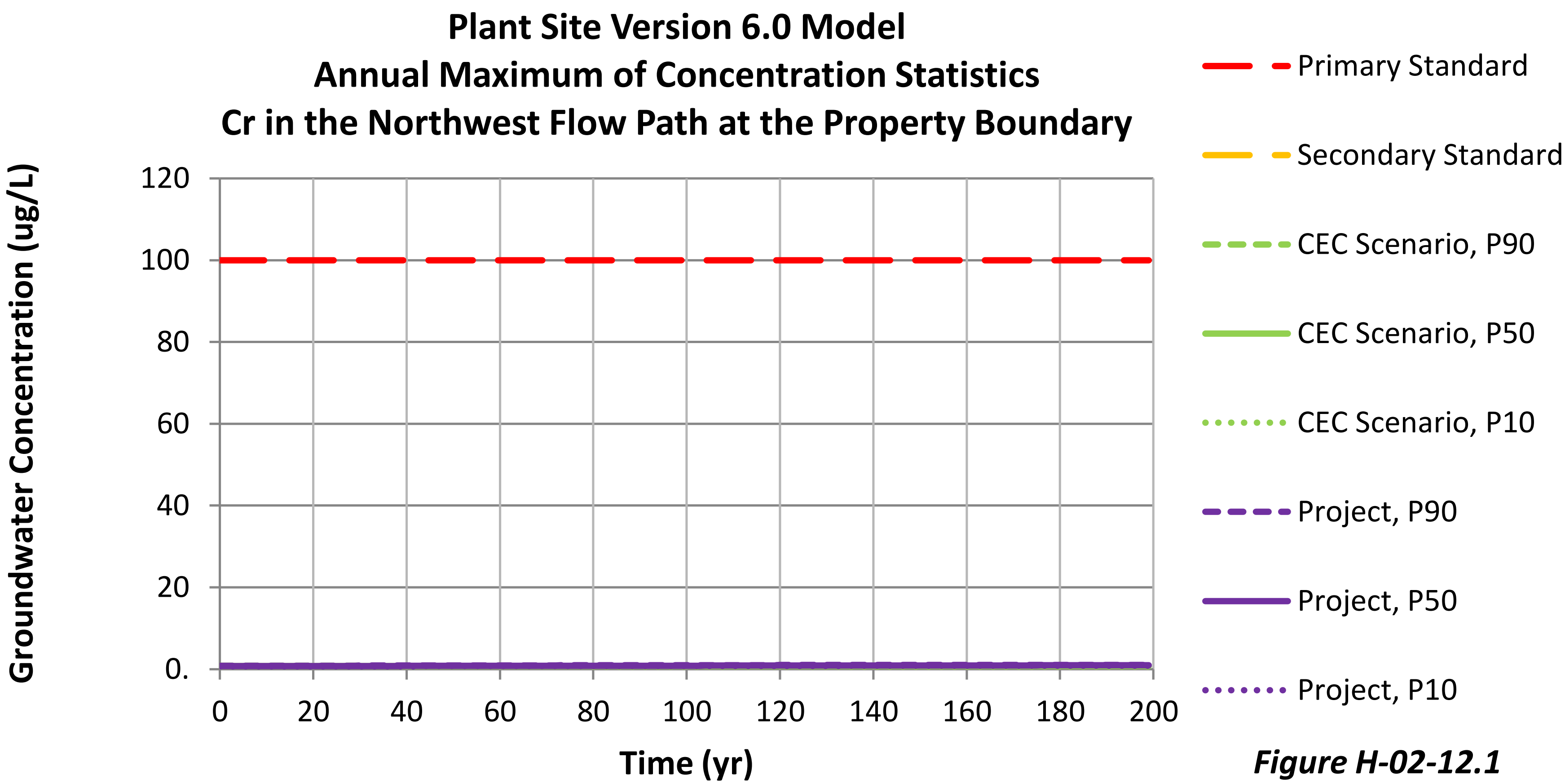

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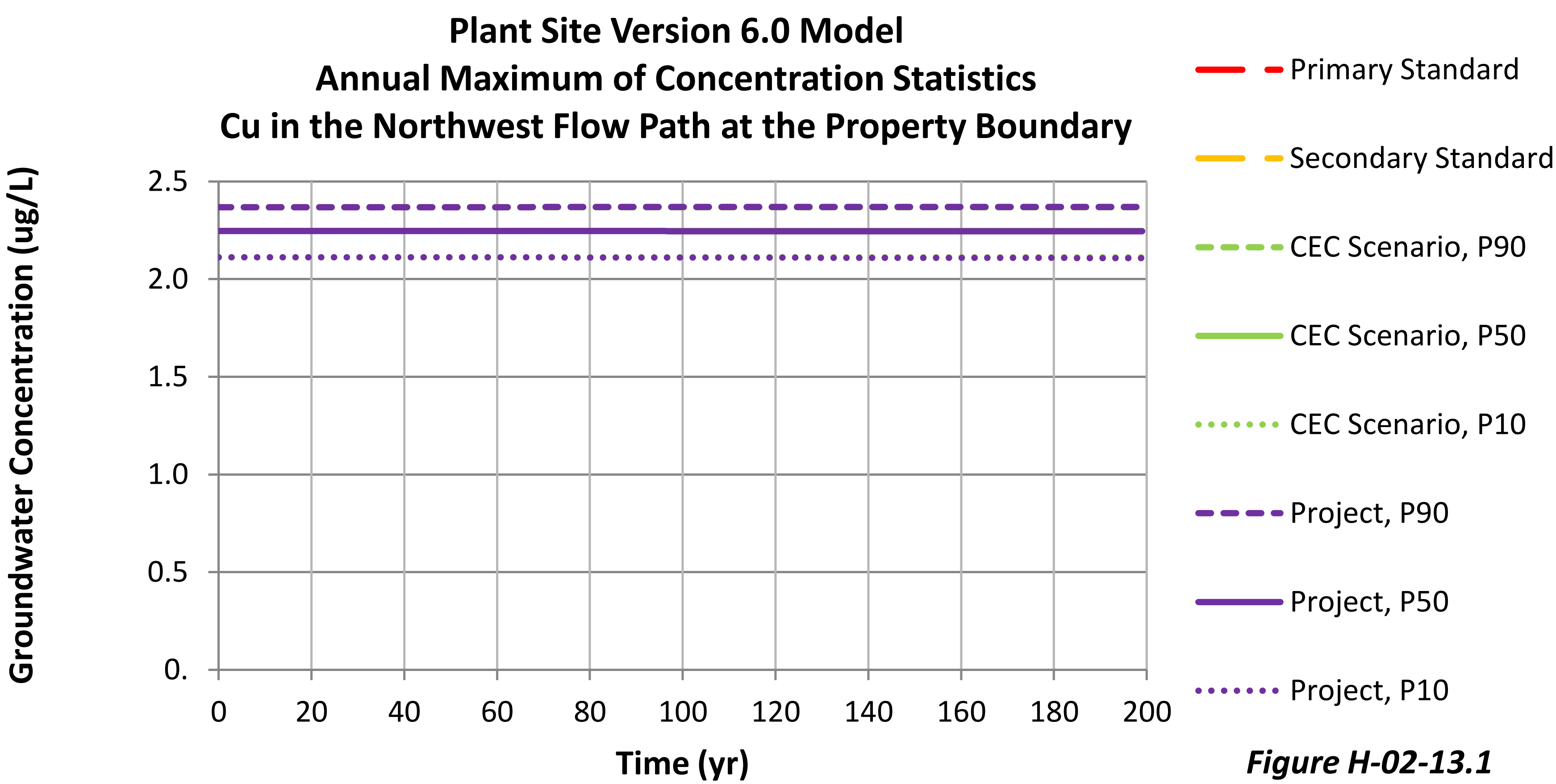

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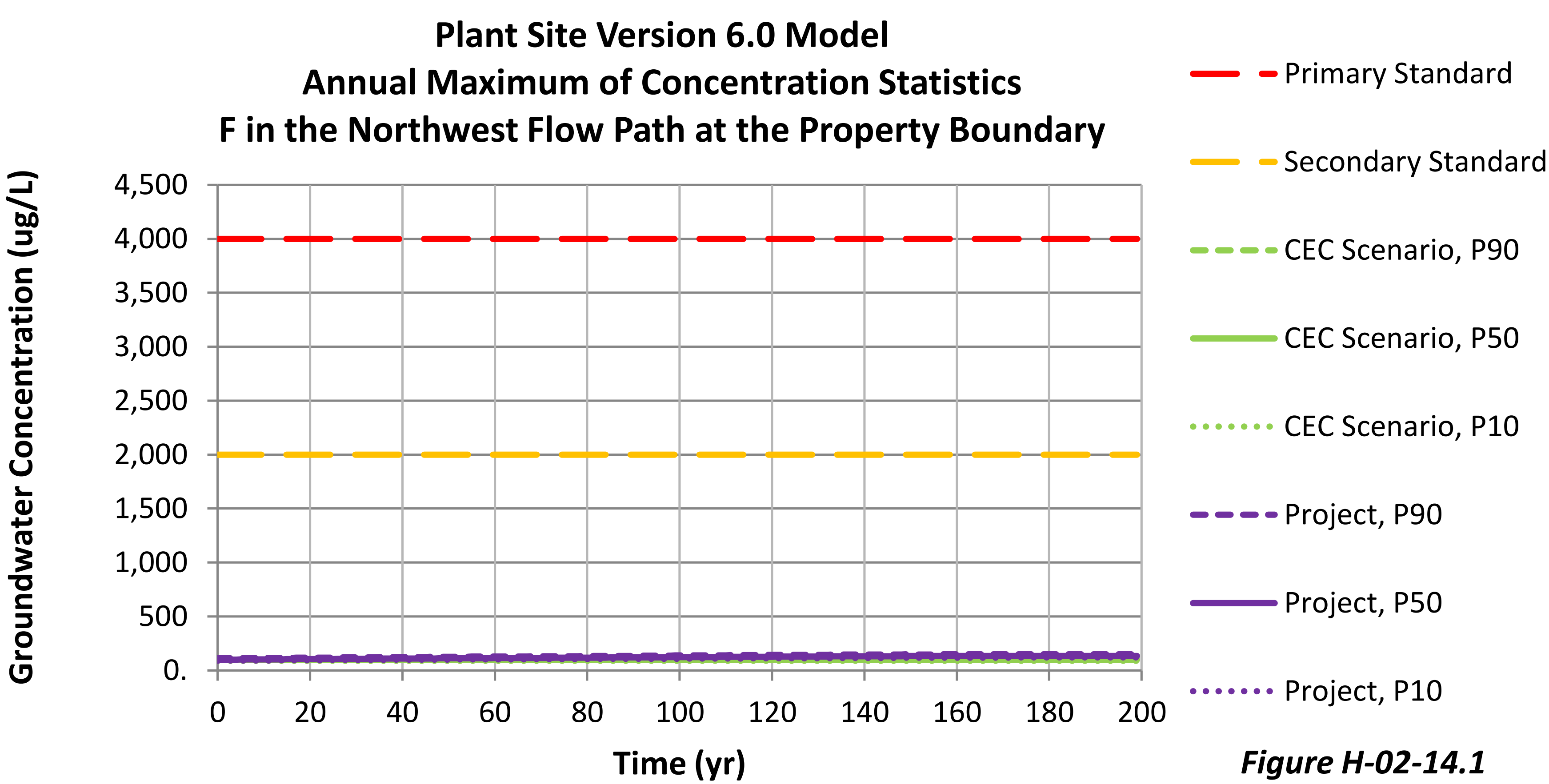

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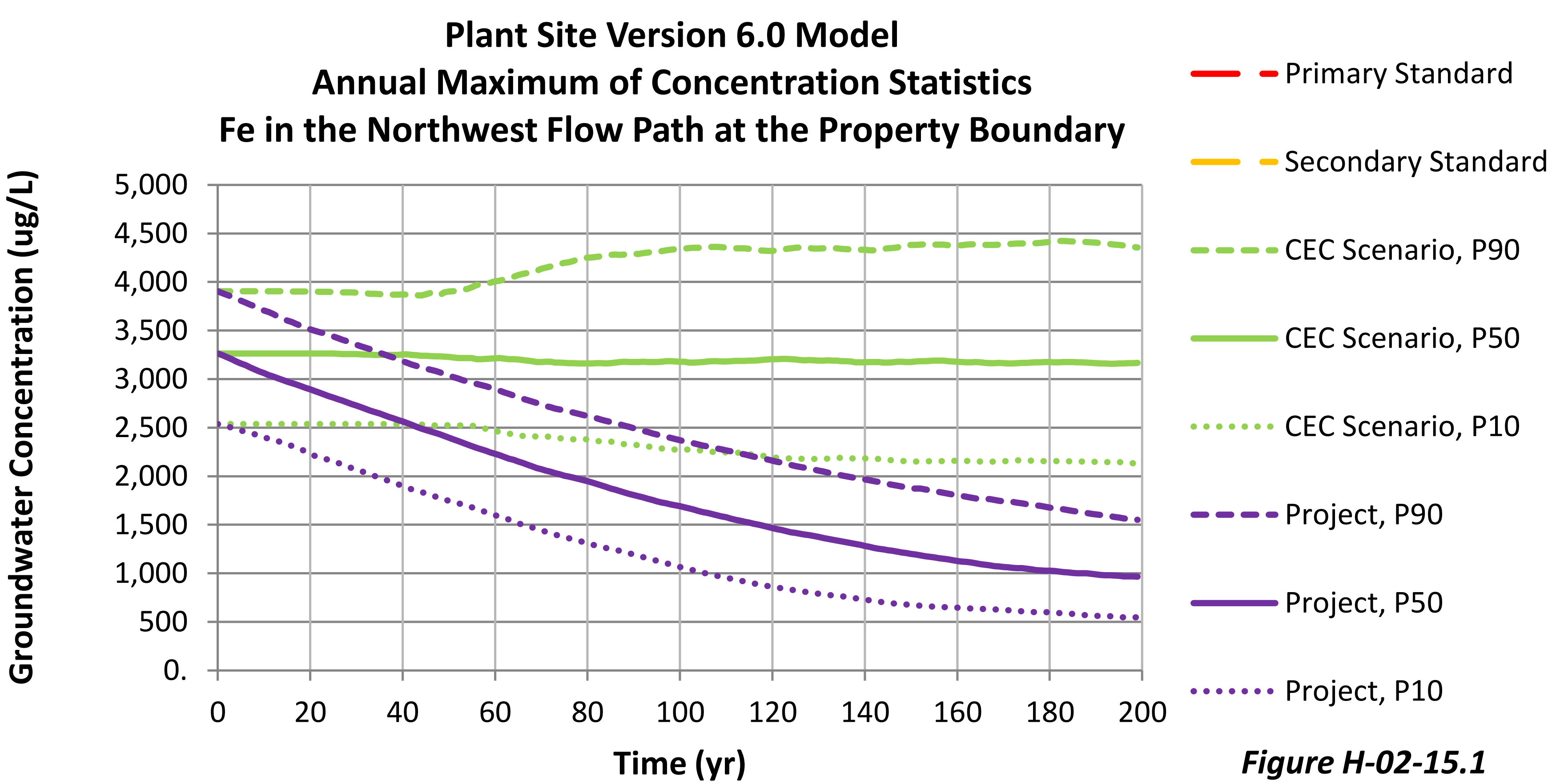

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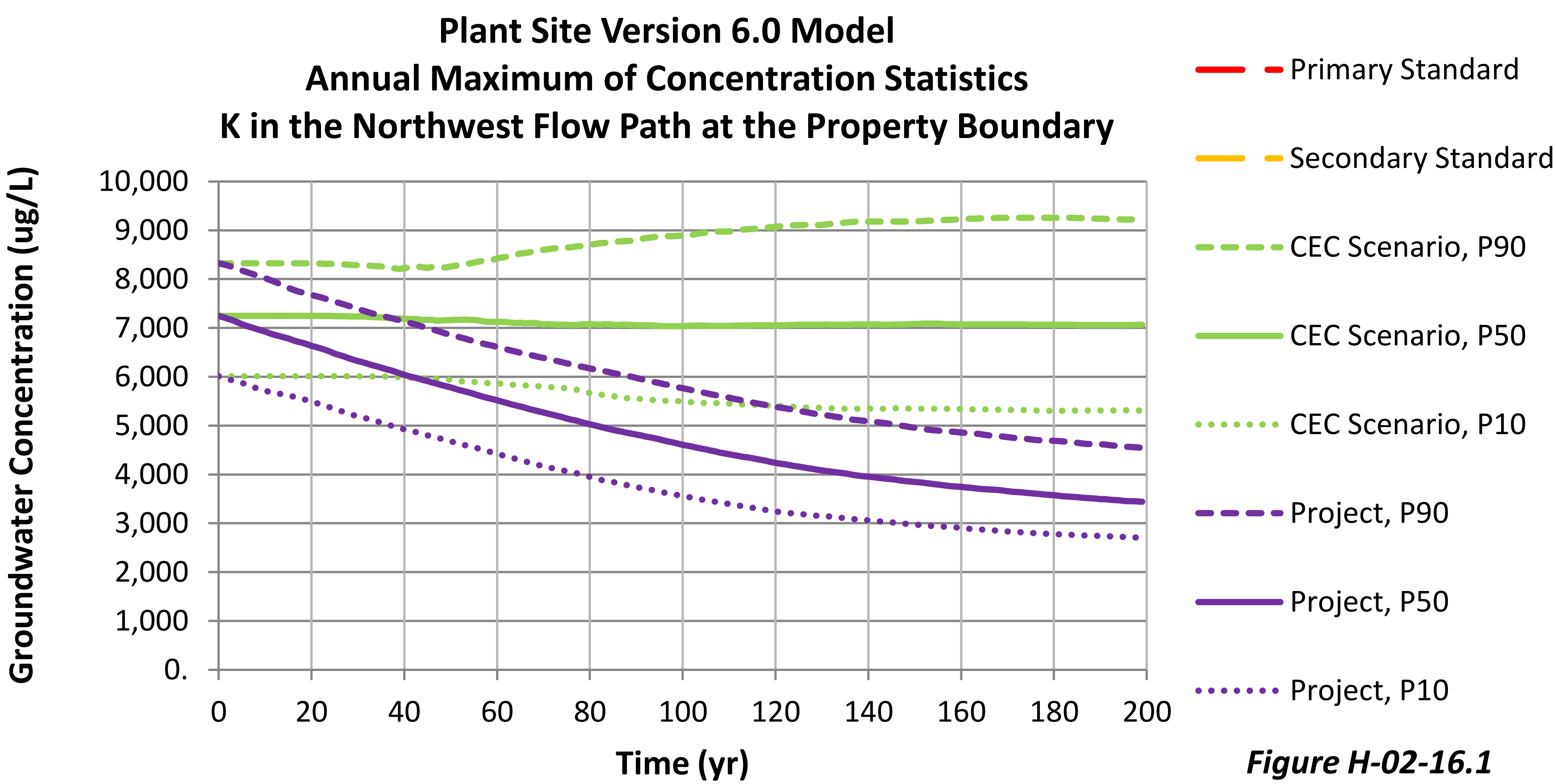

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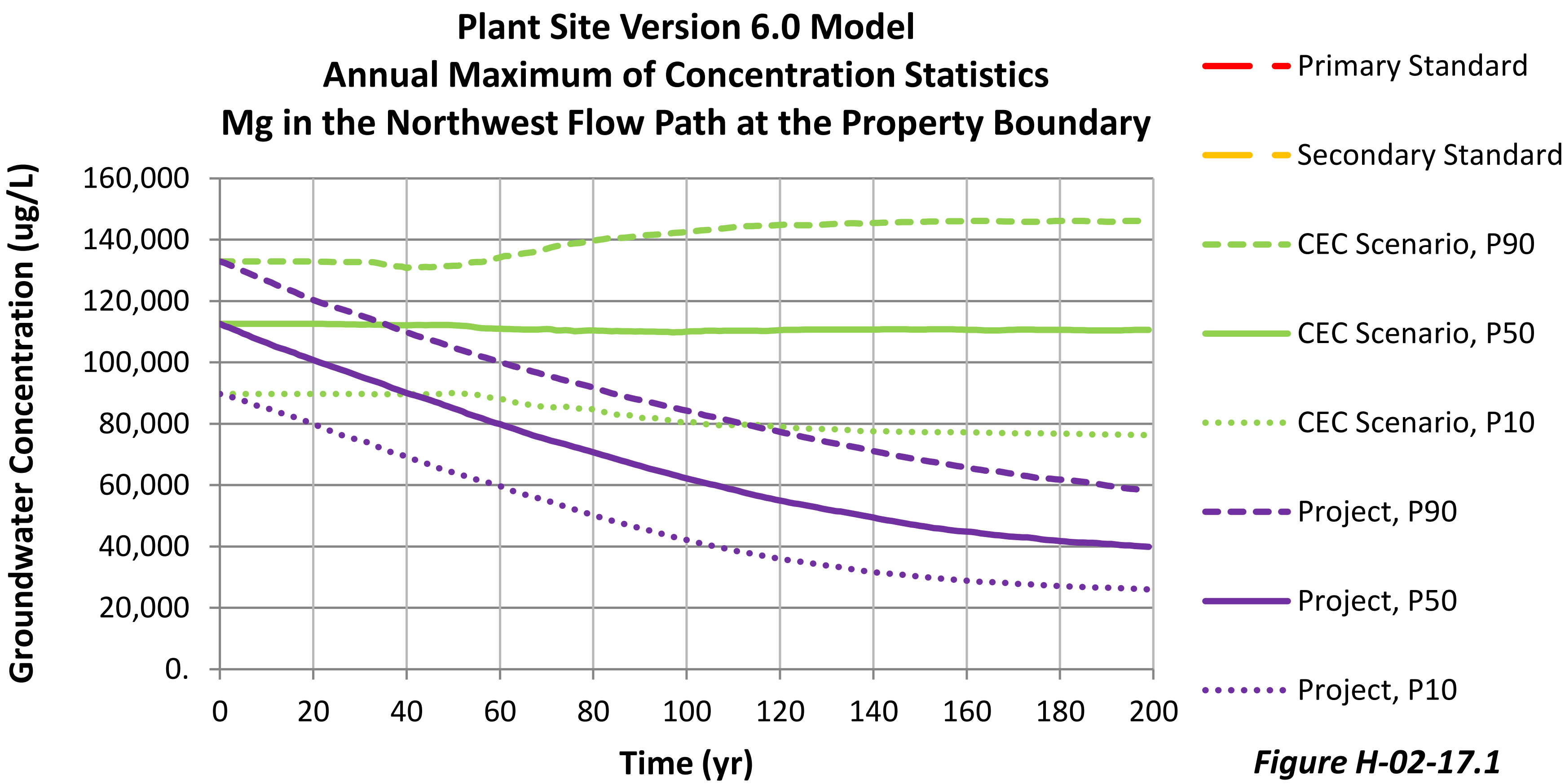

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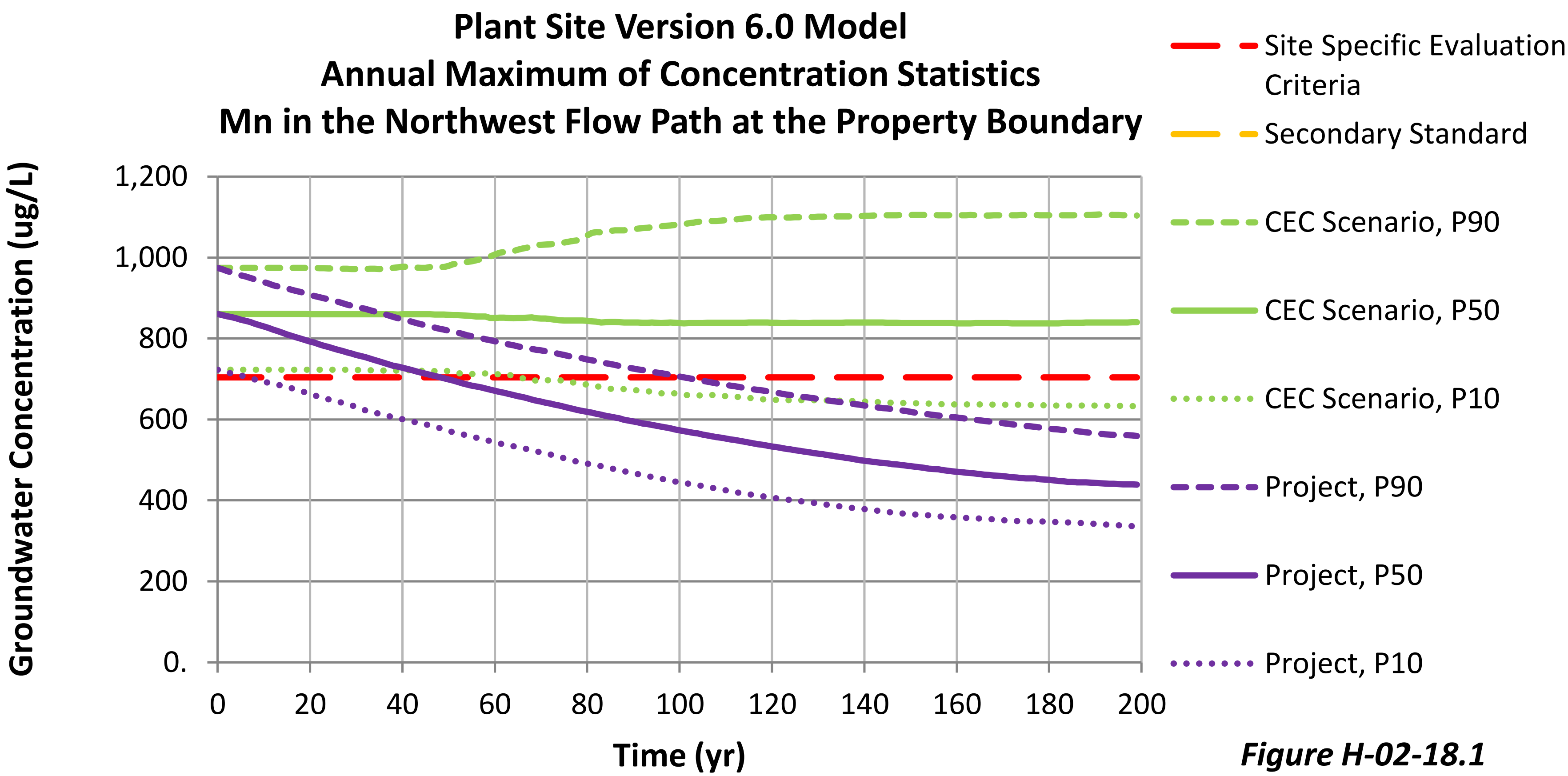

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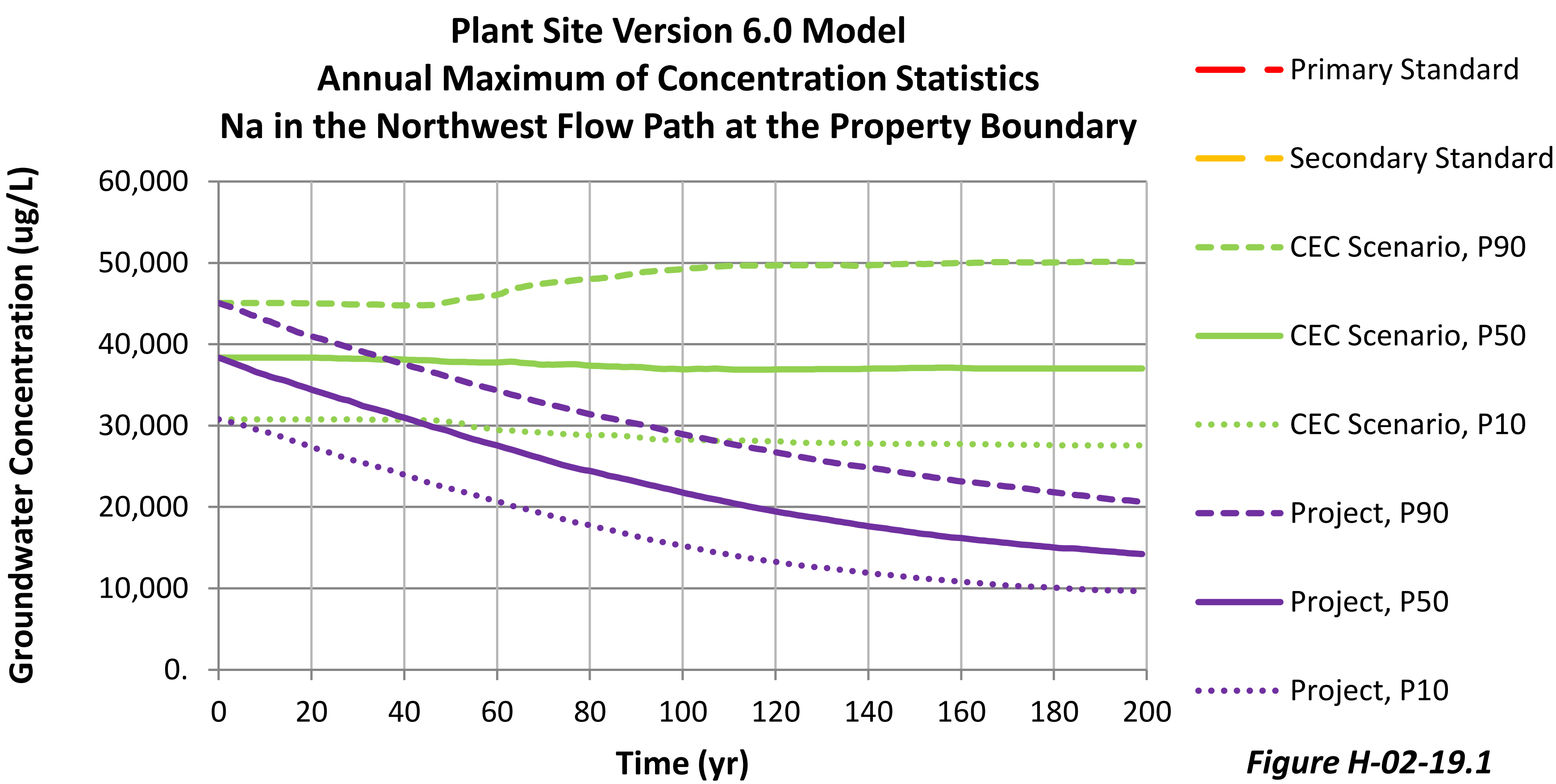

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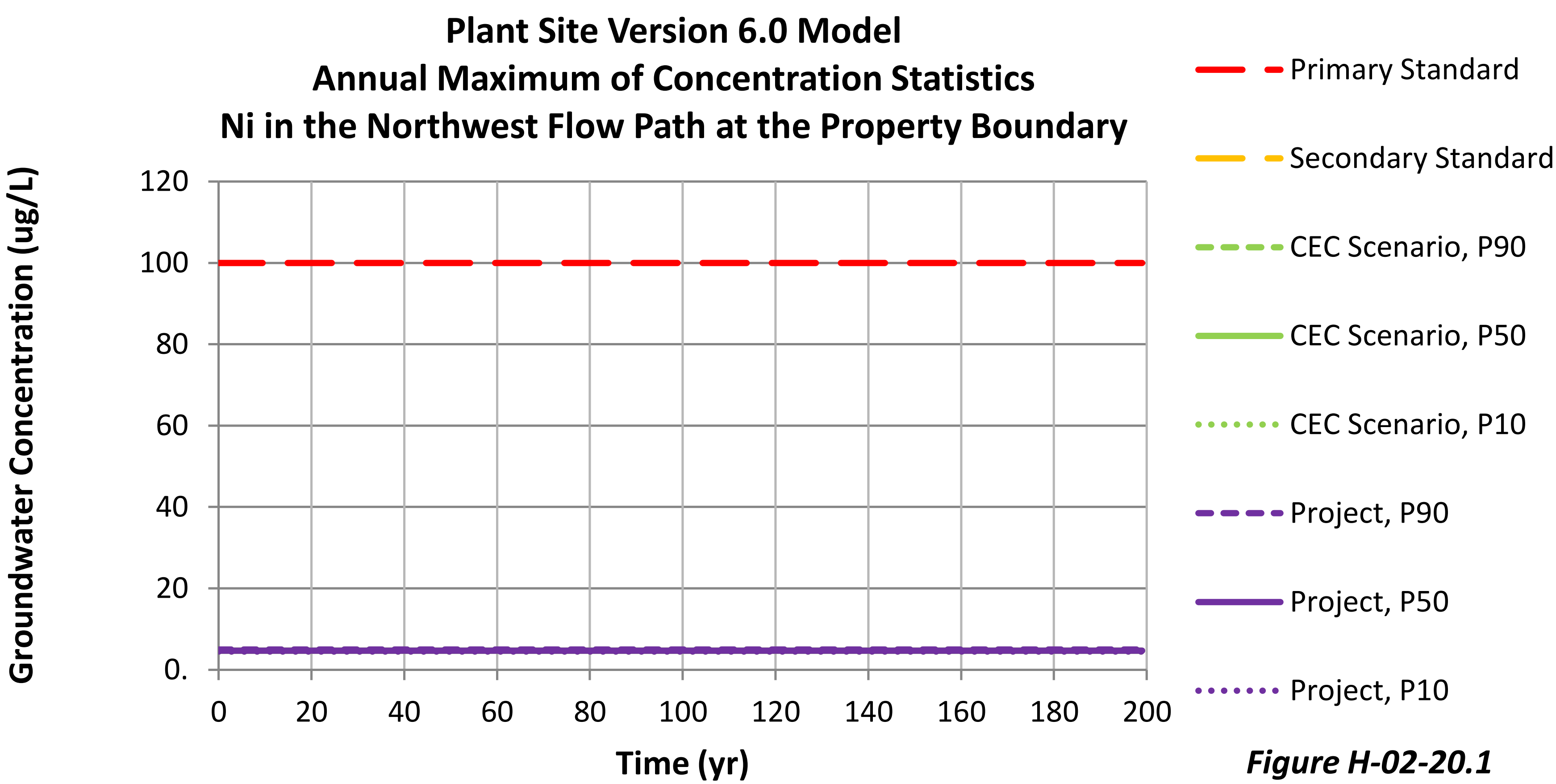

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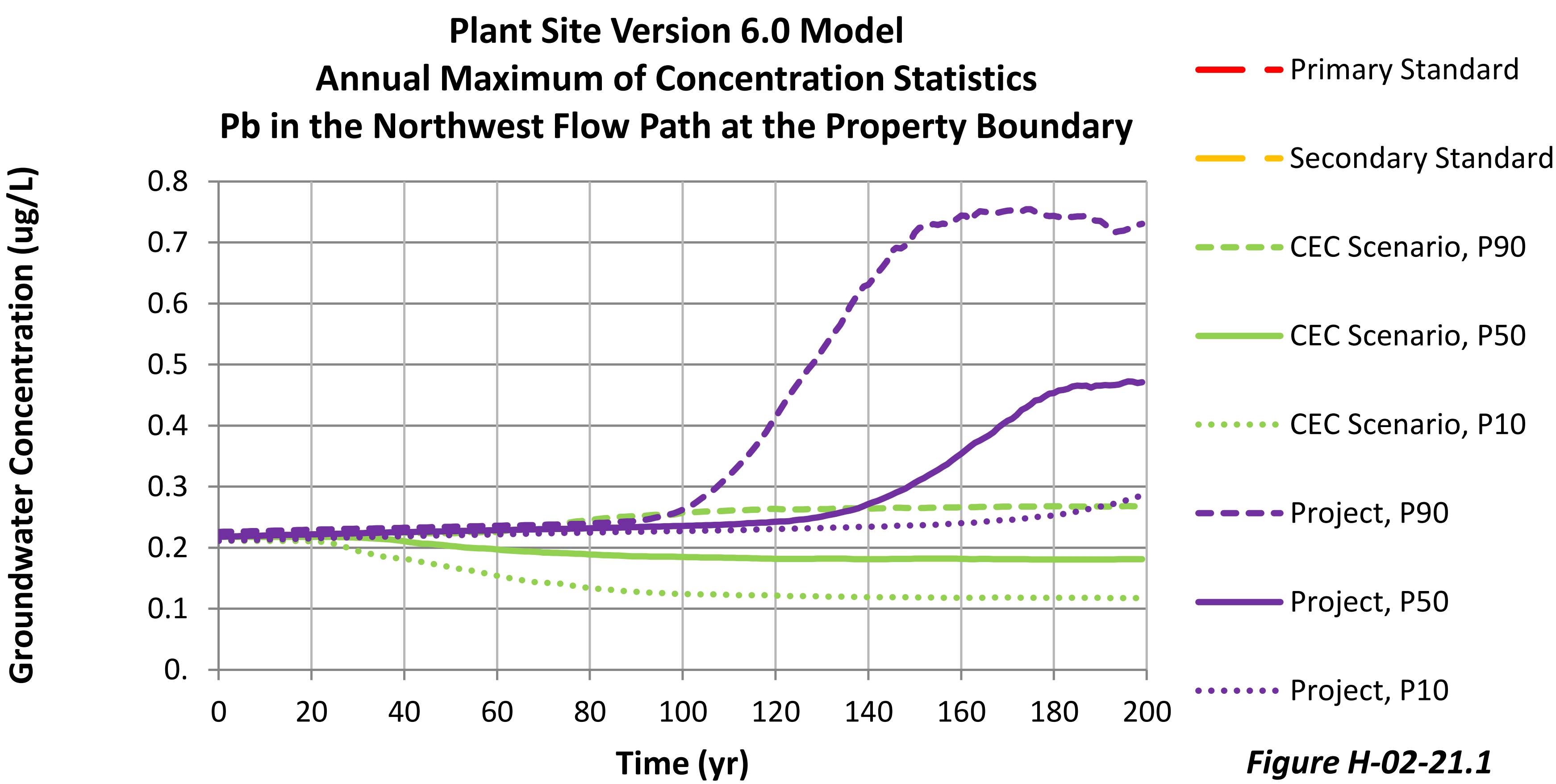

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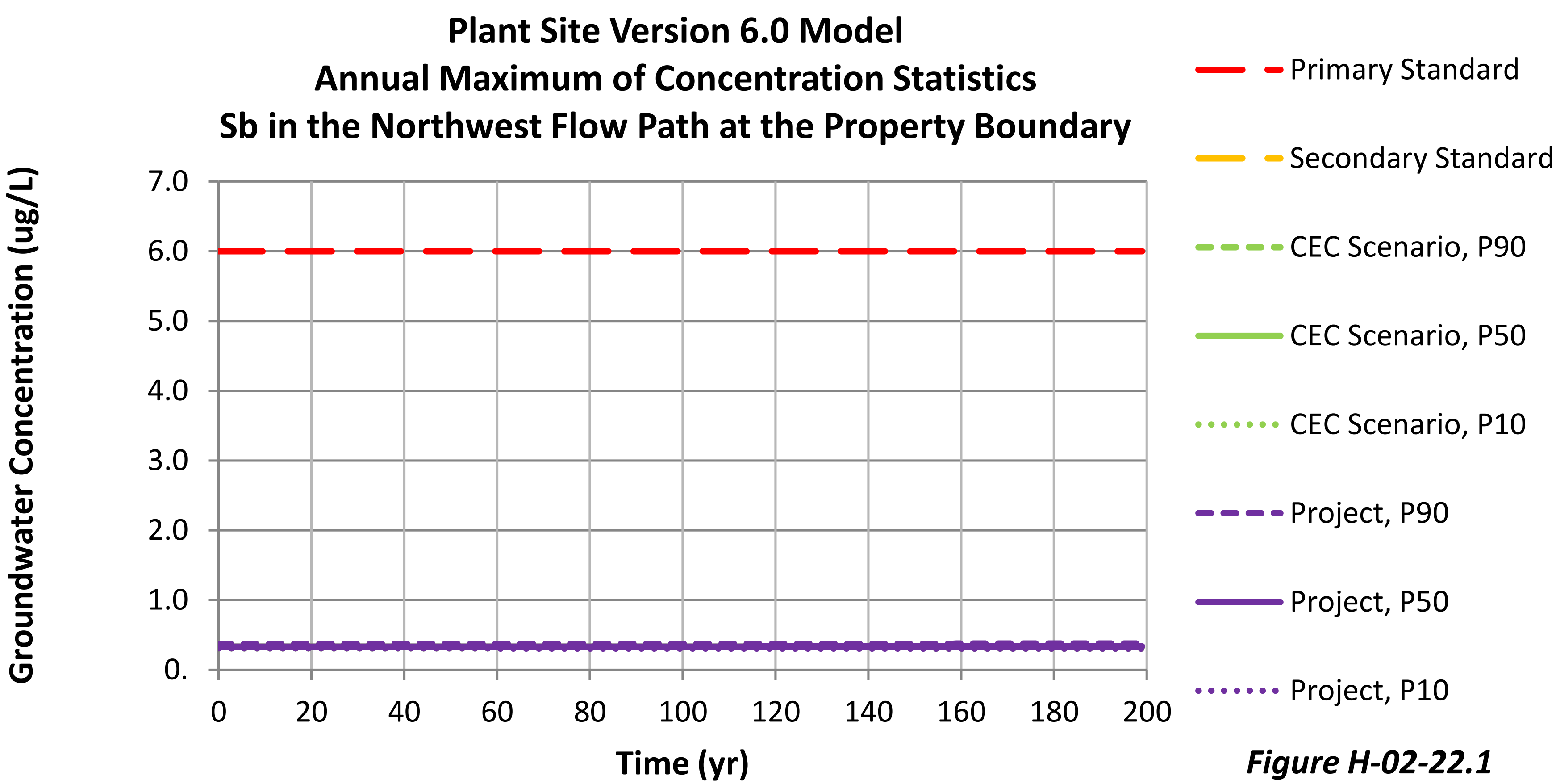

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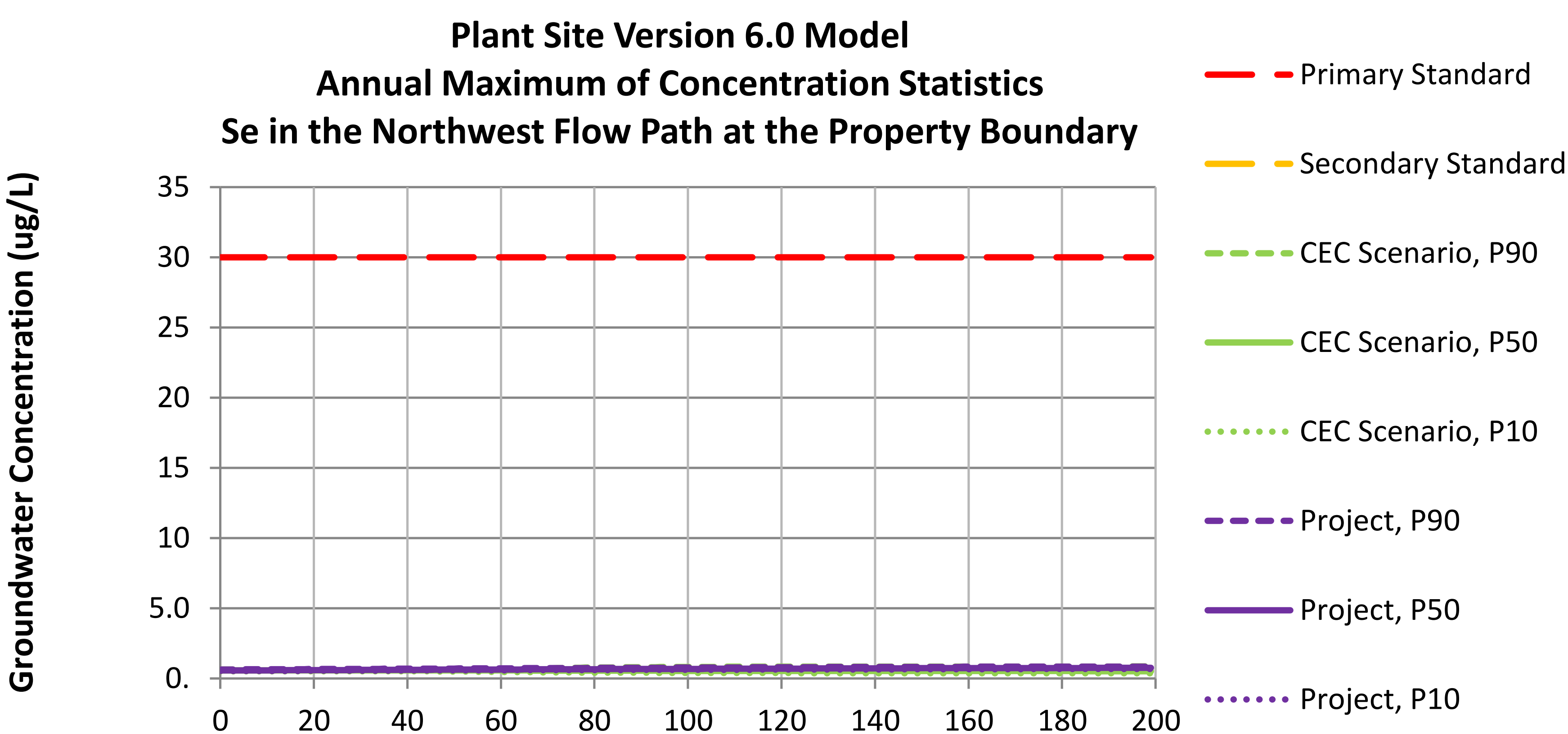

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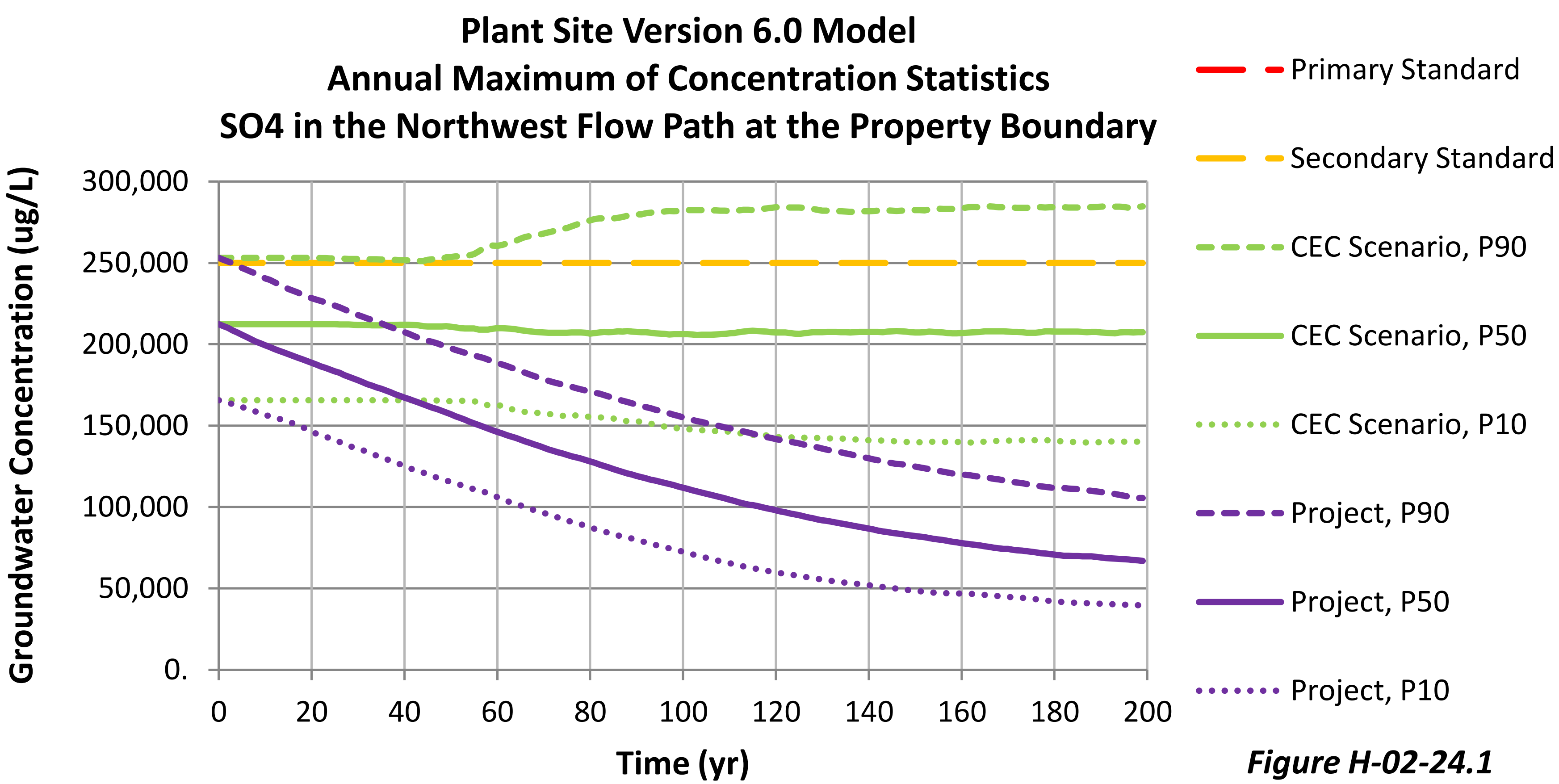

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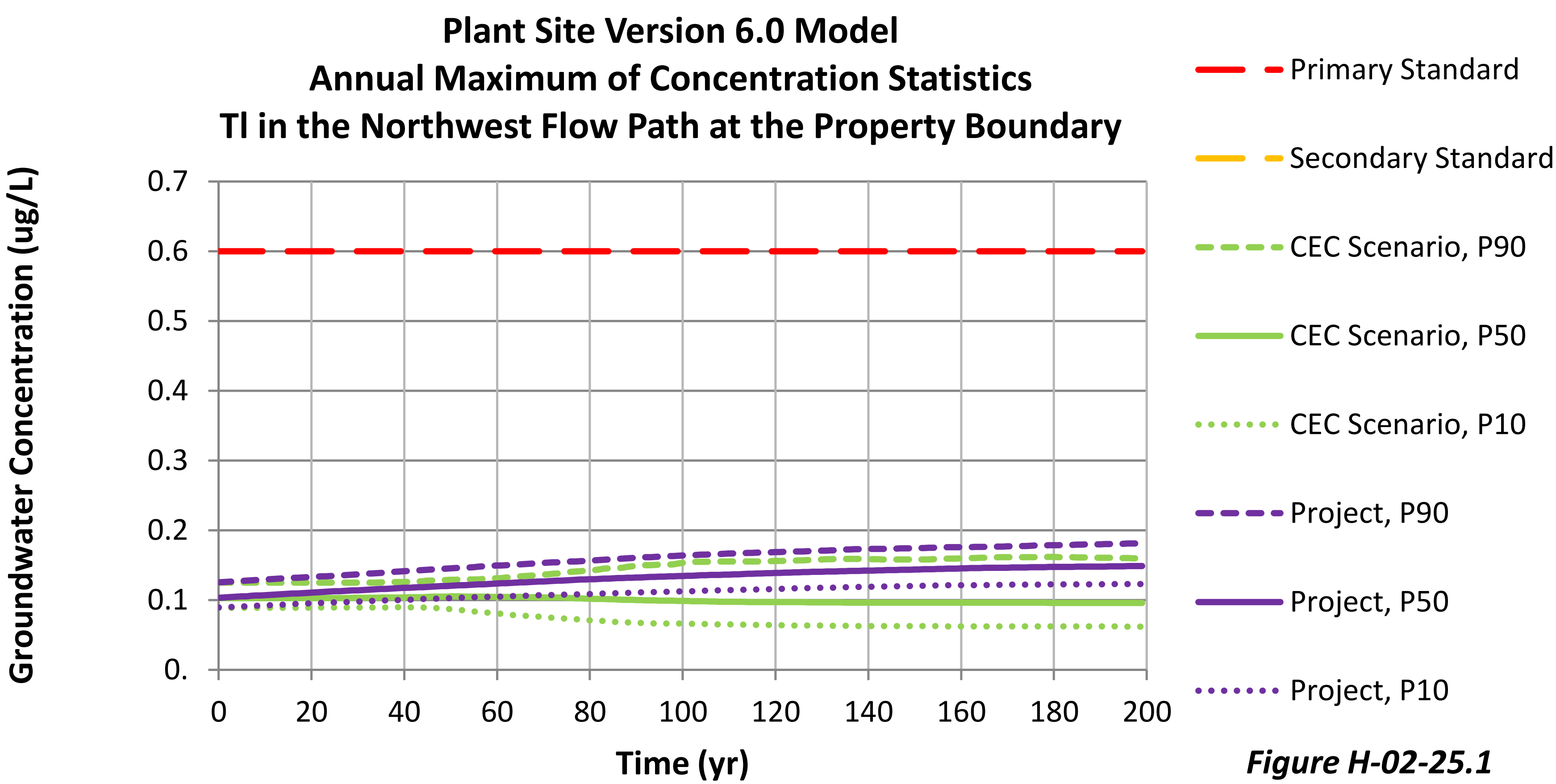

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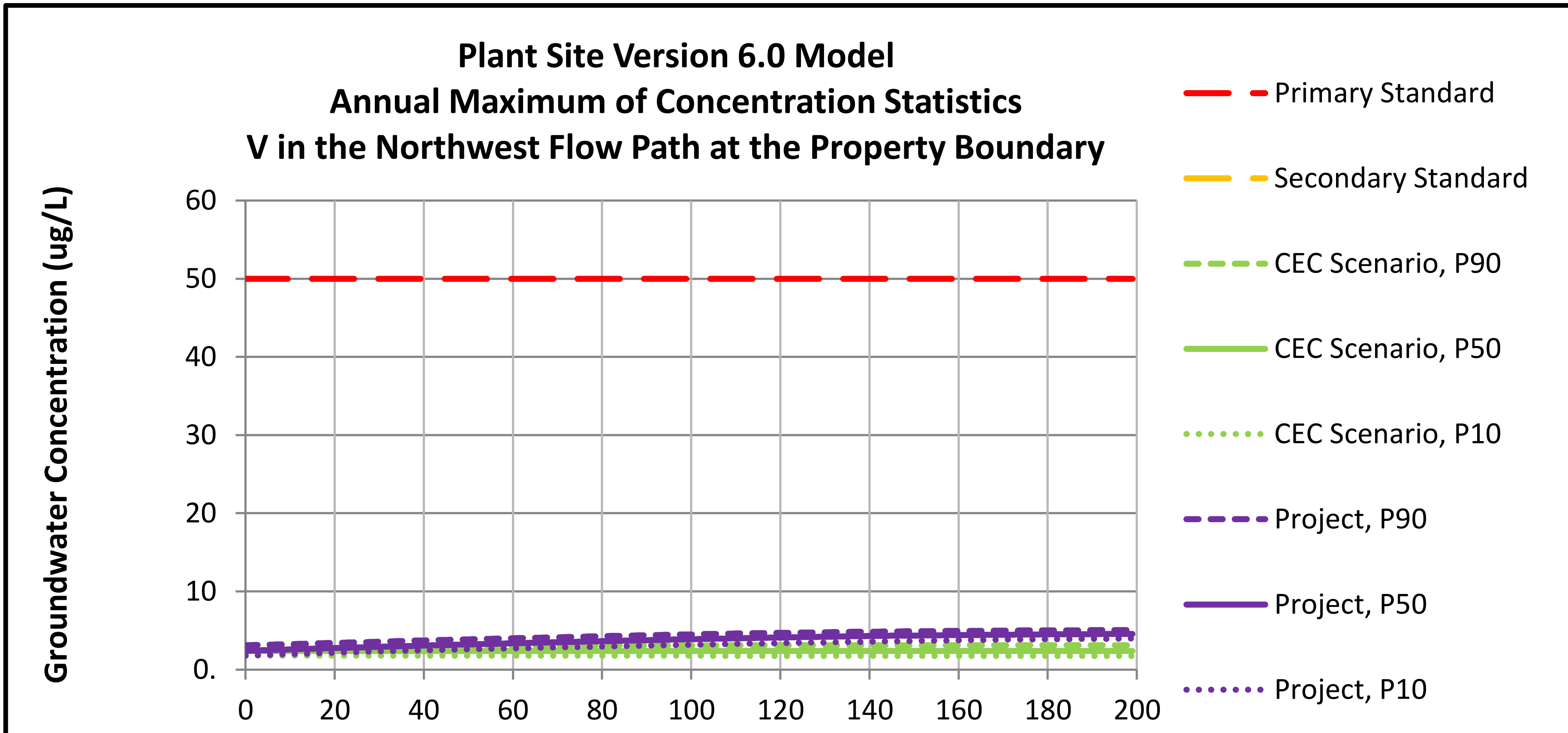

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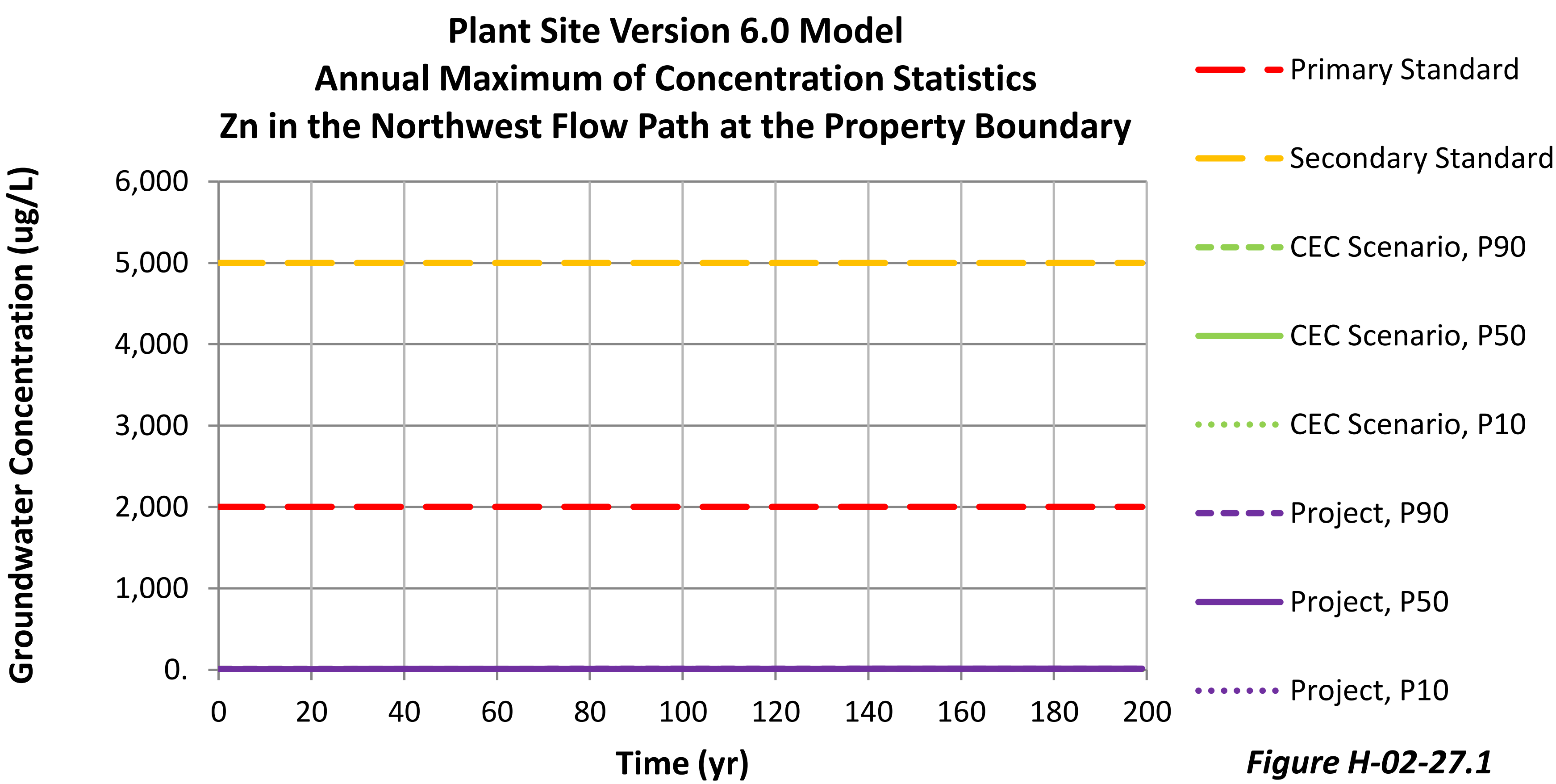

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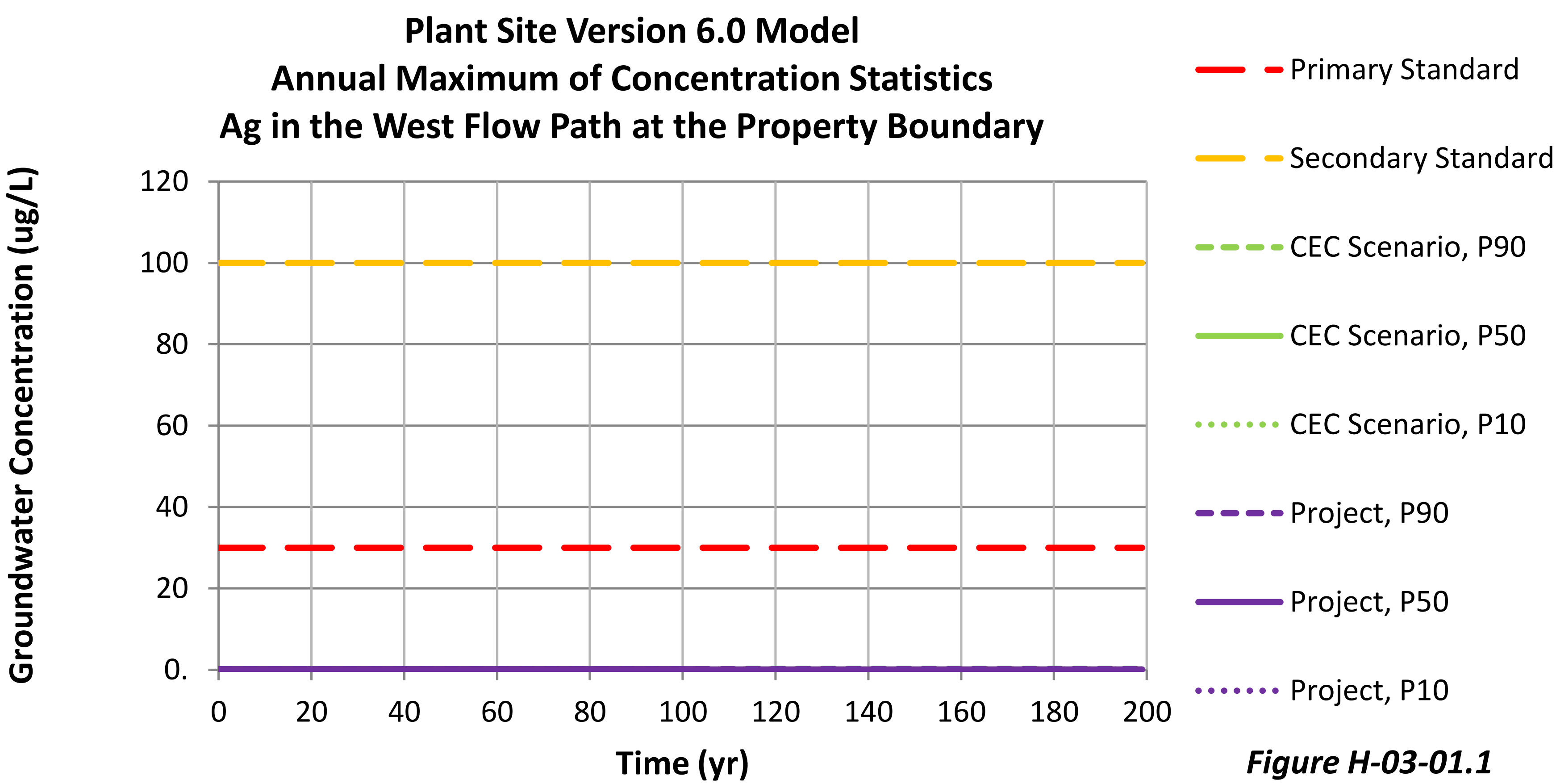

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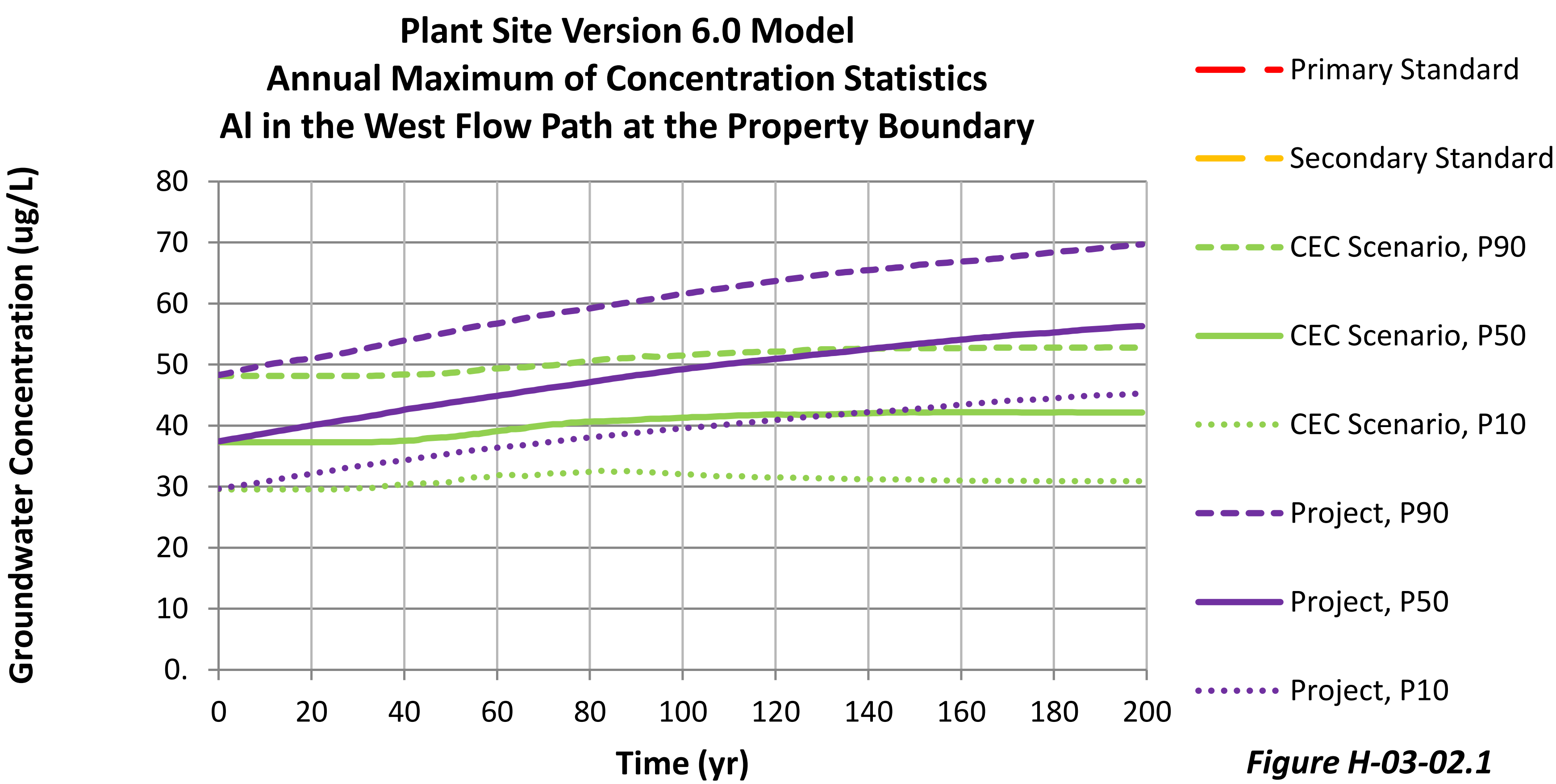

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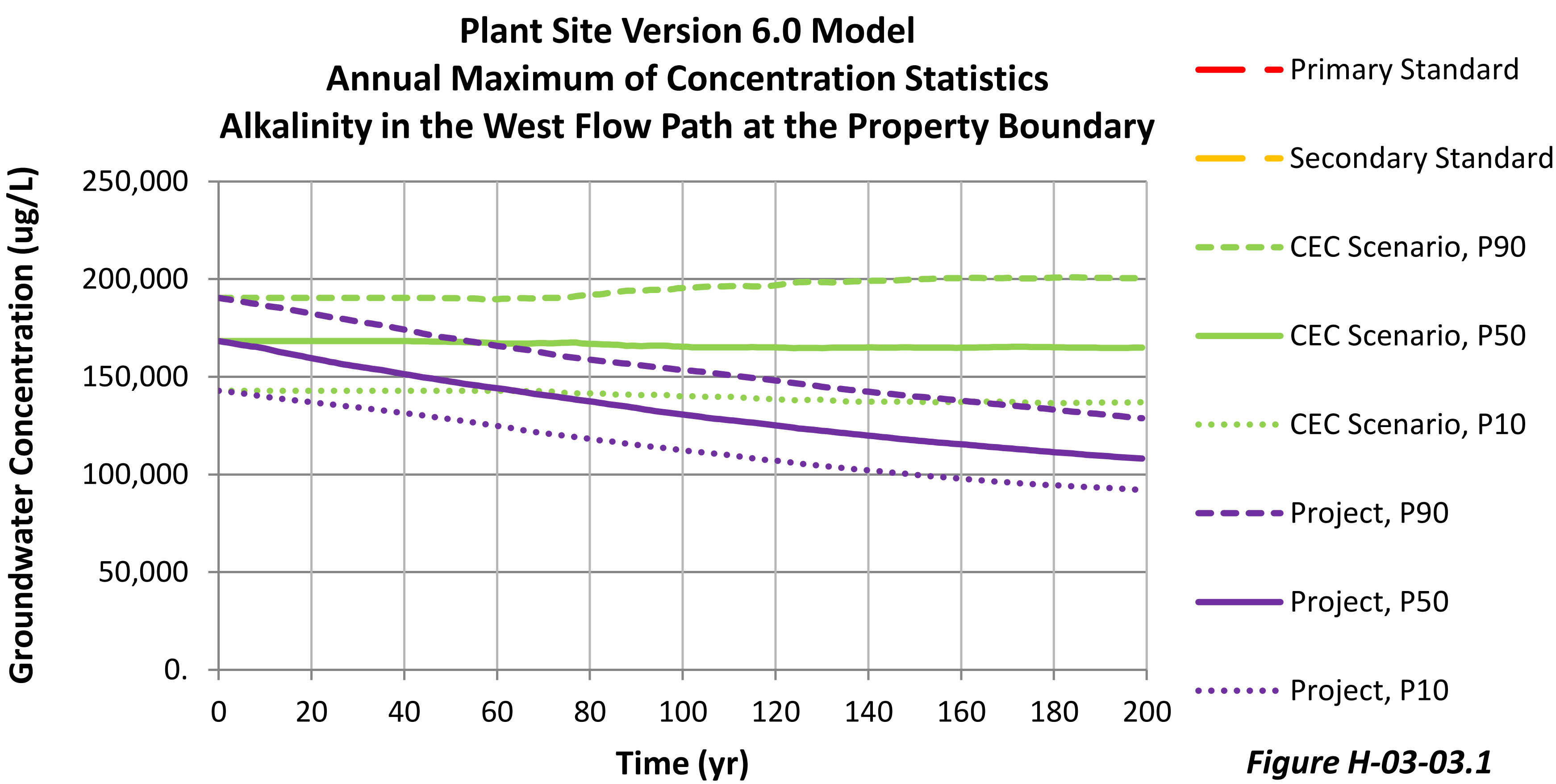

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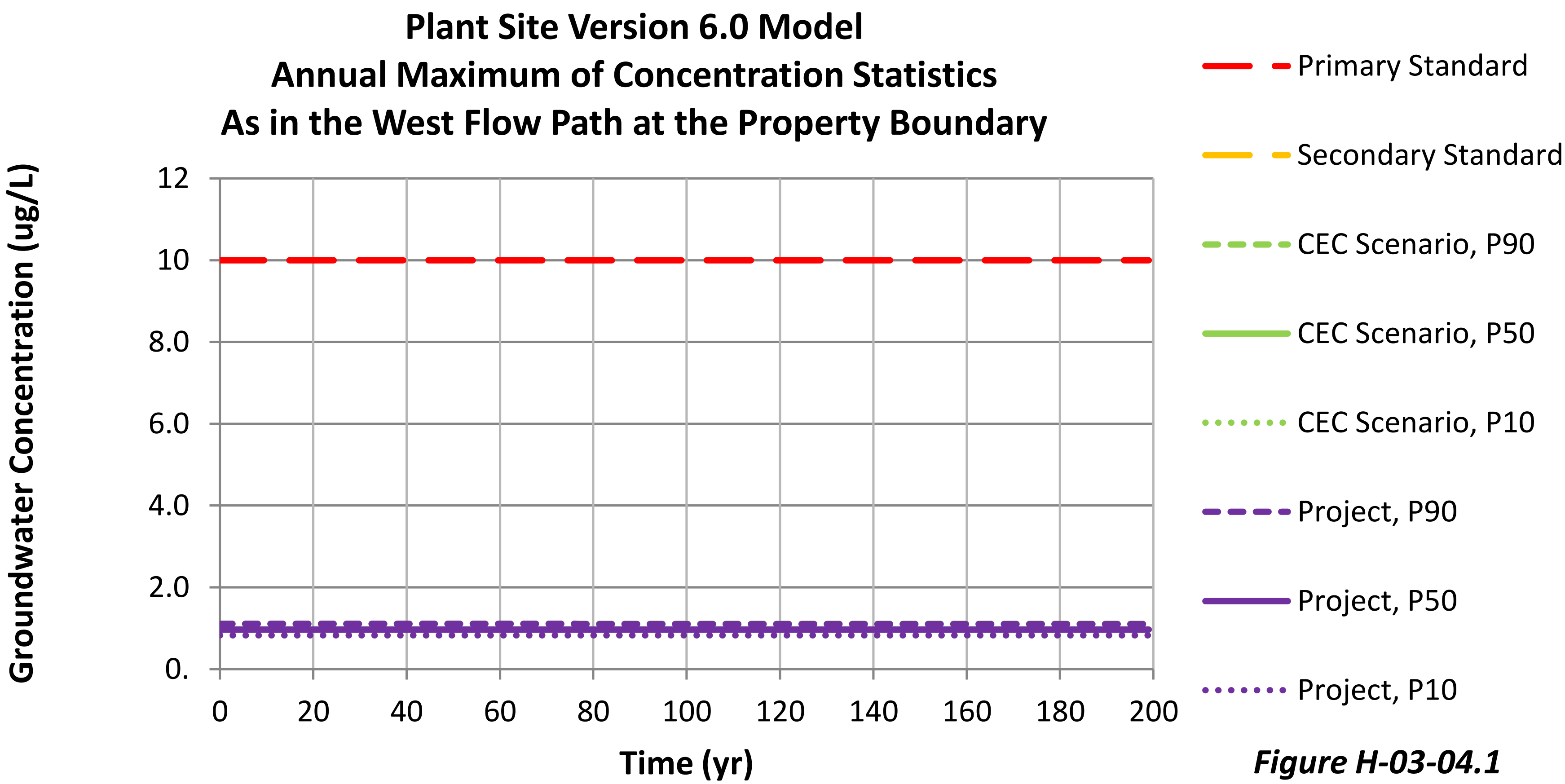

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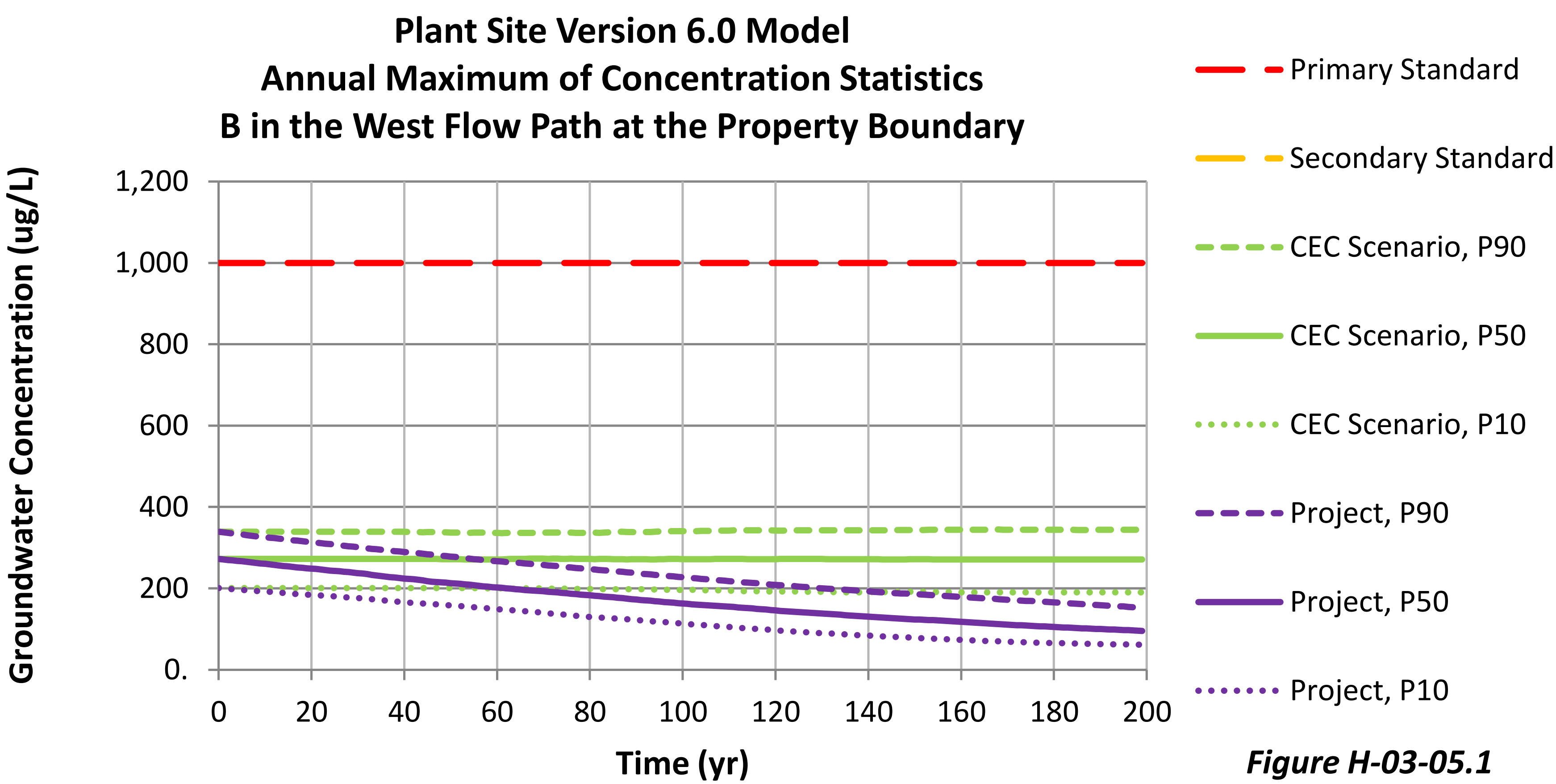

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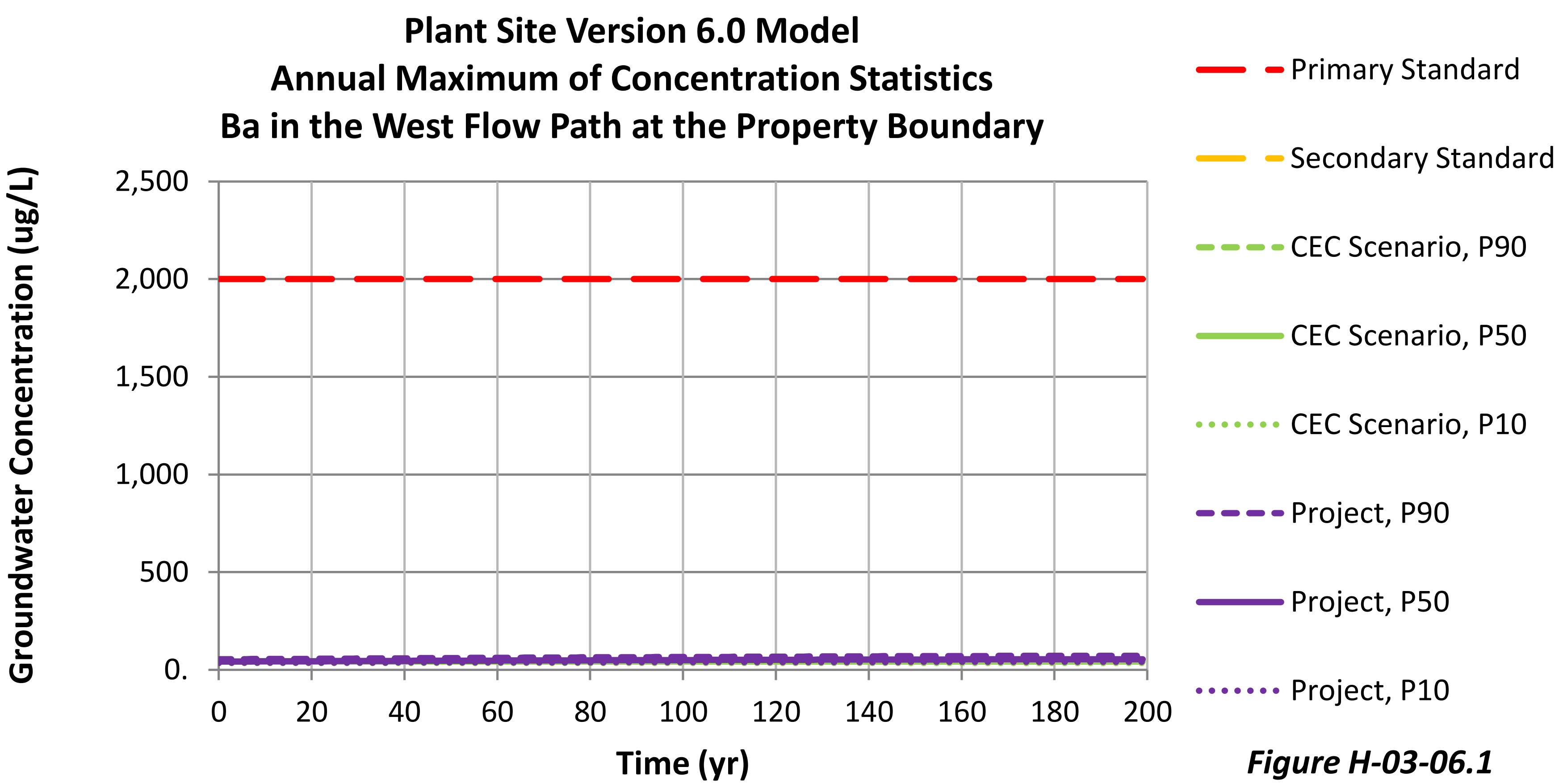

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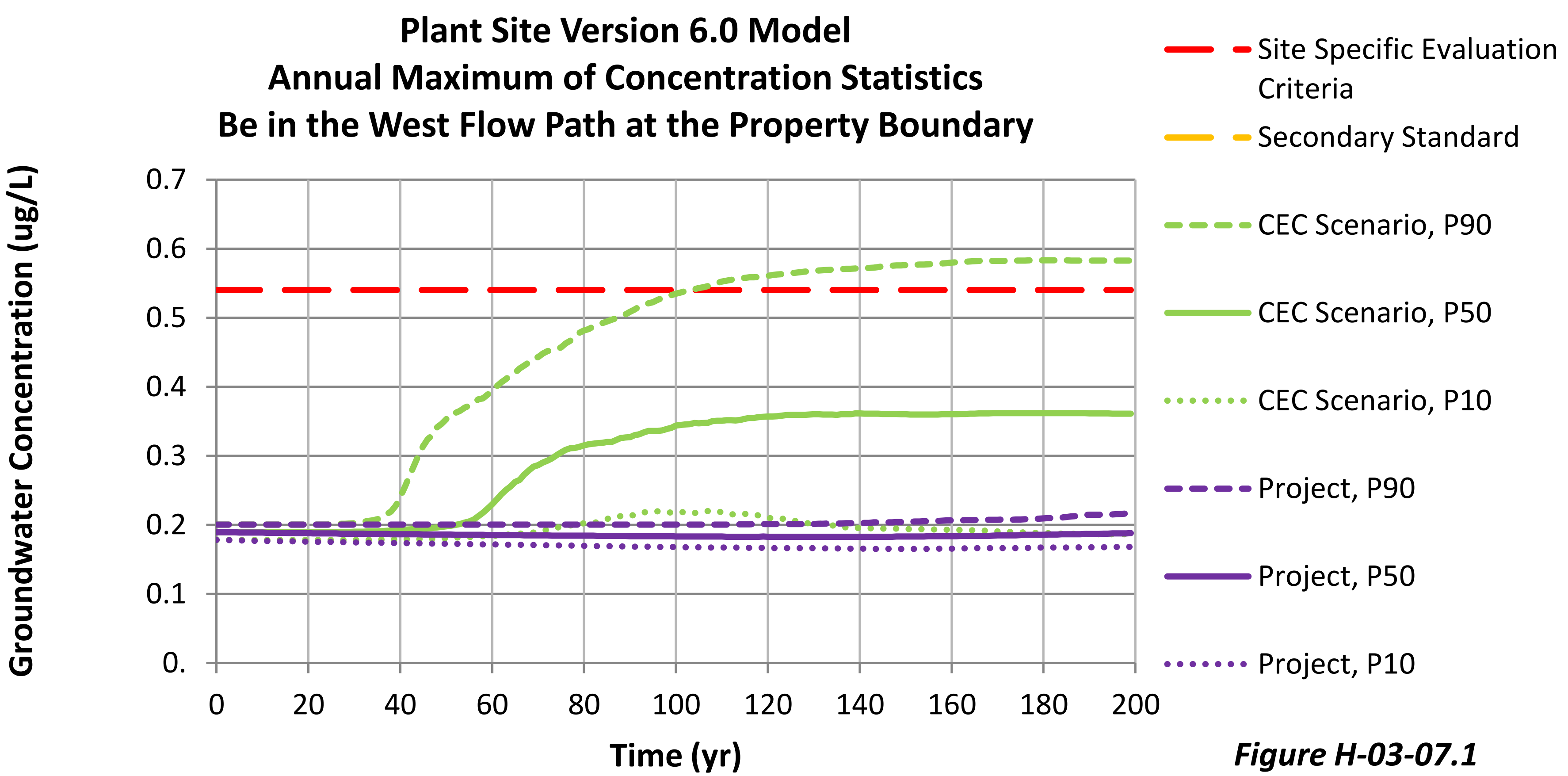

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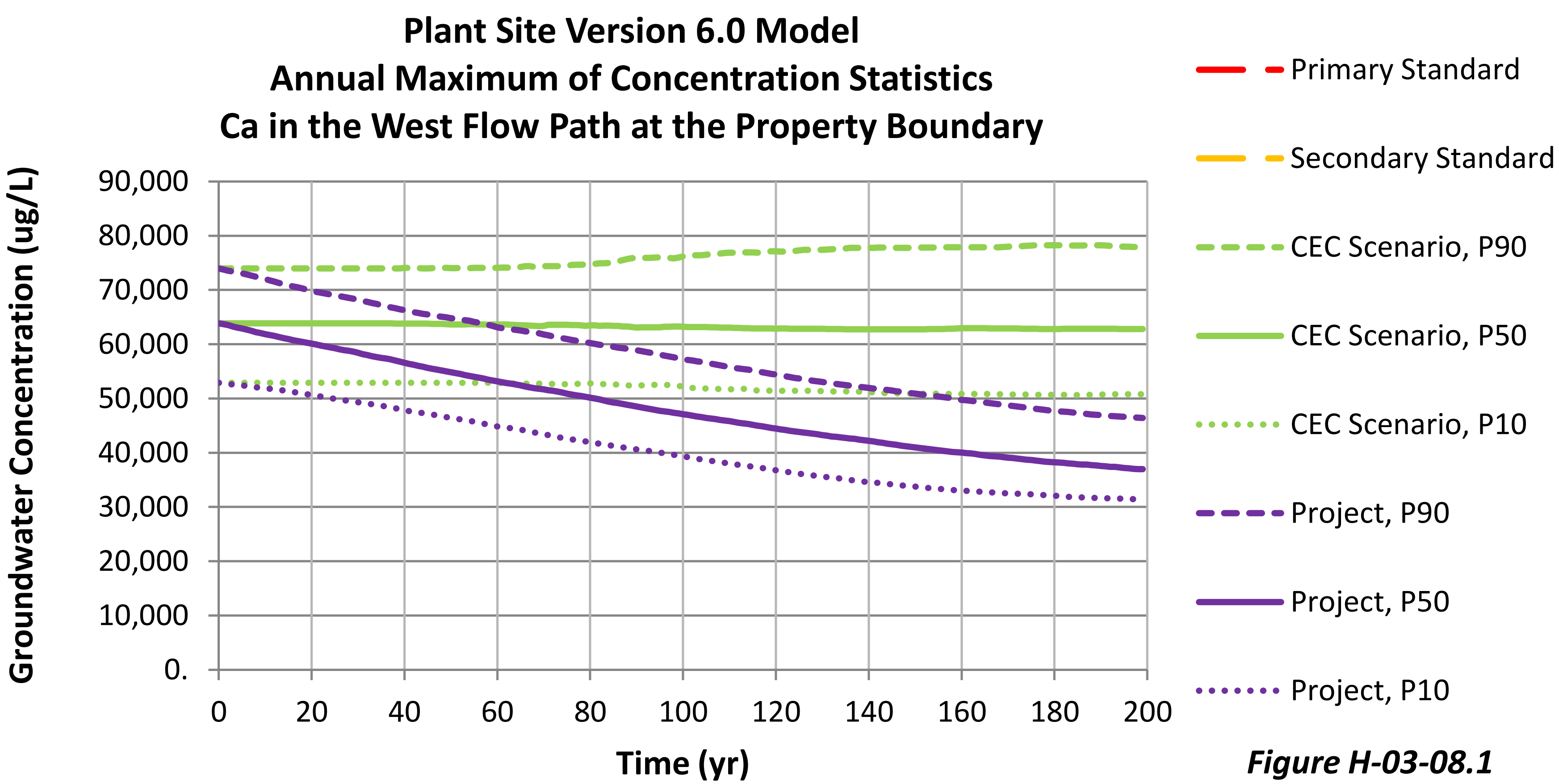

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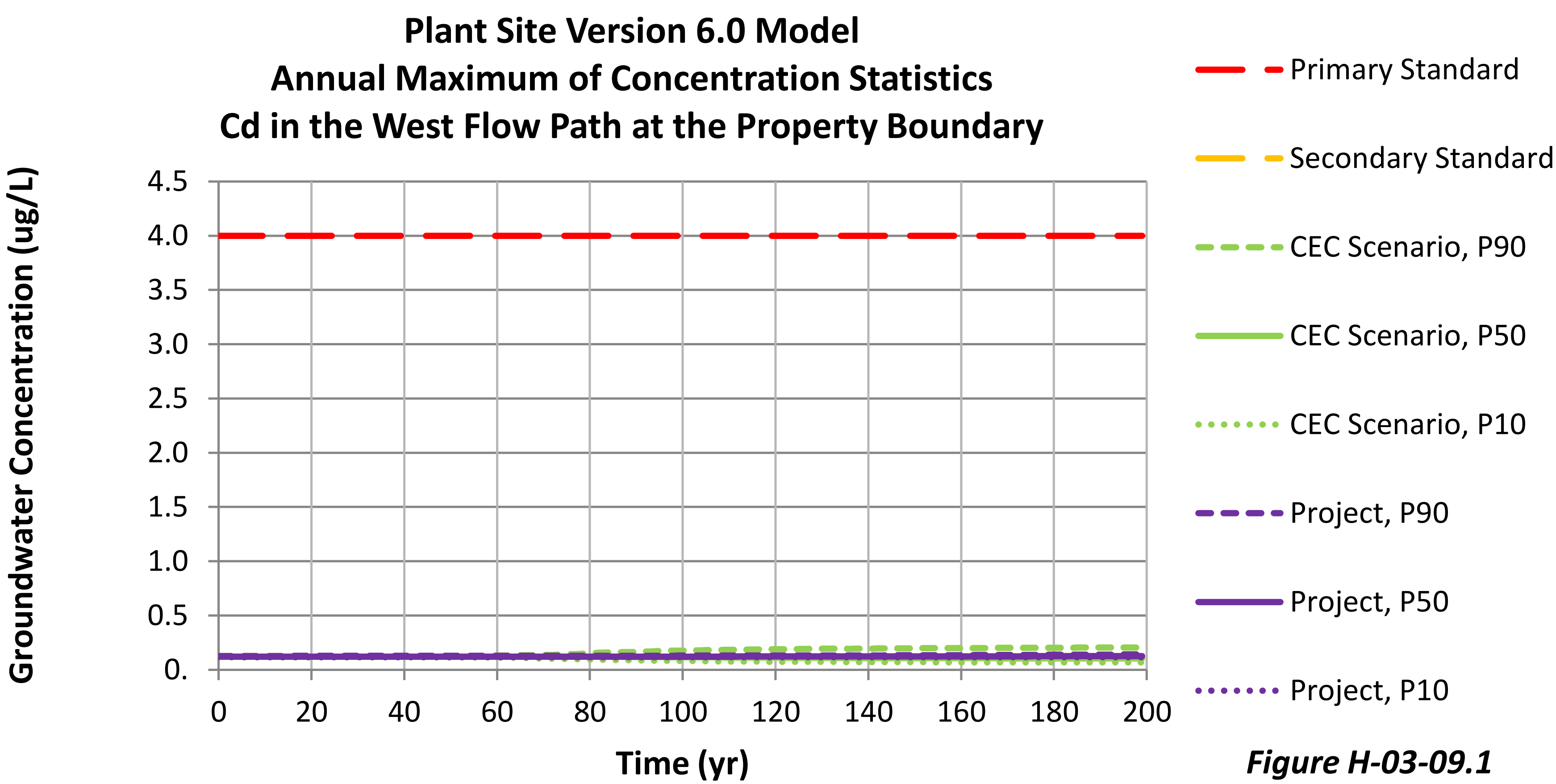

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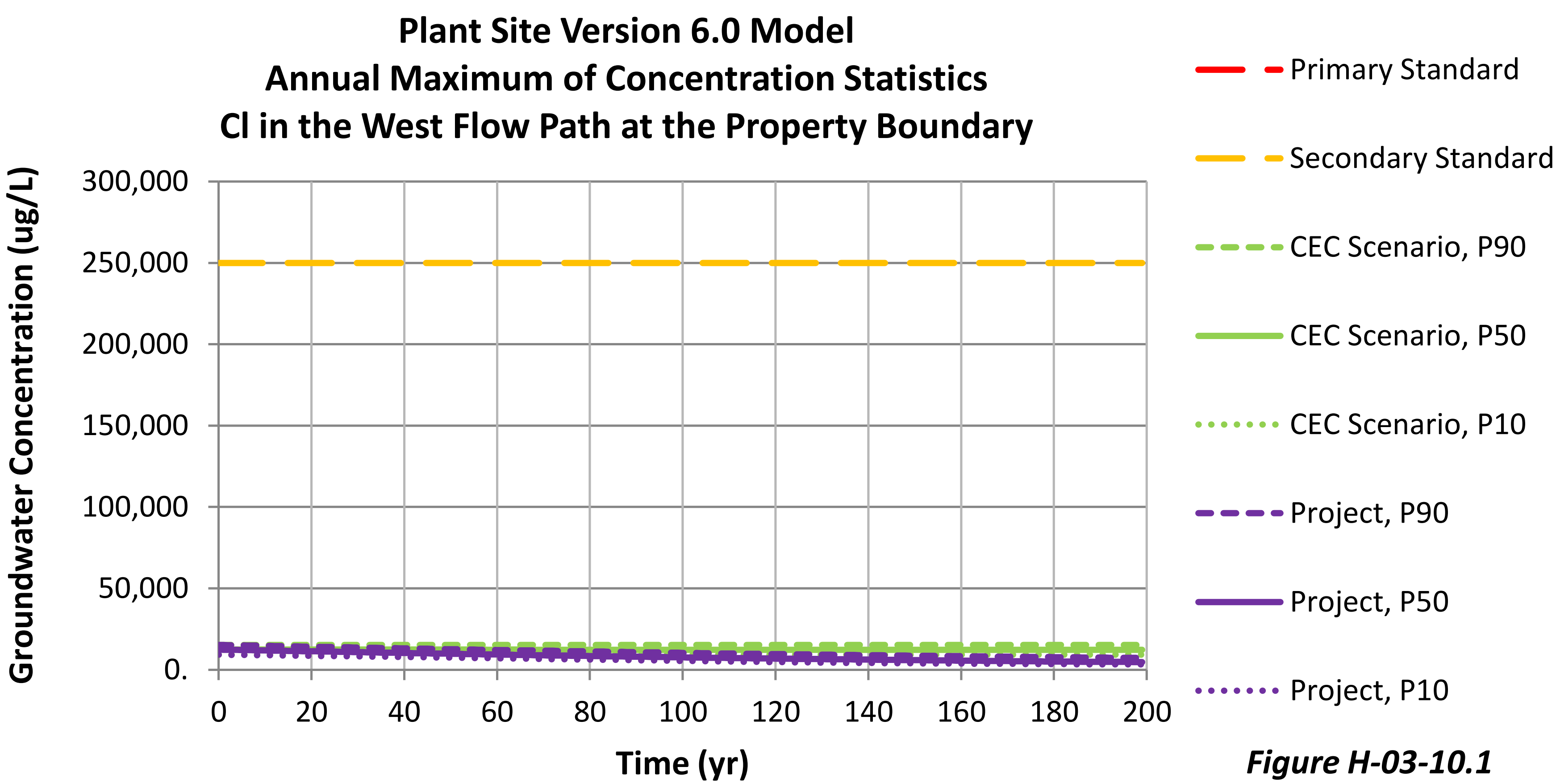

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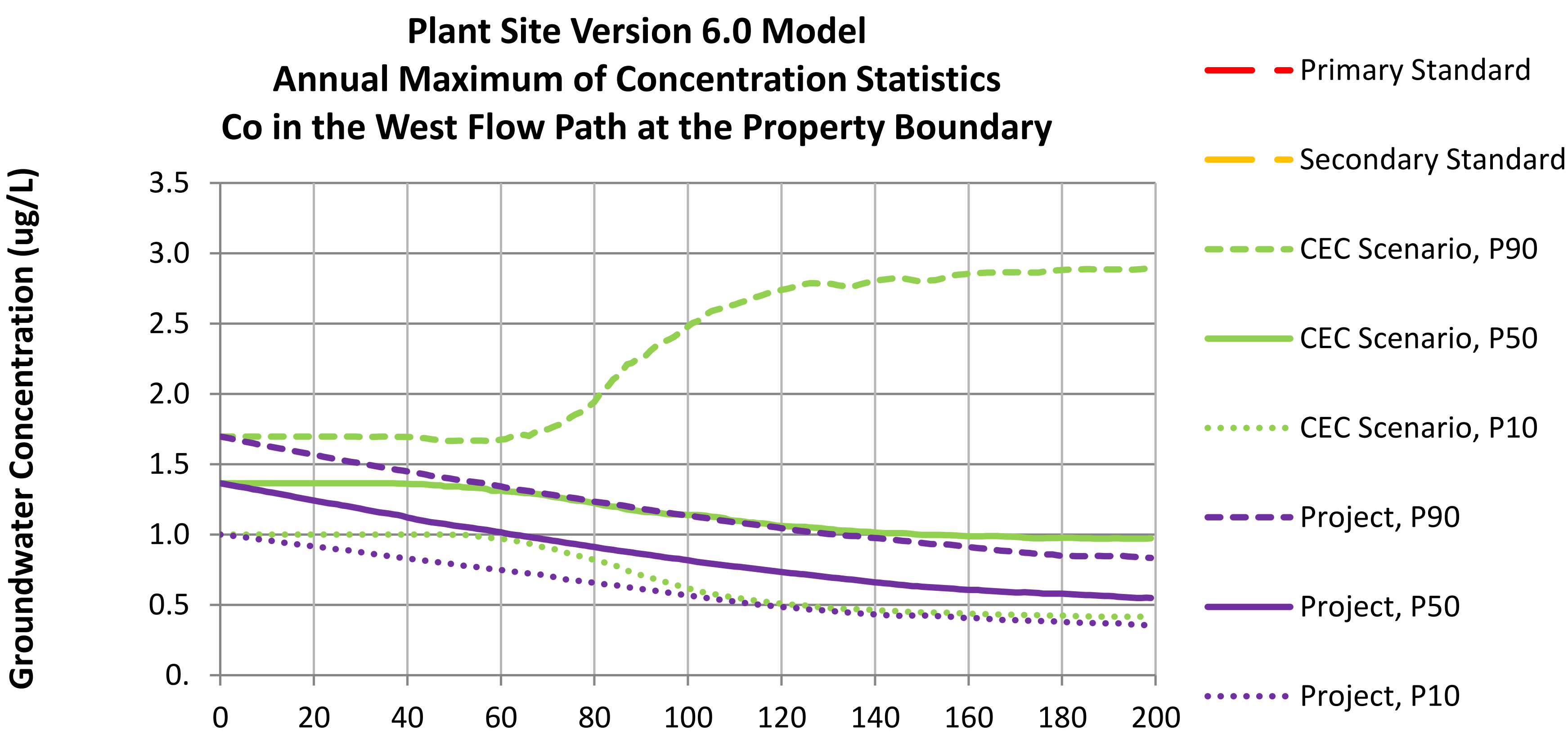

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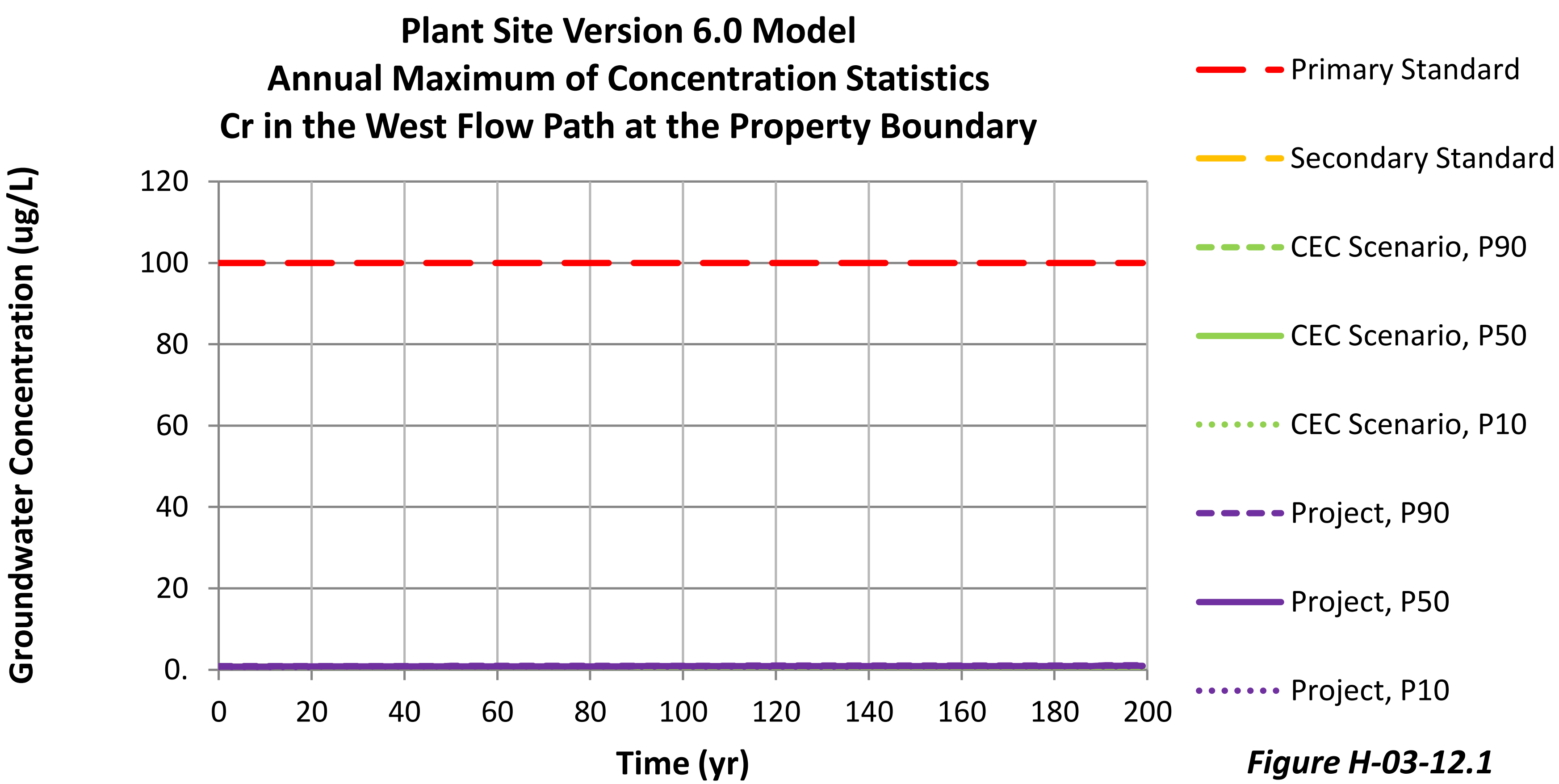

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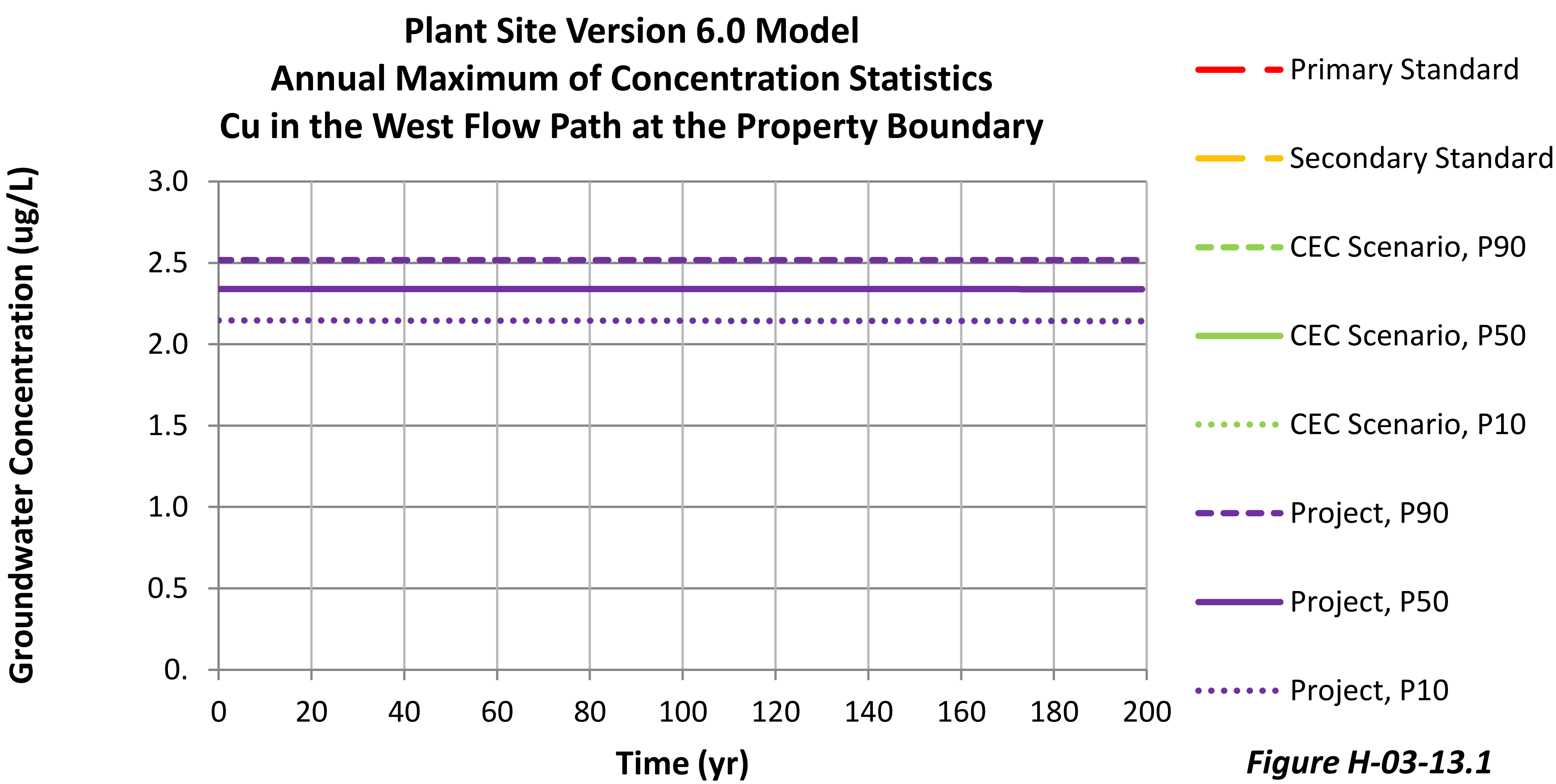

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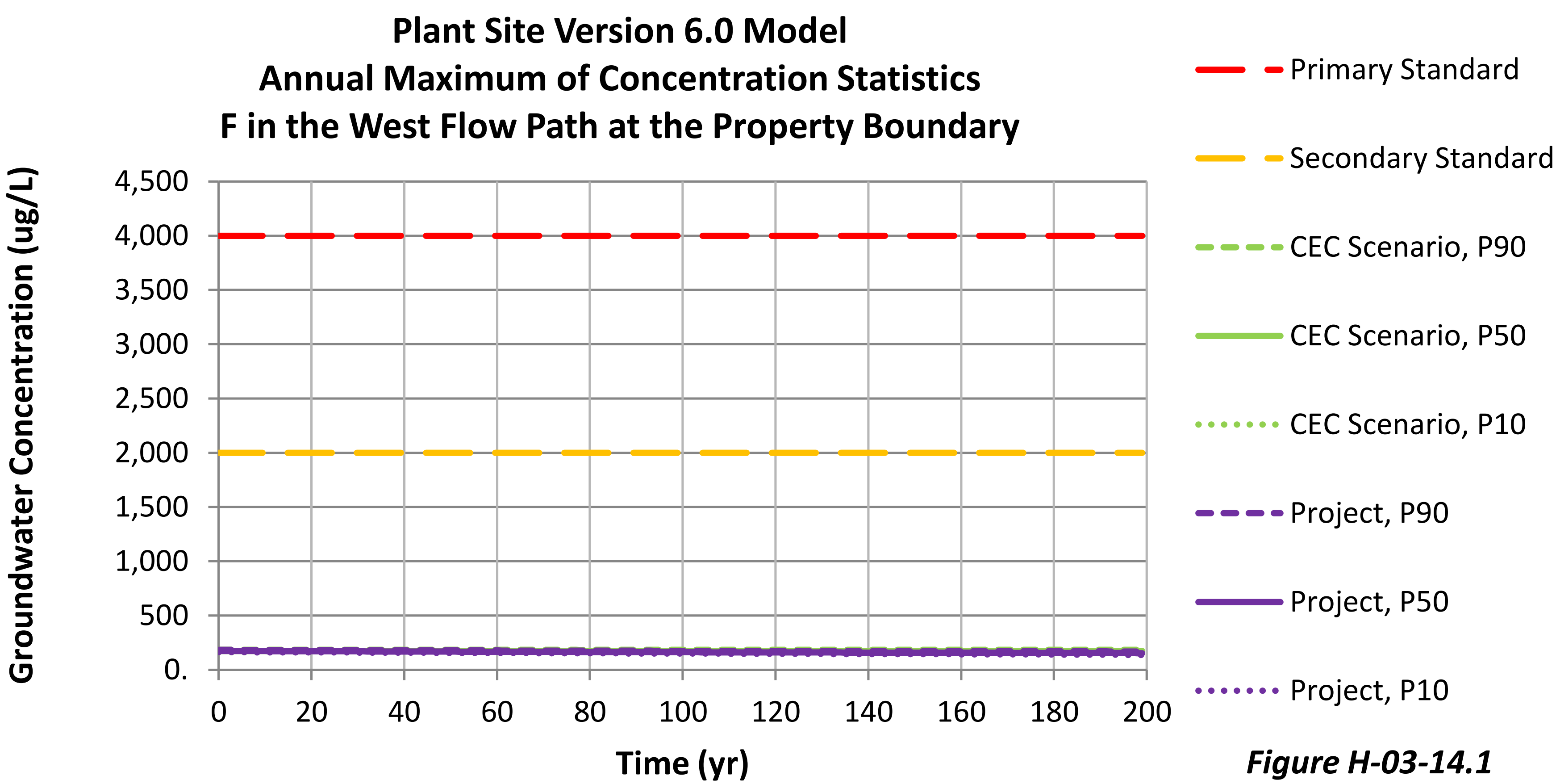

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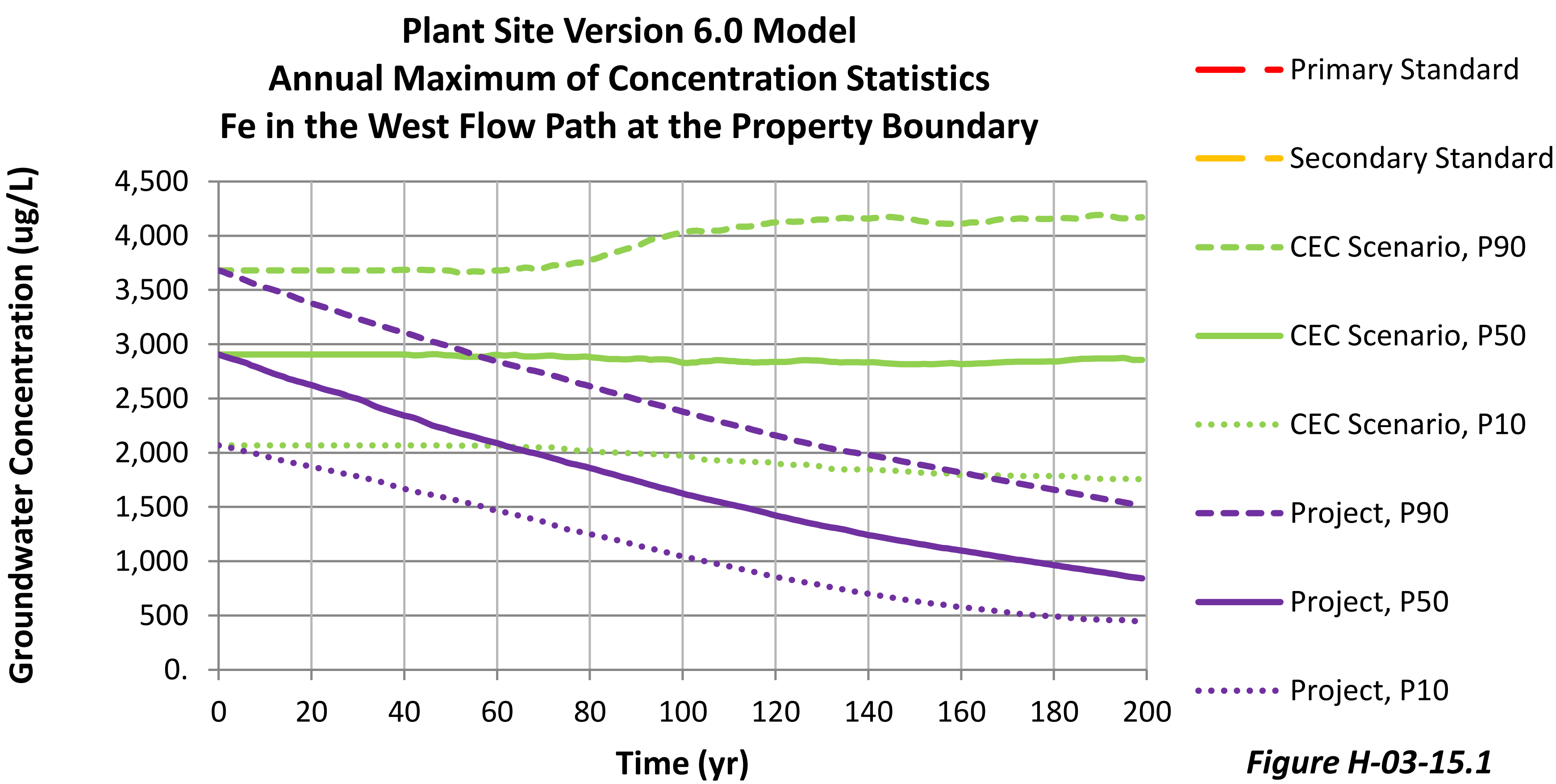

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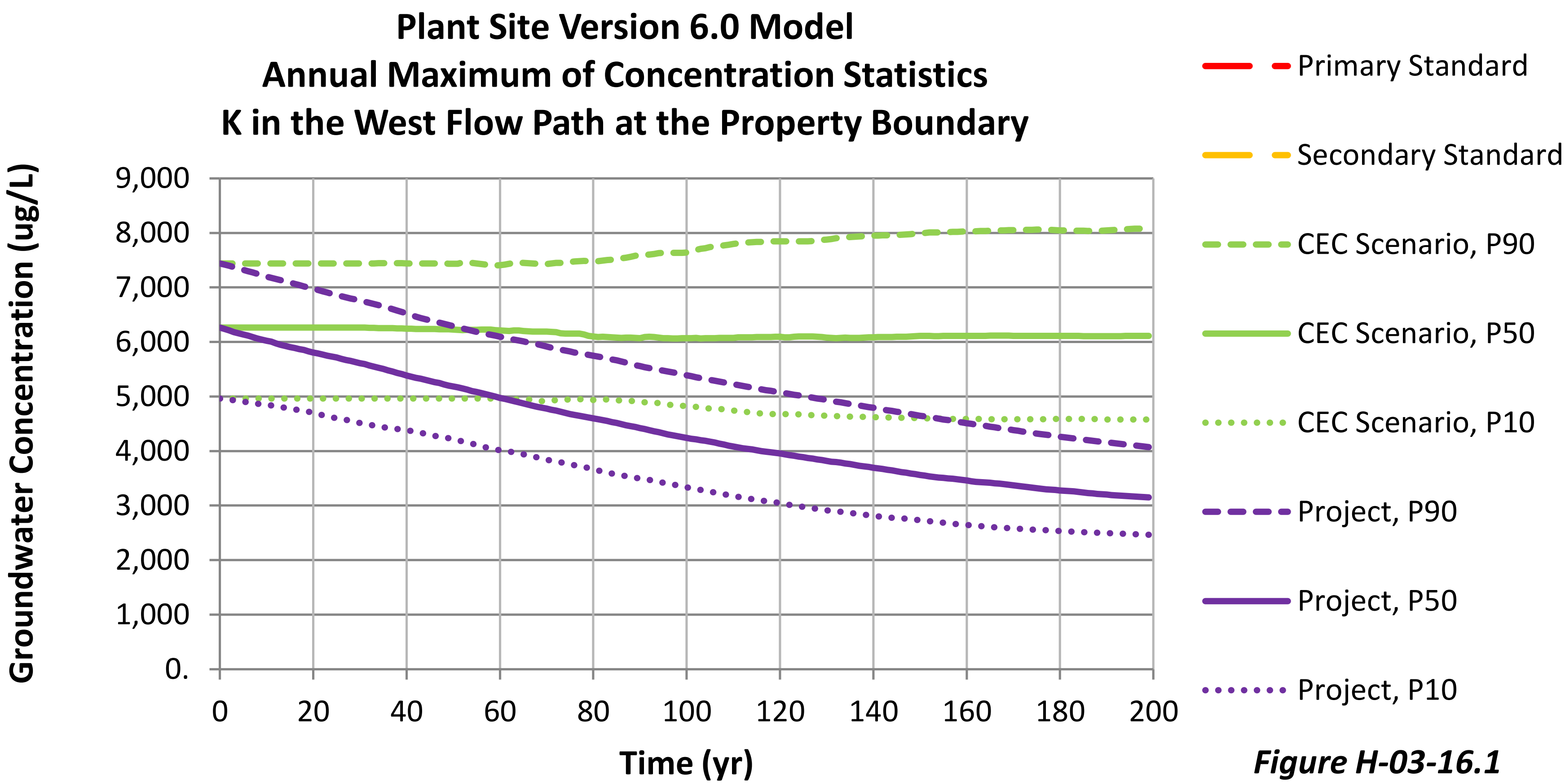

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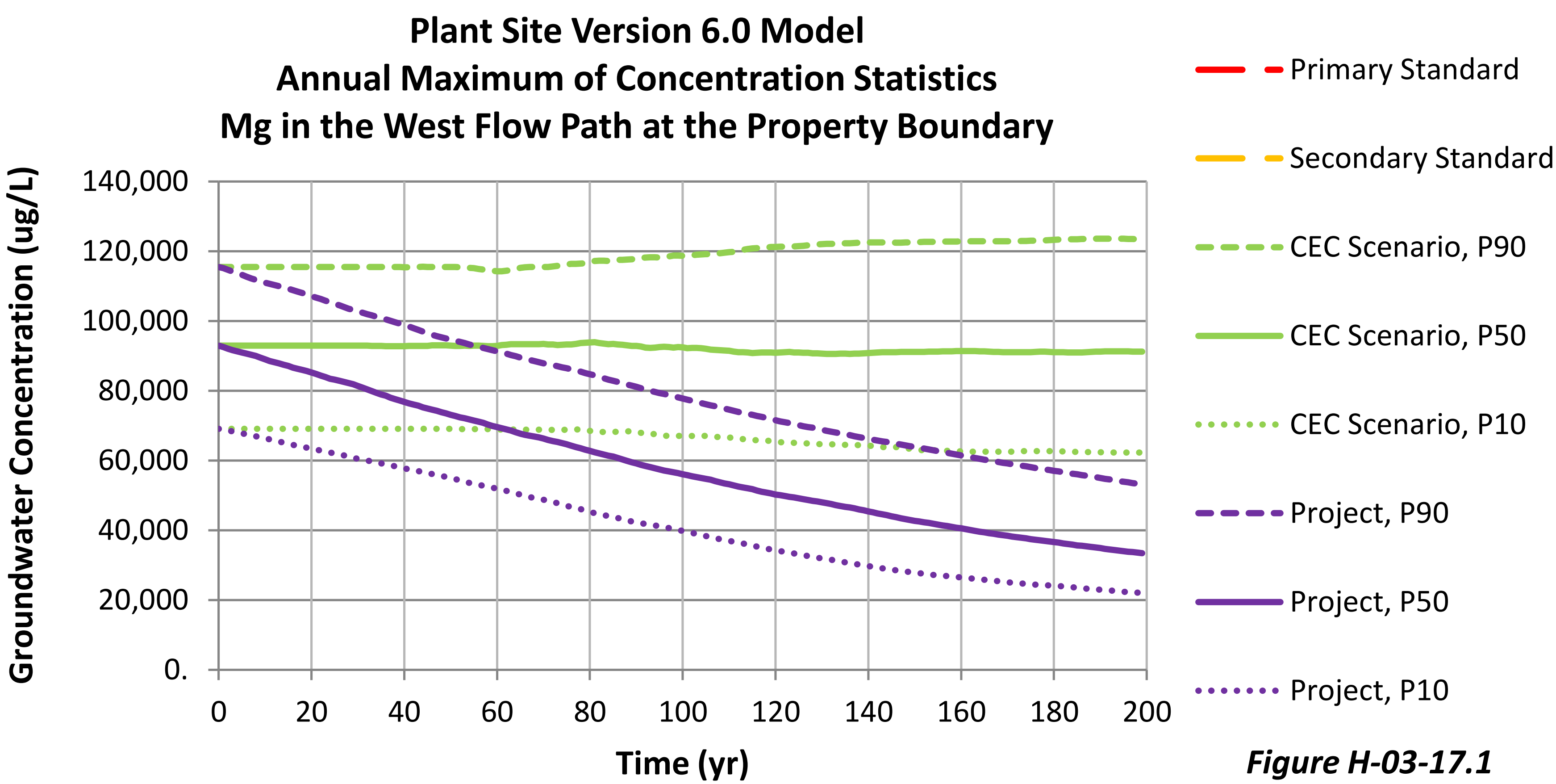

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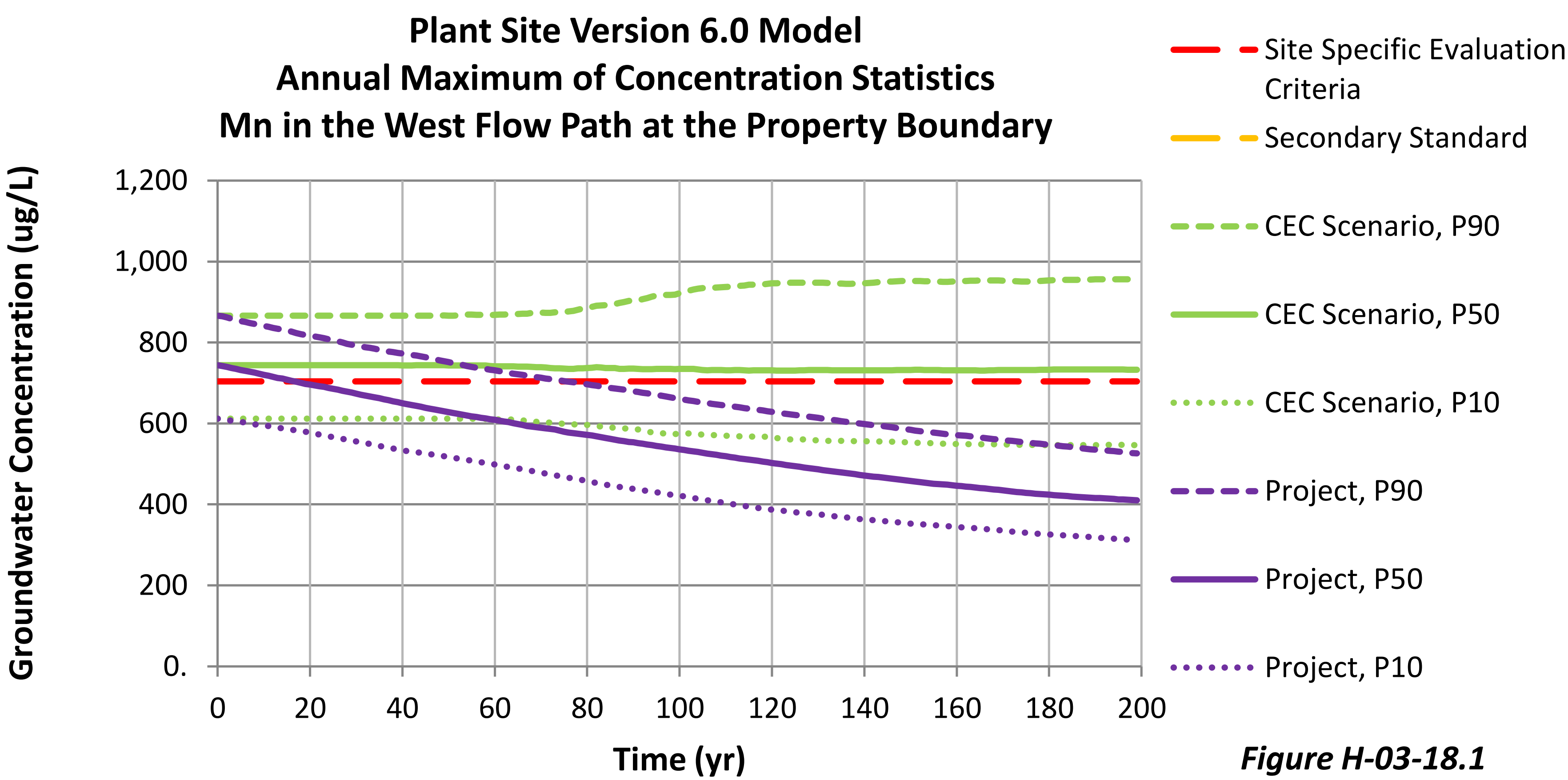

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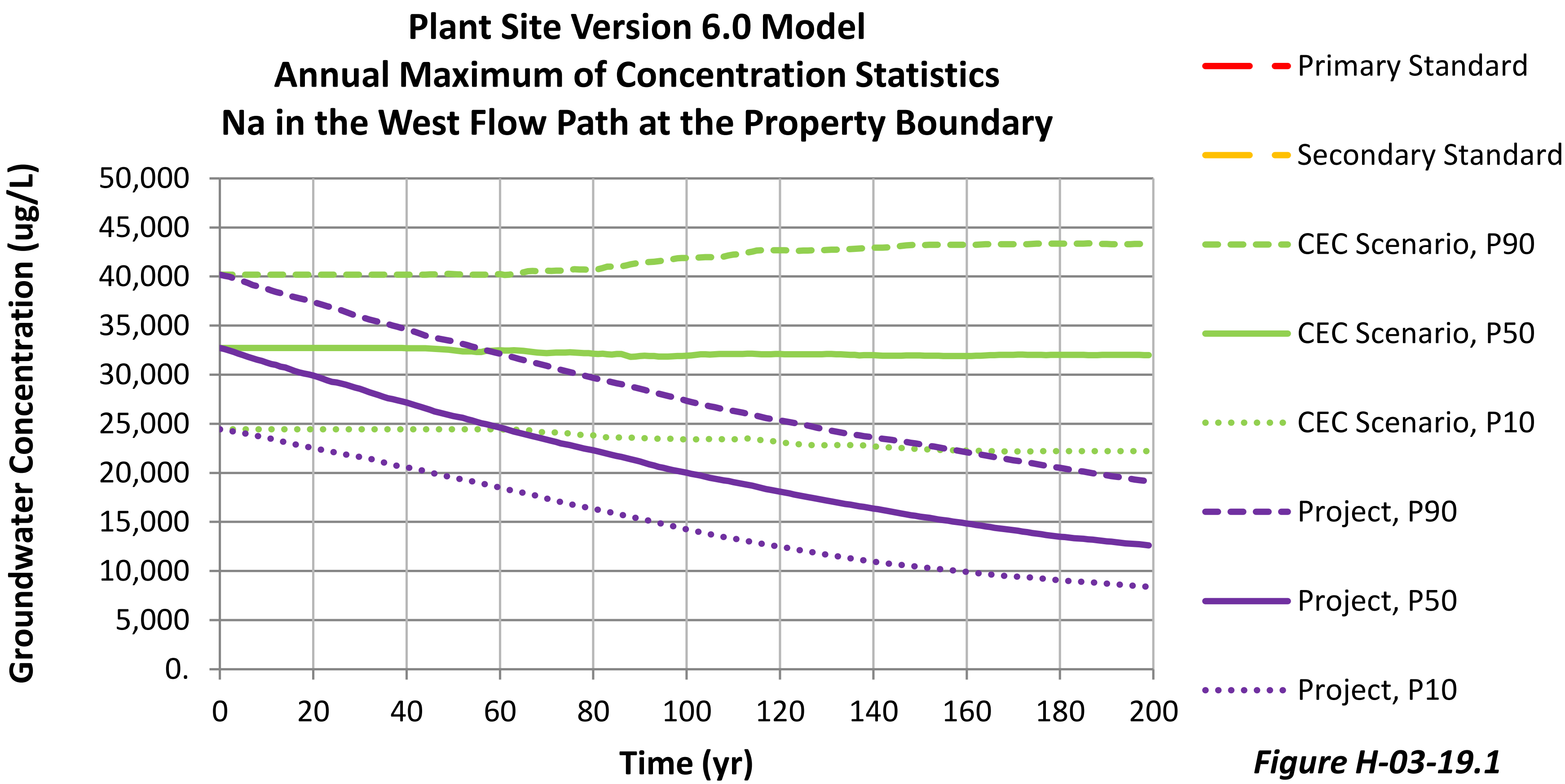

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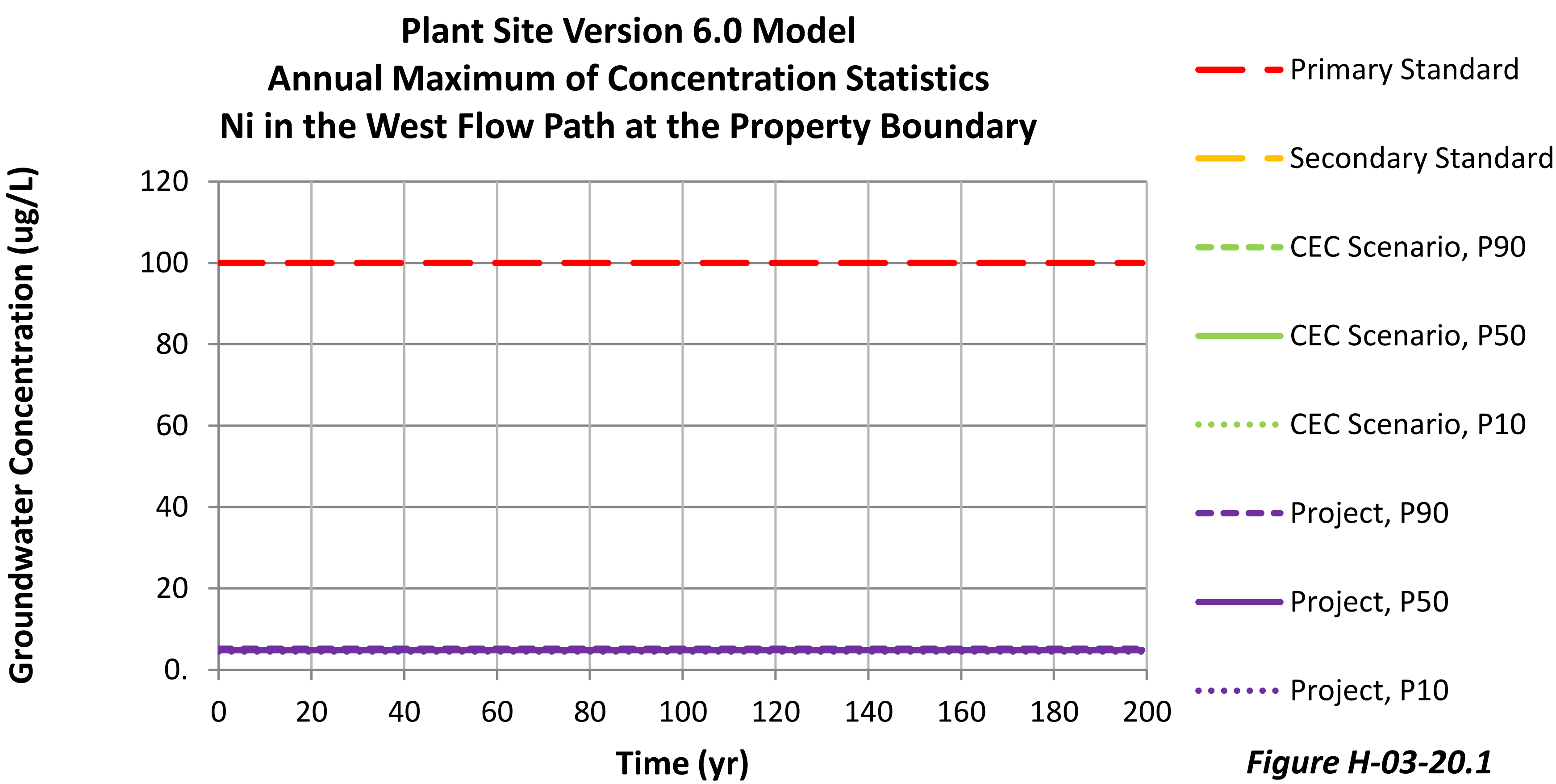

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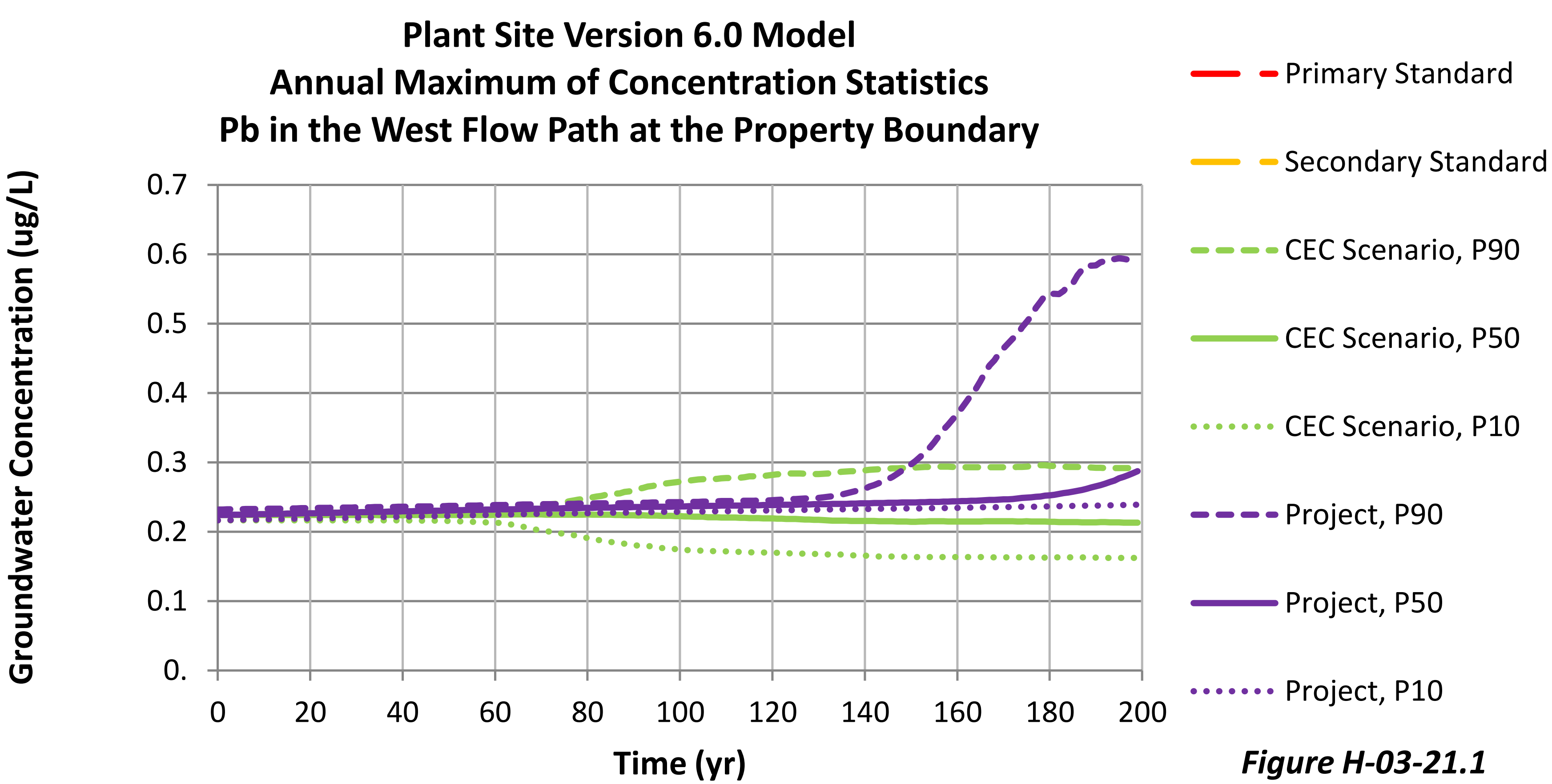

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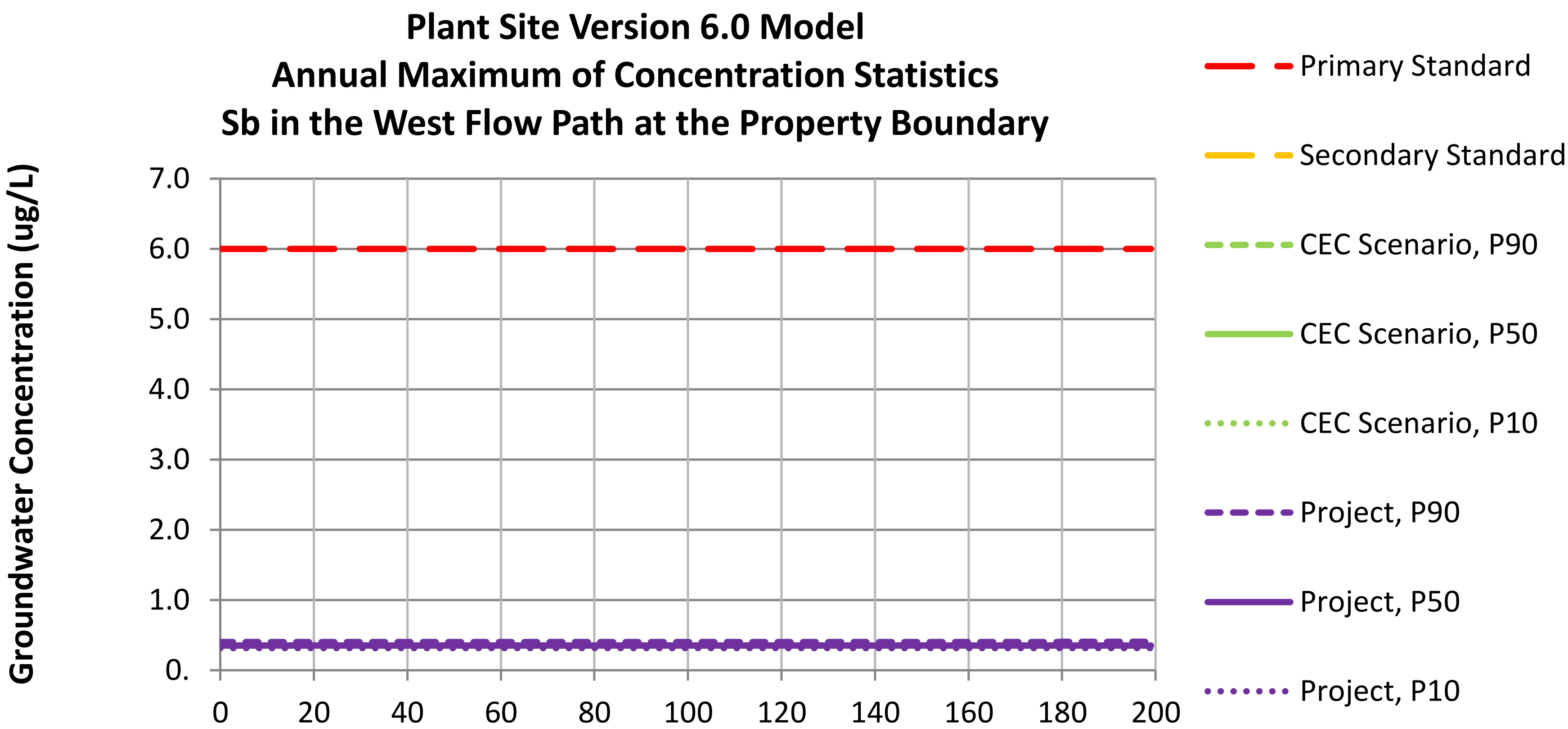

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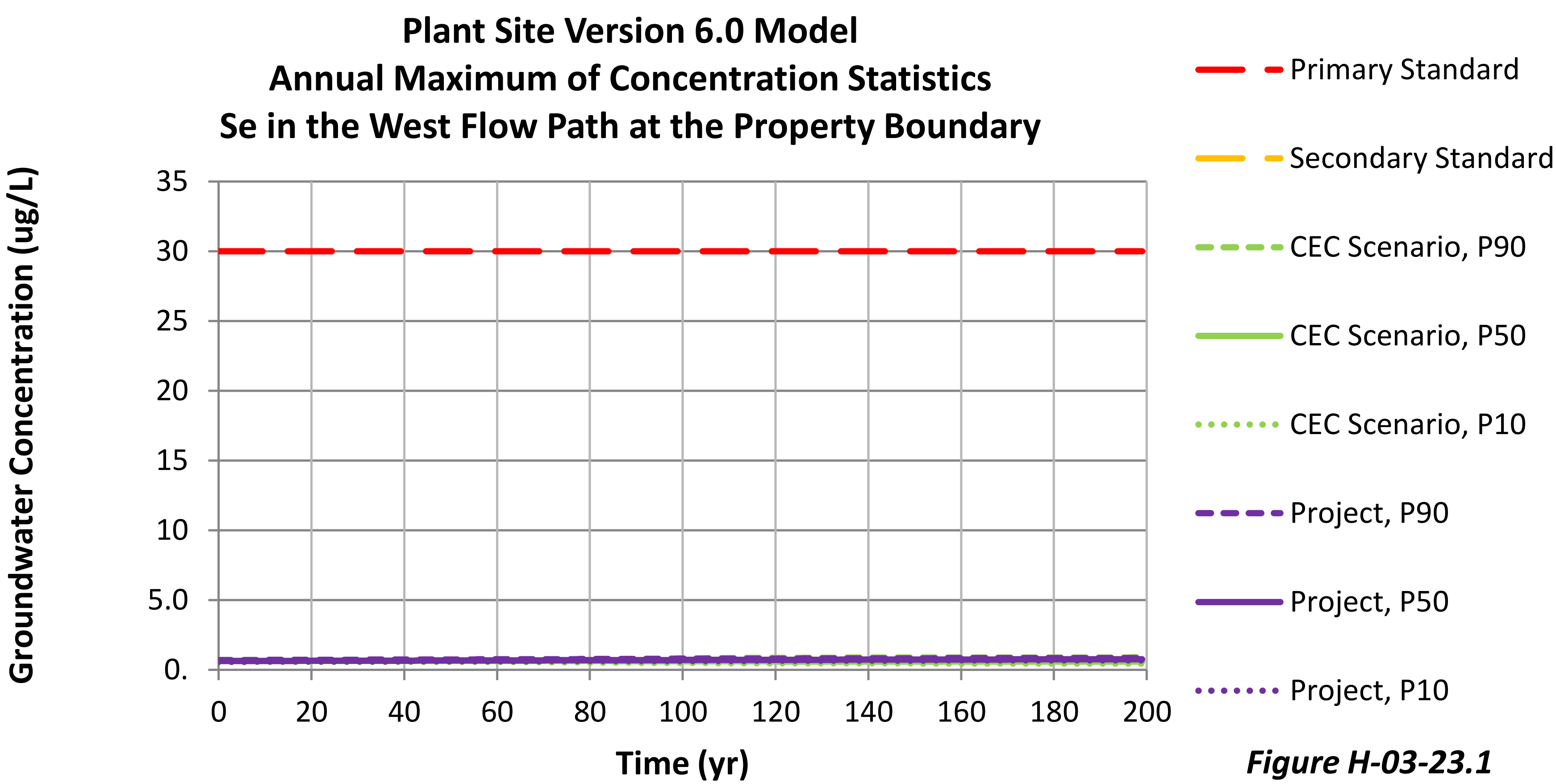

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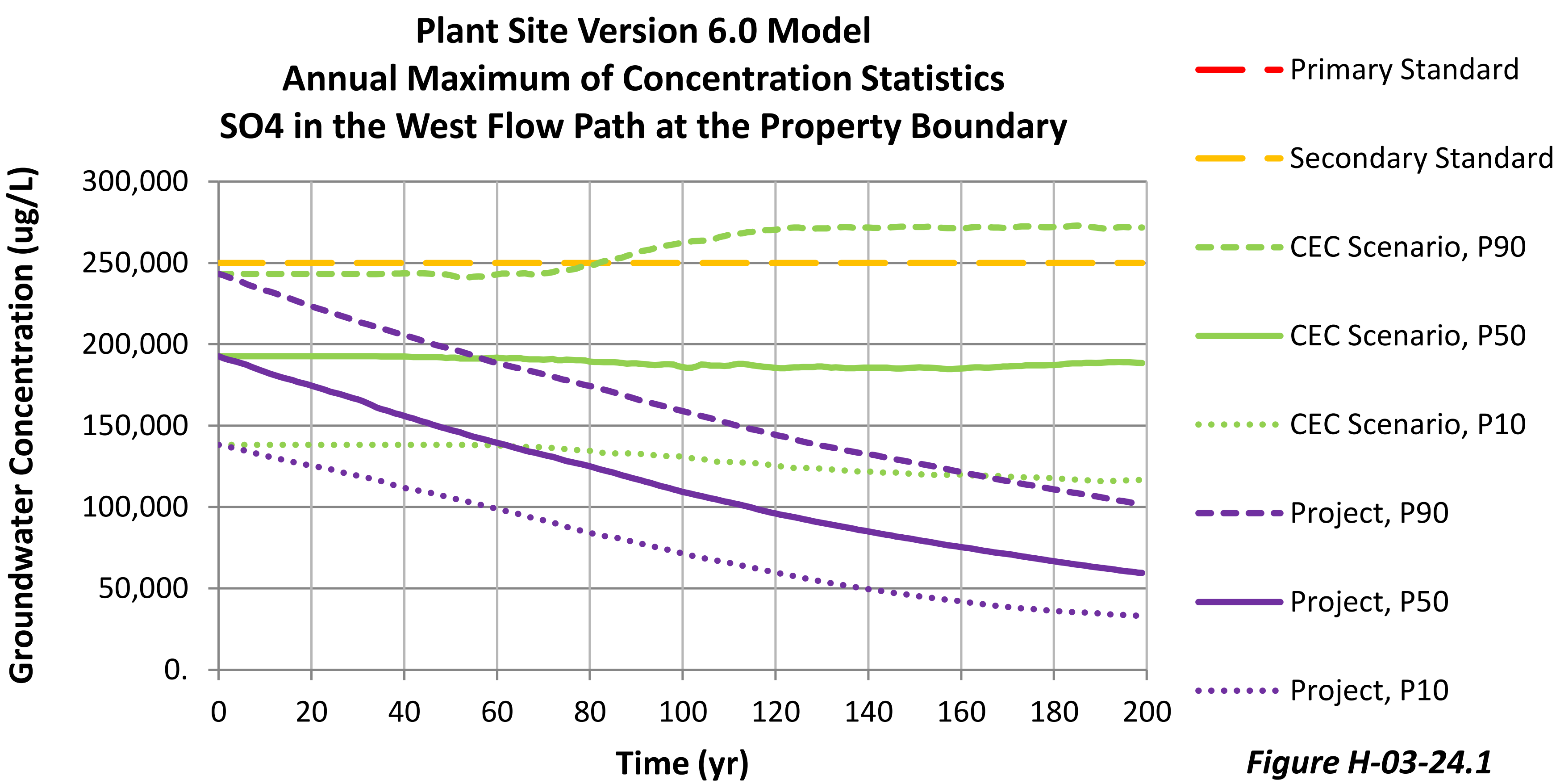

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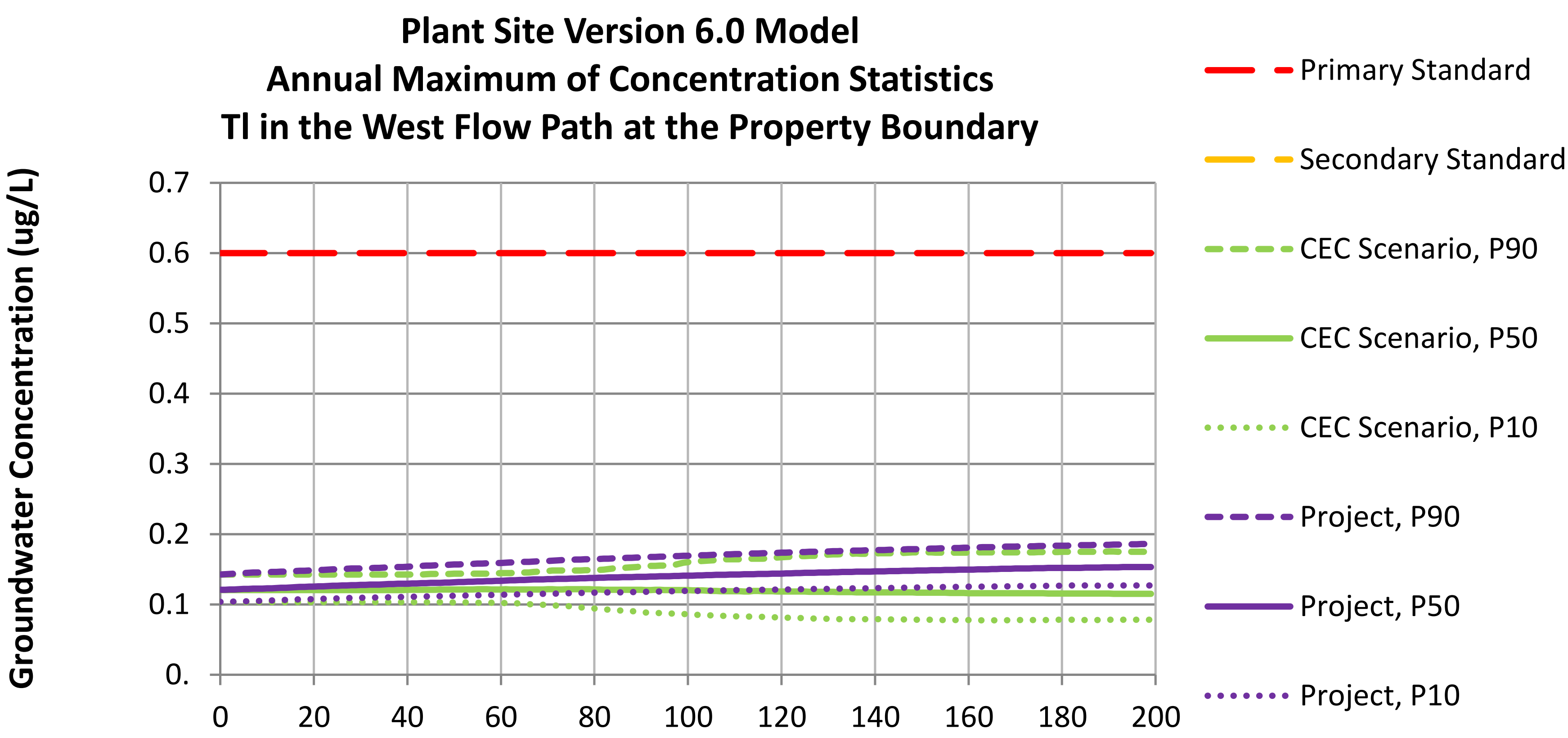

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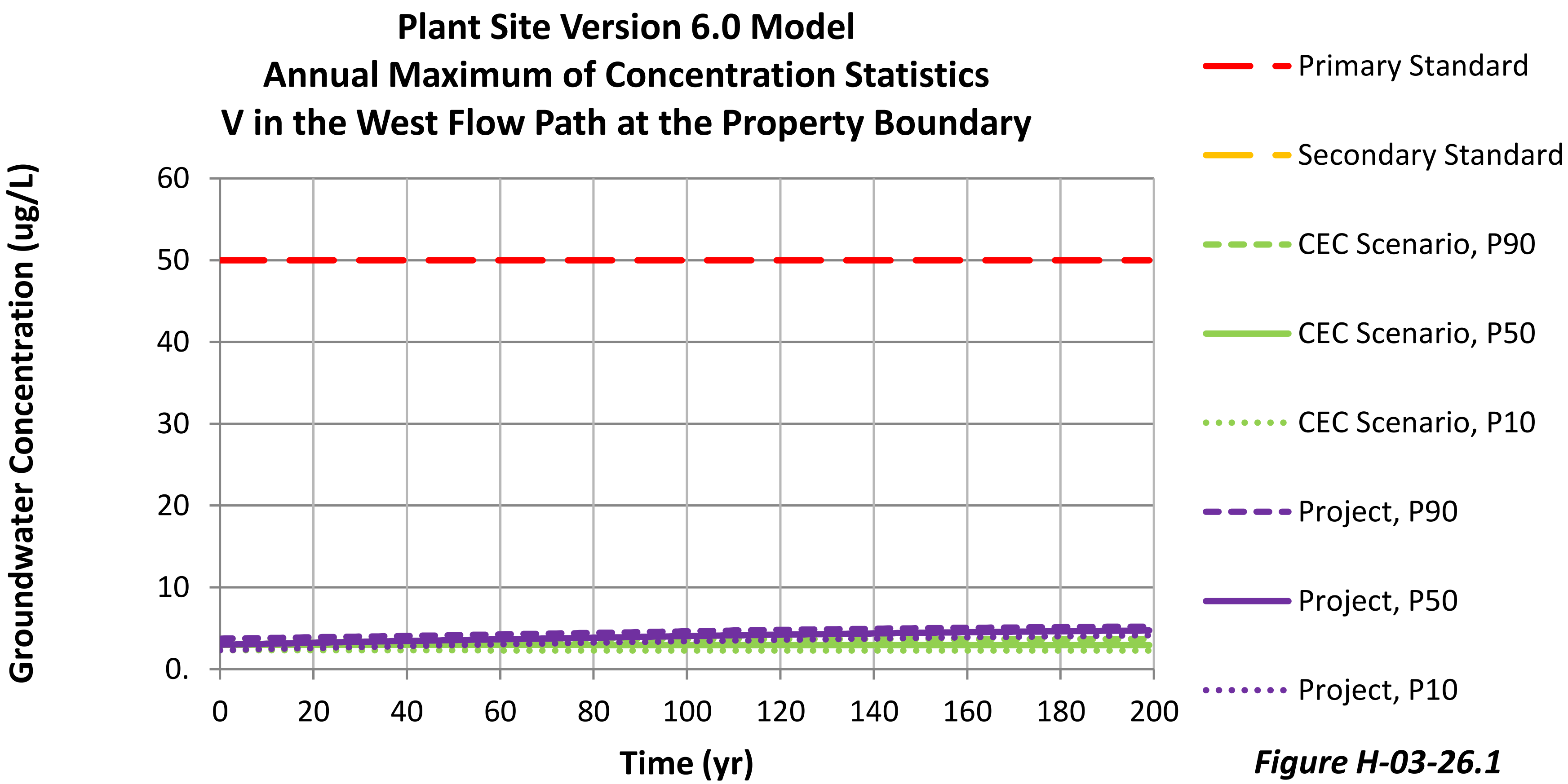

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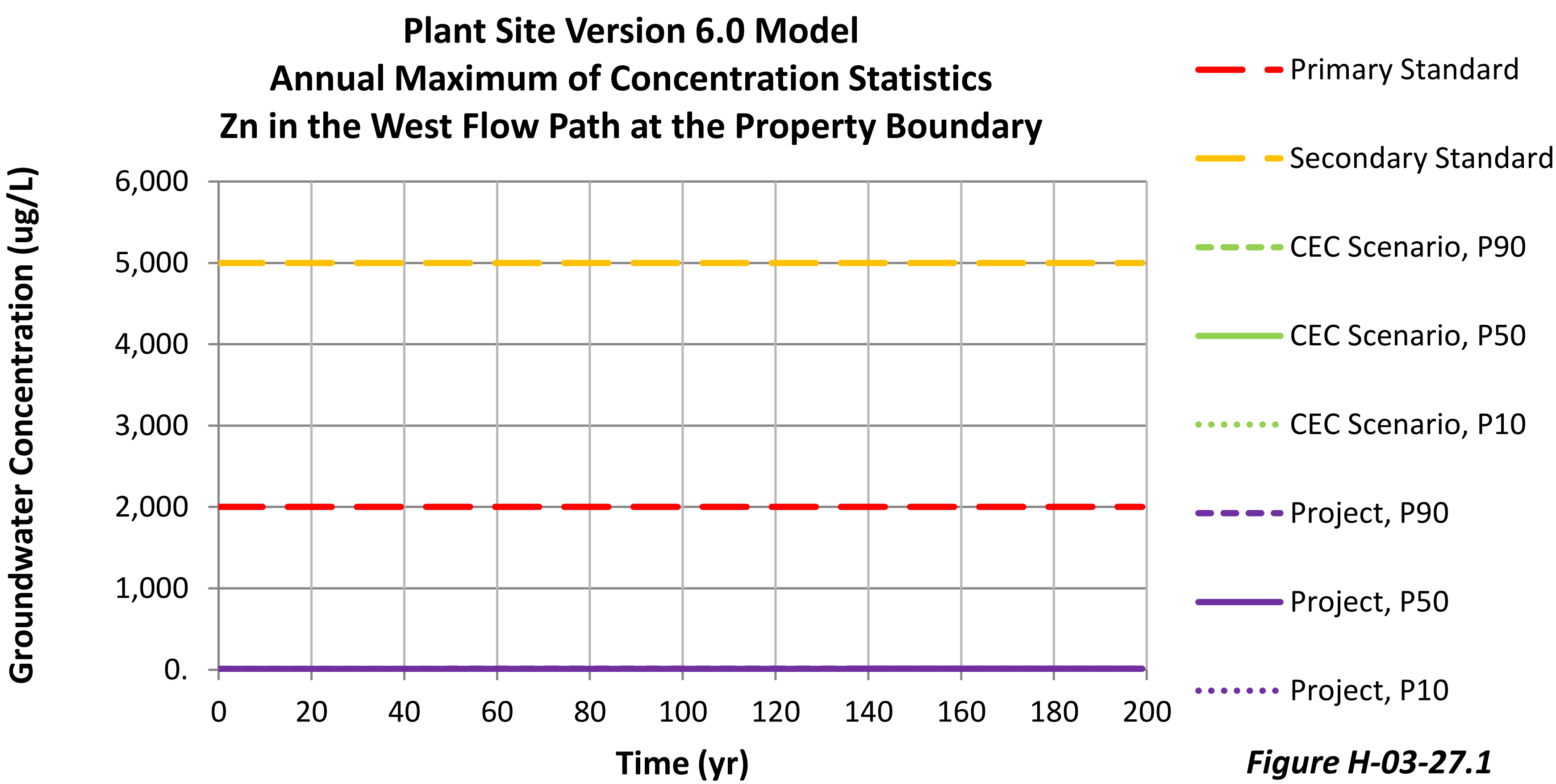


Figure H-03-27.1

Attachment I

Concentration Statistics at the Surface Water Evaluation Locations

Attachment I Concentration Statistics at the Surface Water Evaluation Locations

Estimated surface water quality is shown in this attachment using a series of concentration statistic plots. Data for these plots were created as follows:

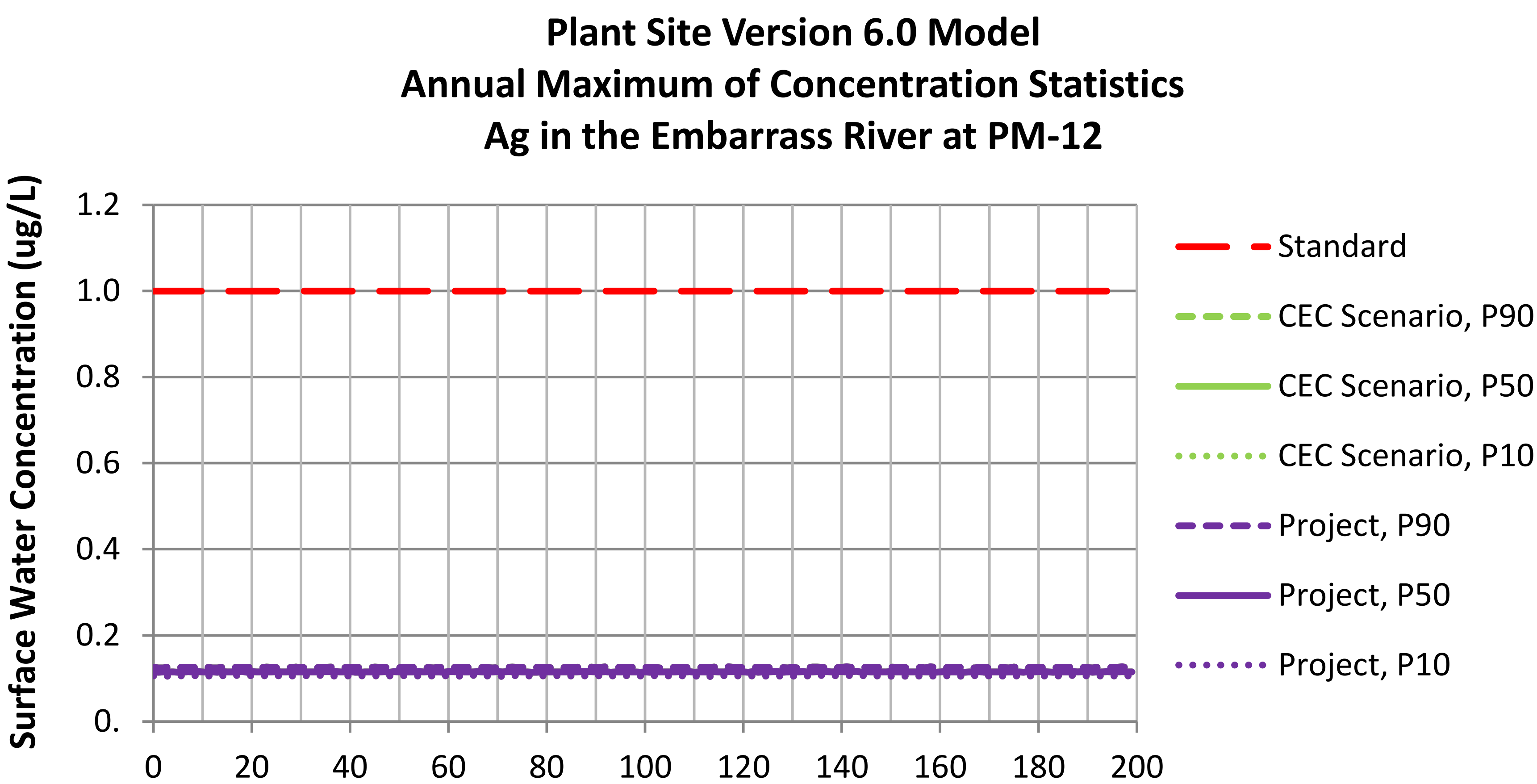
- The probabilistic GoldSim model was run at monthly time steps for 200 years (2401 time steps including the initial time zero). At each time step, the concentration at each surface water evaluation location for each constituent was individually recorded.
- After one realization (i.e., one model run) was completed, the process was repeated until 500 model realizations were completed. The result is 500 estimated concentrations of each constituent at each surface water evaluation location at every time step.
- At every time step, and for every constituent, the 500 estimated concentrations were sorted smallest-to-largest and 3 single values were chosen to represent the statistics at that particular time step. This step was performed at each surface water evaluation location.
- From the 500 estimate concentrations, sorted smallest-to-largest, the 50th value was chosen to represent the 10th percentile (P10), the 250th value was chosen to represent the median (P50), and the 450th value was chosen to represent the 90th percentile (P90). This indicates that at any time, 10% of the model results are less than or equal to the P10 value, 50% are less than or equal to the P50 value, and 90% are less than or equal to the P90 value.
- This process was repeated for all constituents at each surface water evaluation location, resulting in 3 time series lines representing the 10th, 50th, and 90th percentiles of concentrations at every time step (monthly results).
- For plotting the results over the entire 200 years of the simulation, the data was summarized by year to make the plots legible. The monthly model outputs for the 10th, 50th, and 90th percentiles are plotted on an annual basis by either
  - Taking the maximum value of each percentile for a given year (i.e., the highest 90th percentile value), or
  - Taking the average value of each percentile for a given year (i.e., the average of the twelve 90th percentile values).

The figure numbering convention is "**Figure W-XX-YY.Z**" where:

- **W** indicates the Attachment.
- **XX** is a counter indicating the location; in this attachment it will count from "01" to "10" to account for the surface water evaluation locations PM-12, PM-12.2, PM-12.3, PM-12.4, PM-13, MLC-3, MLC-2, TC-1, PM-19, and PM-11 in that order.

- **YY** is a counter indicating the constituent; in this attachment it will count from “01” to “28” to show the 27 independently modeled constituents and the calculated hardness.

- **Z** is a numerical value, 1 or 2. A value of 1 indicates that the annual maximum has been plotted and a value of 2 indicates that the annual average has been plotted.



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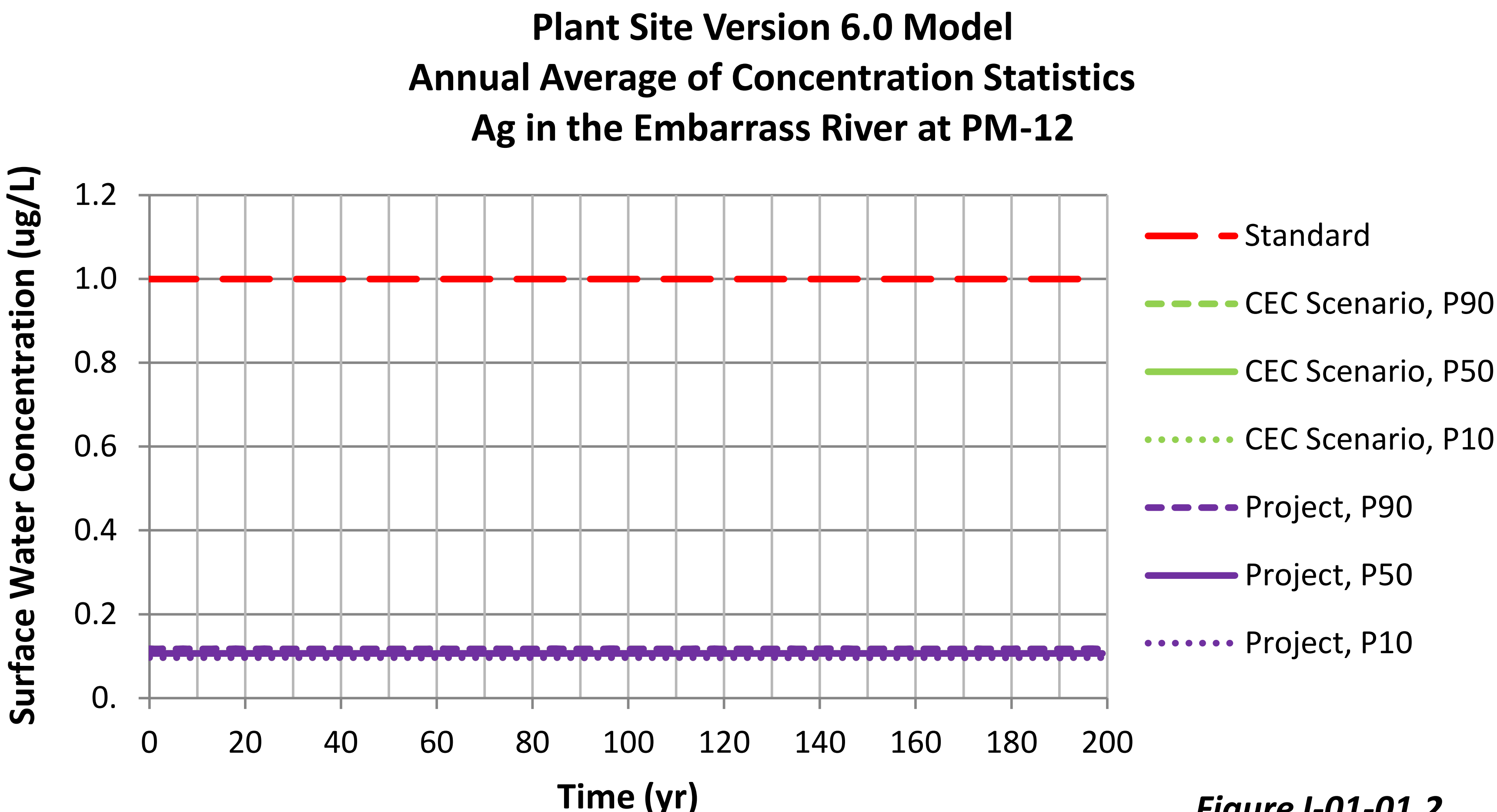

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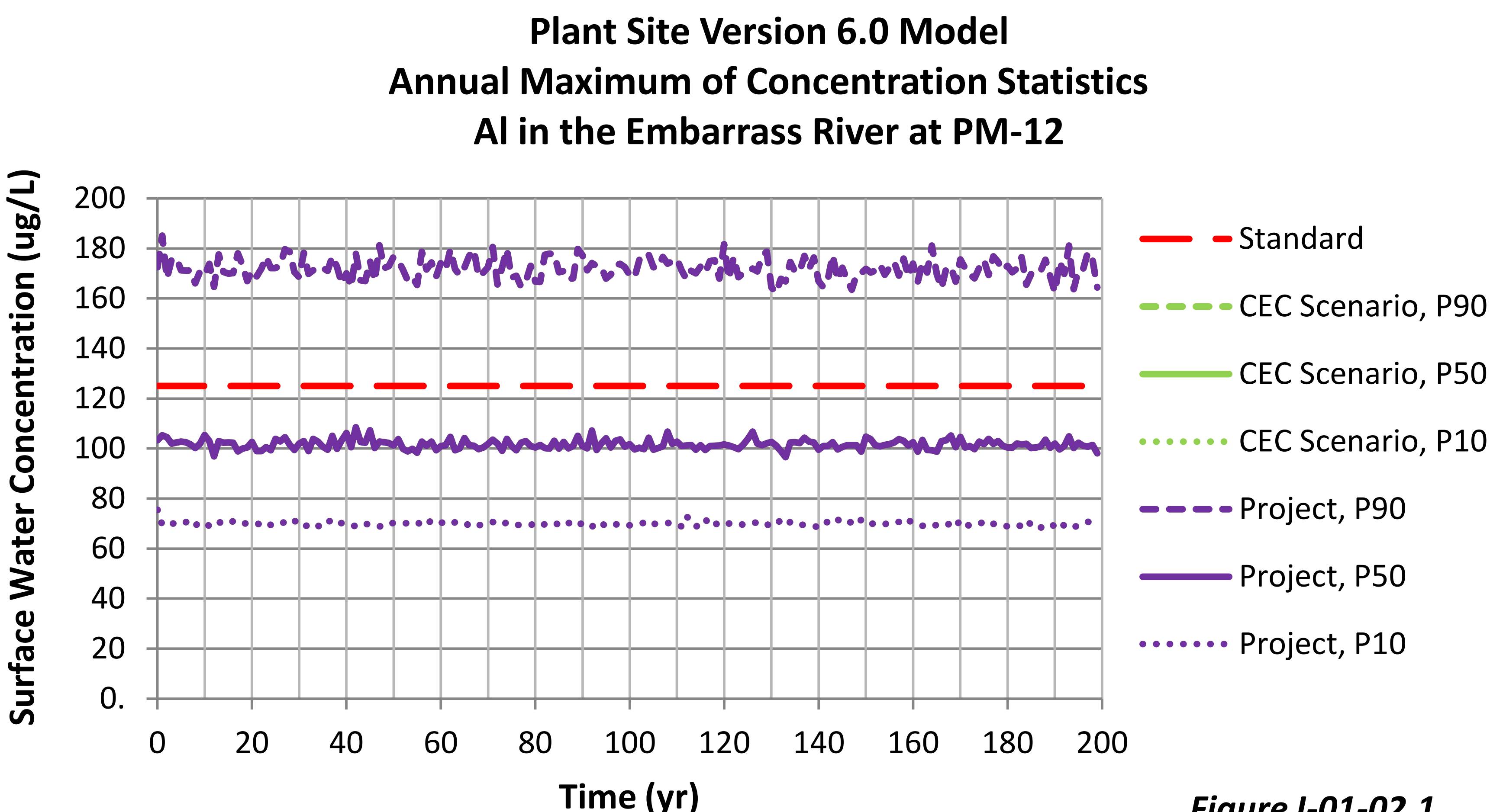

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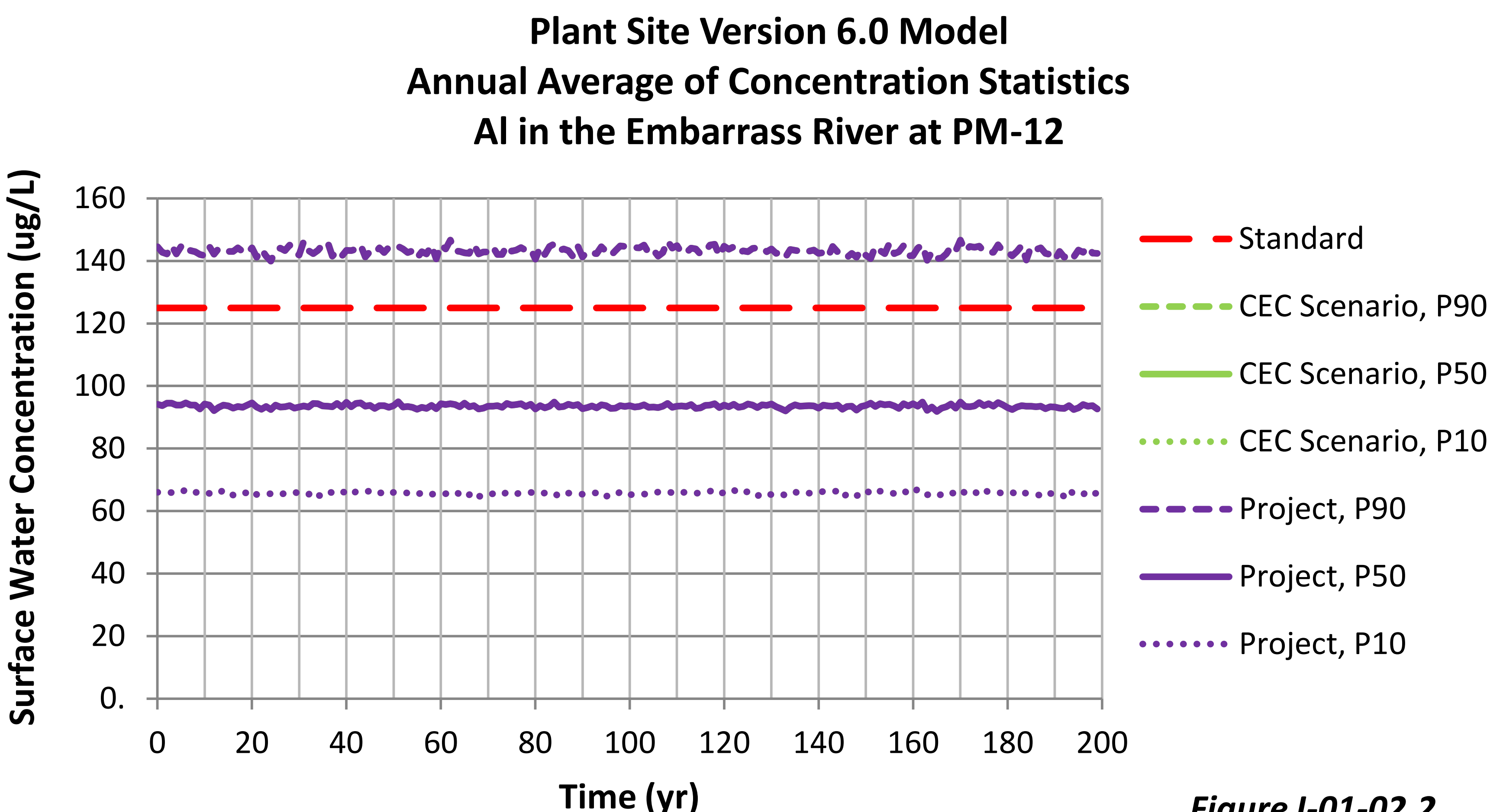

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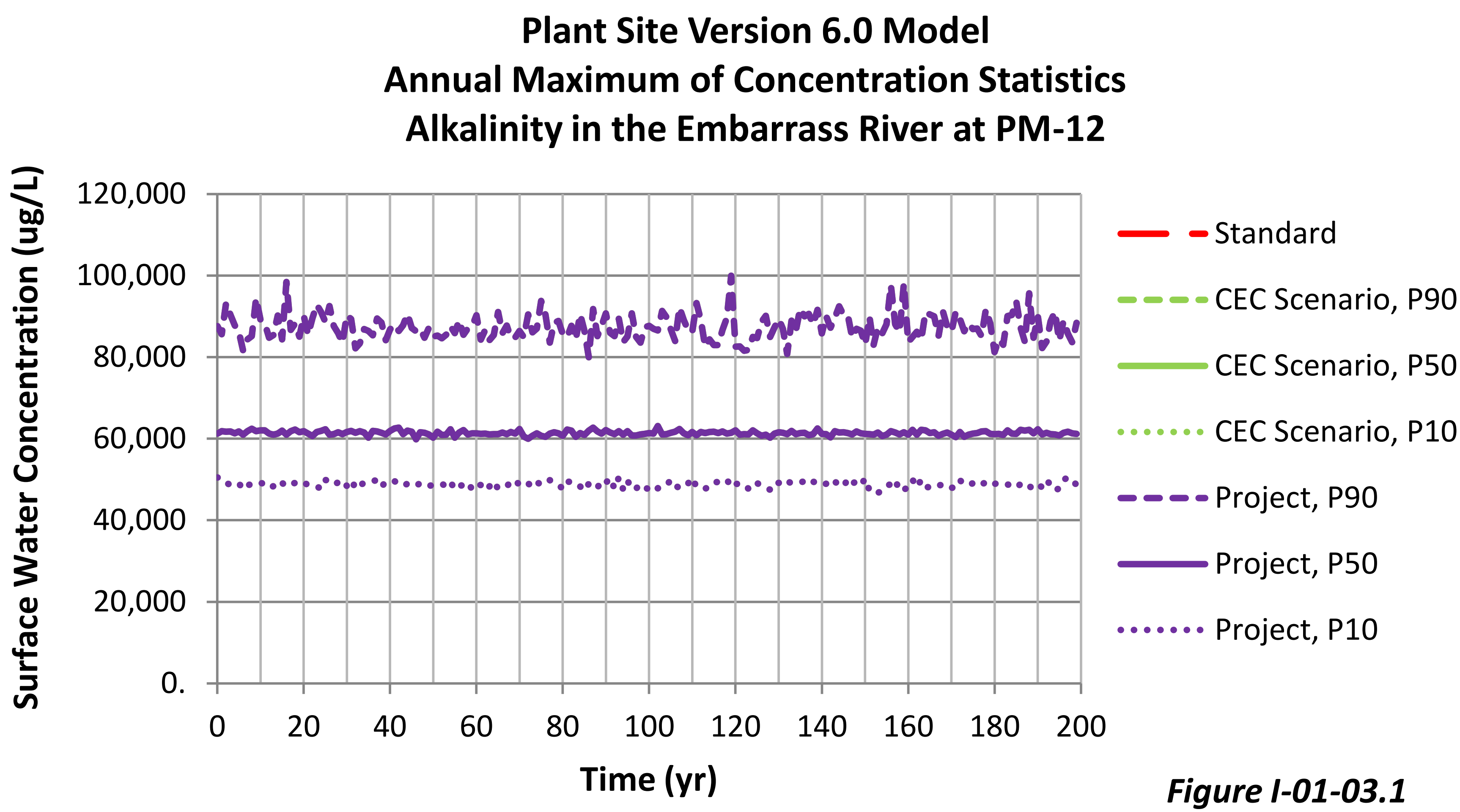

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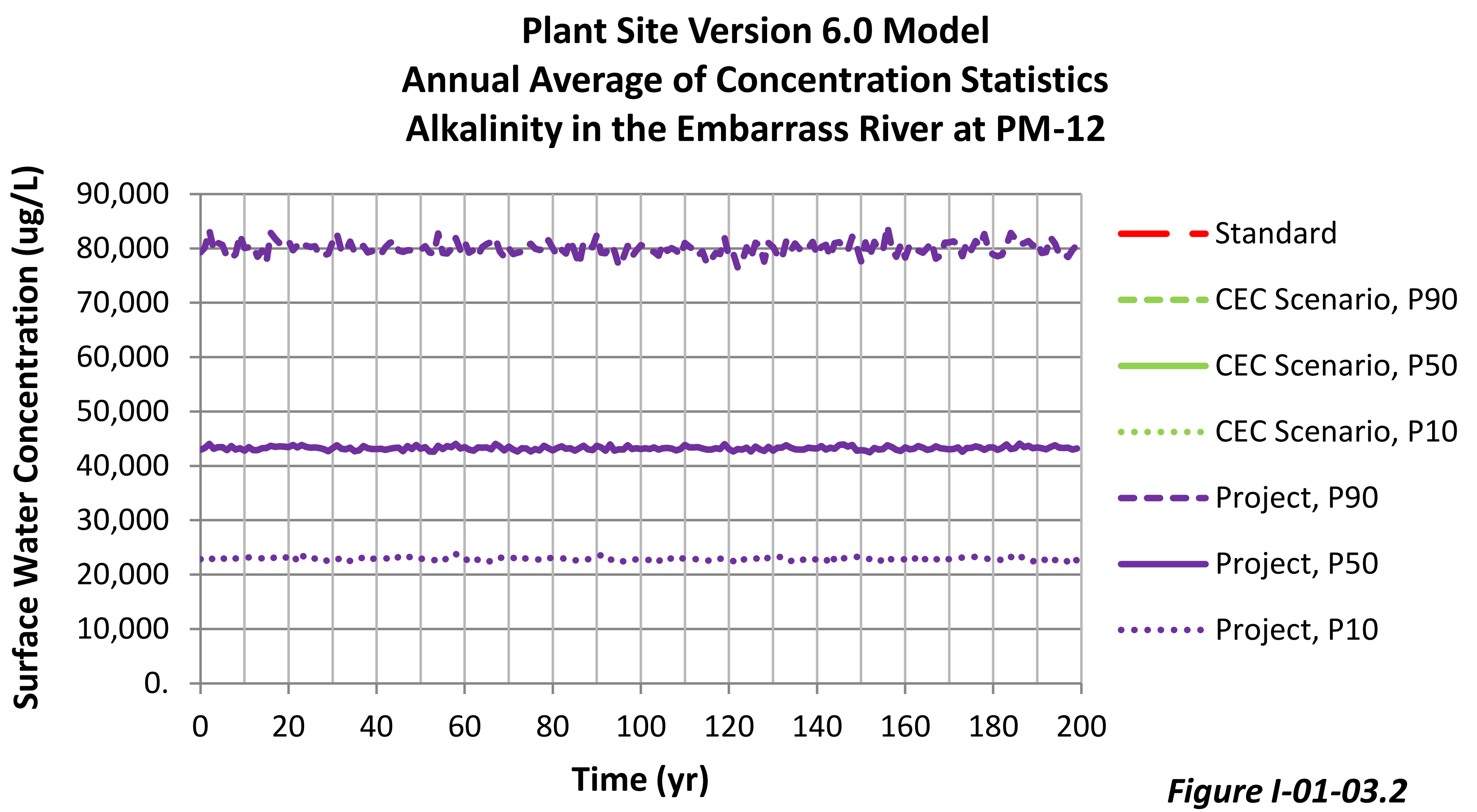

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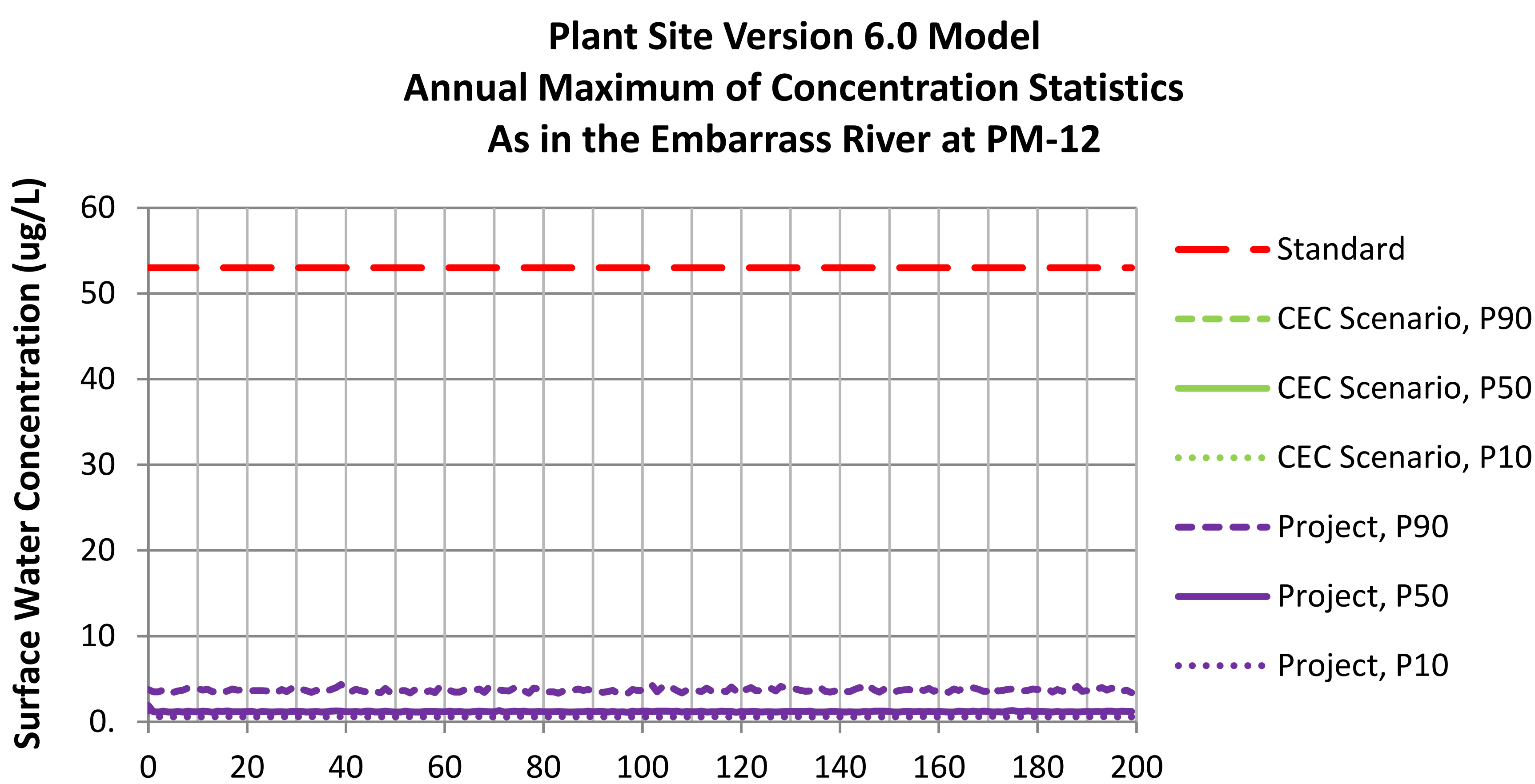

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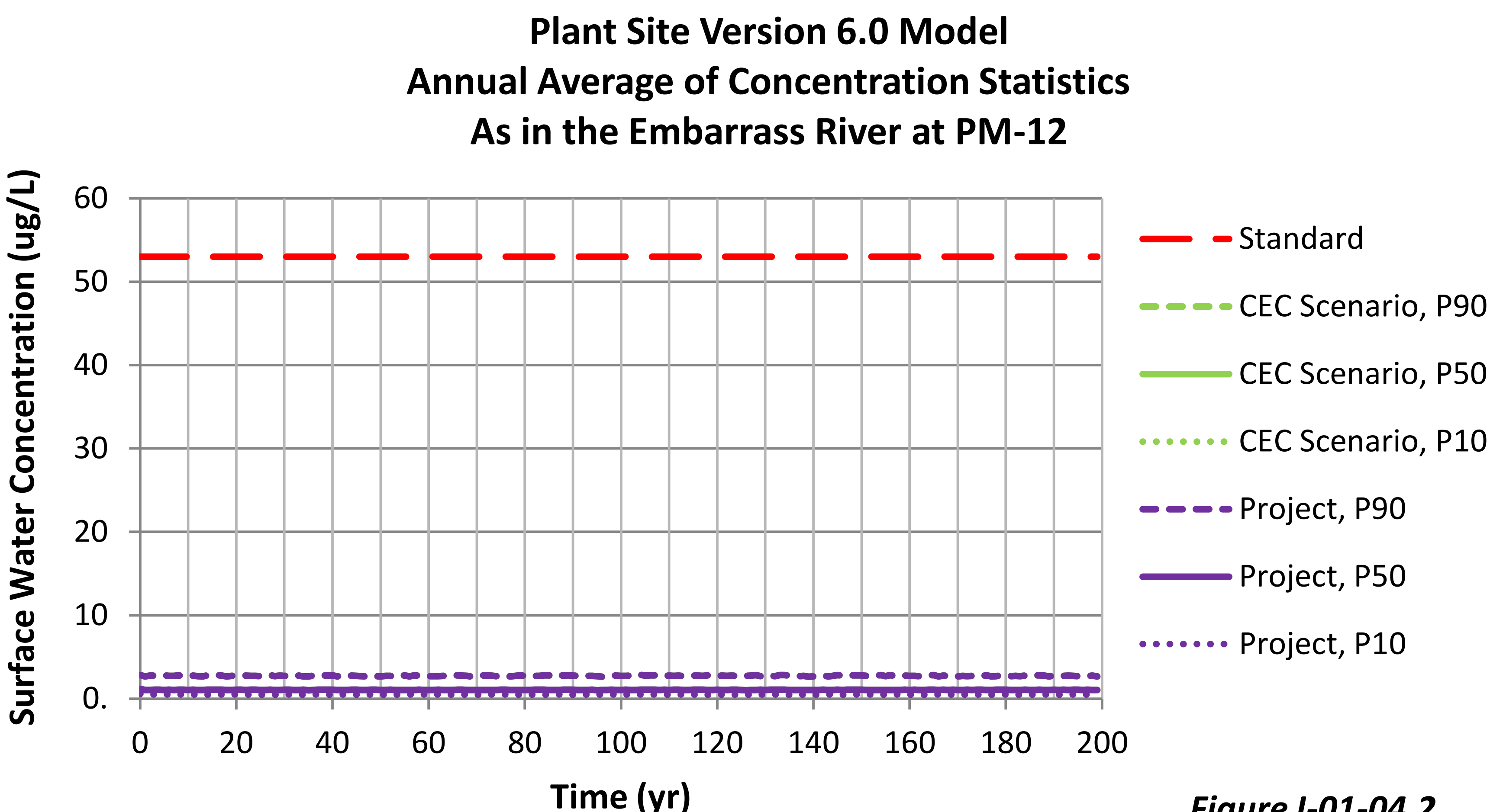

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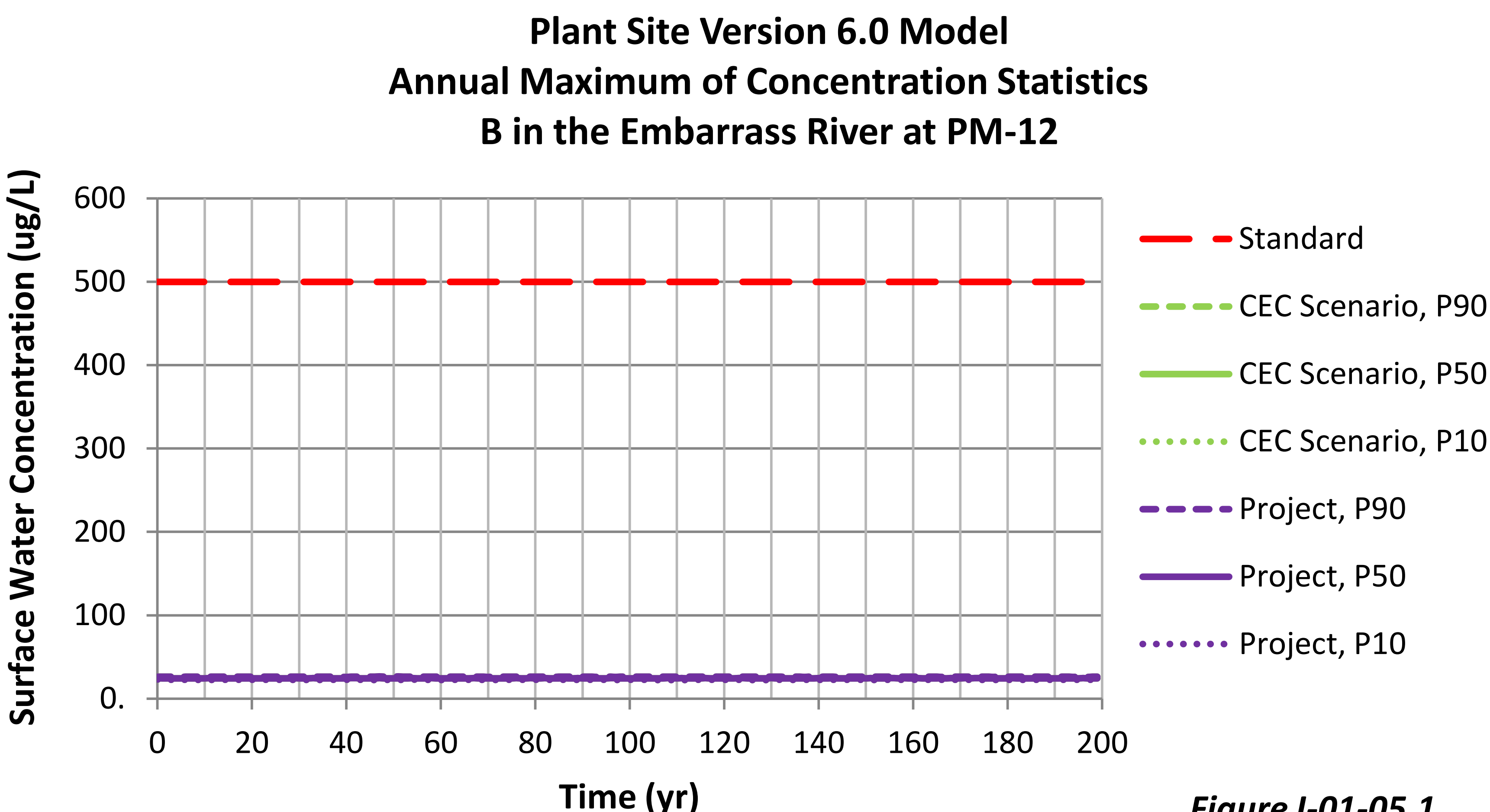

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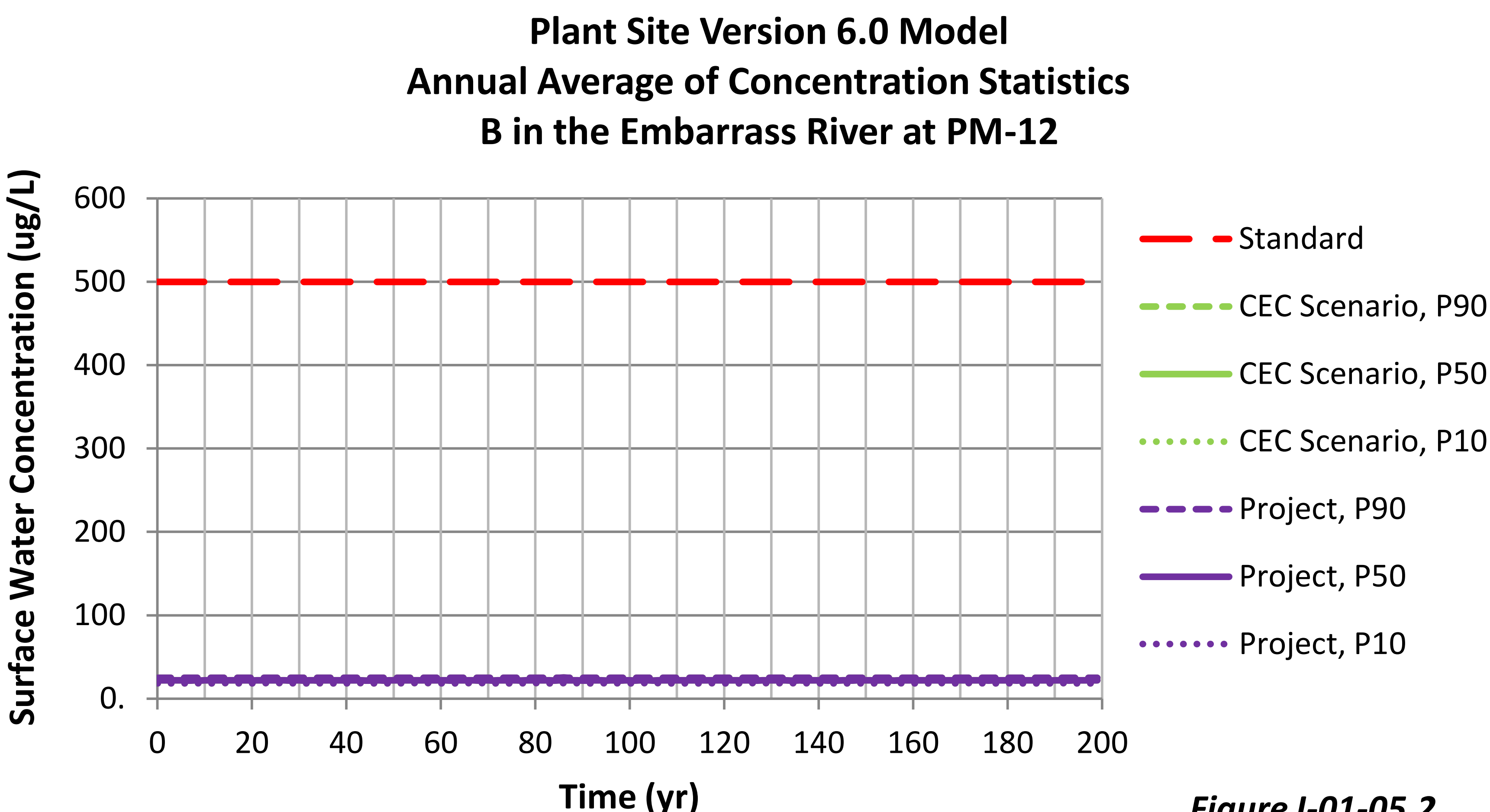

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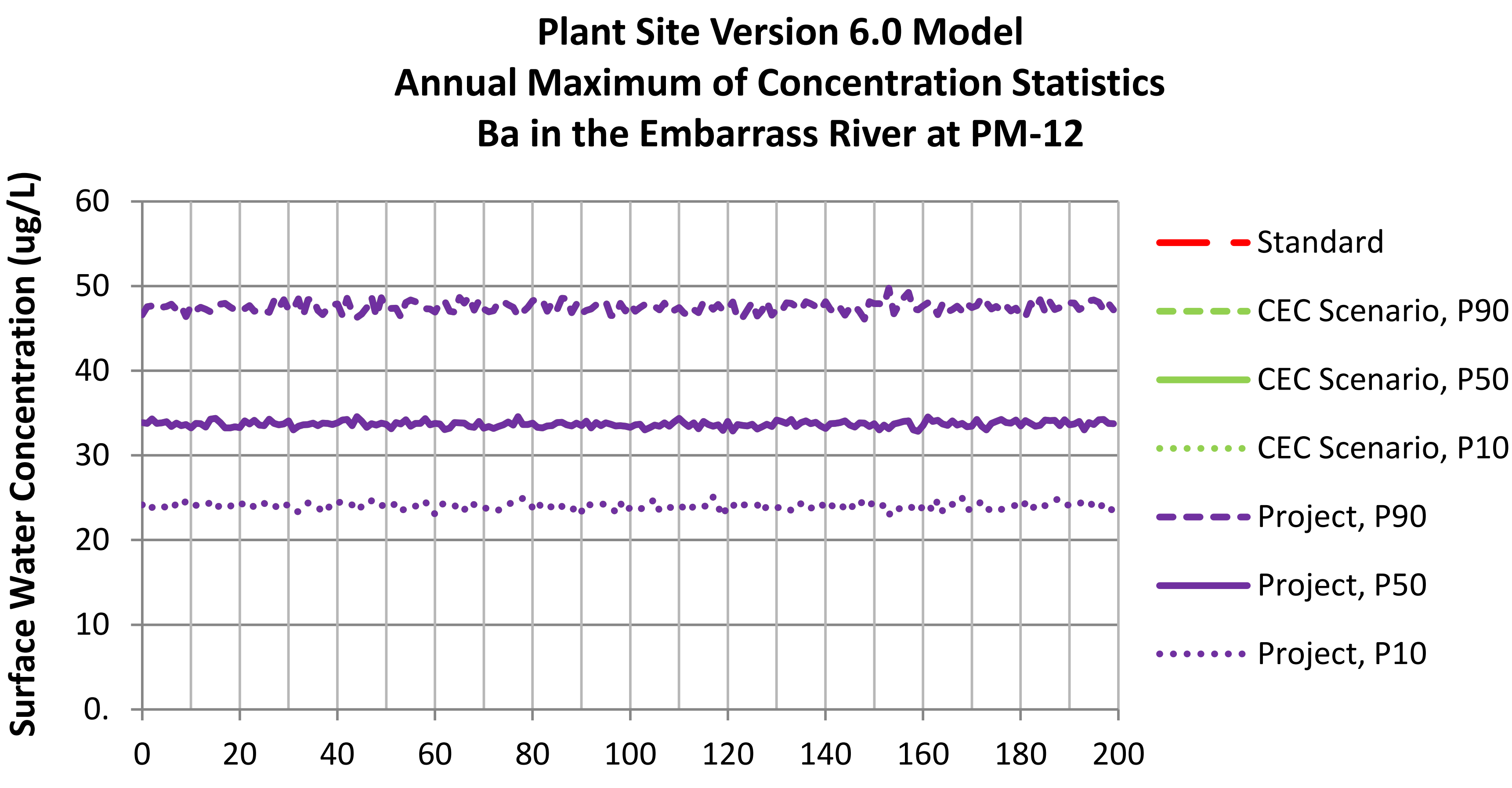

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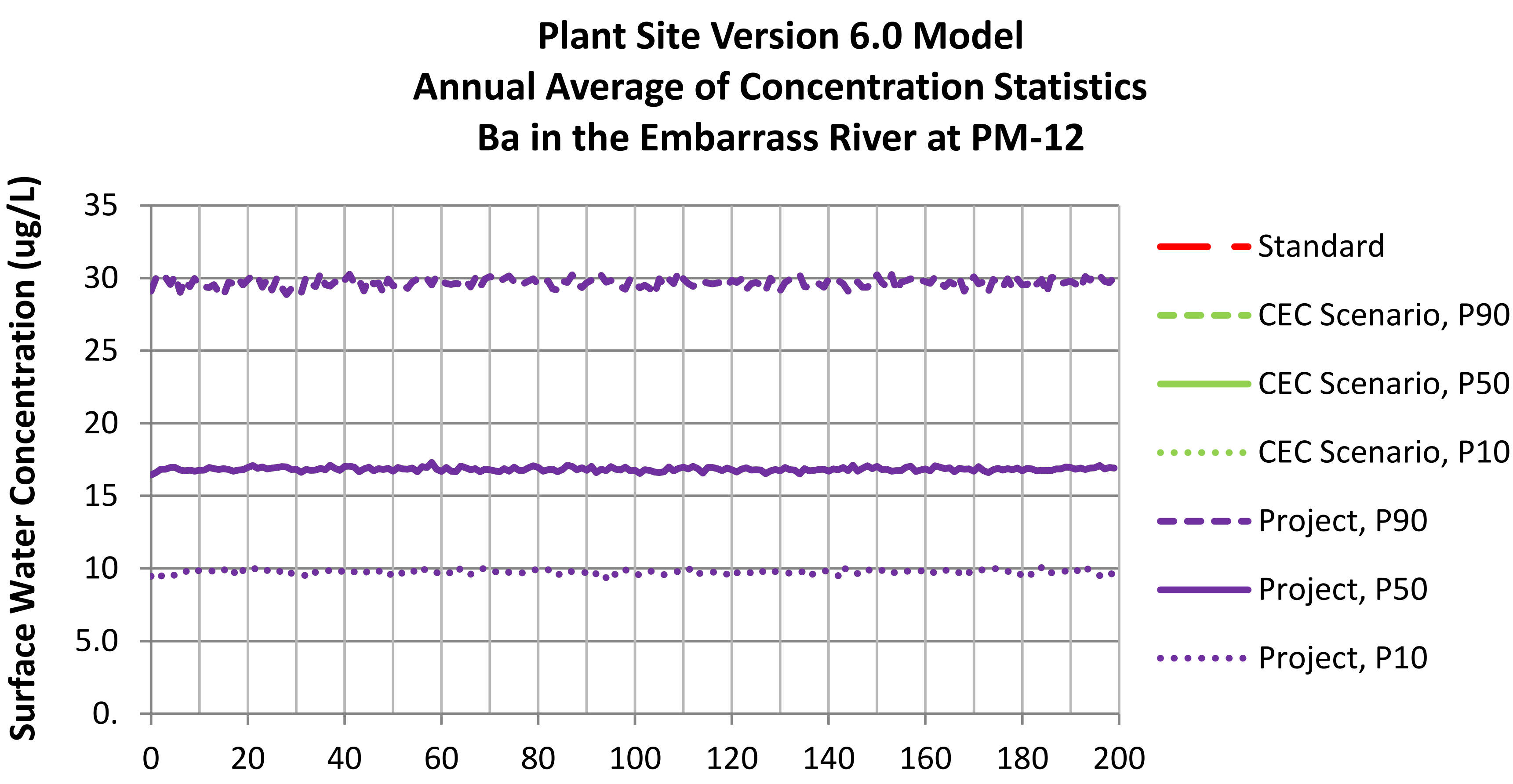

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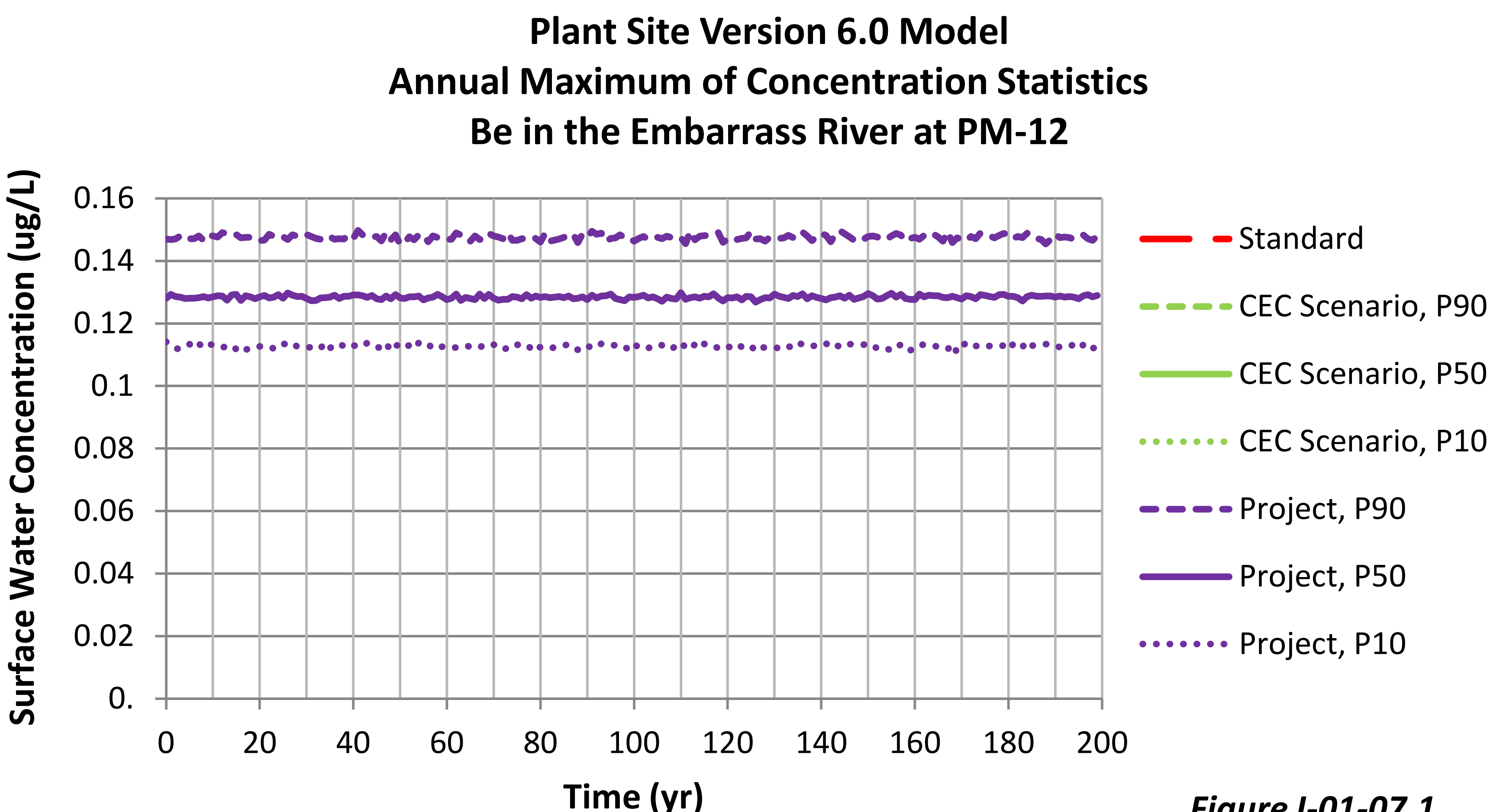

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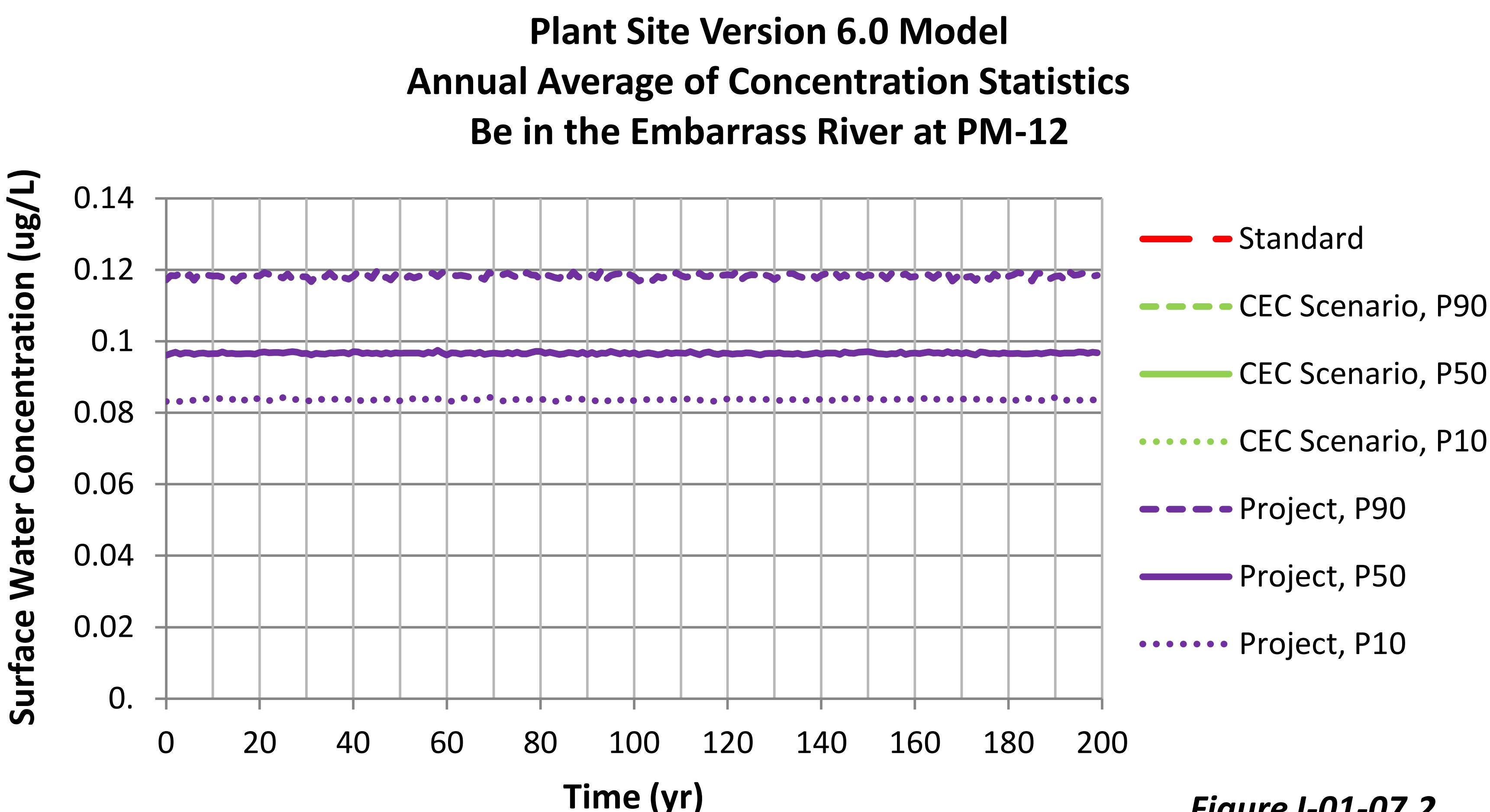

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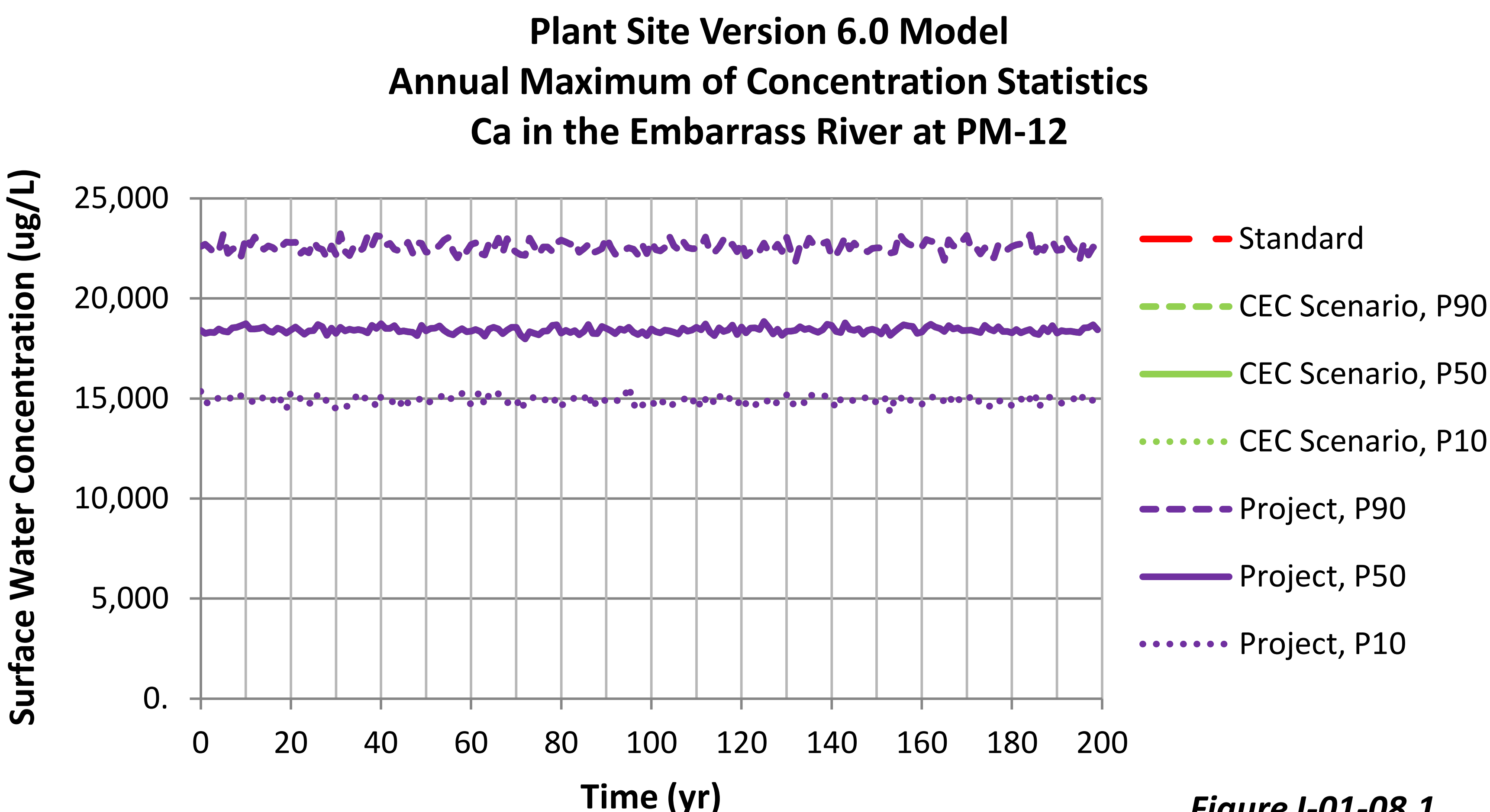

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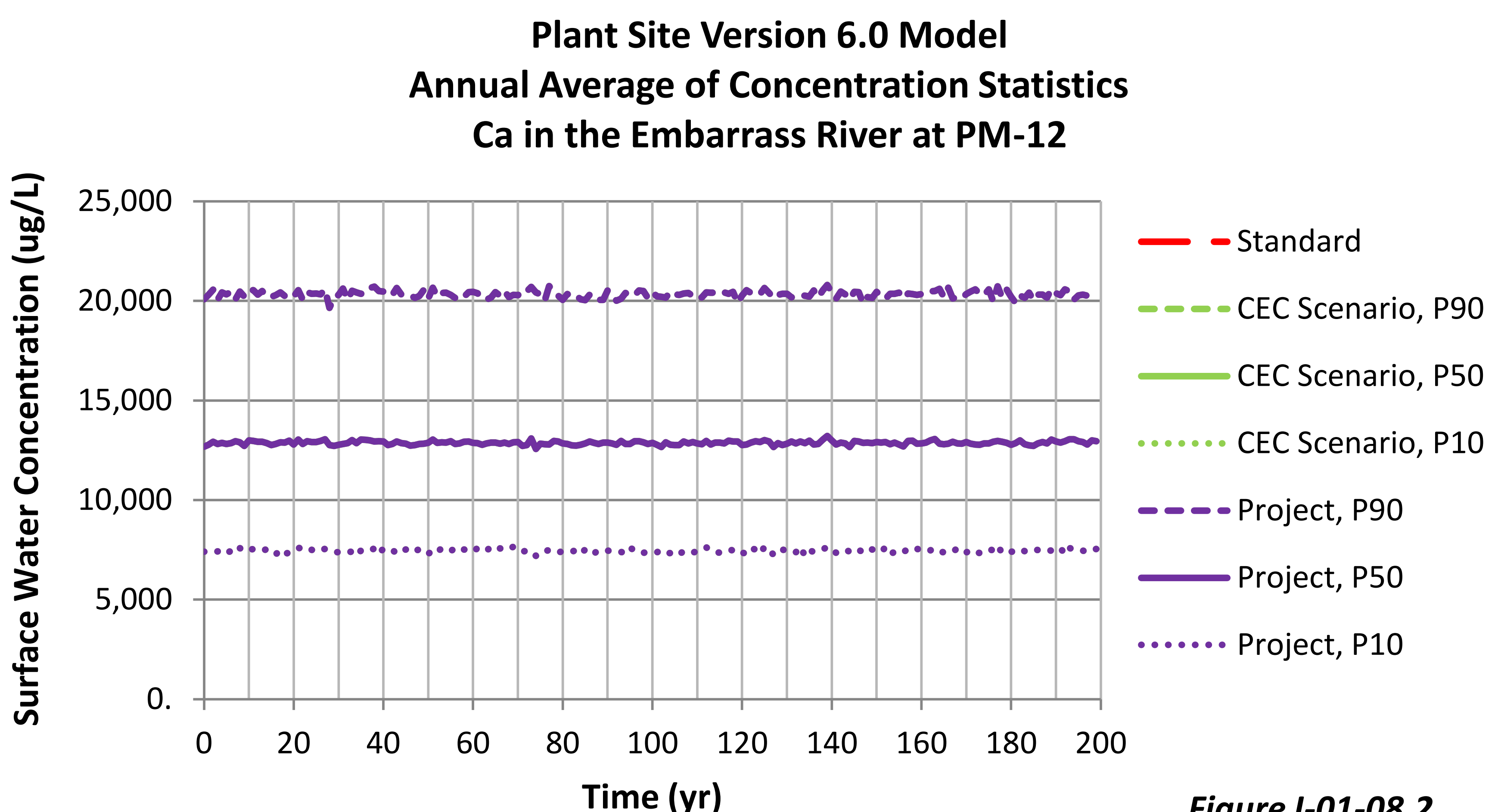

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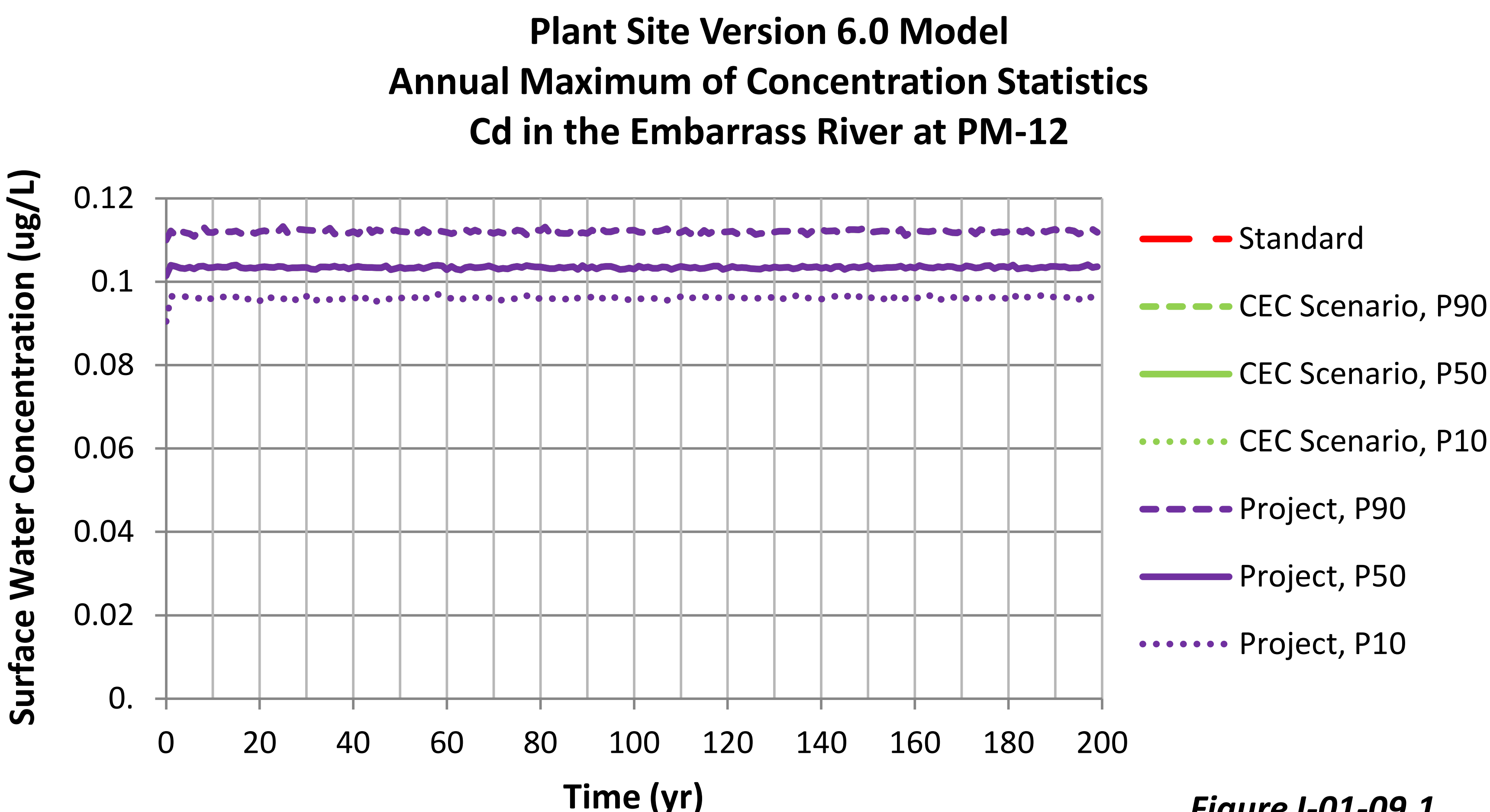

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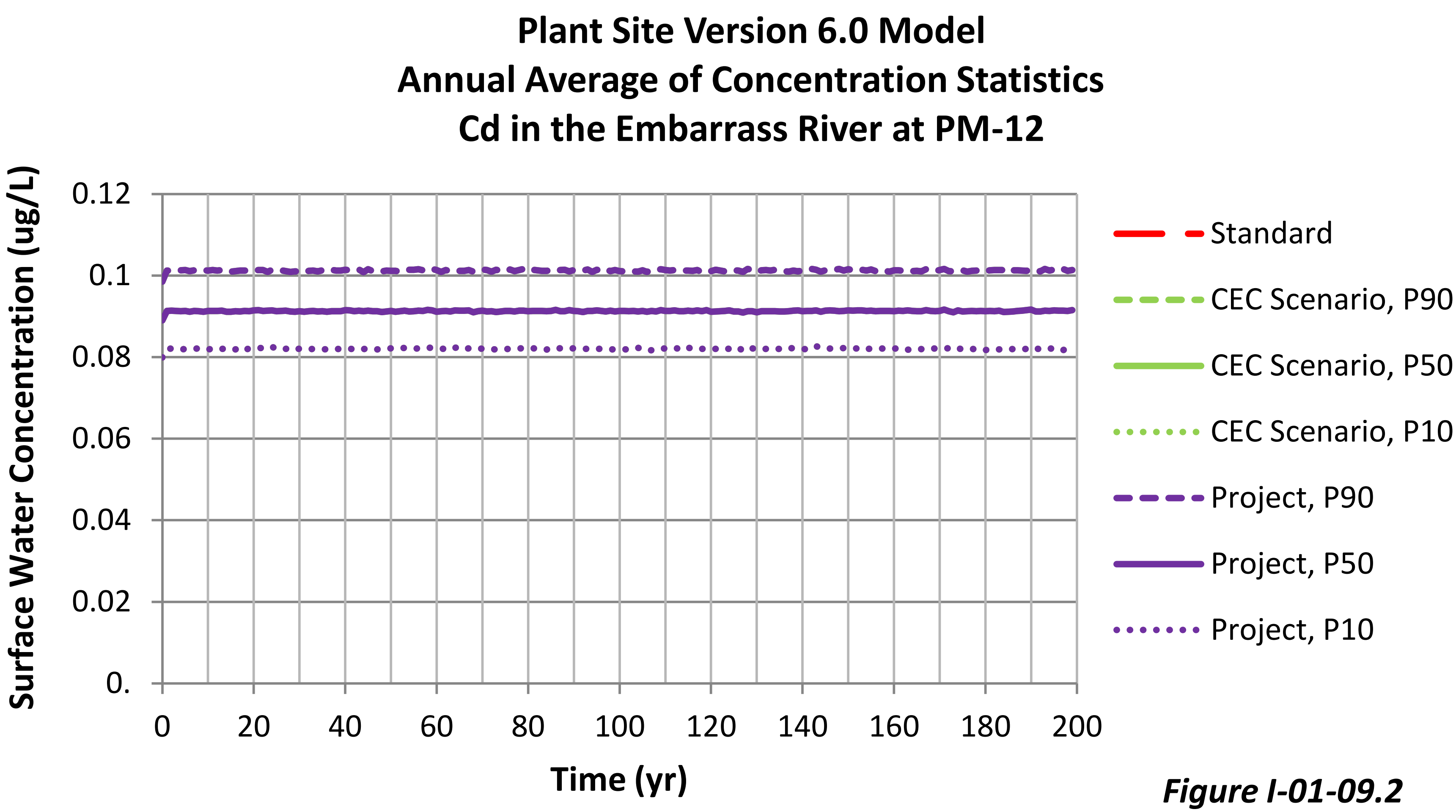

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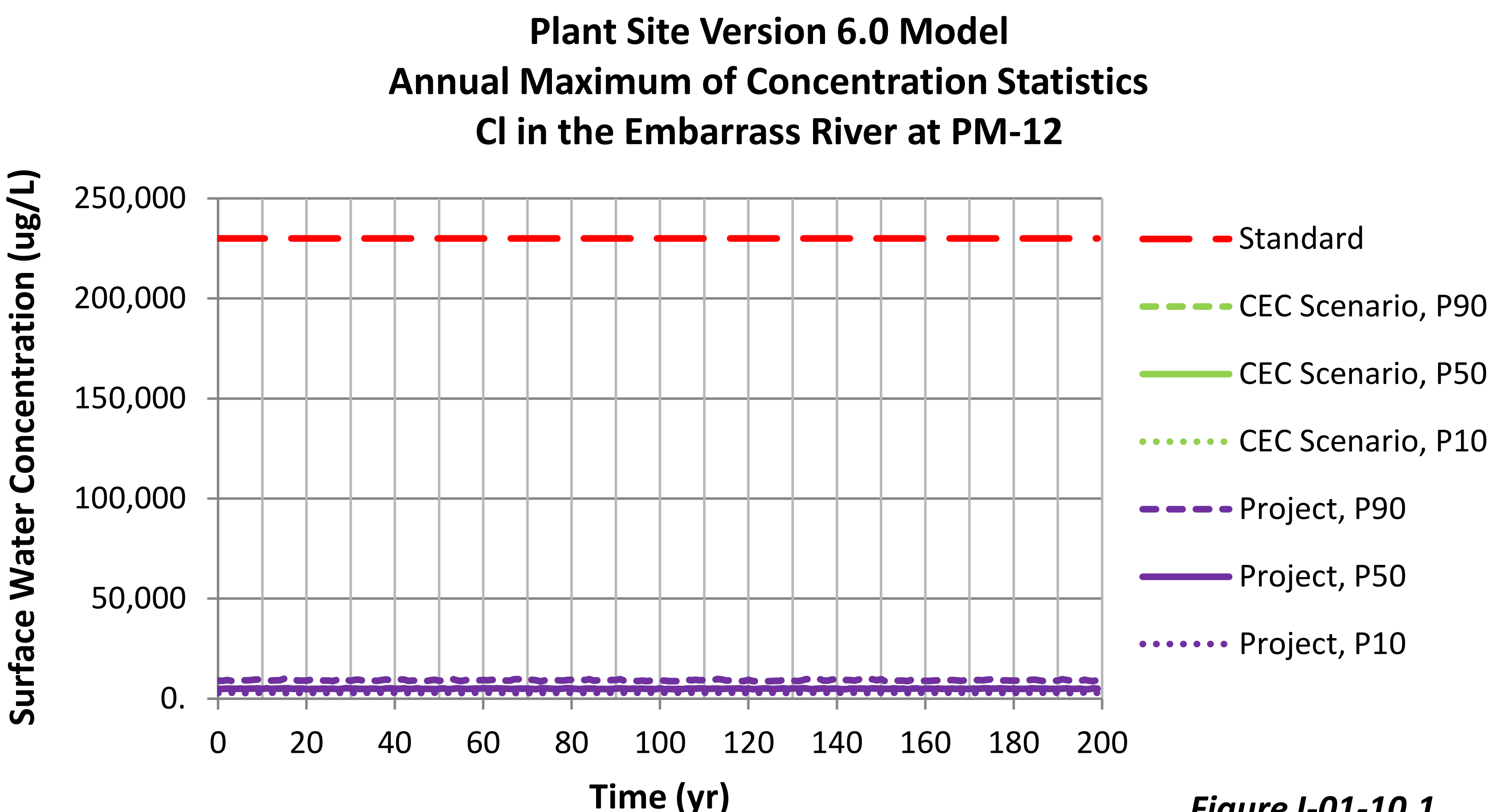

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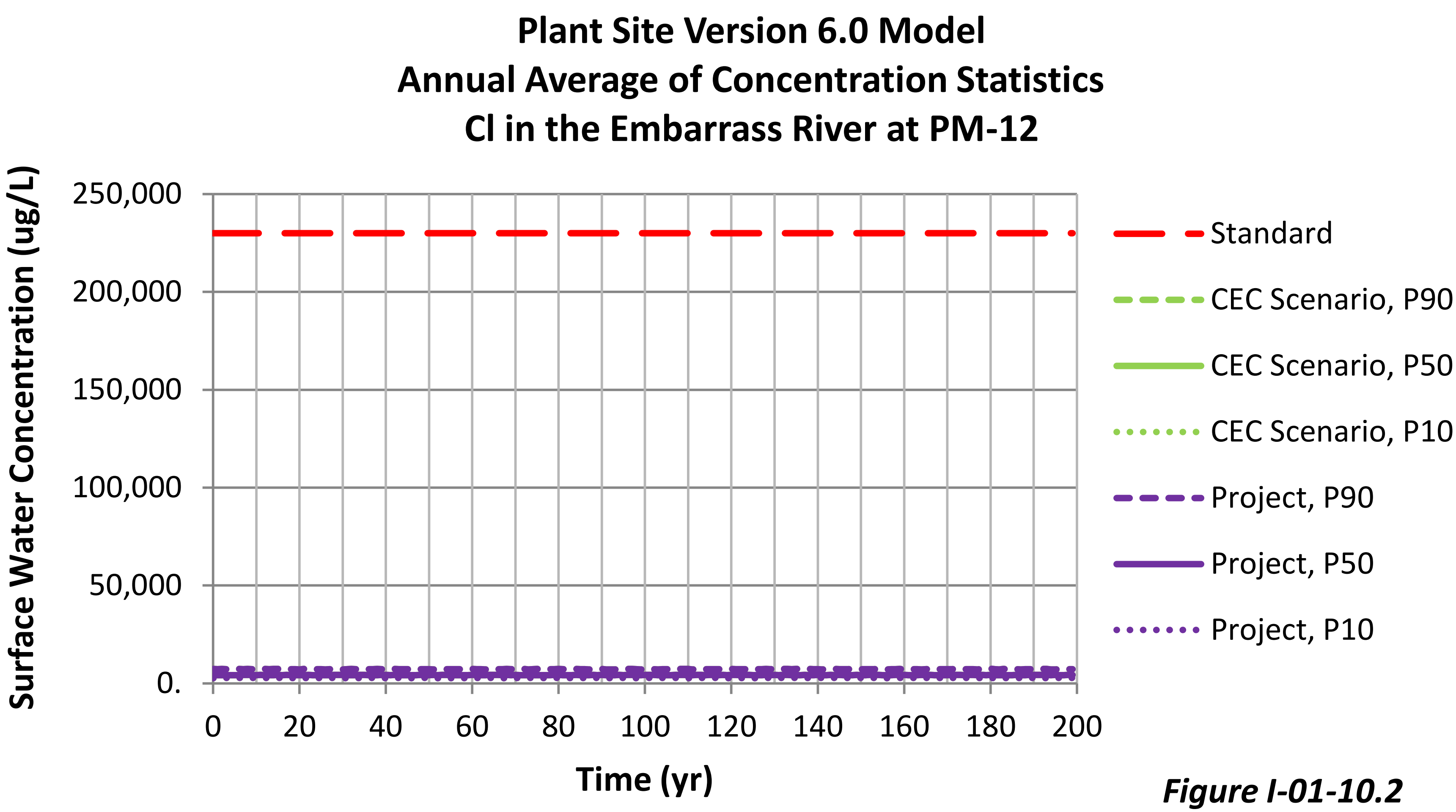

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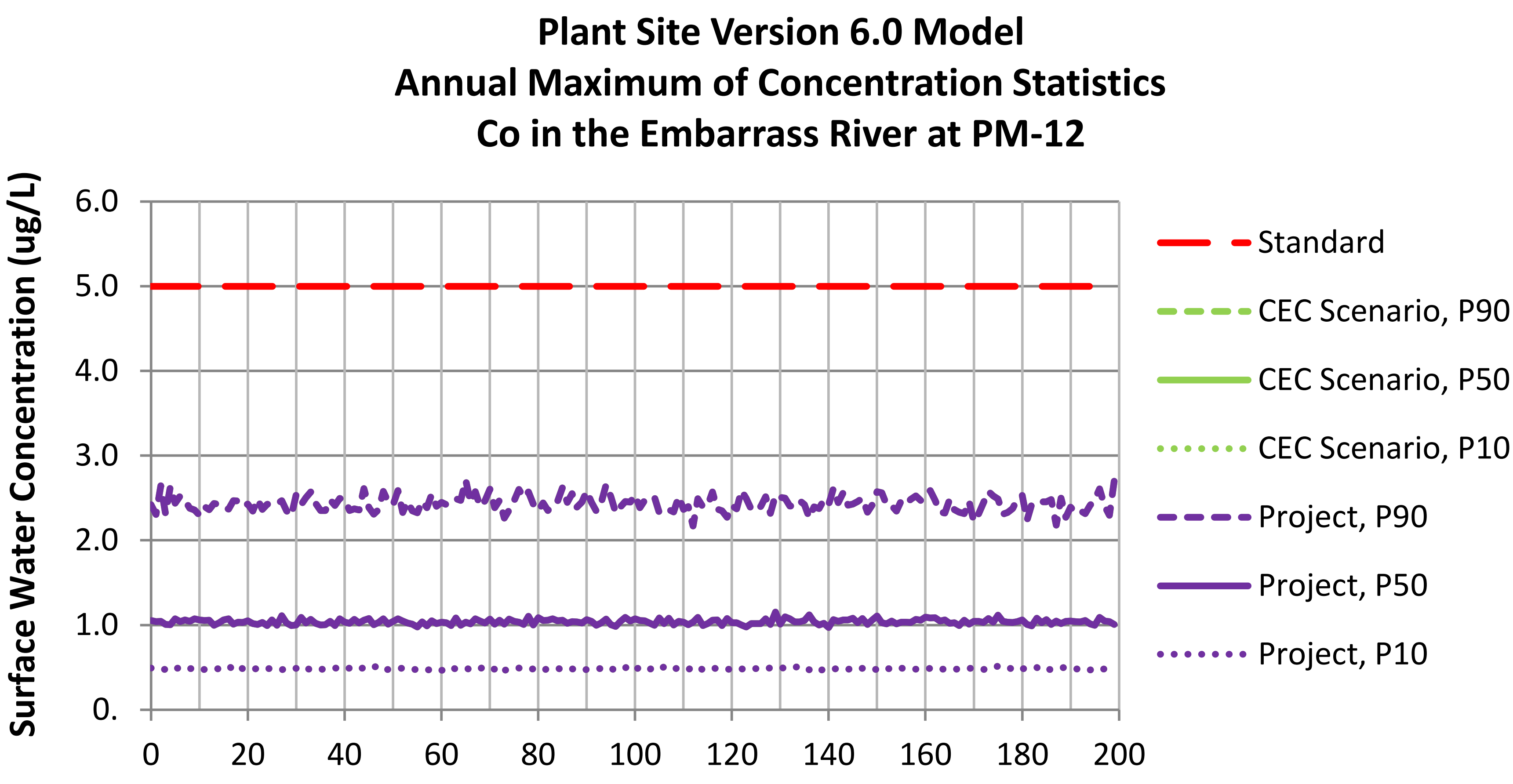

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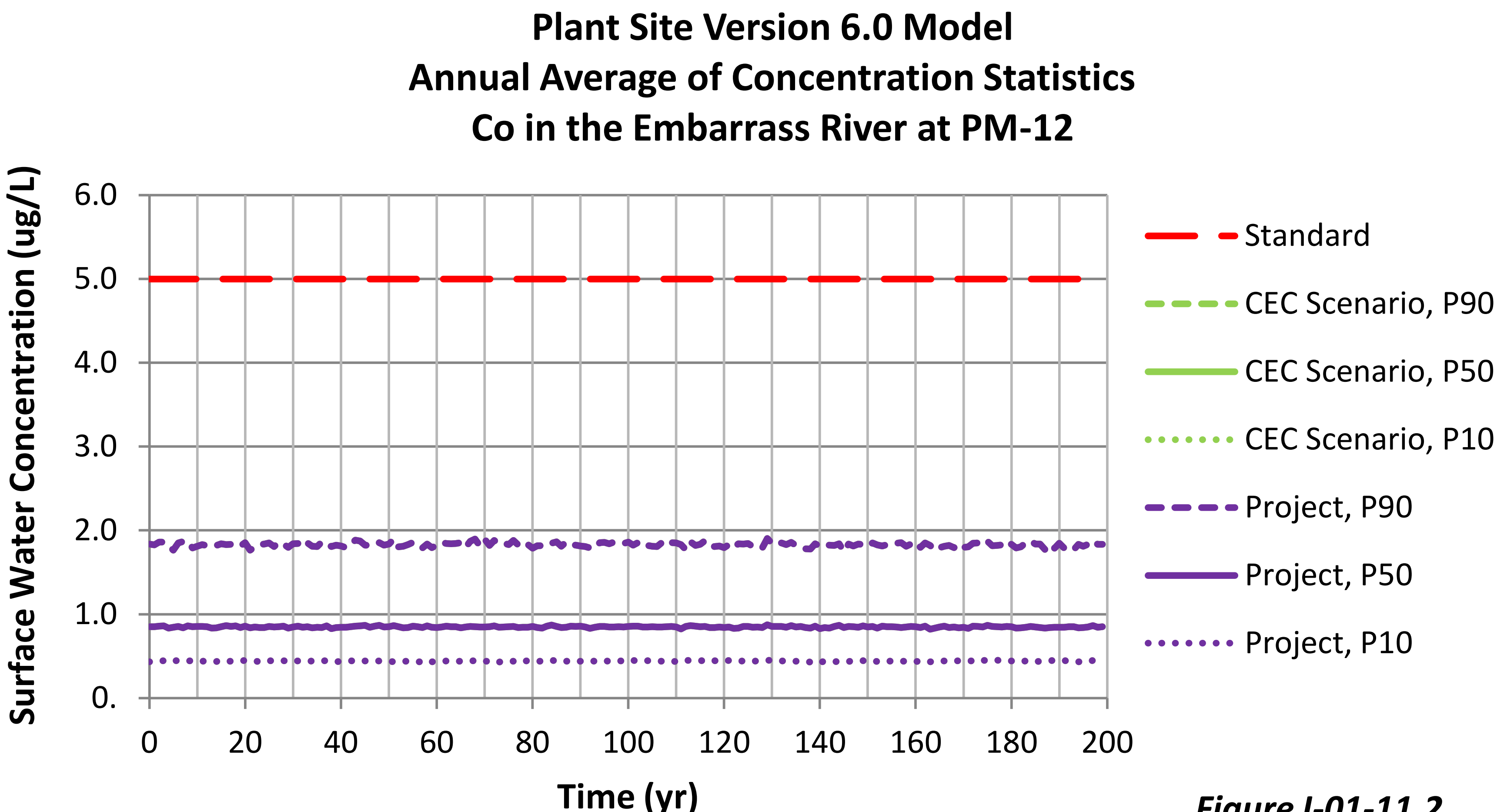

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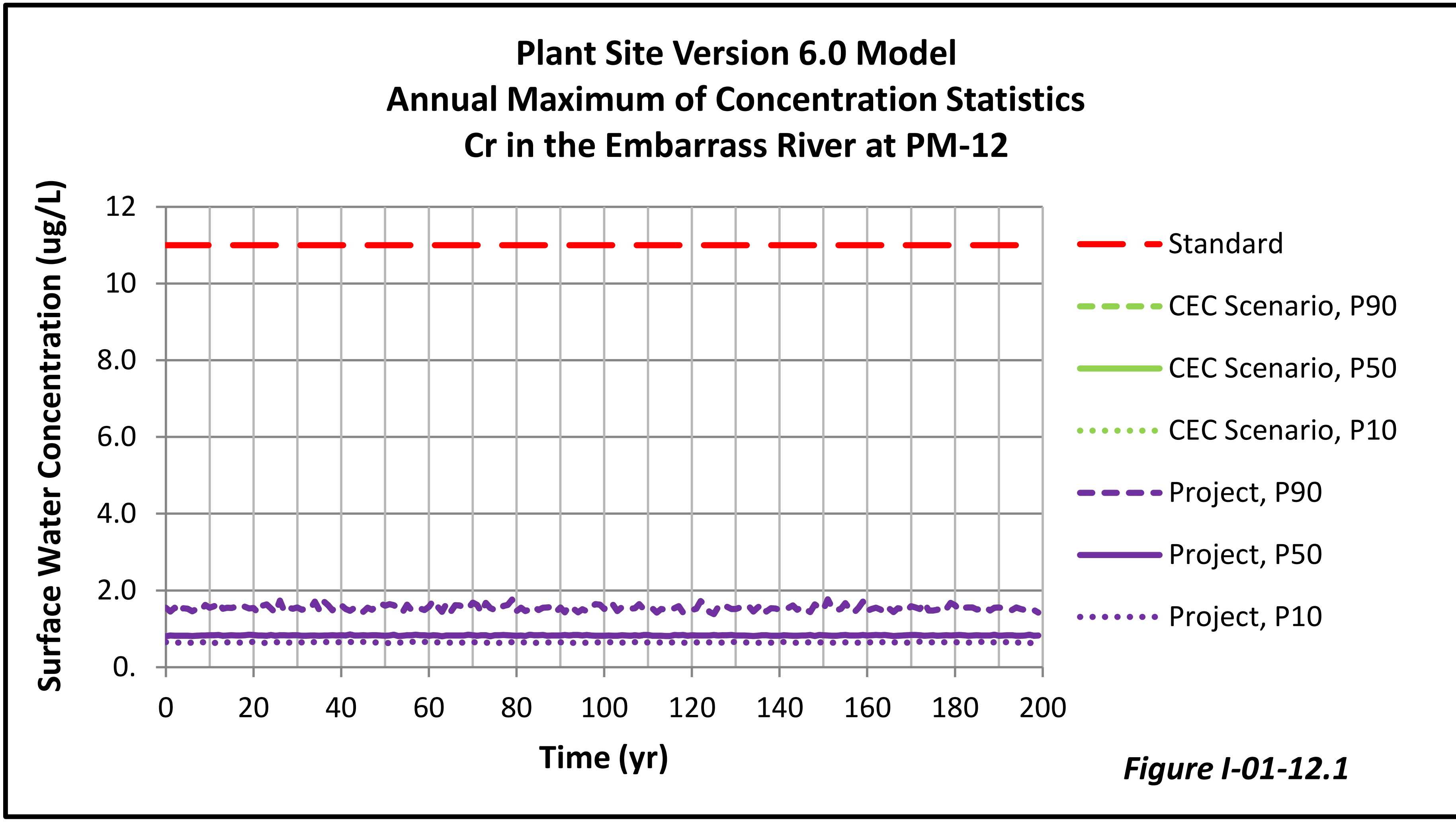

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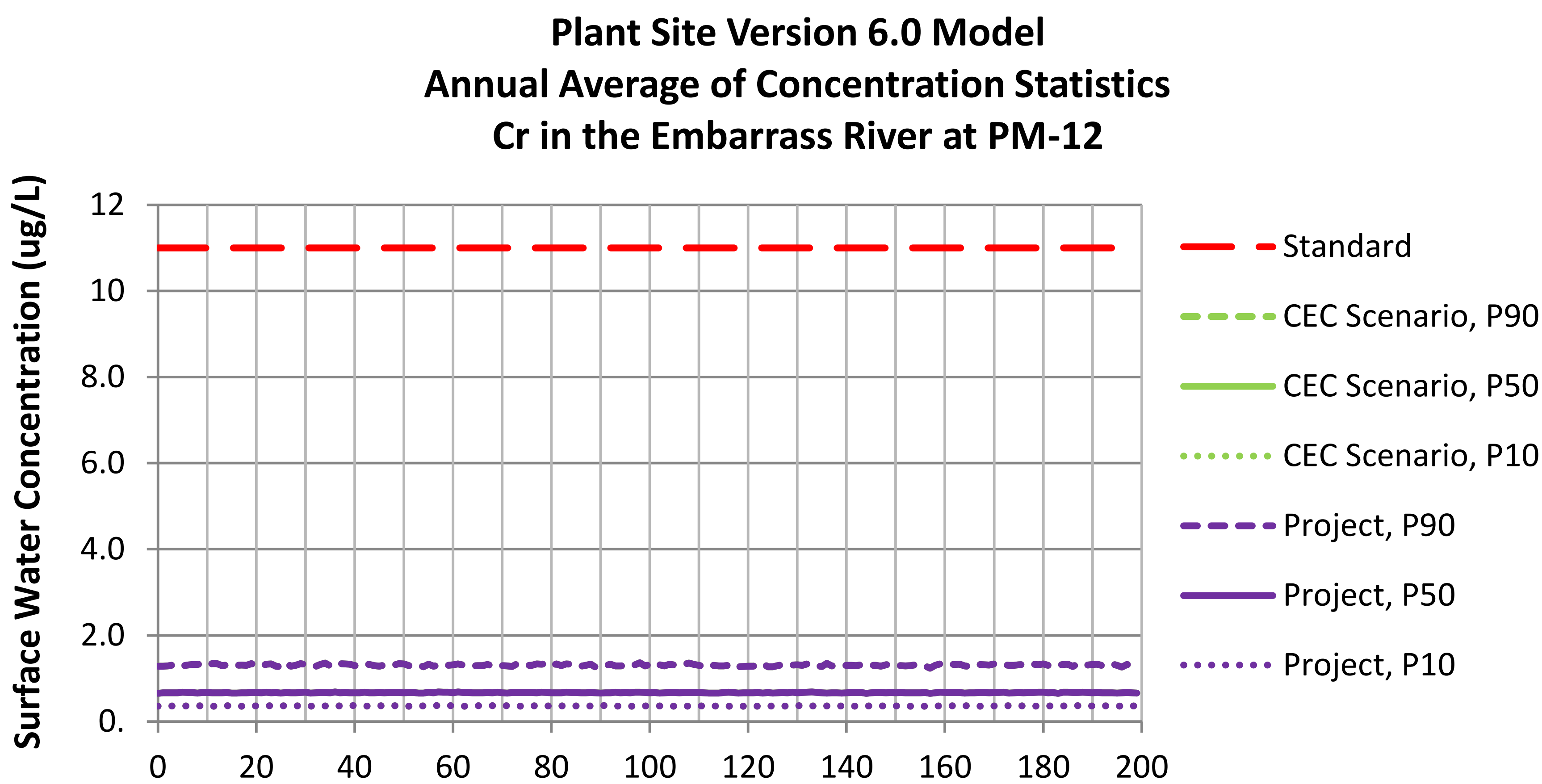

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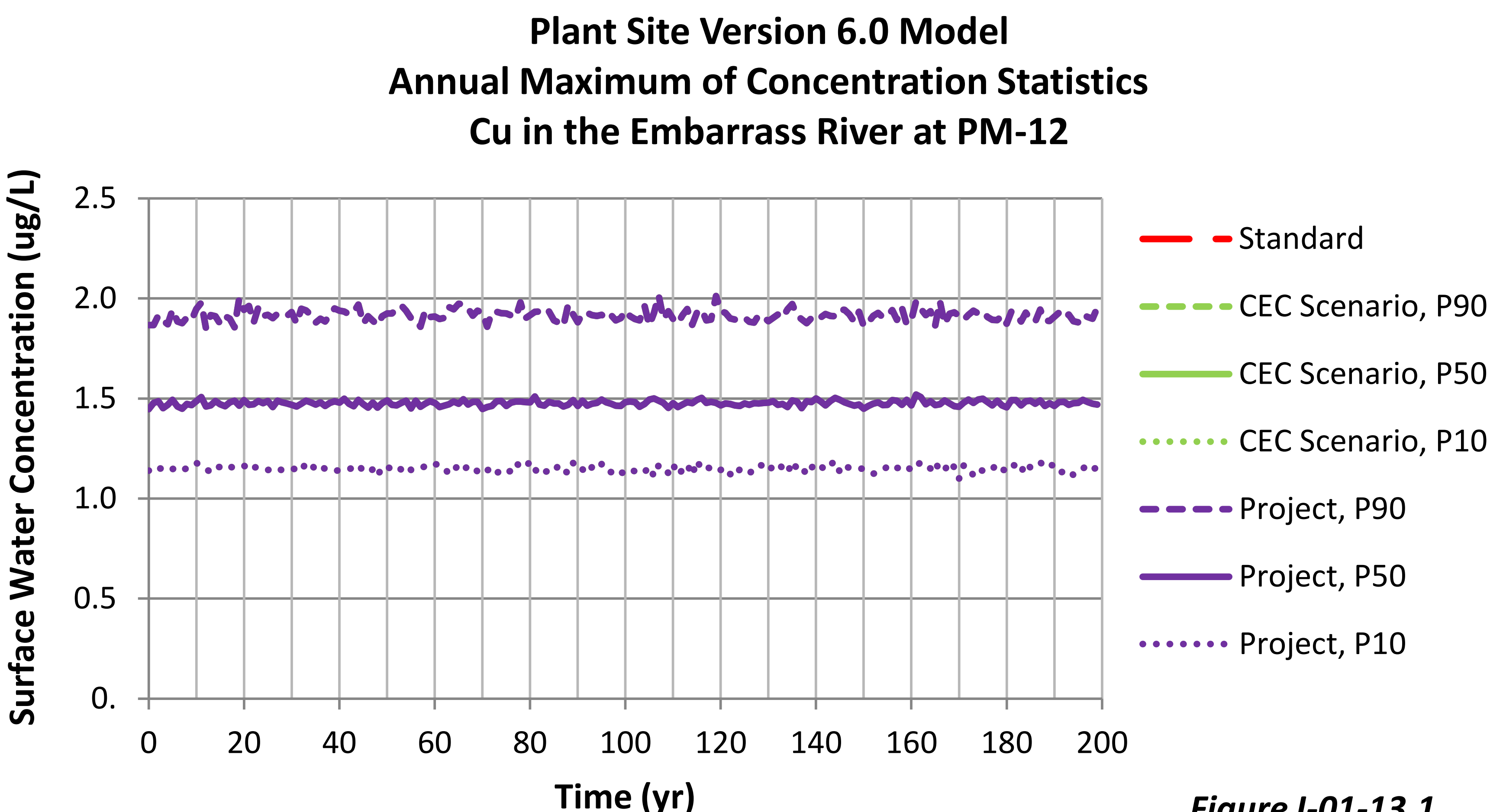

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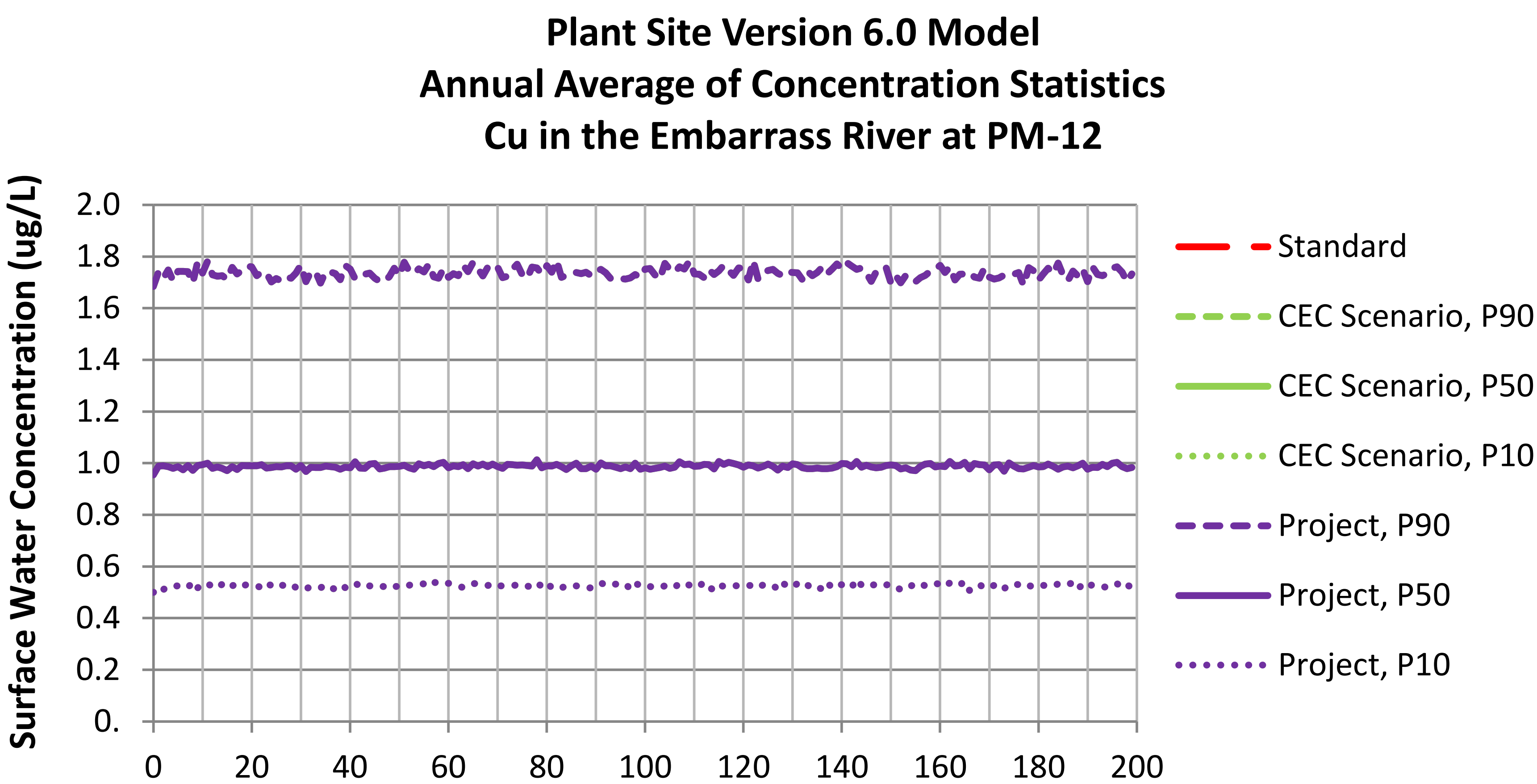

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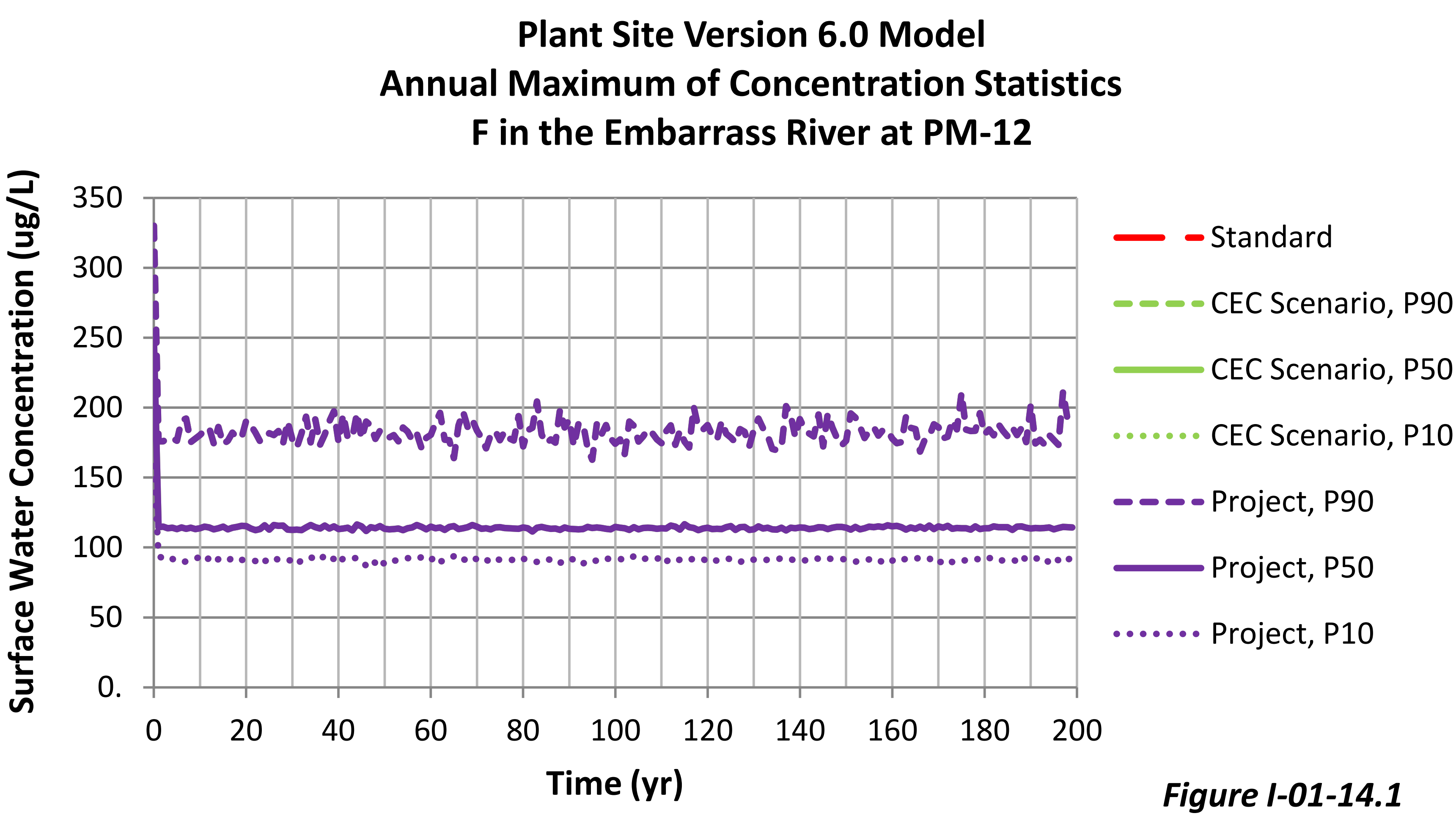

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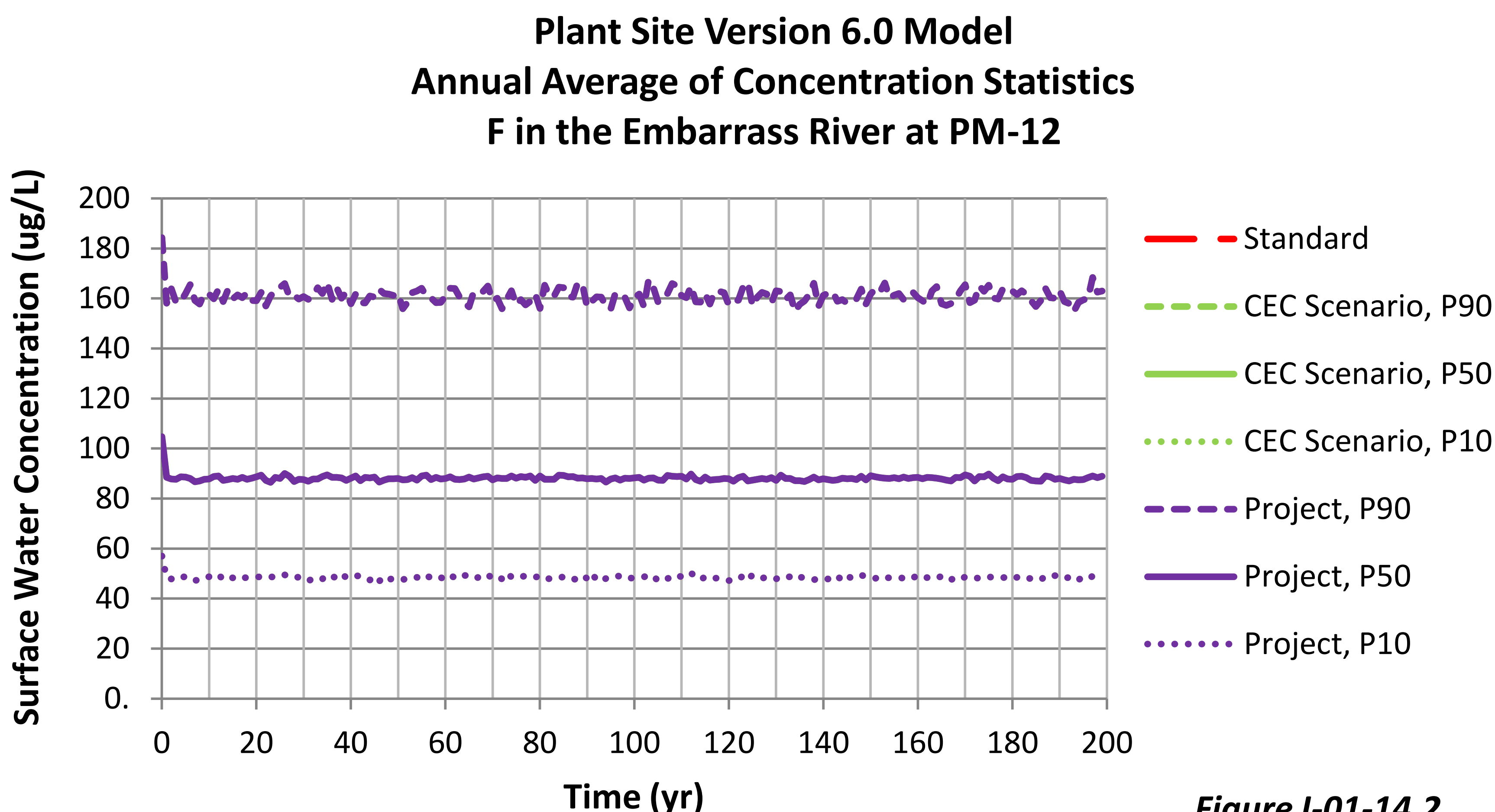

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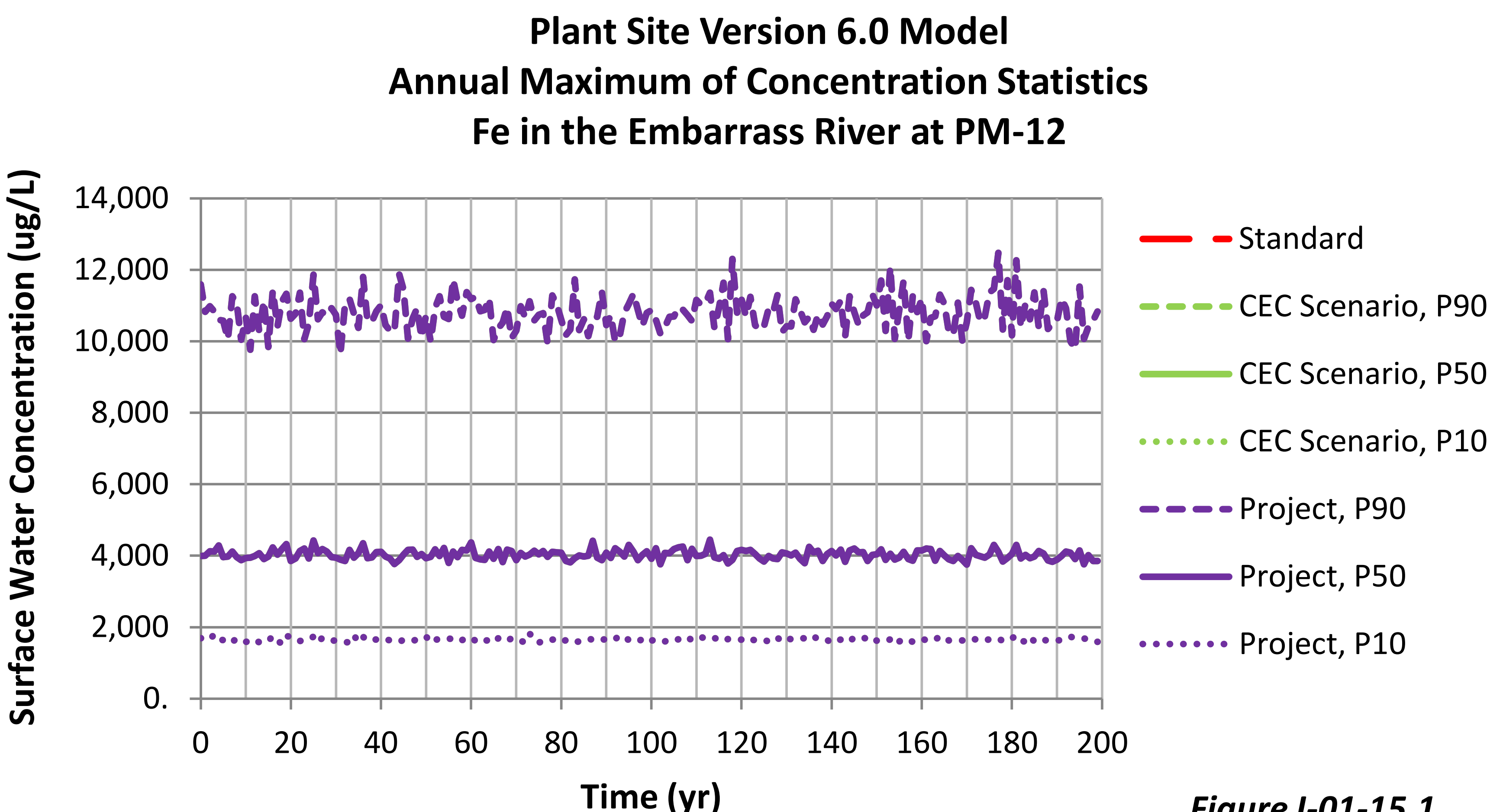

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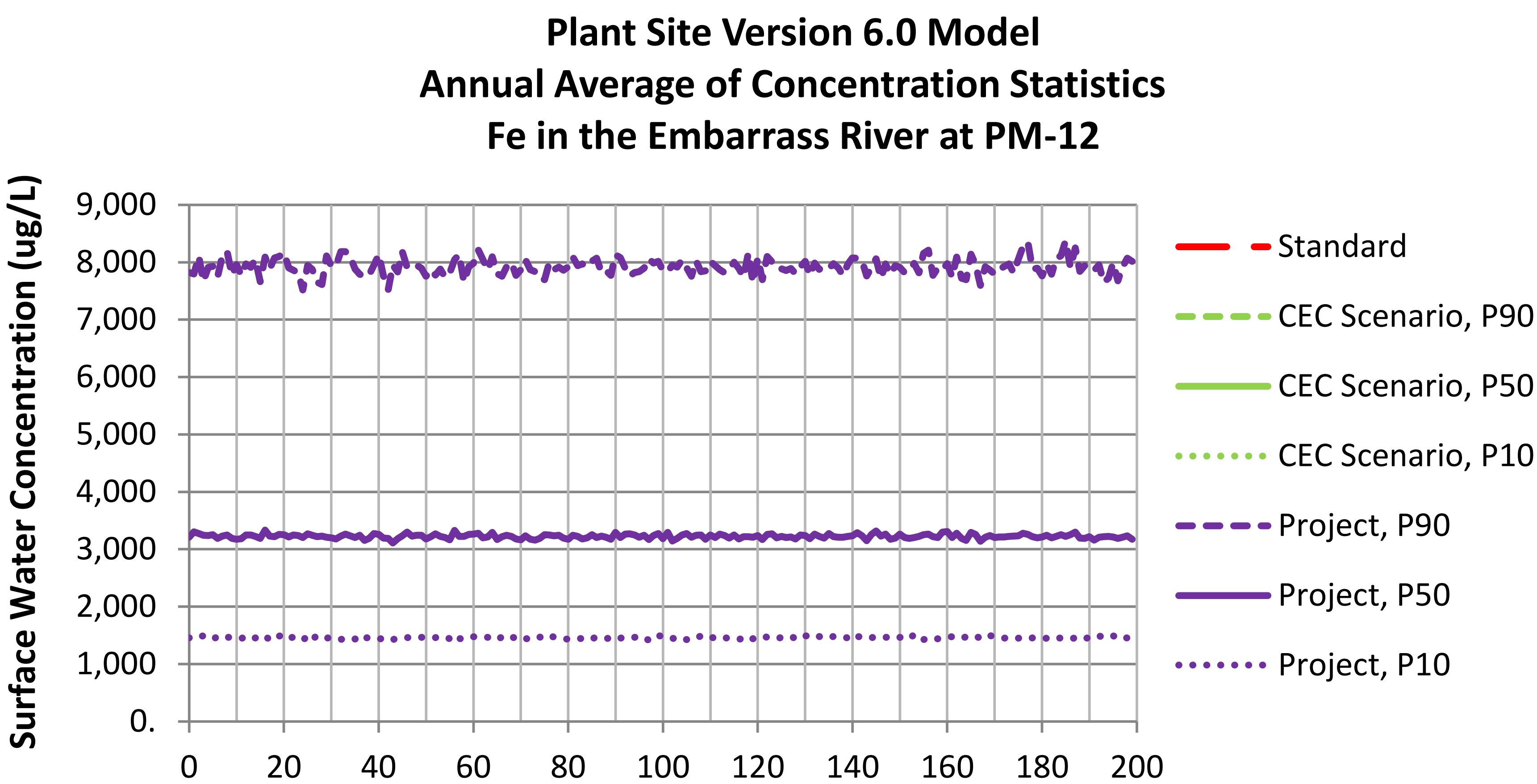

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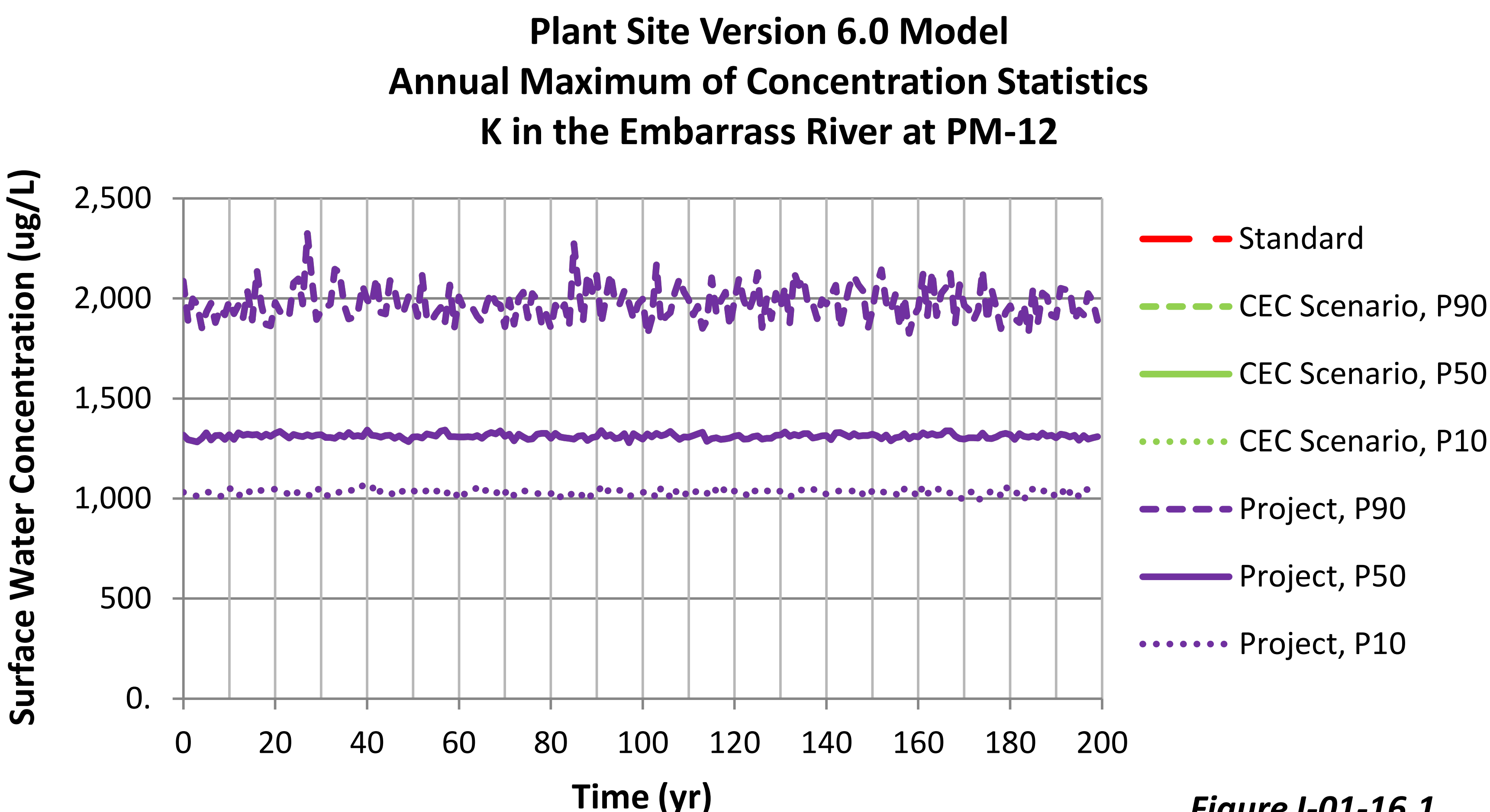

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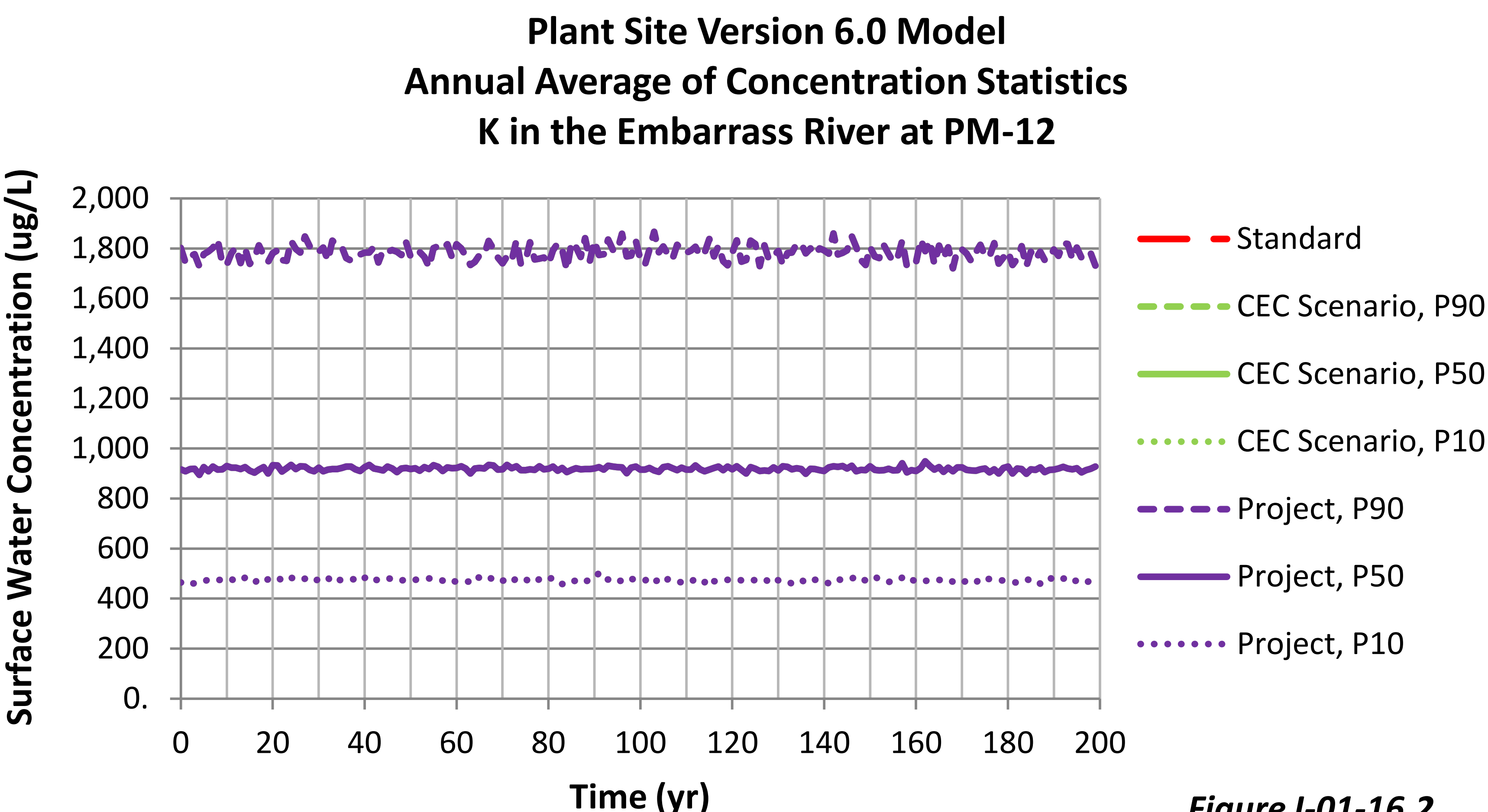

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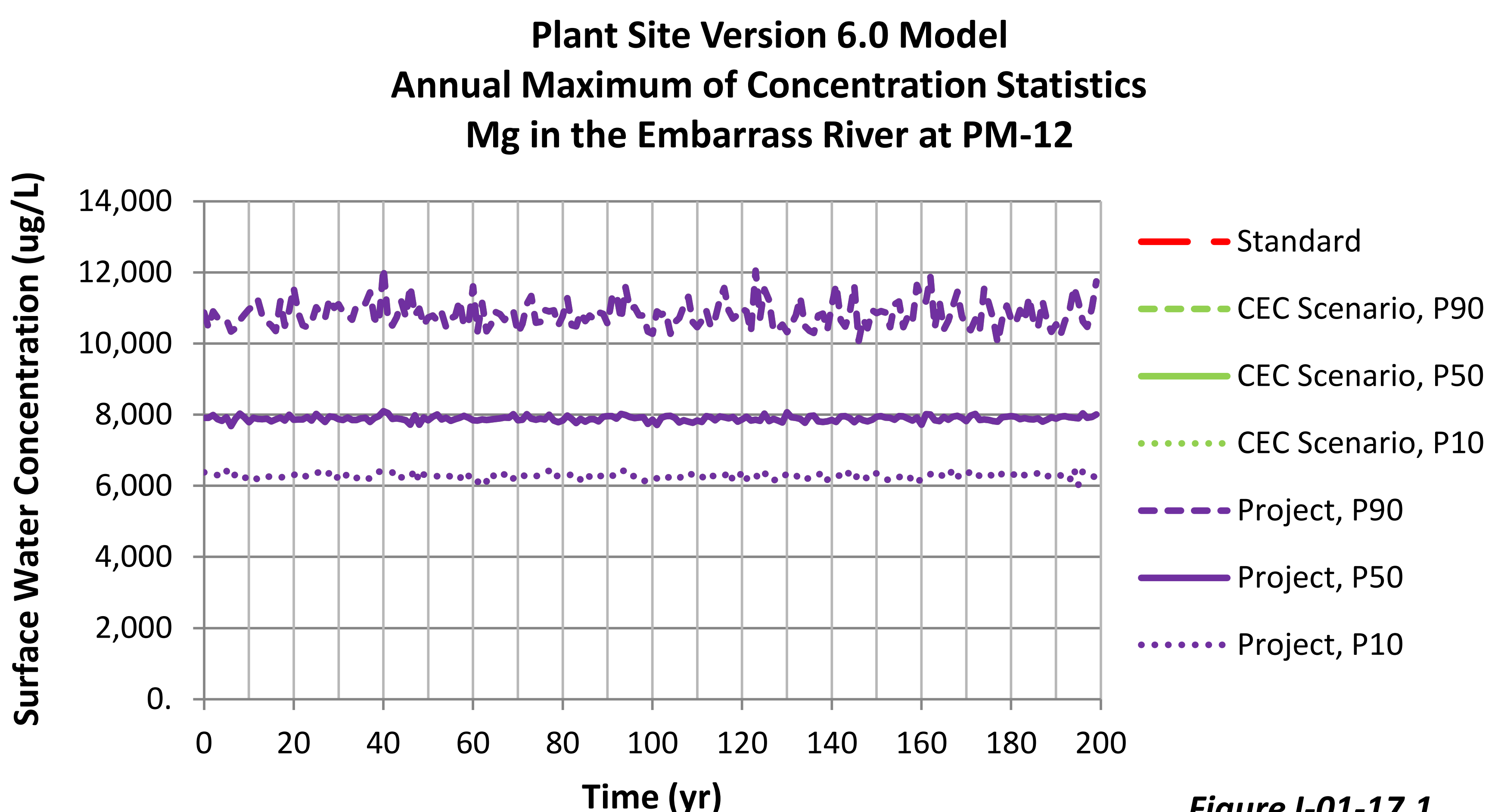

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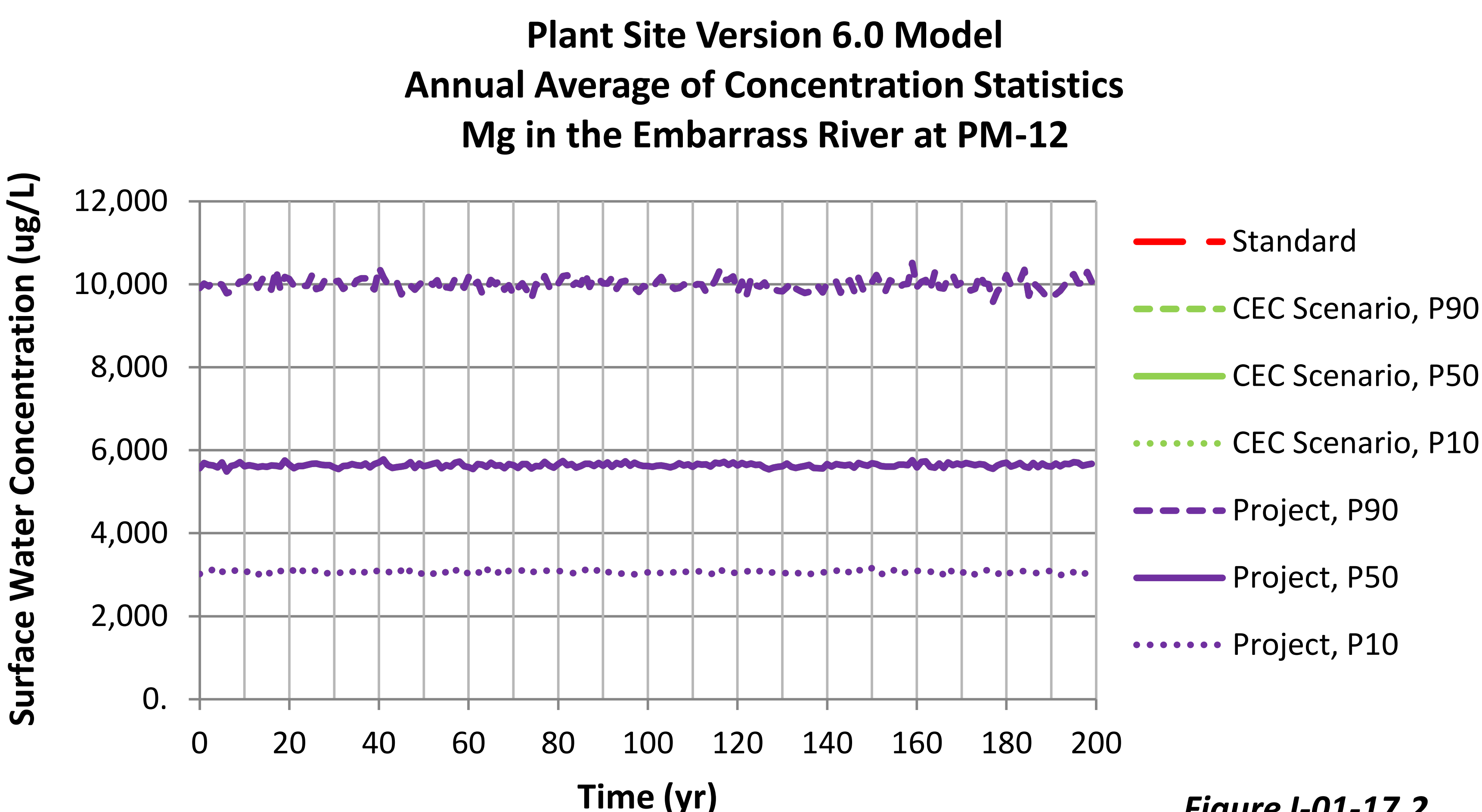

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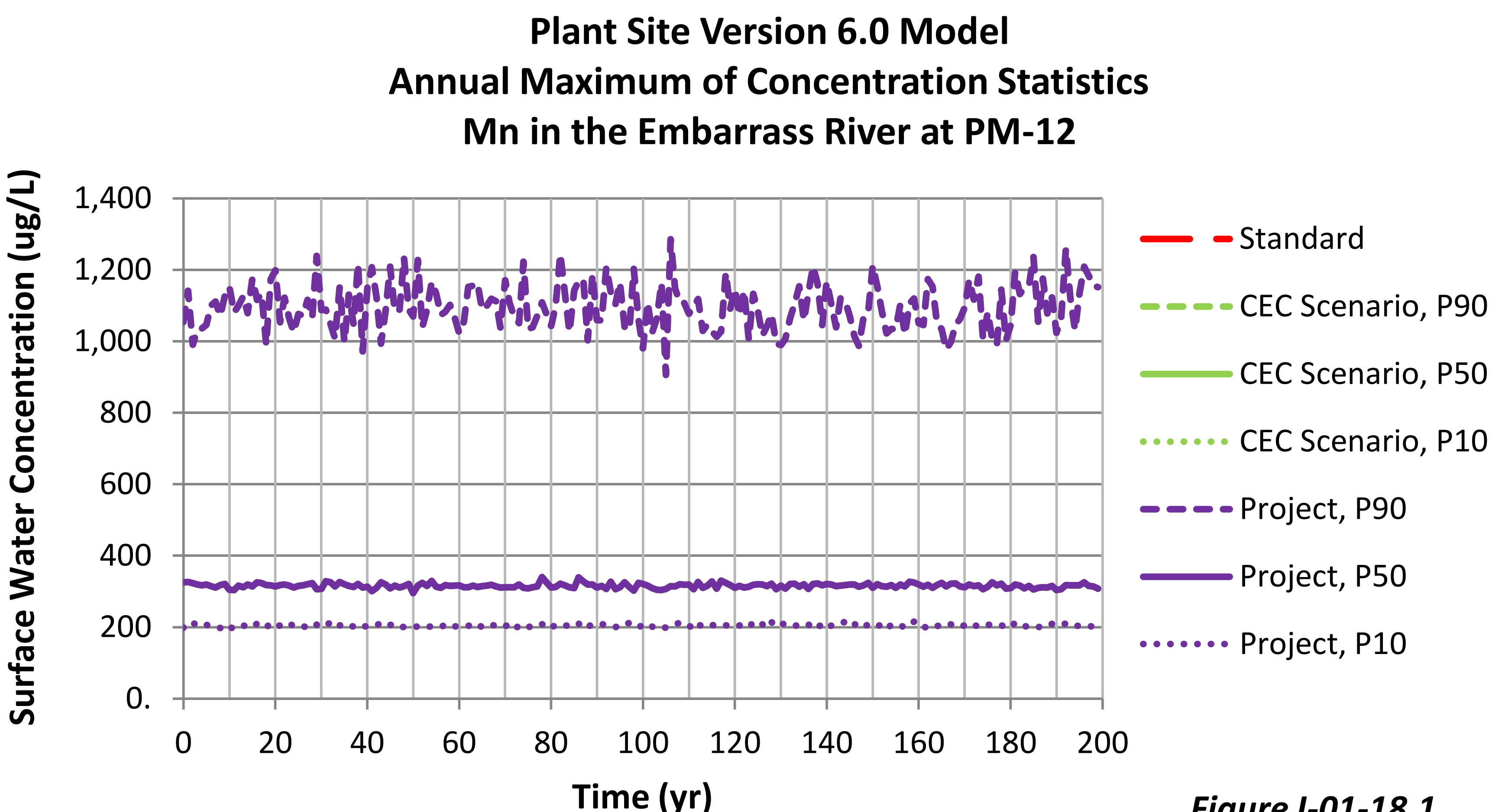

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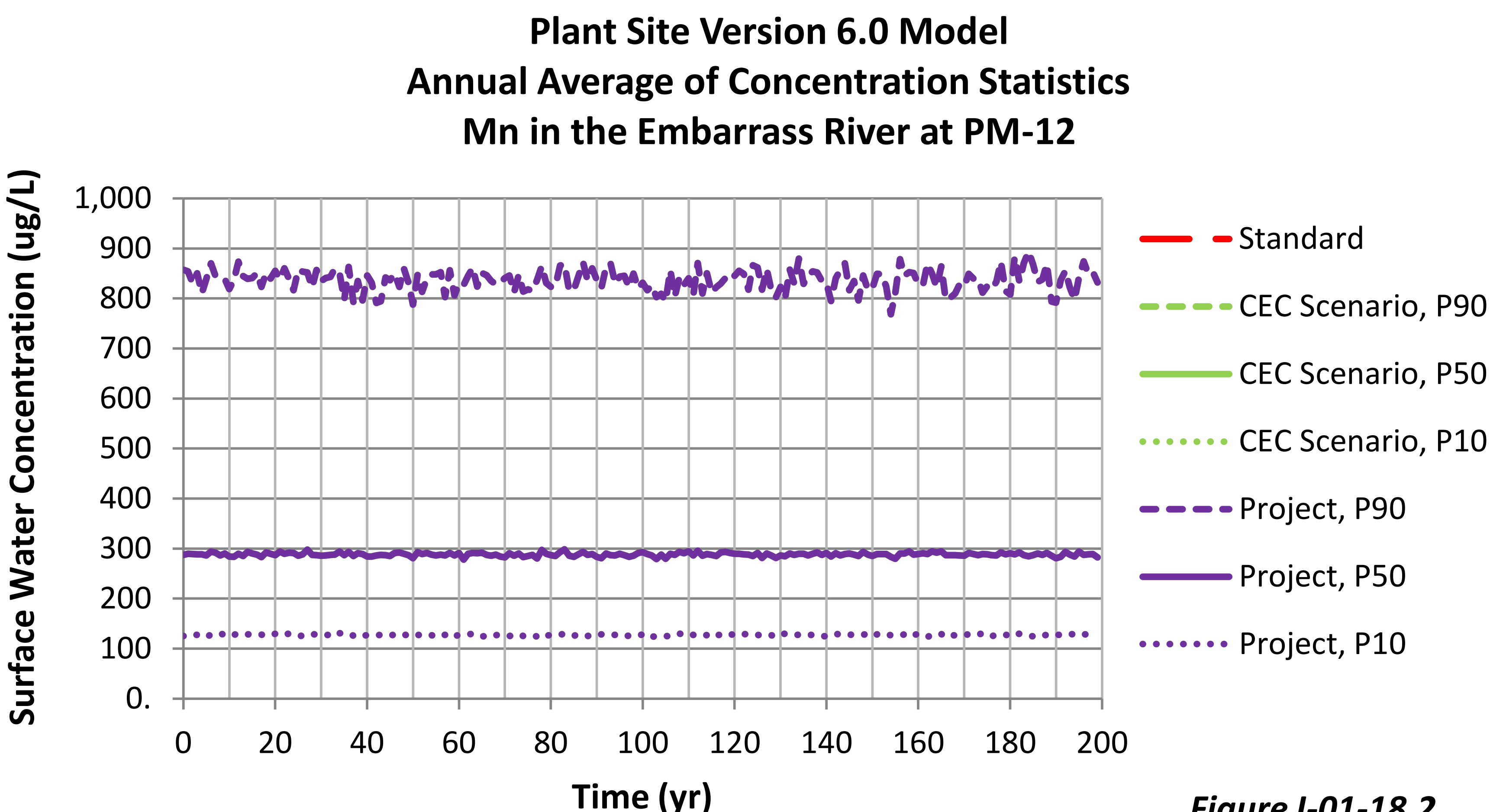

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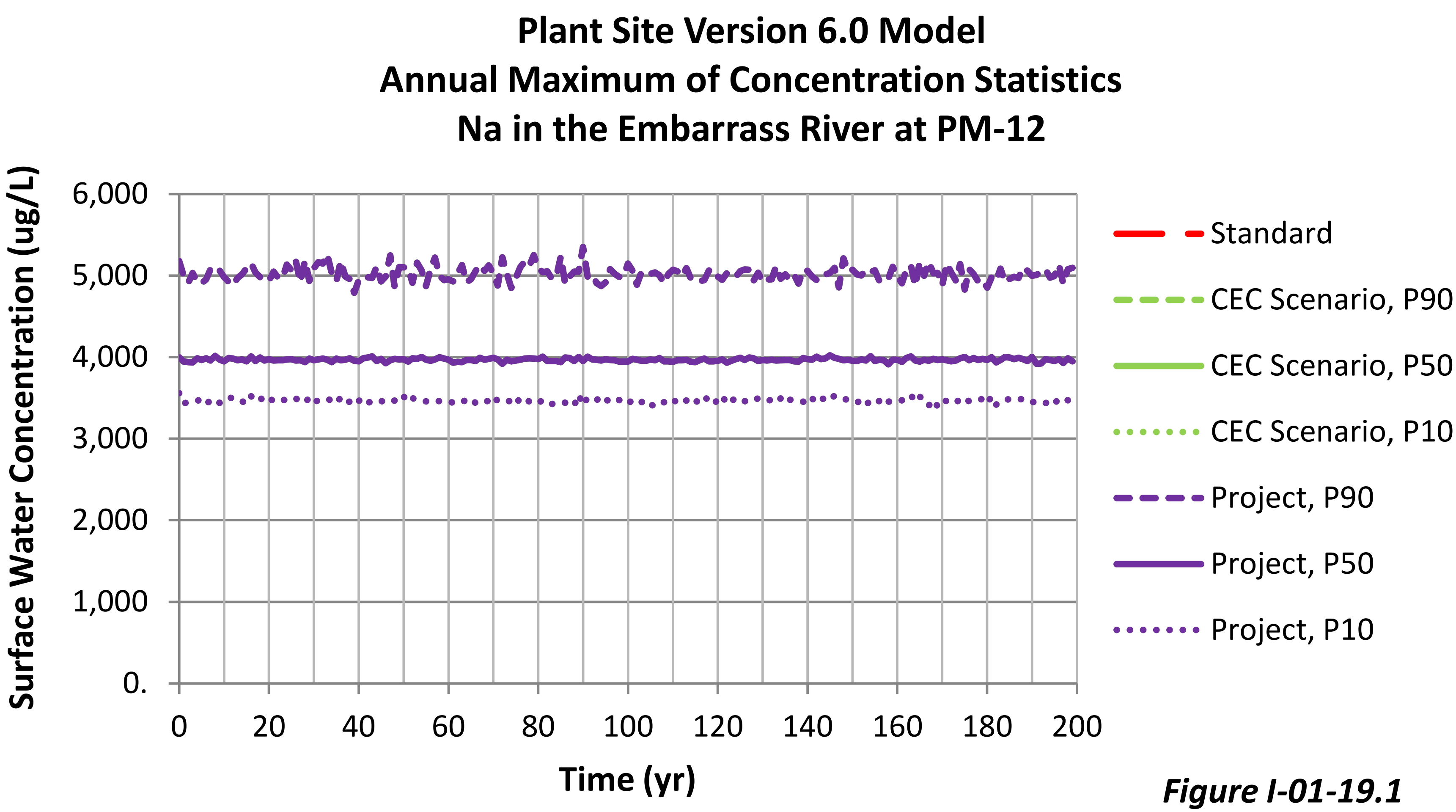

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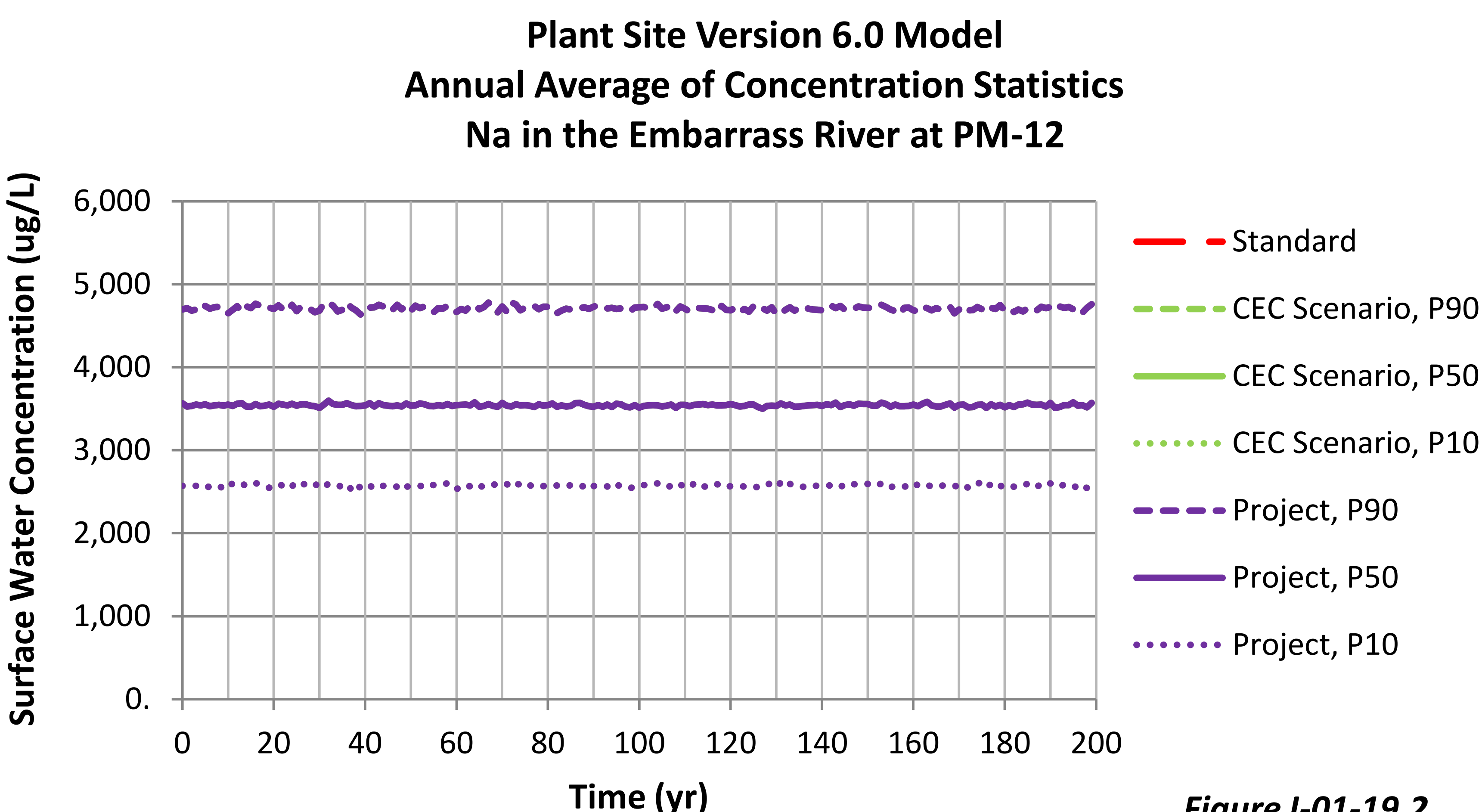

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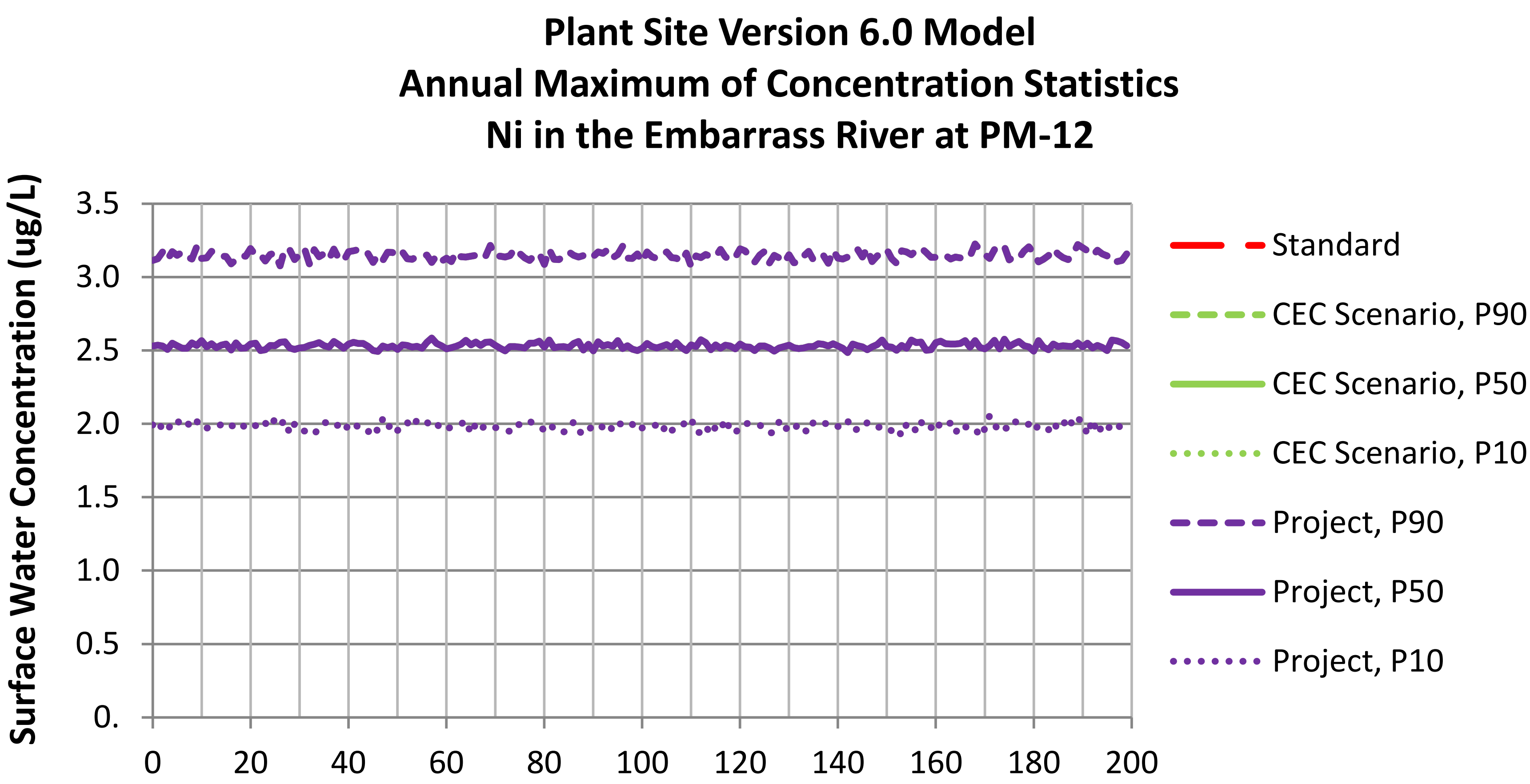

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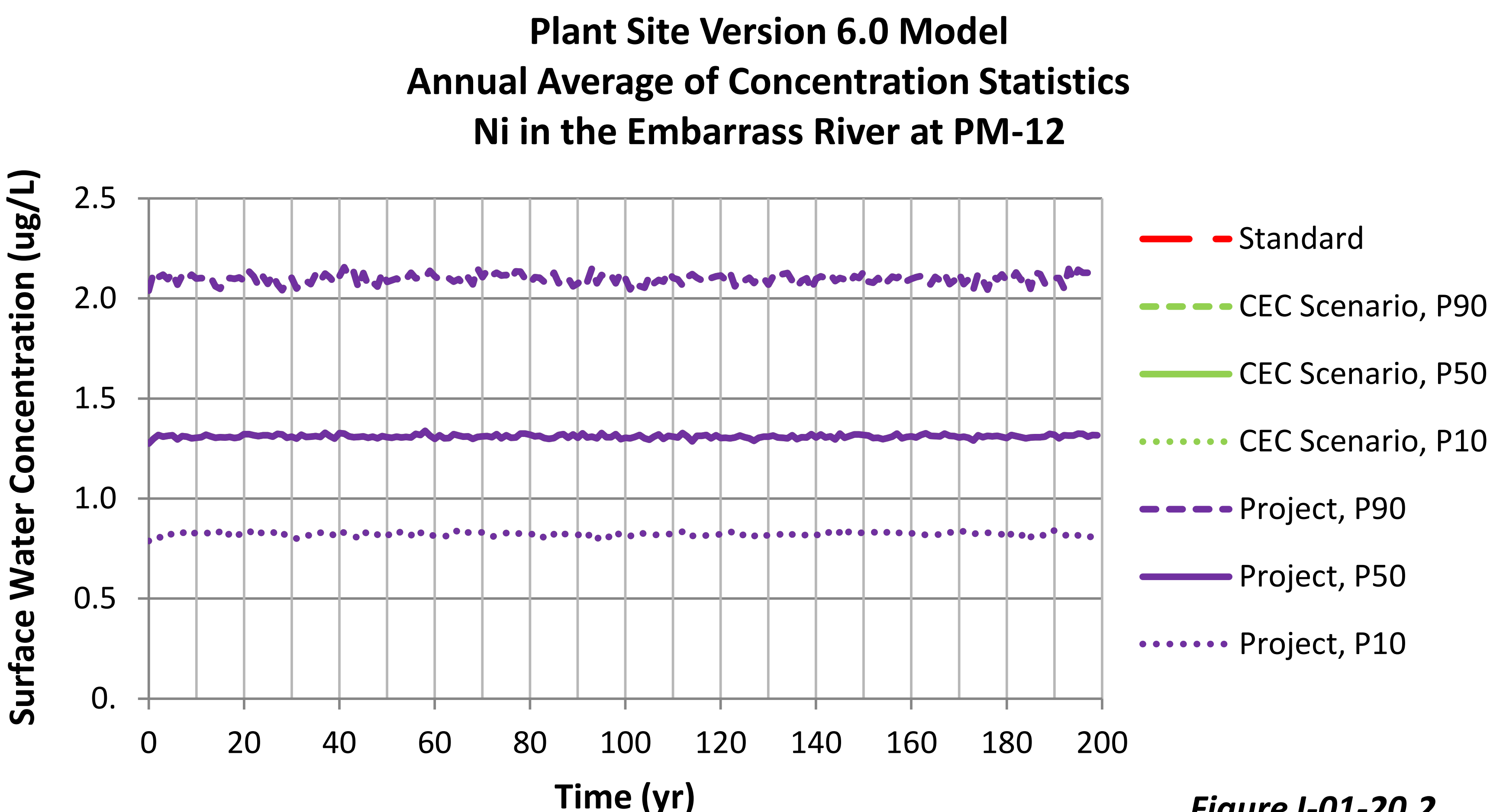

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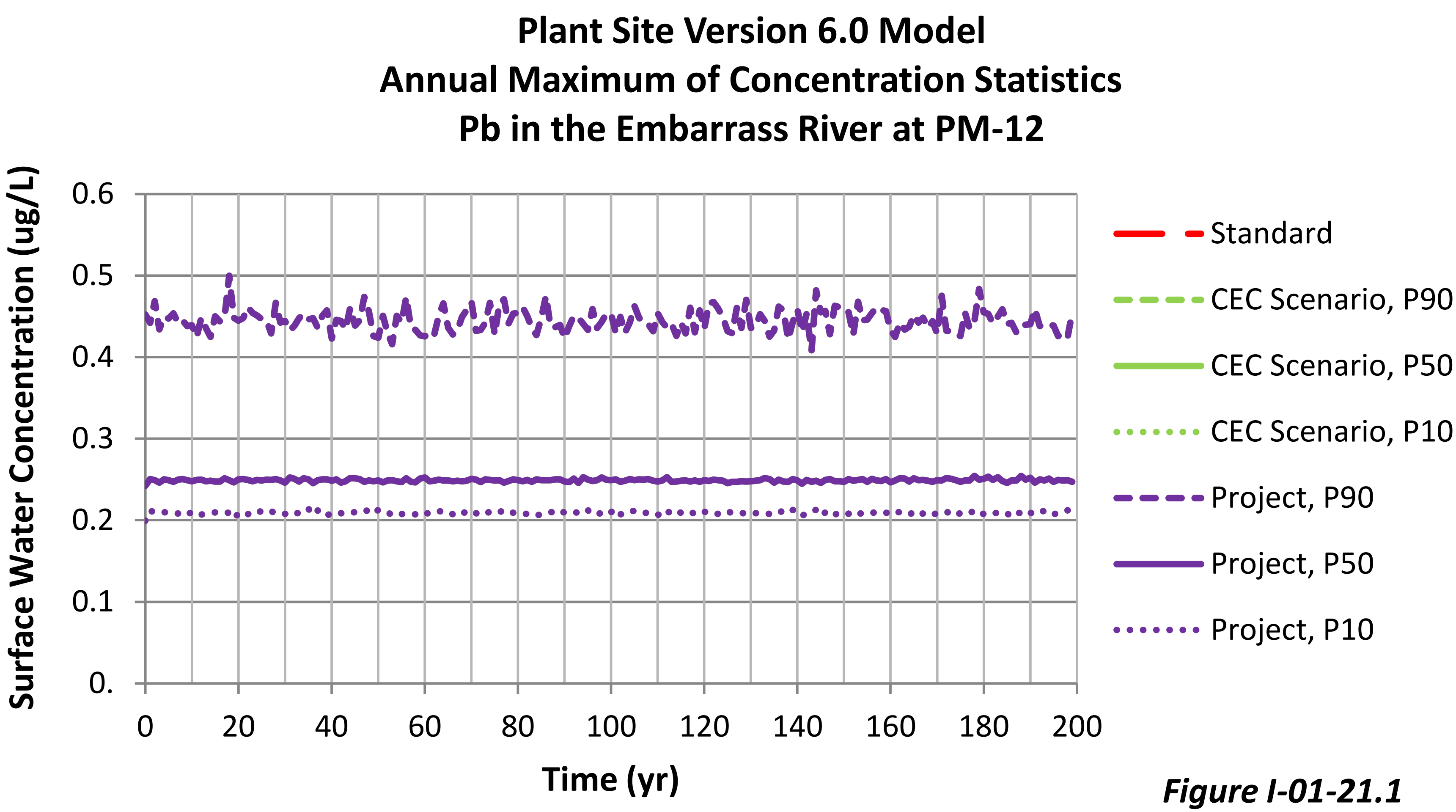

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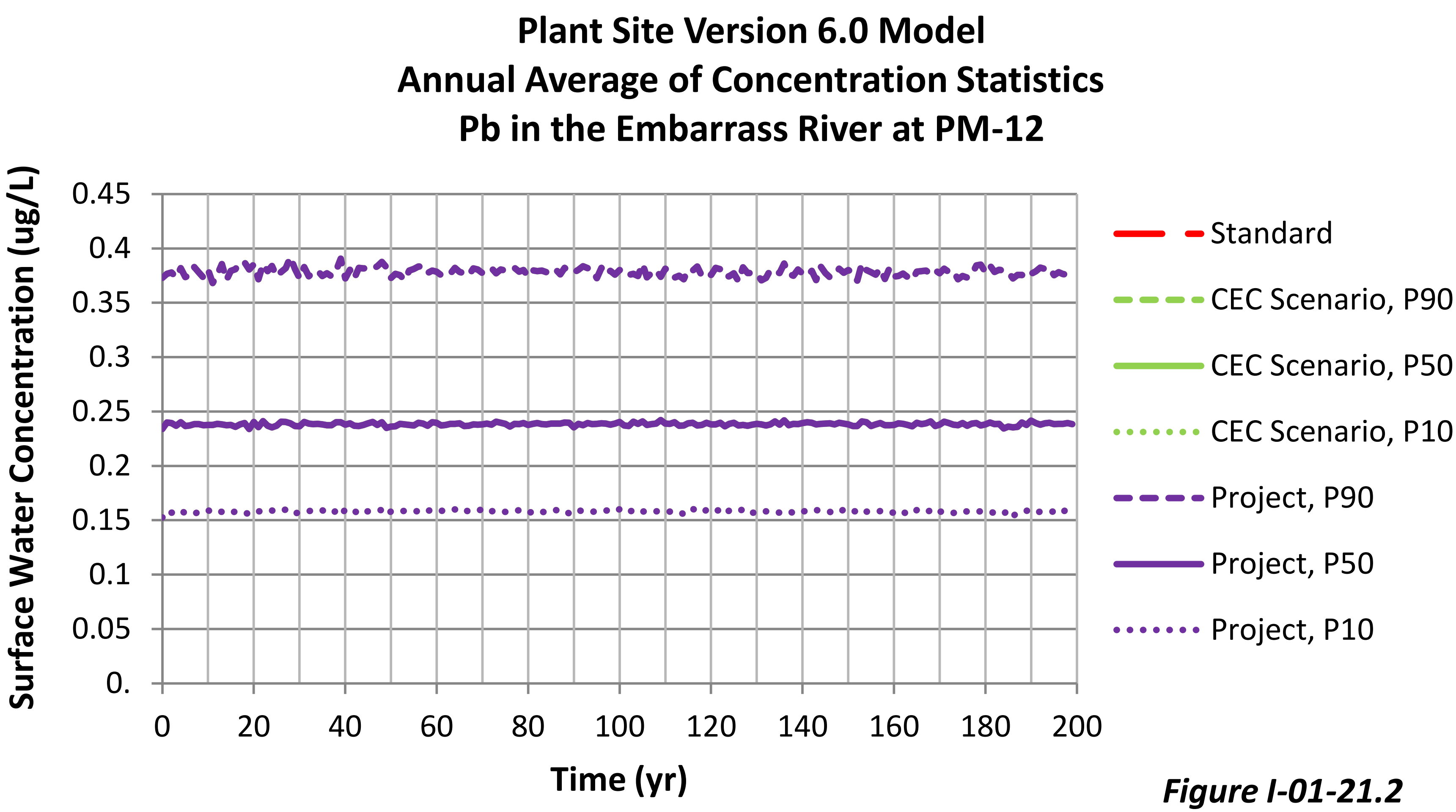

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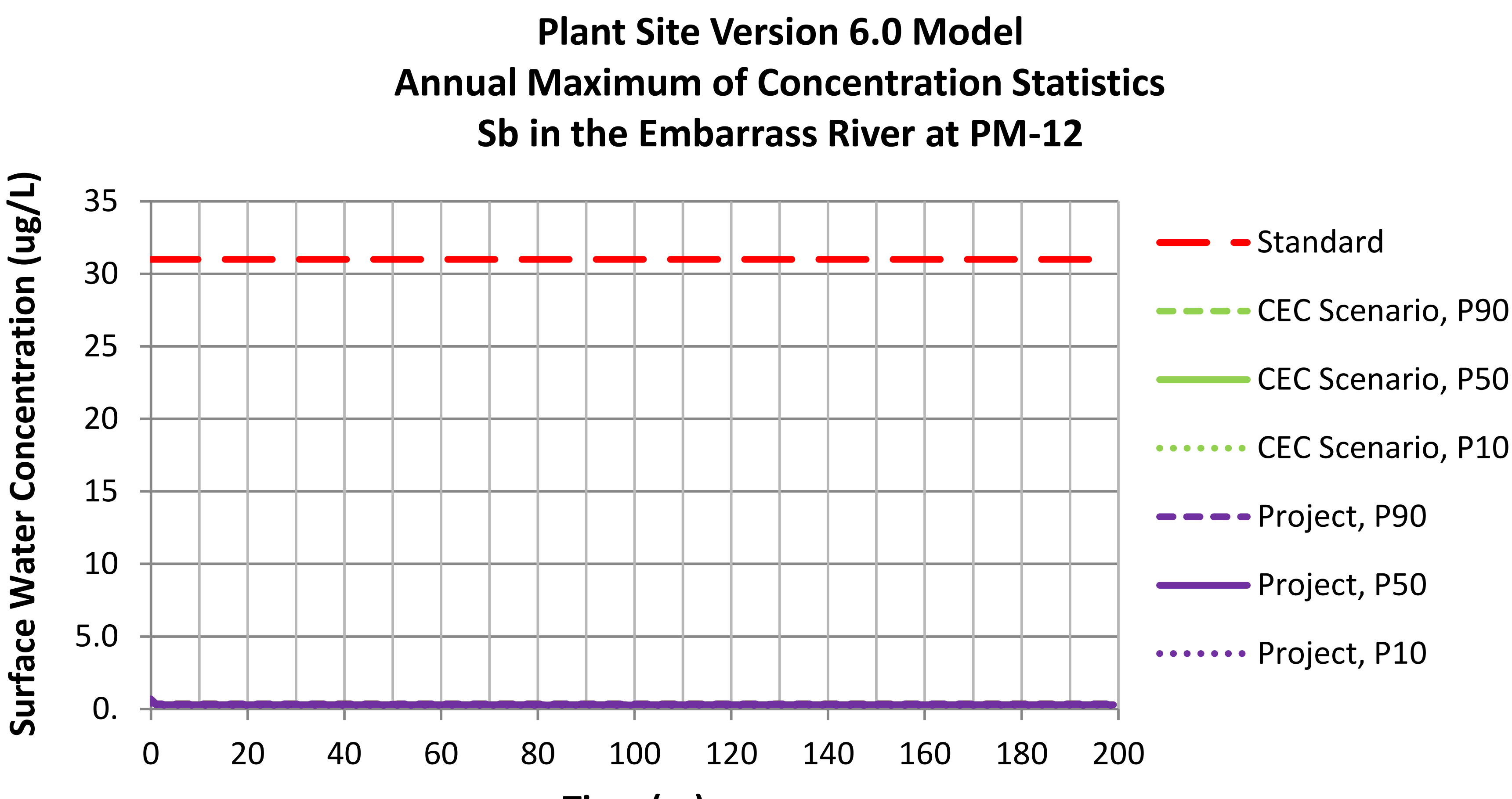

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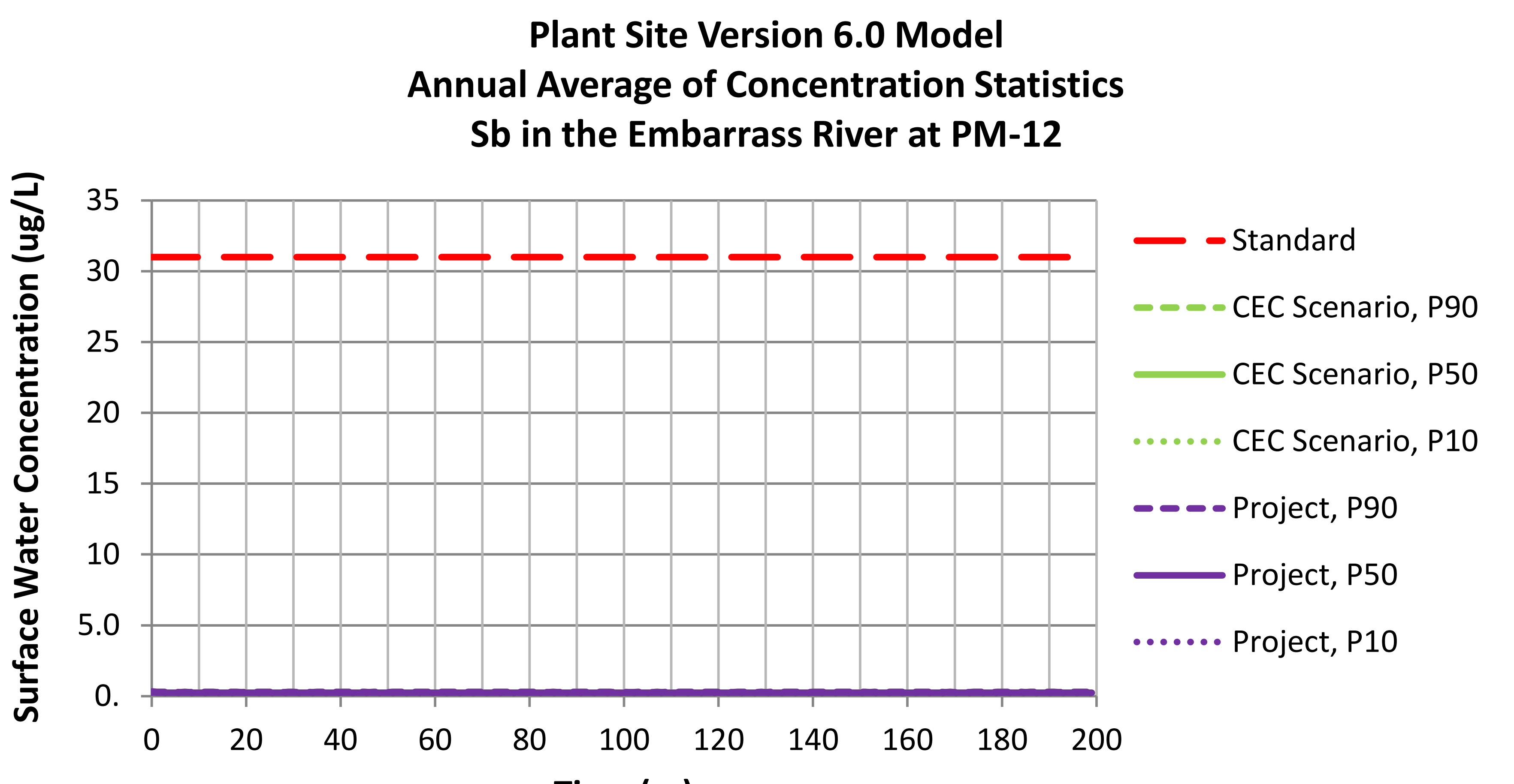

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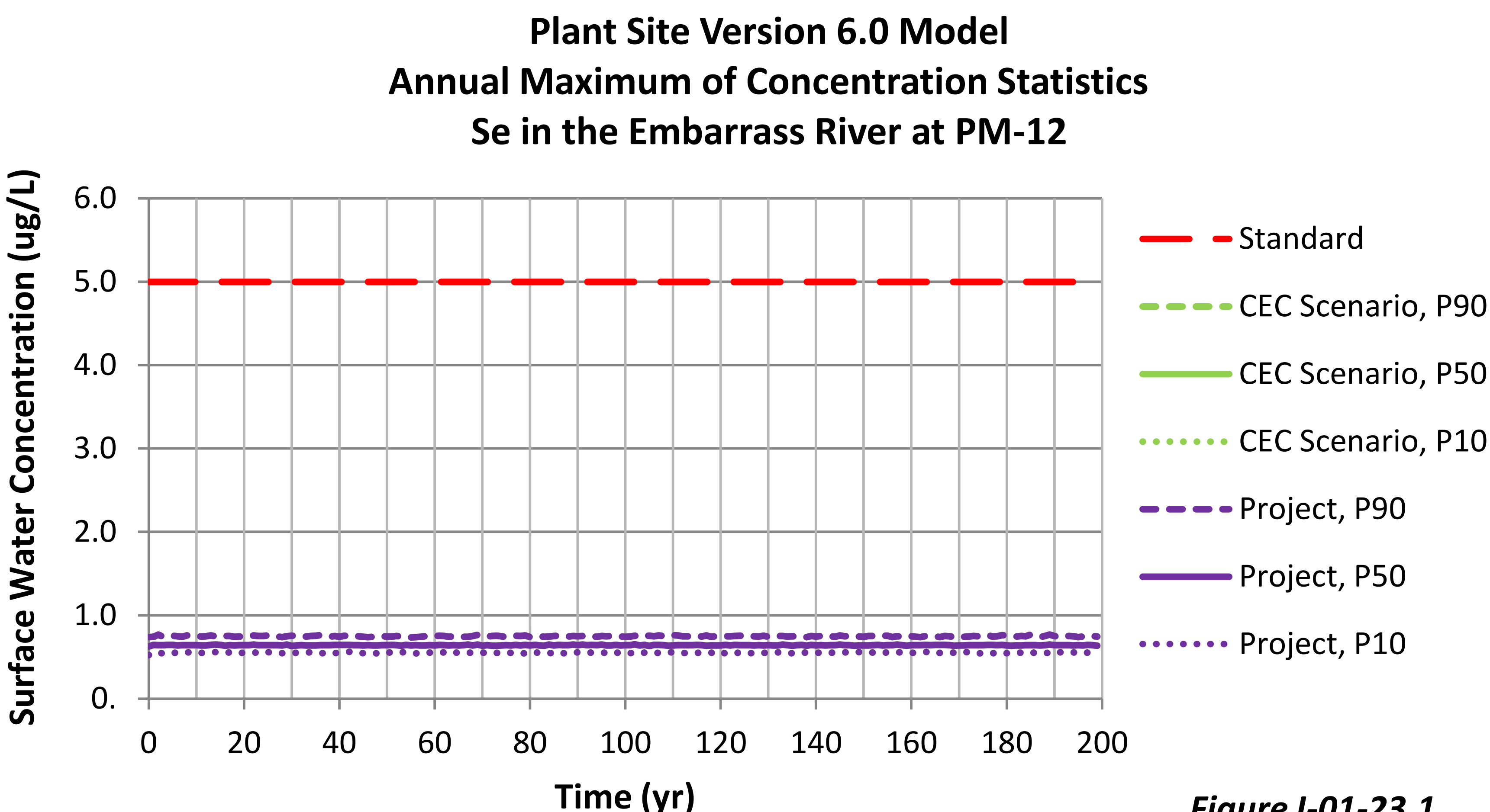

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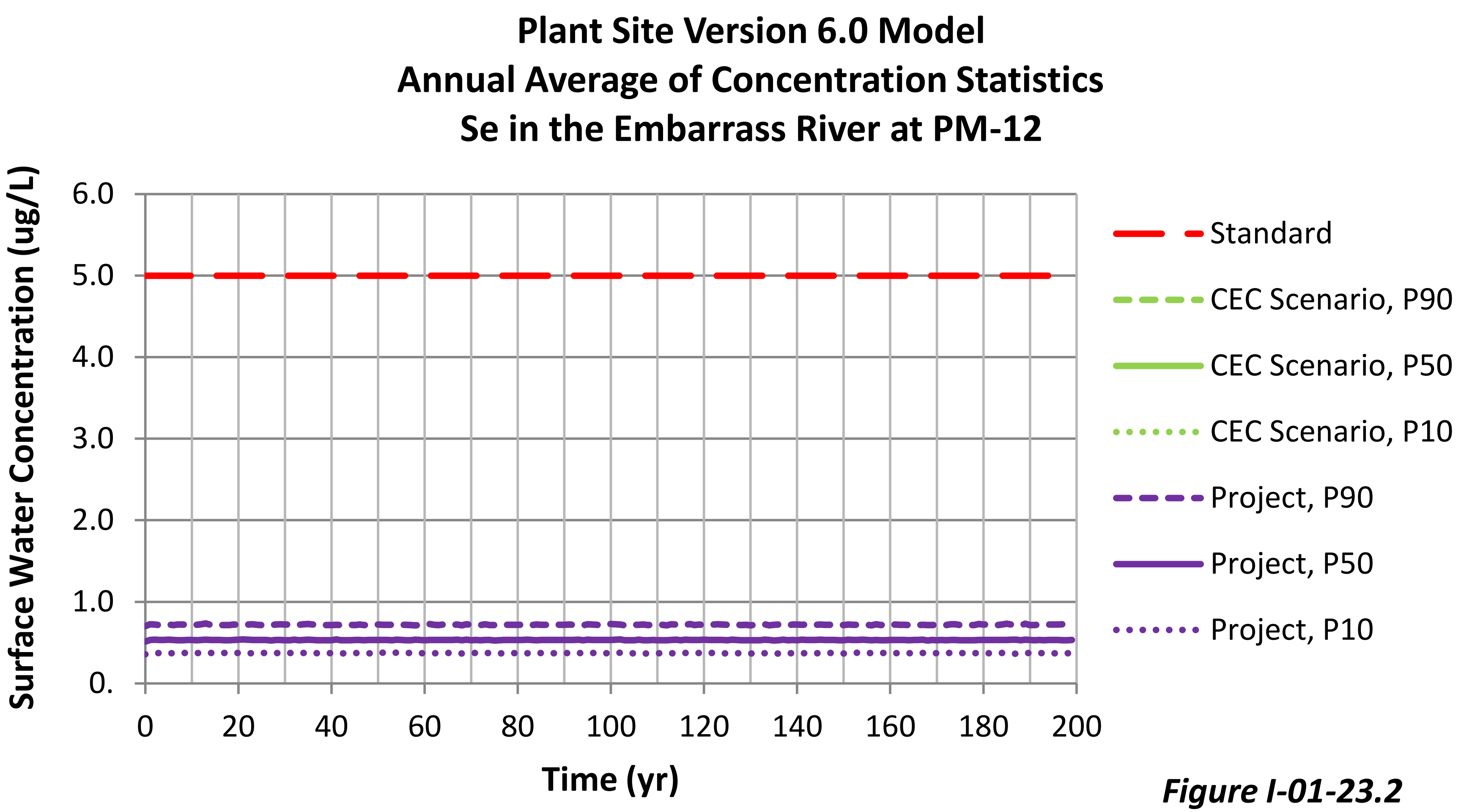

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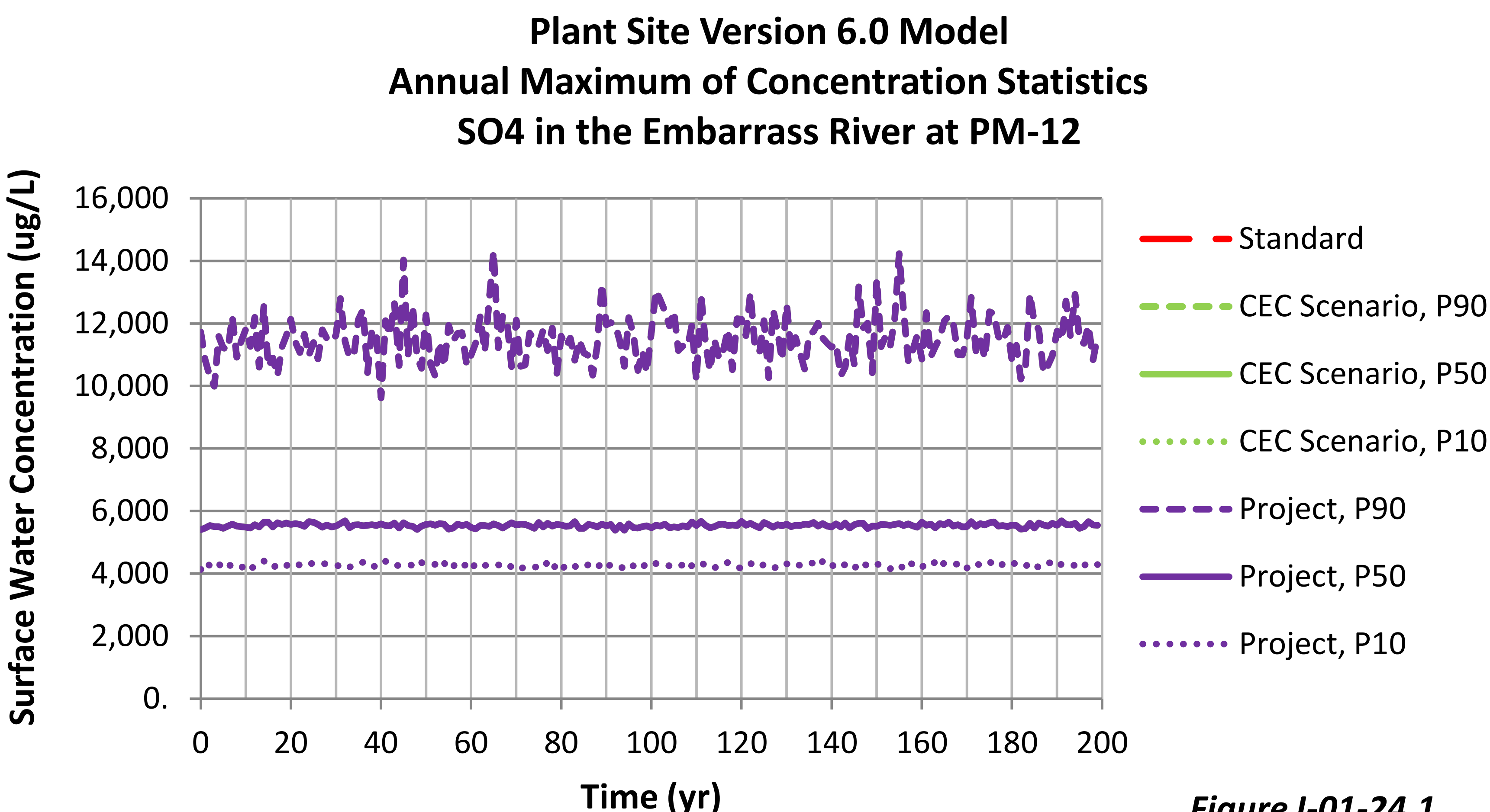

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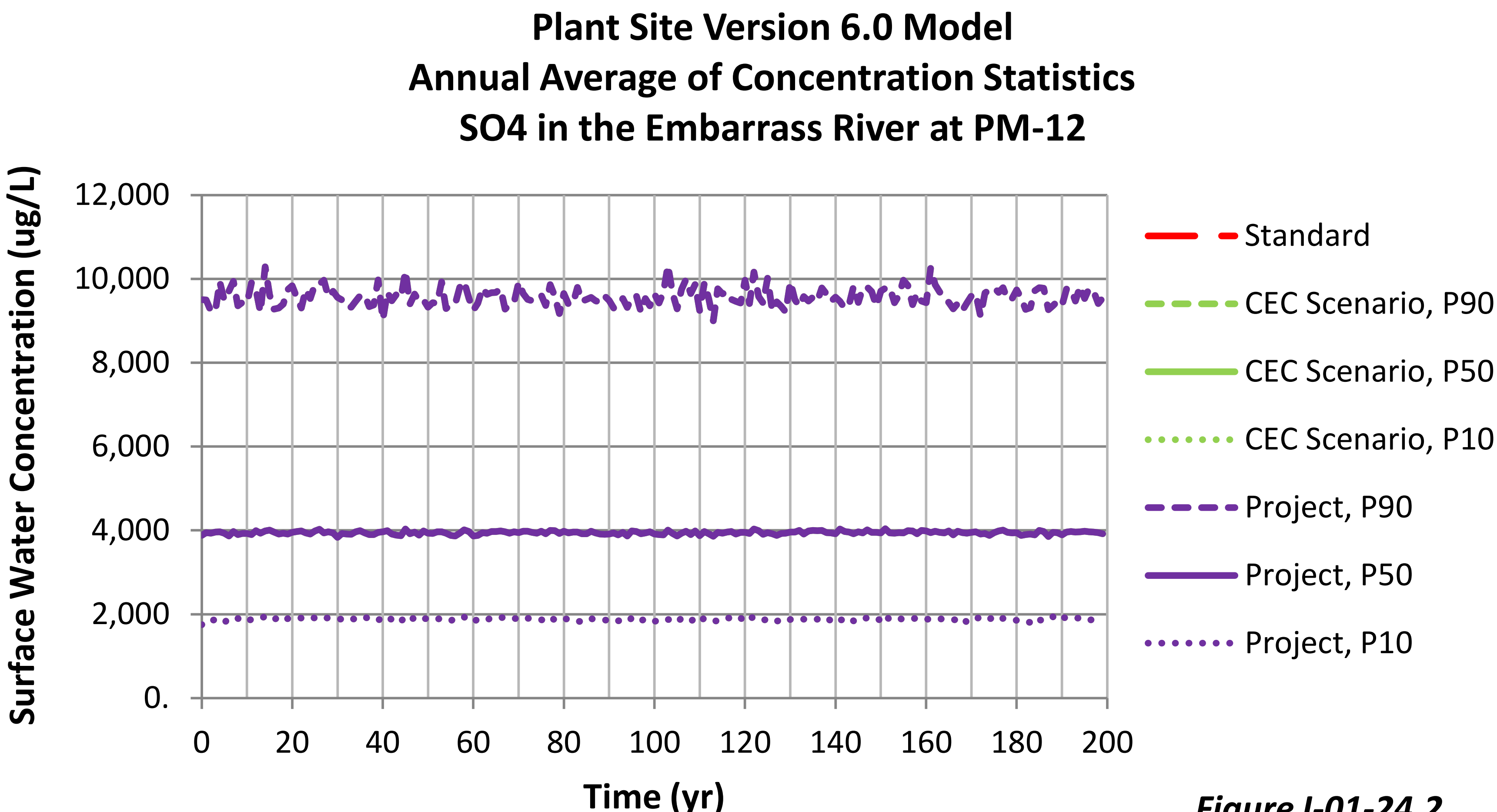

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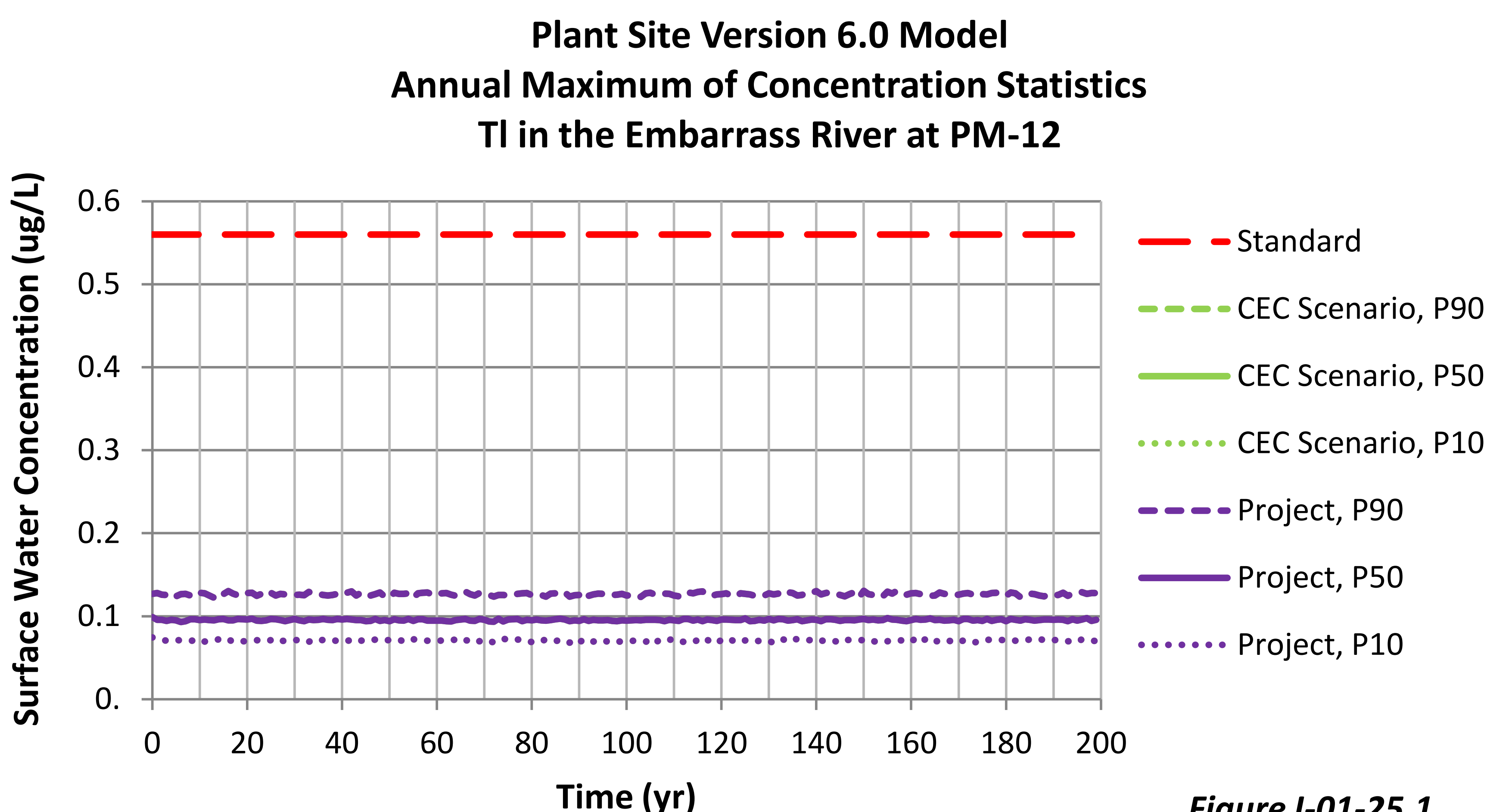

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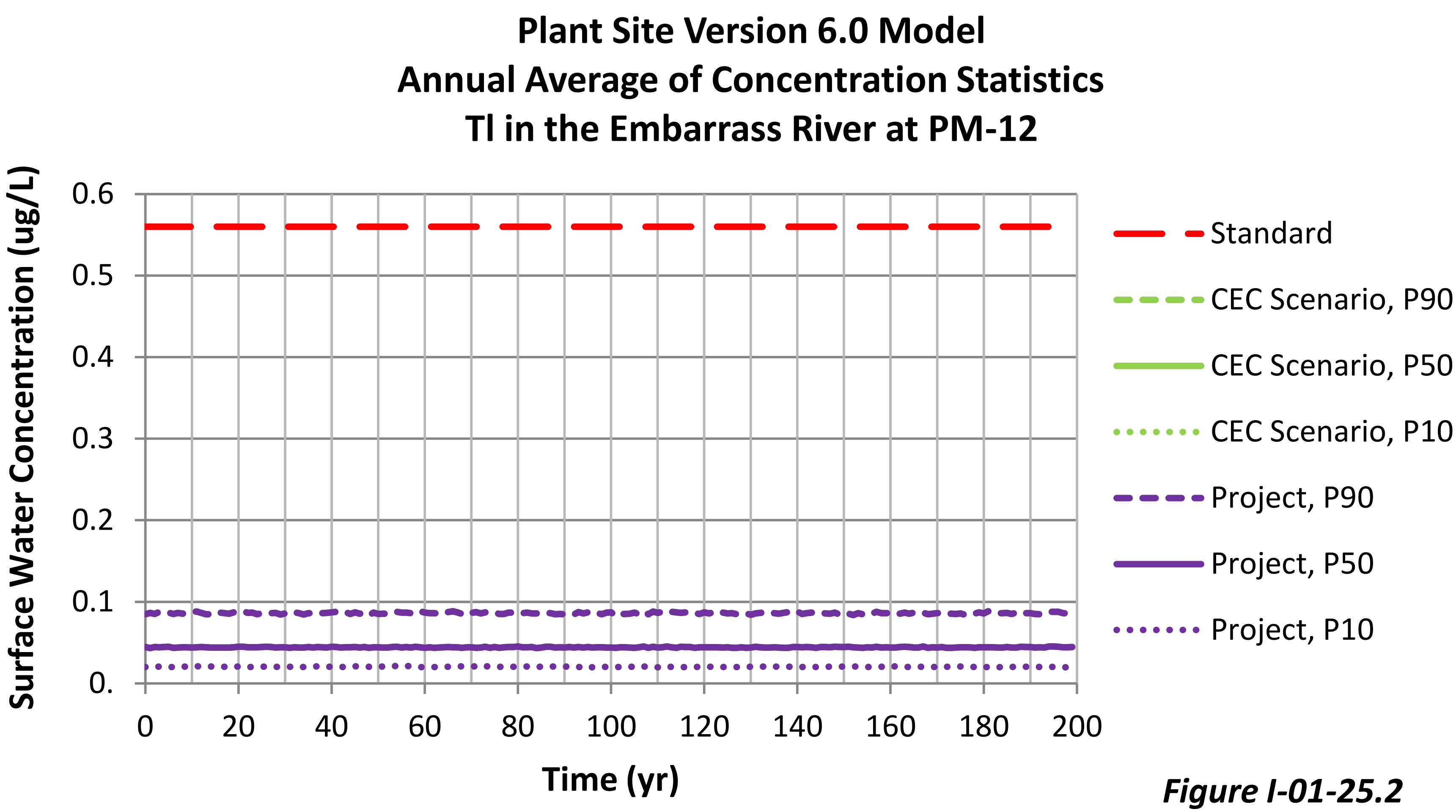

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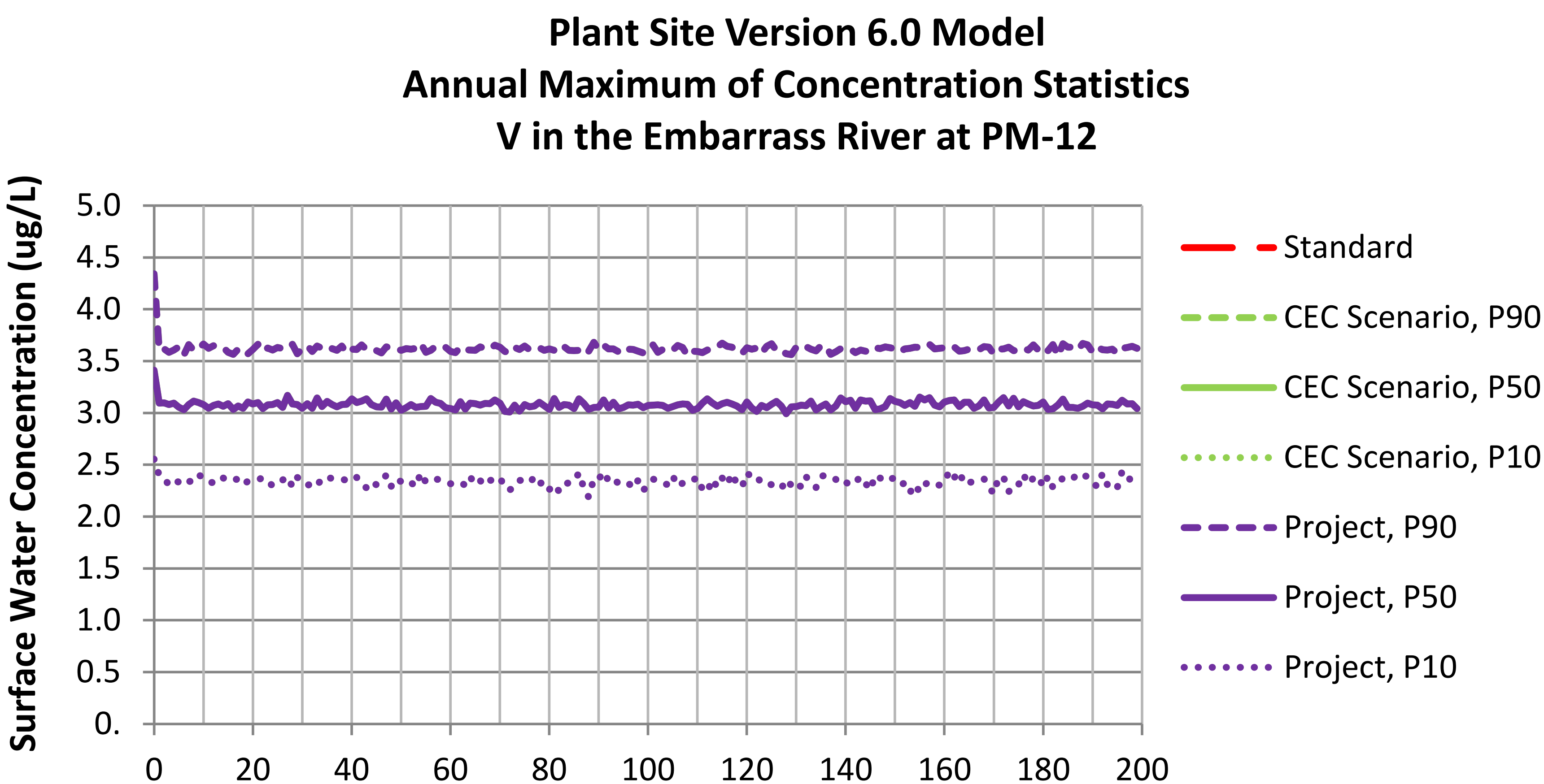

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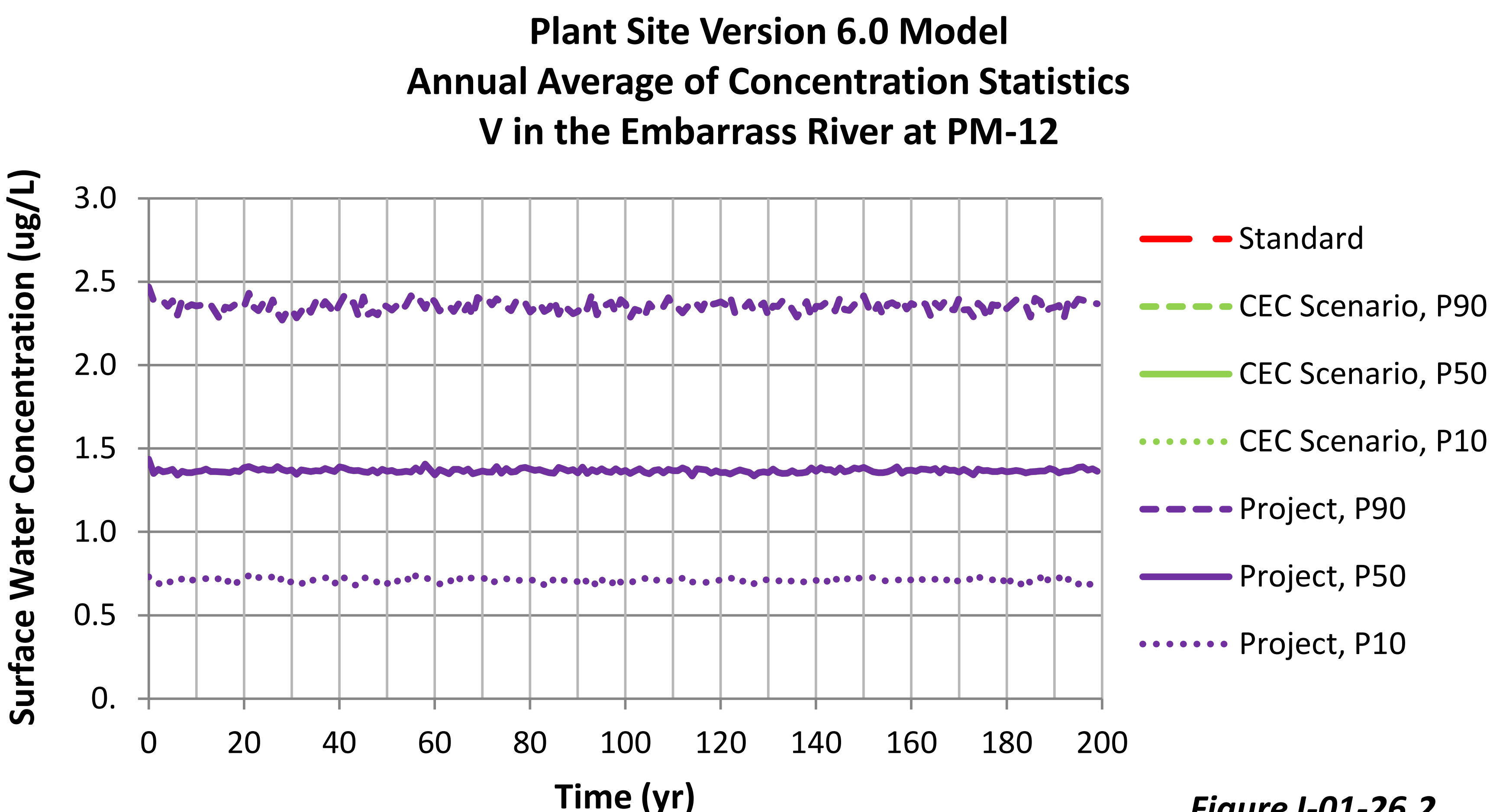

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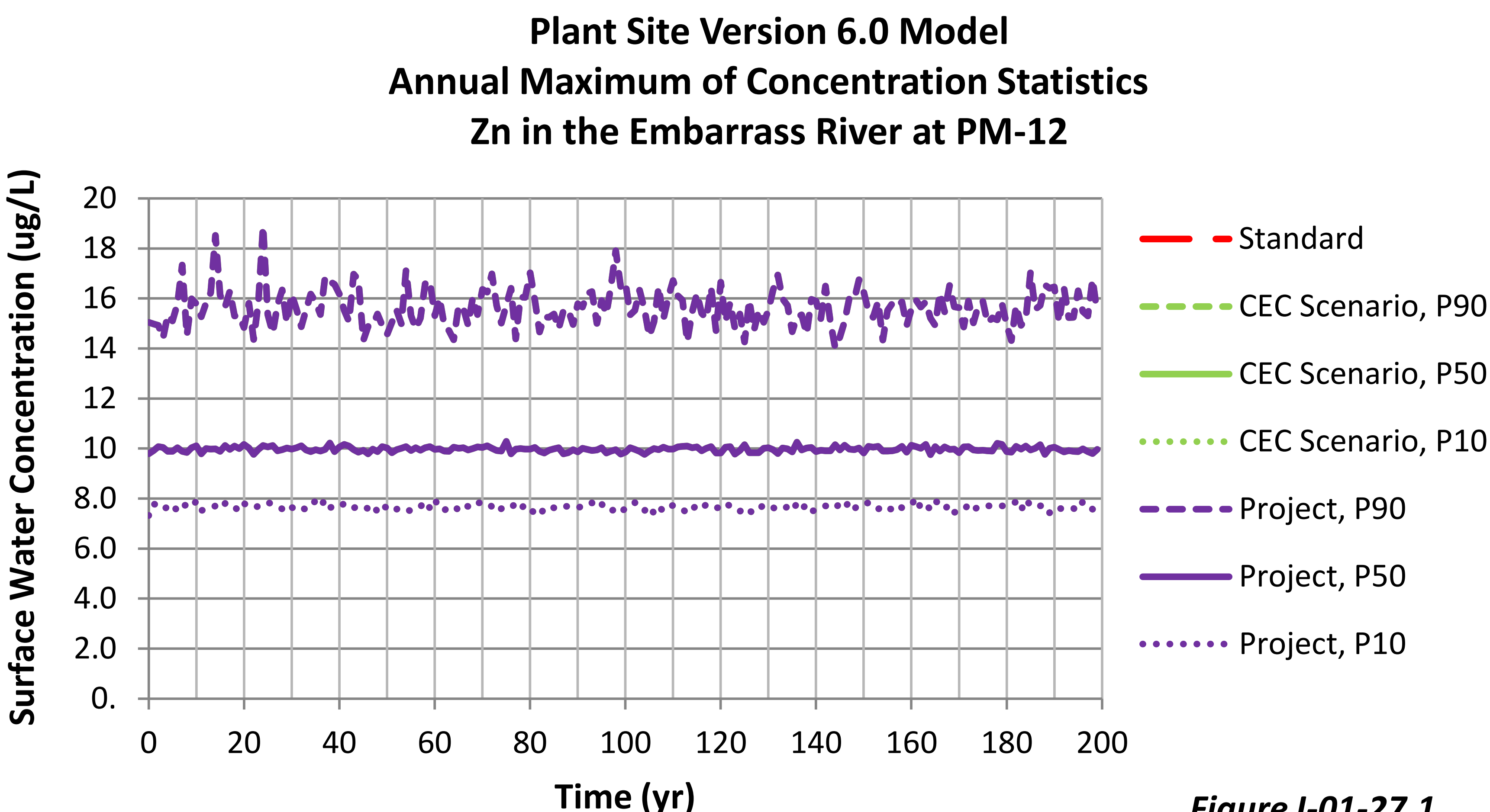

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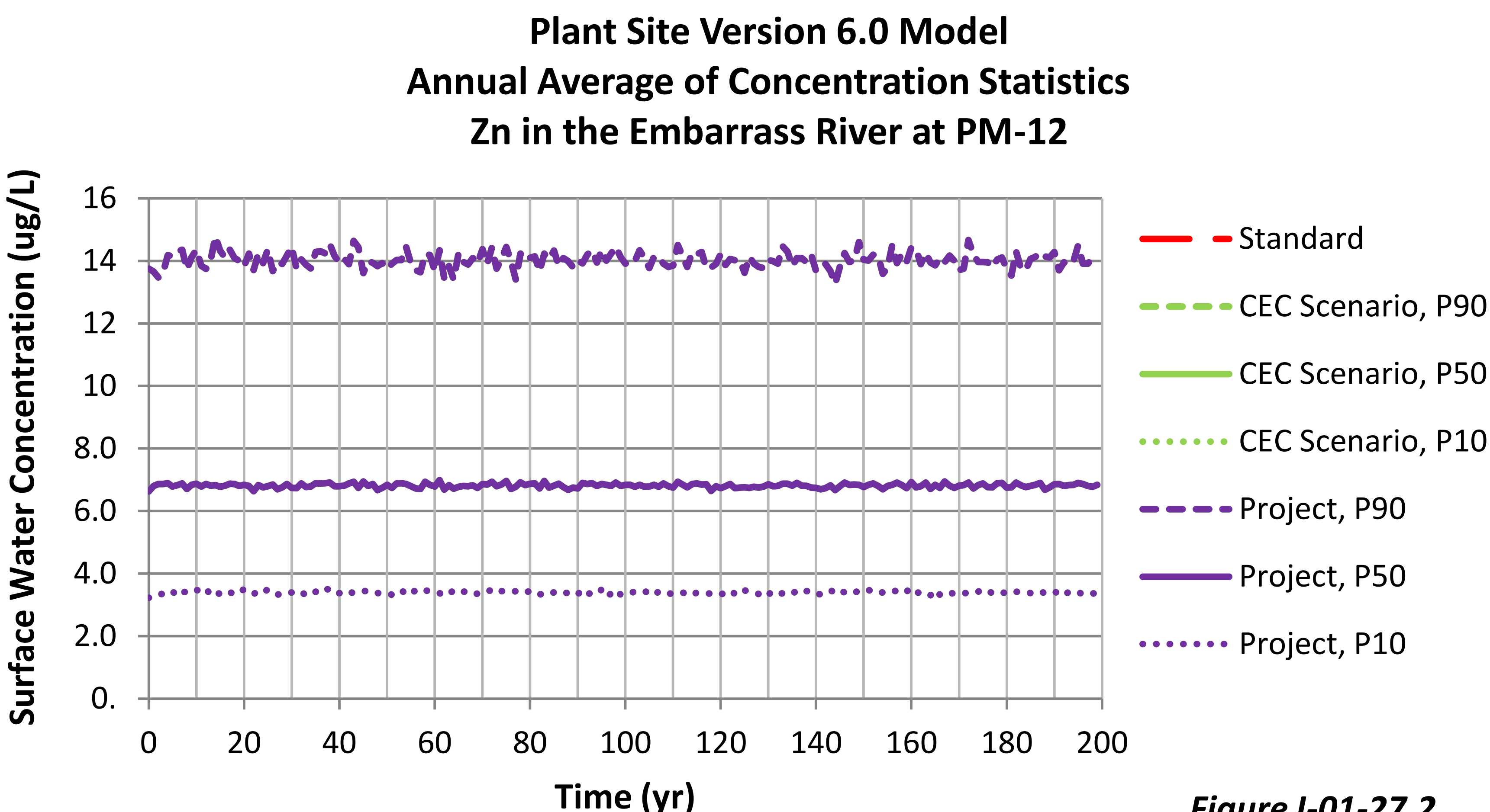

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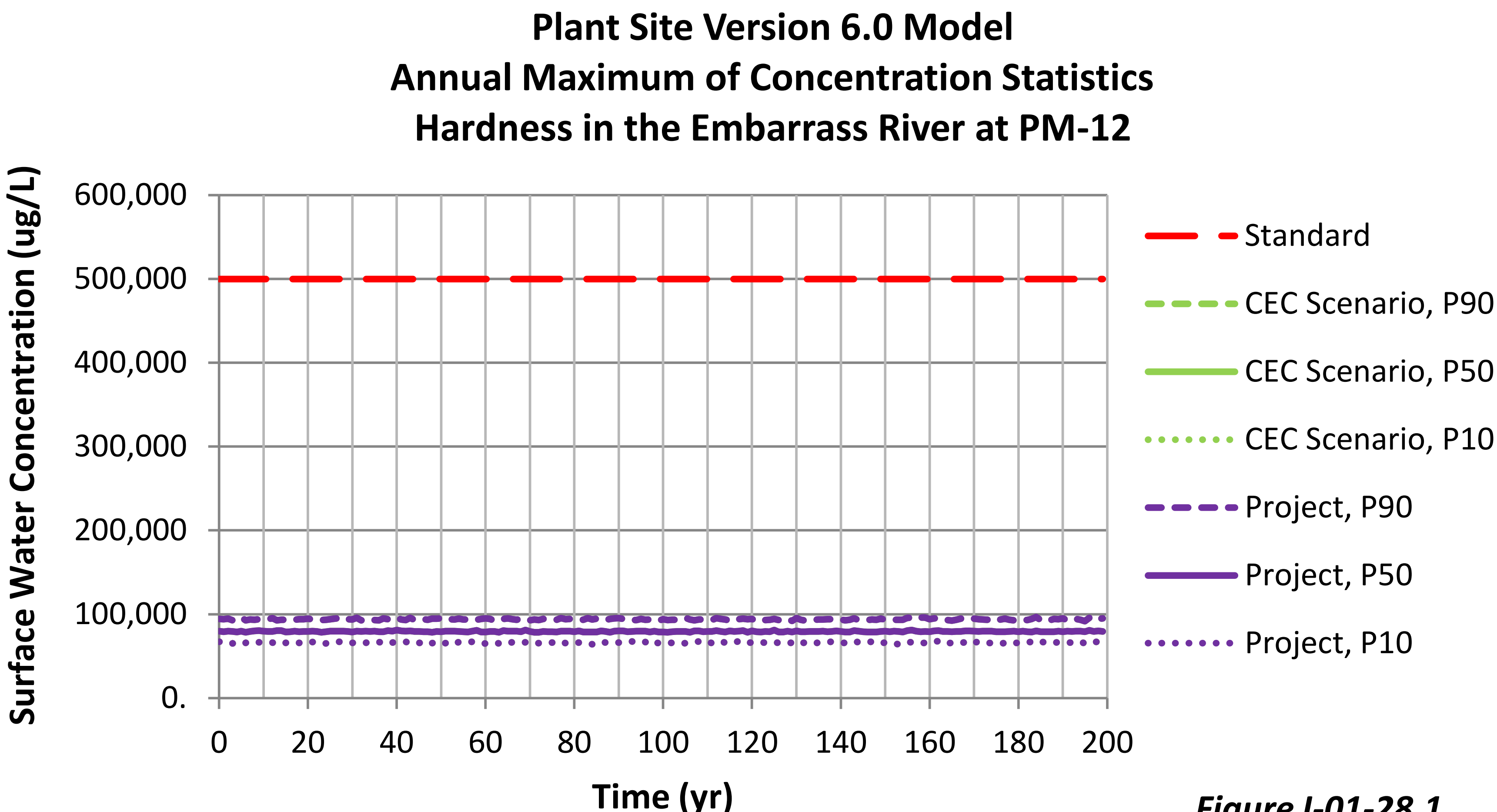

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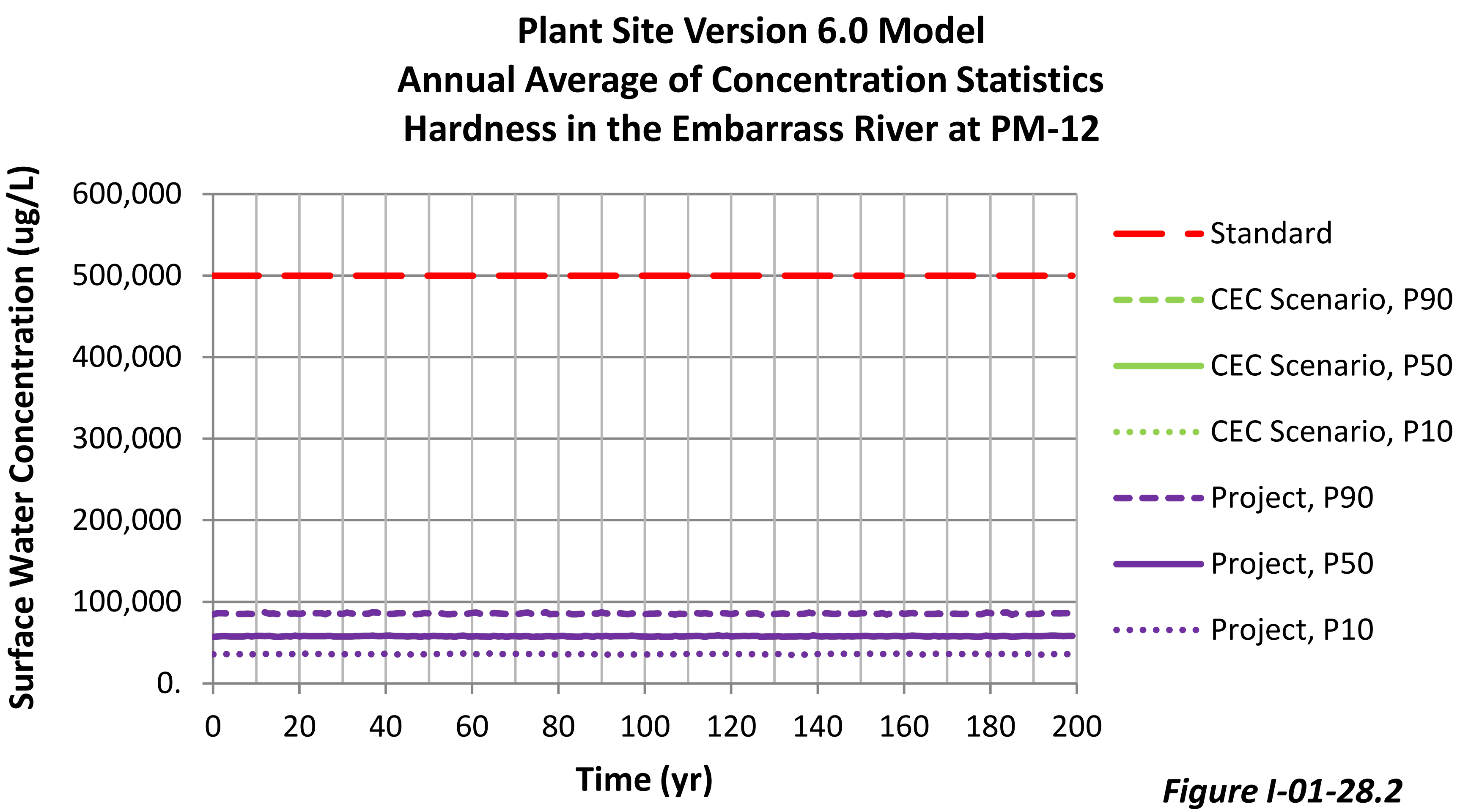

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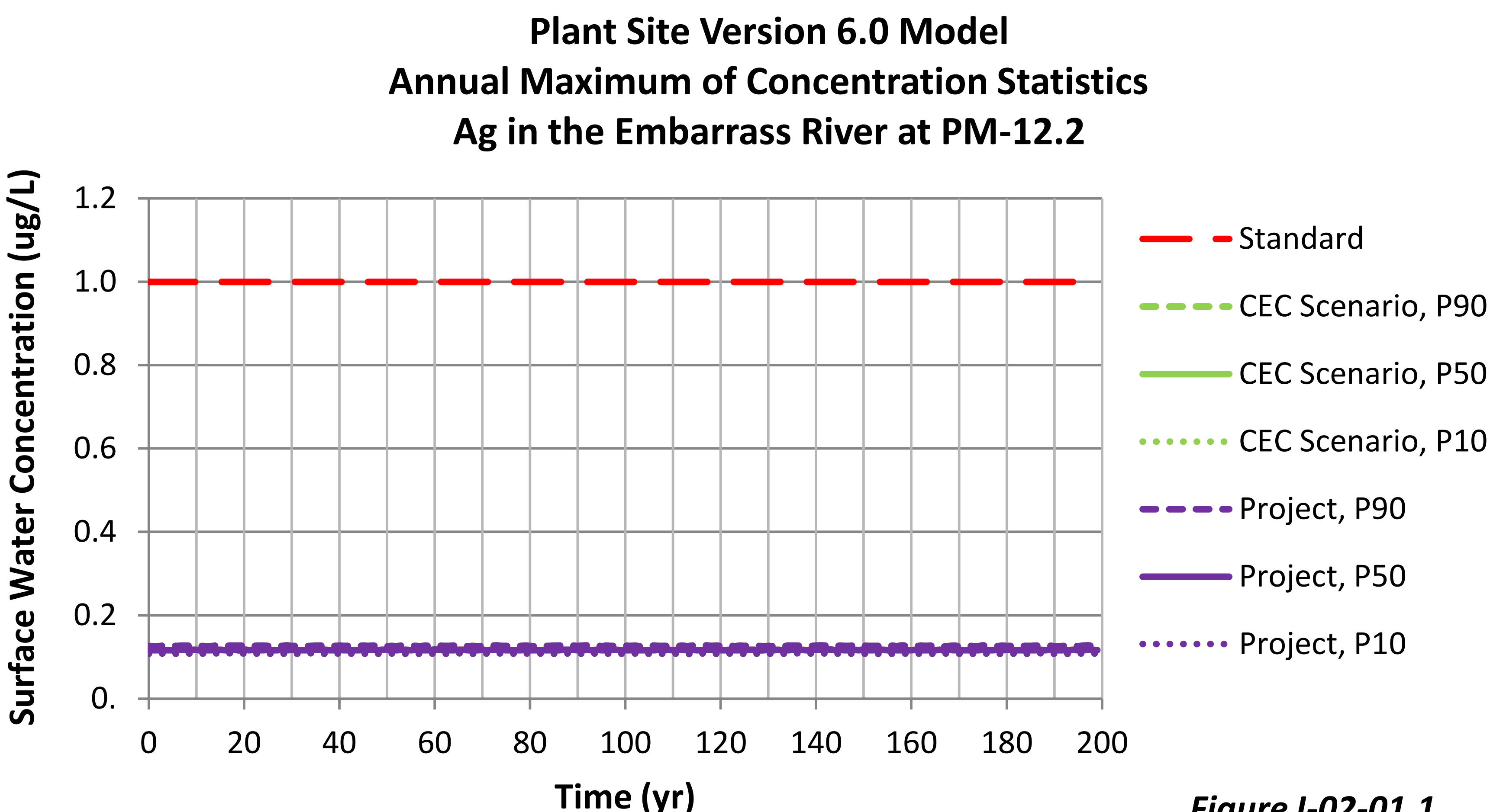

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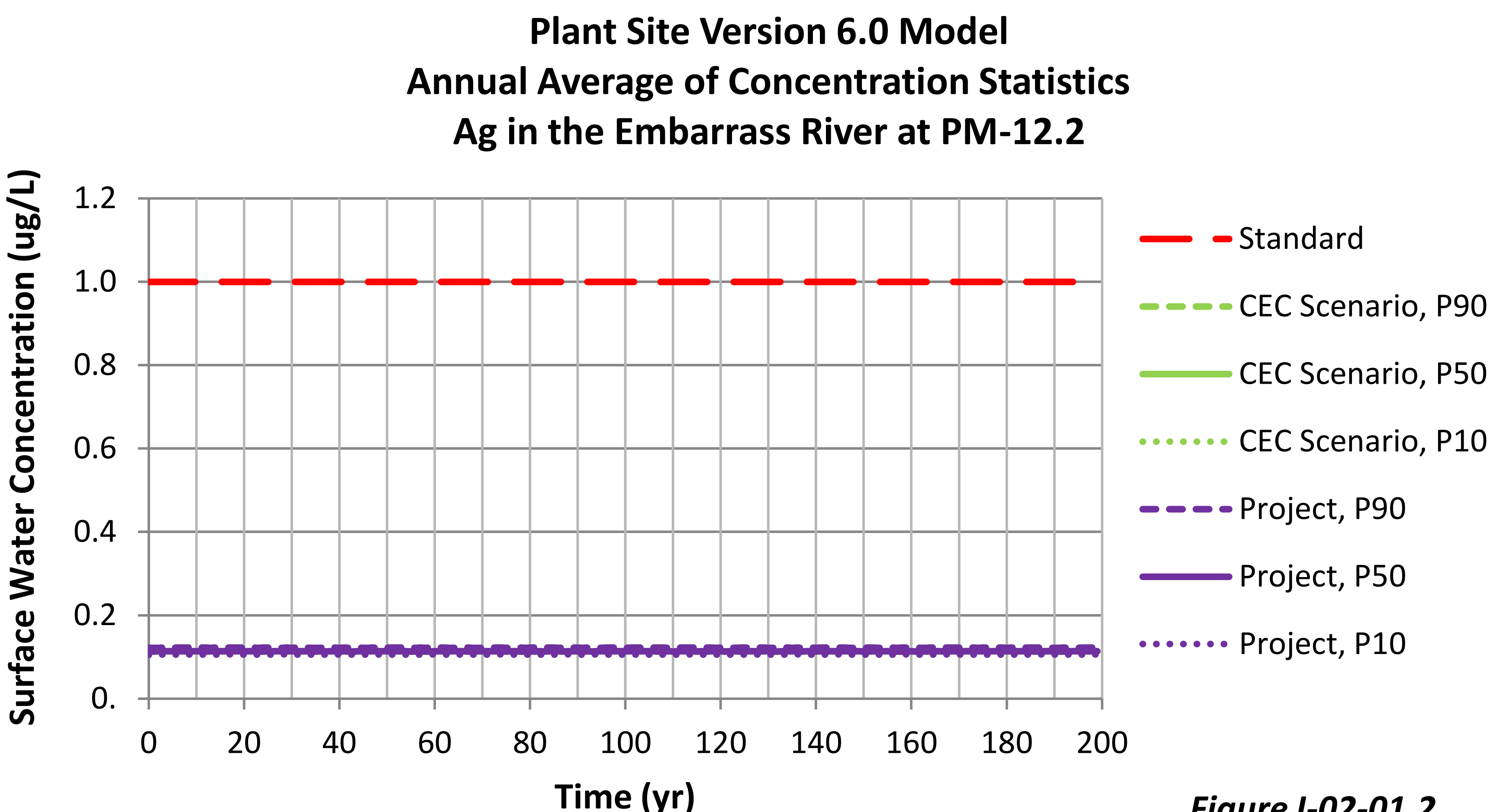

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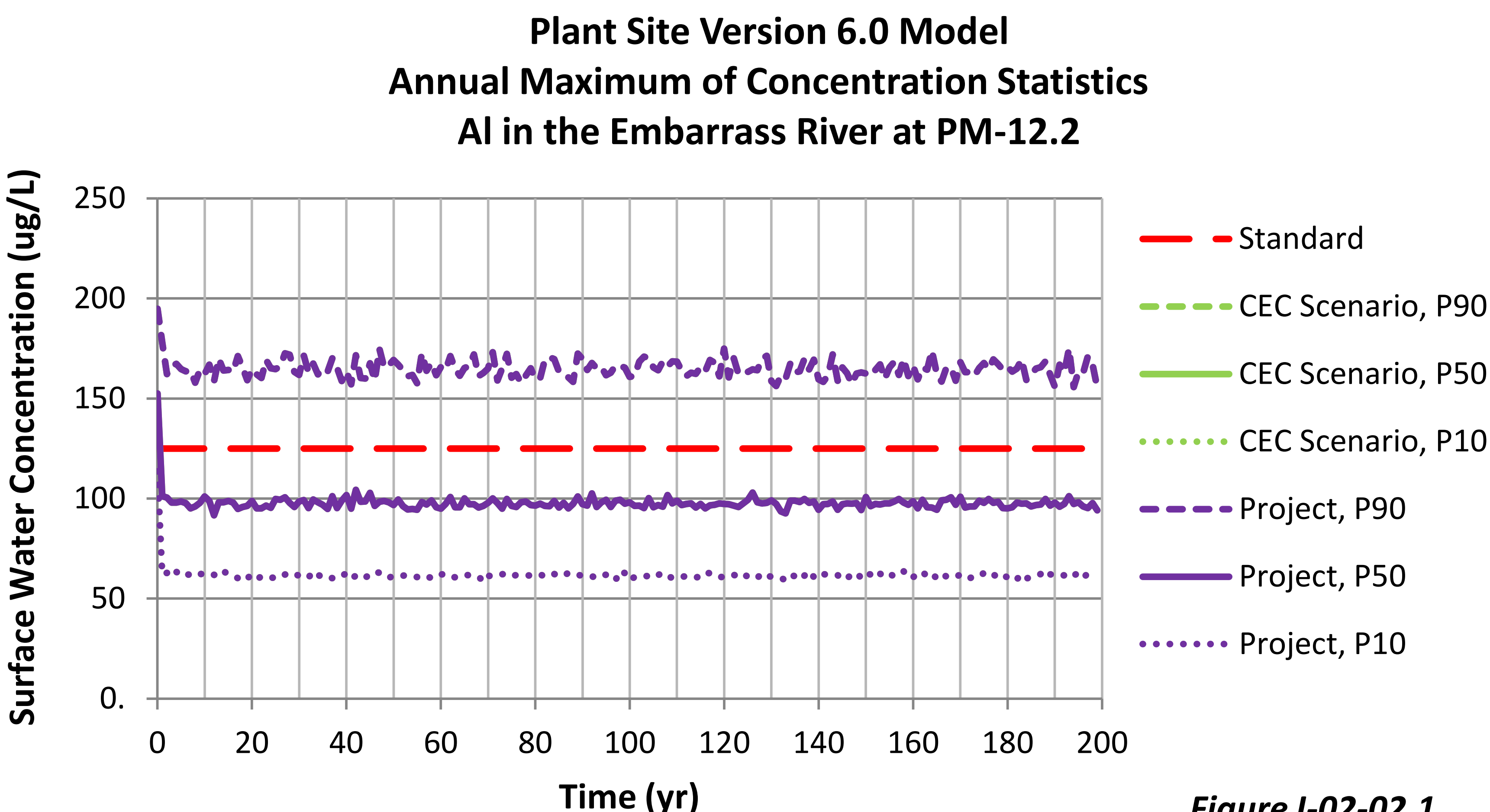

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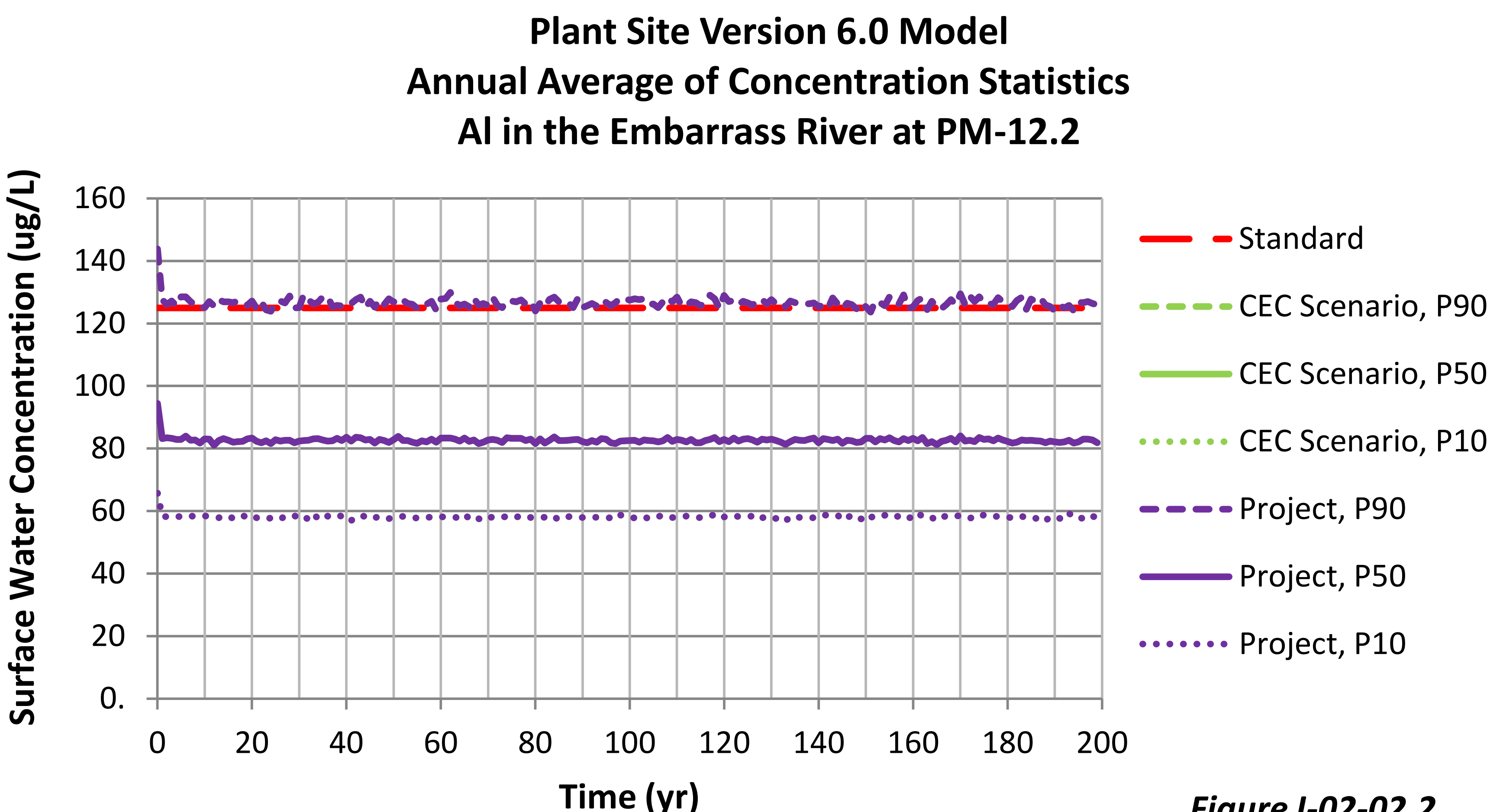

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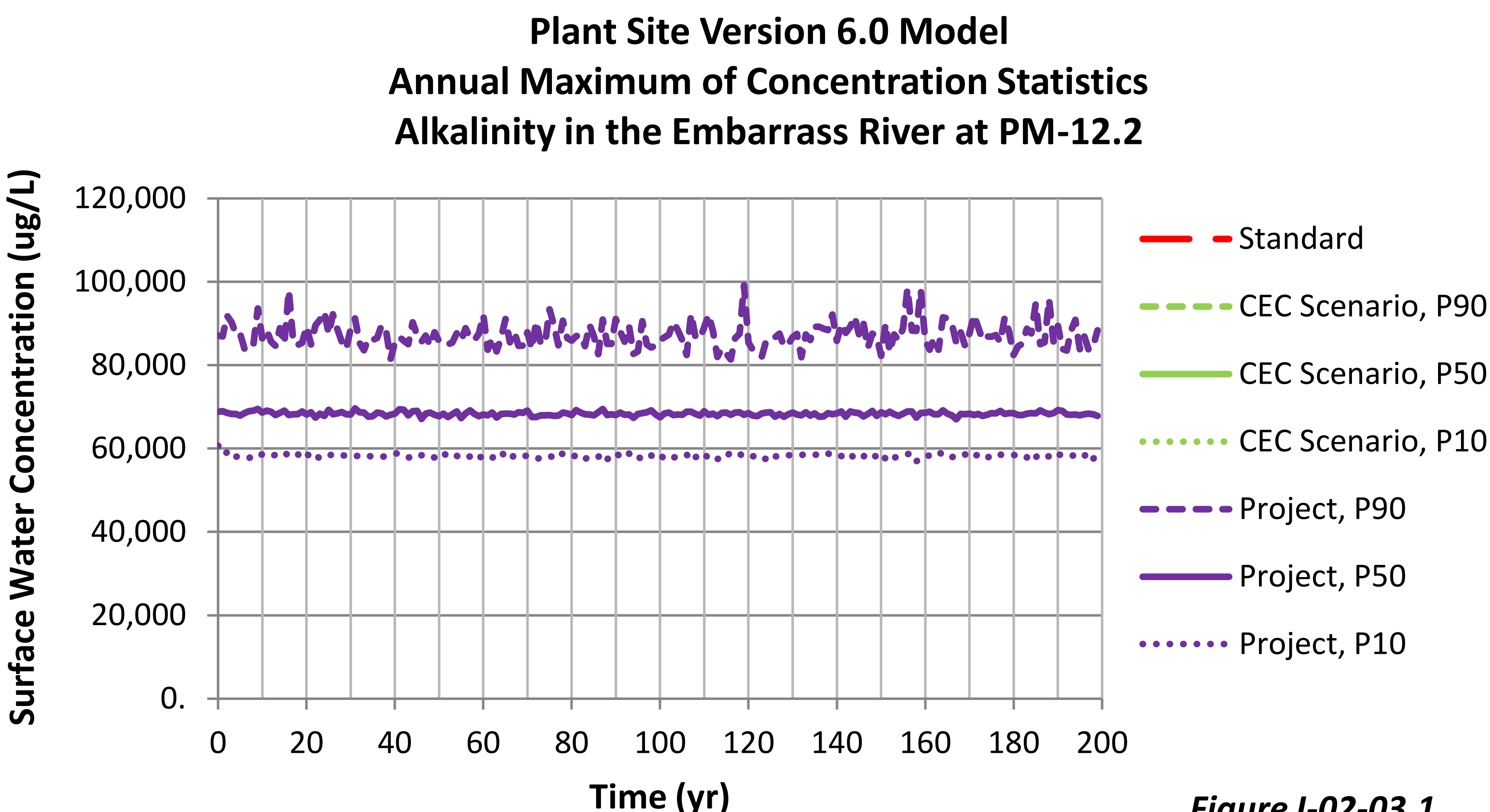

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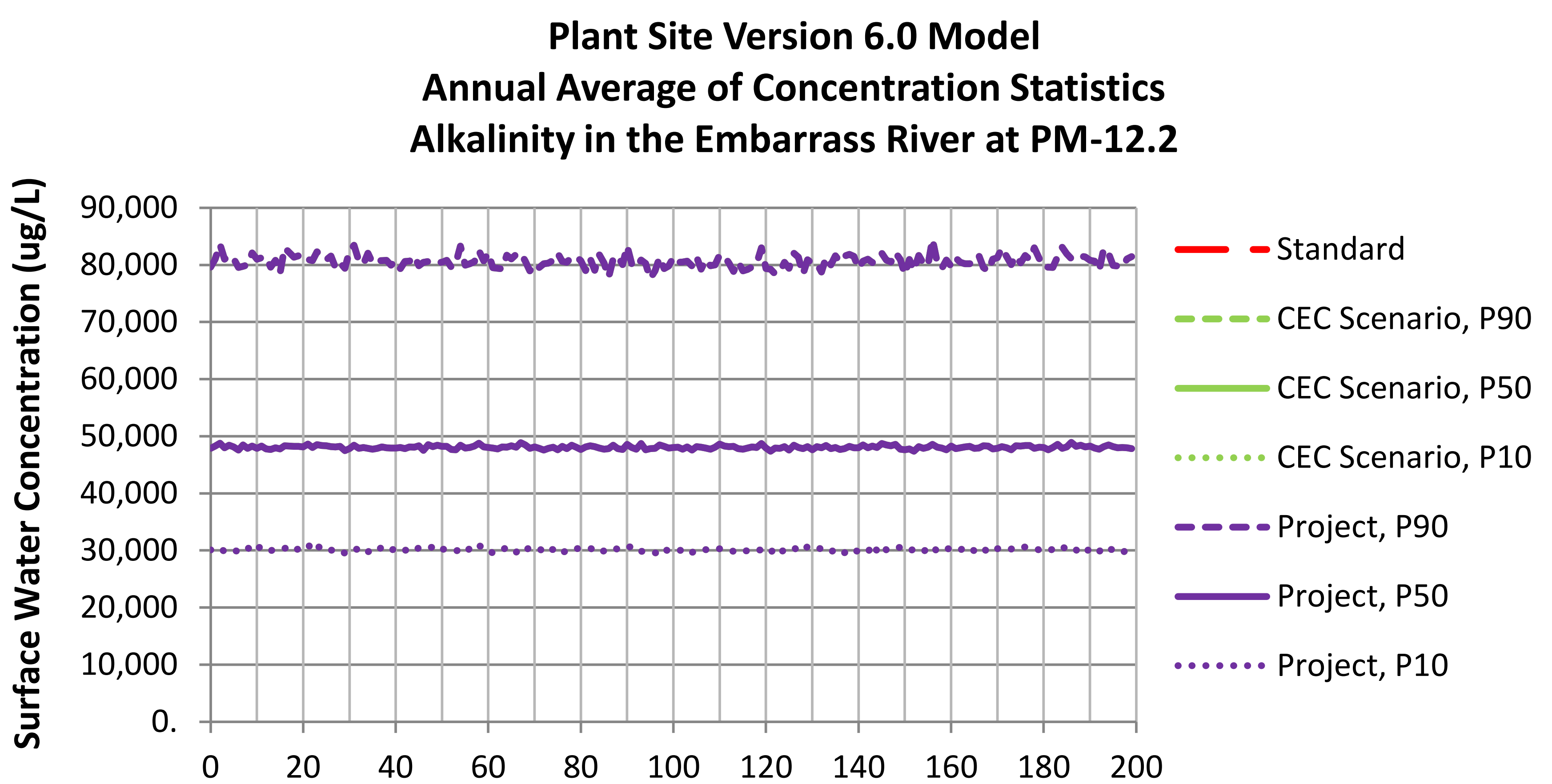

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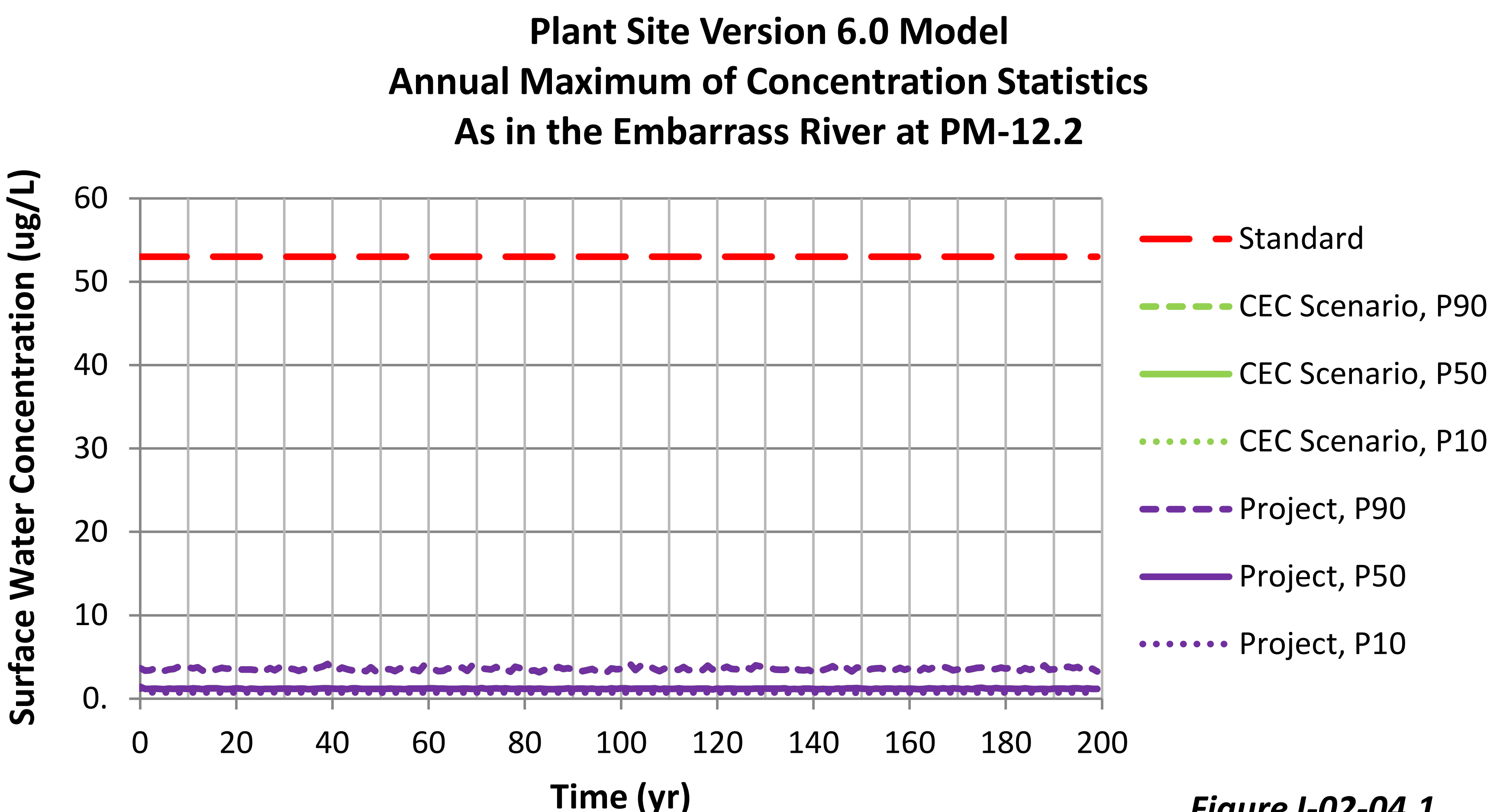

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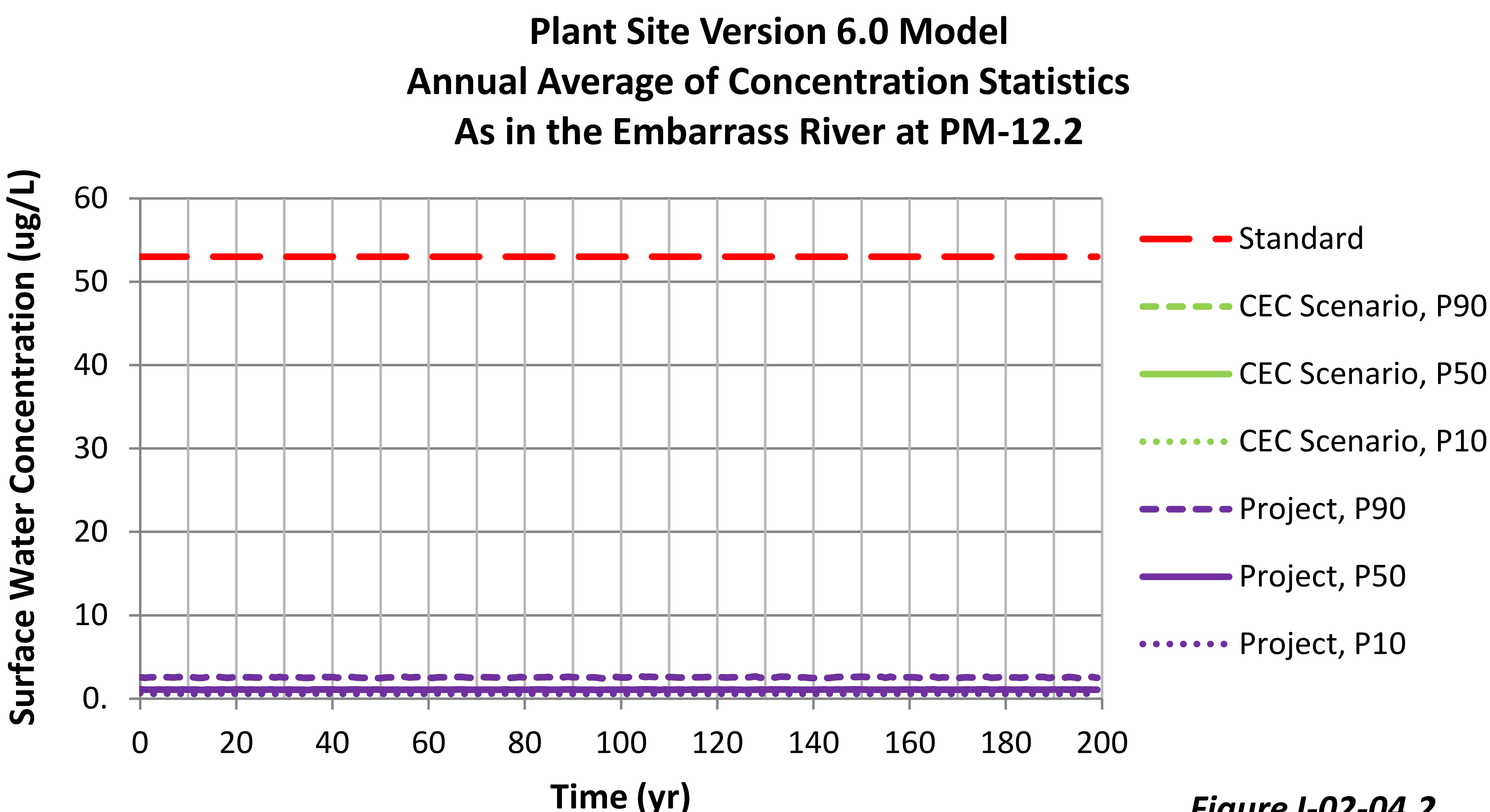

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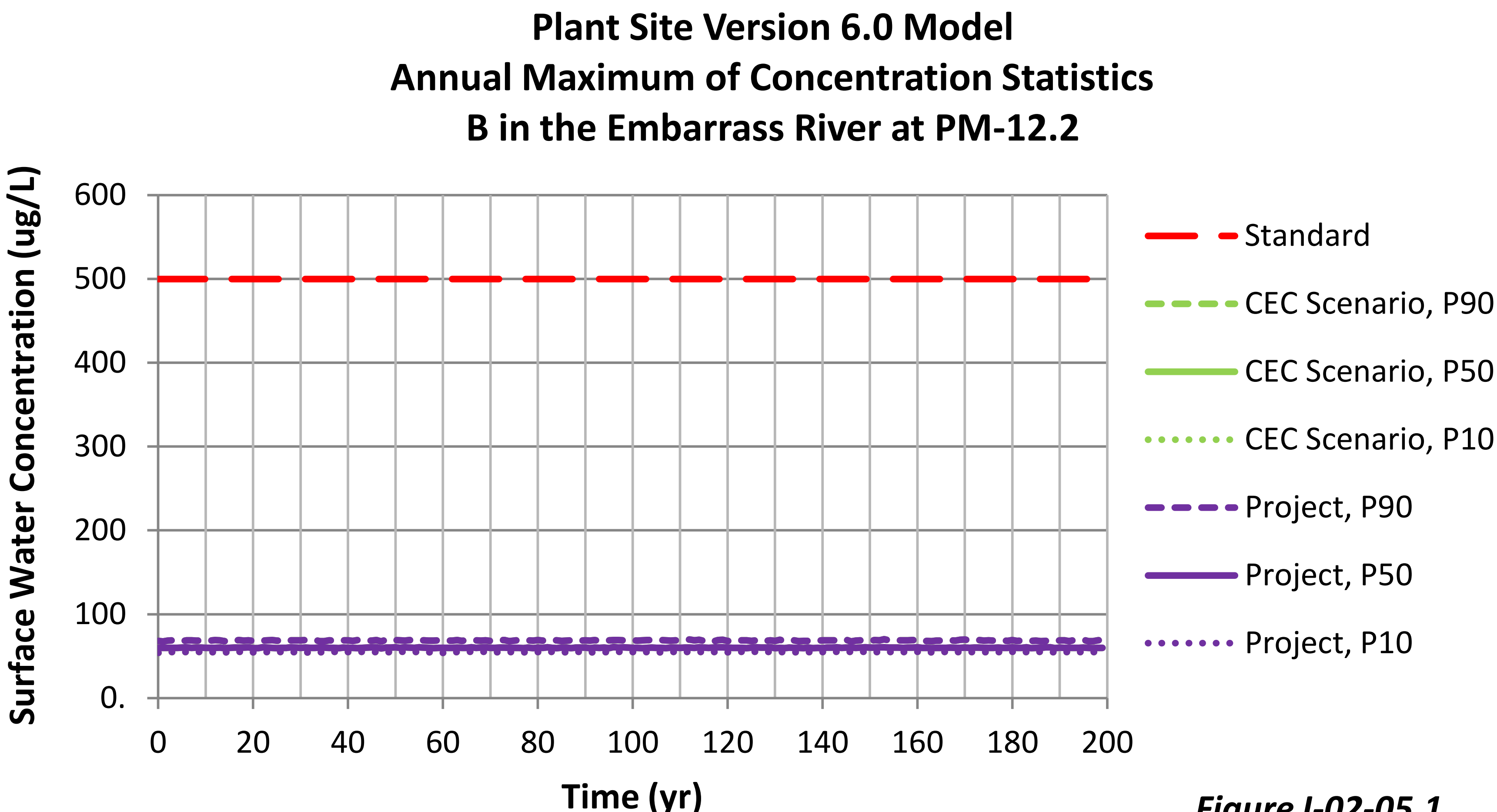

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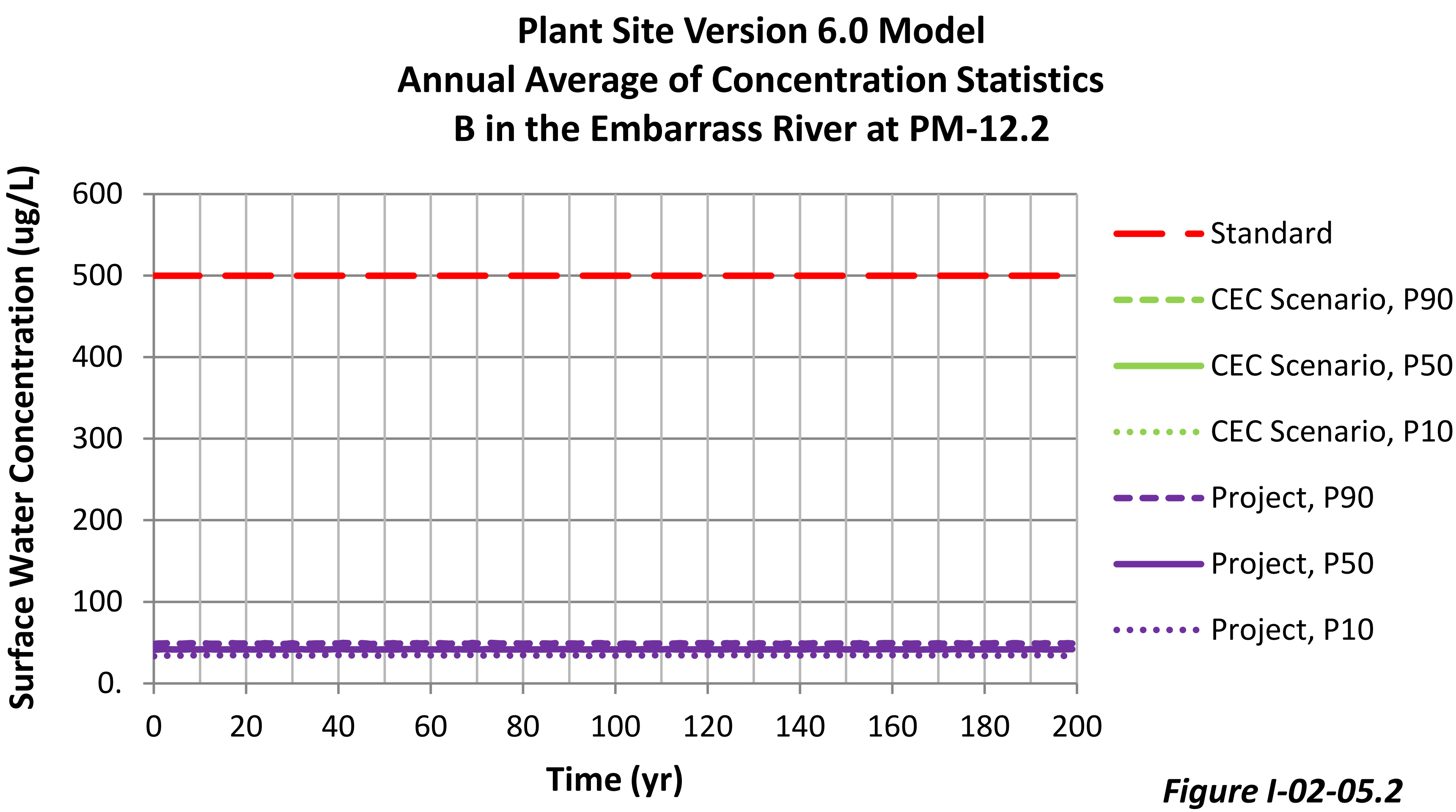

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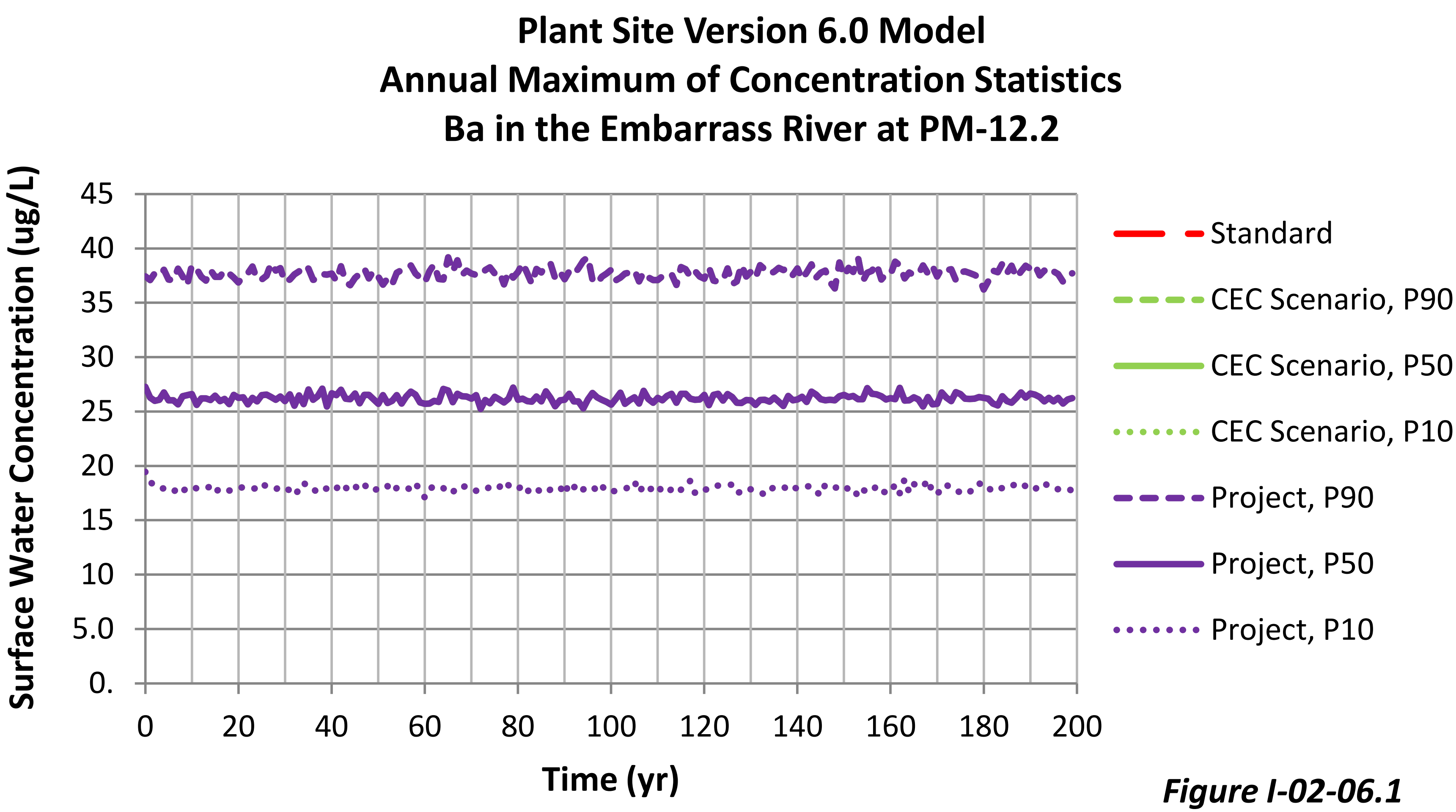

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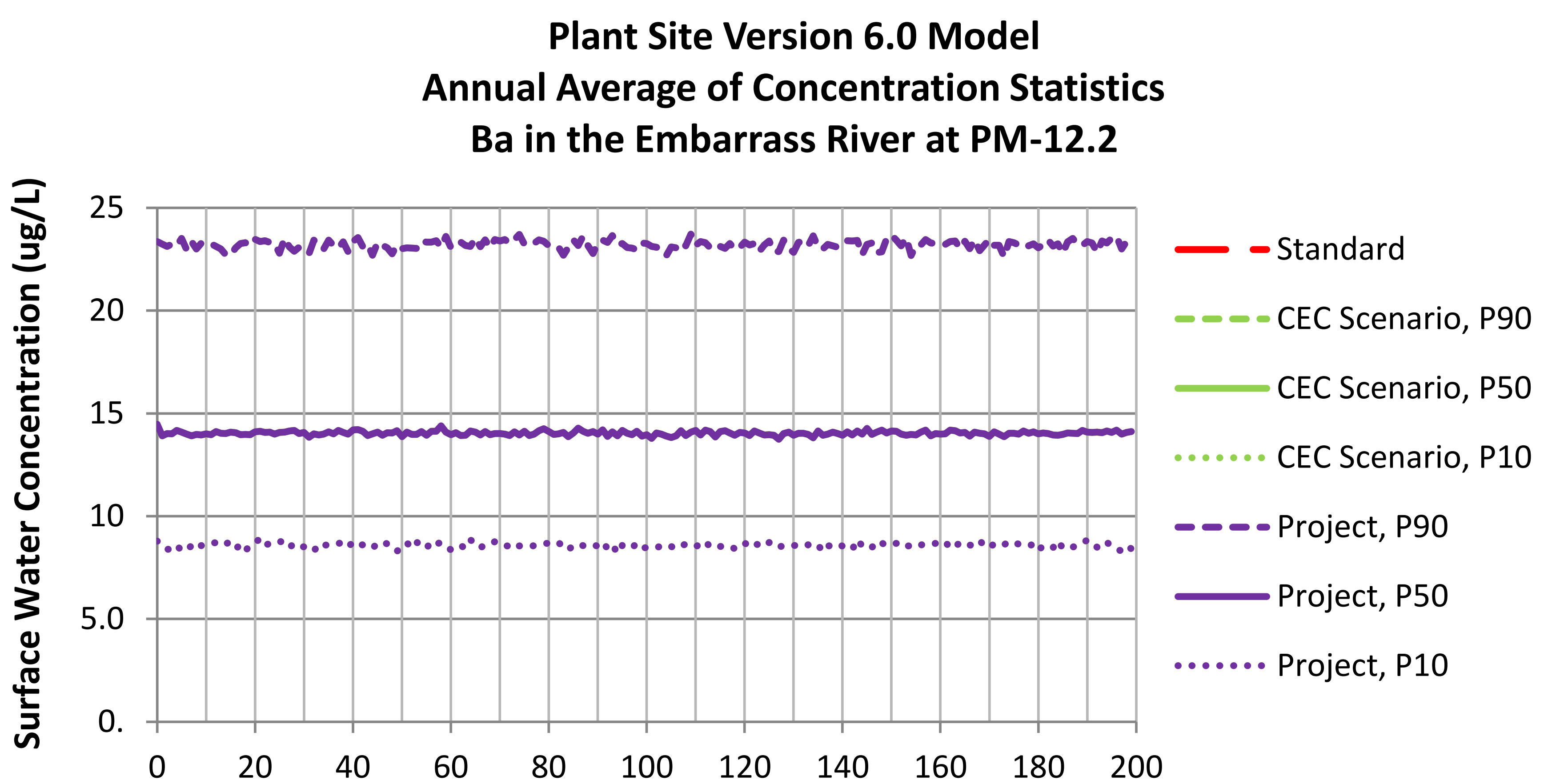

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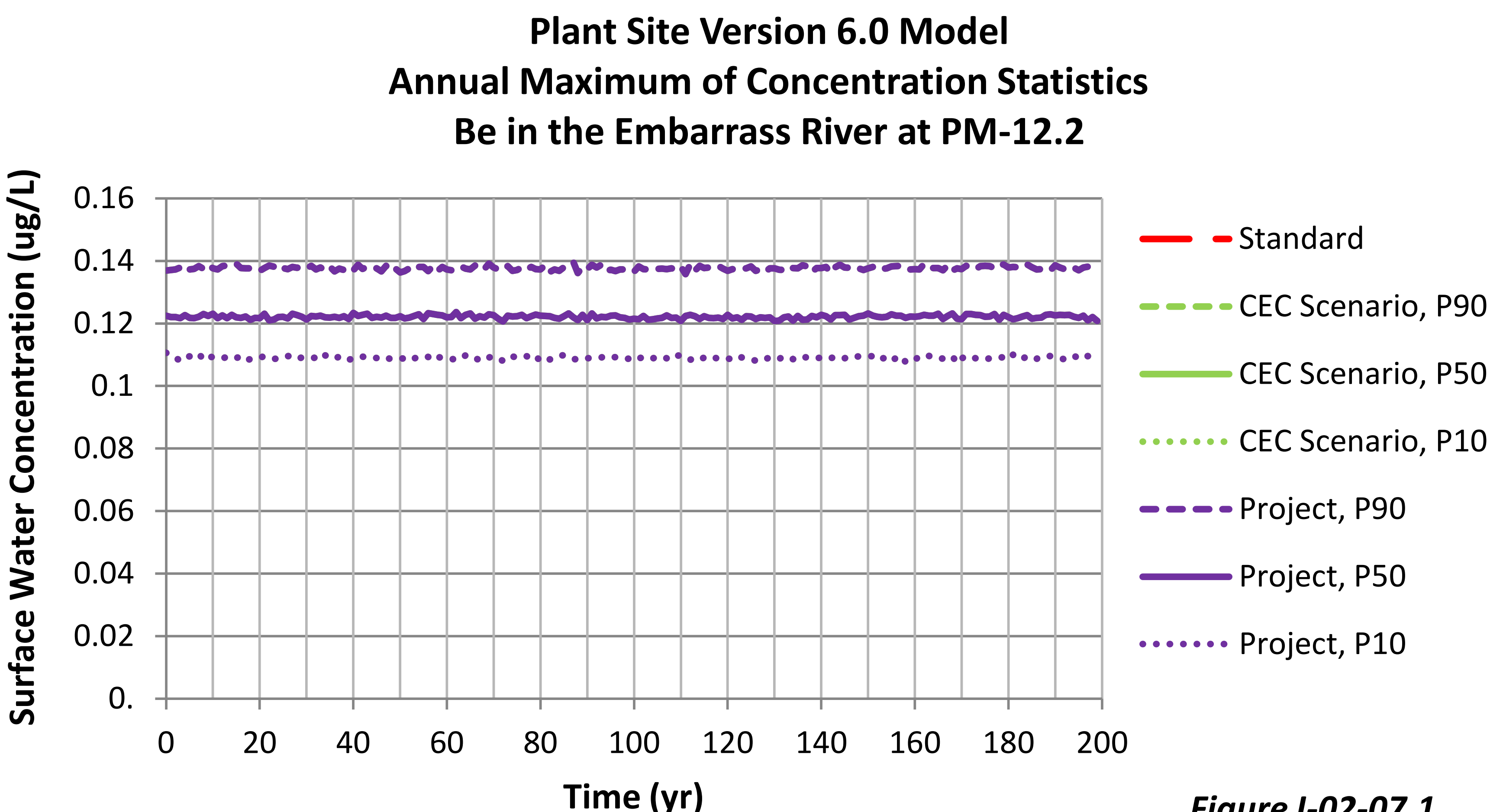

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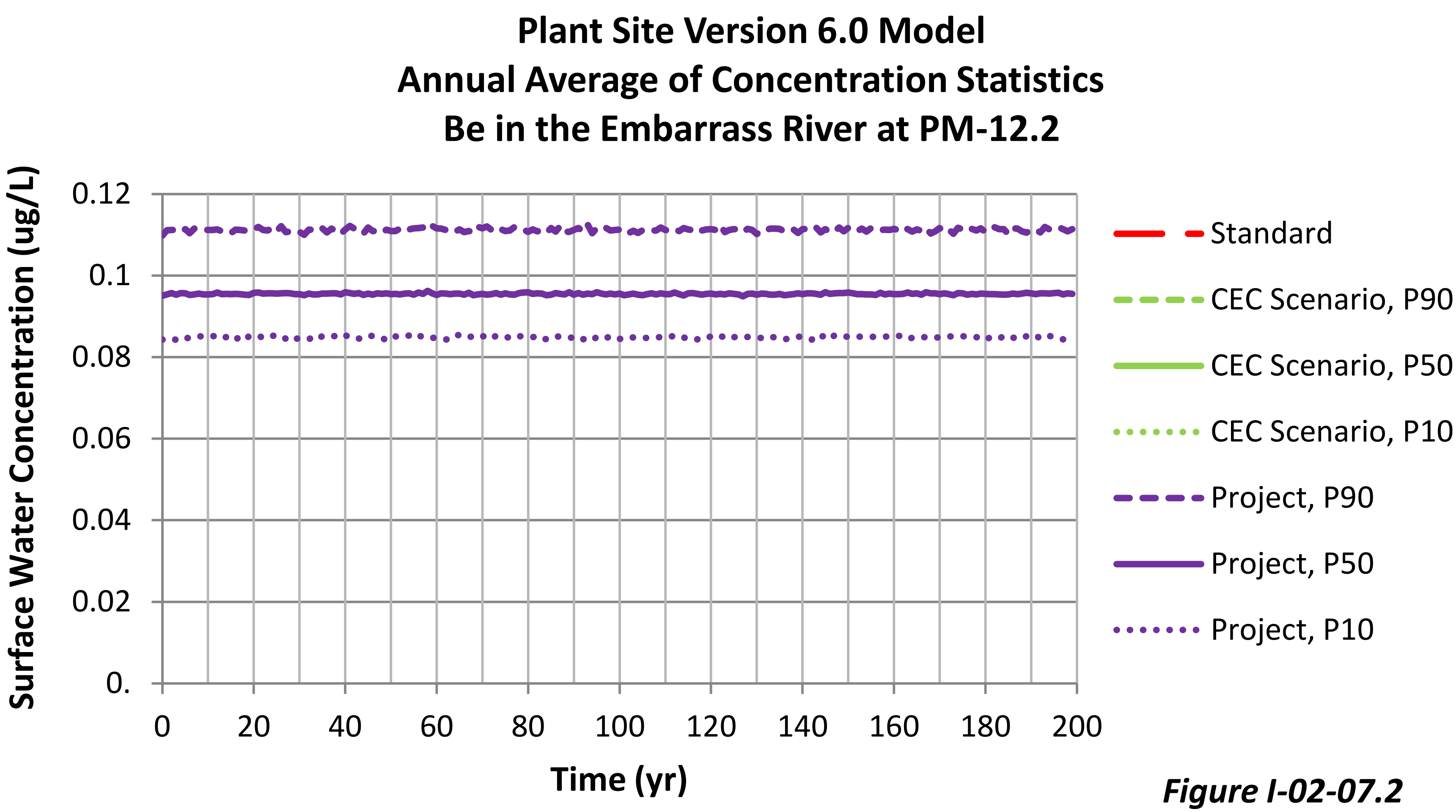

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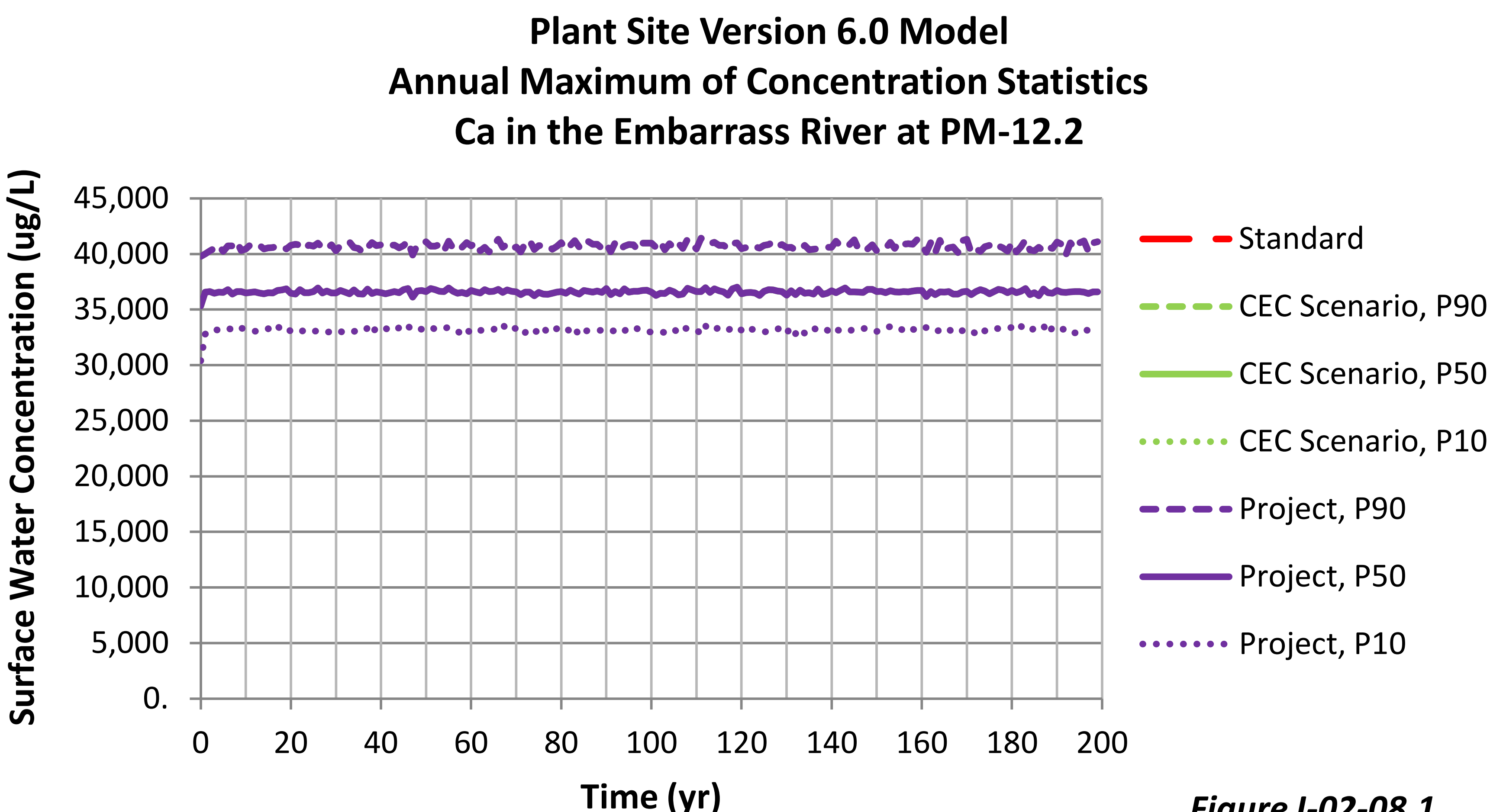

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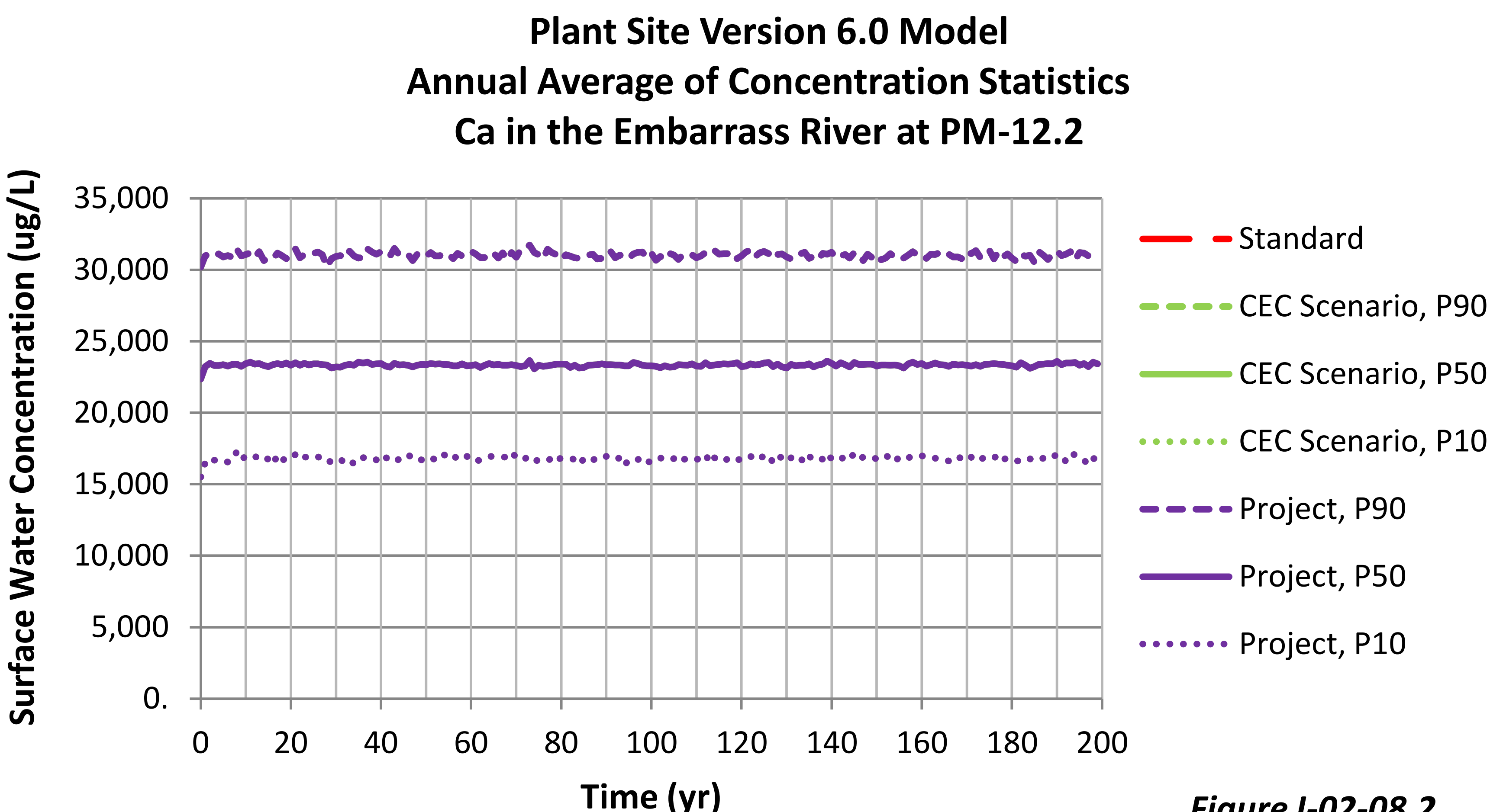

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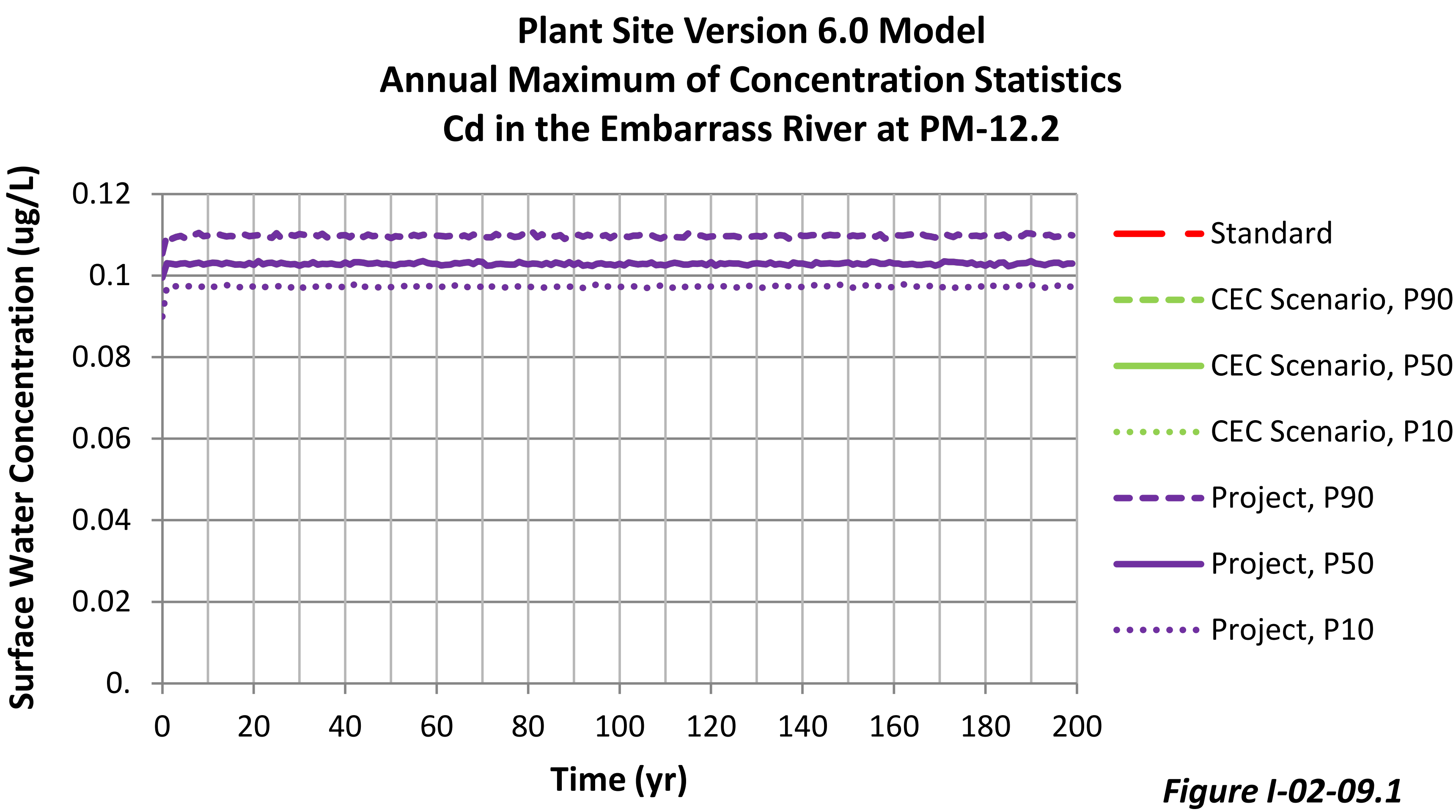

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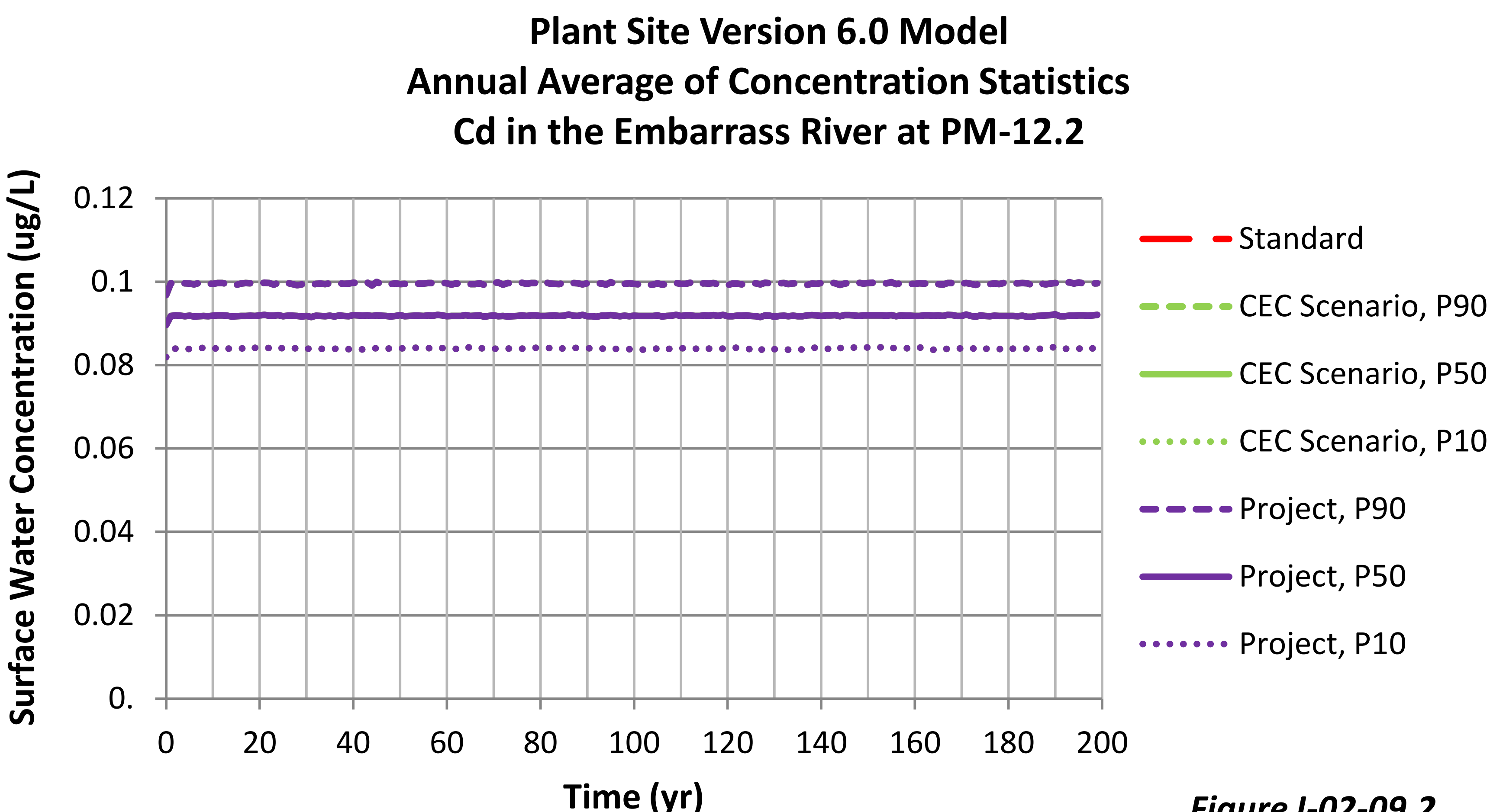

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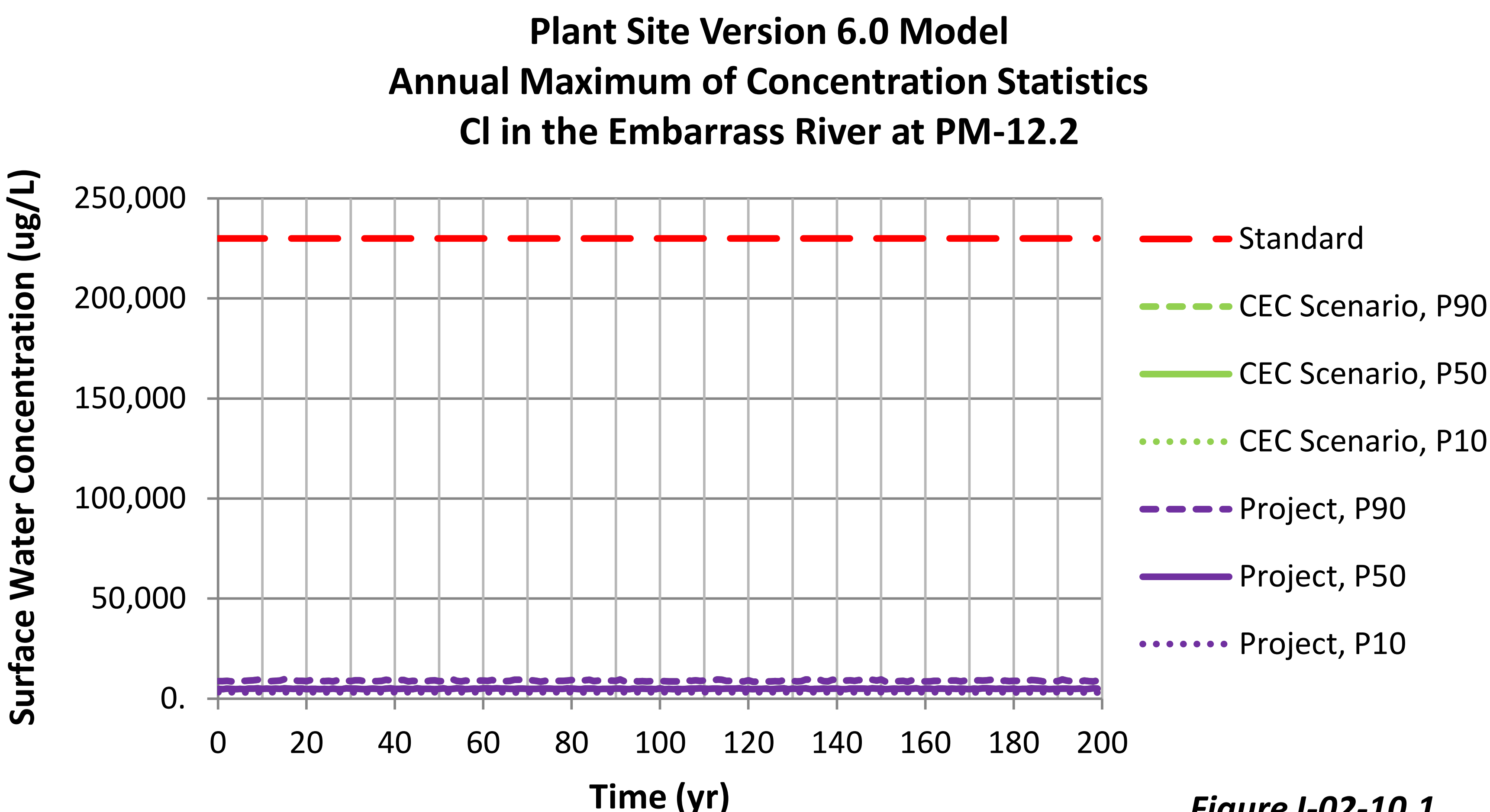

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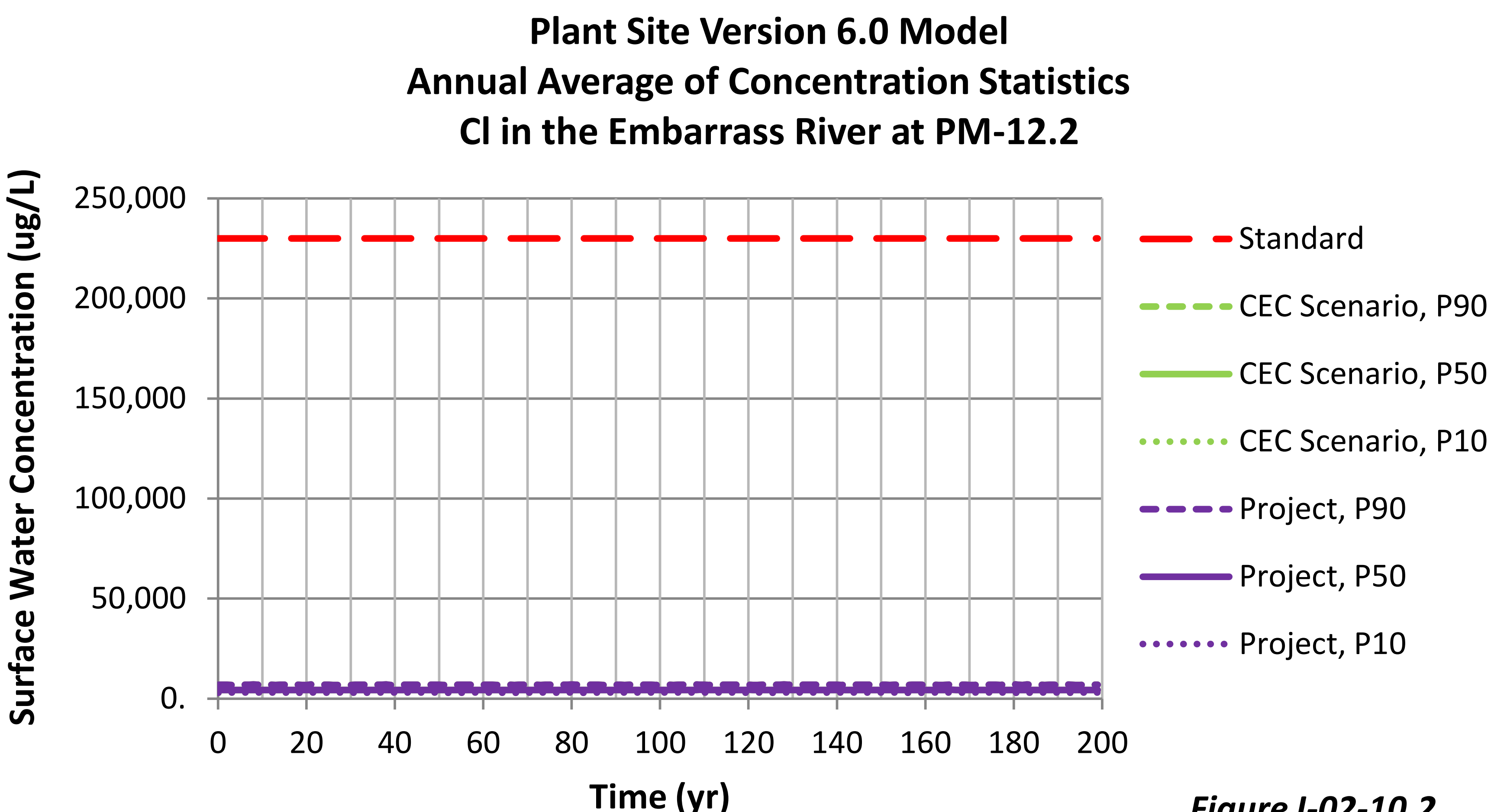

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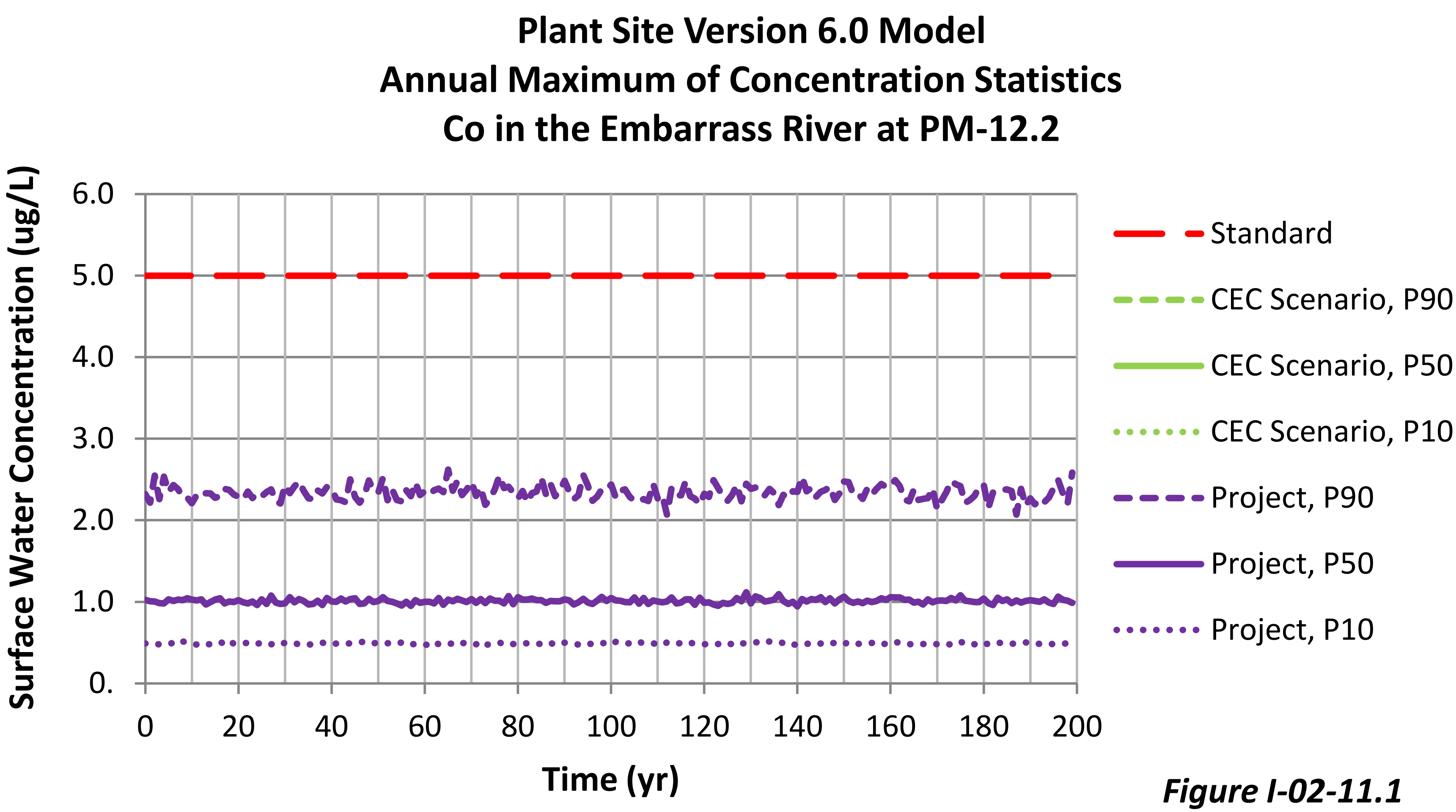

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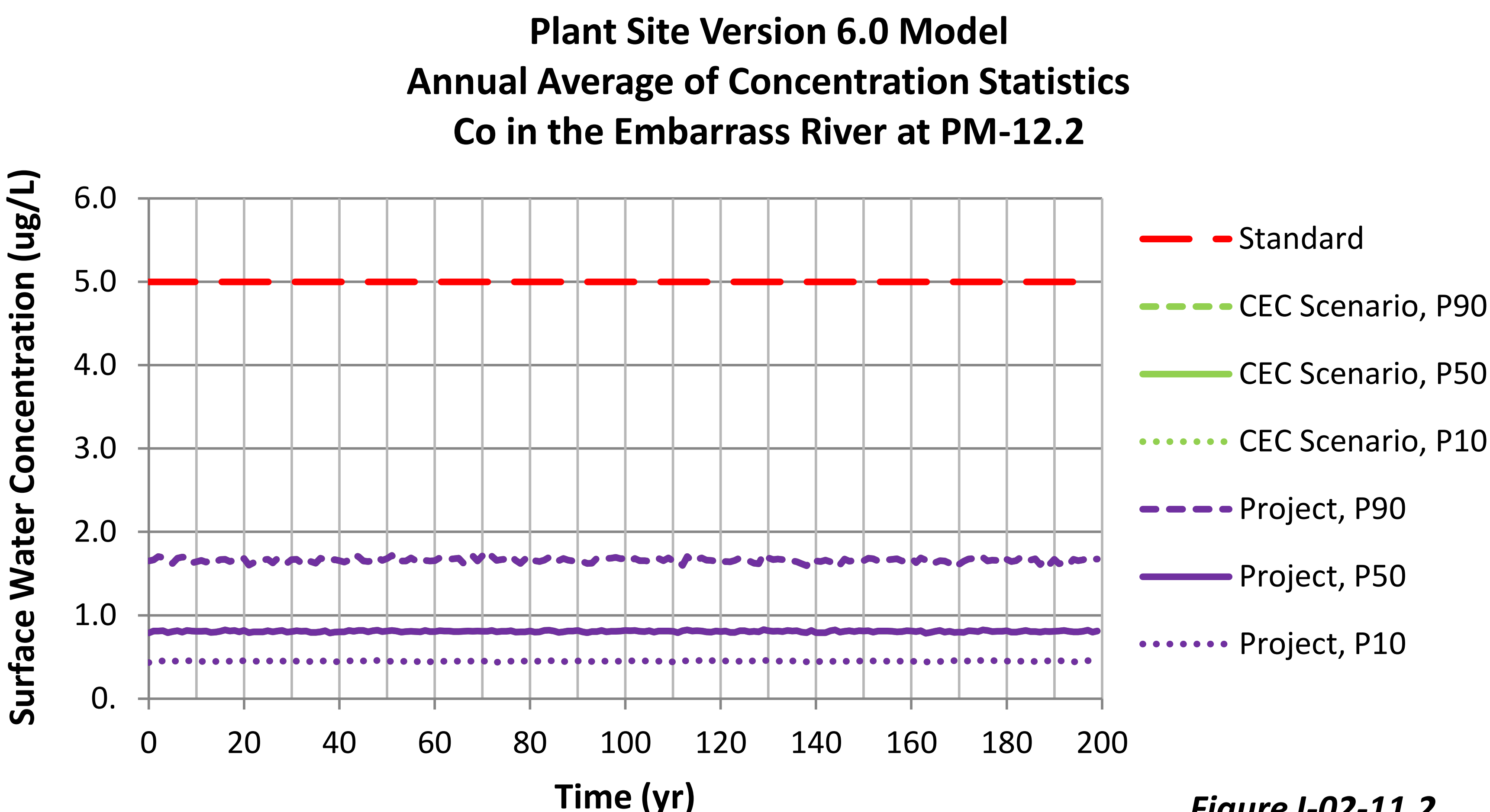

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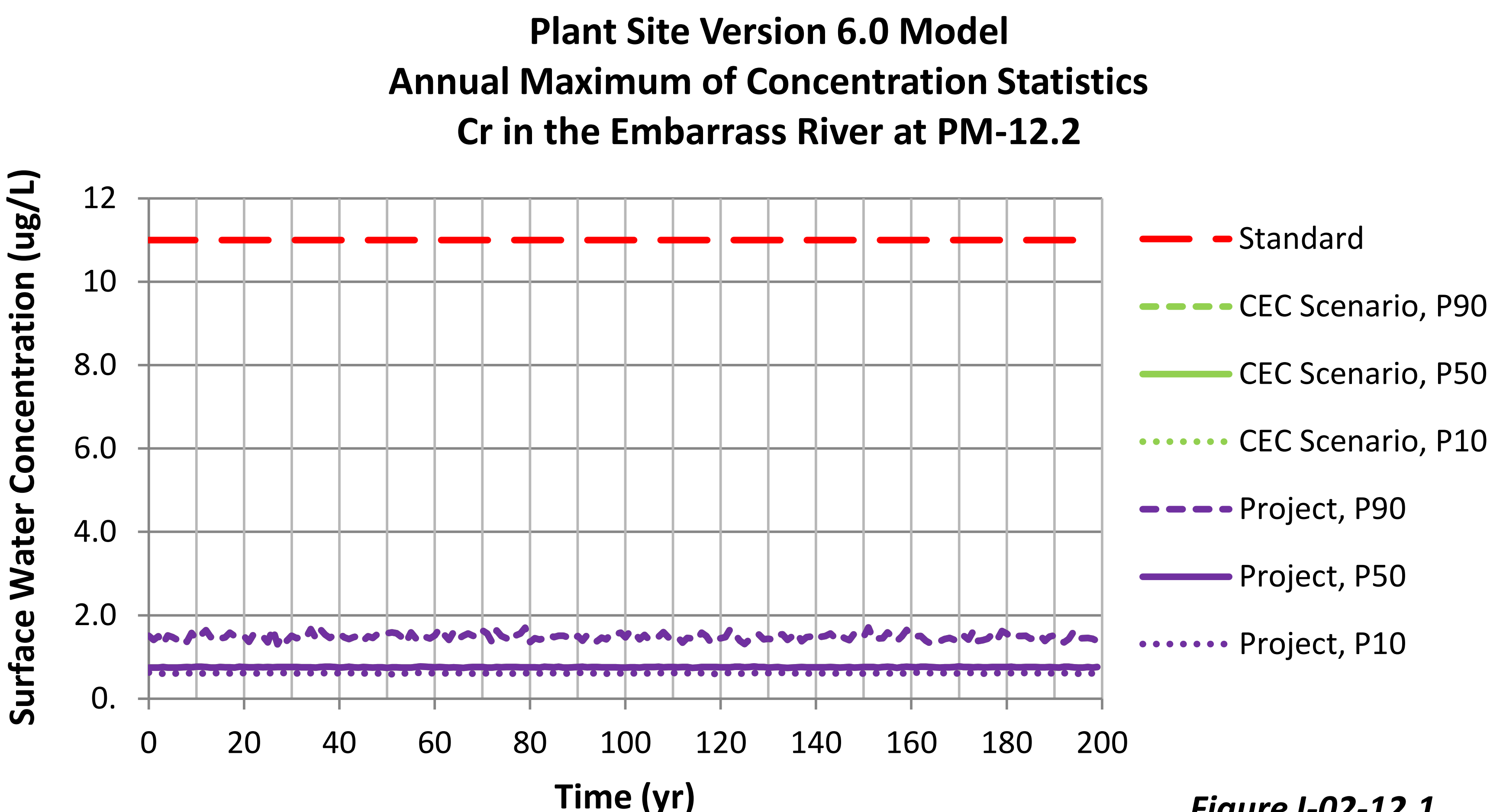

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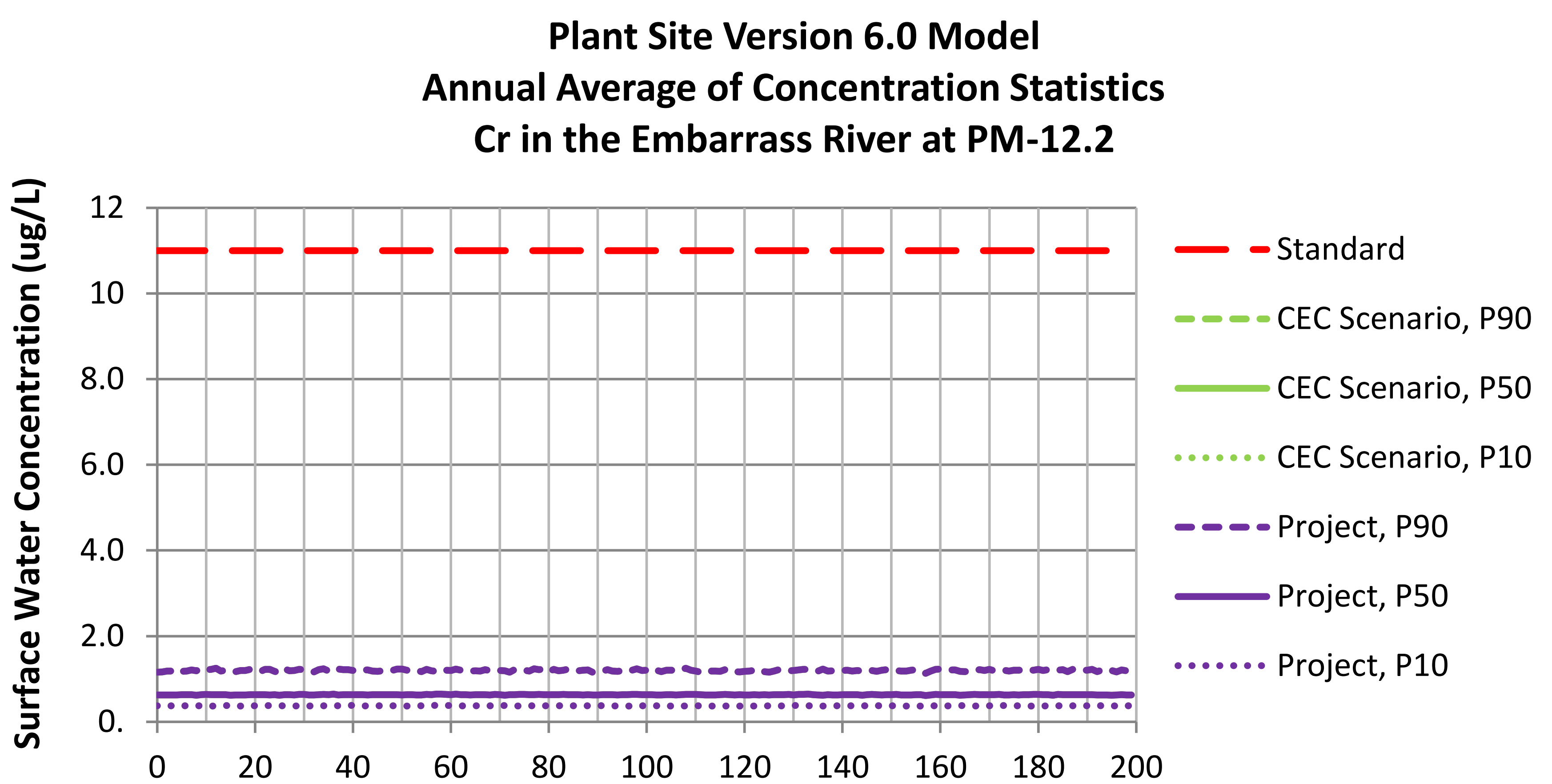

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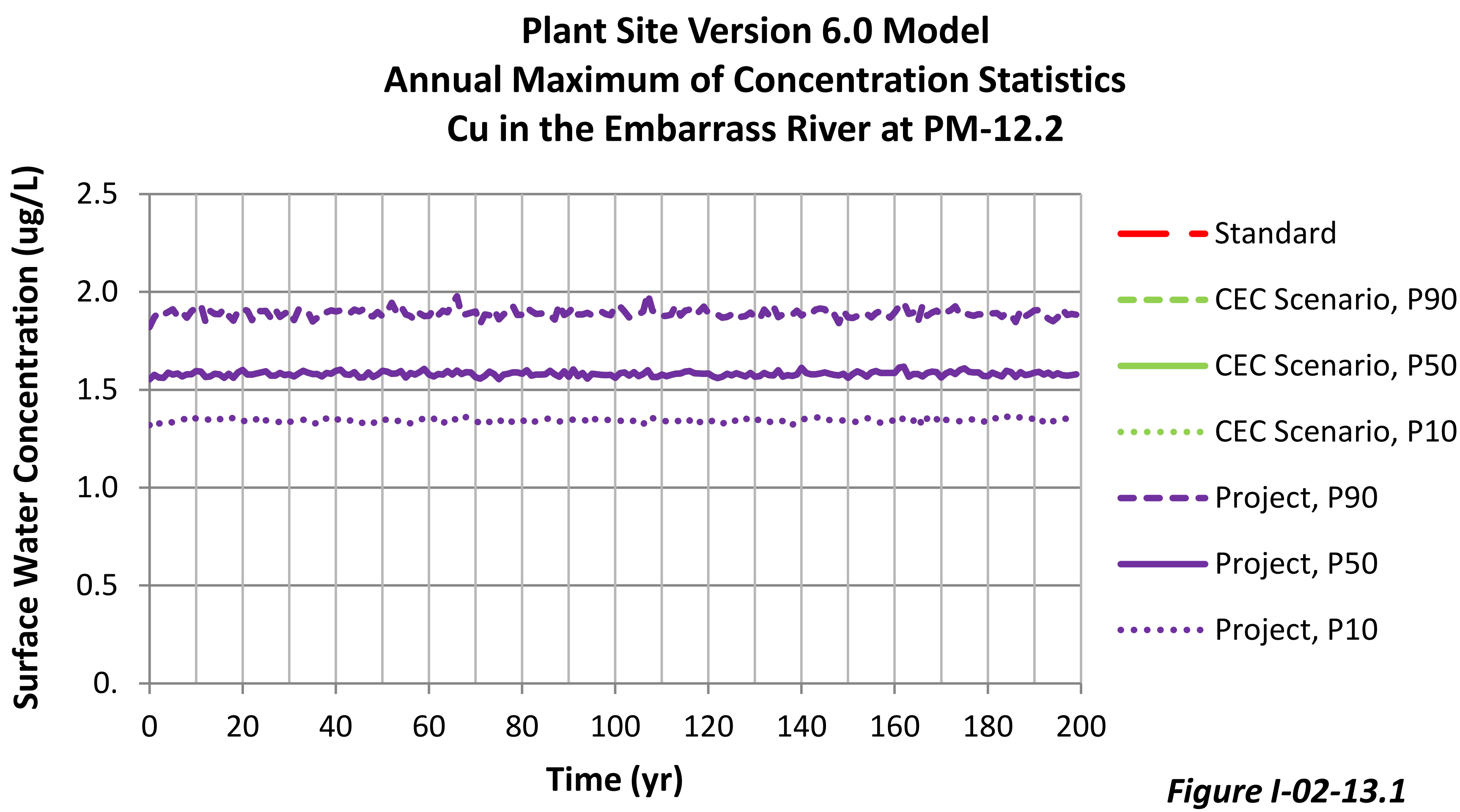

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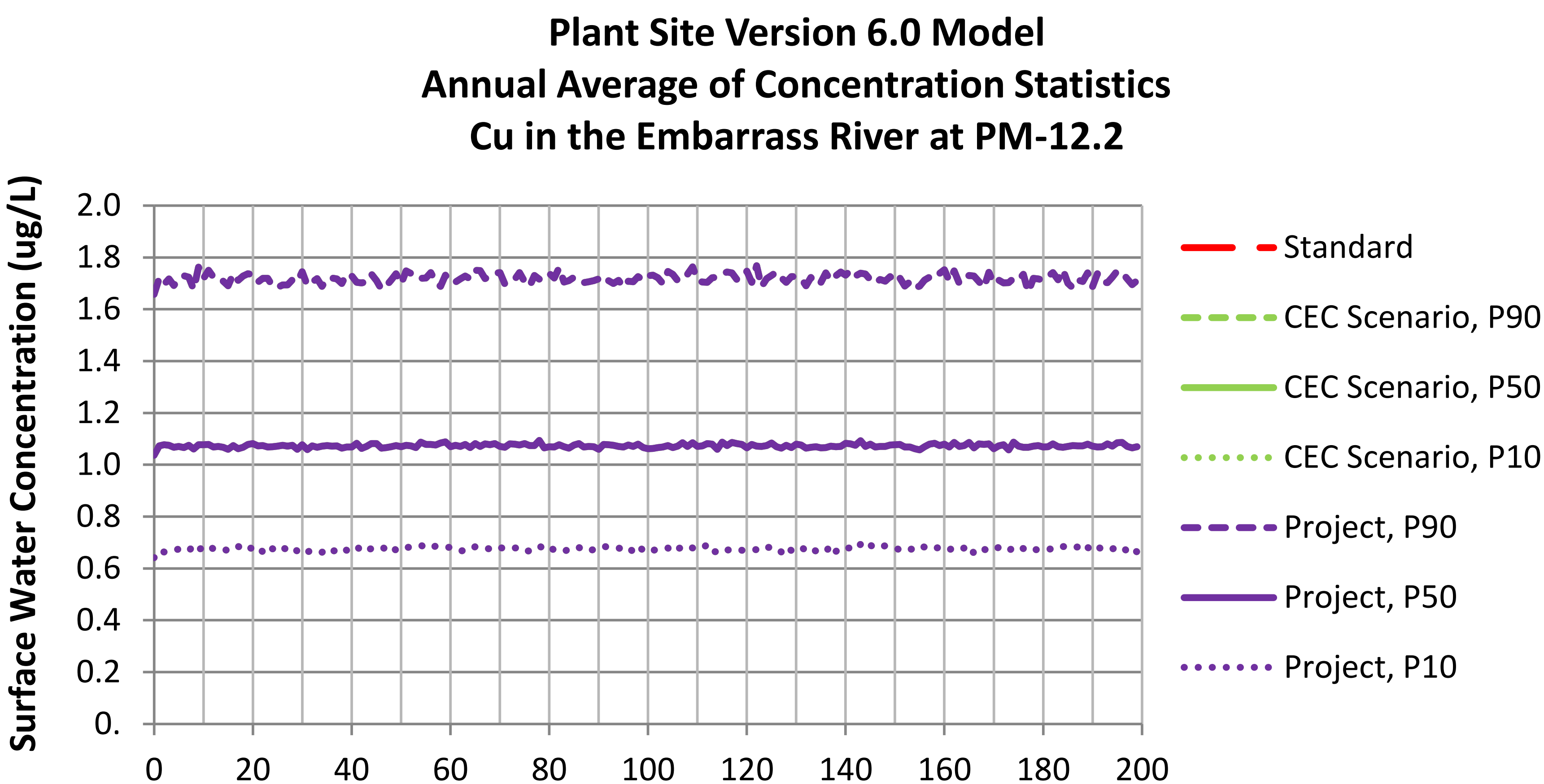

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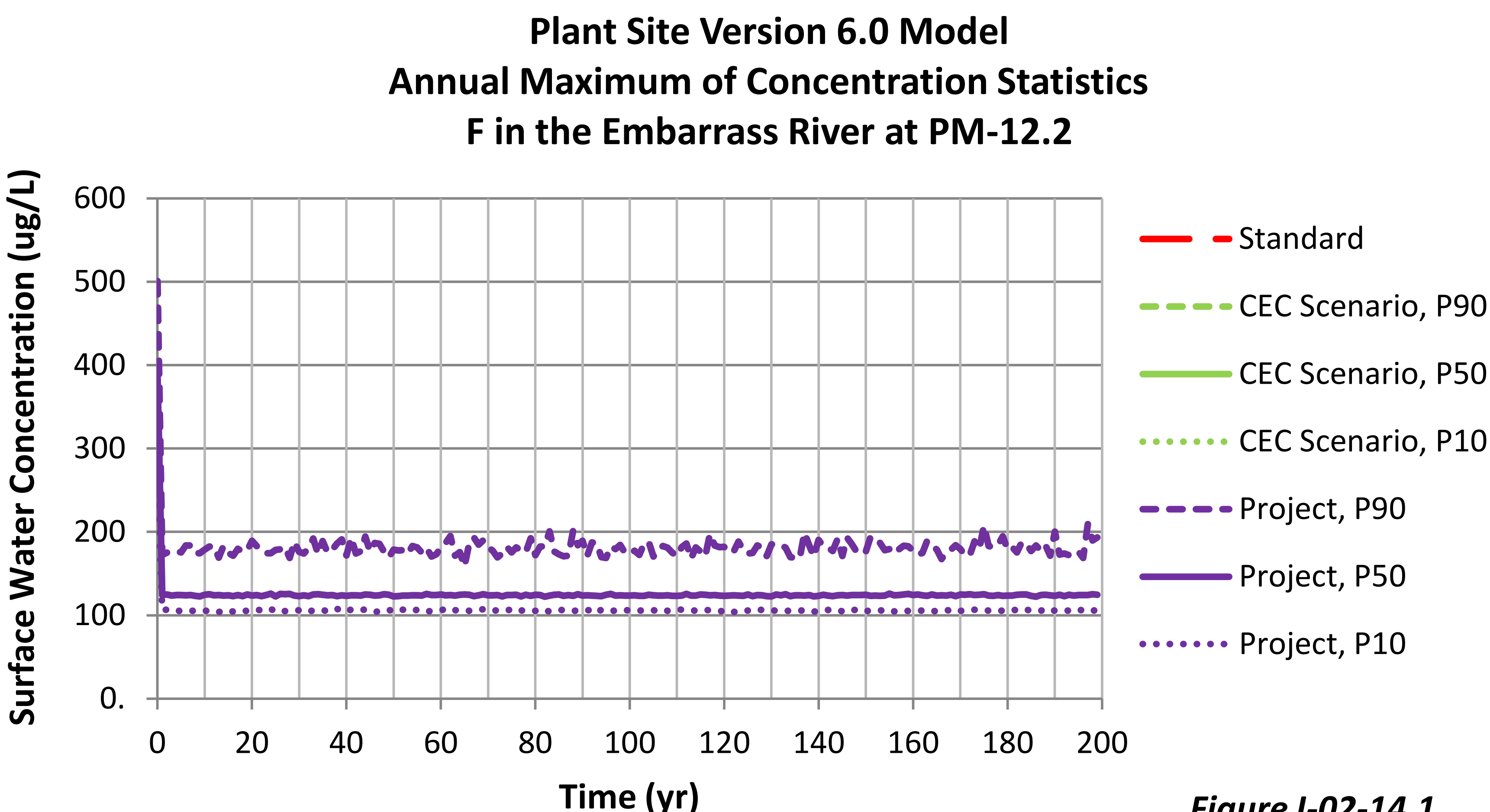

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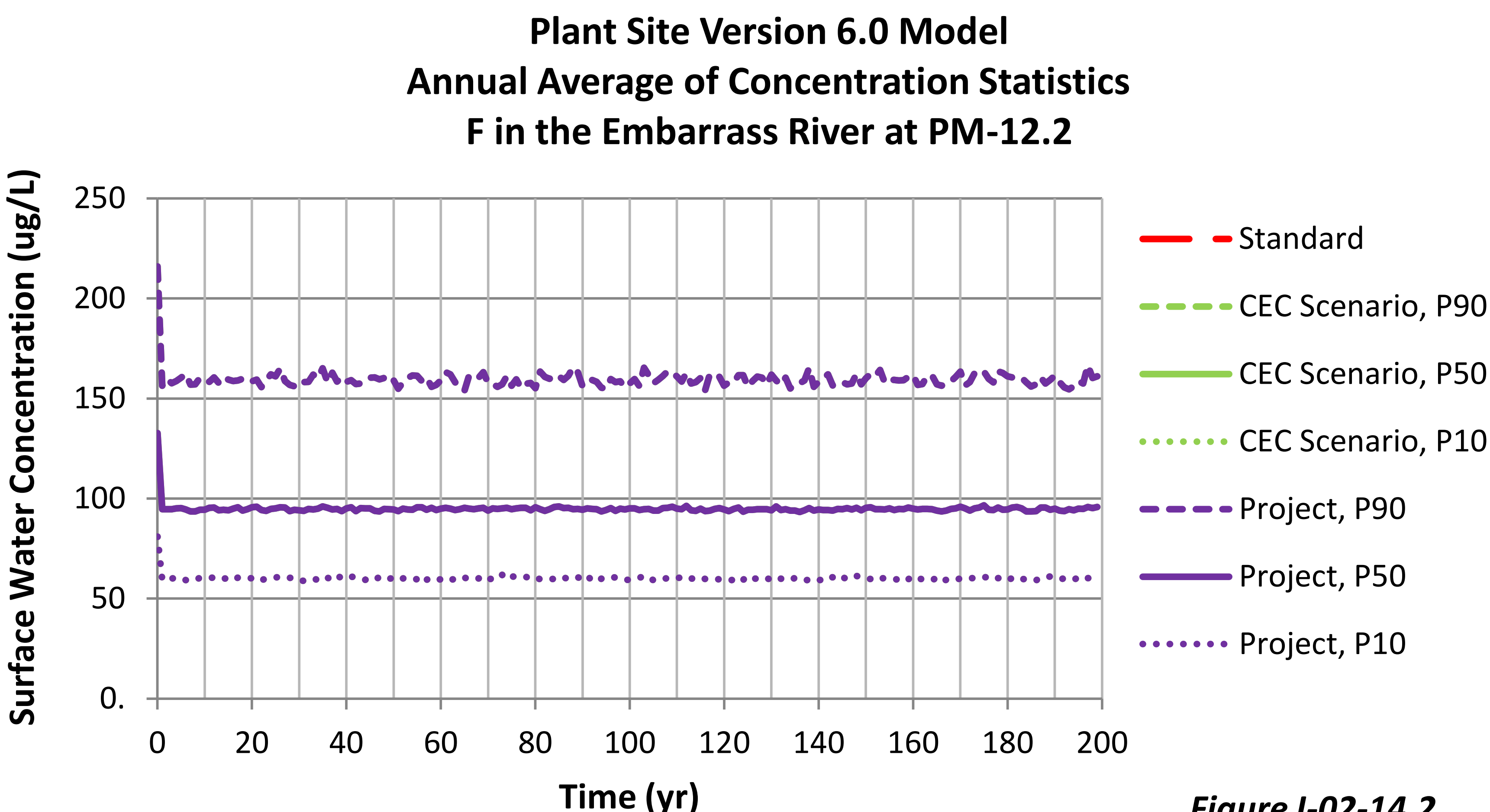

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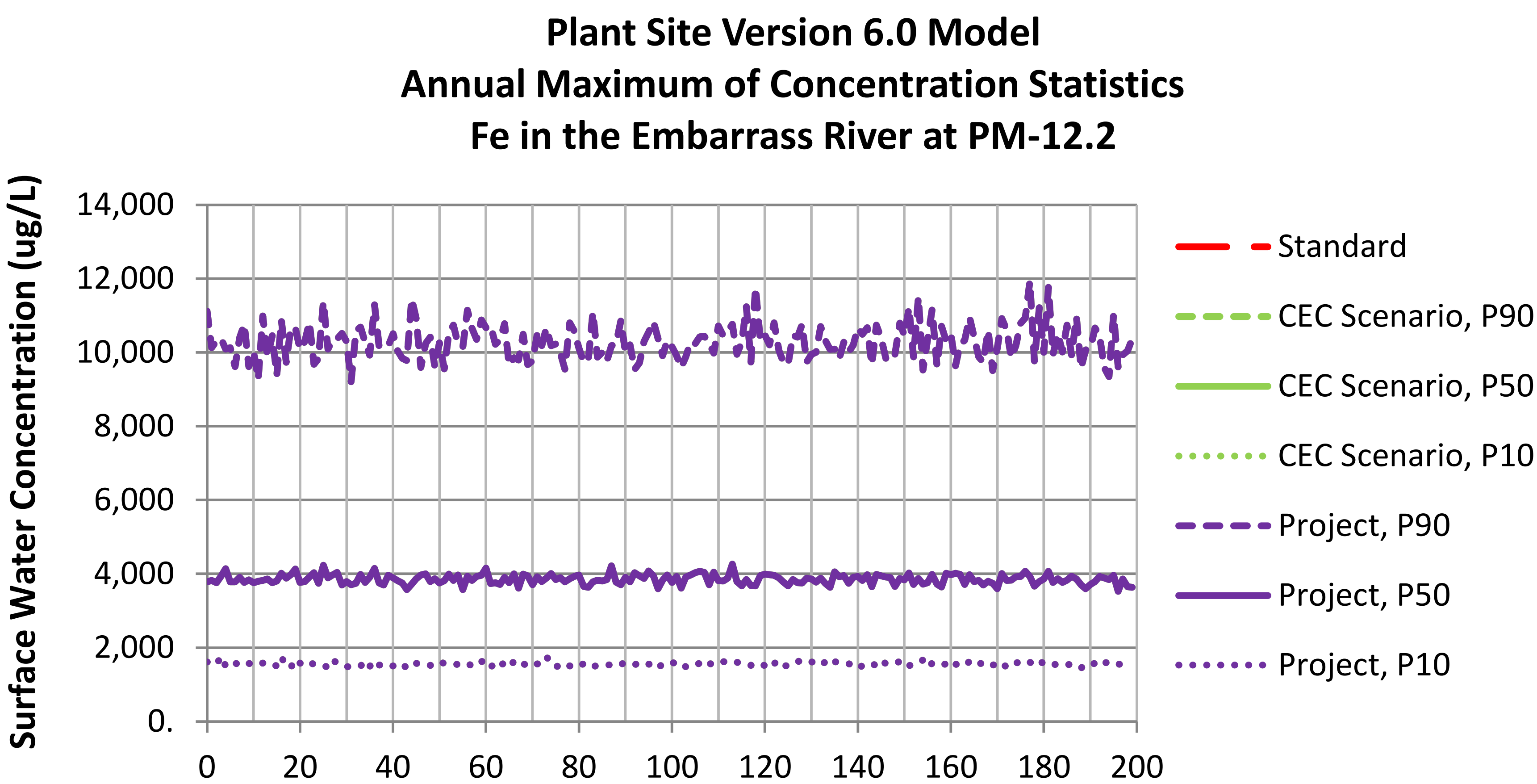

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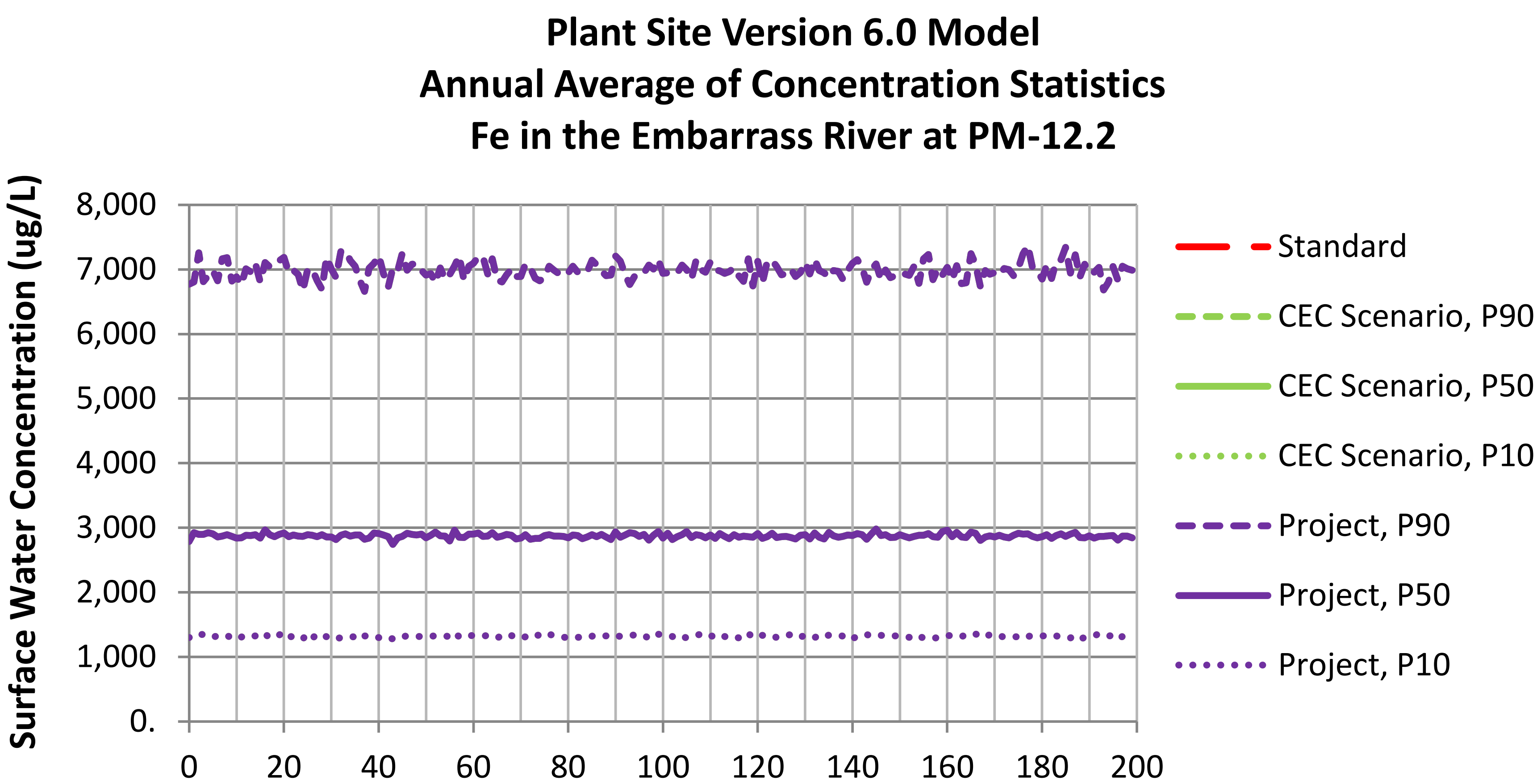

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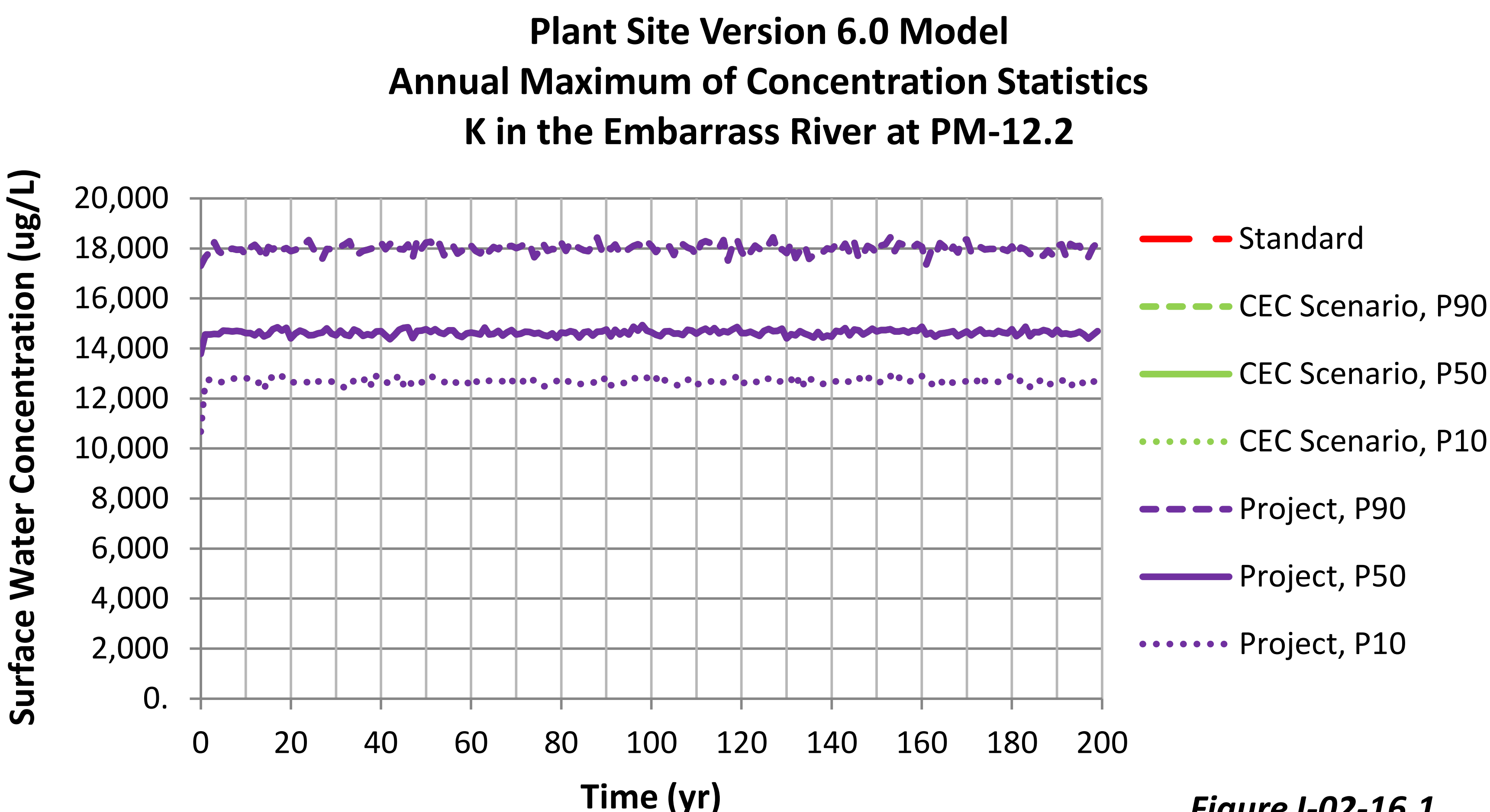

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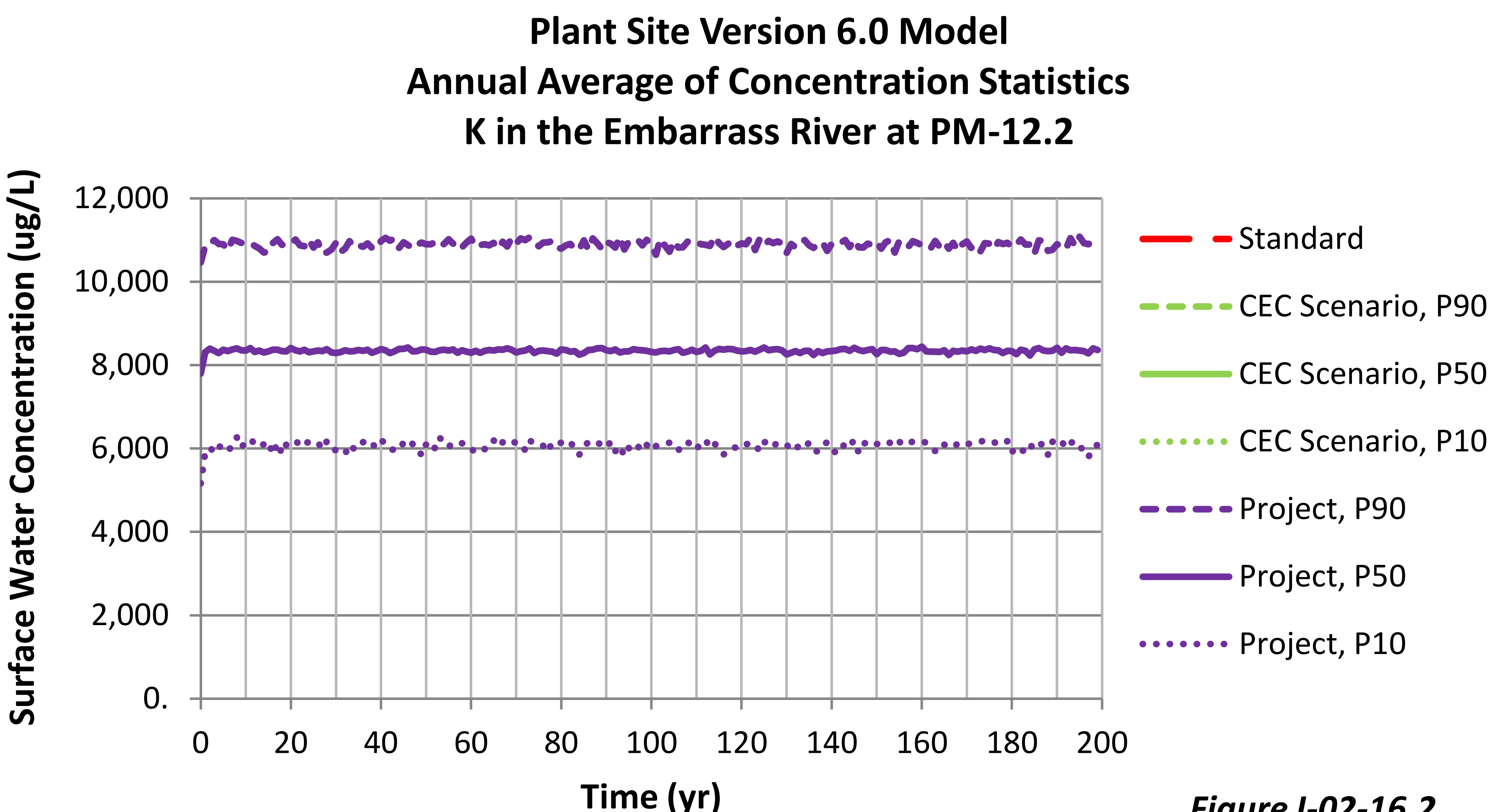

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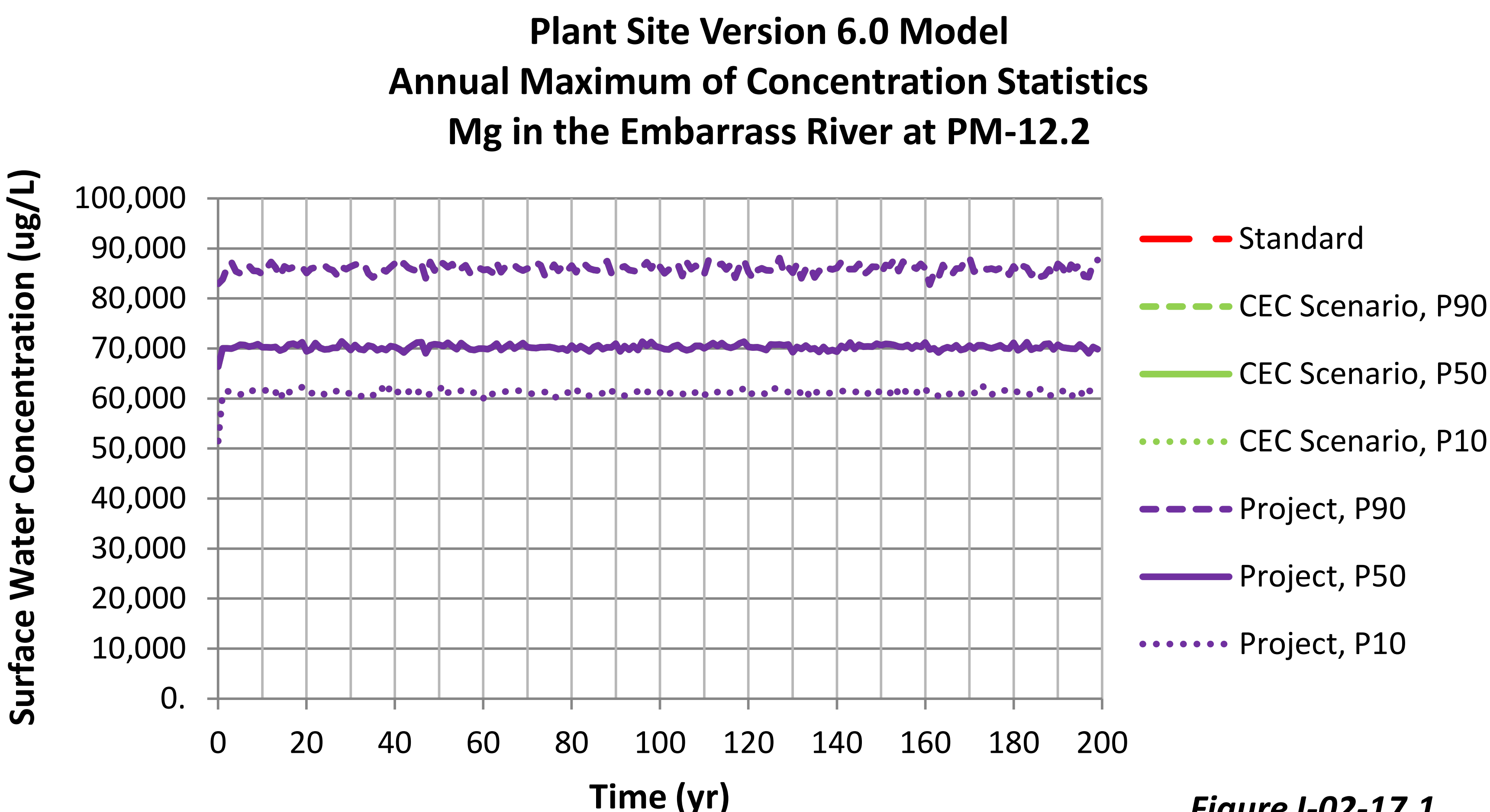

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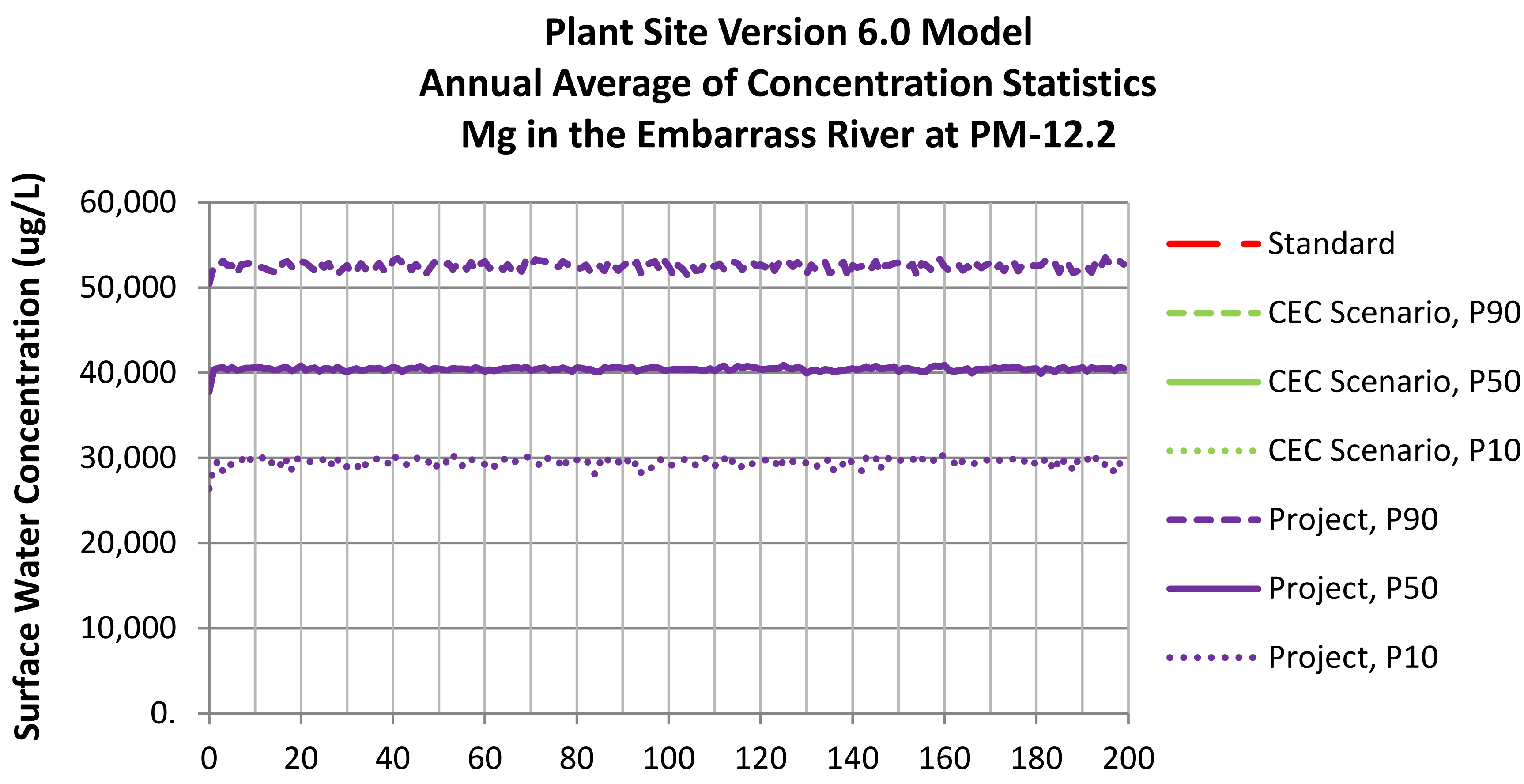

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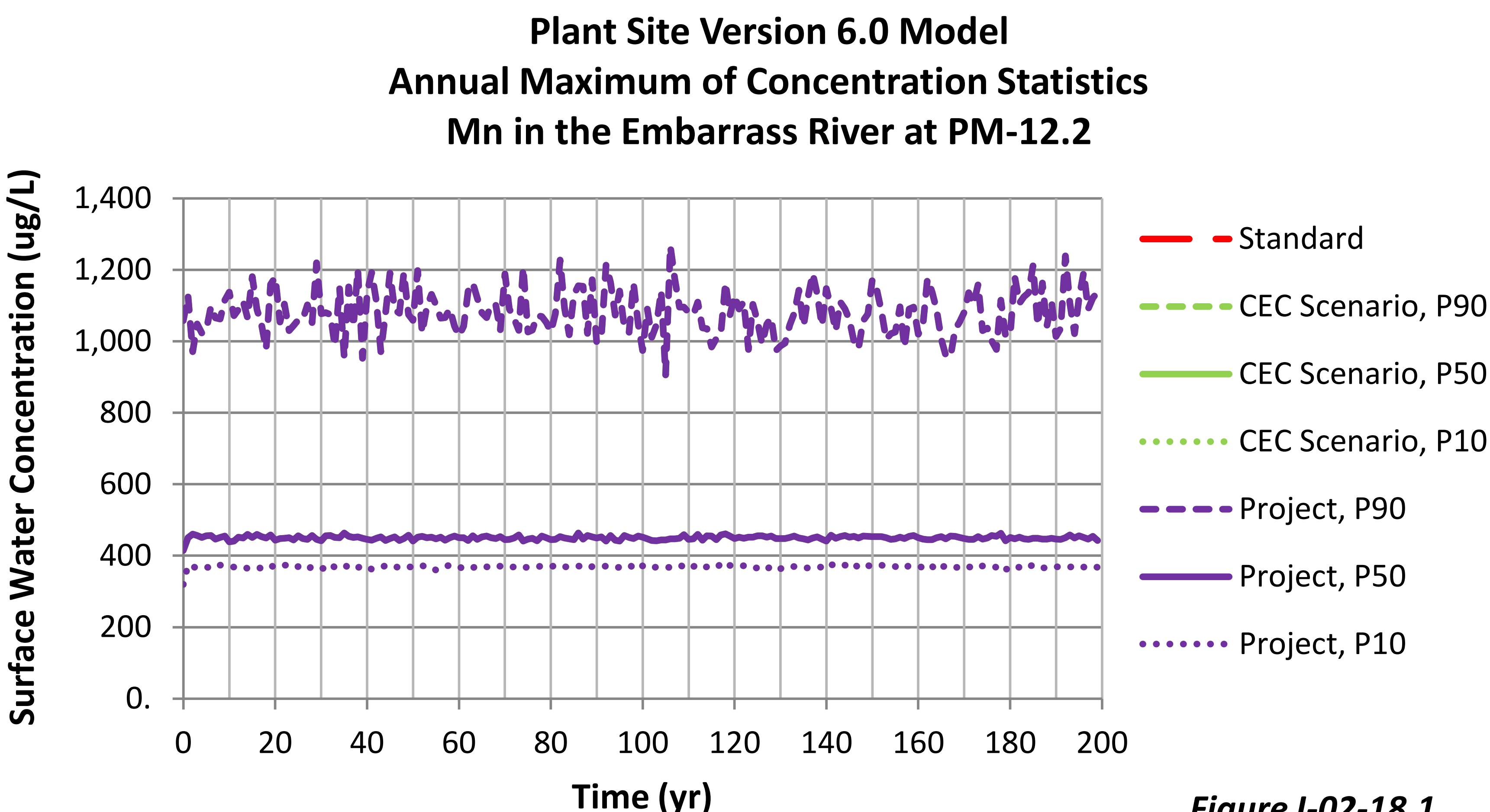

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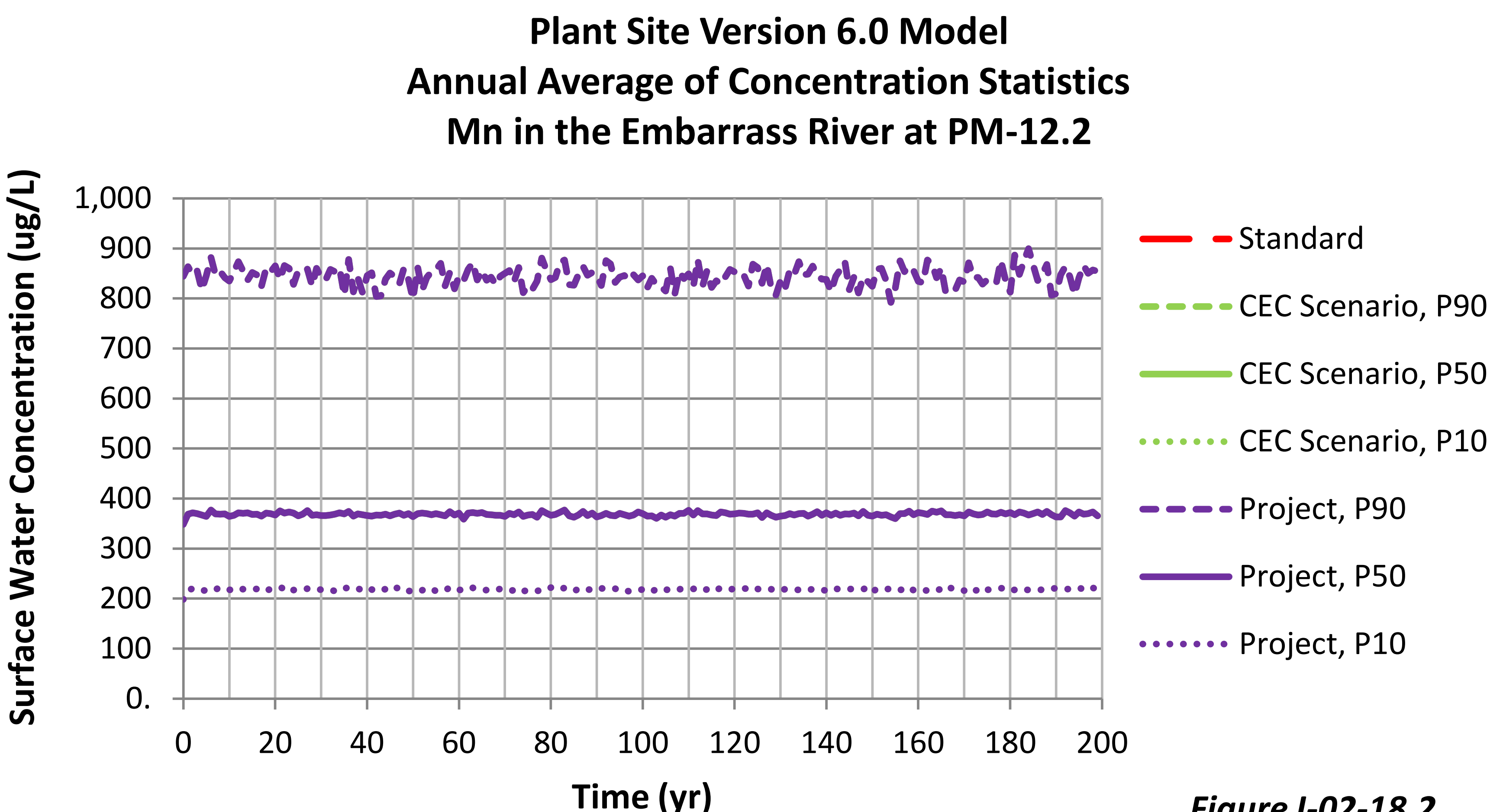

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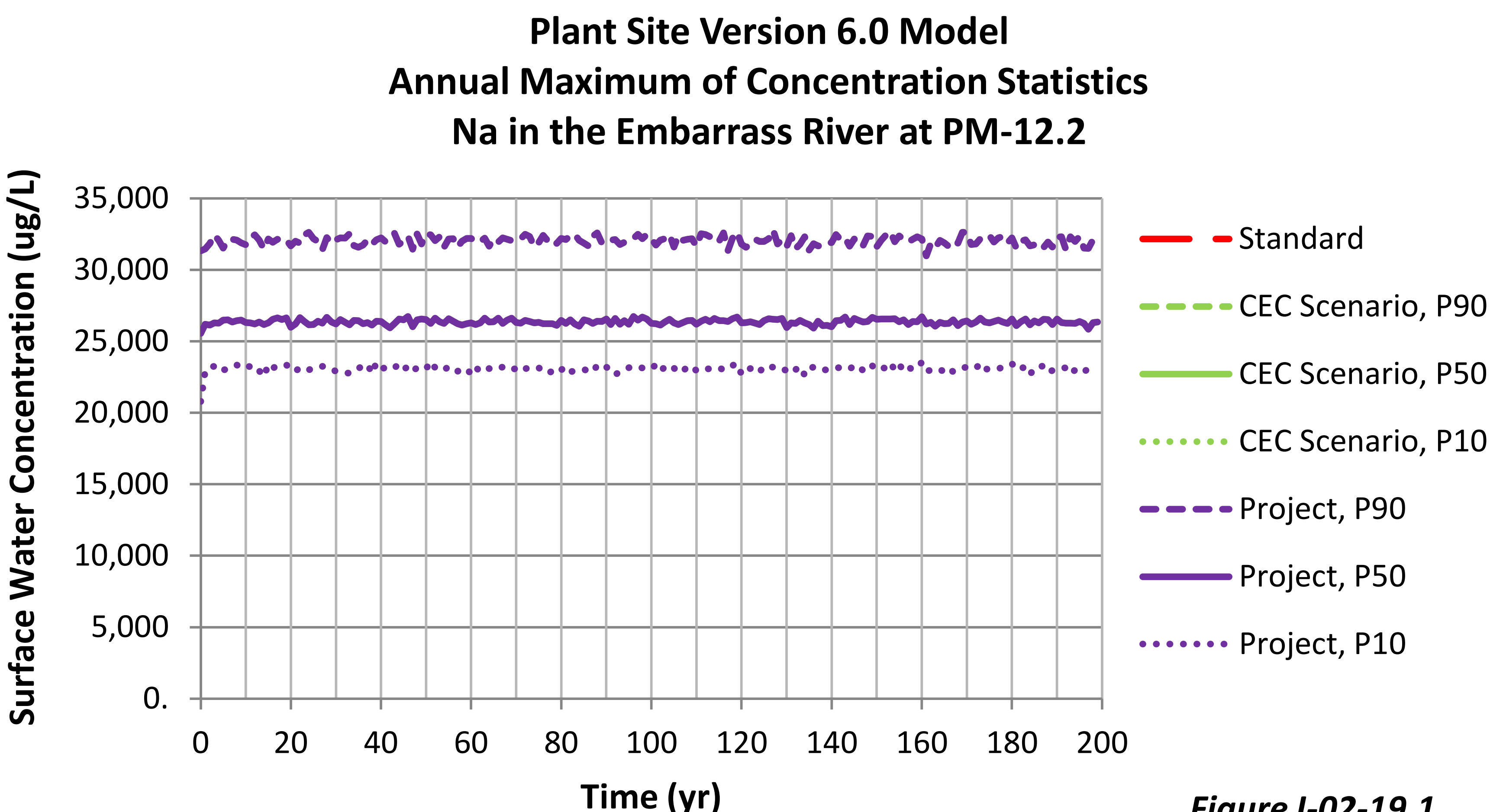

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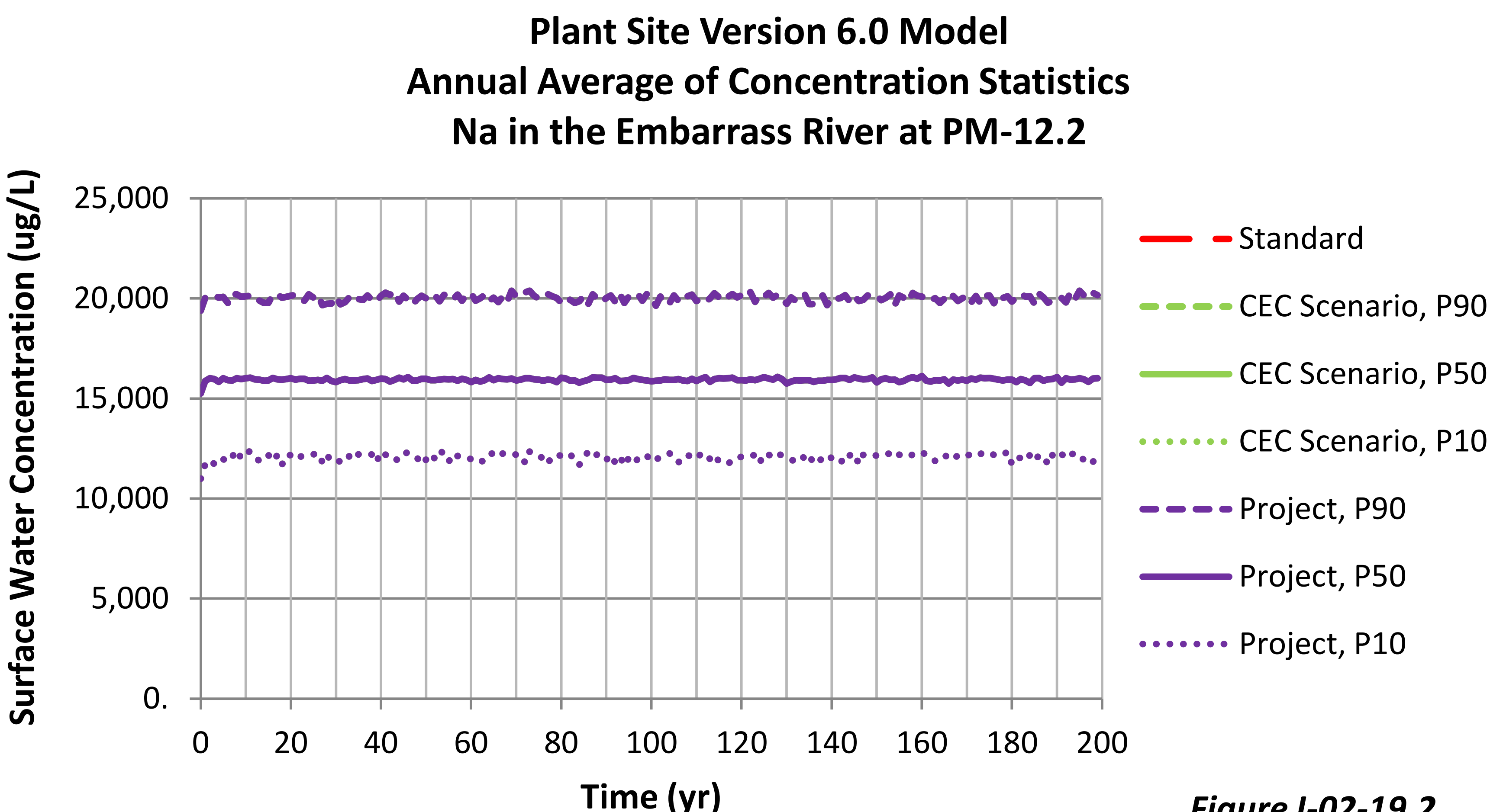

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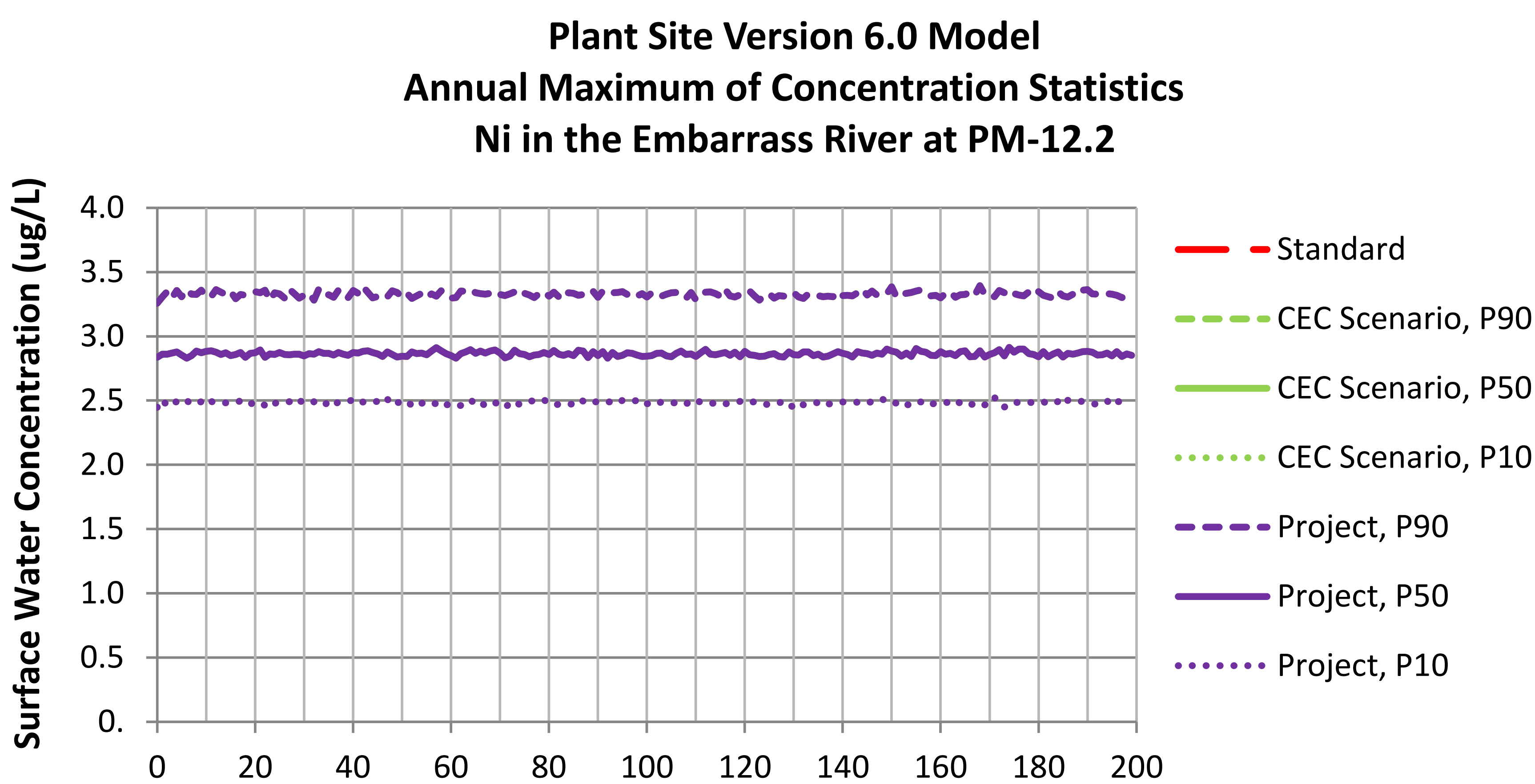

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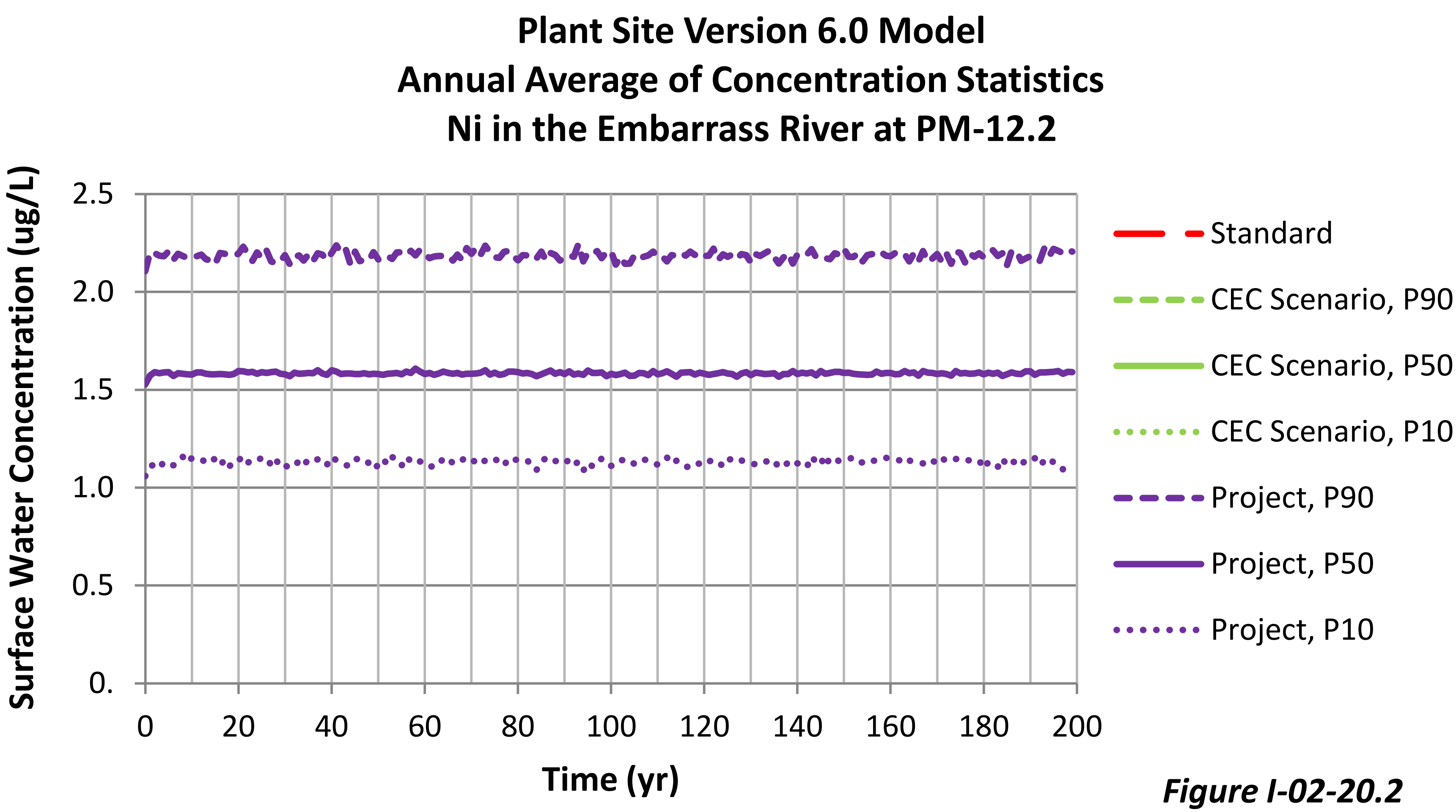

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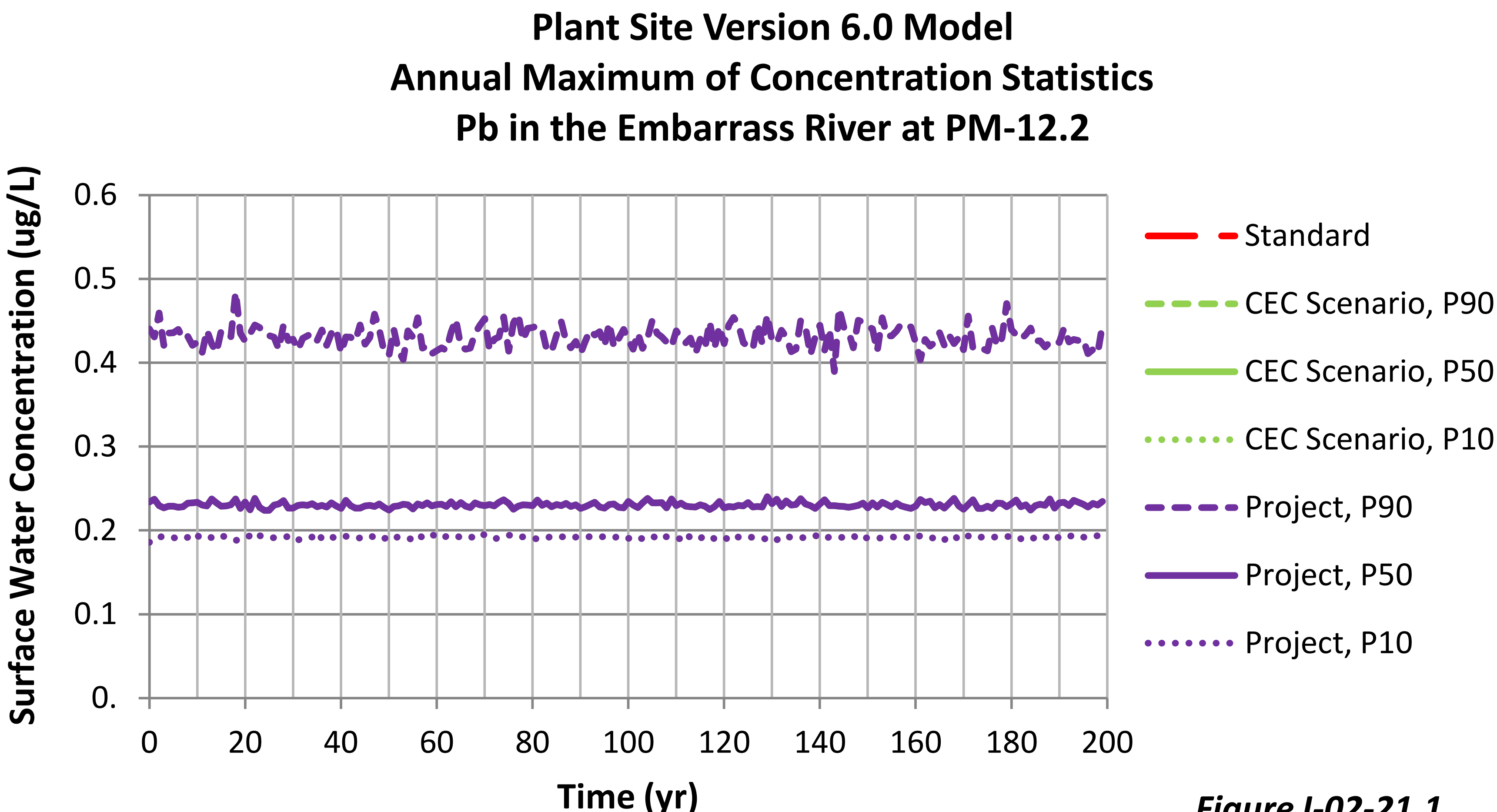

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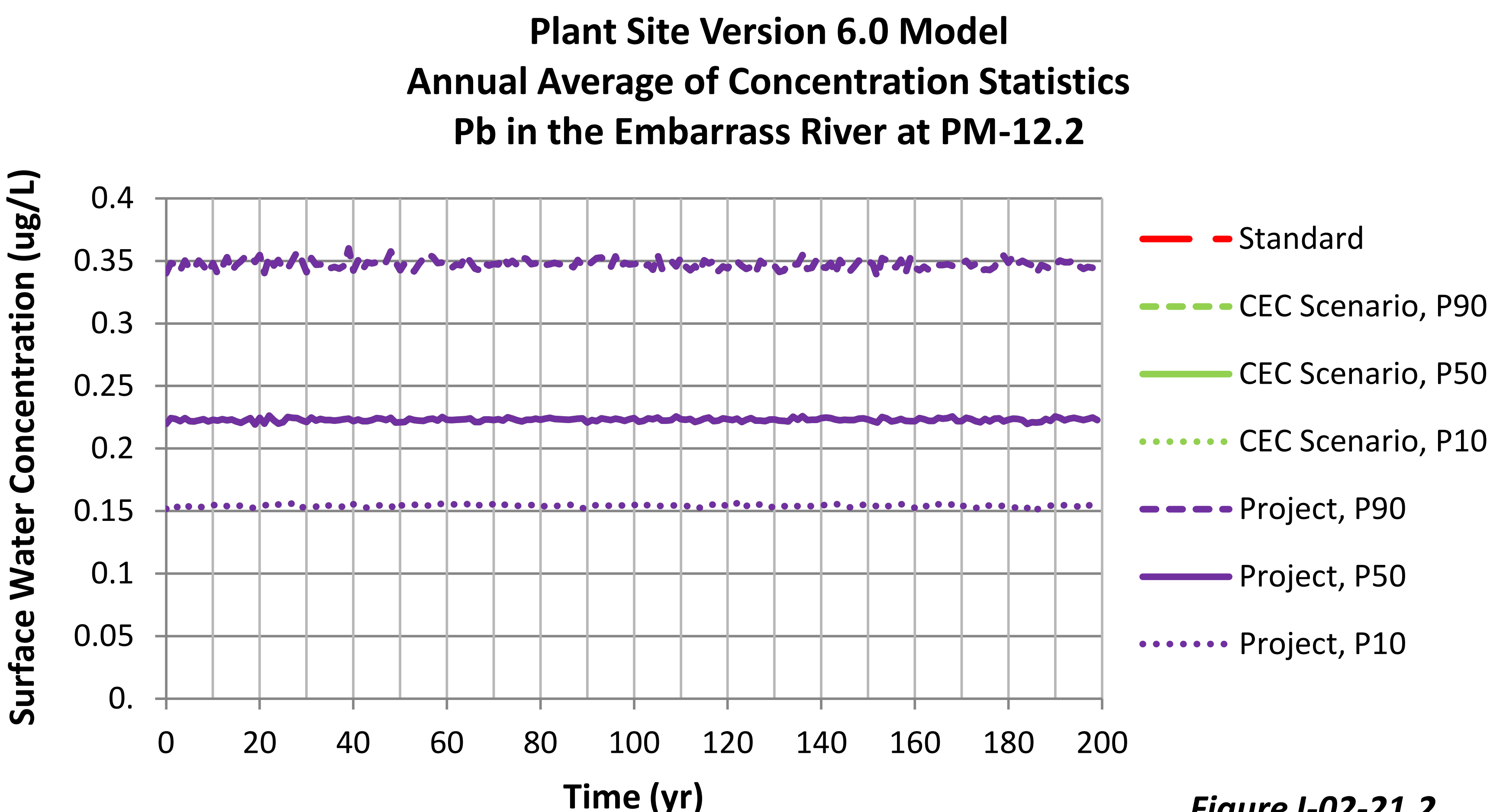

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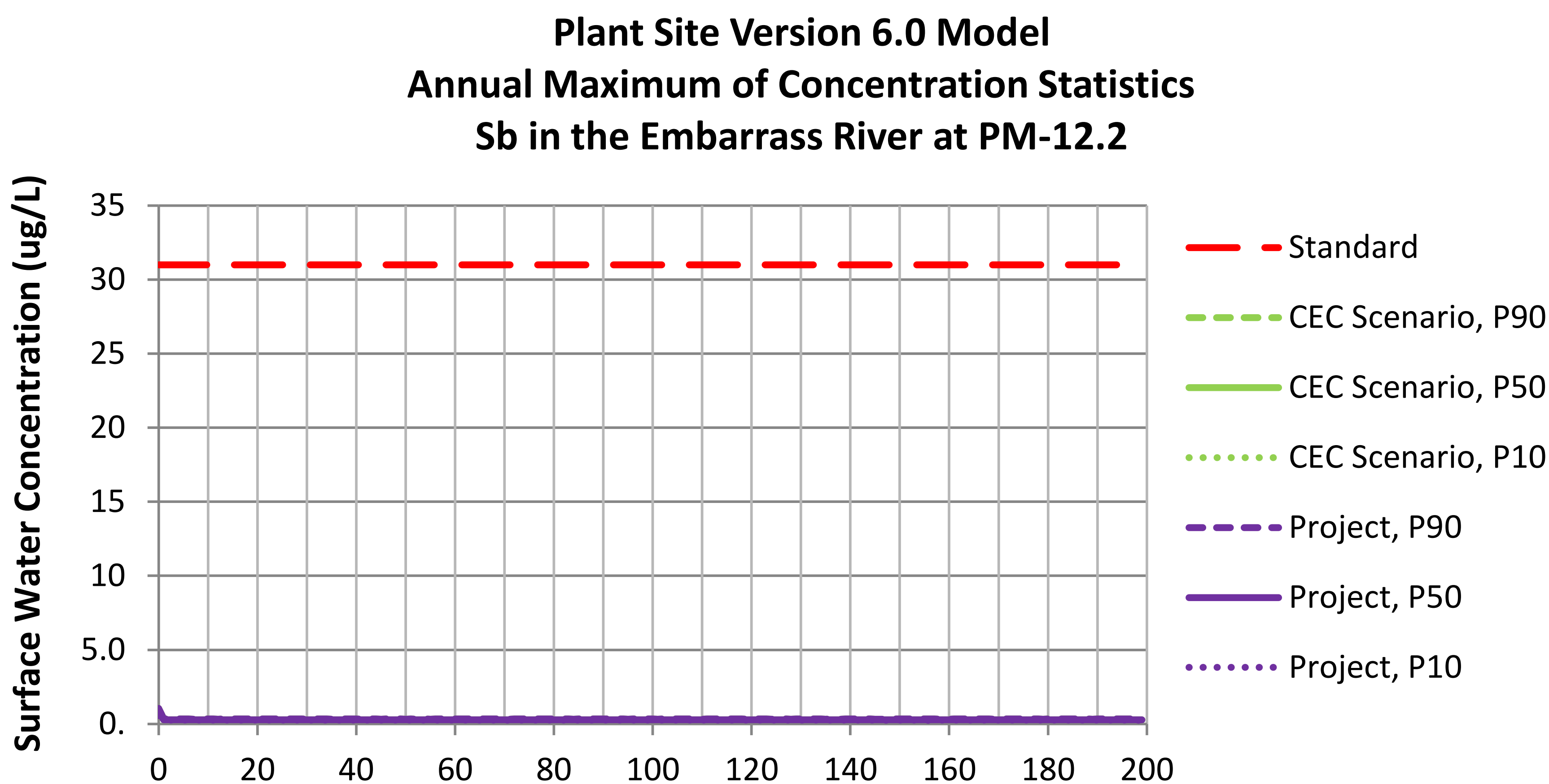

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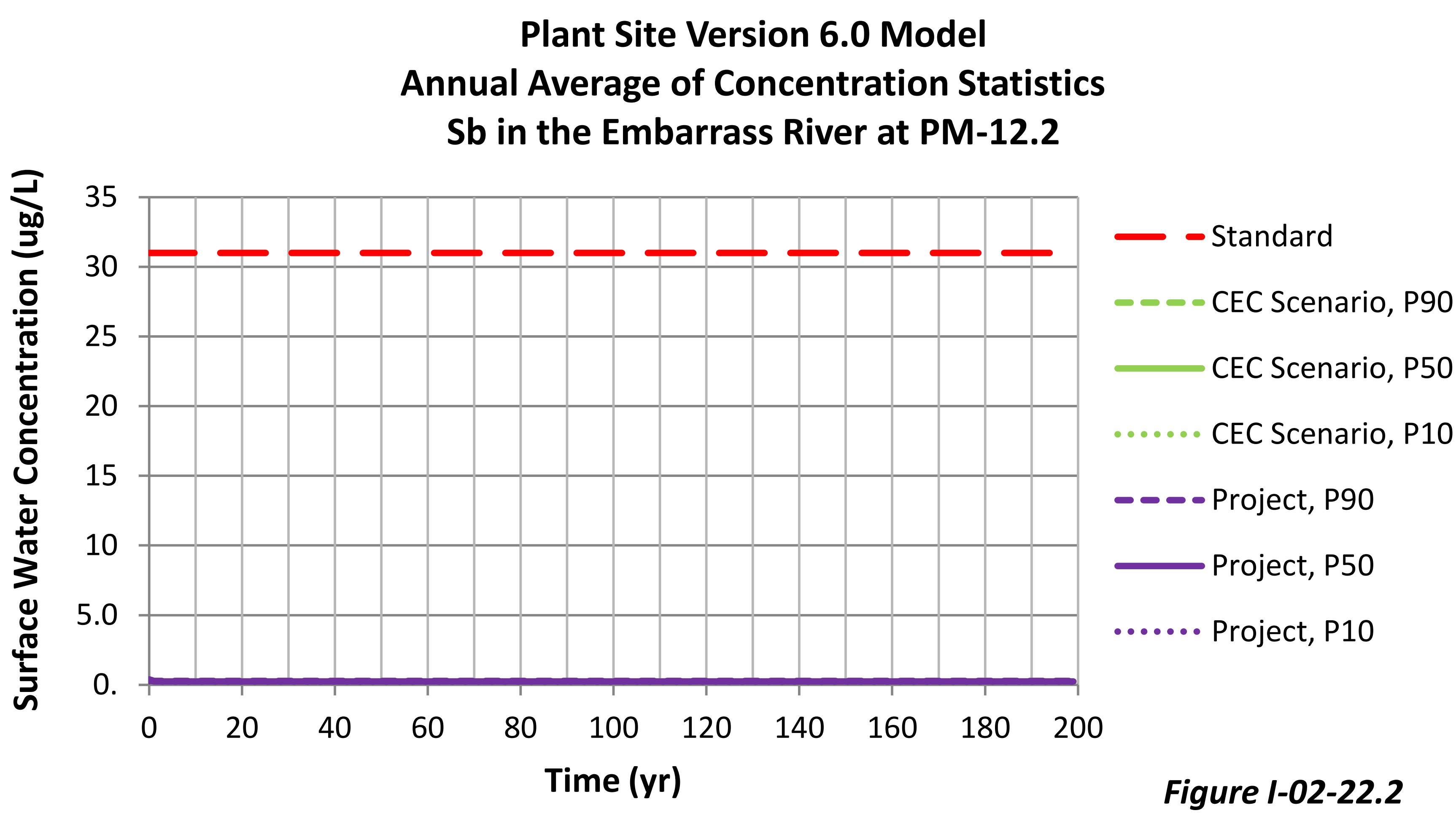

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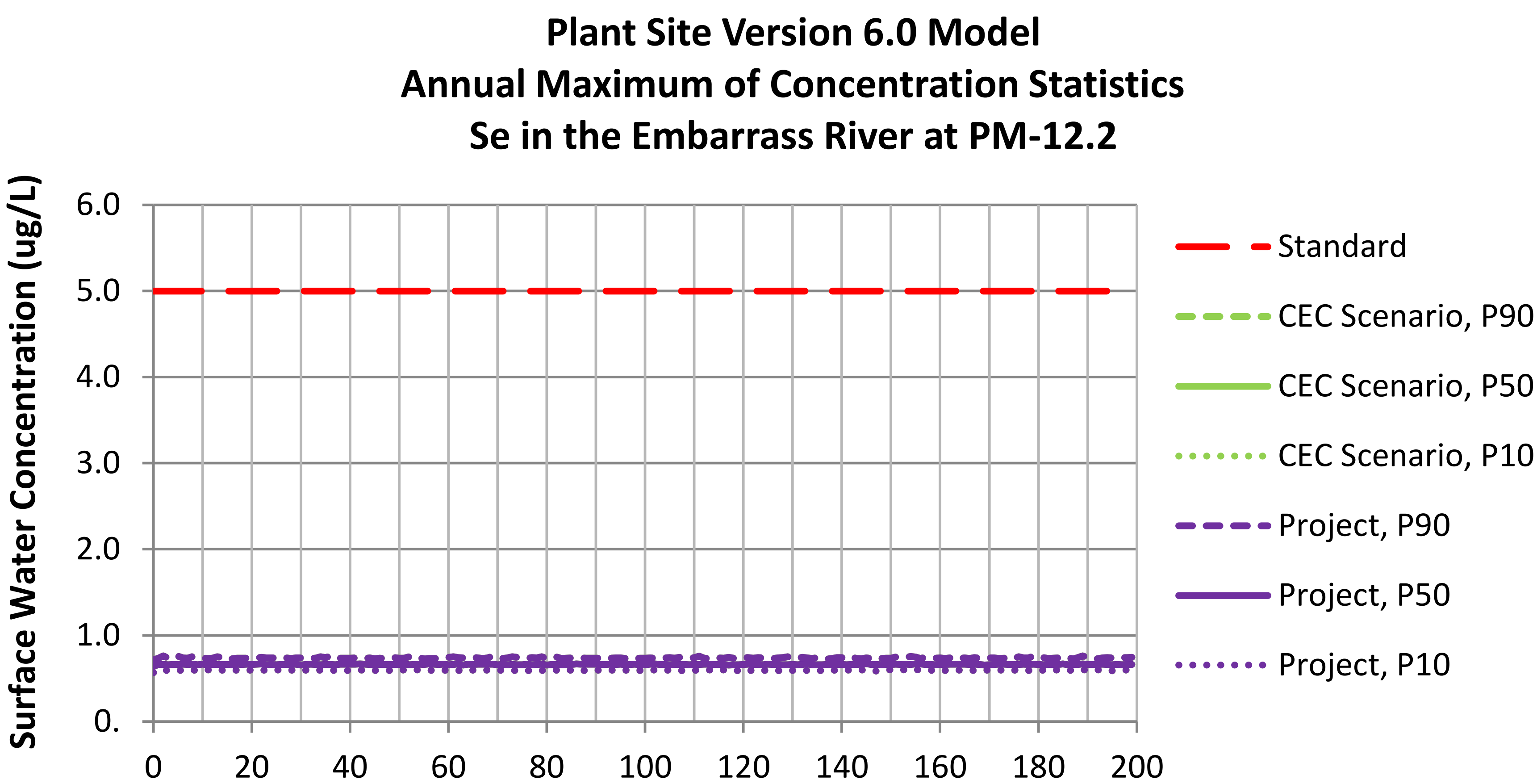

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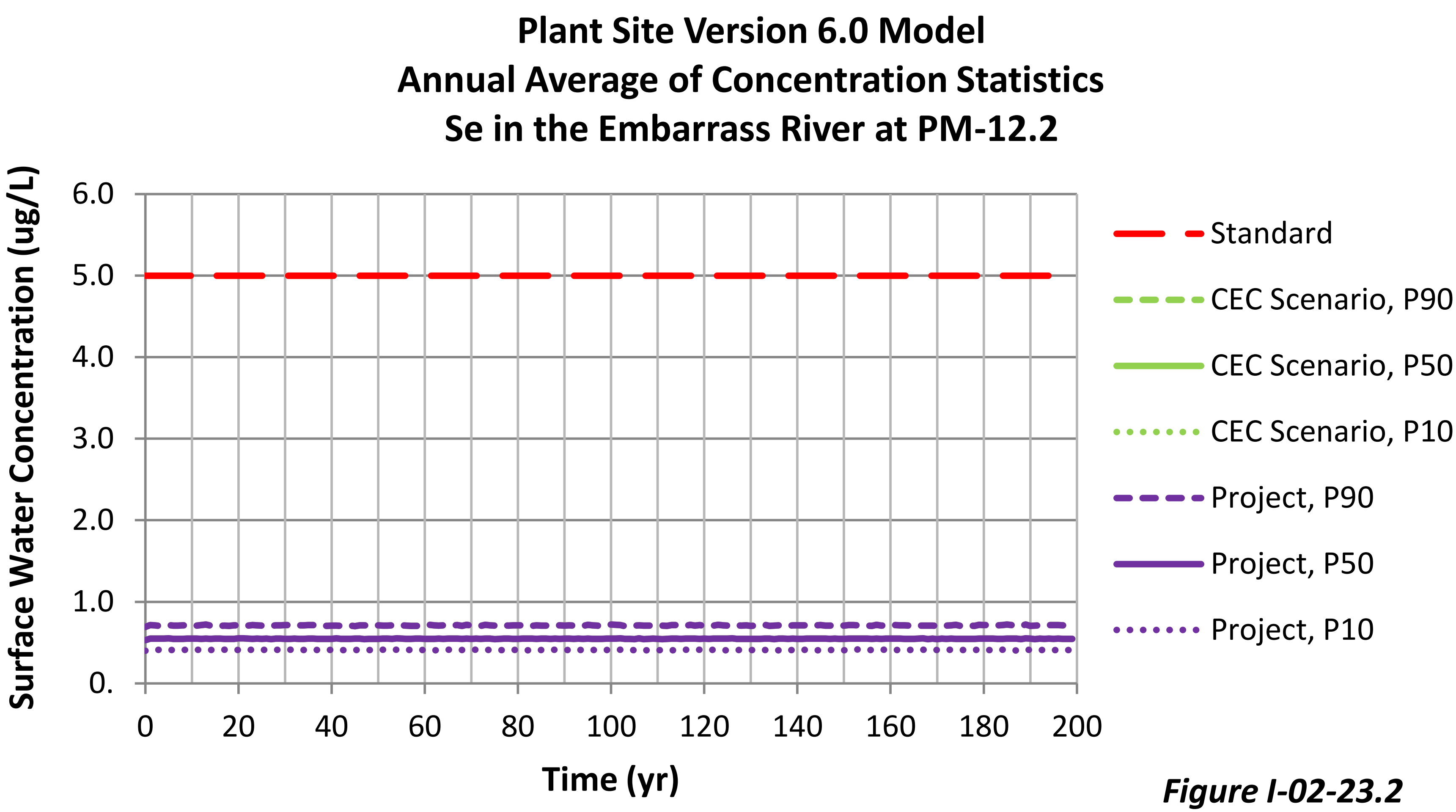

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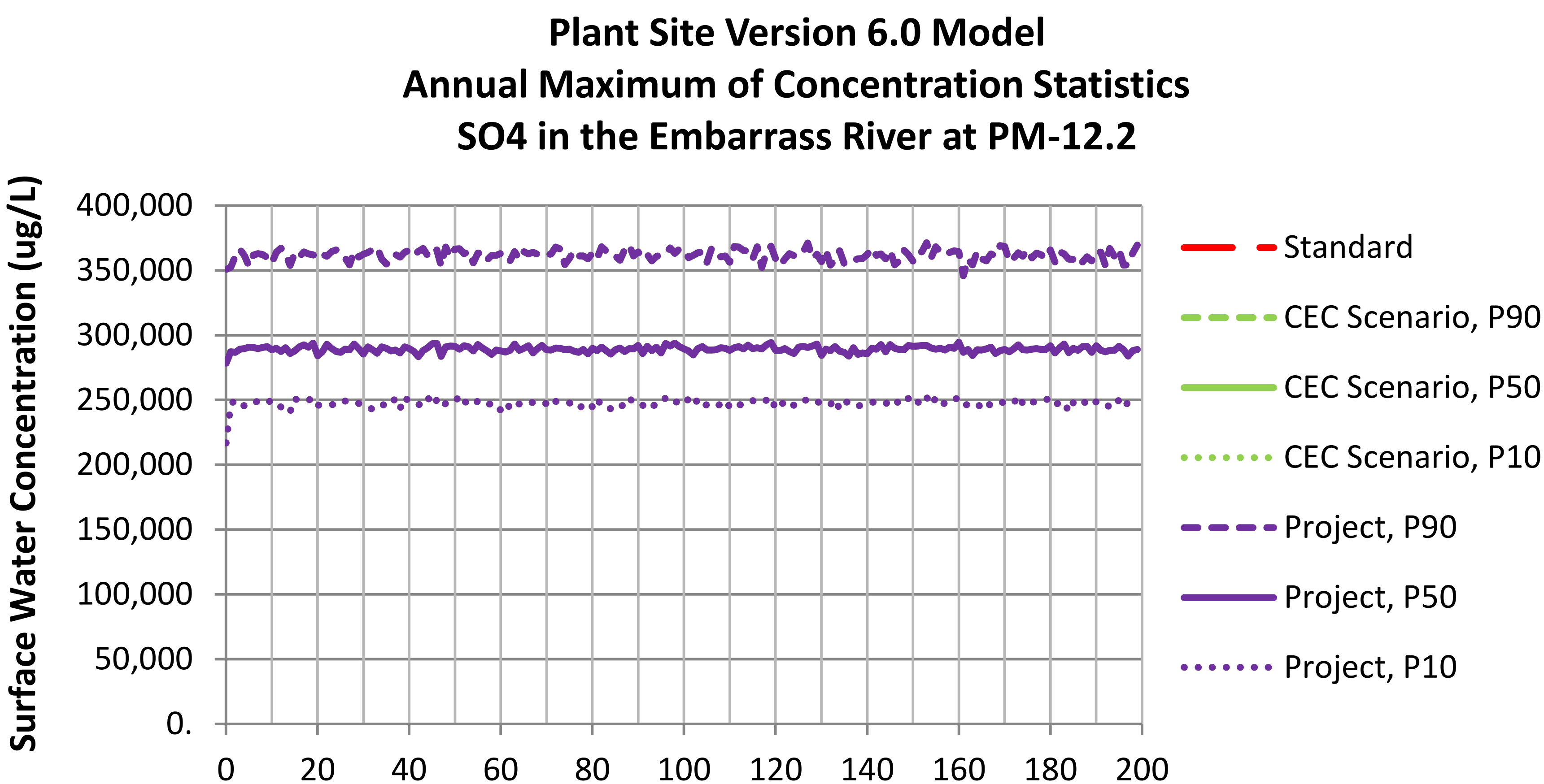

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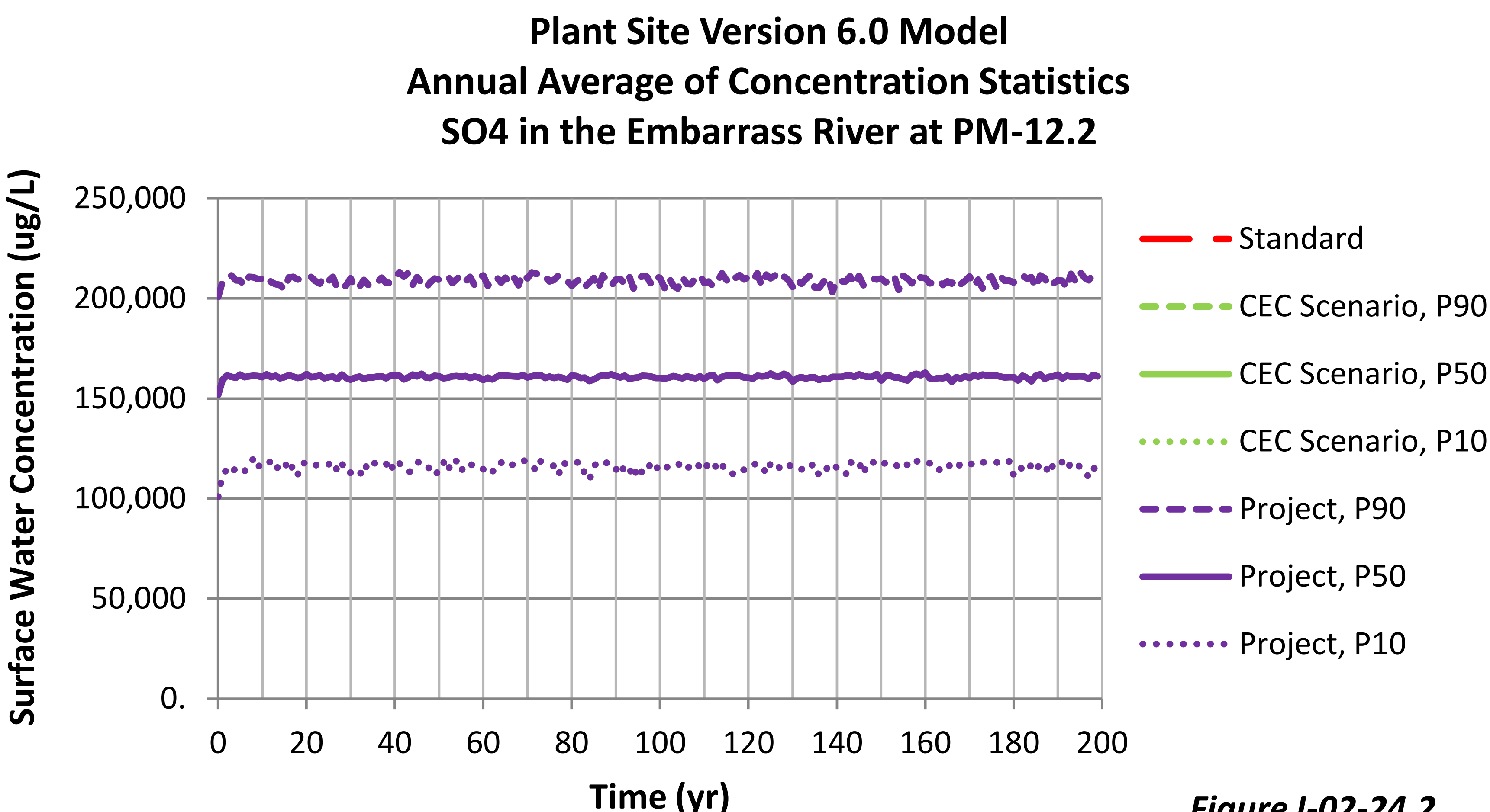

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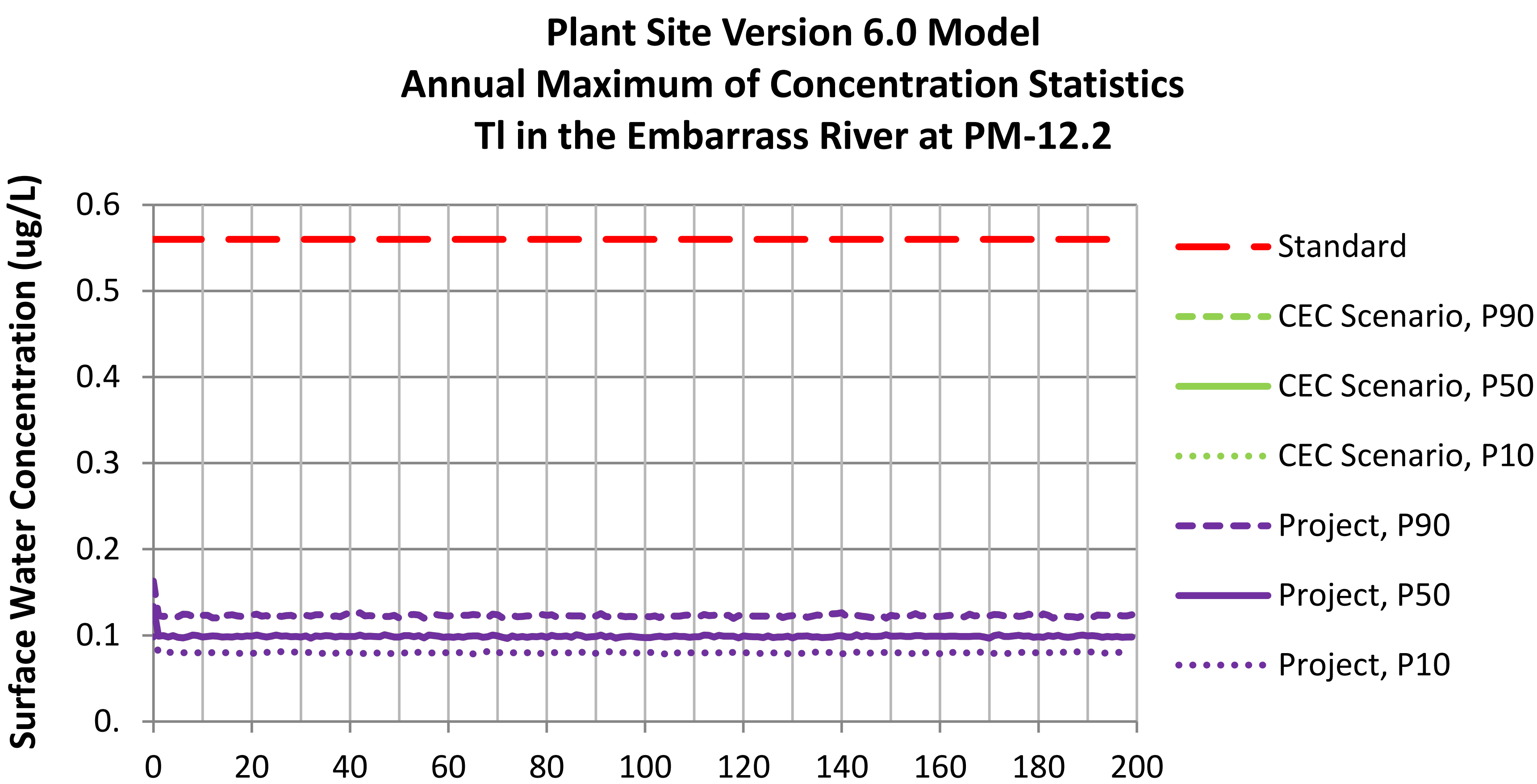

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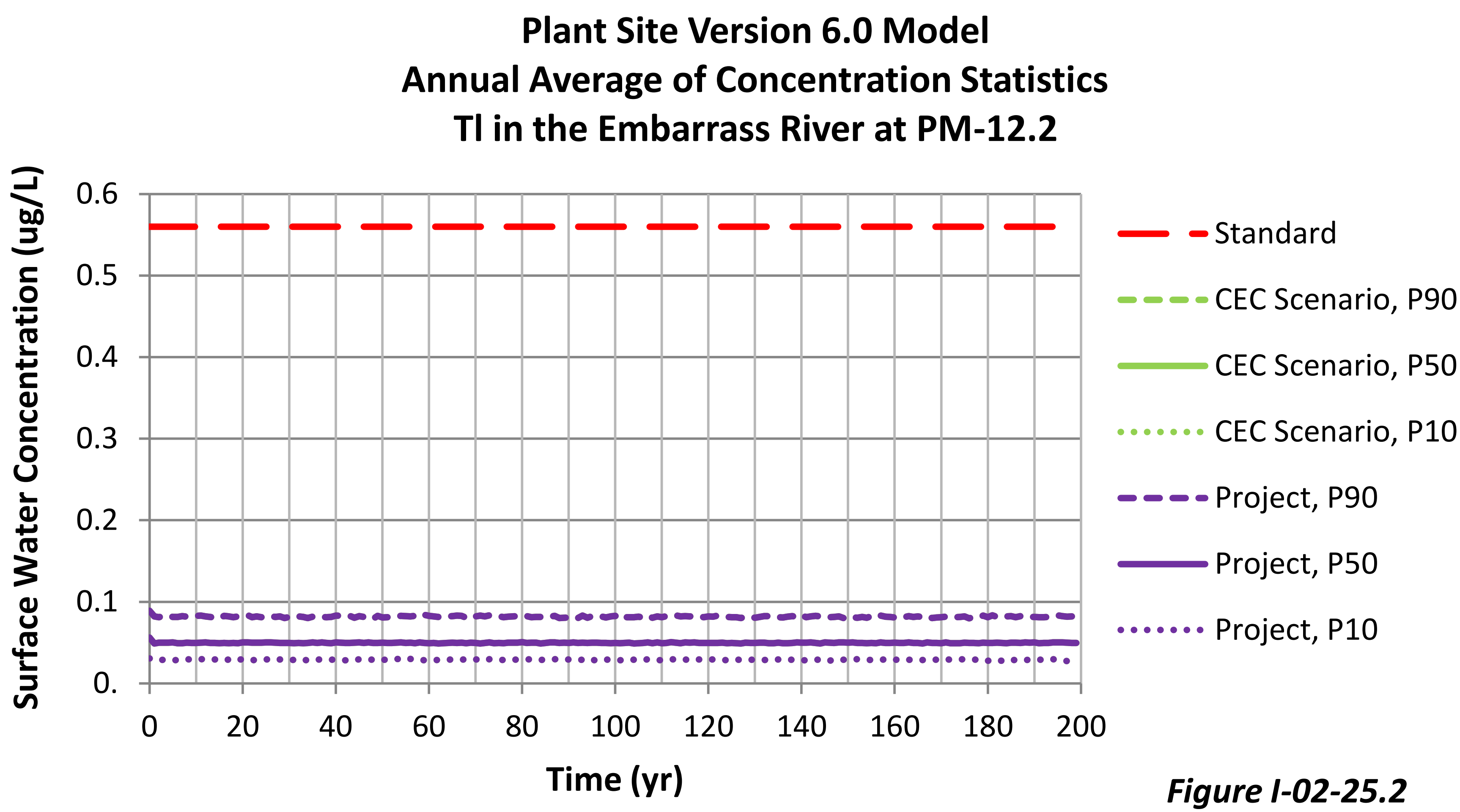

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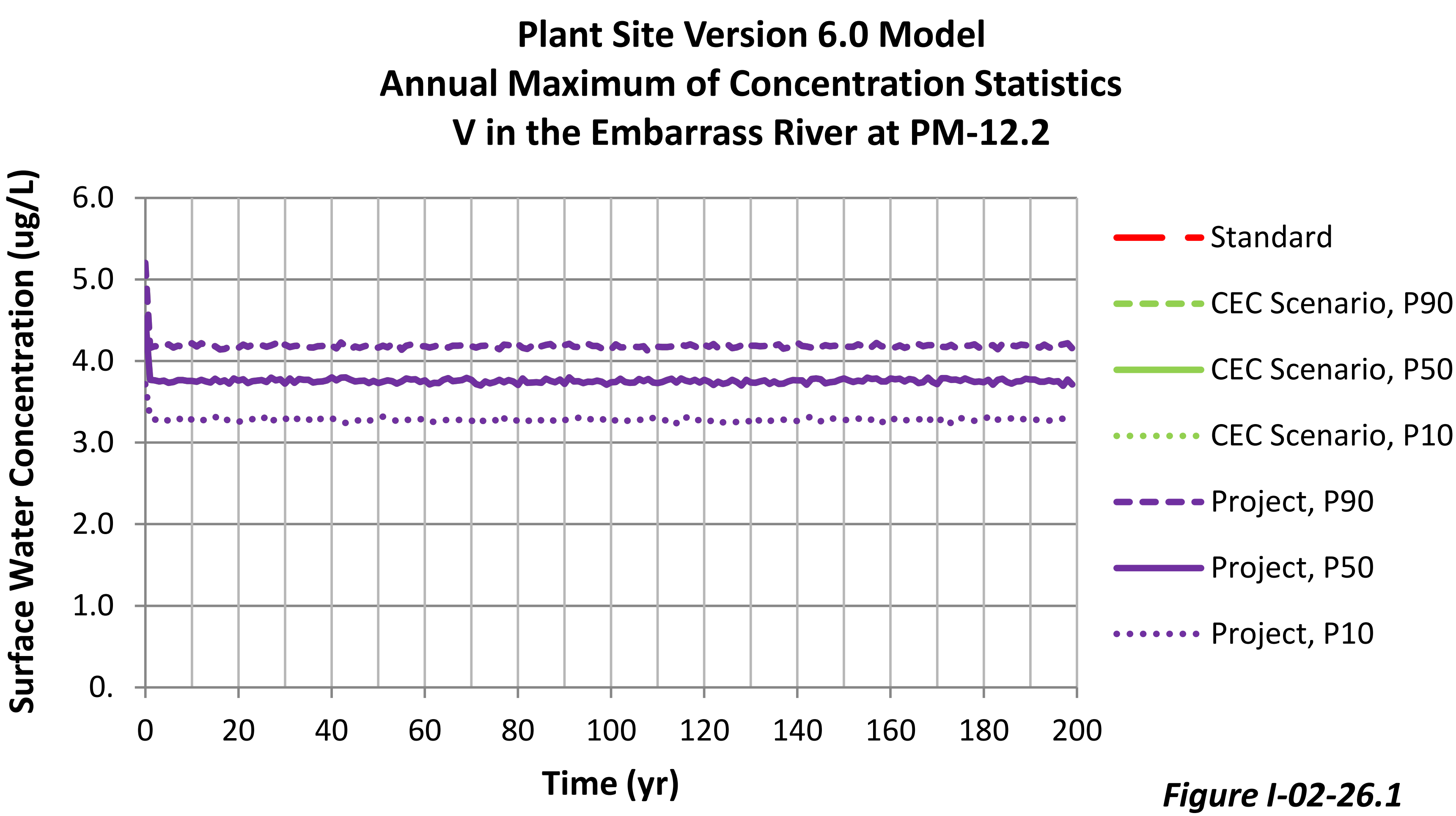

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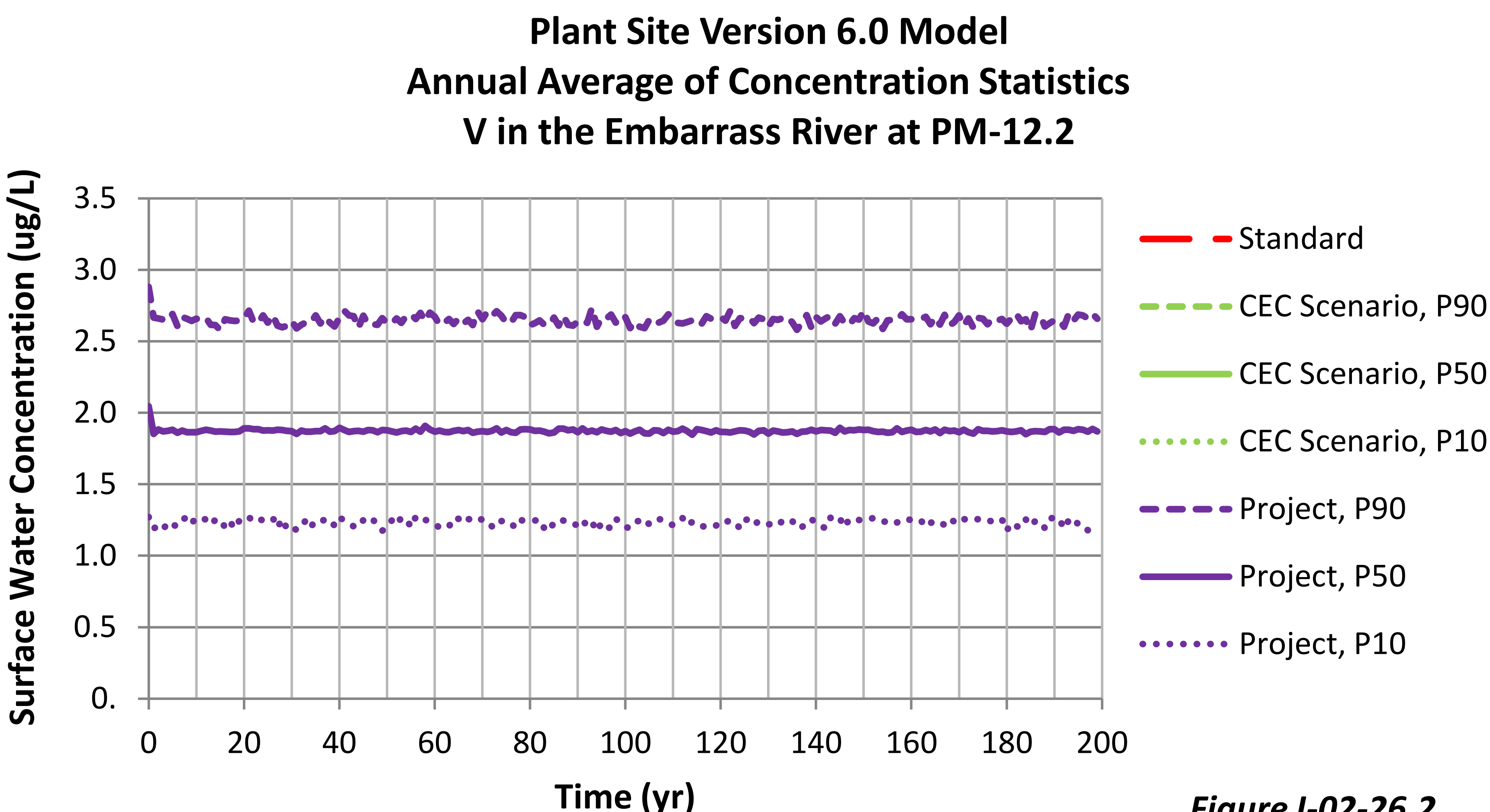

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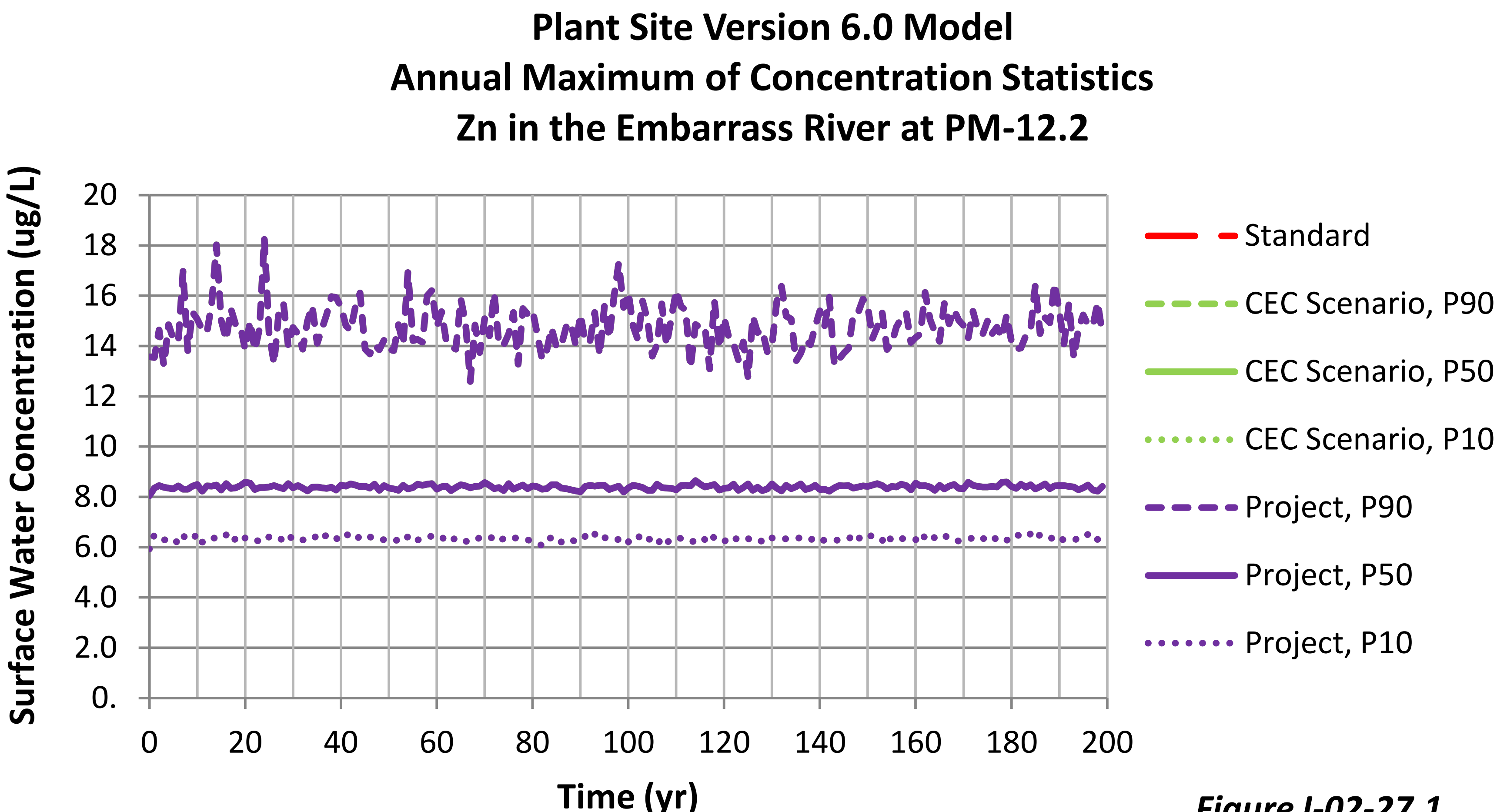

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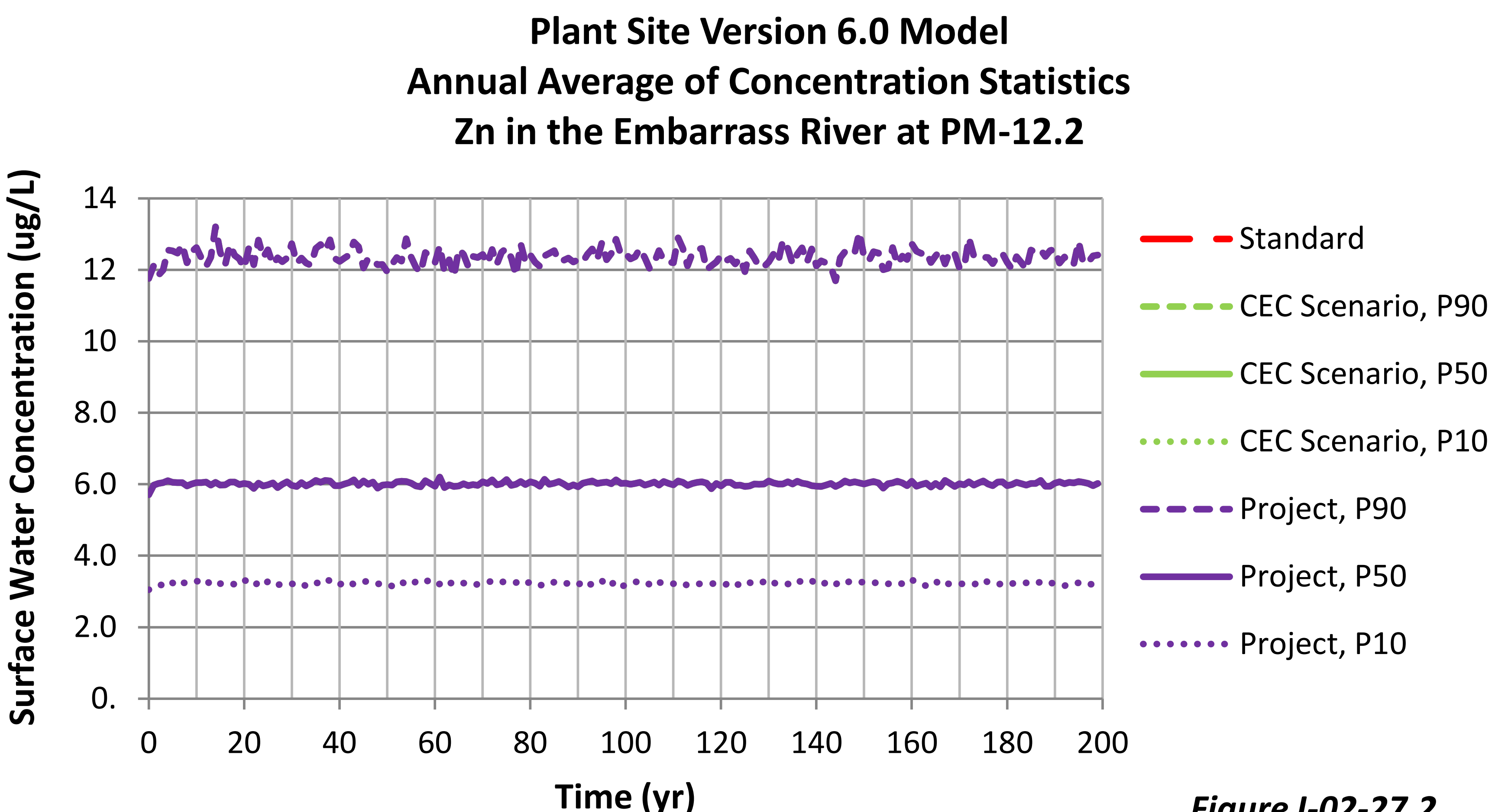

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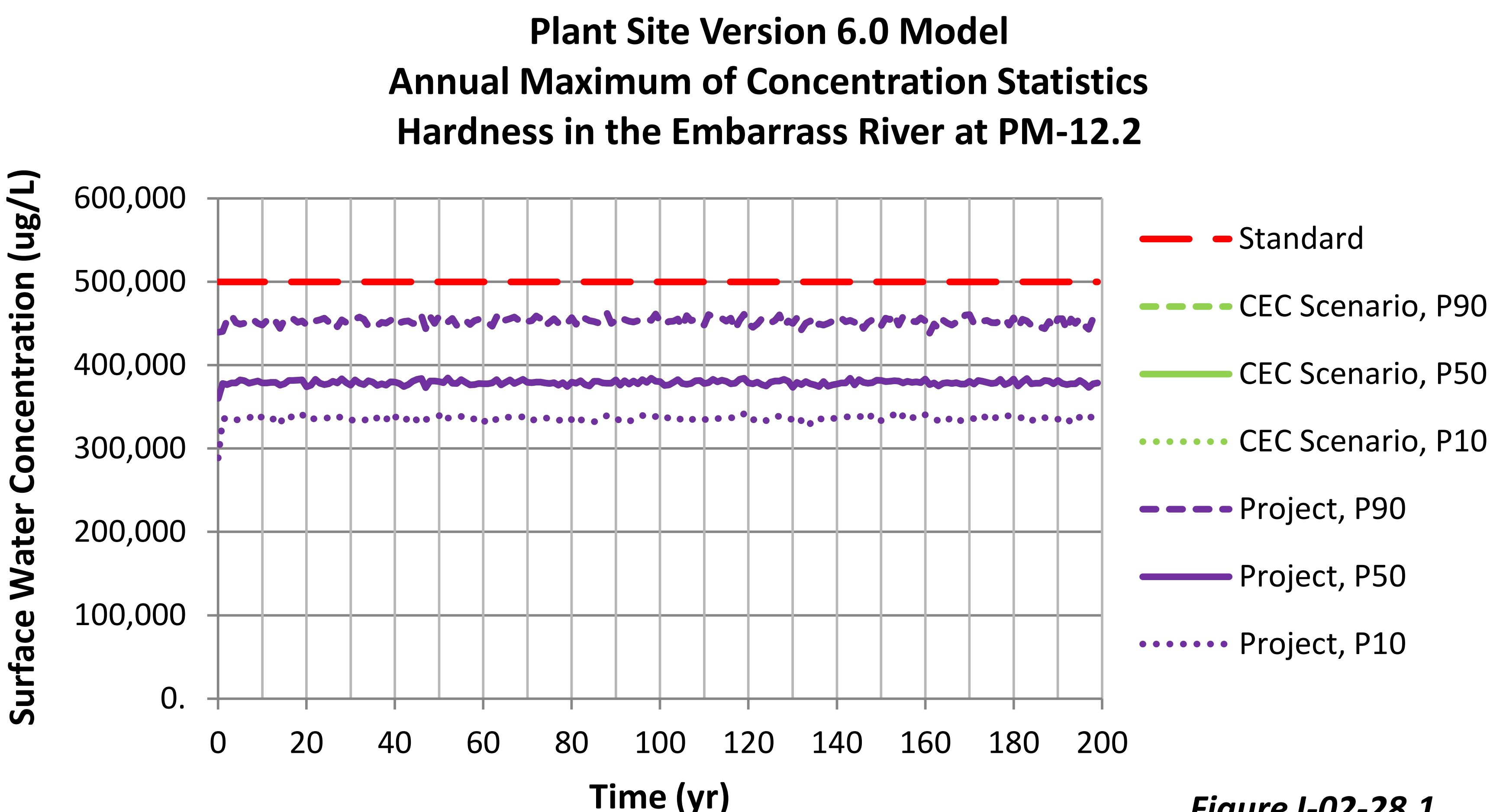

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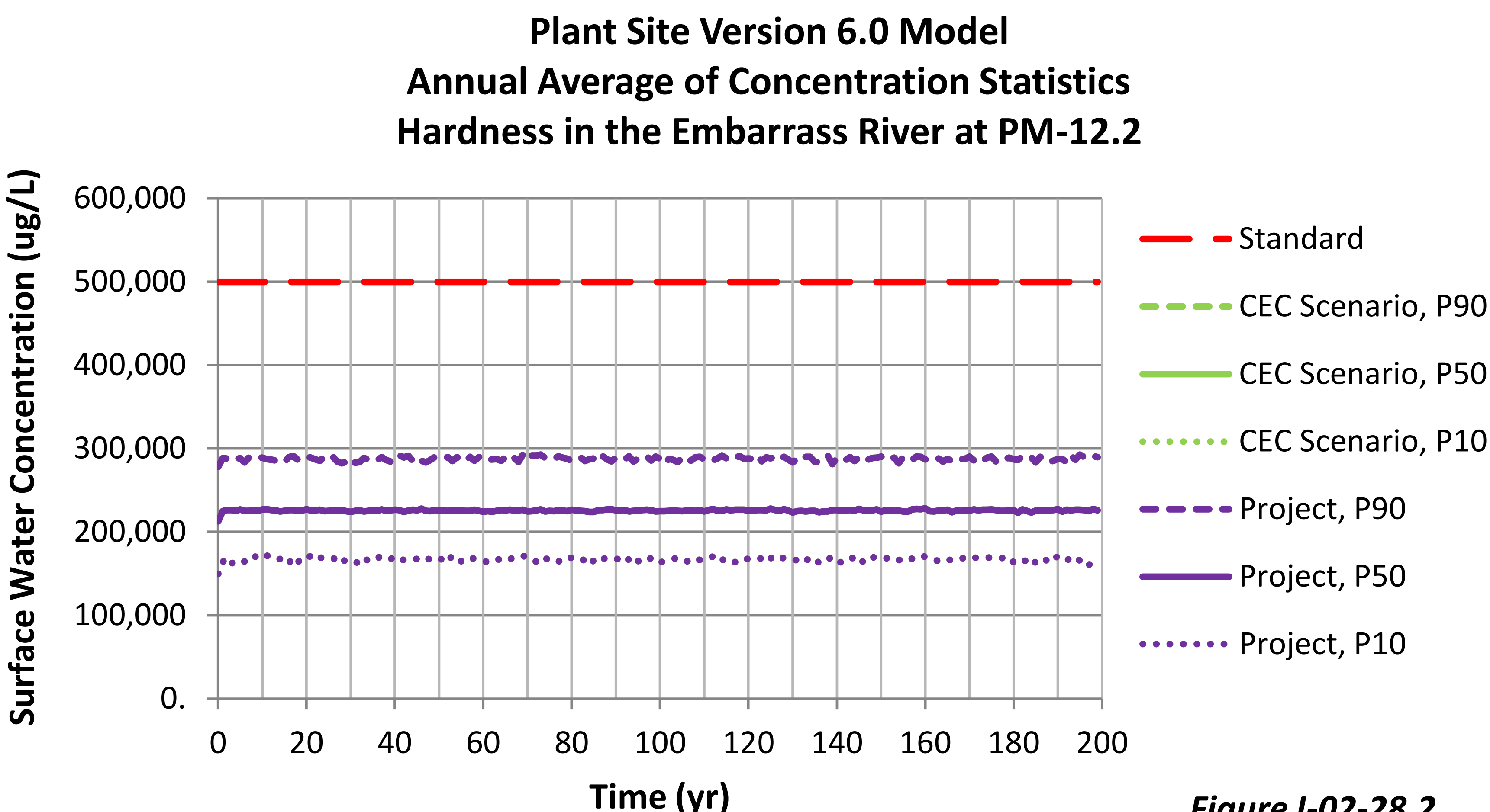

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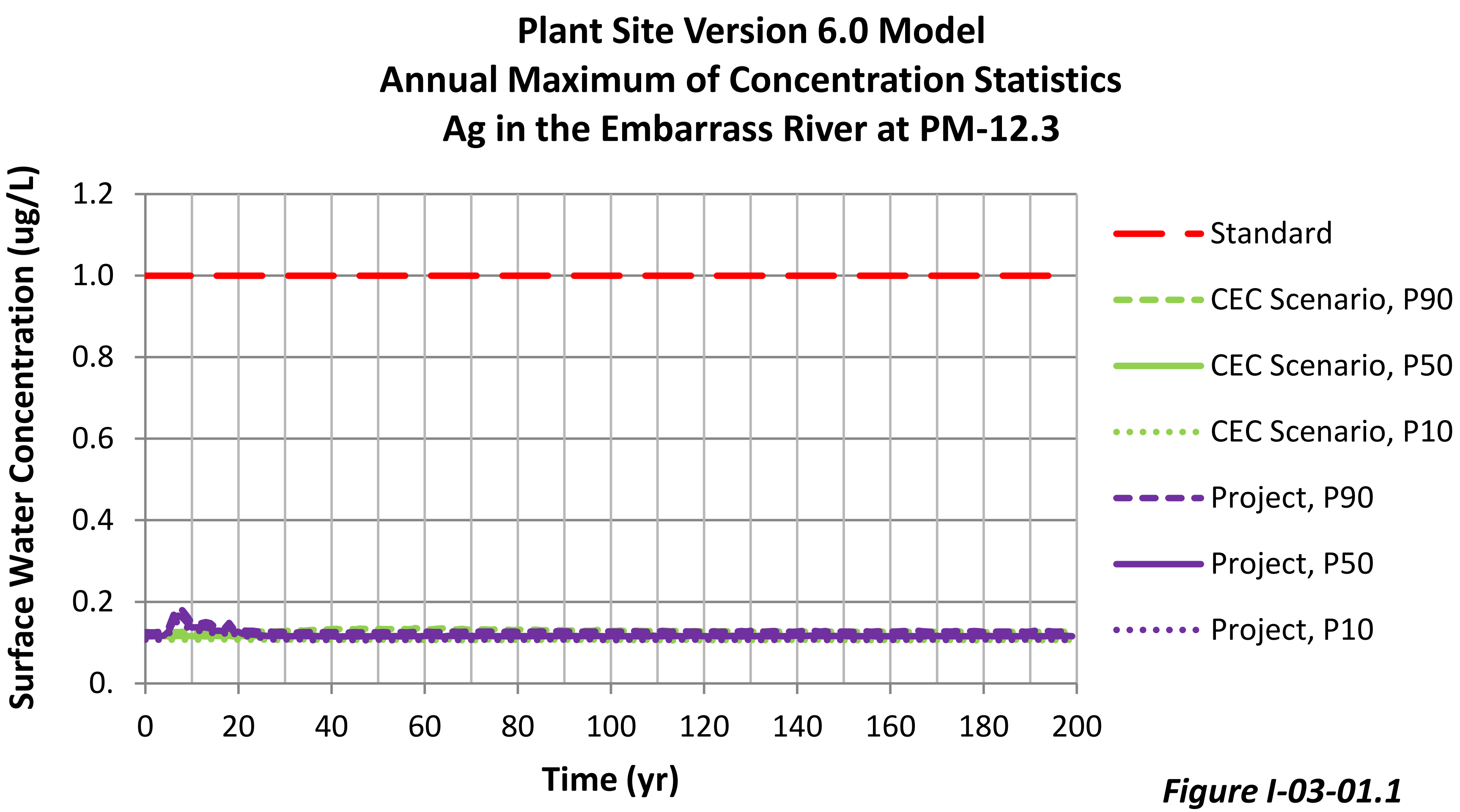

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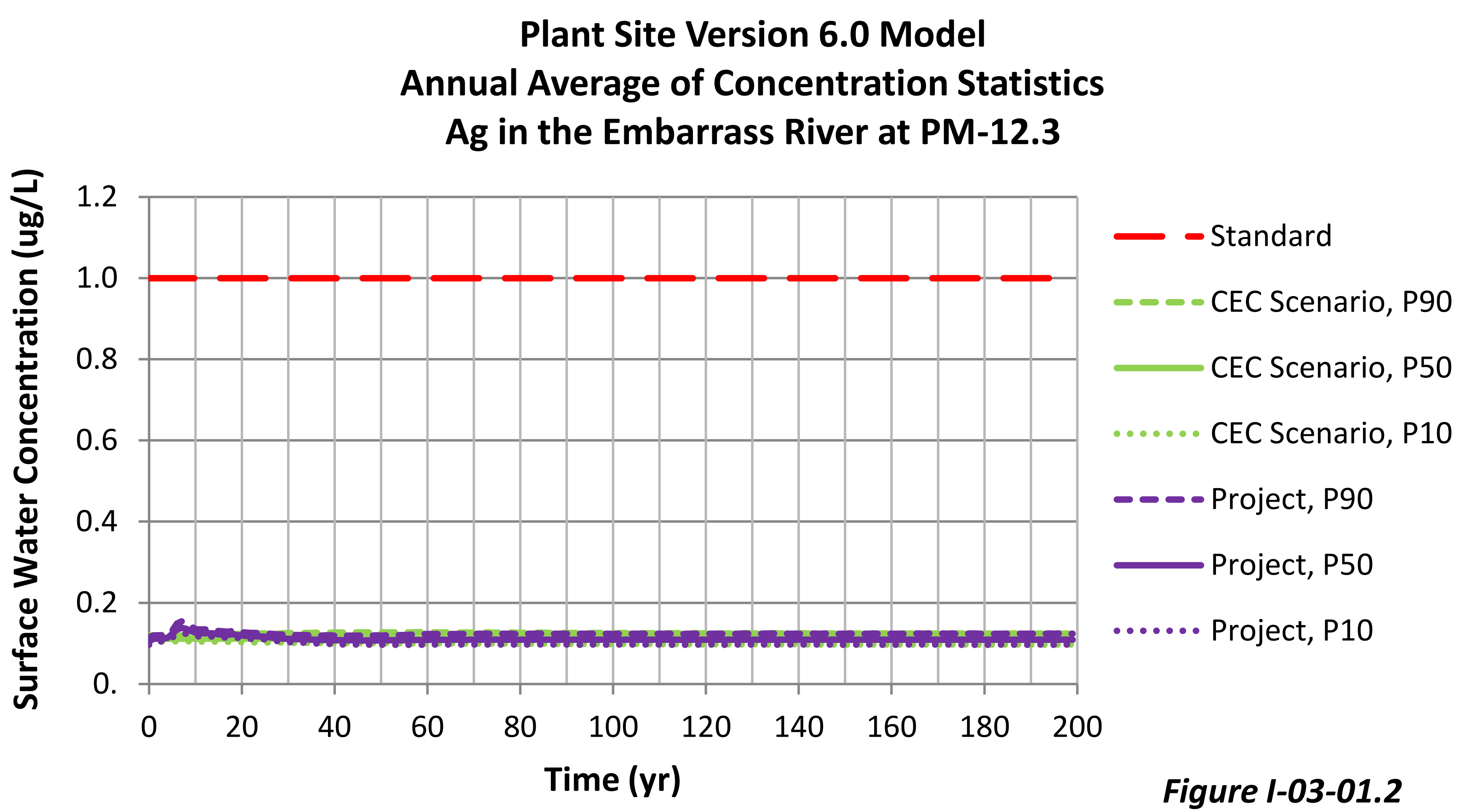

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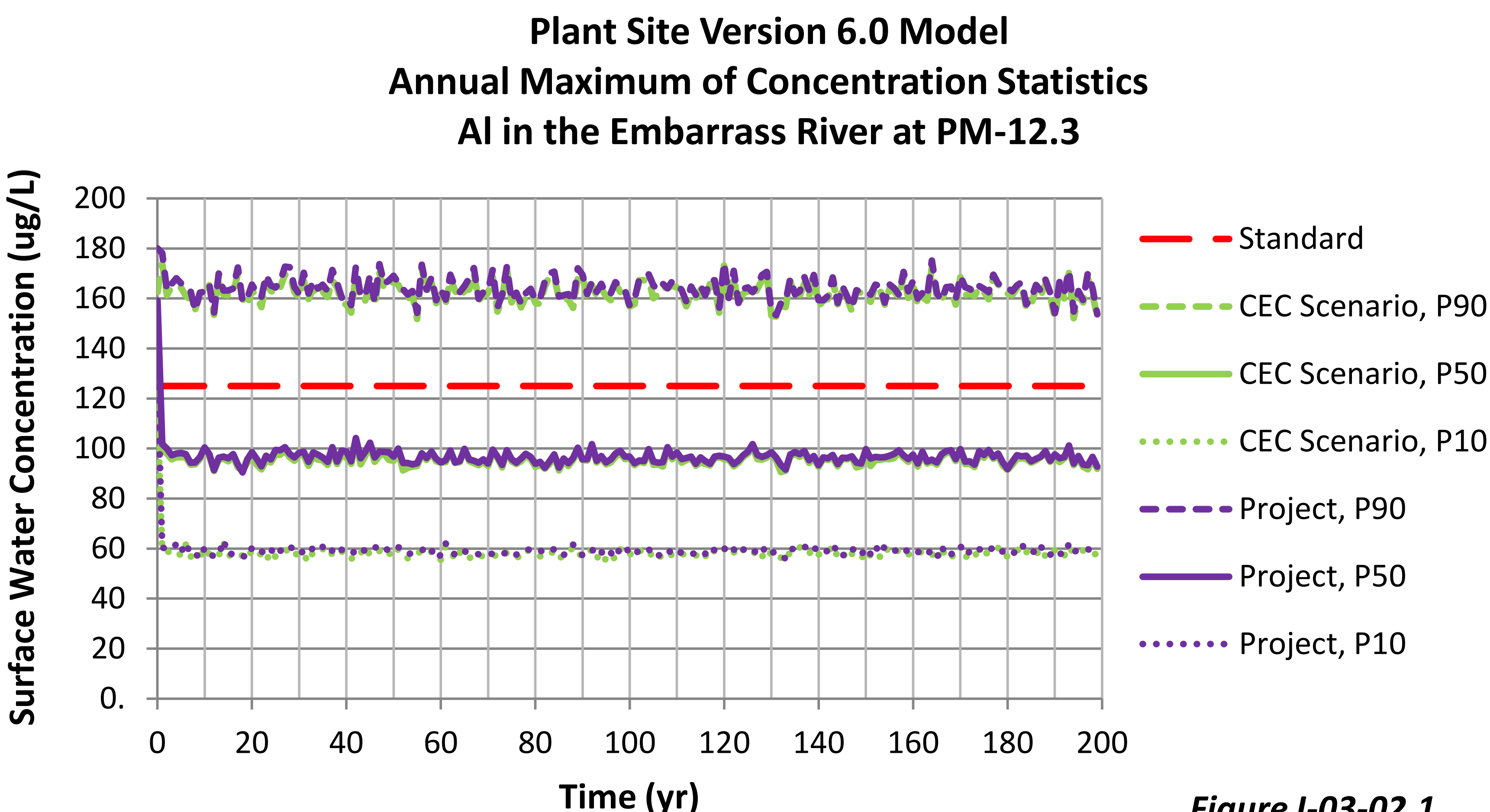

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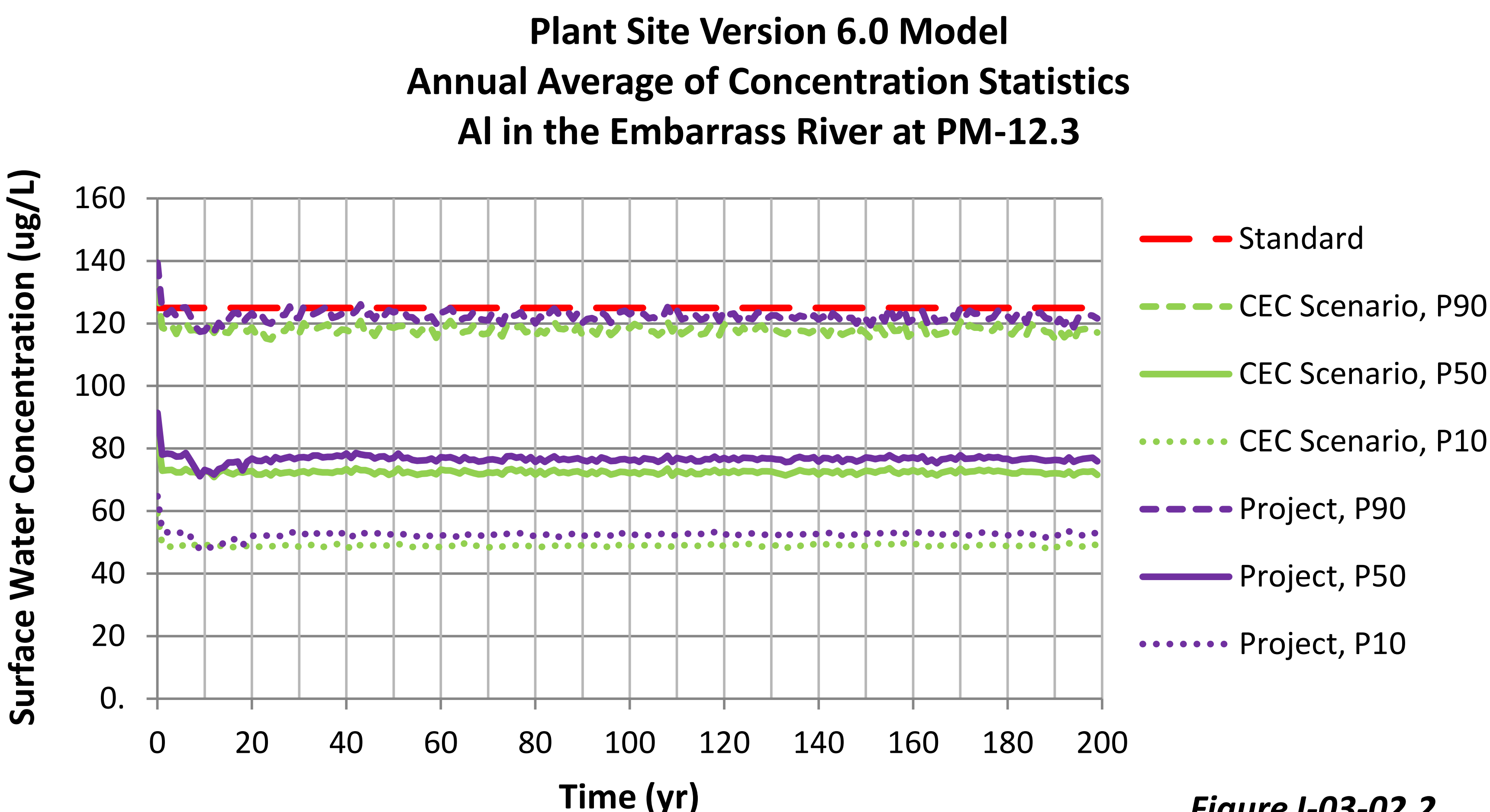

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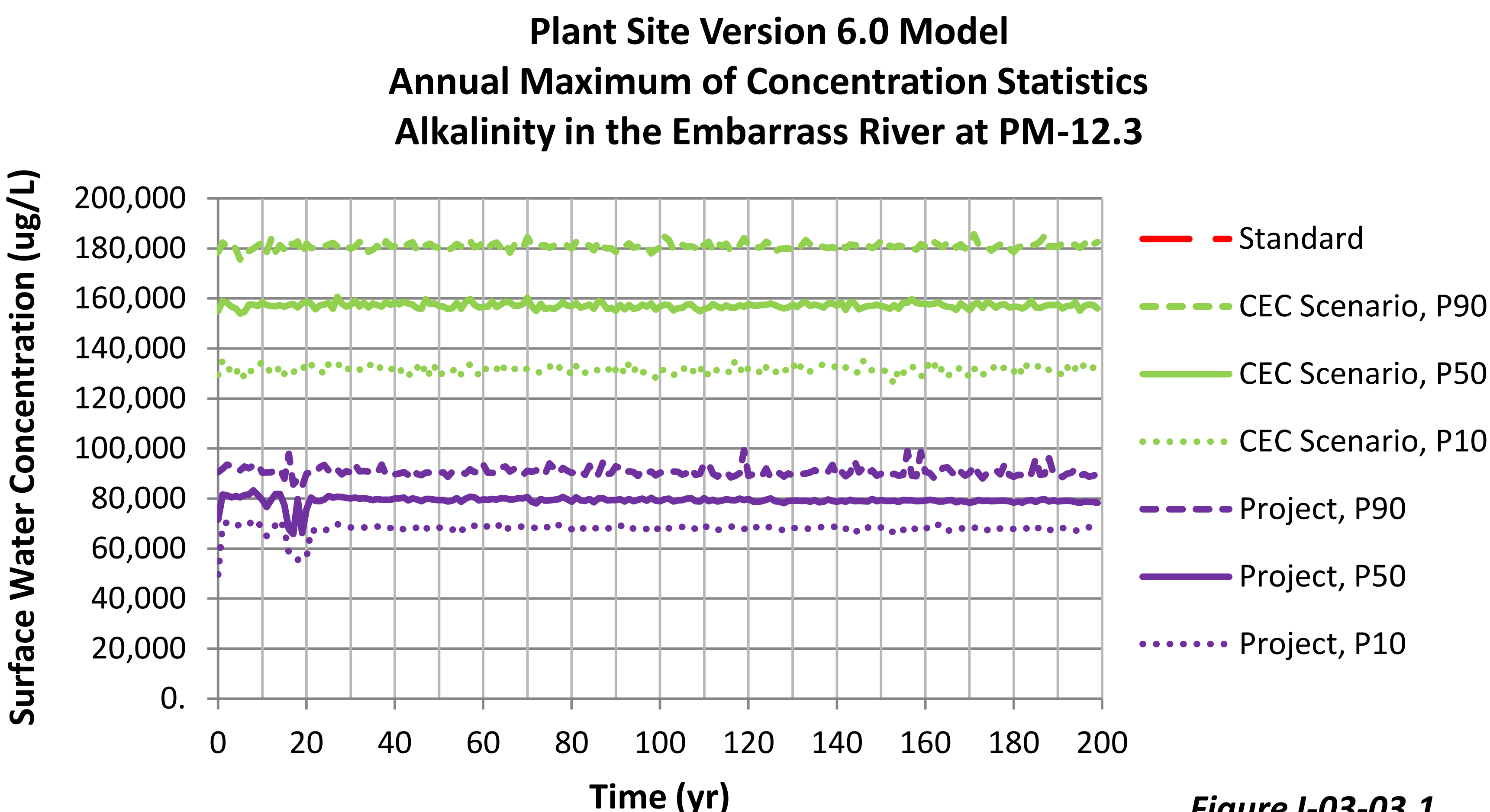

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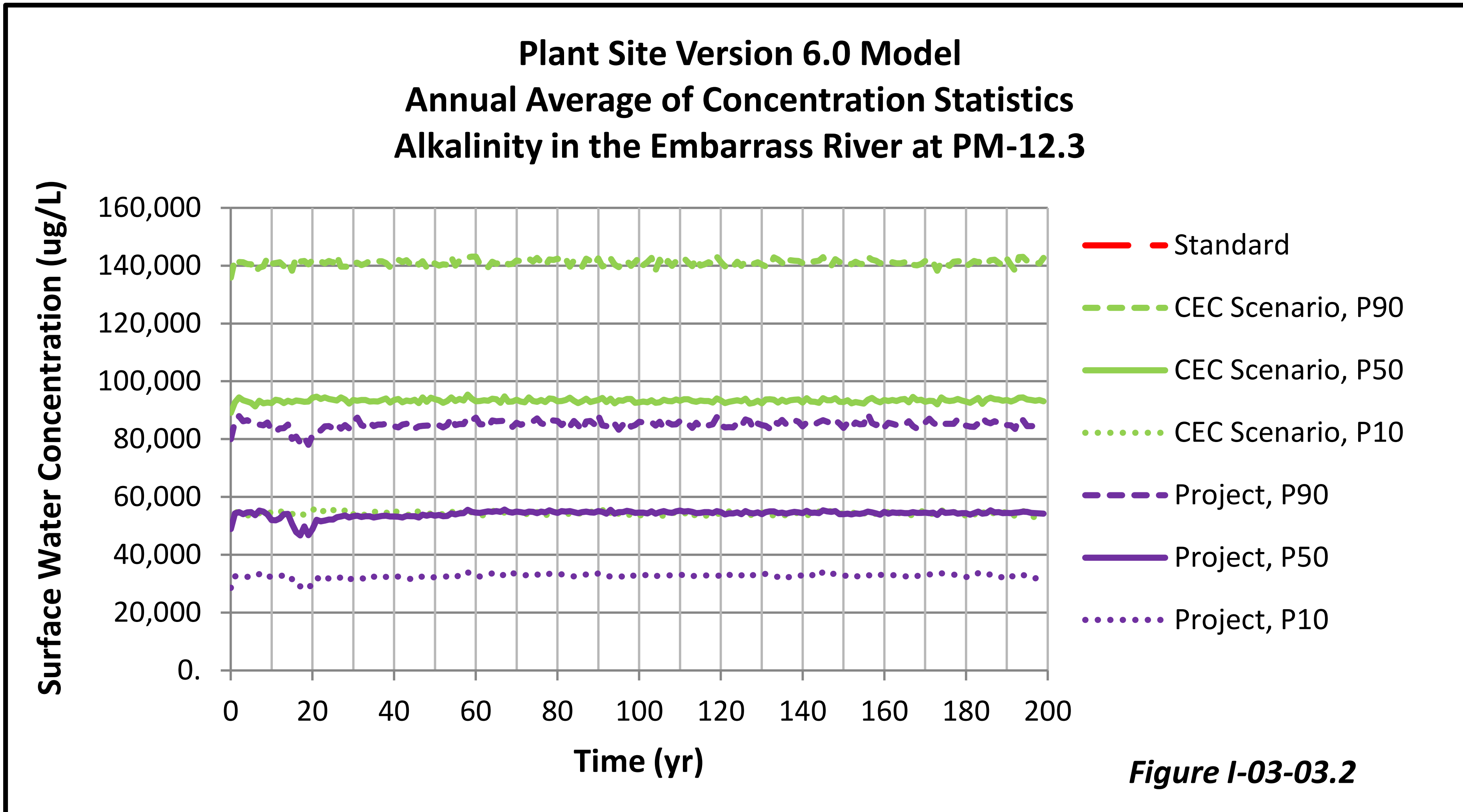

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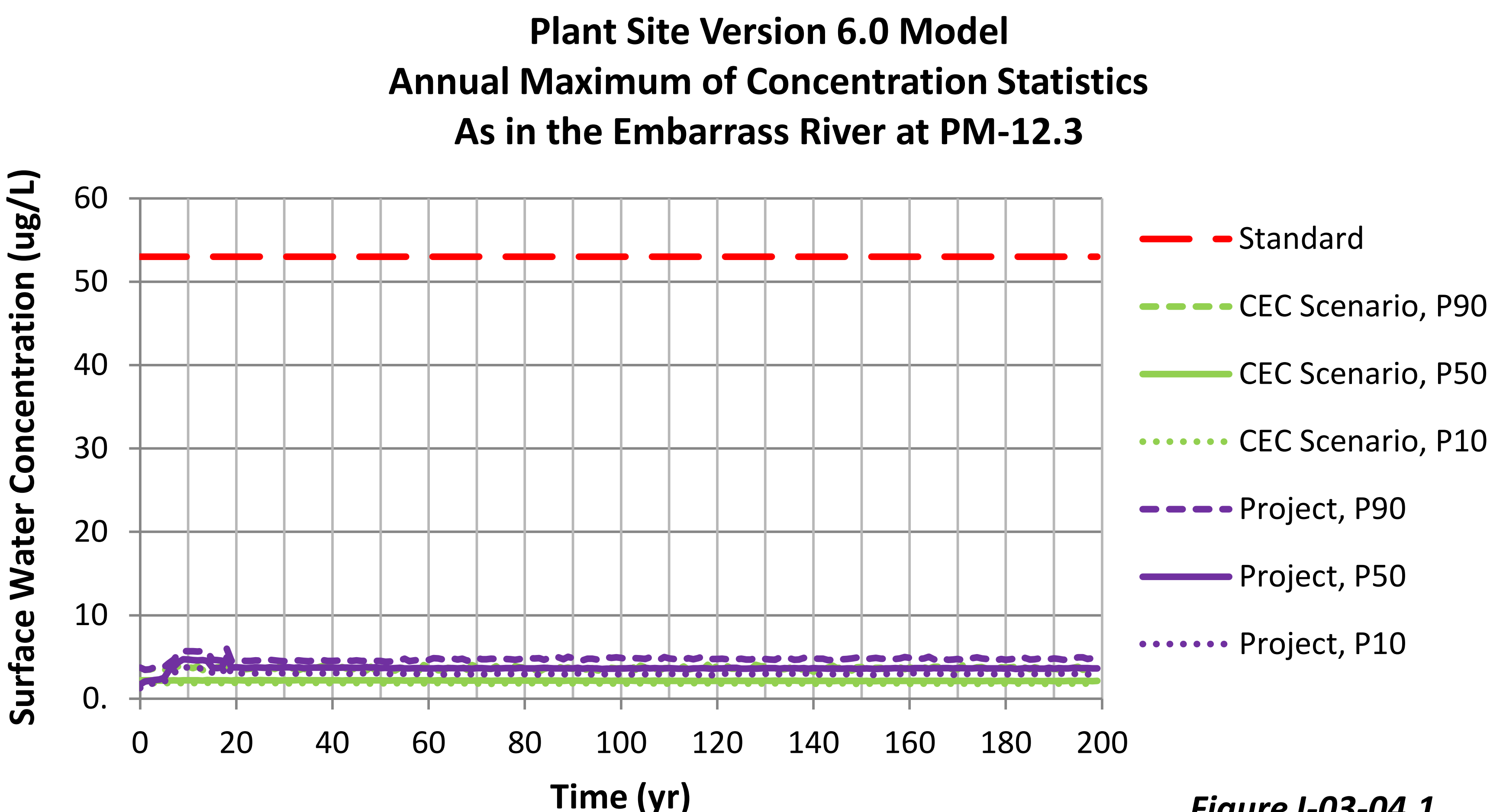

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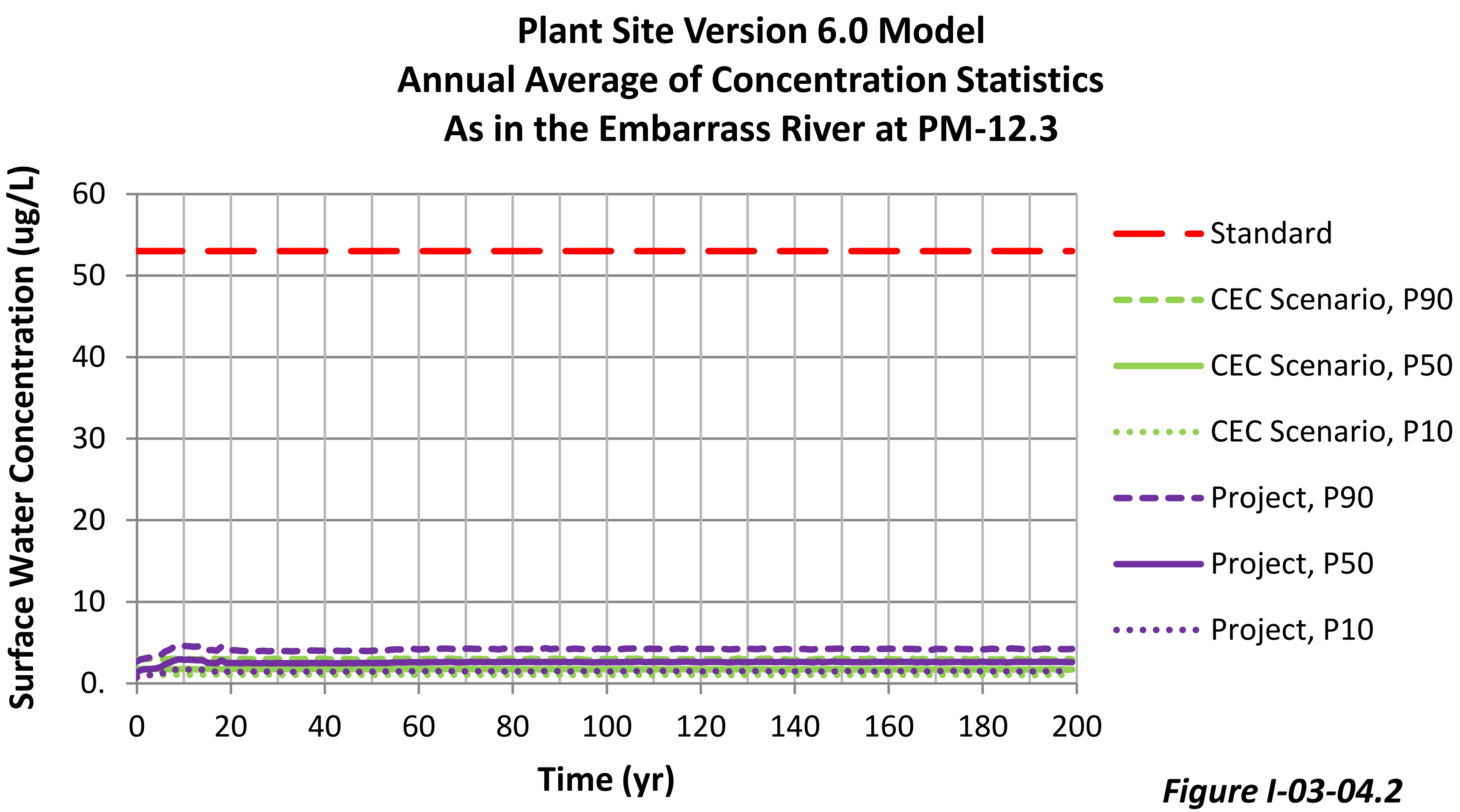

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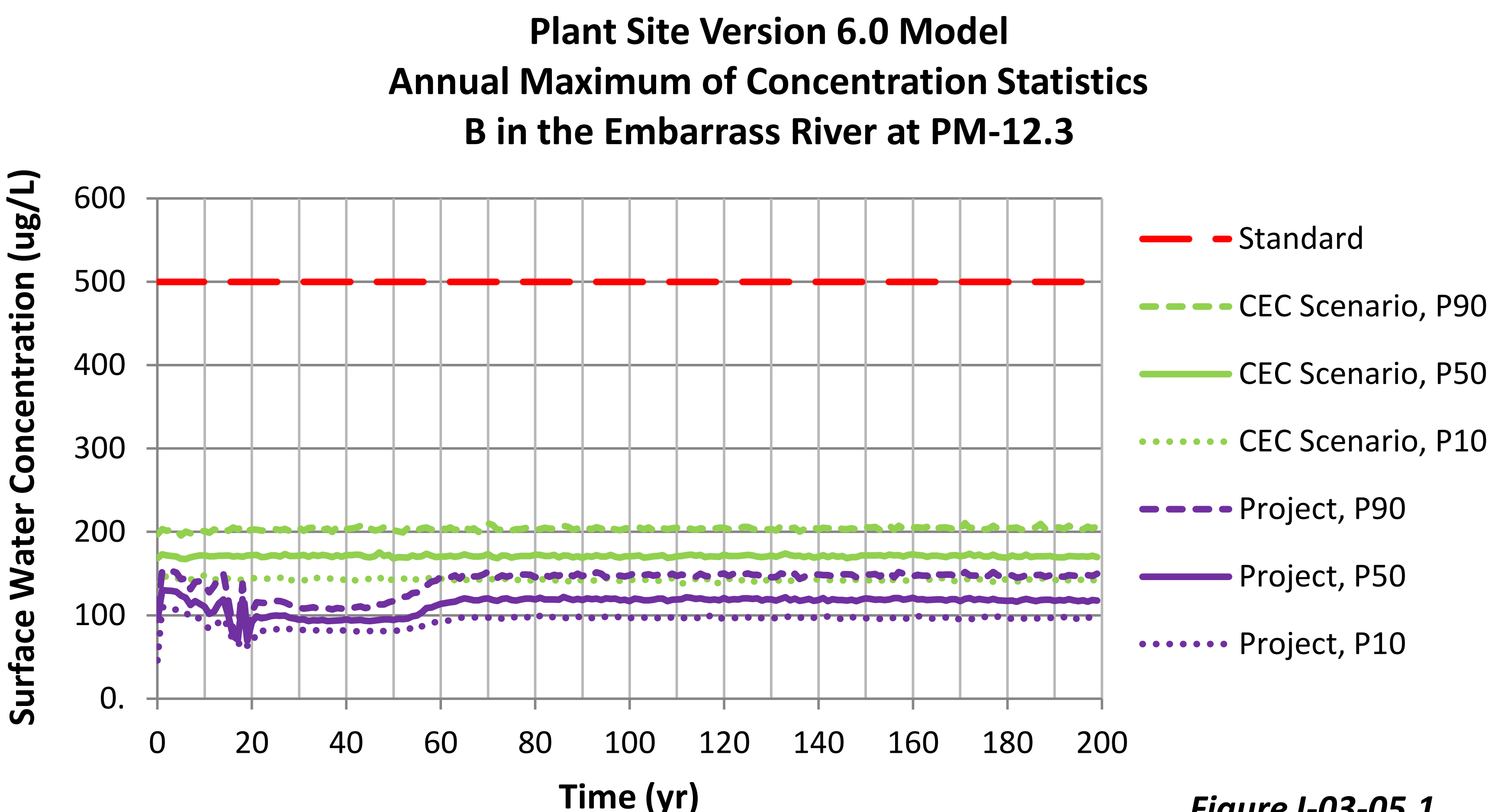

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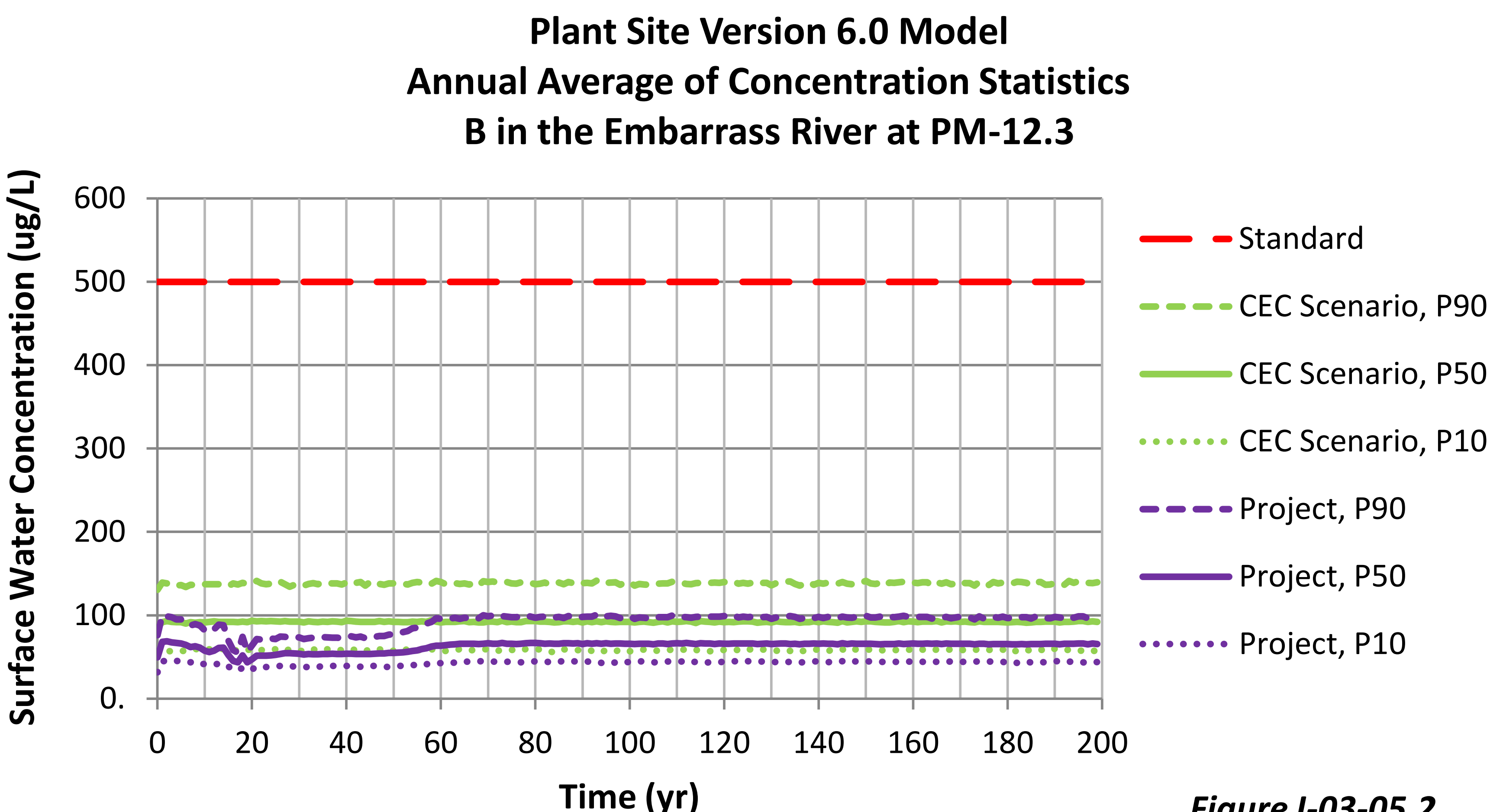

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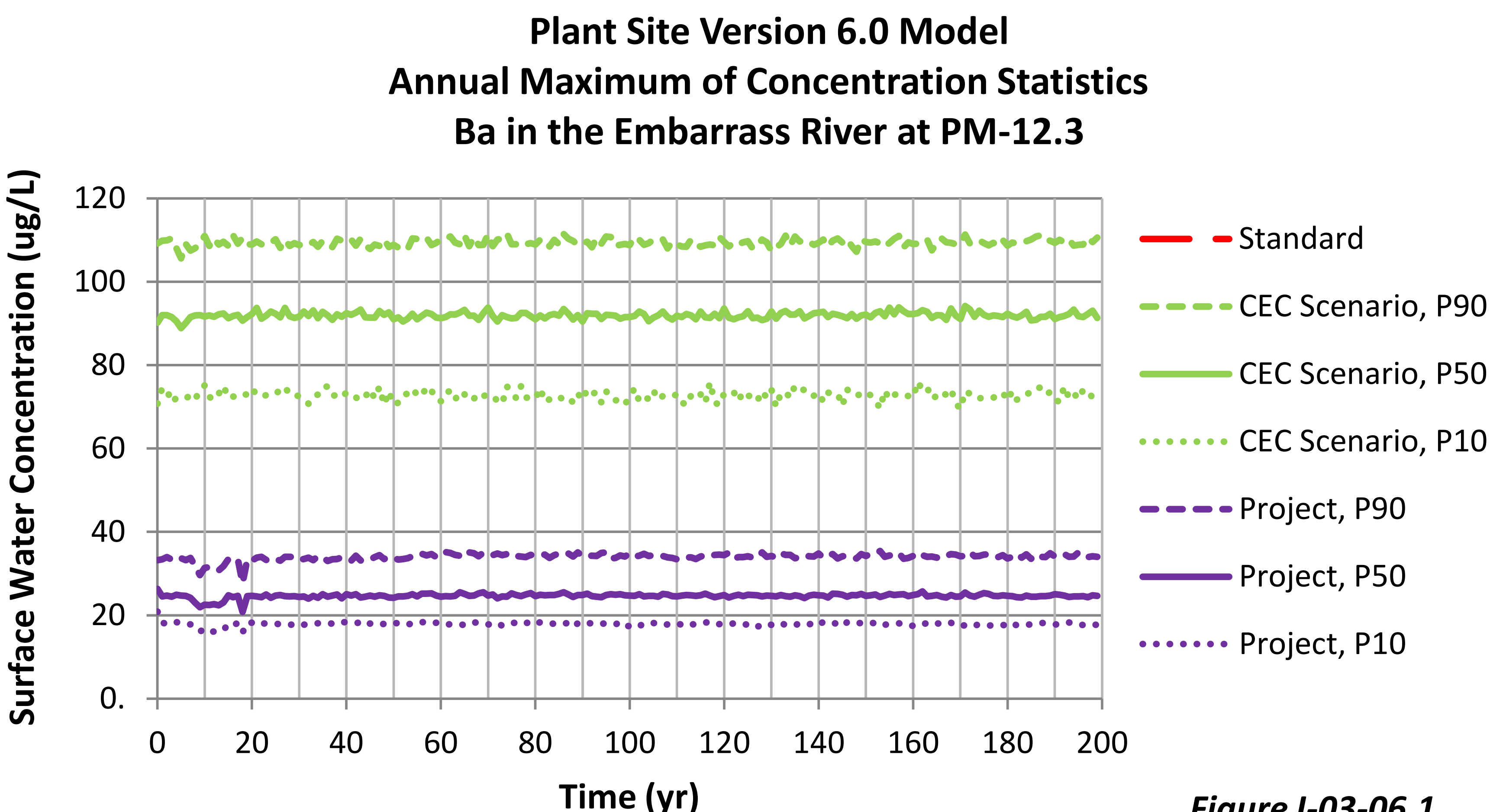

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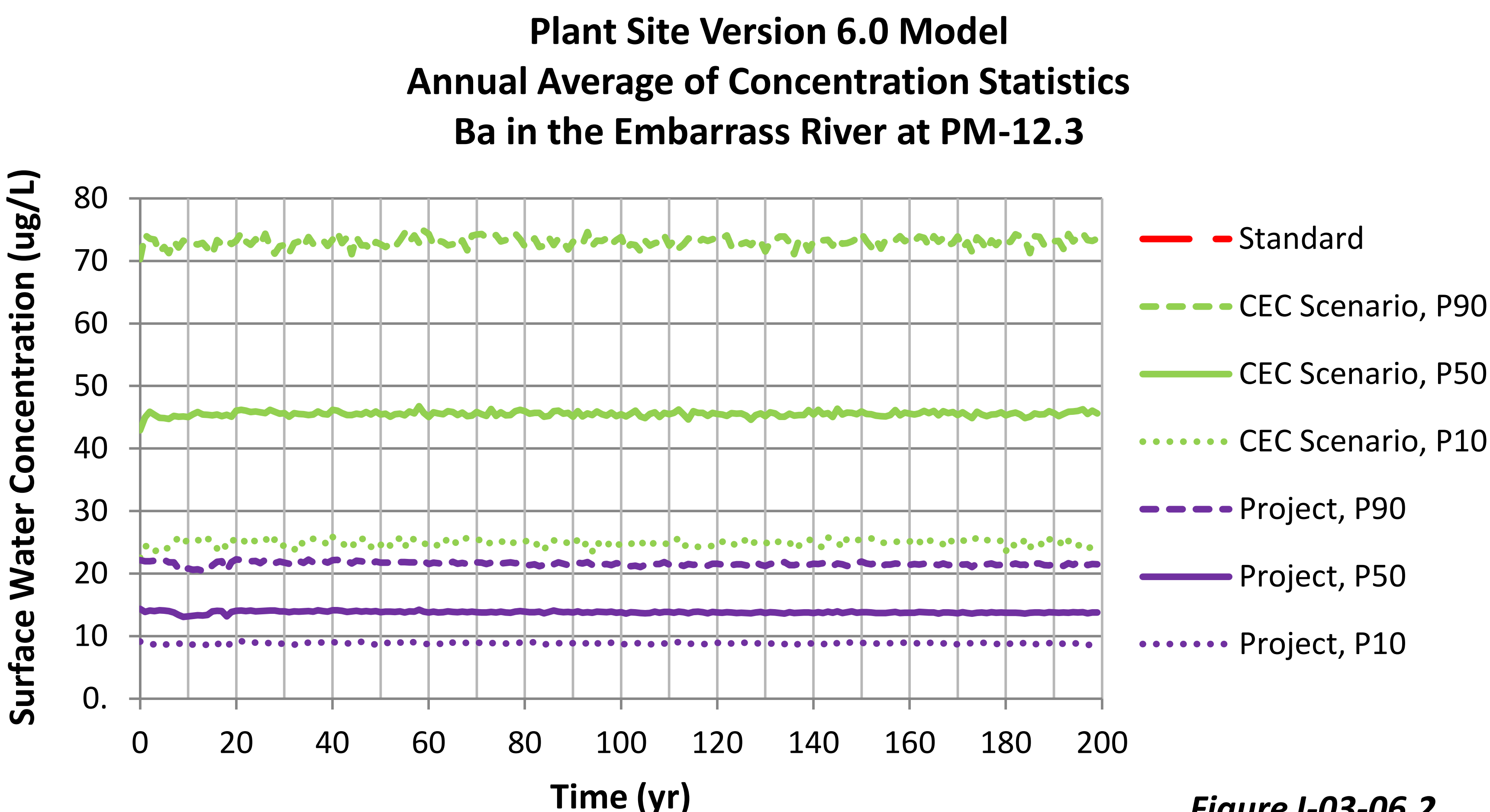

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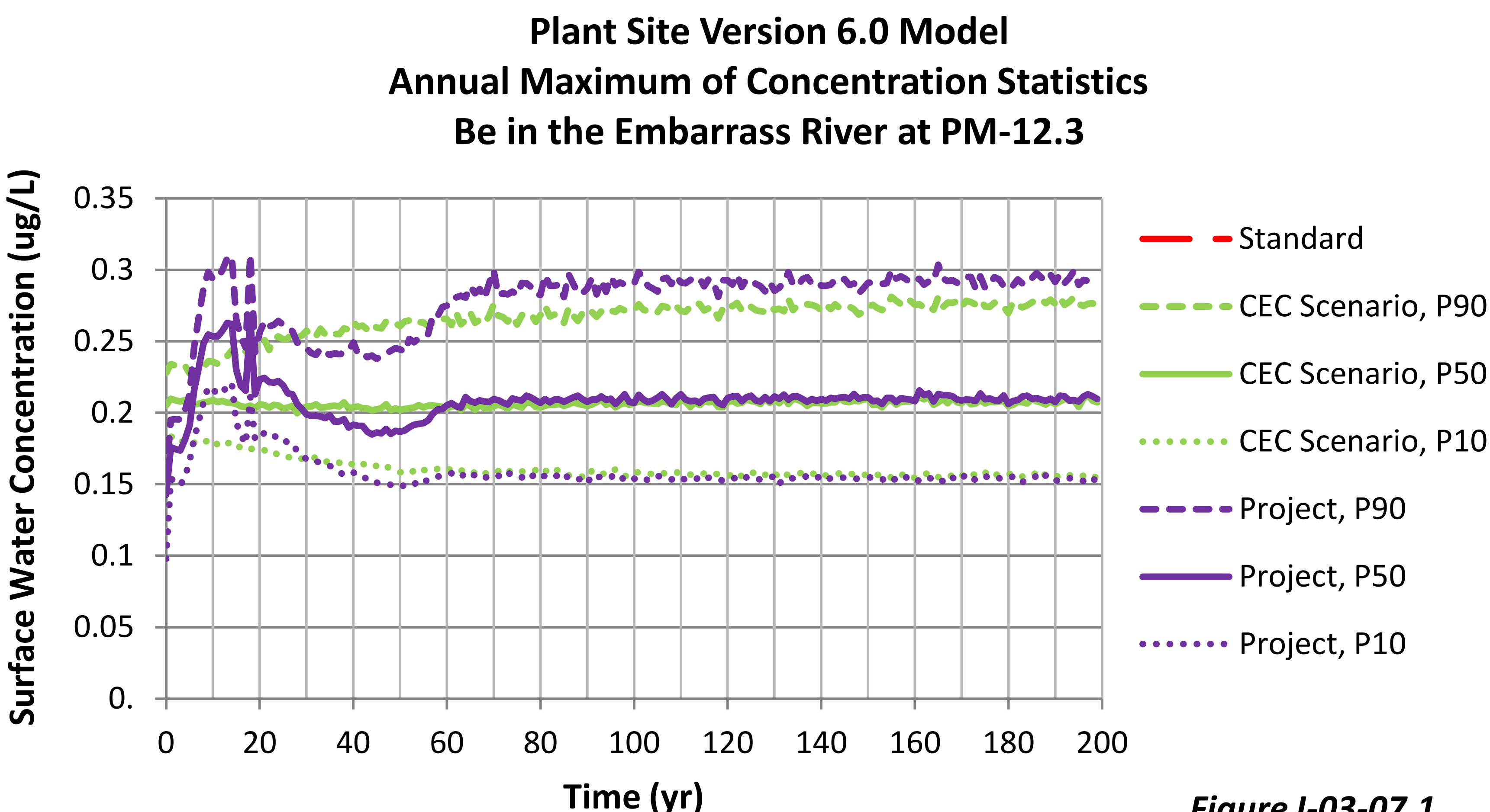

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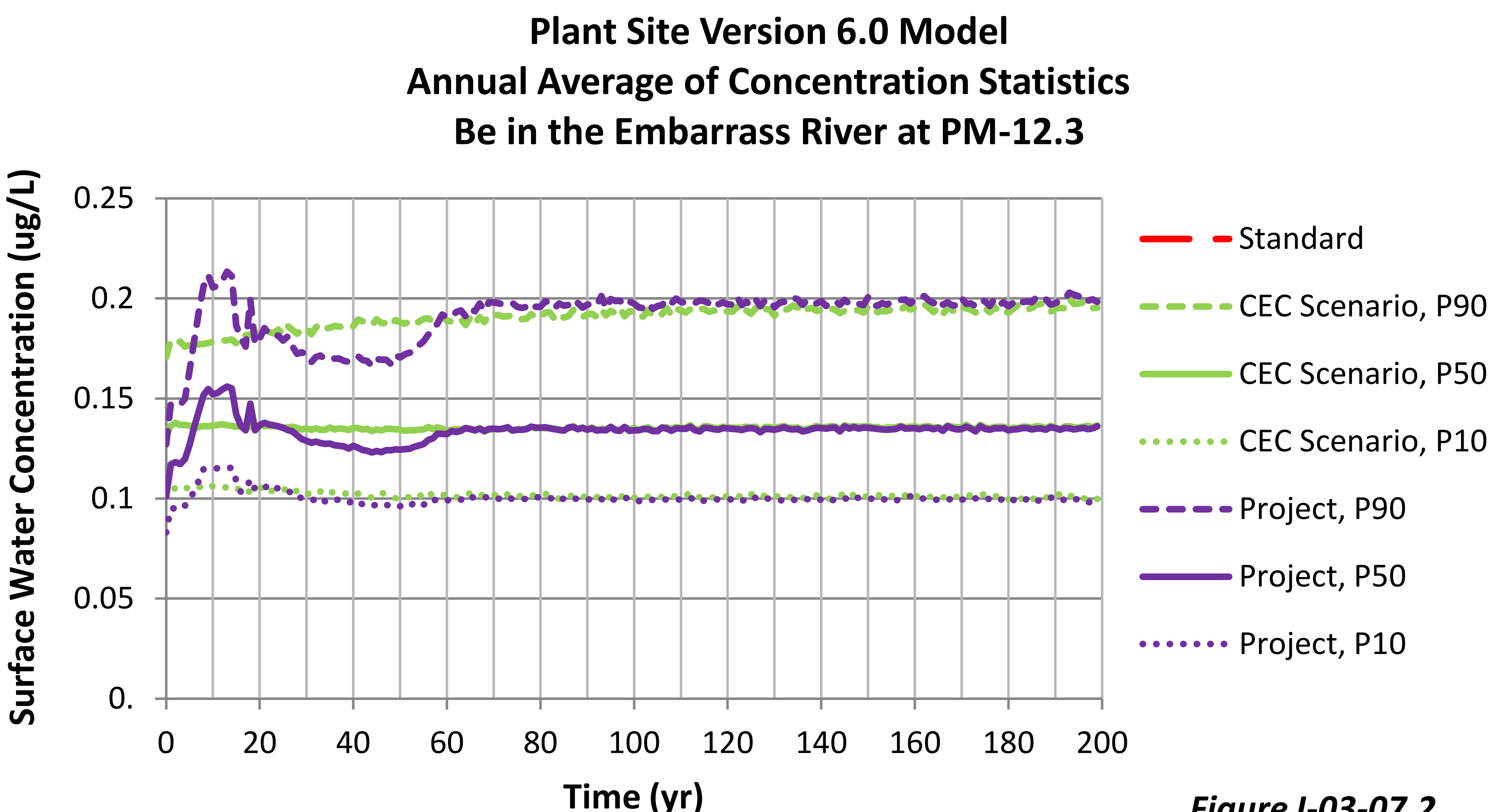

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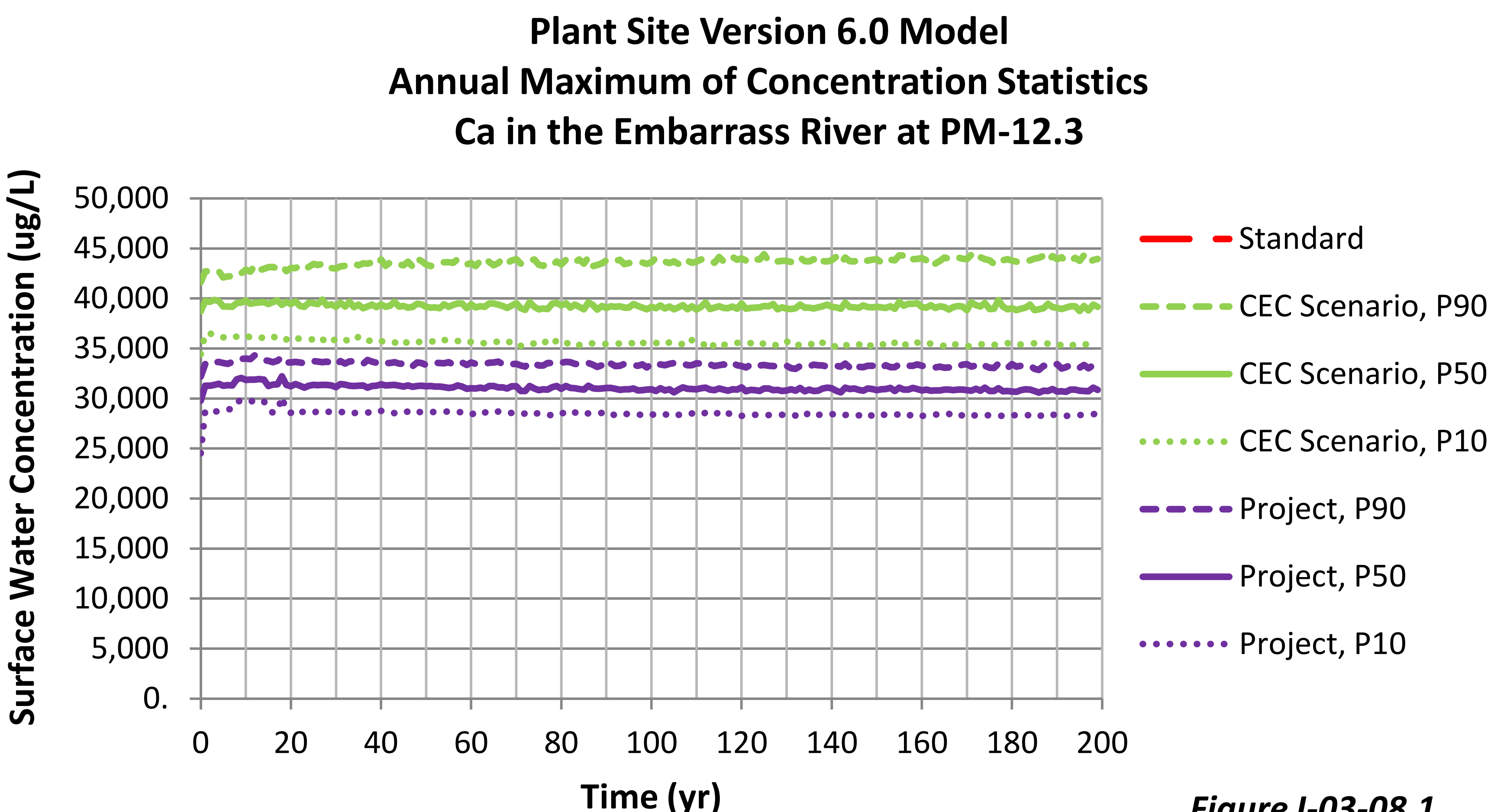

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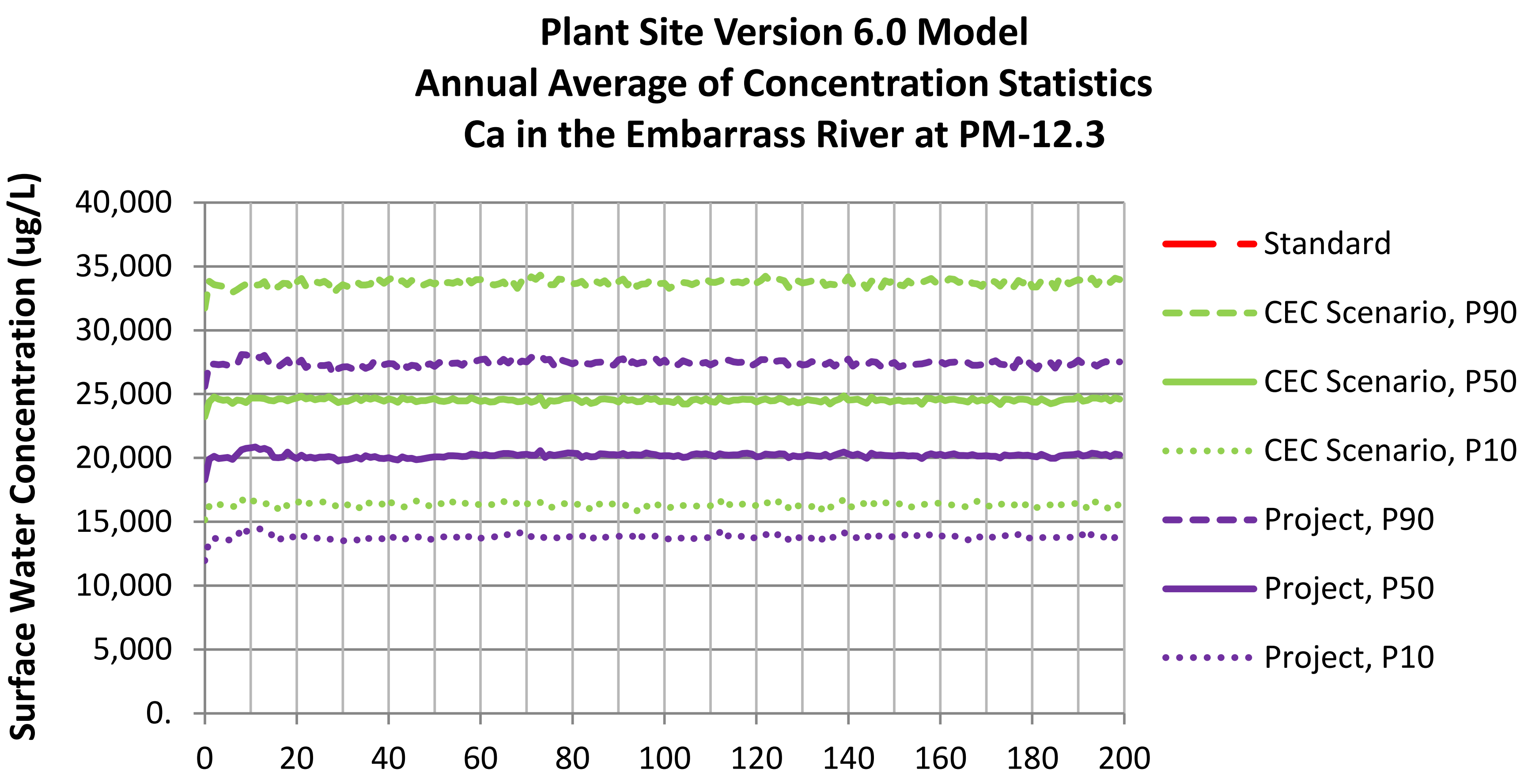

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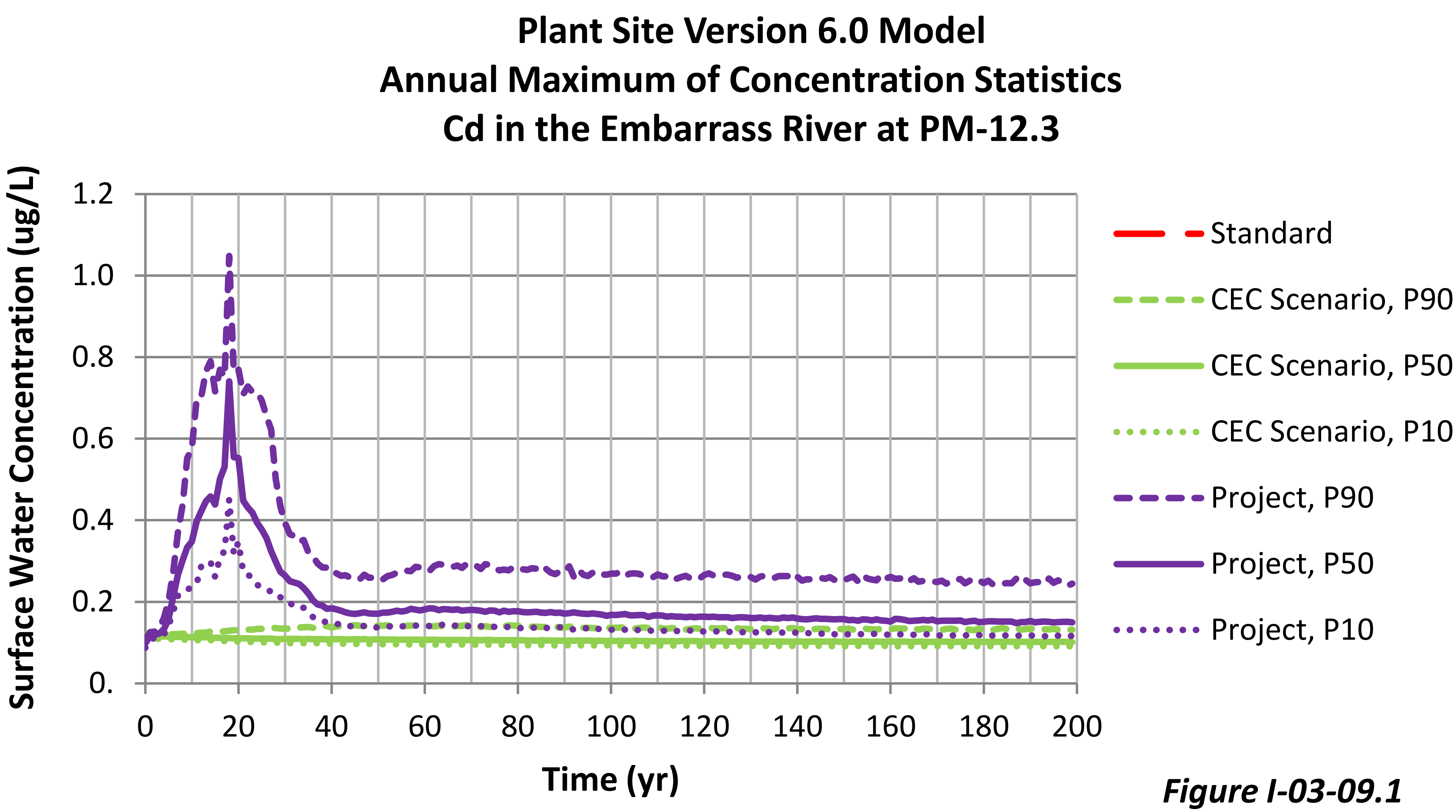

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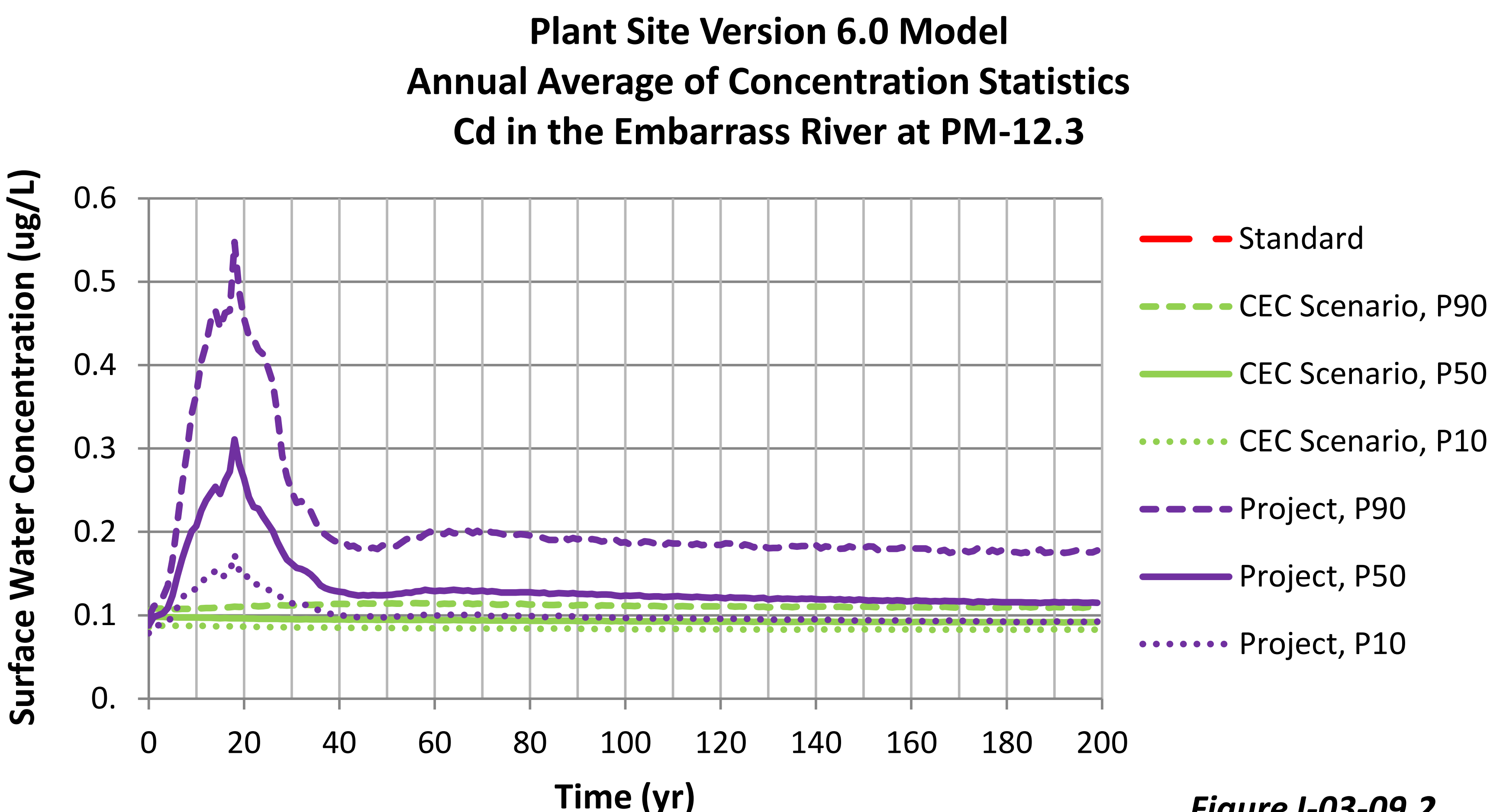

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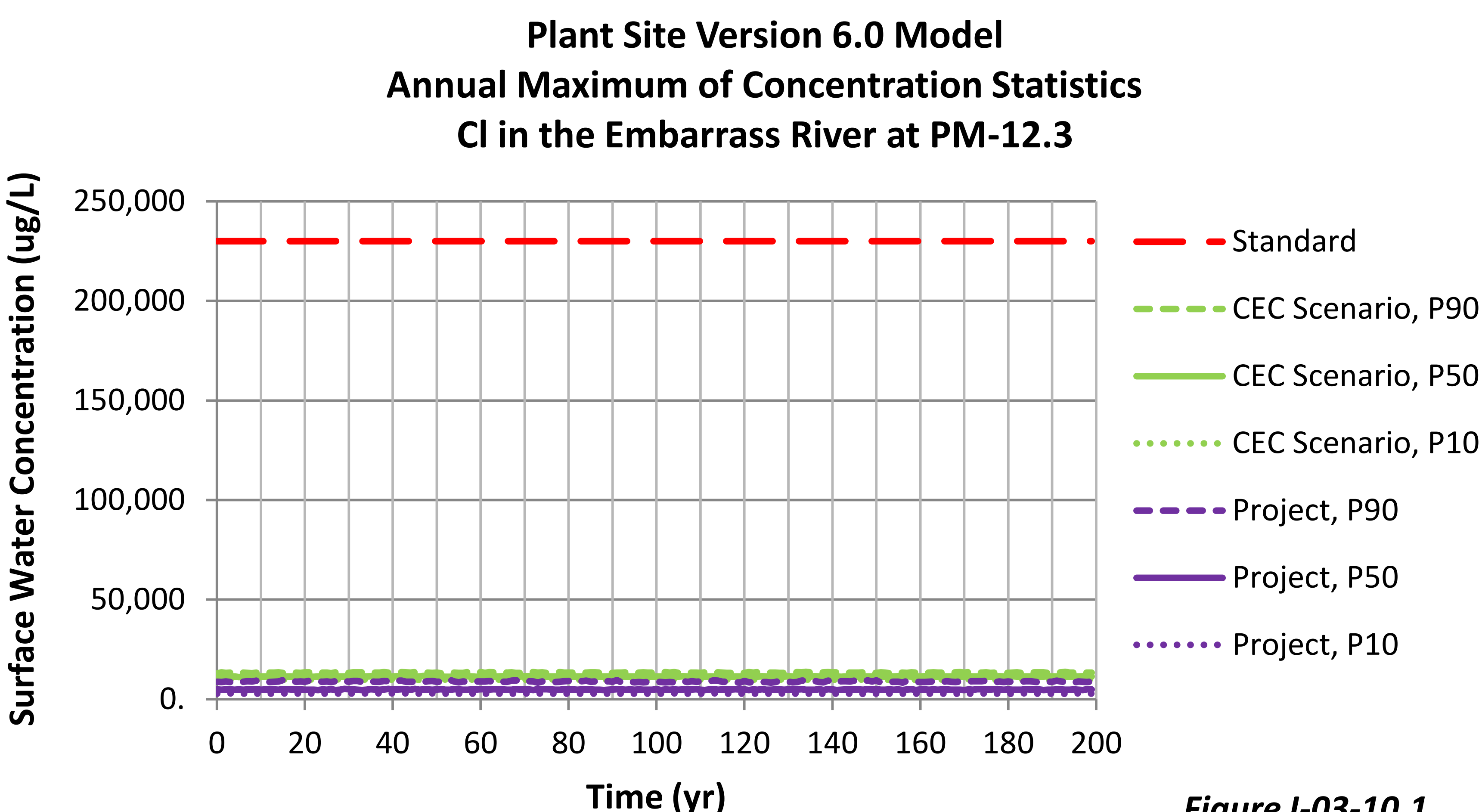

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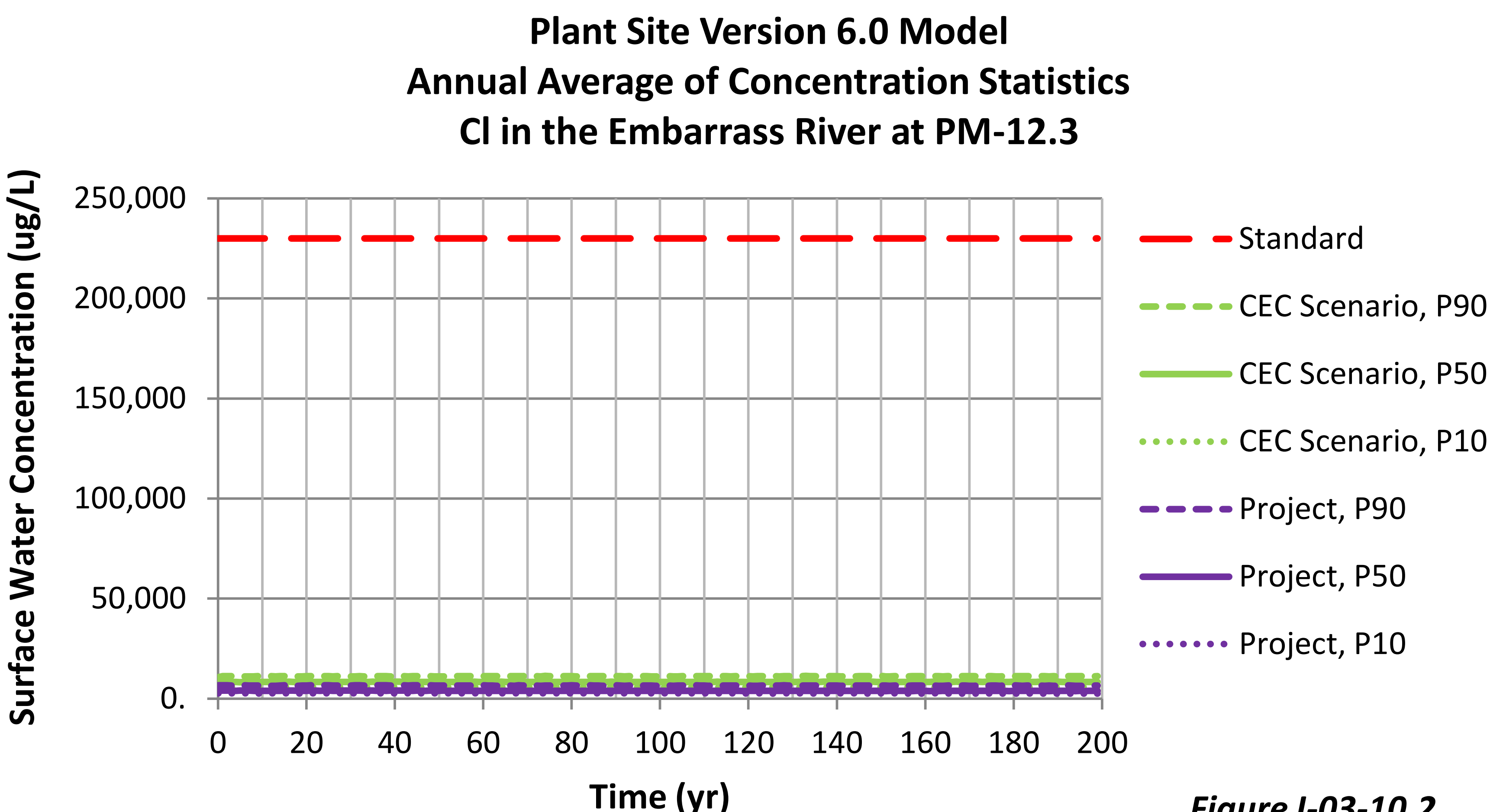

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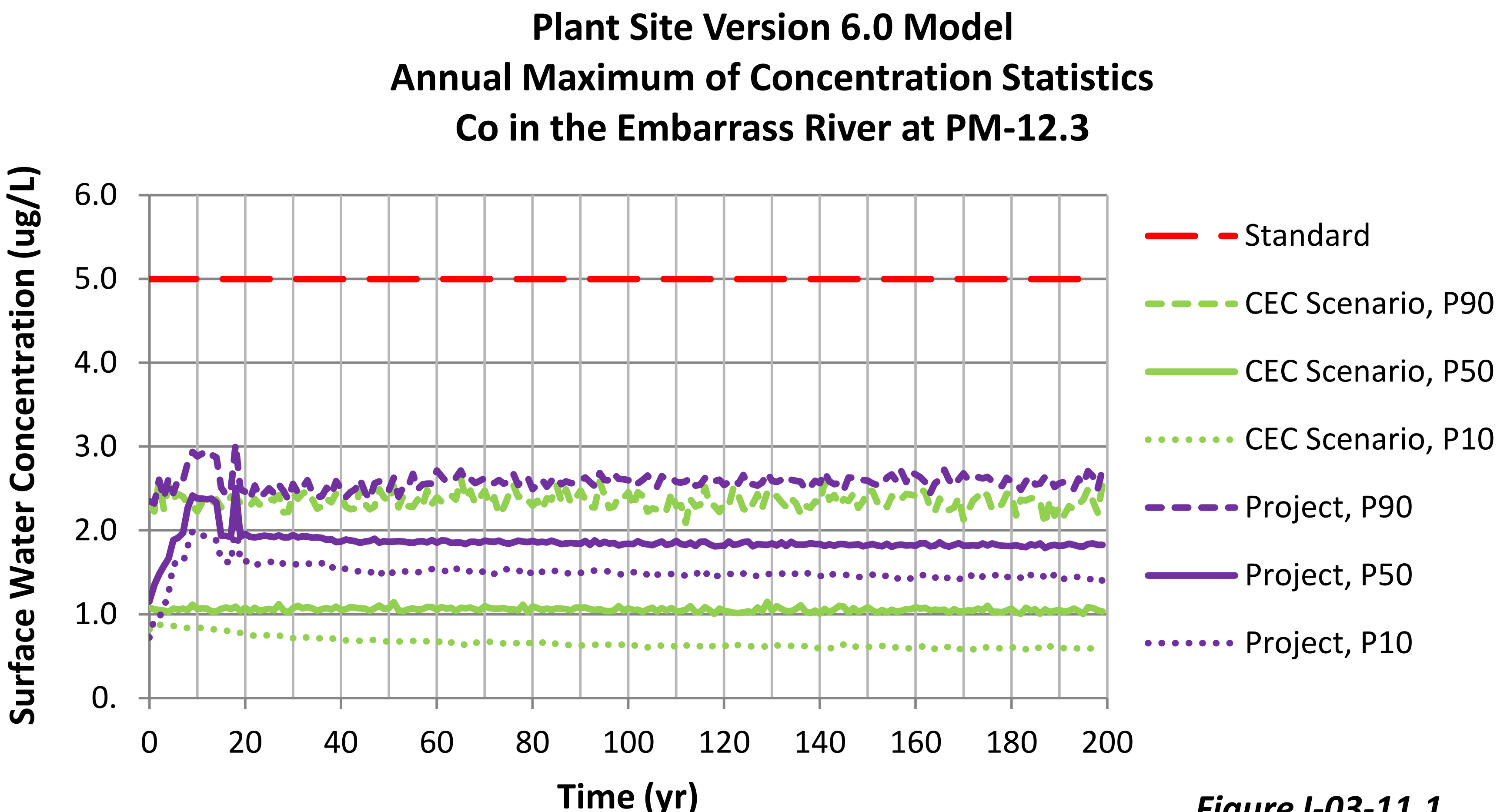

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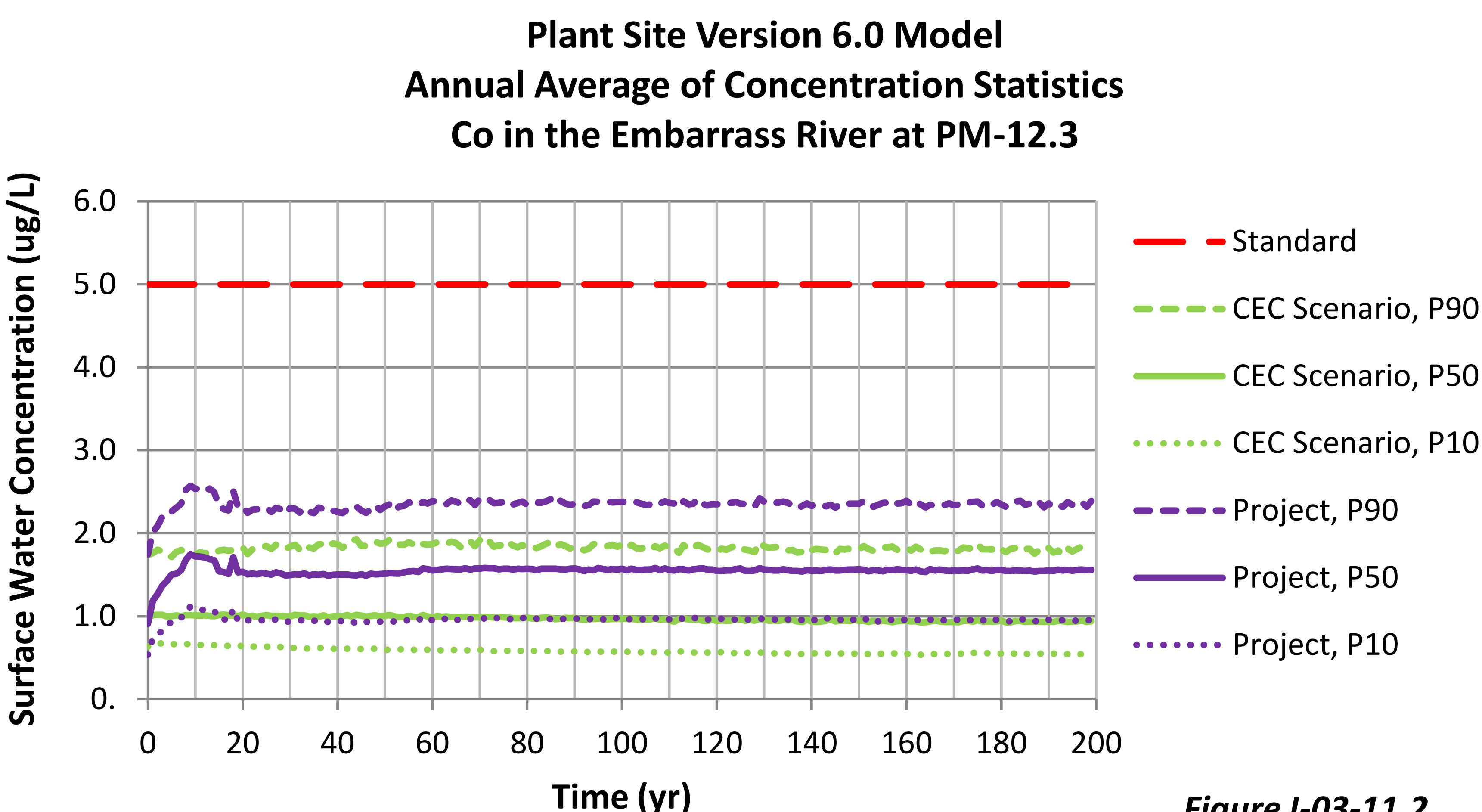

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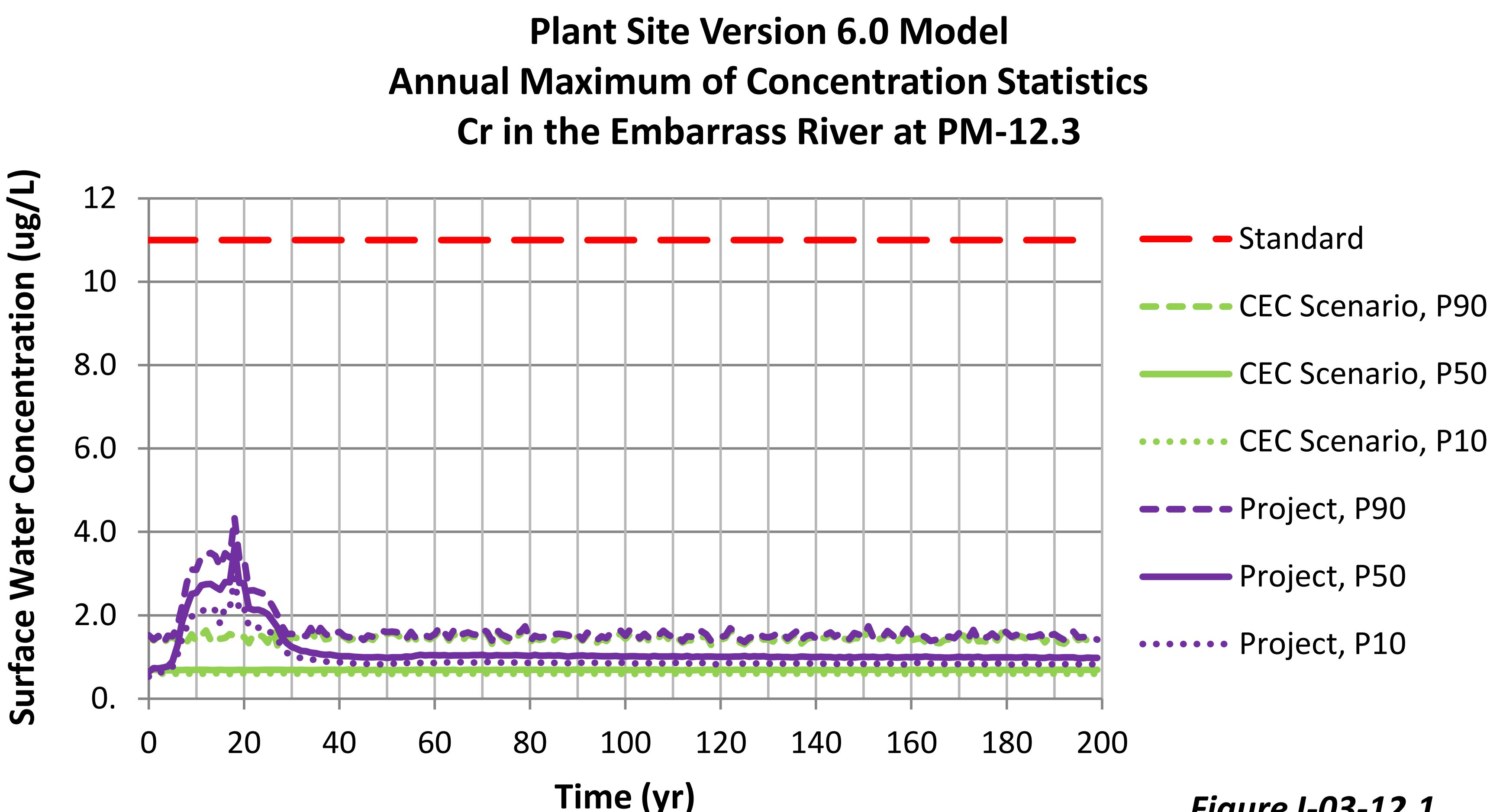

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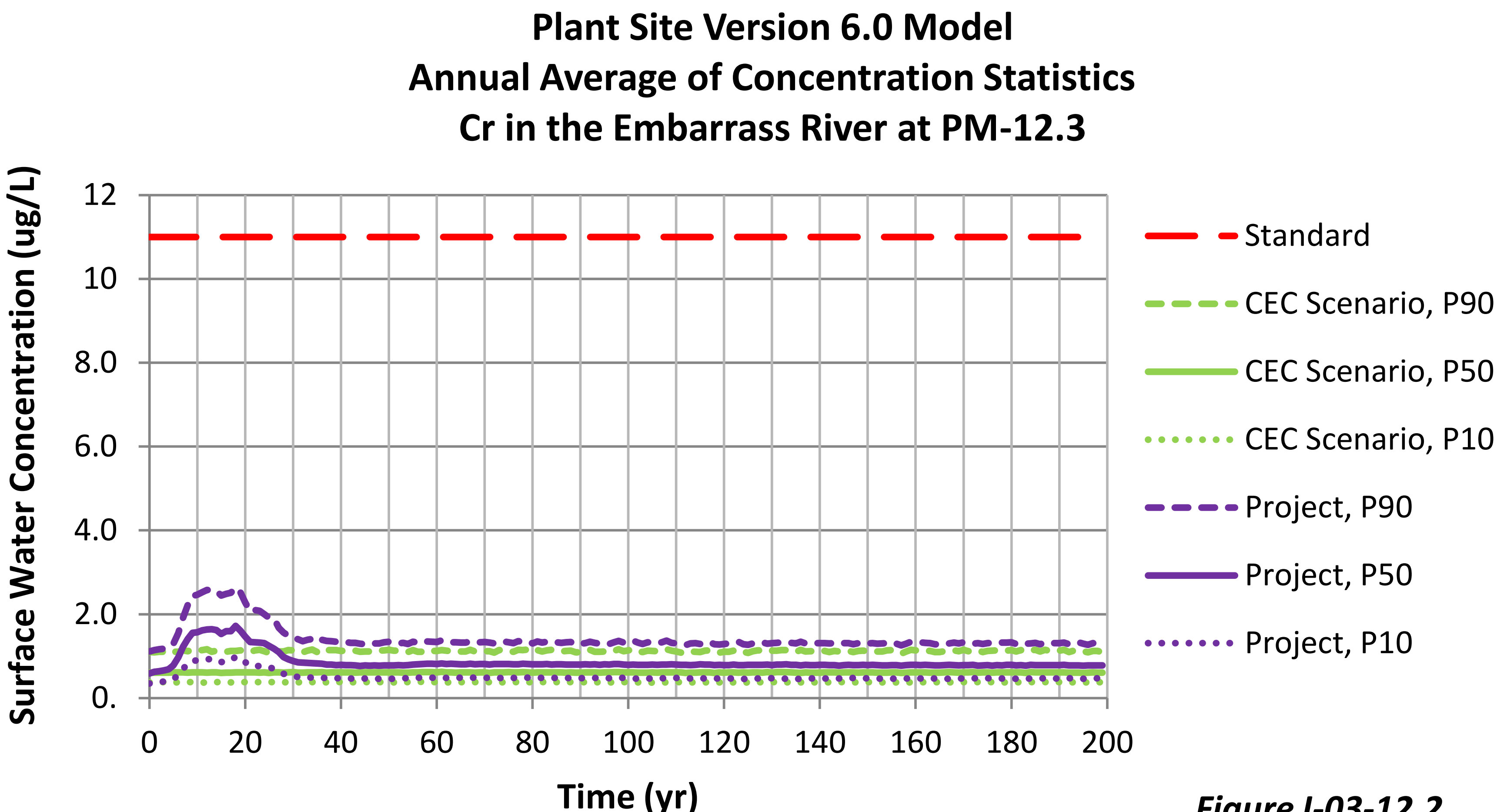

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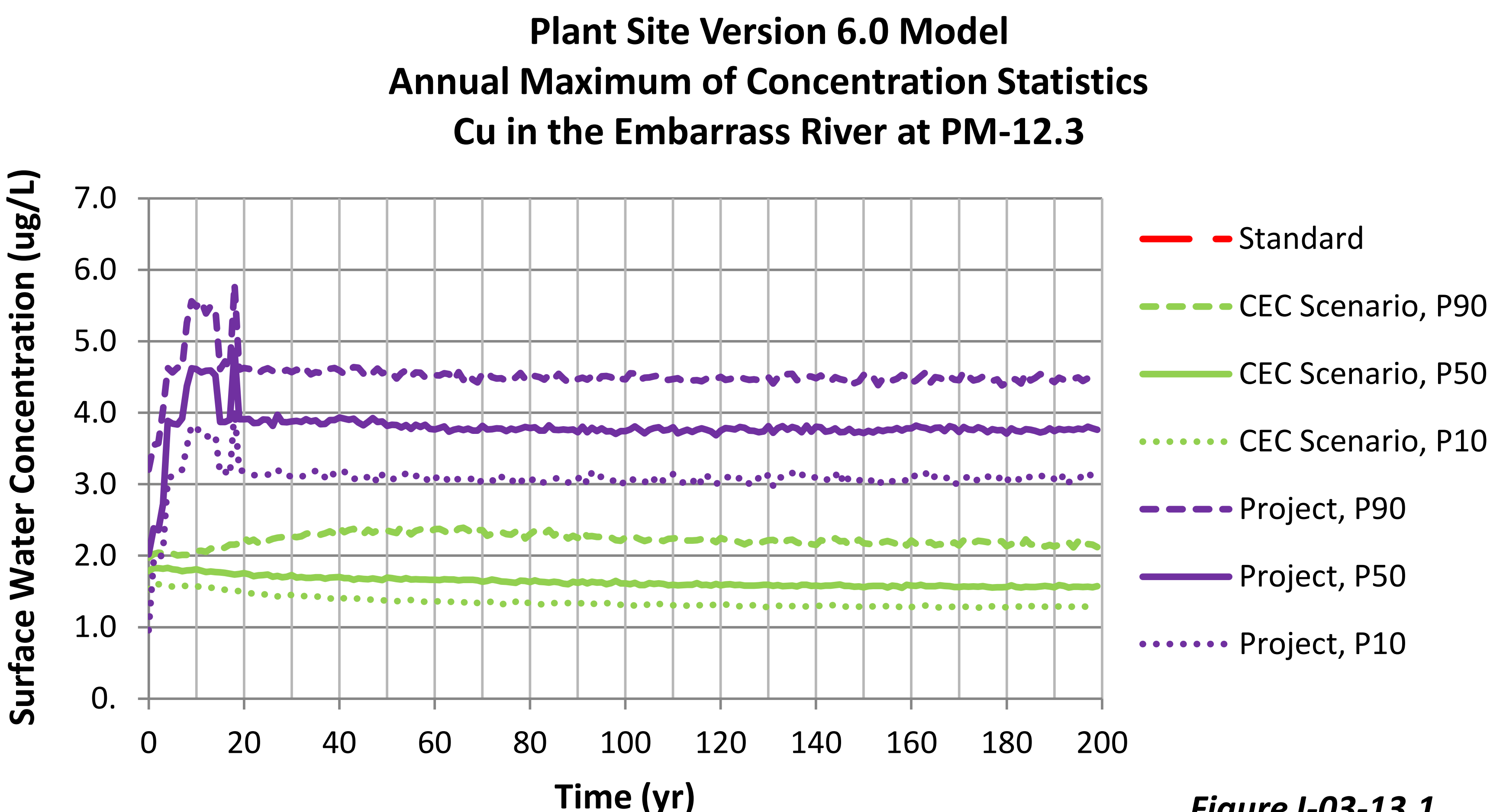

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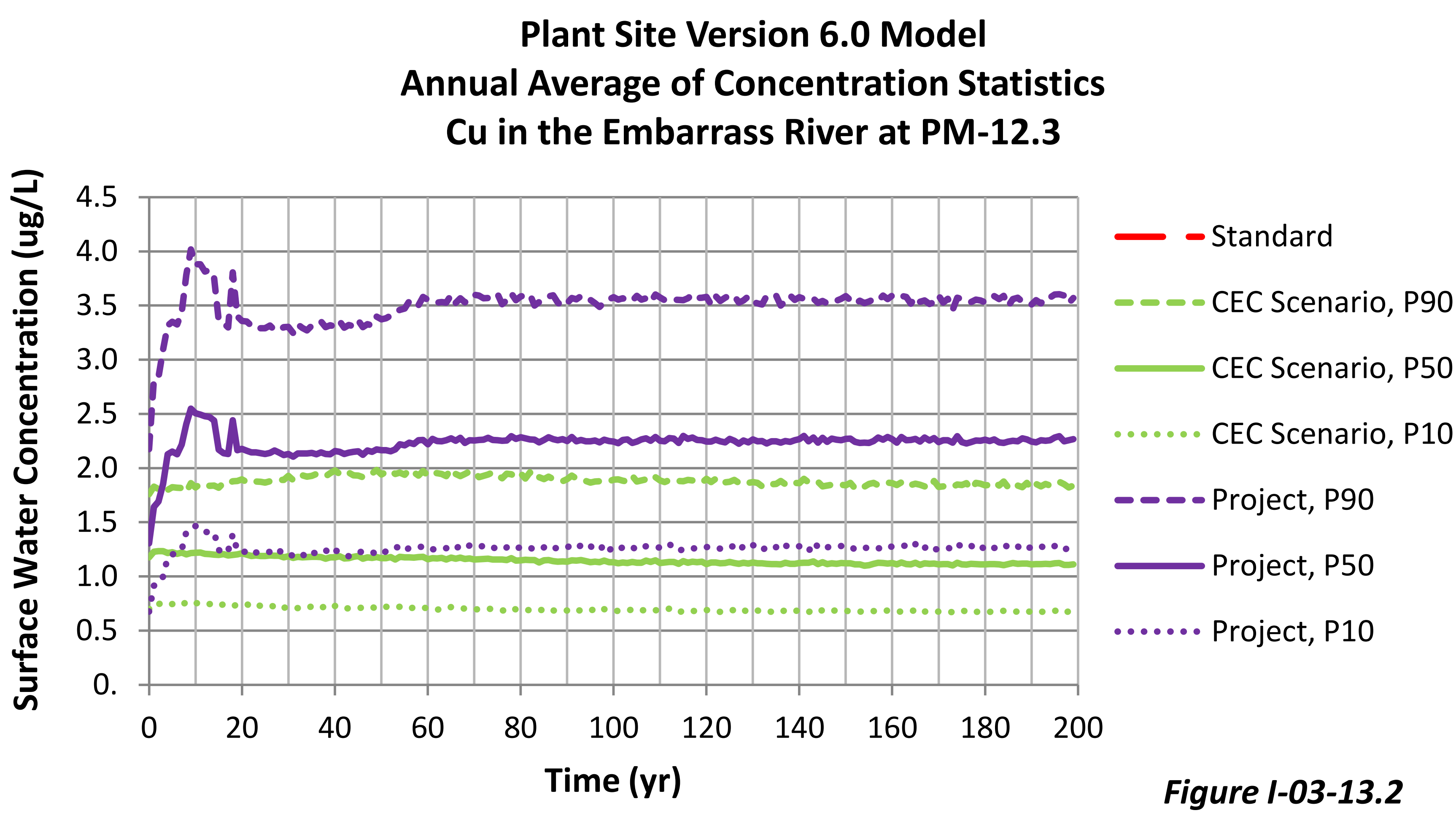

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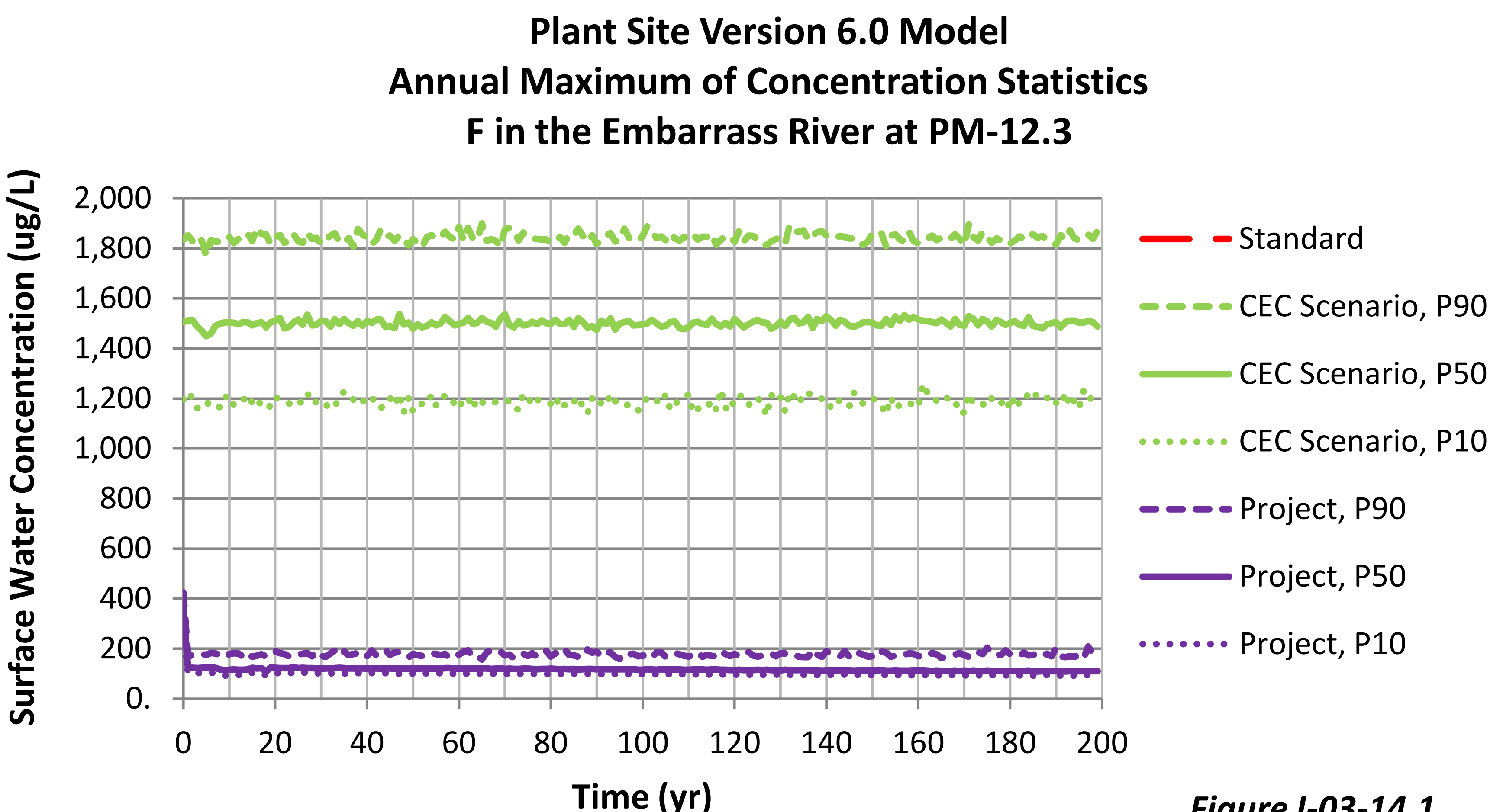

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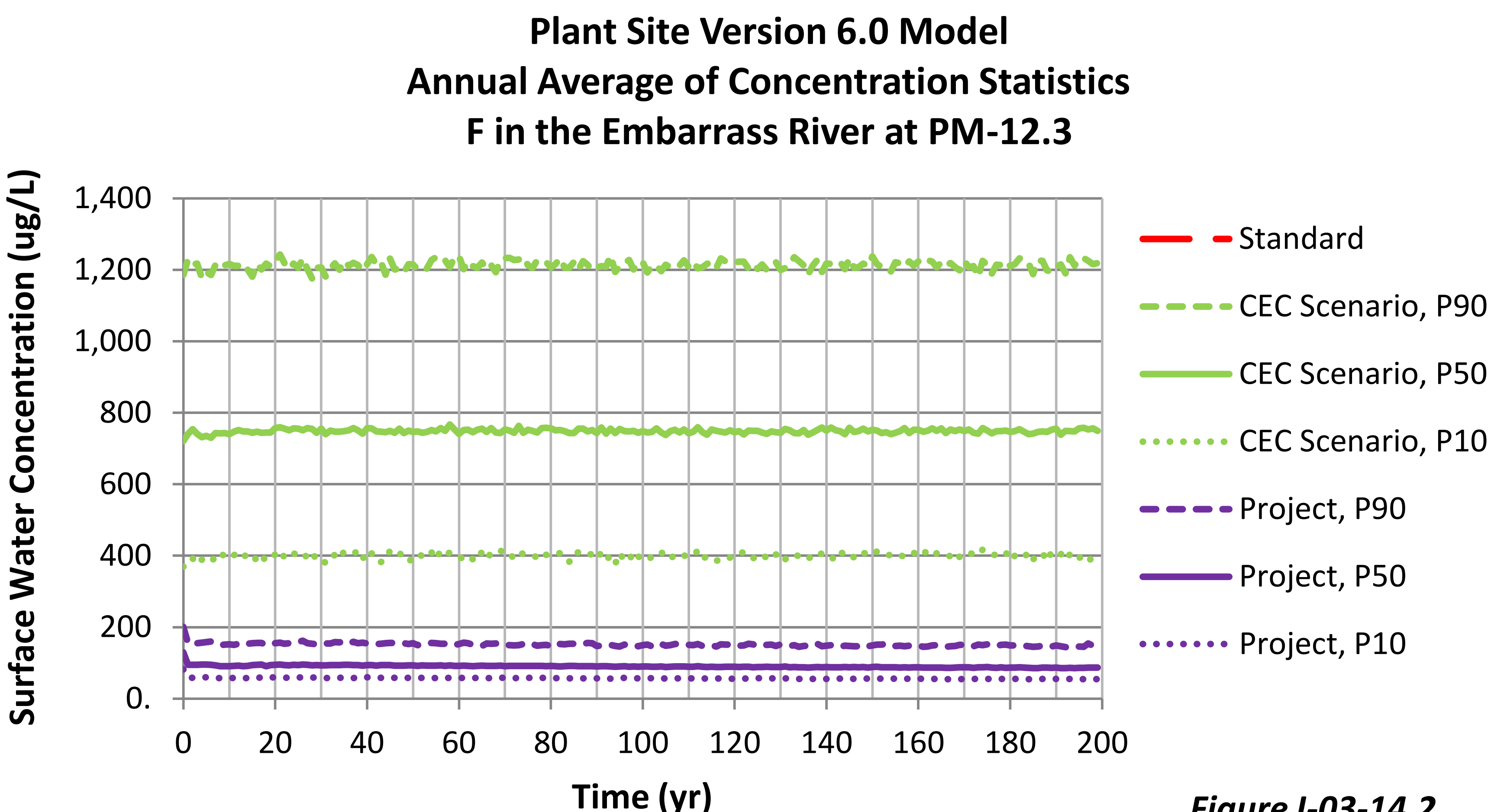

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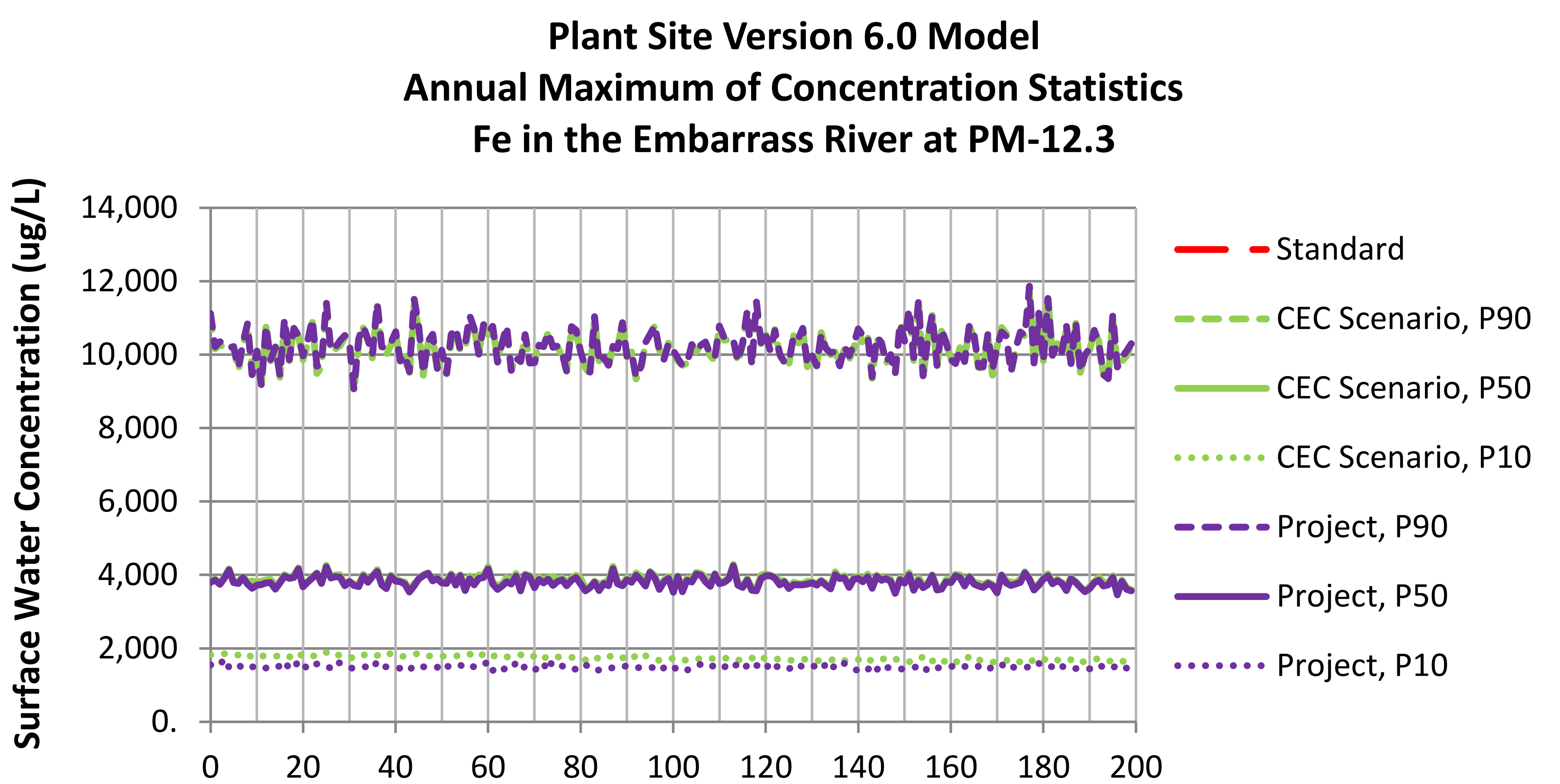

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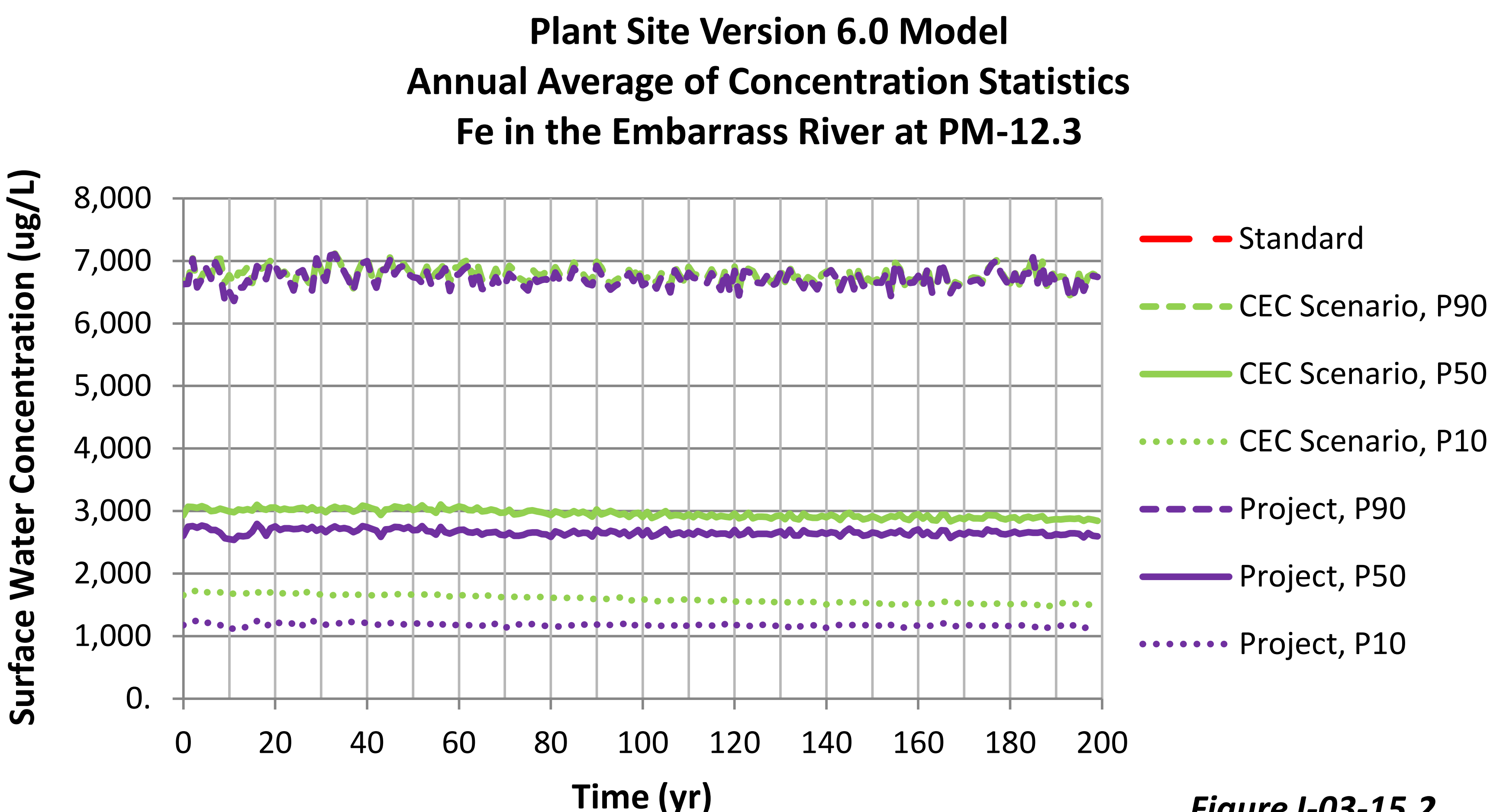

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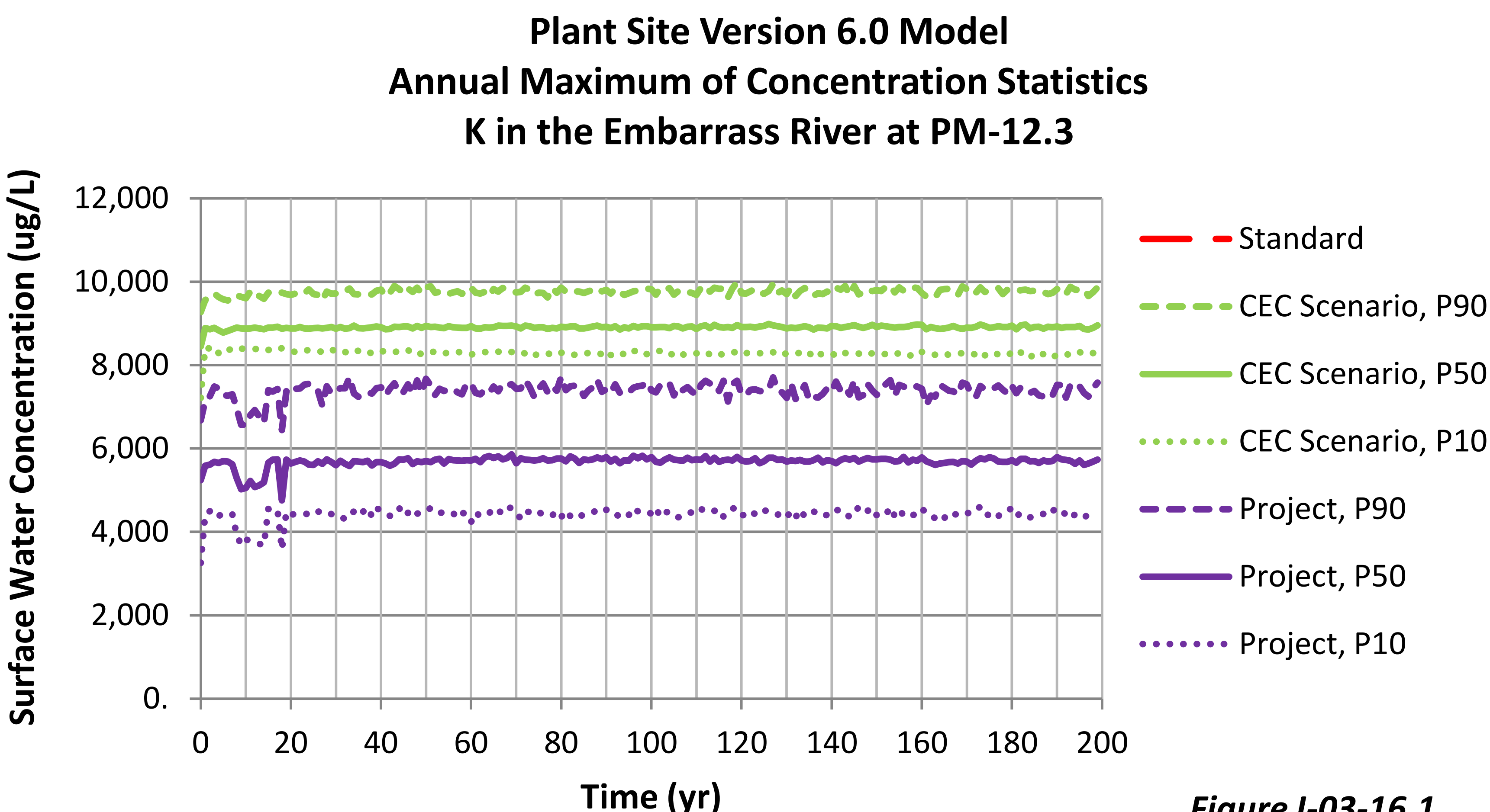

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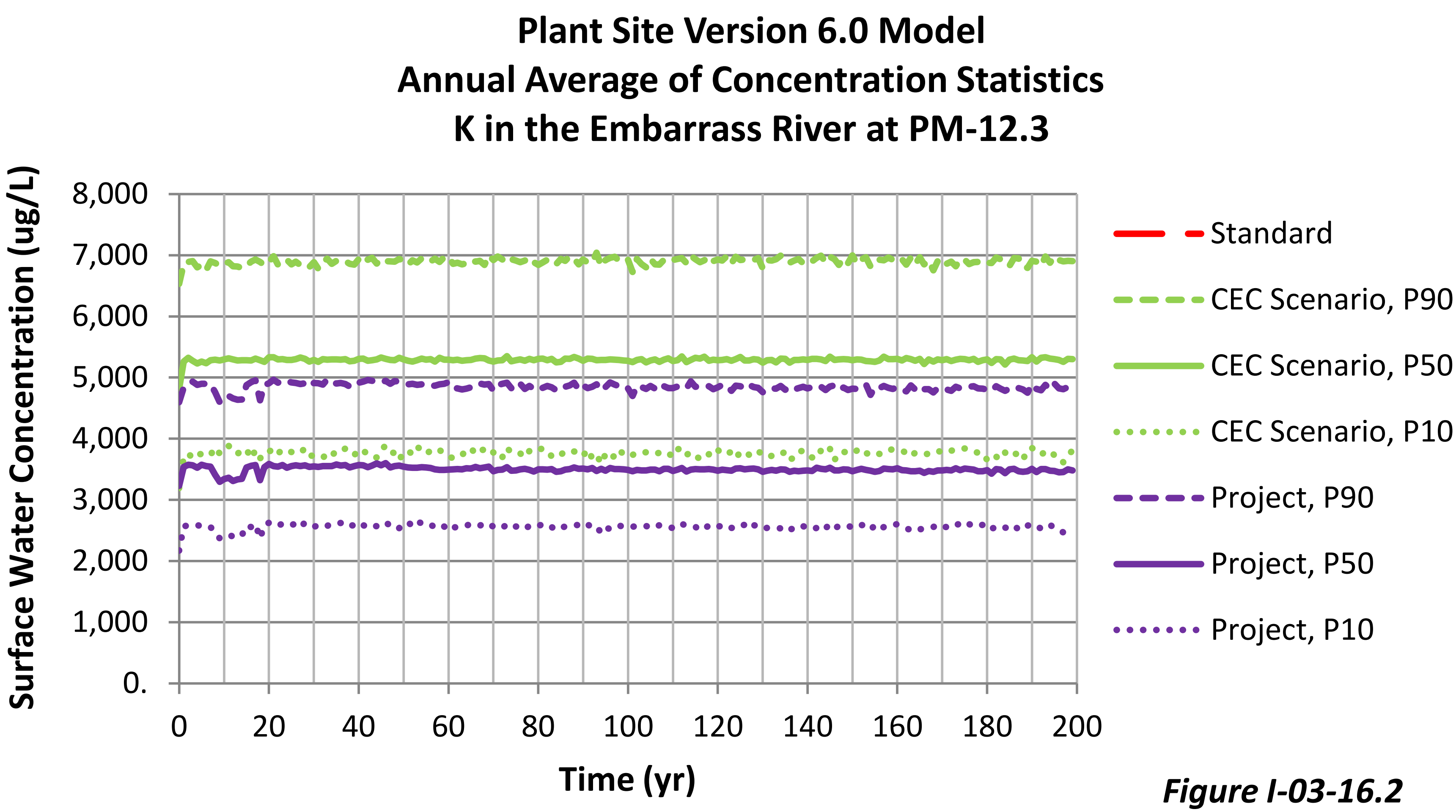

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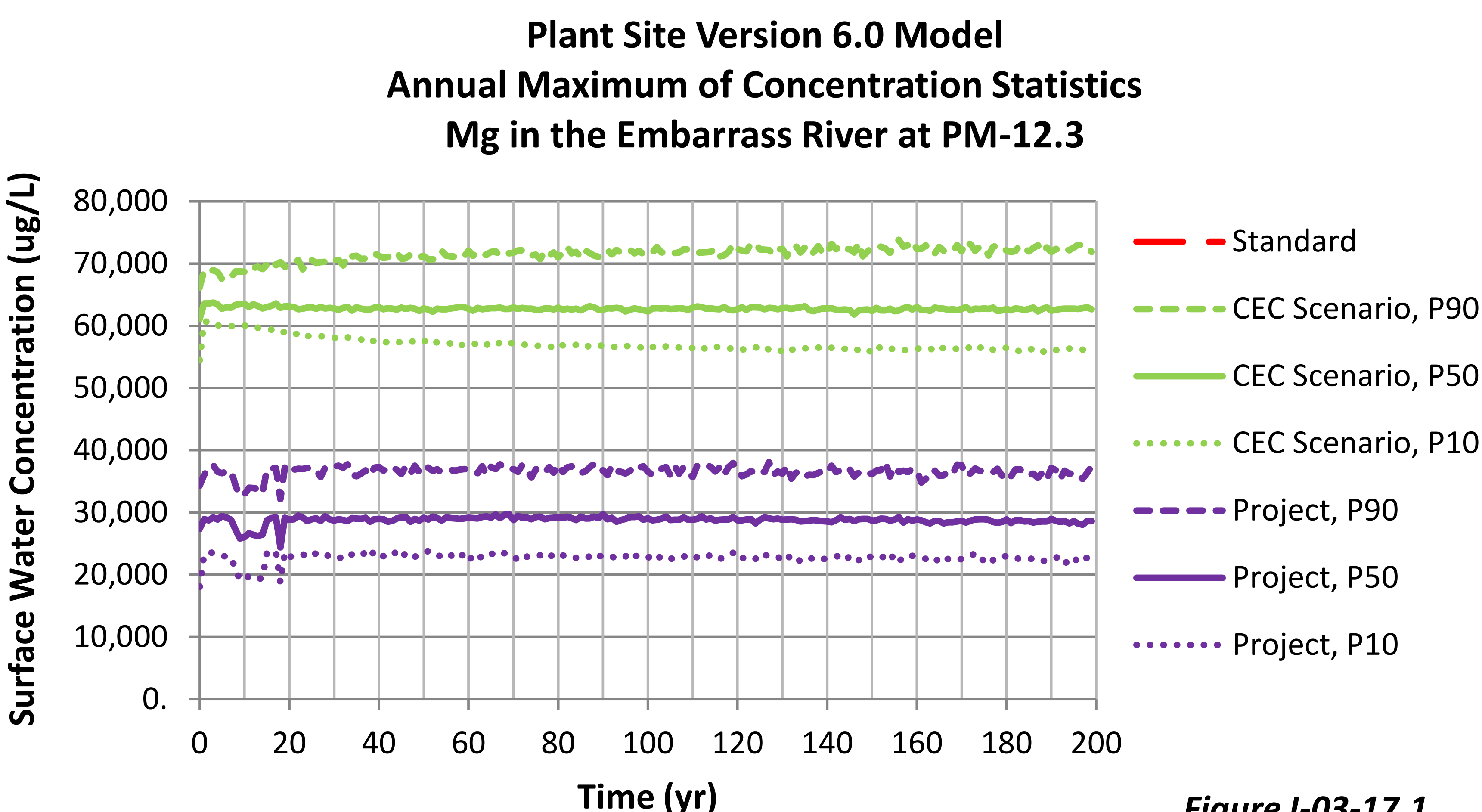

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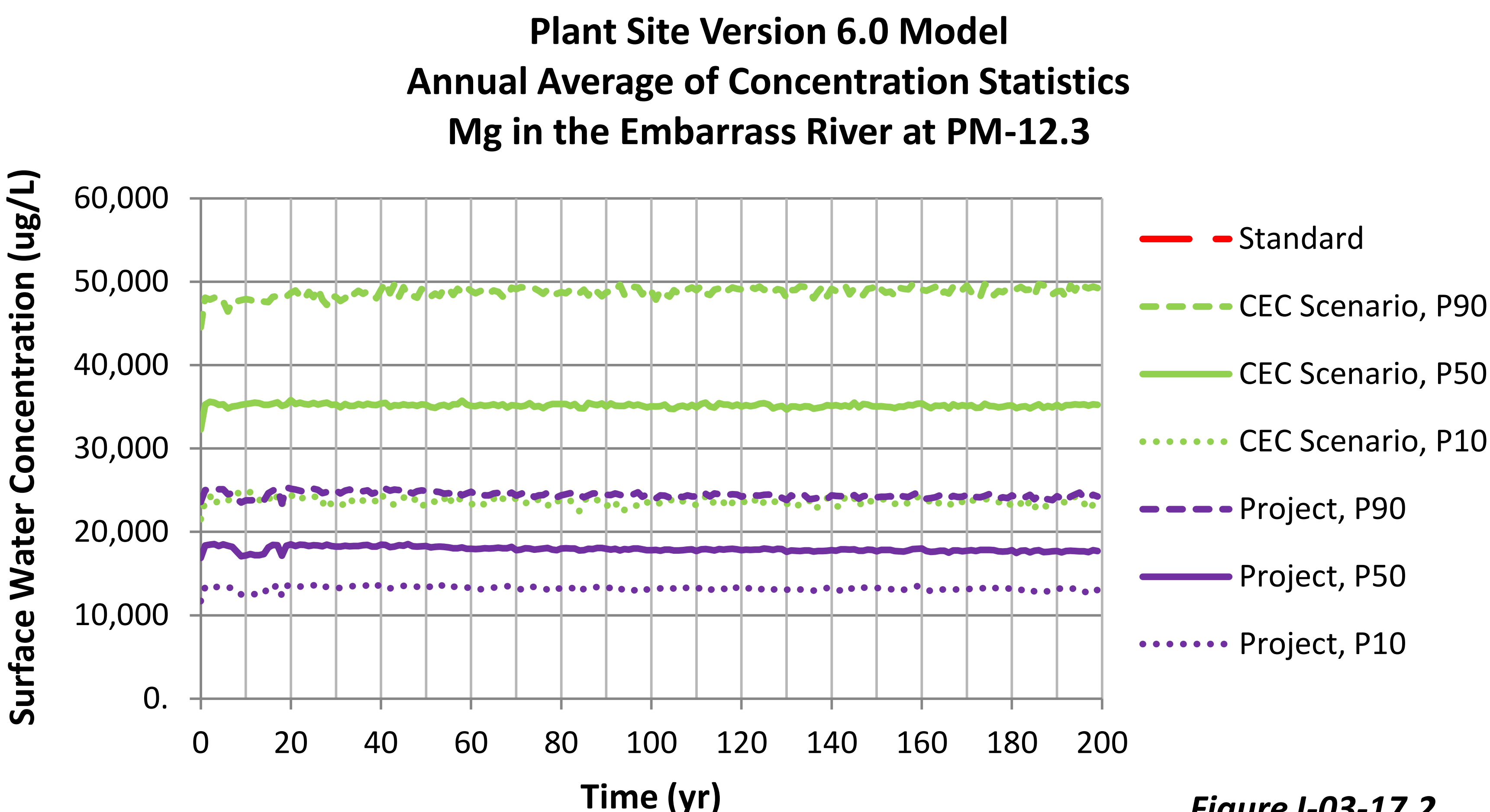

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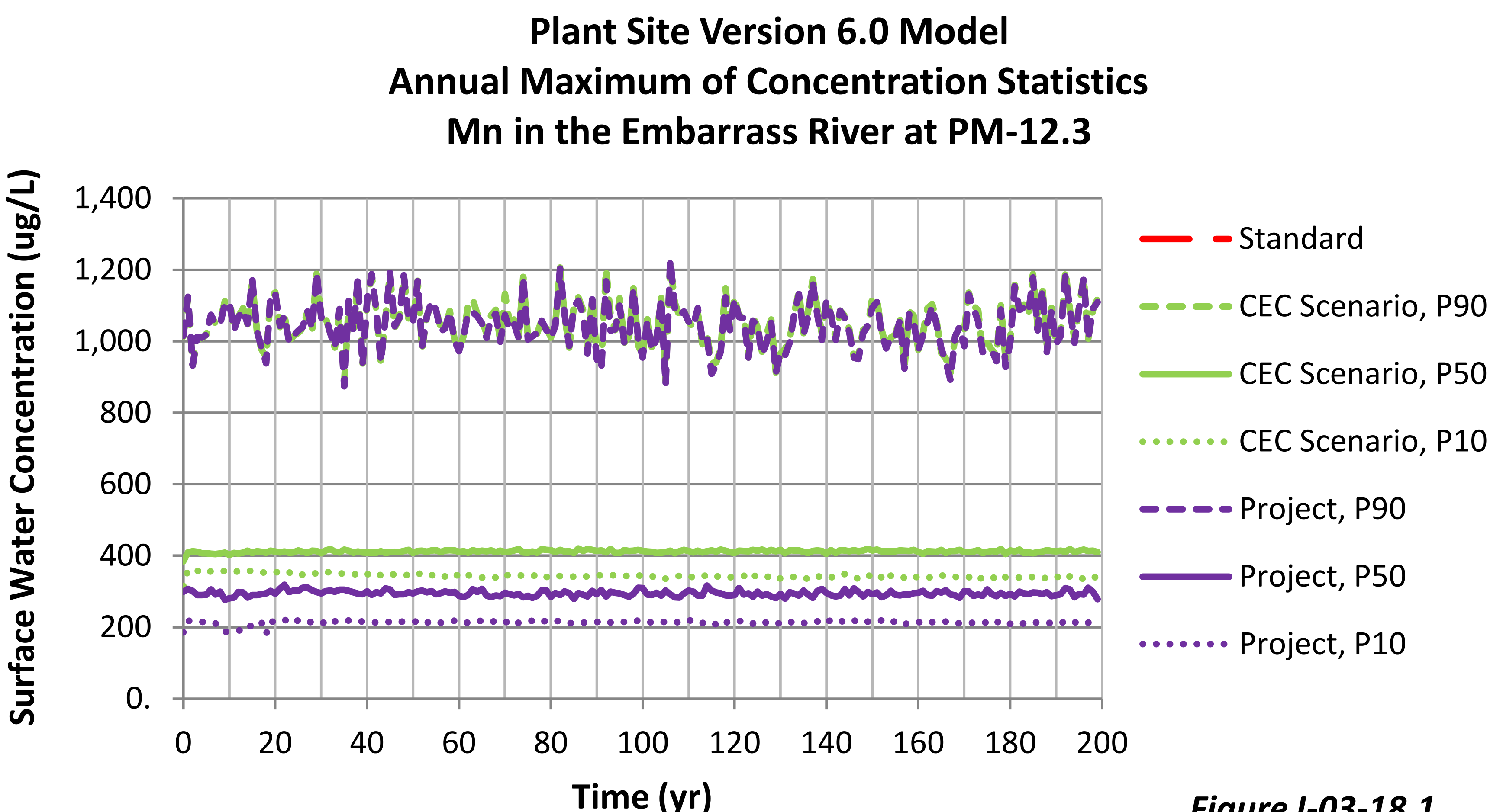

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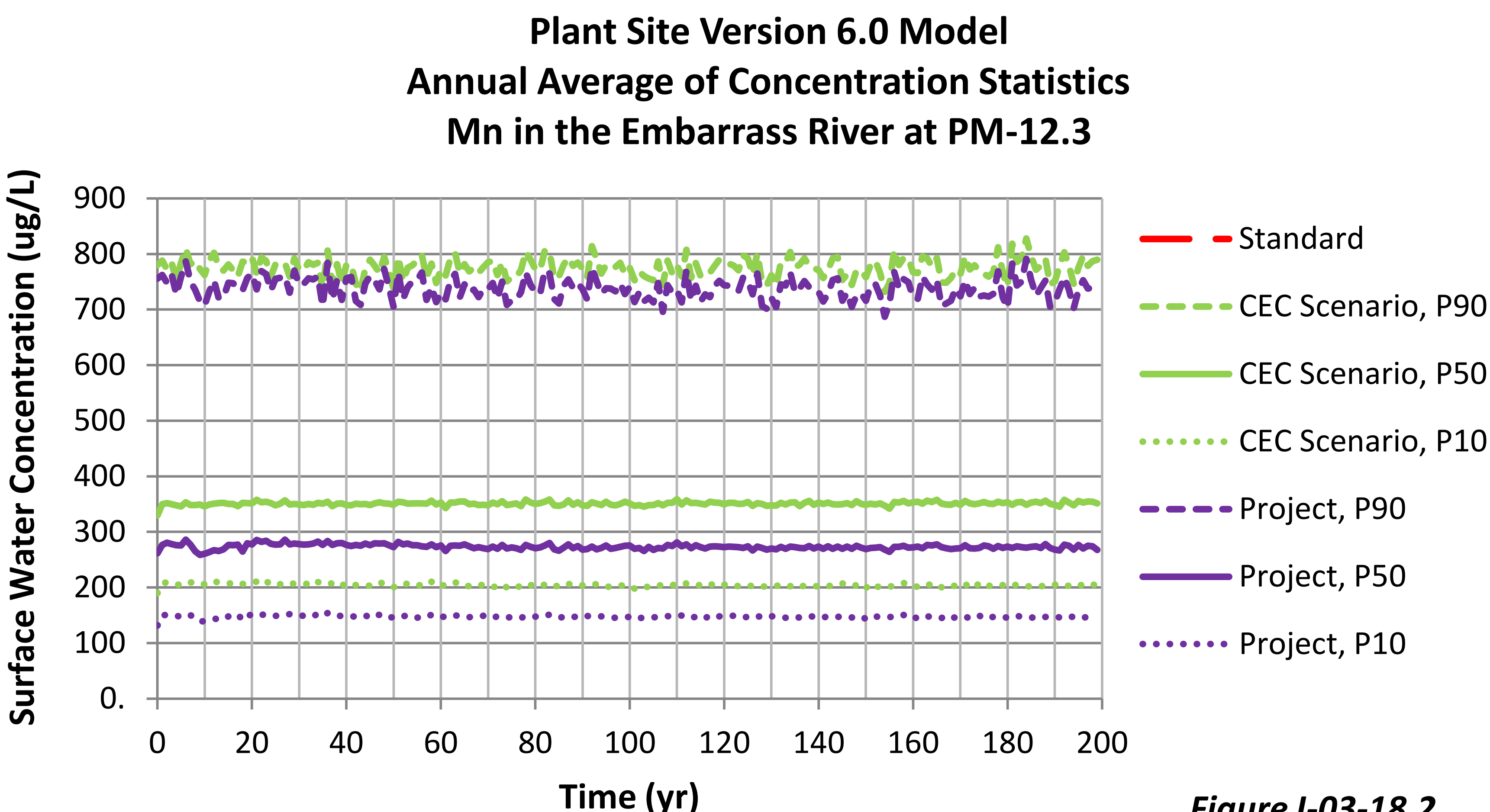

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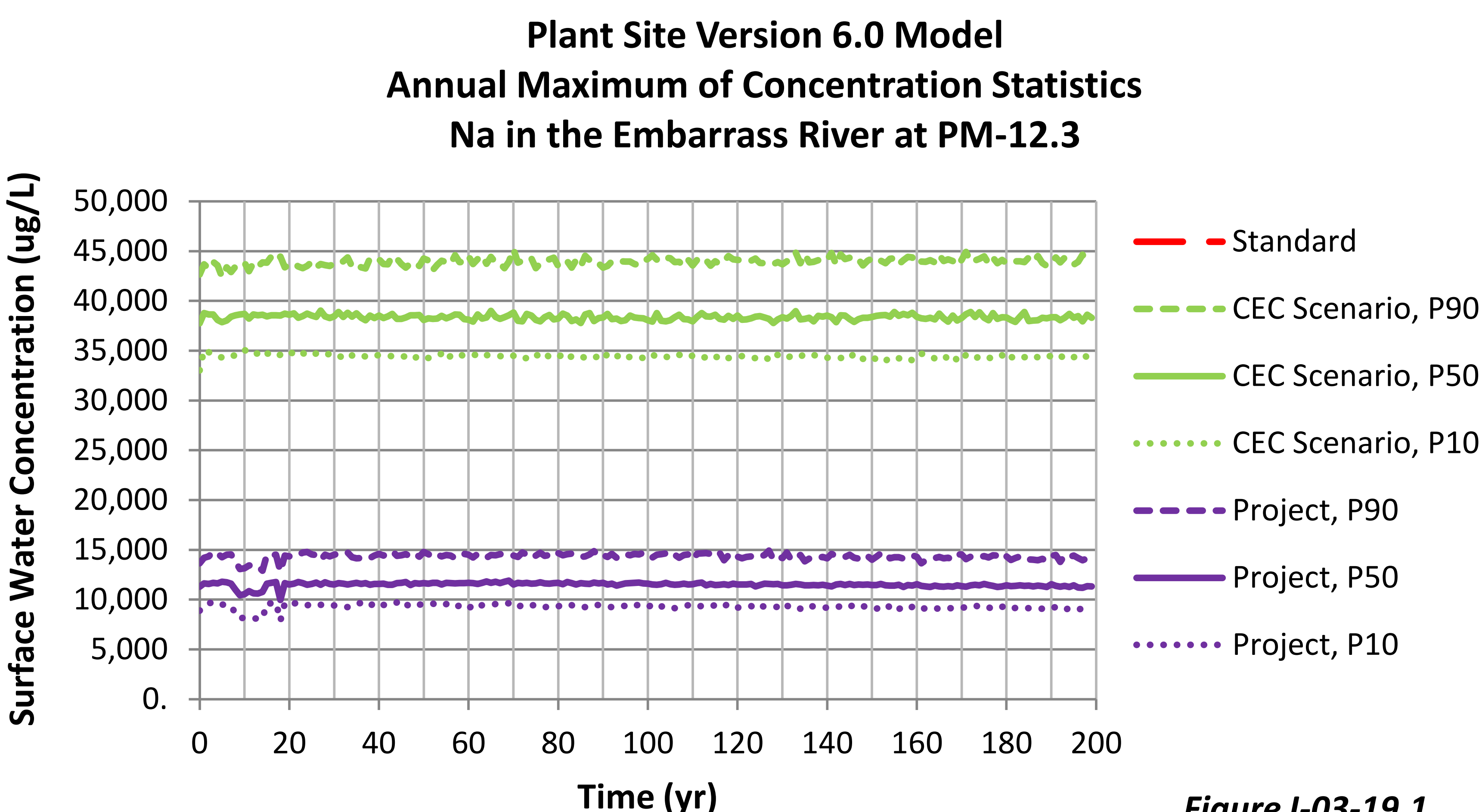

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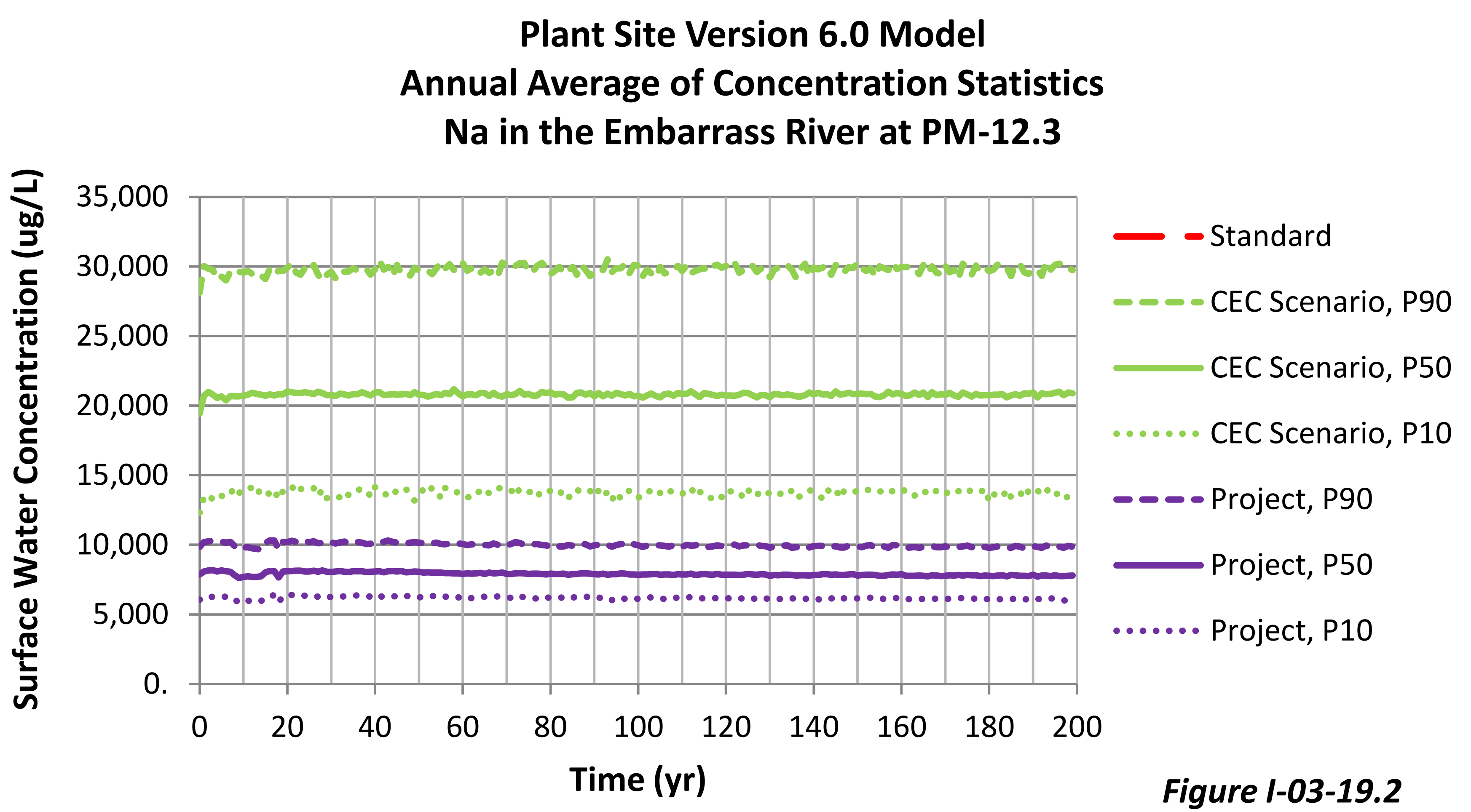

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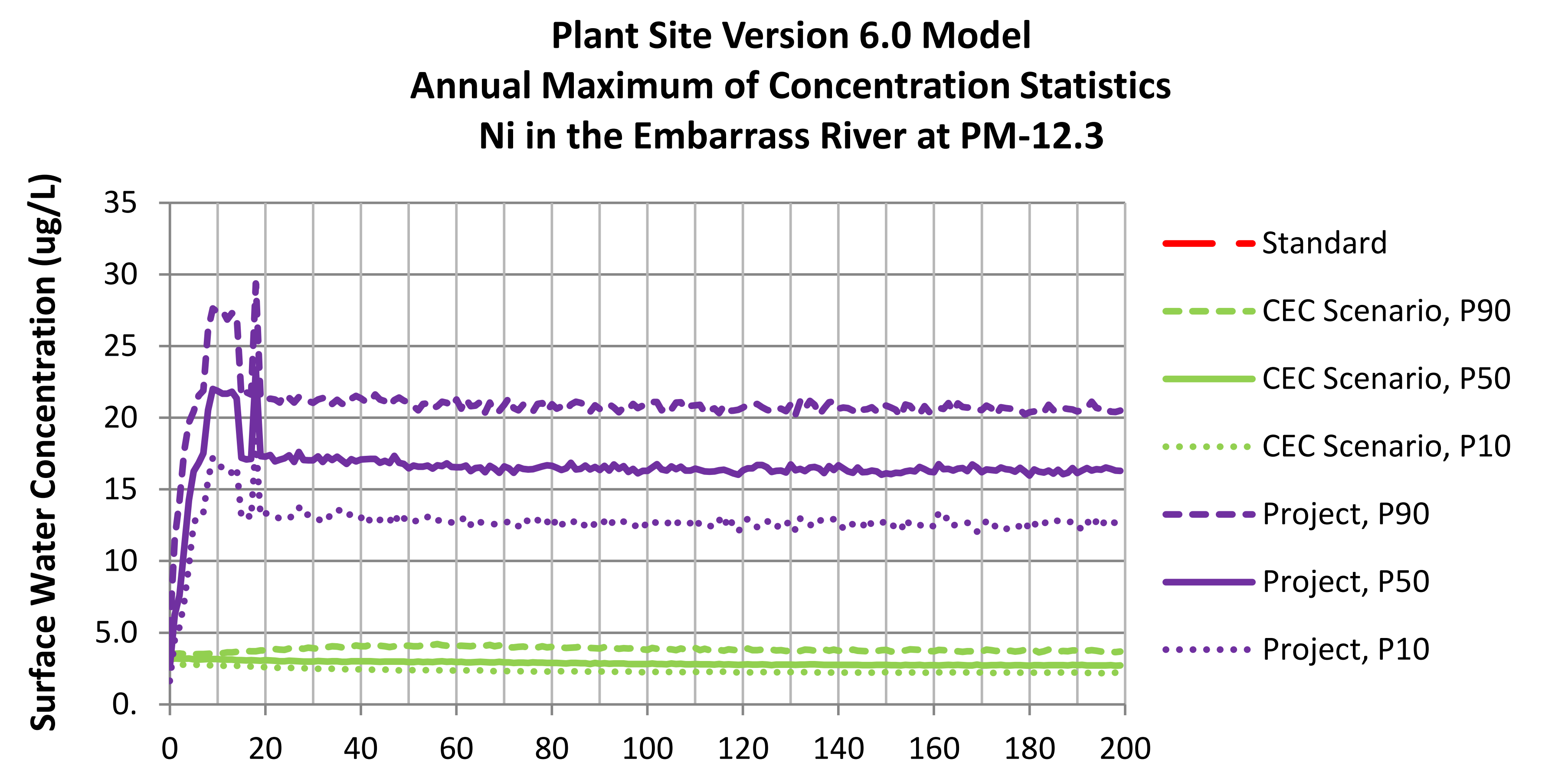

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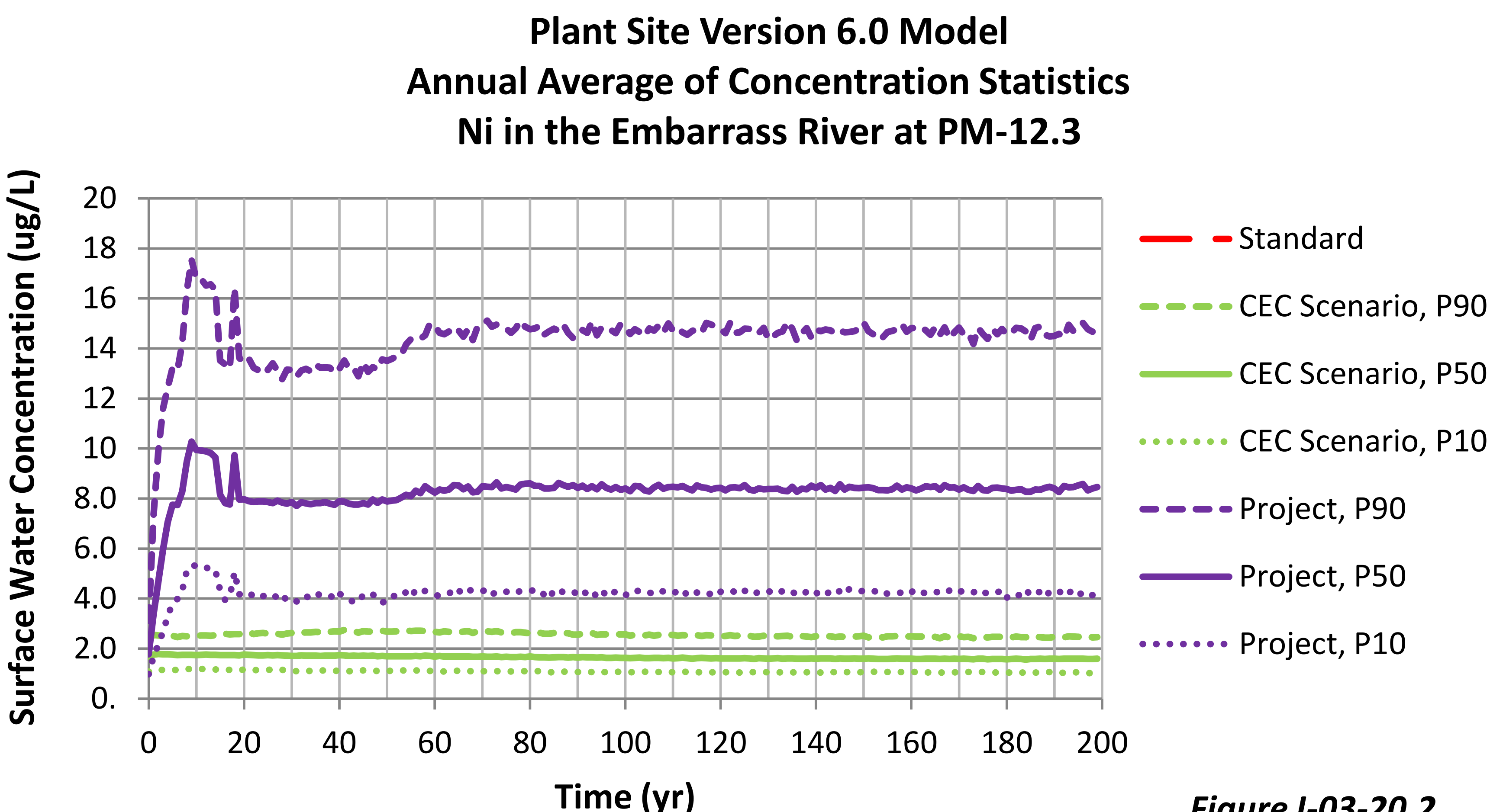

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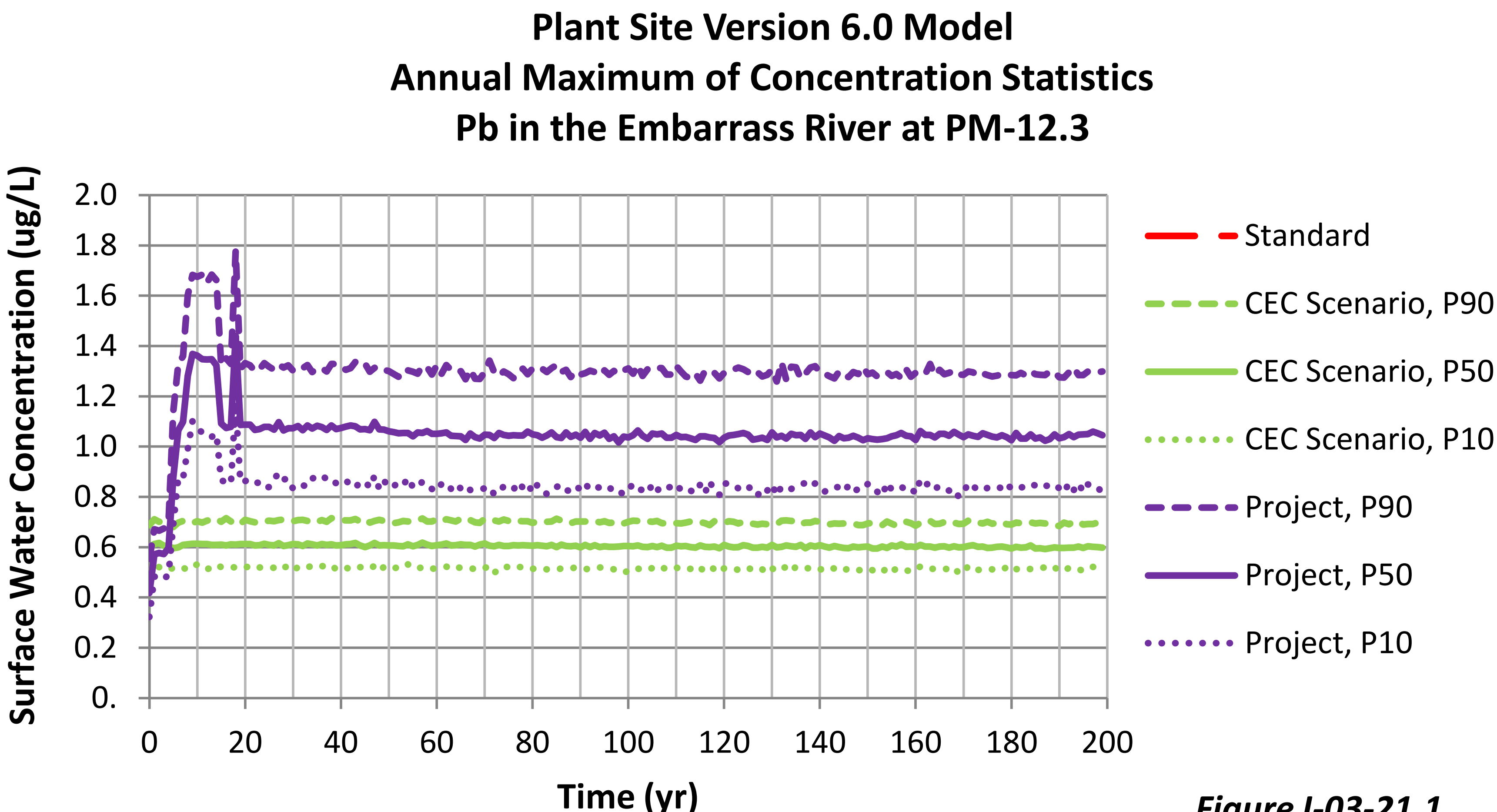

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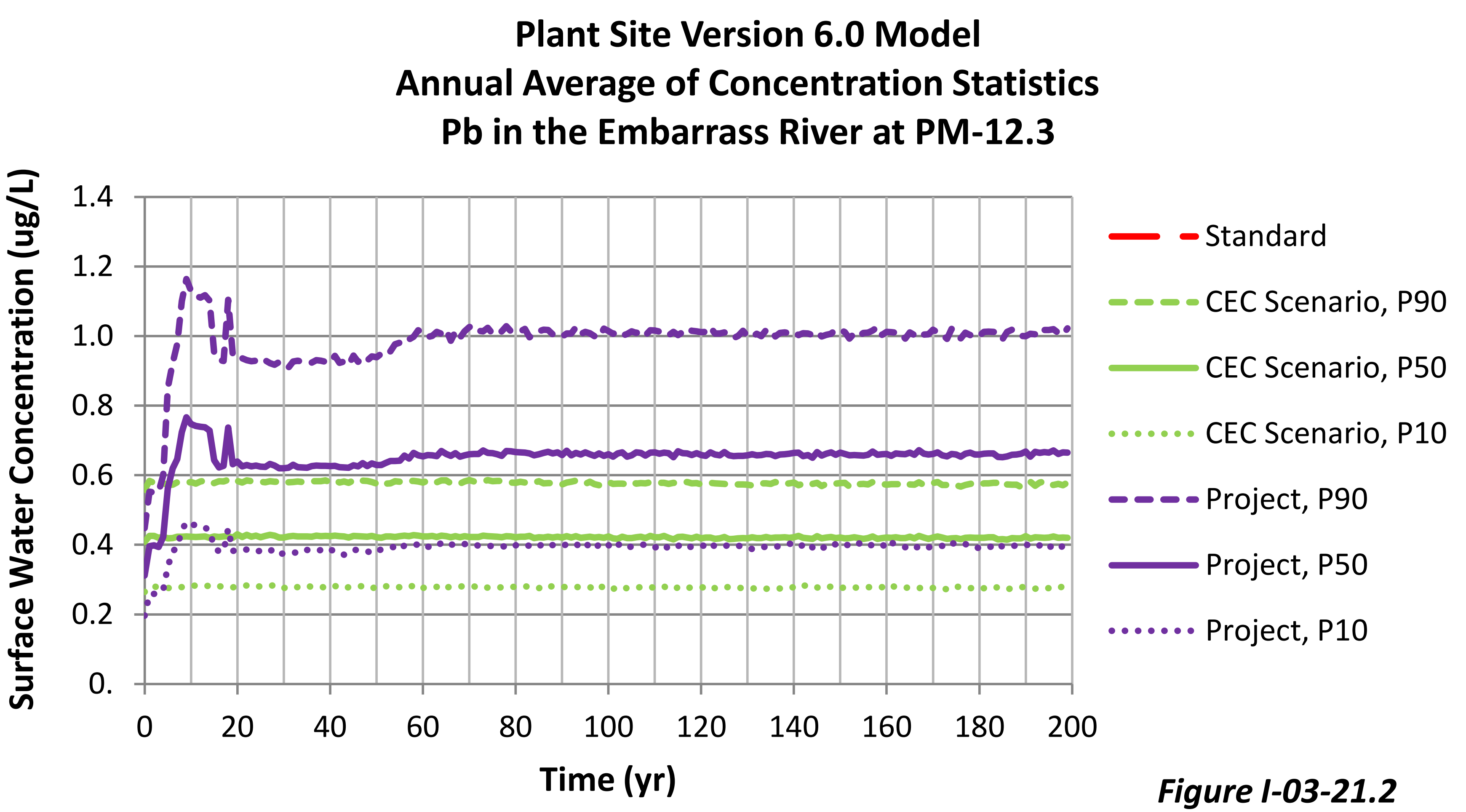

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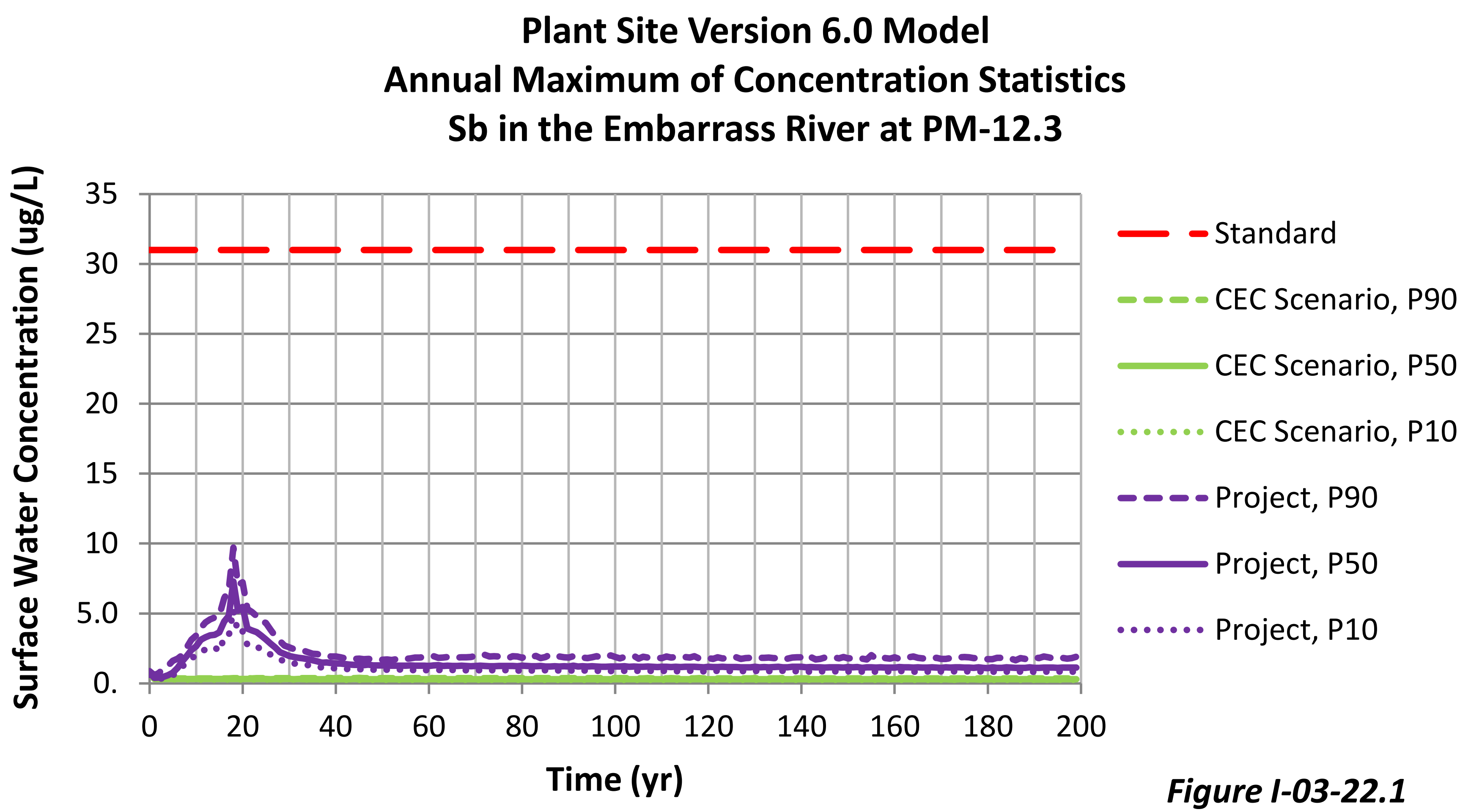

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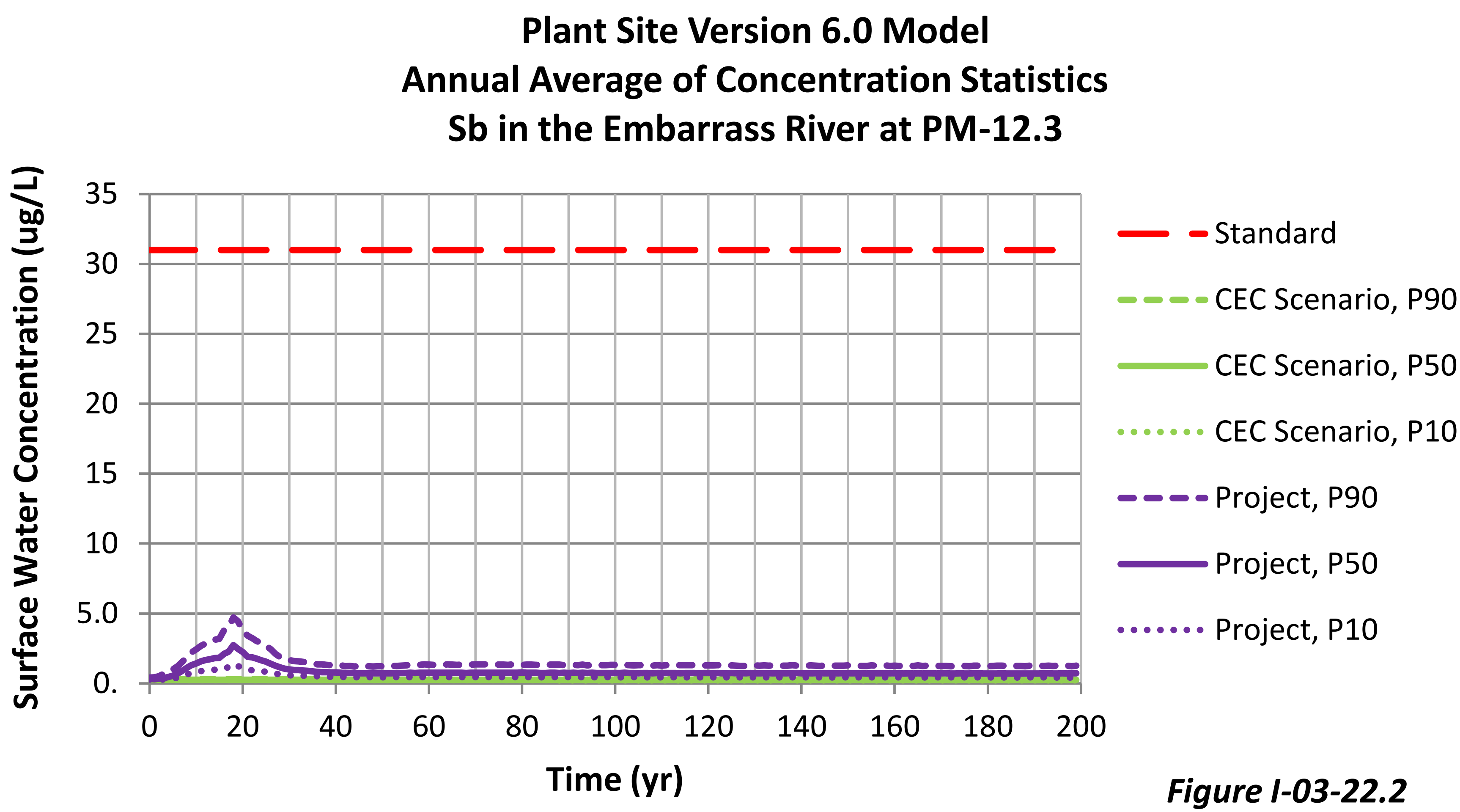

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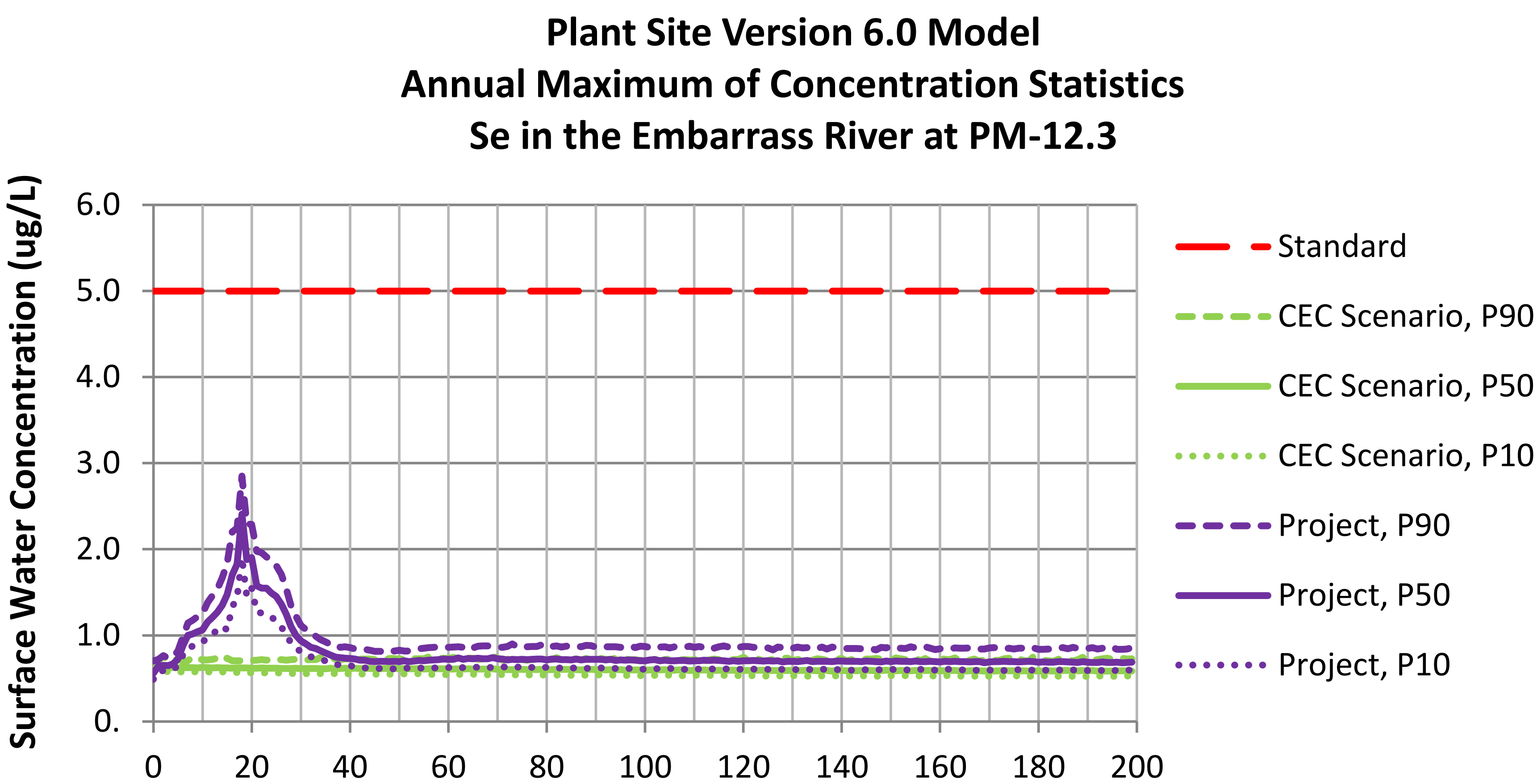

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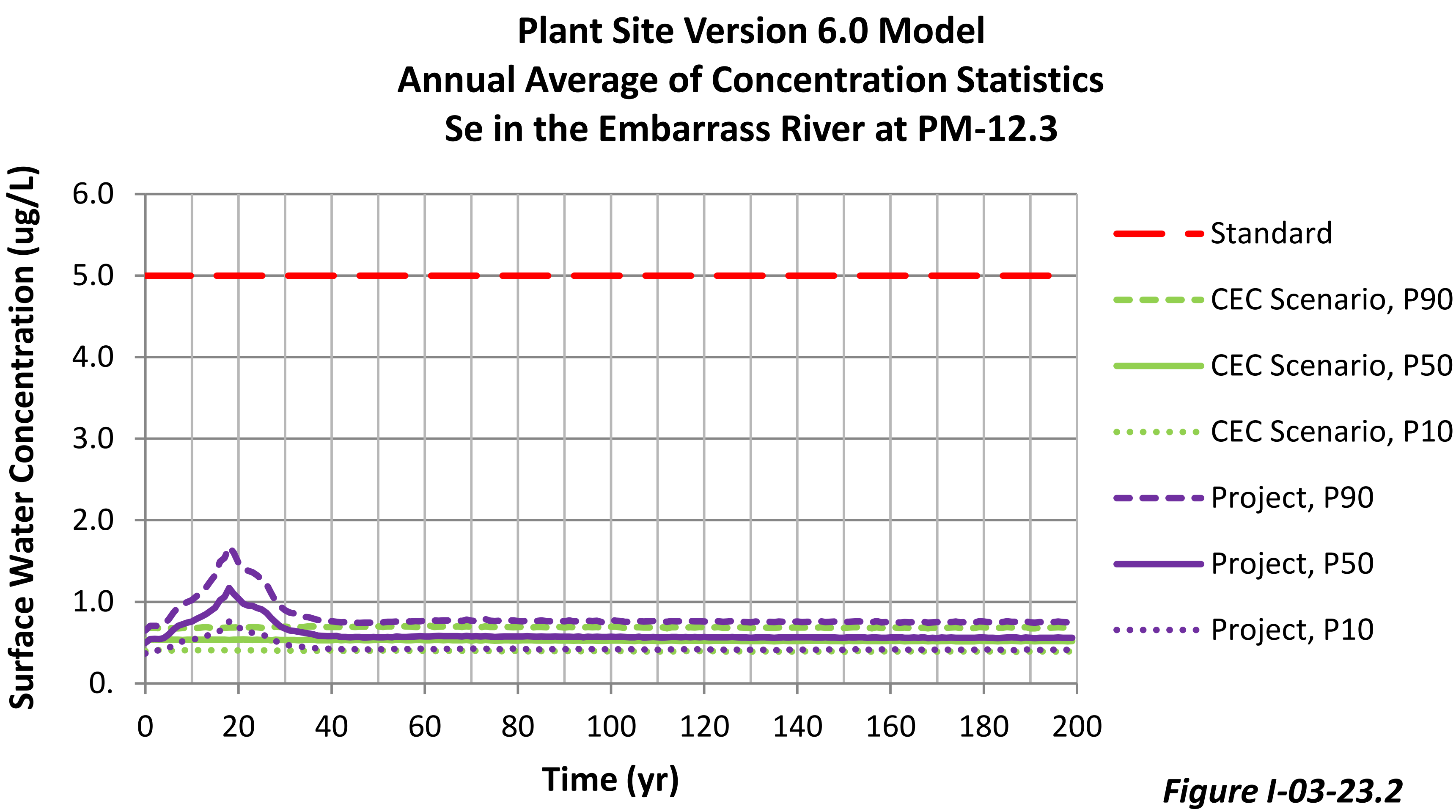

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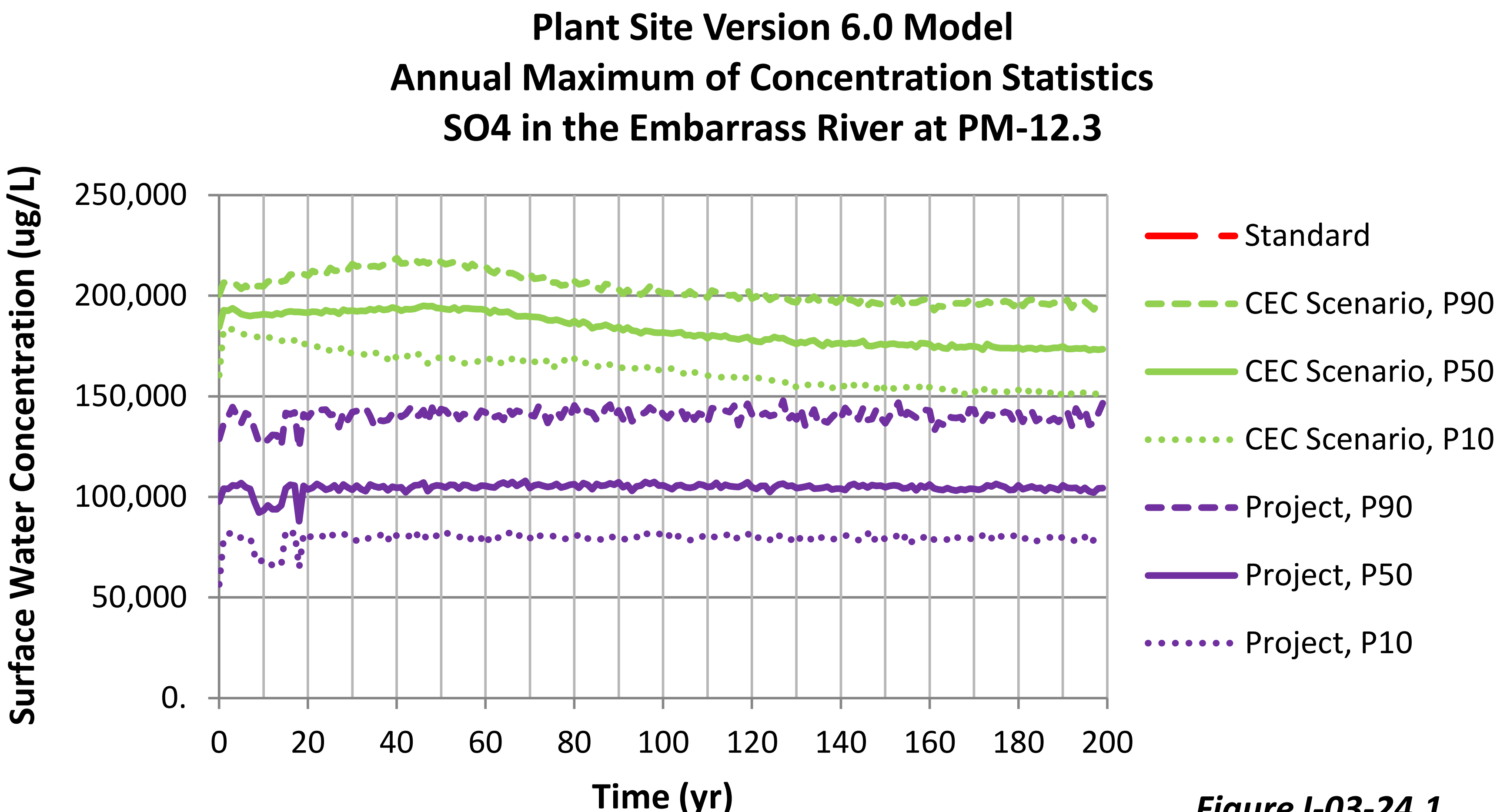

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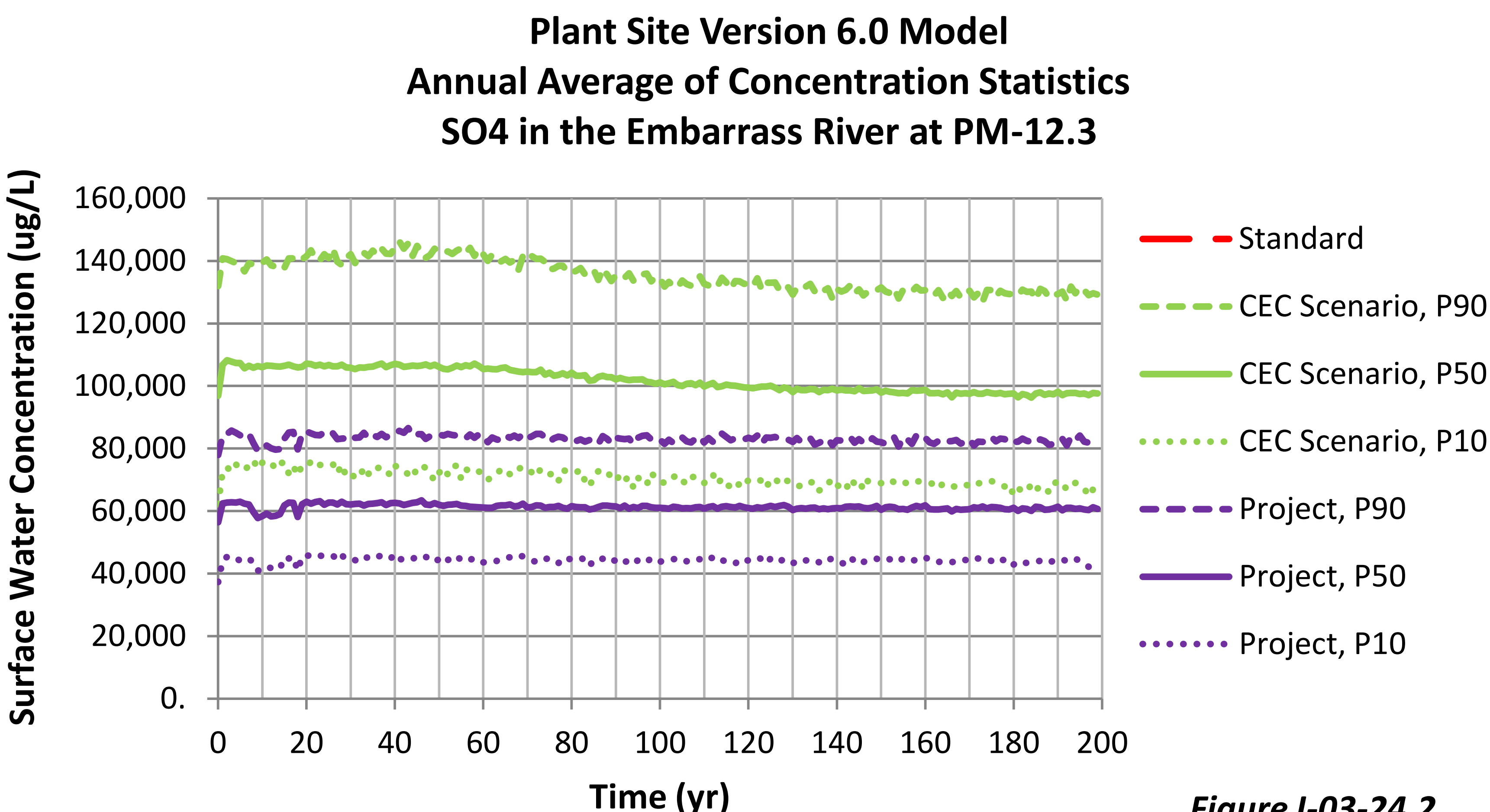

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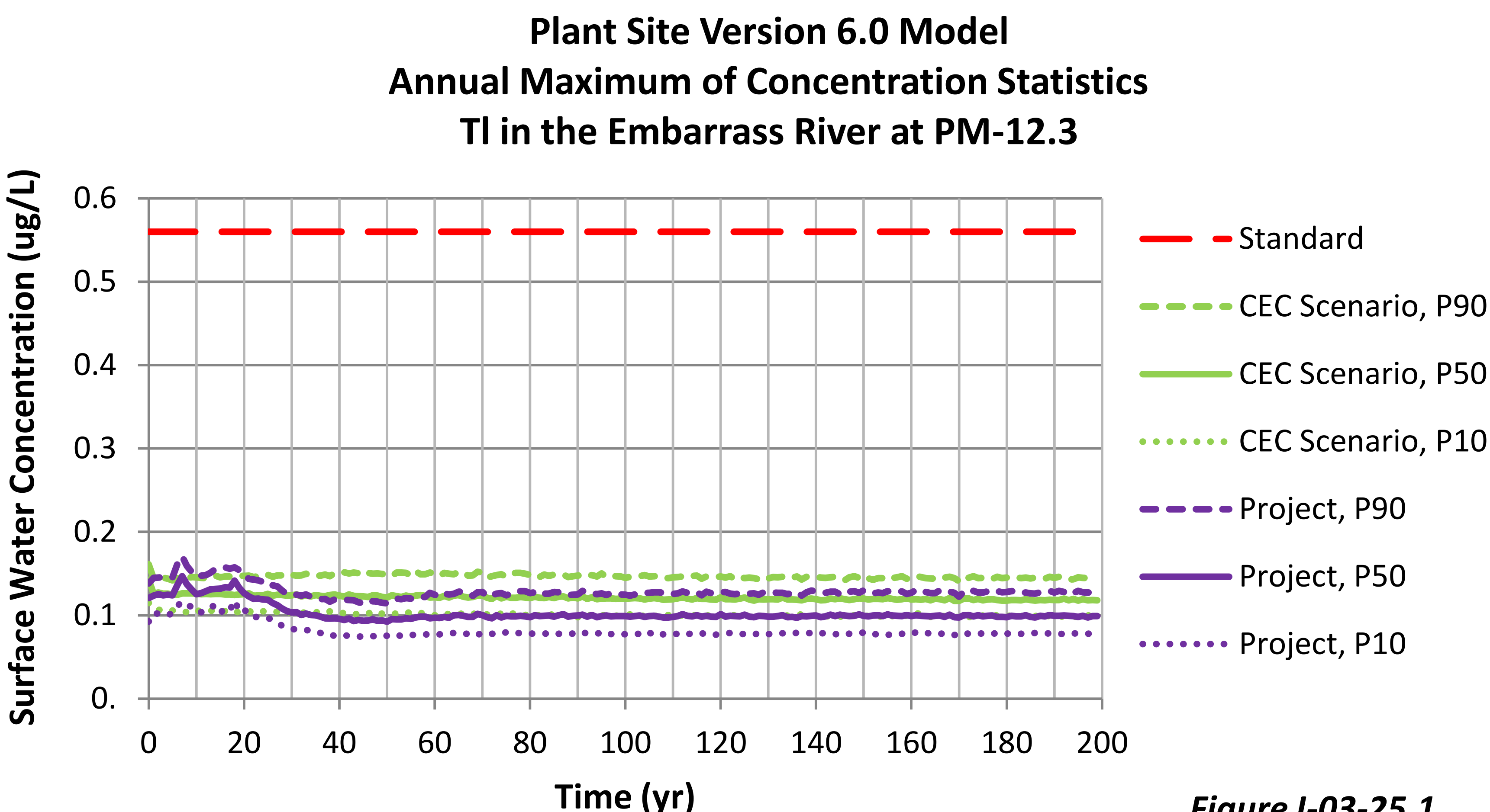

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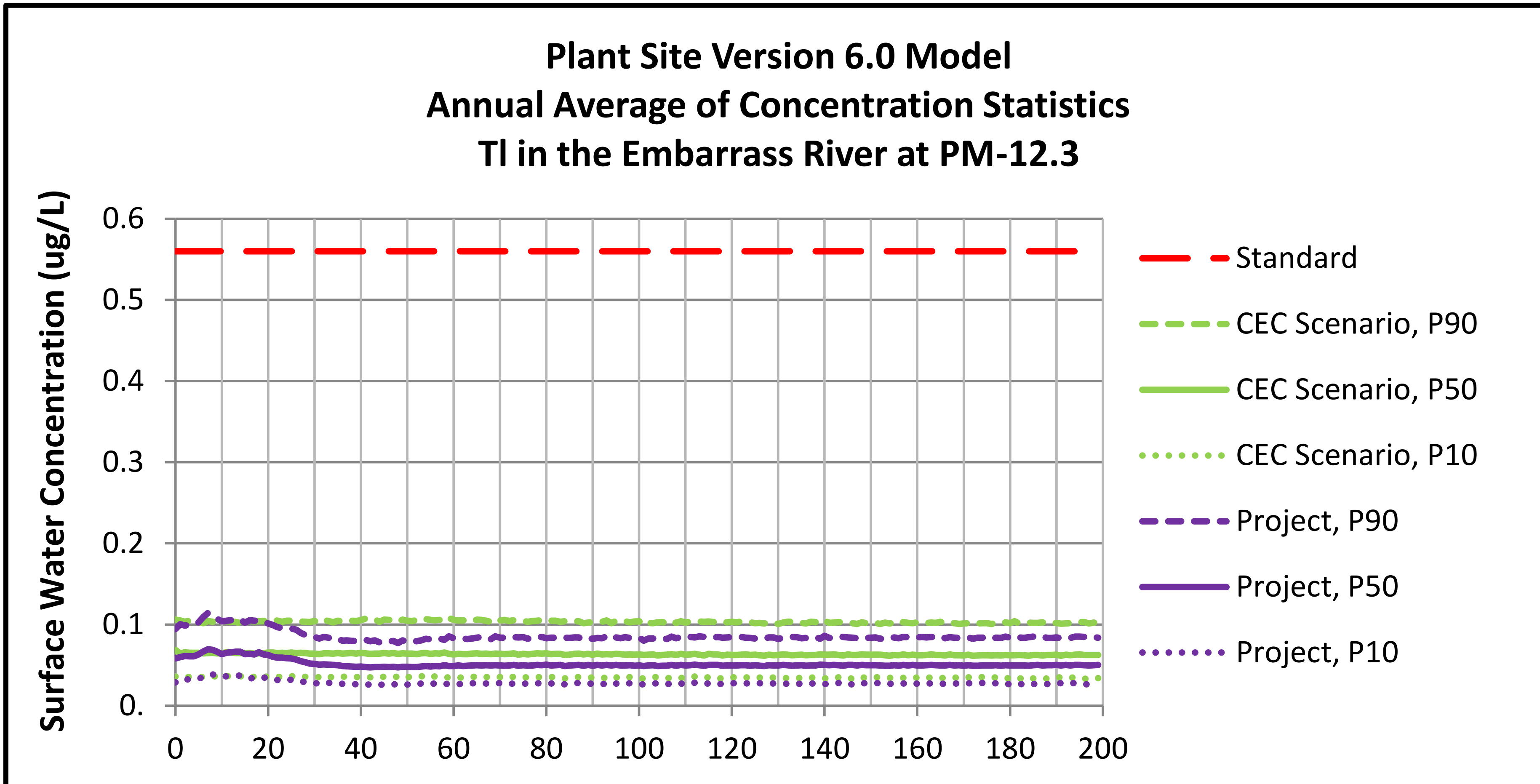

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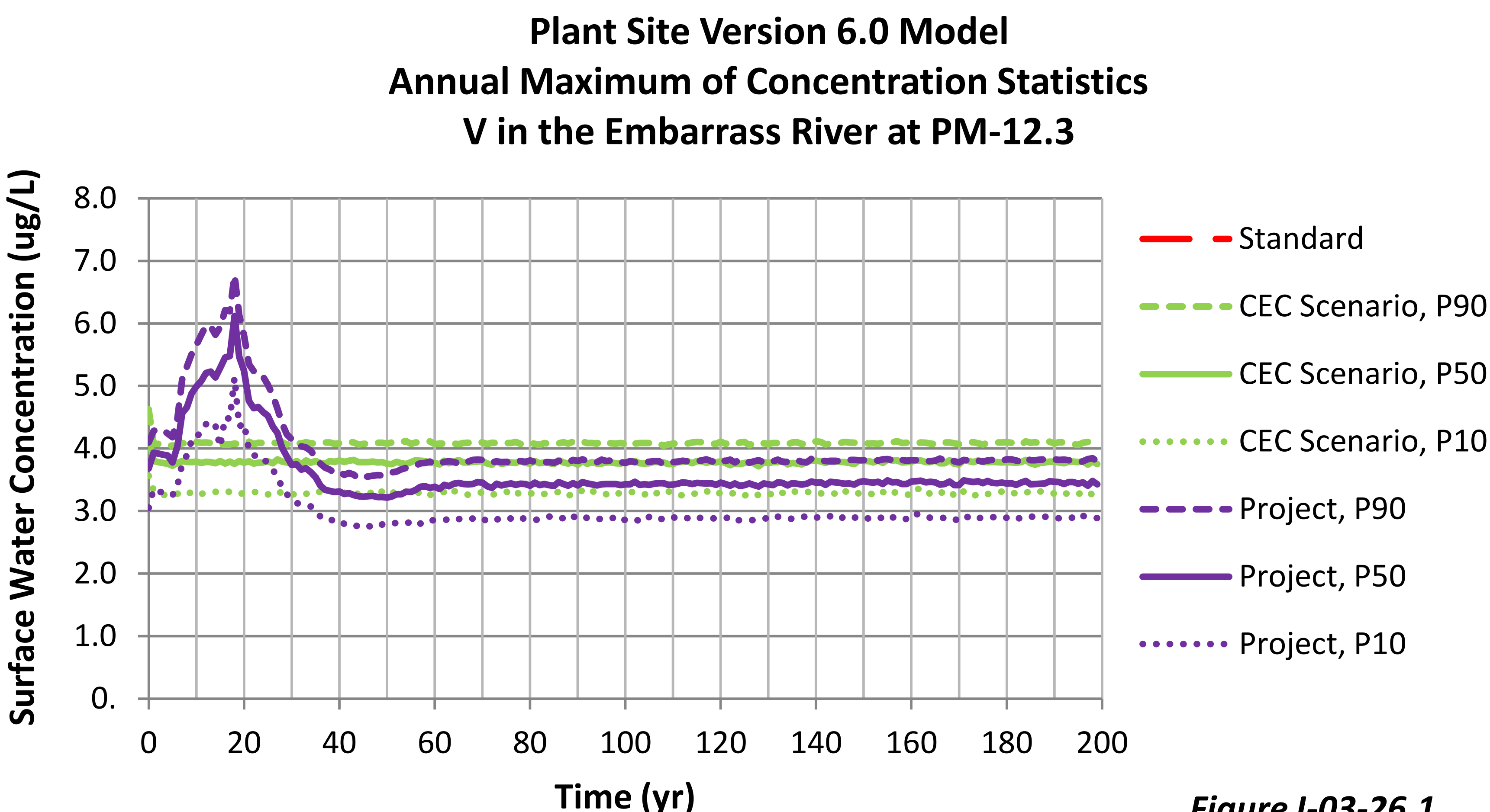

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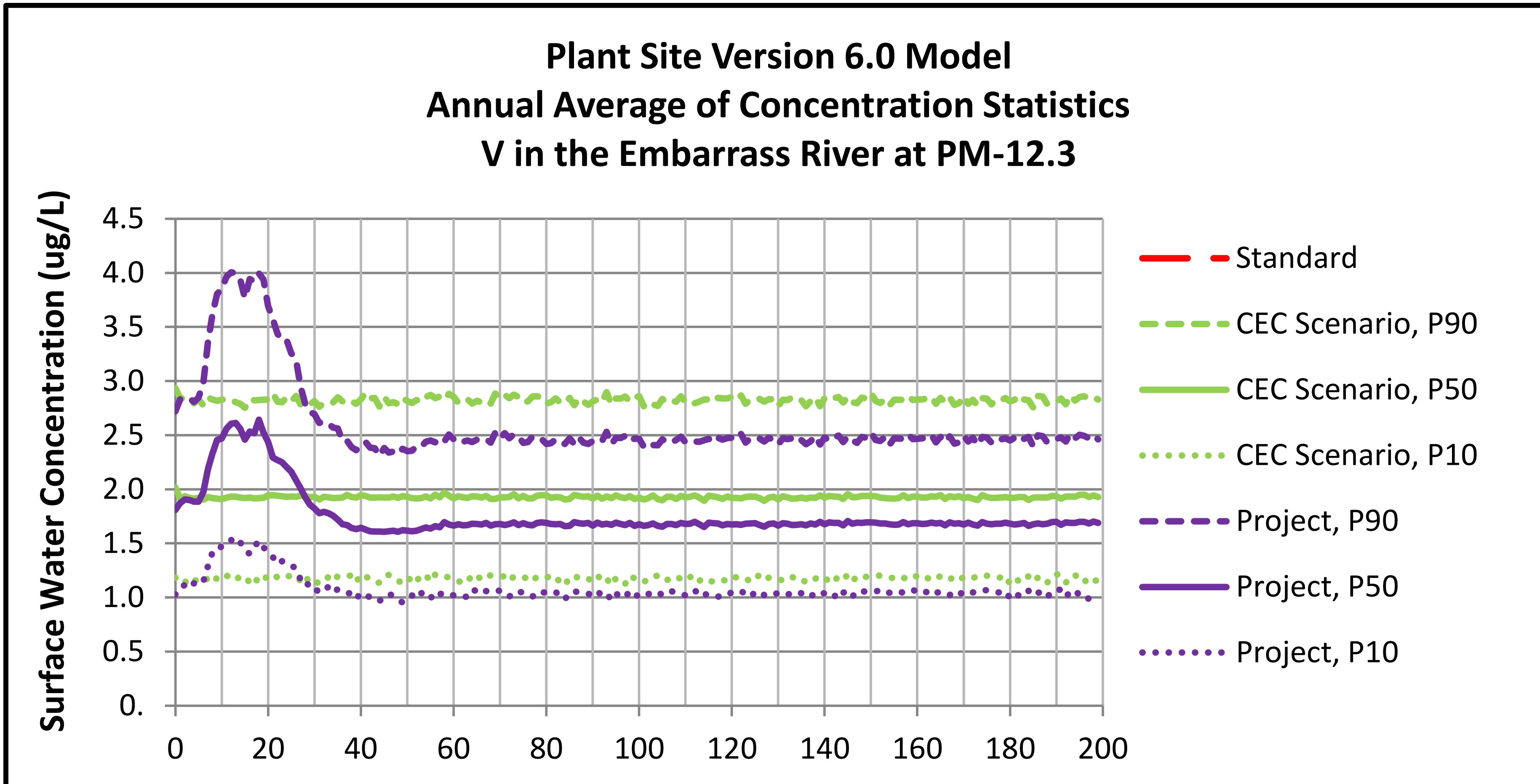

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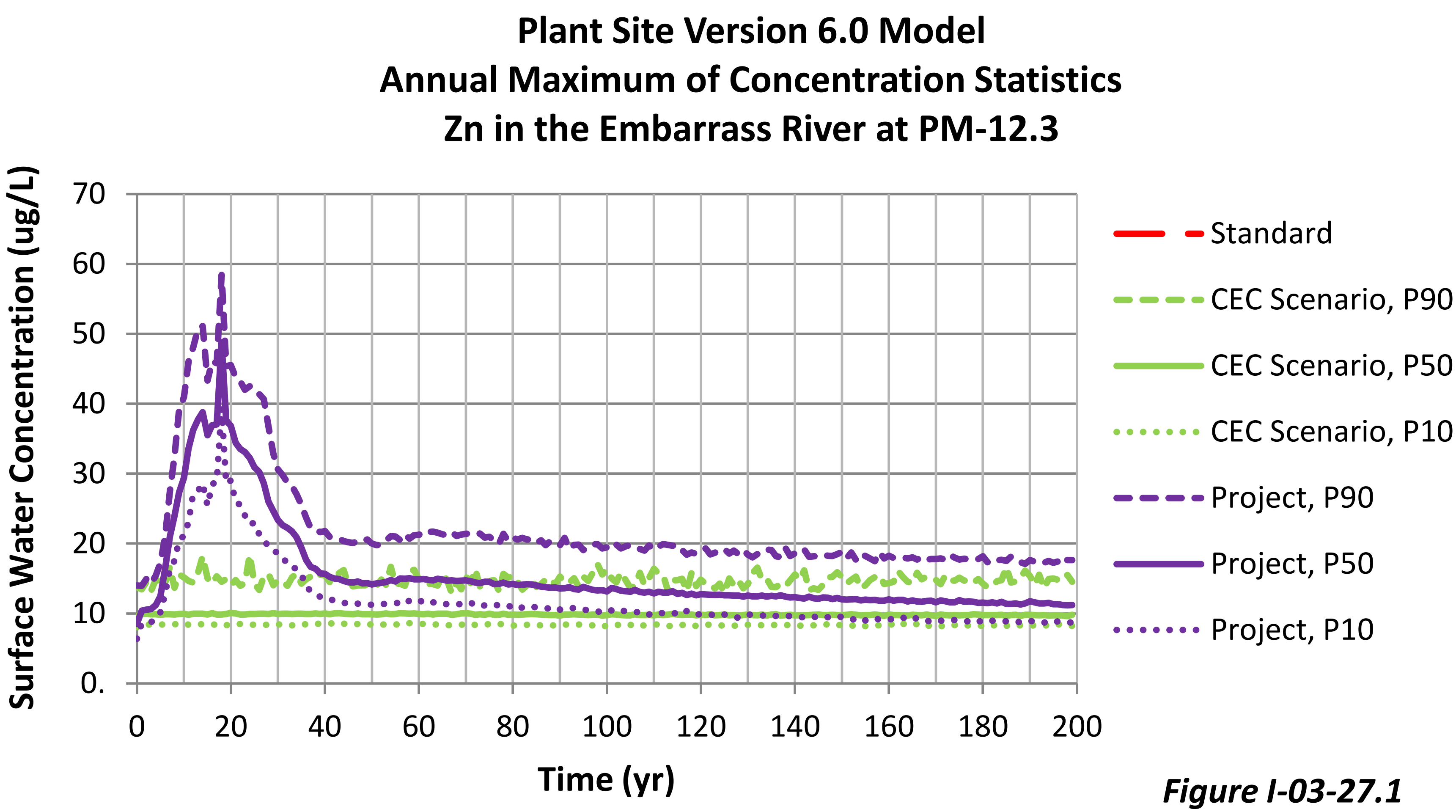

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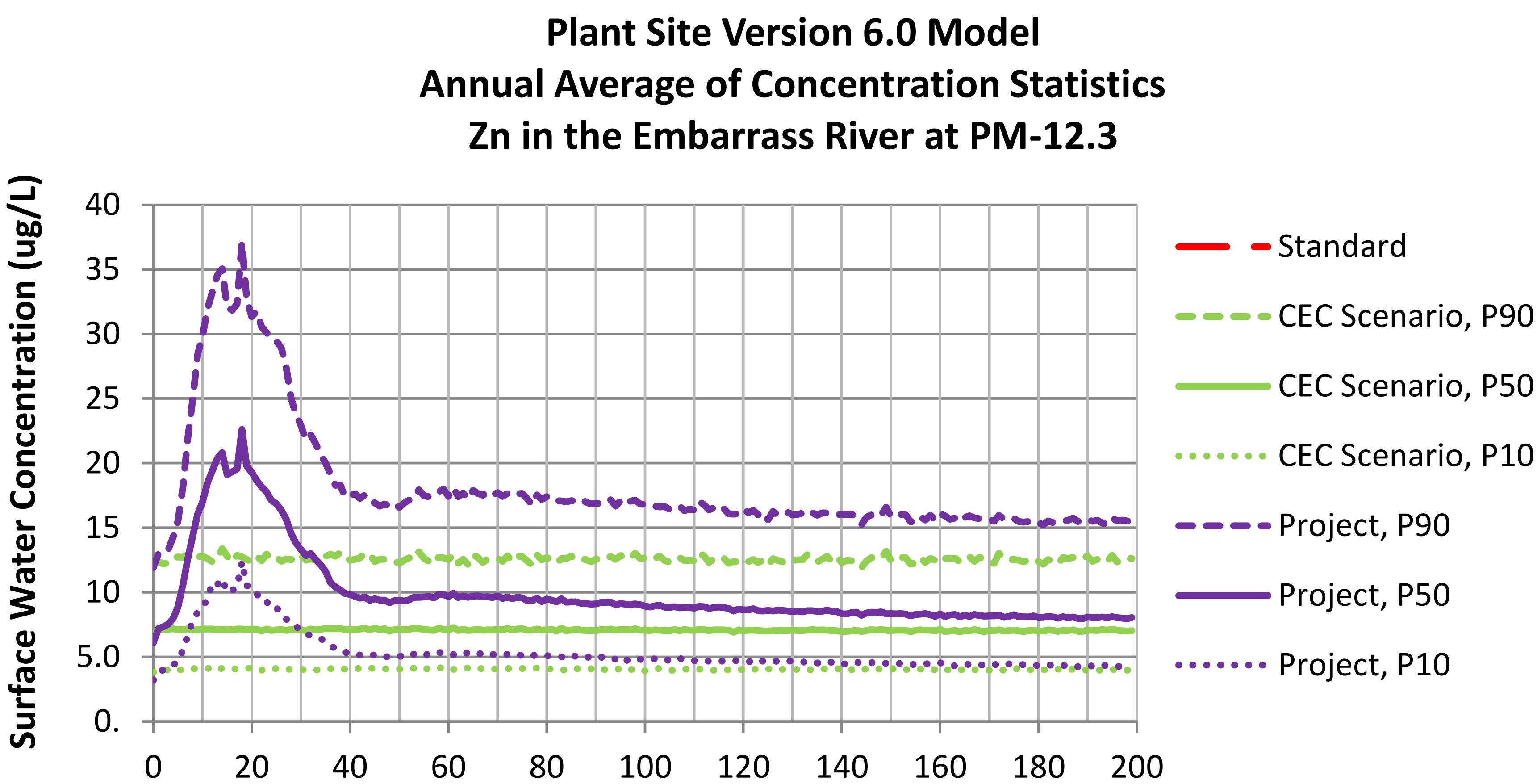

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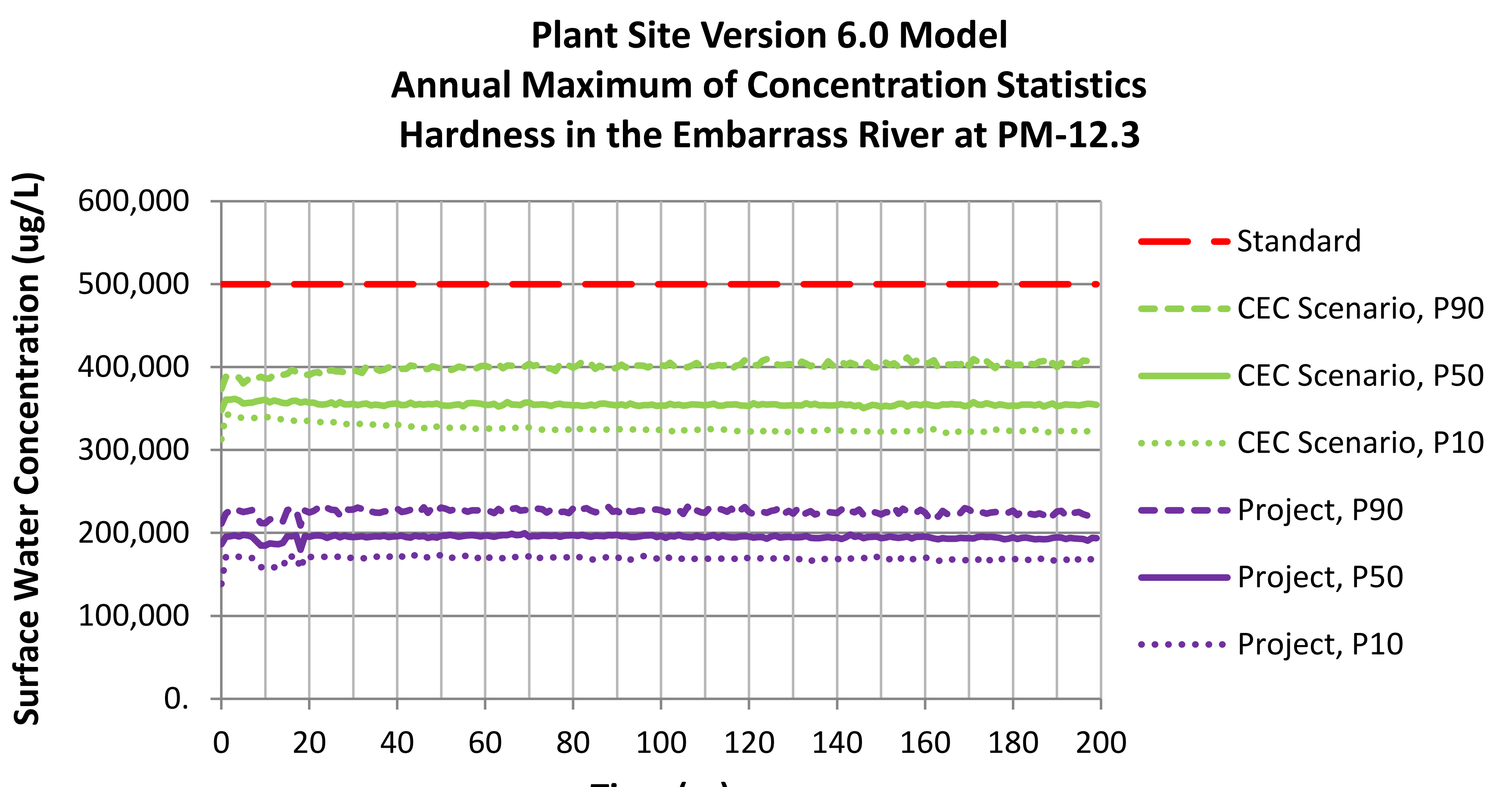

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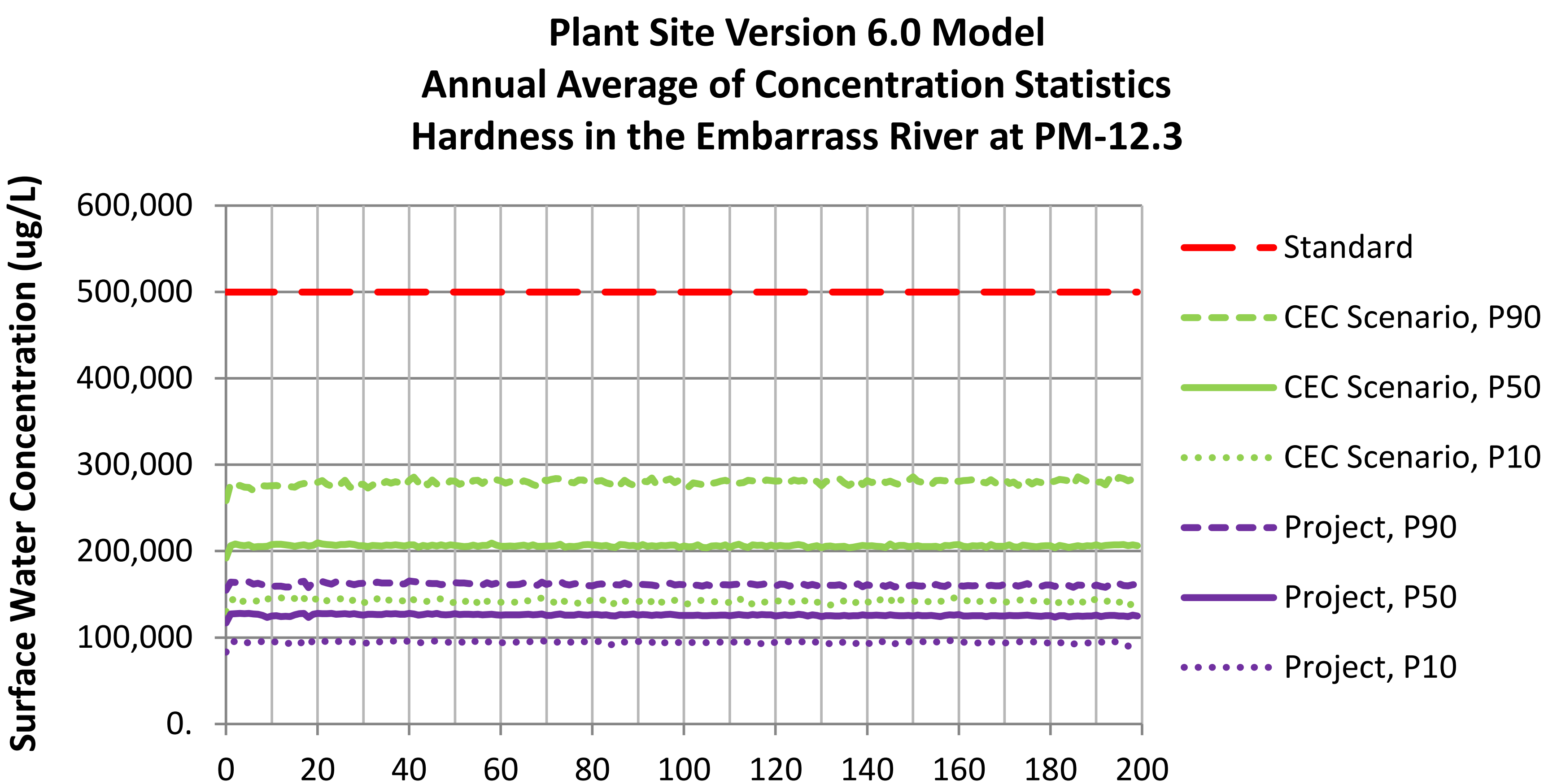

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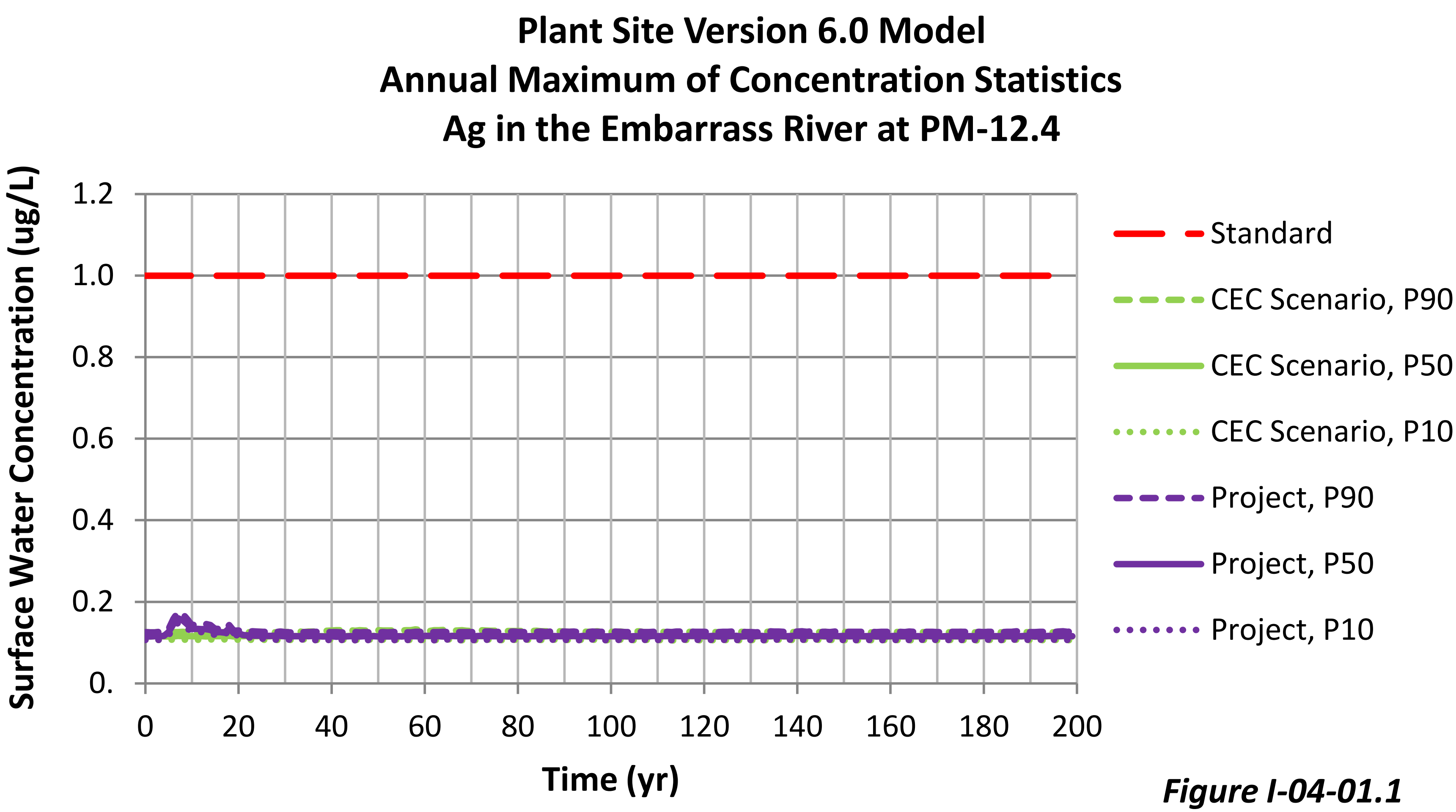

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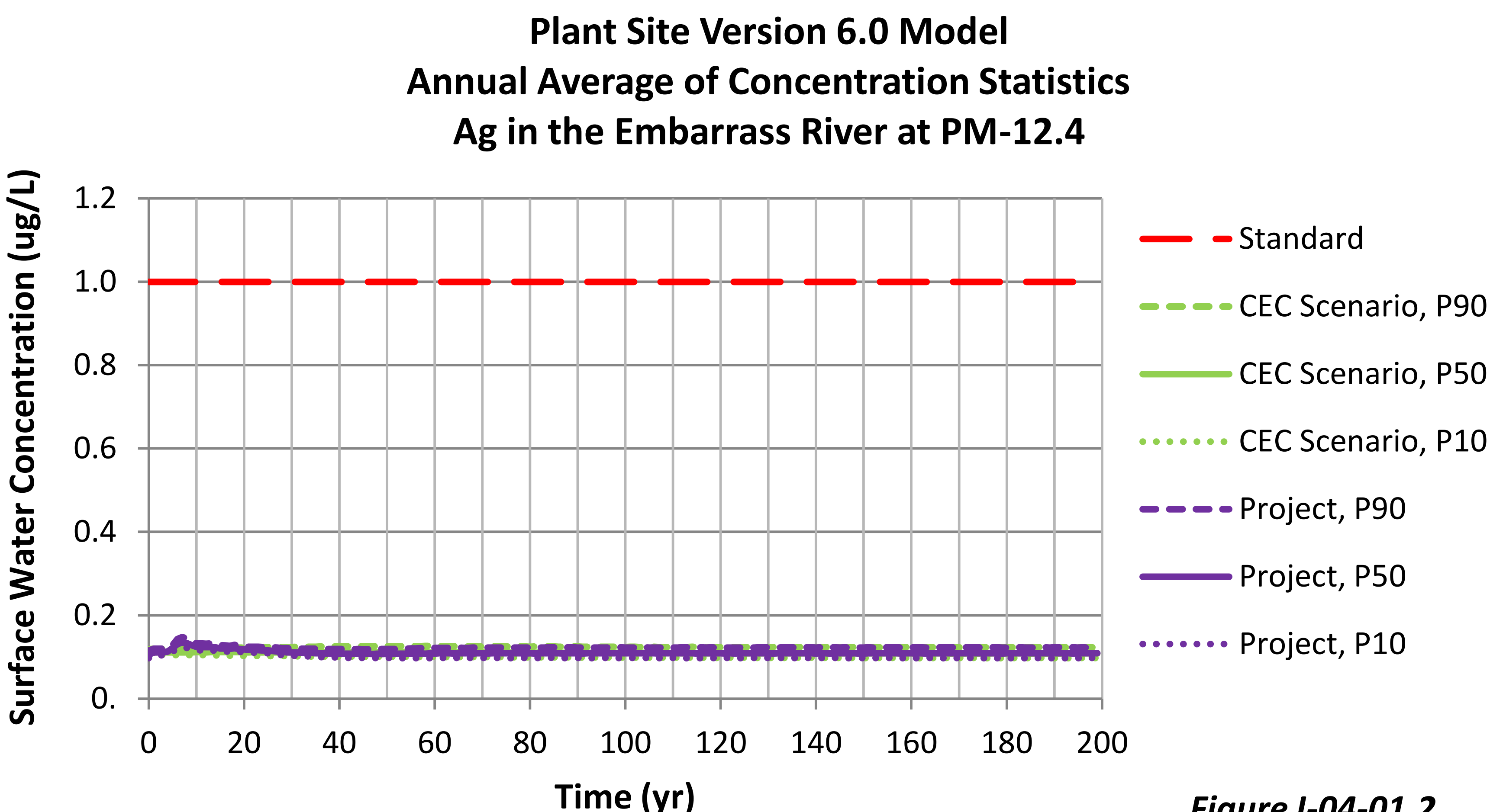

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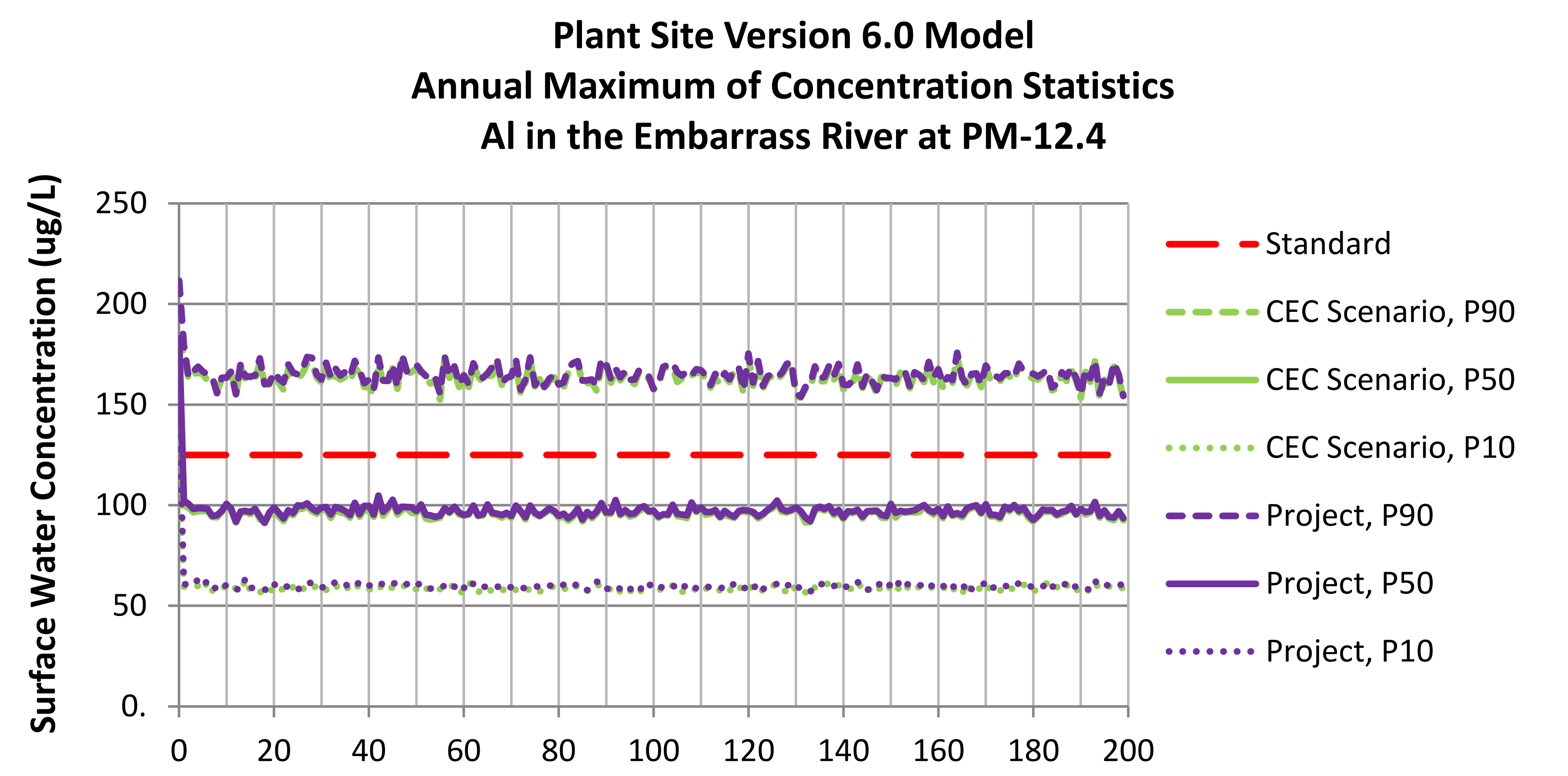

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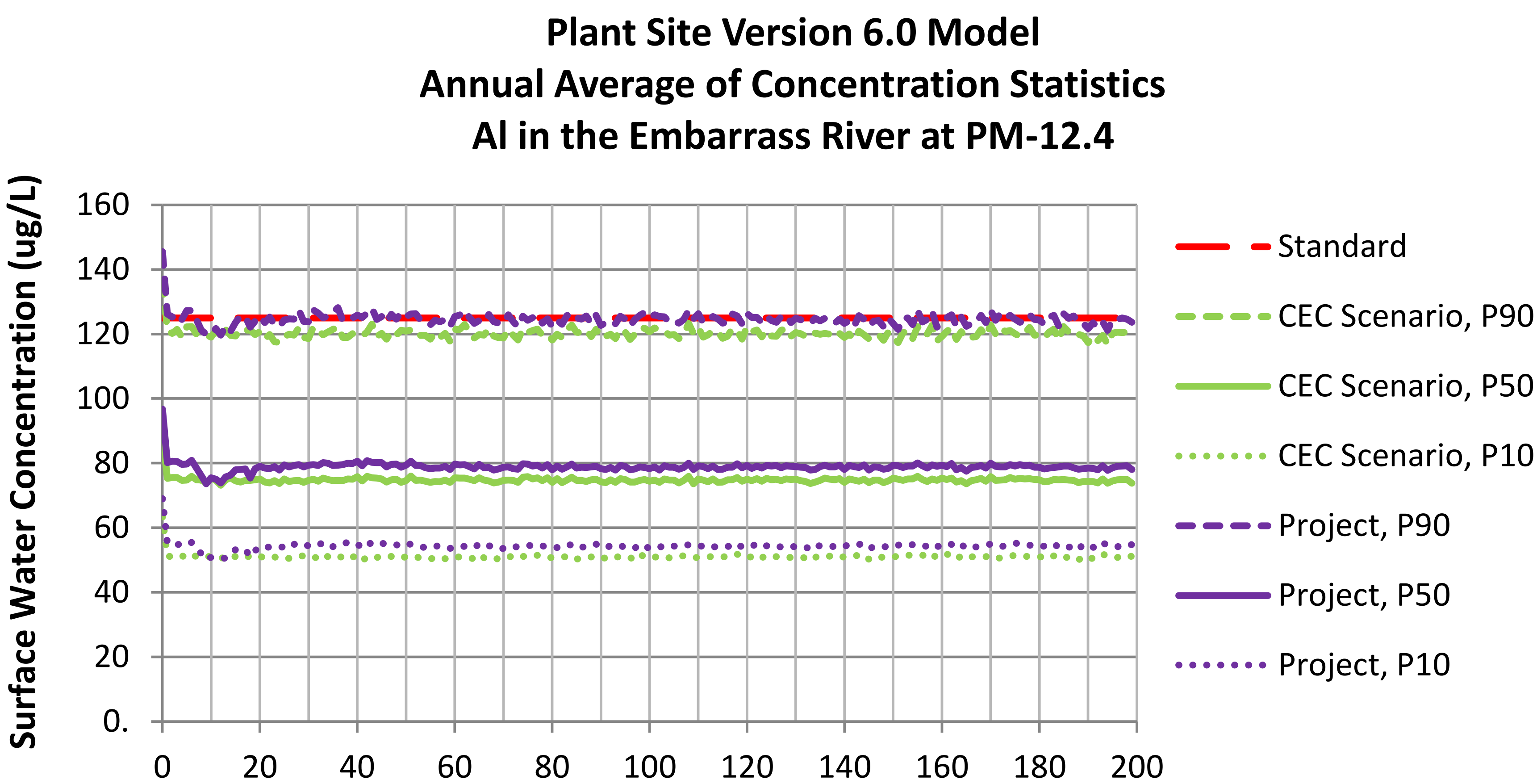

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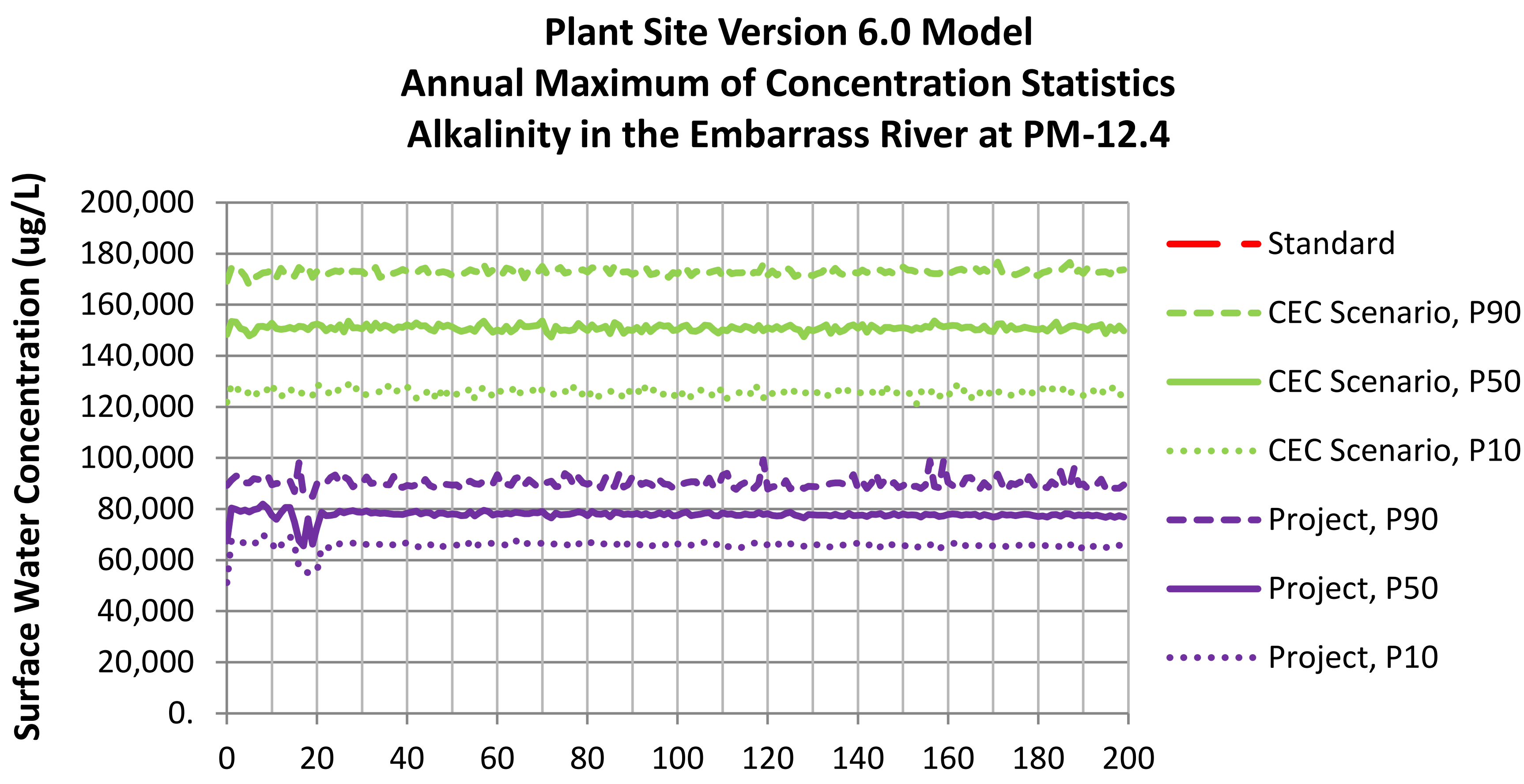

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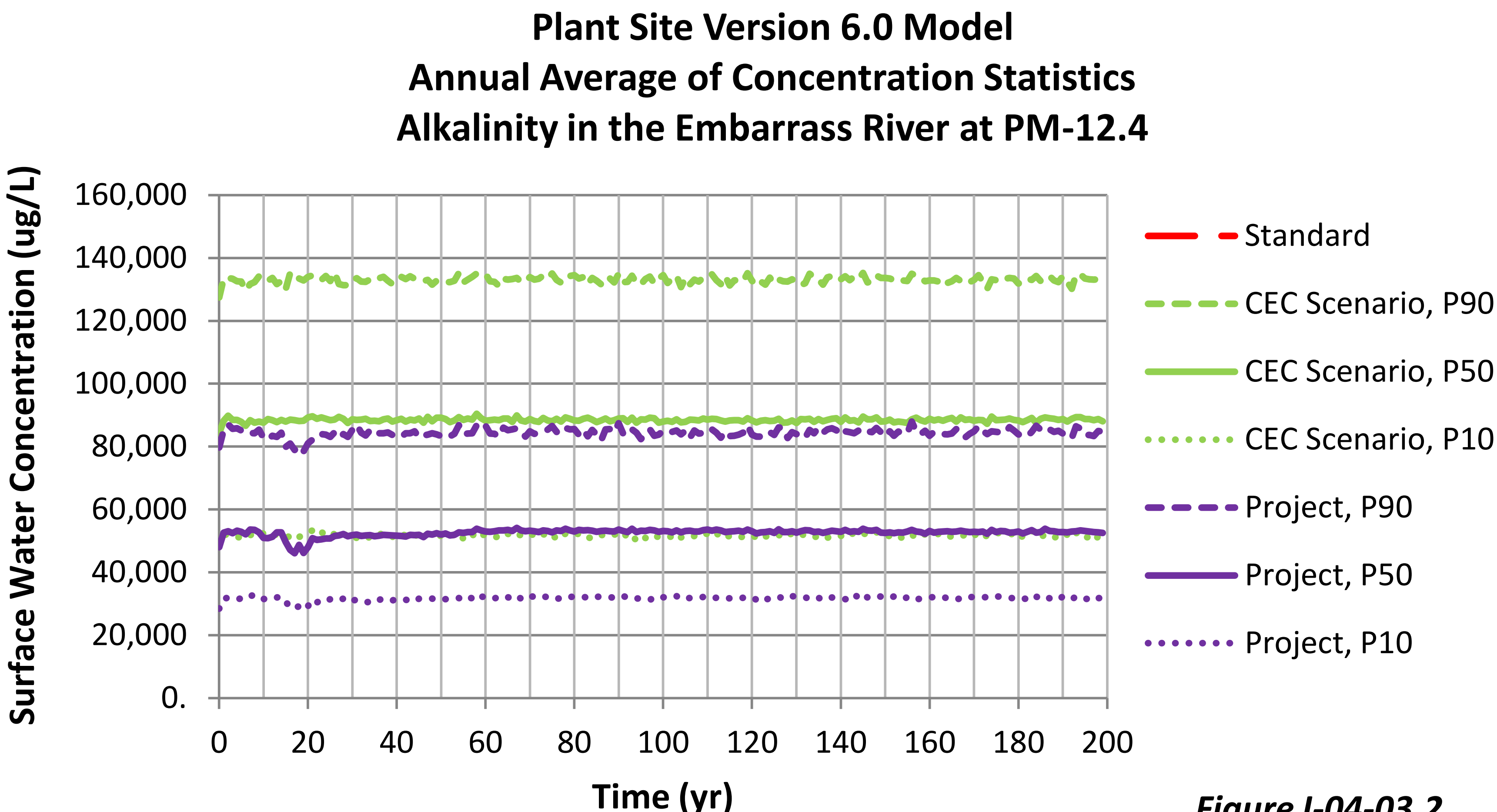

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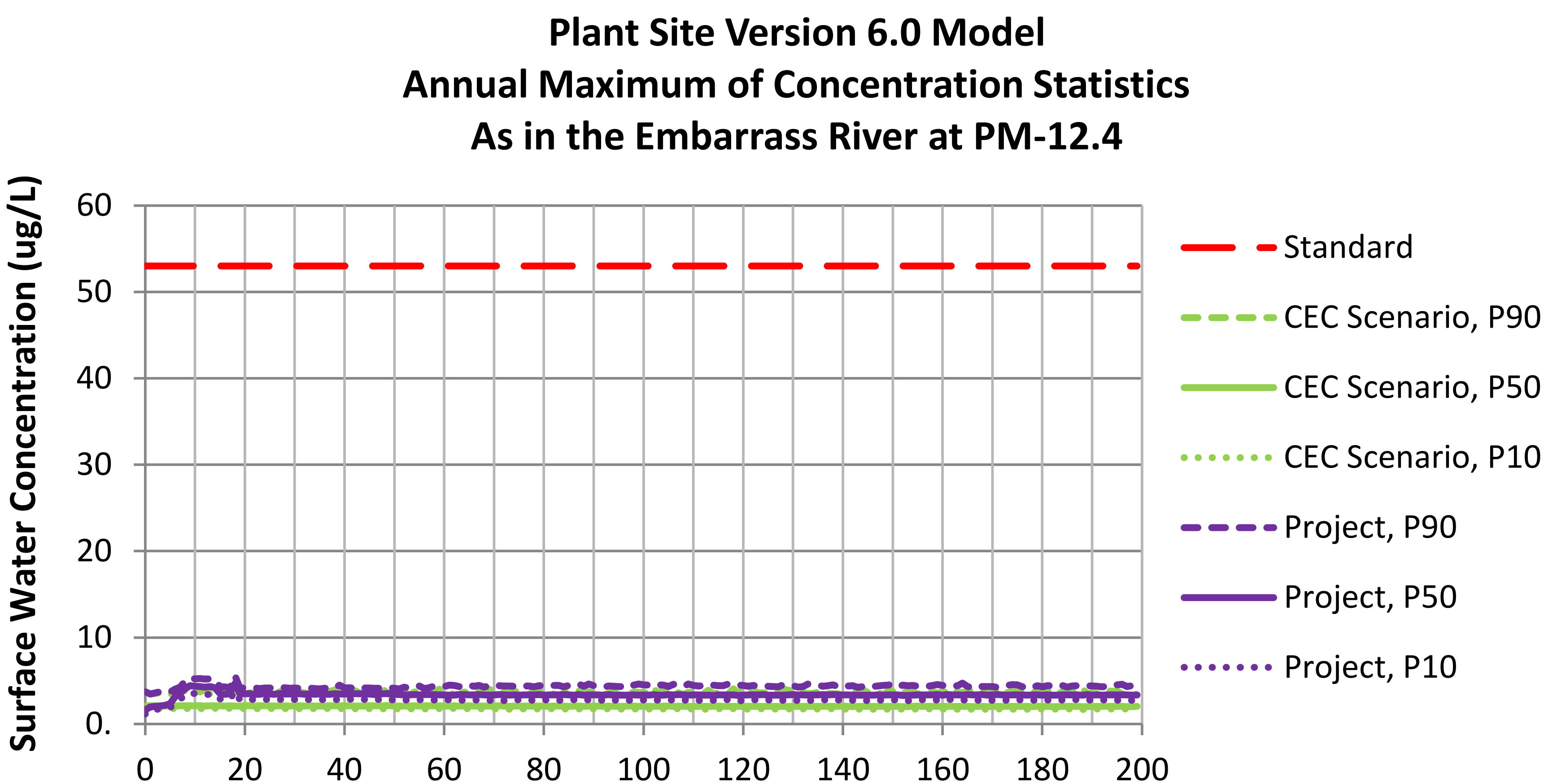

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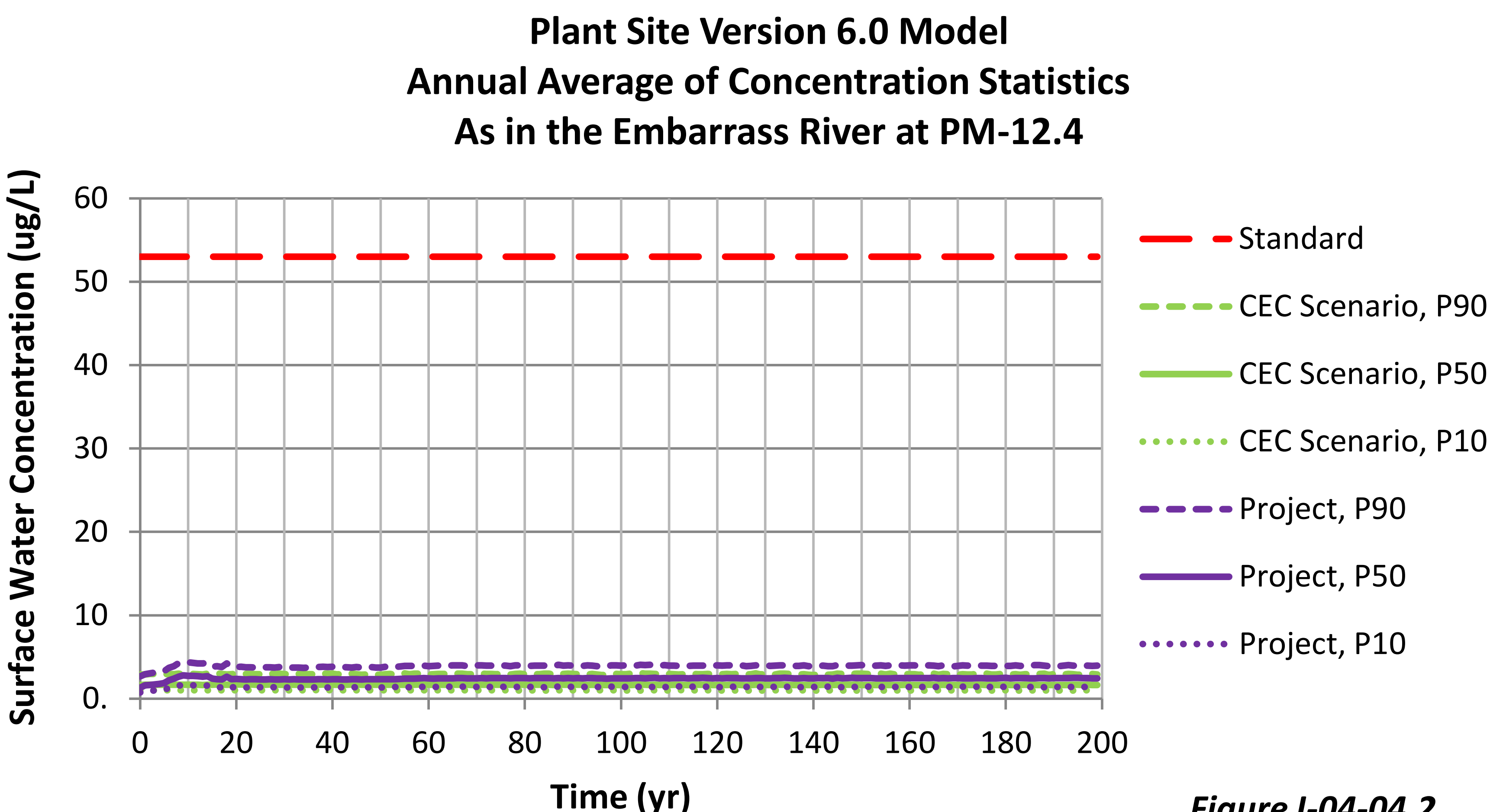

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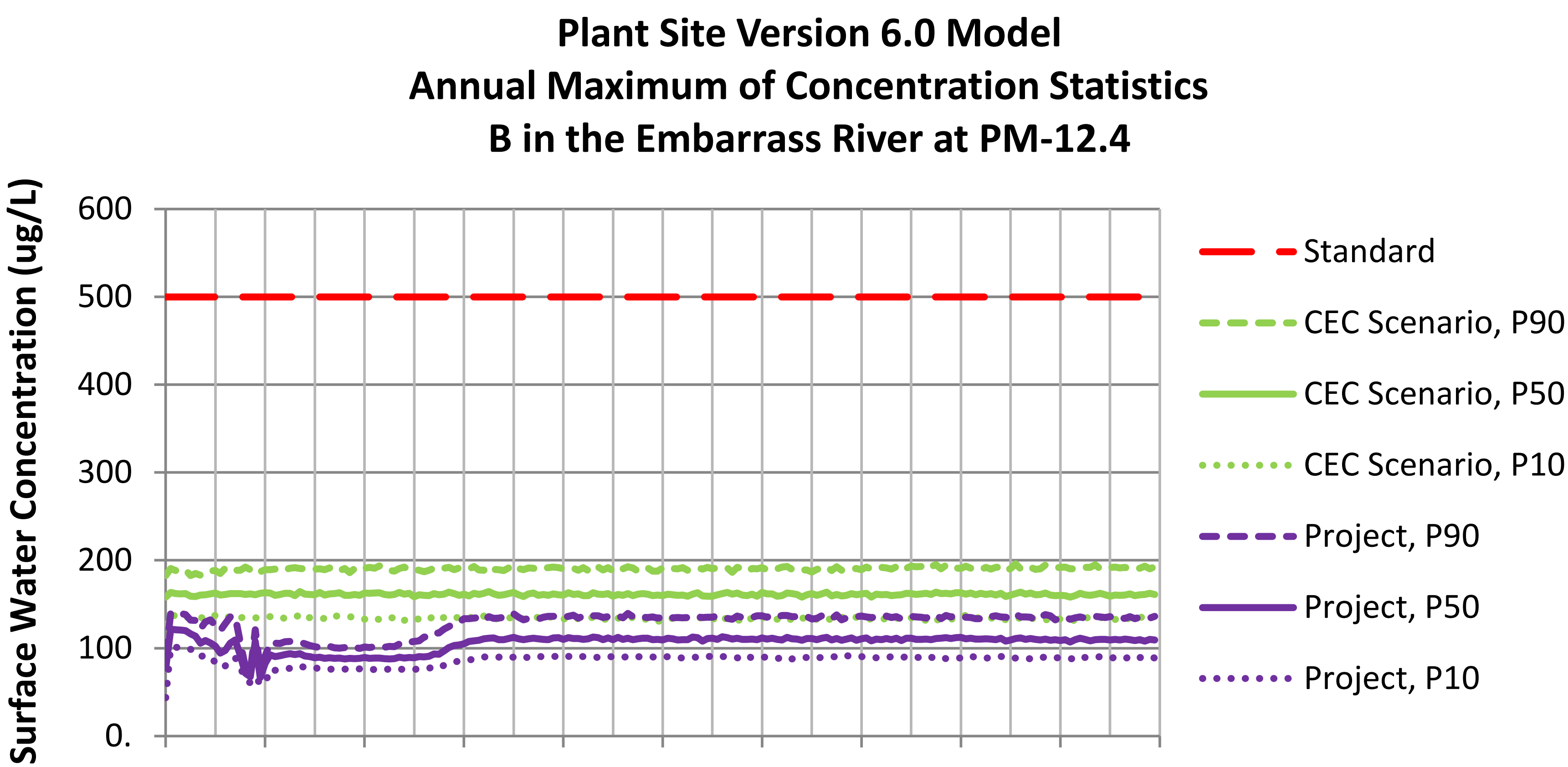

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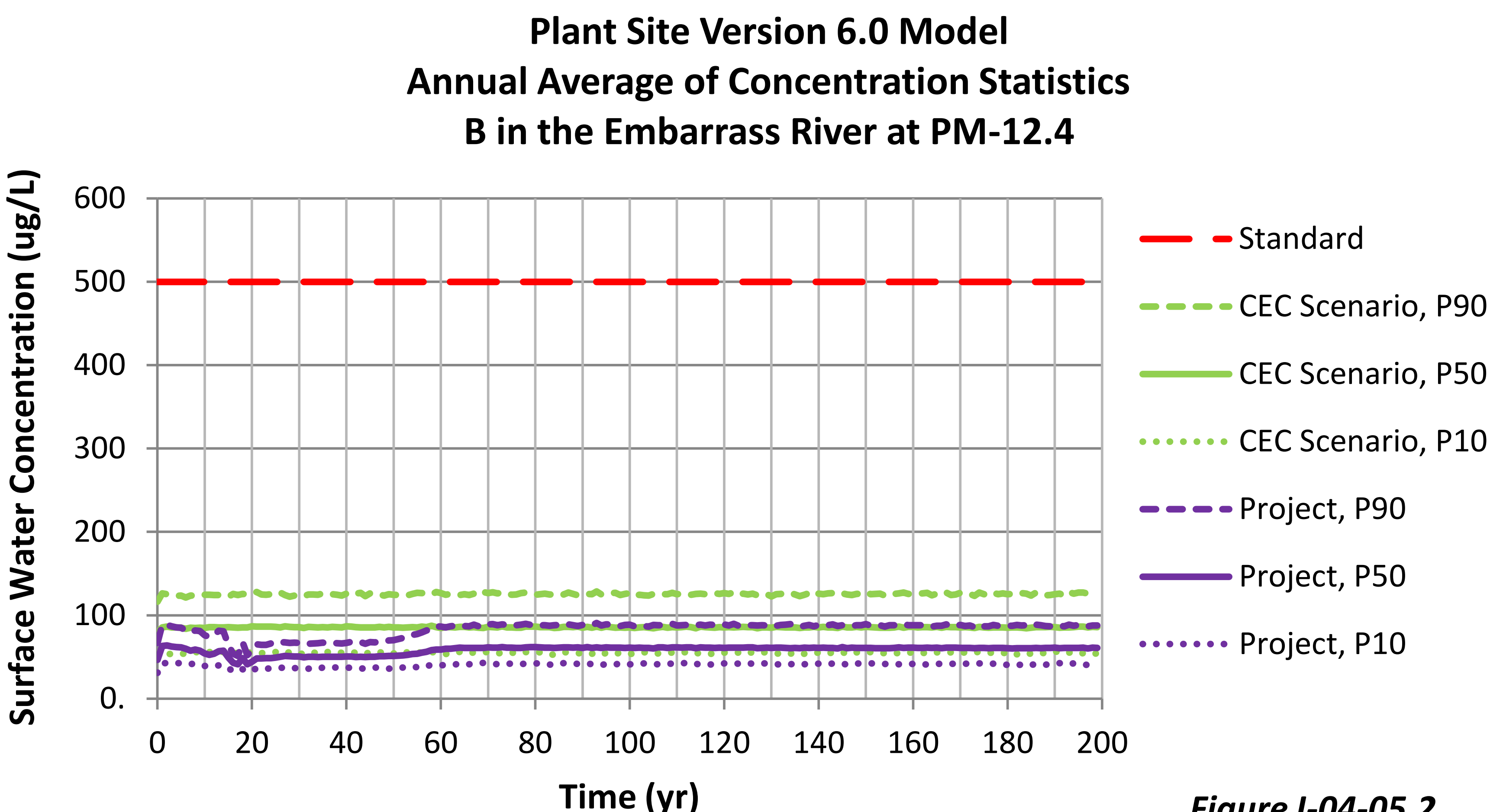

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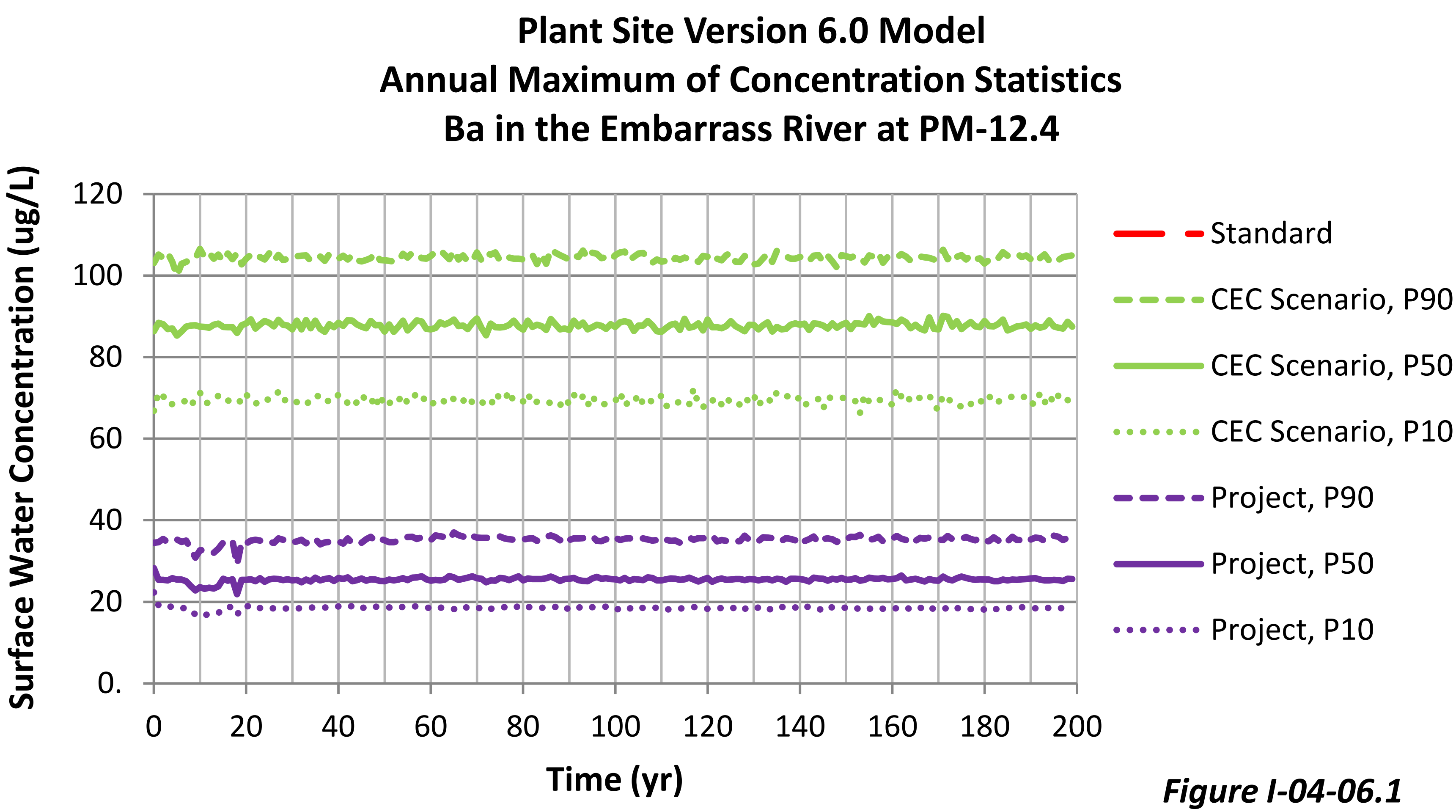

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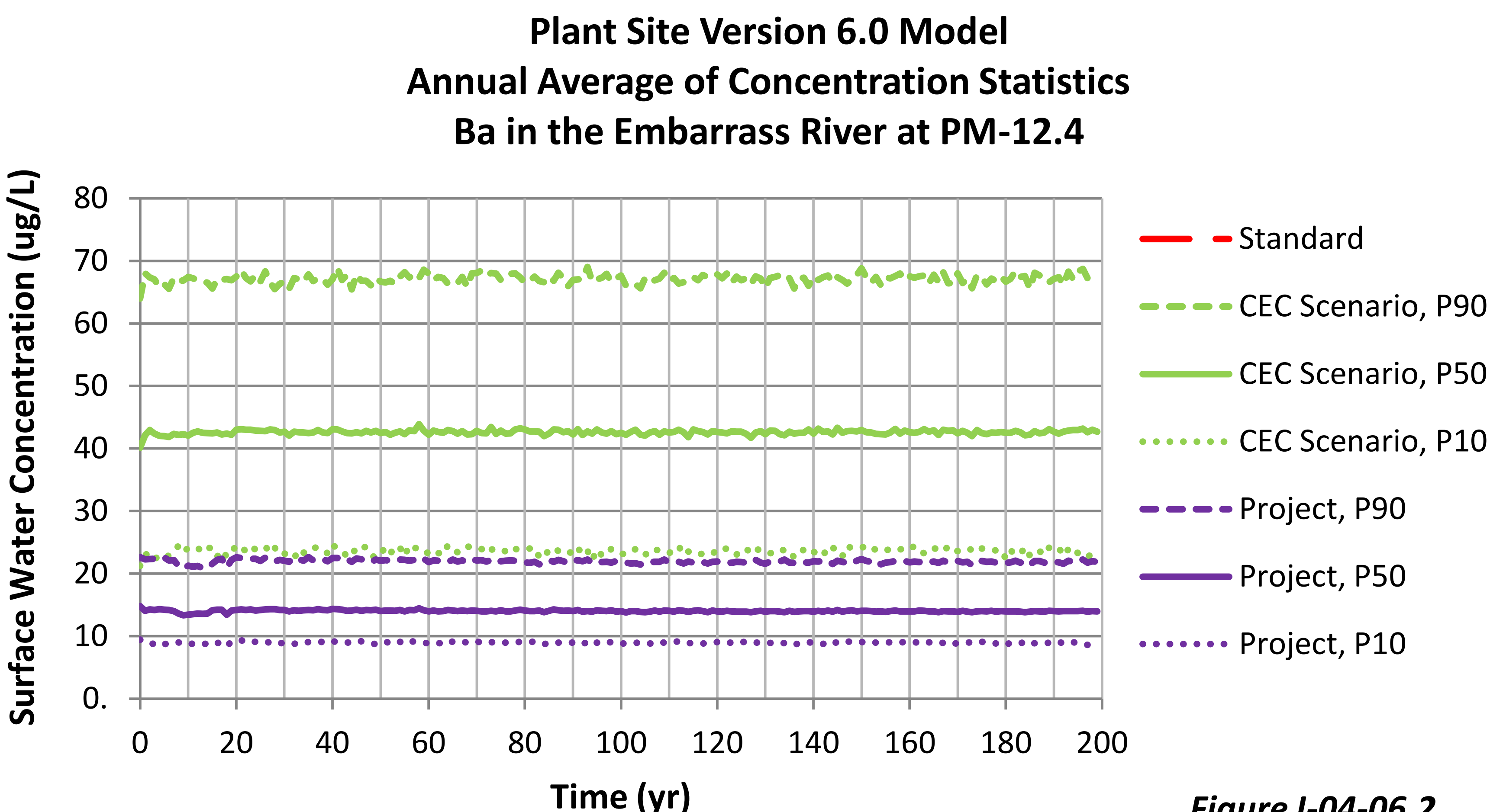

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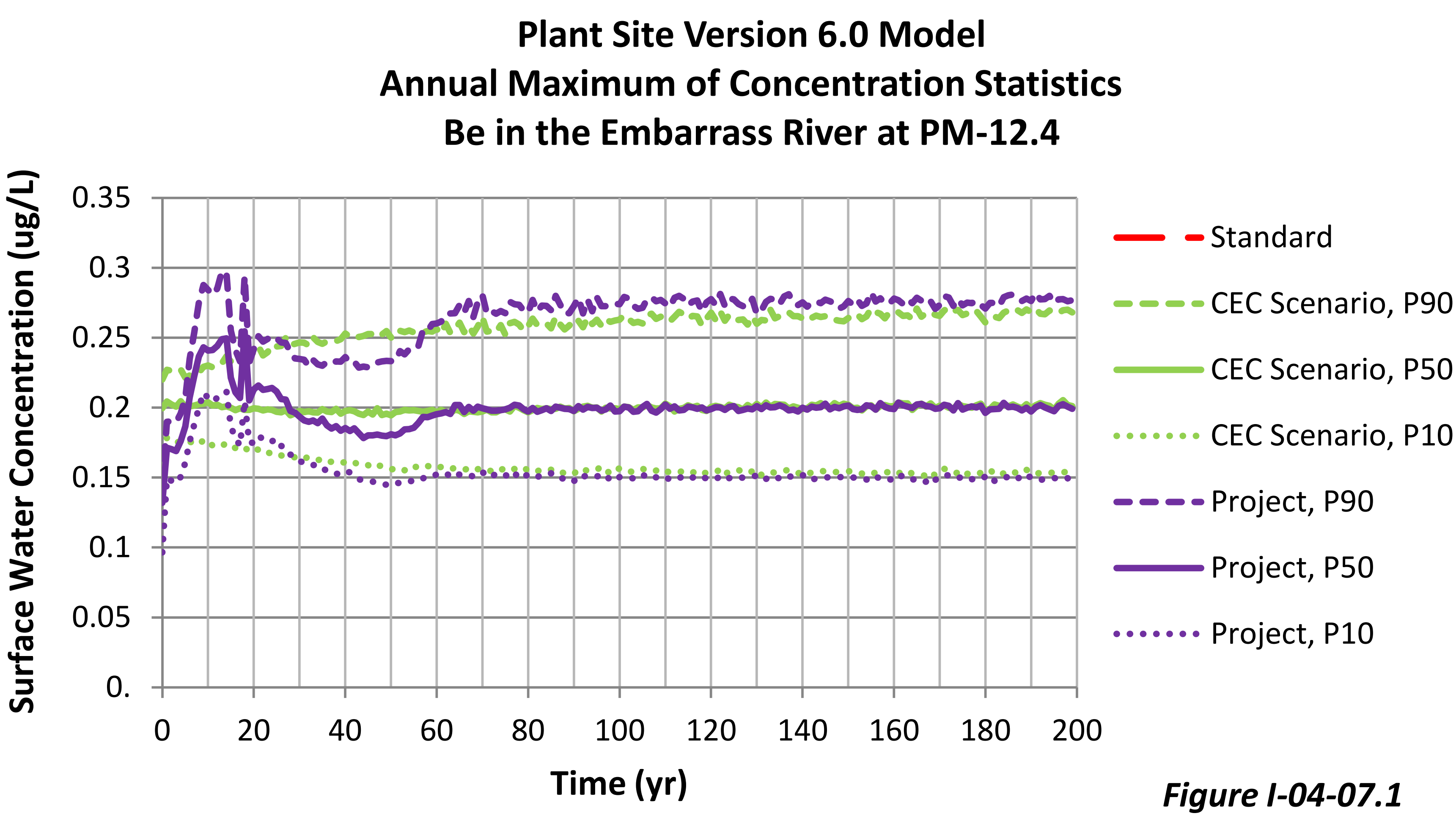

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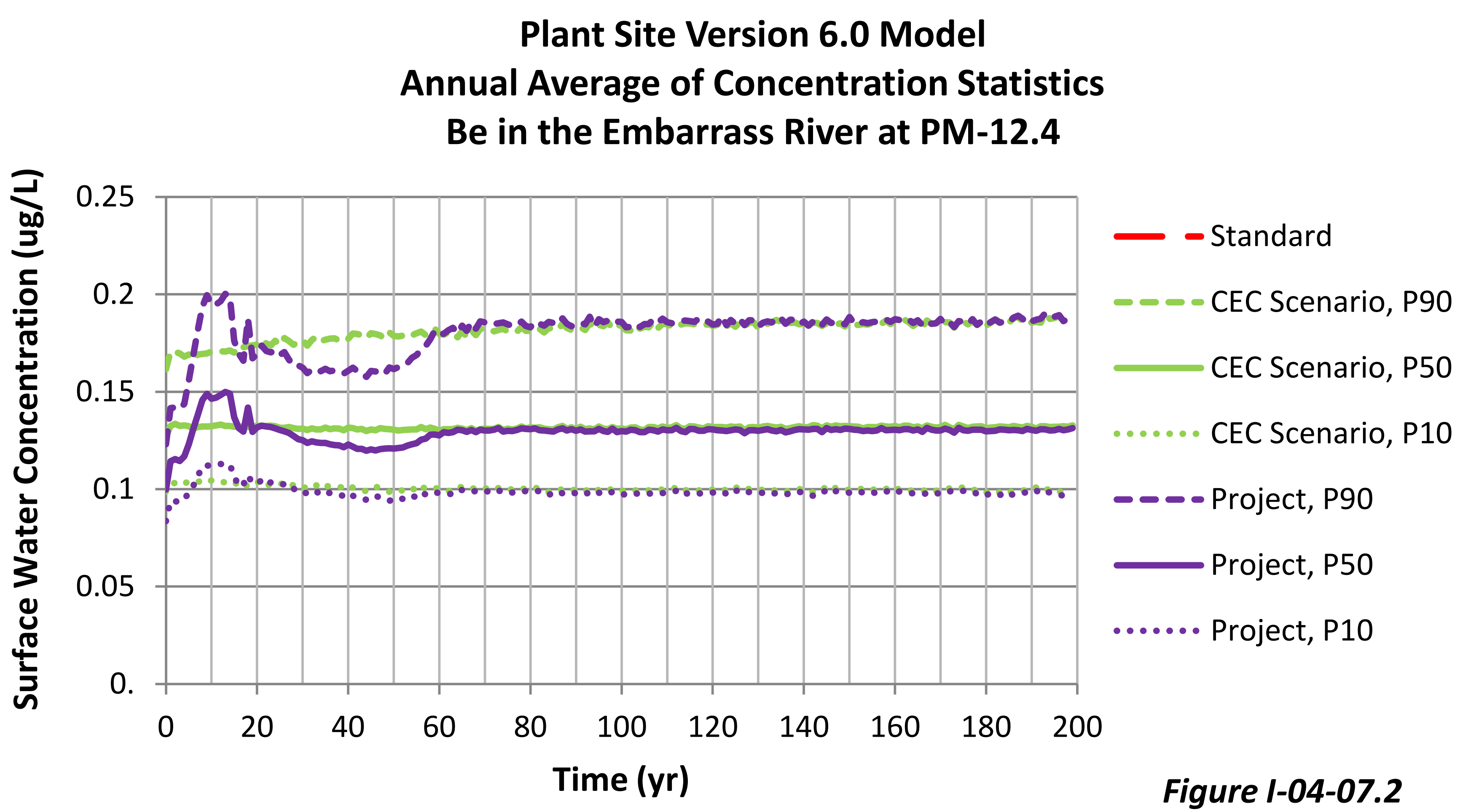

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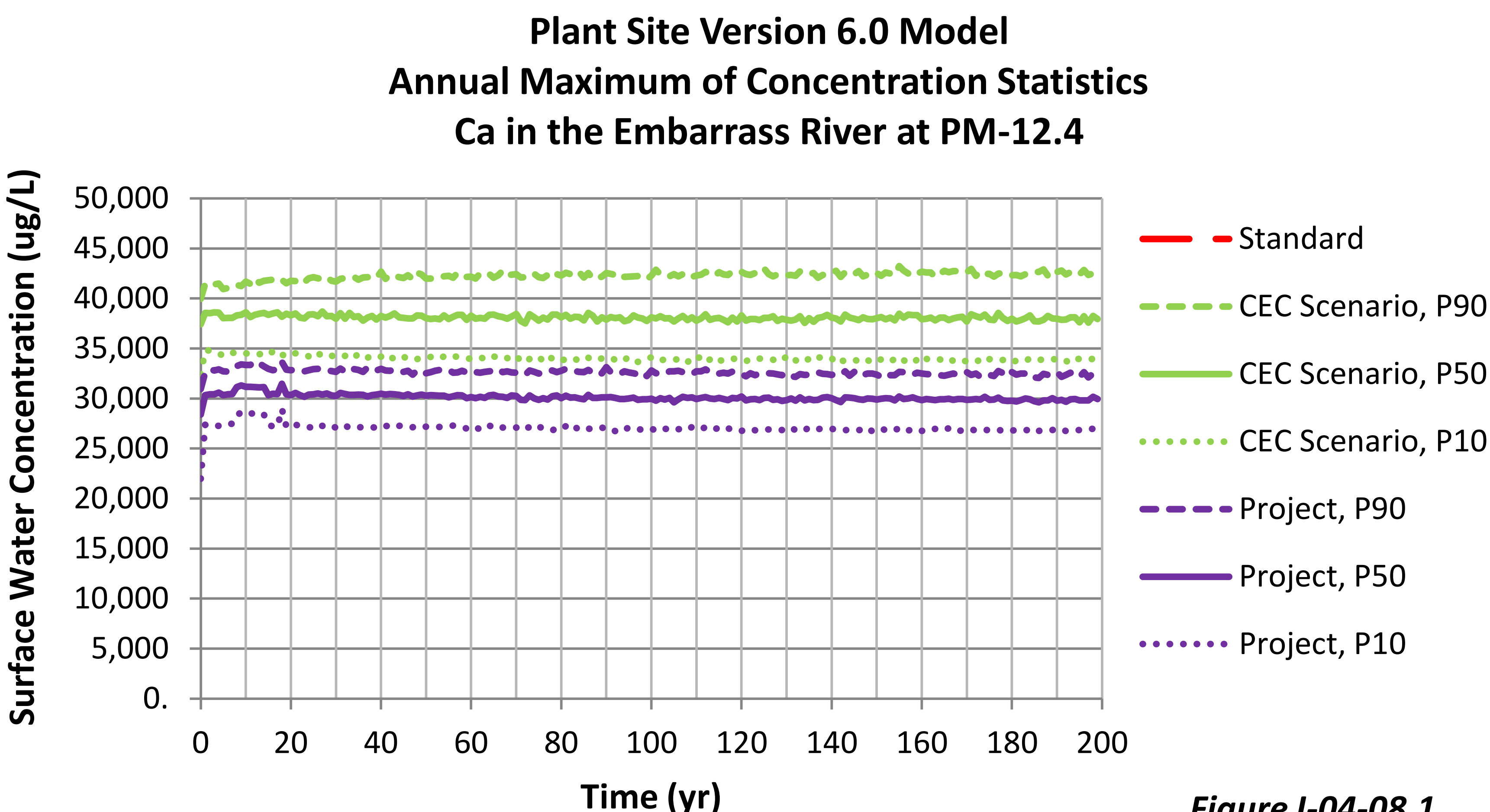

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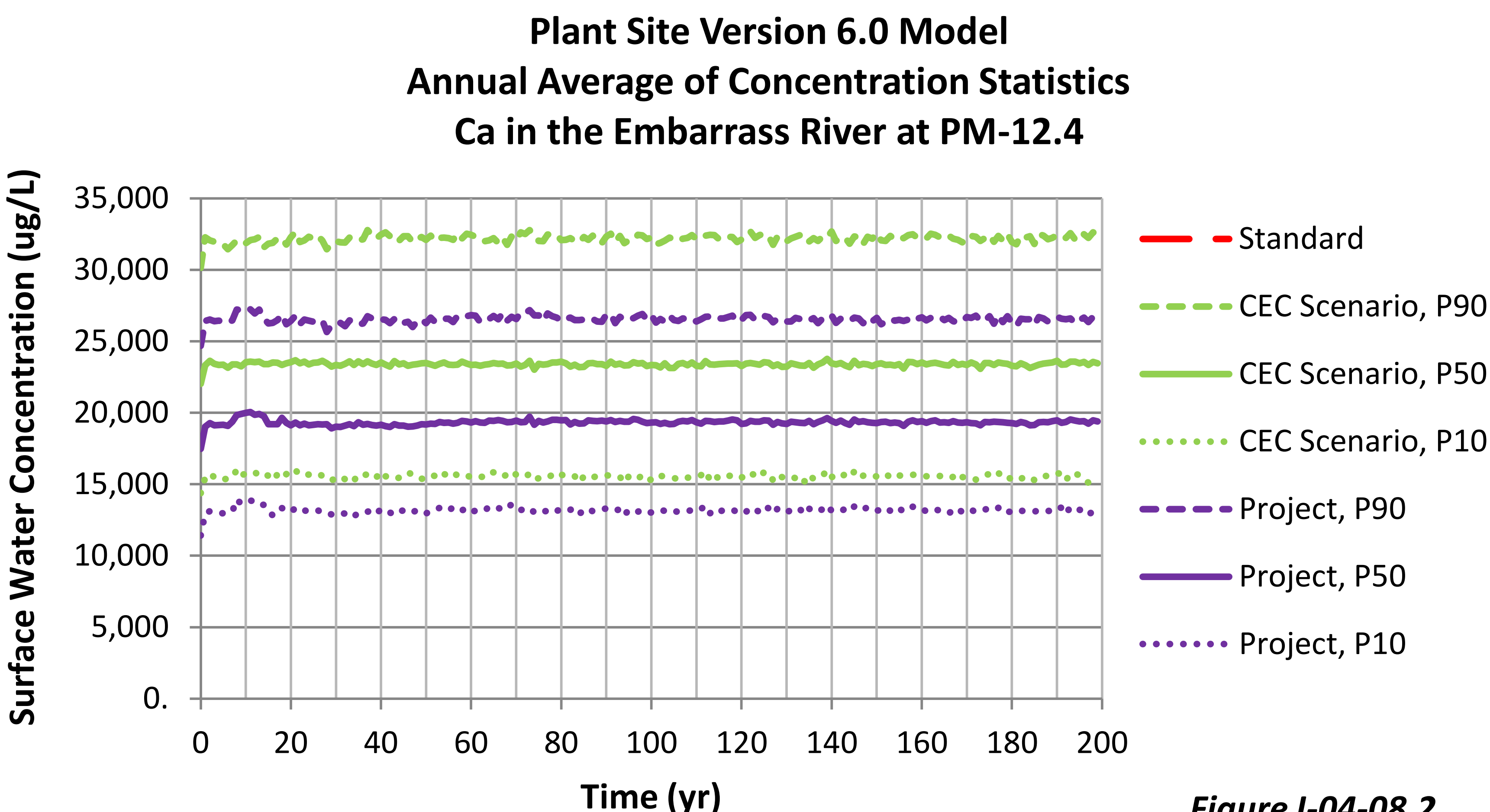

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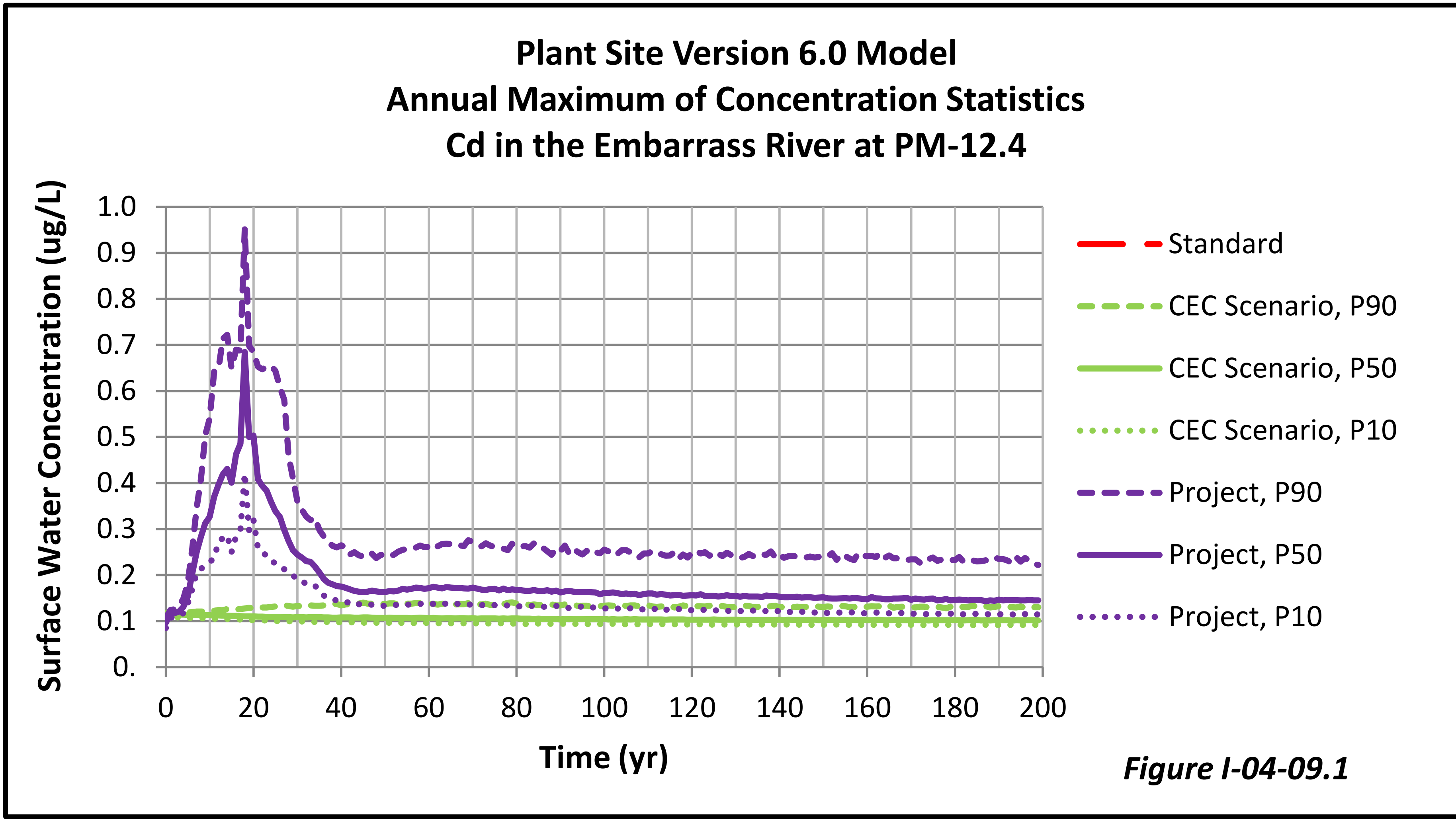

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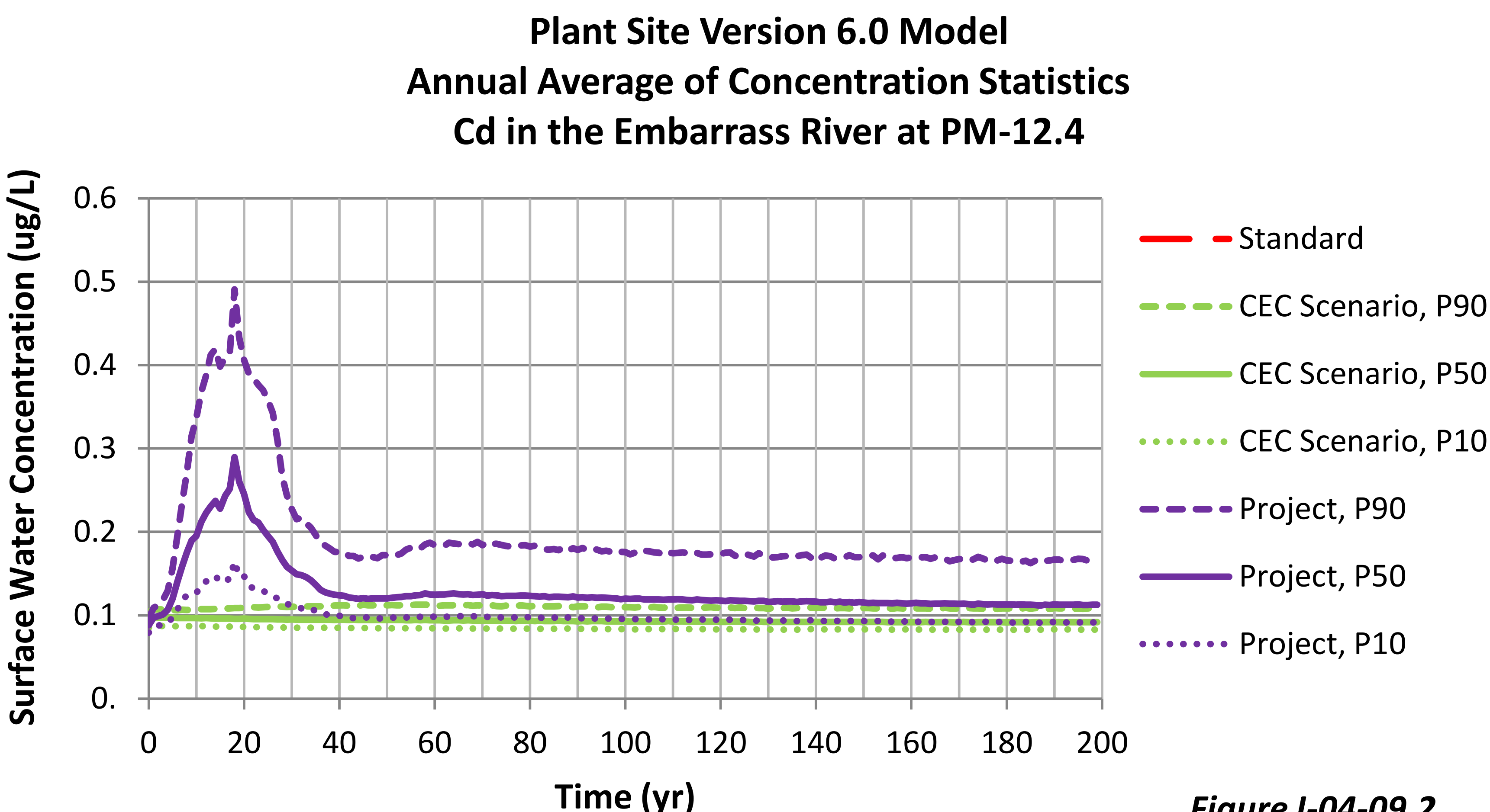

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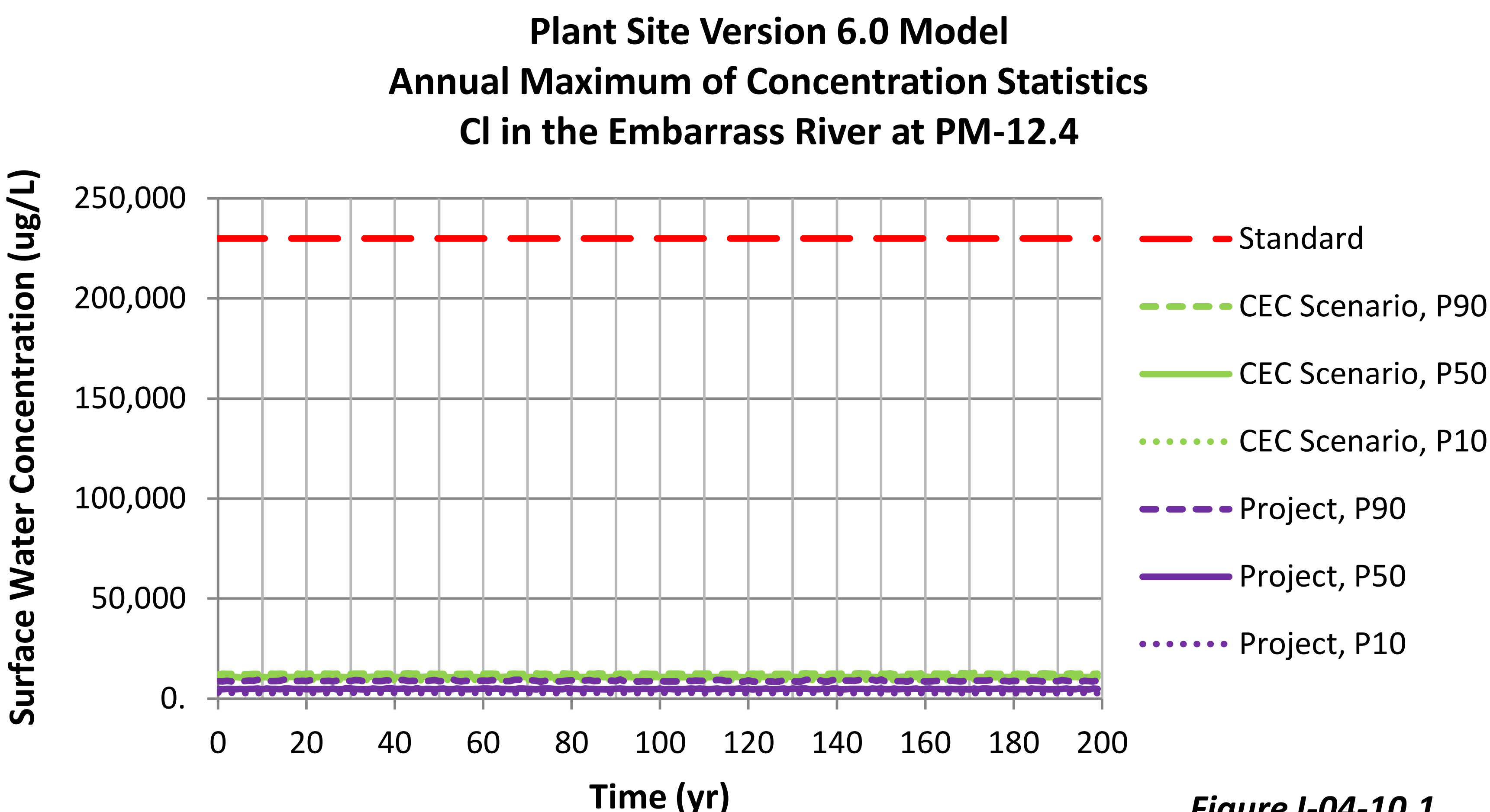

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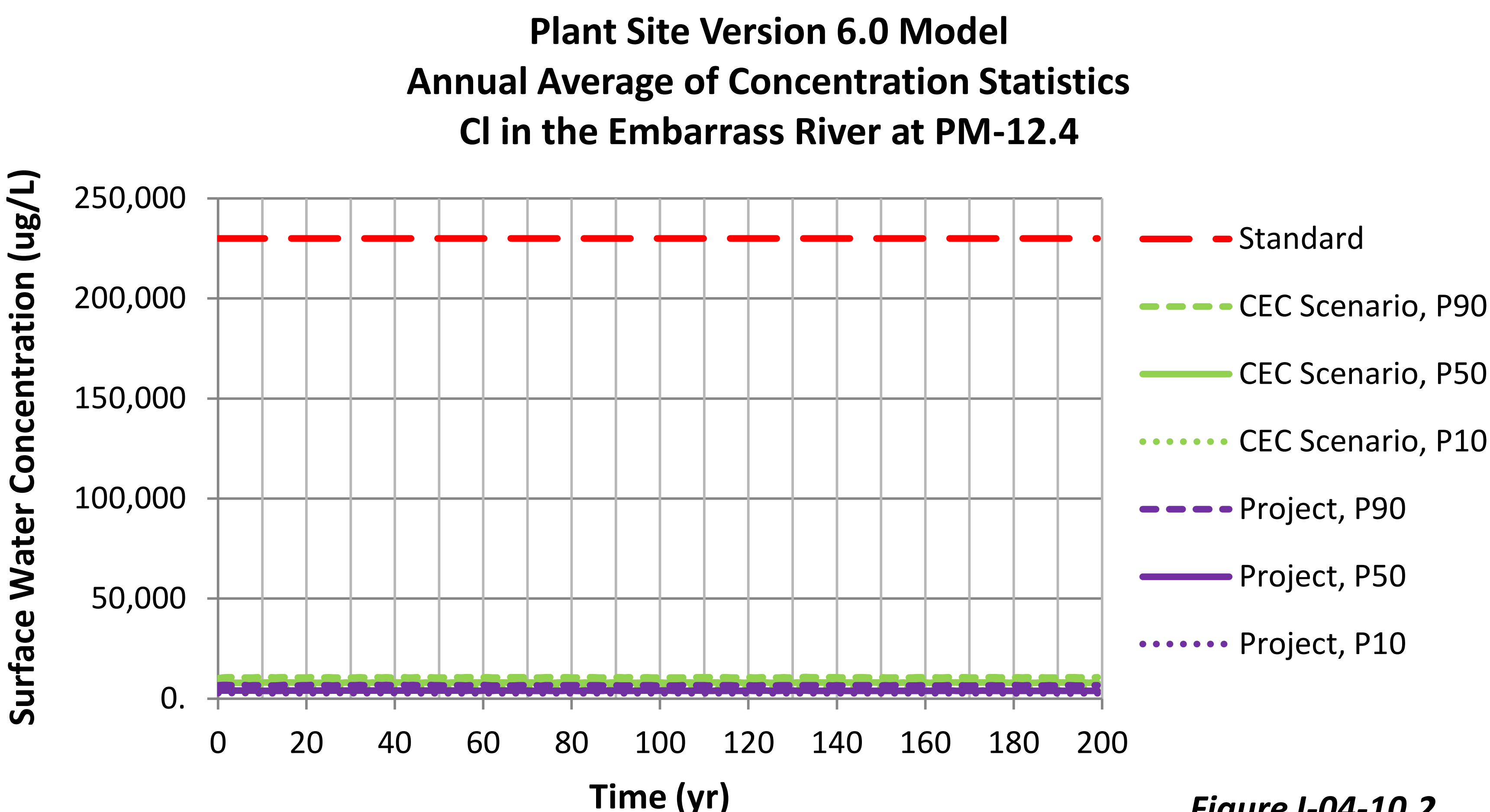

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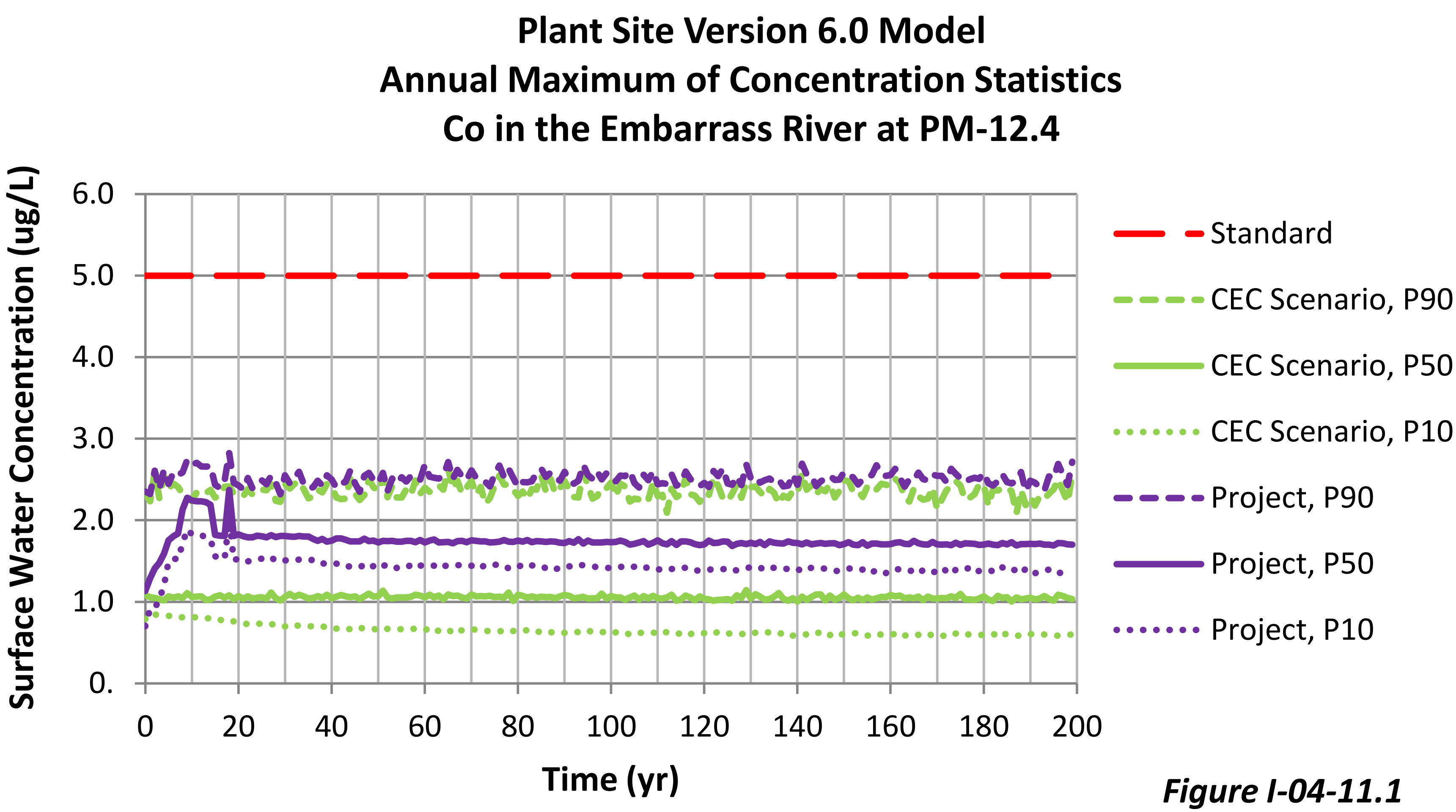

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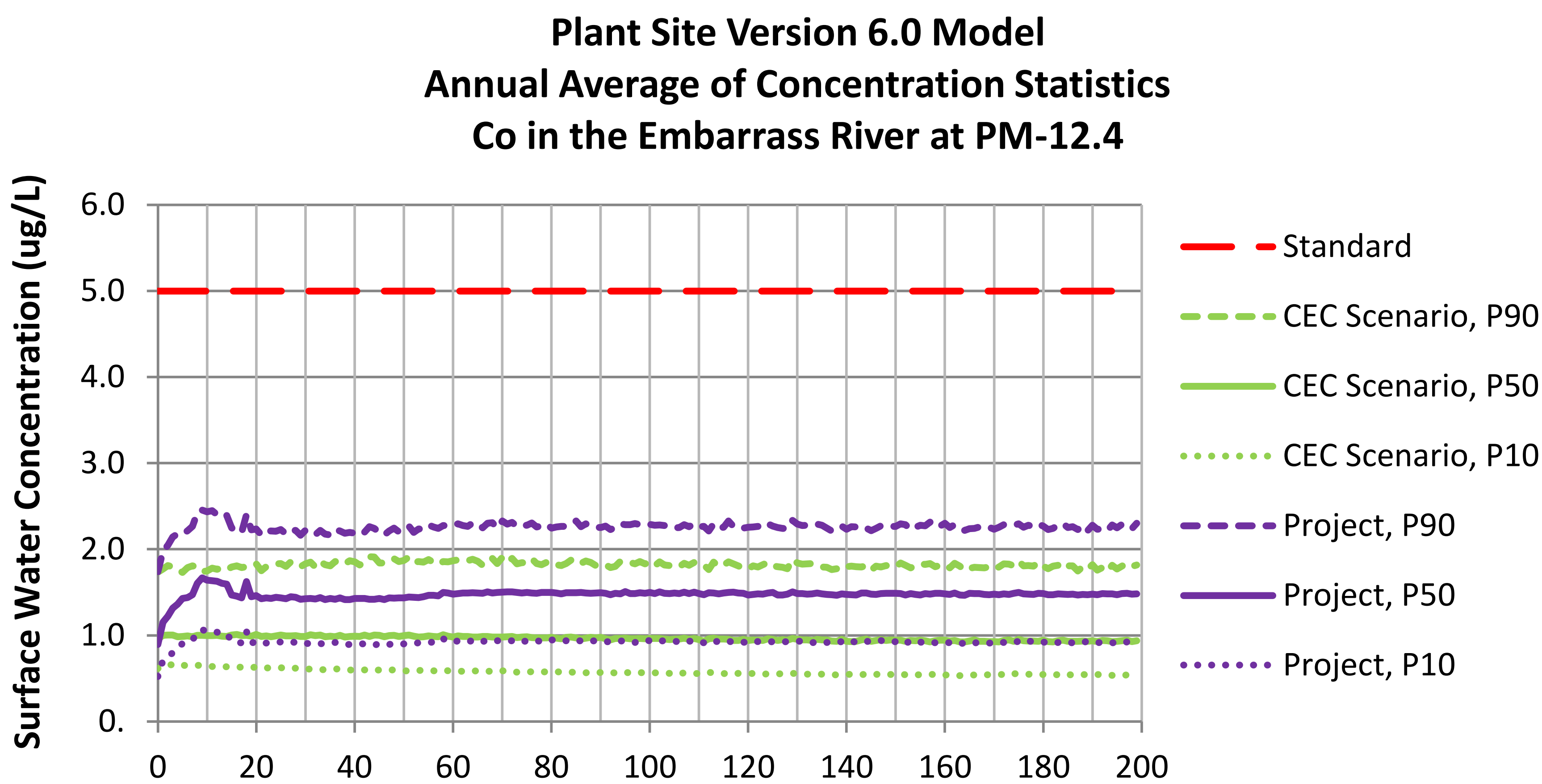

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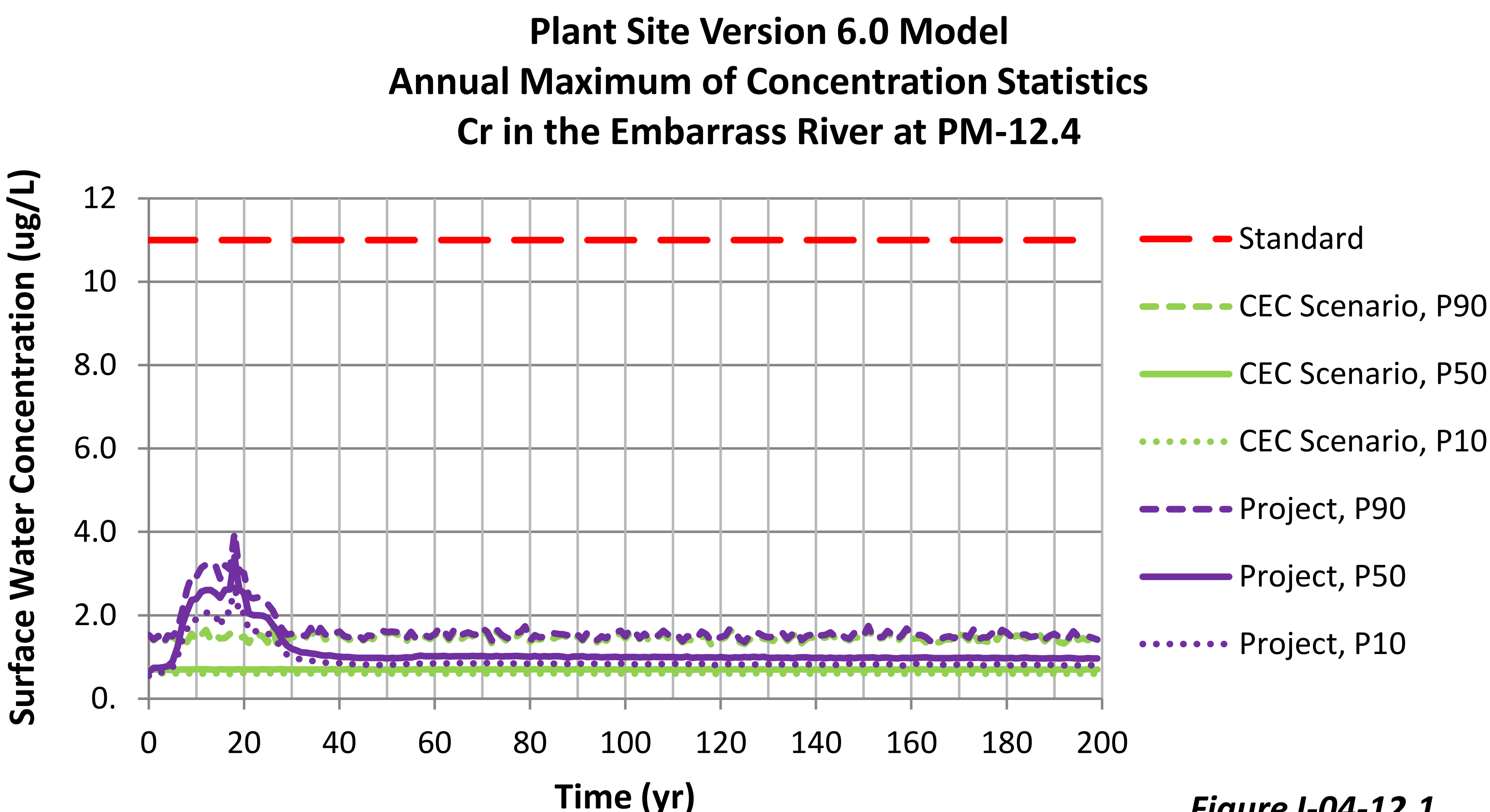

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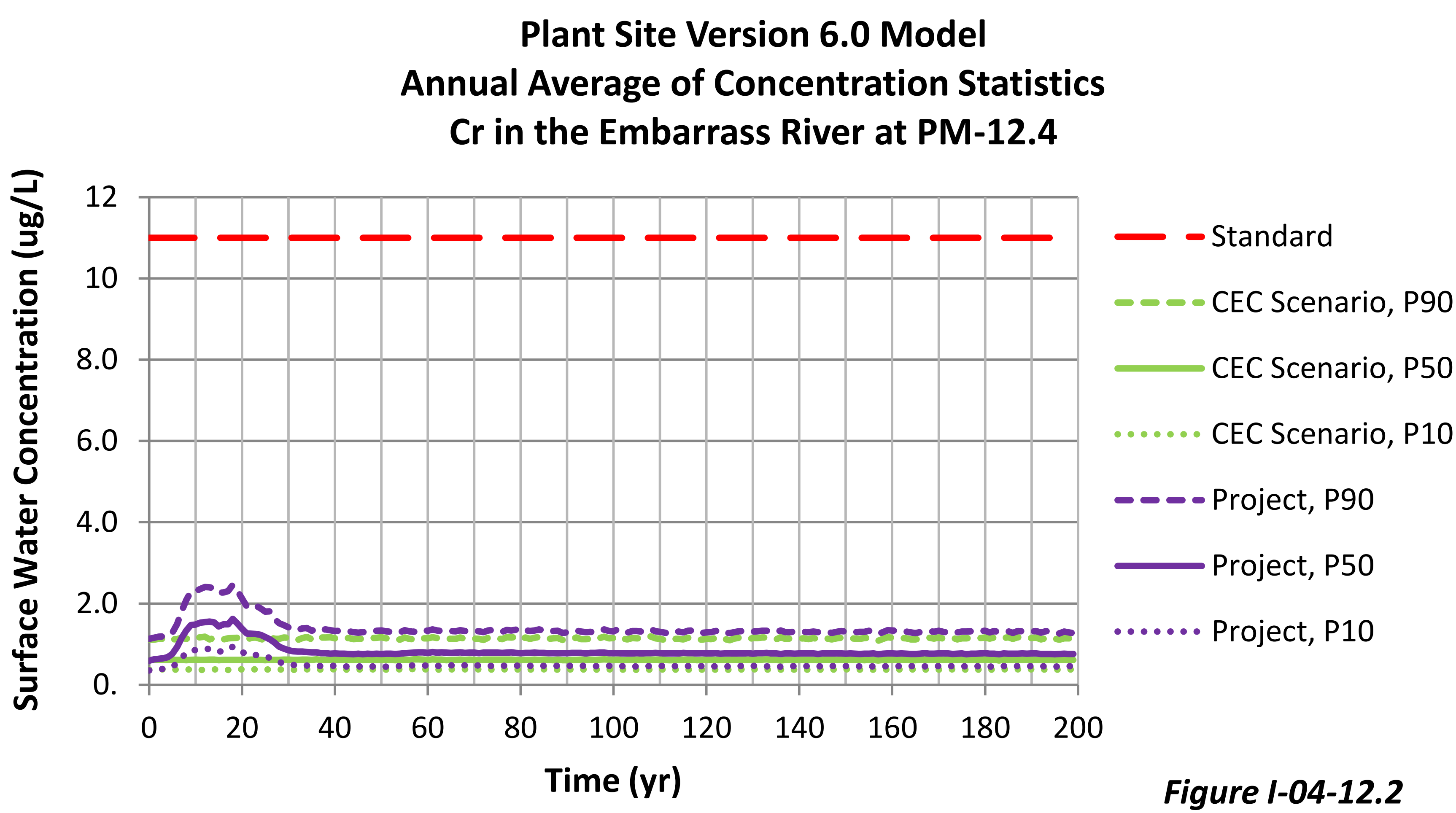

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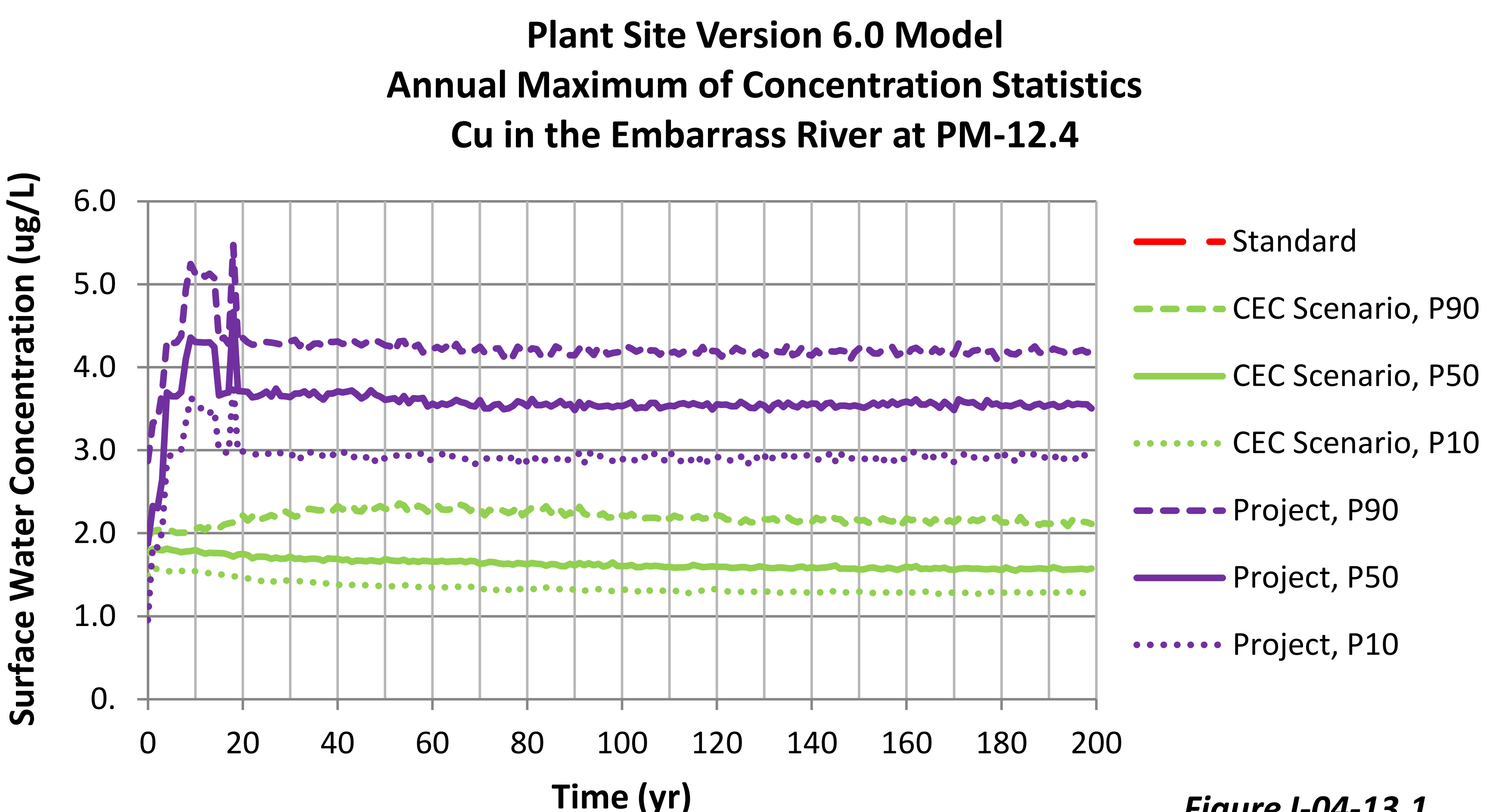

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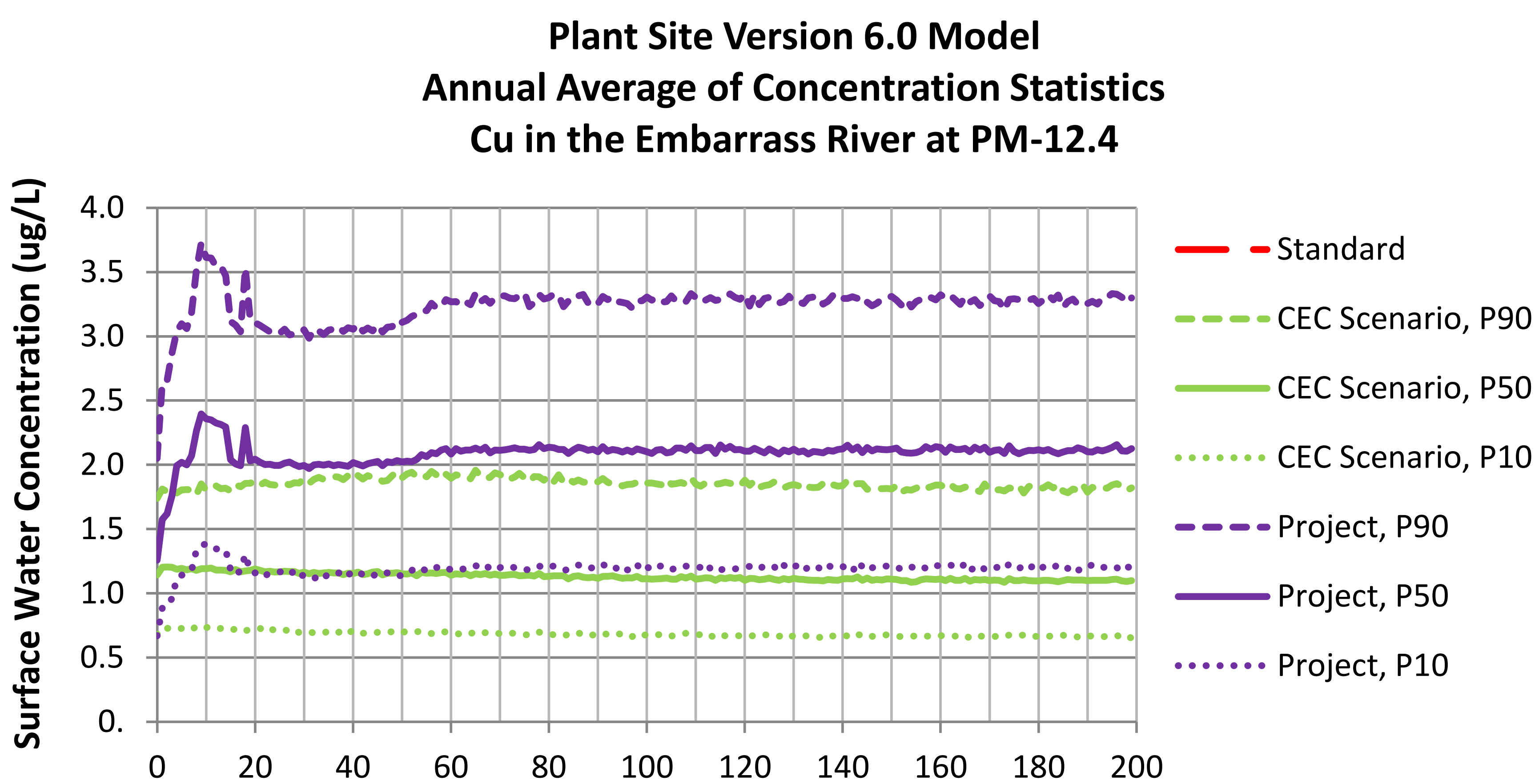

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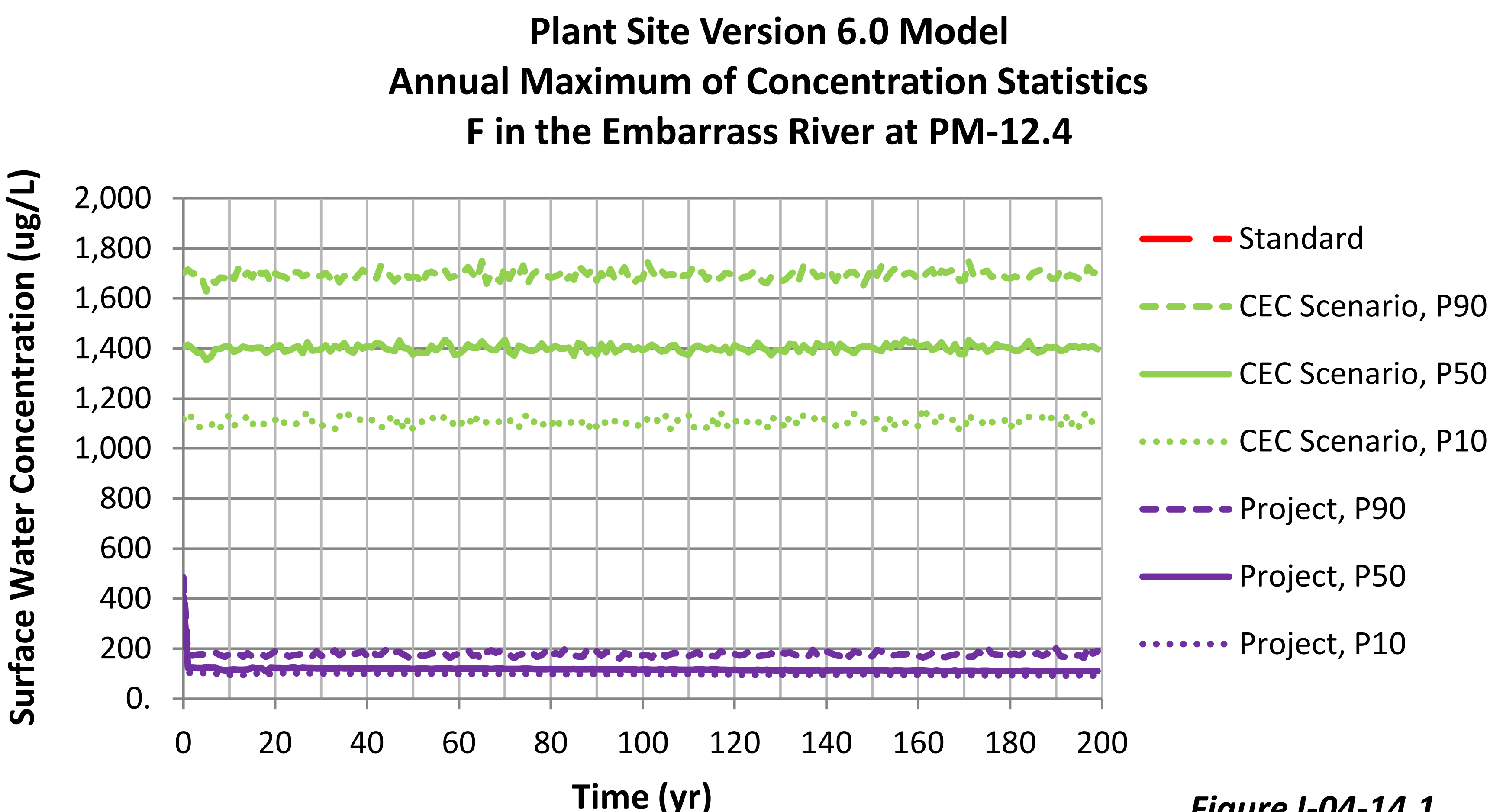

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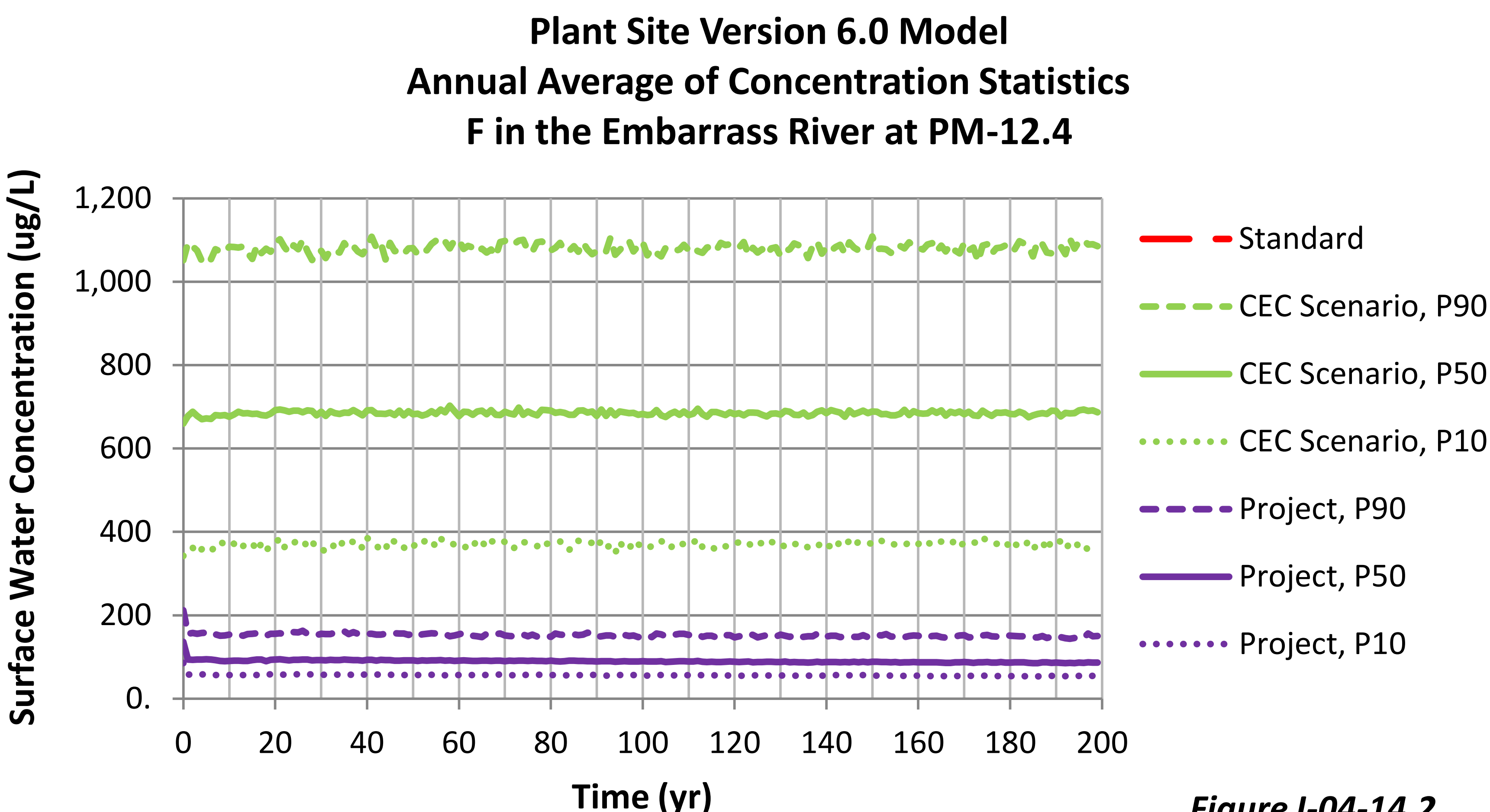

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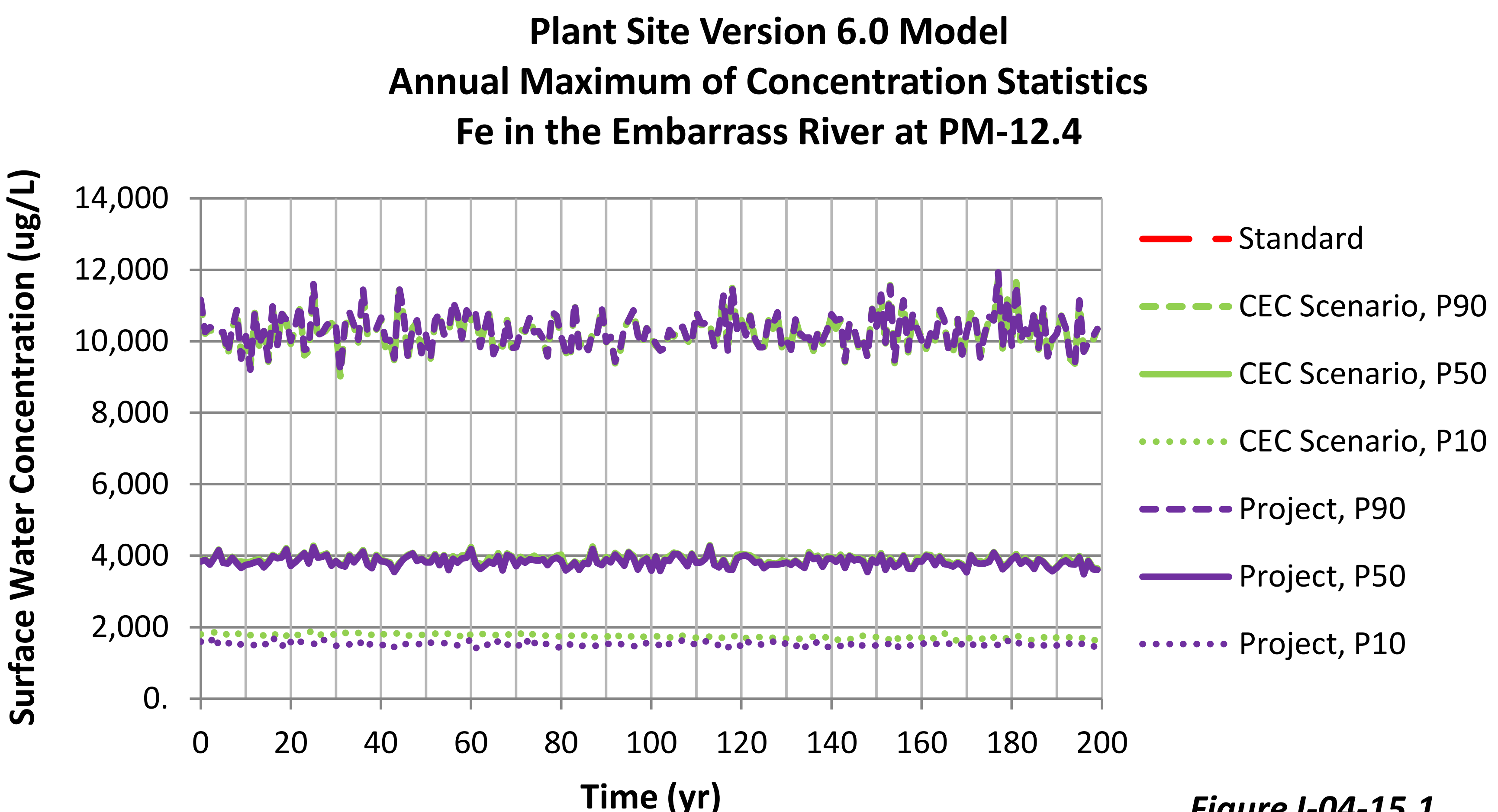

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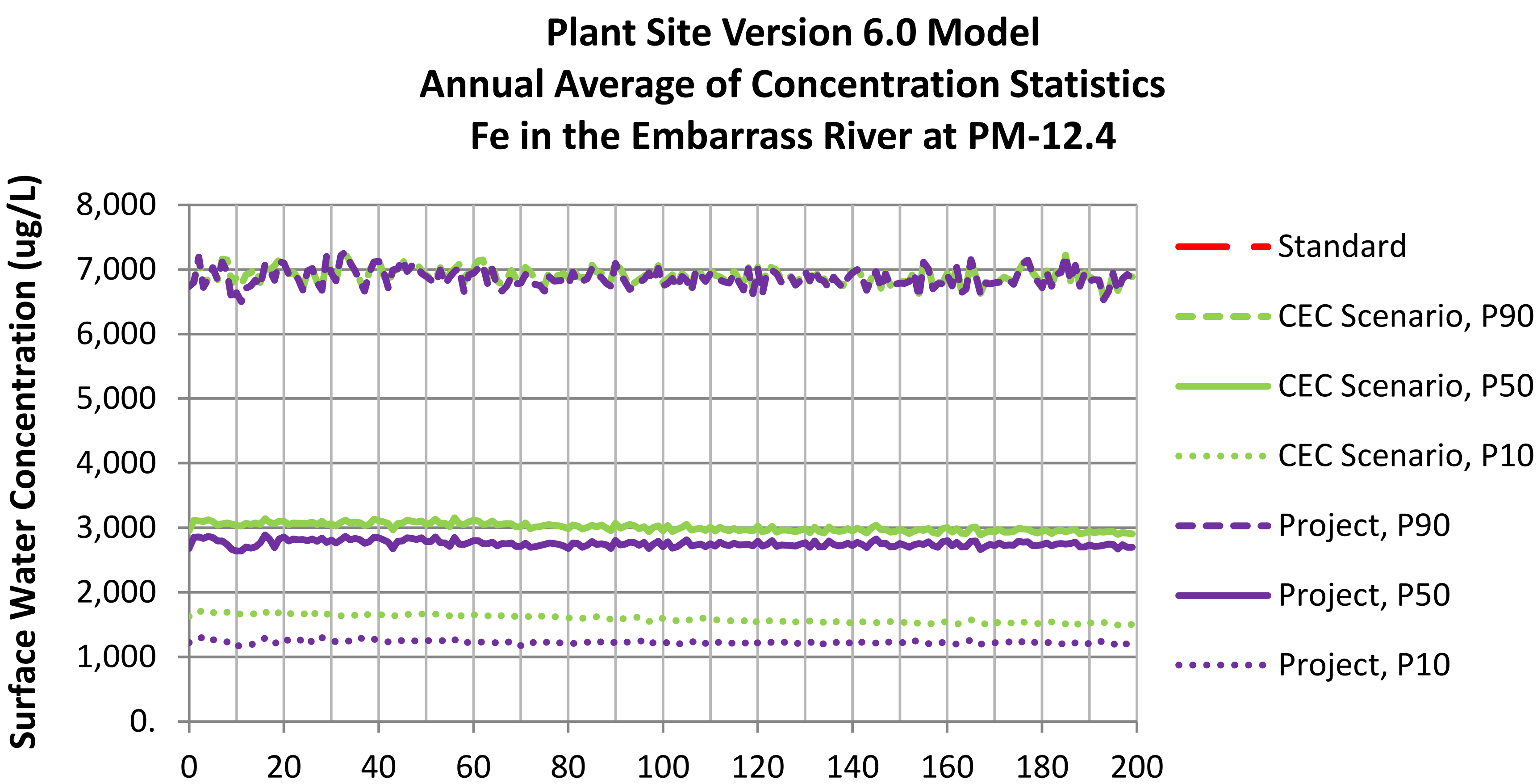

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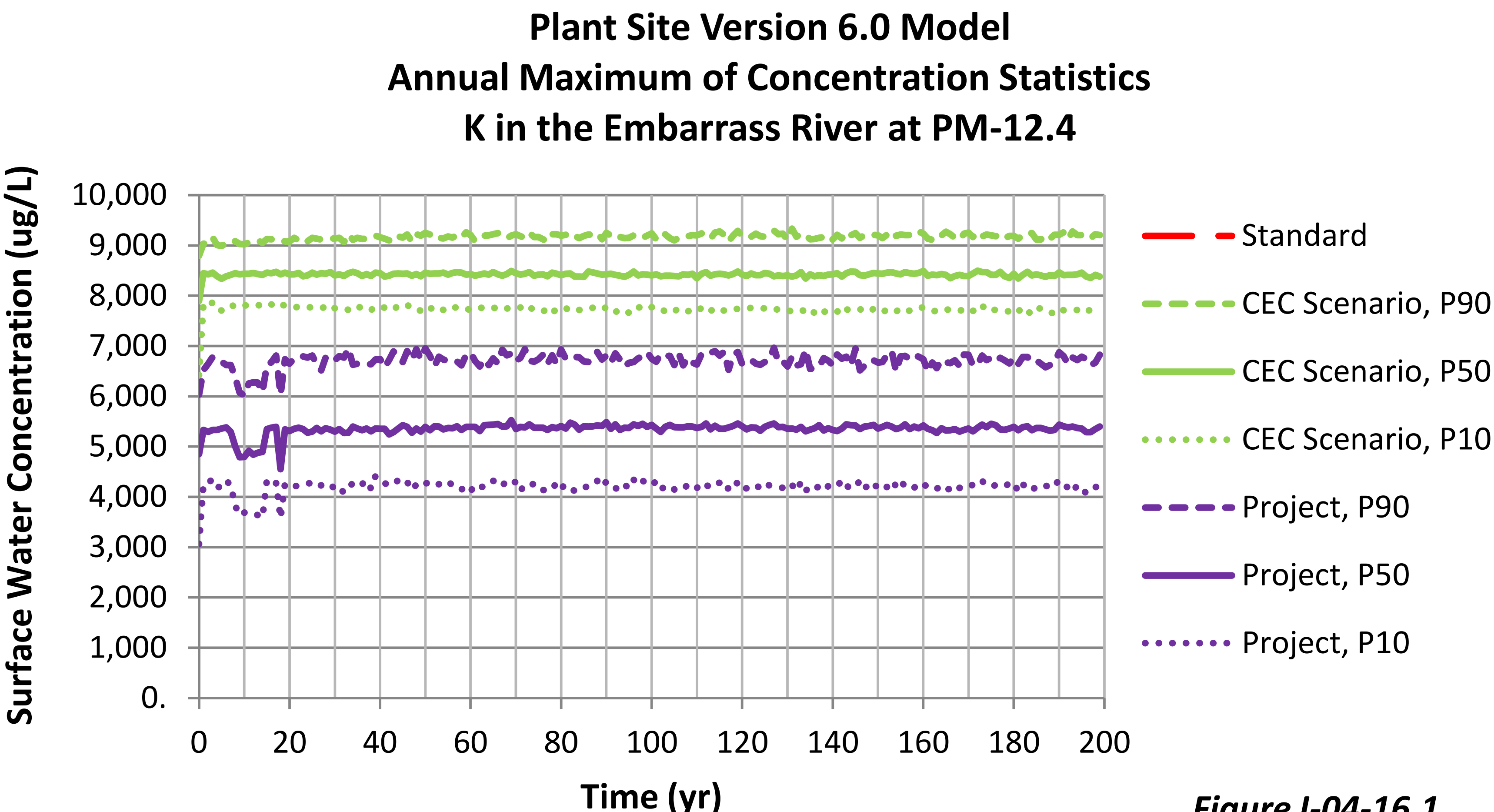

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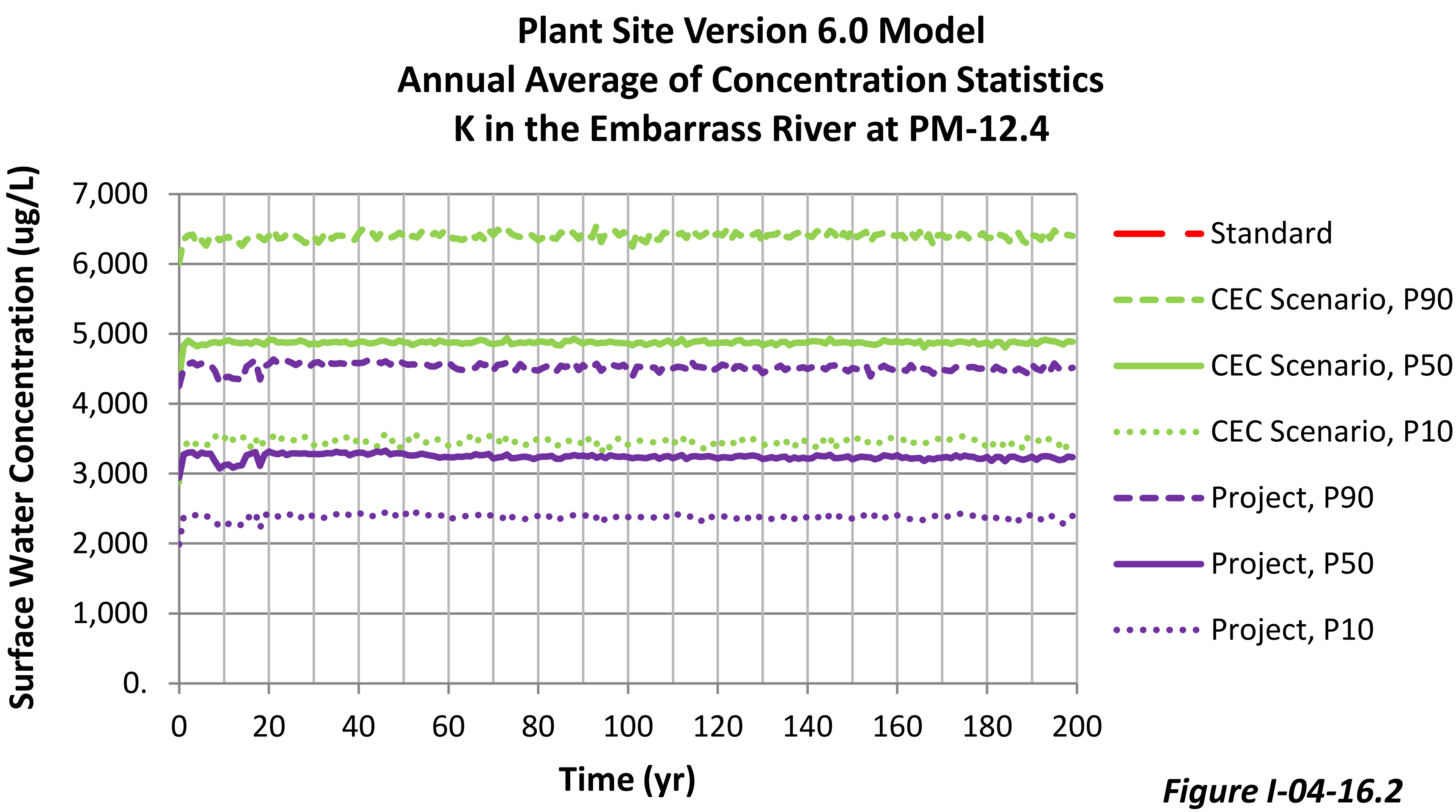

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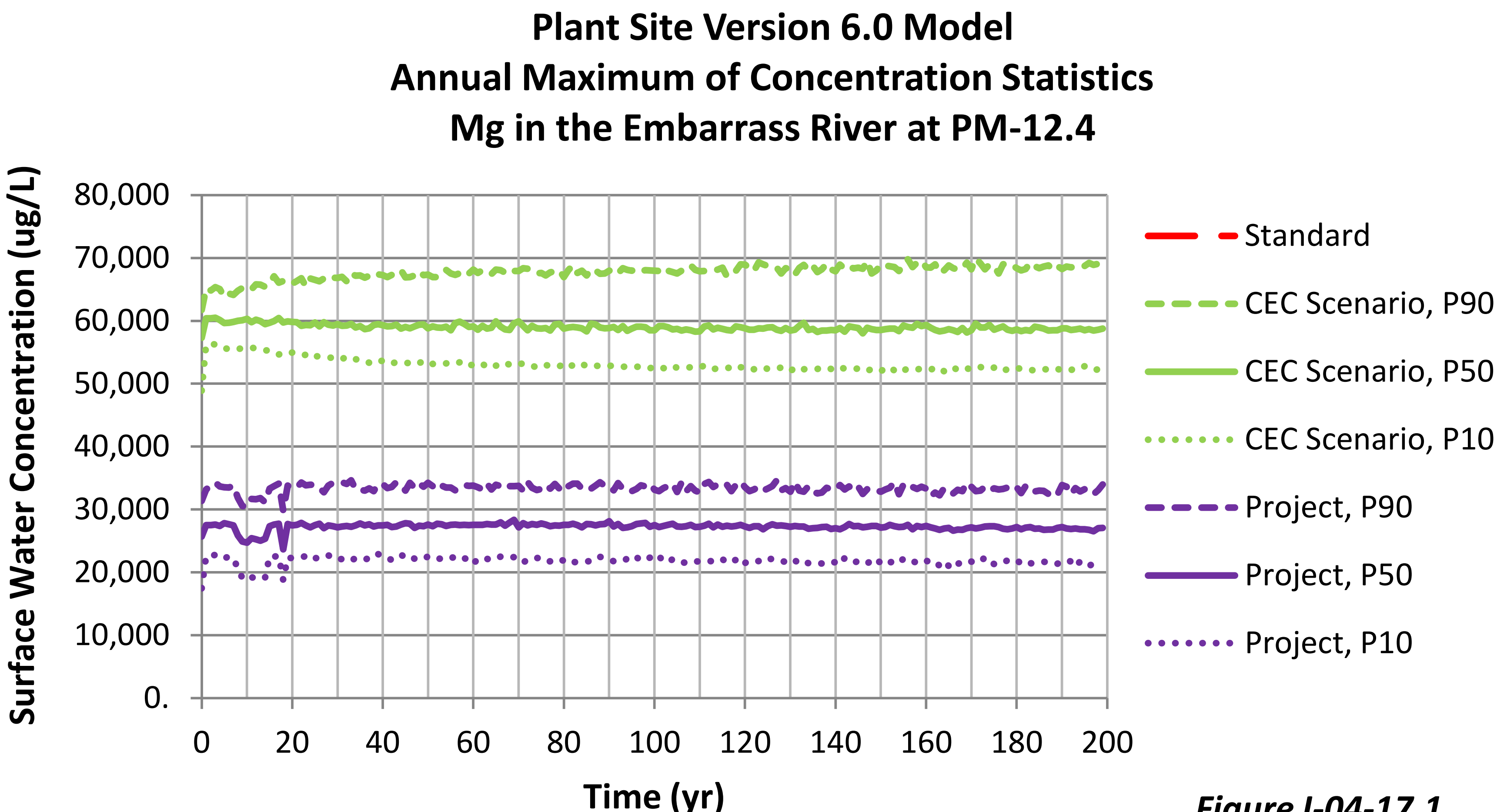

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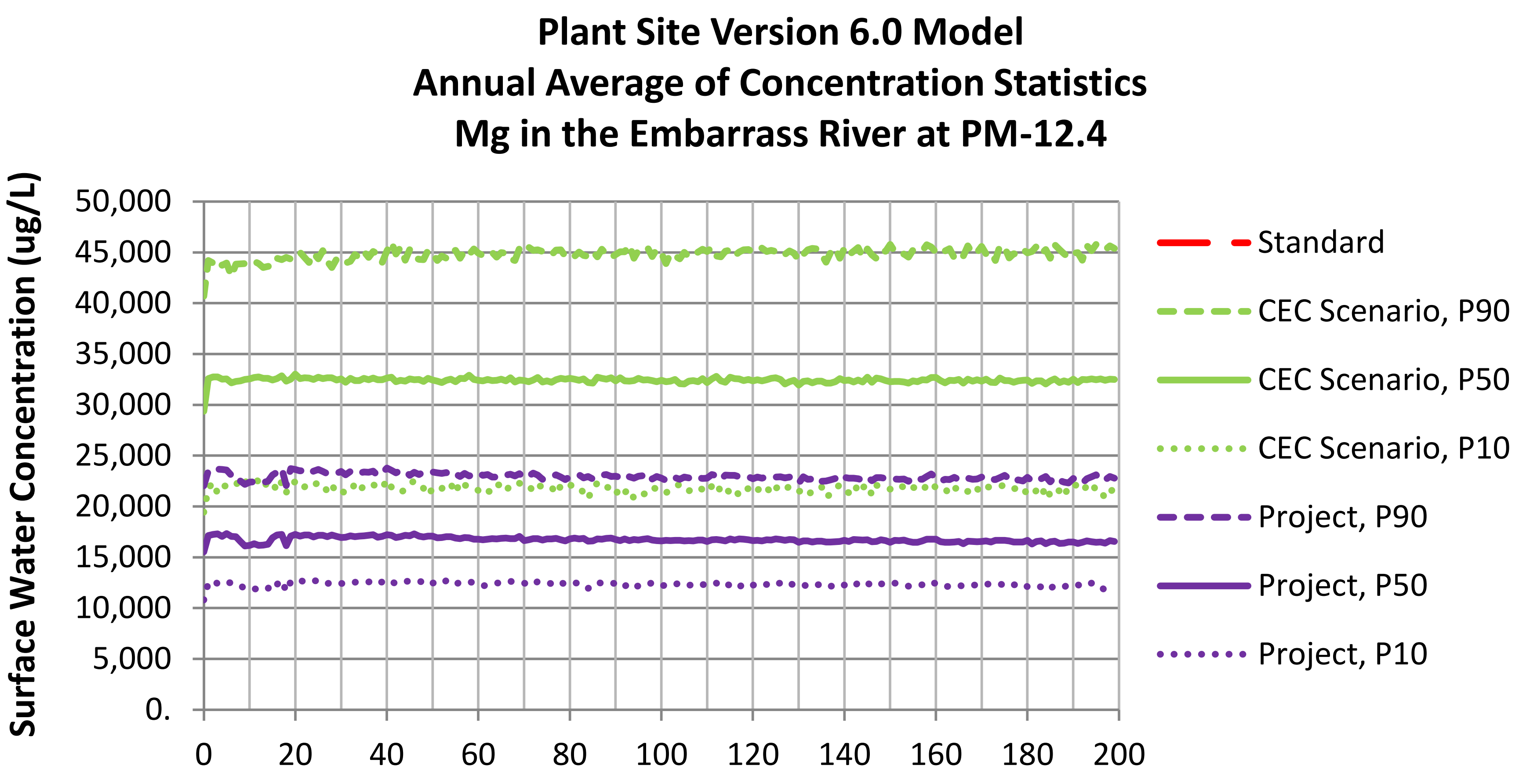

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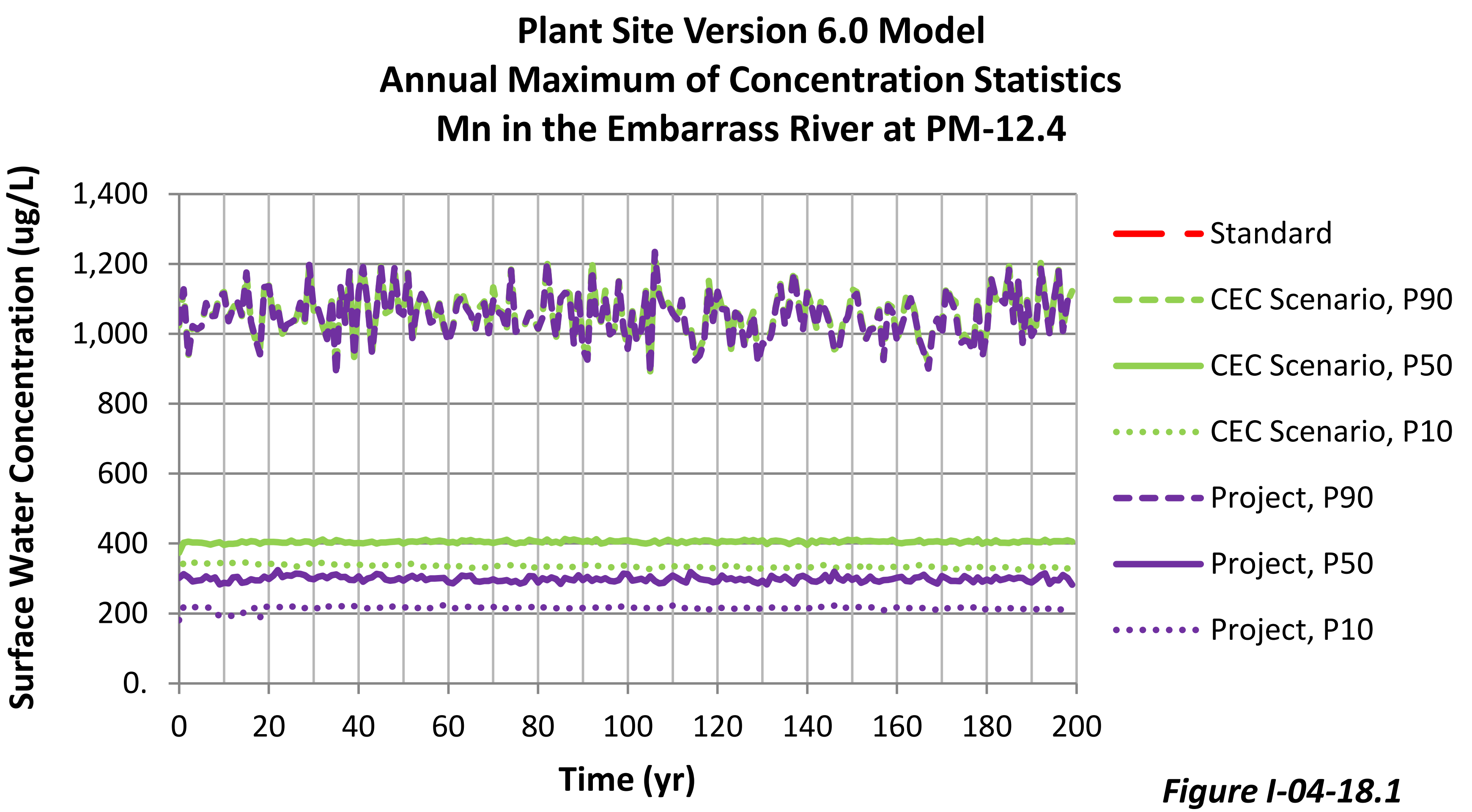

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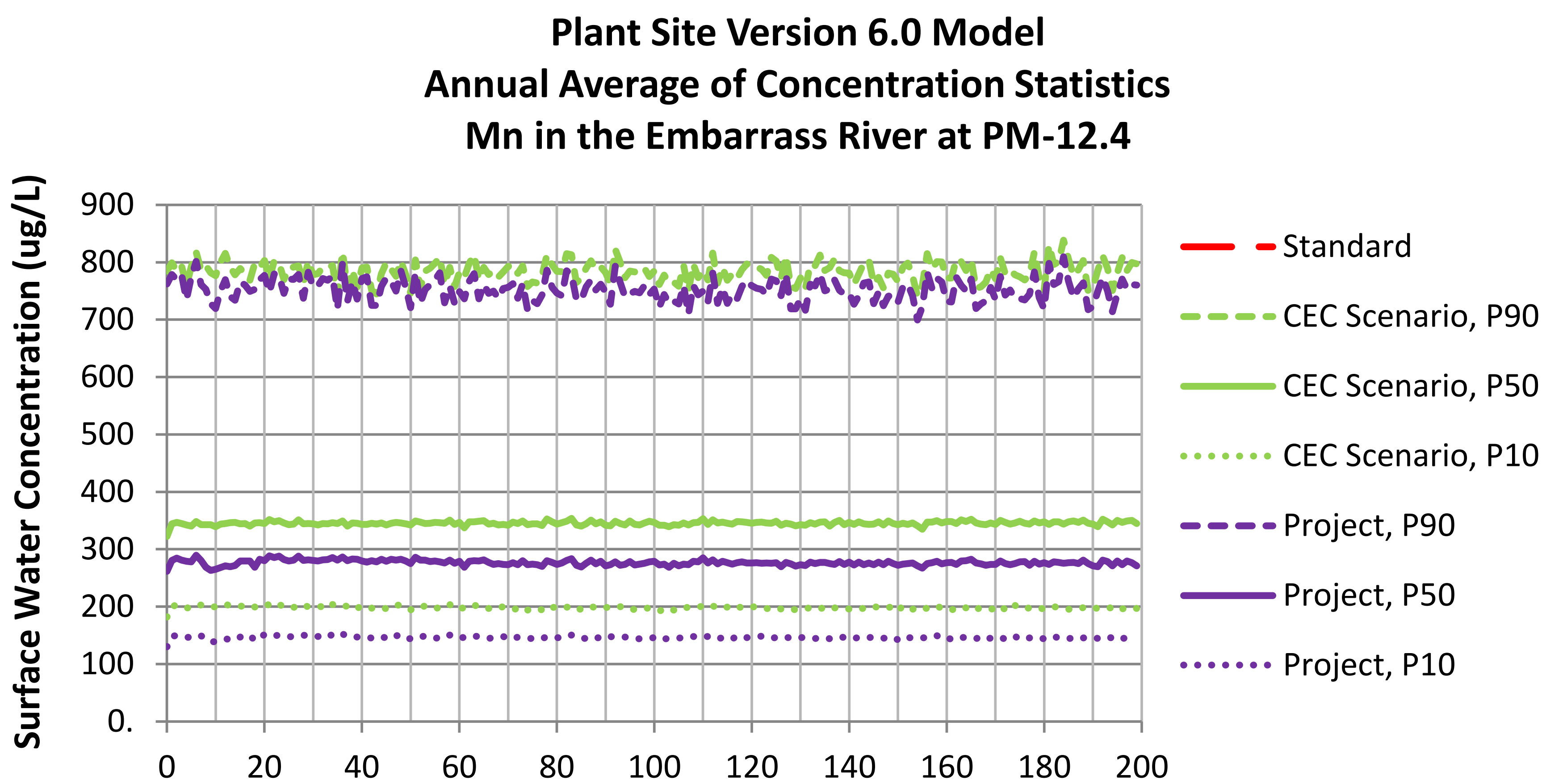

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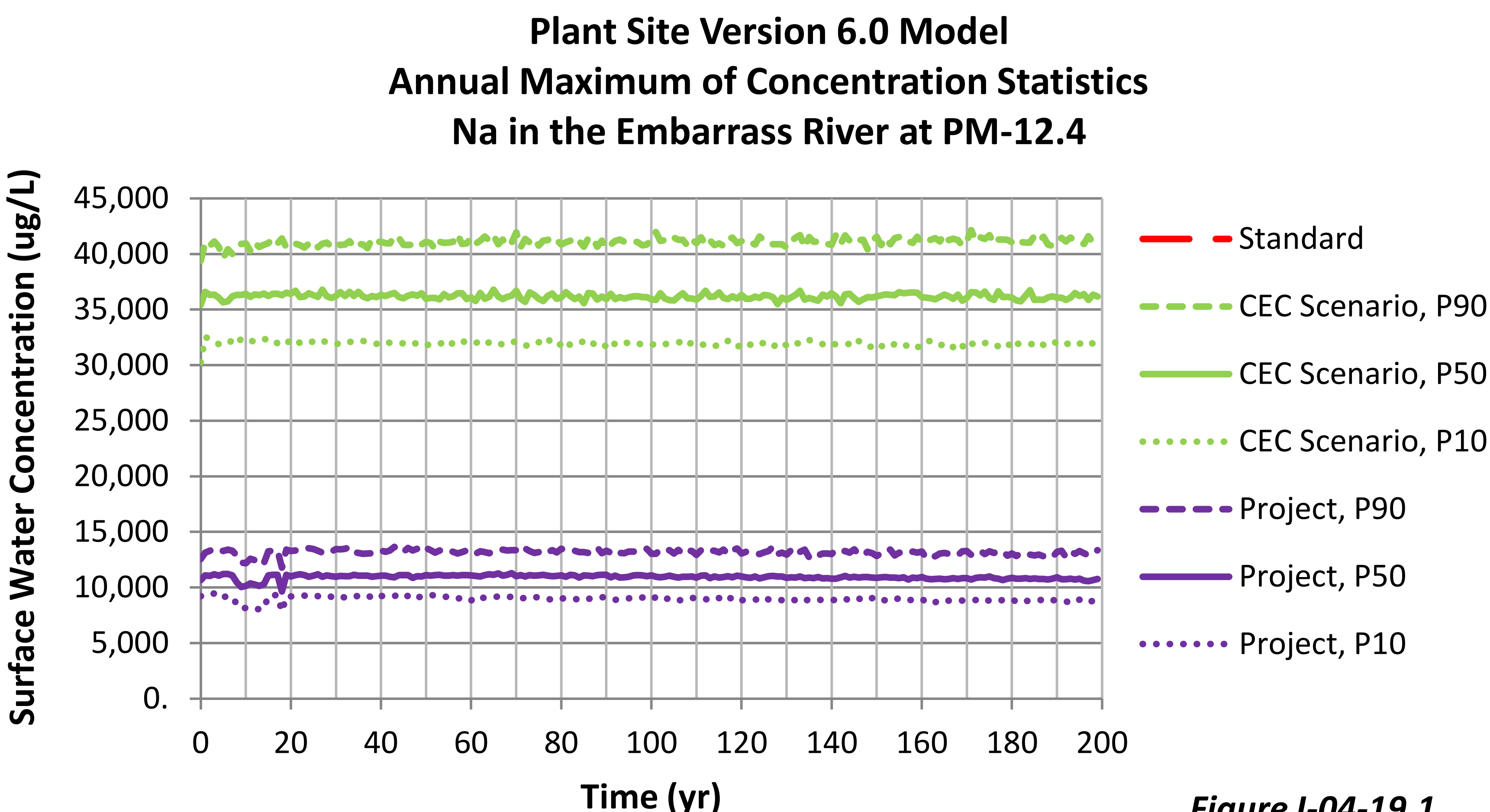

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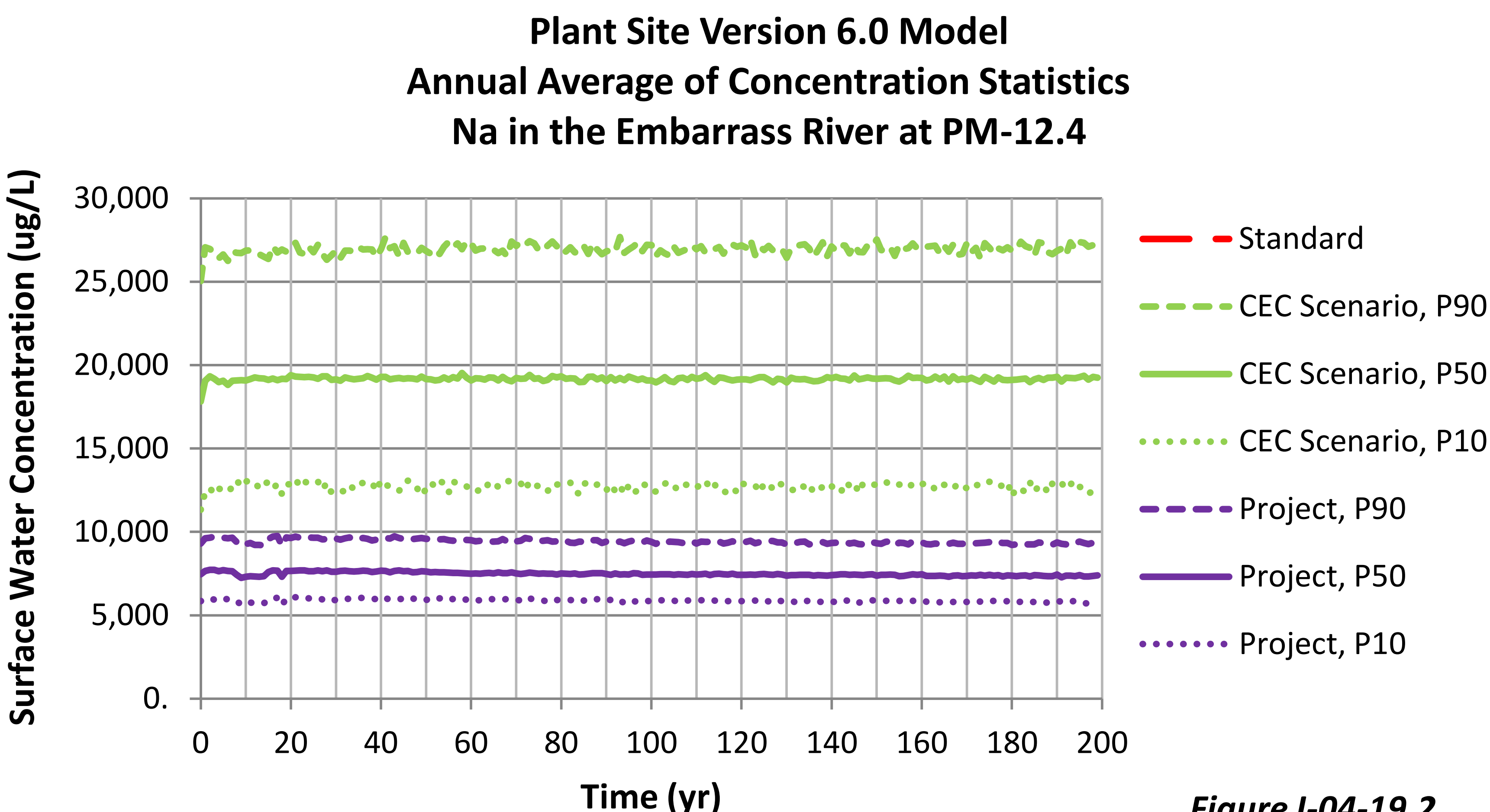

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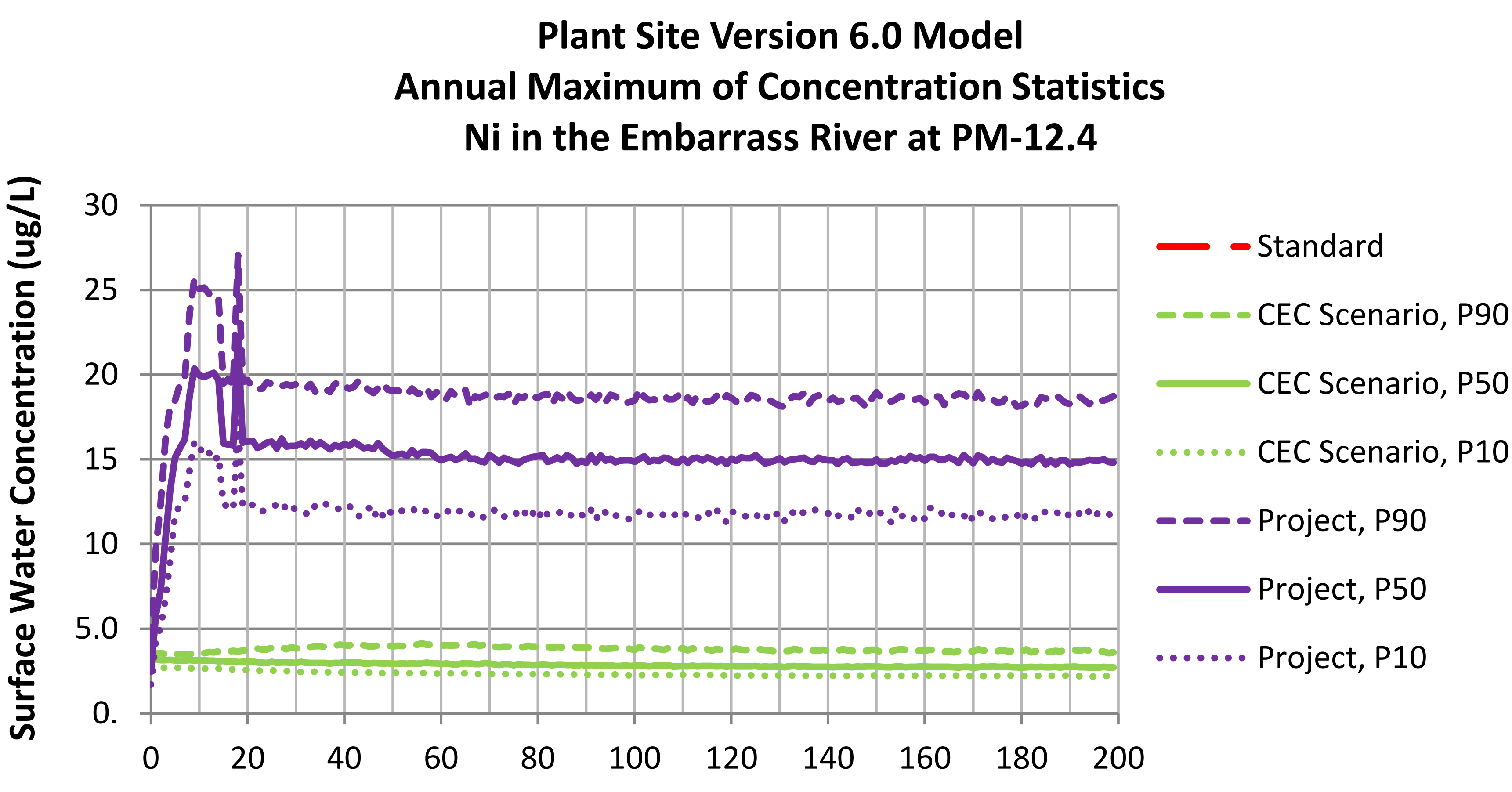

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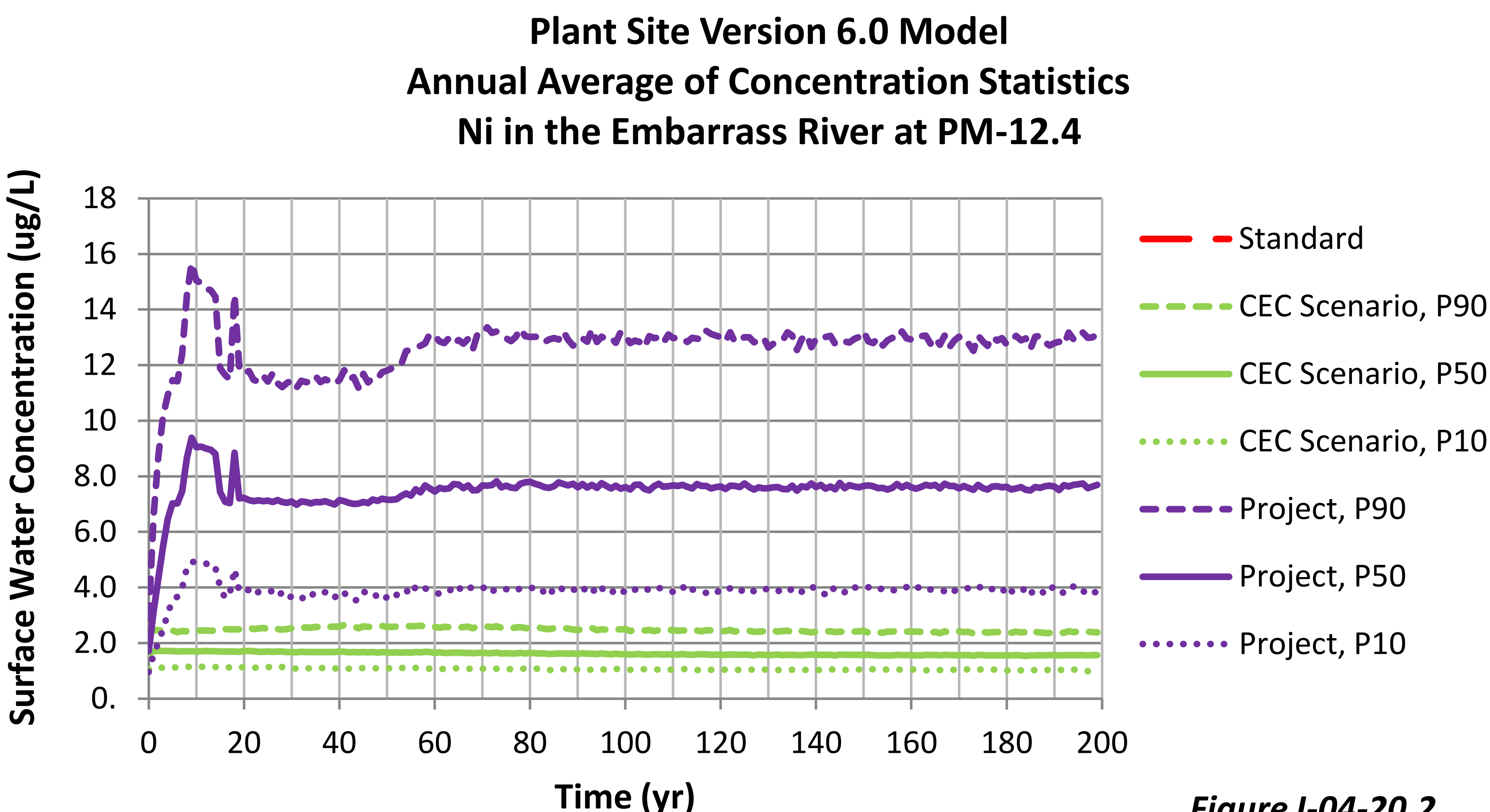

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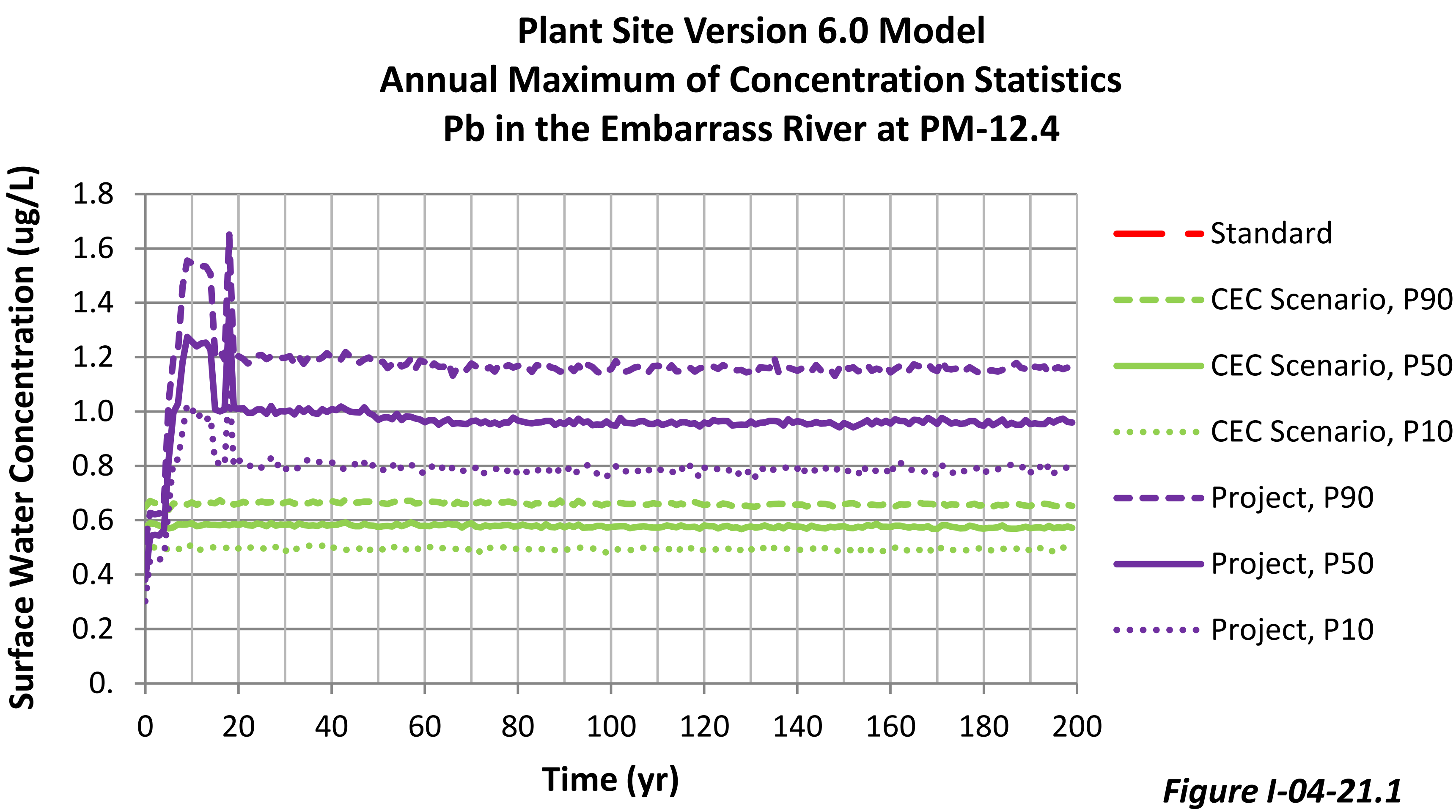

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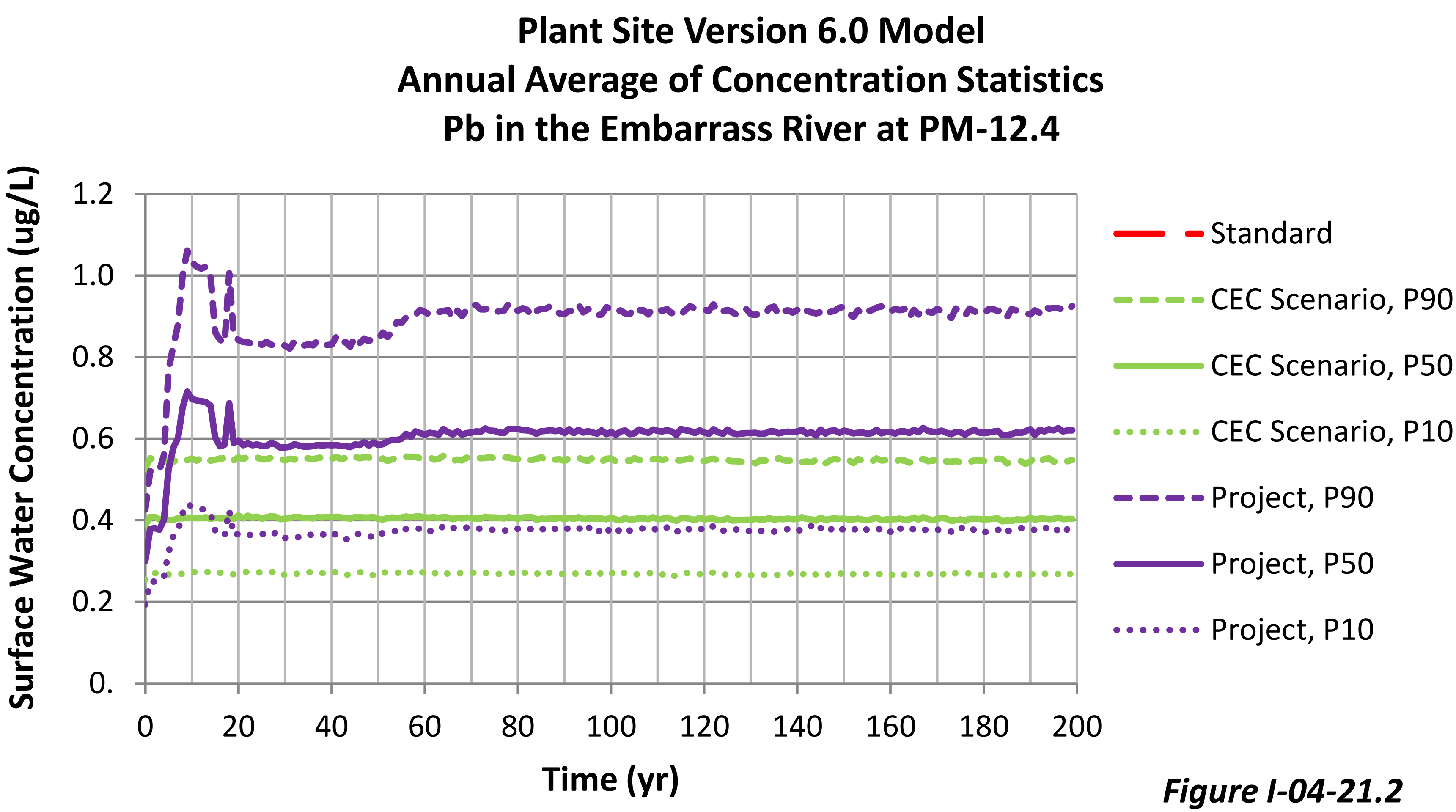

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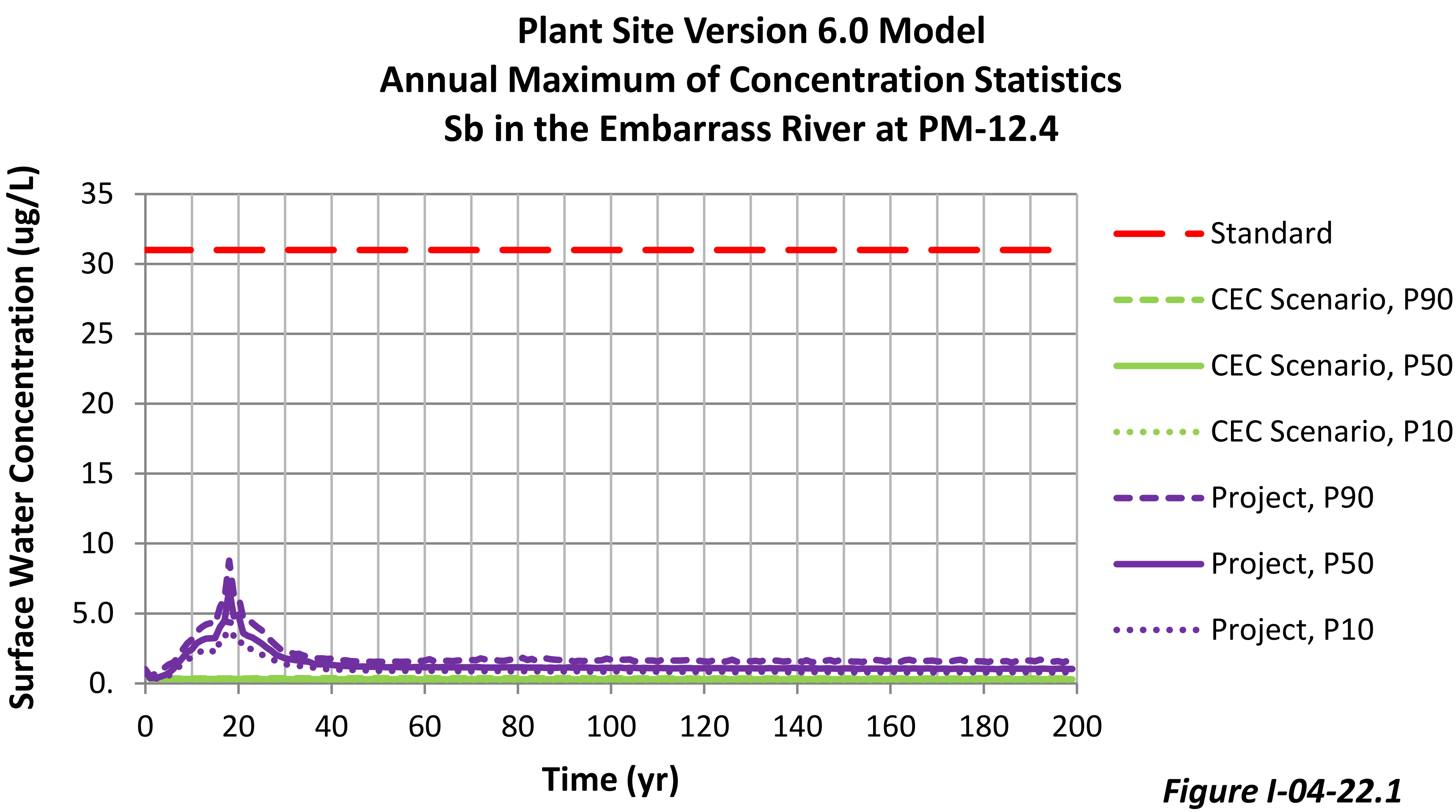

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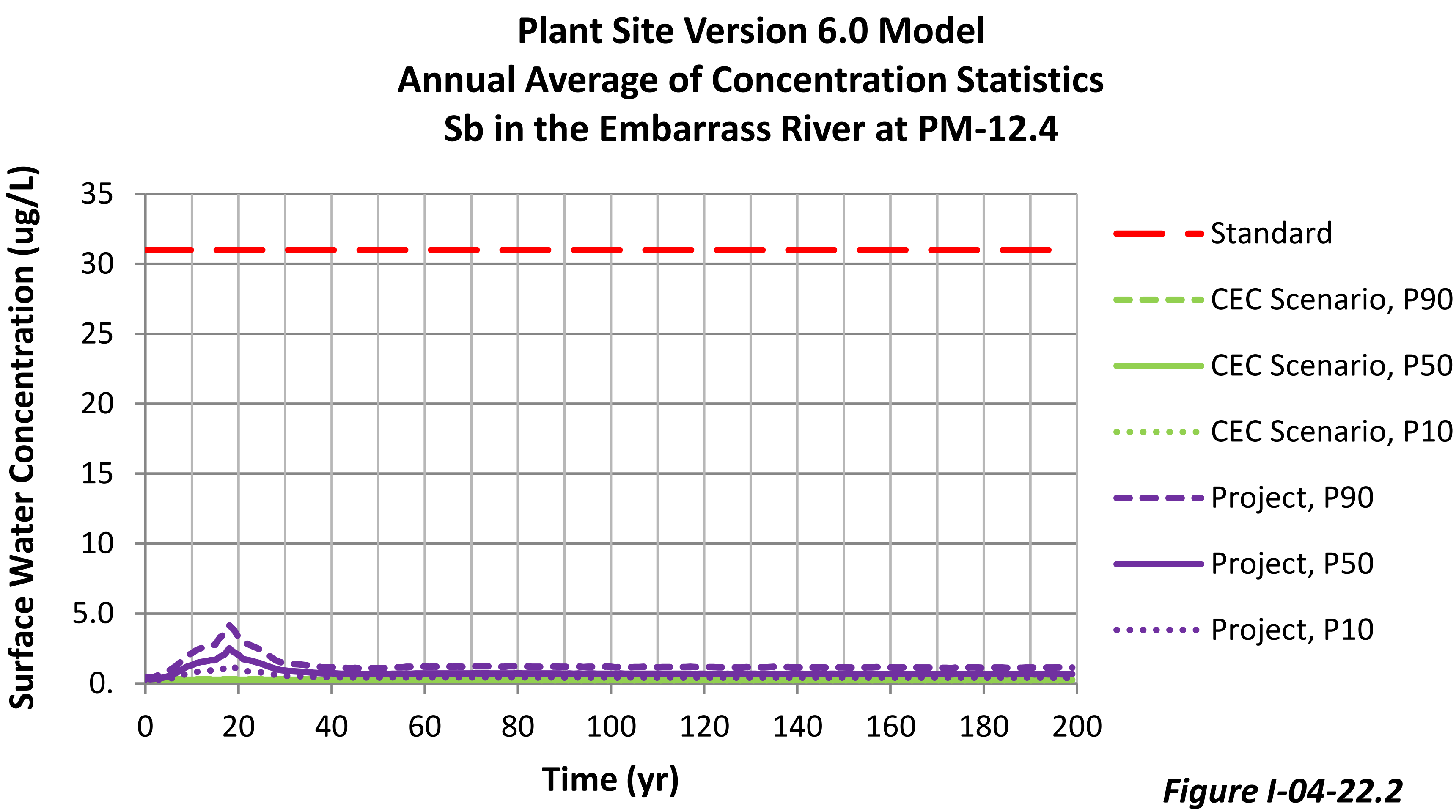

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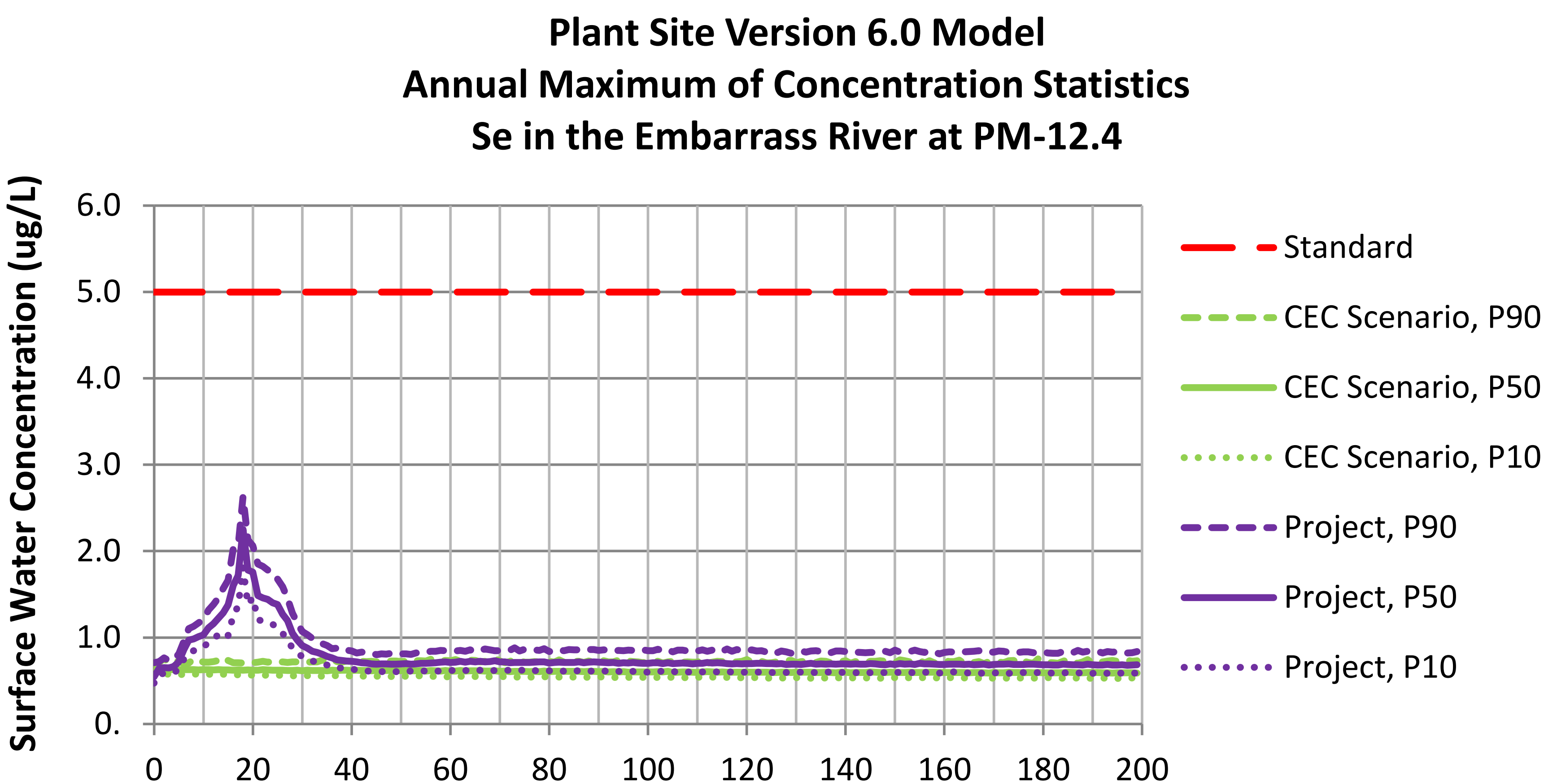

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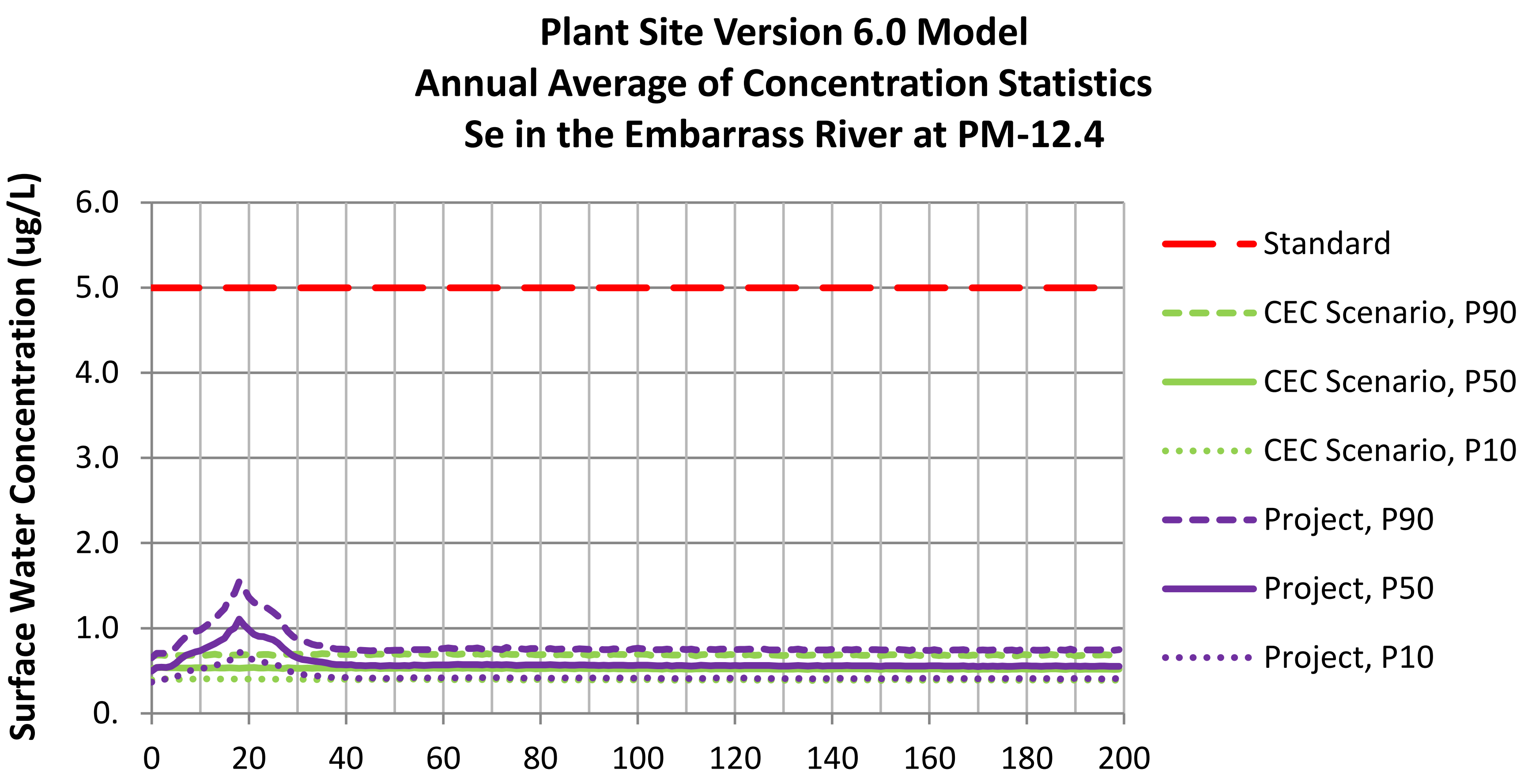

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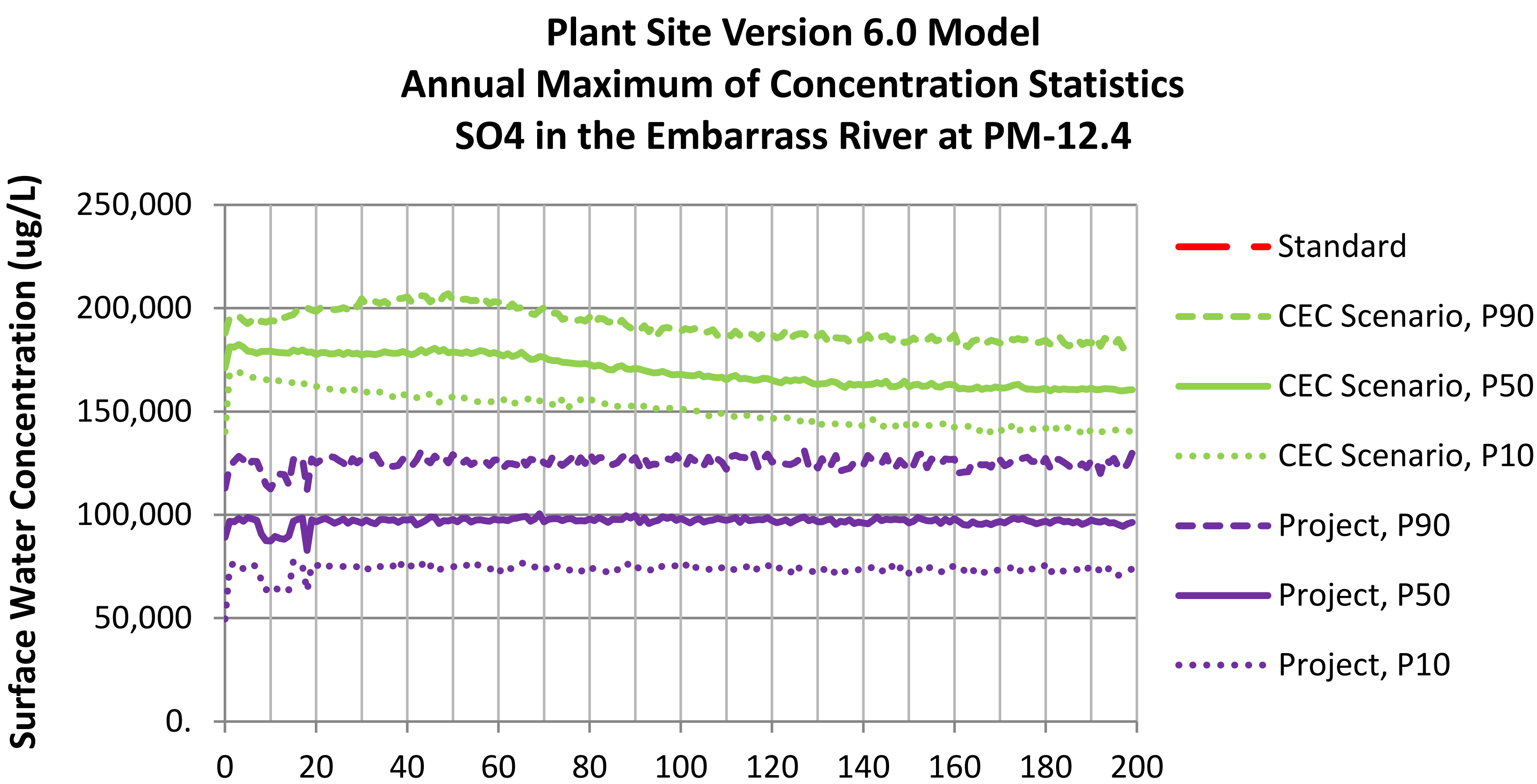

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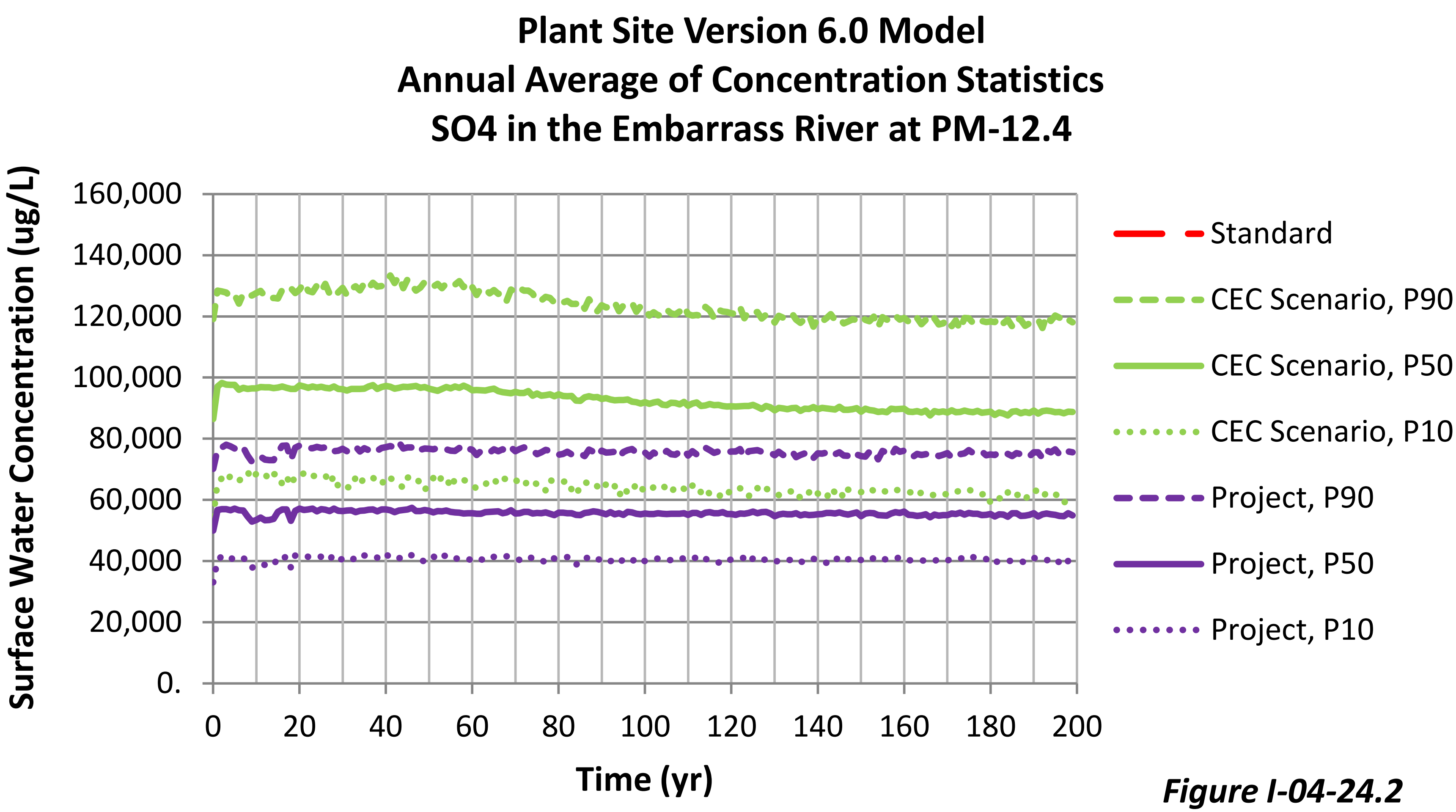

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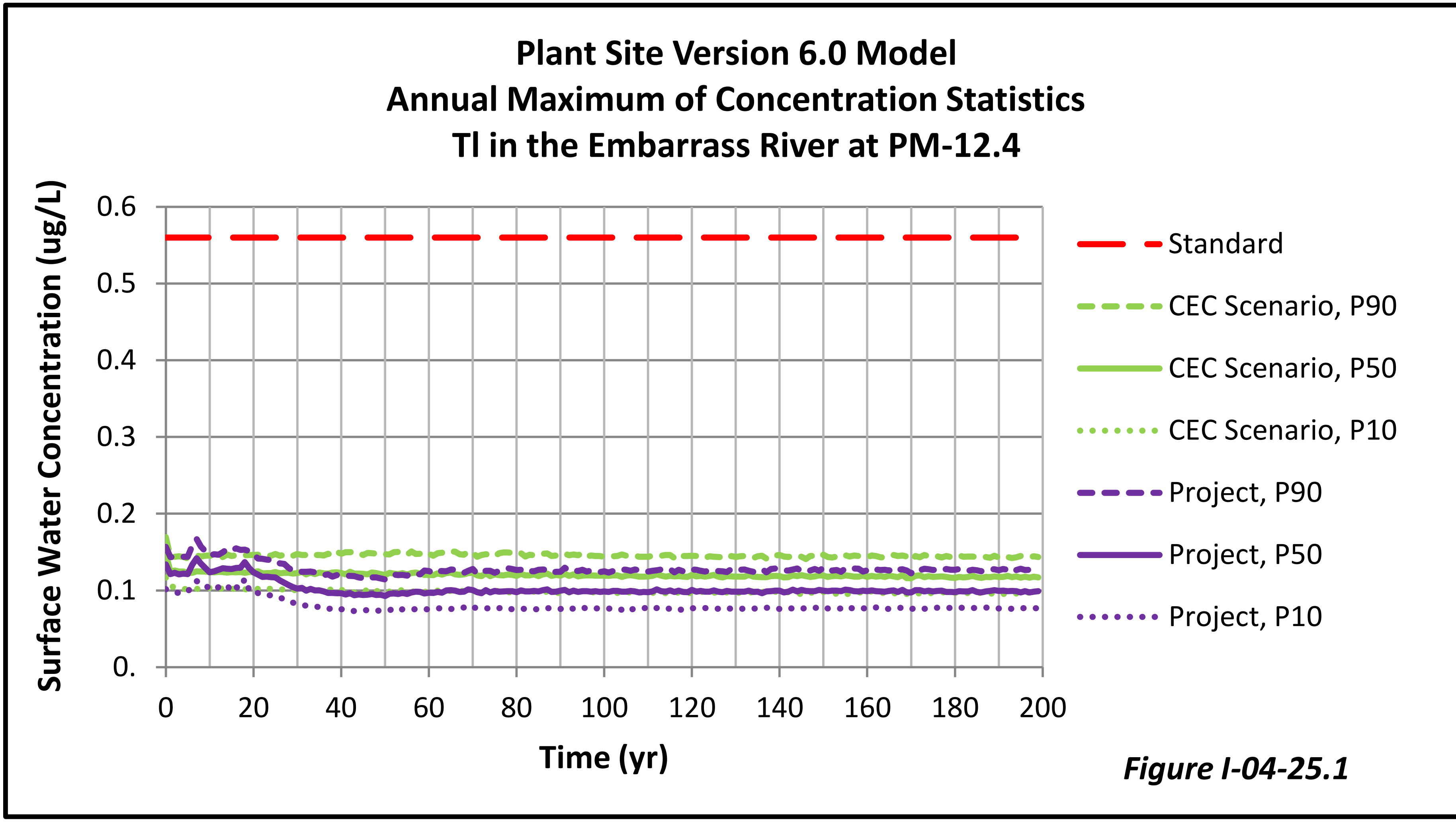

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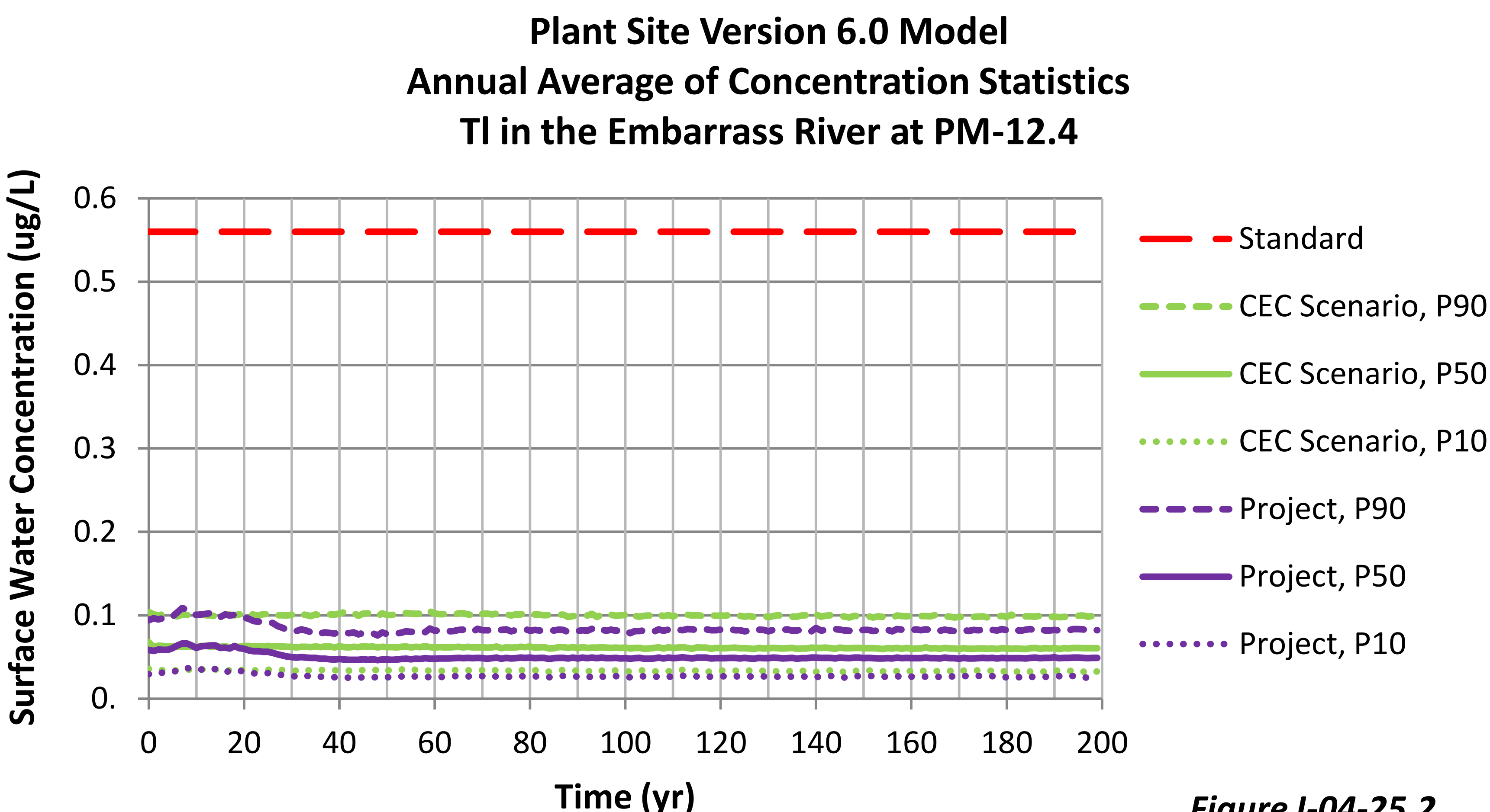

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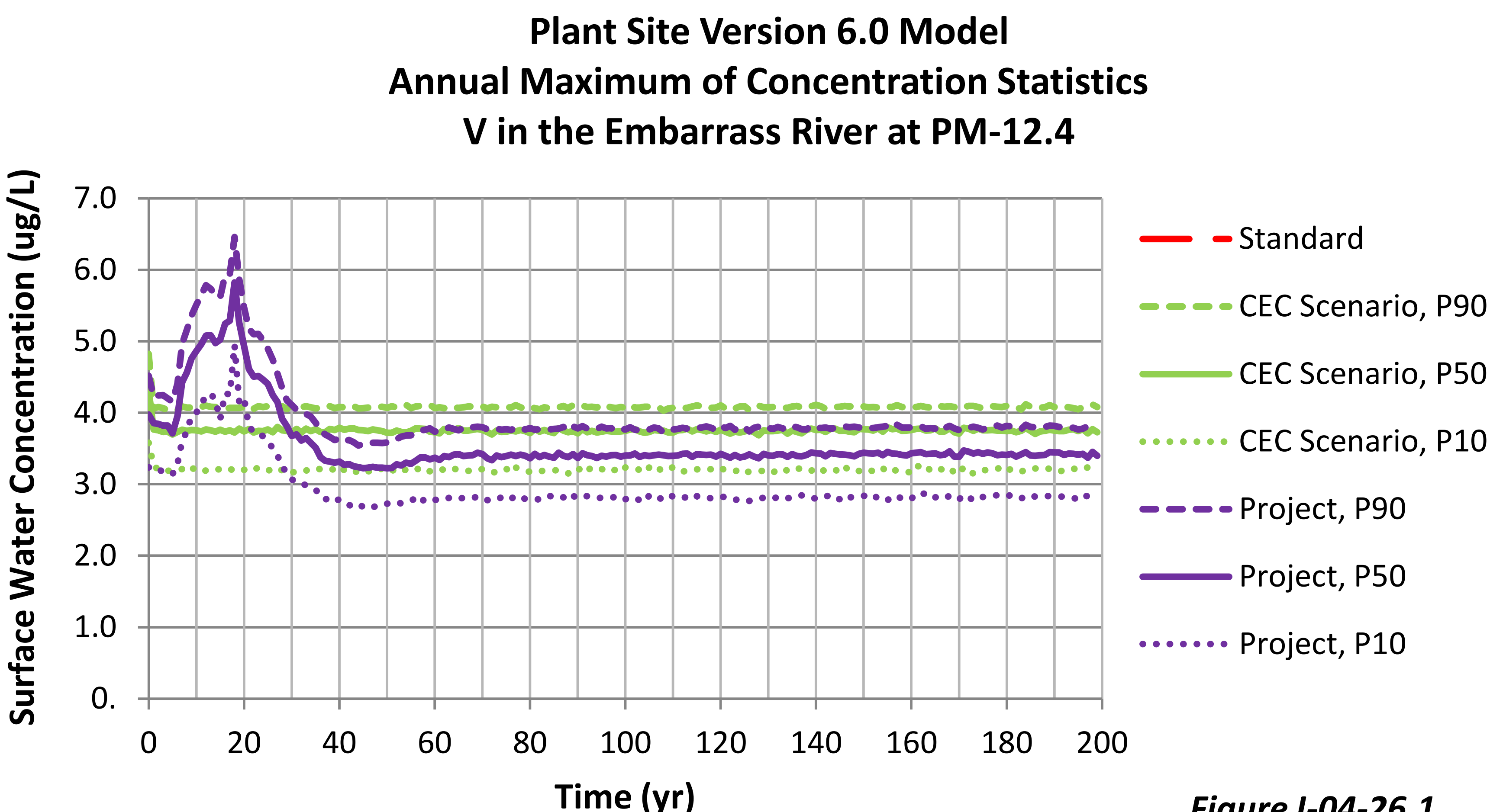

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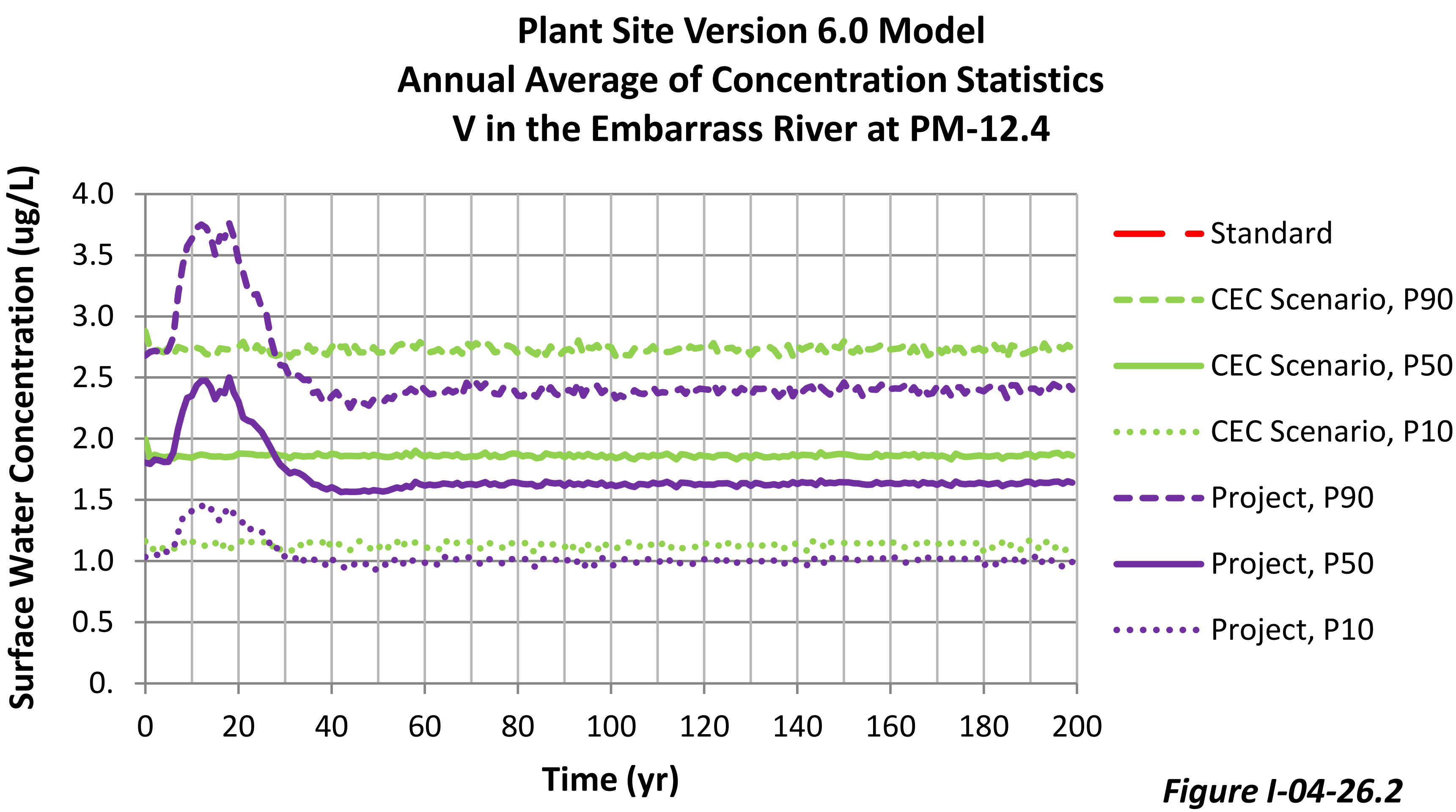

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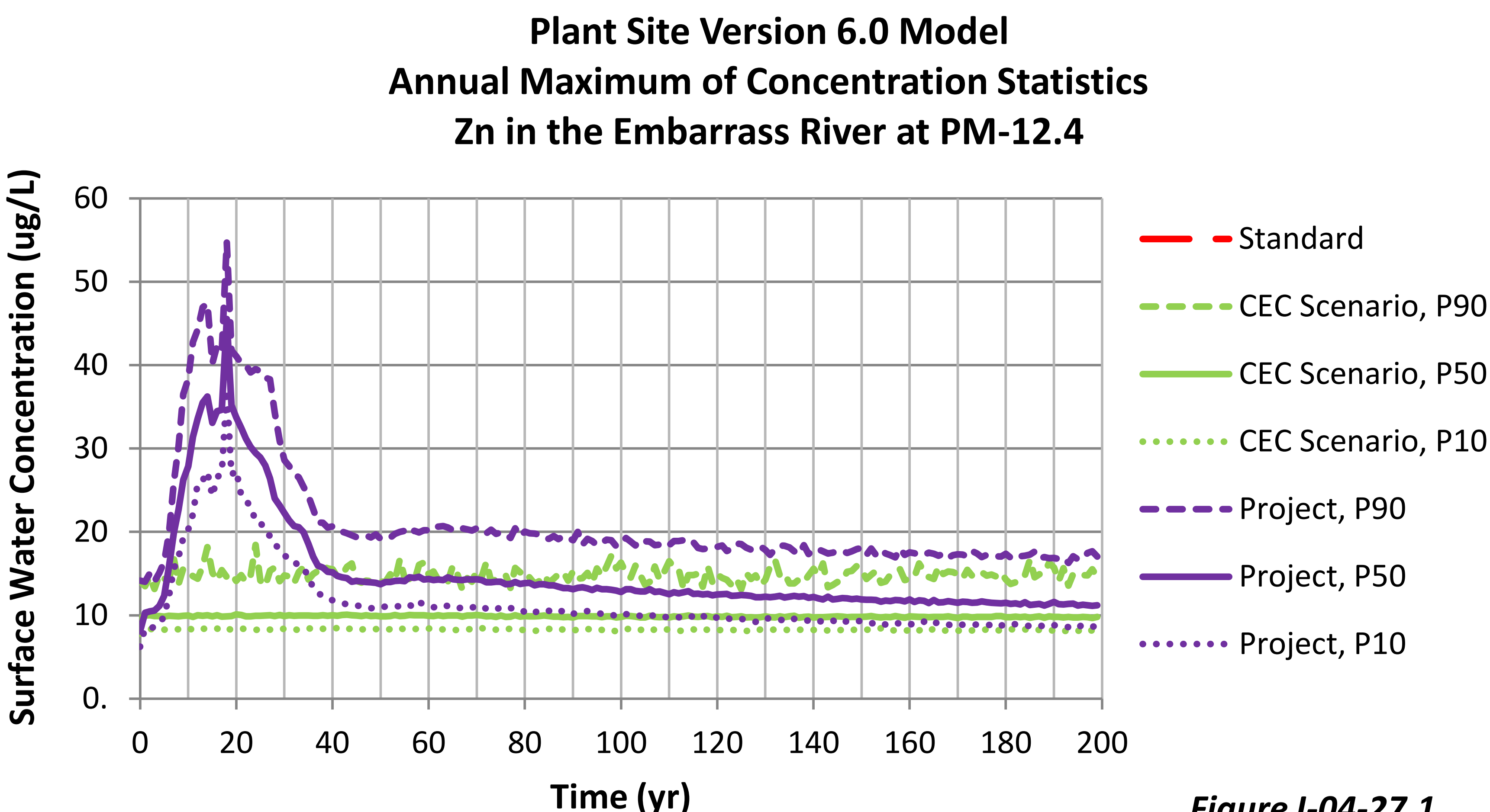

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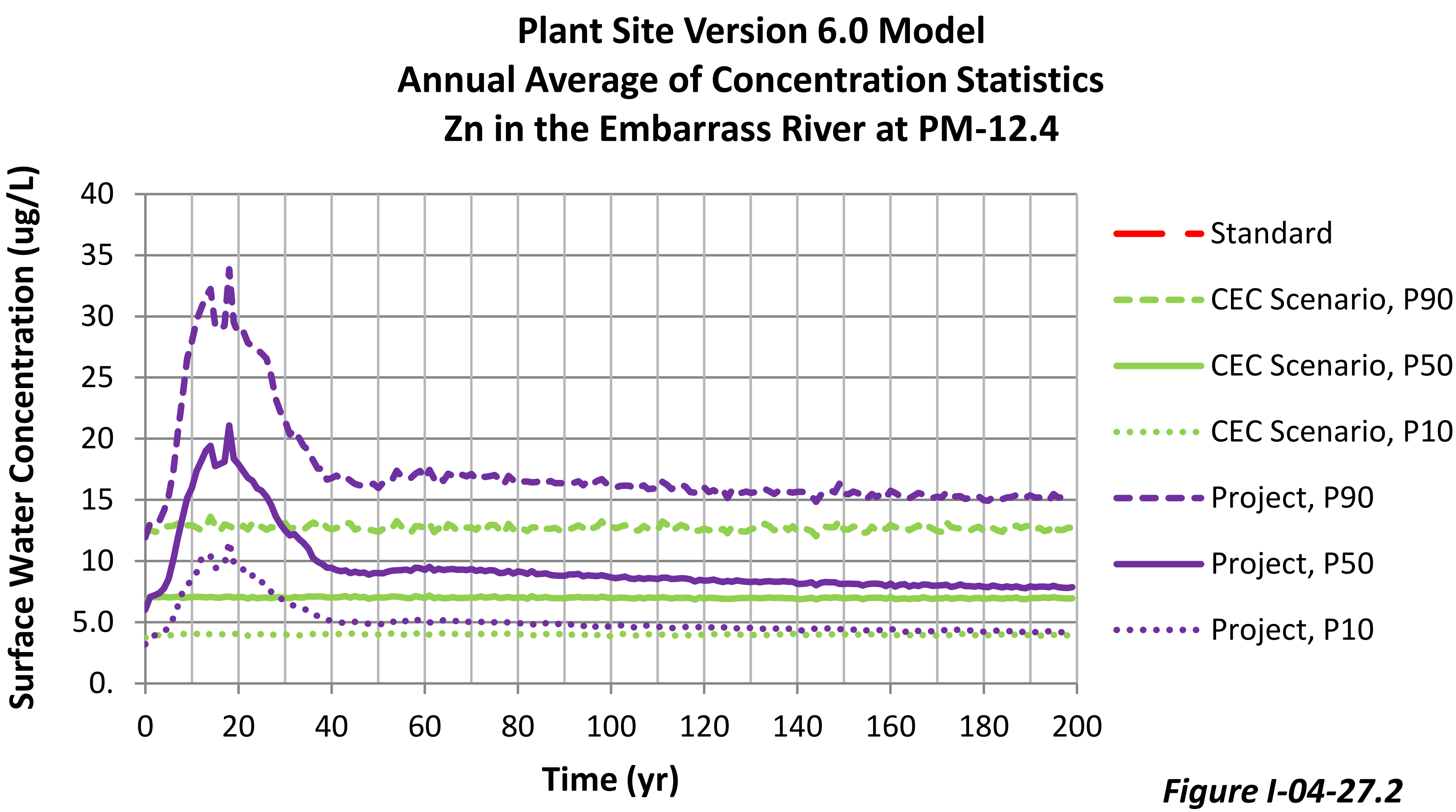

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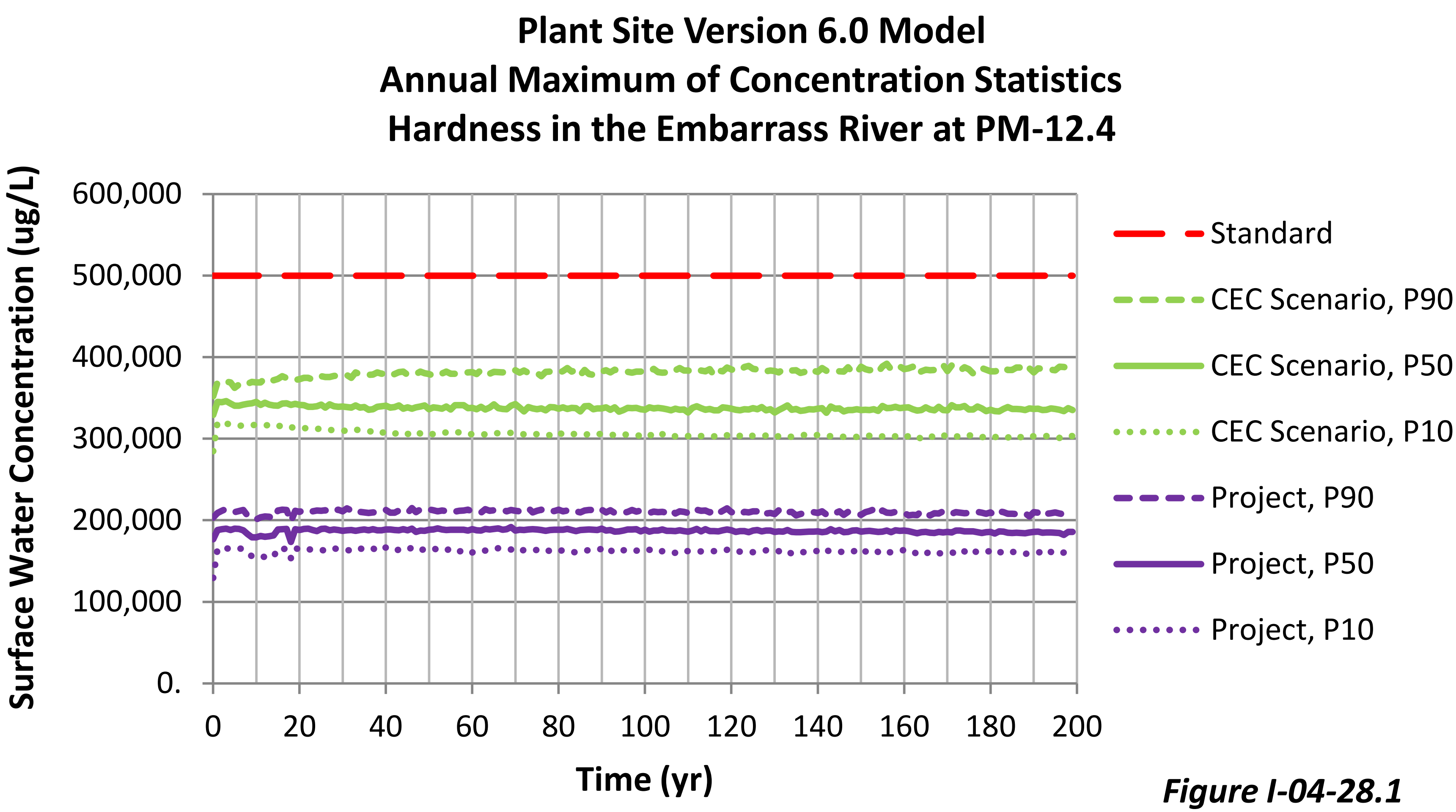

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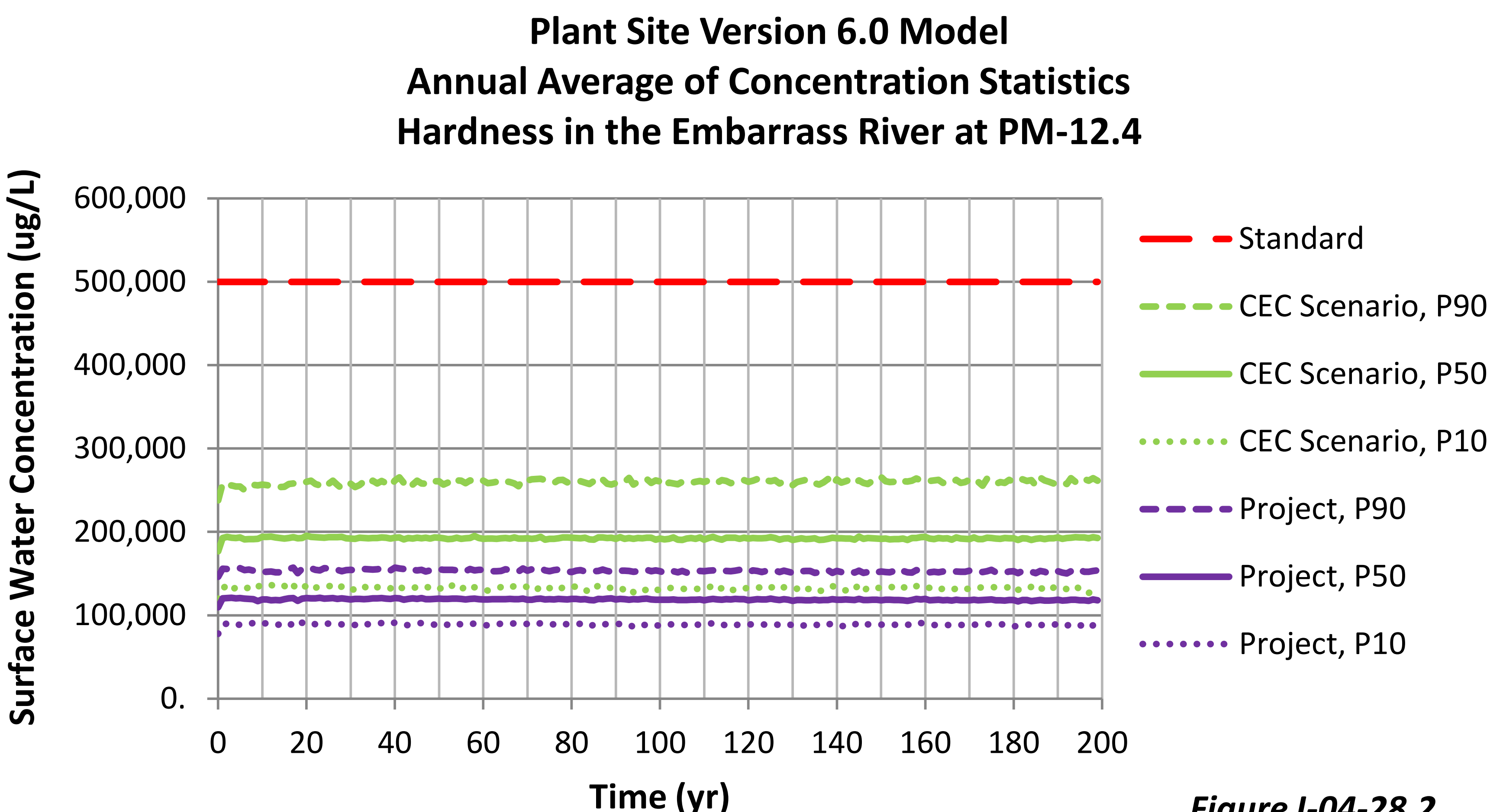

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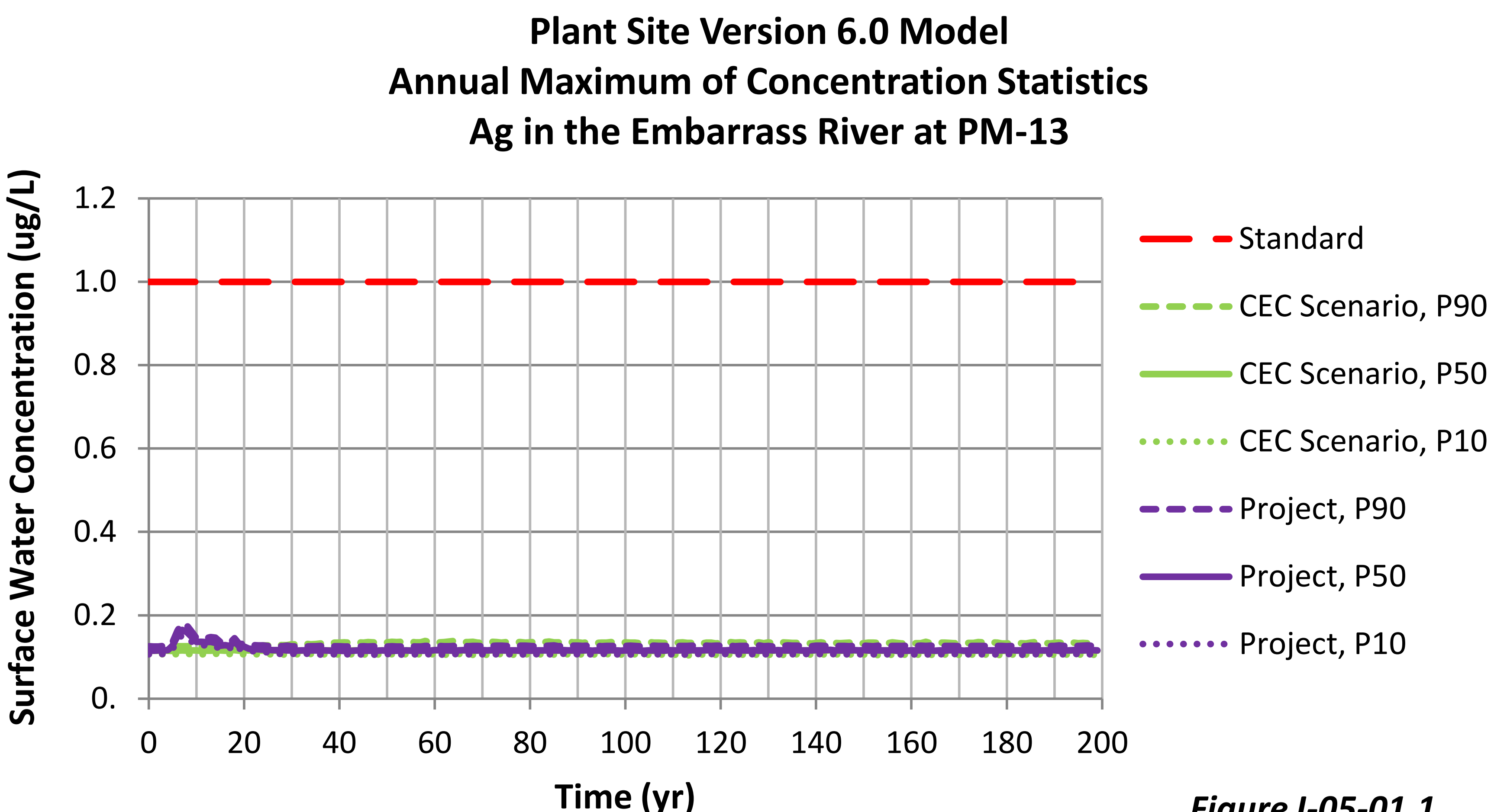

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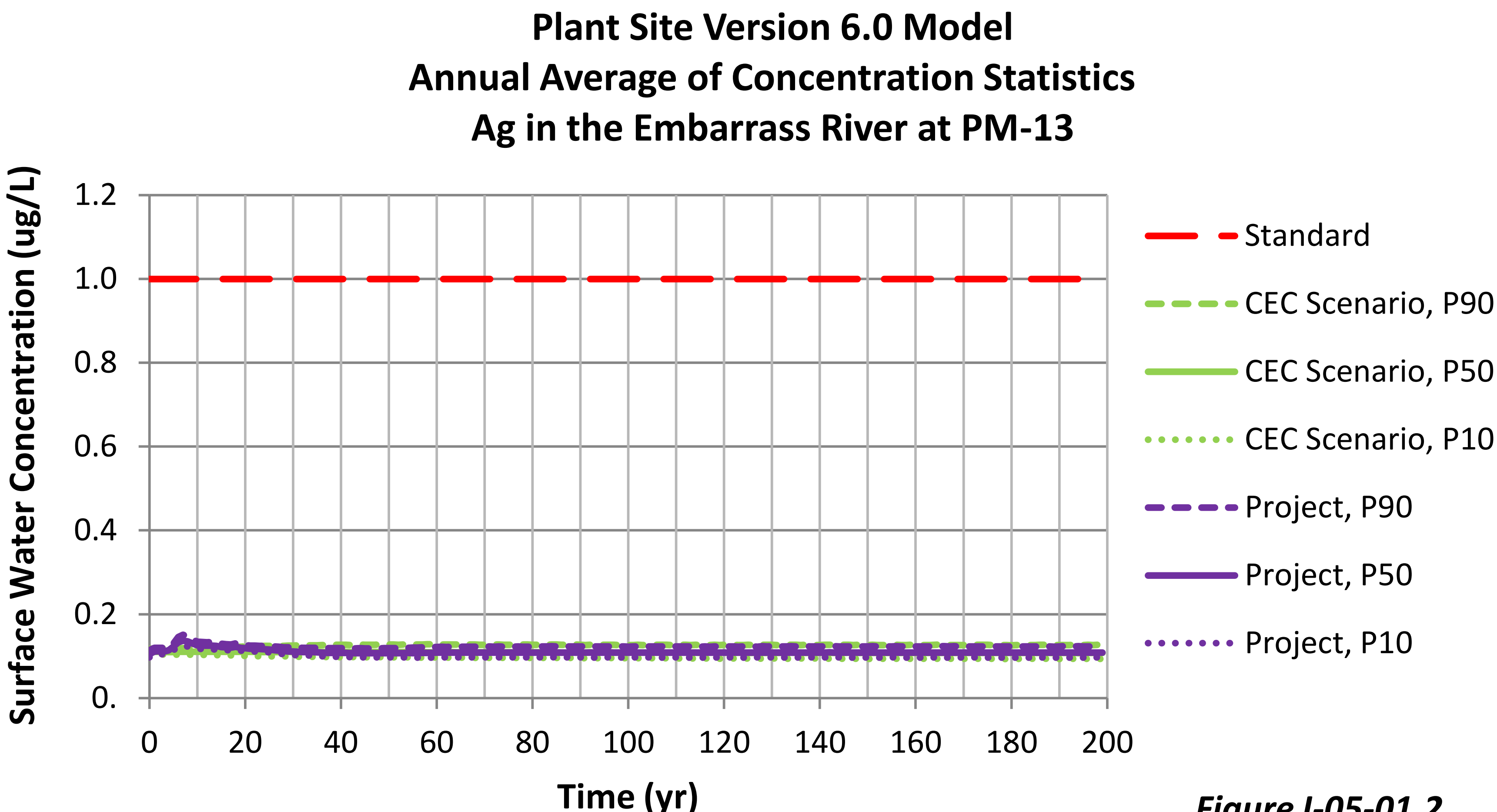

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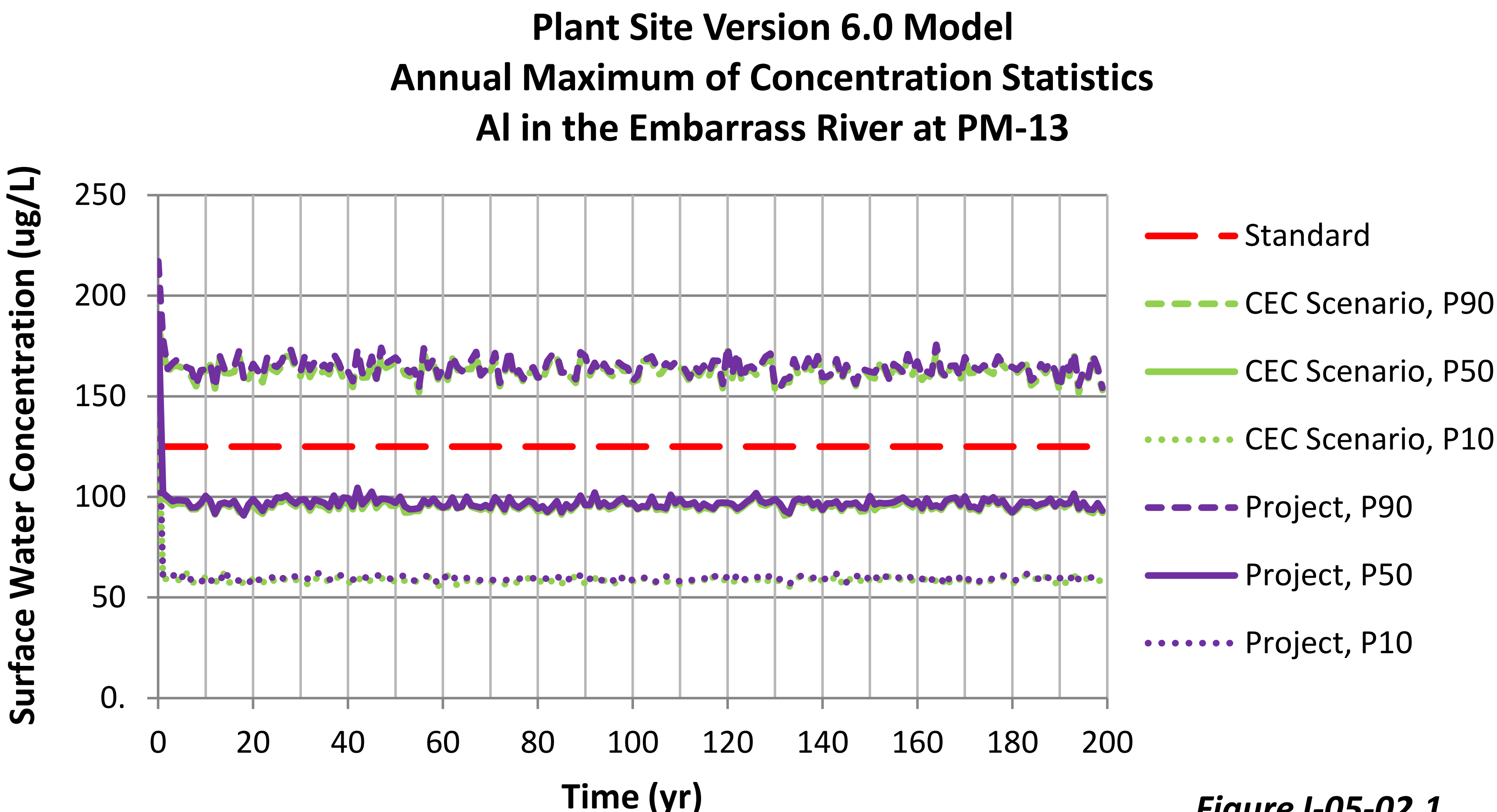

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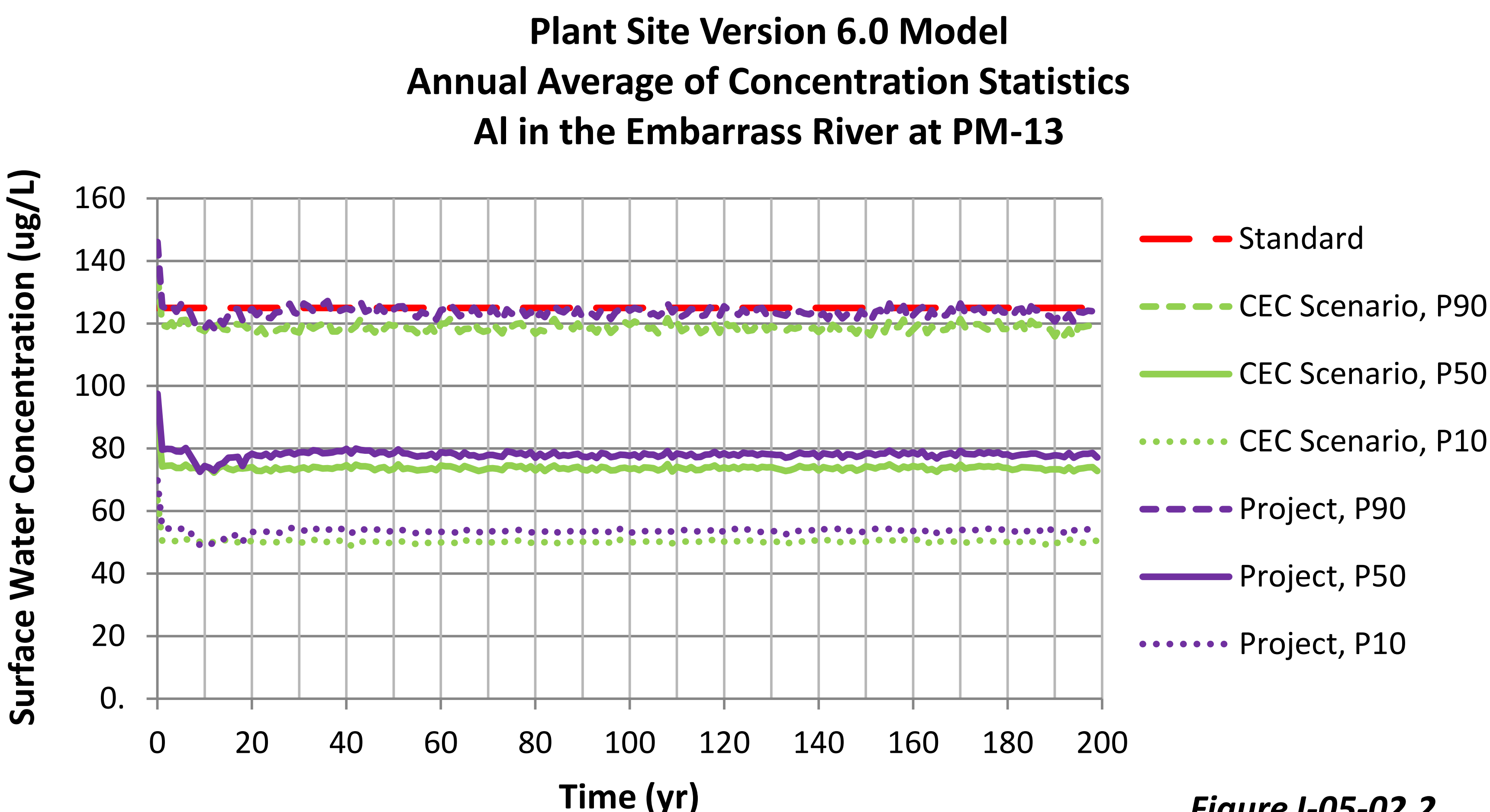

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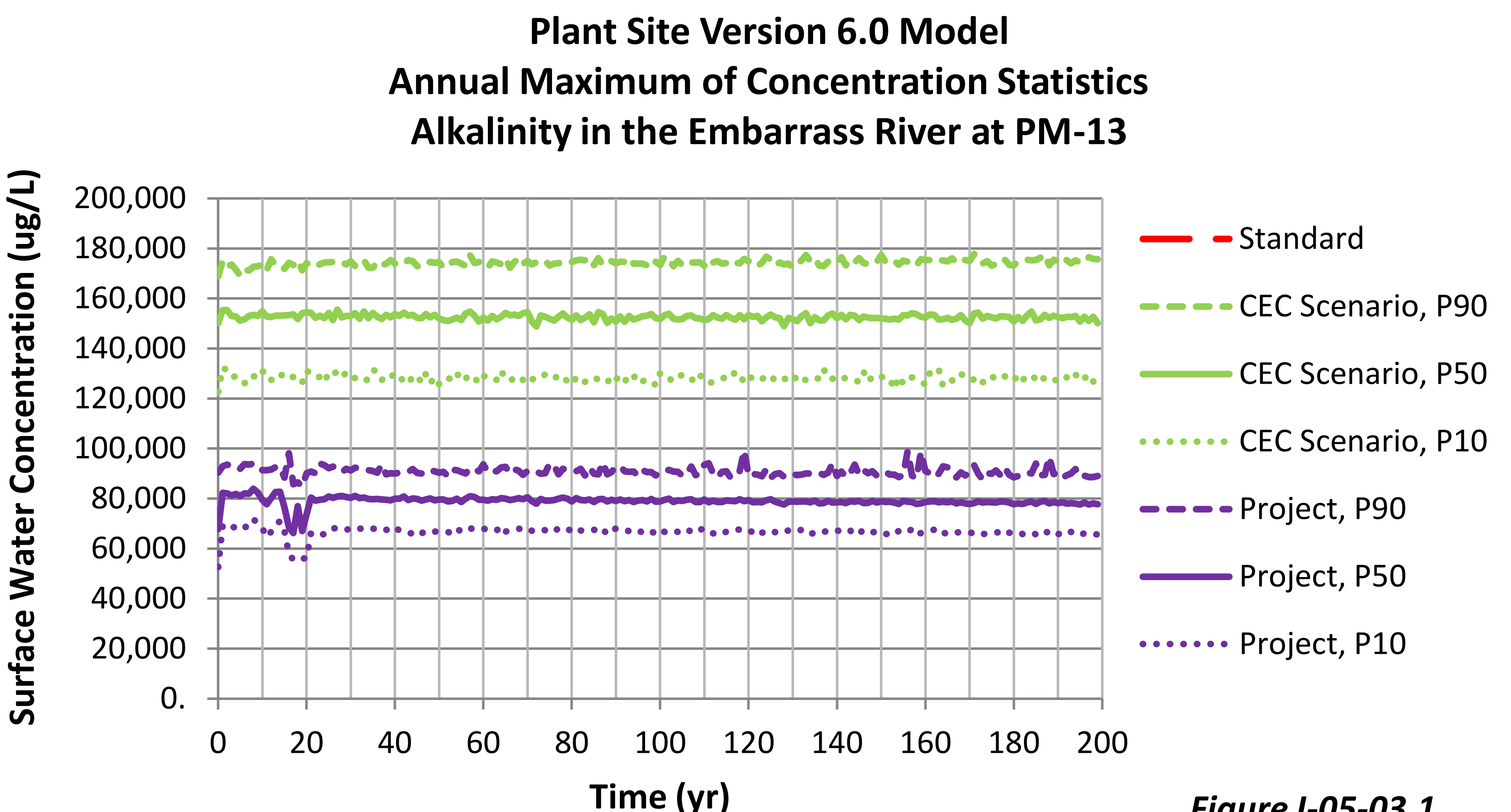

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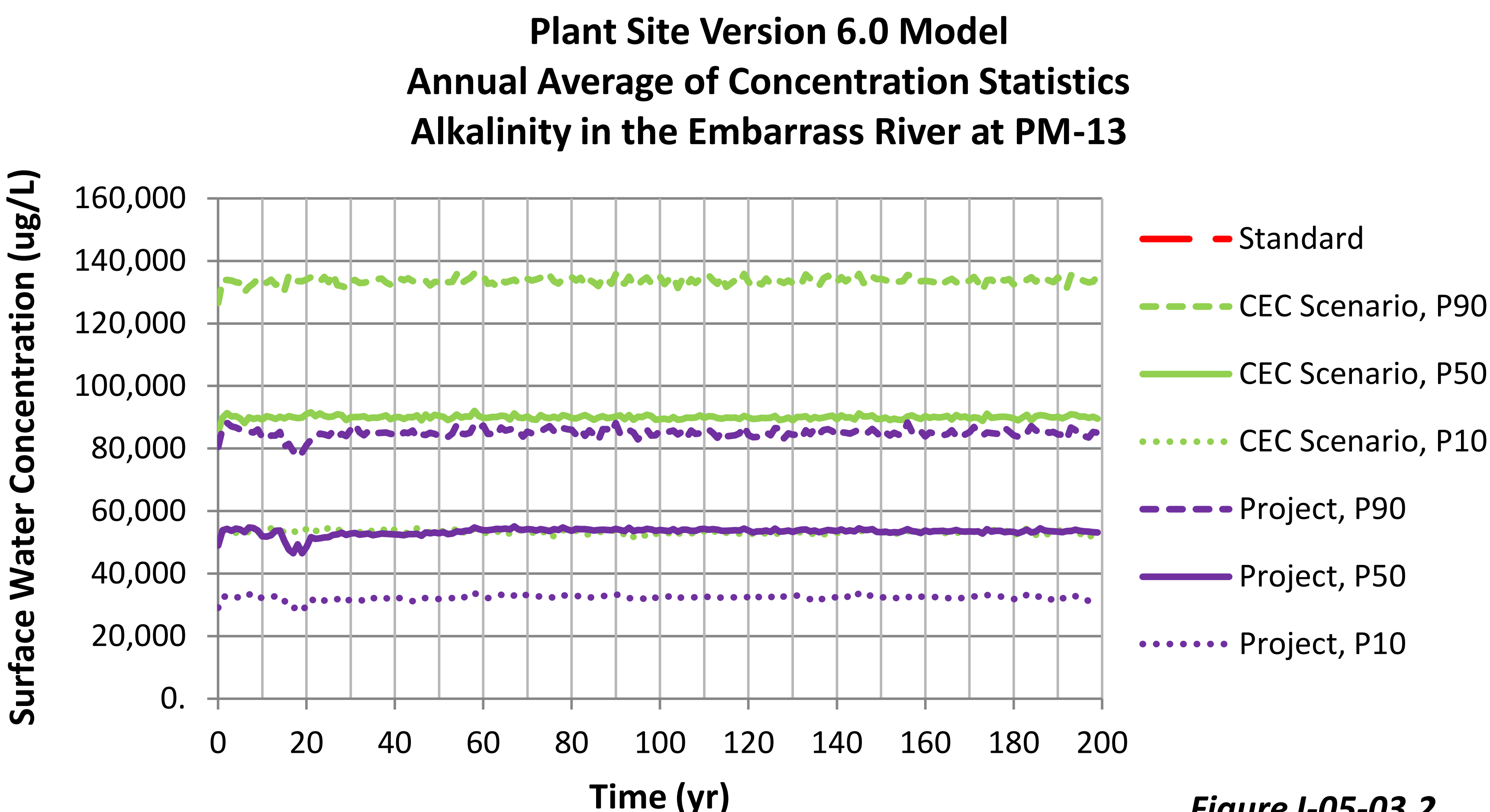

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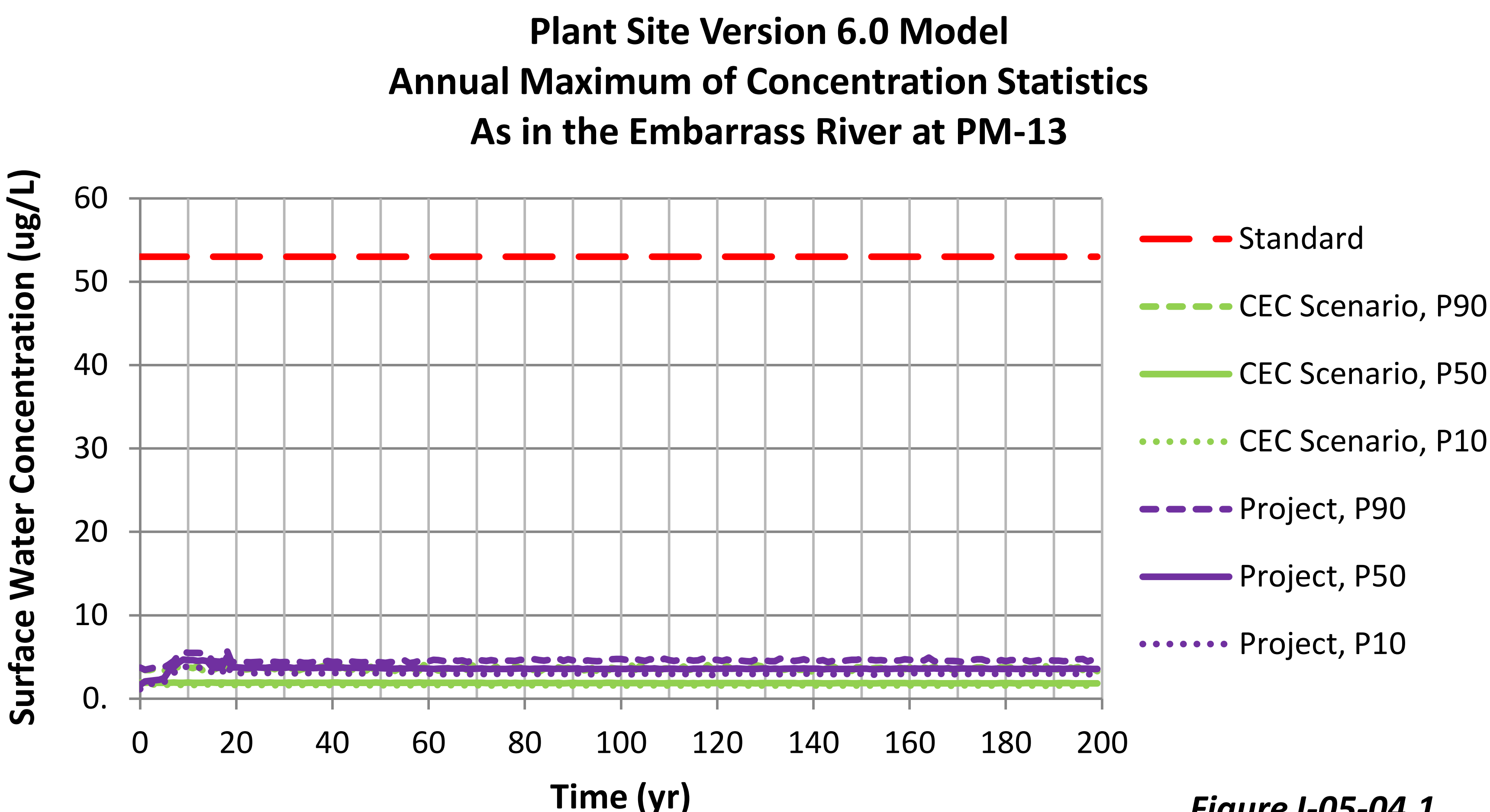

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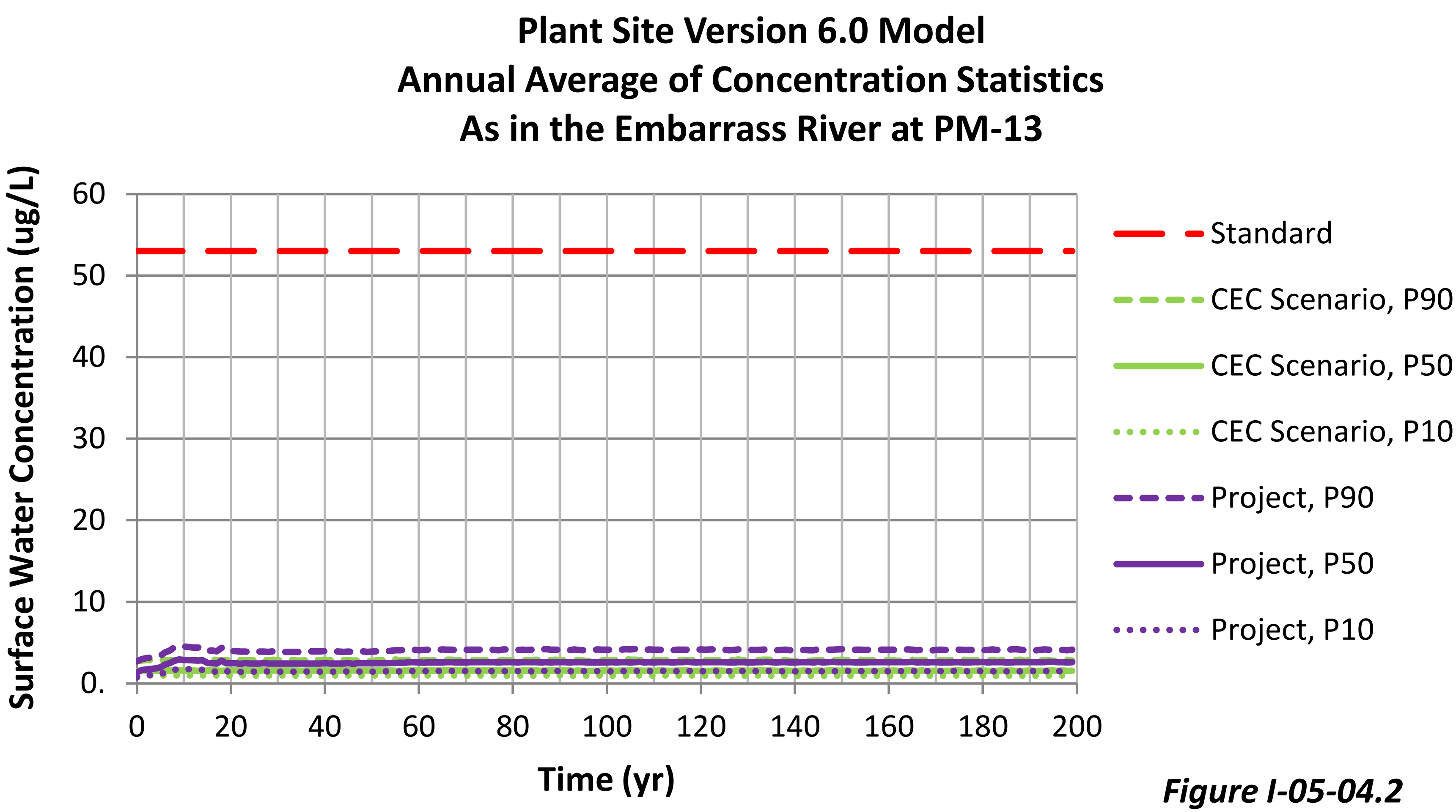

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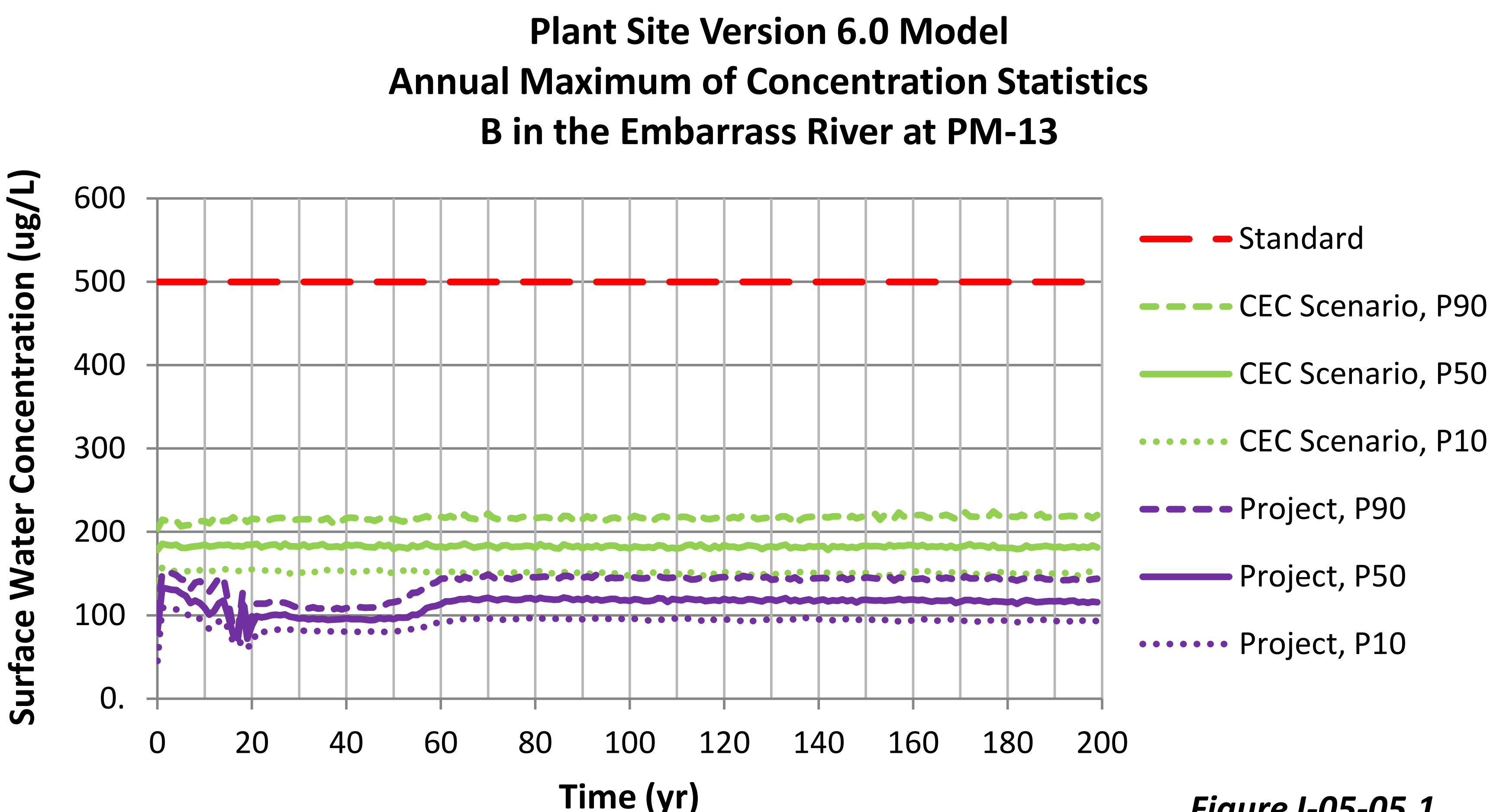

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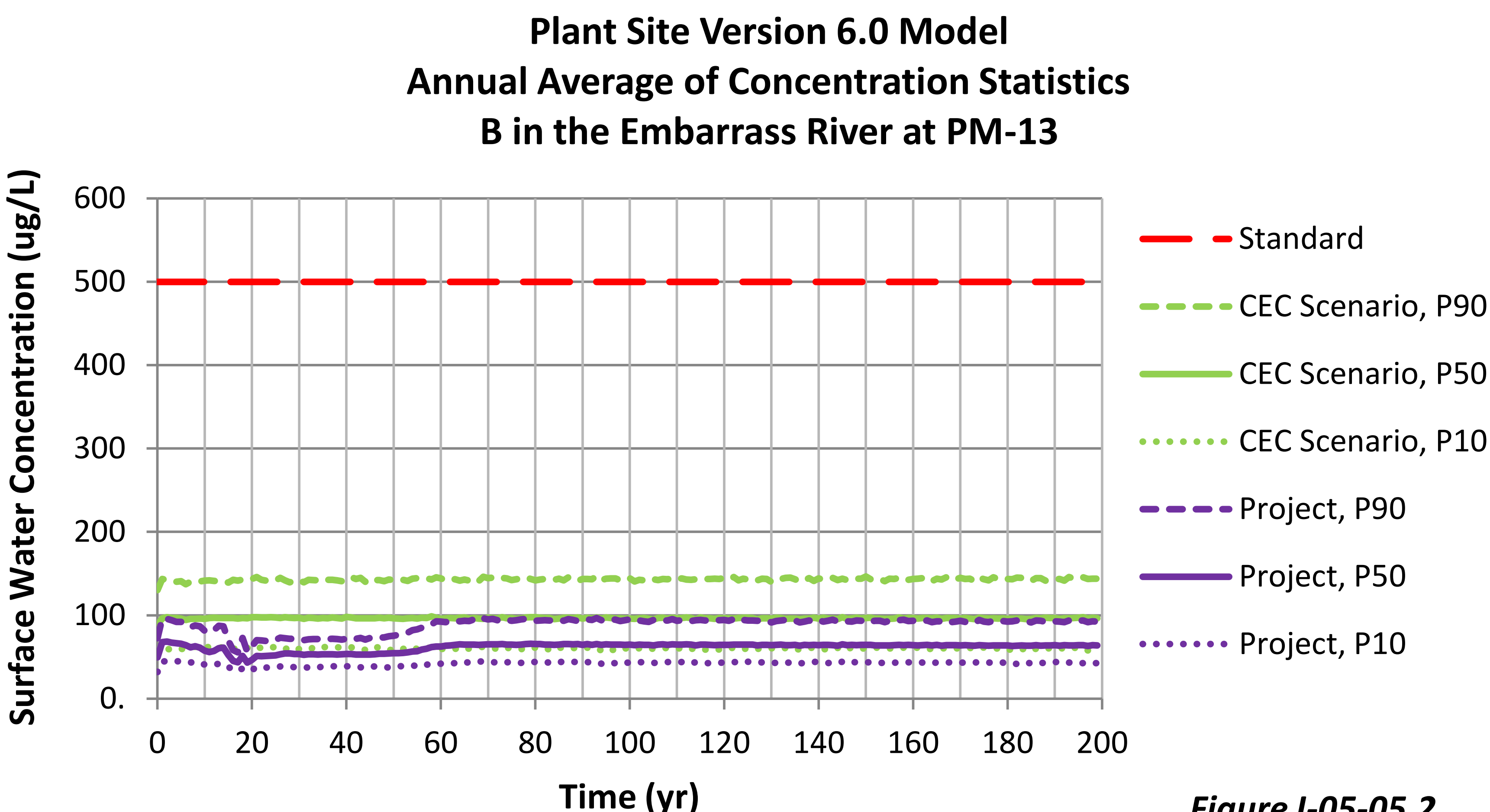

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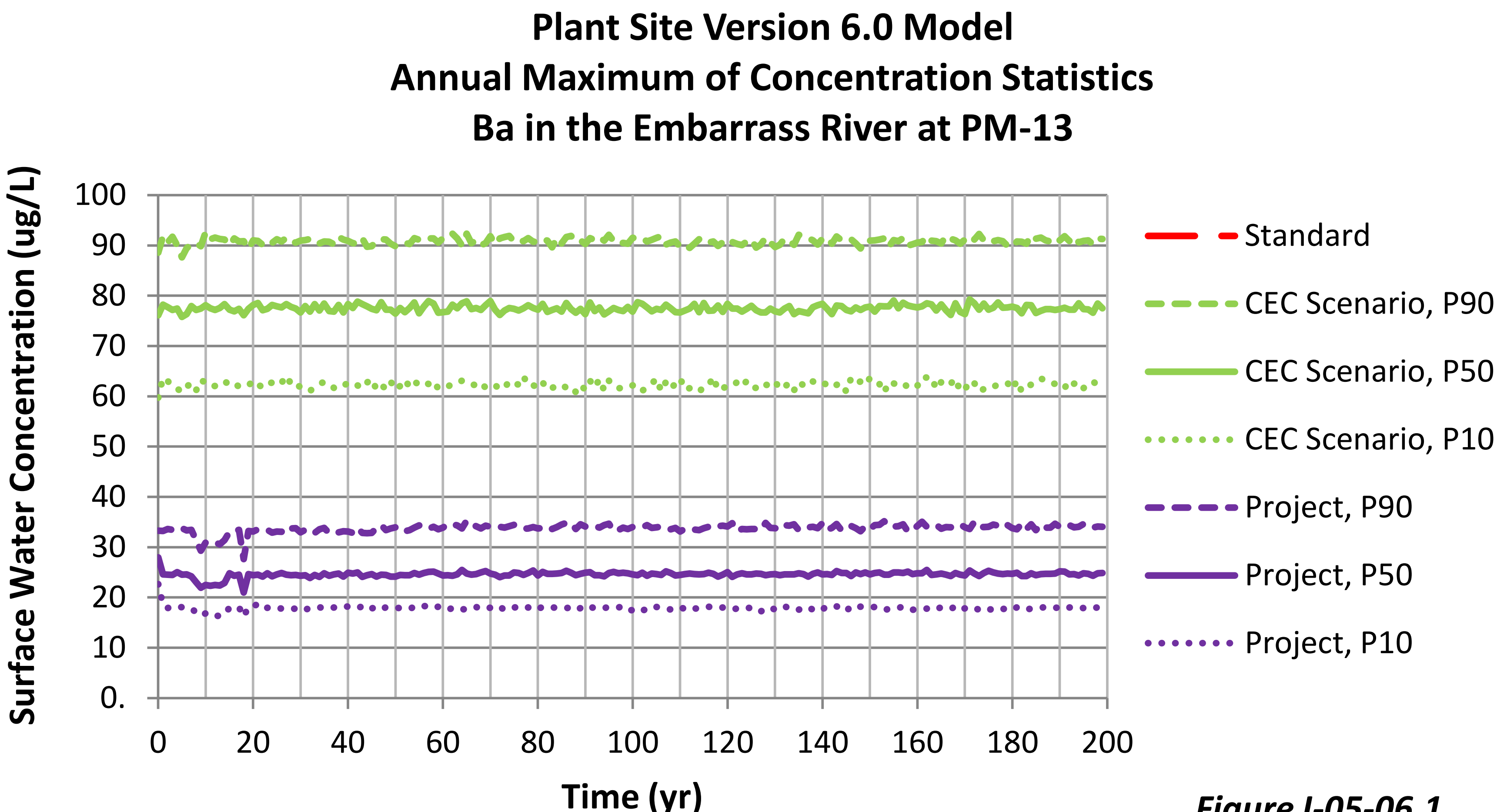

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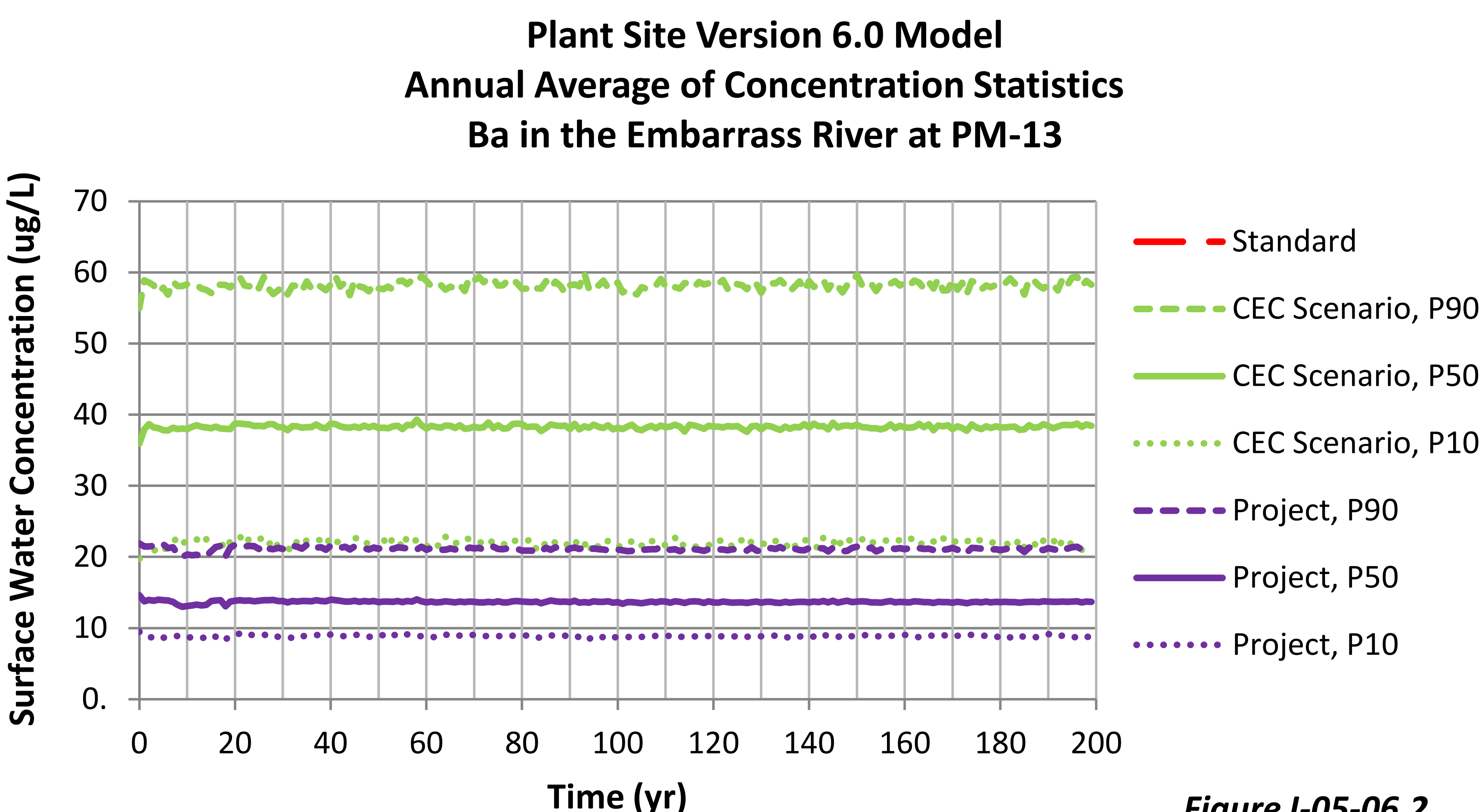

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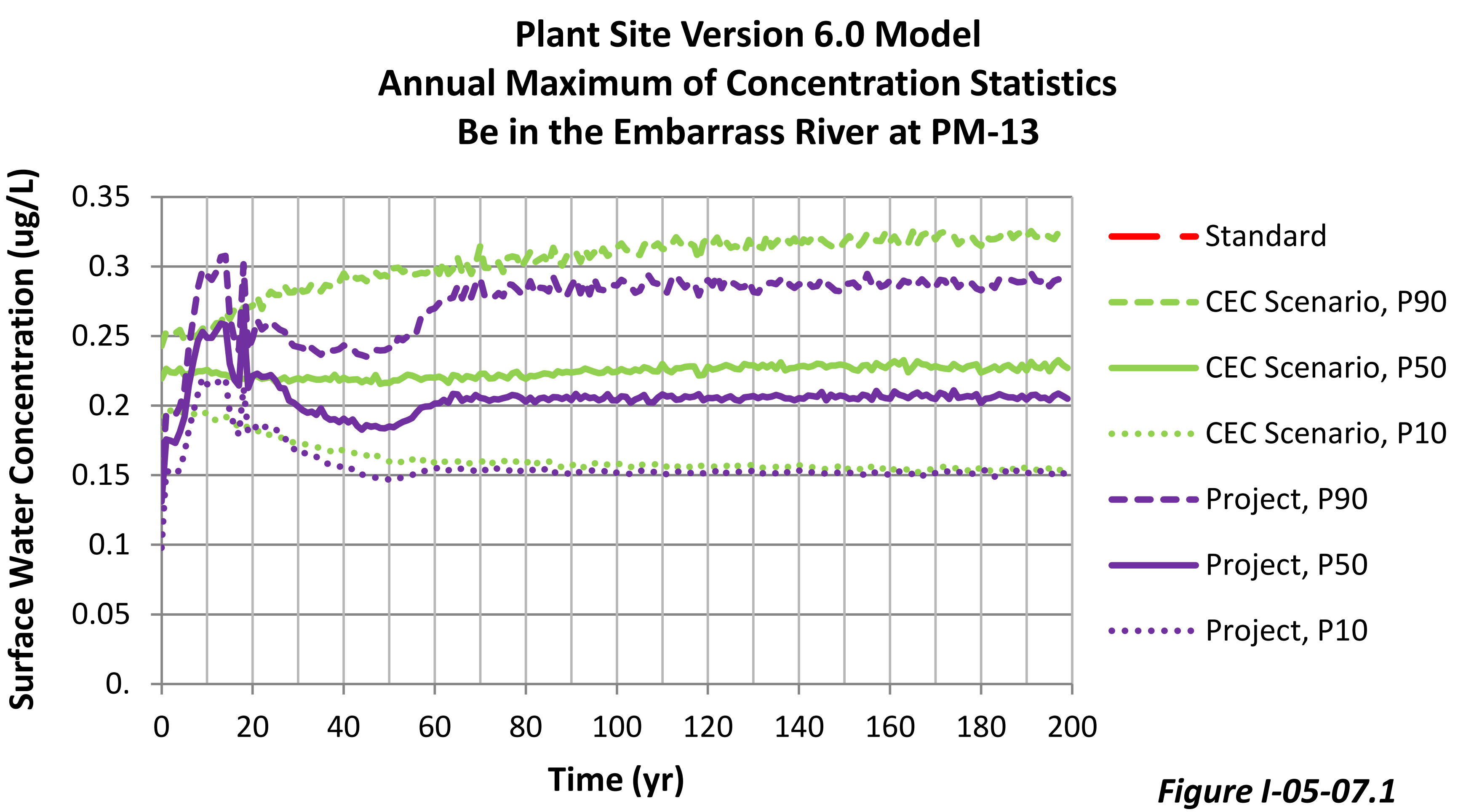

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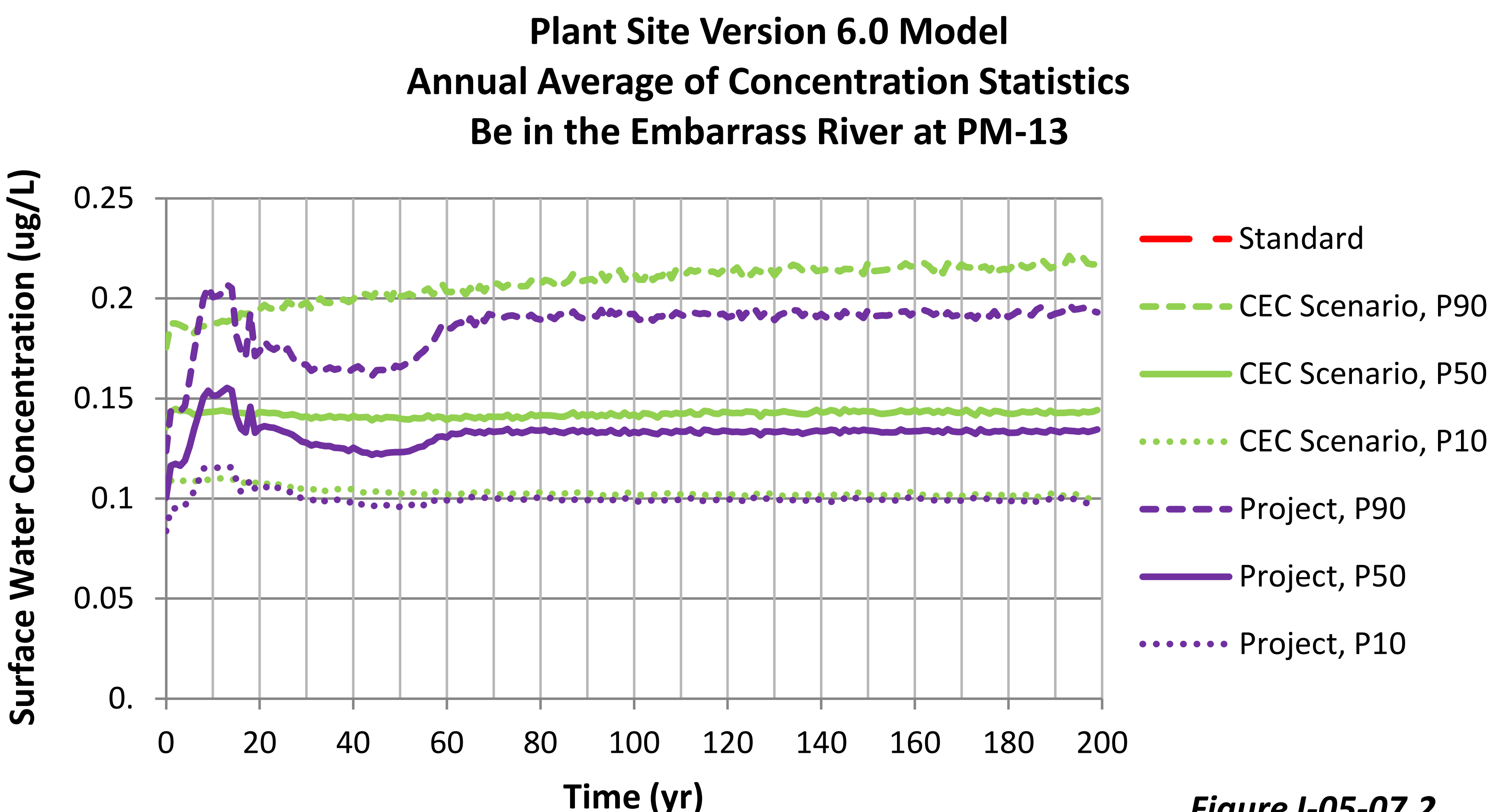

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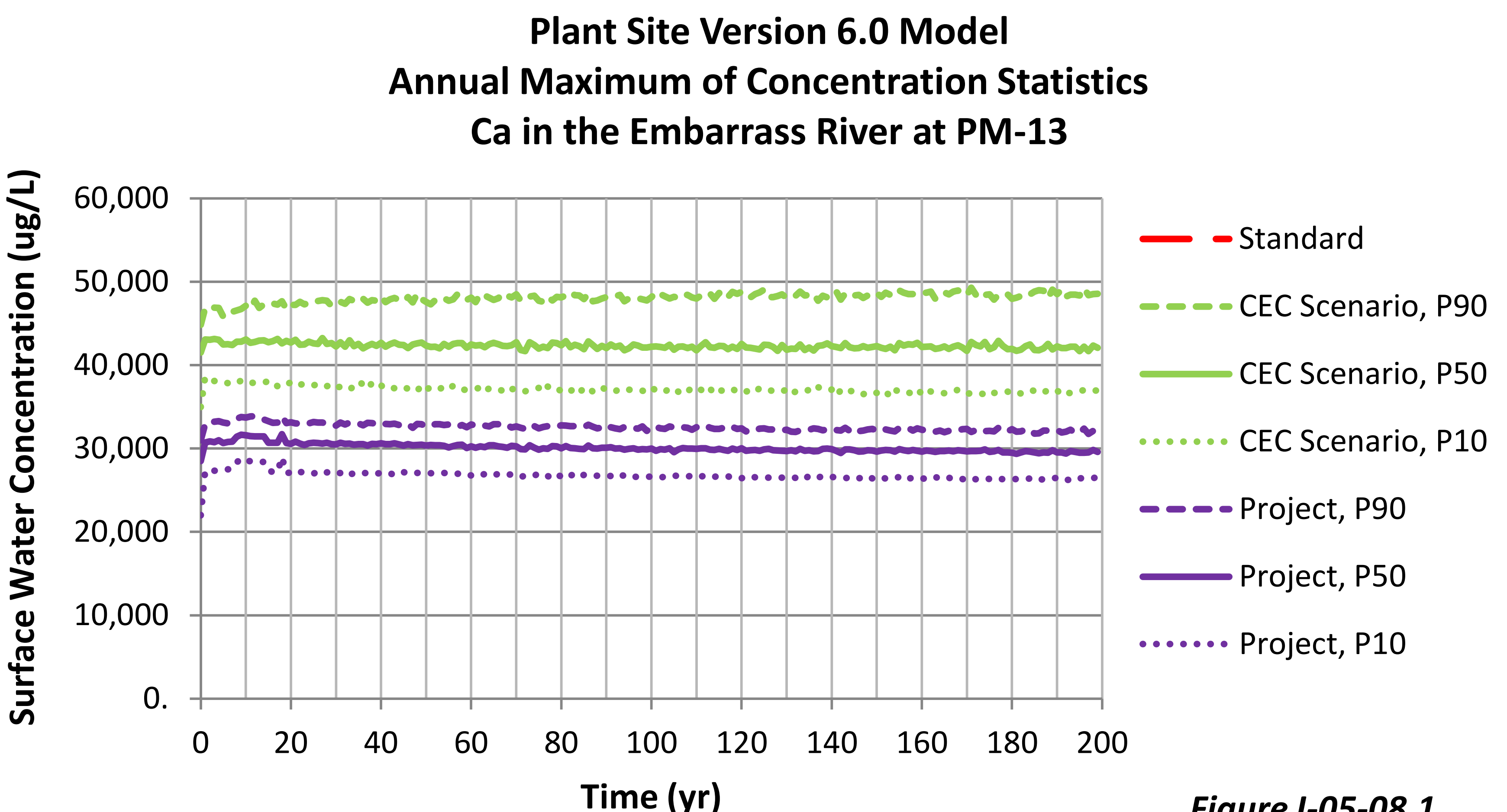

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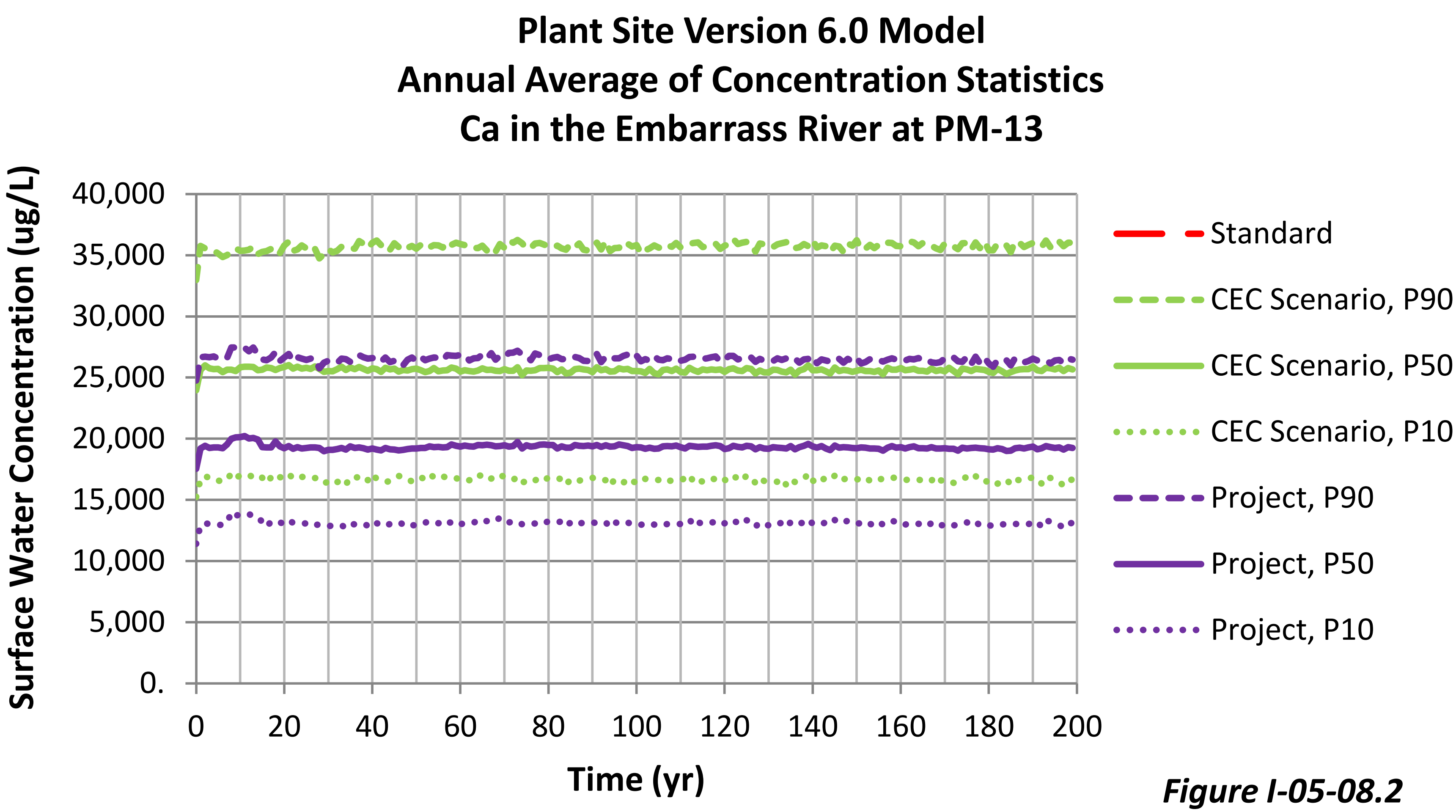

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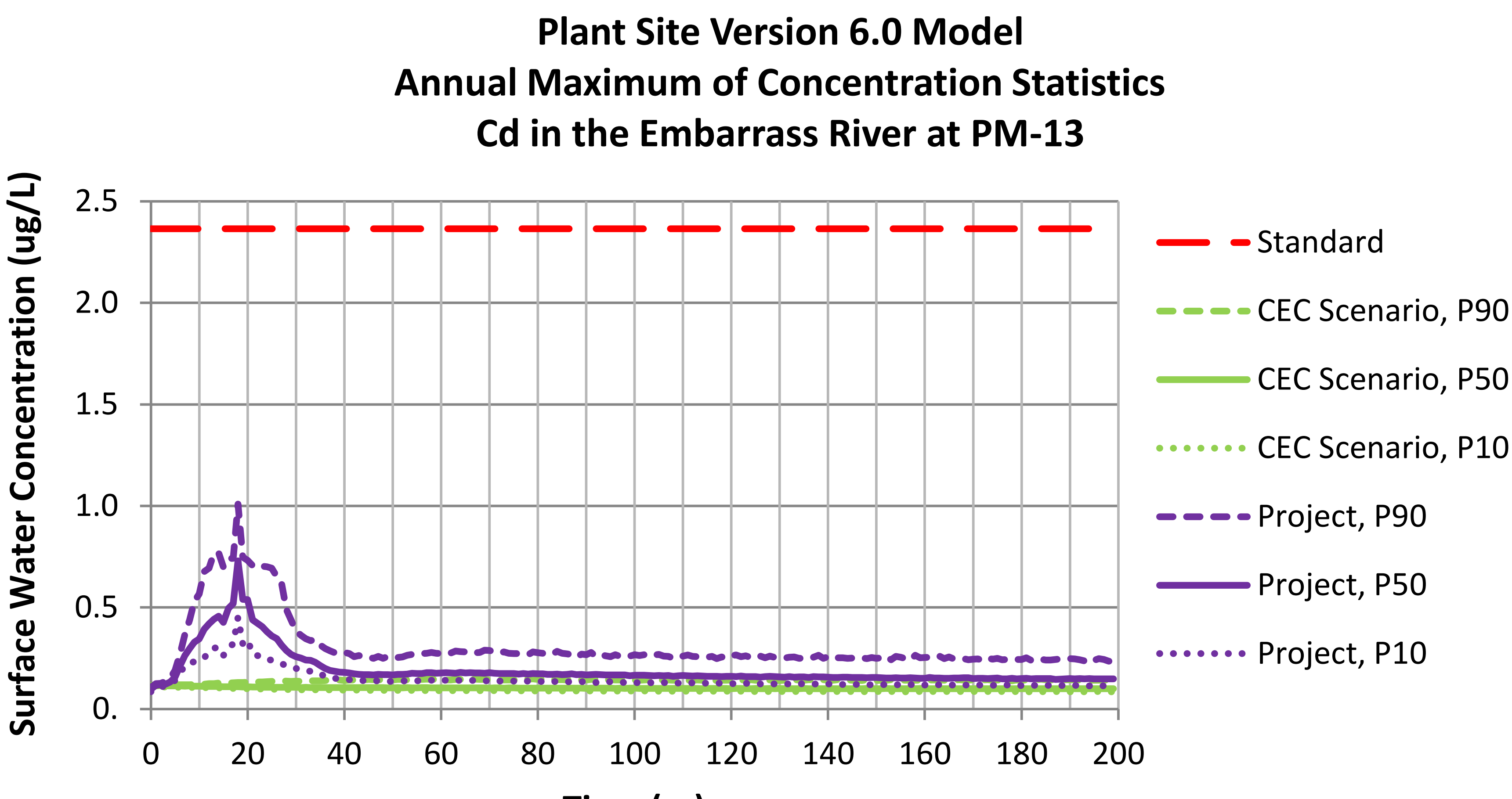

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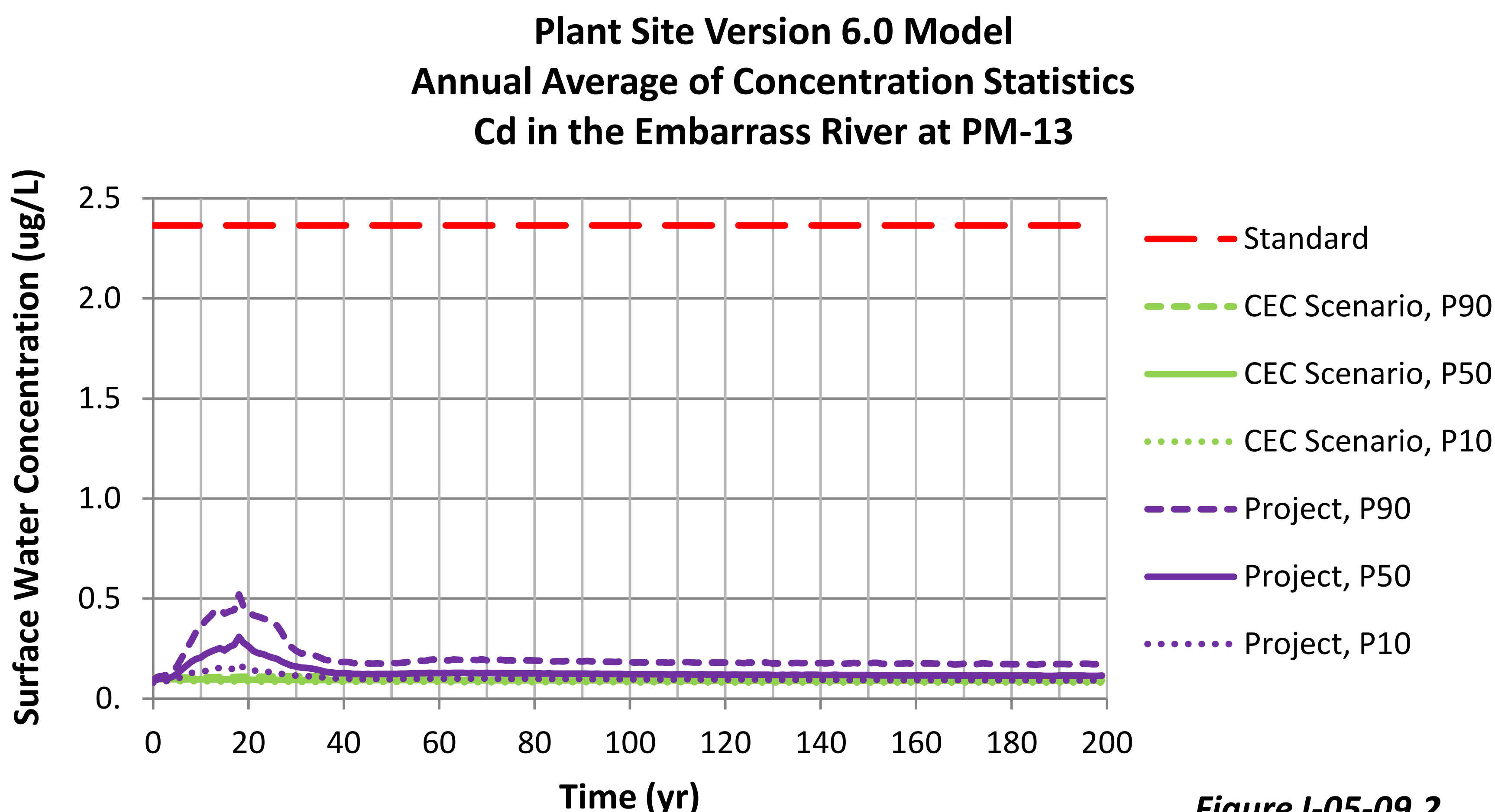

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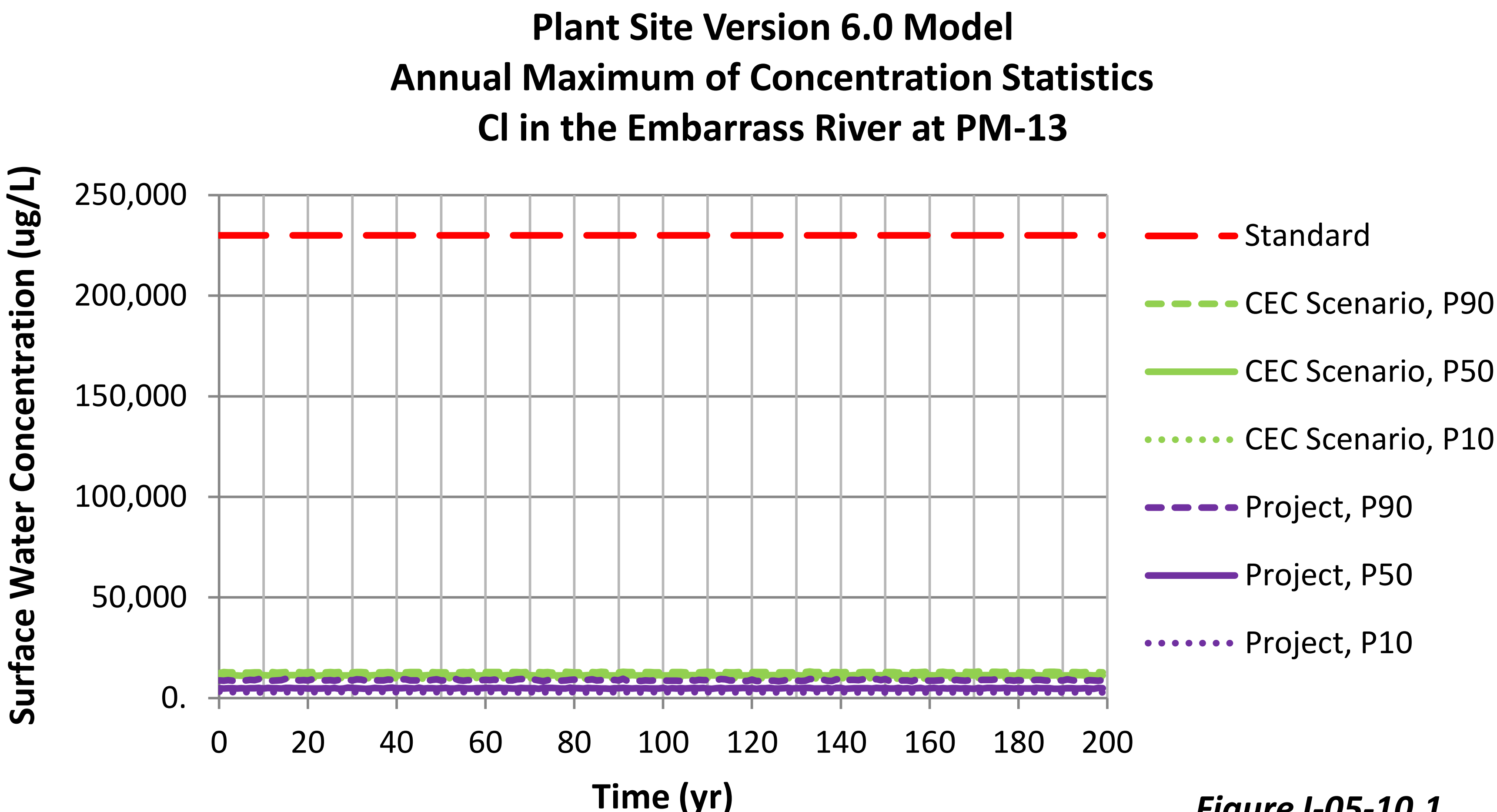

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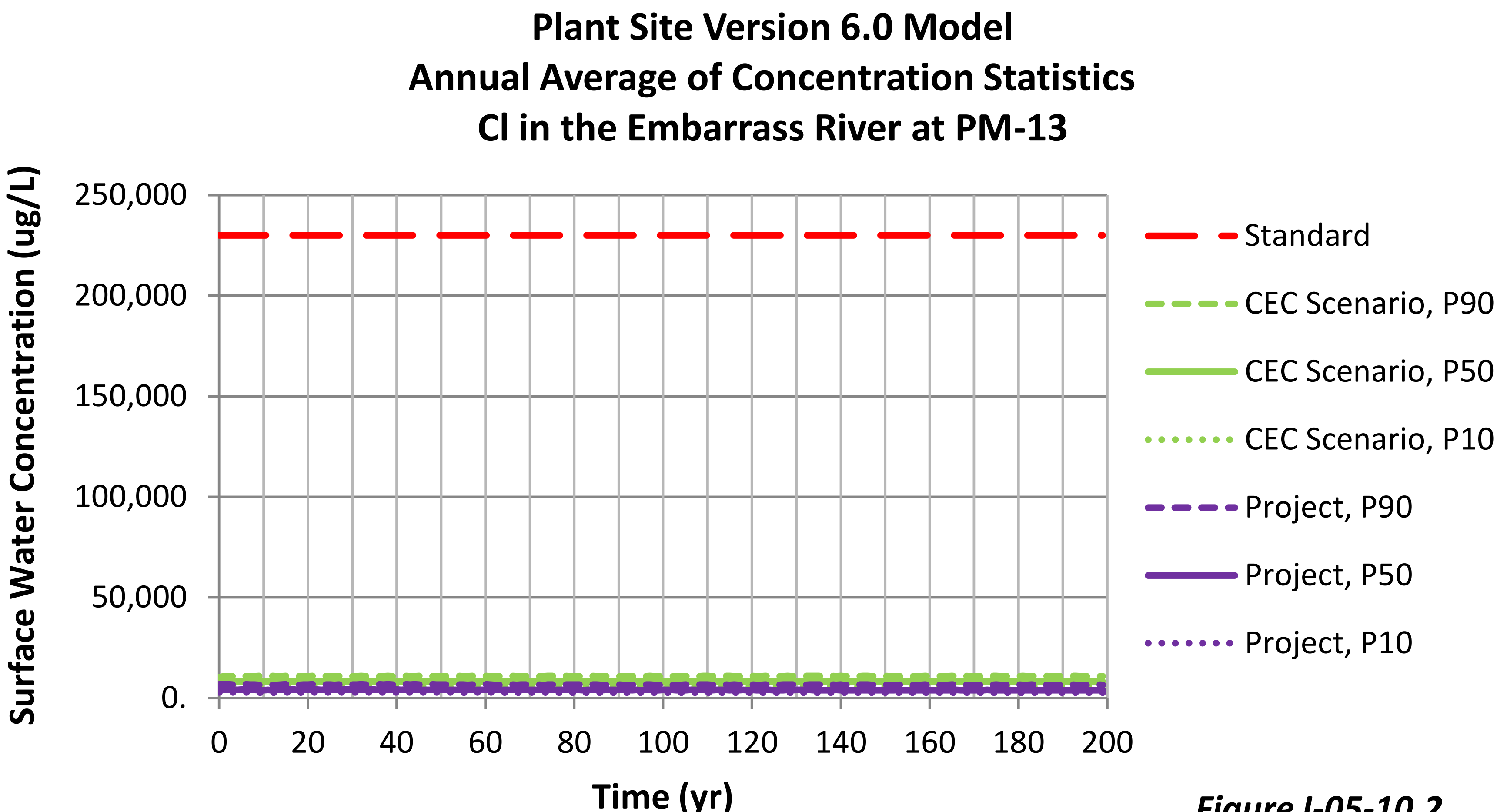

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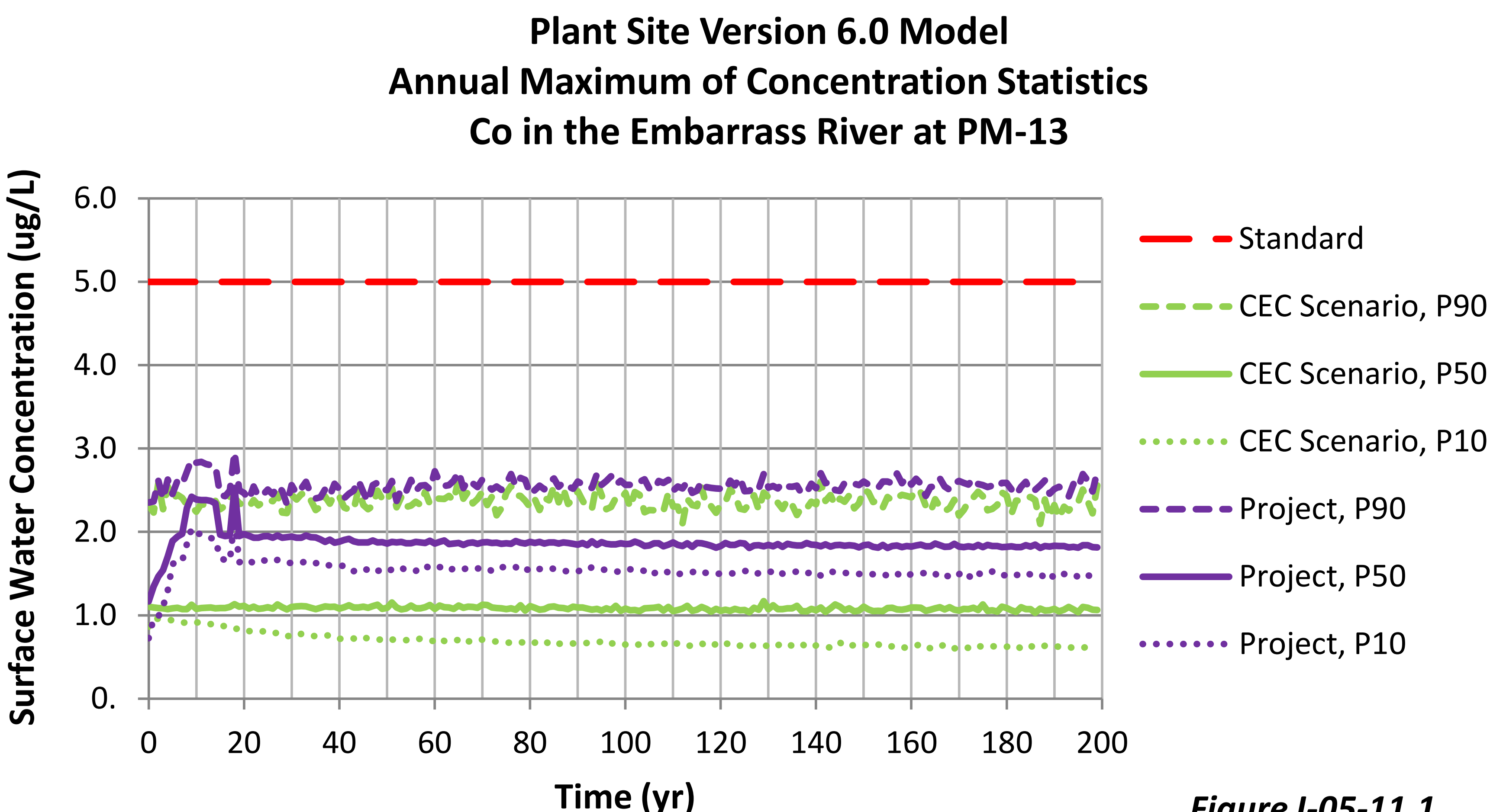

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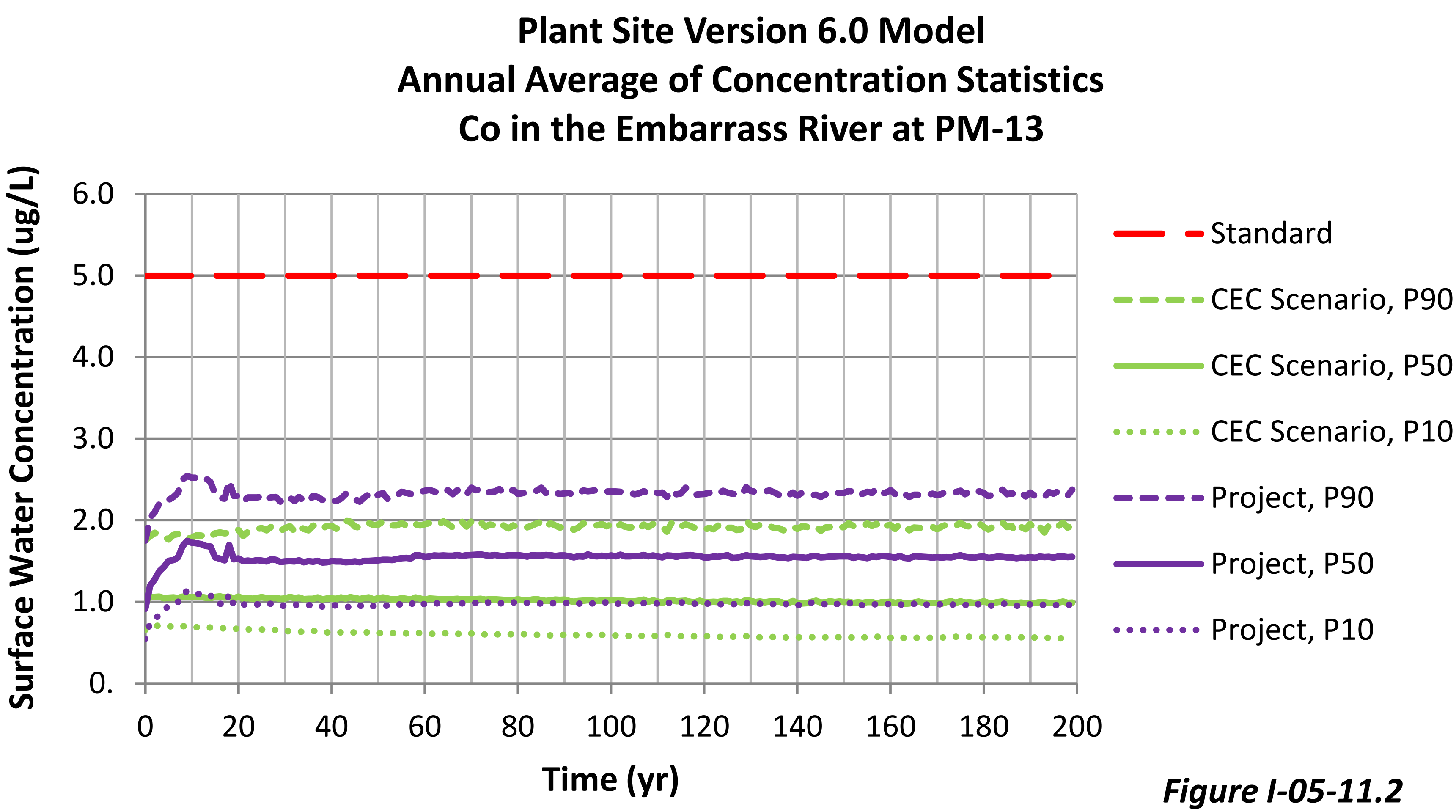

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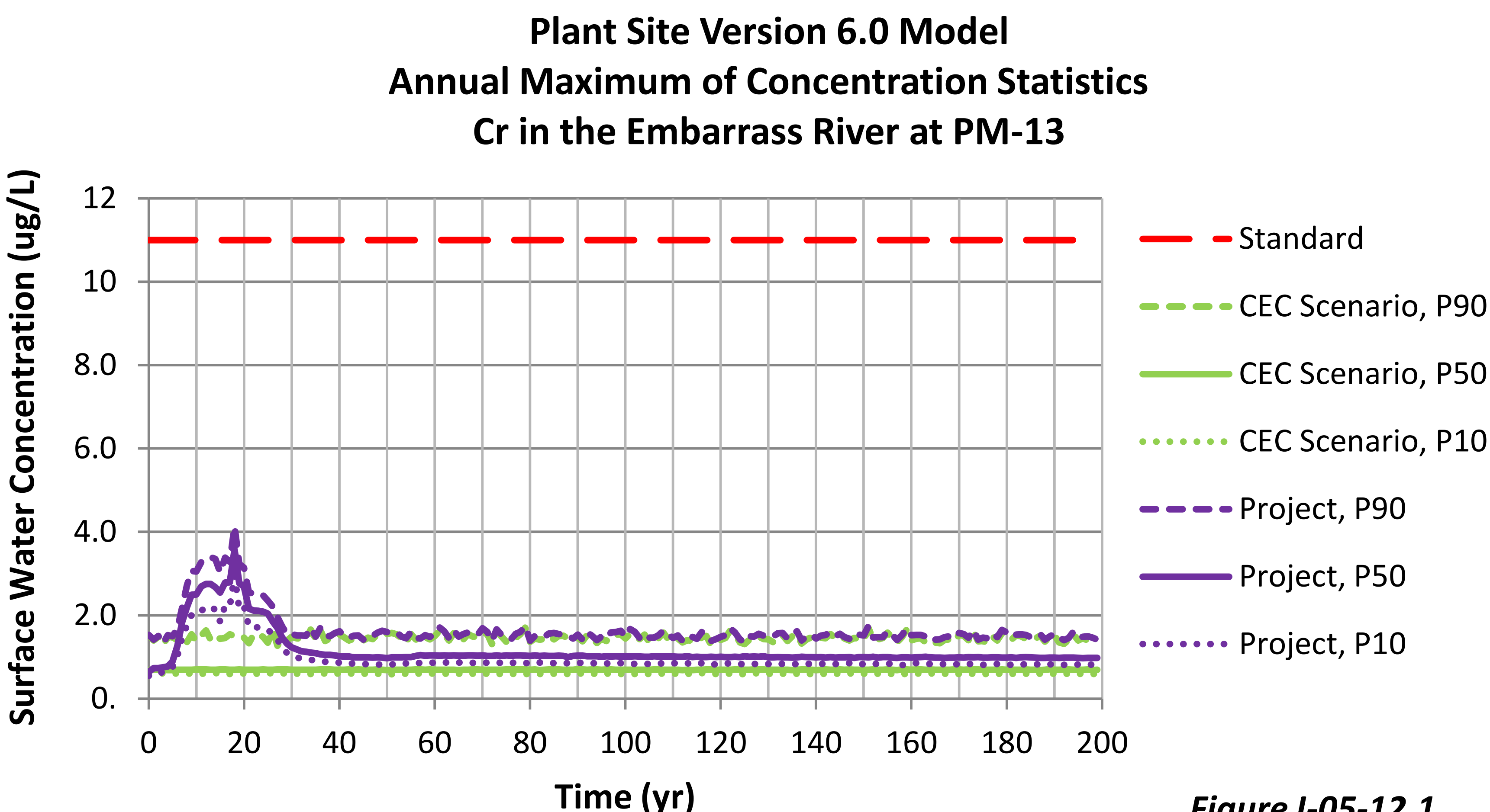

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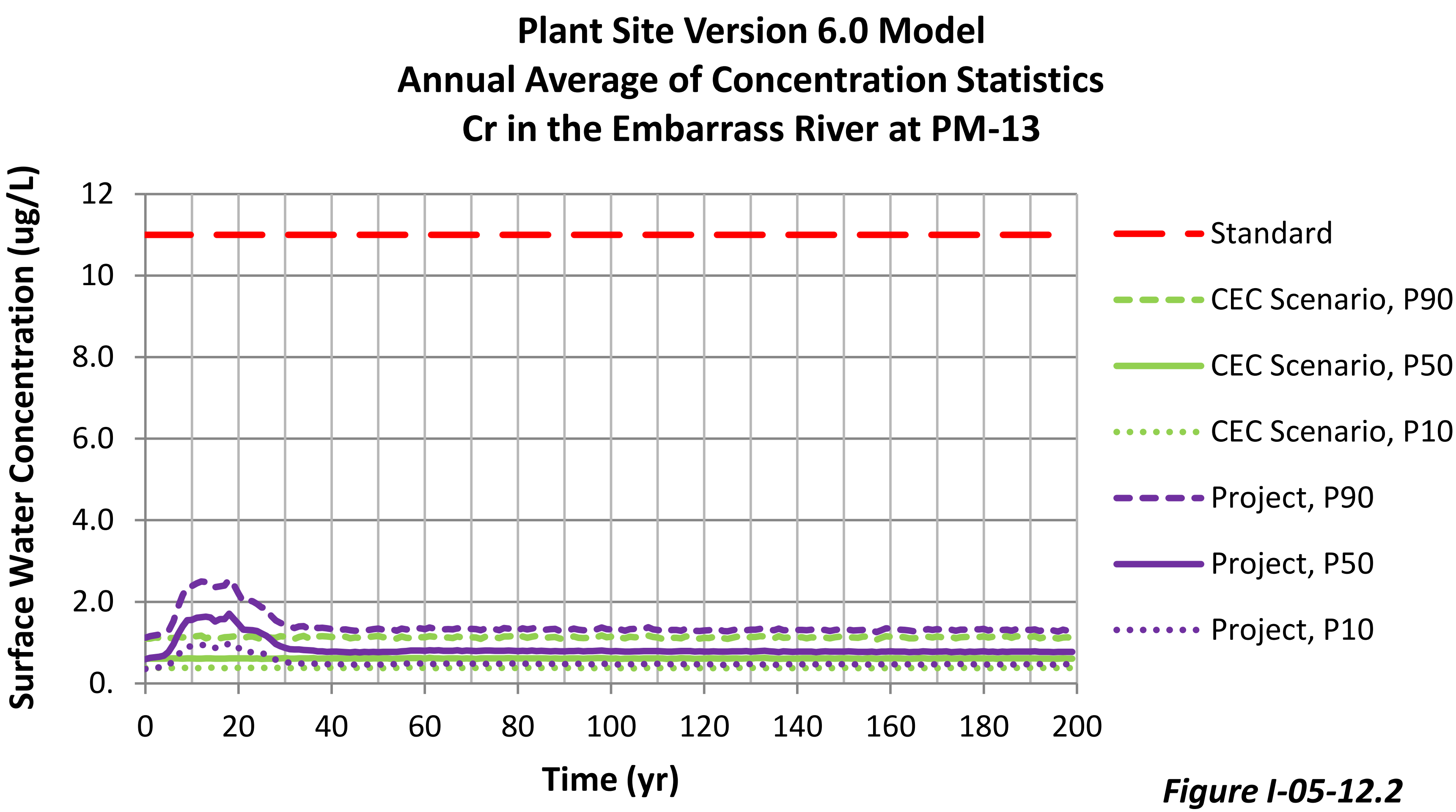

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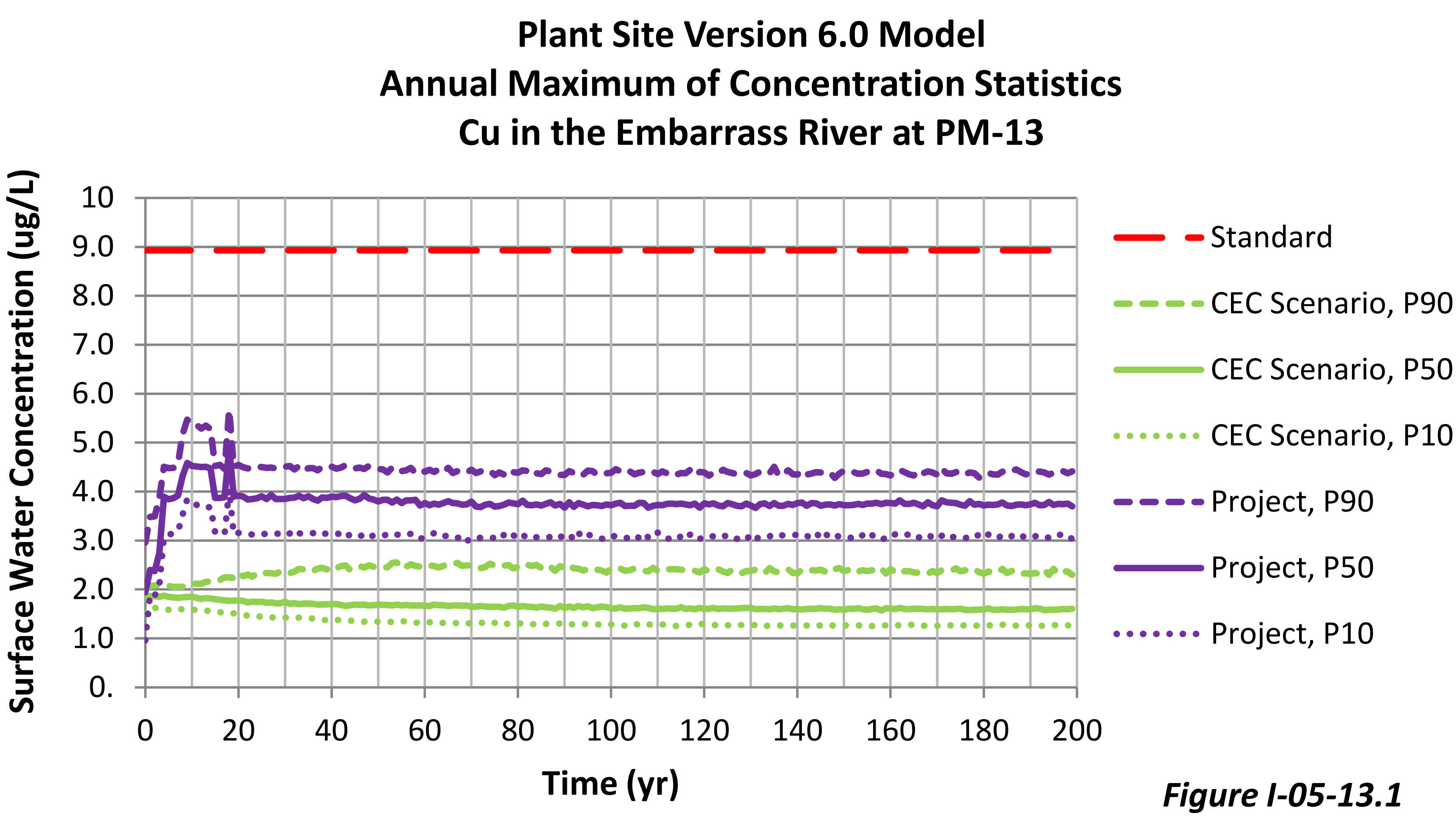
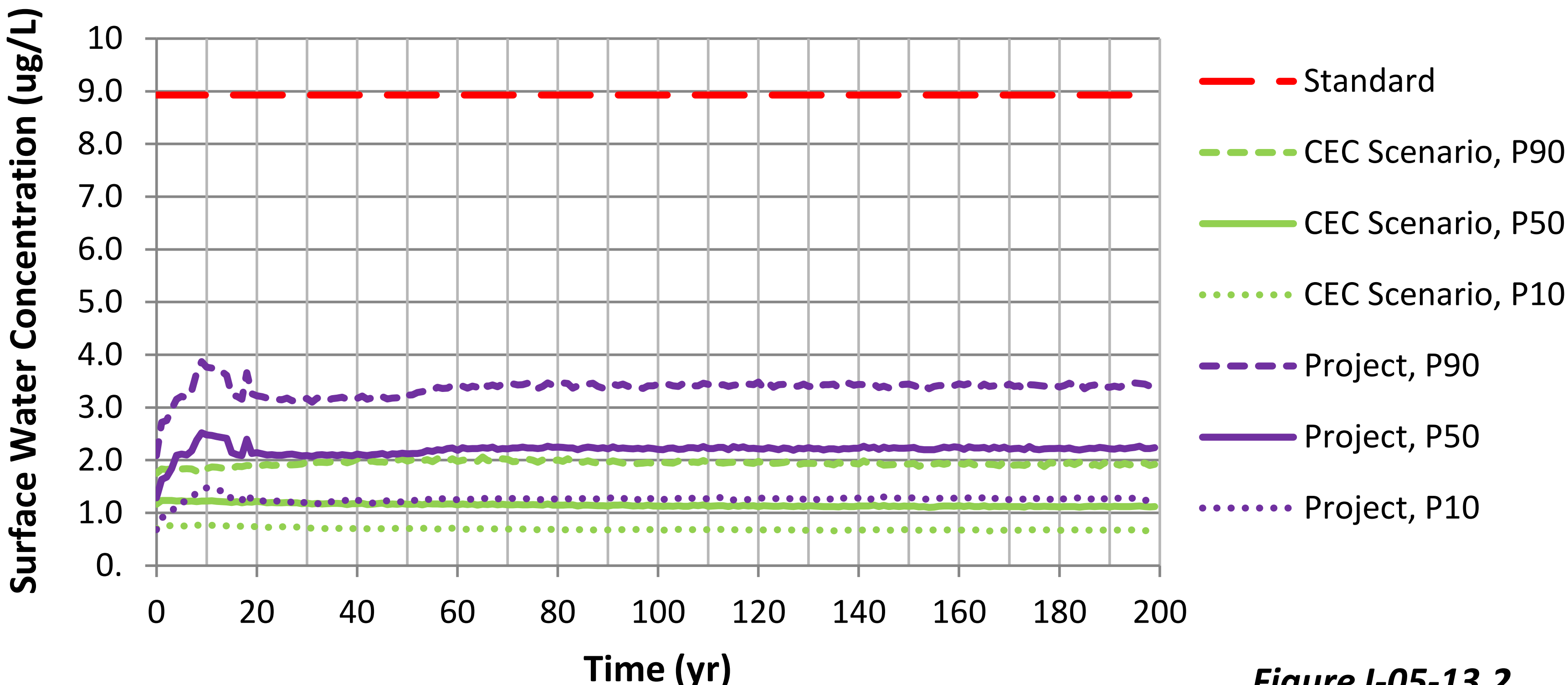


Figure I-05-13.1

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Cu in the Embarrass River at PM-13



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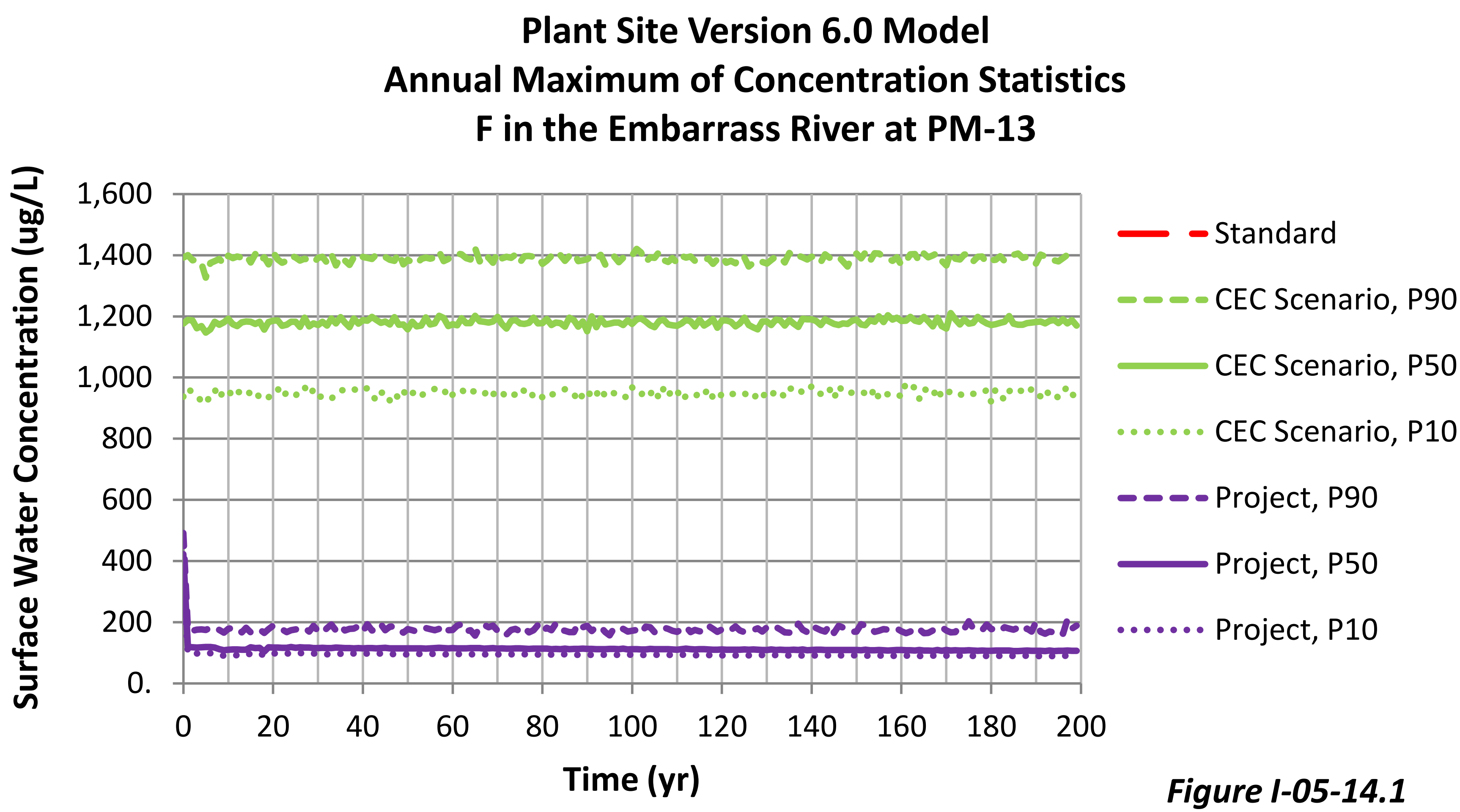

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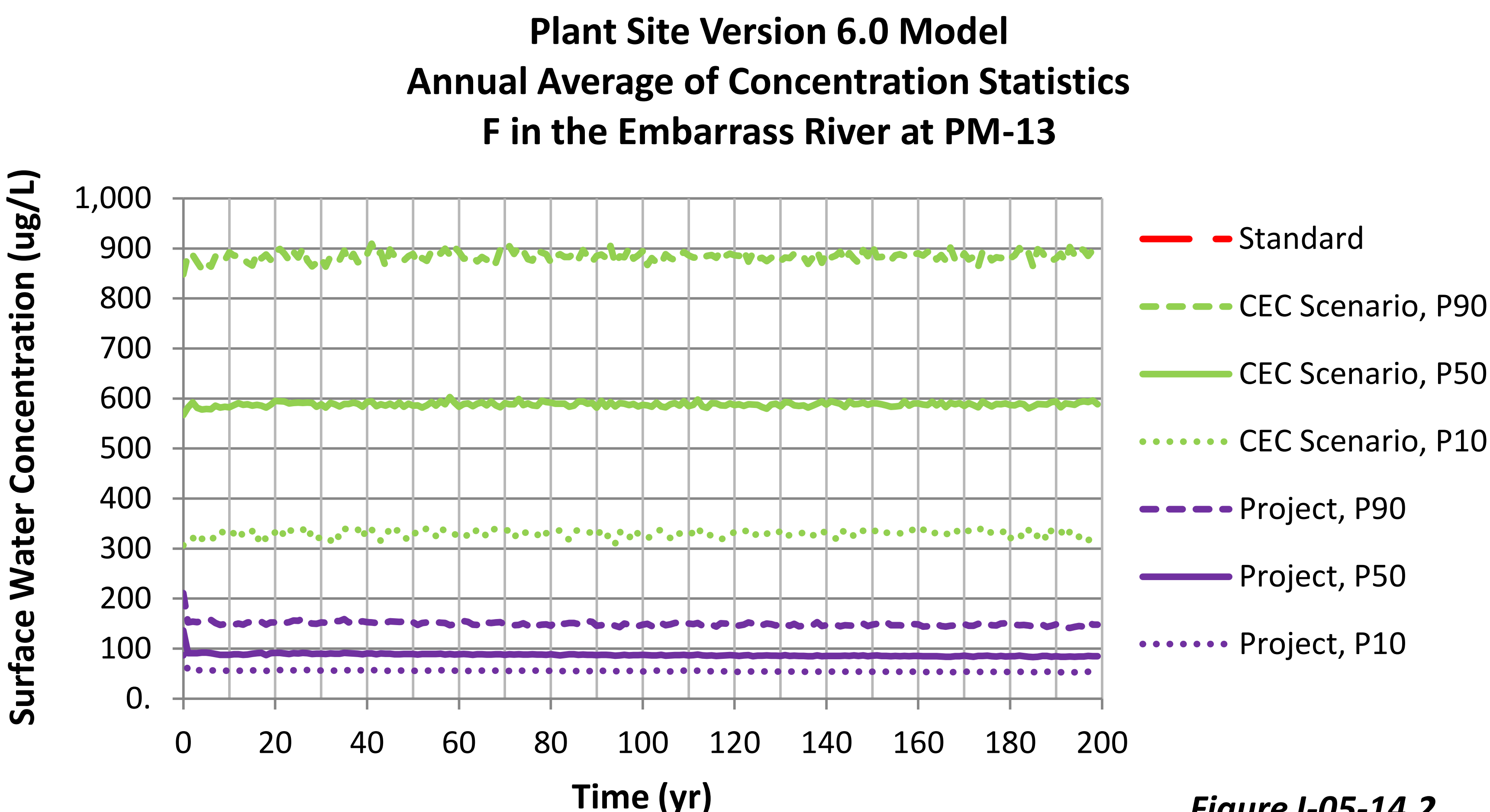

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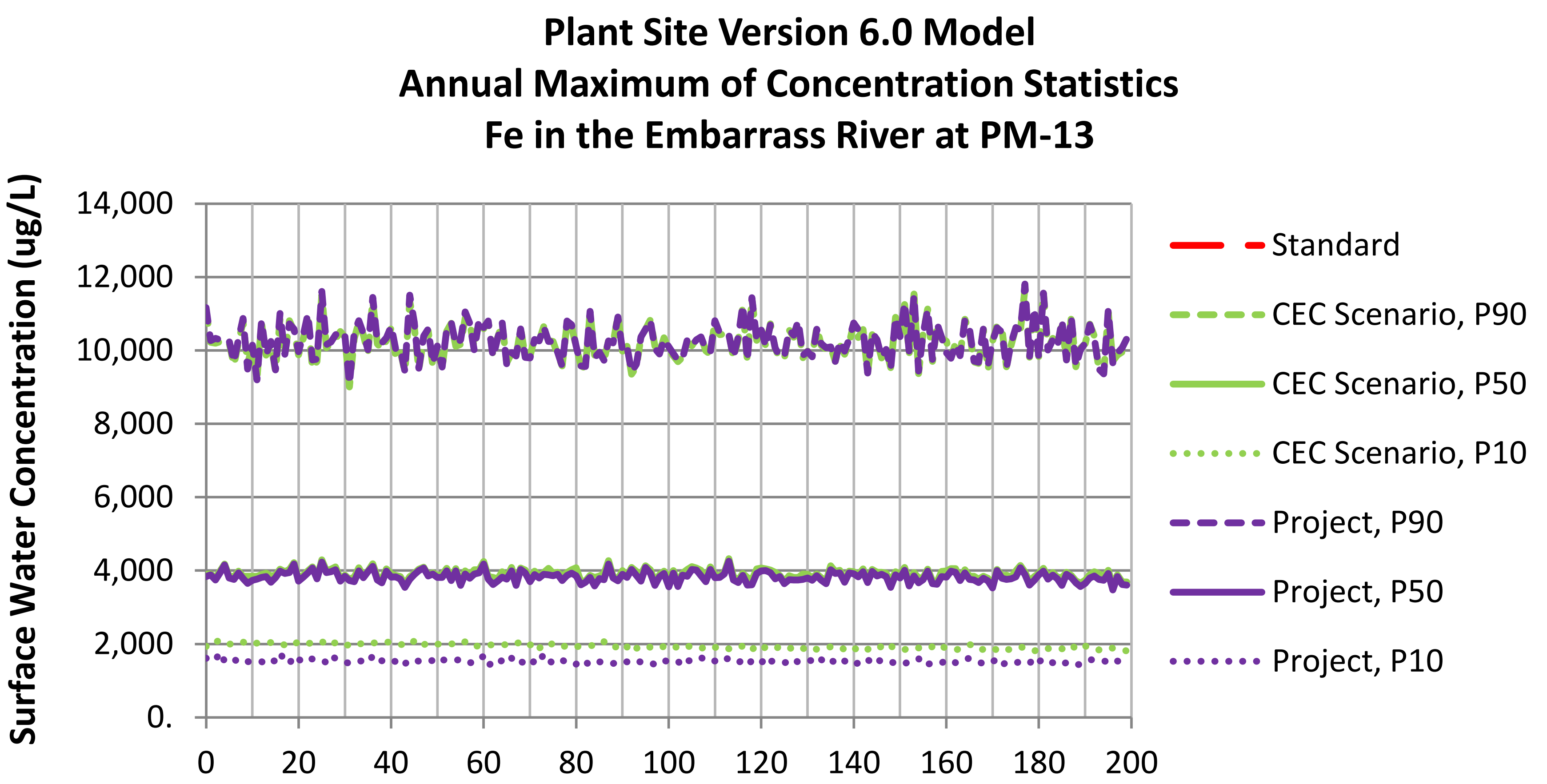

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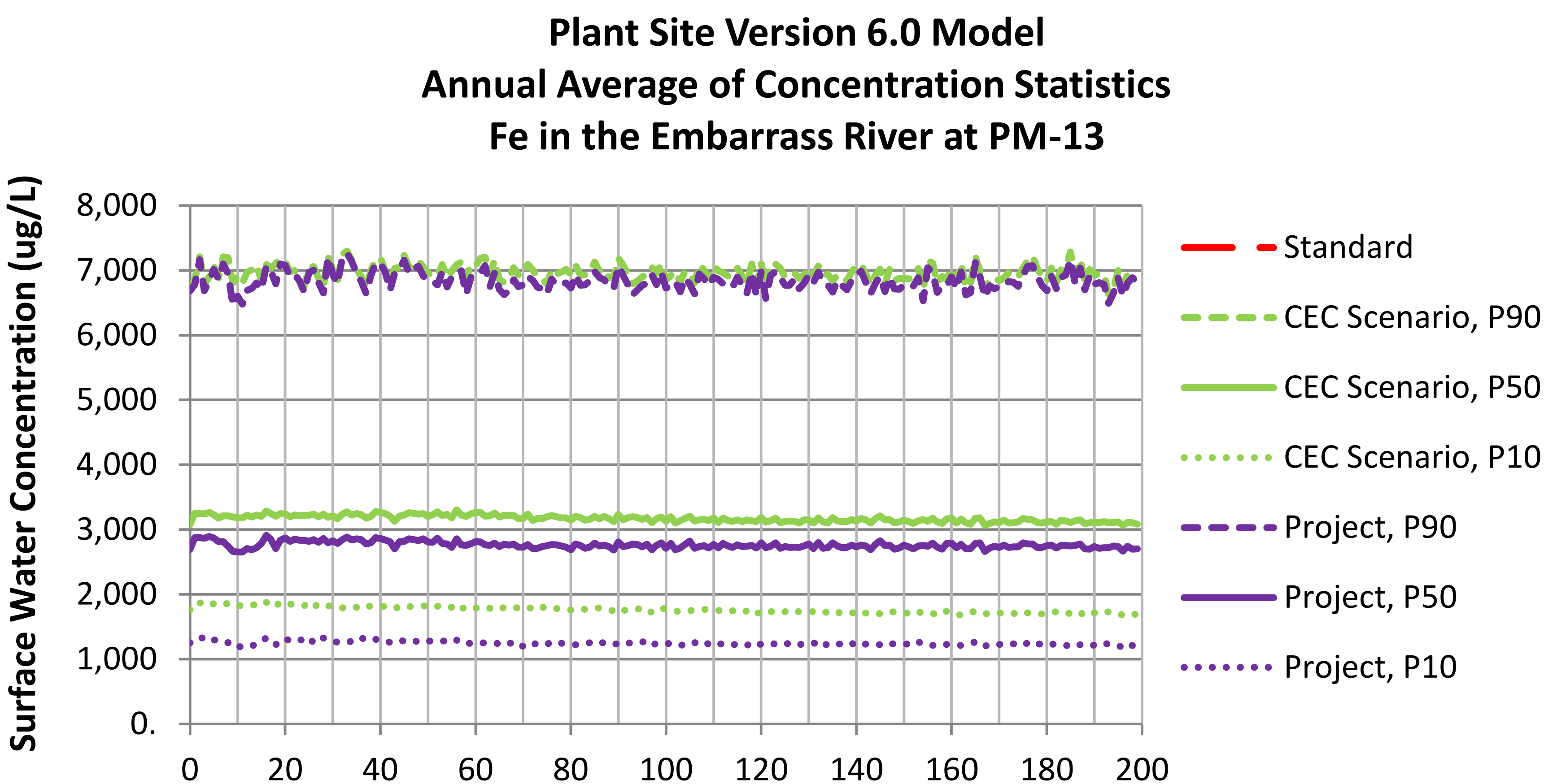

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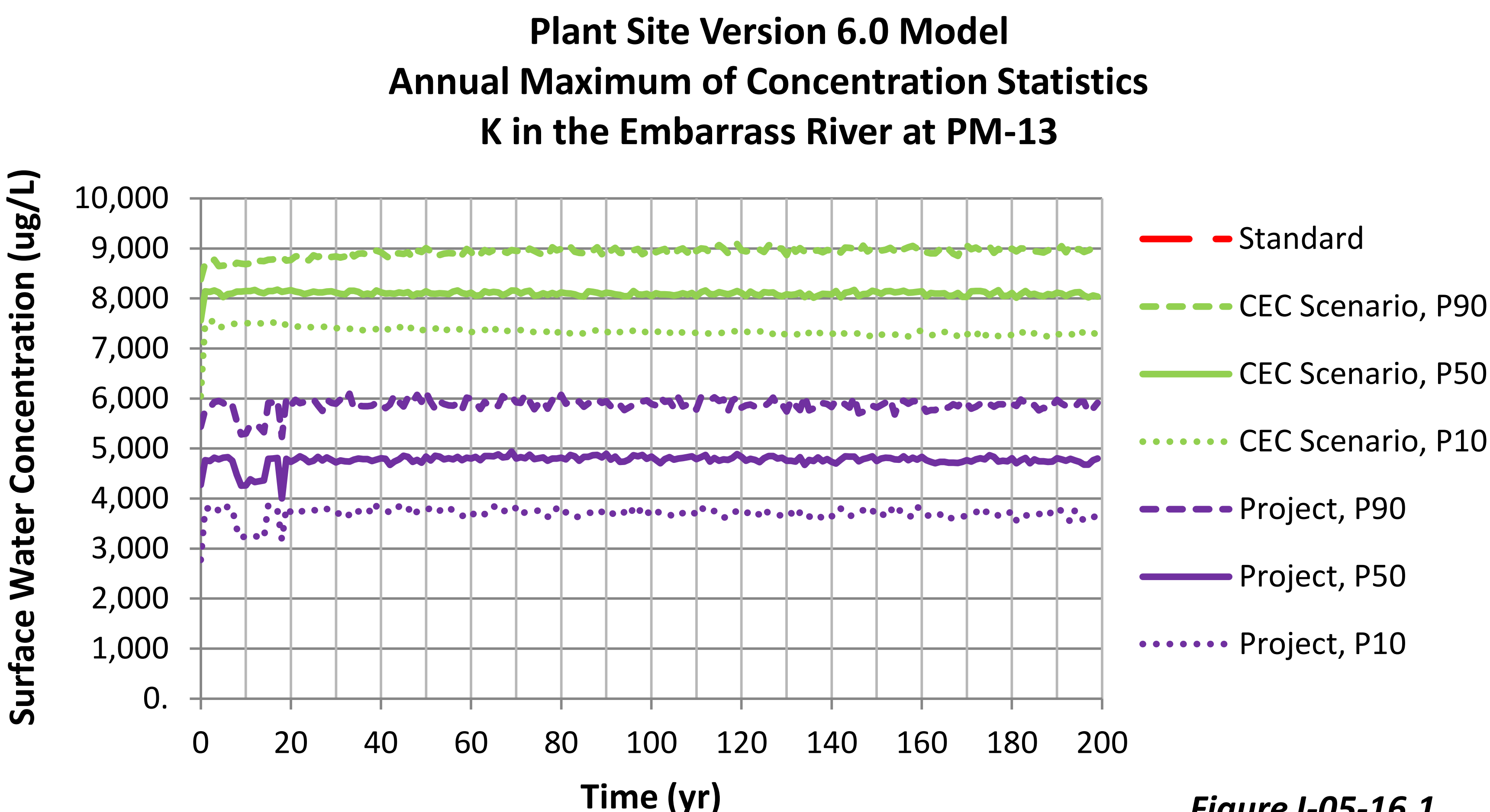

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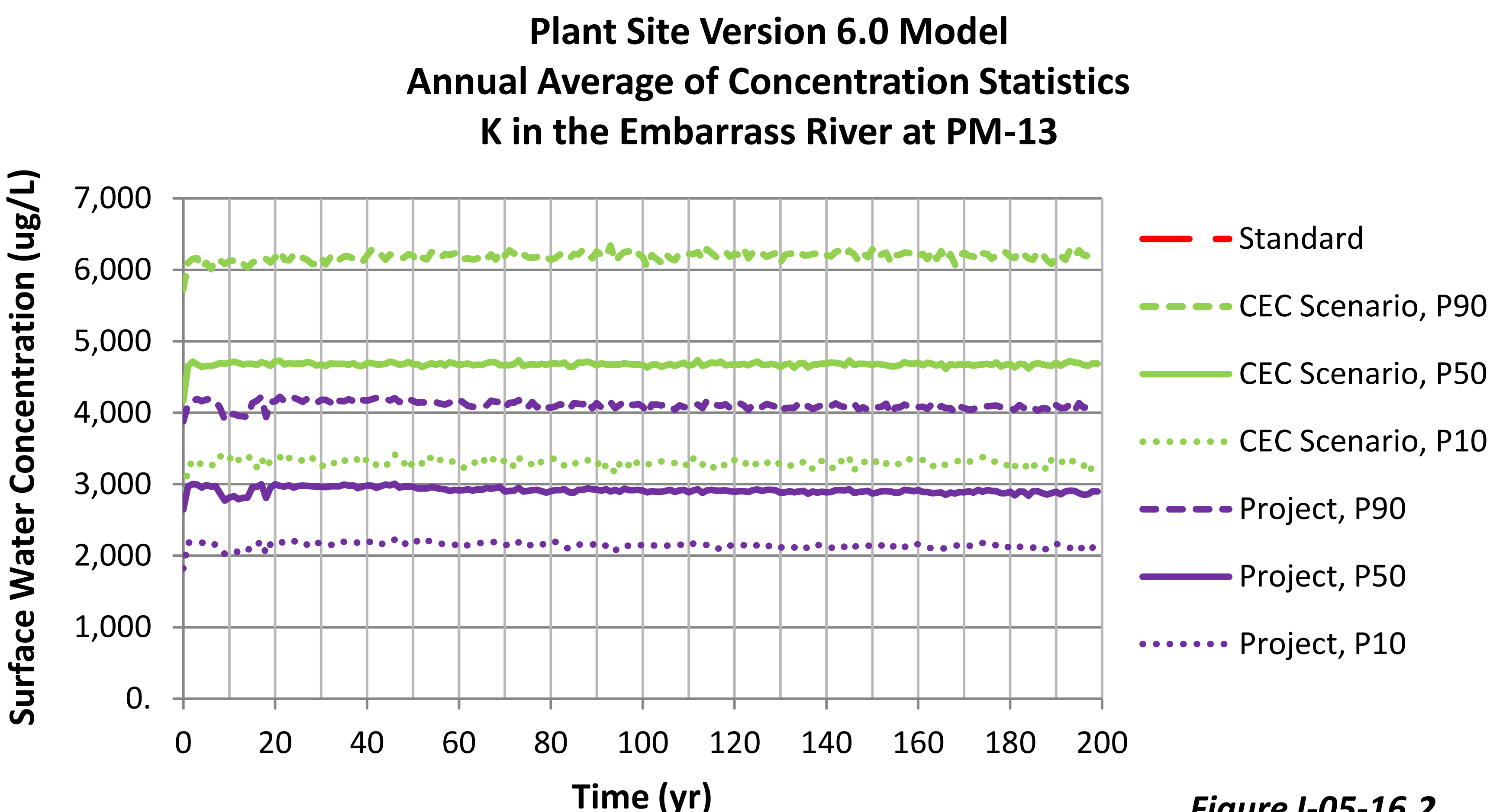

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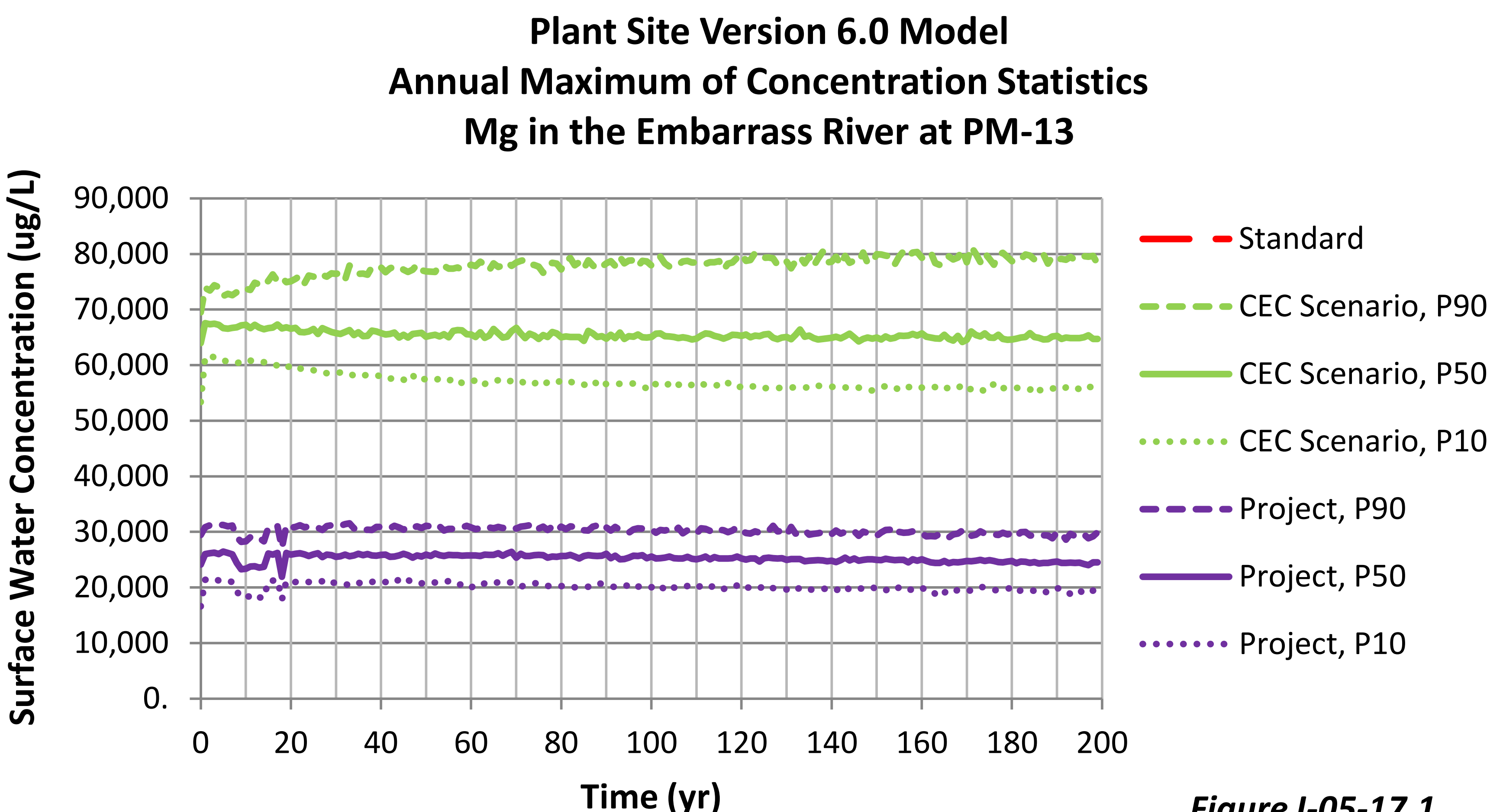

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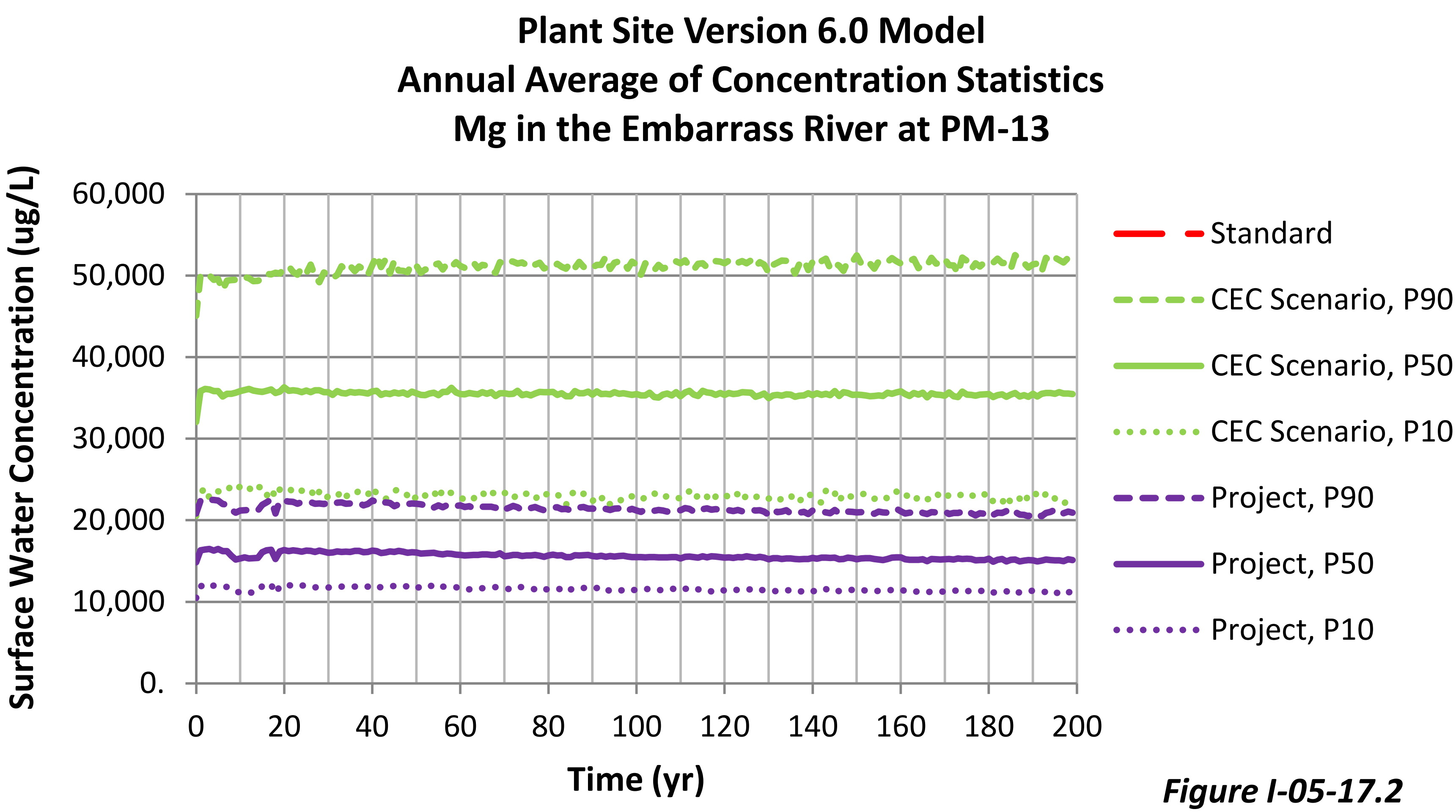

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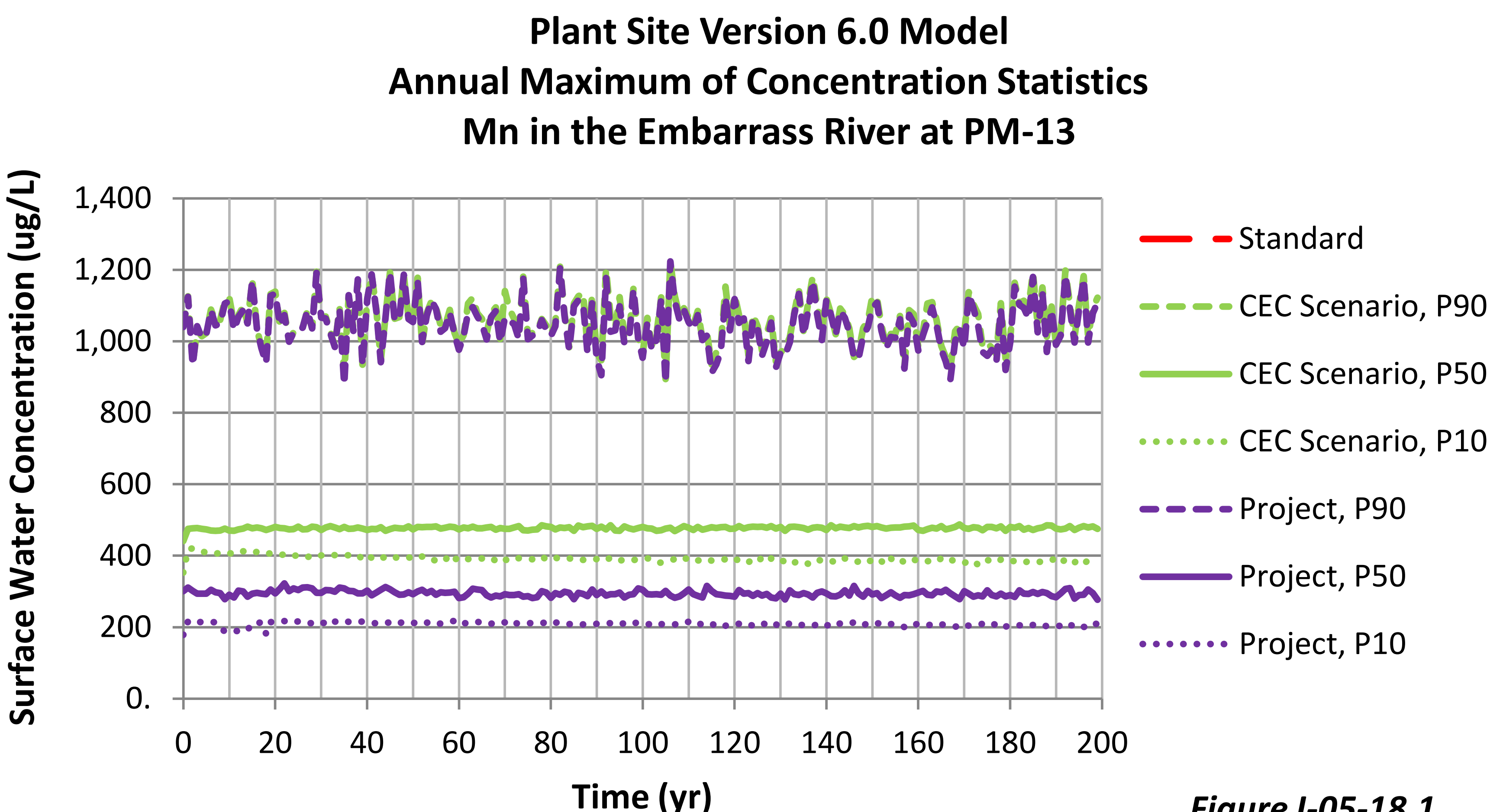

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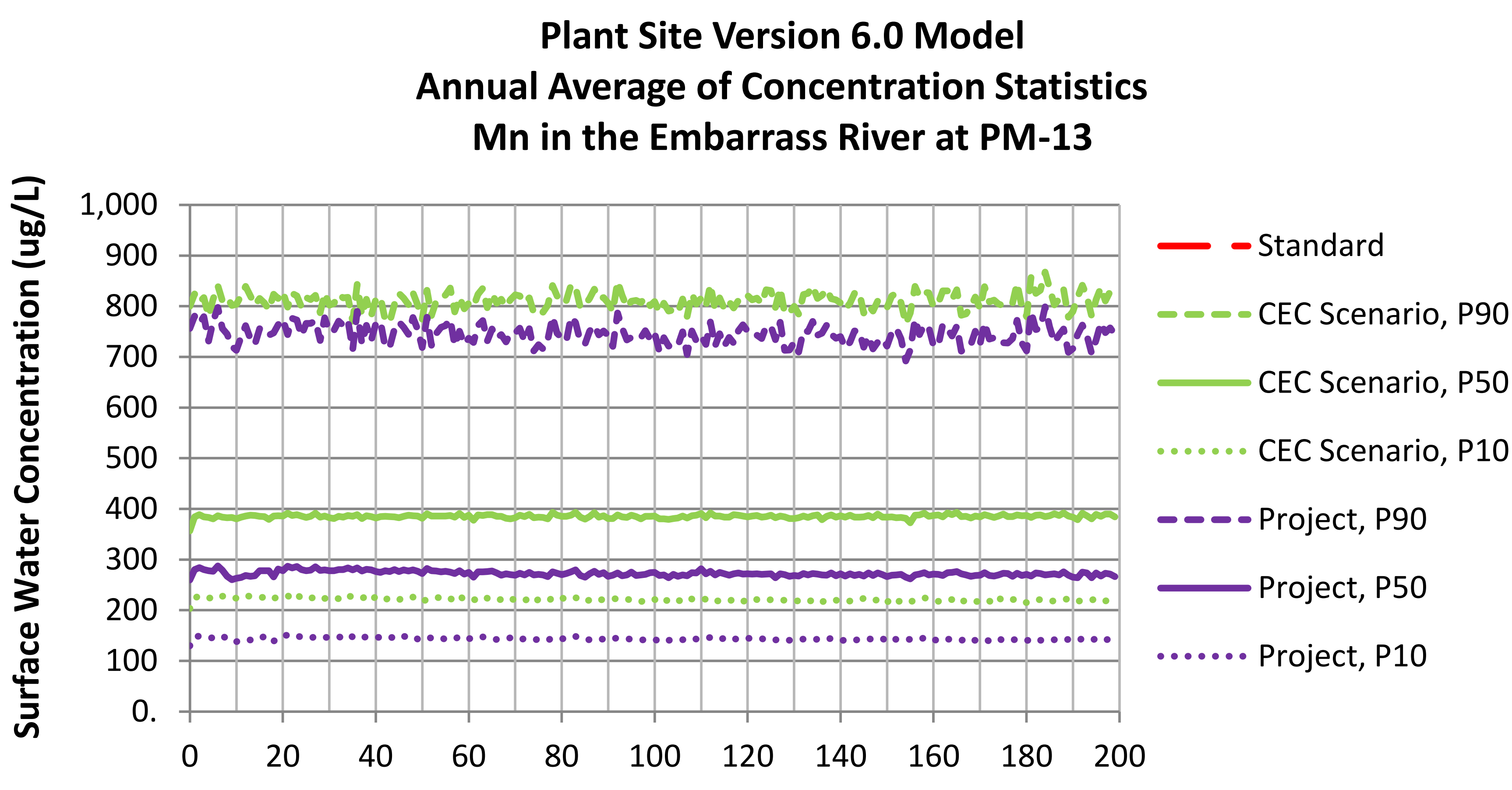

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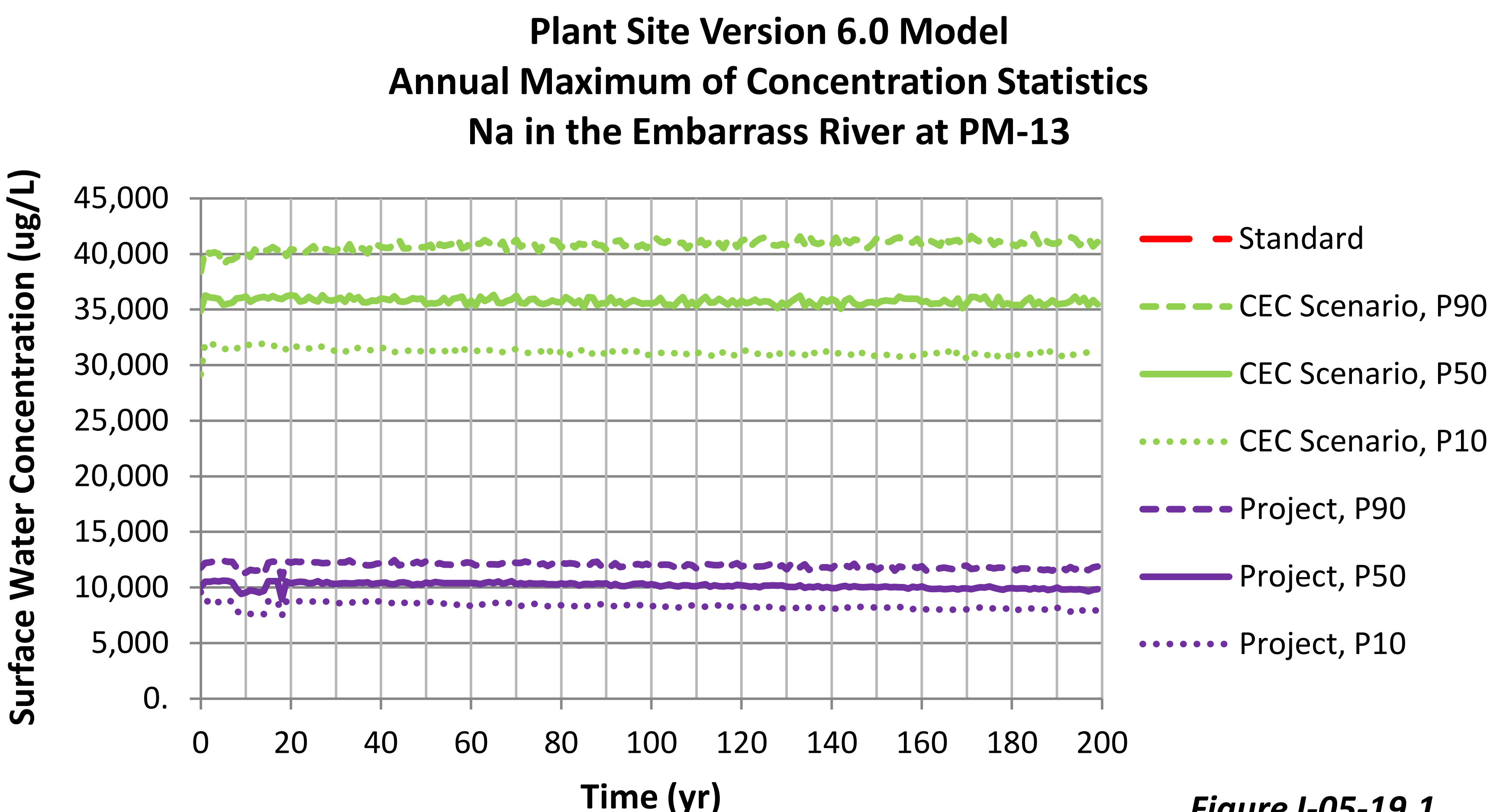

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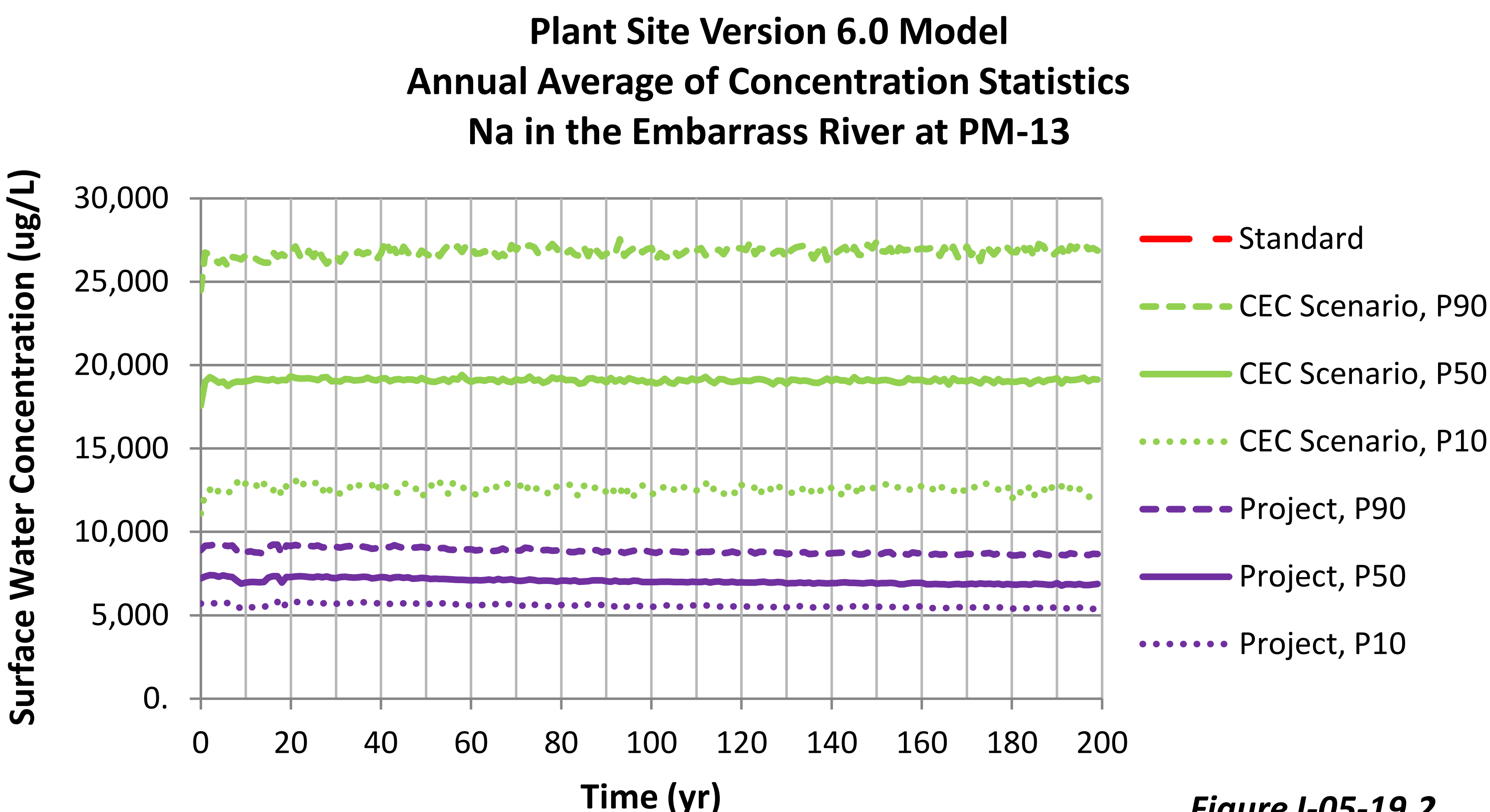

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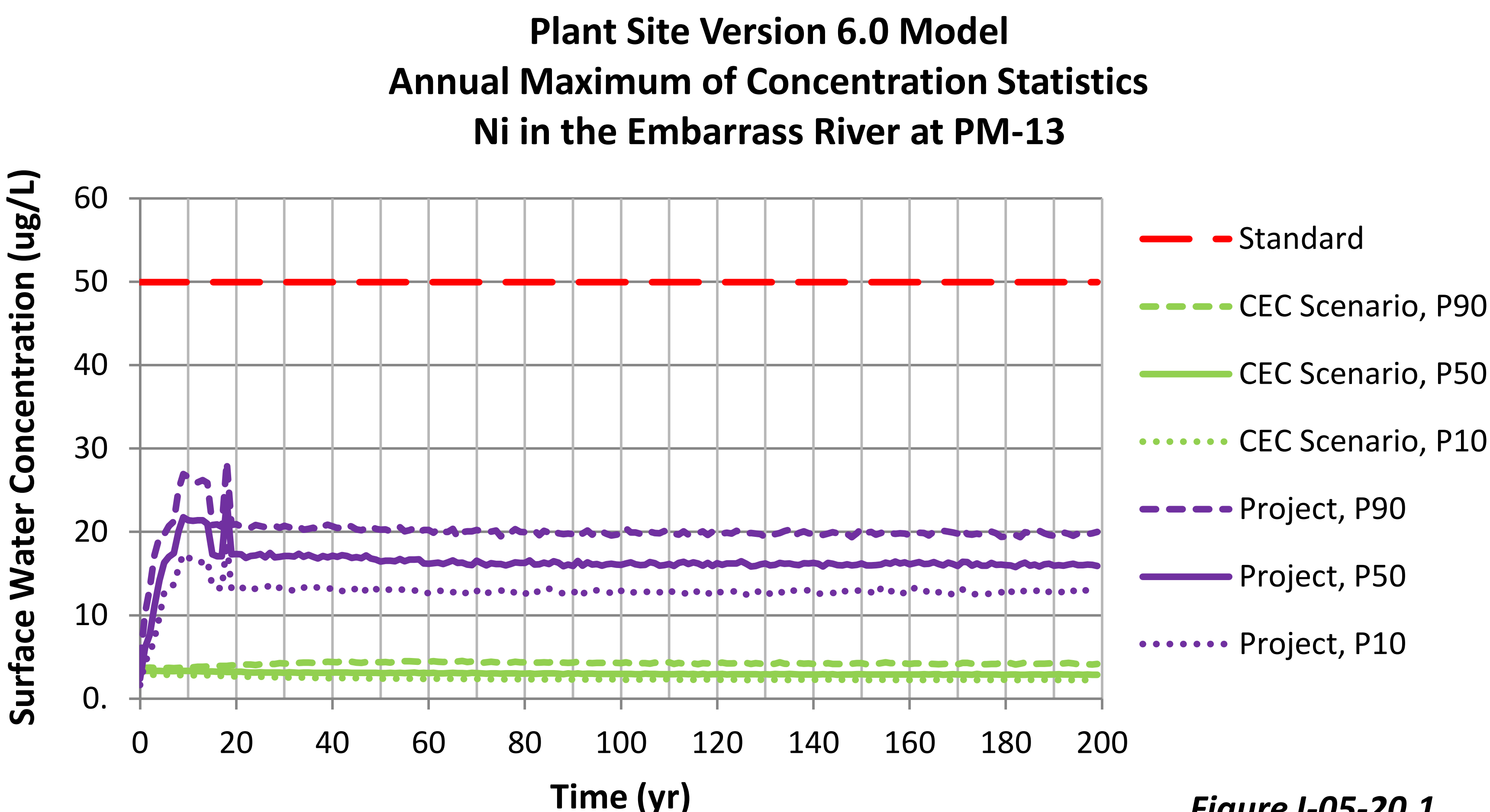

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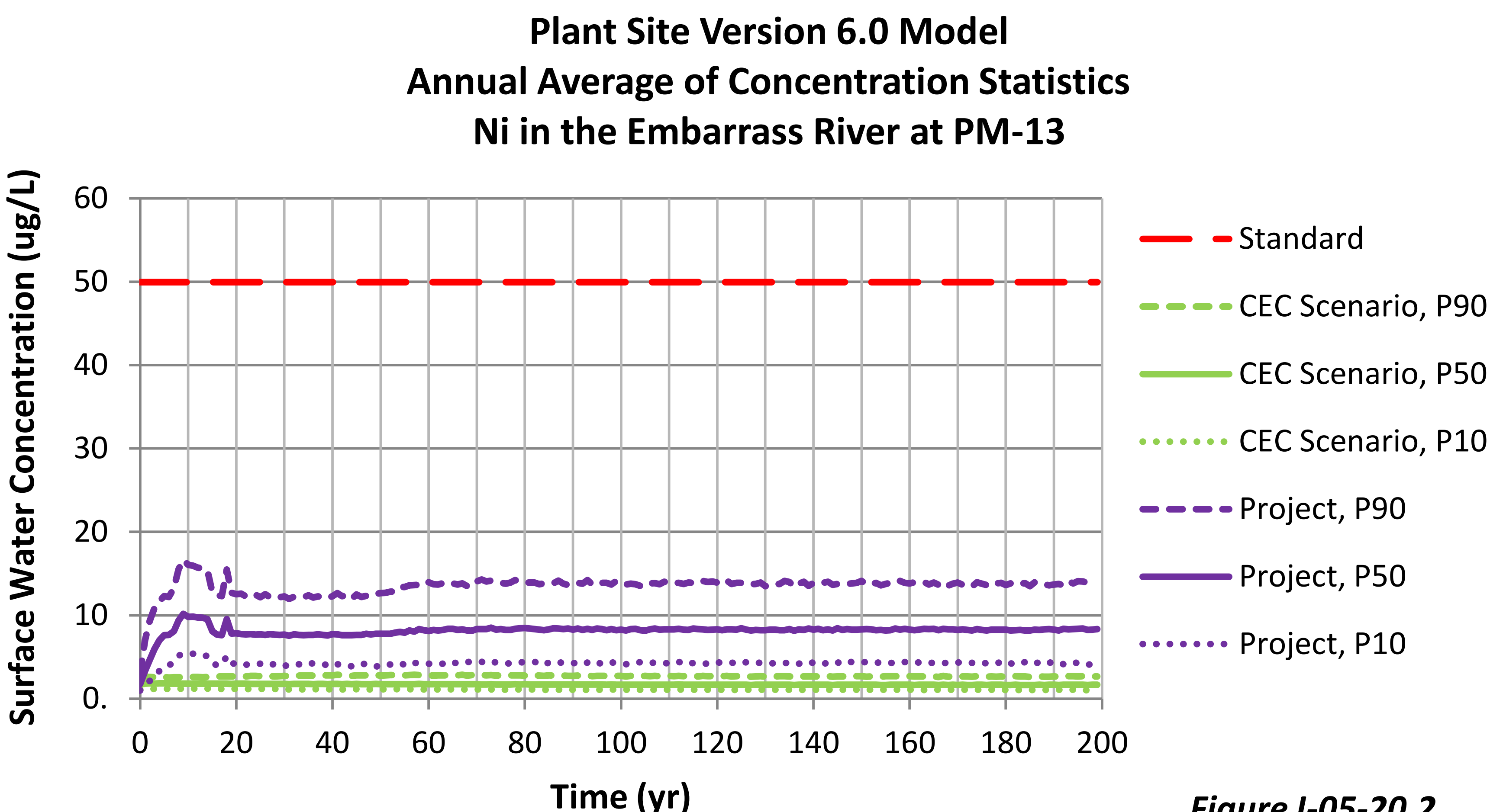

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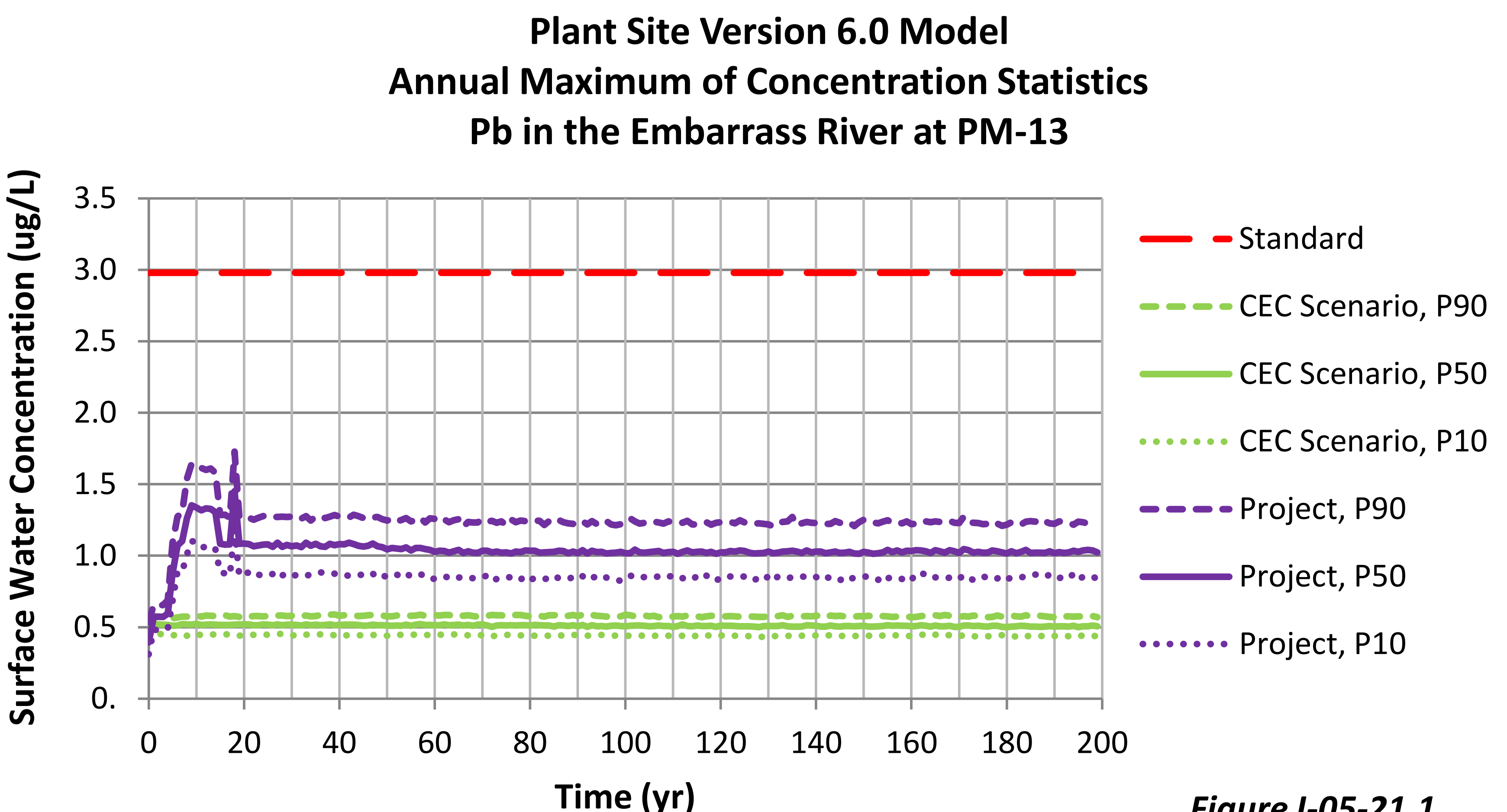

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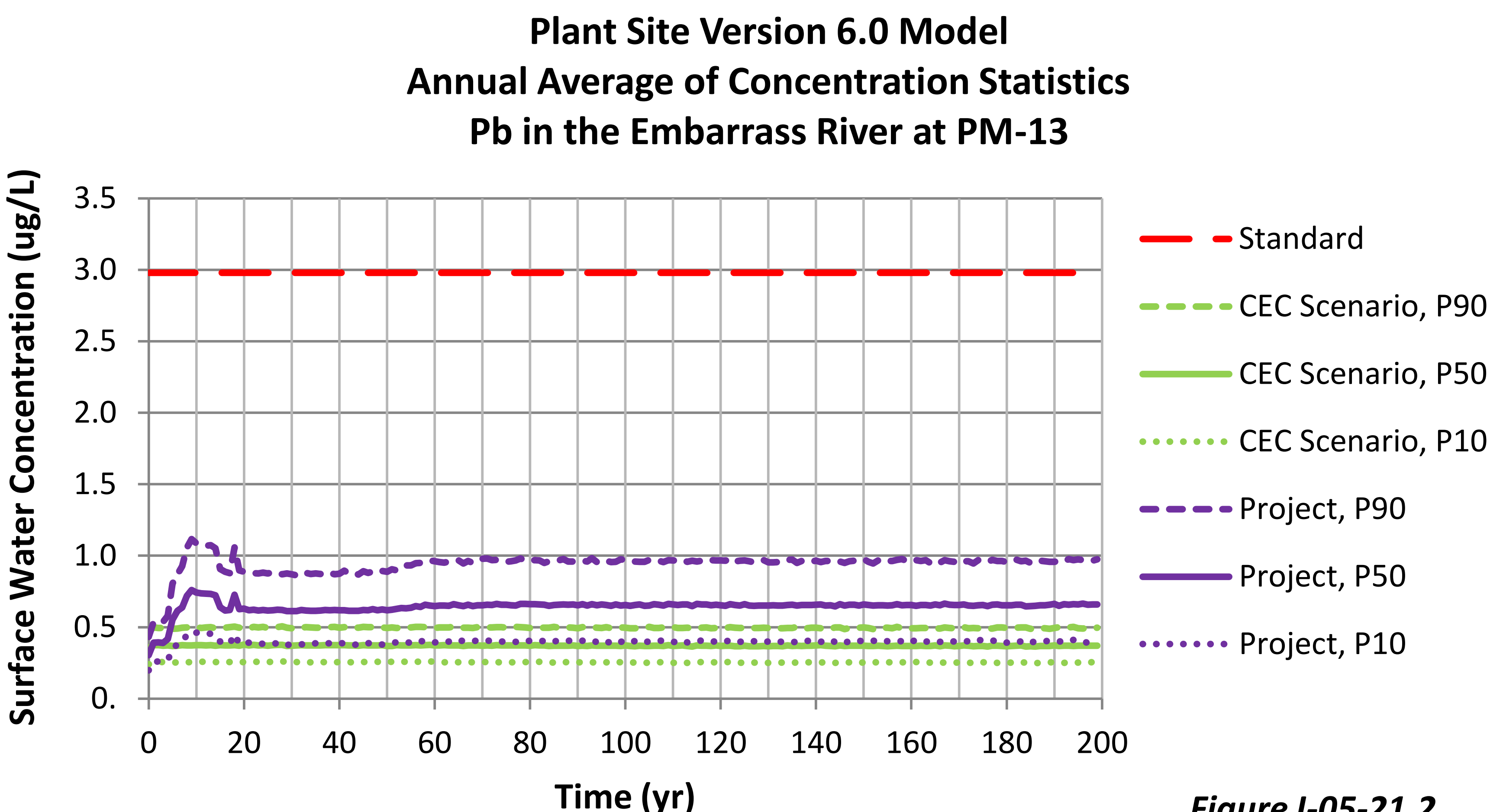

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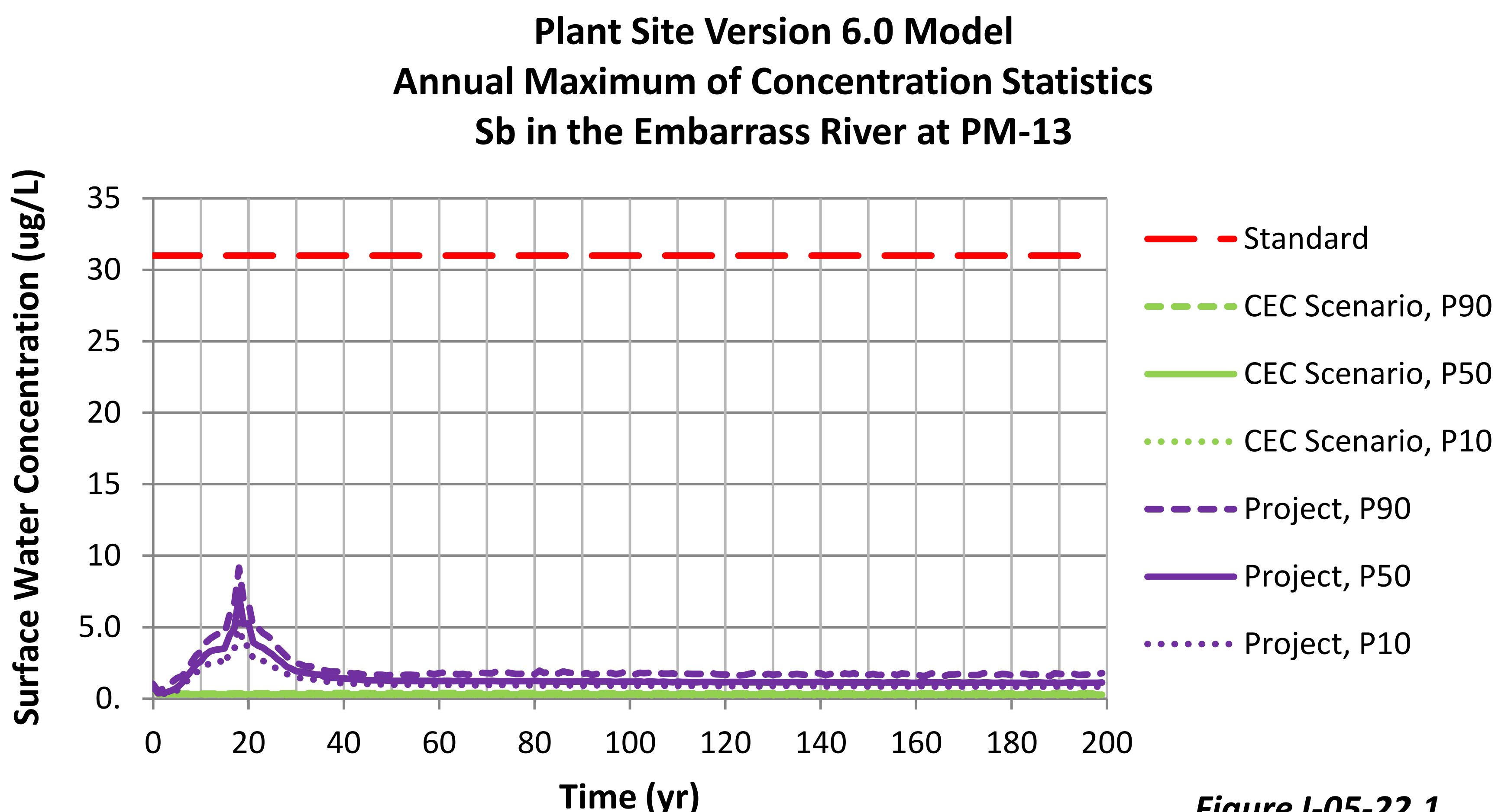

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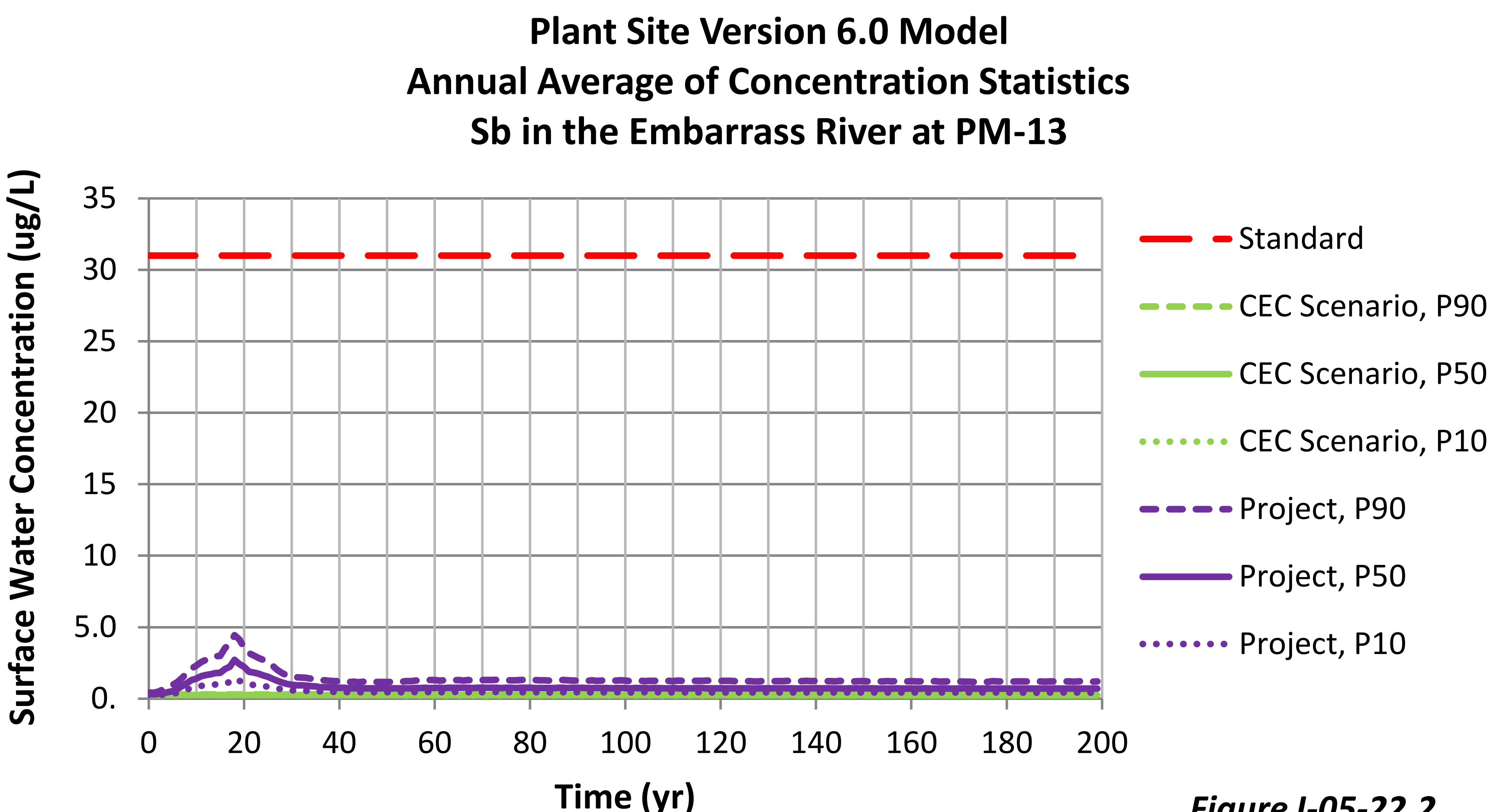

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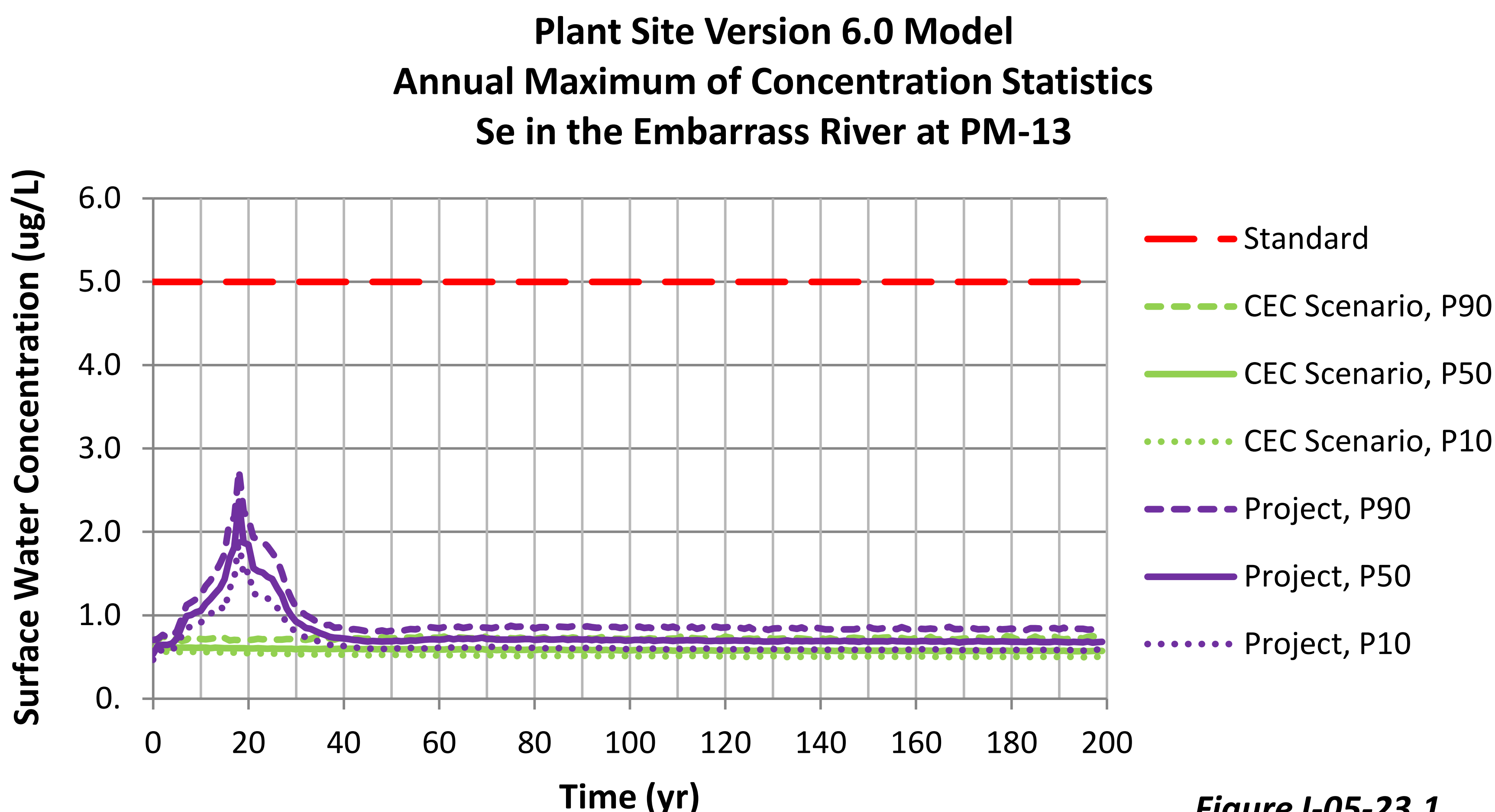

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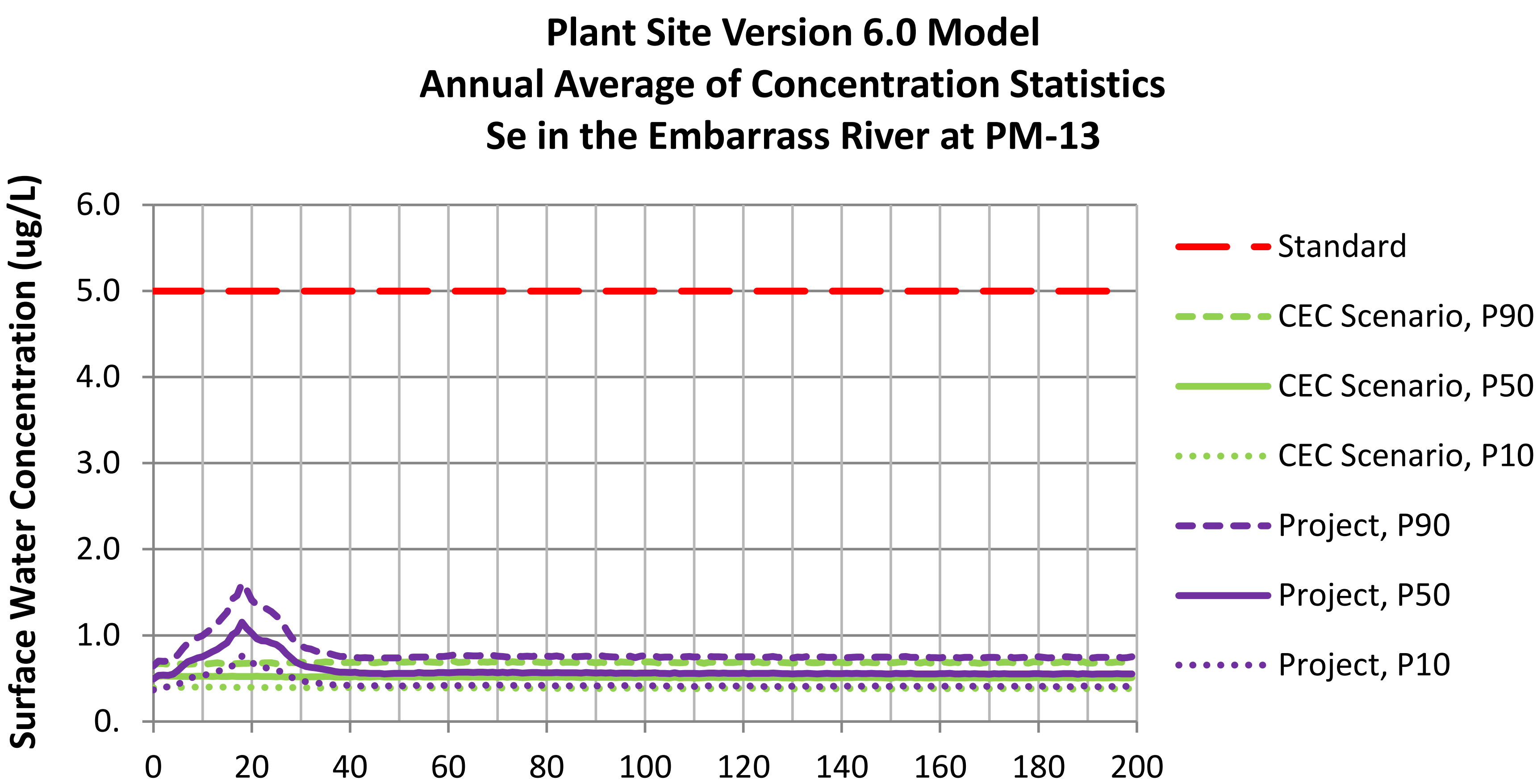

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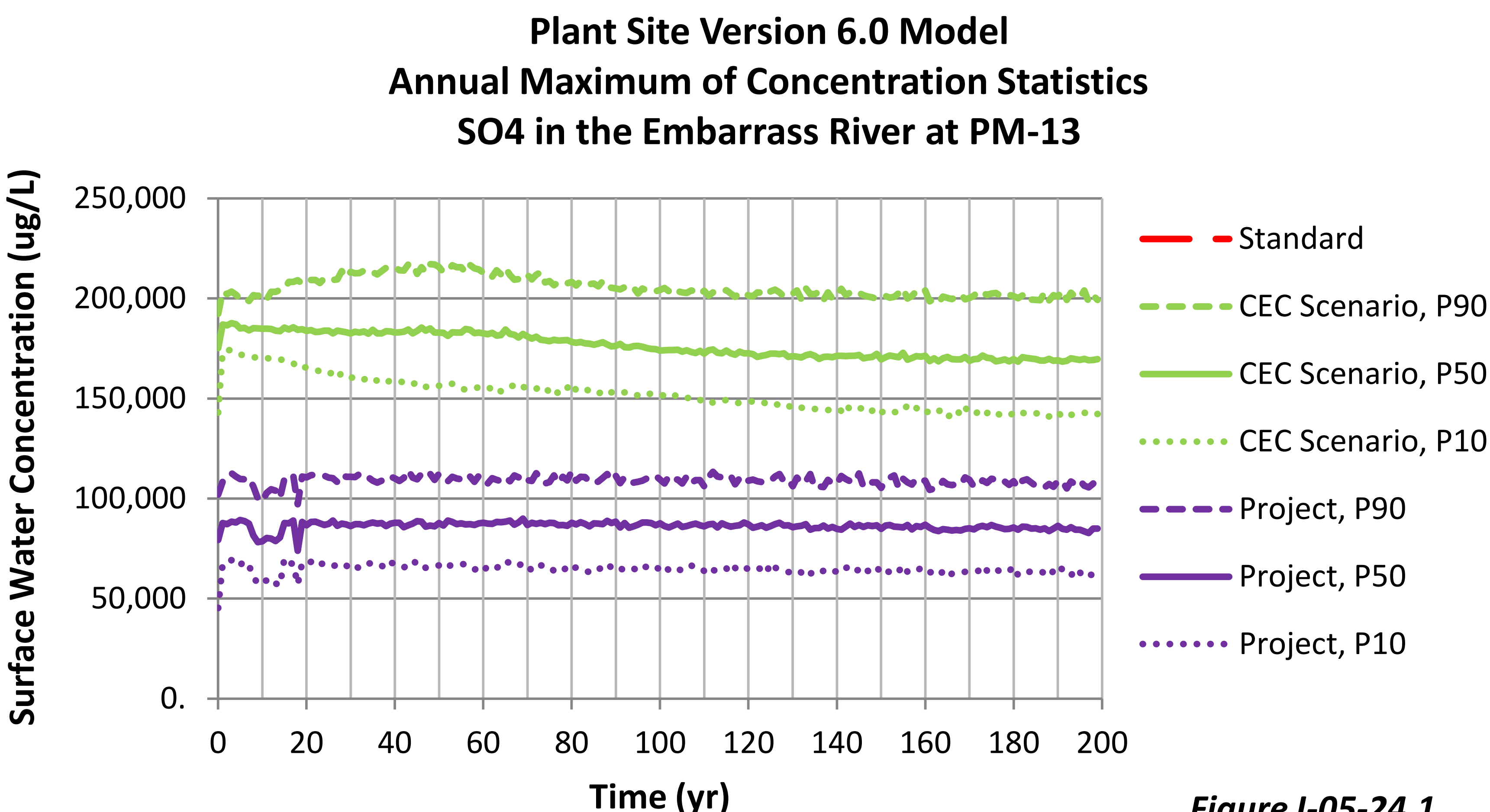

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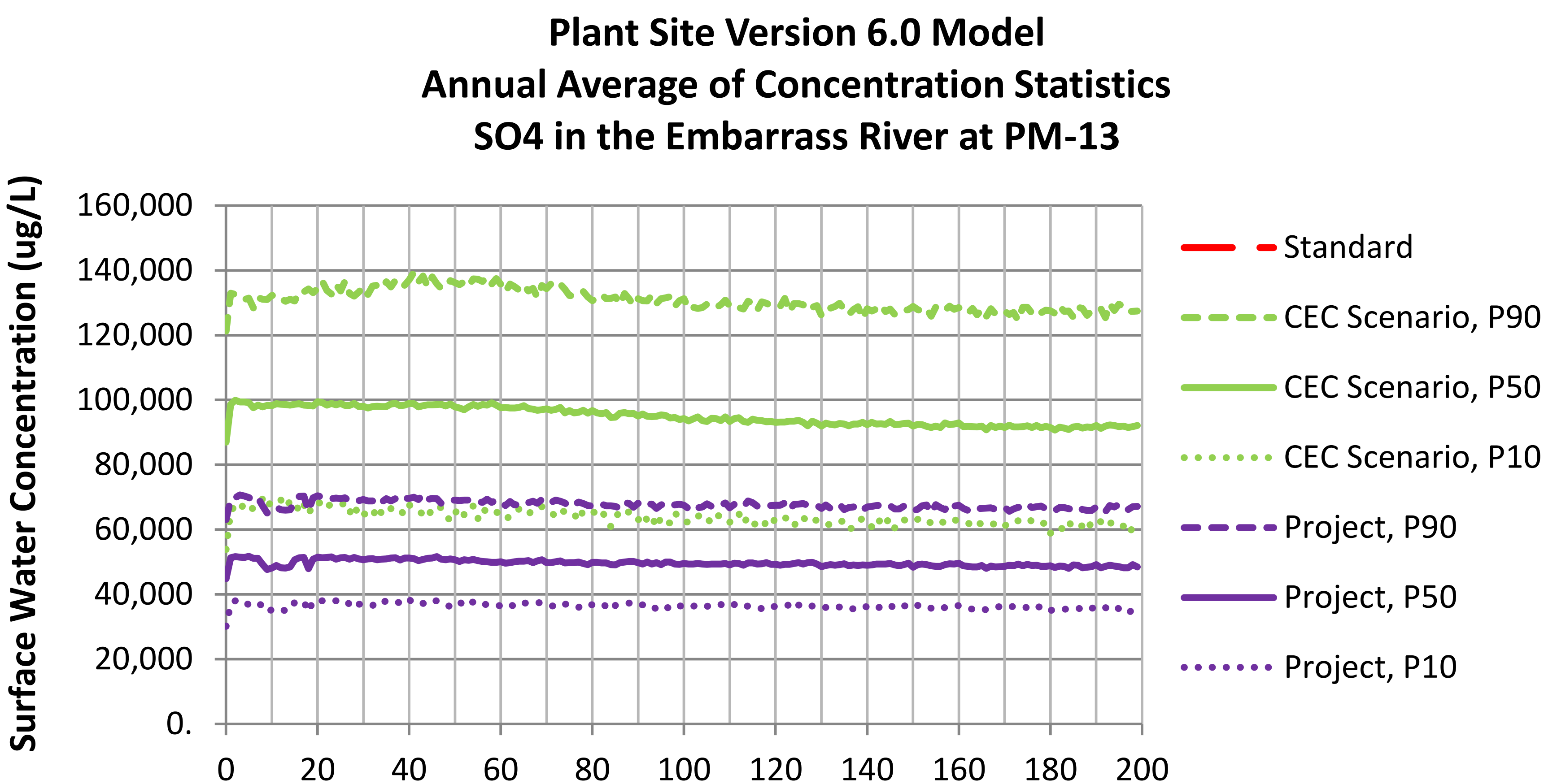

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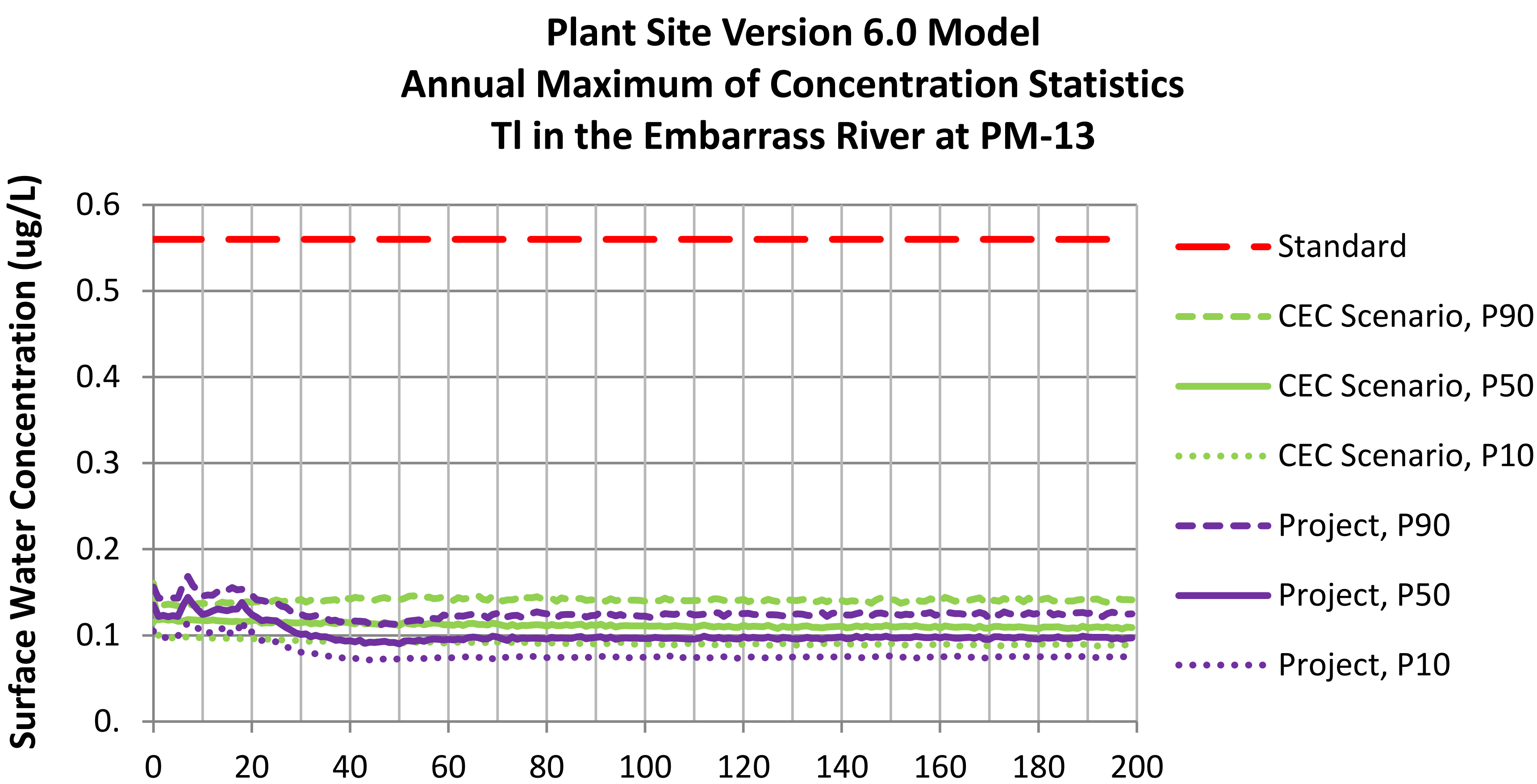

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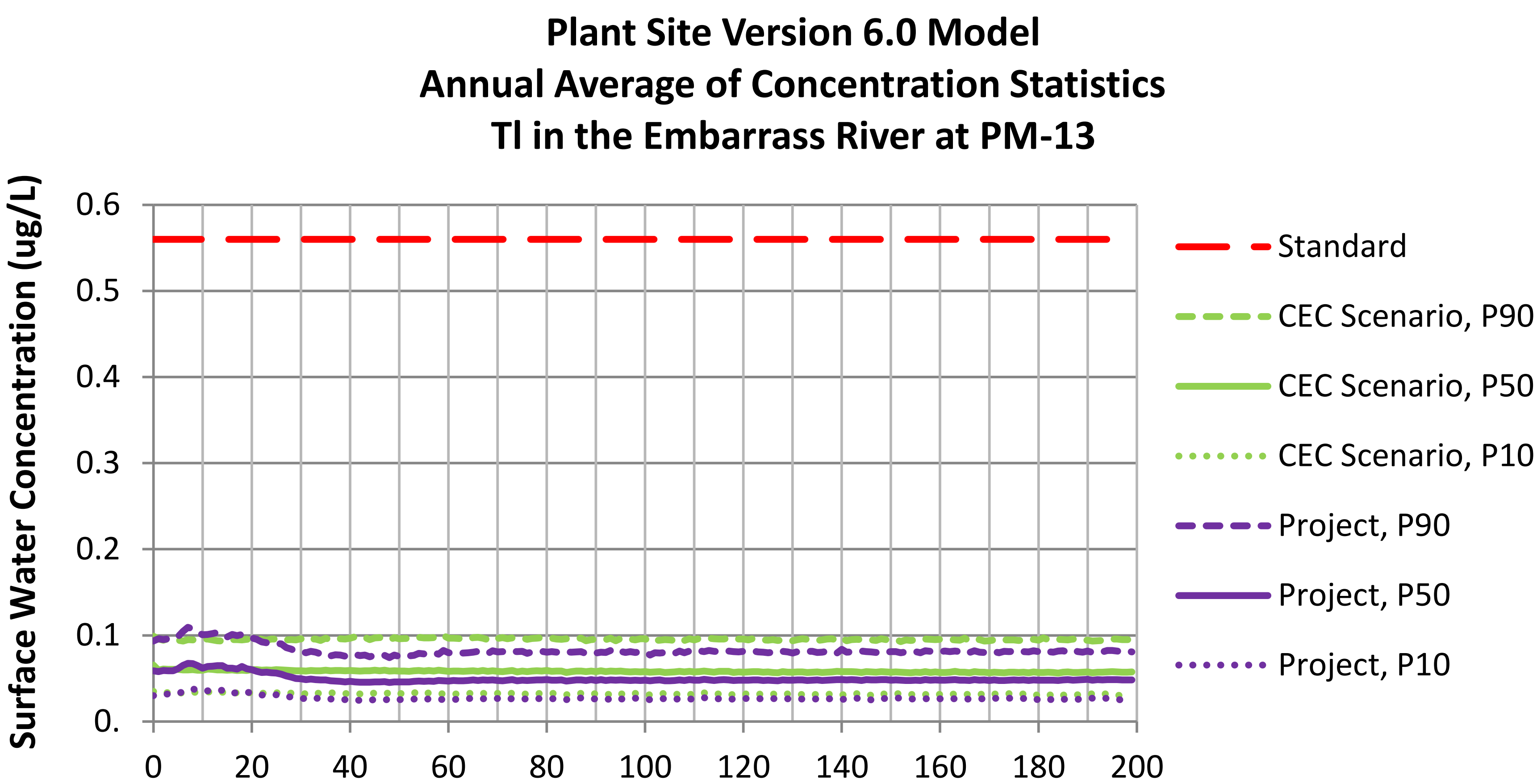

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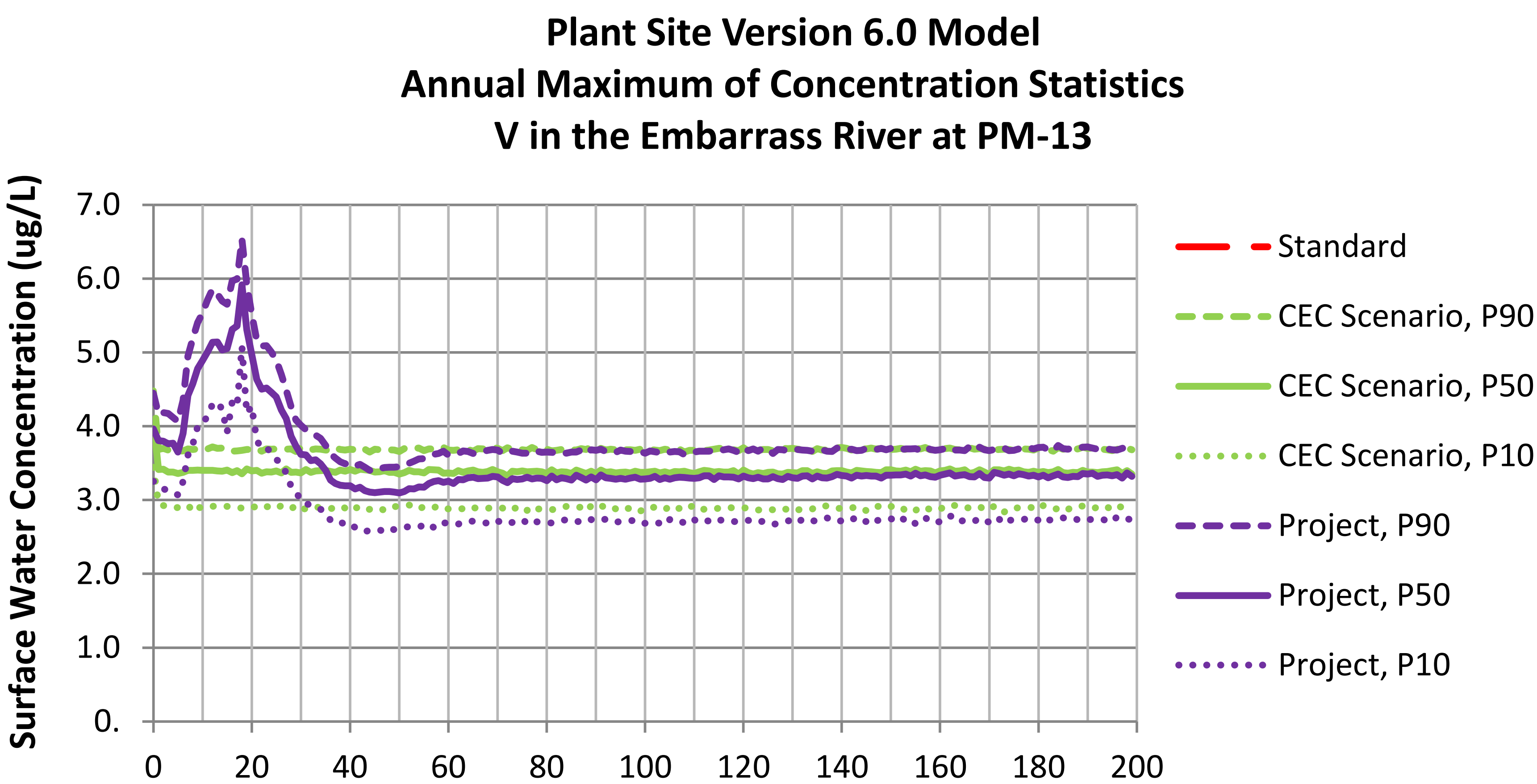

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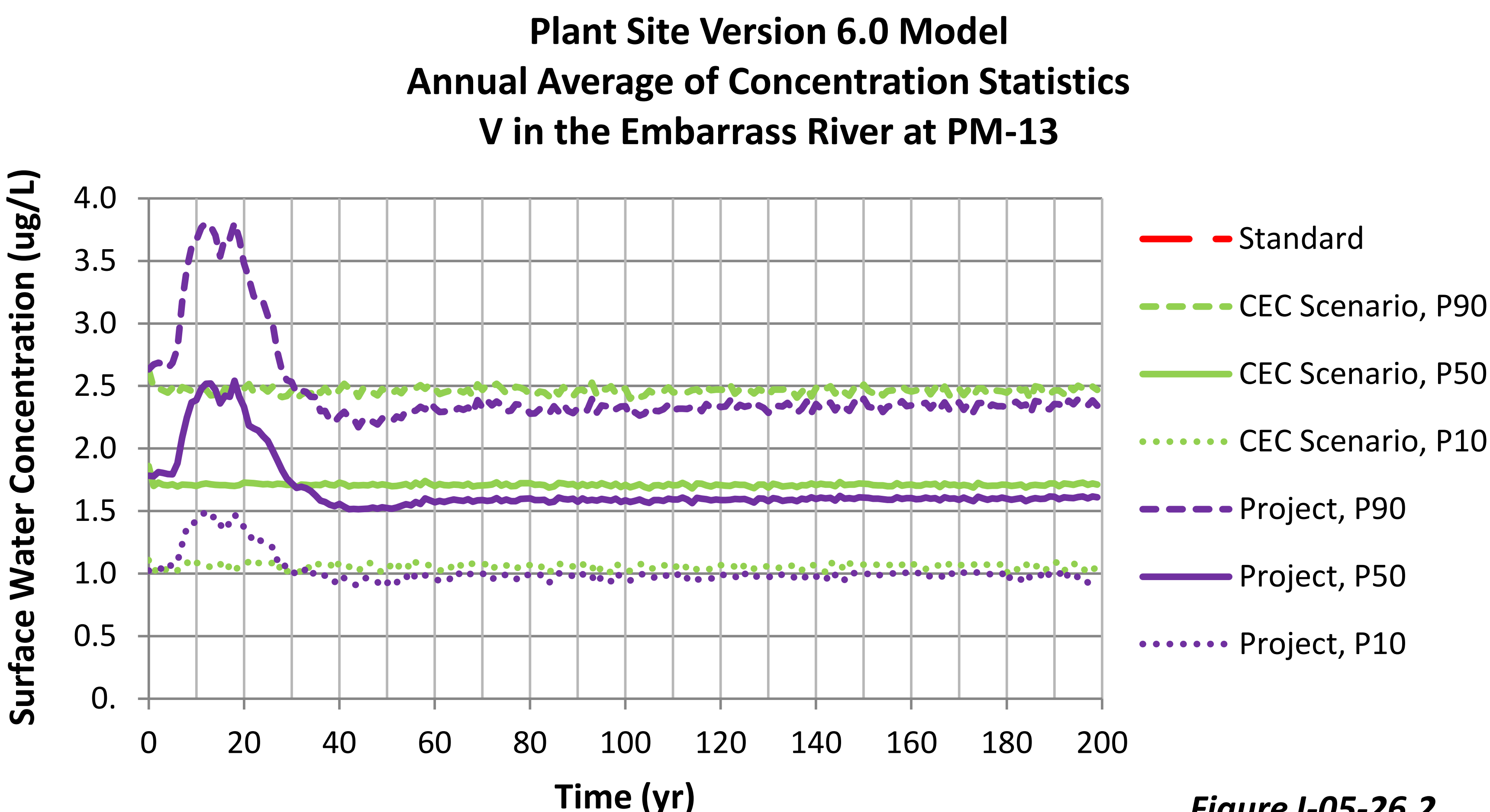

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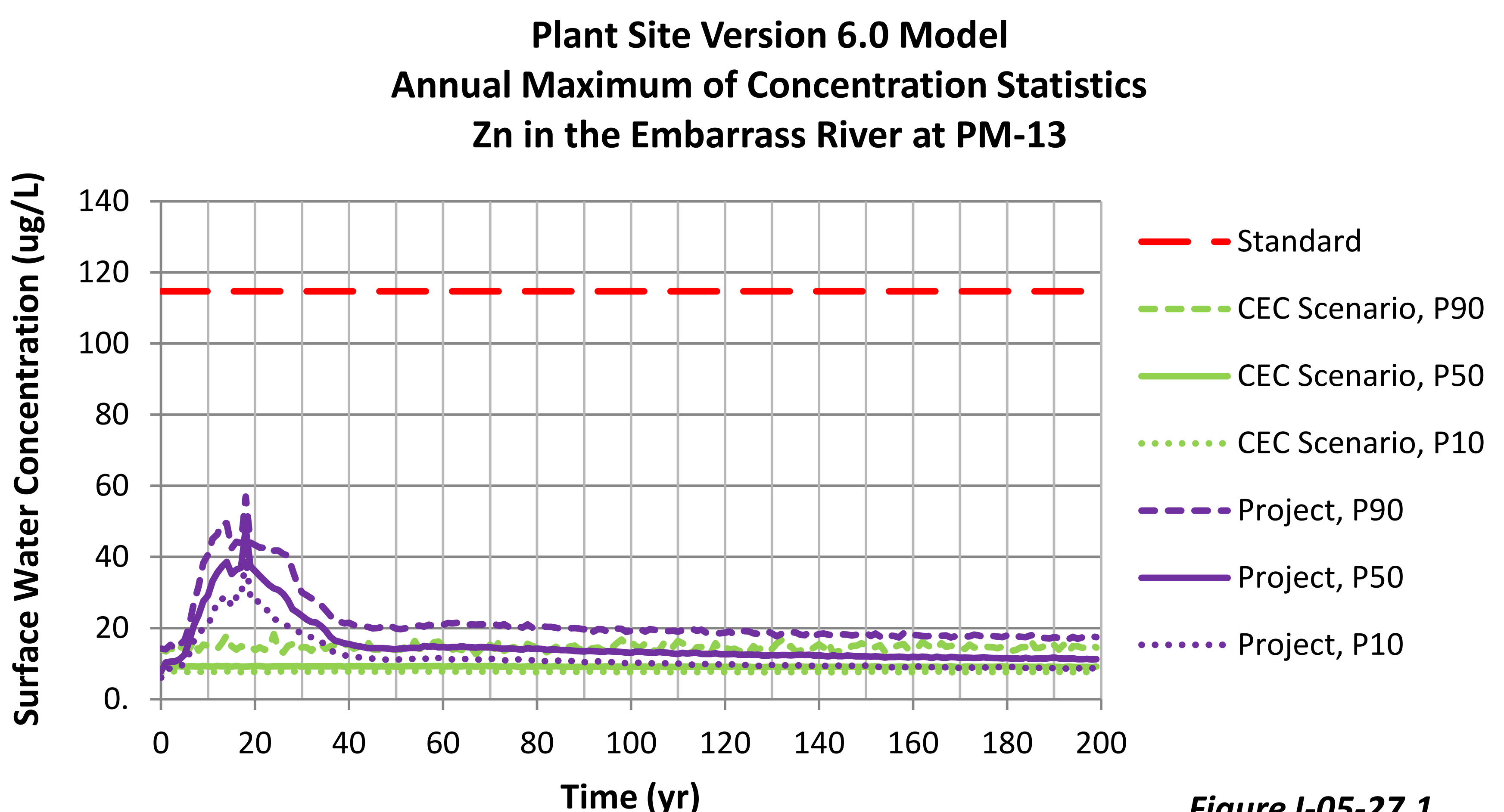

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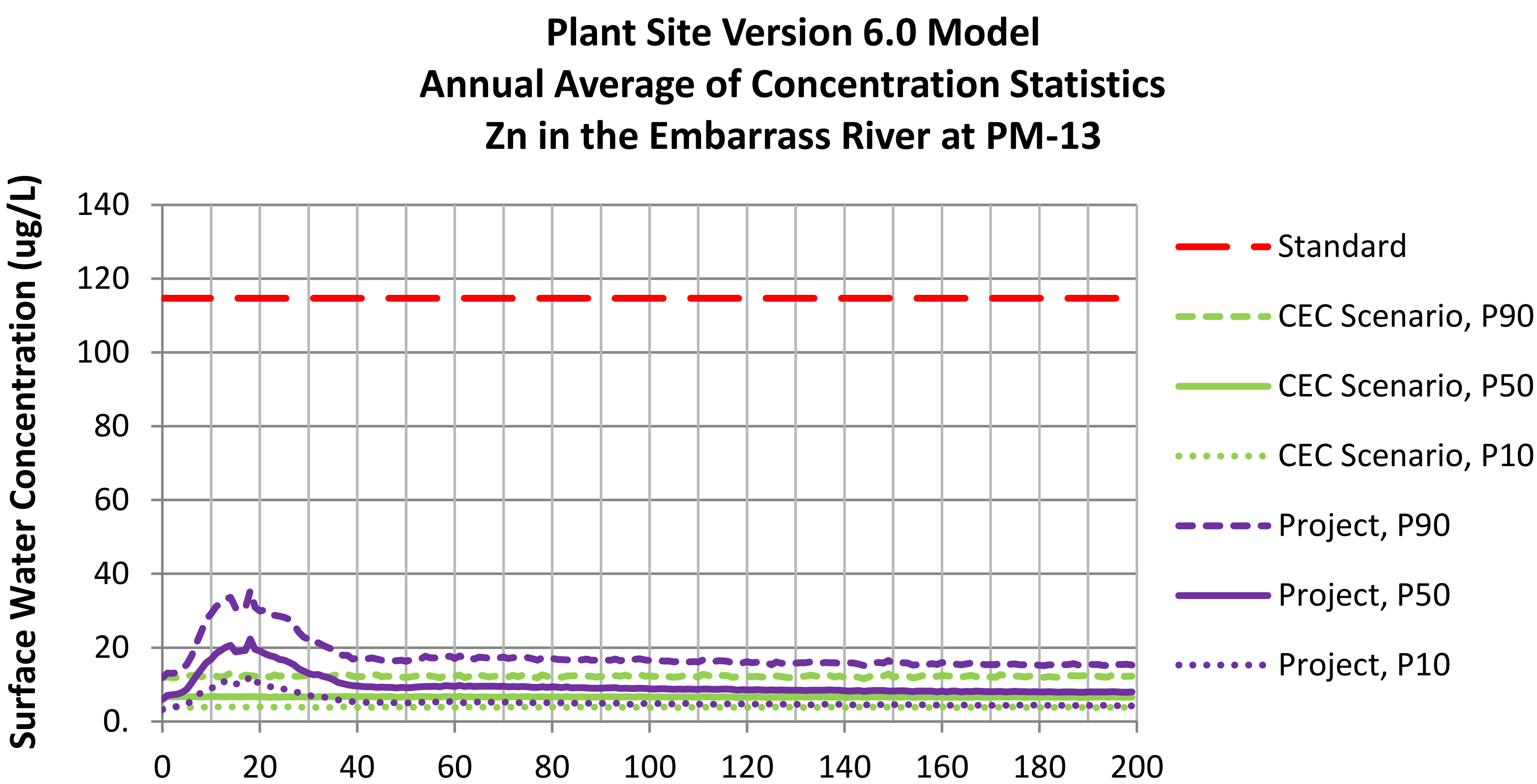

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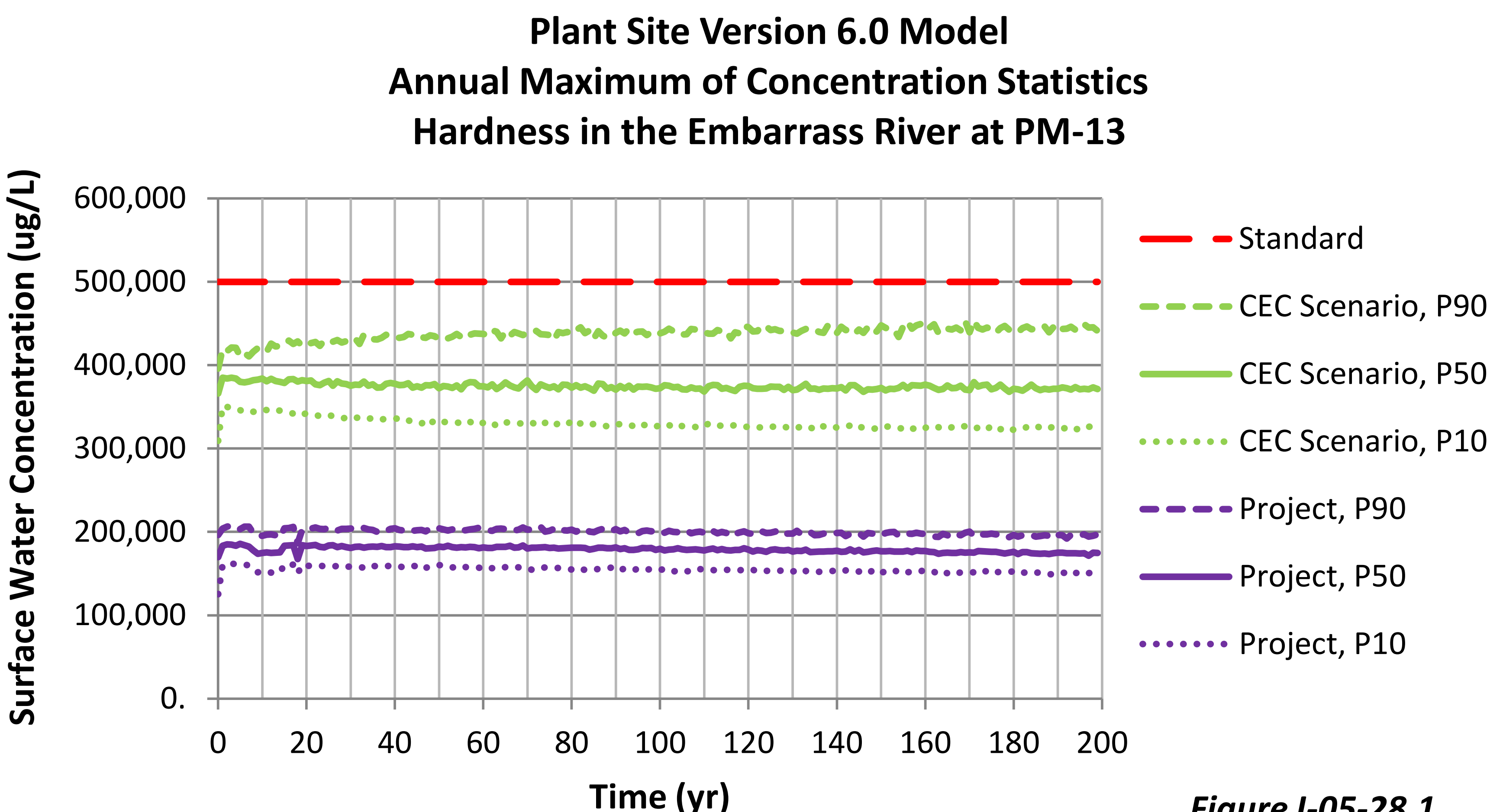
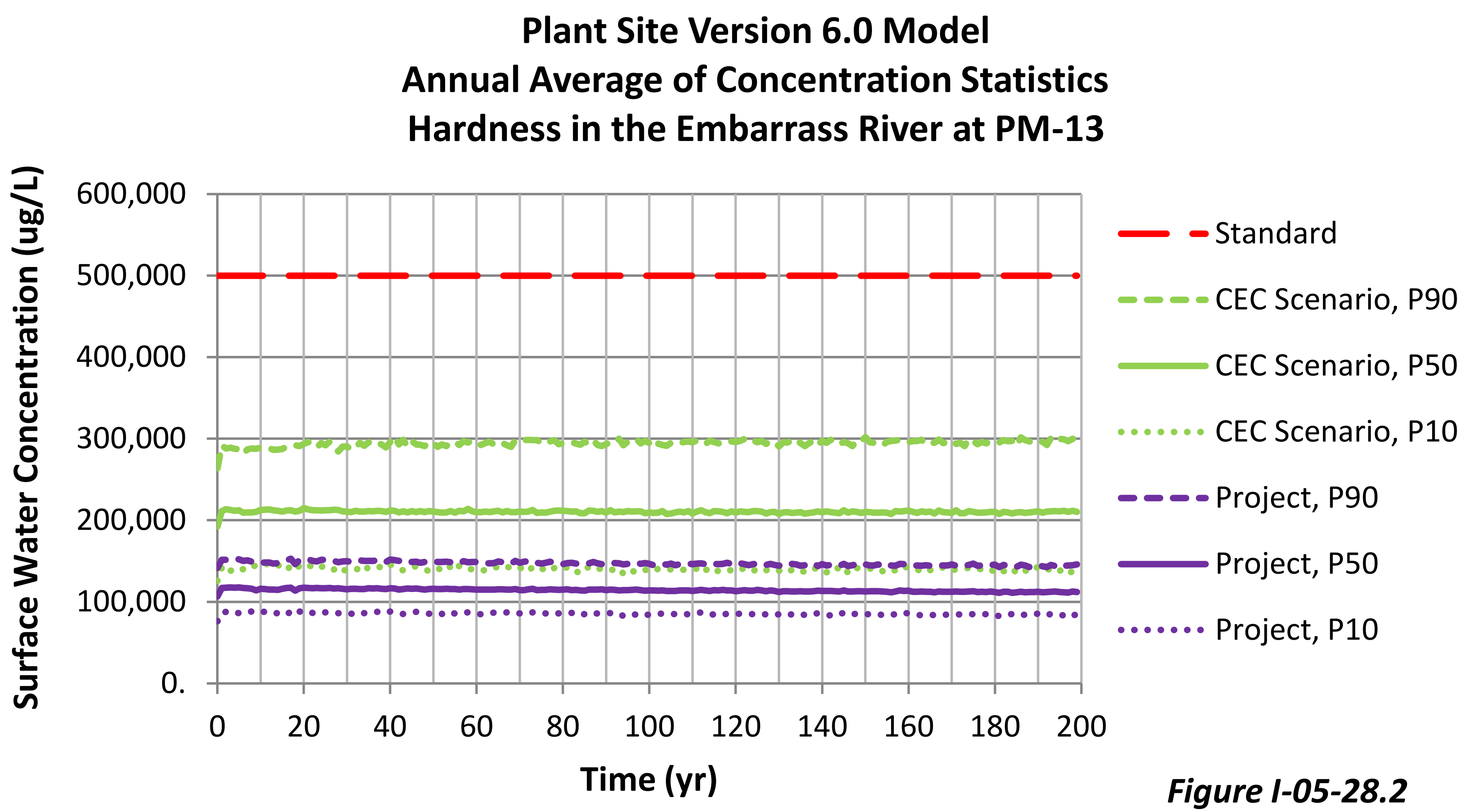


Figure I-05-28.1



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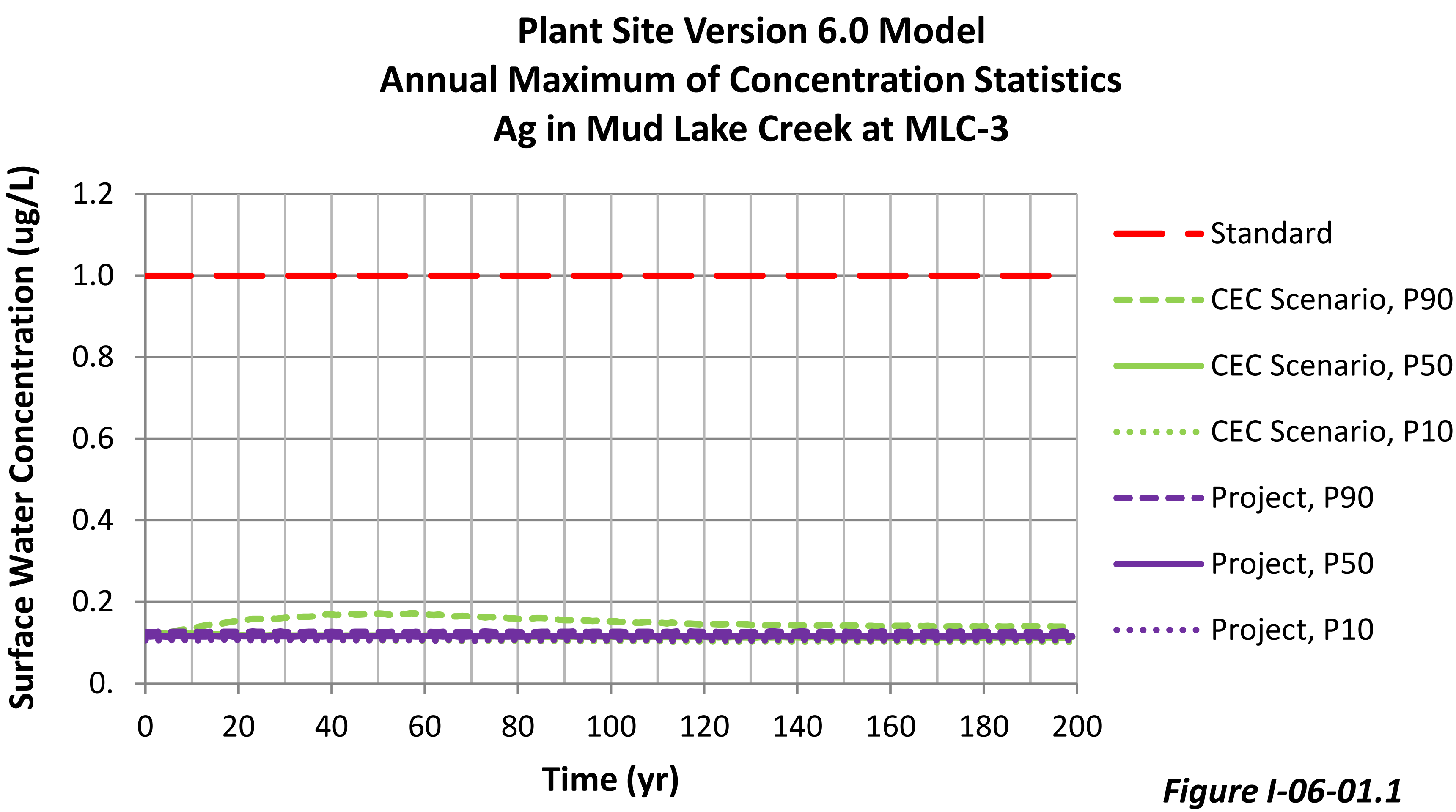
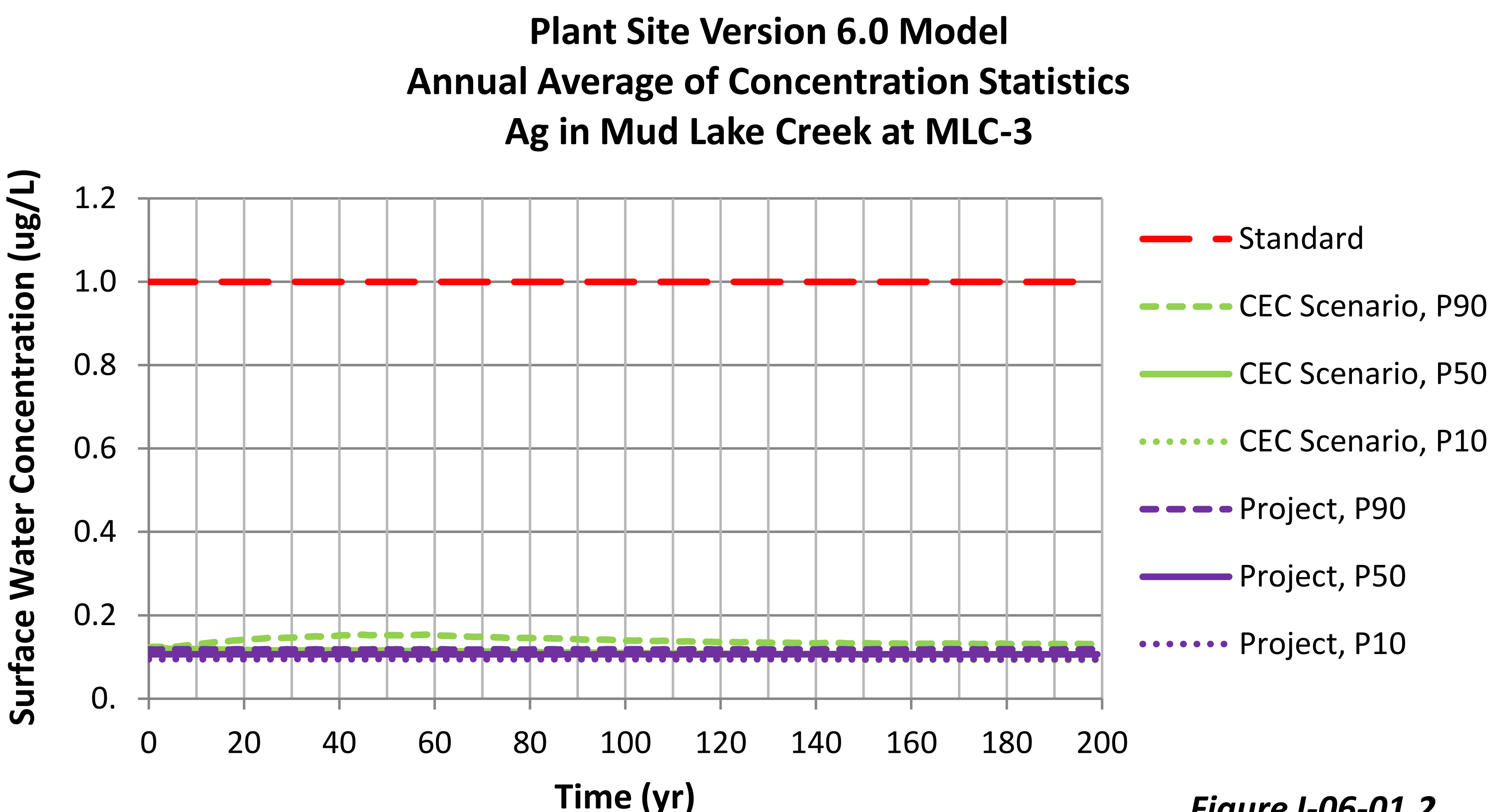


Figure I-06-01.1



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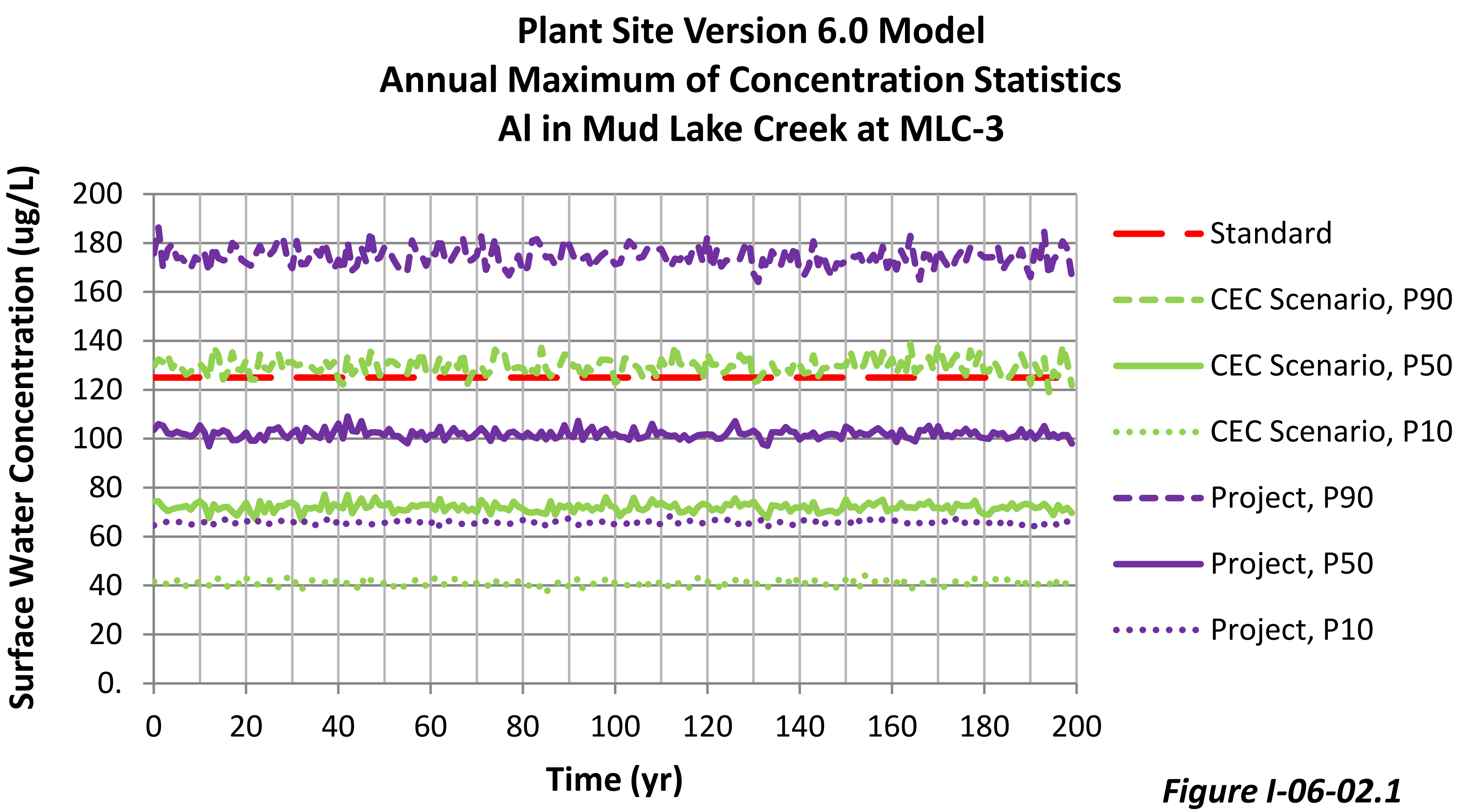
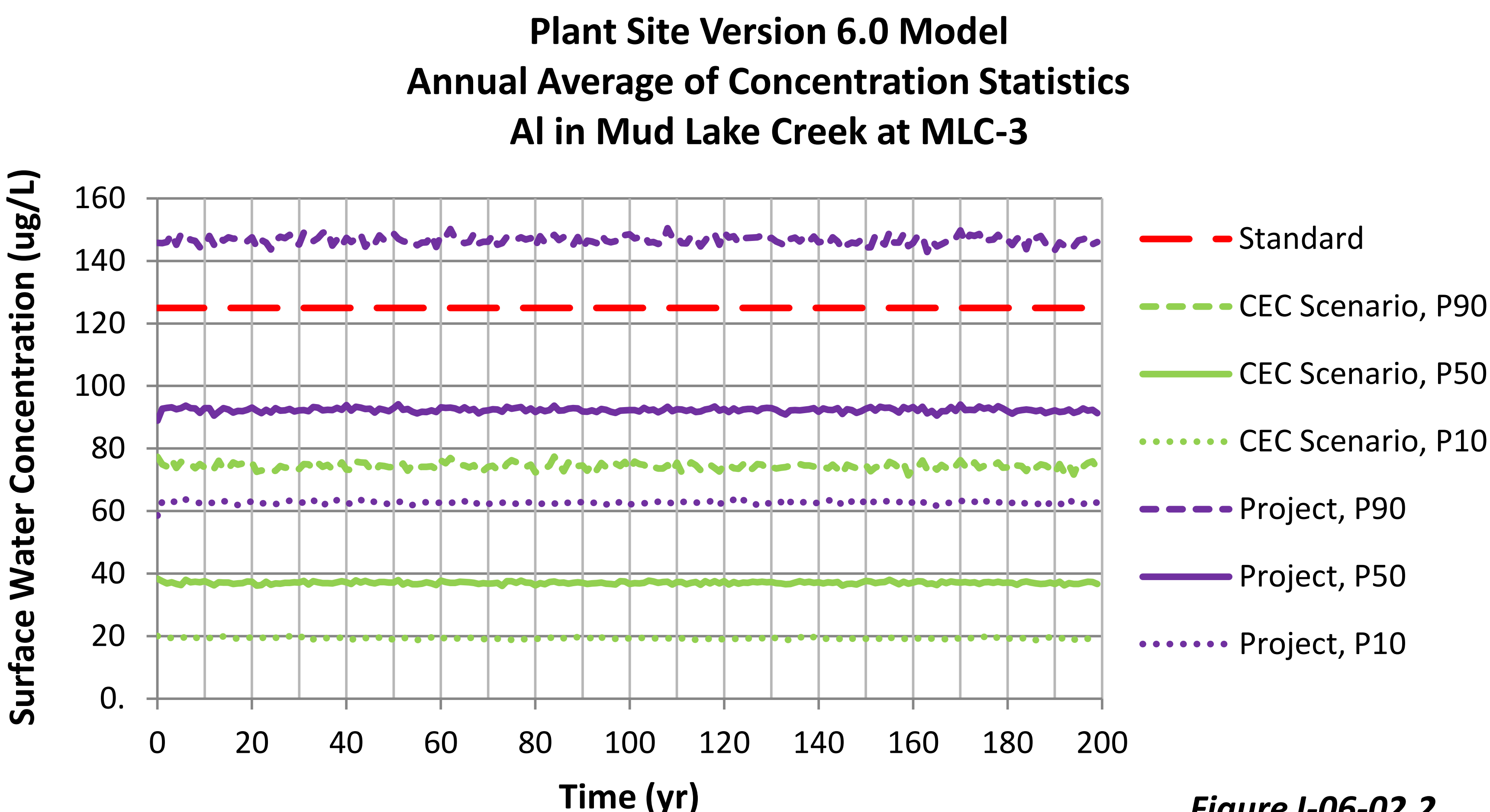


Figure I-06-02.1



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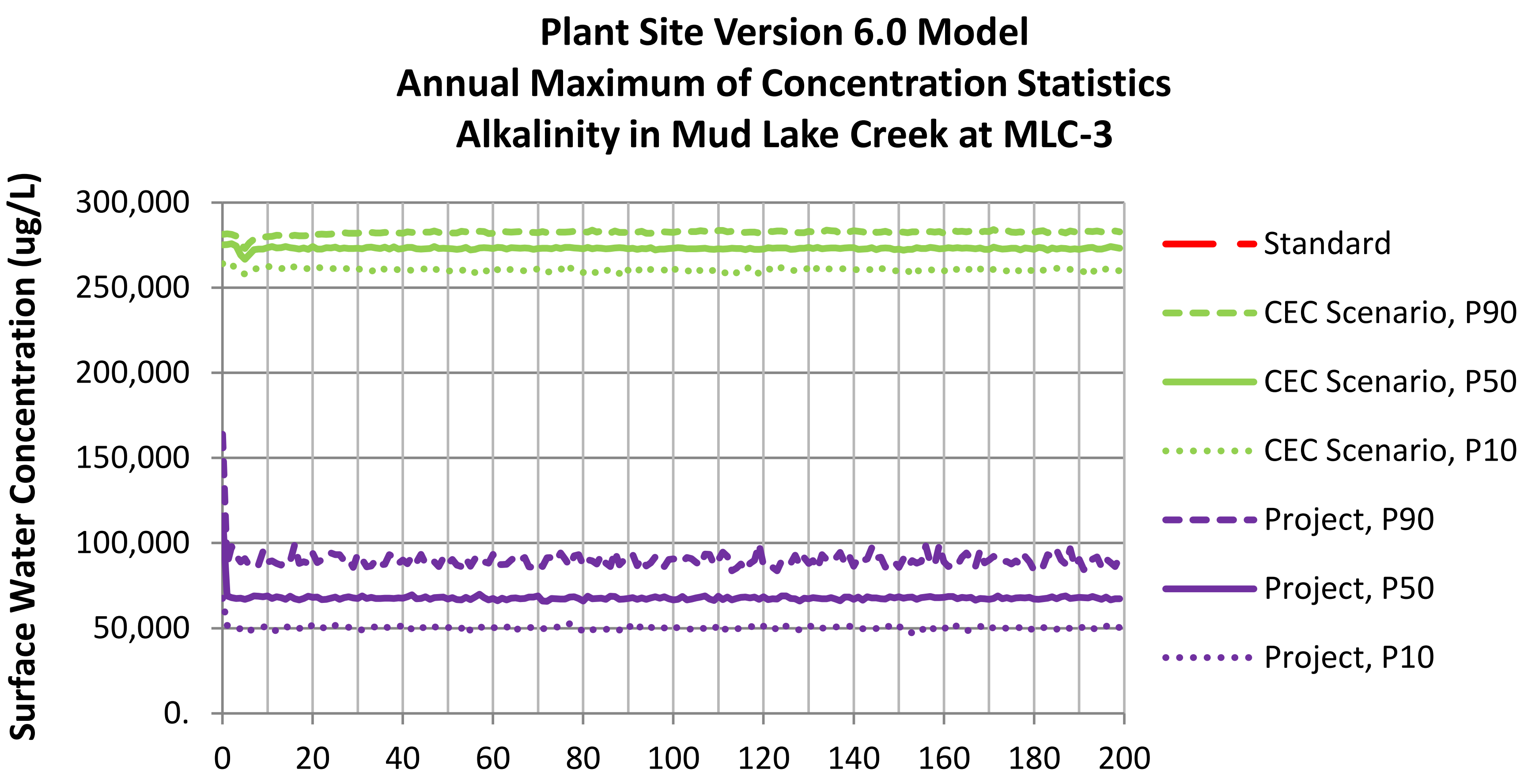

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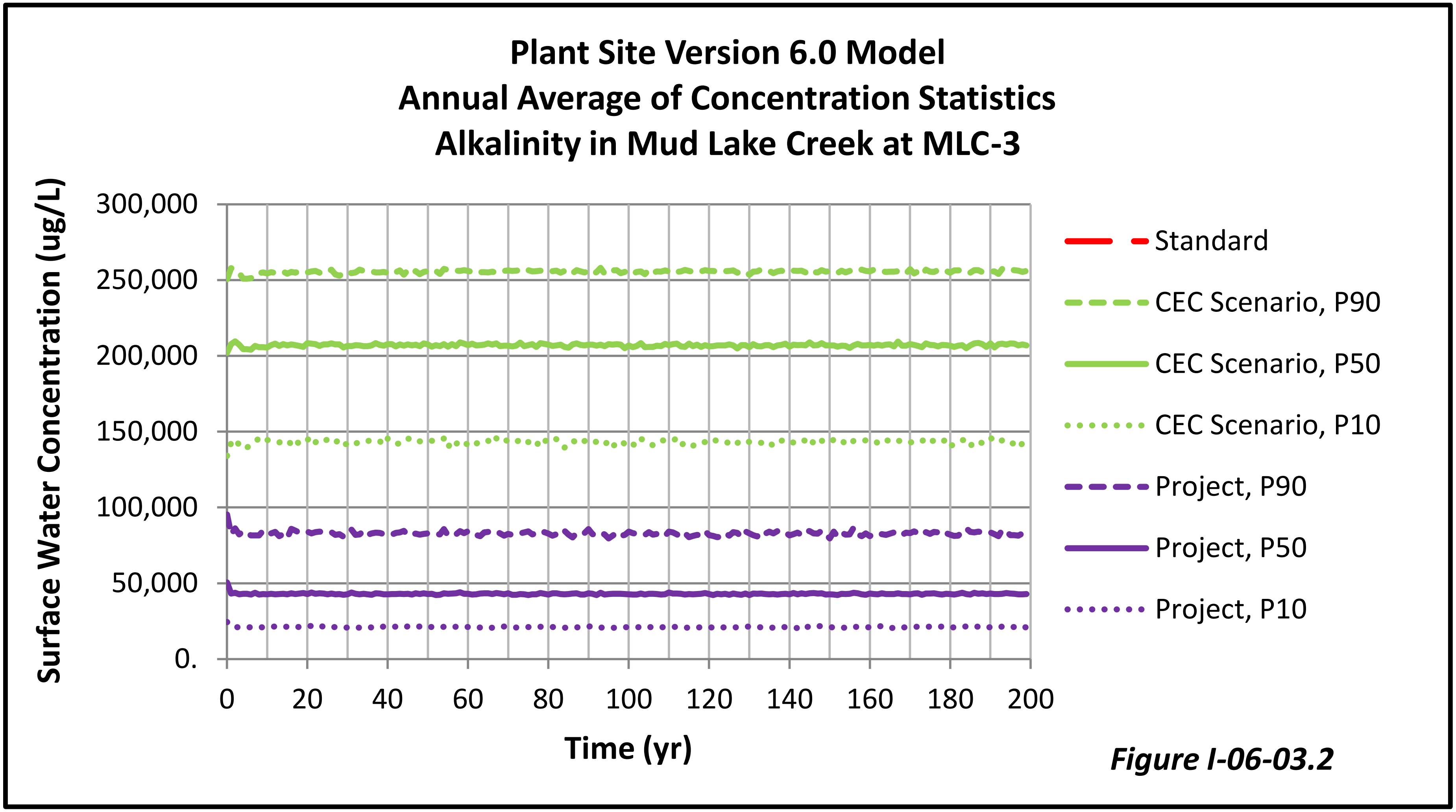
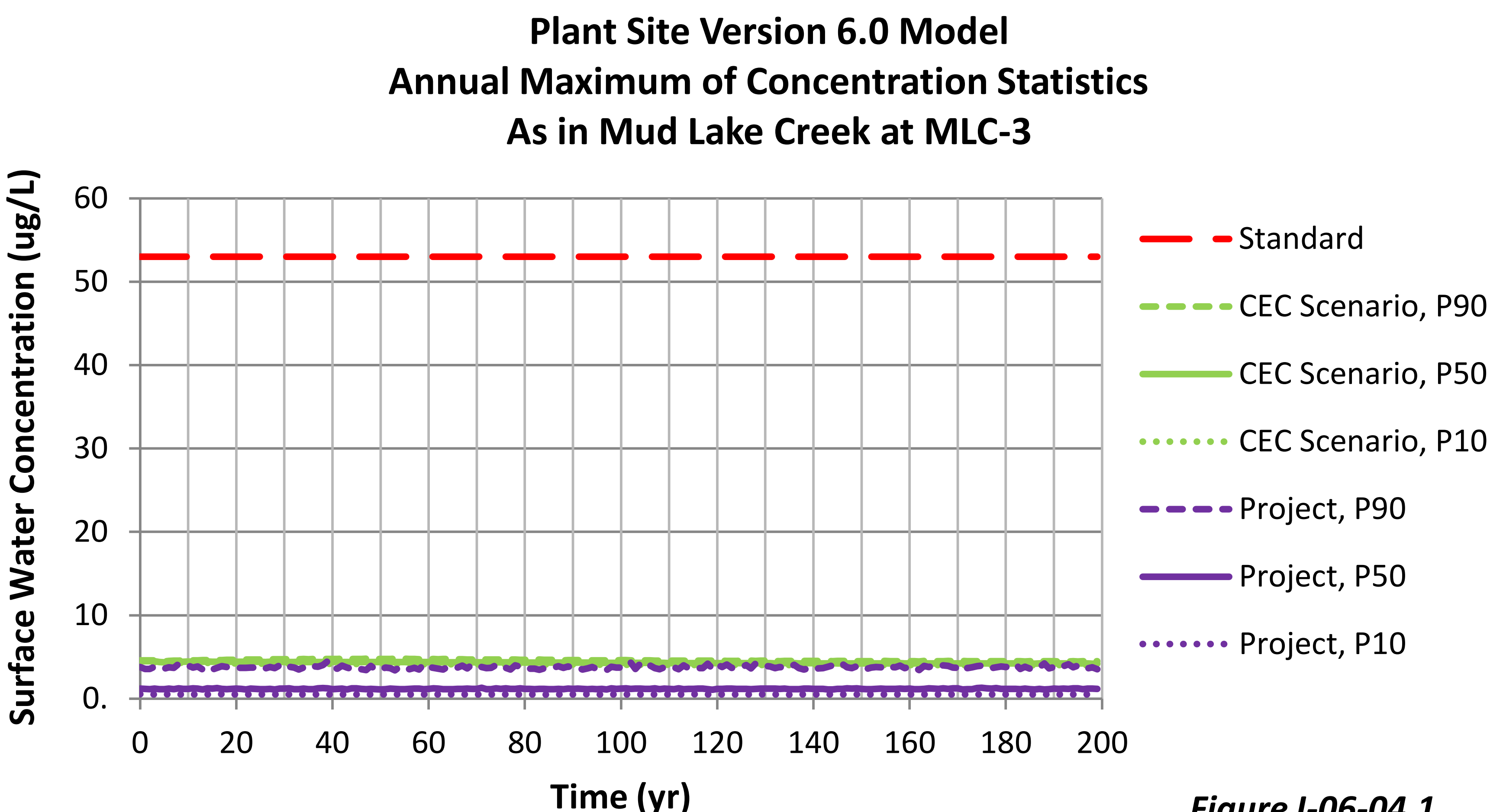

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Alkalinity in Mud Lake Creek at MLC-3
Surface Water Concentration (ug/L)
300,000
250,000
200,000
150,000
100,000
50,000
0.
0
20
40
60
80
100
120
140
160
180
200
Time (yr)
Standard
CEC Scenario, P90
CEC Scenario, P50
CEC Scenario, P10
Project, P90
Project, P50
Project, P10
Figure I-06-03.2



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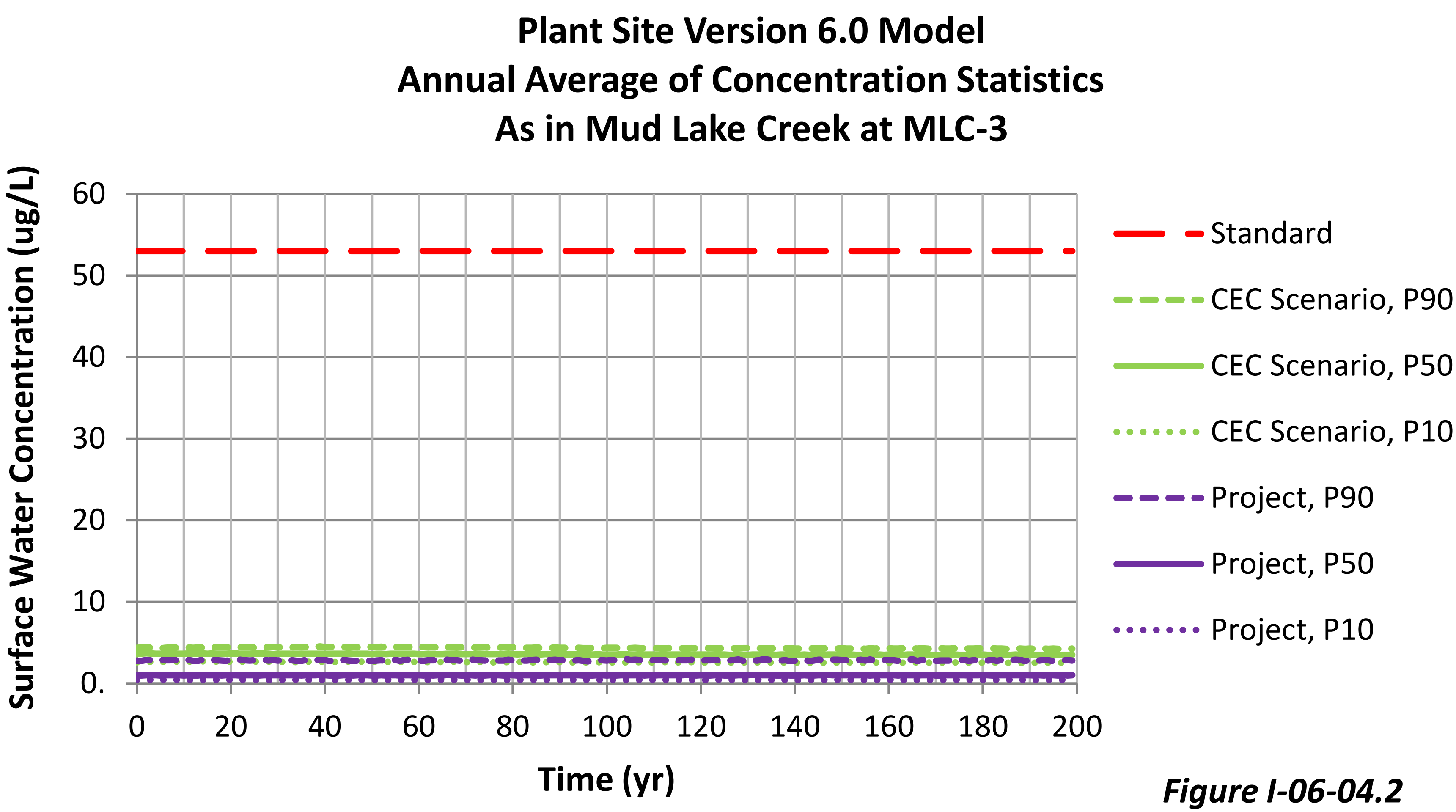

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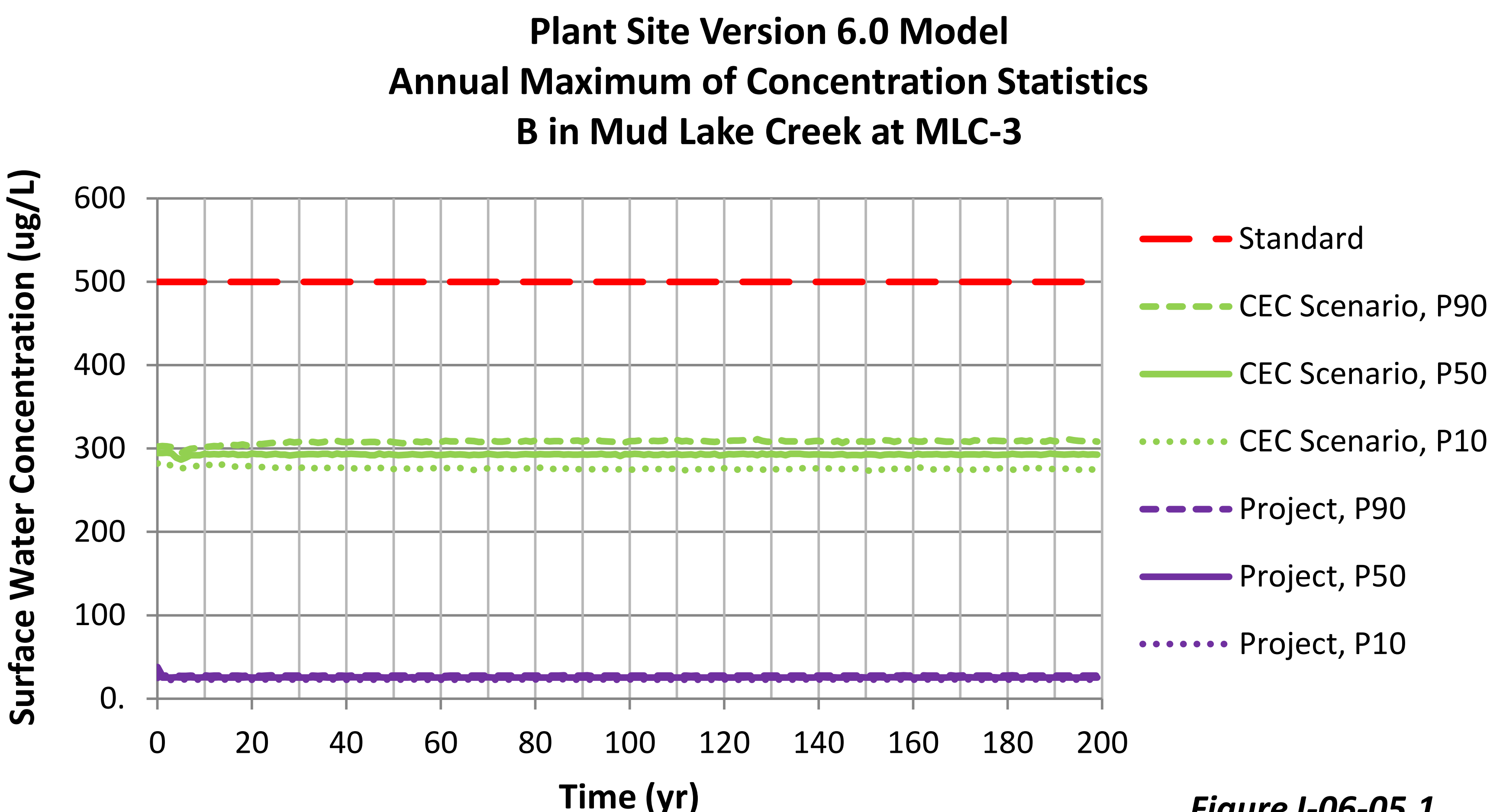

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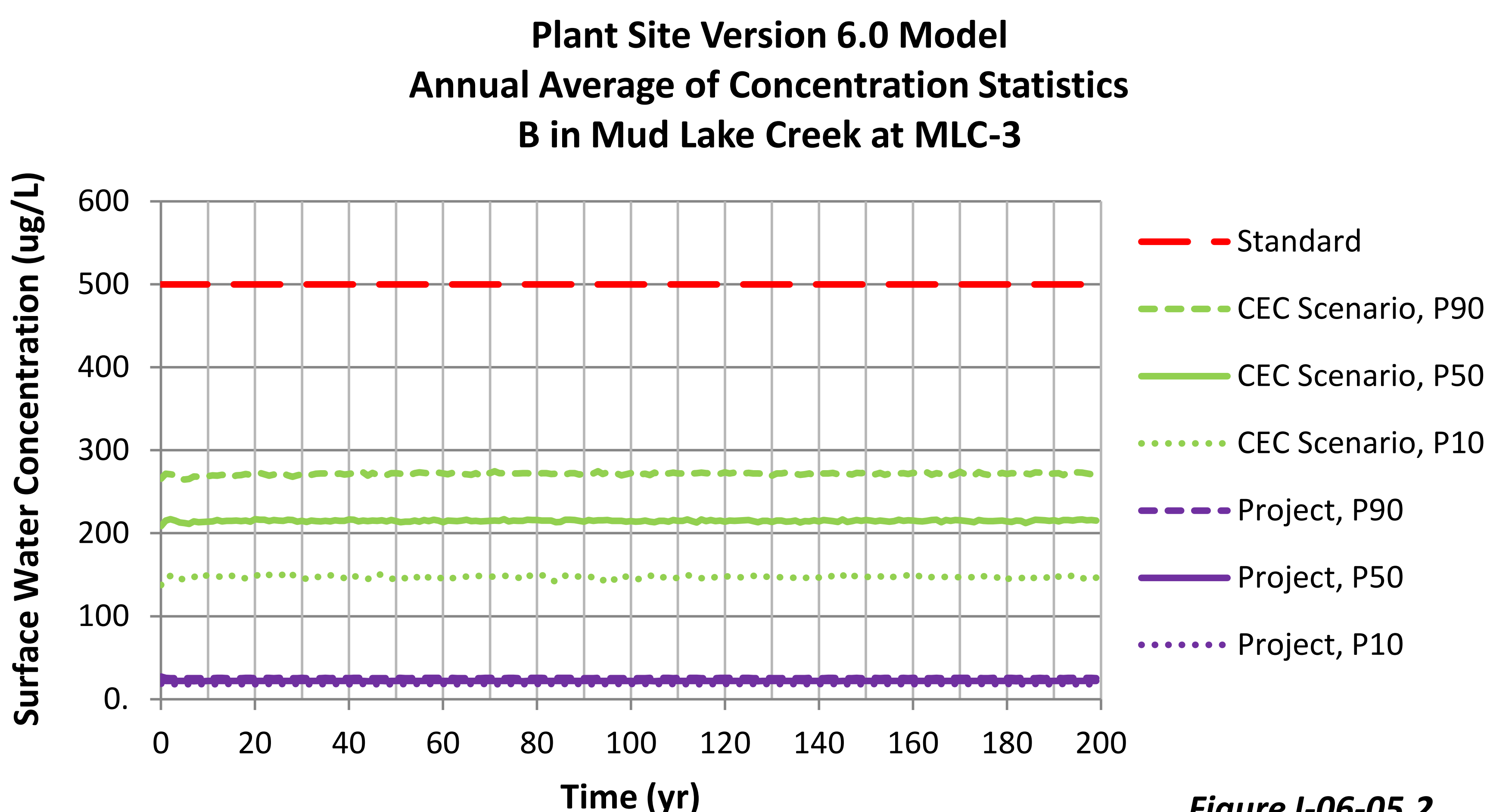

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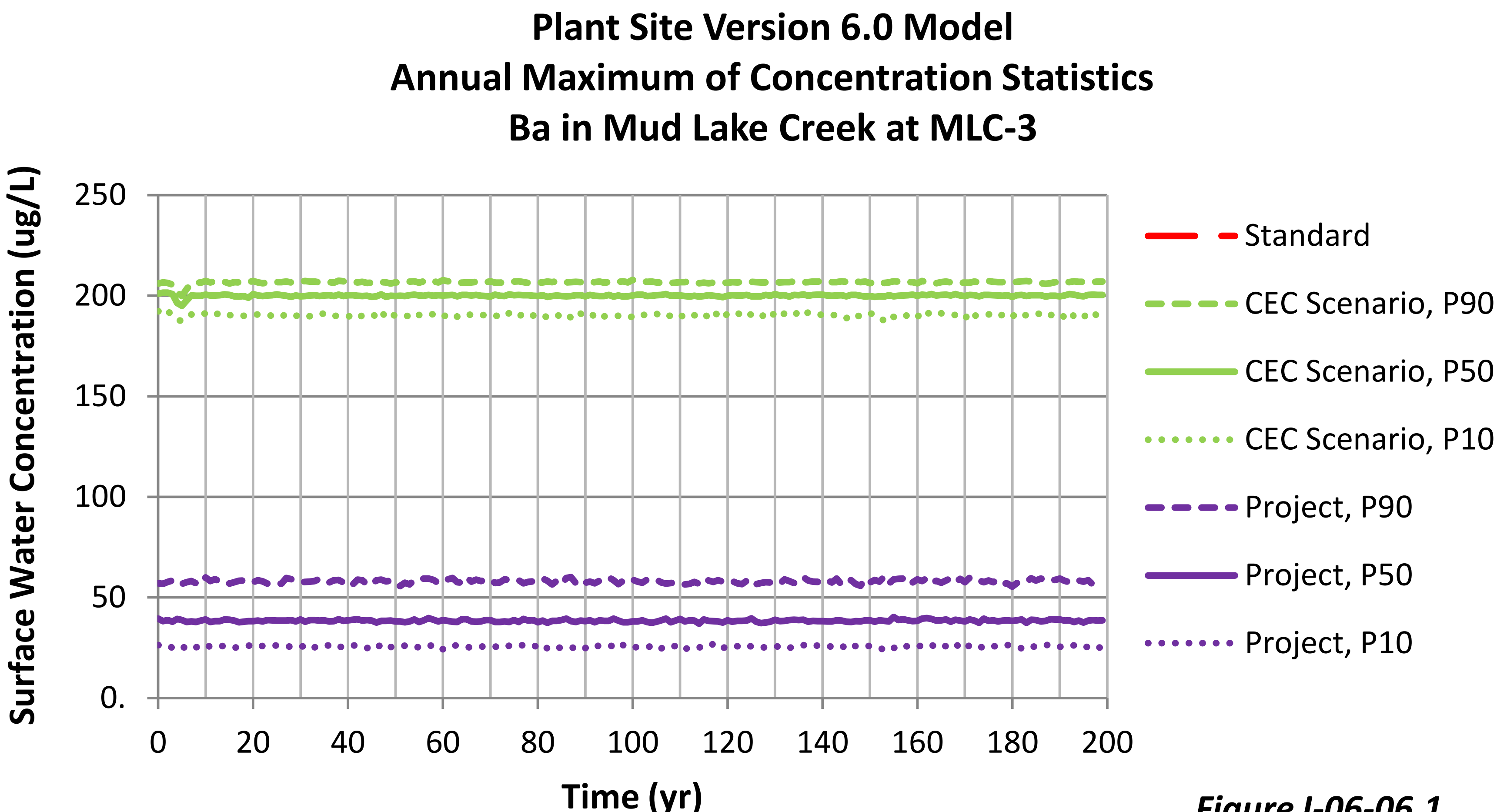

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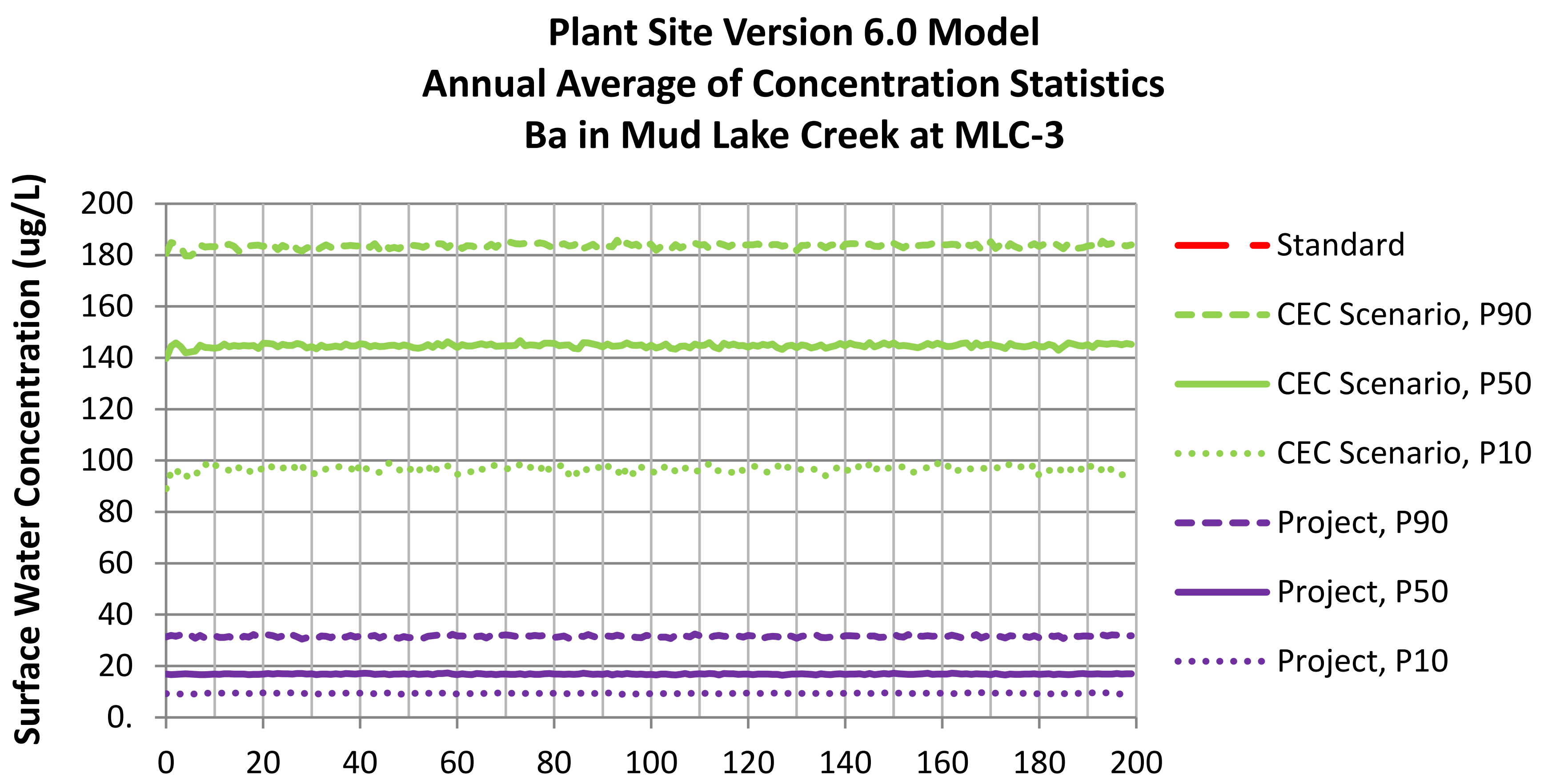

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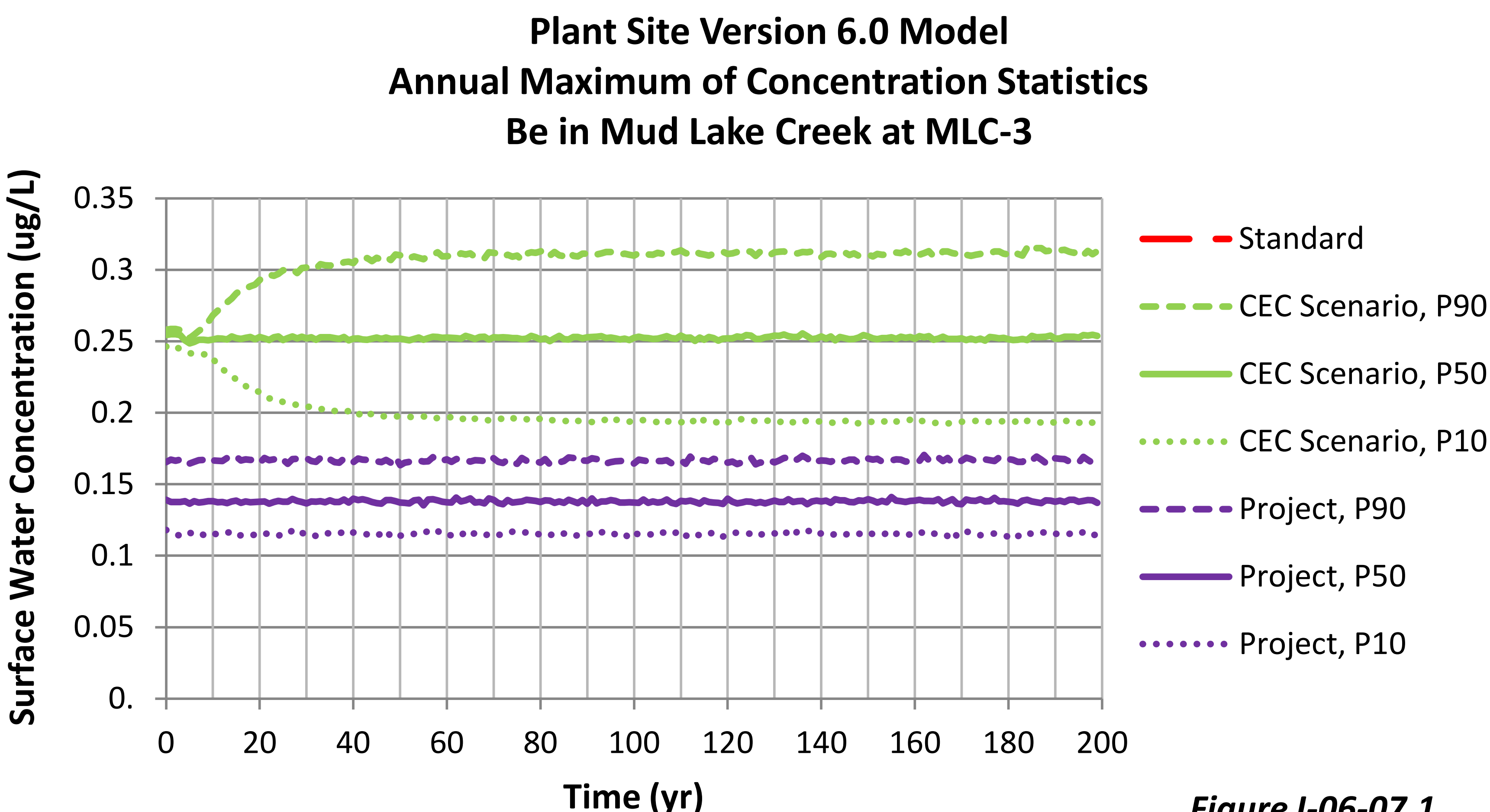

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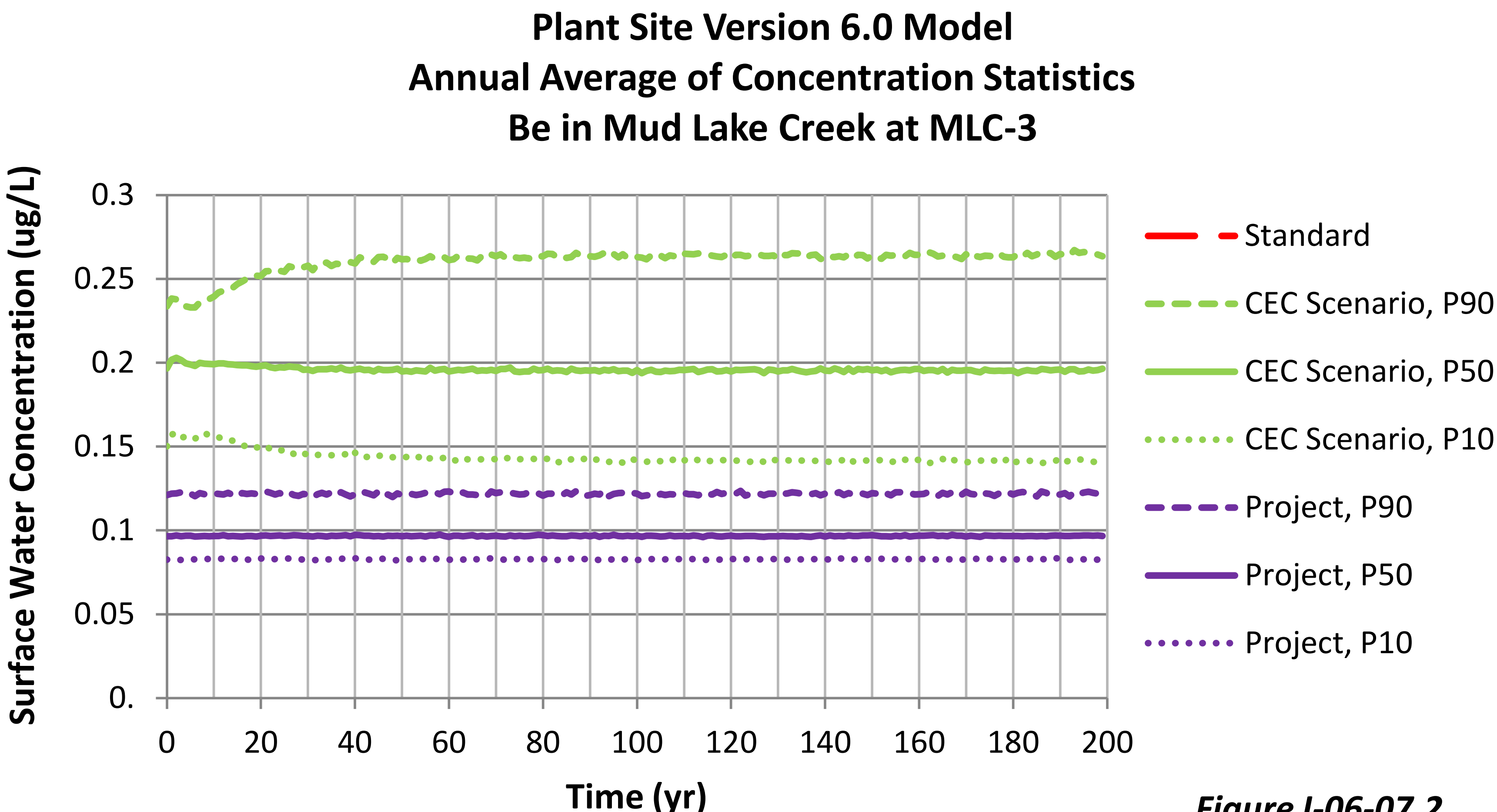

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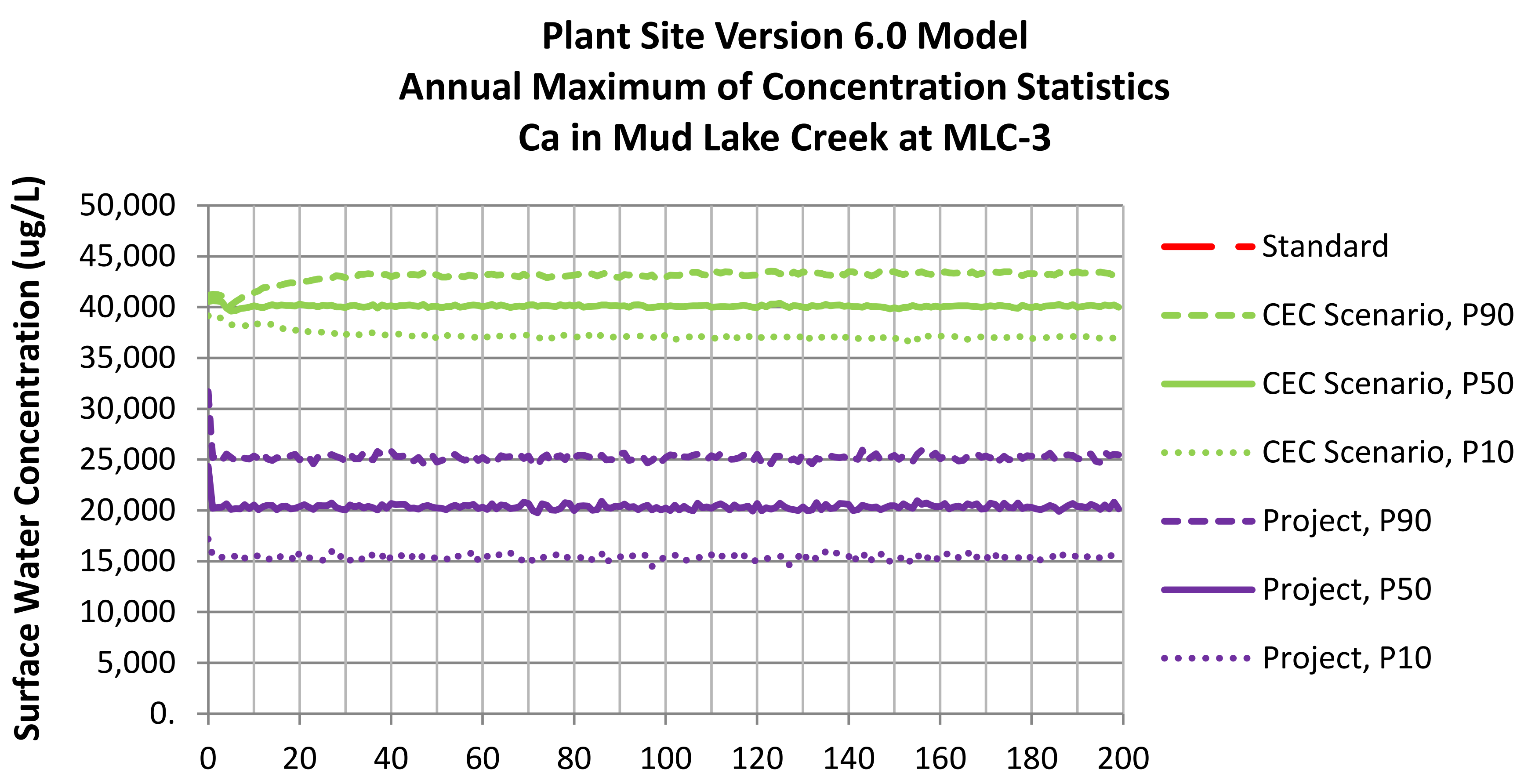

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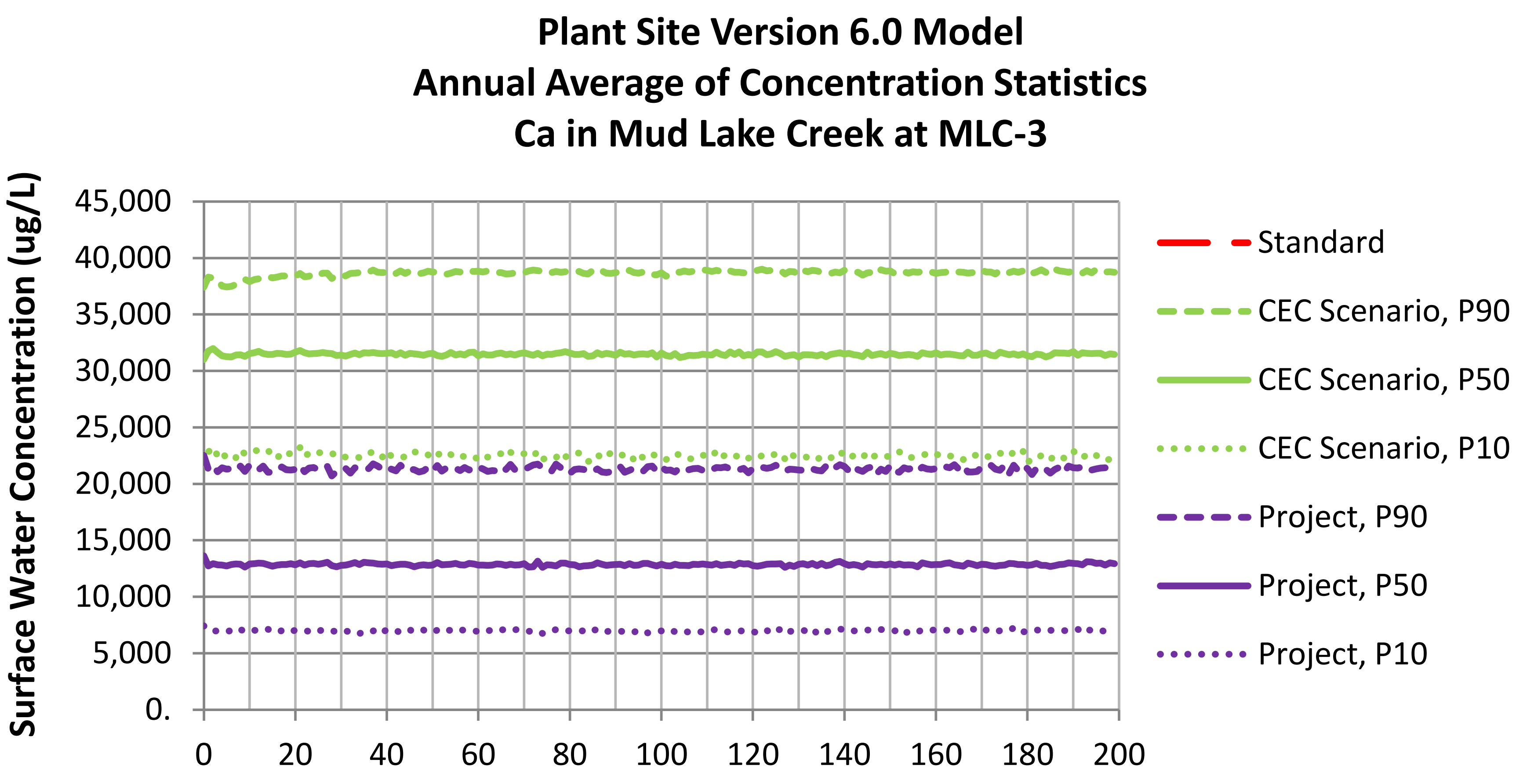

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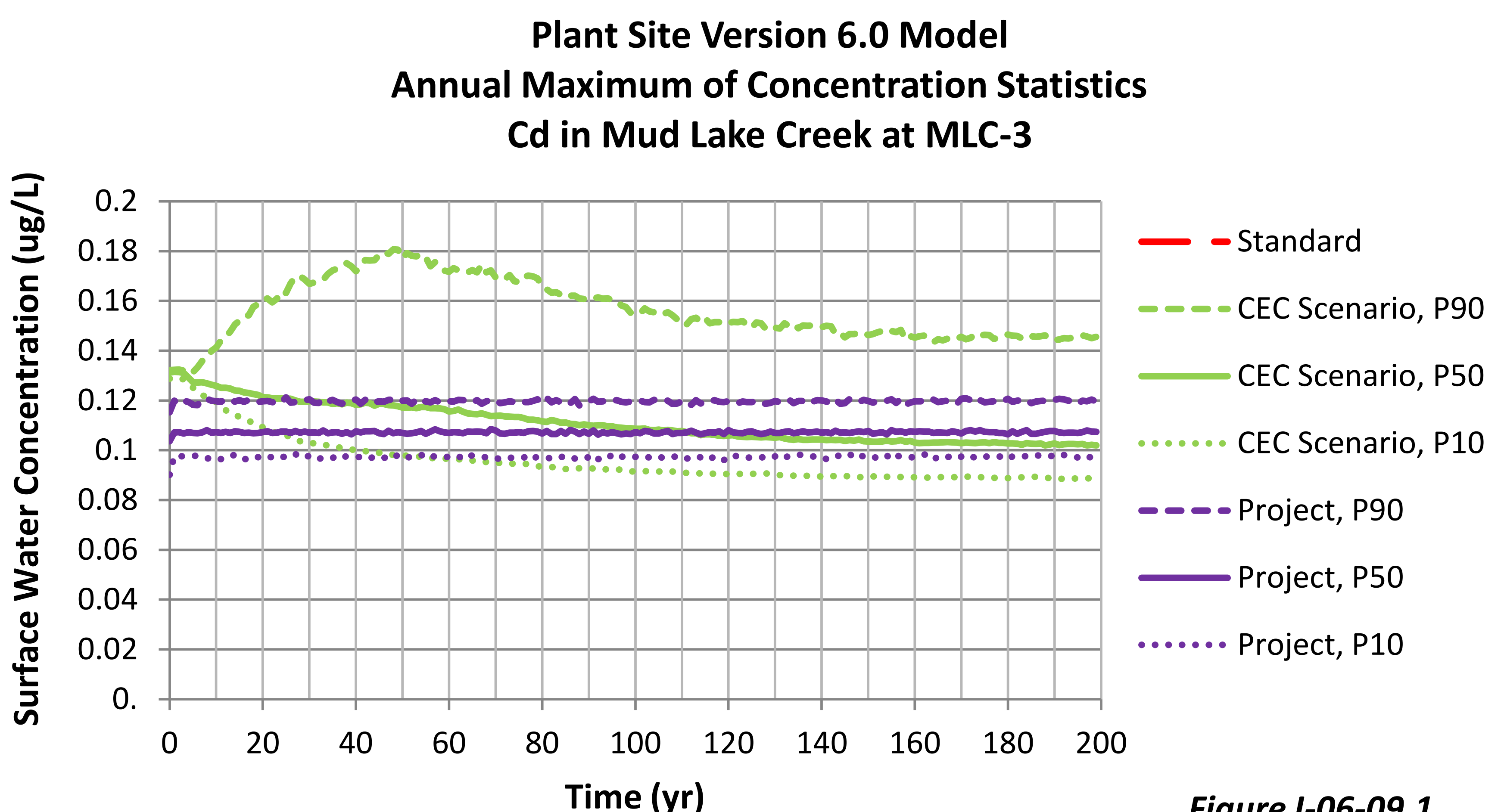

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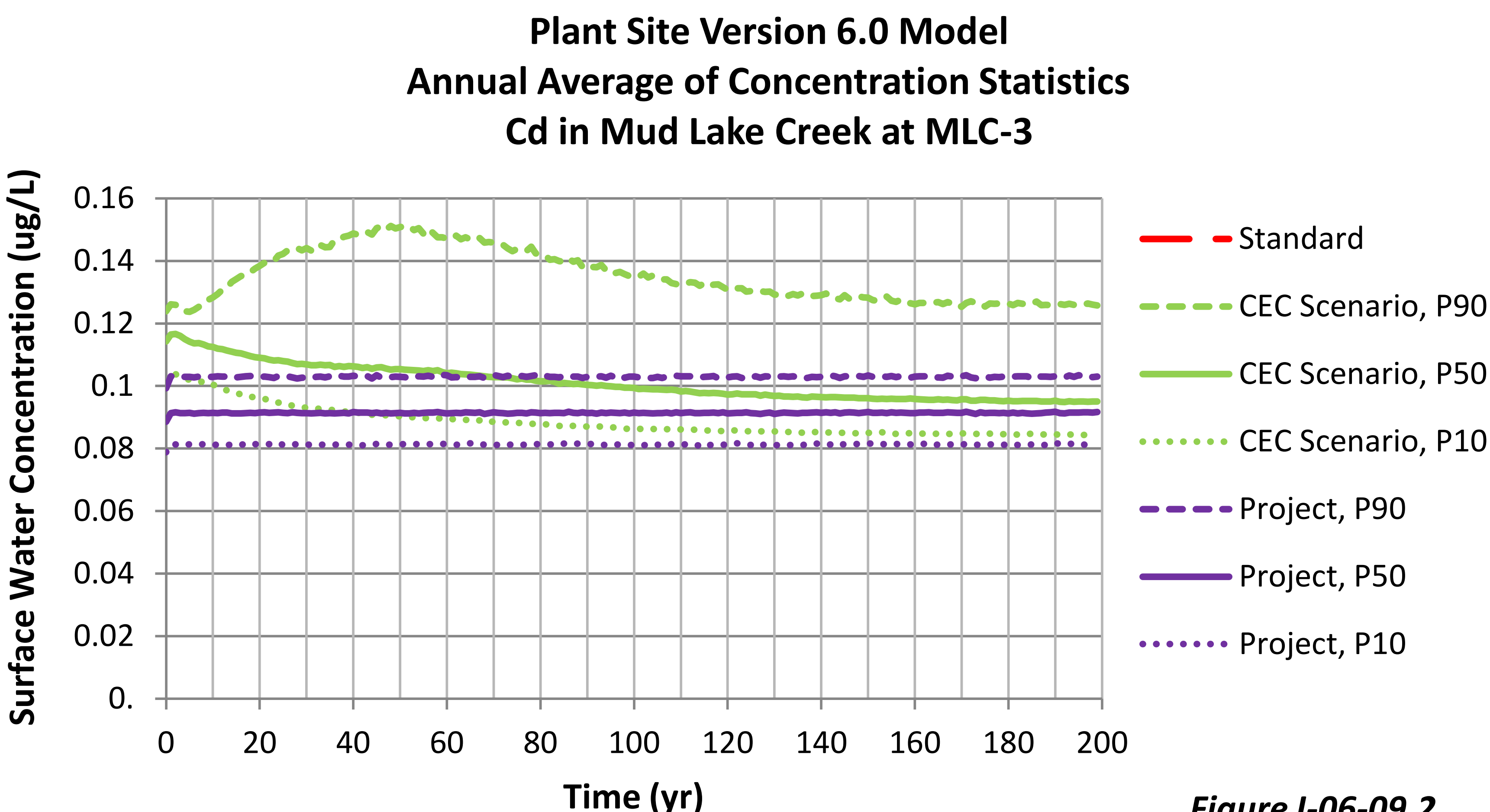

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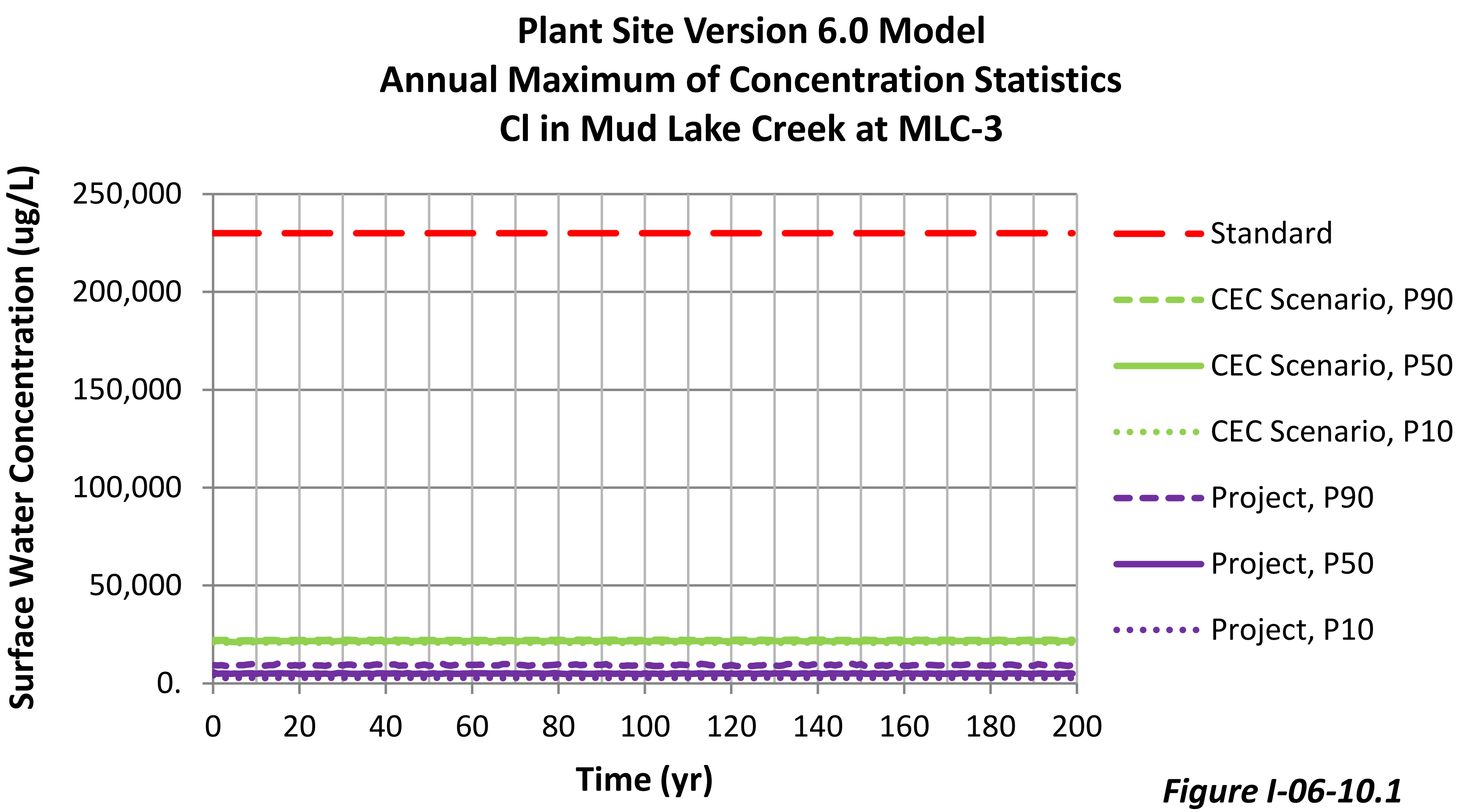

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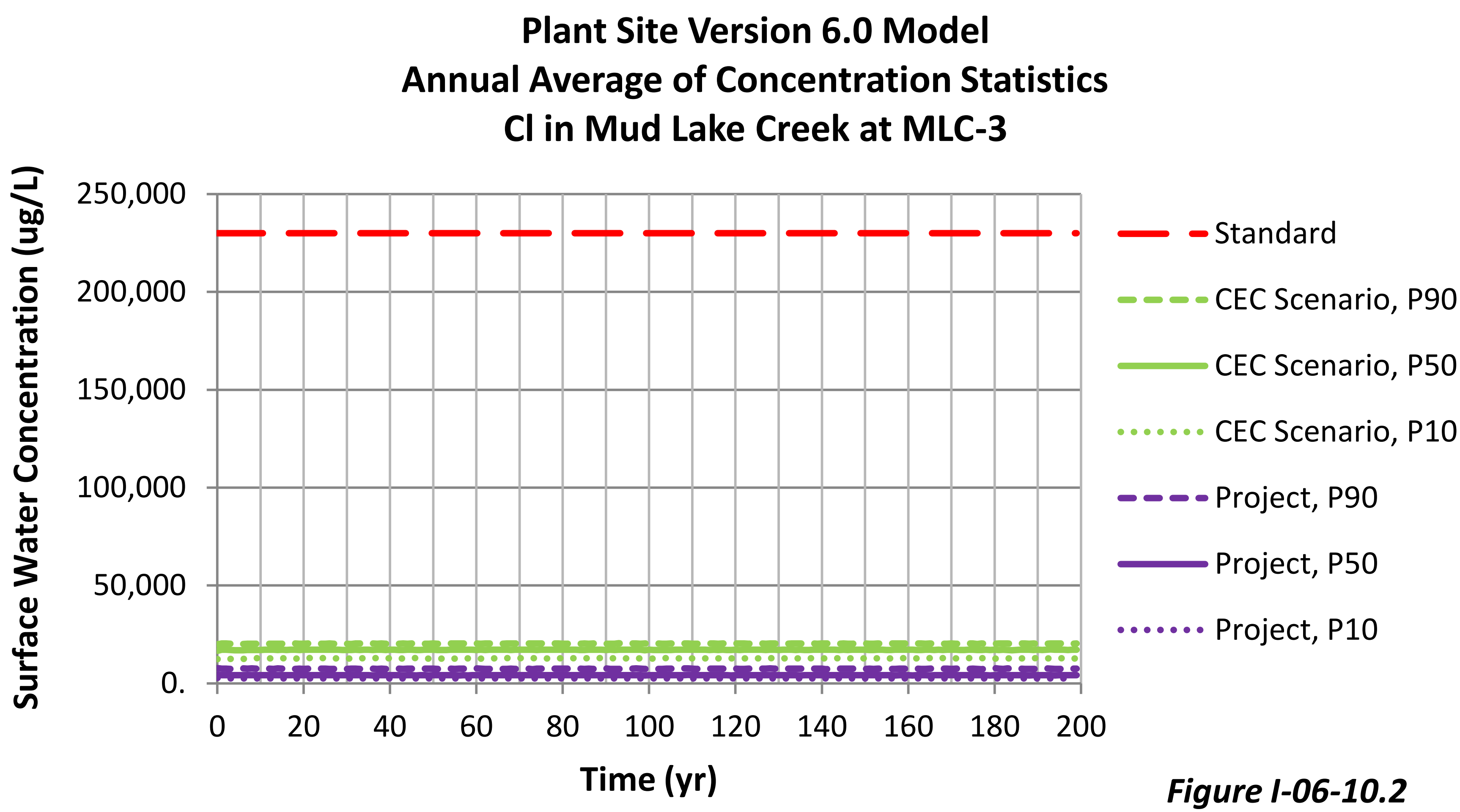

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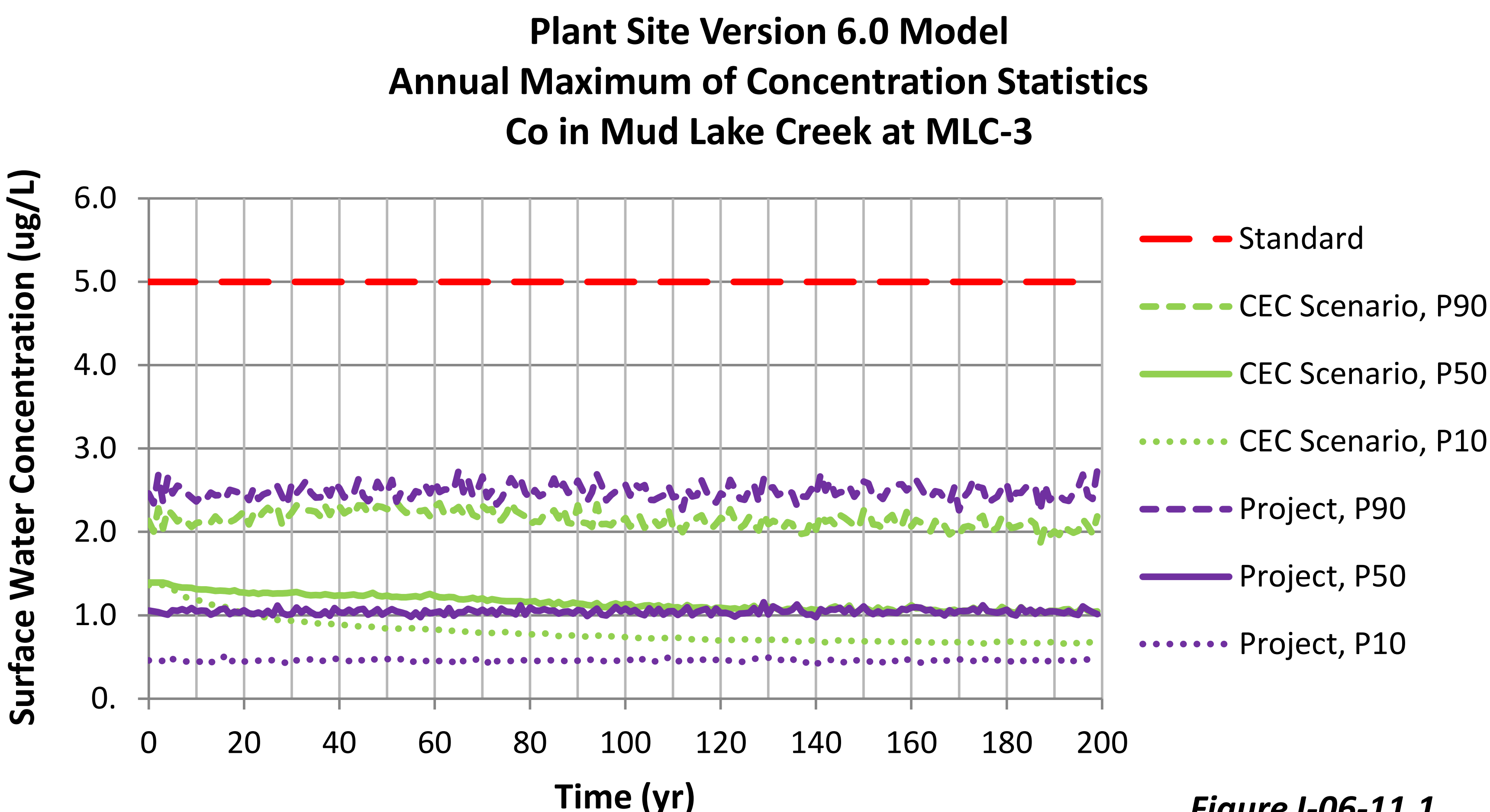

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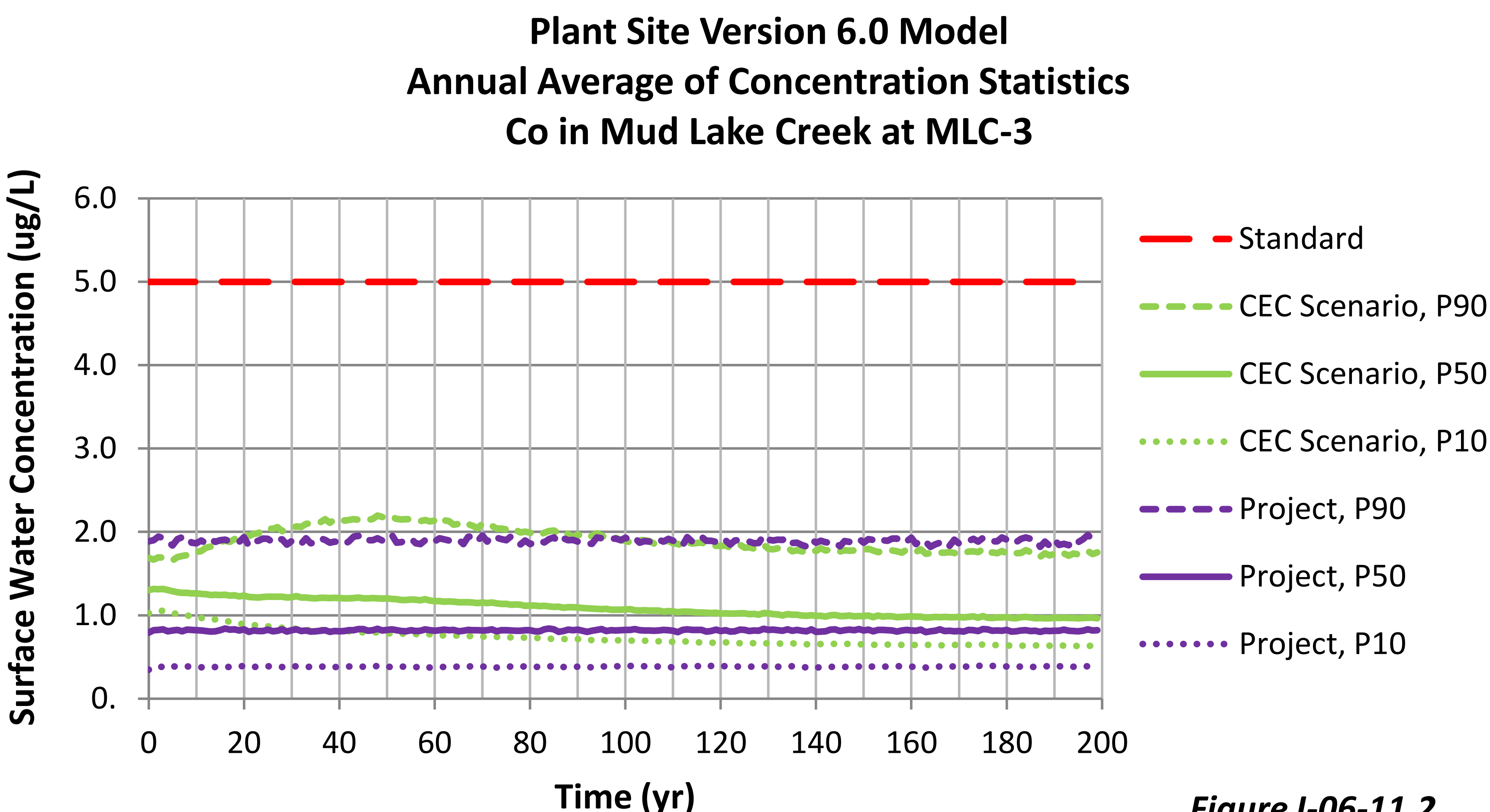

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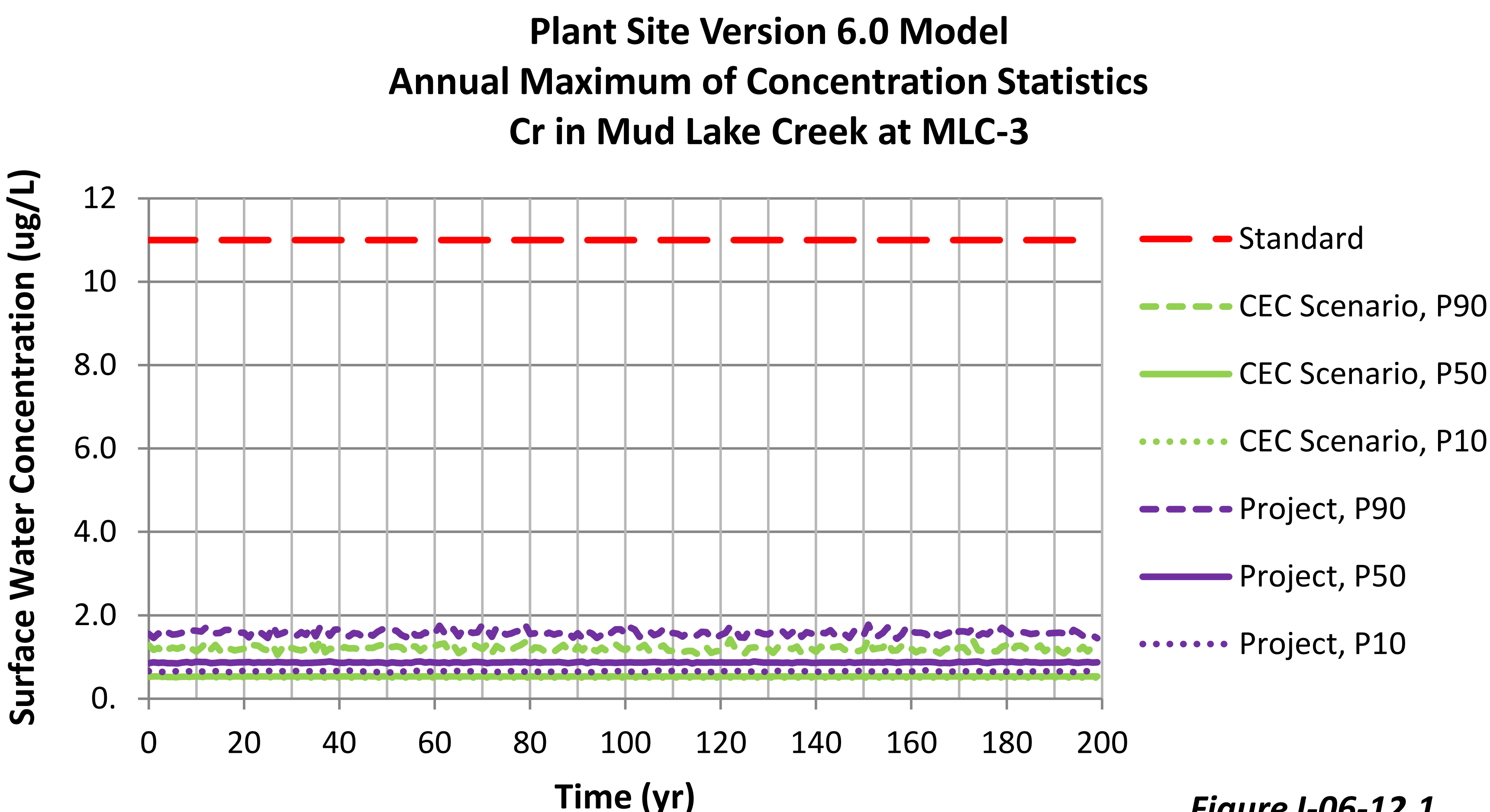

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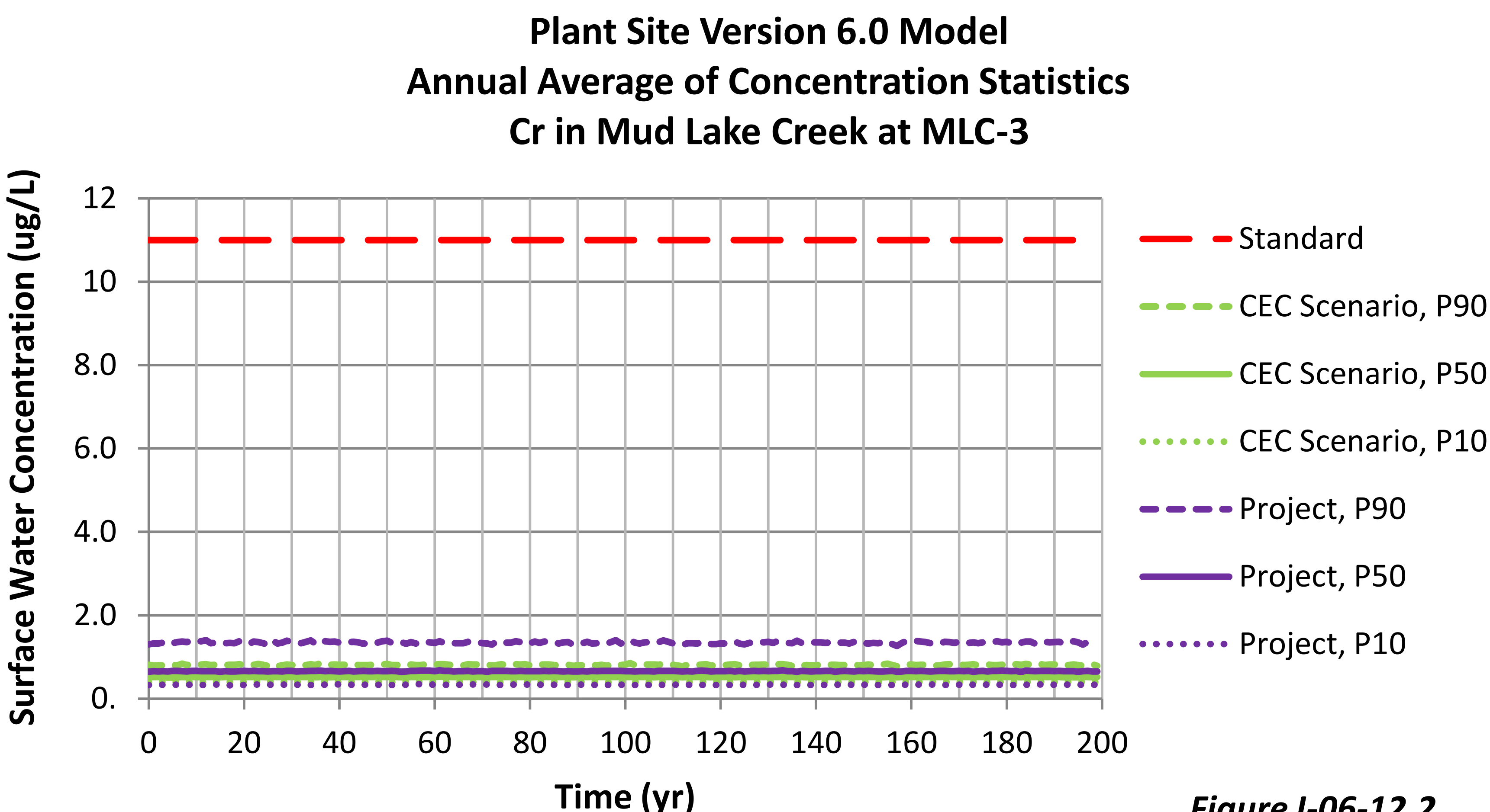

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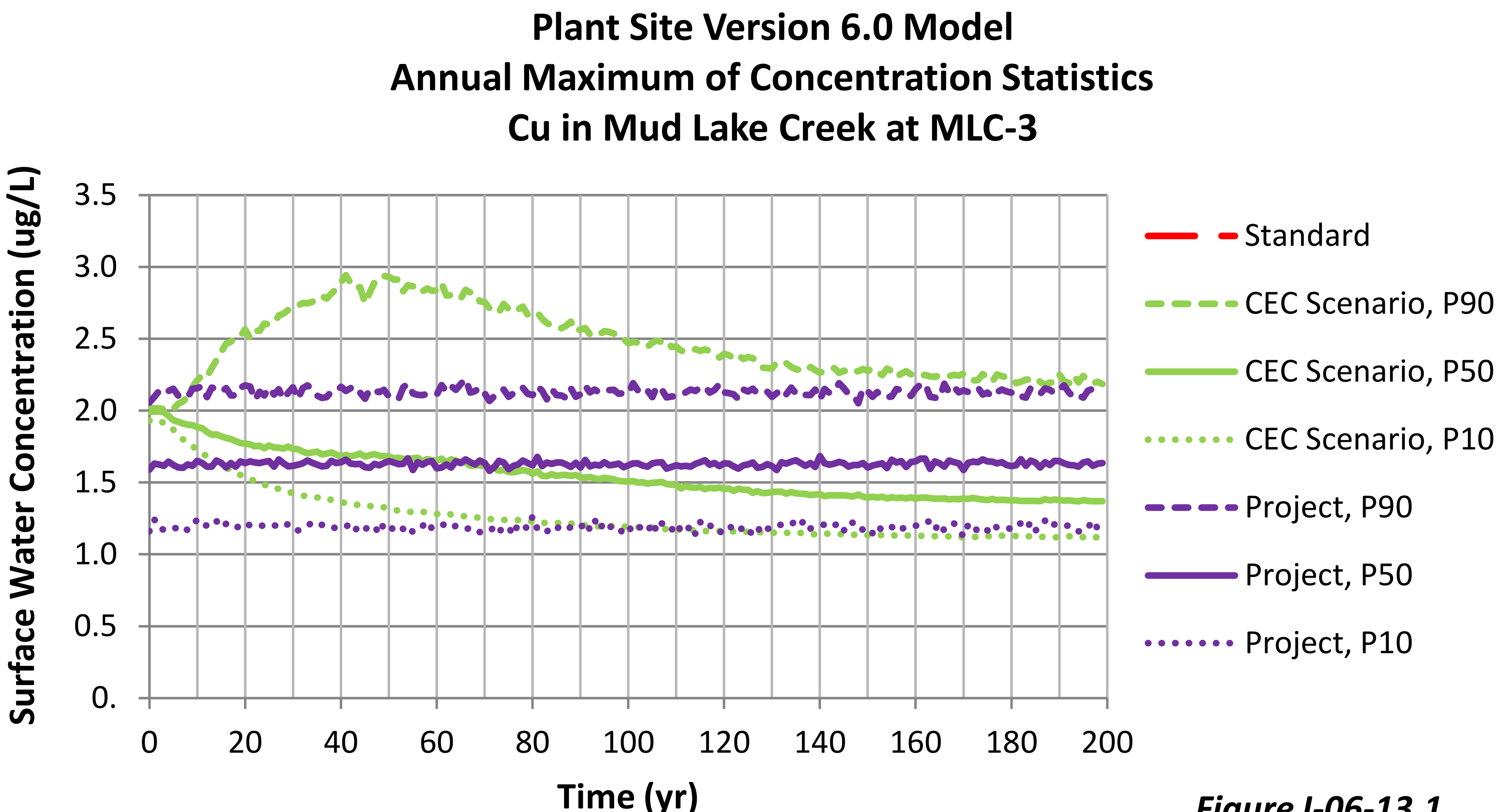

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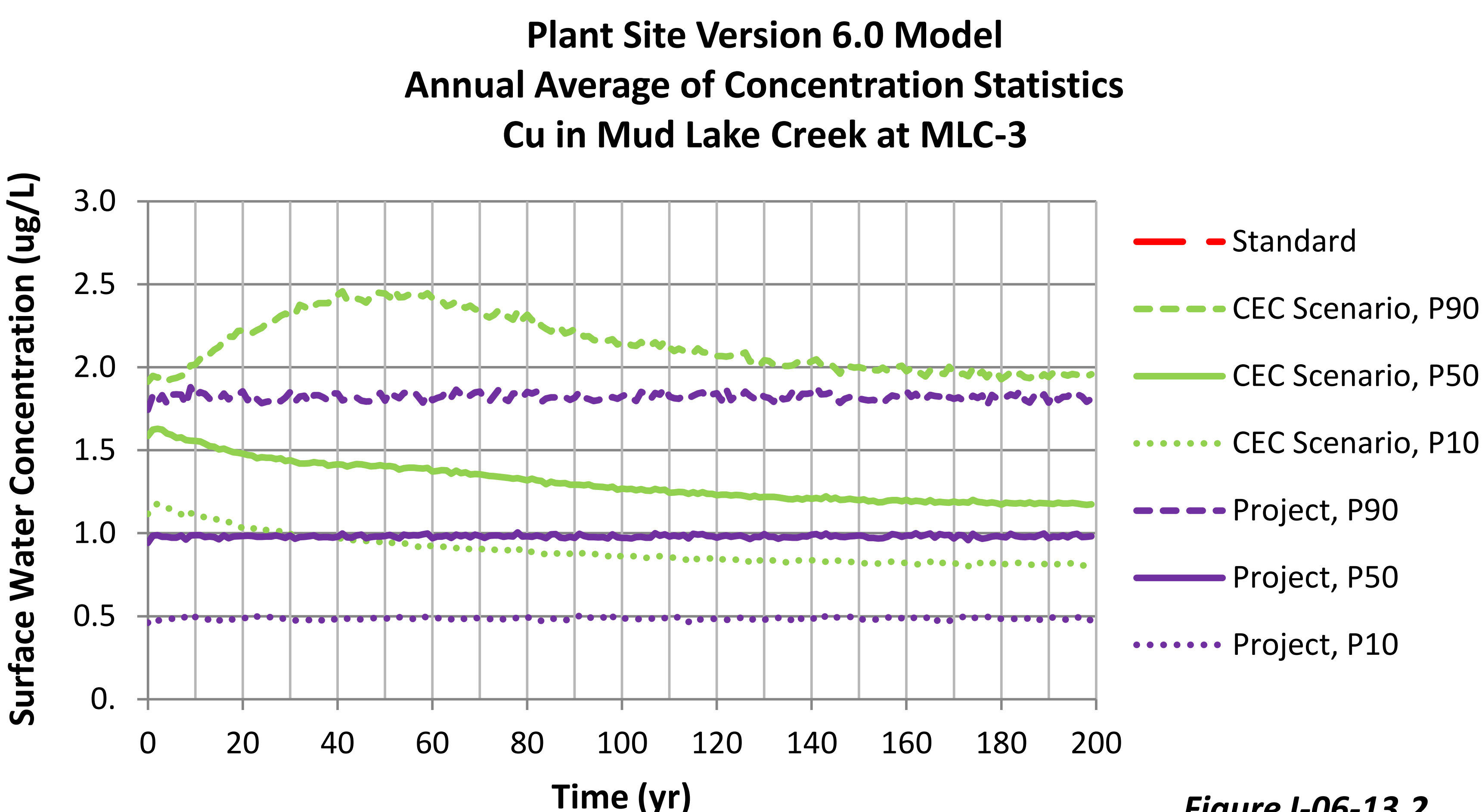

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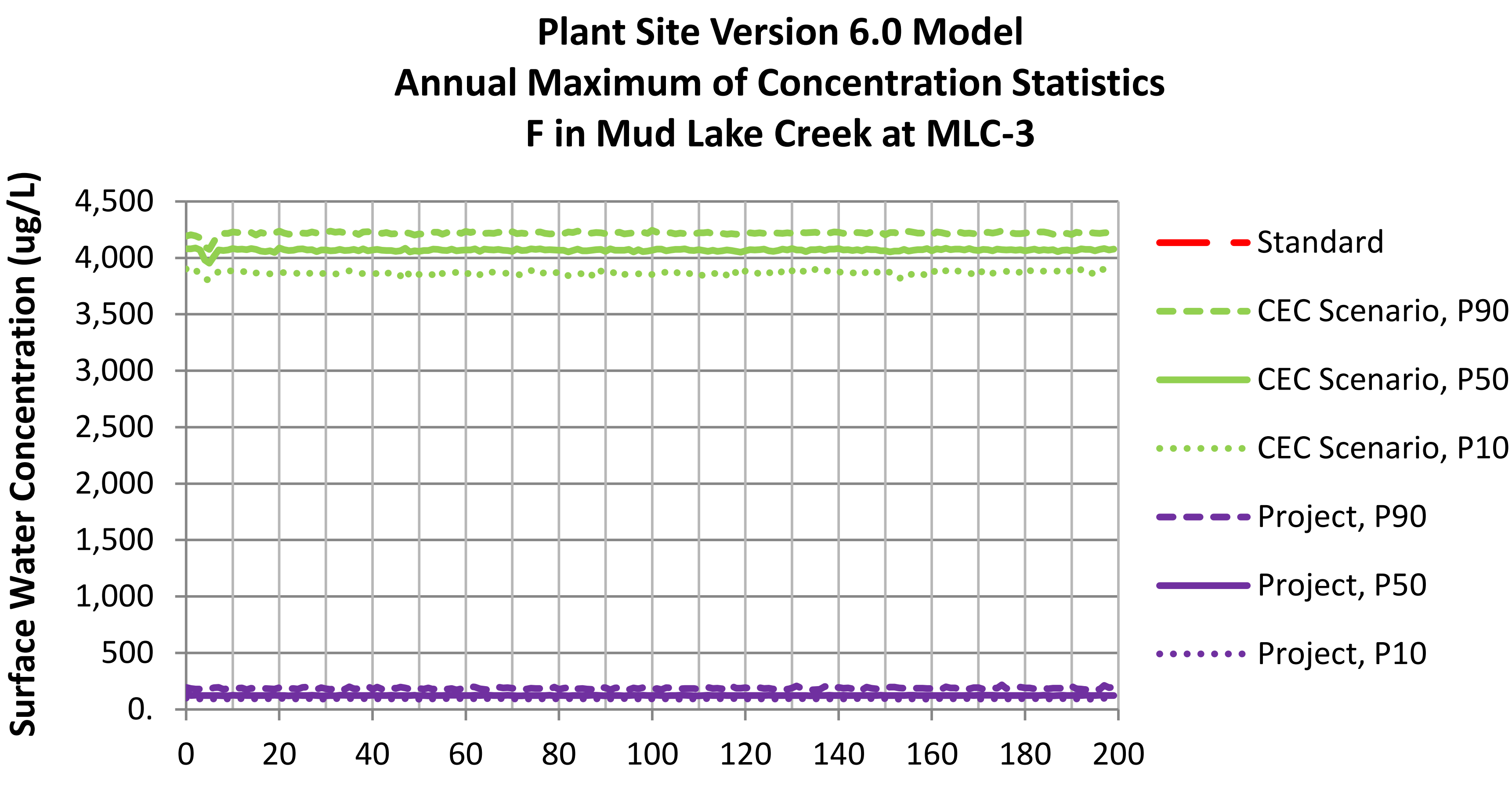

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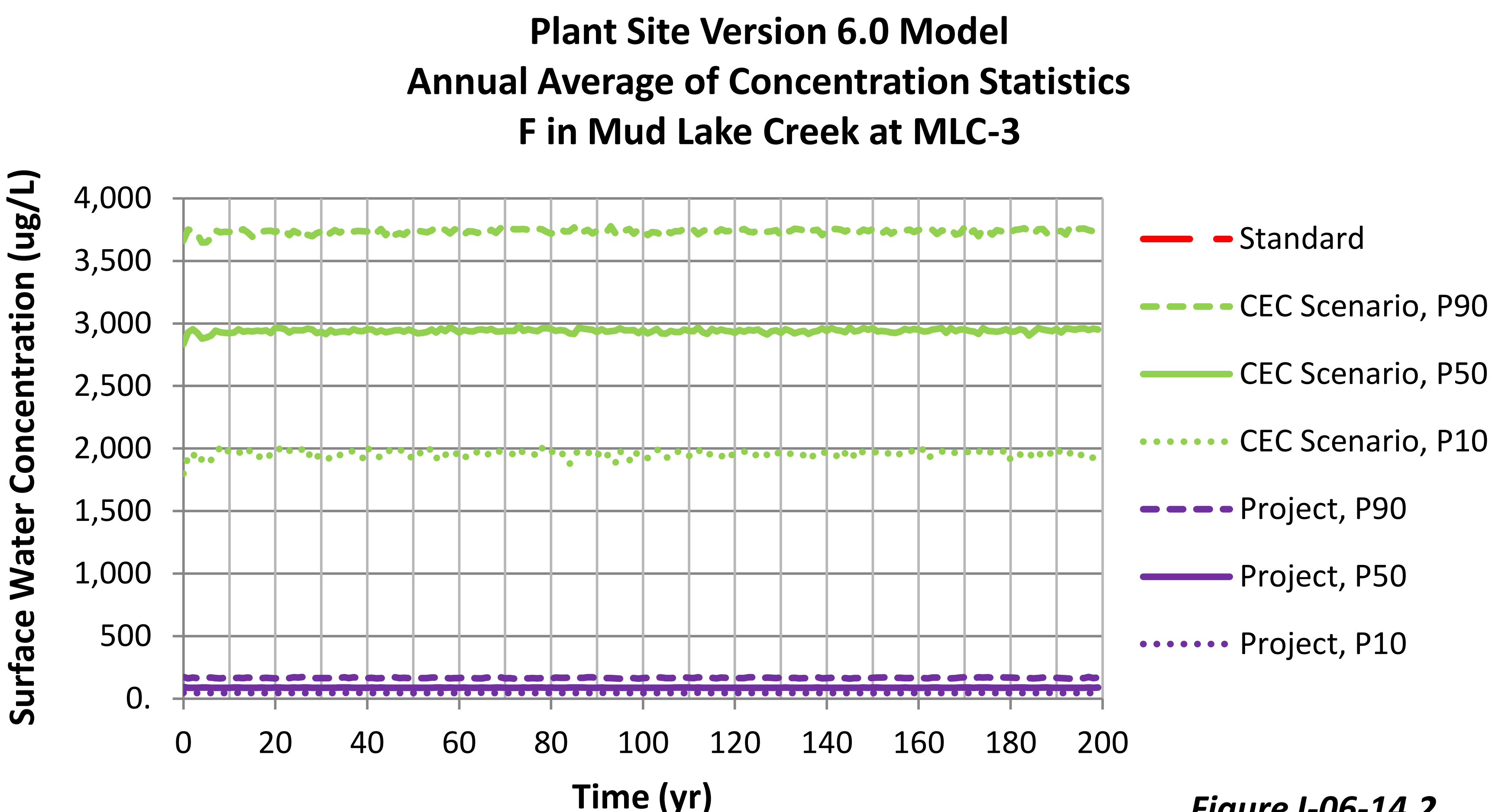

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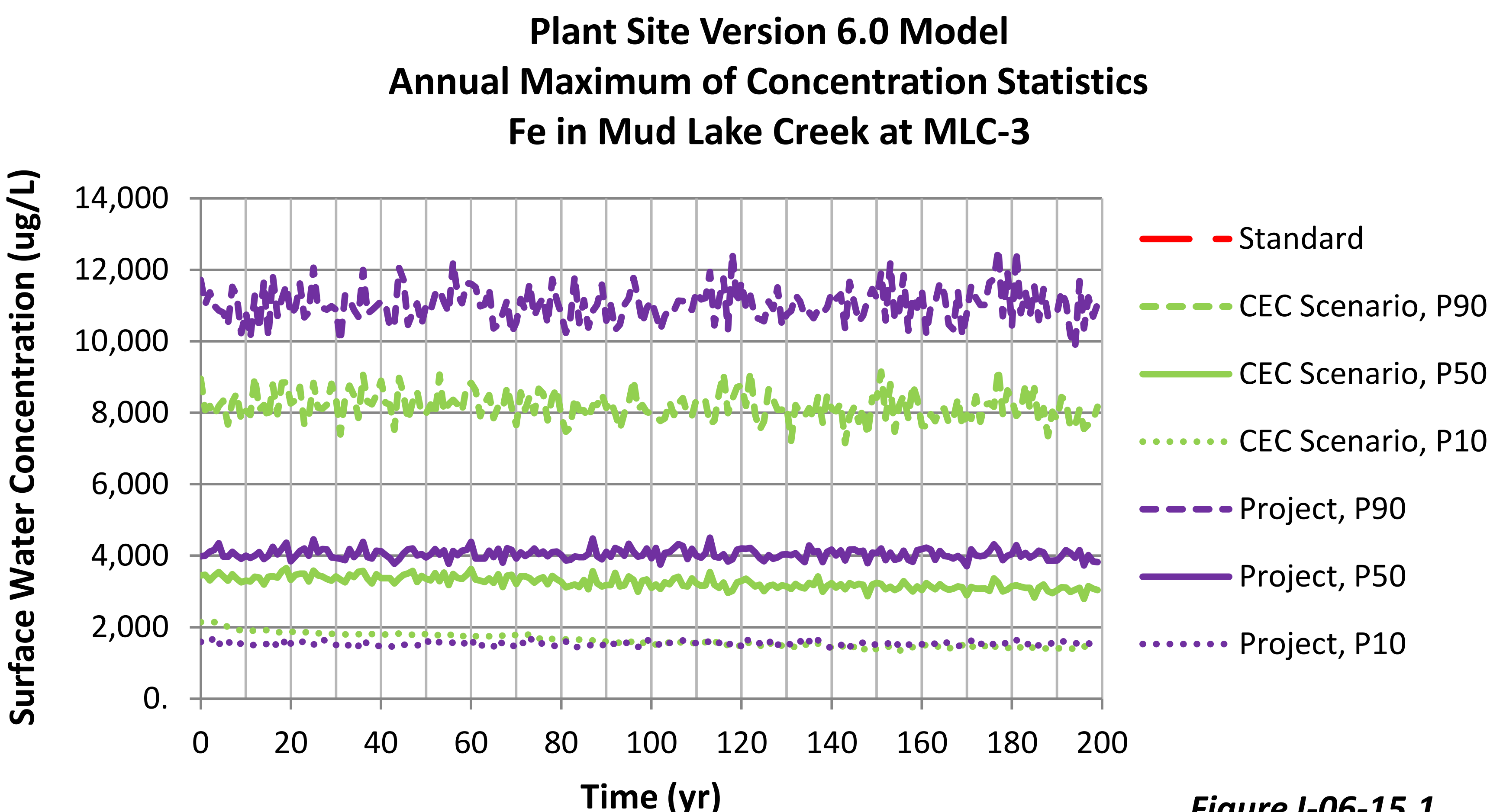

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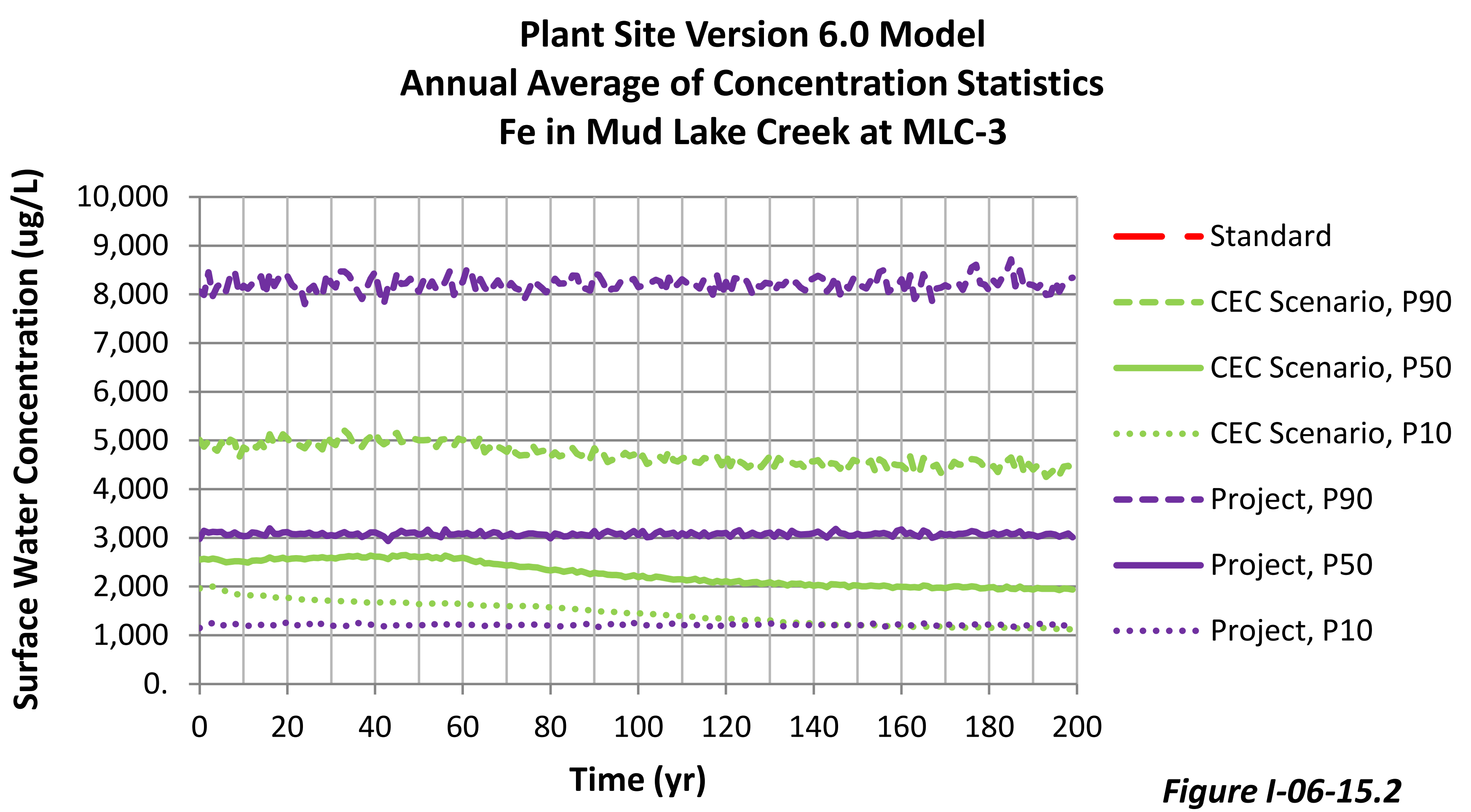

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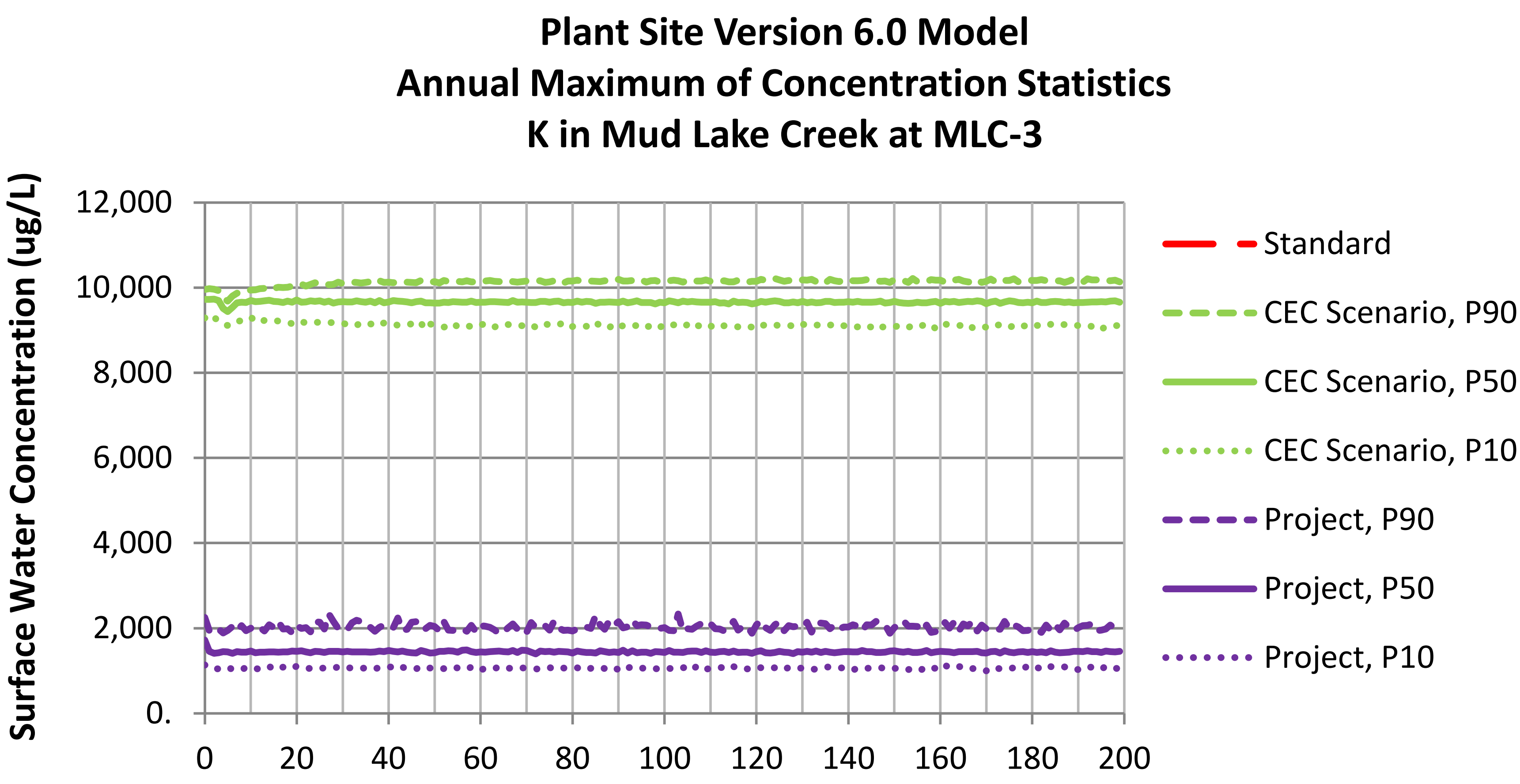

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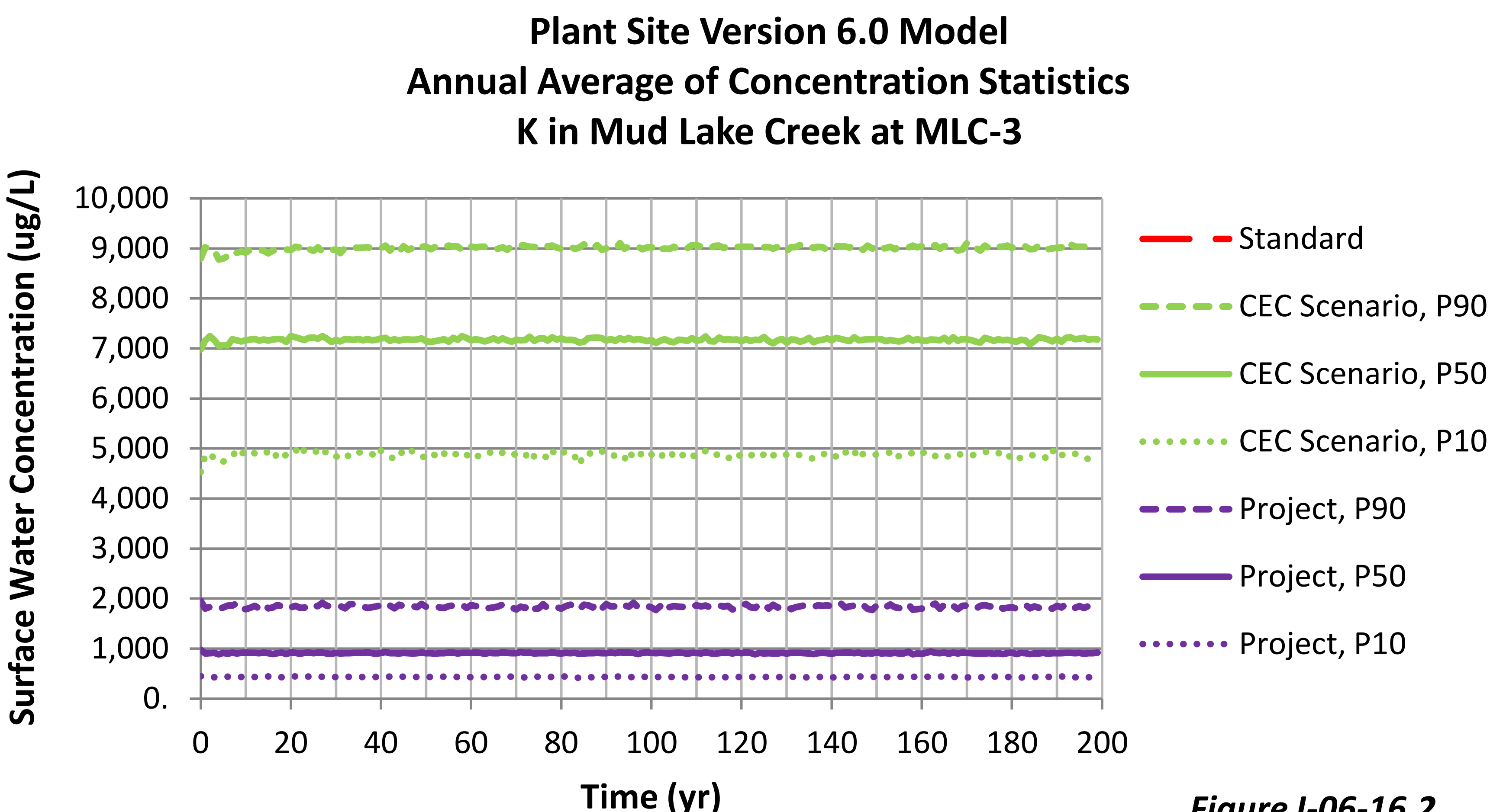

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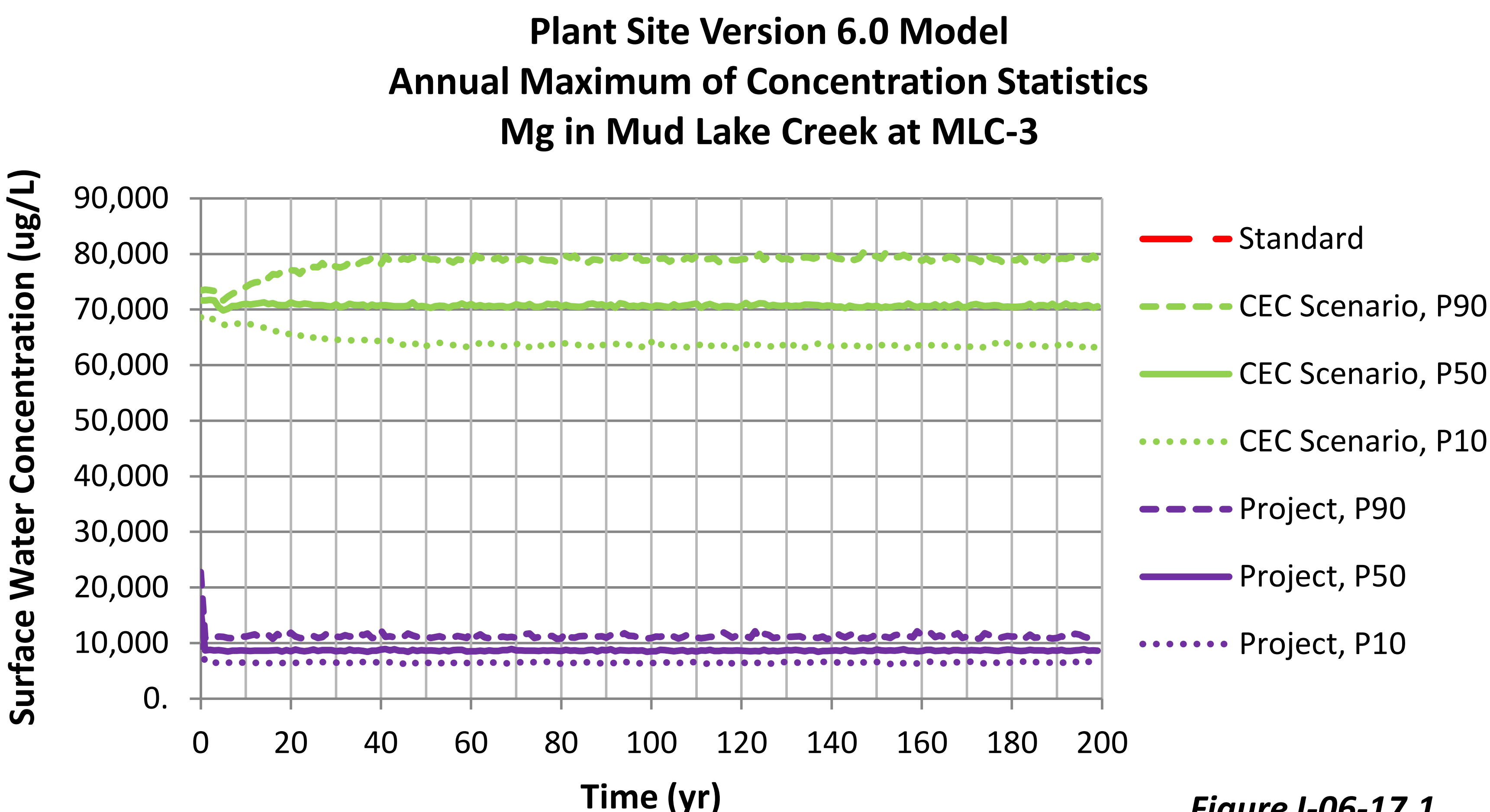

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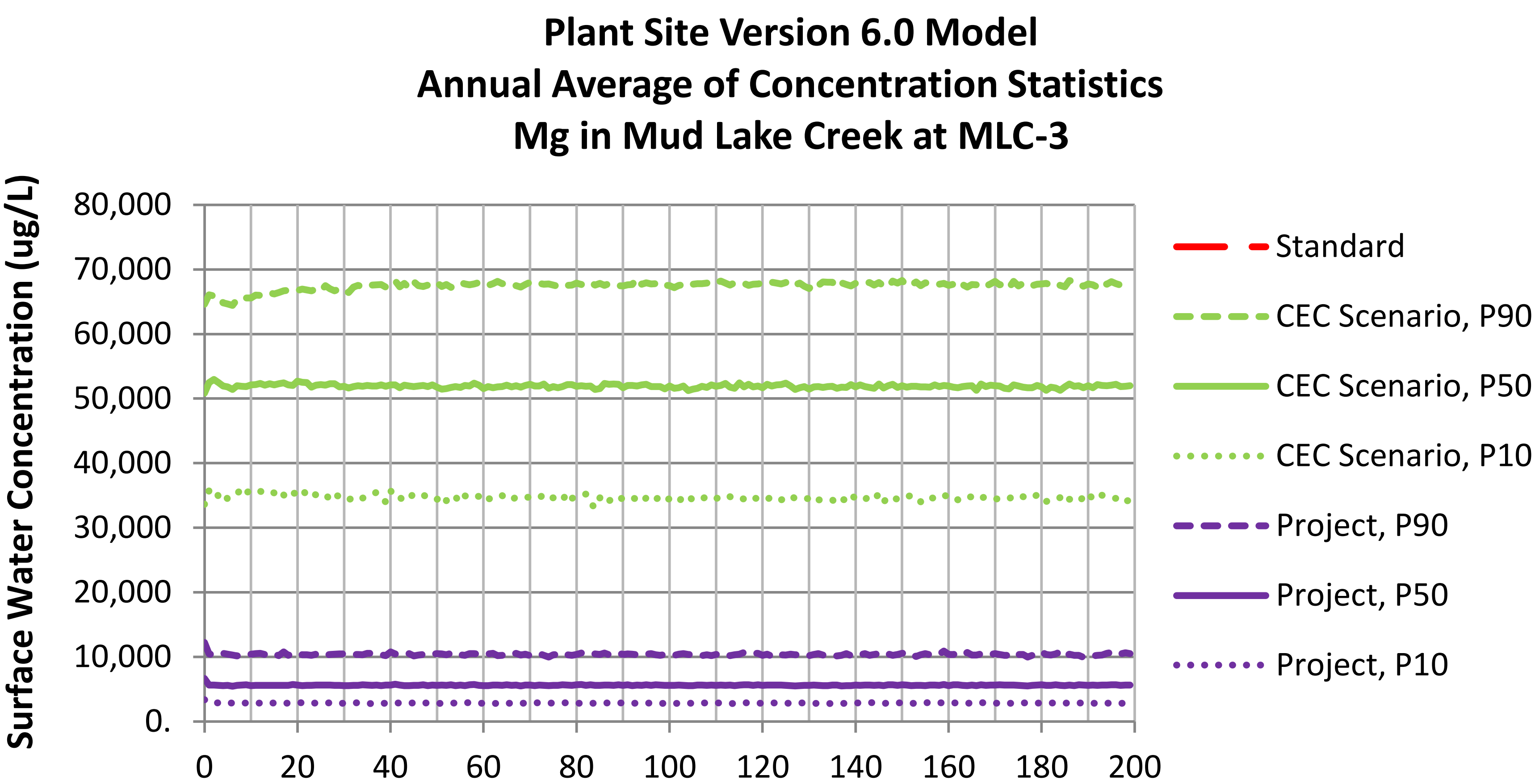

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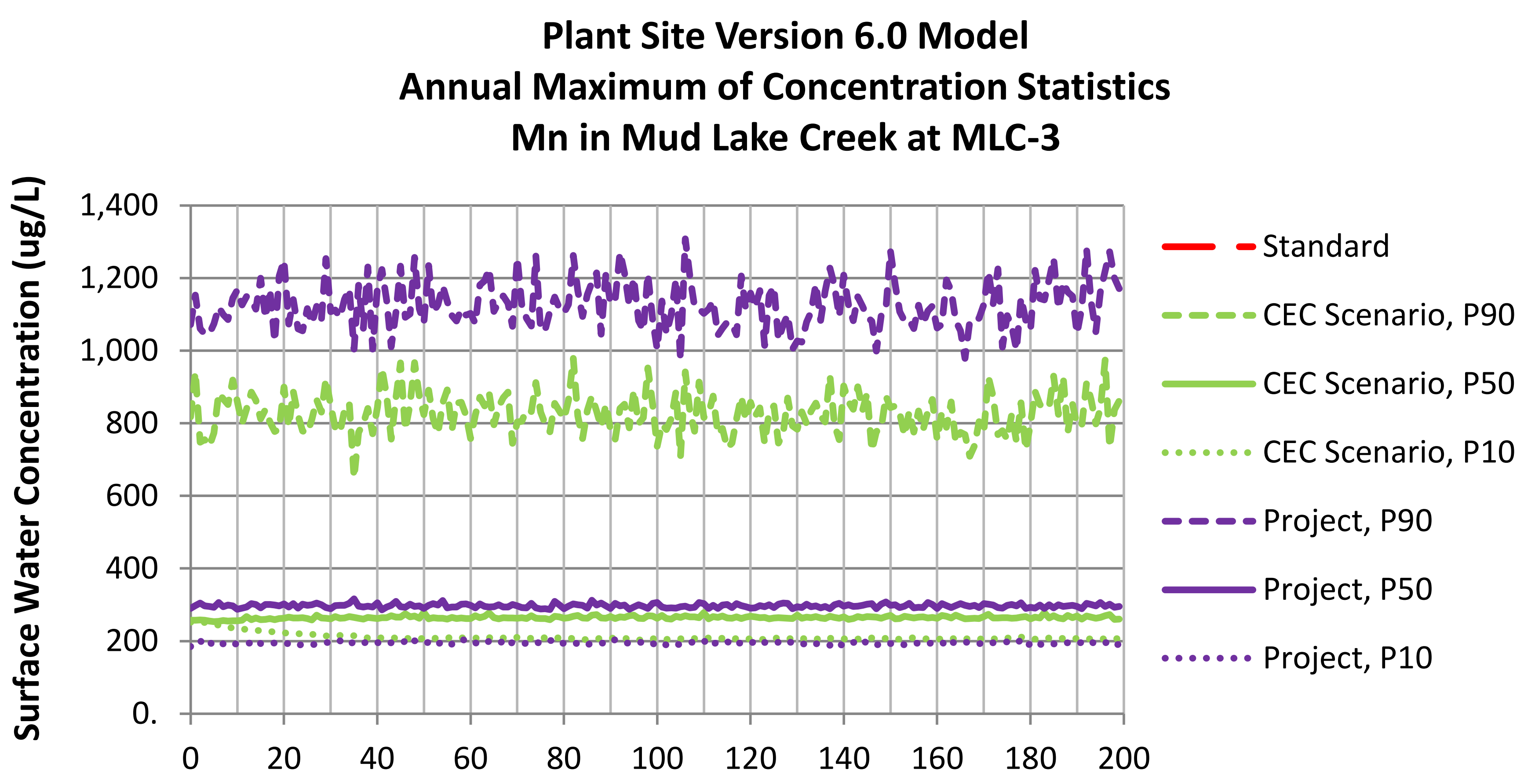

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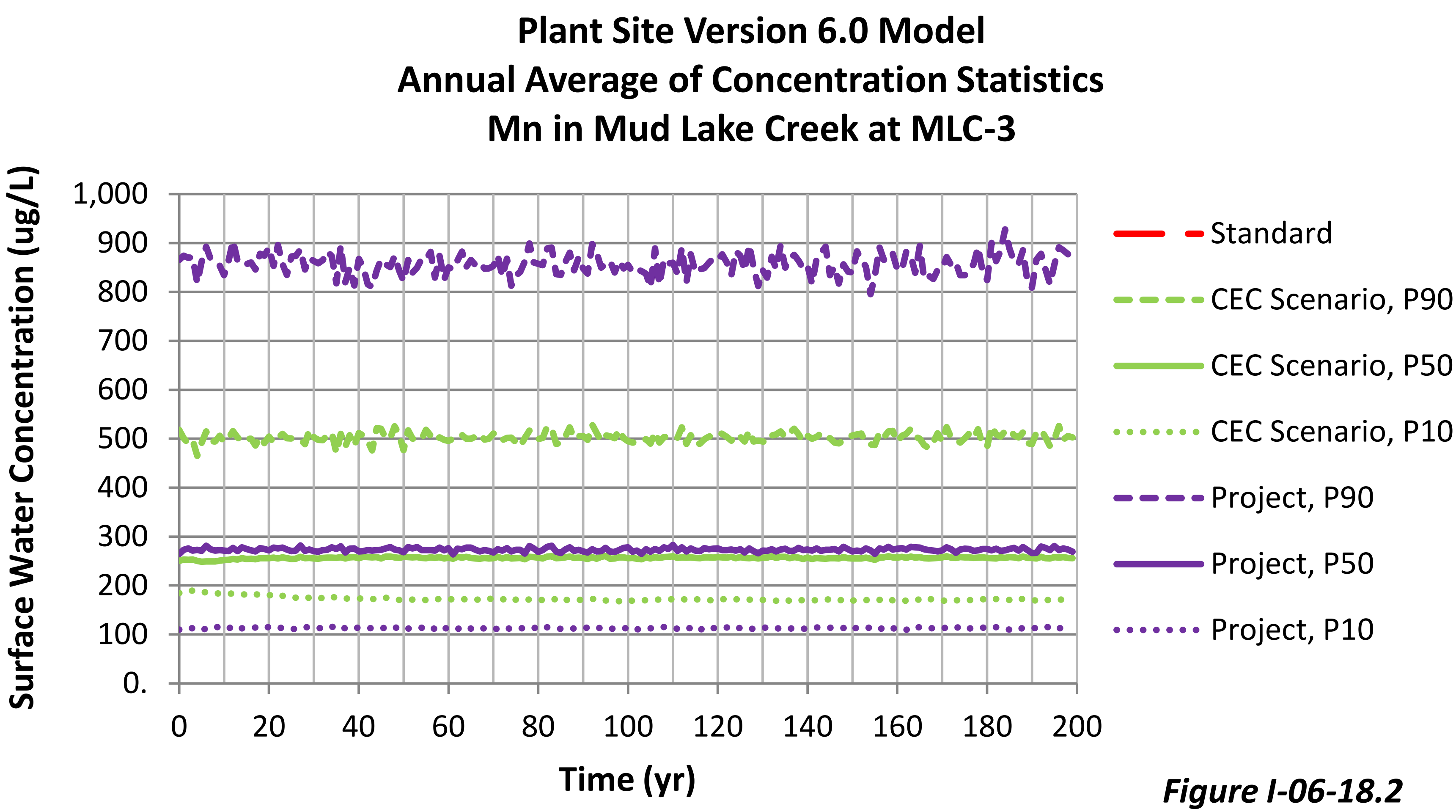

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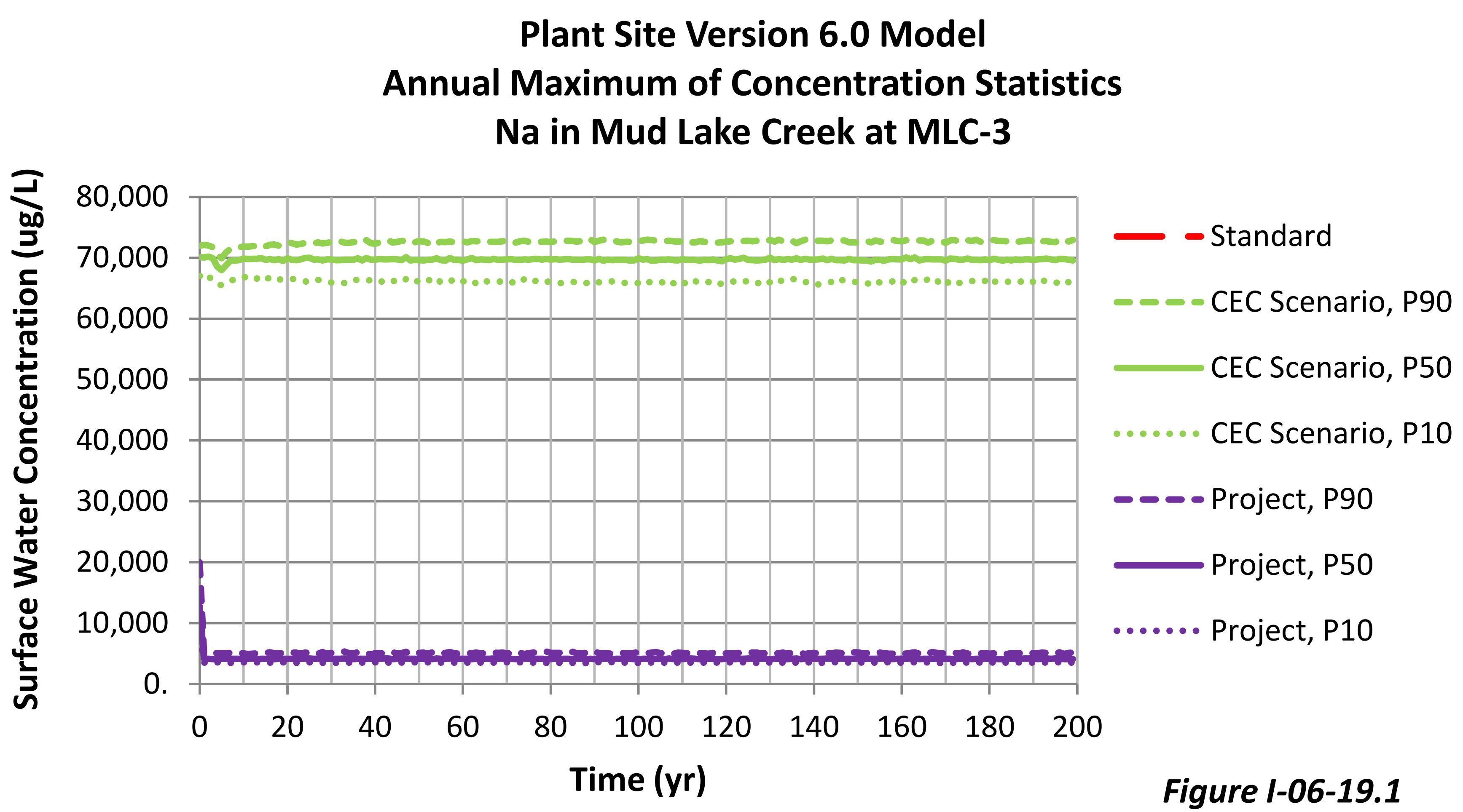

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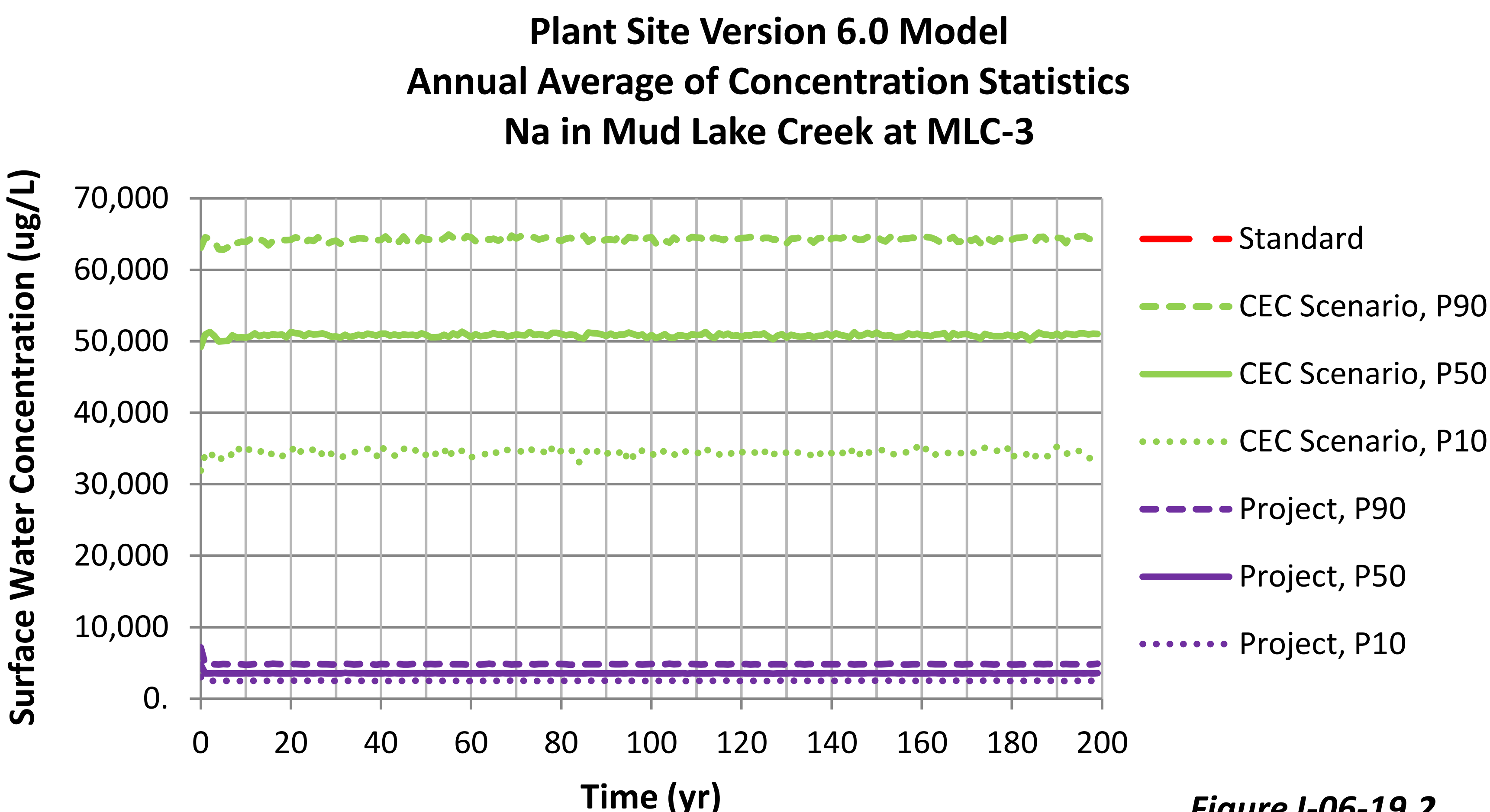

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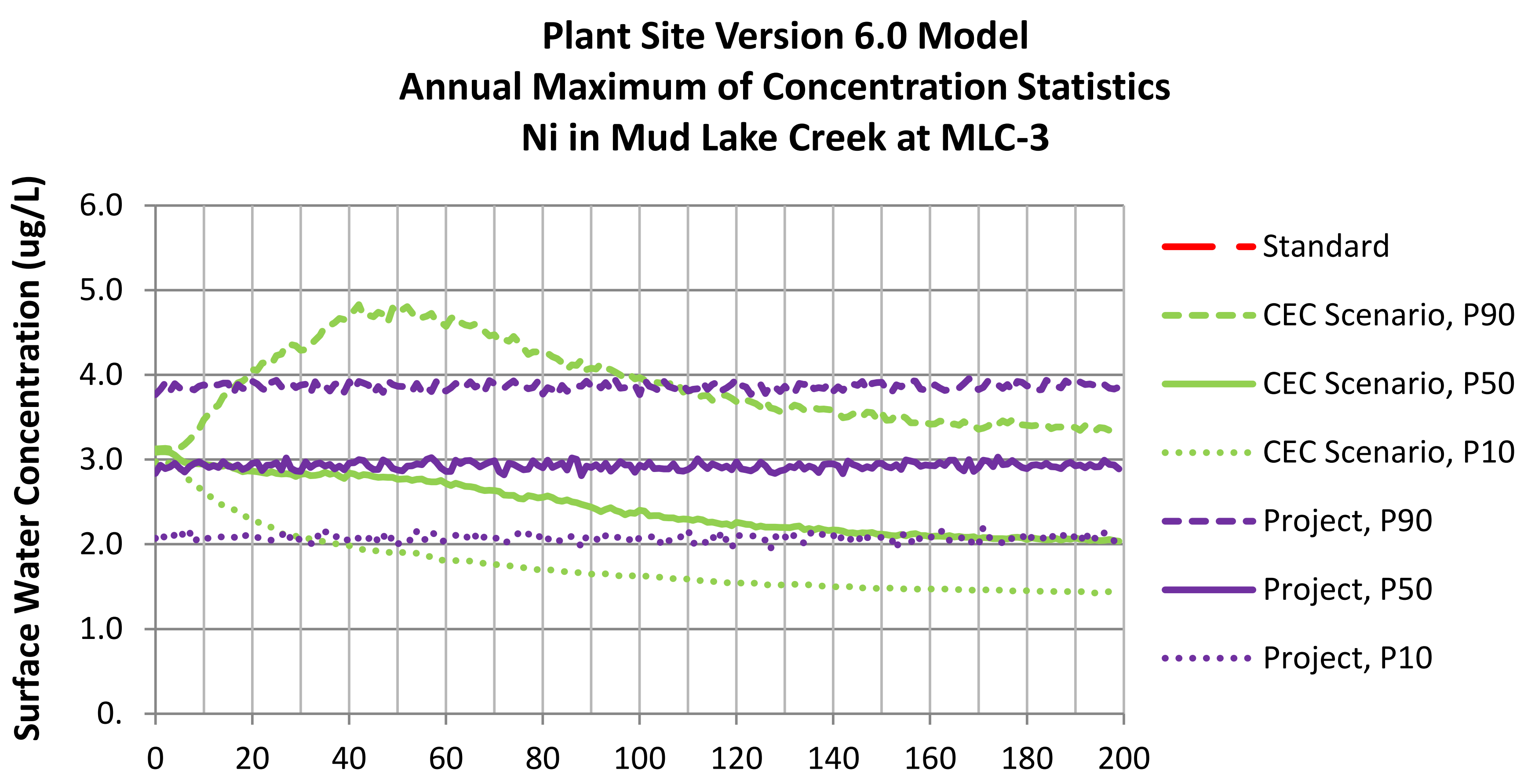

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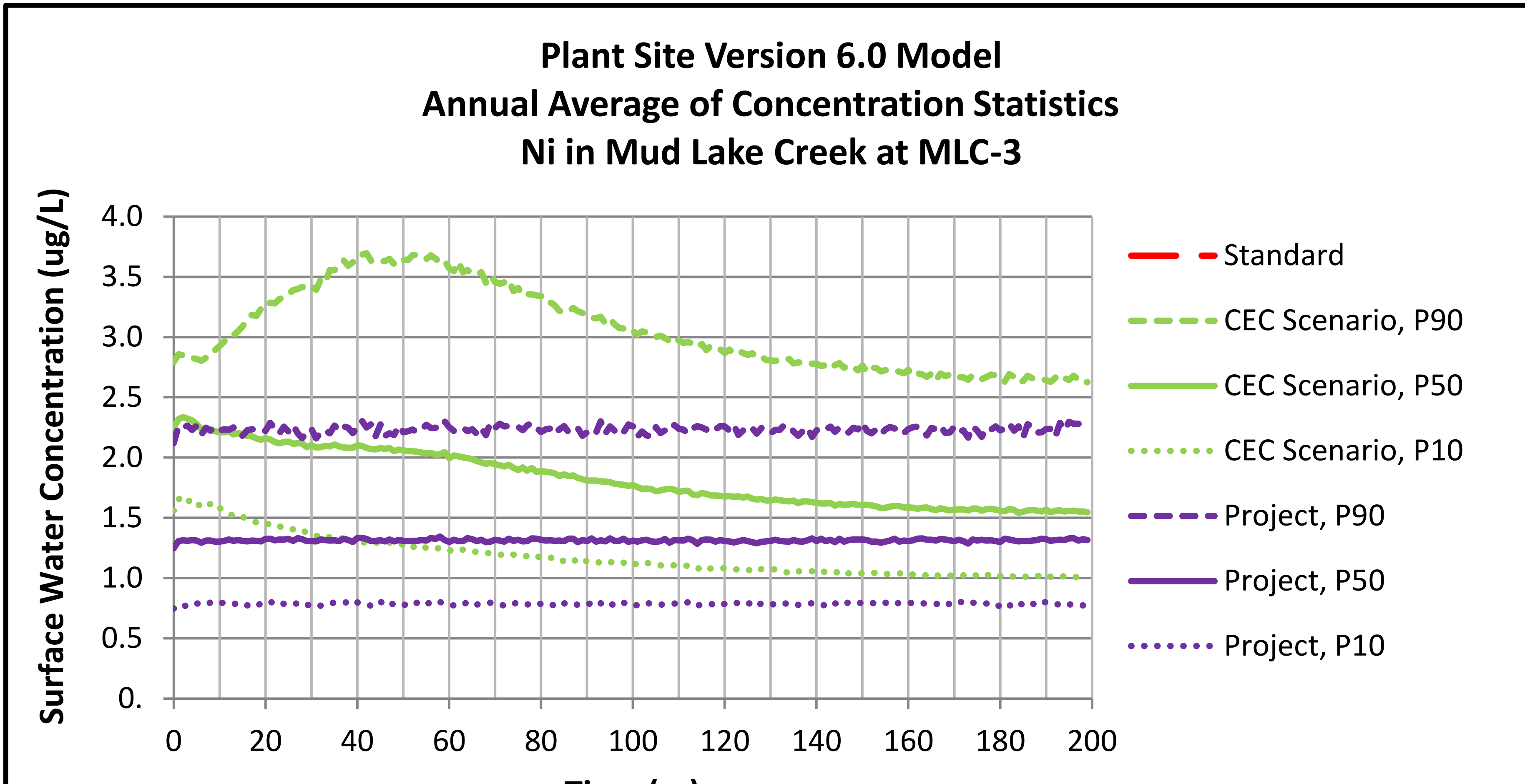

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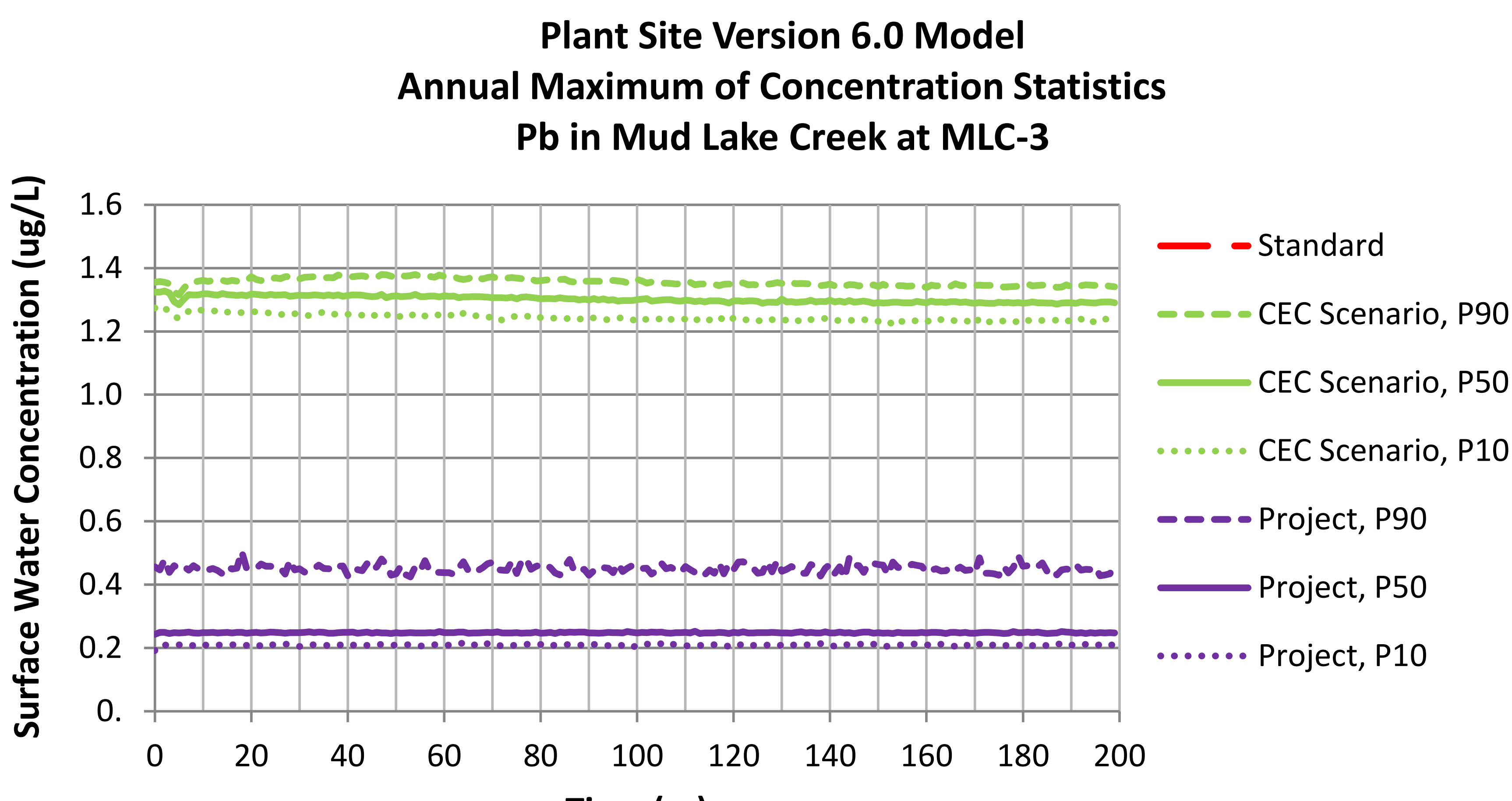

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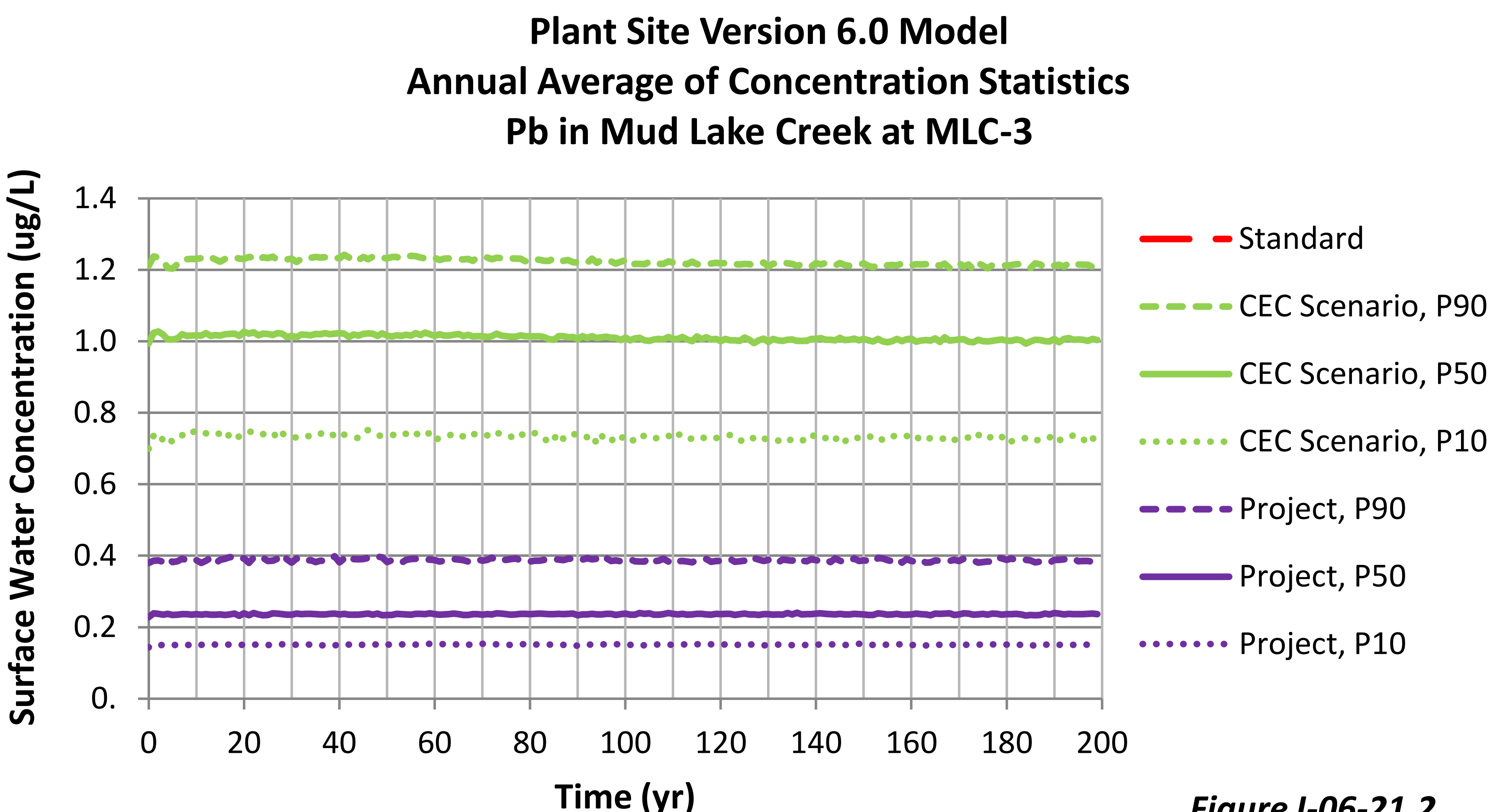

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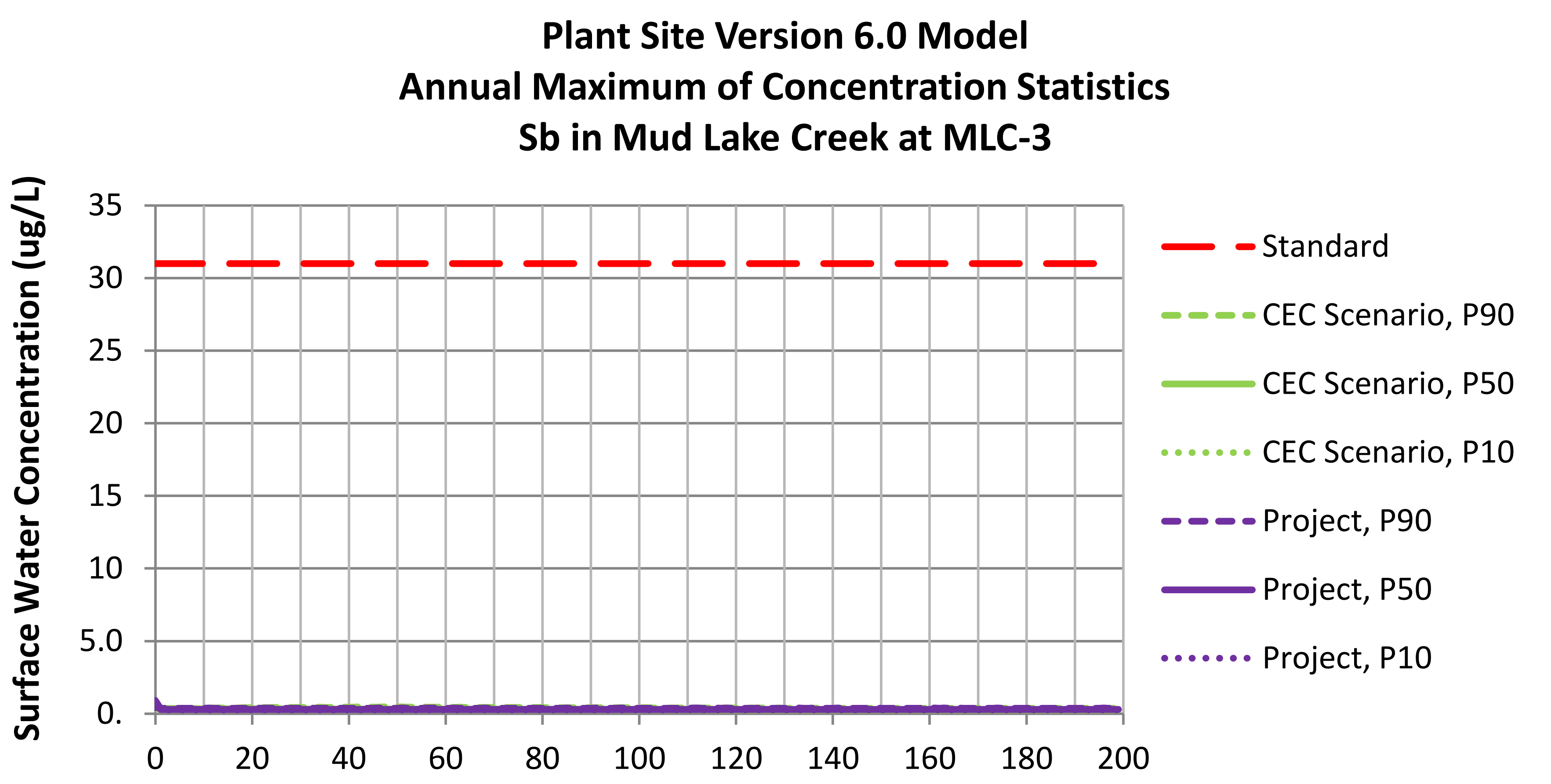

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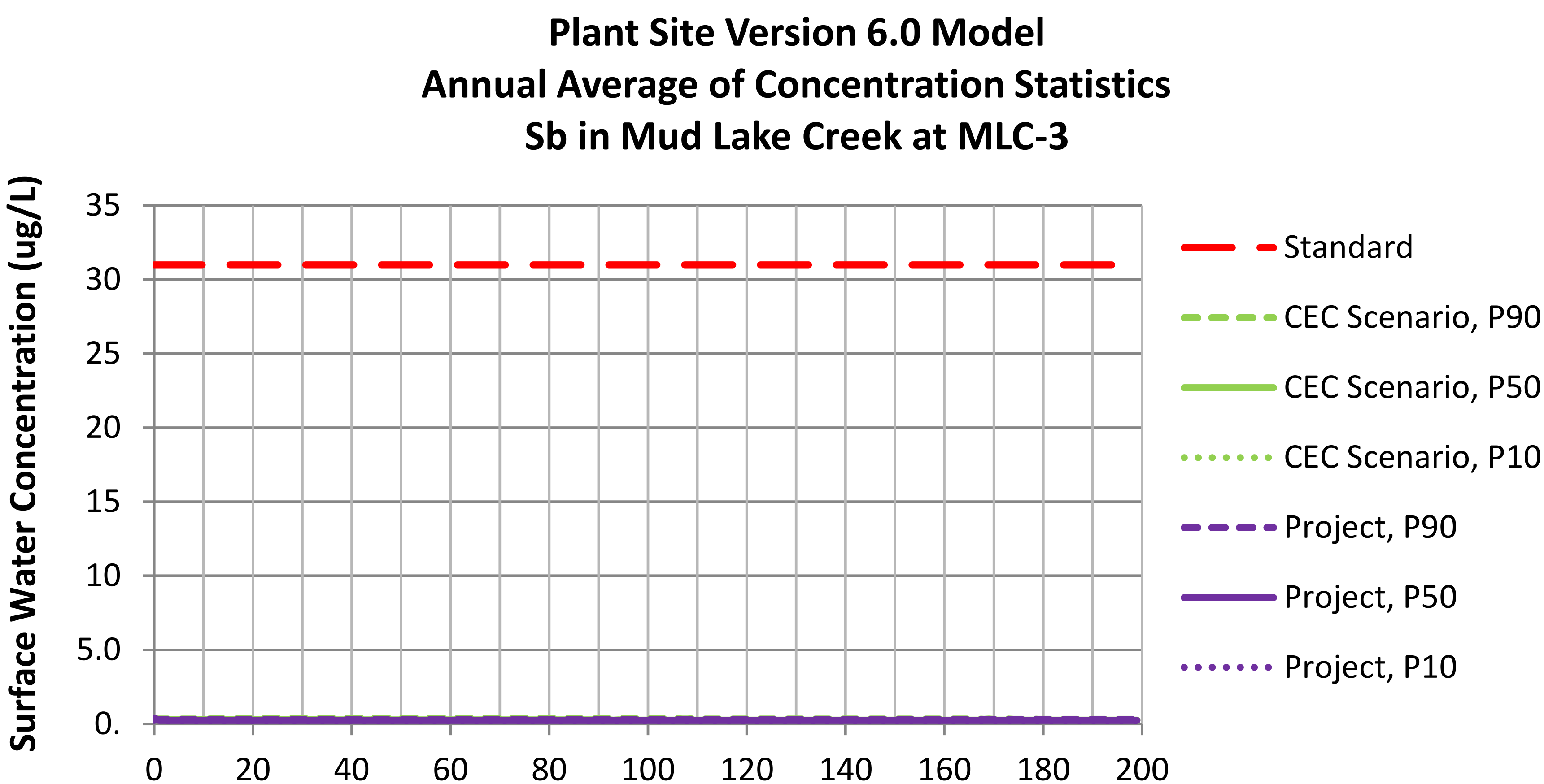

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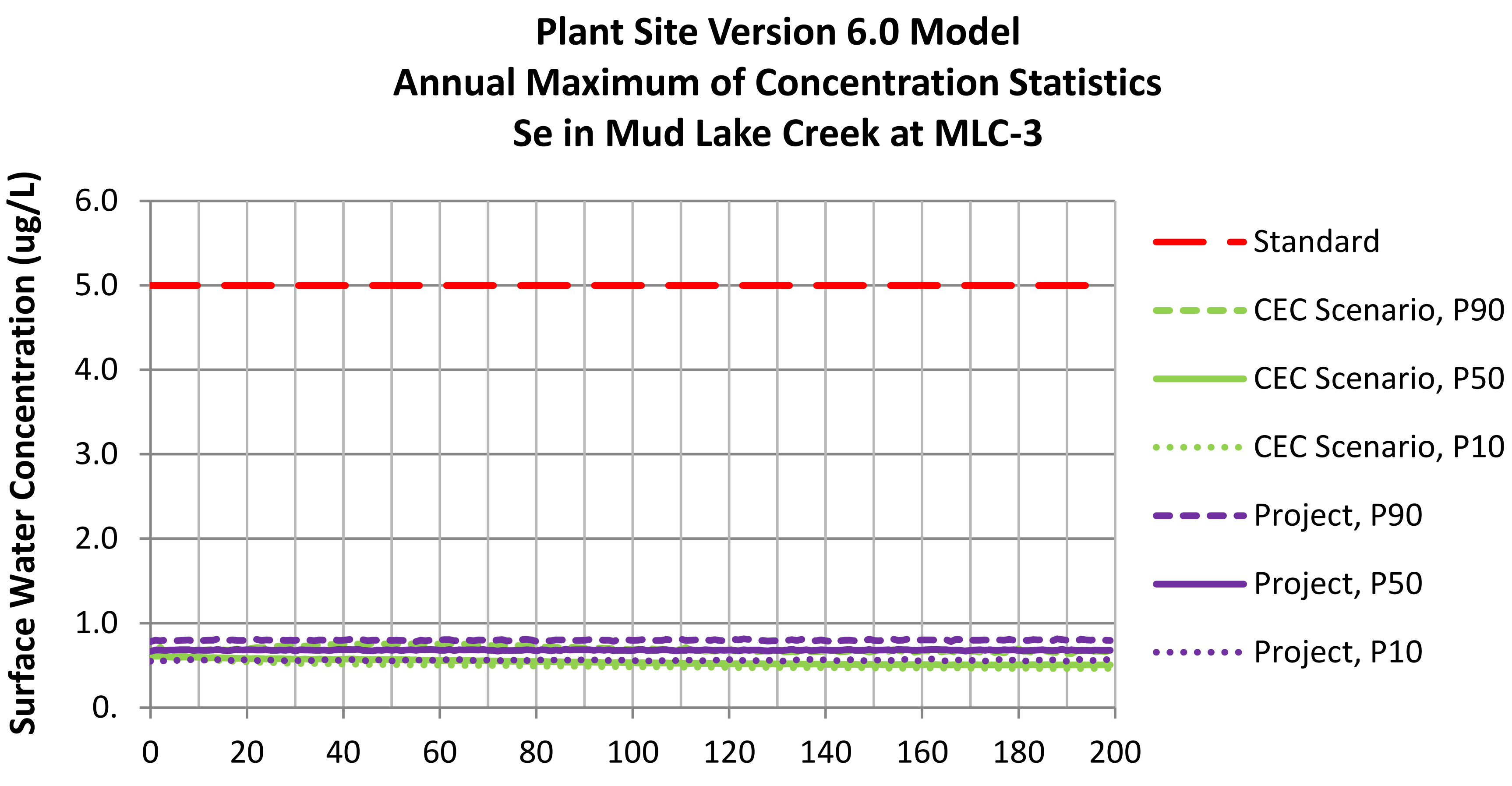

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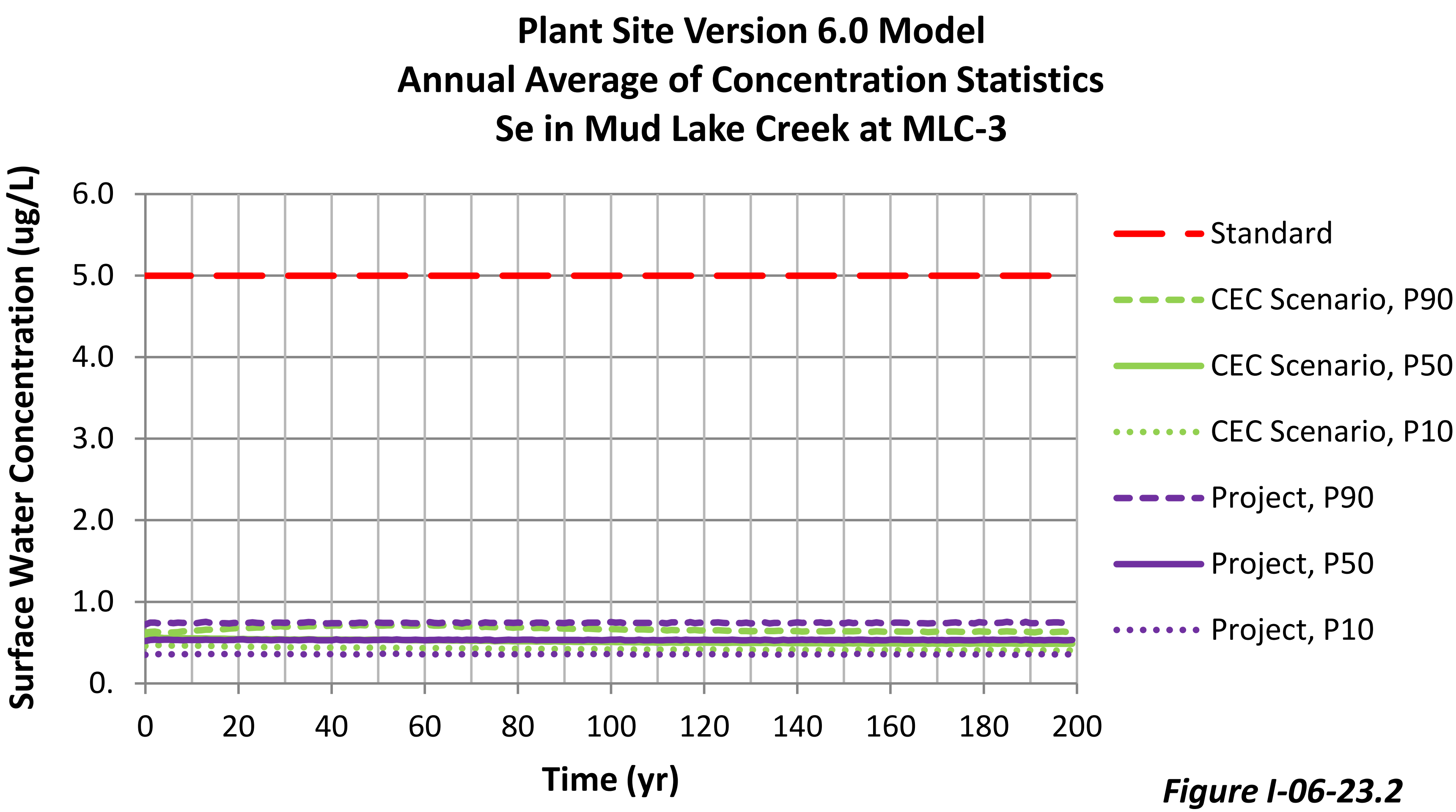

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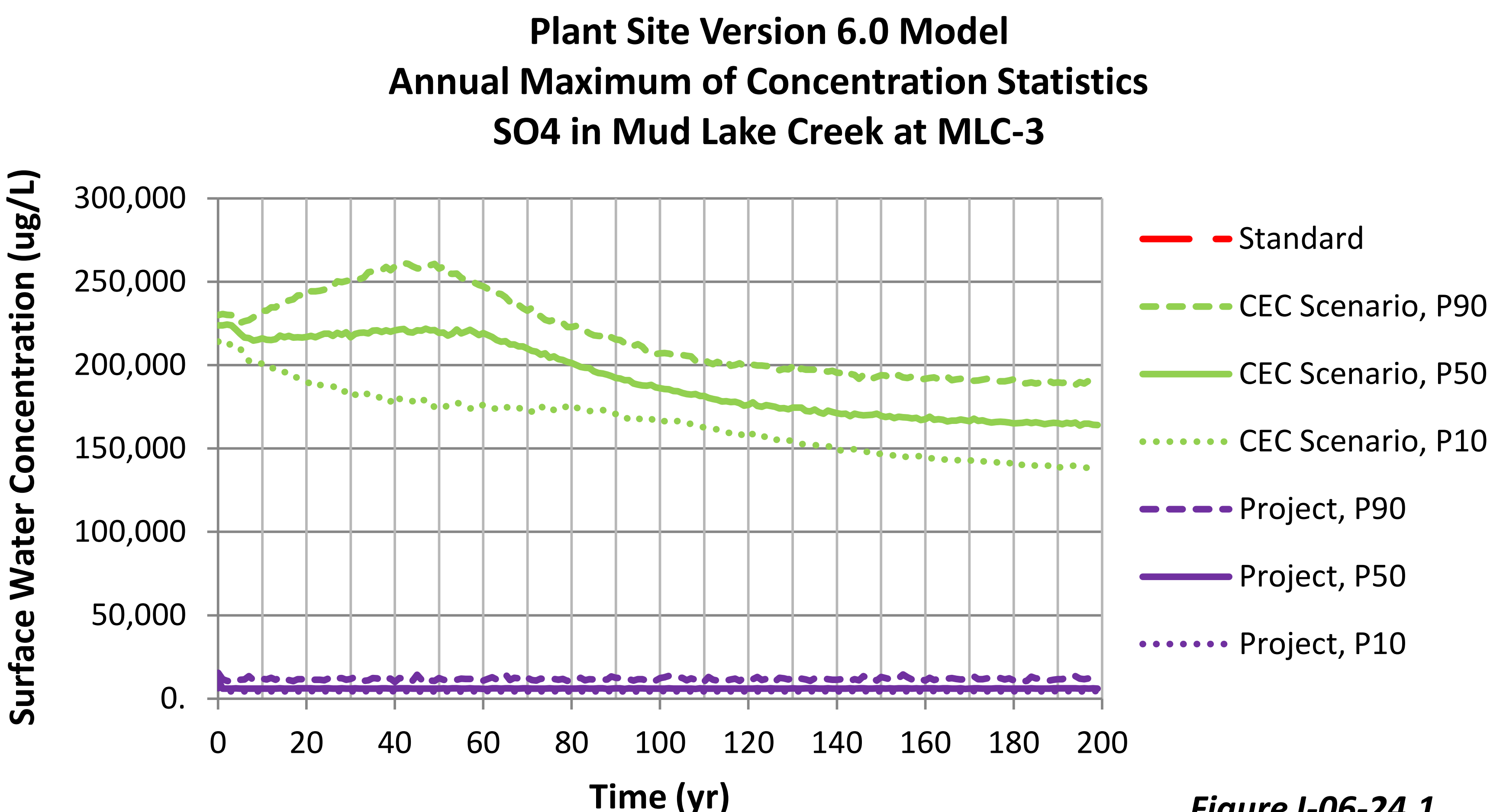

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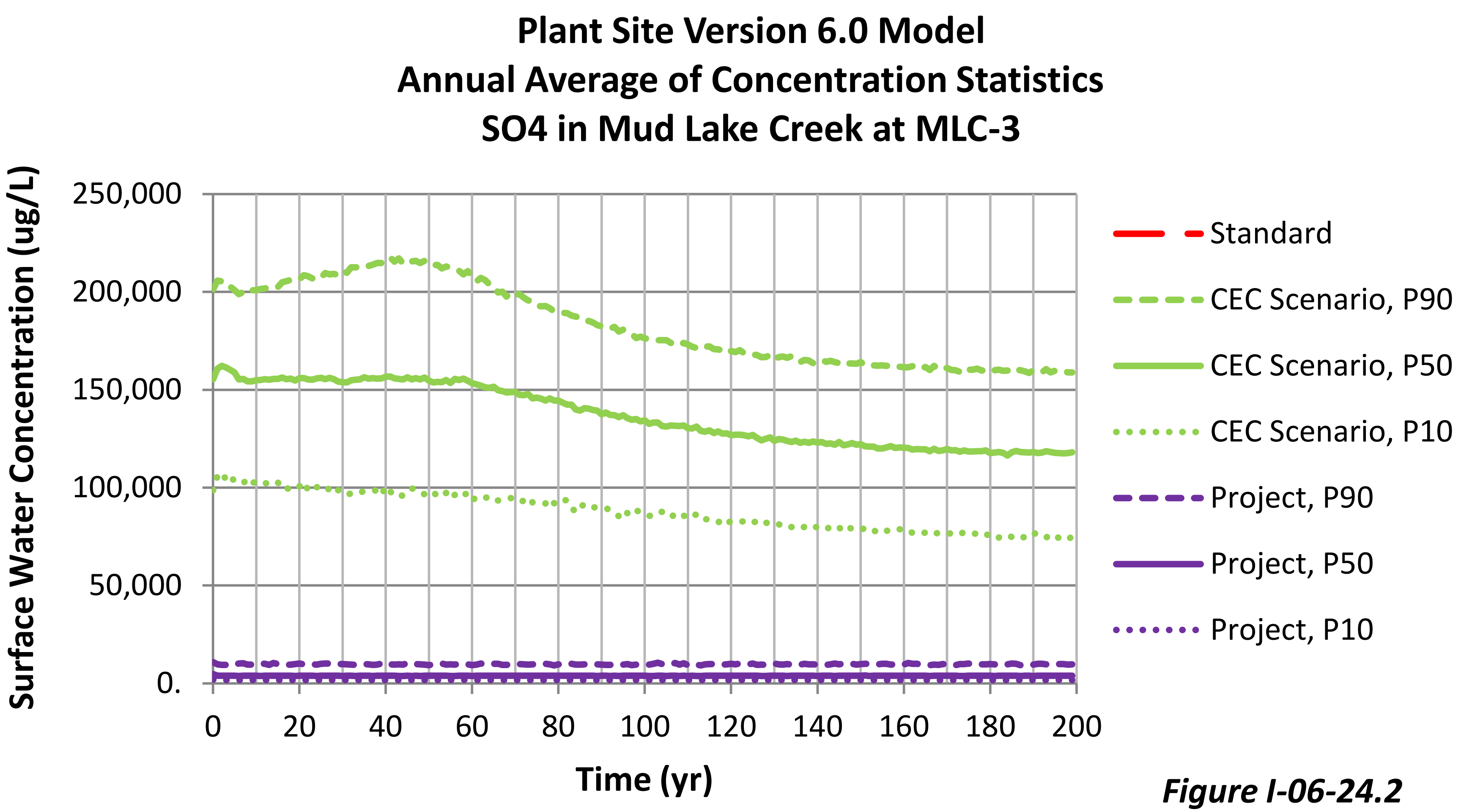

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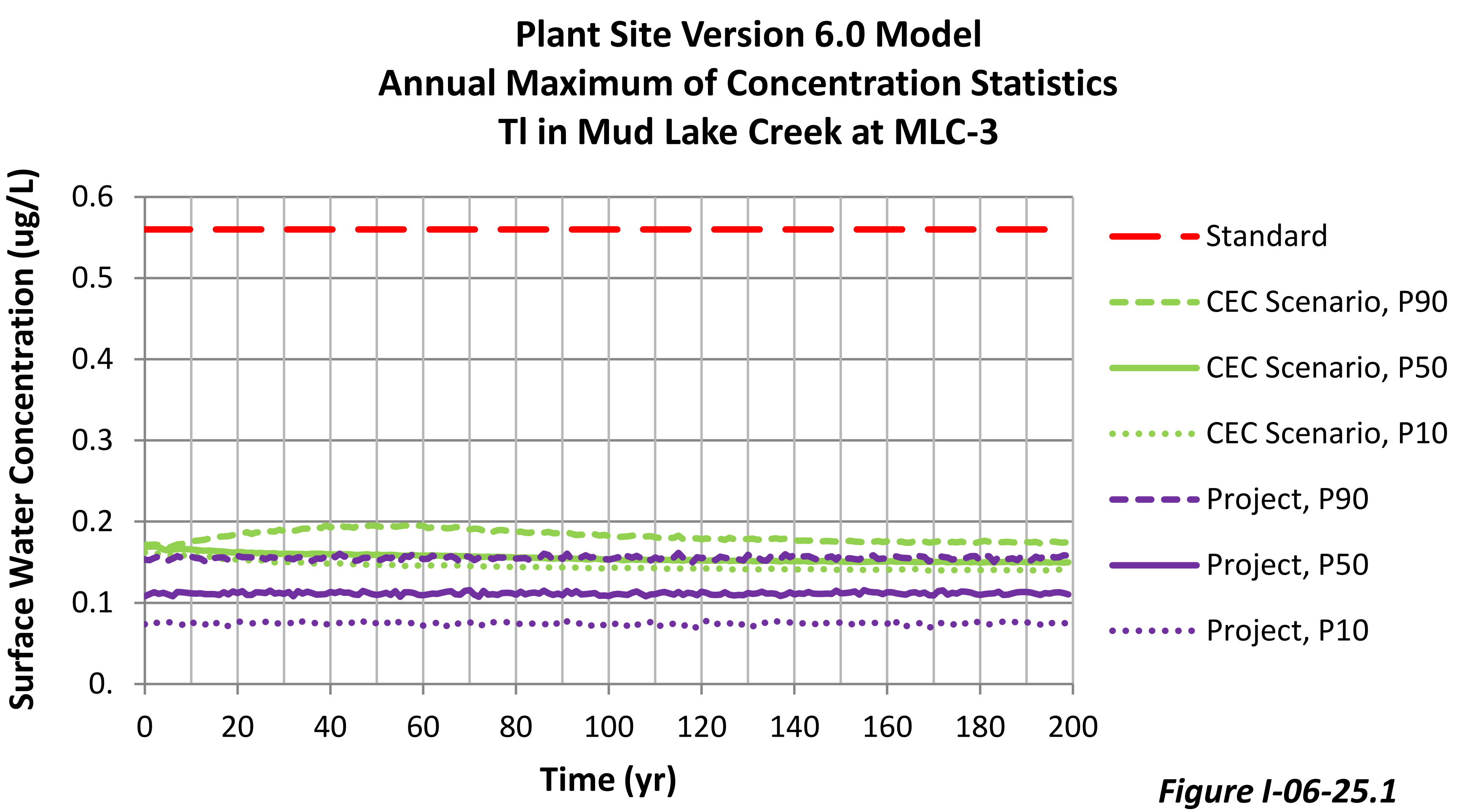

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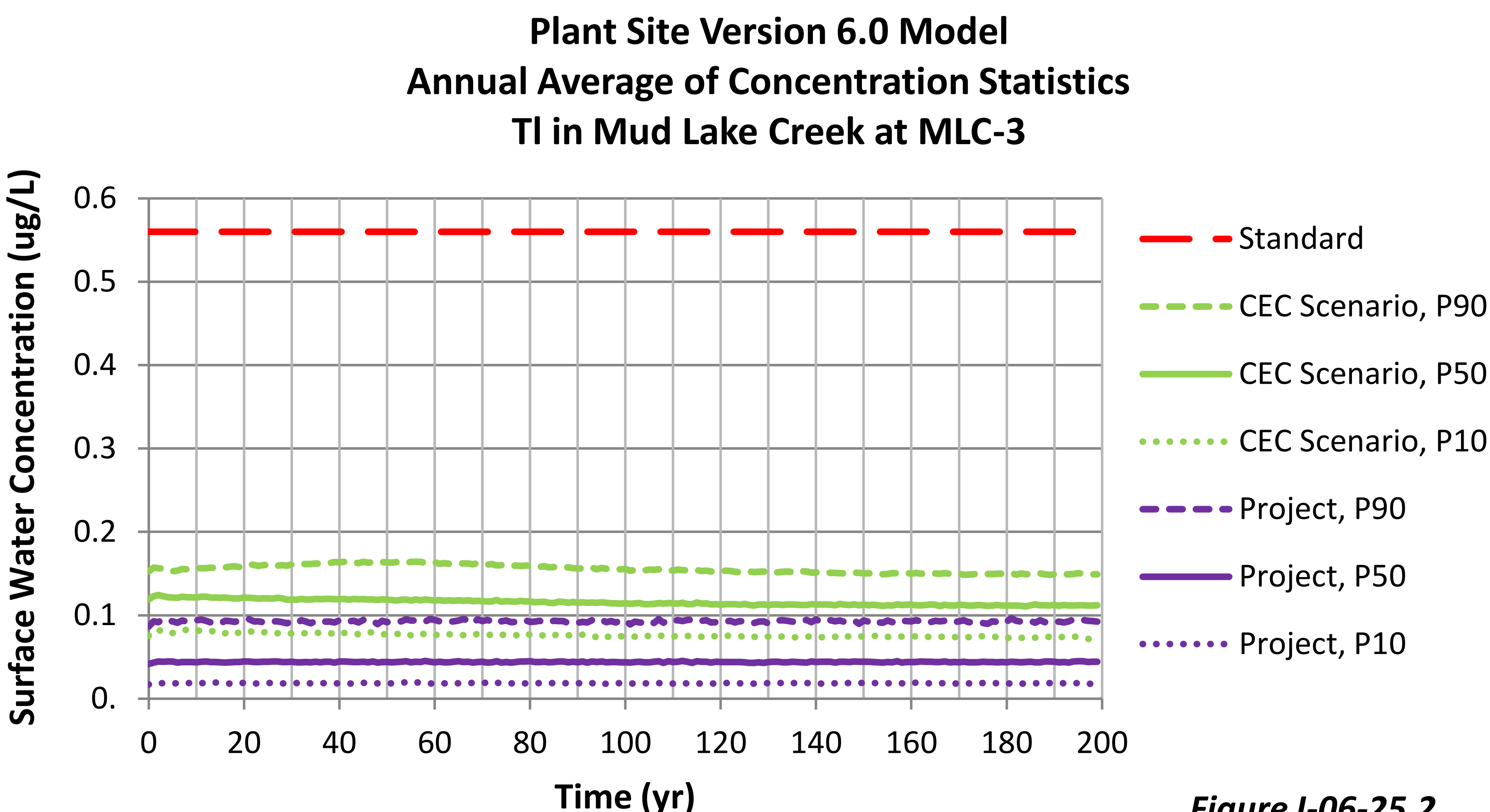

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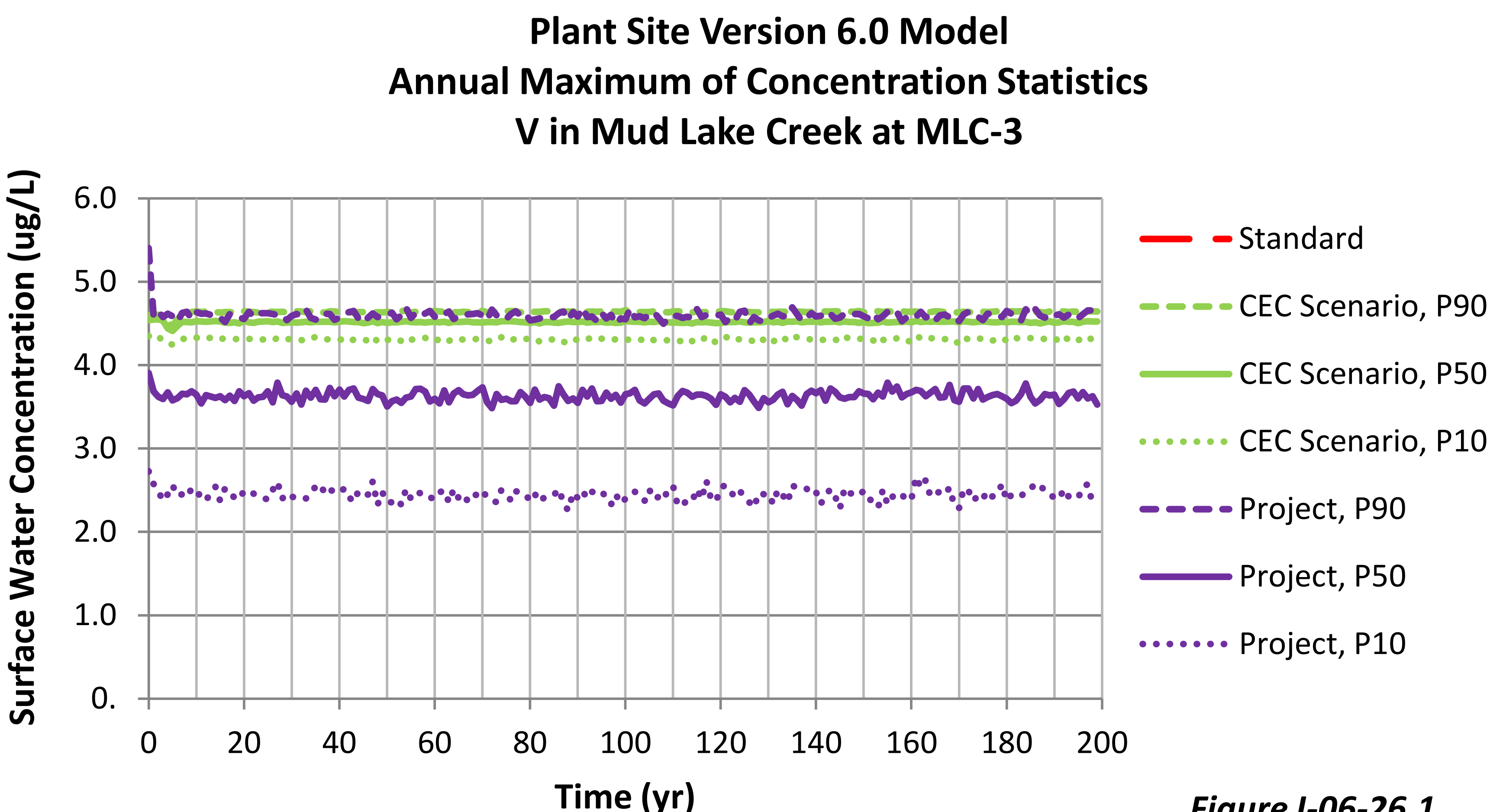

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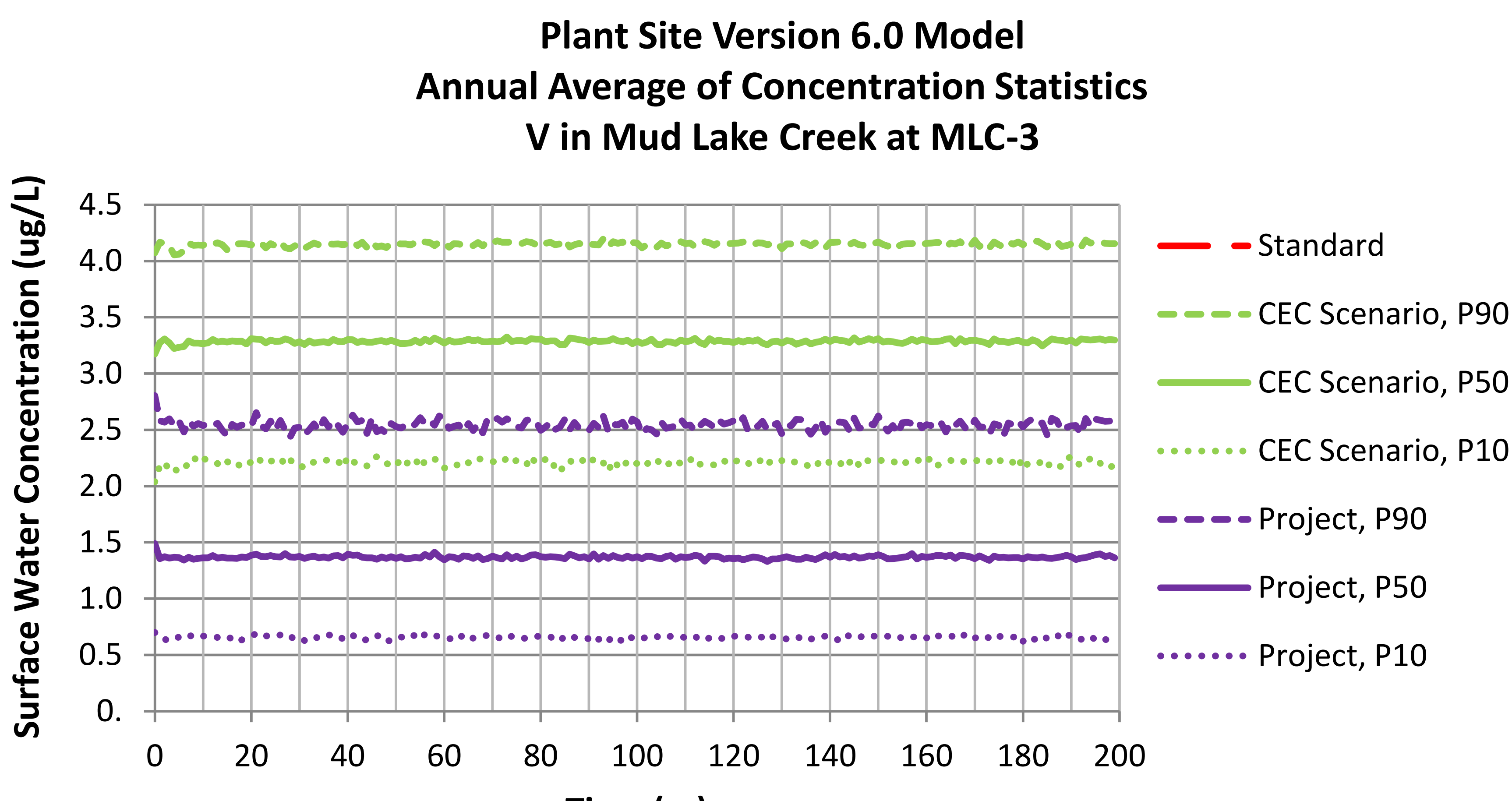

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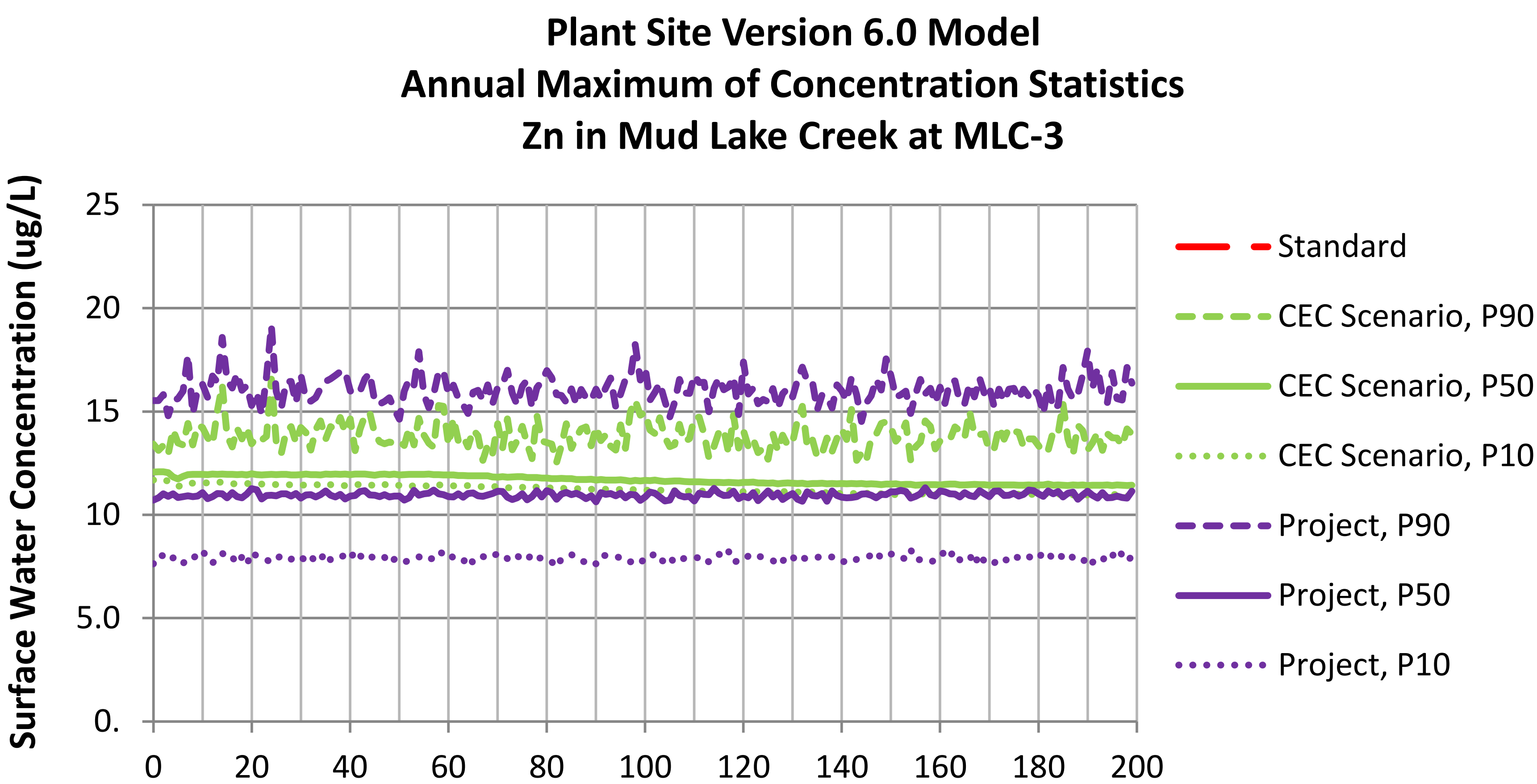

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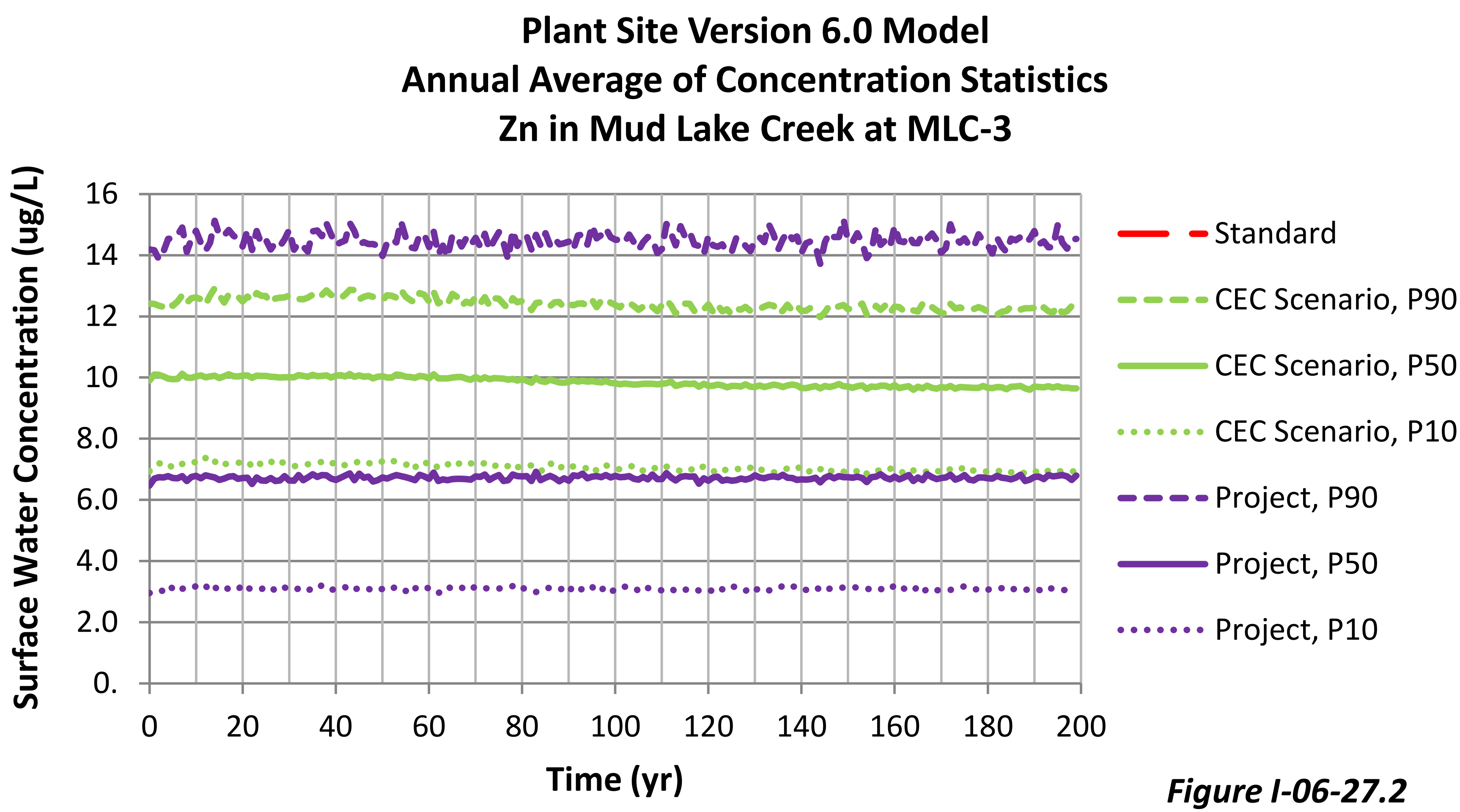

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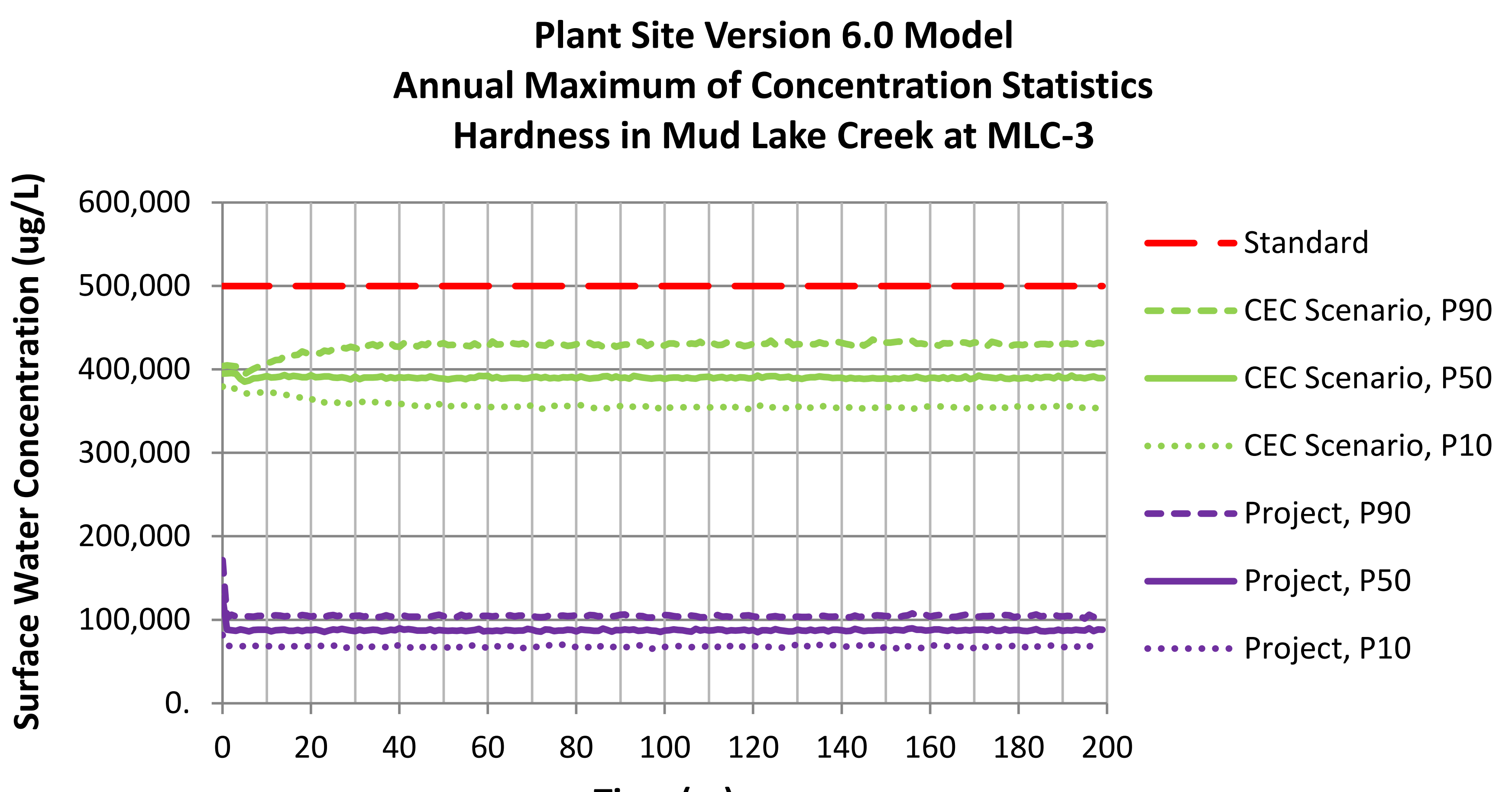

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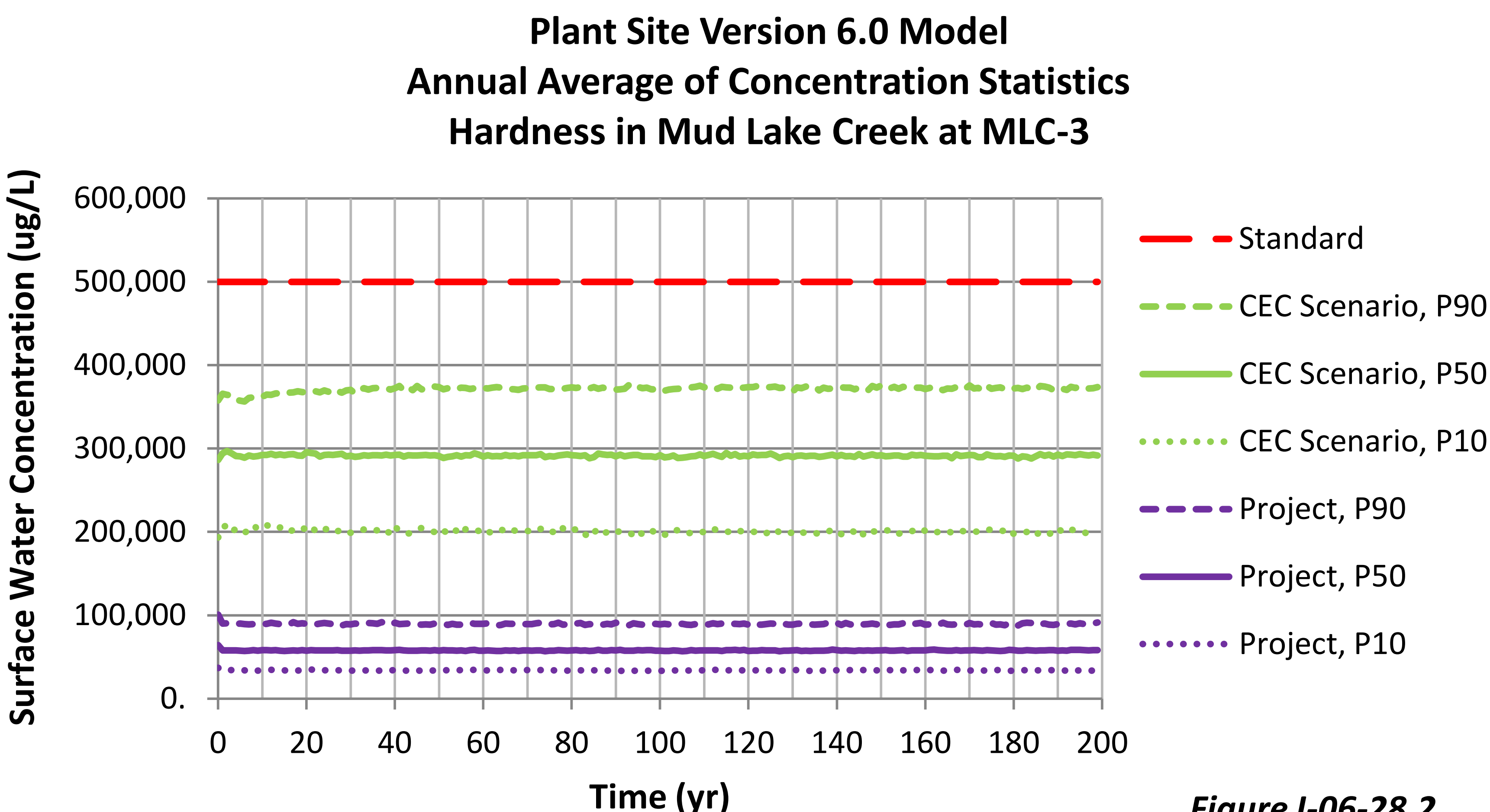

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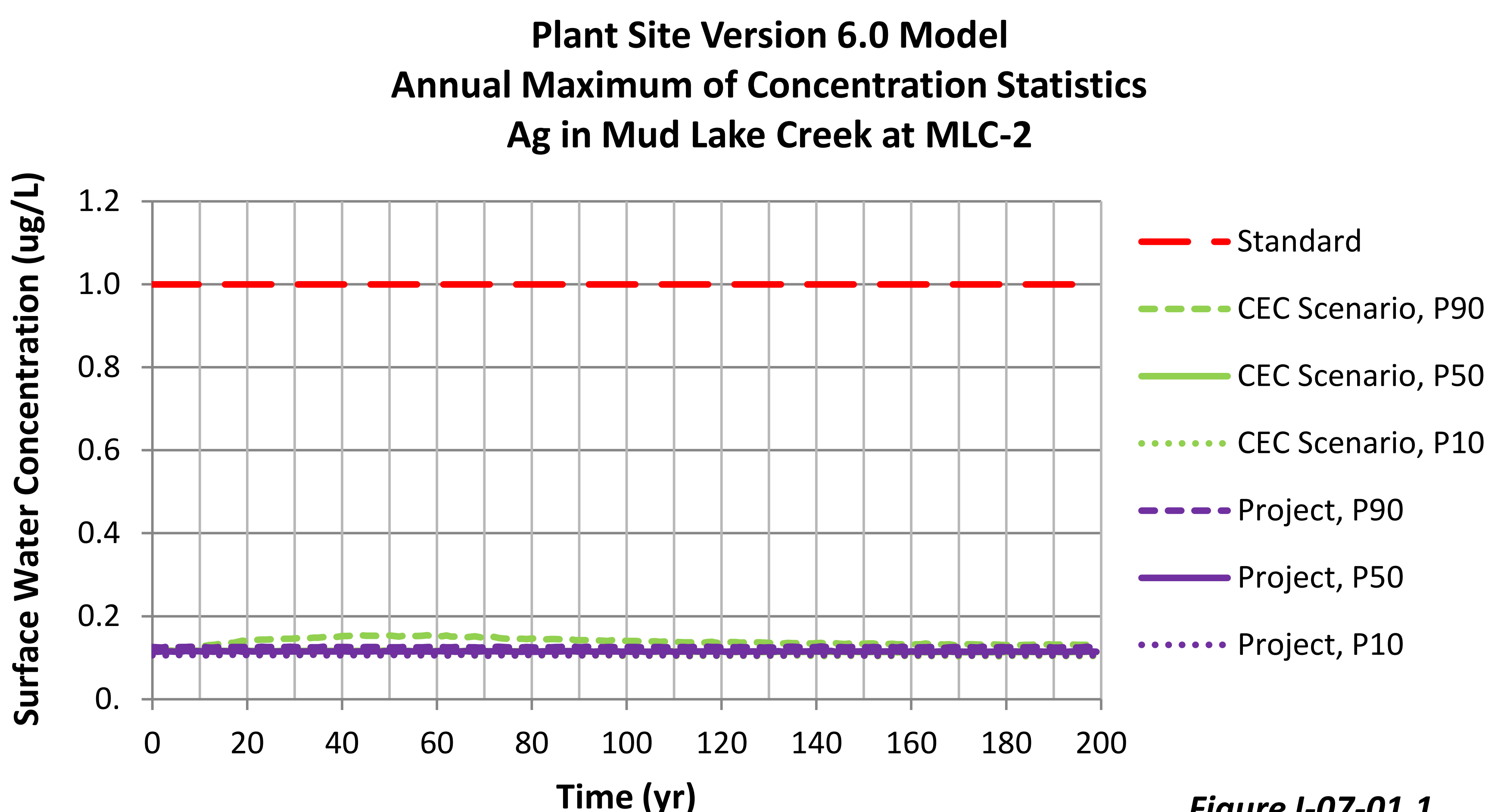

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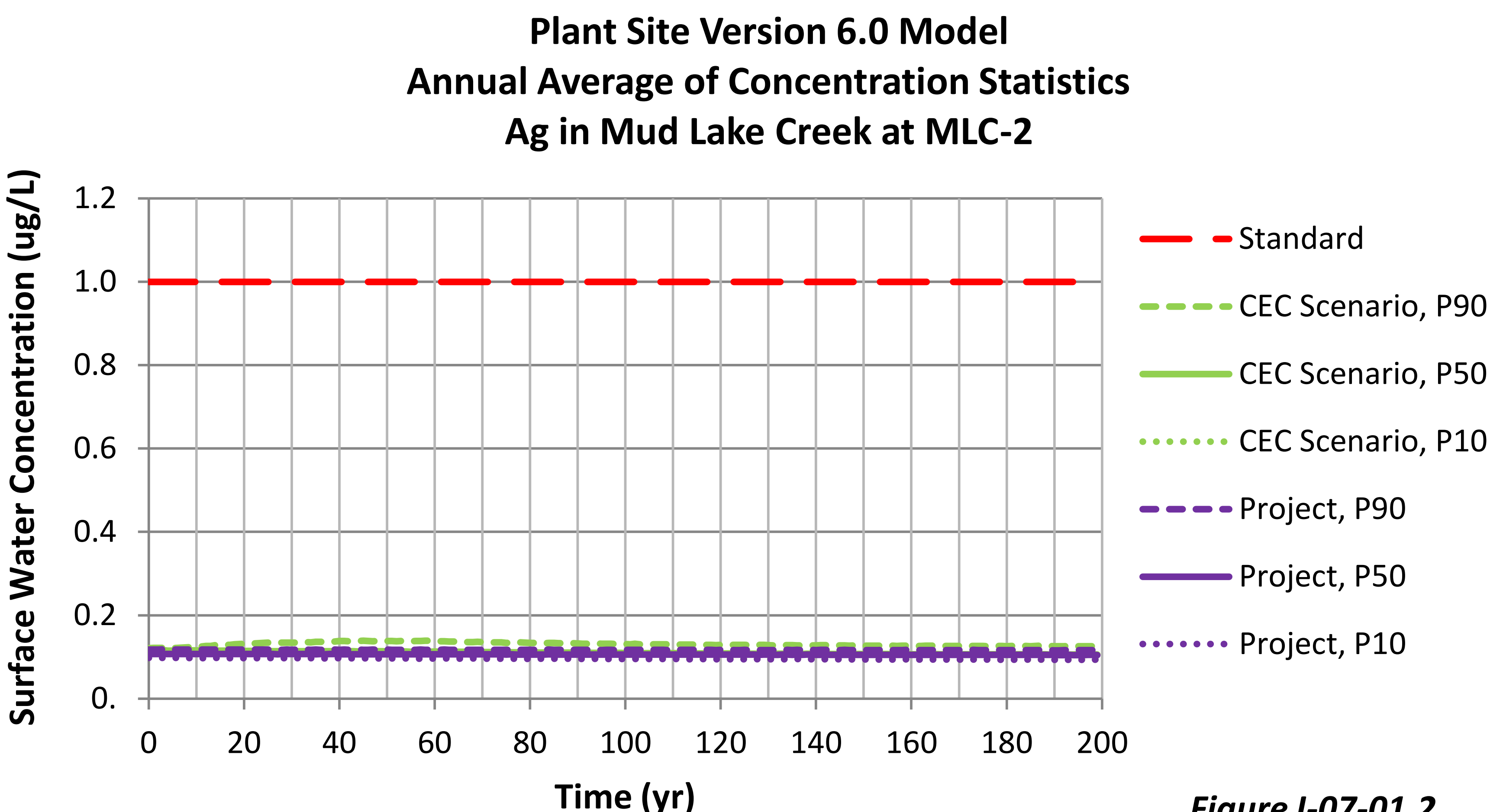

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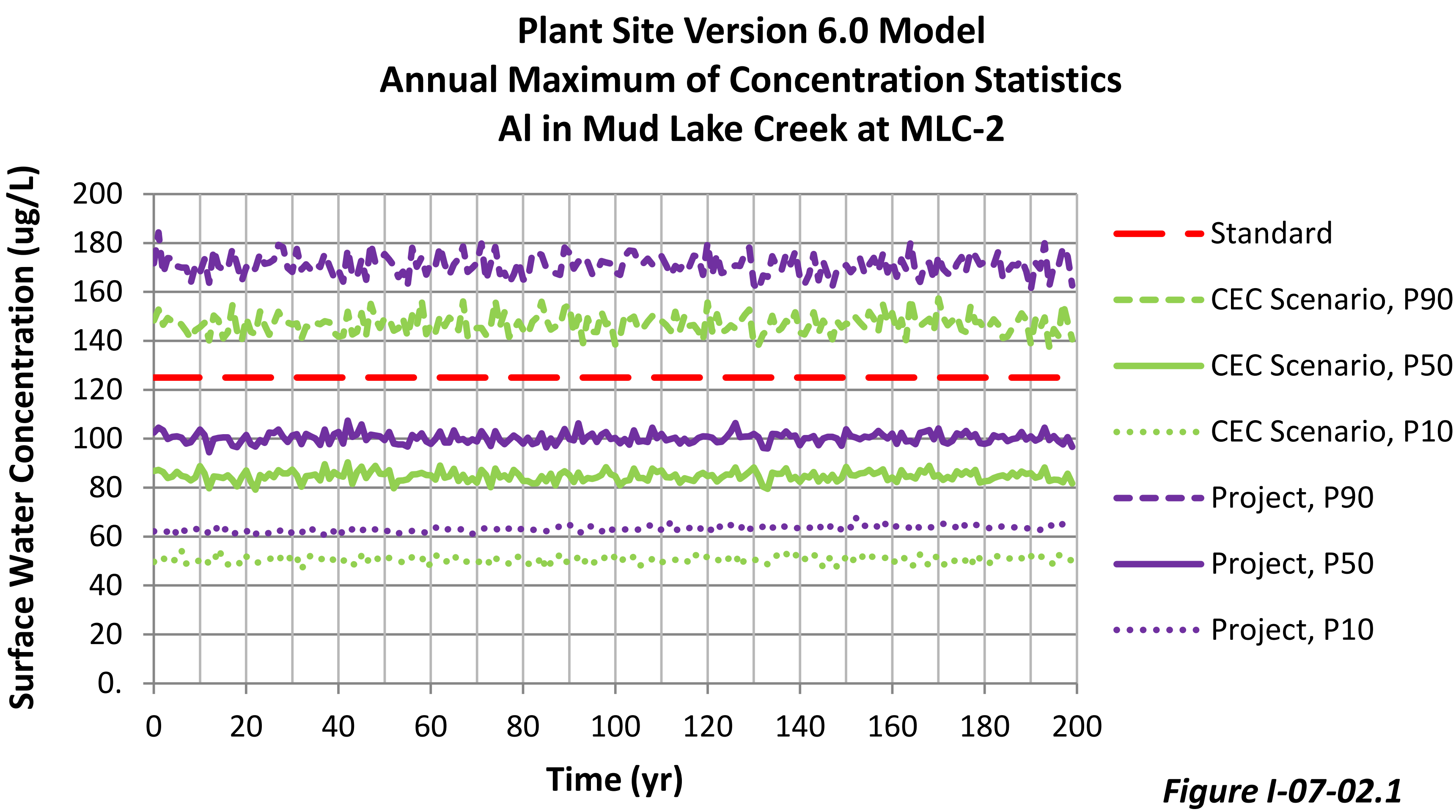

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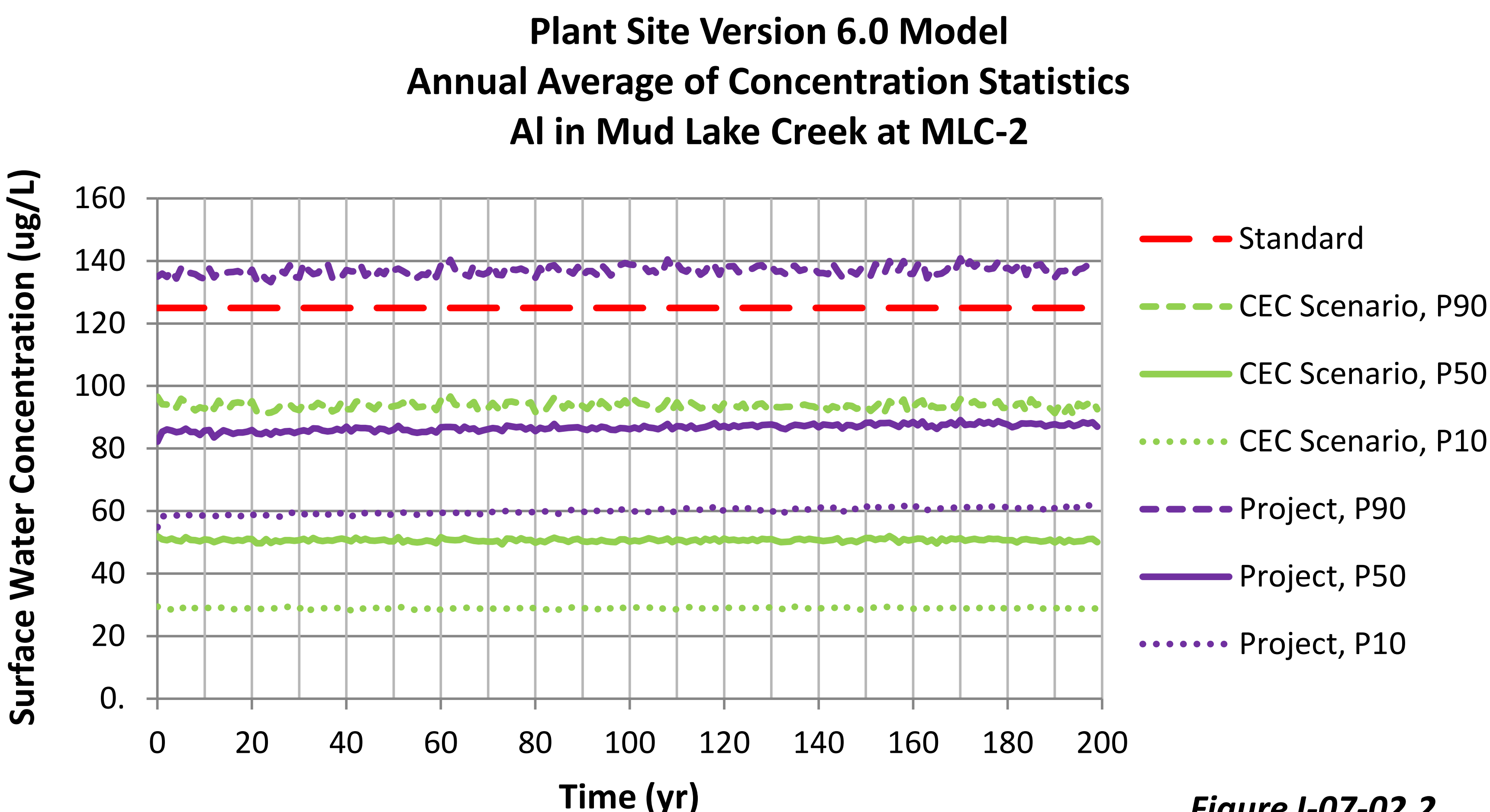

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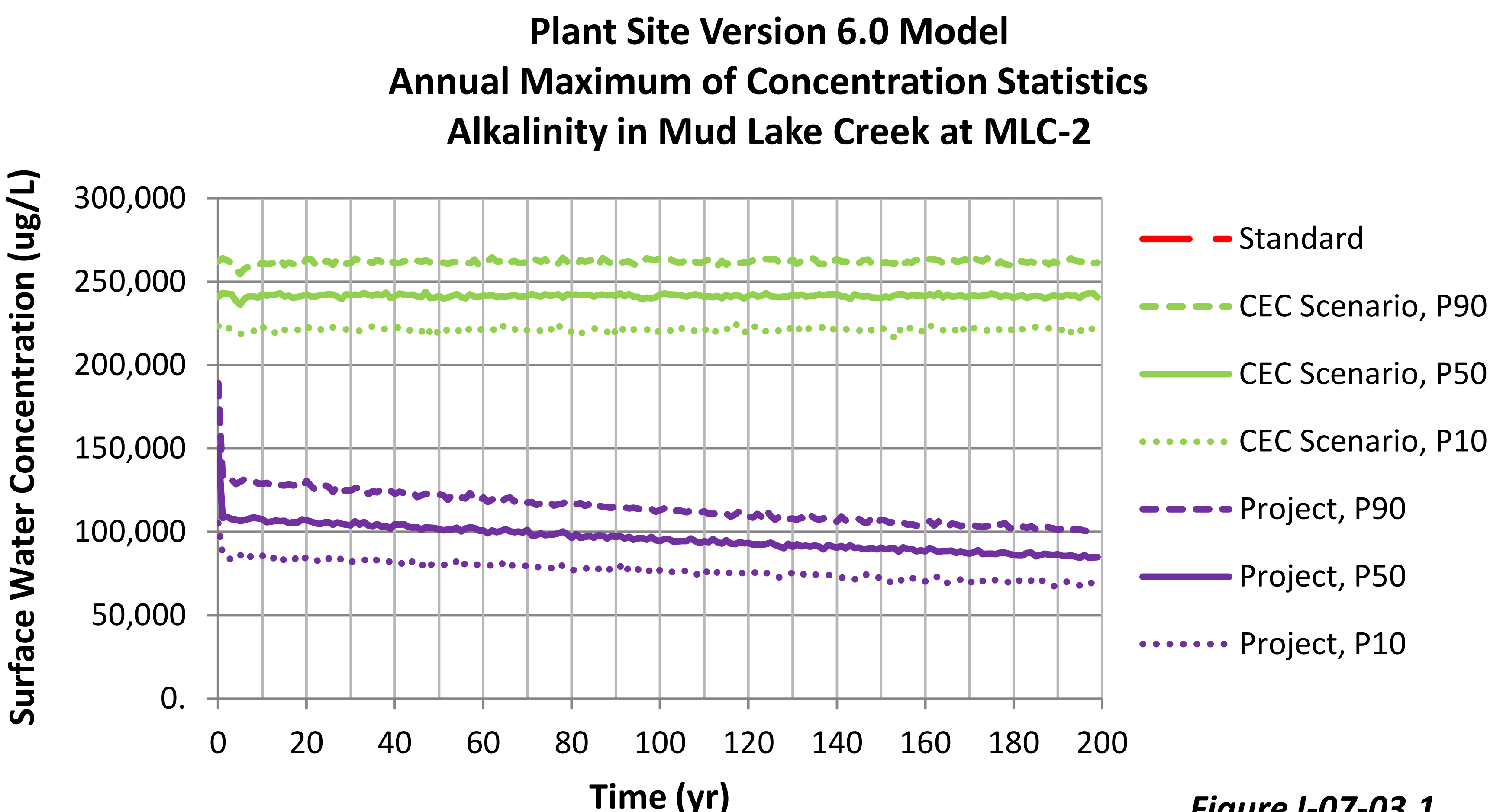

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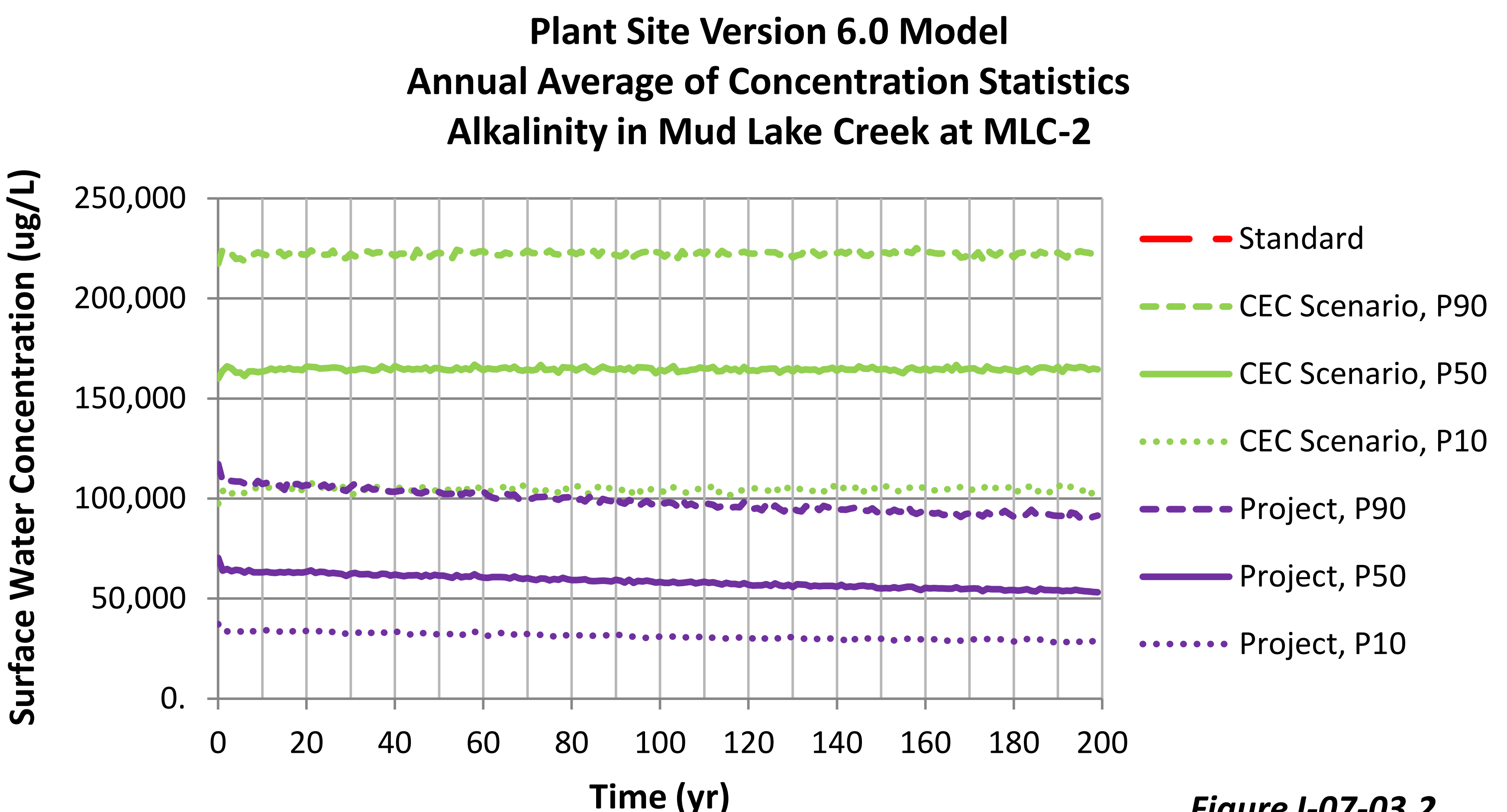

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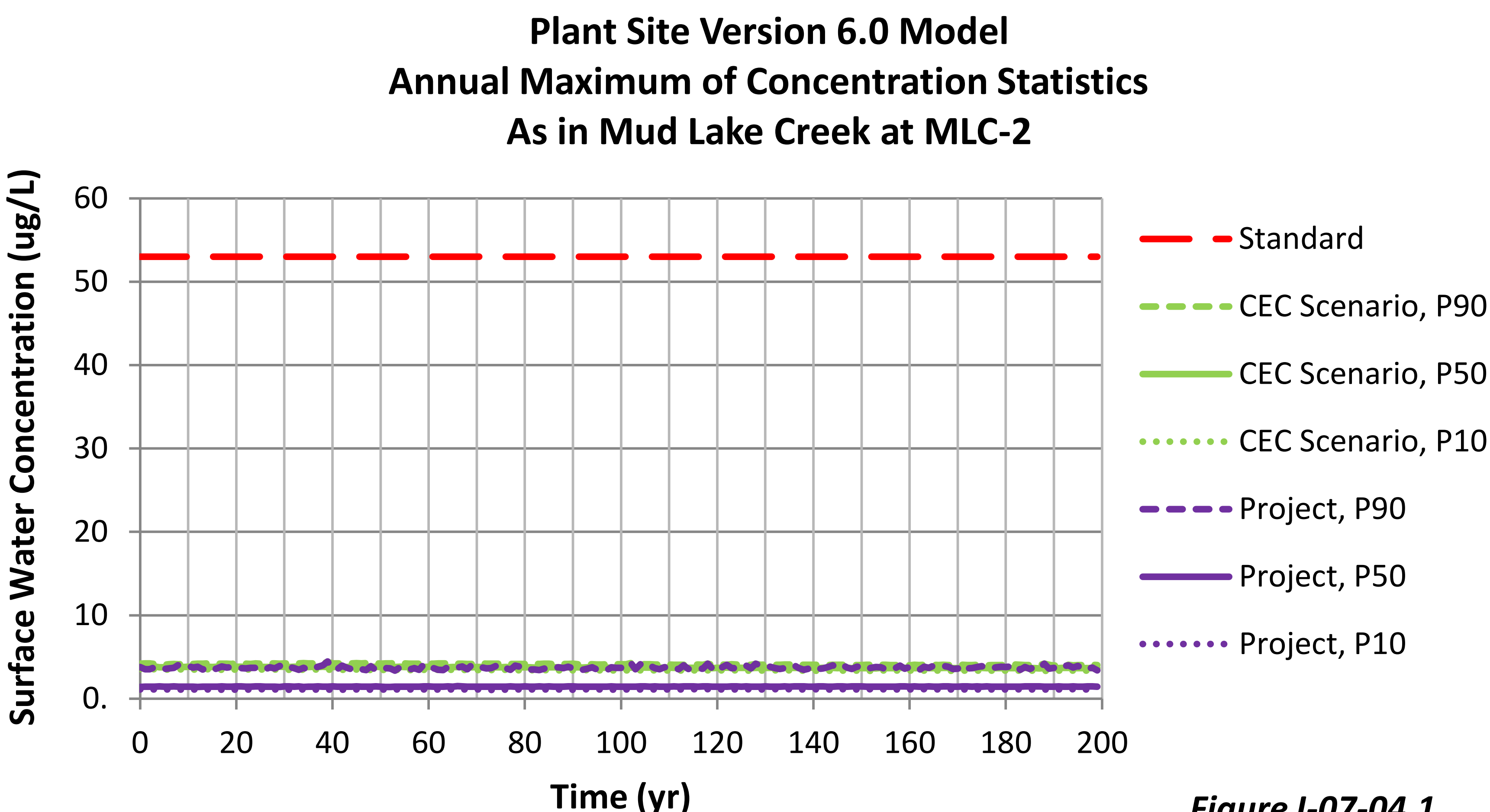

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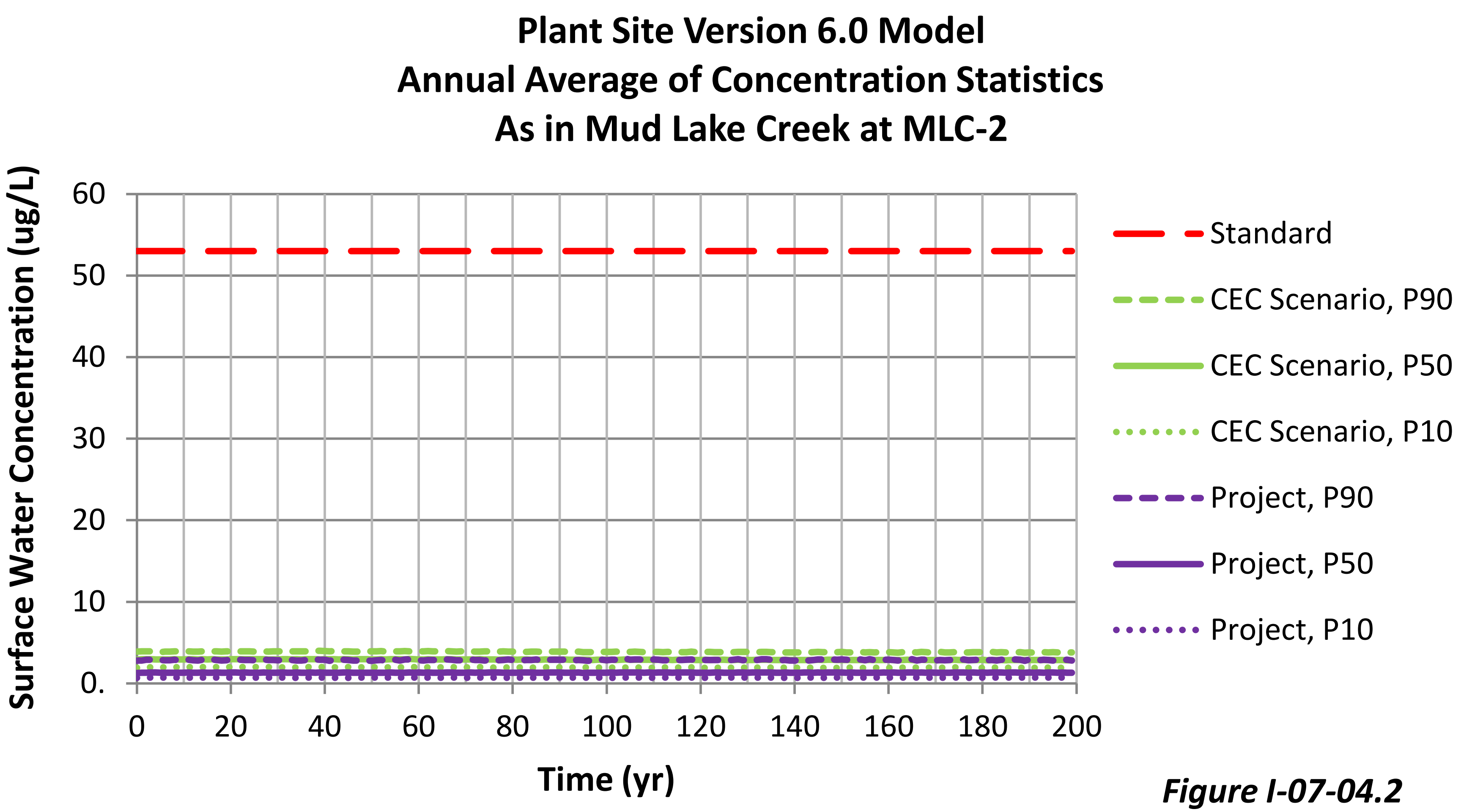

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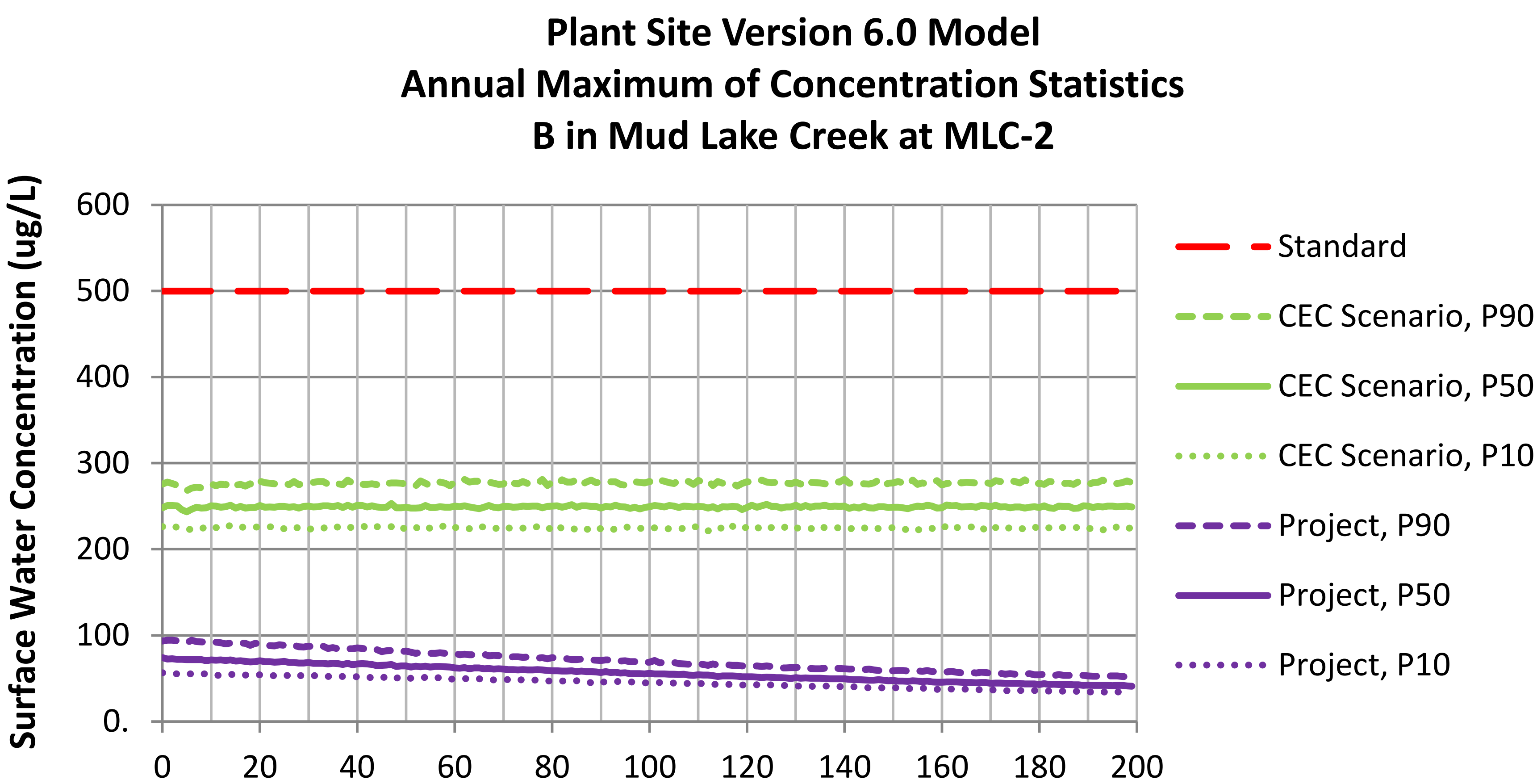

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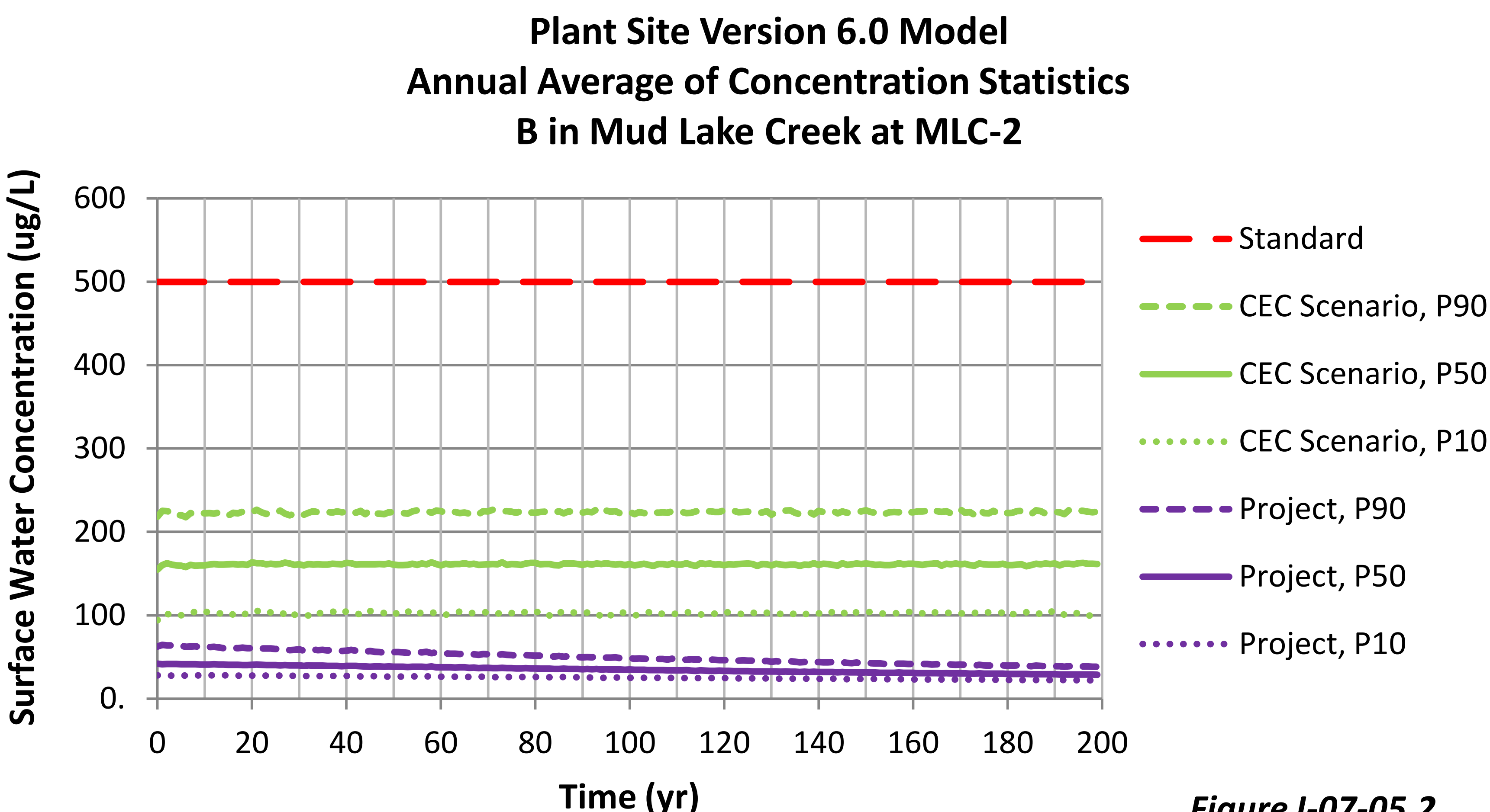

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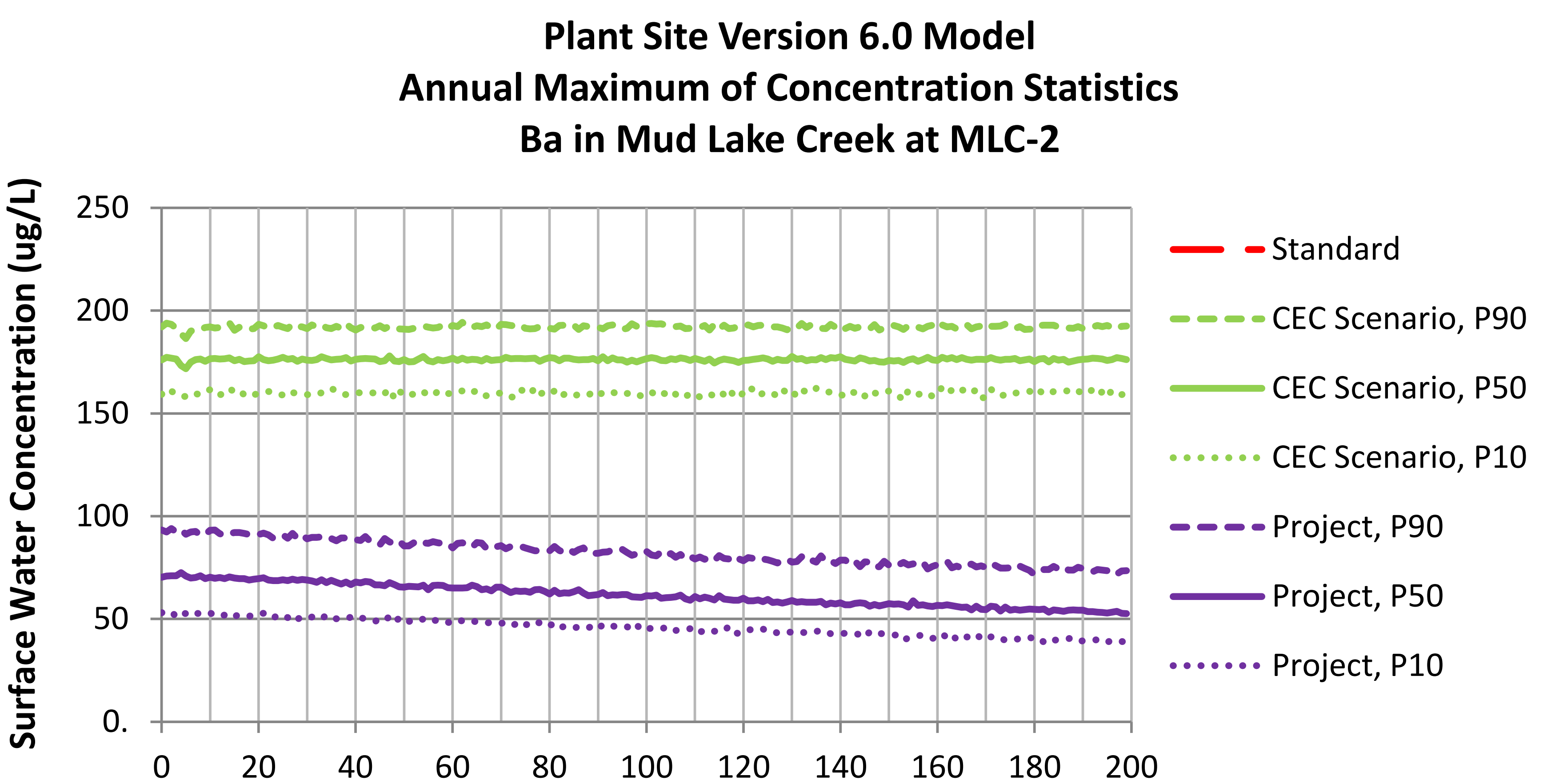

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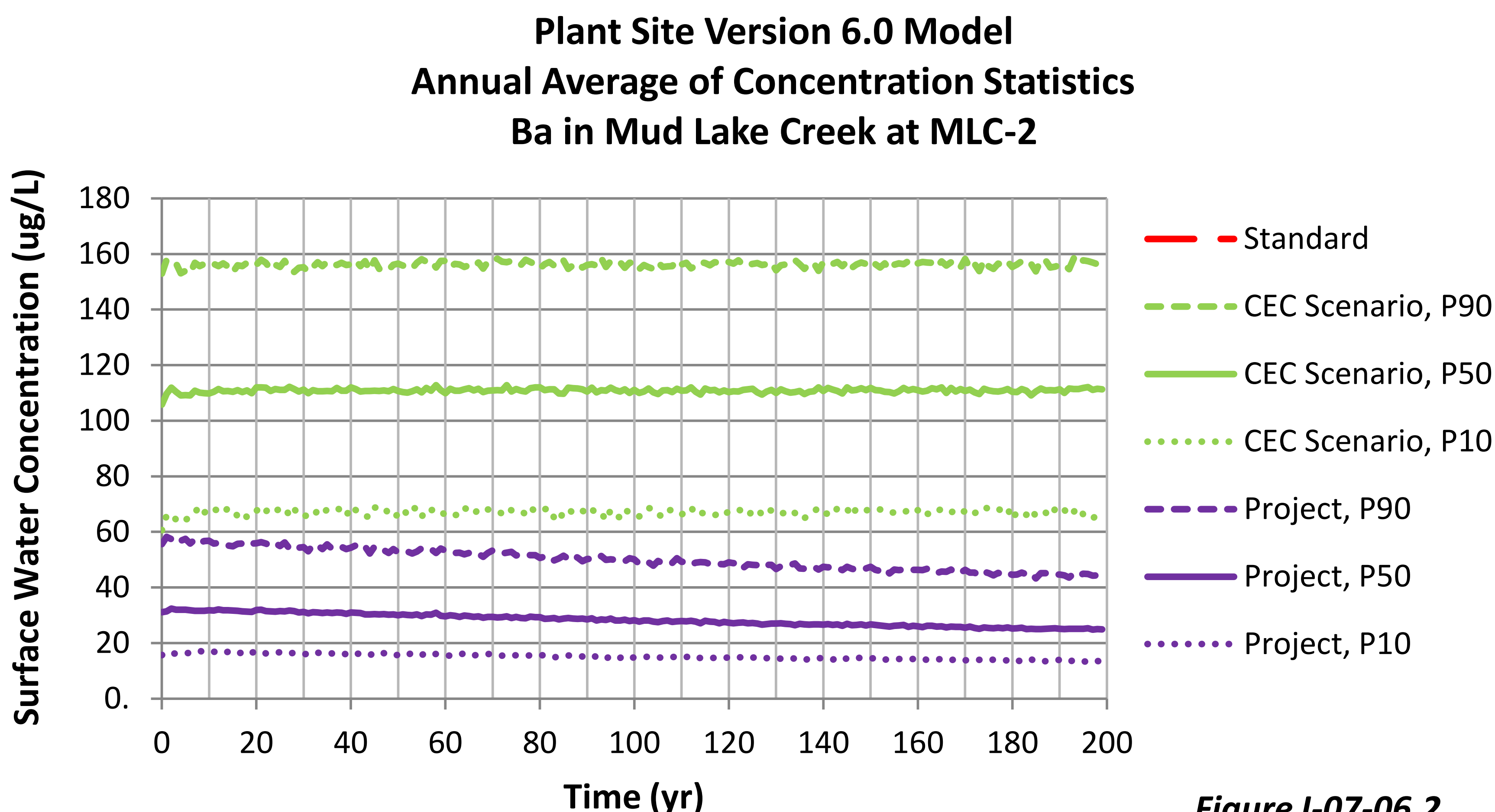

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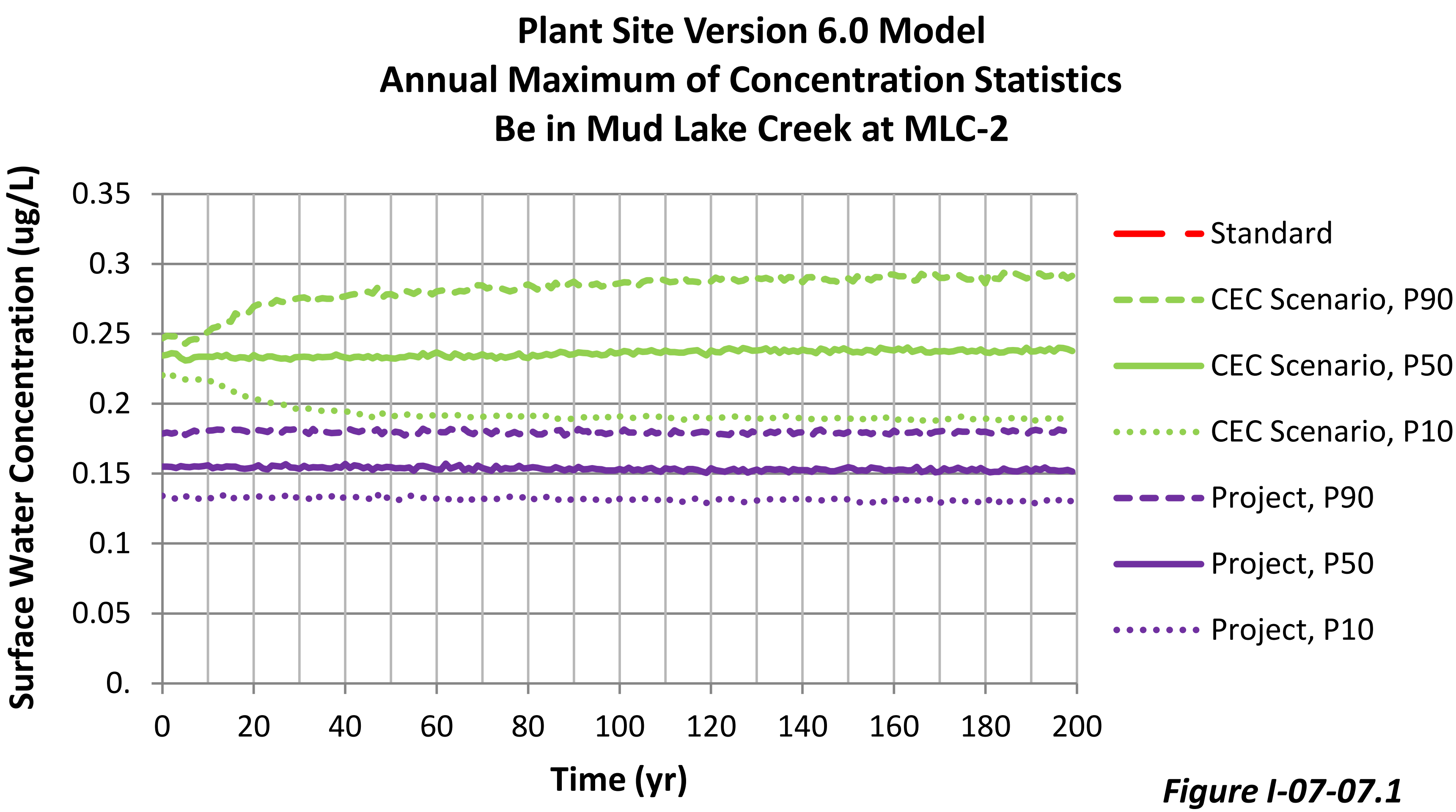

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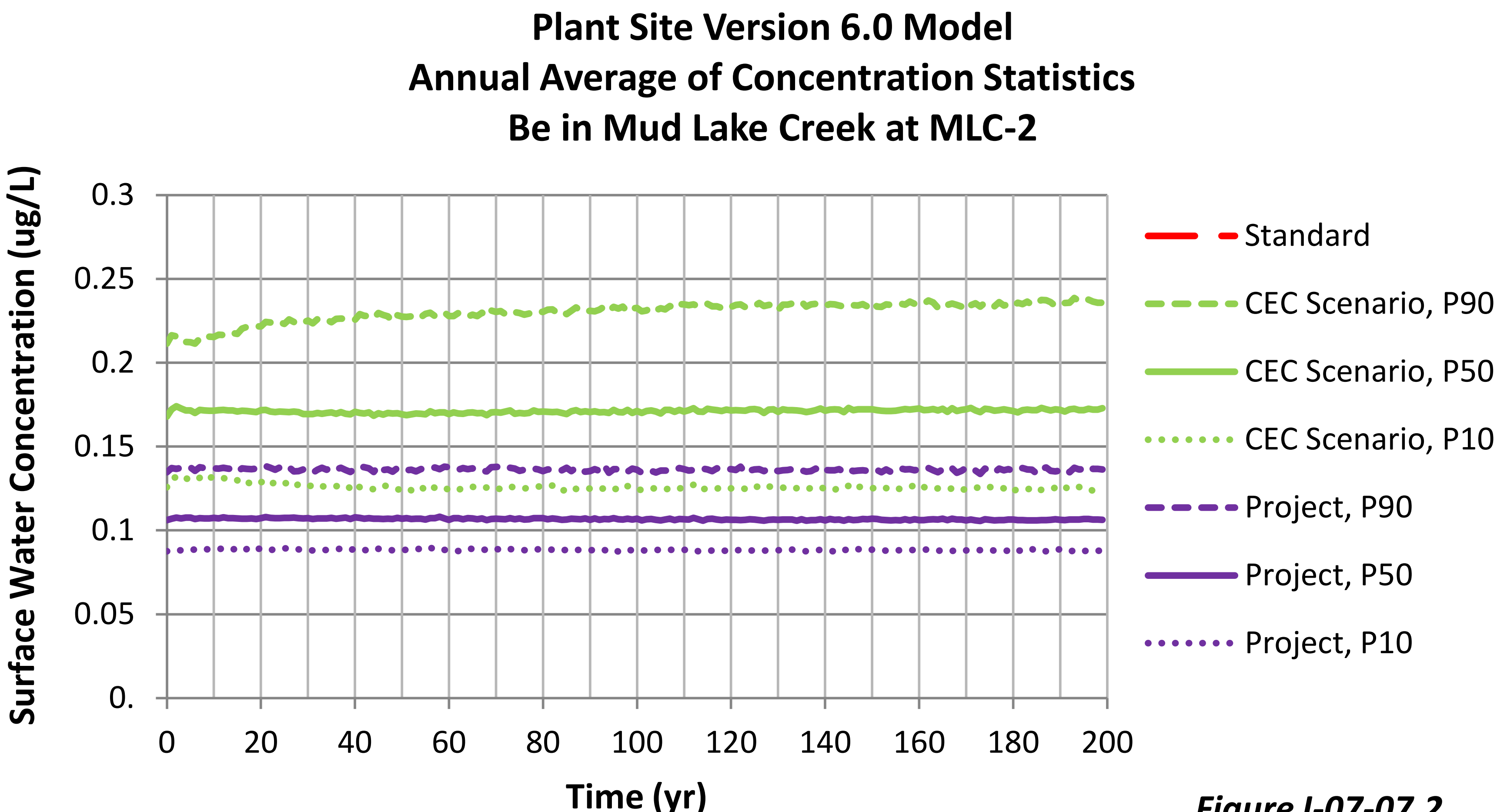

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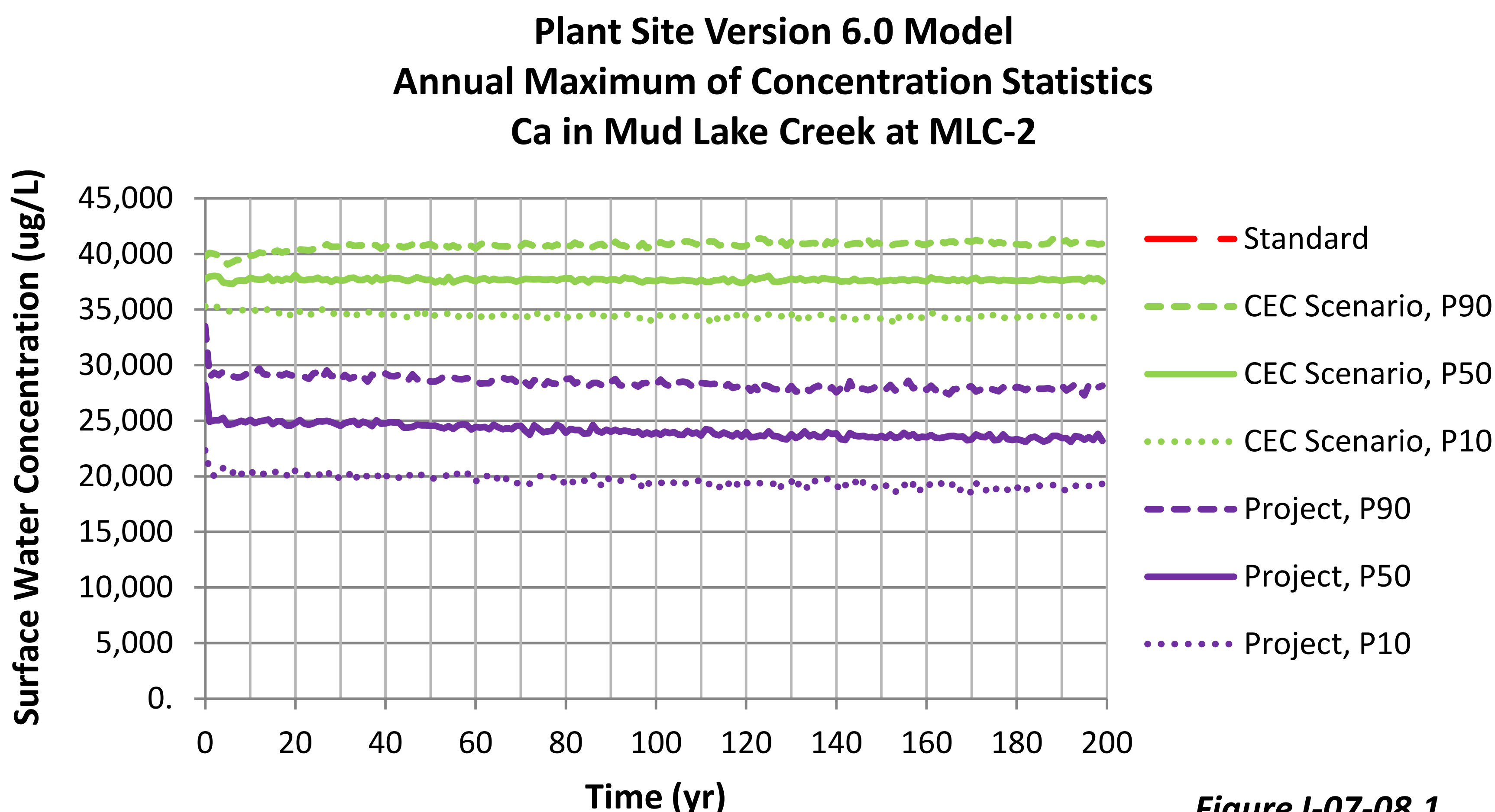

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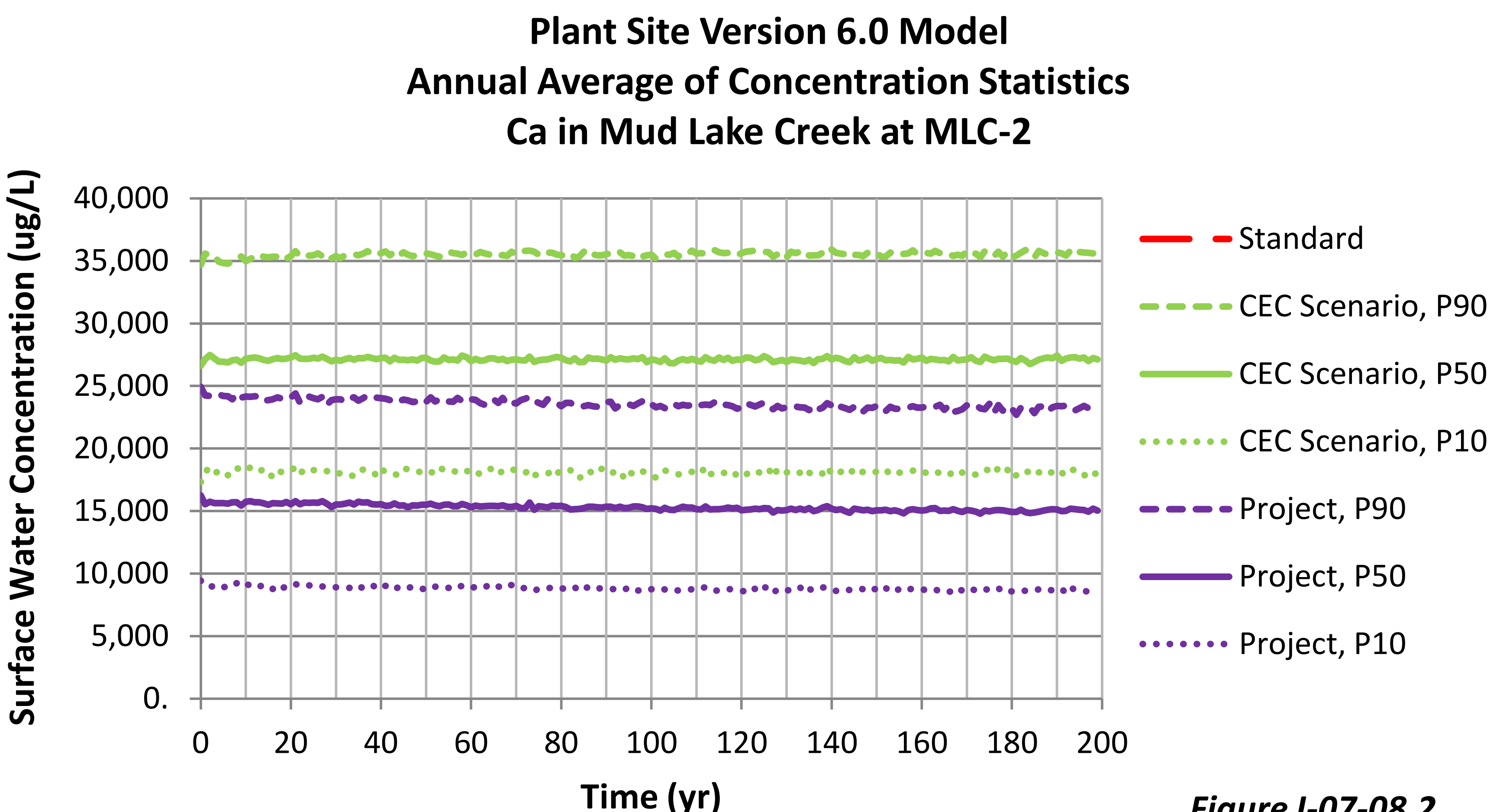

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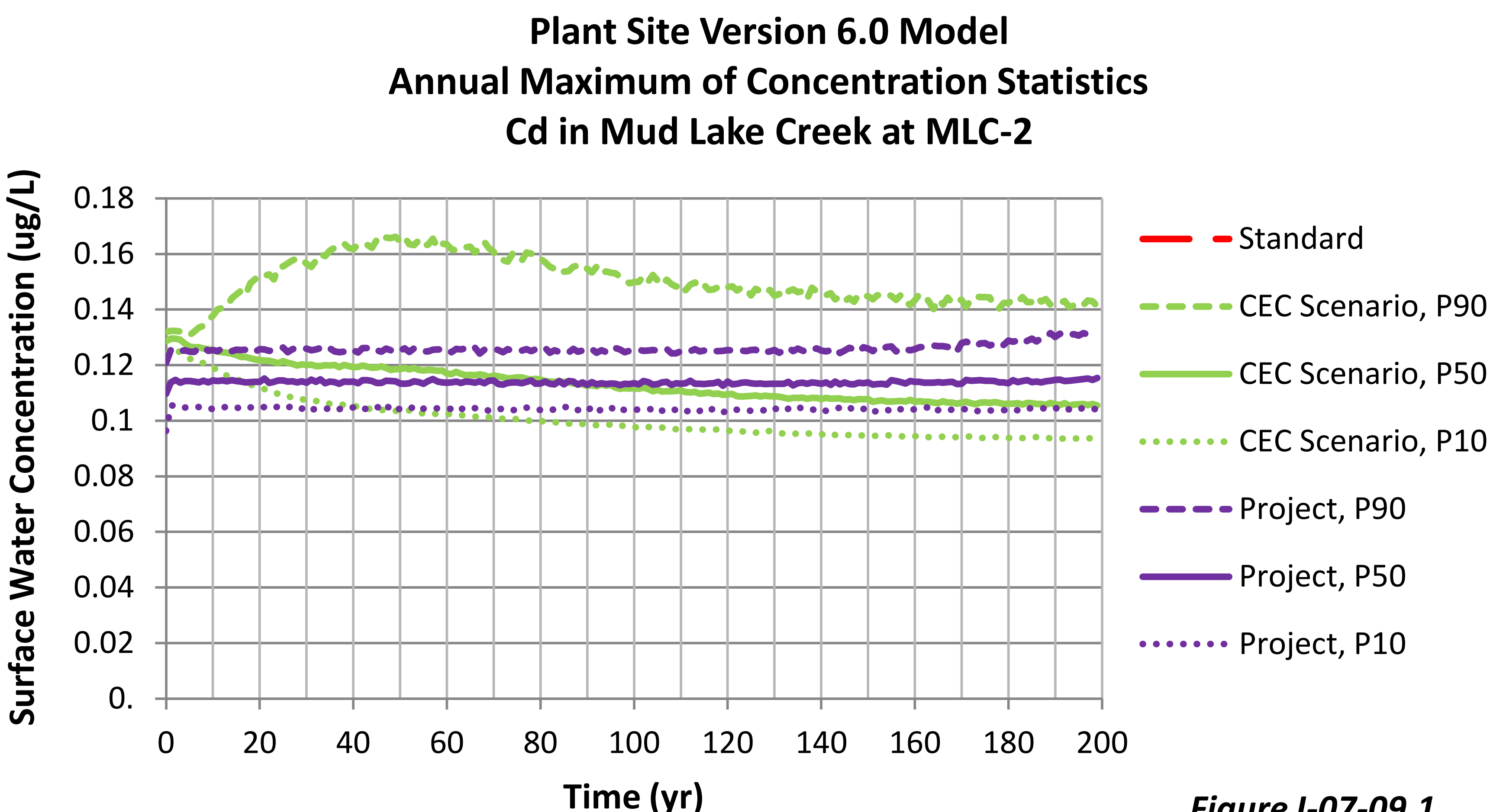

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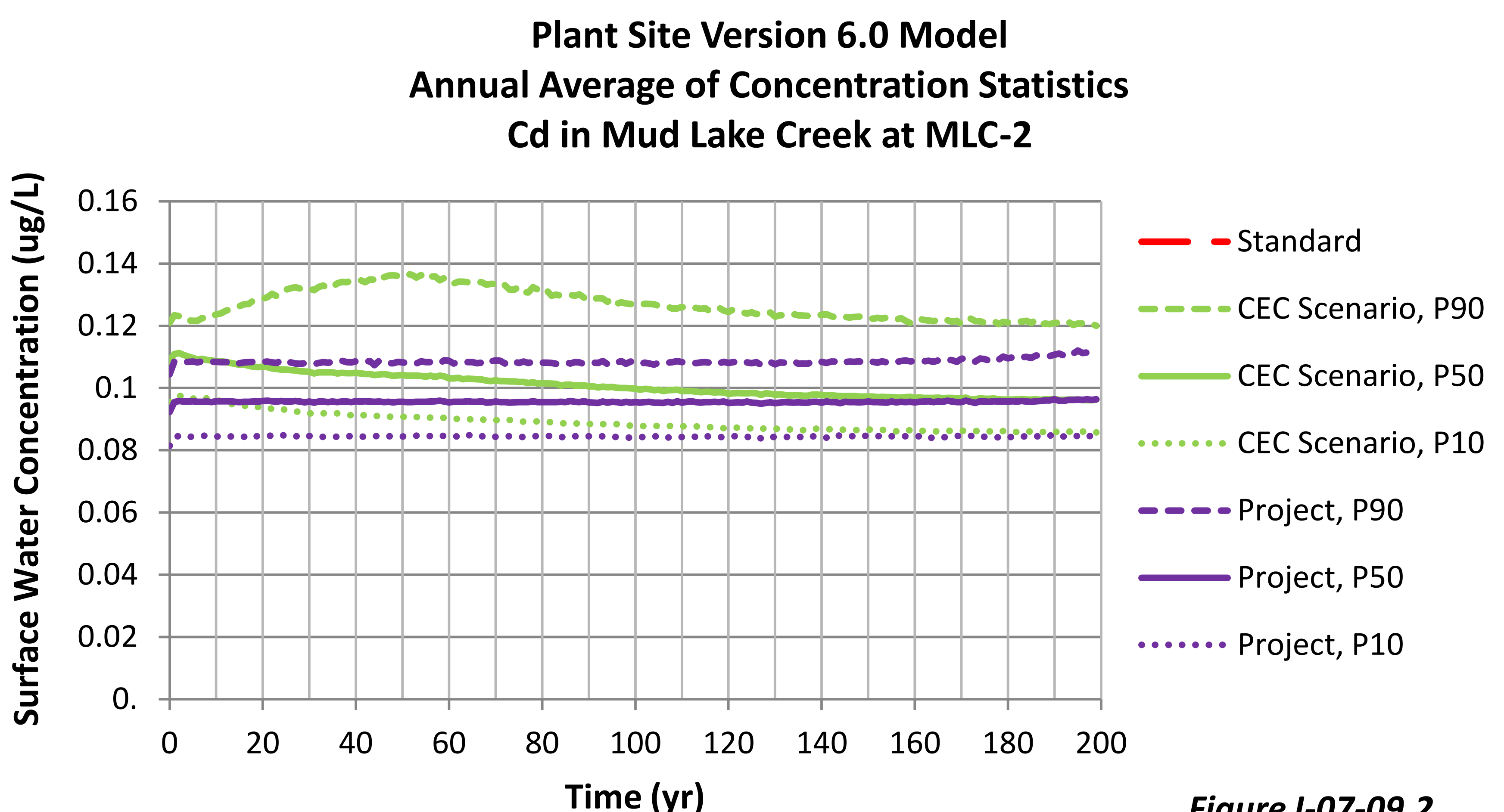

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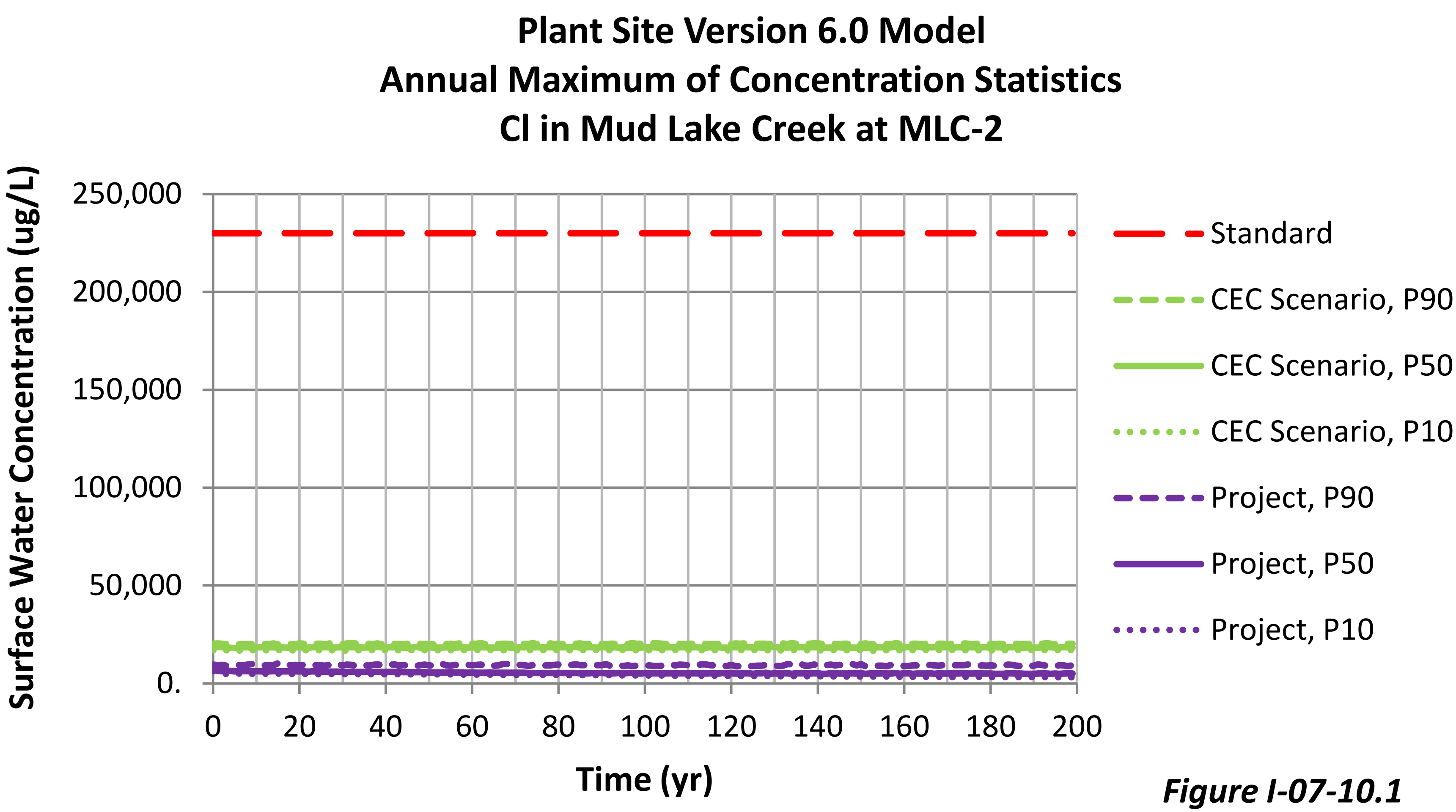

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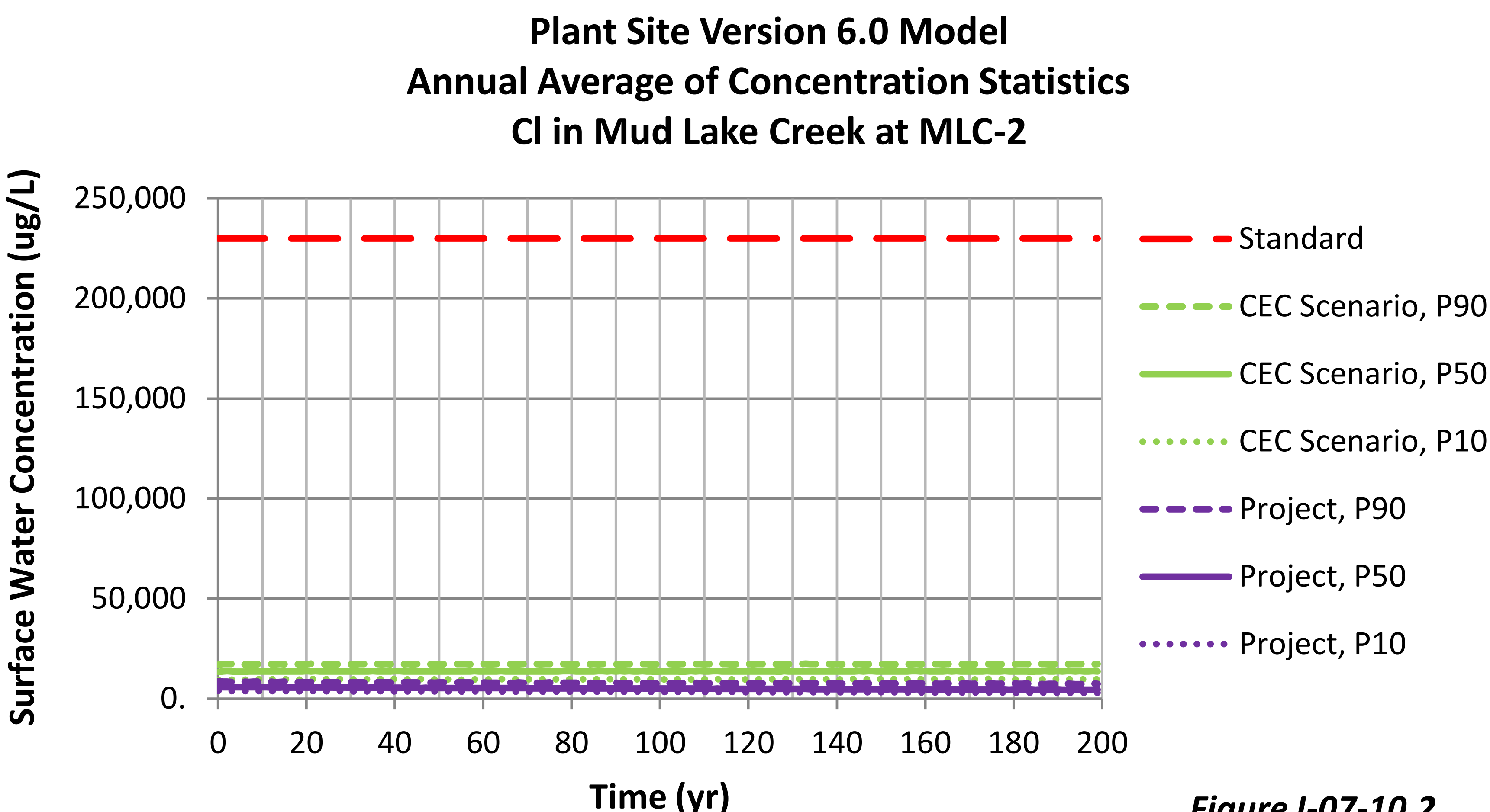

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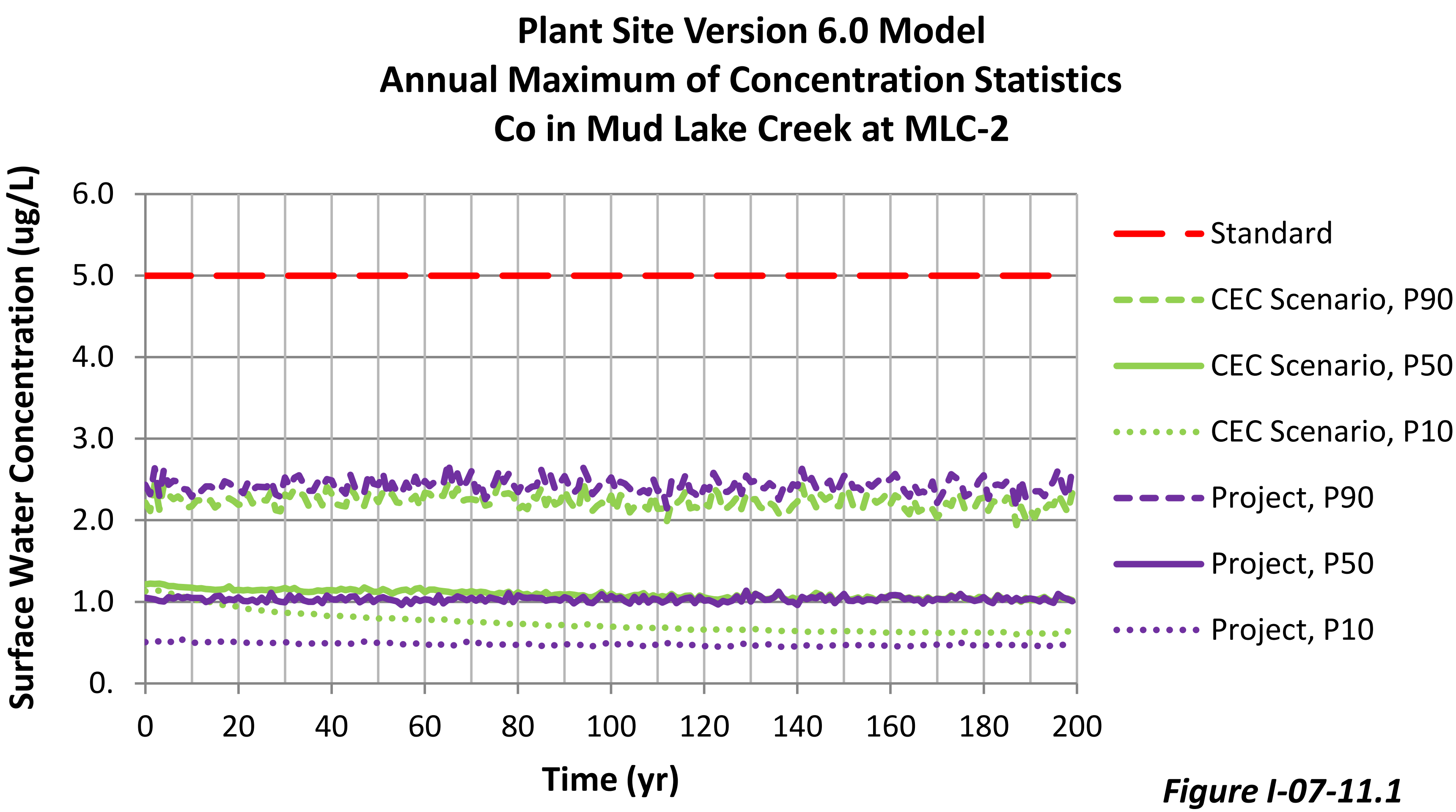

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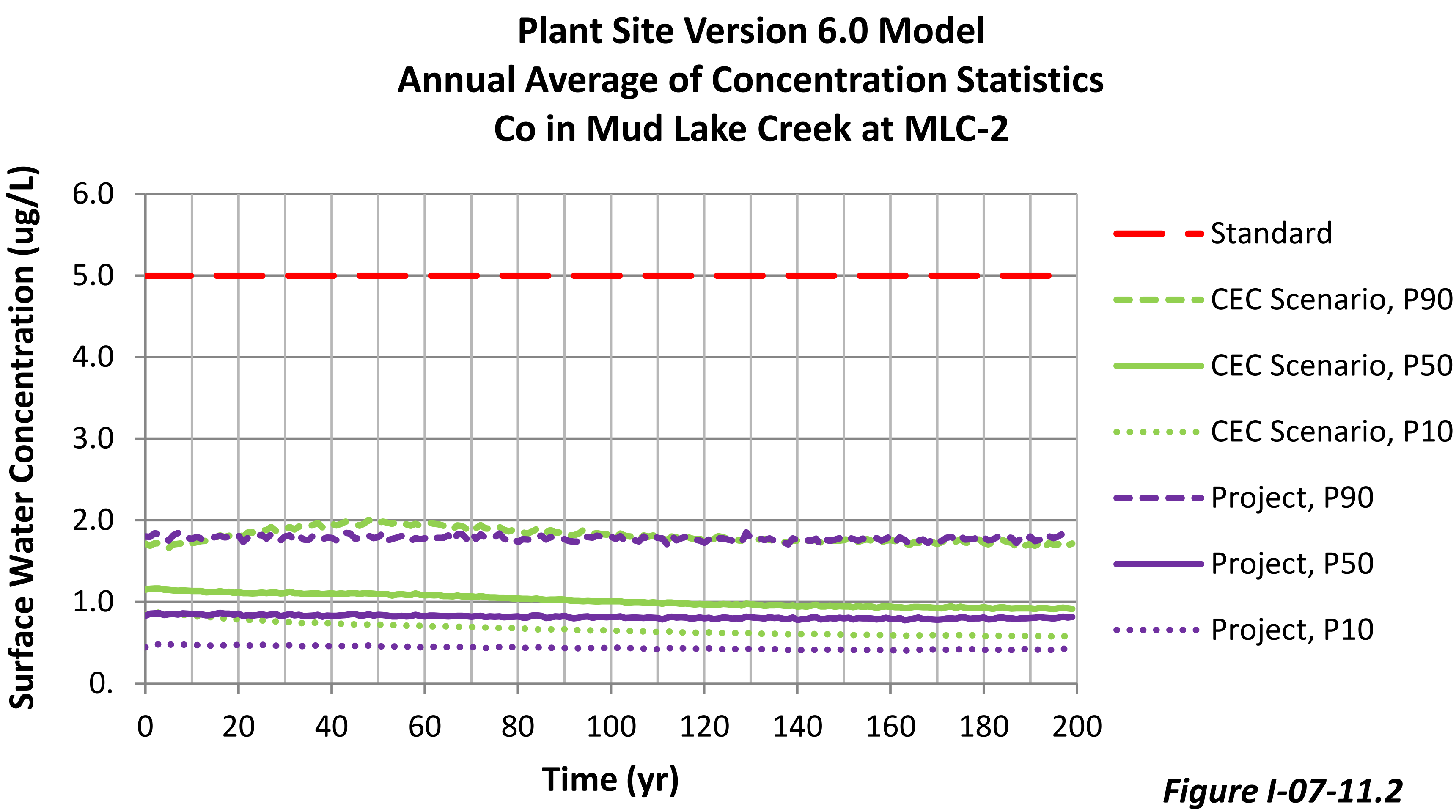

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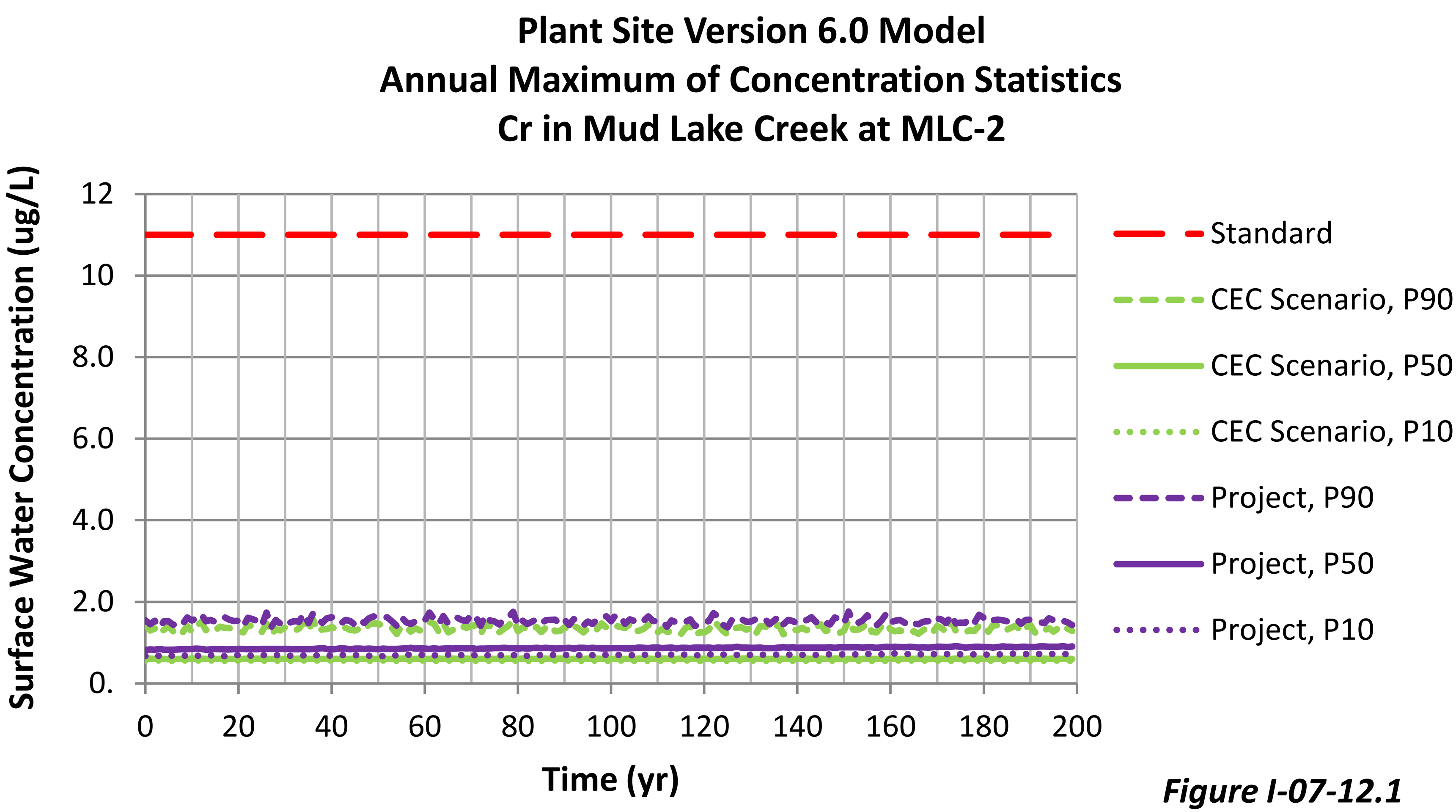

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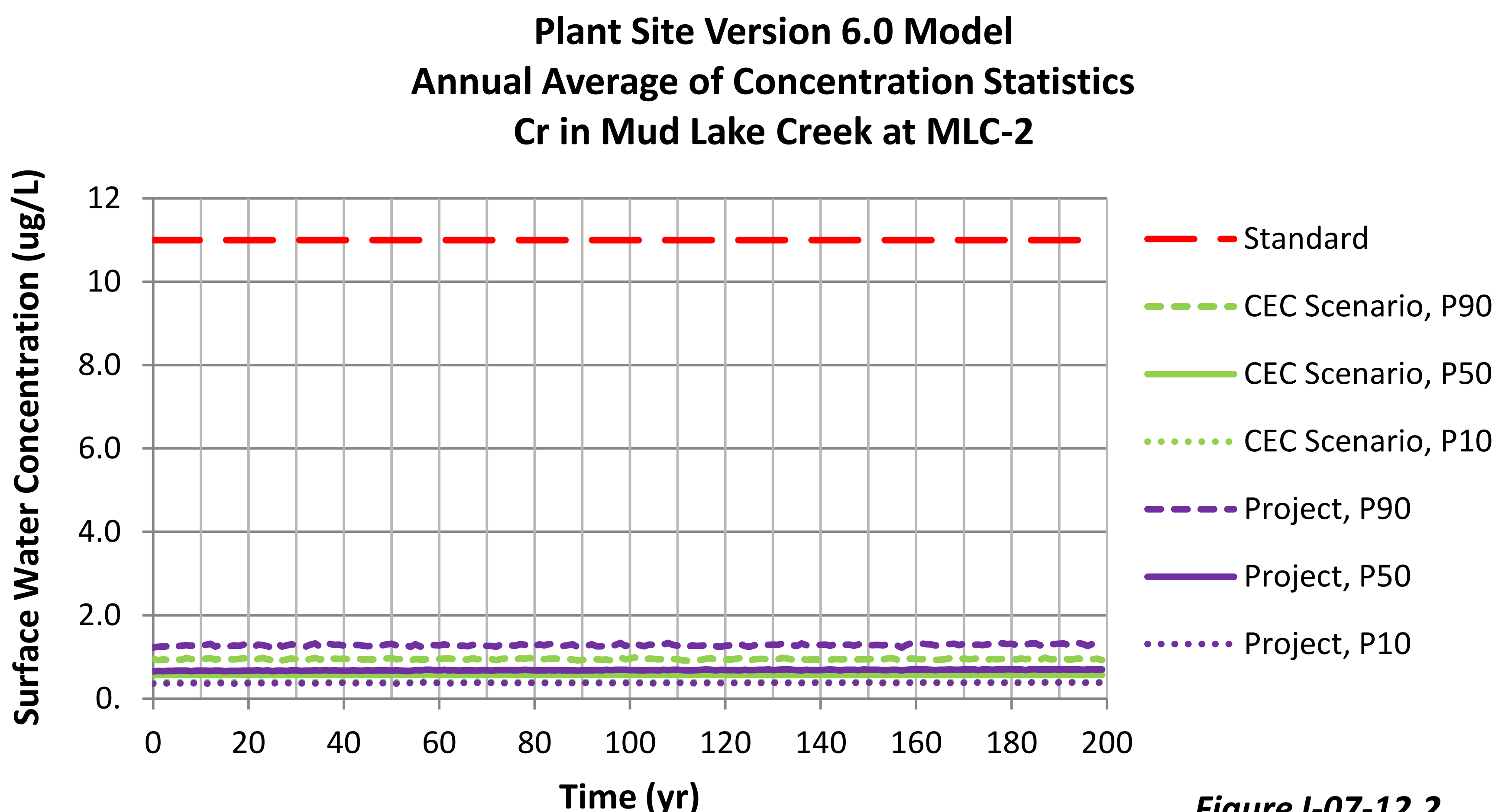

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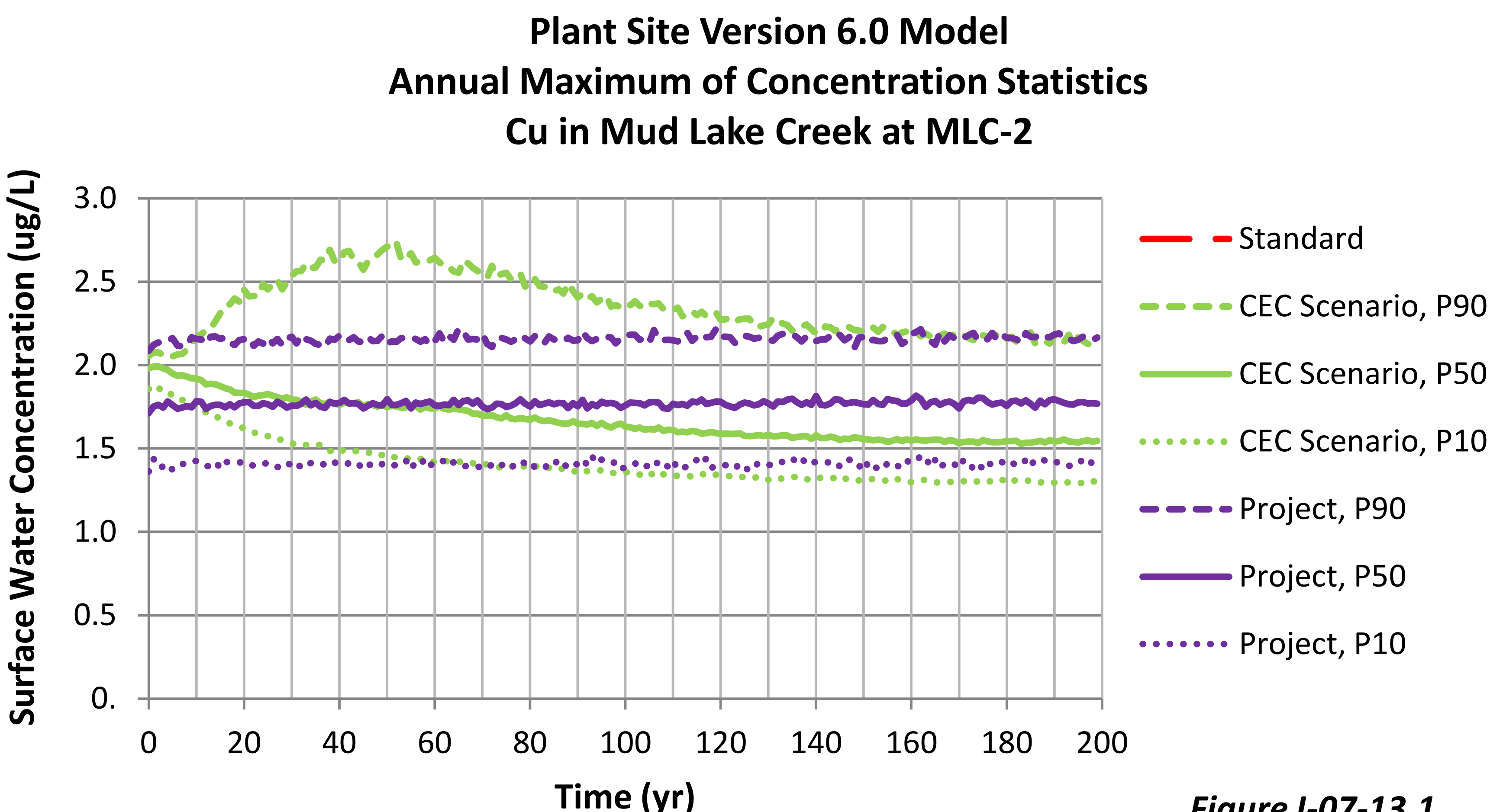

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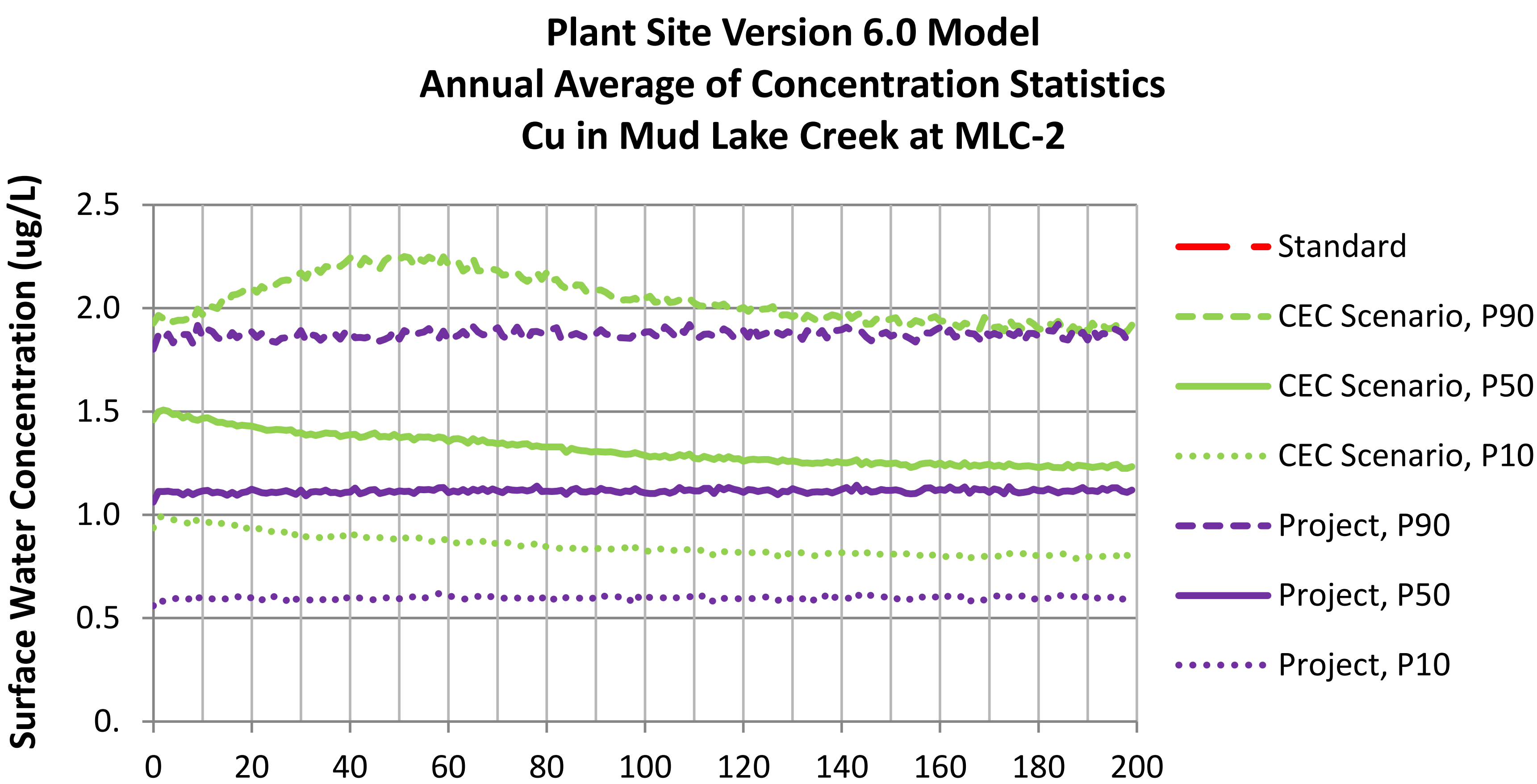

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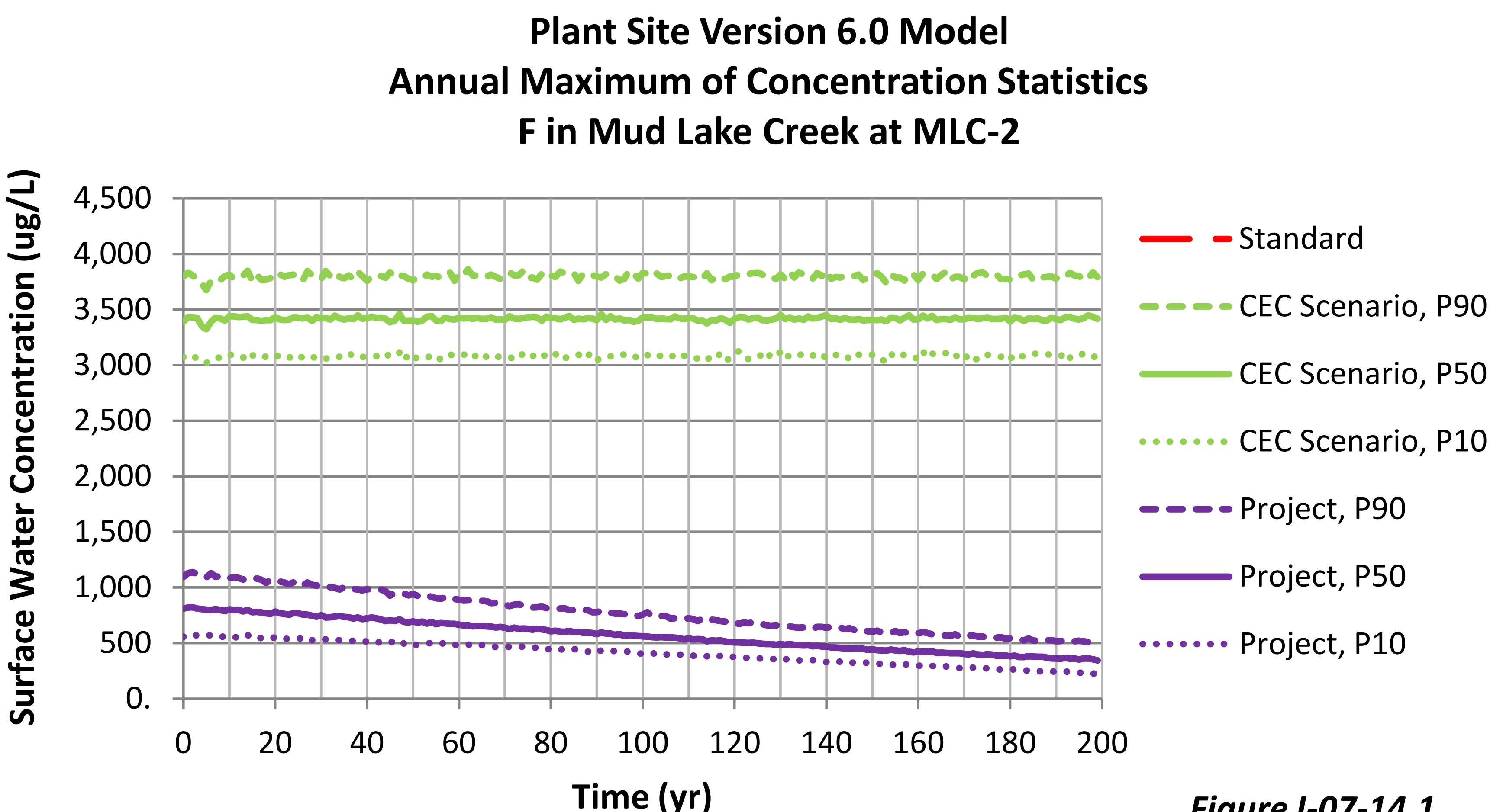

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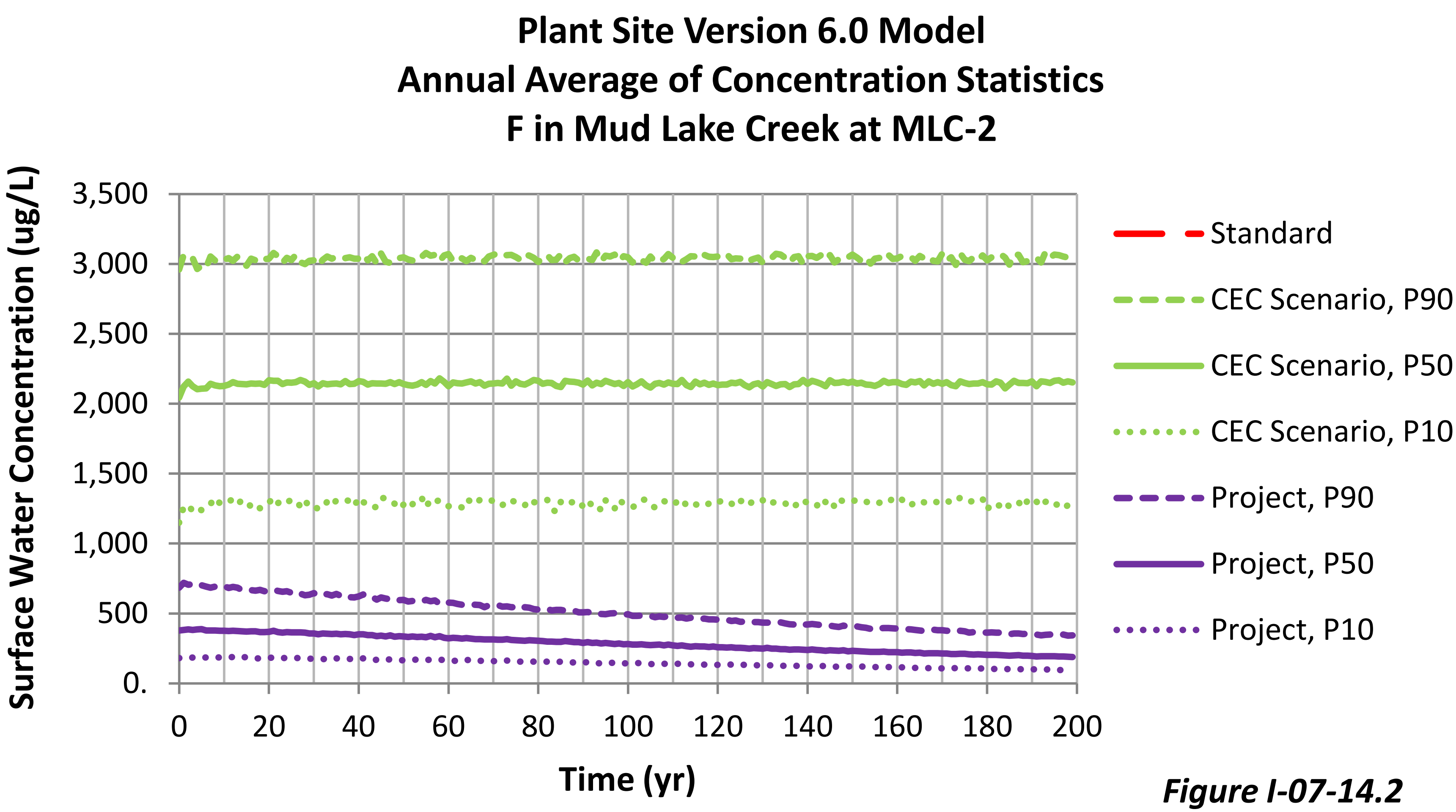

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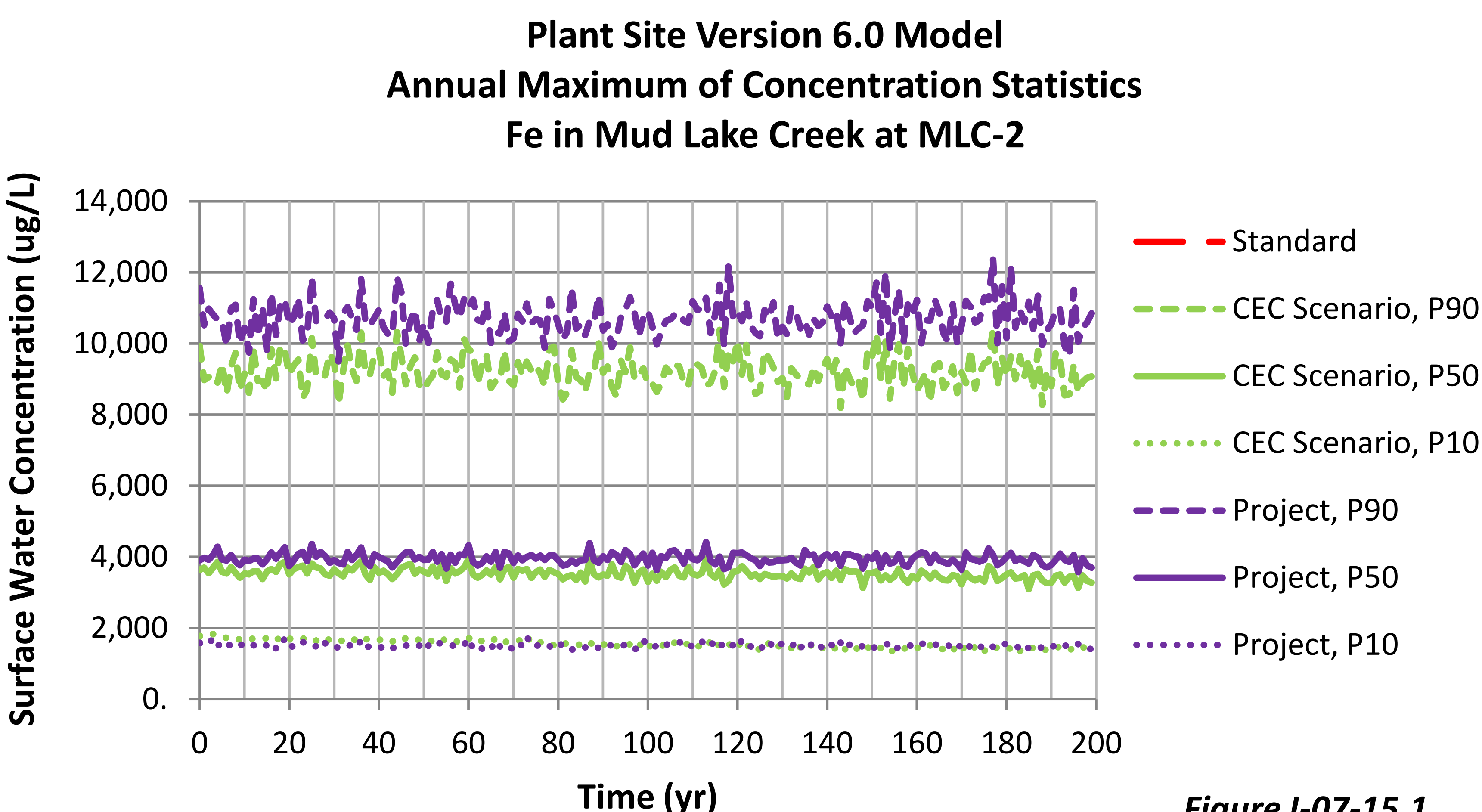

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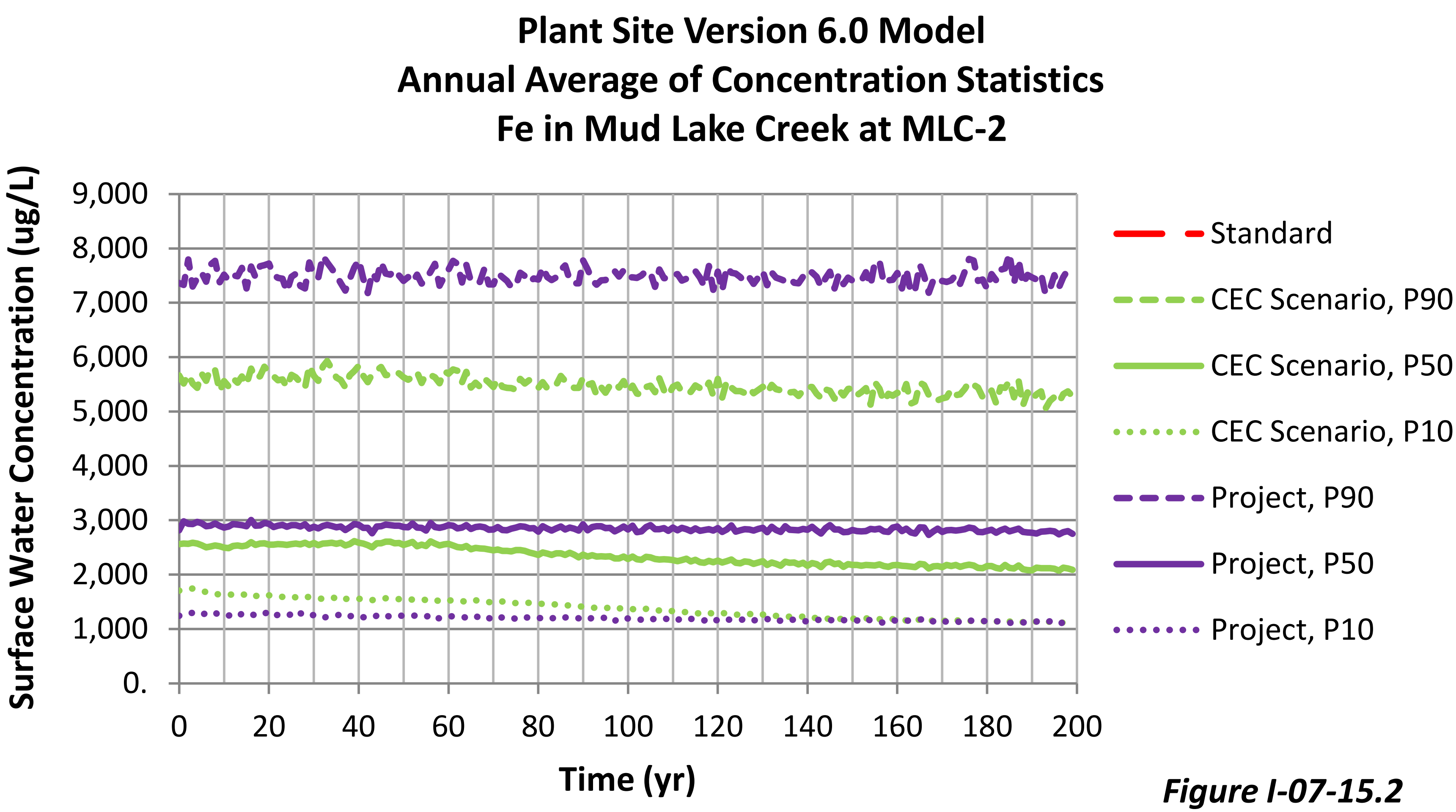

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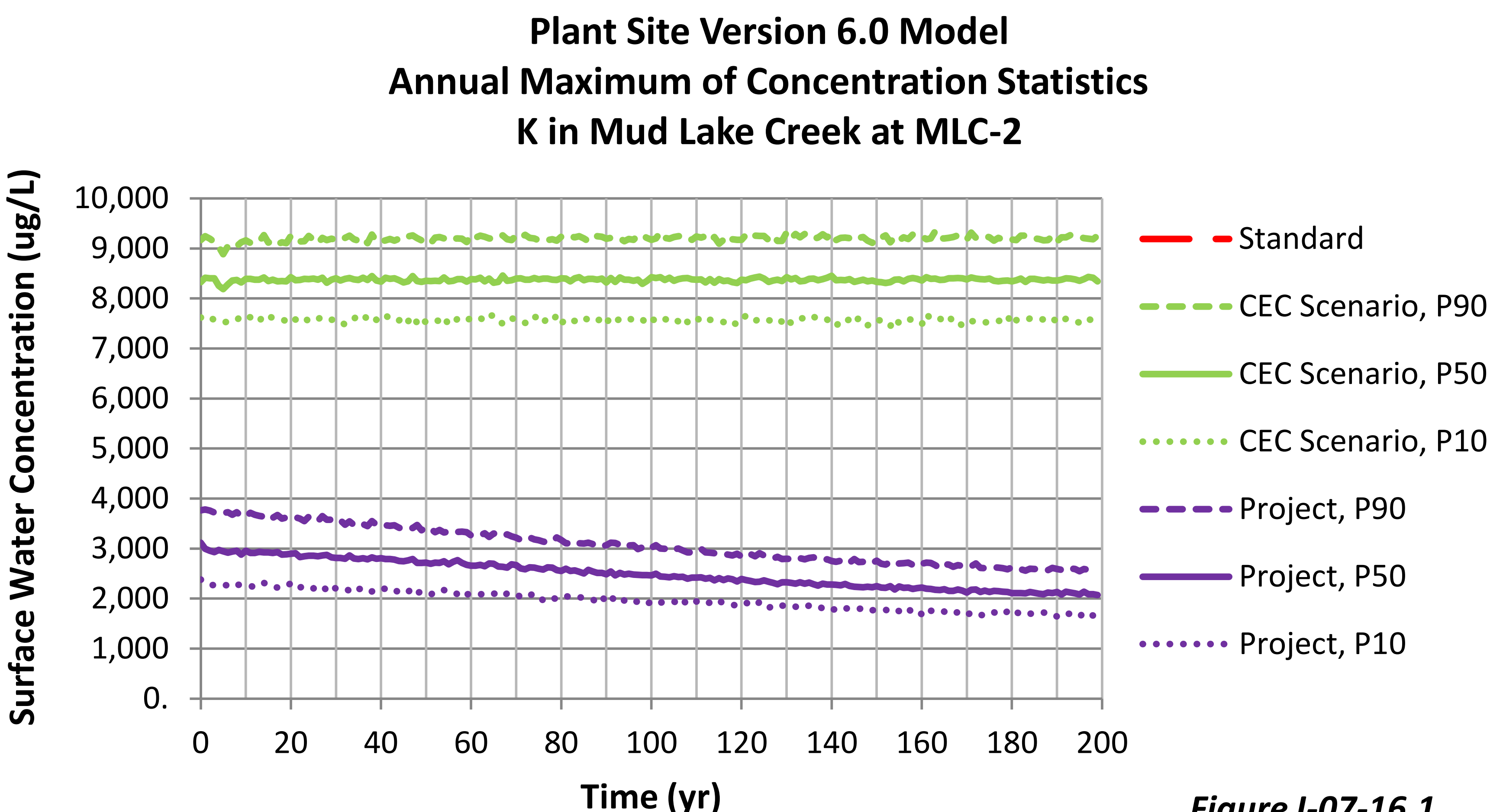

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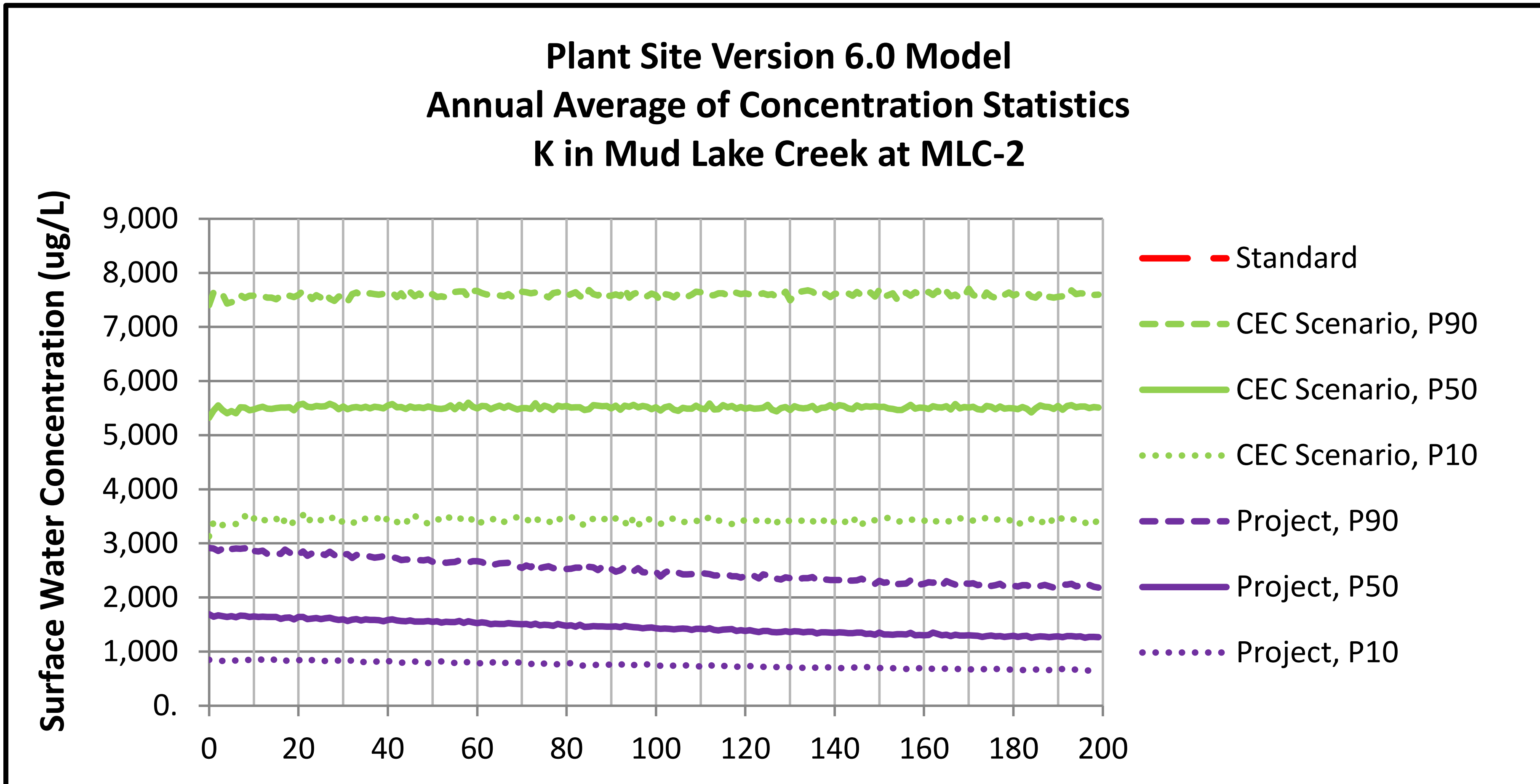

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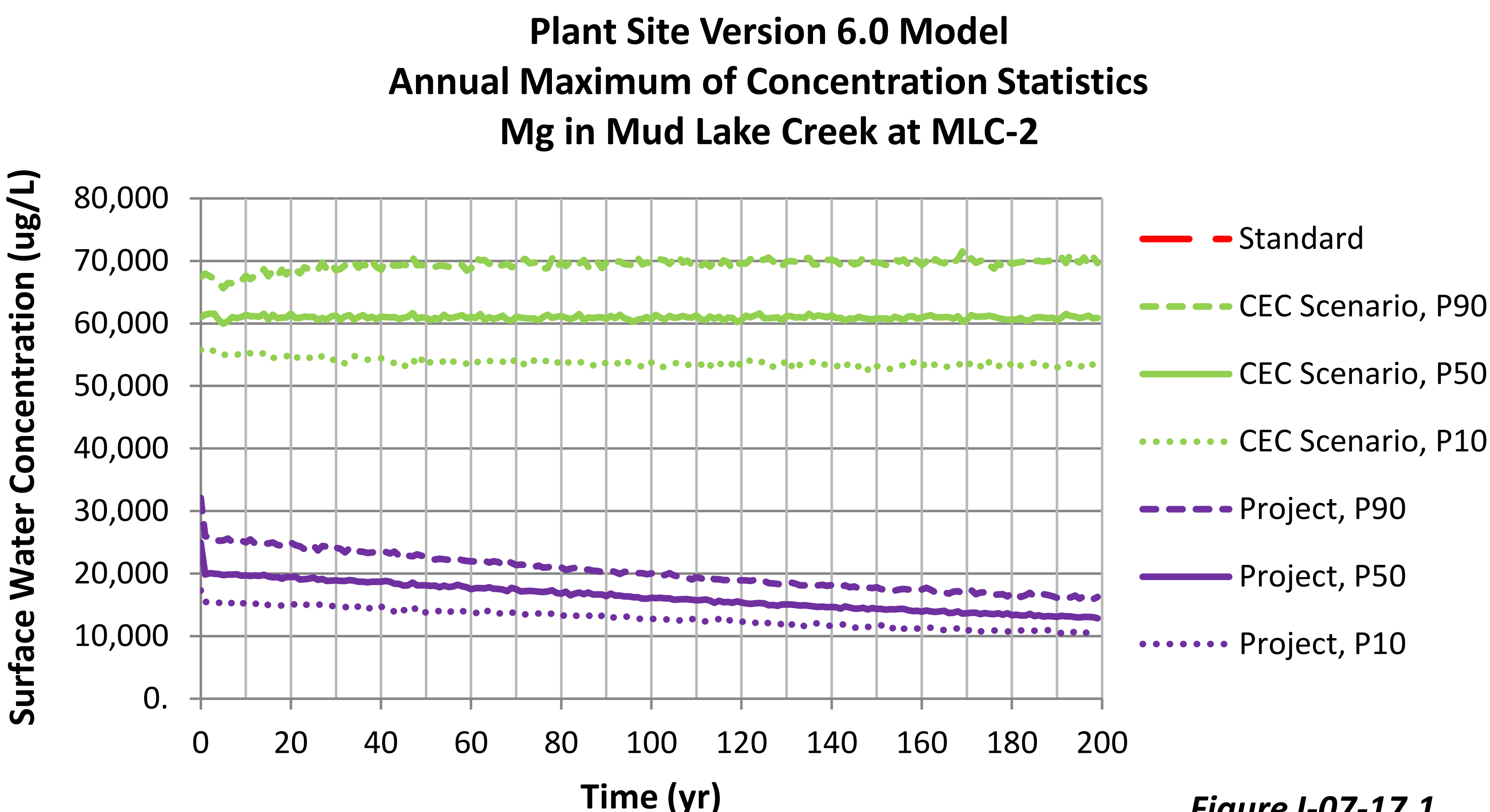

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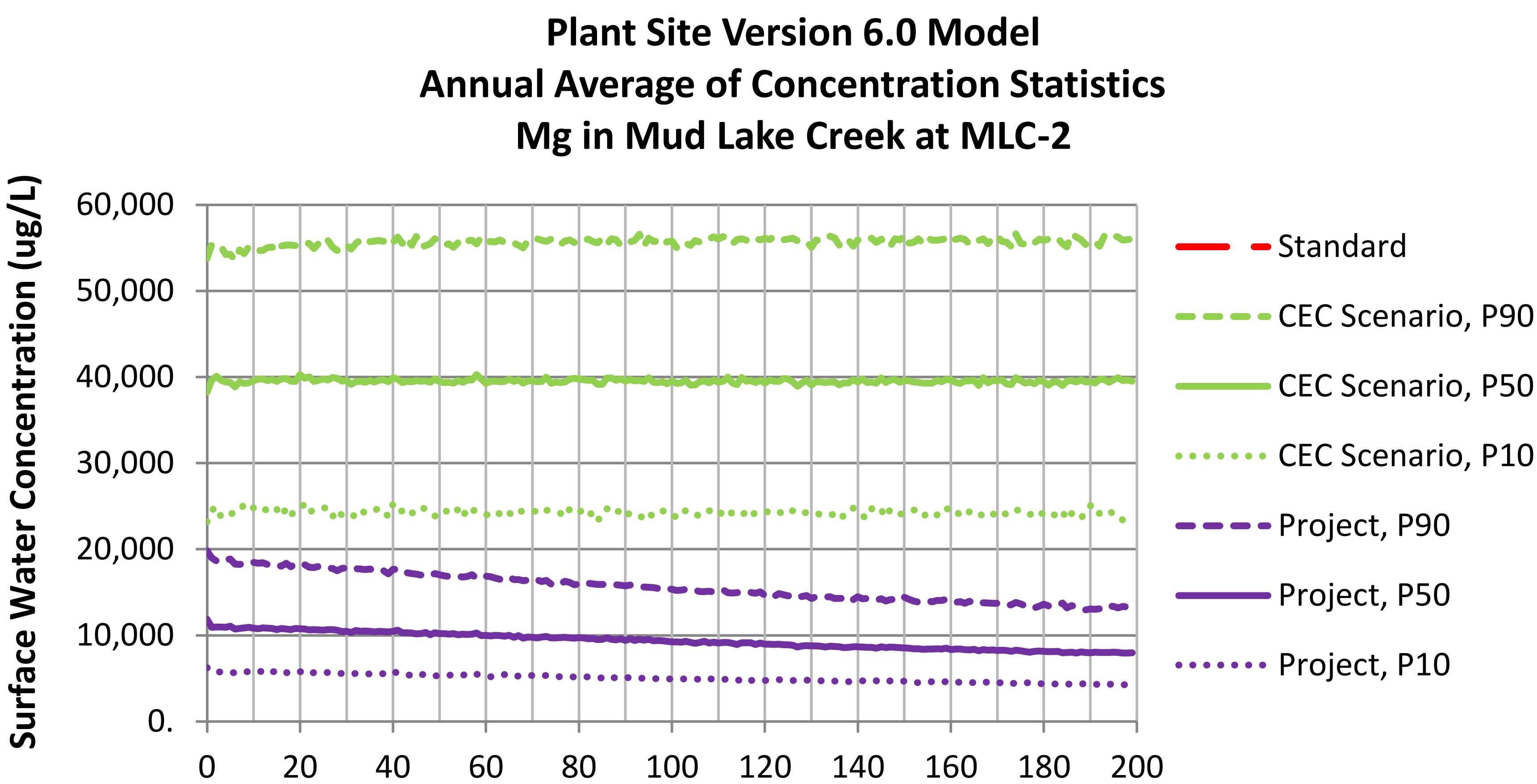

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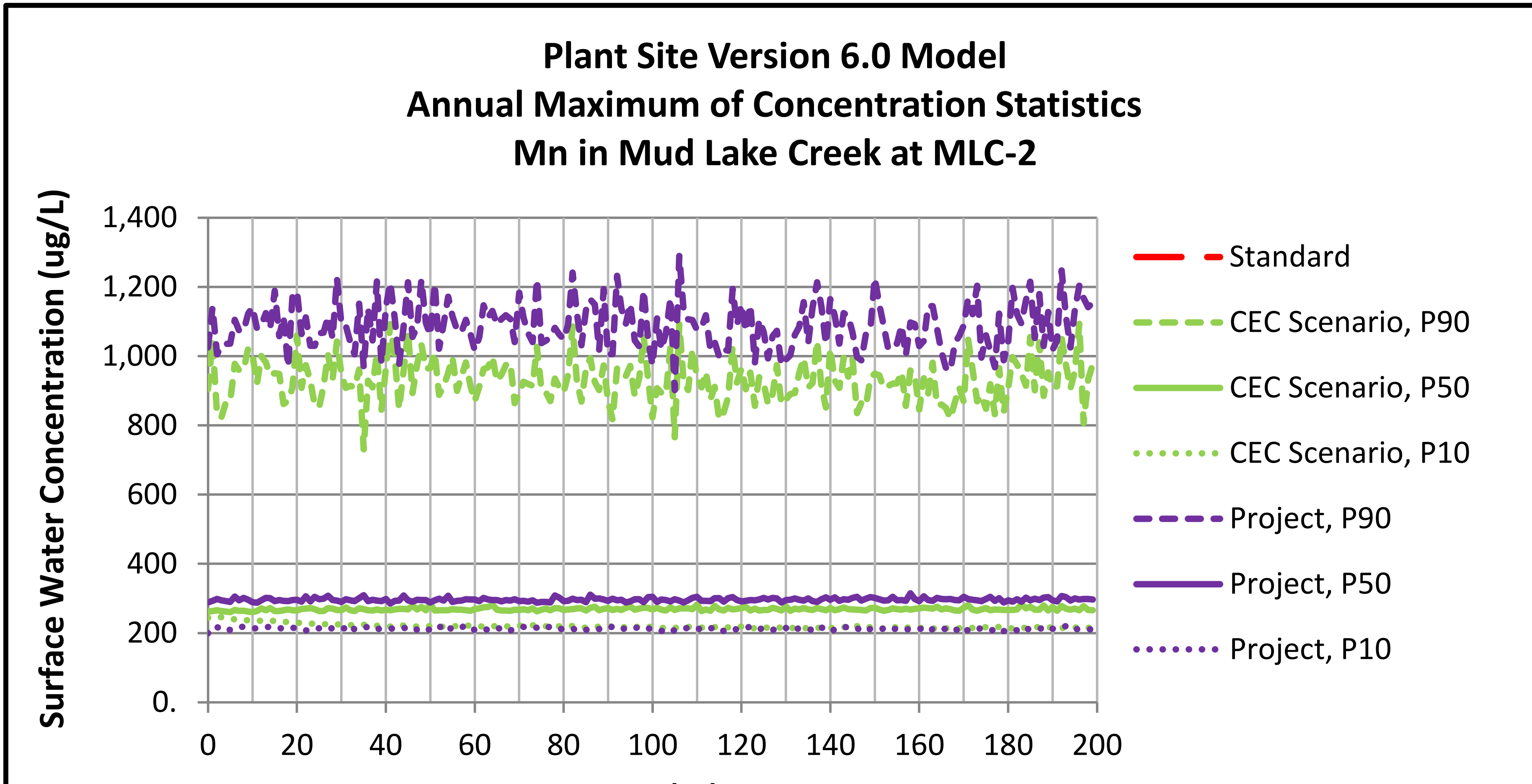

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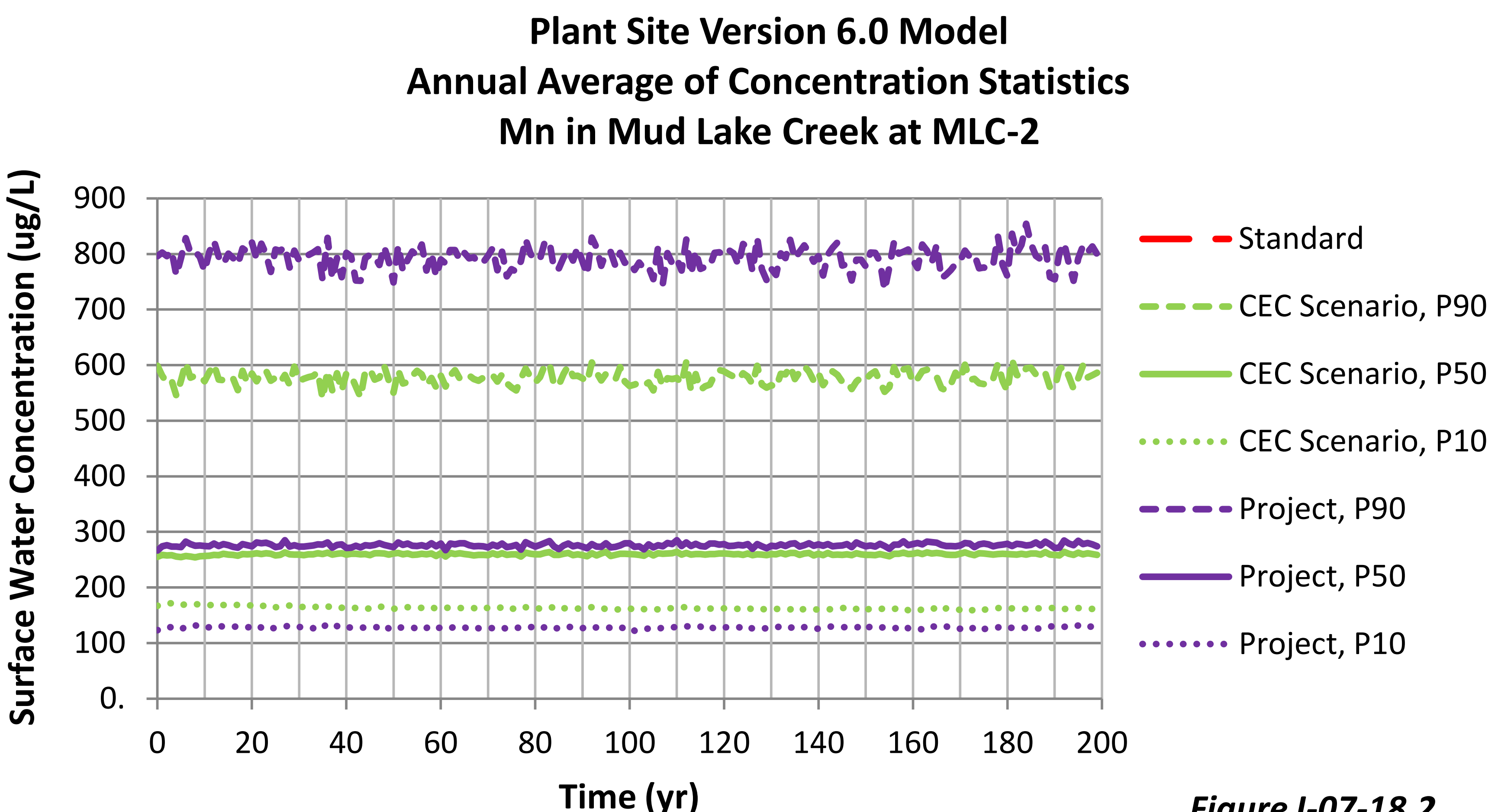

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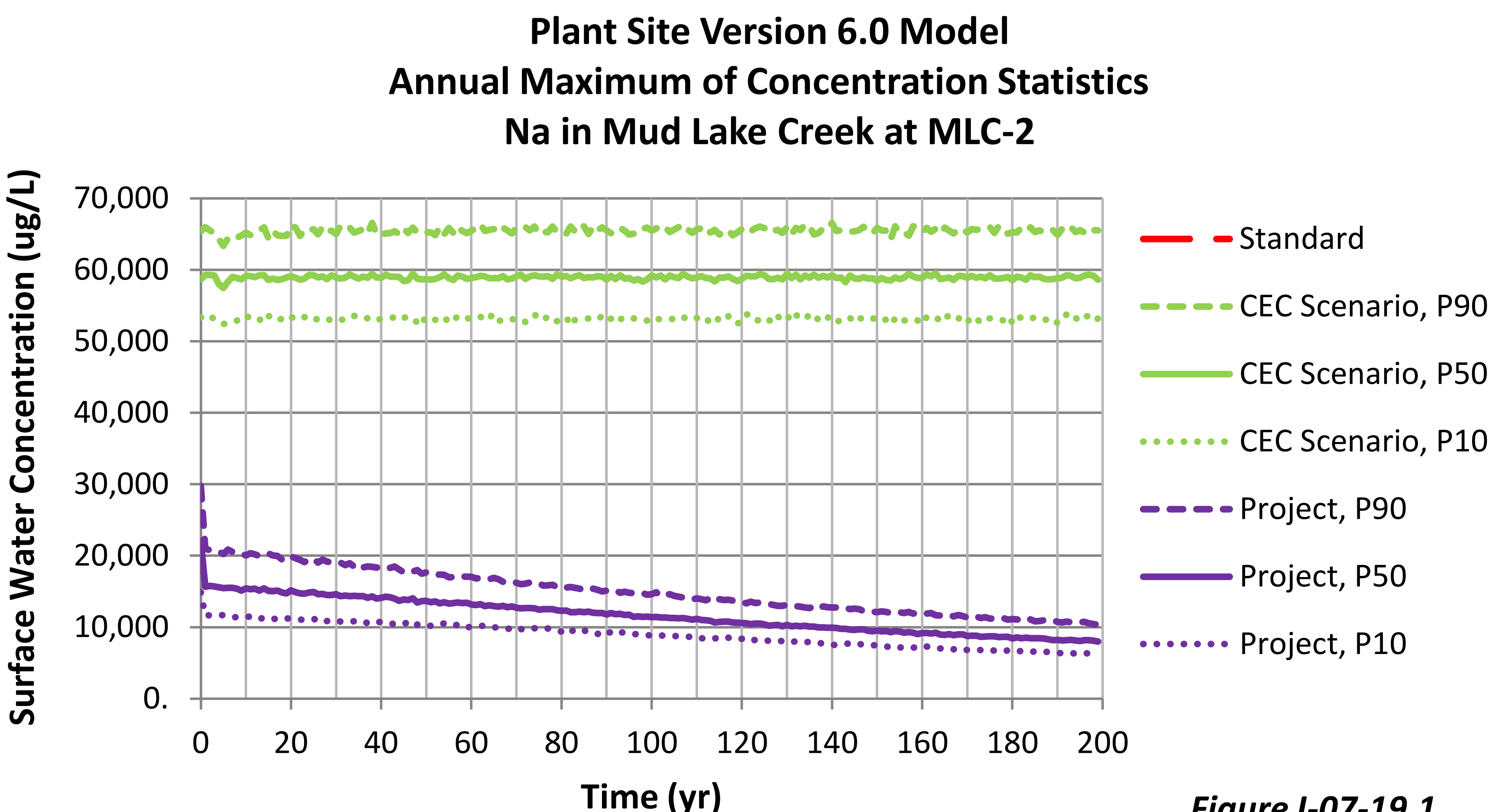

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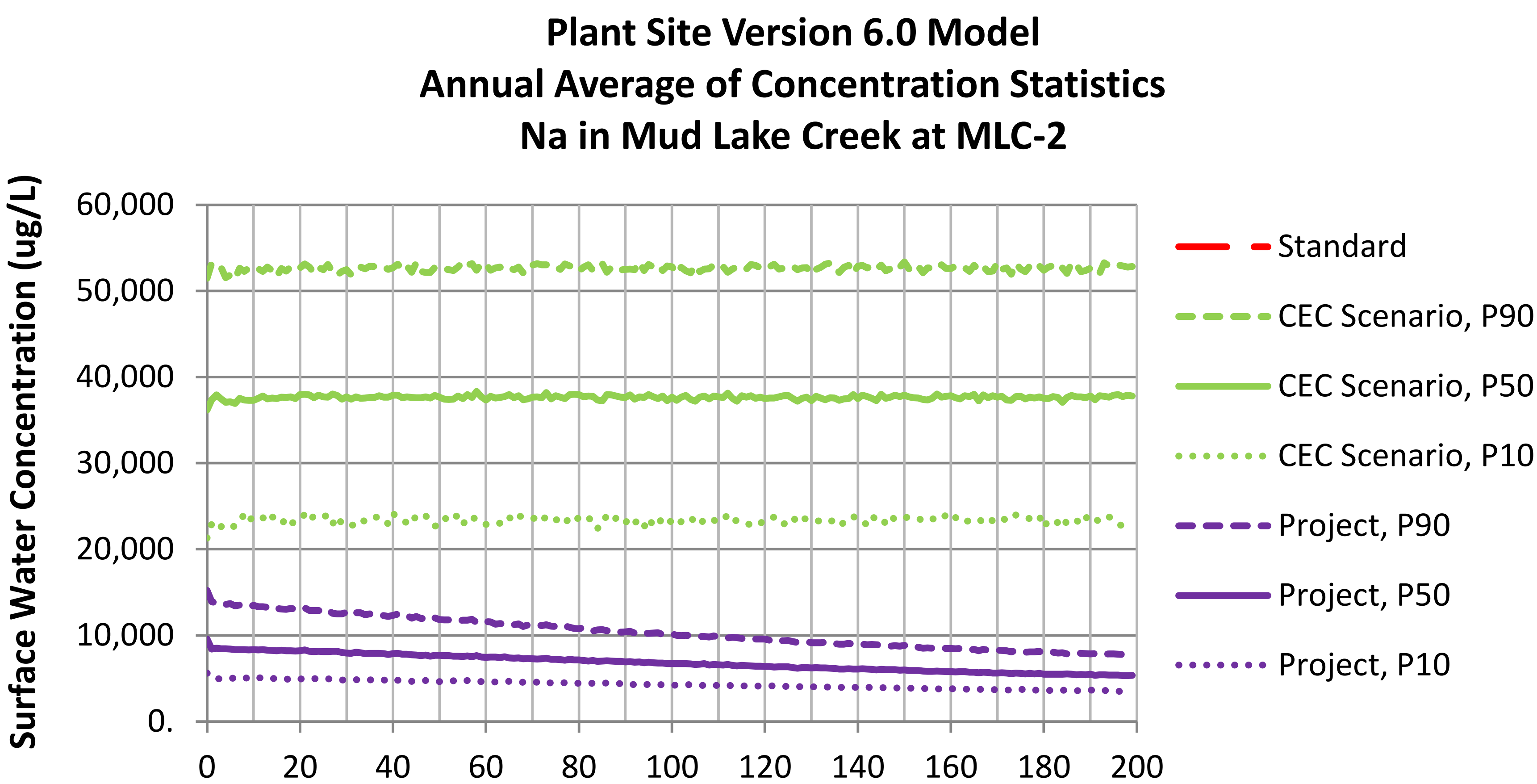

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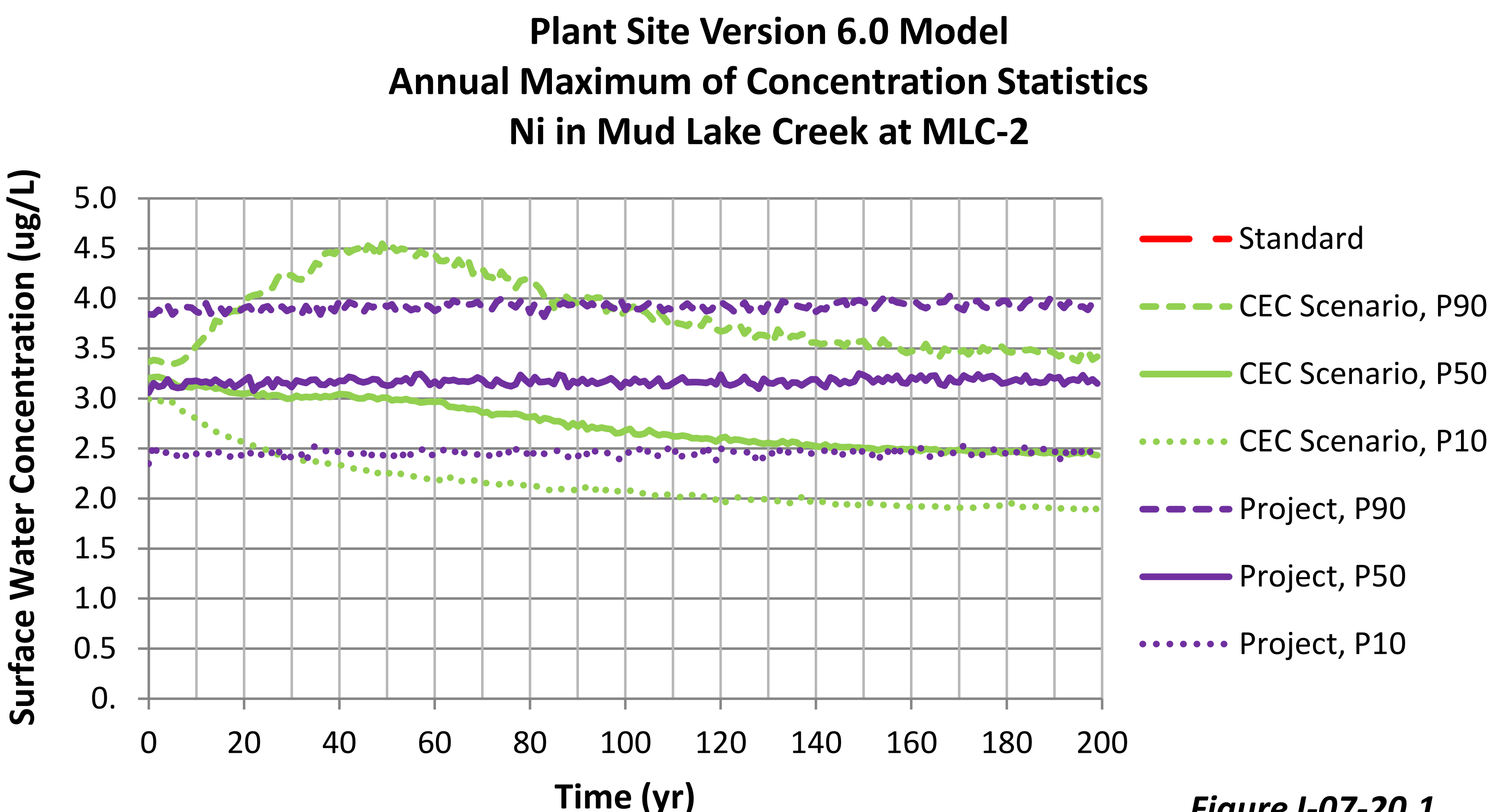

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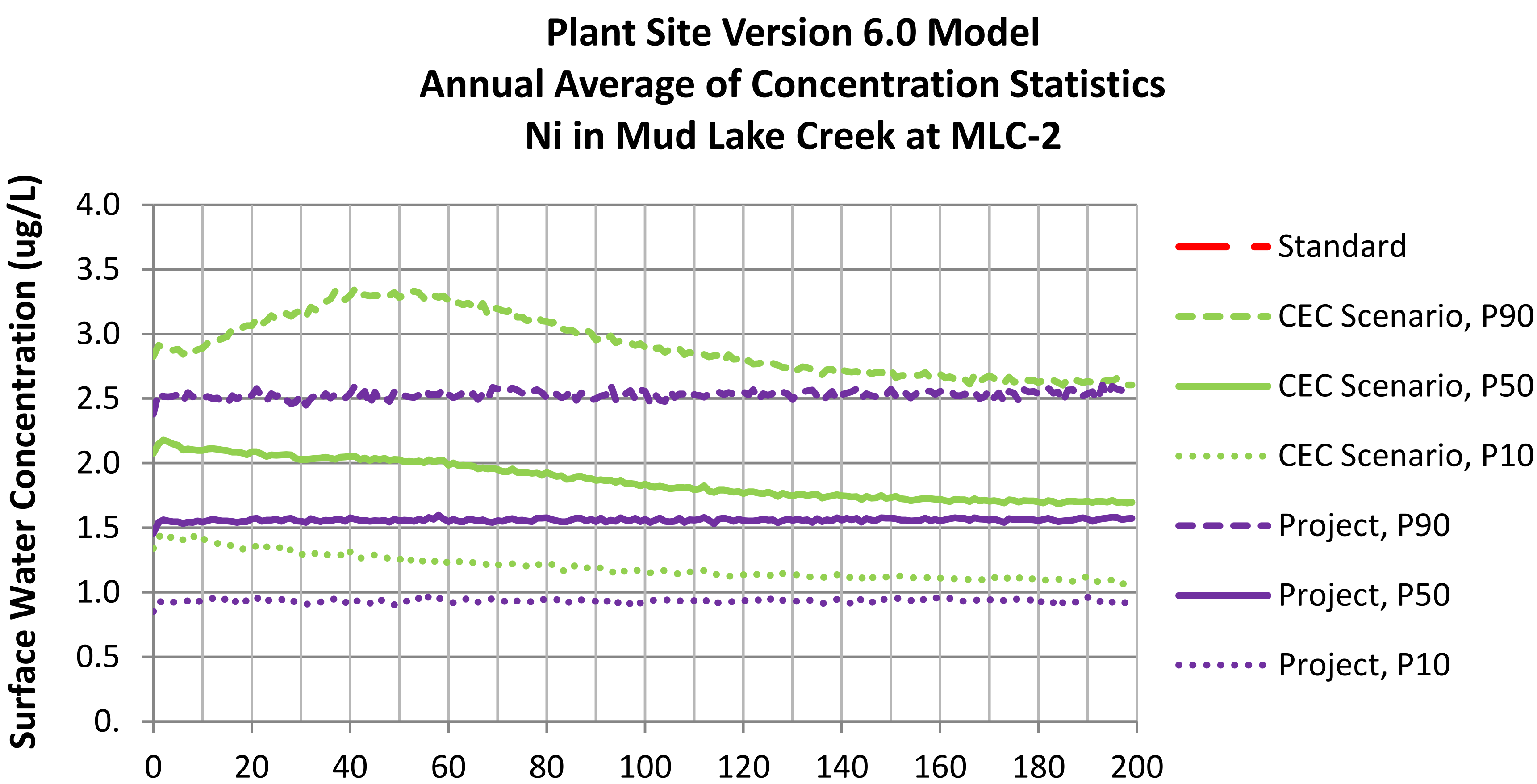

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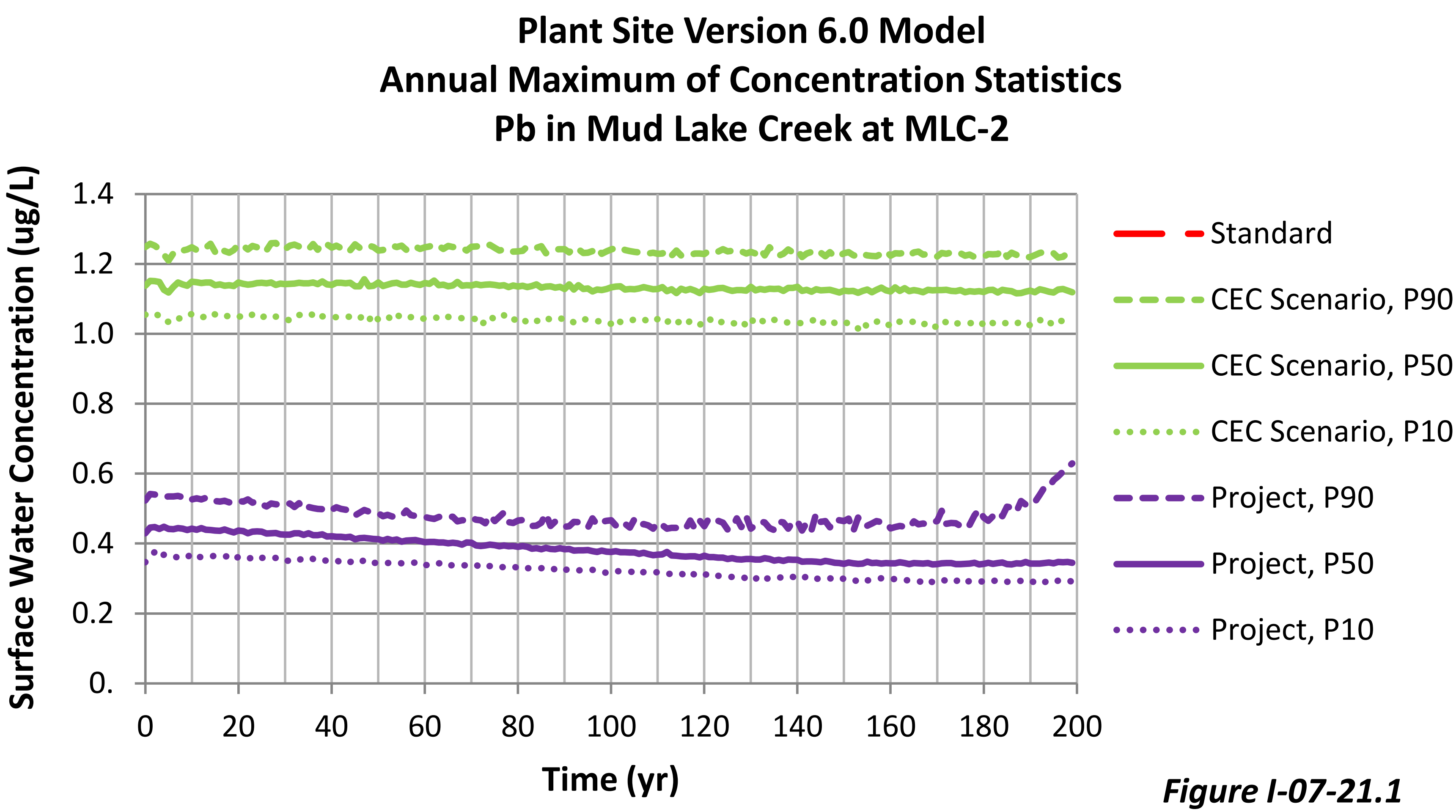

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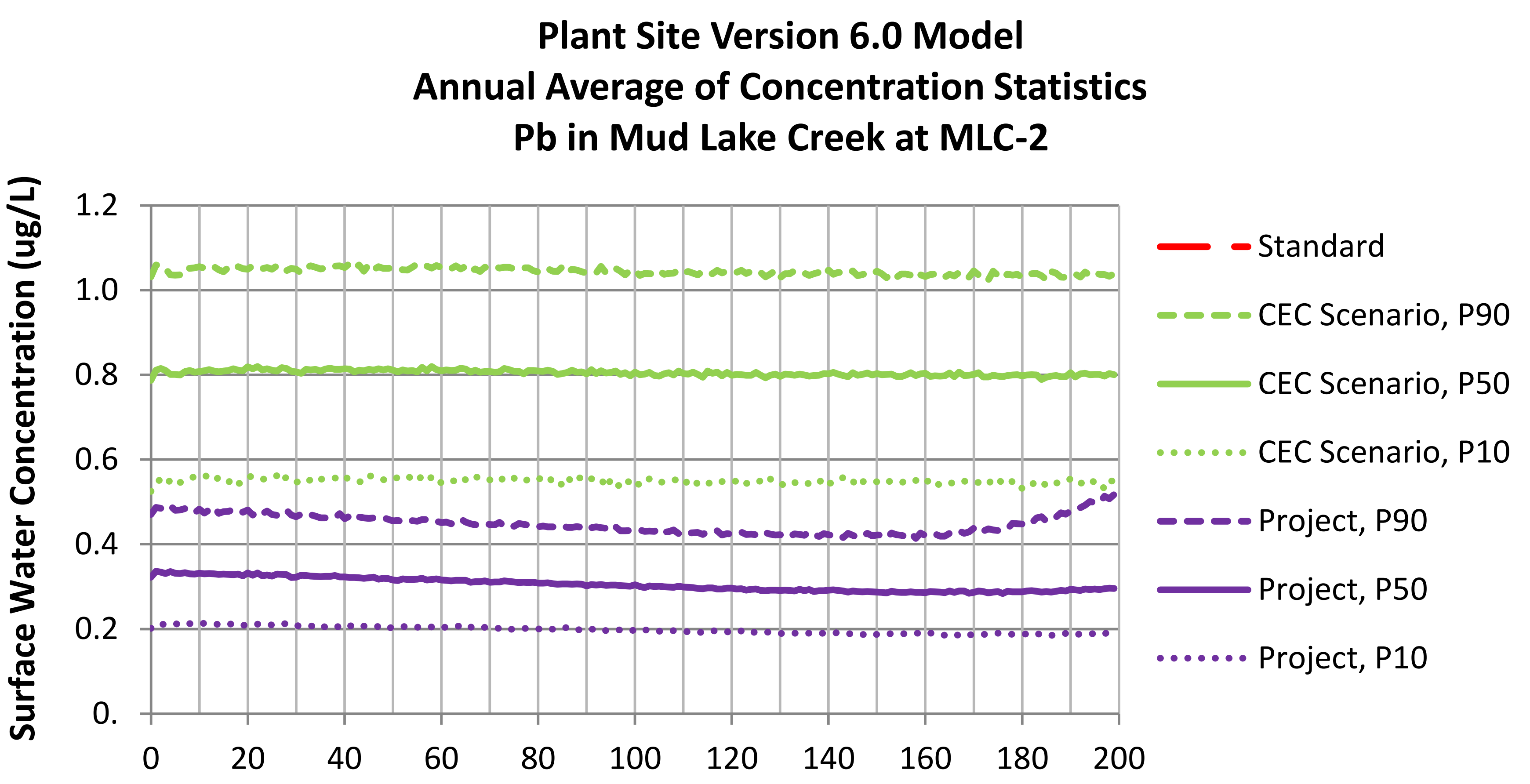

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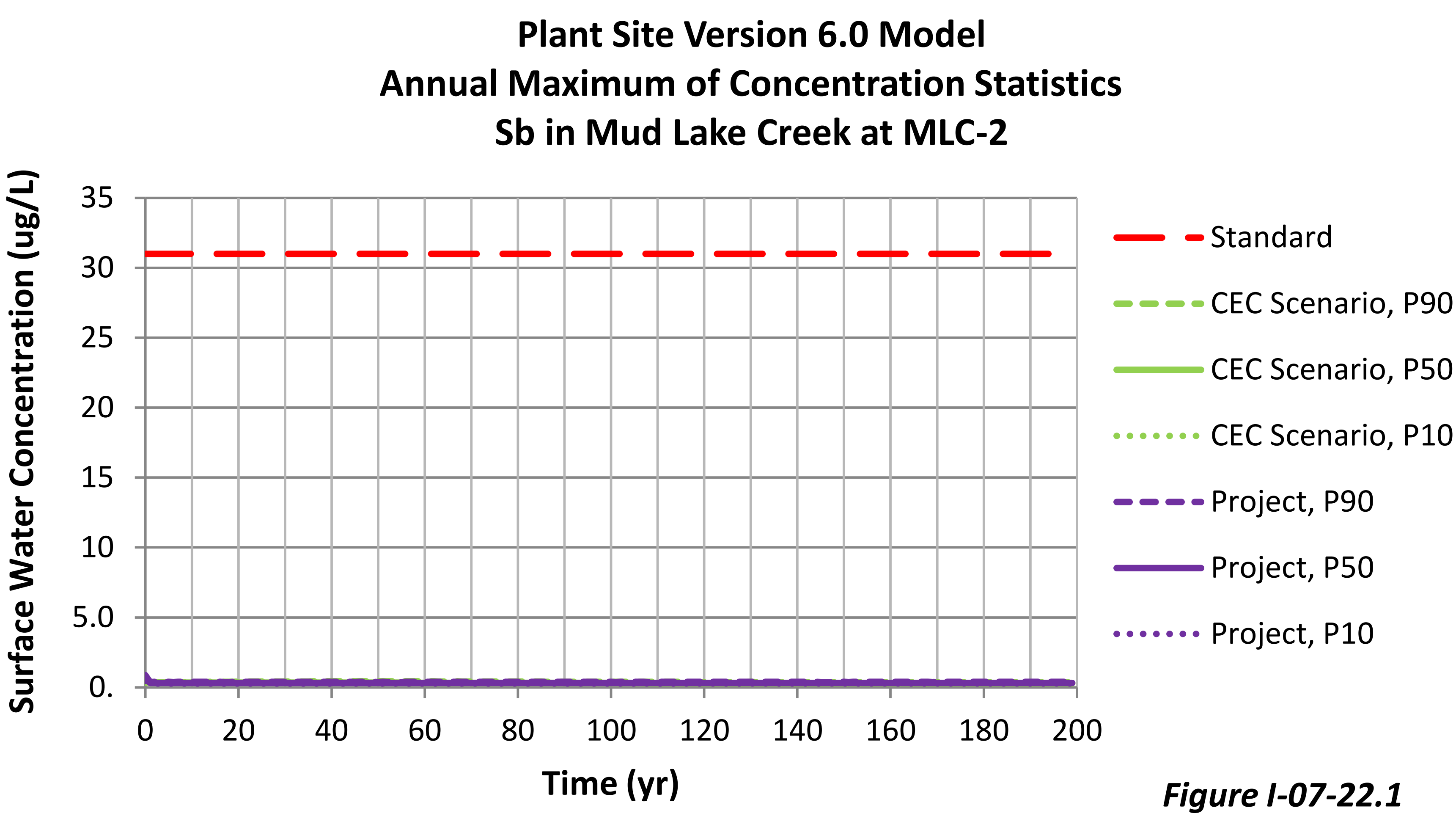

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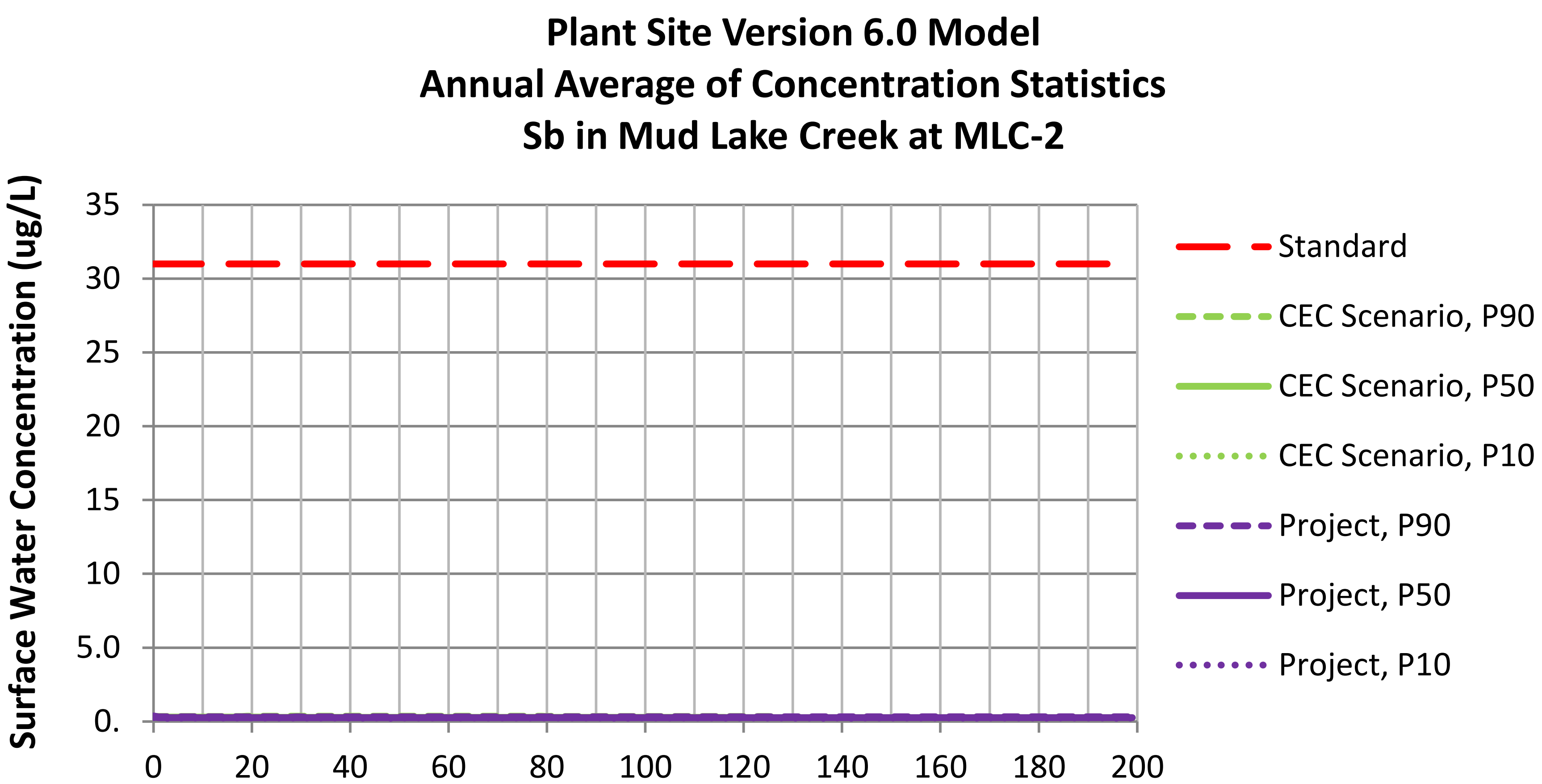

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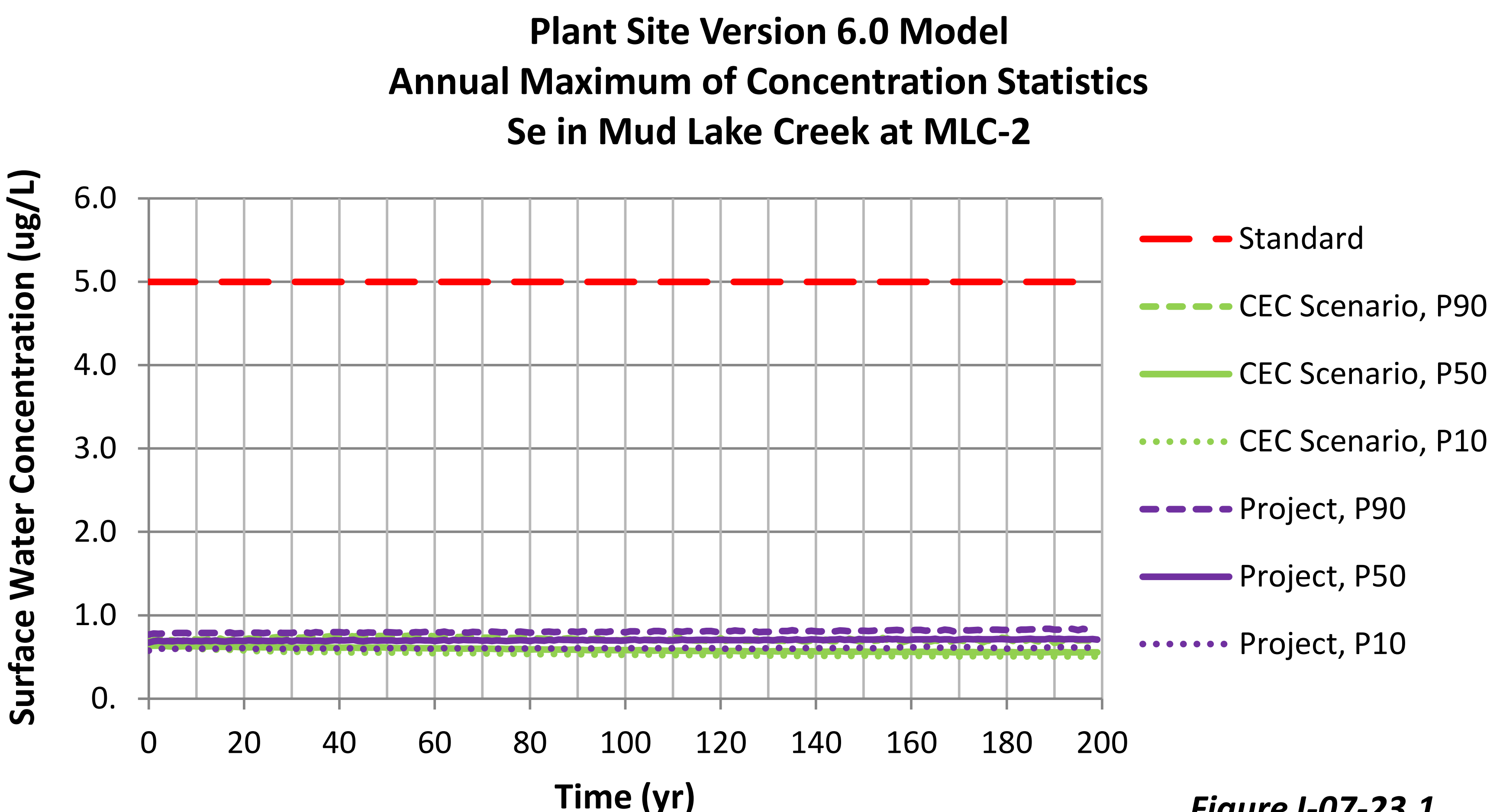

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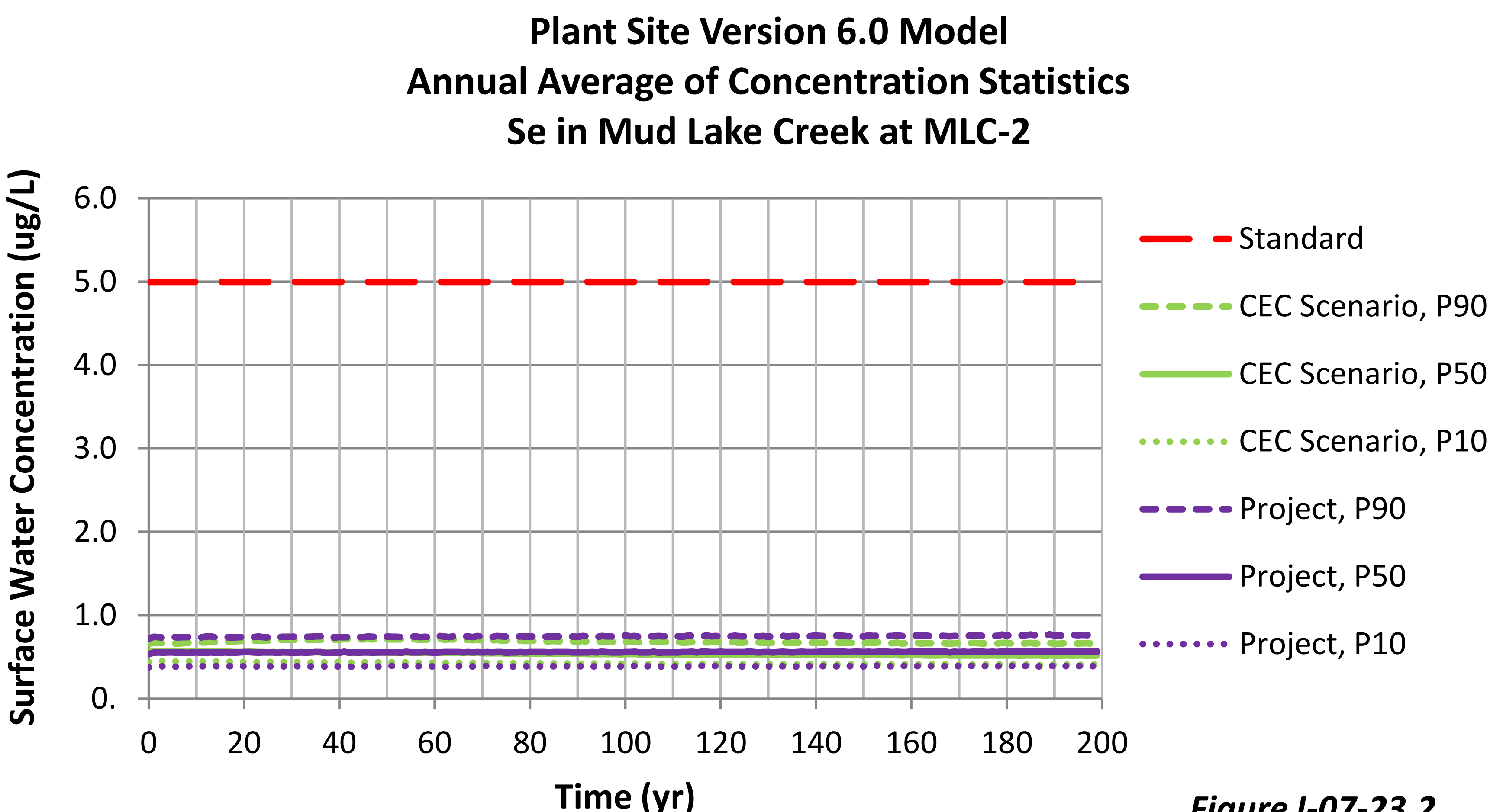

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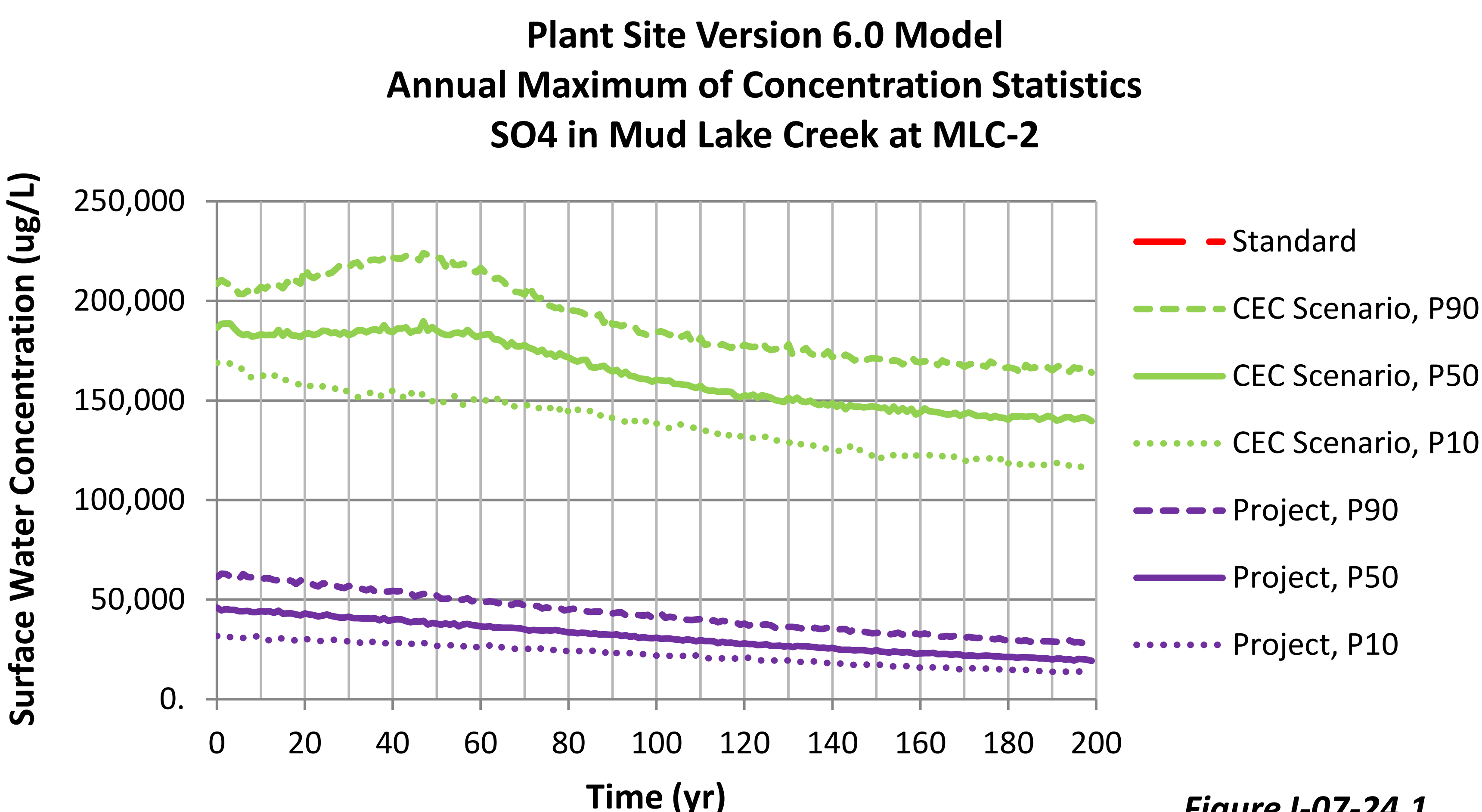

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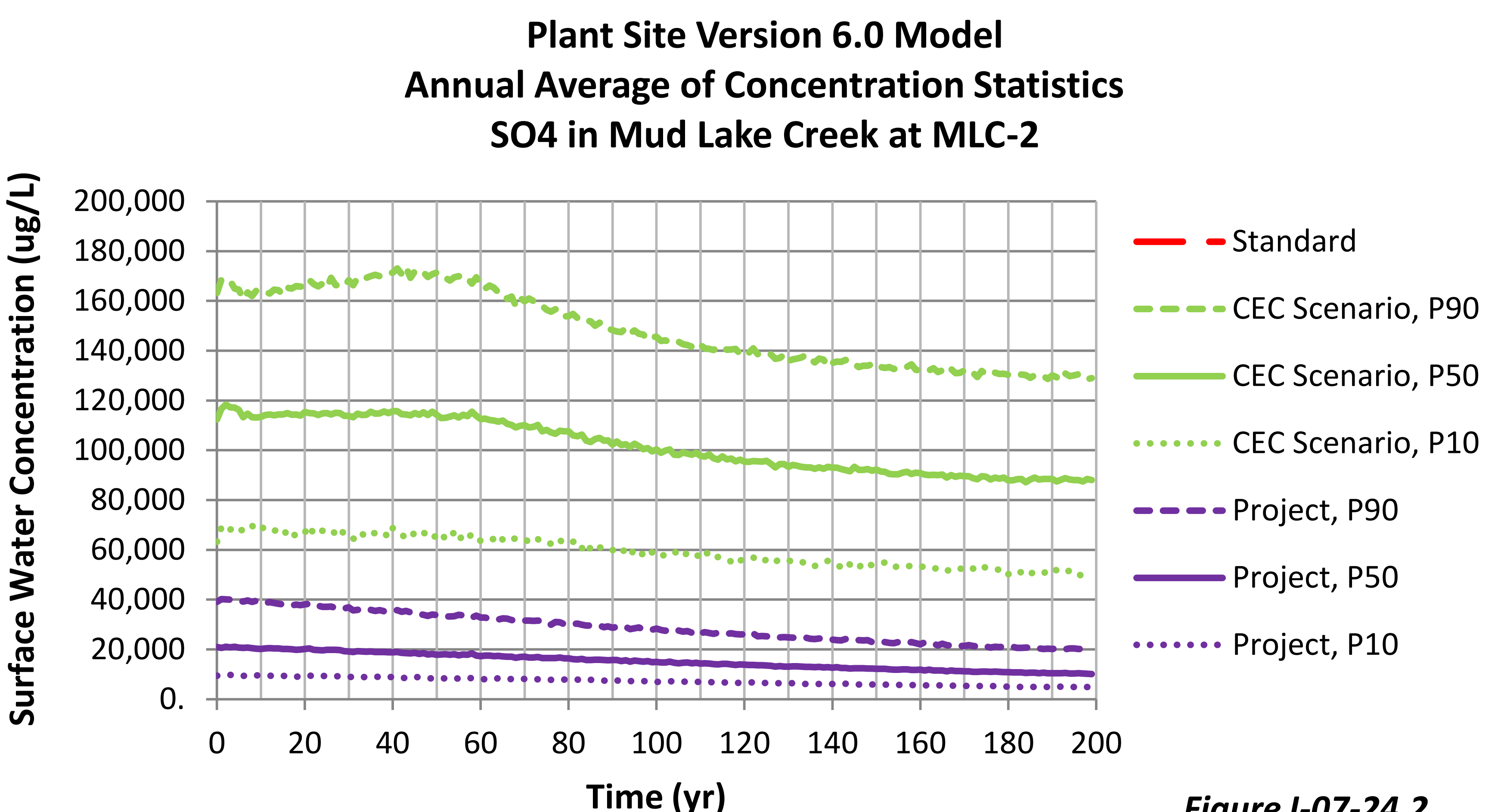

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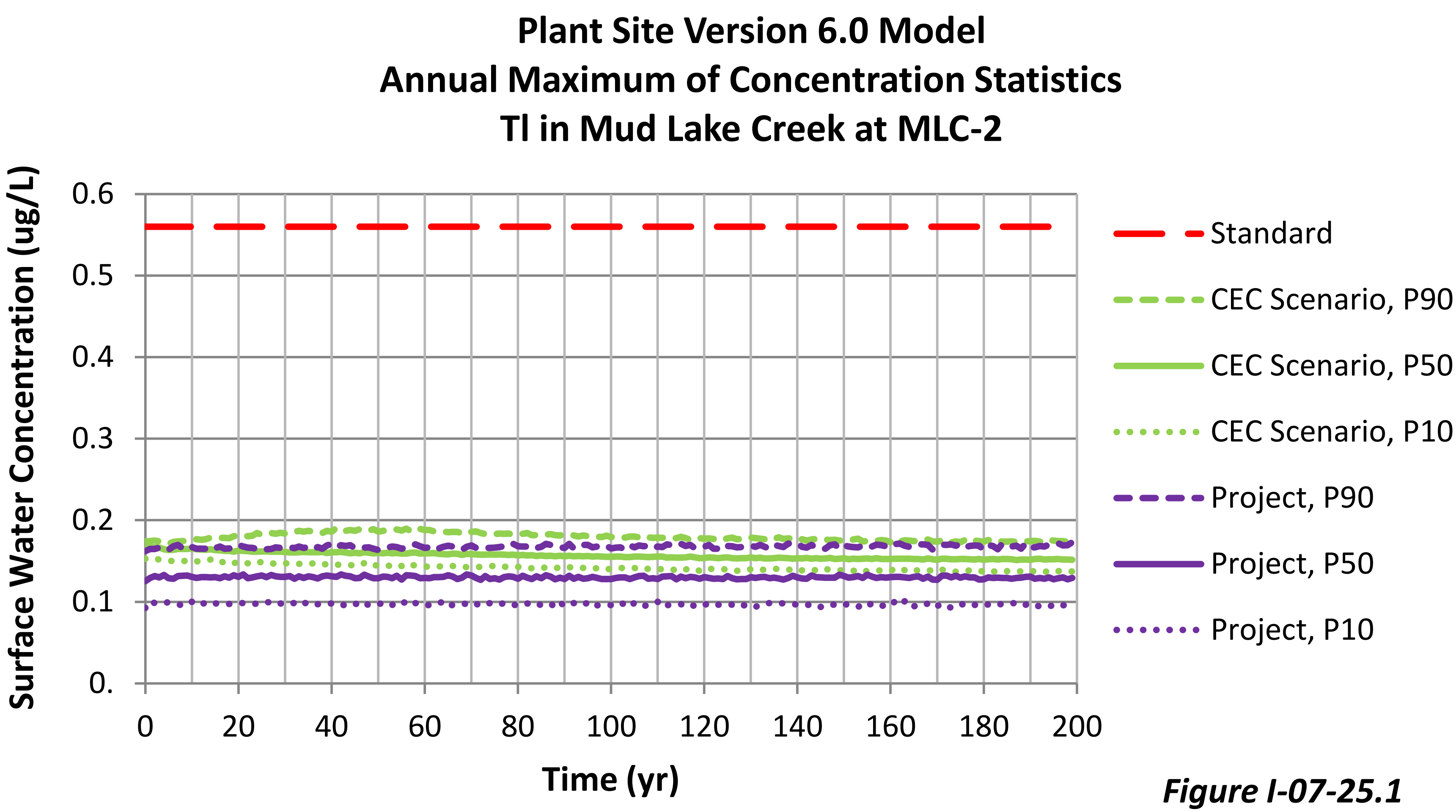

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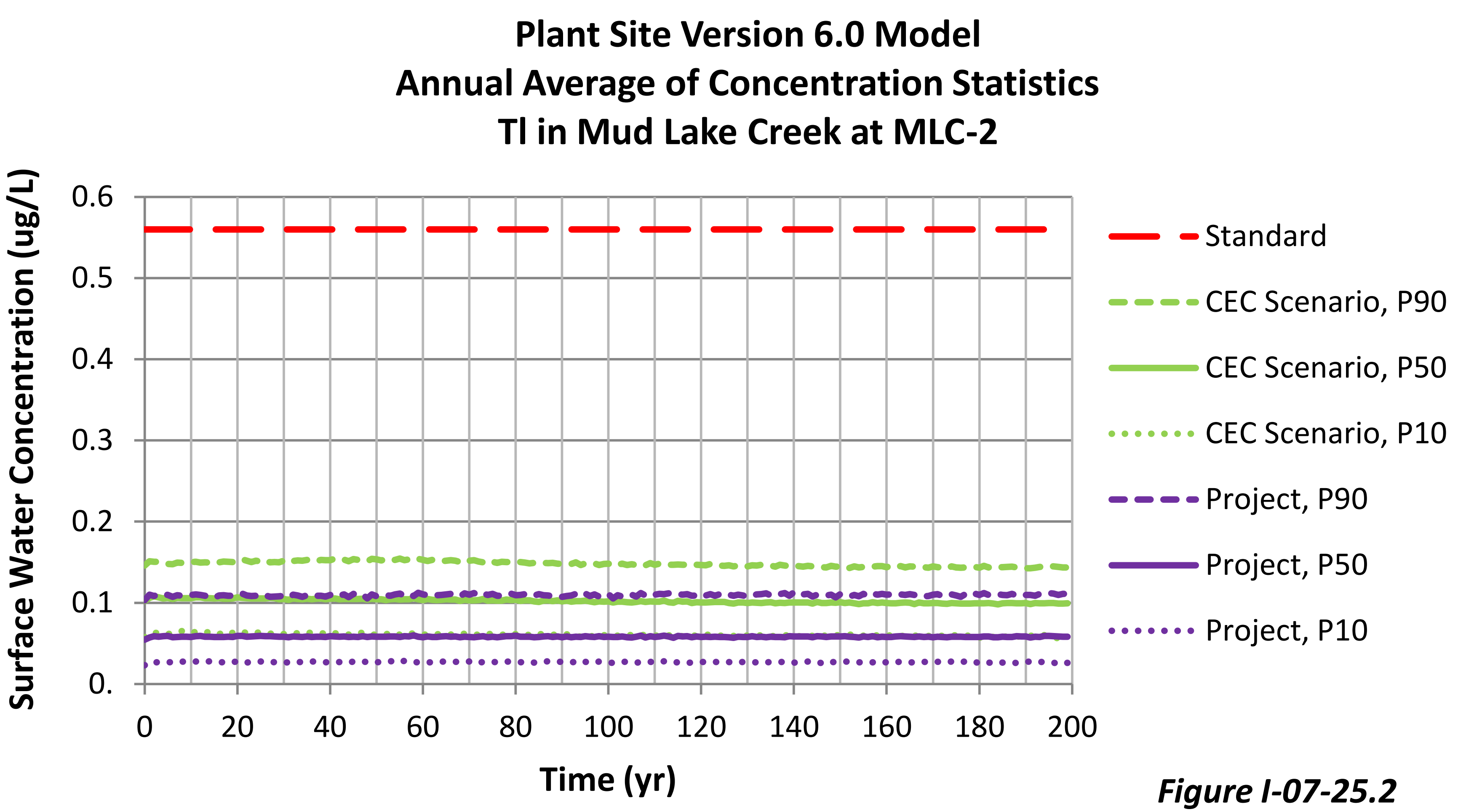

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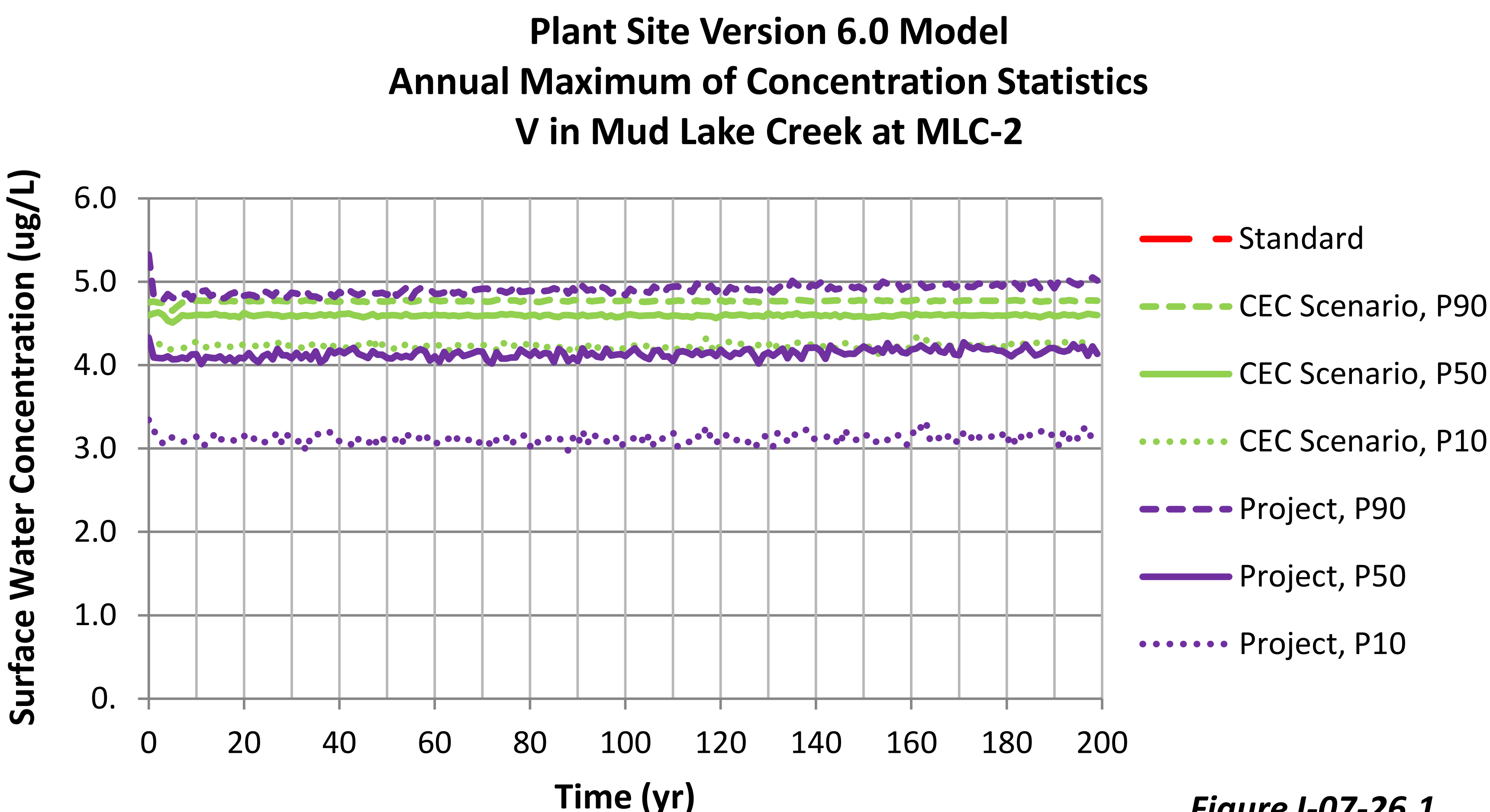

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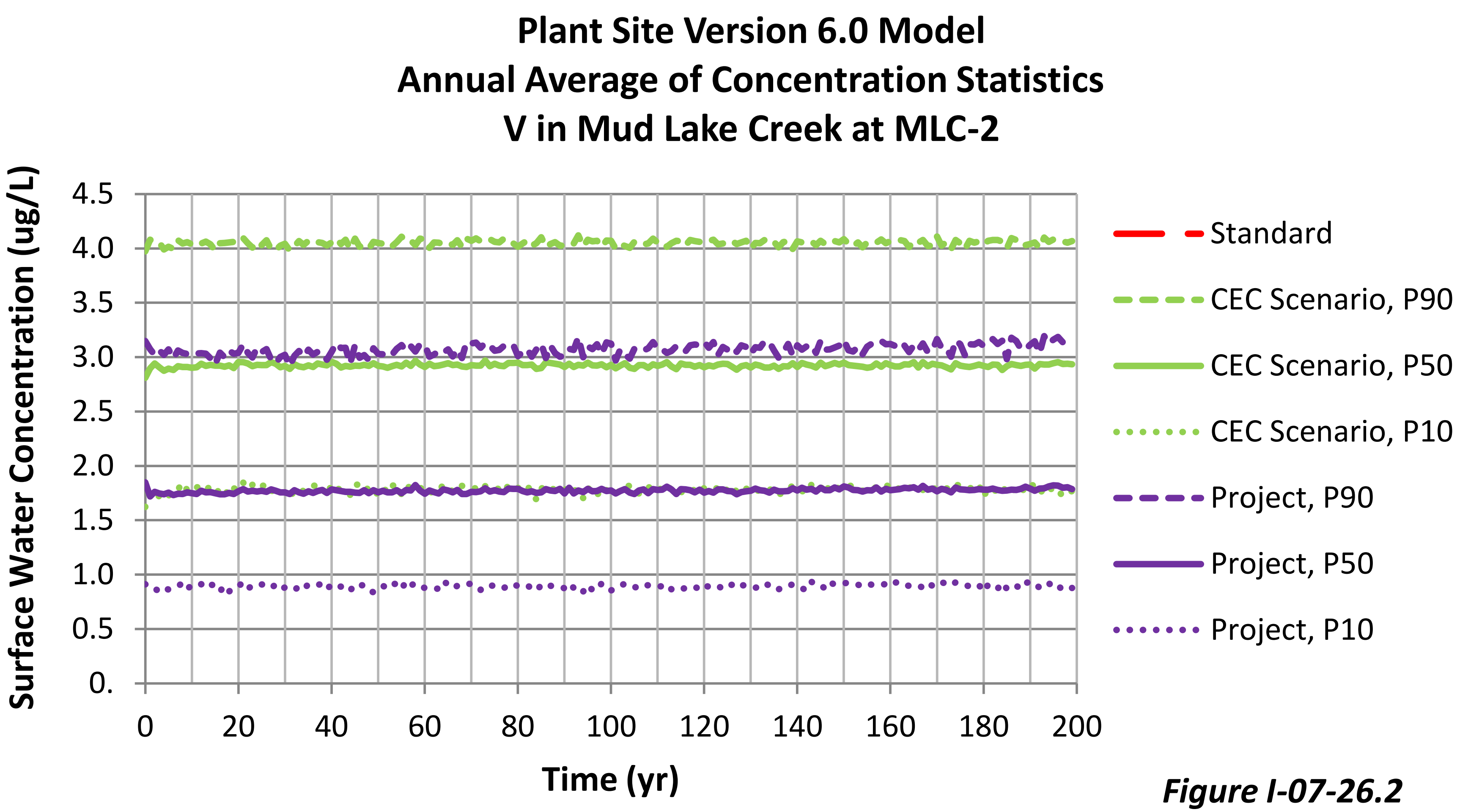

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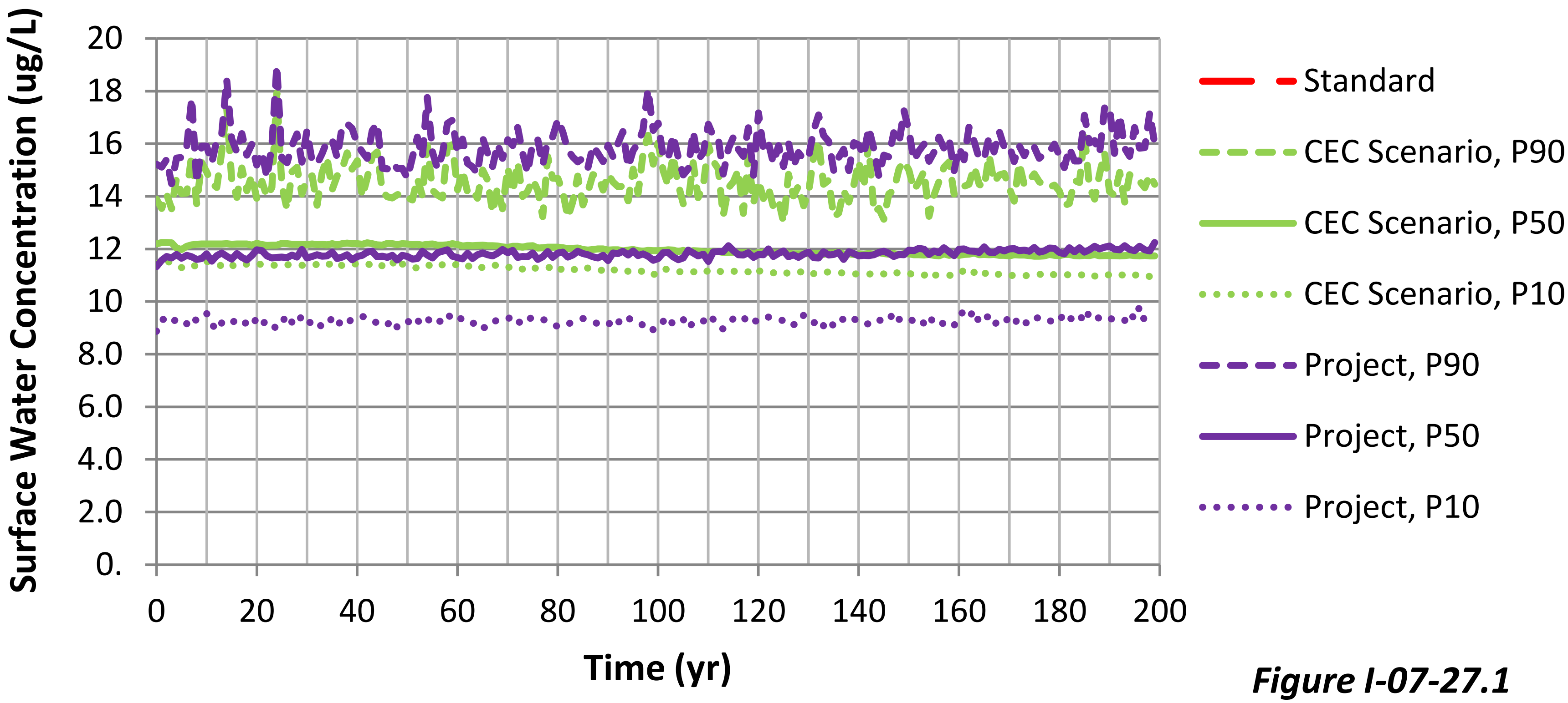
Plant Site Version 6.0 Model
Annual Maximum of Concentration Statistics
Zn in Mud Lake Creek at MLC-2



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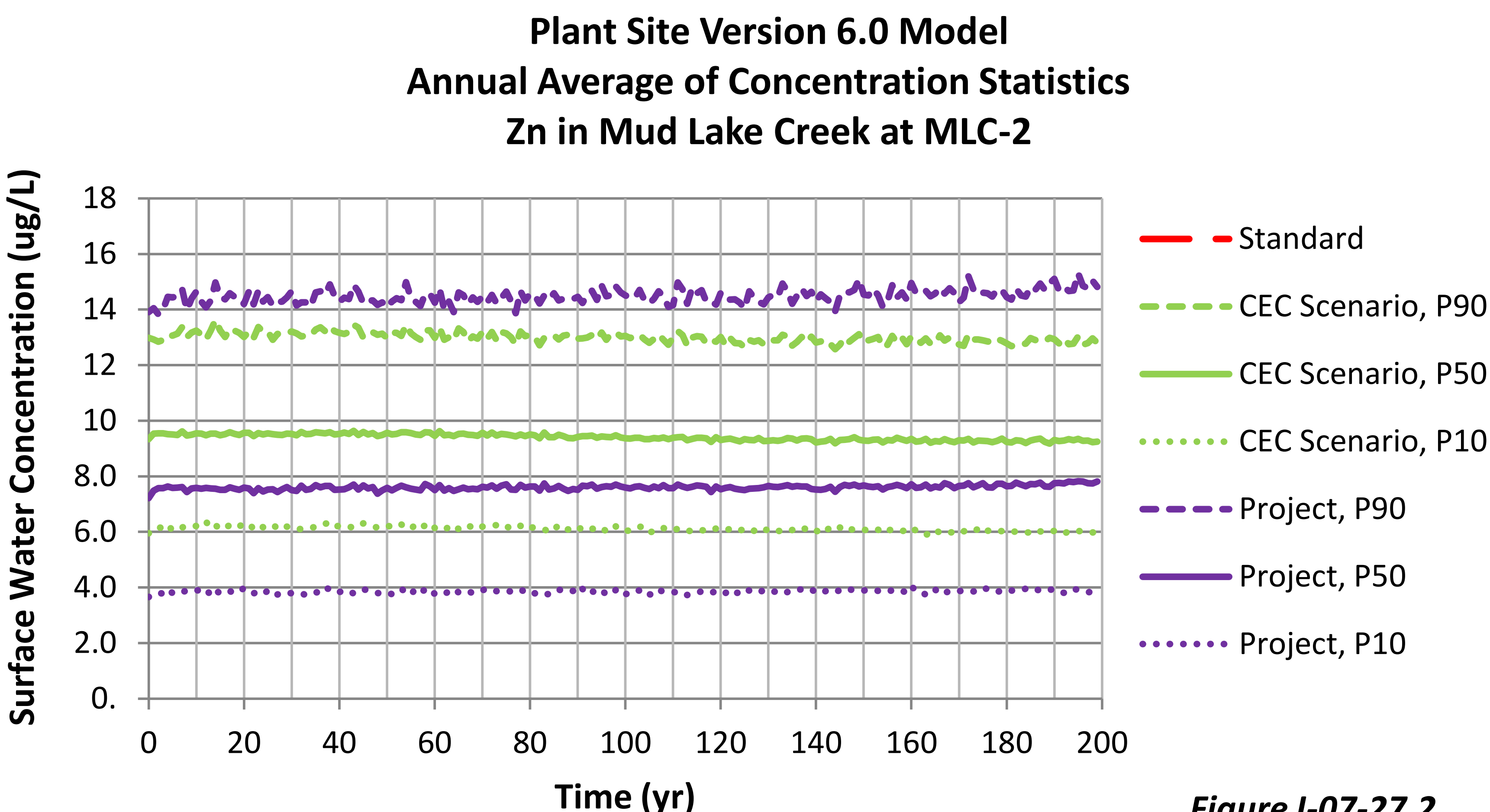

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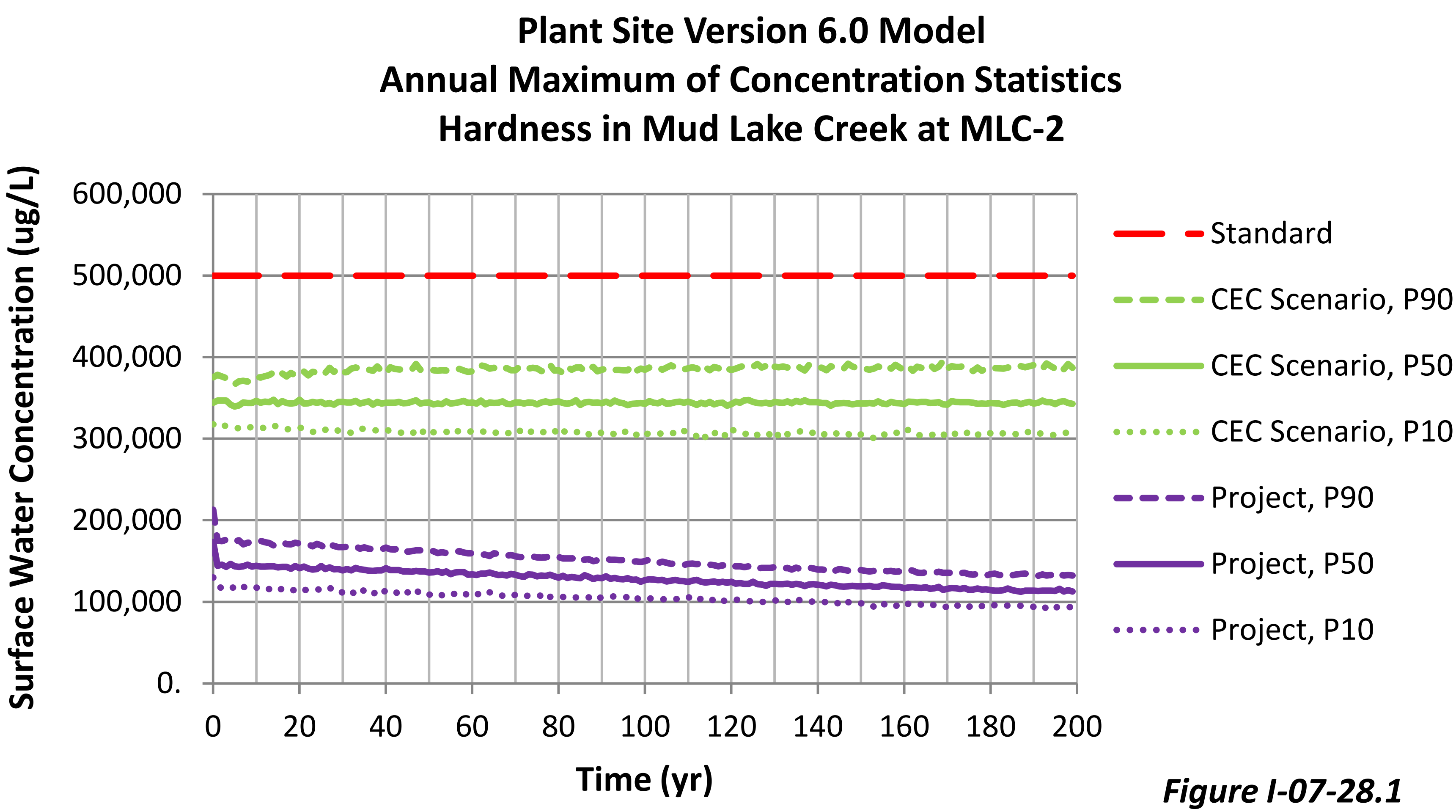

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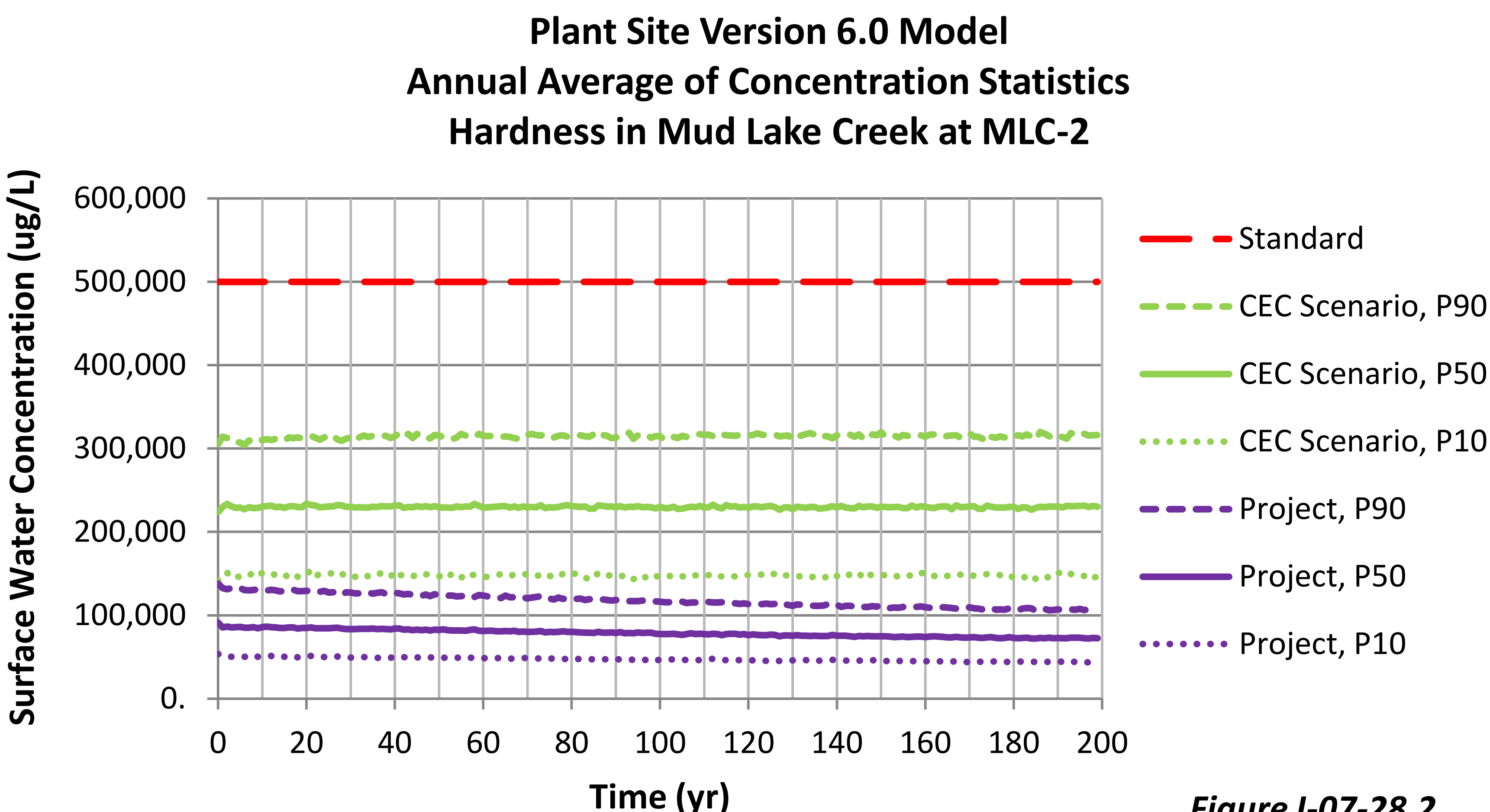

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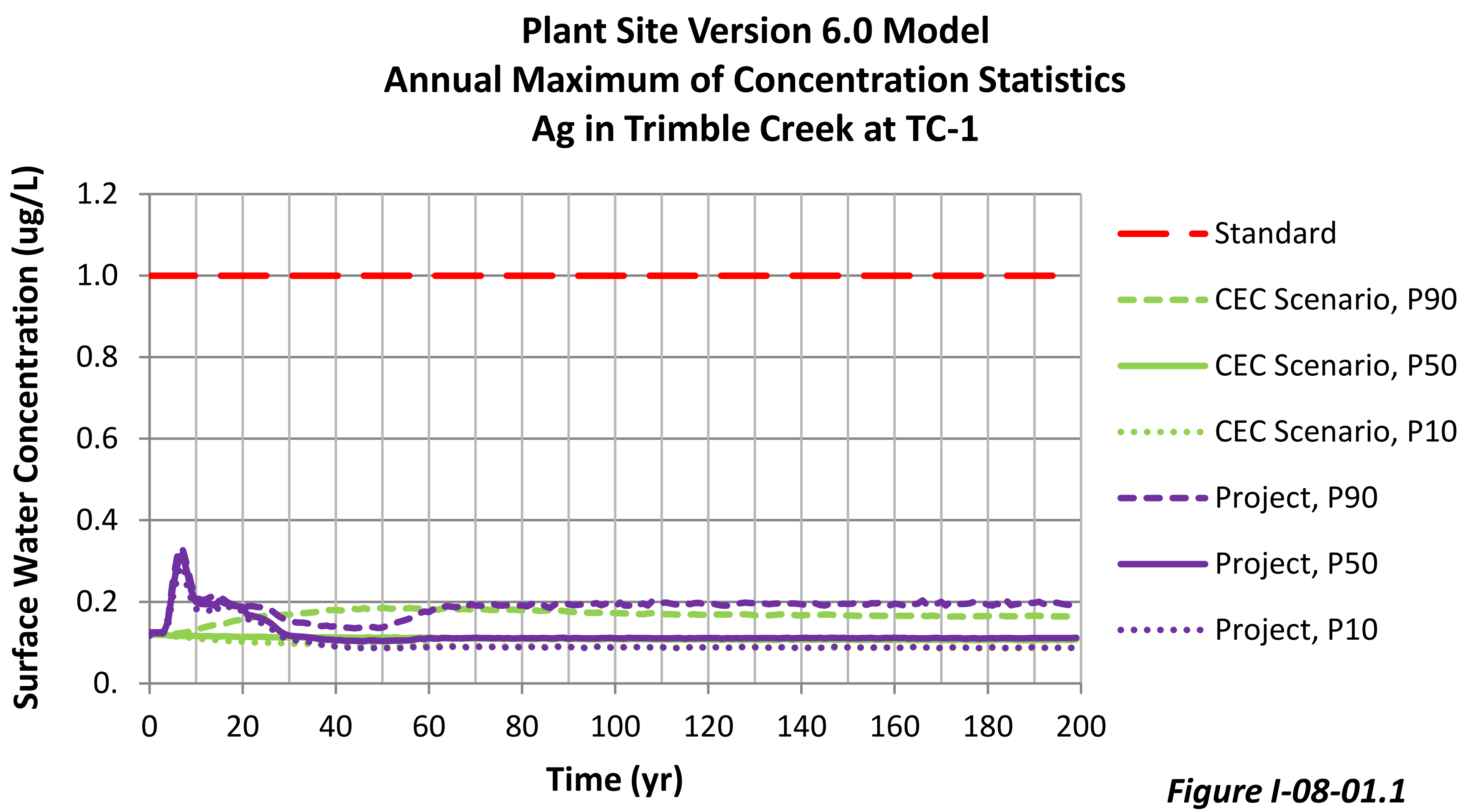

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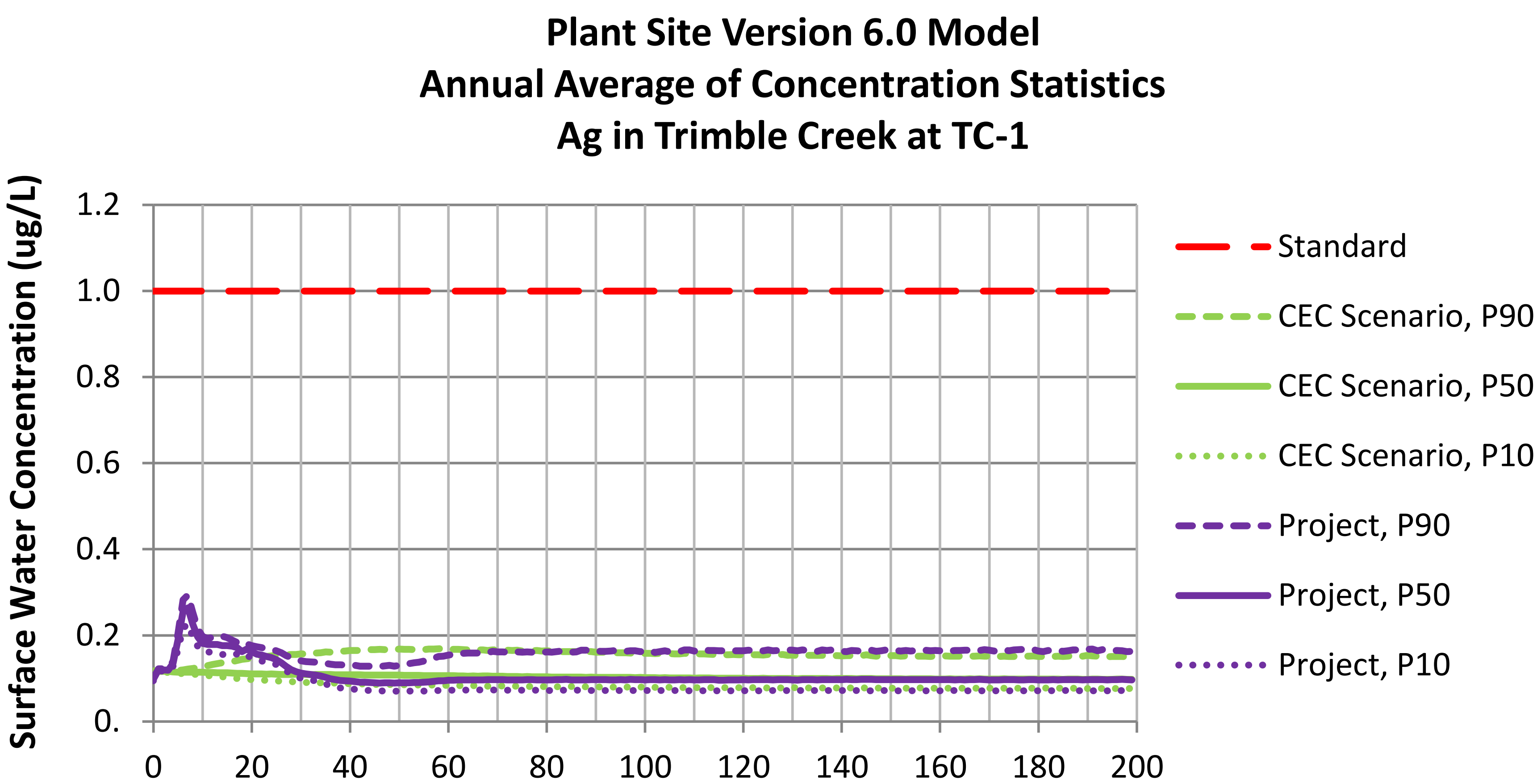

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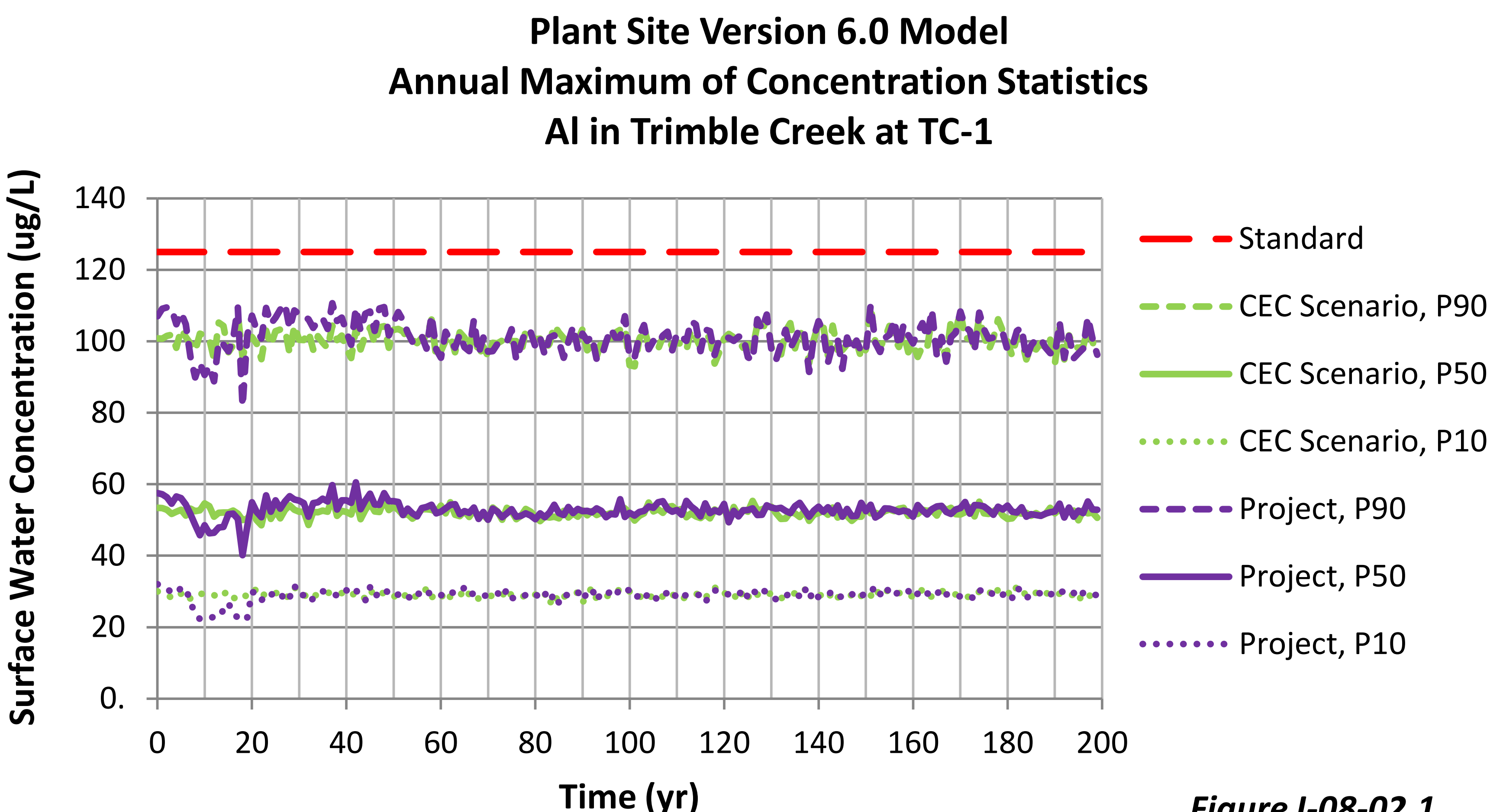

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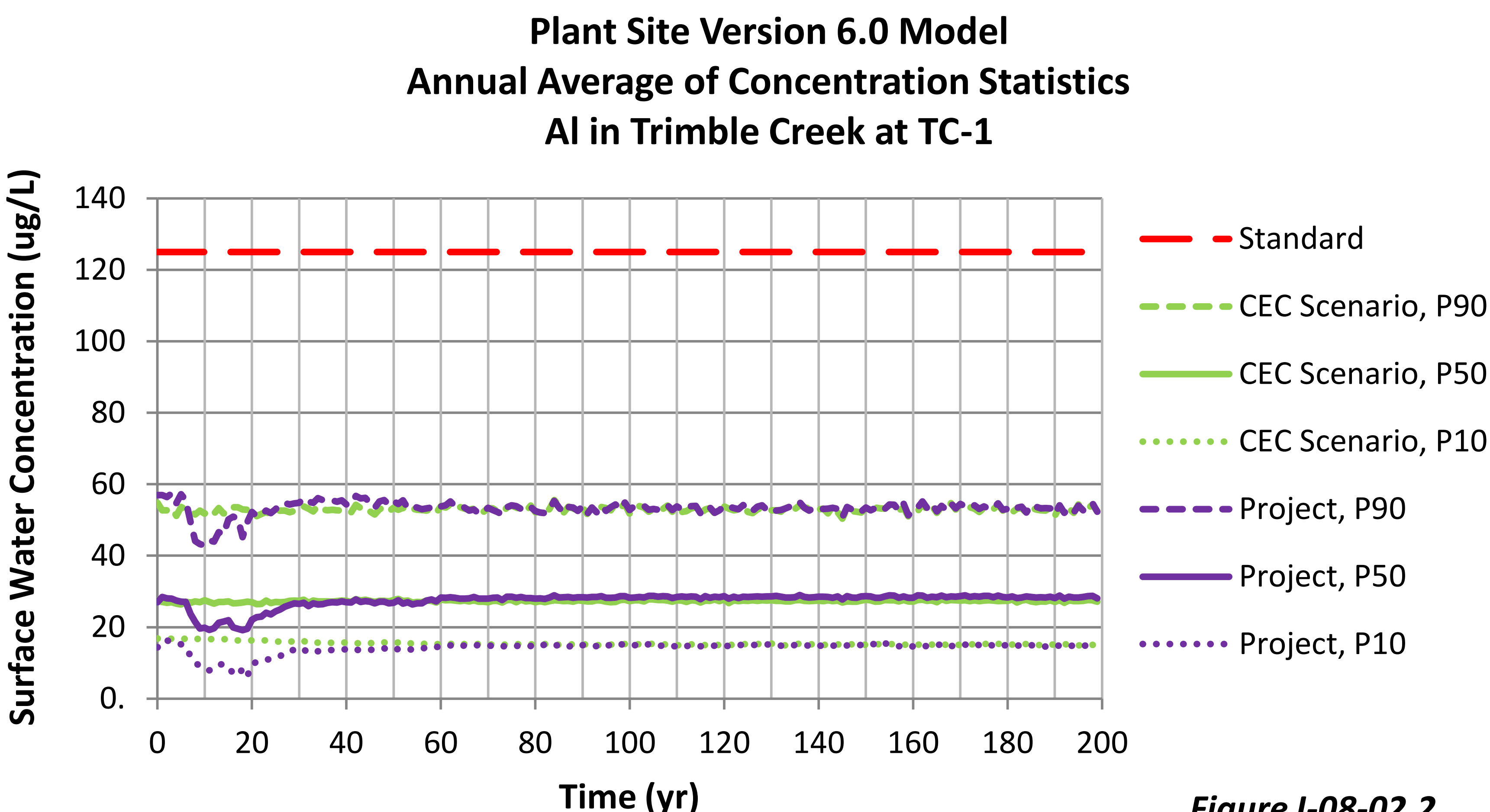

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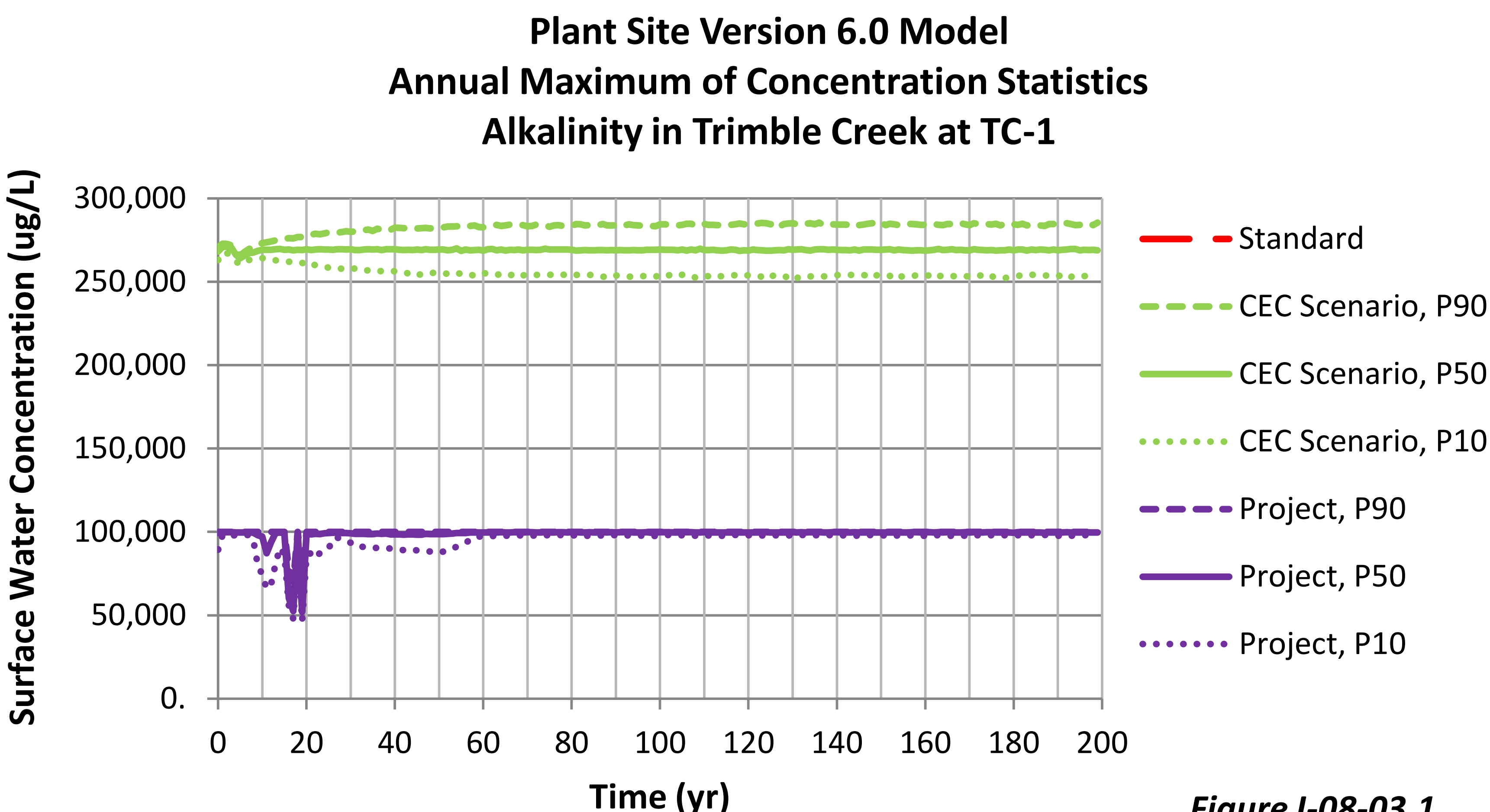

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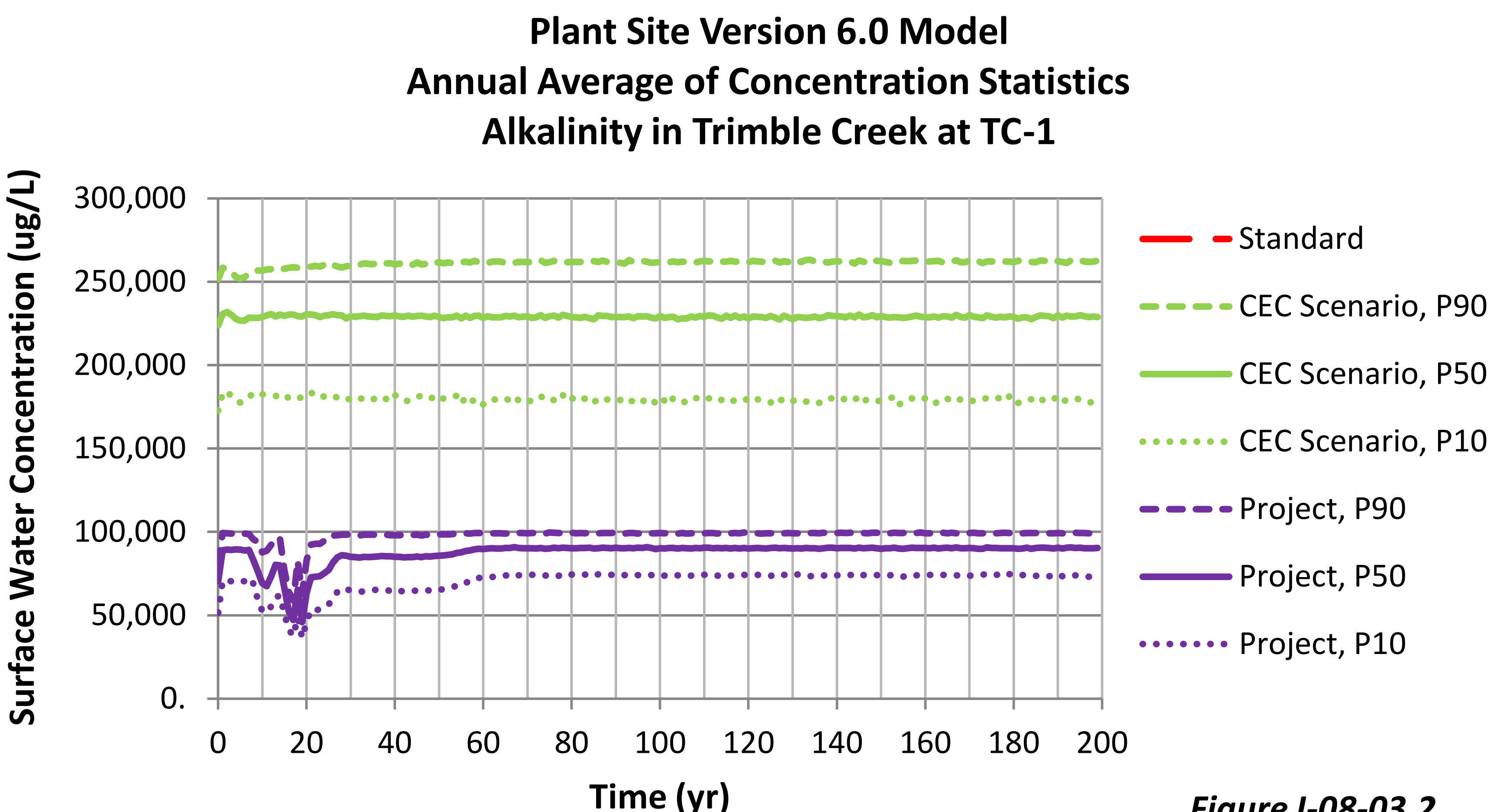

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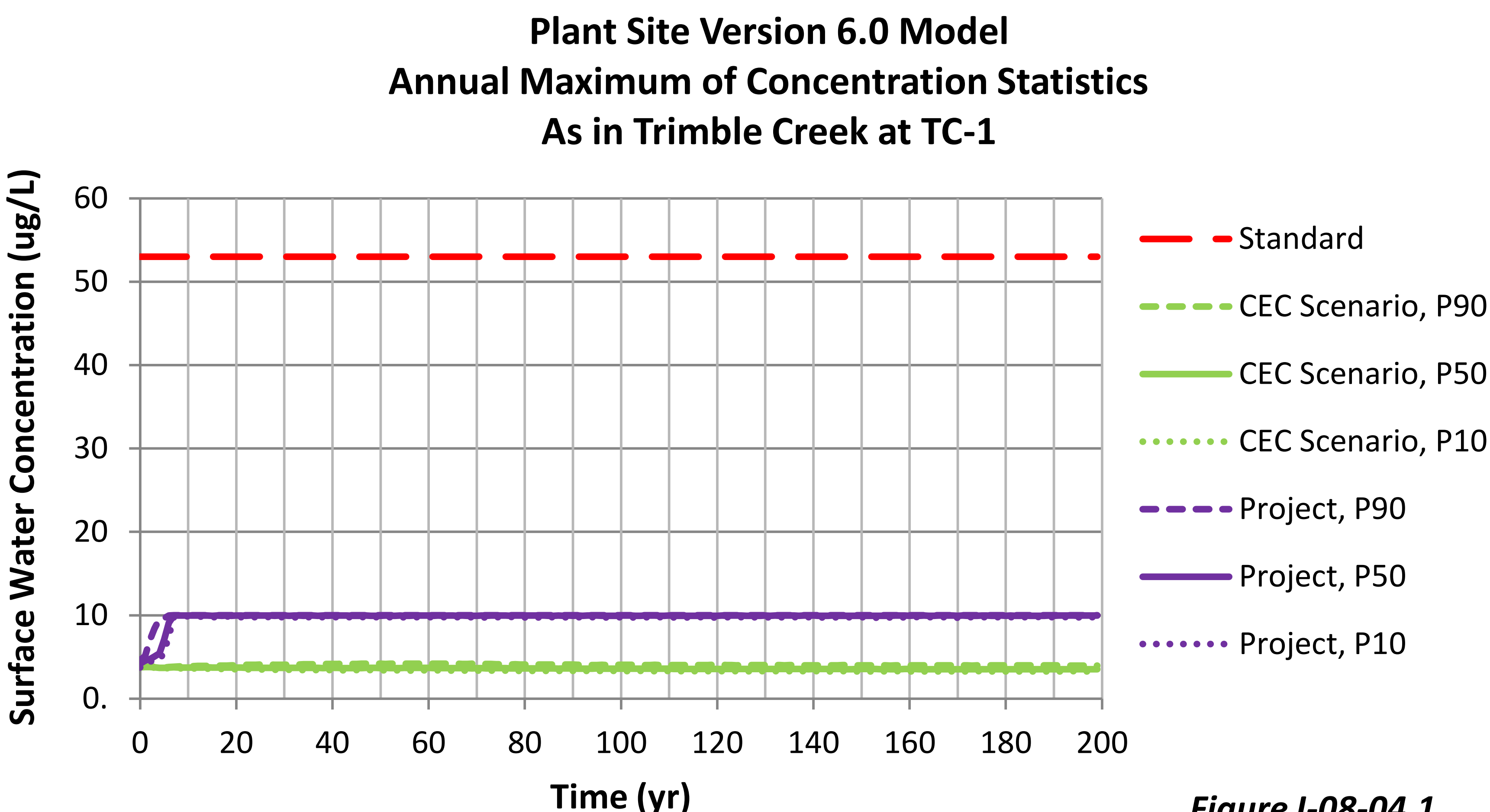

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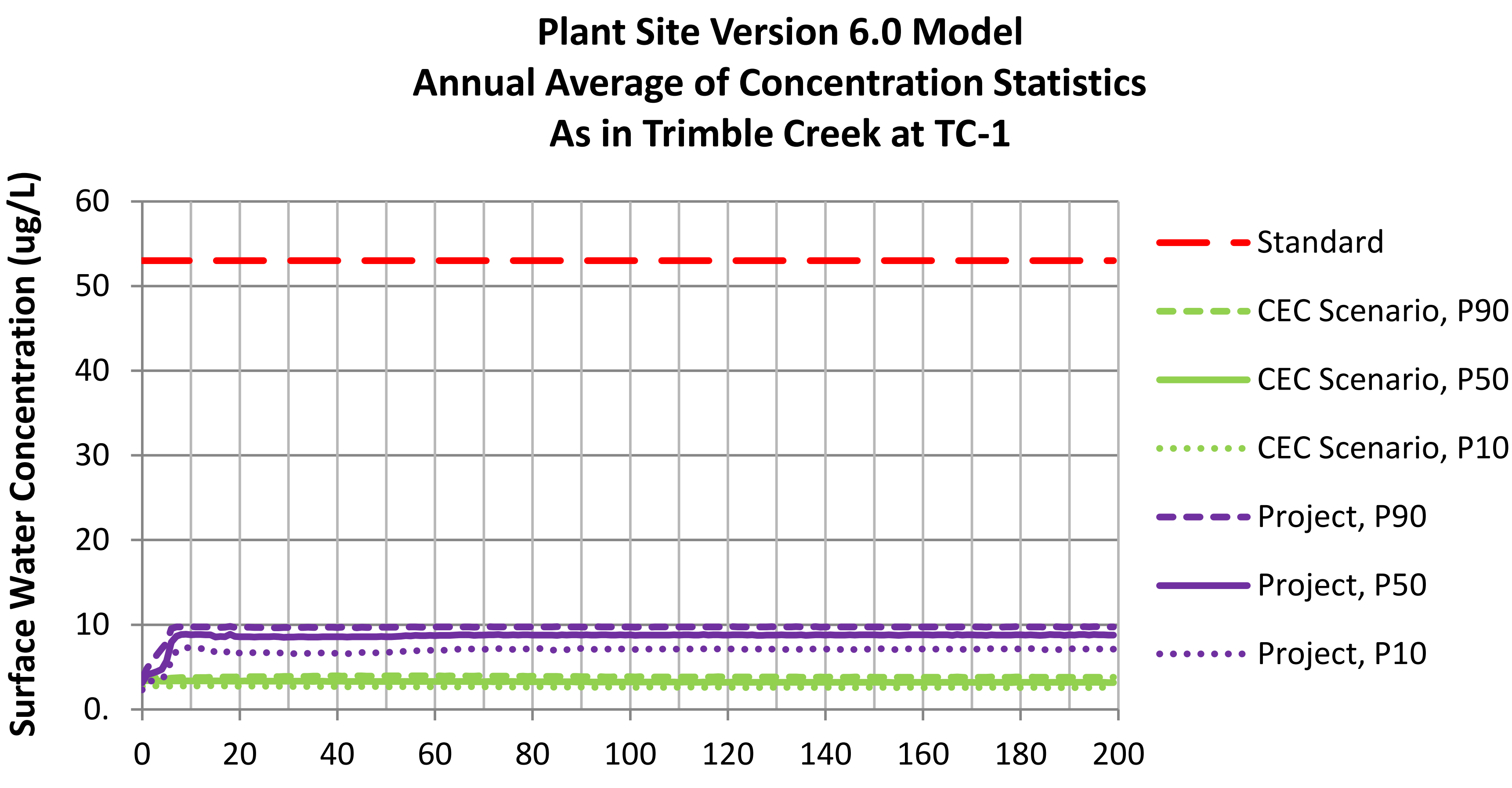

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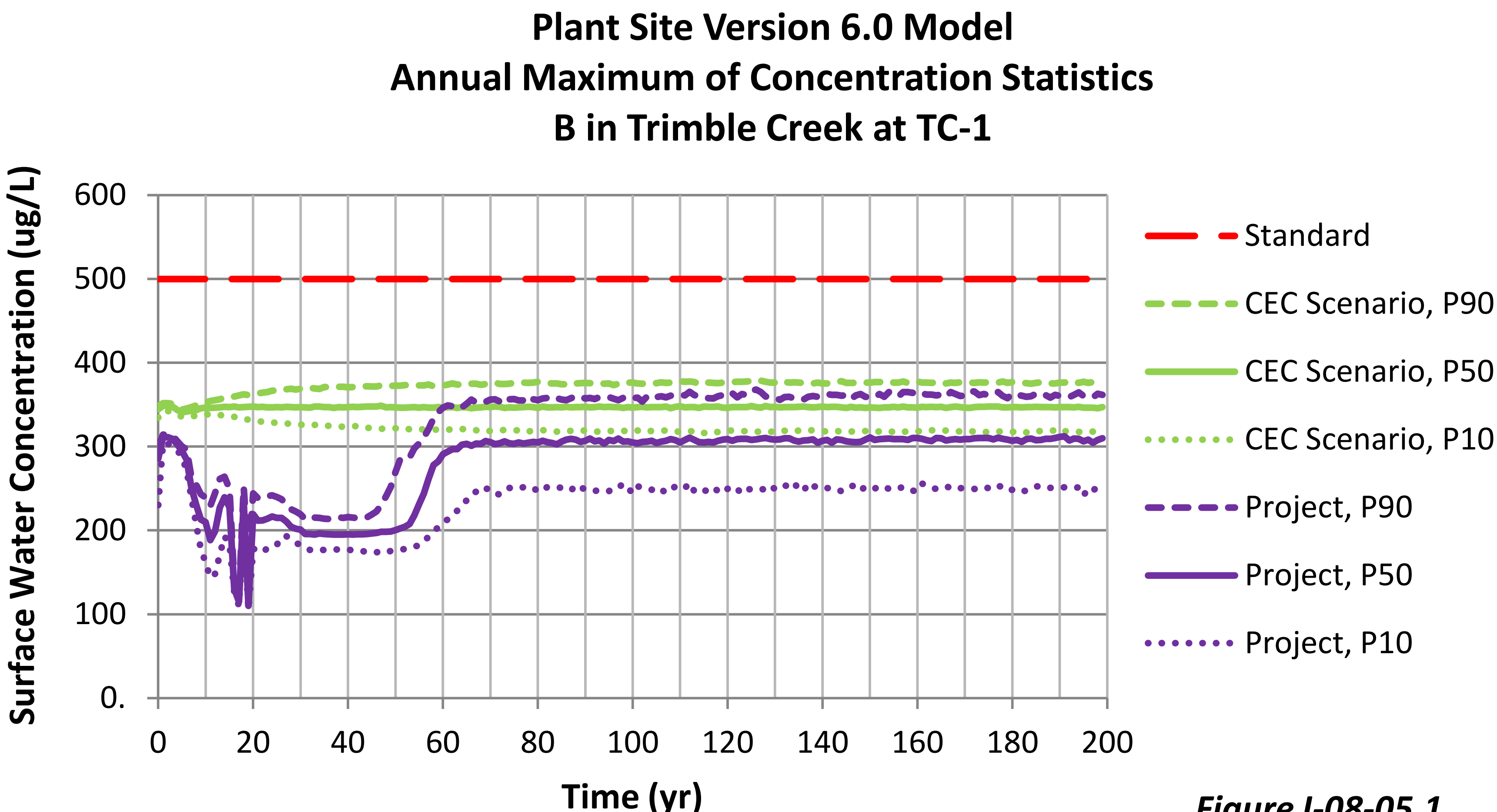

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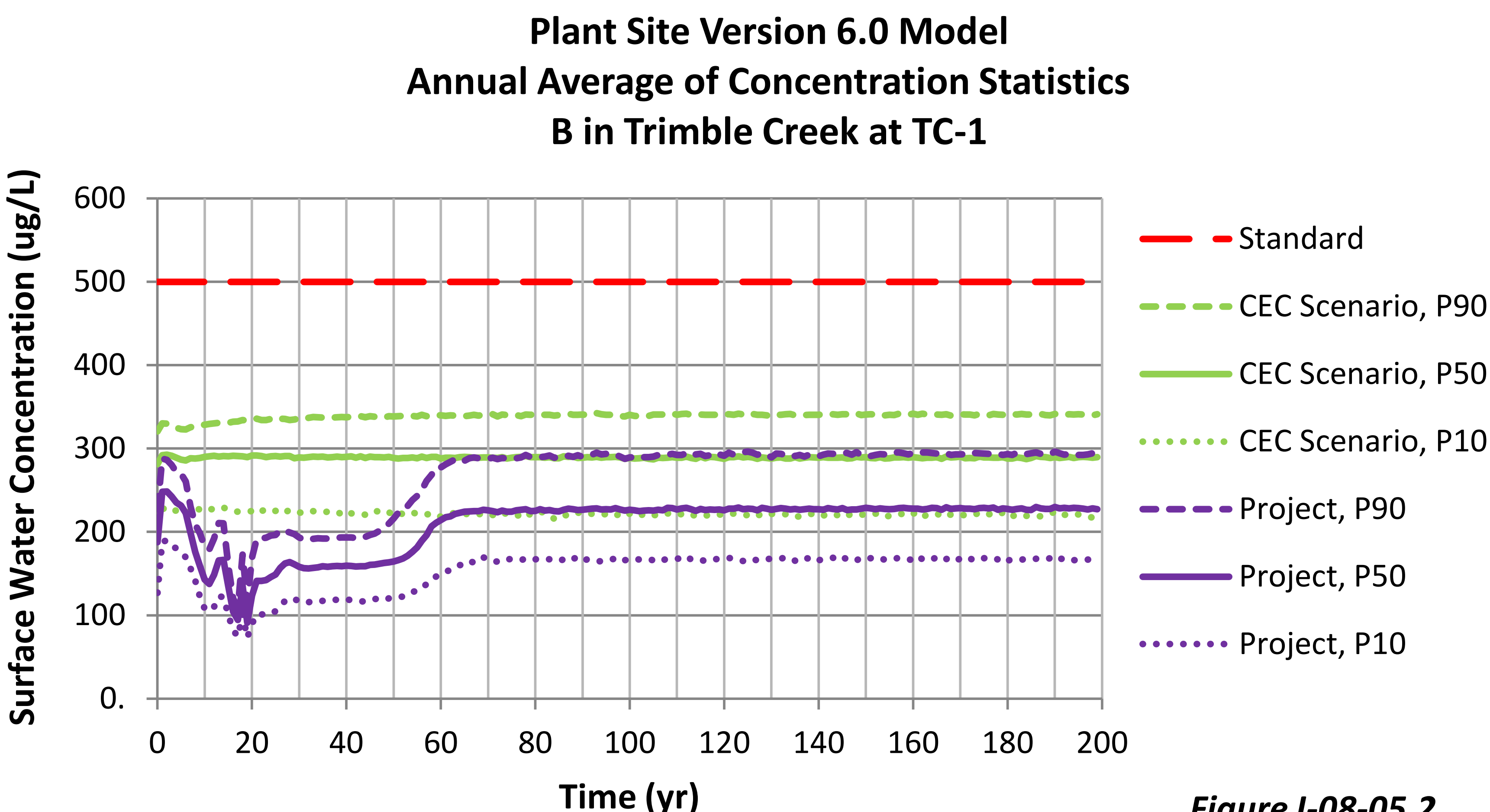

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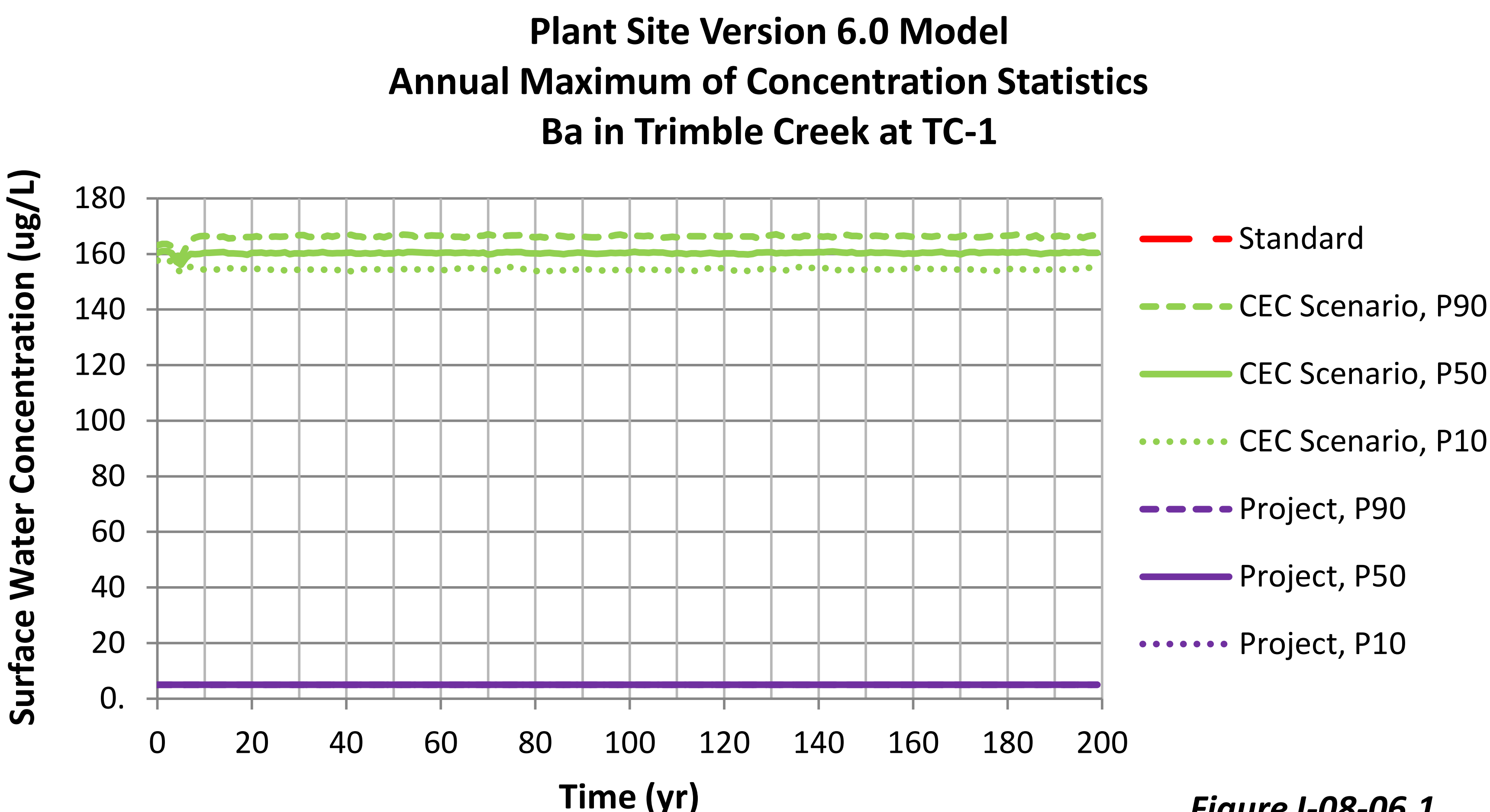

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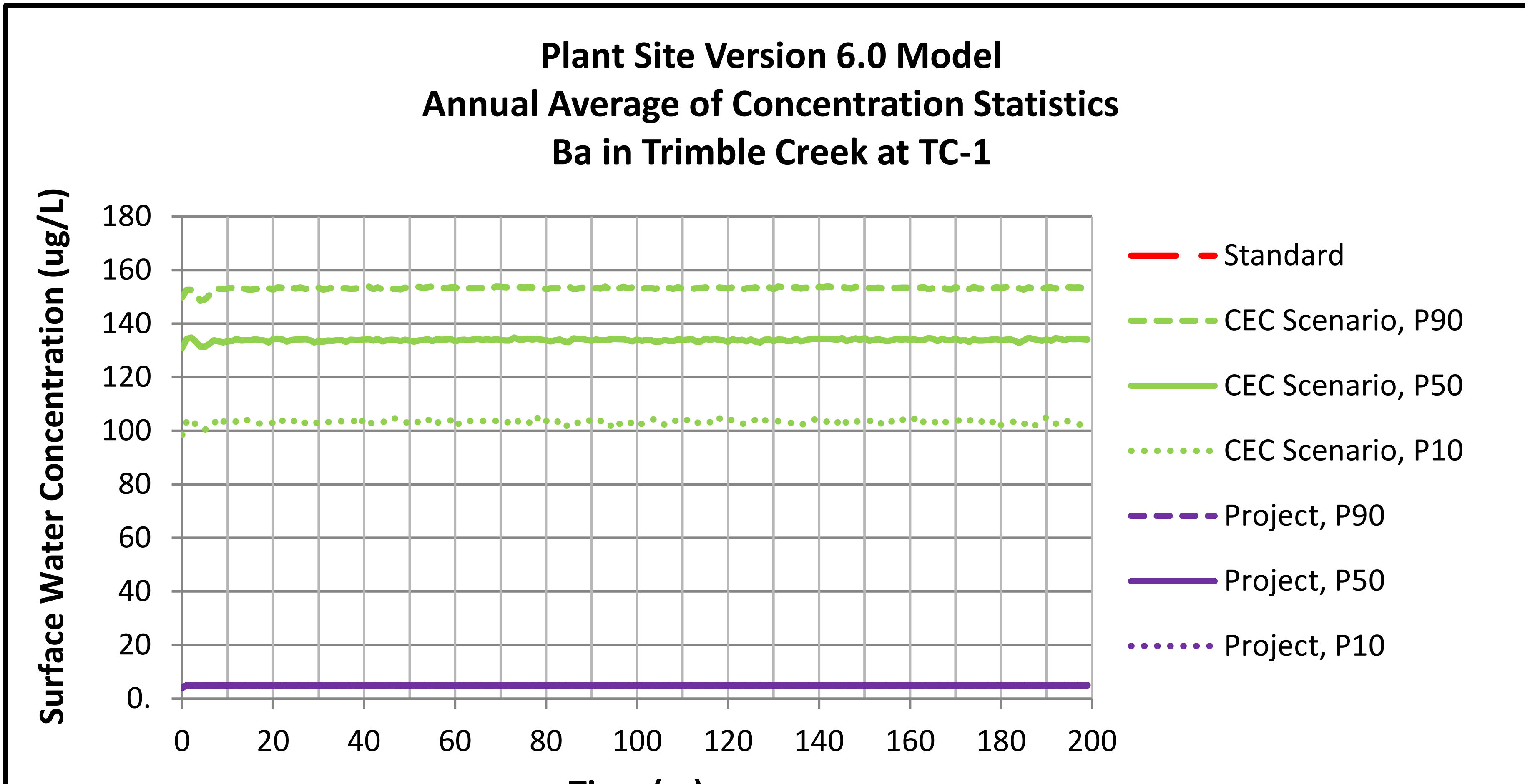

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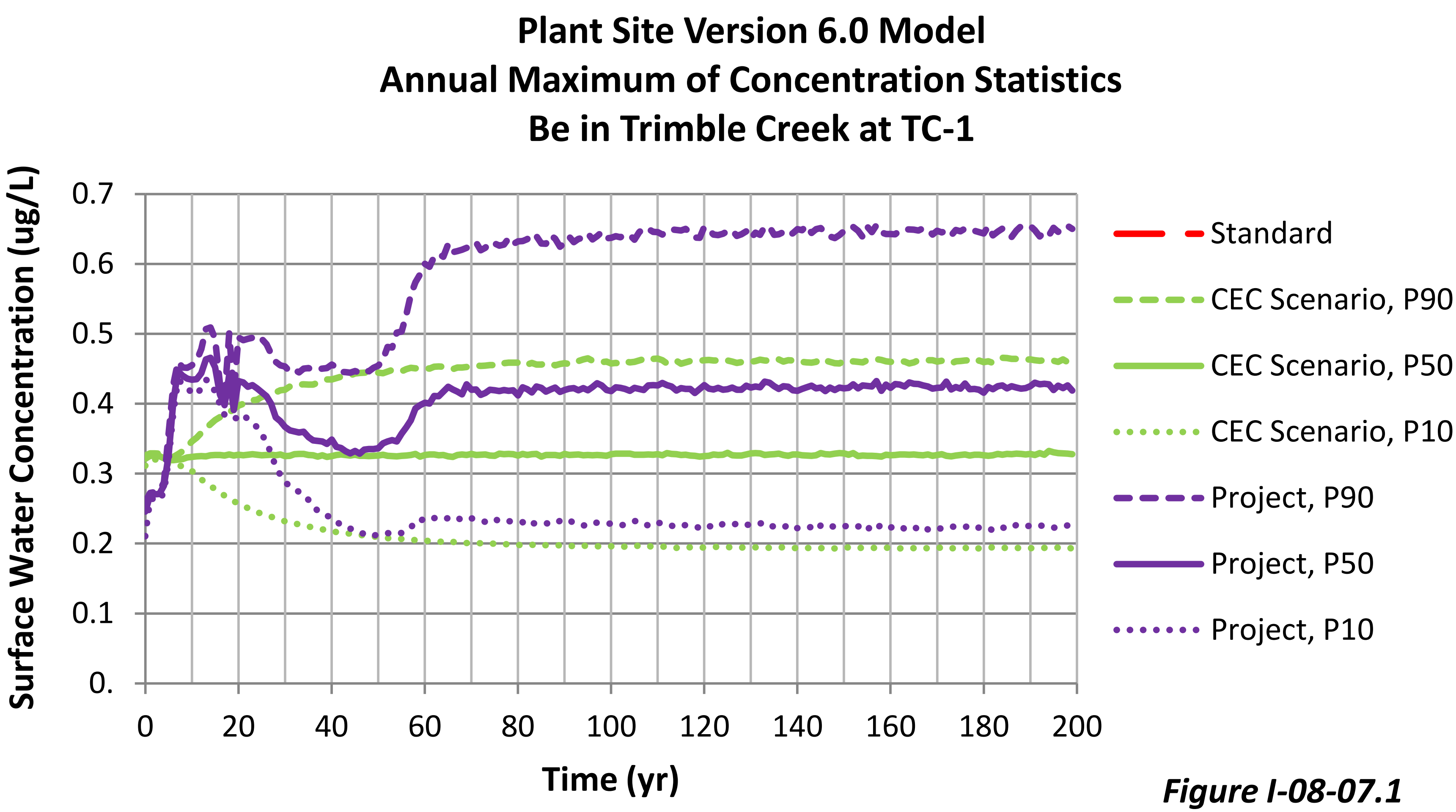

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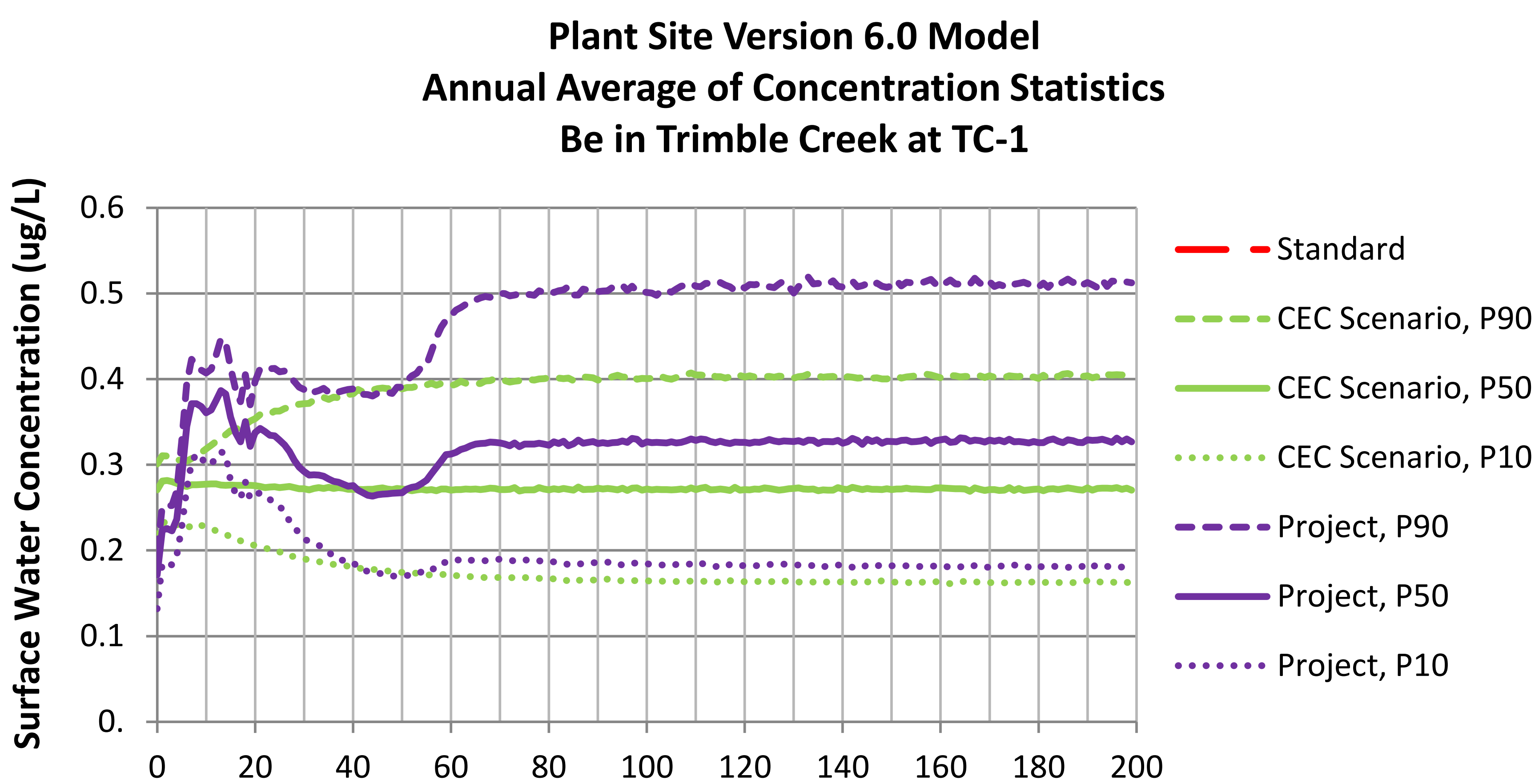

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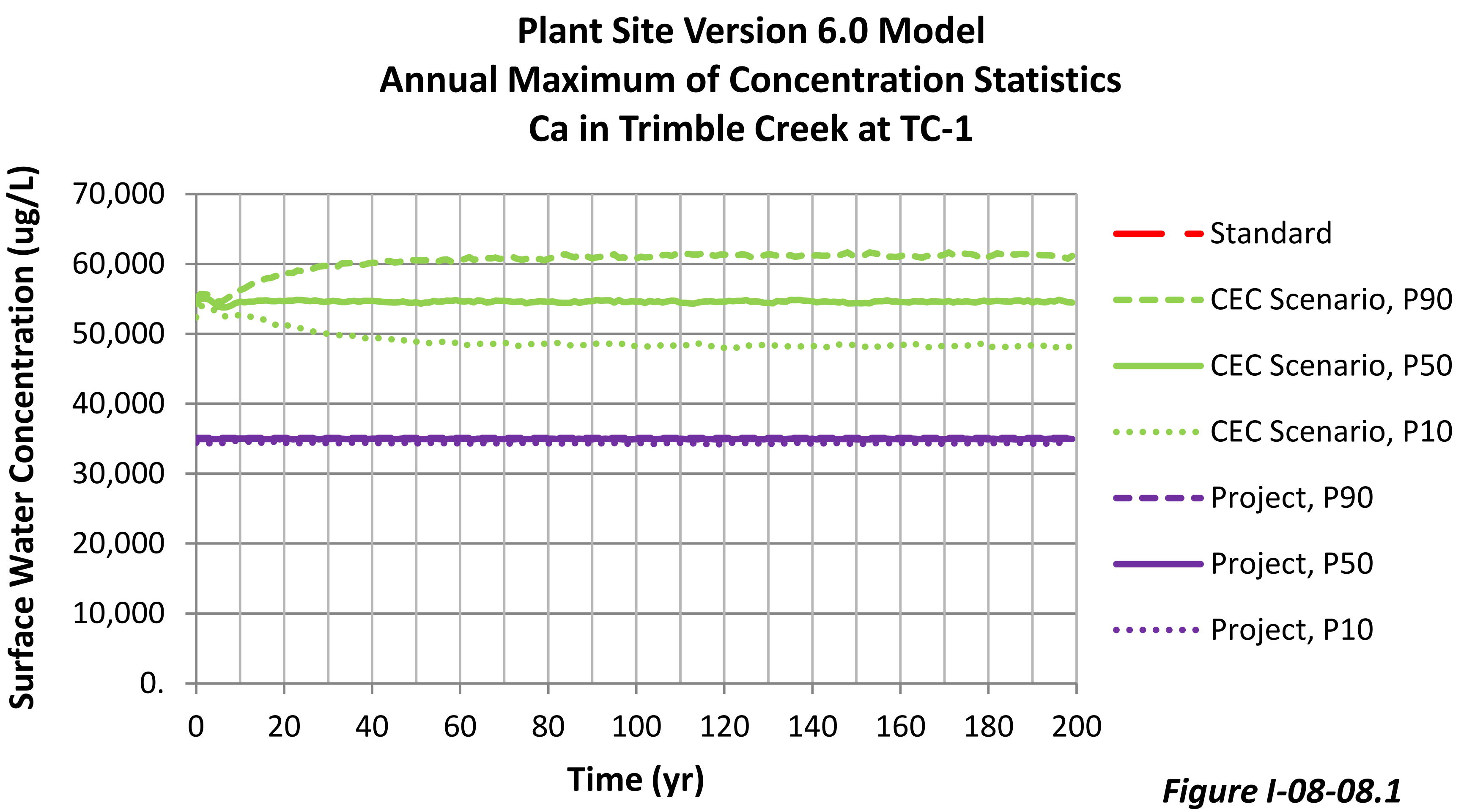

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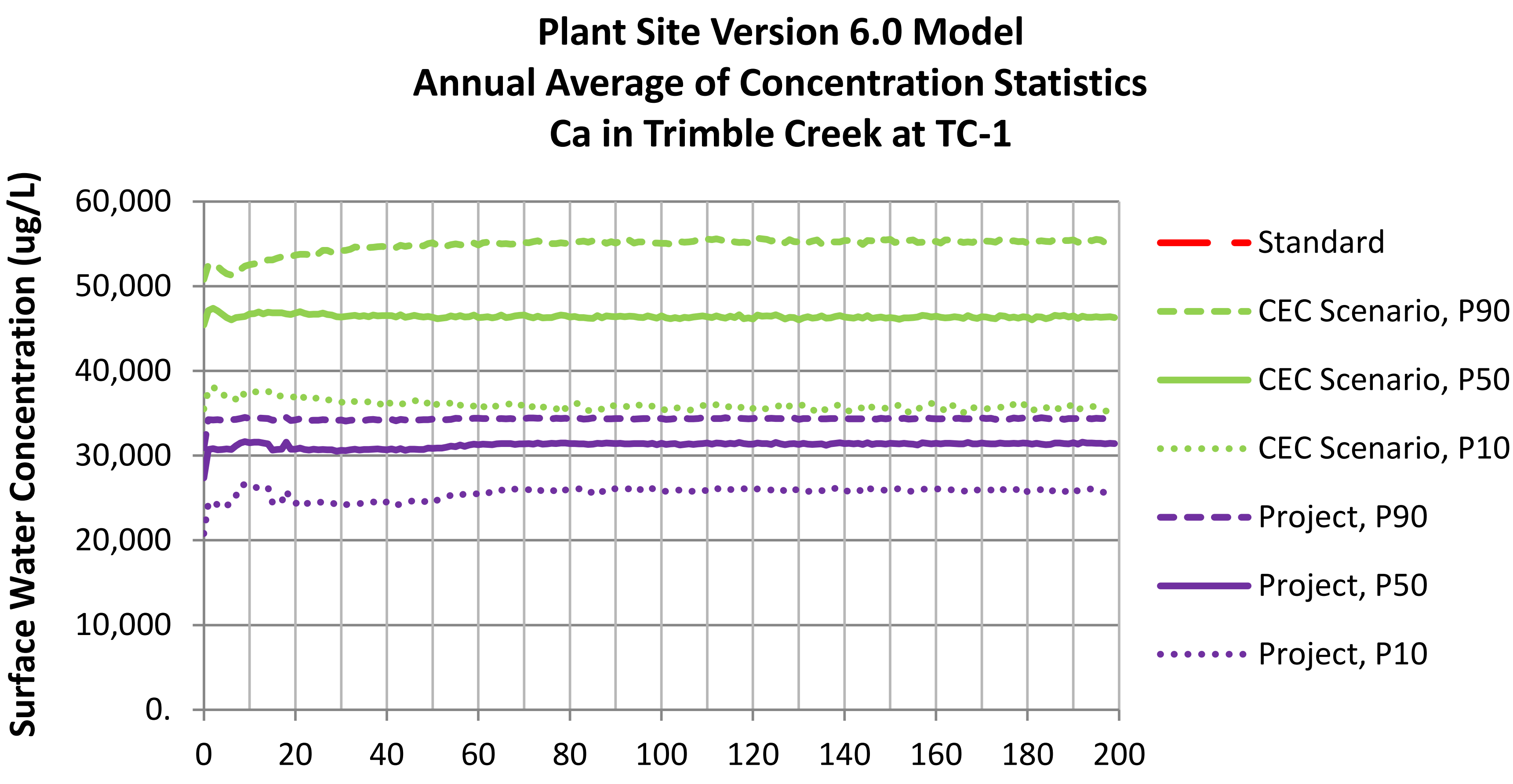

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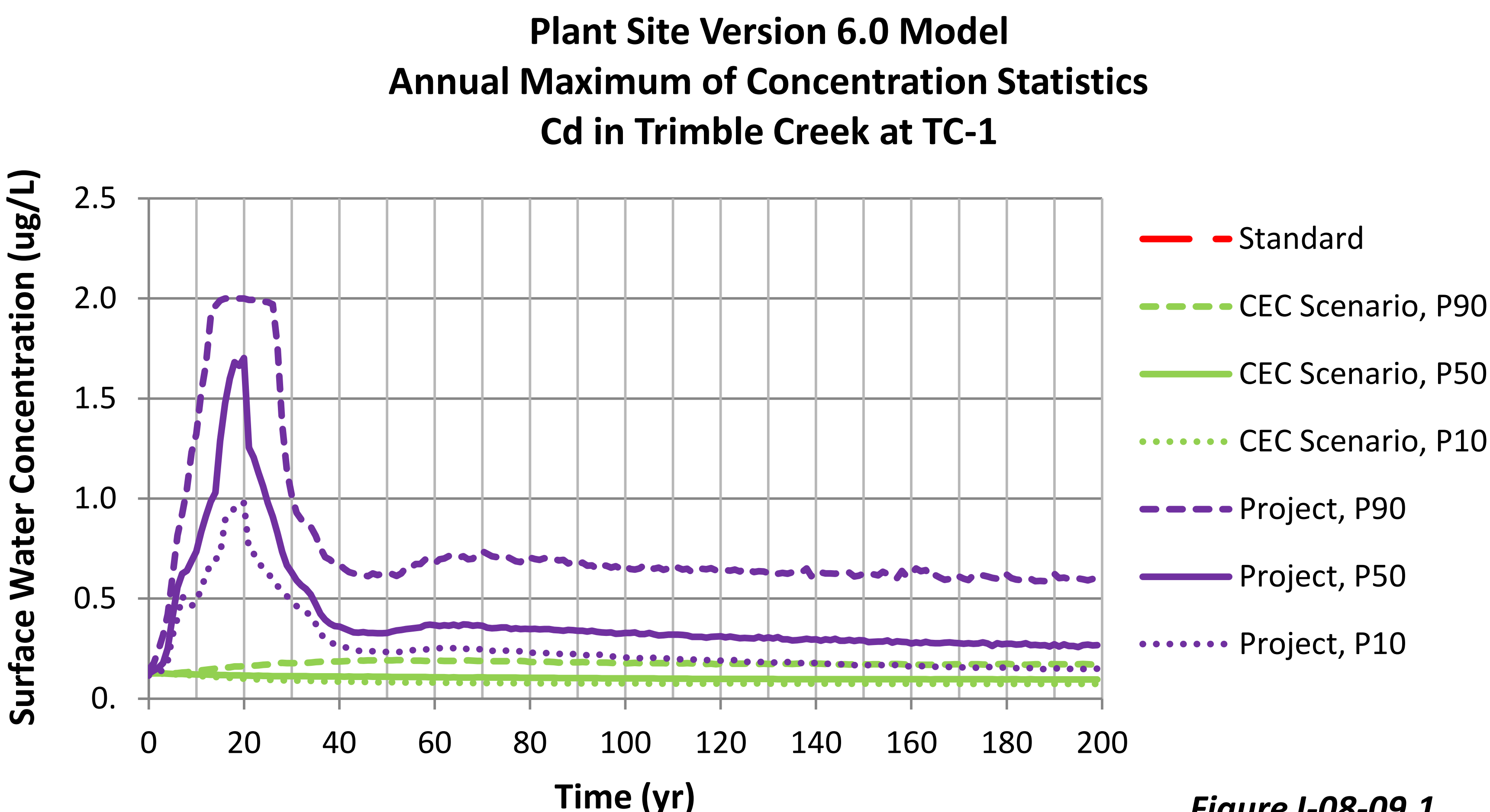

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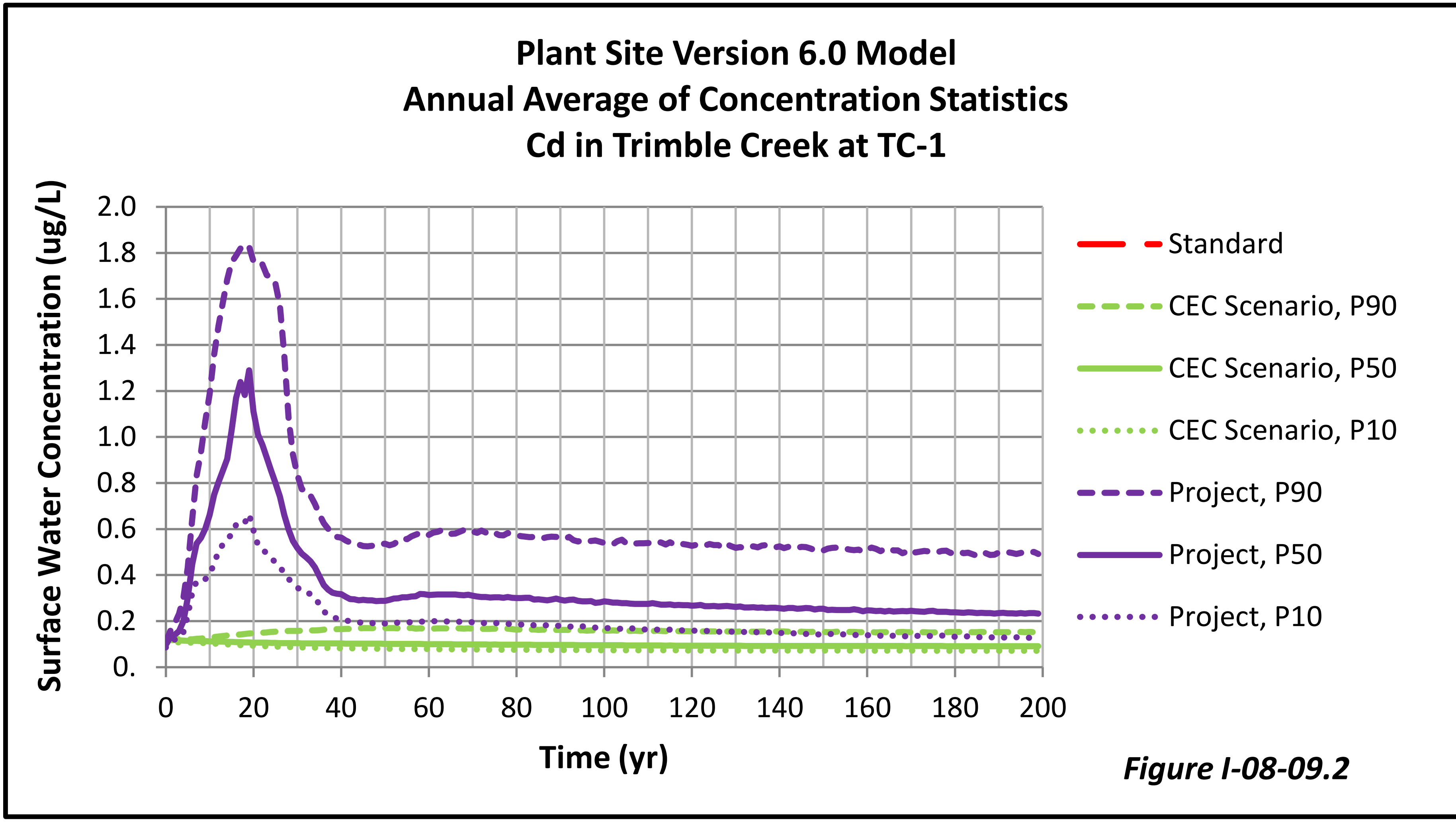

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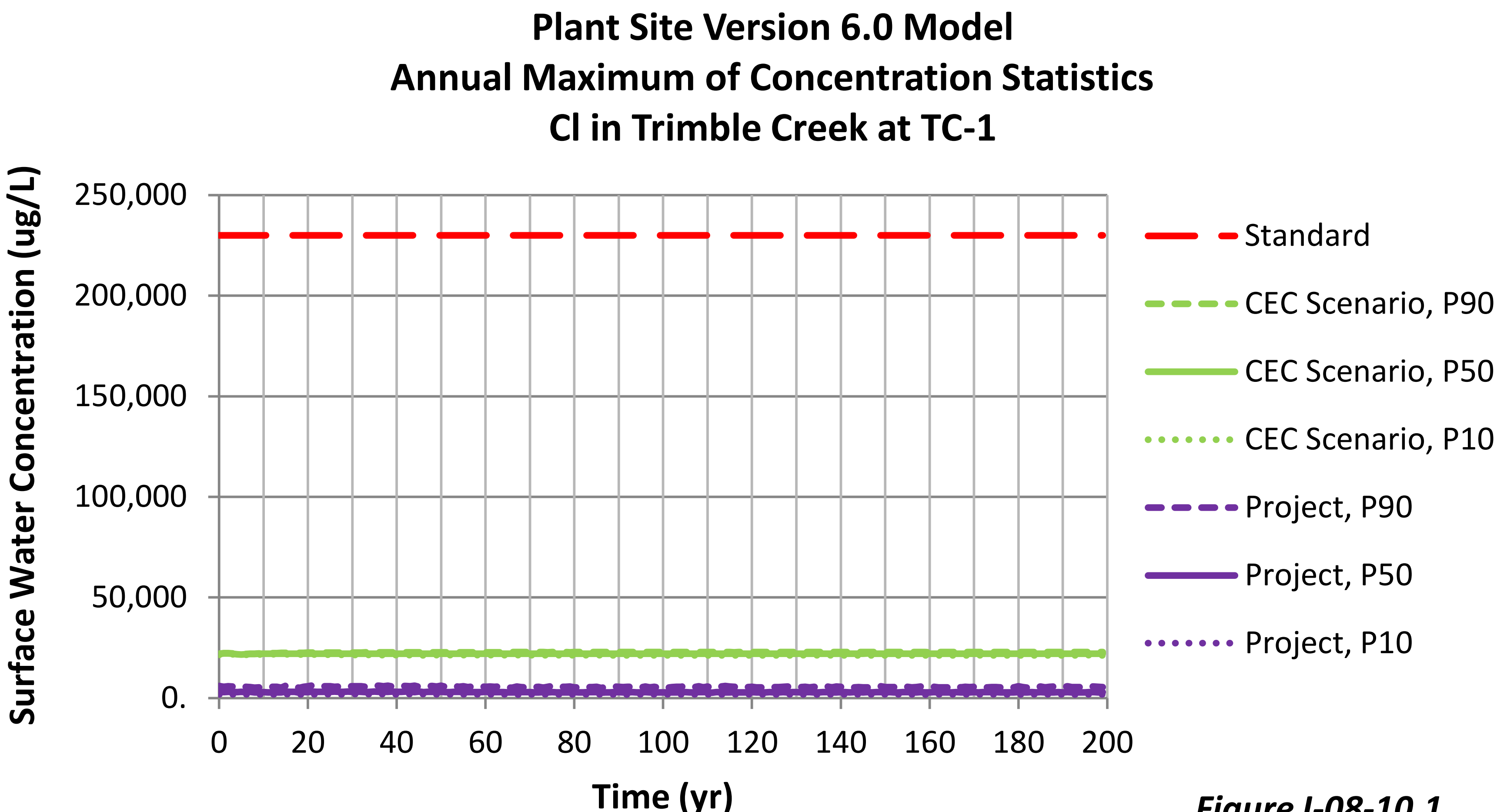

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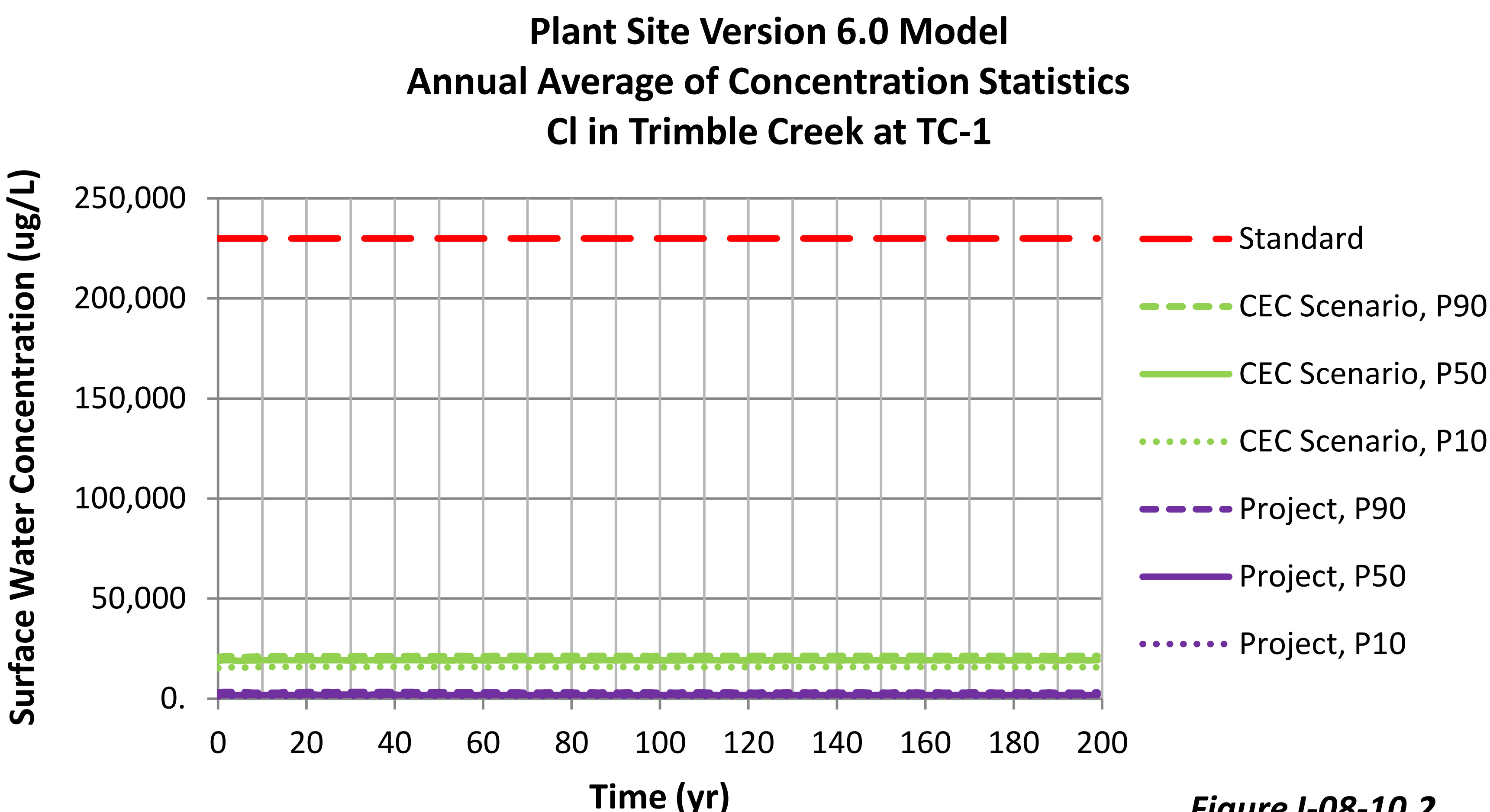

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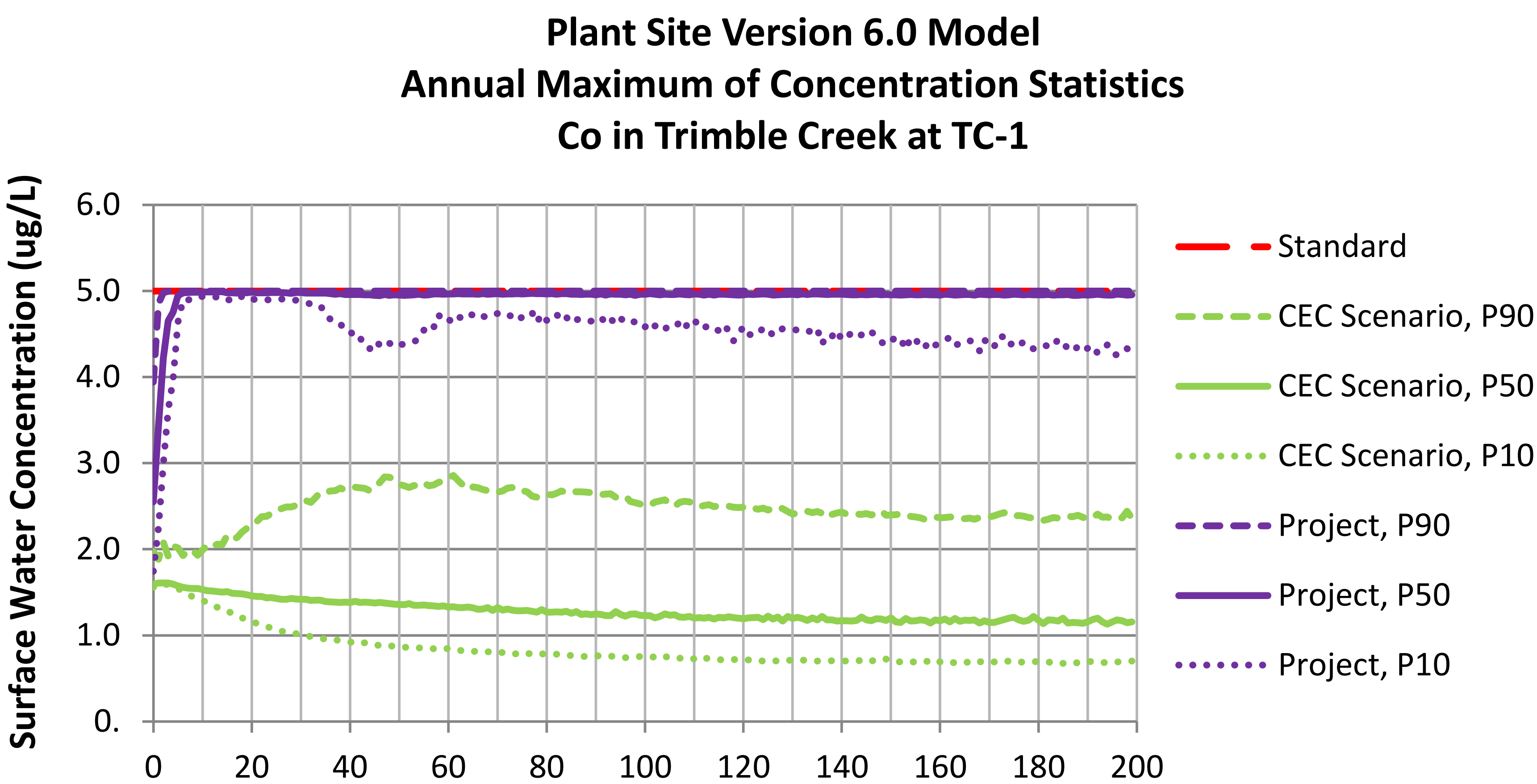

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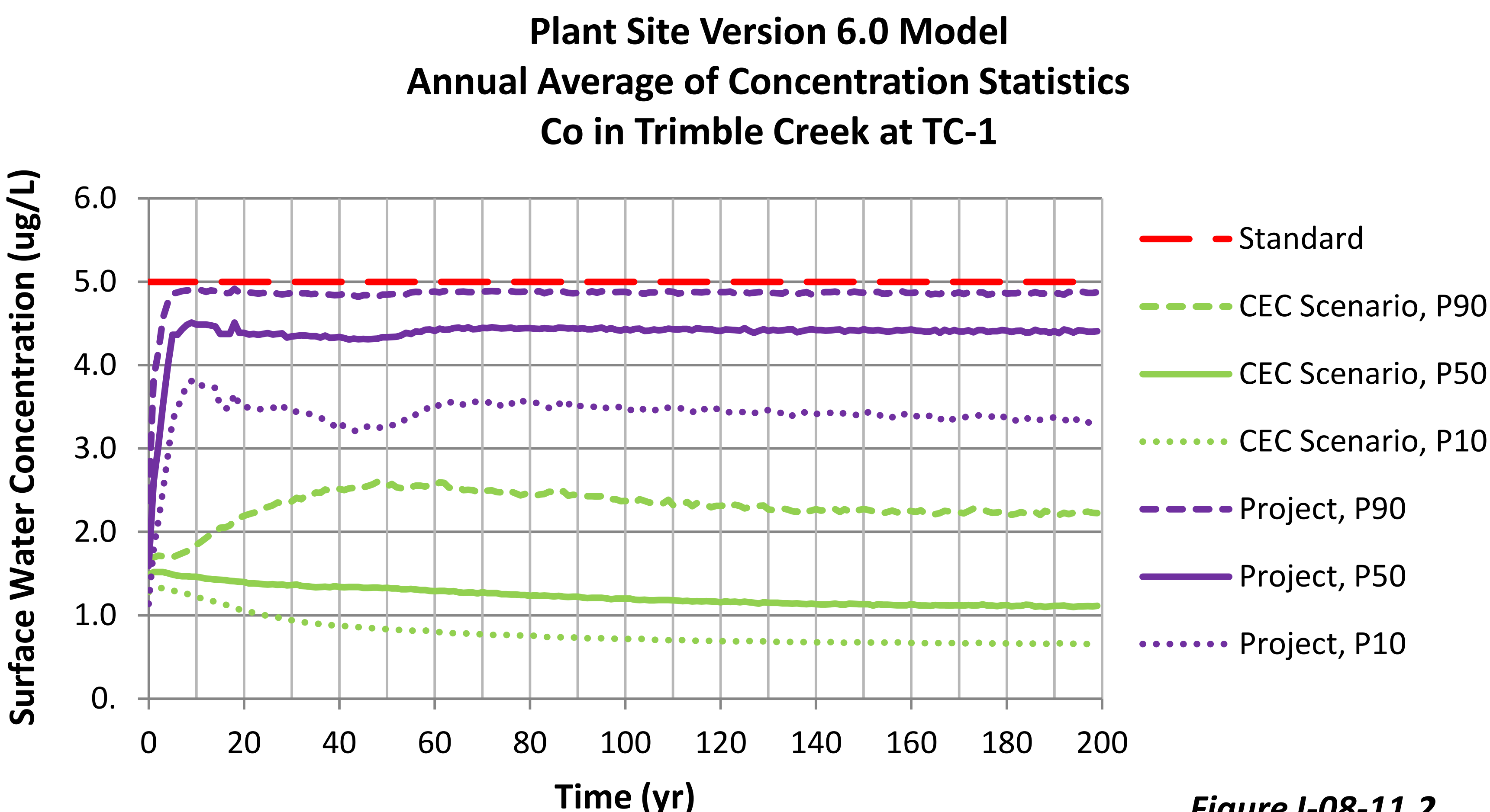

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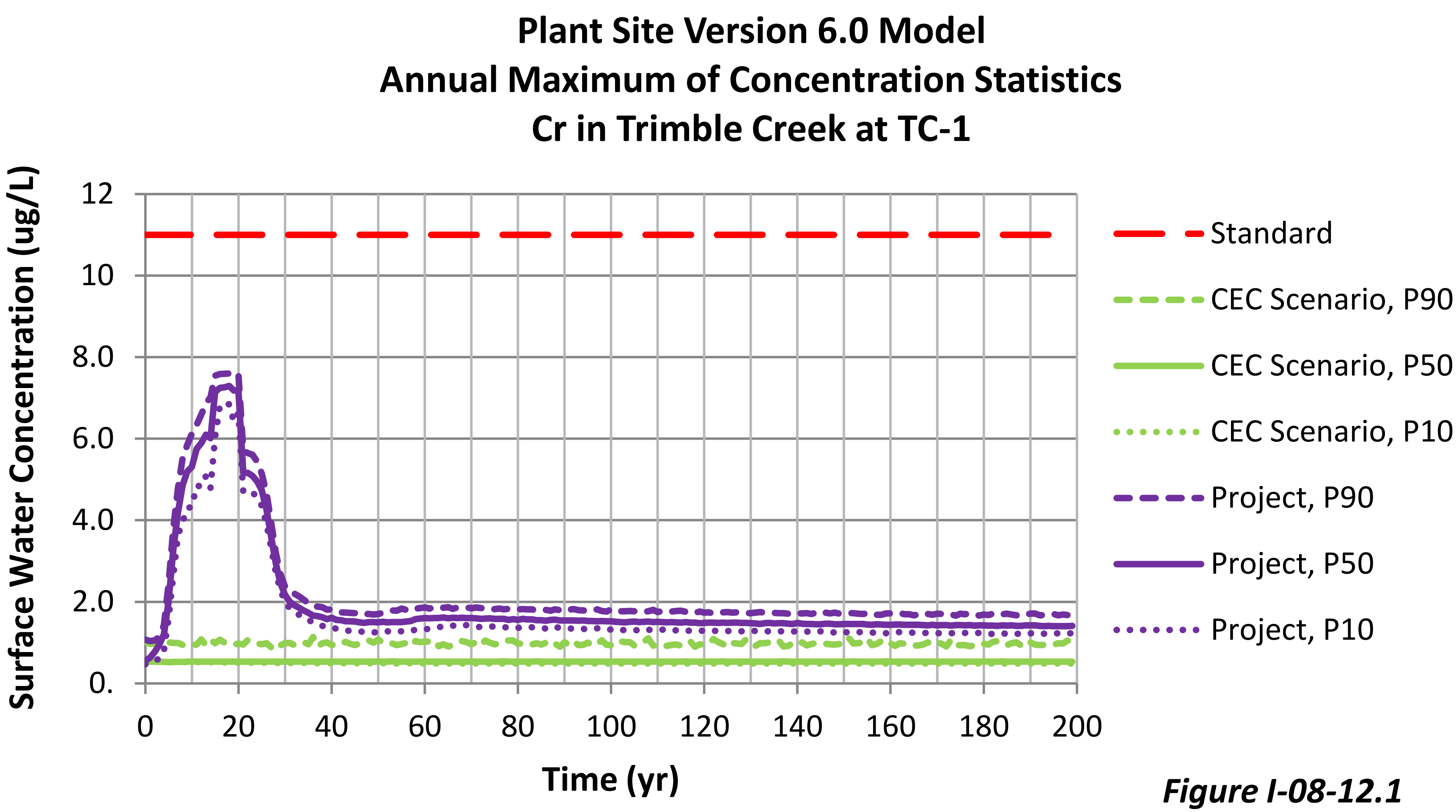

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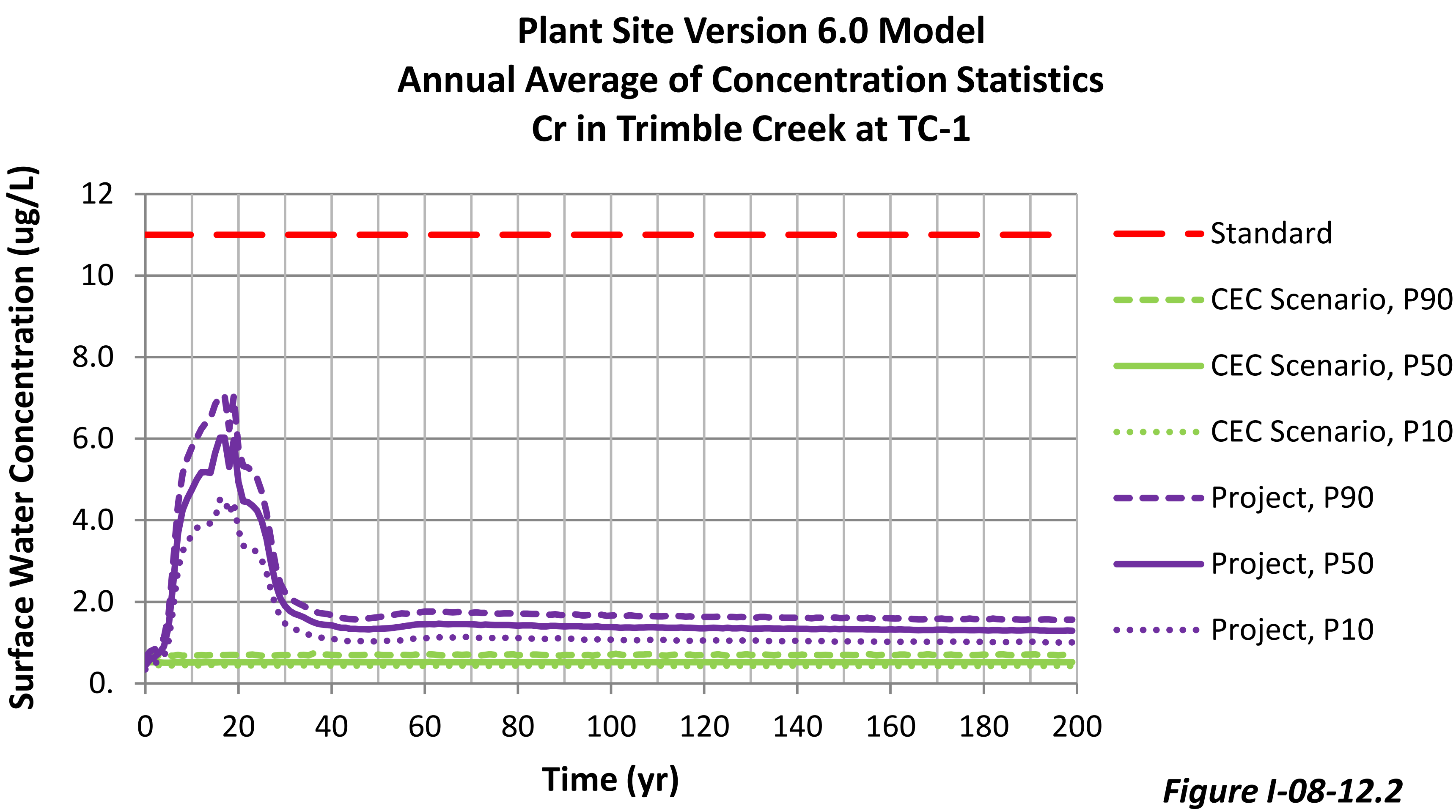

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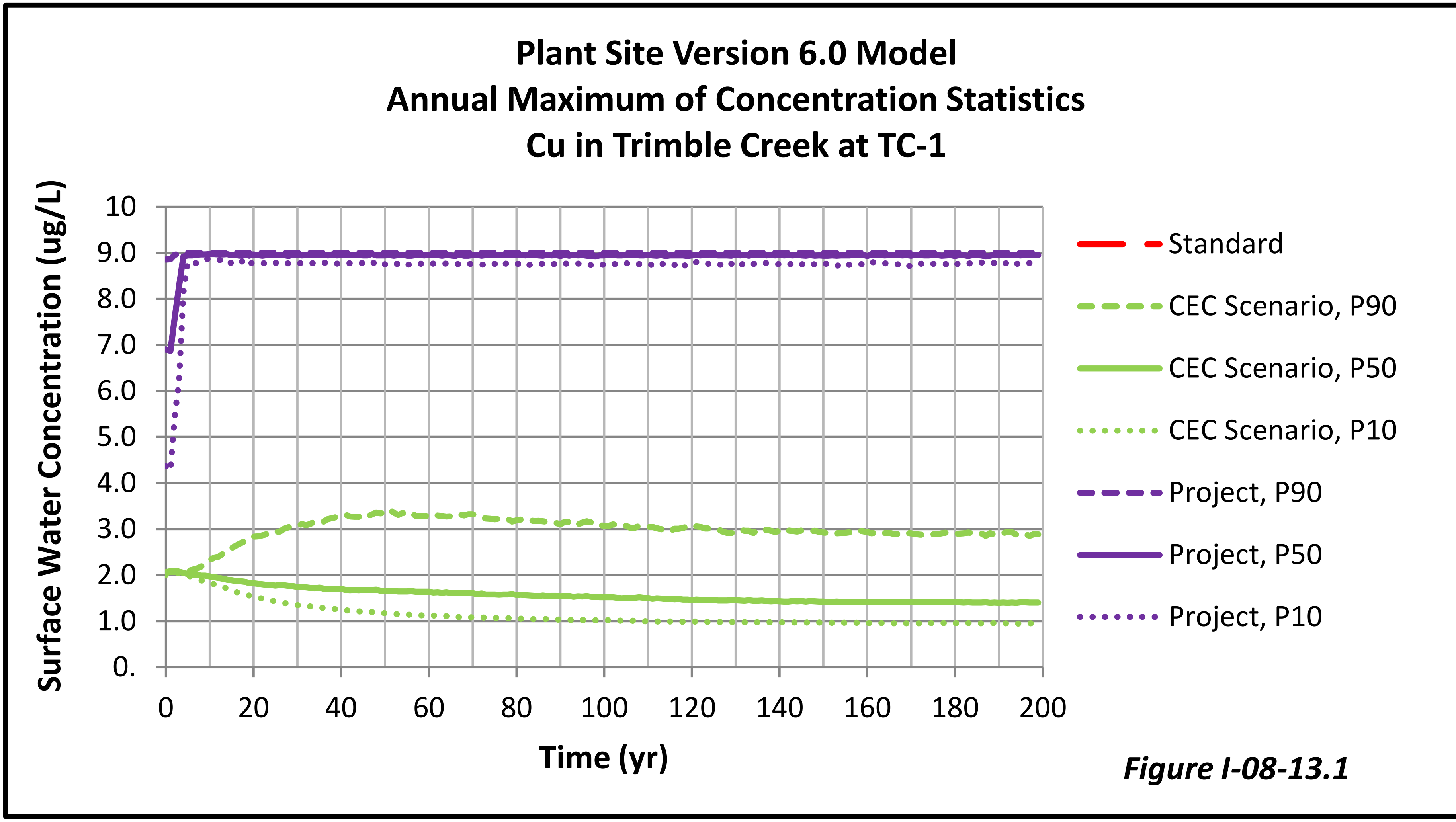

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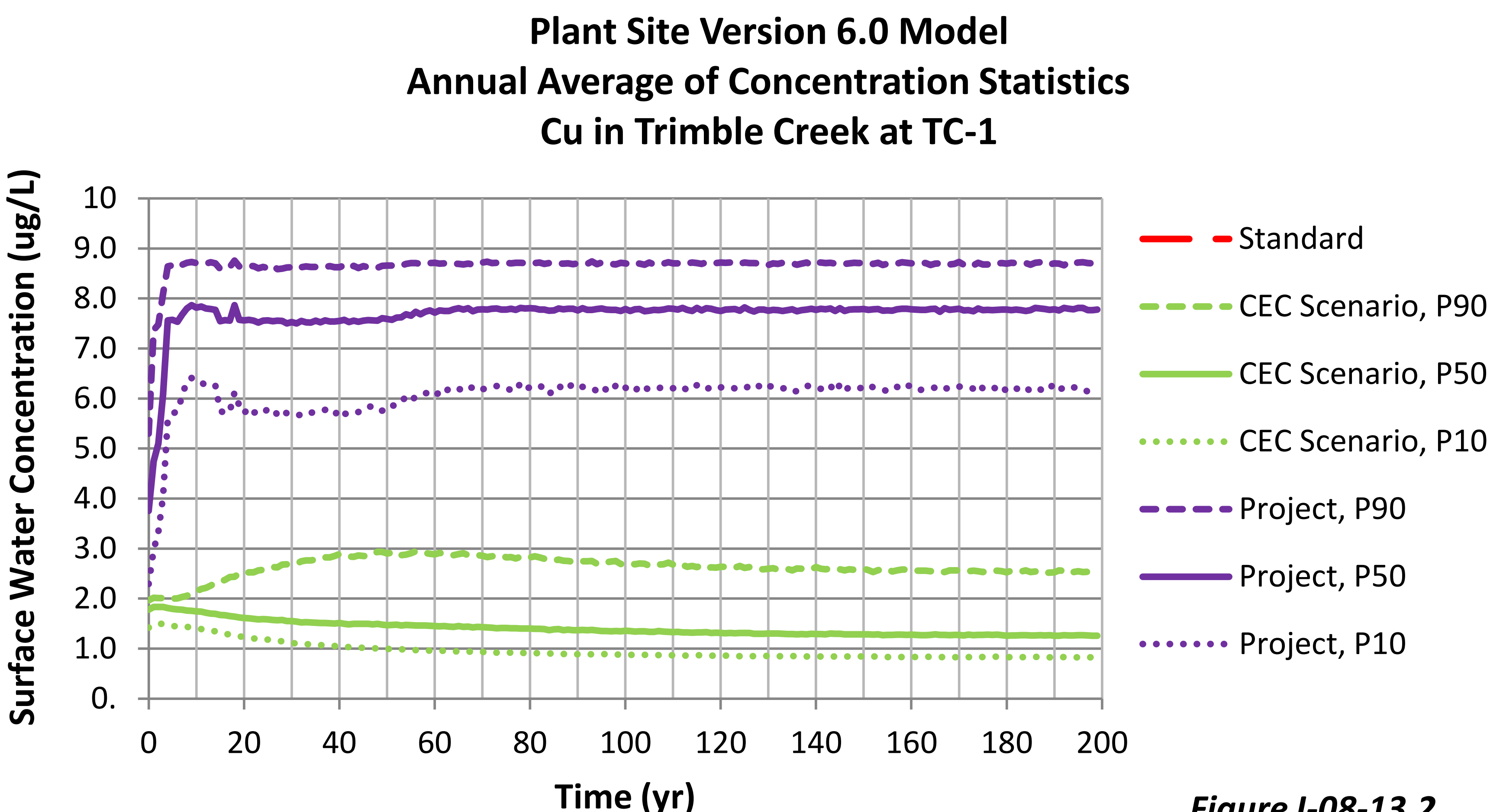

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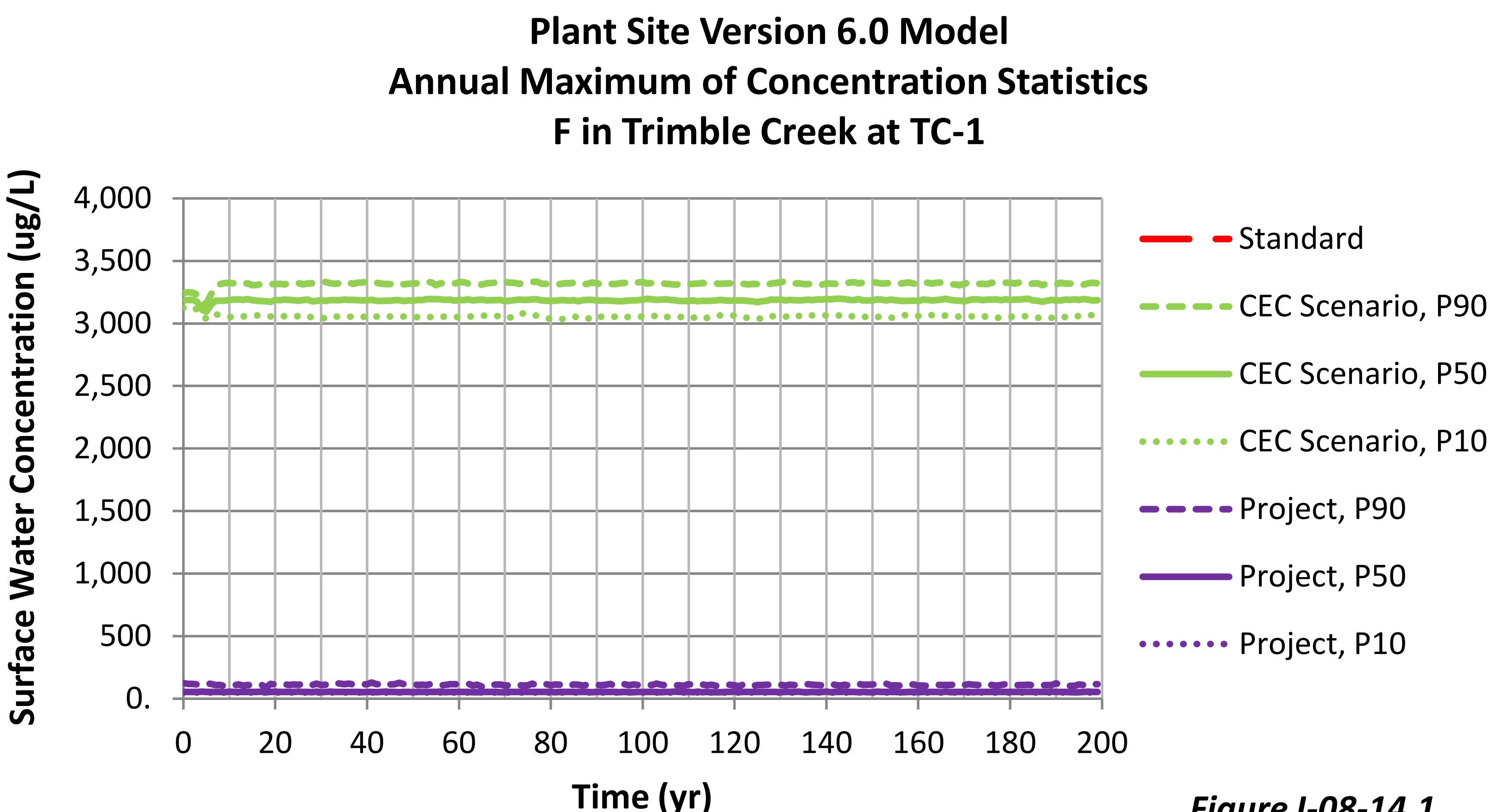

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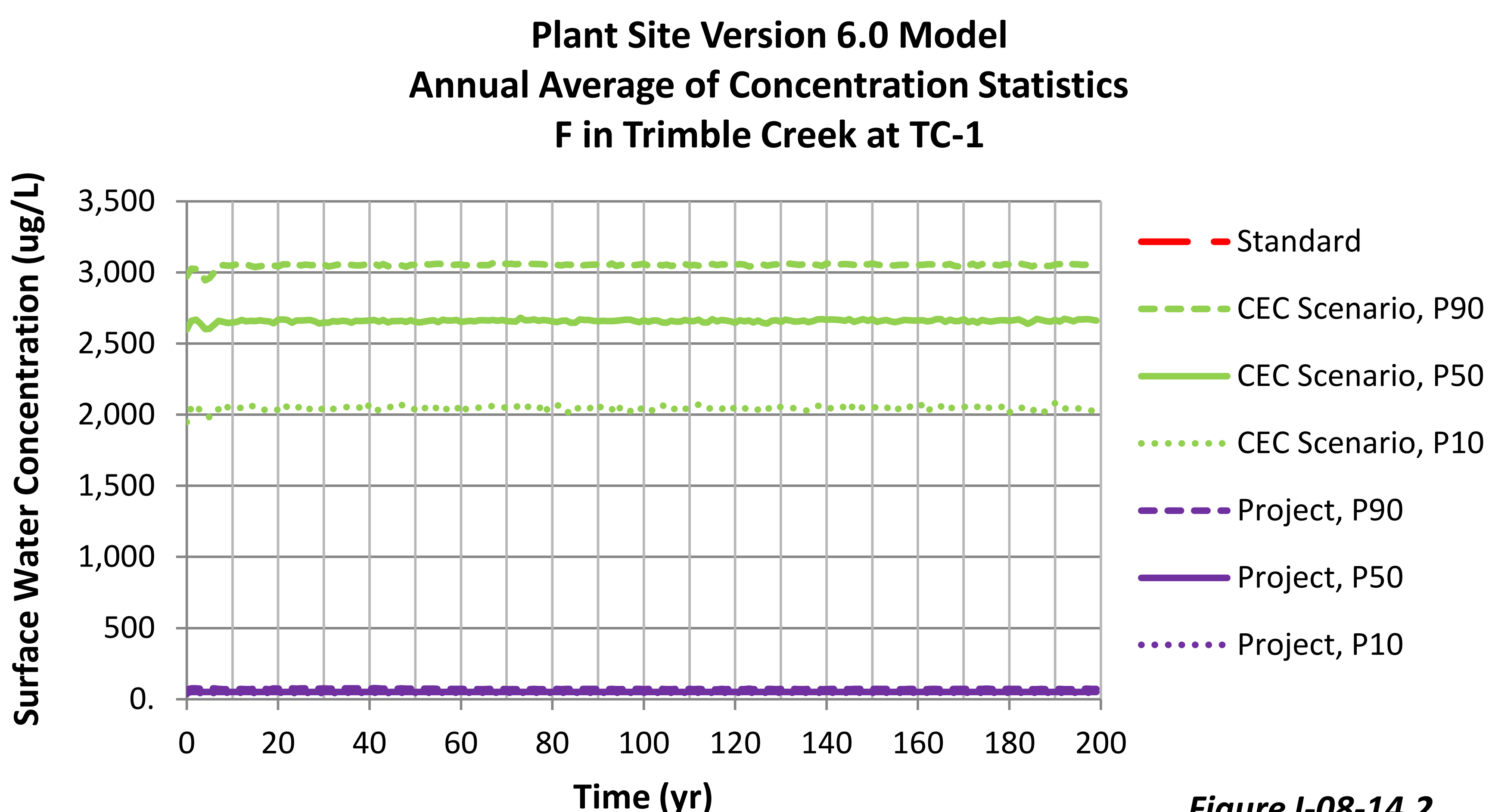

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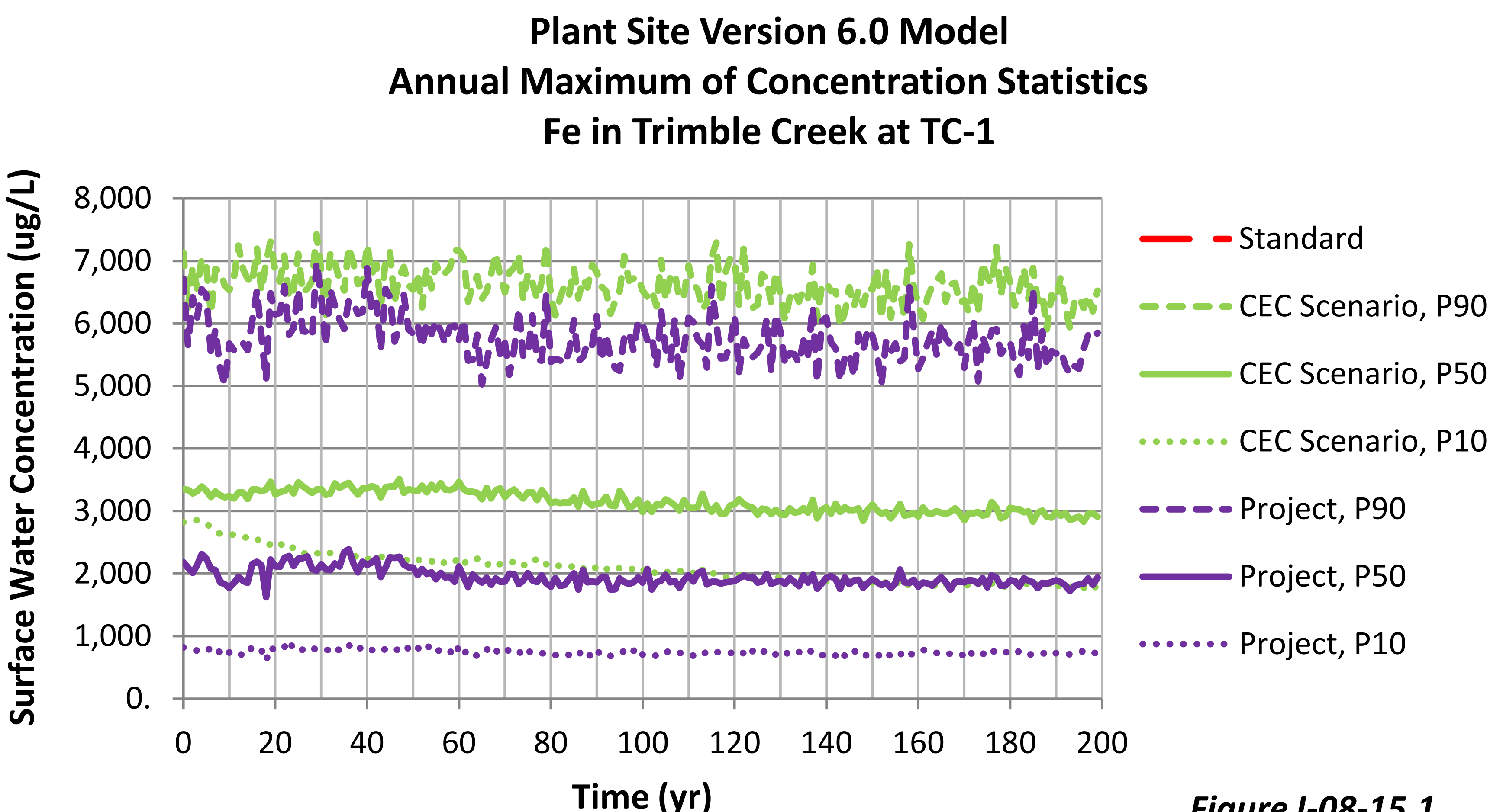

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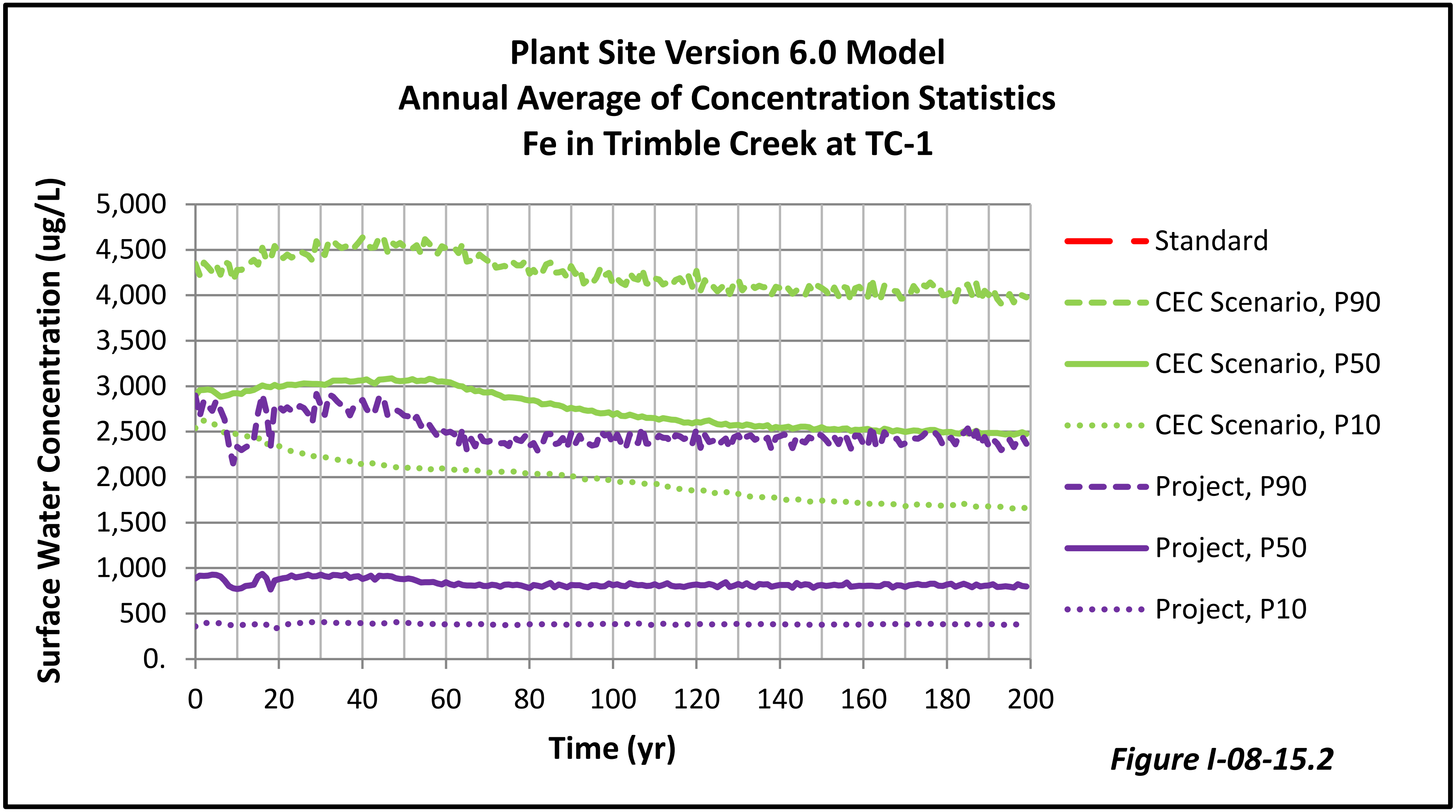

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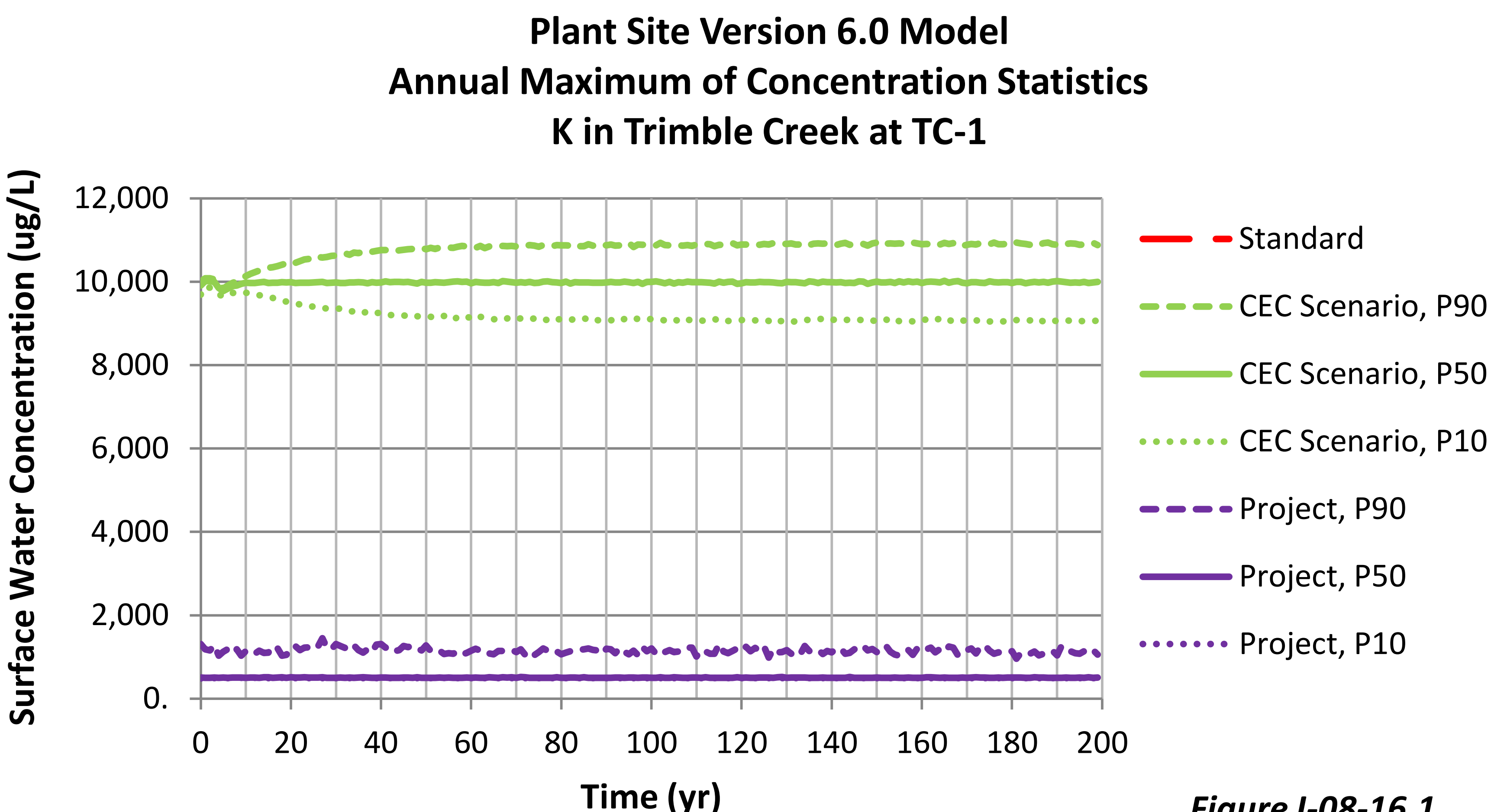

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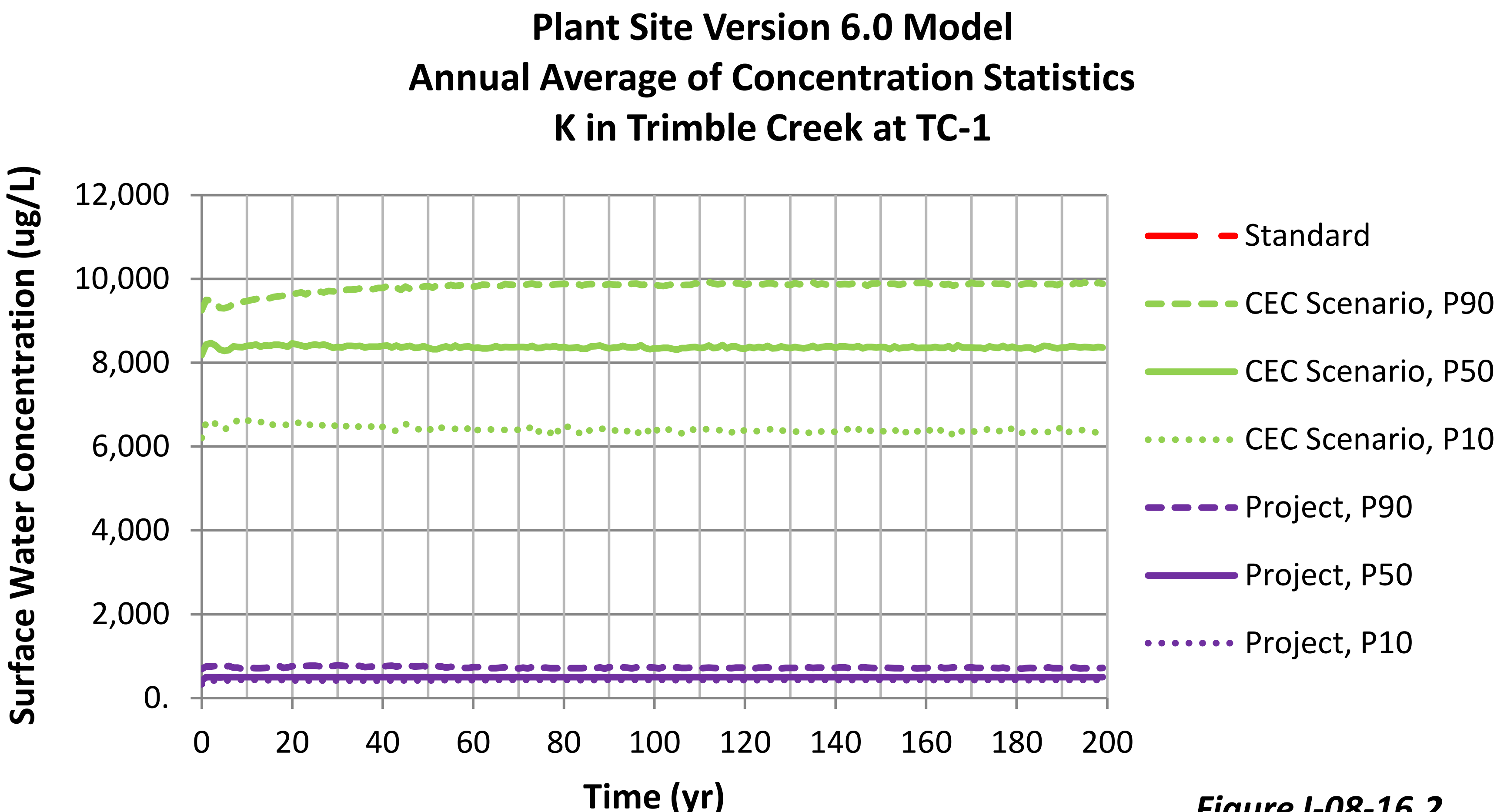

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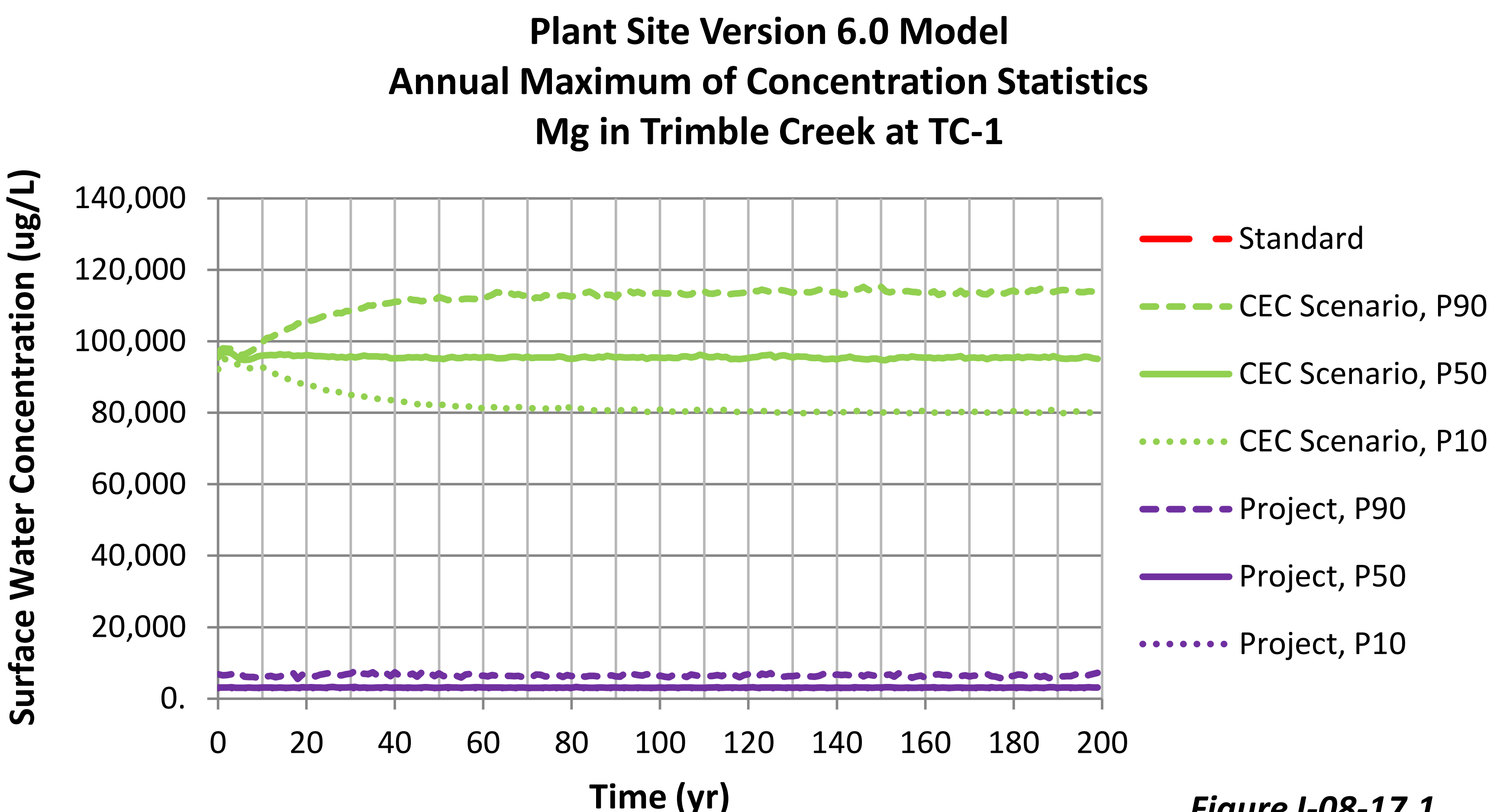

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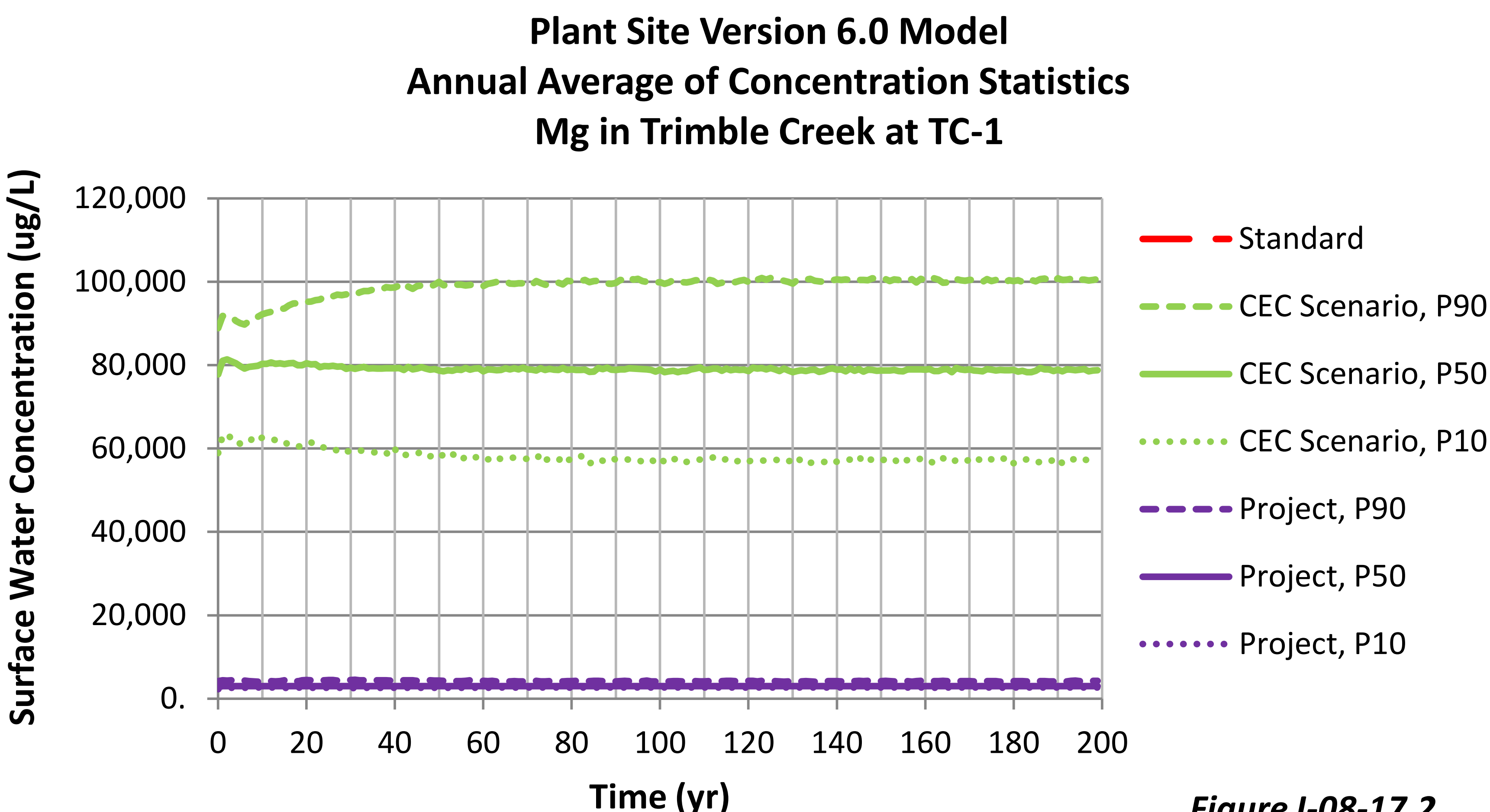

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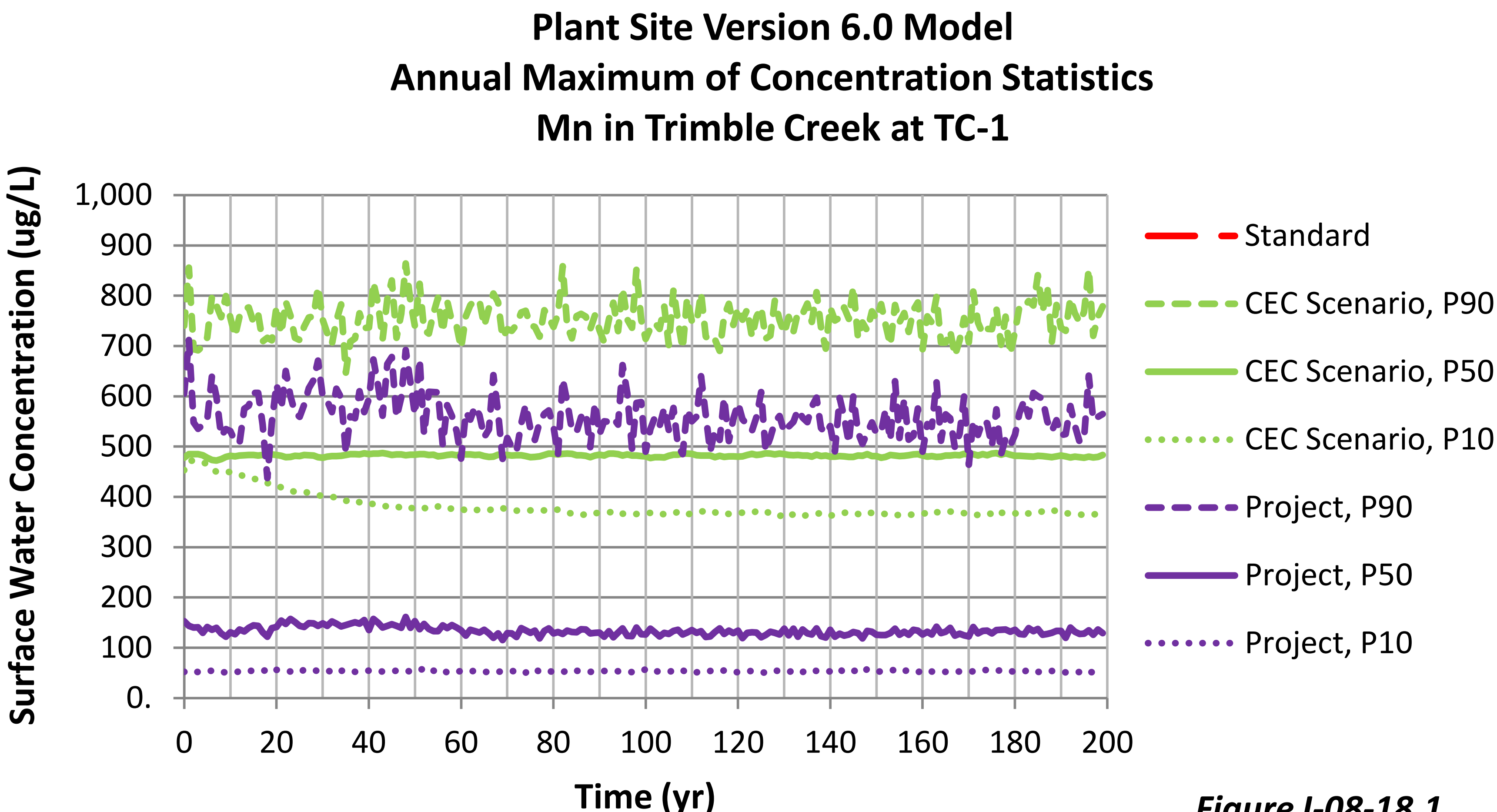

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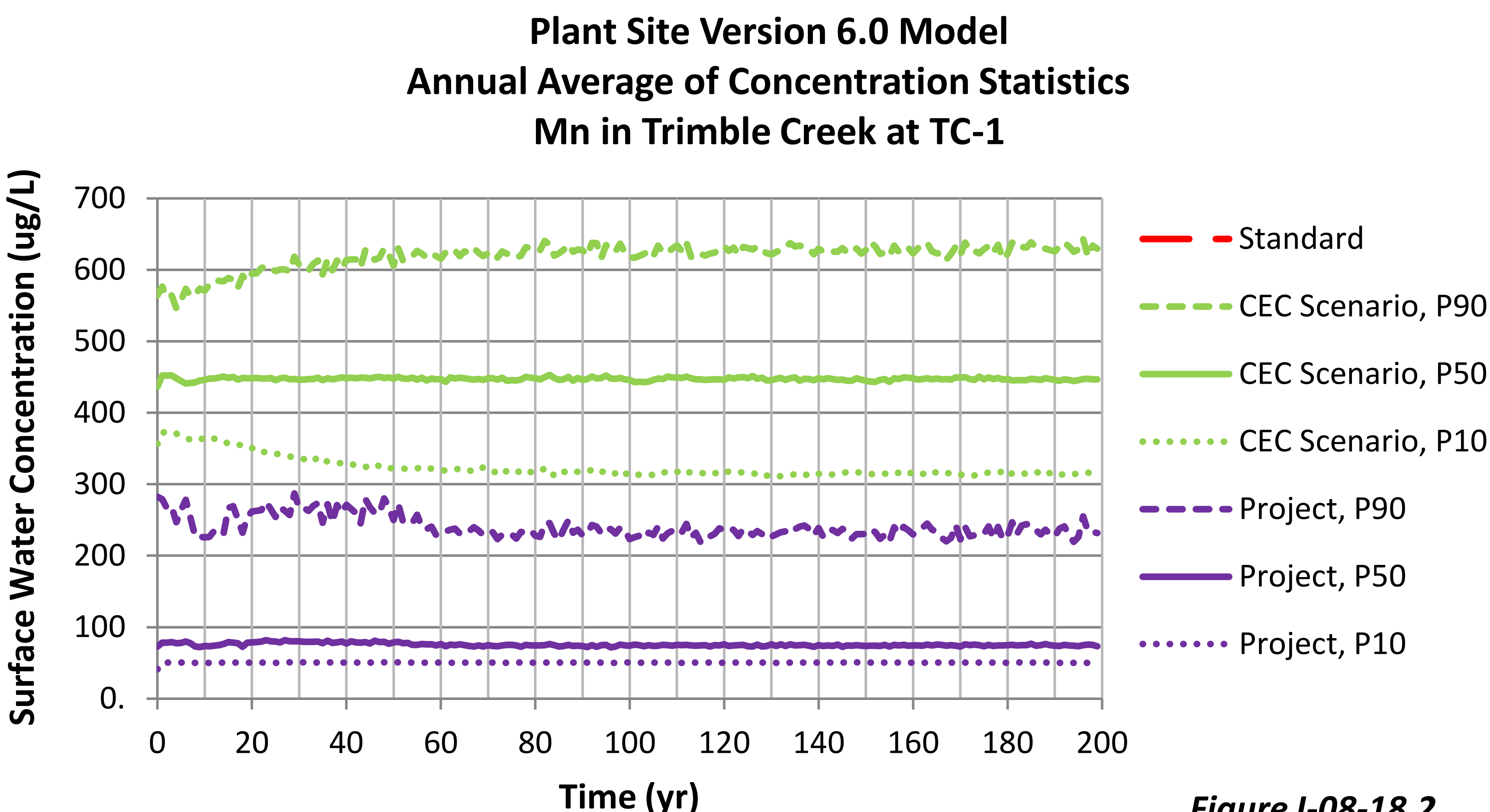

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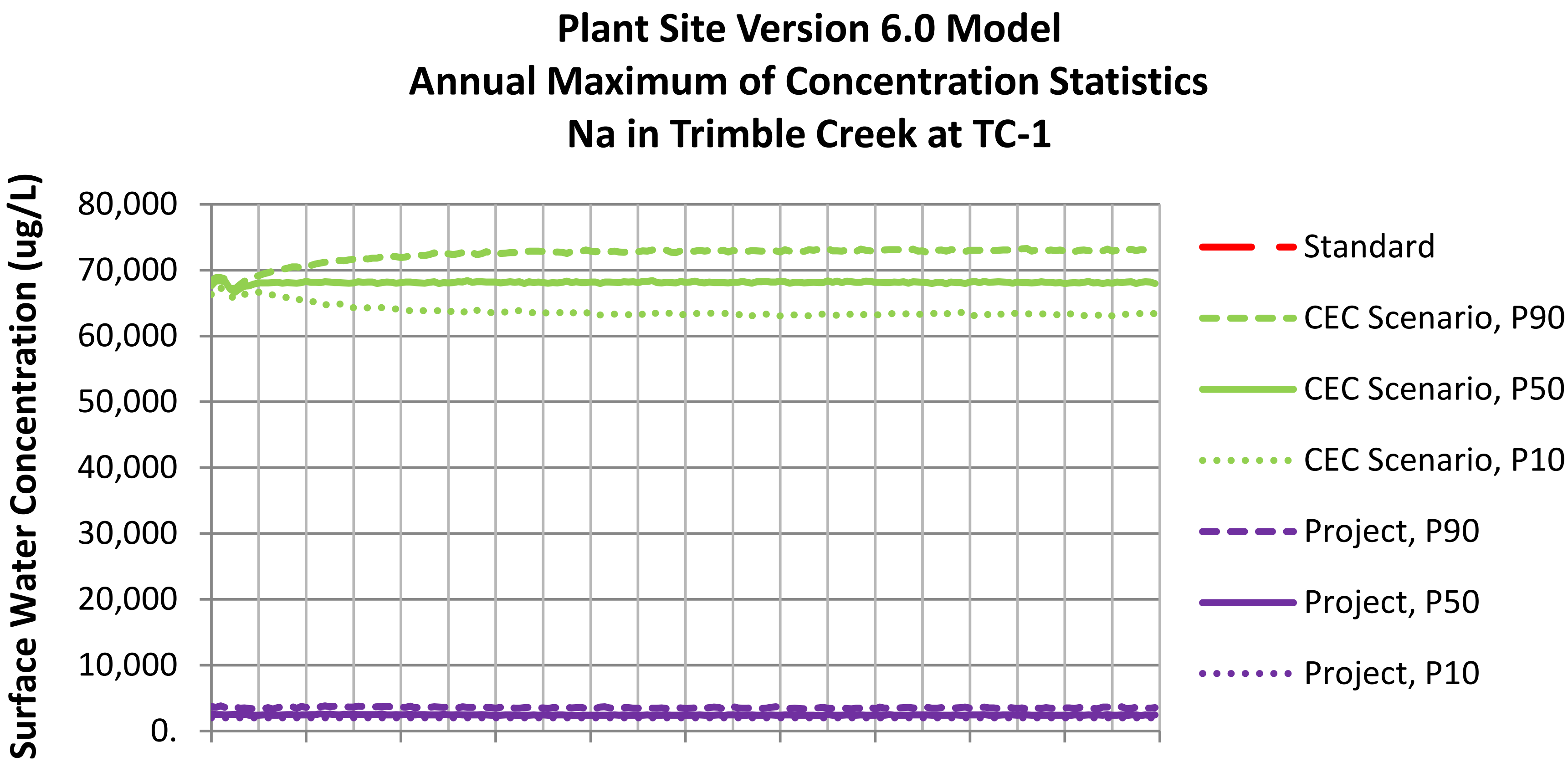

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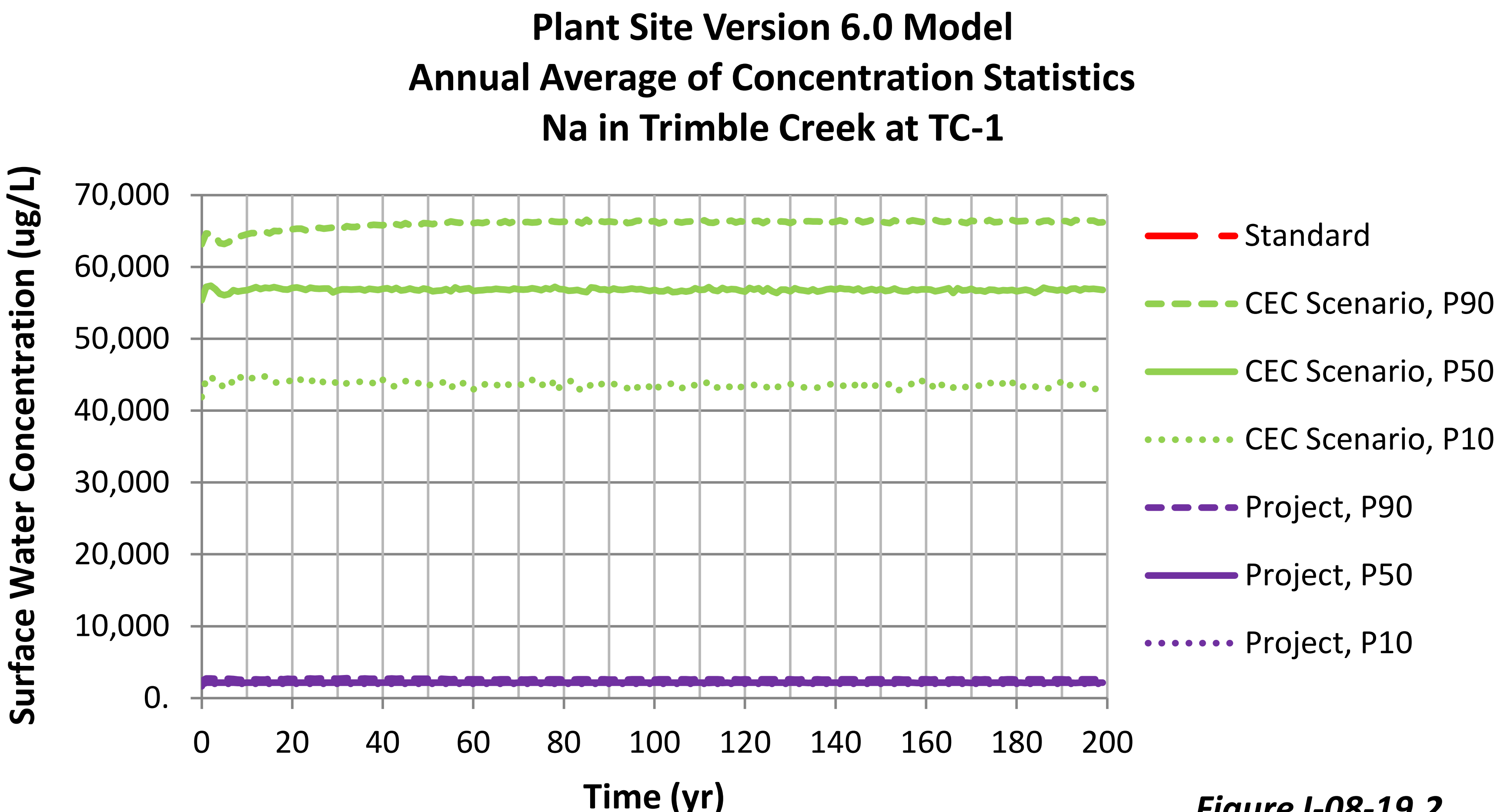

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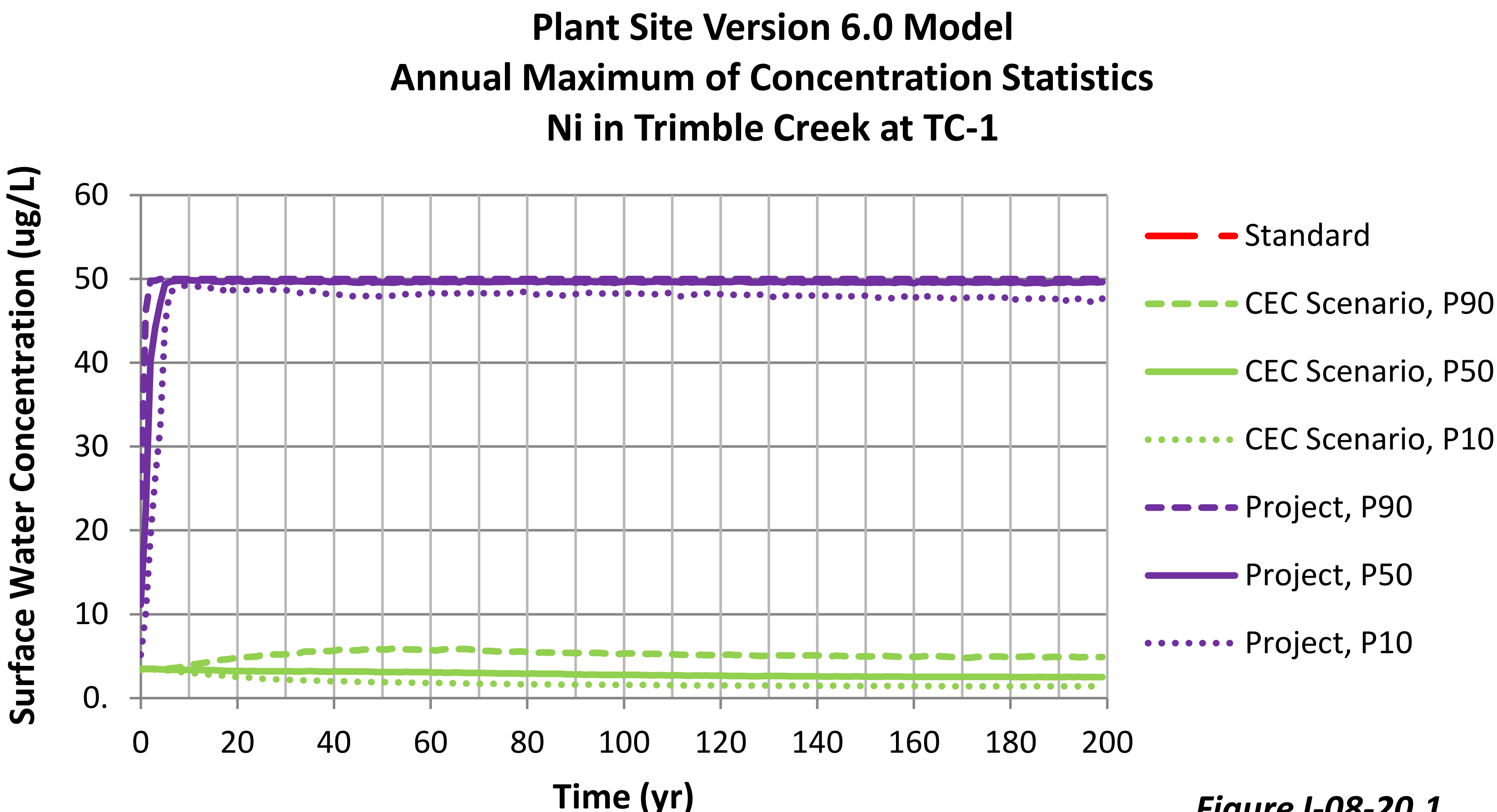

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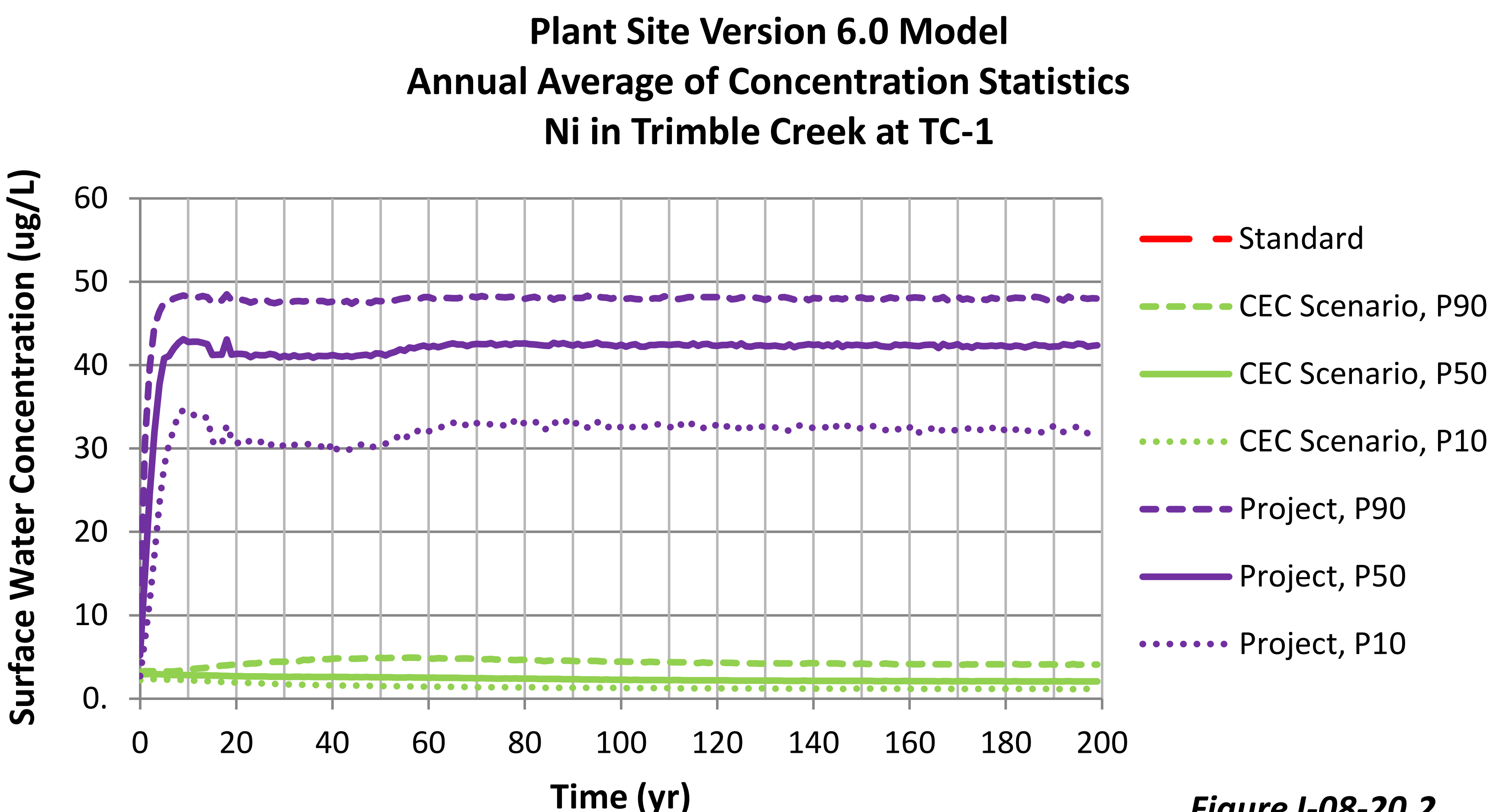

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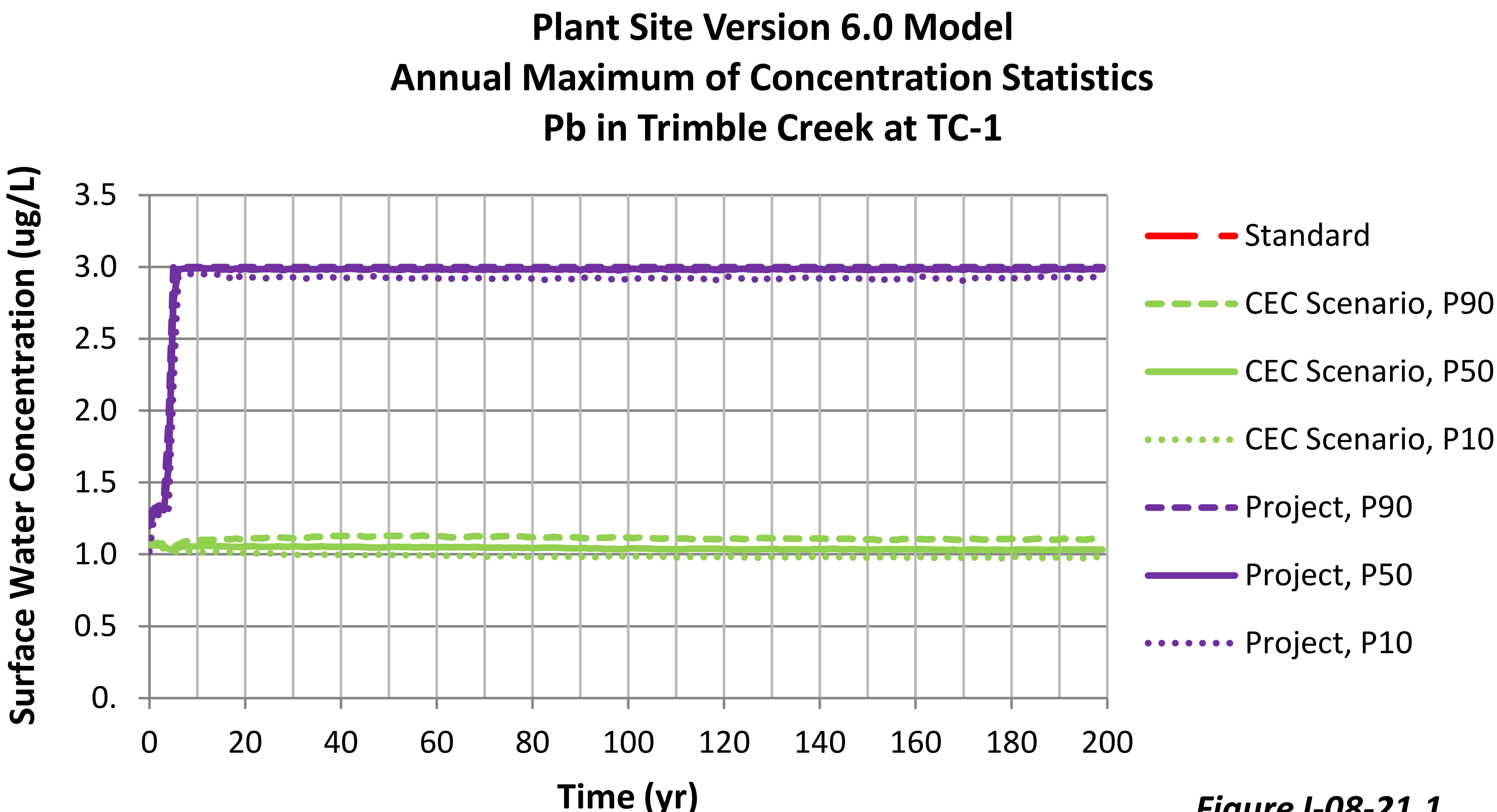

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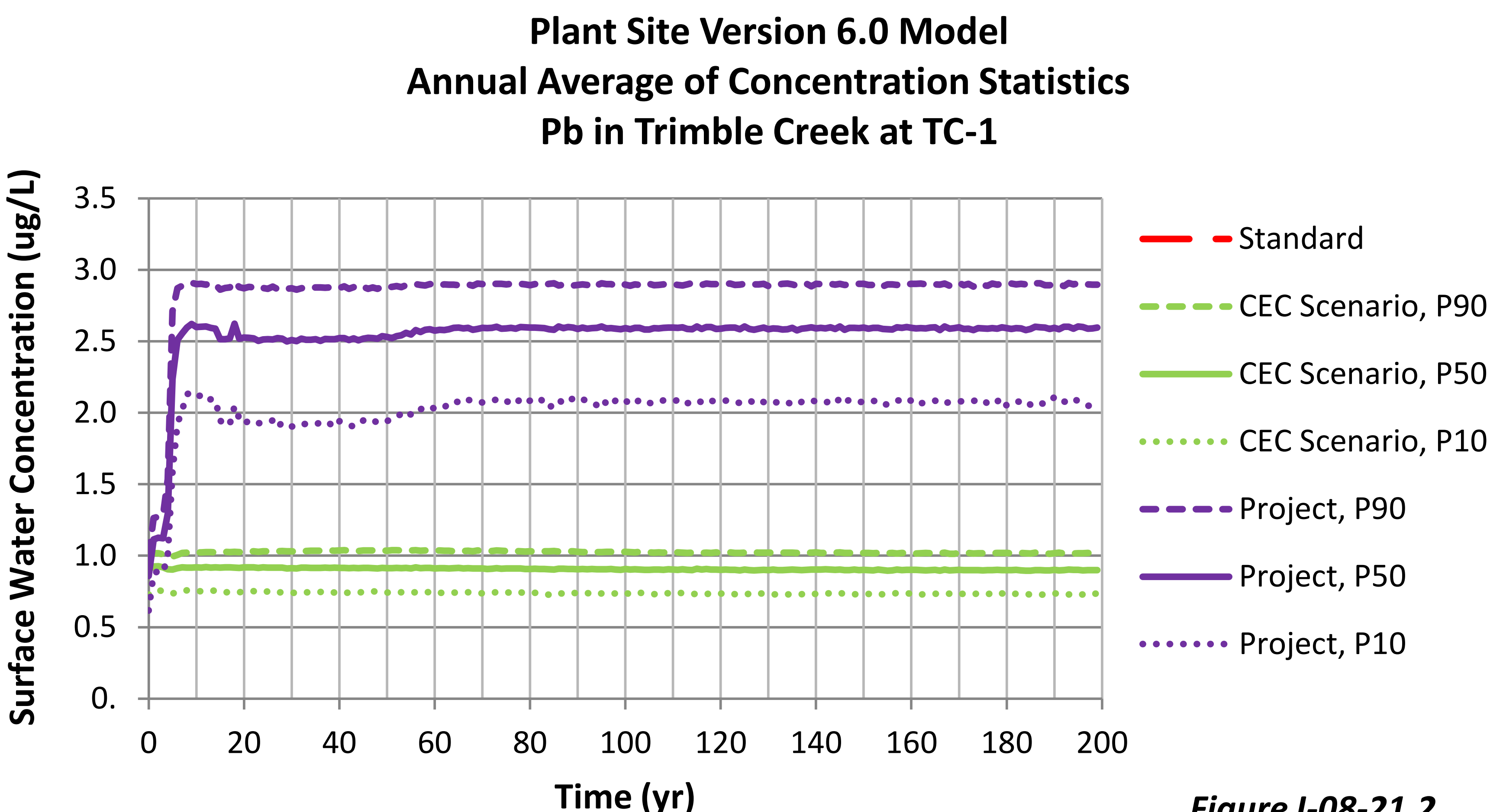

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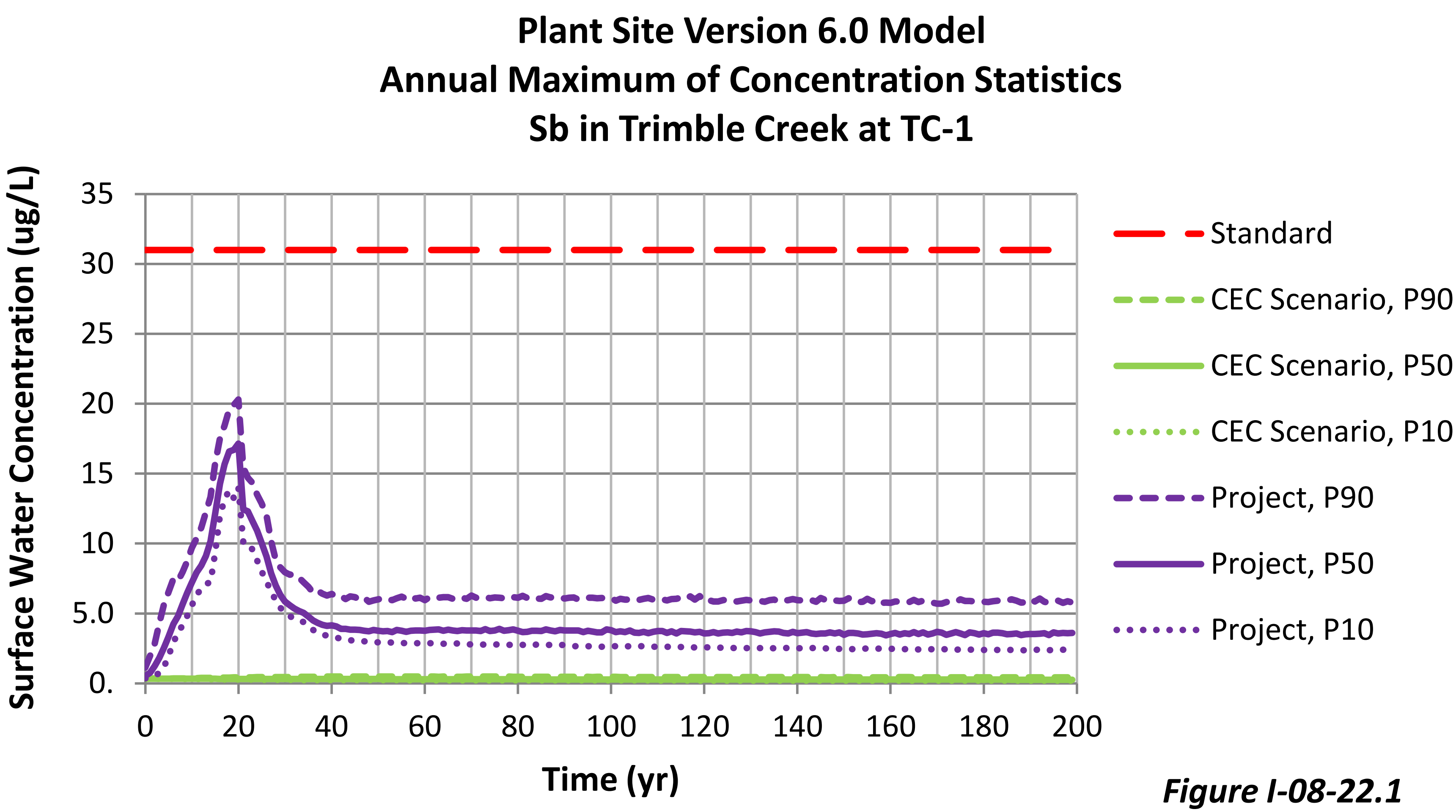

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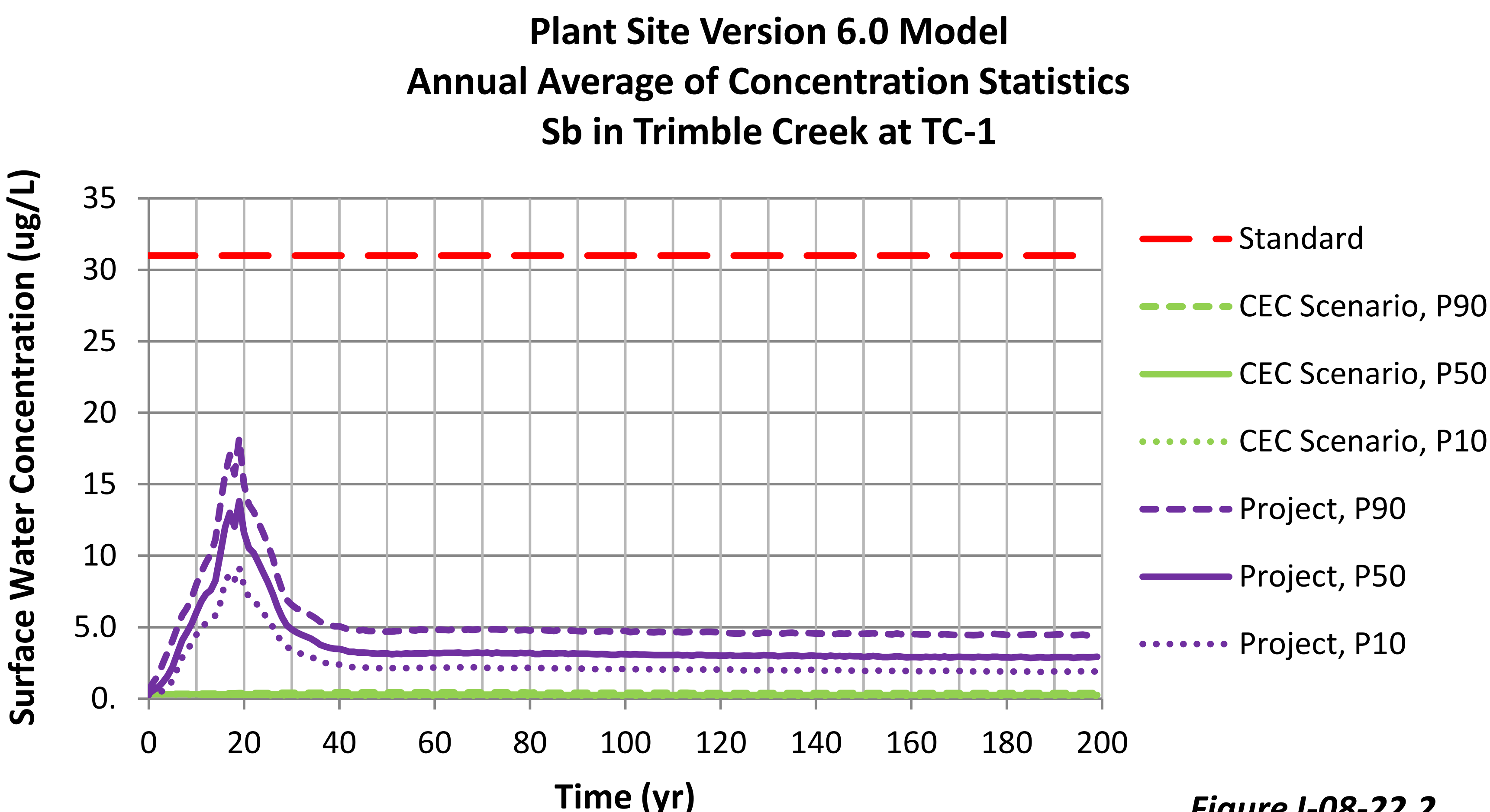

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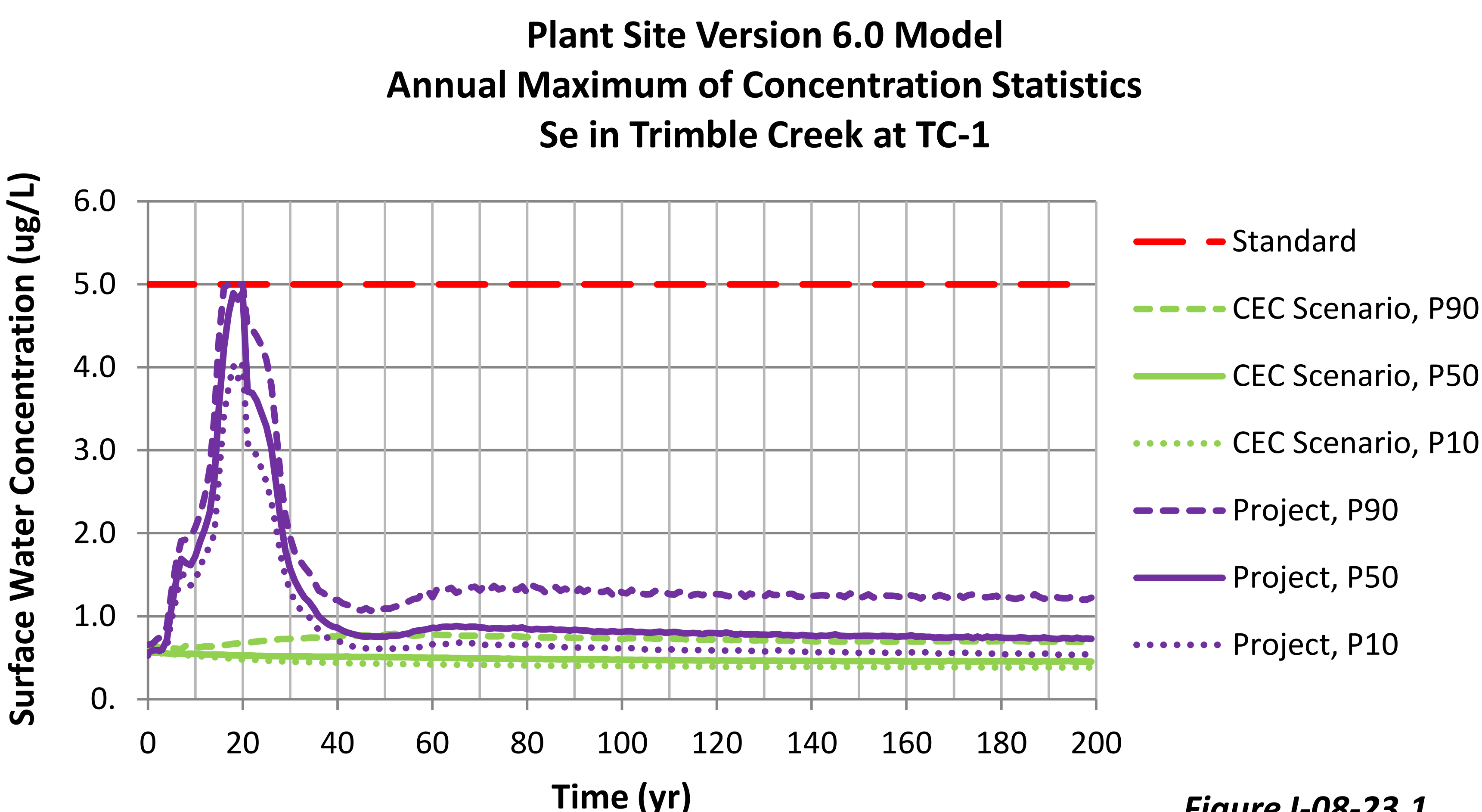

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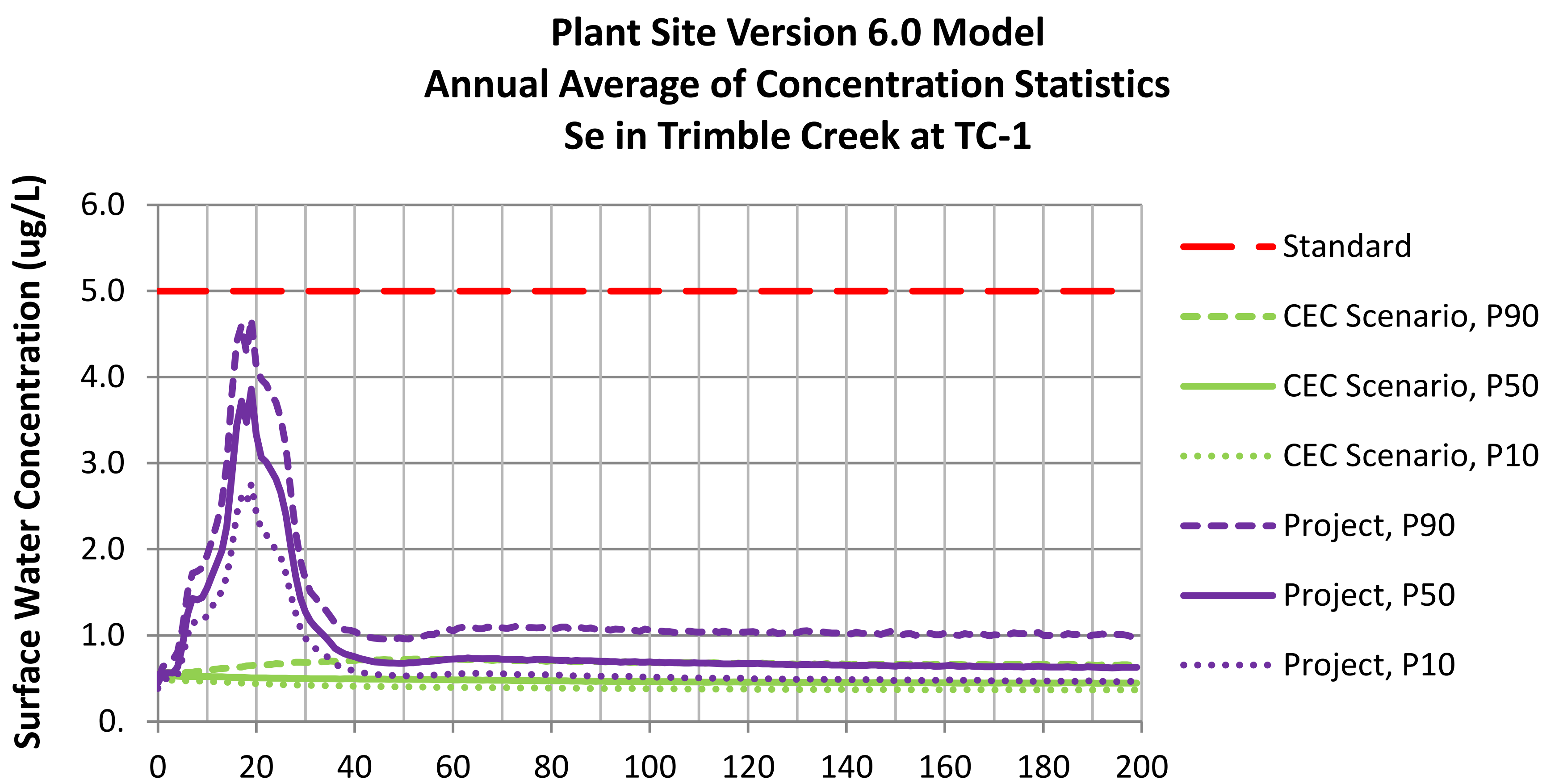

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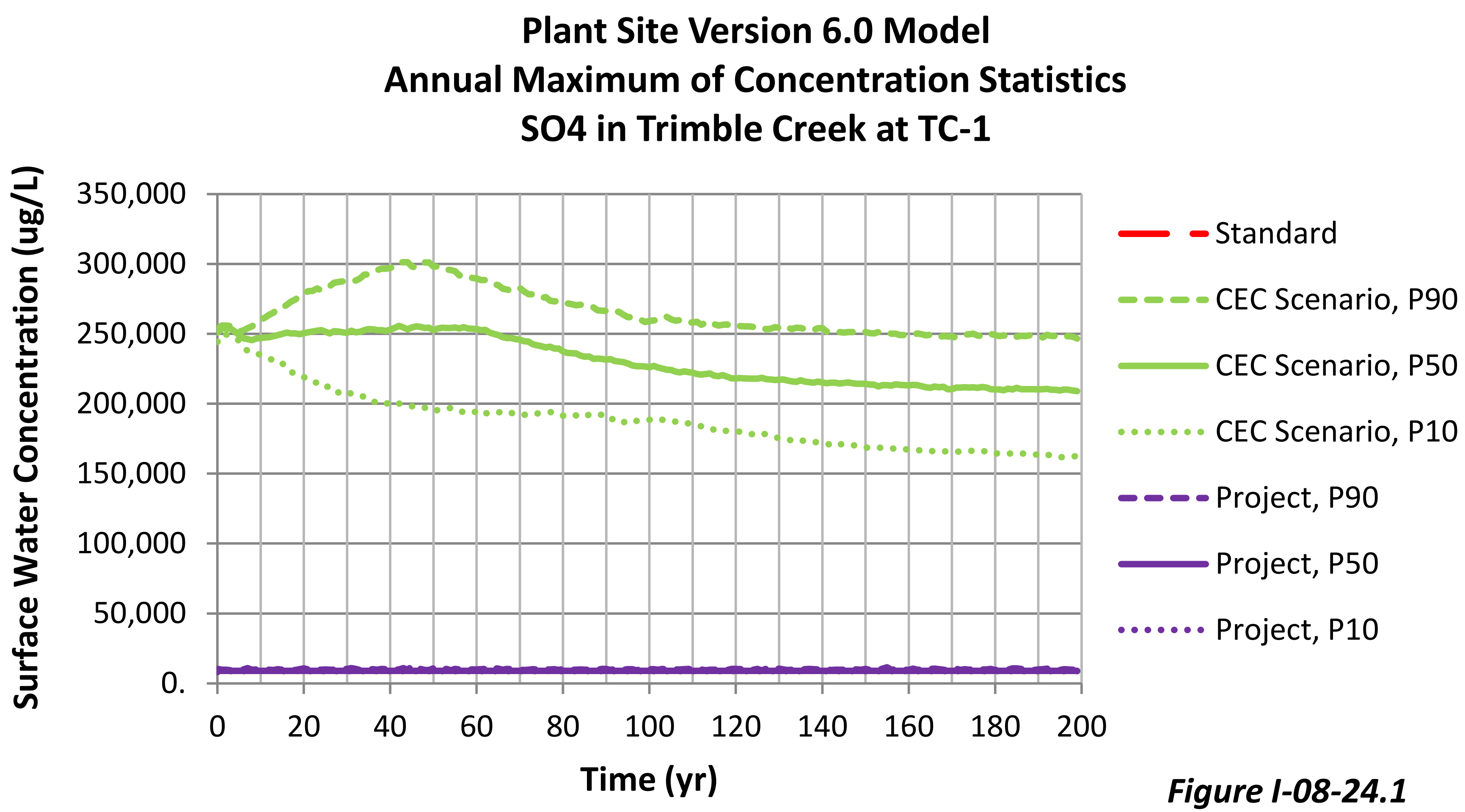

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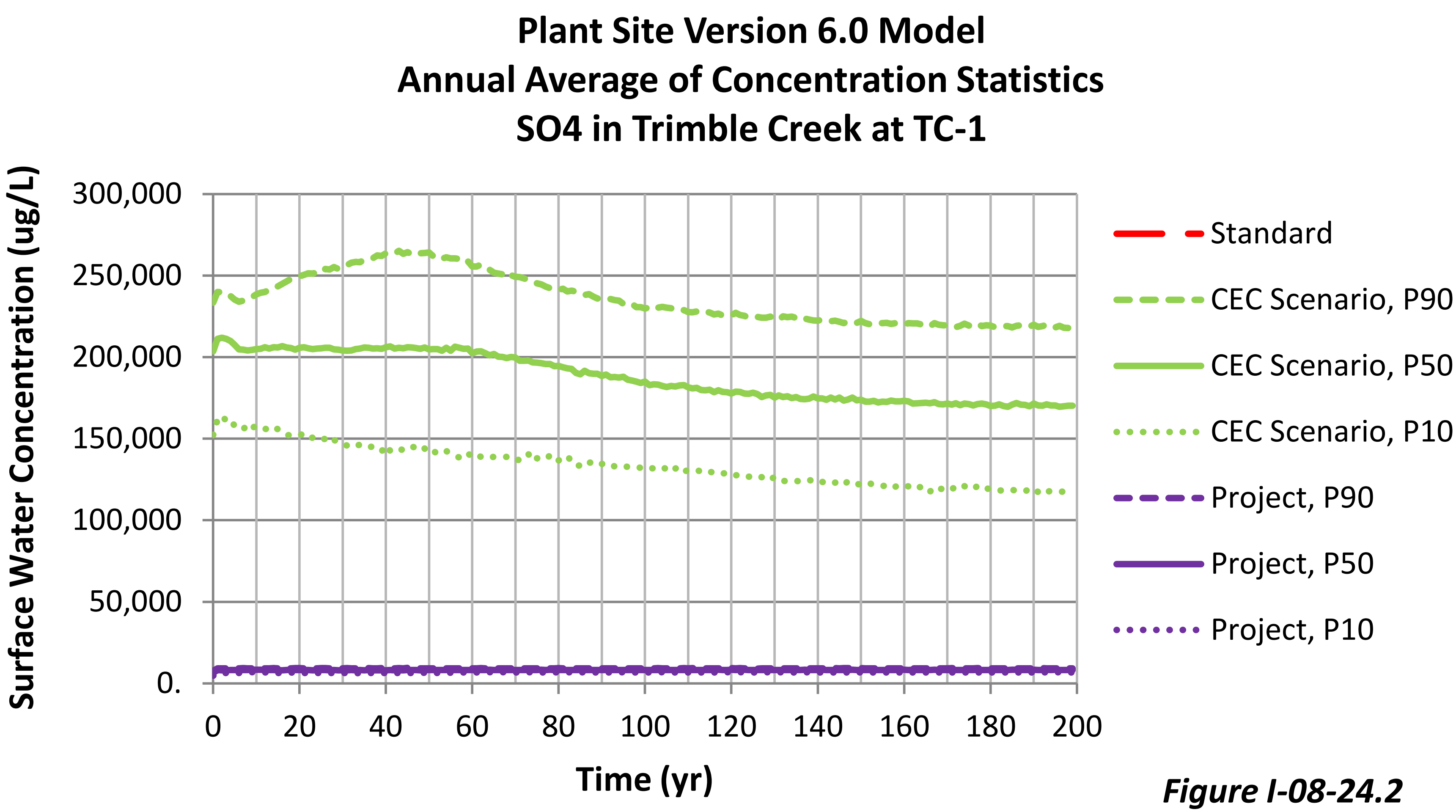

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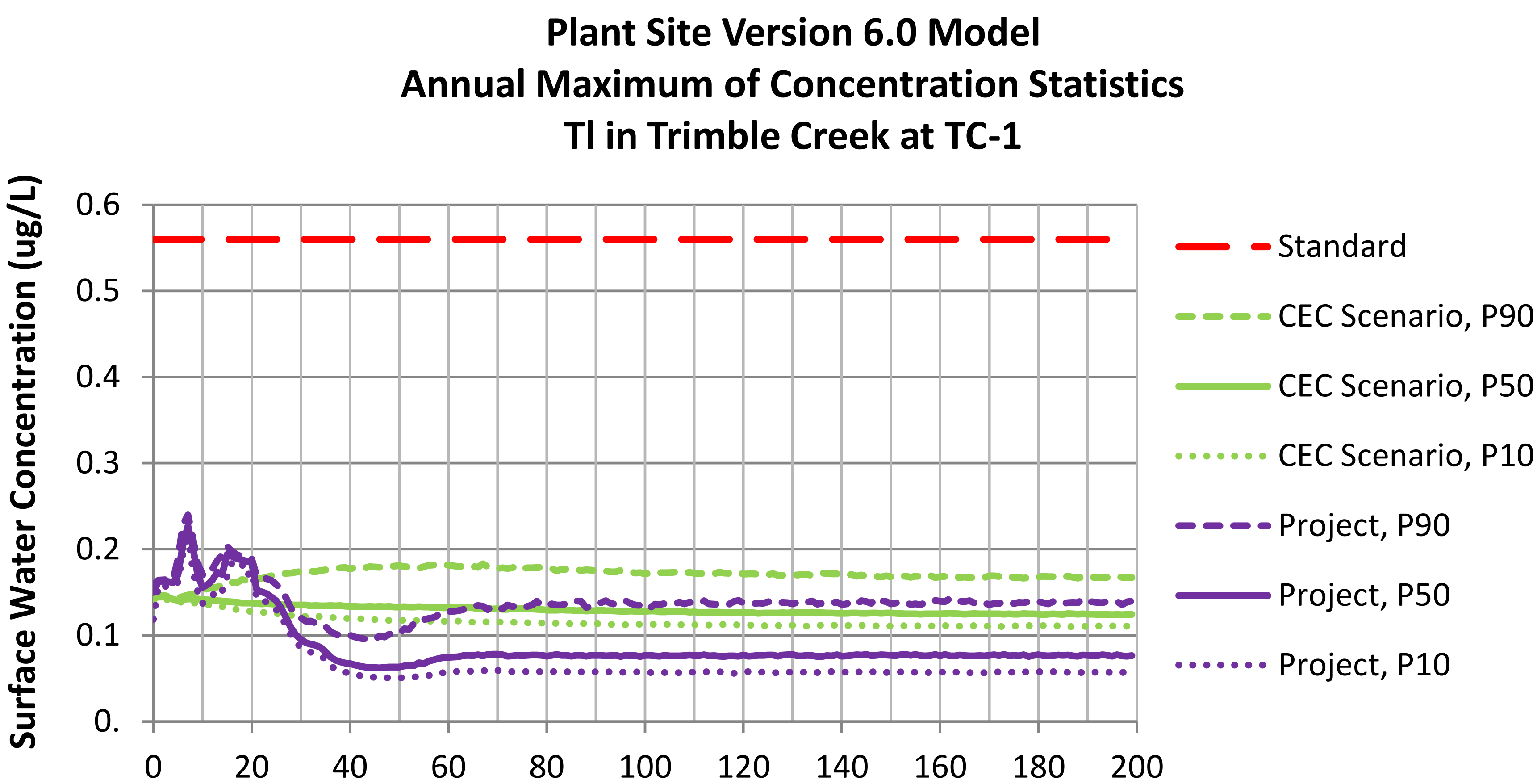

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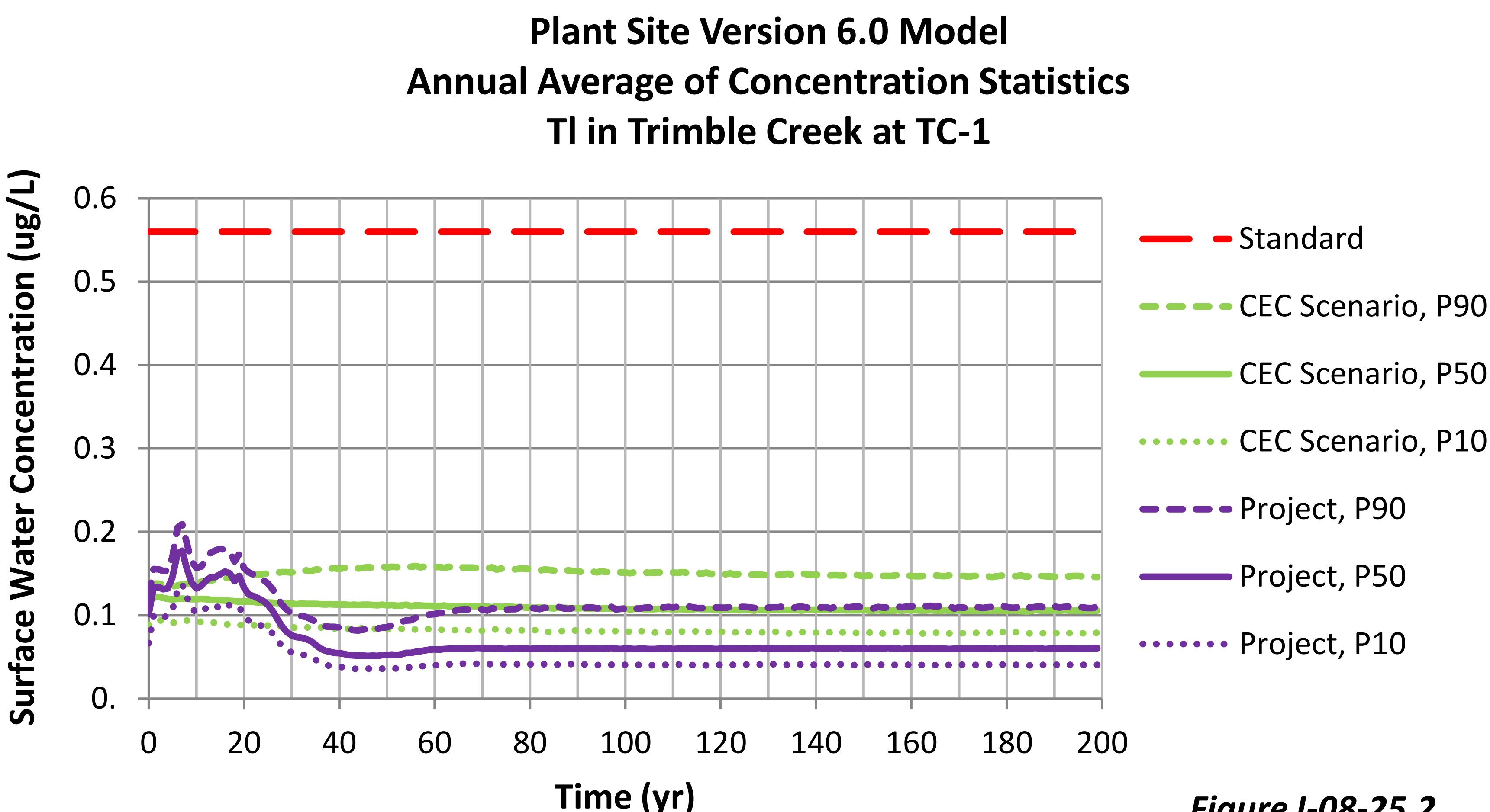

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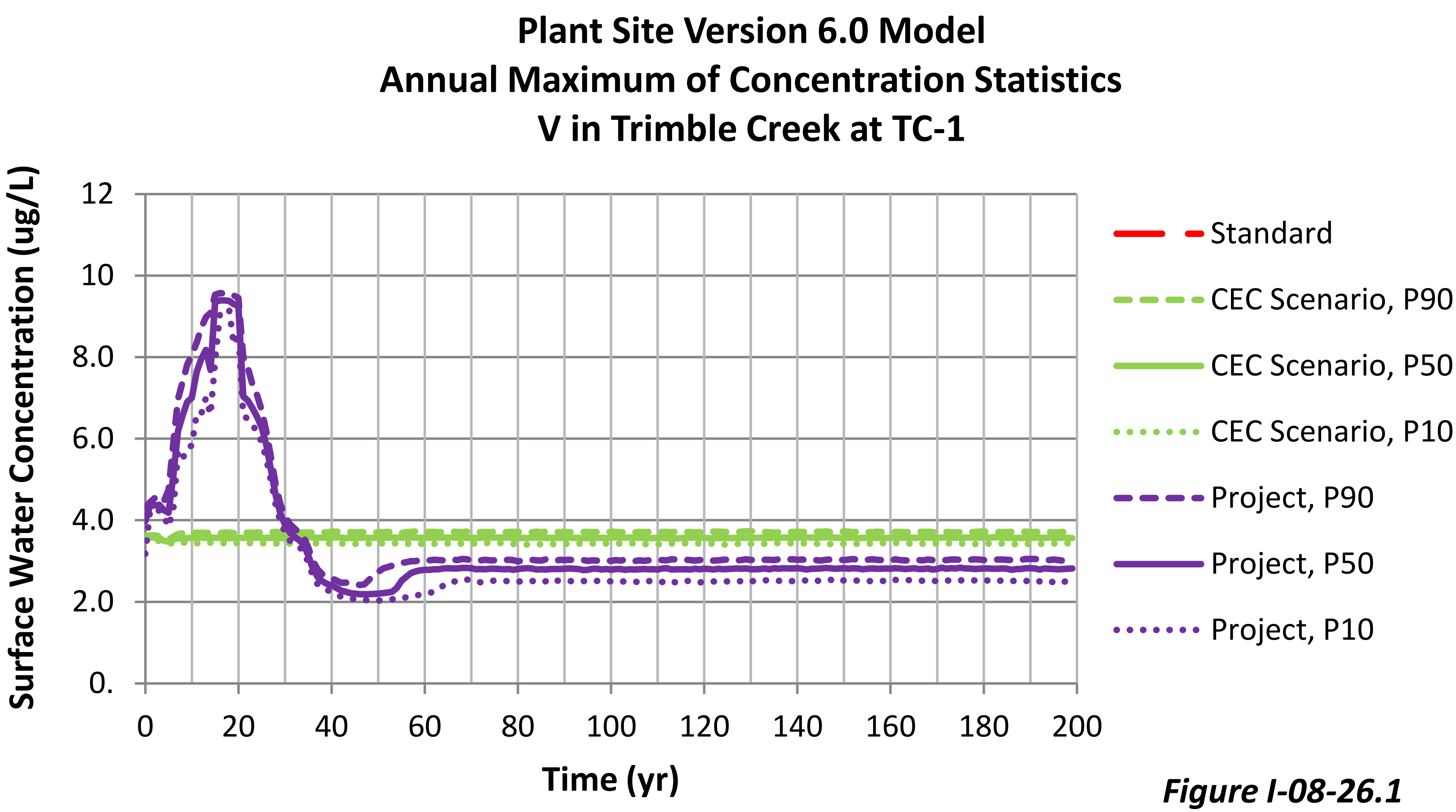

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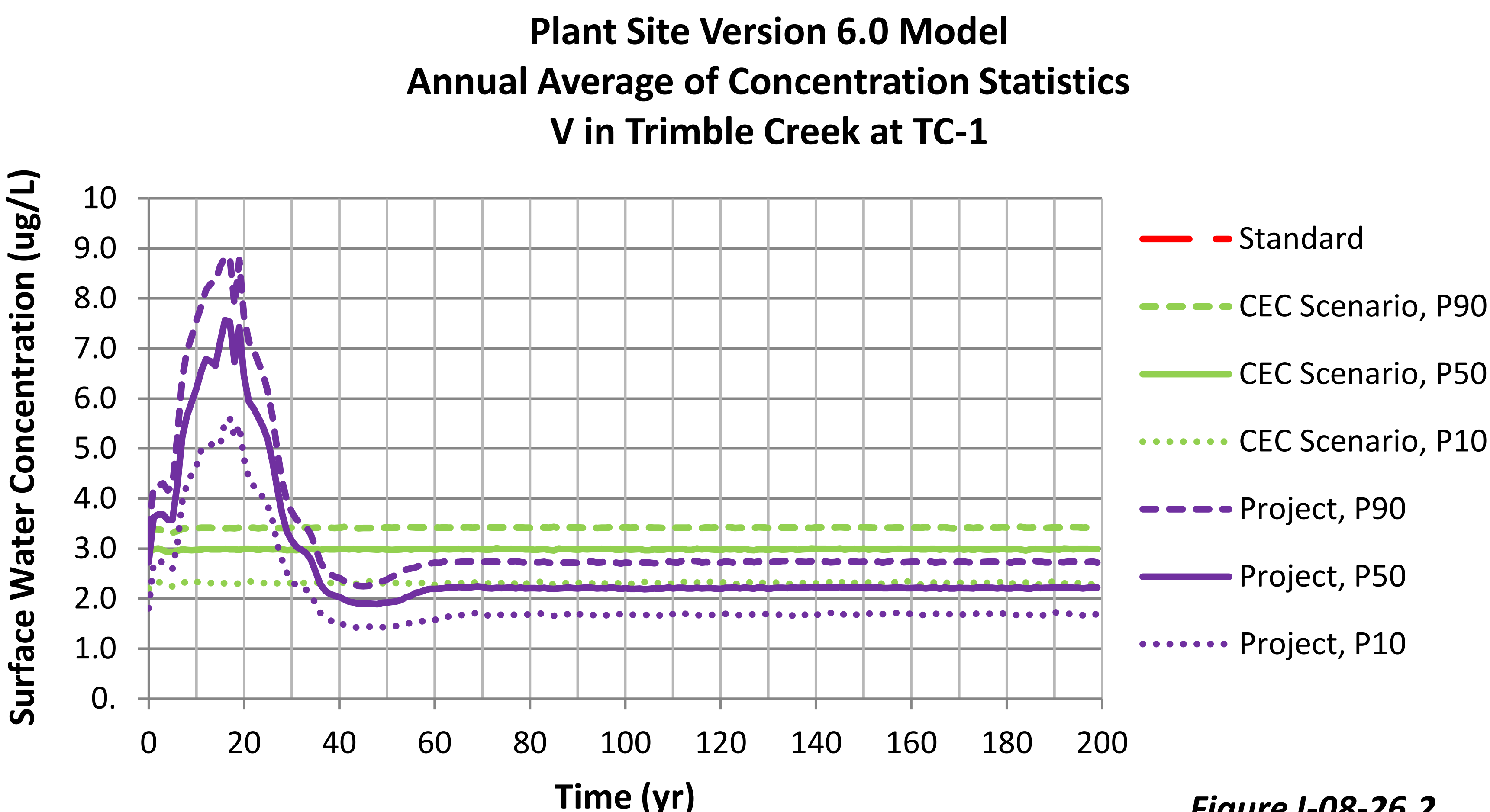

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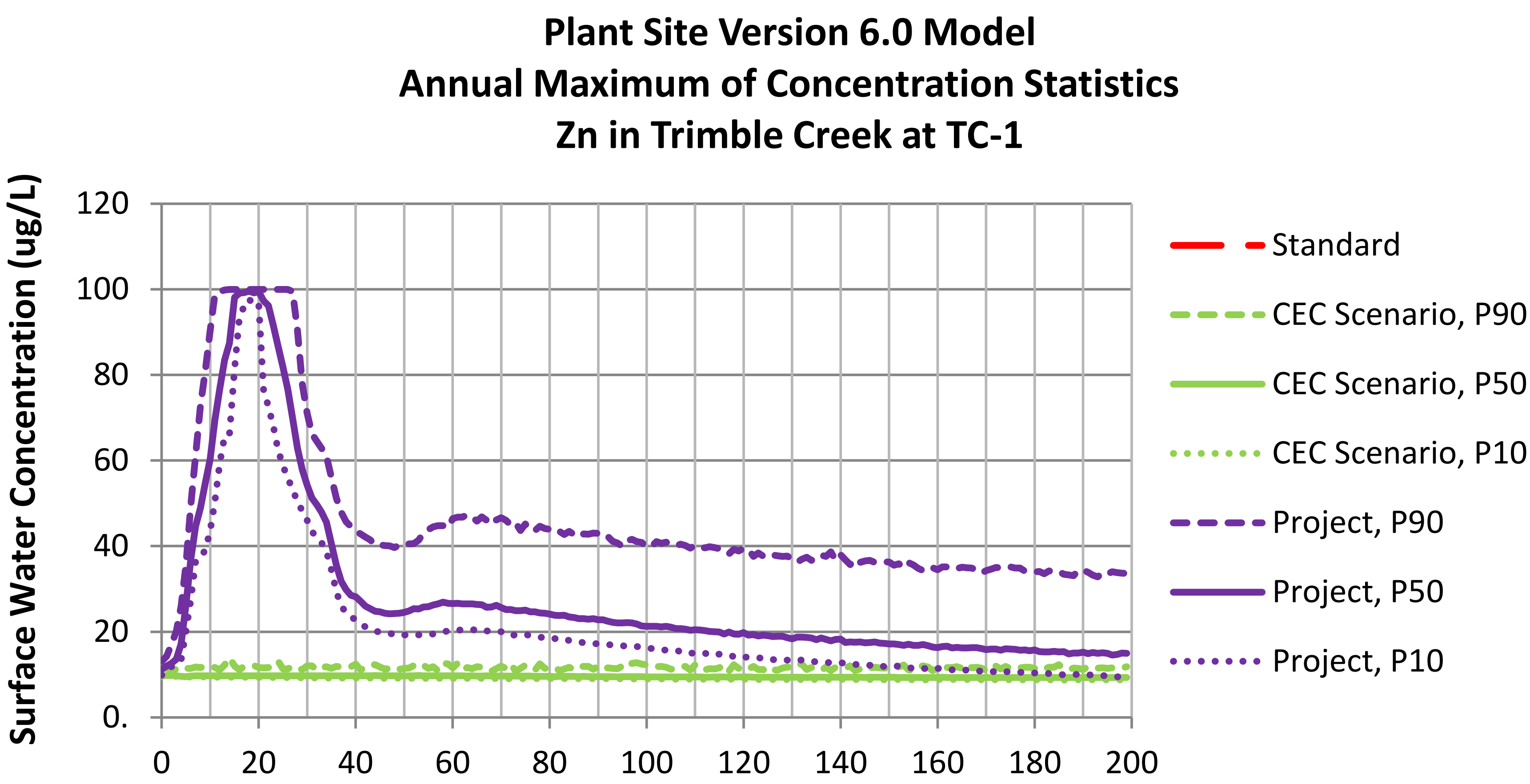

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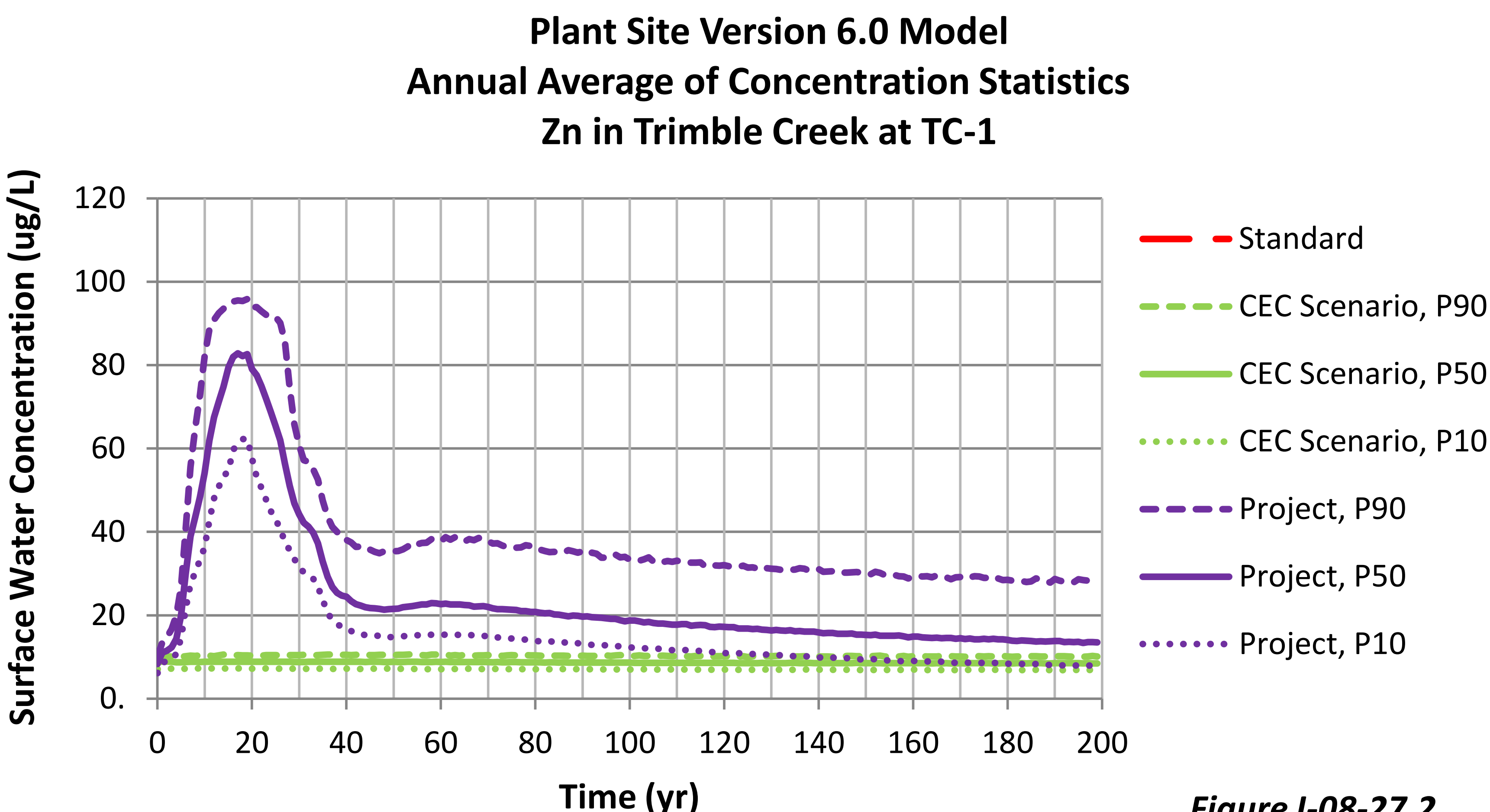

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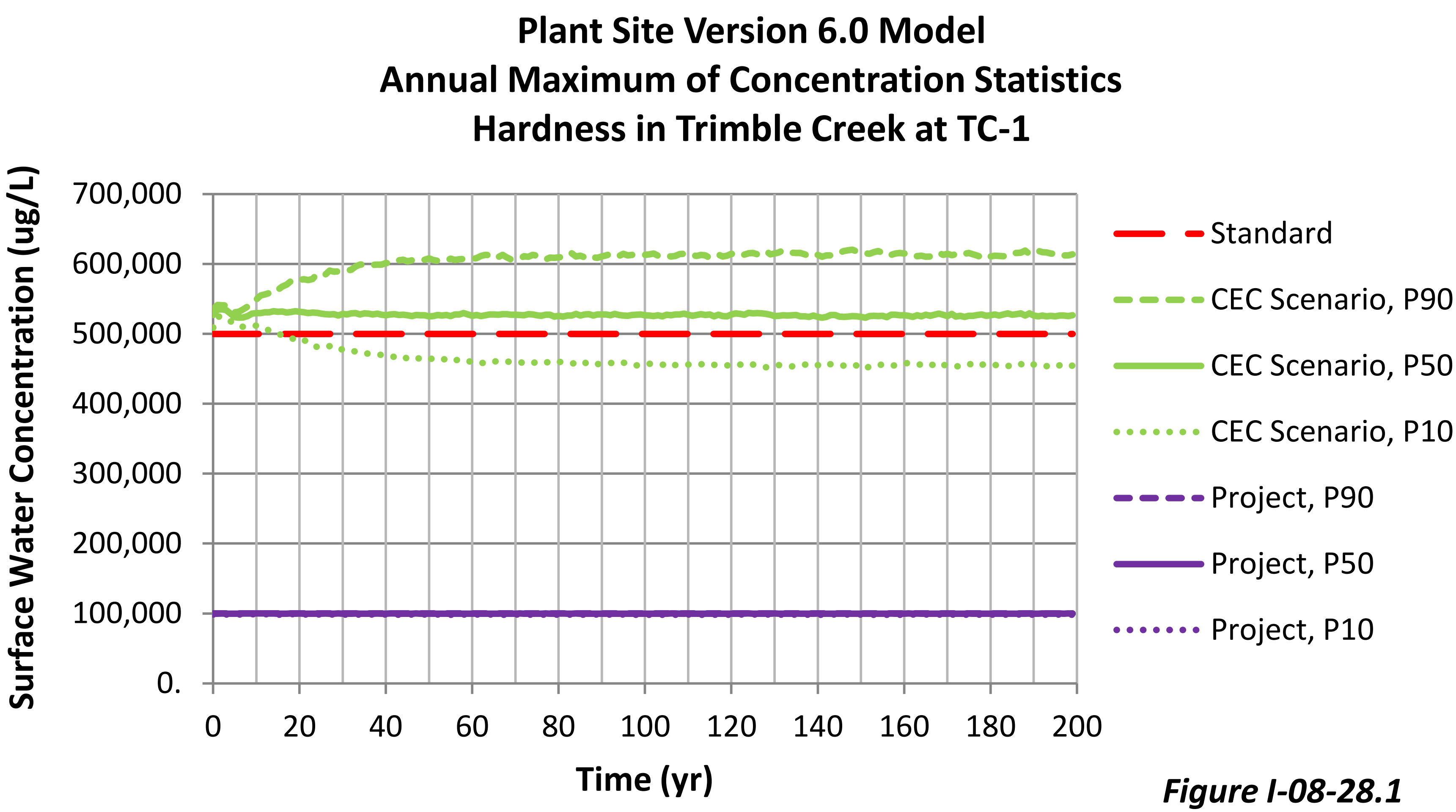

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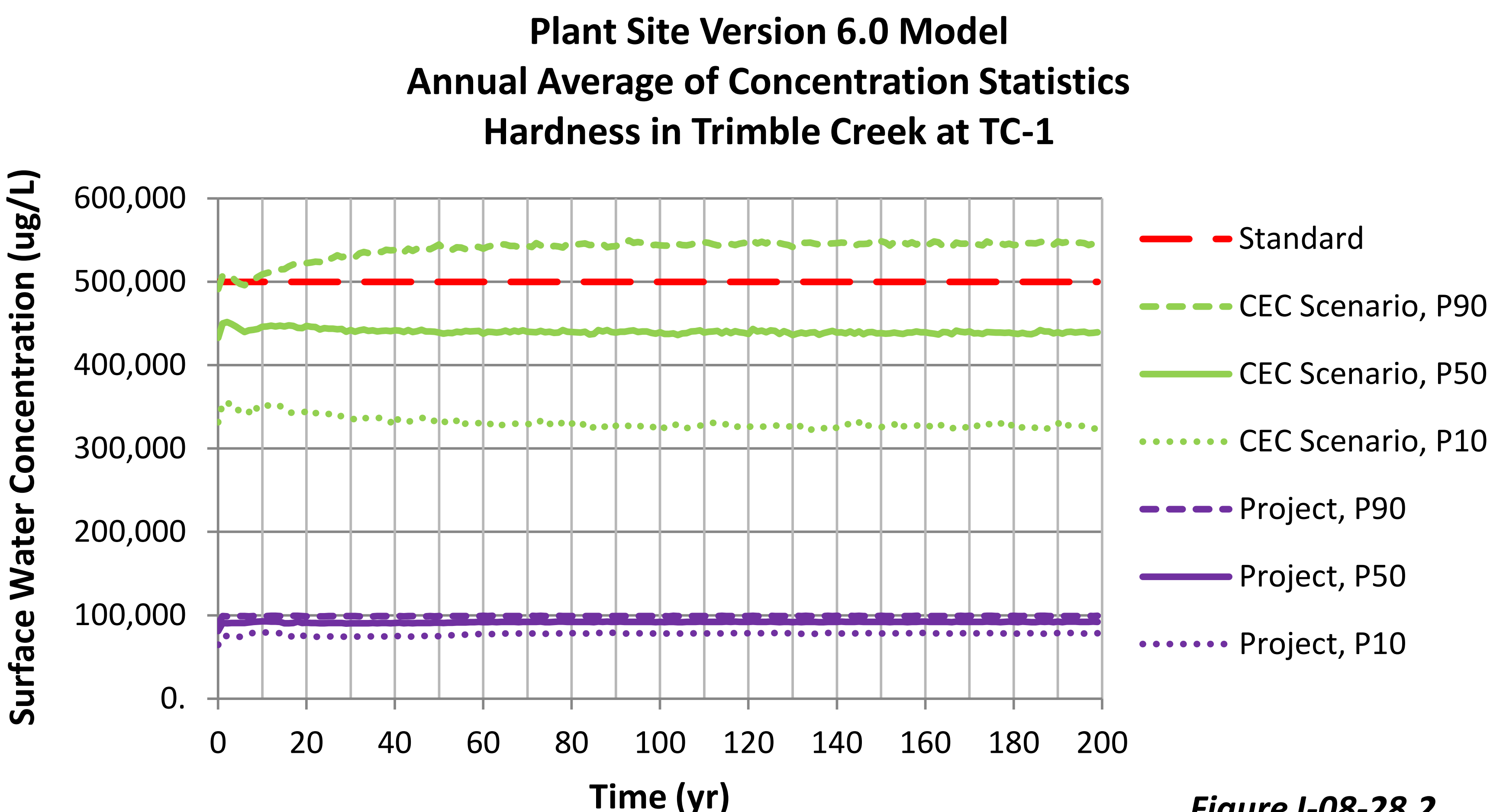

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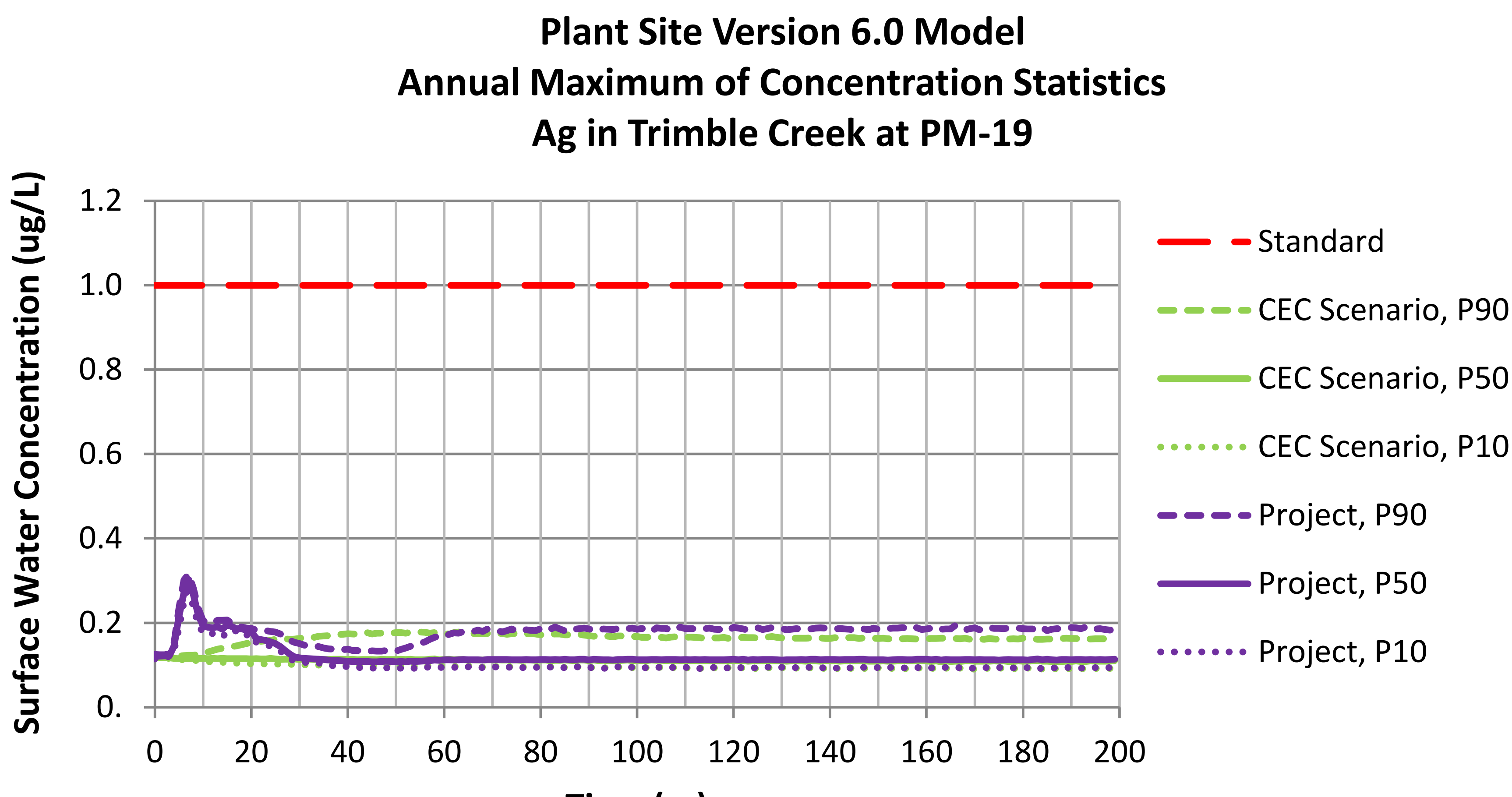

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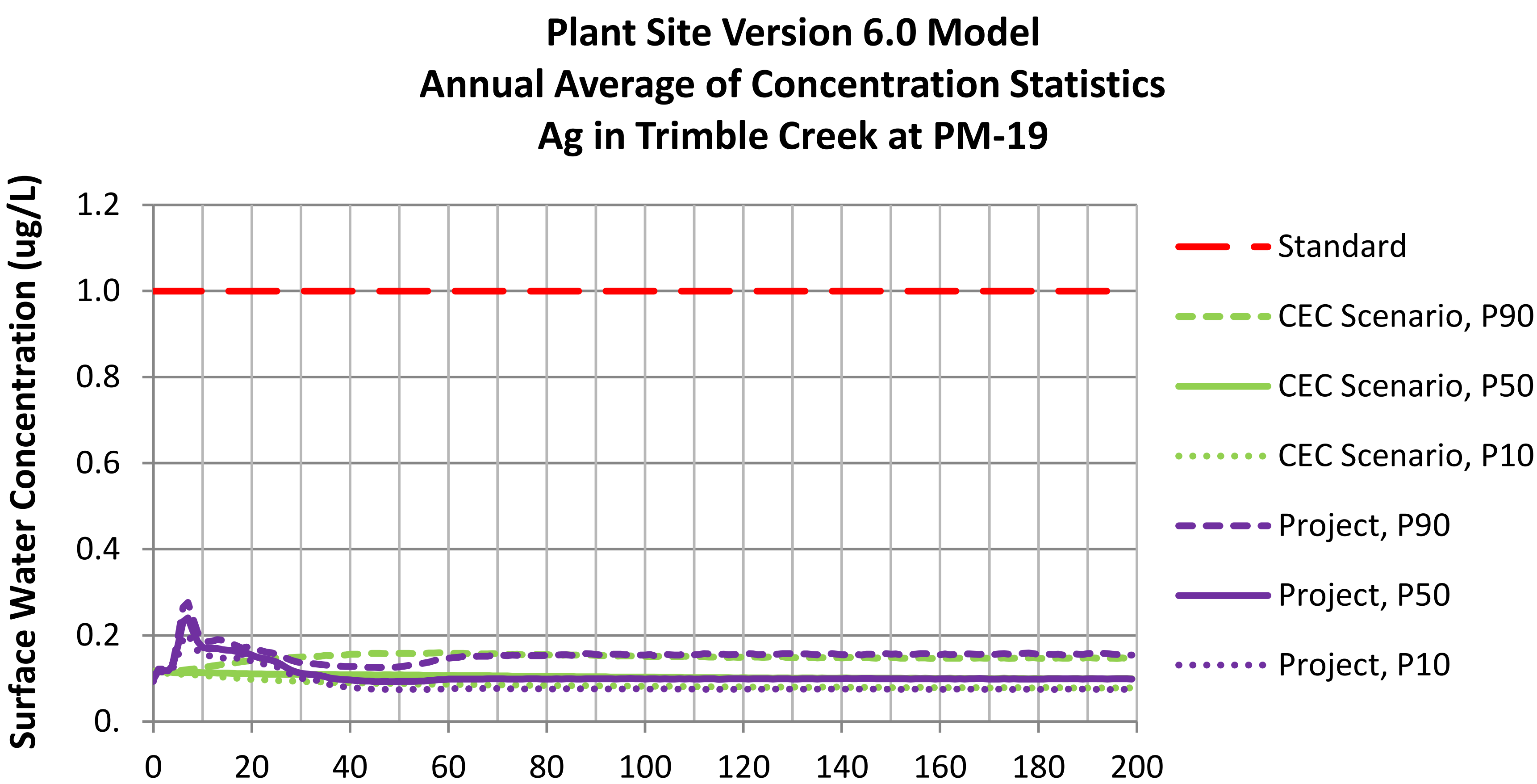

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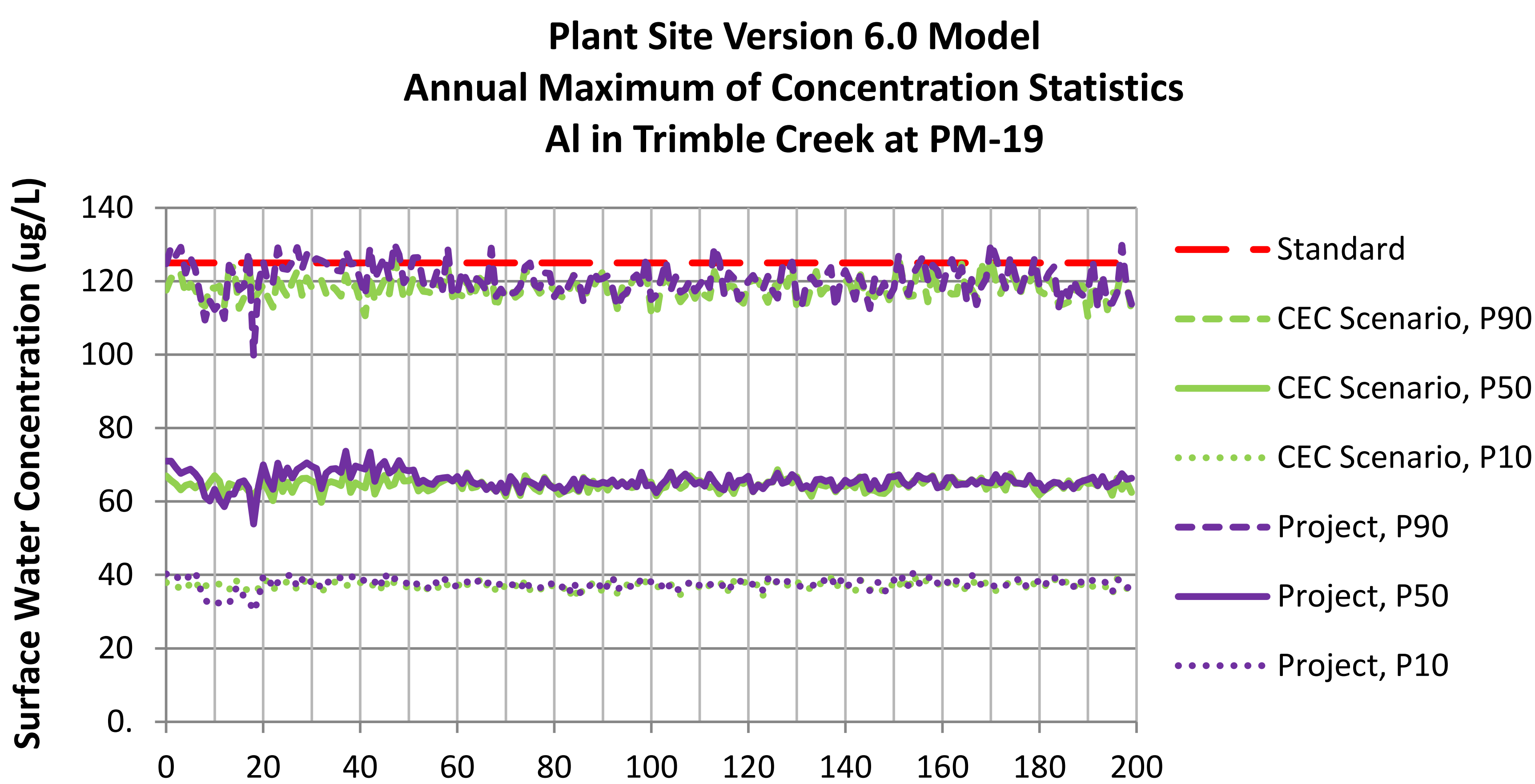

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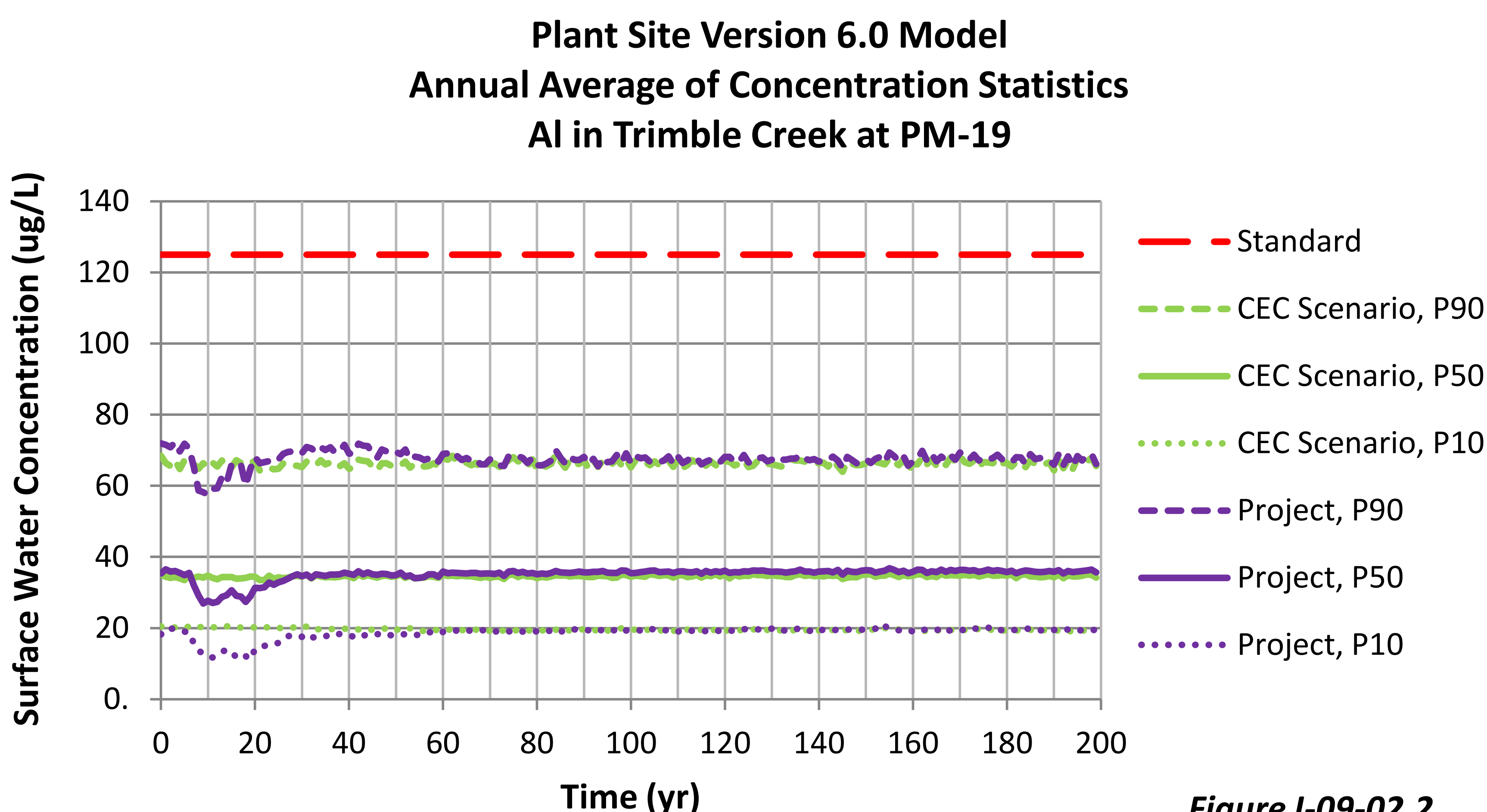

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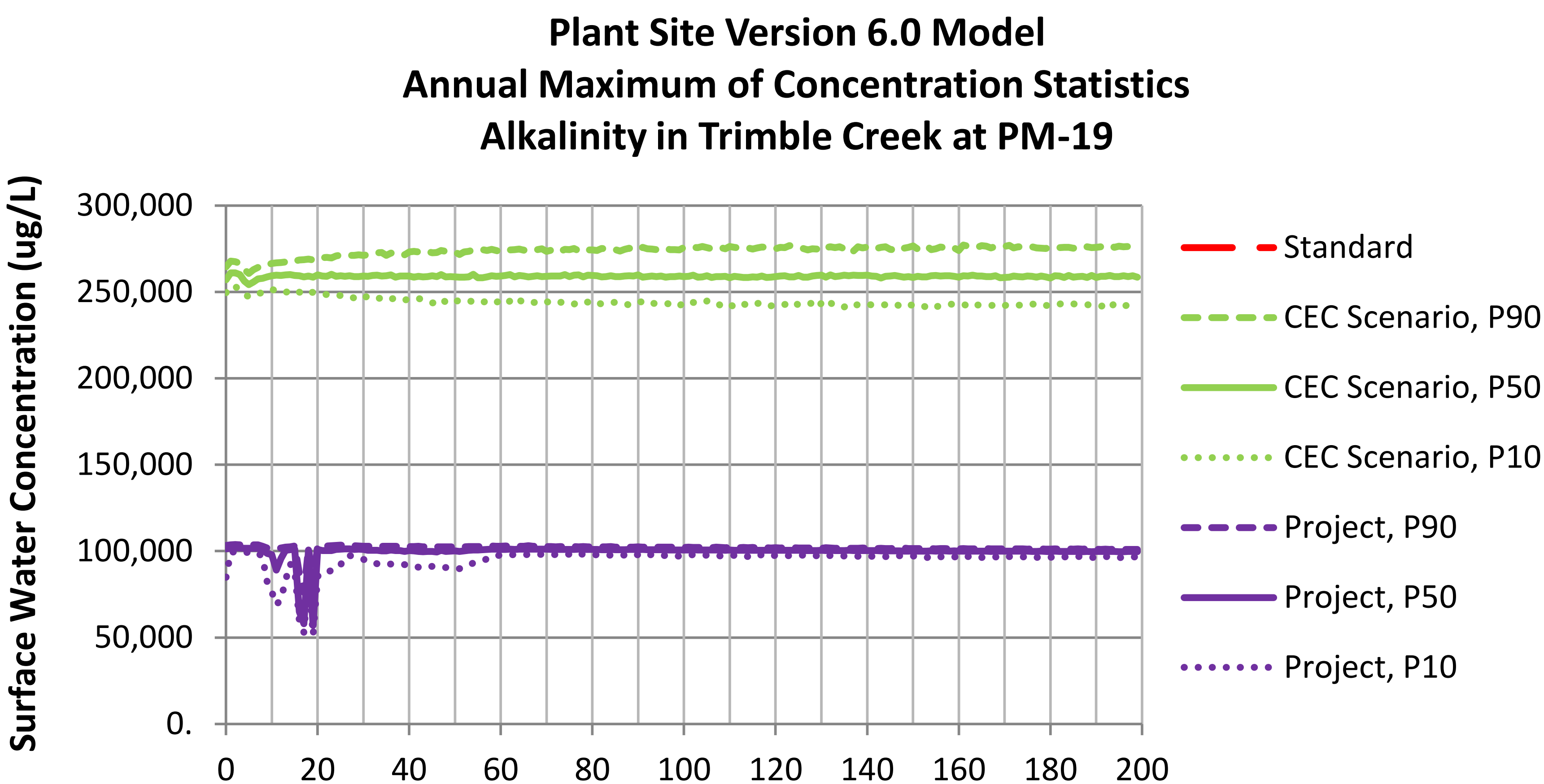

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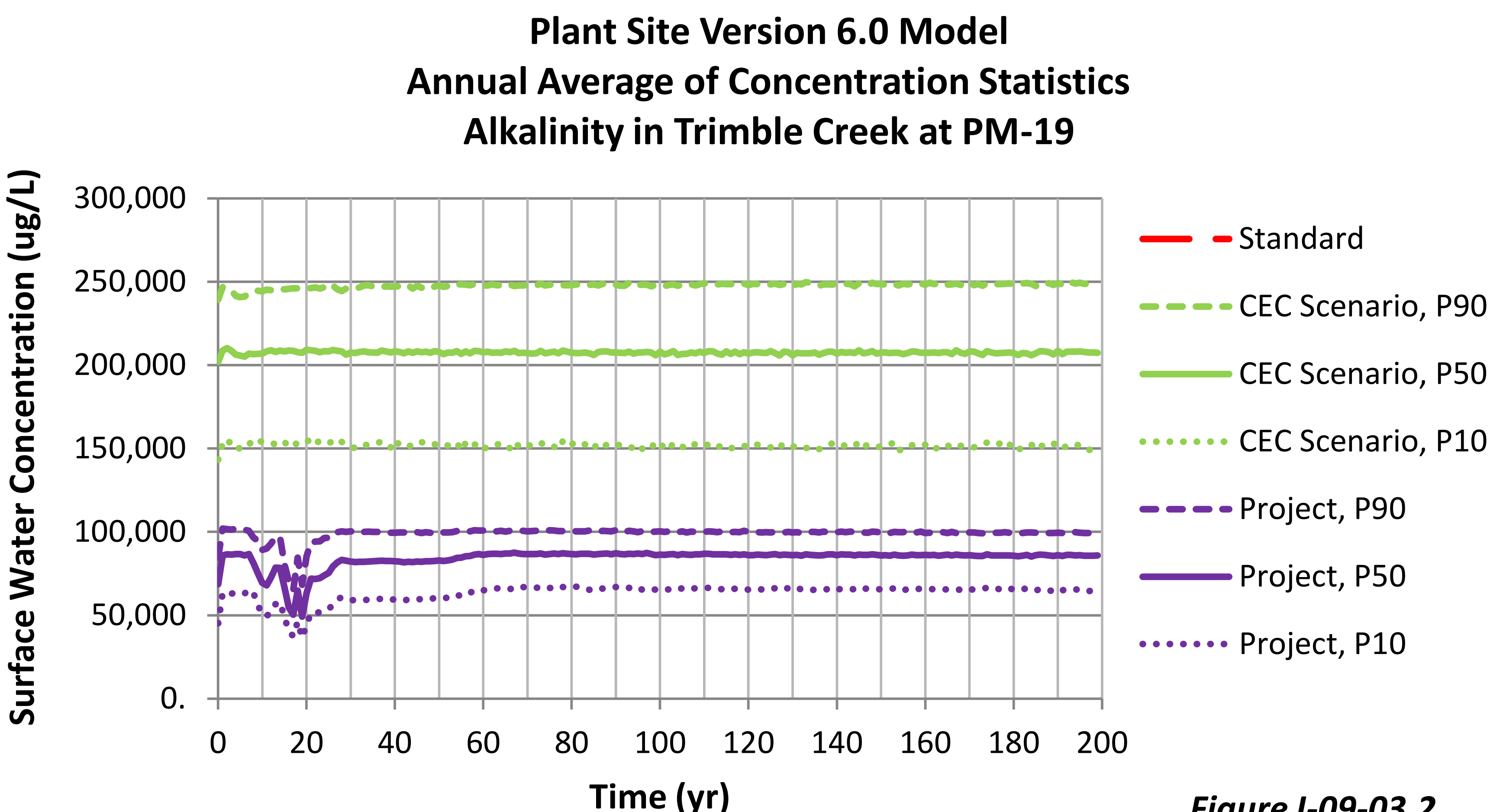

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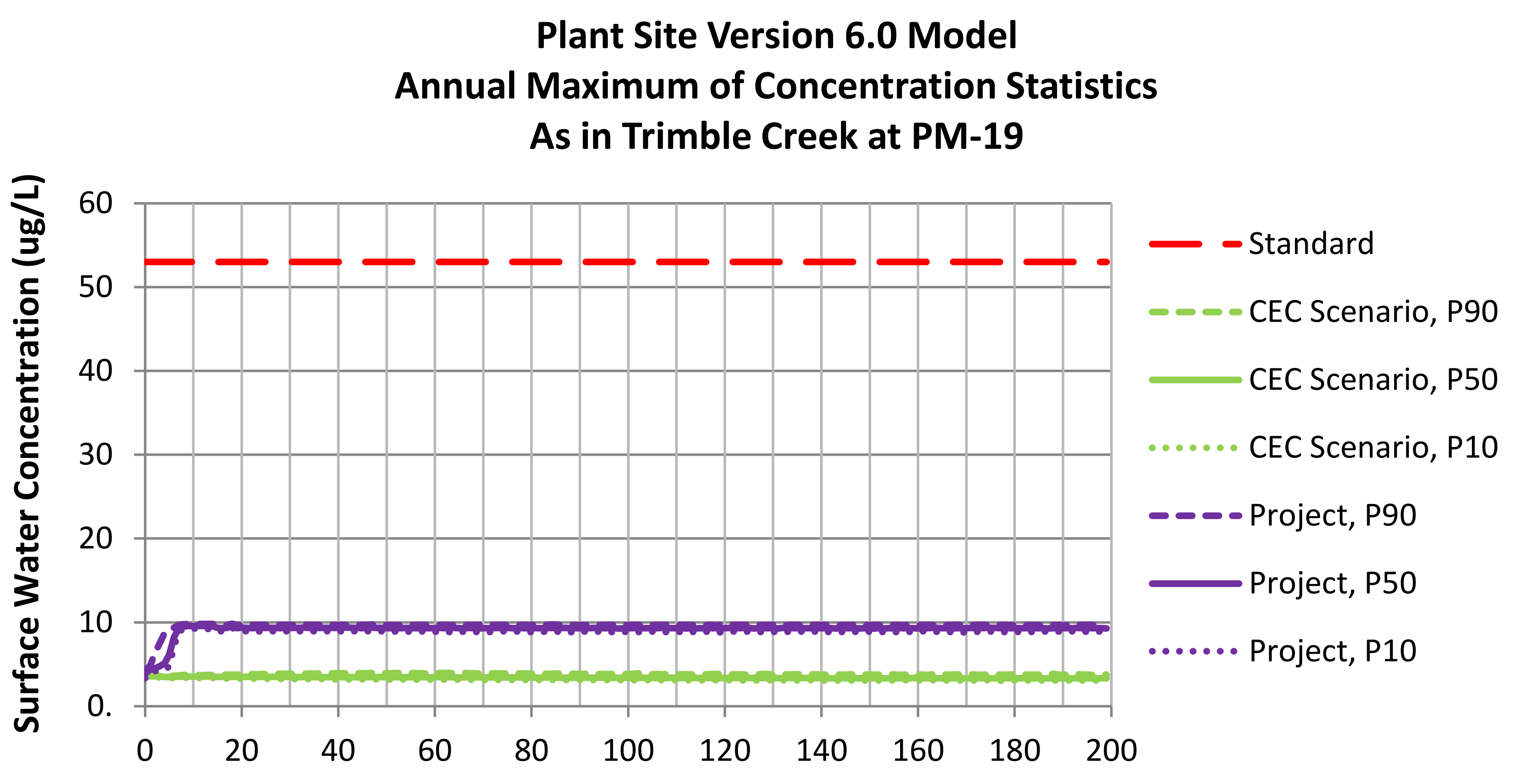

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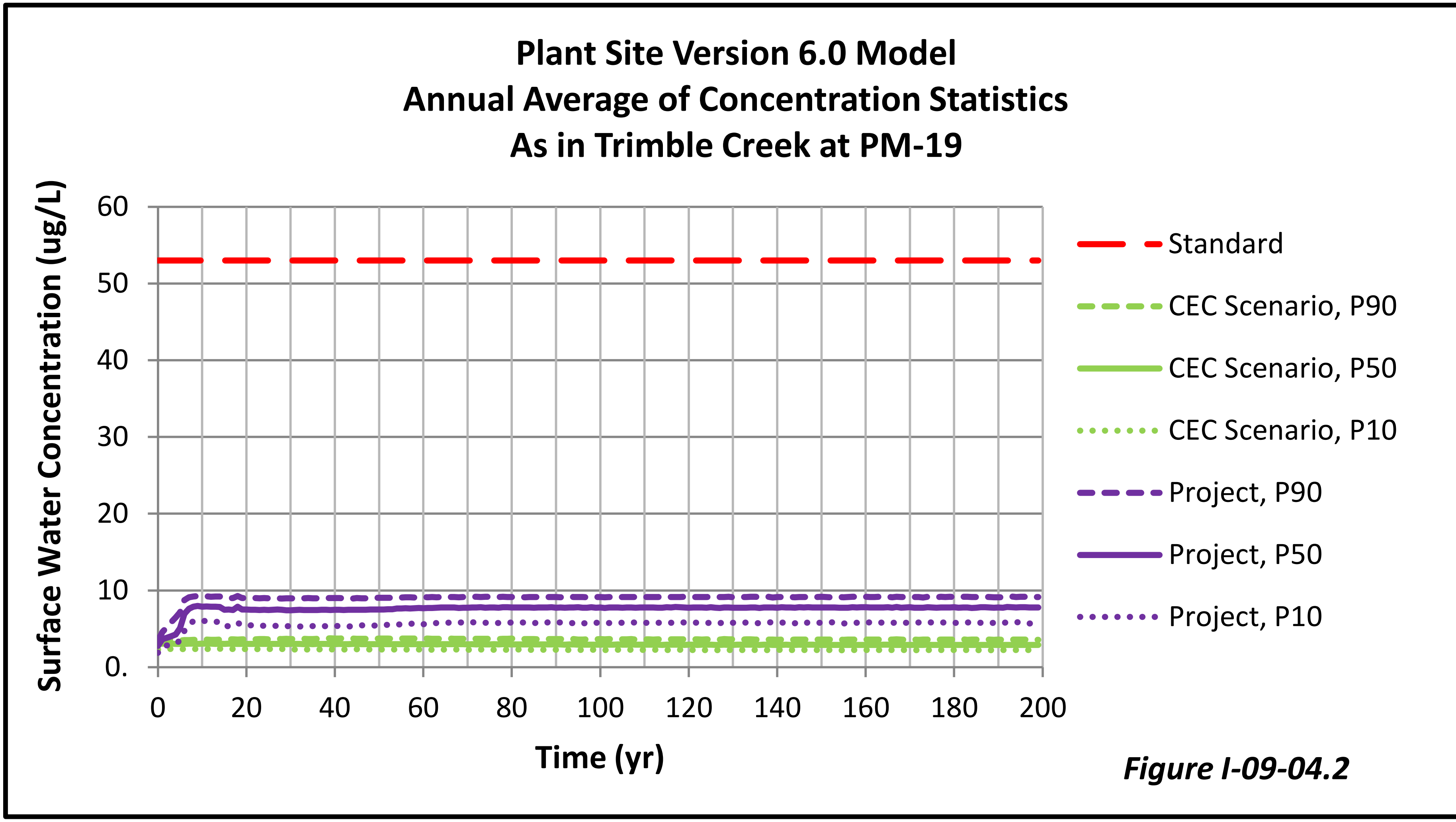
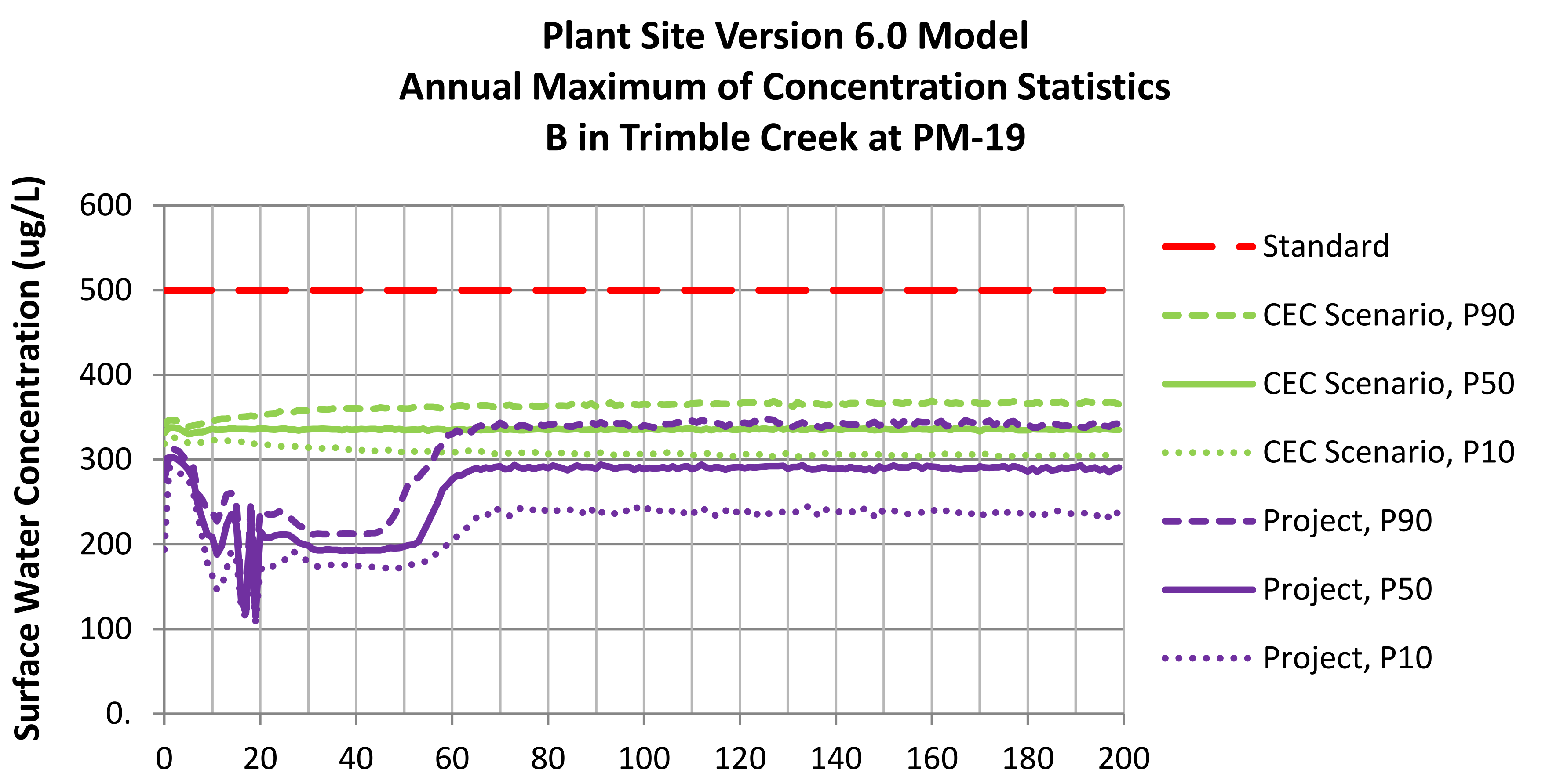

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
As in Trimble Creek at PM-19
Surface Water Concentration (ug/L)
60
50
40
30
20
10
0.
0
20
40
60
80
100
120
140
160
180
200
Time (yr)
Standard
CEC Scenario, P90
CEC Scenario, P50
CEC Scenario, P10
Project, P90
Project, P50
Project, P10
Figure I-09-04.2



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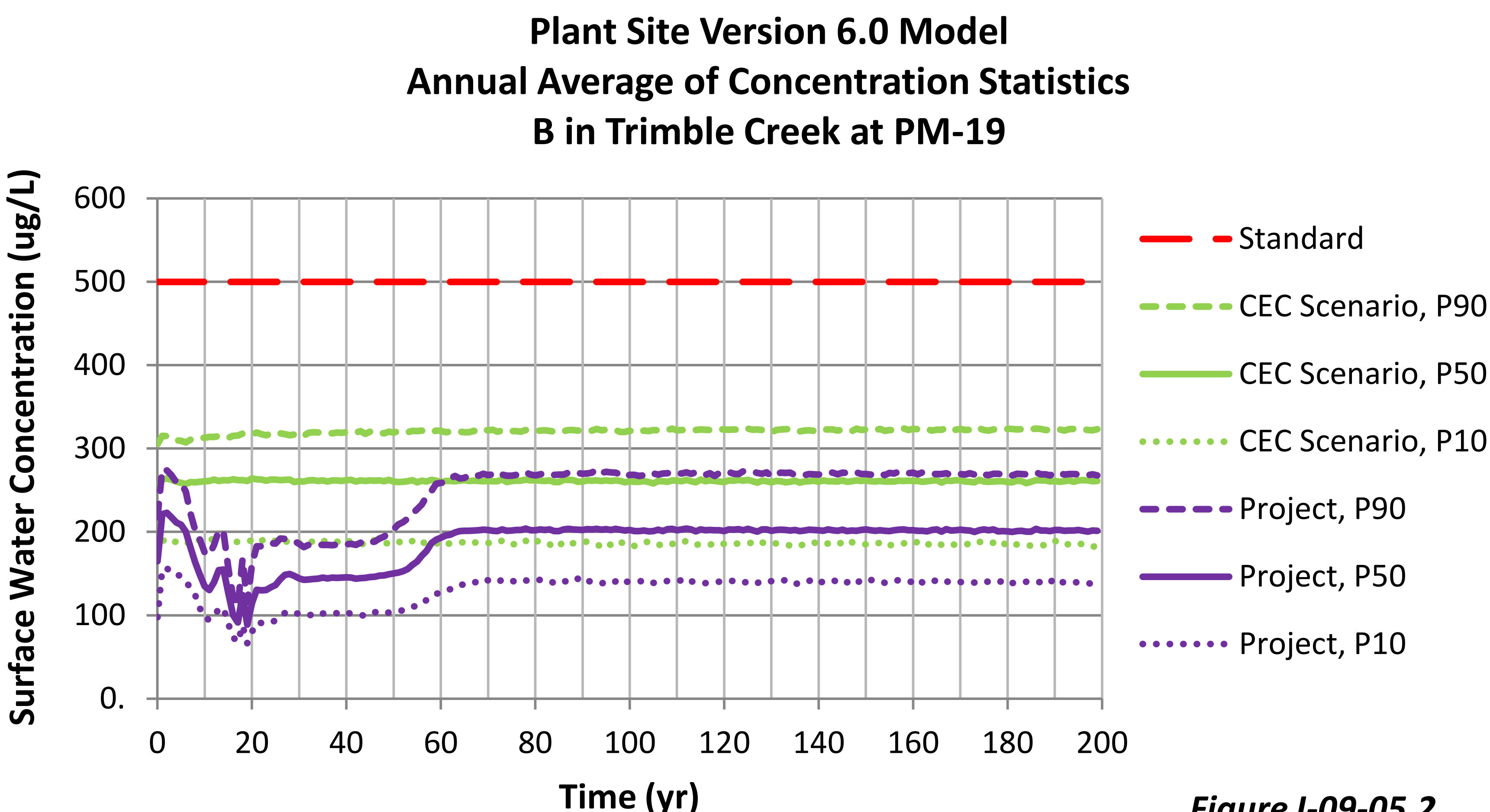

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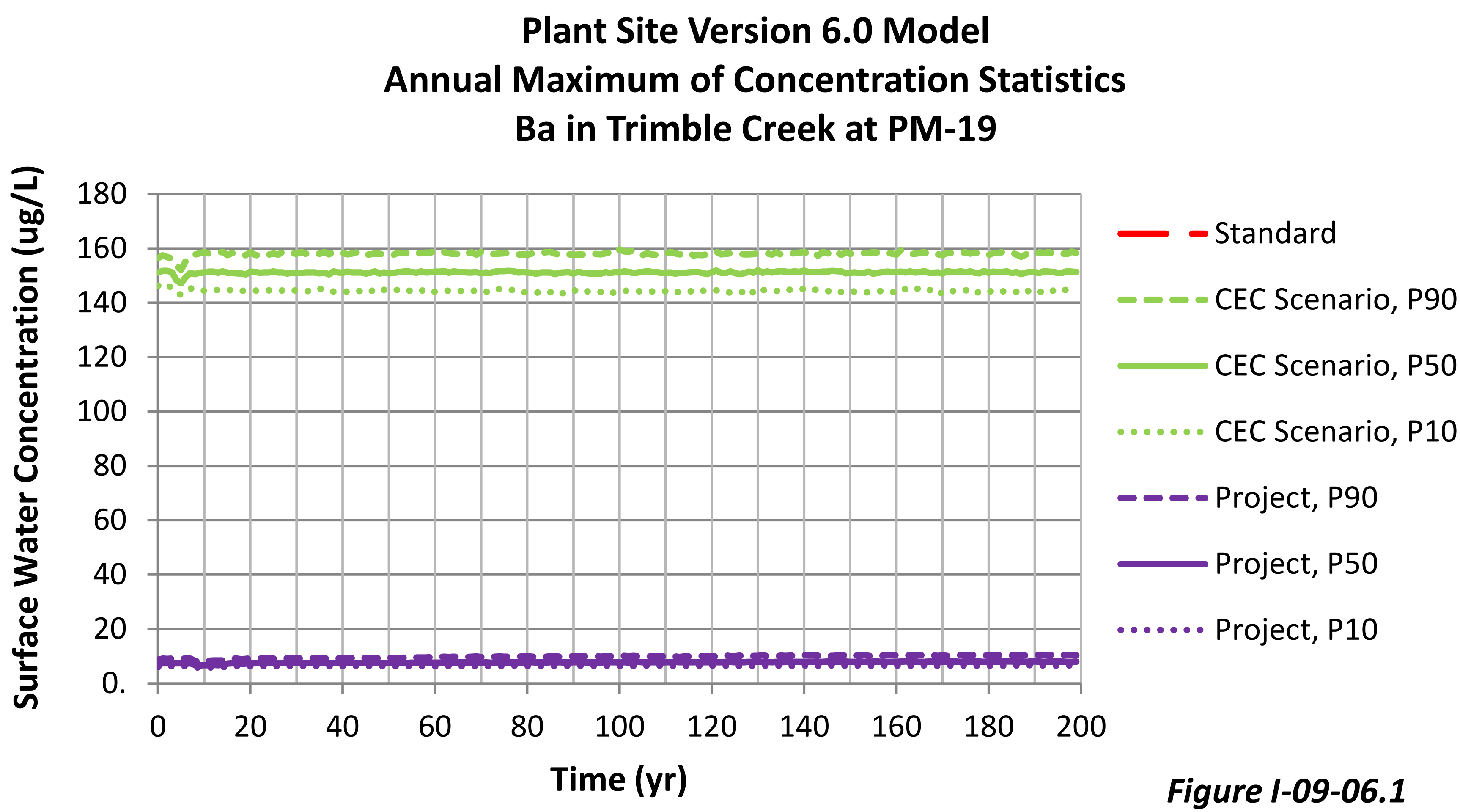

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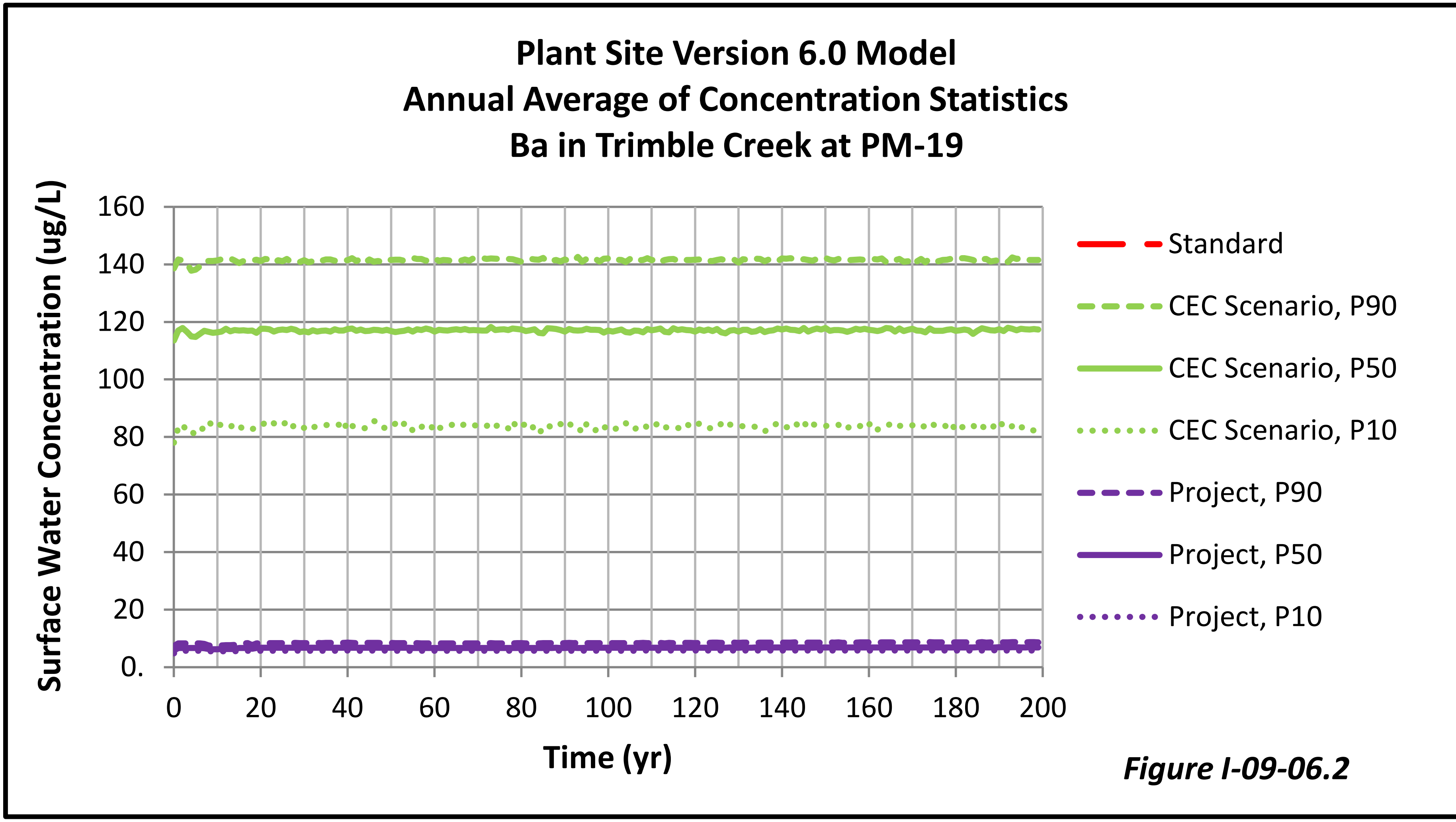

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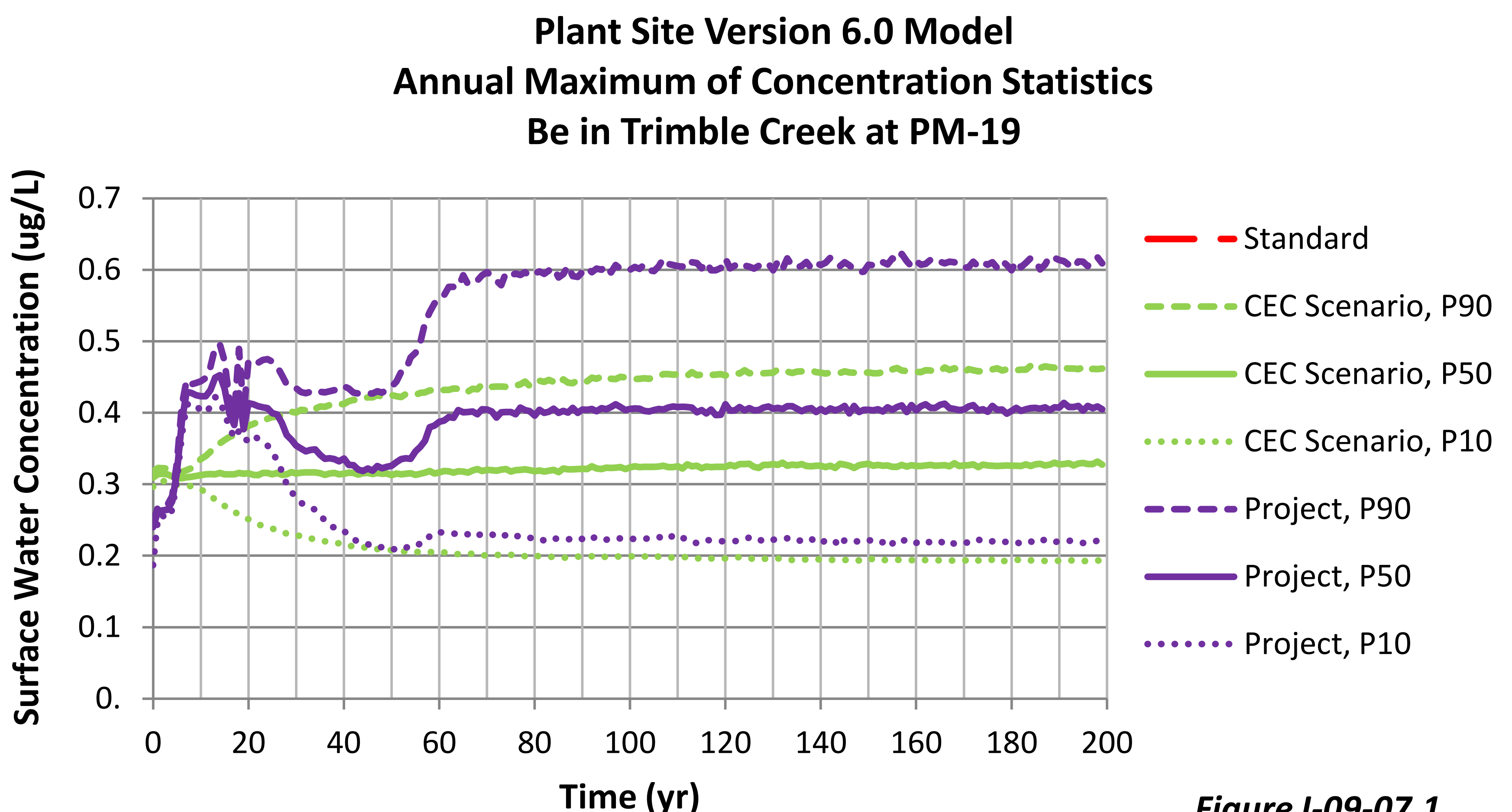

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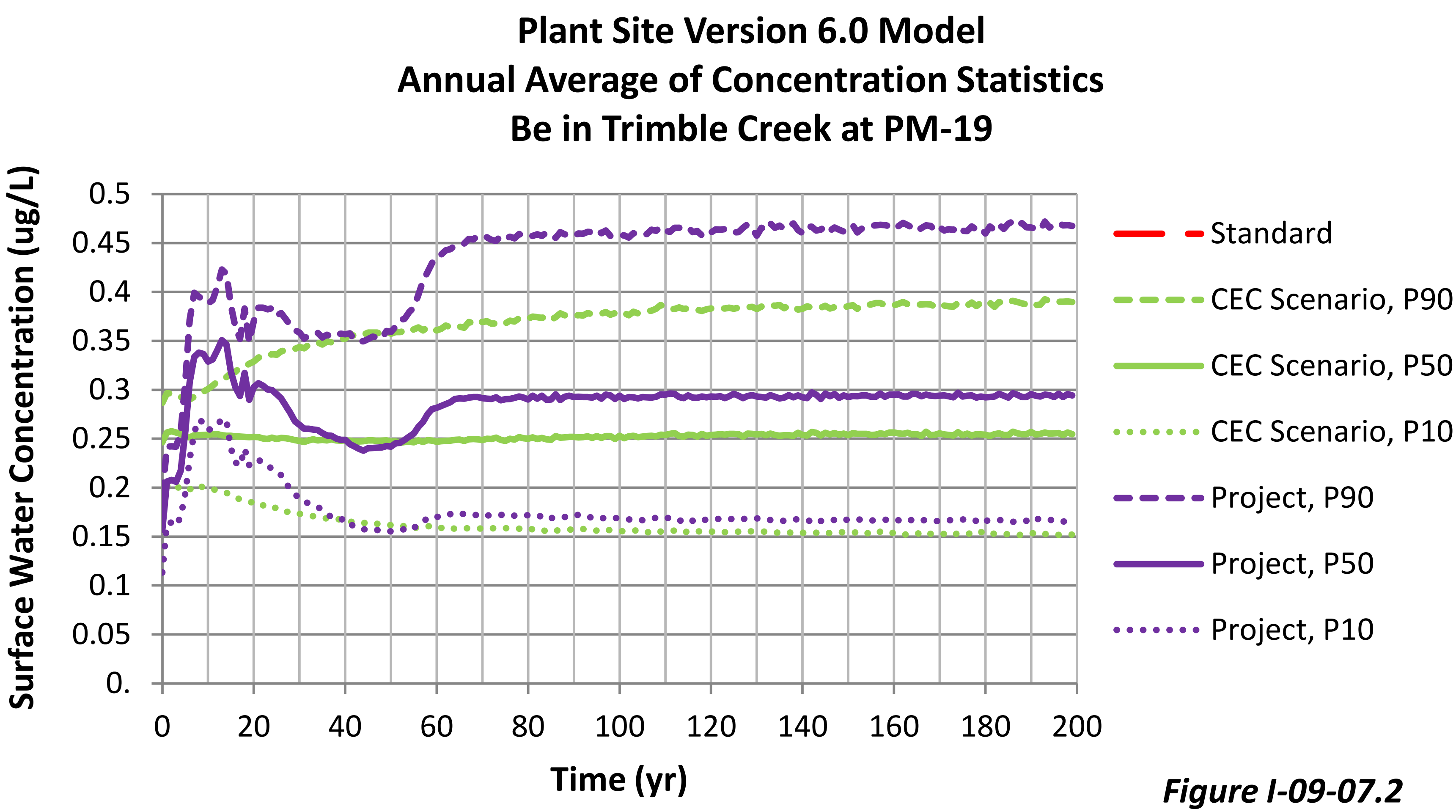

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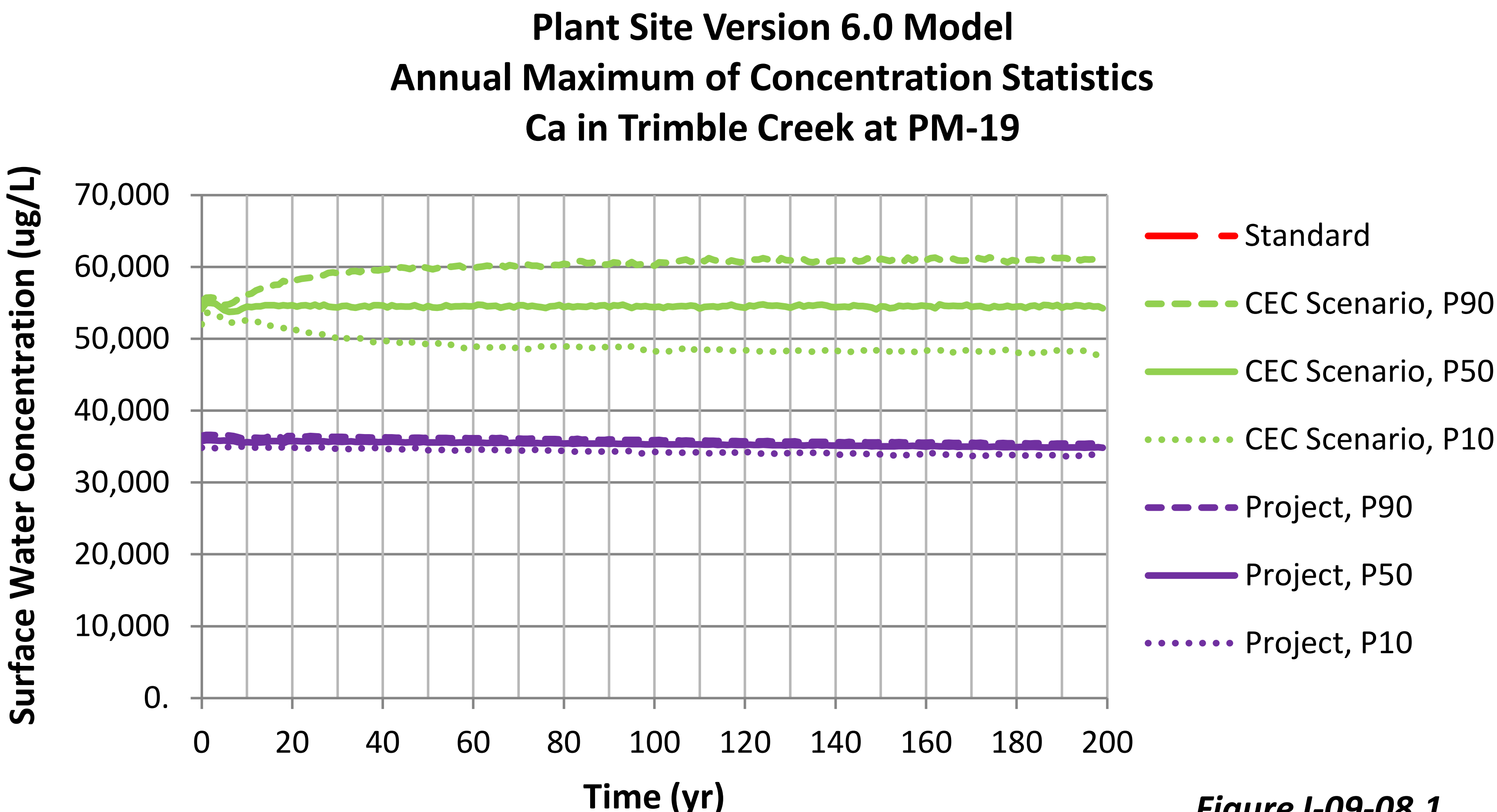

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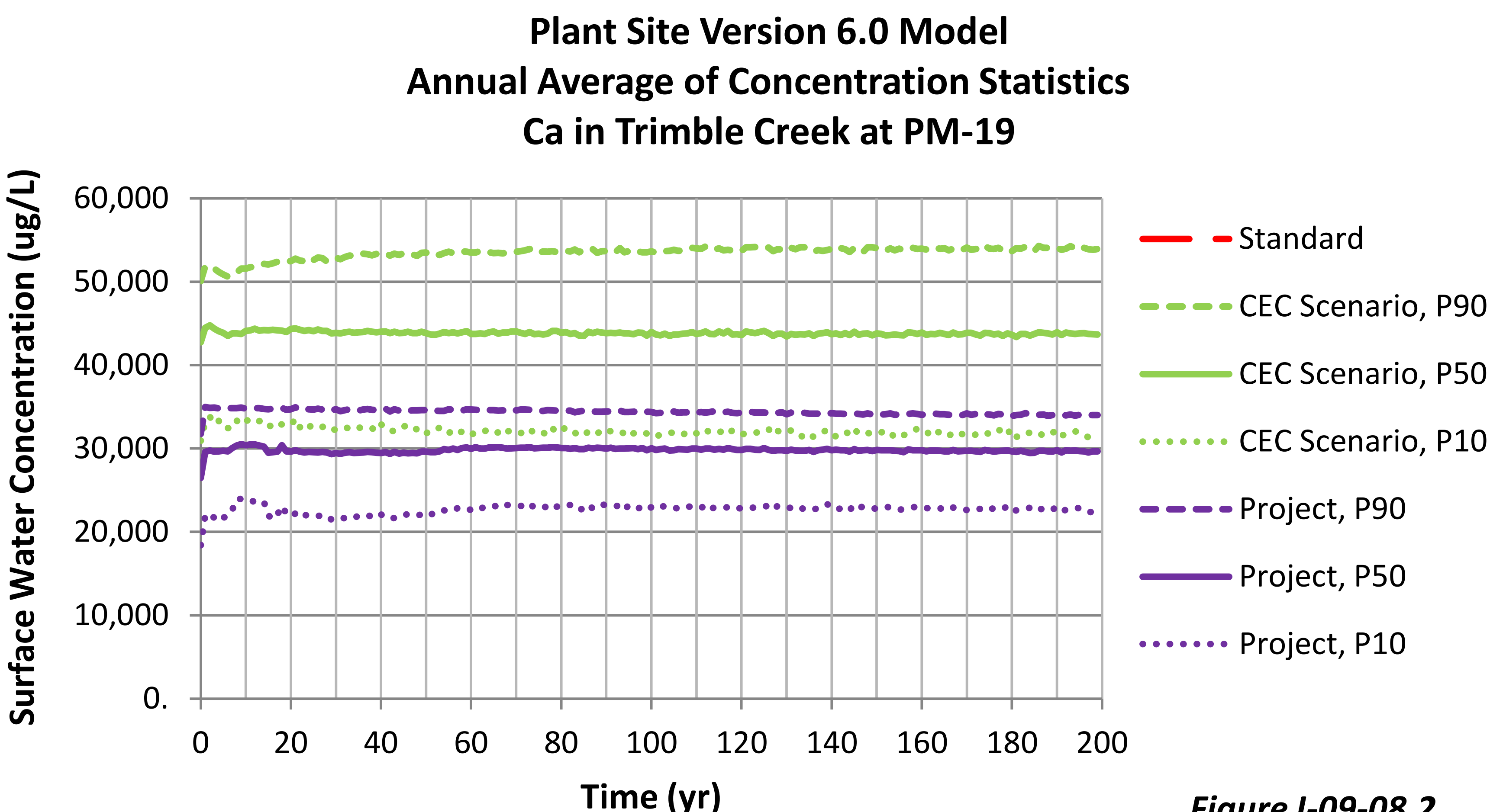

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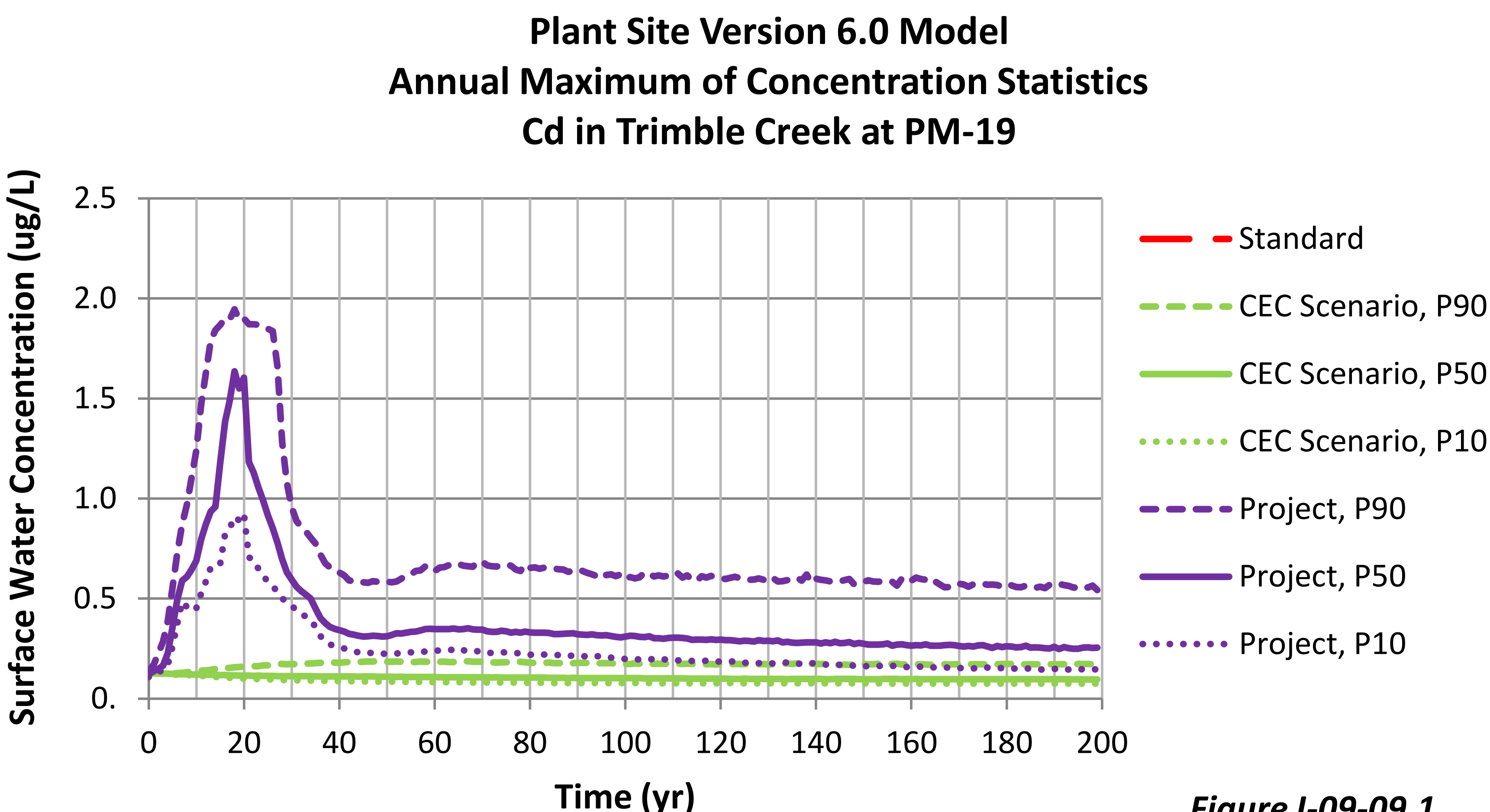

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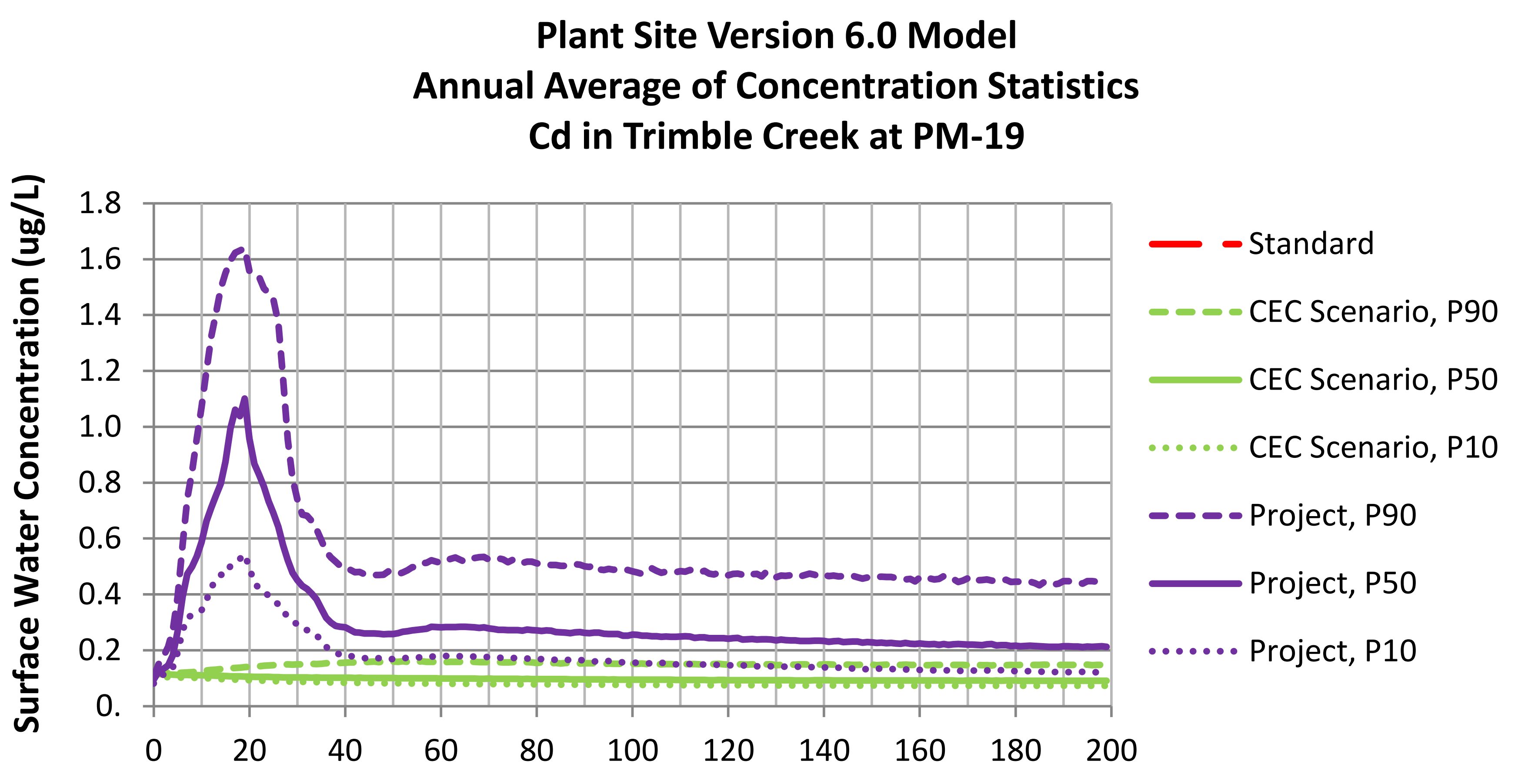

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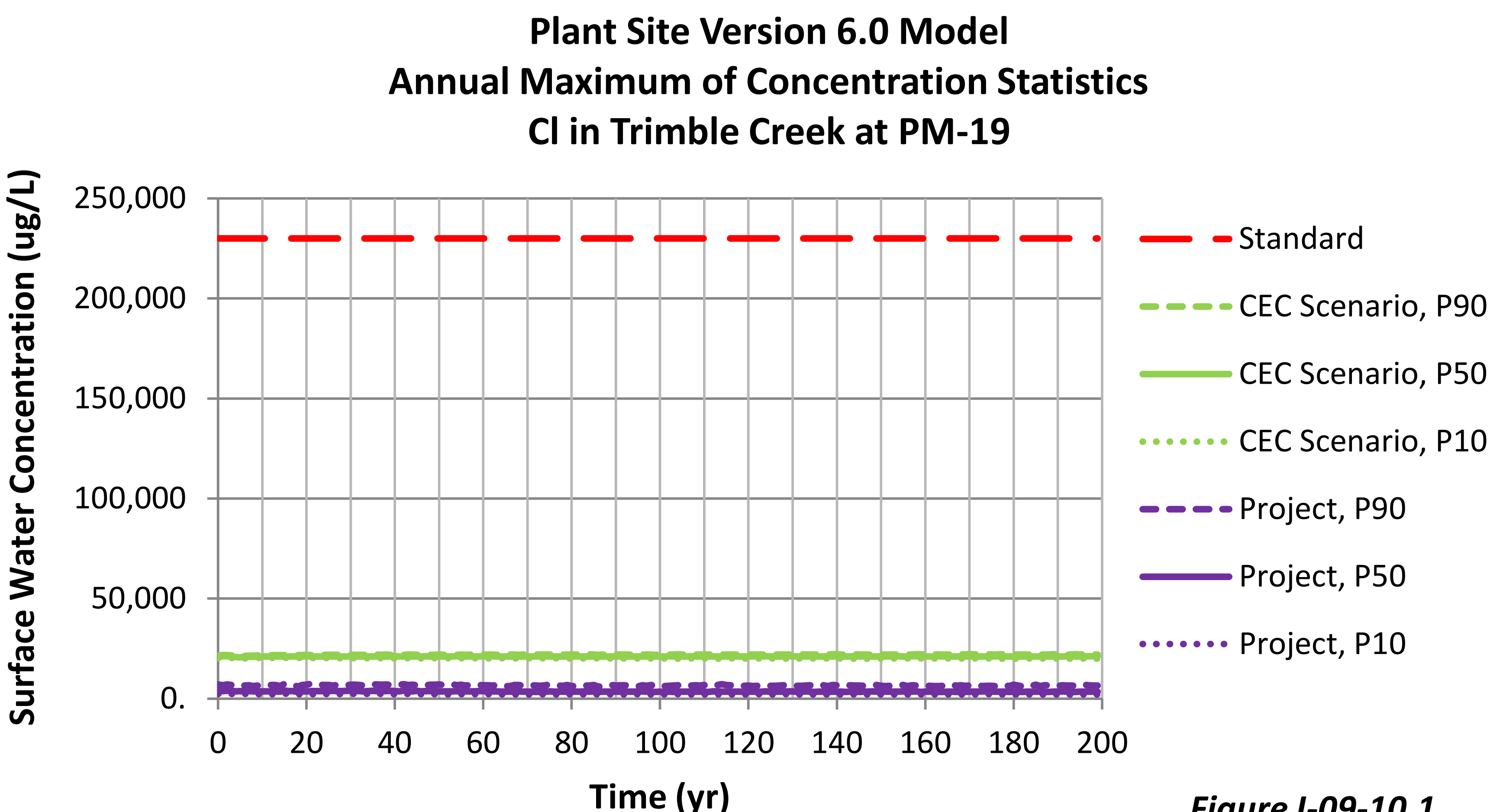

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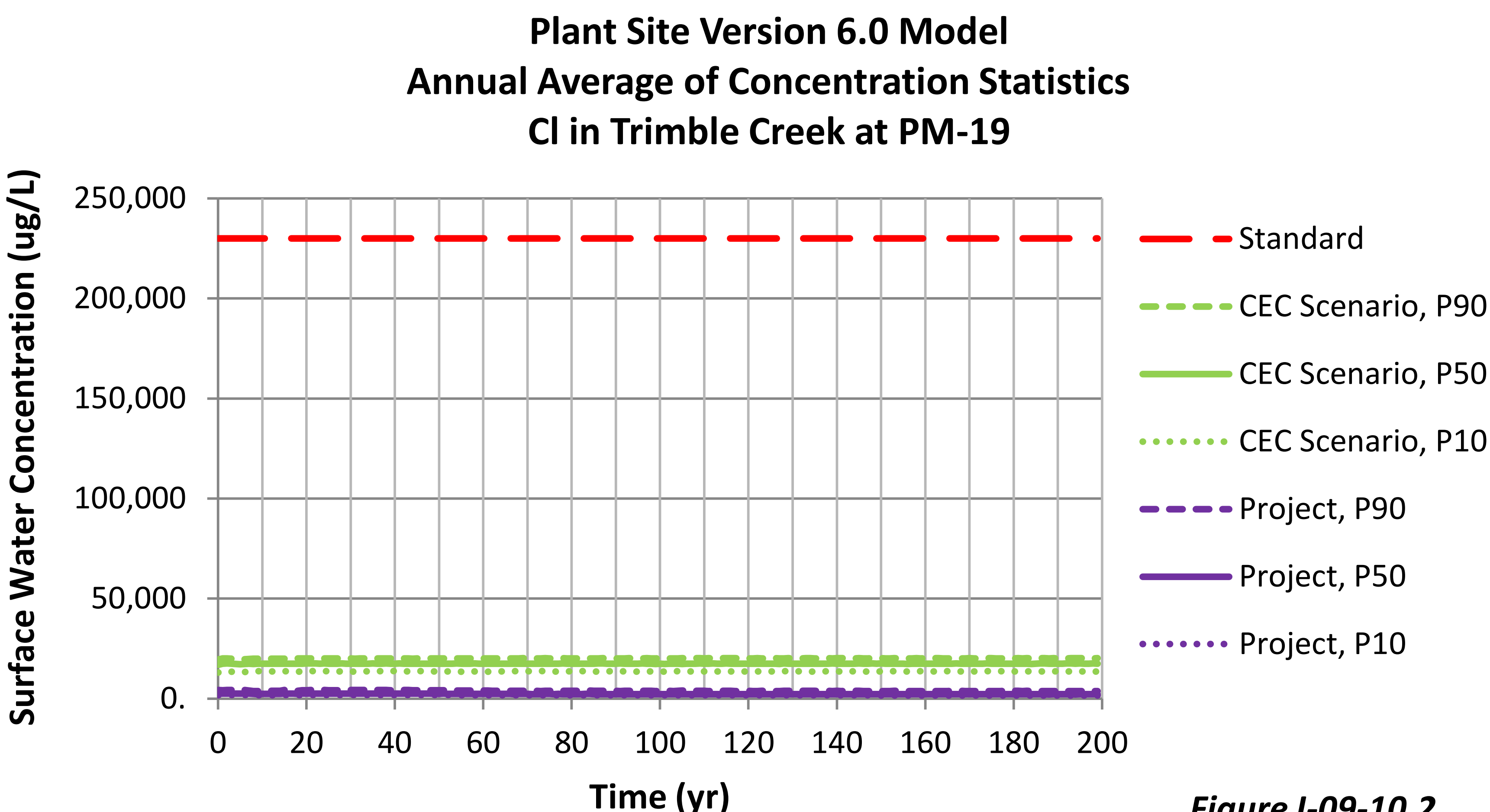

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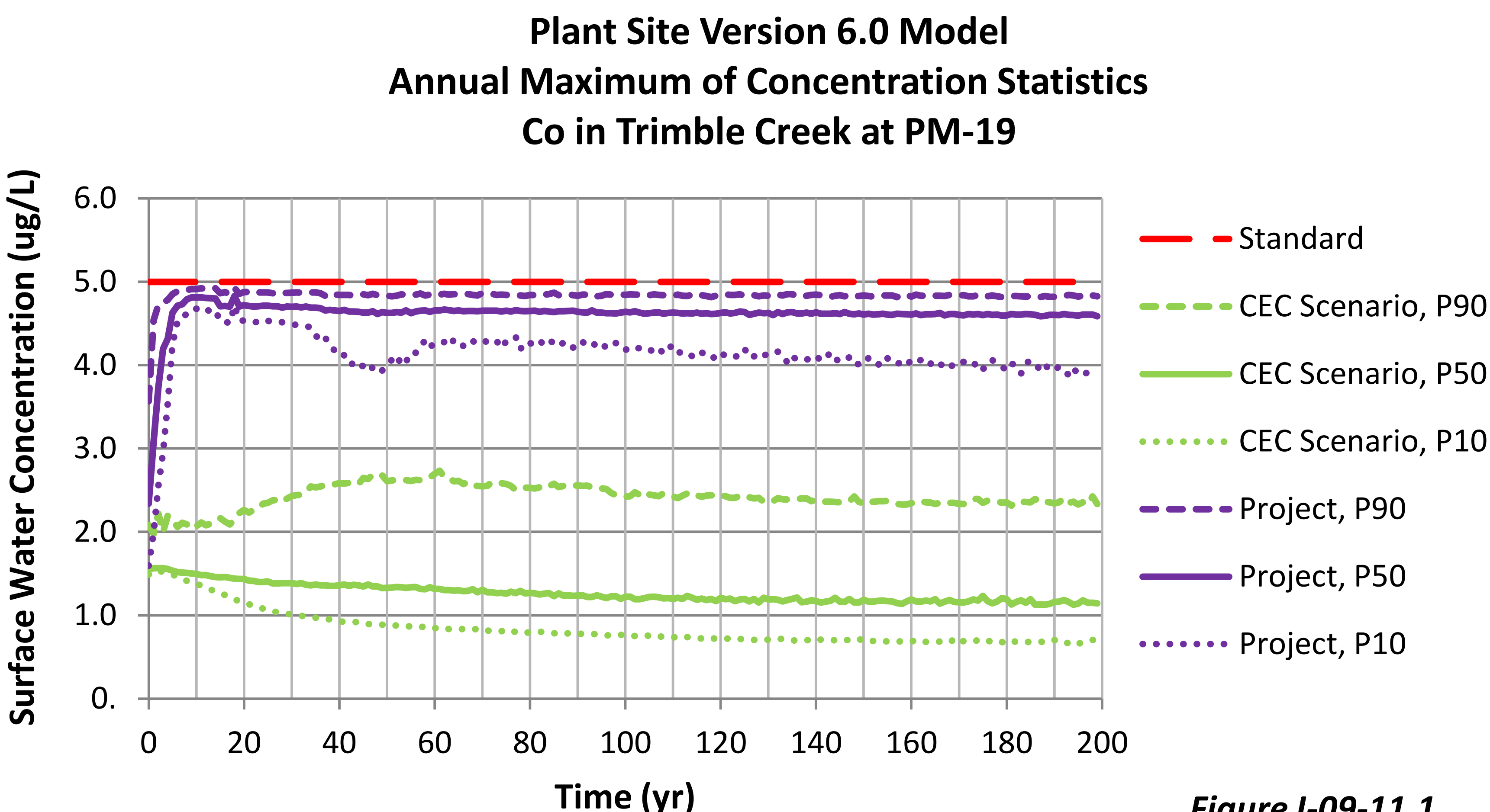

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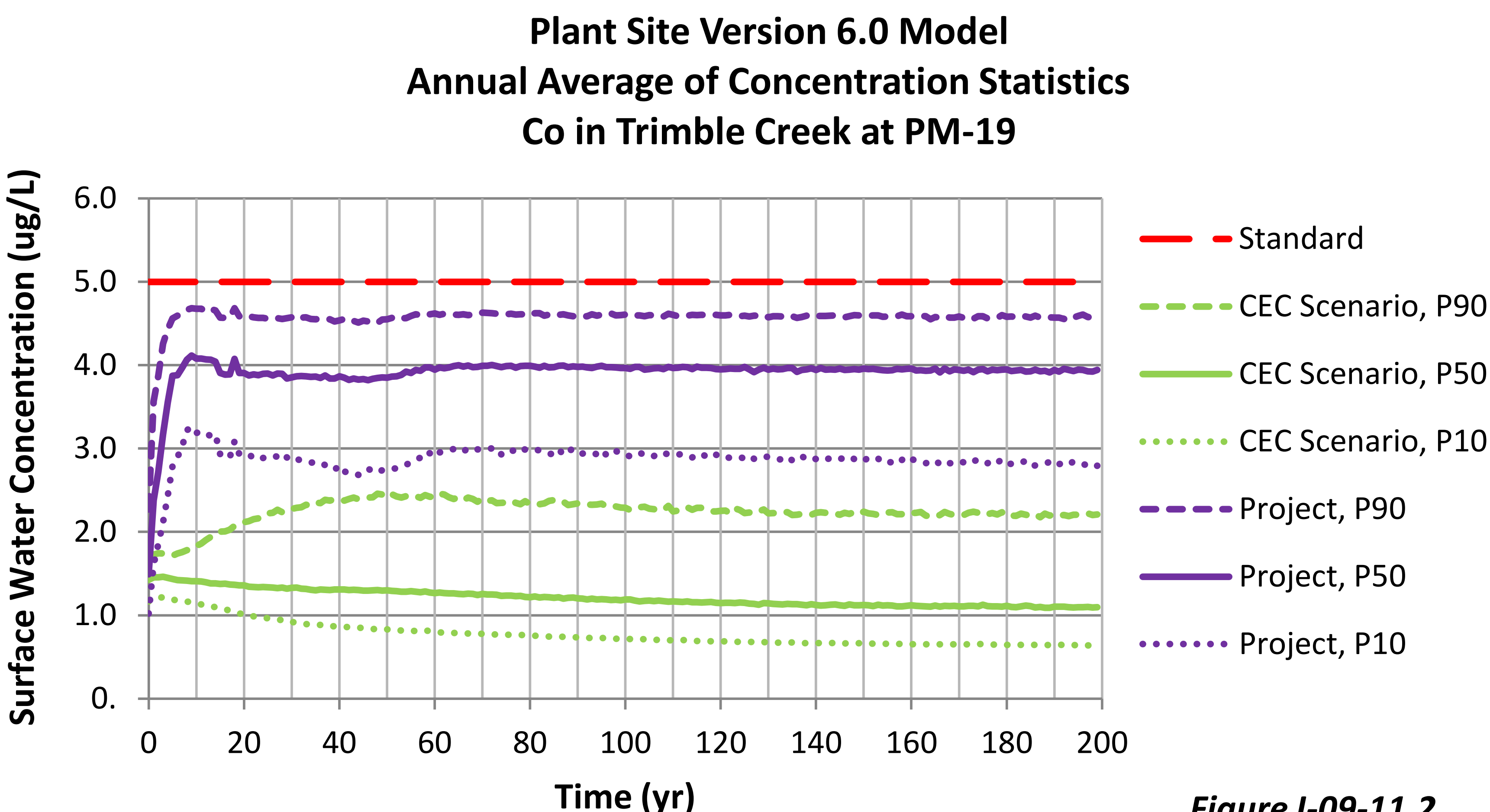
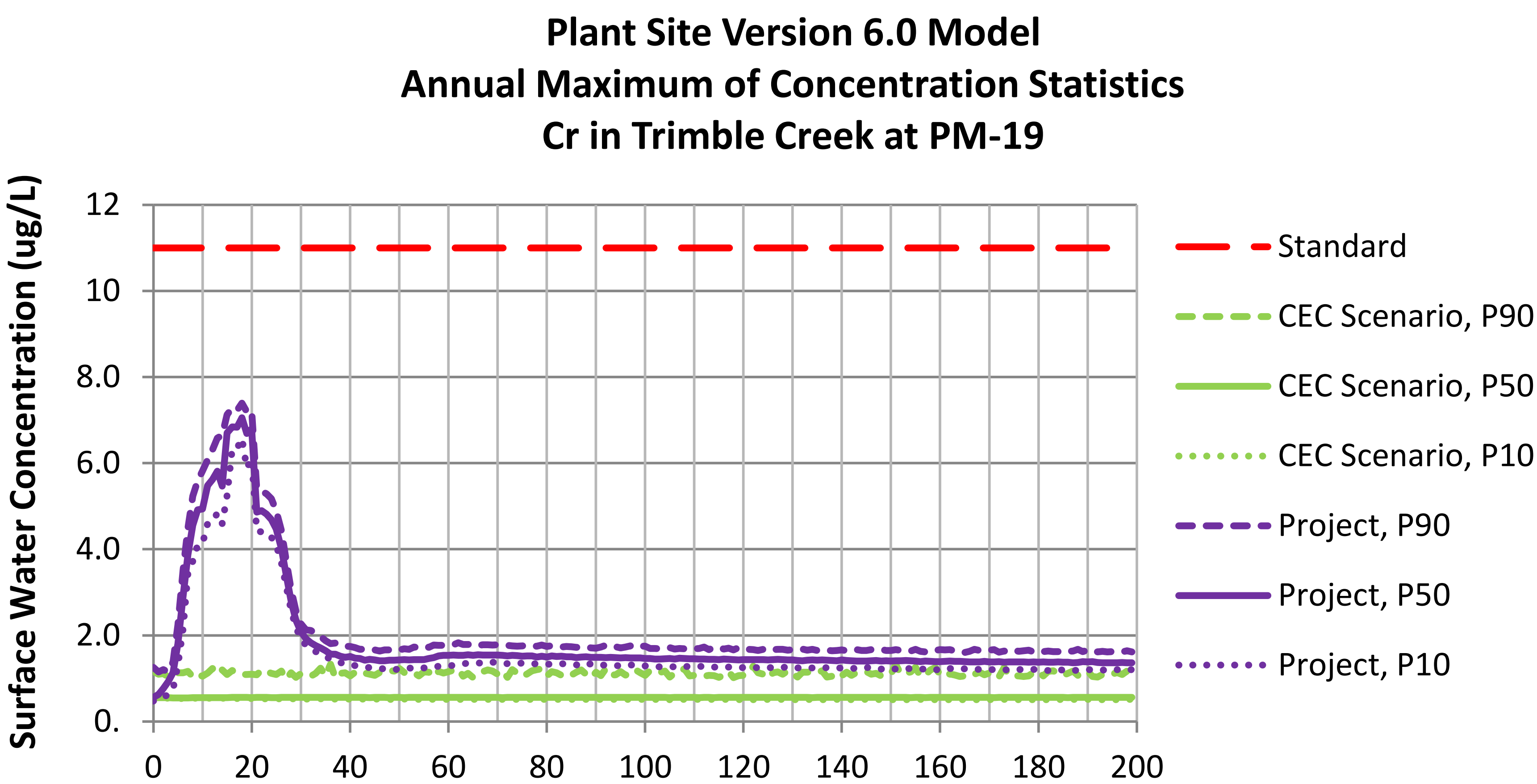


Figure I-09-11.2



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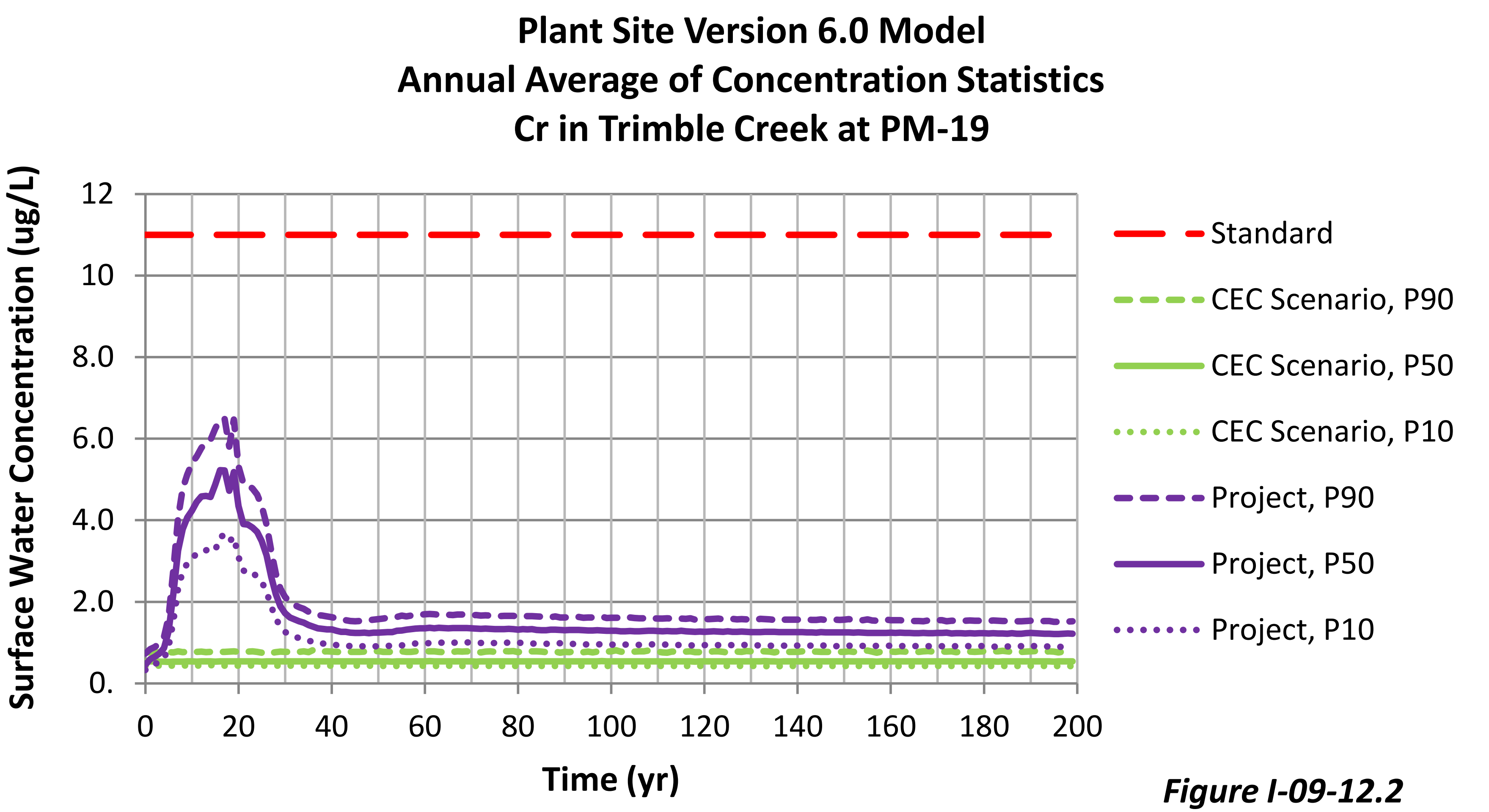


Figure I-09-12.2

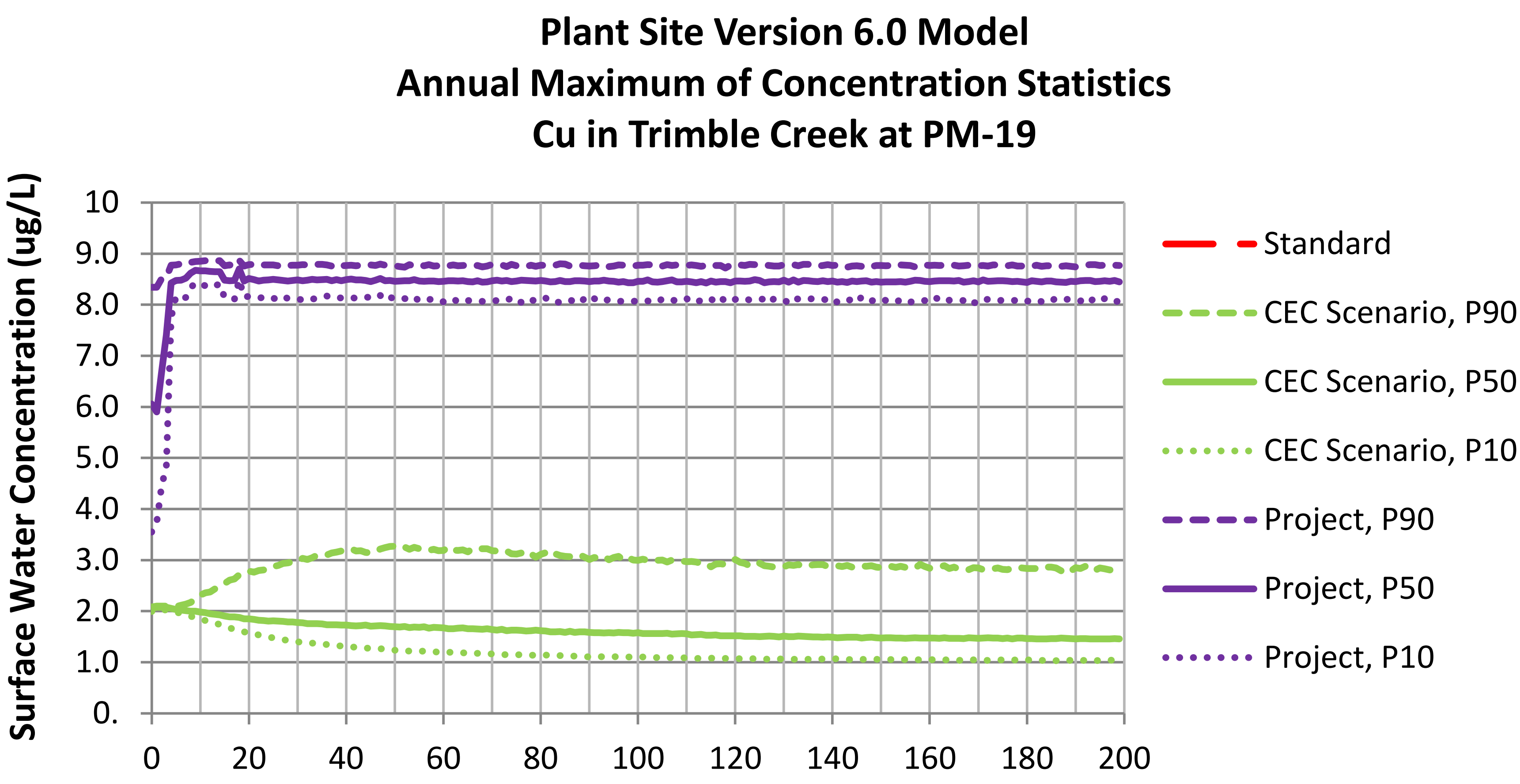
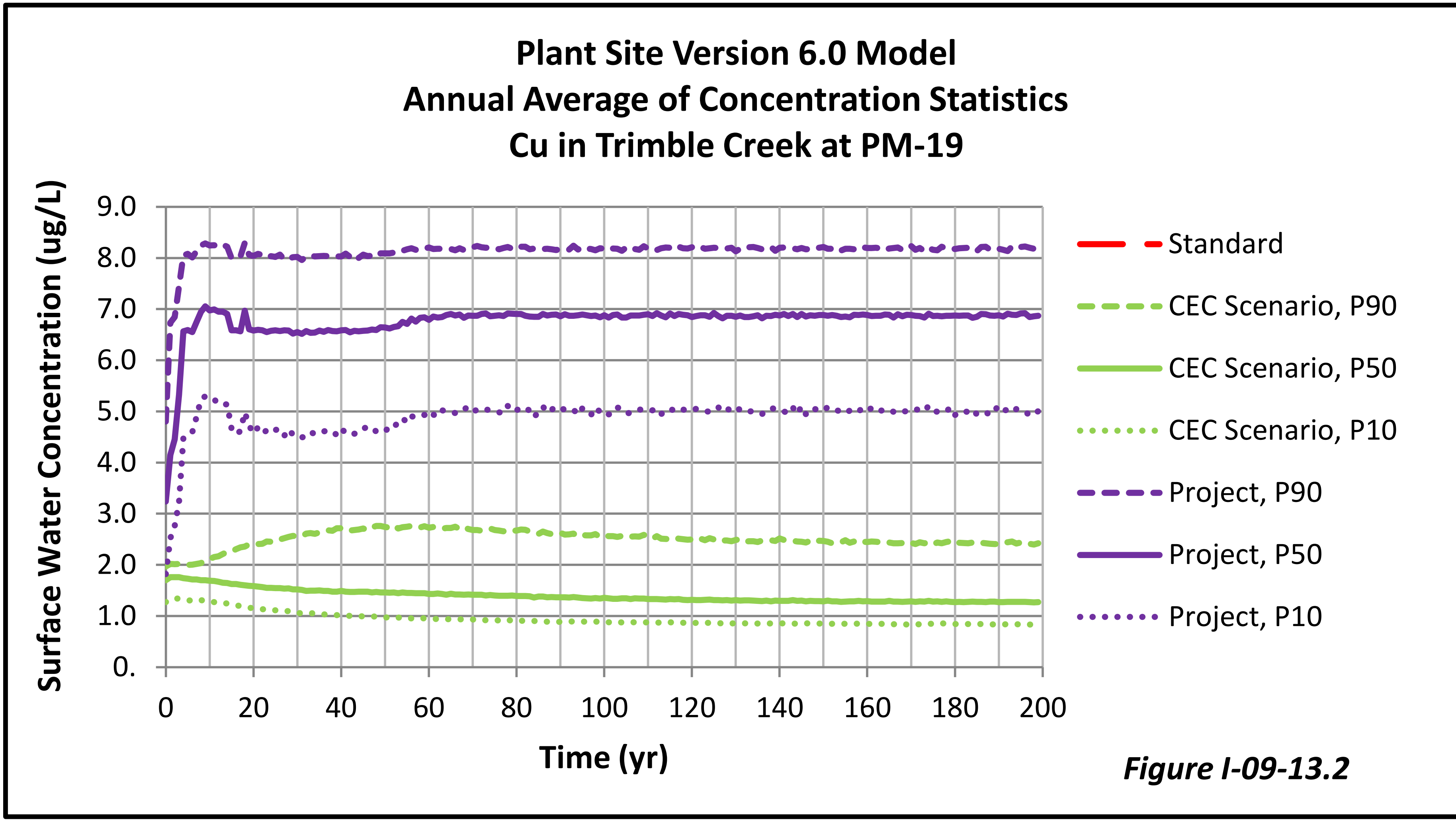


Figure I-09-13.1



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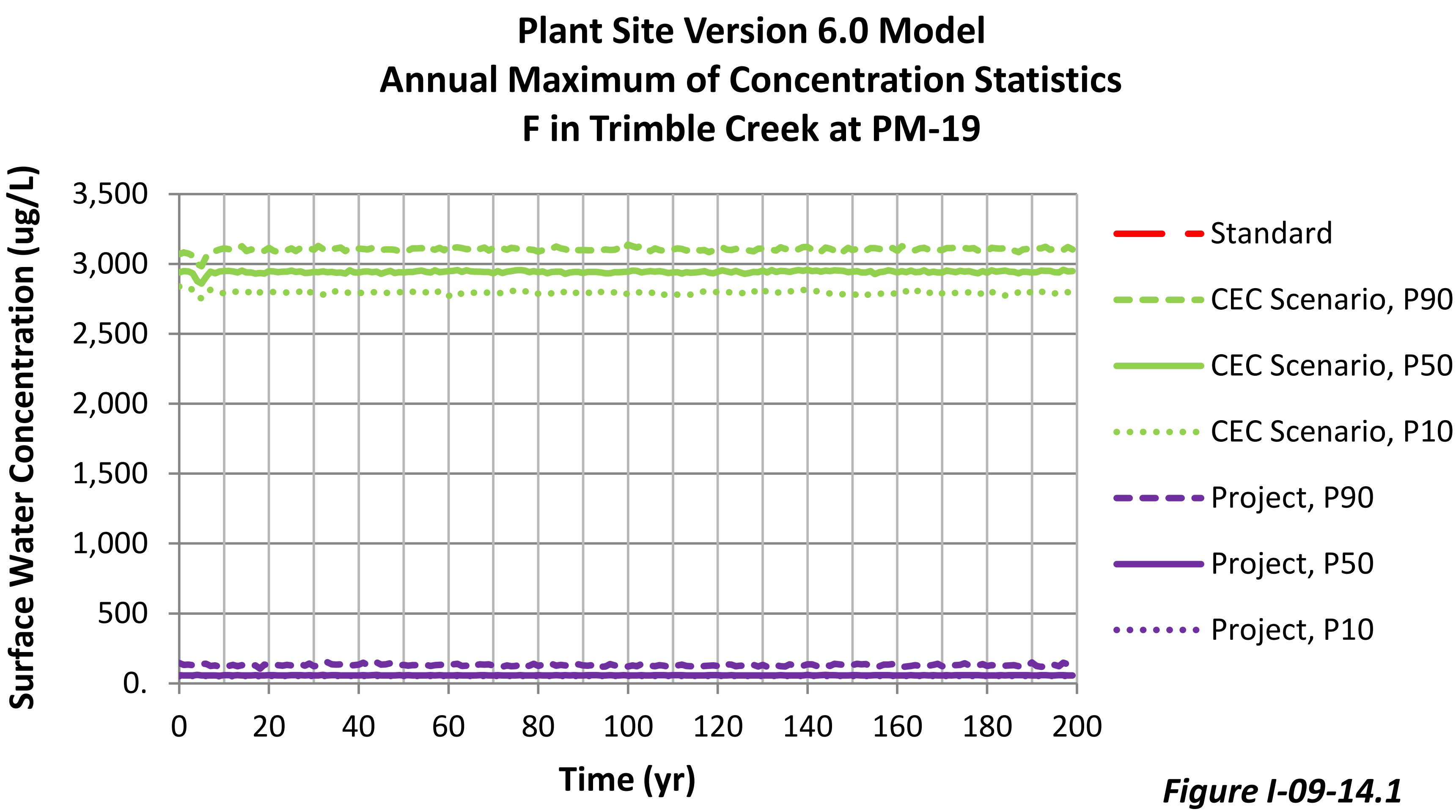

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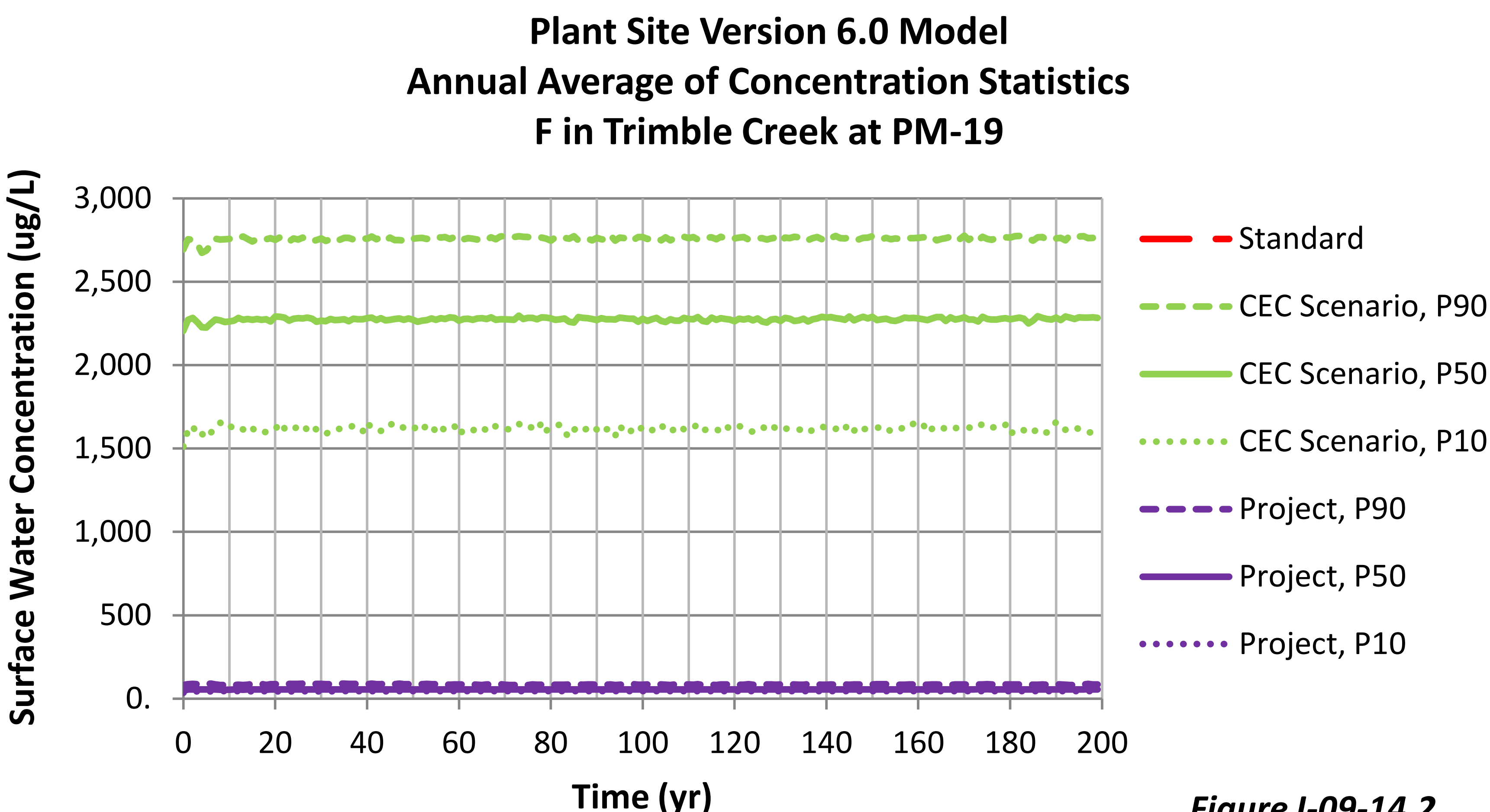

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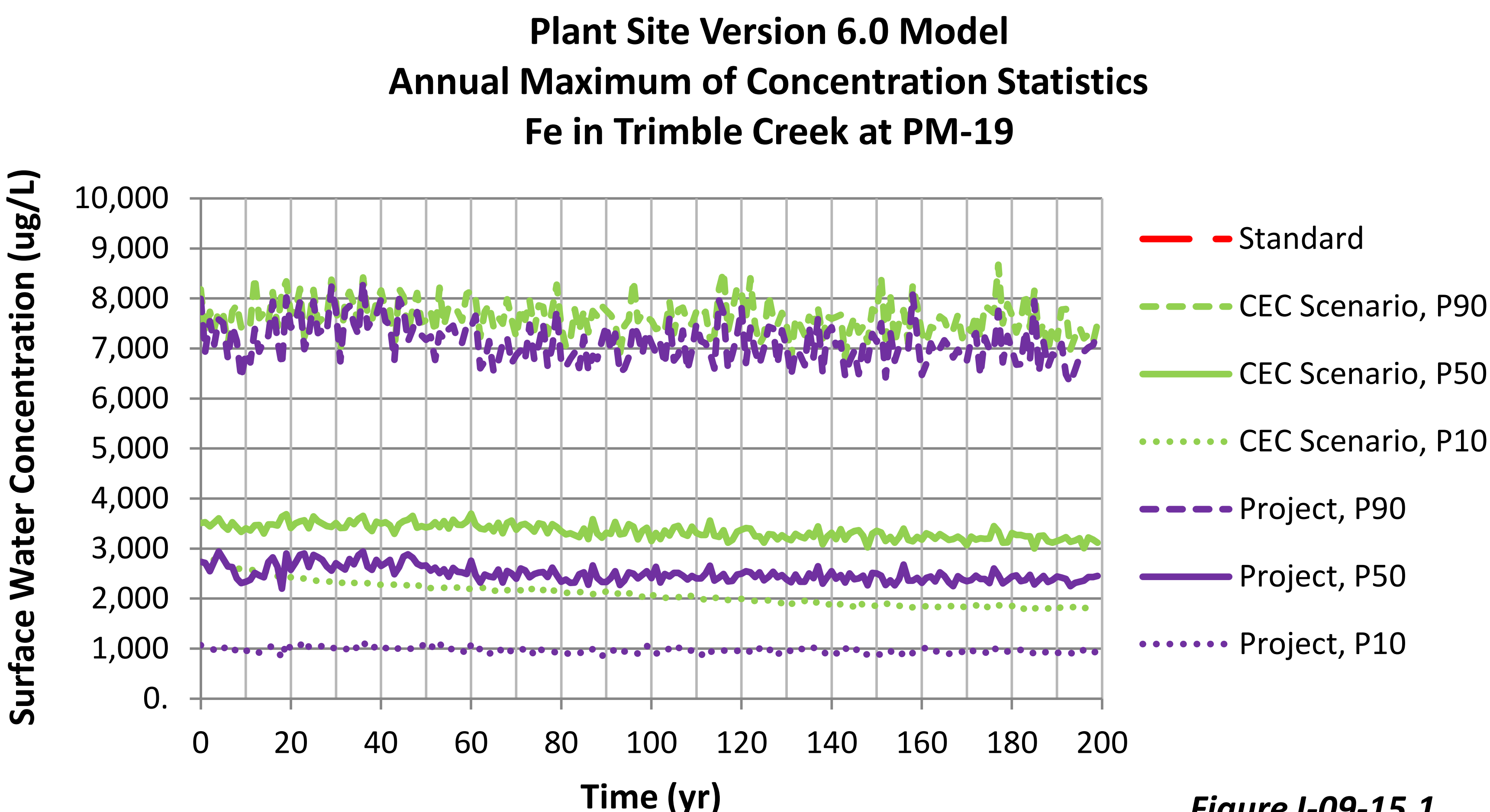

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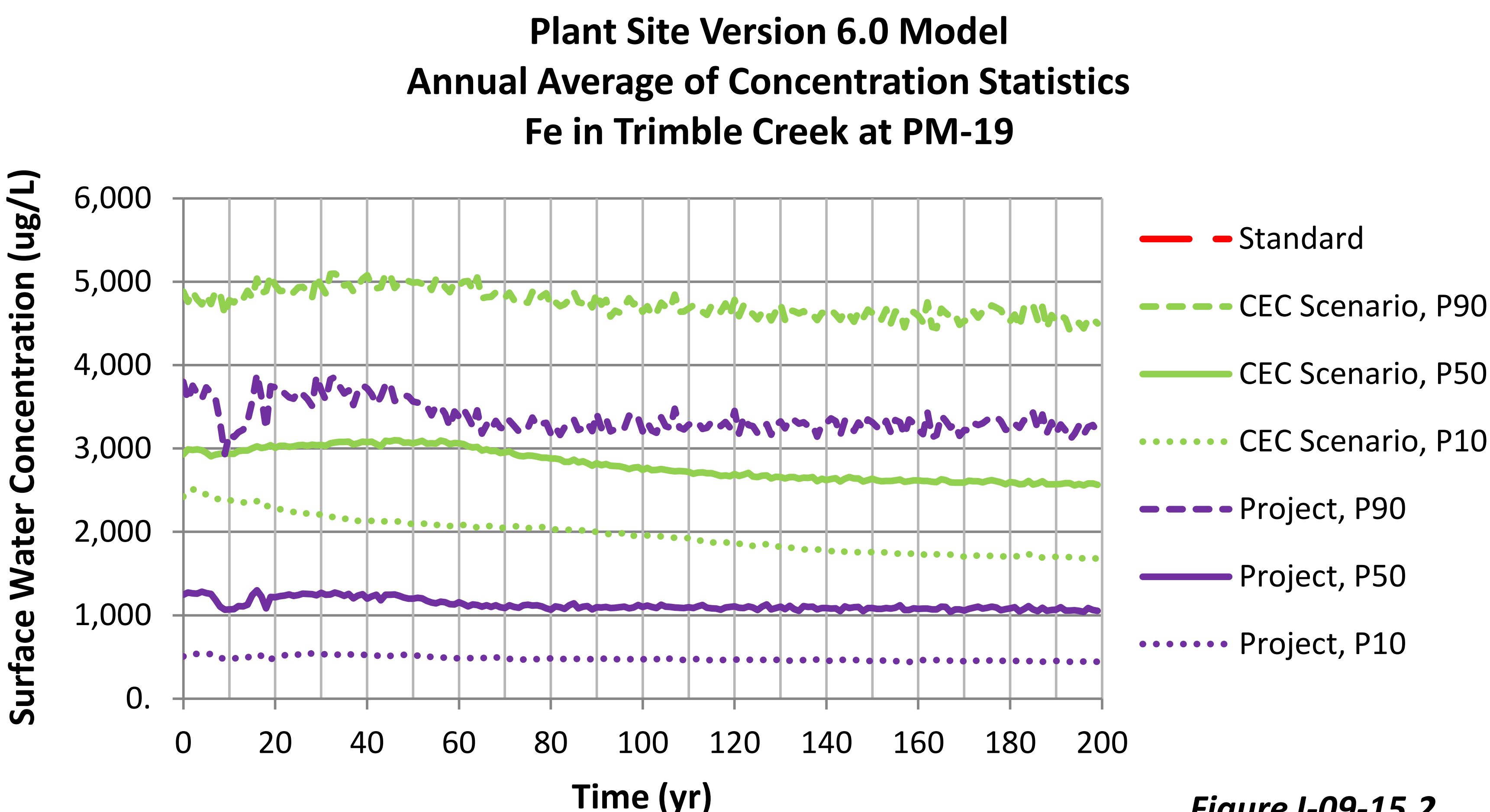

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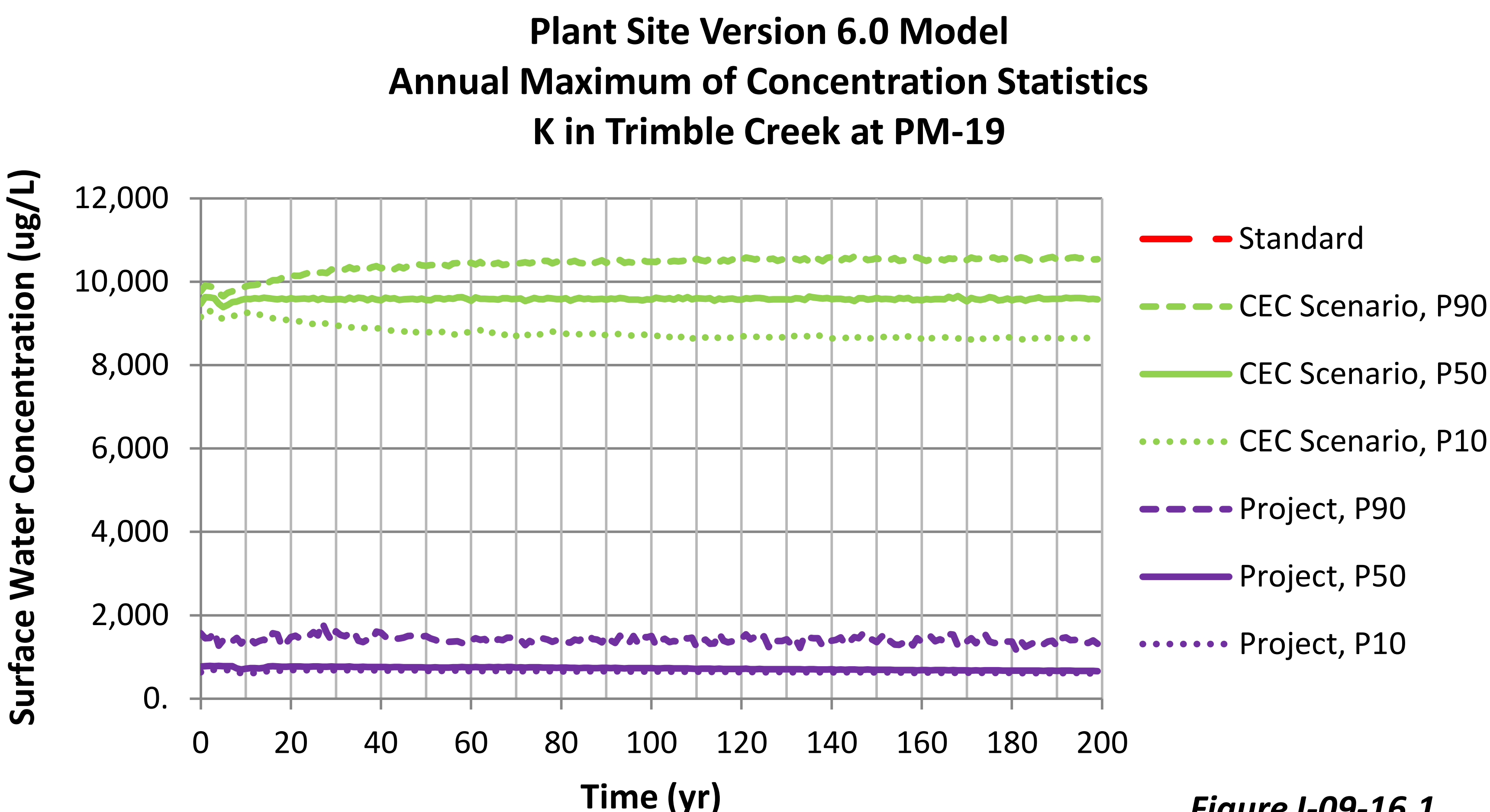
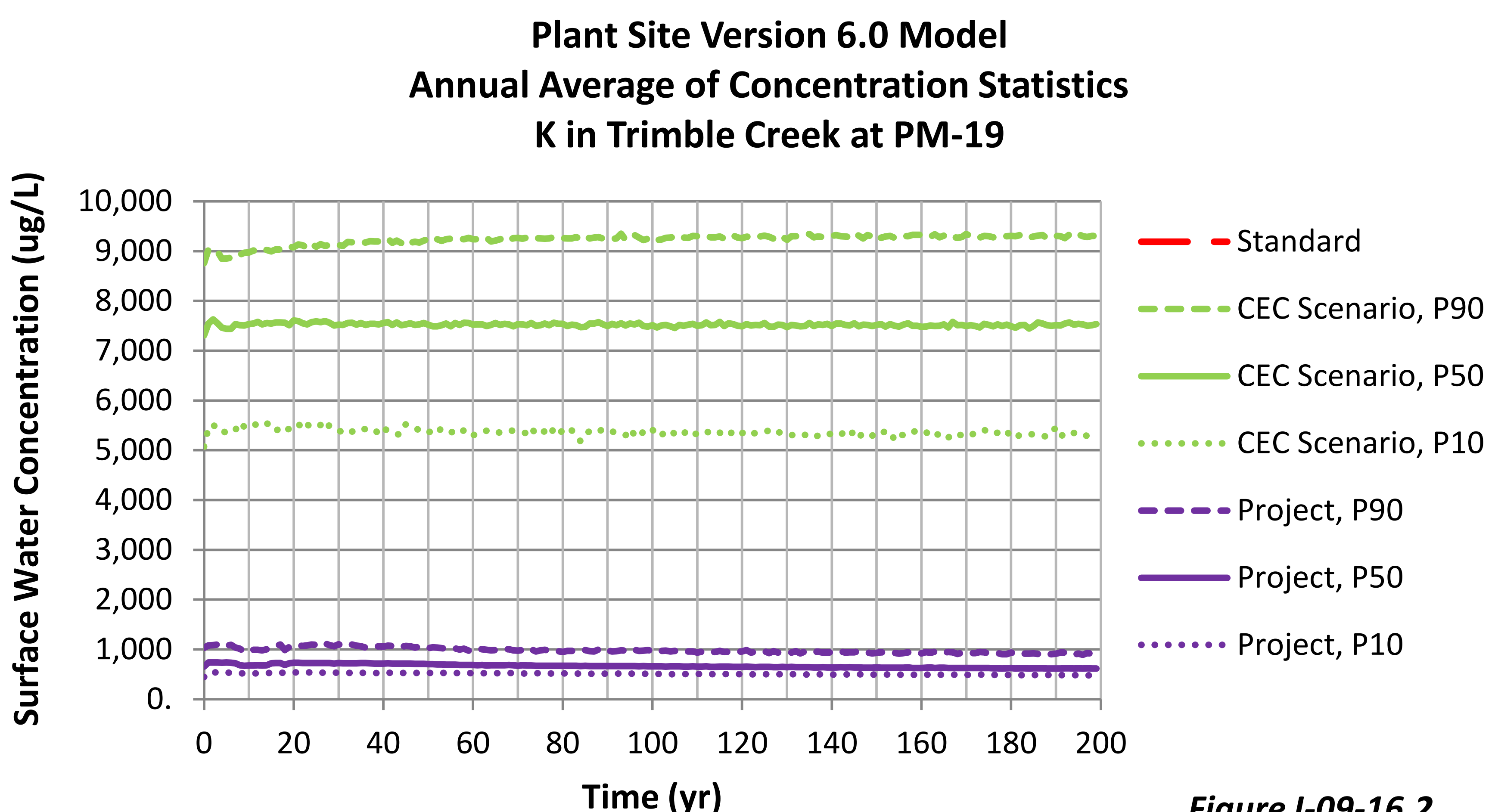


Figure I-09-16.1



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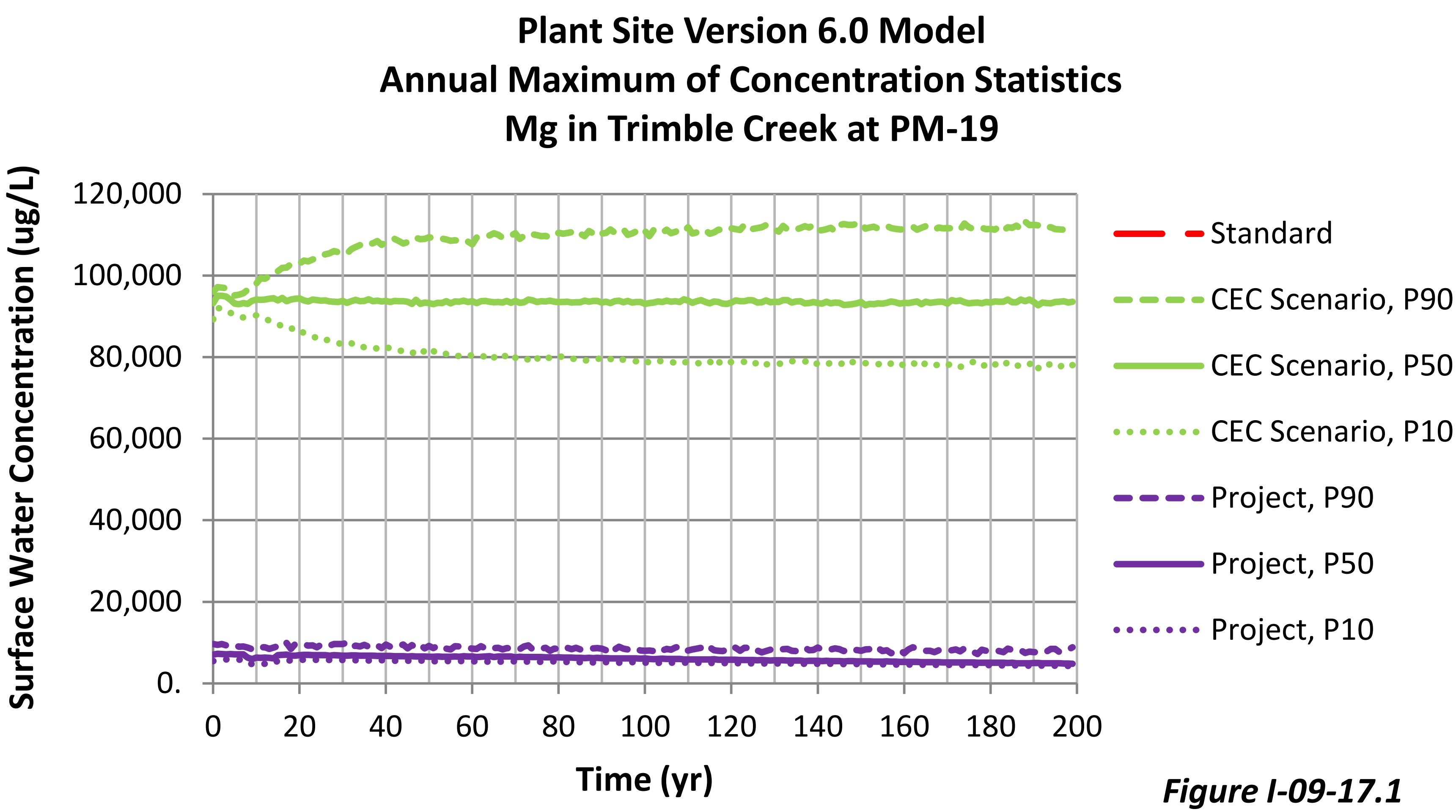

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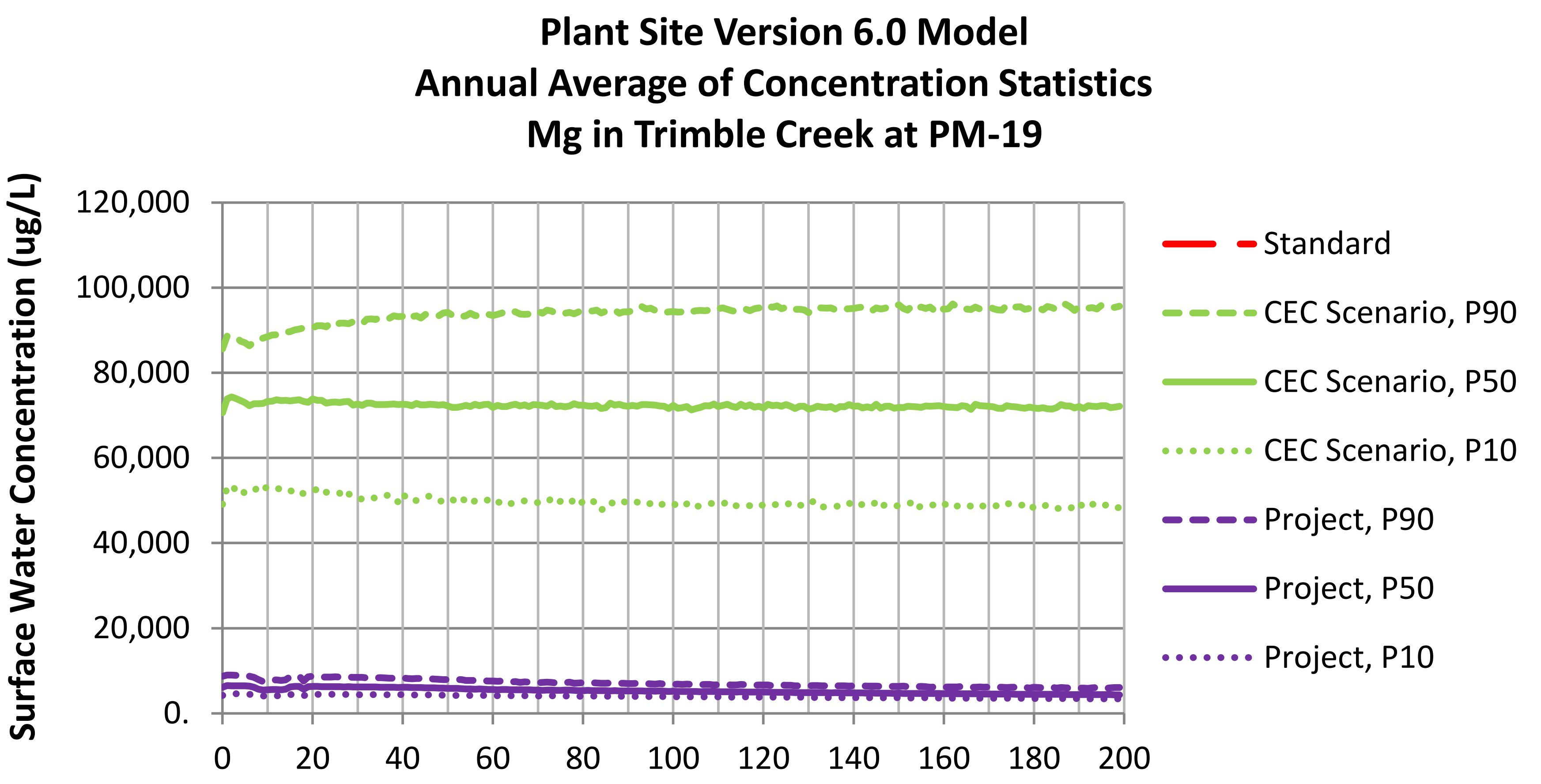

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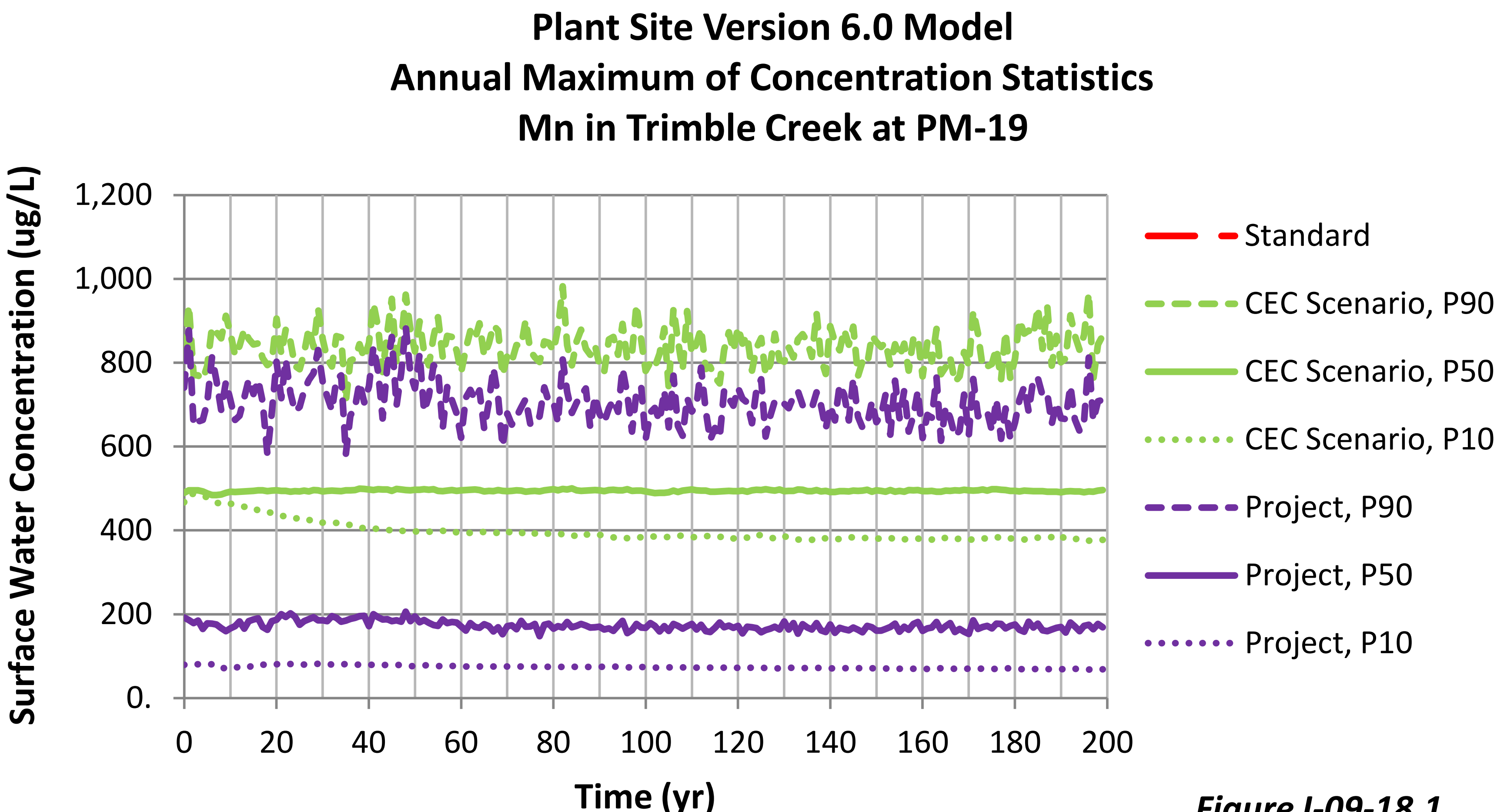

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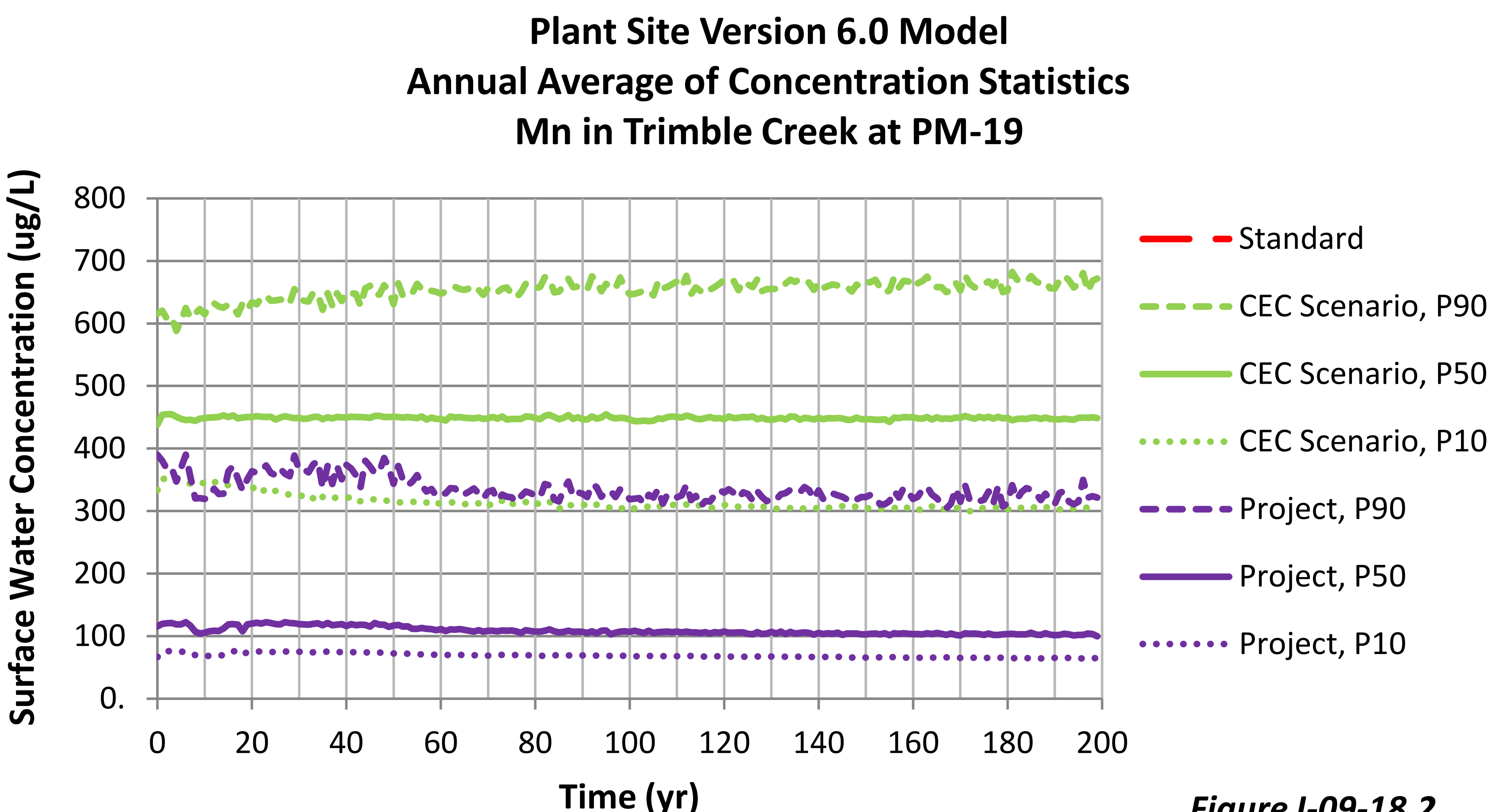

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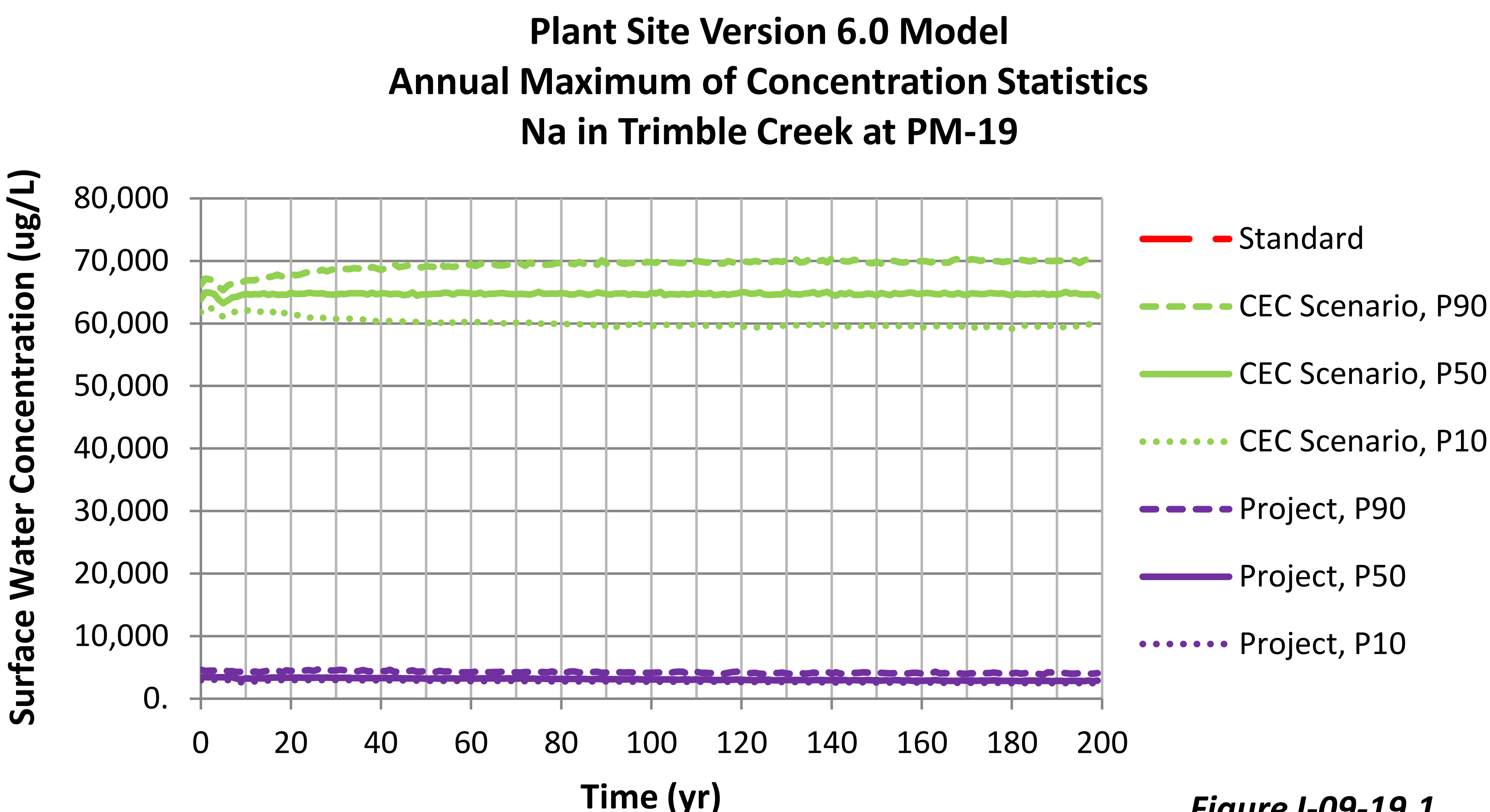

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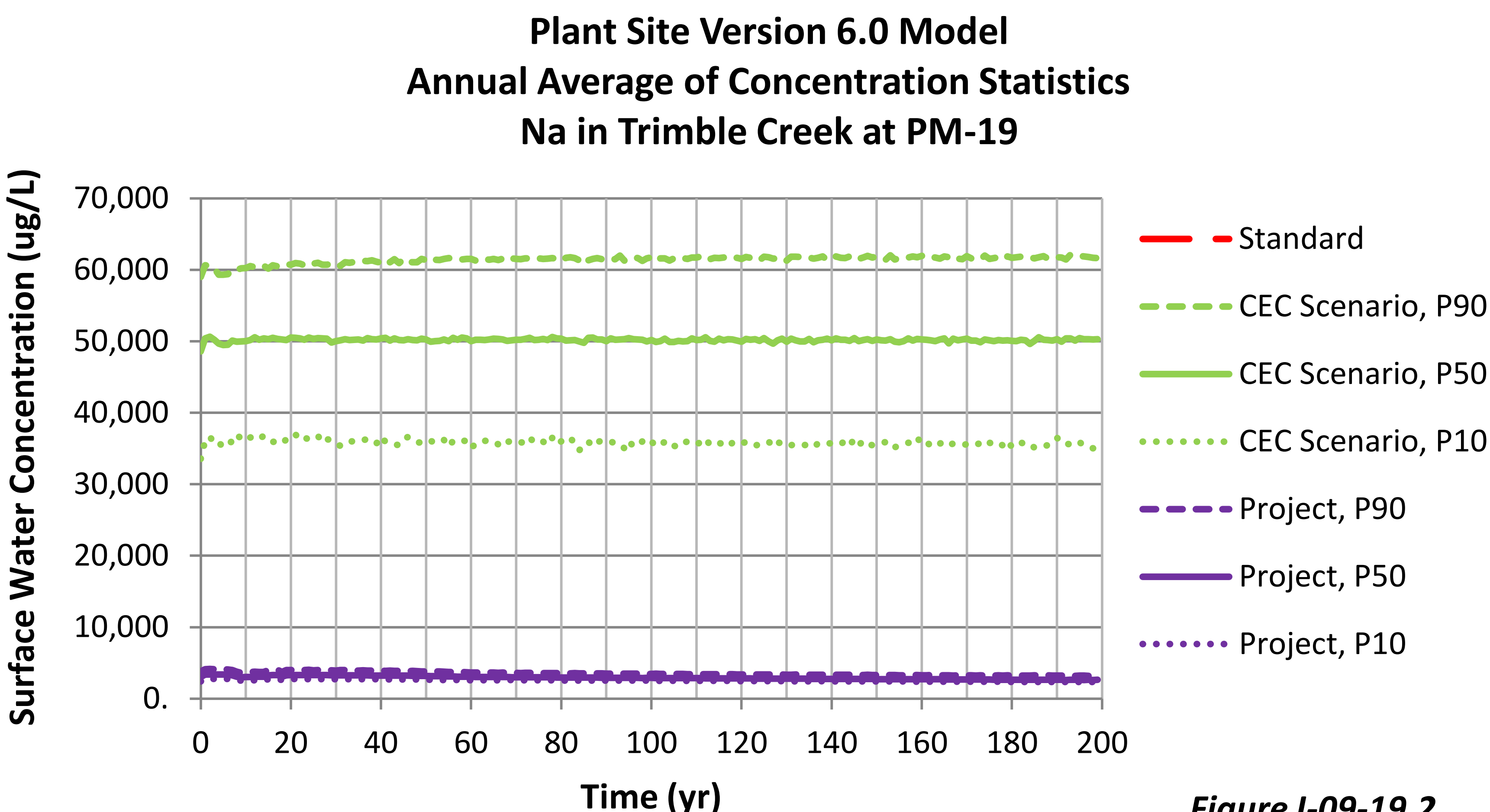

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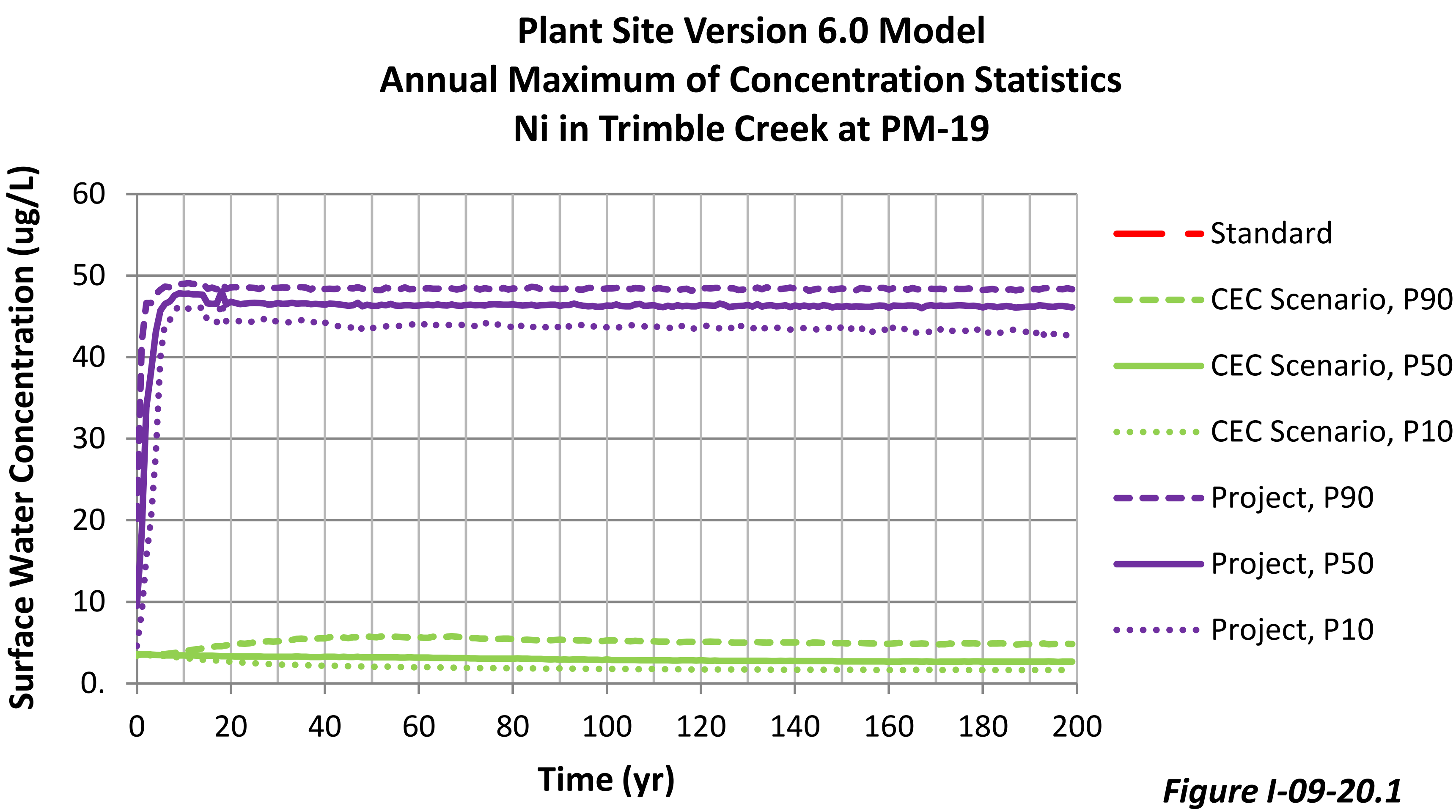

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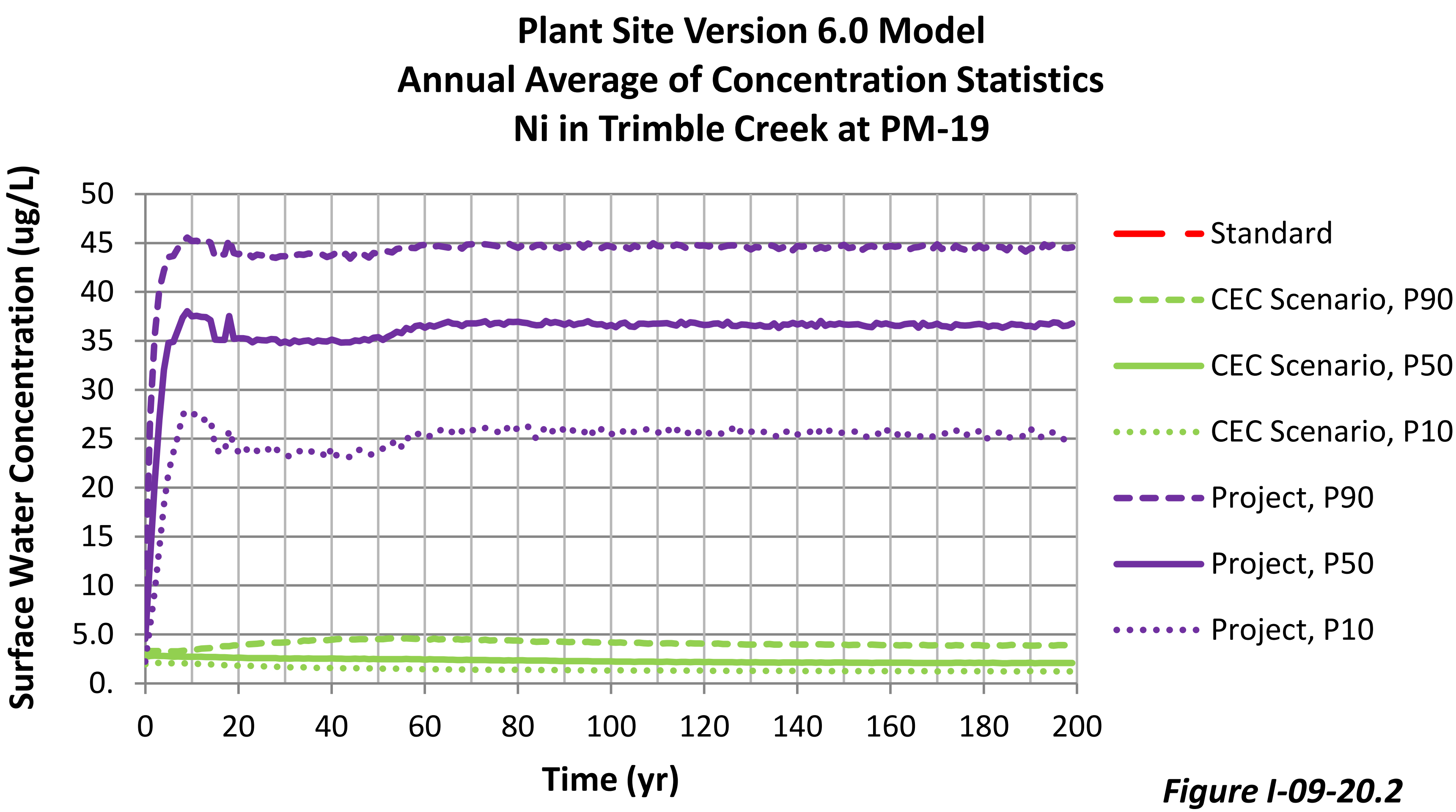

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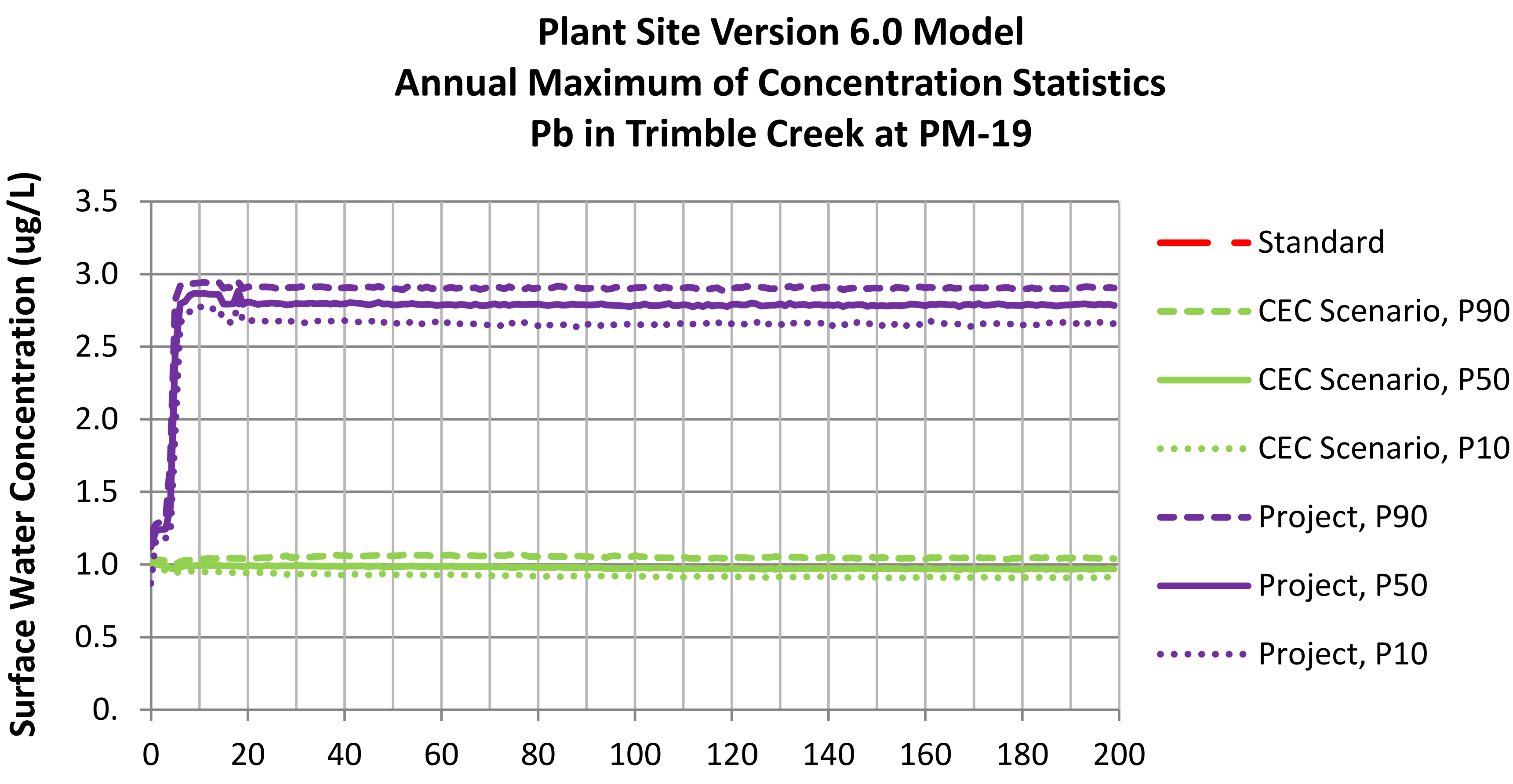
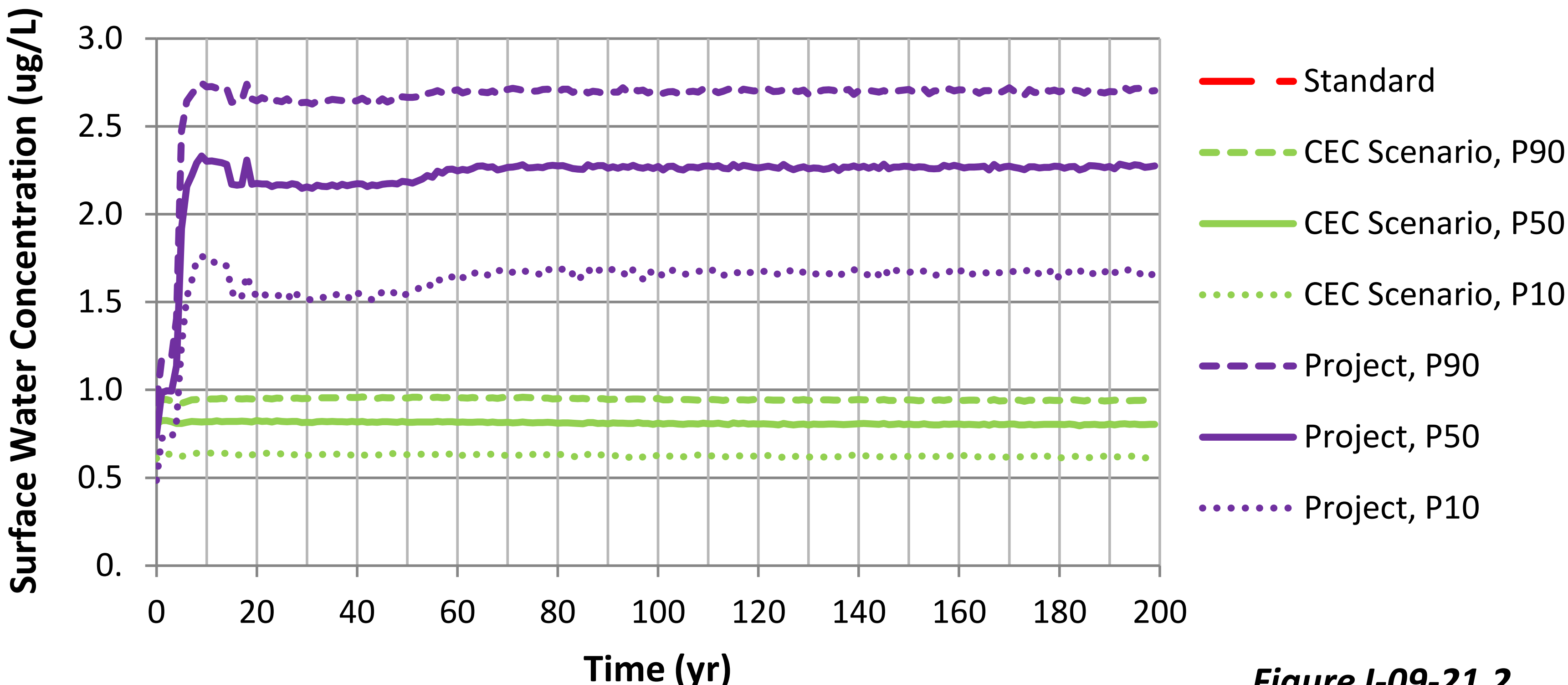


Figure I-09-21.1

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Pb in Trimble Creek at PM-19



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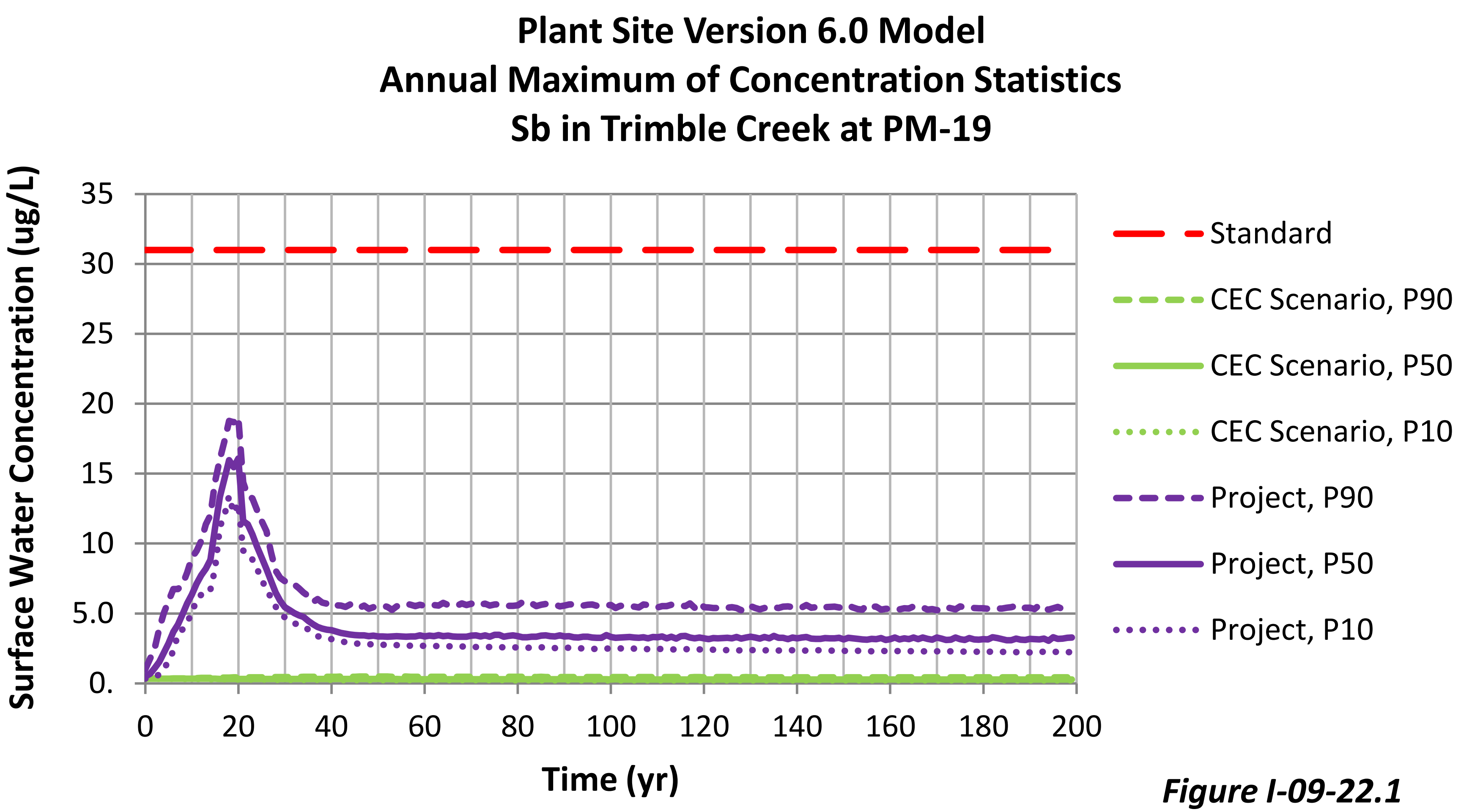
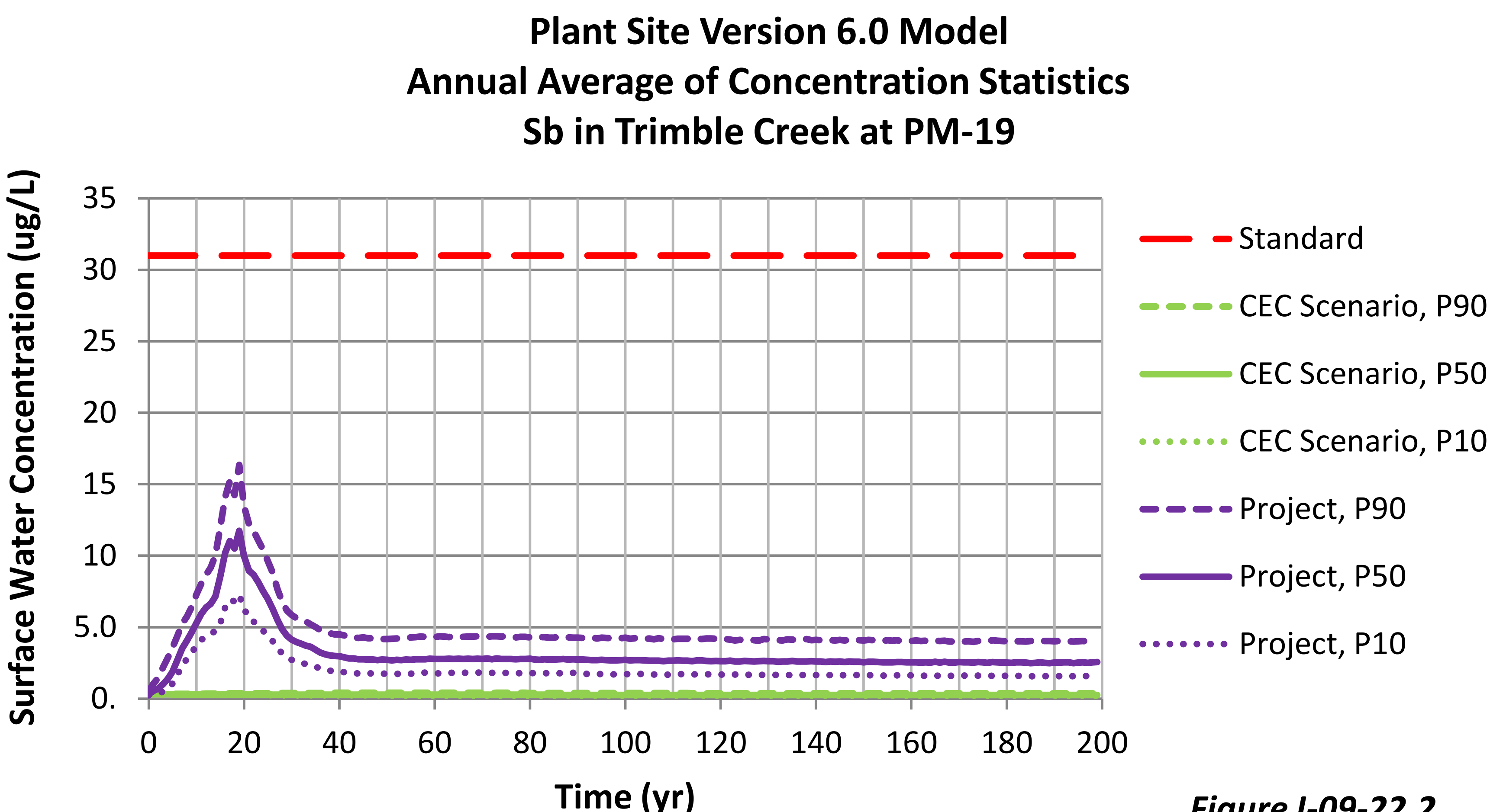


Figure I-09-22.1



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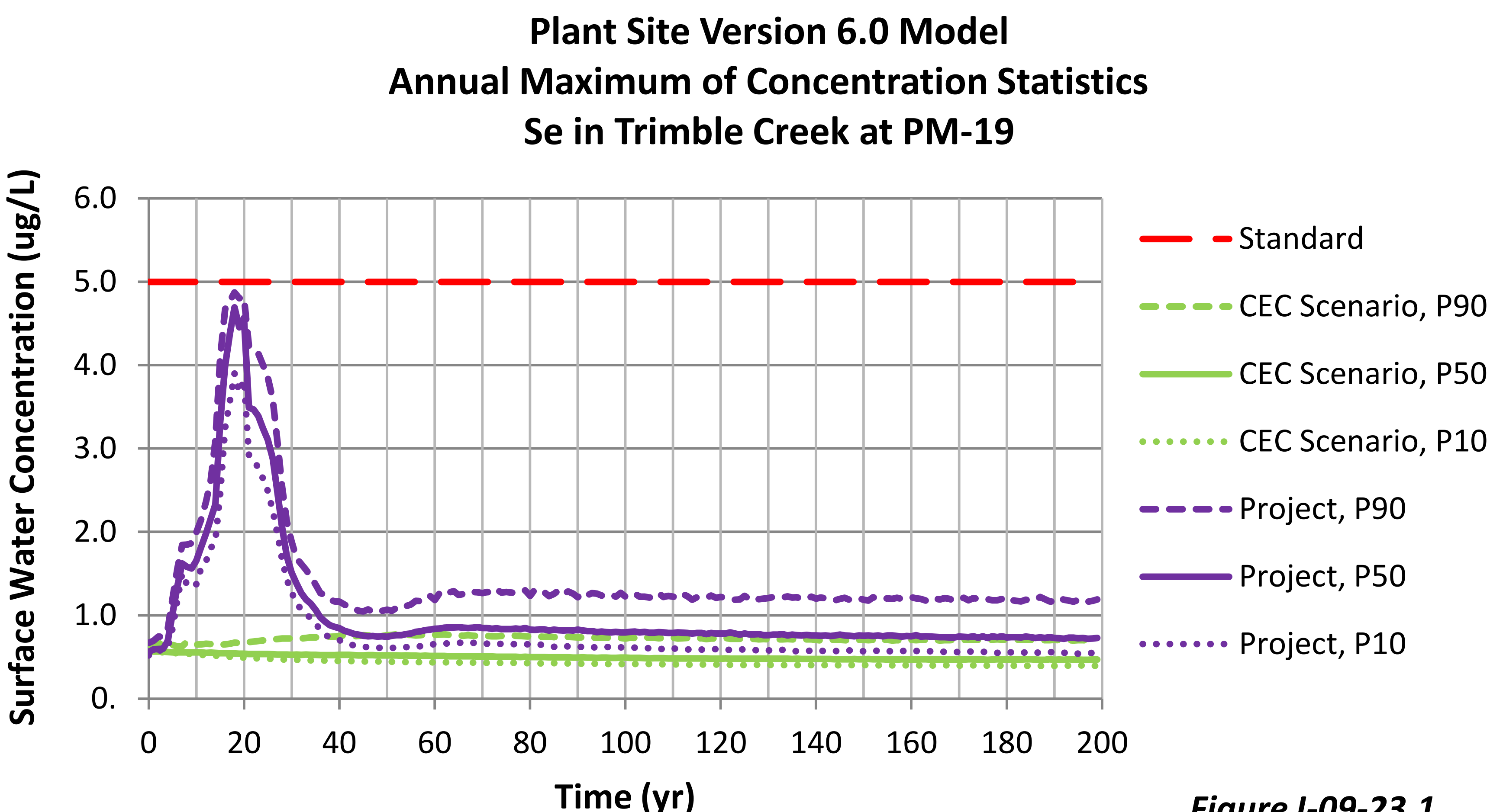

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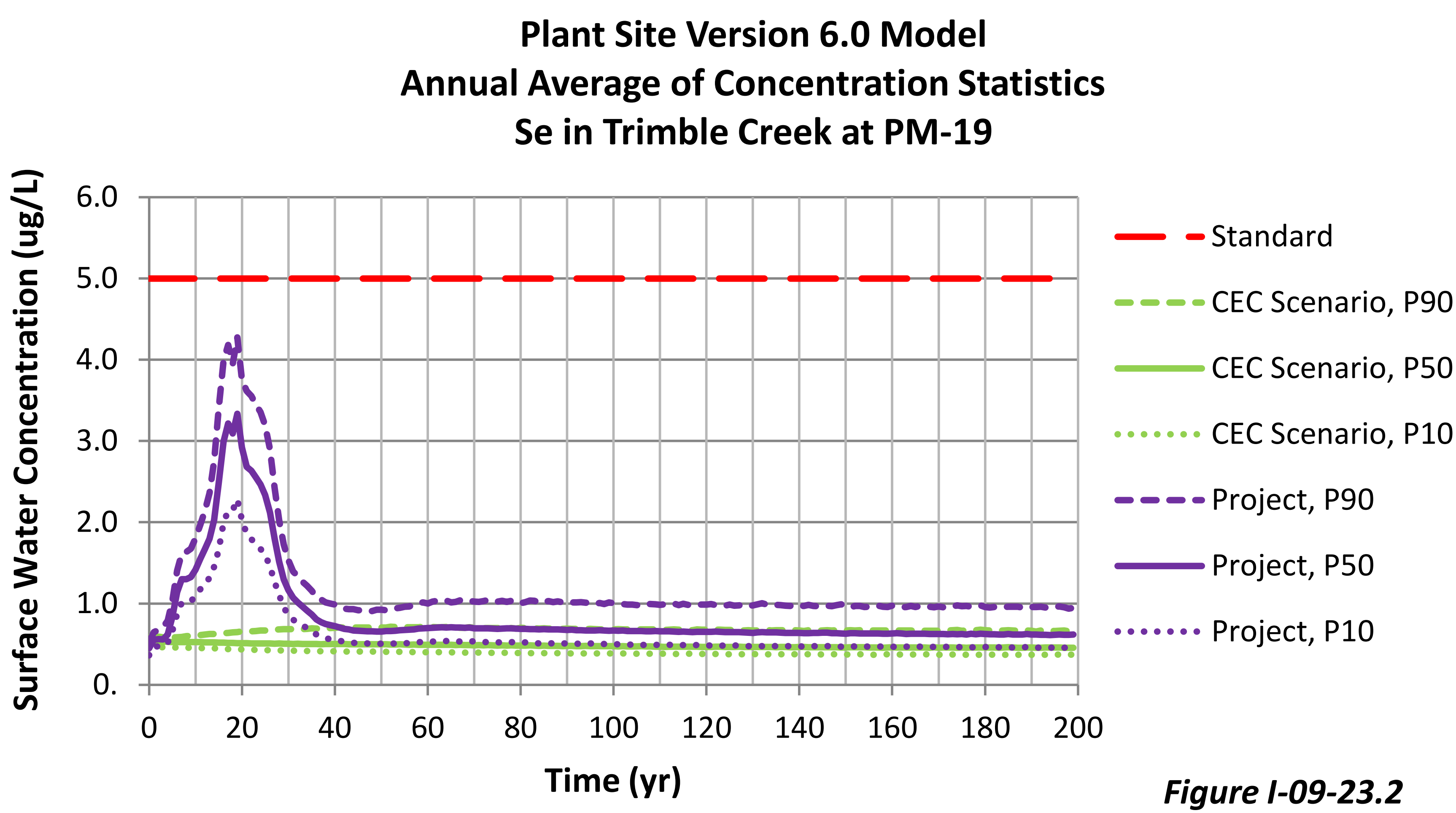


Figure I-09-23.2

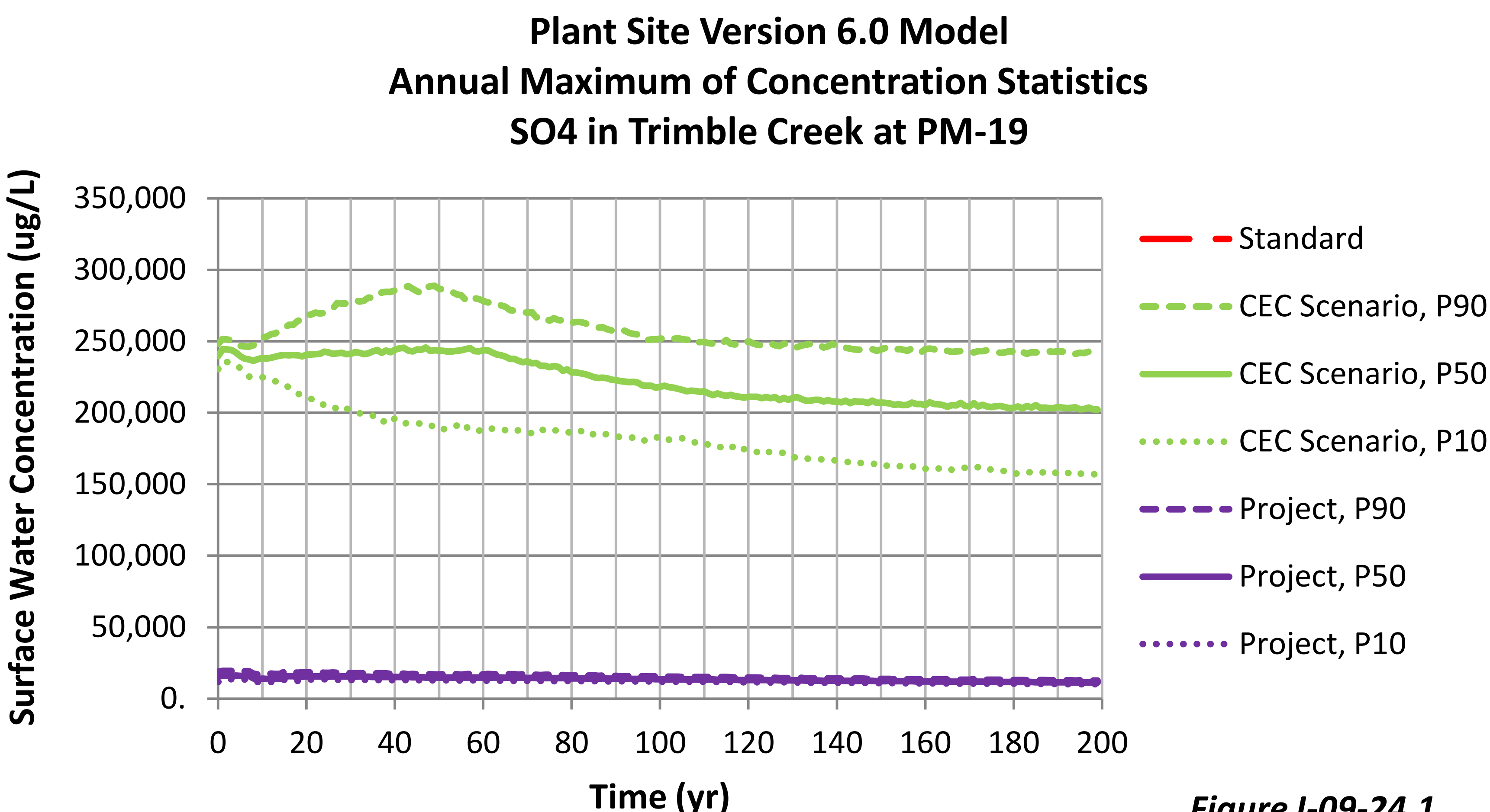
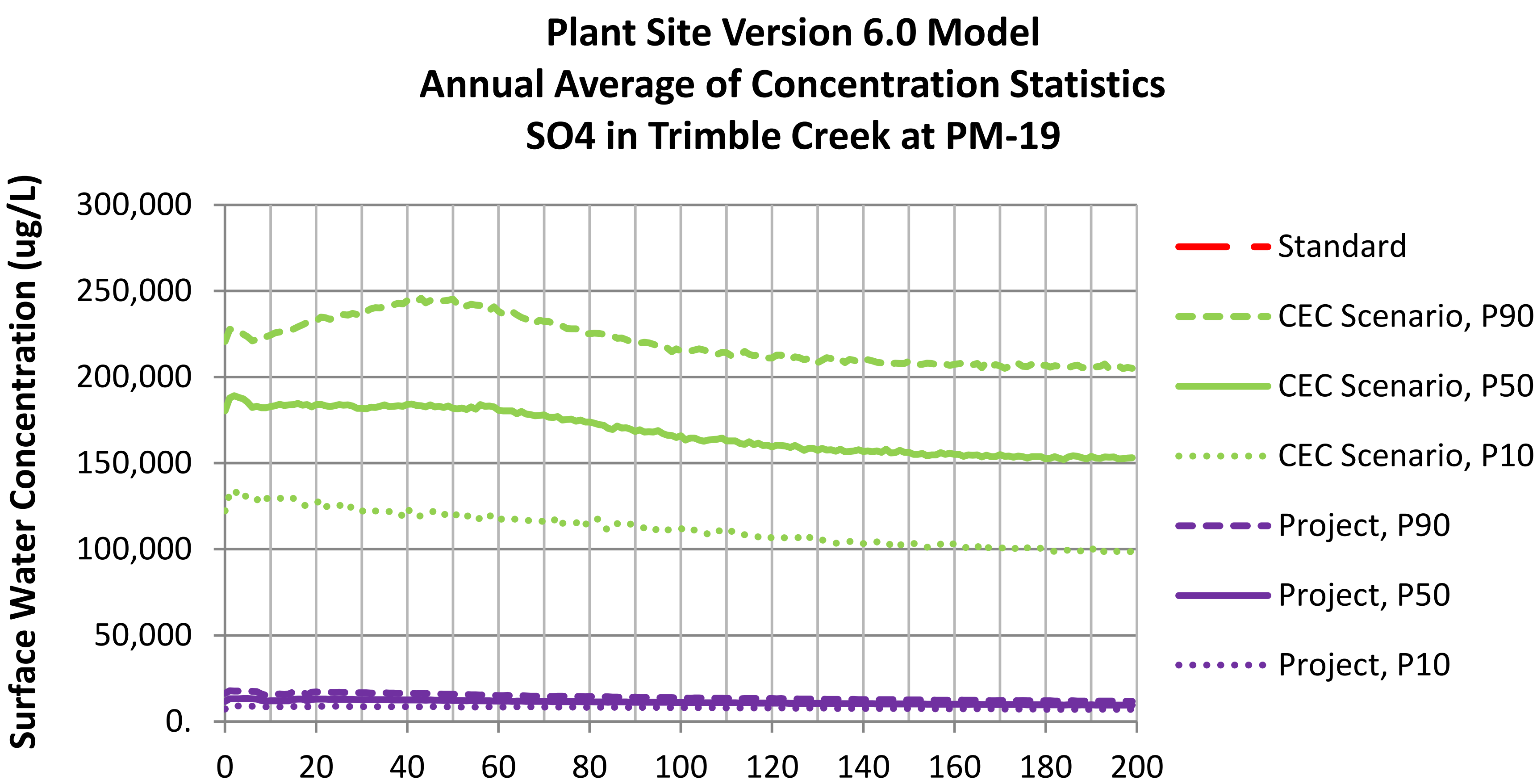


Figure I-09-24.1



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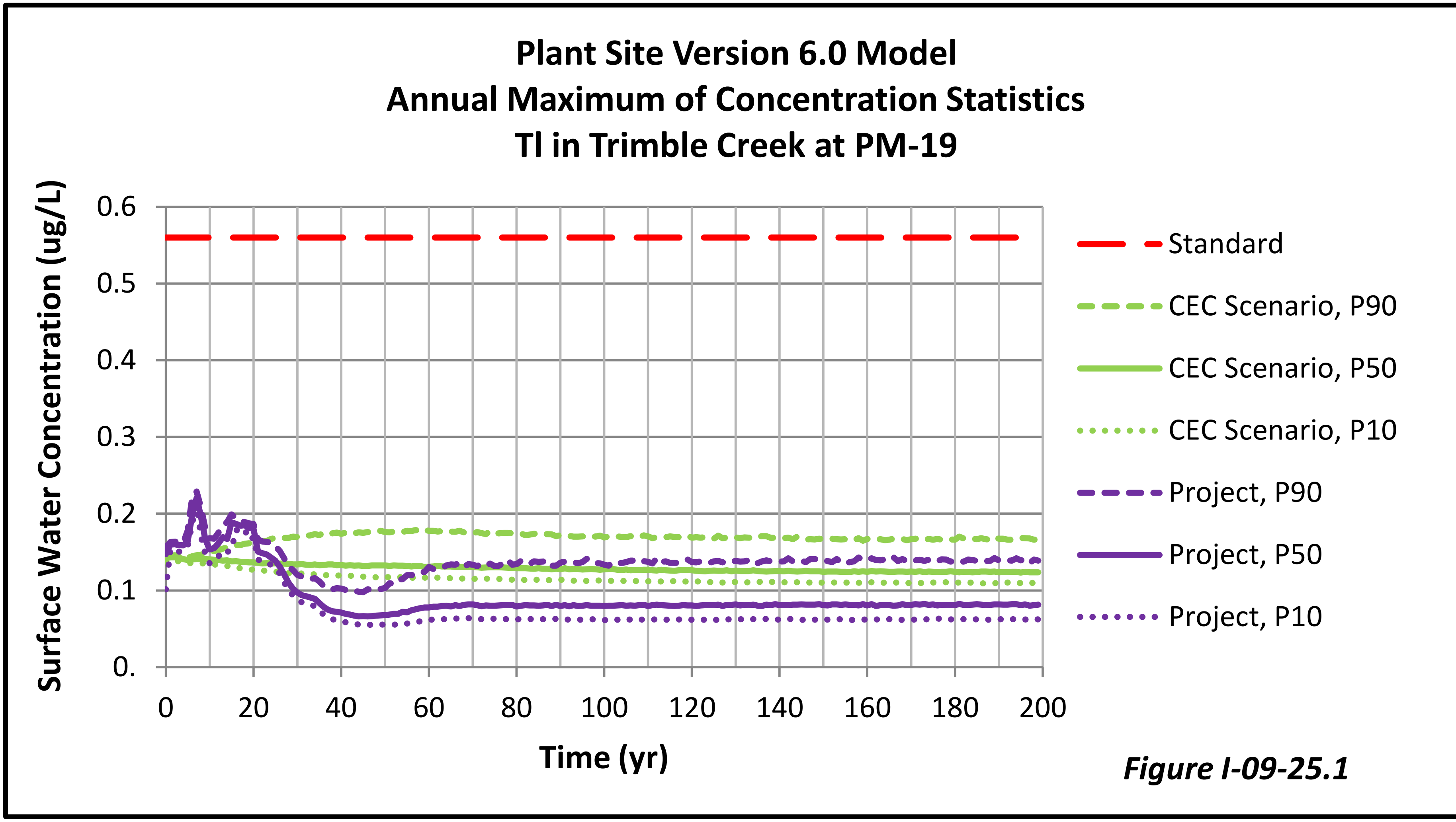
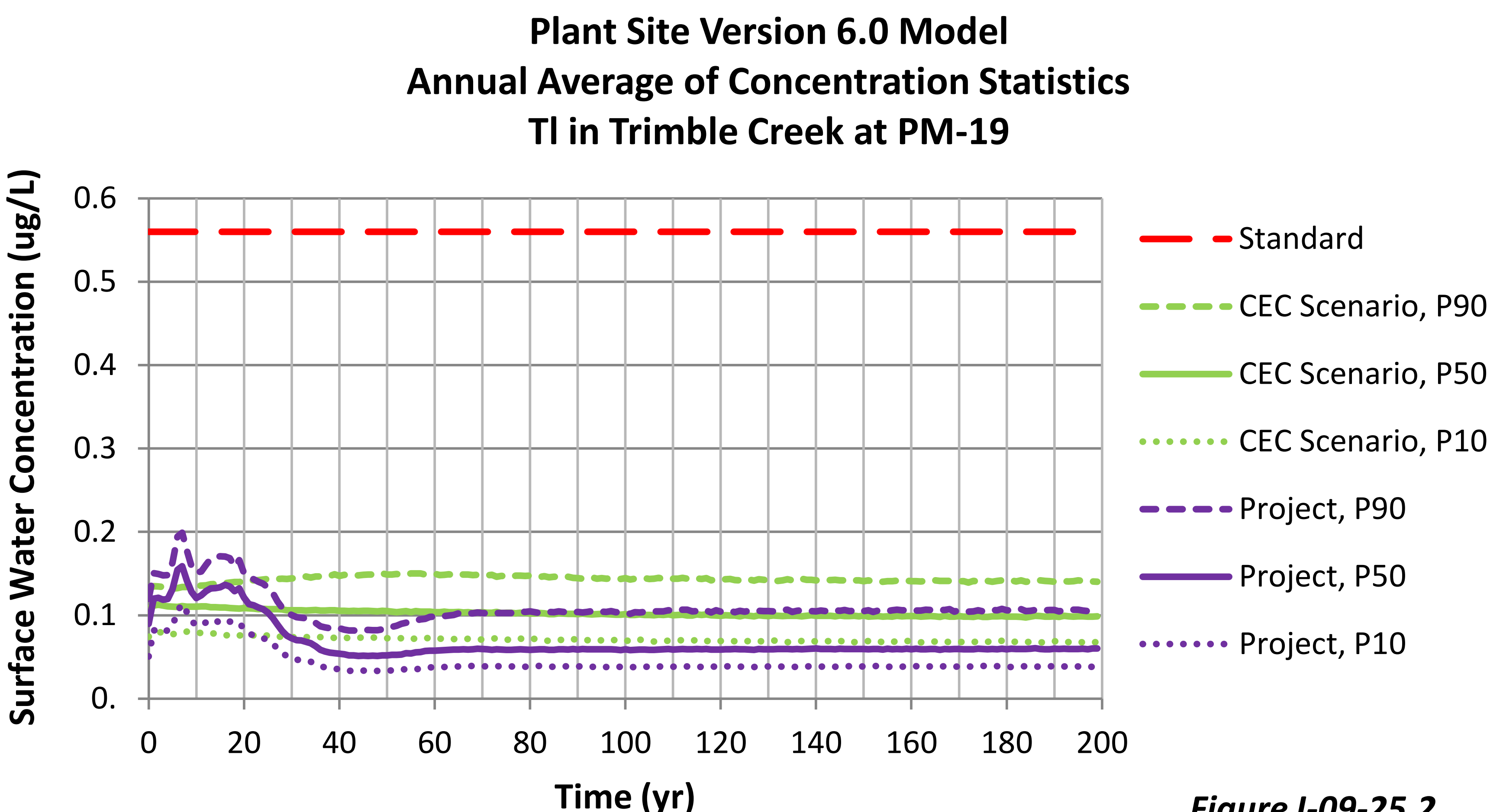


Figure I-09-25.1



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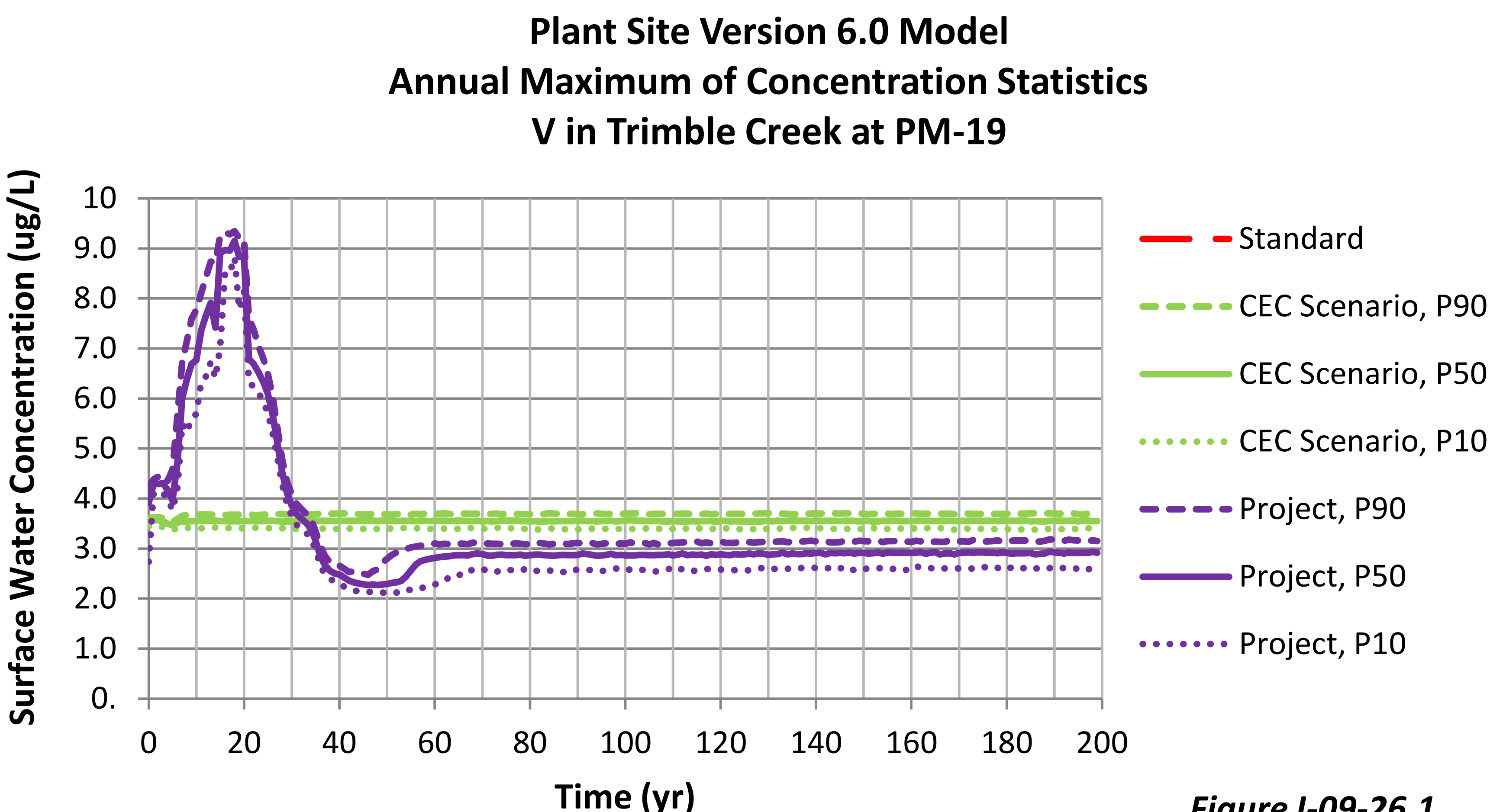

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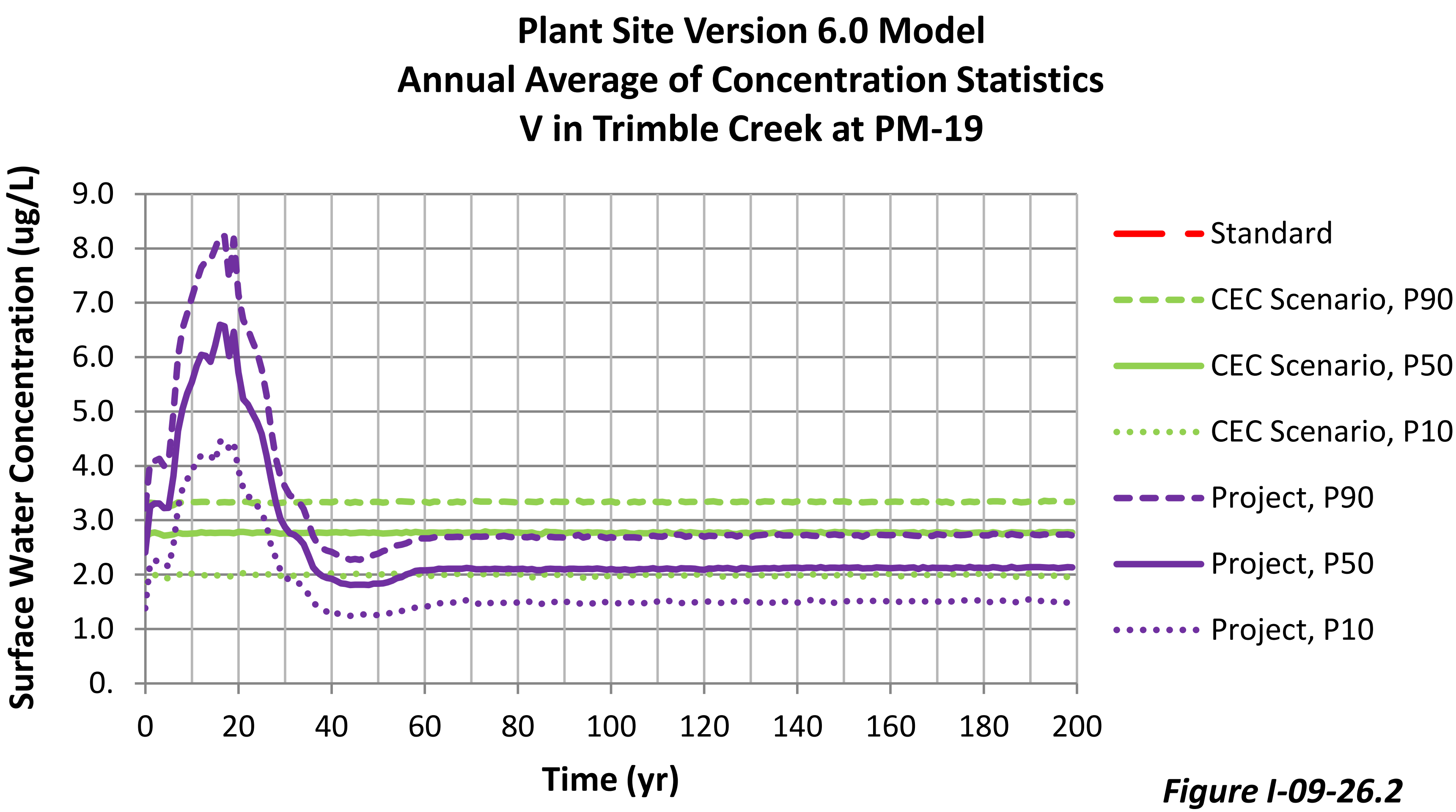

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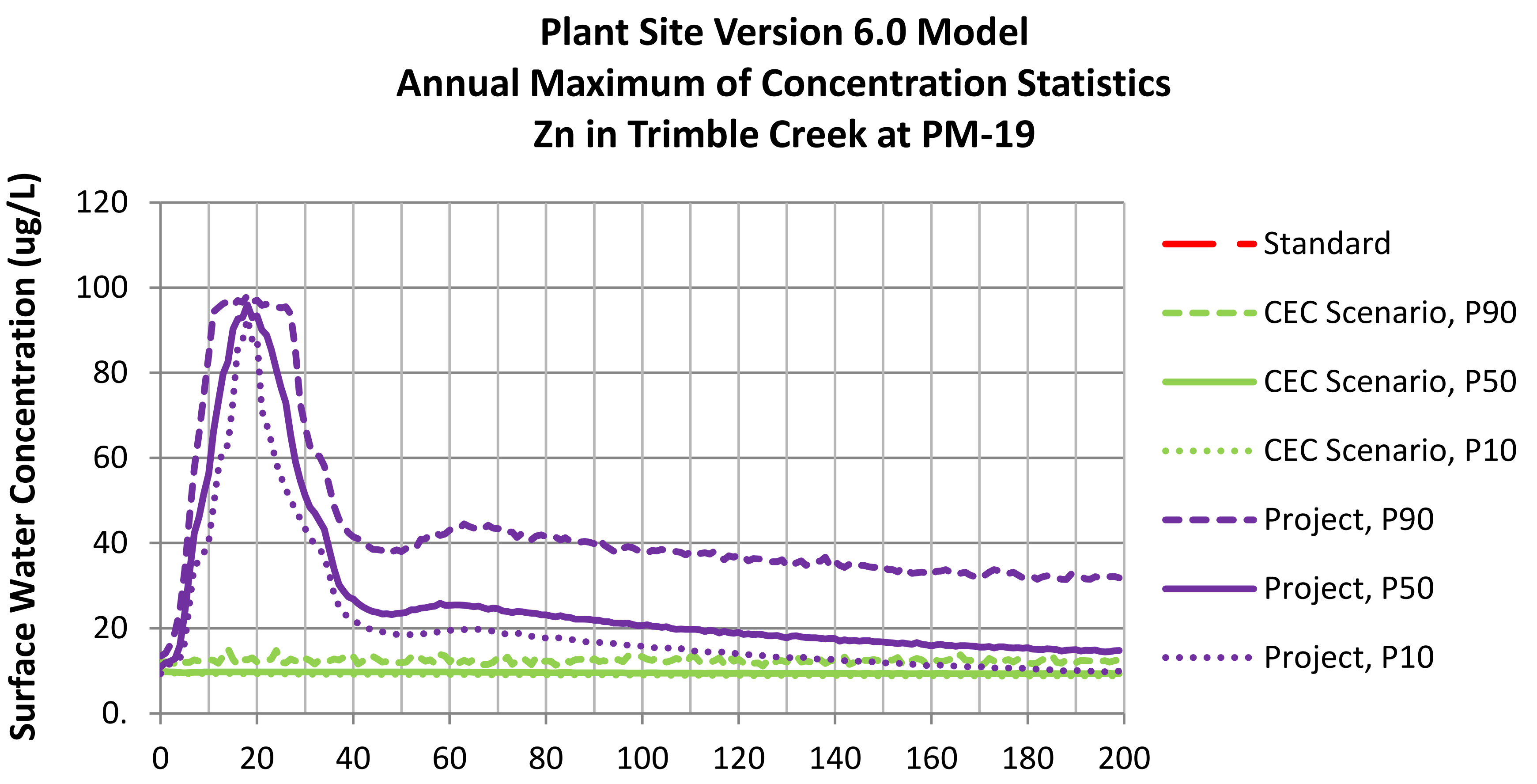

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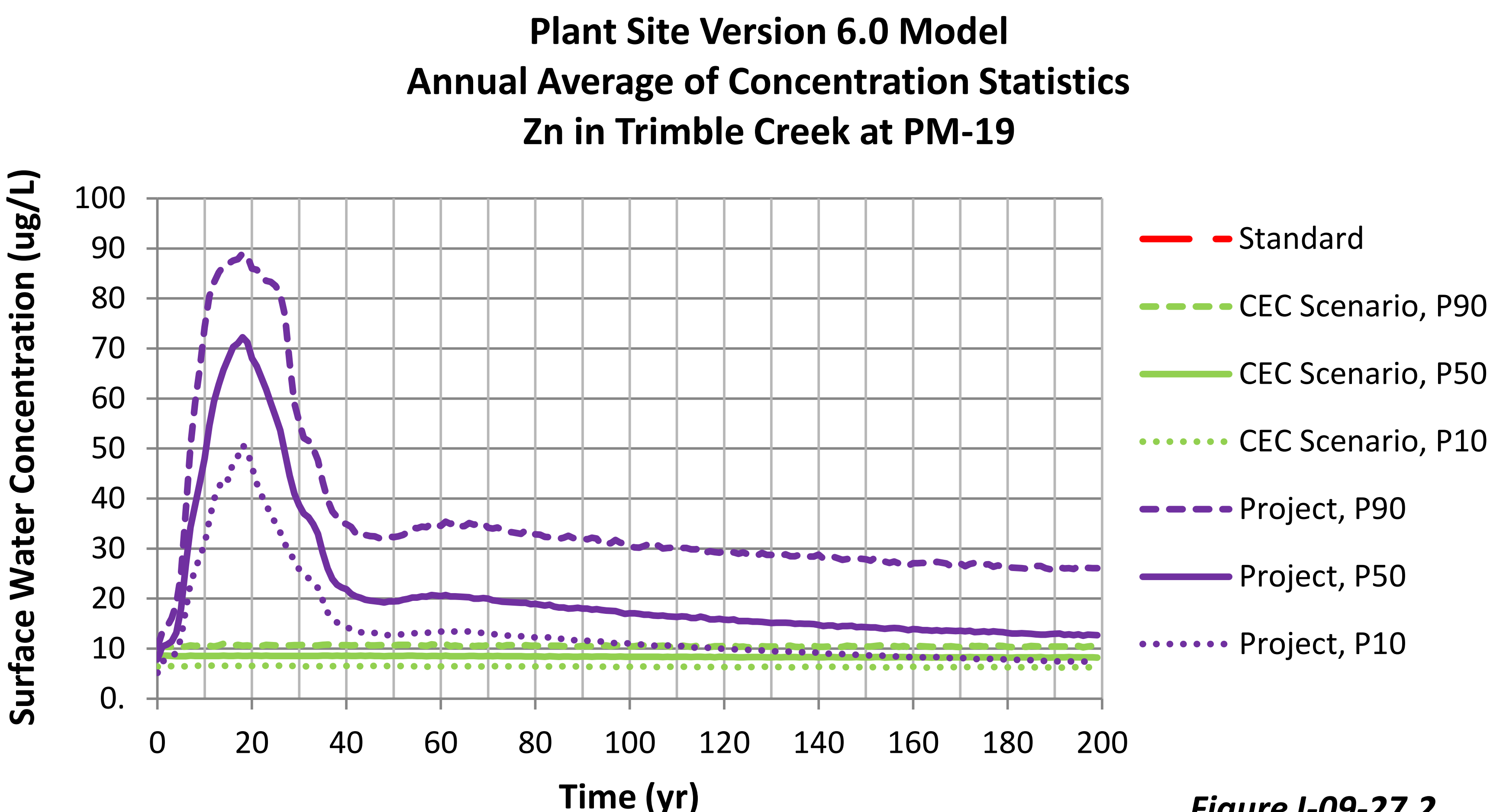

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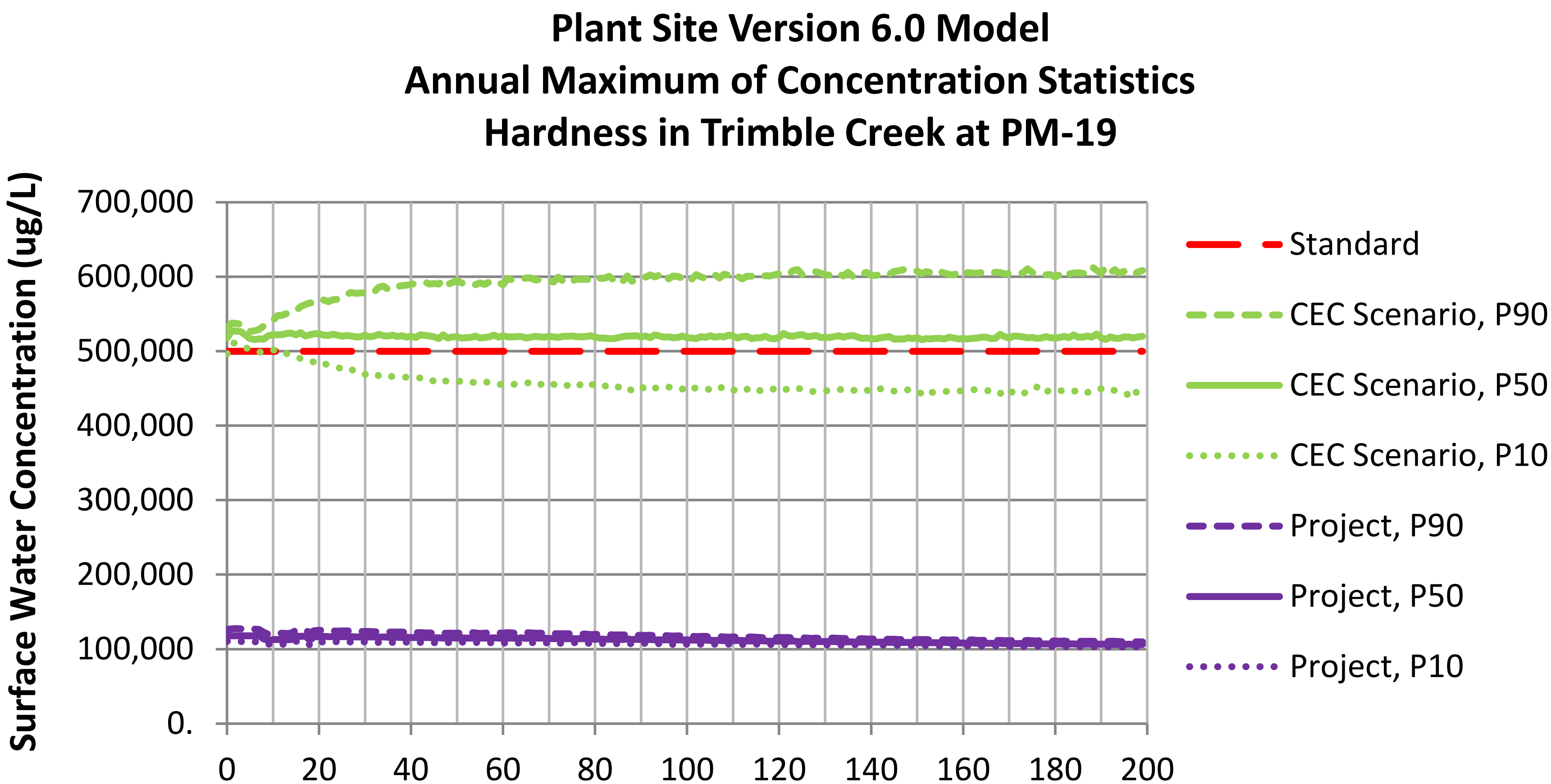

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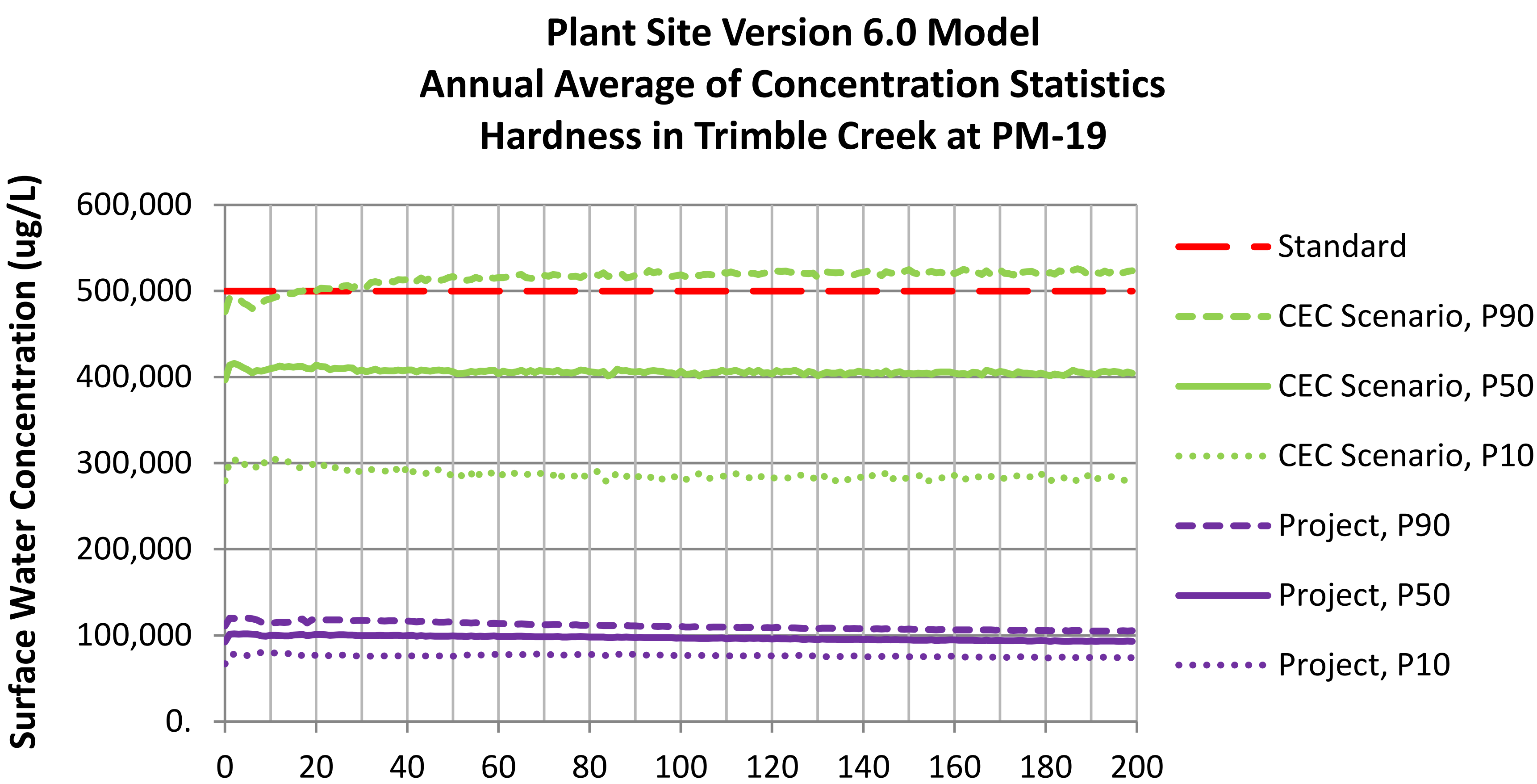

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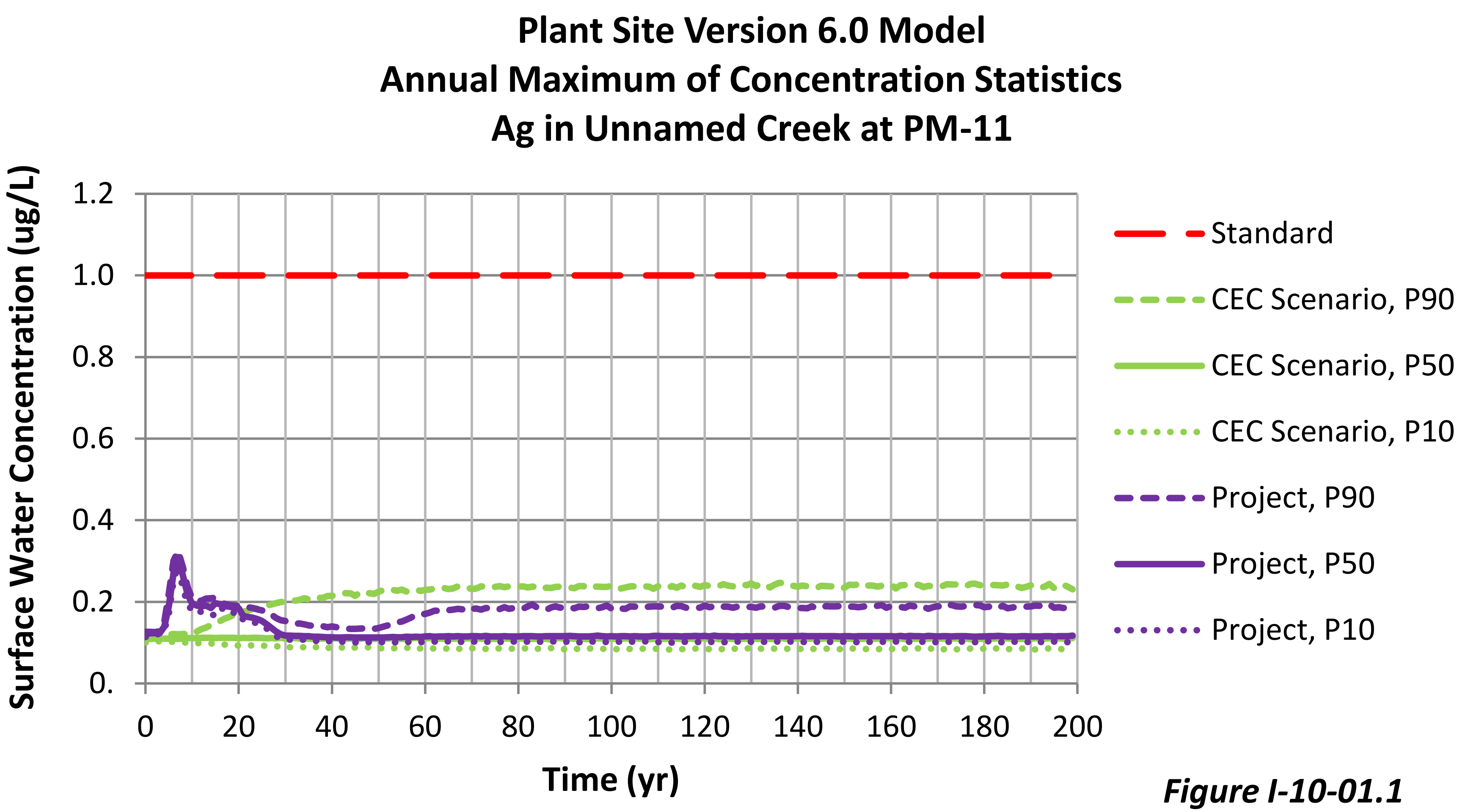

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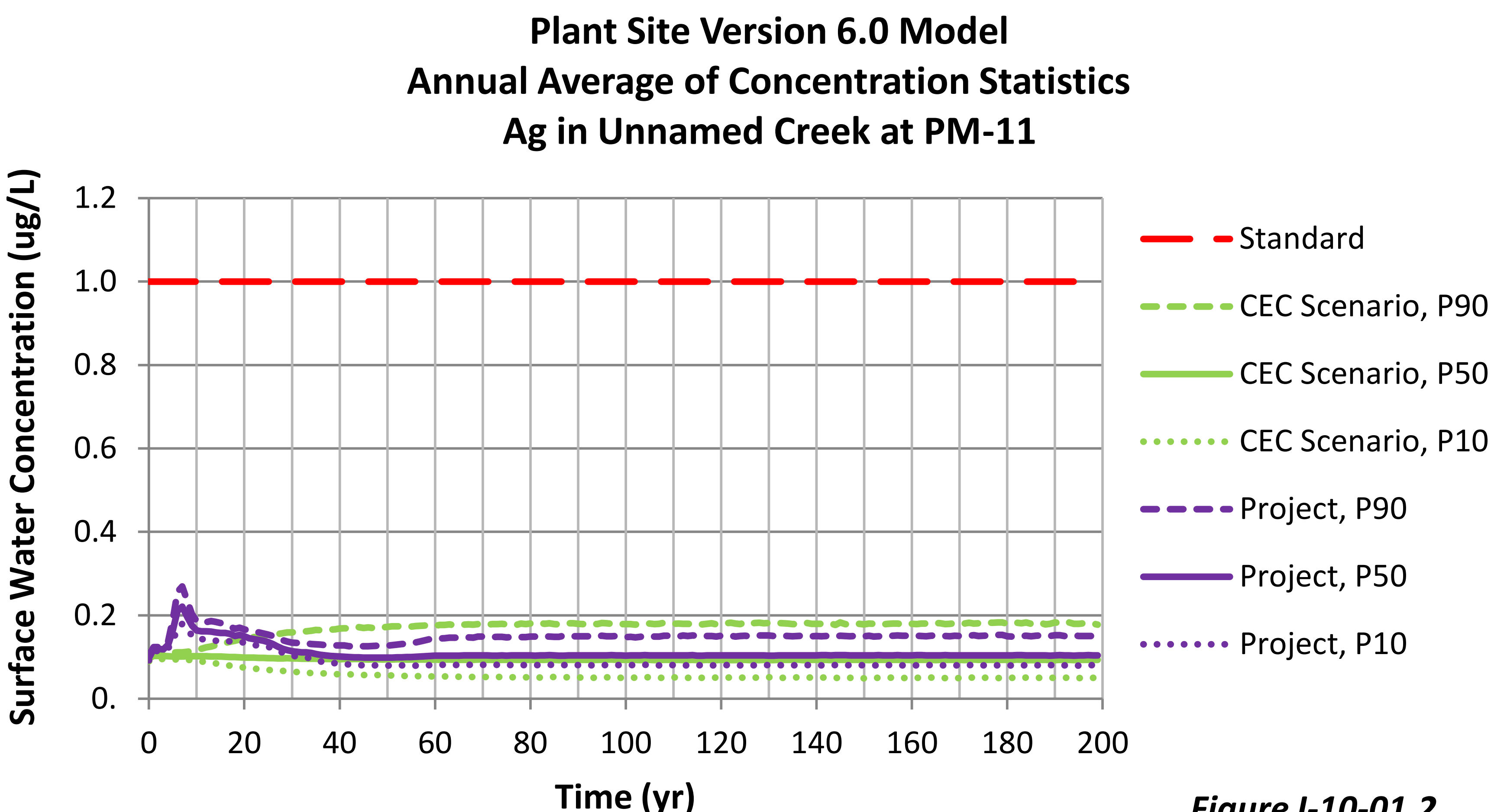

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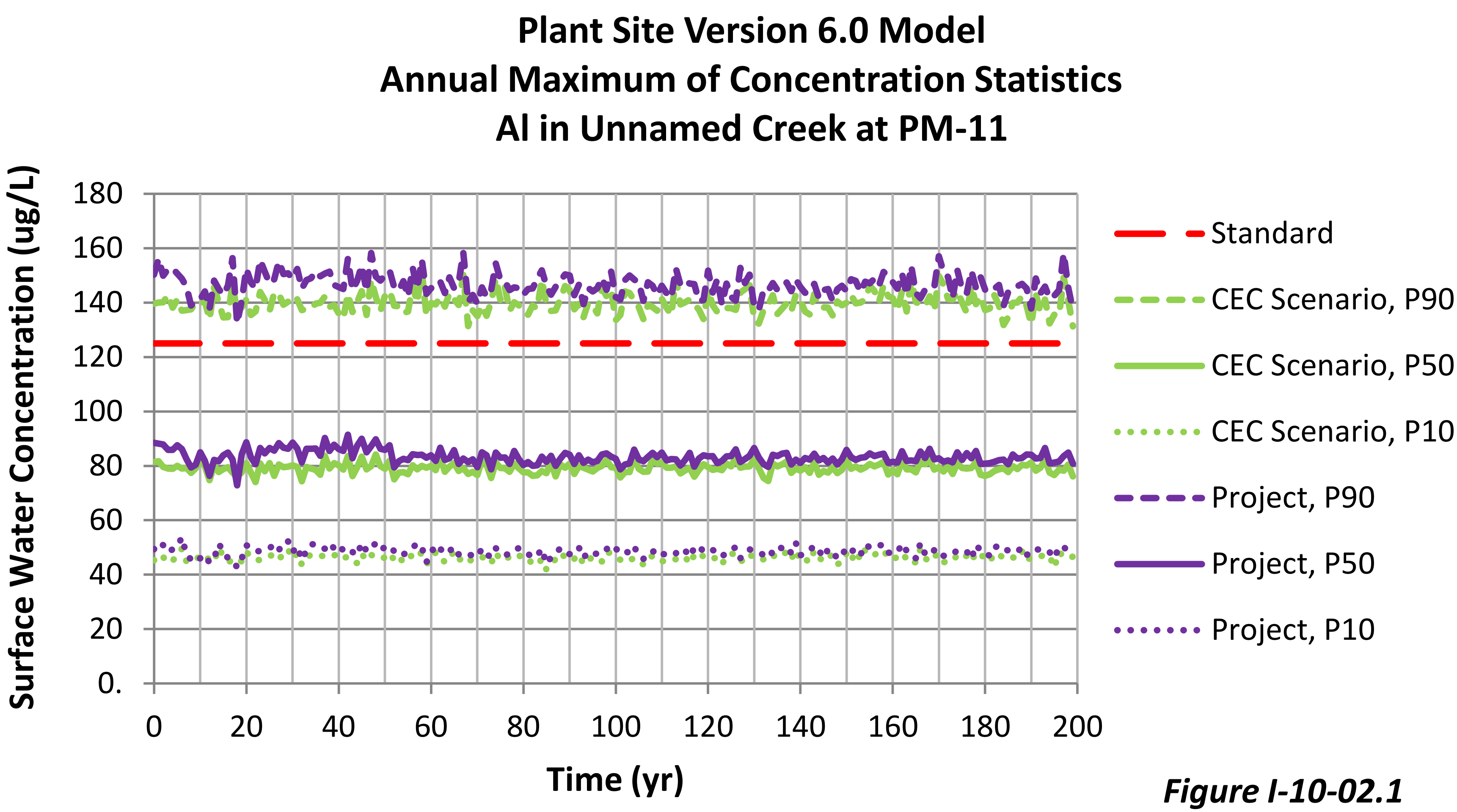

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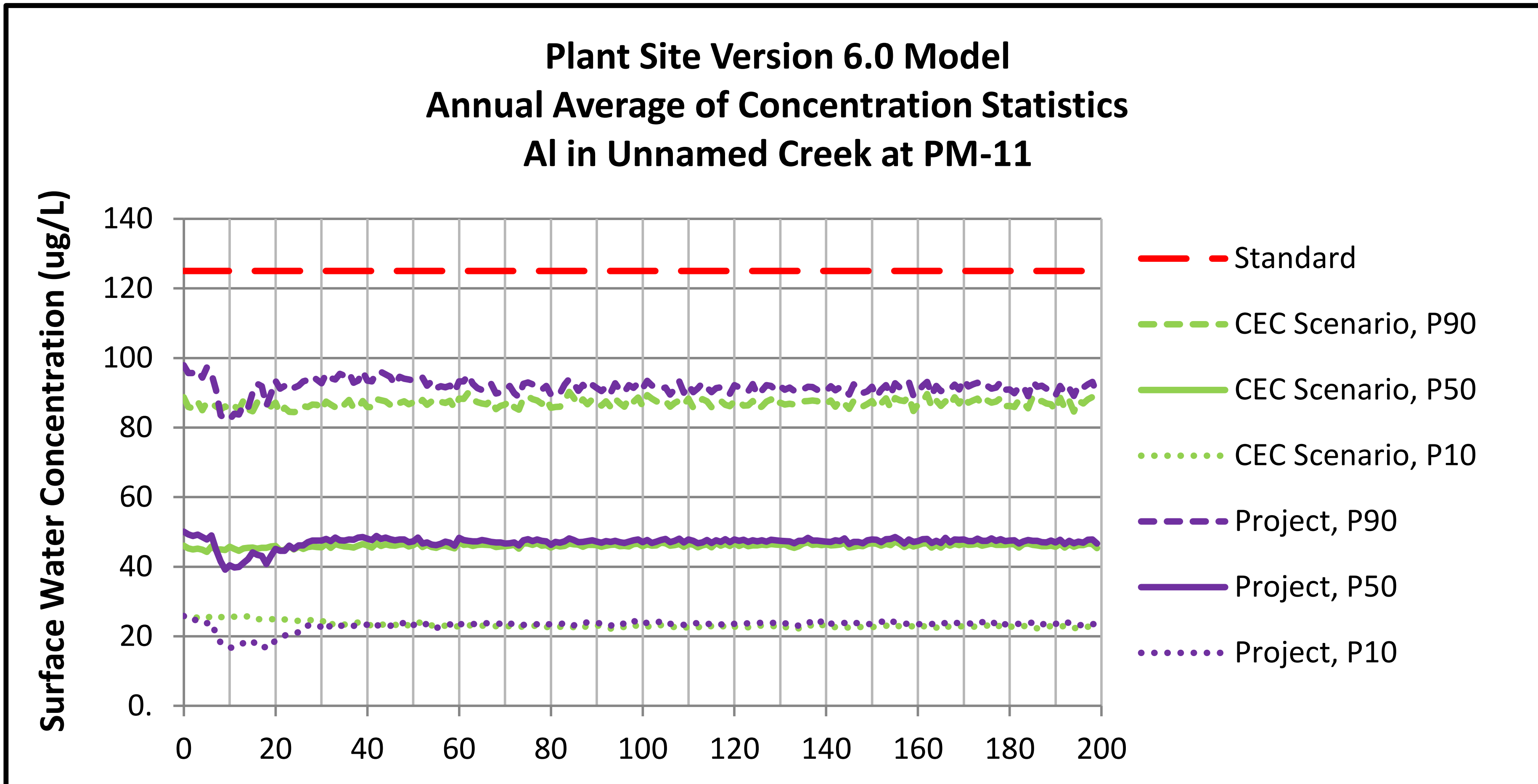

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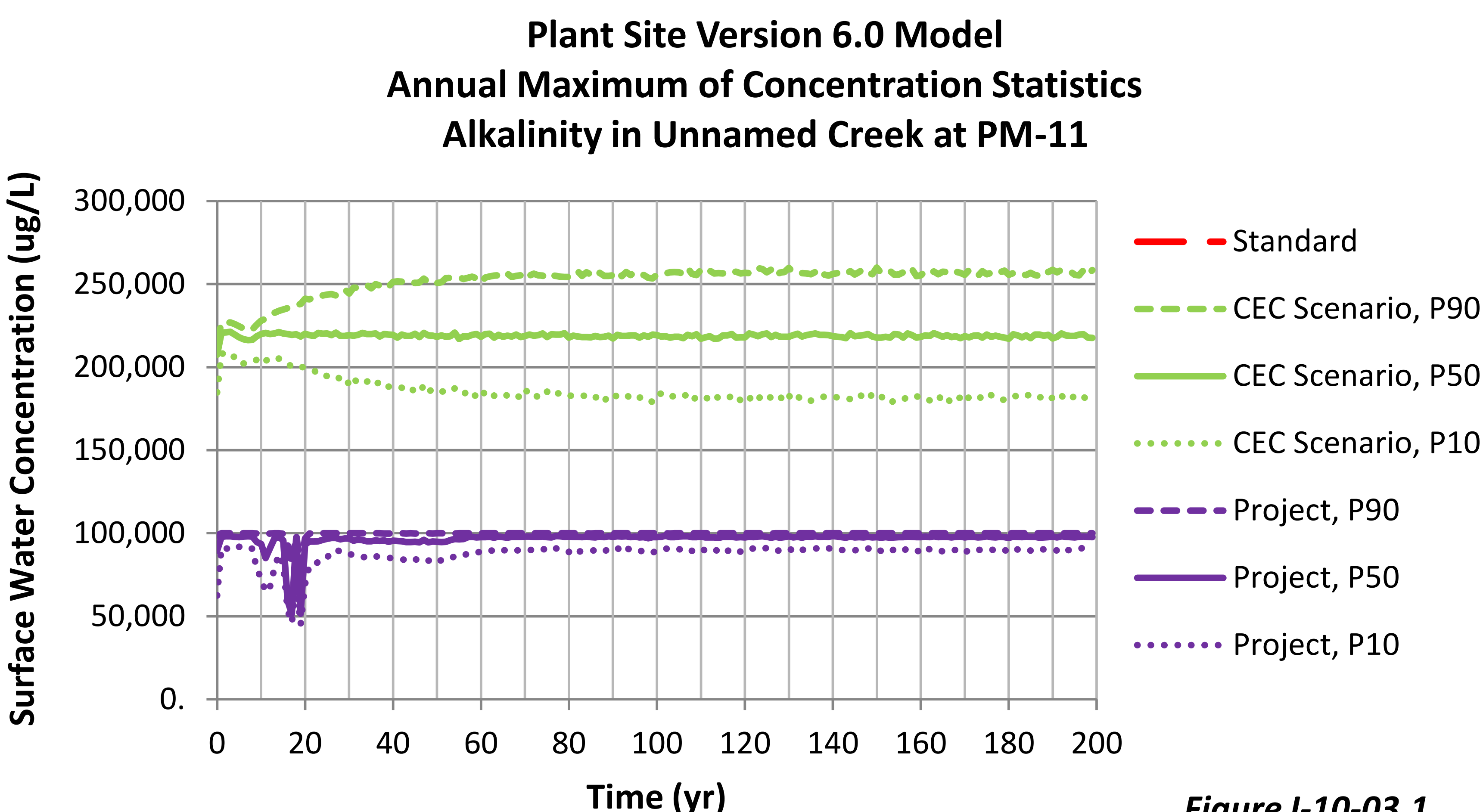

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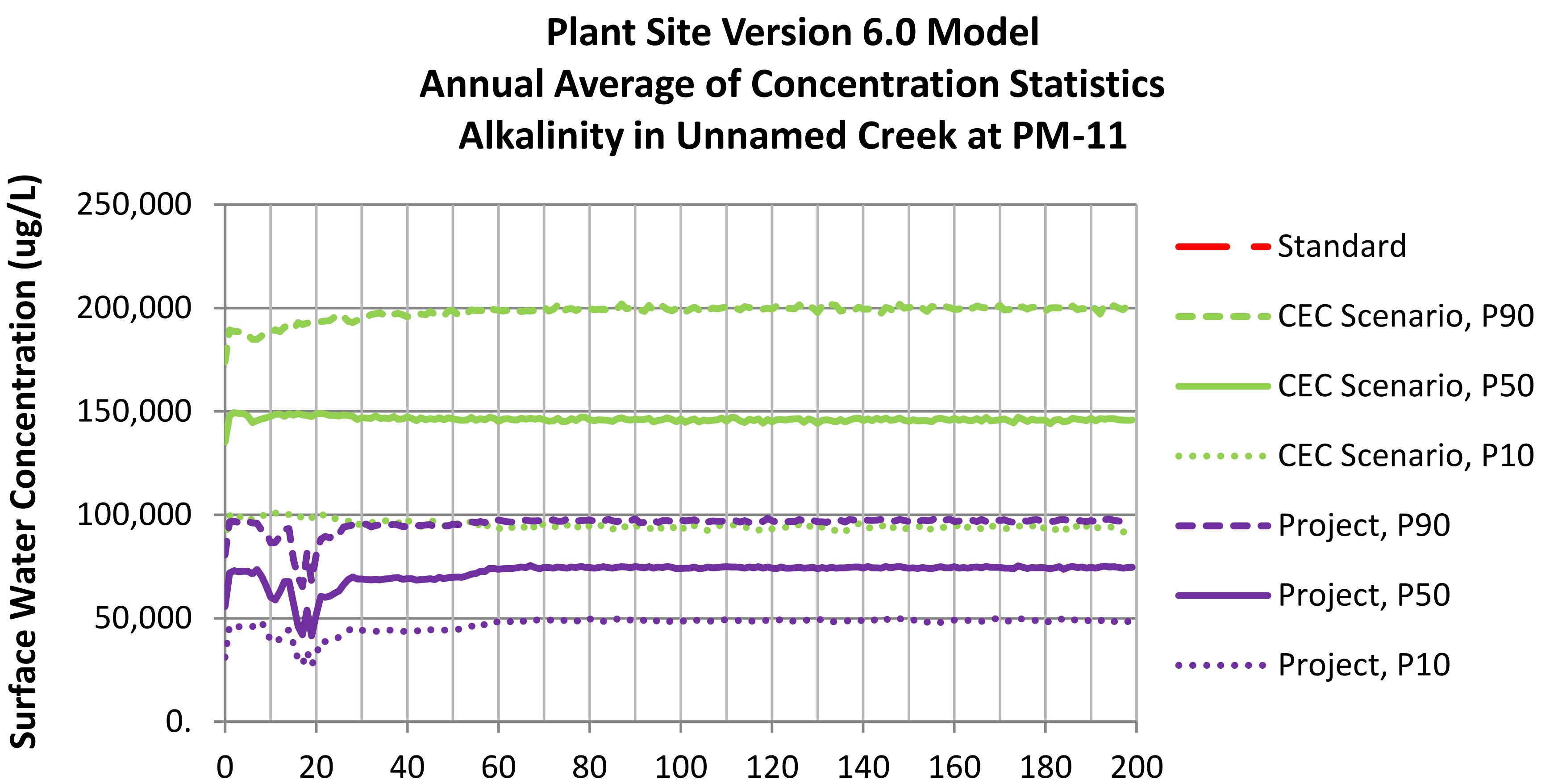

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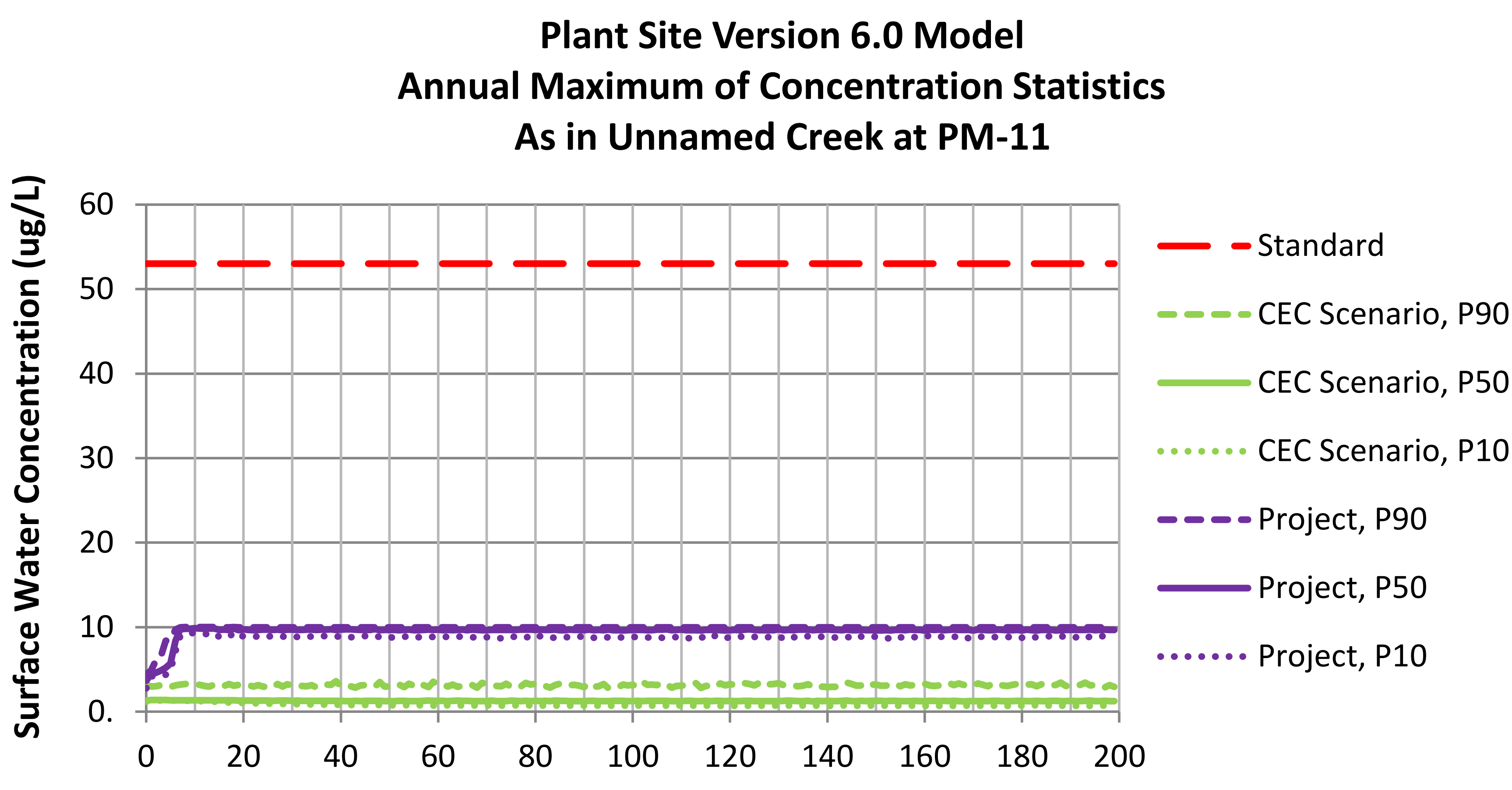

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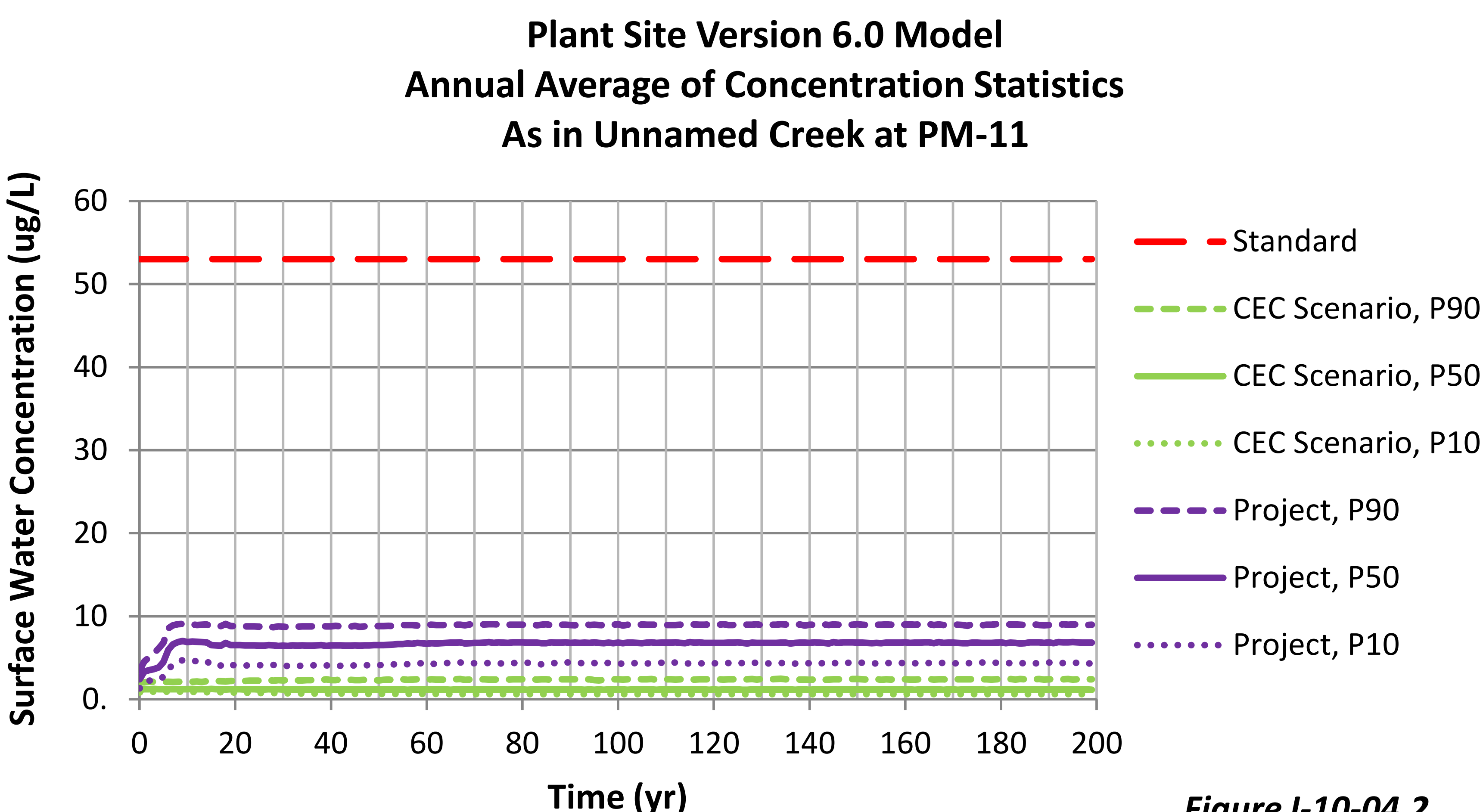

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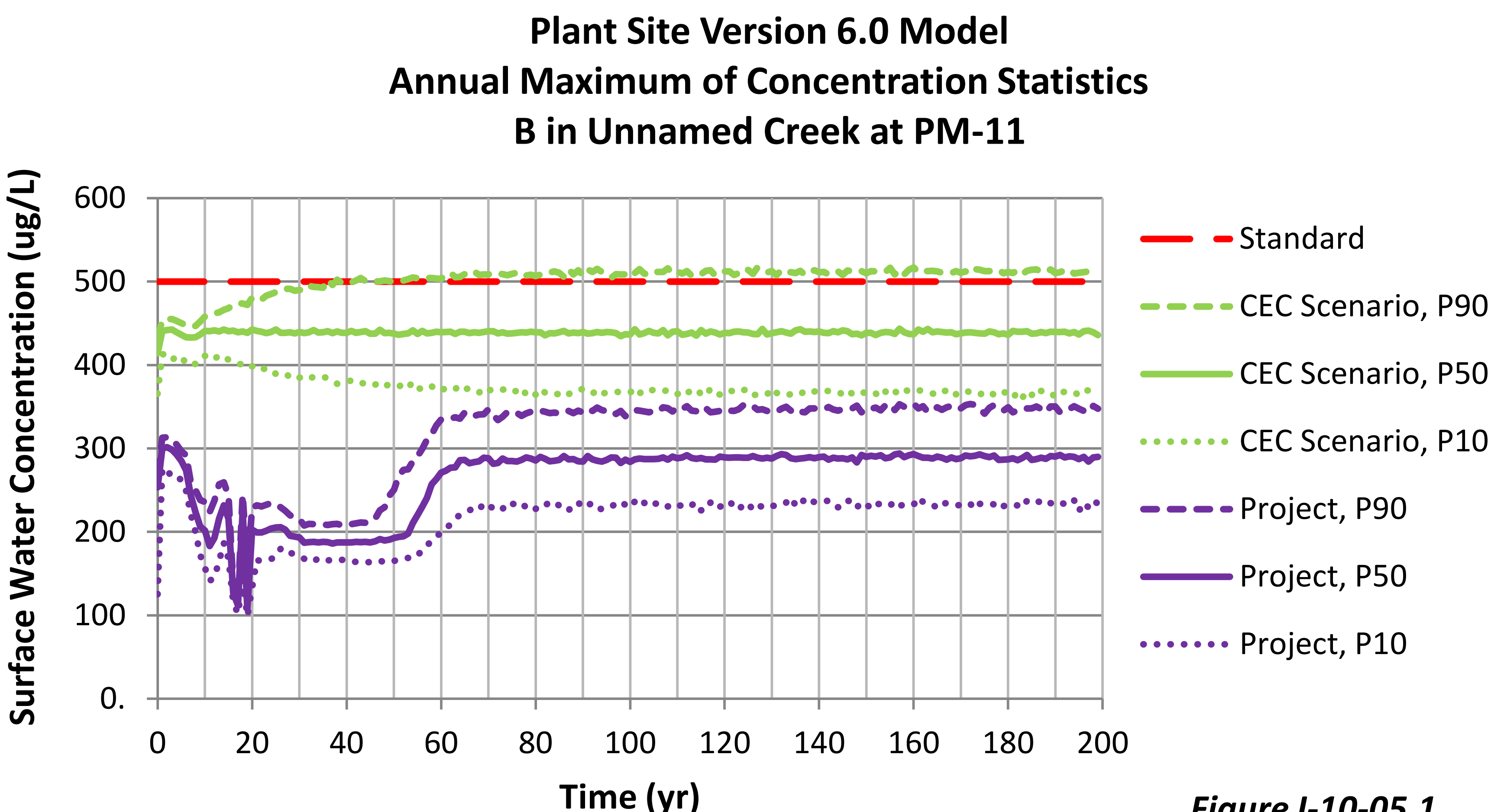

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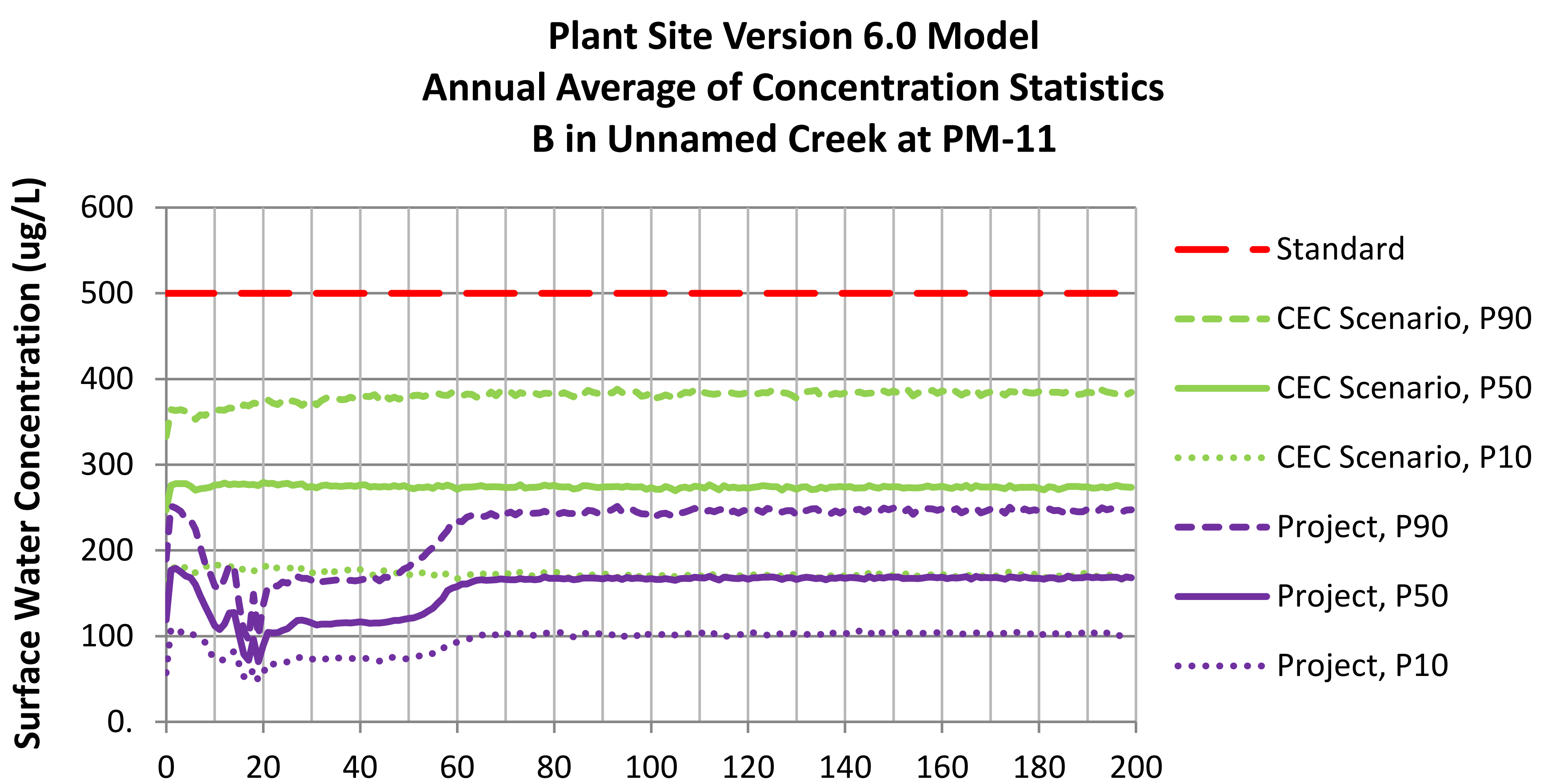

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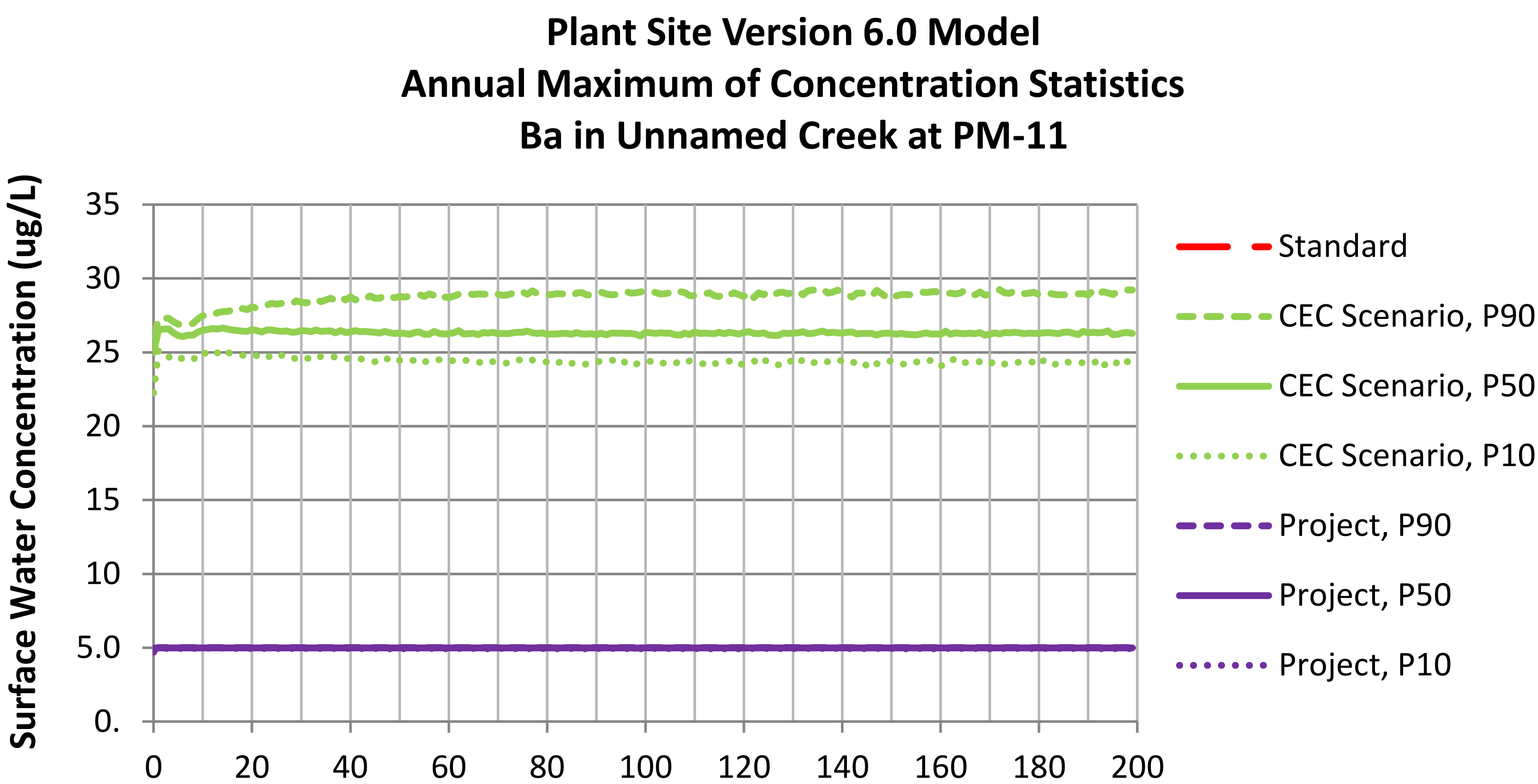

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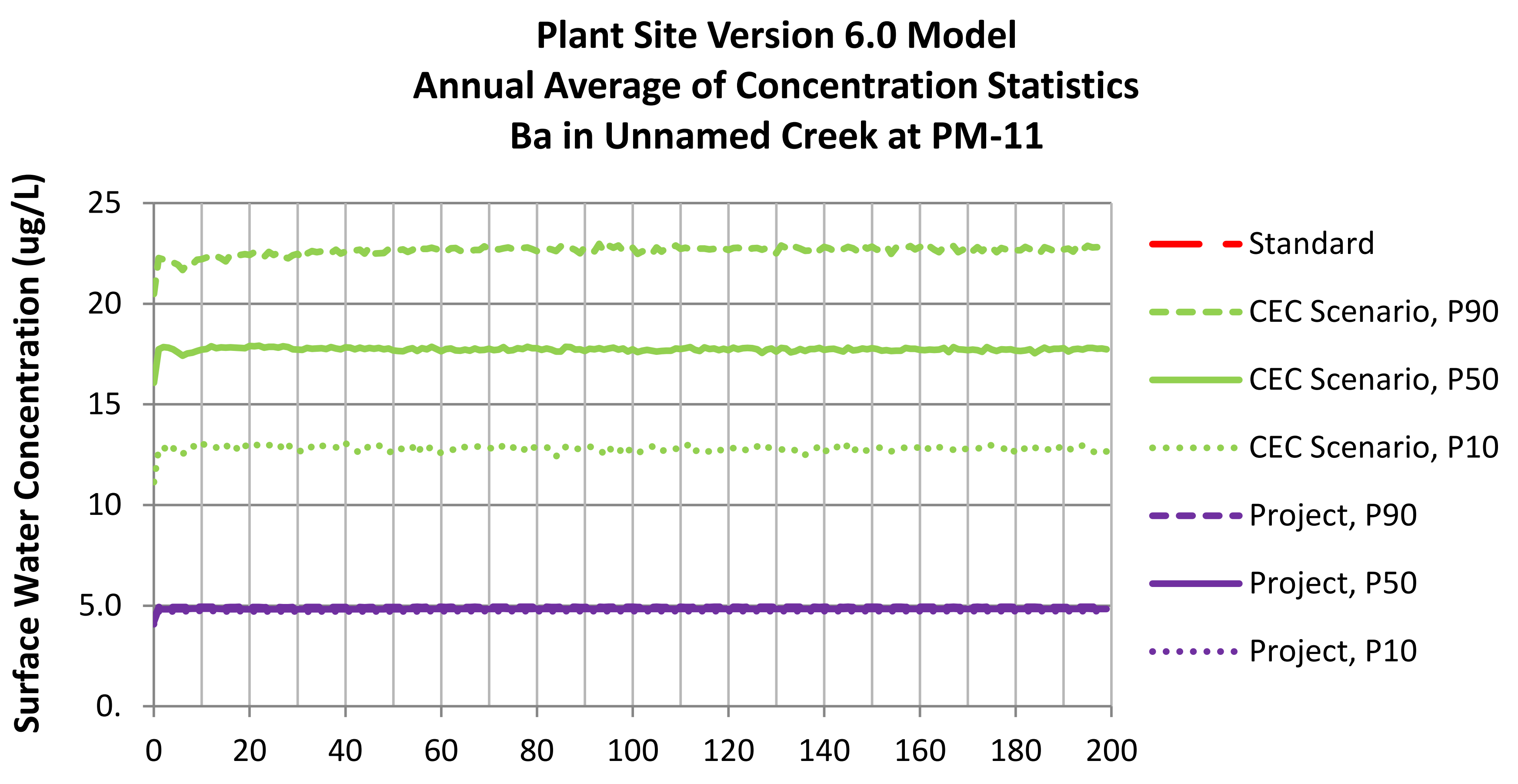

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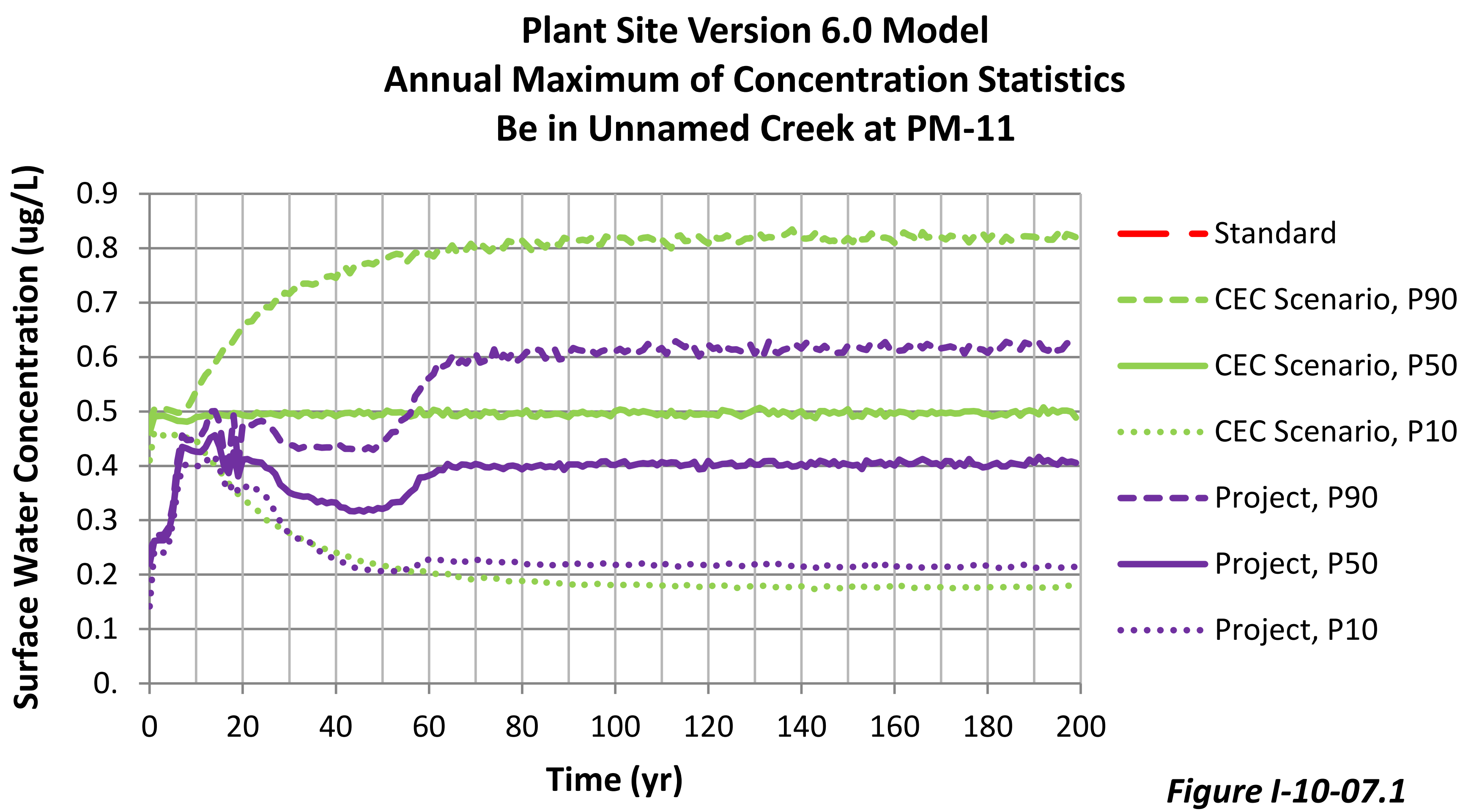

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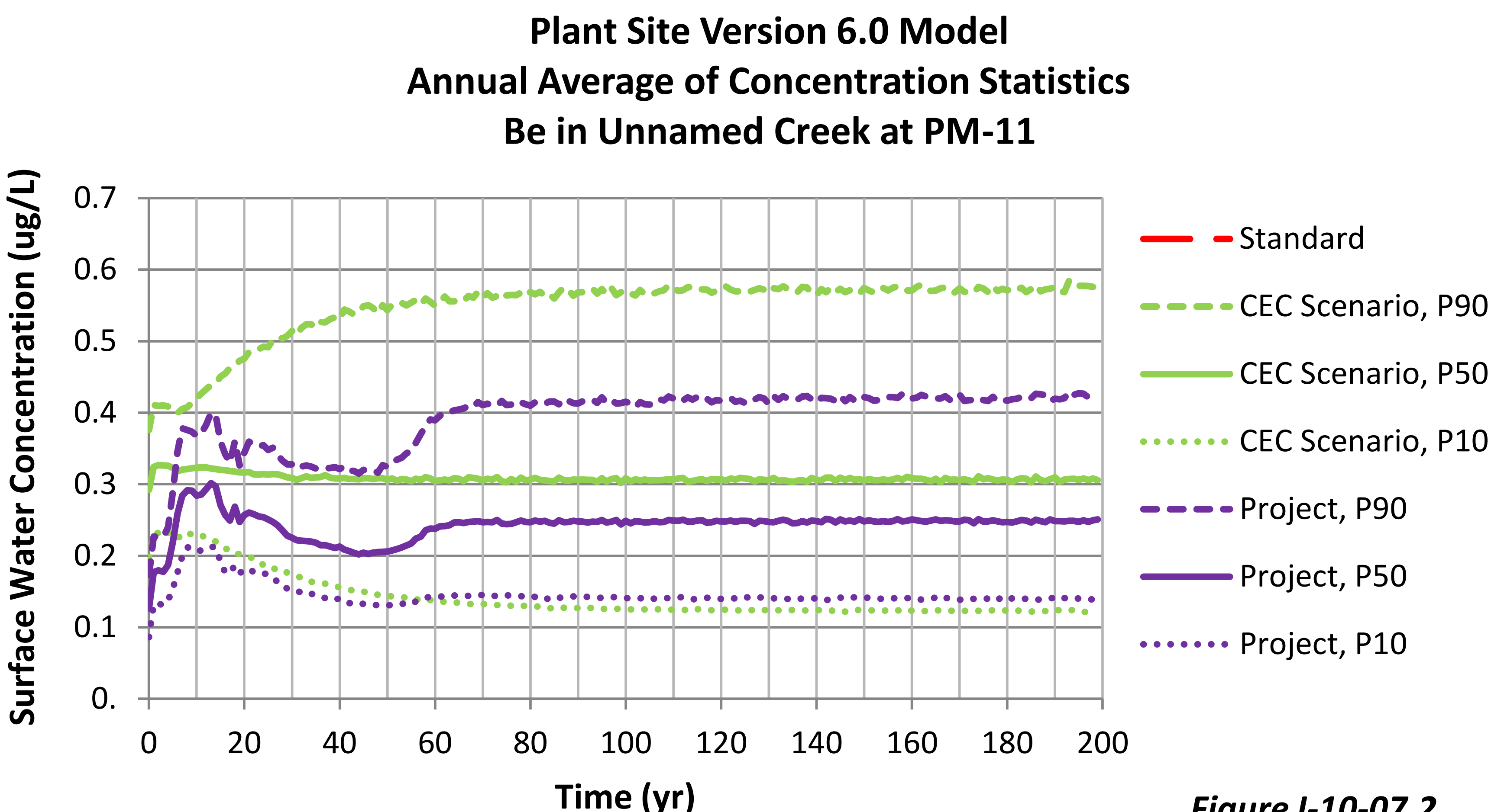

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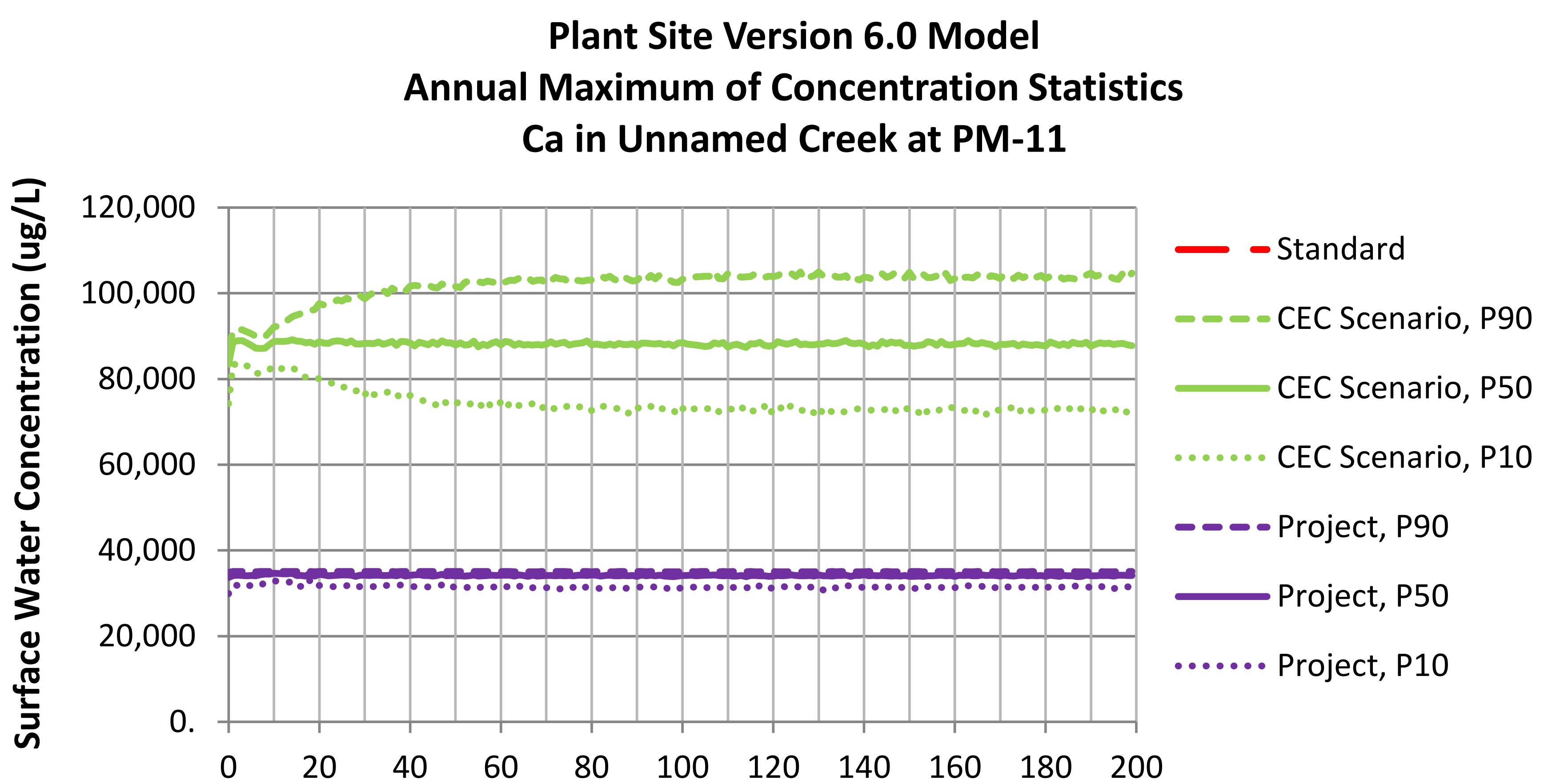

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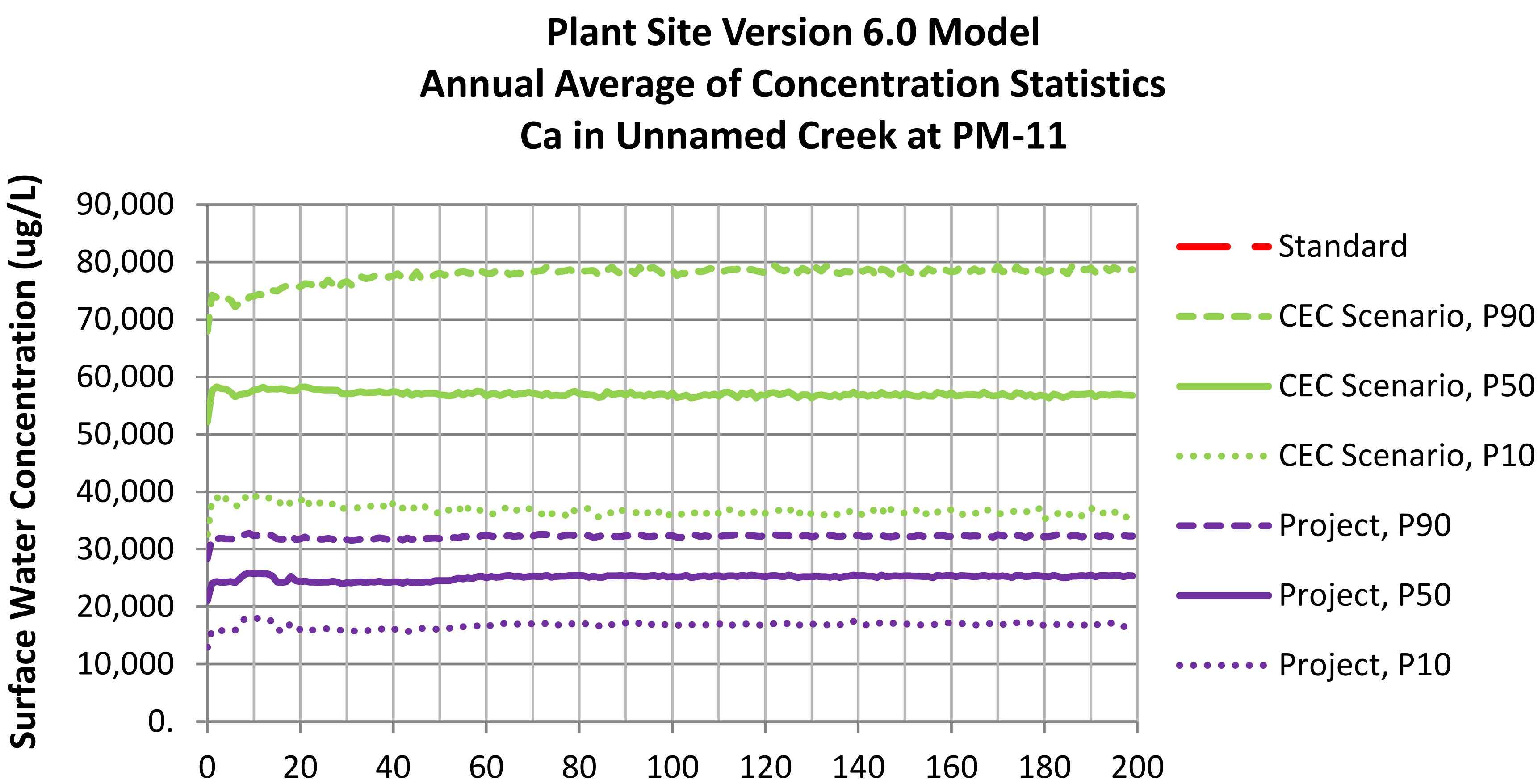

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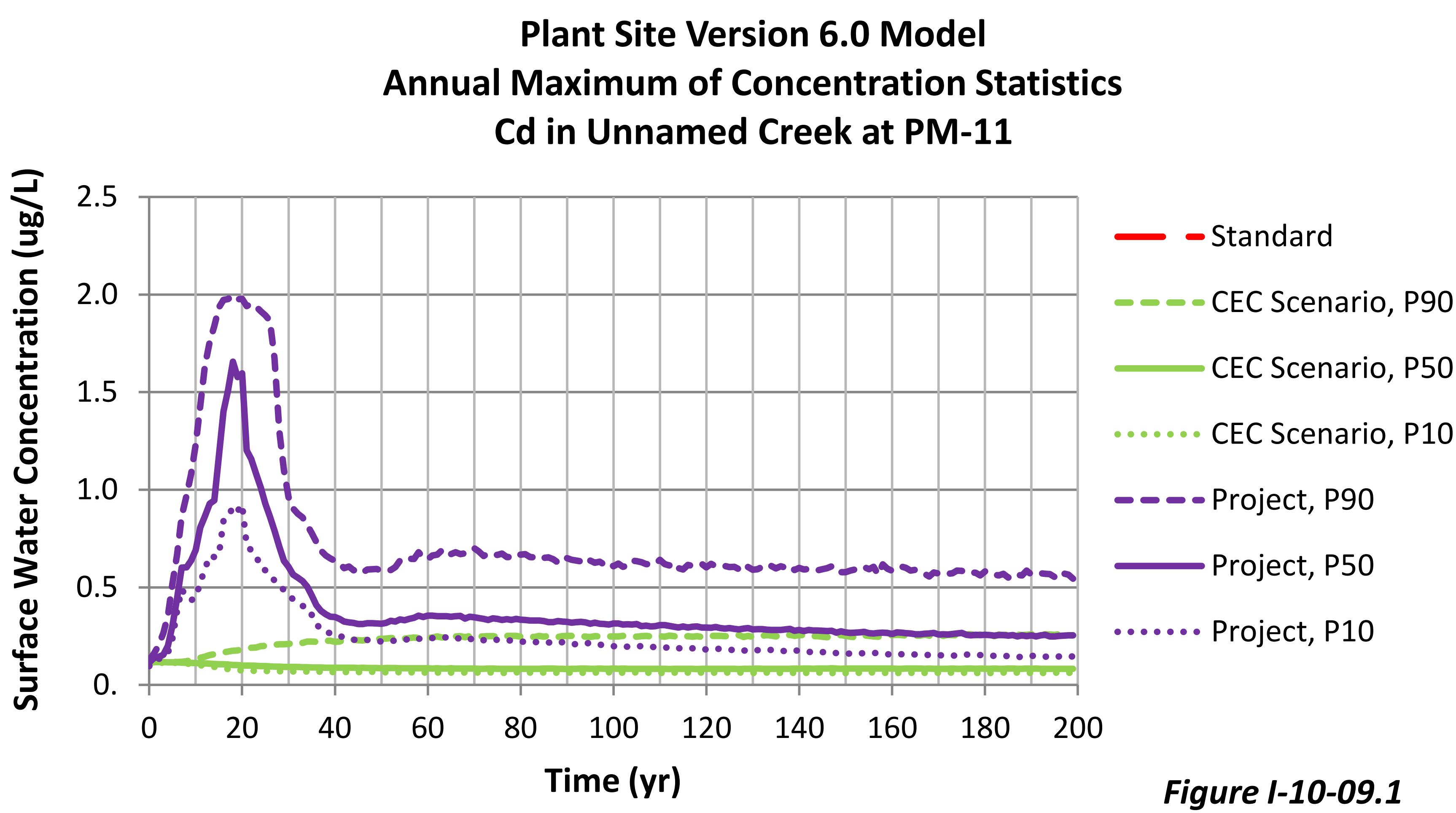

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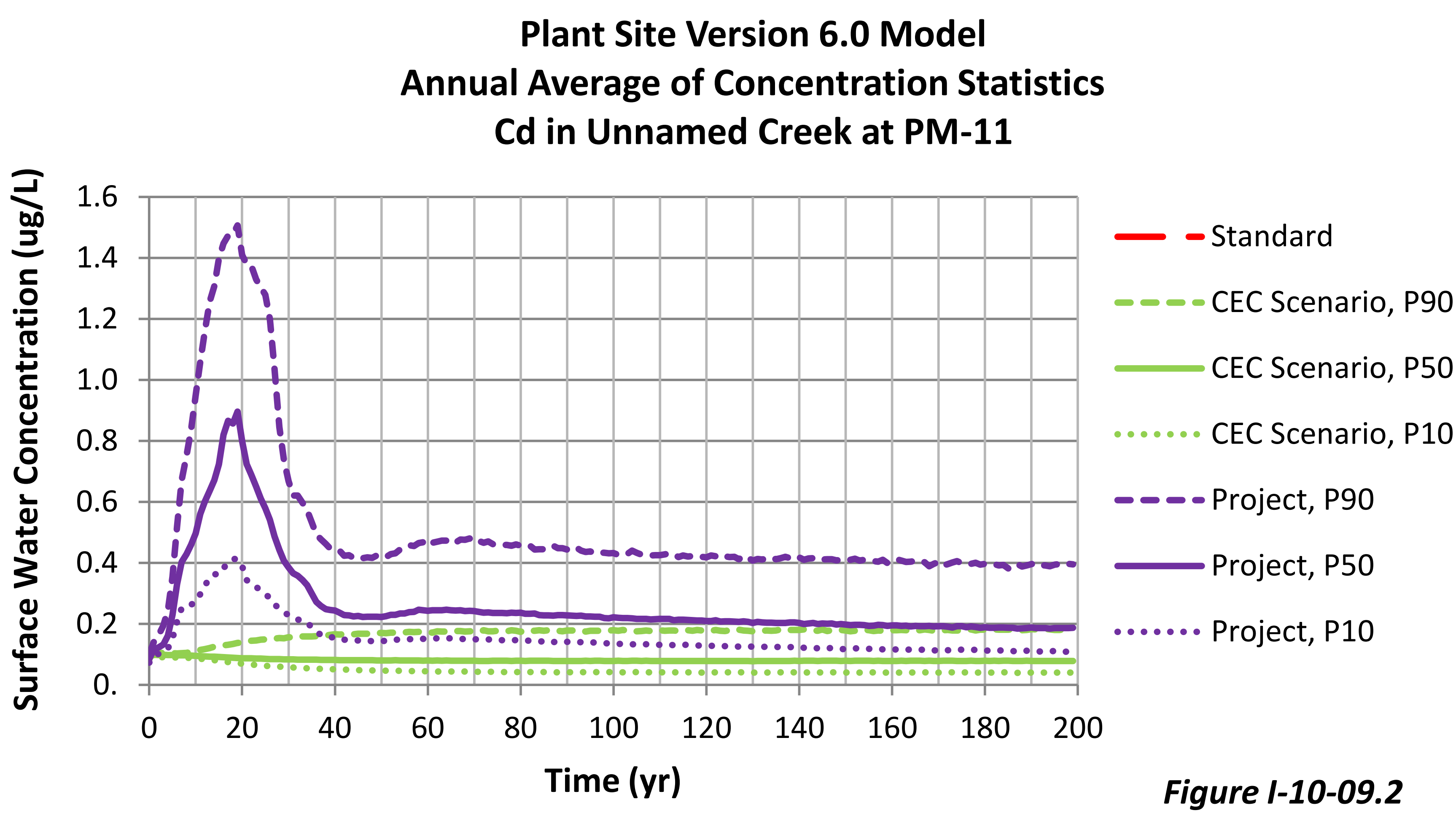

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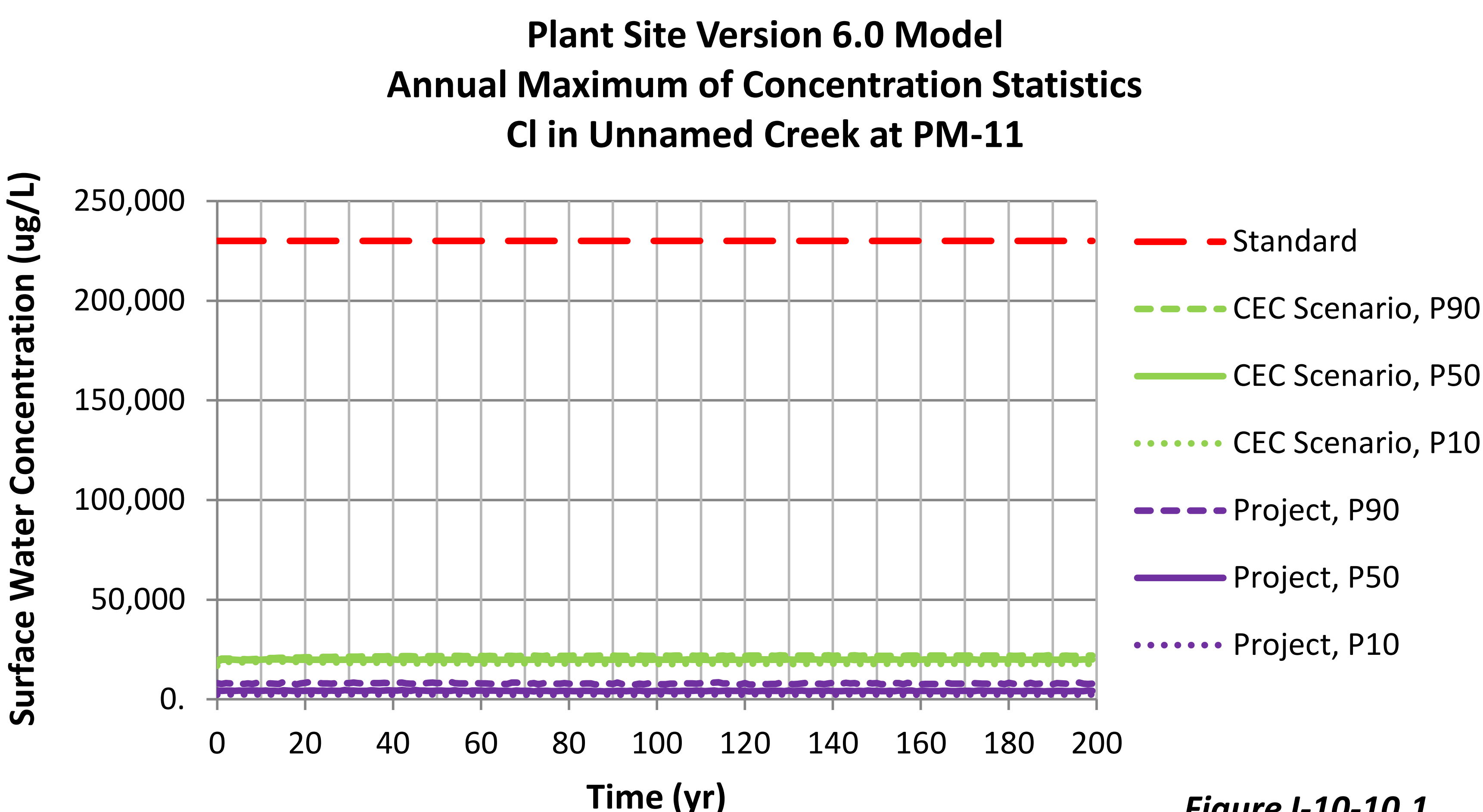

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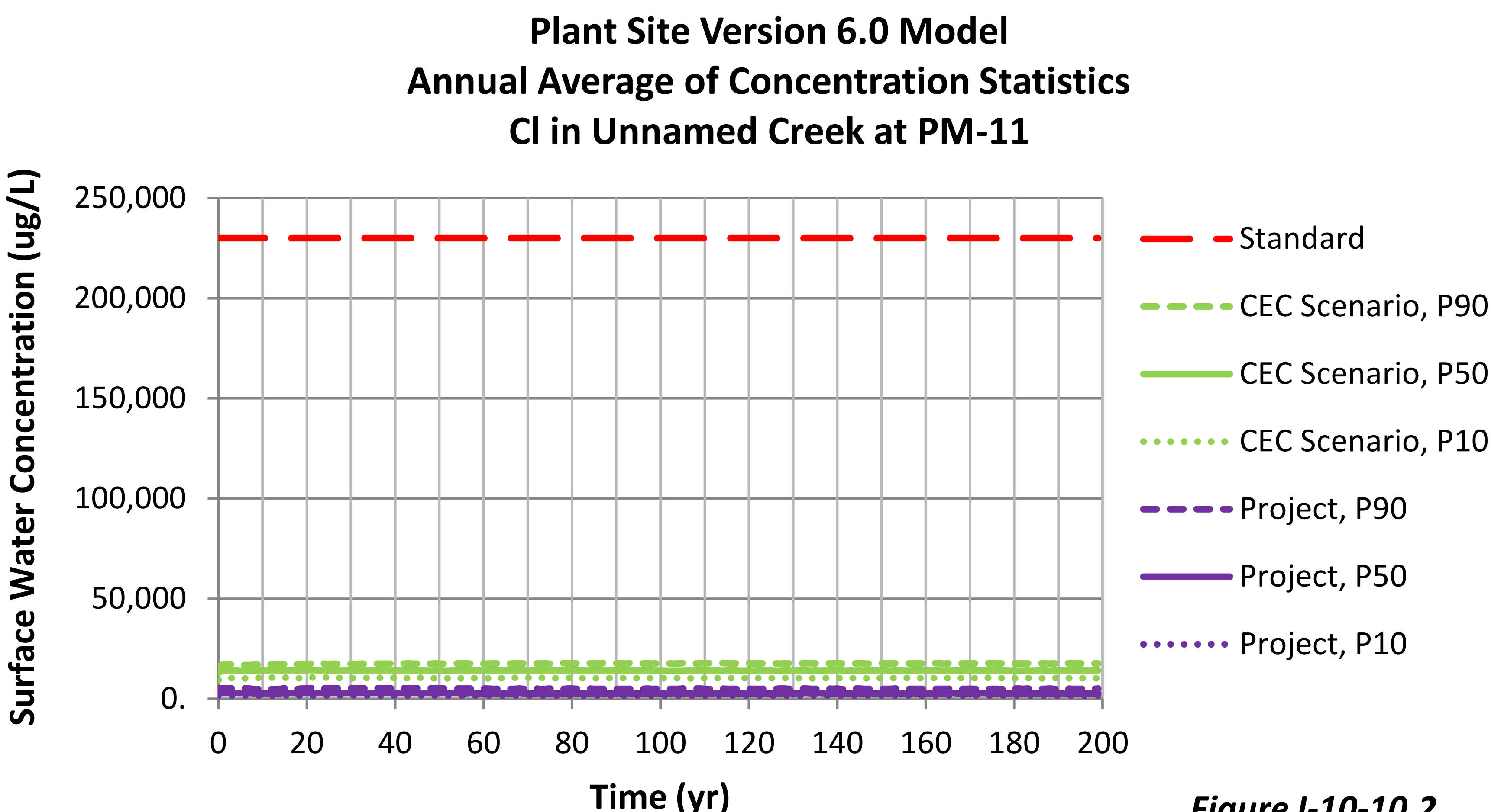

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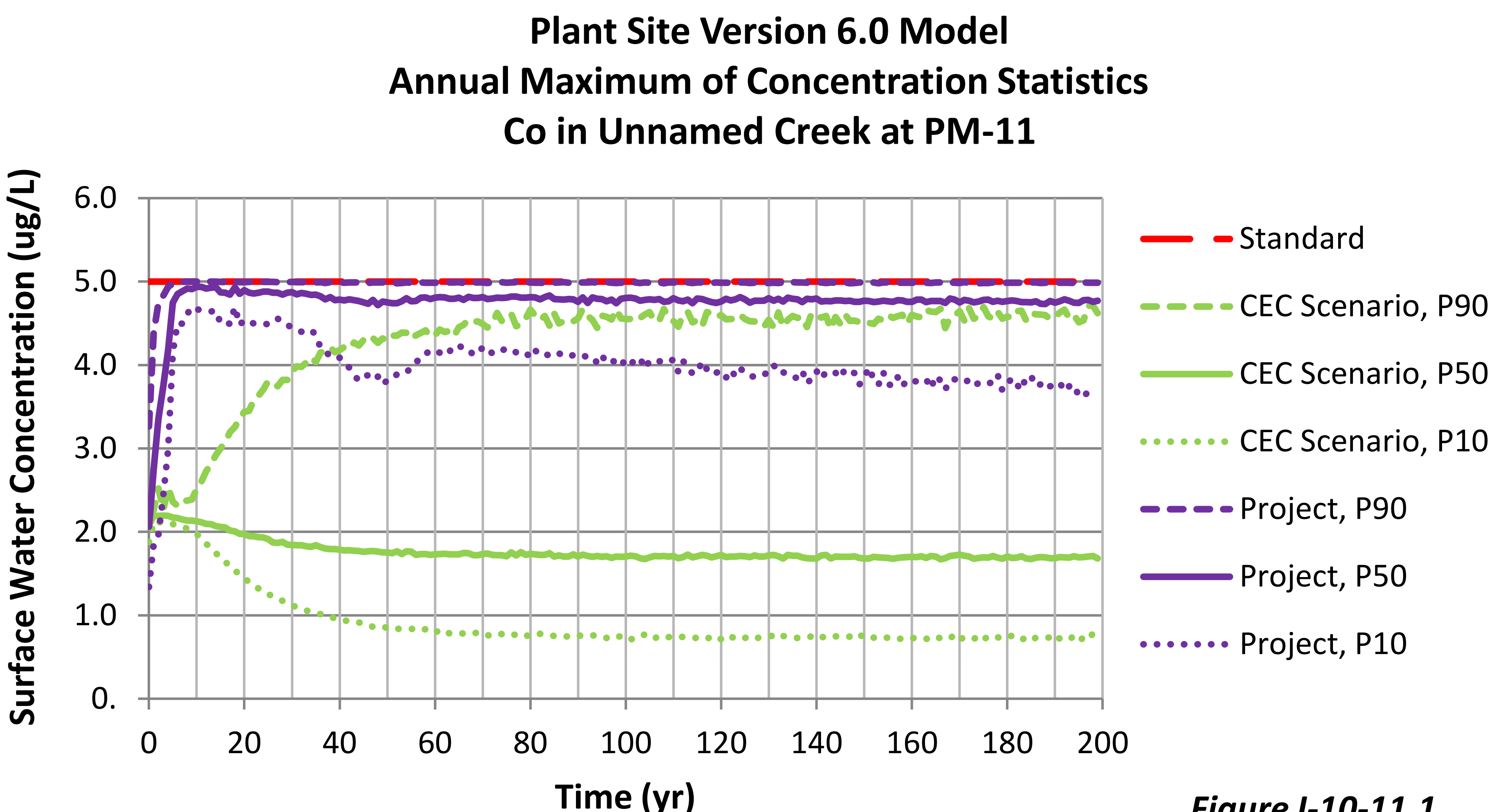

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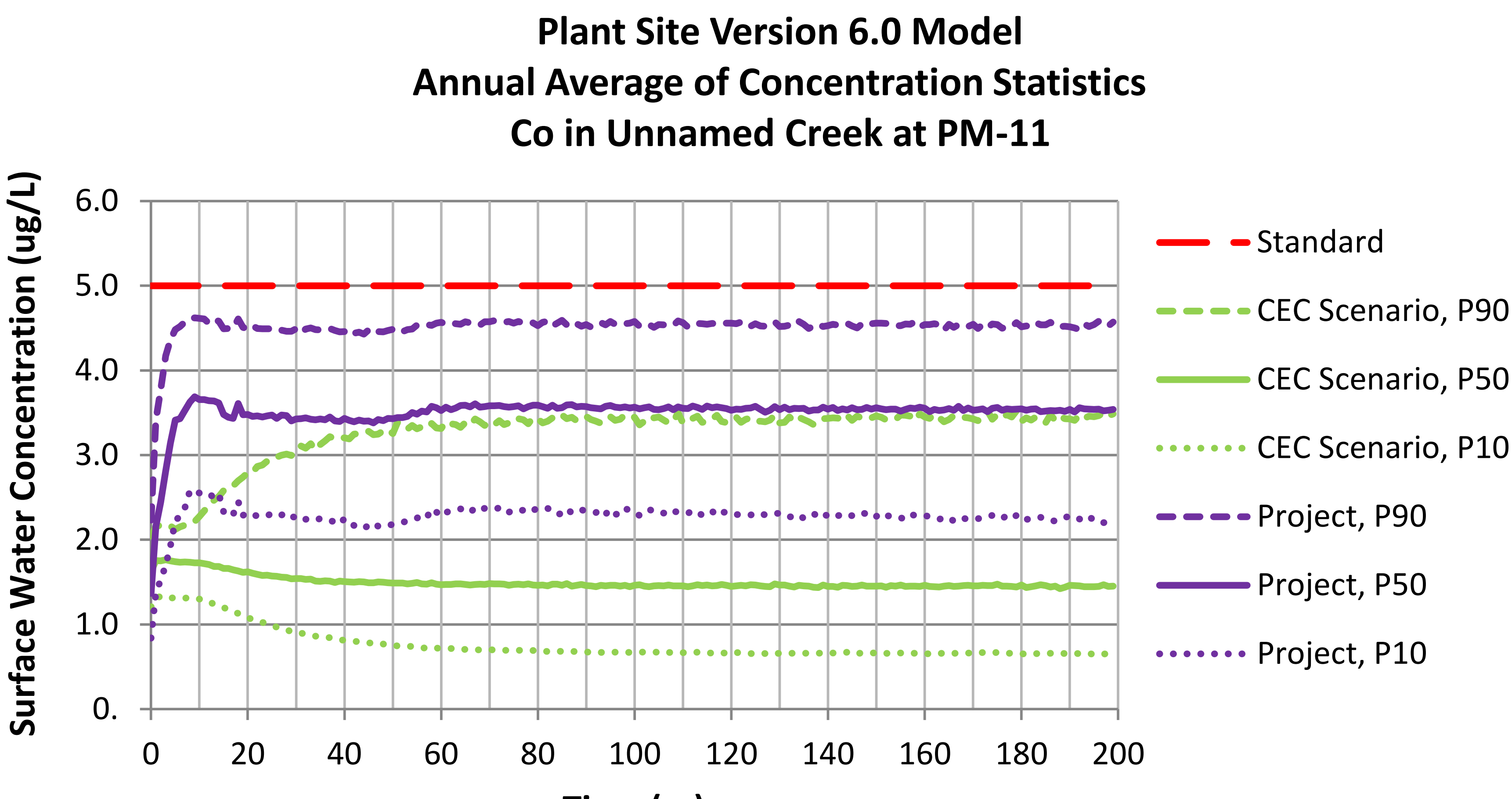

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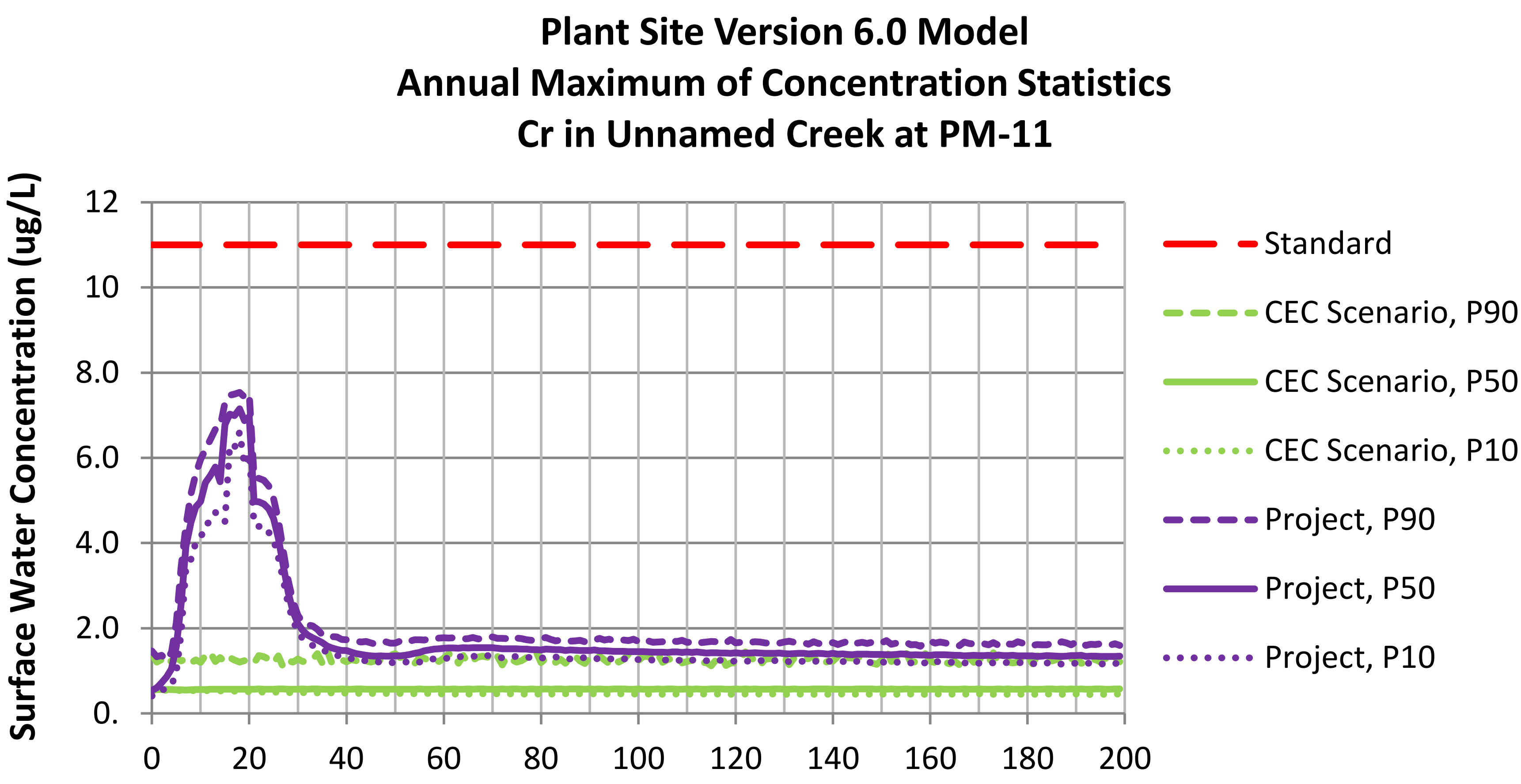

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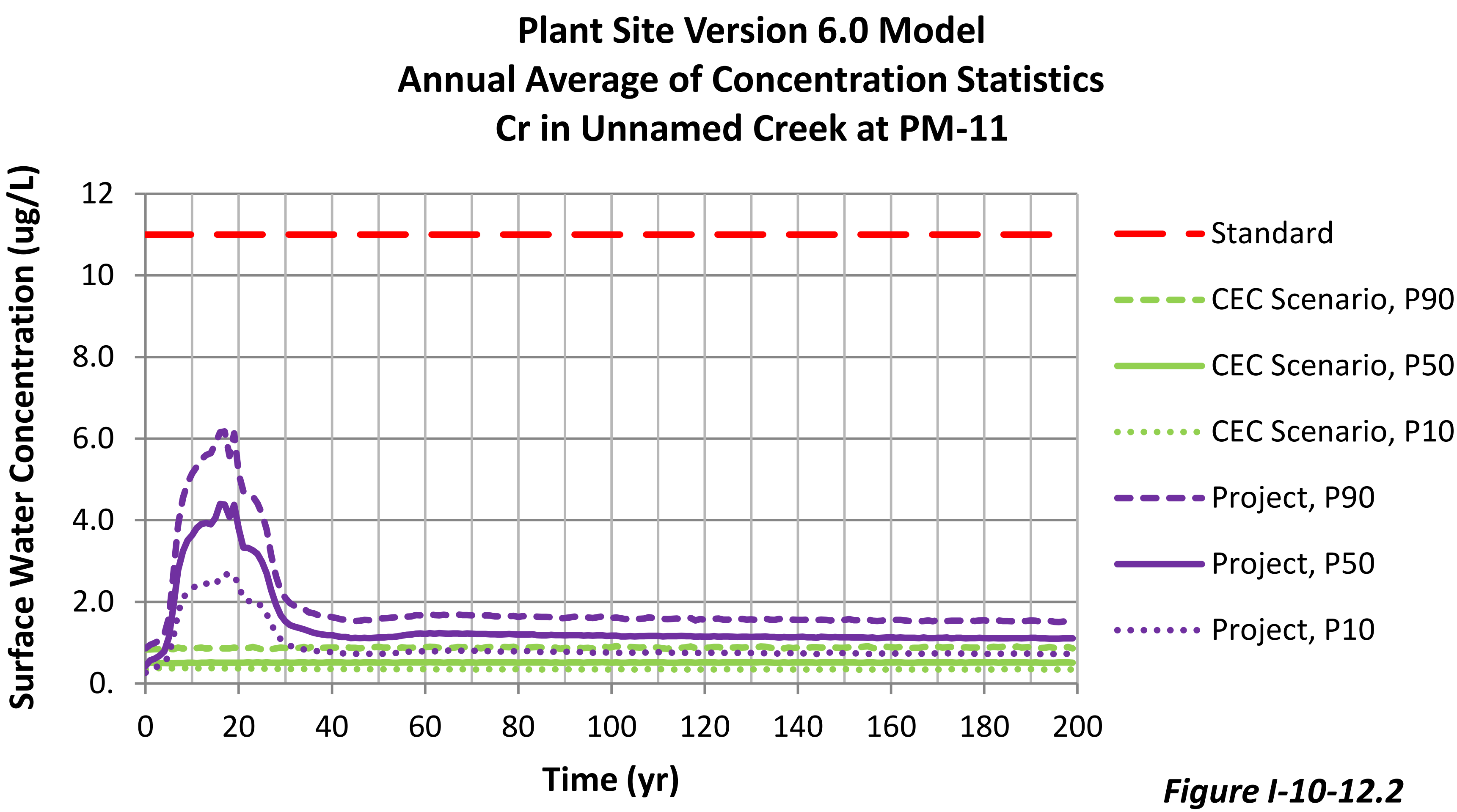

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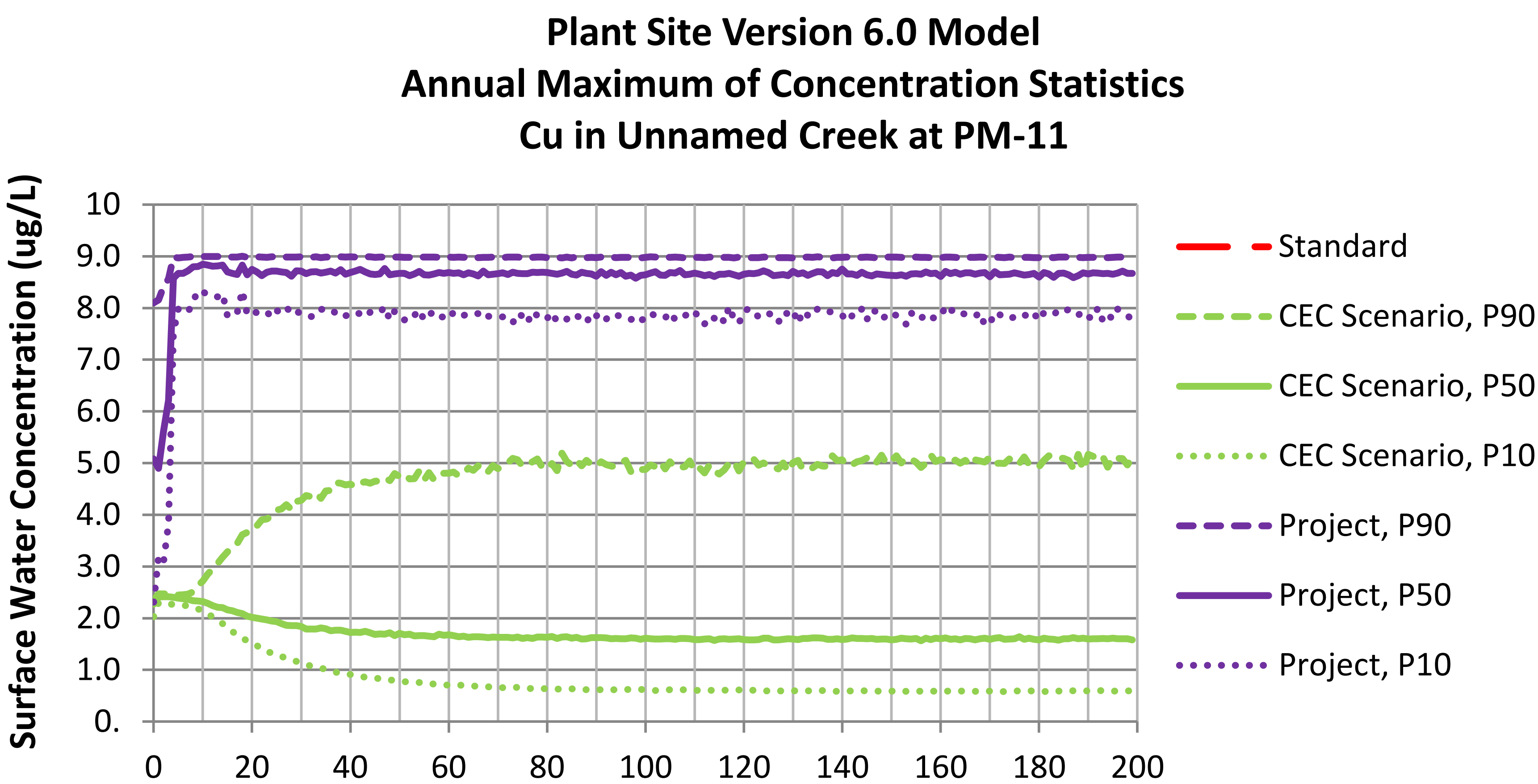

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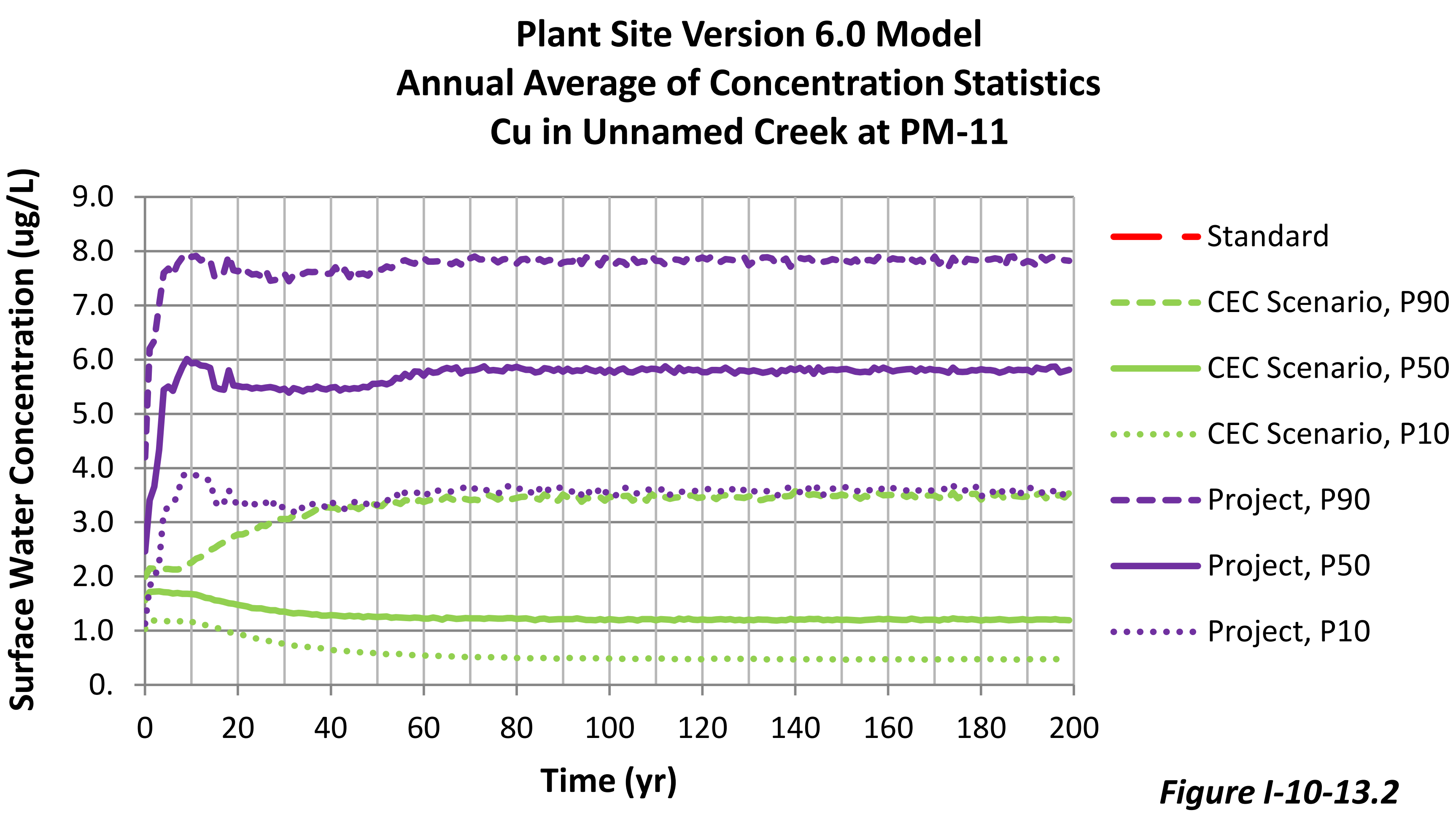

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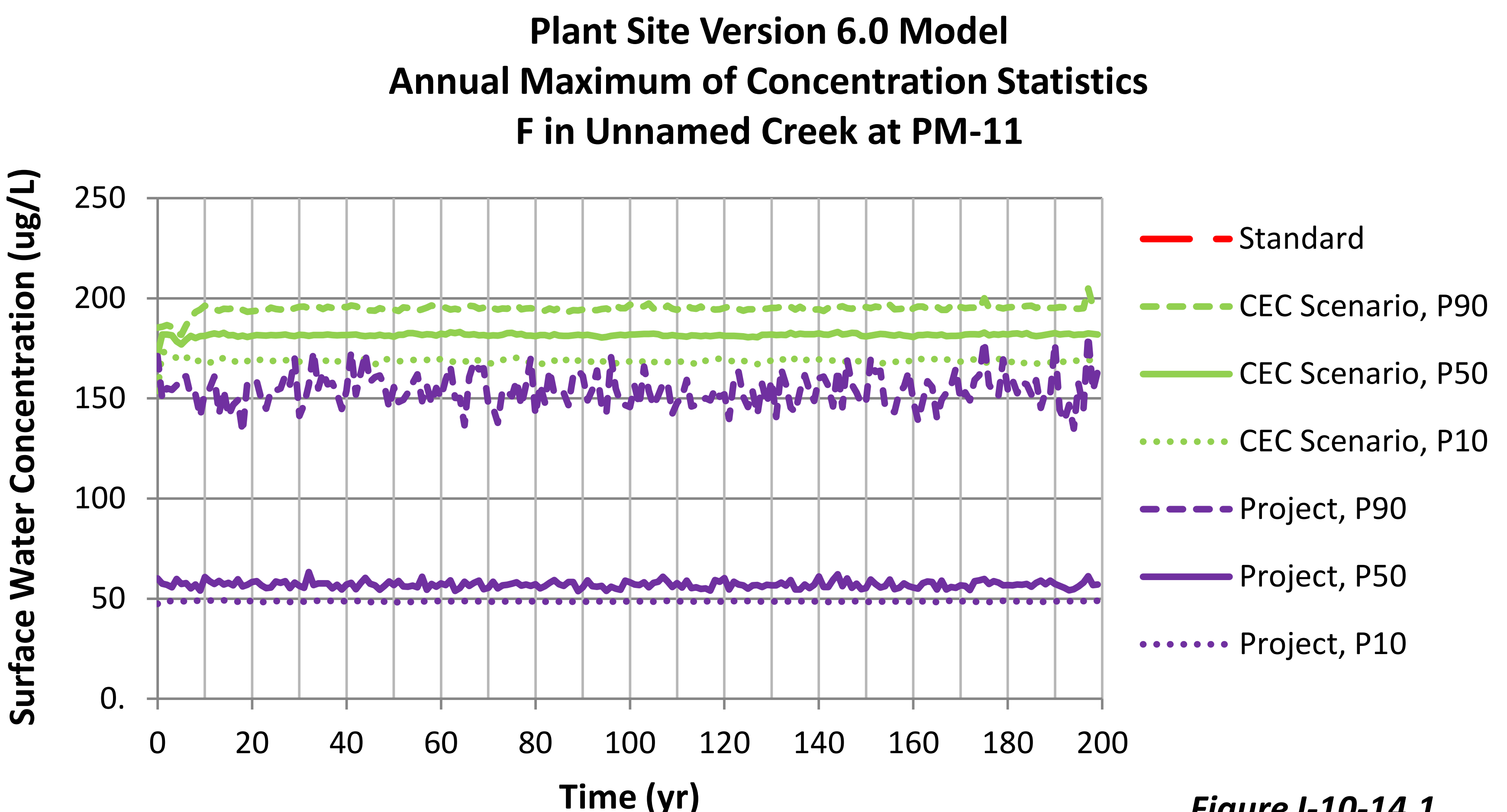

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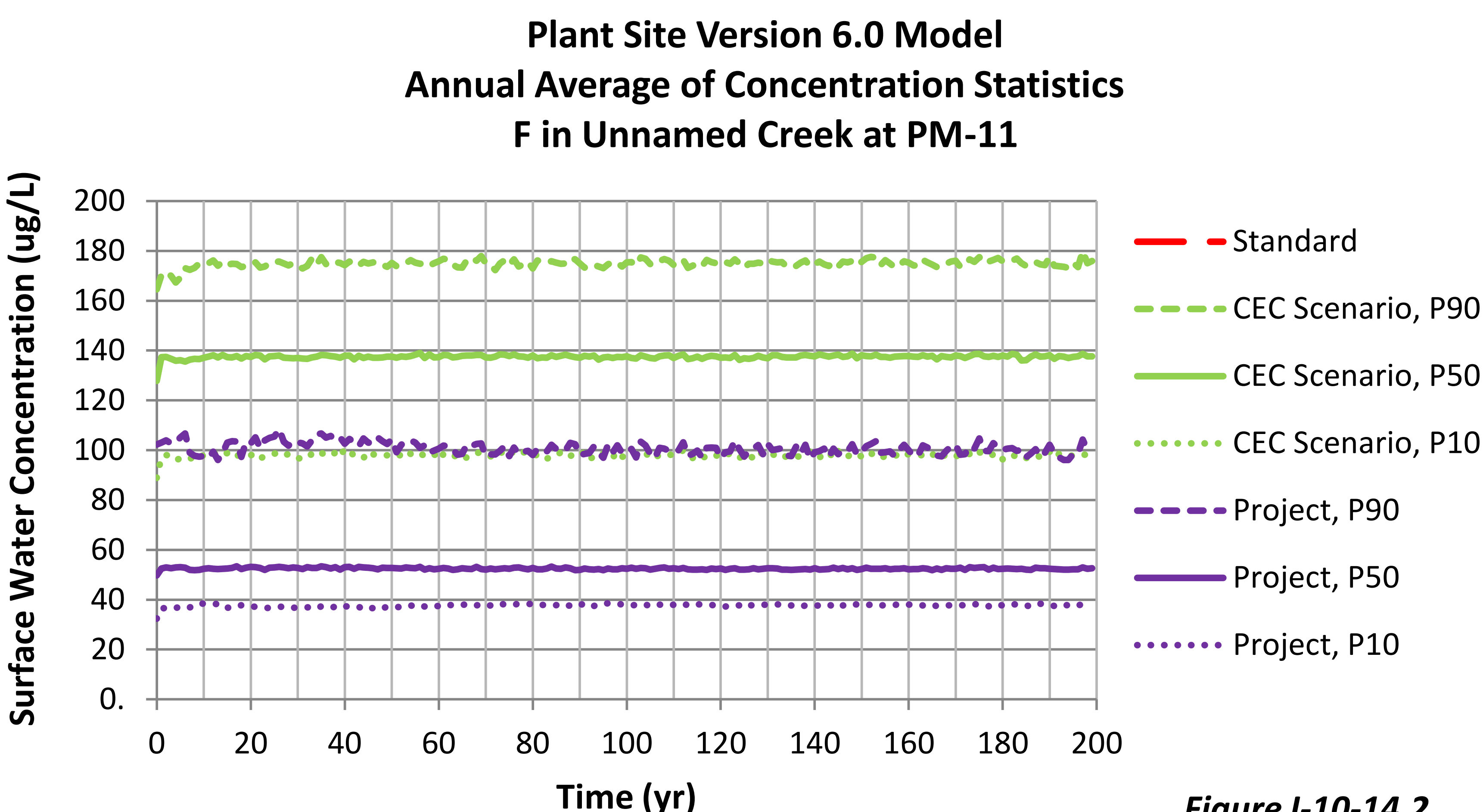

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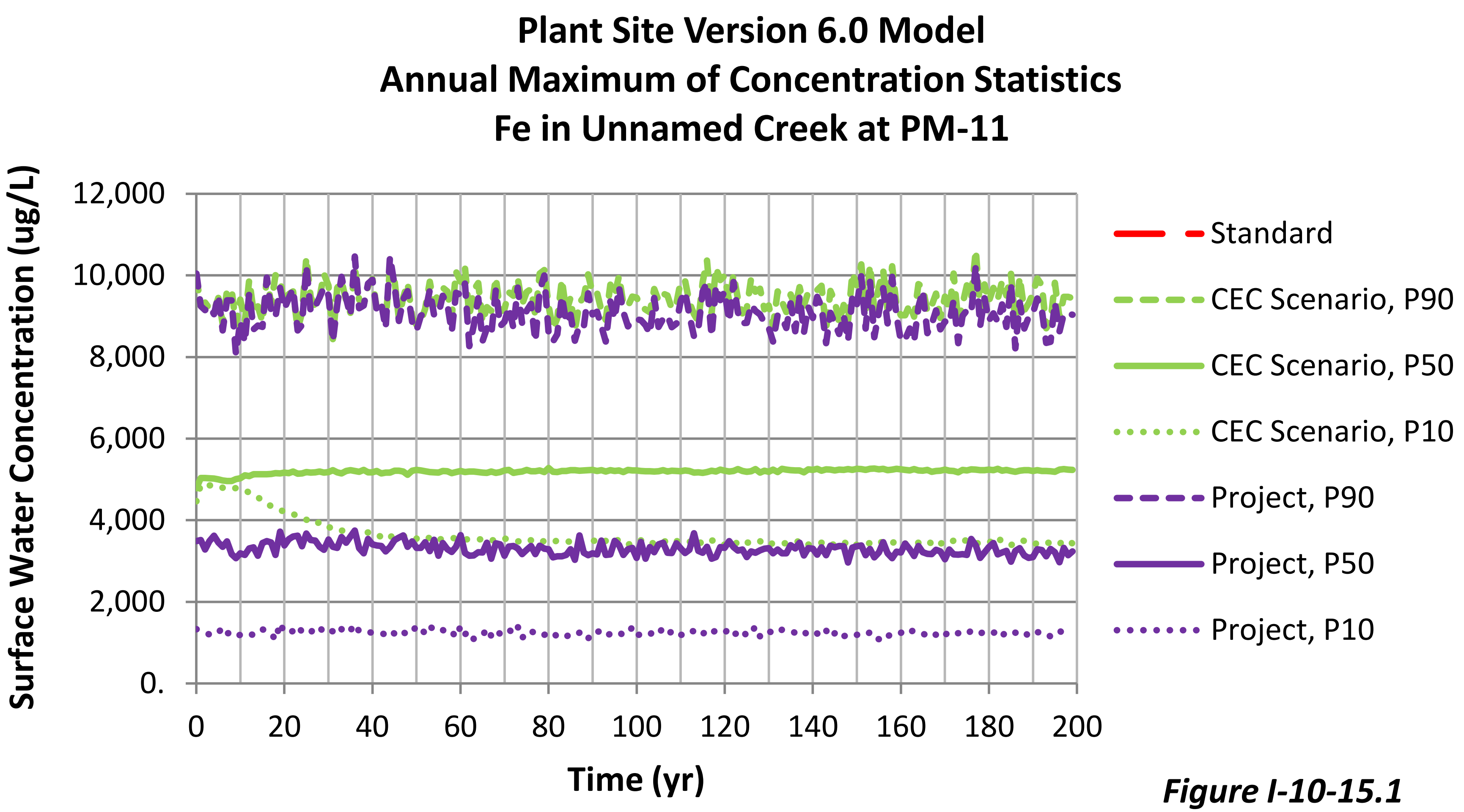

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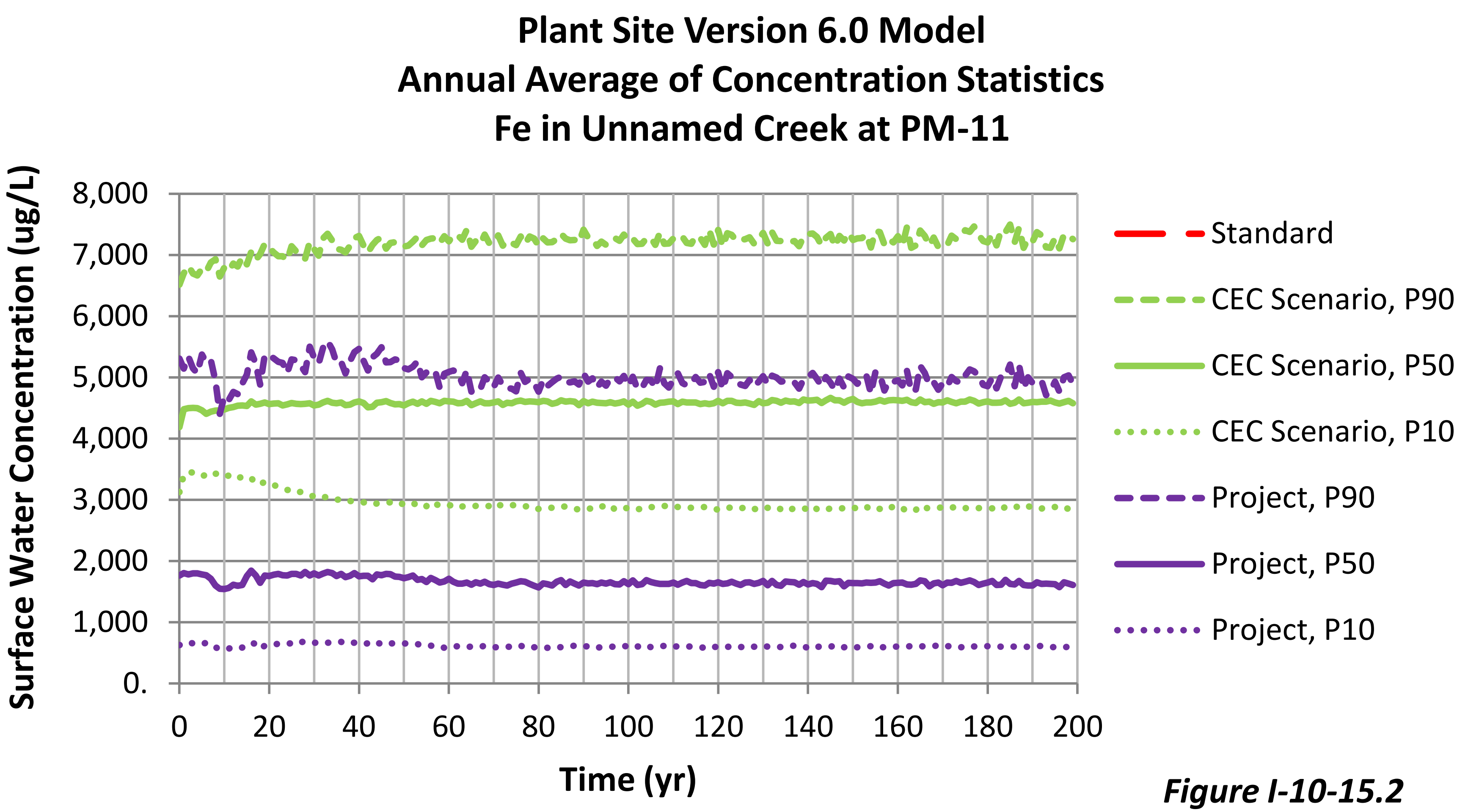

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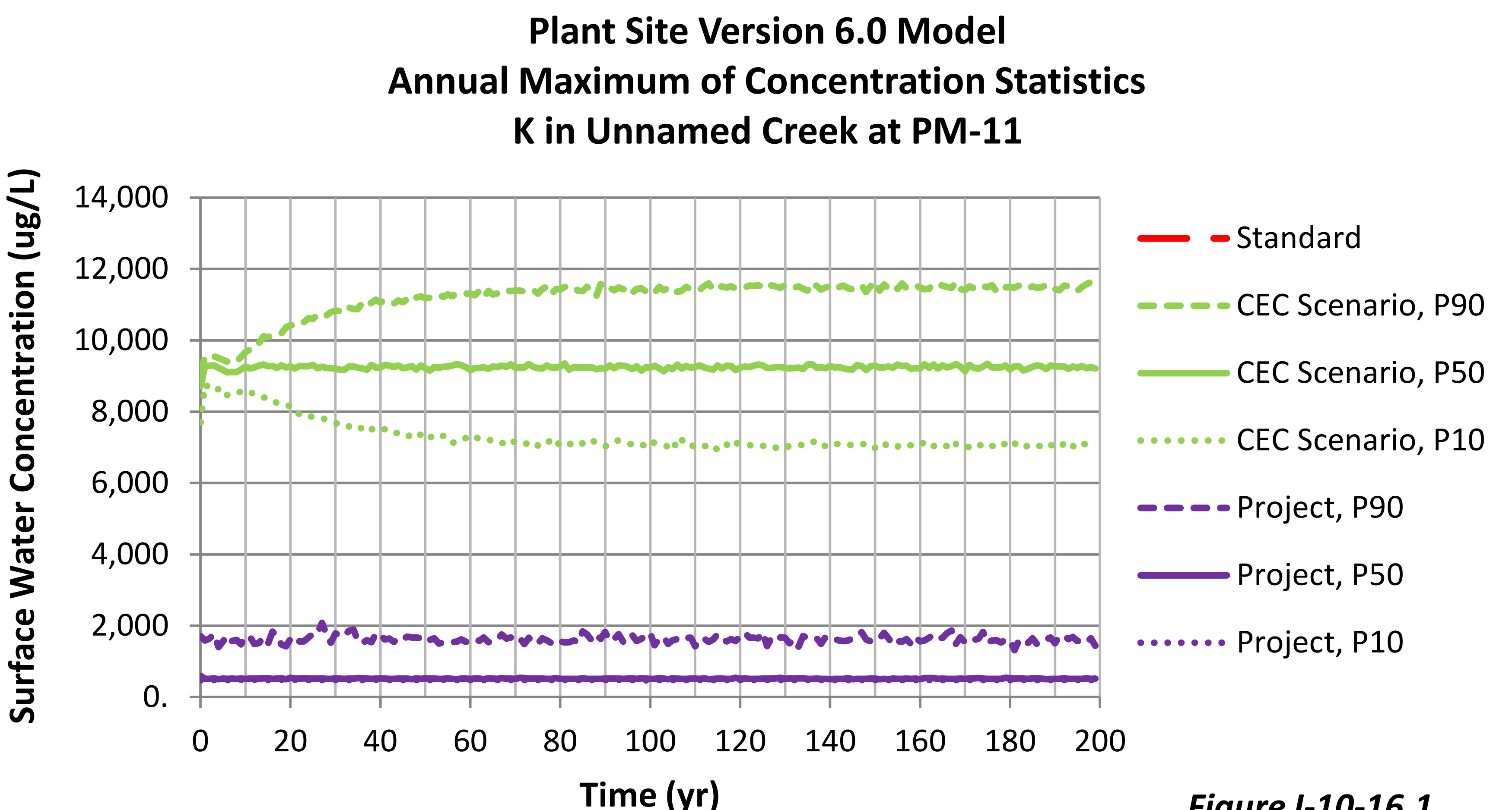

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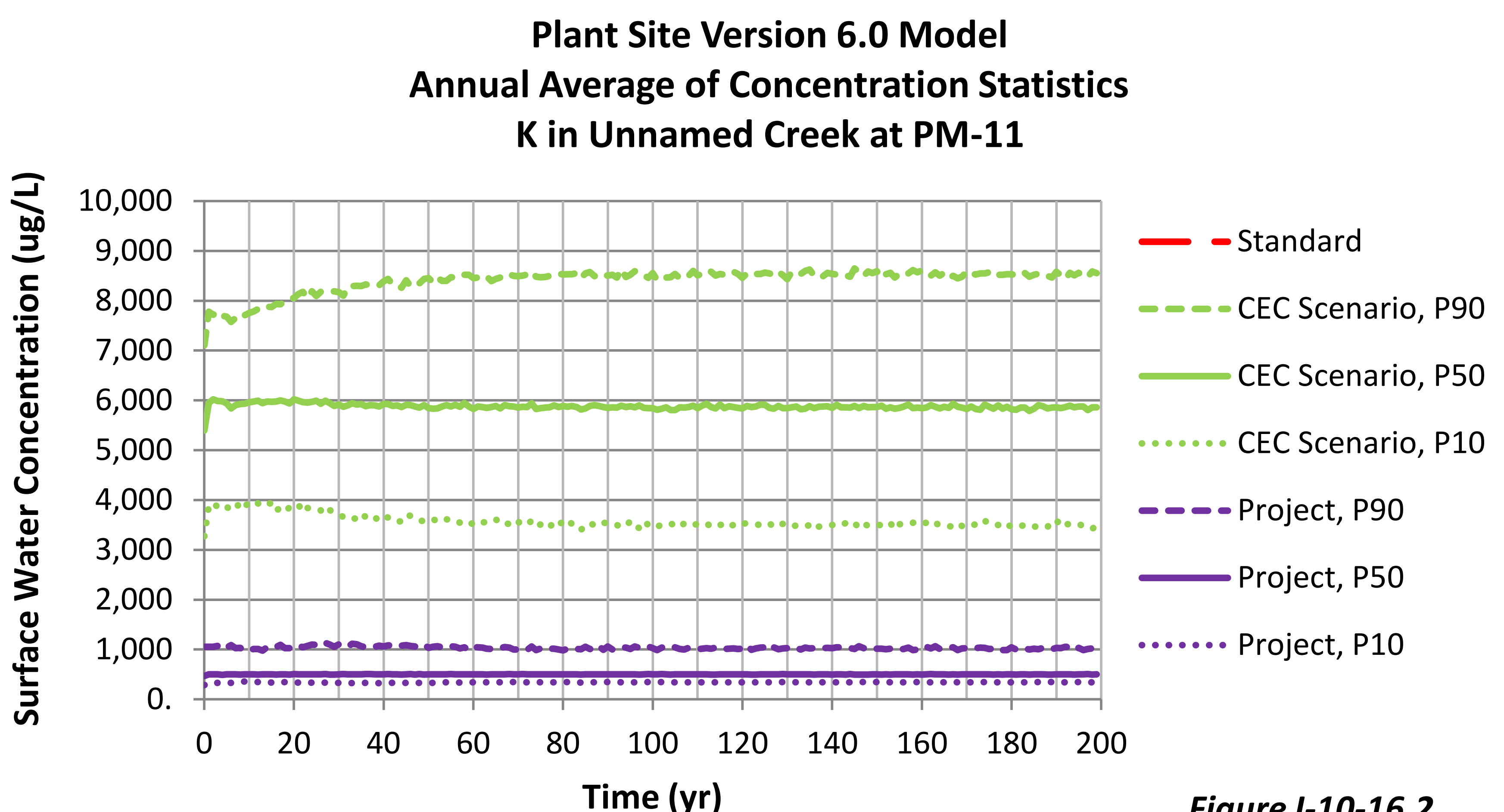

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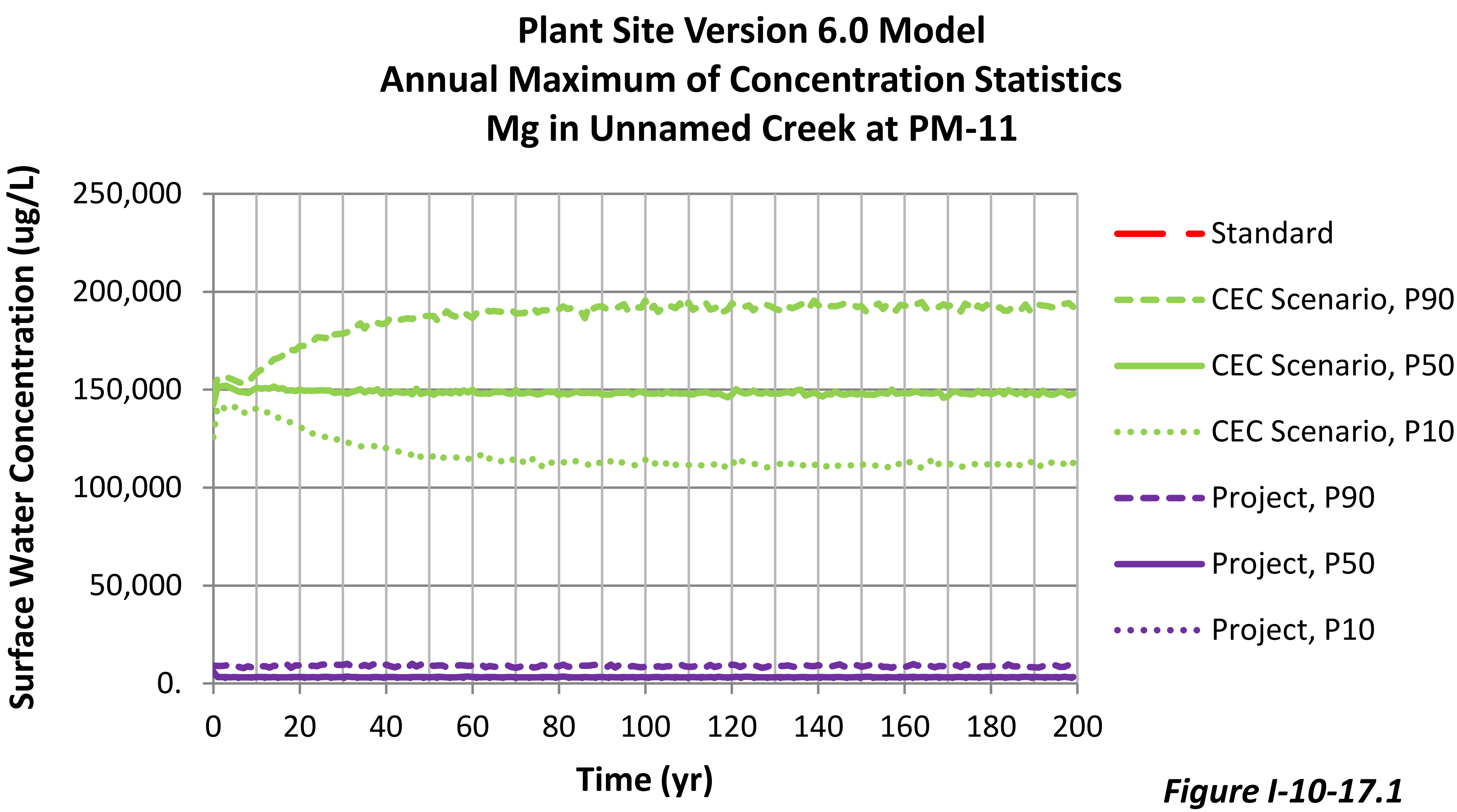

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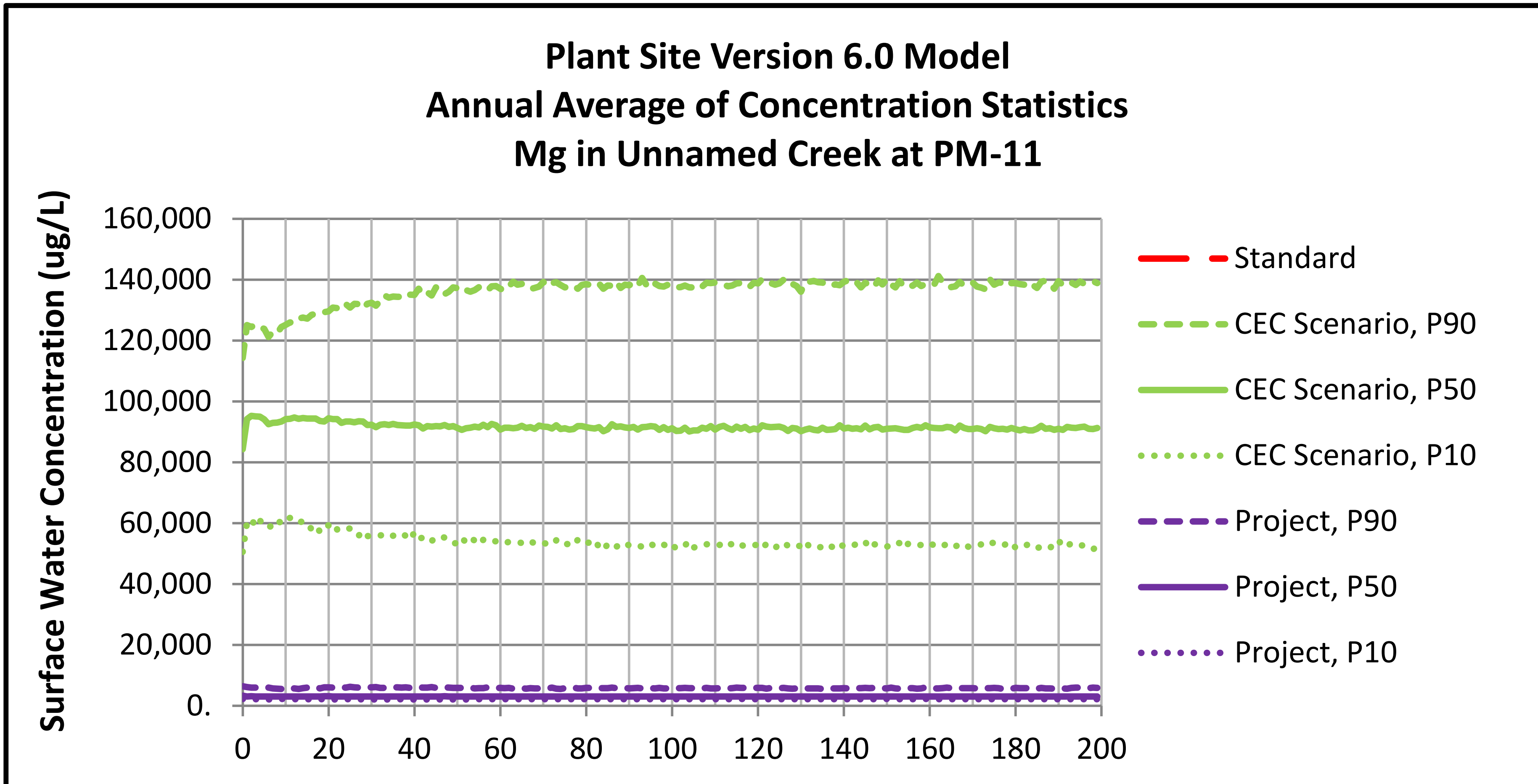

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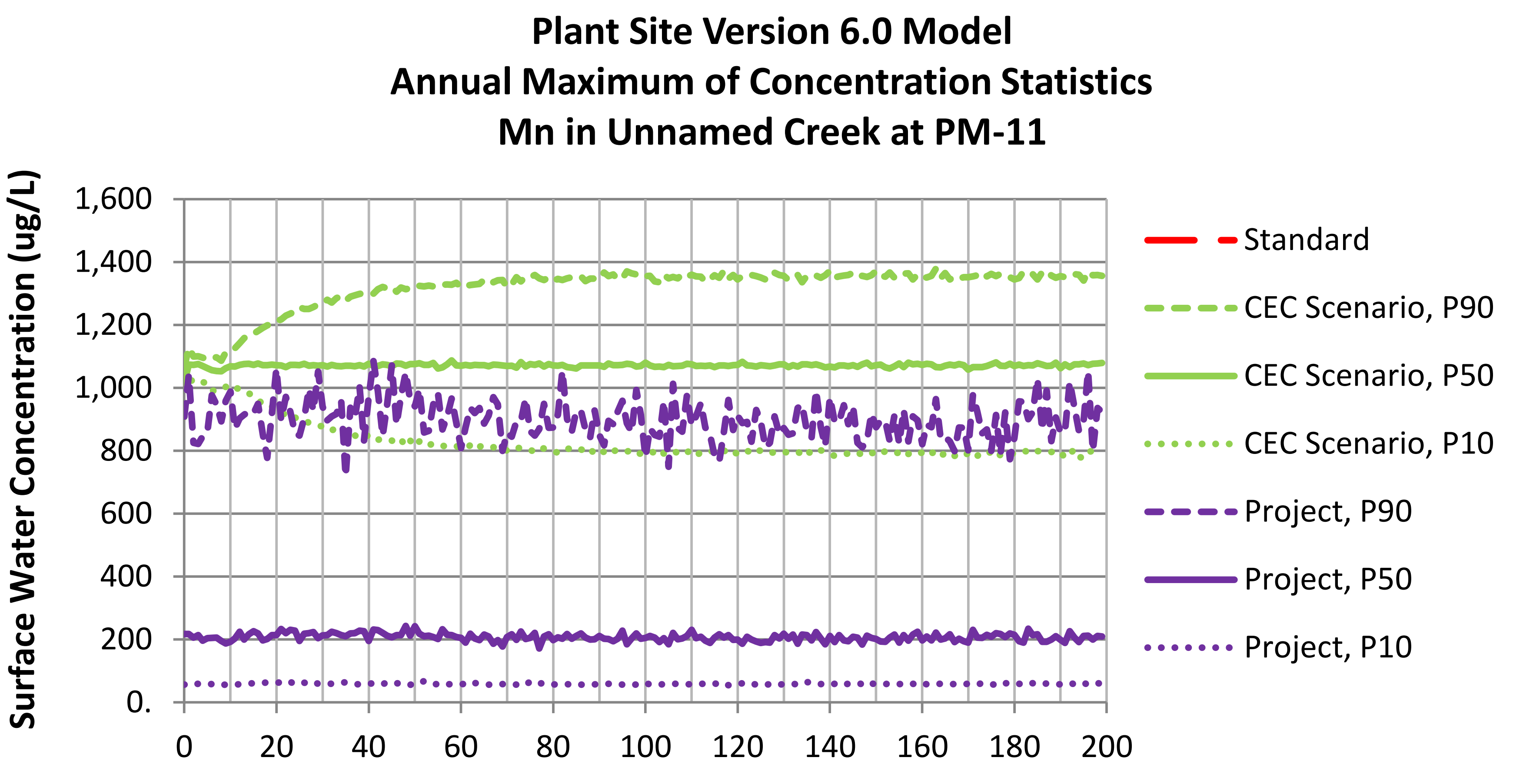

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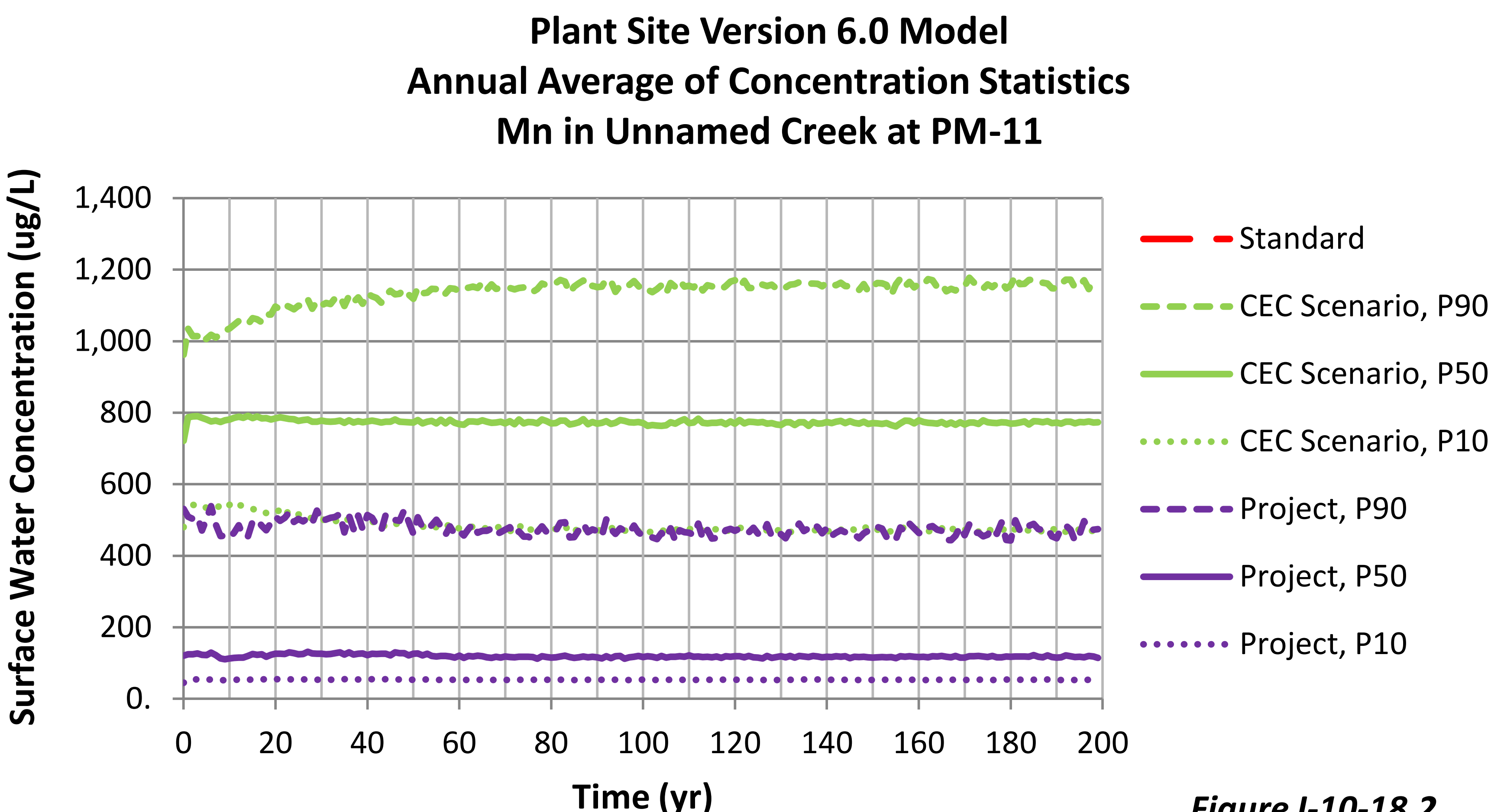

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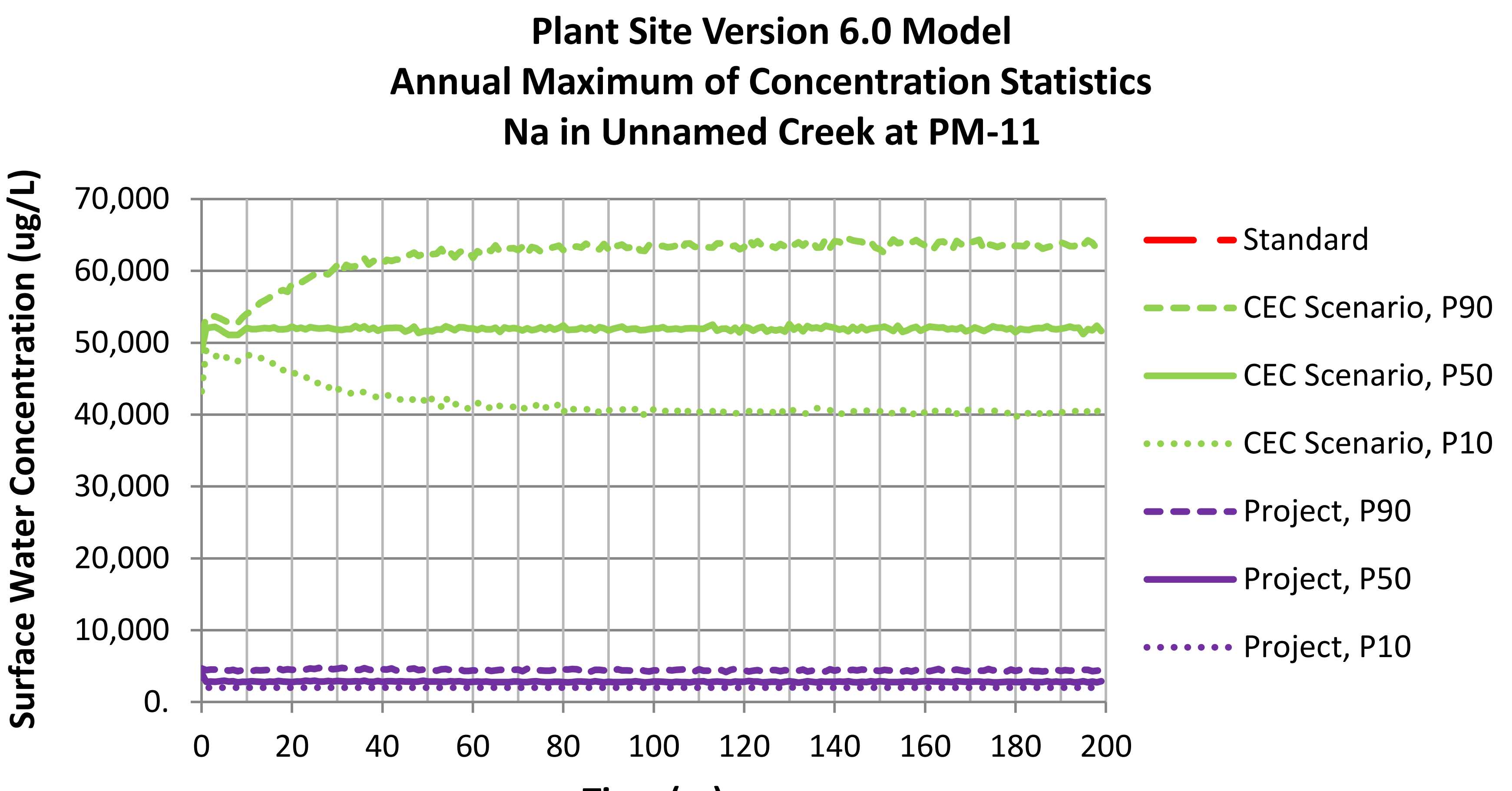

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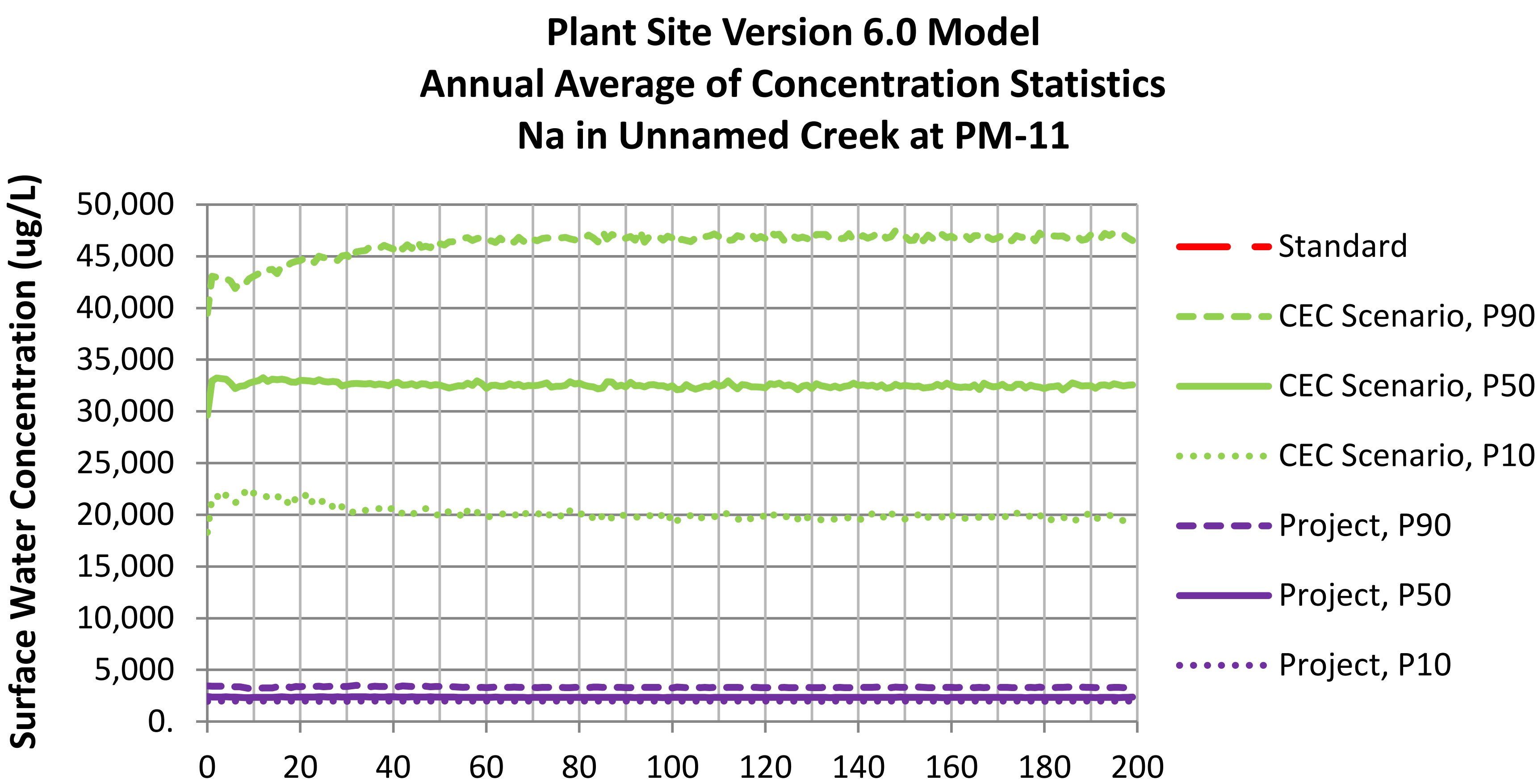

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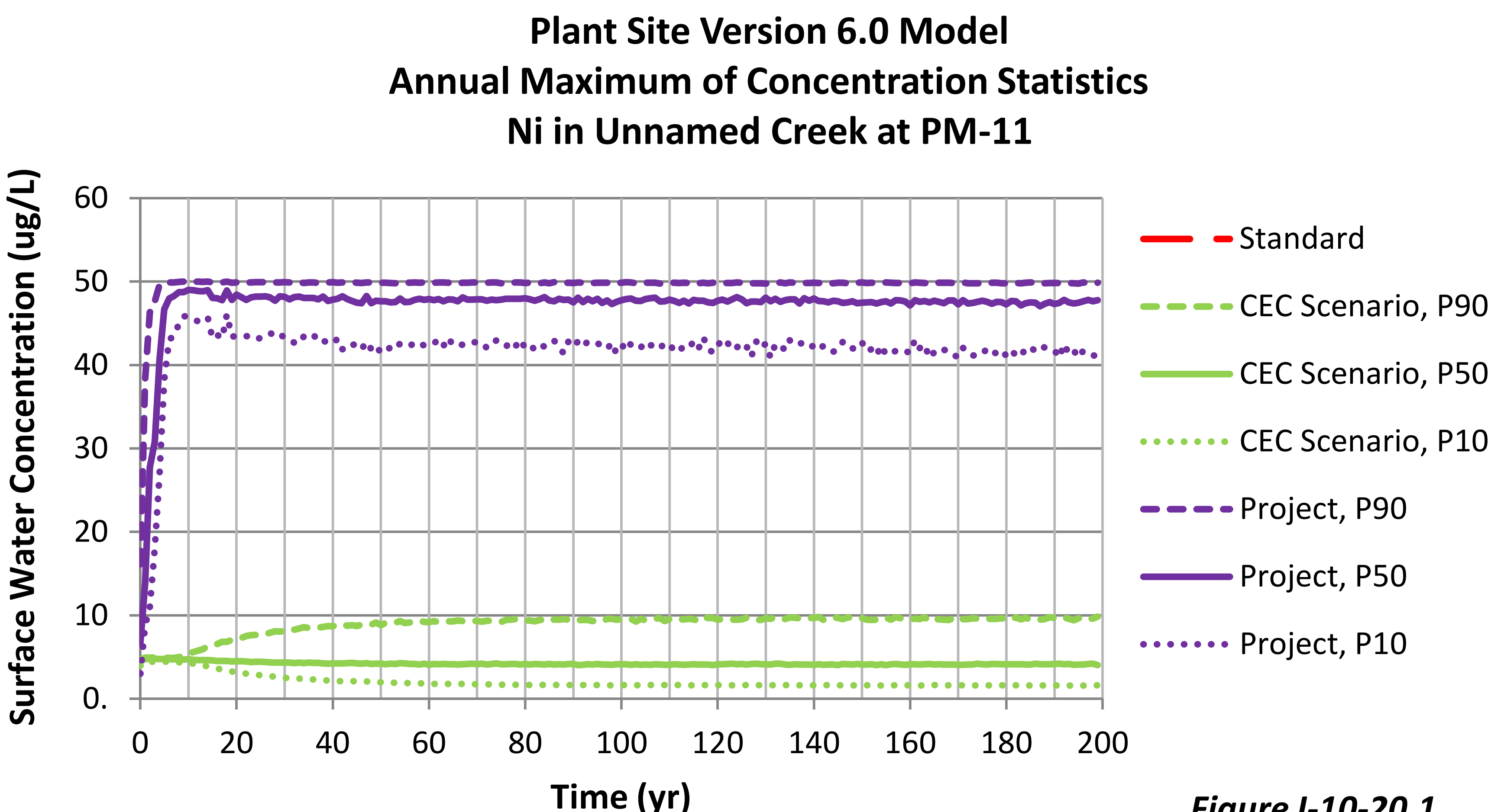

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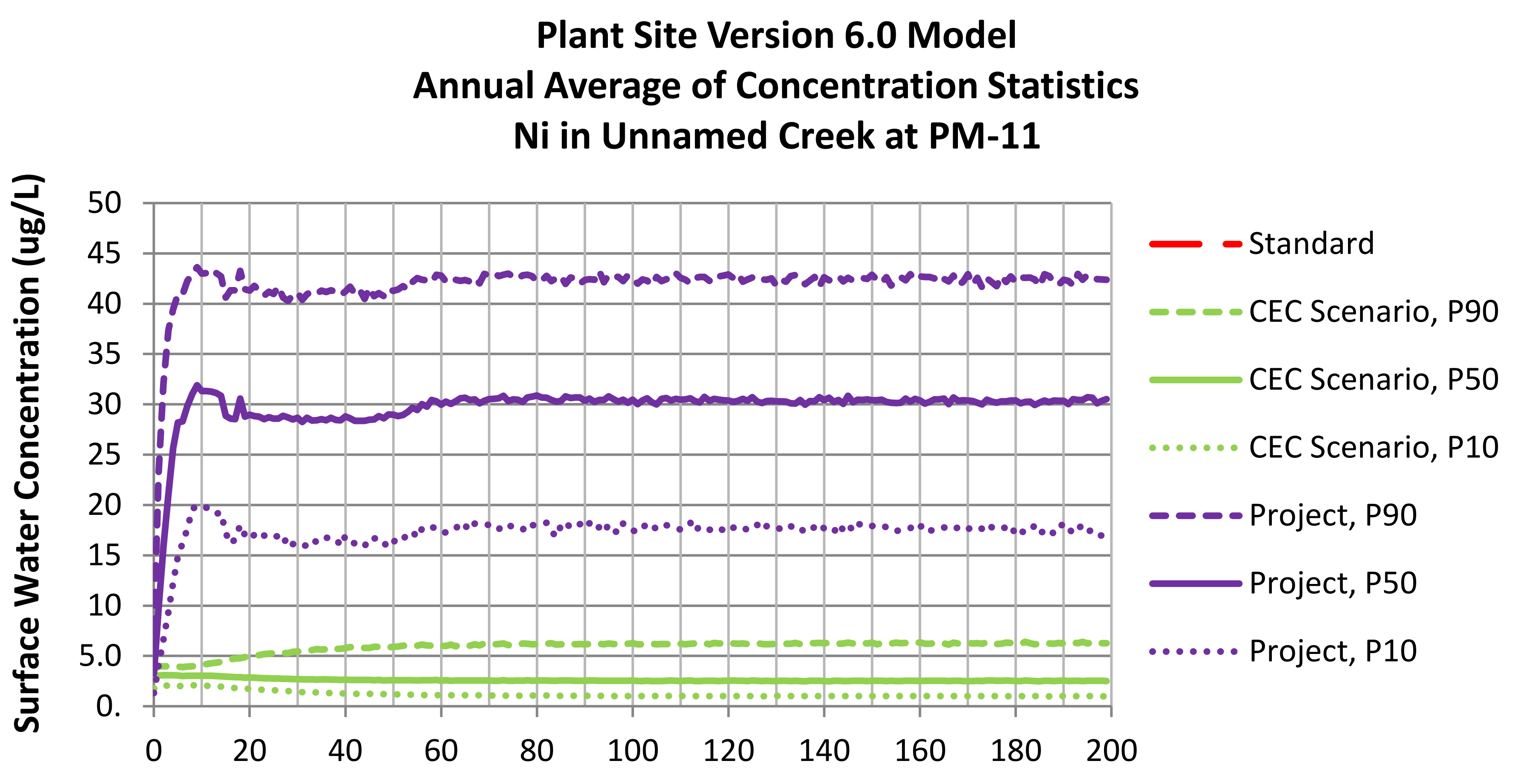

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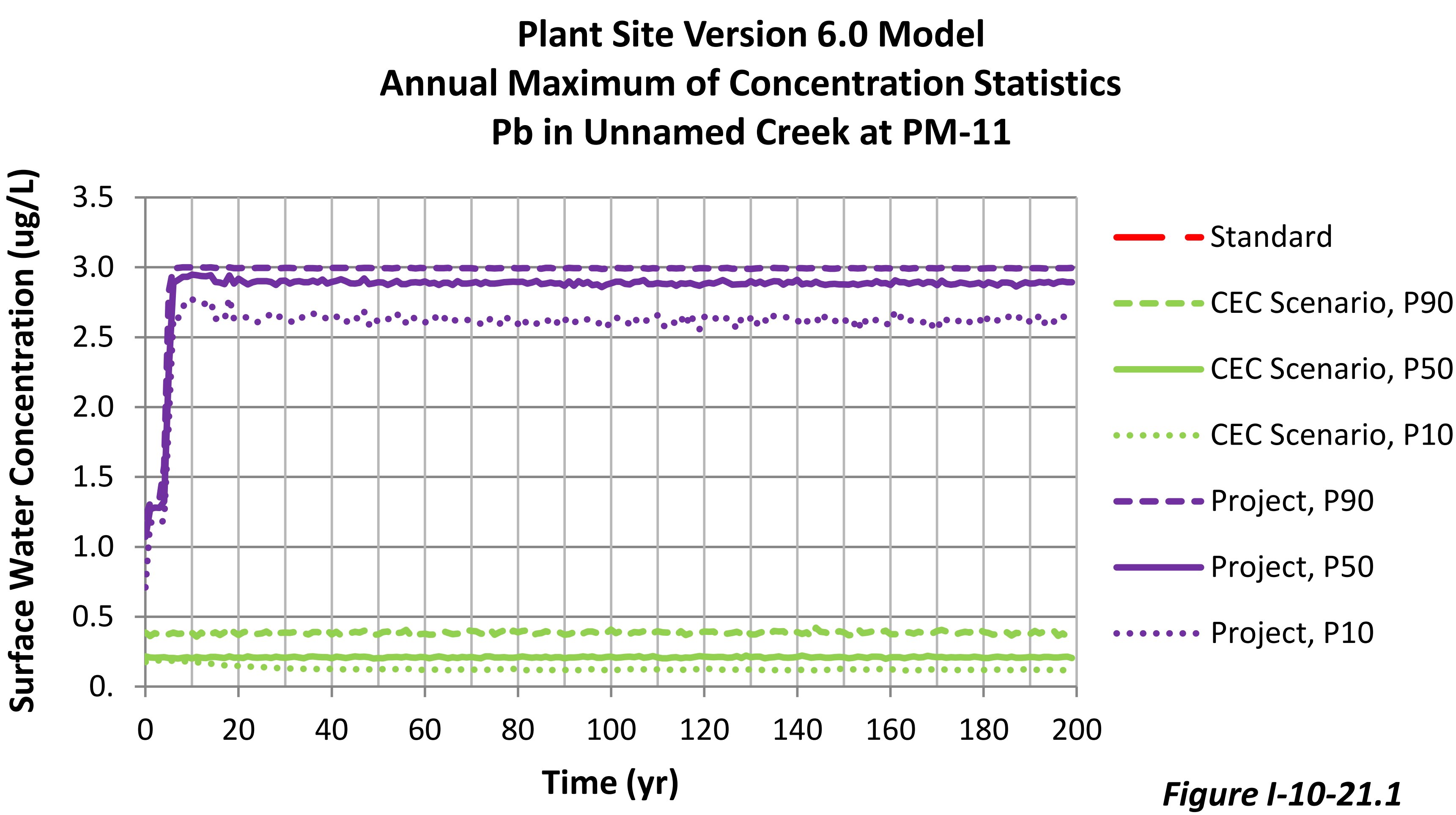

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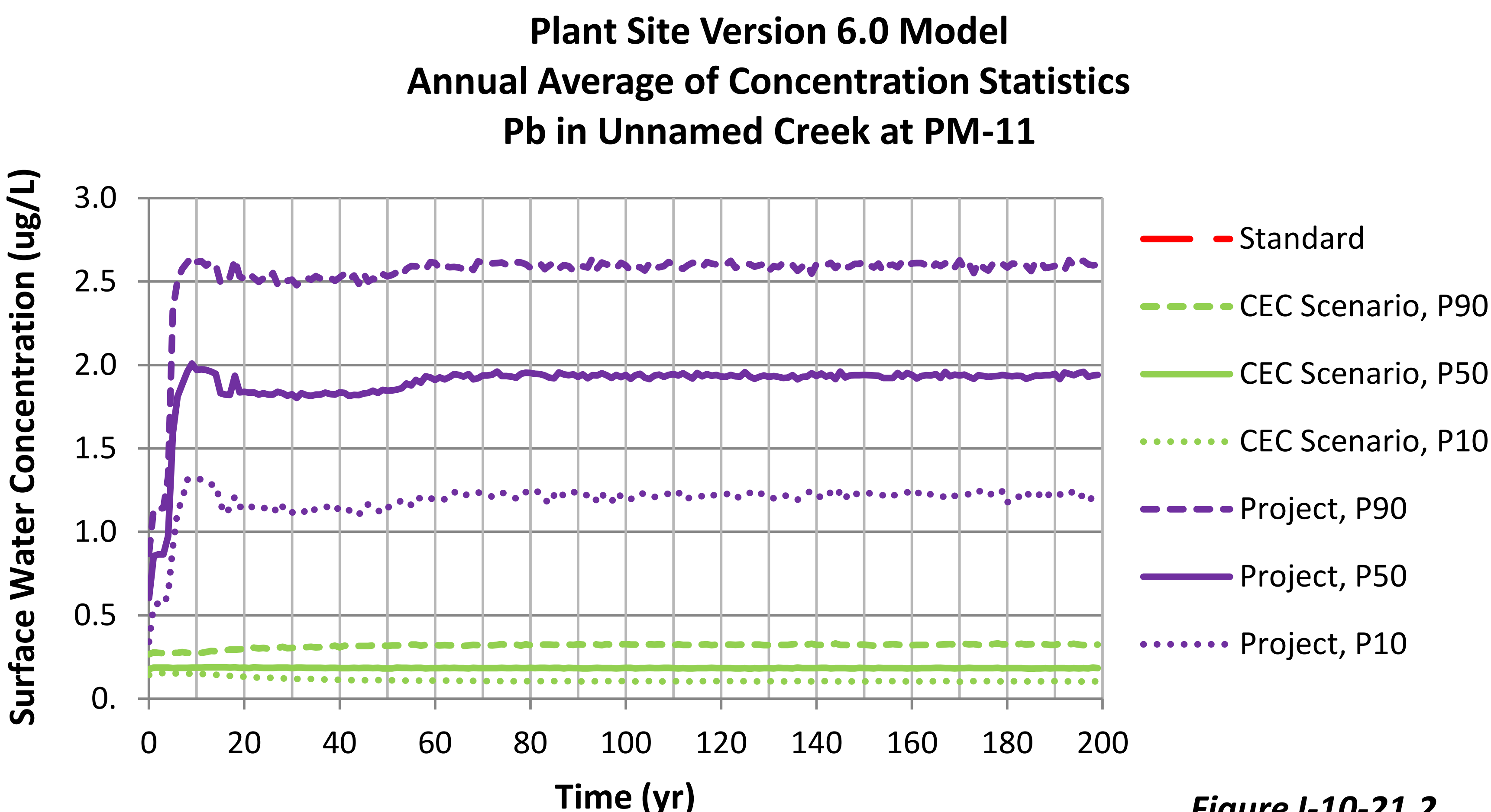

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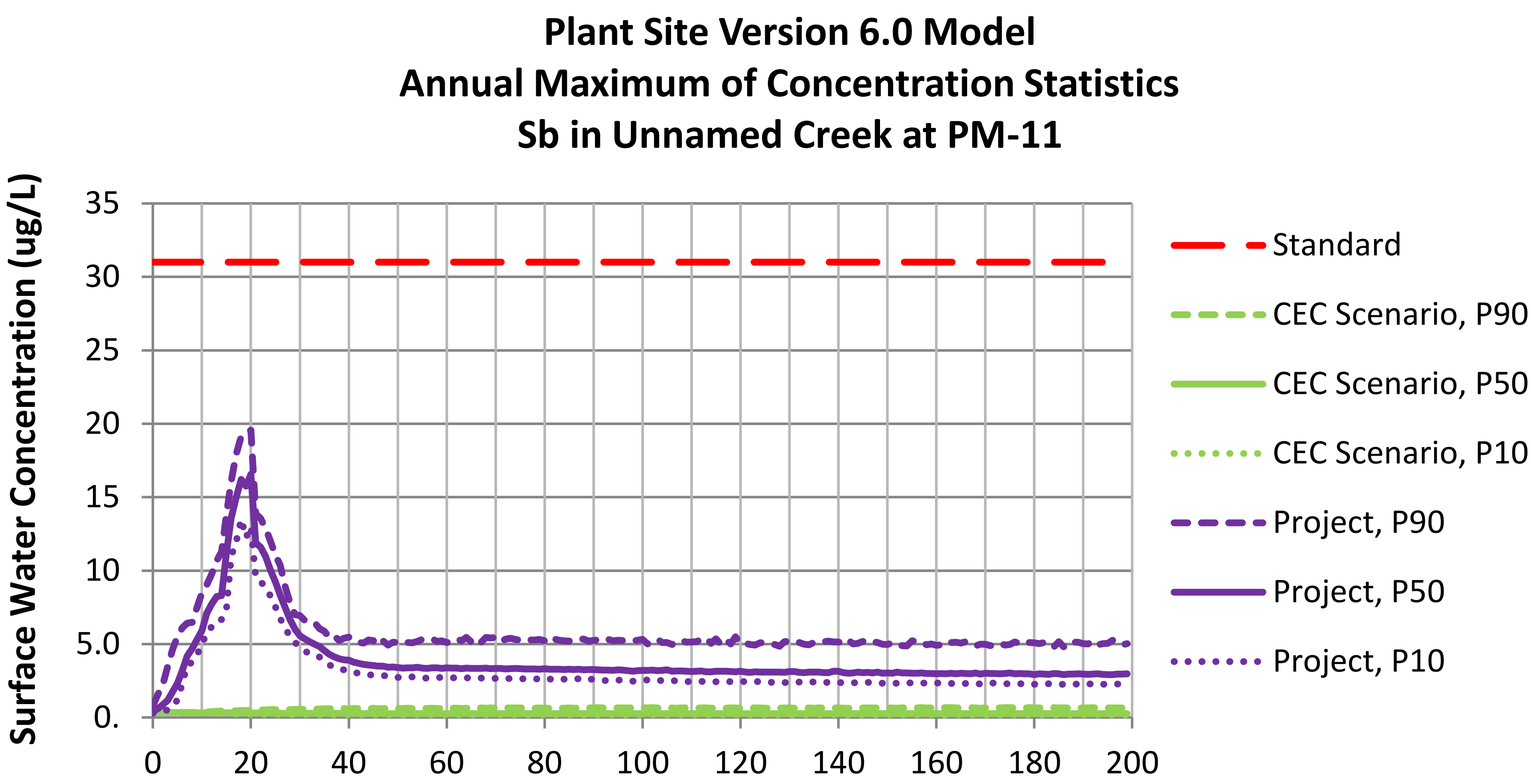

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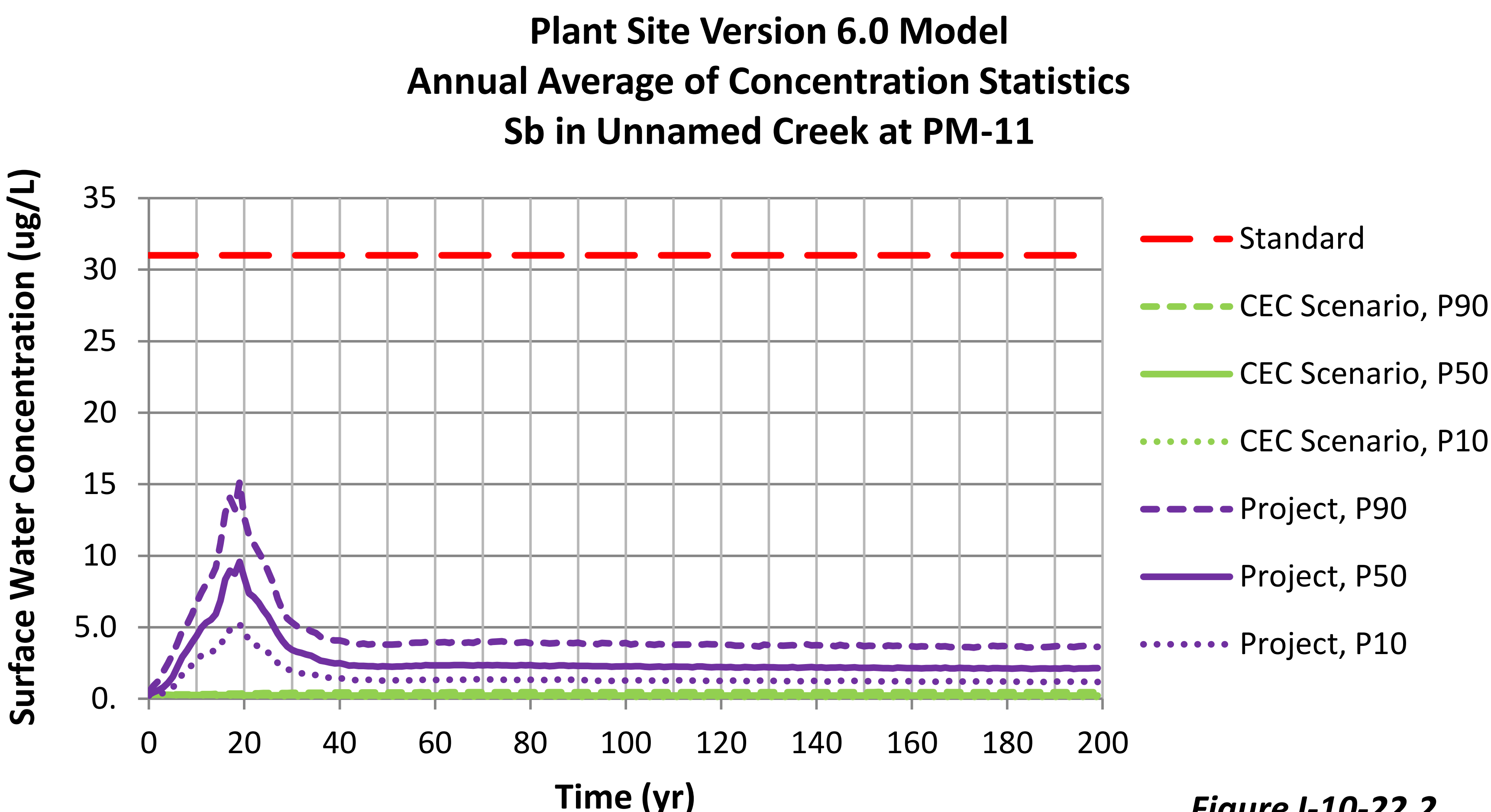

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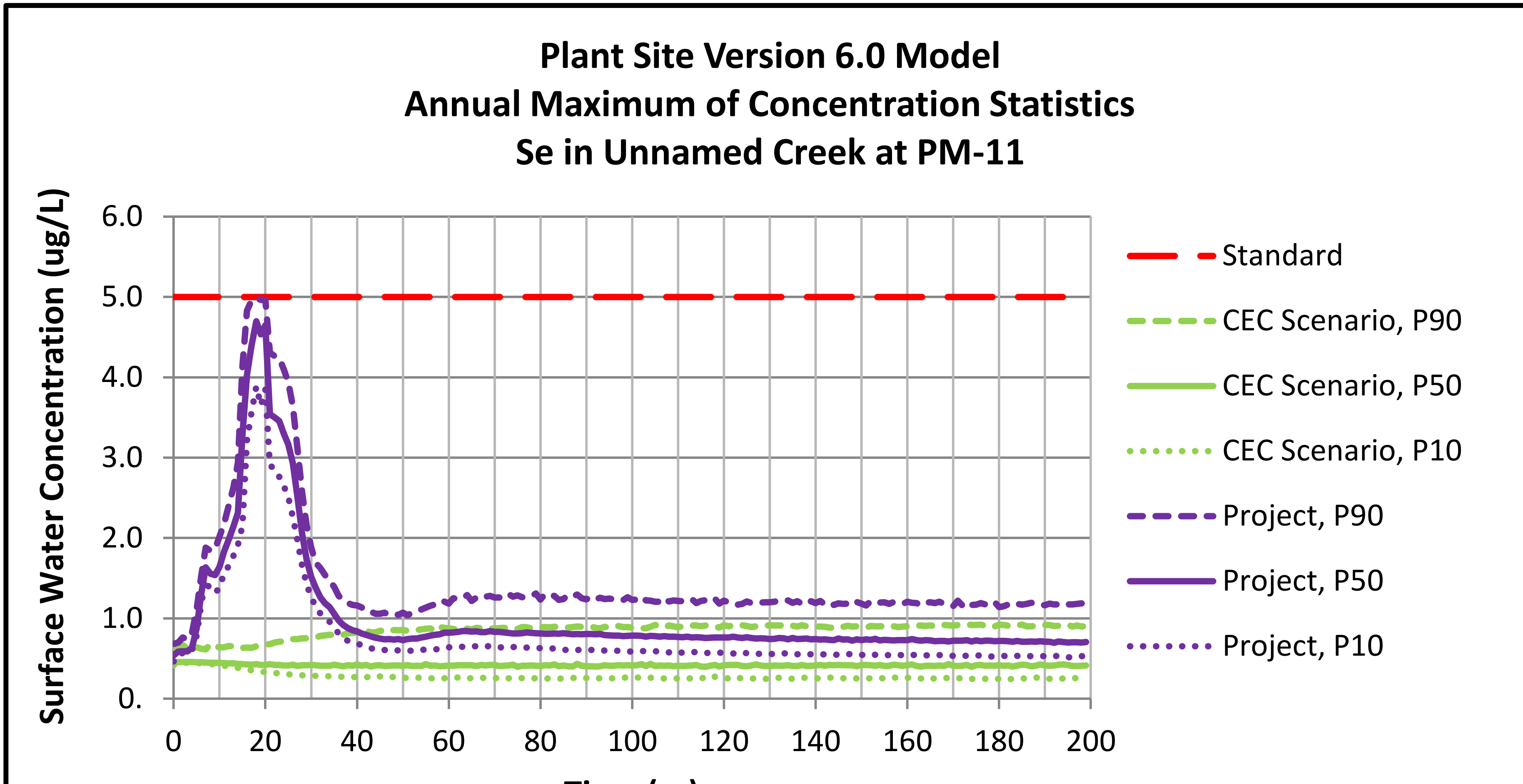

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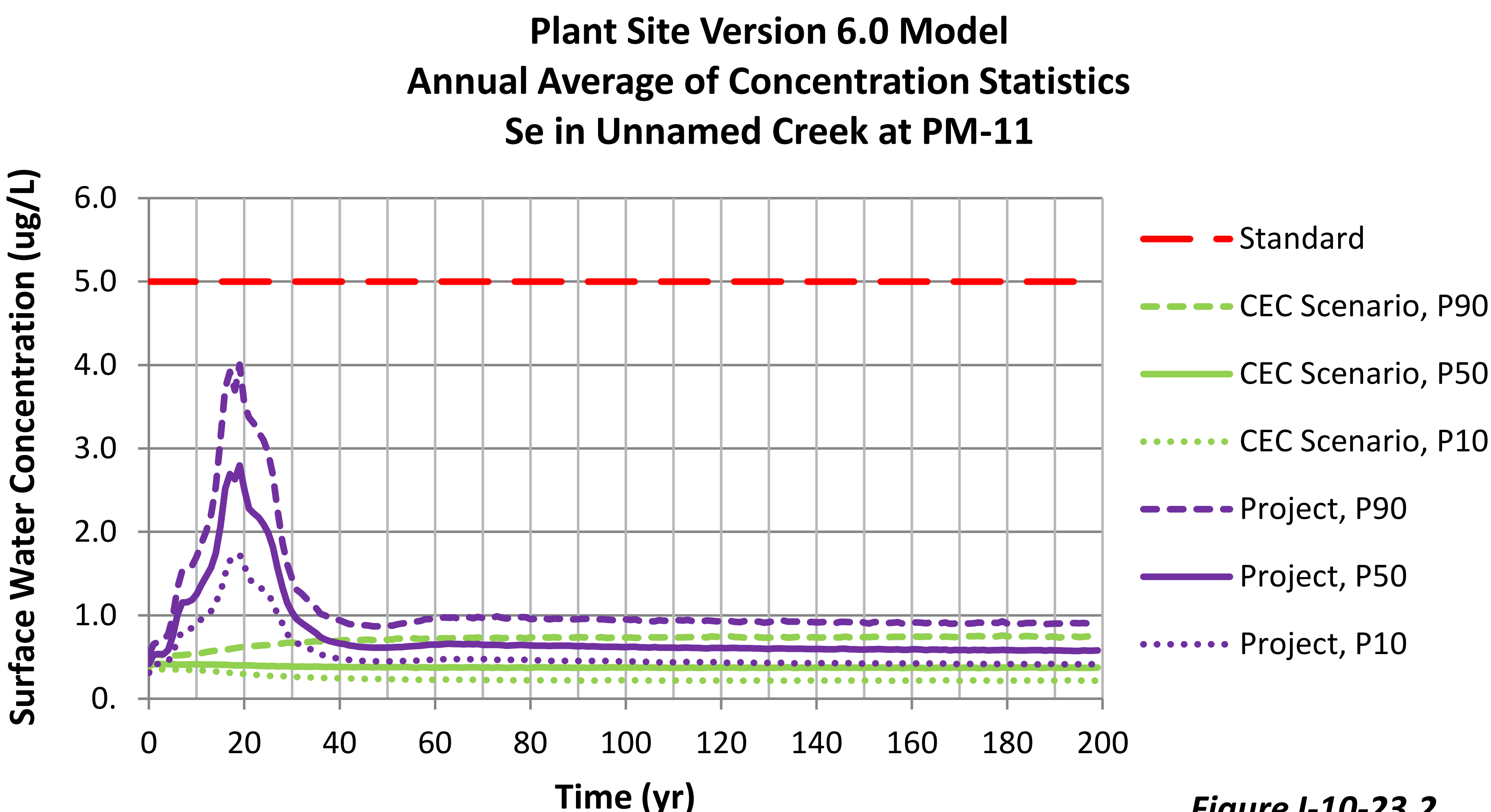

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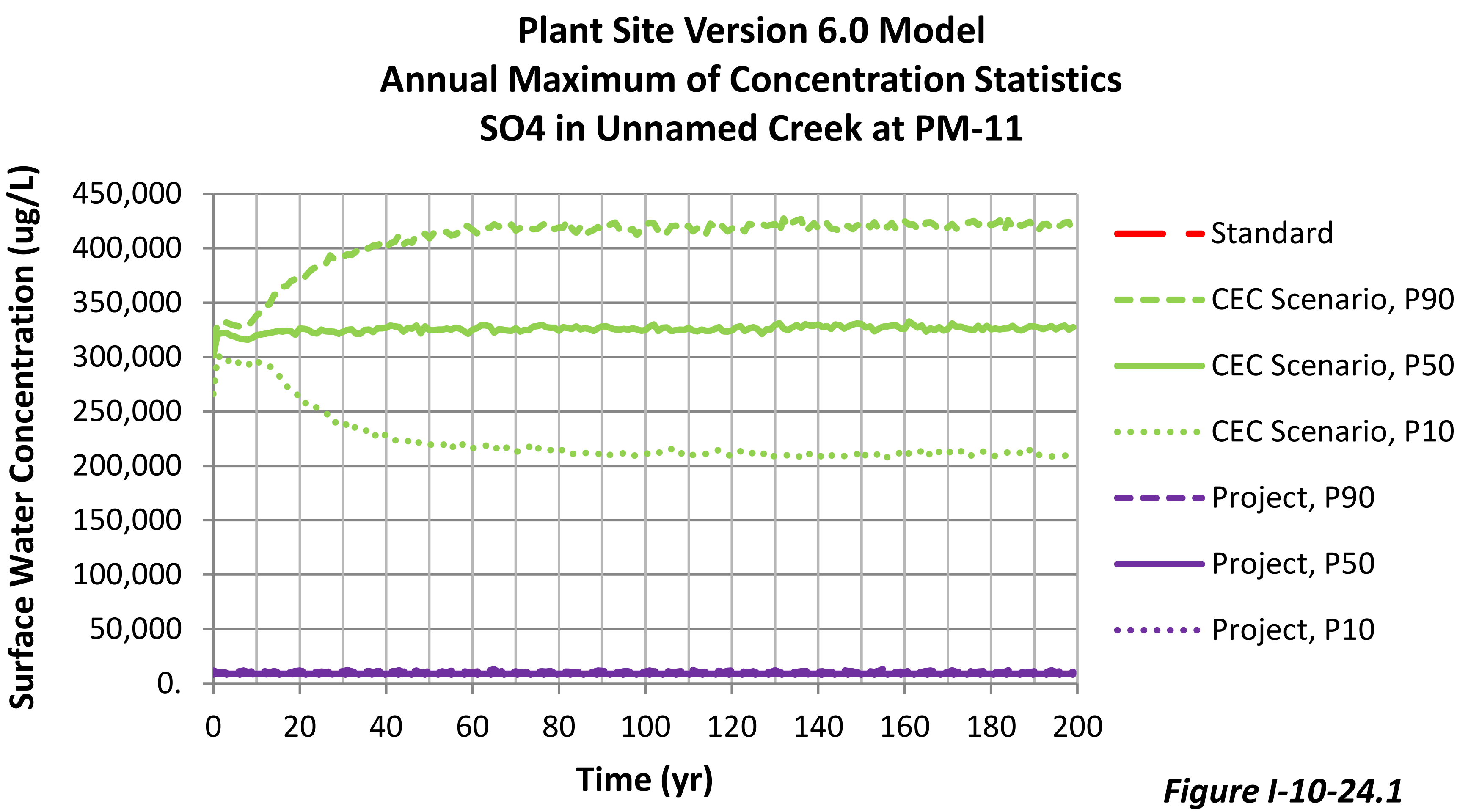

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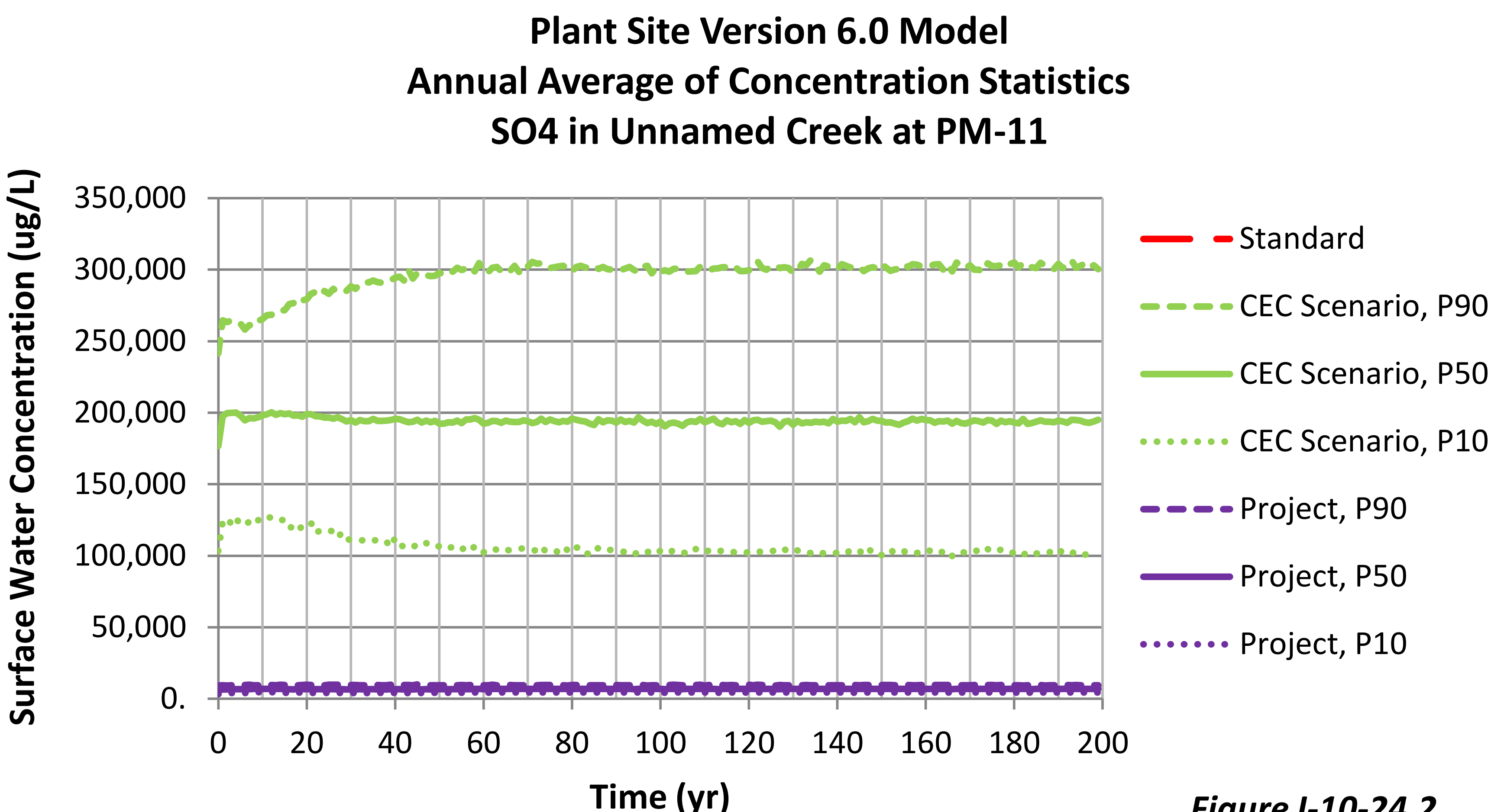

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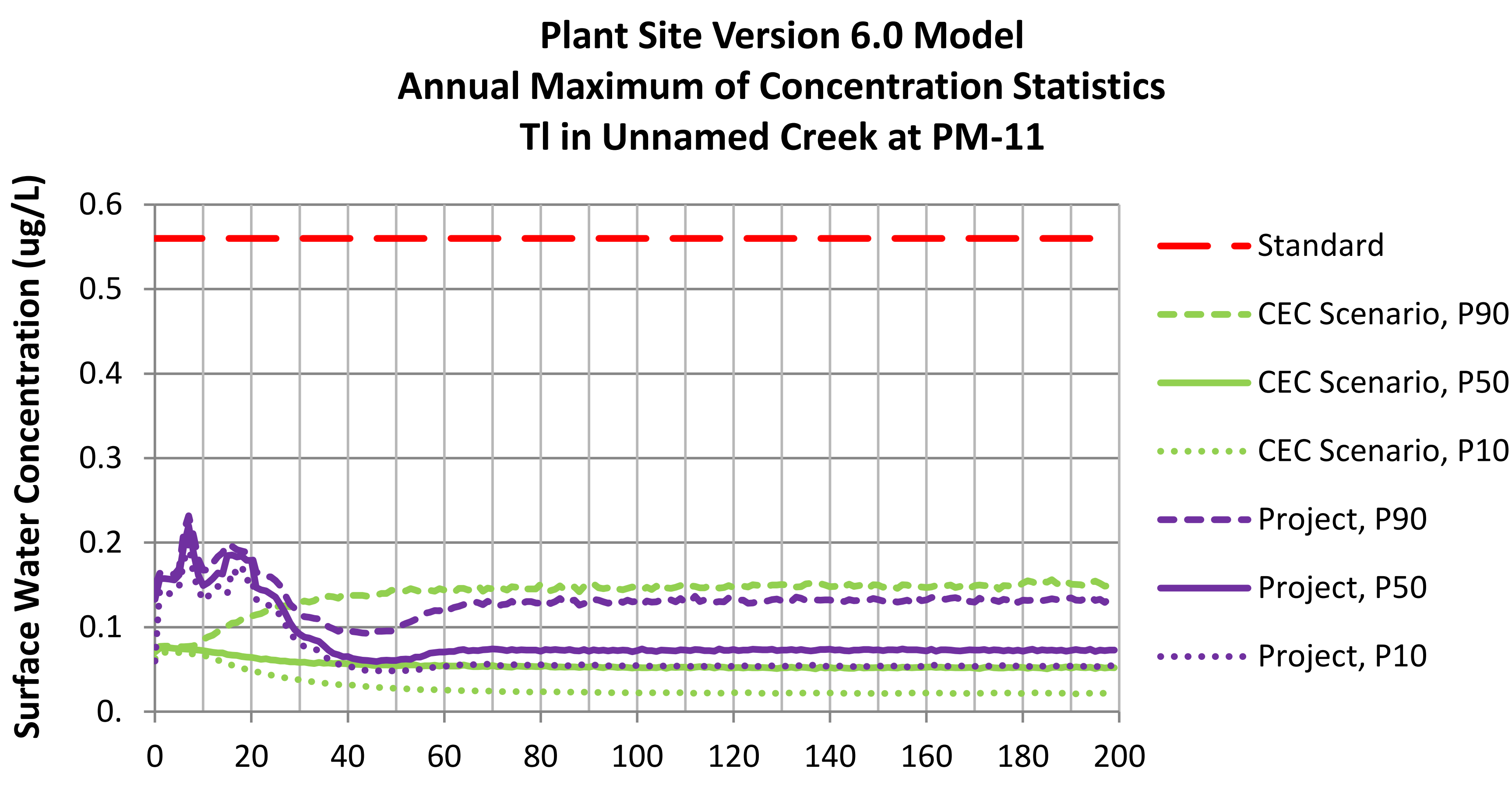

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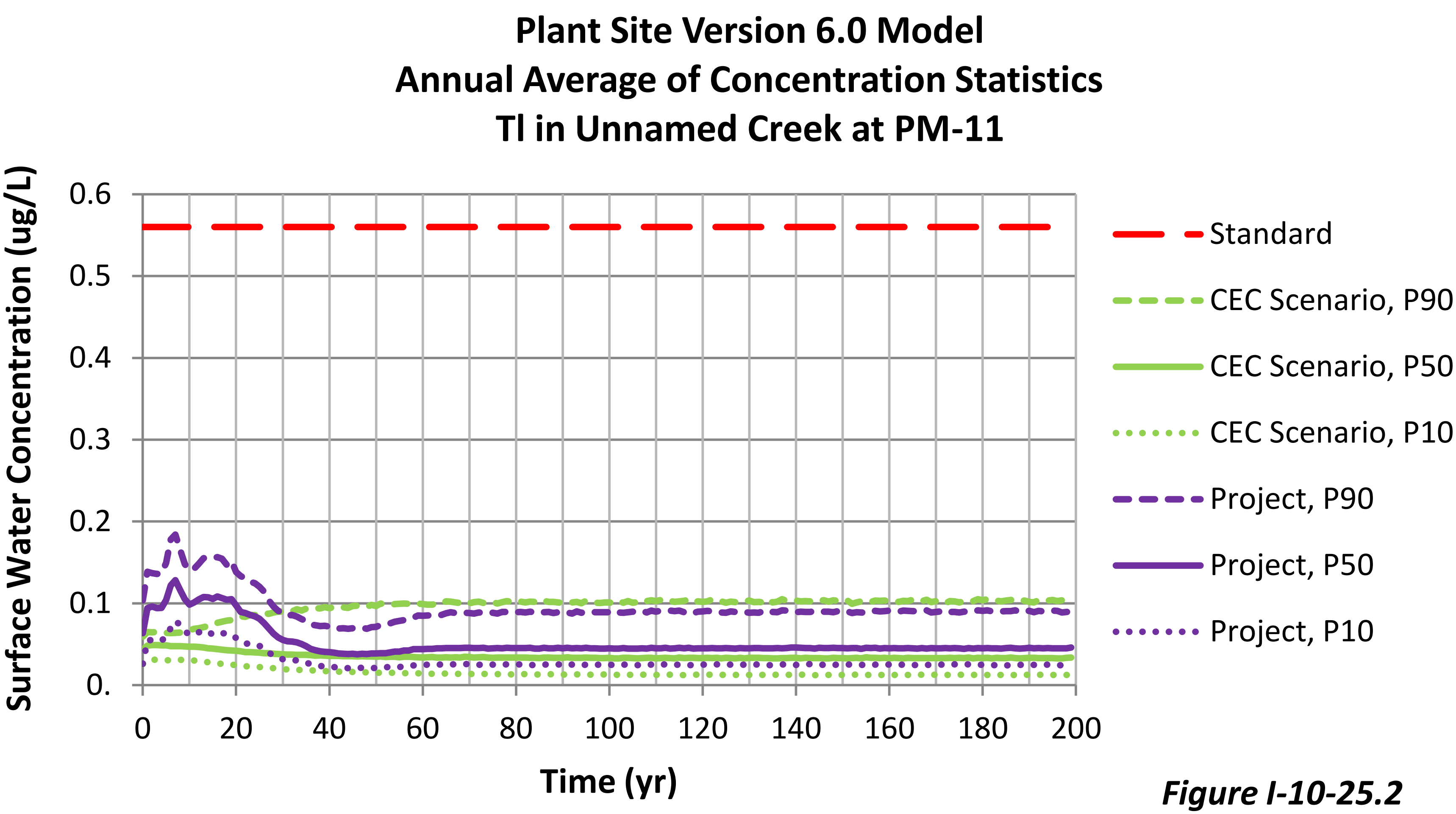

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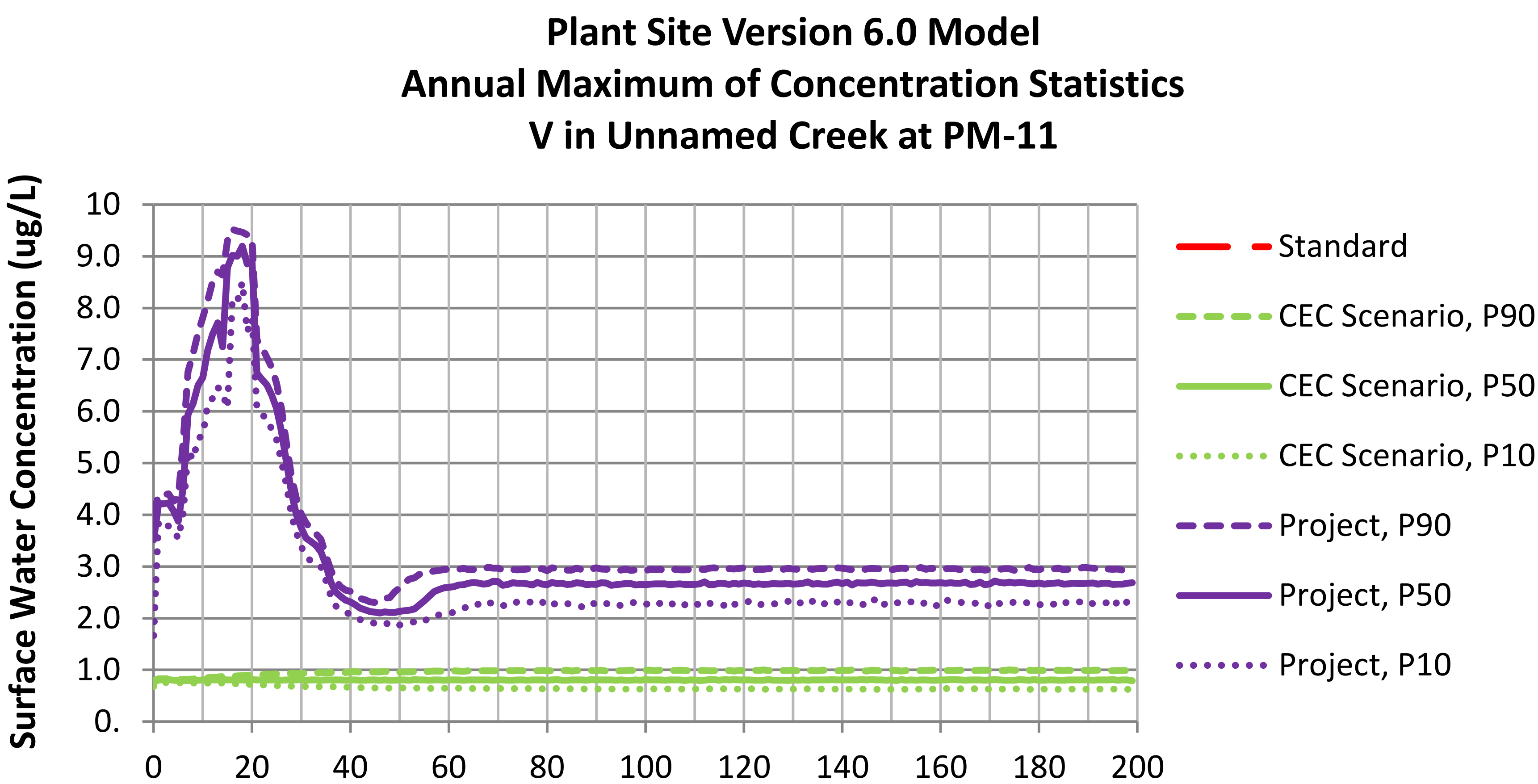

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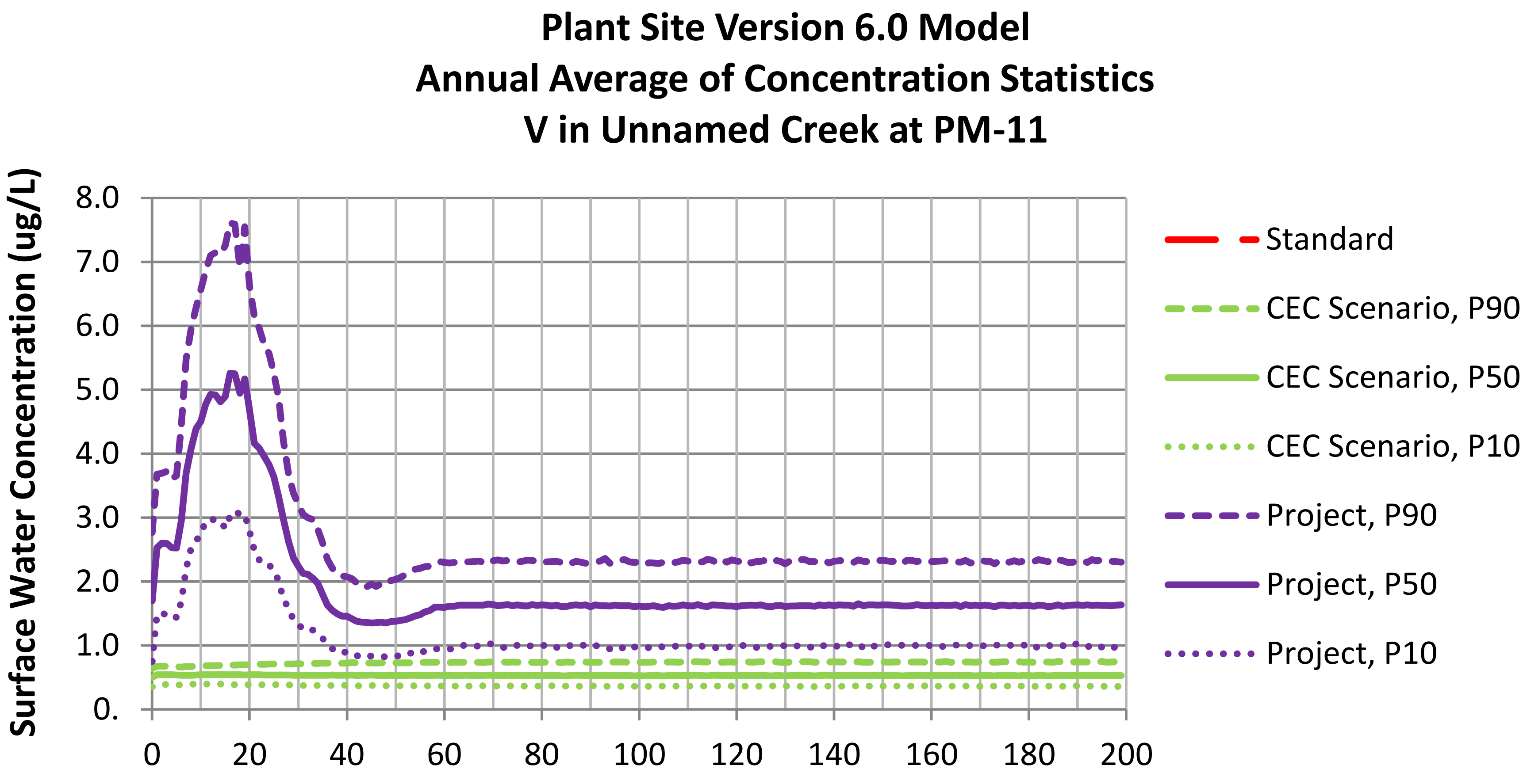

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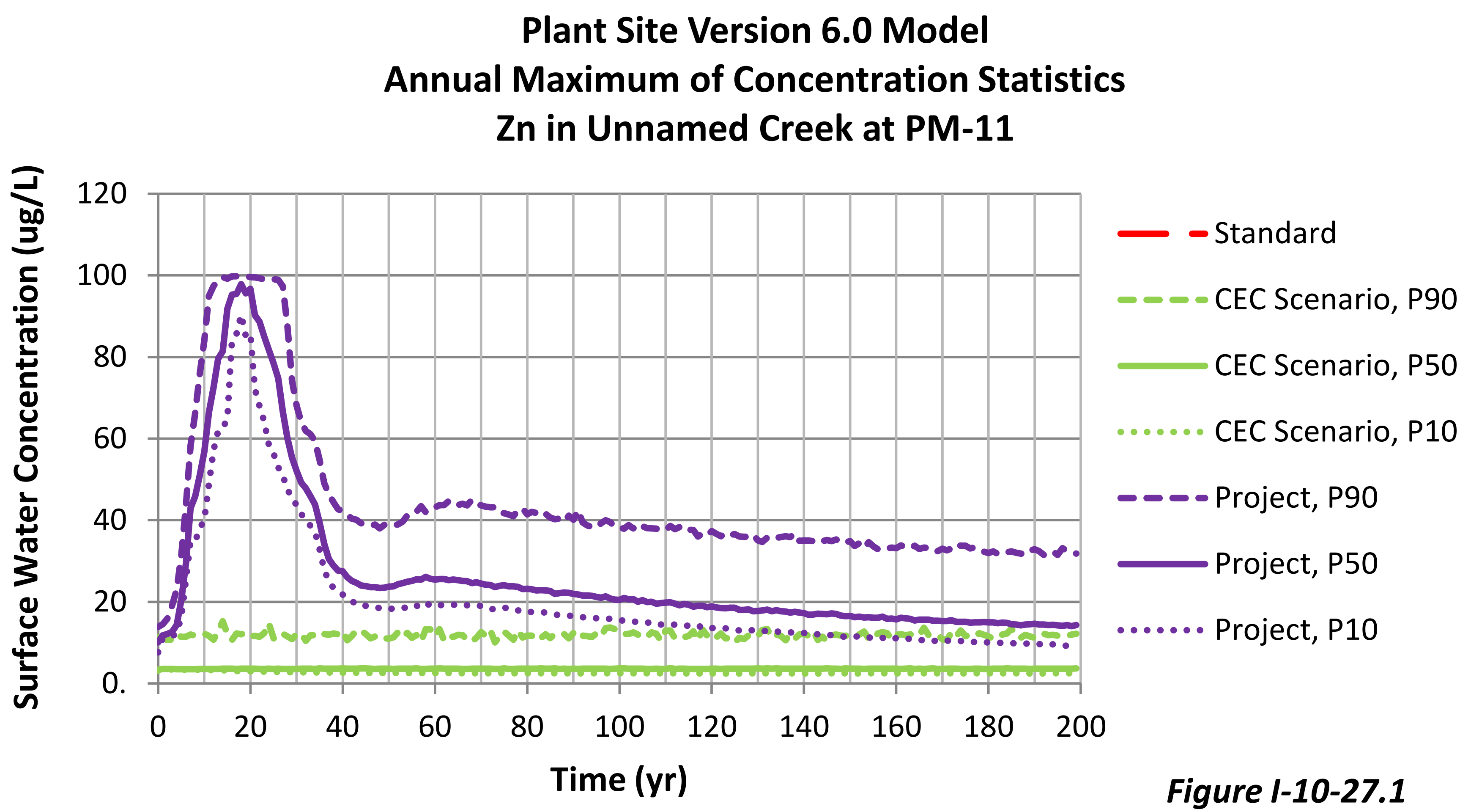

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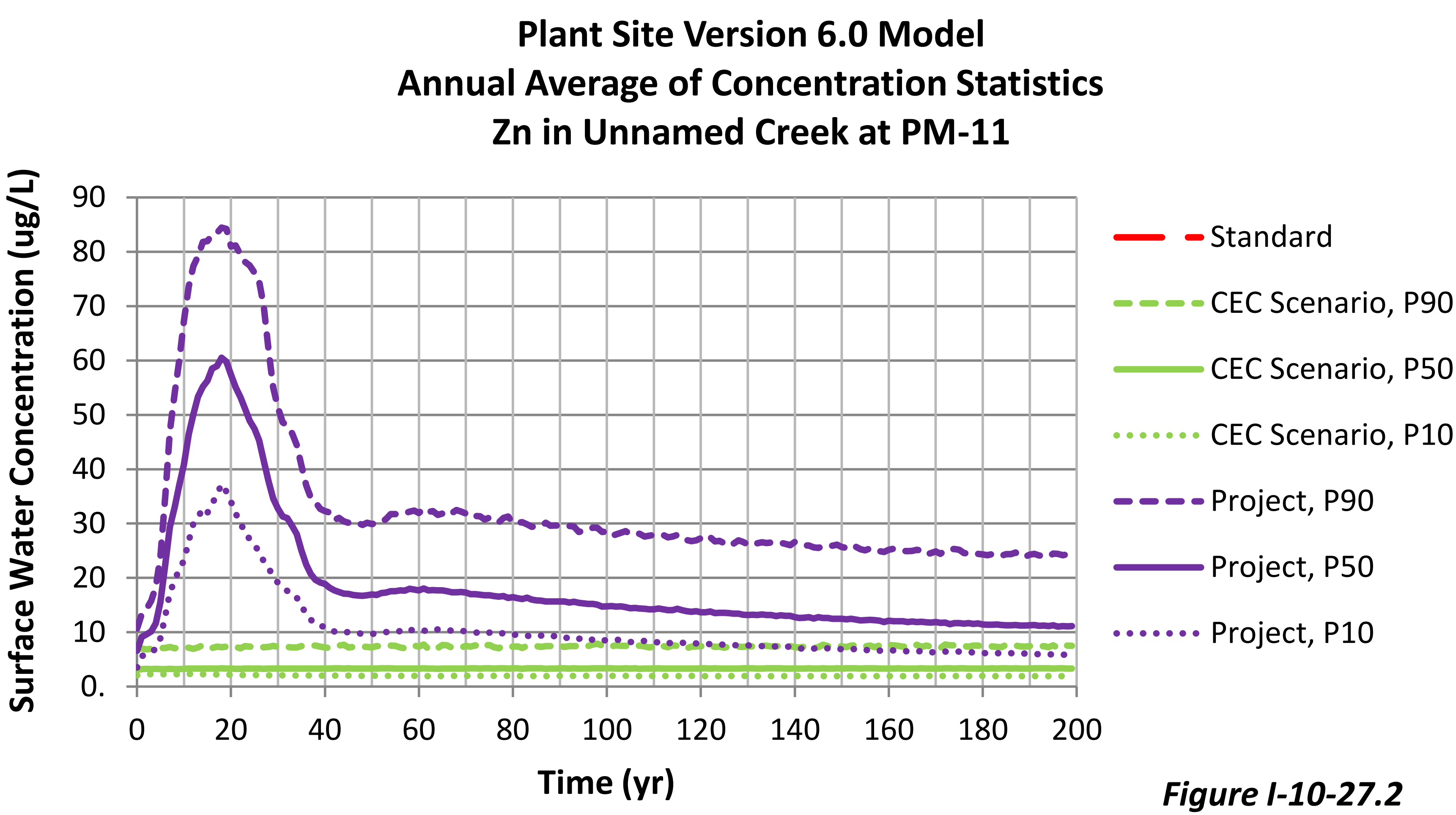

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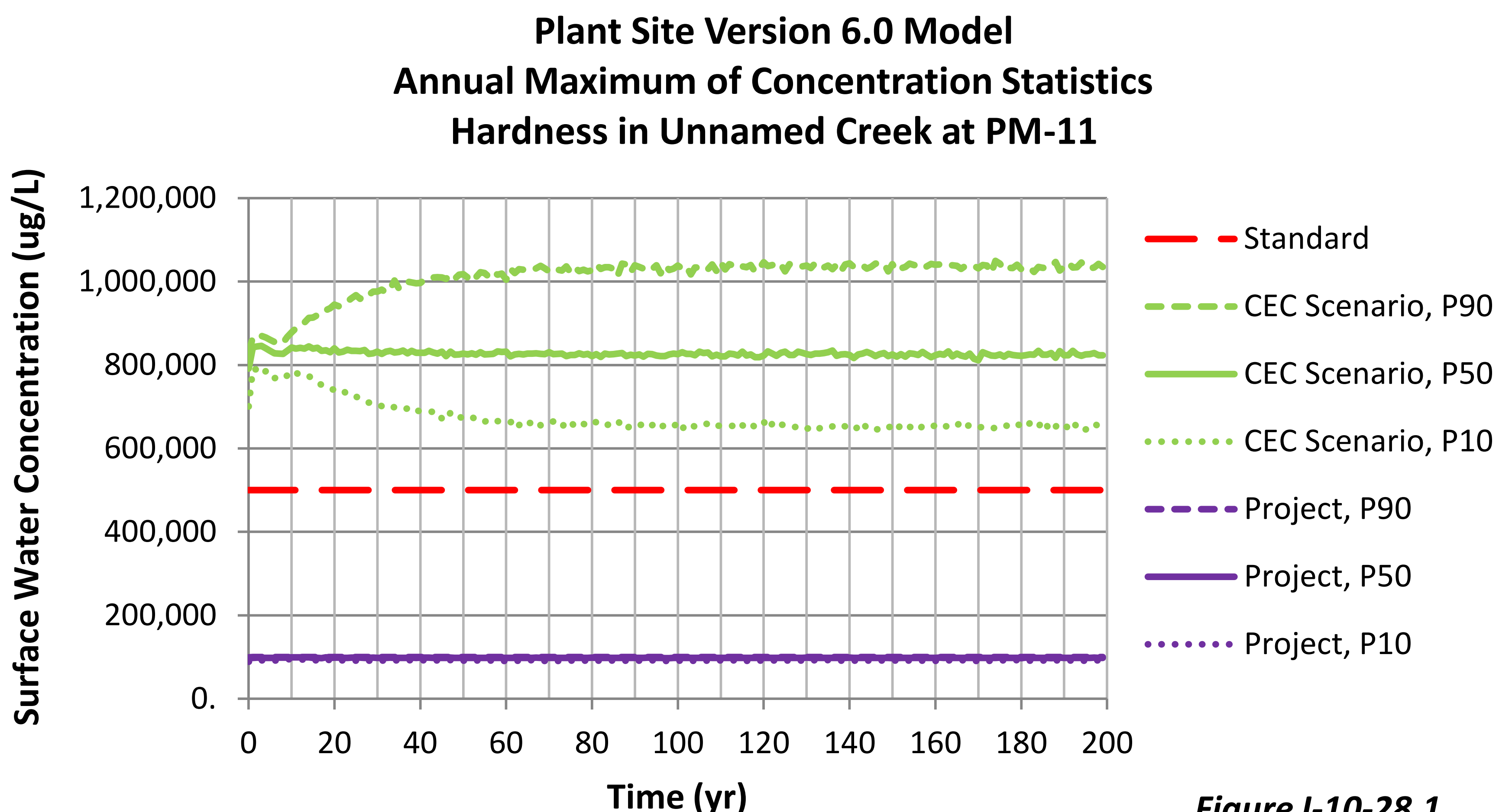

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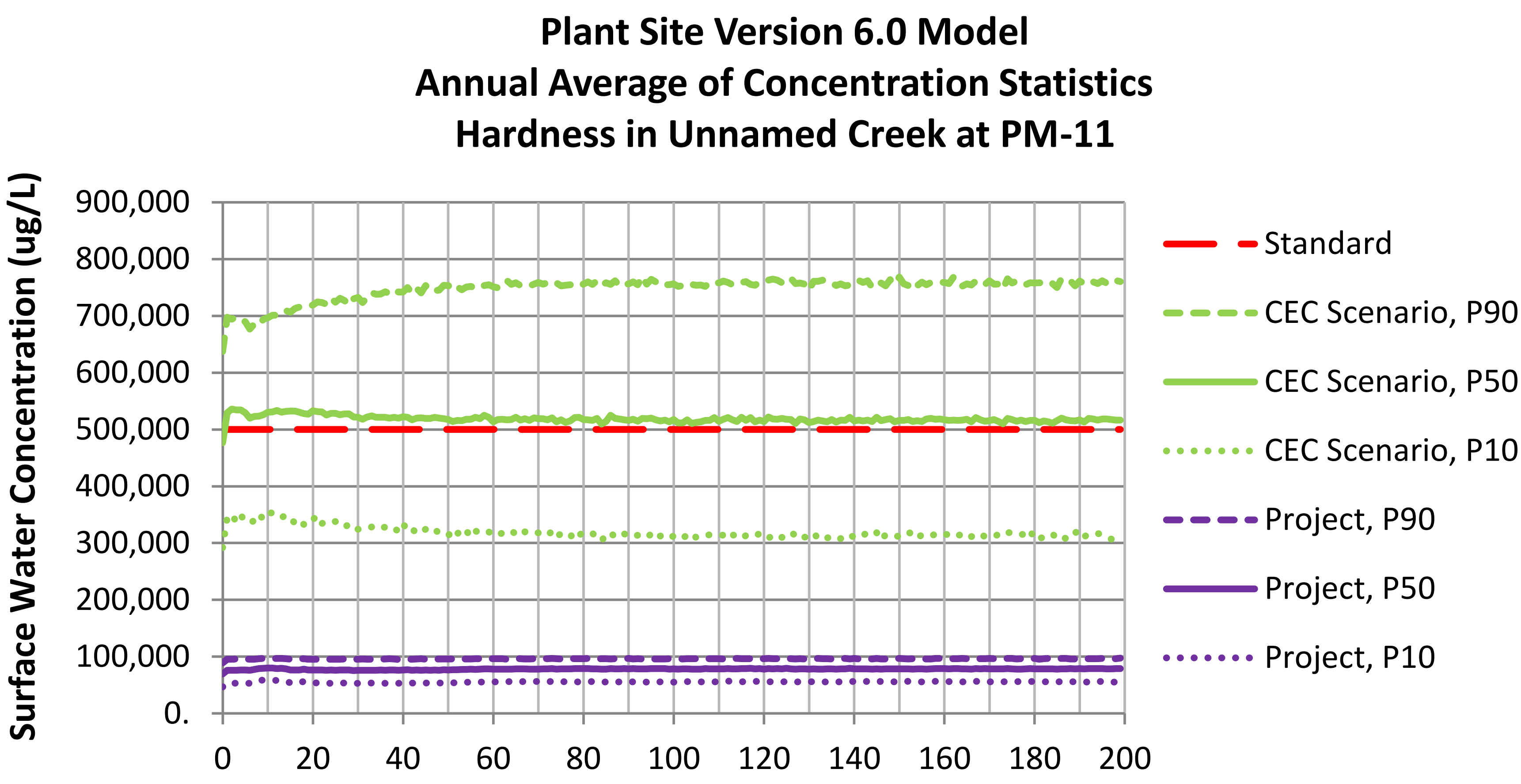


Figure I-10-28.2

Attachment J

Probability of Exceedance Time Series Results at the Surface Water Evaluation Locations

Attachment J Probability of Exceedance Time Series Results at the Surface Water Evaluation Locations

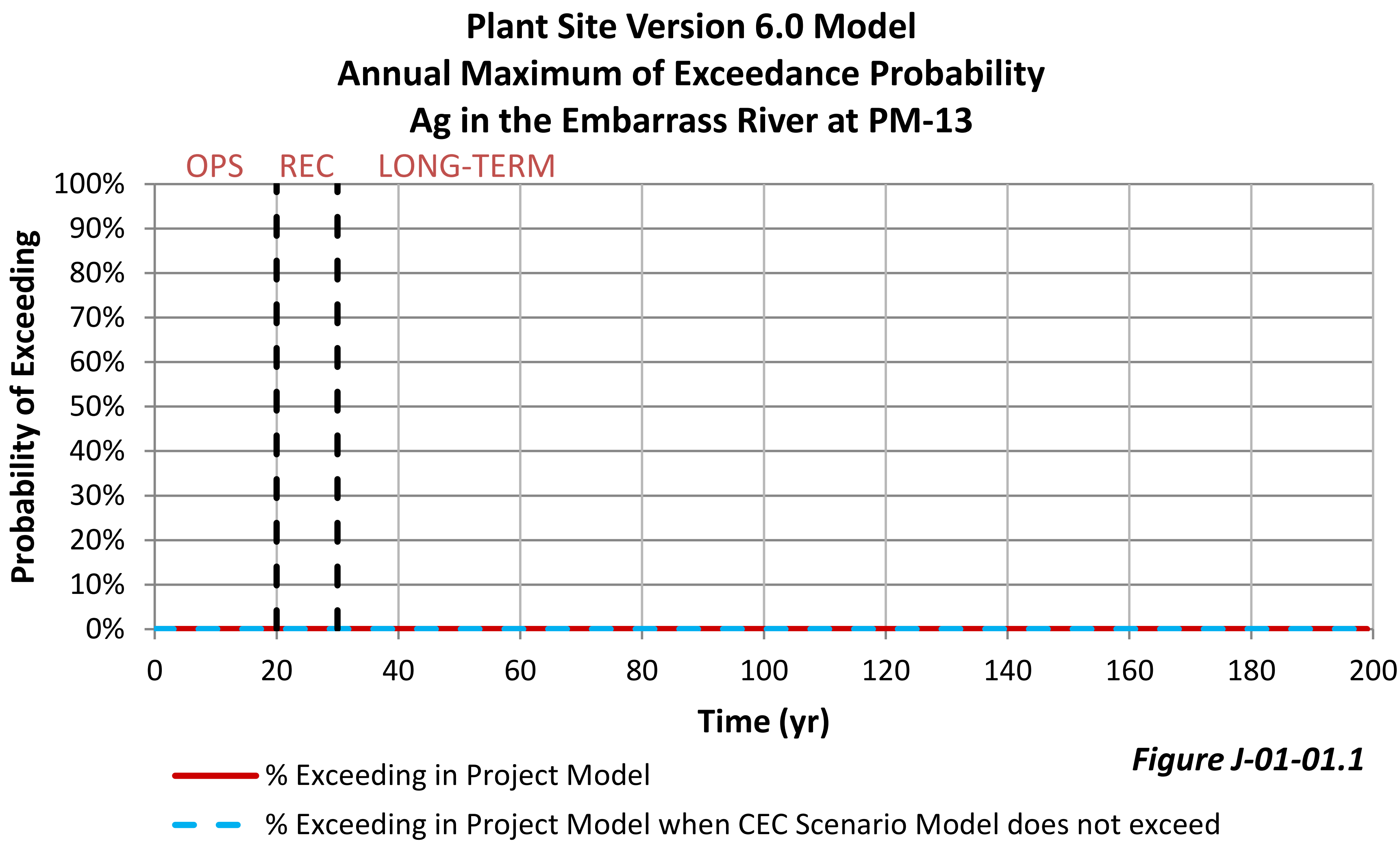
The plots in this section were created by taking the following steps:

- At any given time step, all constituents were individually evaluated (true/false) against the applicable surface water standard at all surface water evaluation locations. If the estimated concentration was greater than the standard, the result for that constituent, at that time, and at that location, is true; if it is not over the standard, the result is false.
- The evaluation was performed at every time step during a realization, resulting in a 200-year time series (2401 time steps/results) of true or false values.
- The process was repeated during each of the additional realizations until all 500 realizations were run. The result is a set of 500 true or false results at every time step for each constituent at each location.
- At any time step (24.33 years for example), the number of realizations showing a result of true was divided by 500, resulting in the probability of estimating an exceedance. Zero exceedances results in 0%, 50 exceedances results in 10%, etc.
- The probability of exceedance was determined for all time steps, resulting in a time series of the probability of exceeding the applicable surface water standard.
- Just as for the concentration statistics plots, the probability of exceedance plots are summarized annually by selecting either the maximum annual probability of exceedance for each year, or by the annual average probability of exceedance for each year.

The red line in the each figure shows the probability of exceedance through time. The blue-dashed line shows the probability of the Project Model simulating an exceedance when the Continuation of Existing Conditions Scenario Model would not show an exceedance. This represents the increase in the probability of an exceedance at each time step due to the Project. In each figure, the vertical black-dashed lines separate the time period operations (OPS) from reclamation (REC), and the time period reclamation from long-term closure (LONG-TERM).

The figure numbering convention is "**Figure W-XX-YY.Z**" where:

- **W** indicates the Attachment.
- **XX** is a counter indicating the location; in this attachment it will count from "01" to "10" to account for the surface water evaluation locations PM-12, PM-12.2, PM-12.3, PM-12.4, PM-13, MLC-3, MLC-2, TC-1, PM-19, and PM-11 in that order.
- **YY** is a counter indicating the constituent; in this attachment it will count from "01" to "28" to show the 27 independently modeled constituents and the calculated hardness.
- **Z** is a numerical value, 1 or 2. A value of 1 indicates that the annual maximum has been plotted and a value of 2 indicates that the annual average has been plotted.



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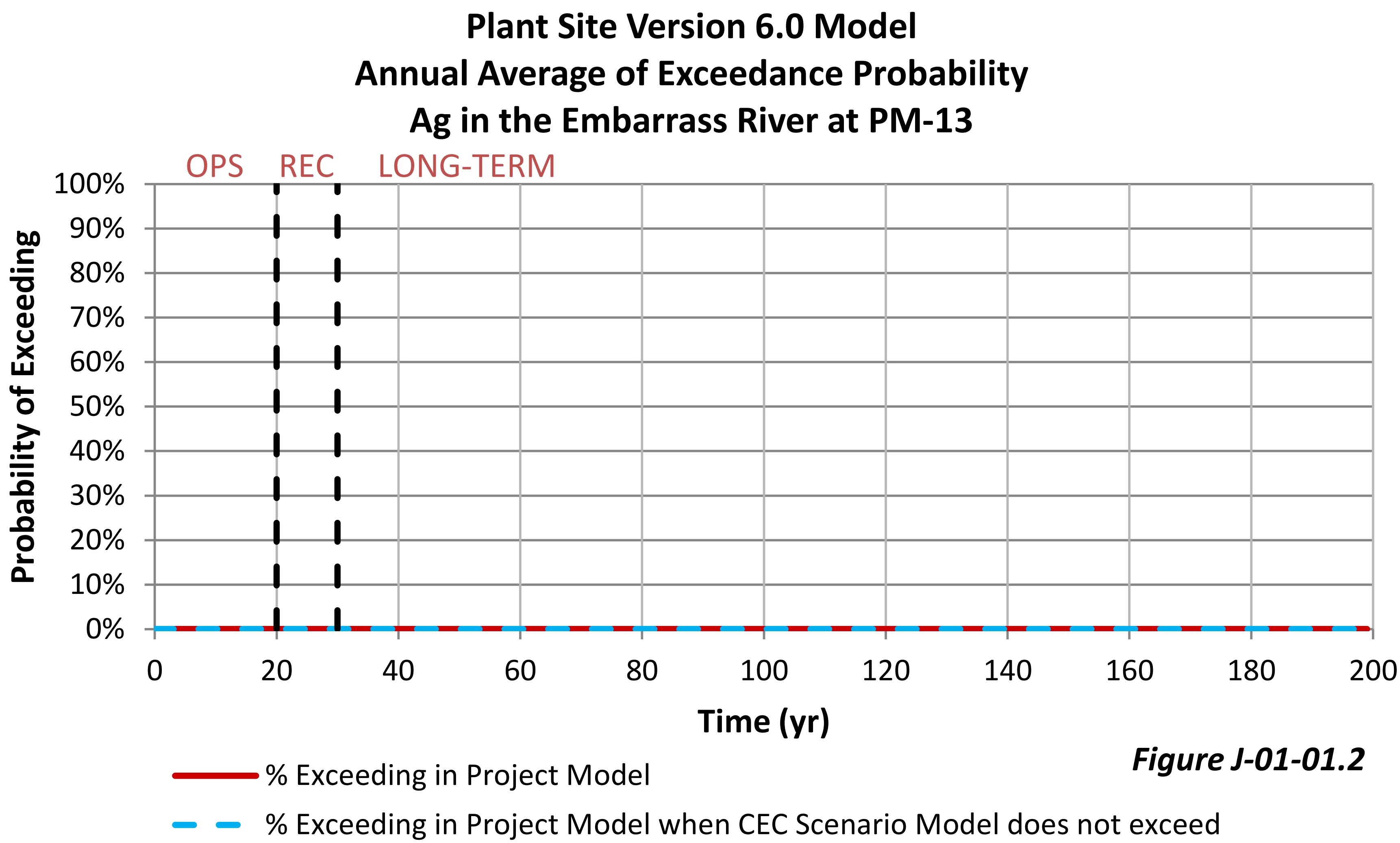

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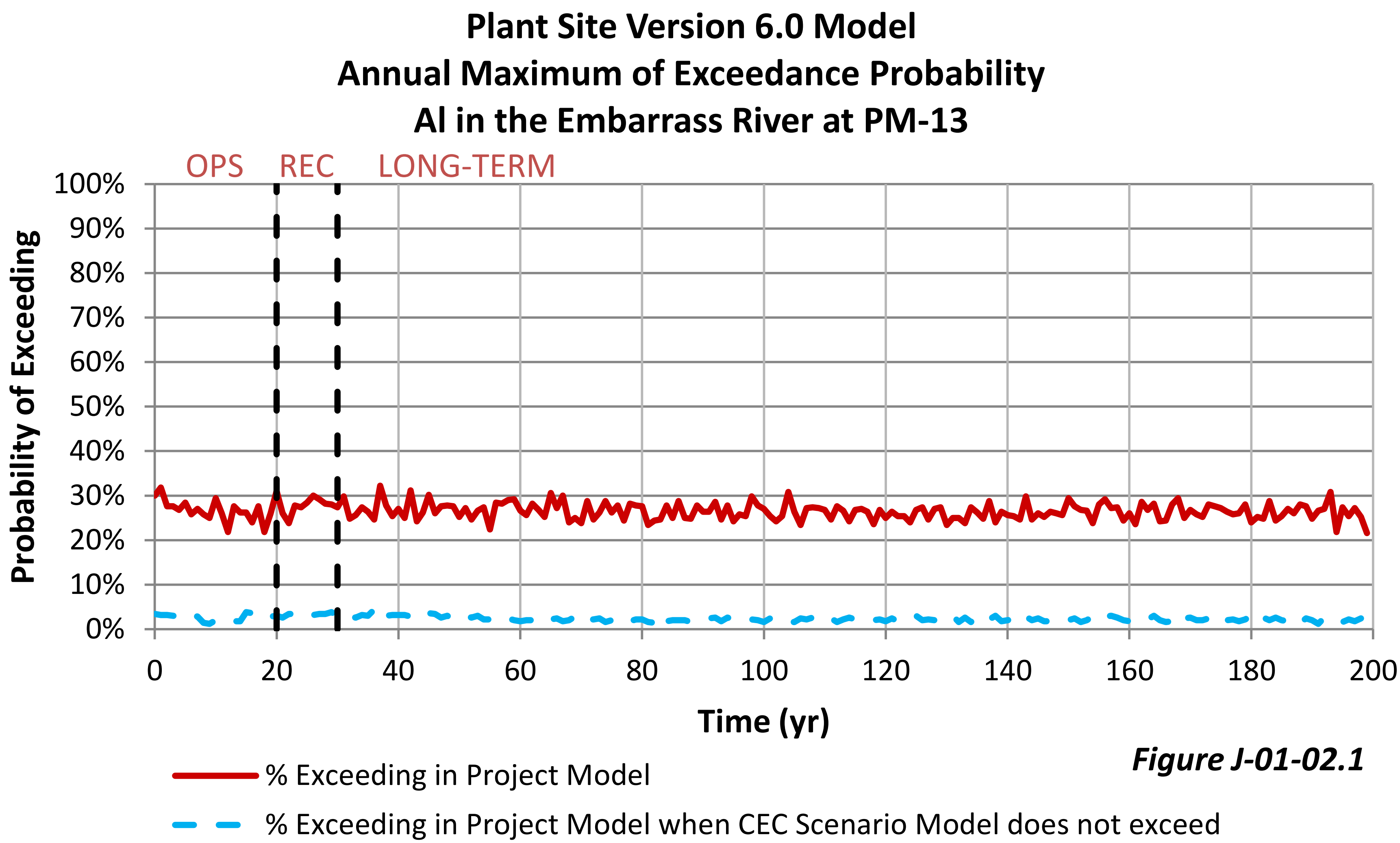
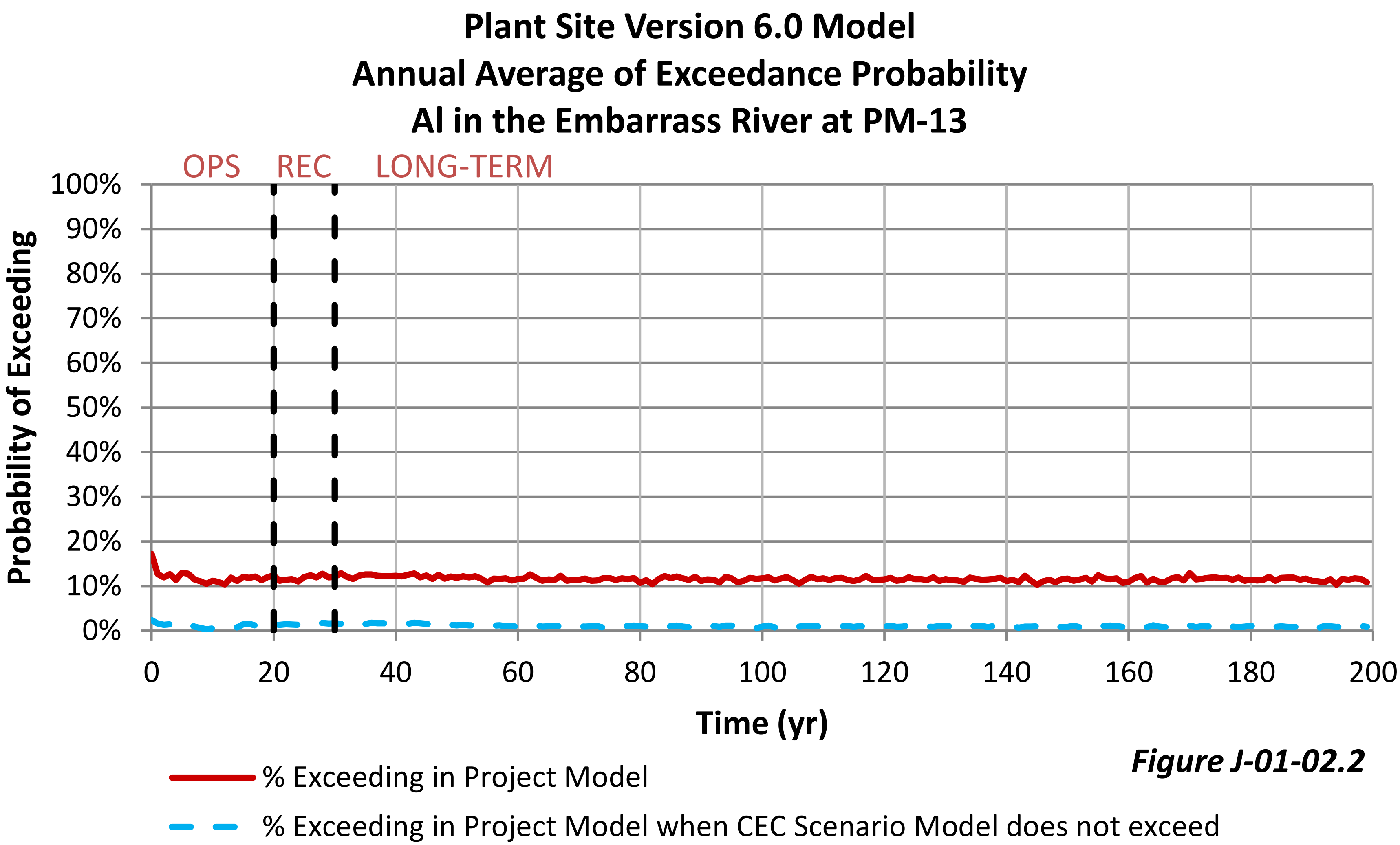


Figure J-01-02.1



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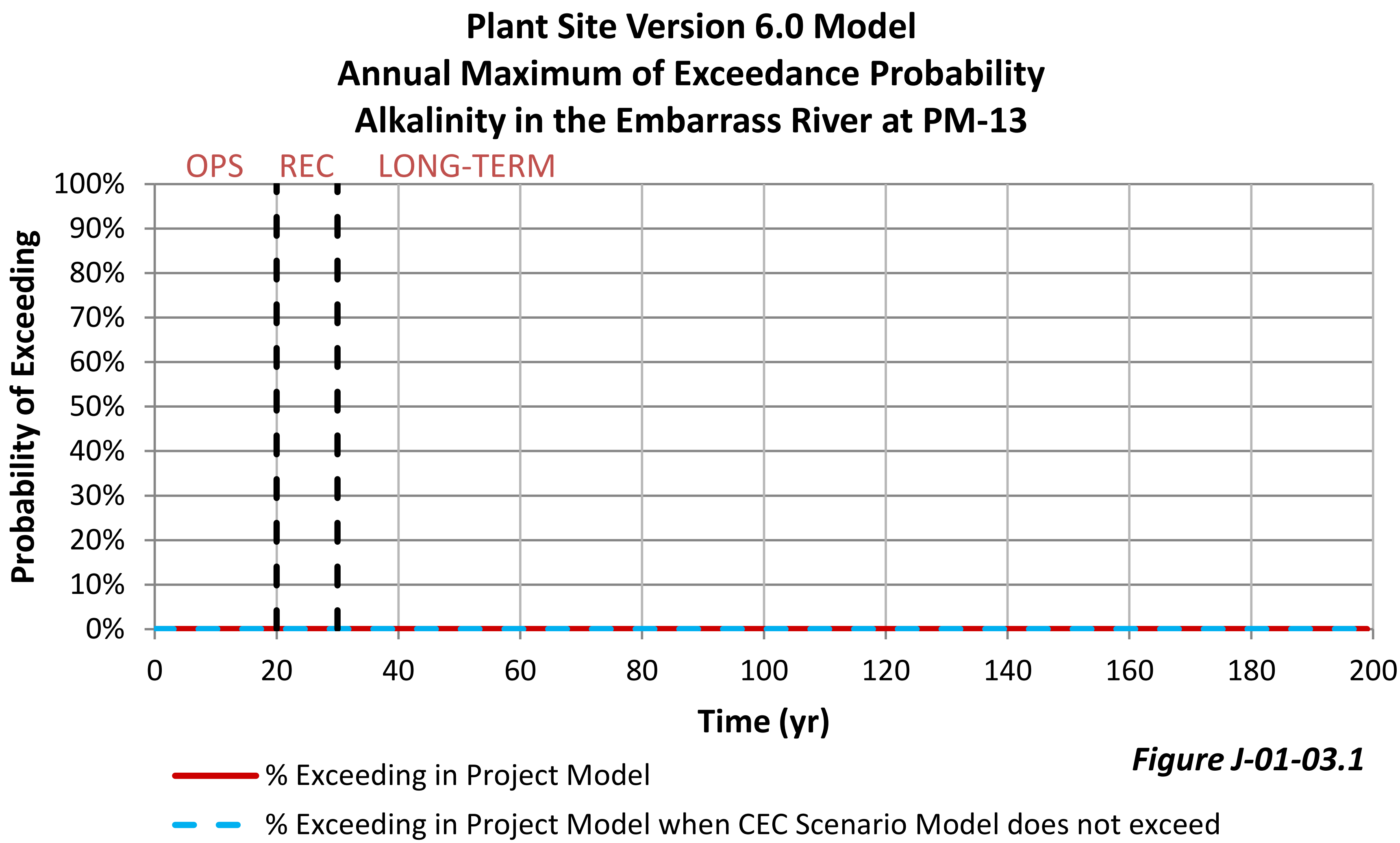

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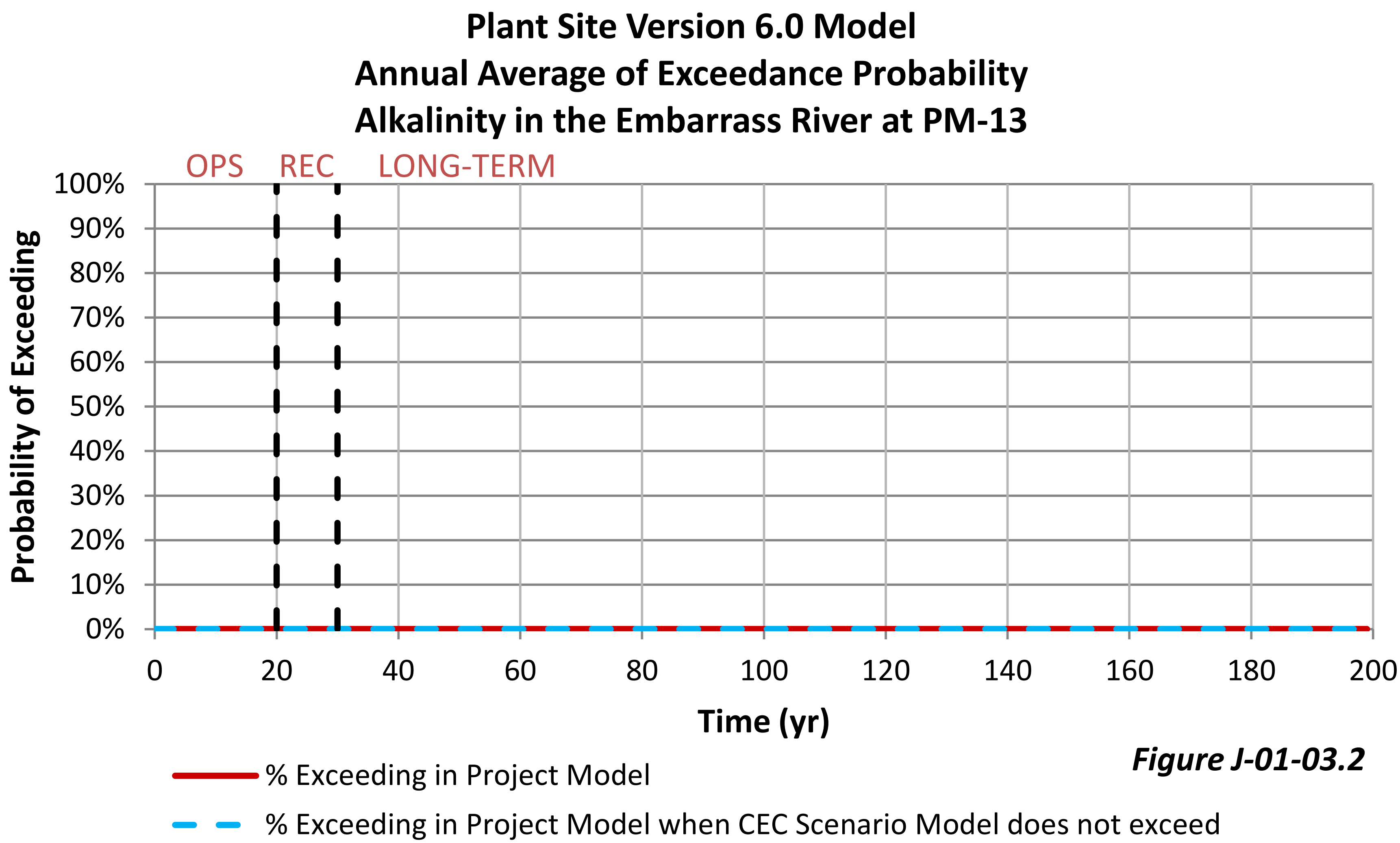

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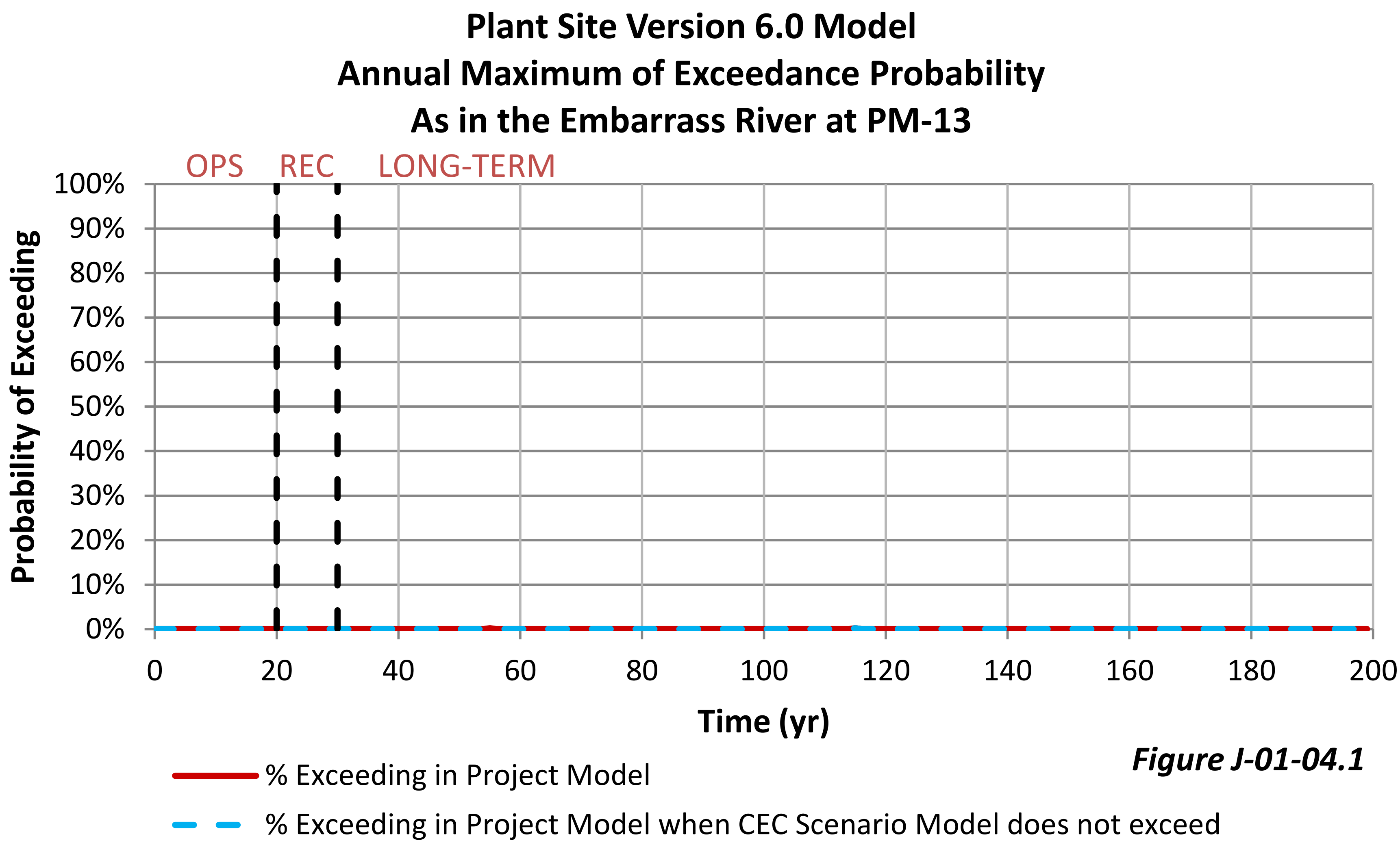

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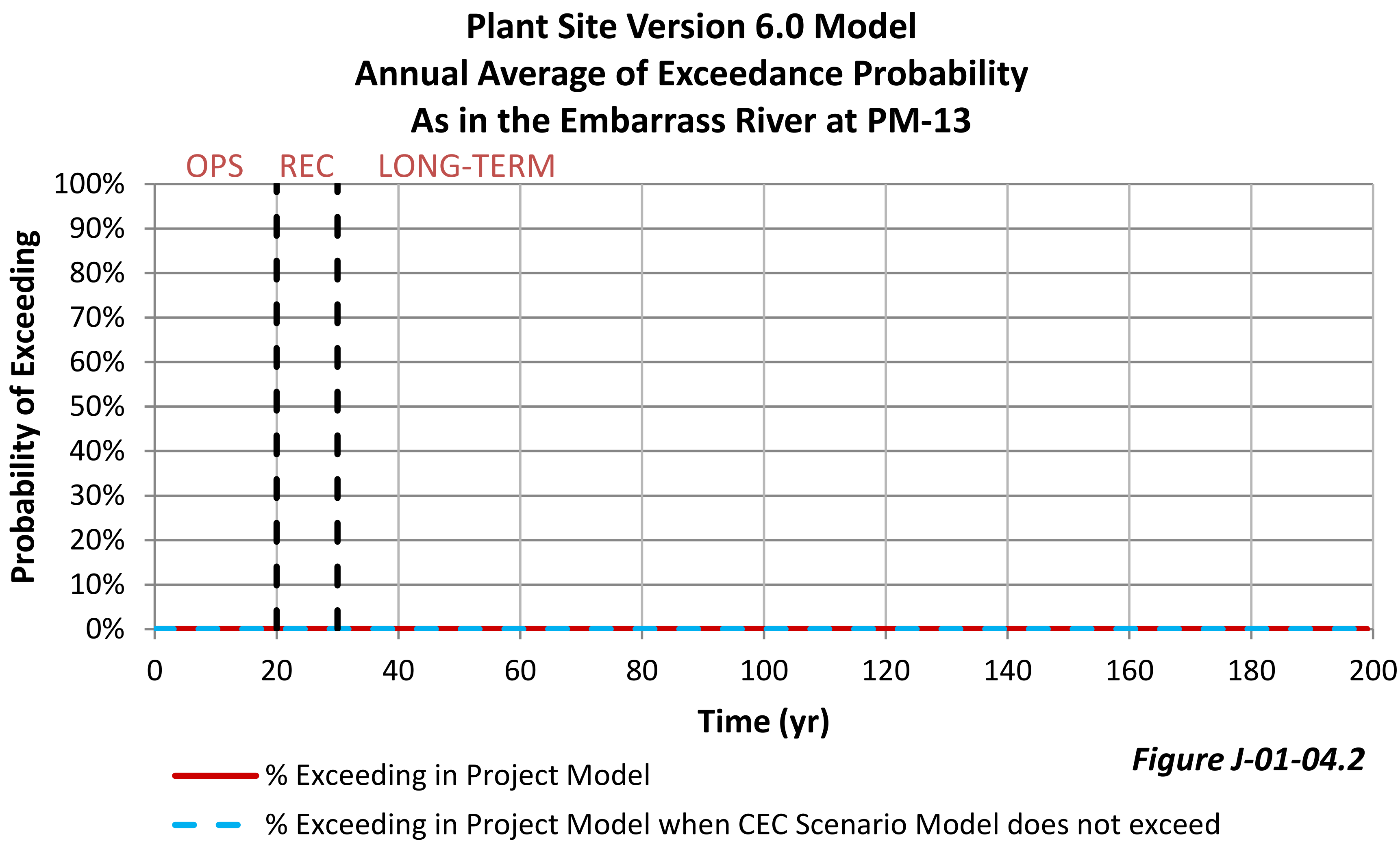

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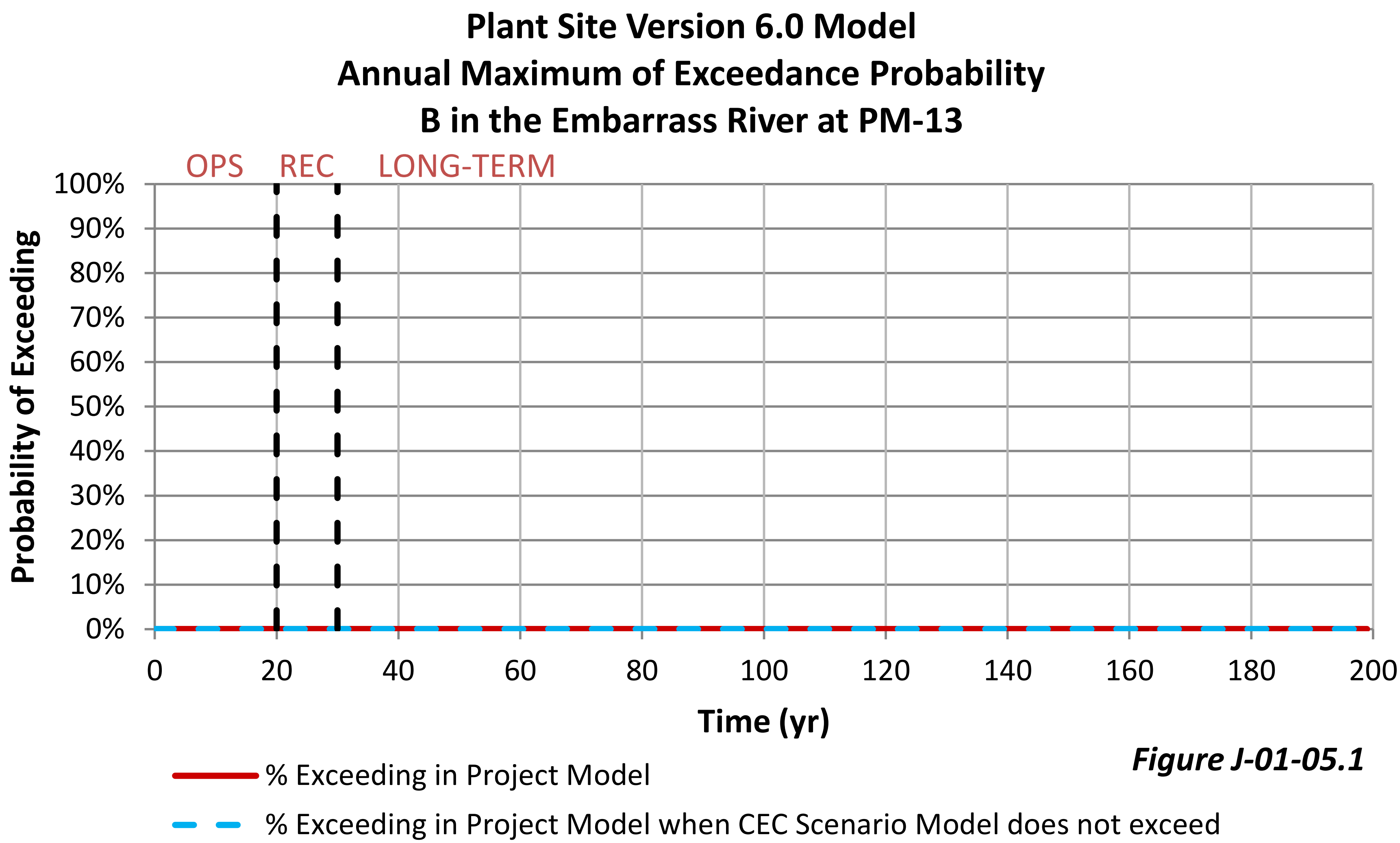

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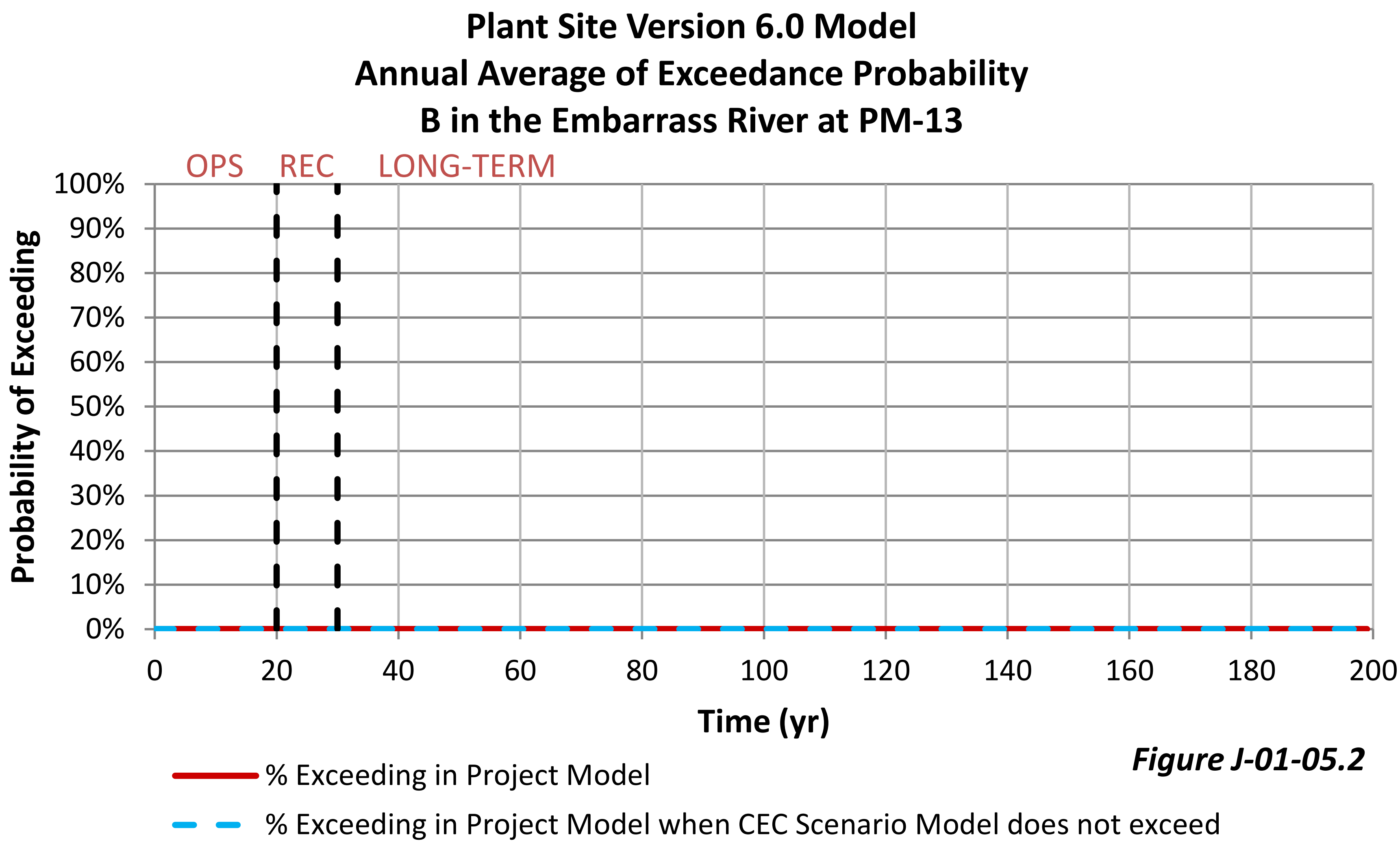

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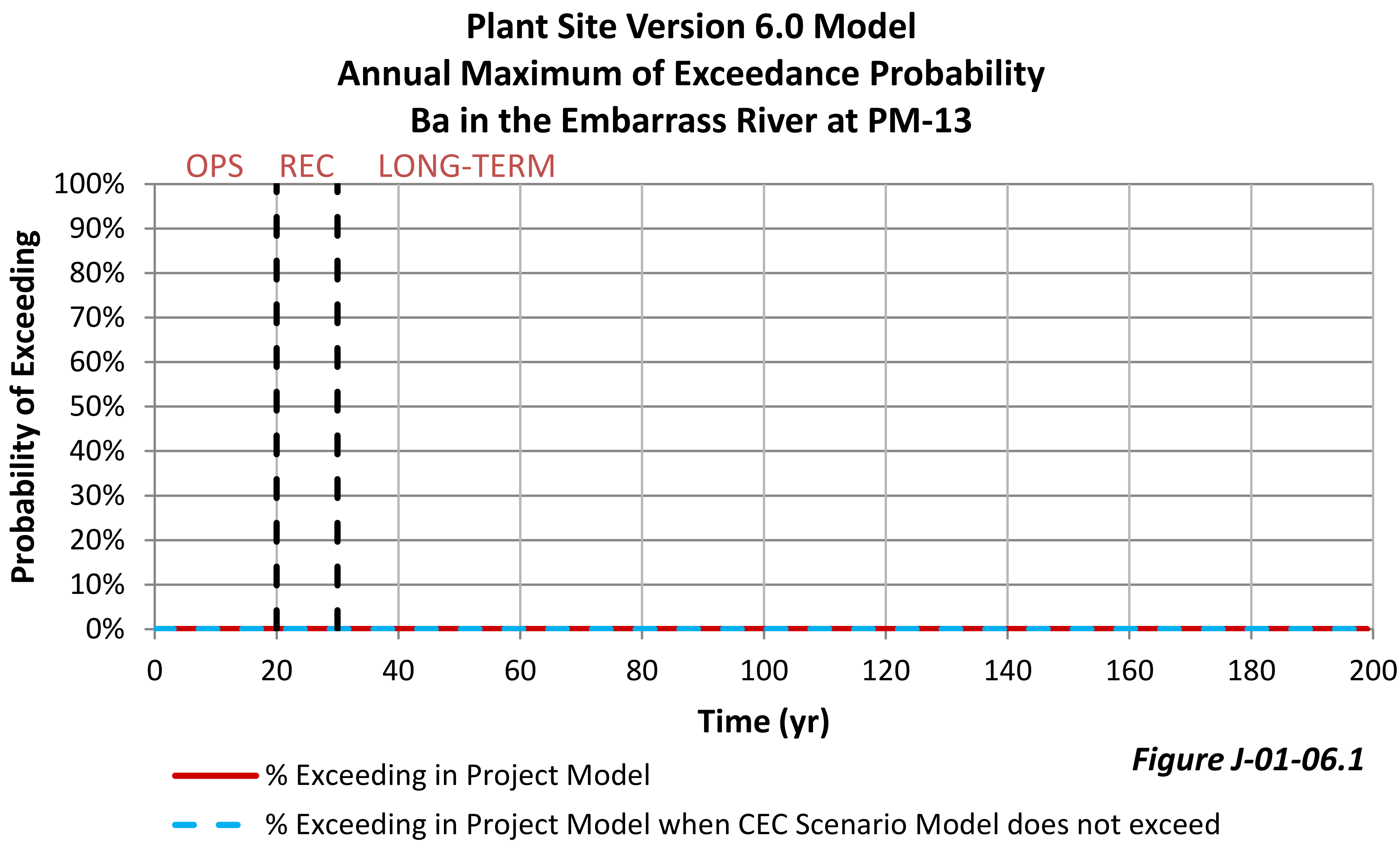

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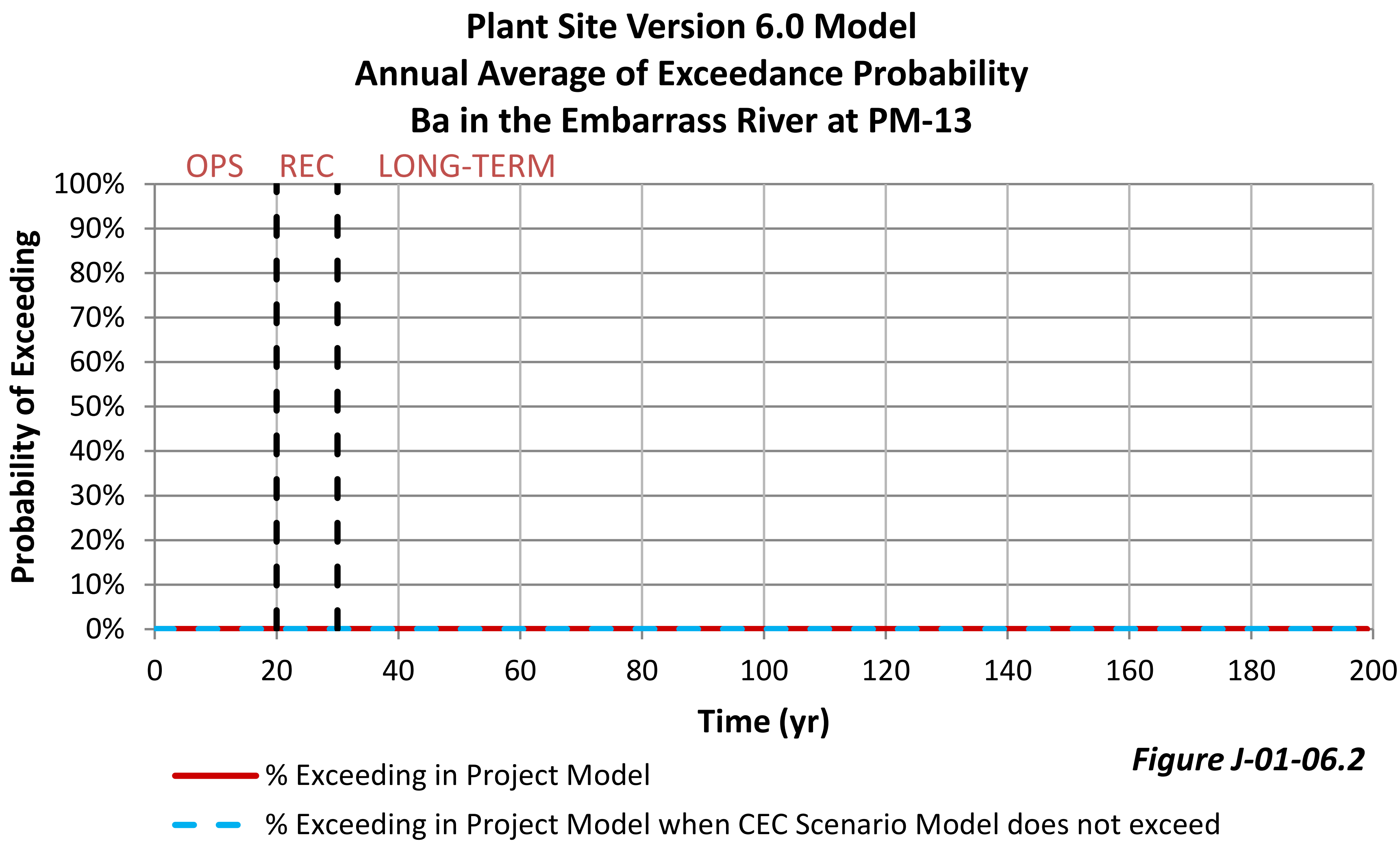

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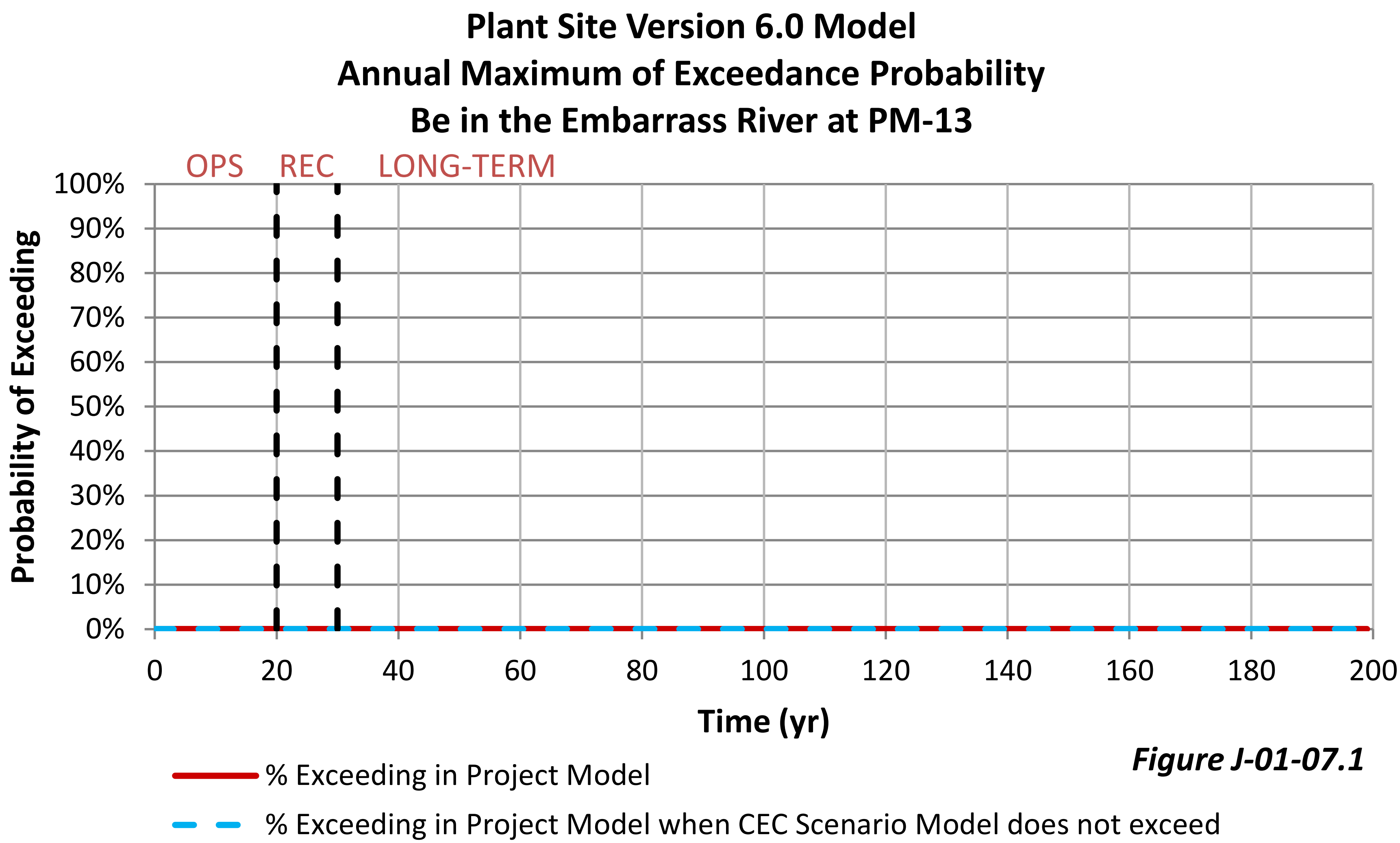

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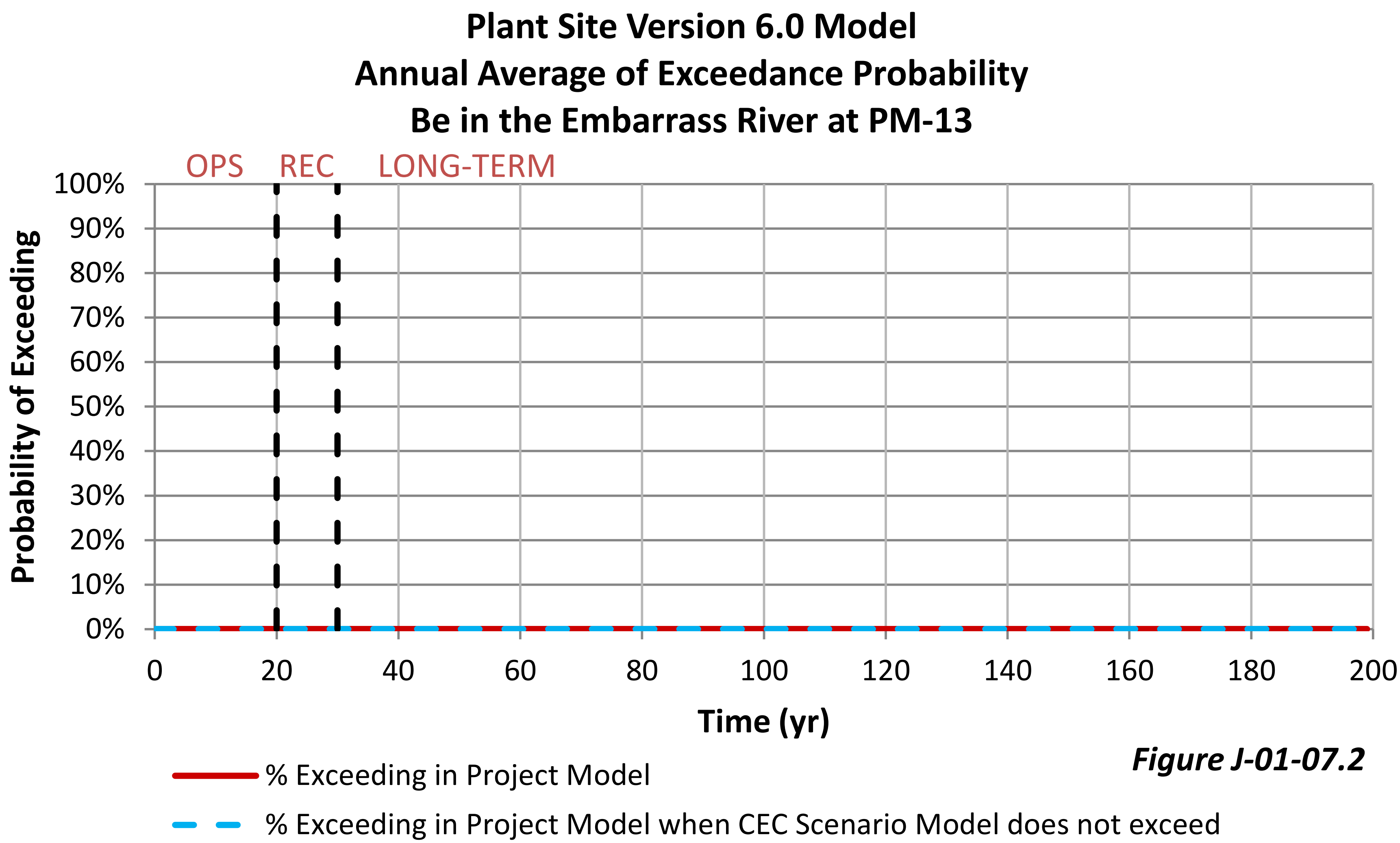

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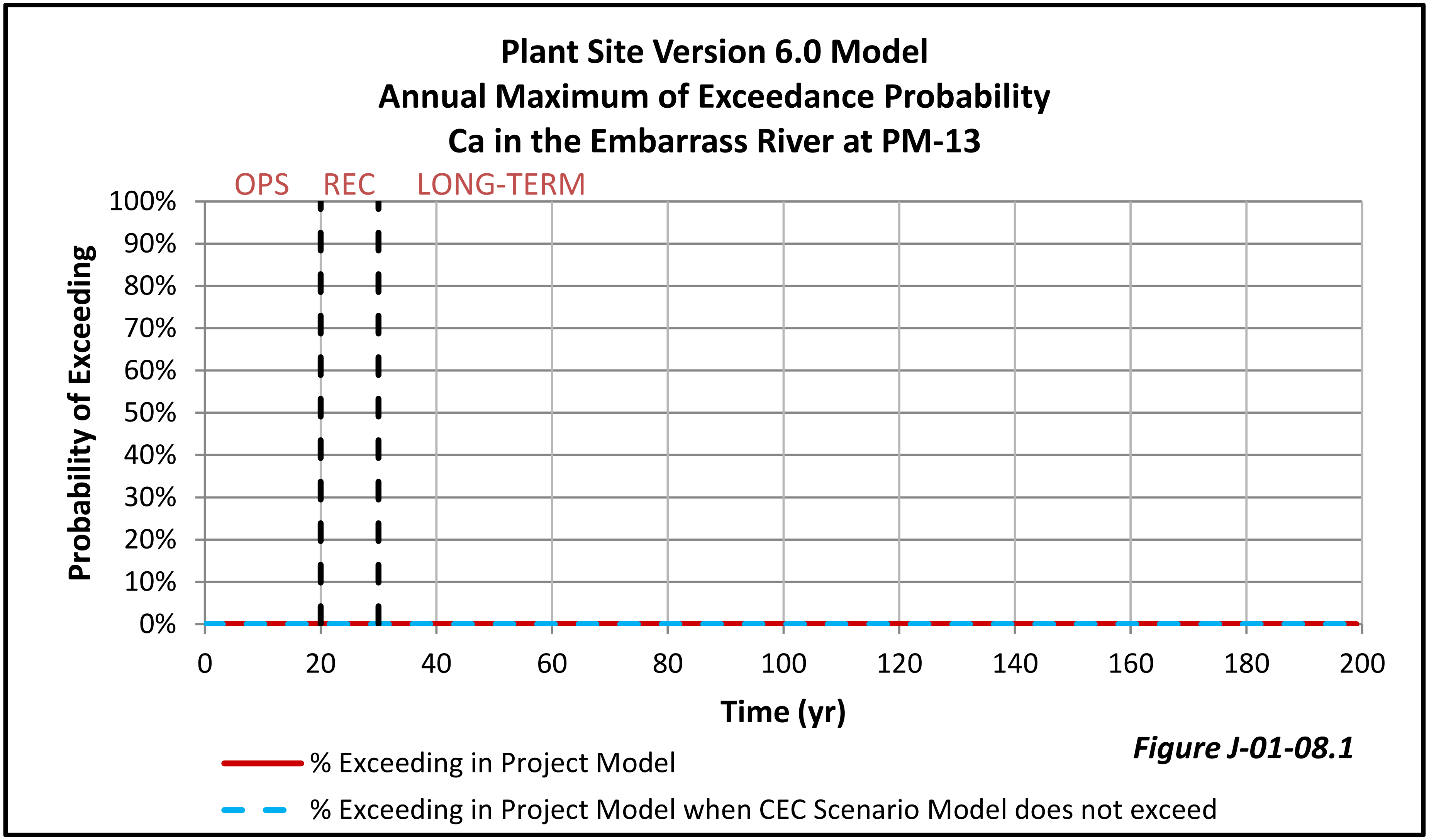

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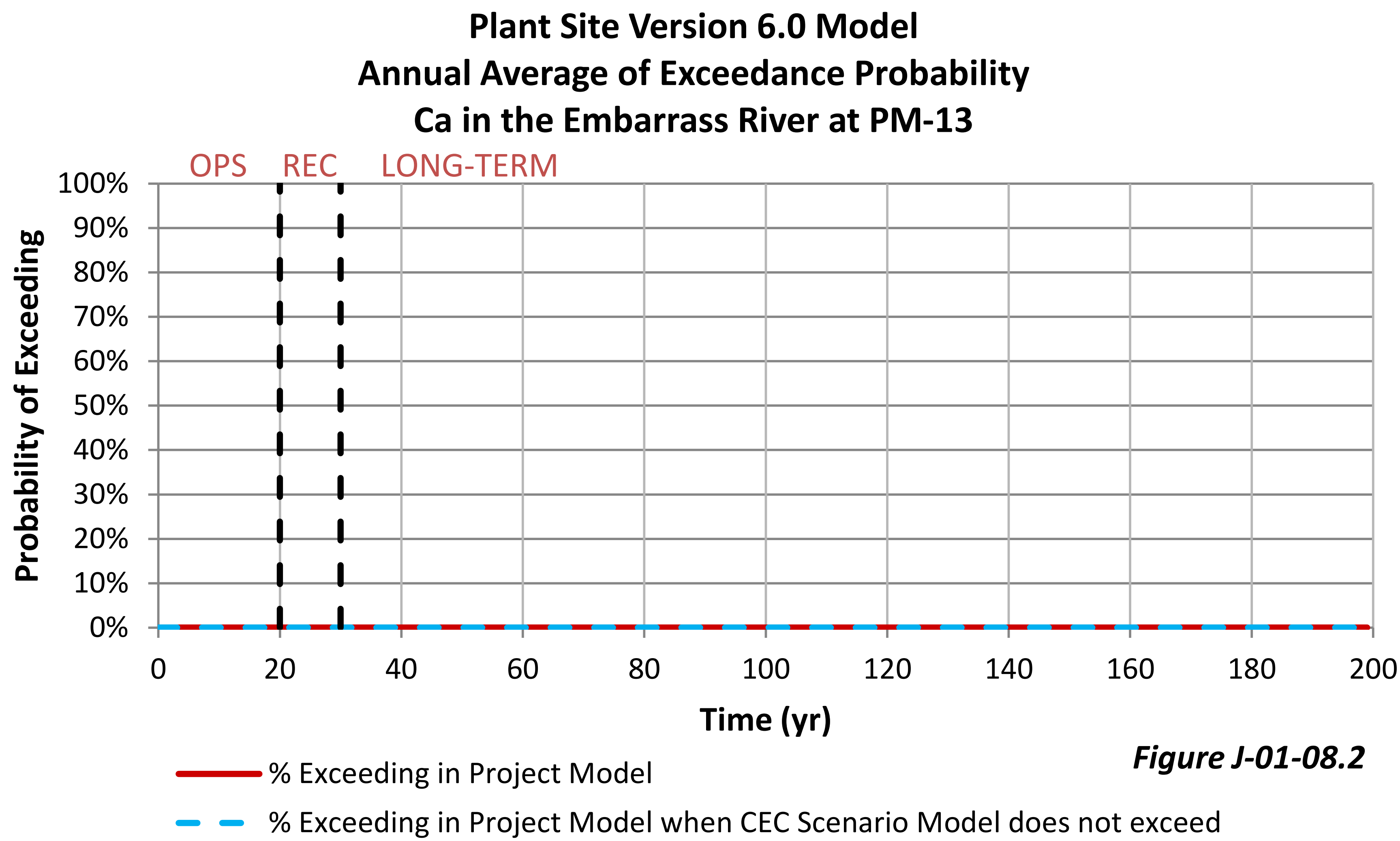

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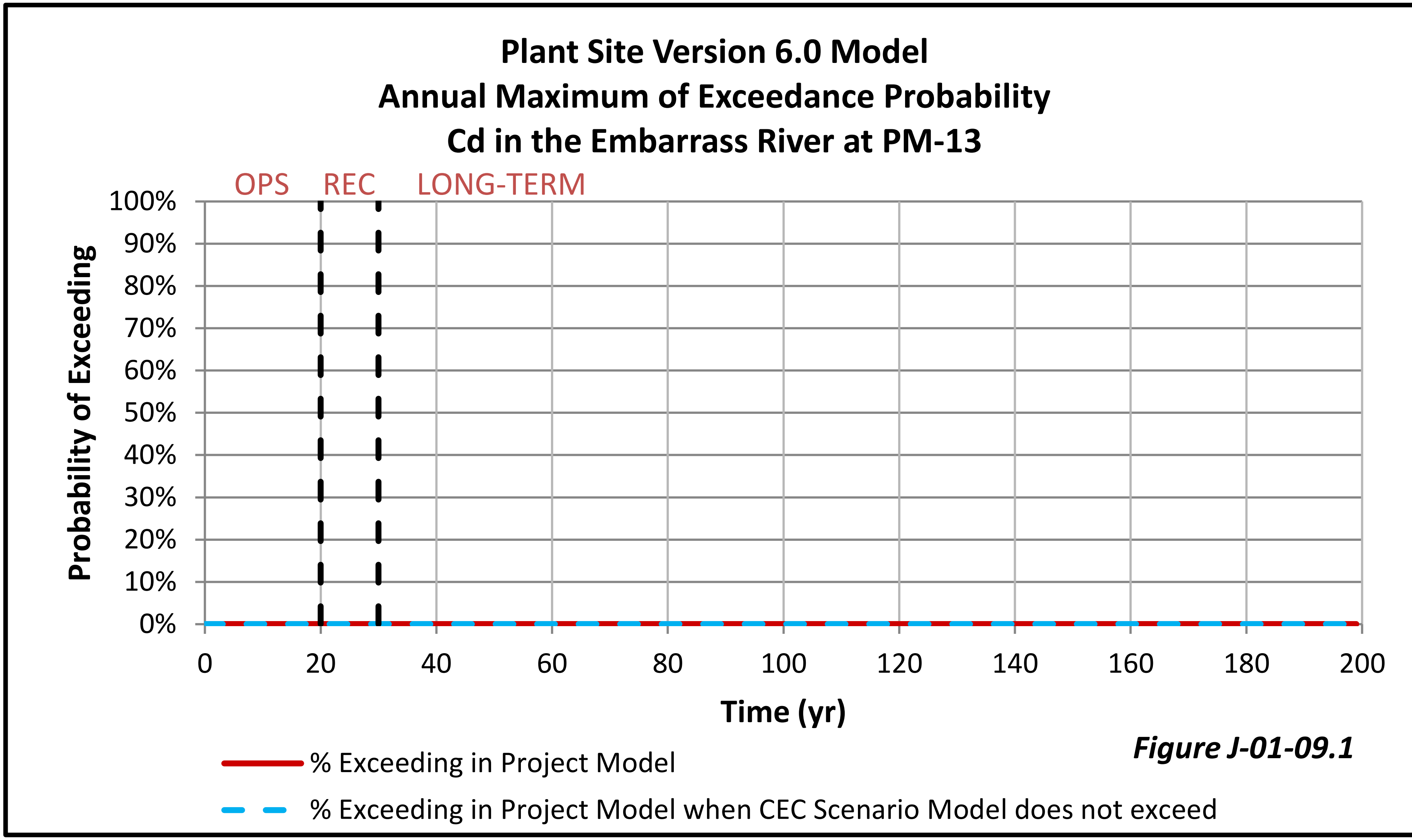

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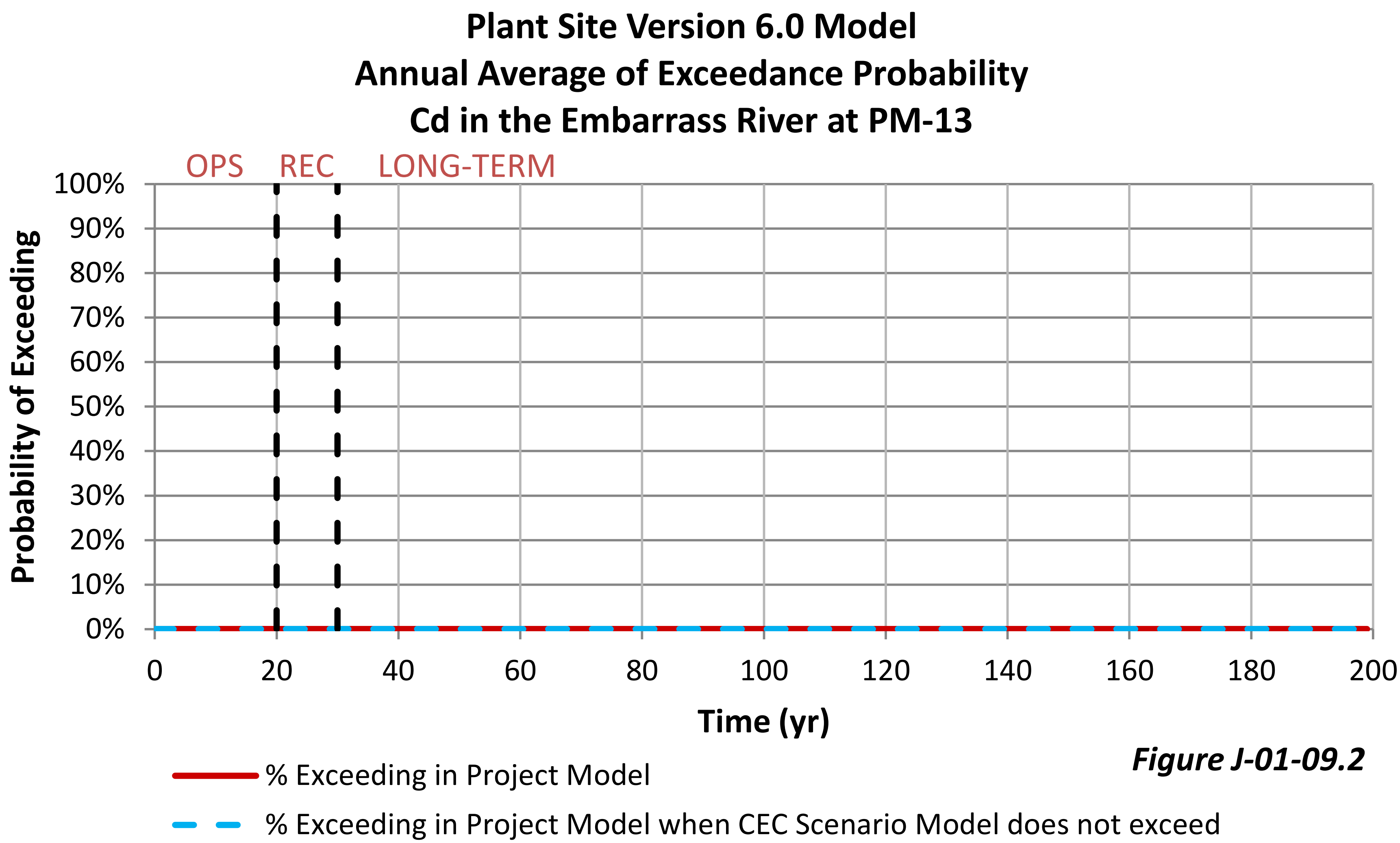

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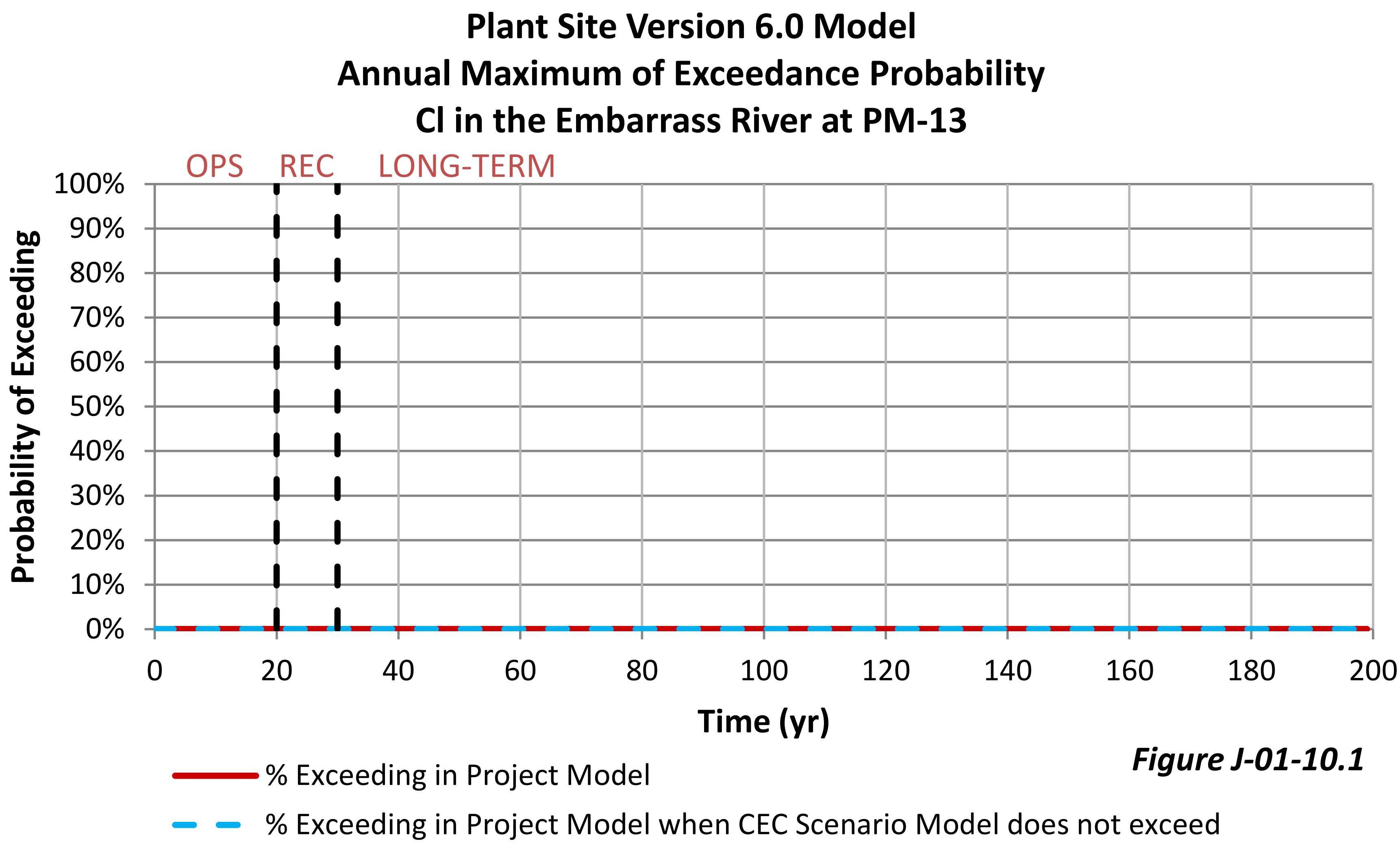

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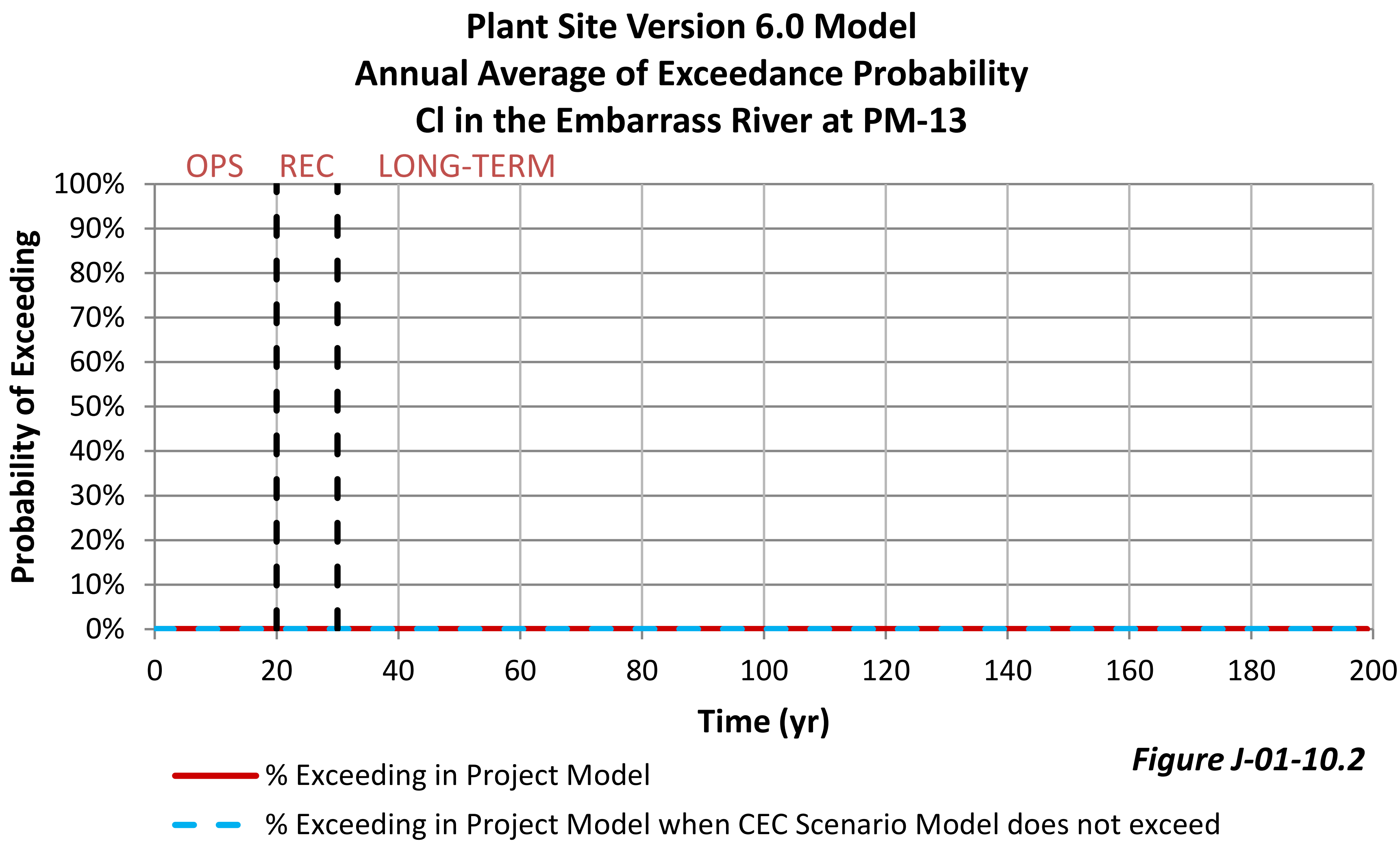

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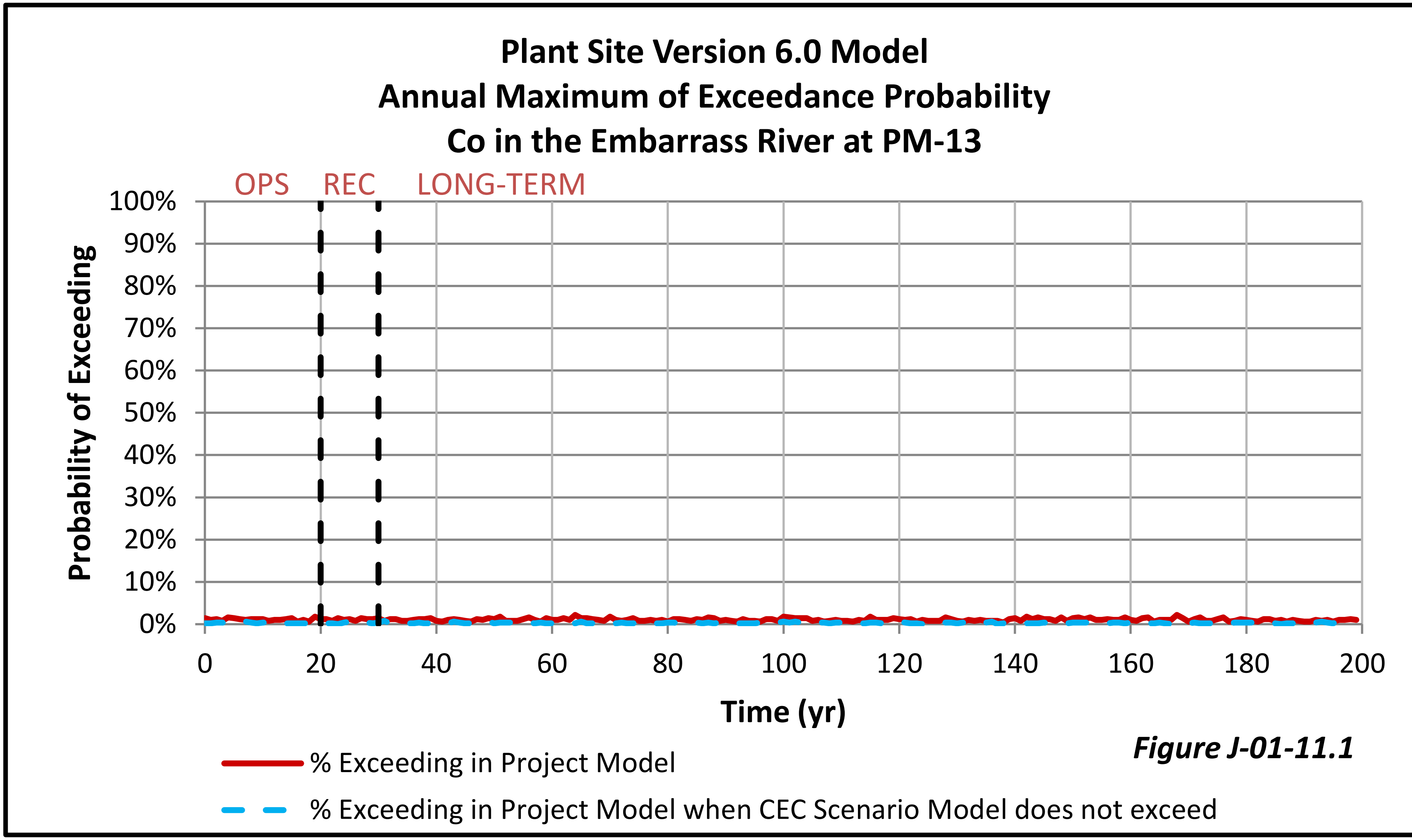

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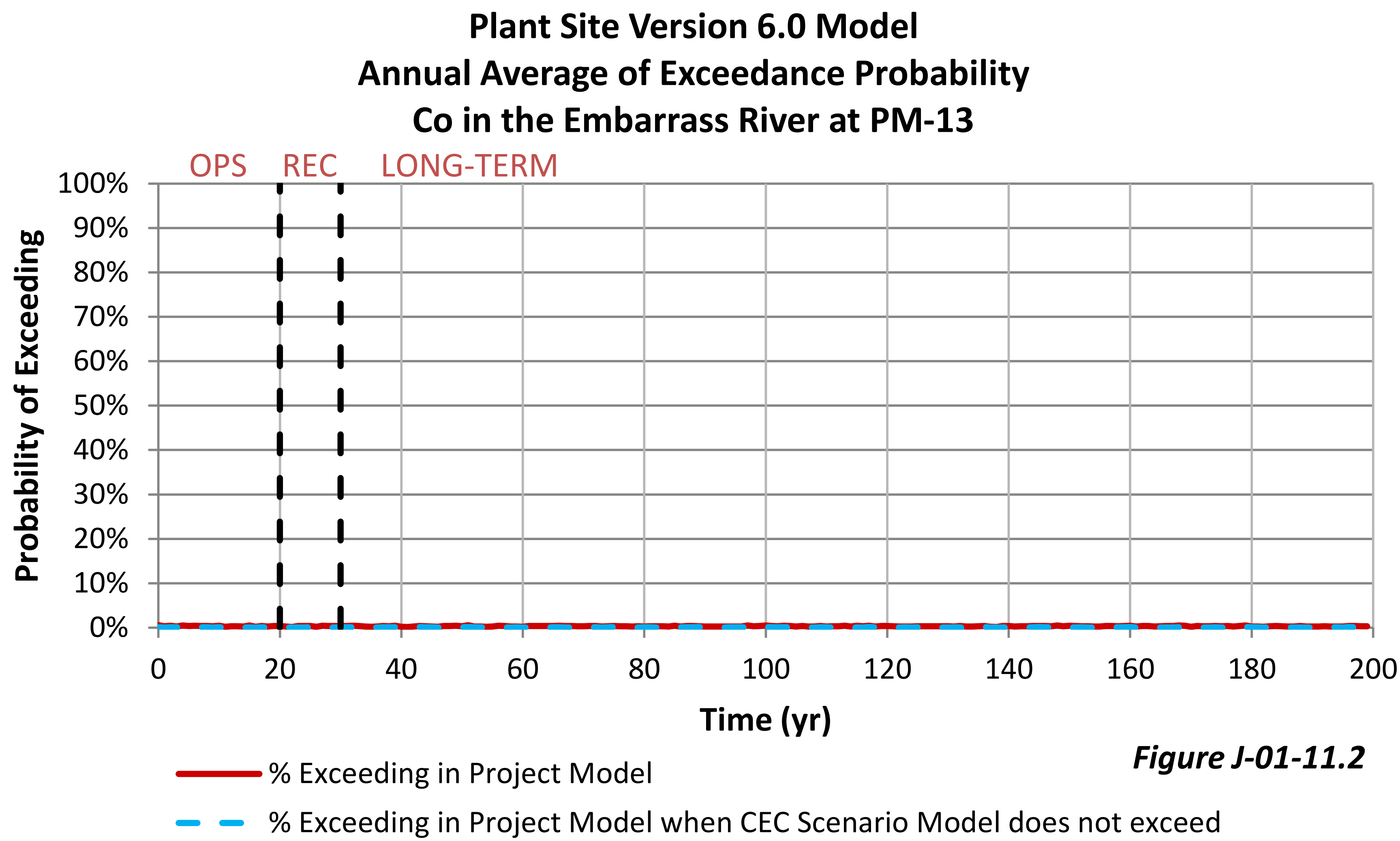

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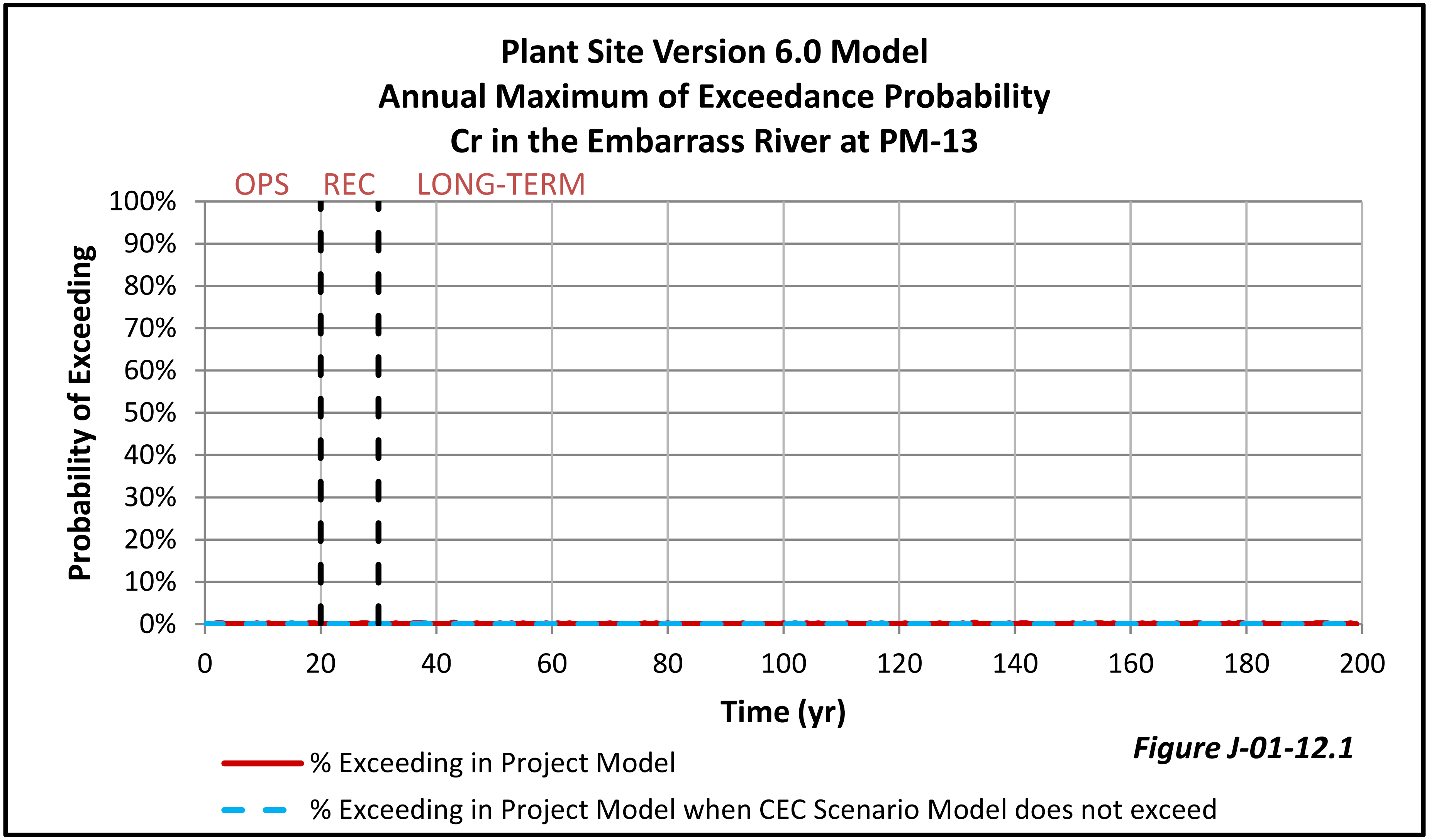

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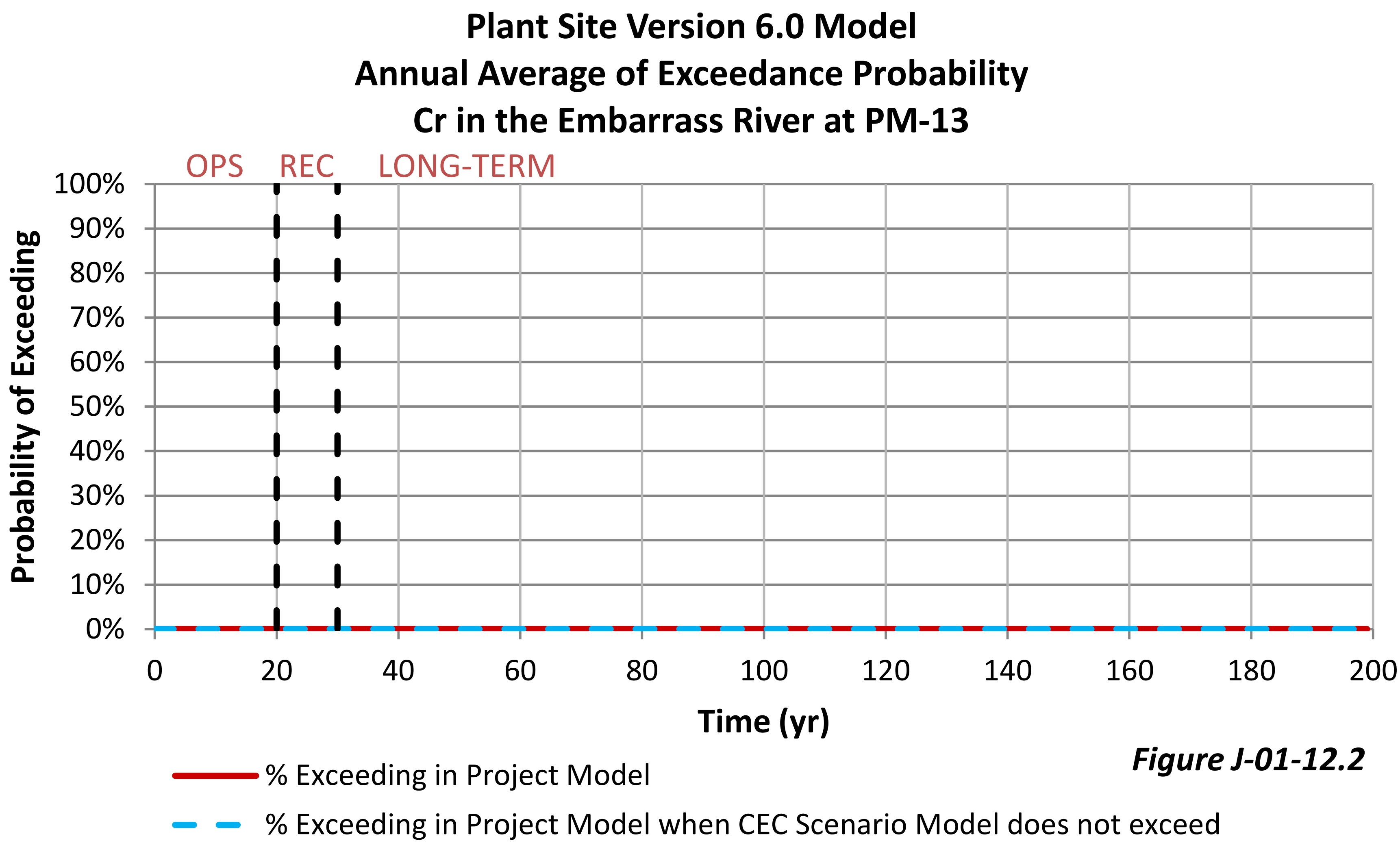

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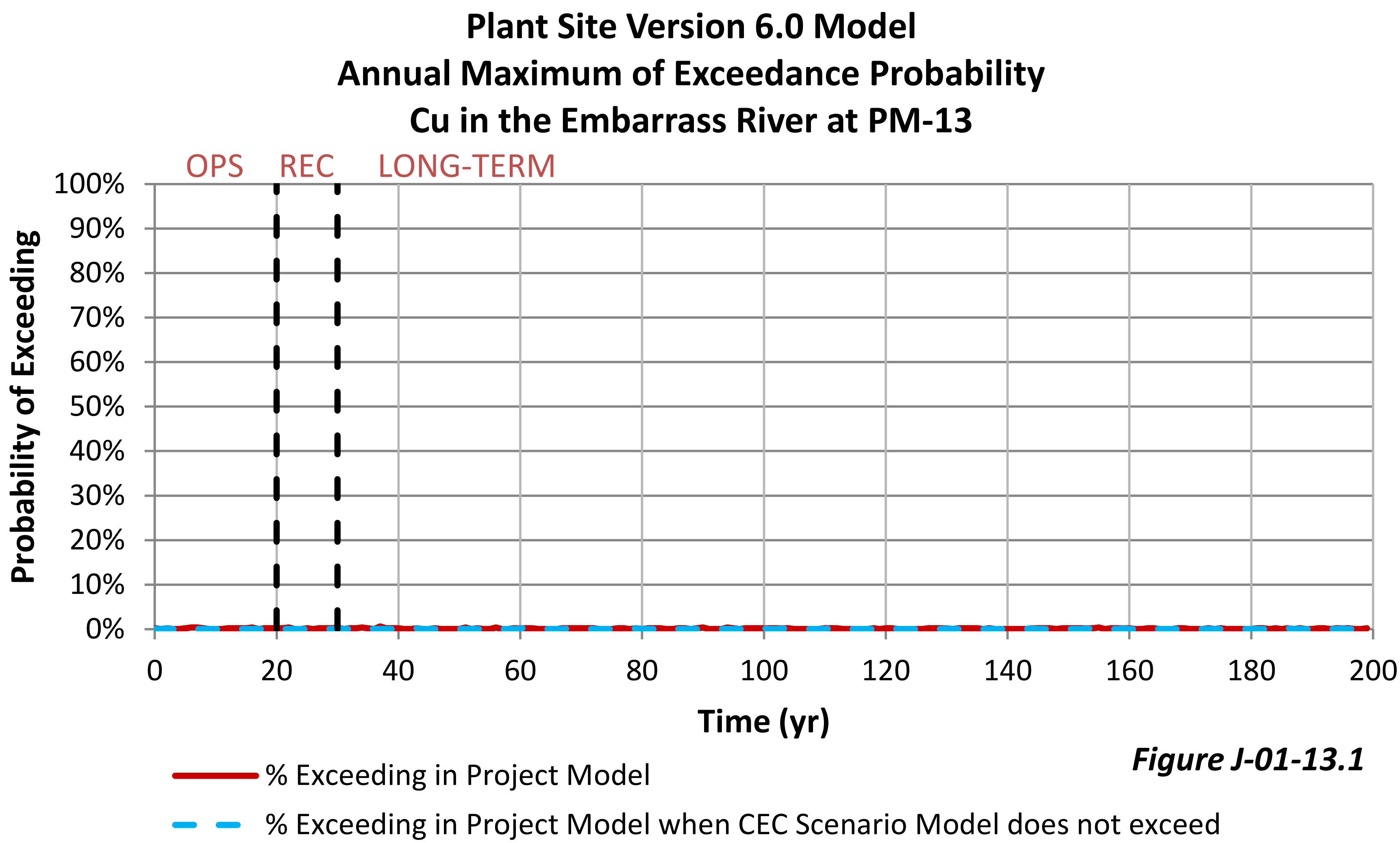

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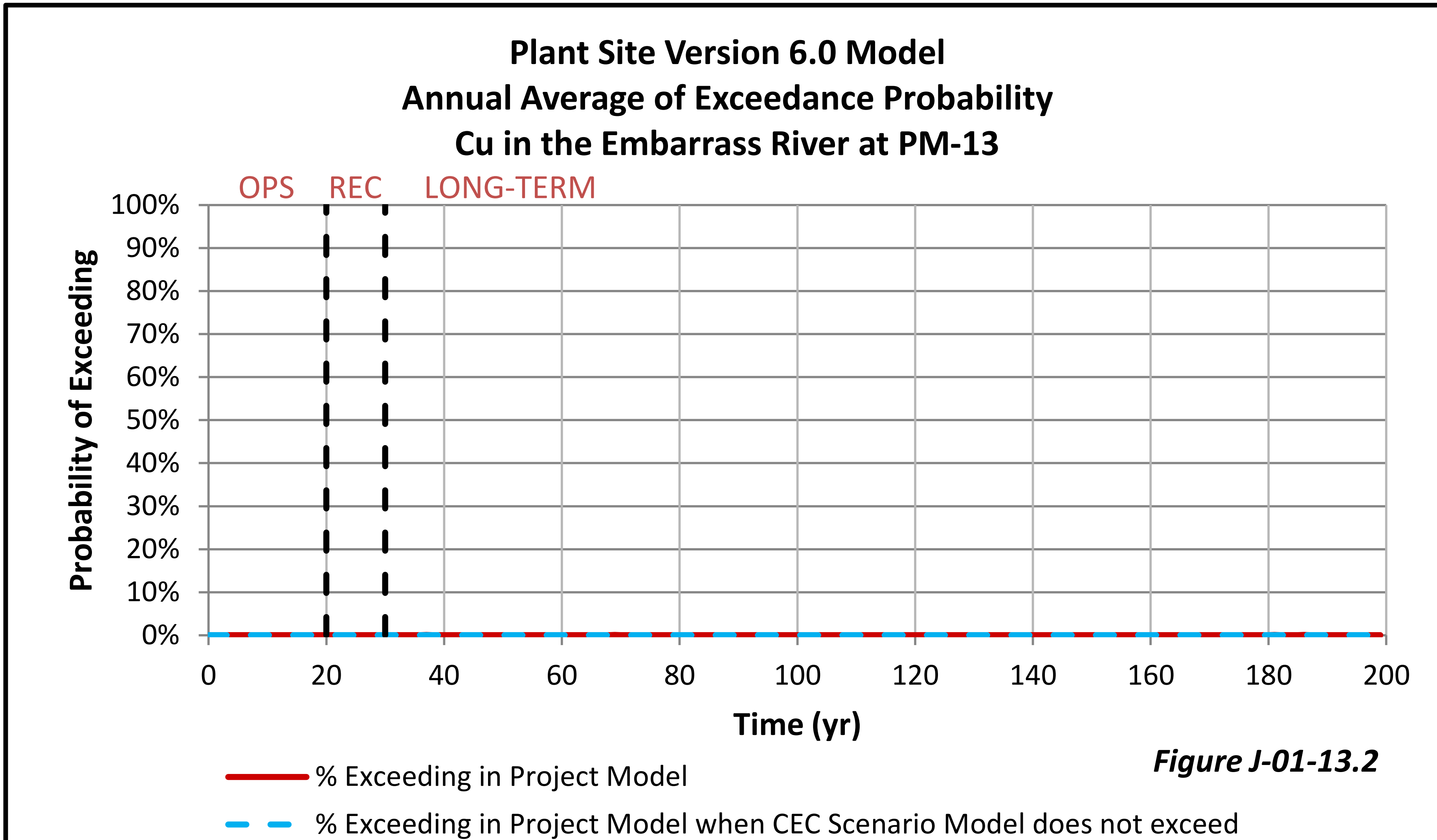

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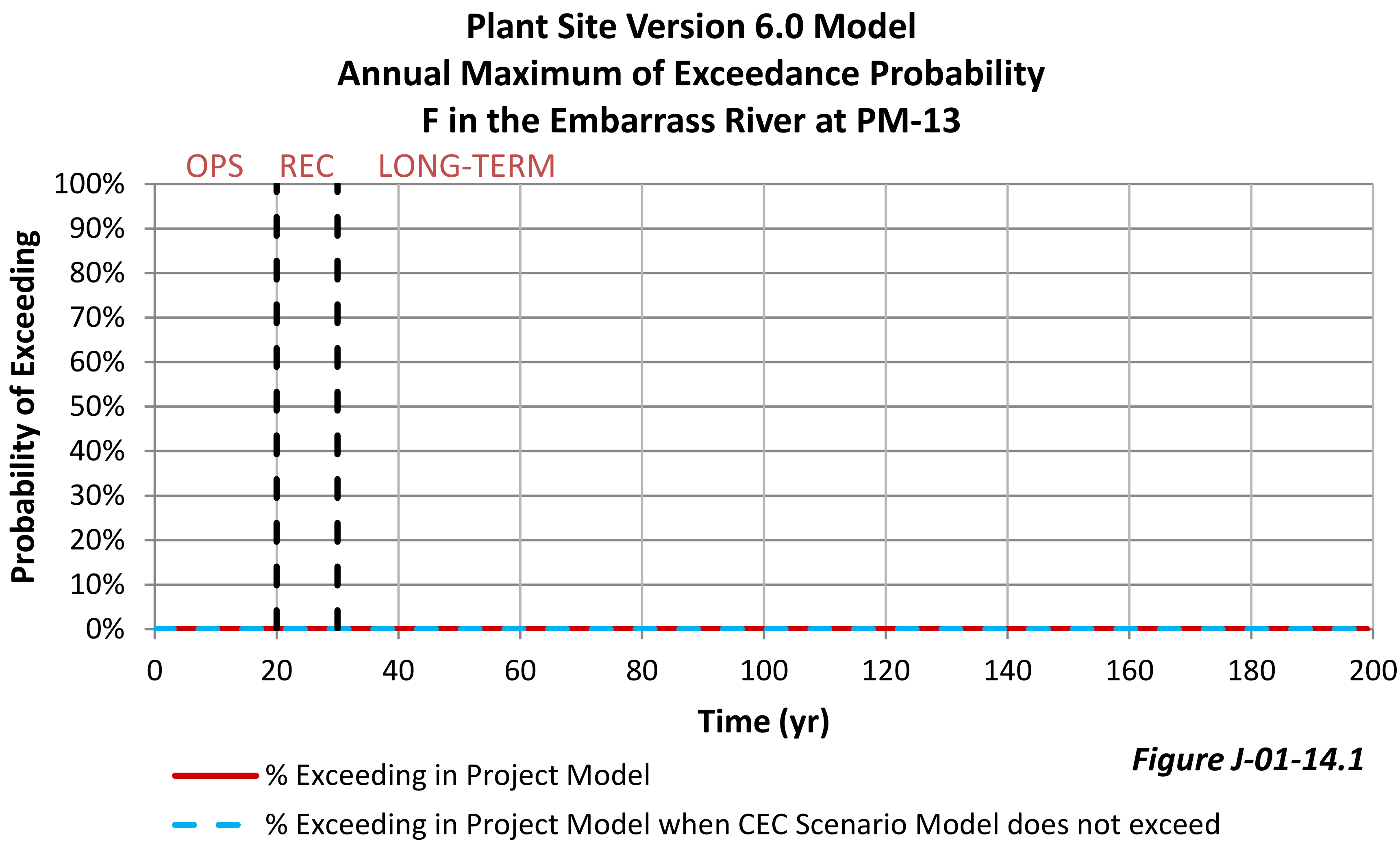

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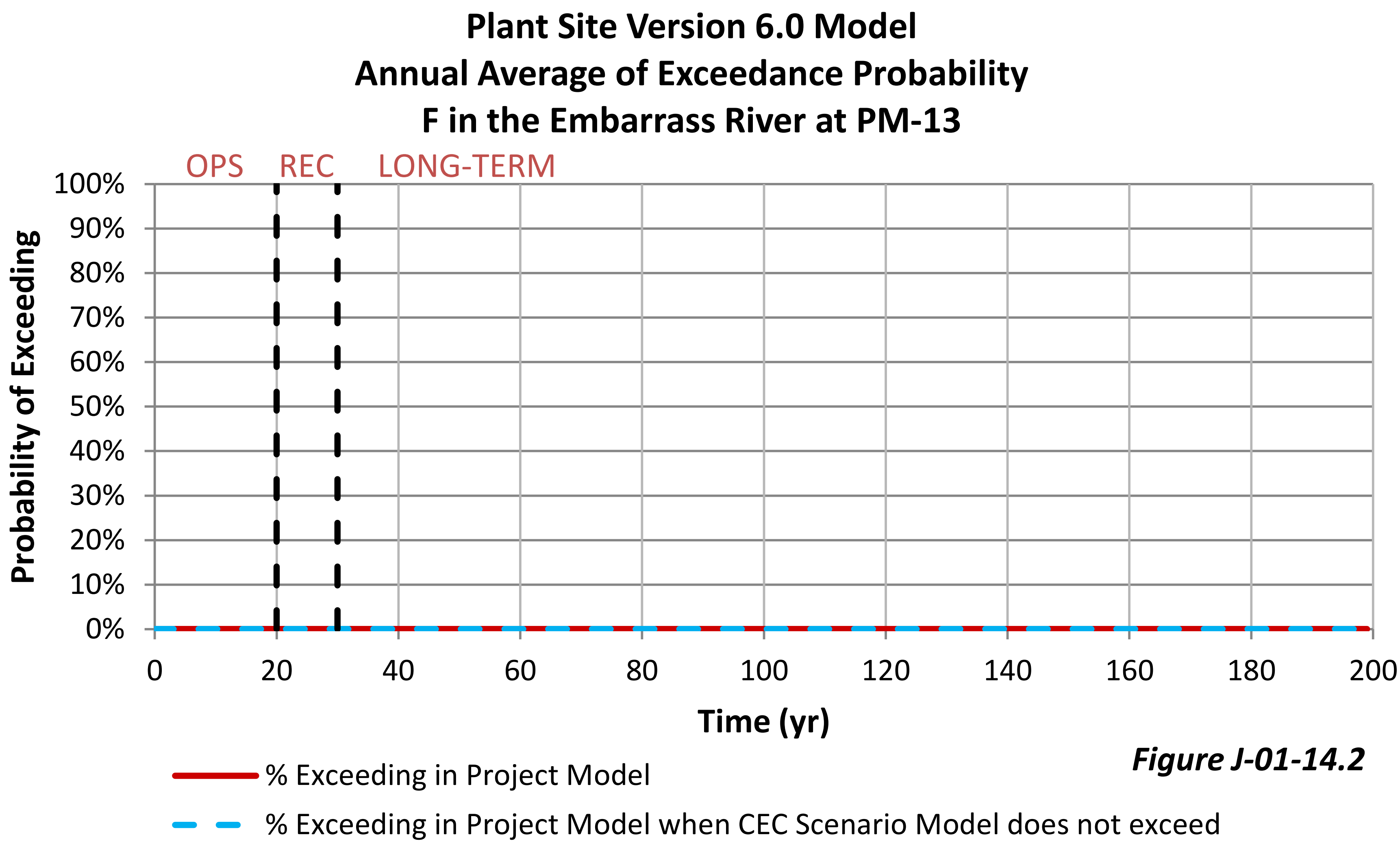

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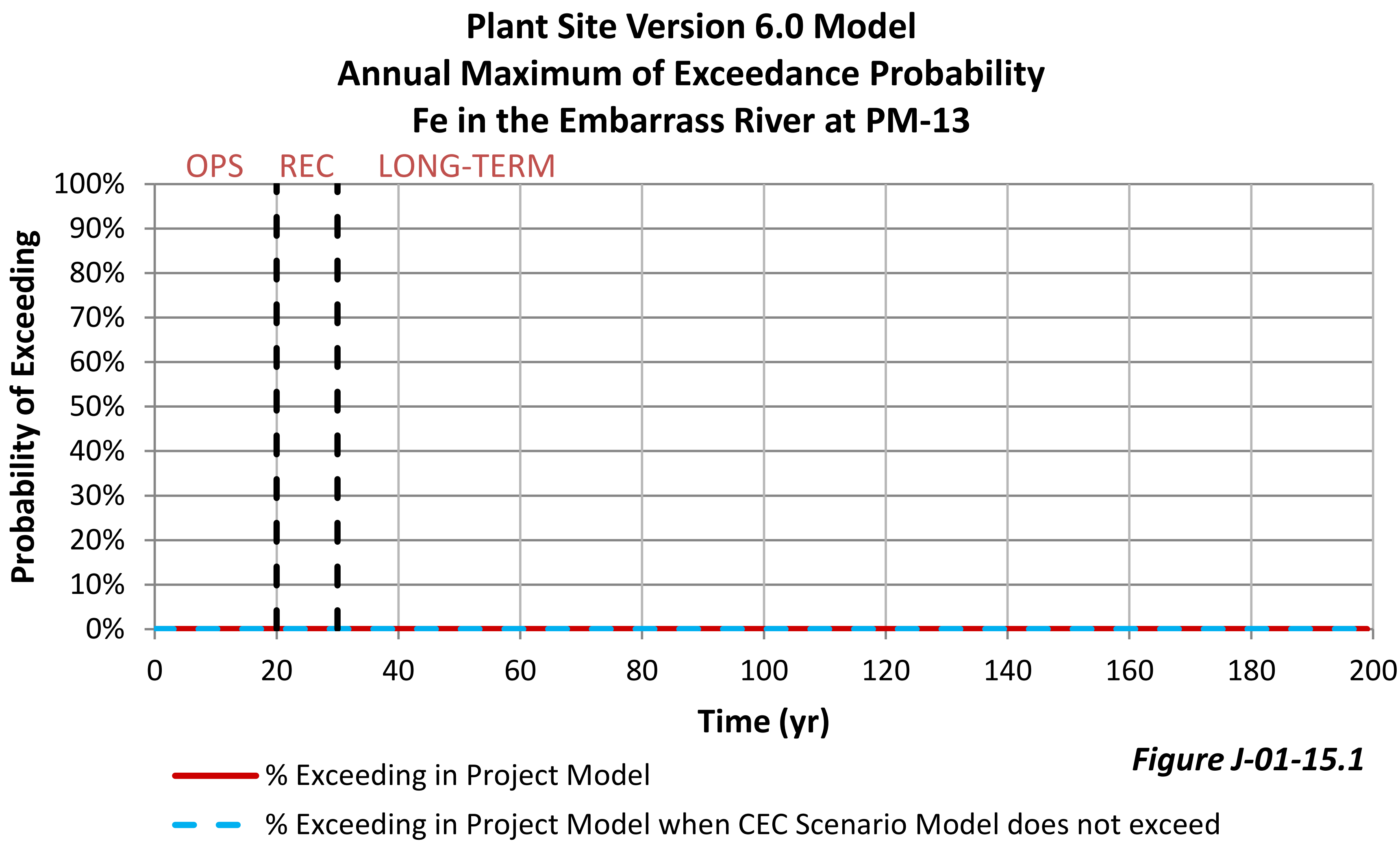

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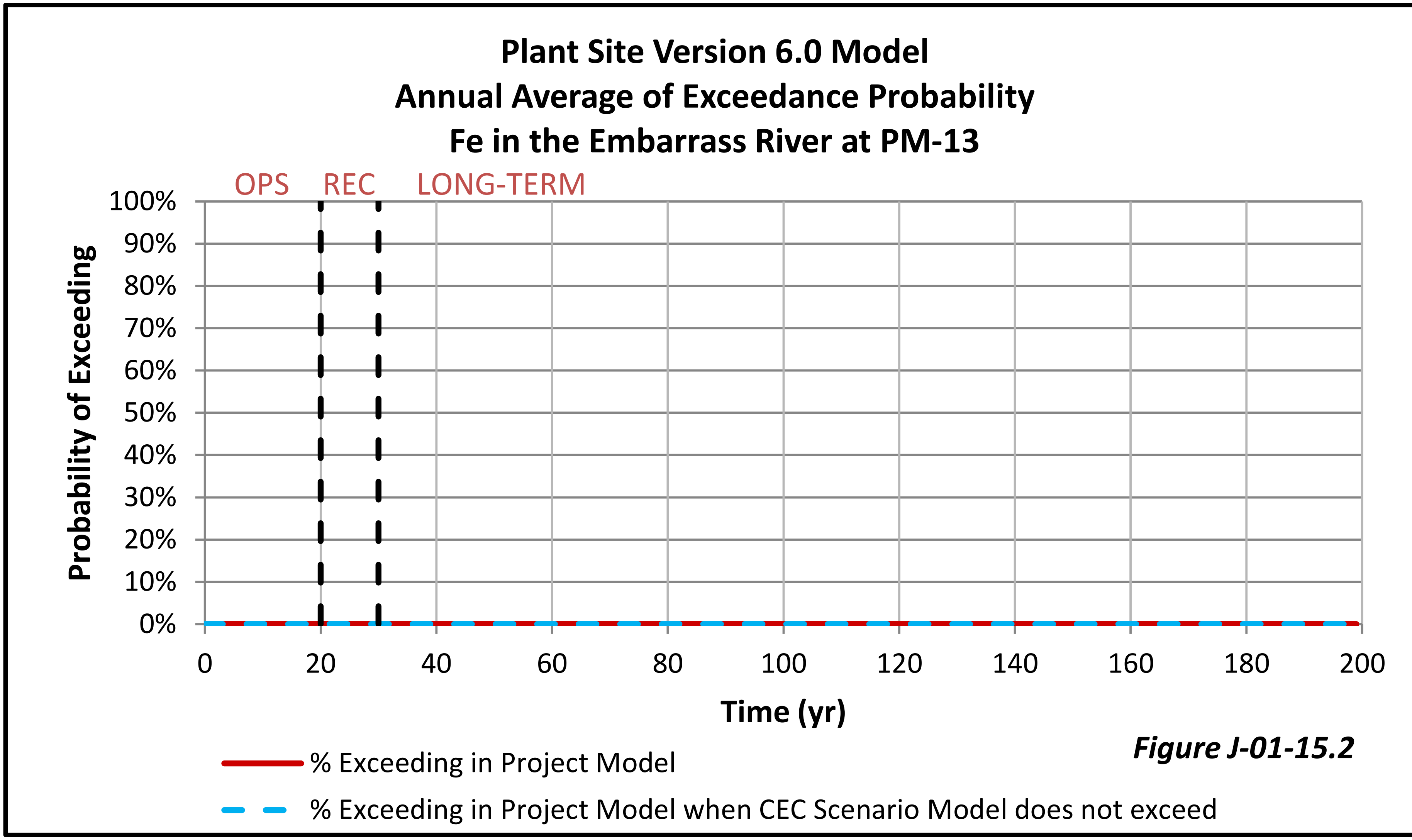

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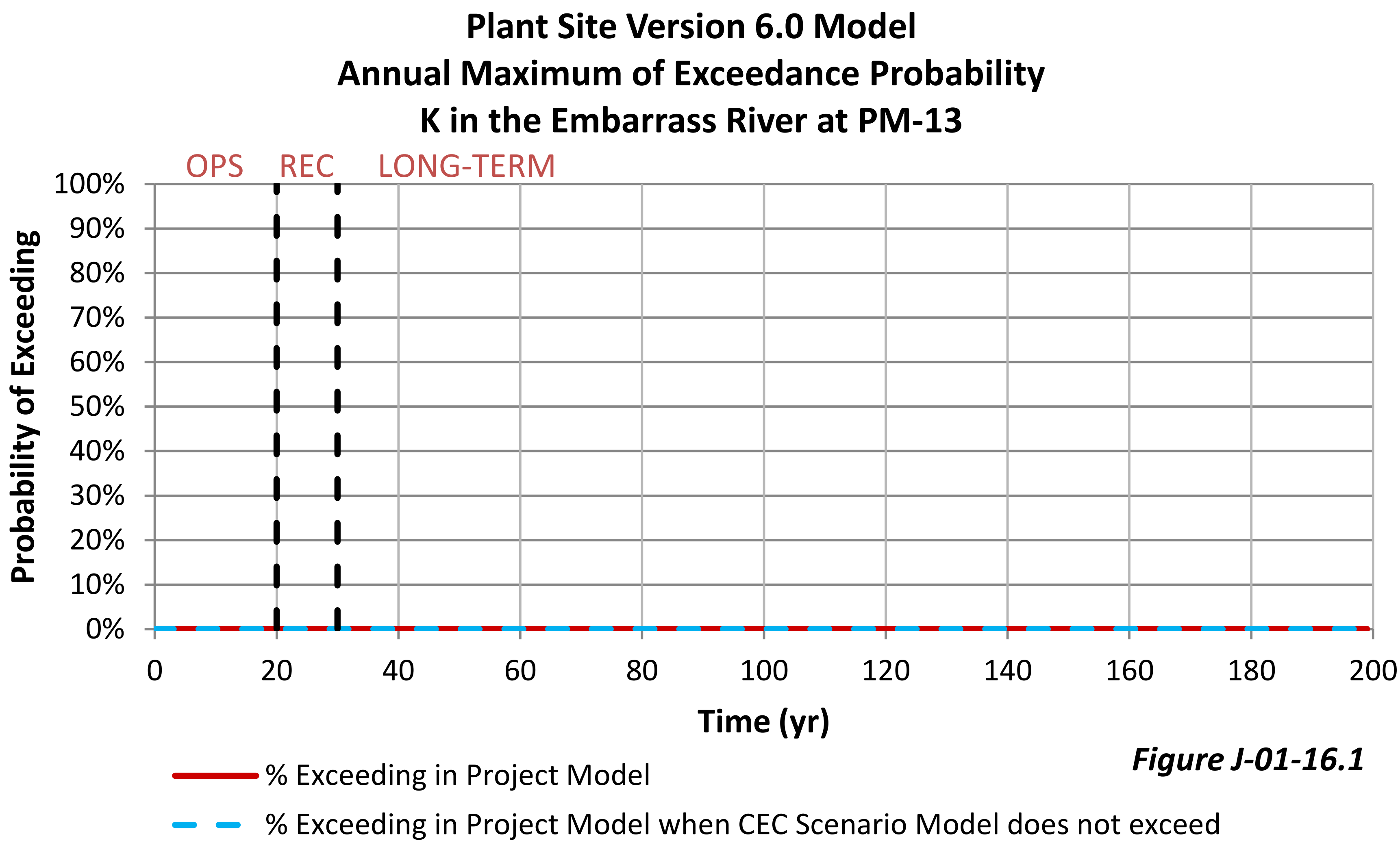

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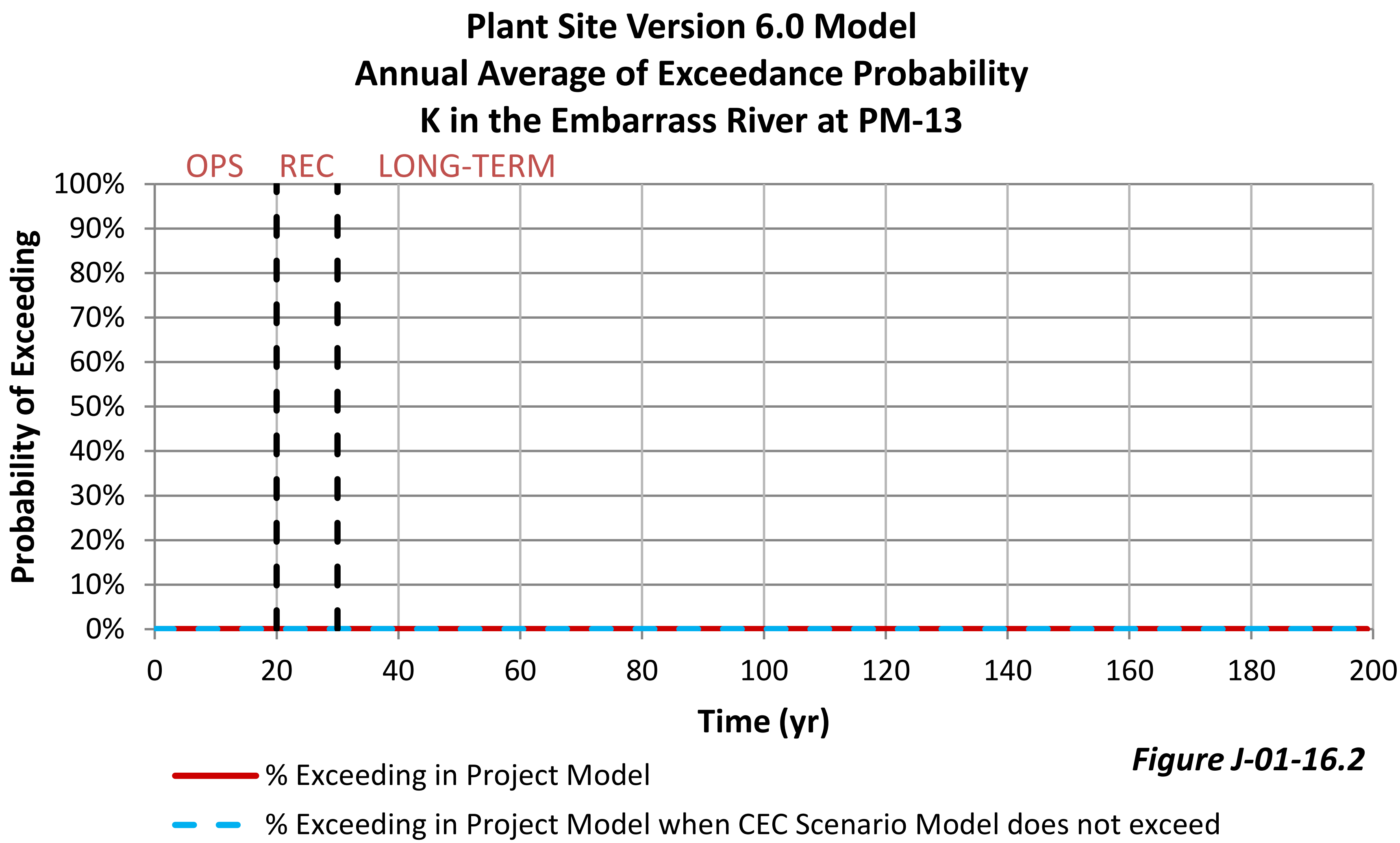

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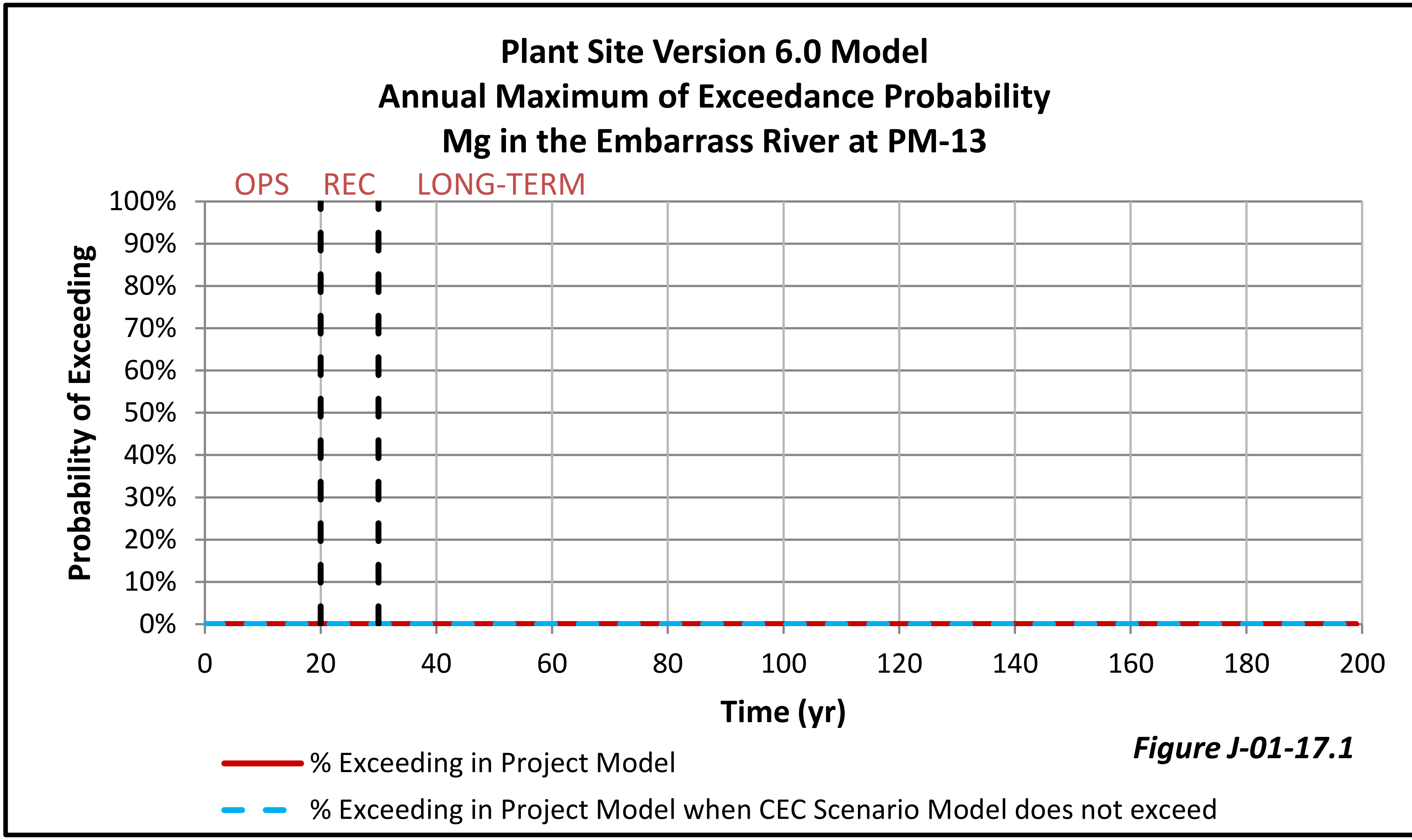

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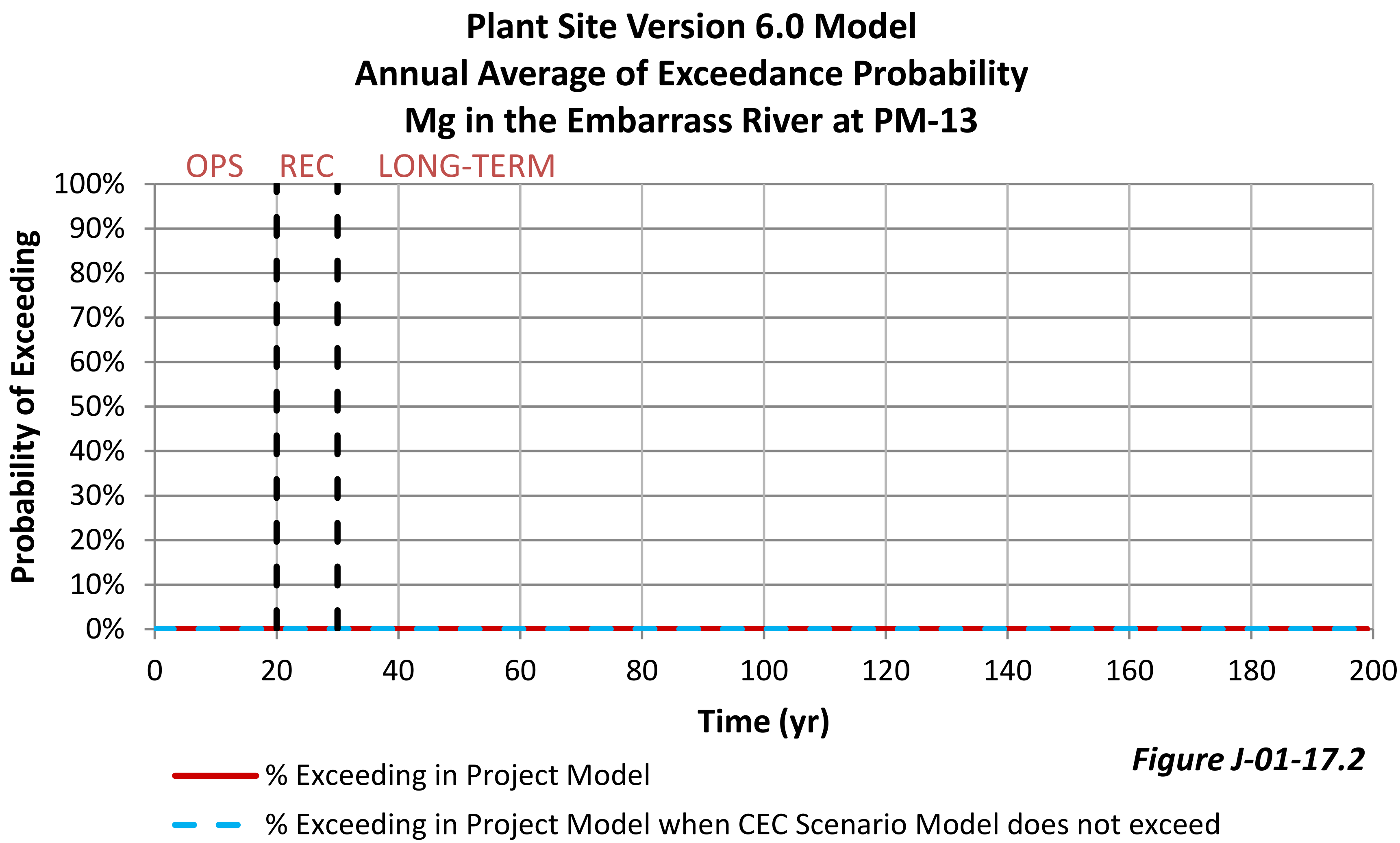

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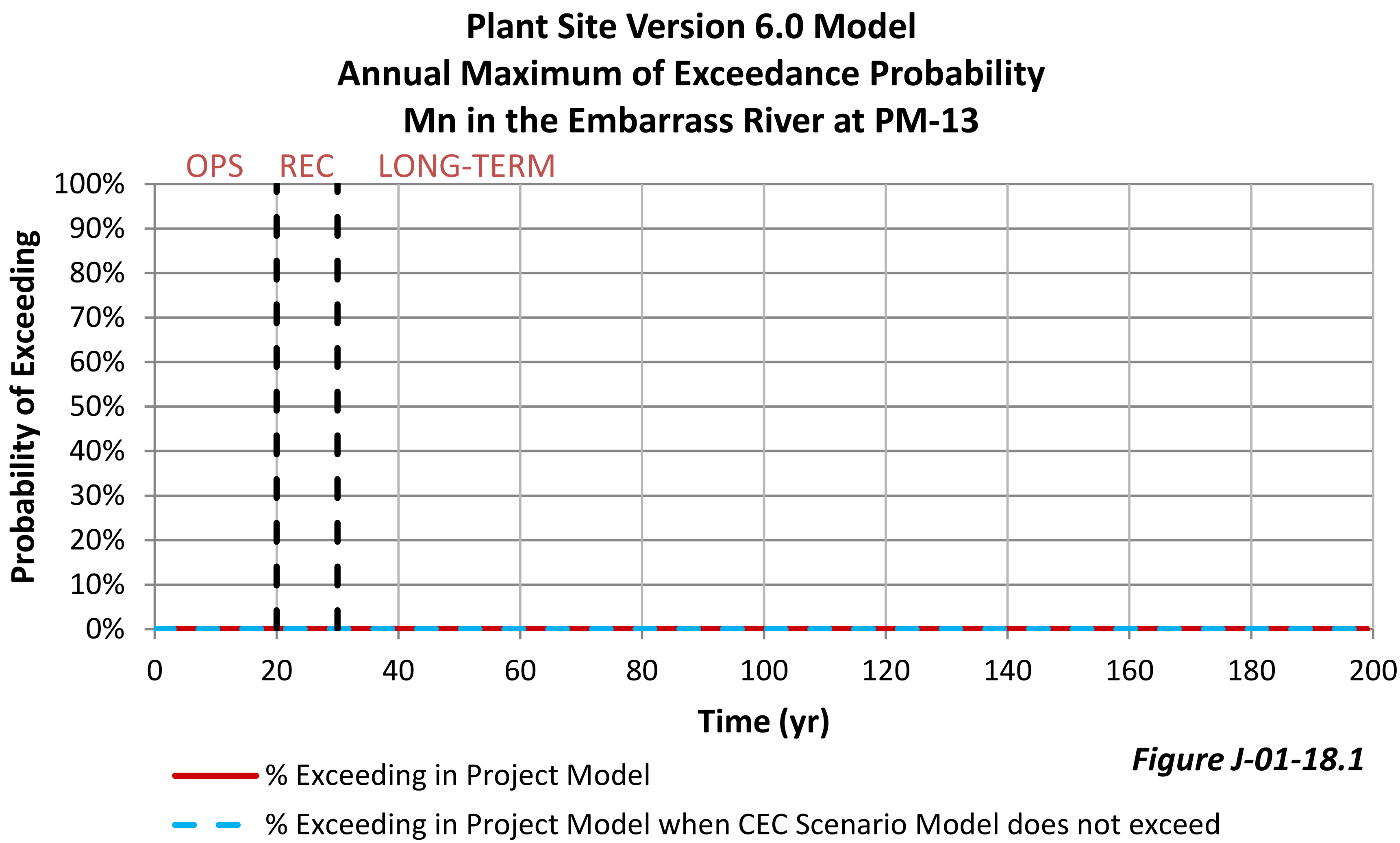

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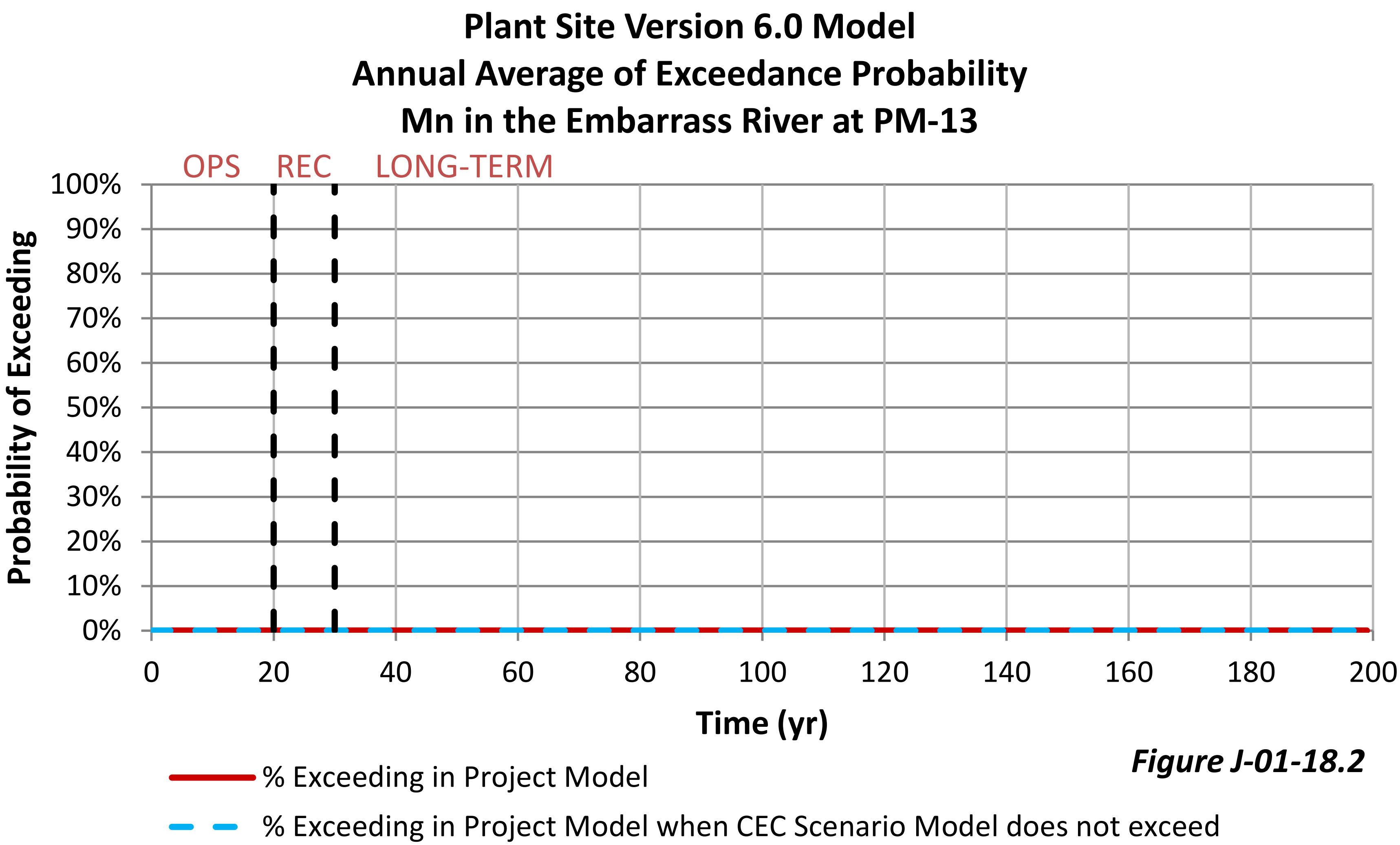

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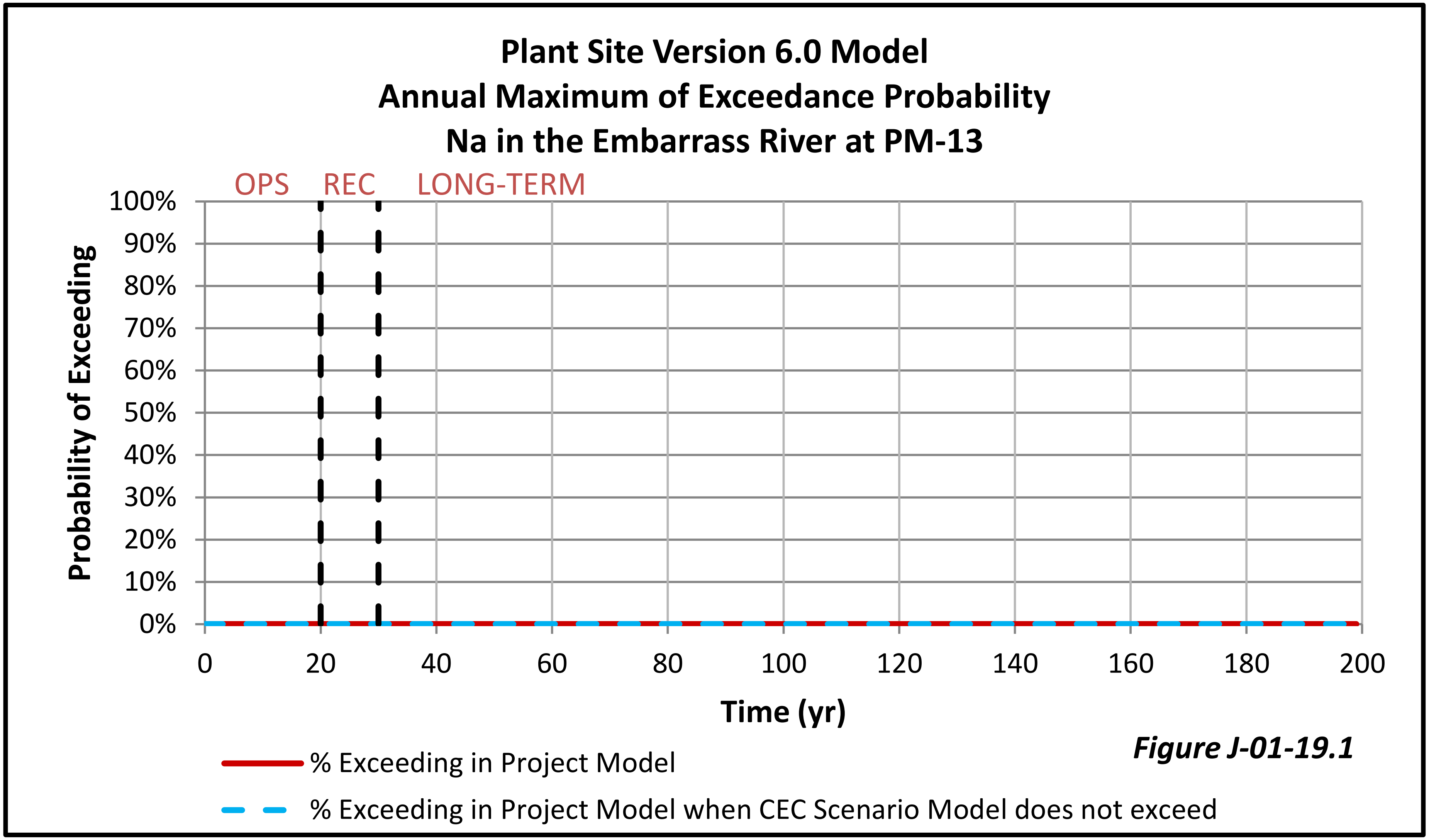

Plant Site Version 6.0 Model
Annual Maximum of Exceedance Probability
Na in the Embarrass River at PM-13
OPS
REC
LONG-TERM
Probability of Exceeding
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
20
40
60
80
100
120
140
160
180
200
Time (yr)
% Exceeding in Project Model
% Exceeding in Project Model when CEC Scenario Model does not exceed
Figure J-01-19.1

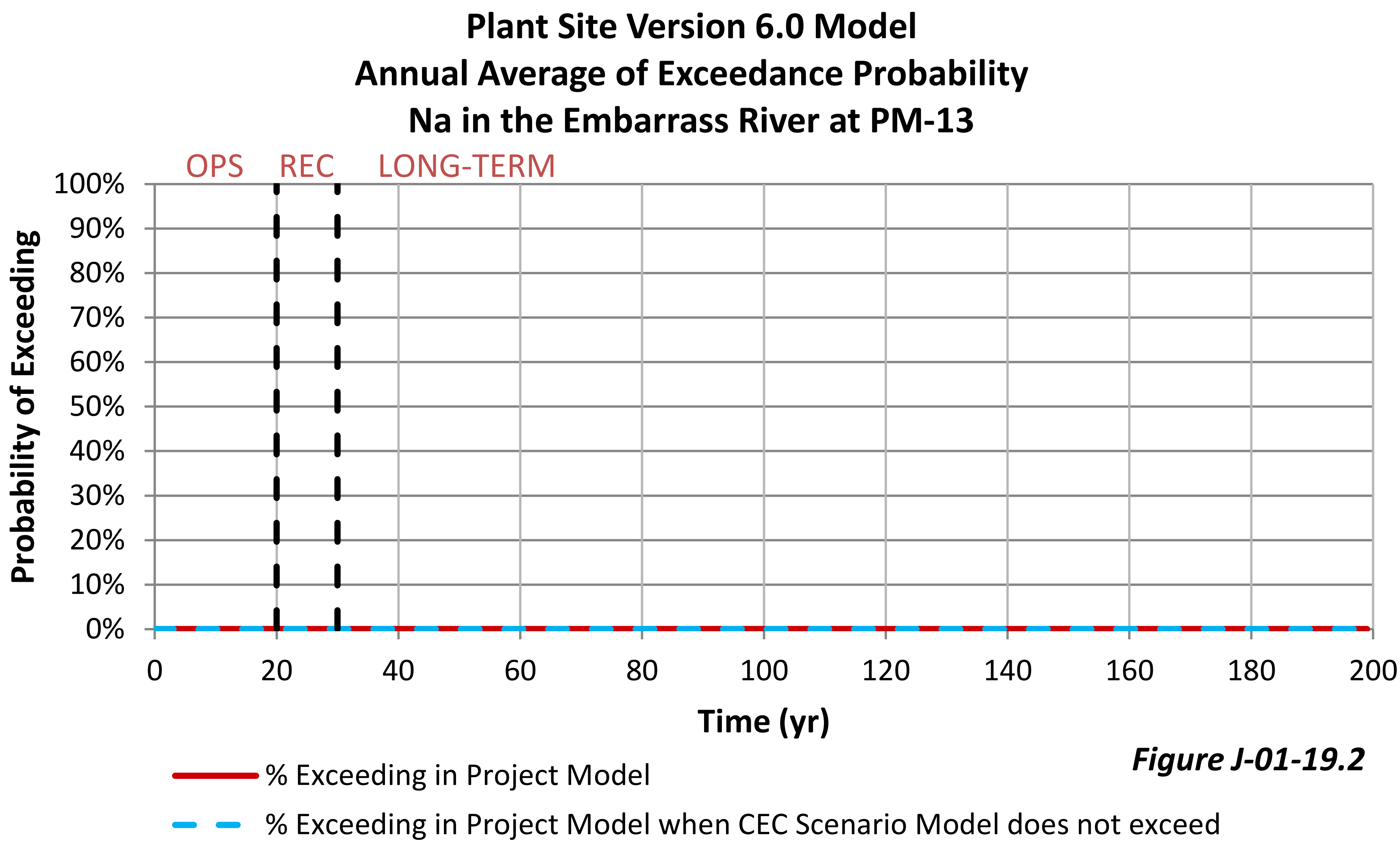
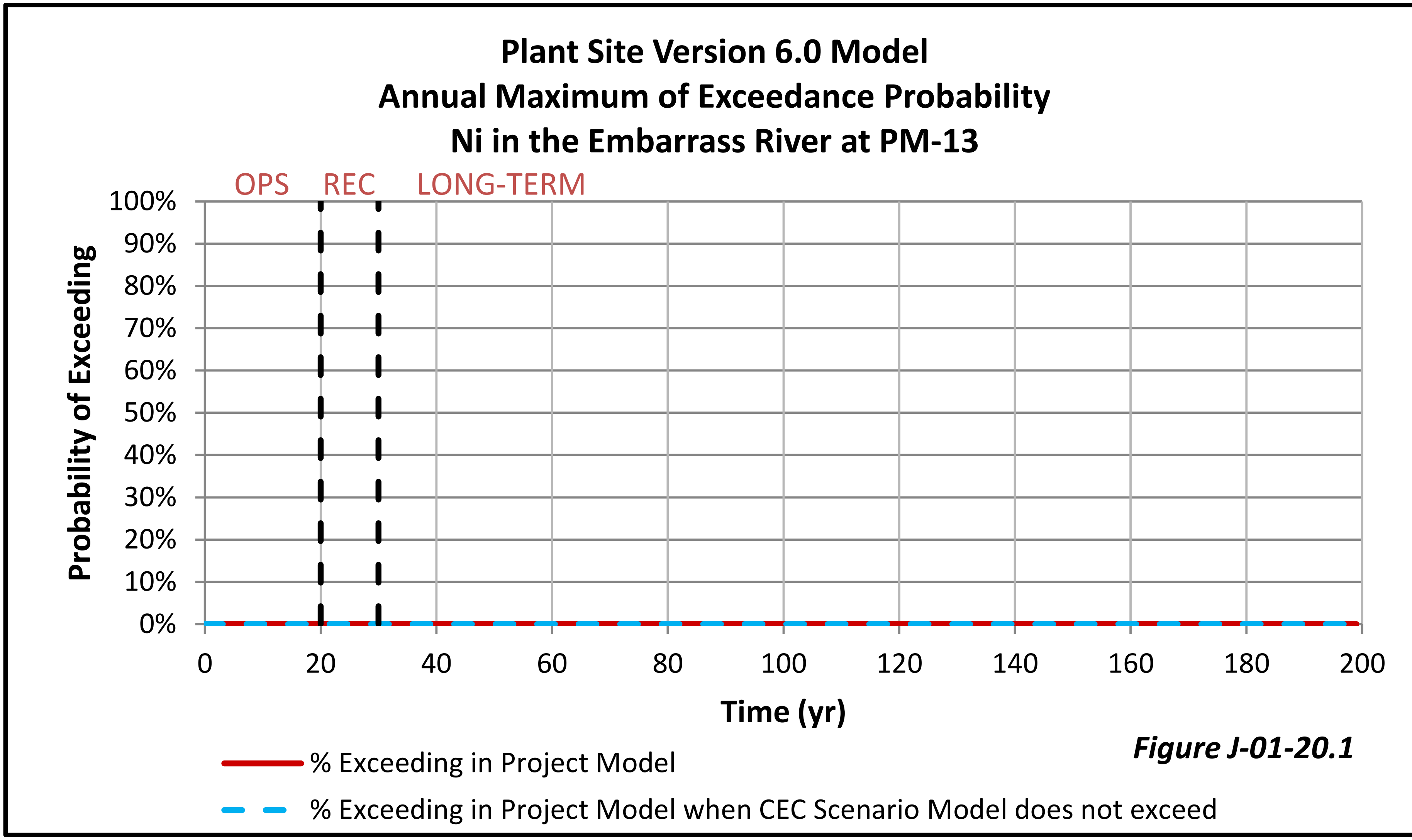


Figure J-01-19.2



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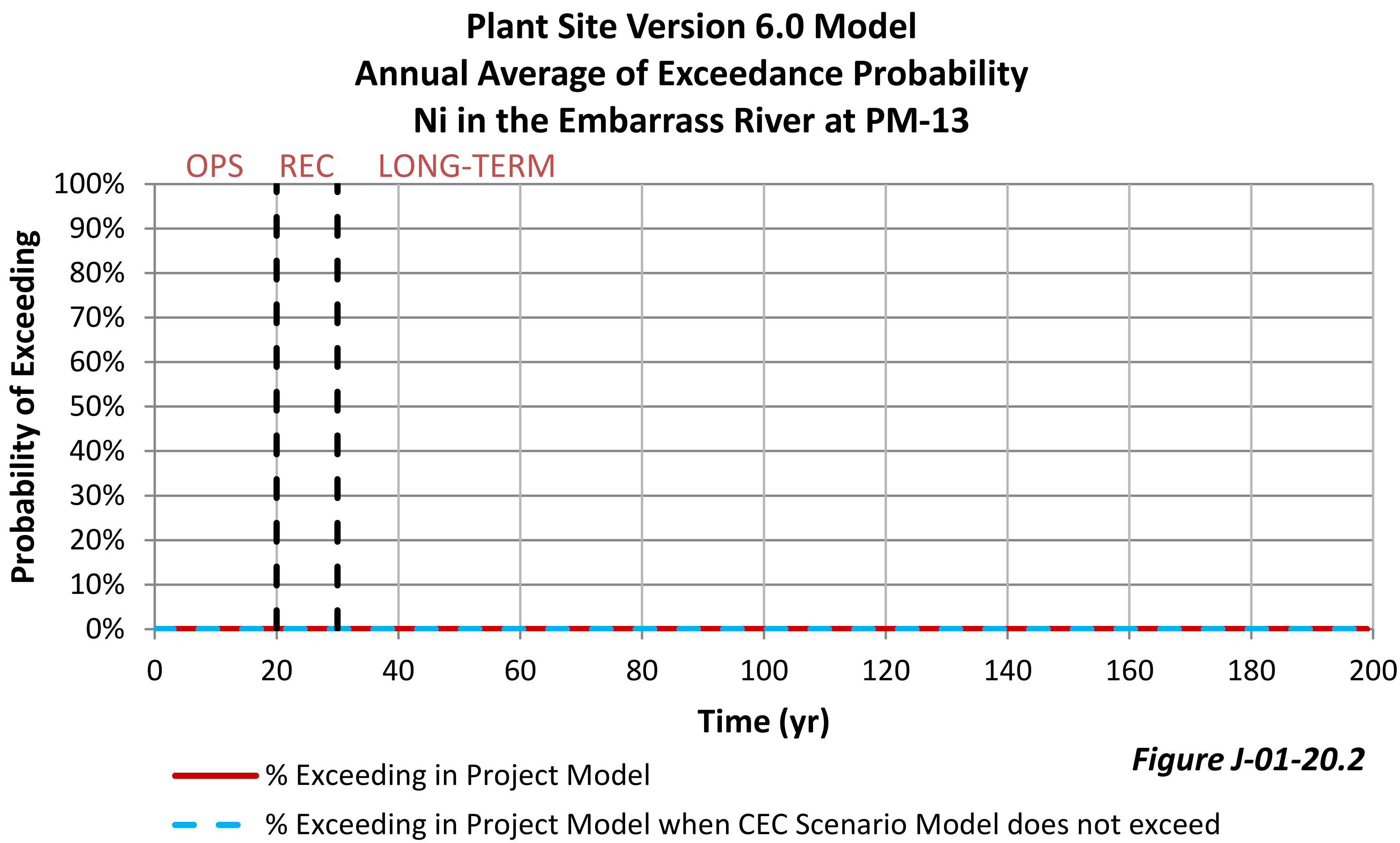

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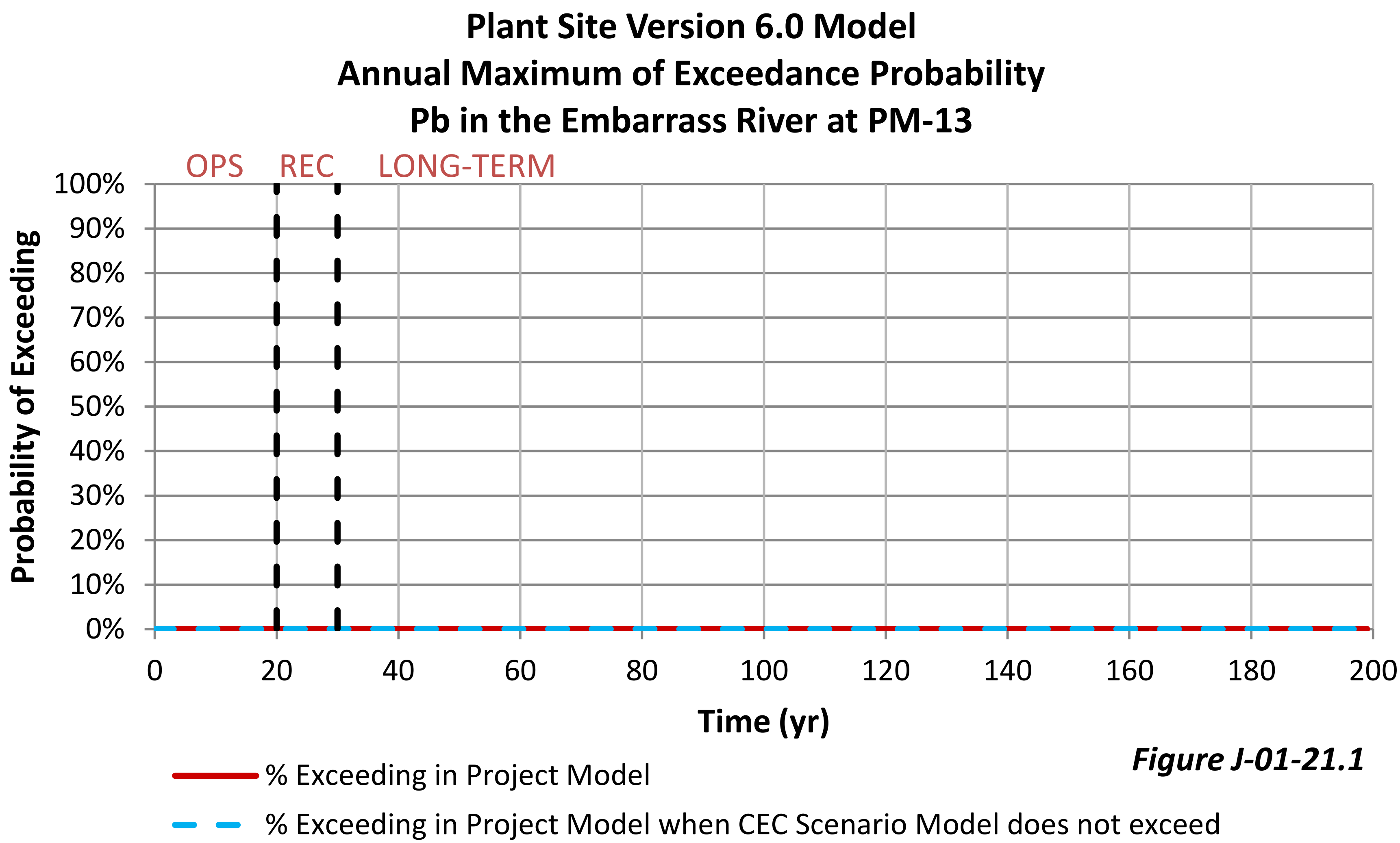

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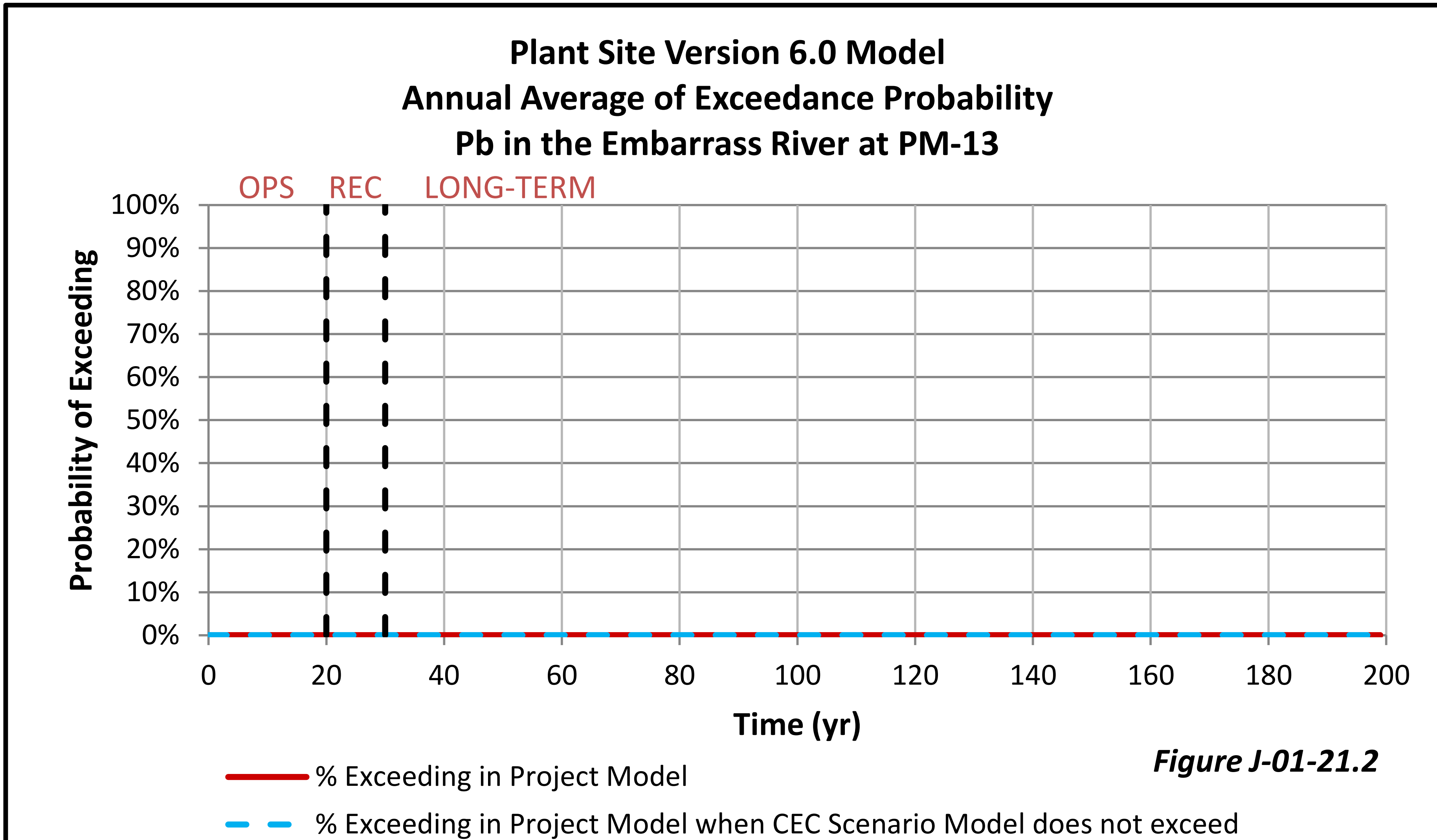

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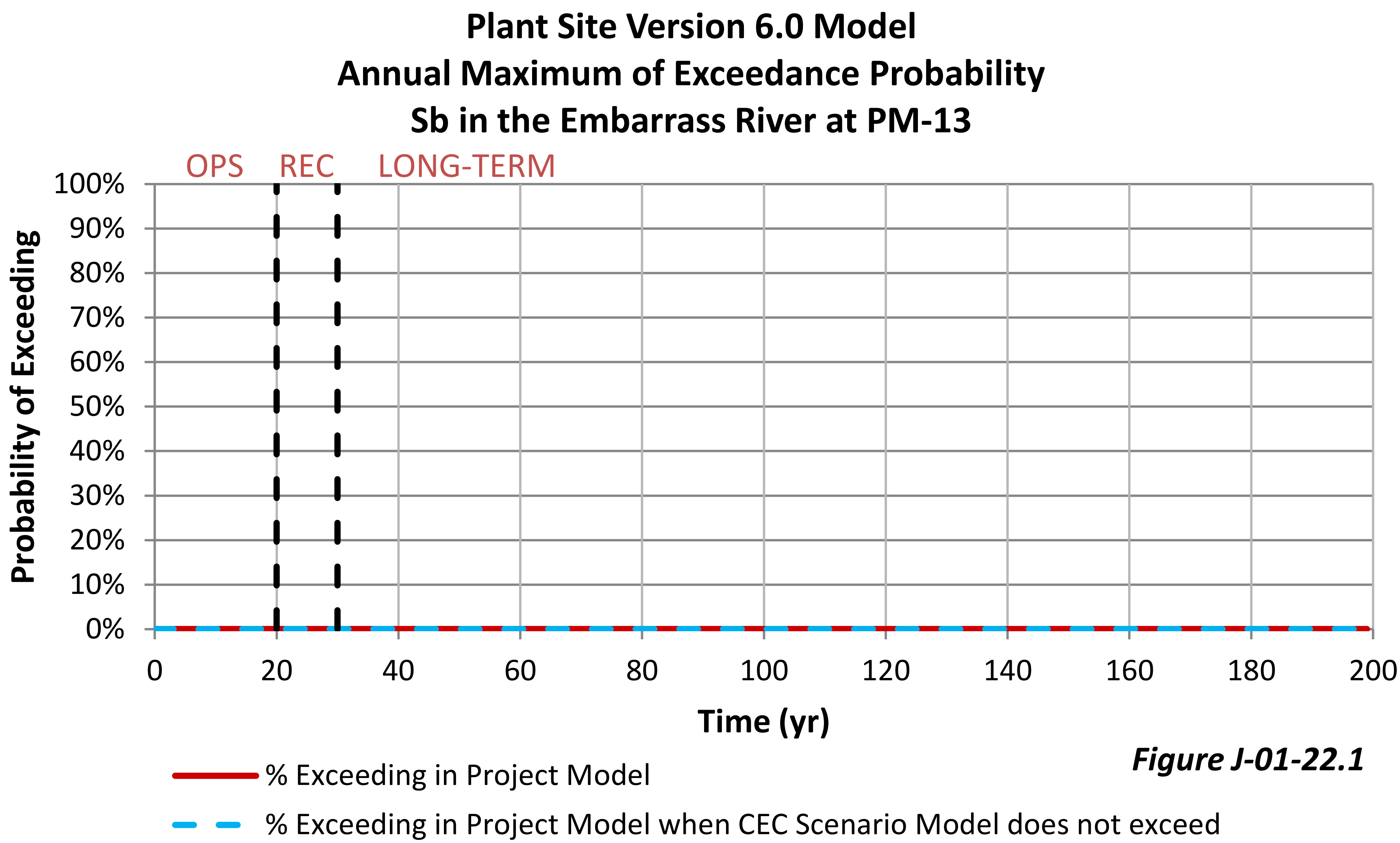

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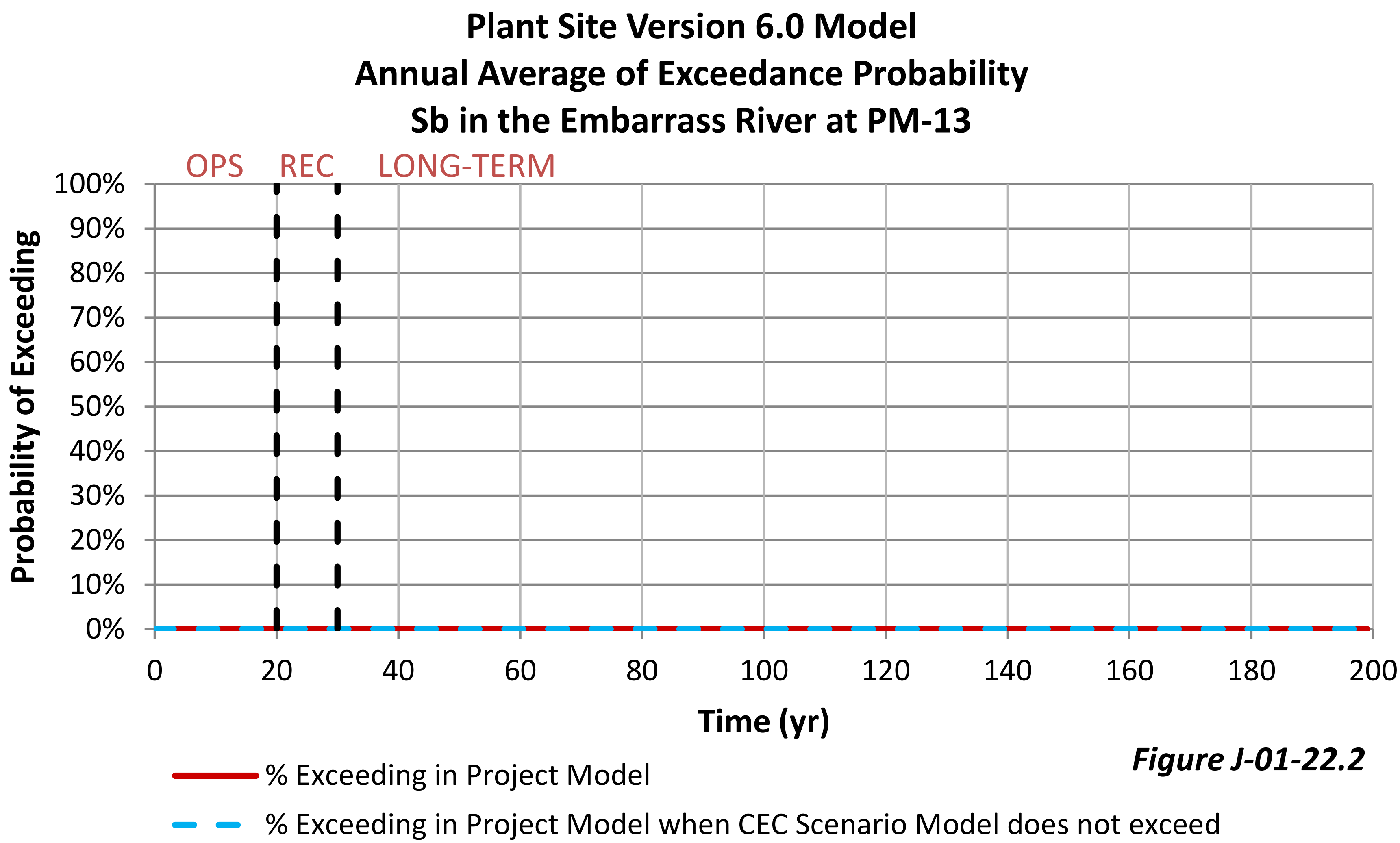

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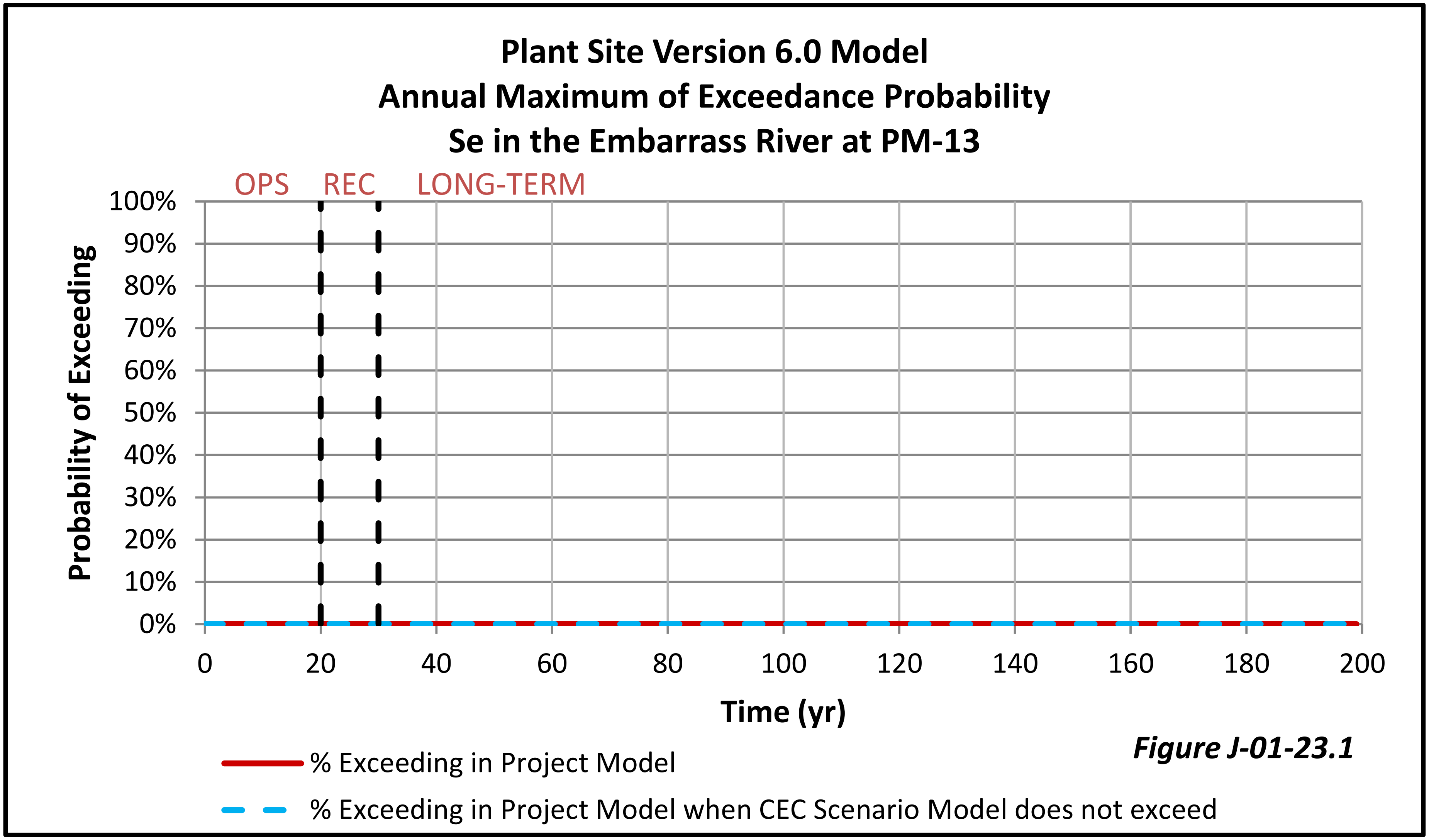


Figure J-01-23.1

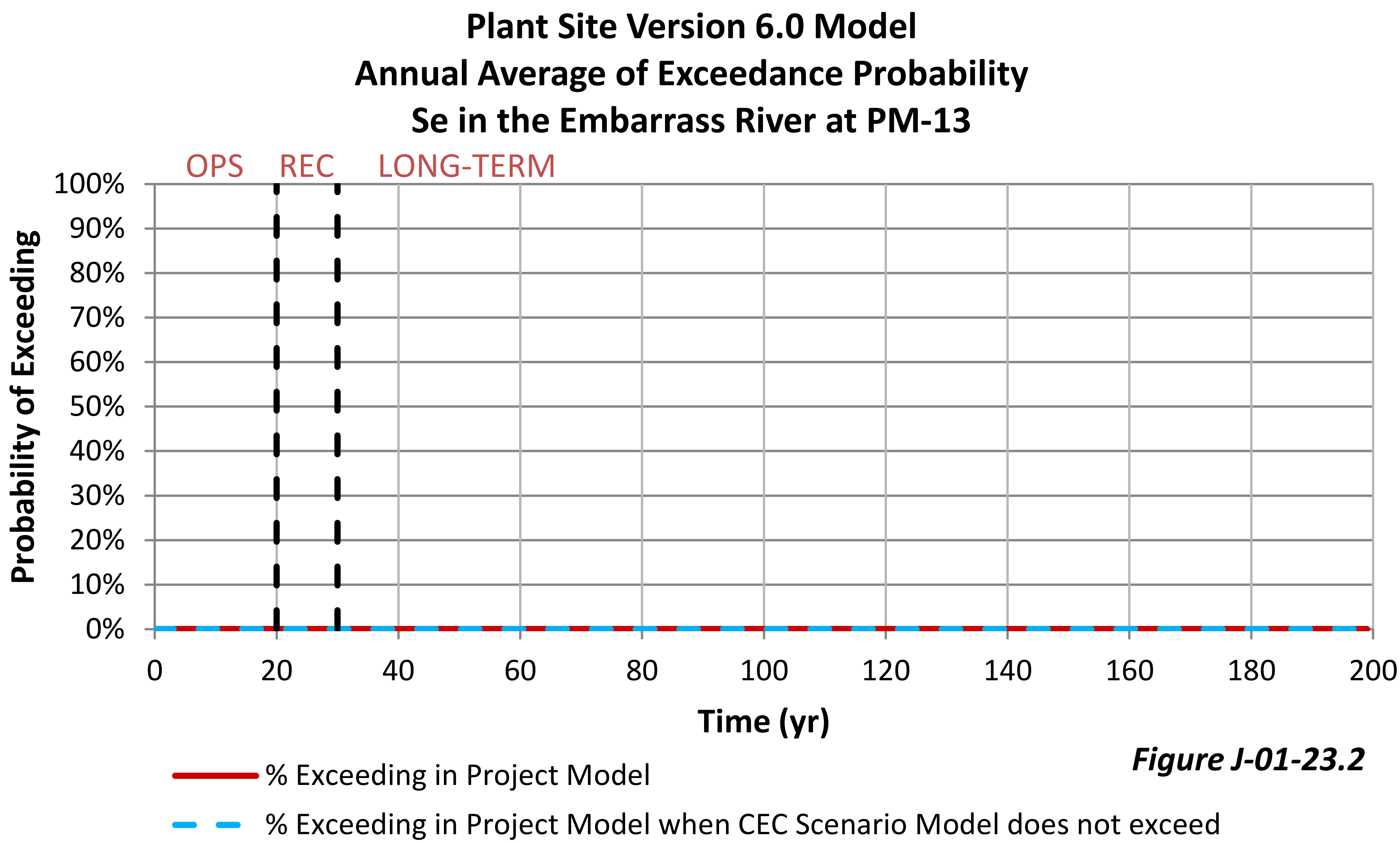
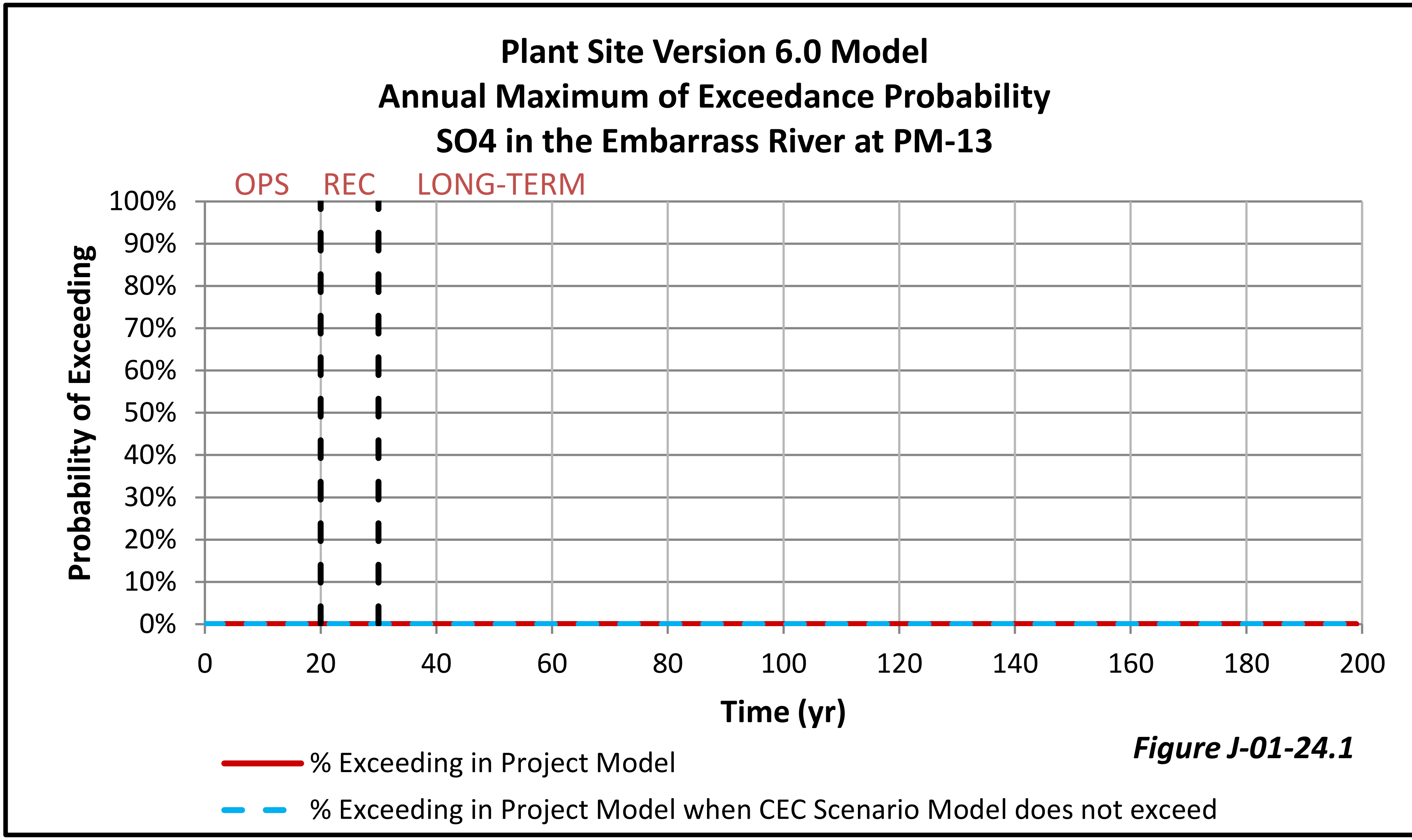


Figure J-01-23.2



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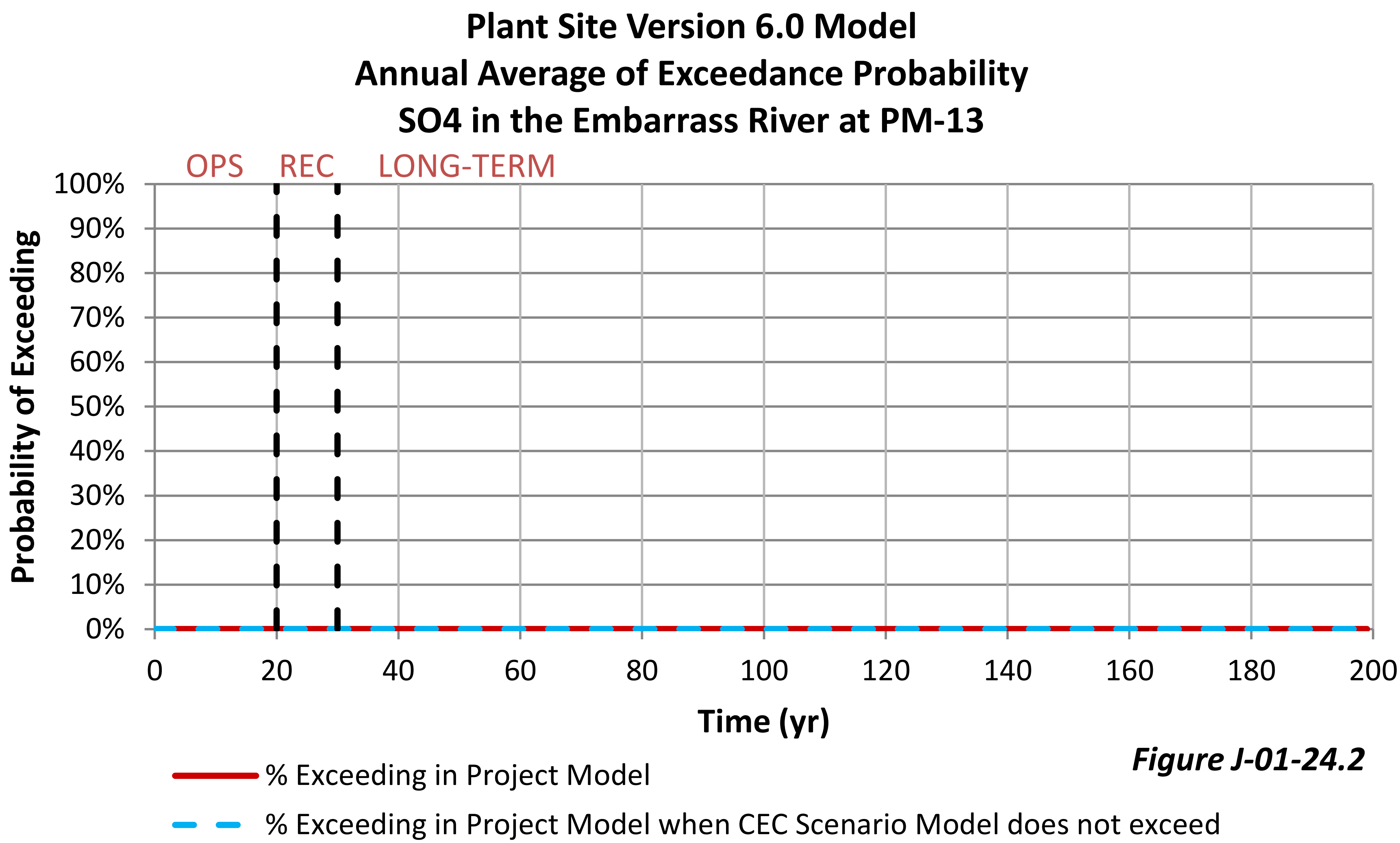

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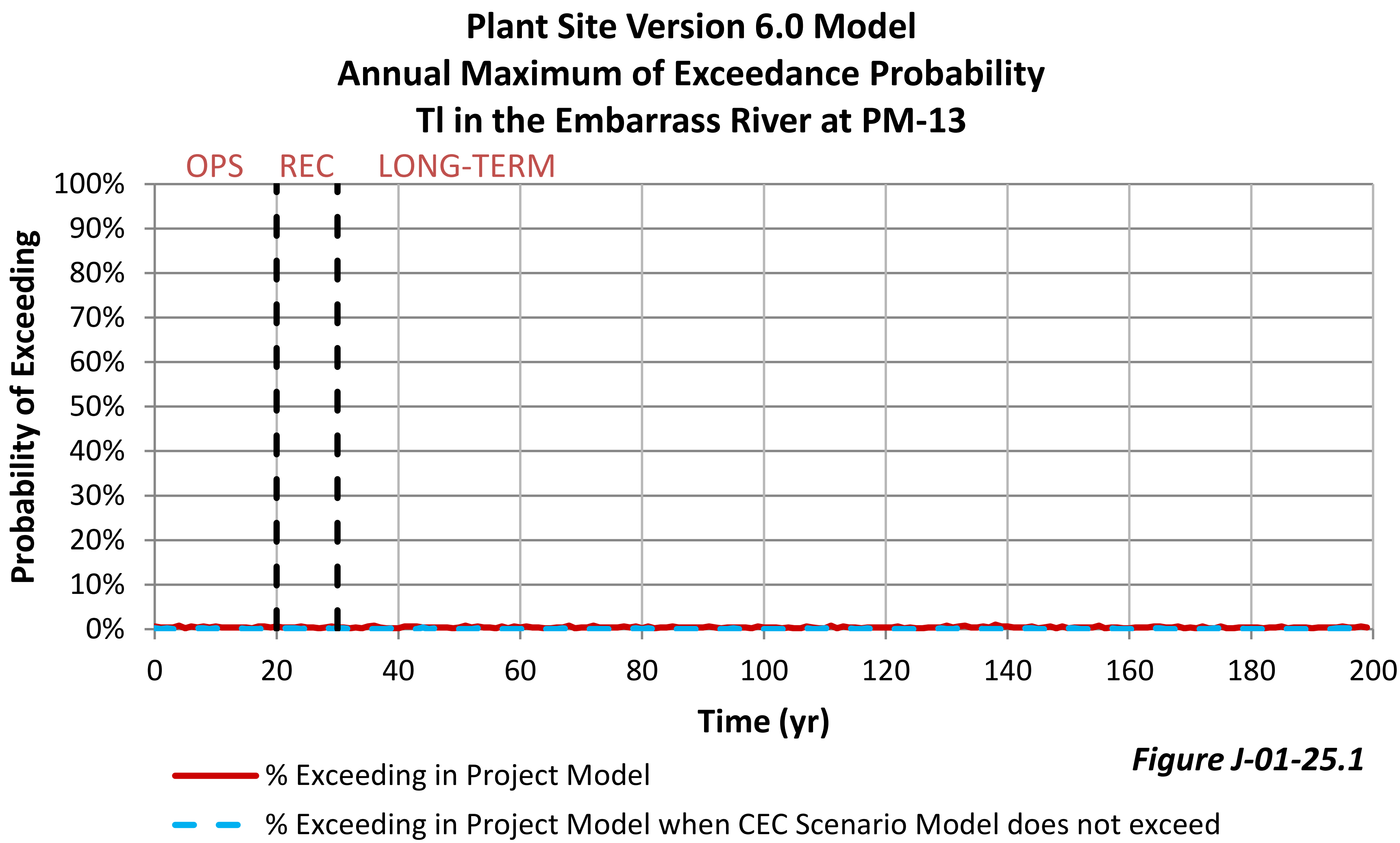

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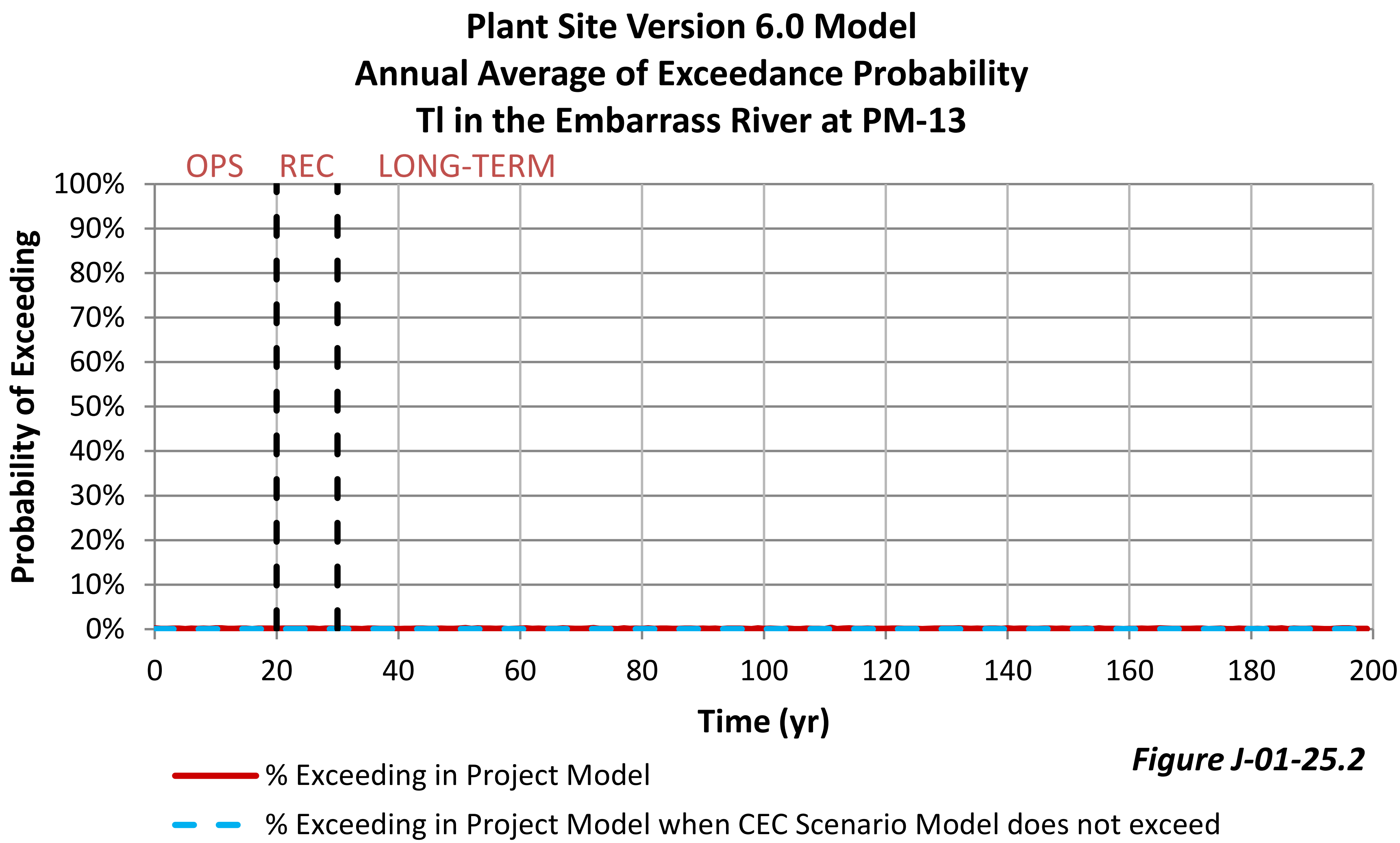
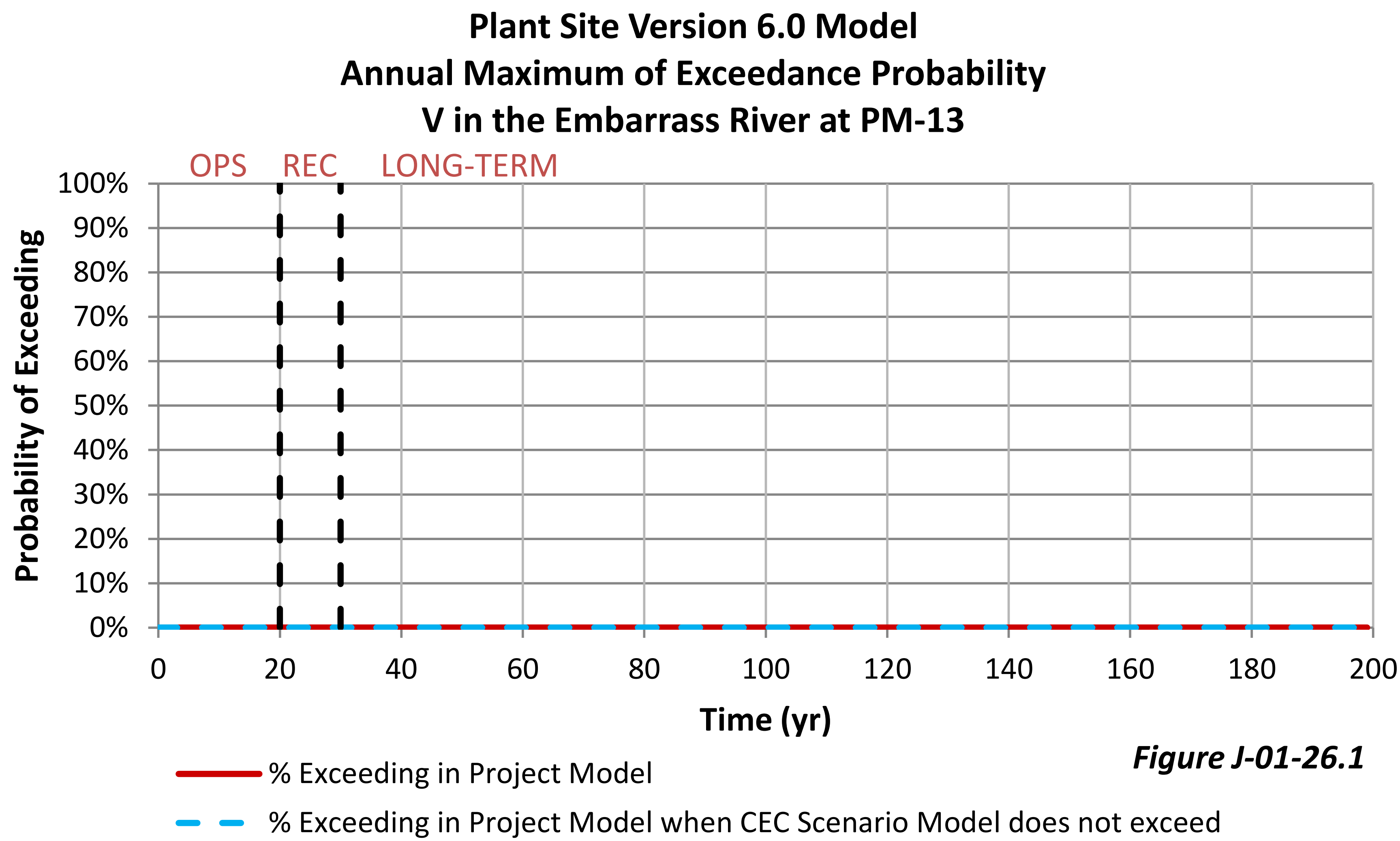


Figure J-01-25.2



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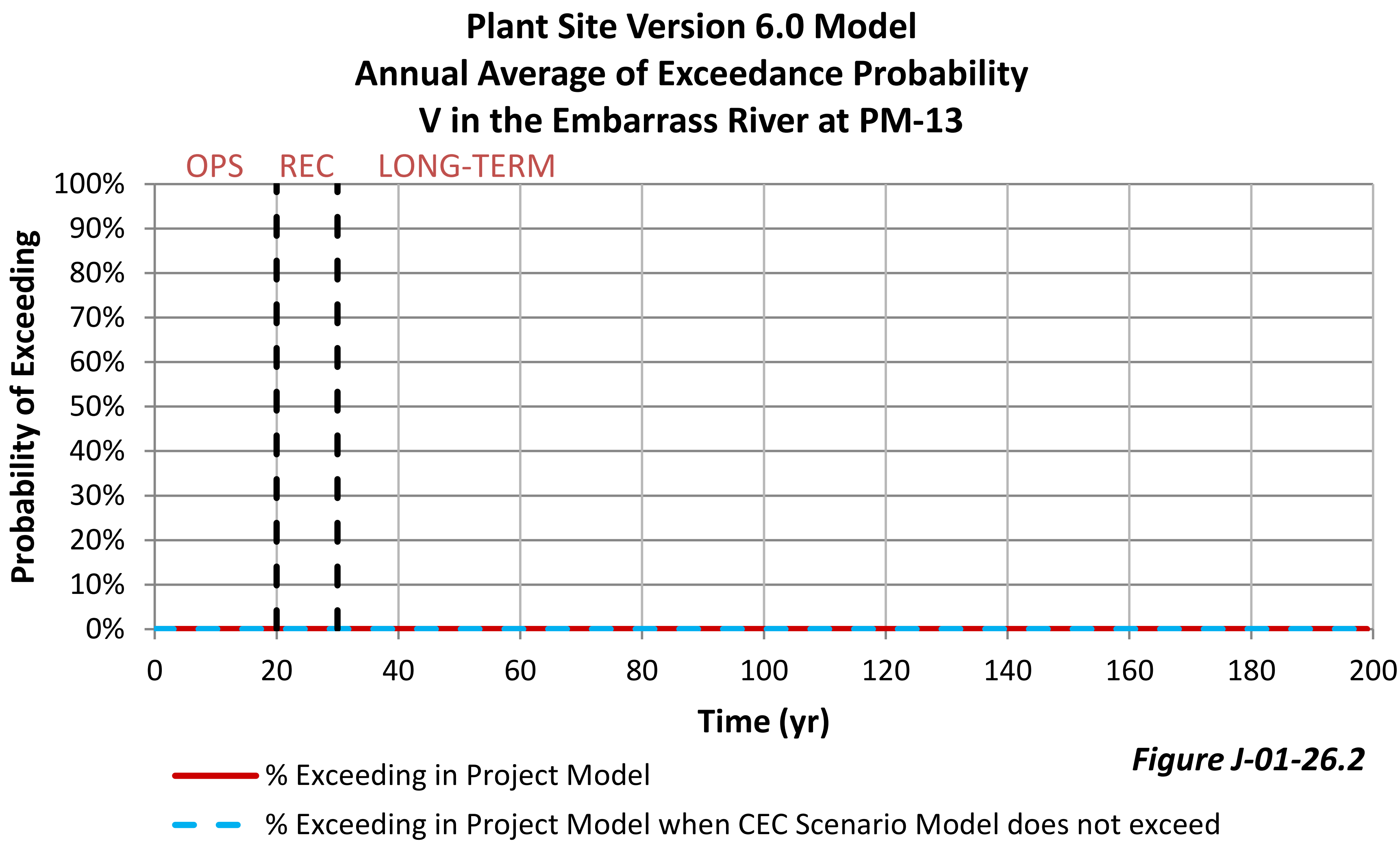
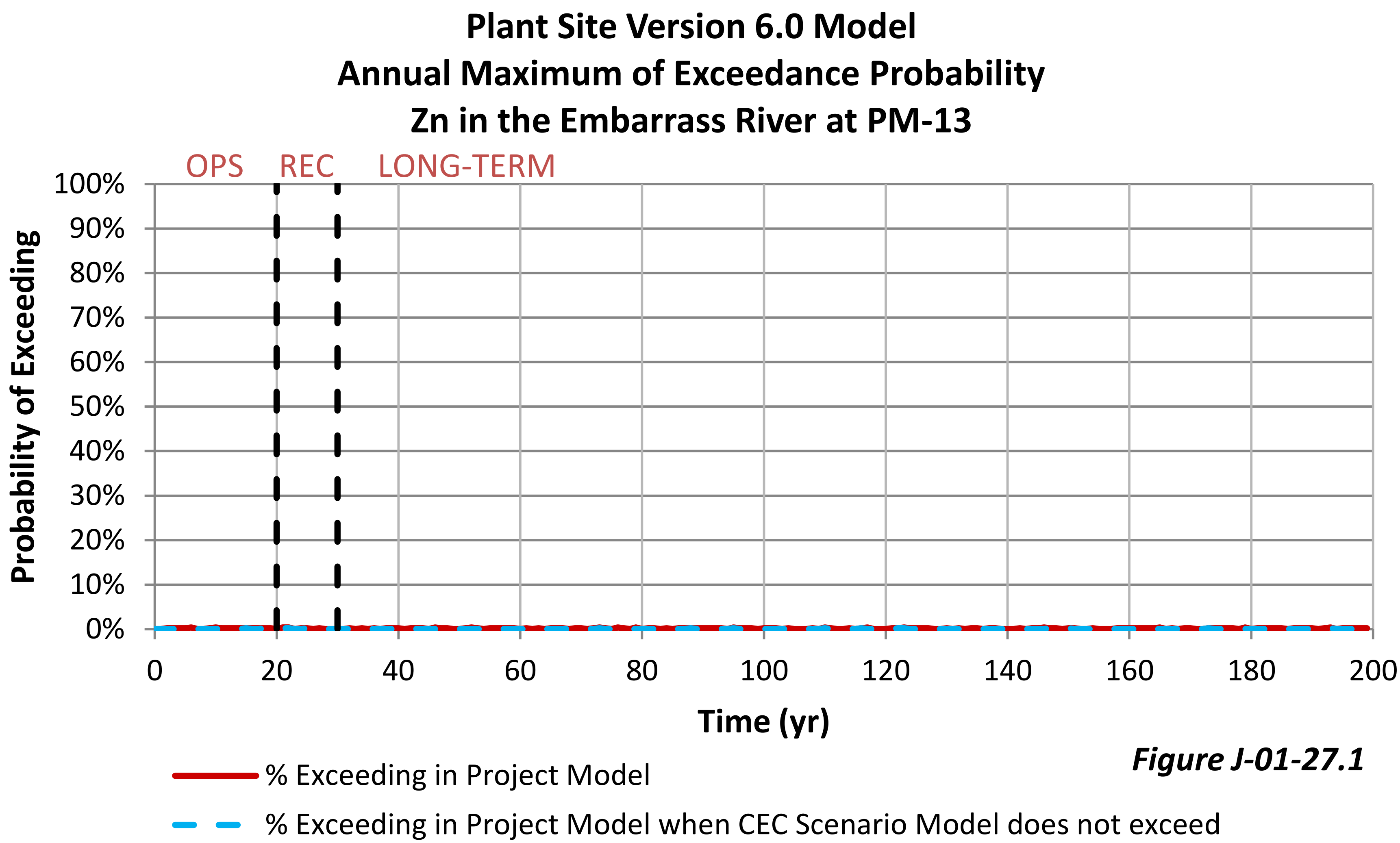


Figure J-01-26.2



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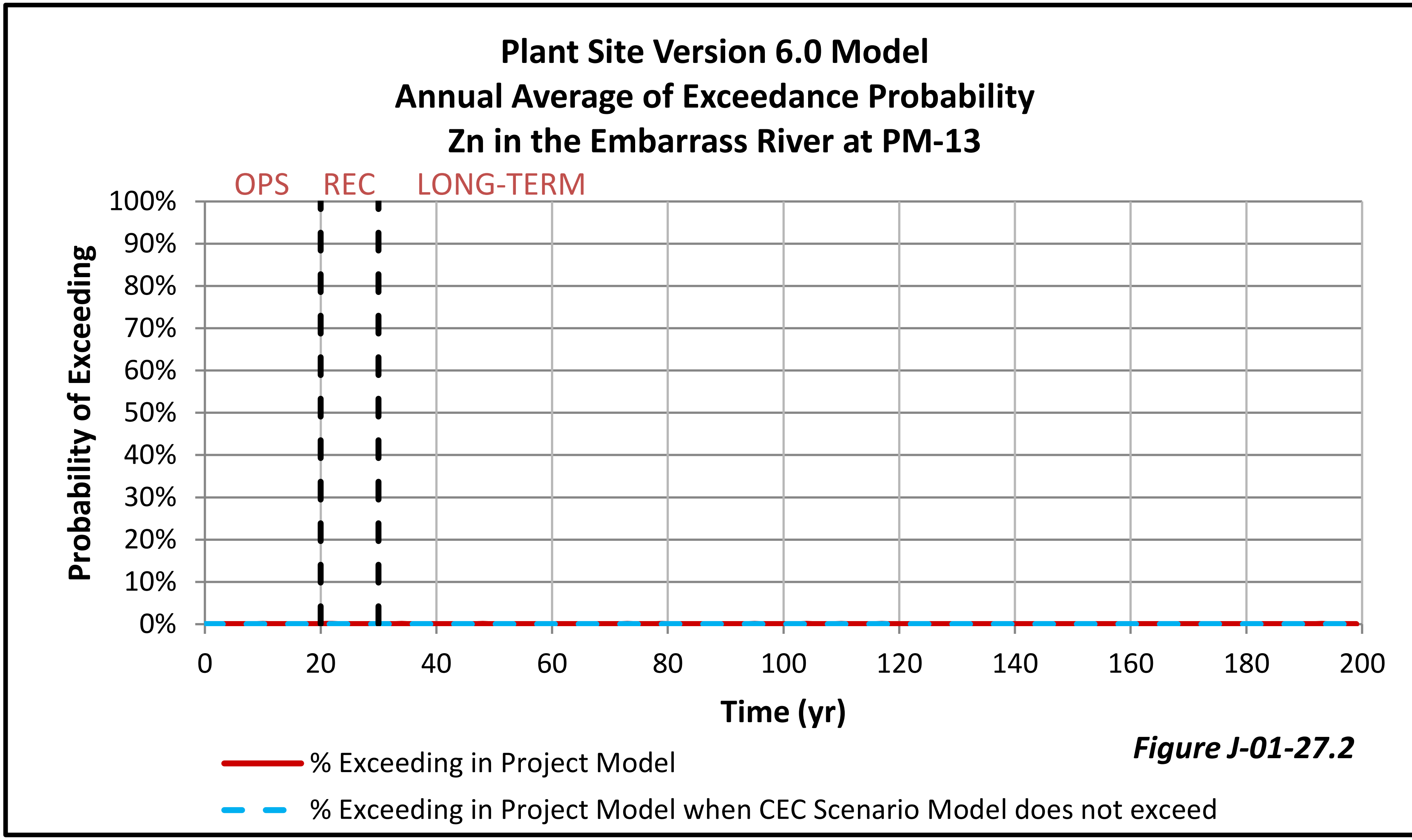
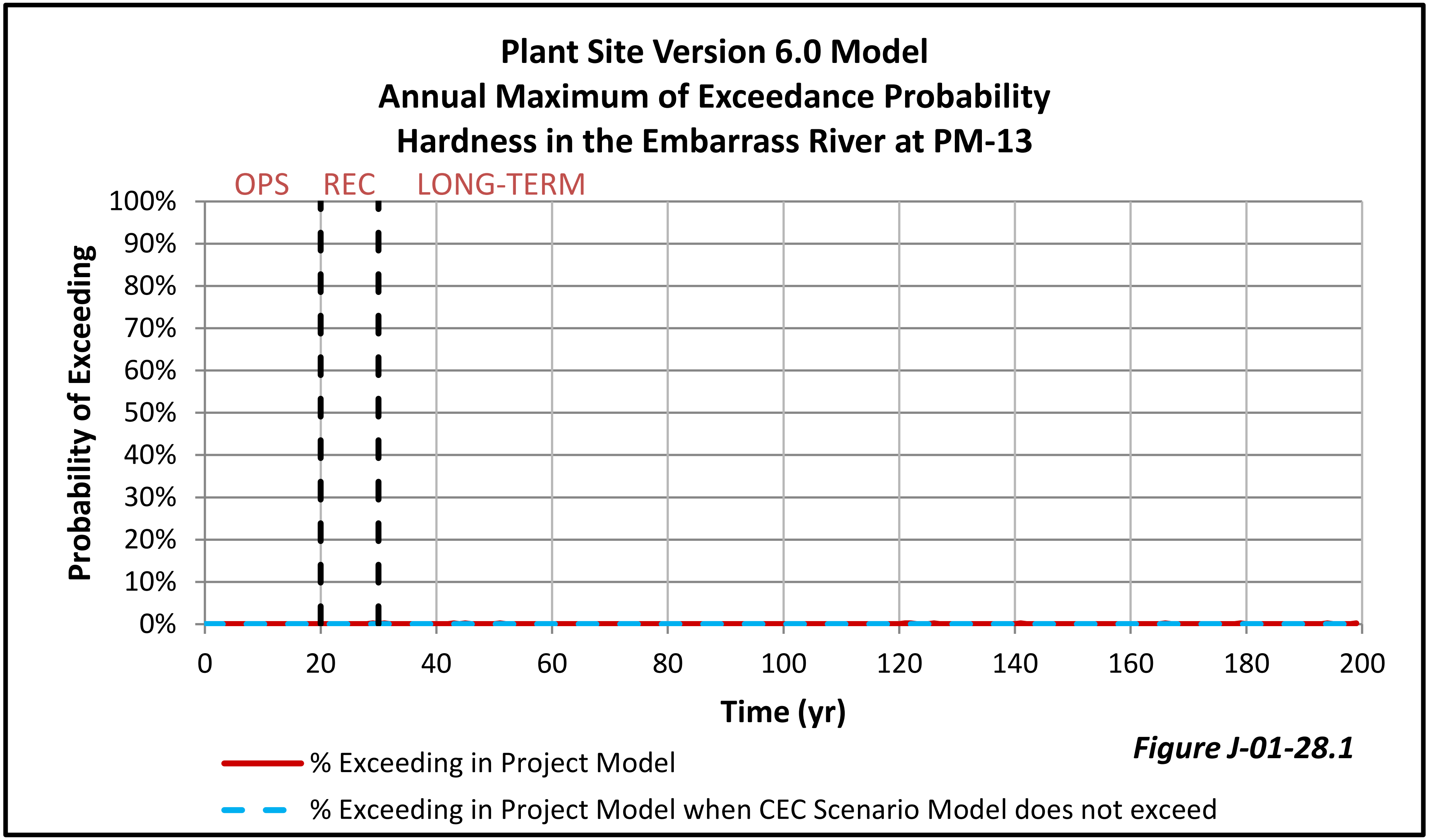


Figure J-01-27.2


Plant Site Version 6.0 Model
Annual Maximum of Exceedance Probability
Hardness in the Embarrass River at PM-13
OPS
REC
LONG-TERM
Probability of Exceeding
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
20
40
60
80
100
120
140
160
180
200
Time (yr)
% Exceeding in Project Model
% Exceeding in Project Model when CEC Scenario Model does not exceed
Figure J-01-28.1

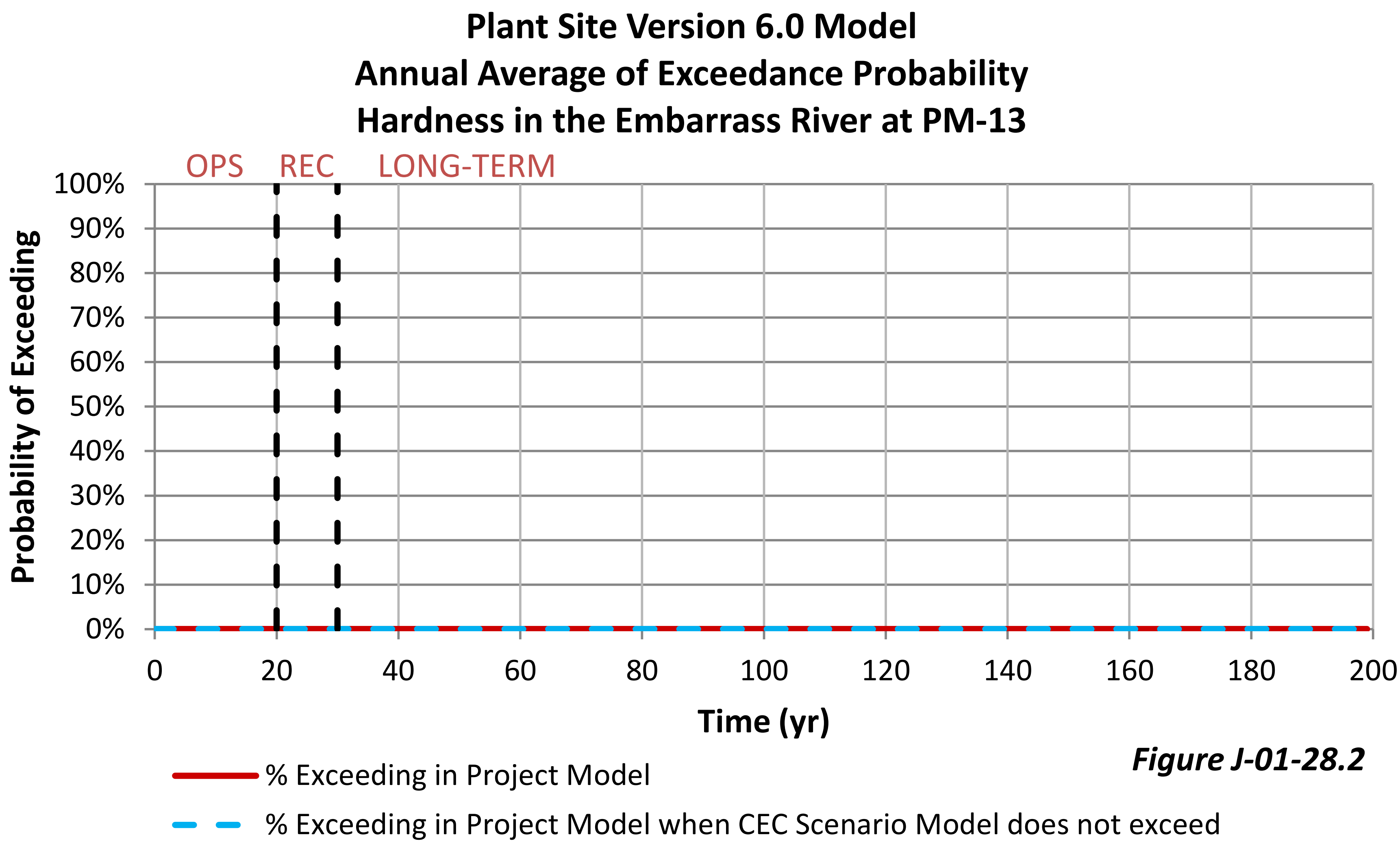


Figure J-01-28.2

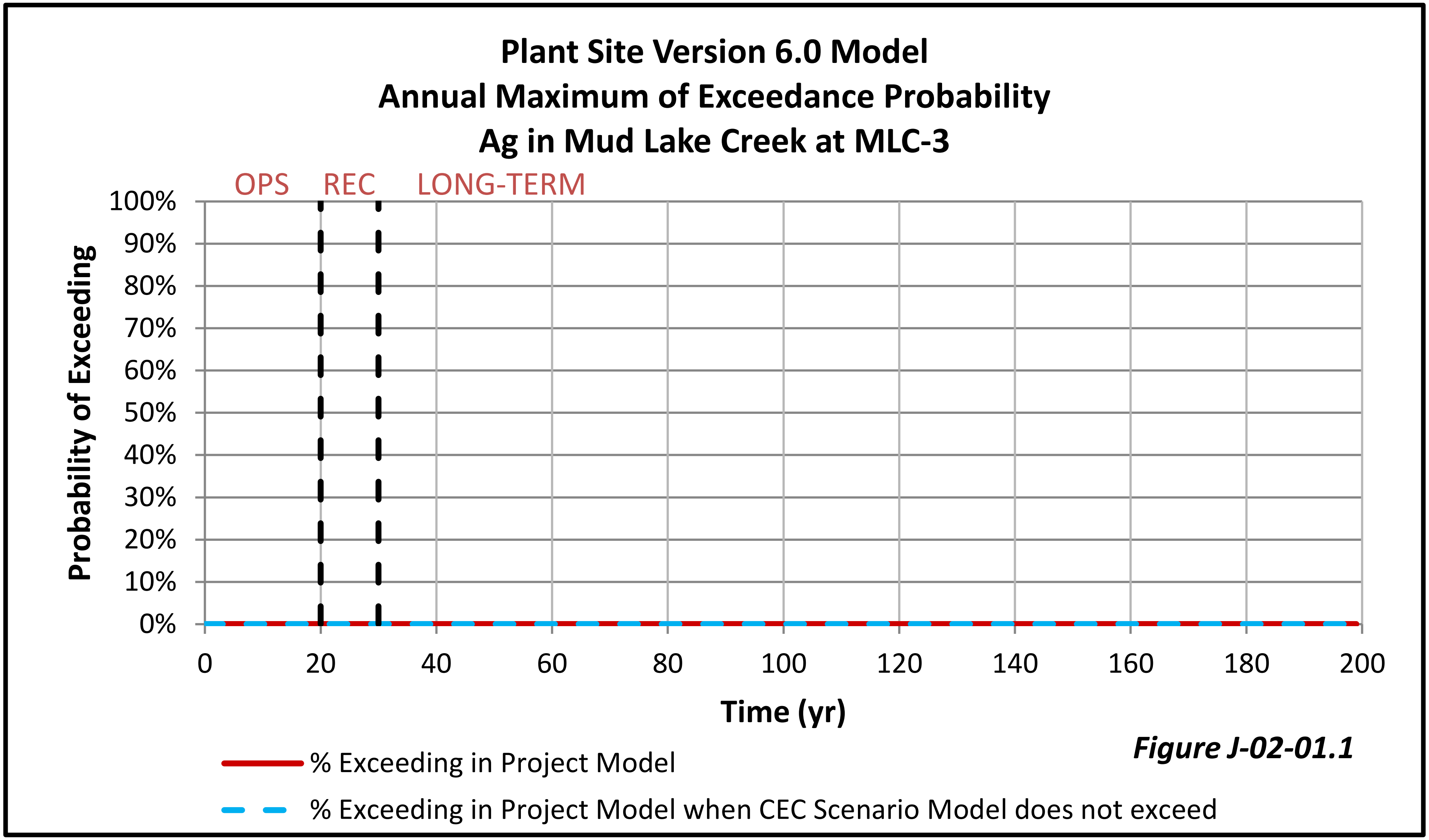
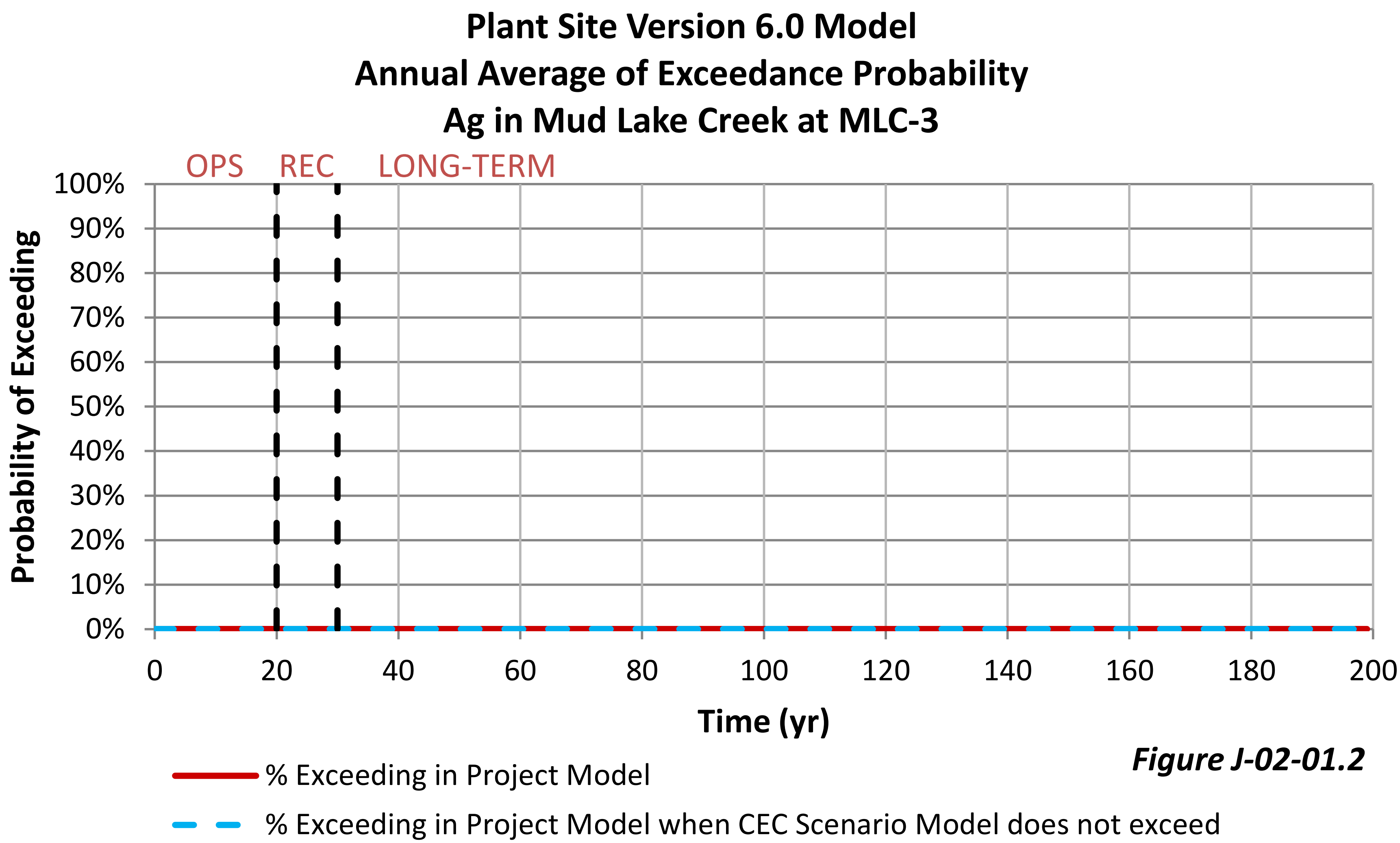


Figure J-02-01.1



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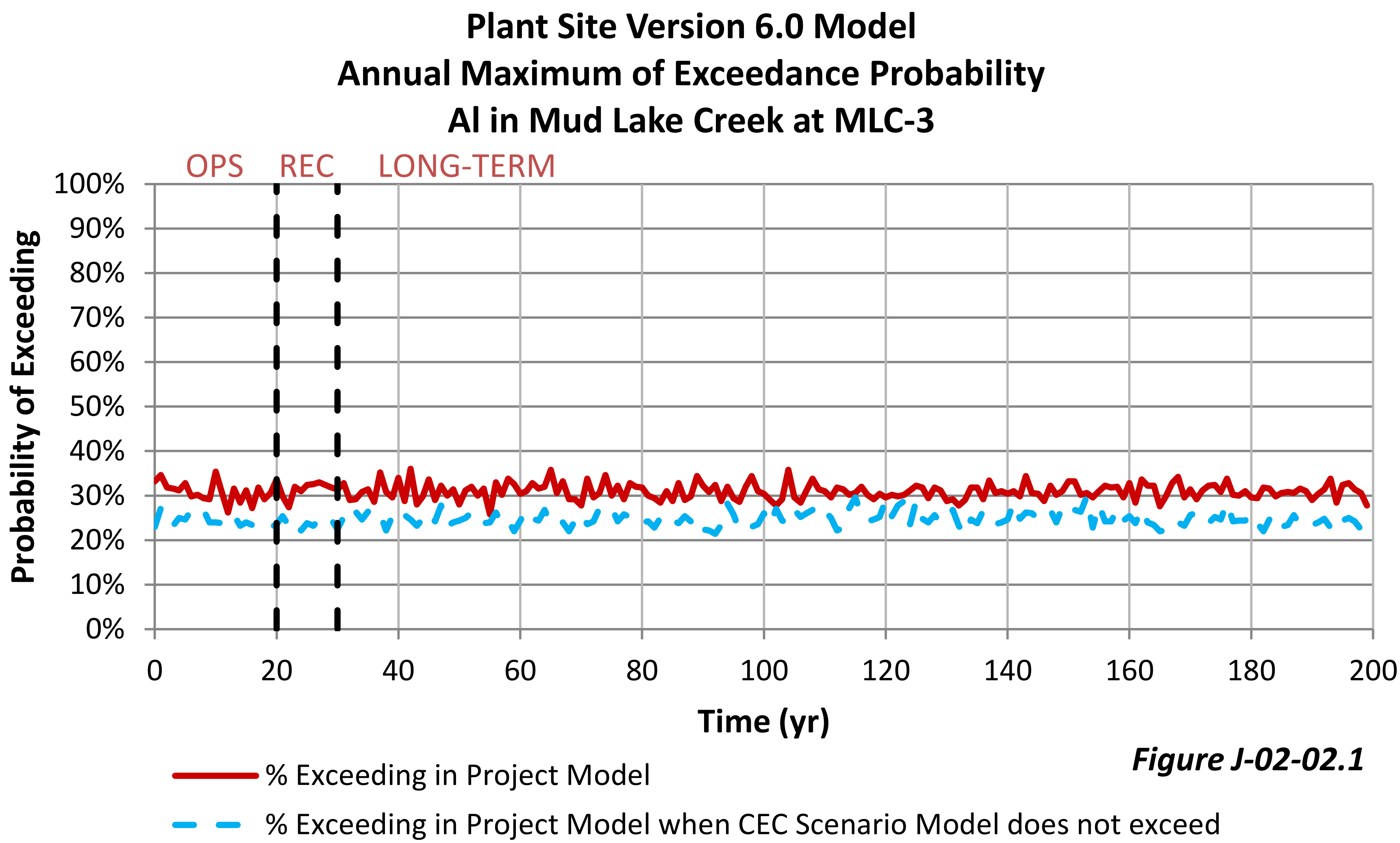

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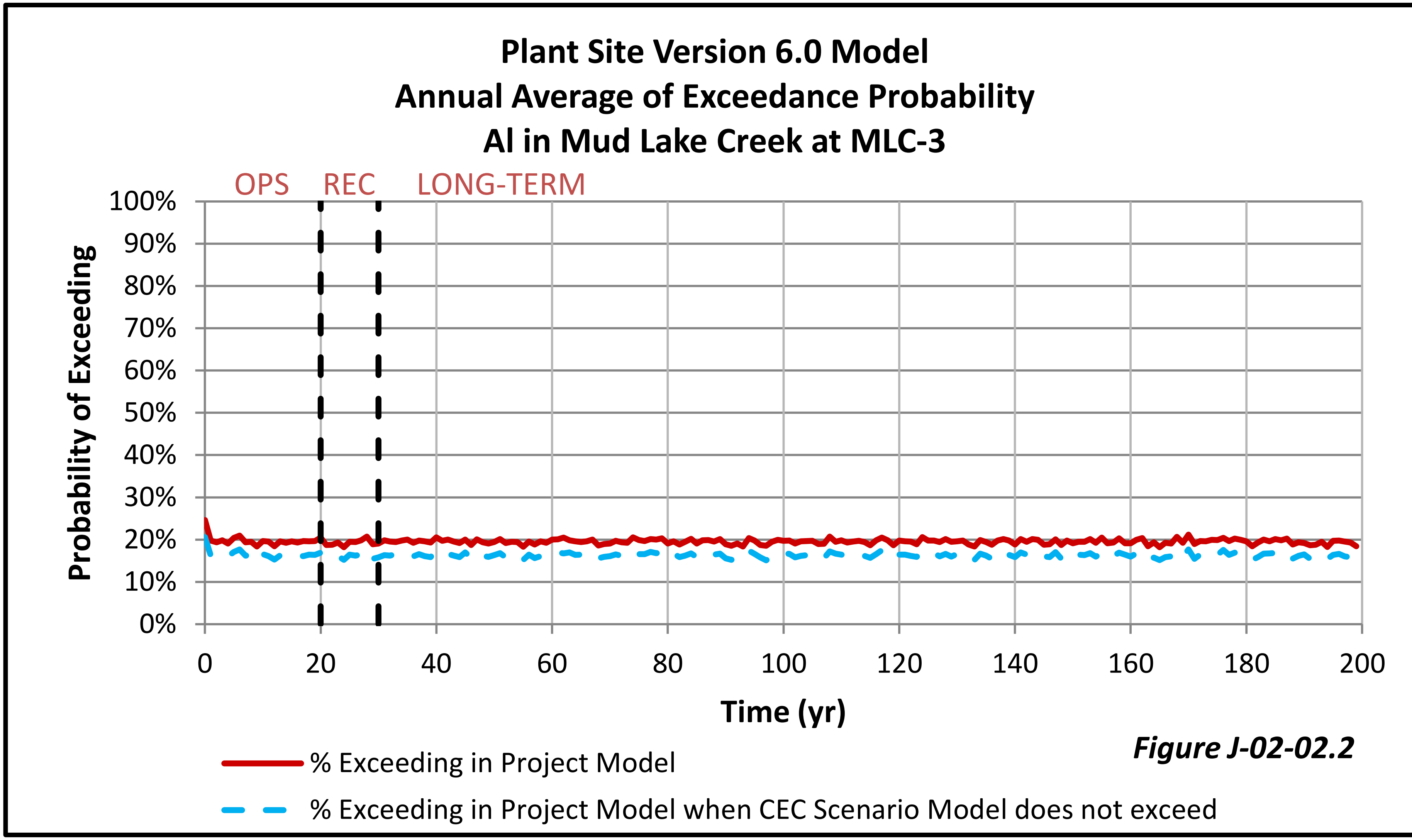

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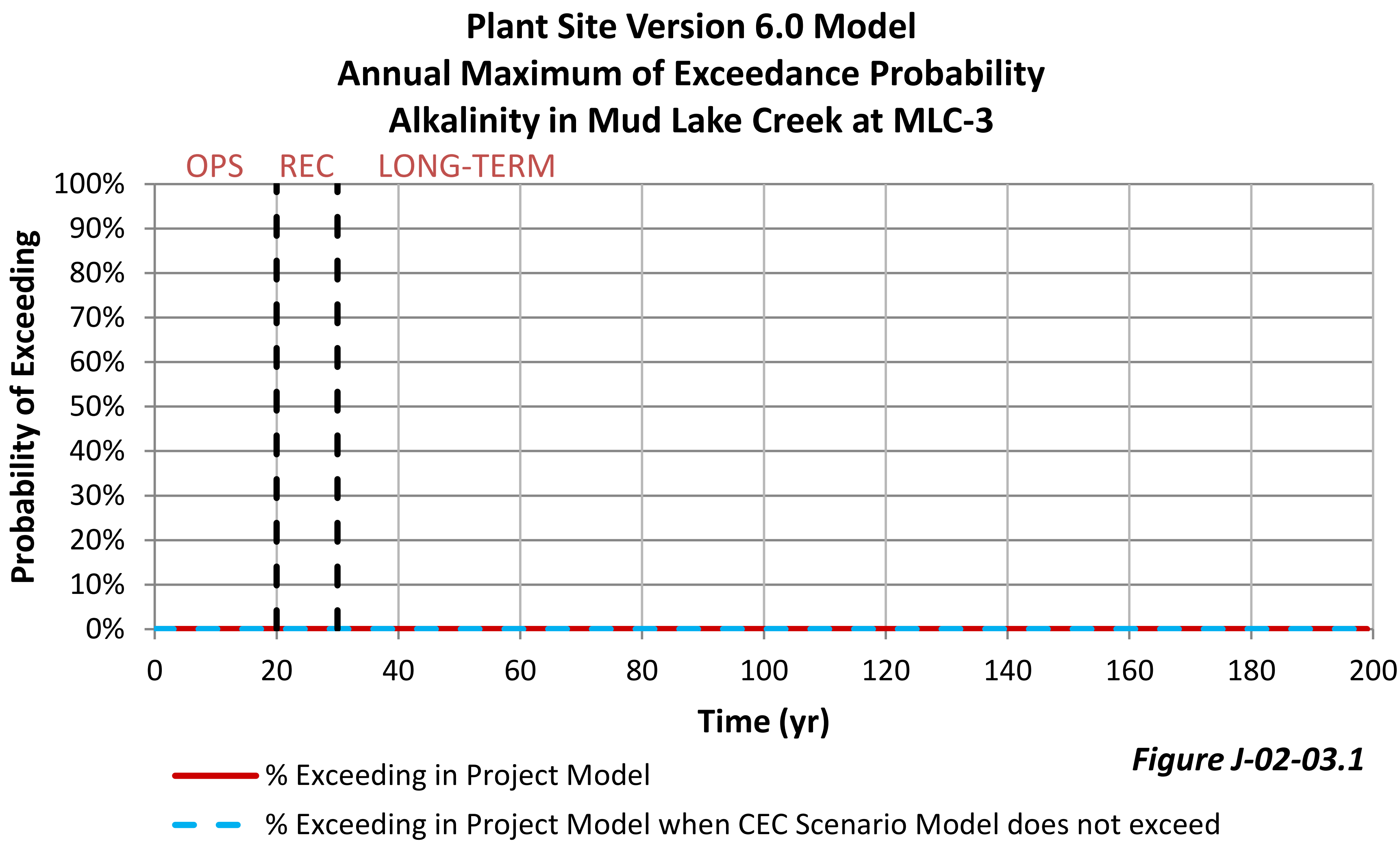

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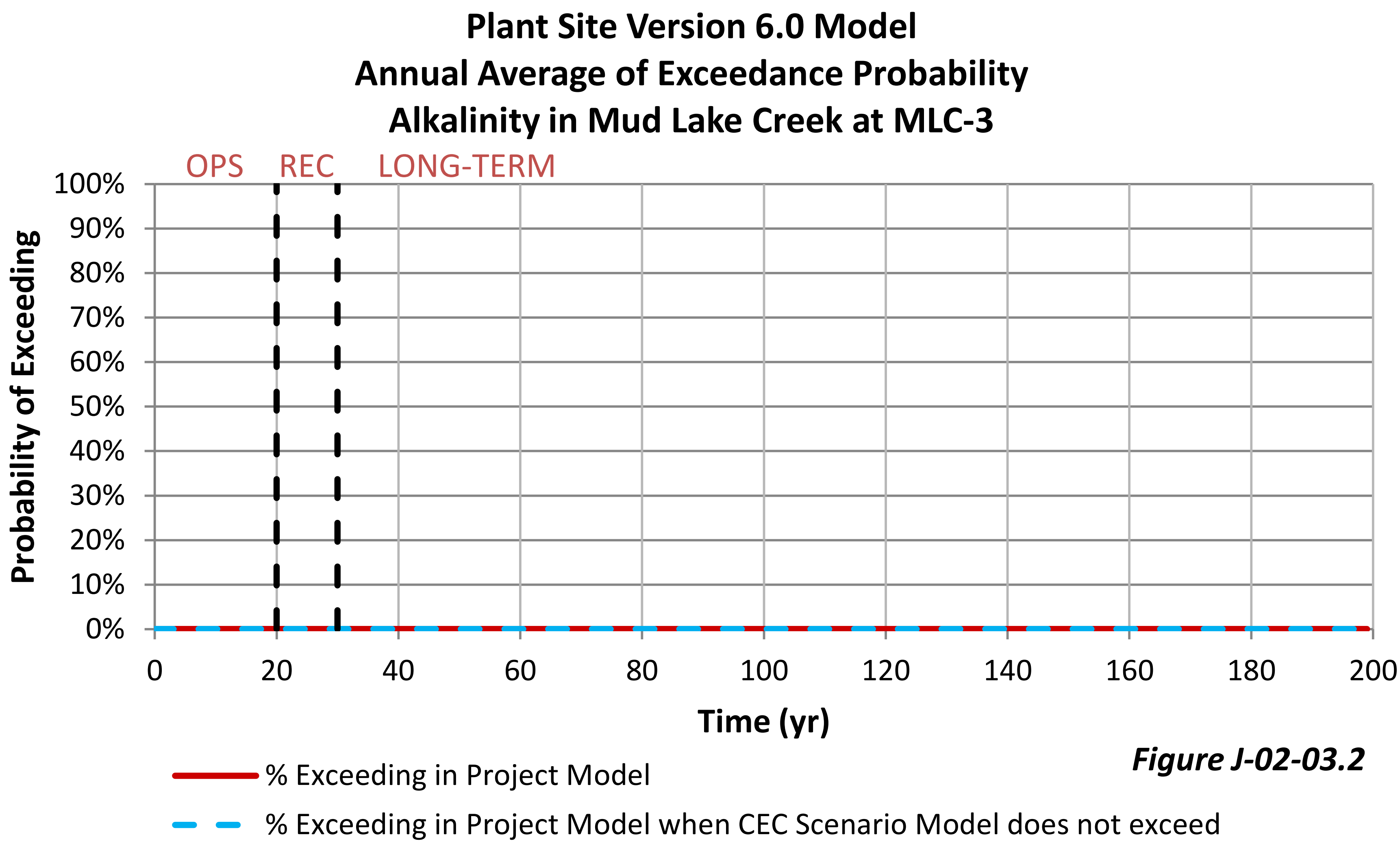

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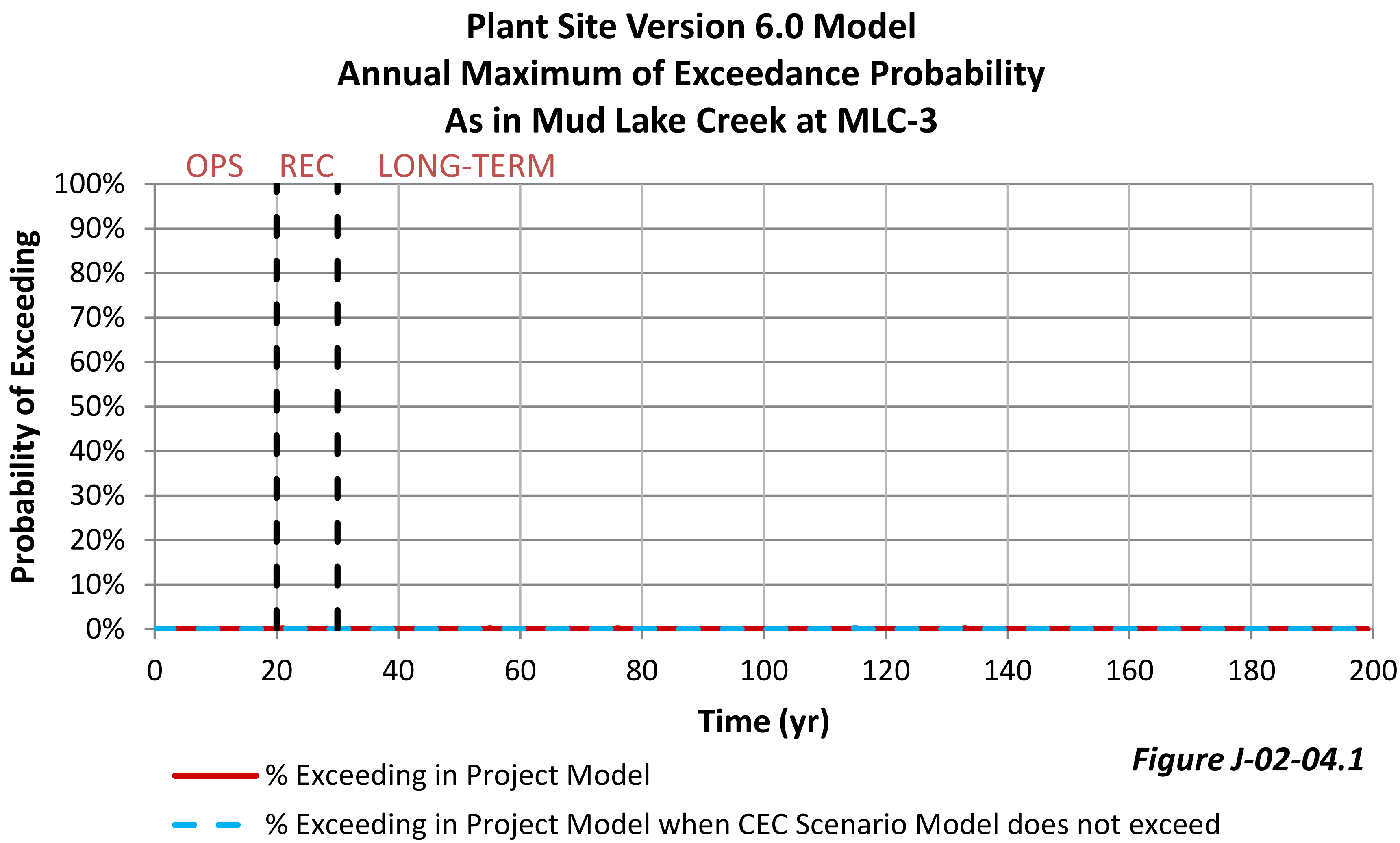

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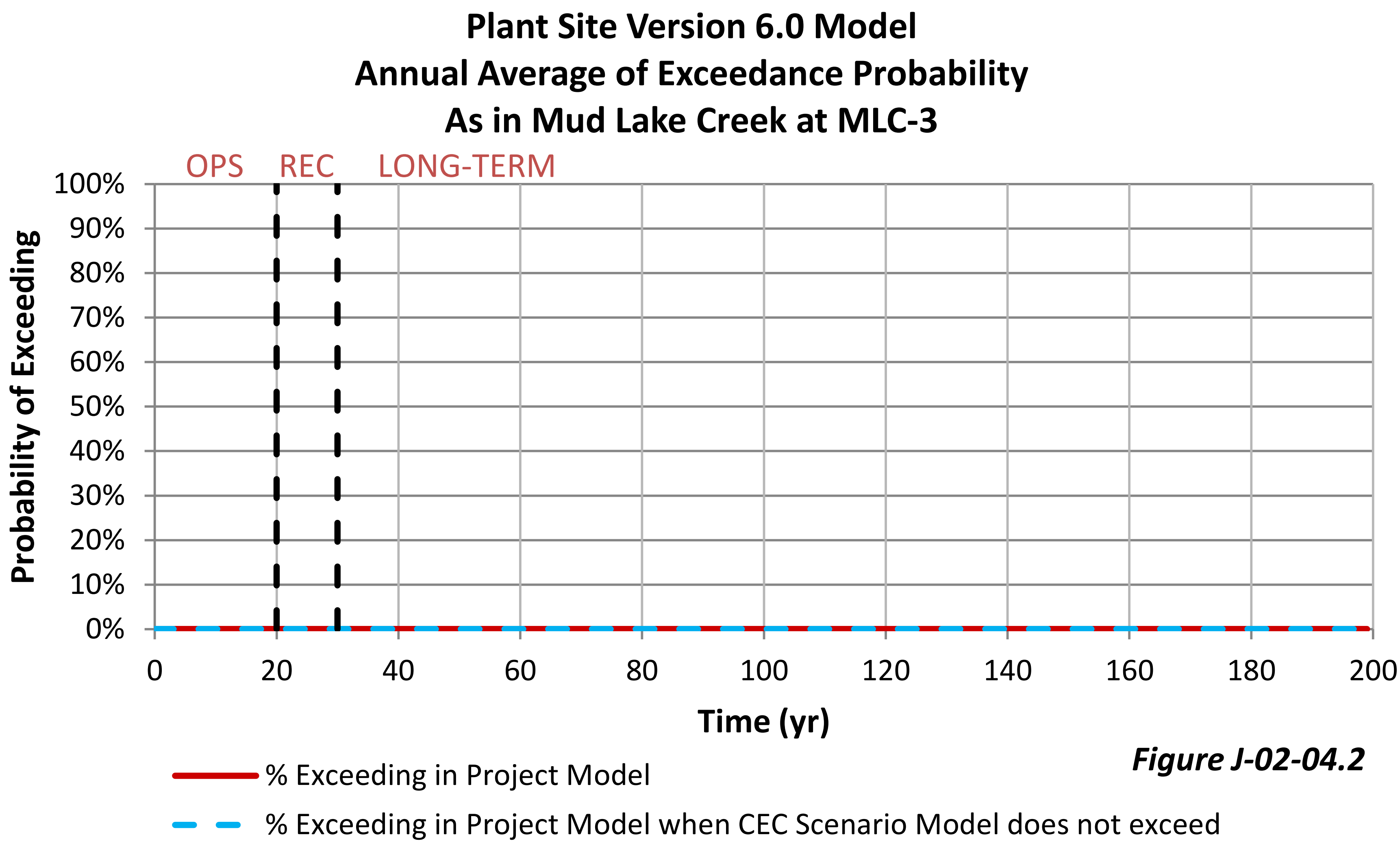

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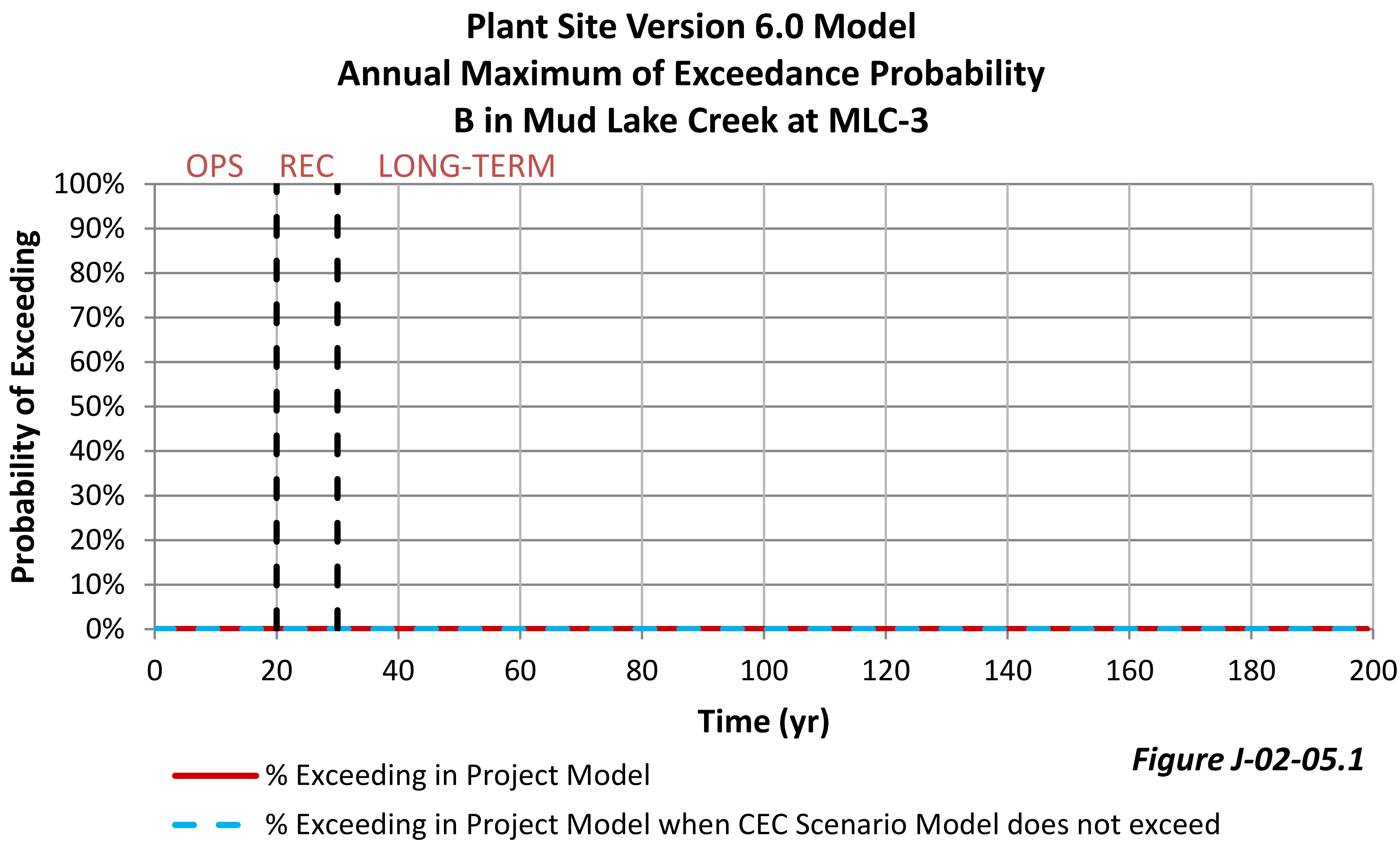

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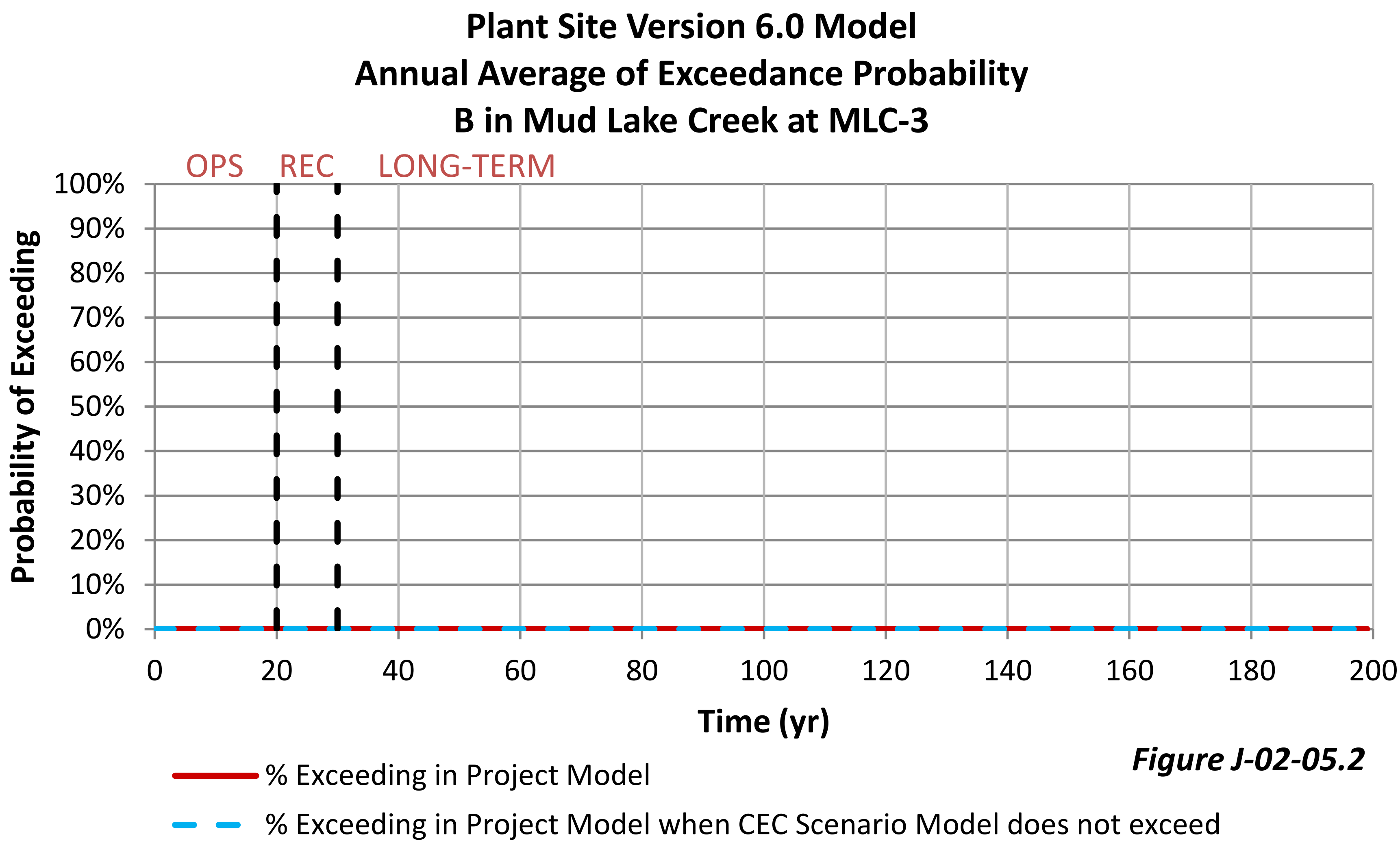

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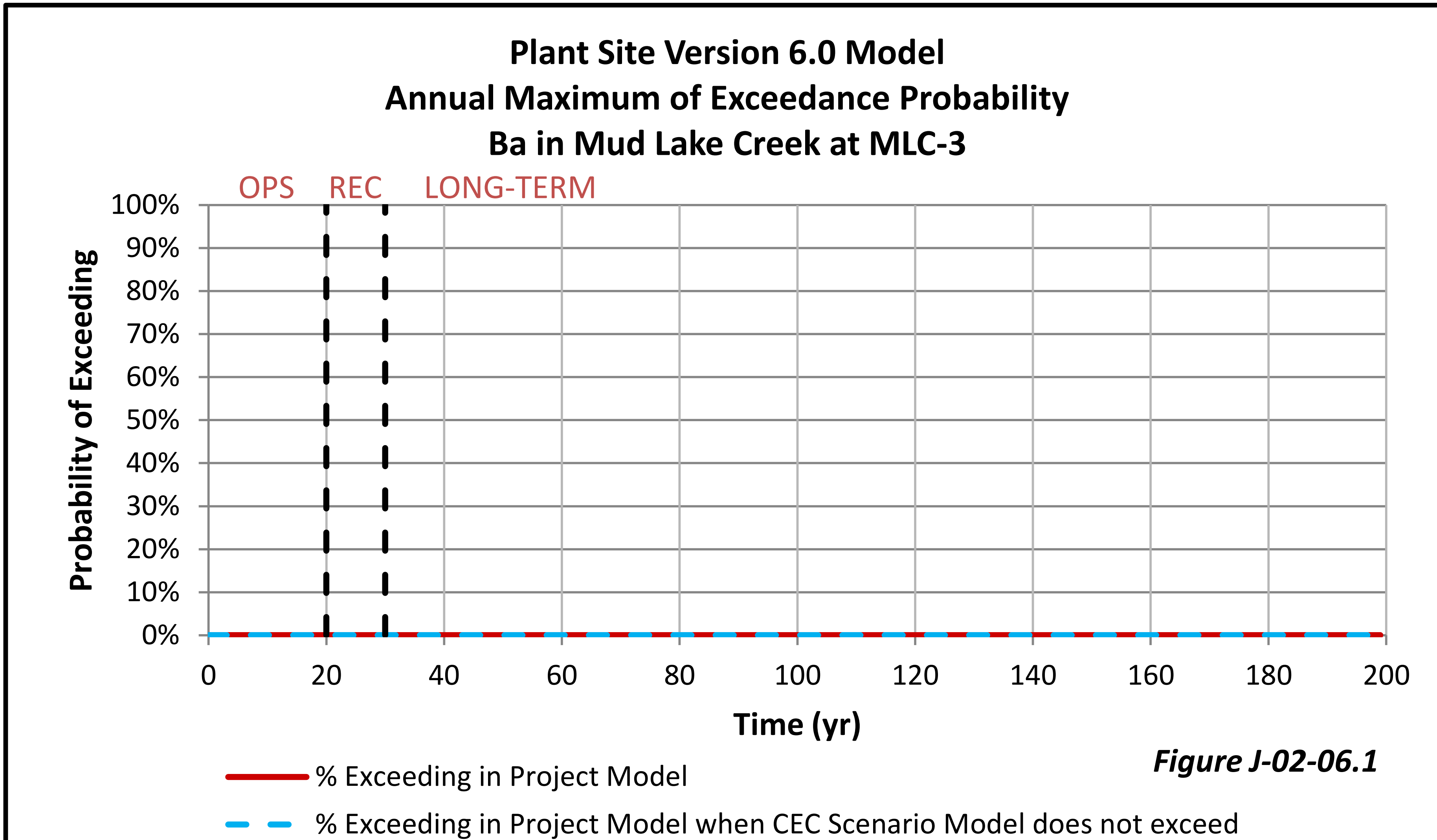

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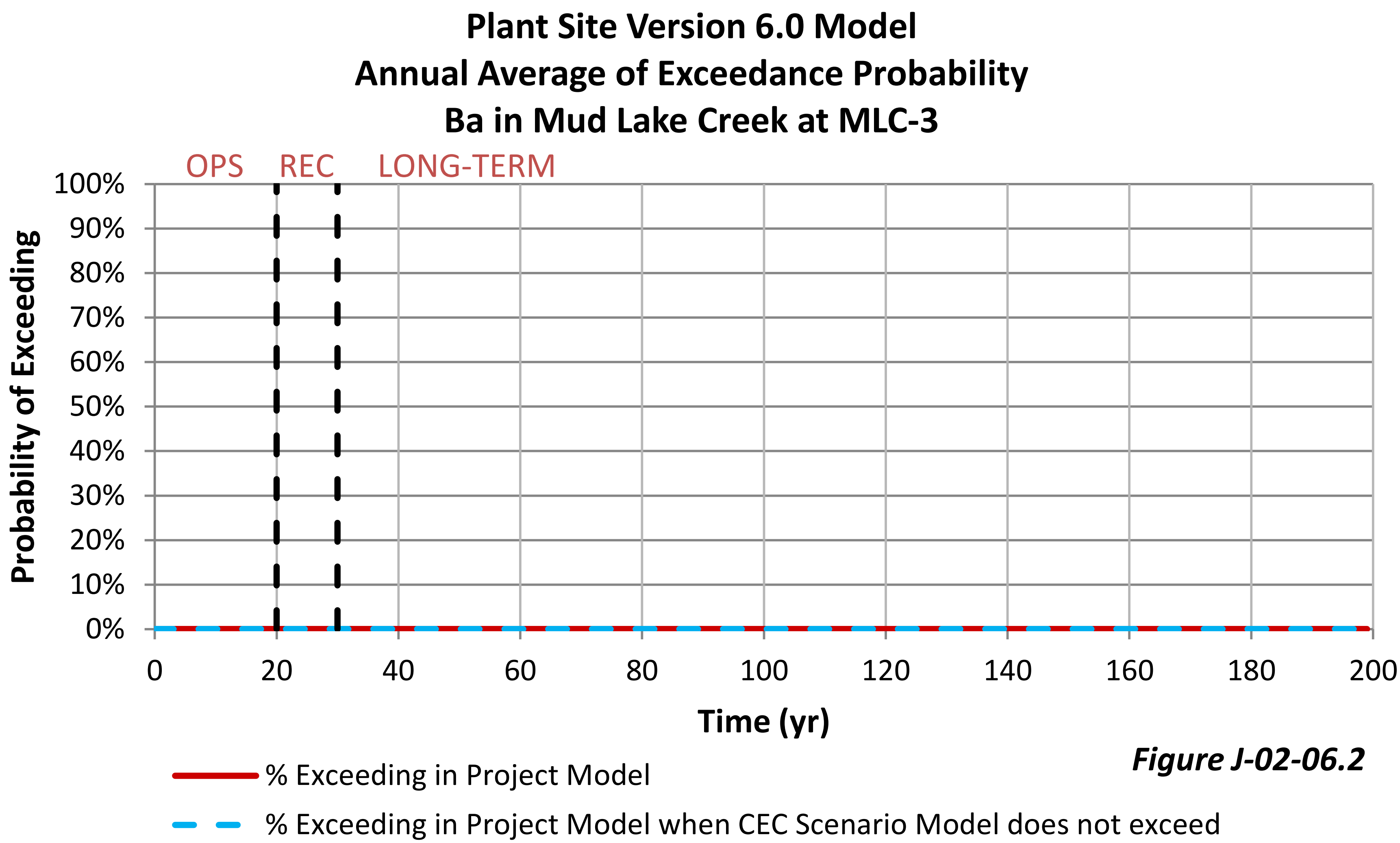

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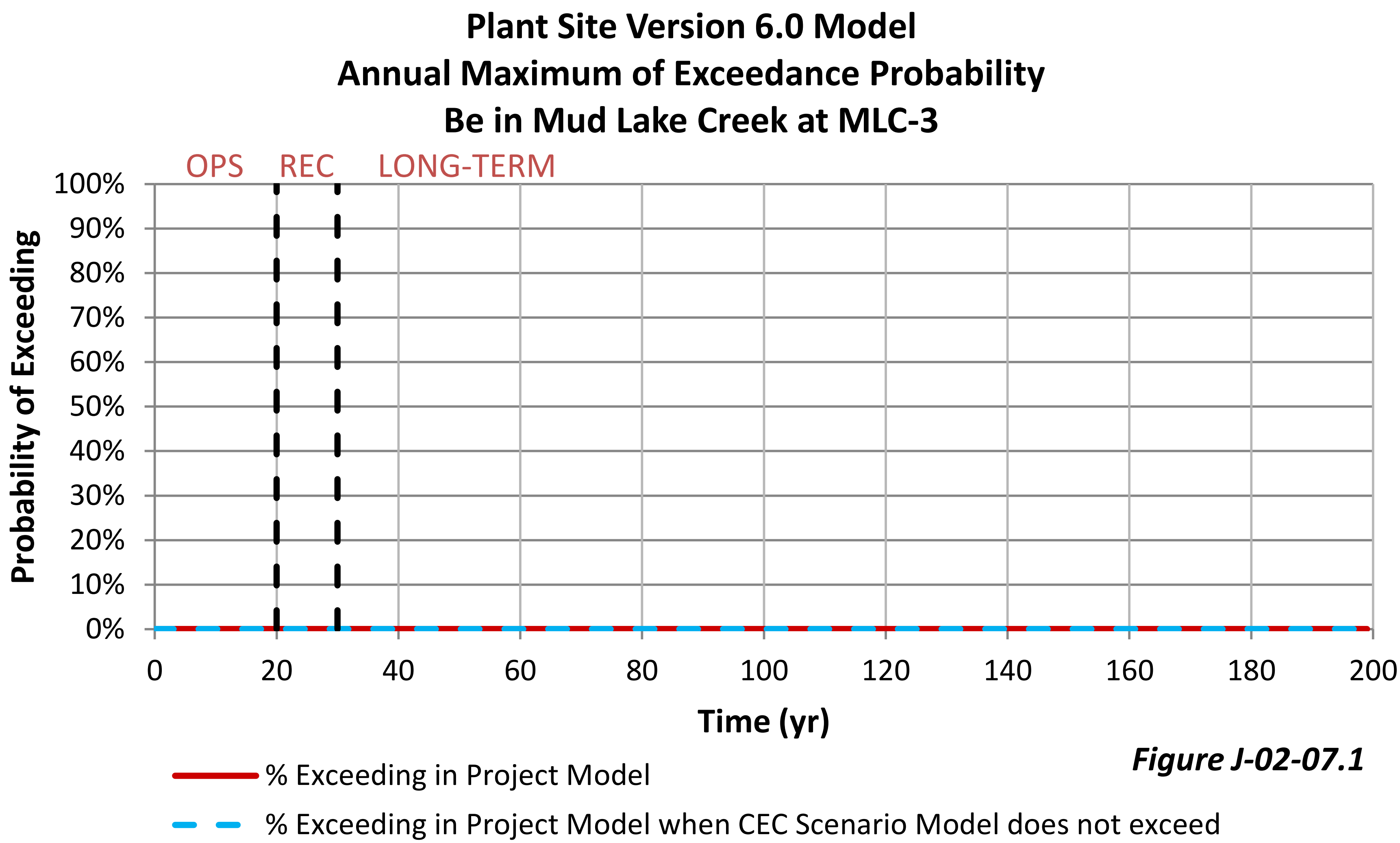

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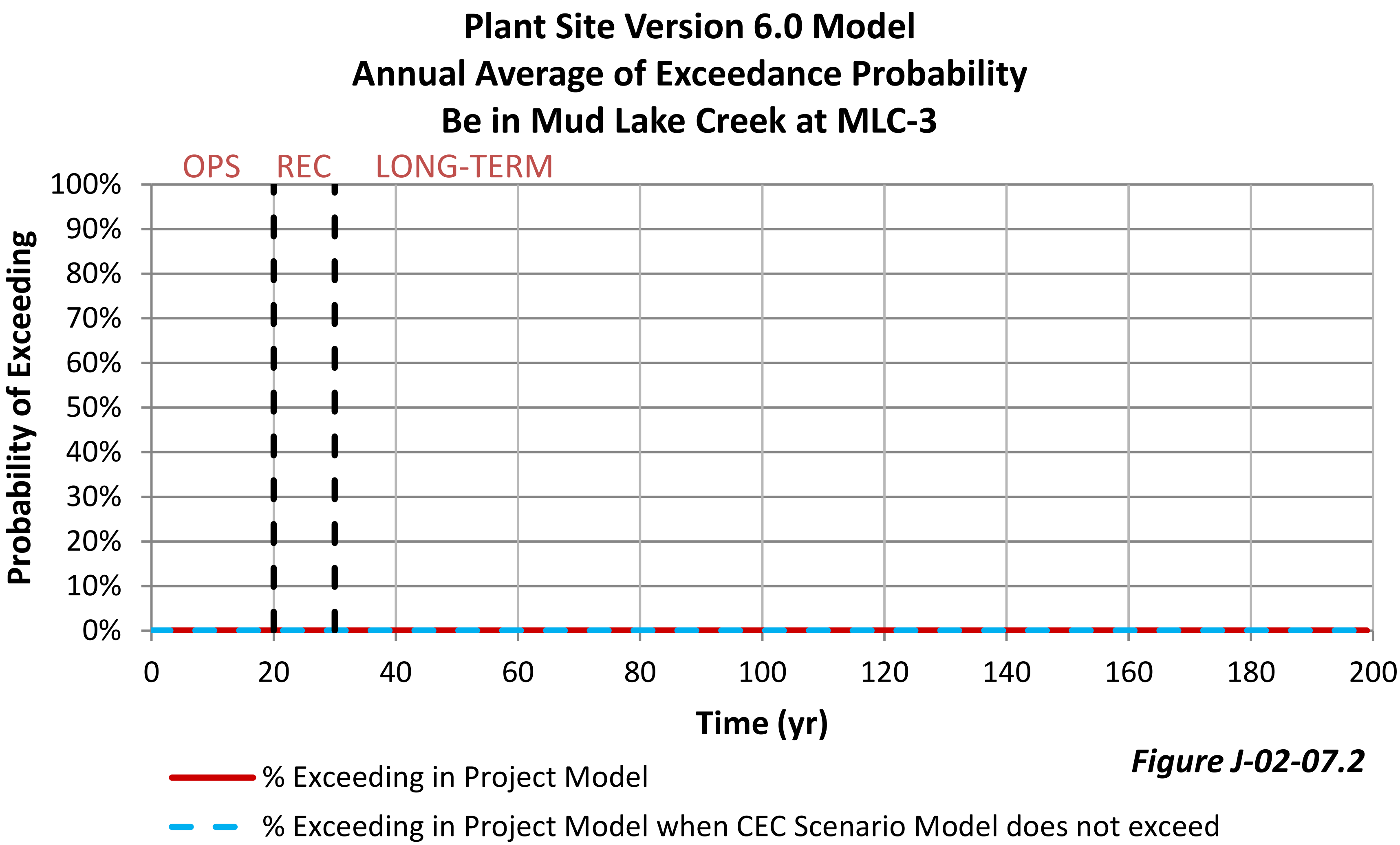

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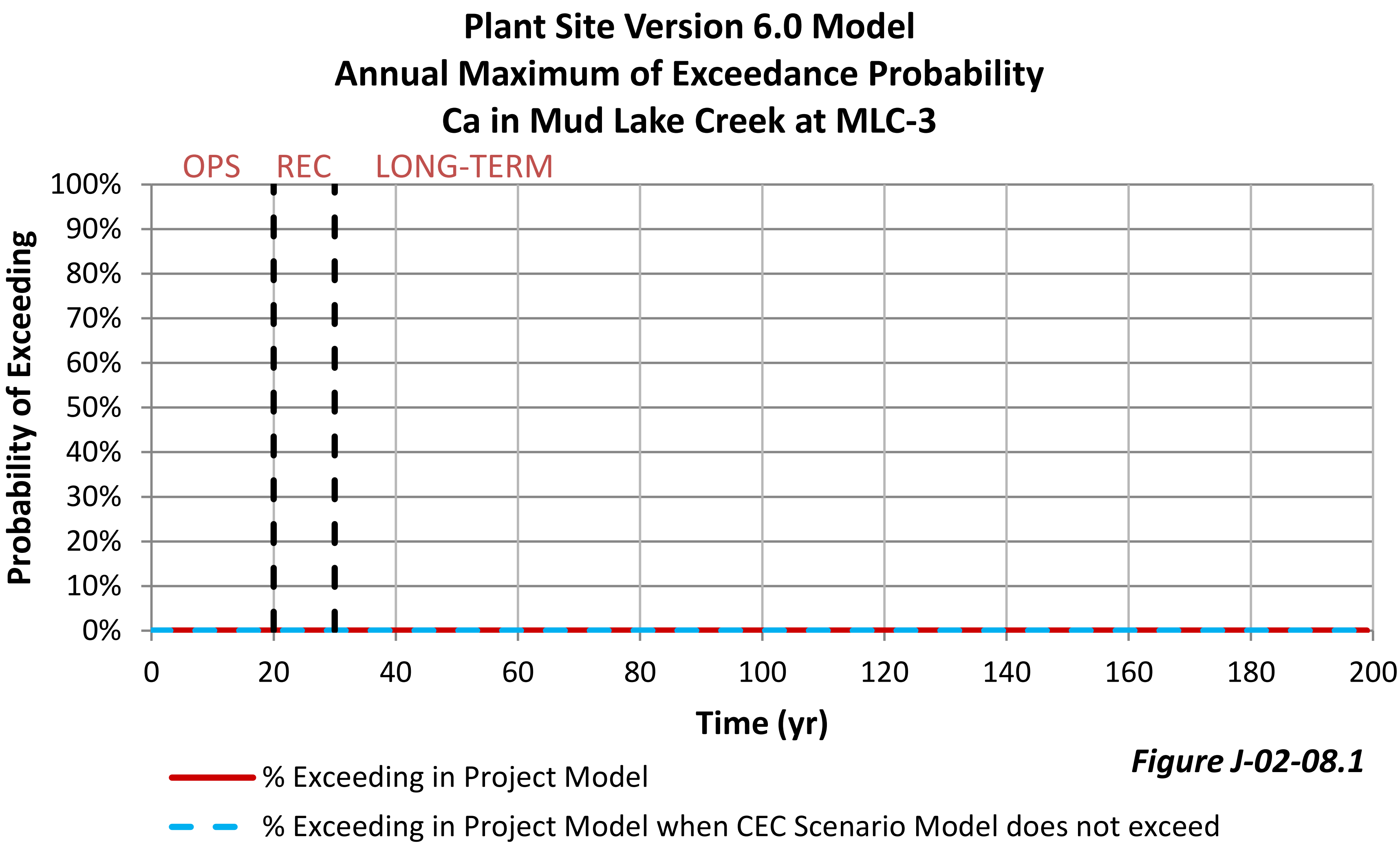

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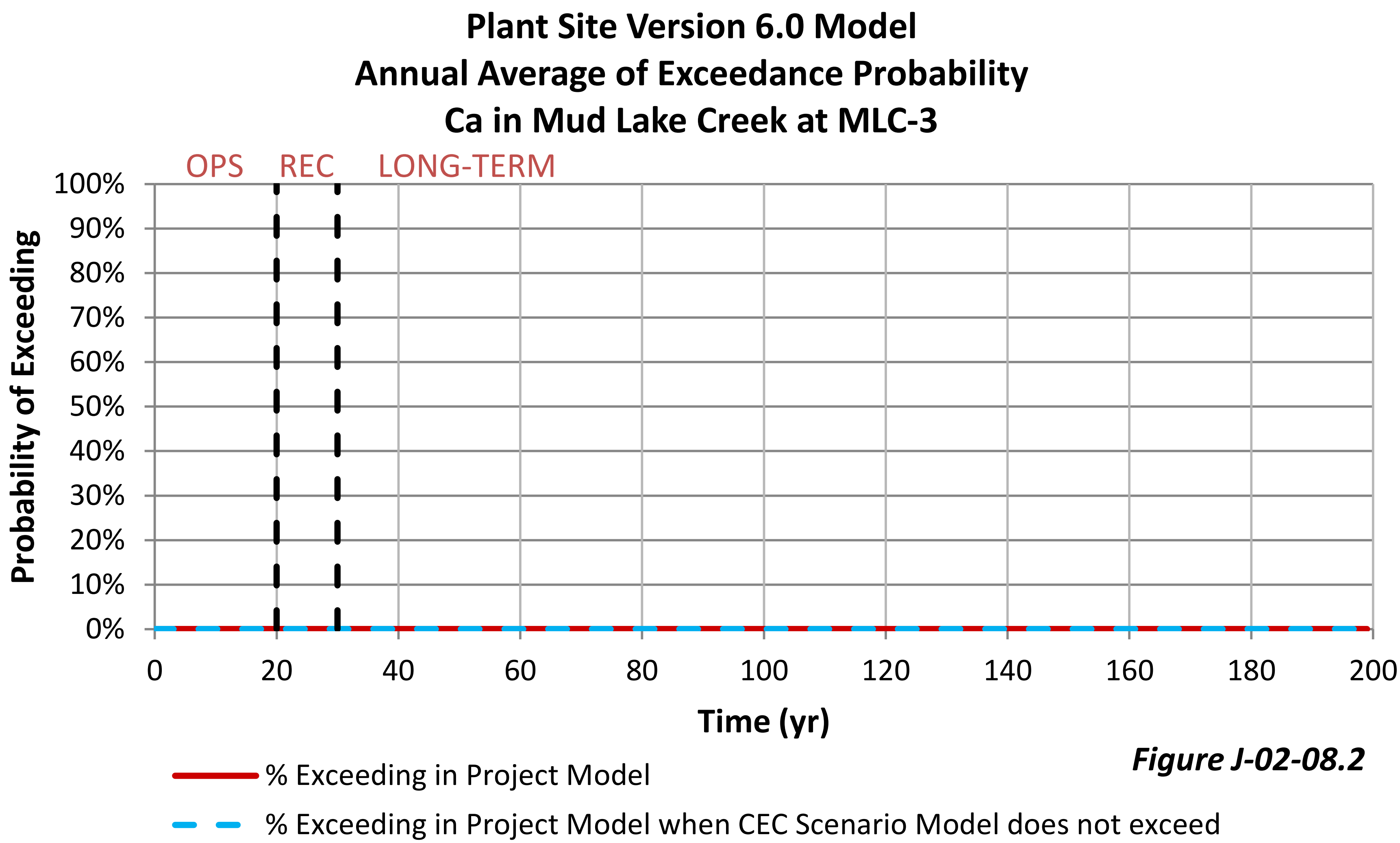

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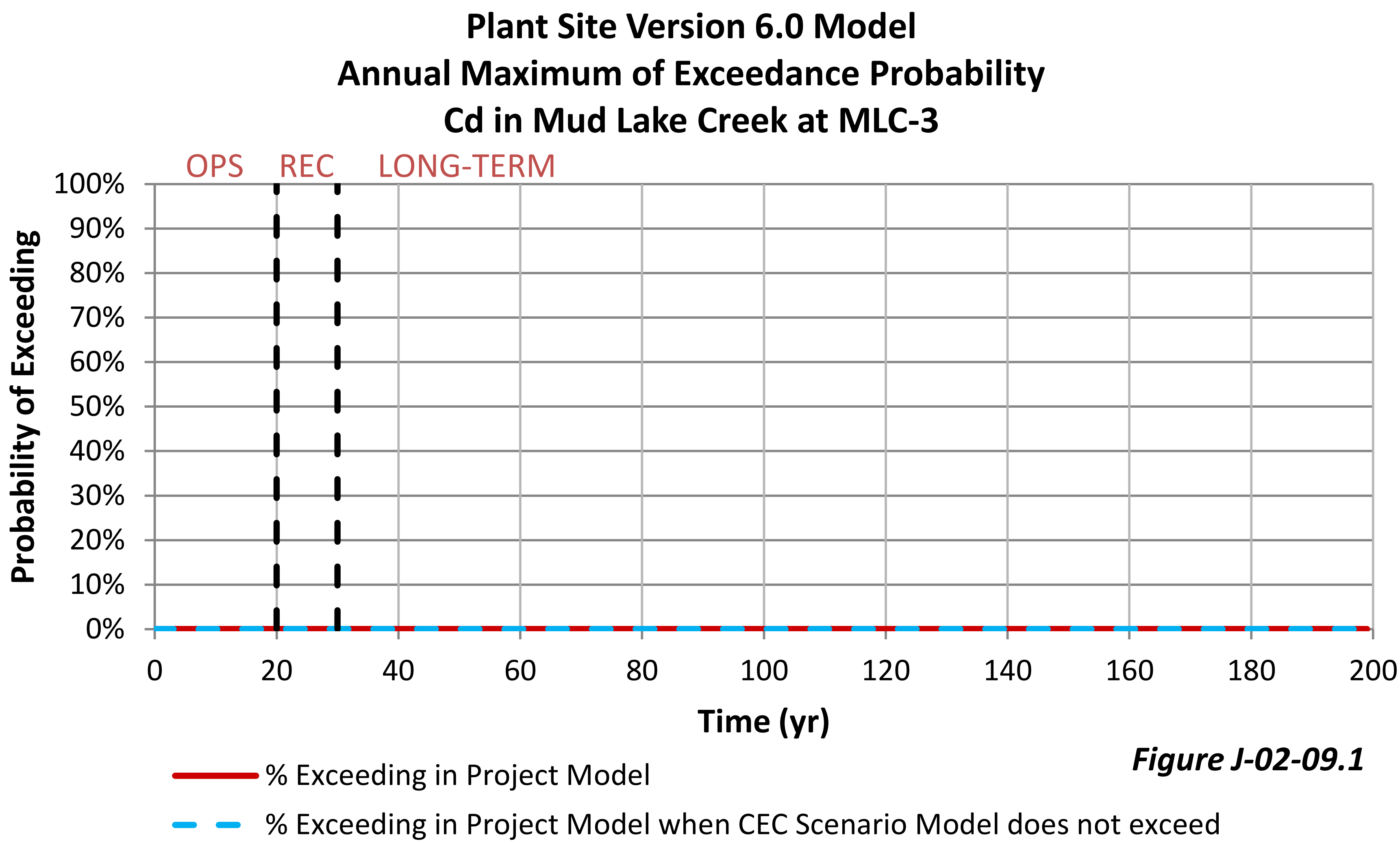

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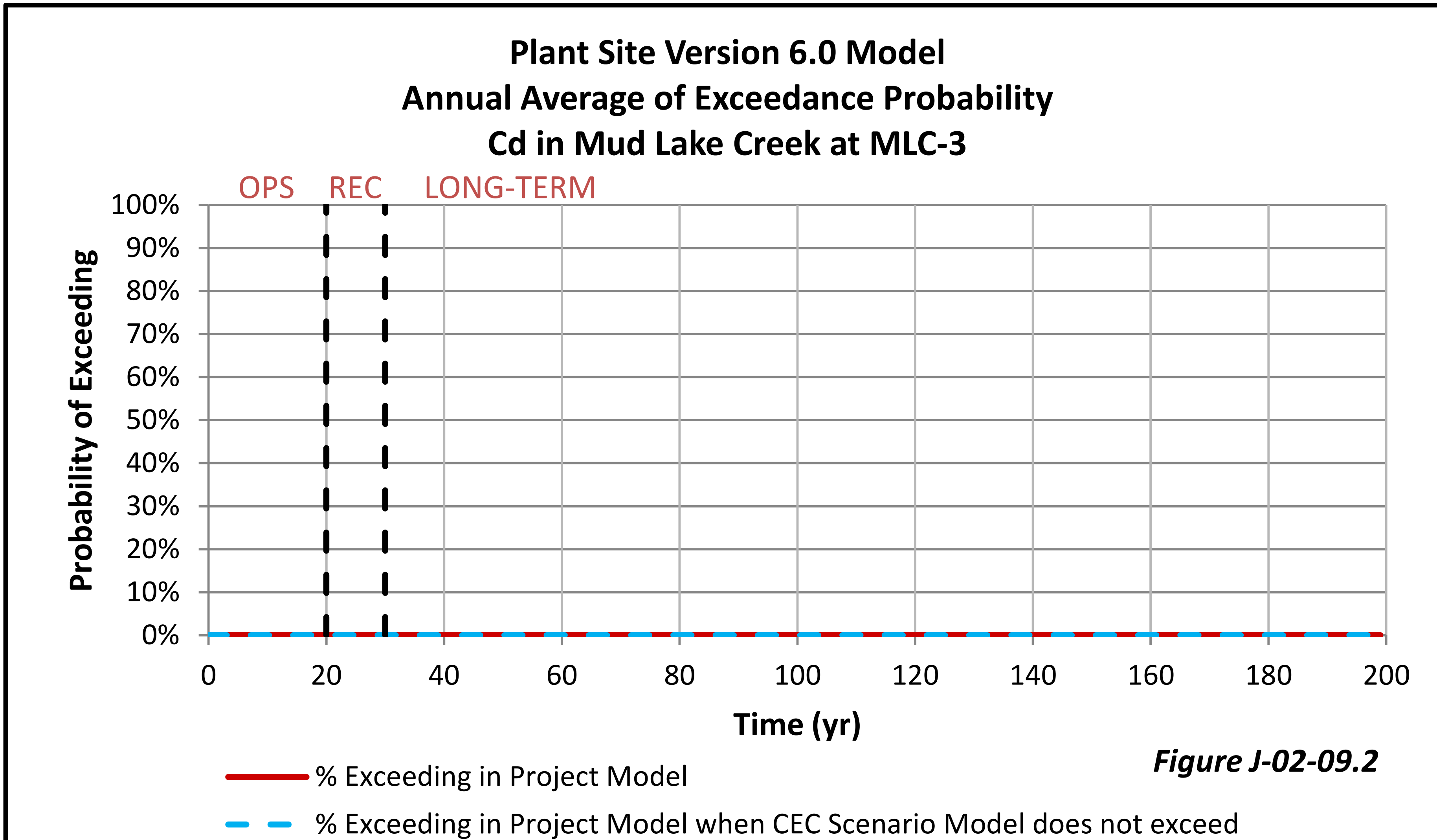

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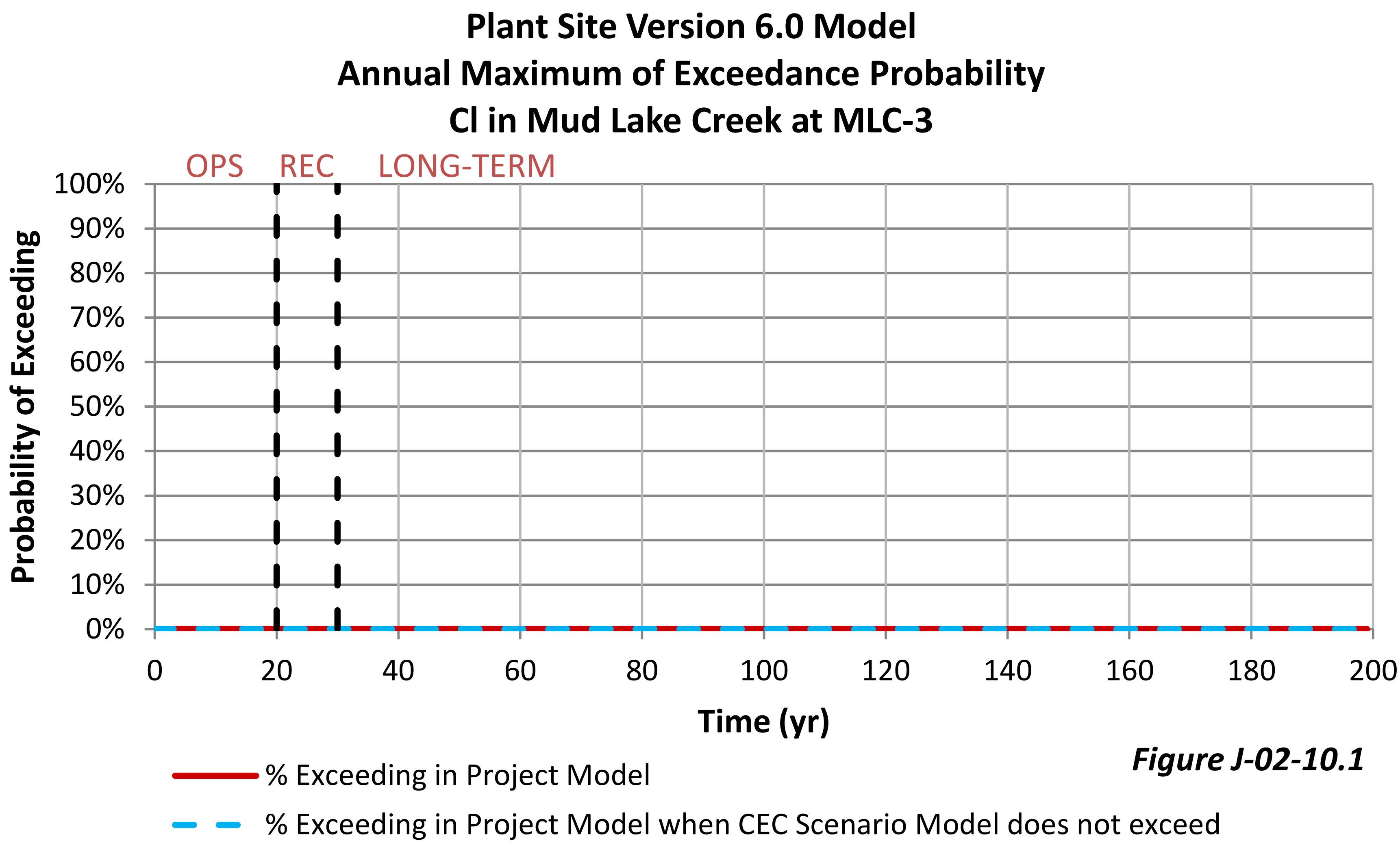

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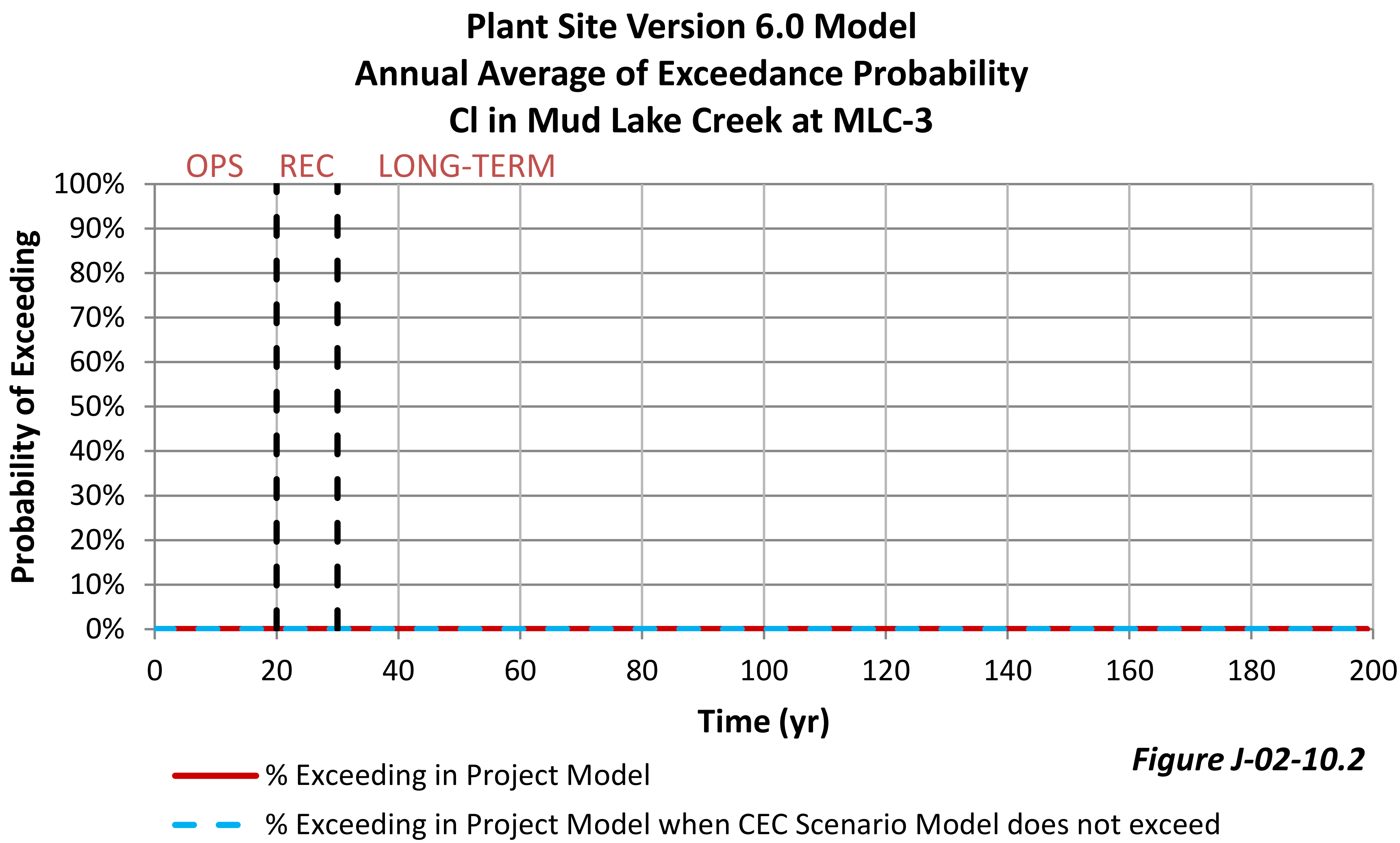

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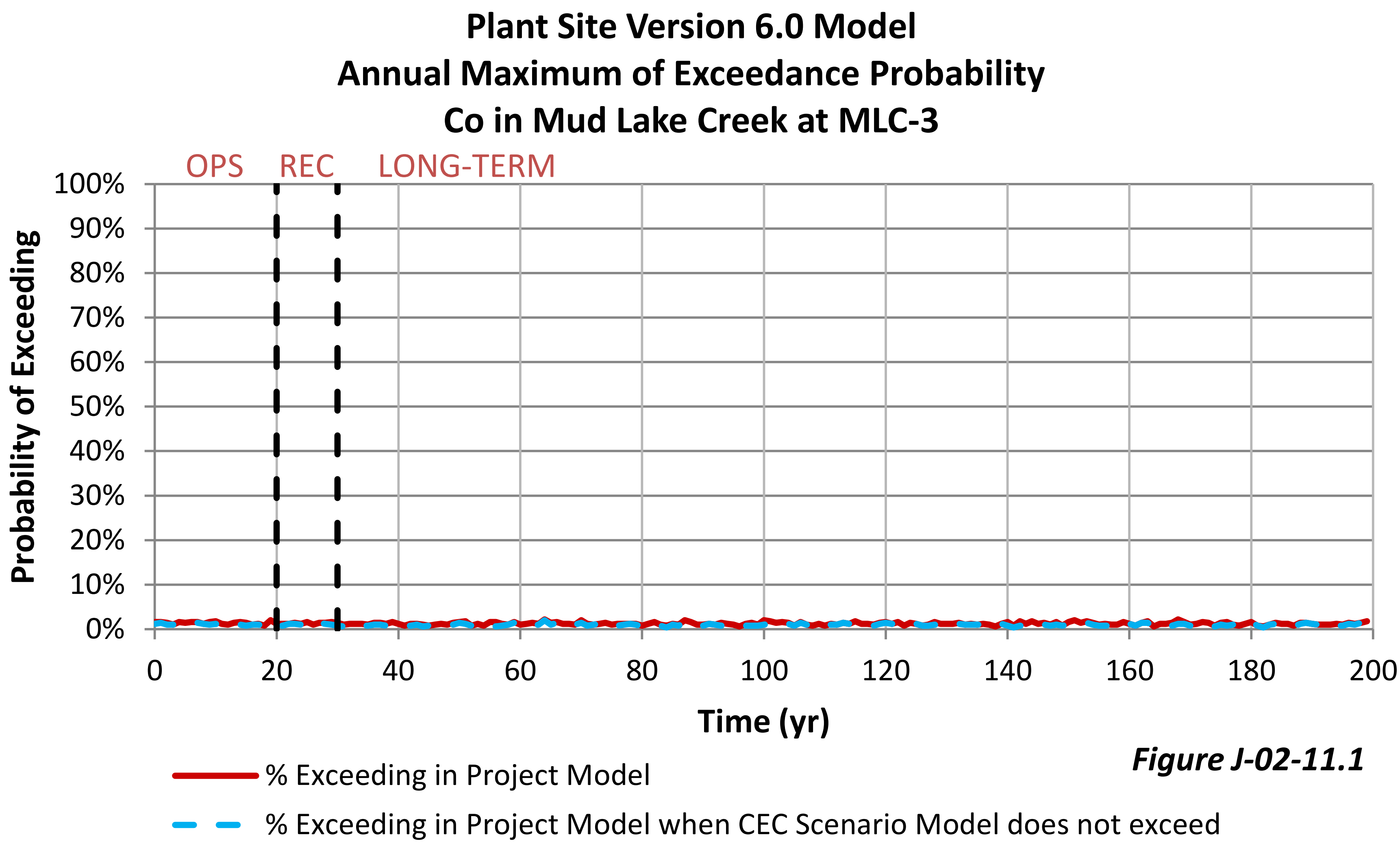

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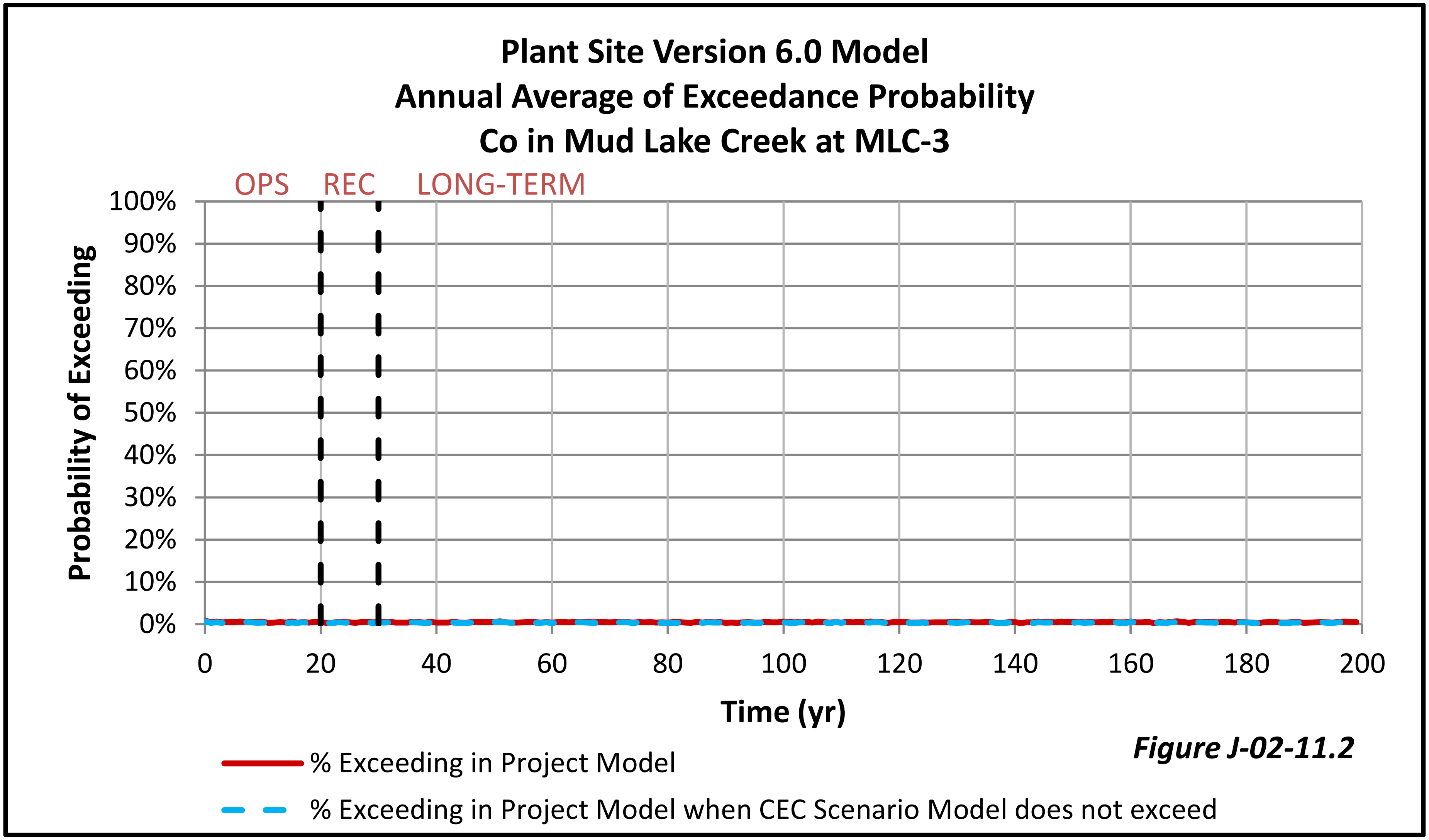

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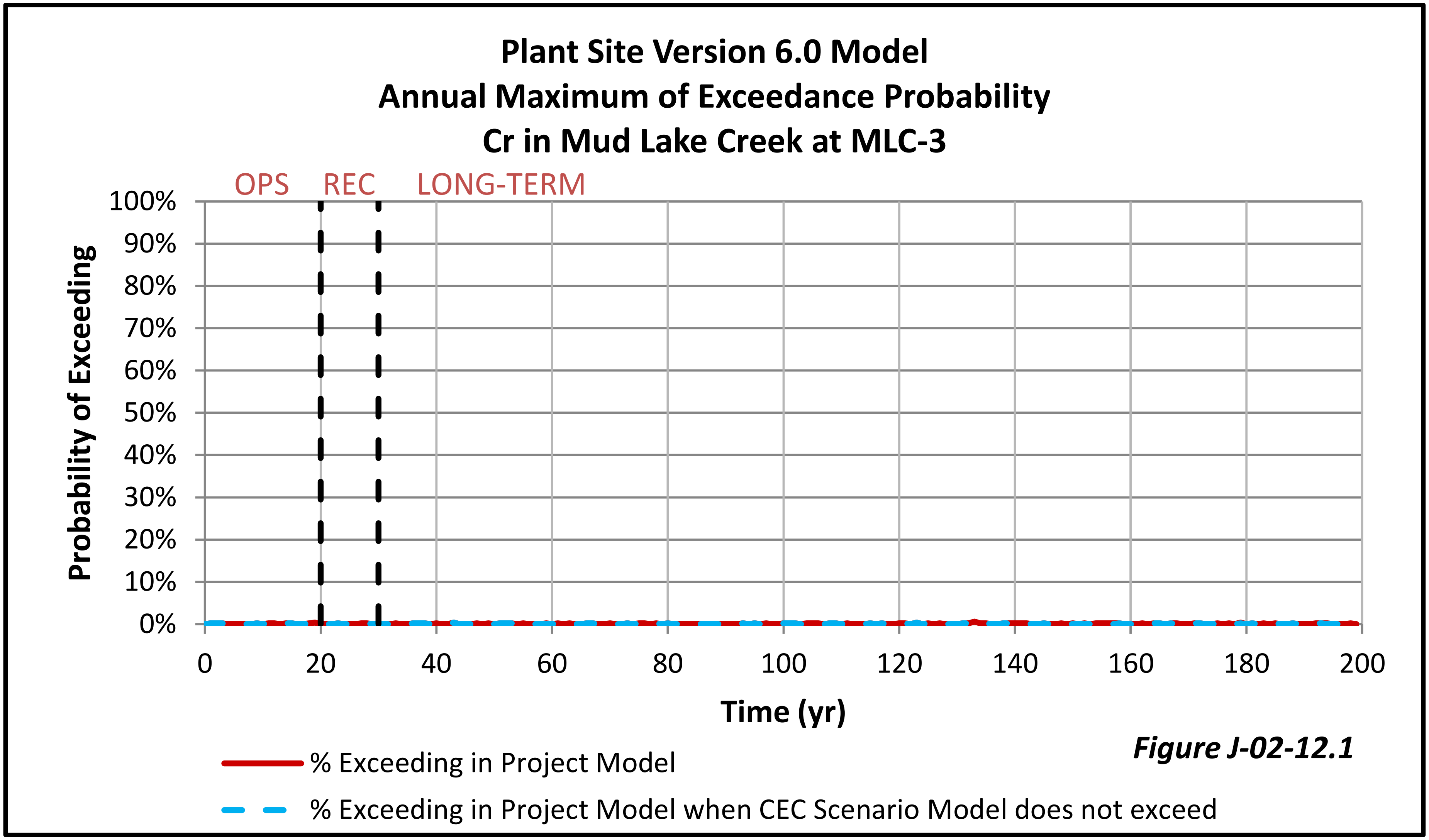

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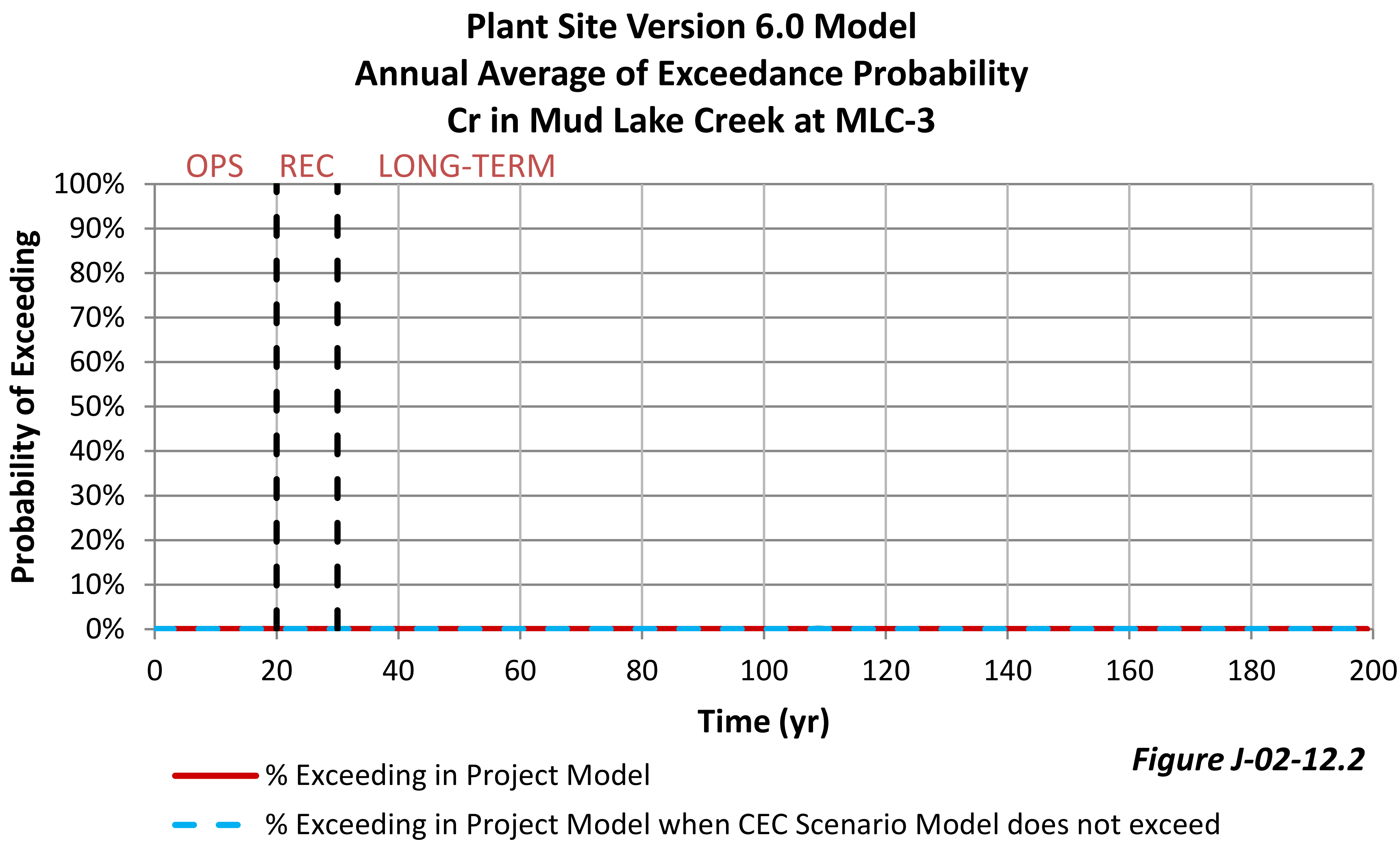

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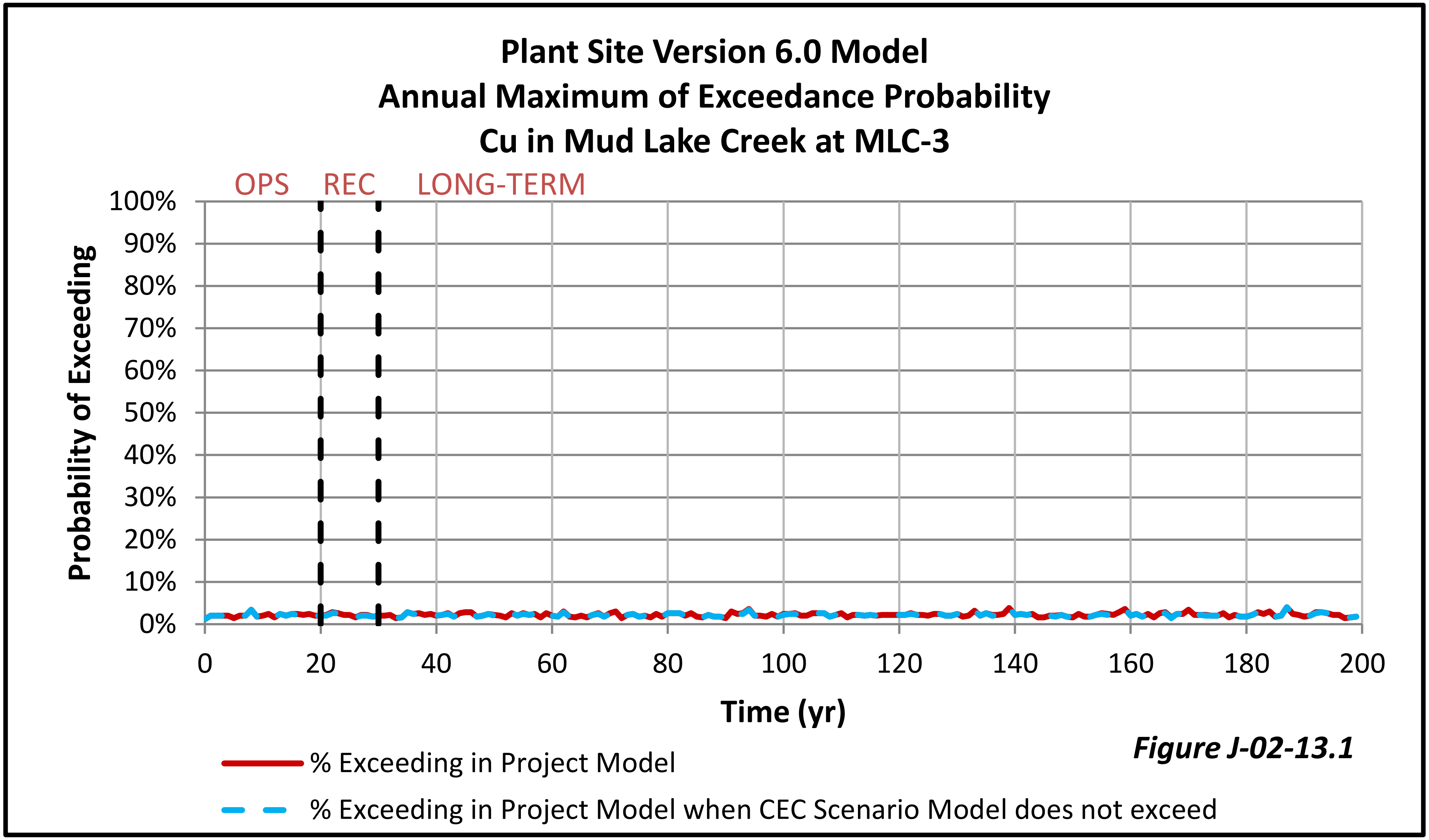

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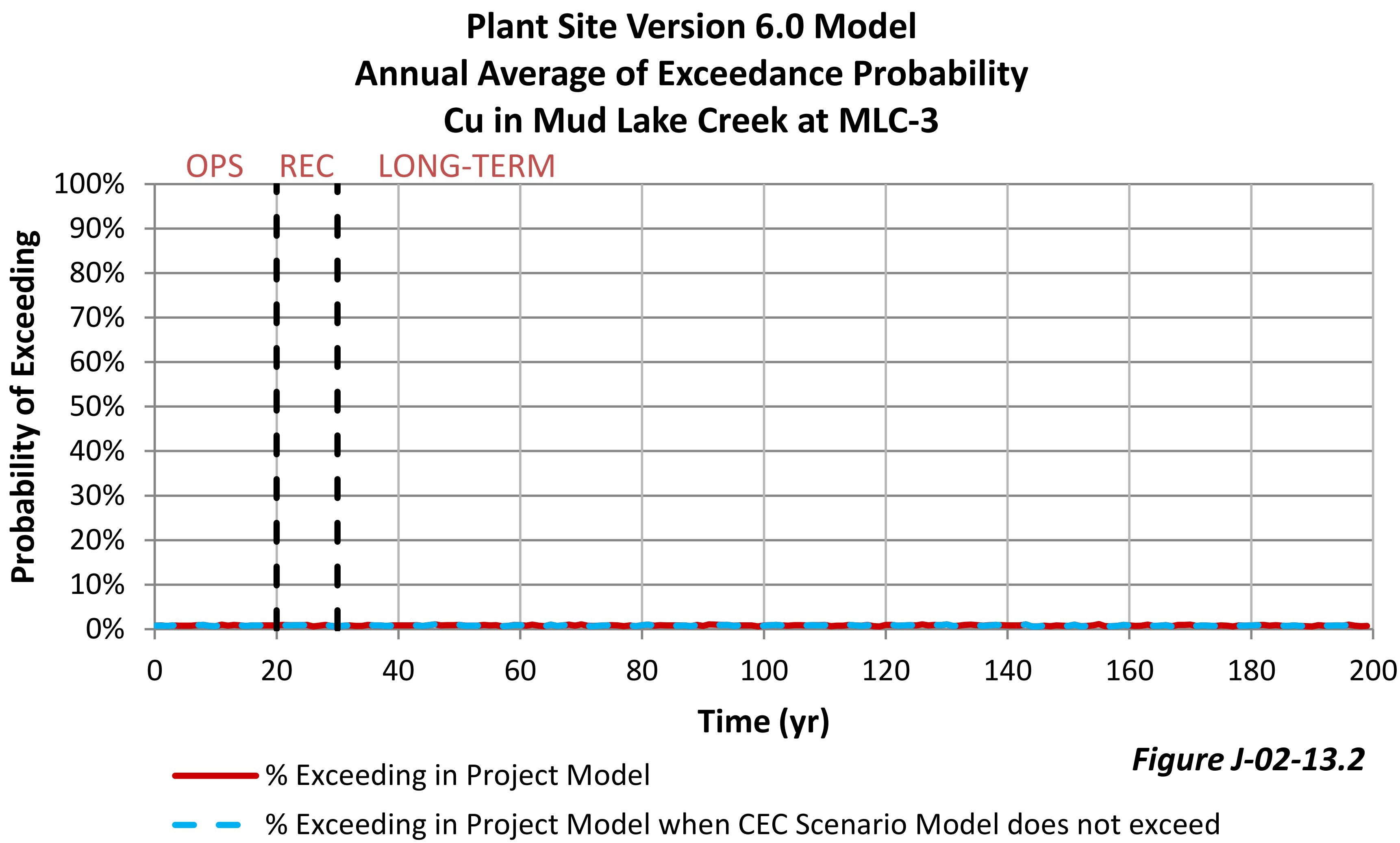

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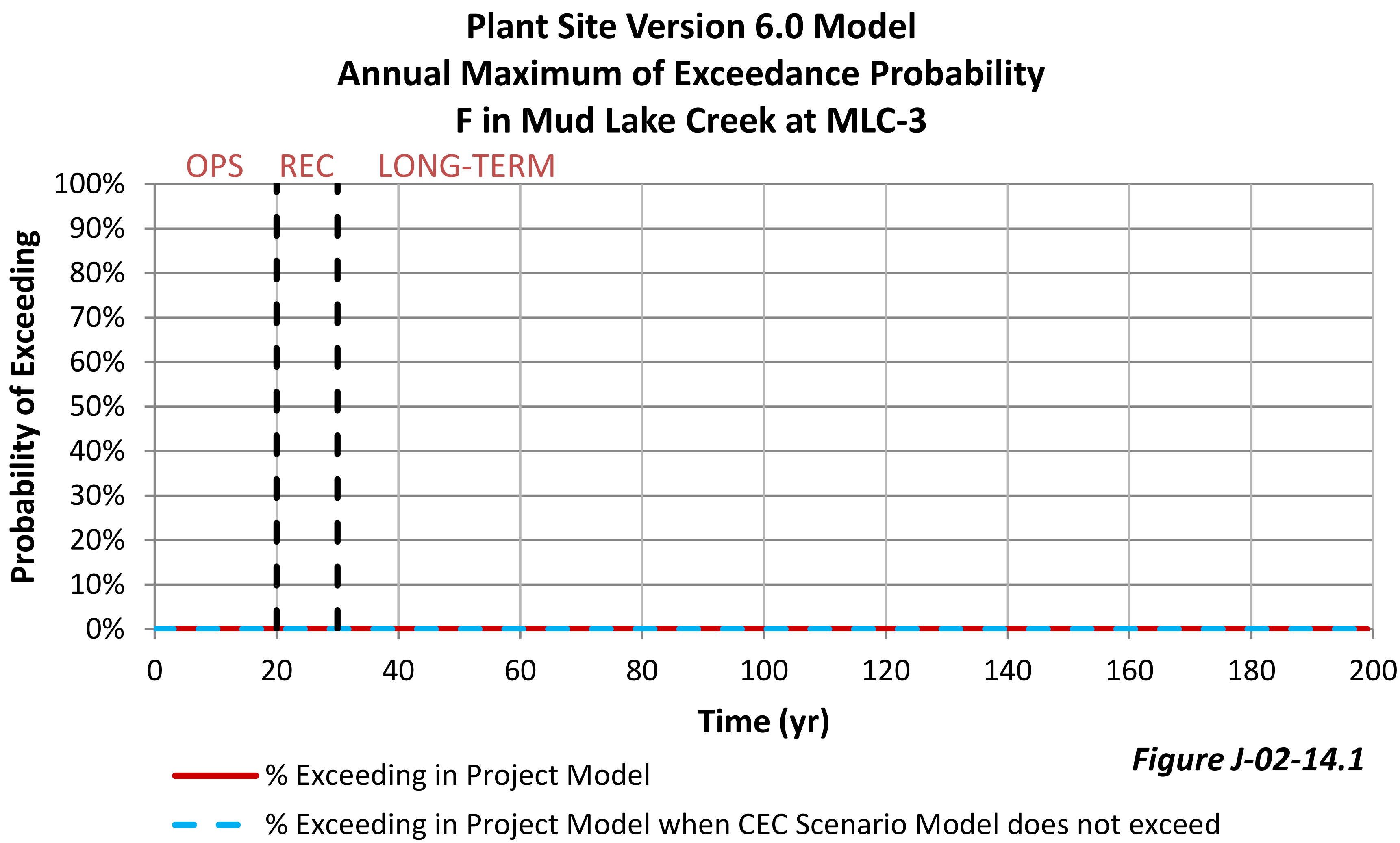

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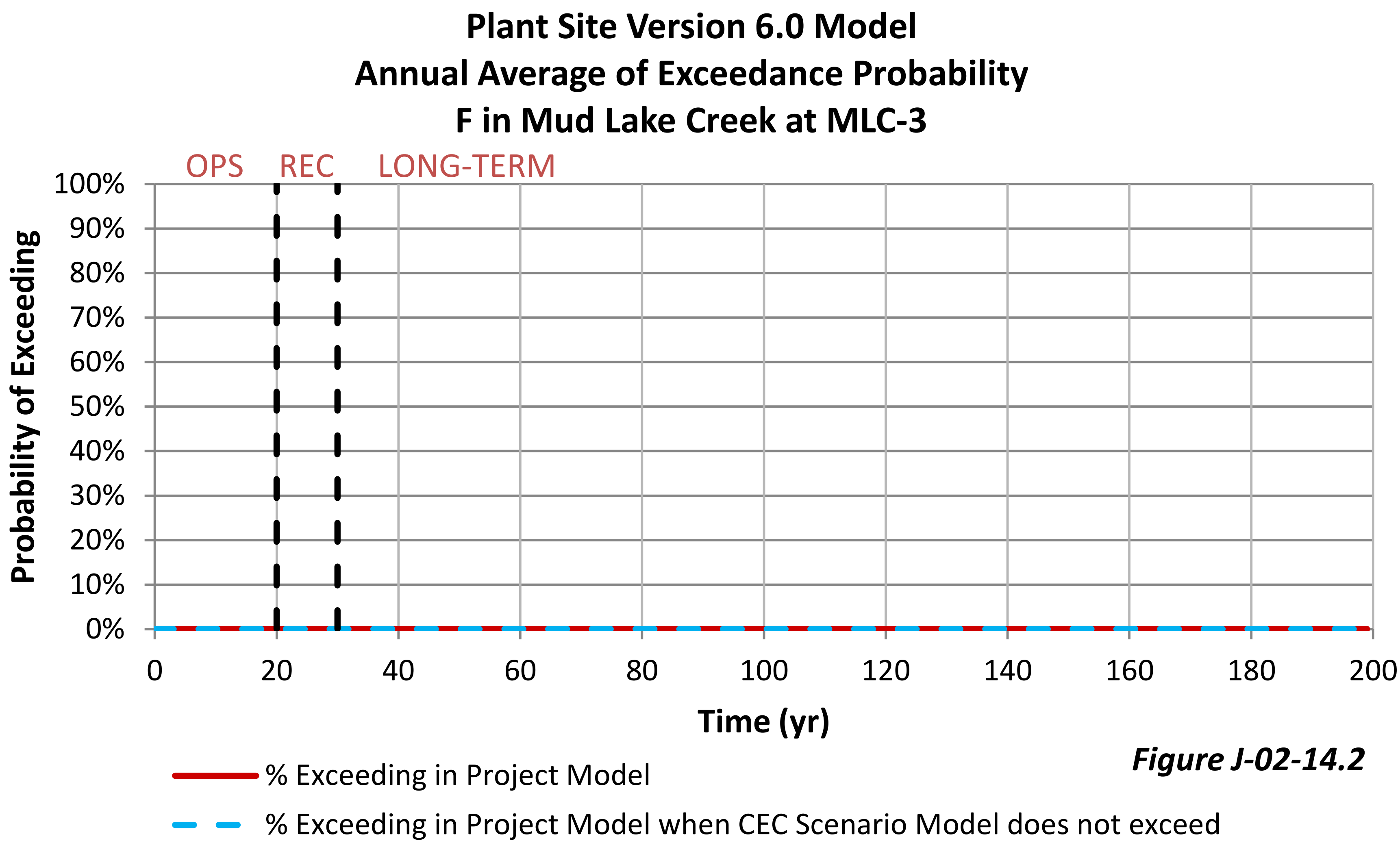

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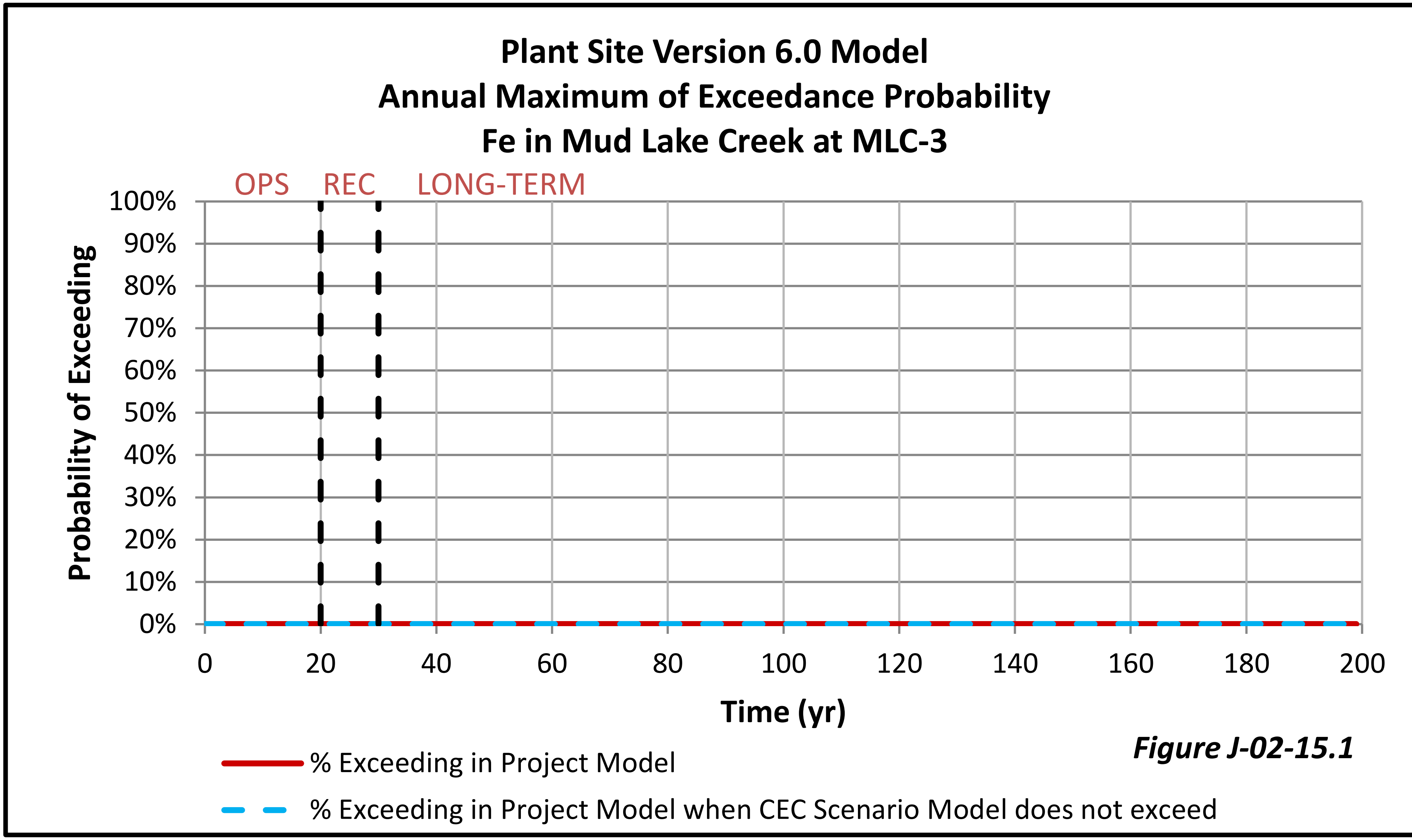

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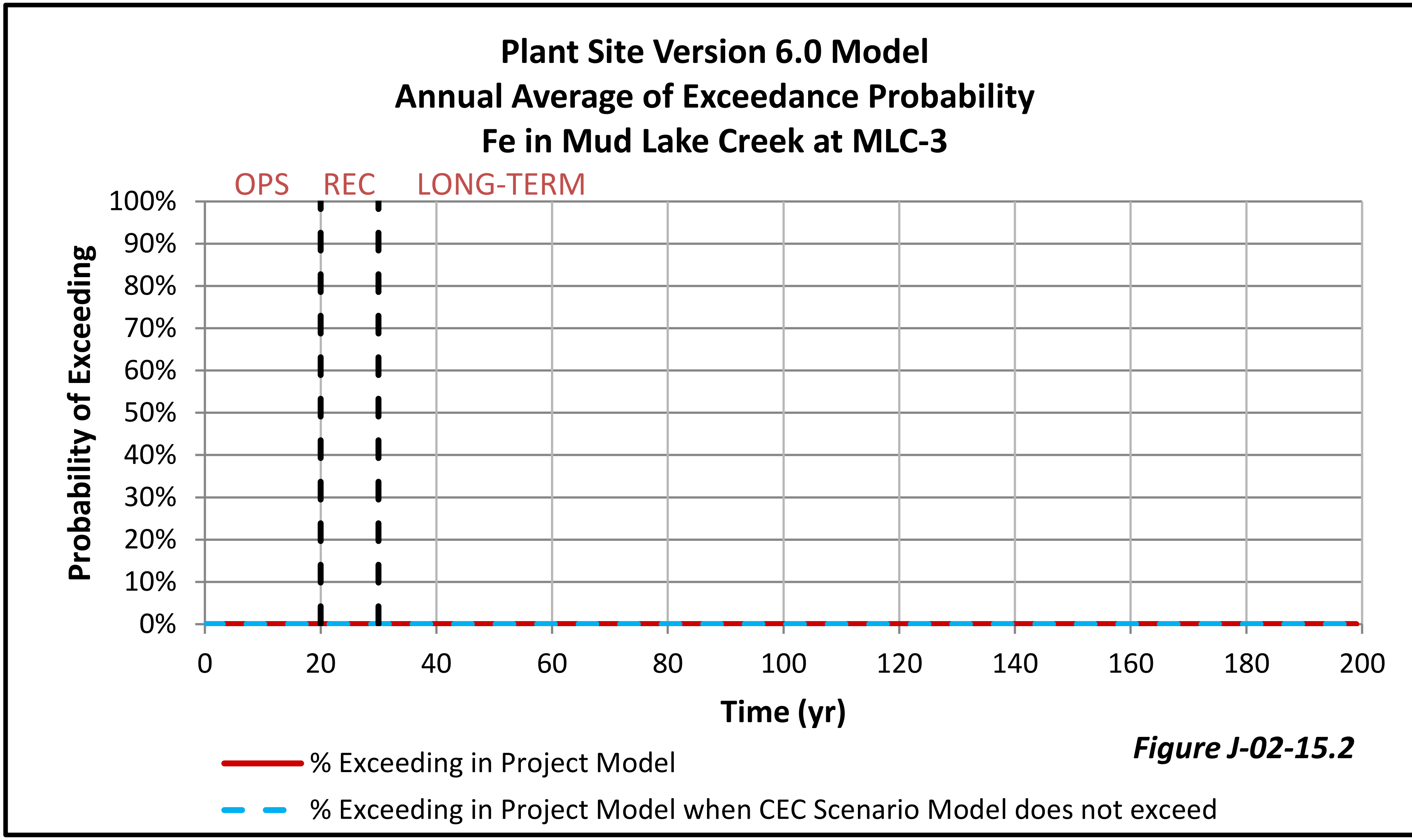

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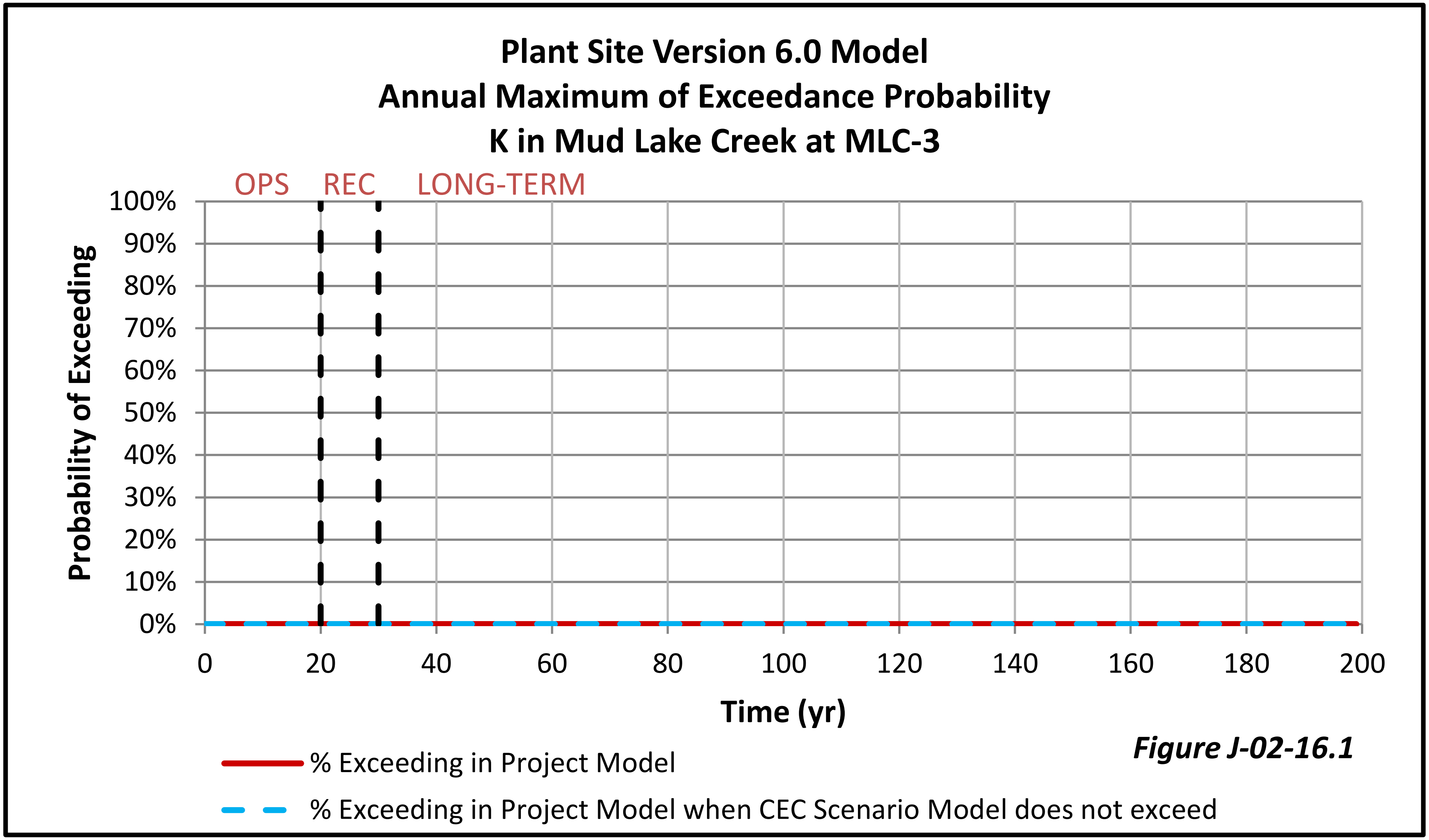

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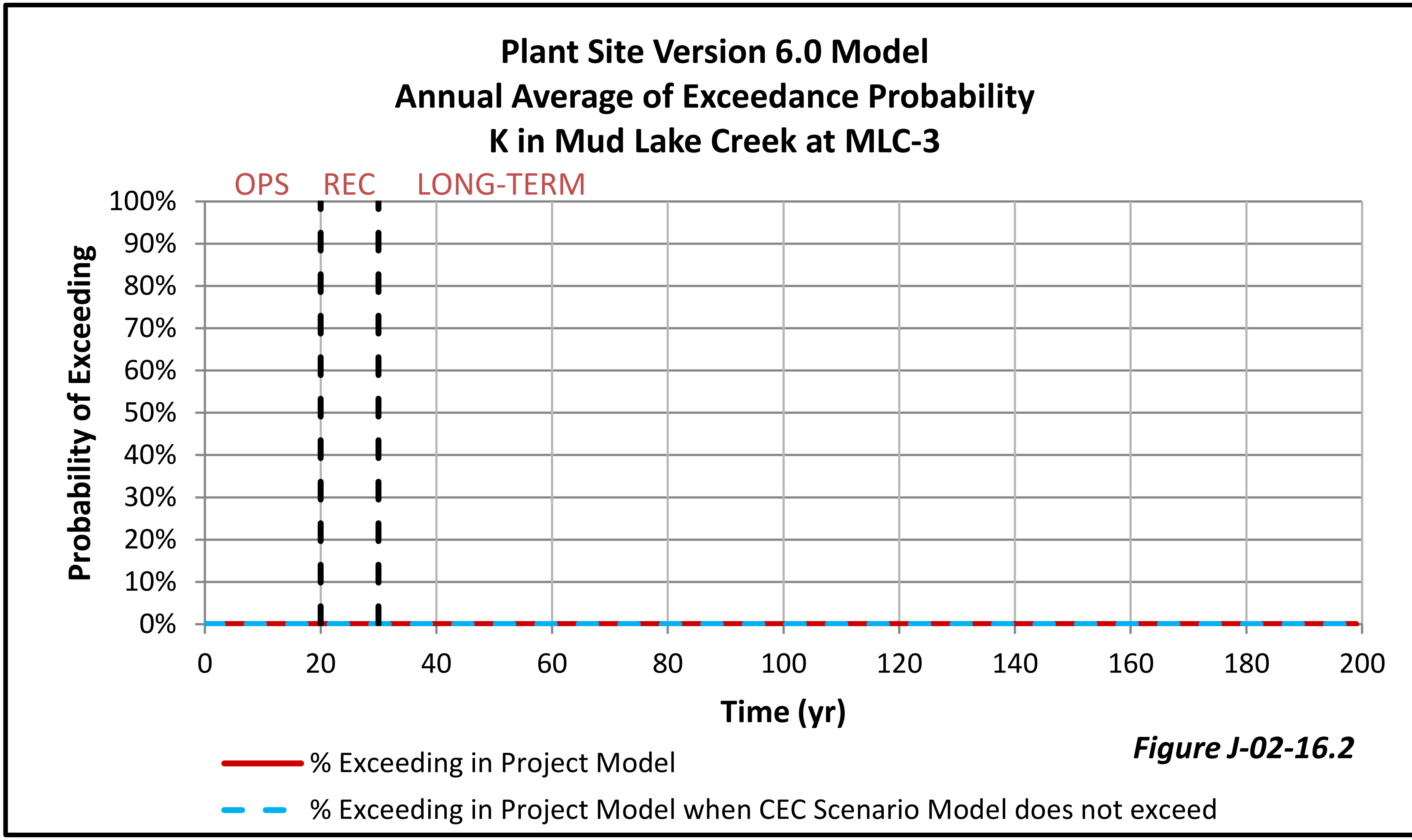

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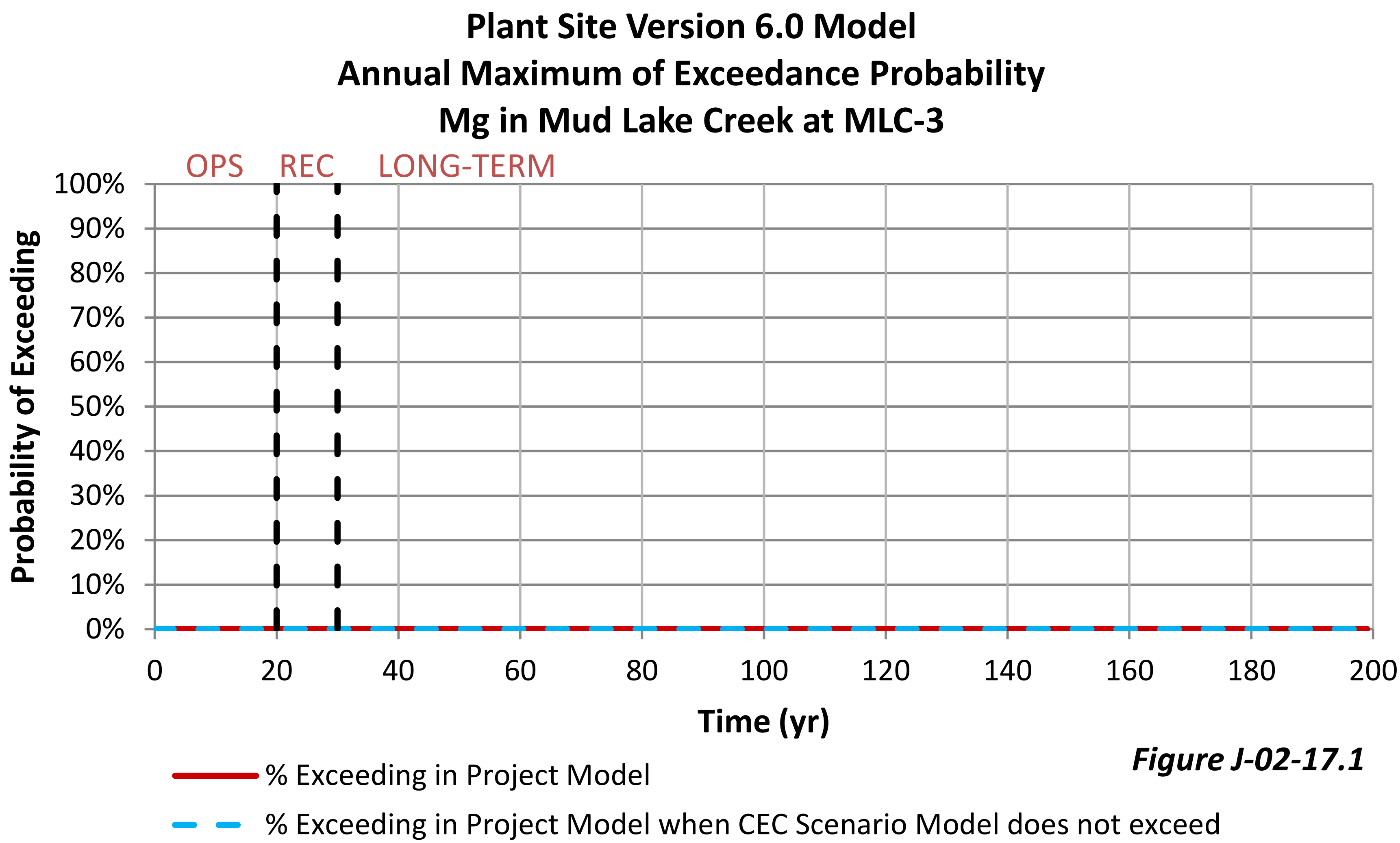

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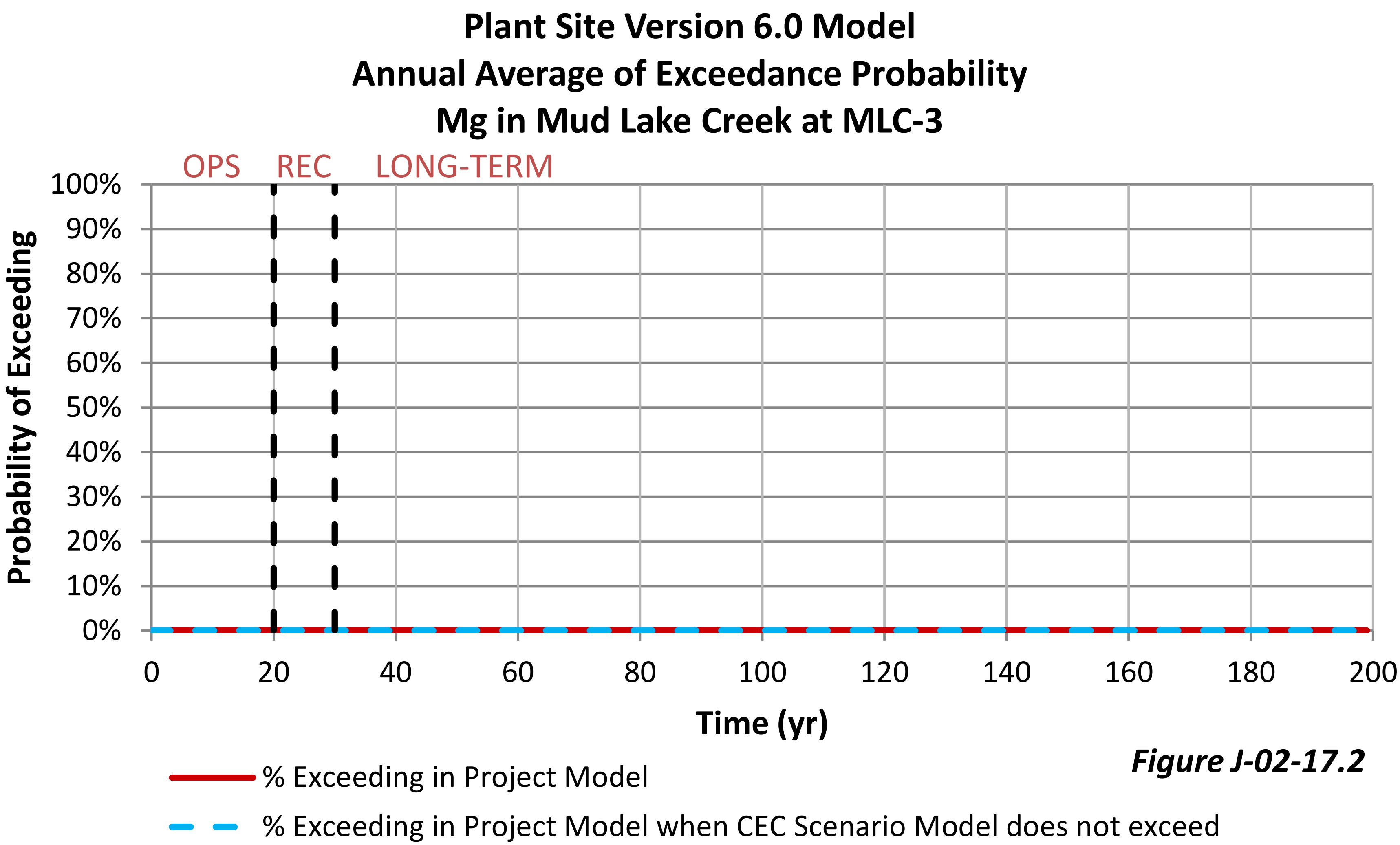

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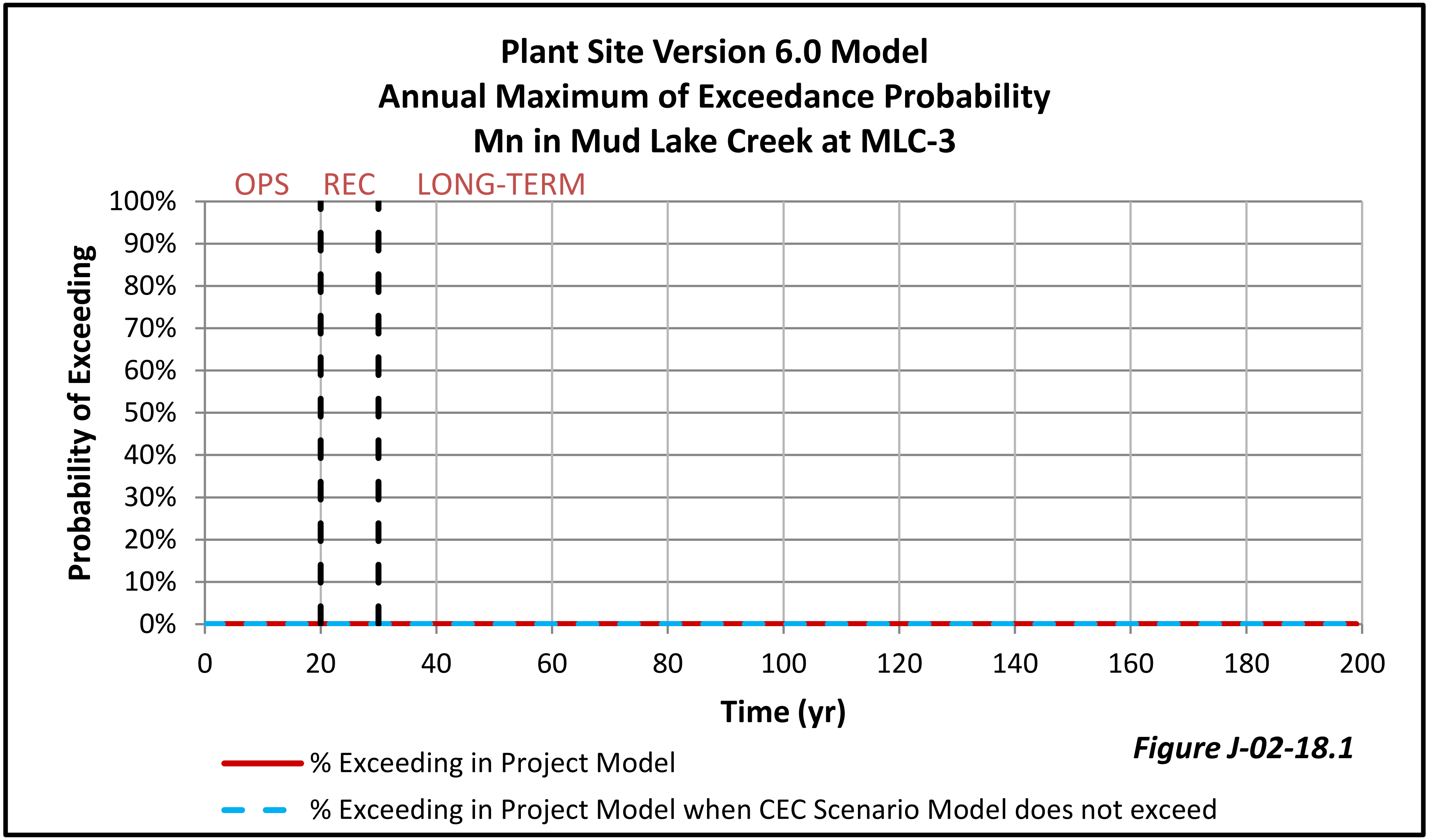

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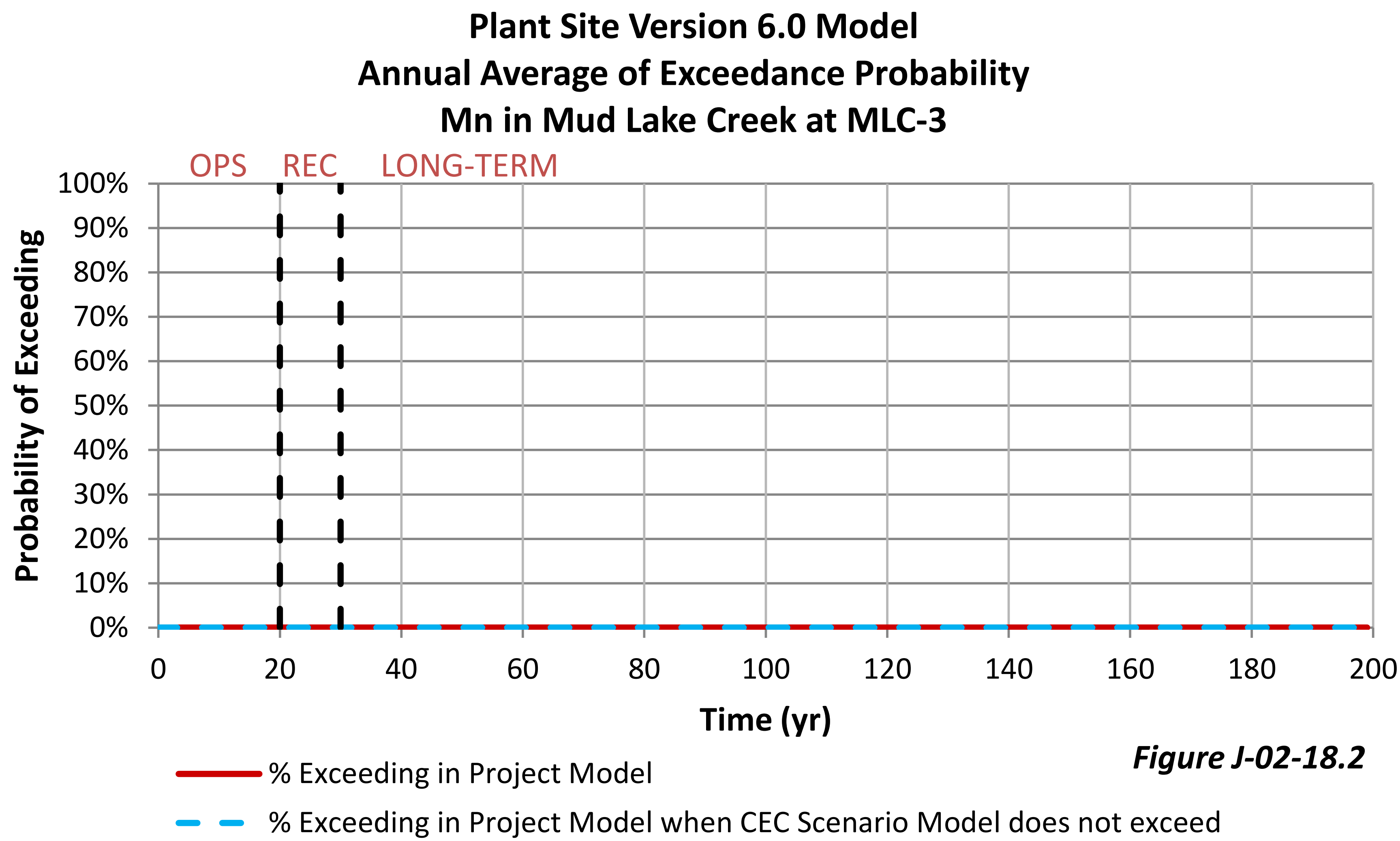

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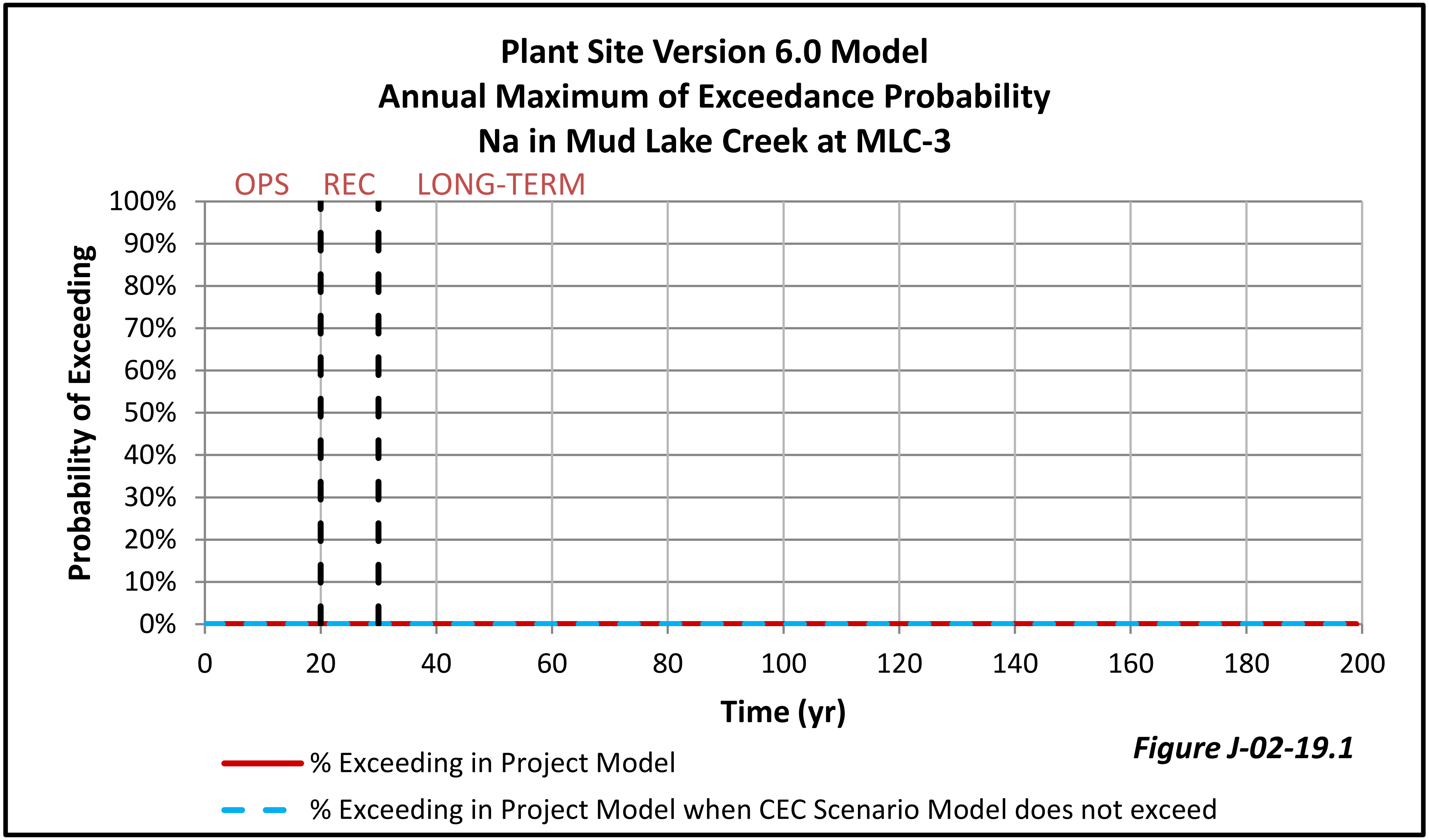

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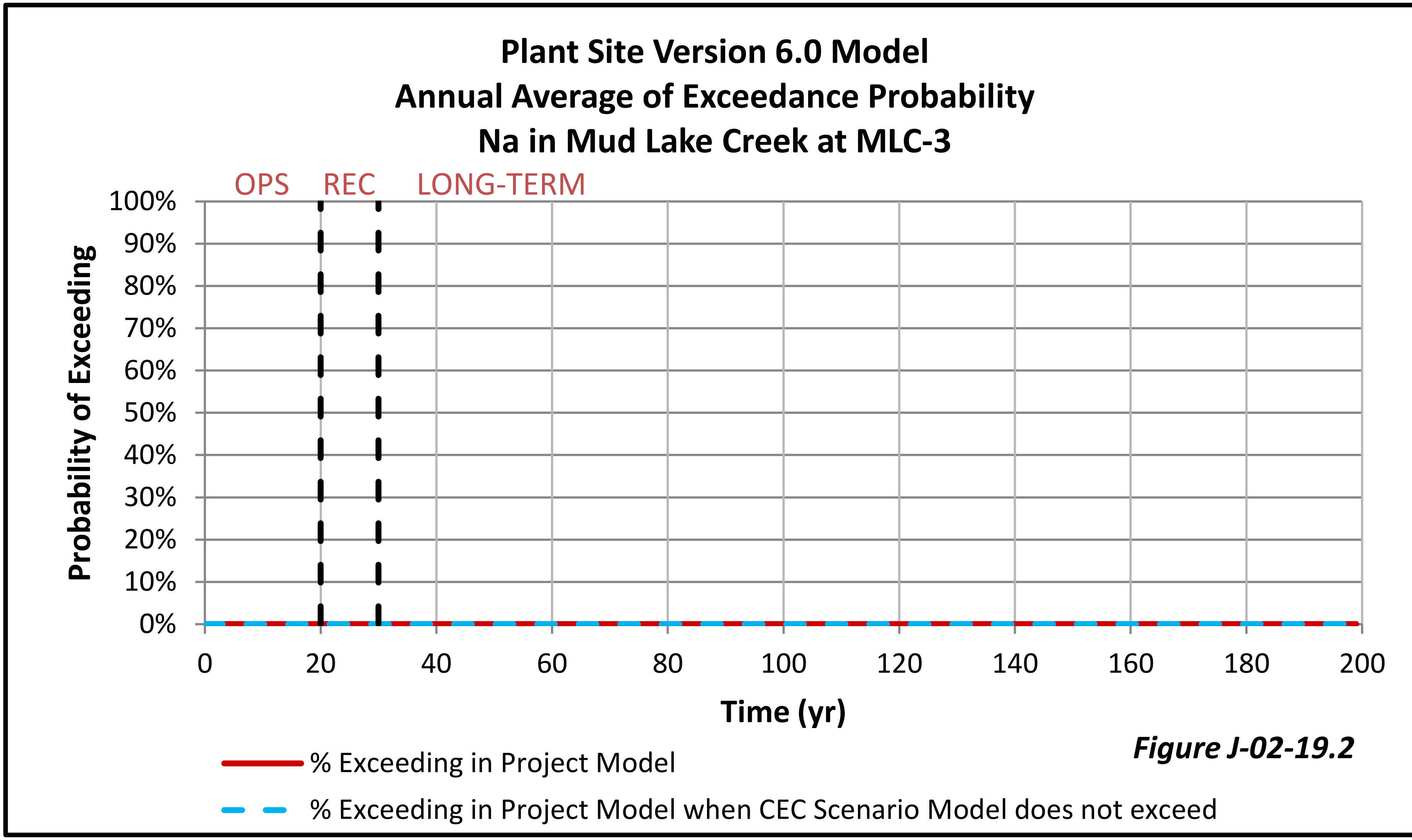

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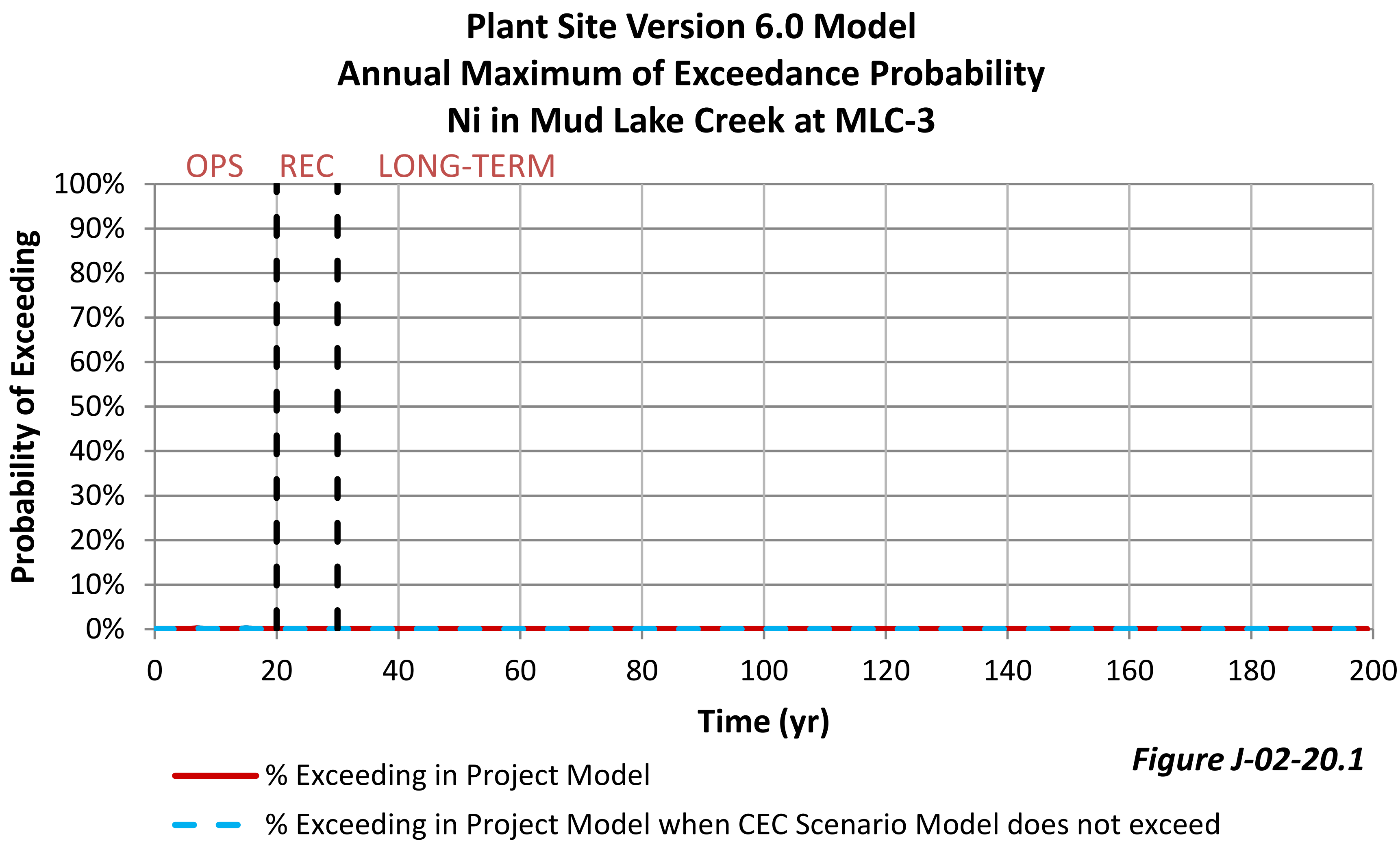

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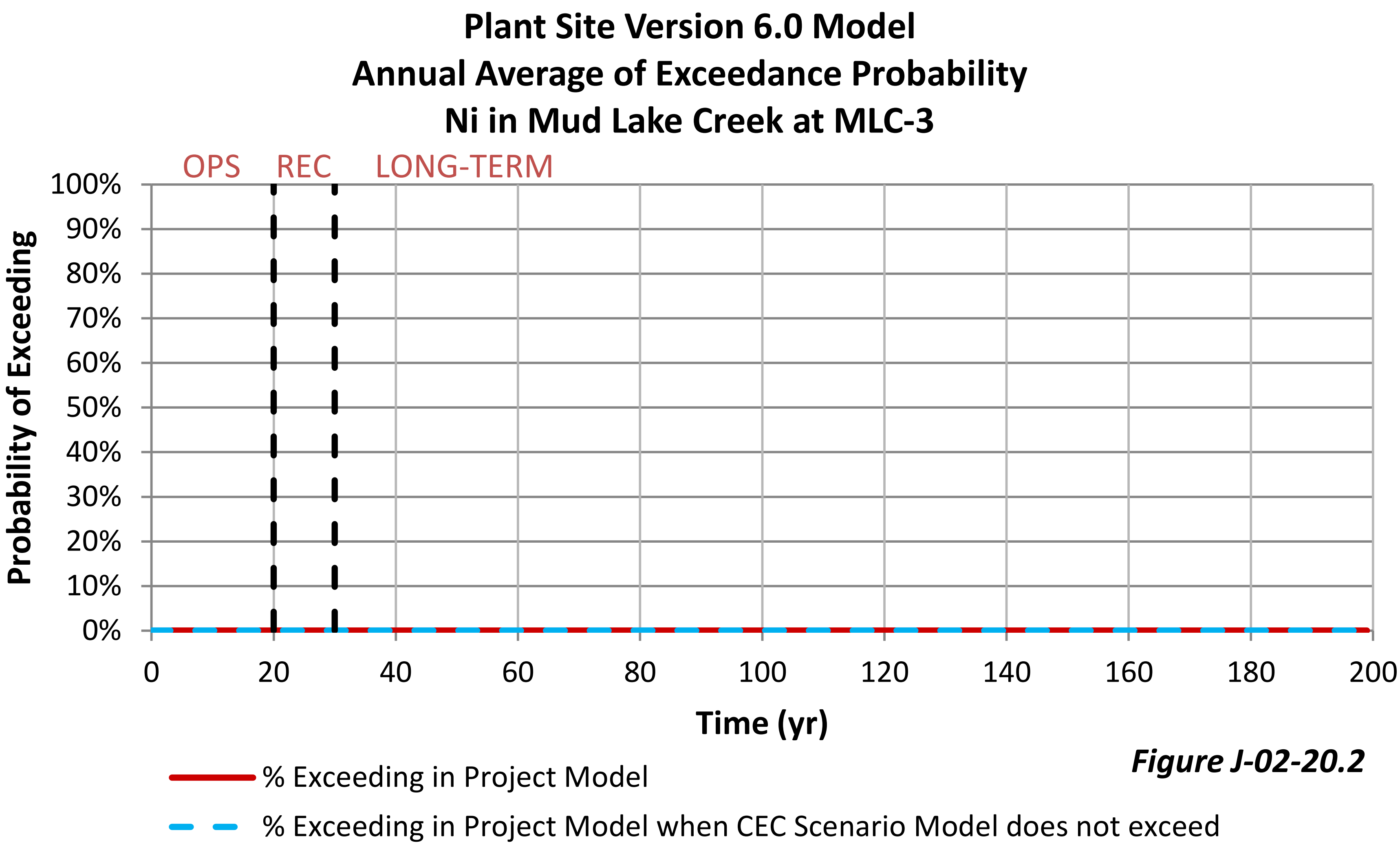

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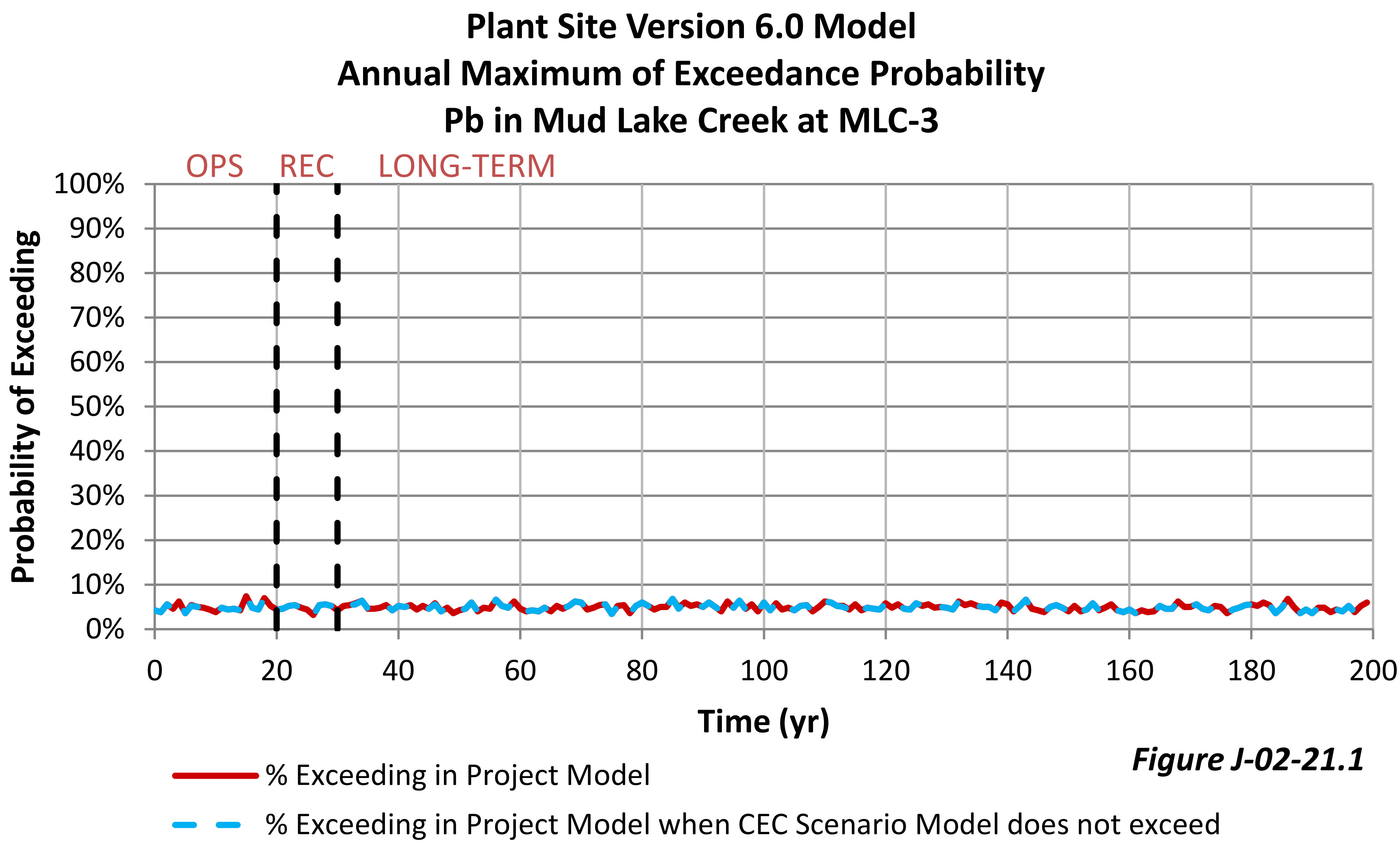

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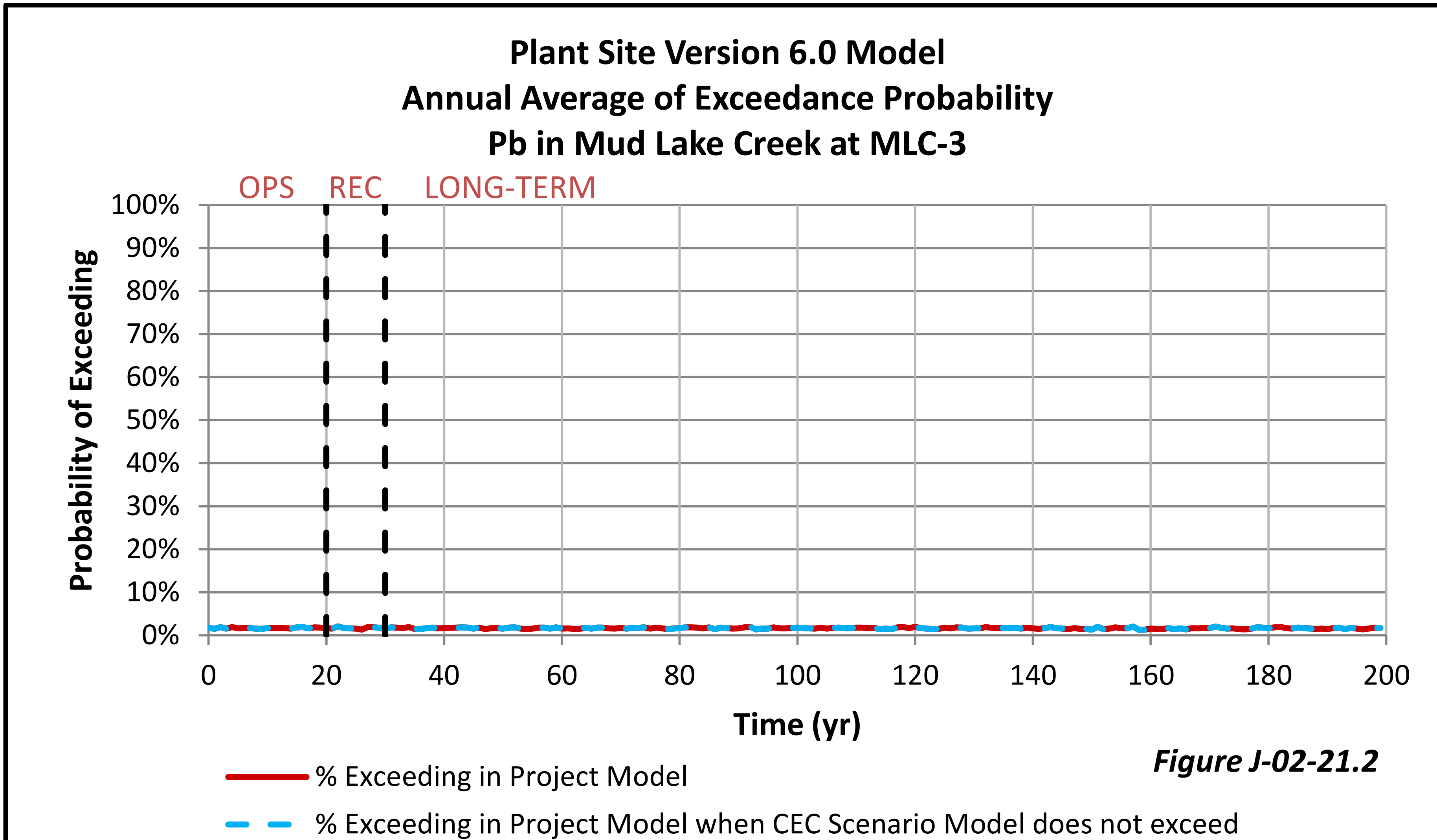

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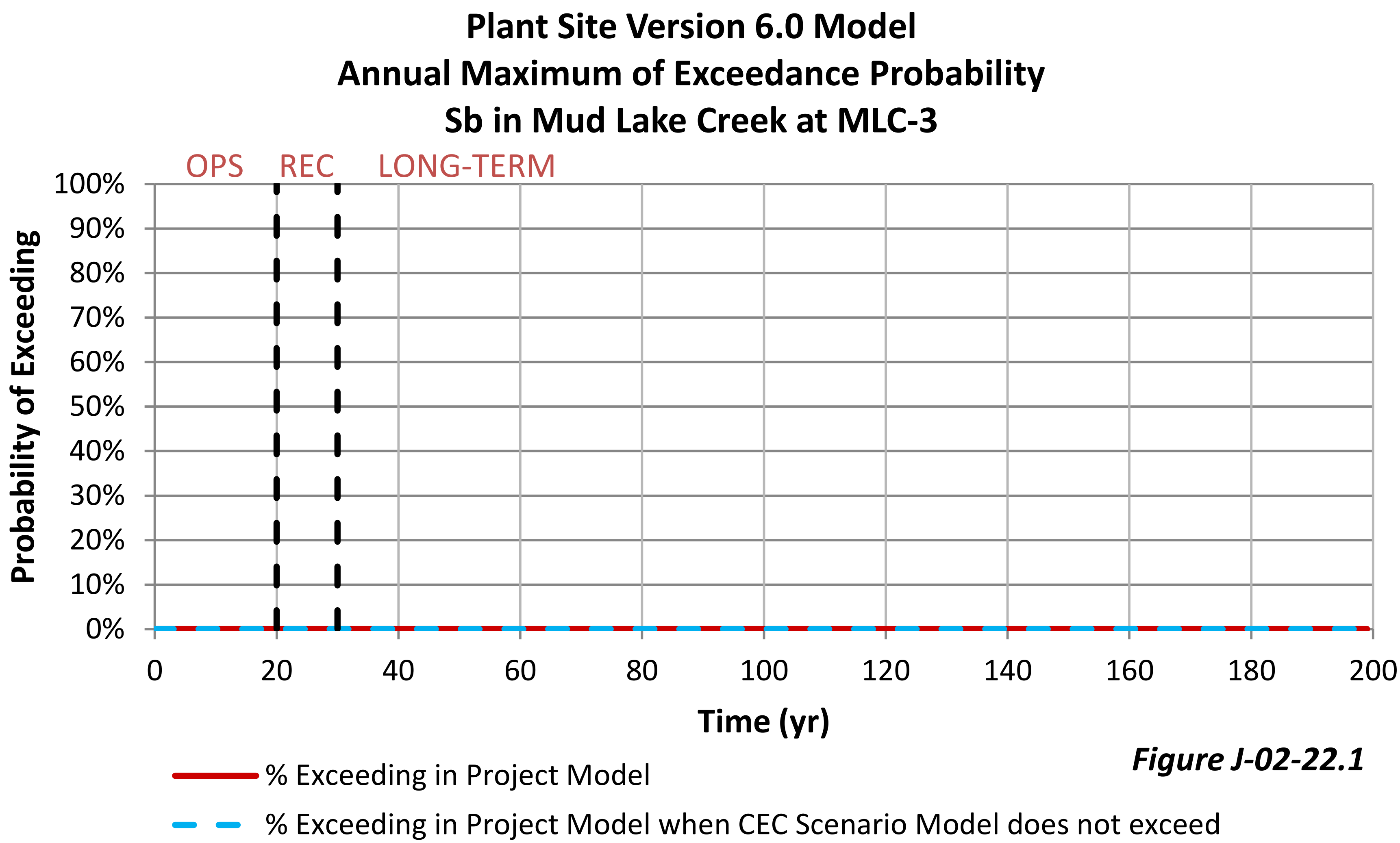

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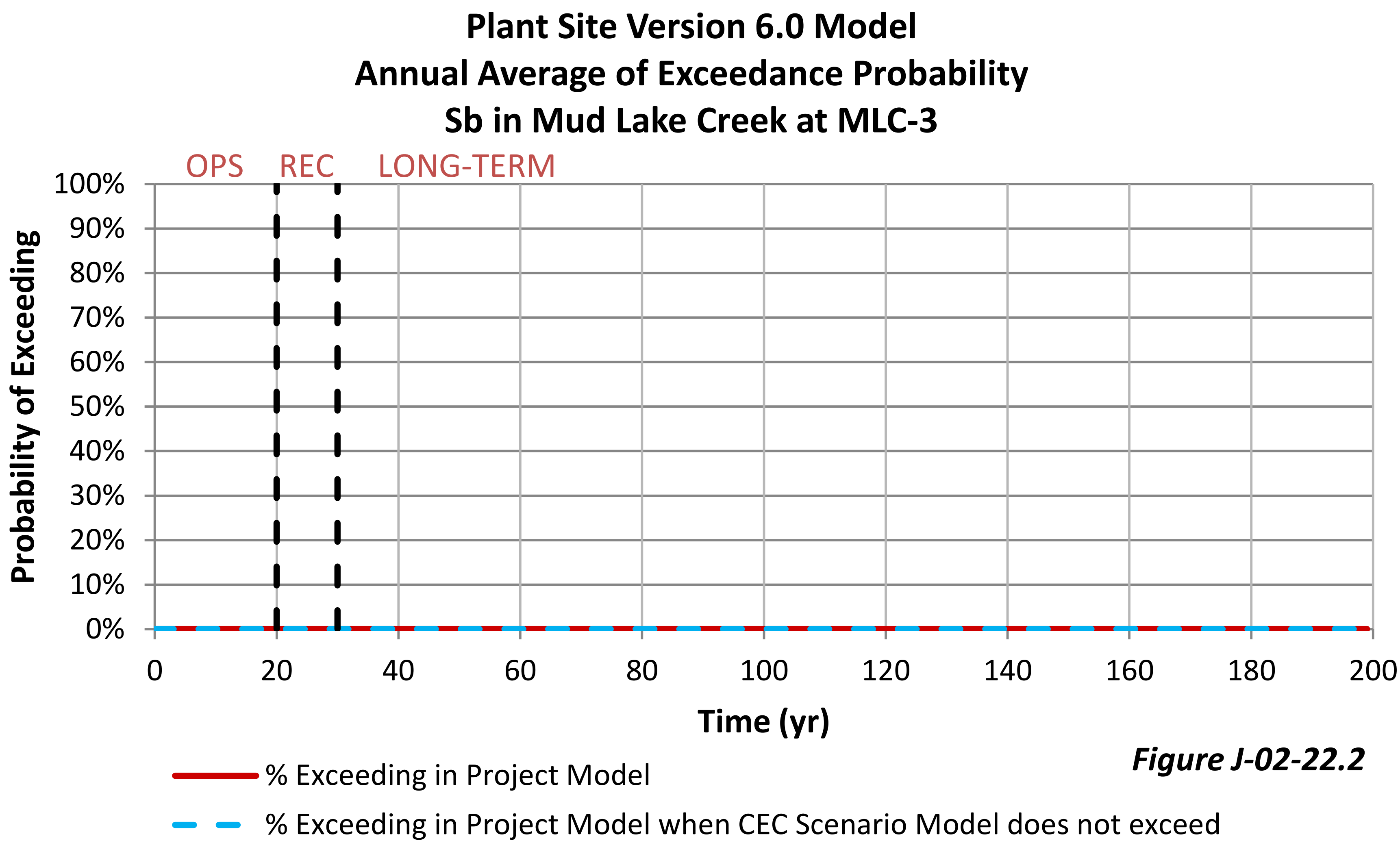

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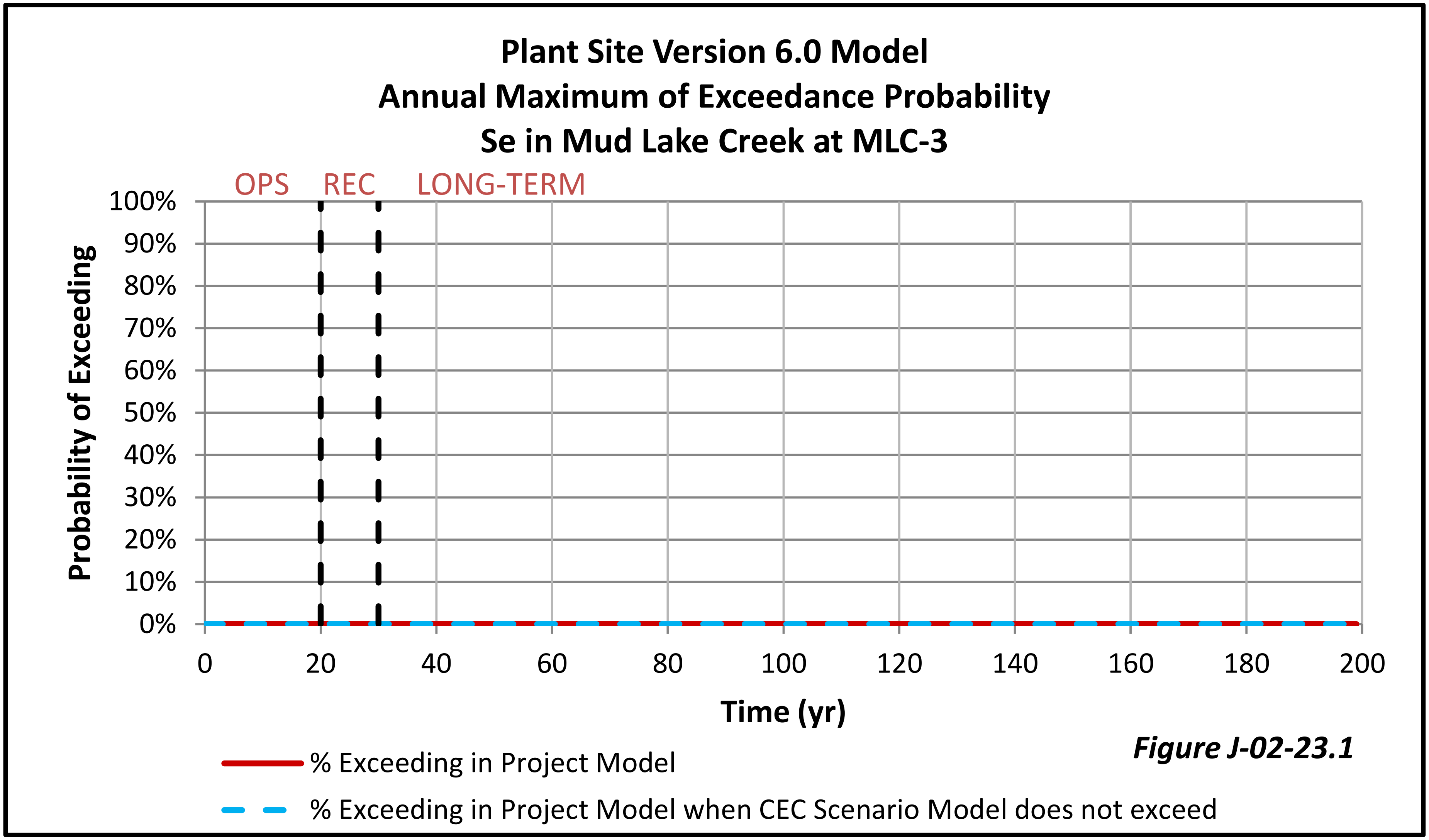

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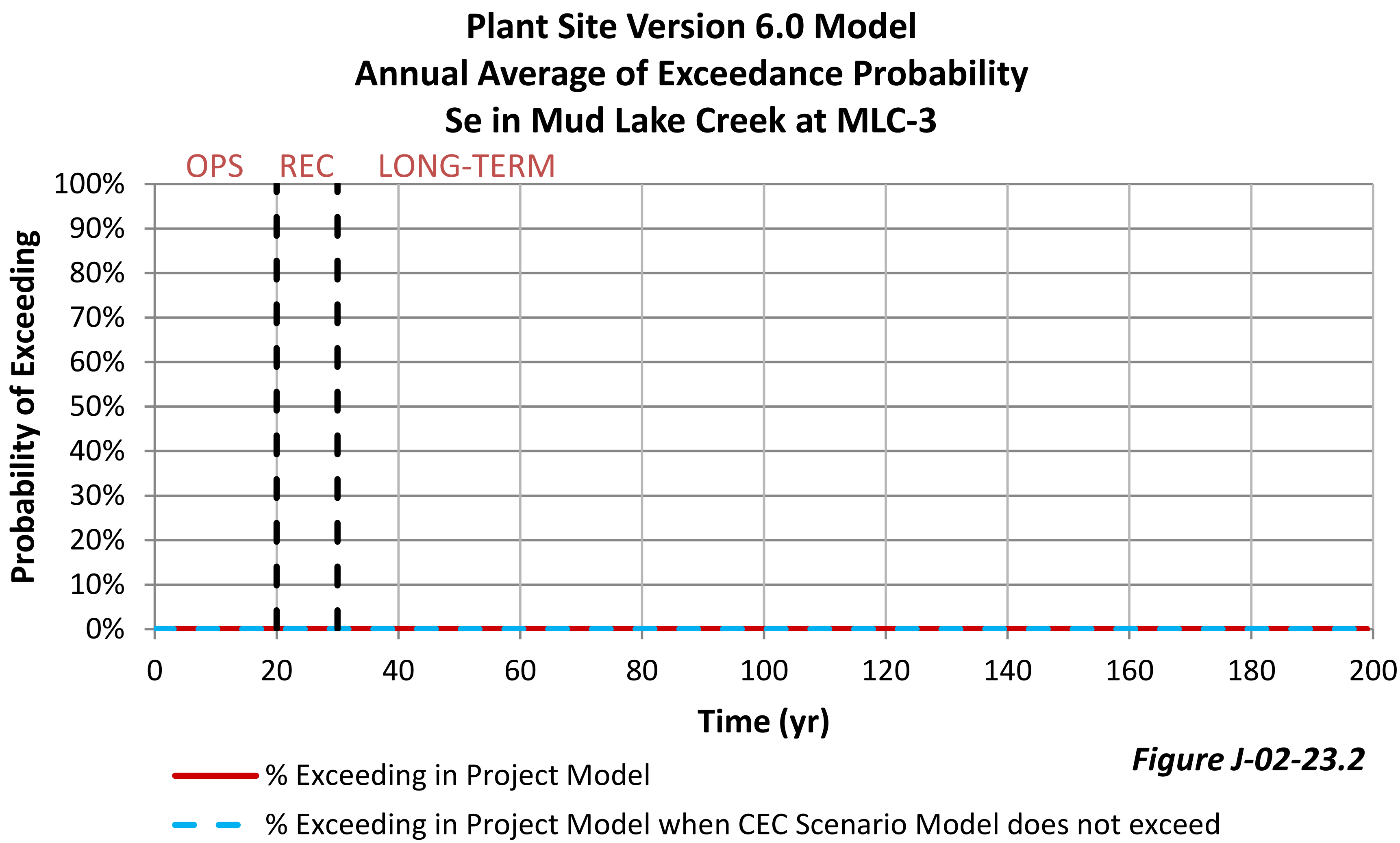

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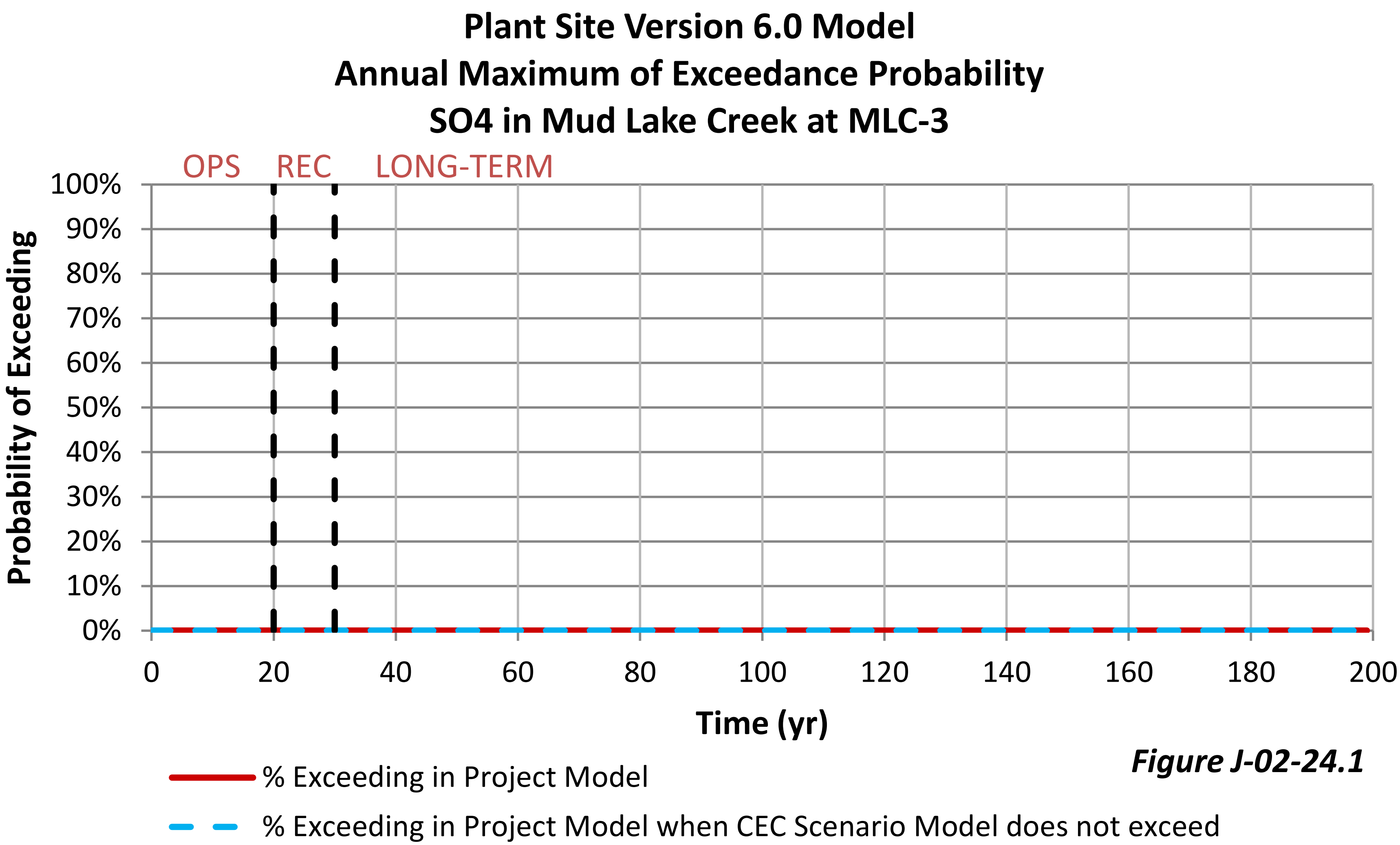

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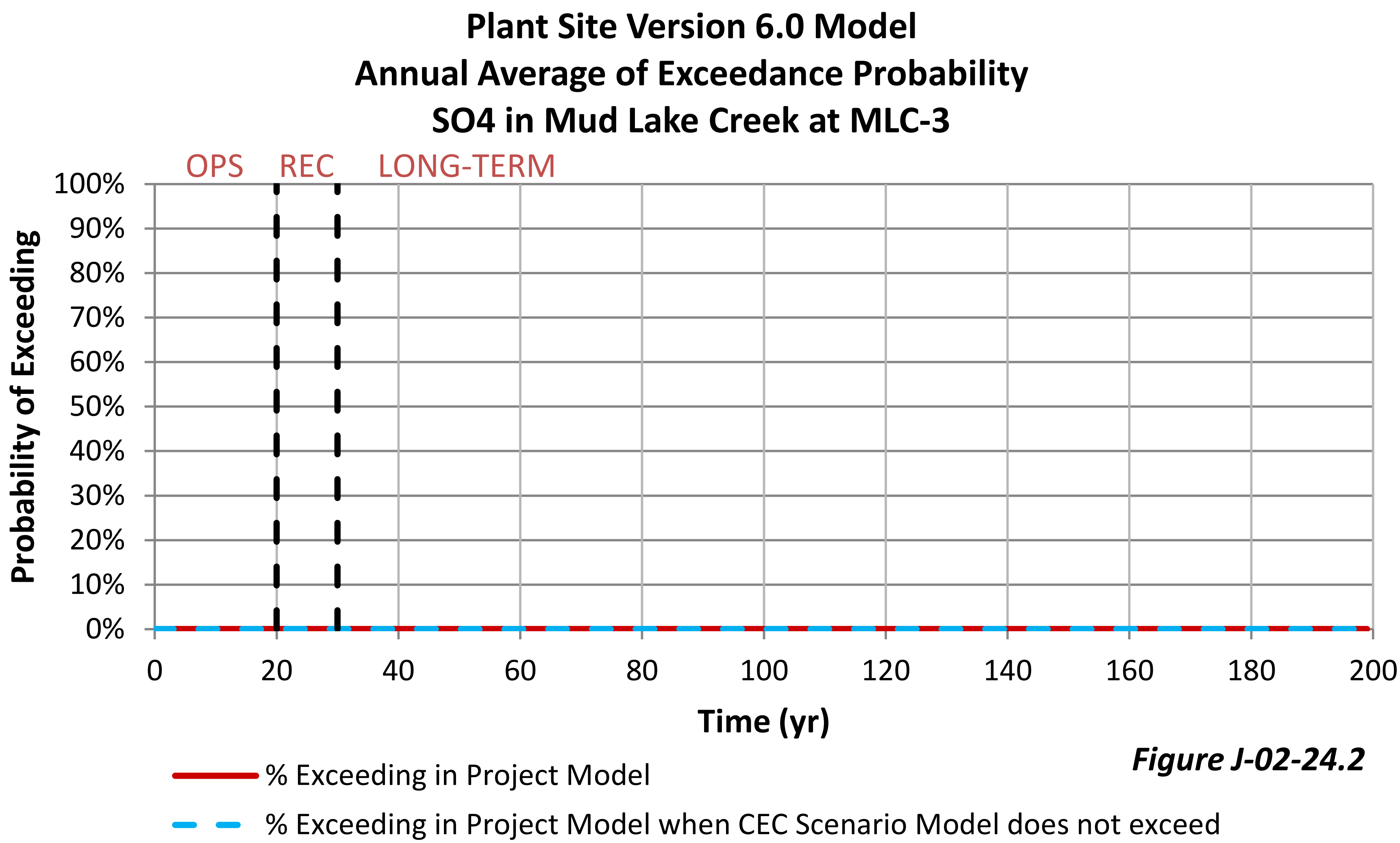

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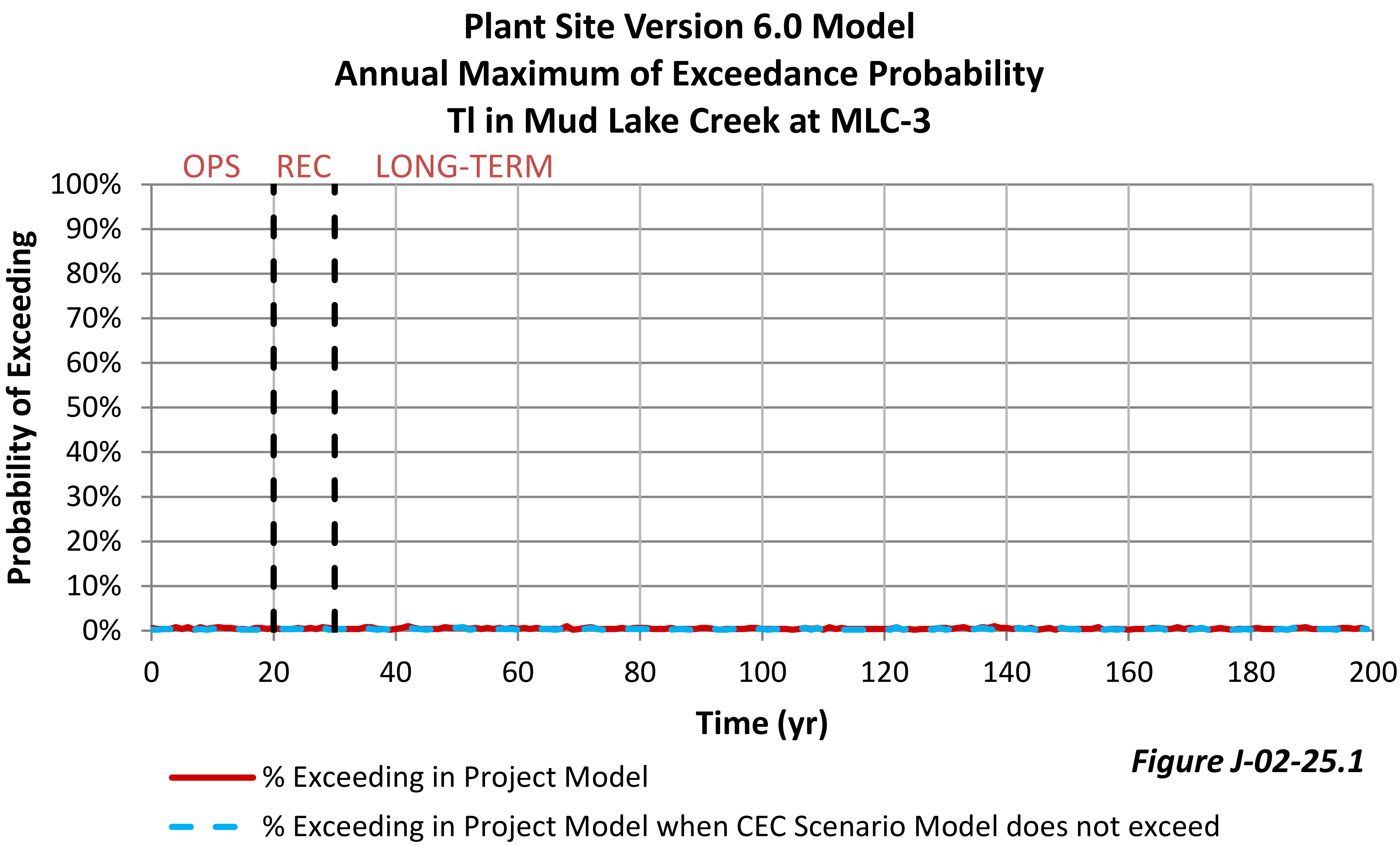

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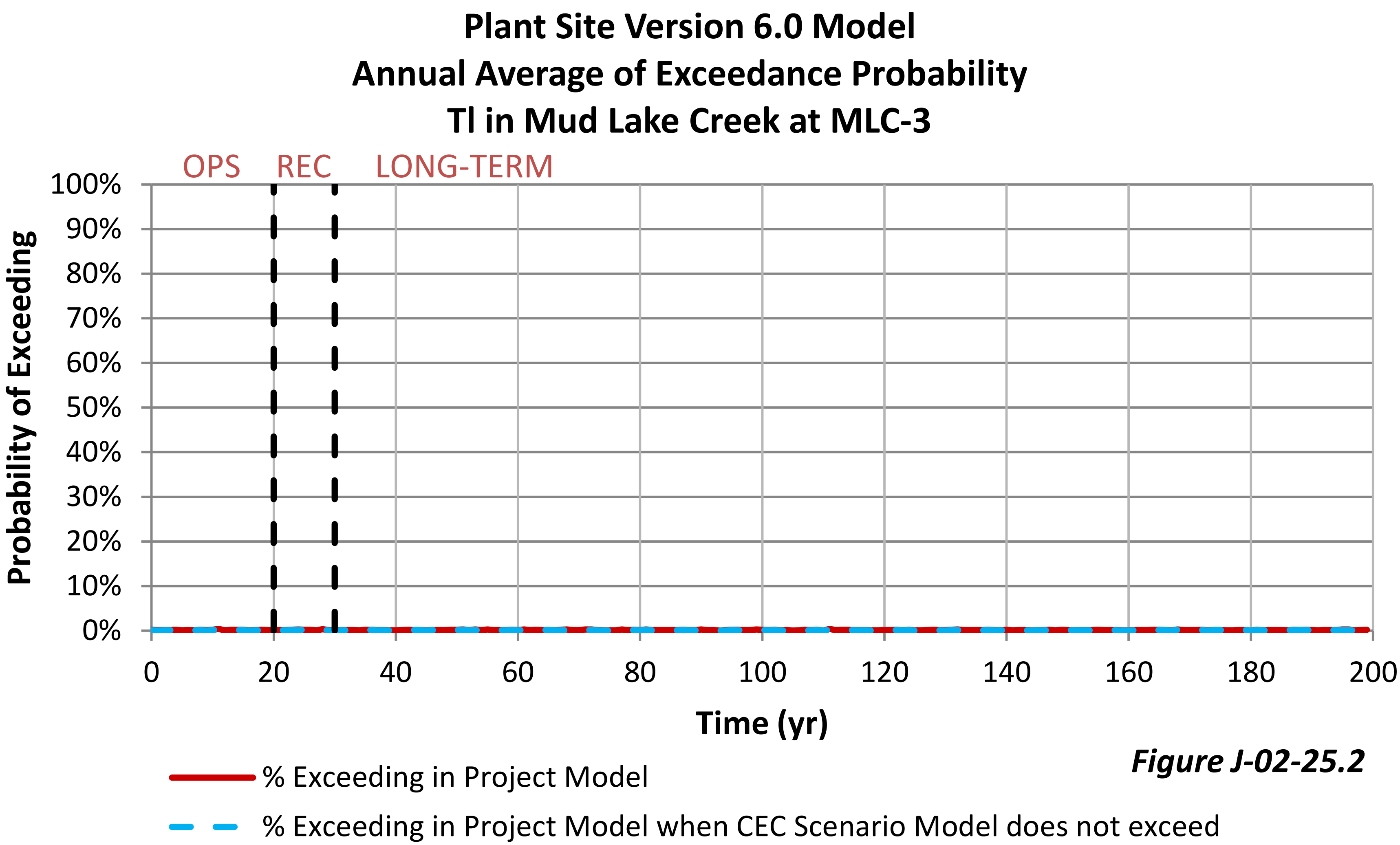

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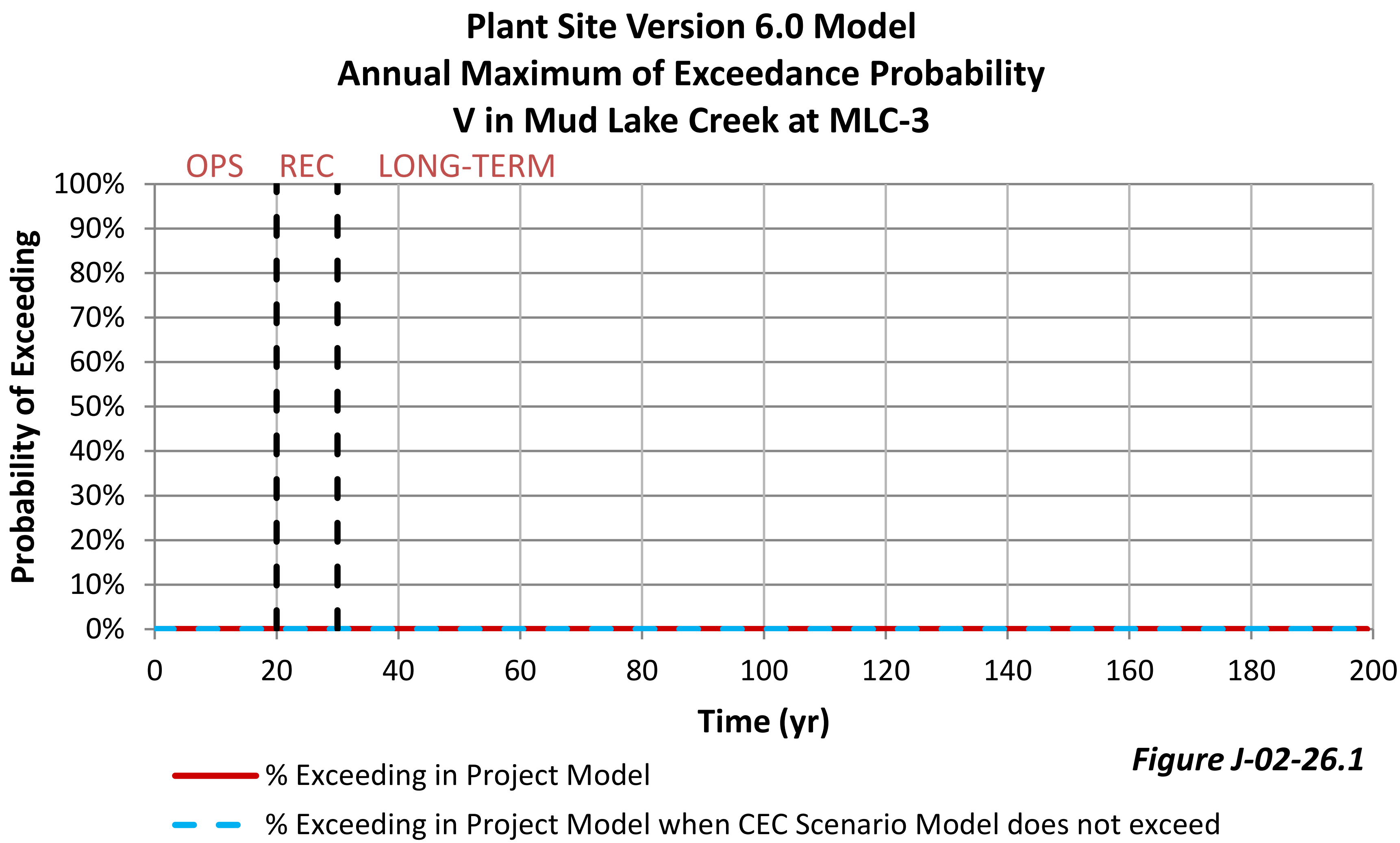

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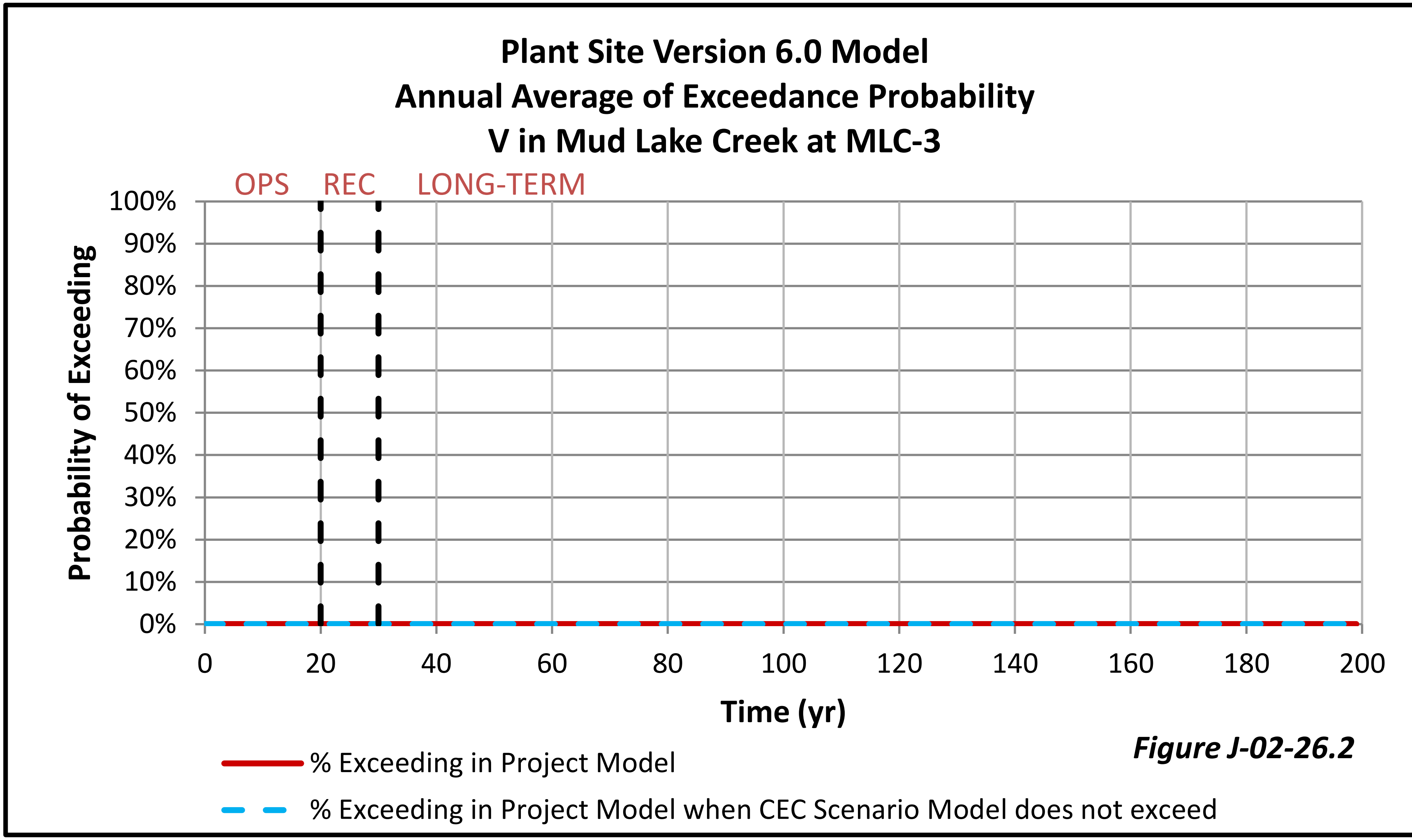

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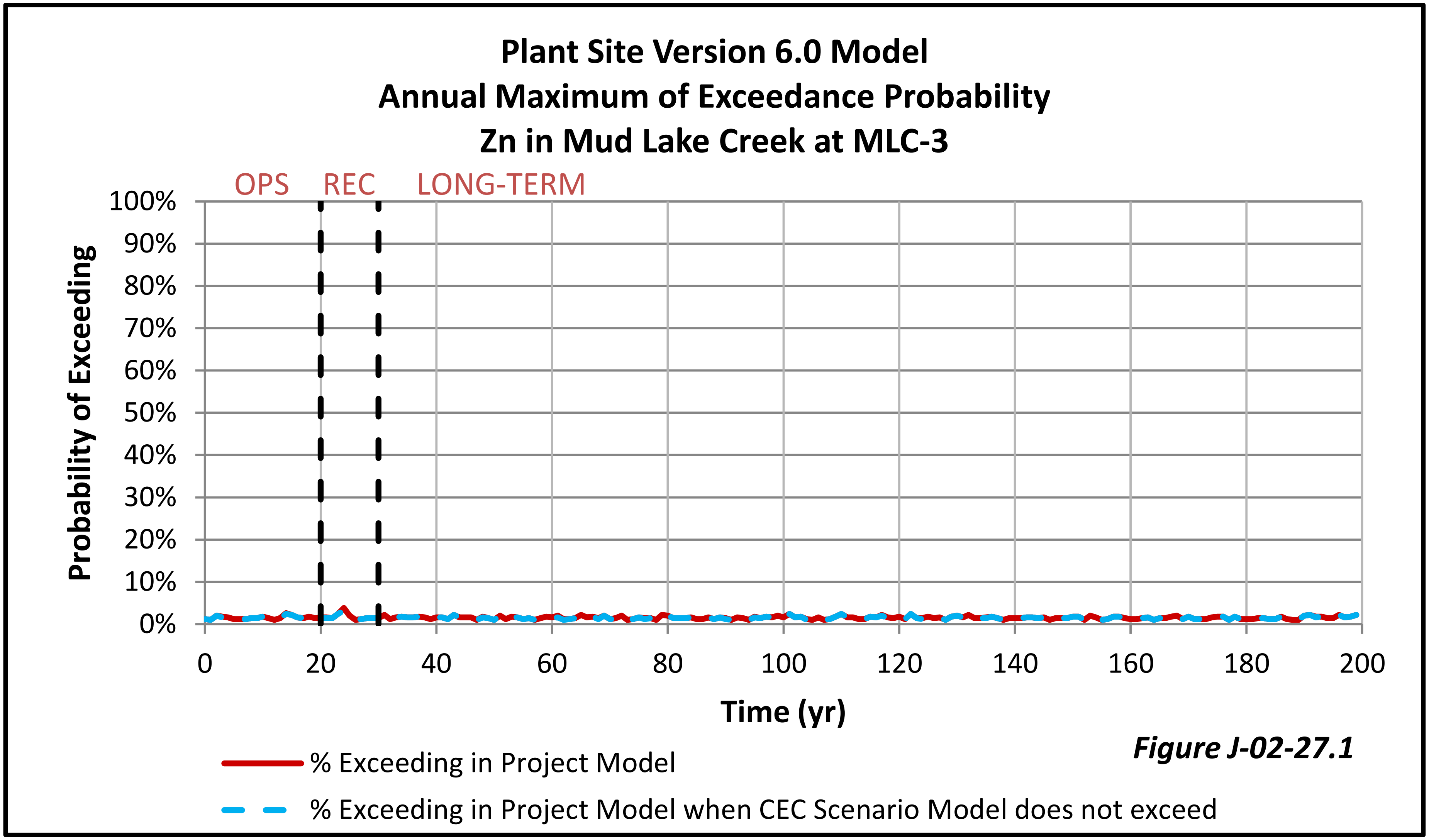

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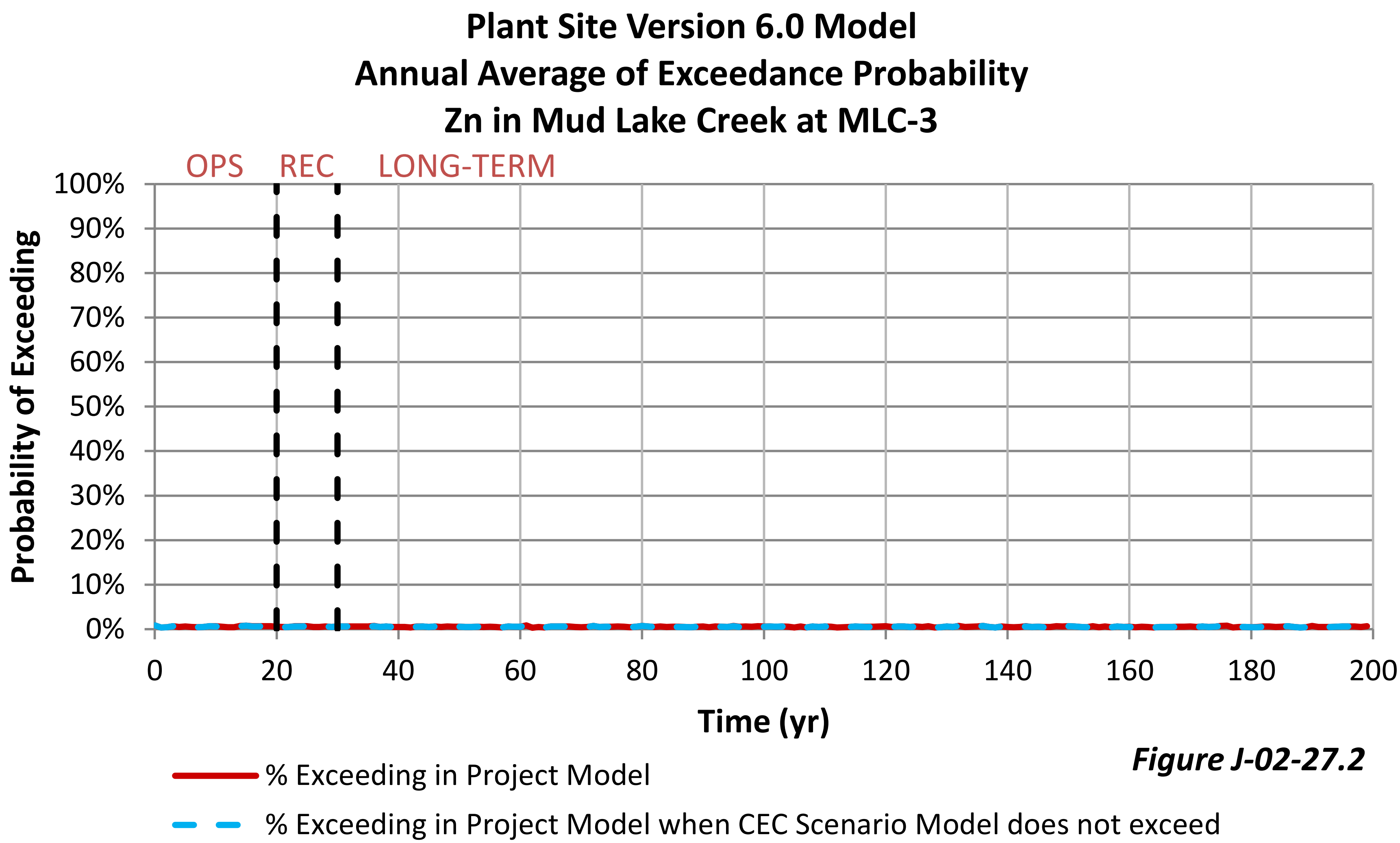

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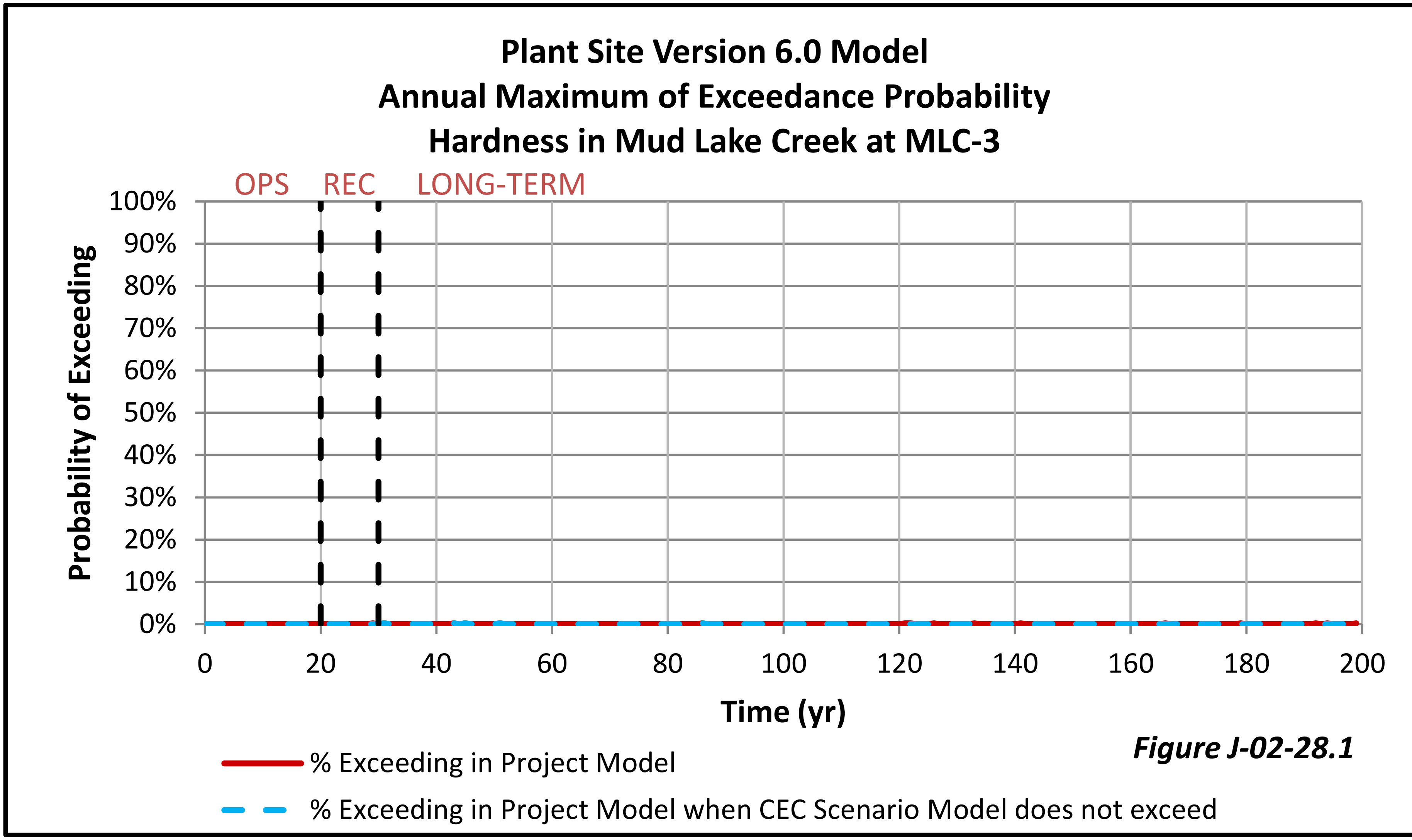

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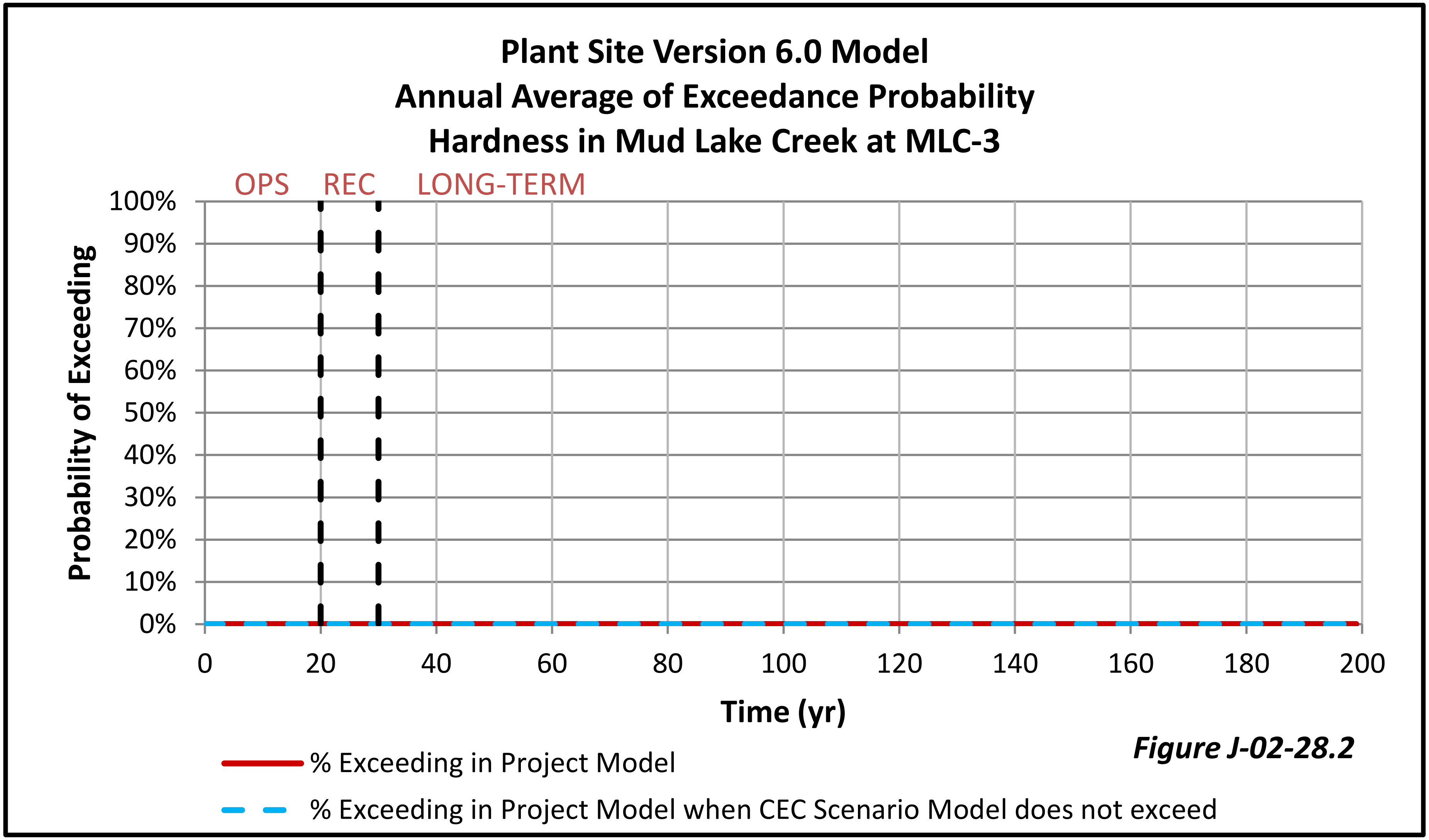

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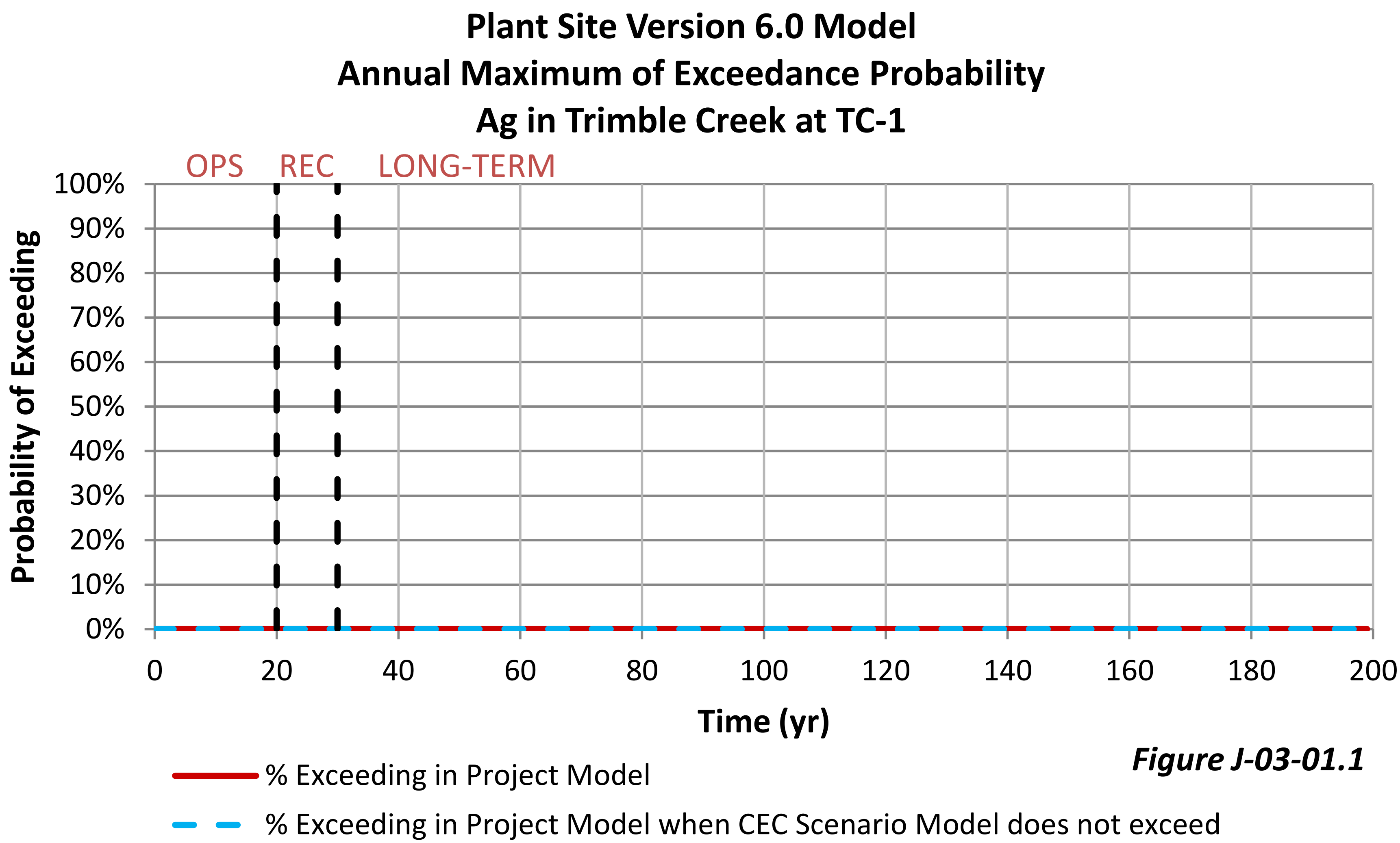

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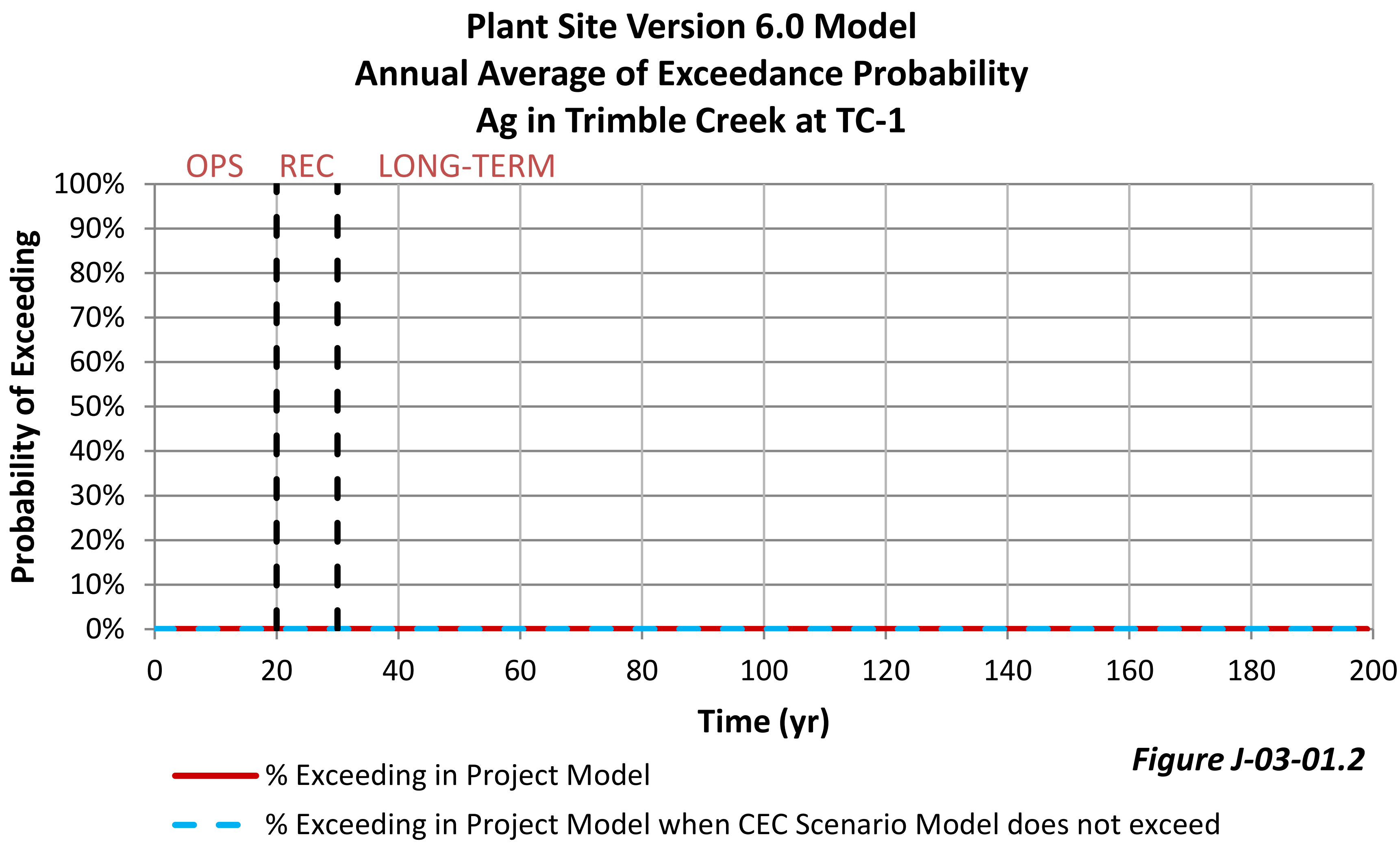

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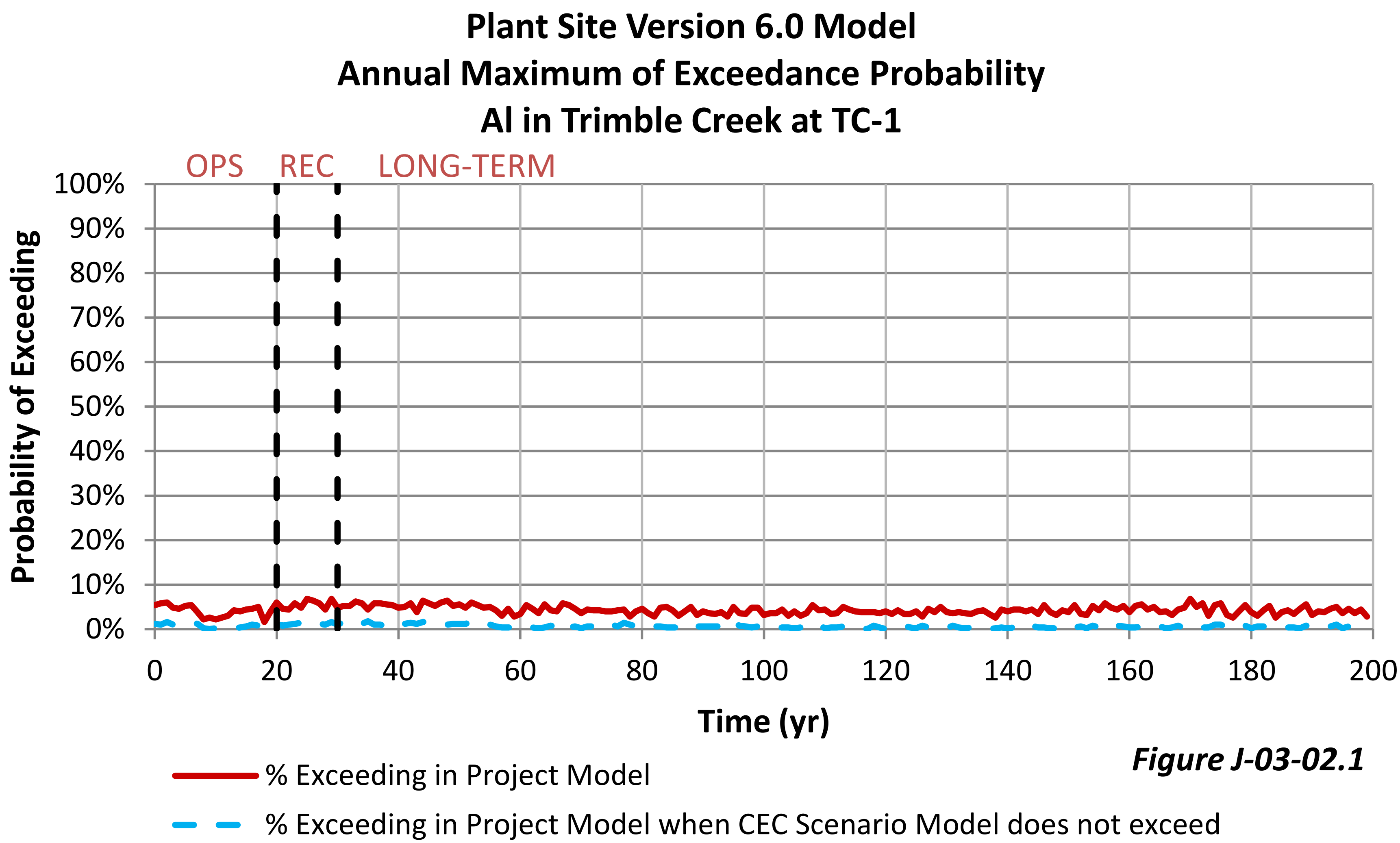

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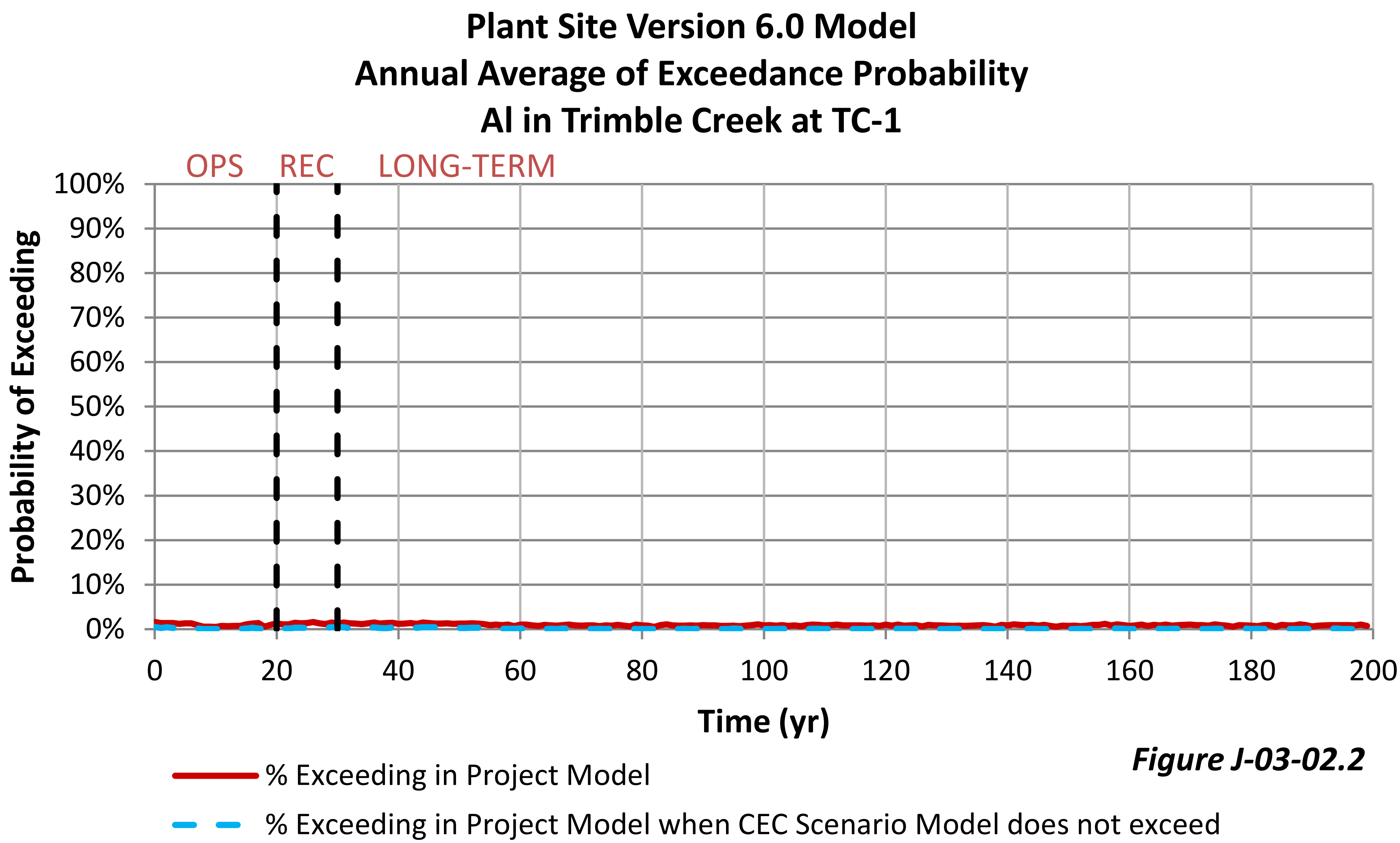

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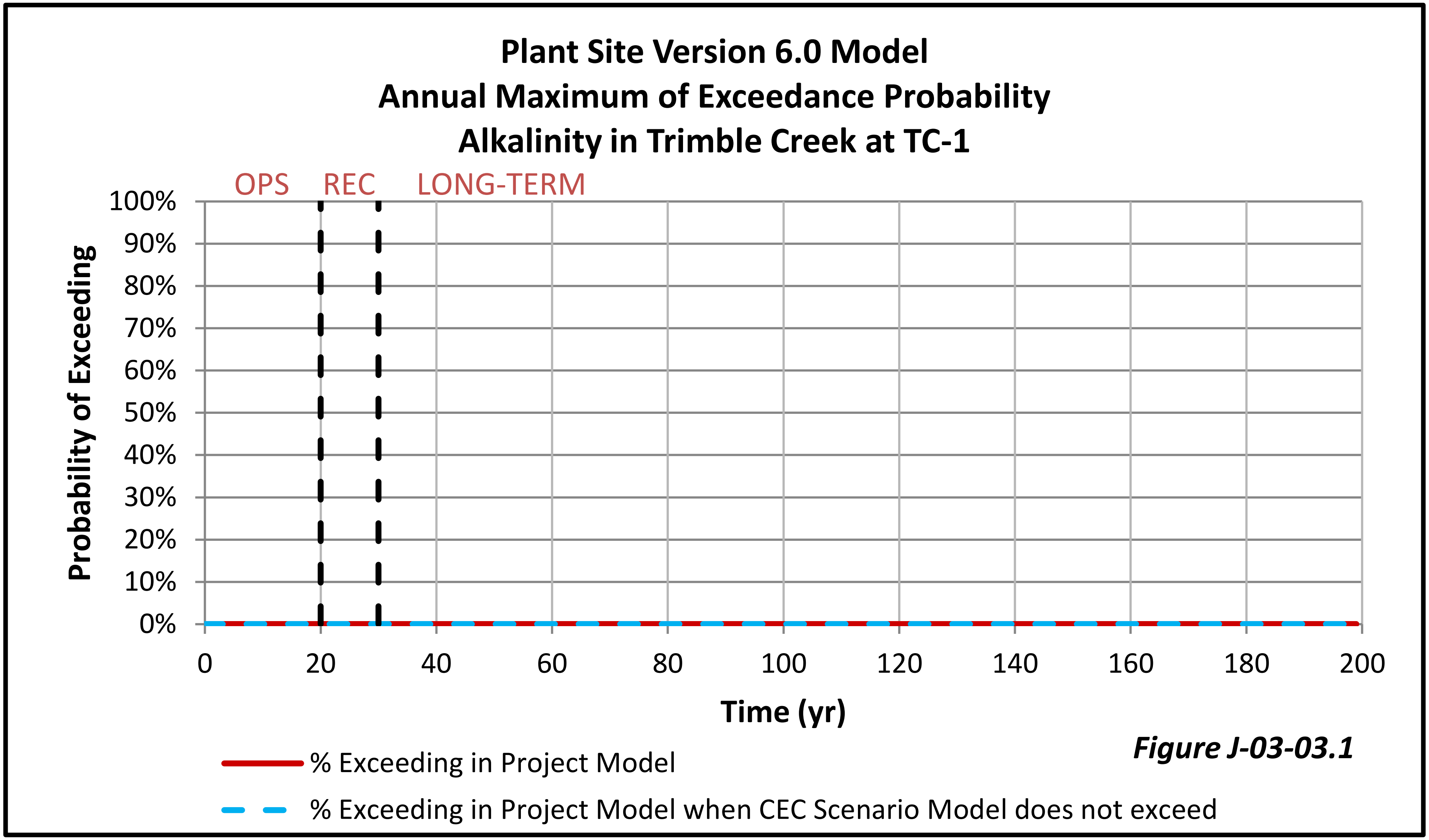

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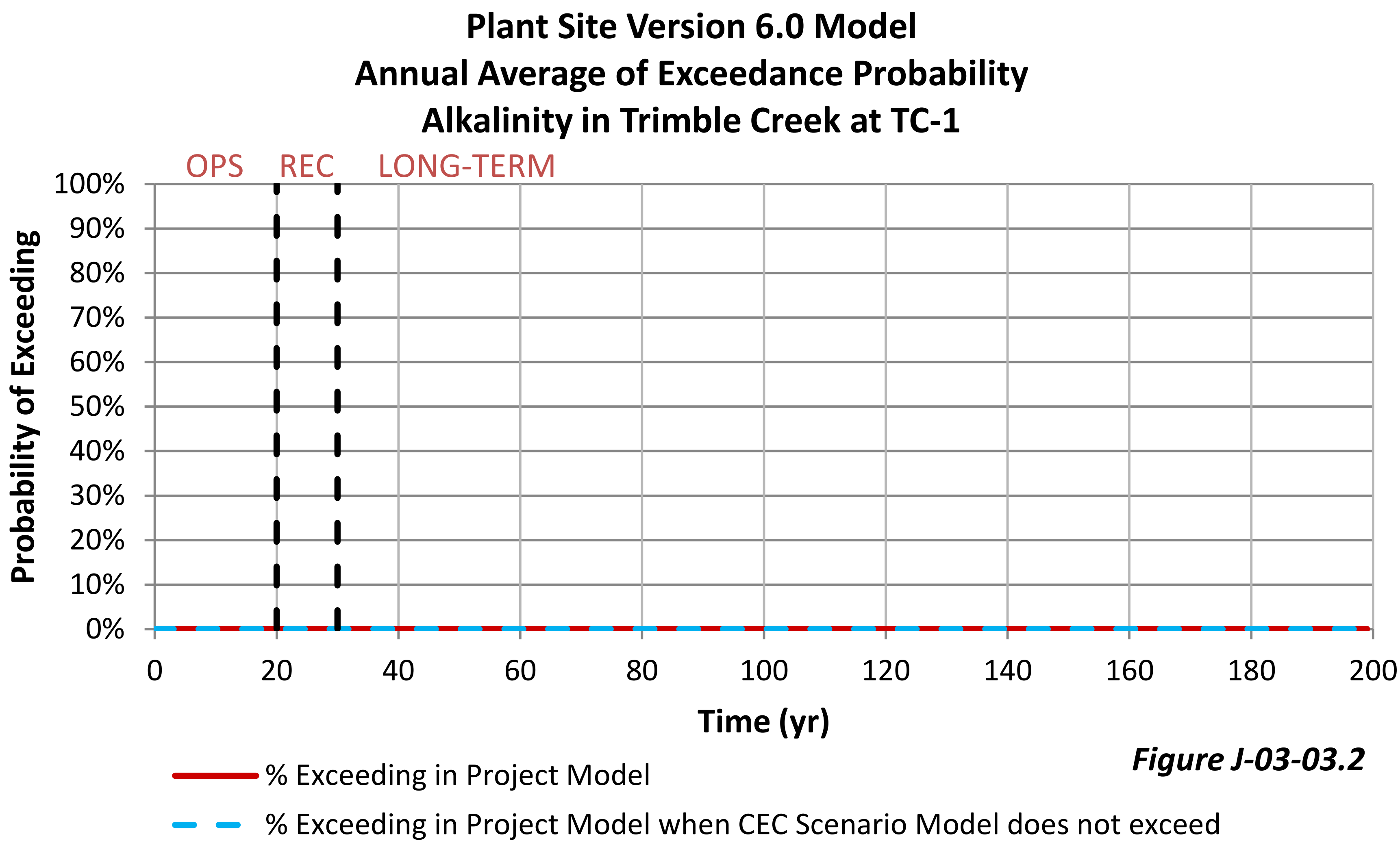

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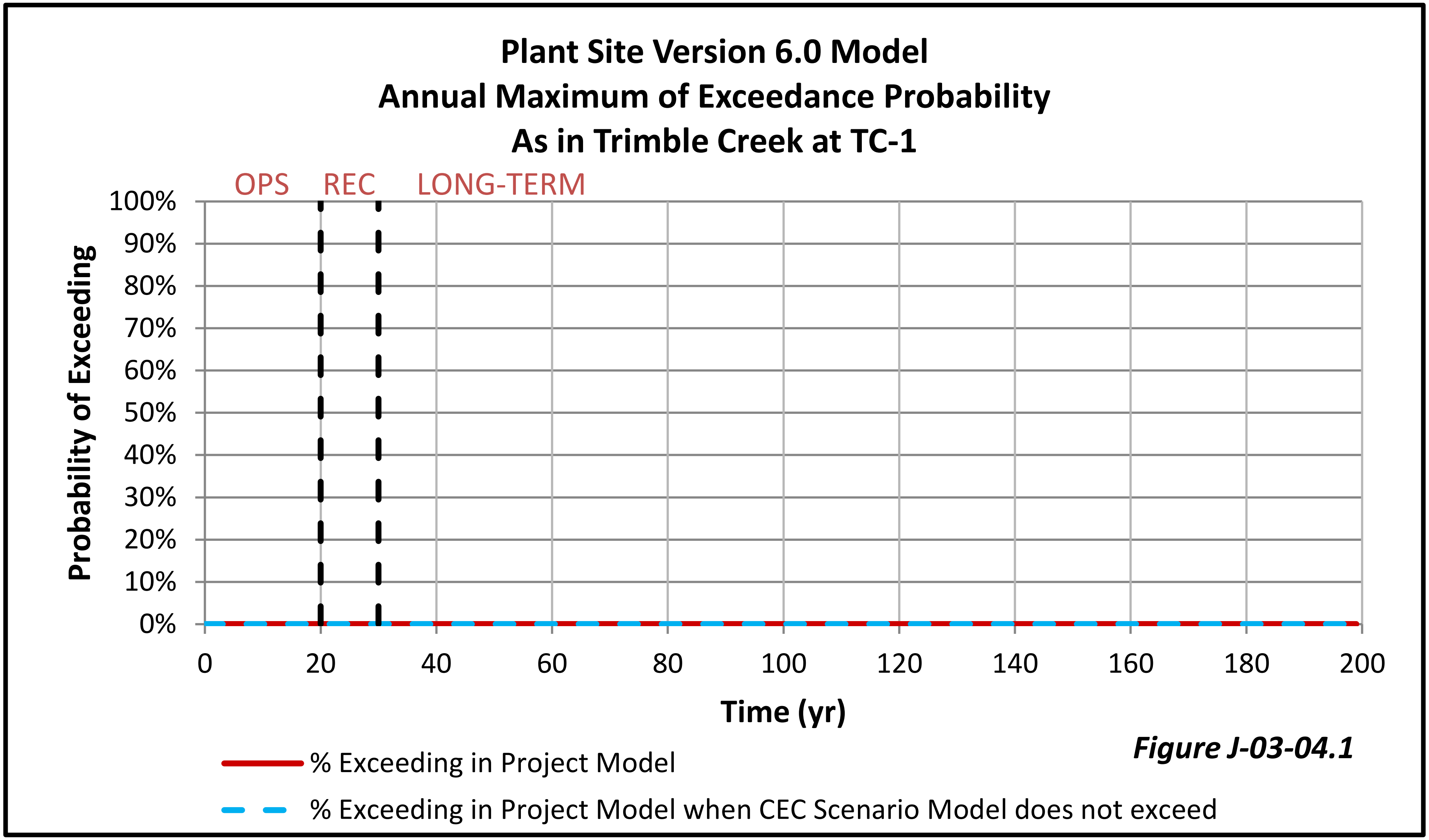

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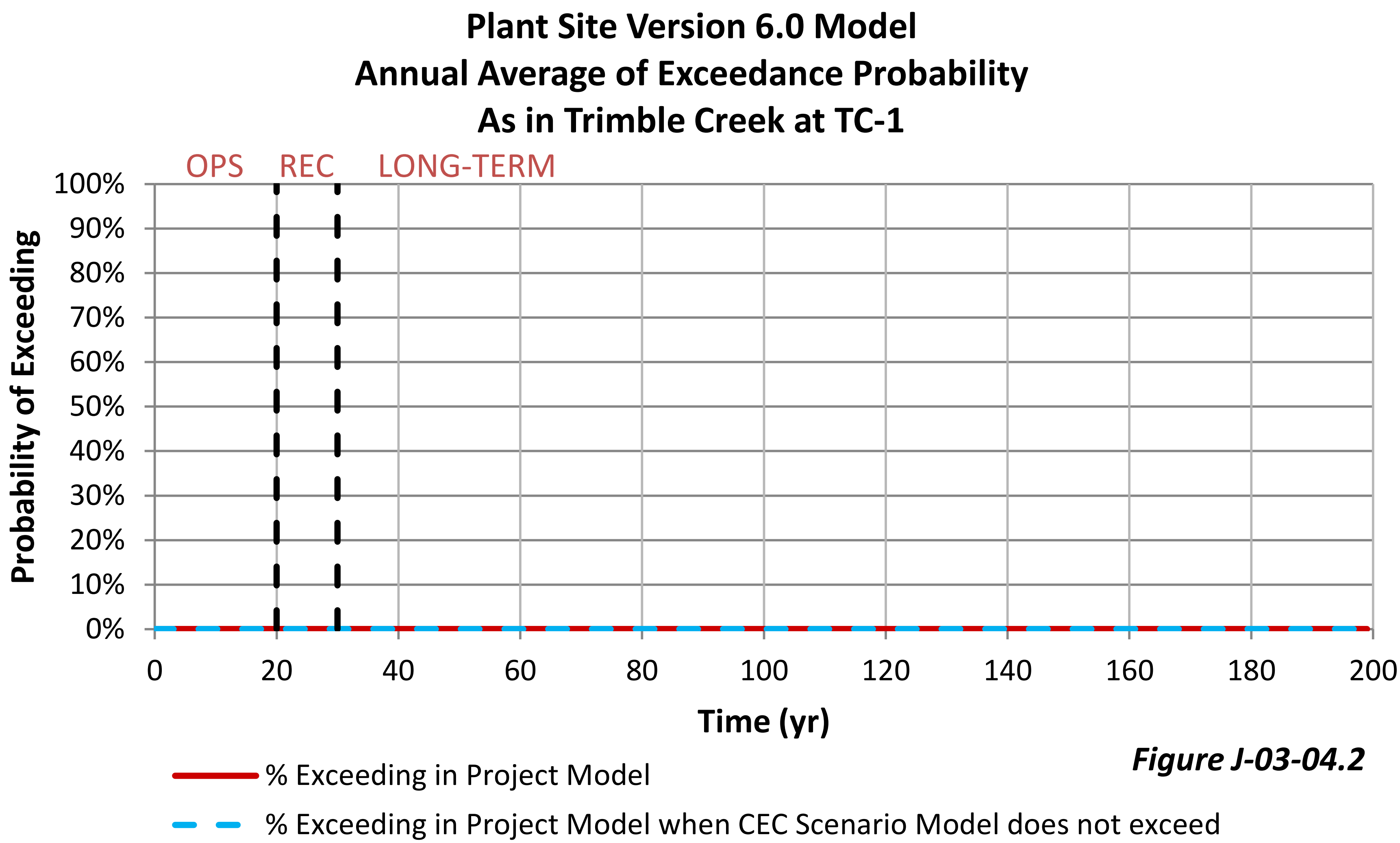

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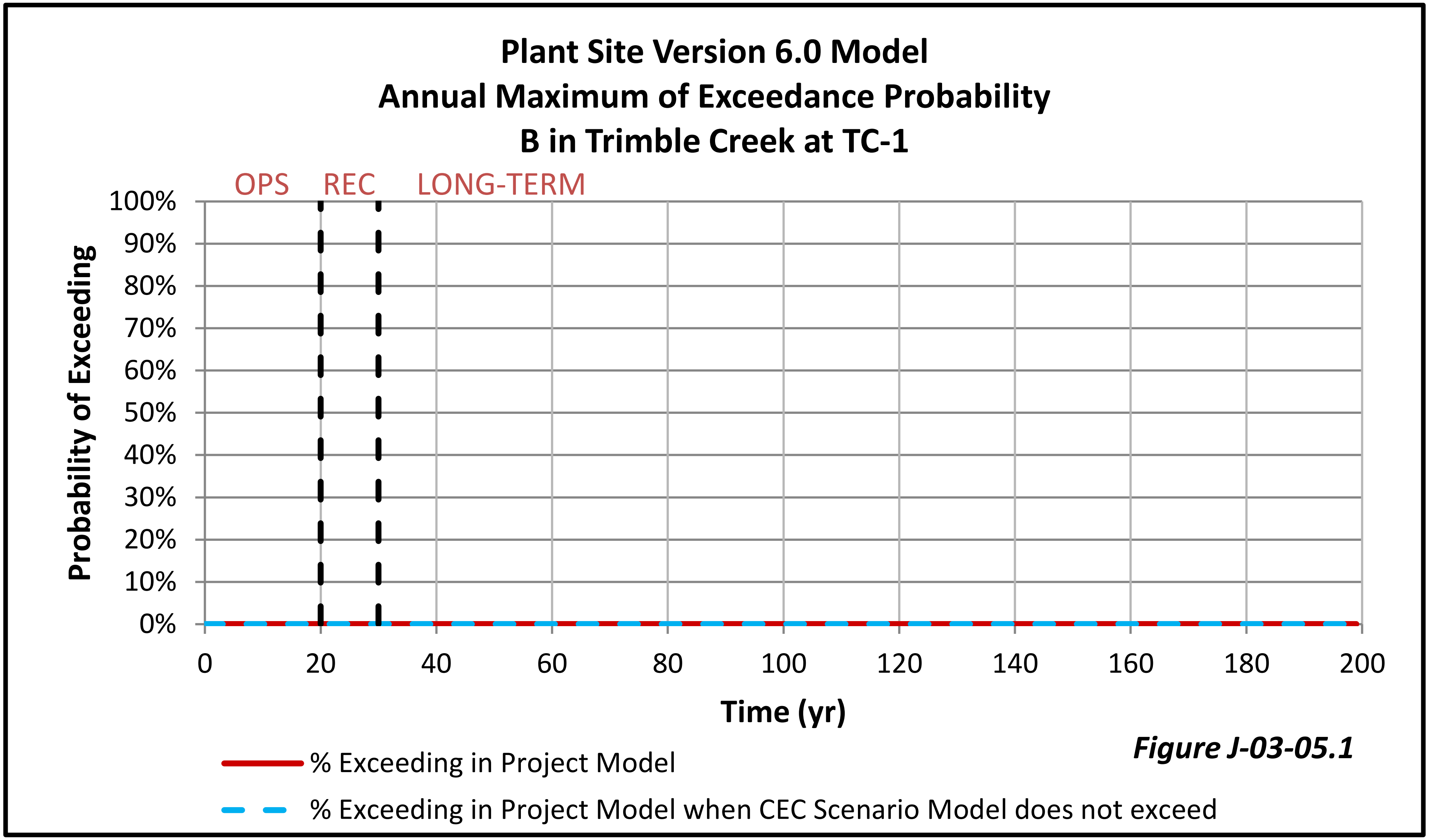

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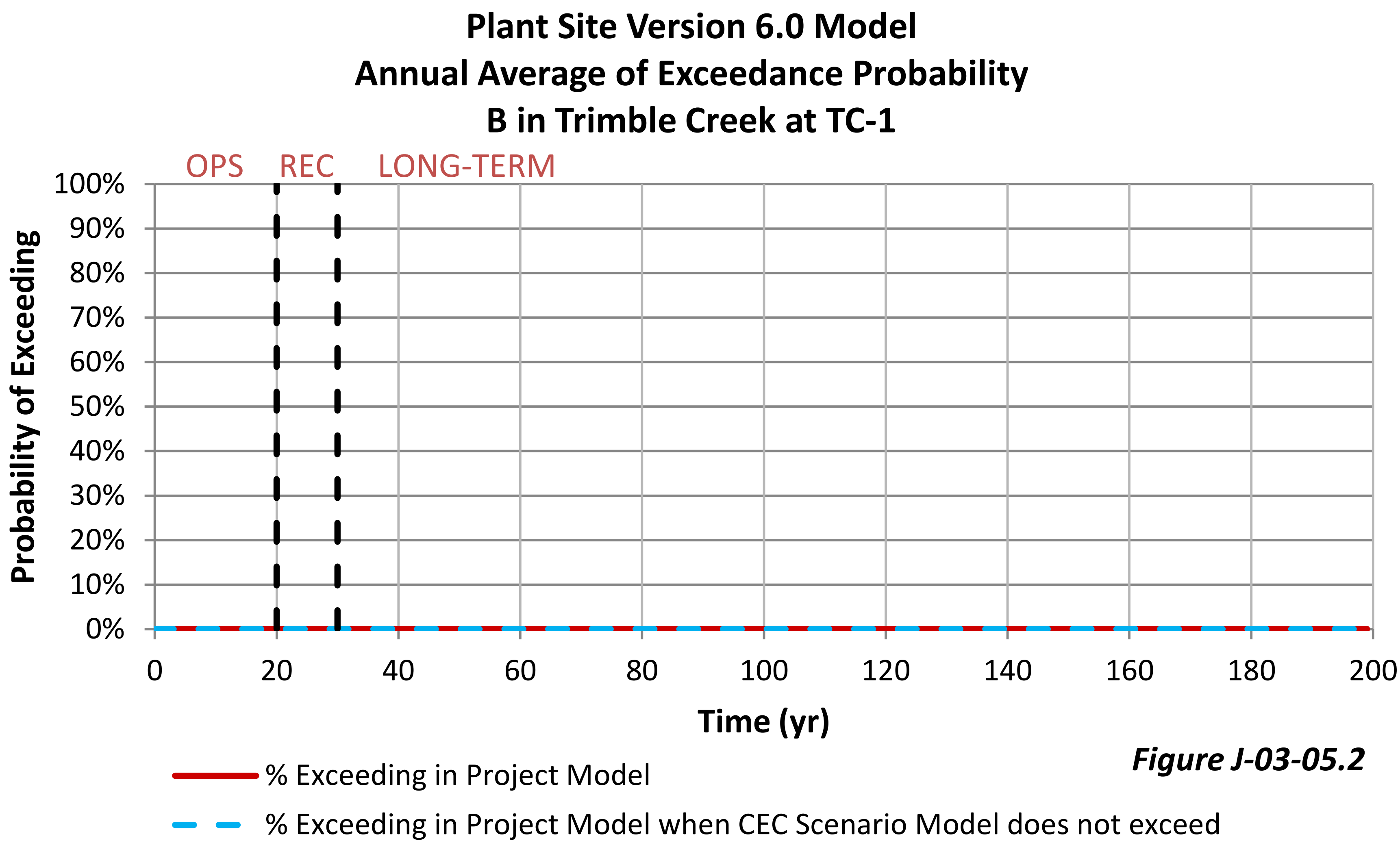

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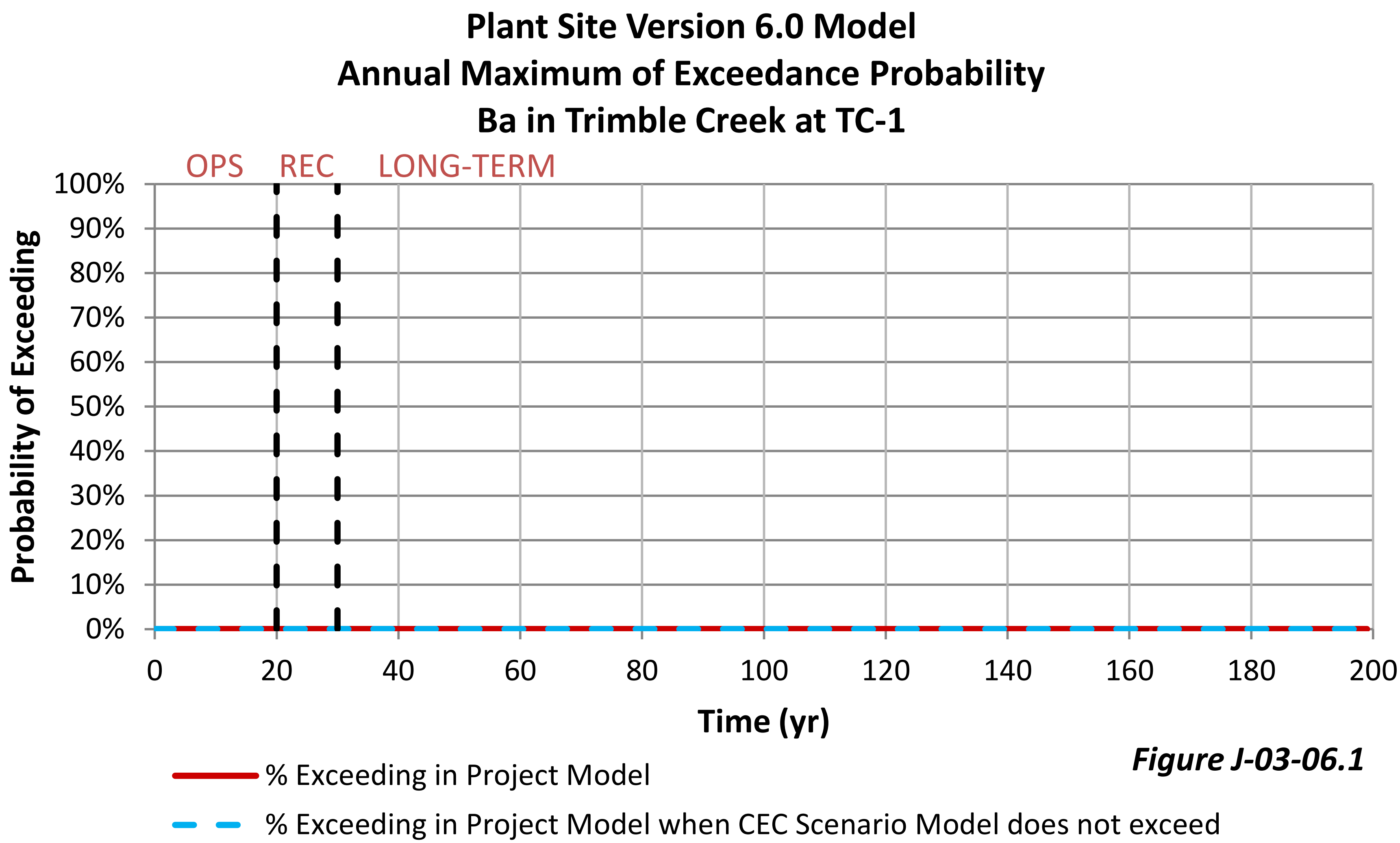

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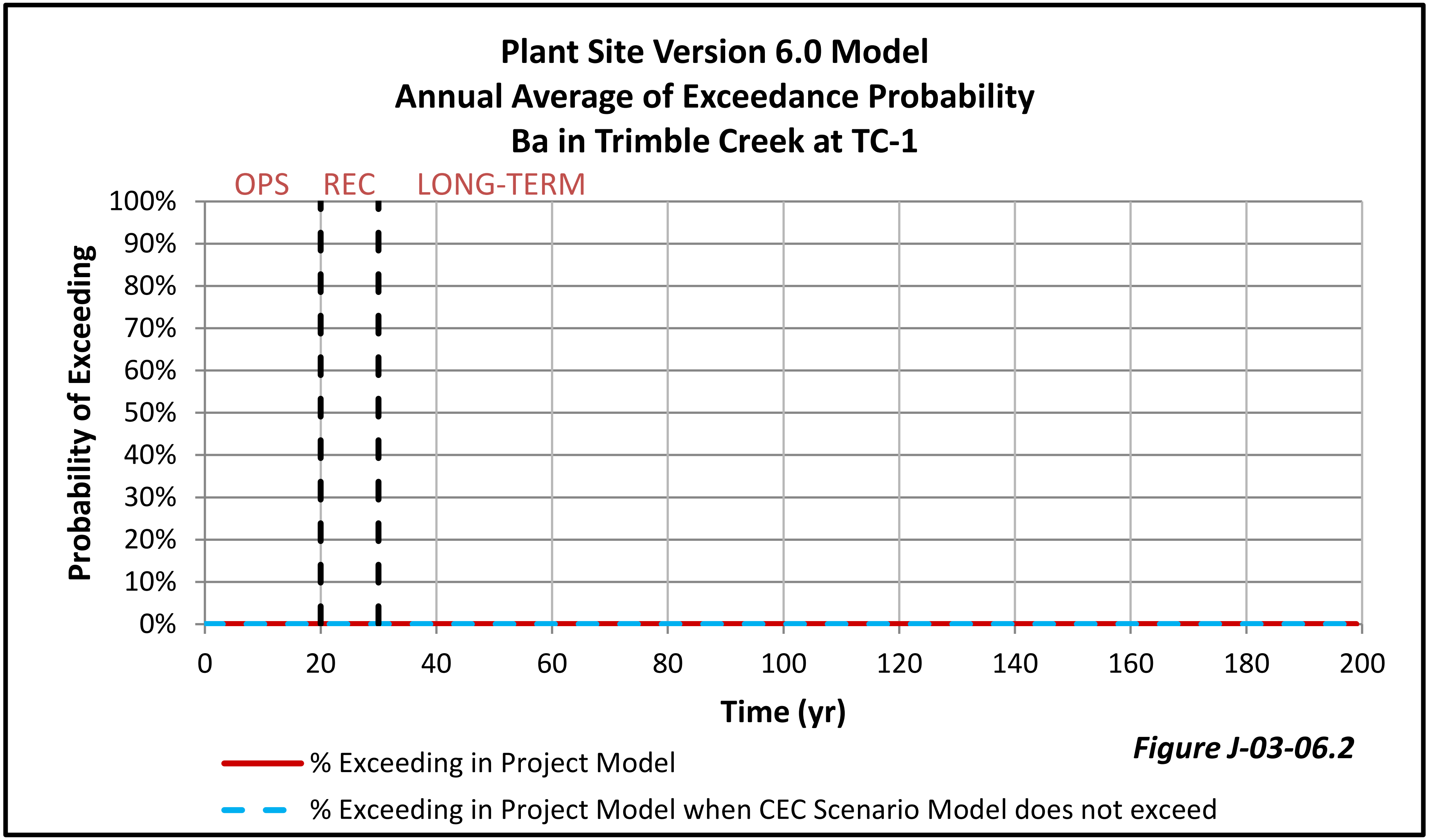

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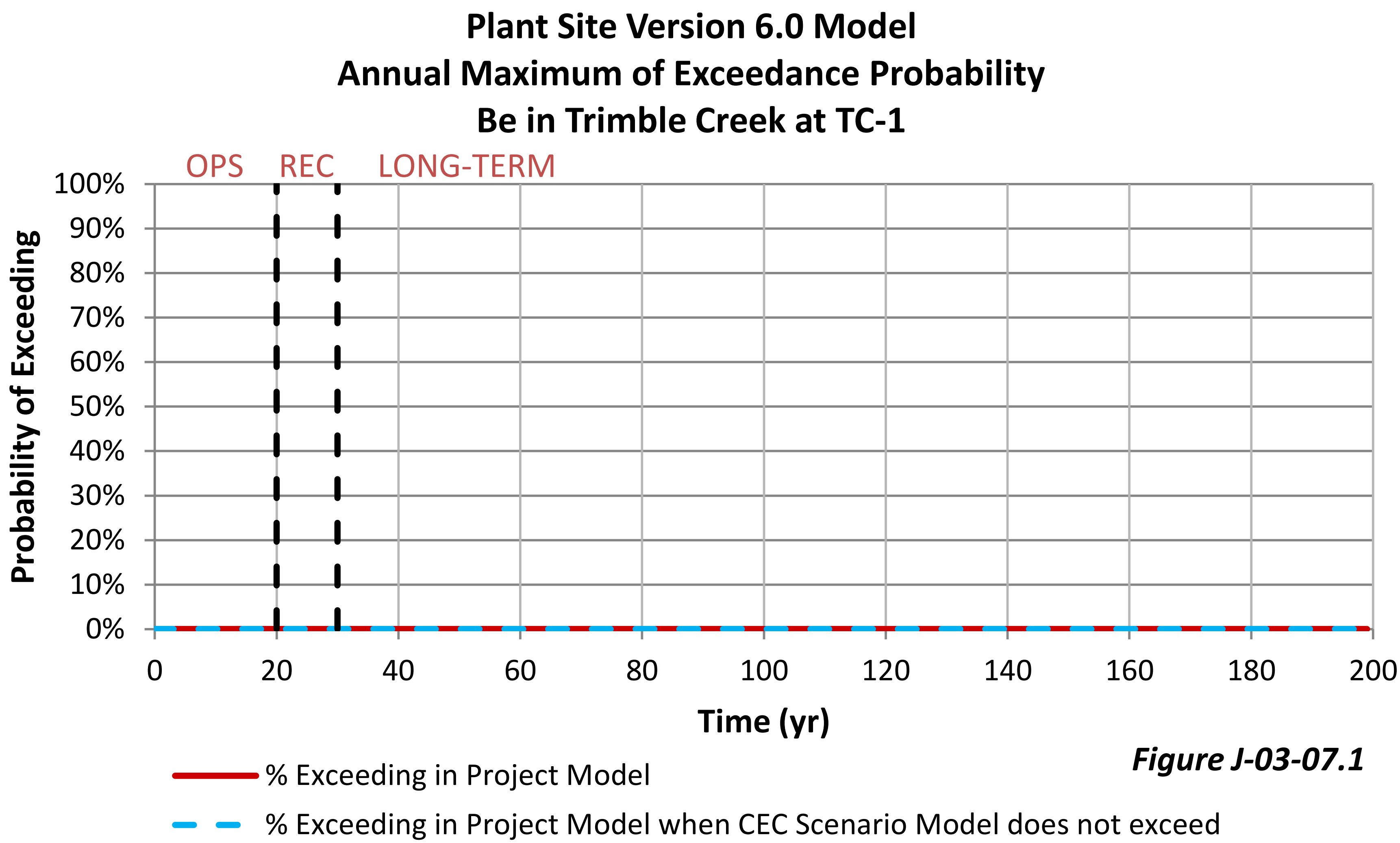

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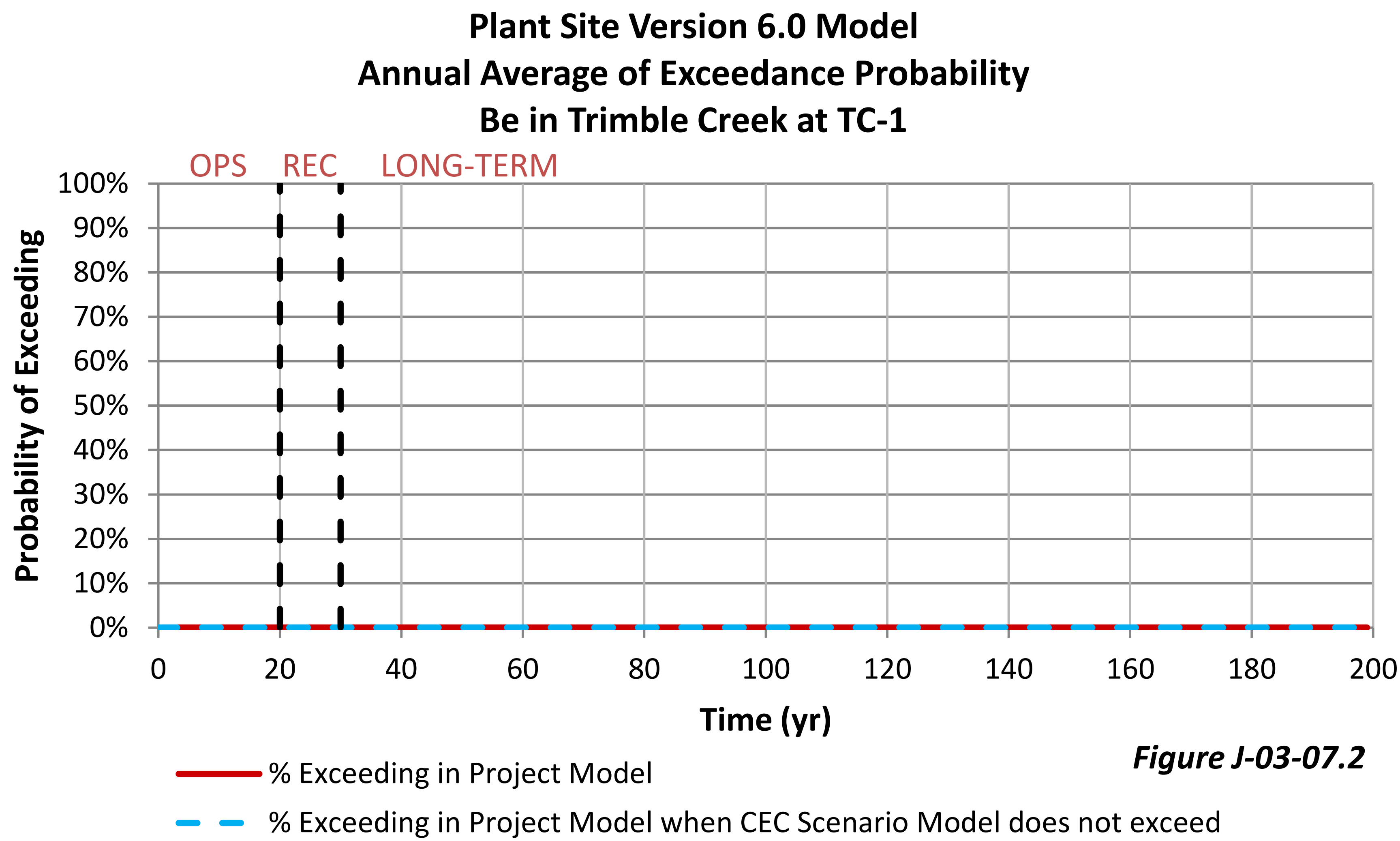

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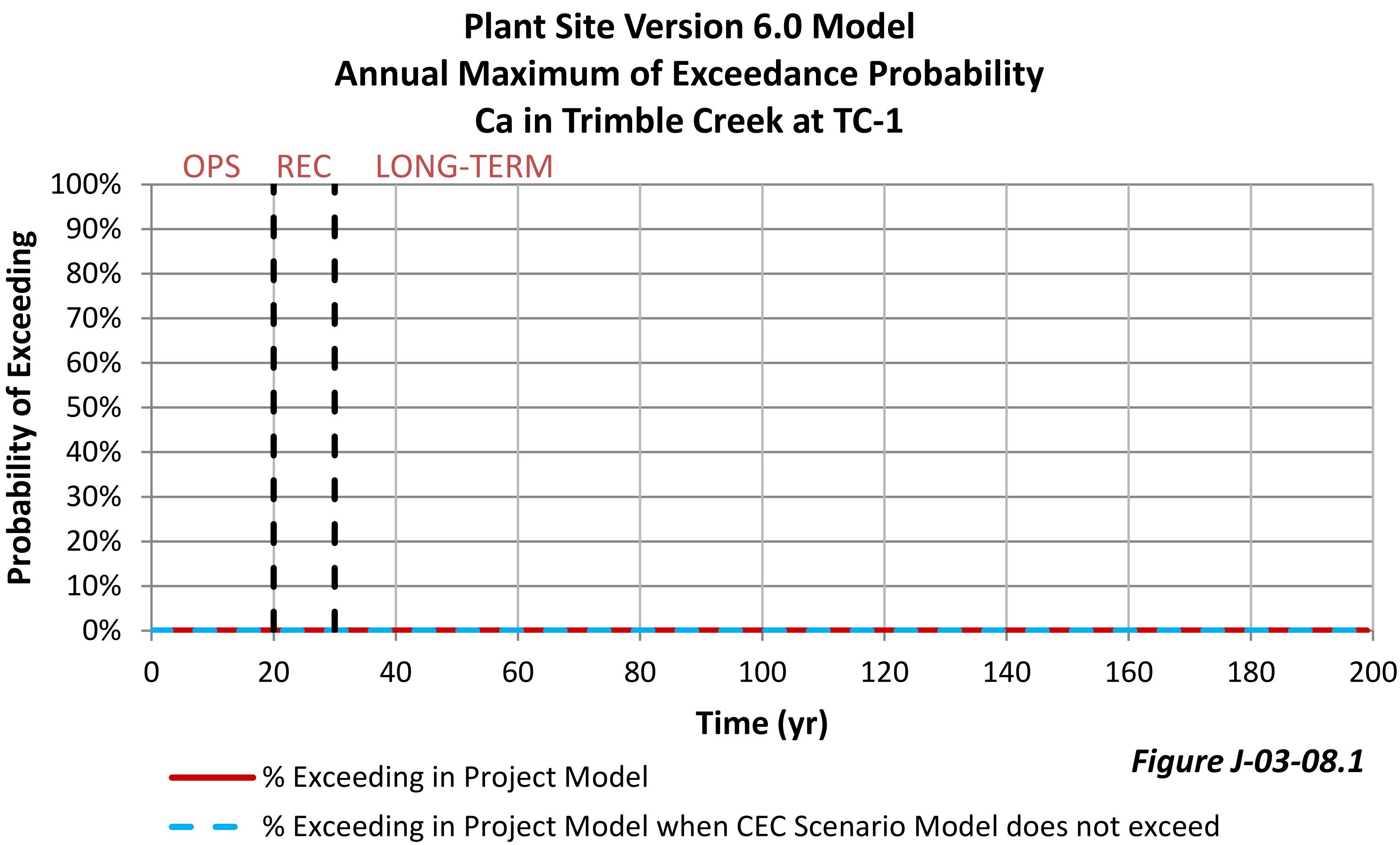

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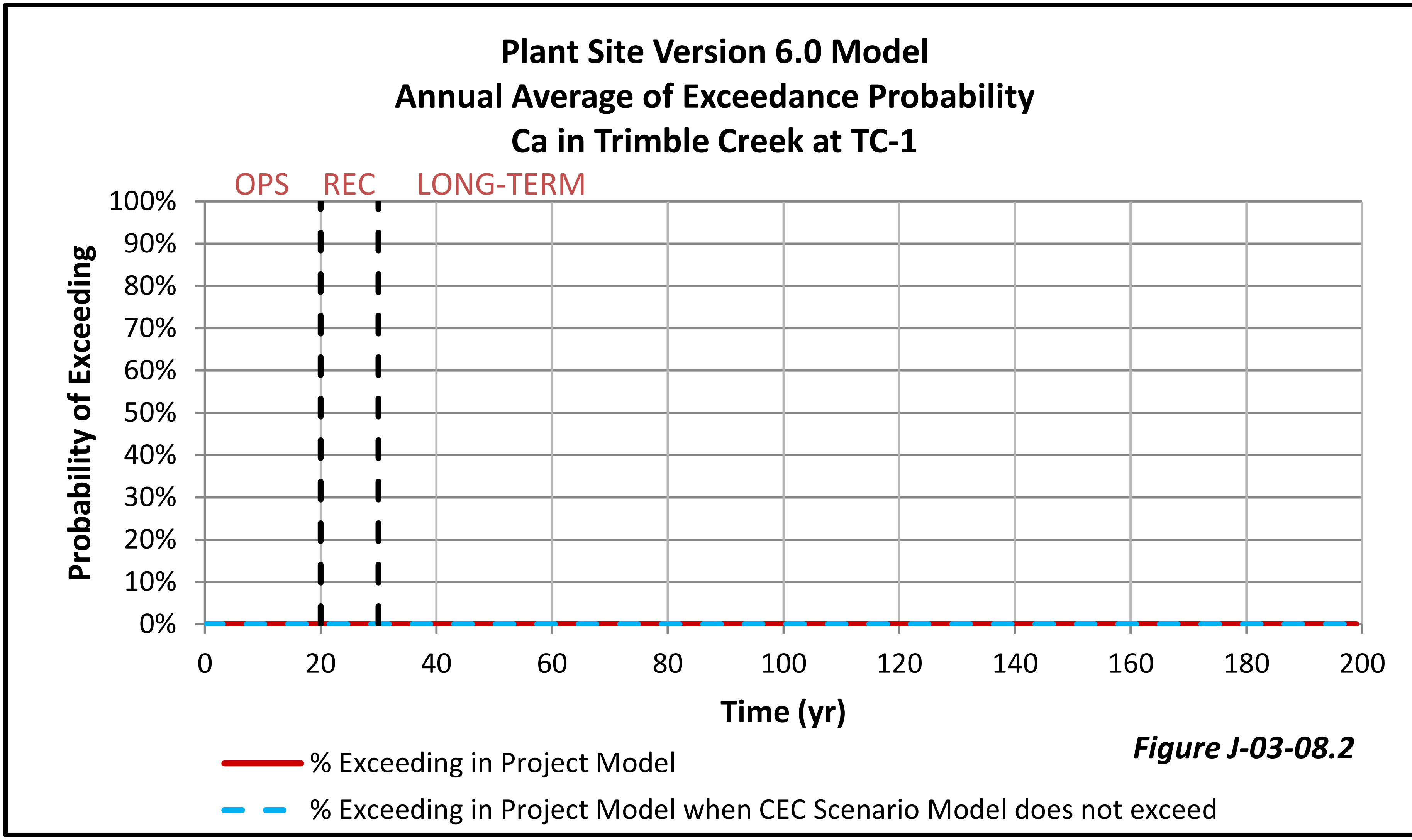

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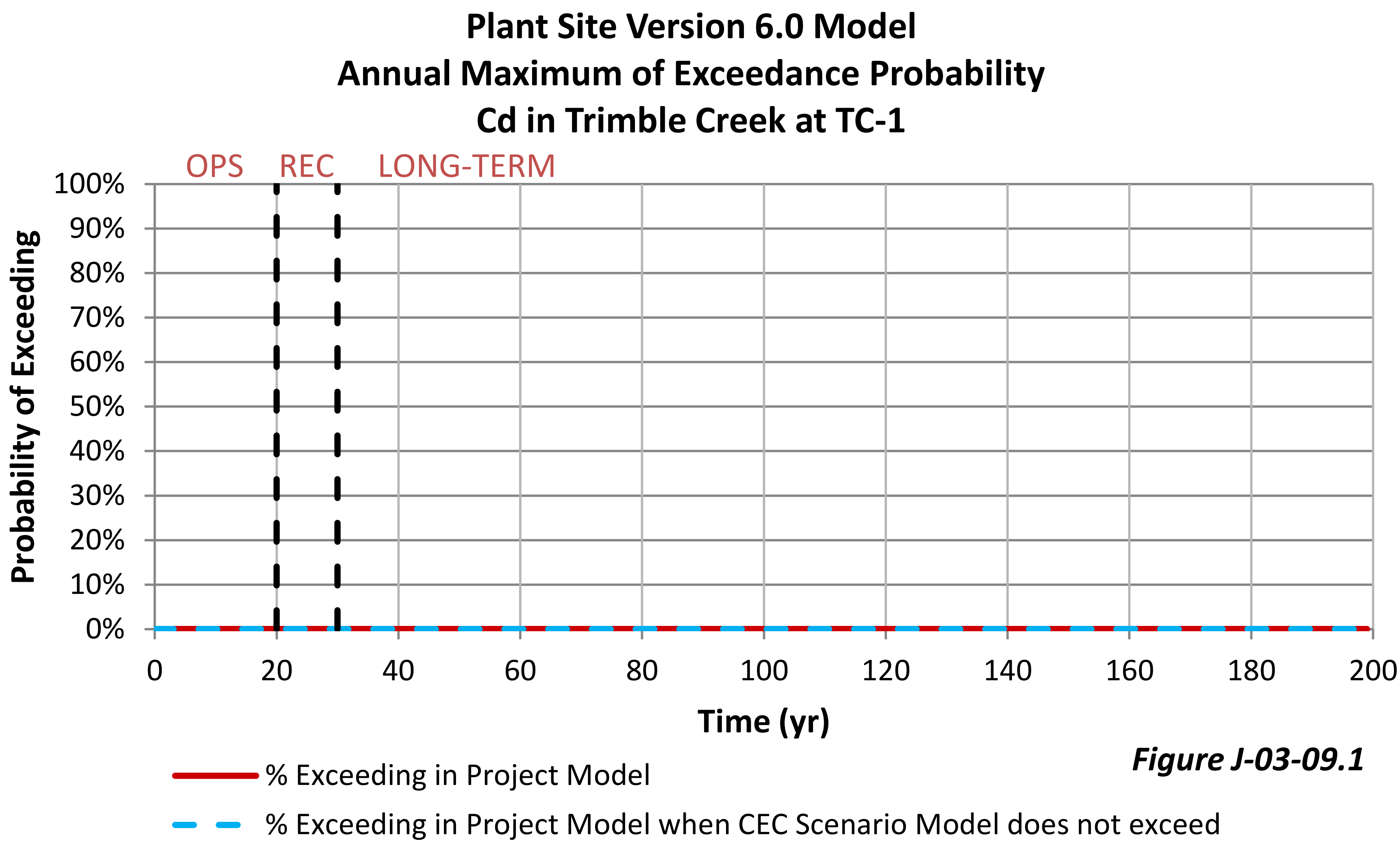

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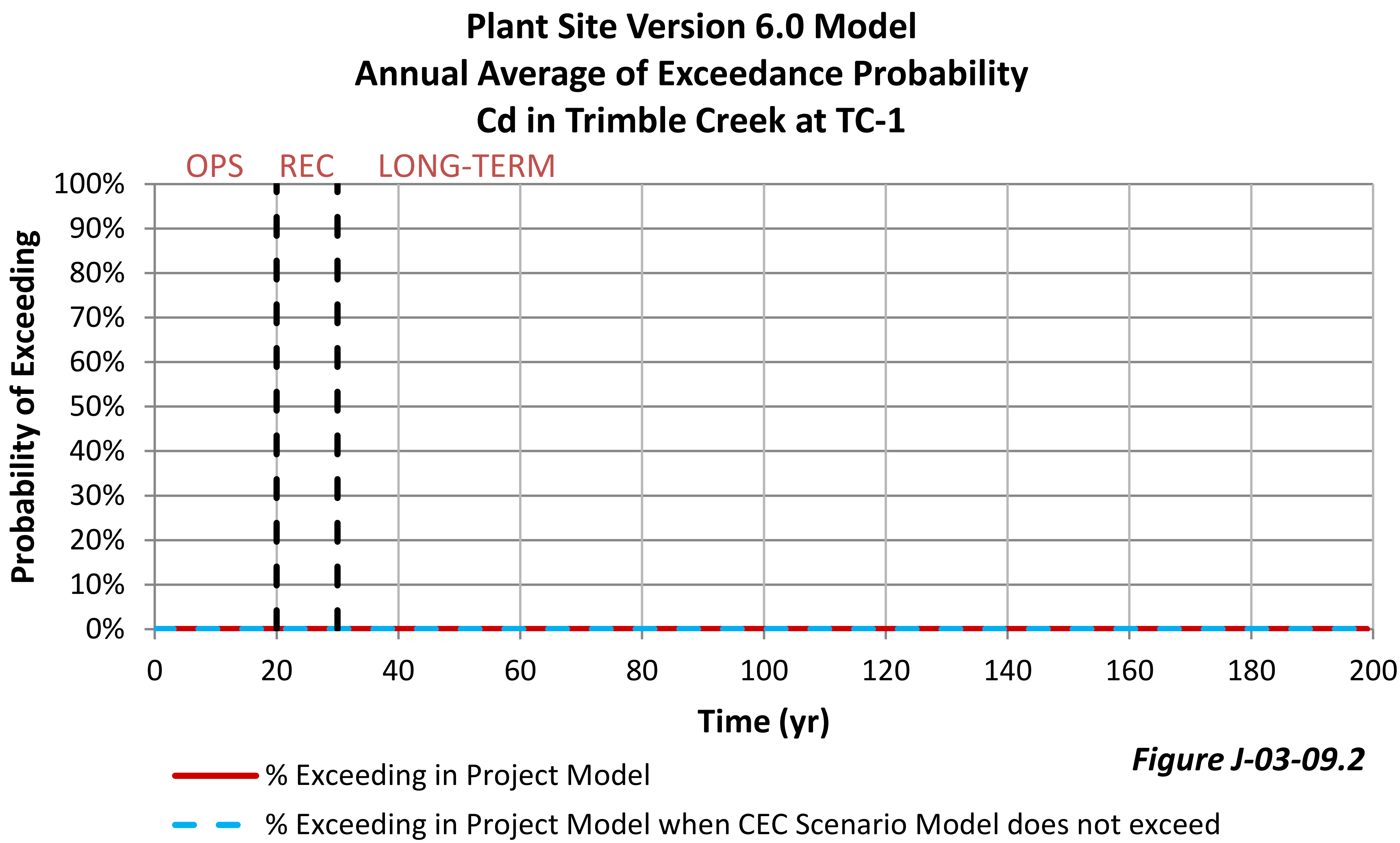

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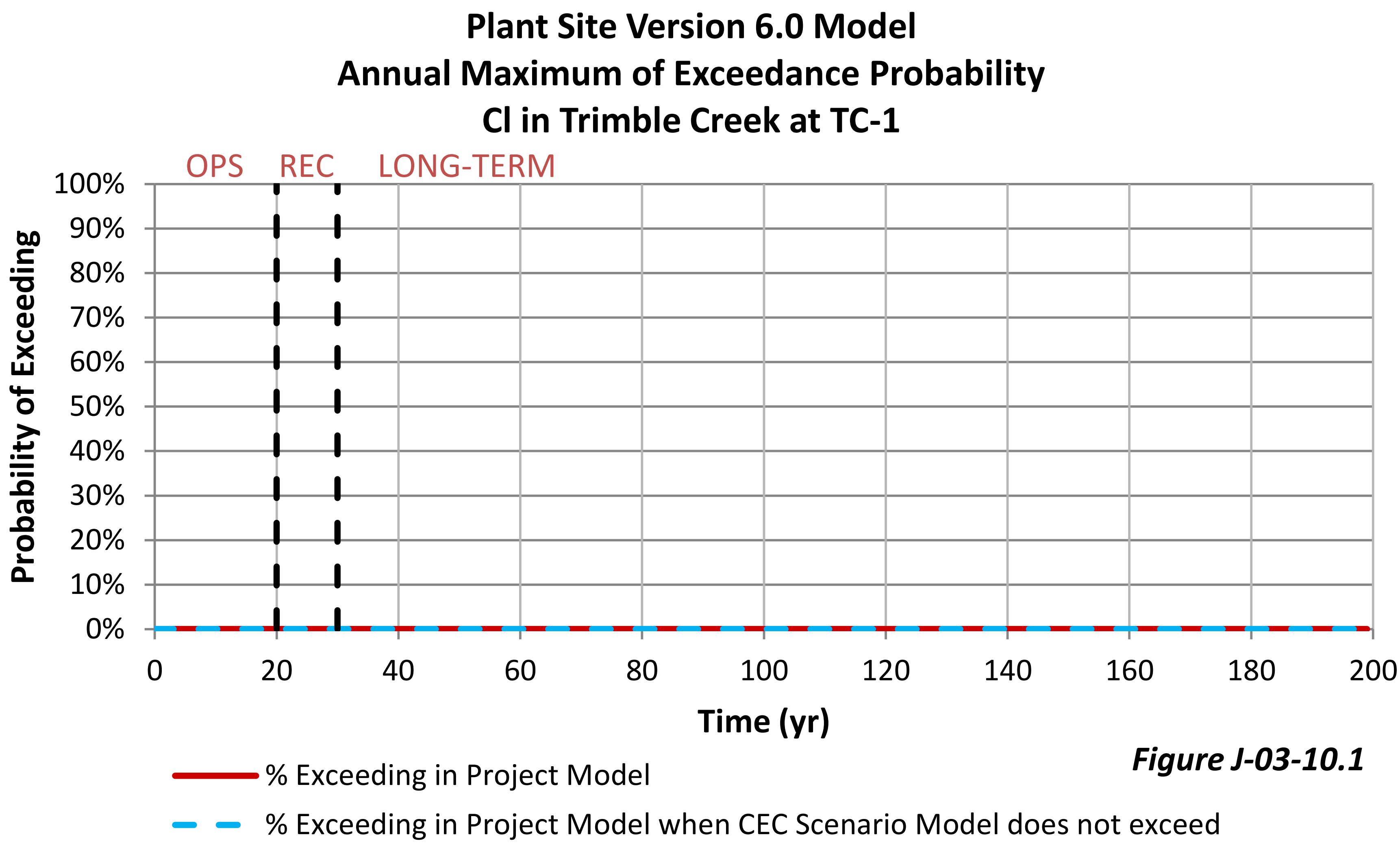

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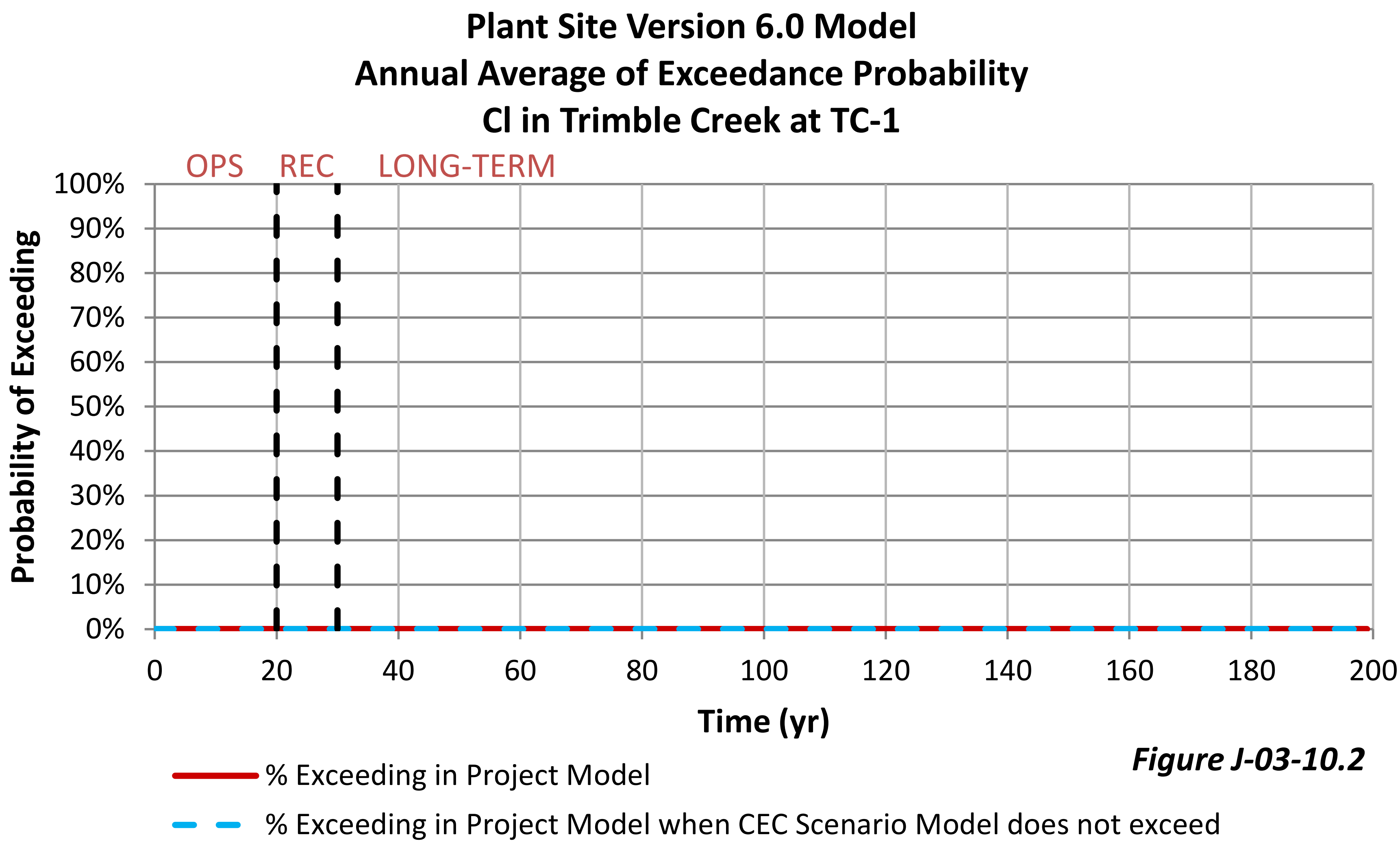

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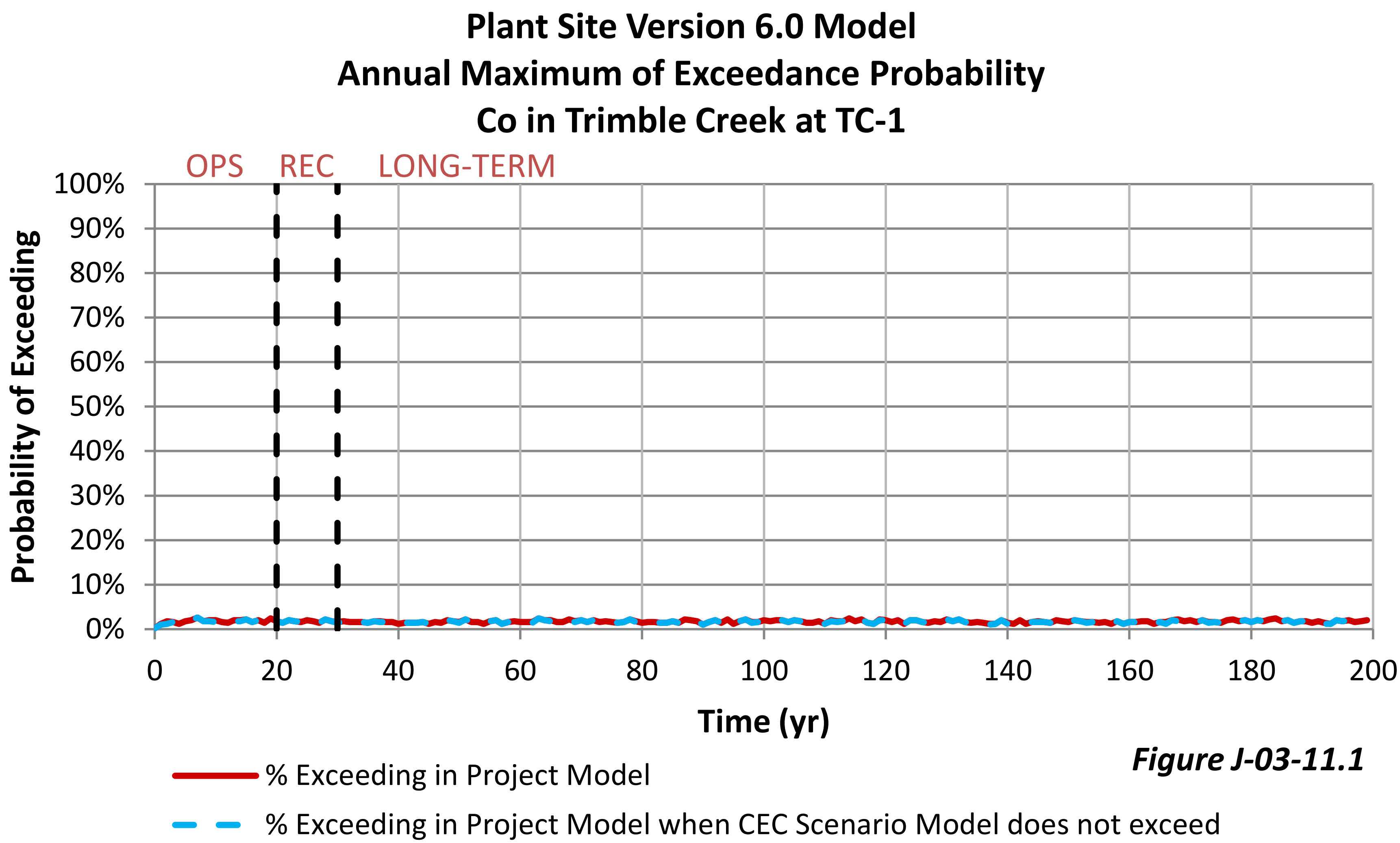

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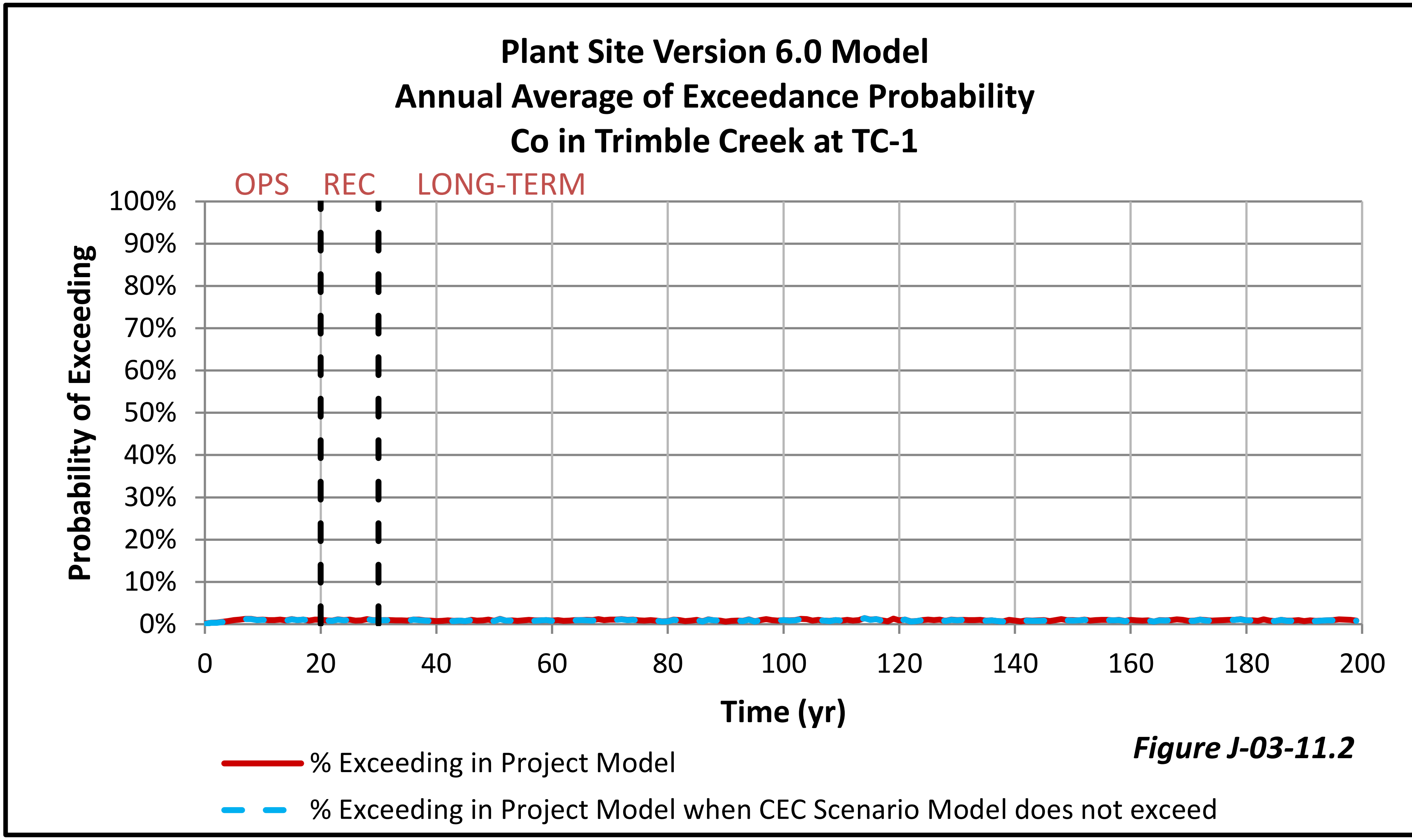

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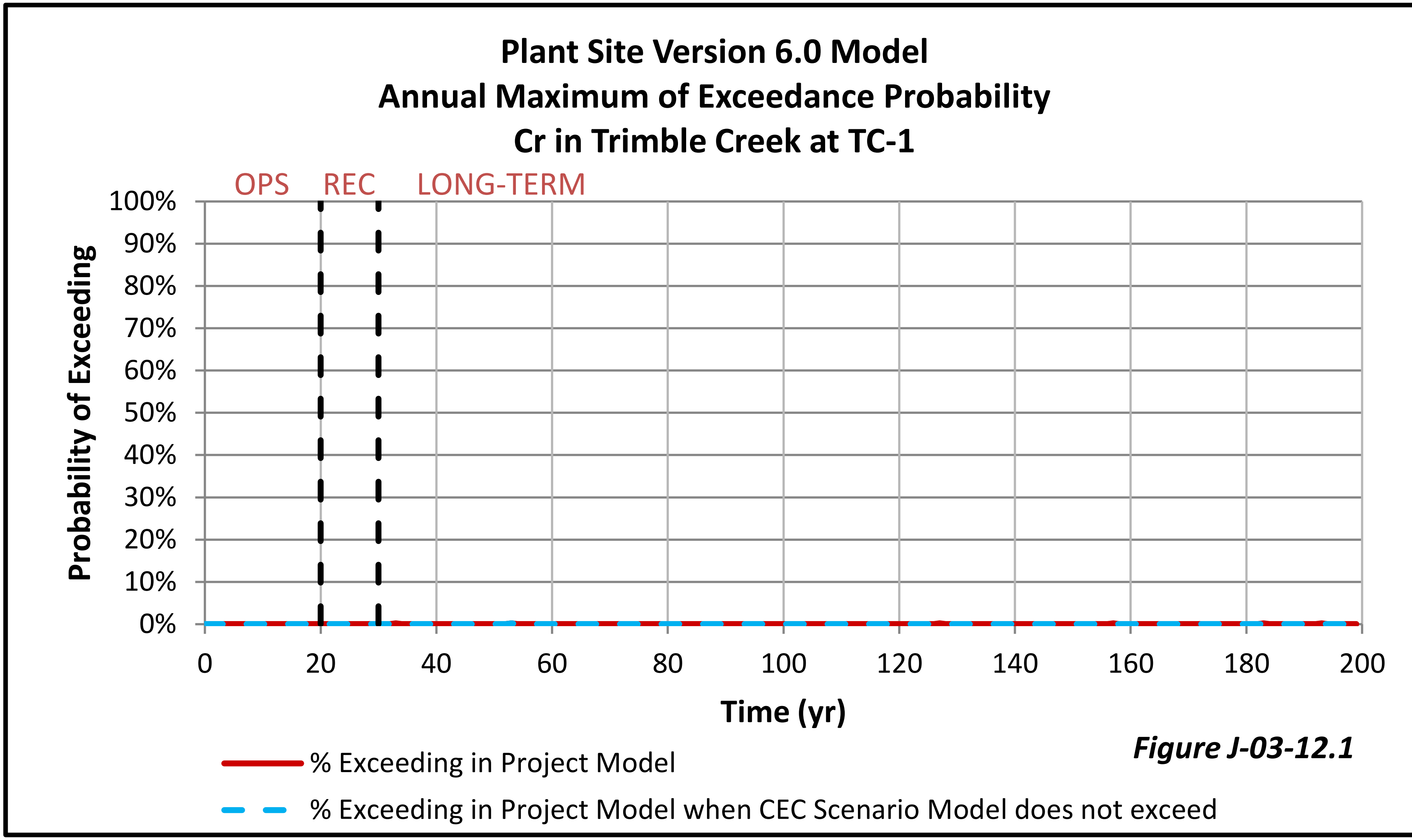

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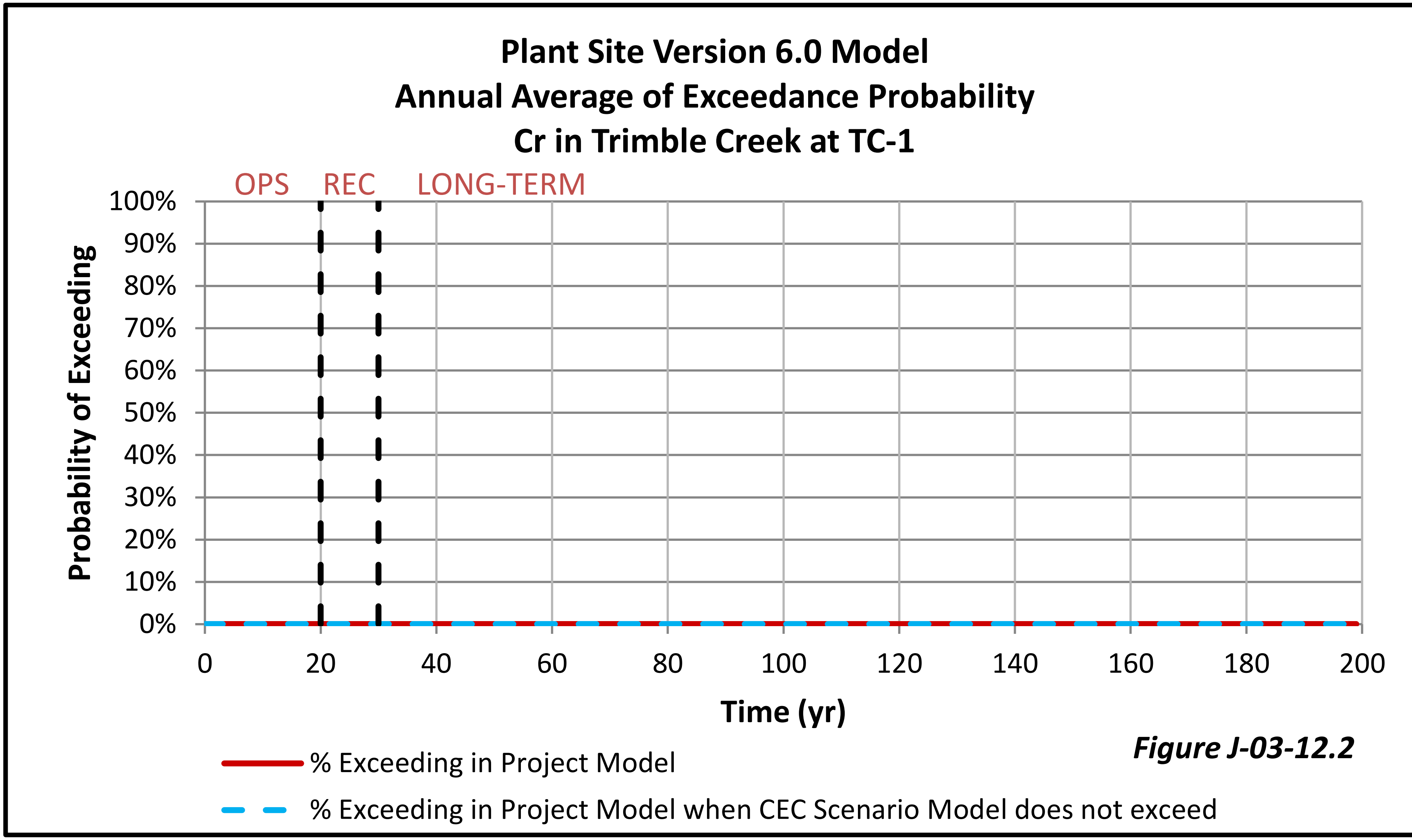

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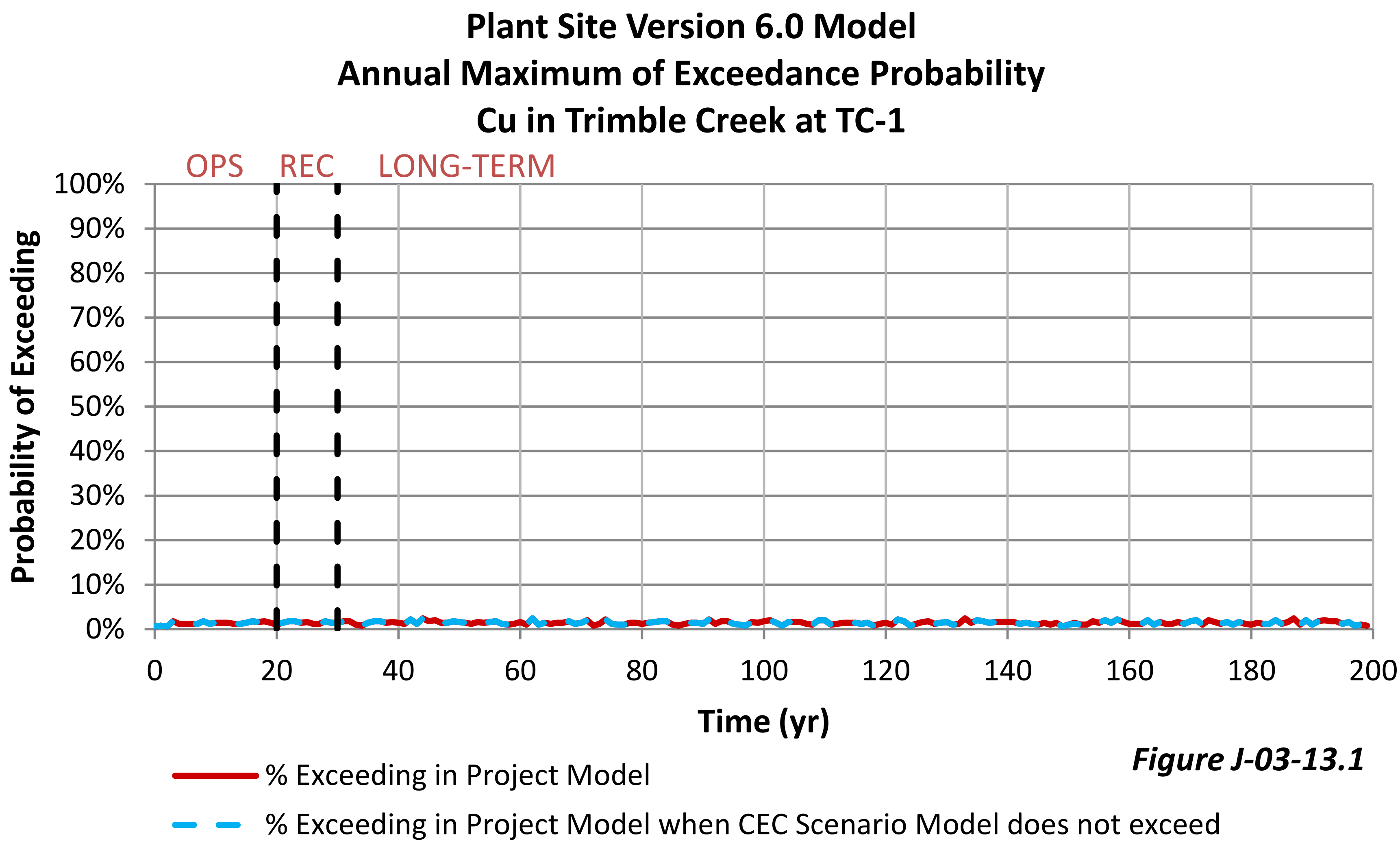

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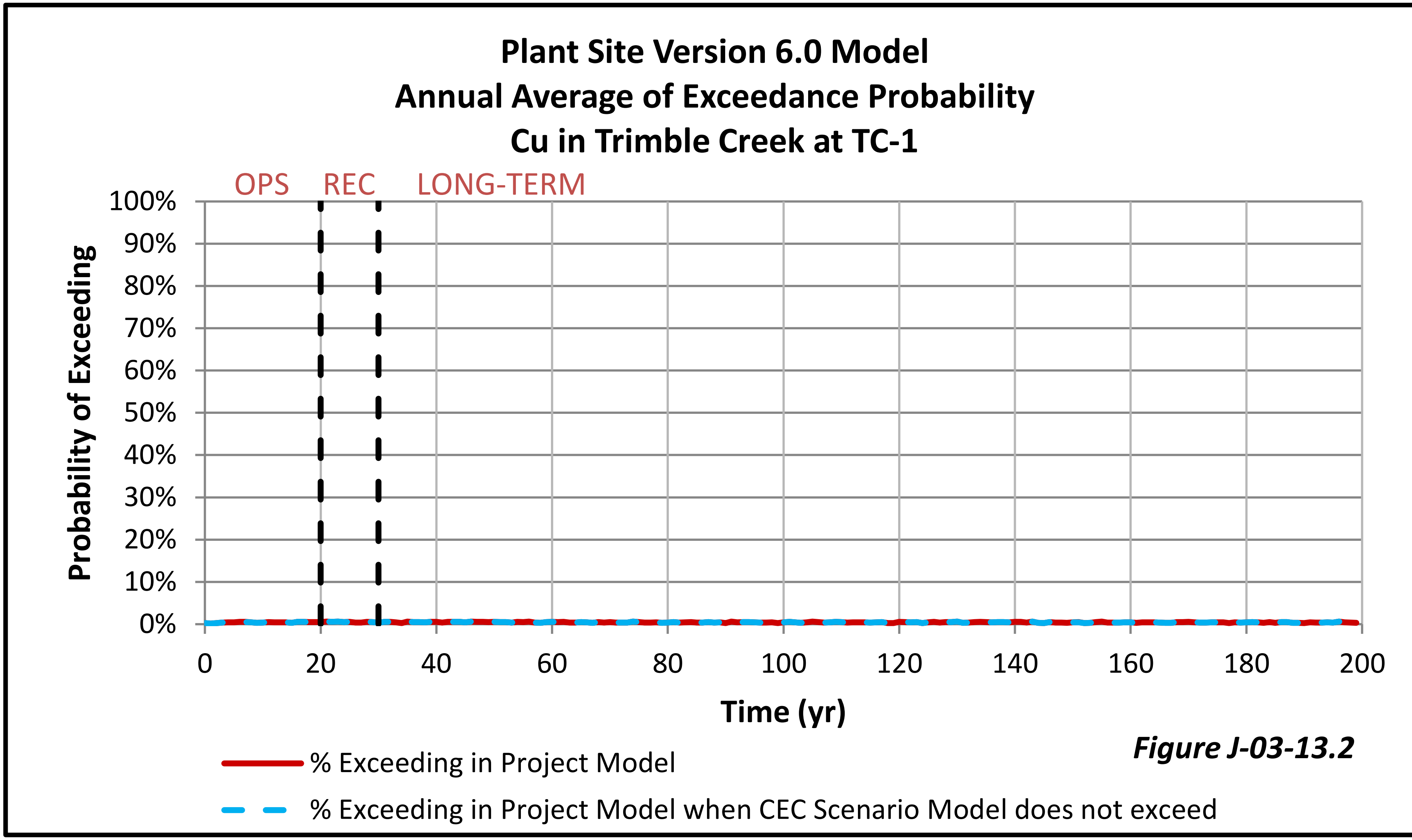

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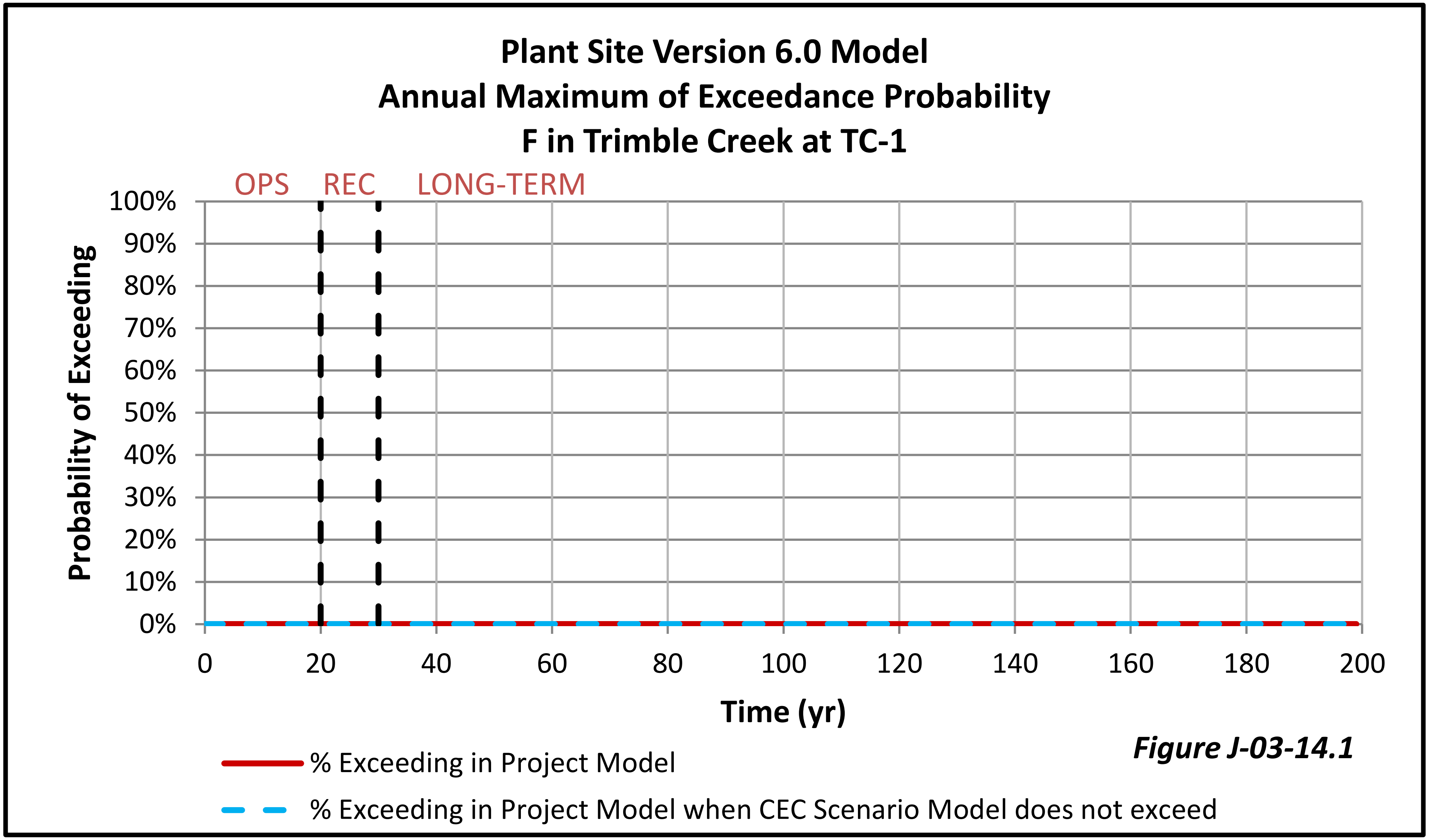

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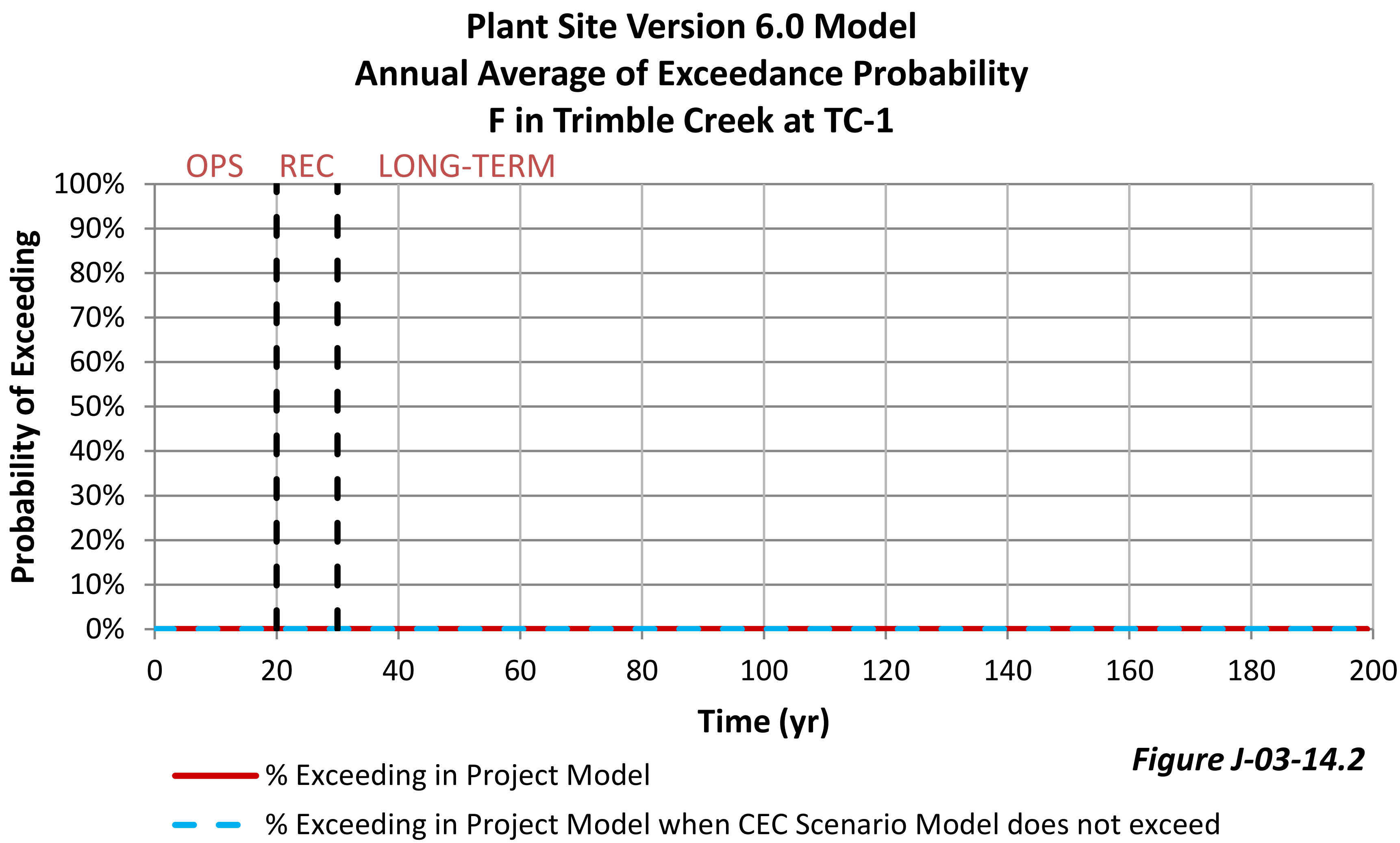

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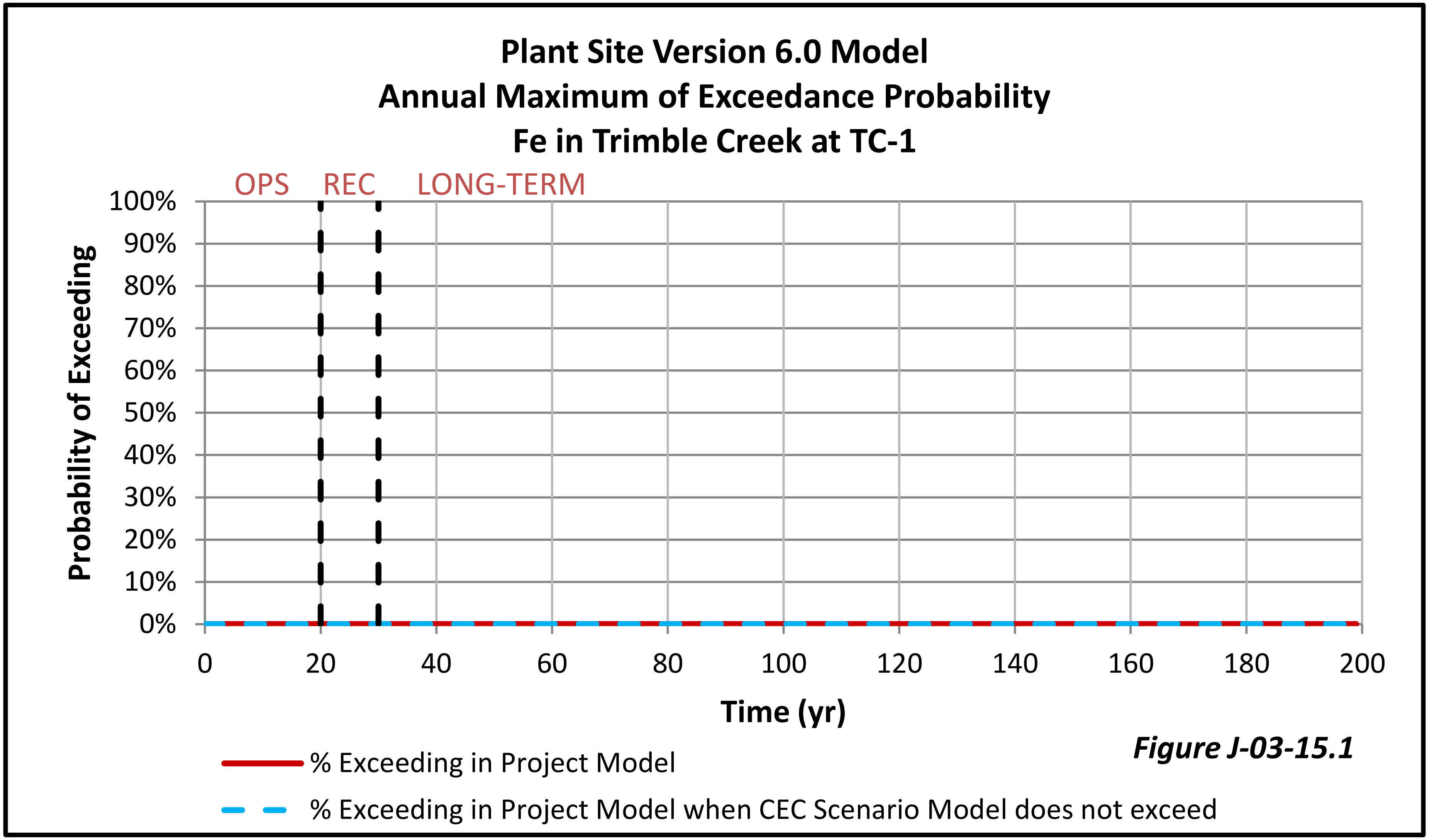

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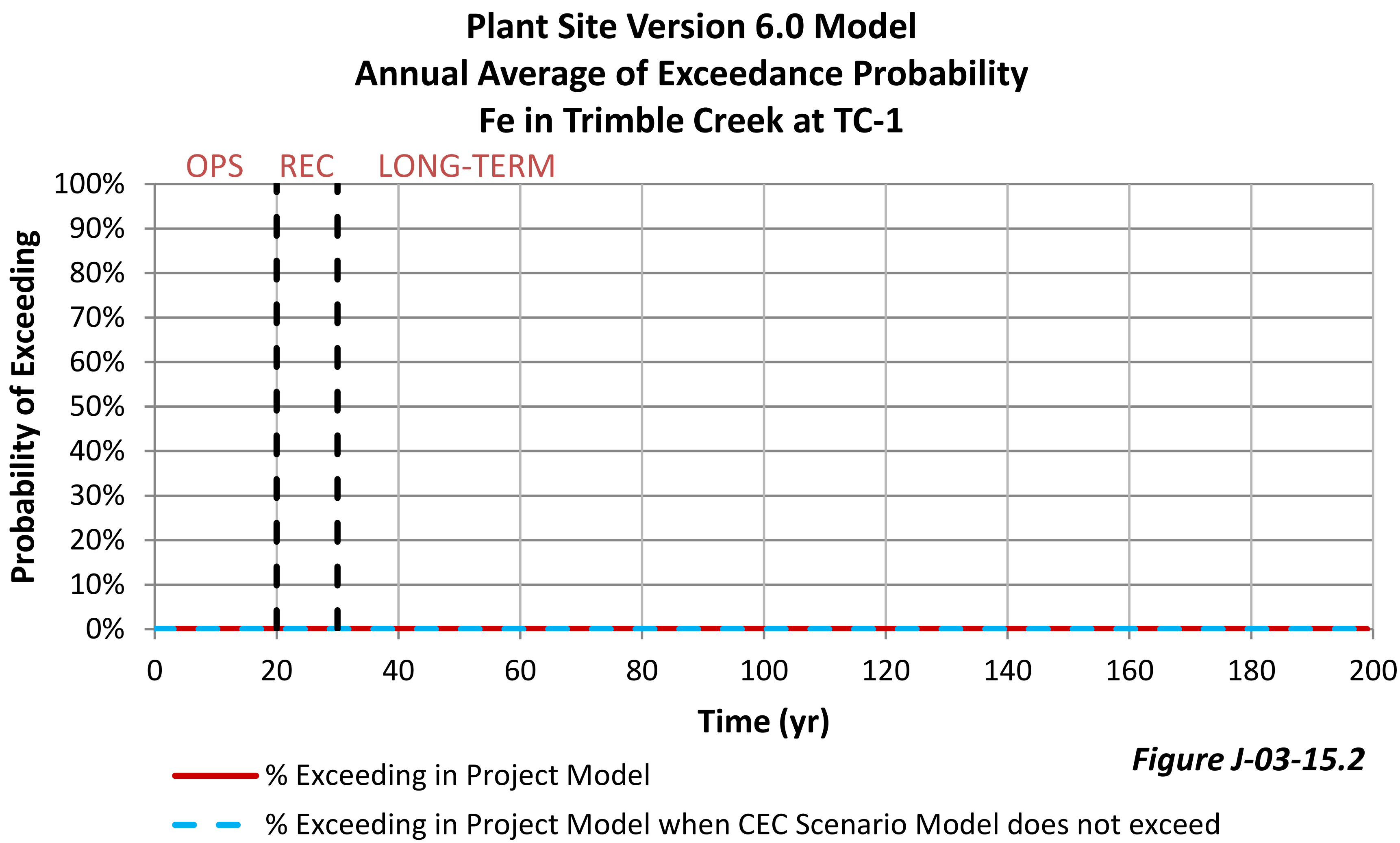

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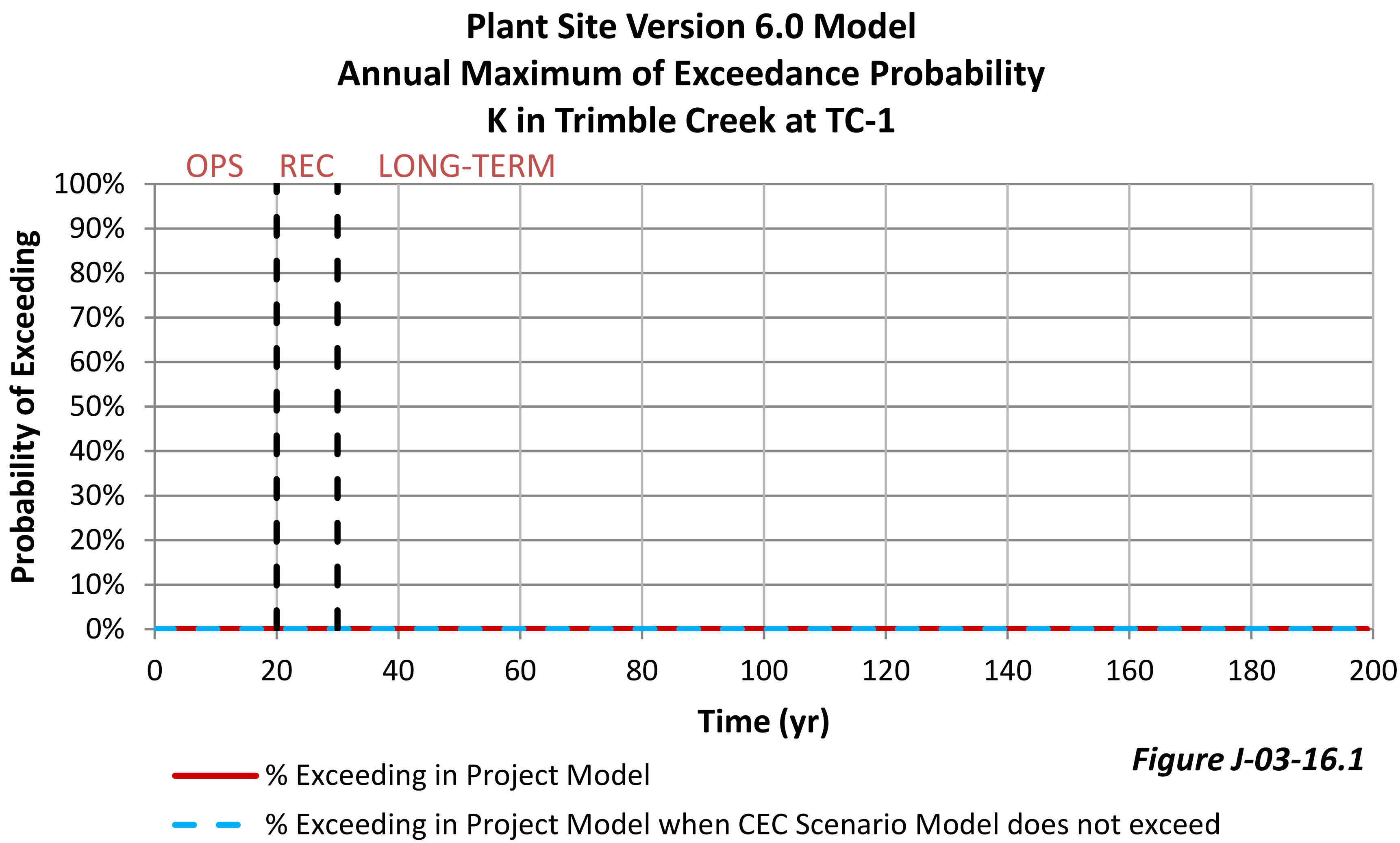

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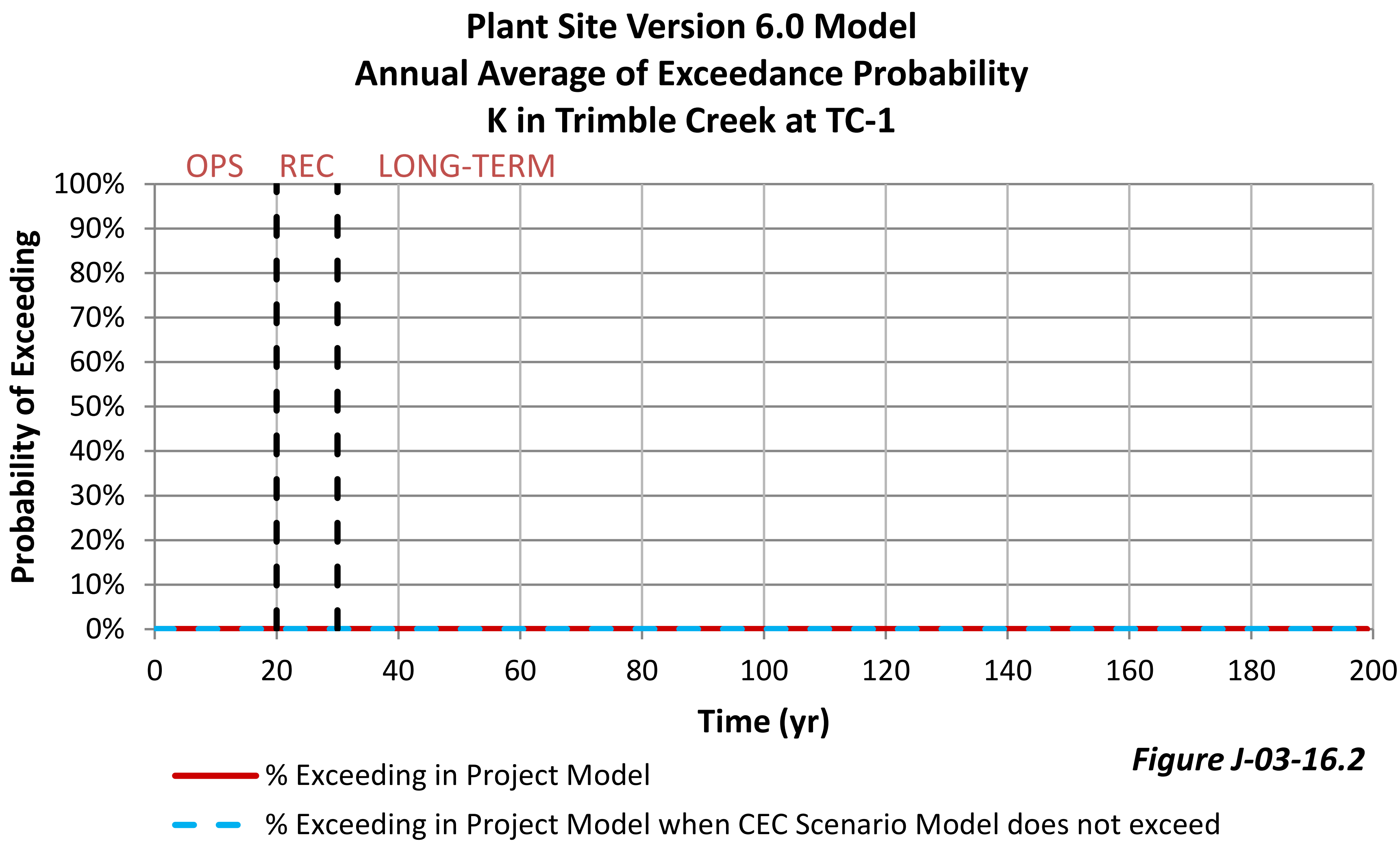

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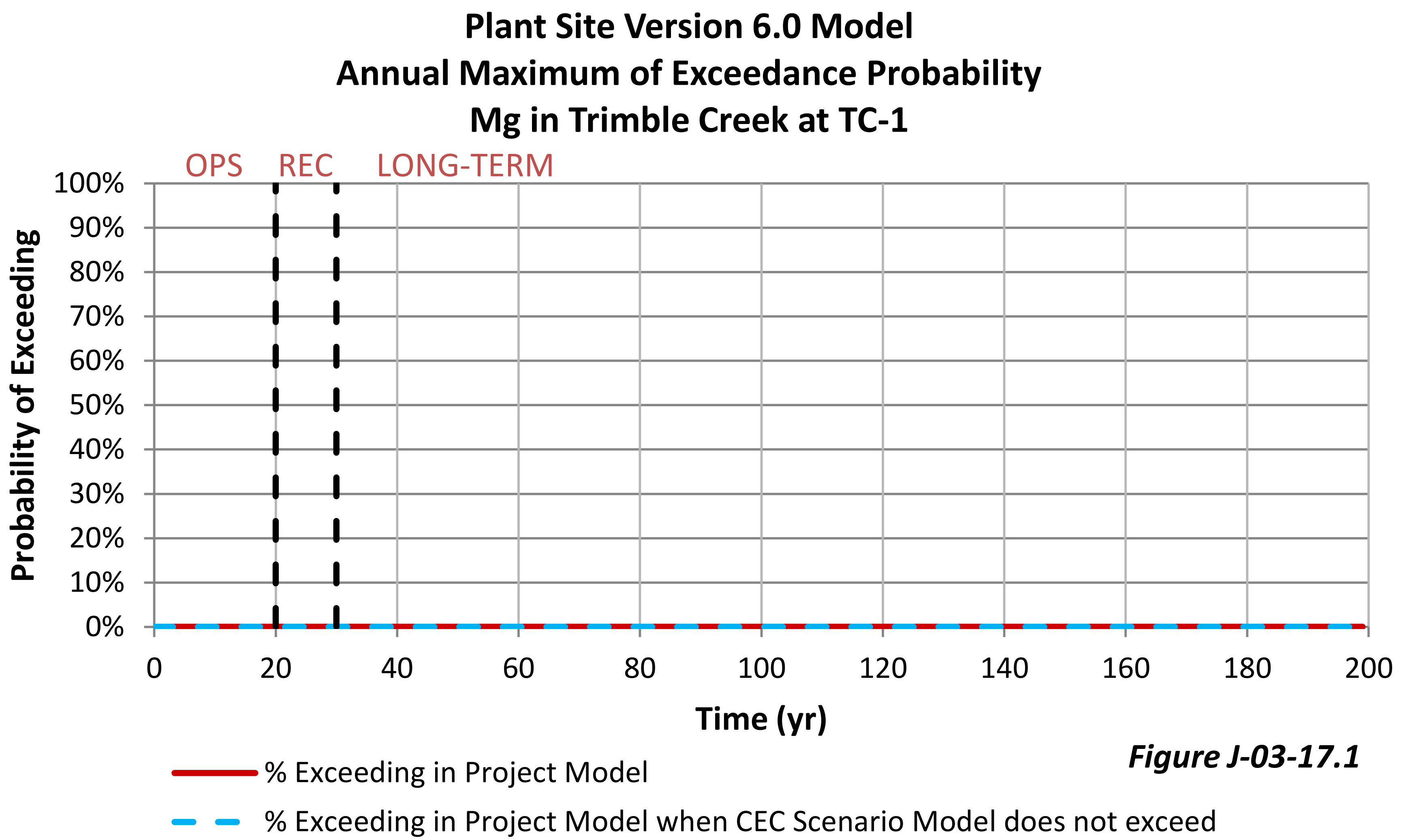

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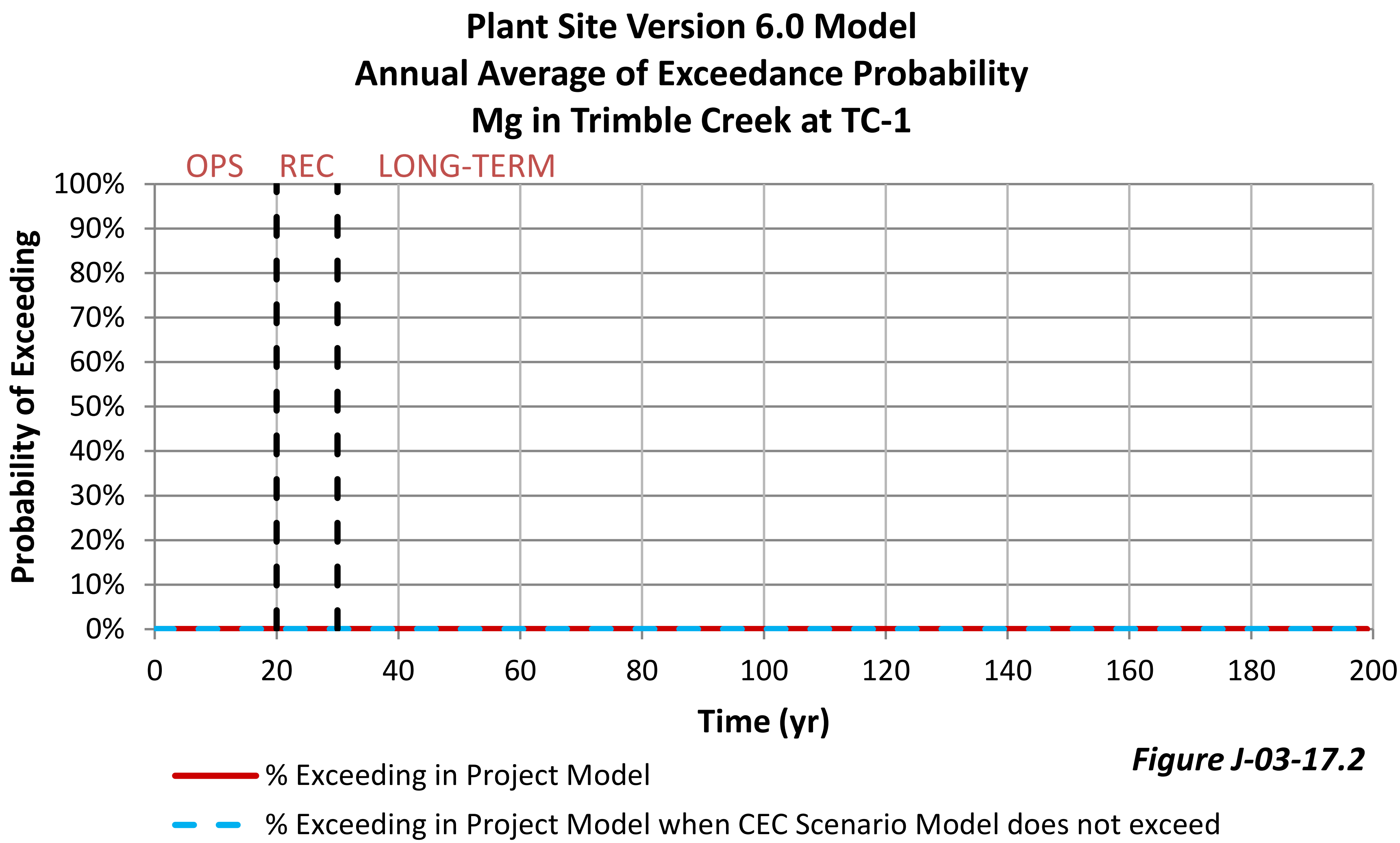

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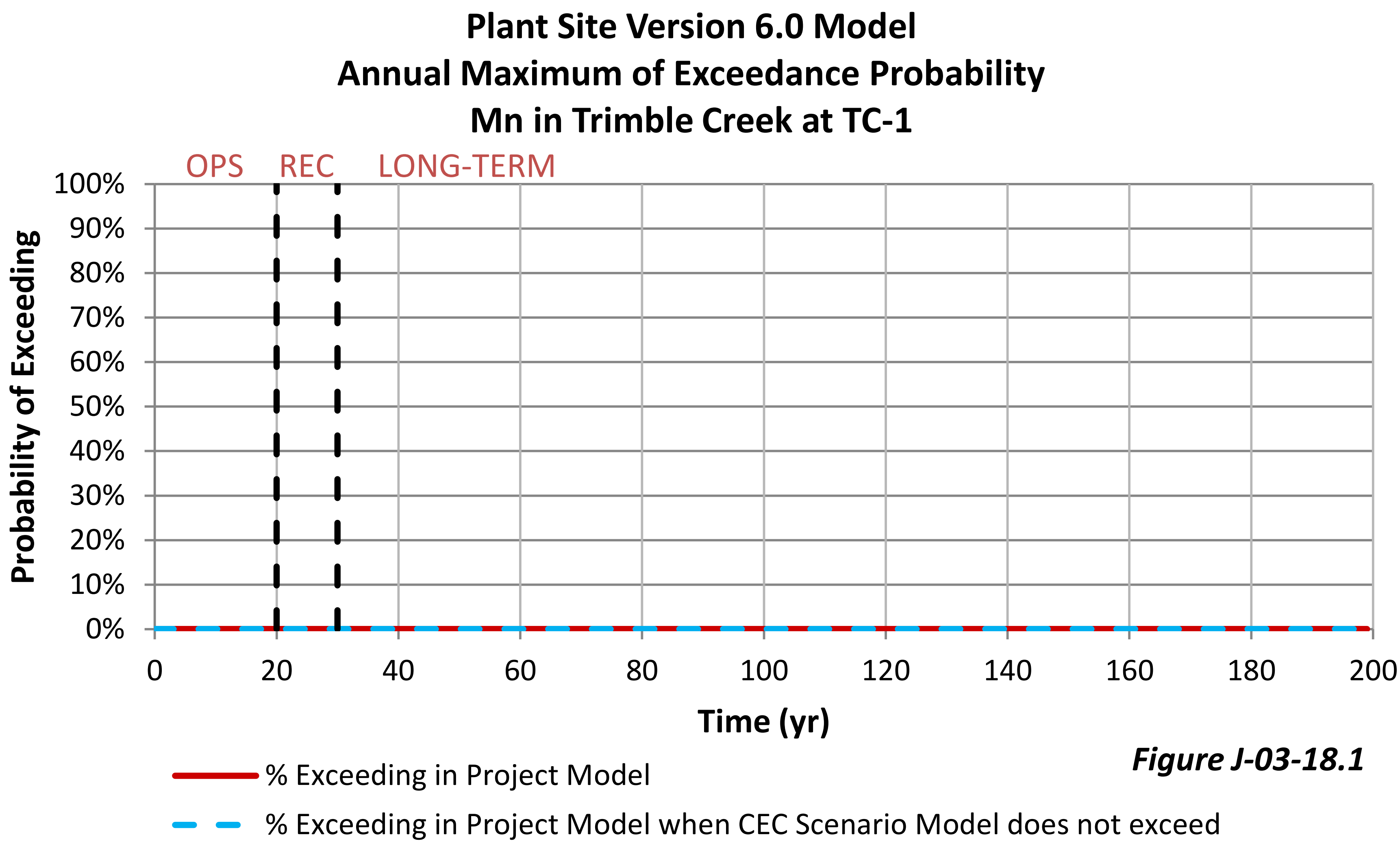

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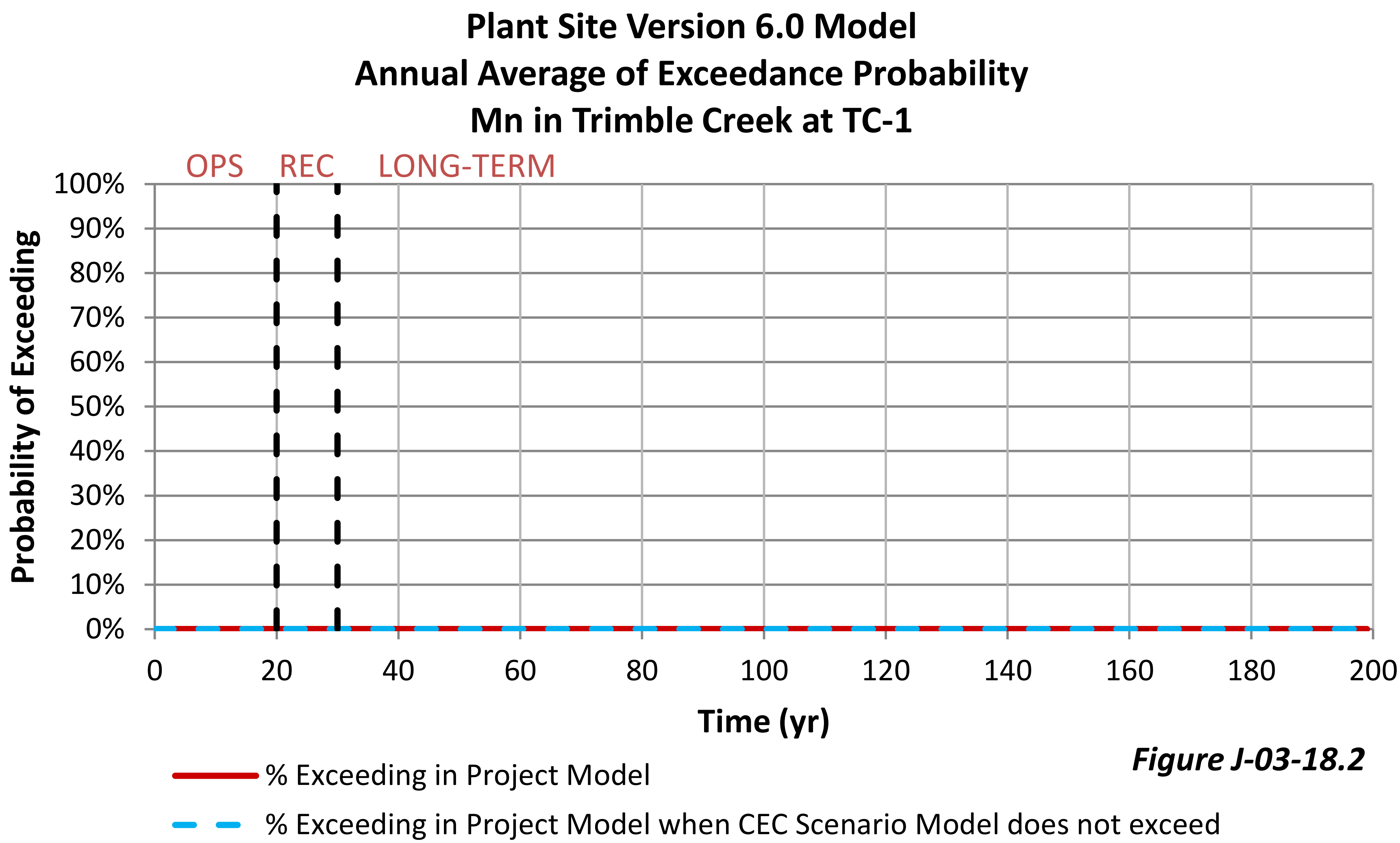

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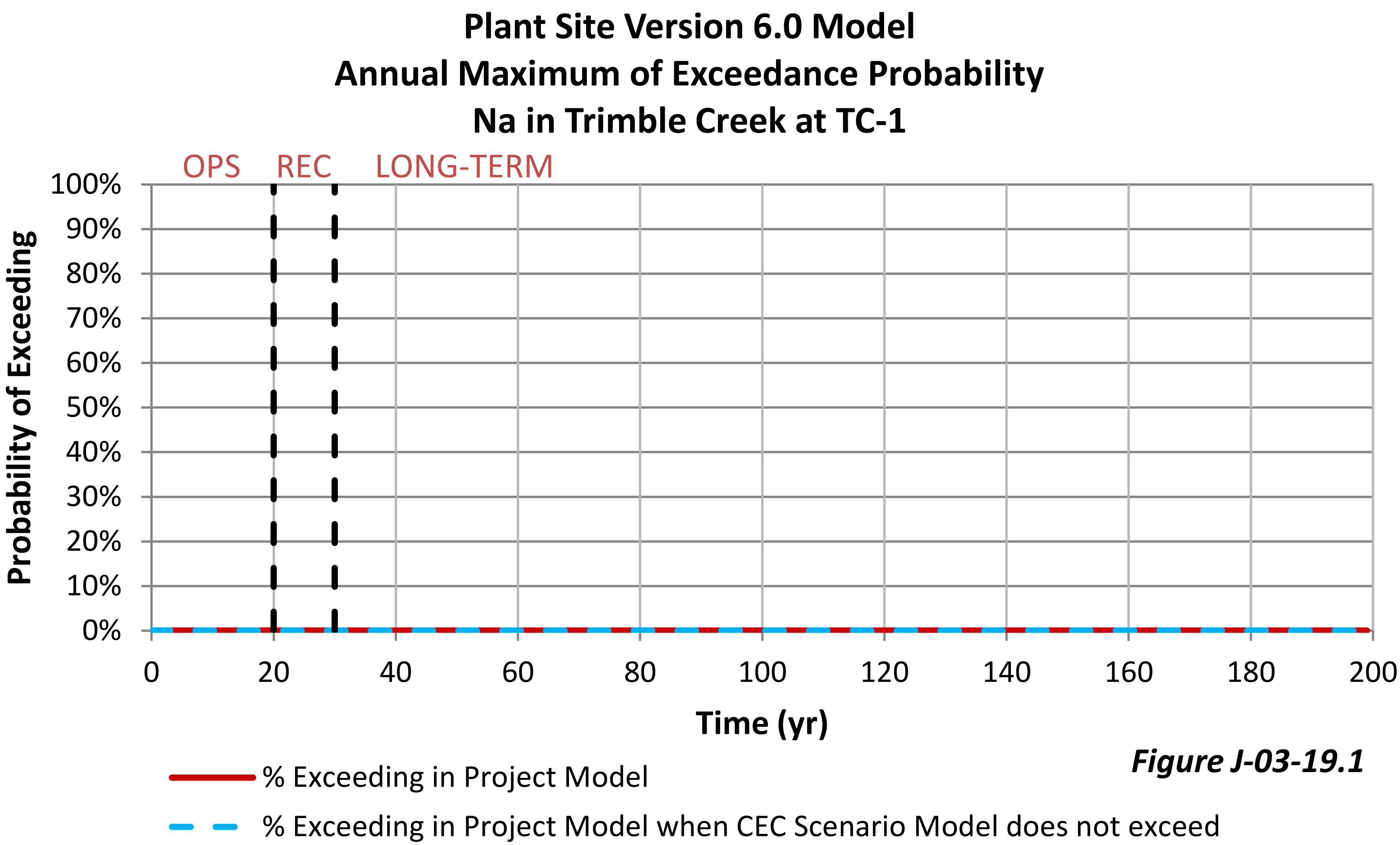

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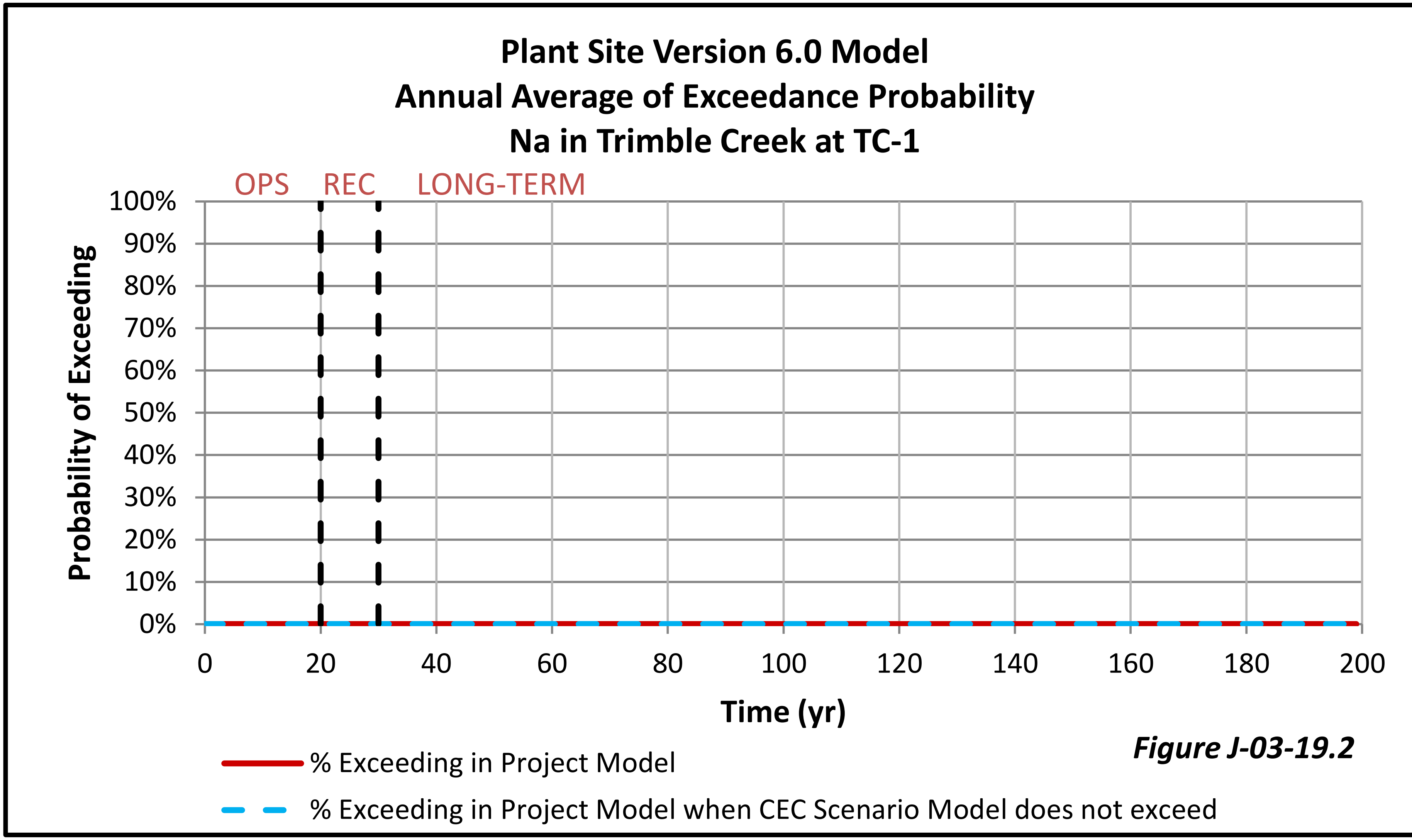

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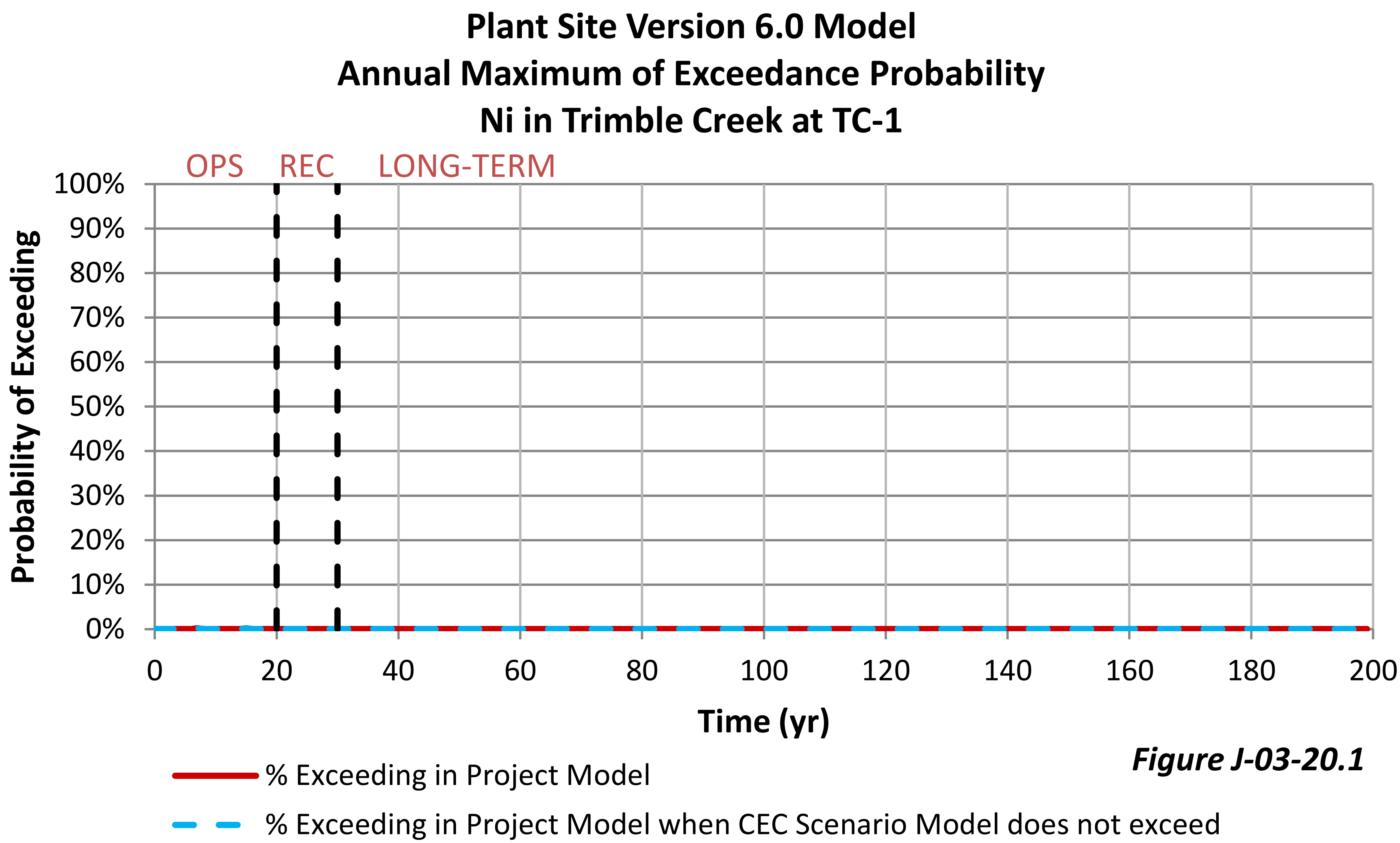

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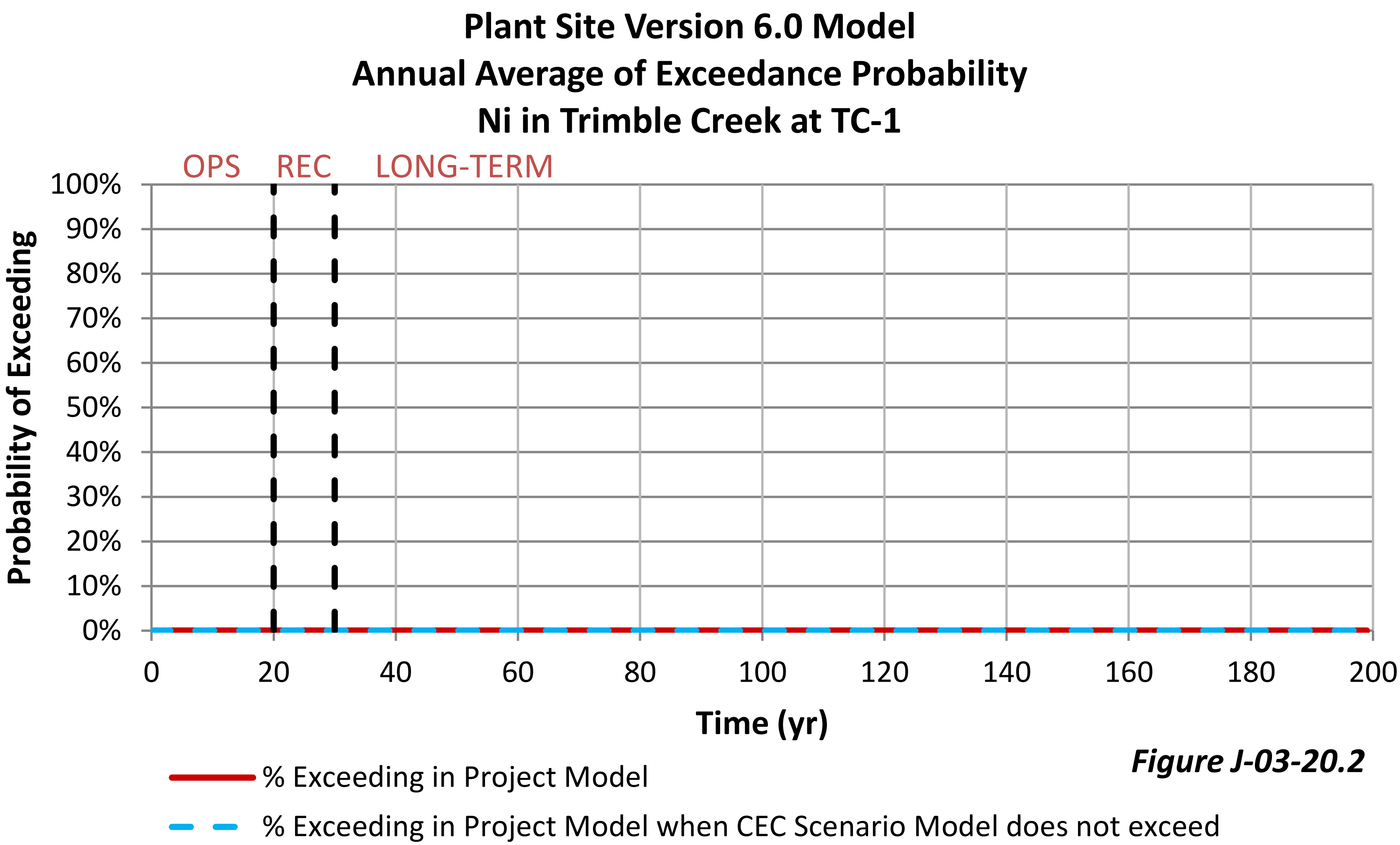

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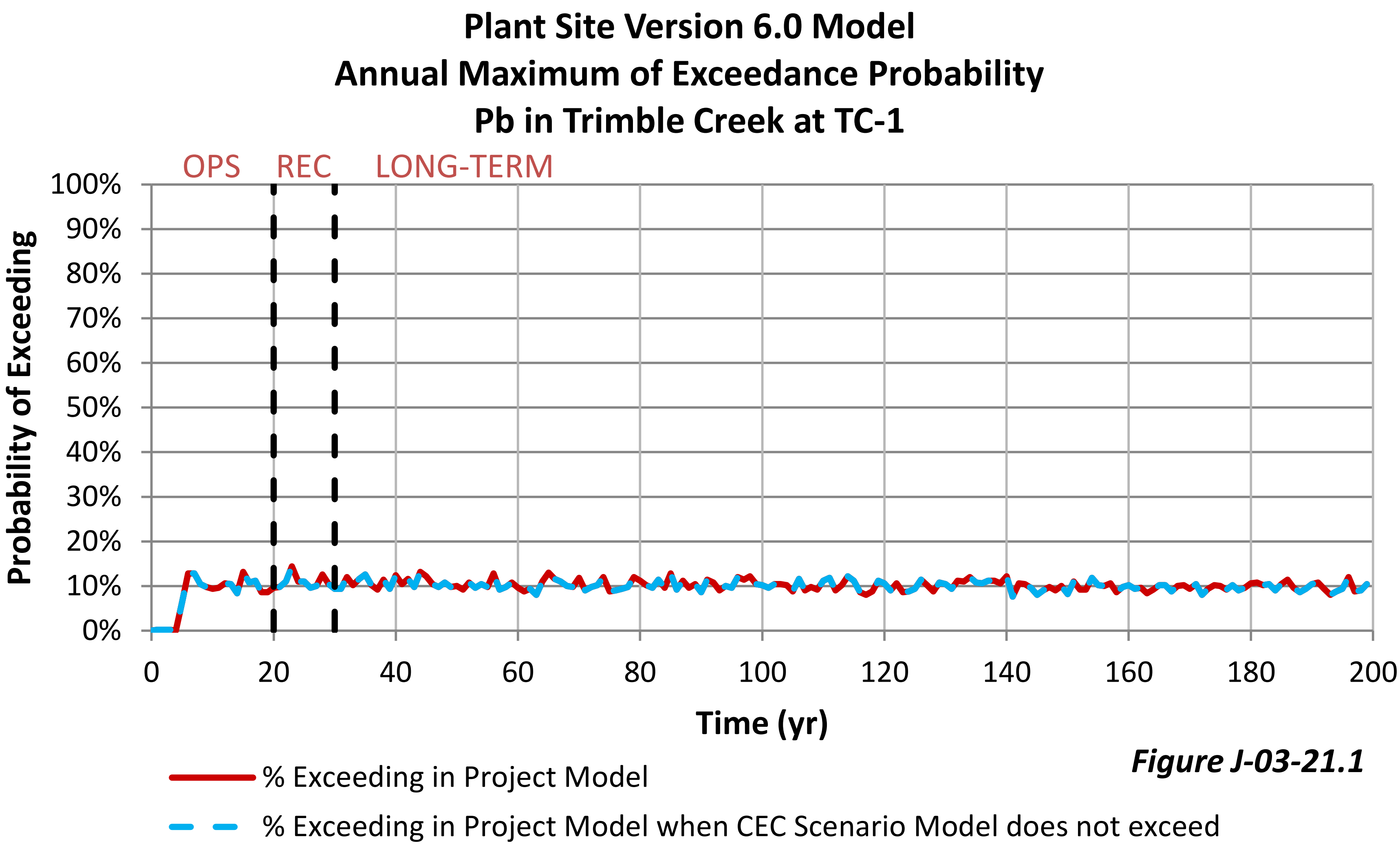

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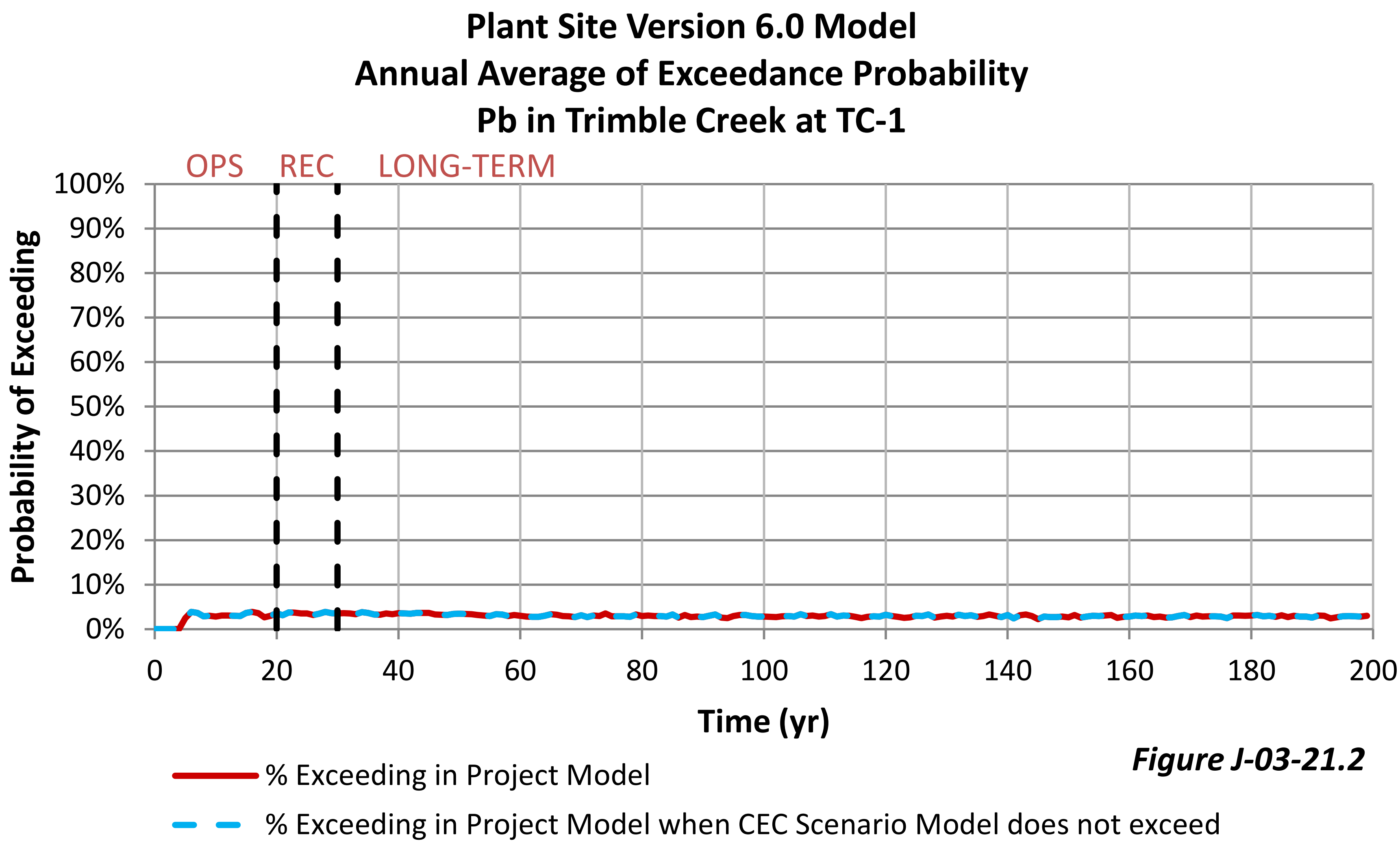

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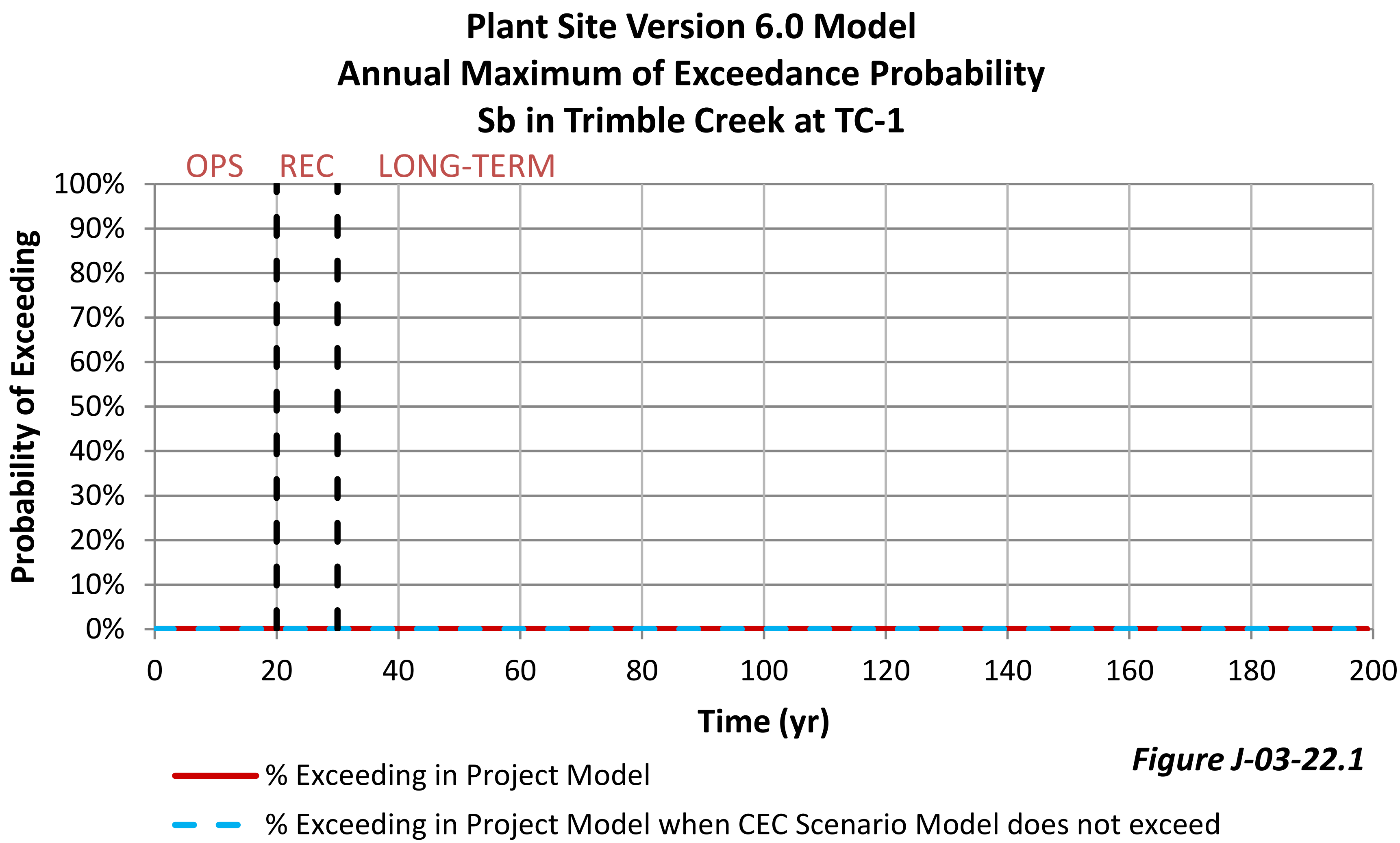

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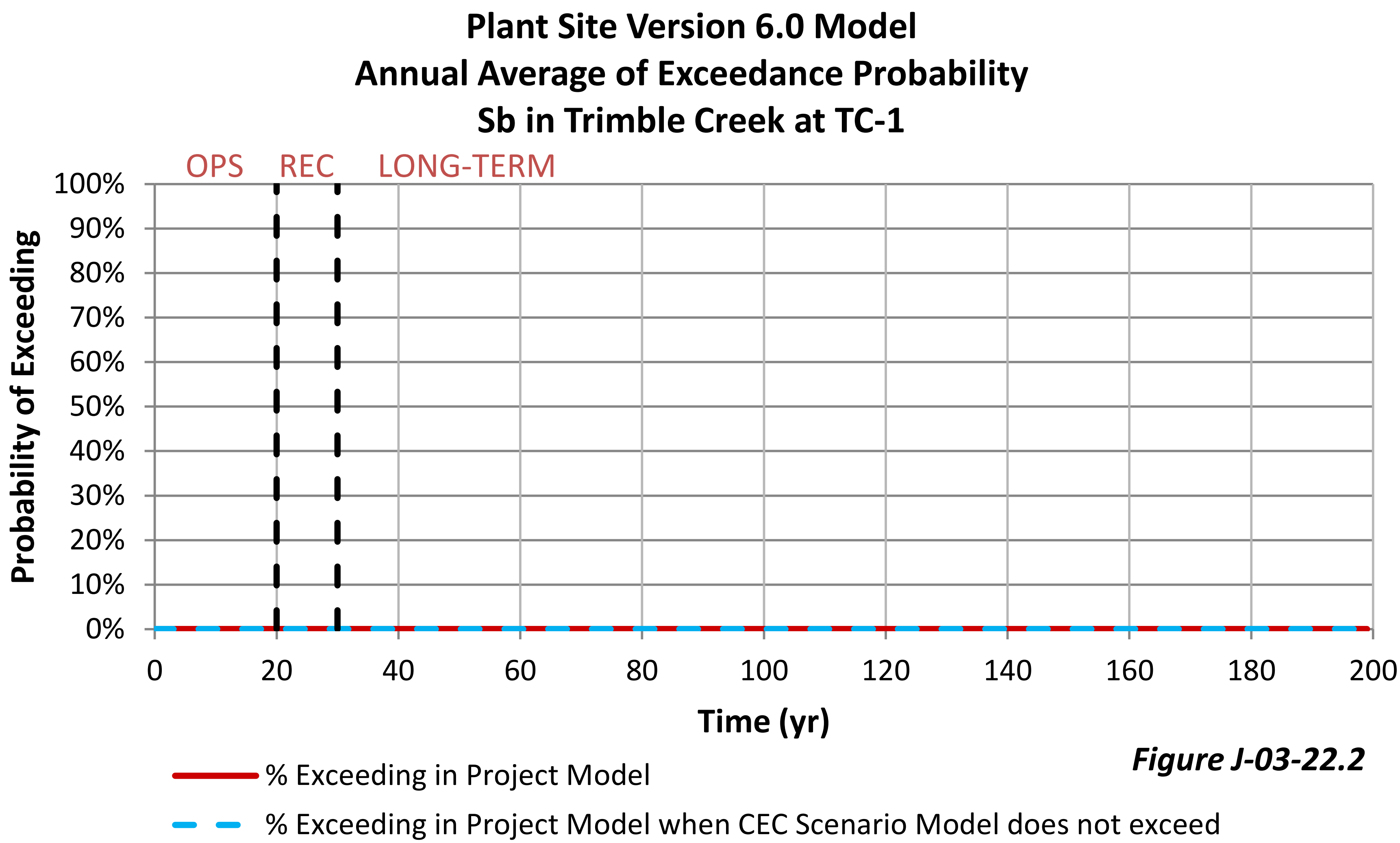

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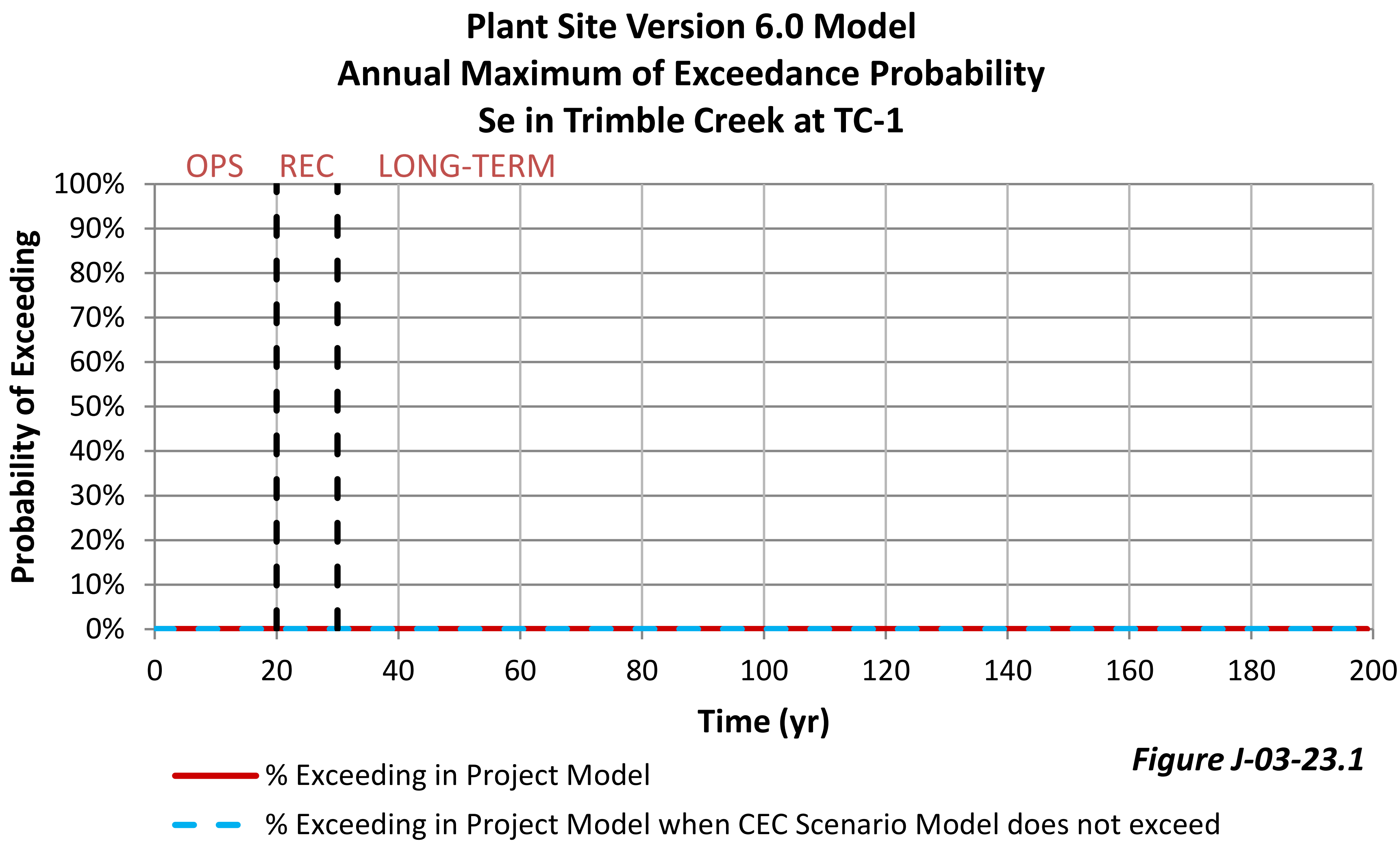

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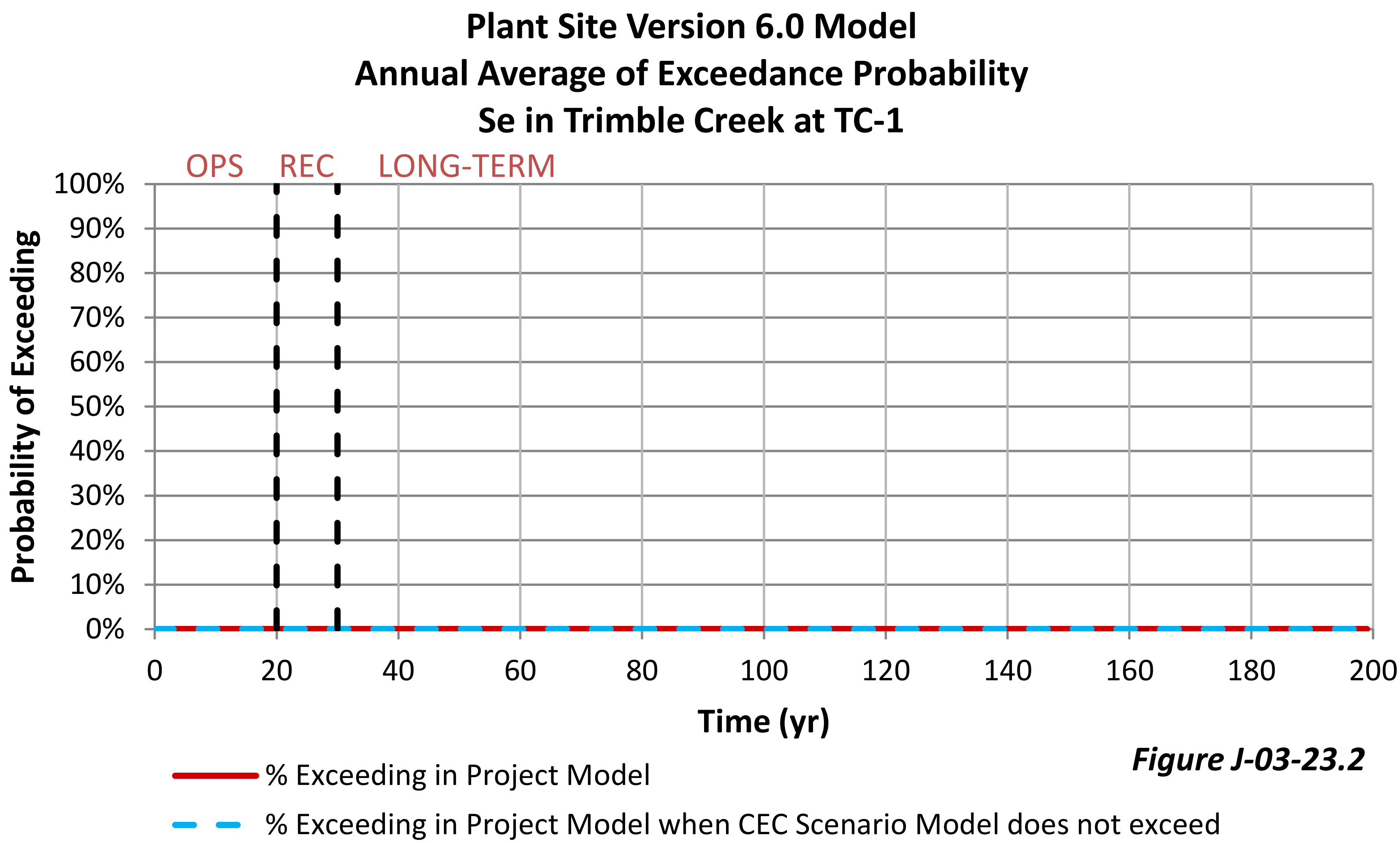

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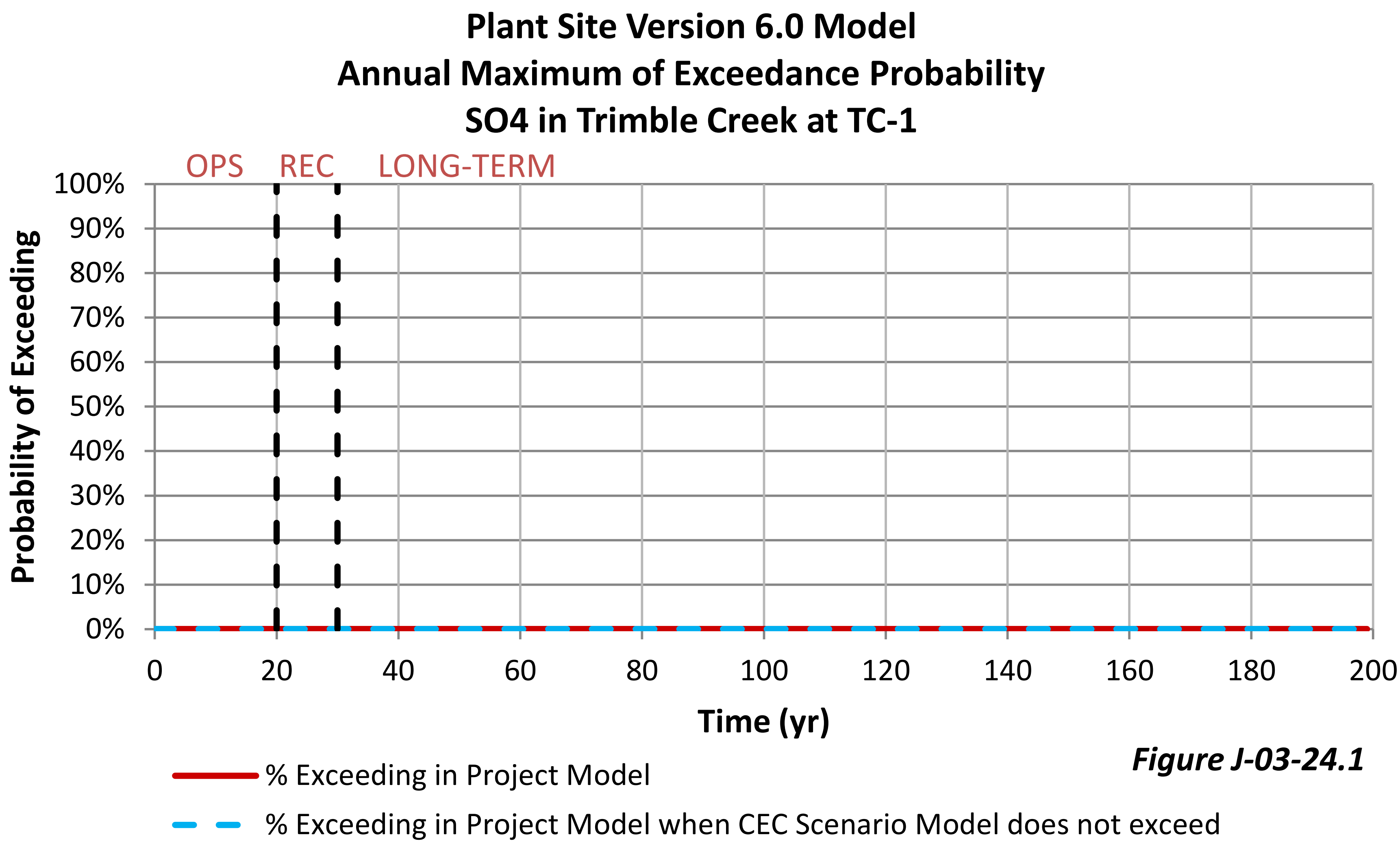

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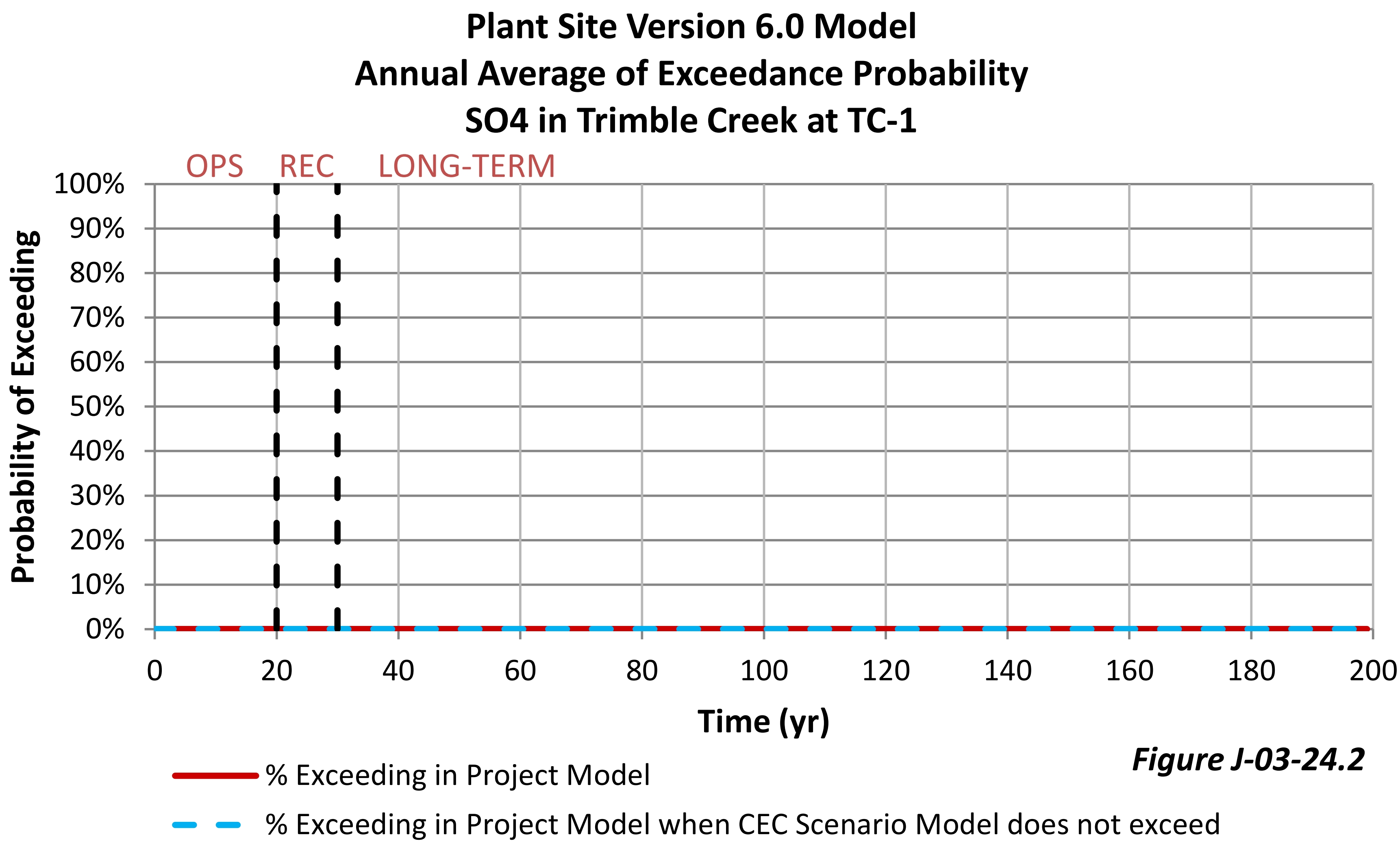

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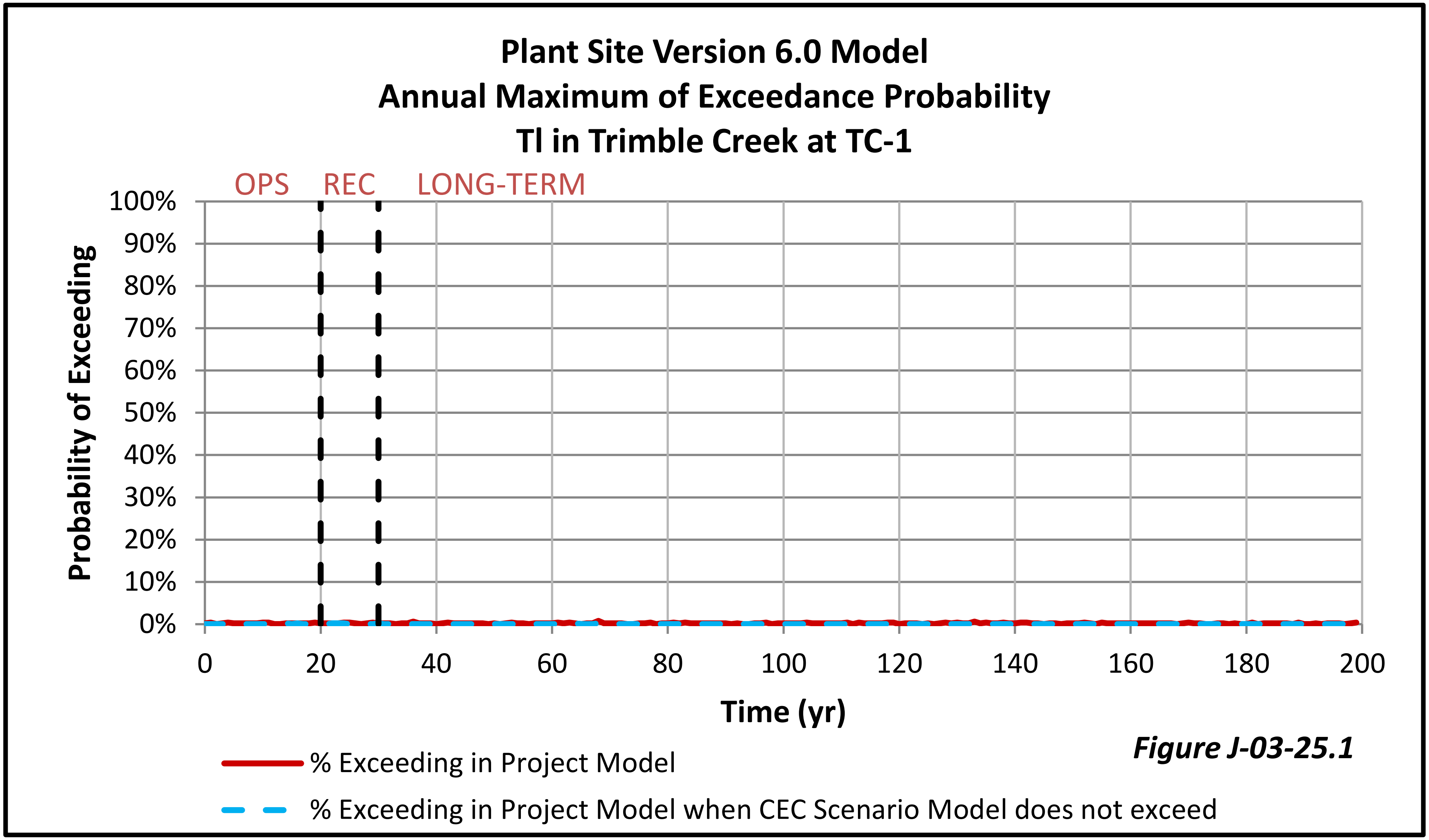

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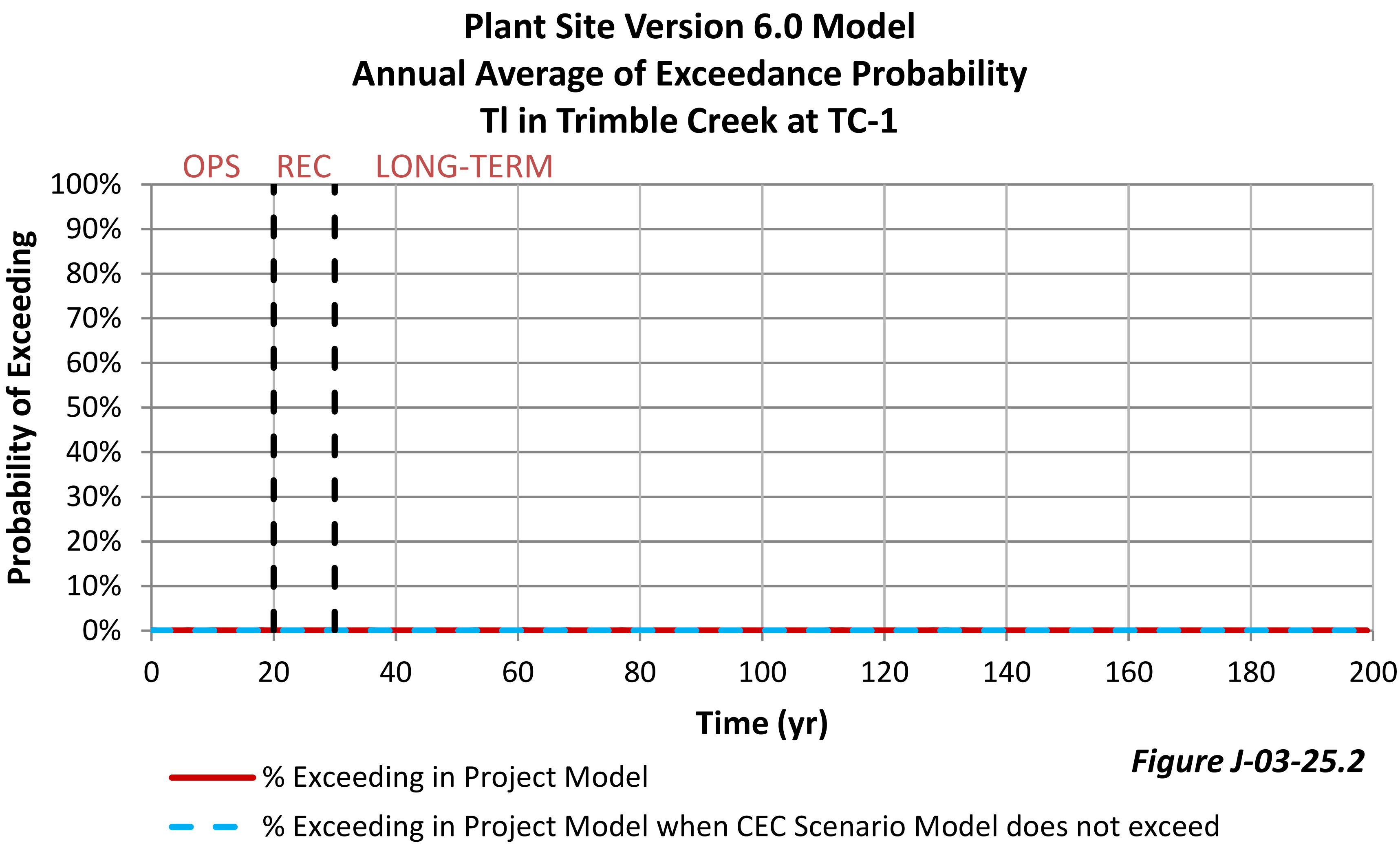

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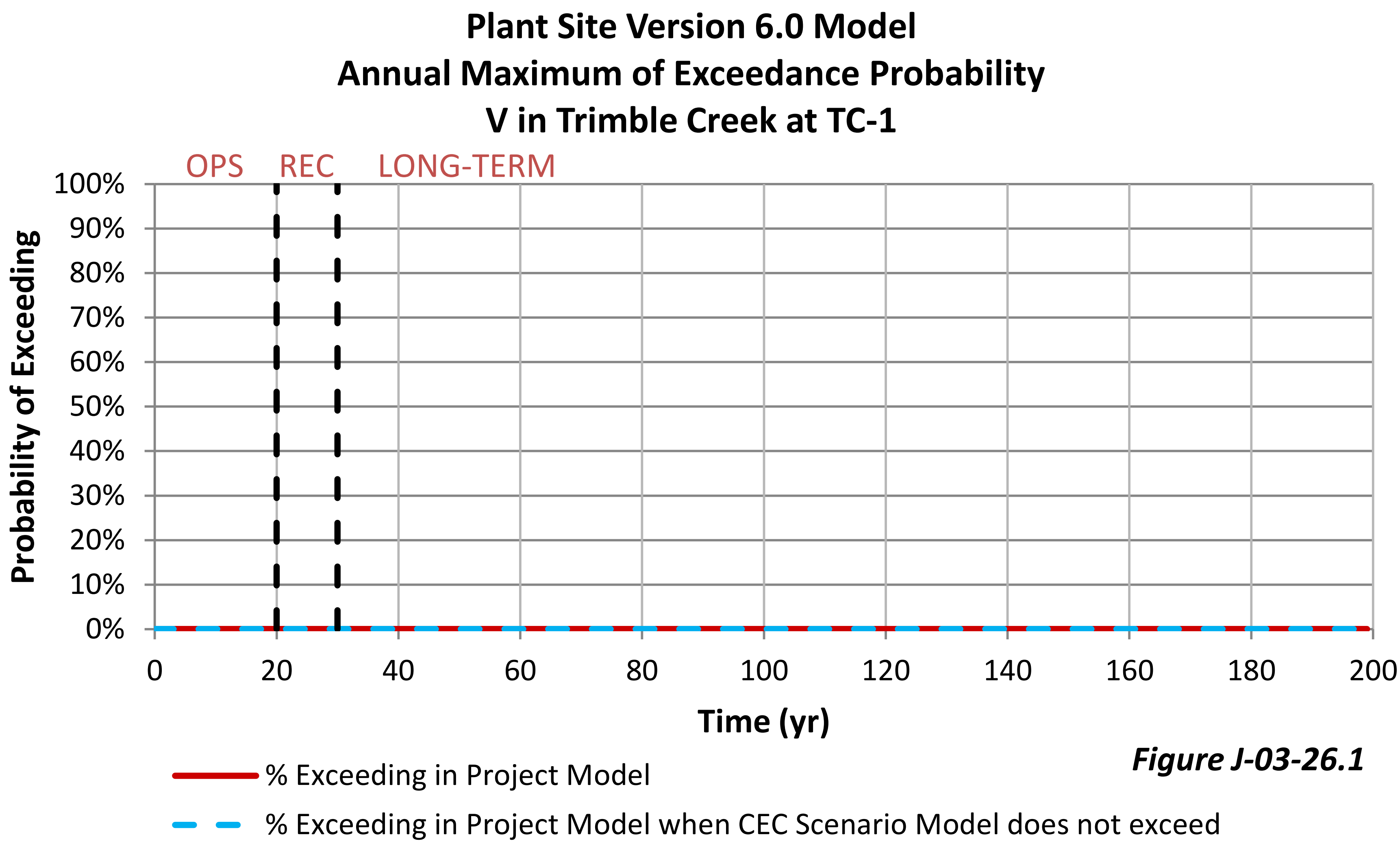

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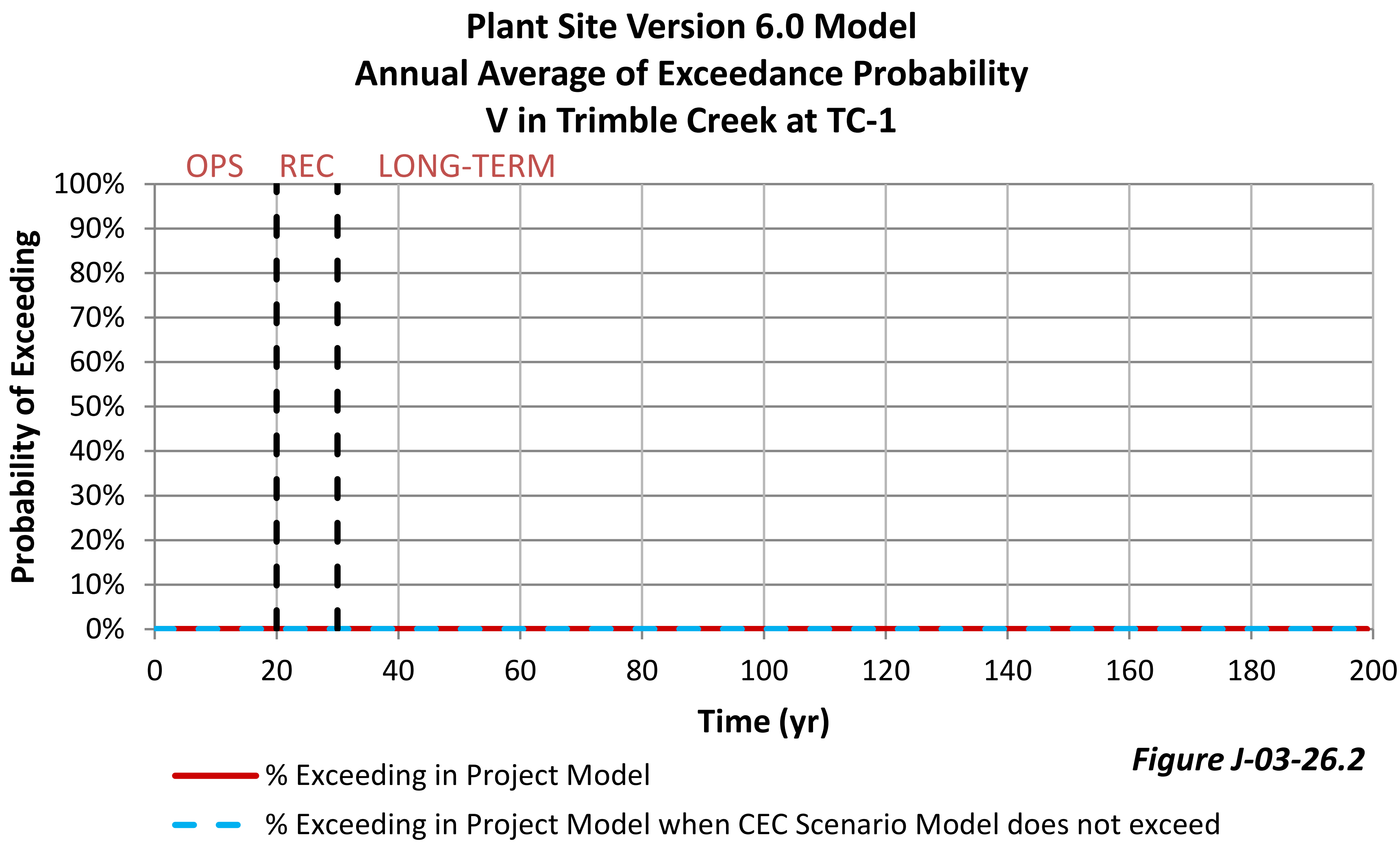

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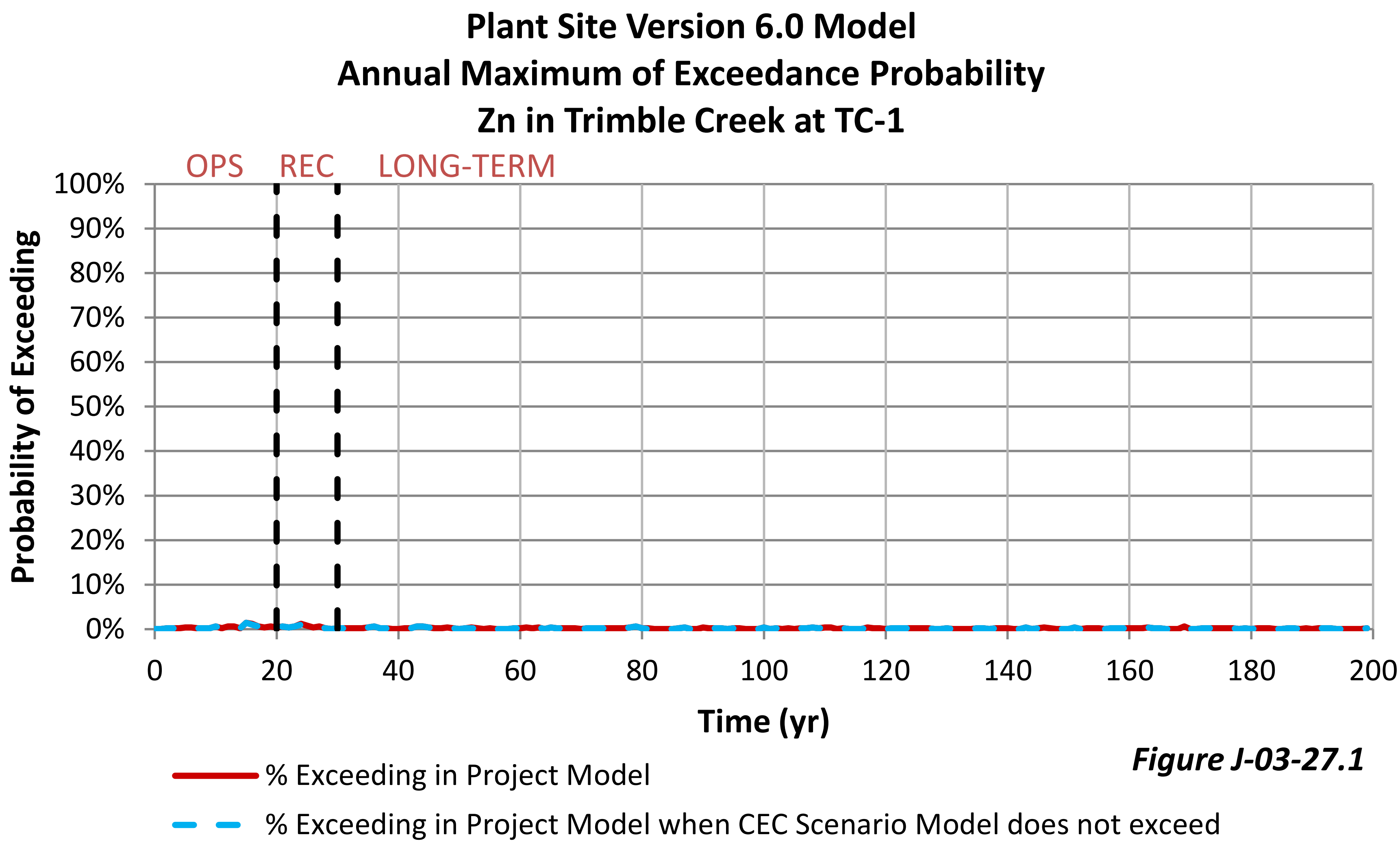

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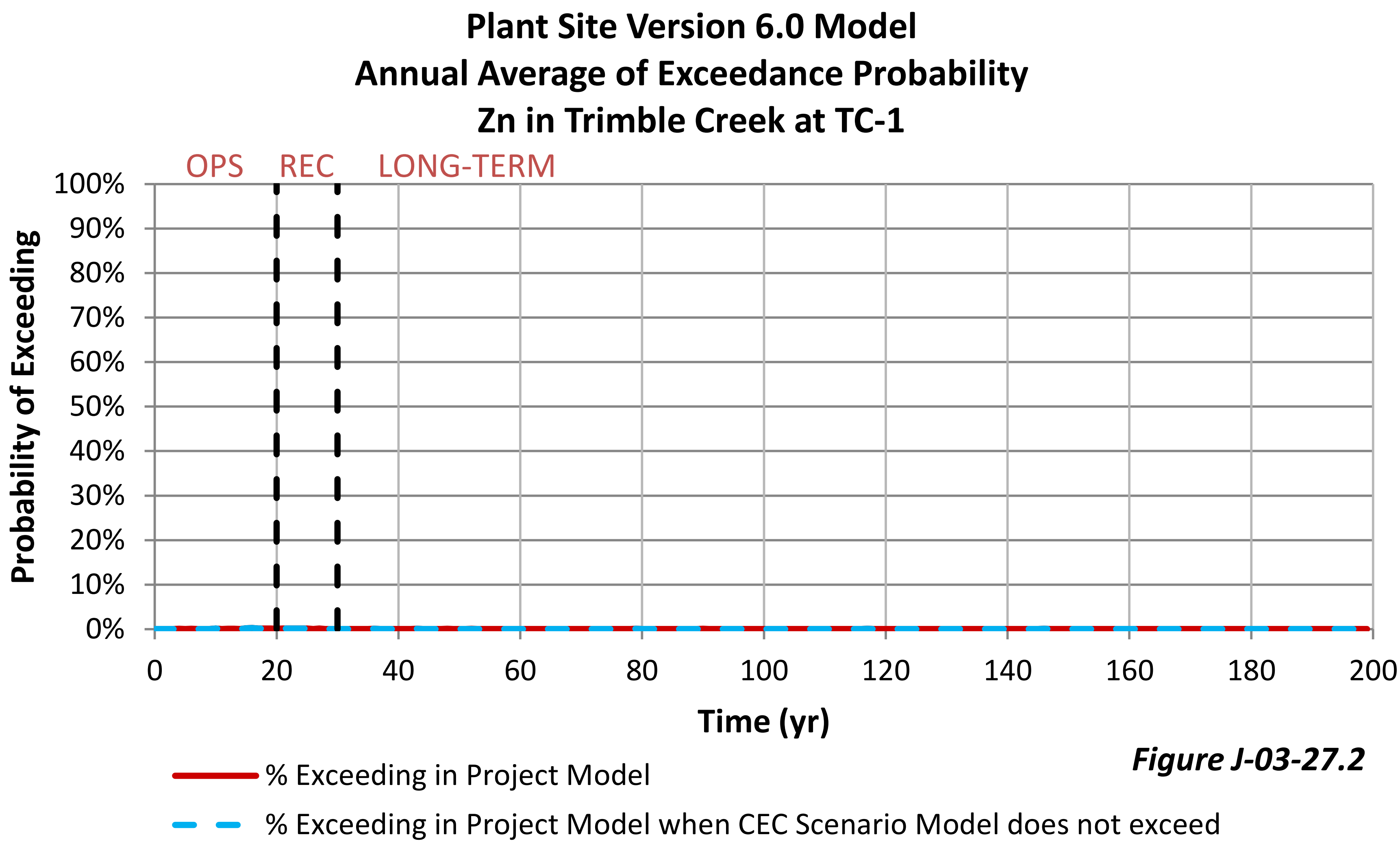

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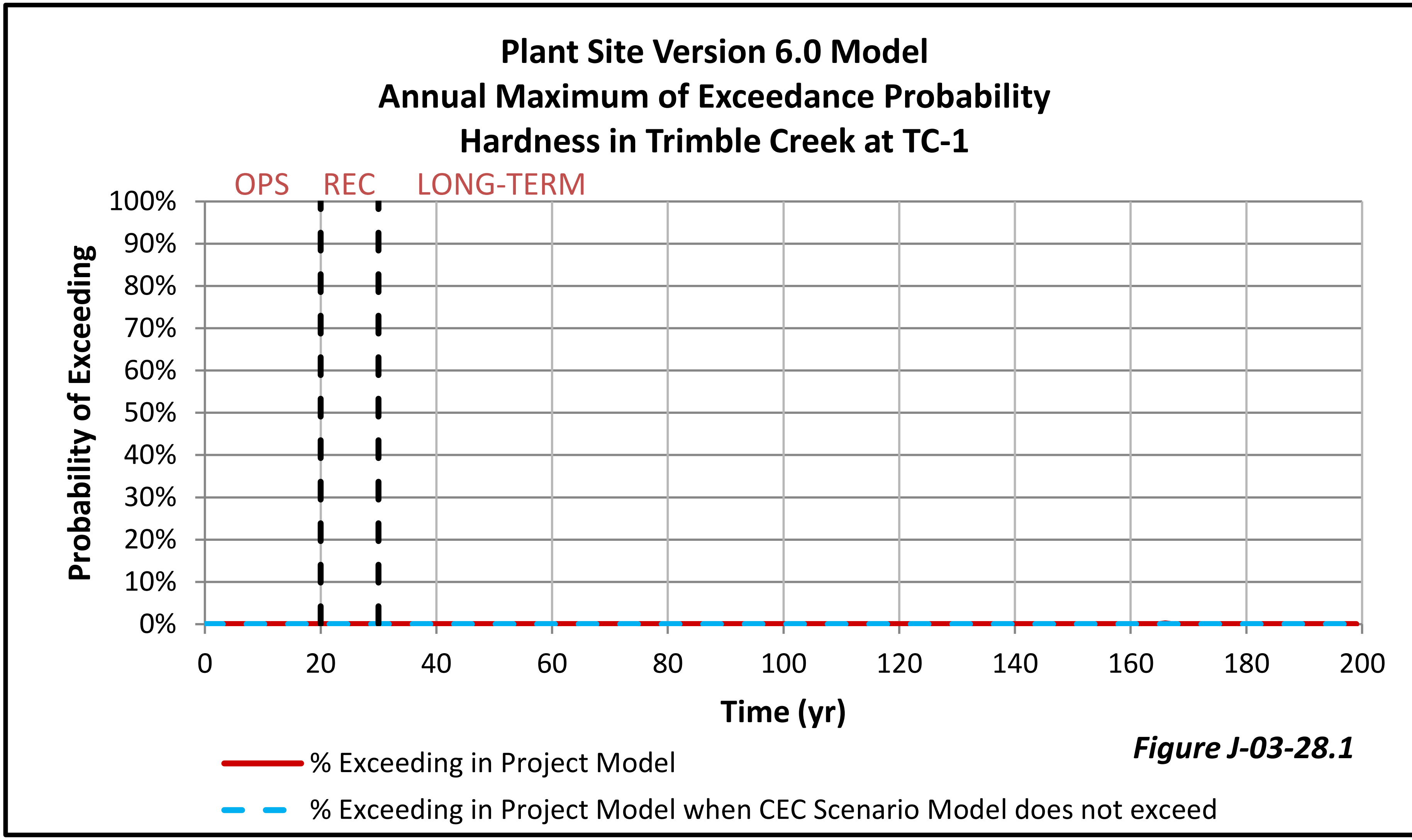

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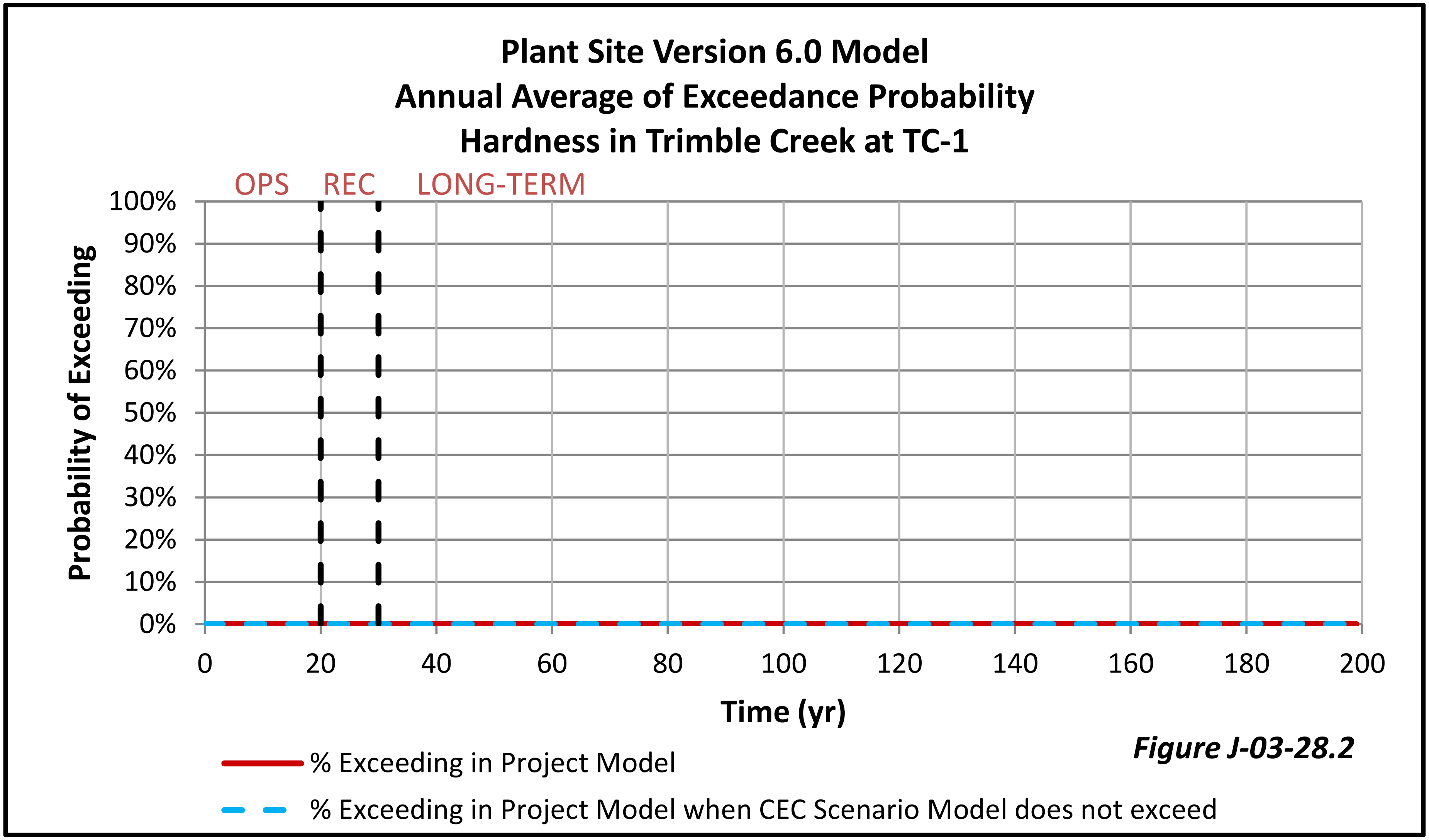

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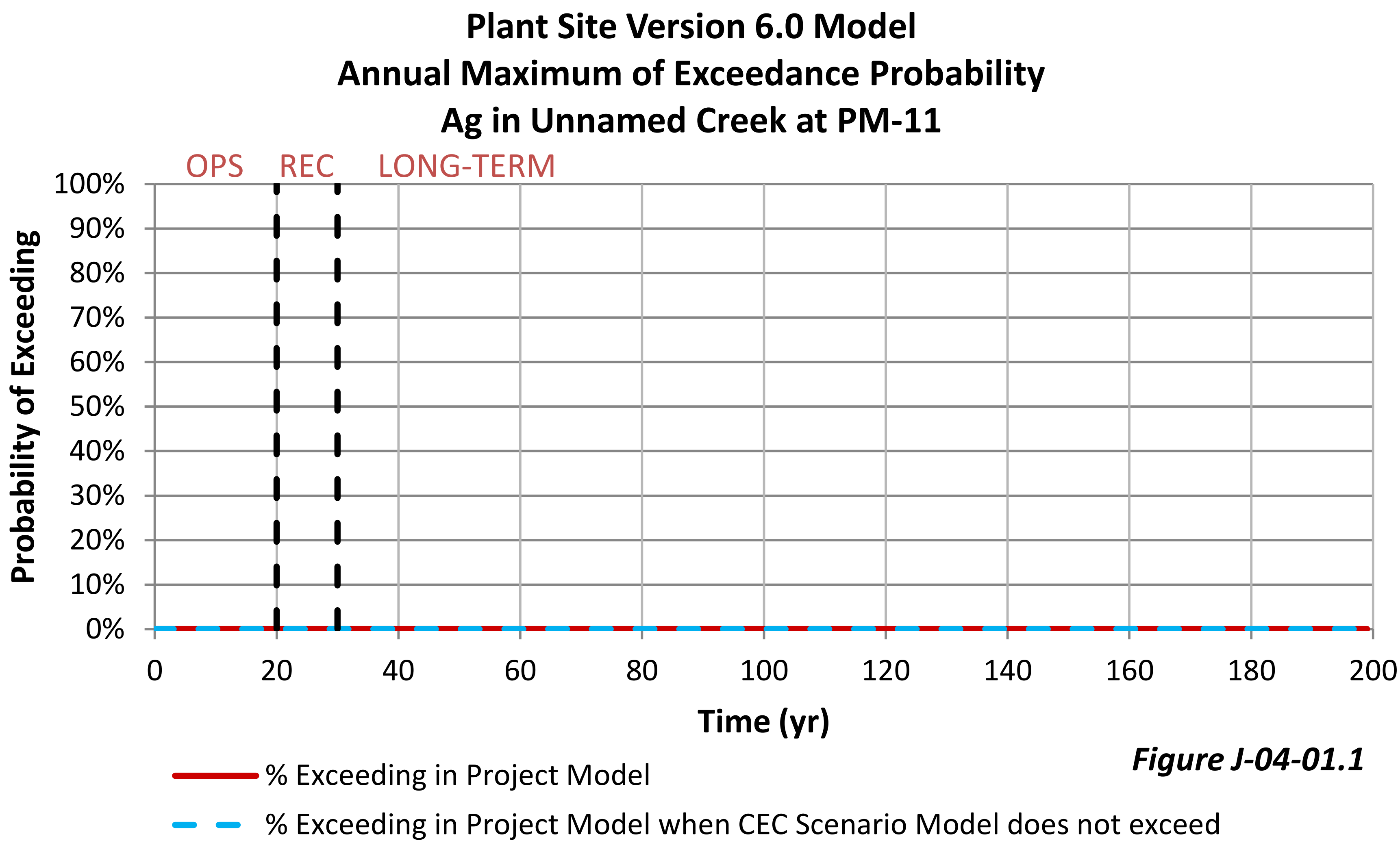

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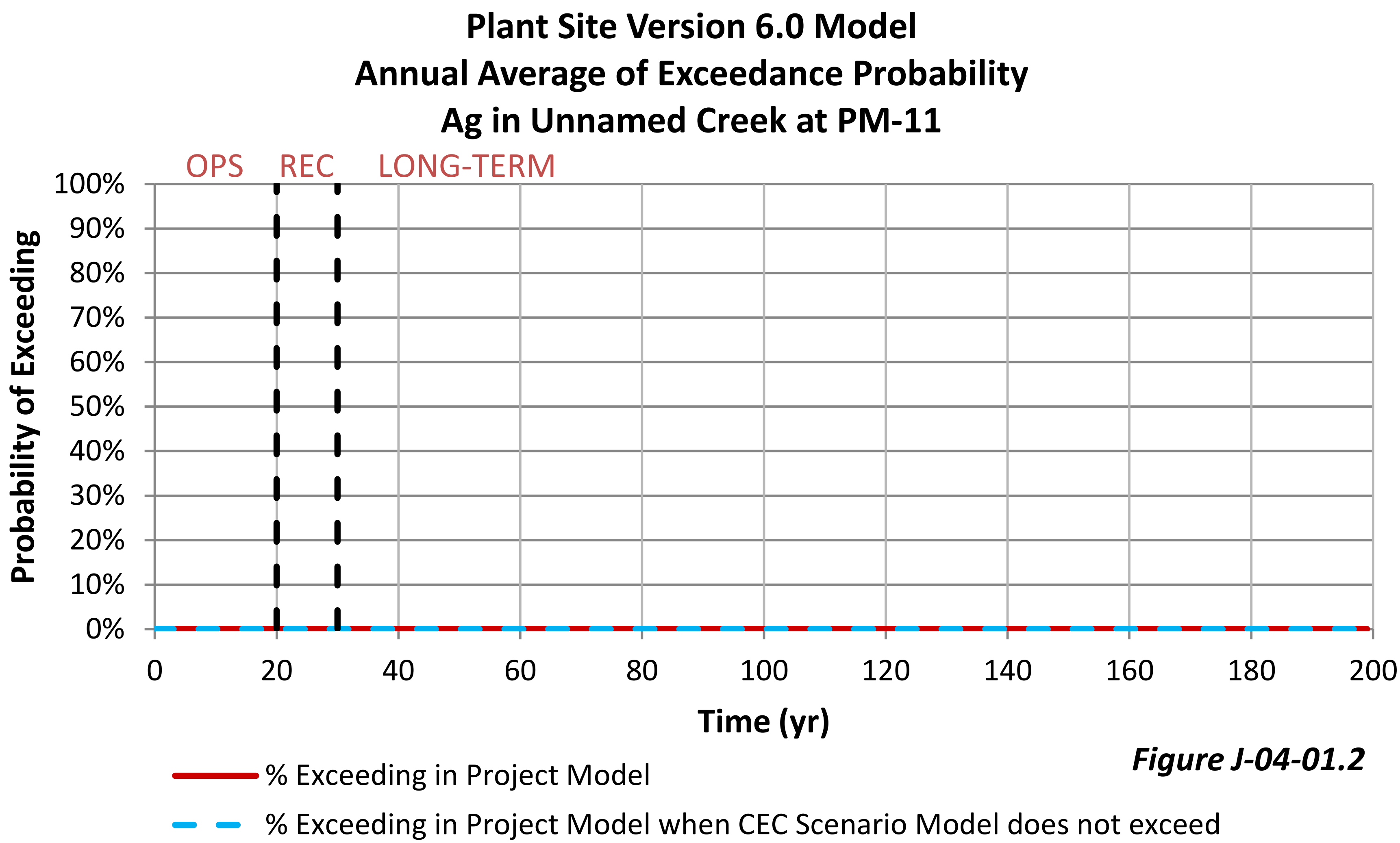

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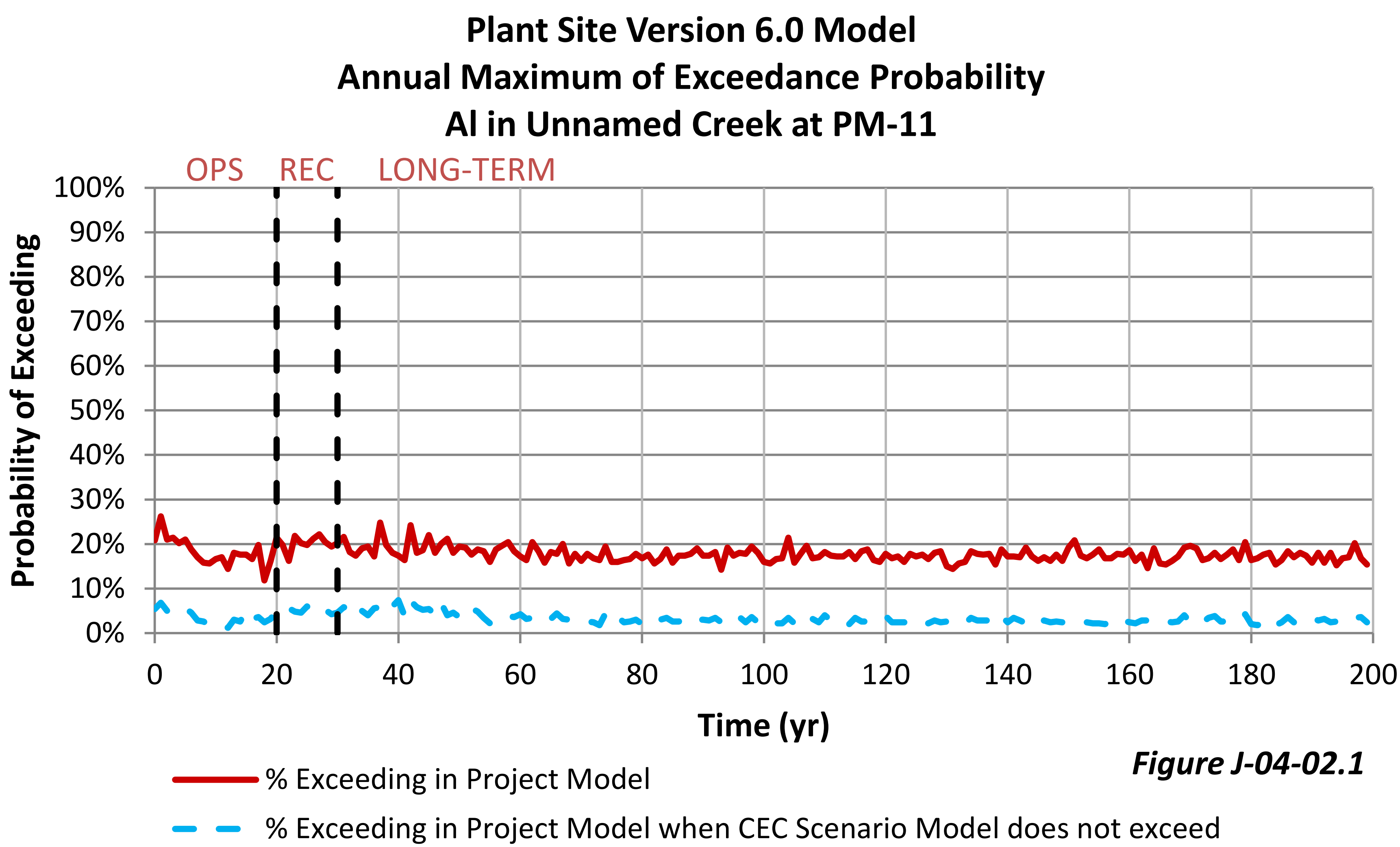

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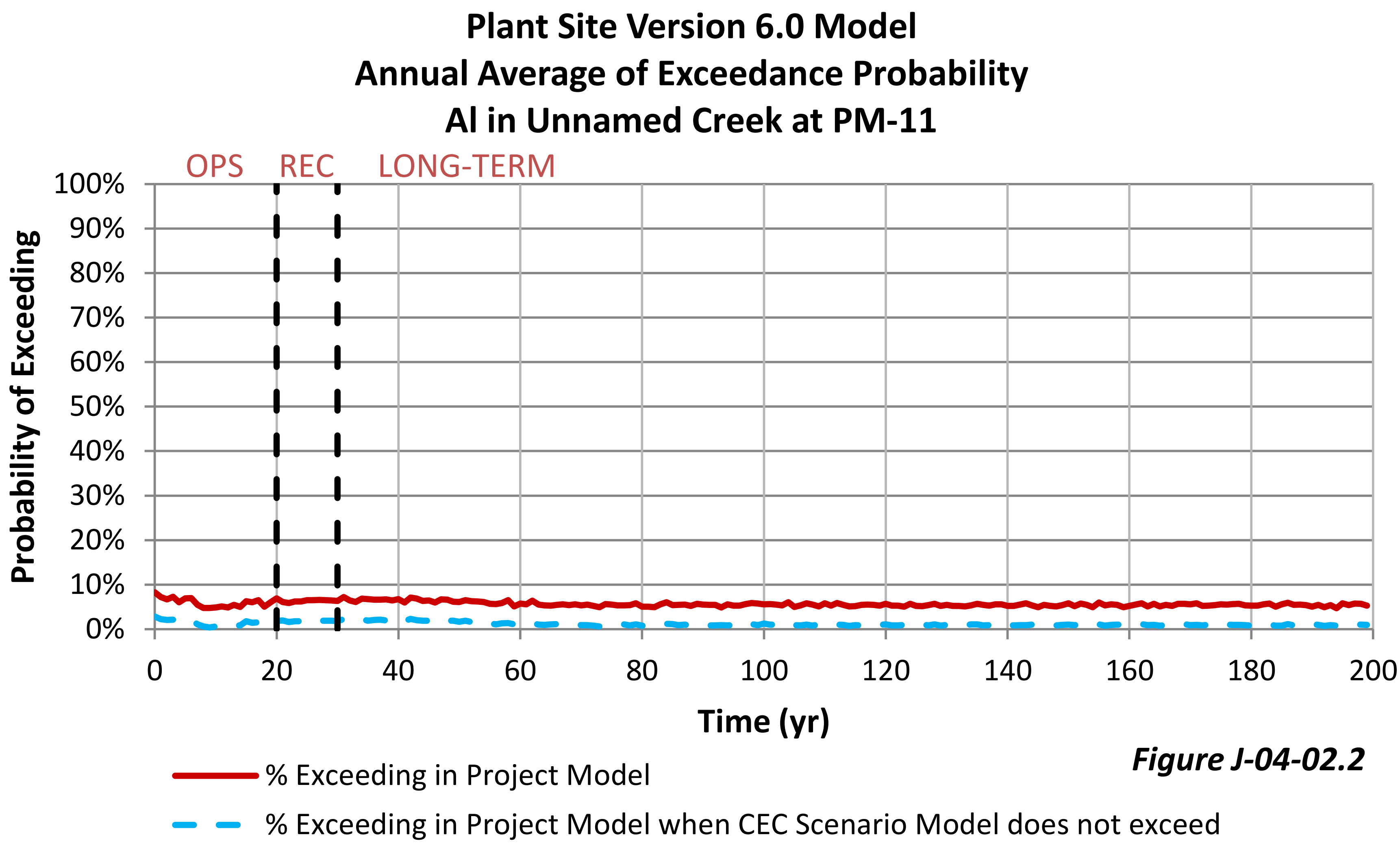

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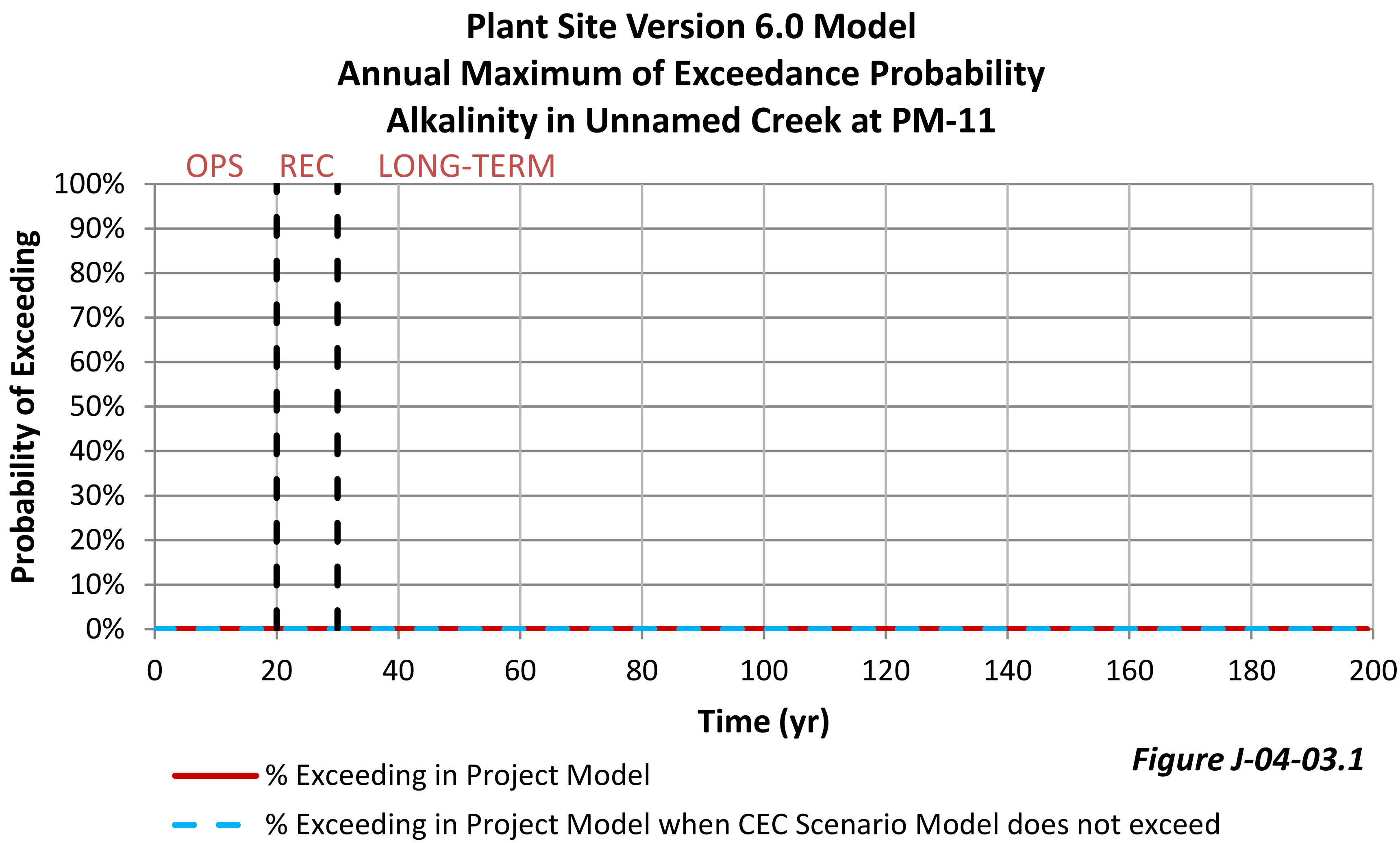

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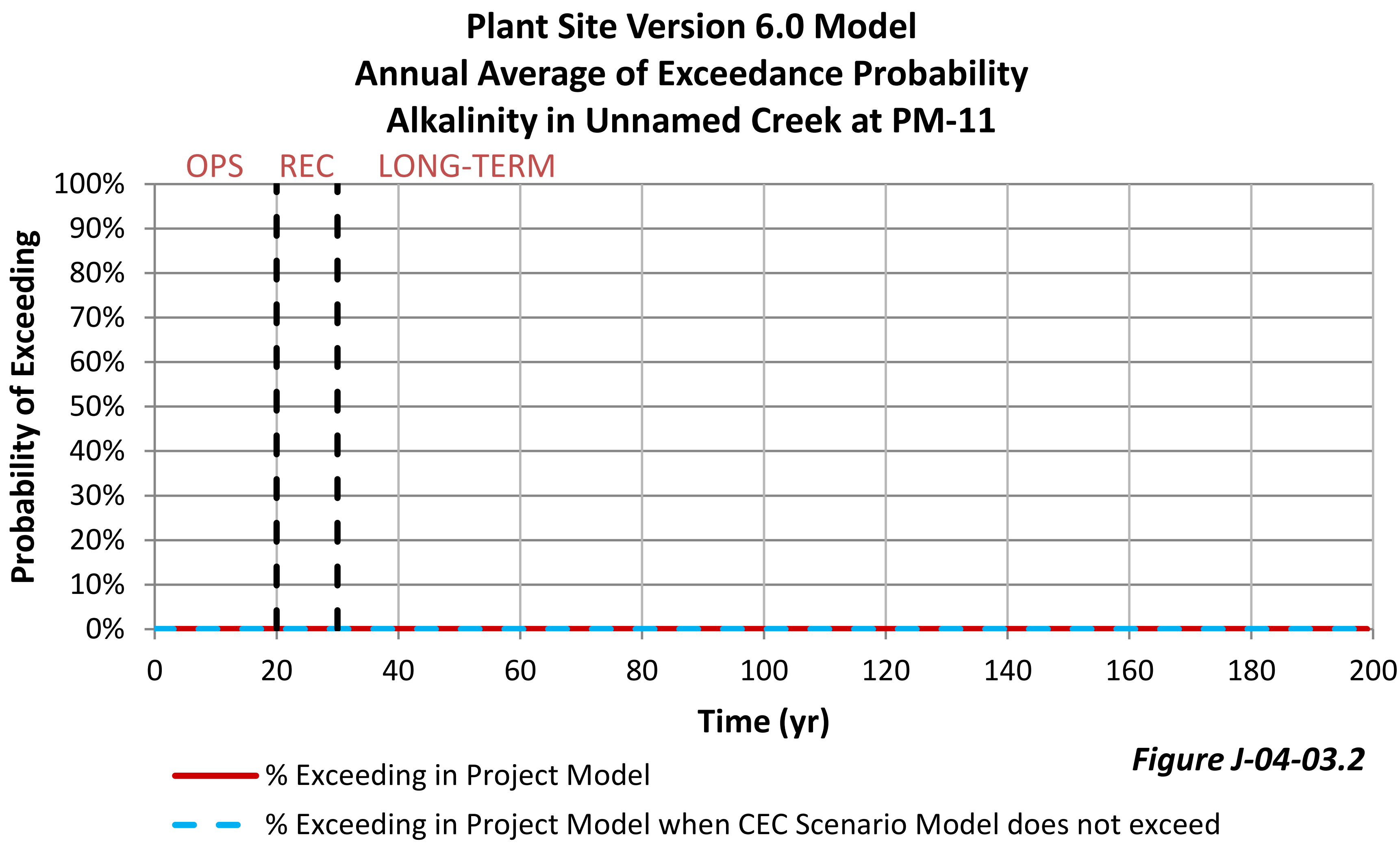

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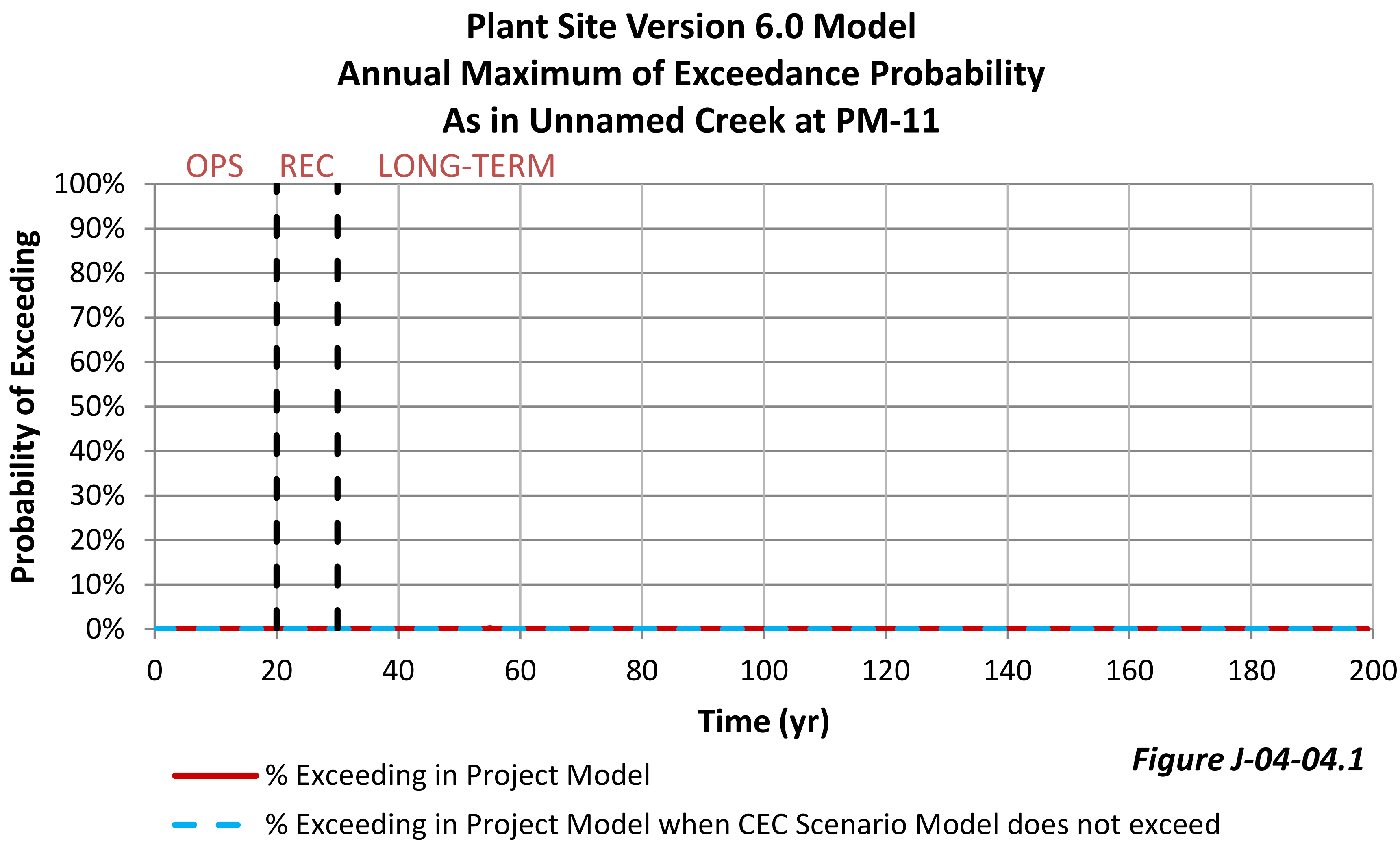

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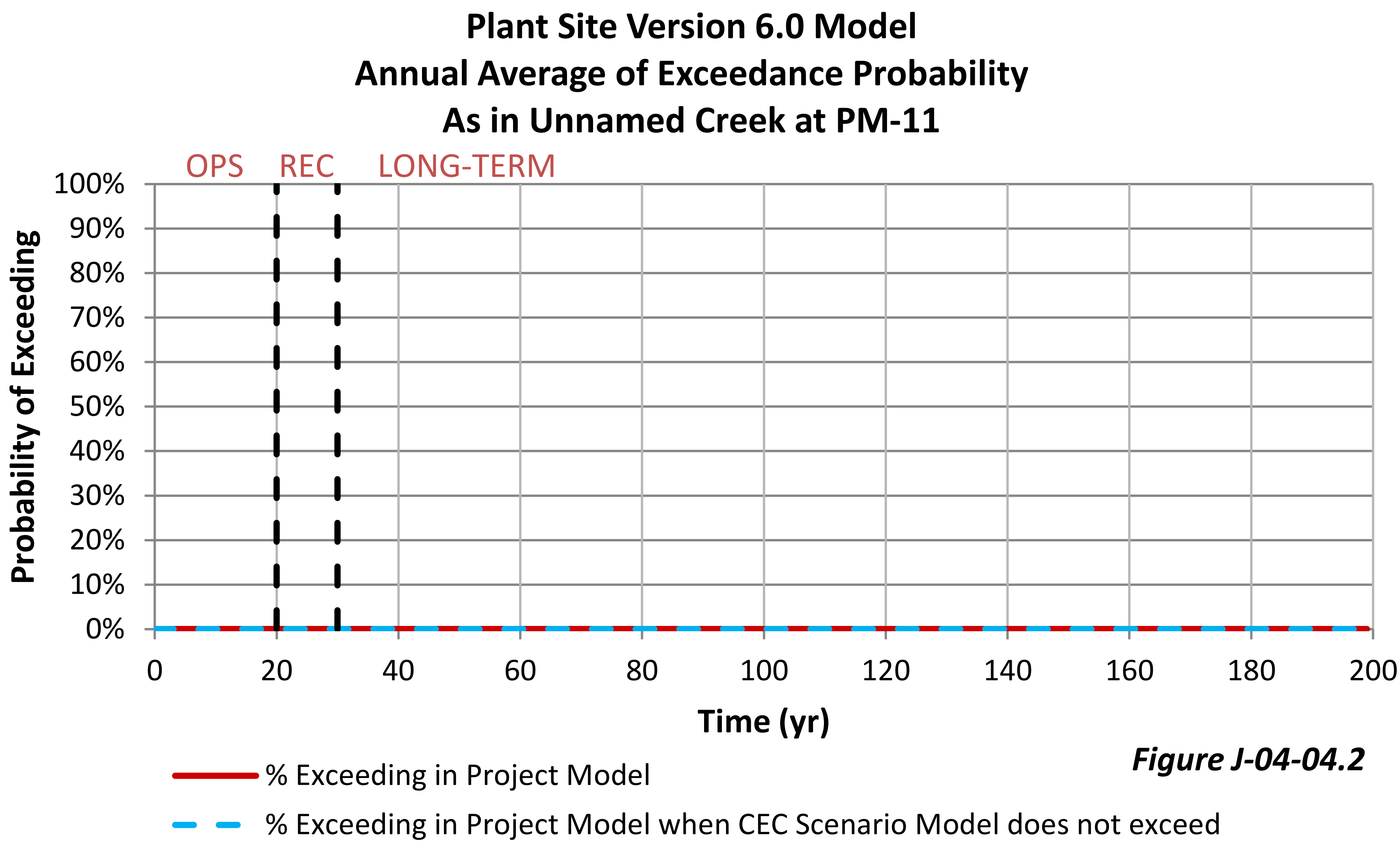

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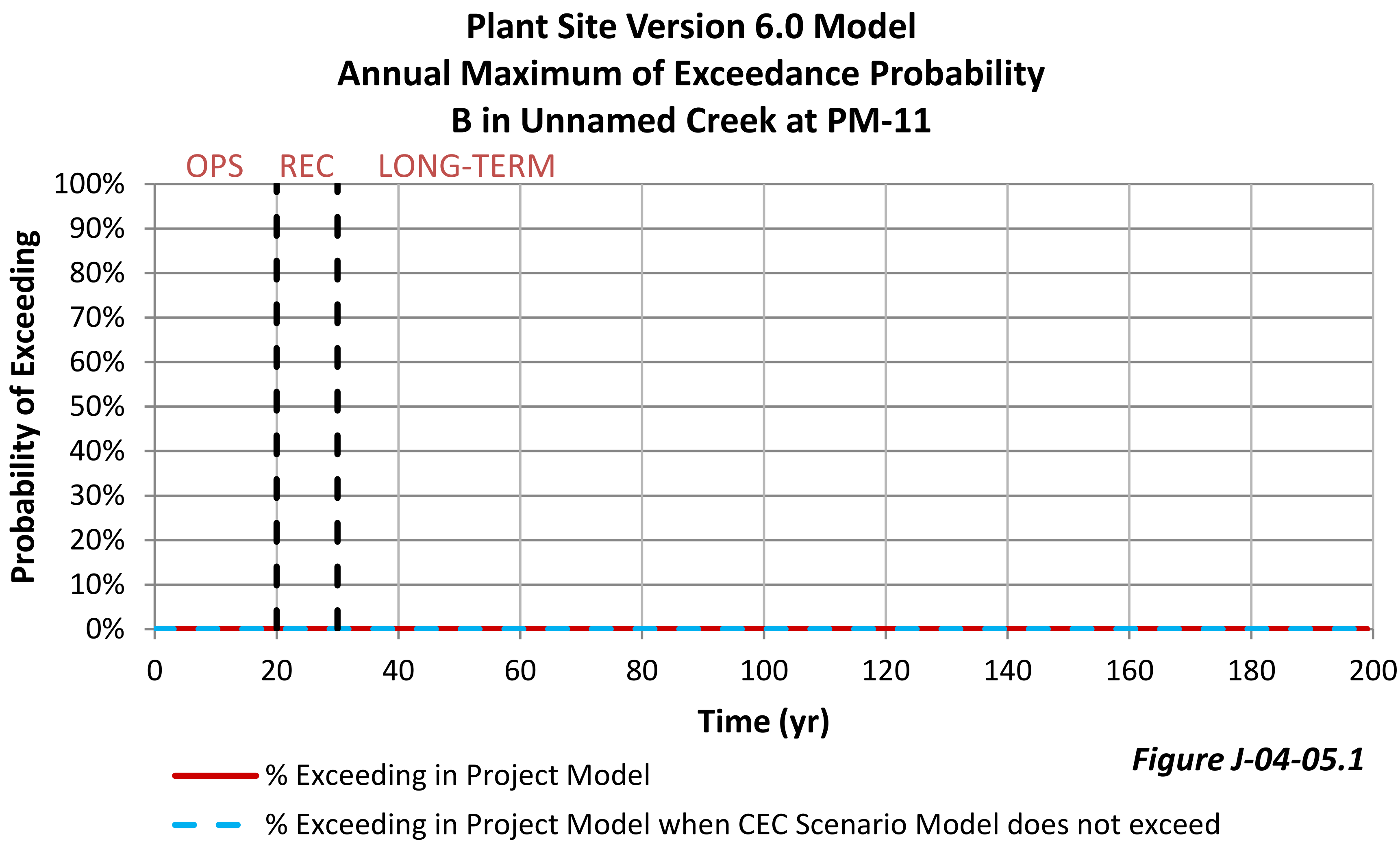

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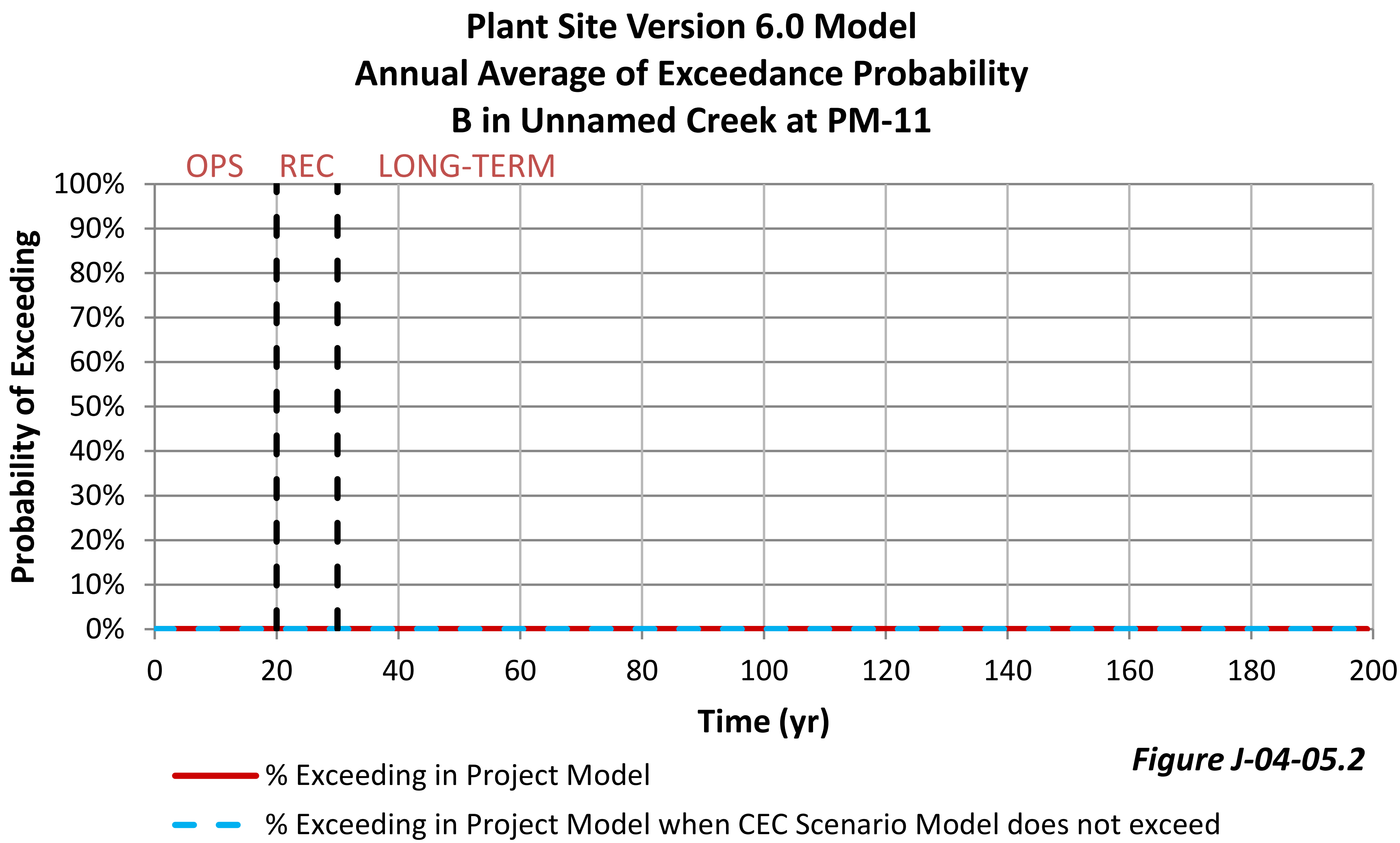

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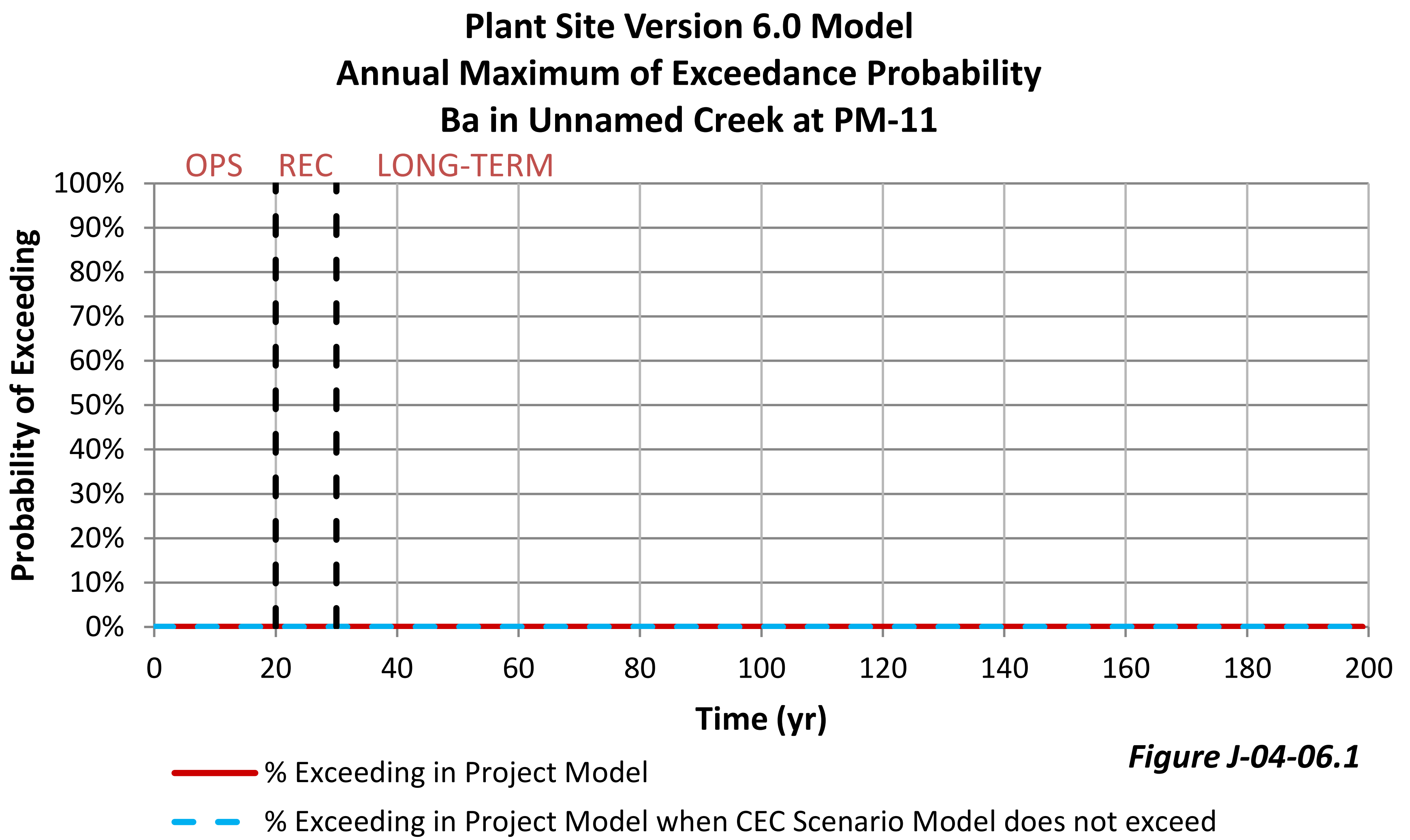

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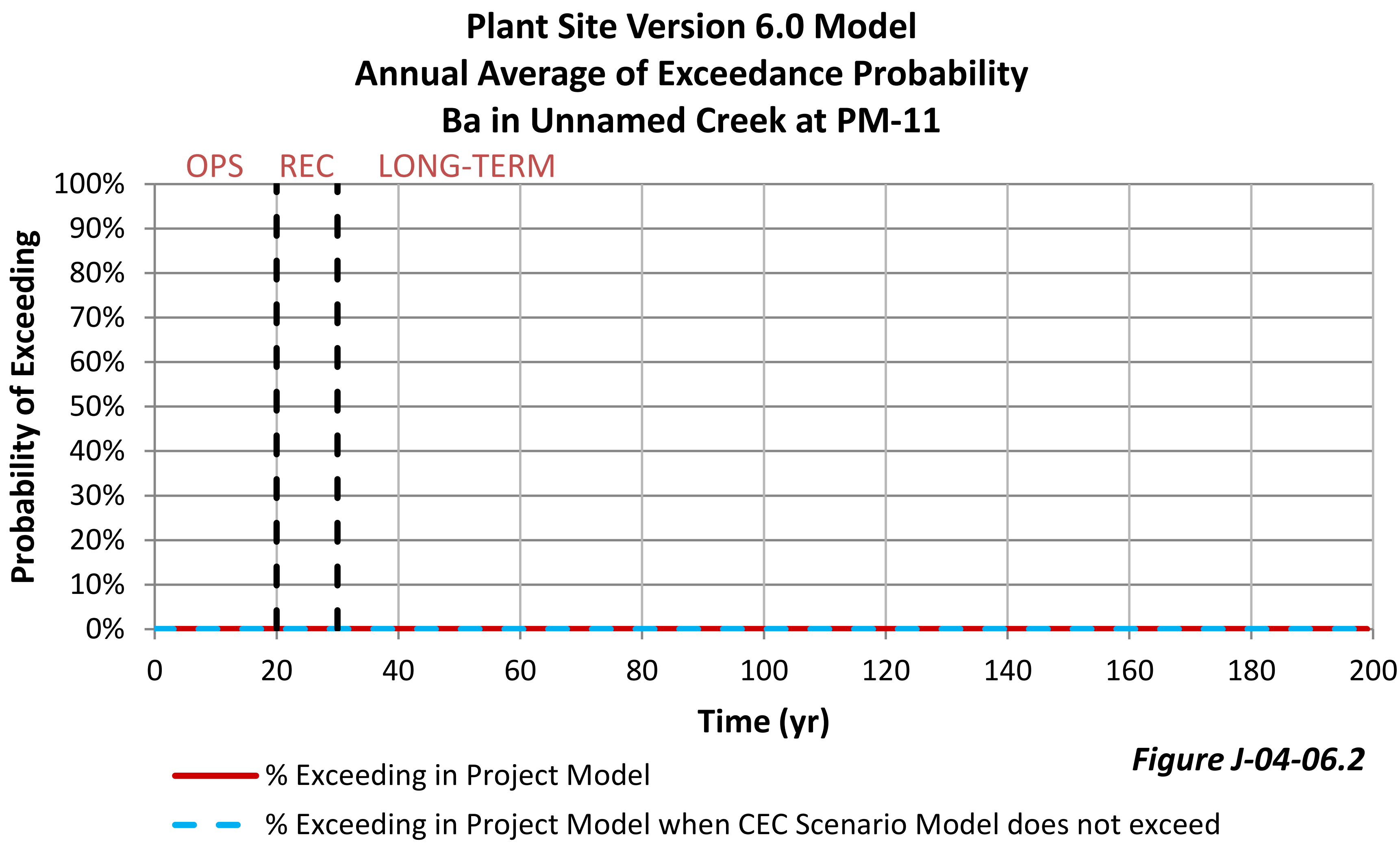

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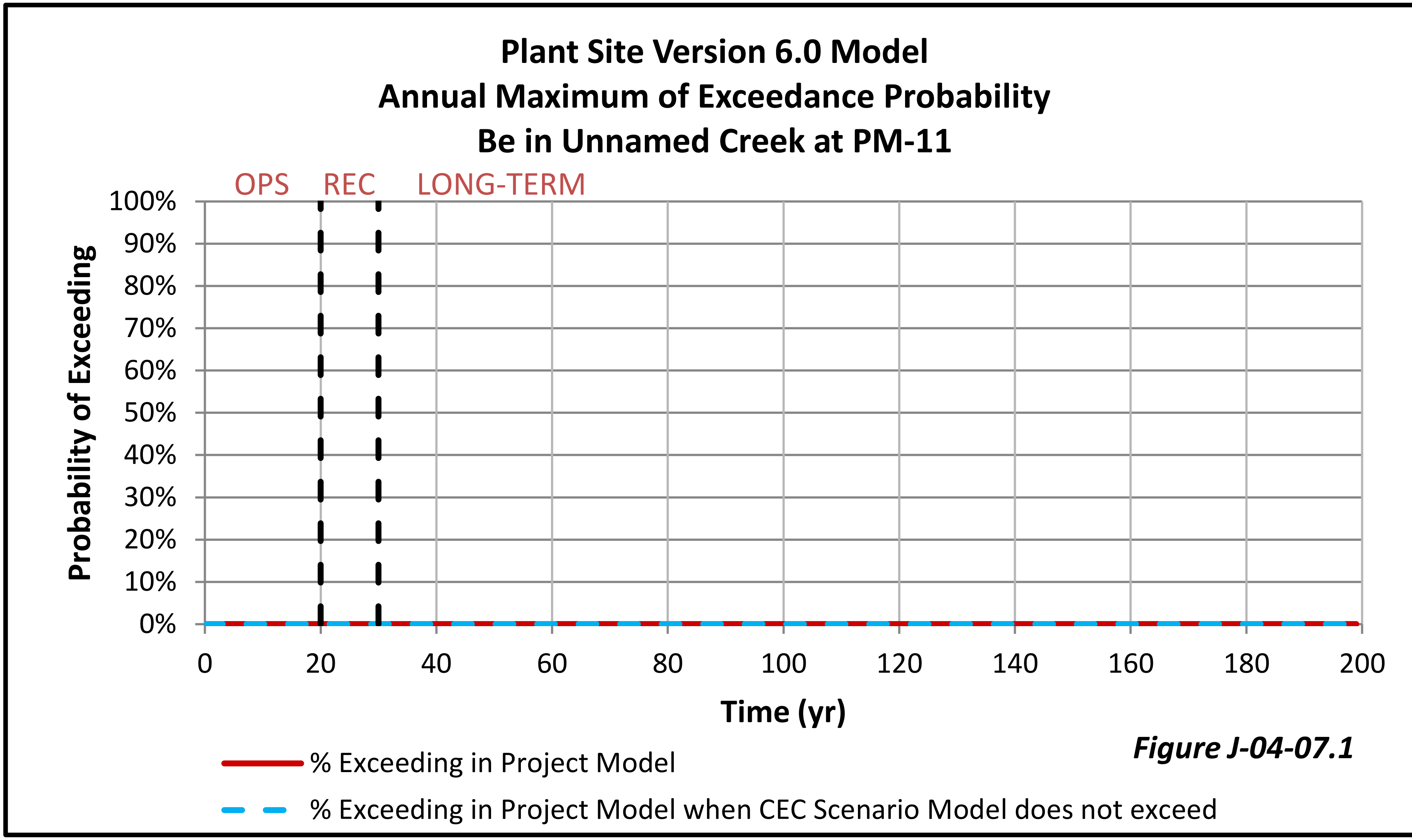

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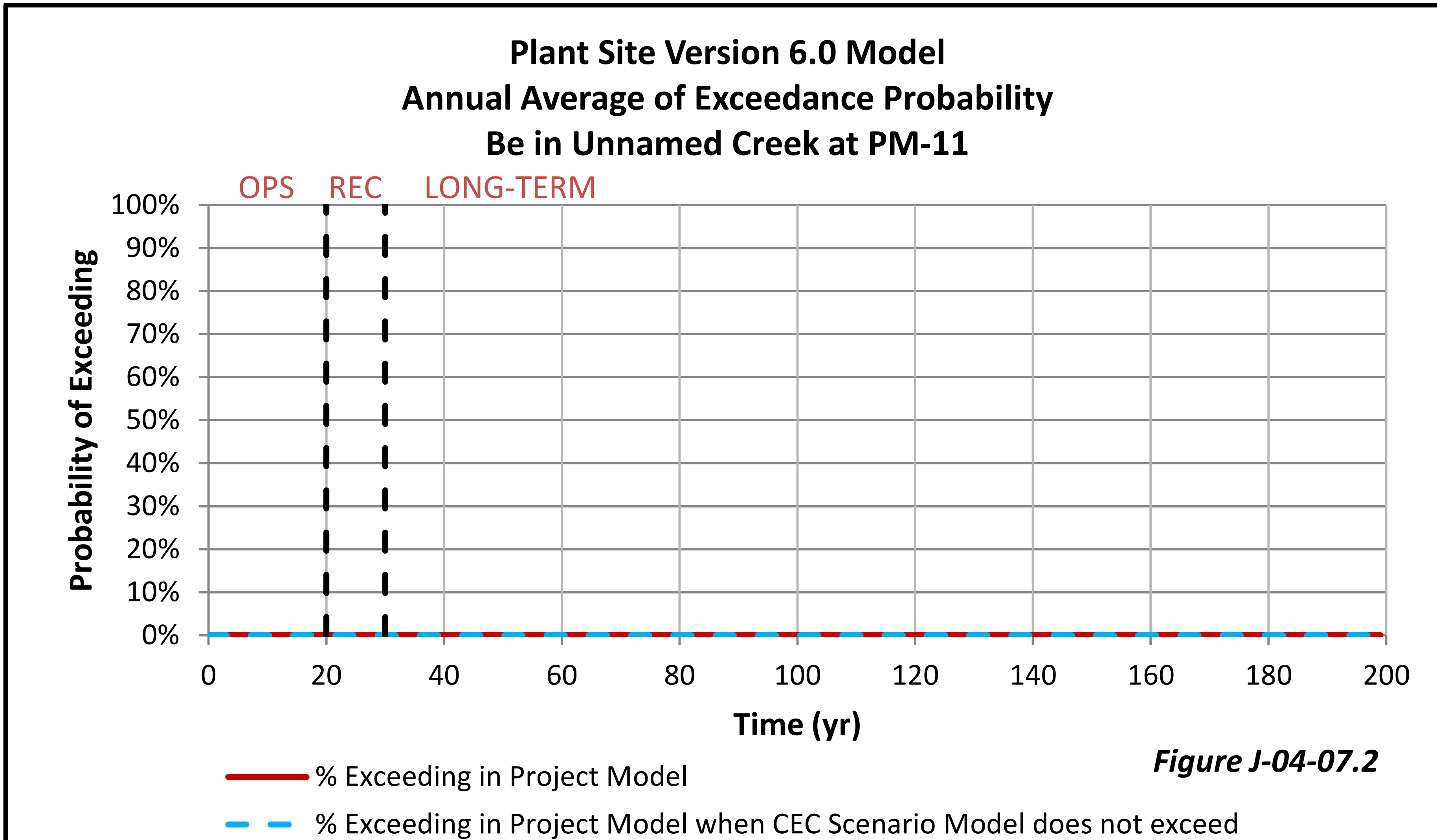

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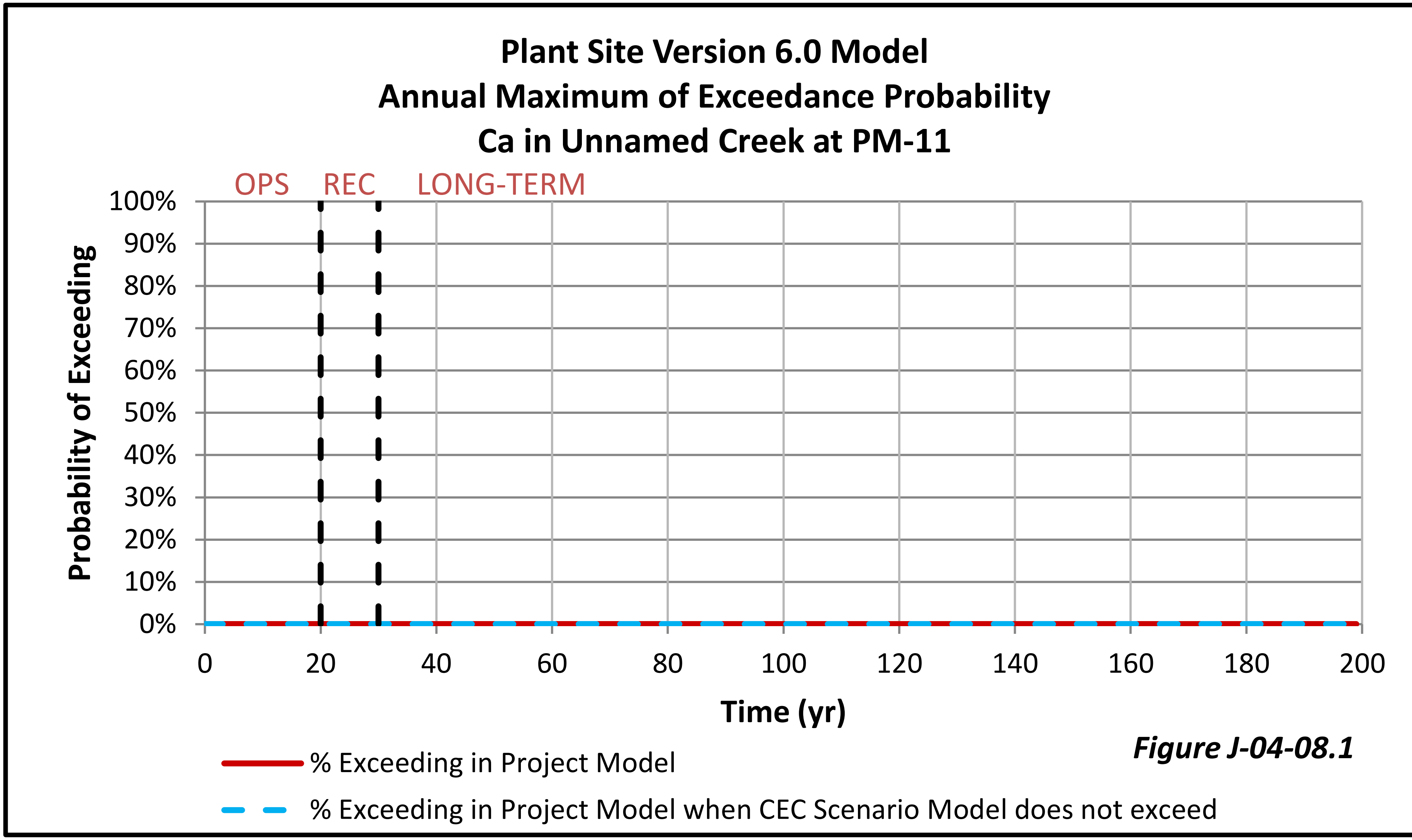

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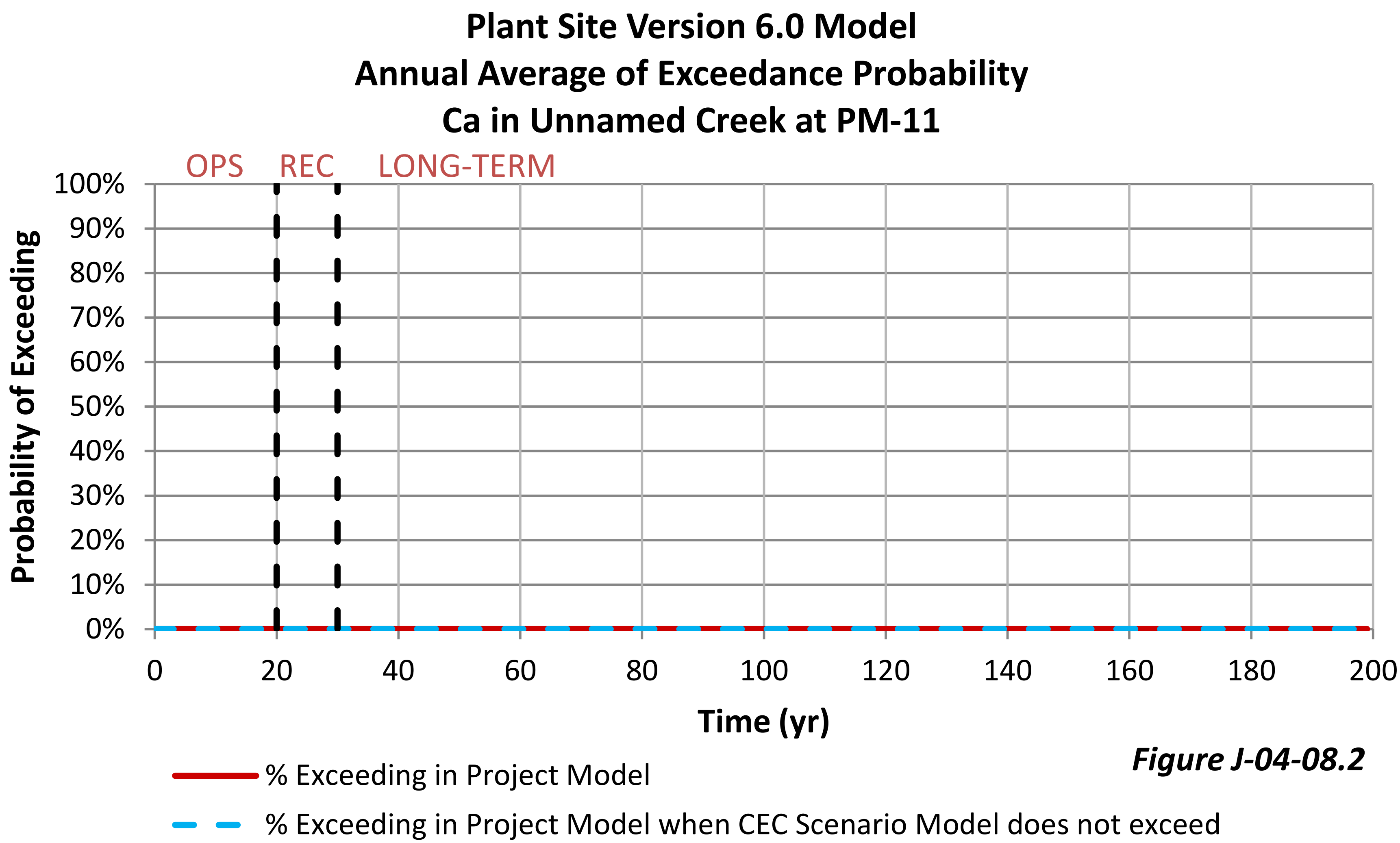

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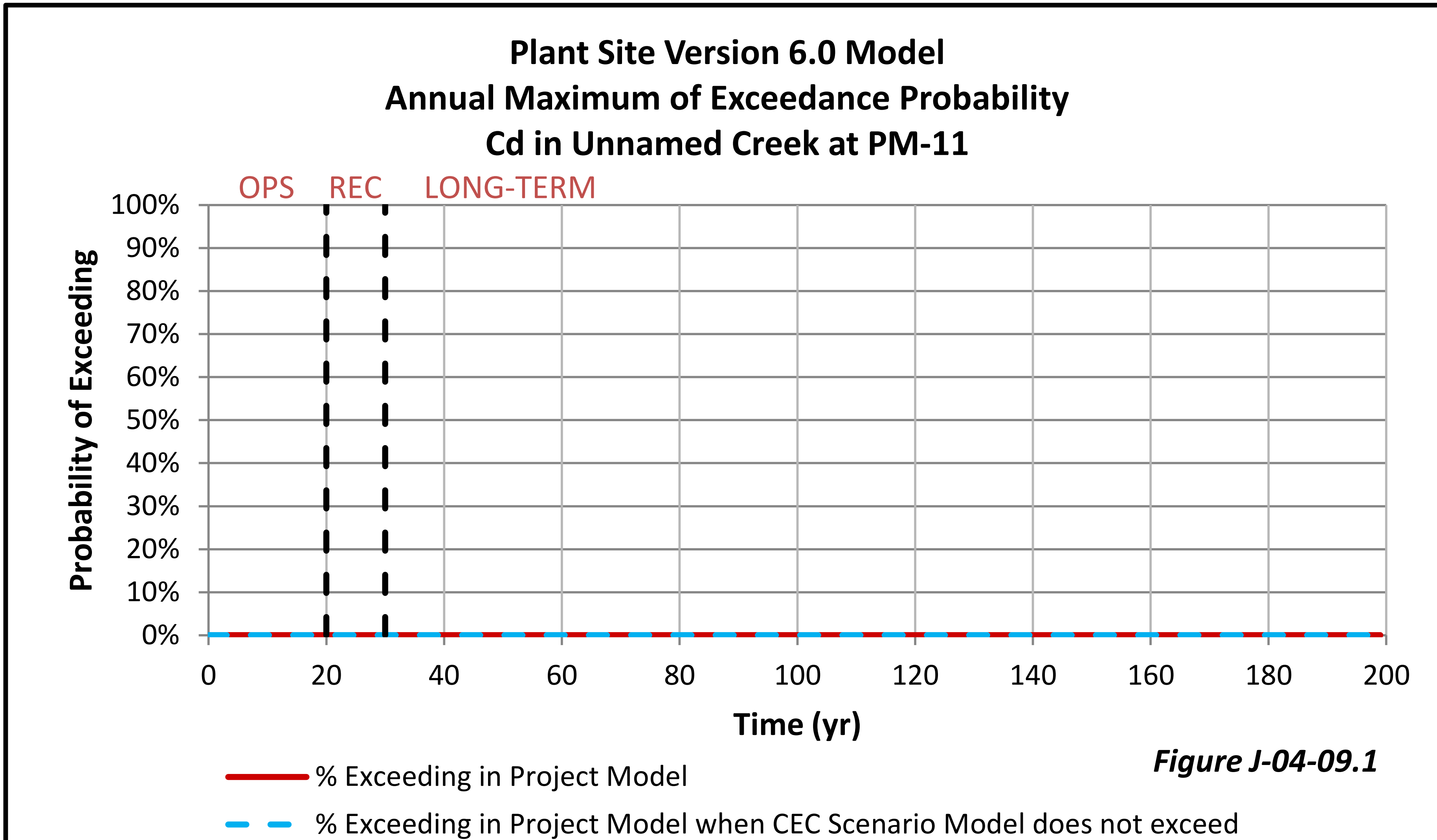

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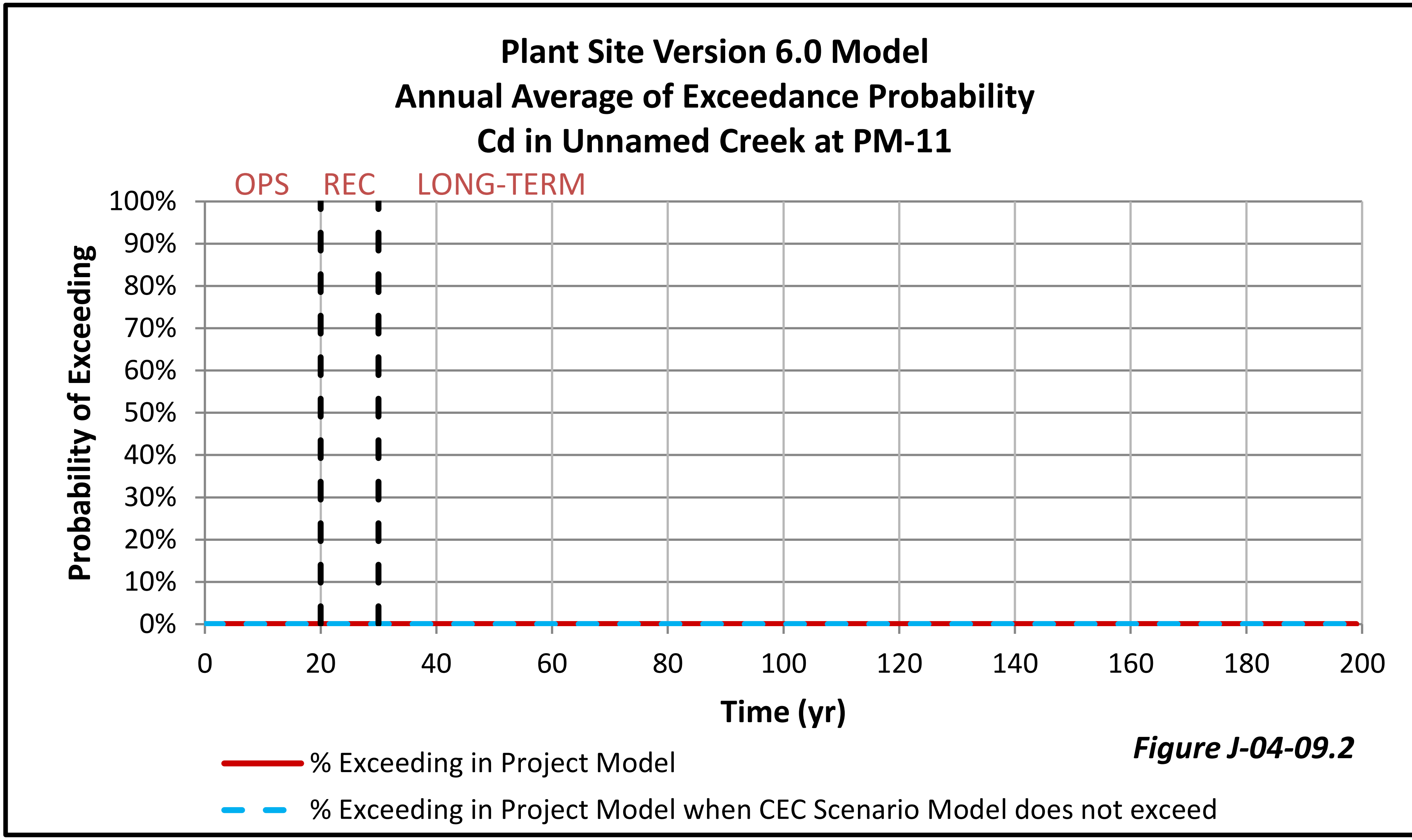

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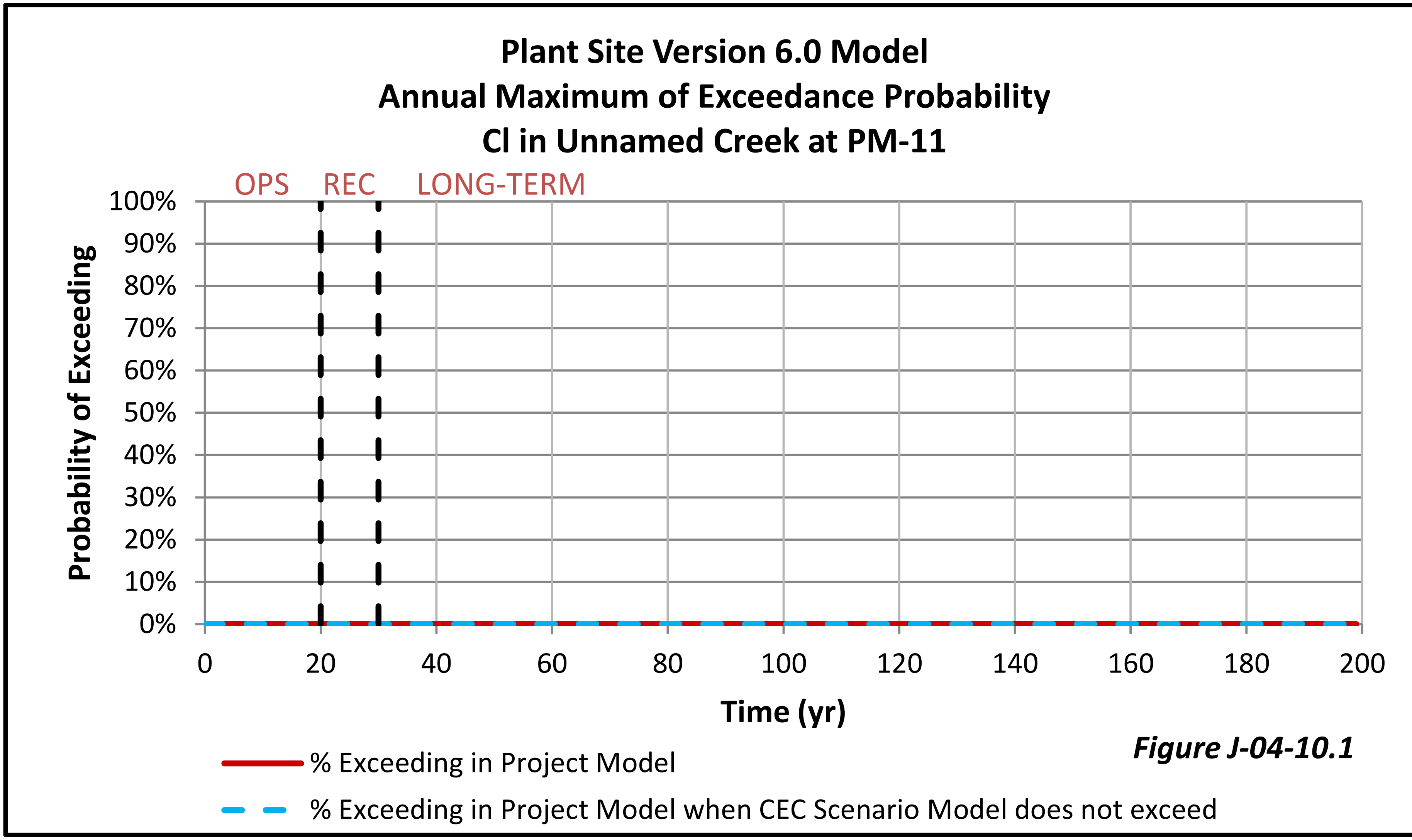

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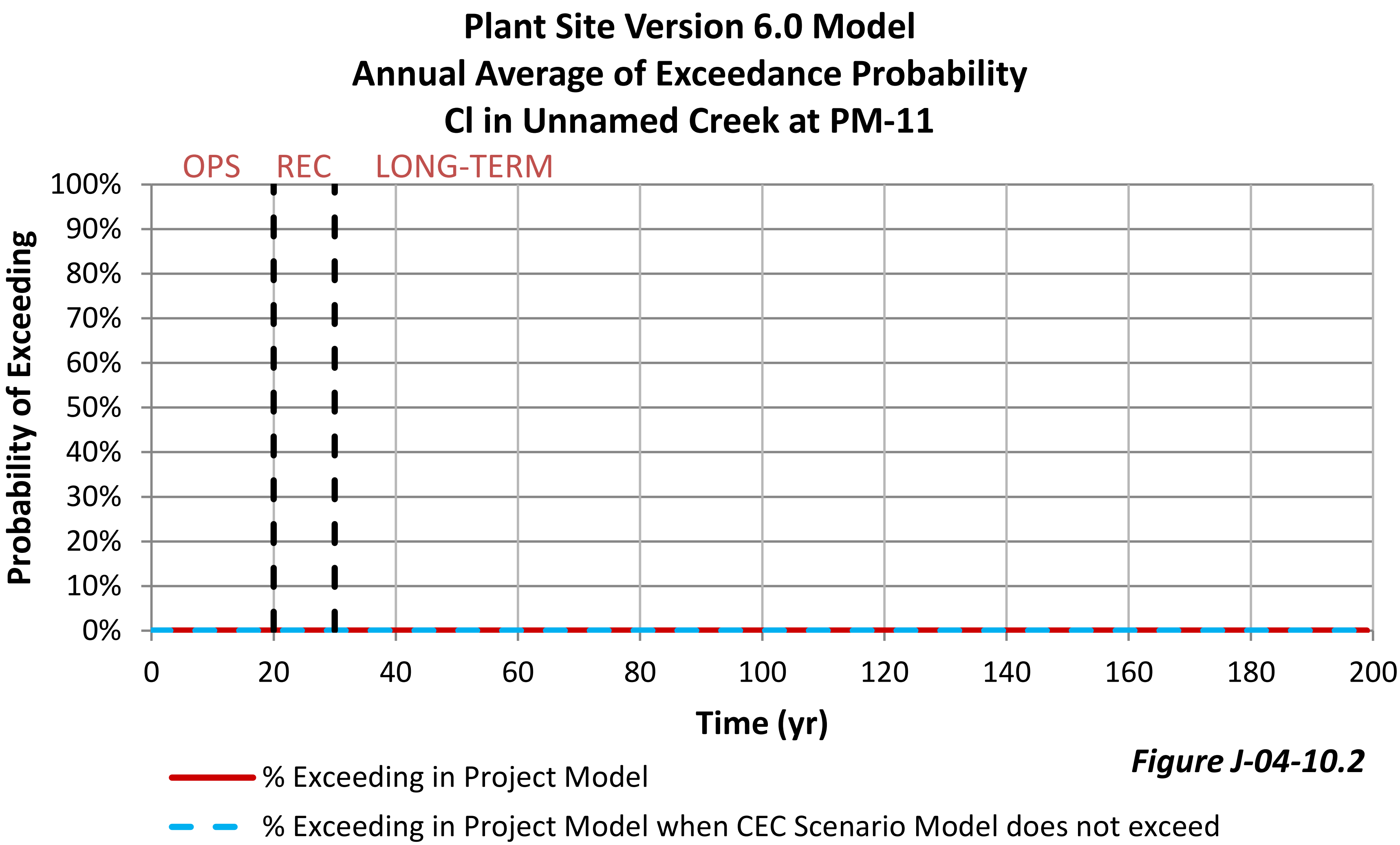

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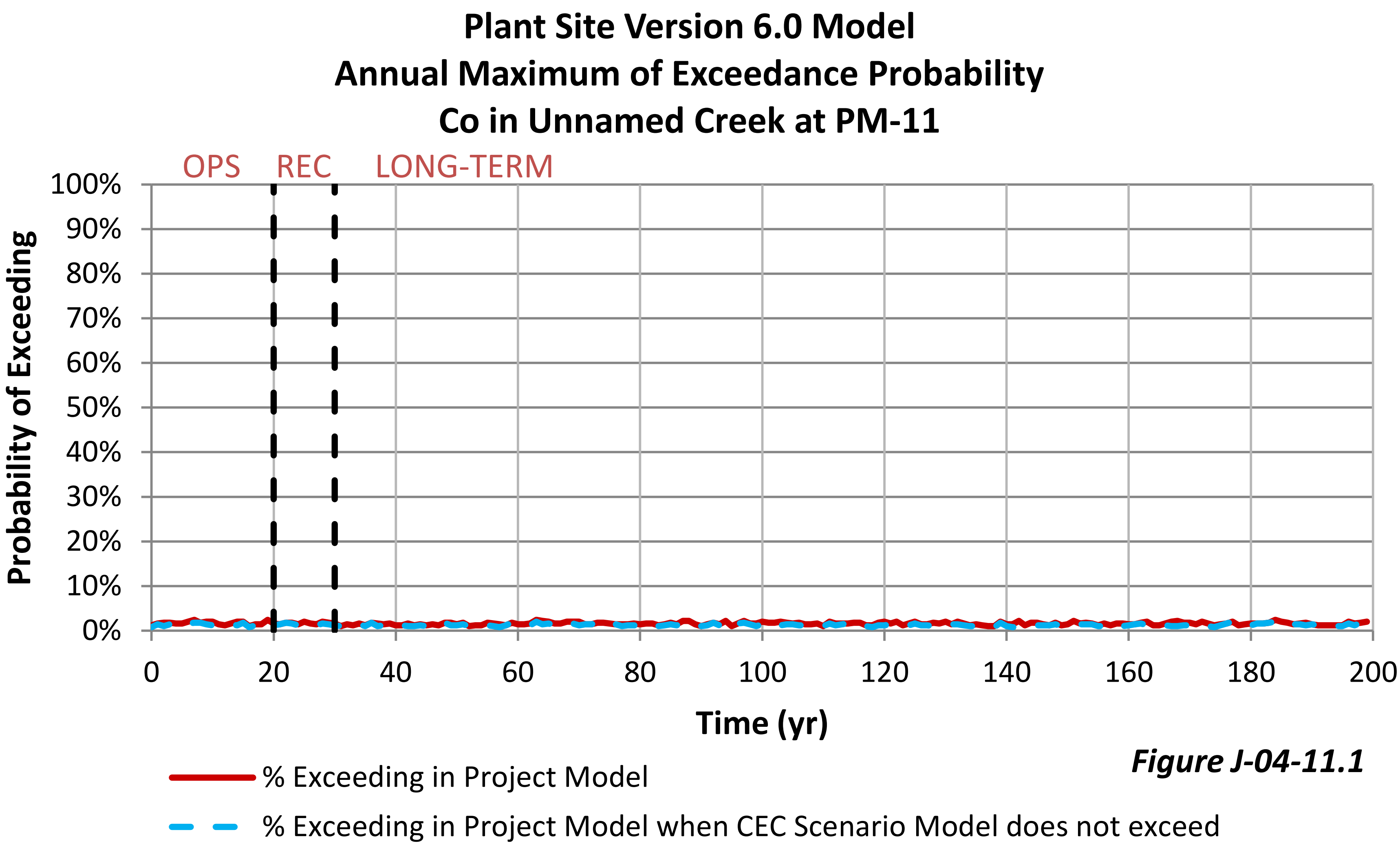

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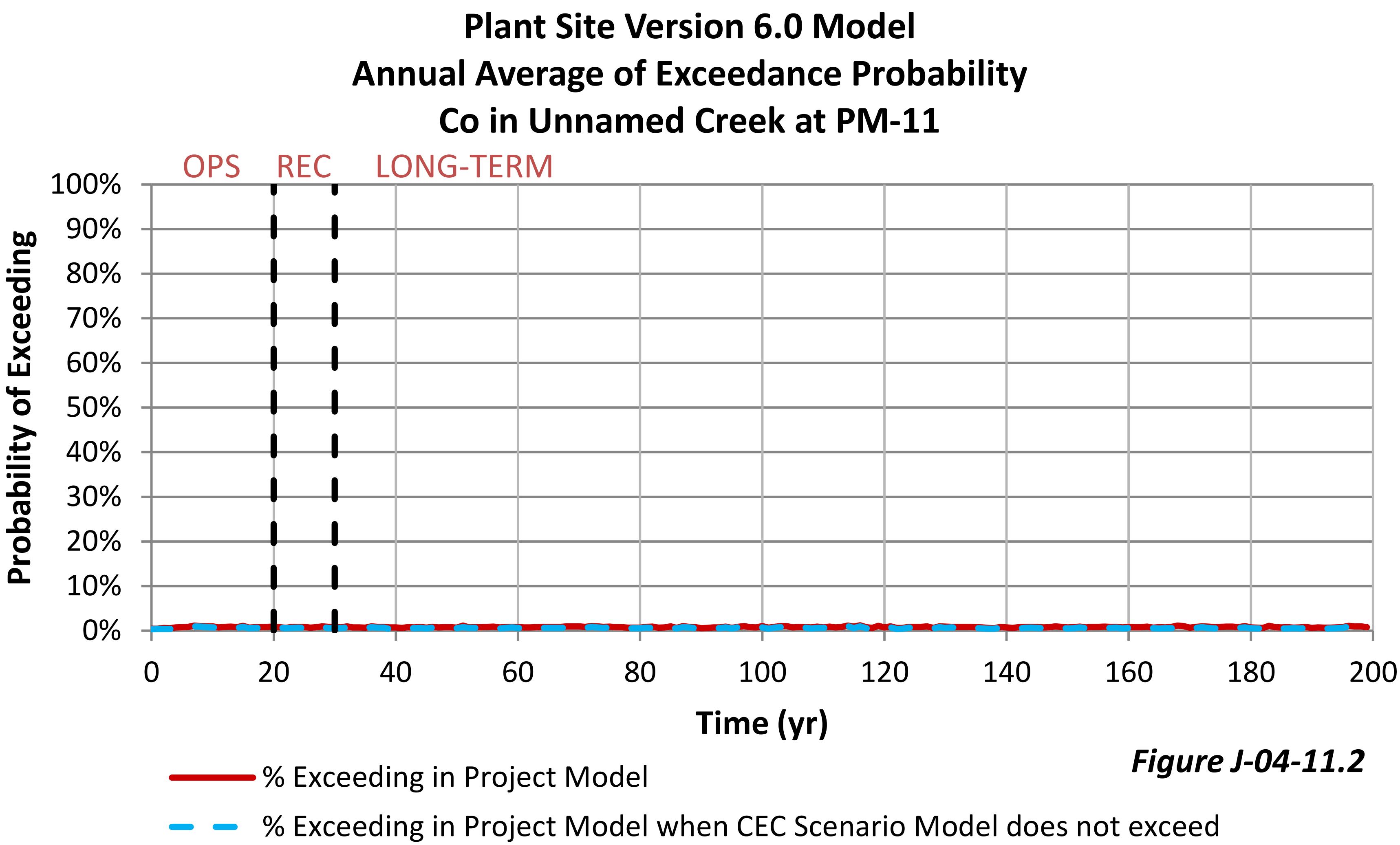

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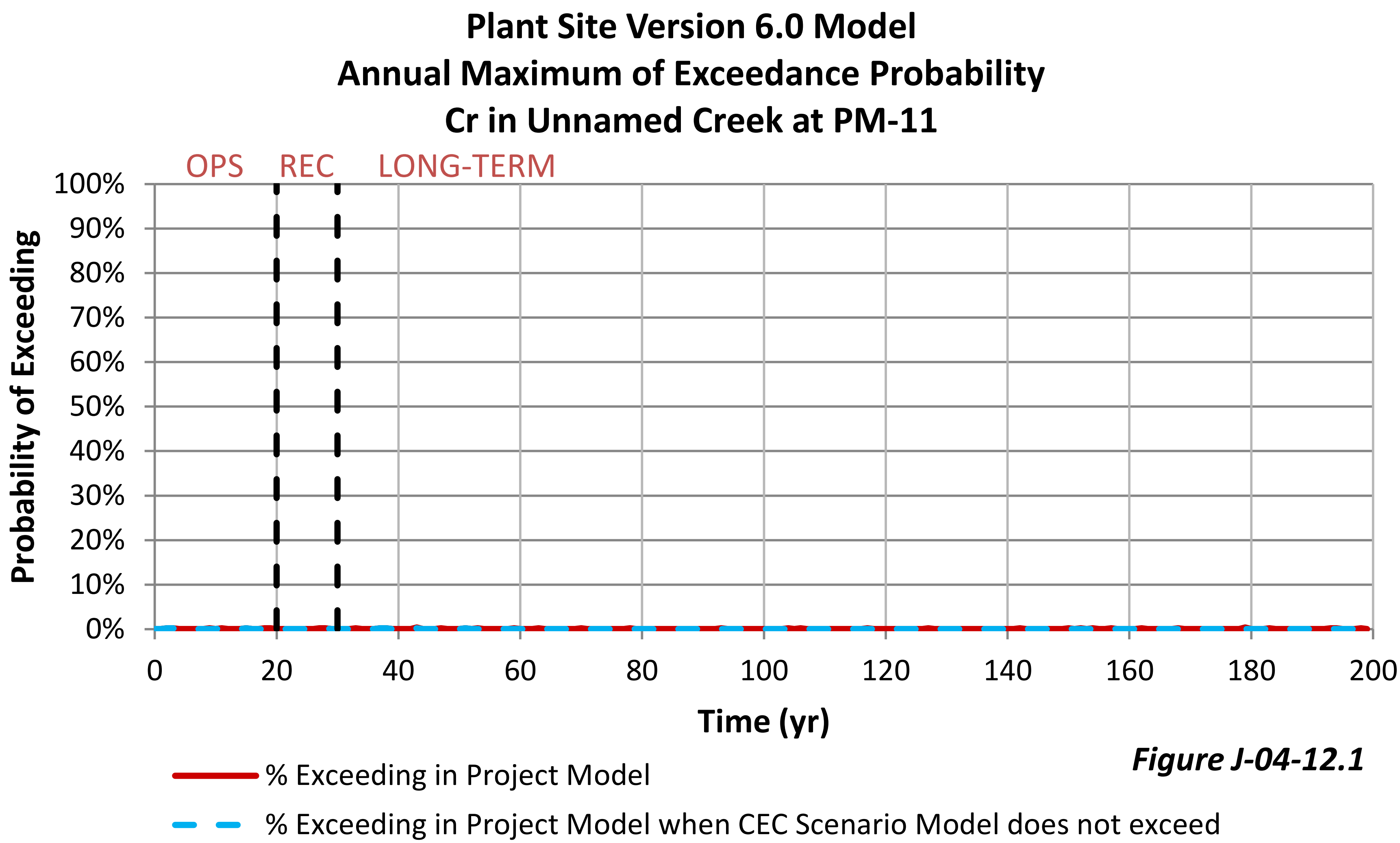

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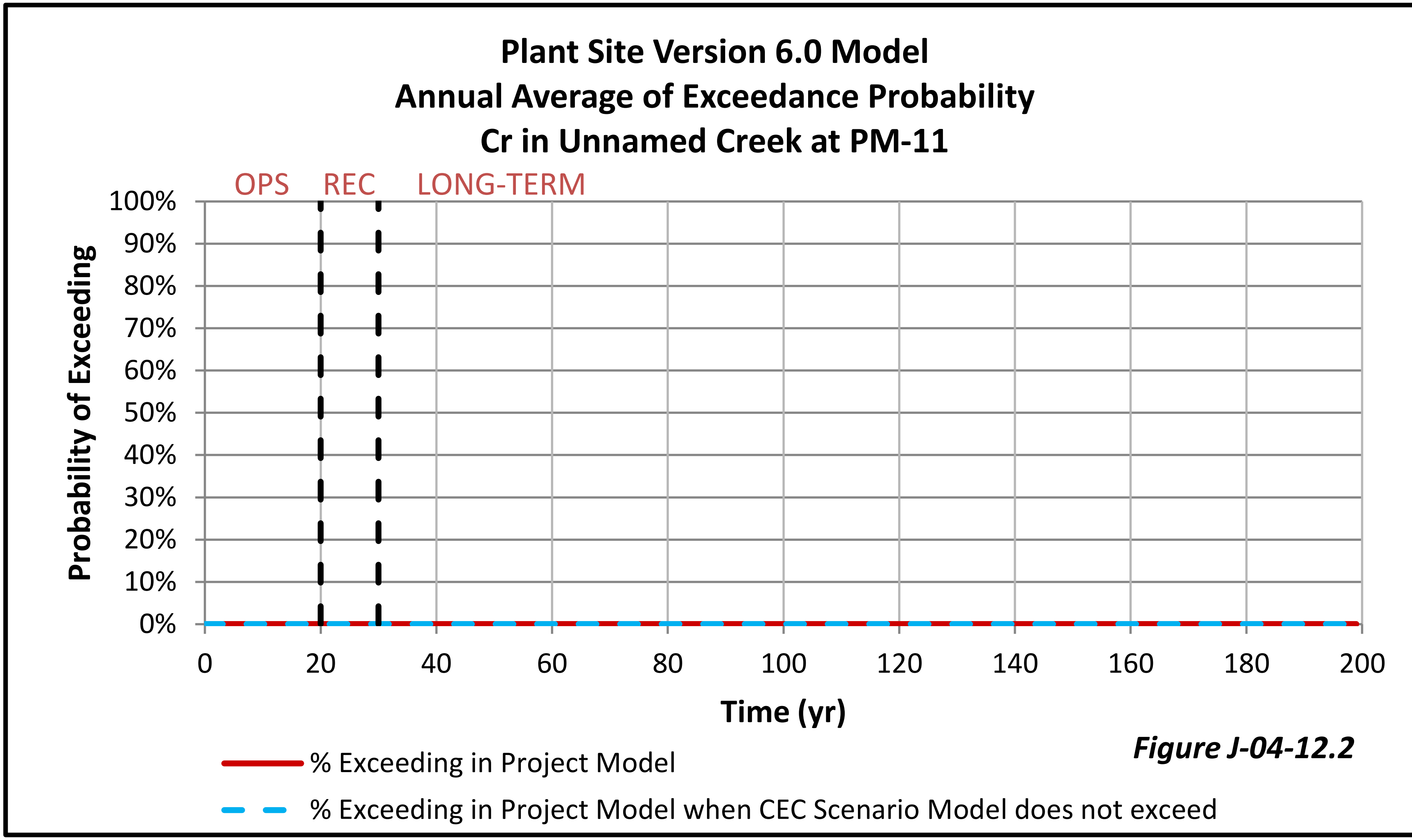

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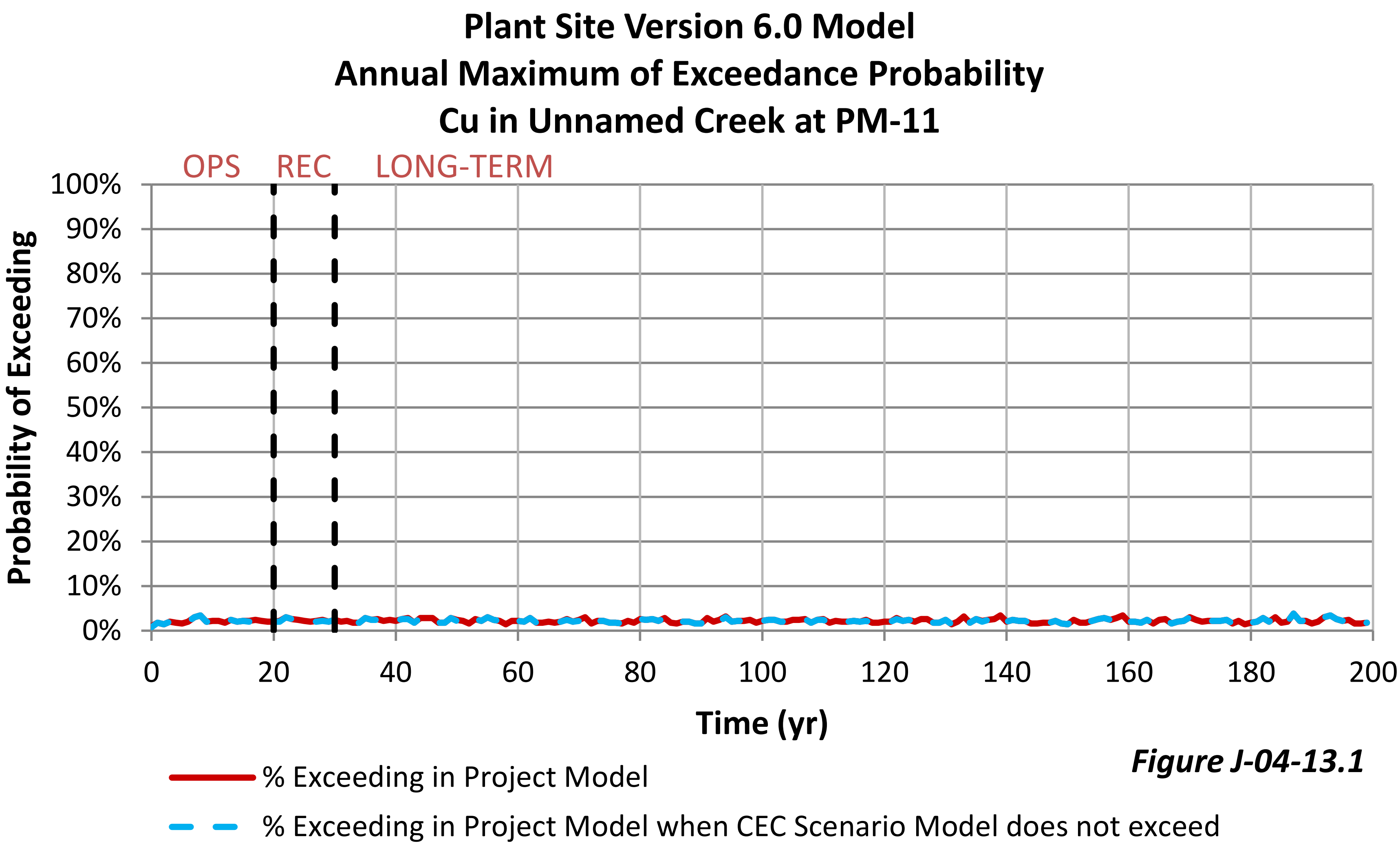

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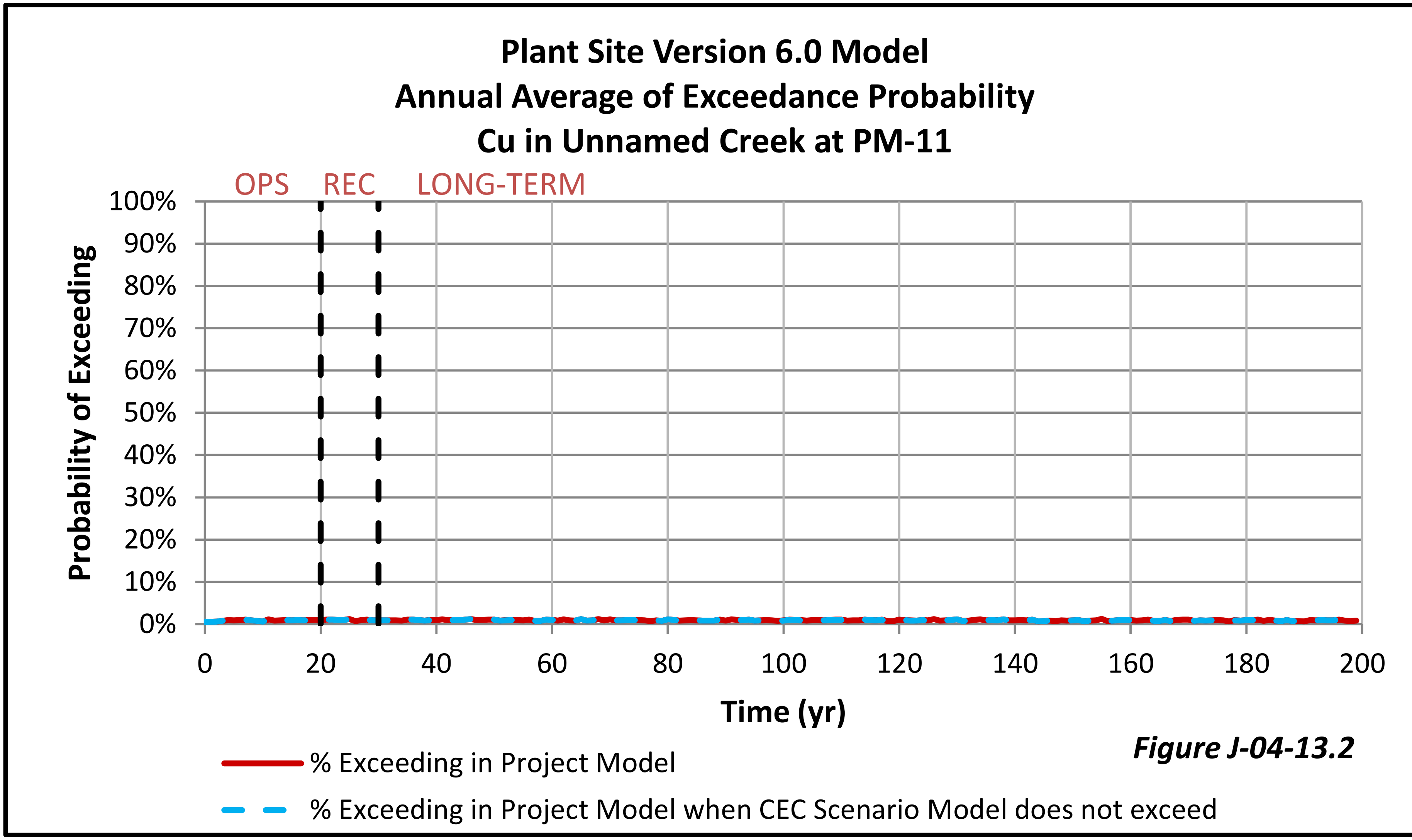

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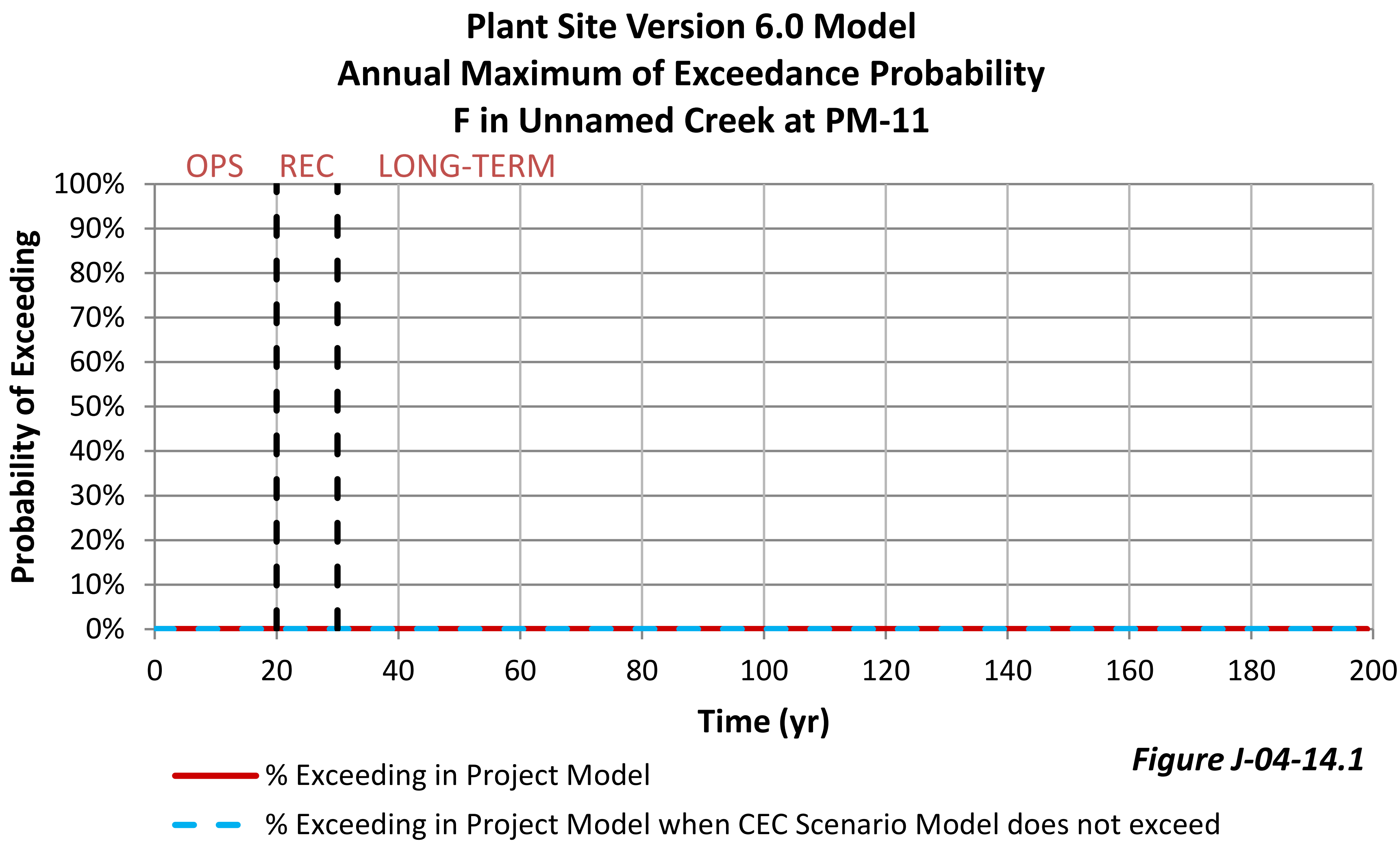

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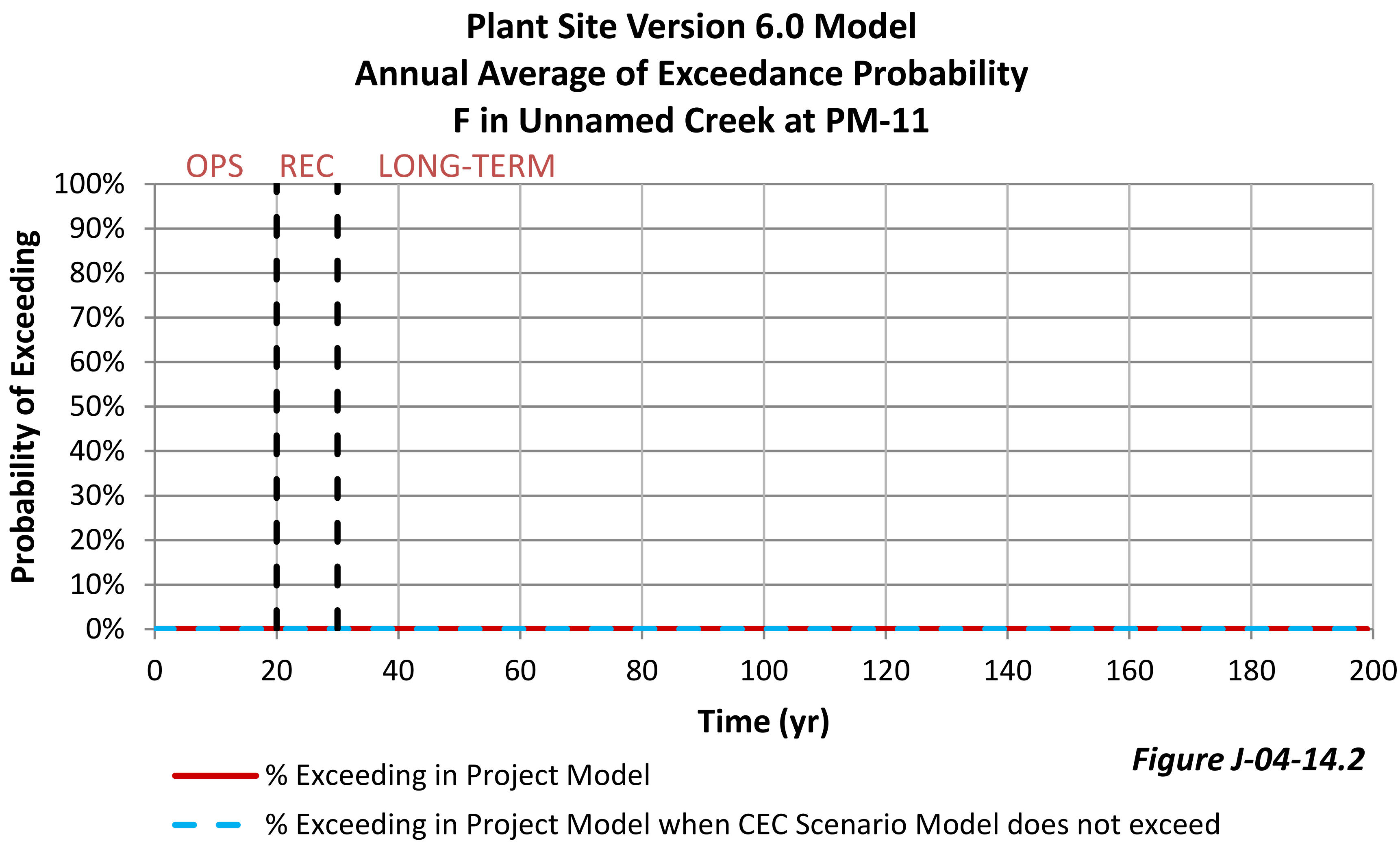

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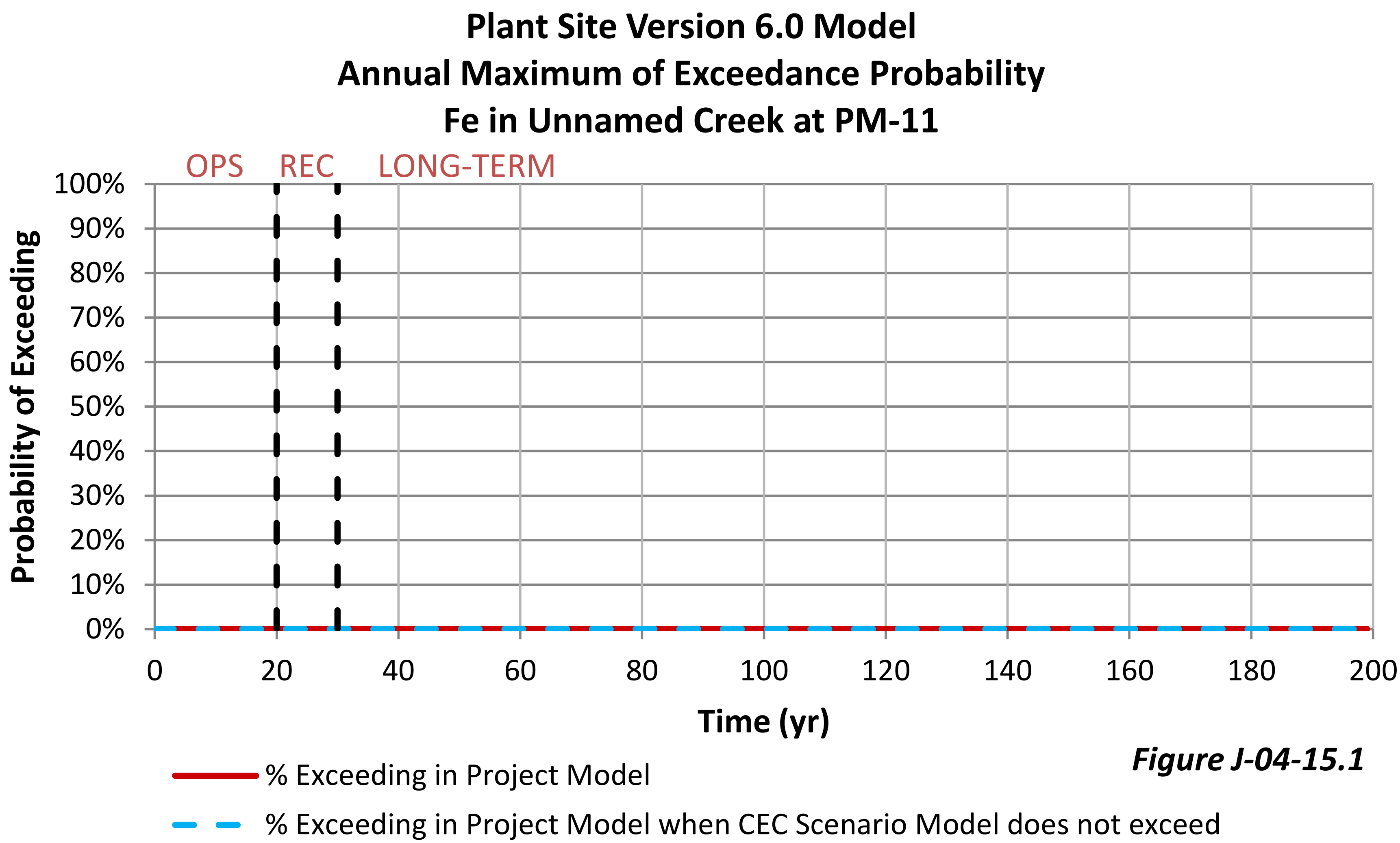

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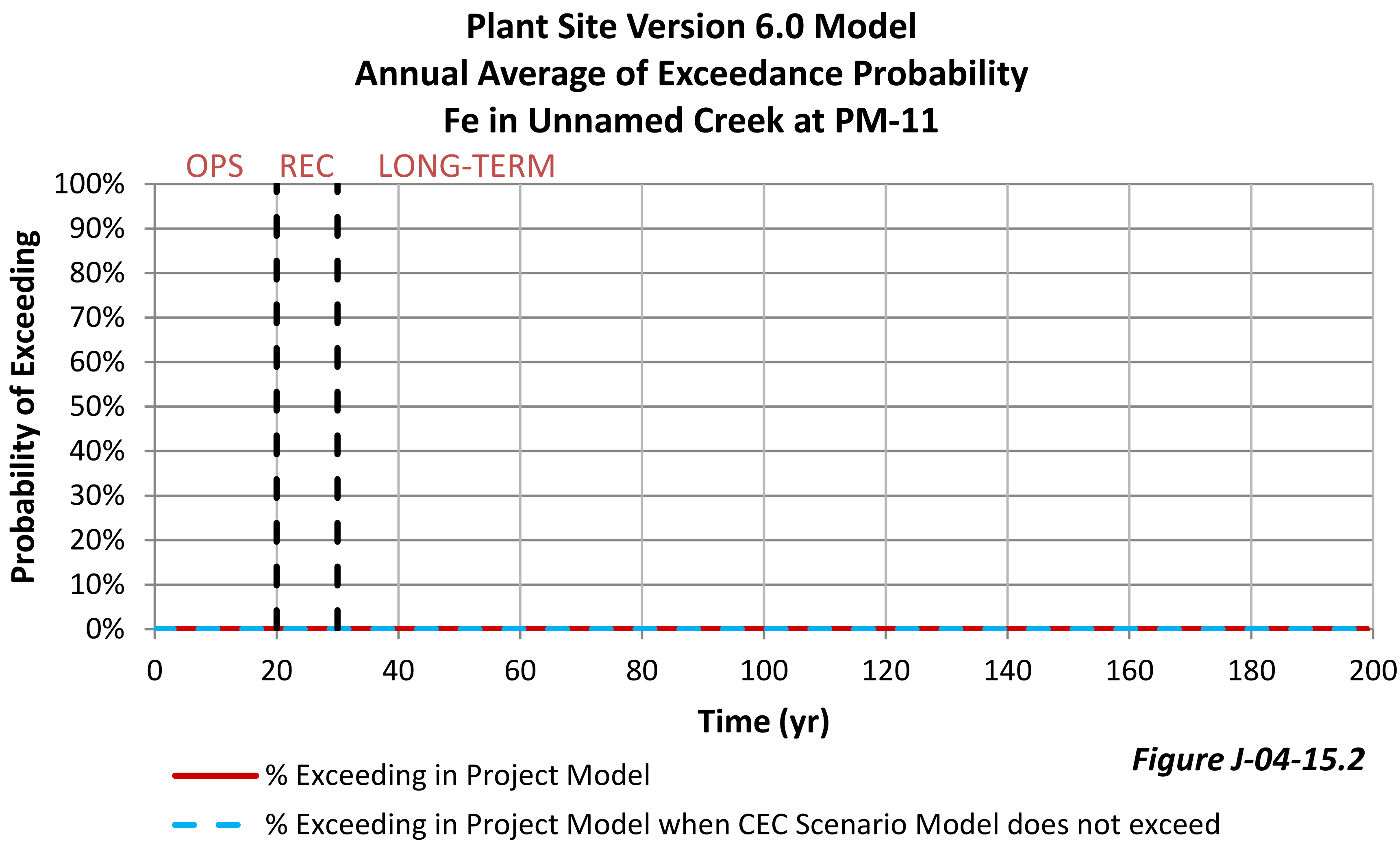

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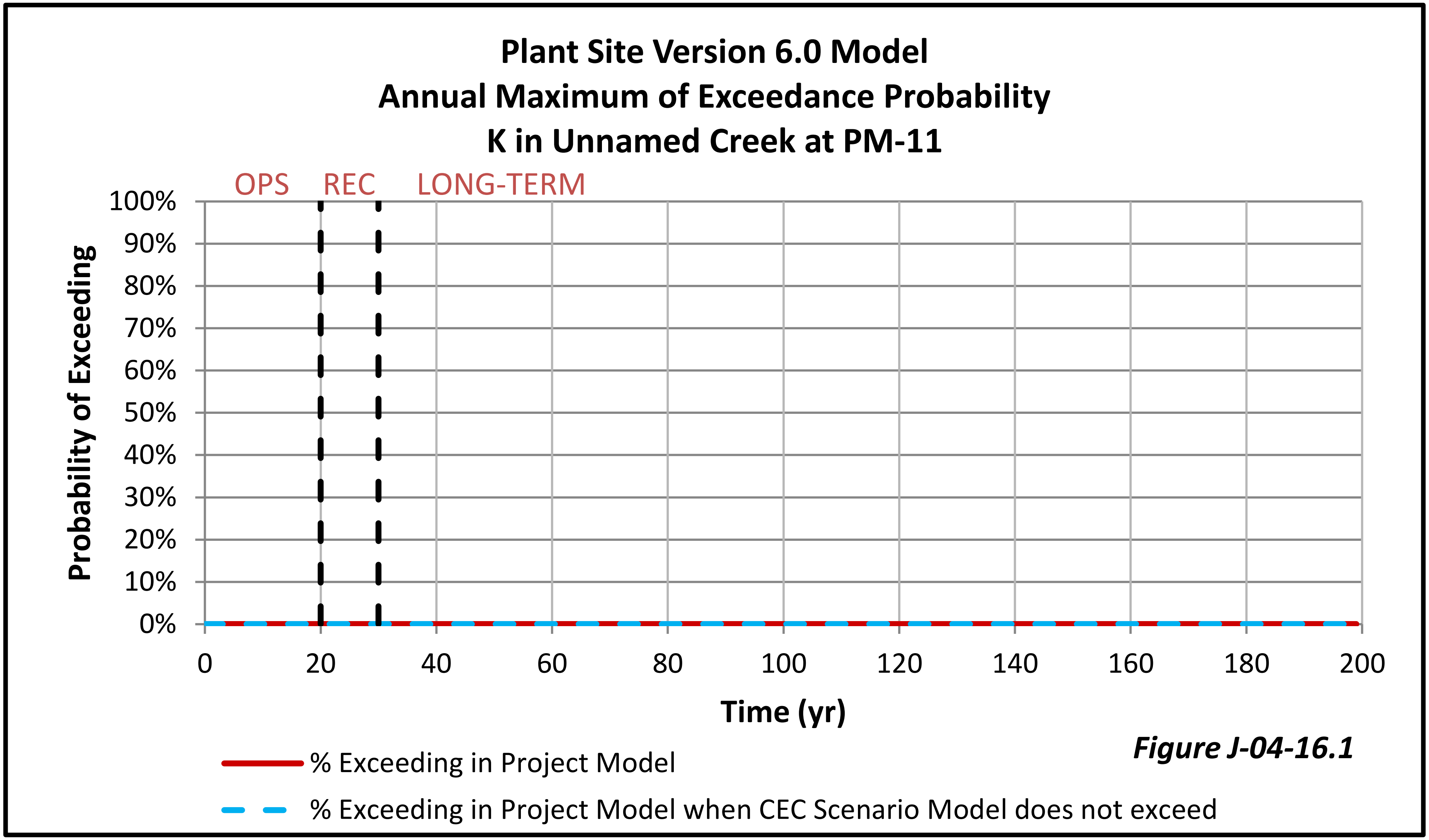

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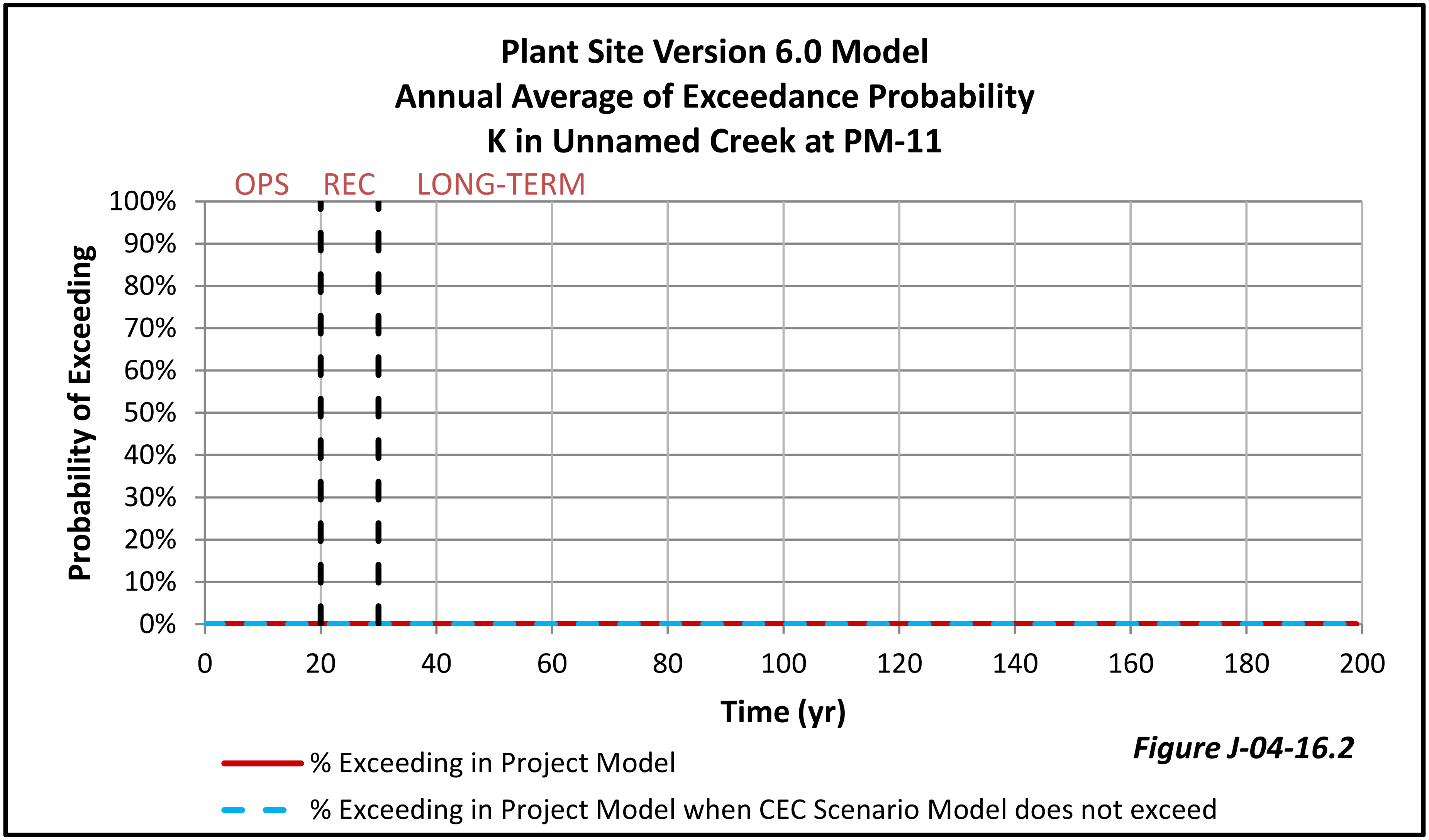

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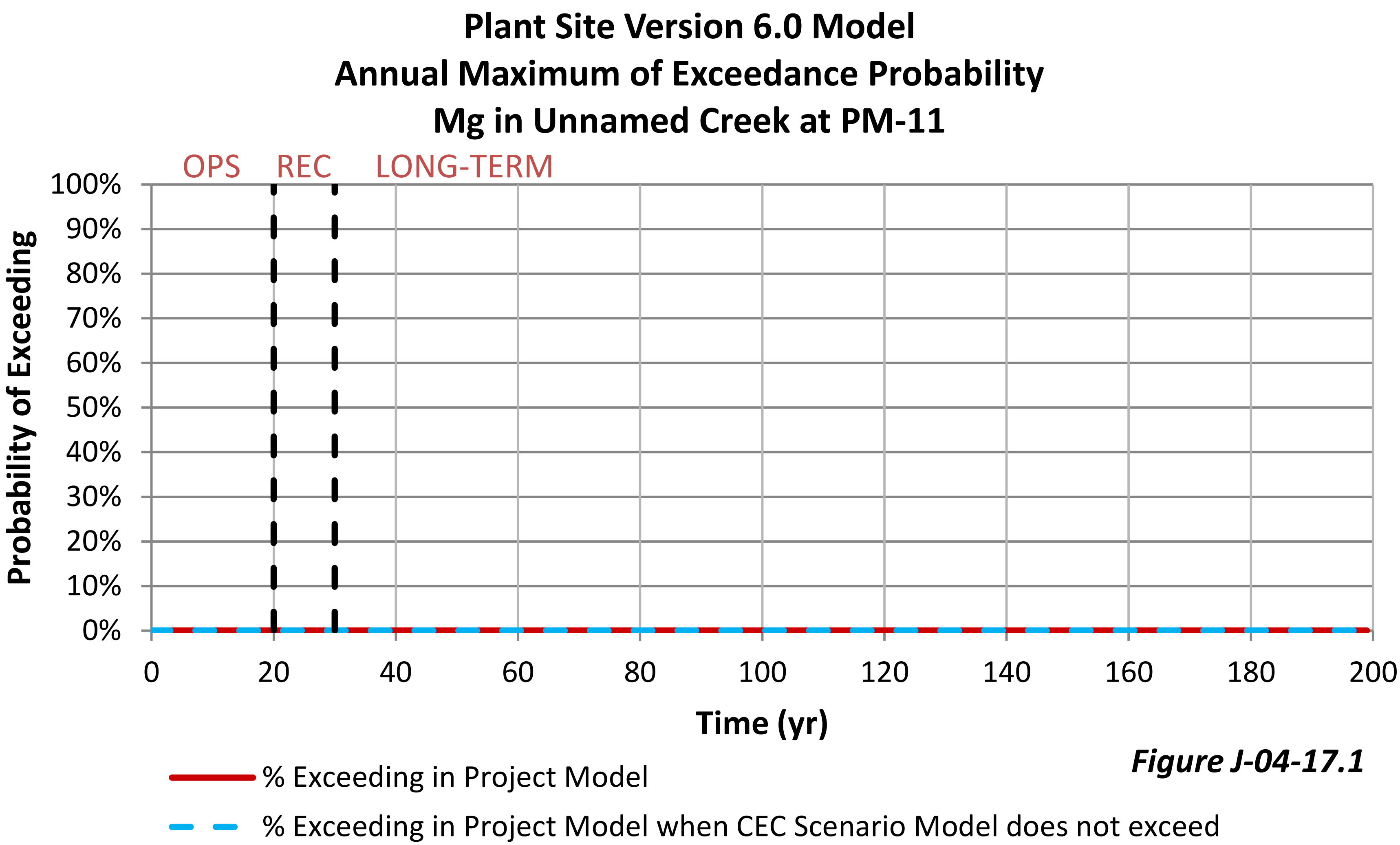

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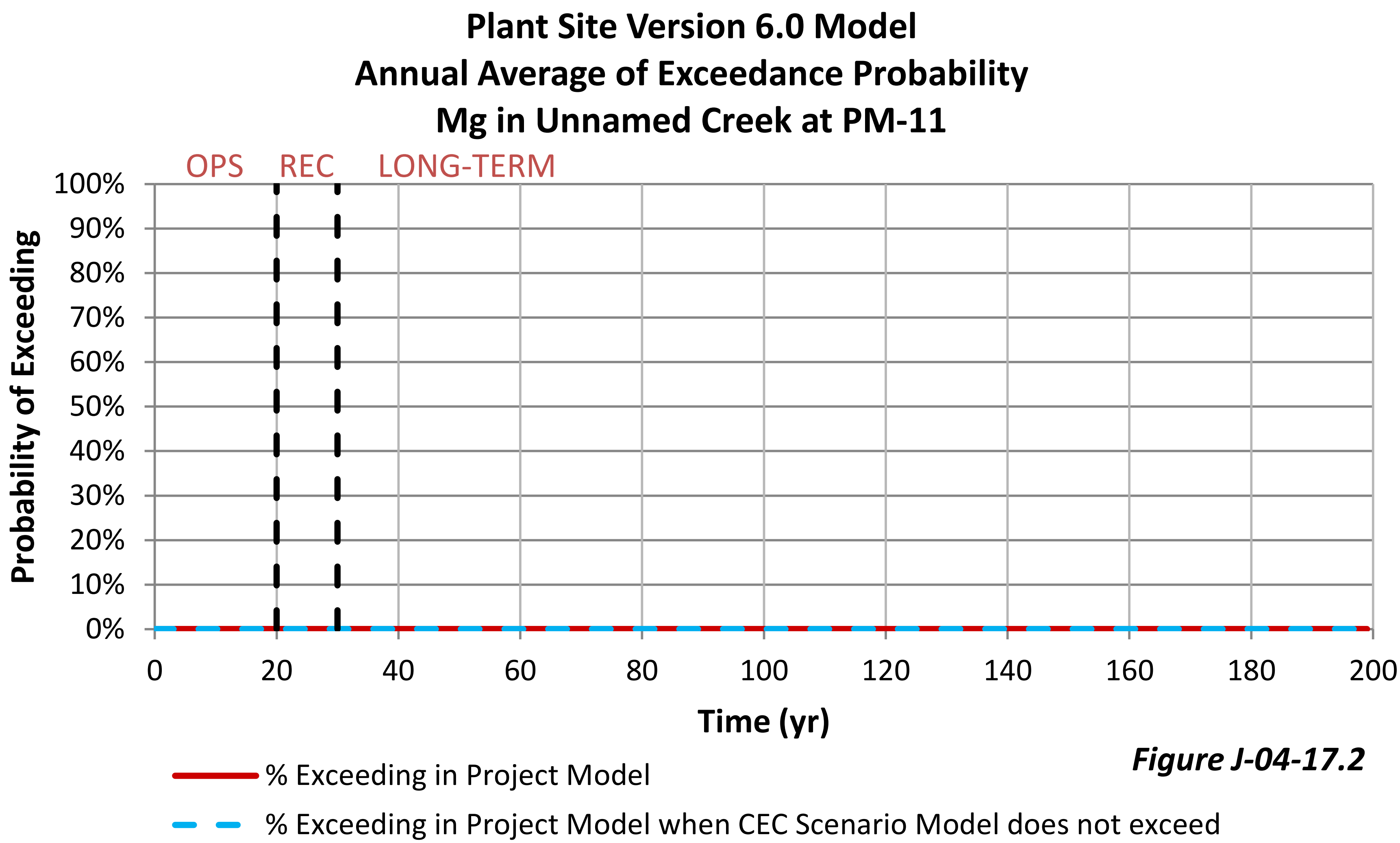

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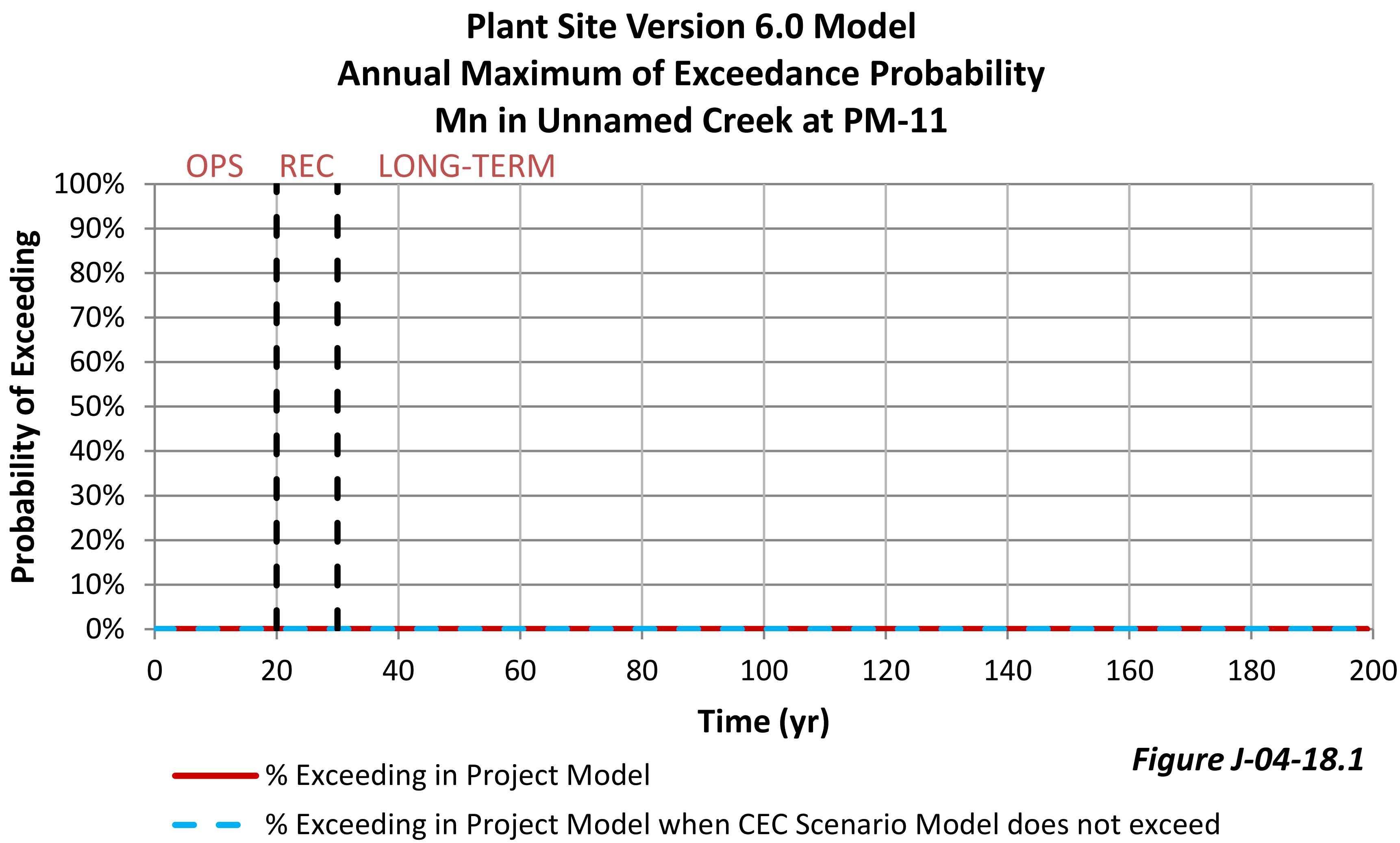

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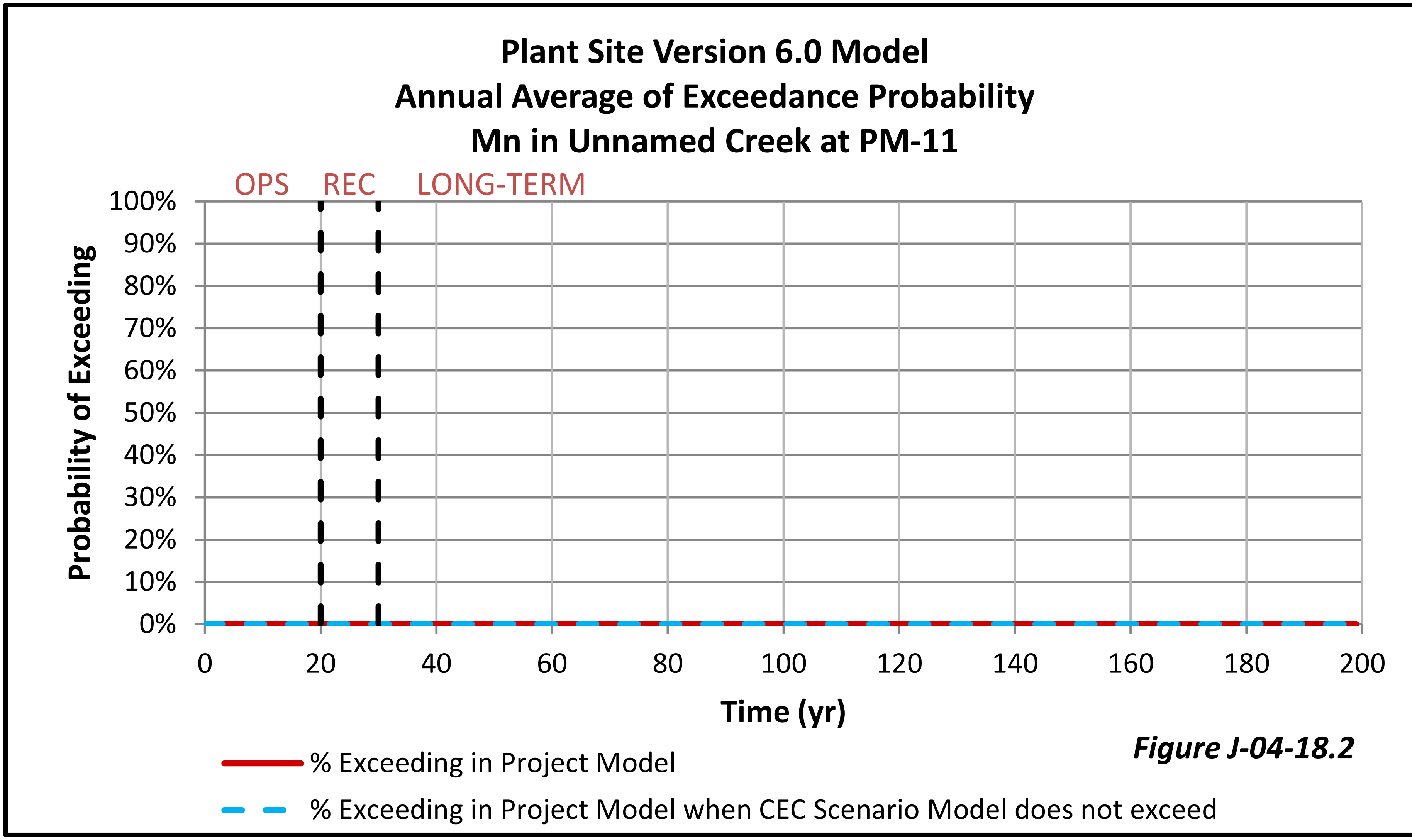

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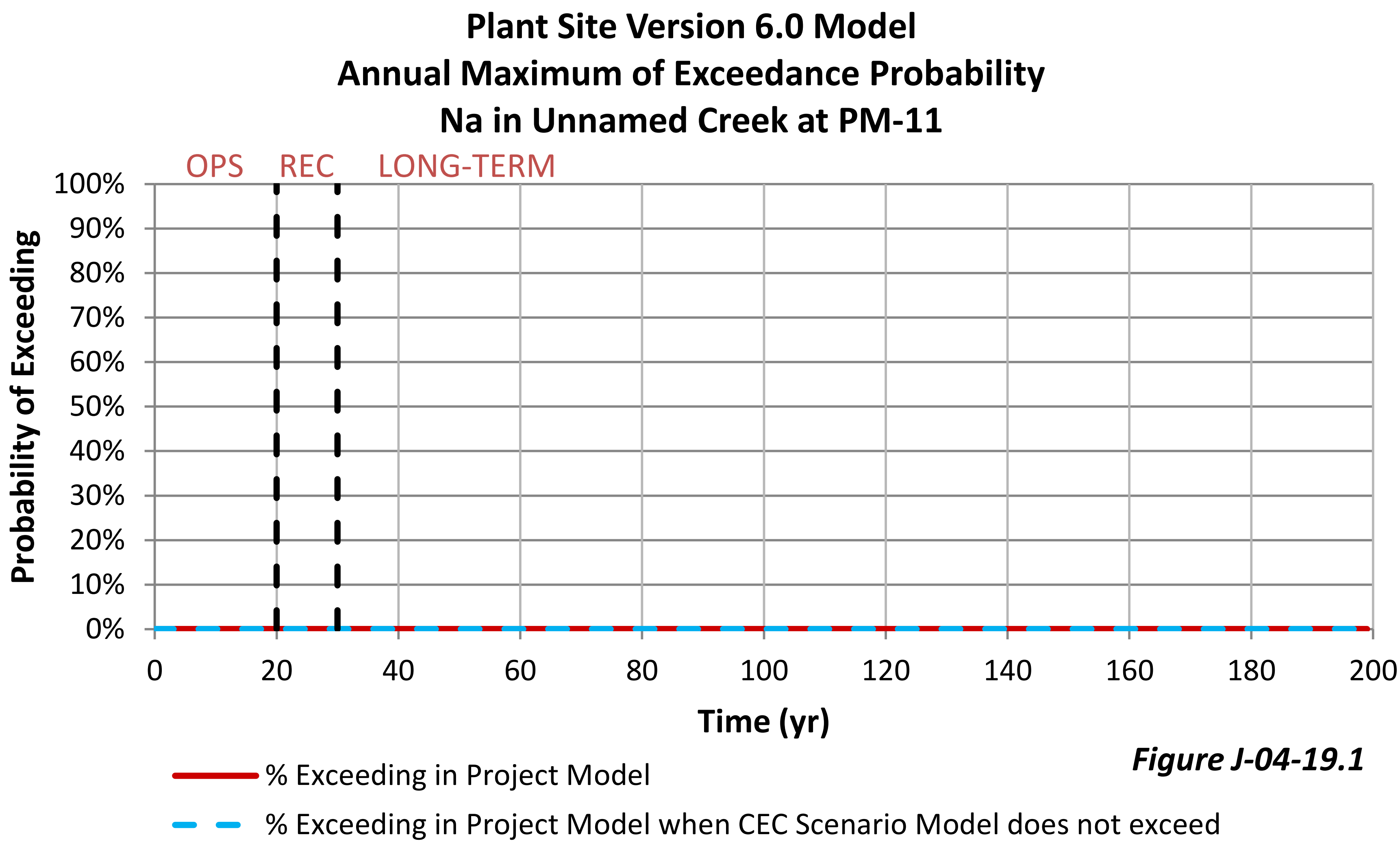

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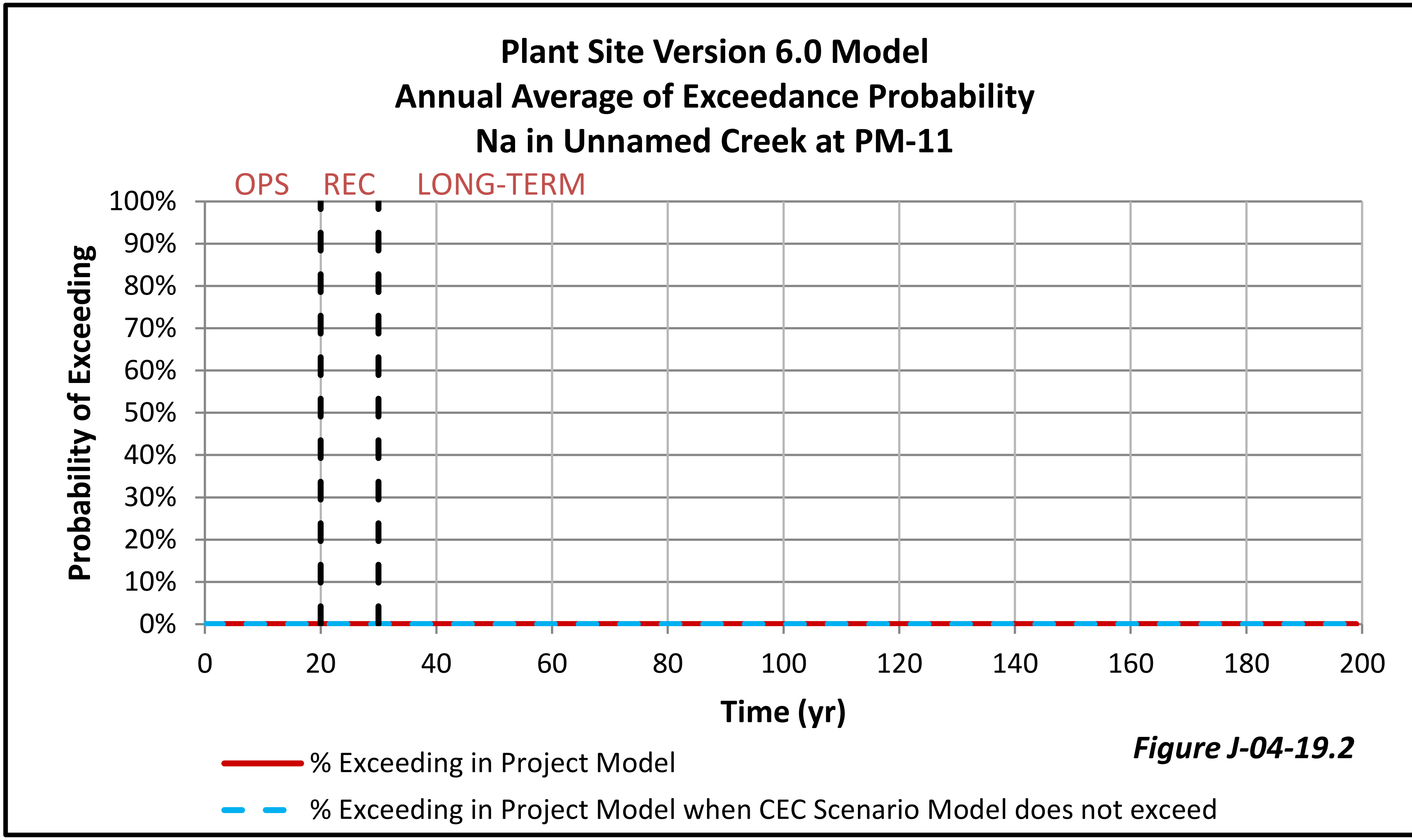

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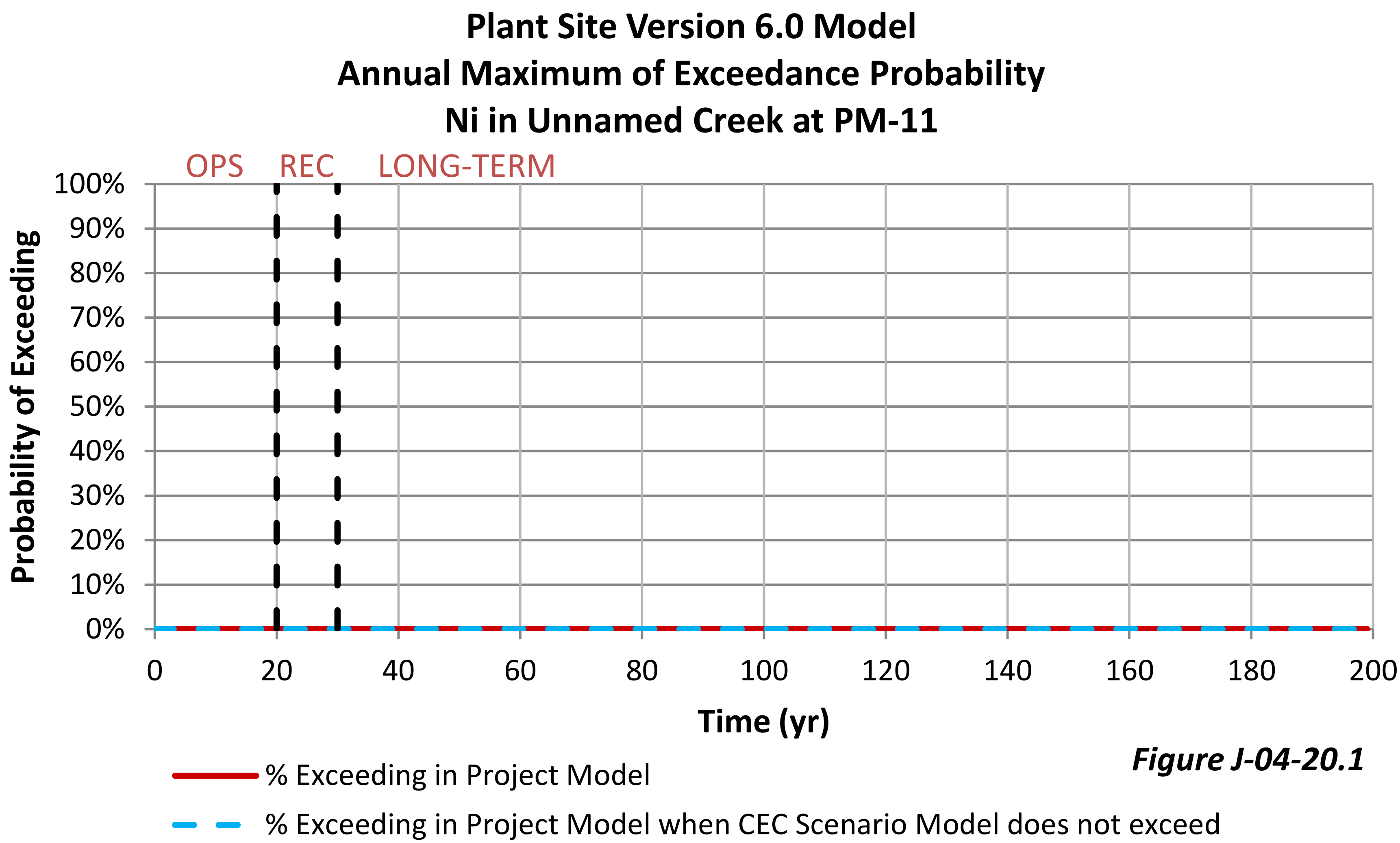

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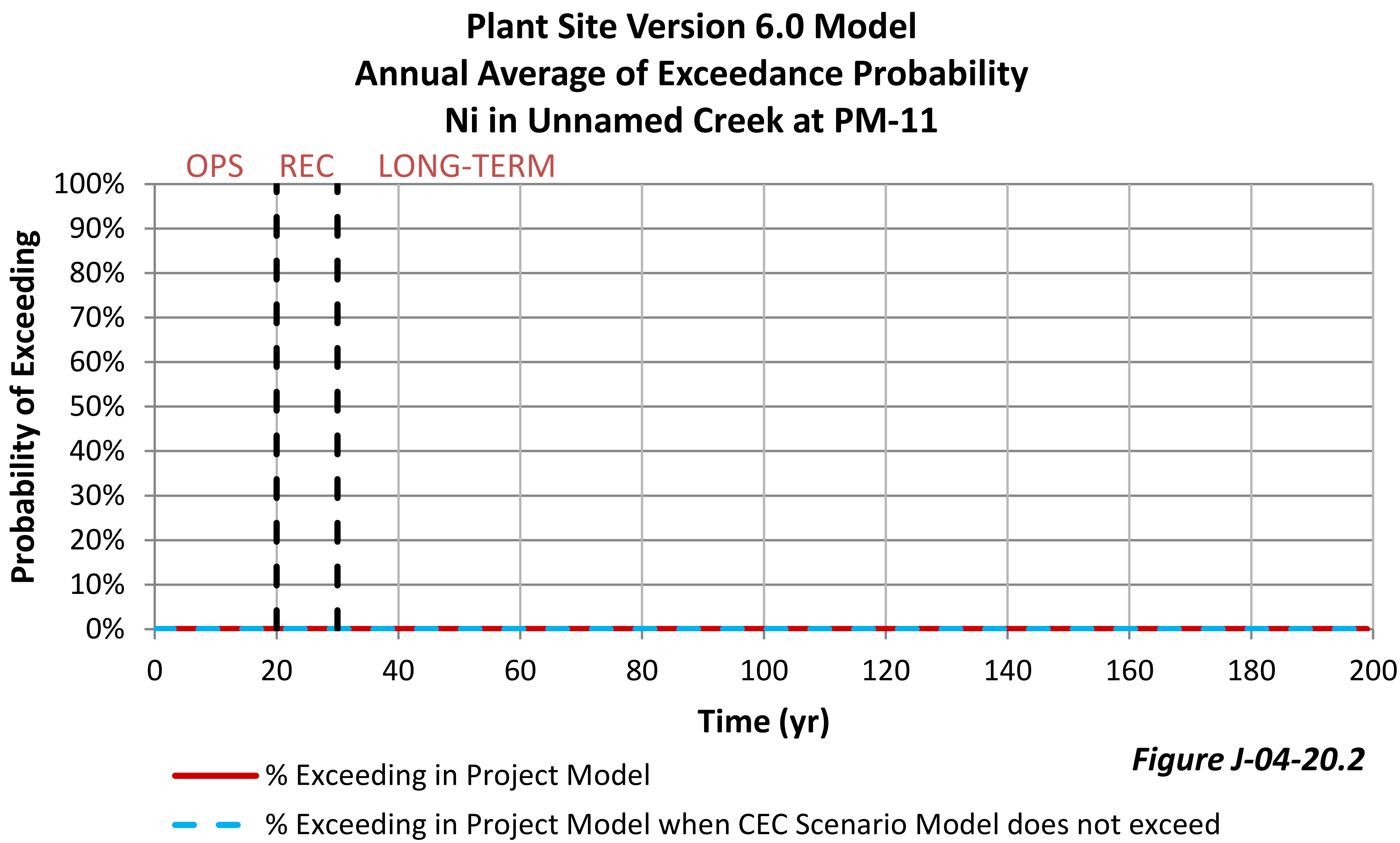

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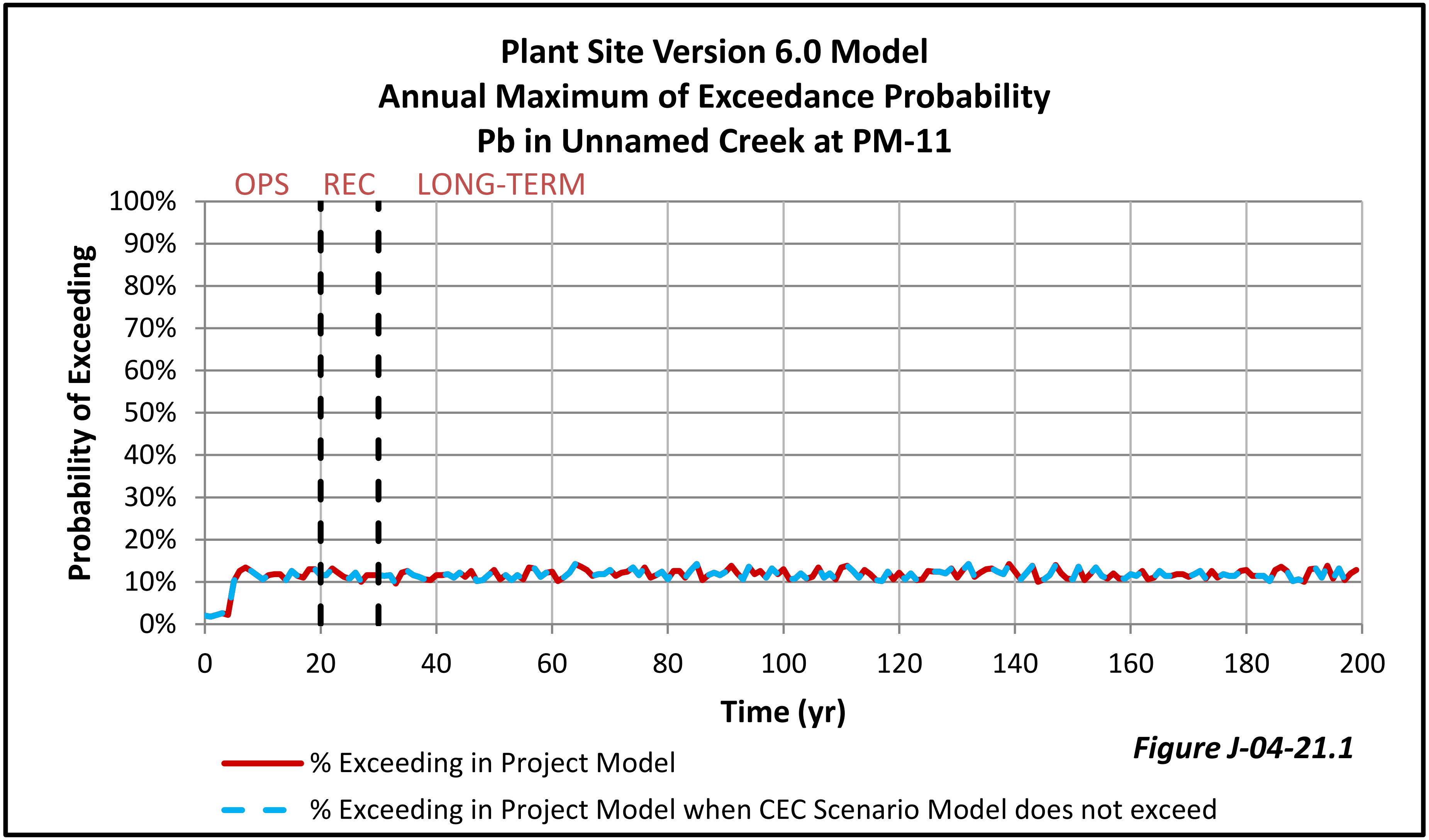

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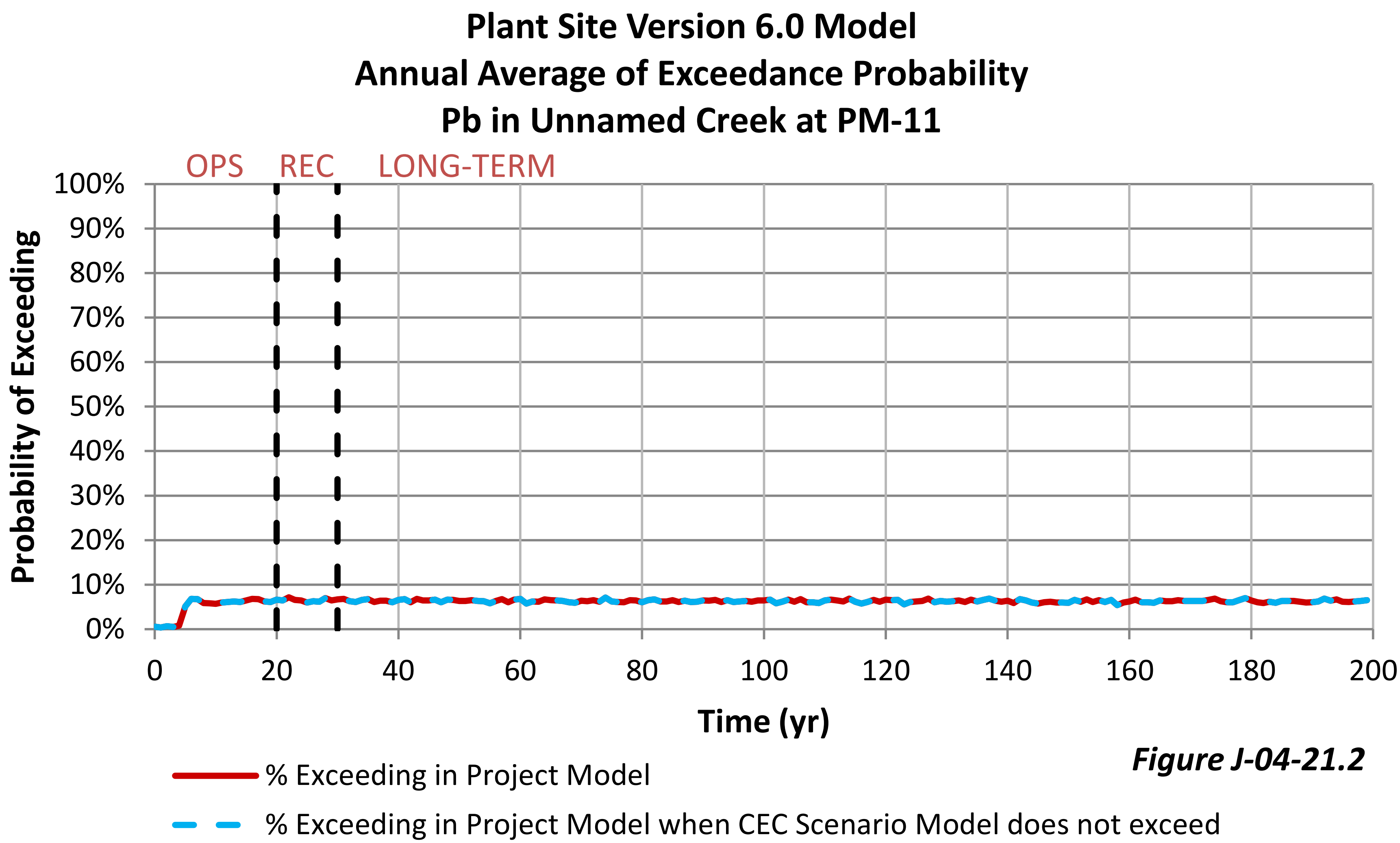

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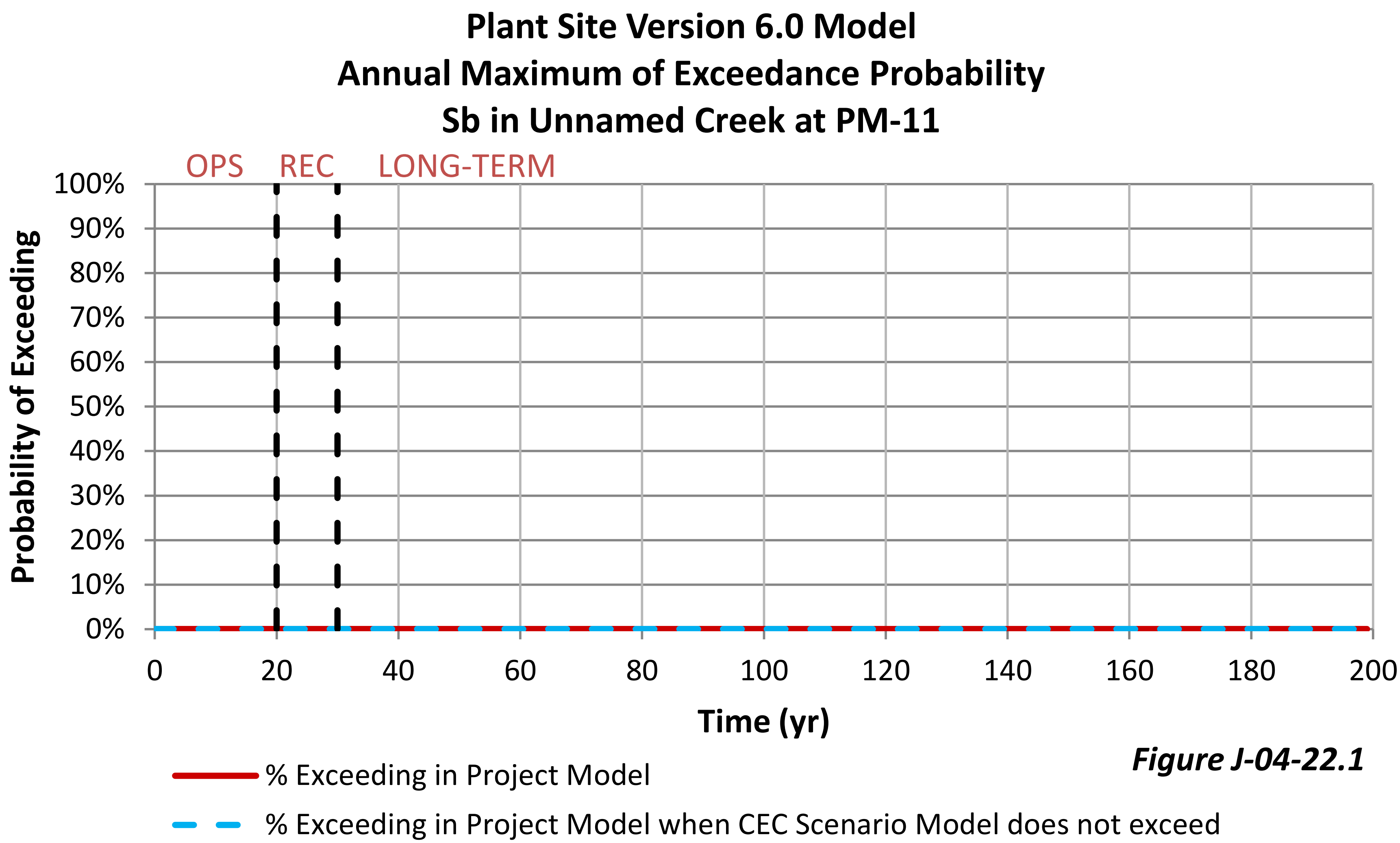

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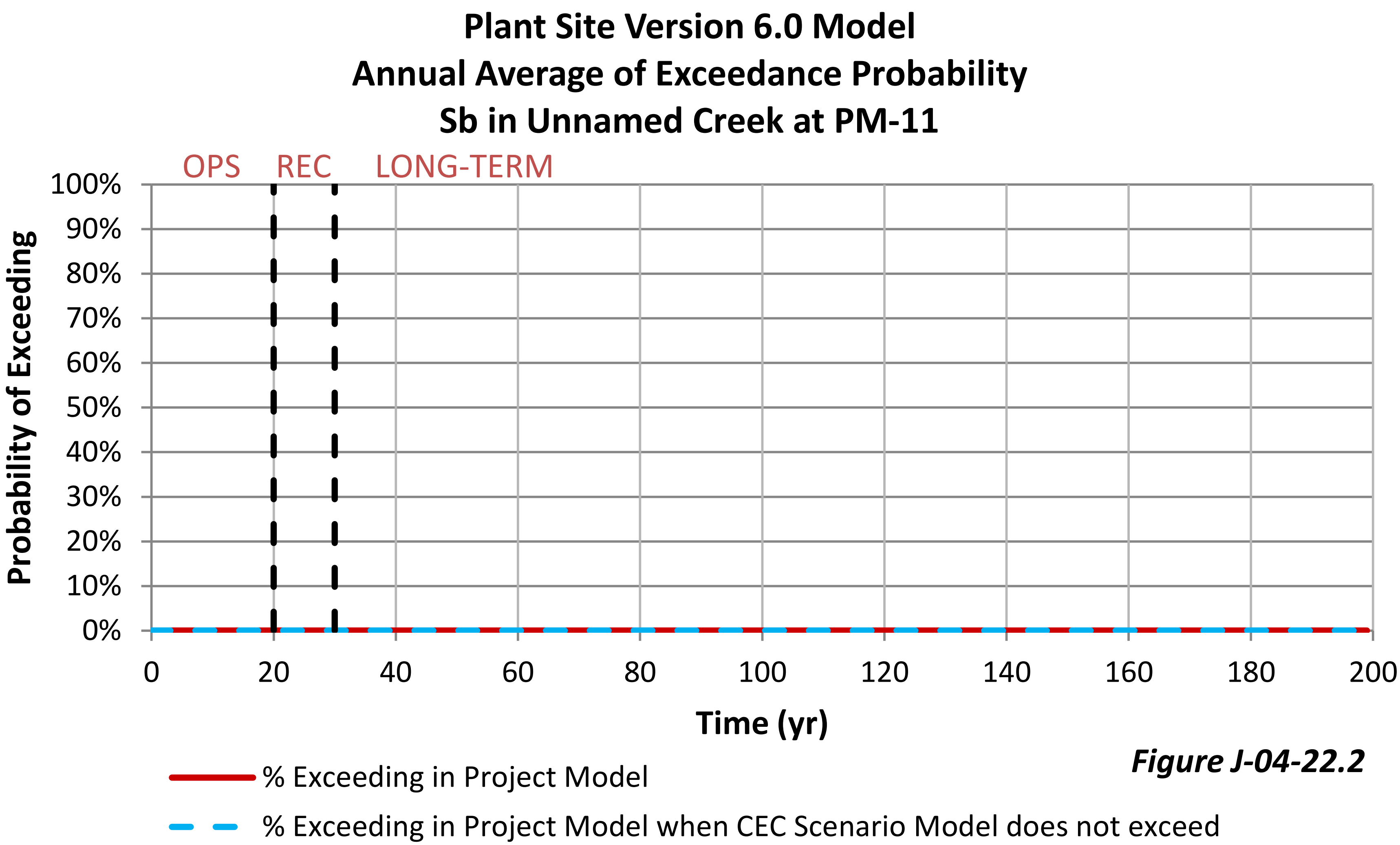

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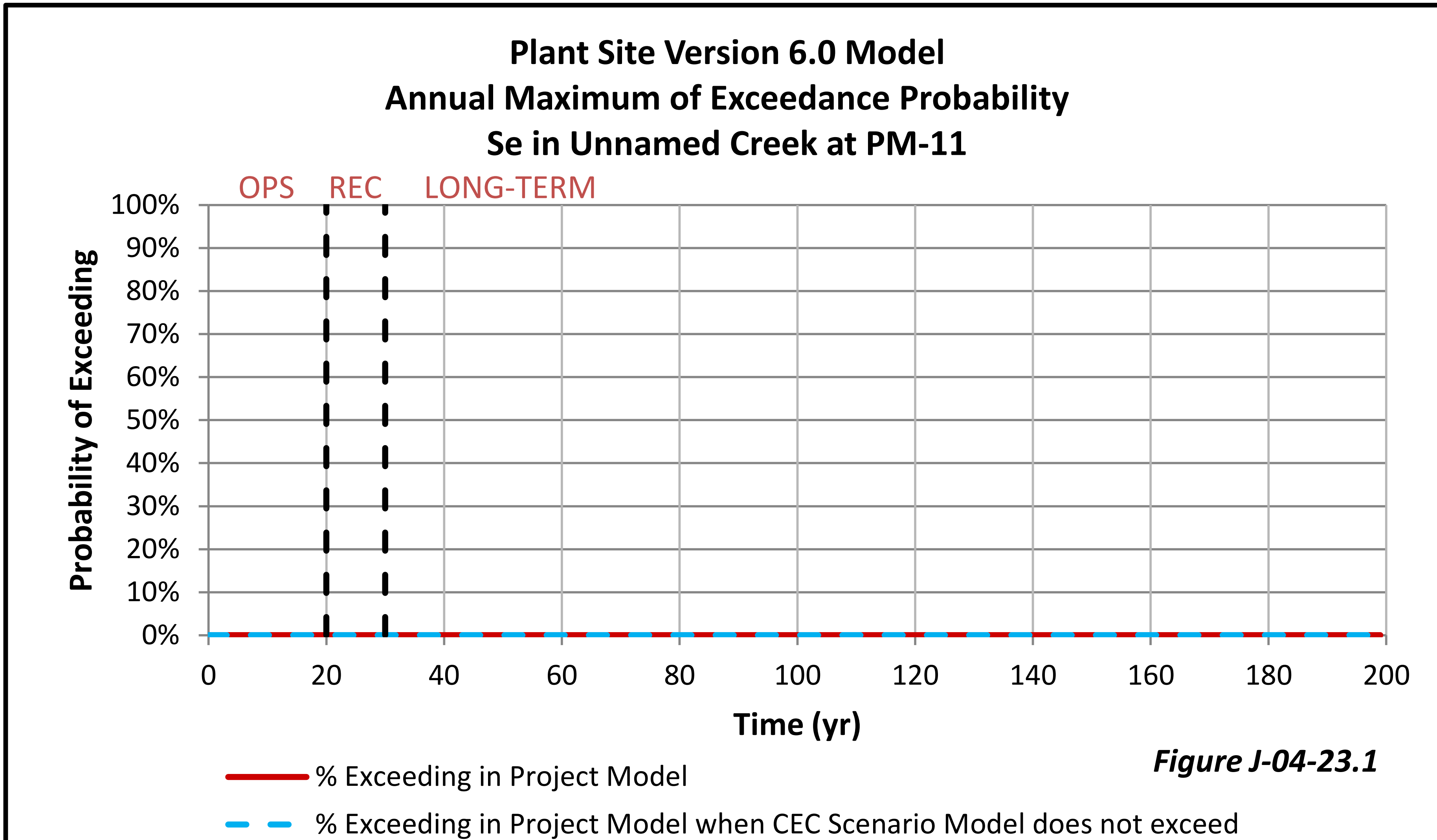

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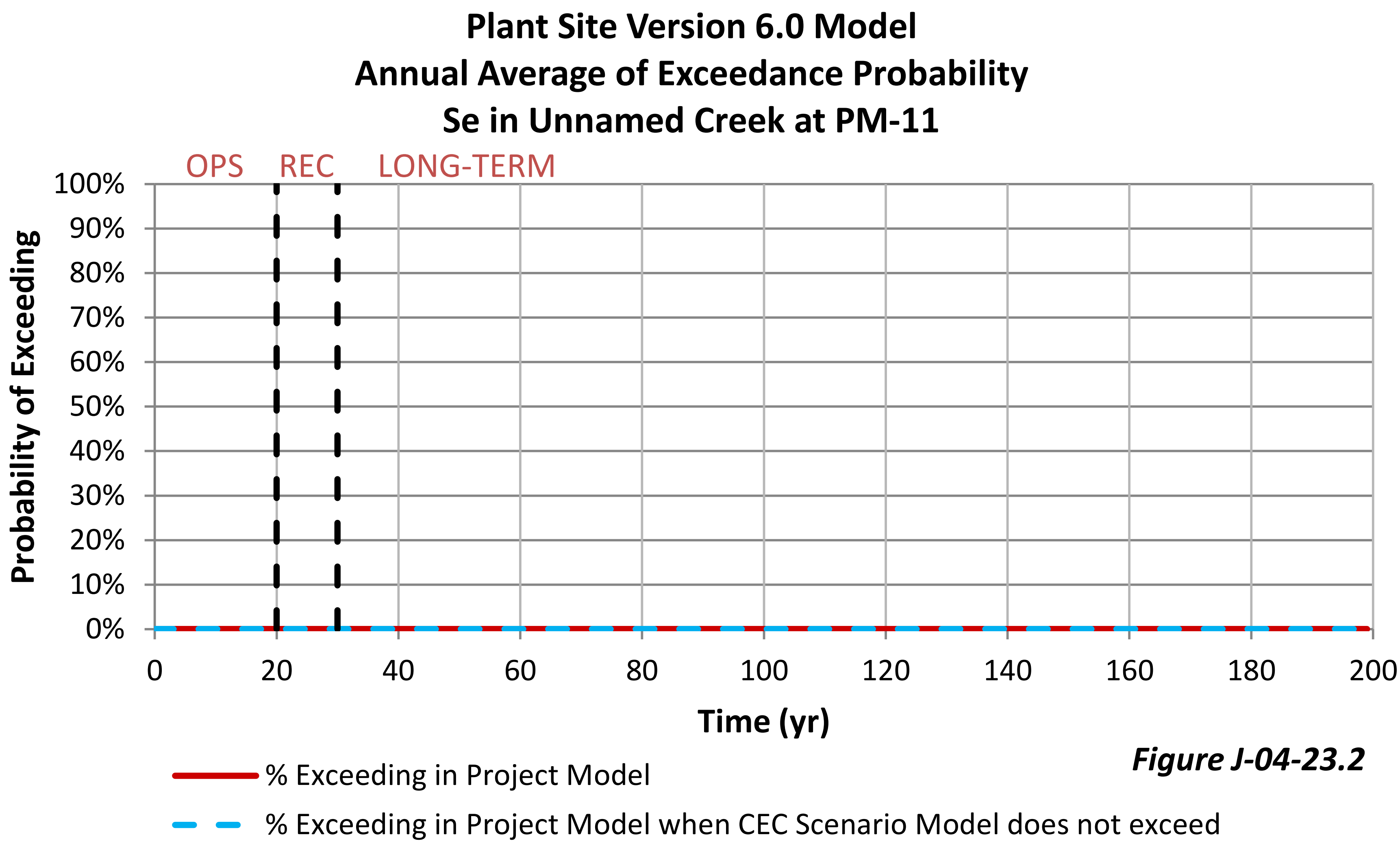

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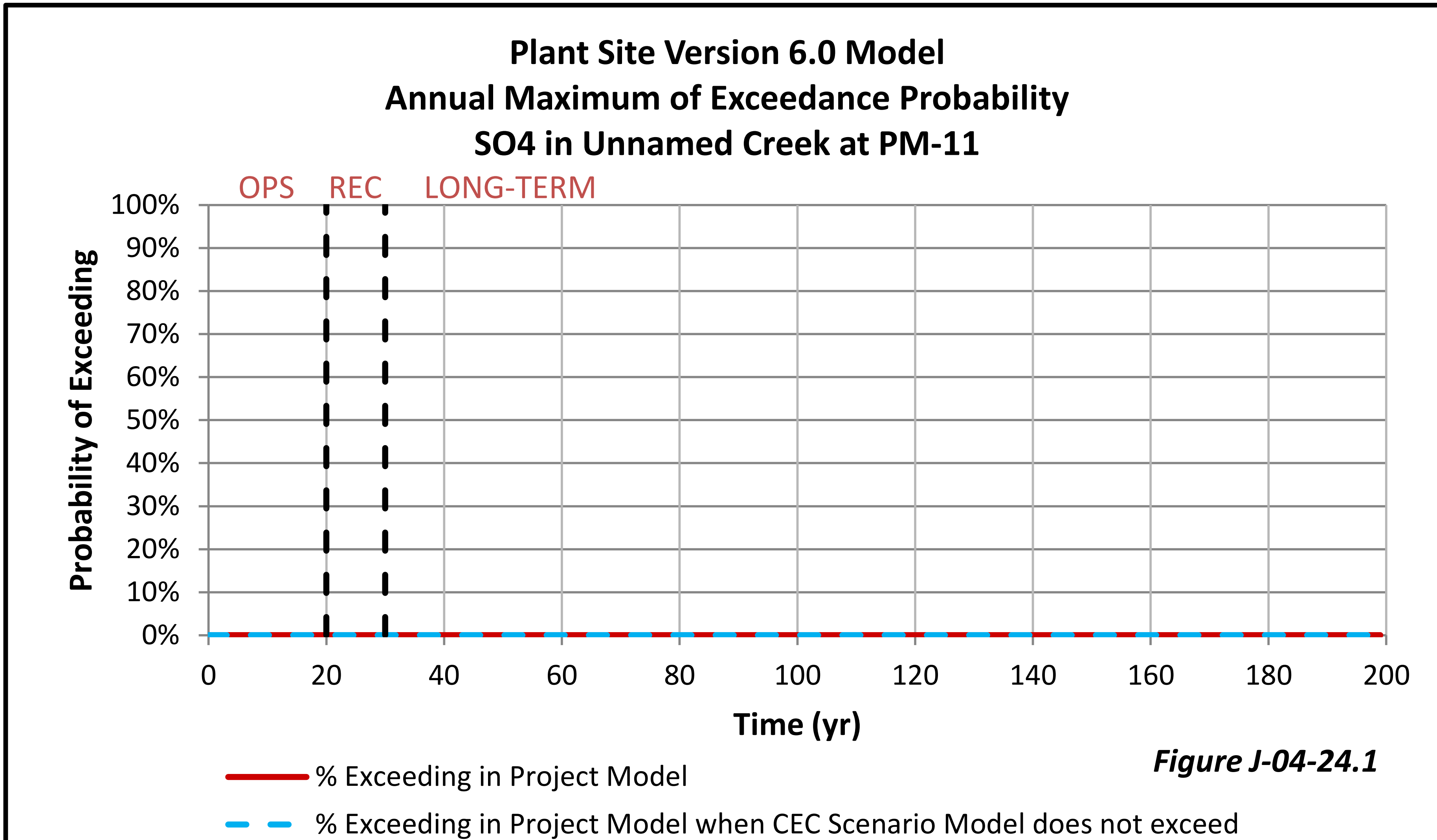

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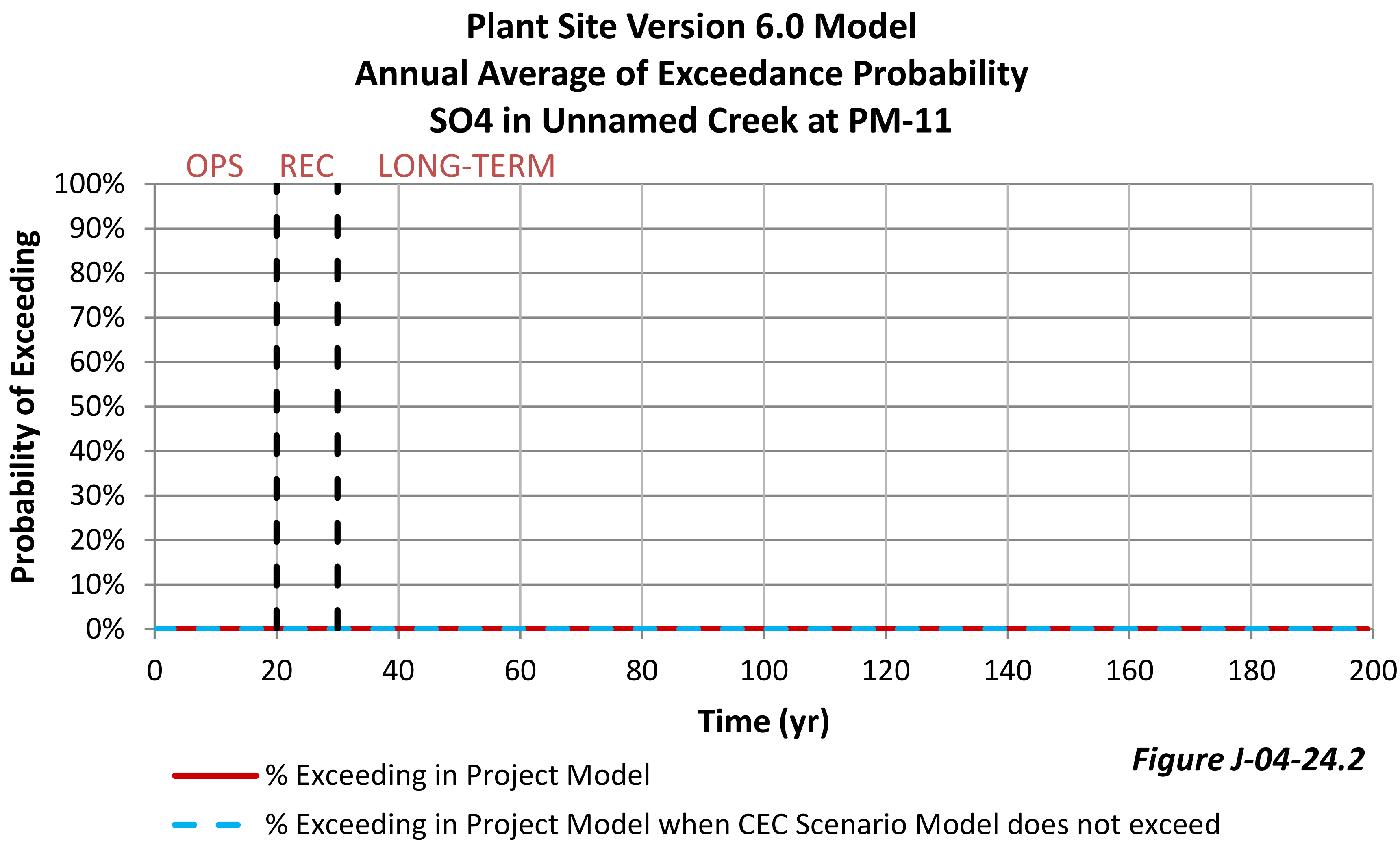

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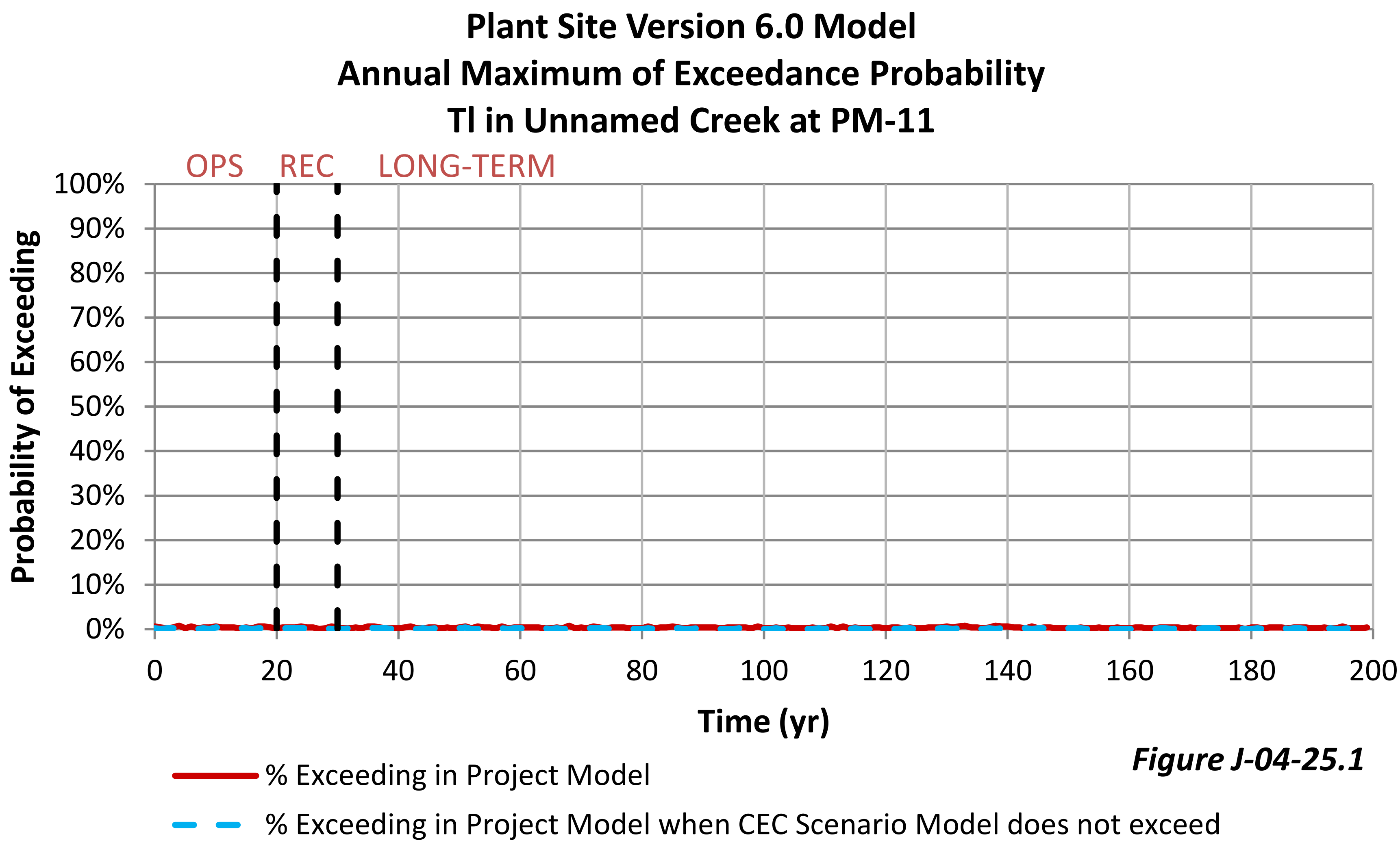

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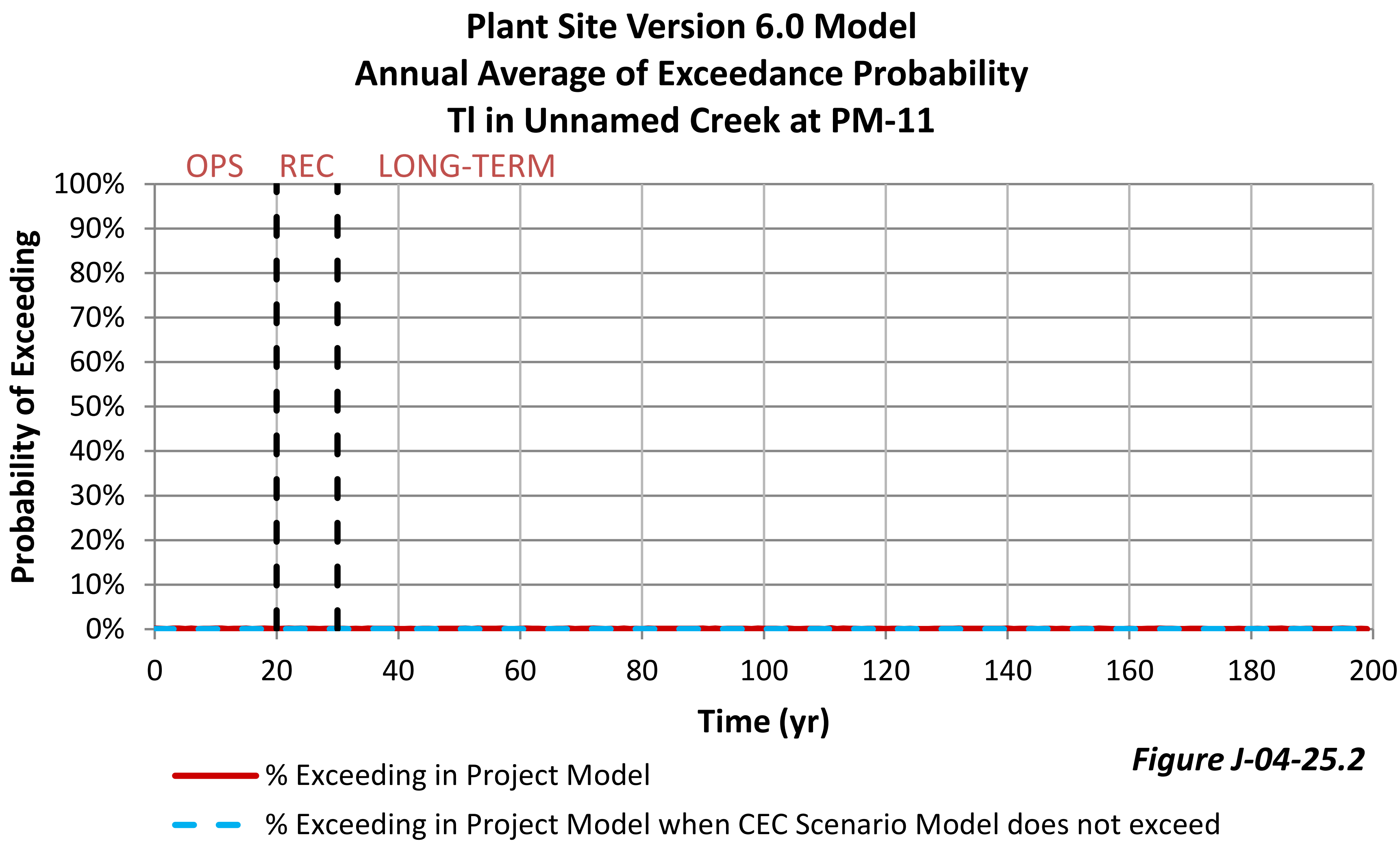

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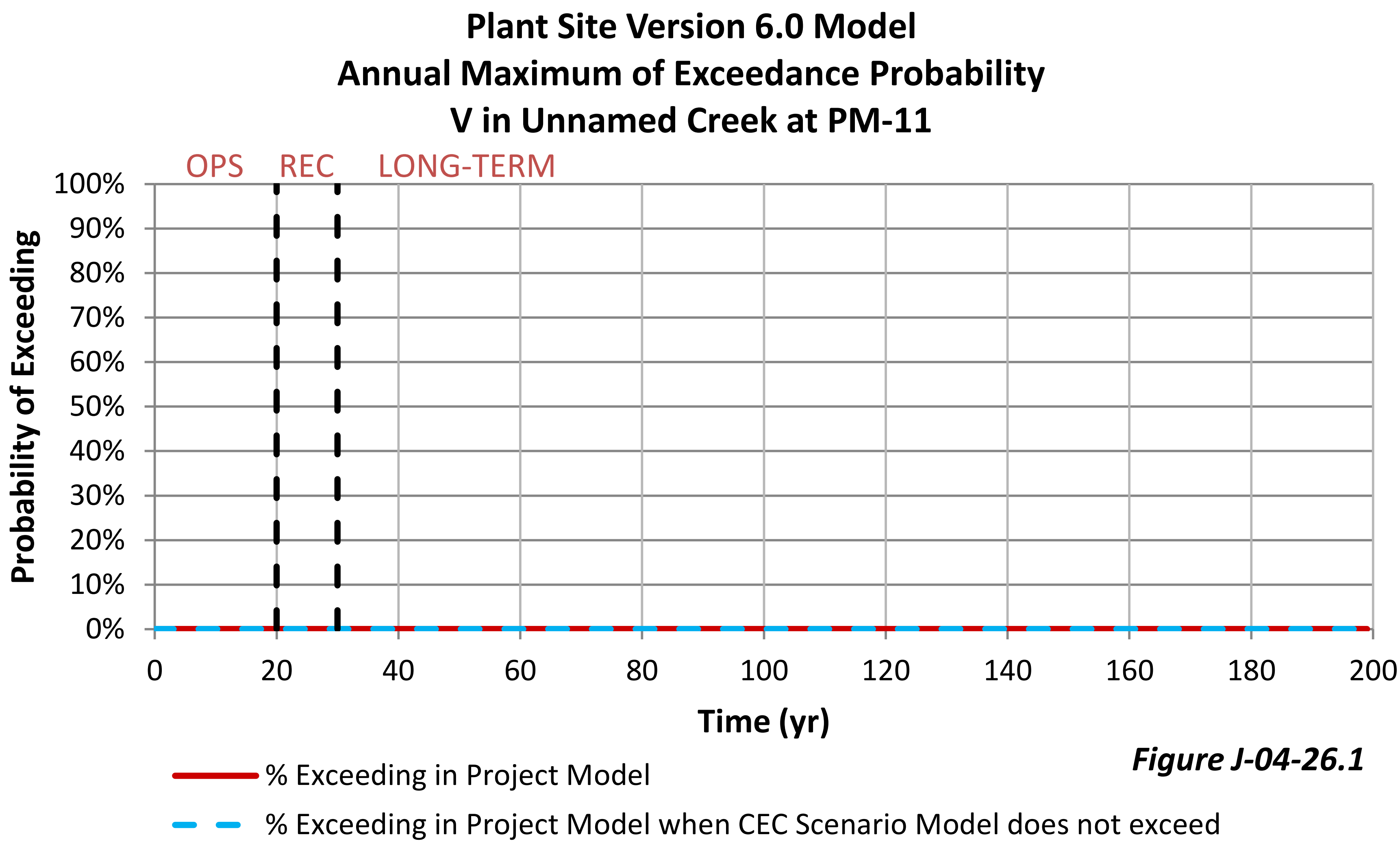

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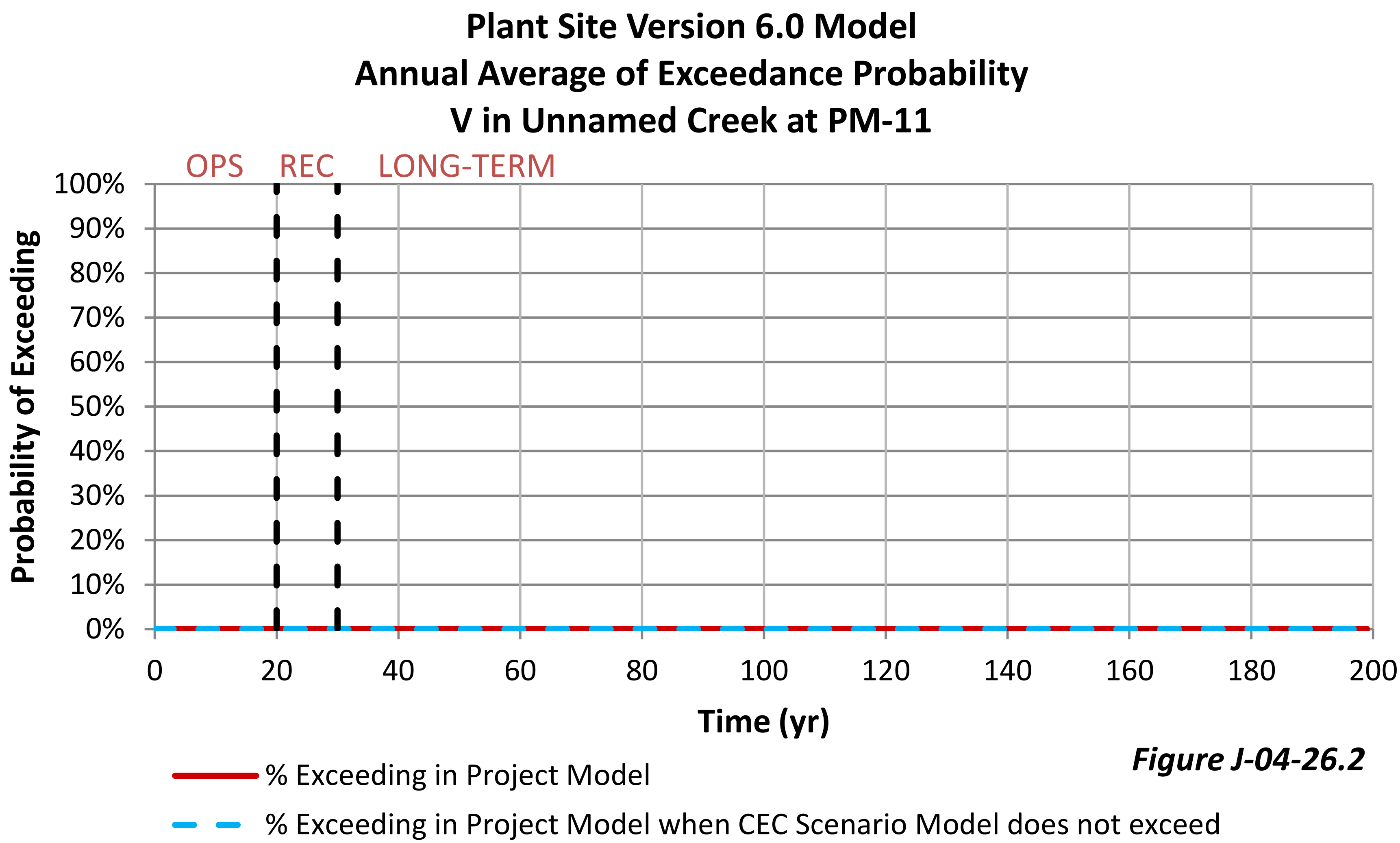

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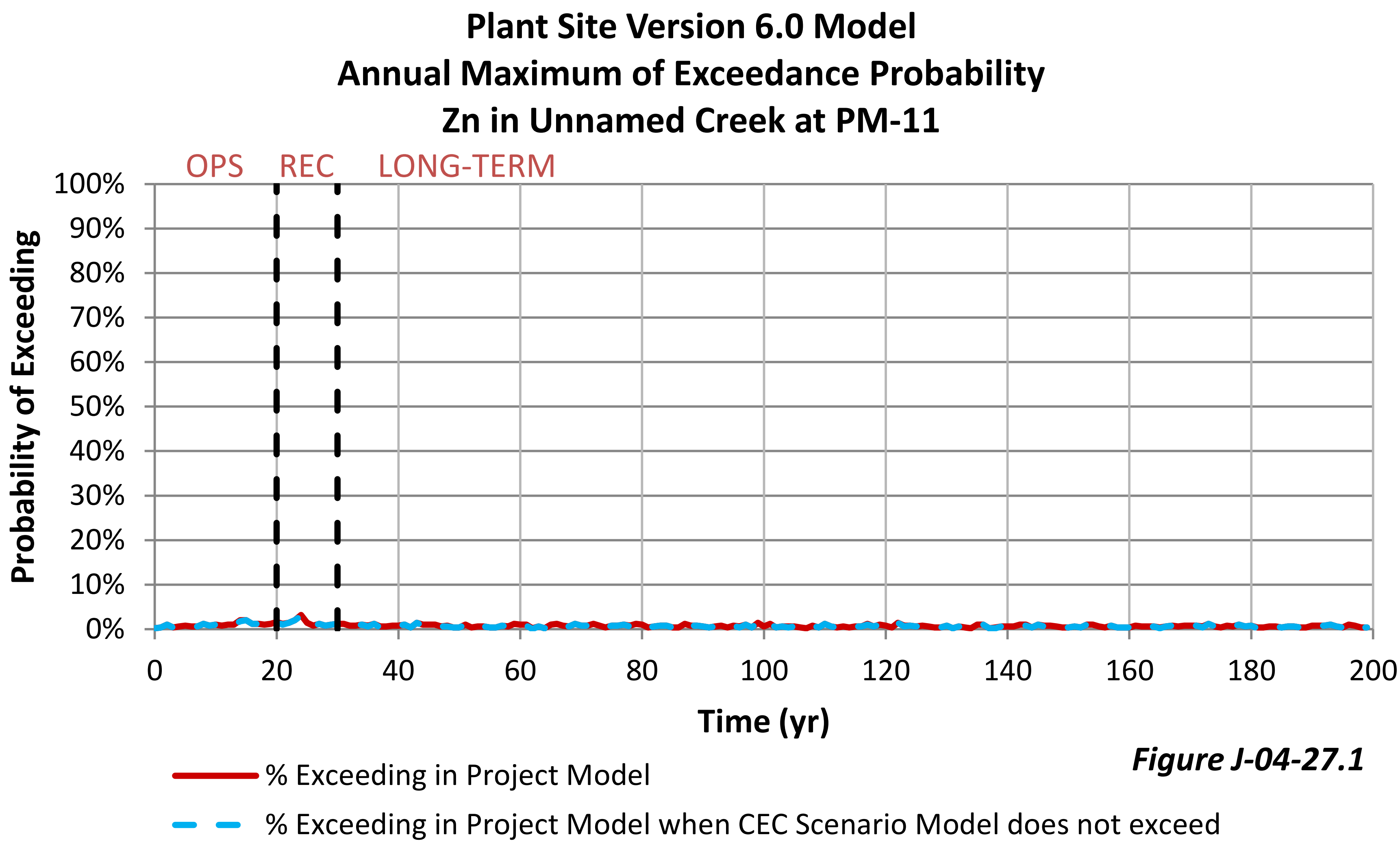

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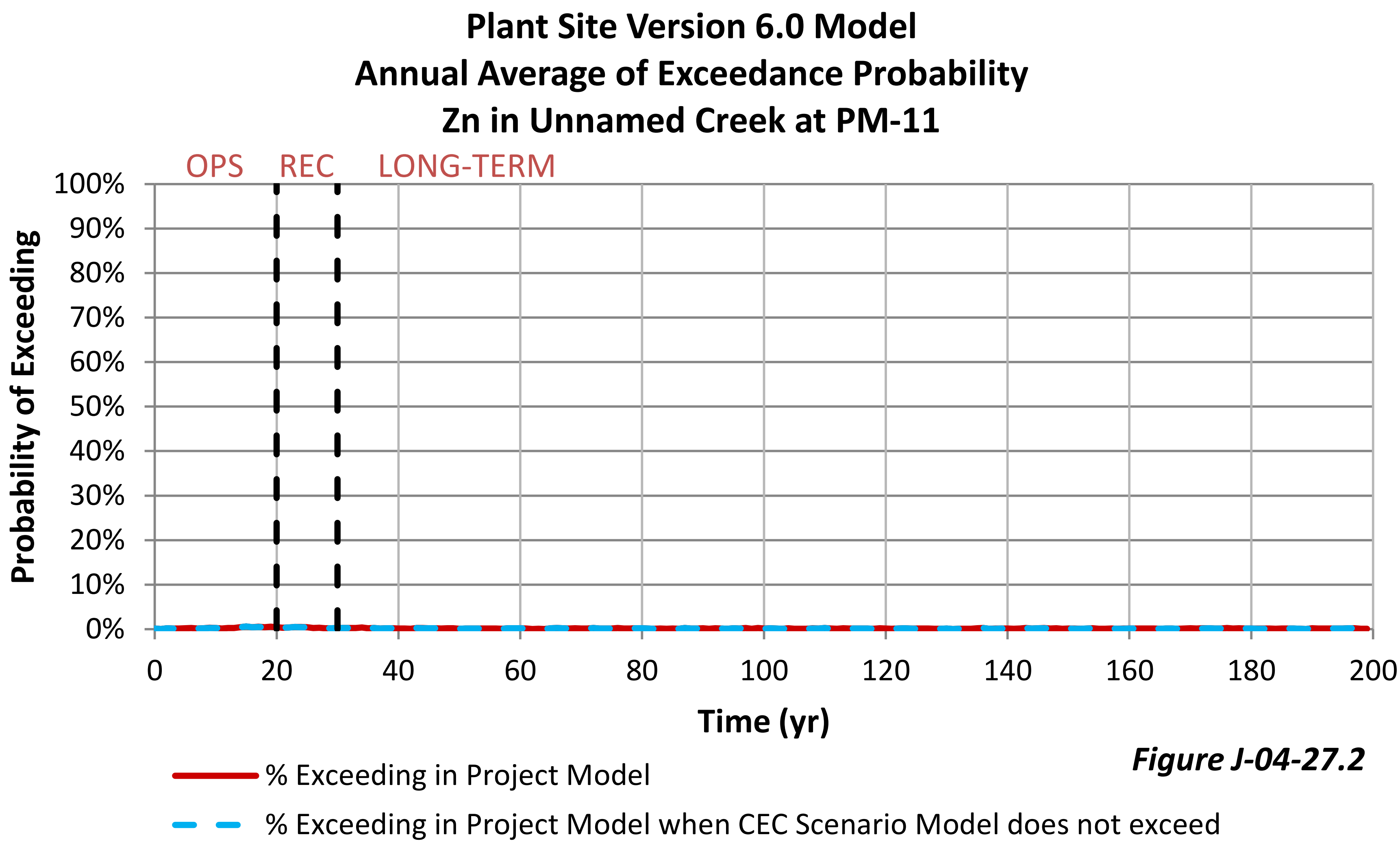

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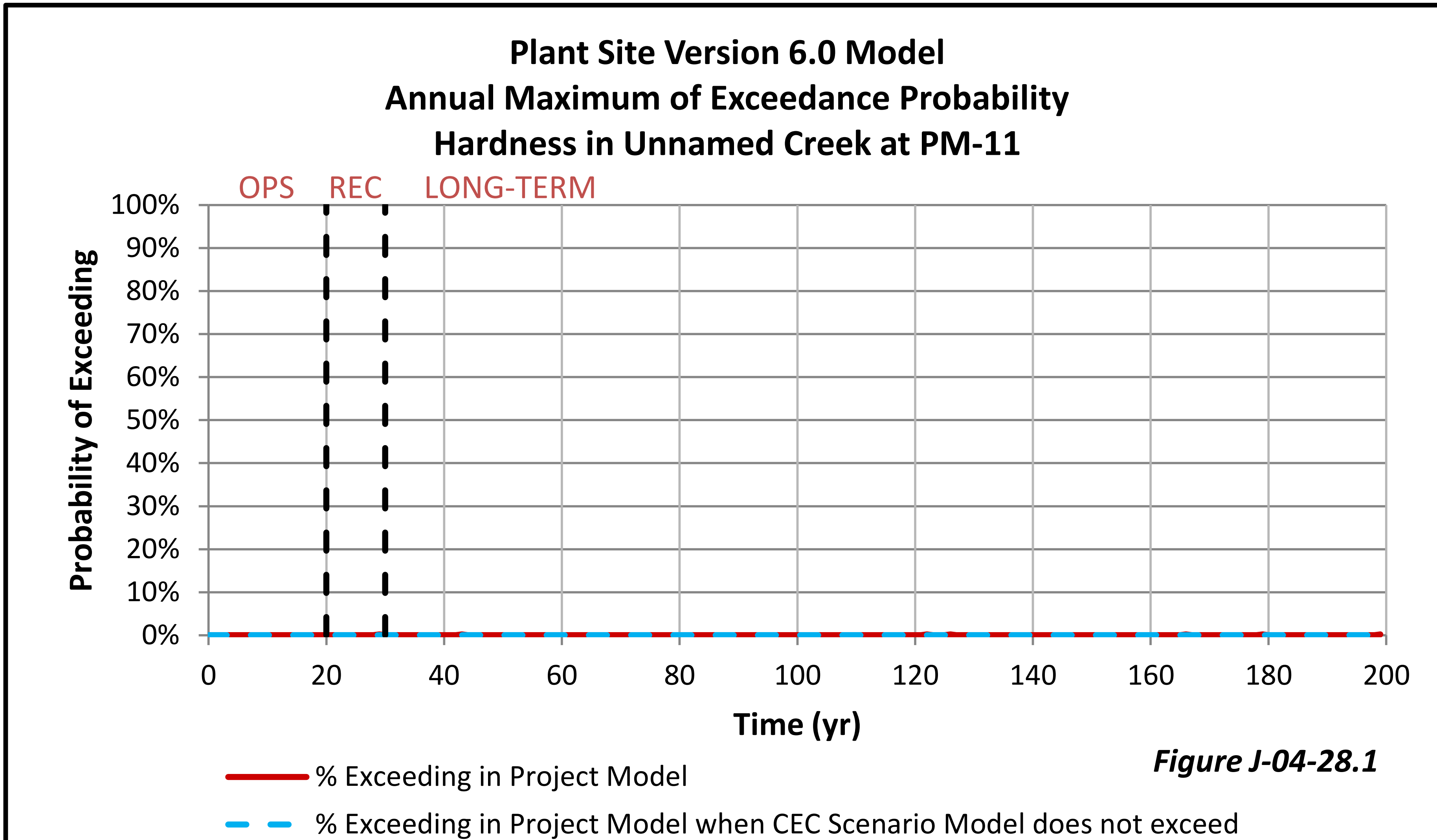

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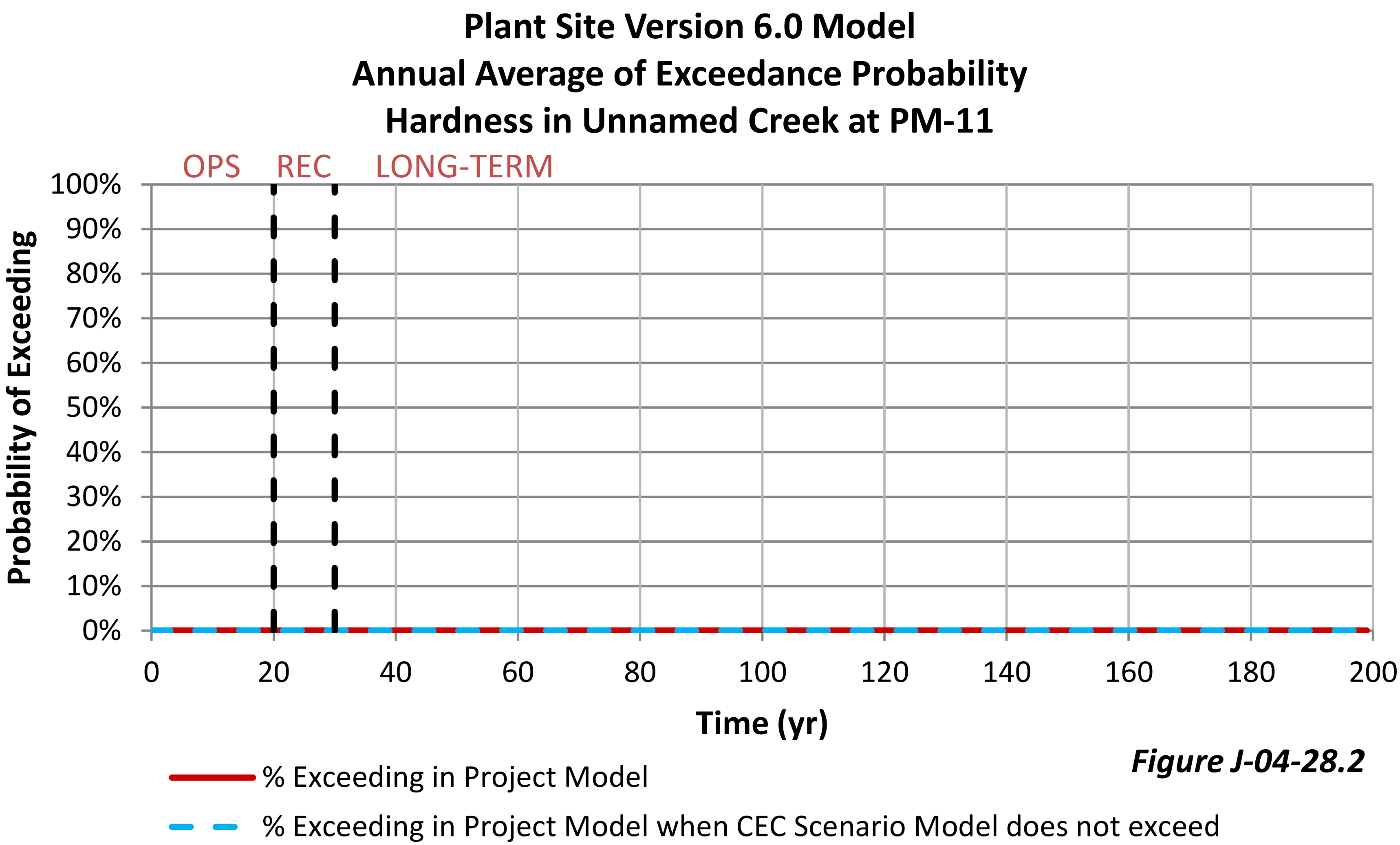

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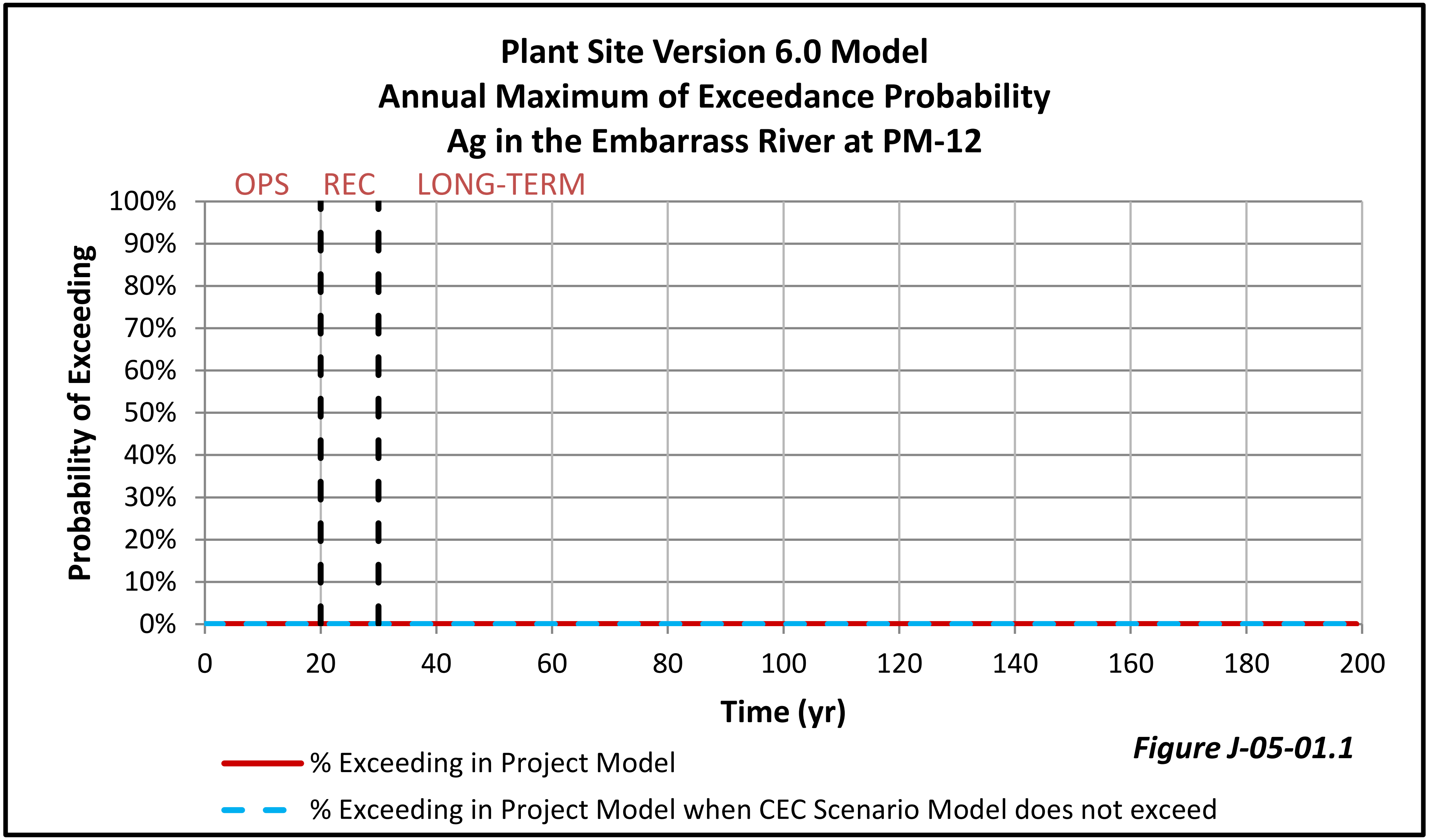

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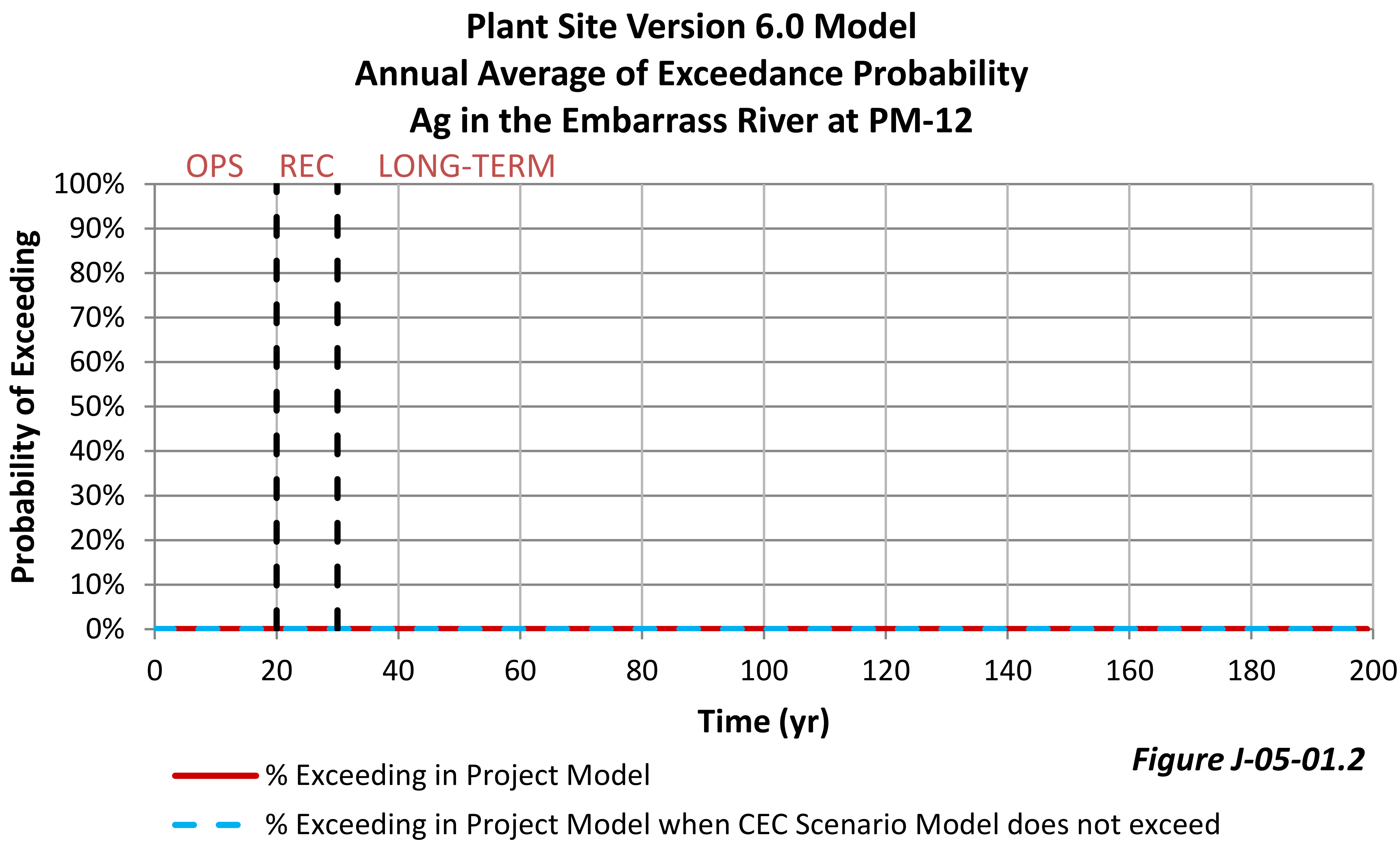

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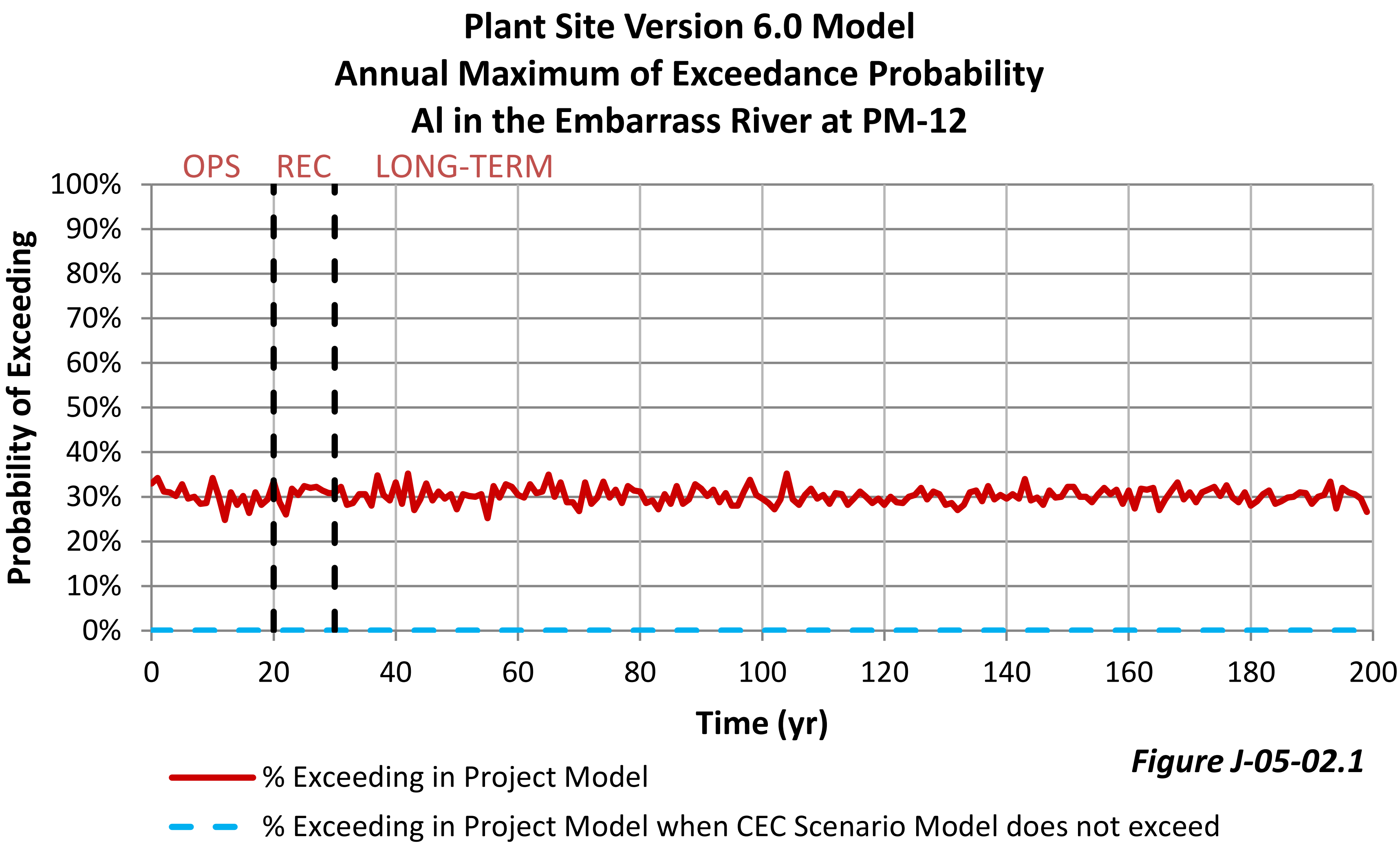

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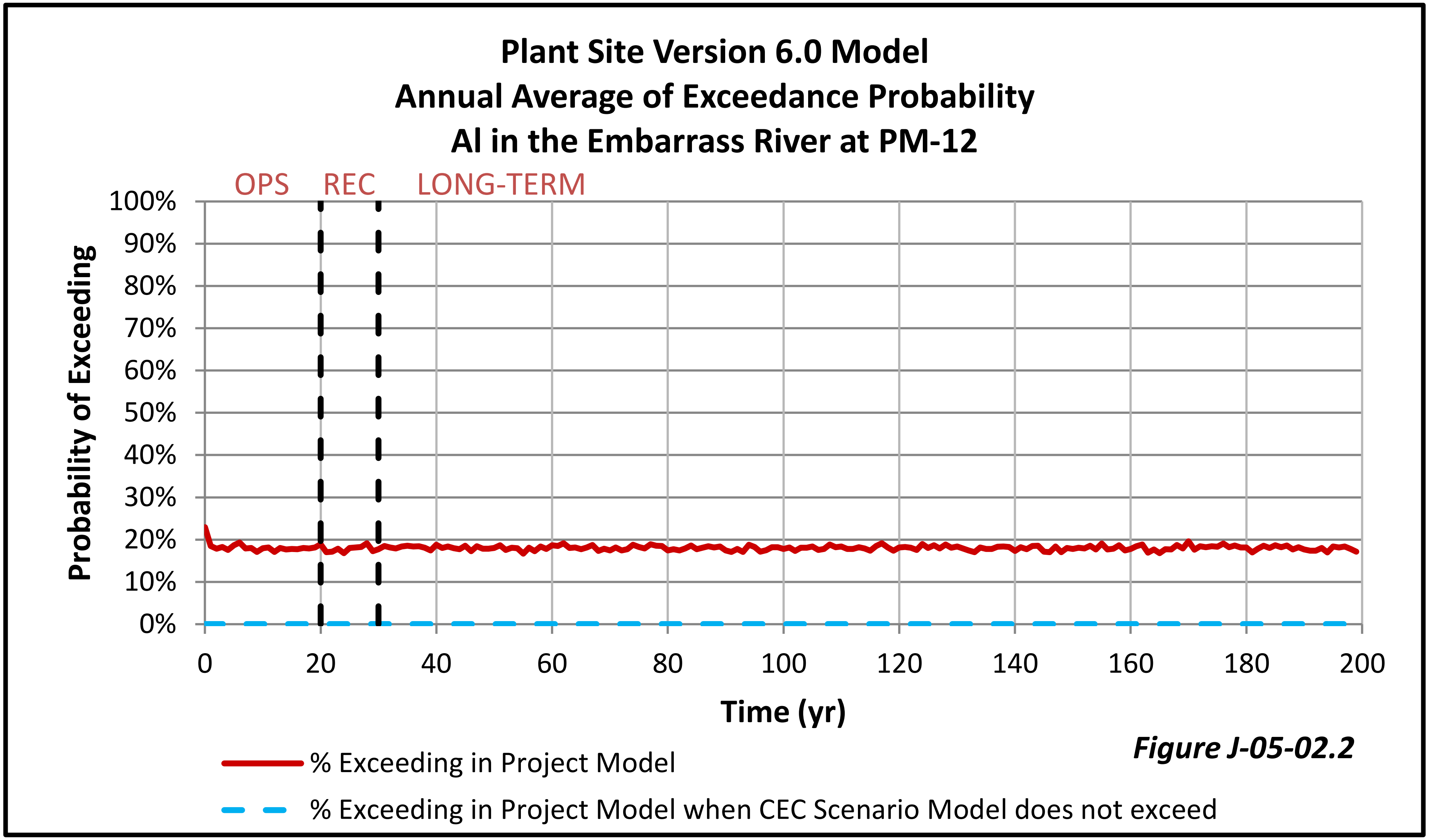

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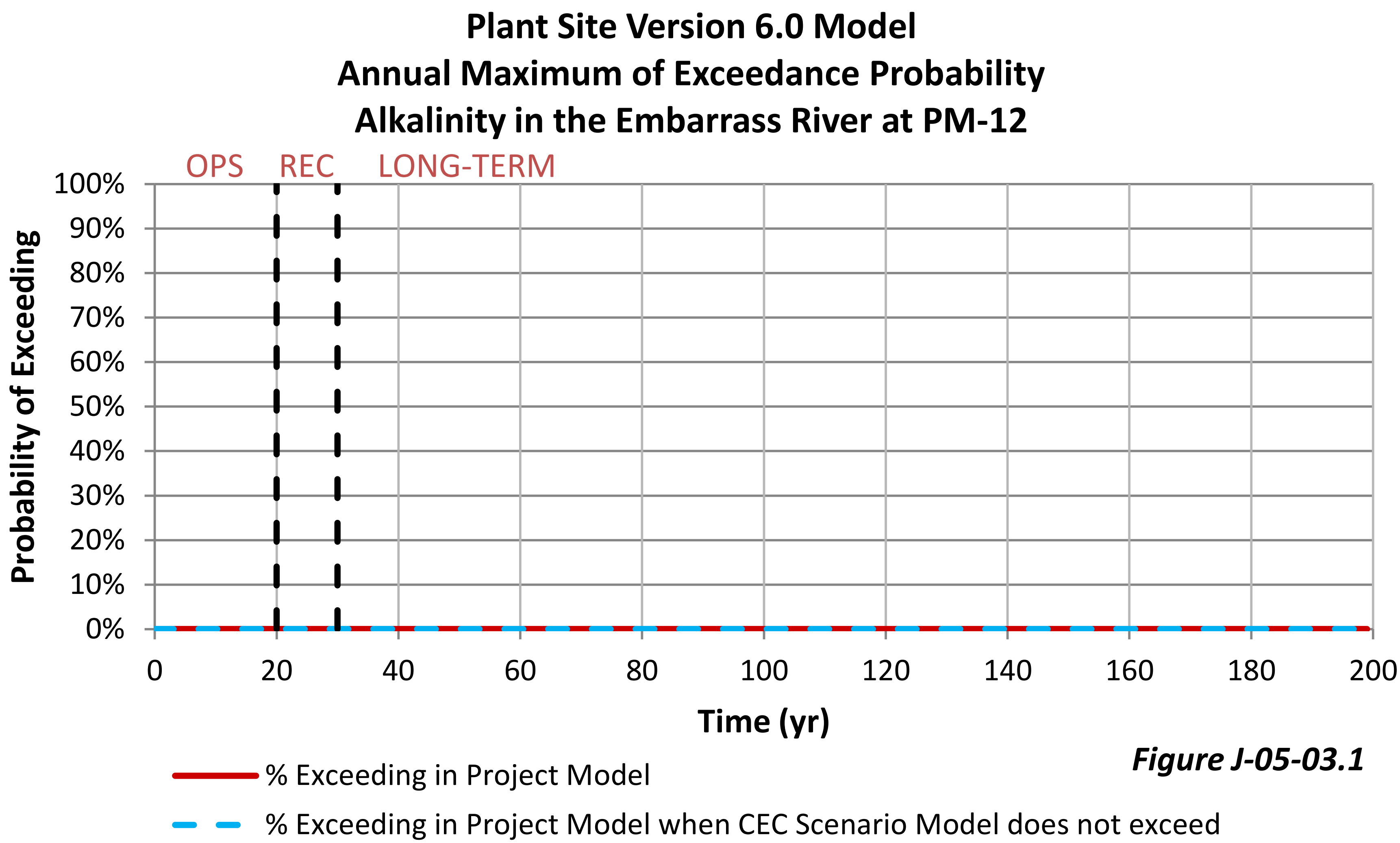

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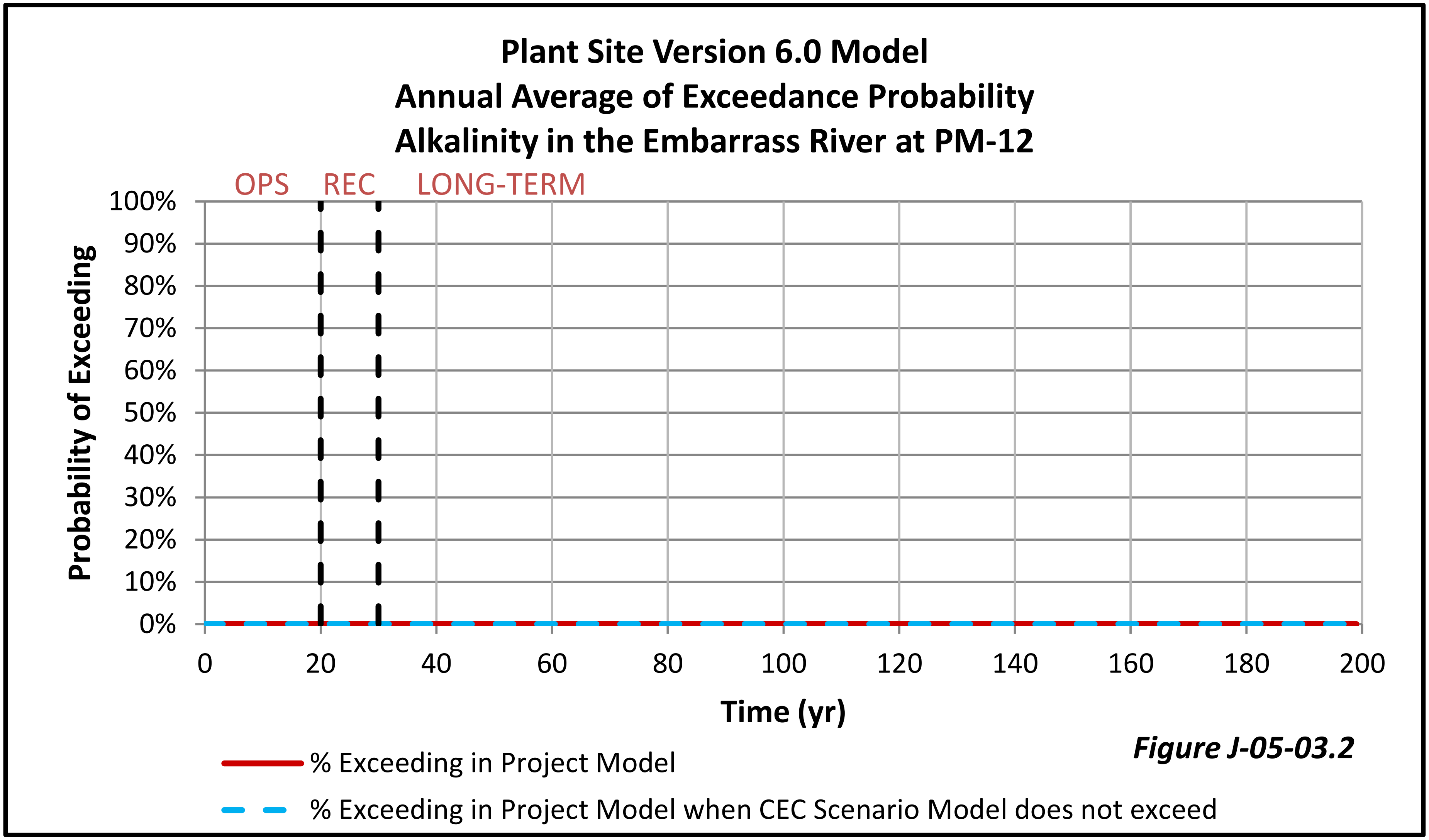

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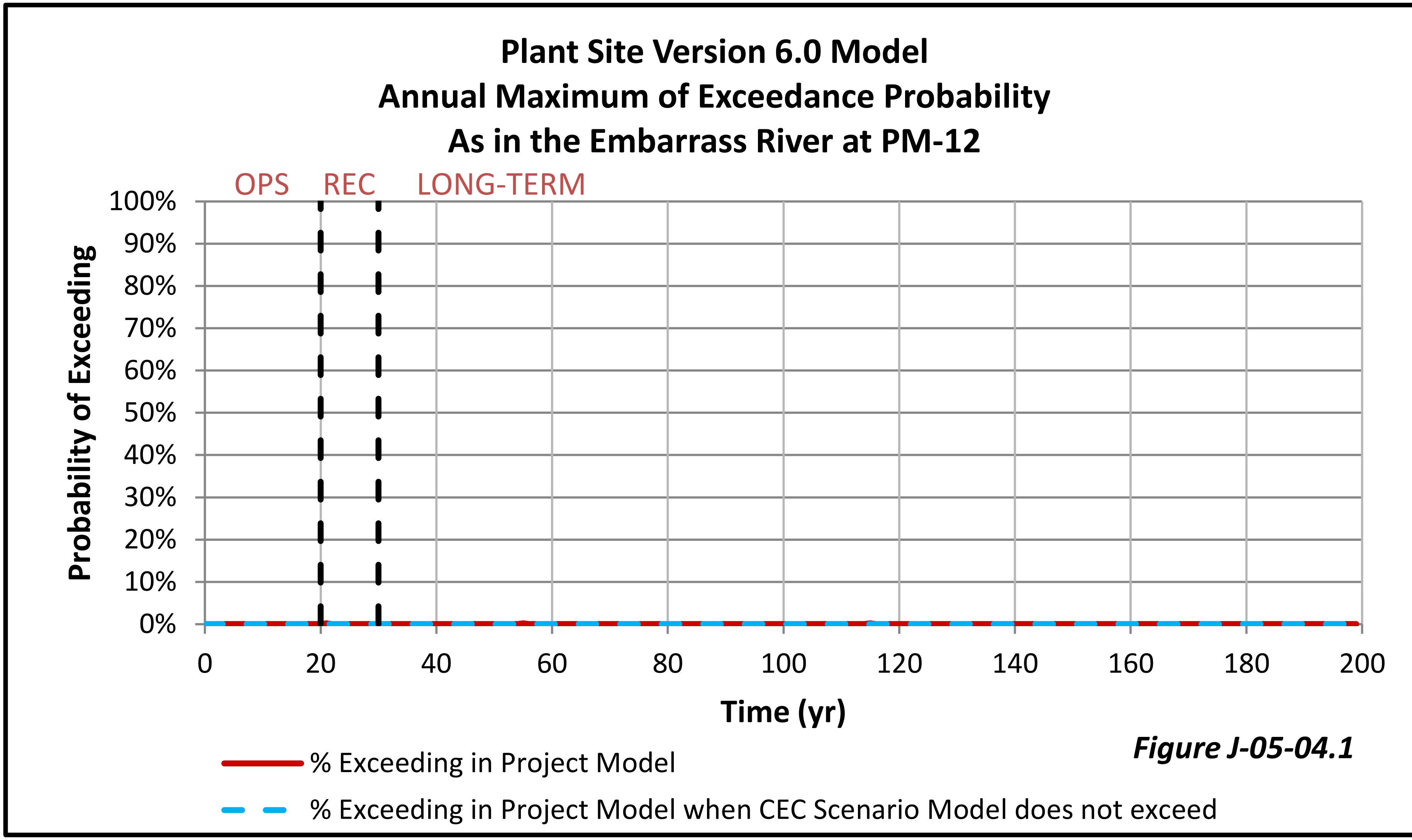

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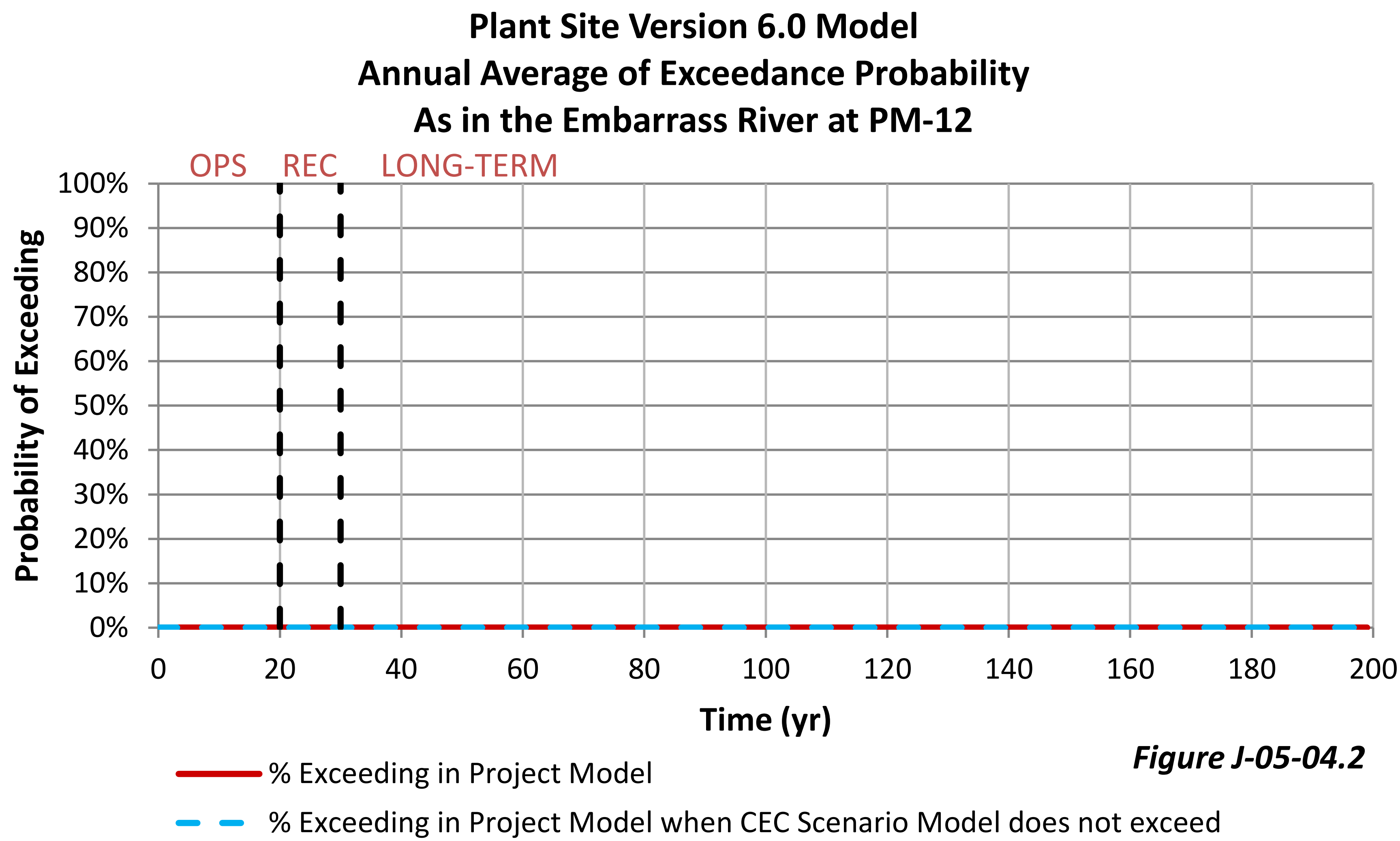

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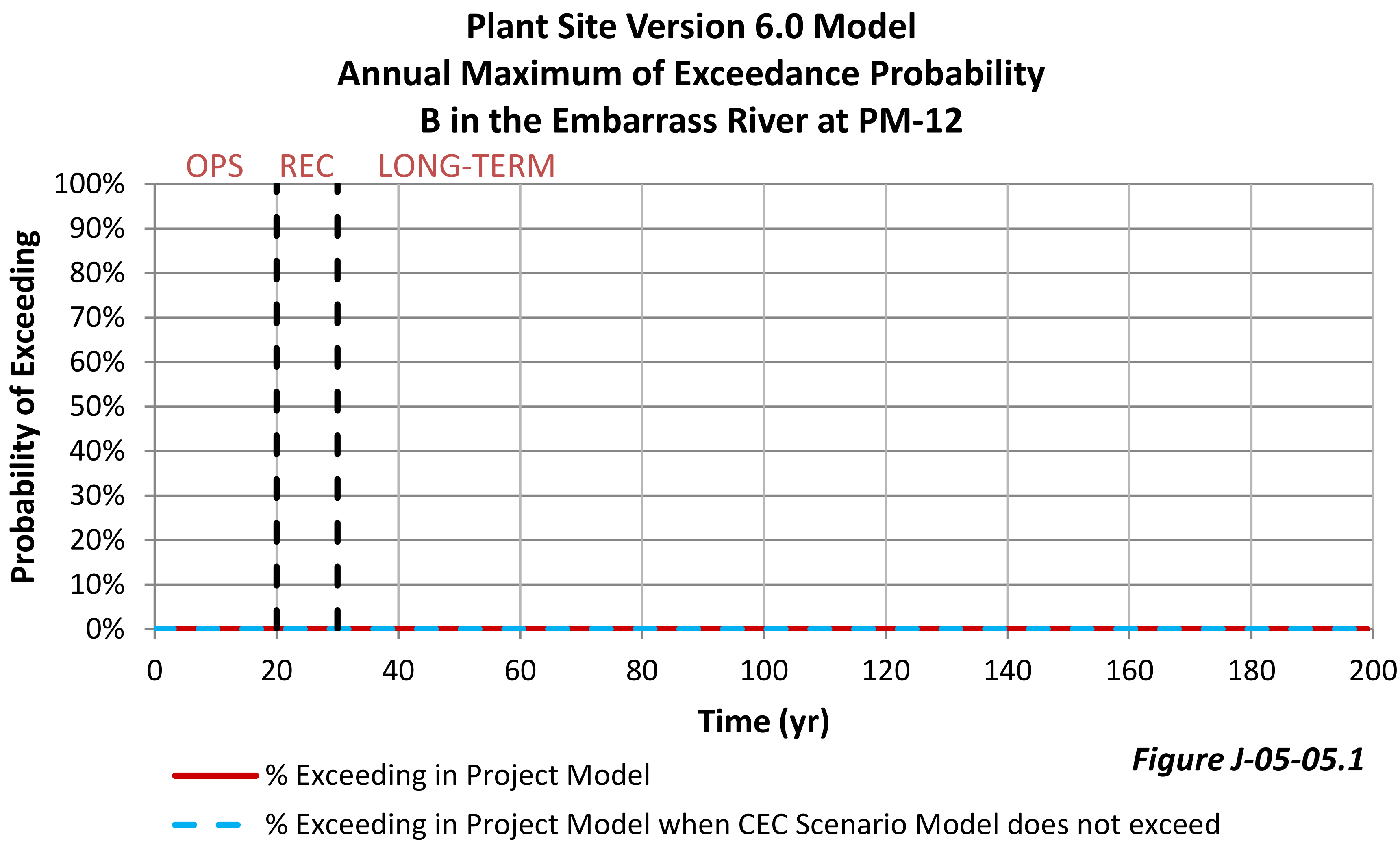

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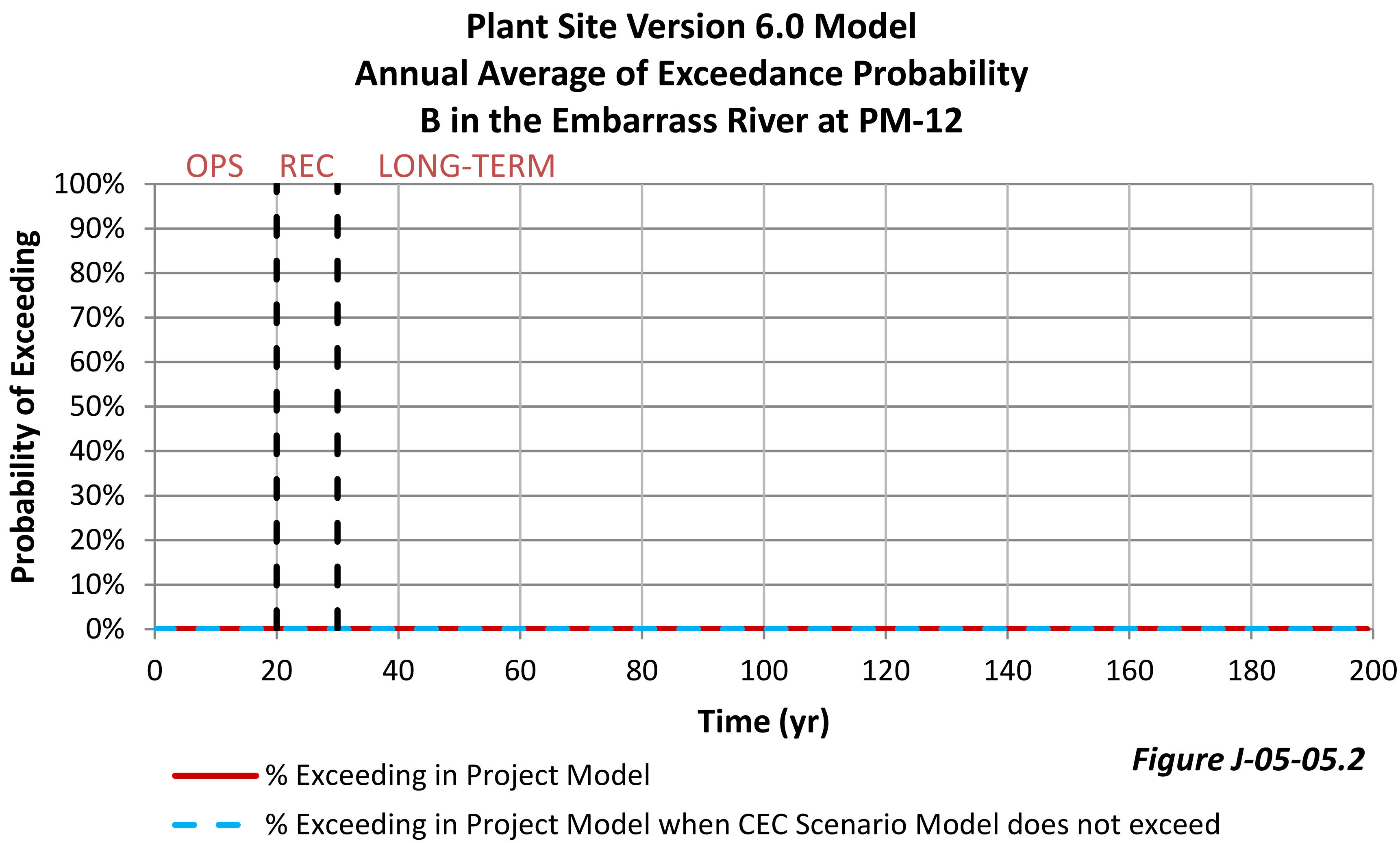

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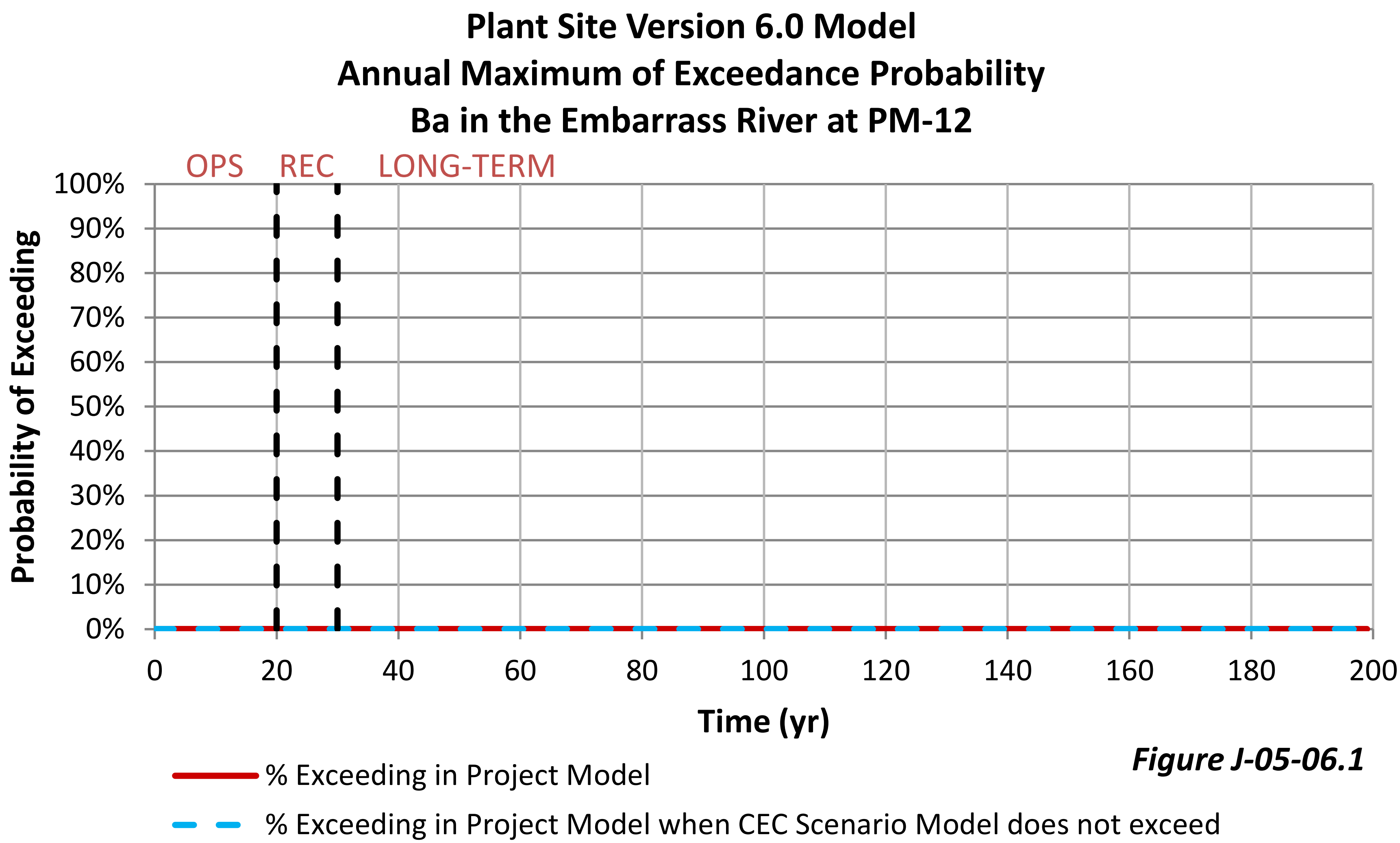

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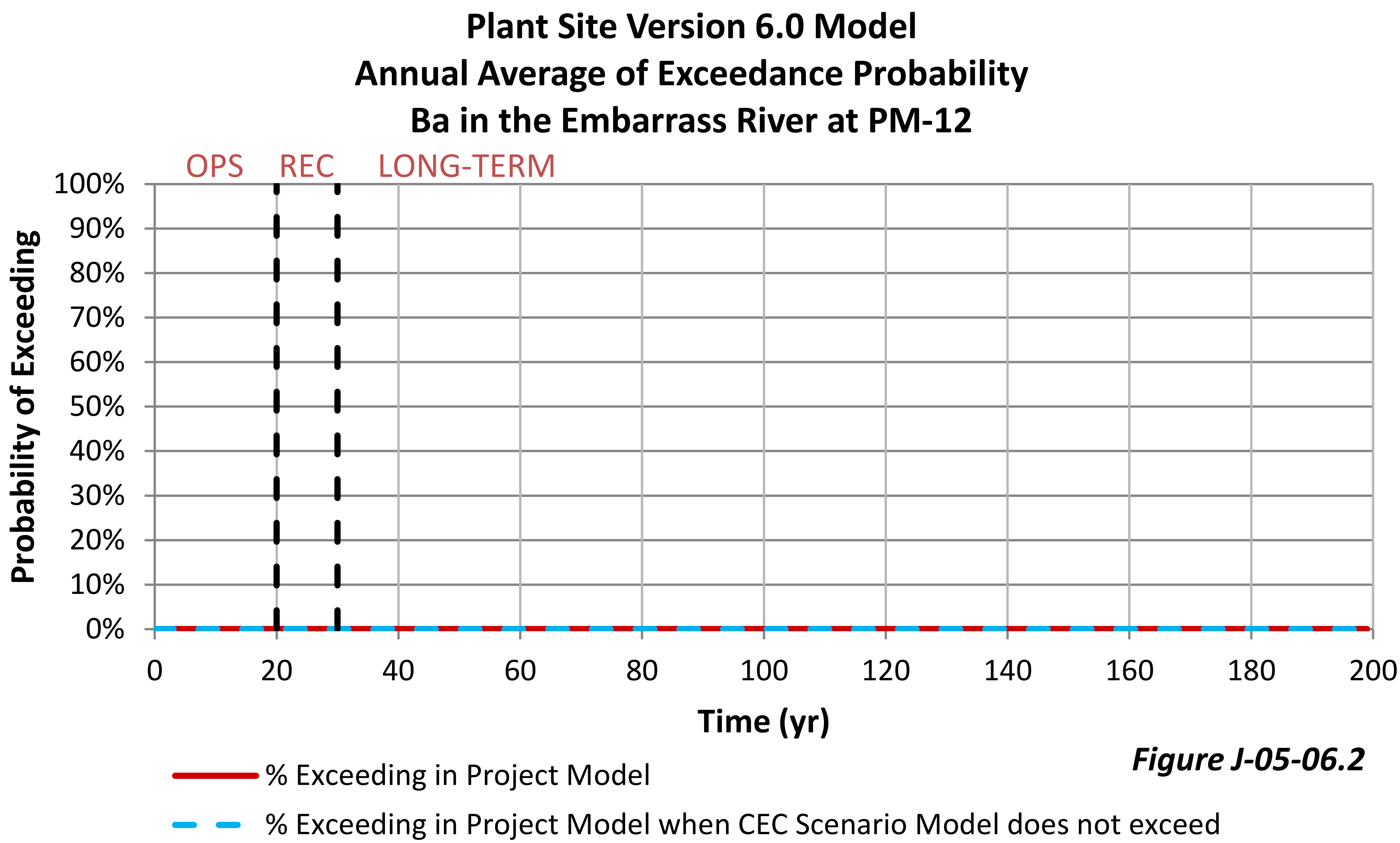

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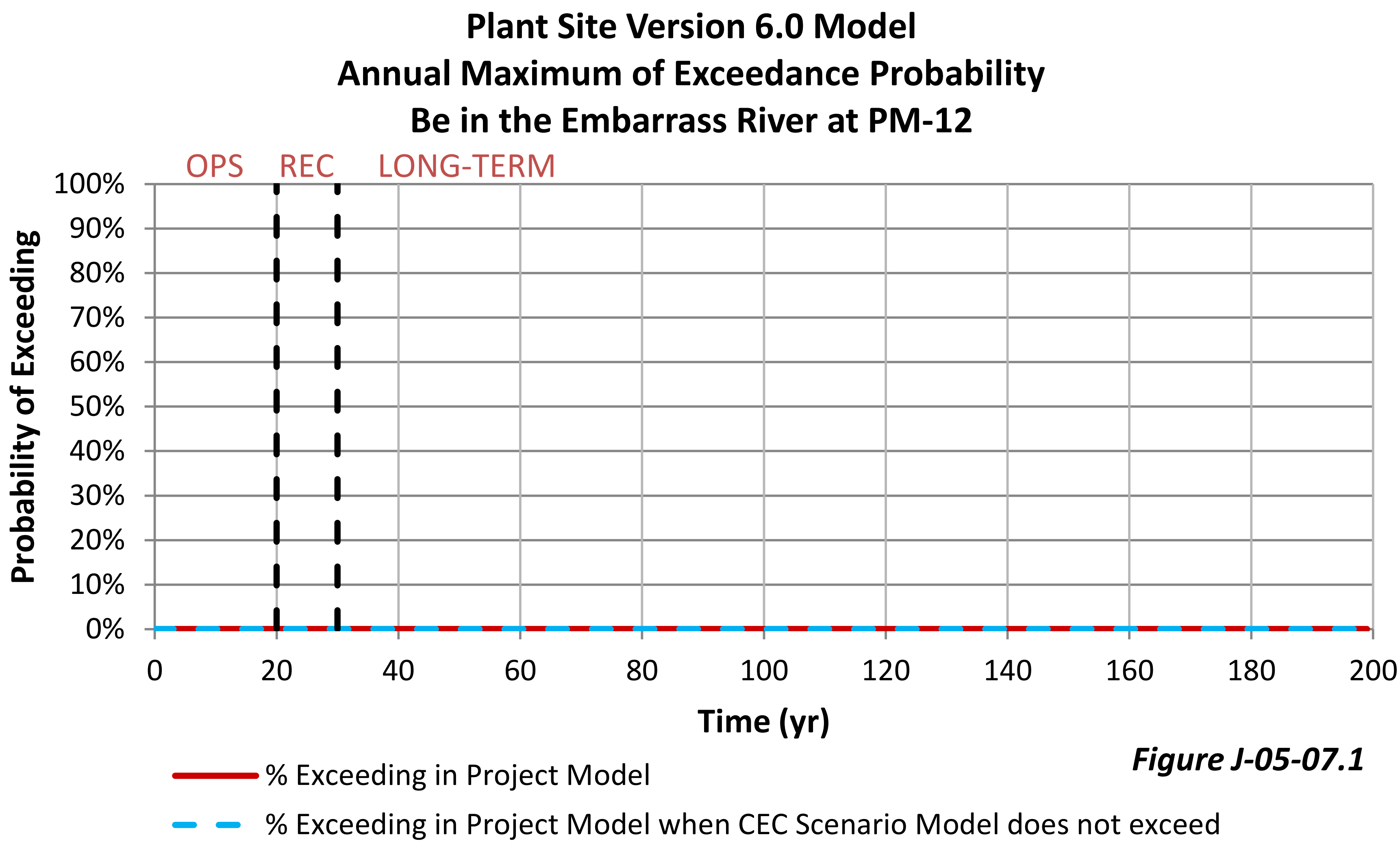

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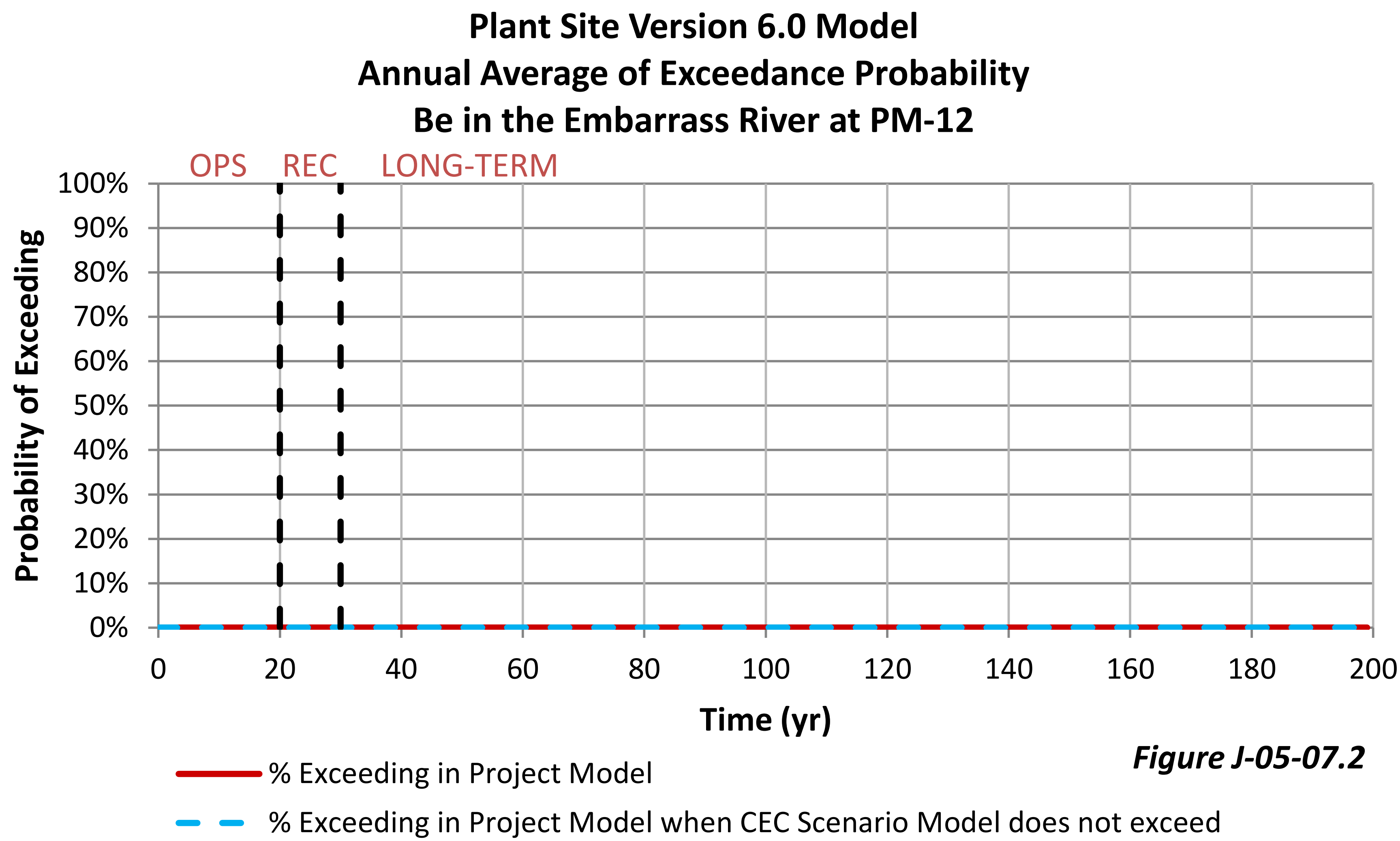

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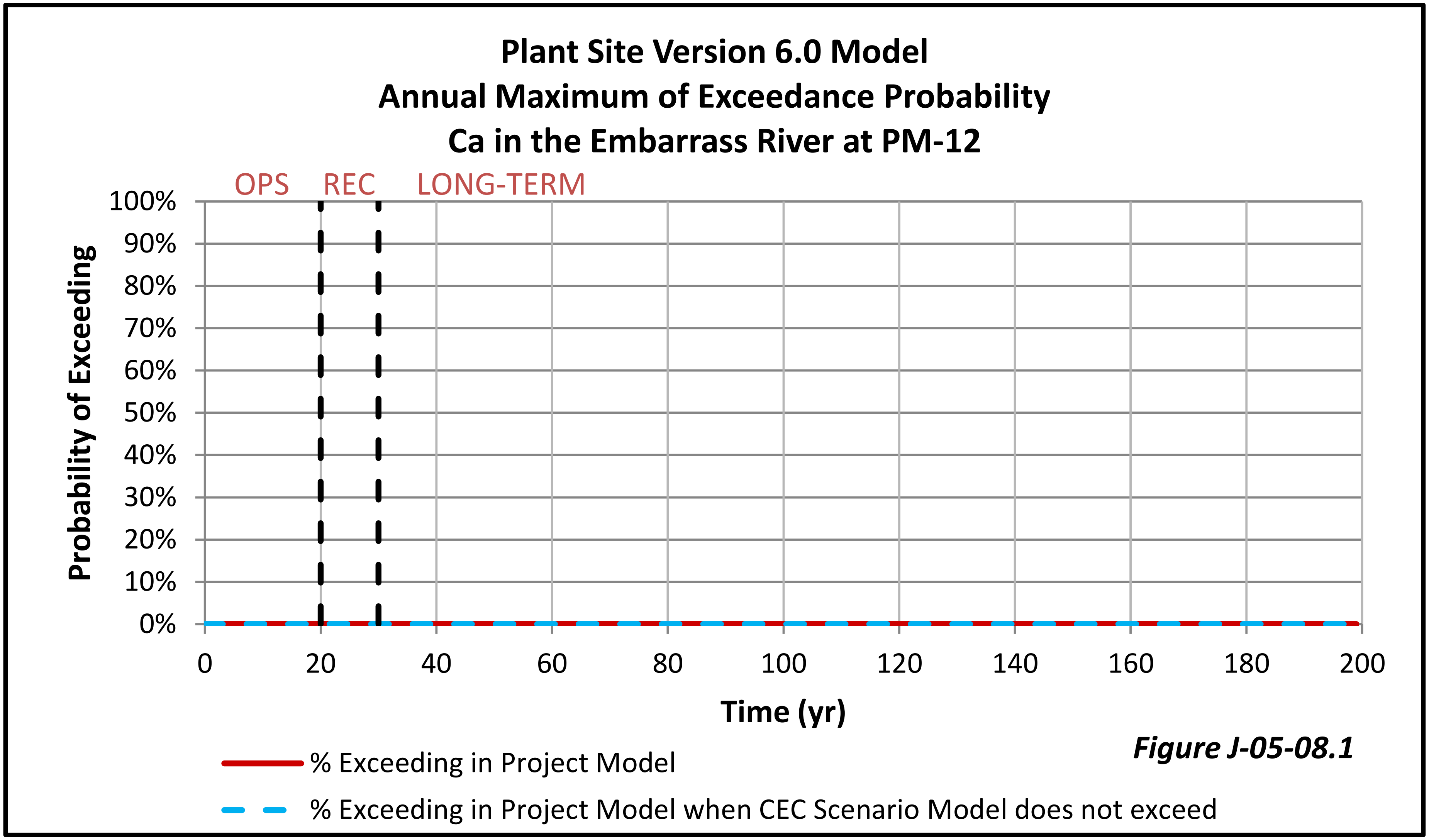

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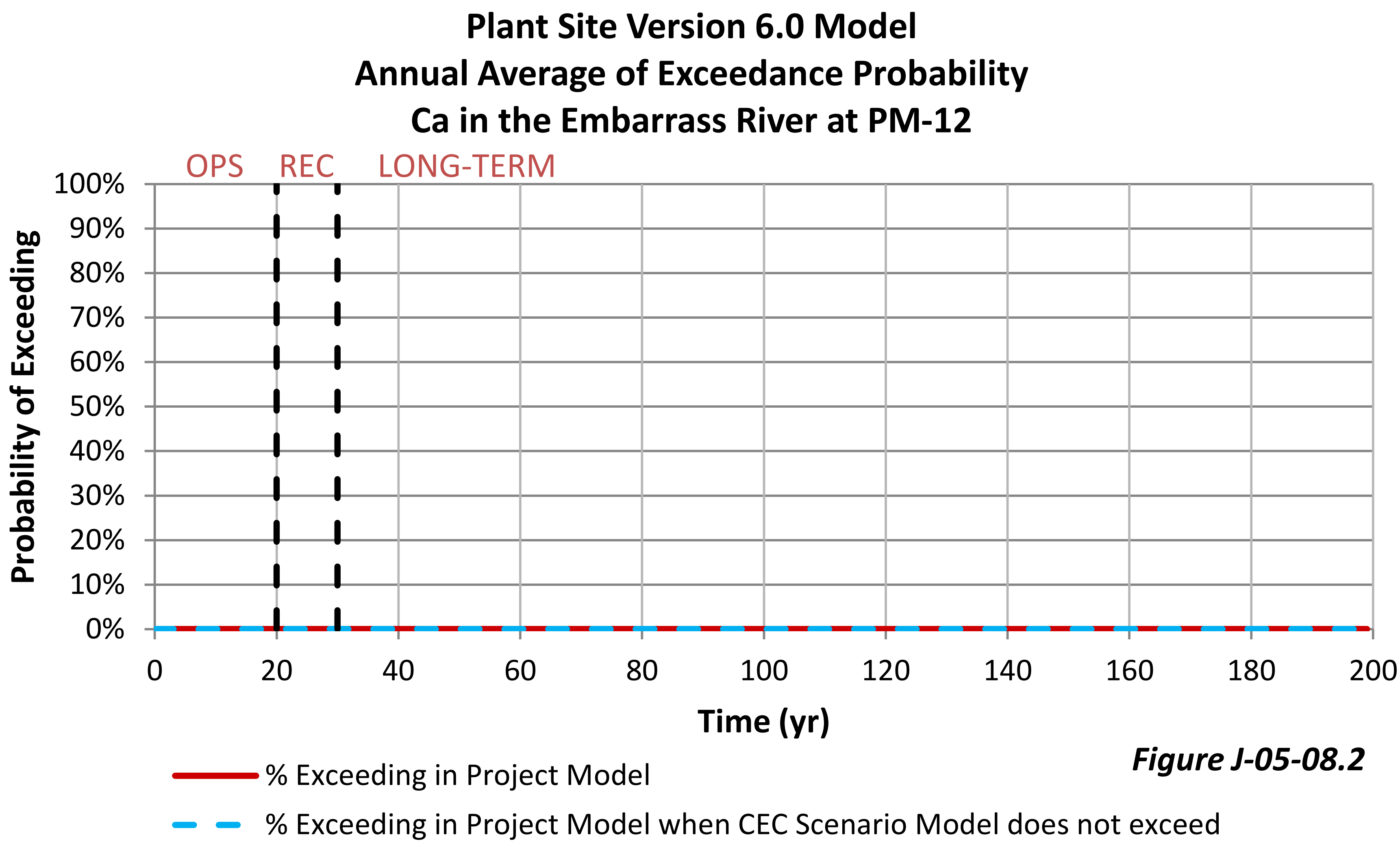

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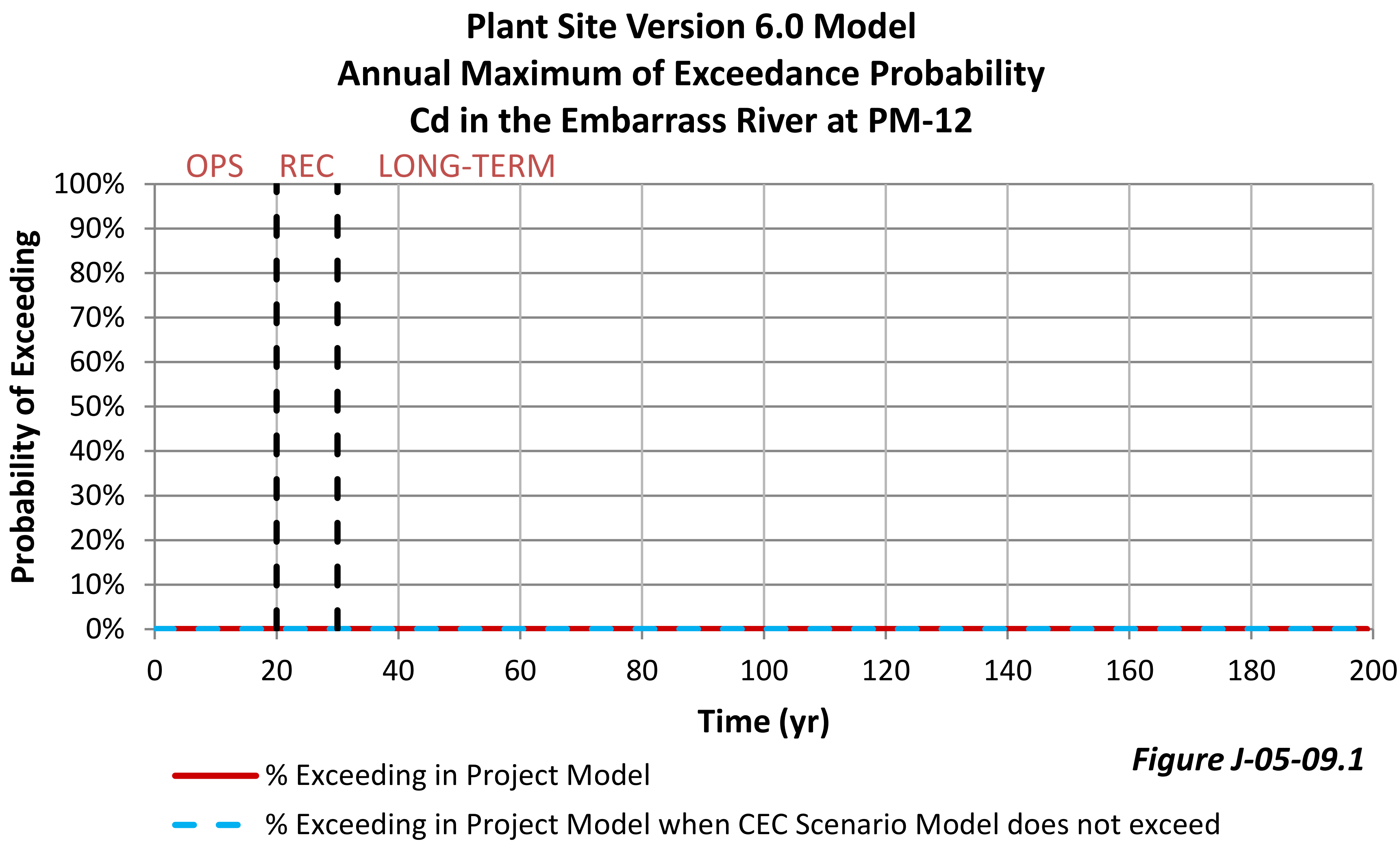

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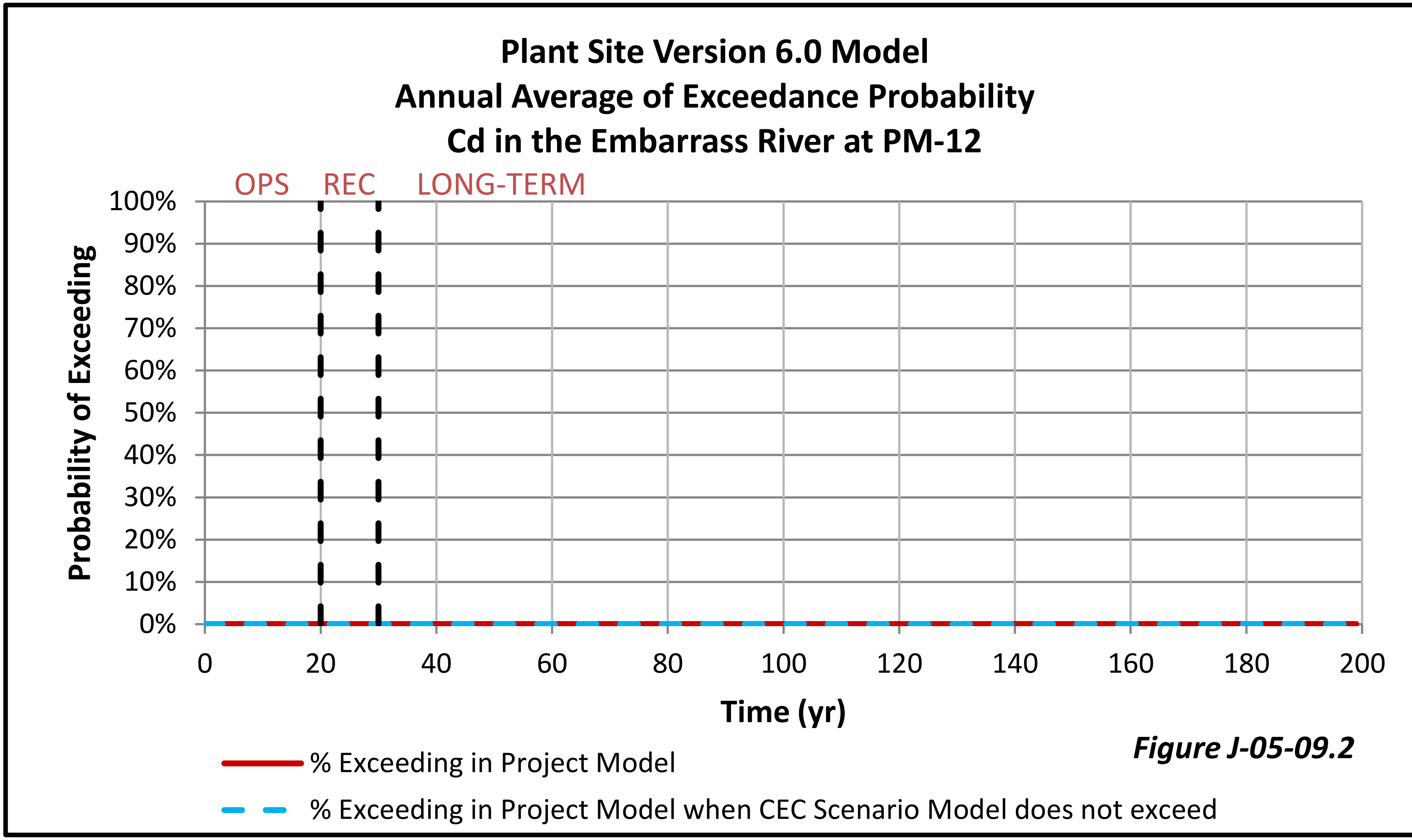

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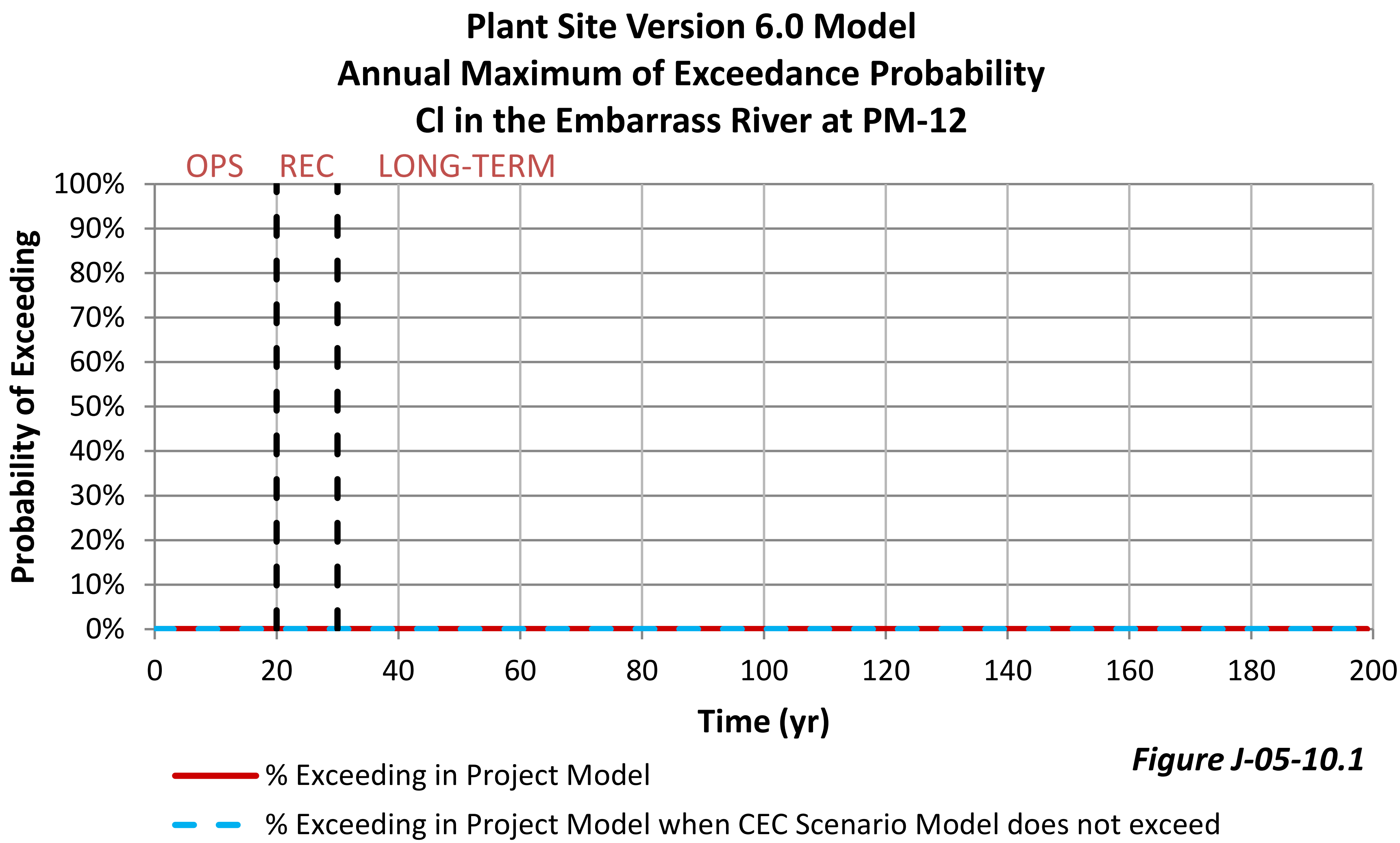

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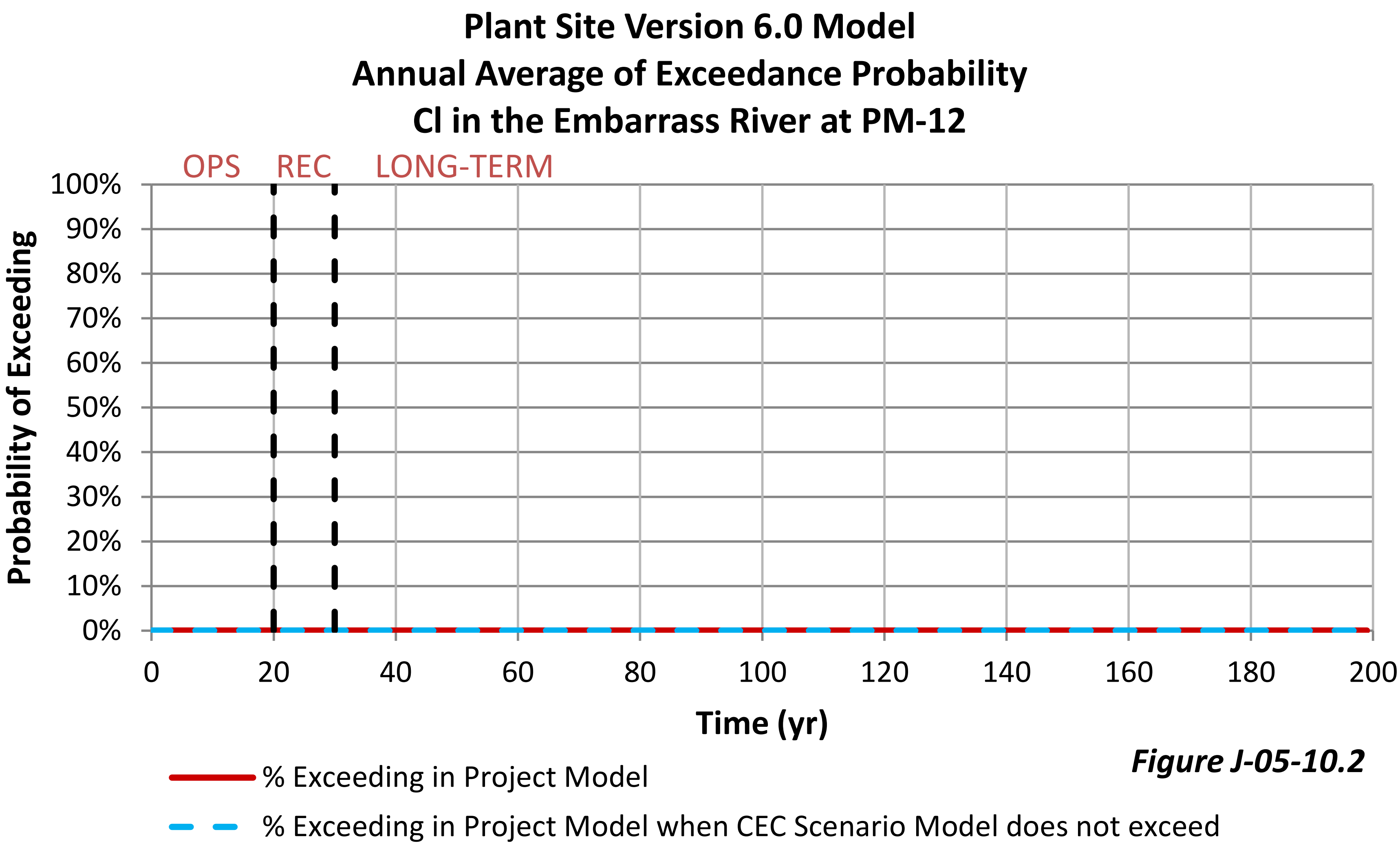

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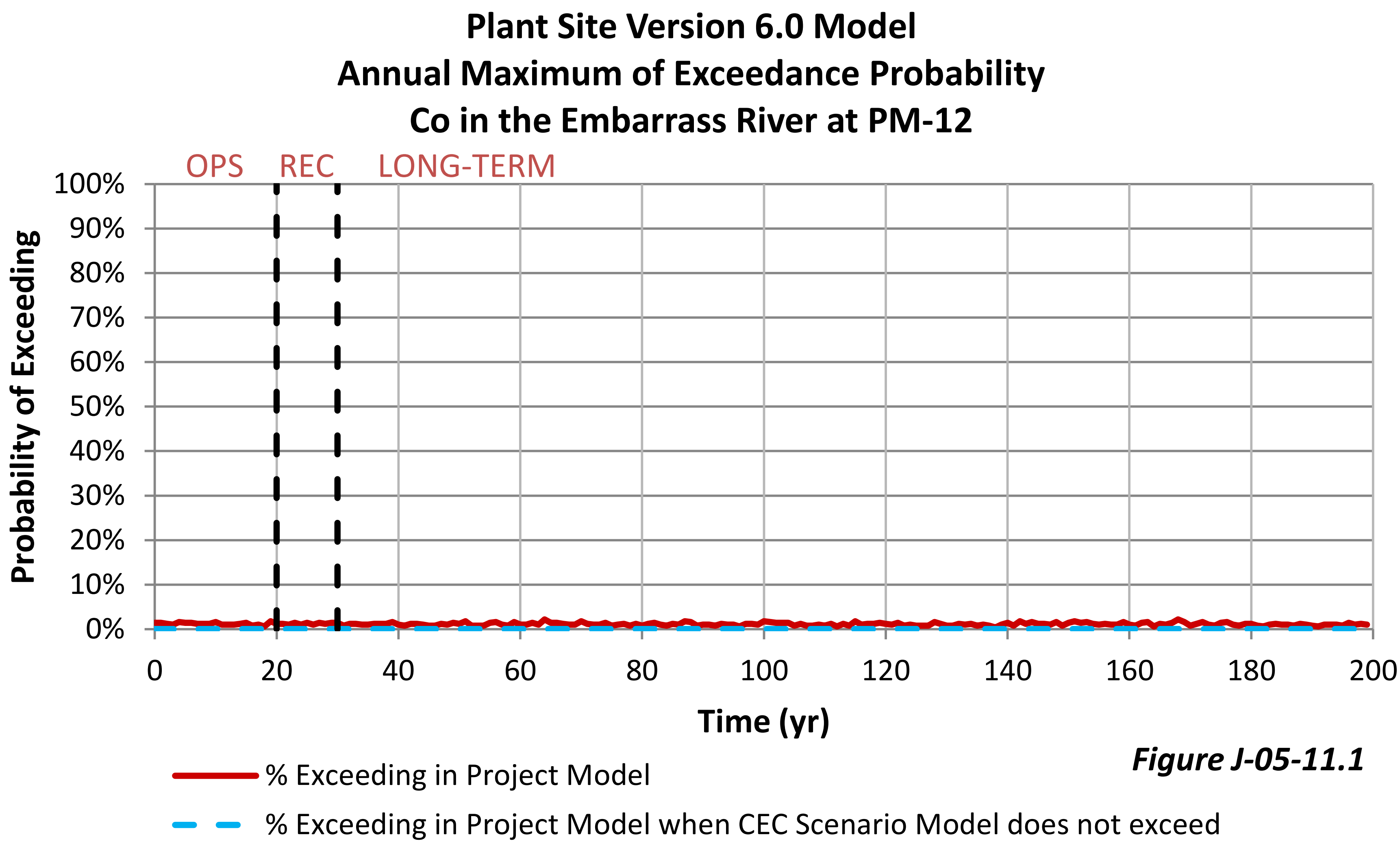

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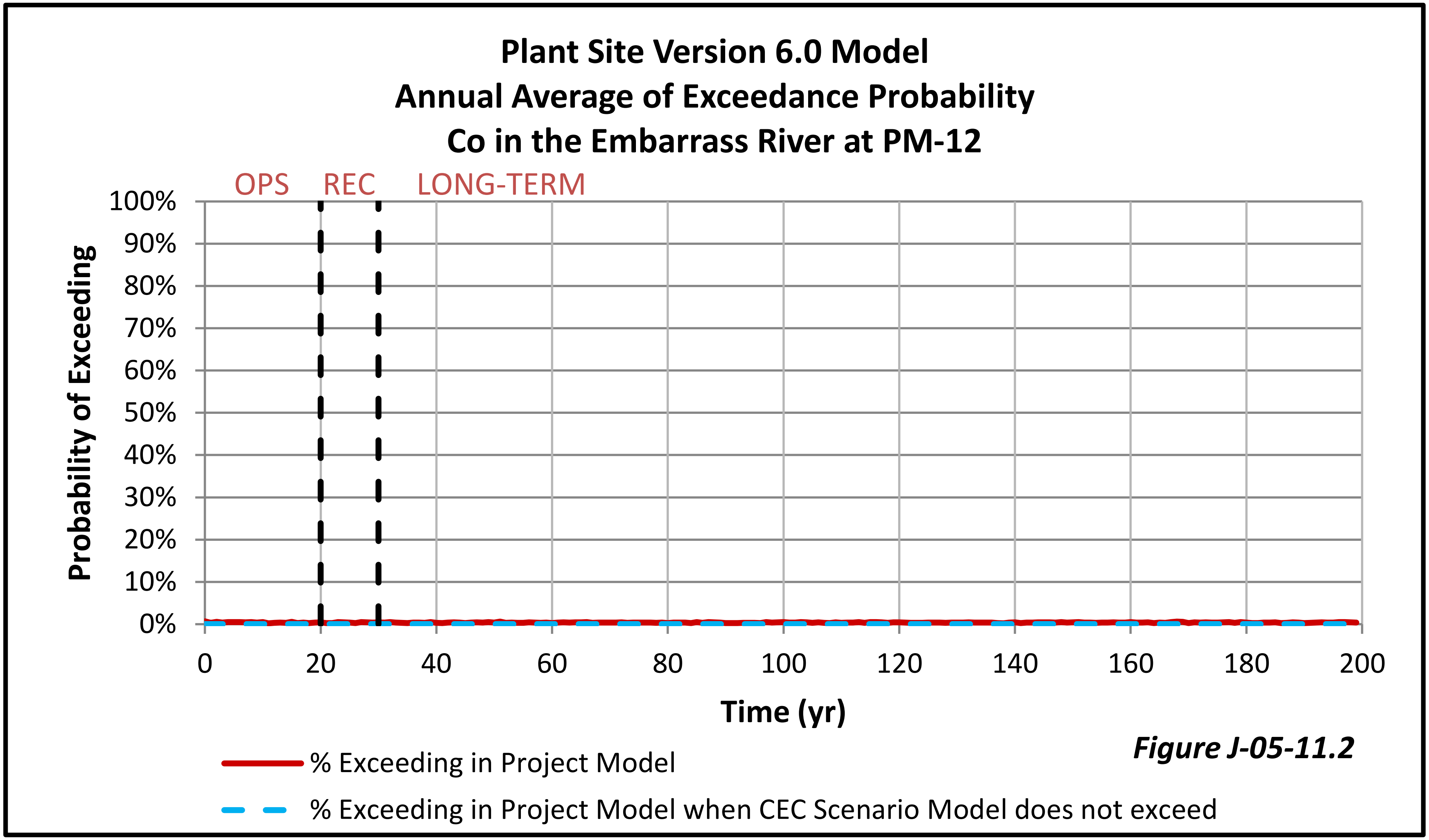

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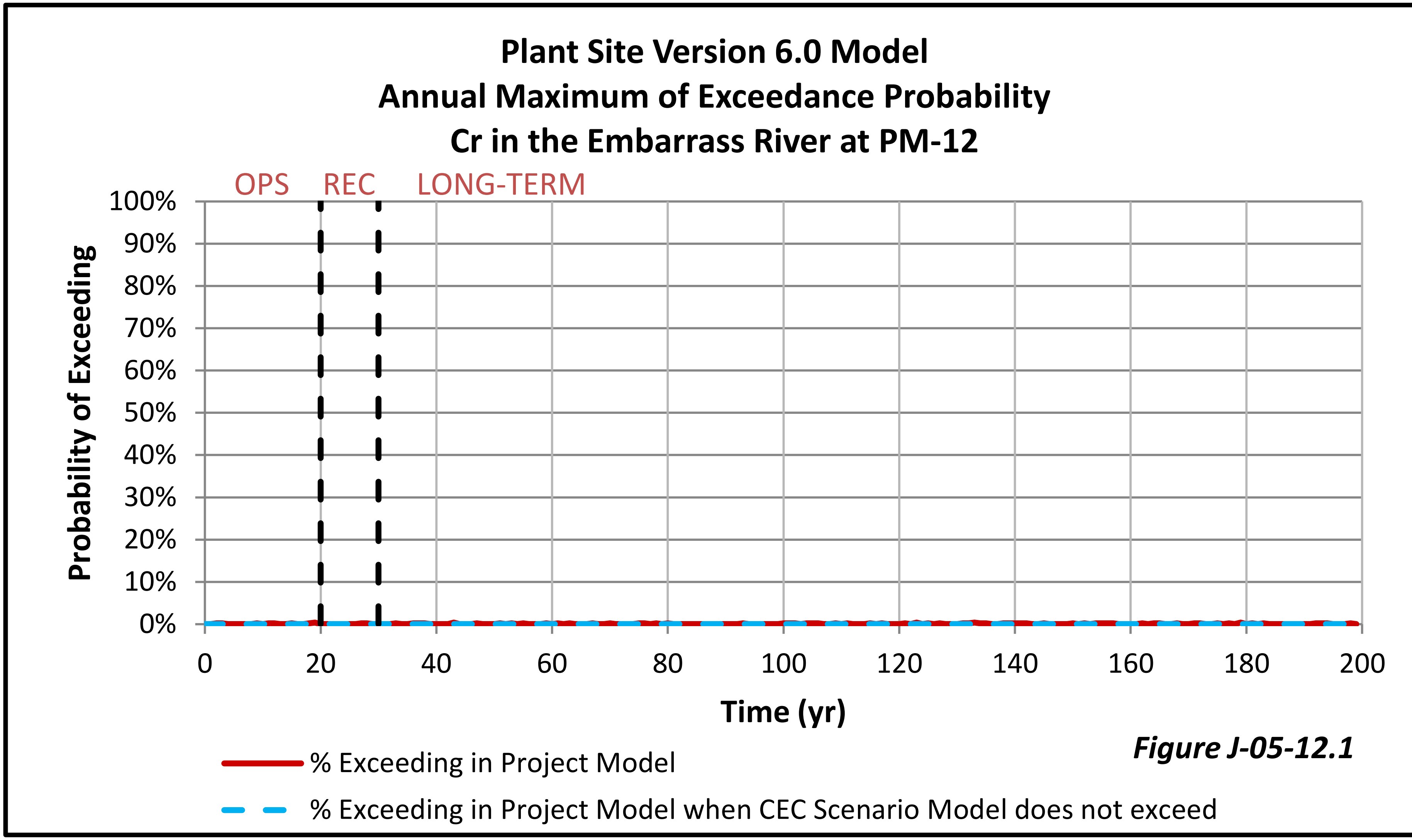

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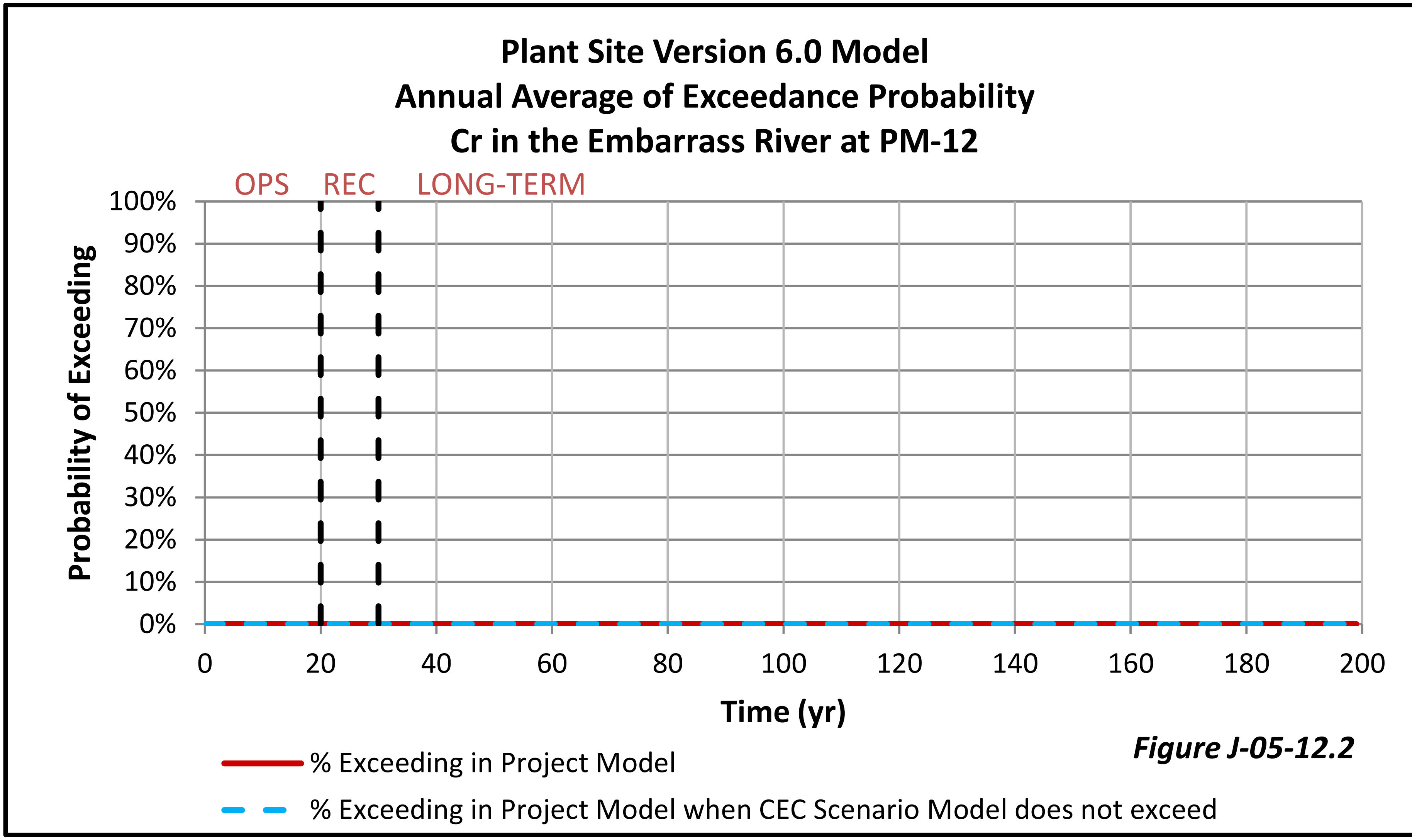

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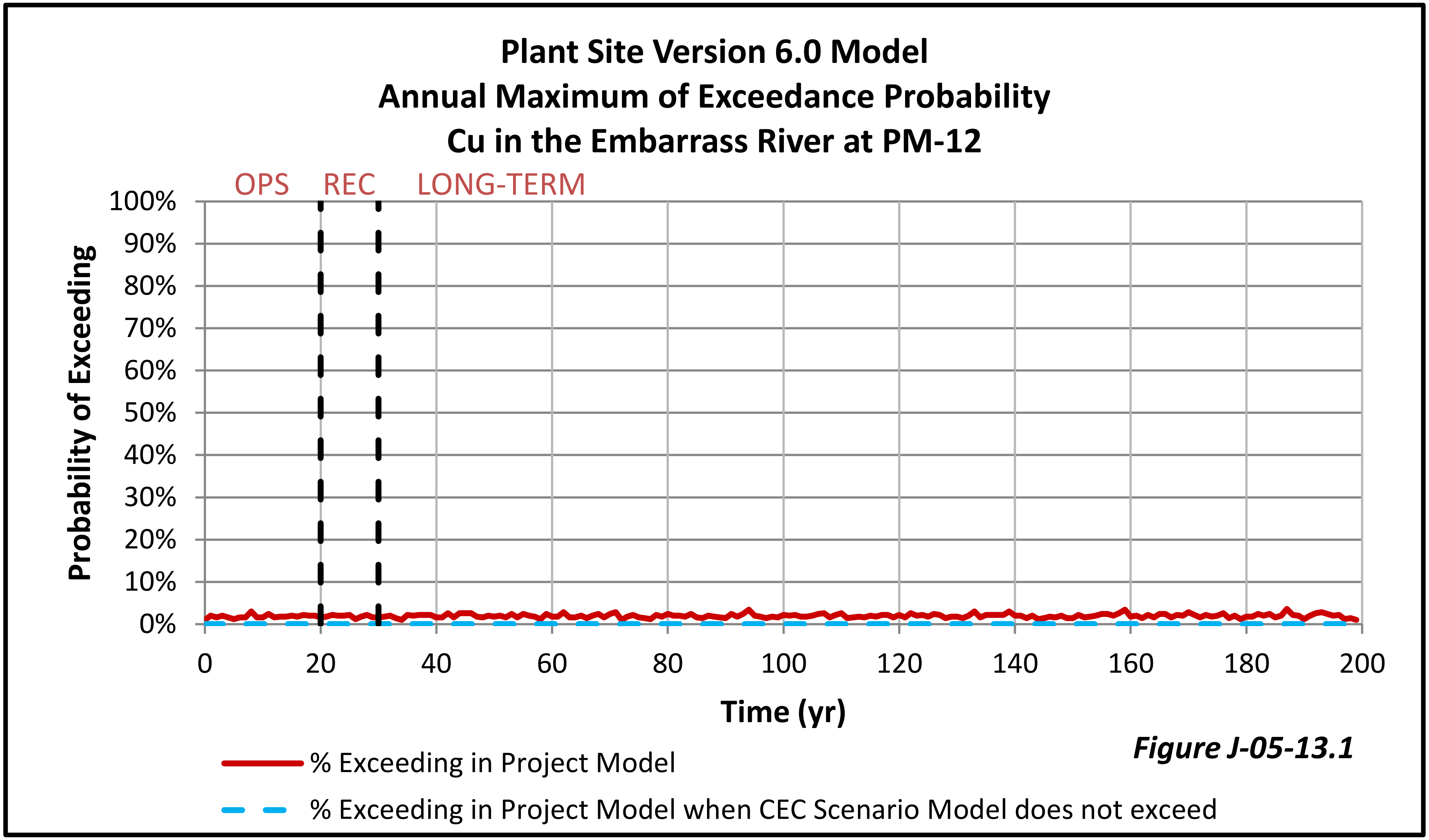

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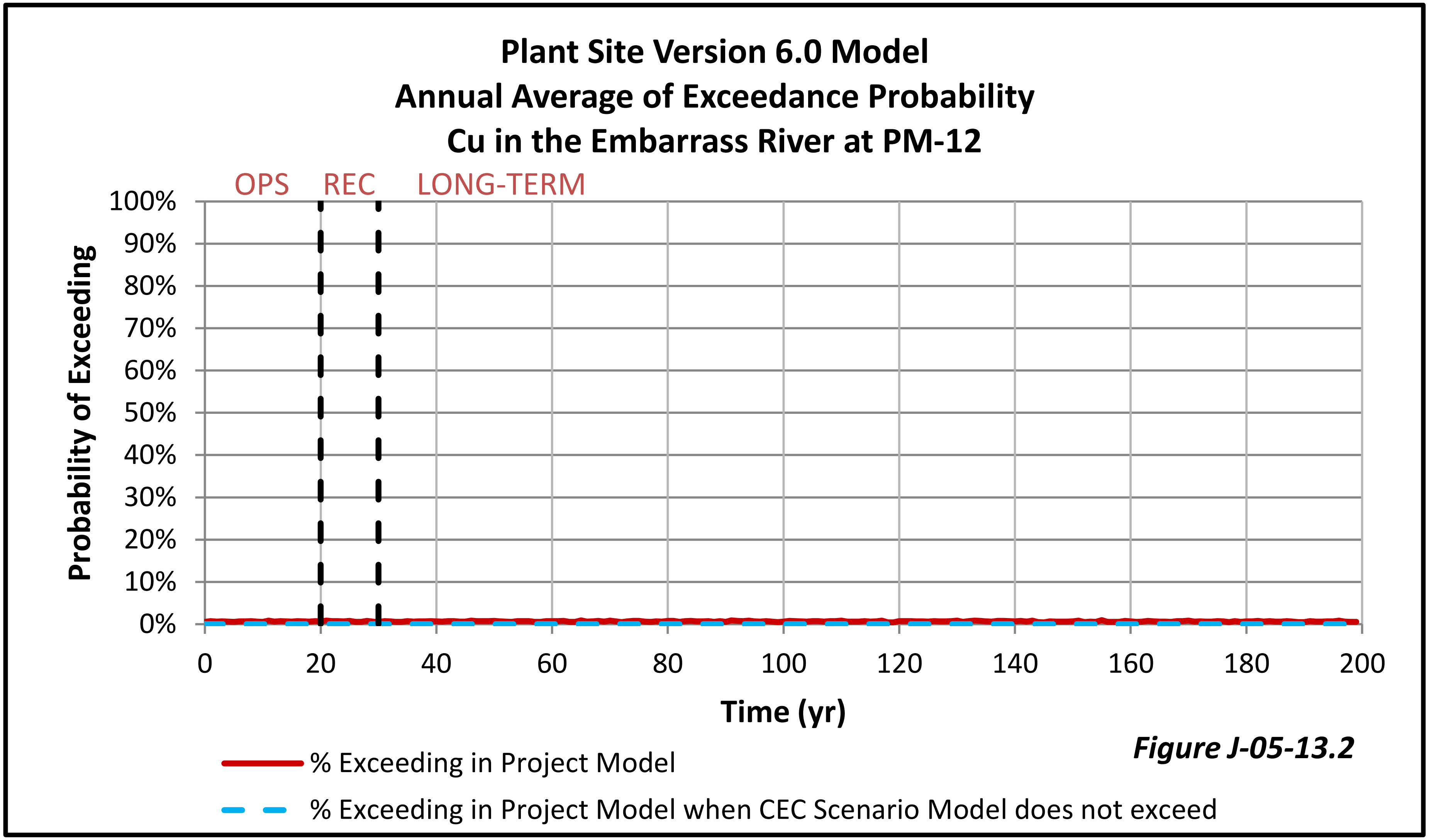

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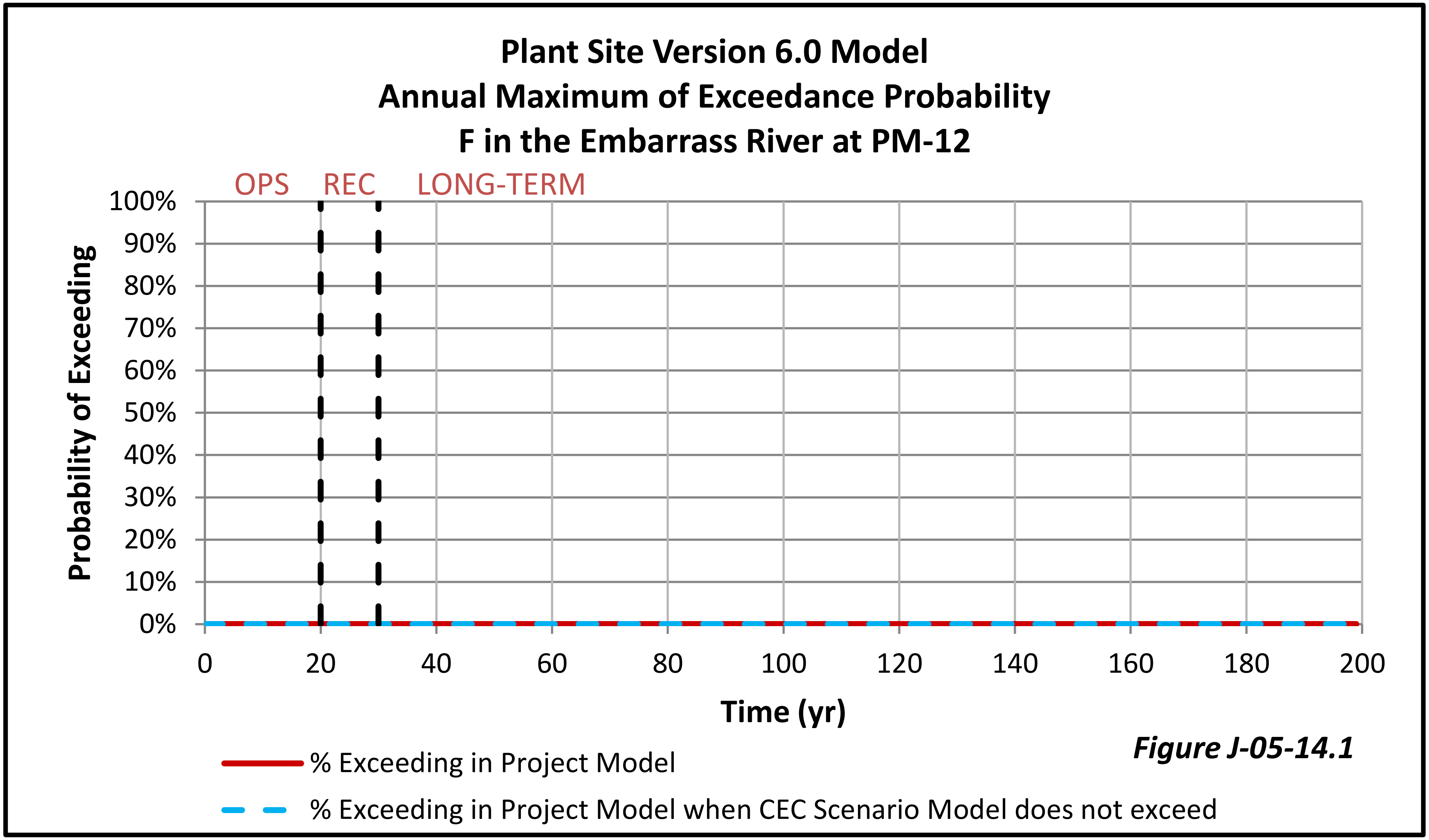

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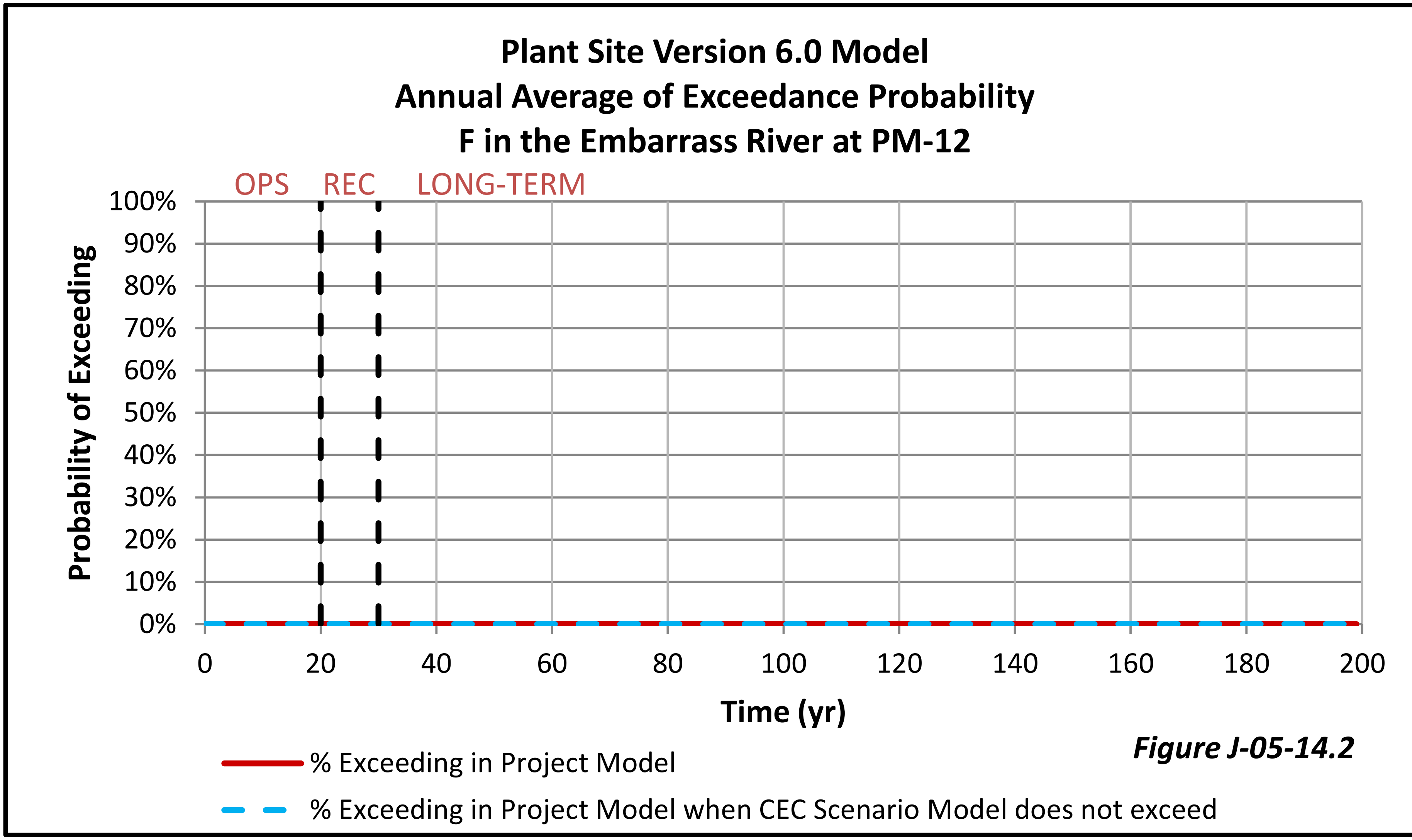

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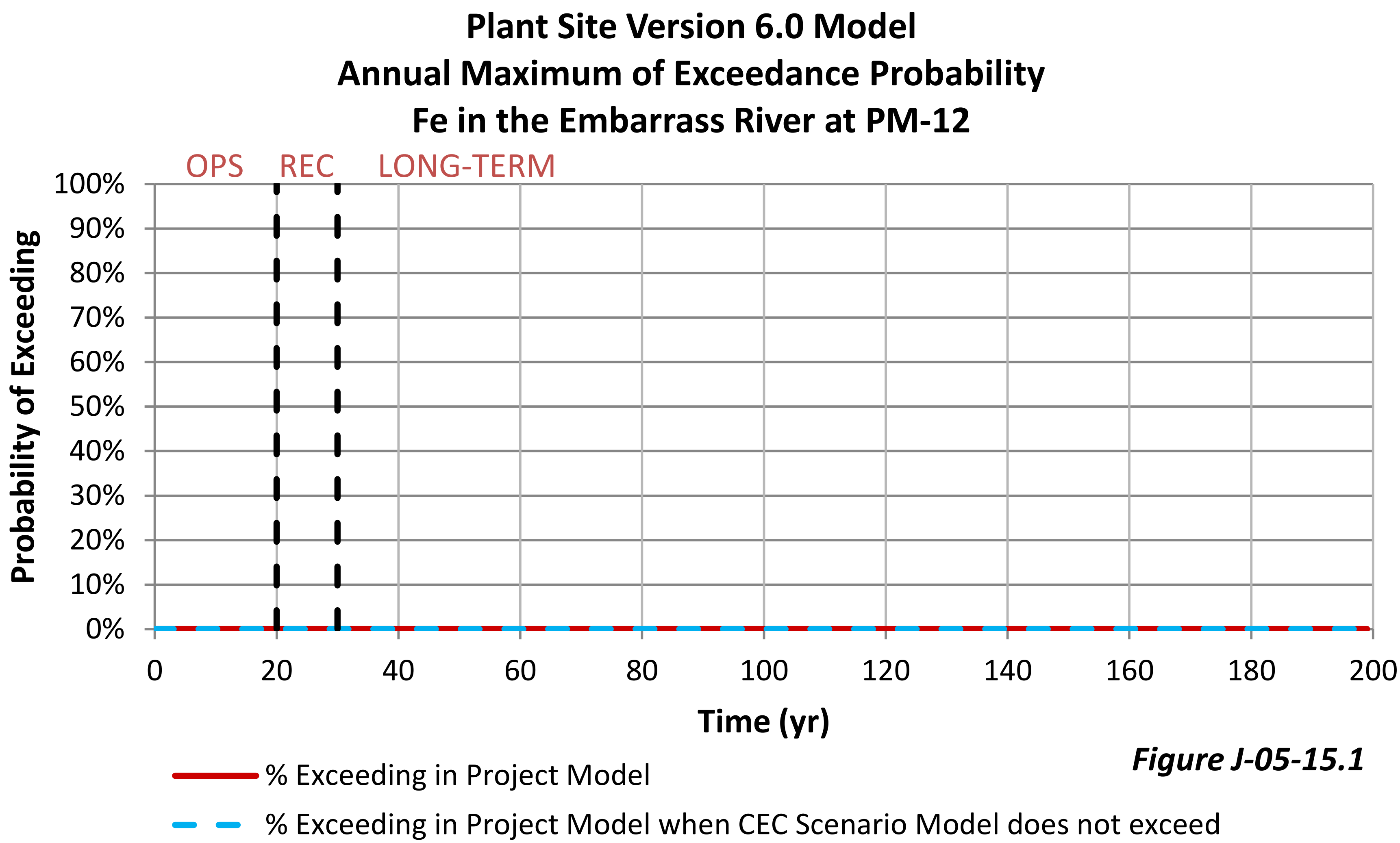

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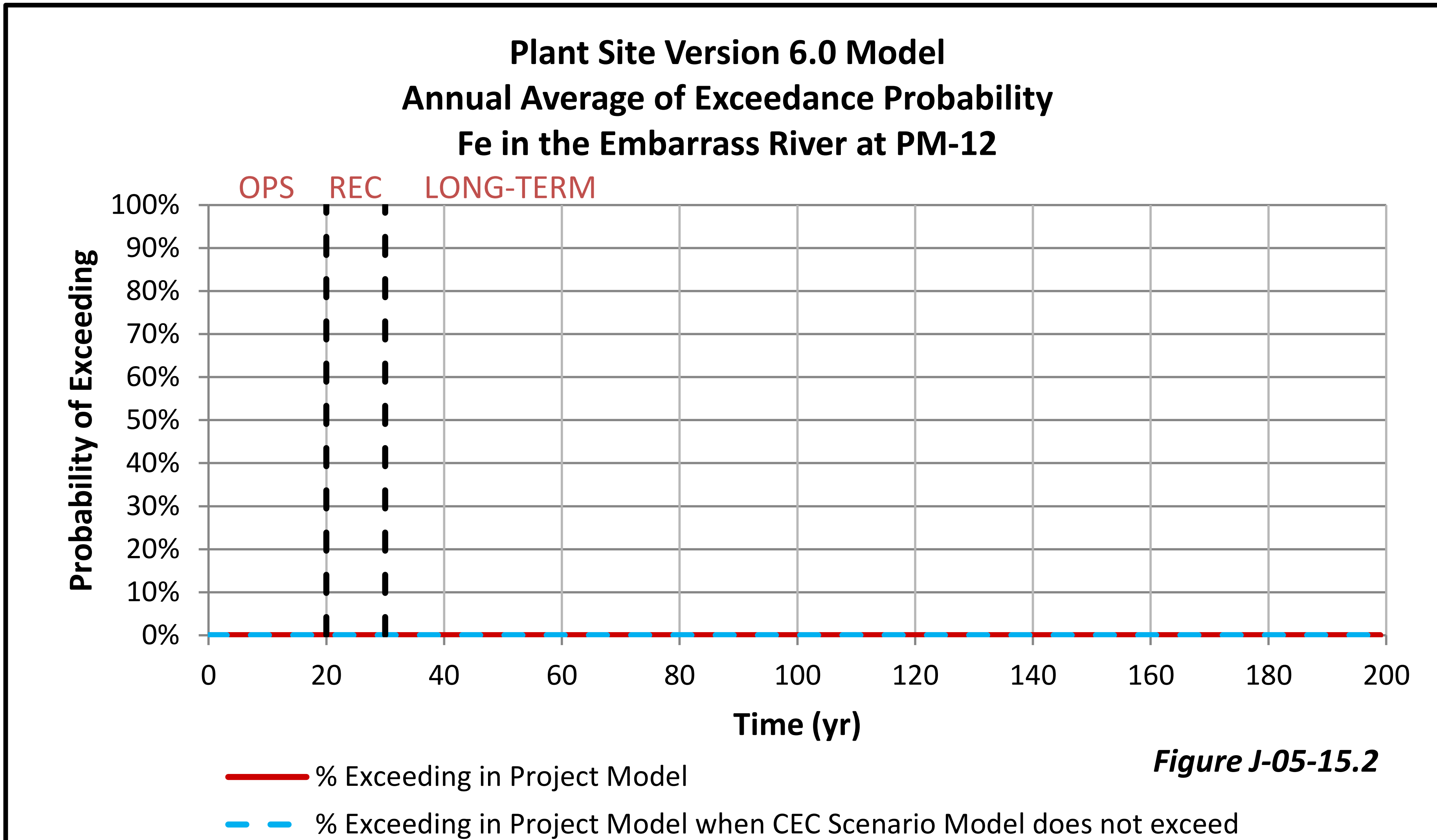

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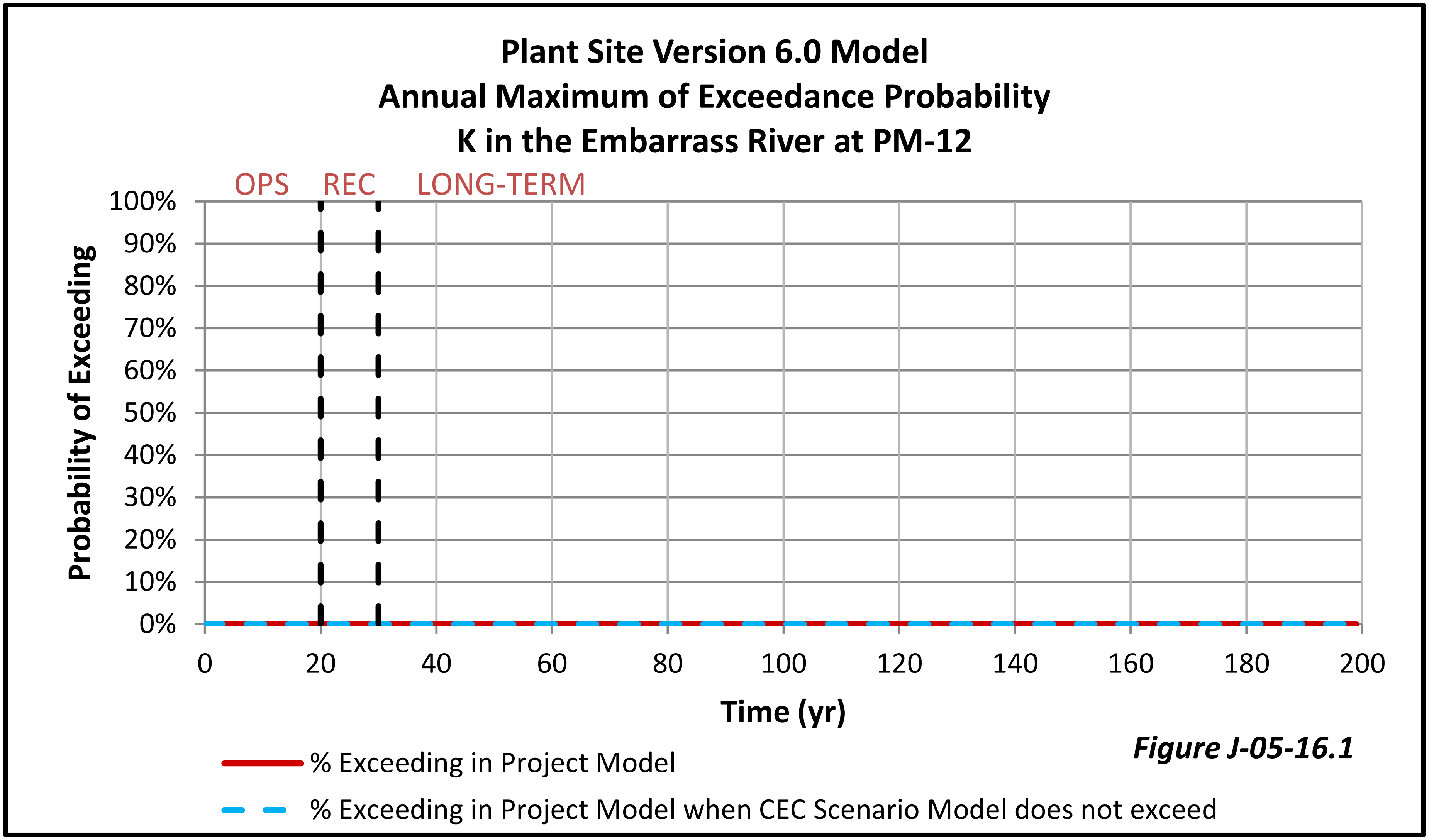

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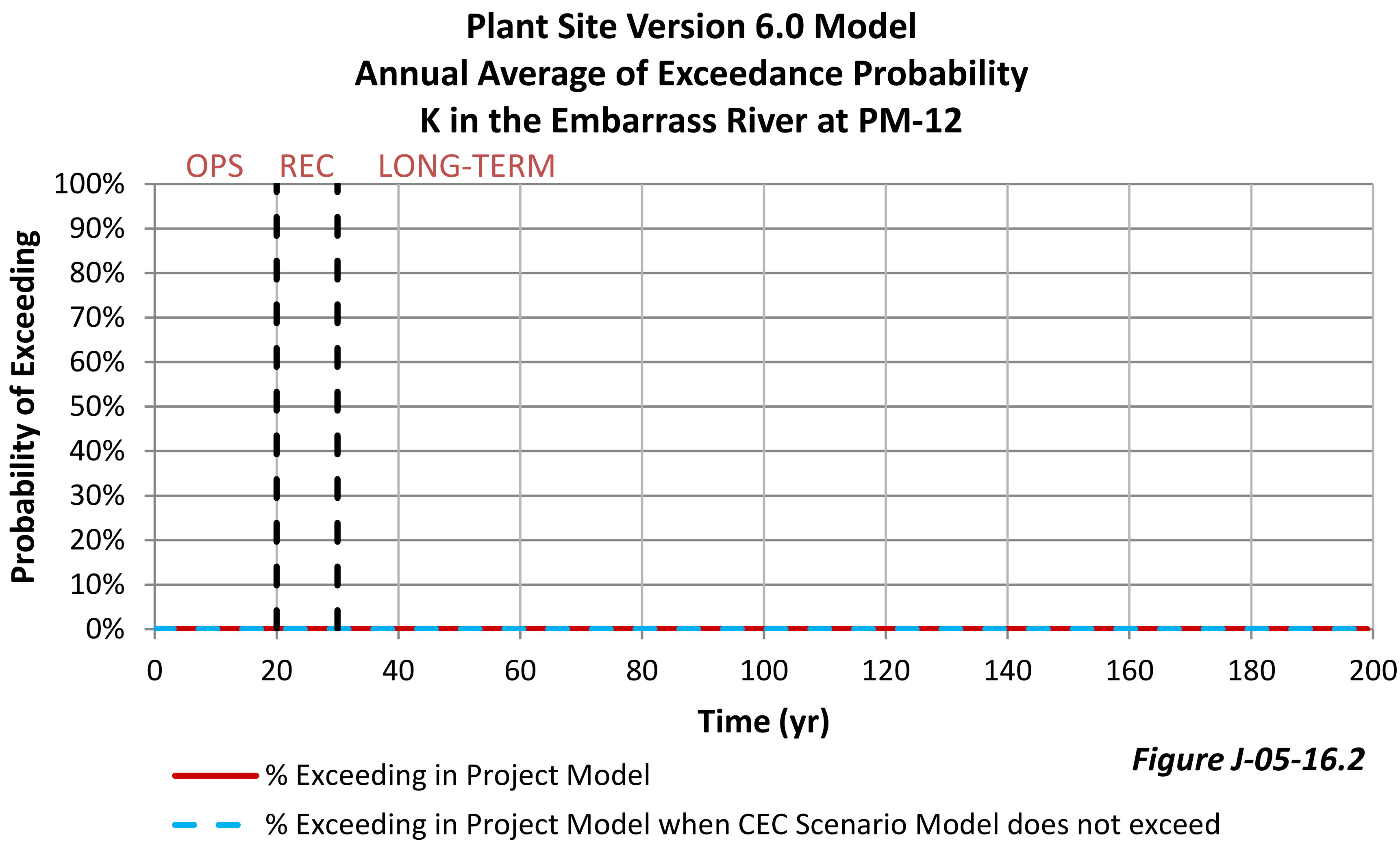

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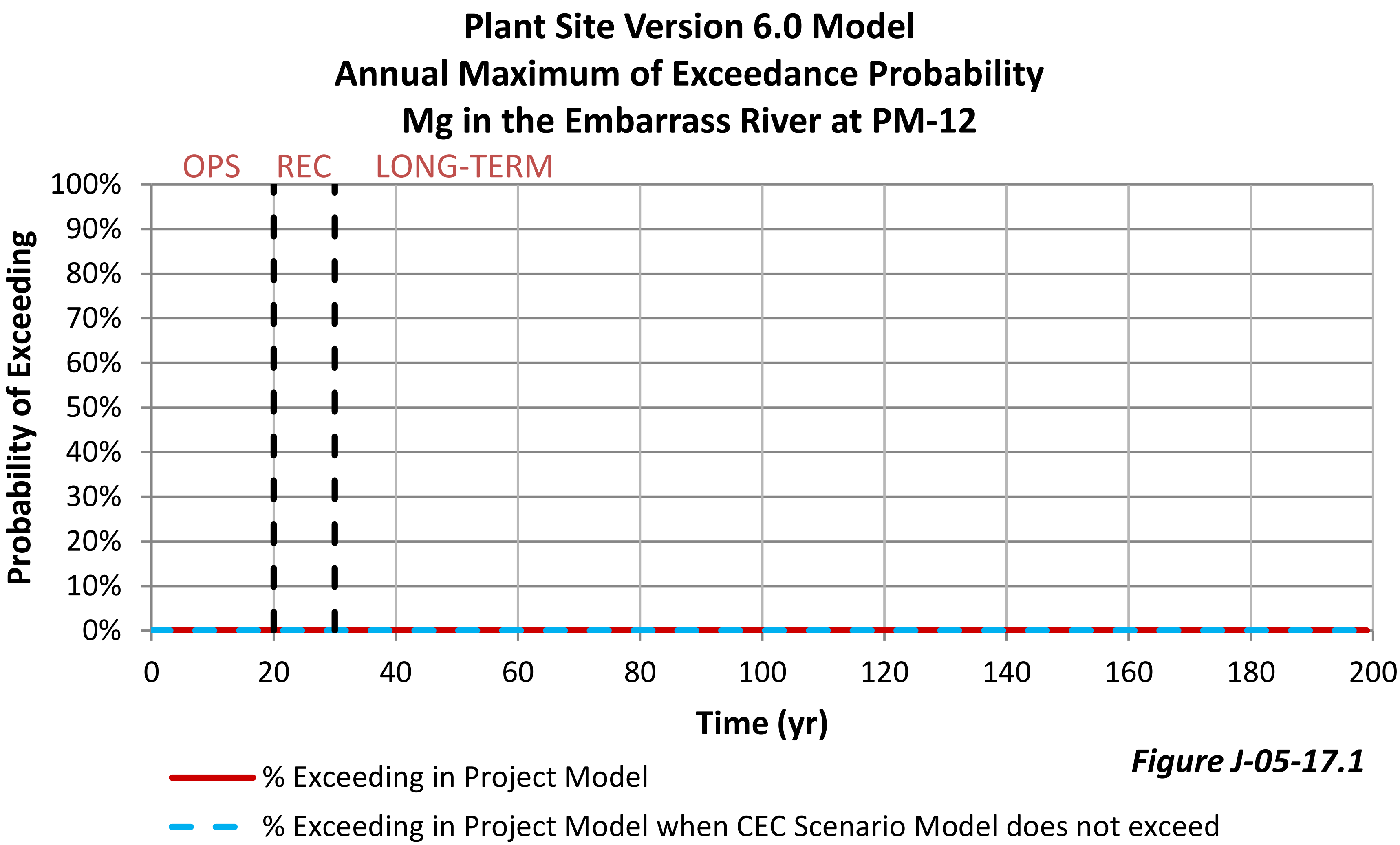

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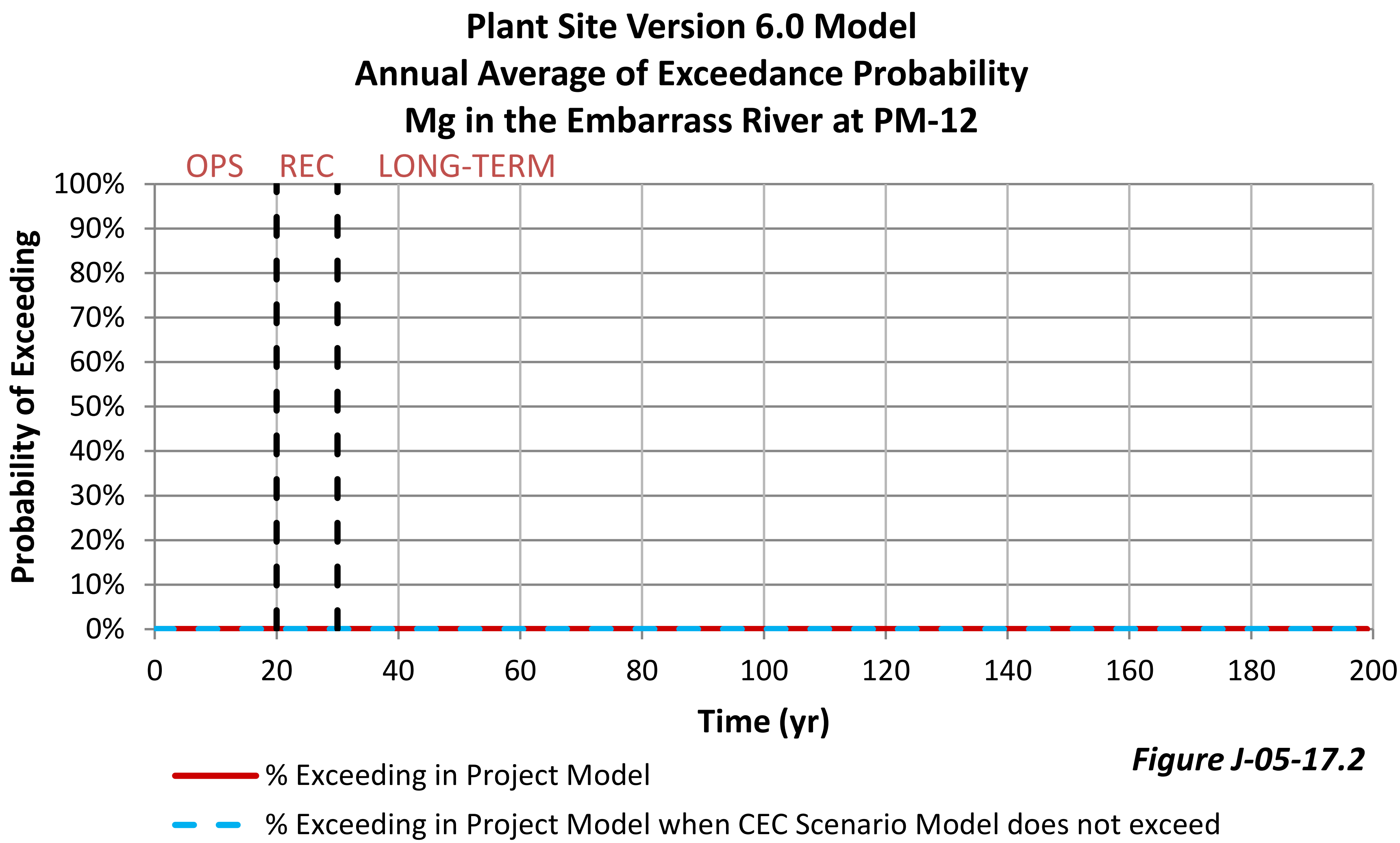

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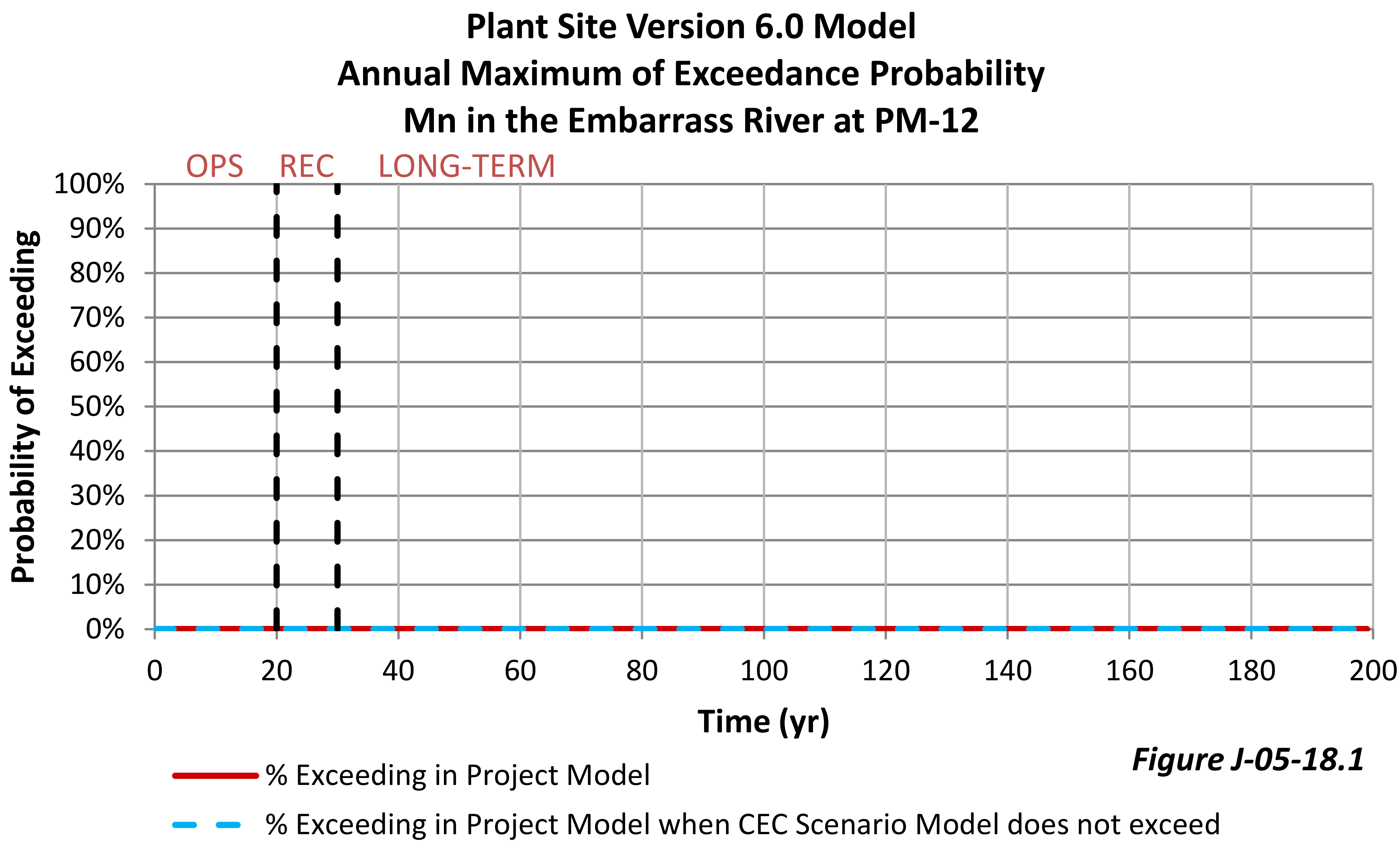

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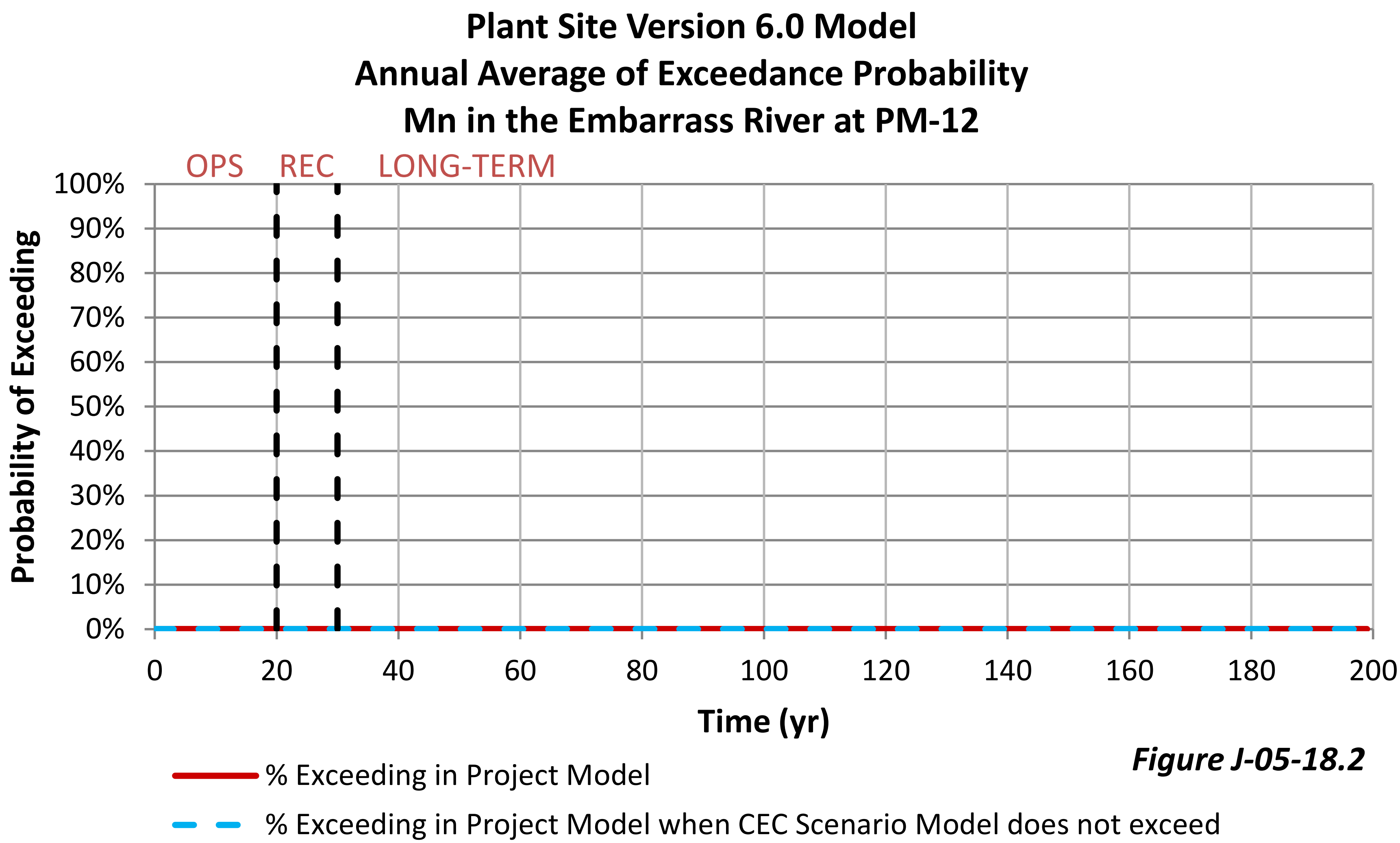

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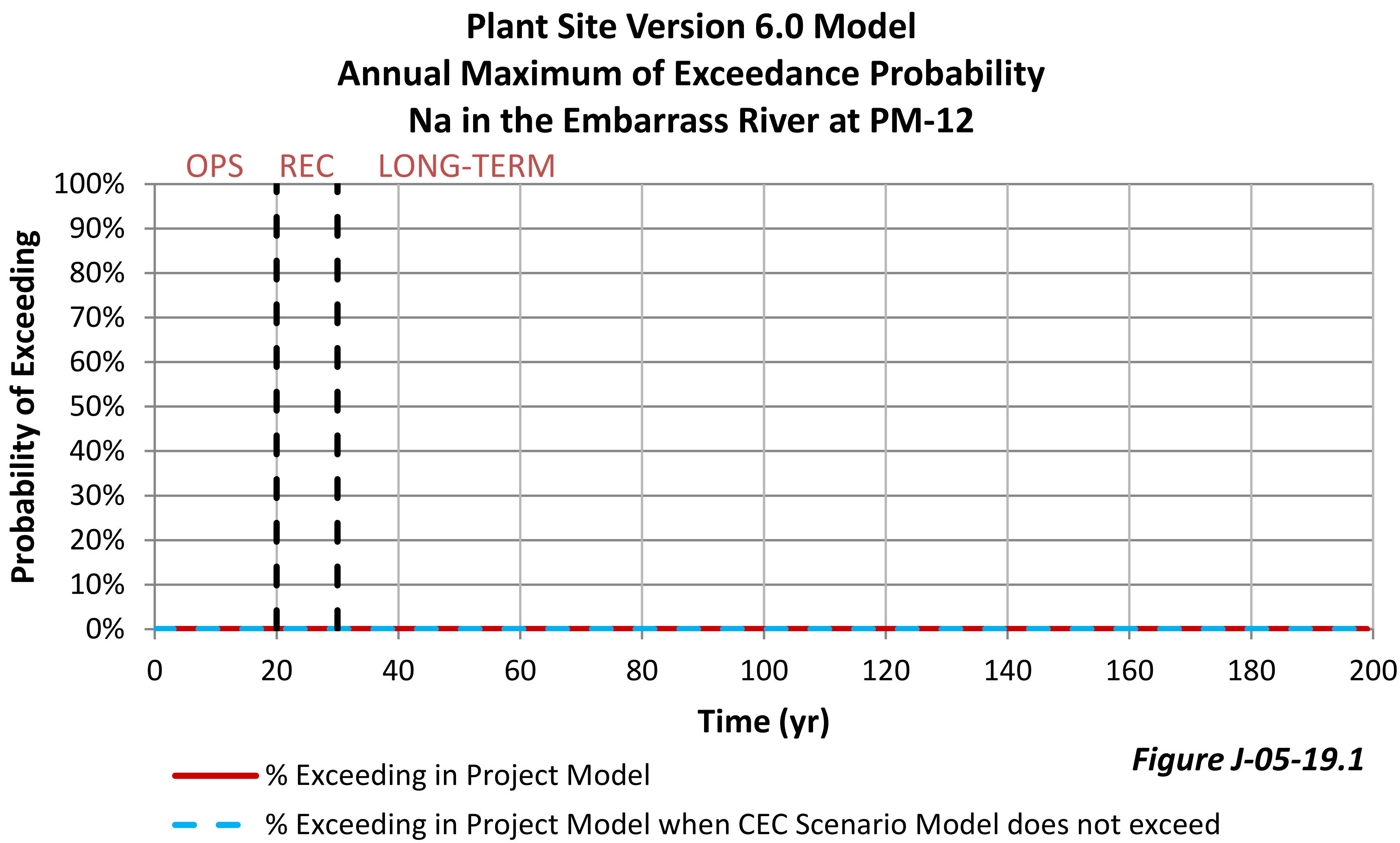

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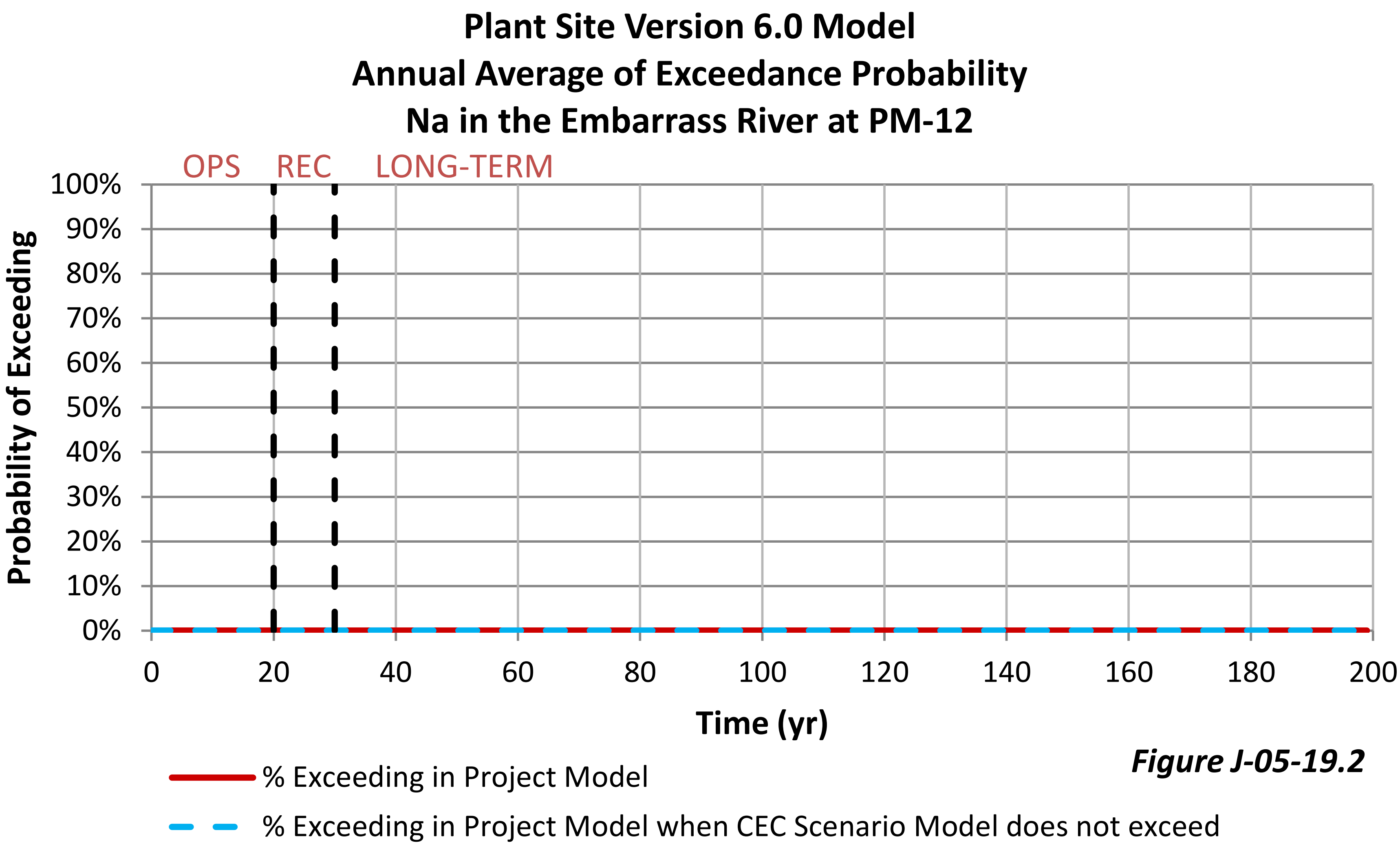

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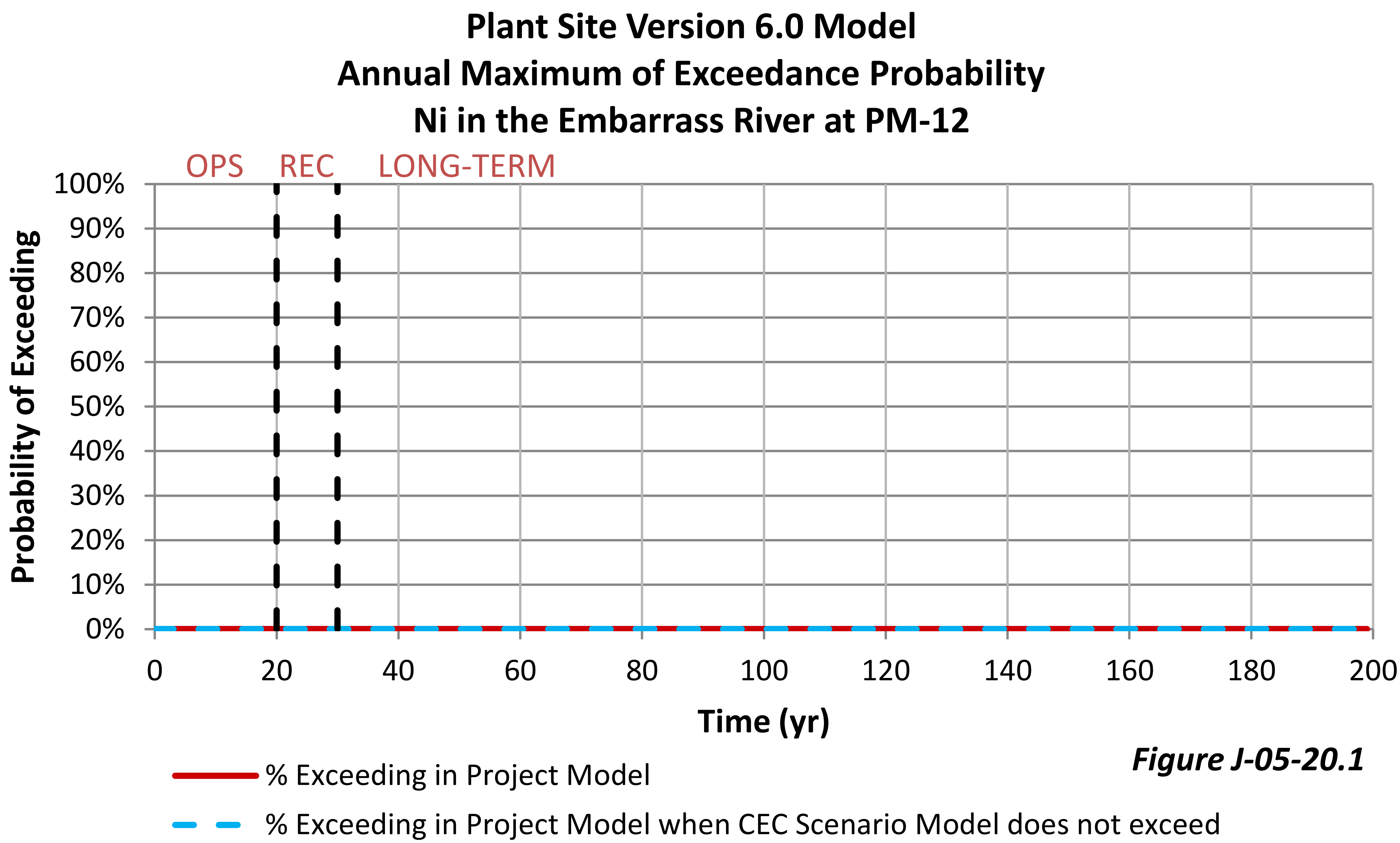

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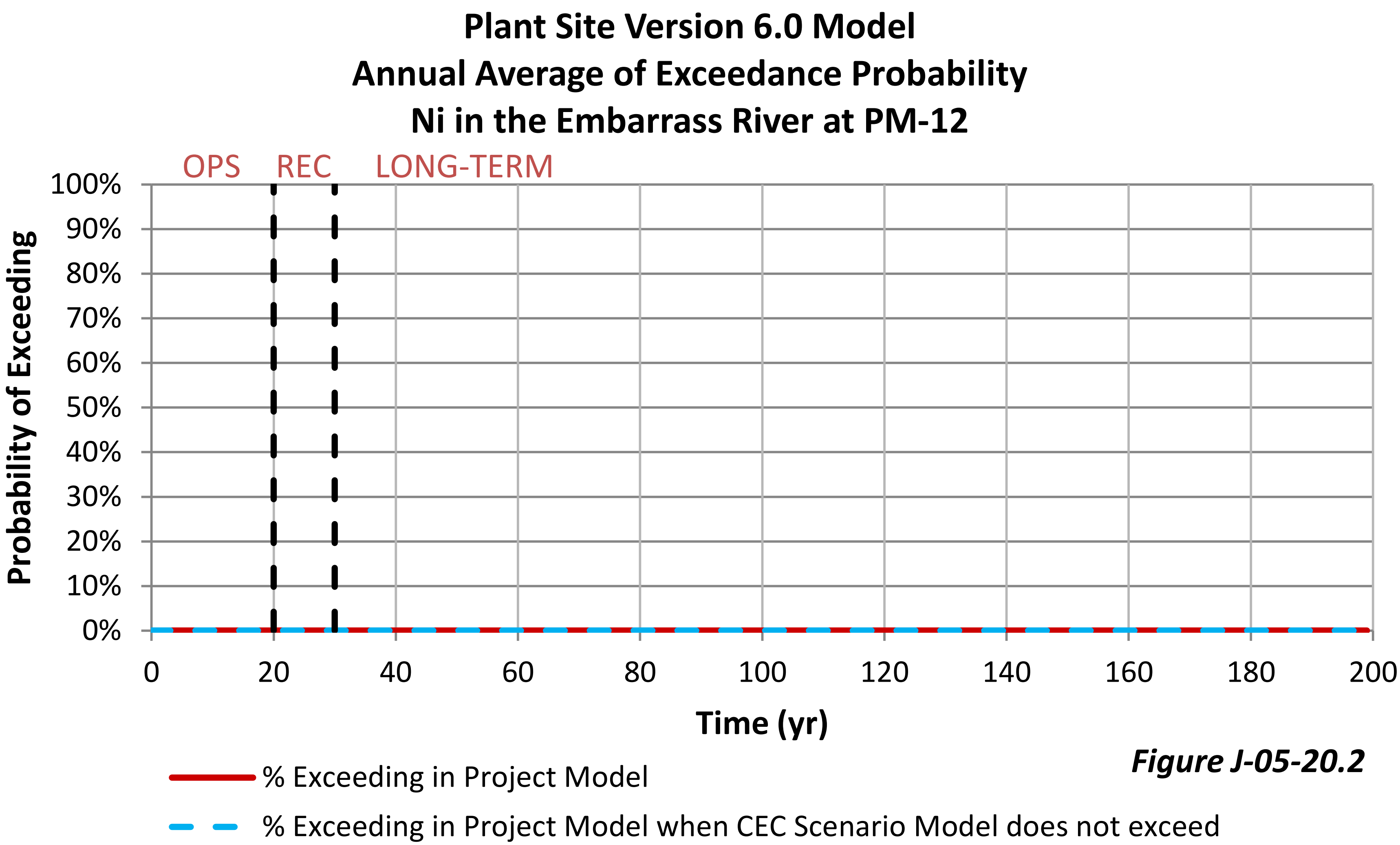

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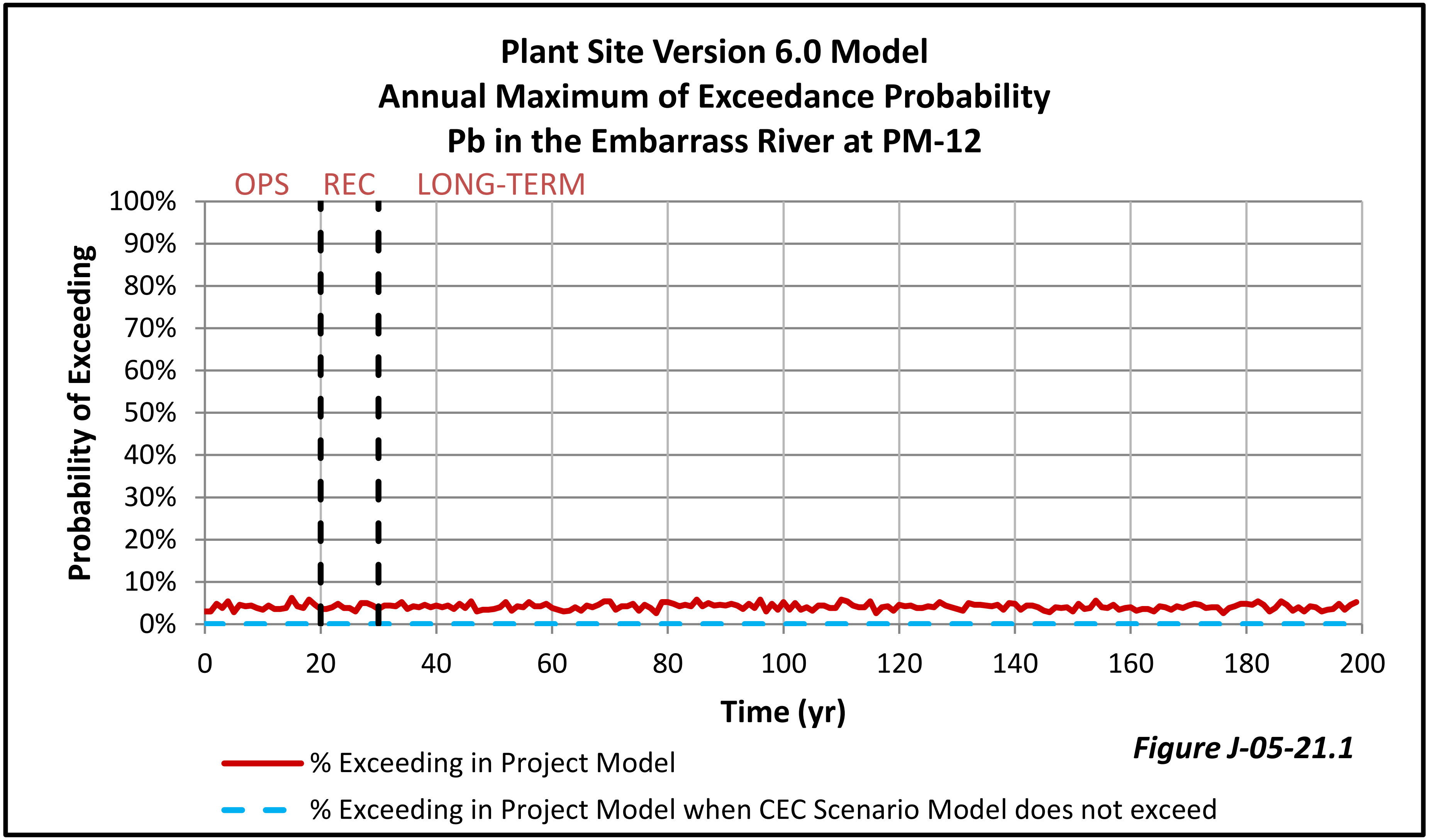

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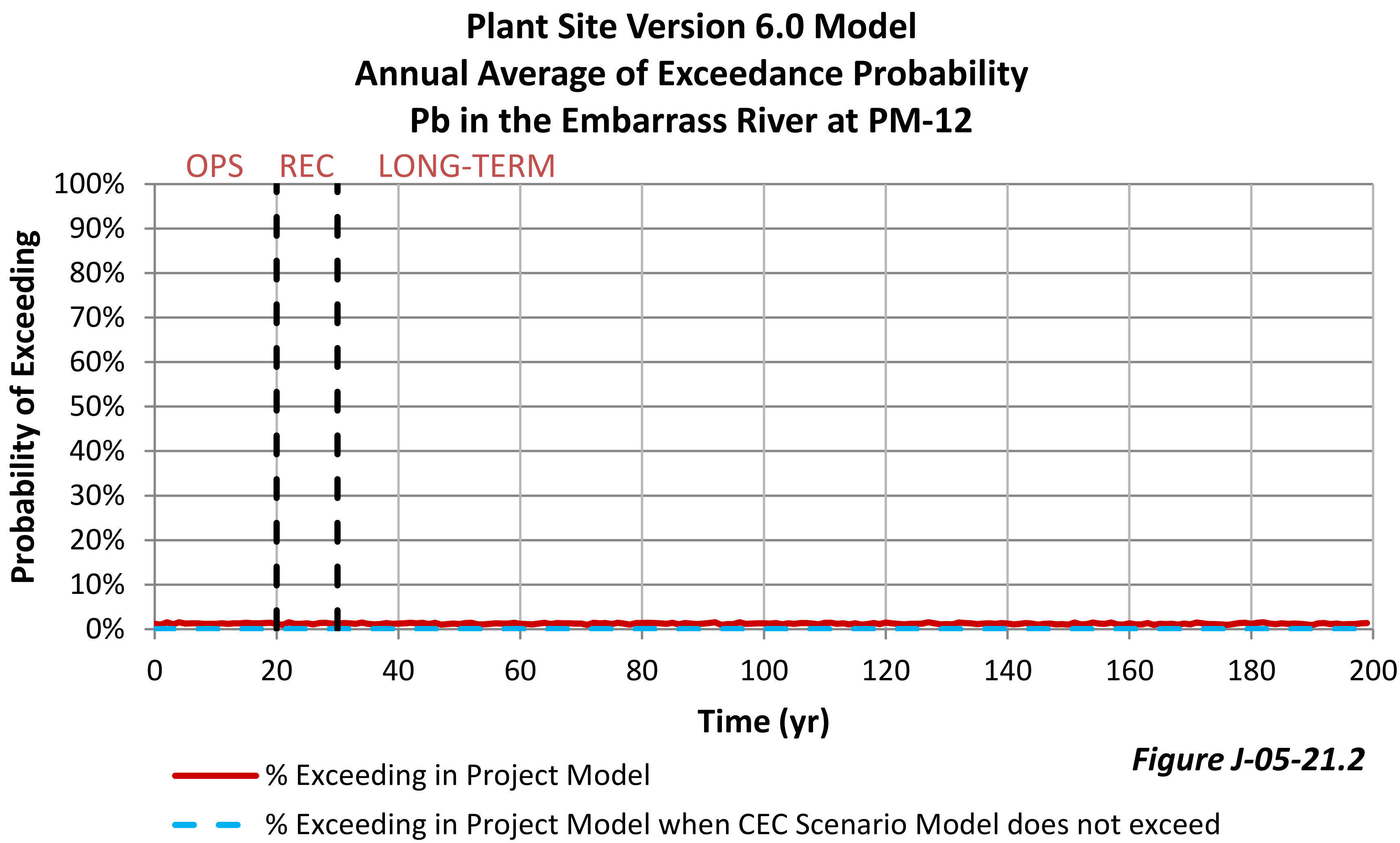

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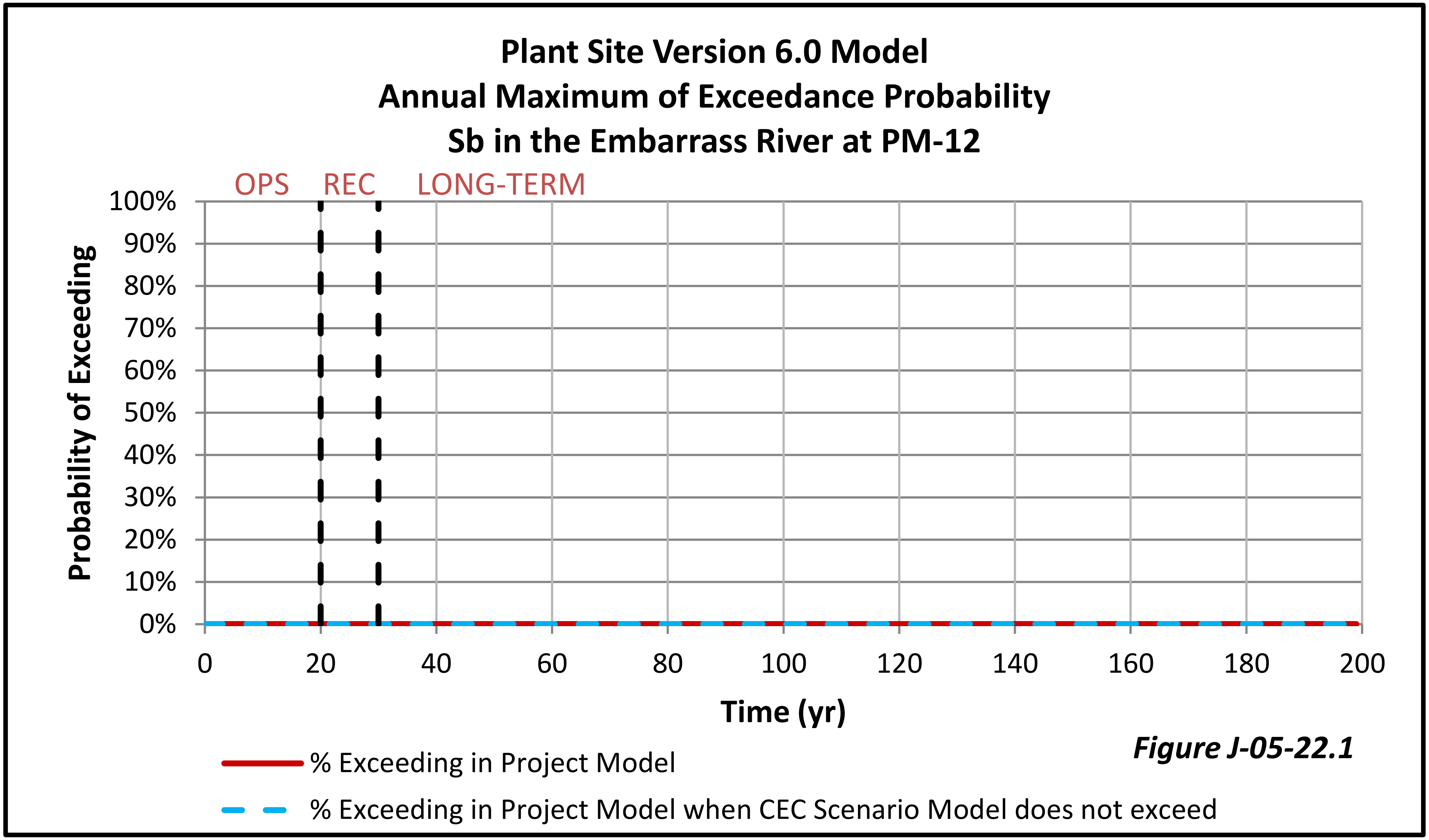

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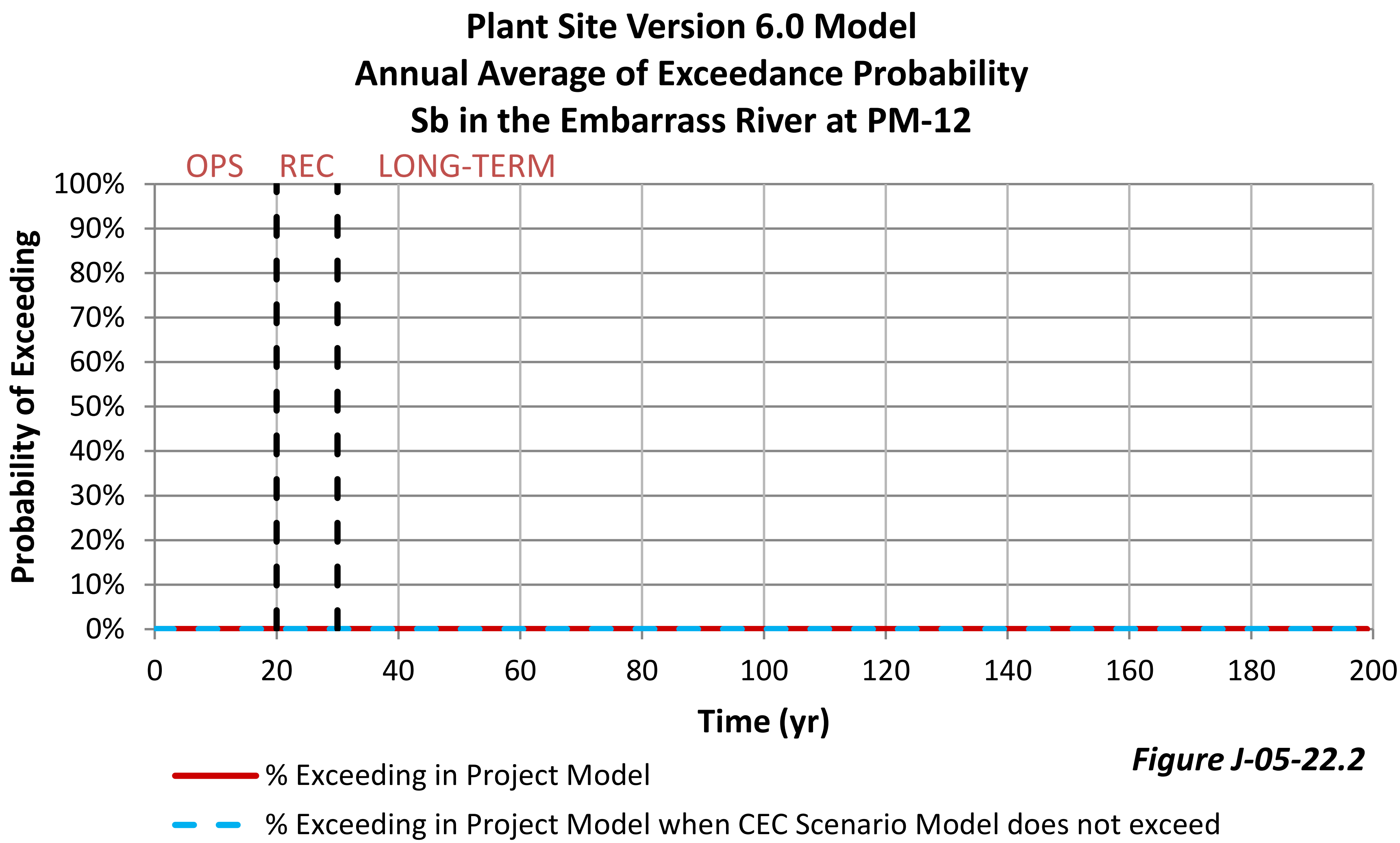
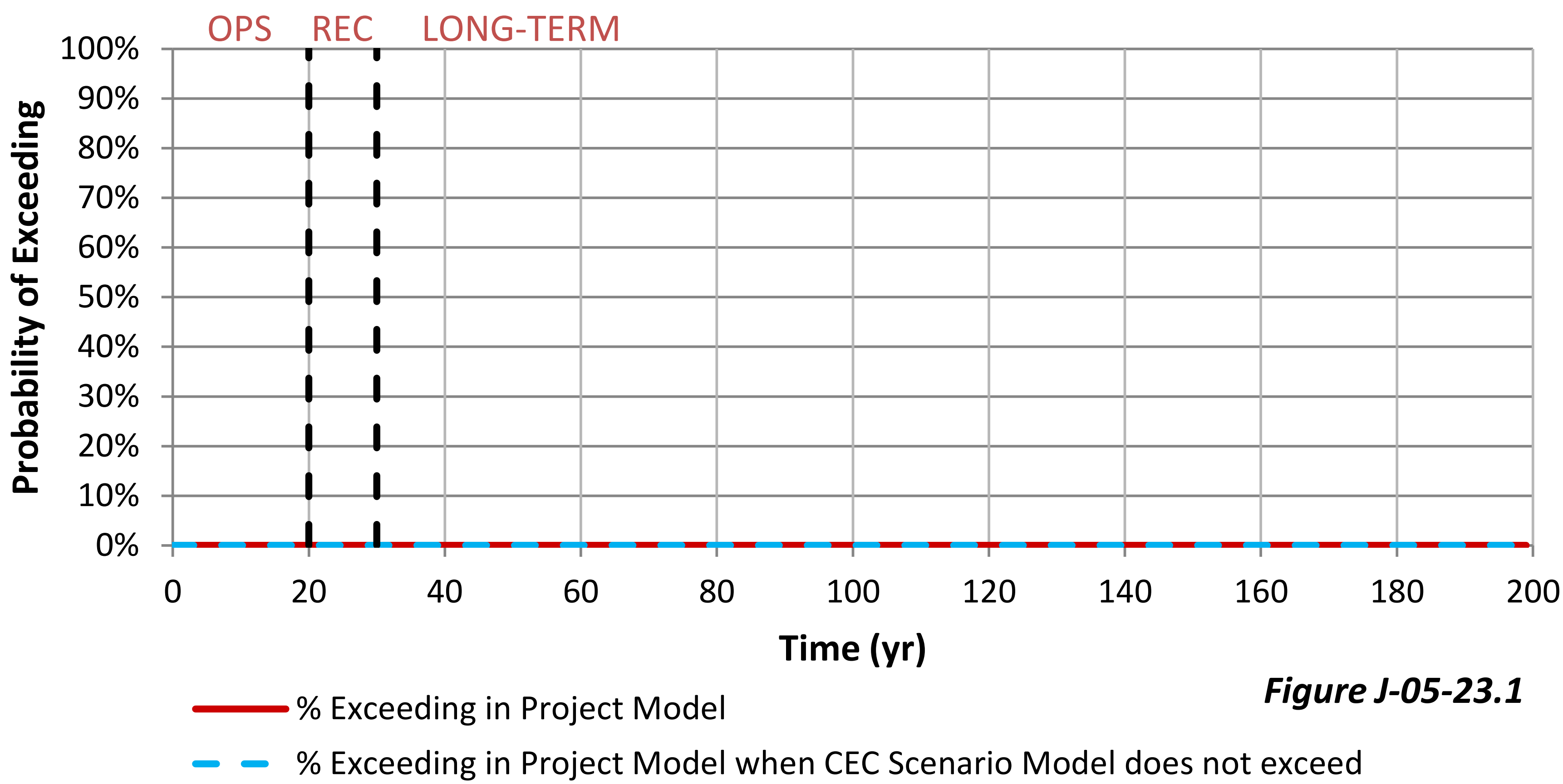


Figure J-05-22.2

Plant Site Version 6.0 Model
Annual Maximum of Exceedance Probability
Se in the Embarrass River at PM-12



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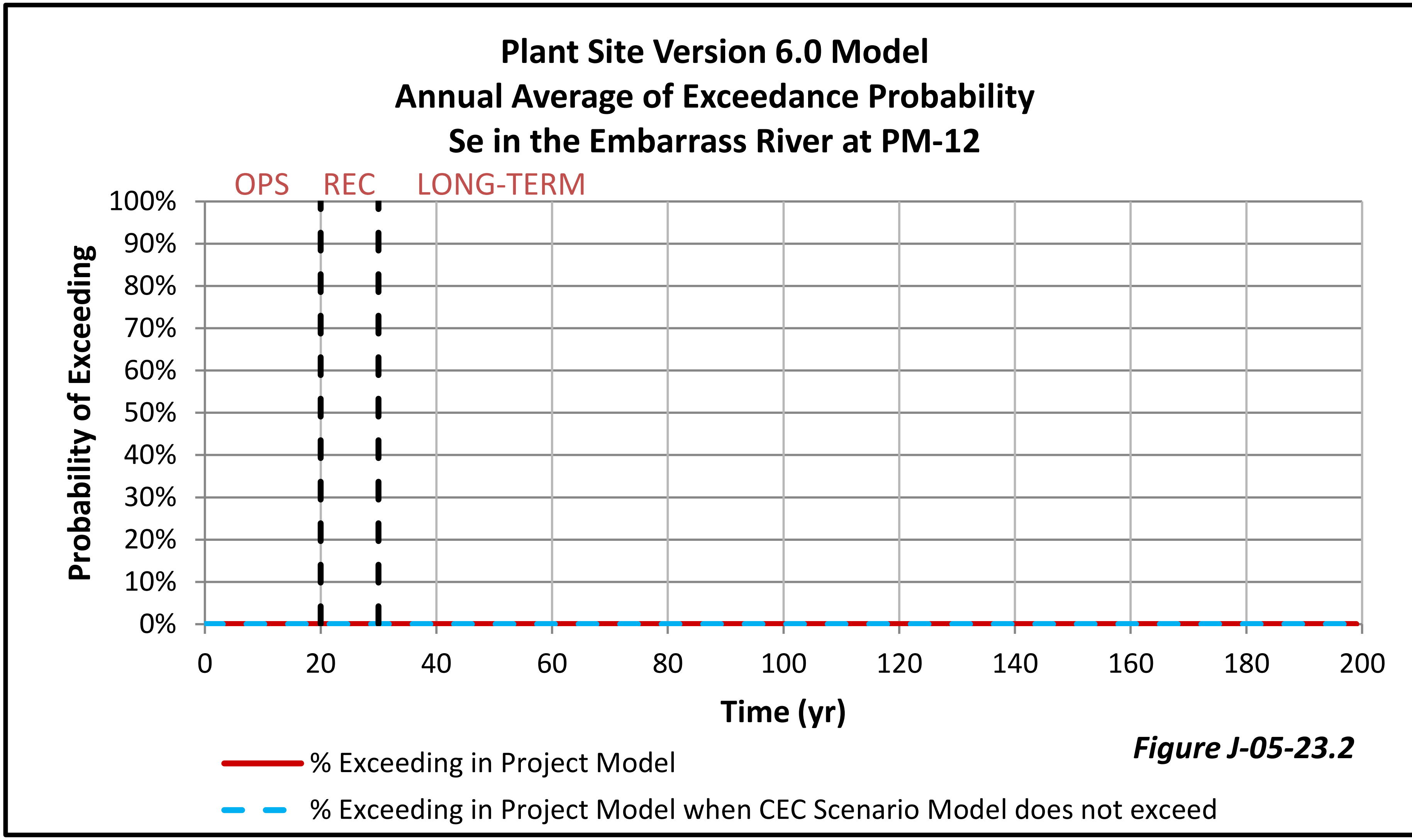

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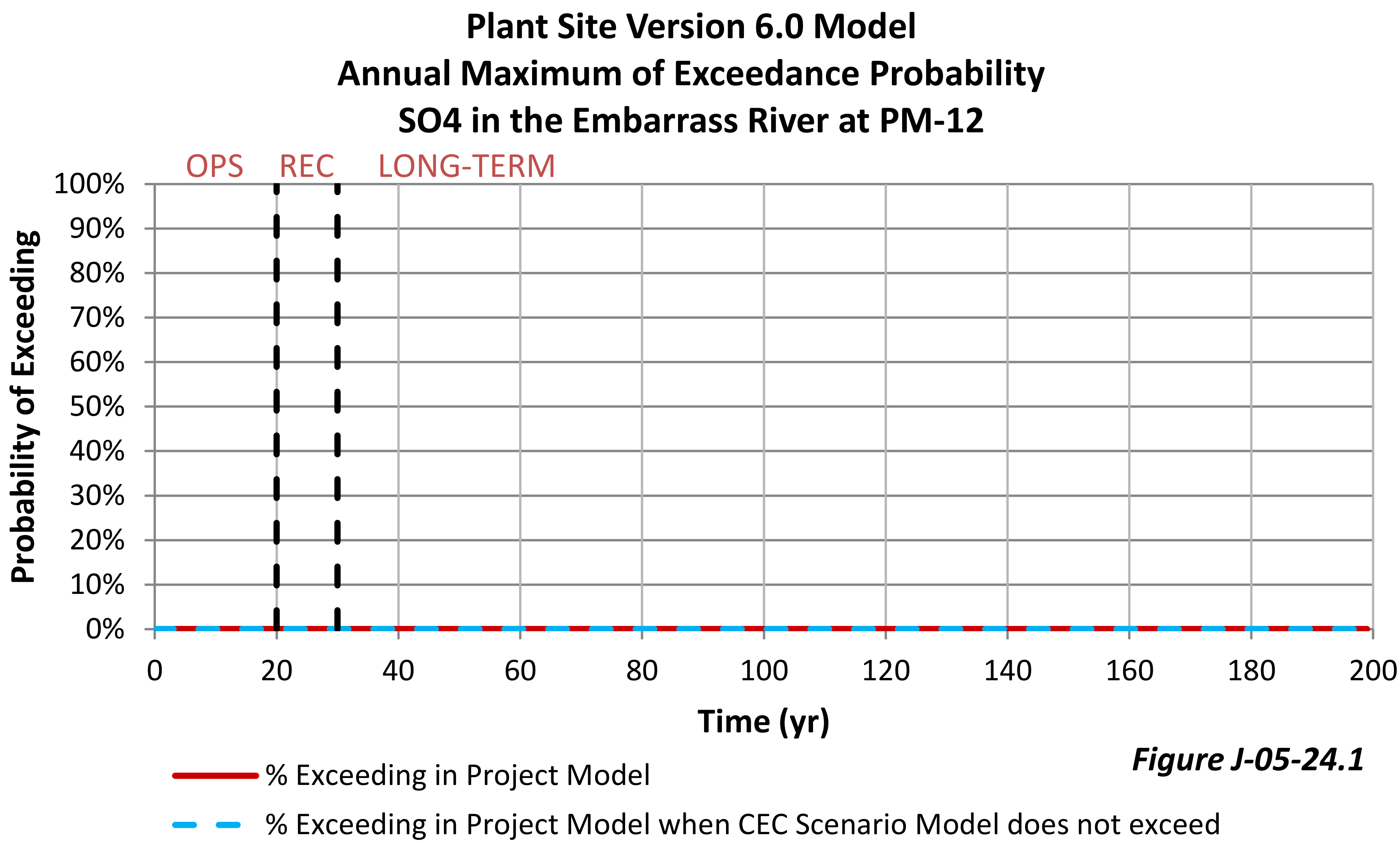
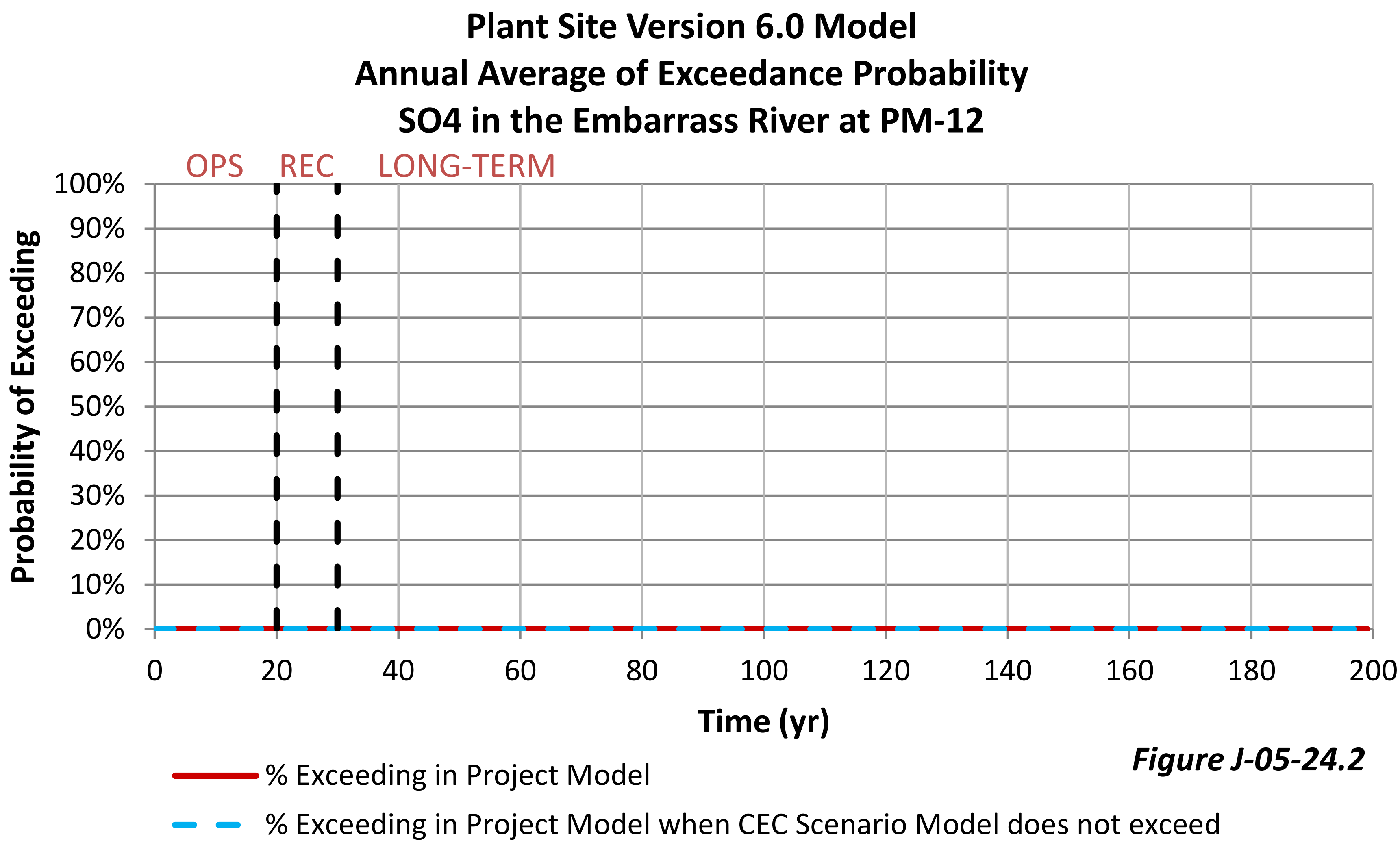


Figure J-05-24.1



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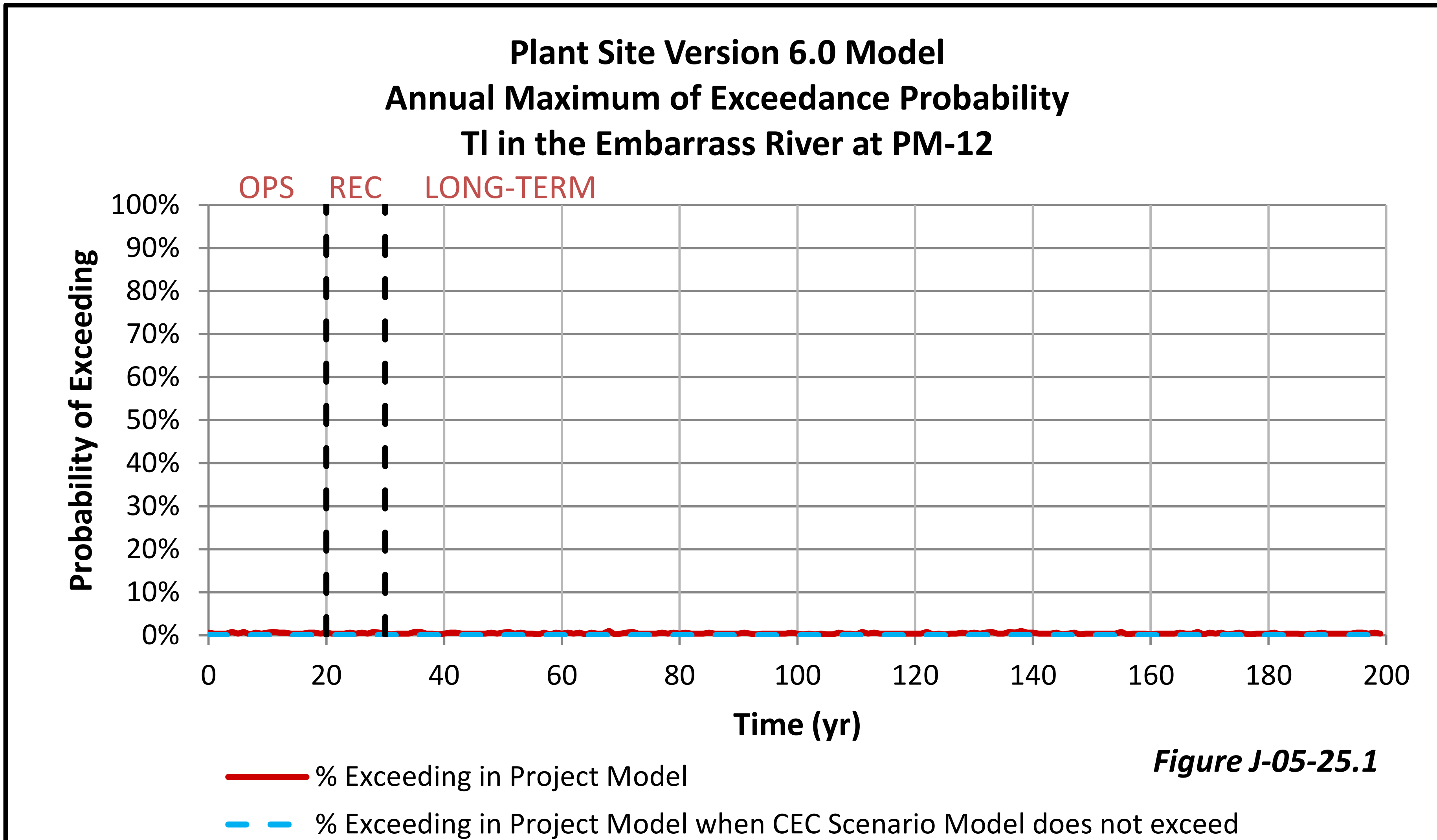

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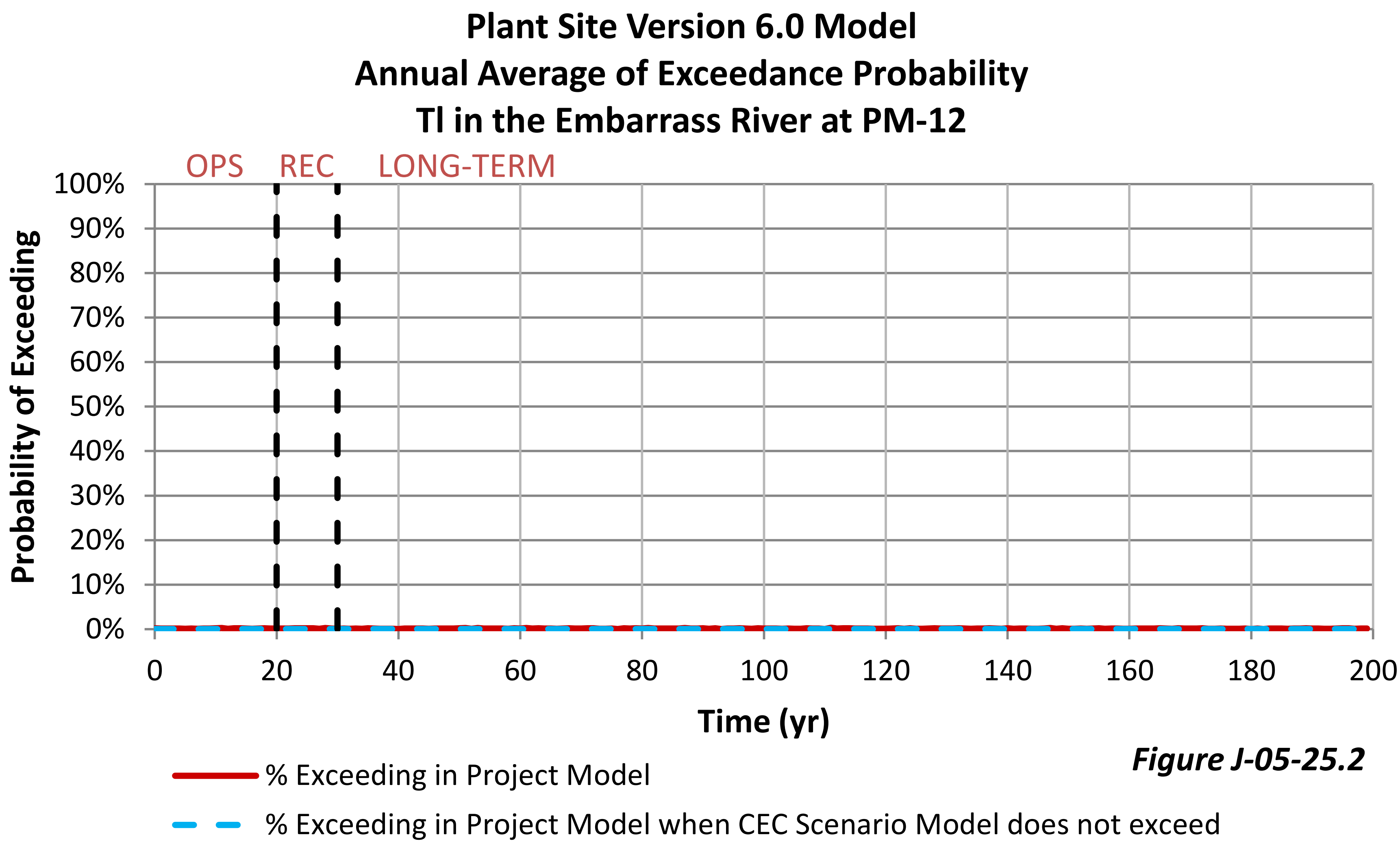

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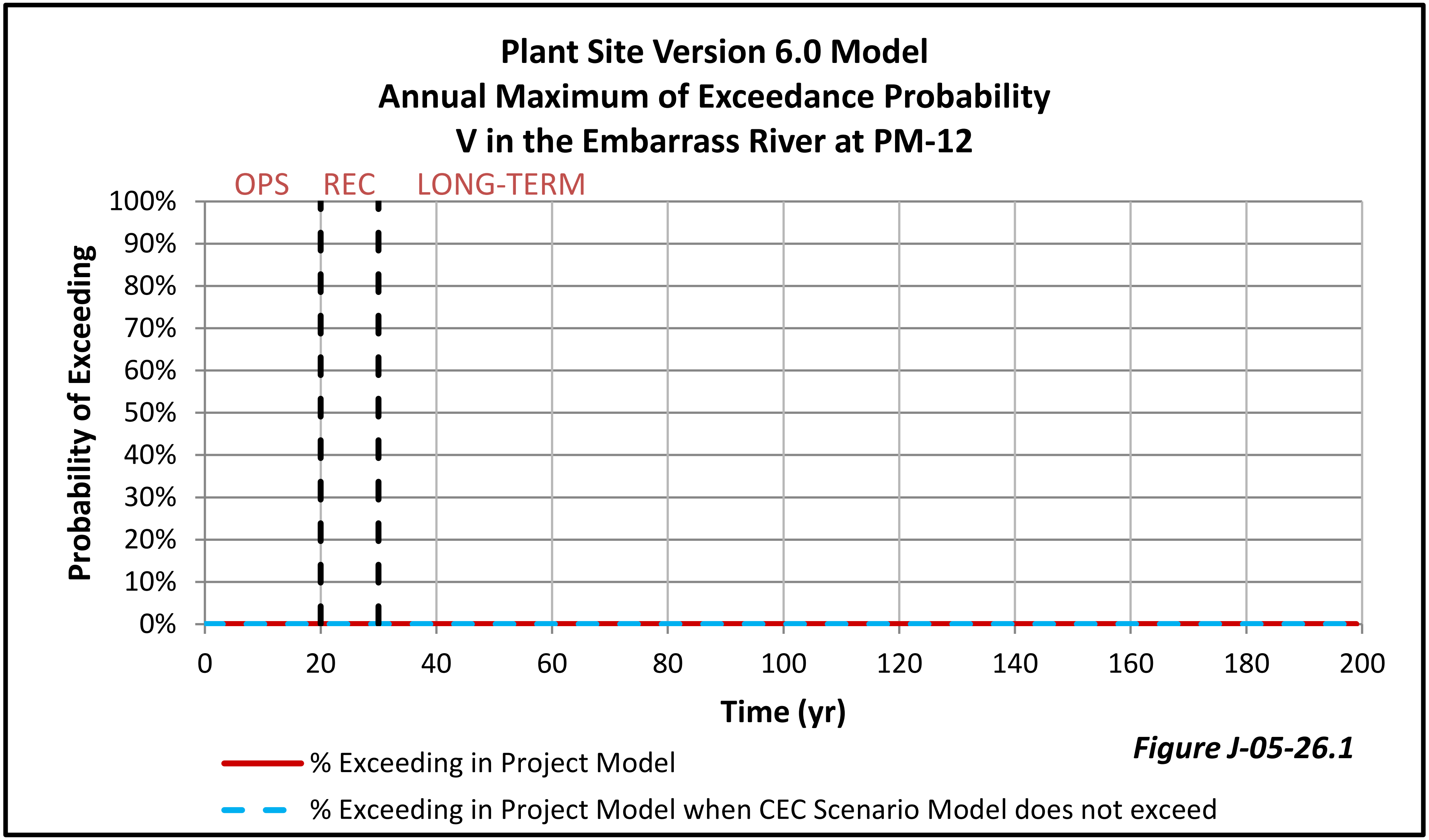

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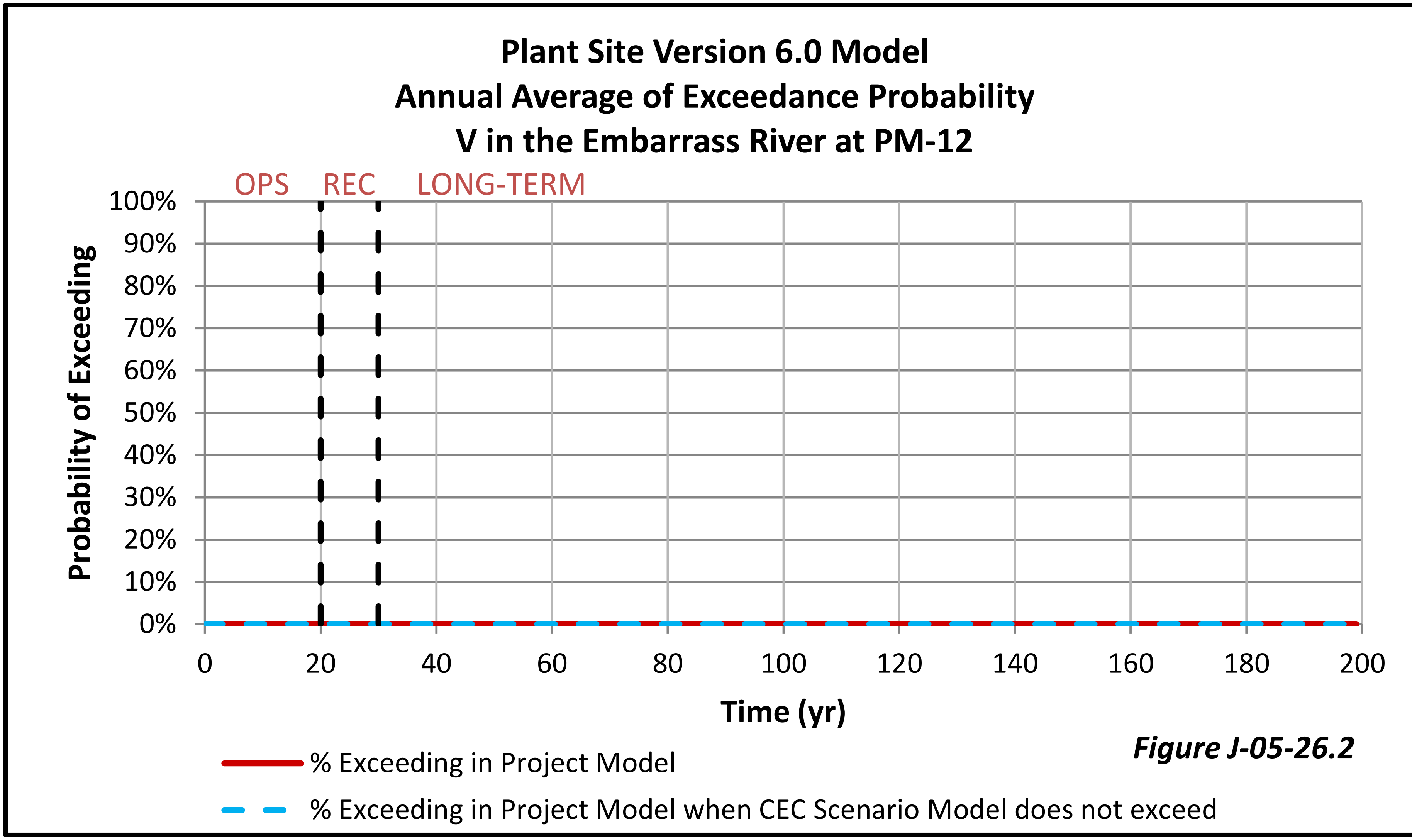

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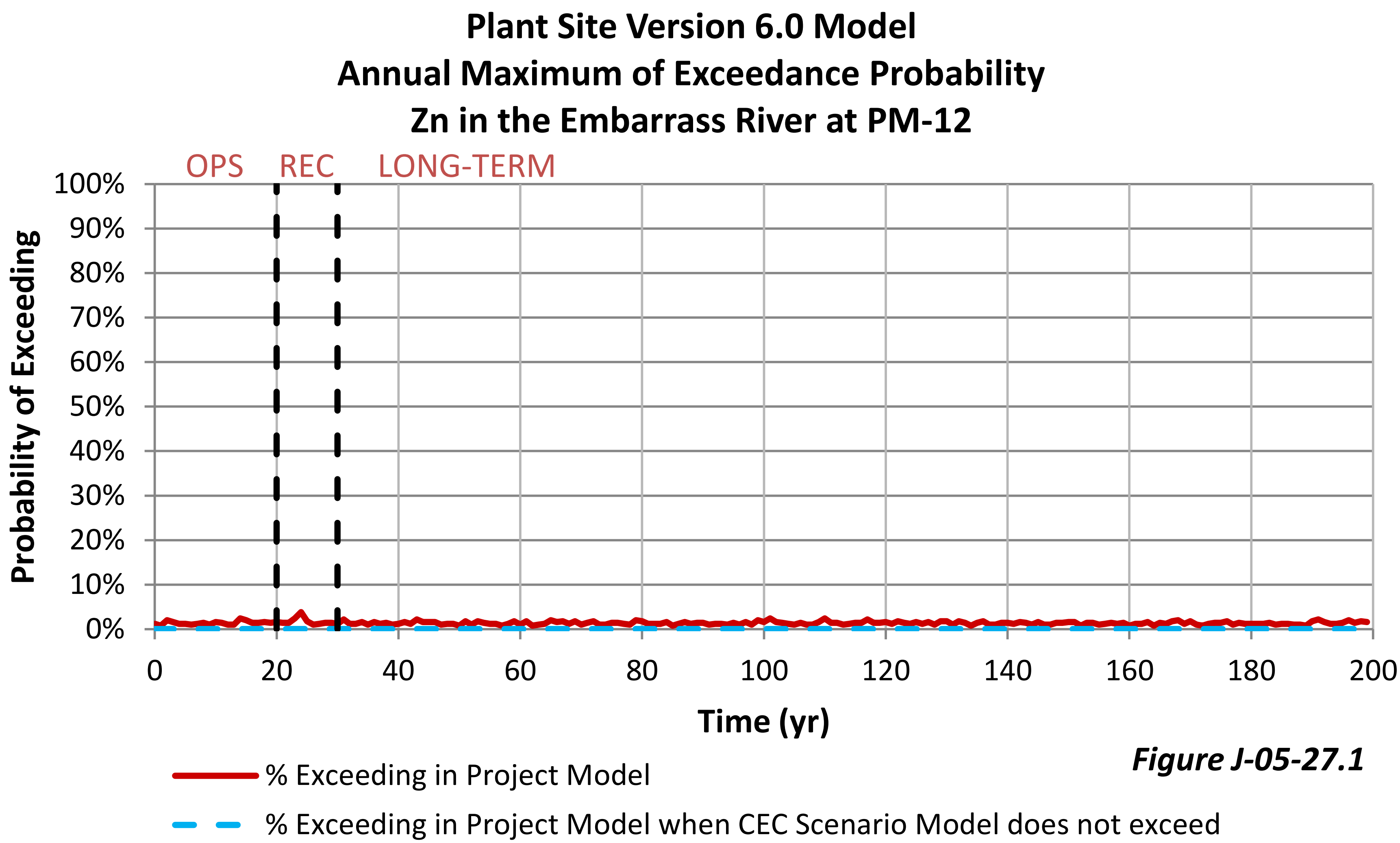
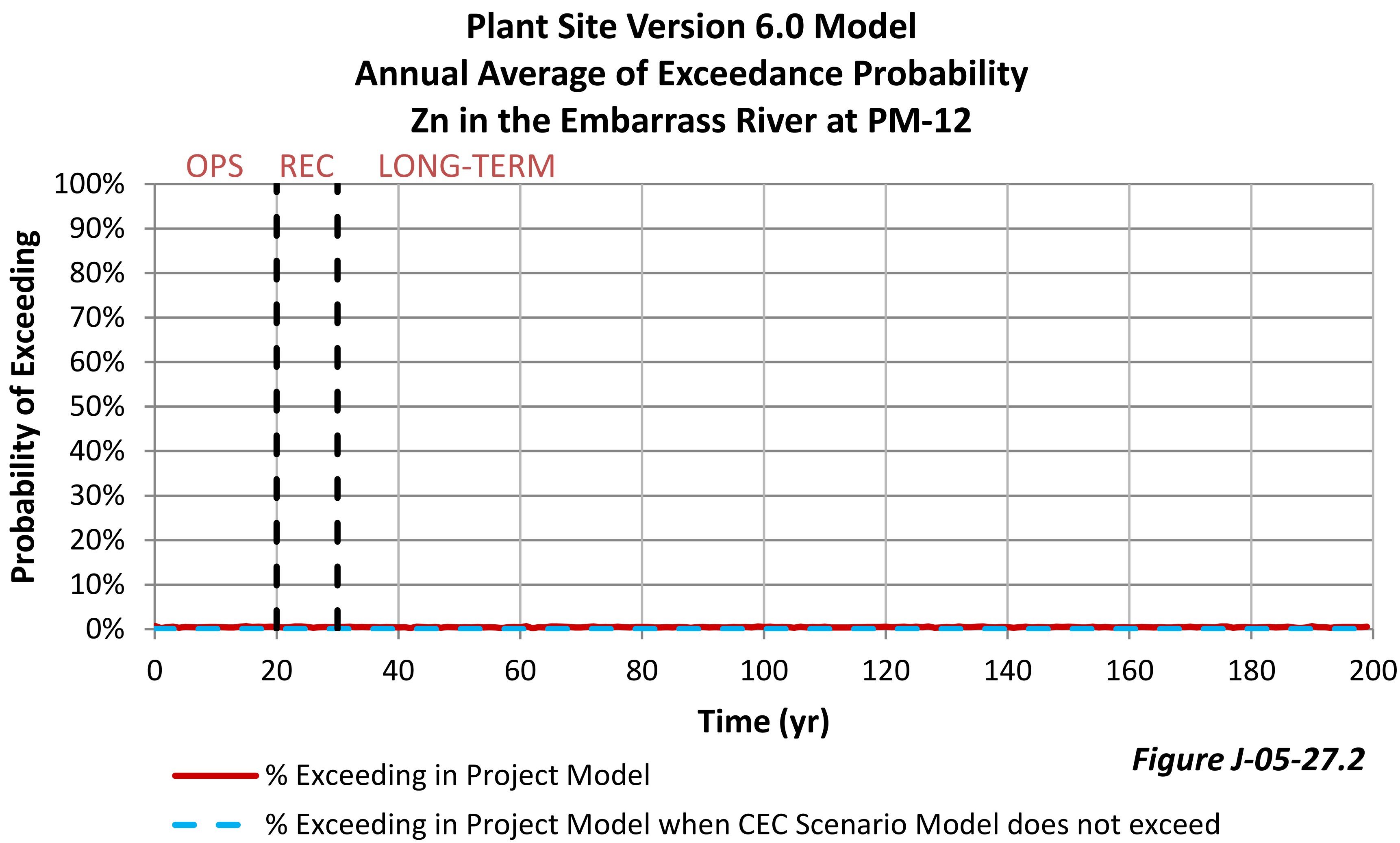


Figure J-05-27.1



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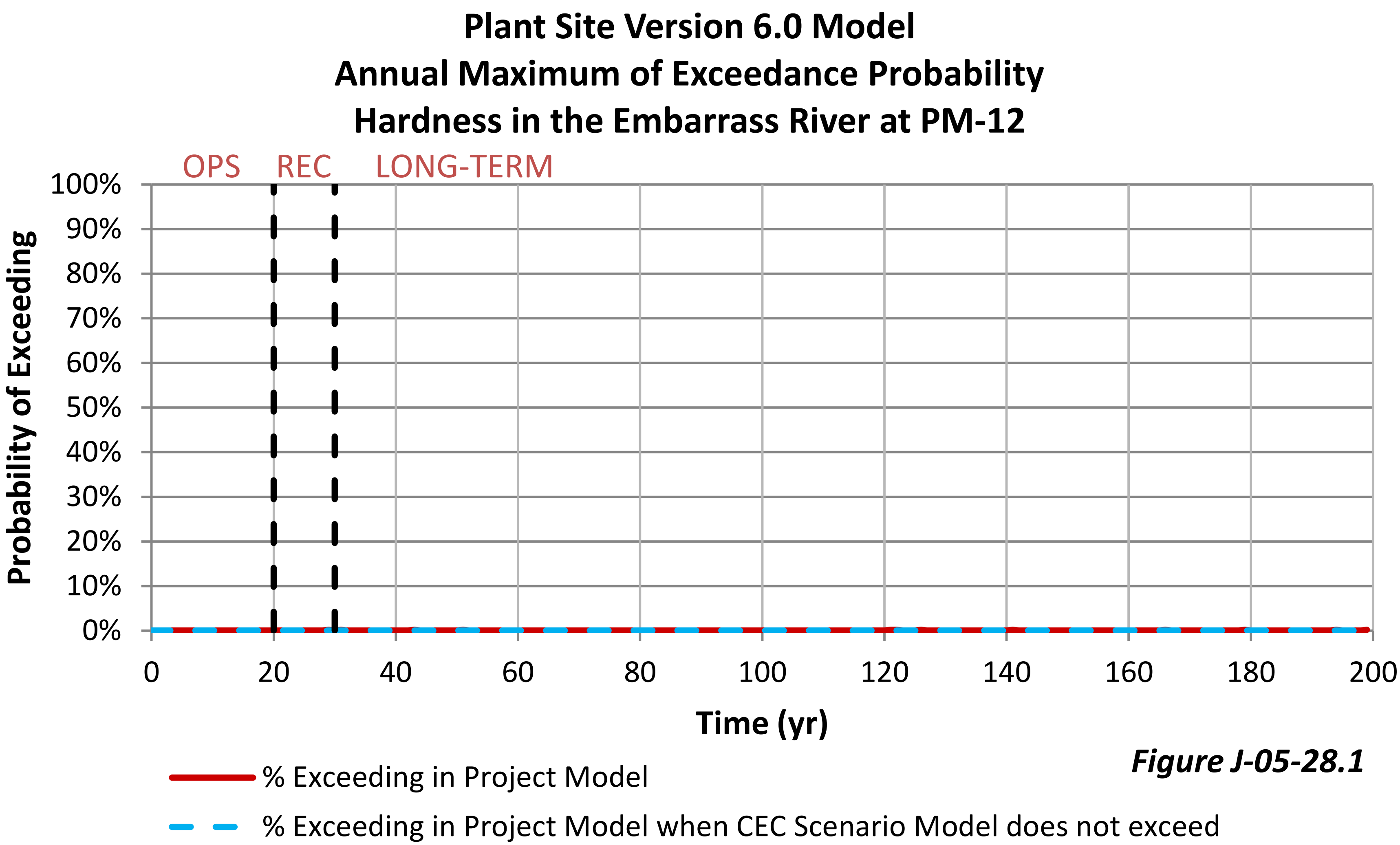


Figure J-05-28.1

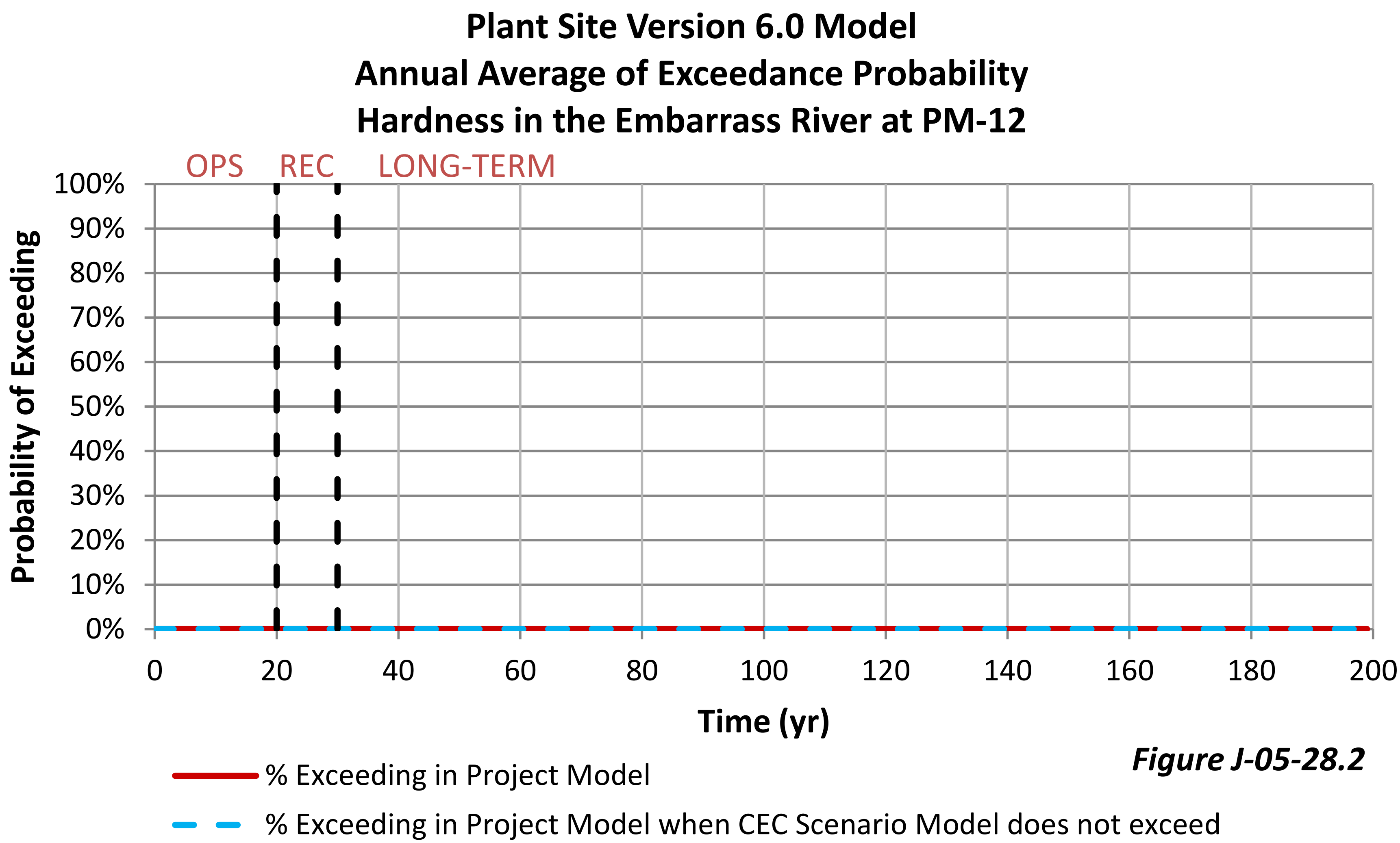


Figure J-05-28.2

Attachment K

Median Loading Rates to the Surface Water Evaluation Locations (Culpability Analysis)

Attachment K Median Loading Rates to the Surface Water Evaluation Locations (Culpability Analysis)

The plots in this attachment were created by taking the following steps:

- At any given time step, the mass loading rate (tonnes/yr) from every source contributing mass load to each of the surface water evaluation locations is calculated and stored. These sources are itemized in the legend of each figure.

- Once the 500 realizations are complete, at every monthly time step the loading rates of a particular constituent from a particular source were sorted minimum to maximum and the median value (250th) was chosen. This step was performed for all sources and all constituents.

- The monthly median loading rates of each constituent from each source were annualized by taking the average of the twelve monthly median loading rates each year. This results in one representative average annual median loading rate of each constituent from each source.

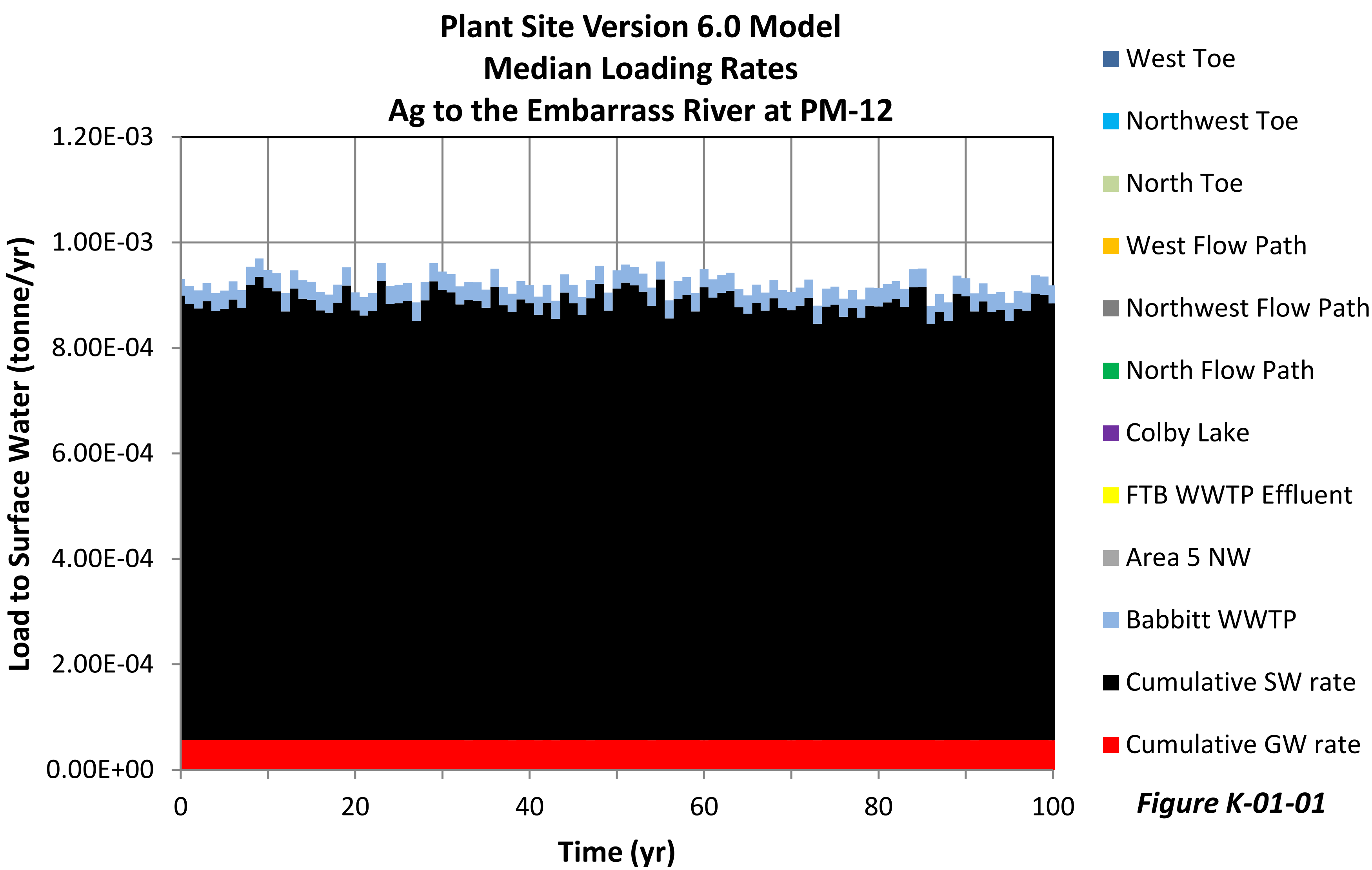
- A stacked bar graph is used to directly compare the average annual median loading rates from each source for any constituent to each of the surface water evaluation locations. The source (uniquely colored in each figure) which covers the most area of the graph at any given time is therefore the most culpable source. Showing a time series graph of loading rates also helps show how the culpable source may change through time.

The figure numbering convention is "**Figure W-XX-YY**" where:

- **W** indicates the Attachment.

- **XX** is a counter indicating the location; in this attachment it will count from "01" to "10" to account for the surface water evaluation locations PM-12, PM-12.2, PM-12.3, PM-12.4, PM-13, MLC-3, MLC-2, TC-1, PM-19, and PM-11 in that order.

- **YY** is a counter indicating the constituent; in this attachment it will count from "01" to "28" to show the 27 independently modeled constituents and the calculated hardness.



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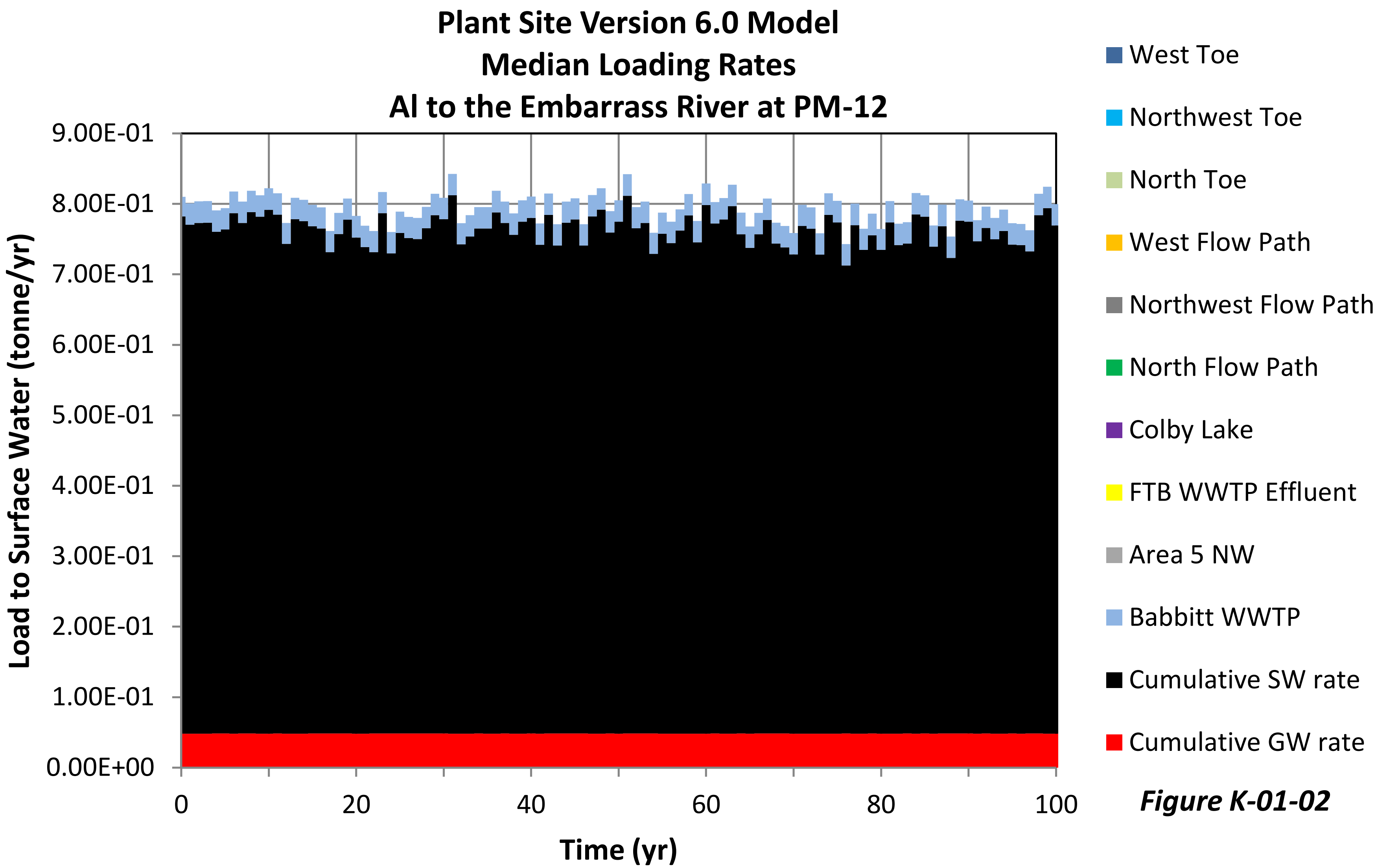

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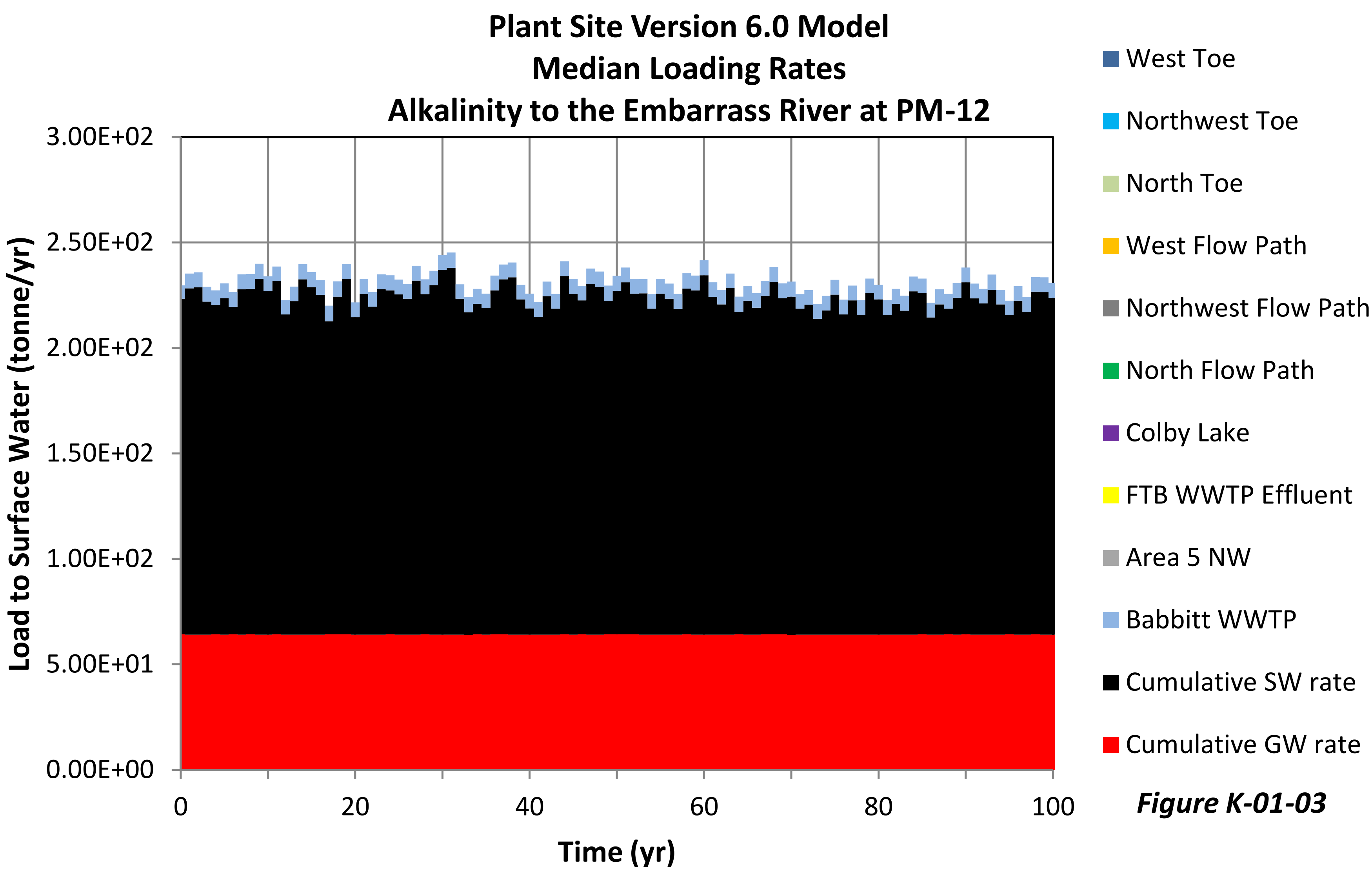

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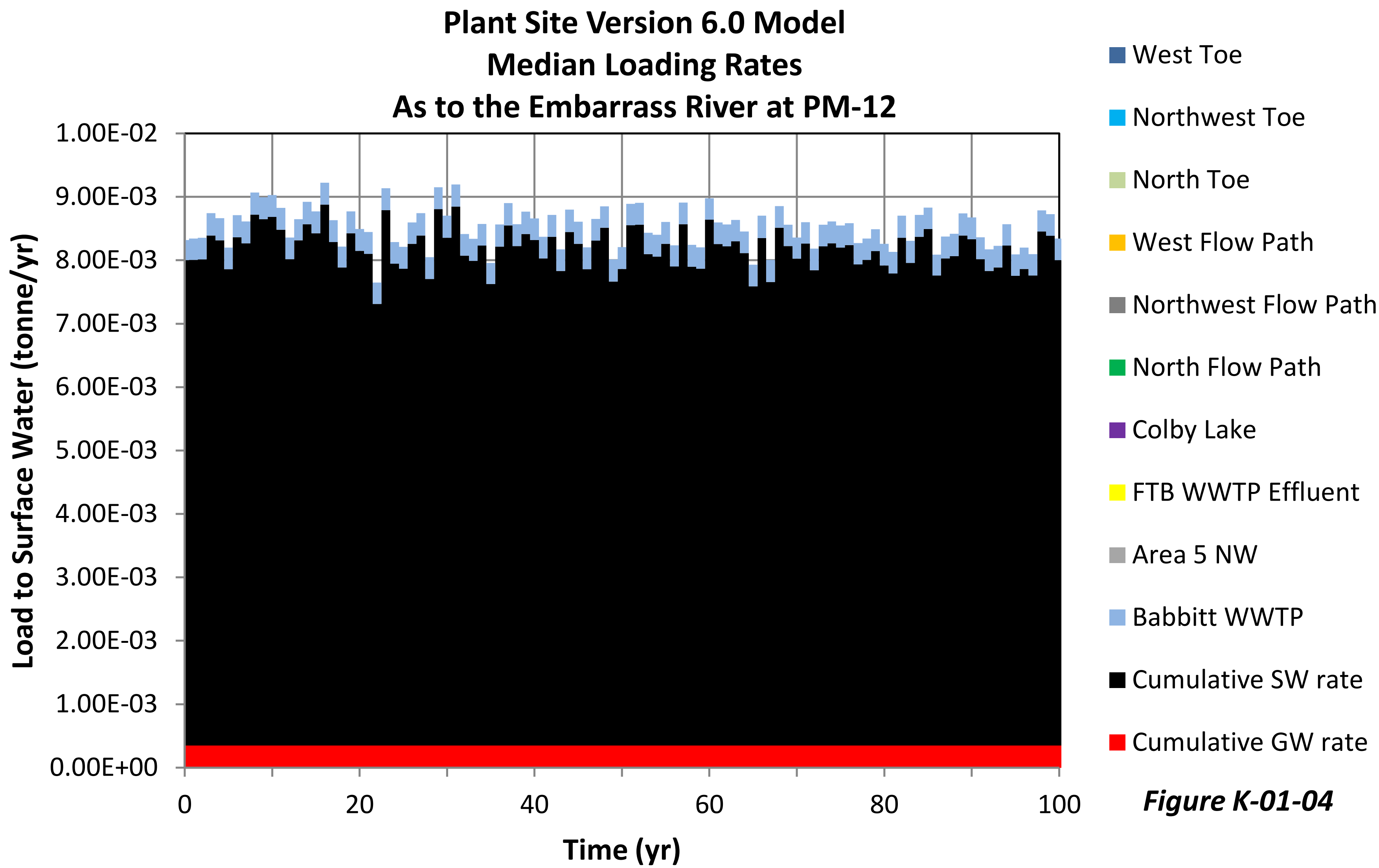

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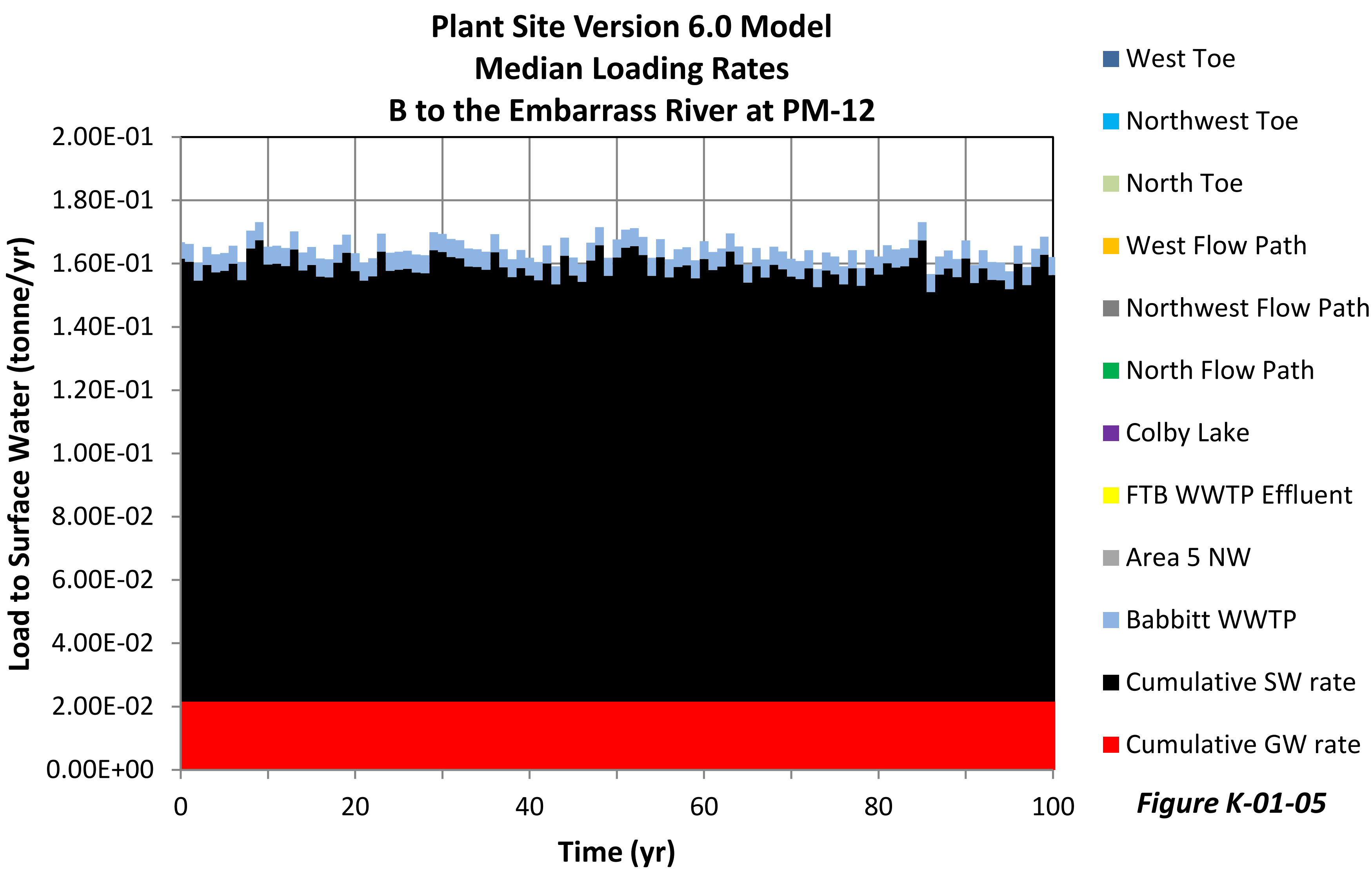

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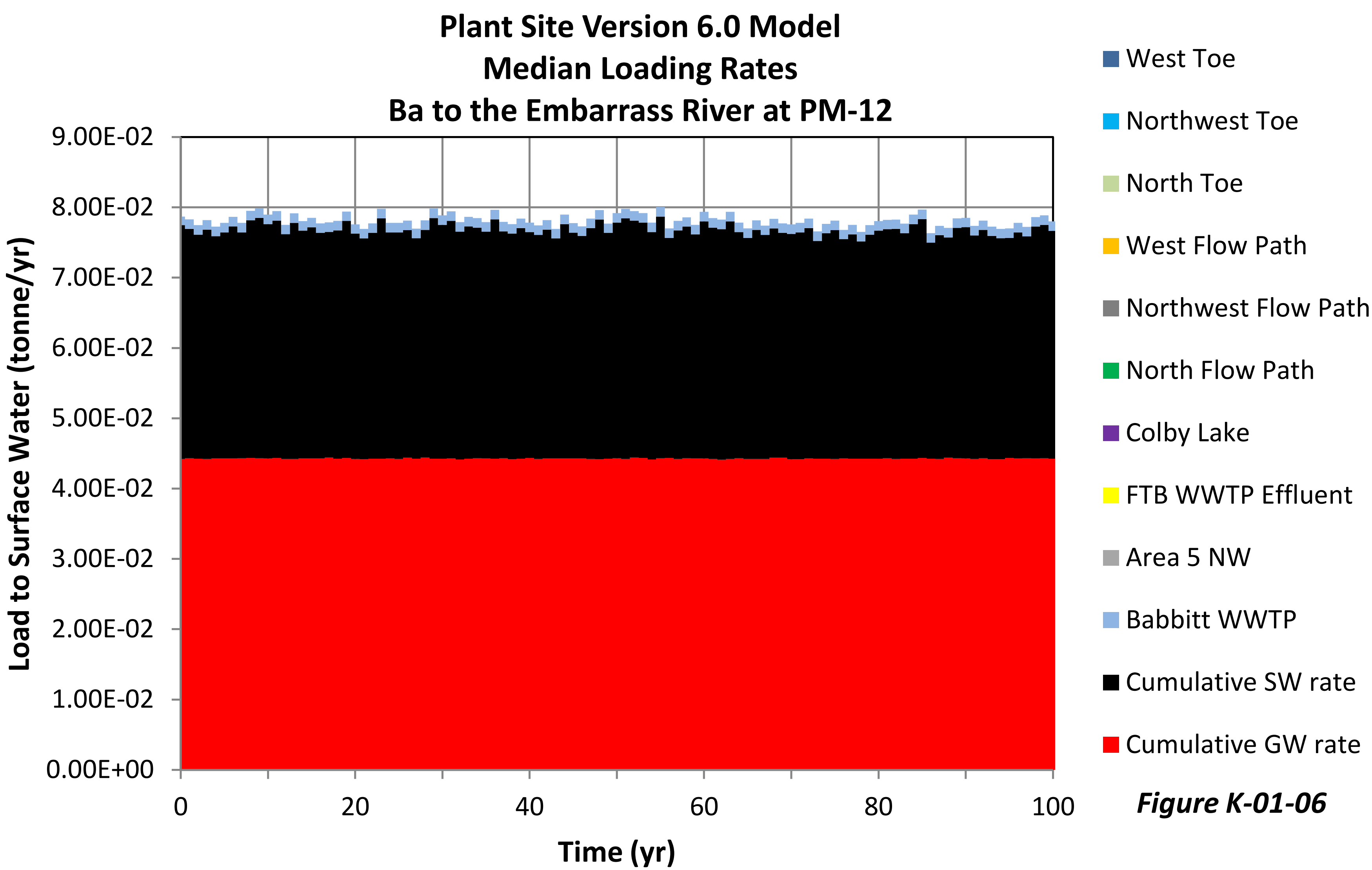

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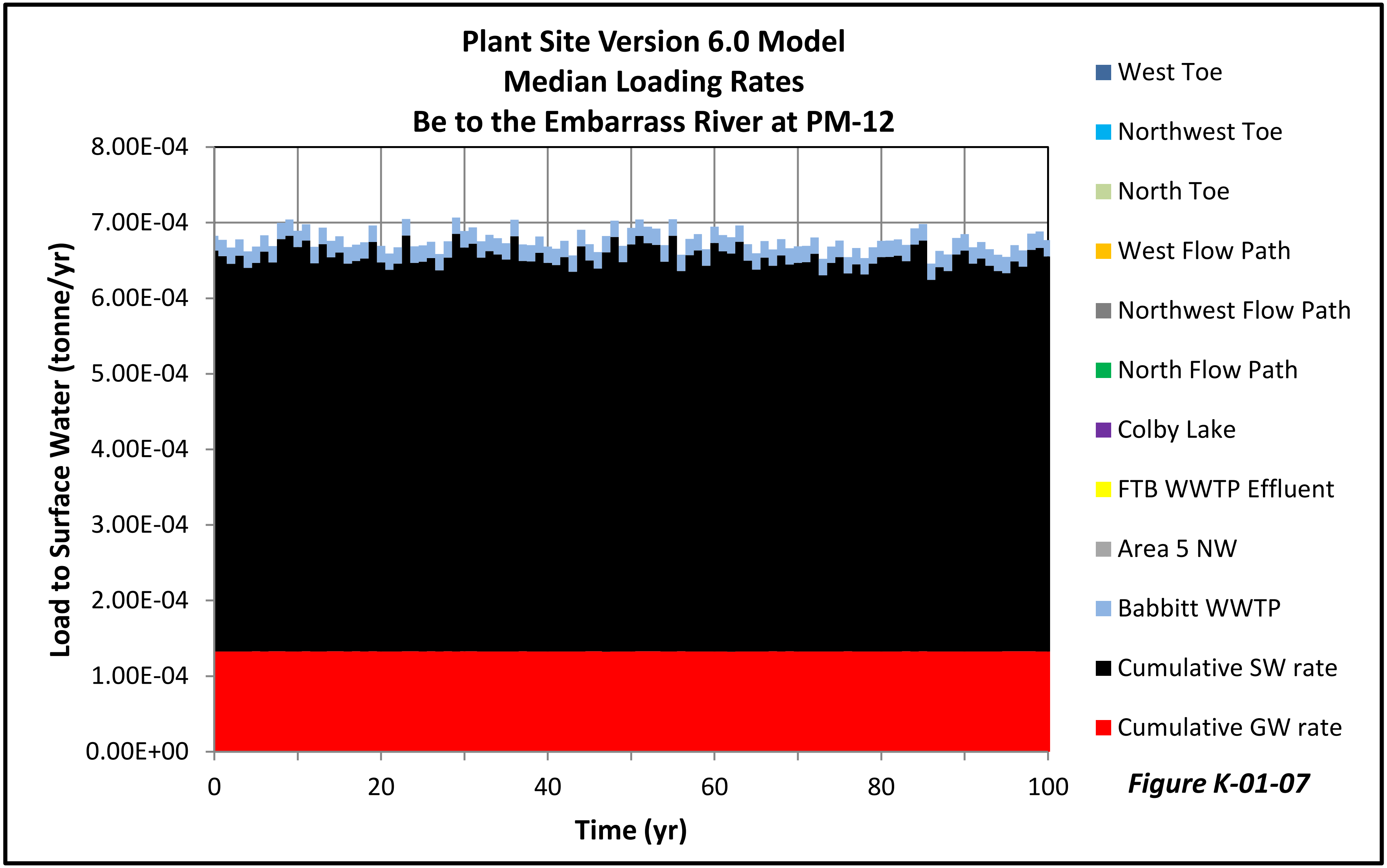

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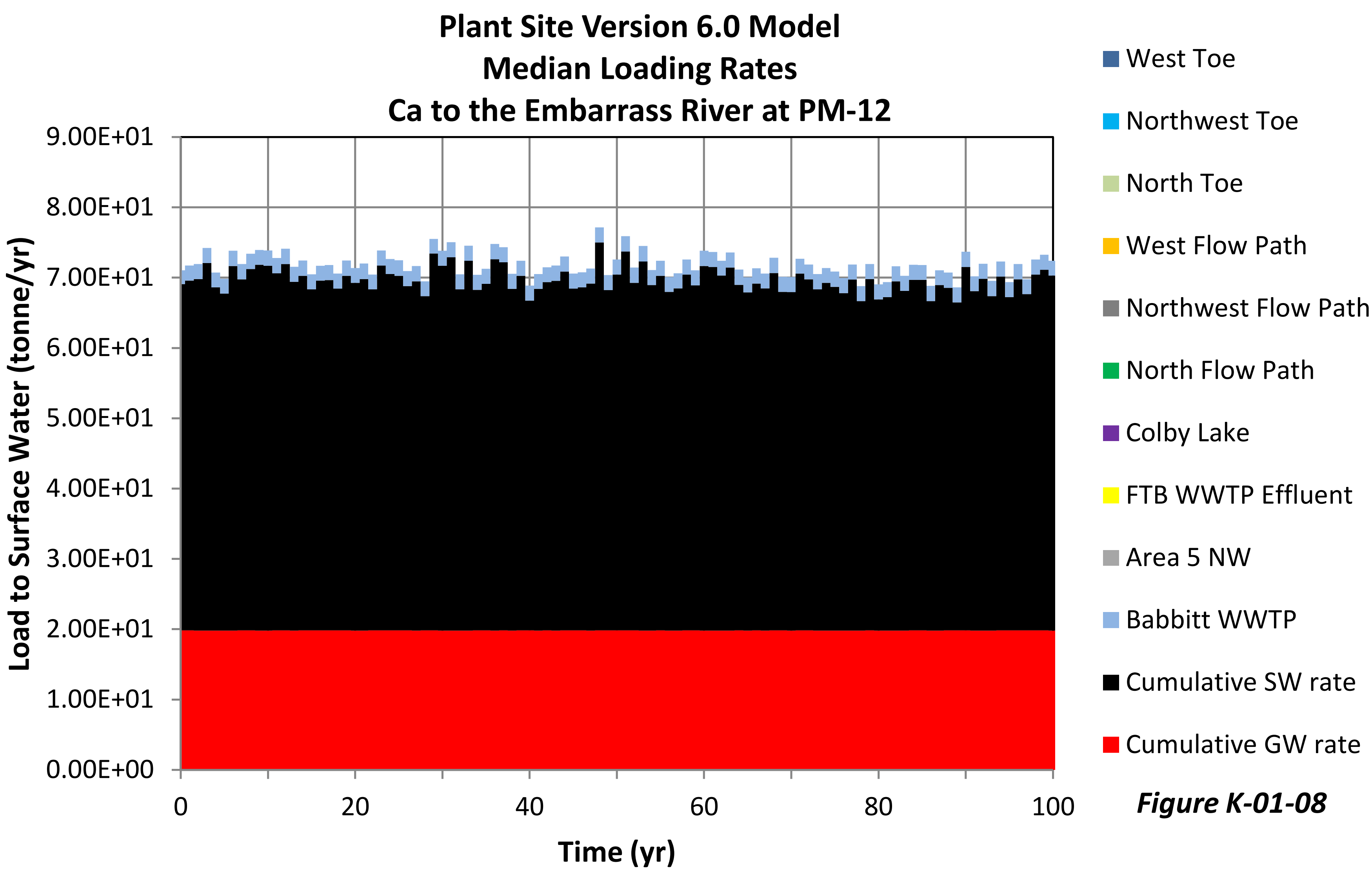

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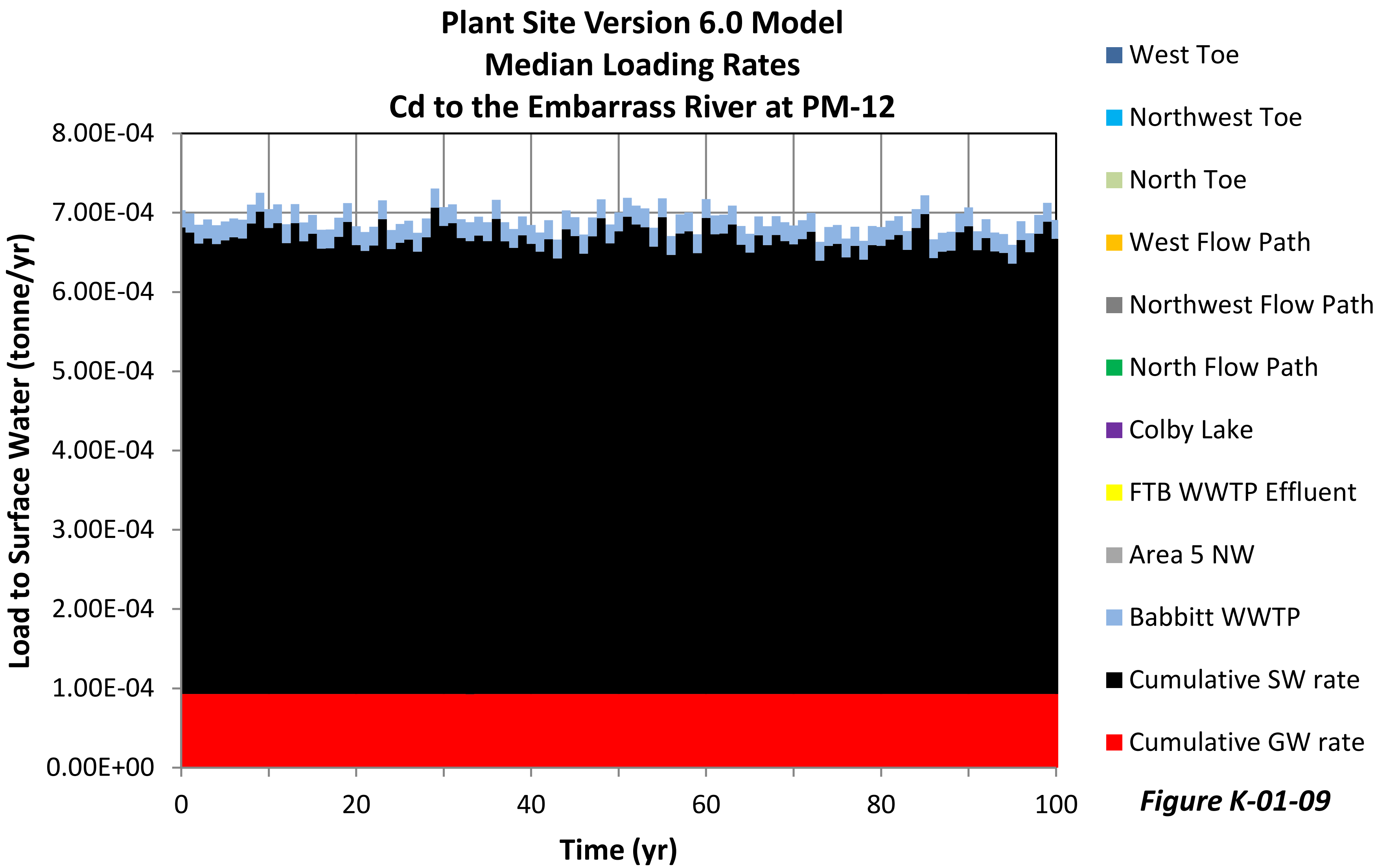

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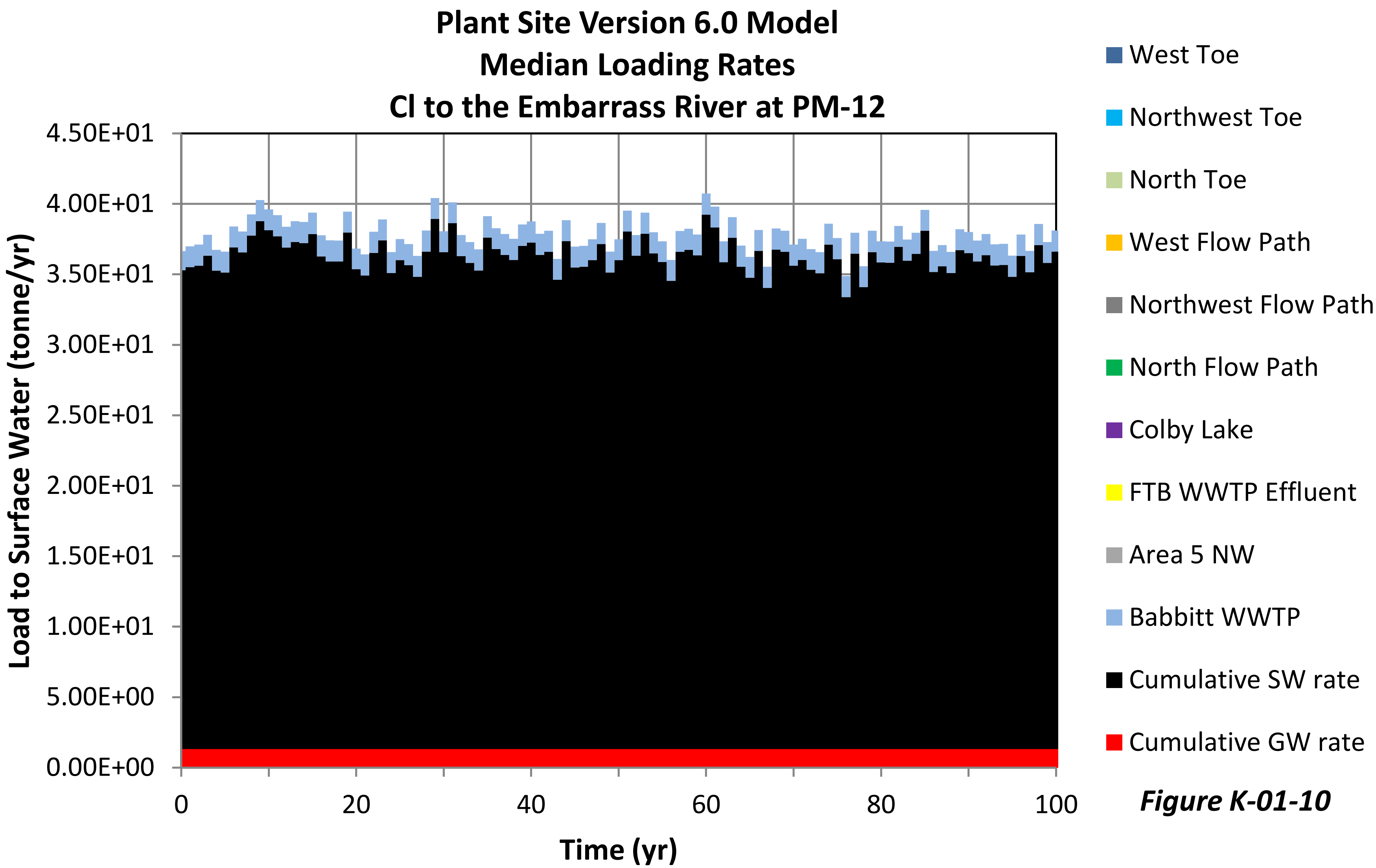

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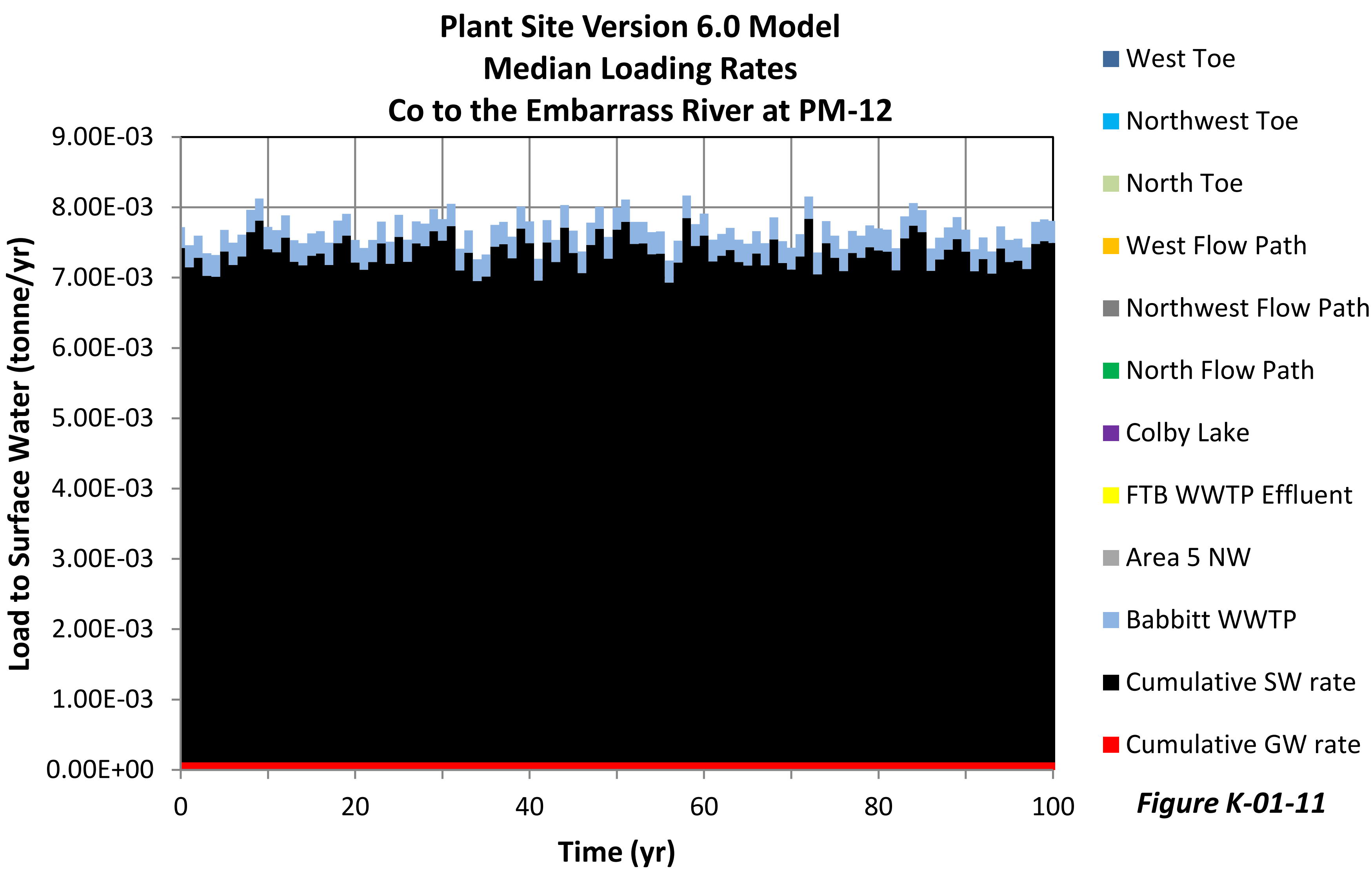

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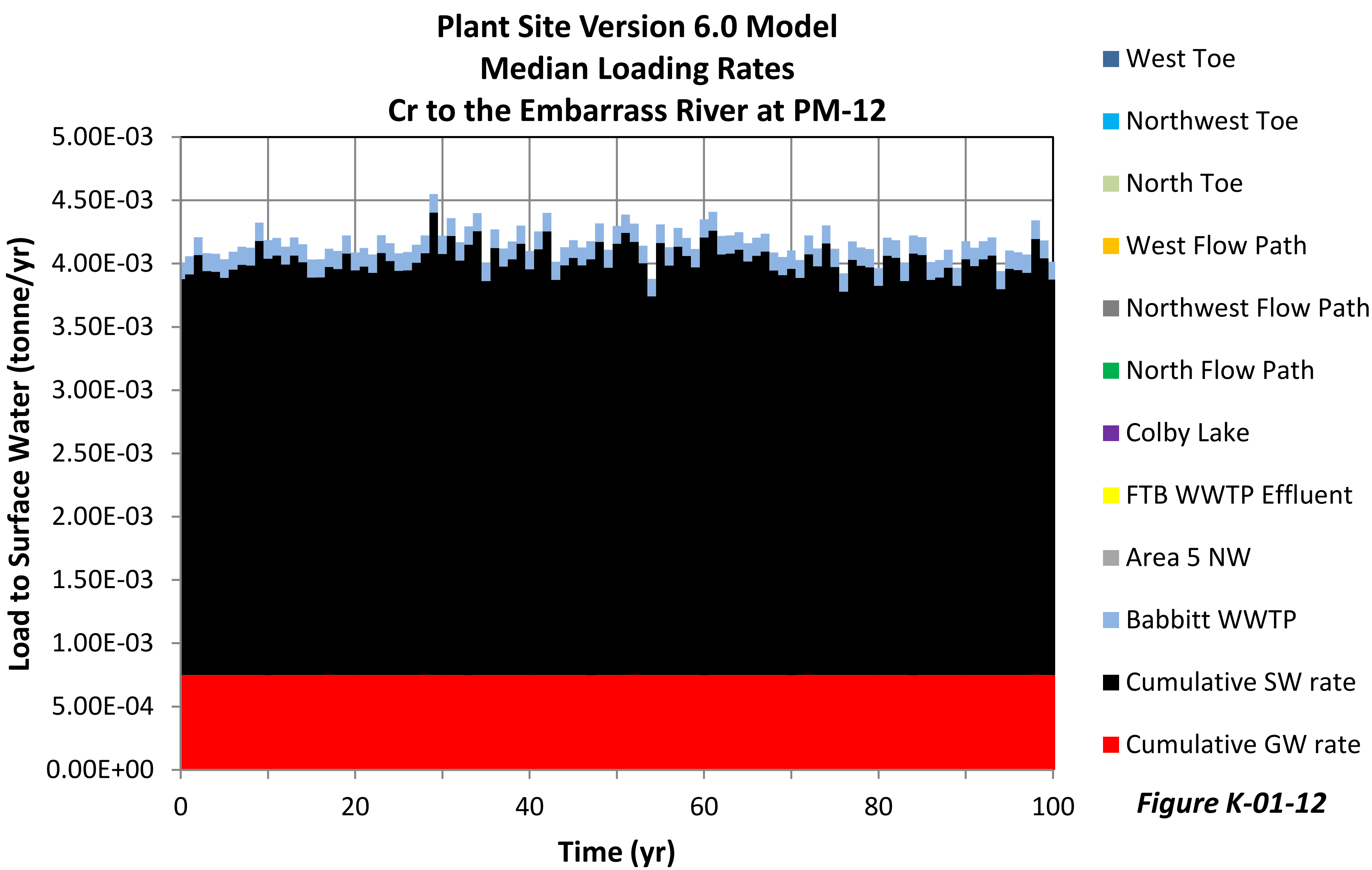

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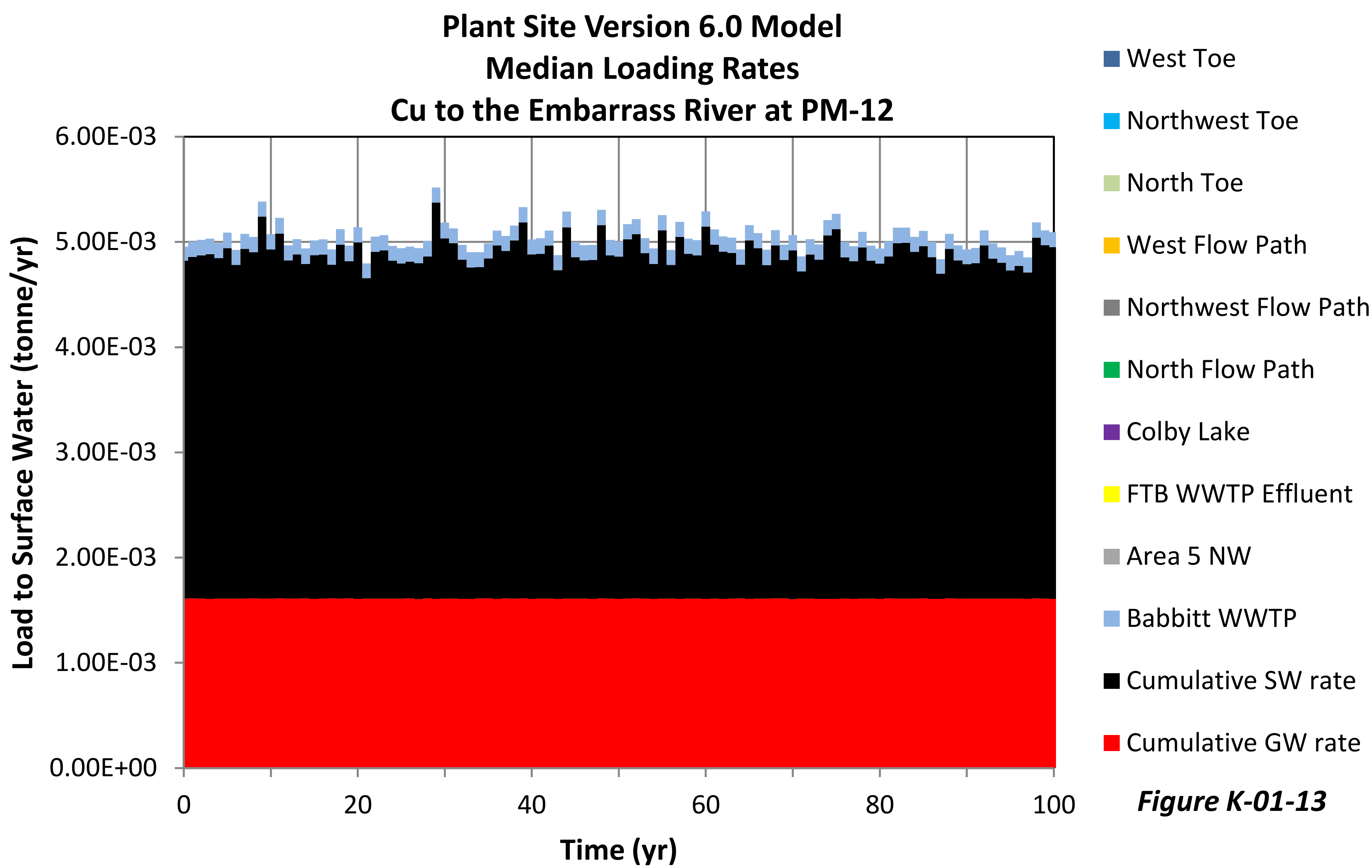

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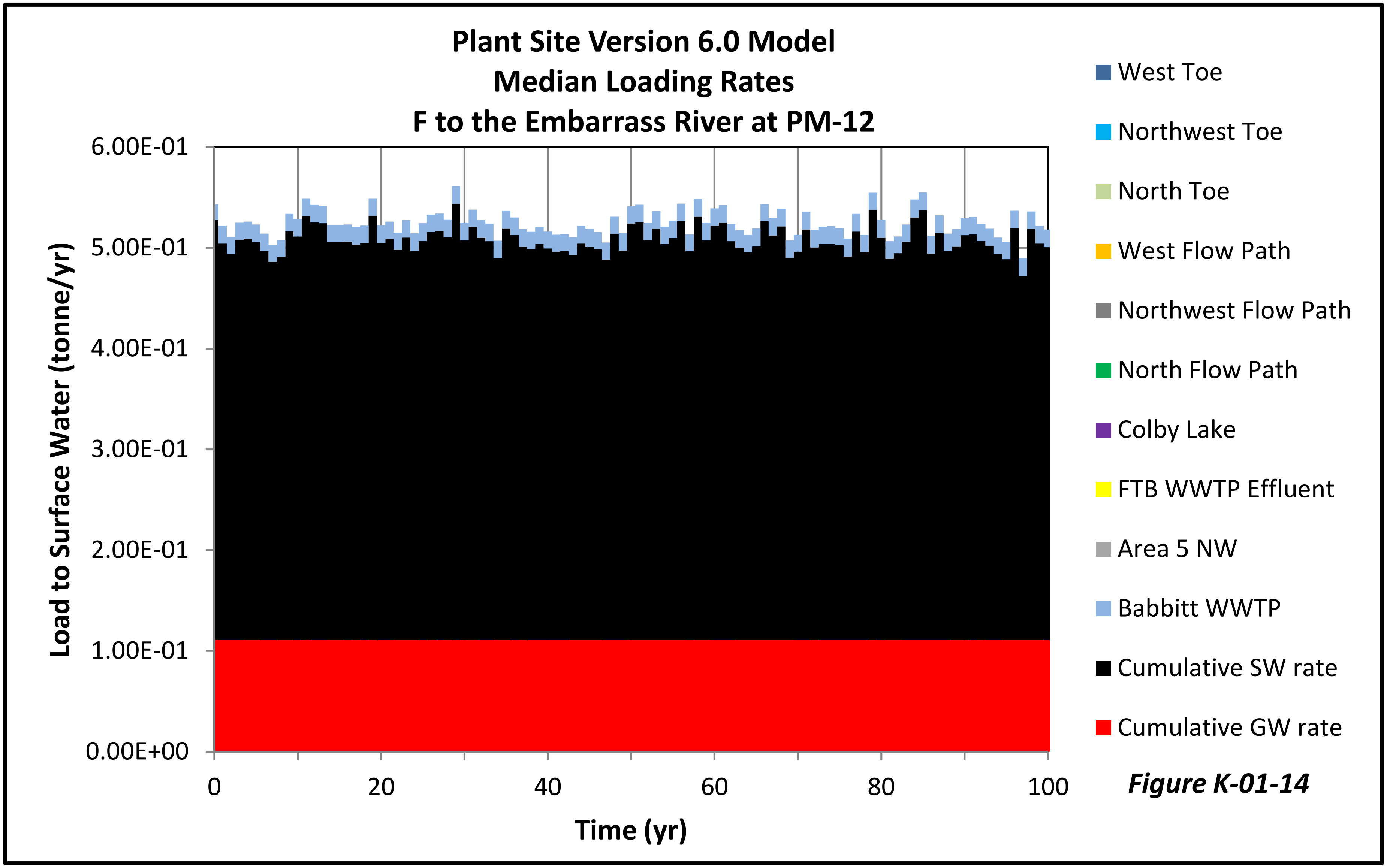

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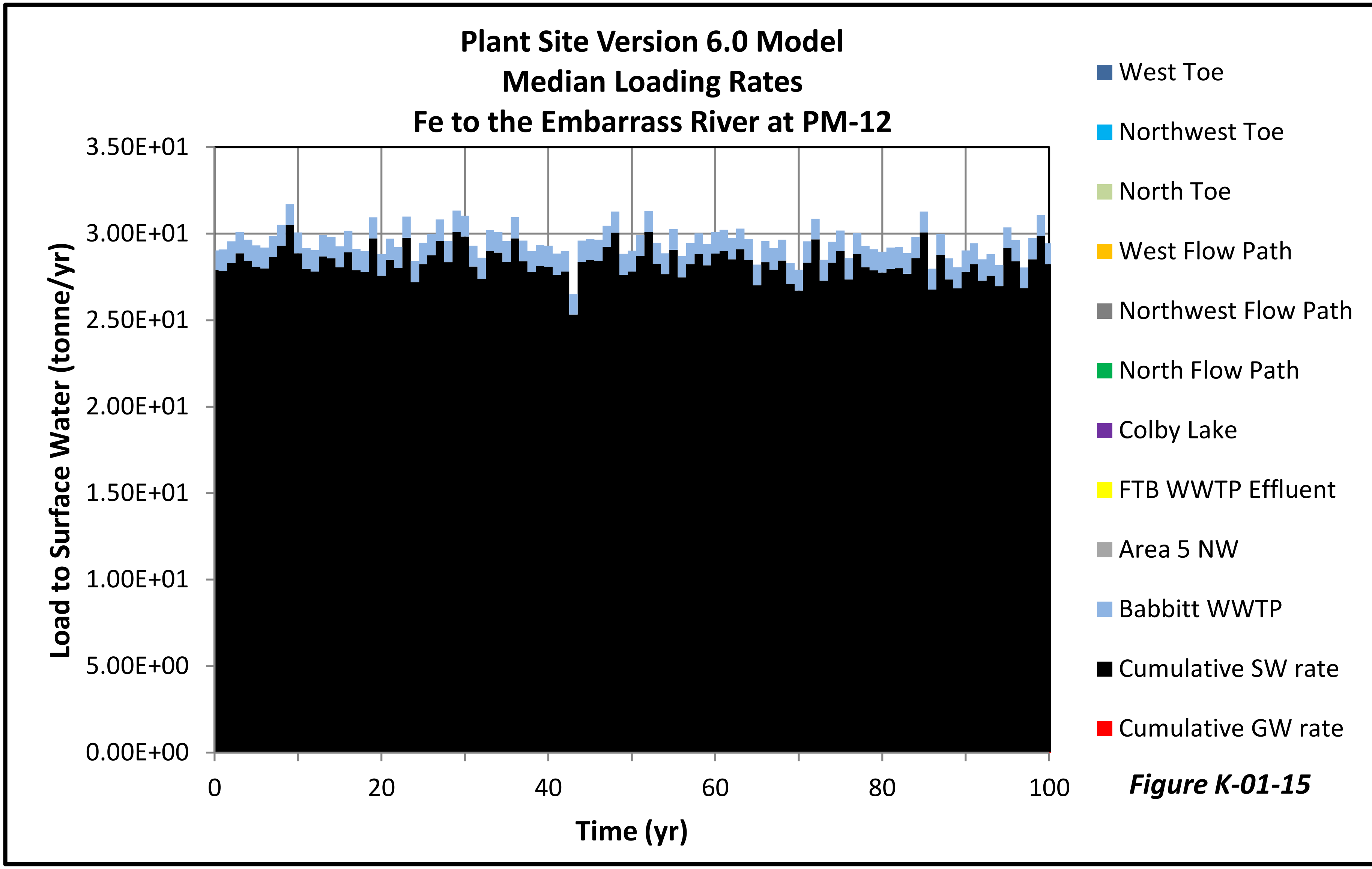

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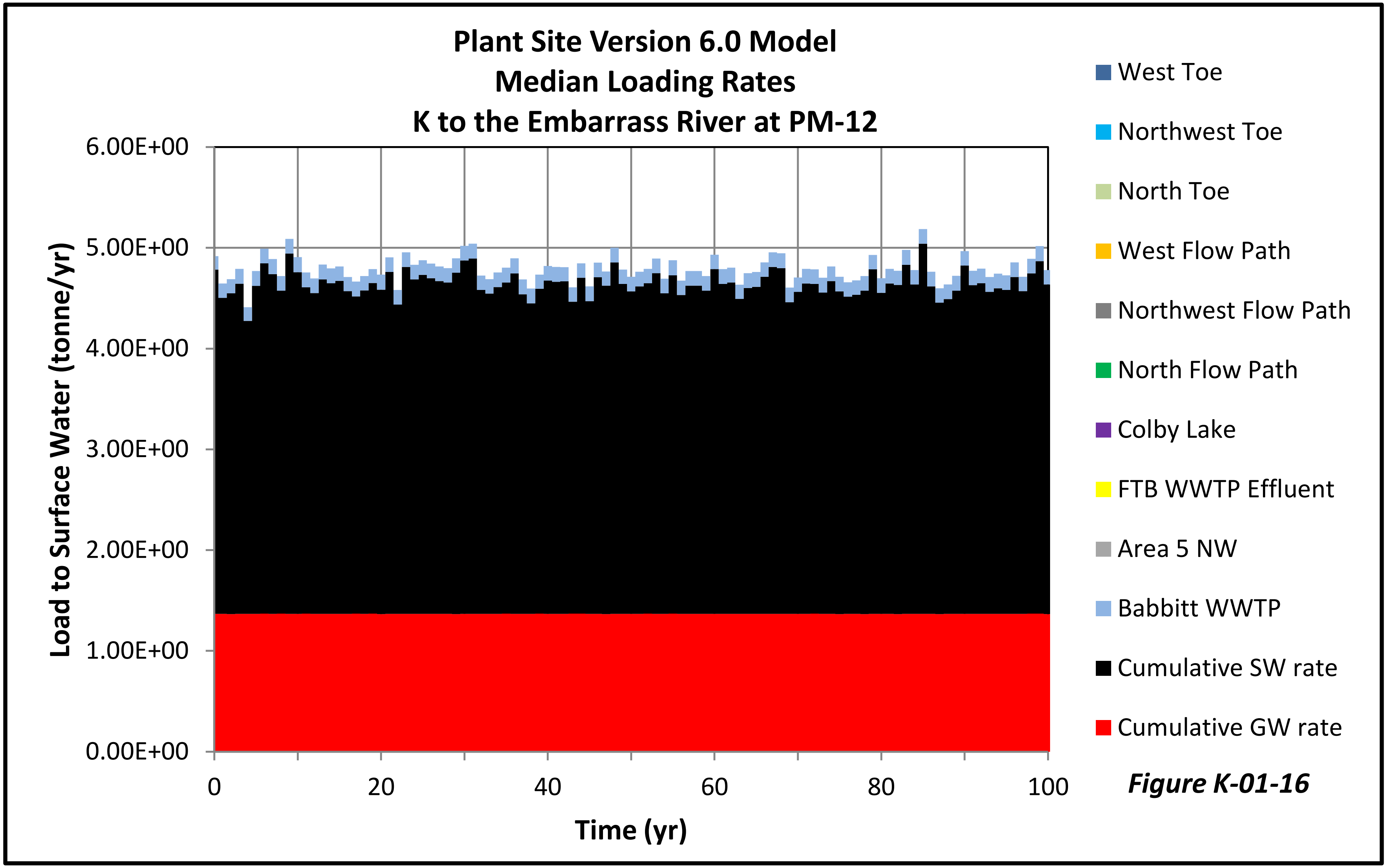

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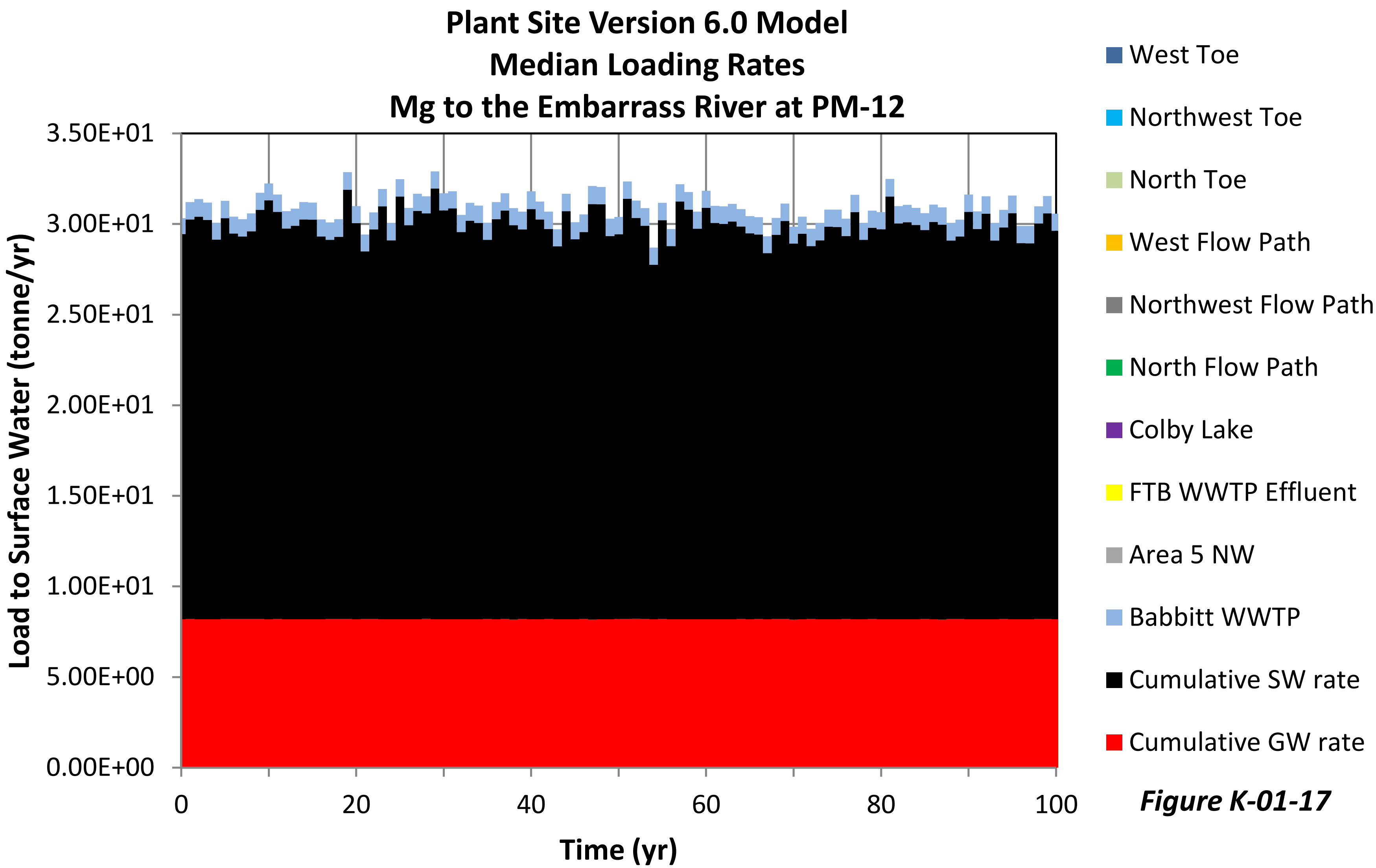

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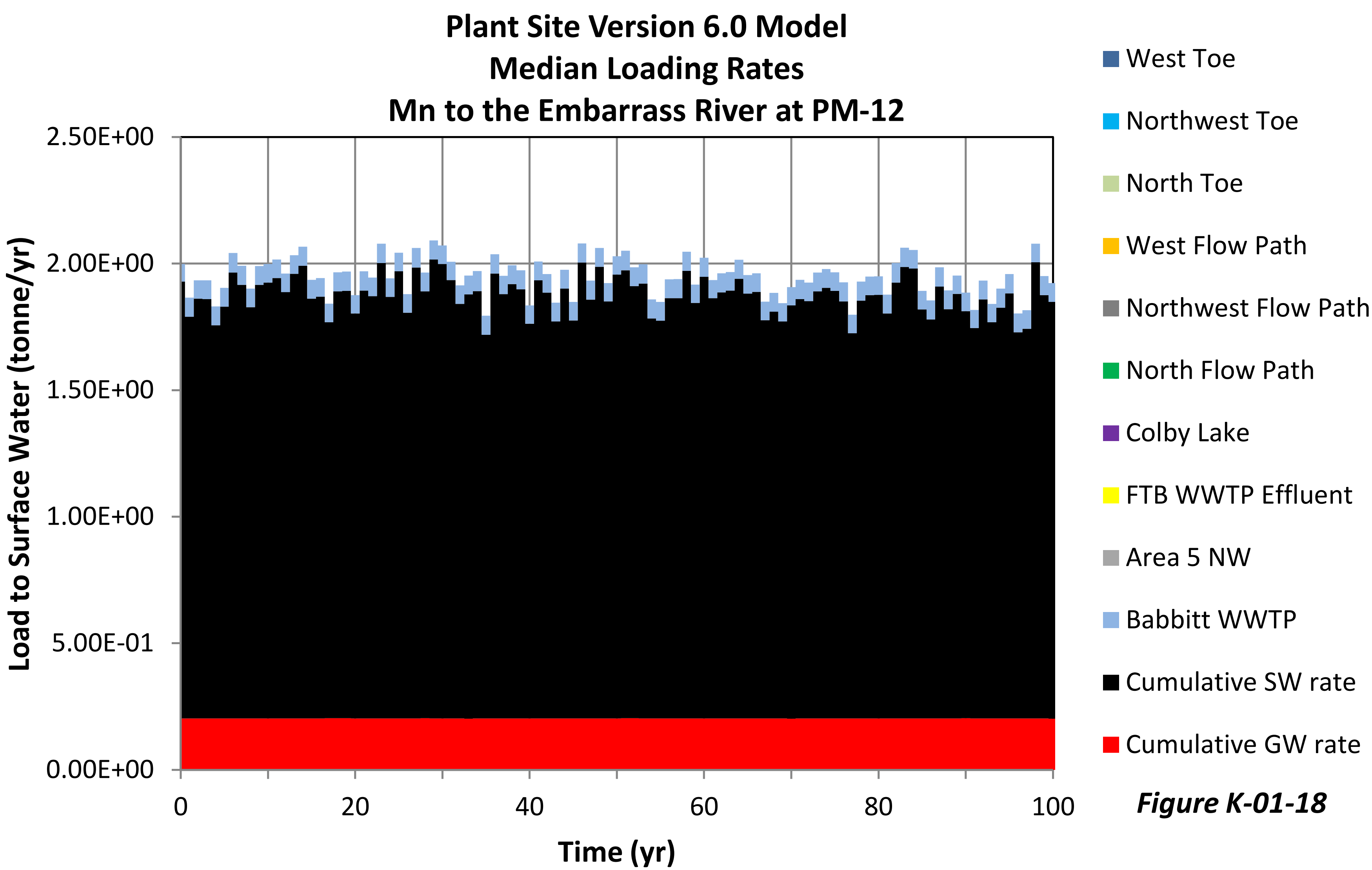

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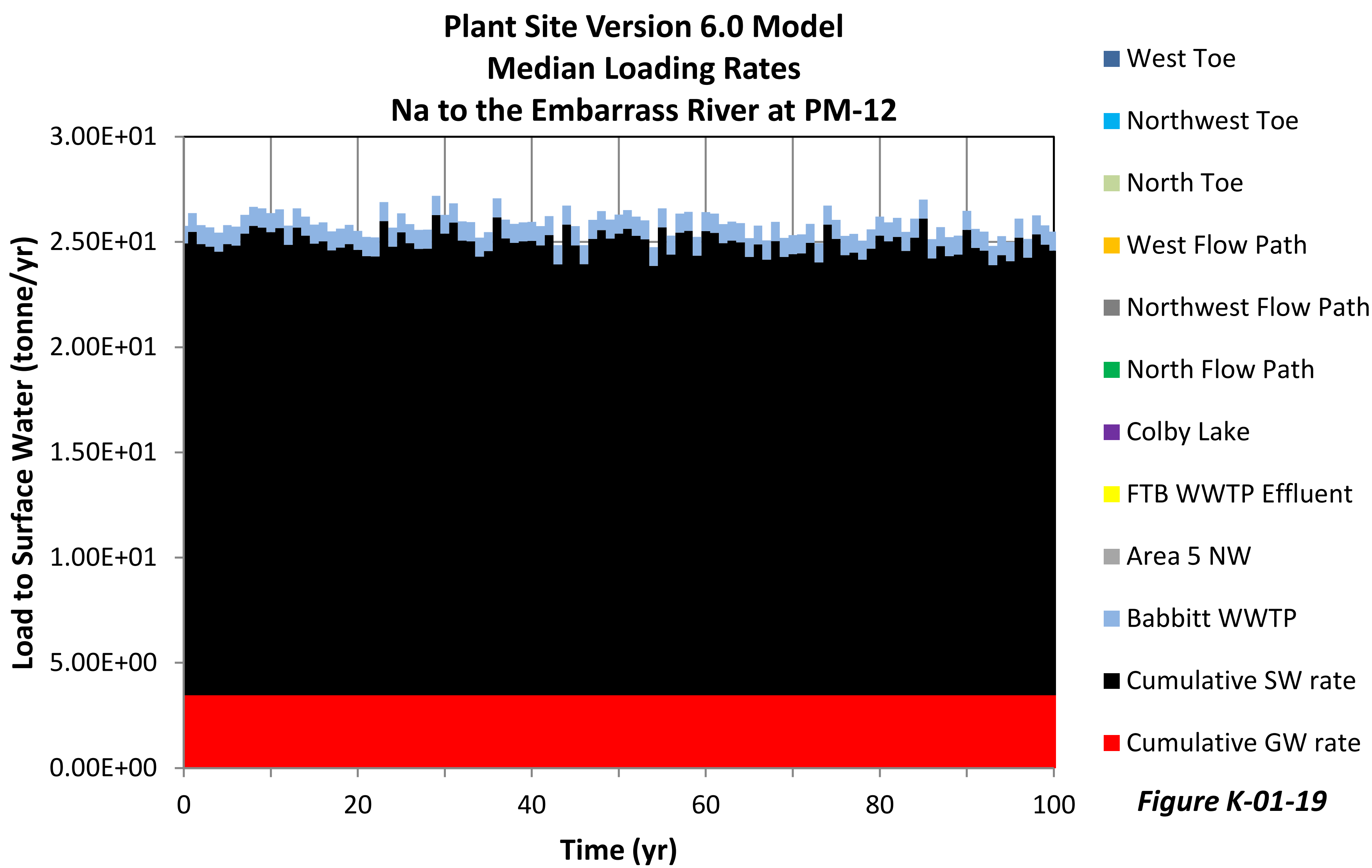

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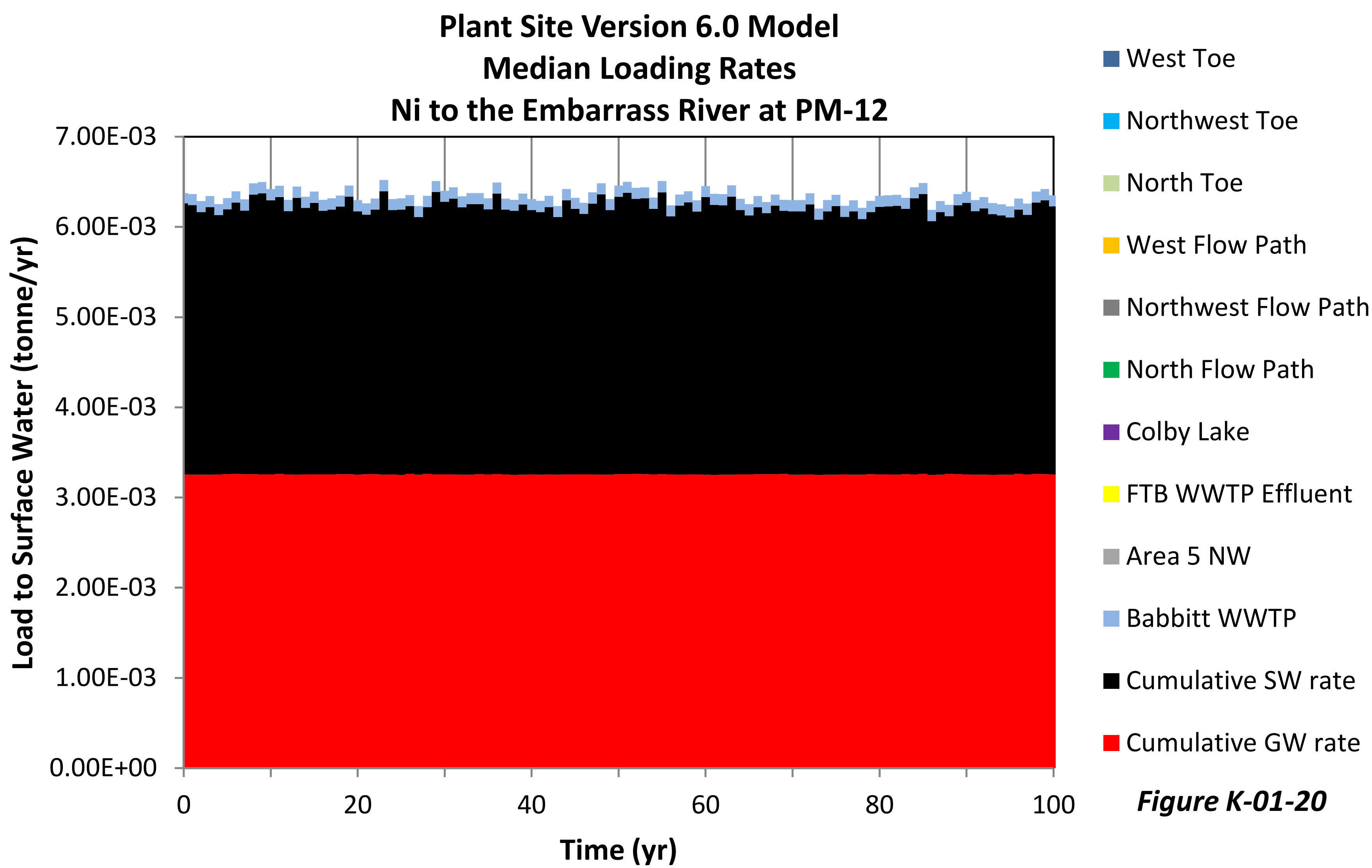

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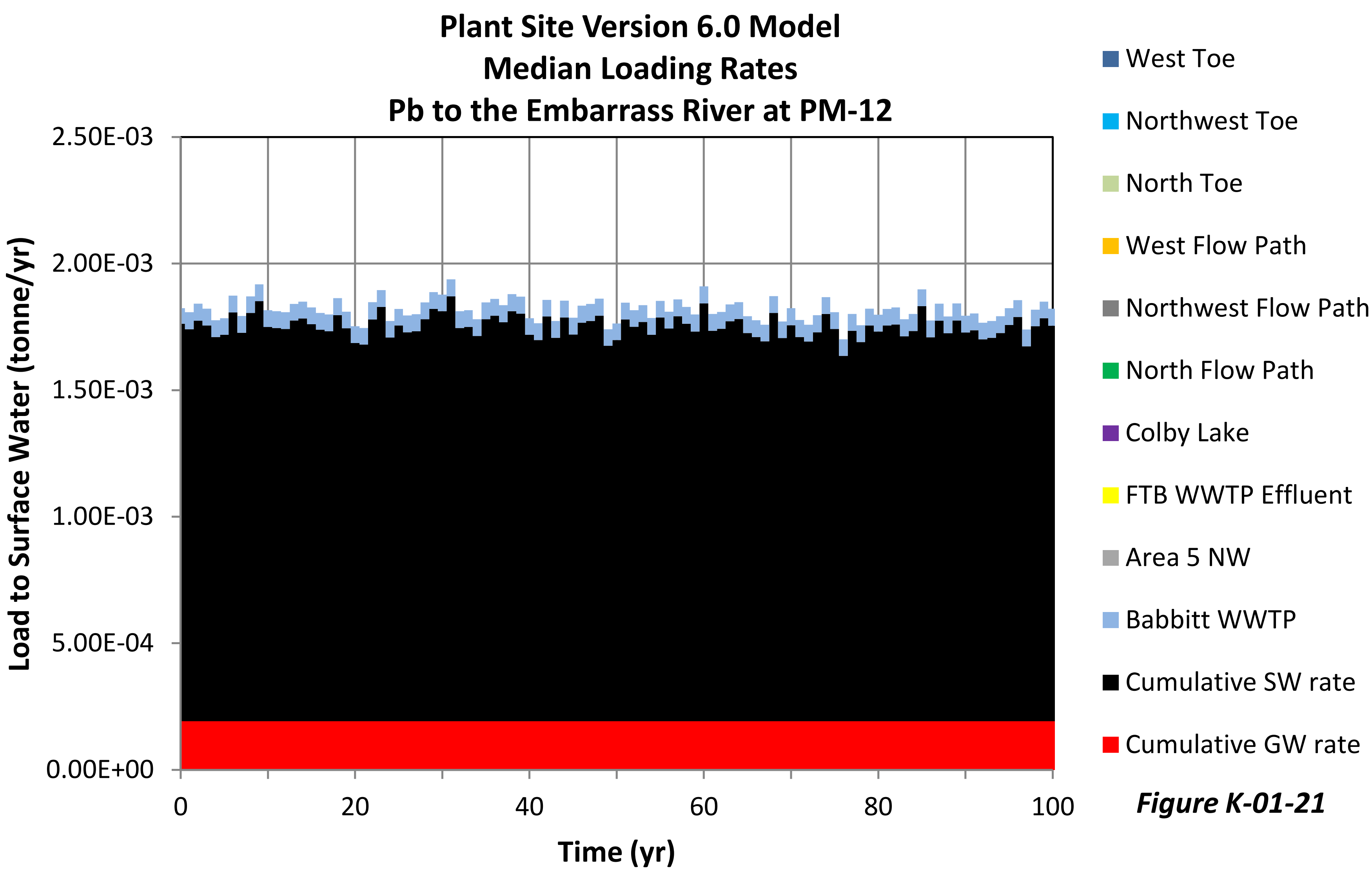

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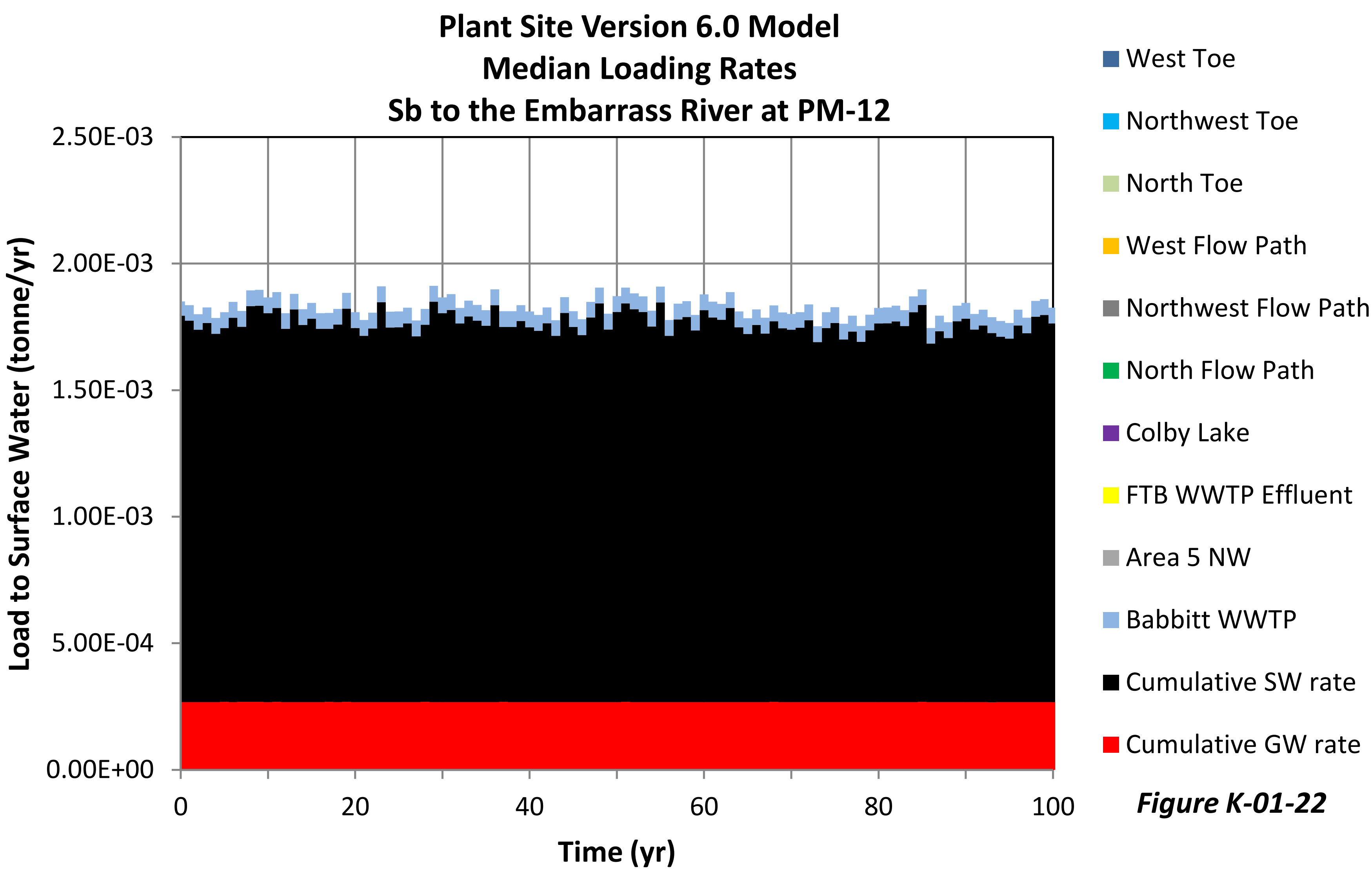

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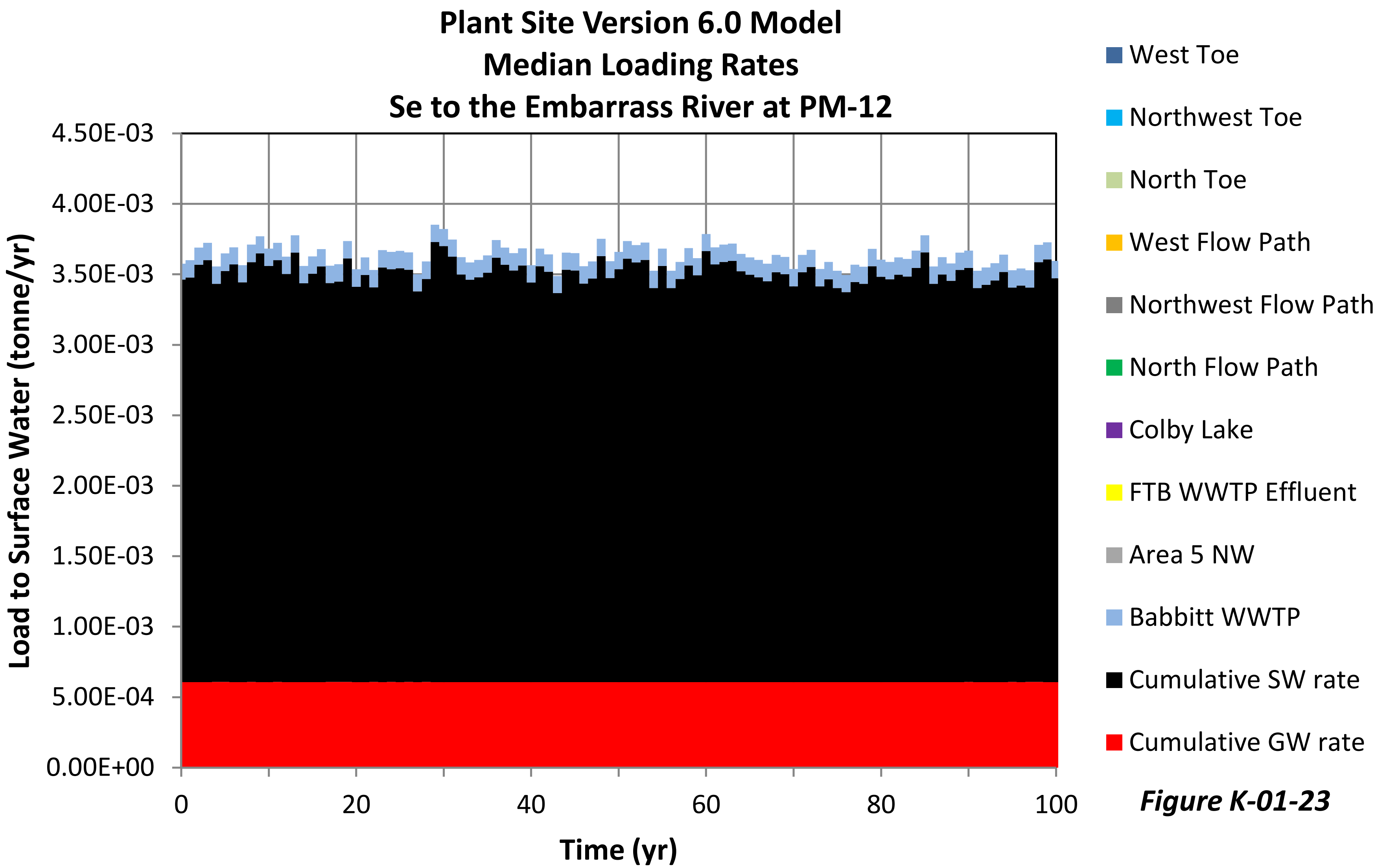

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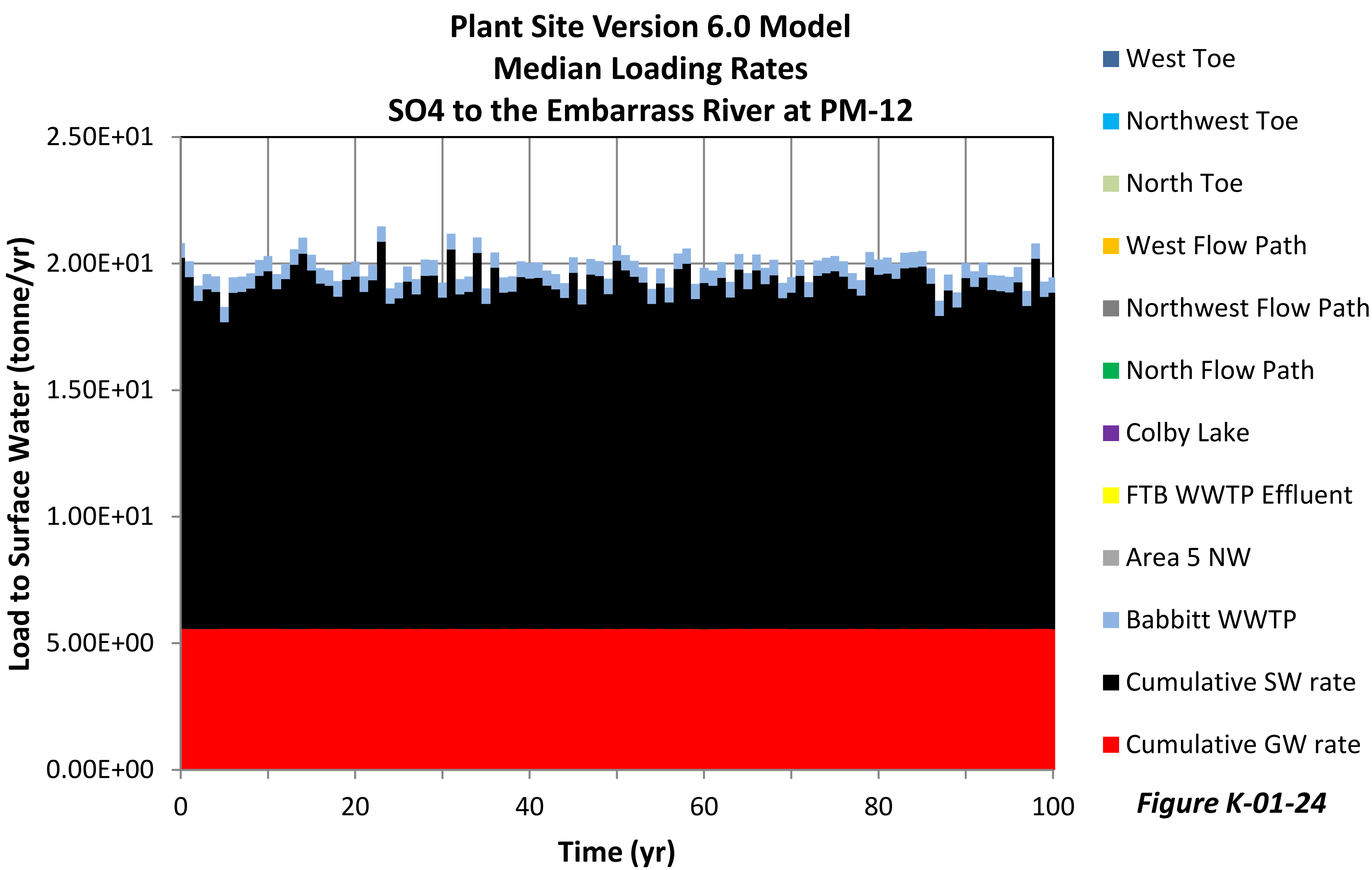

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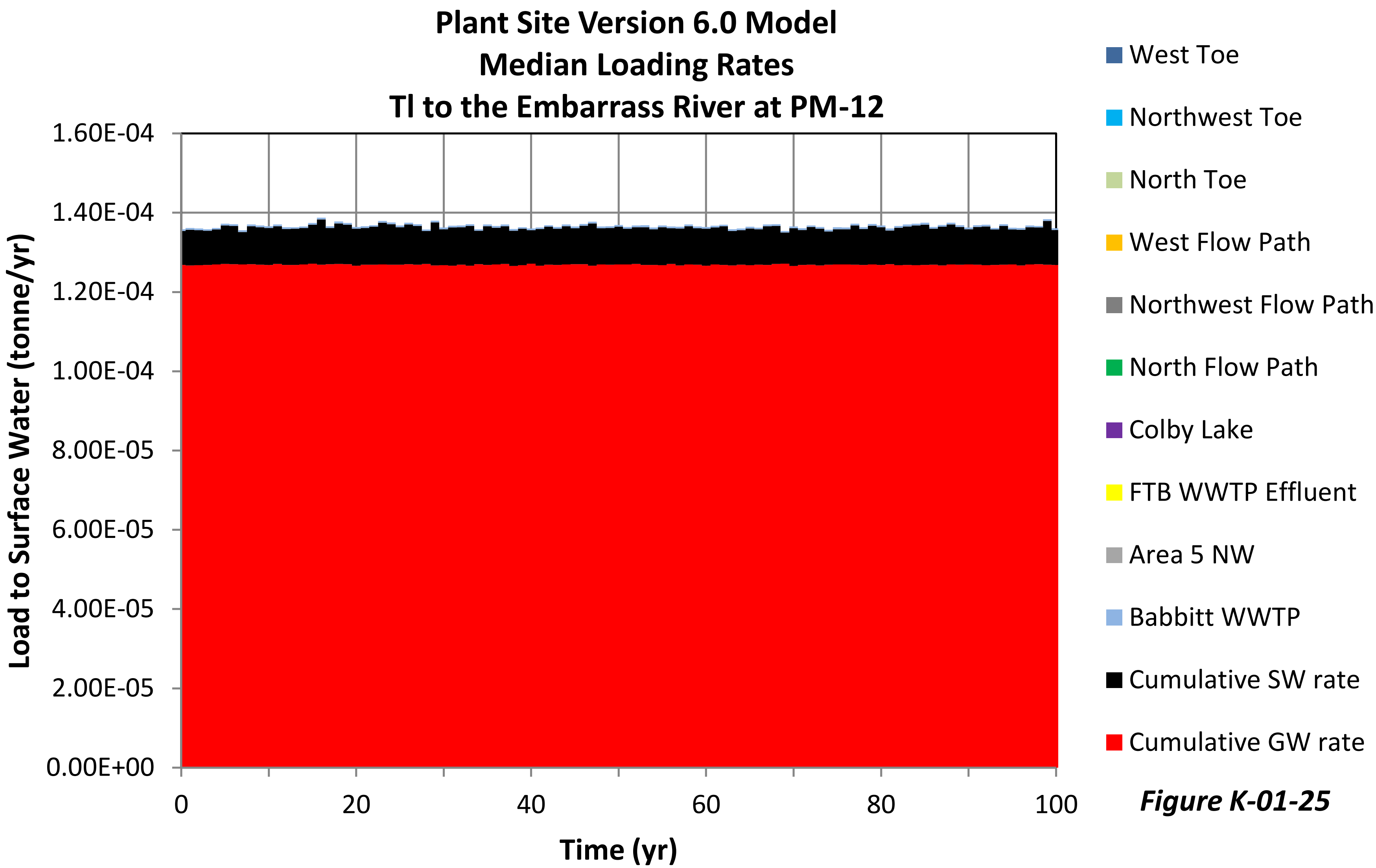

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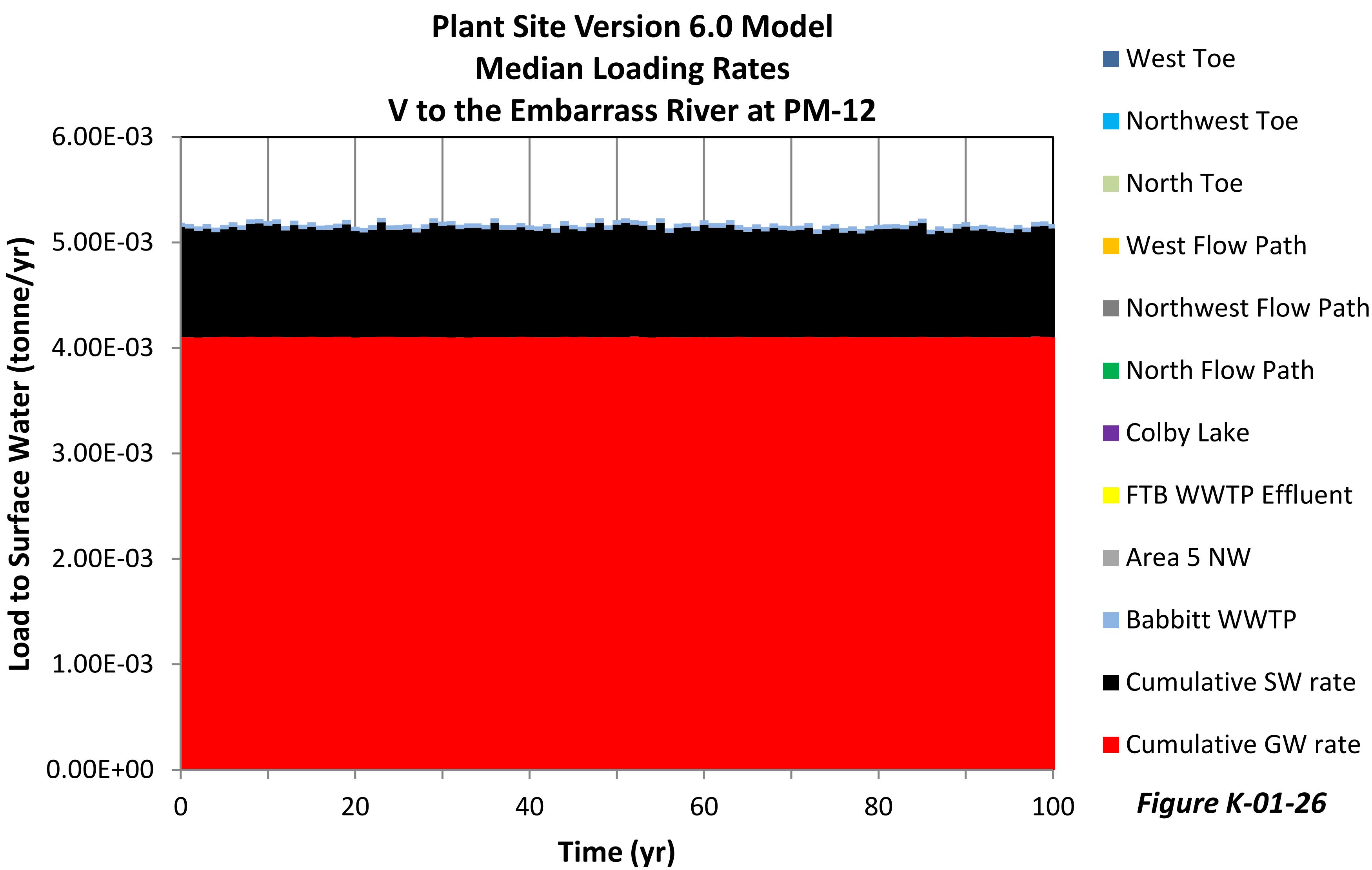

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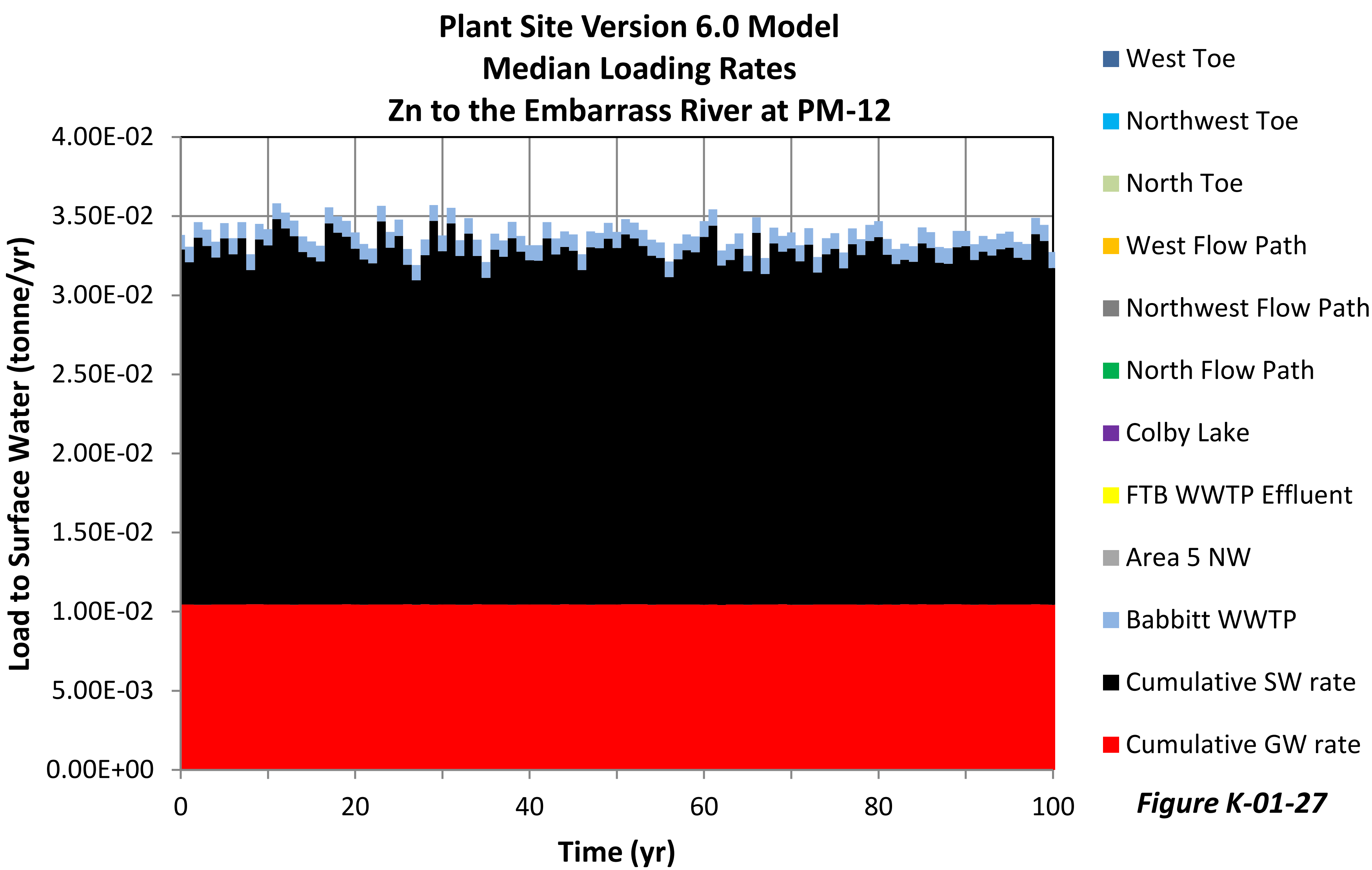

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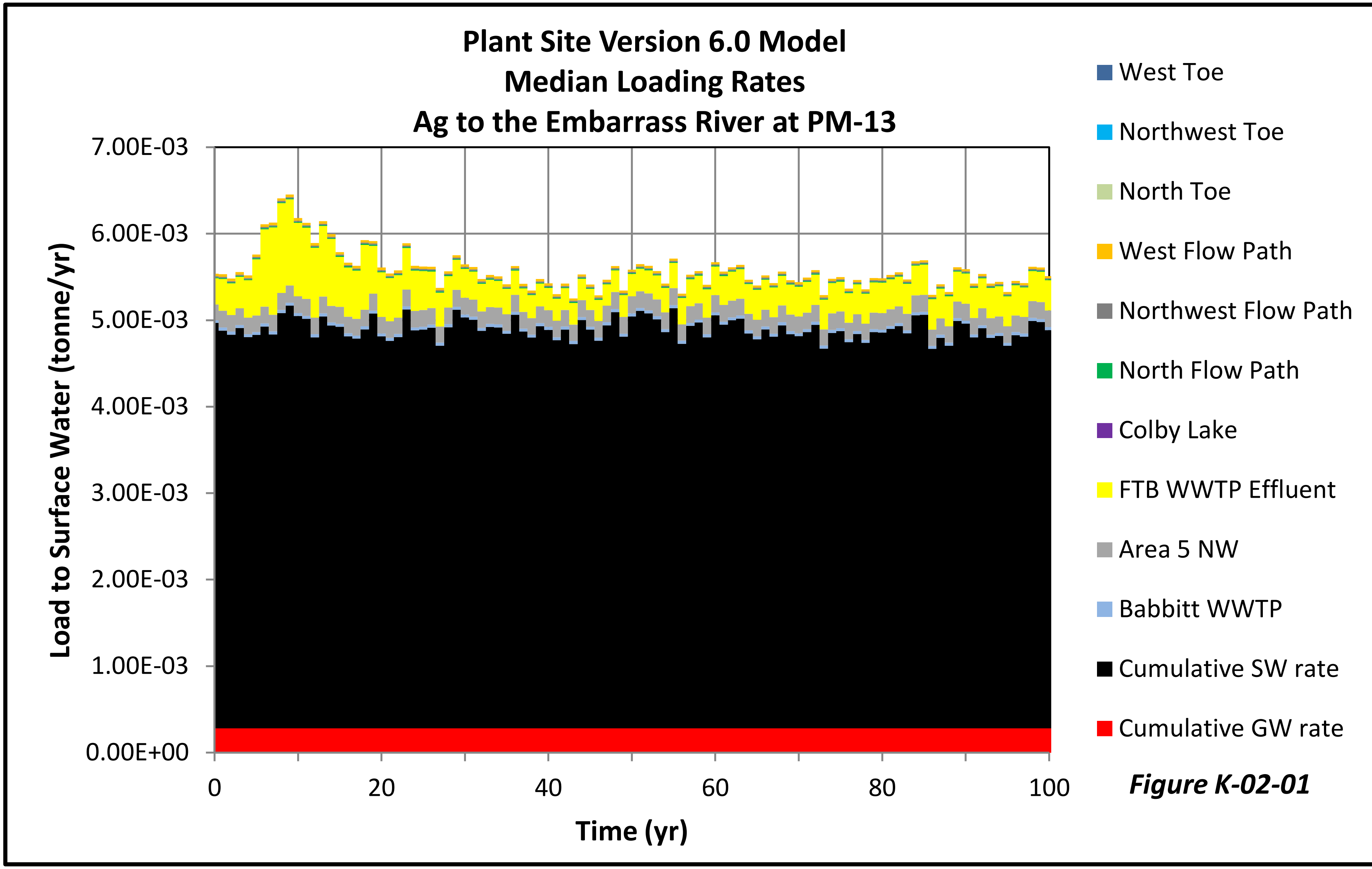

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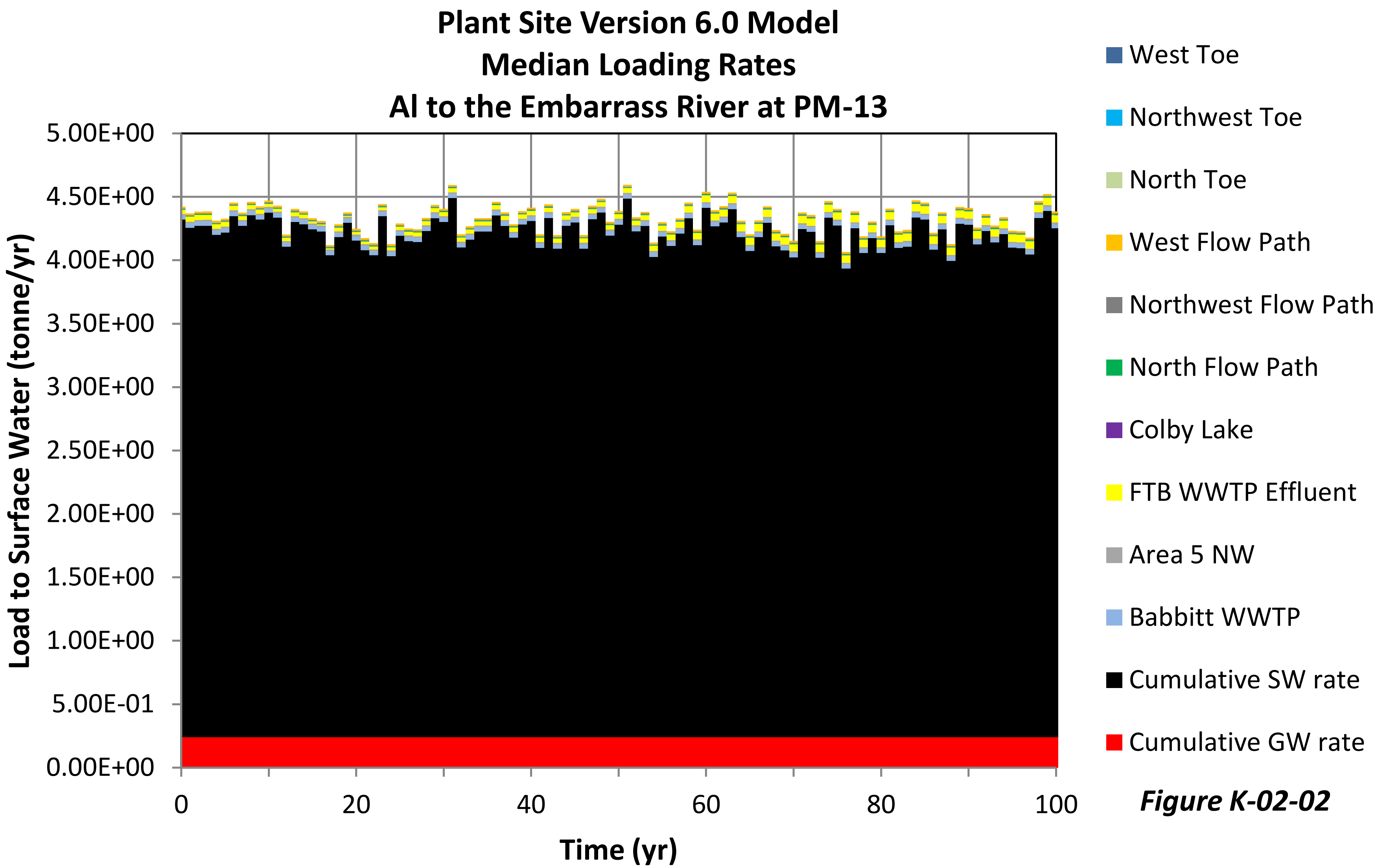

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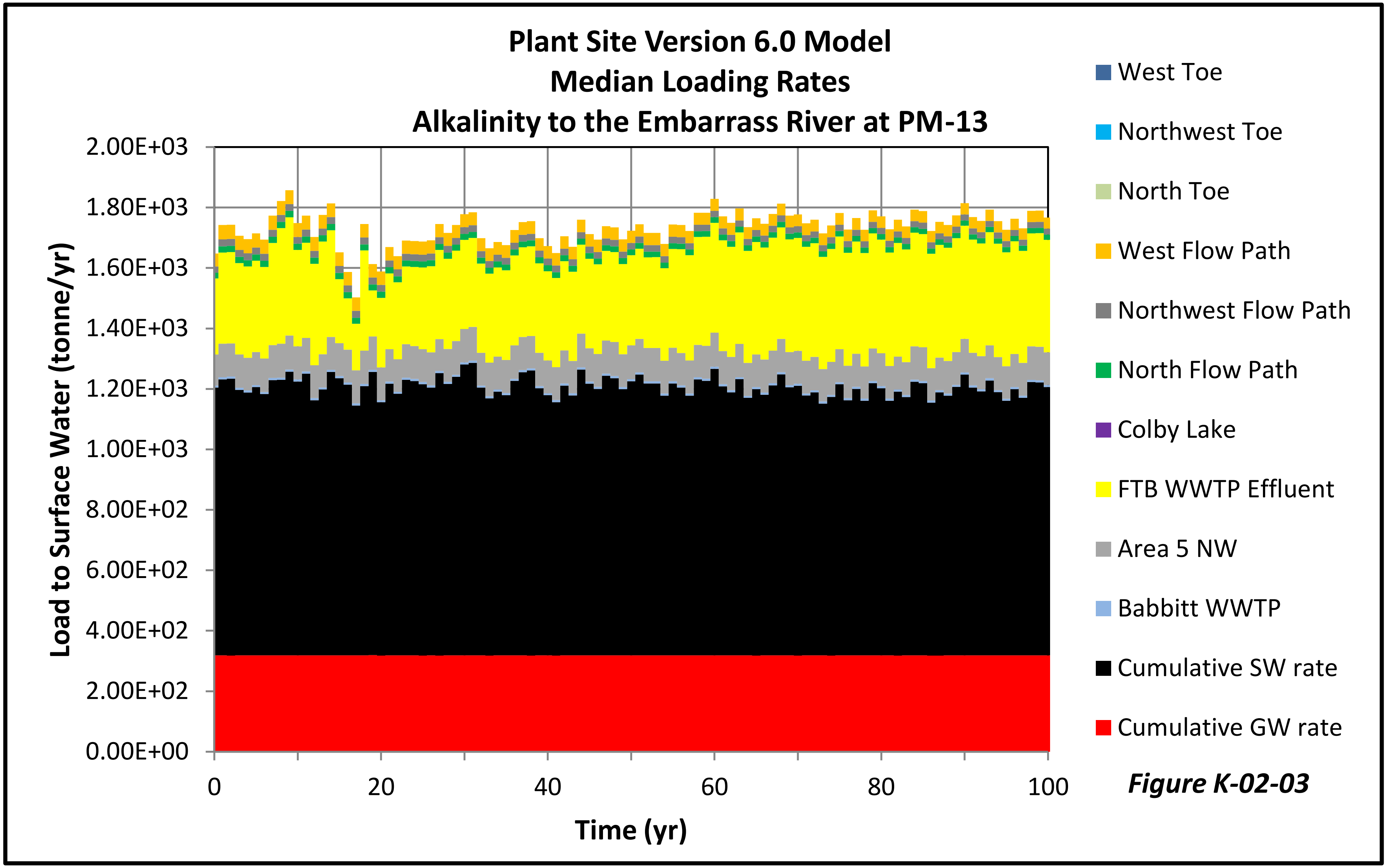

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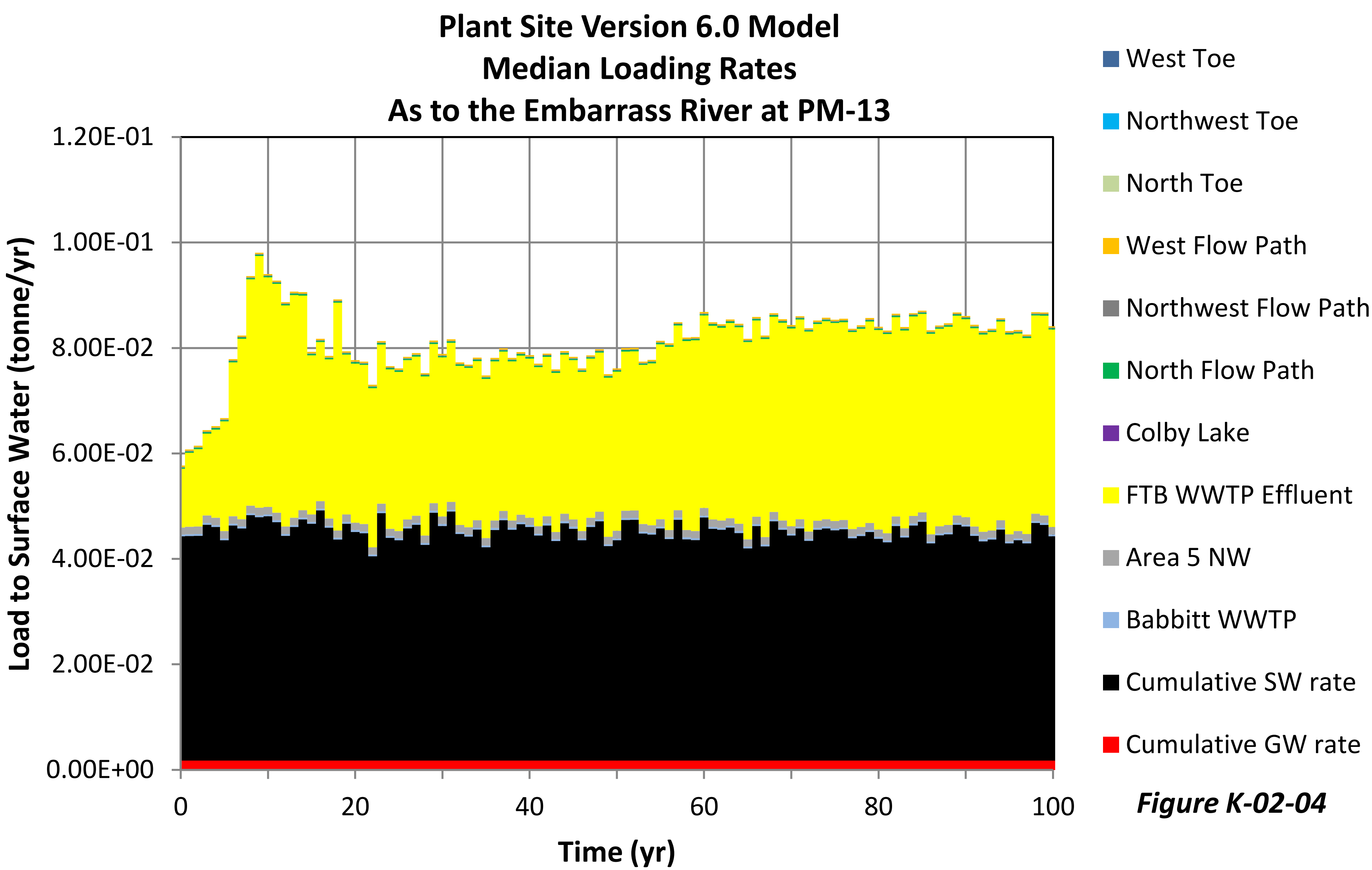

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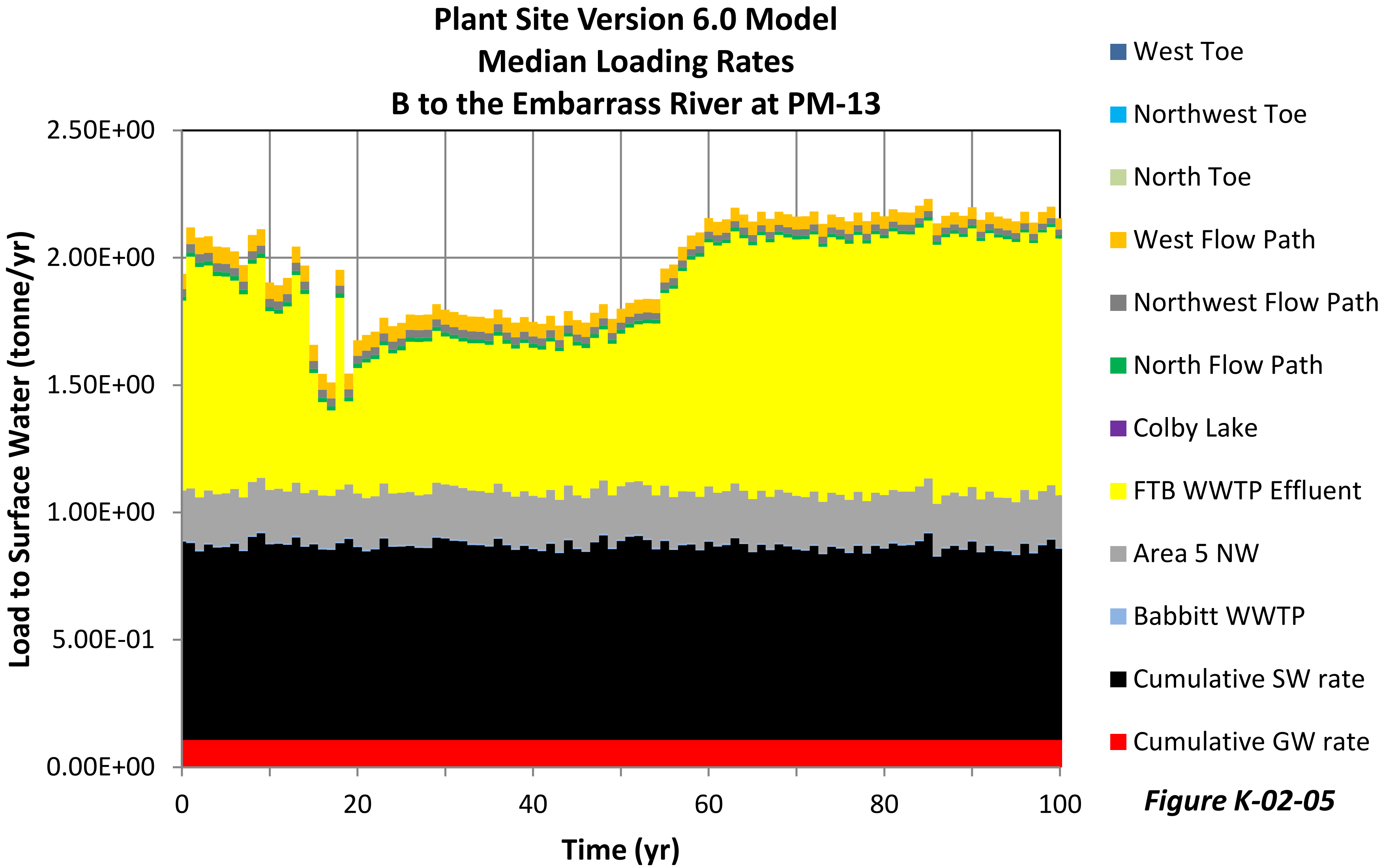

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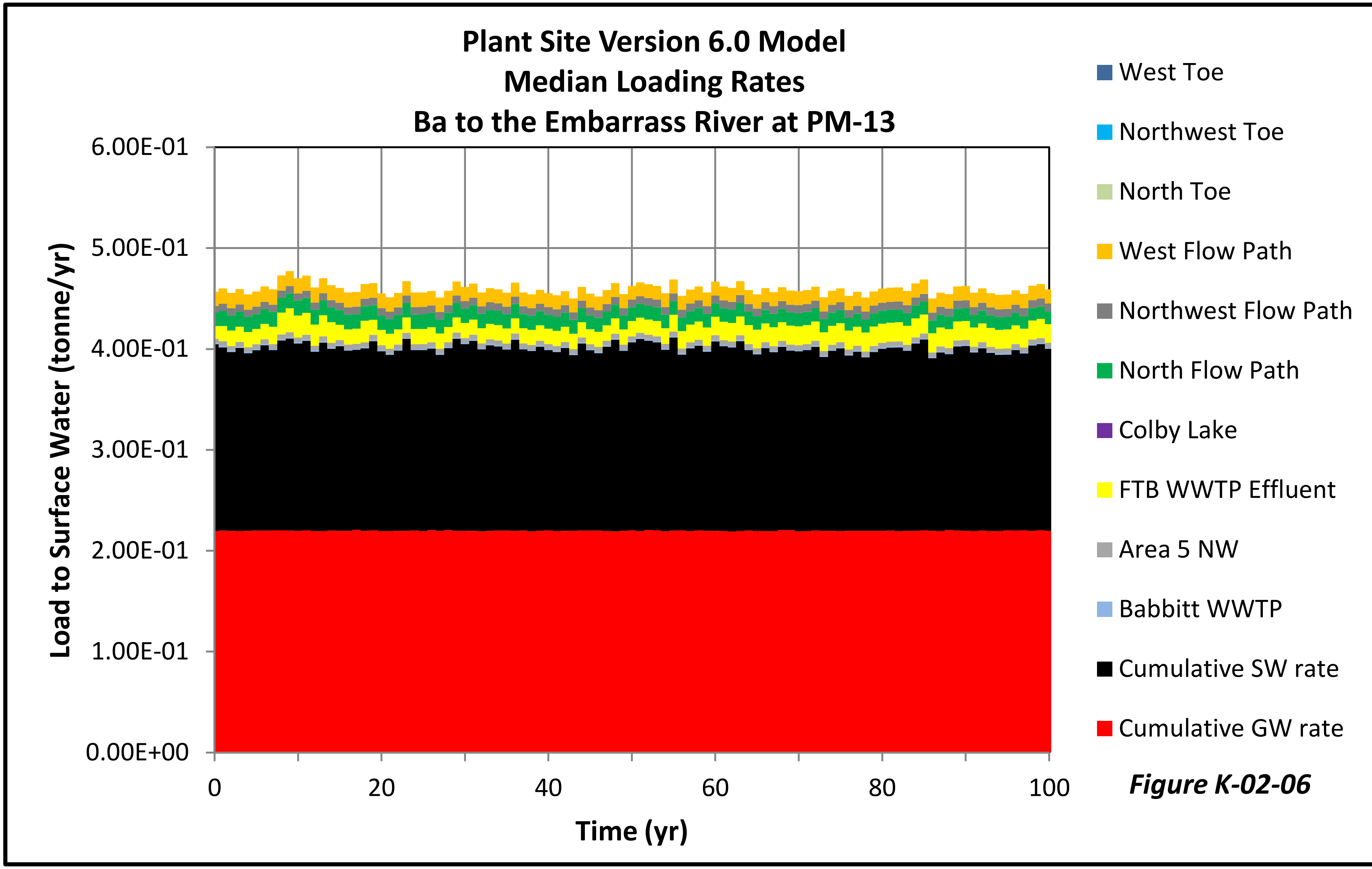

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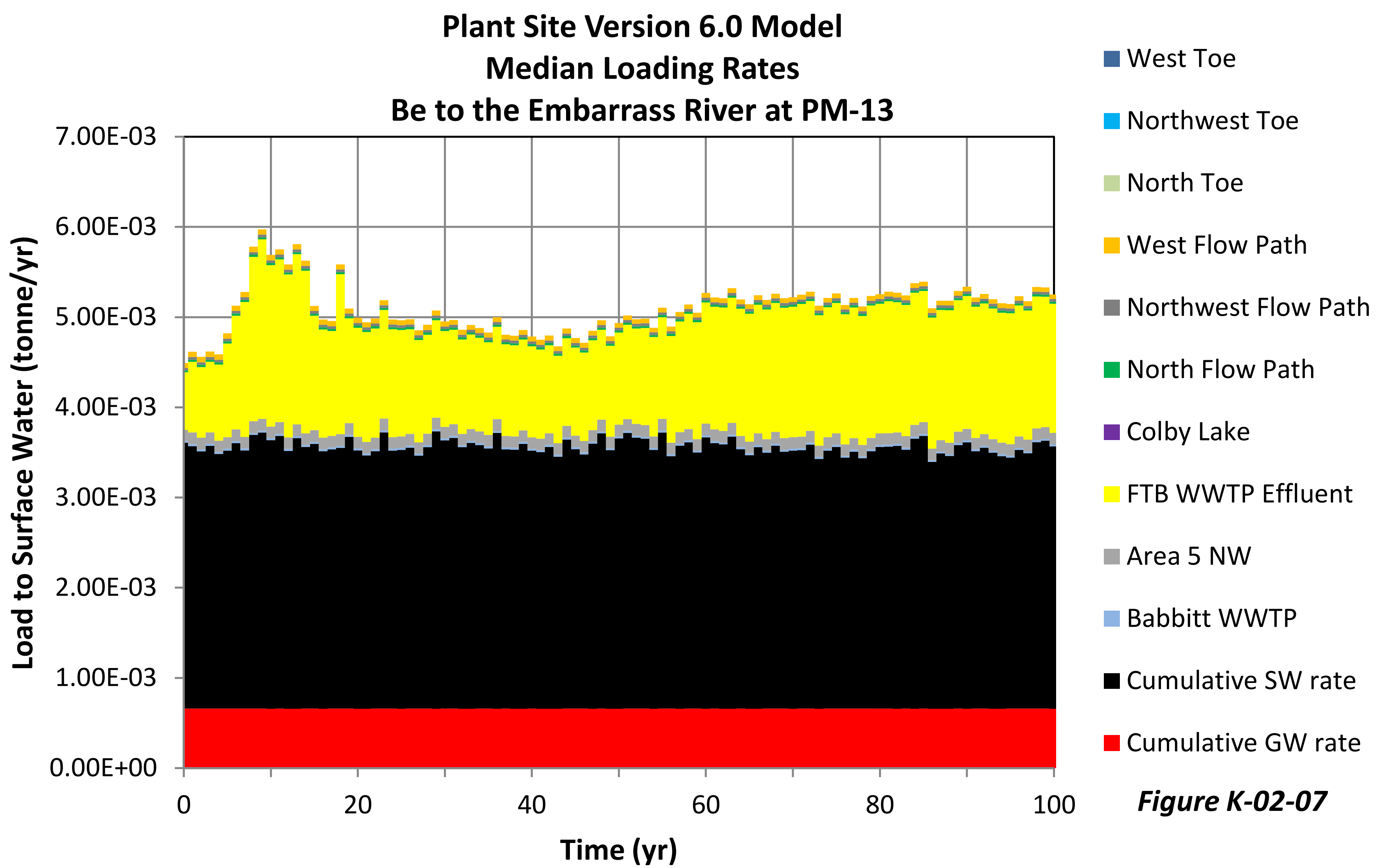

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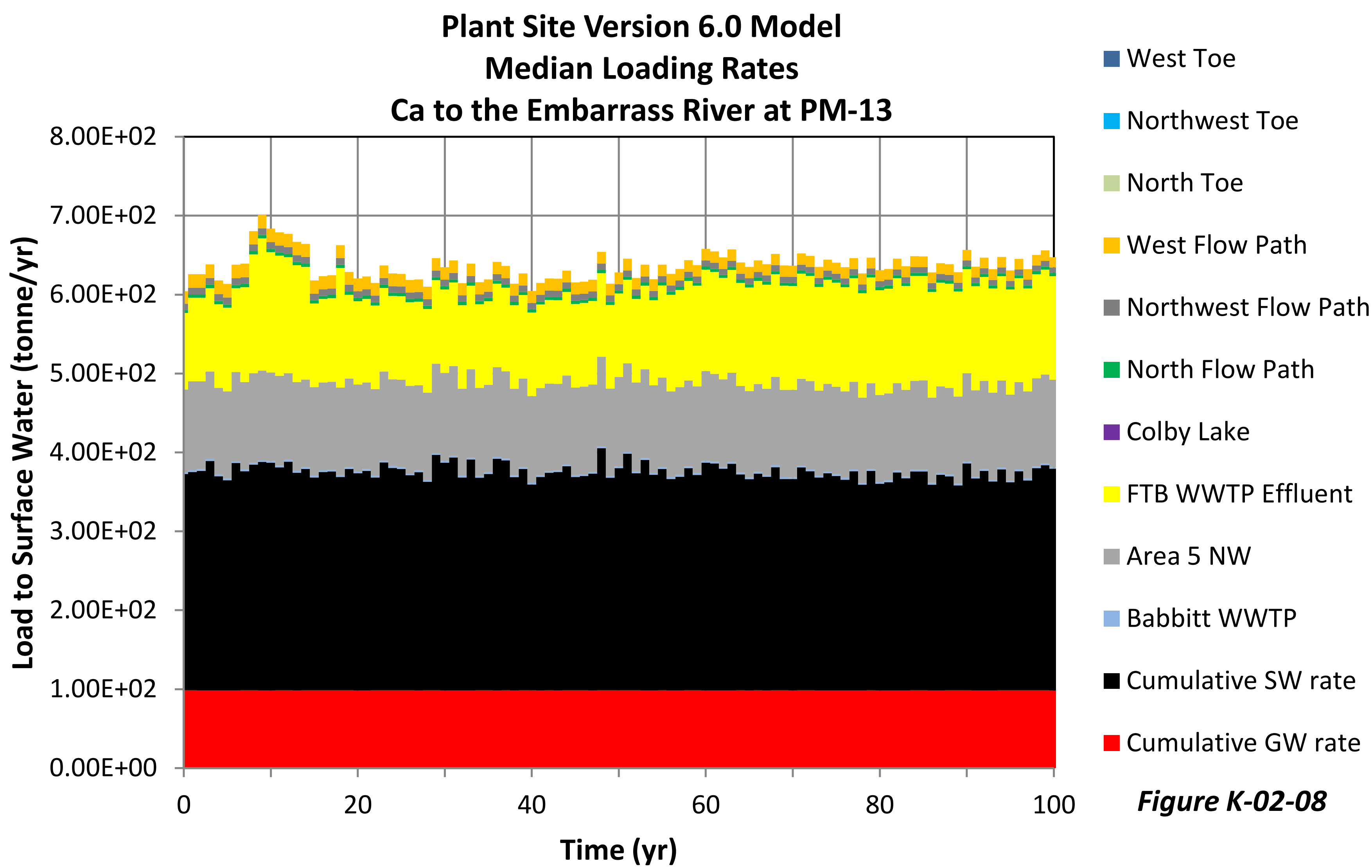

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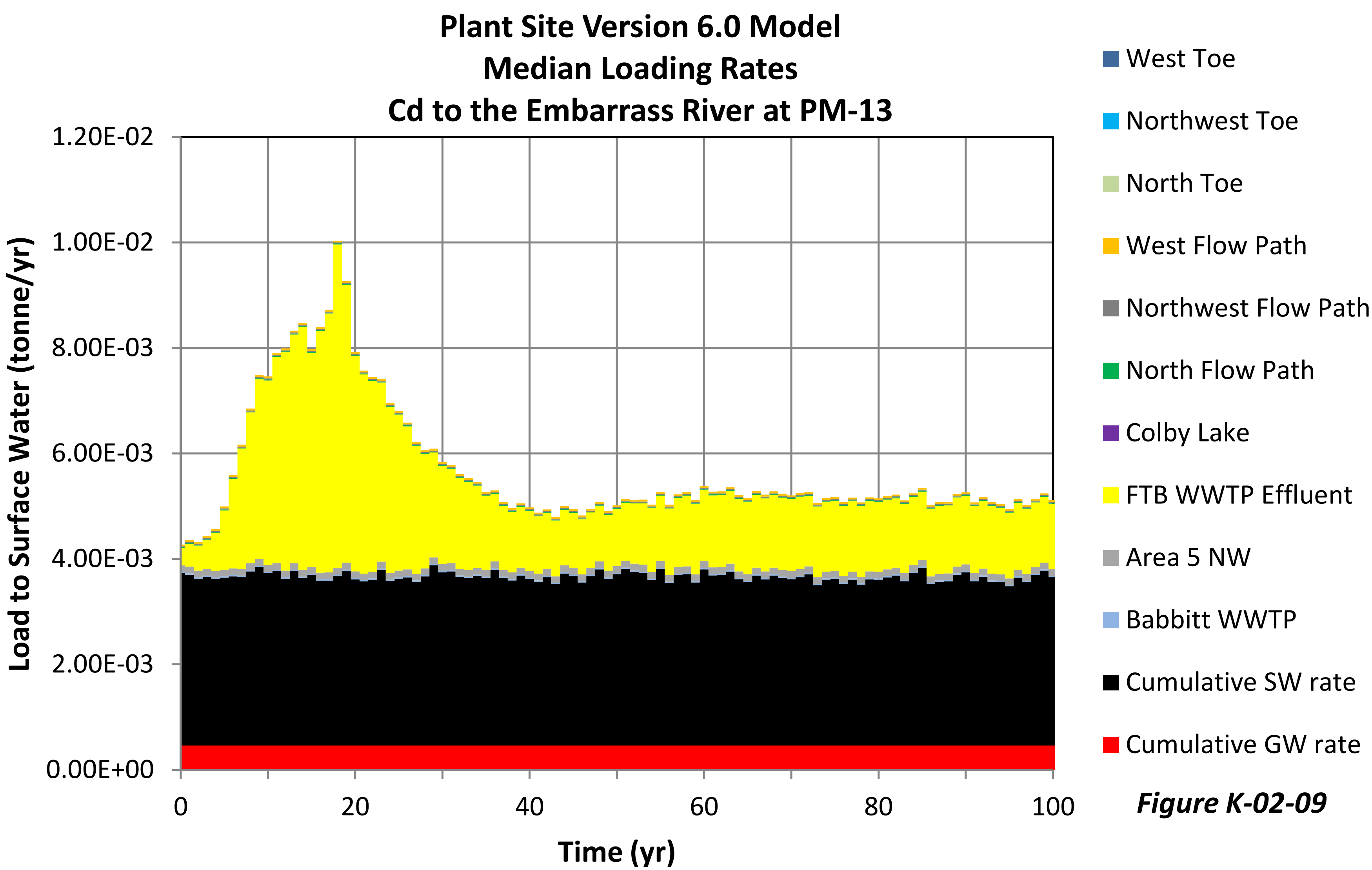

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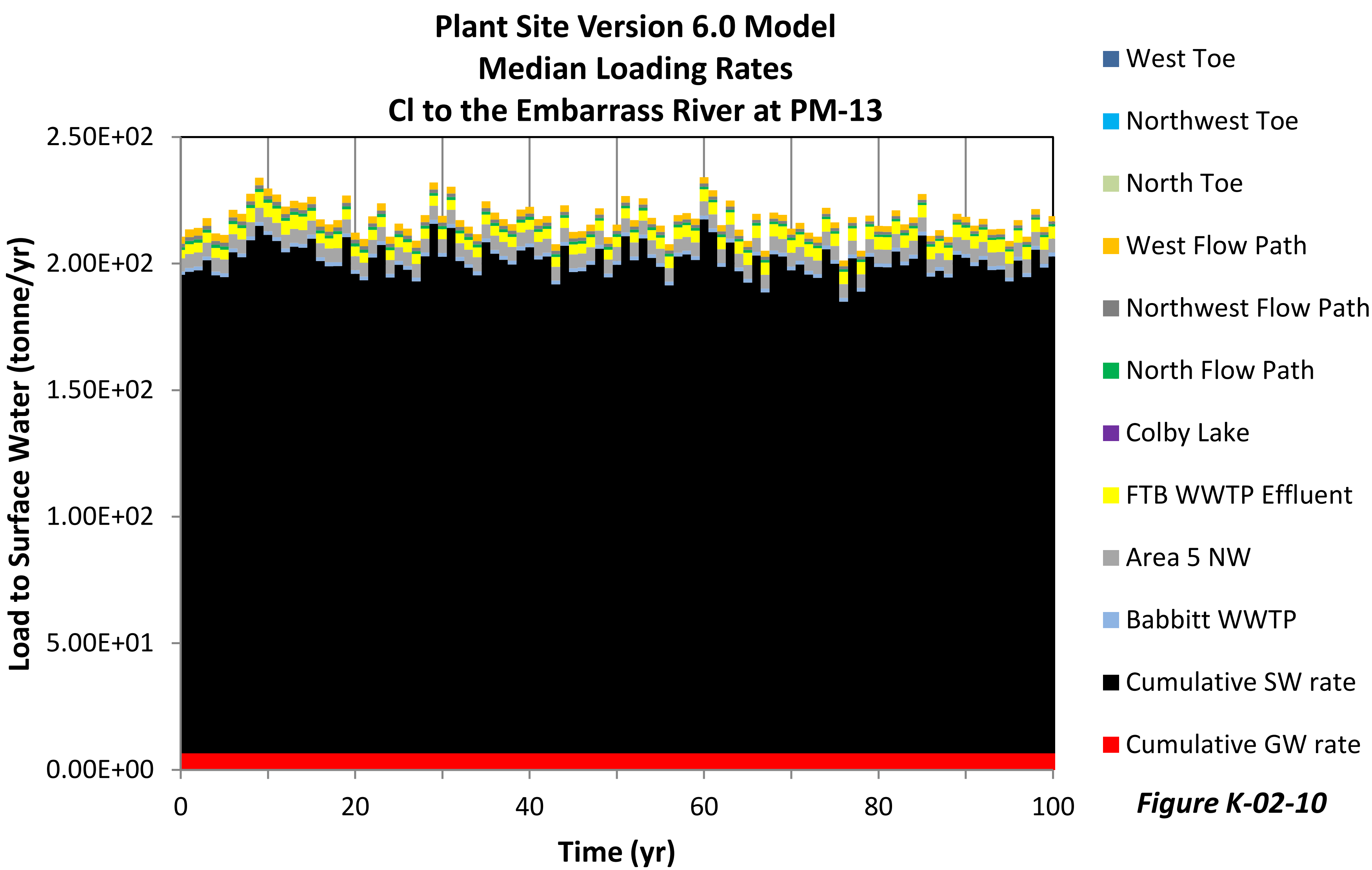

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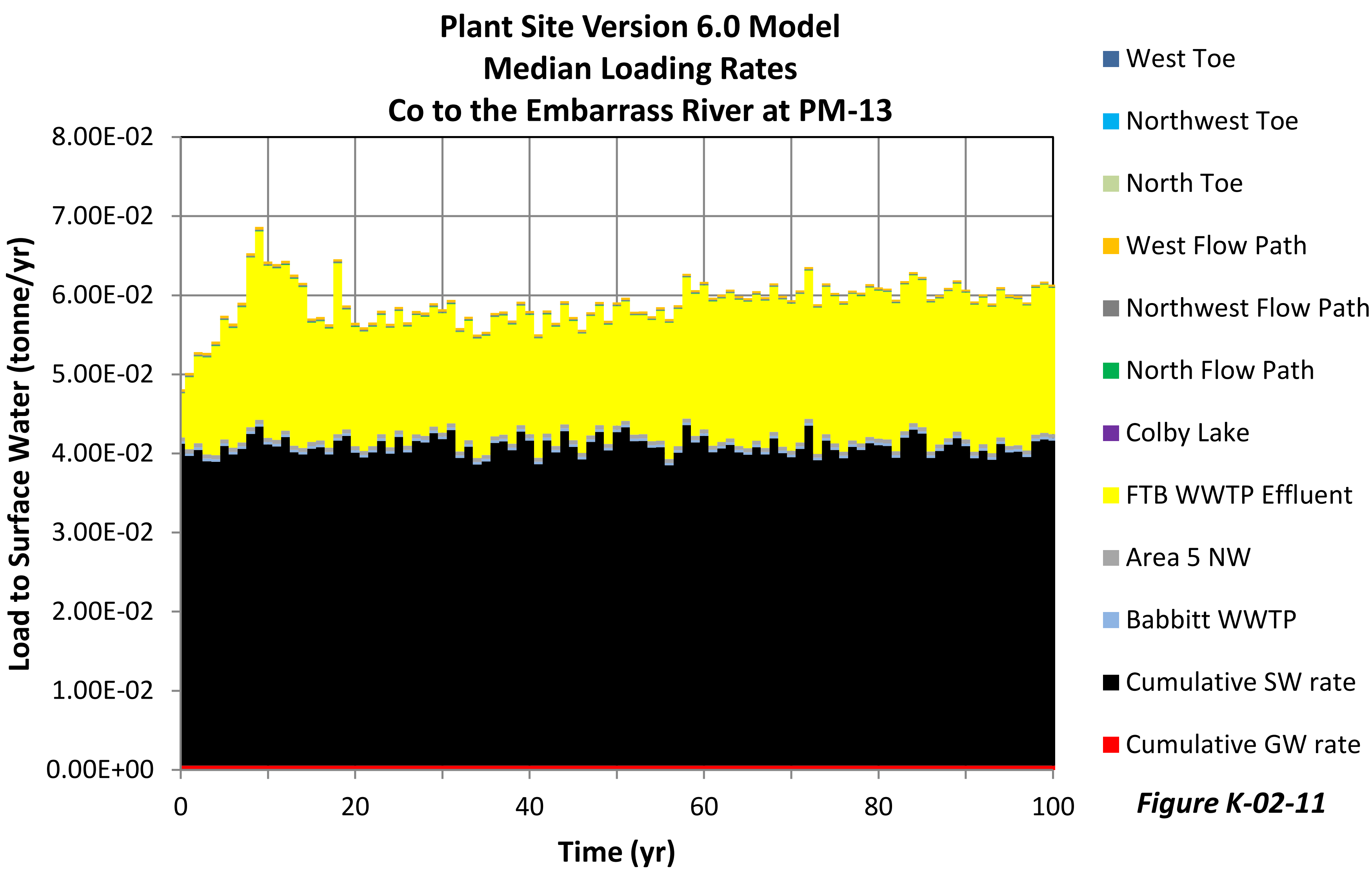

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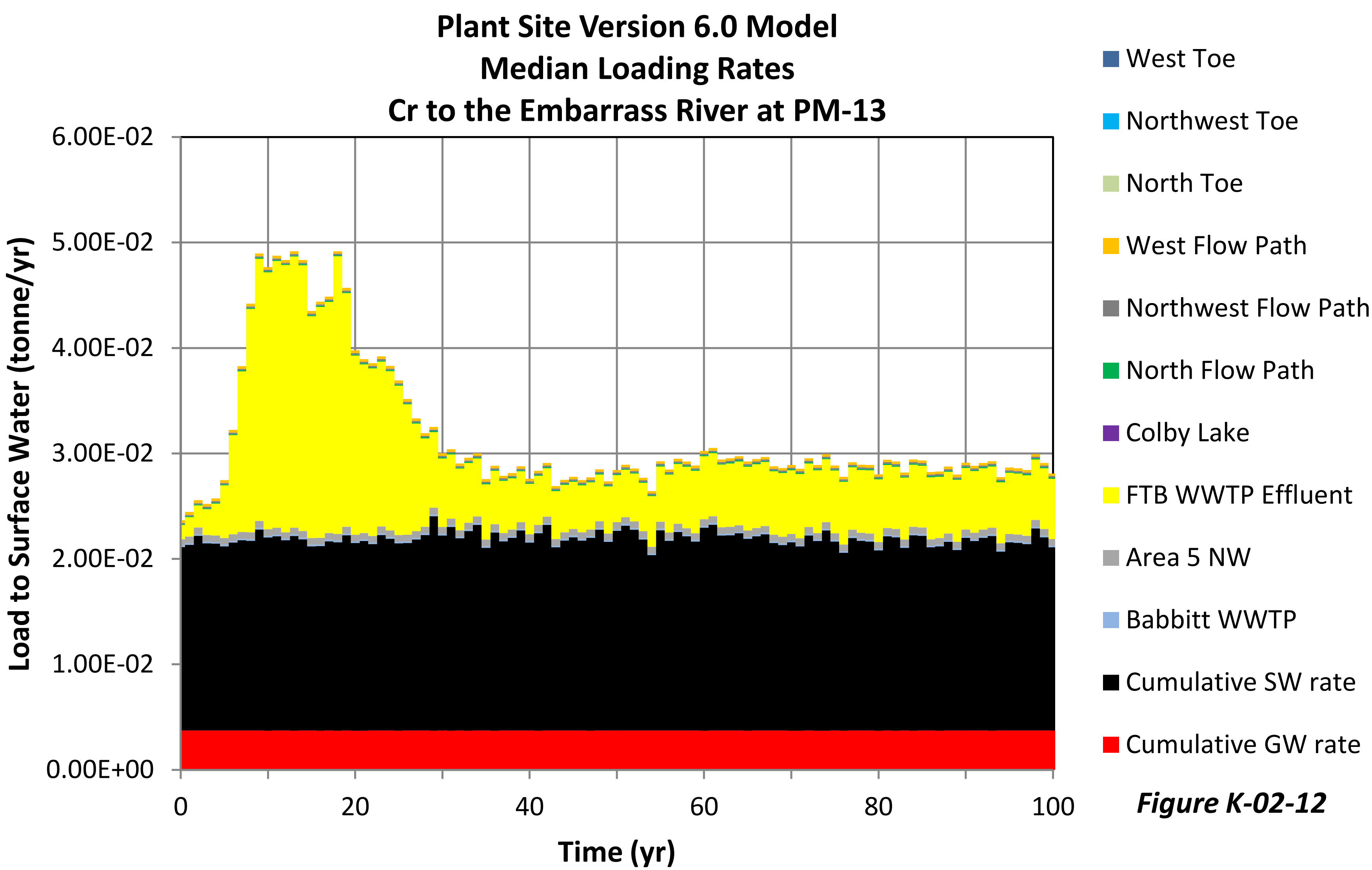

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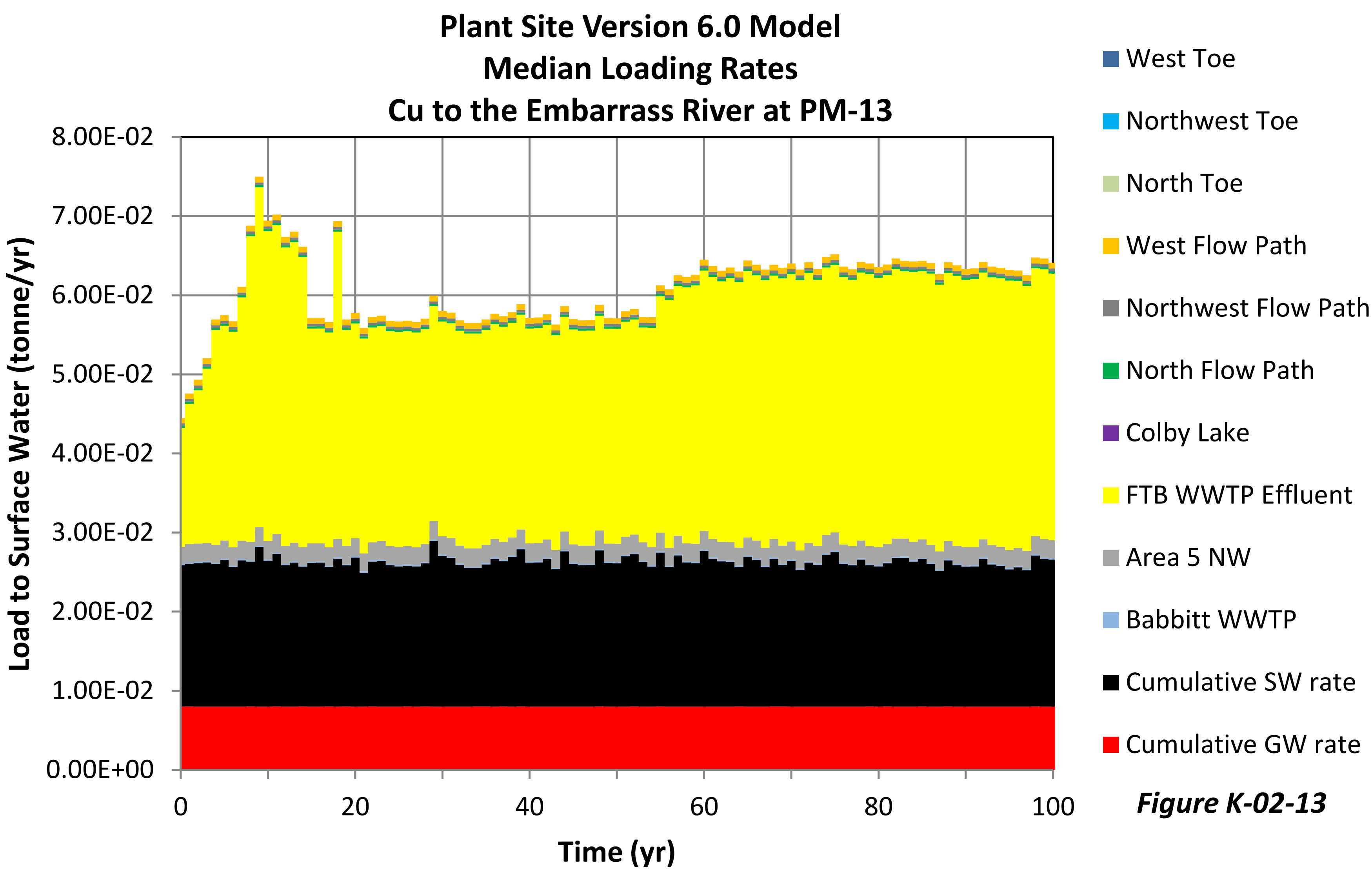

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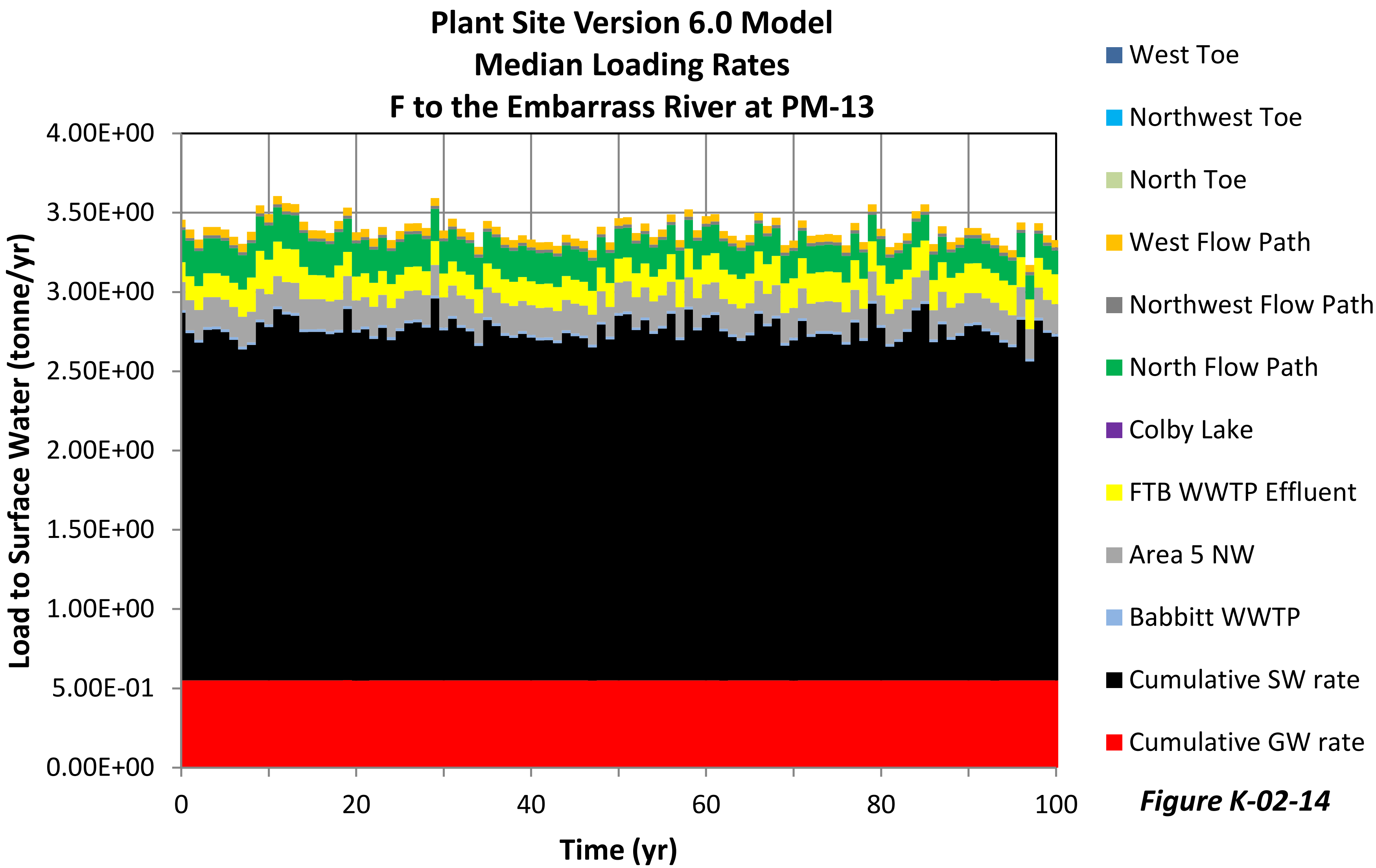

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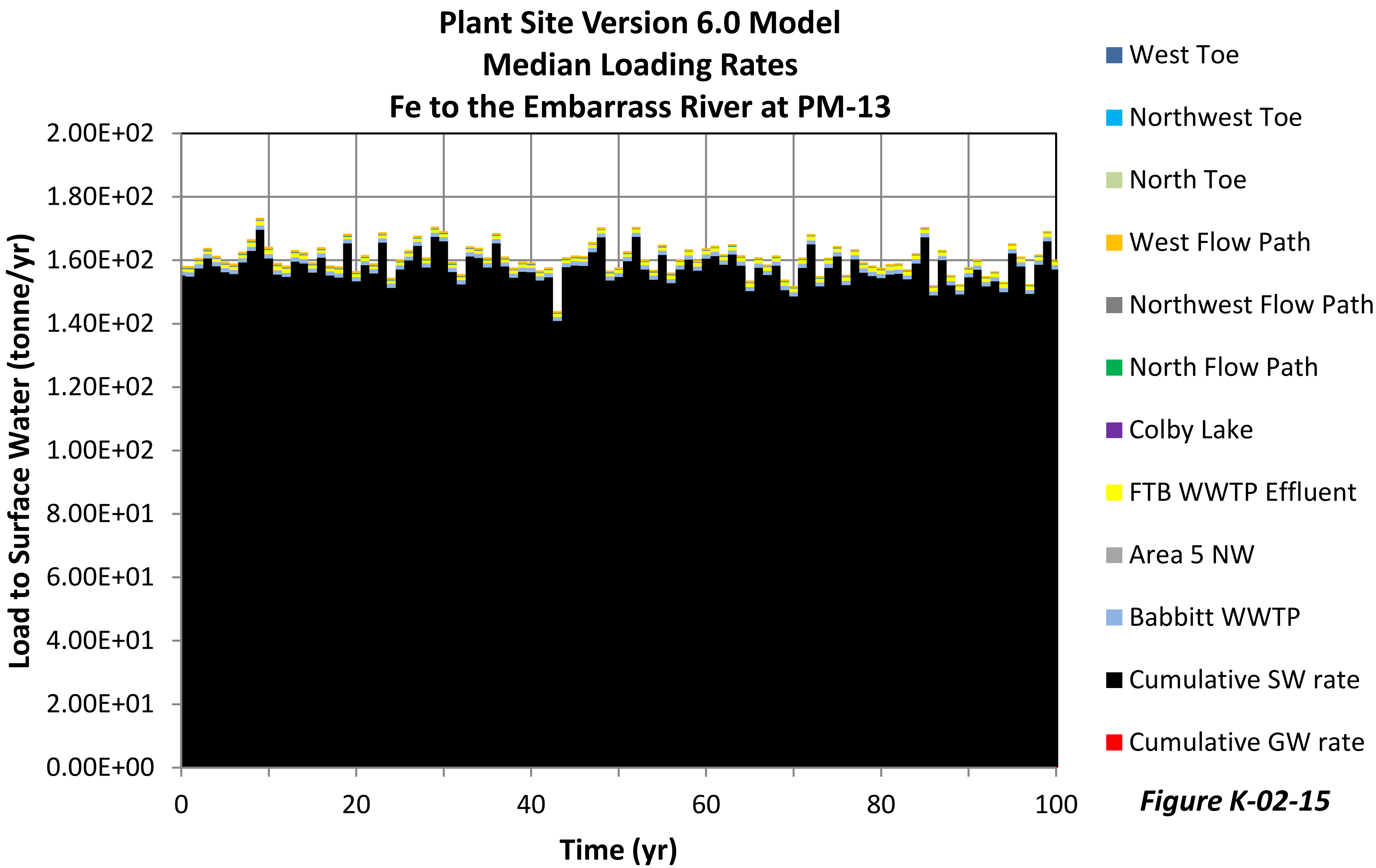

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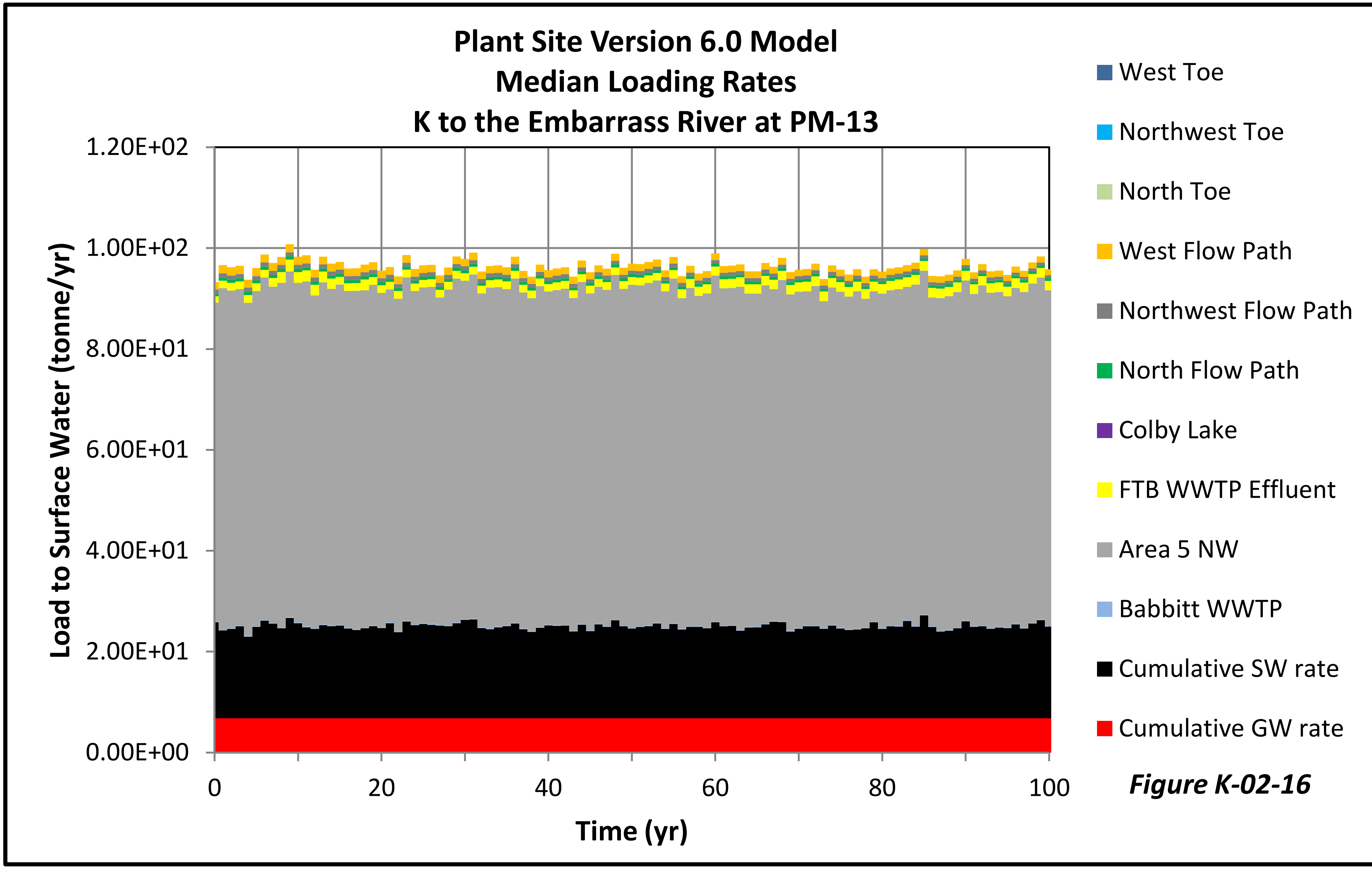

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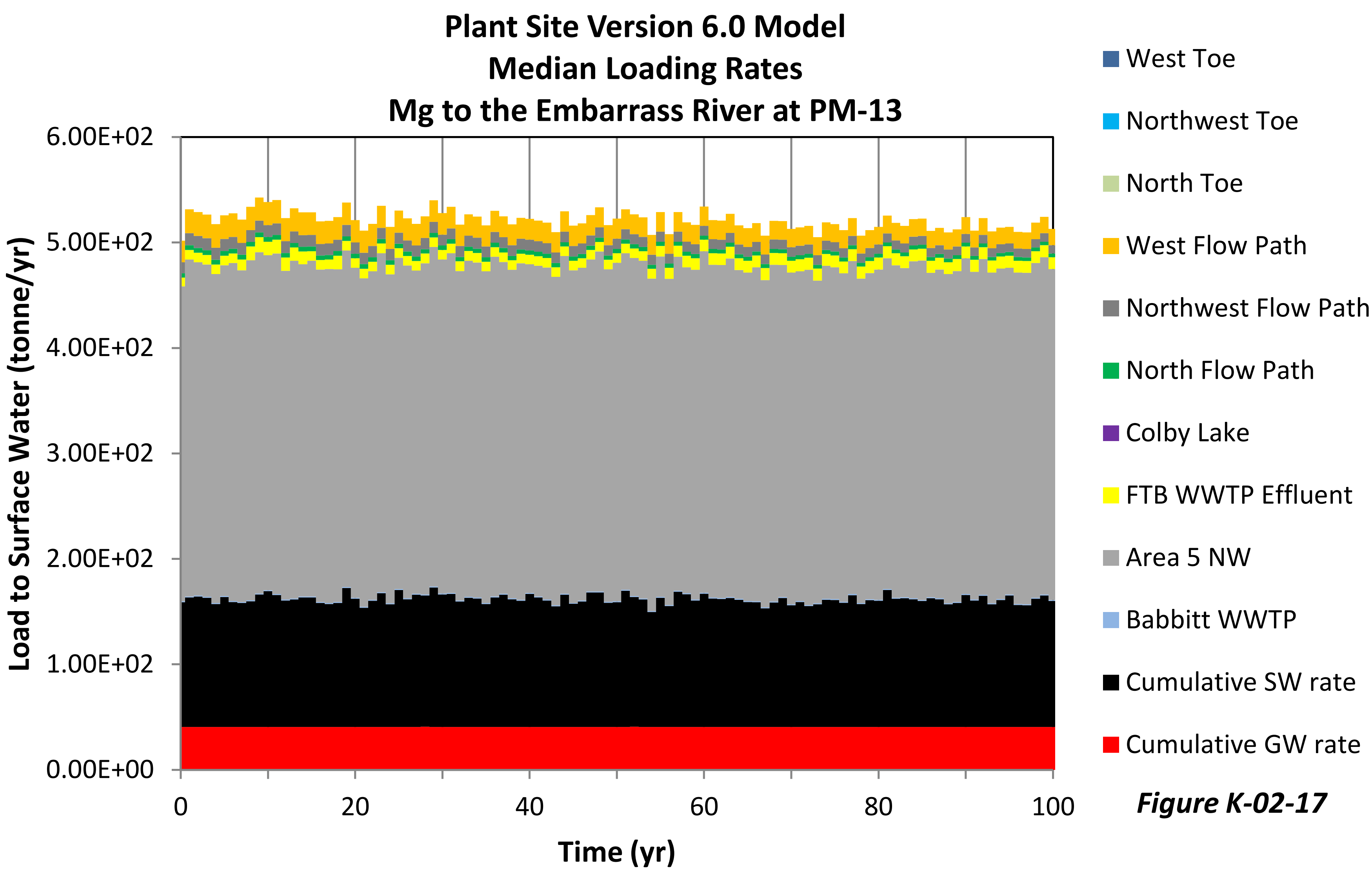

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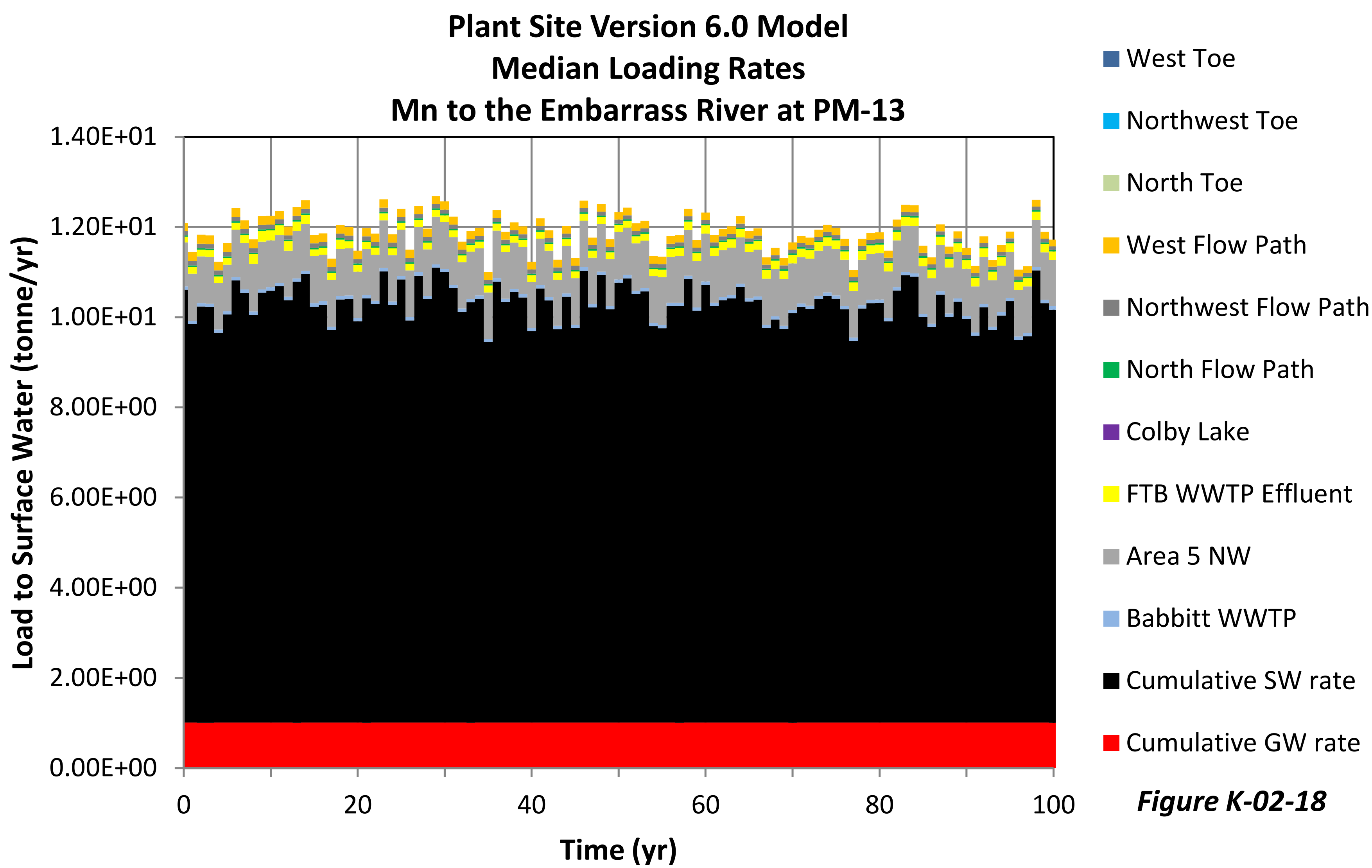

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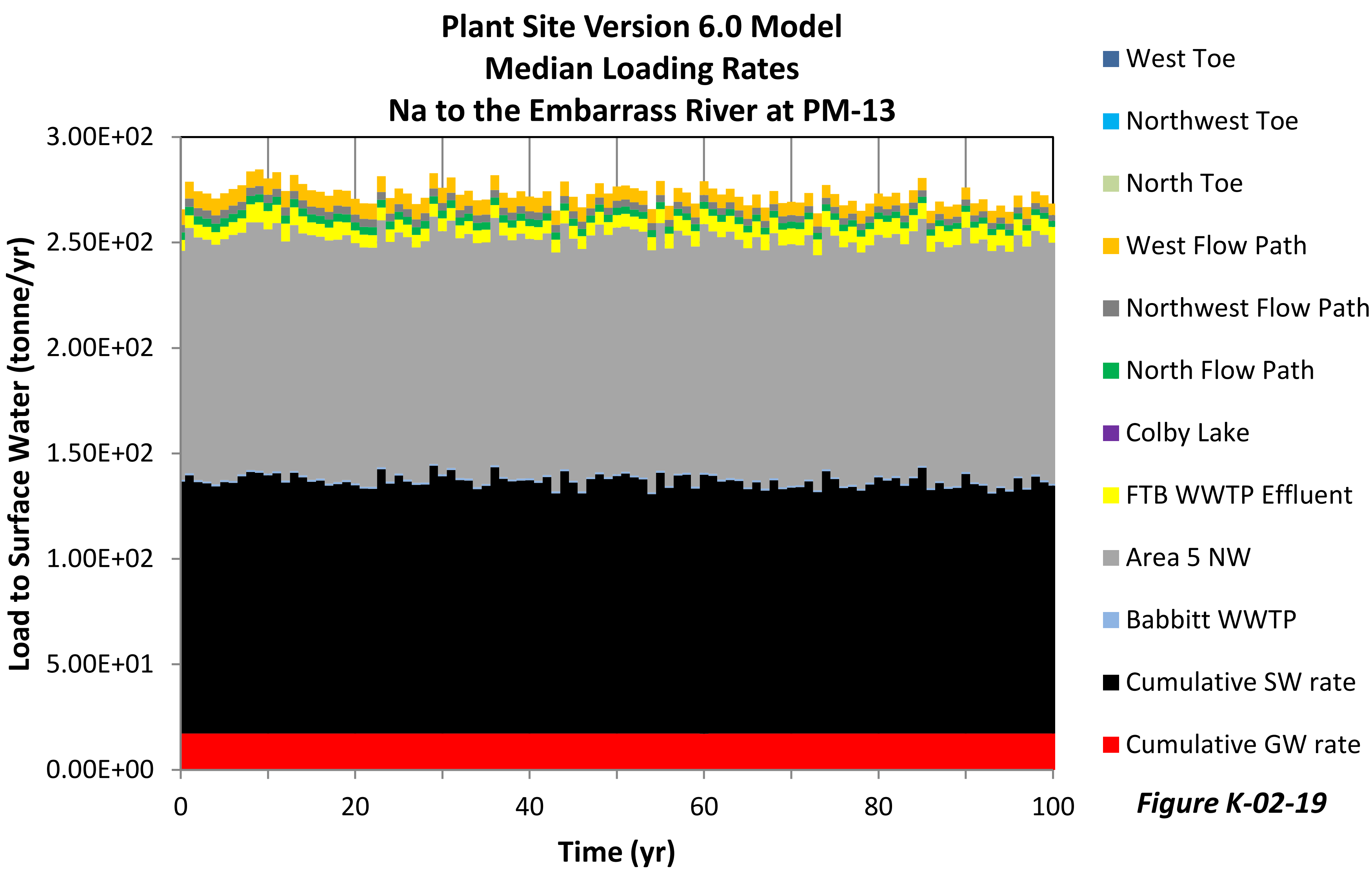

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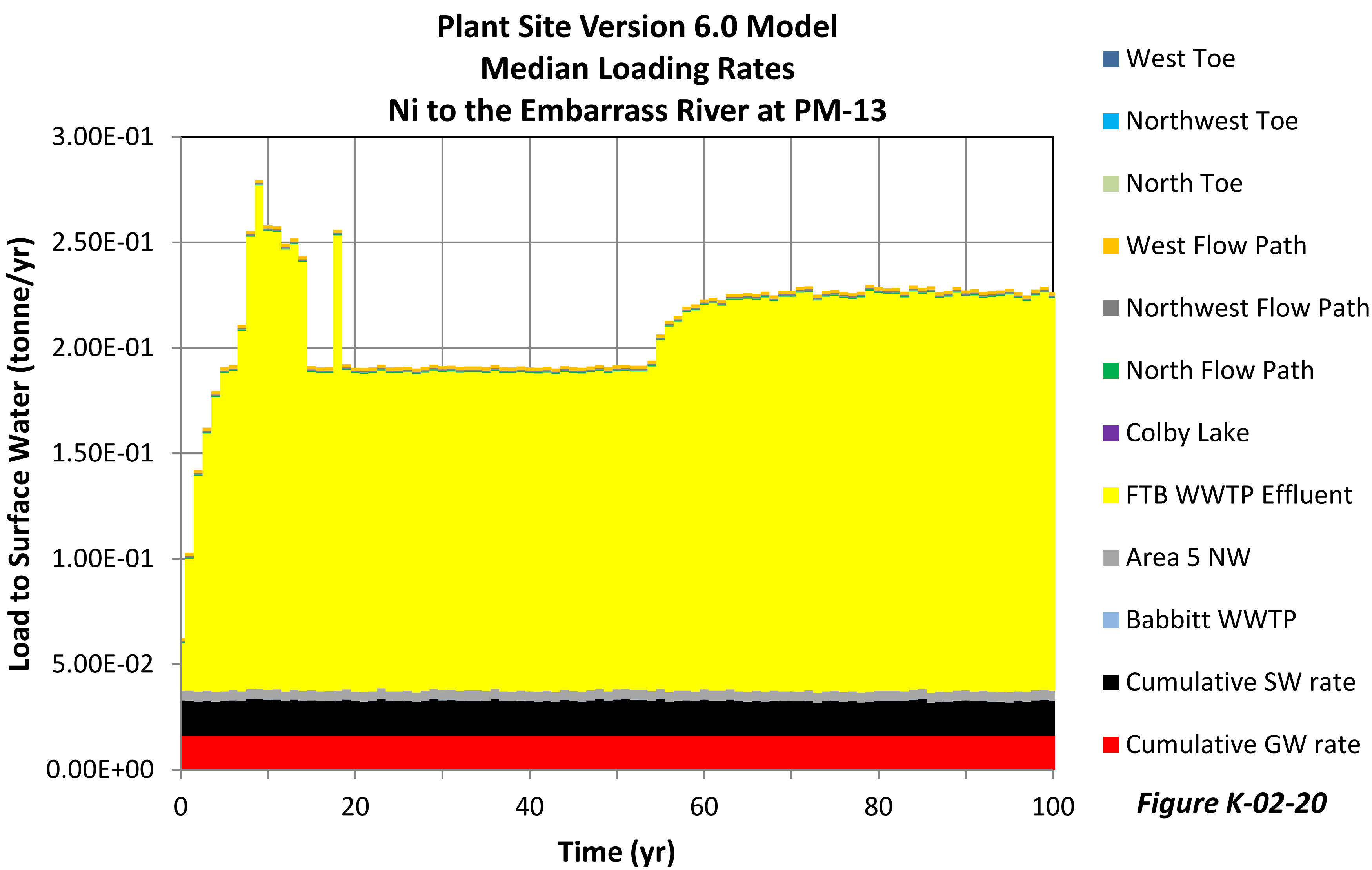

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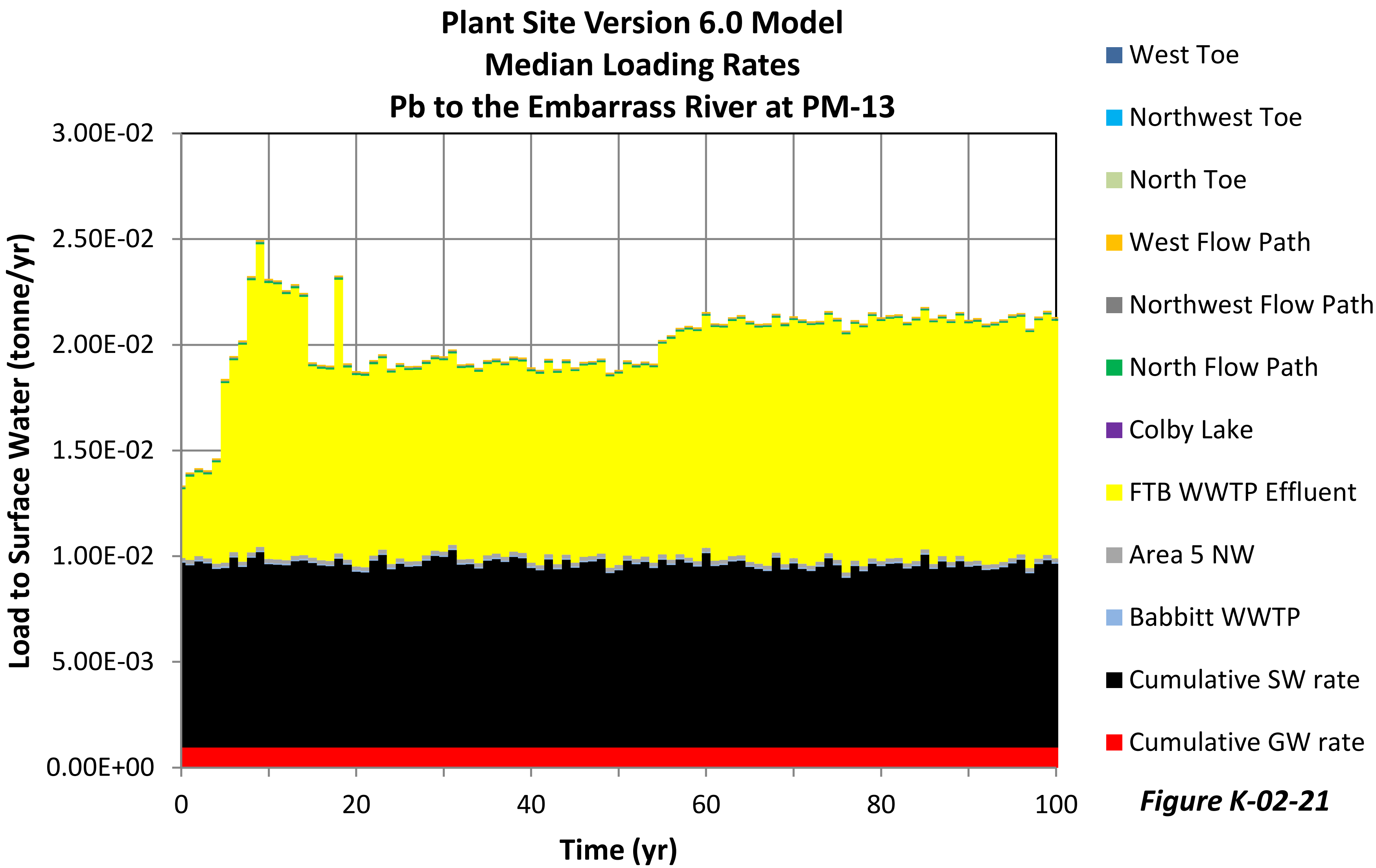

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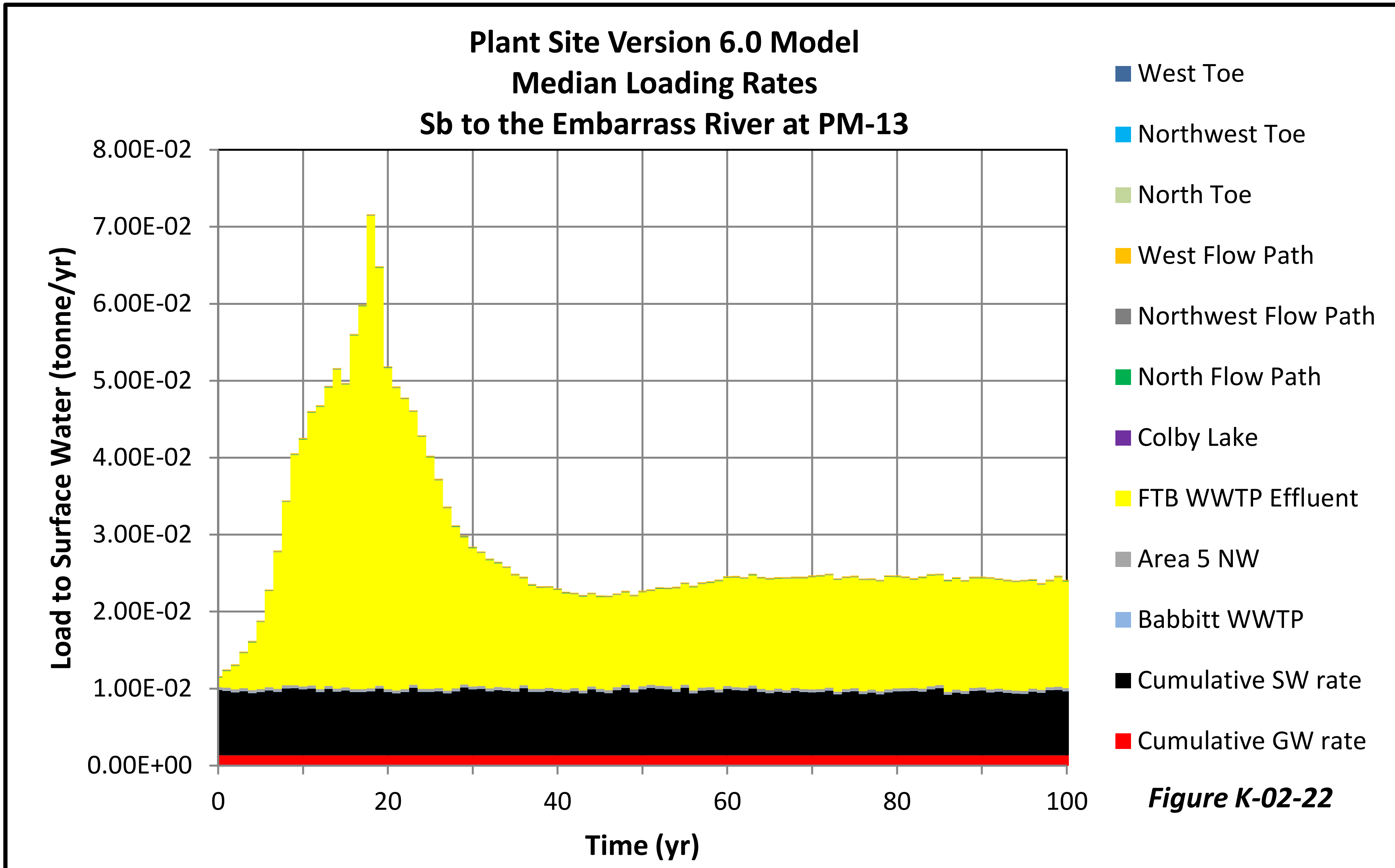

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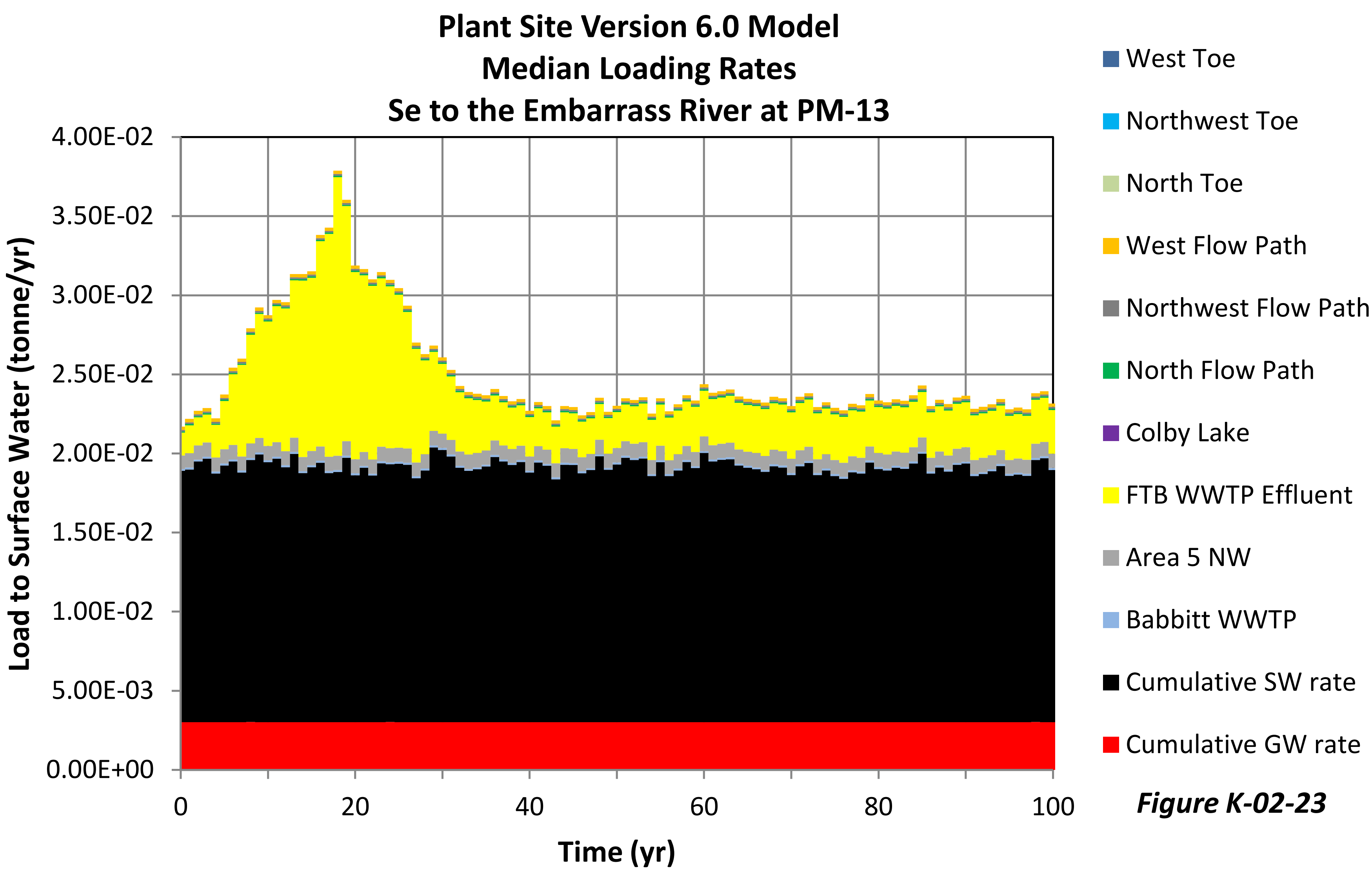

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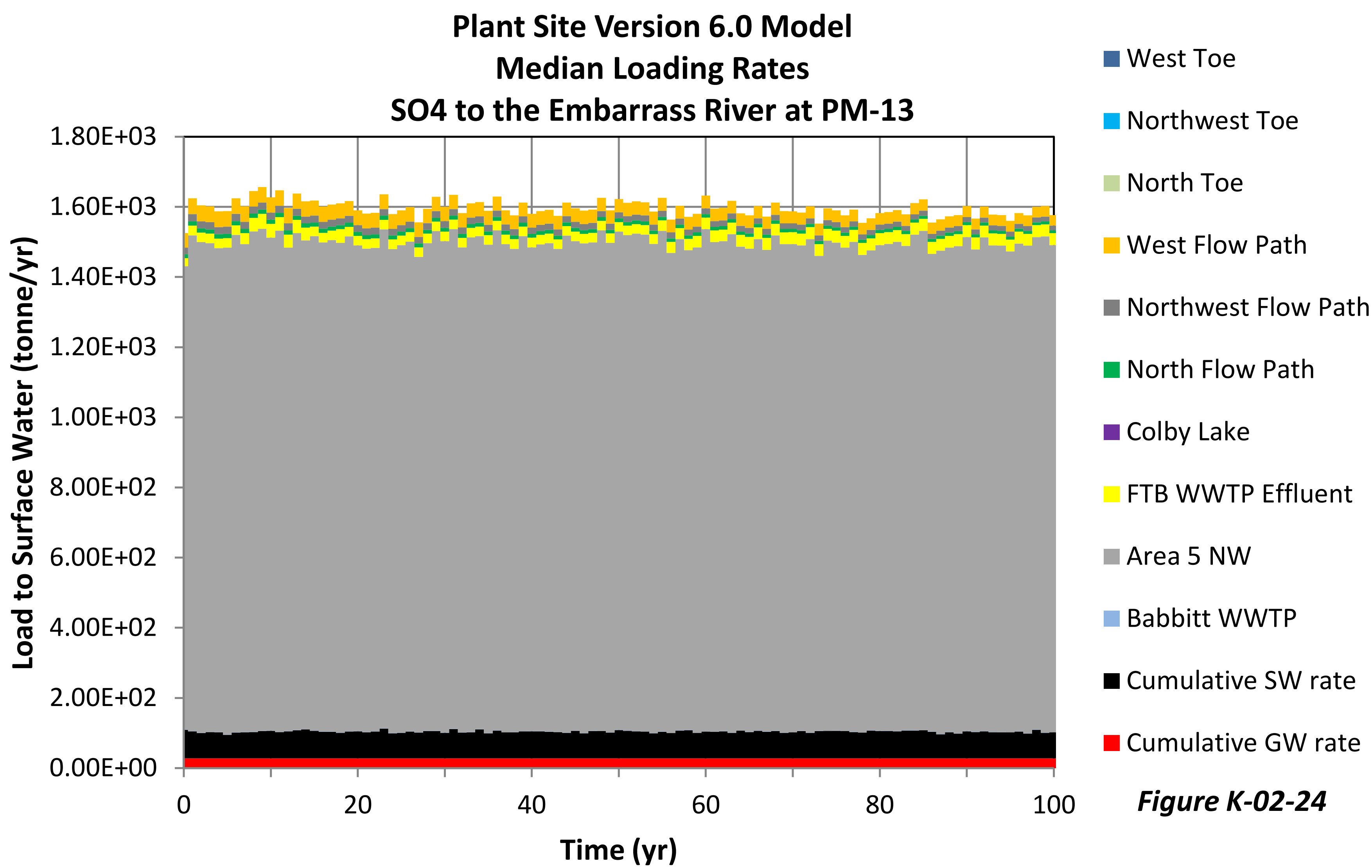

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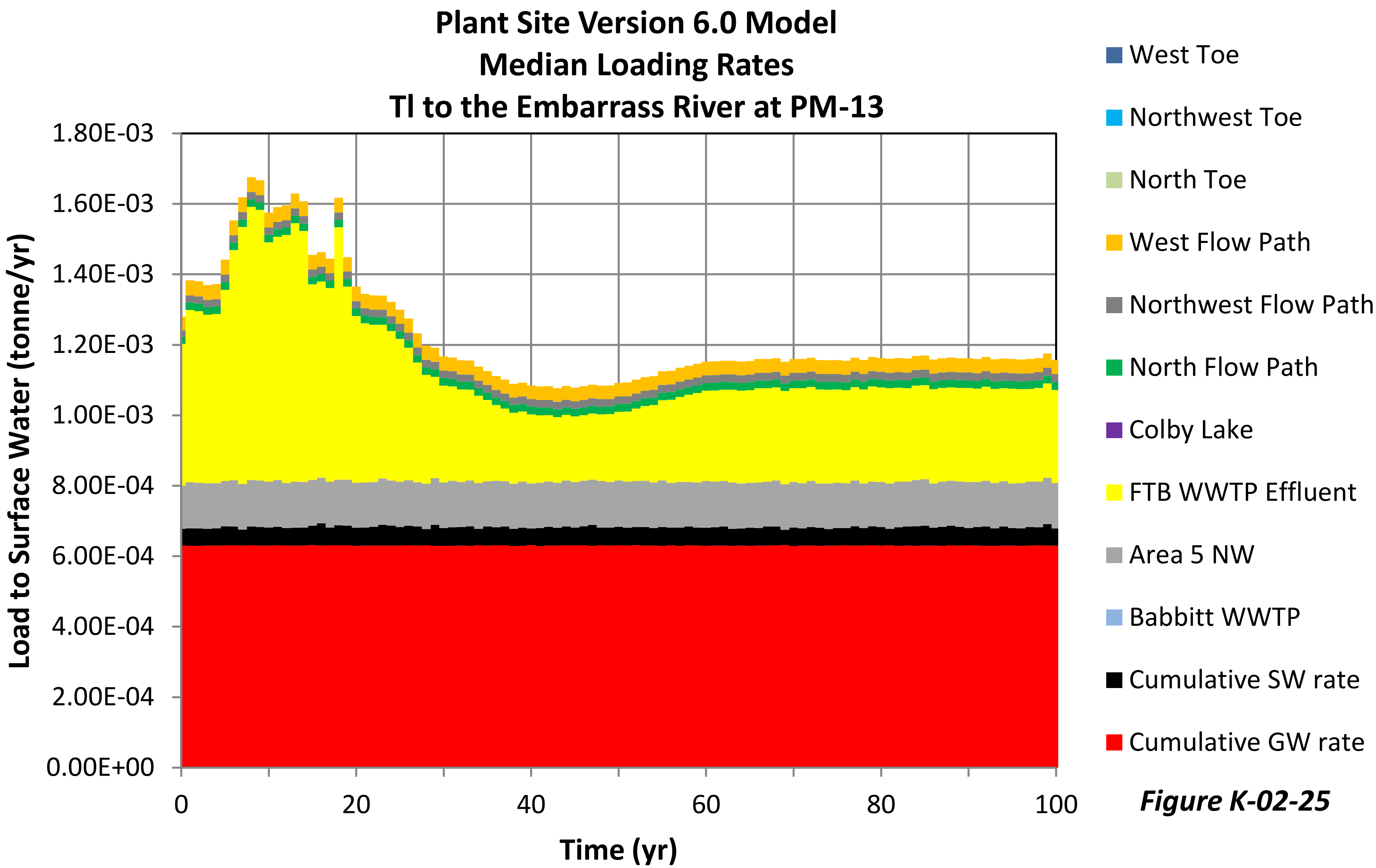

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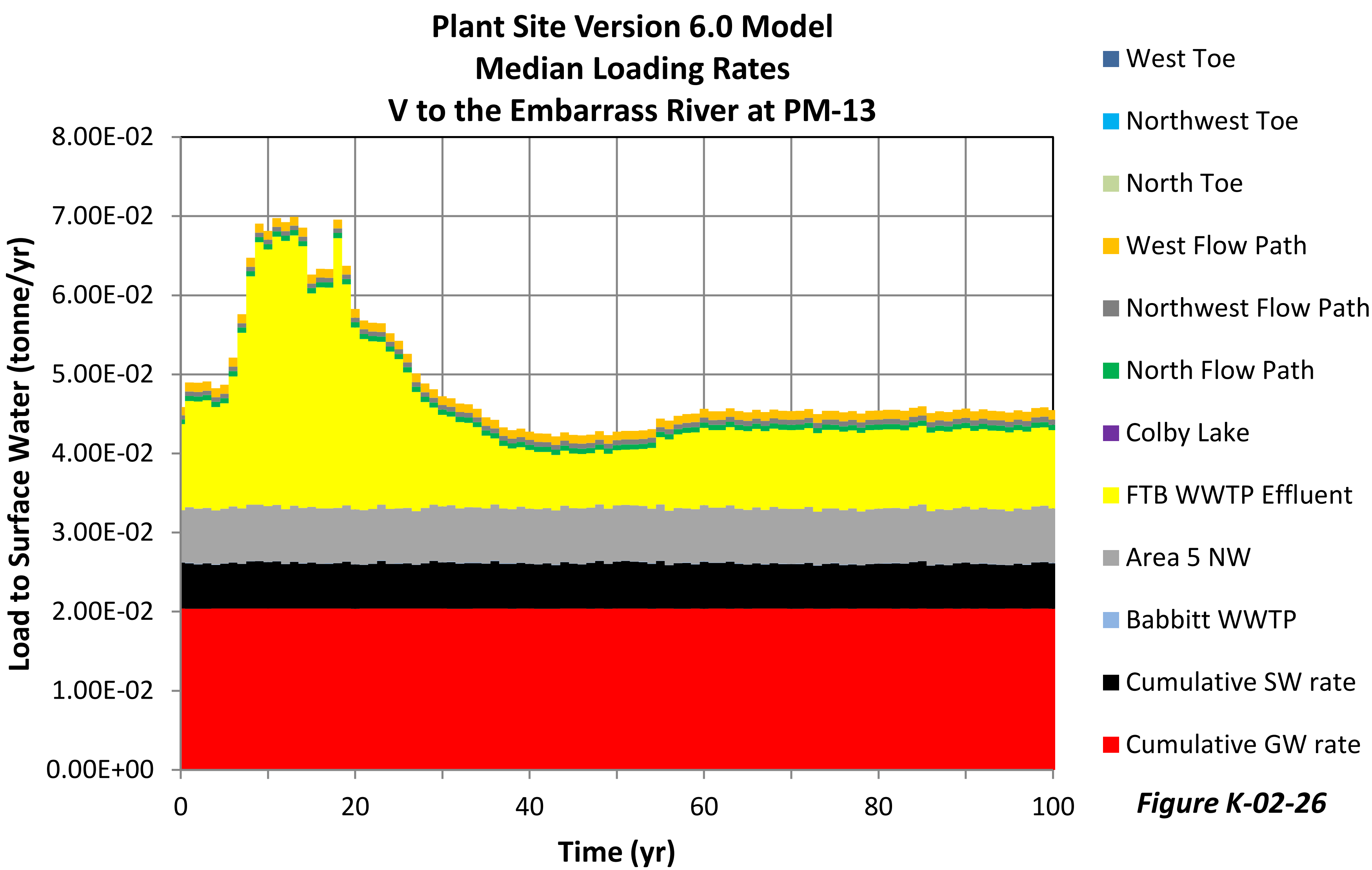

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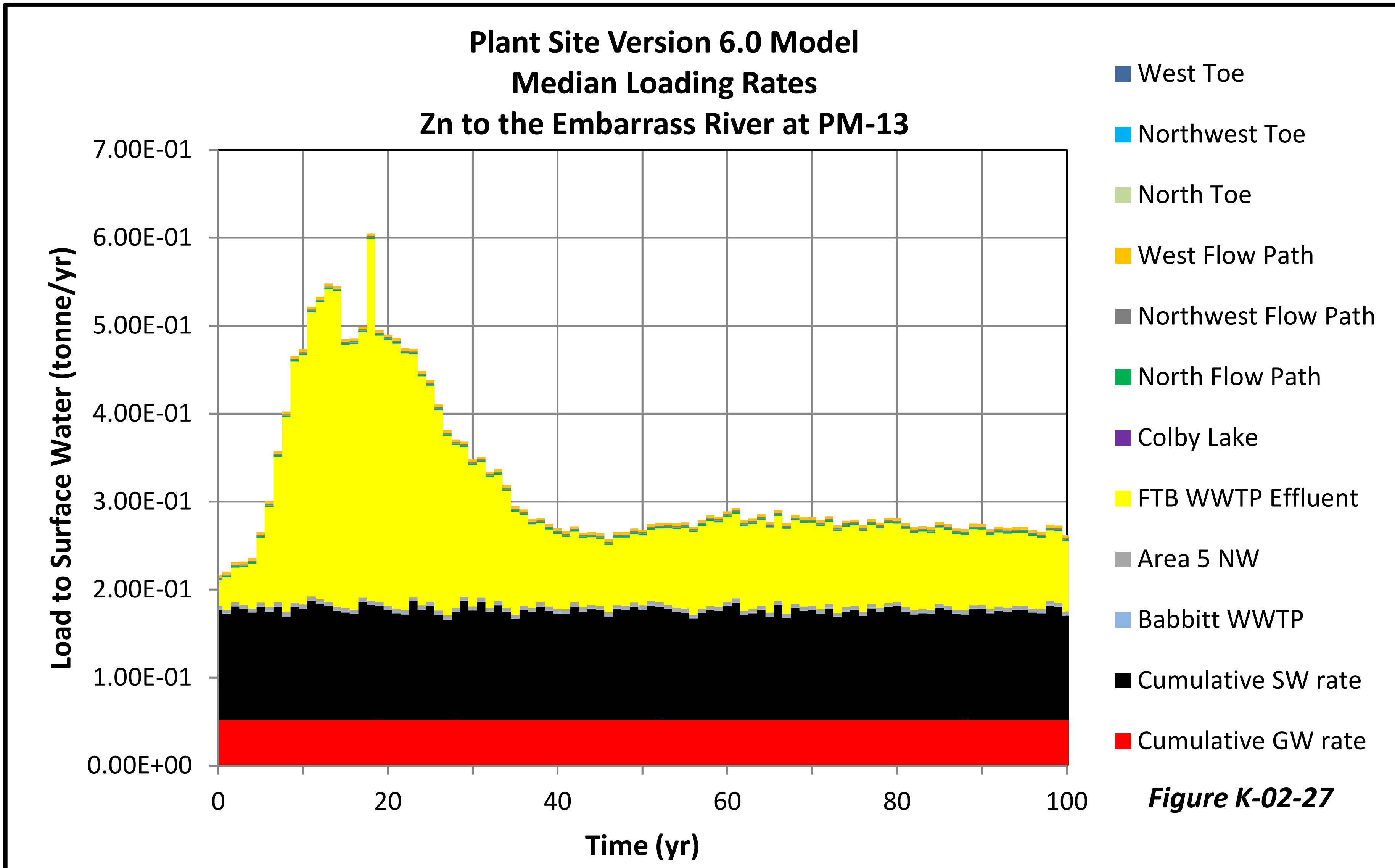

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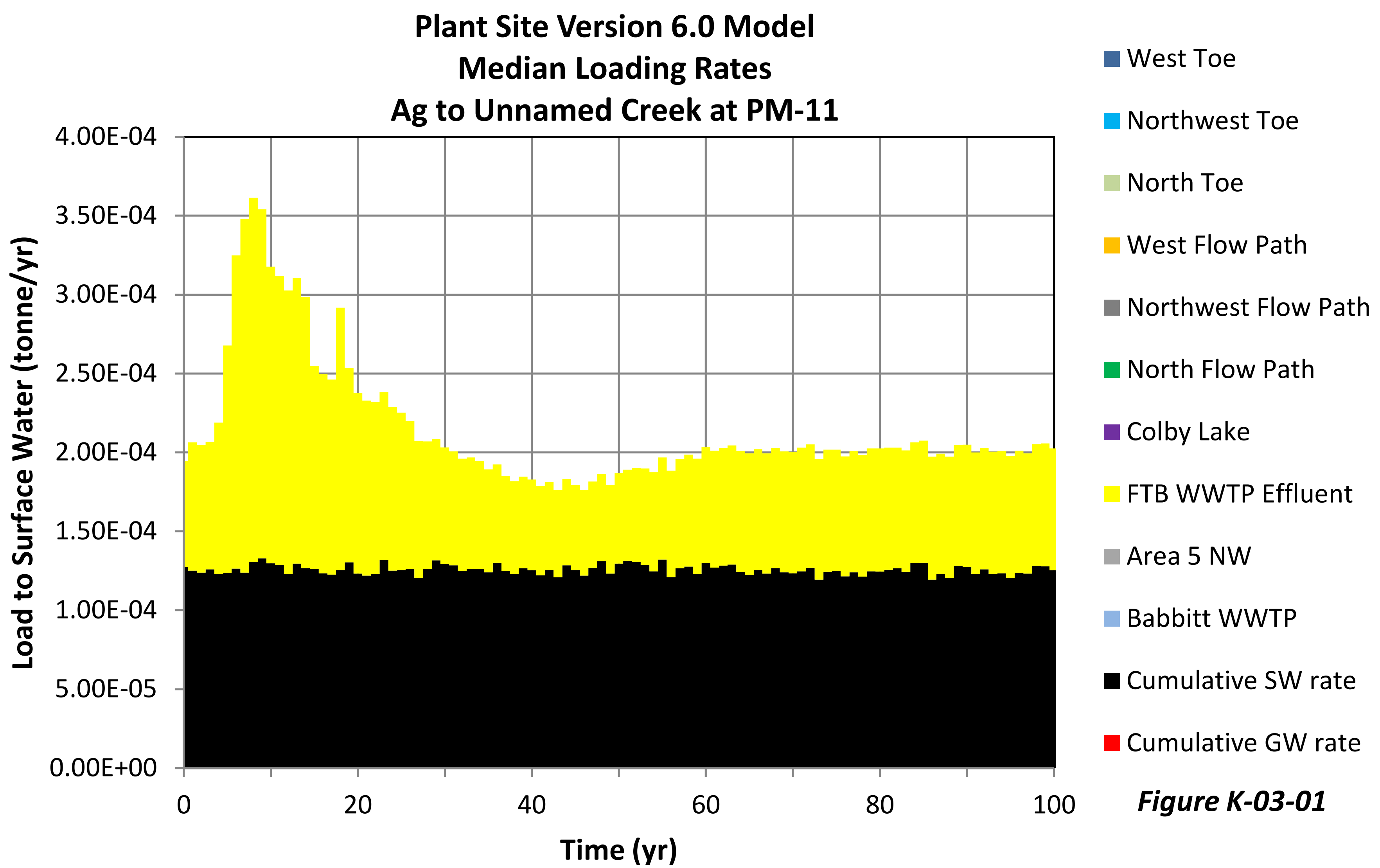

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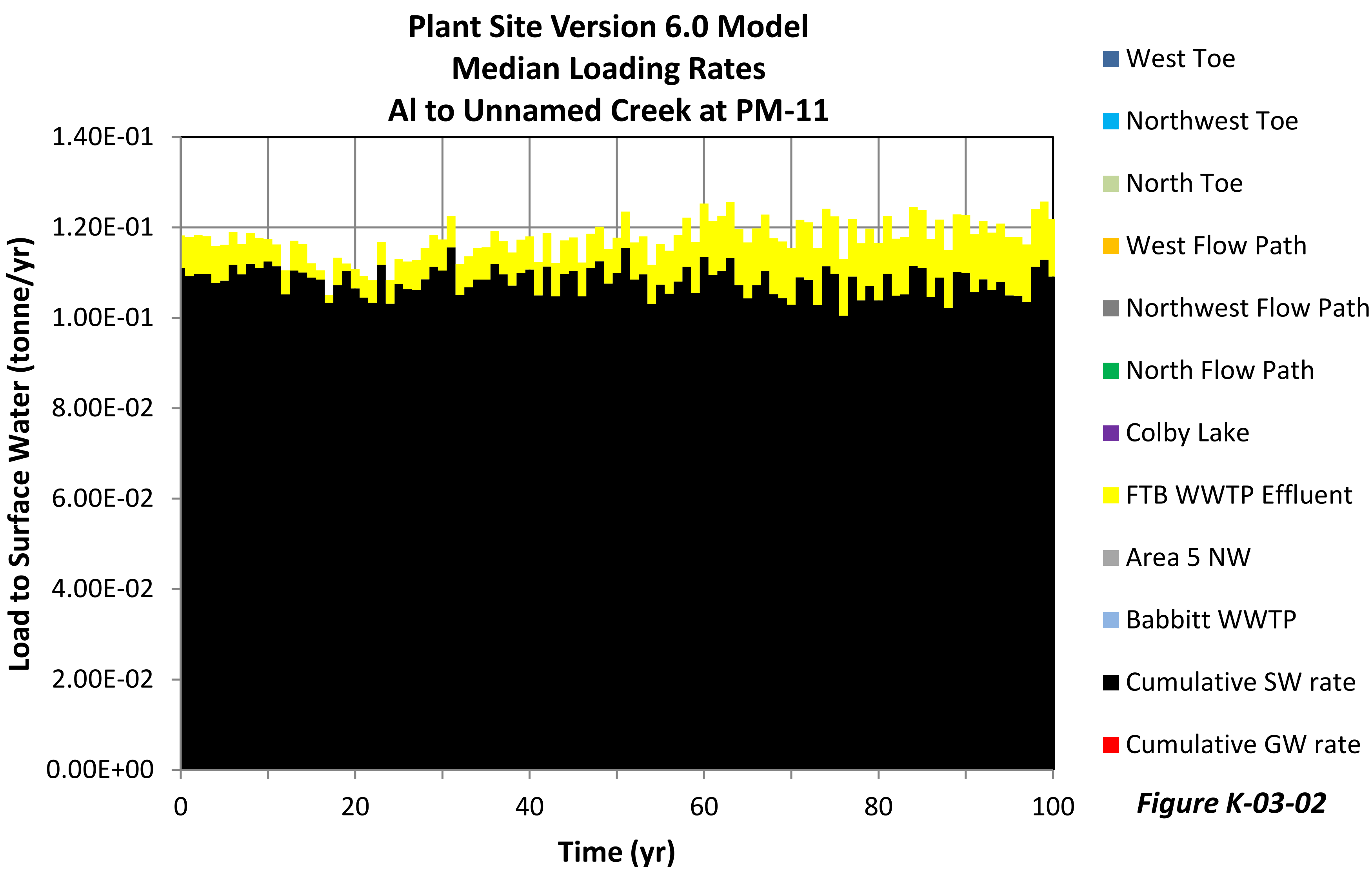

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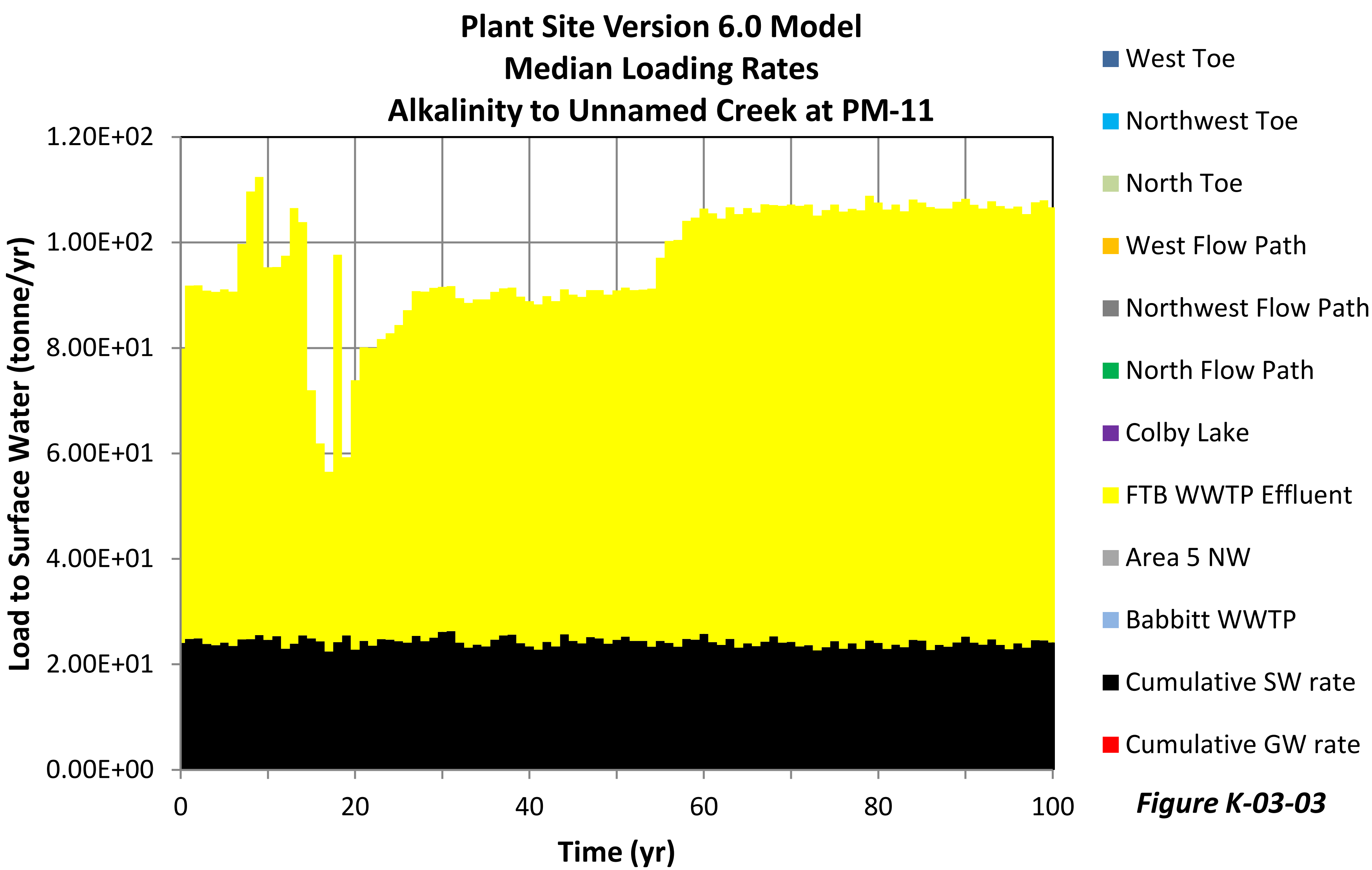

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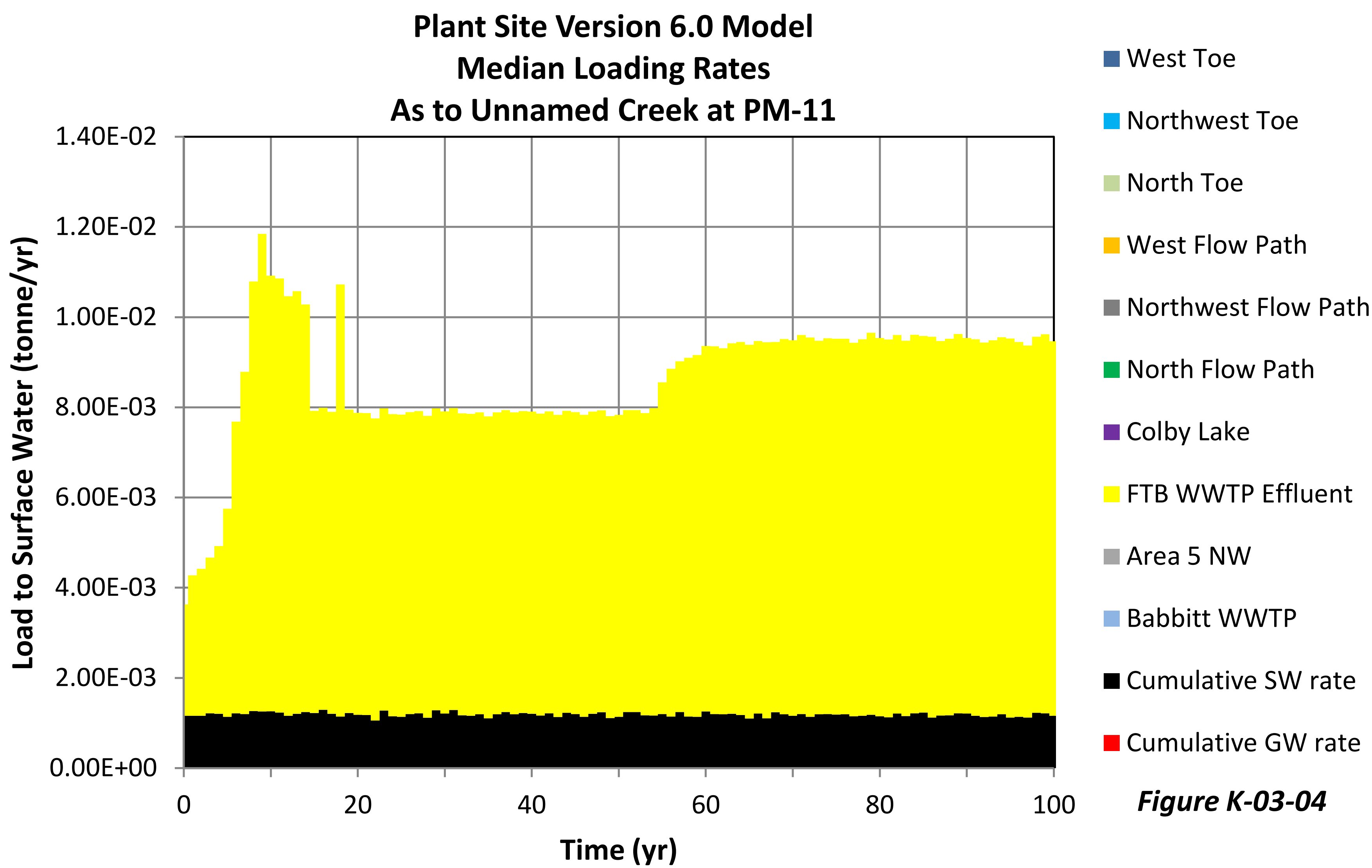

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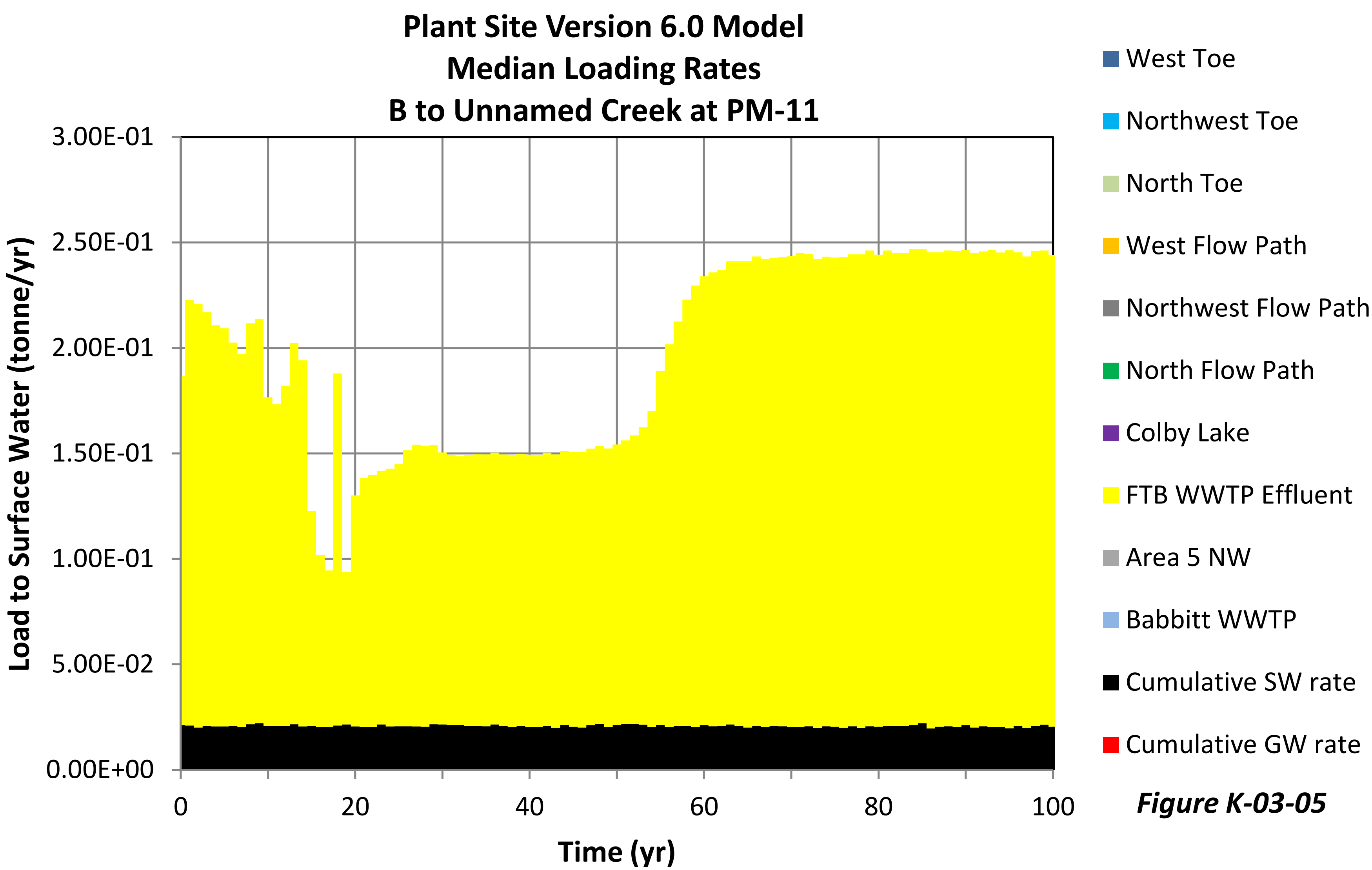

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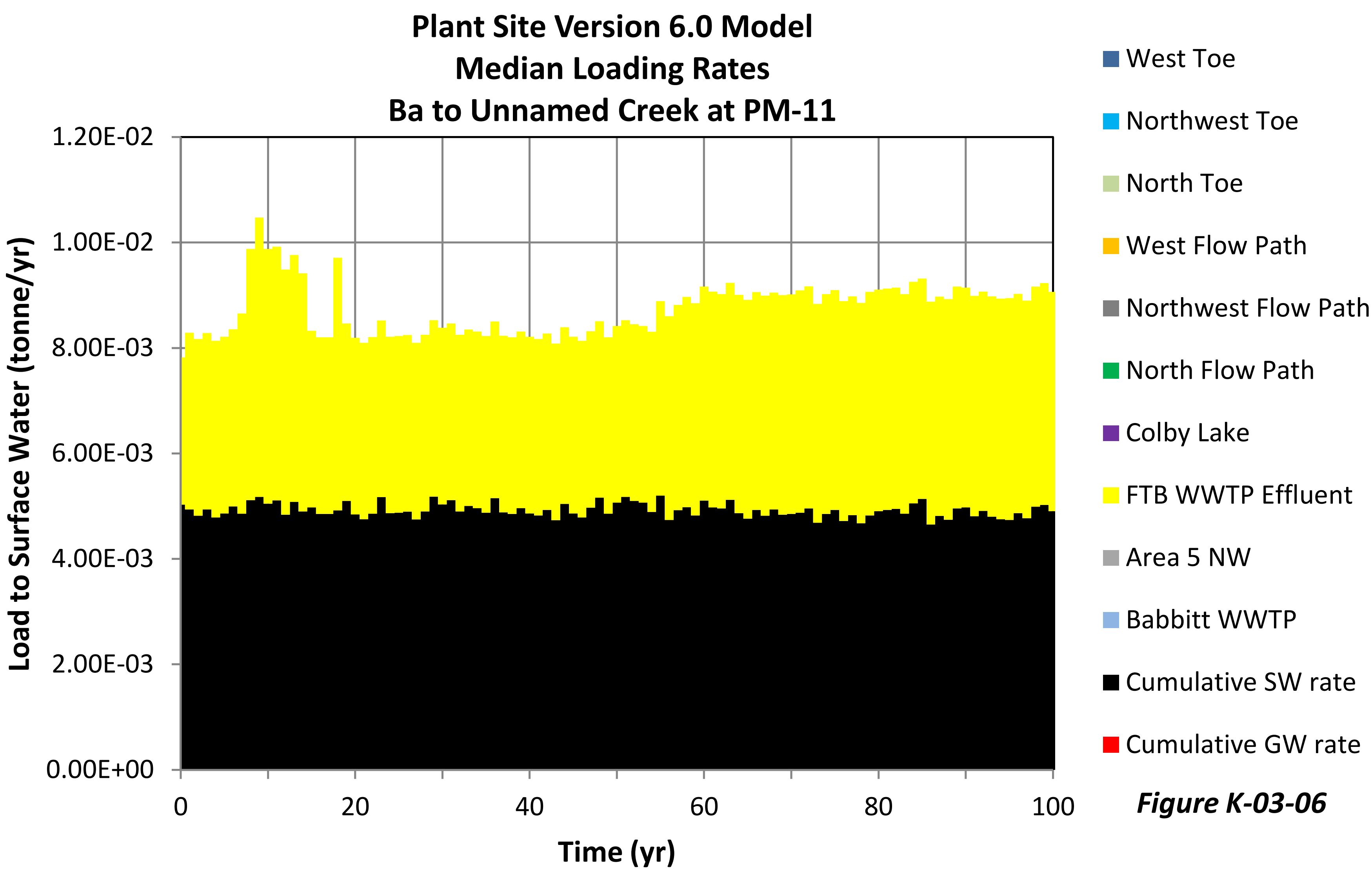

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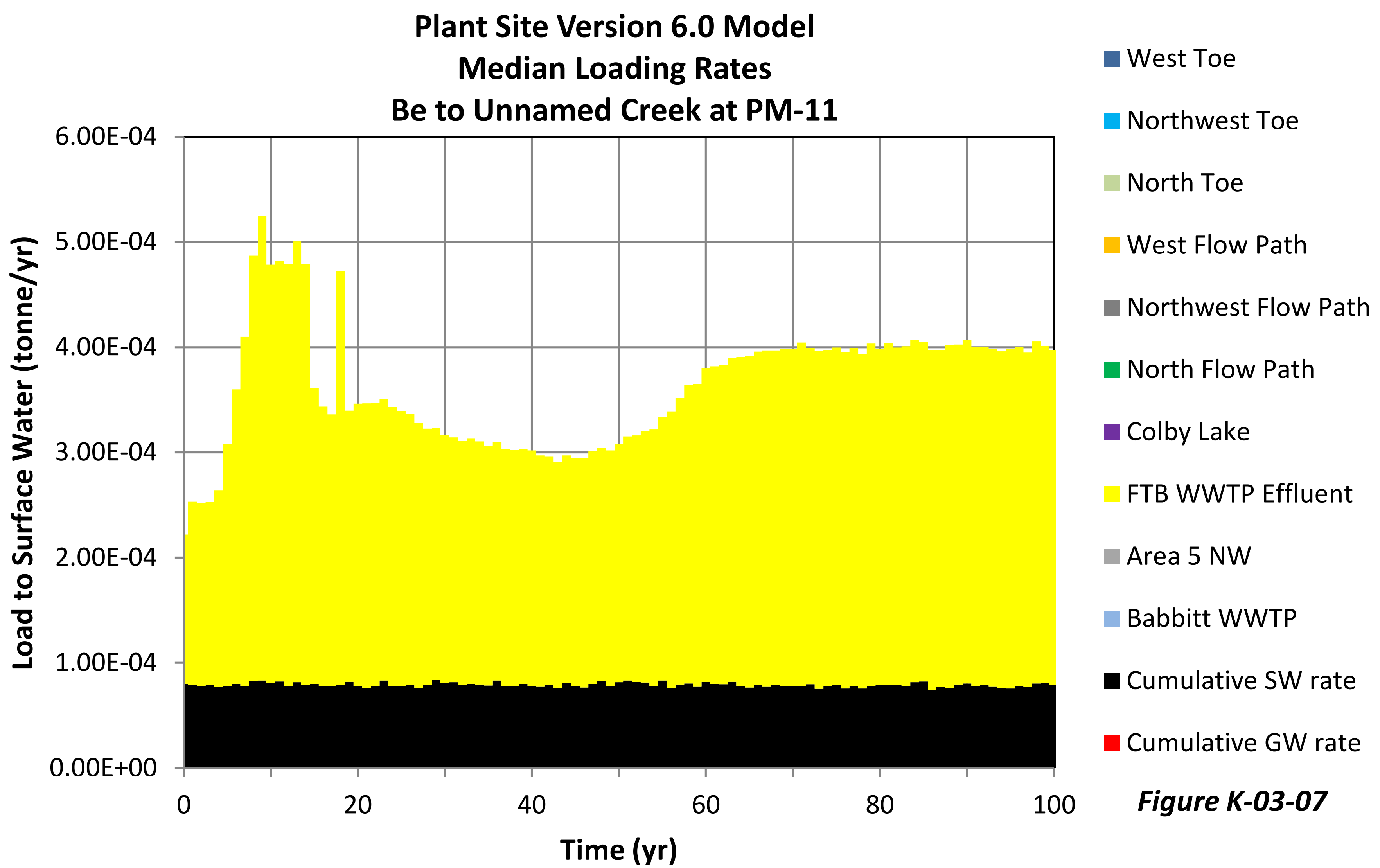

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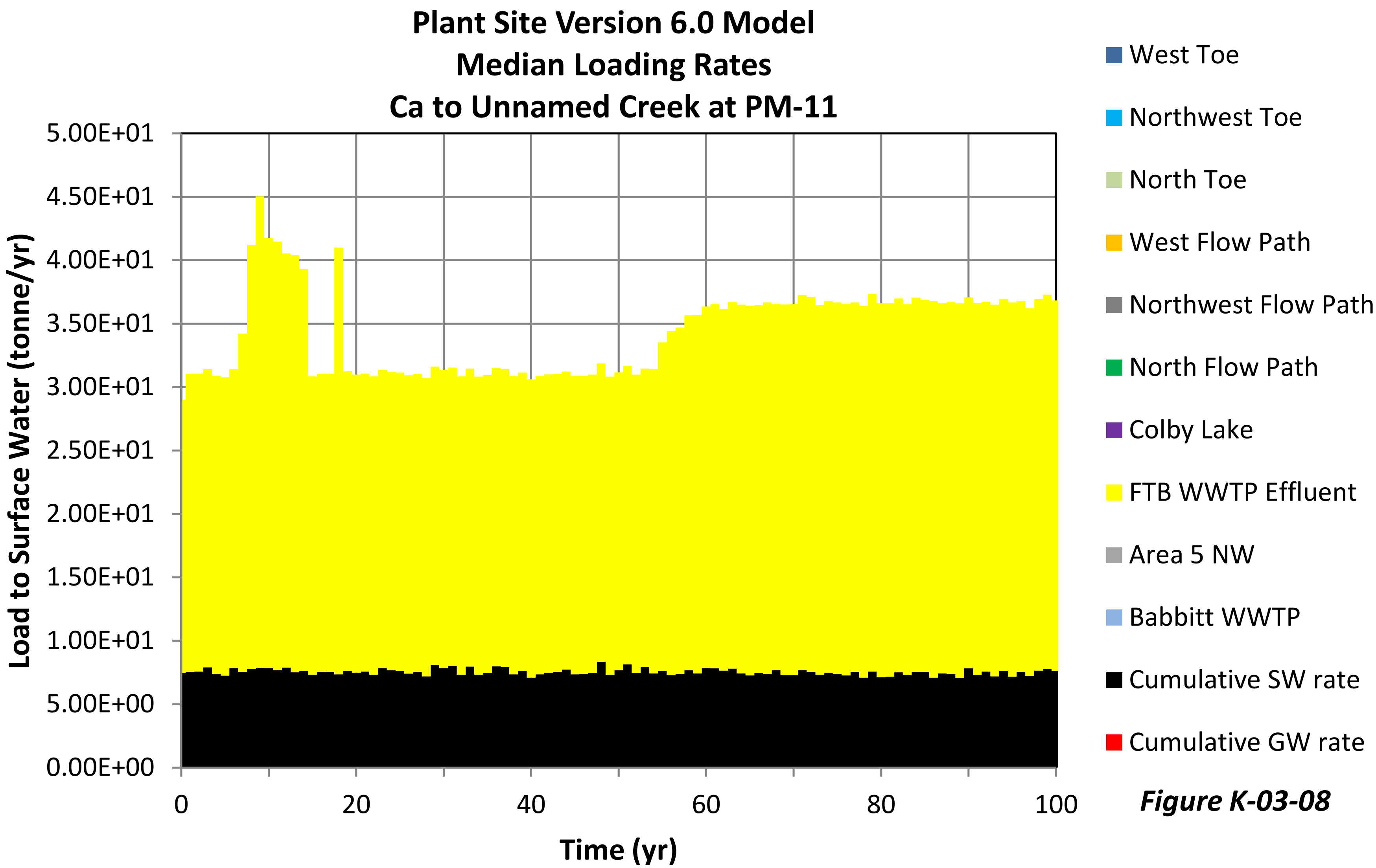

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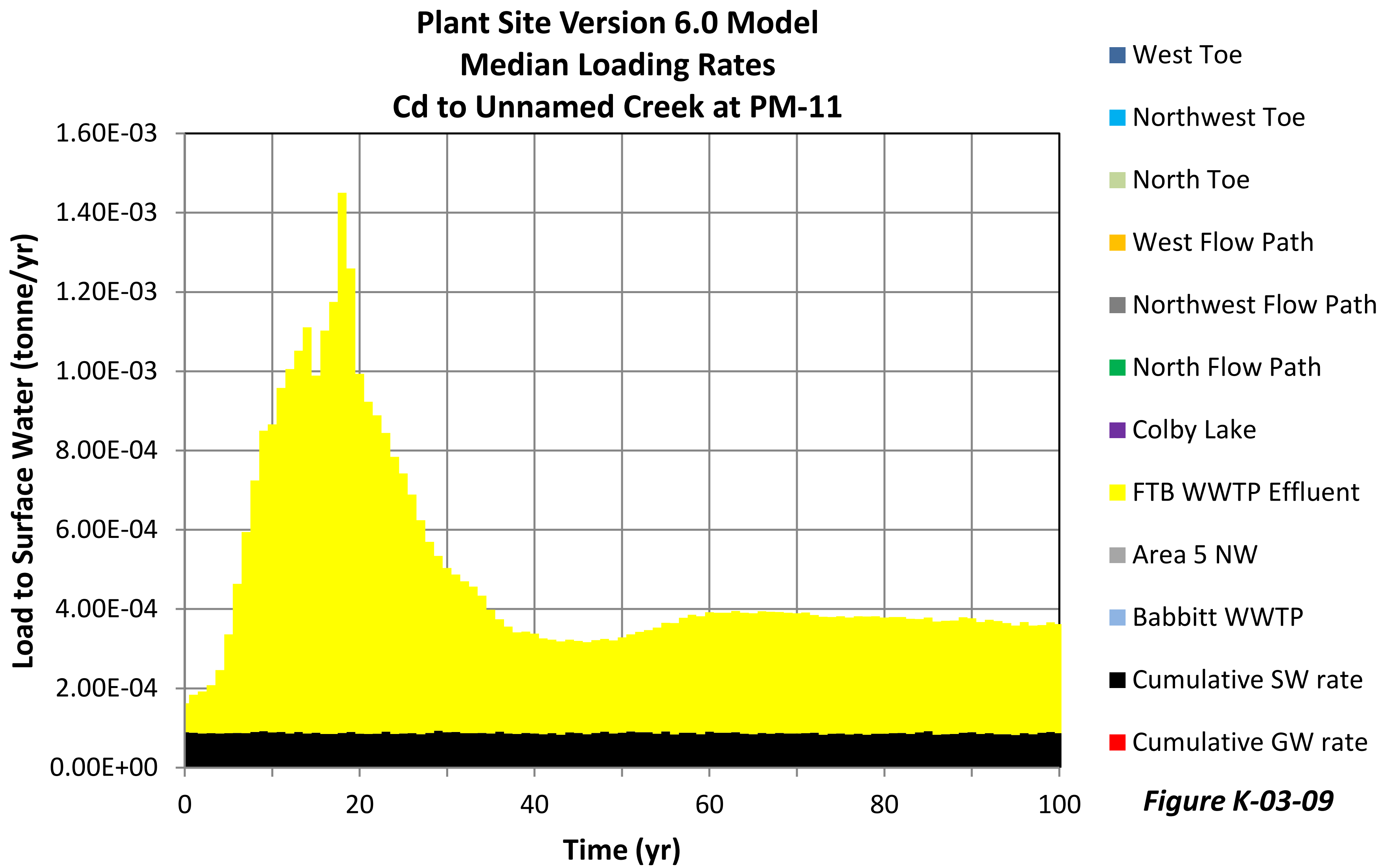

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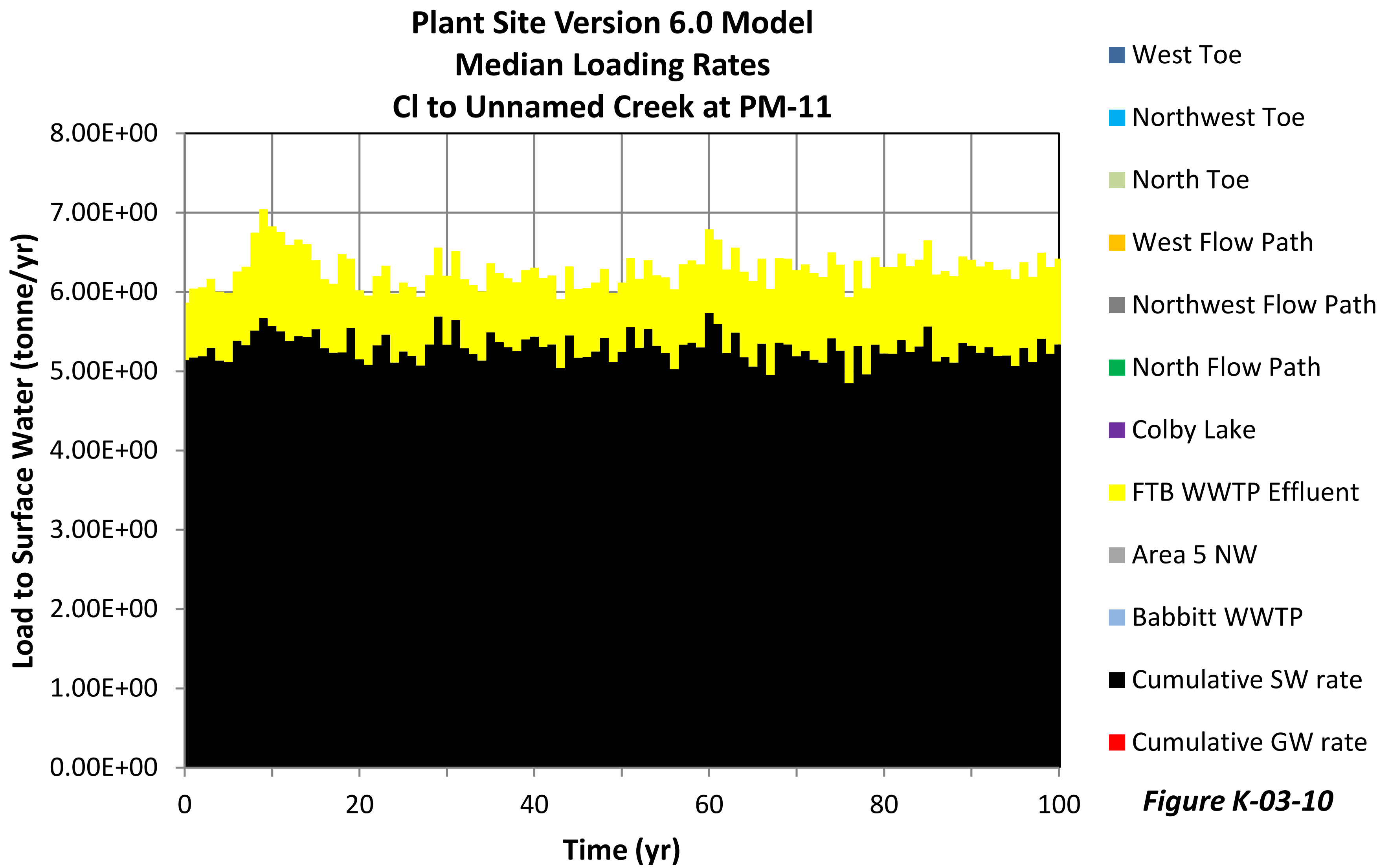

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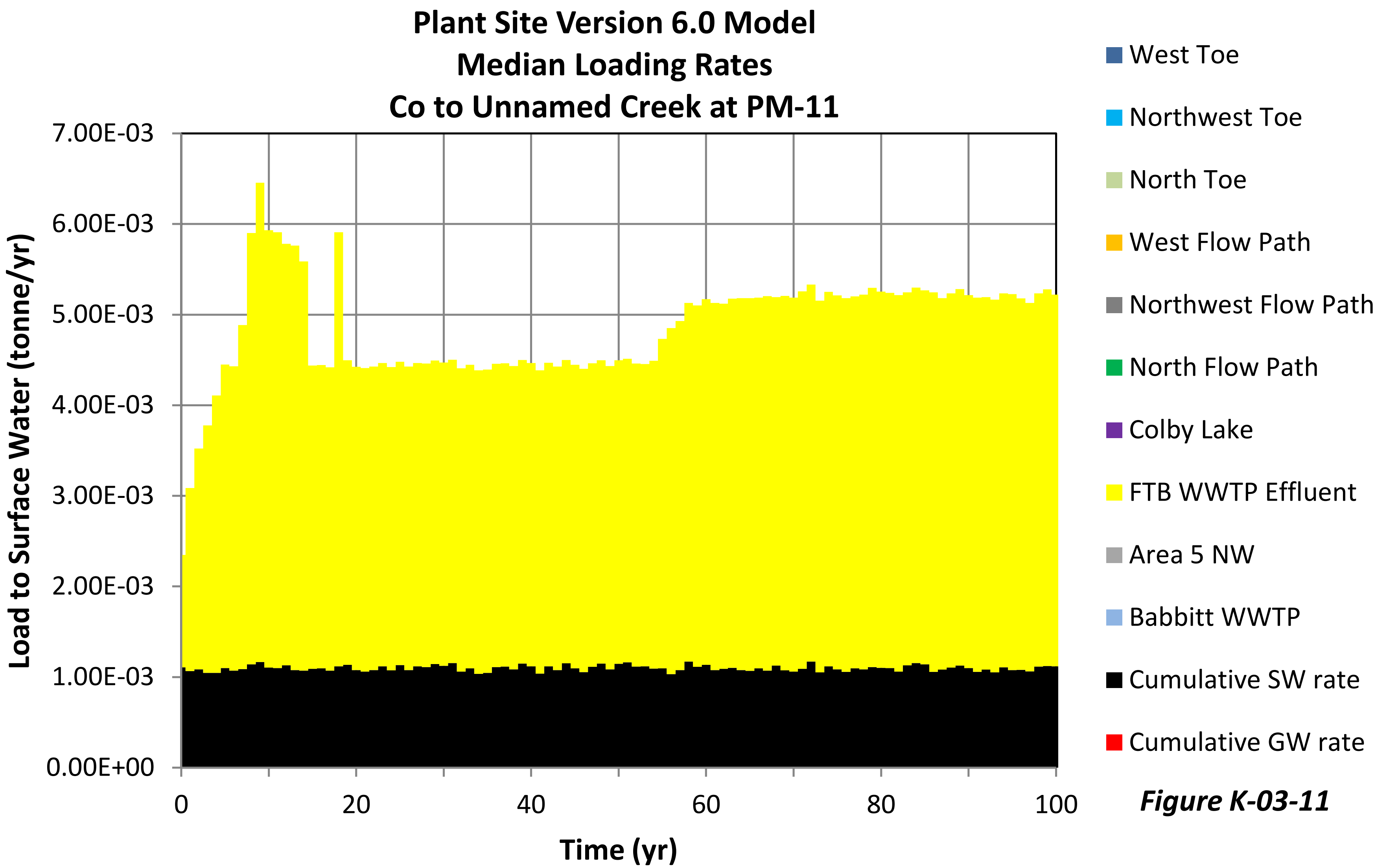

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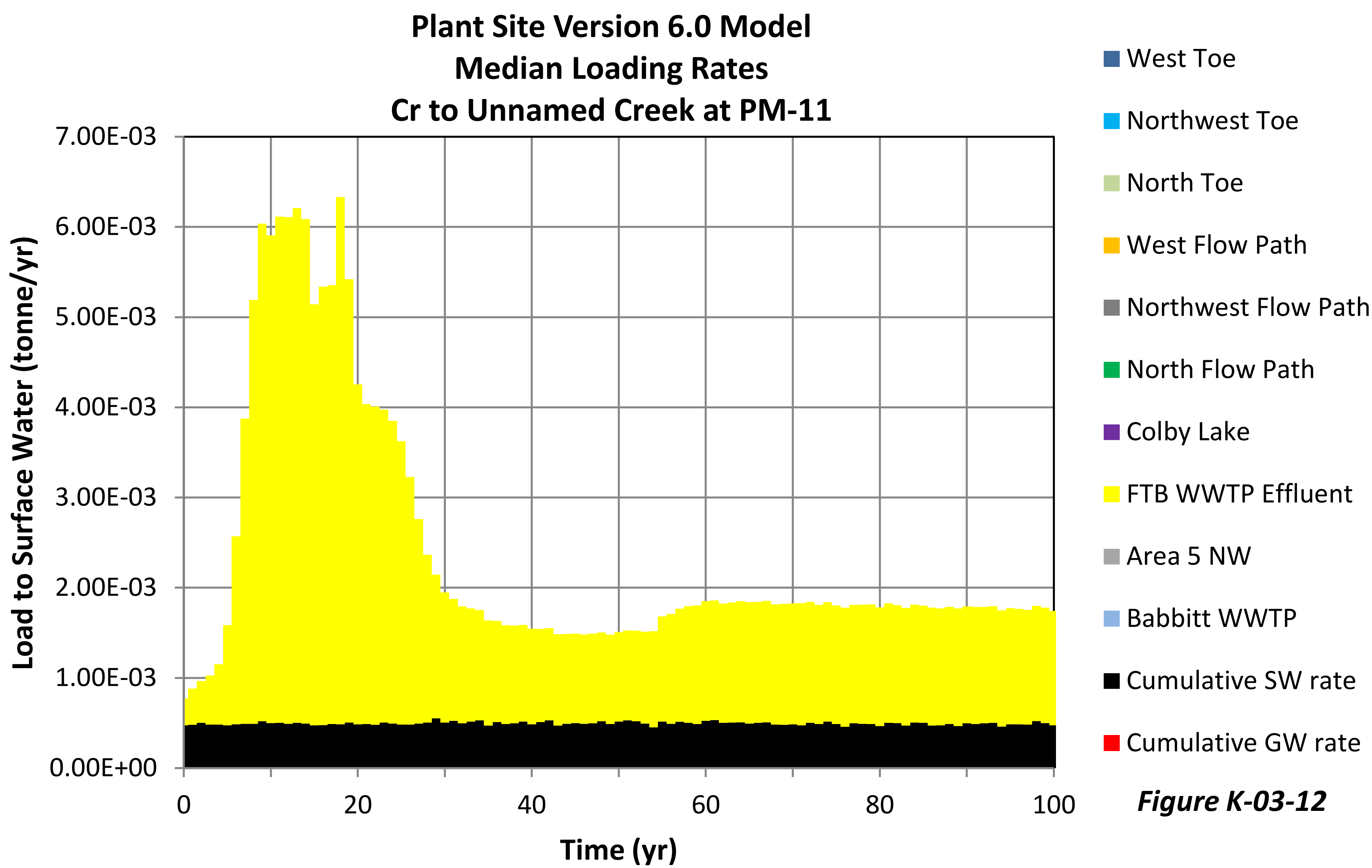

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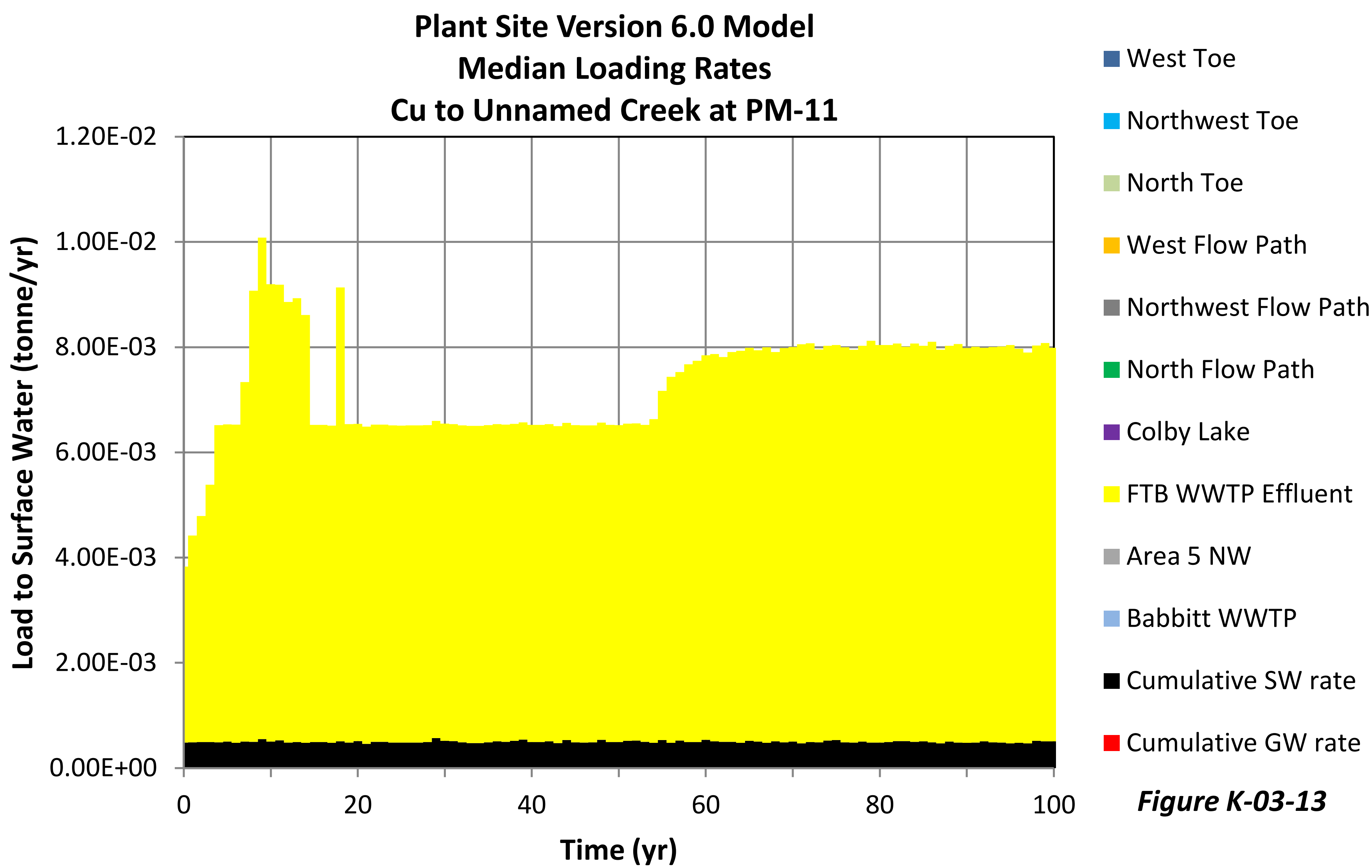

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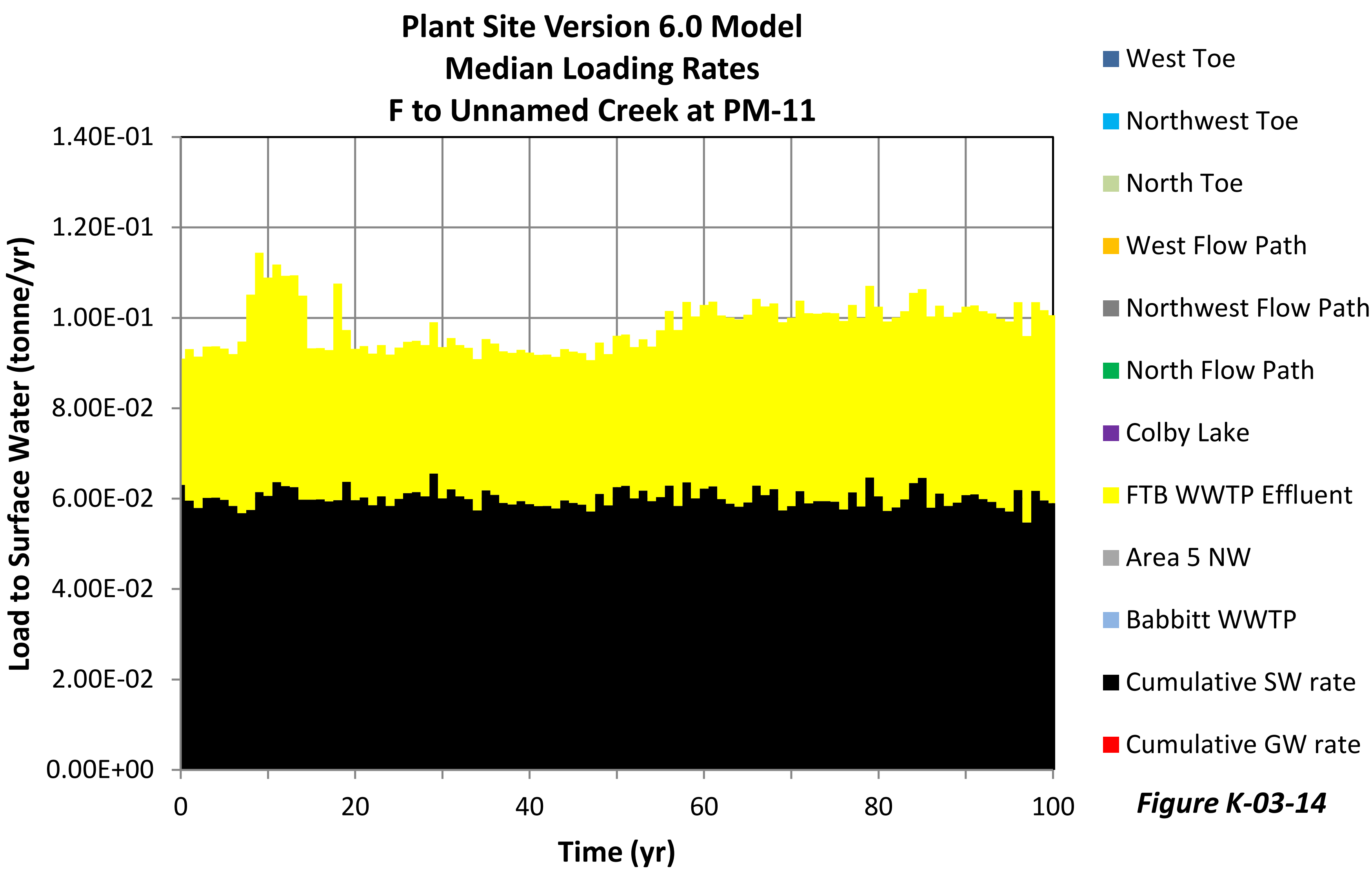

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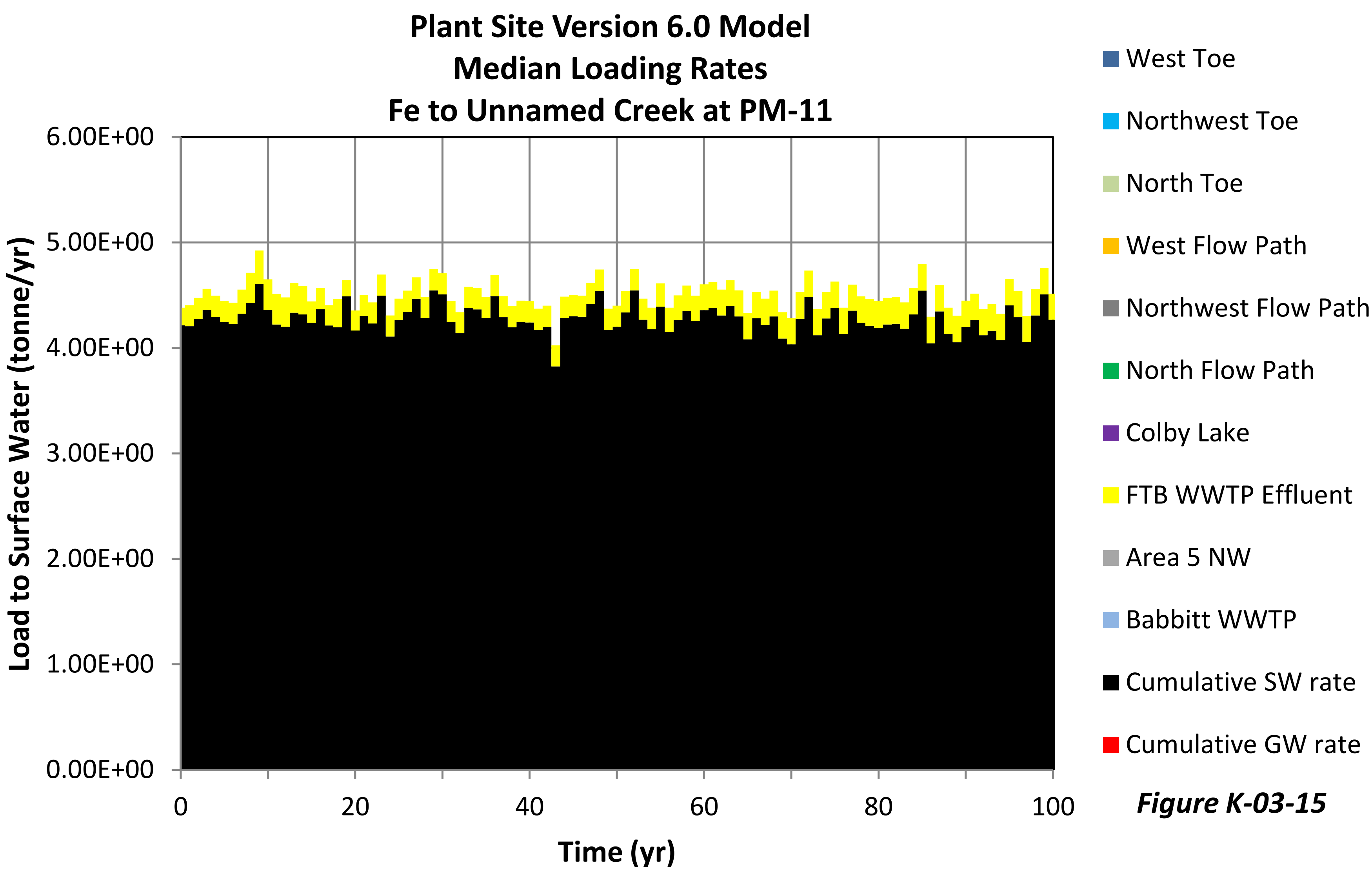

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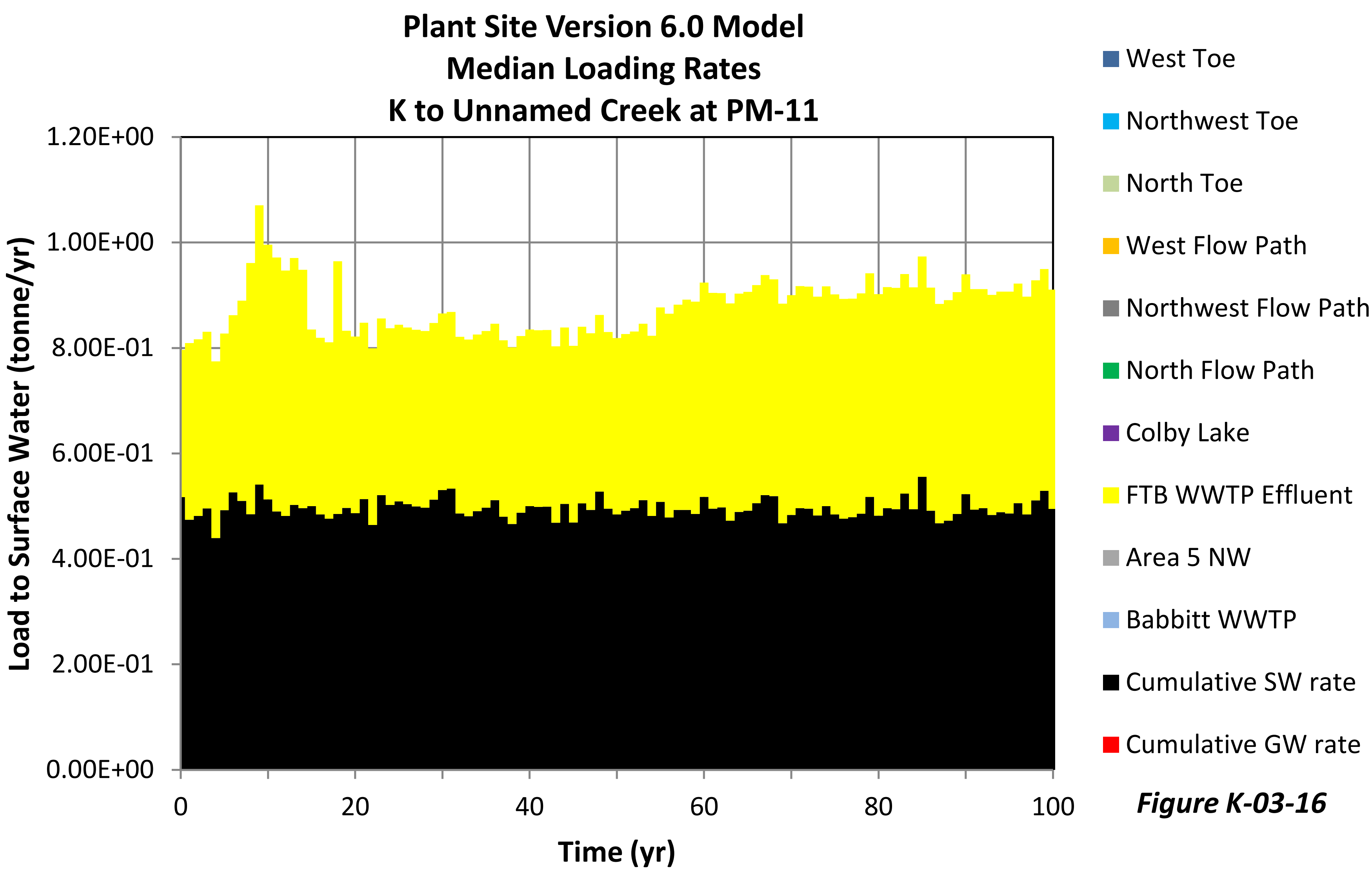

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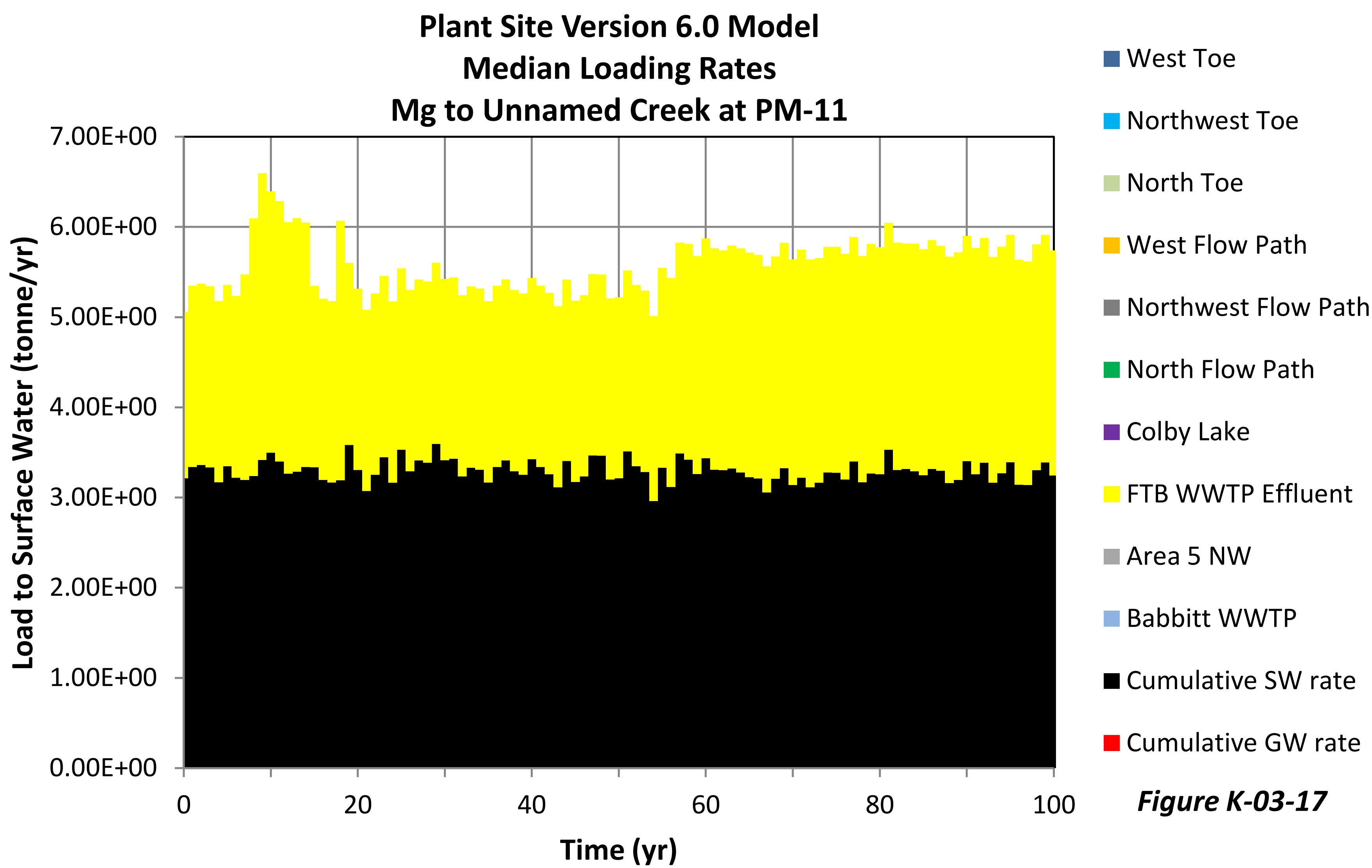

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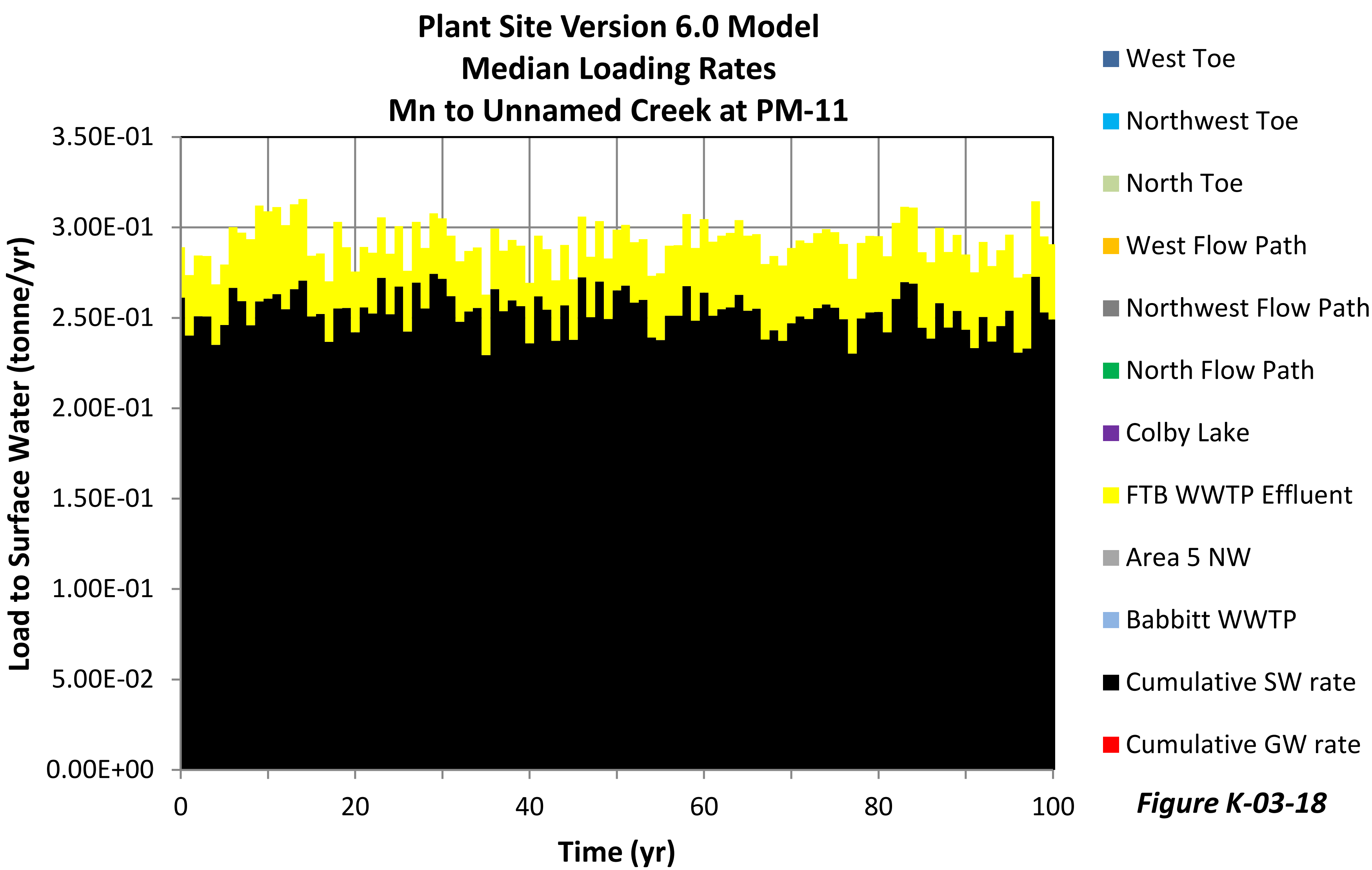

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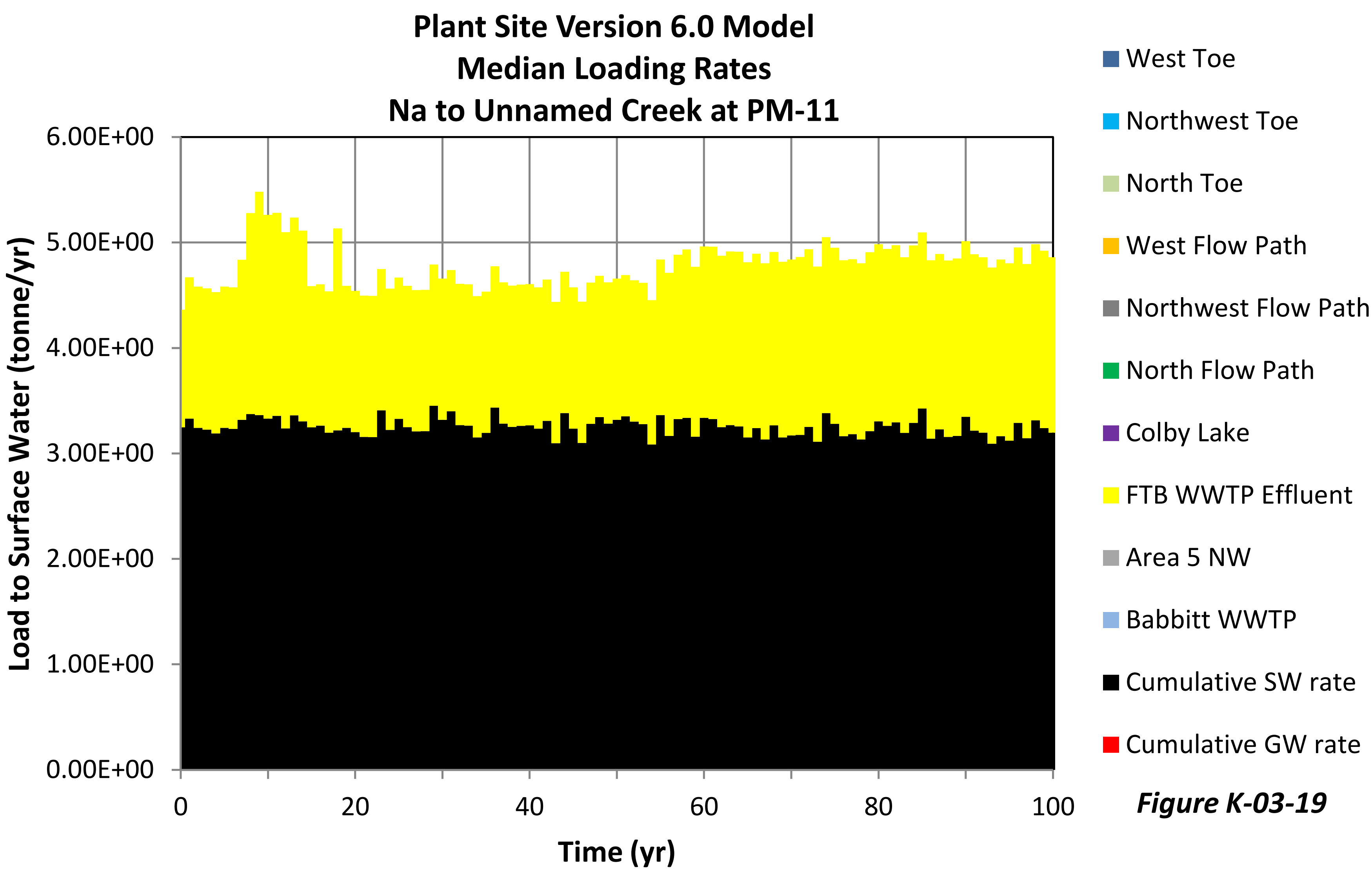

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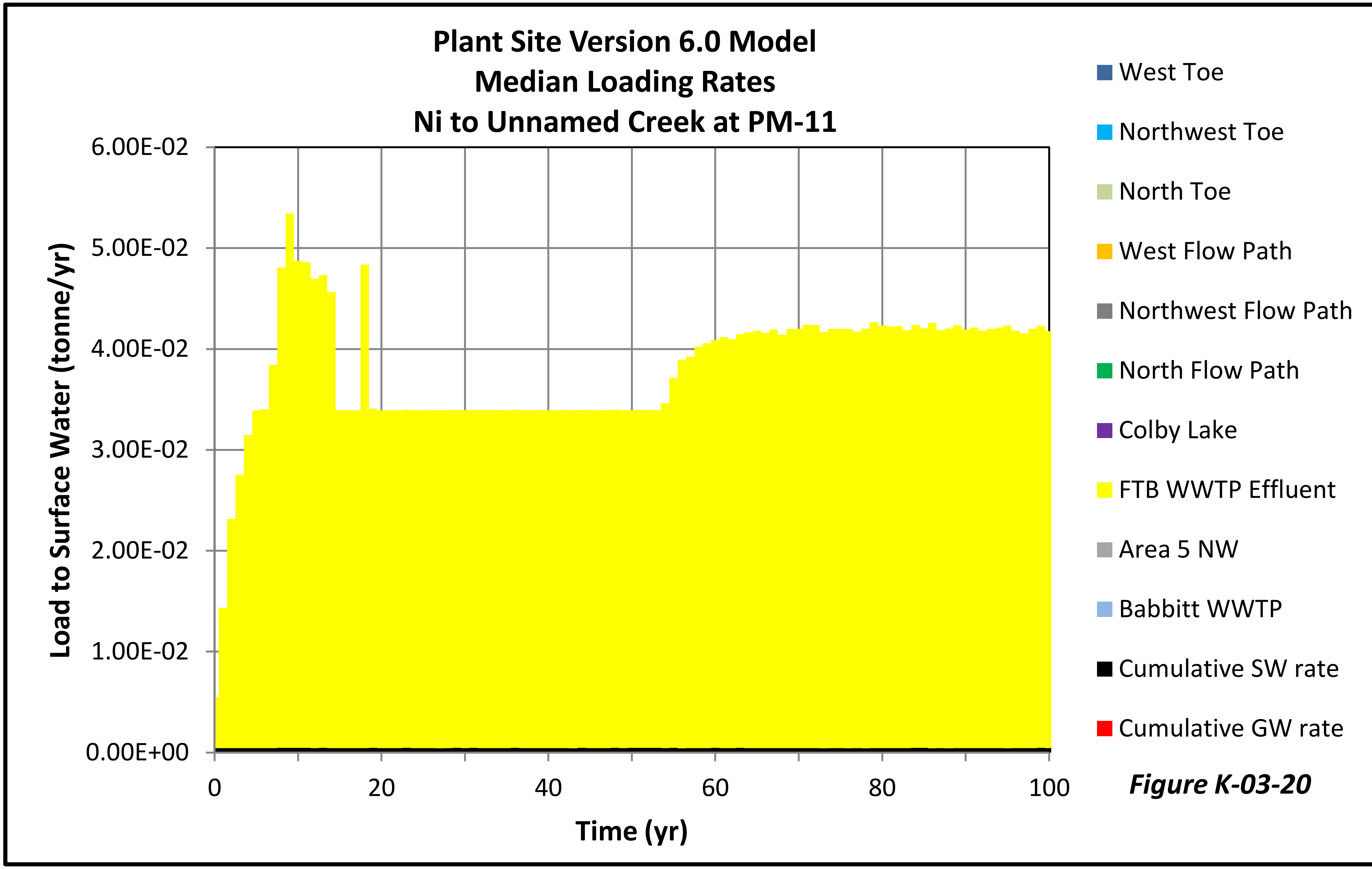

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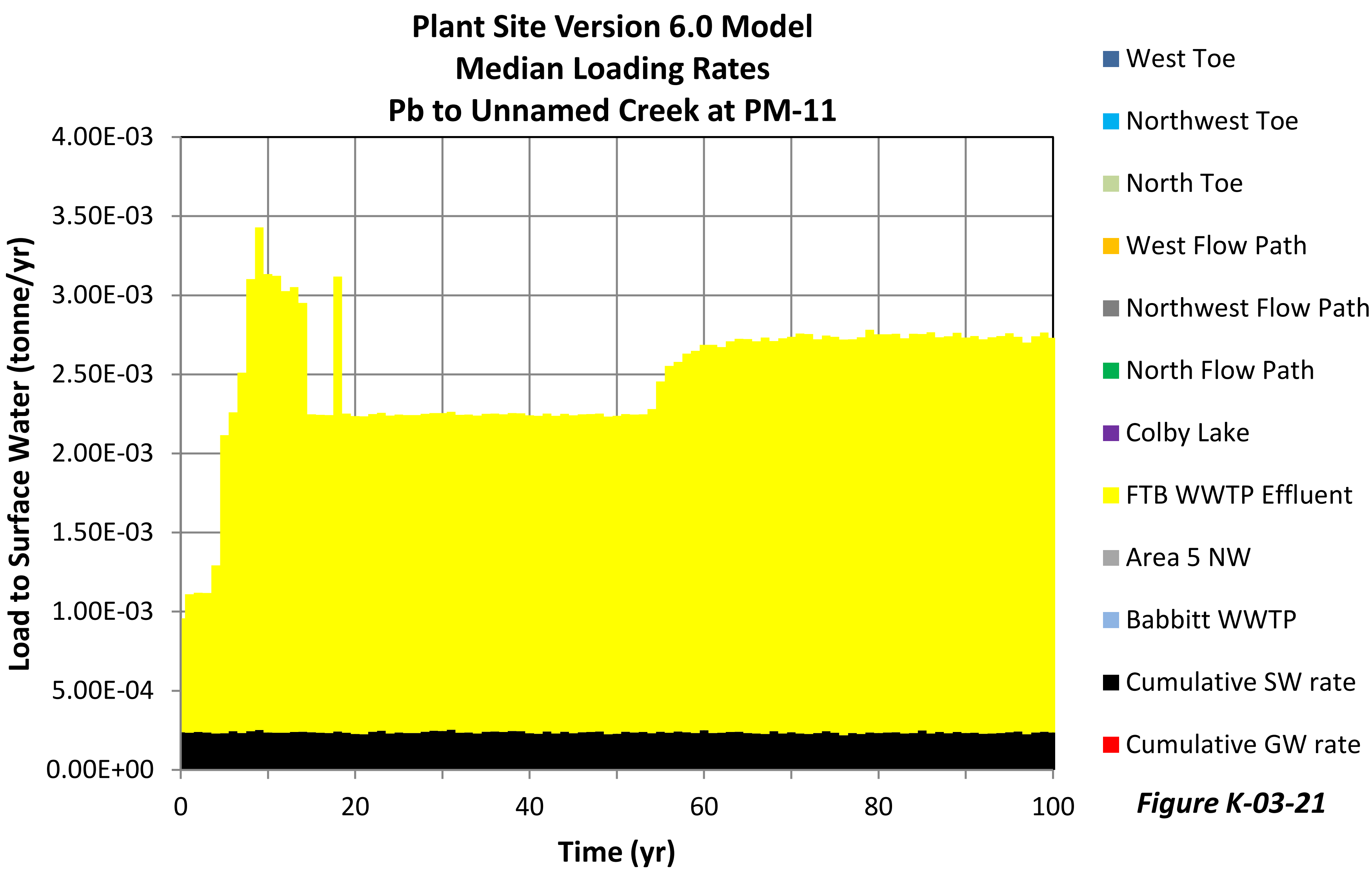

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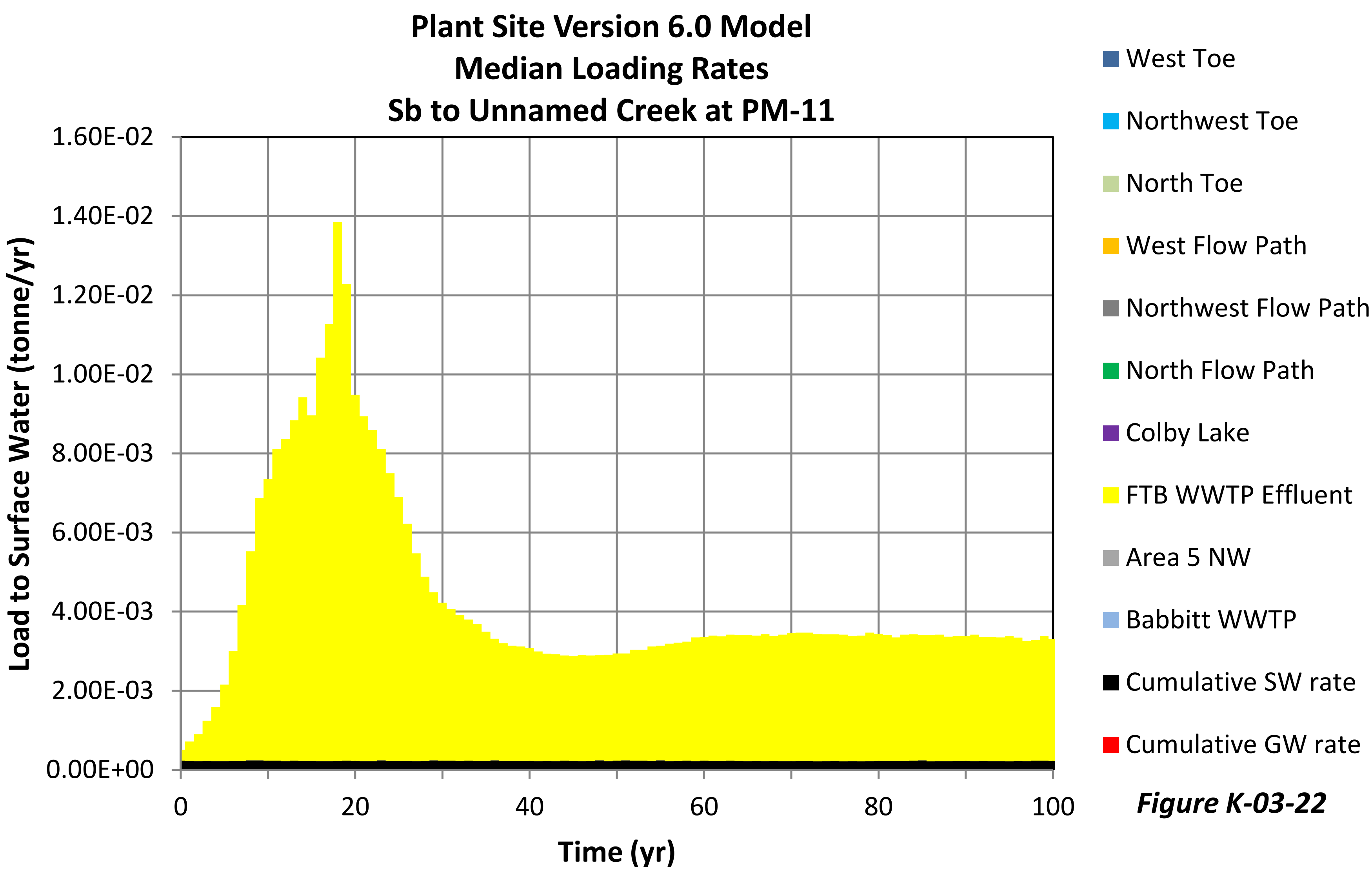

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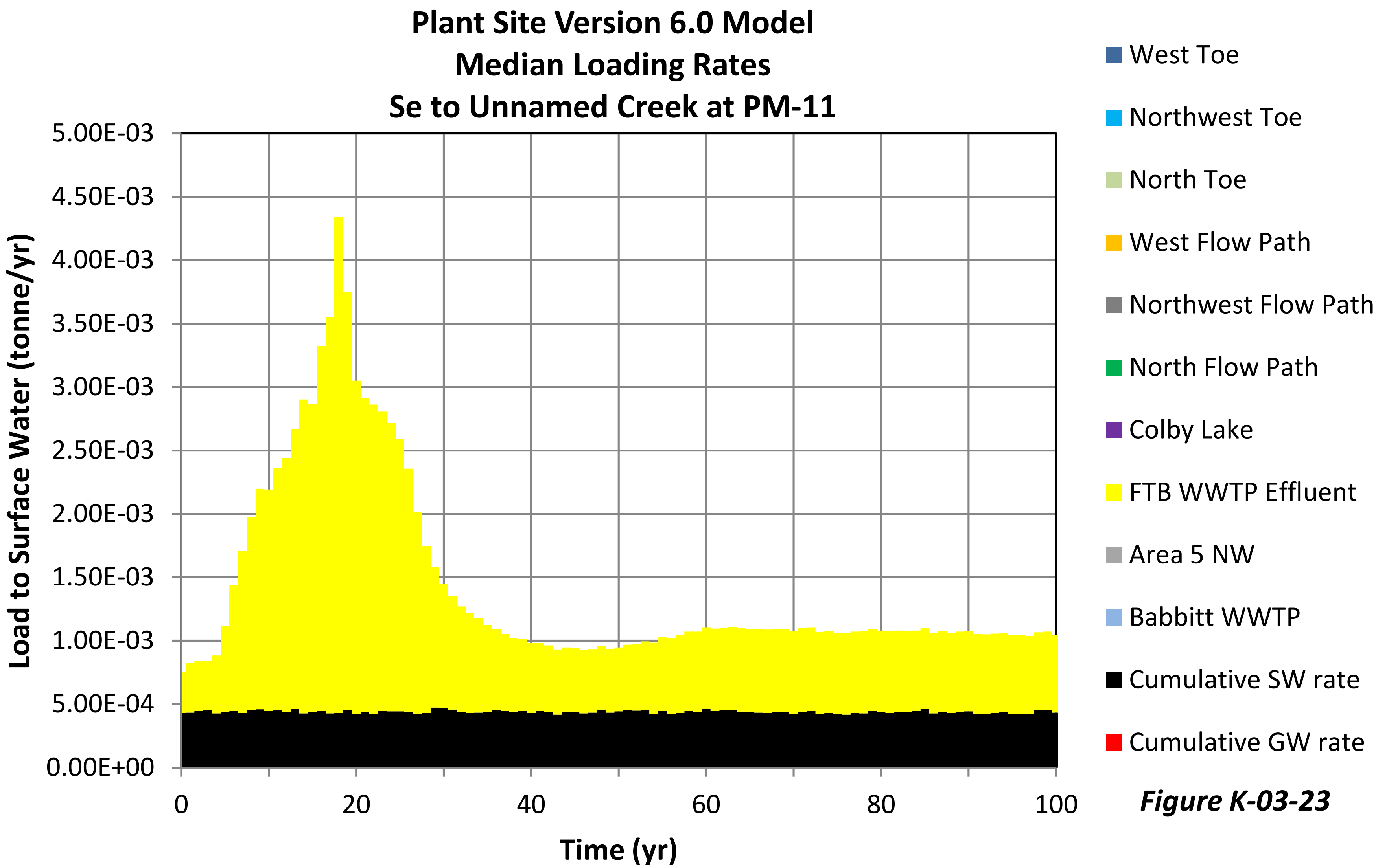

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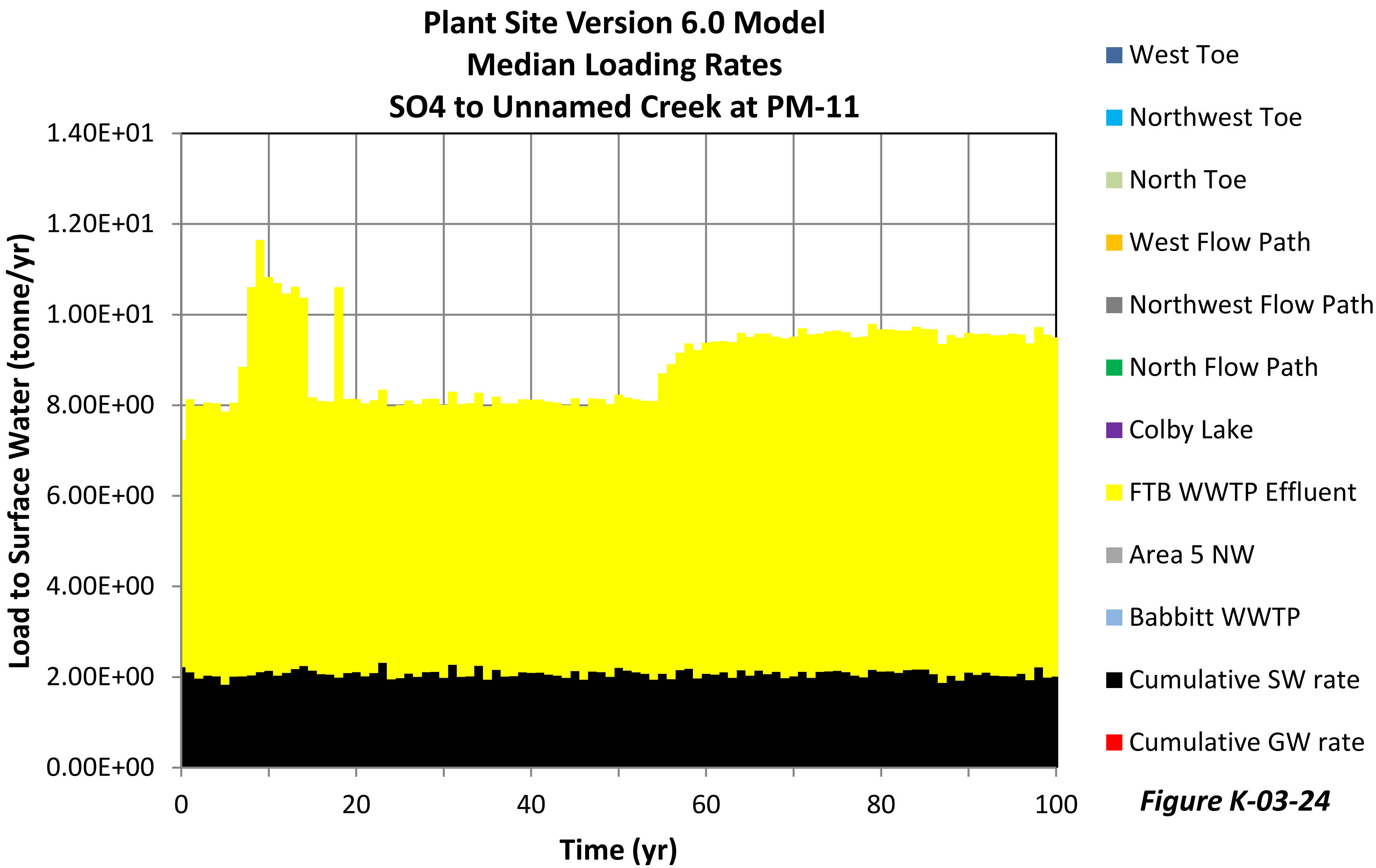

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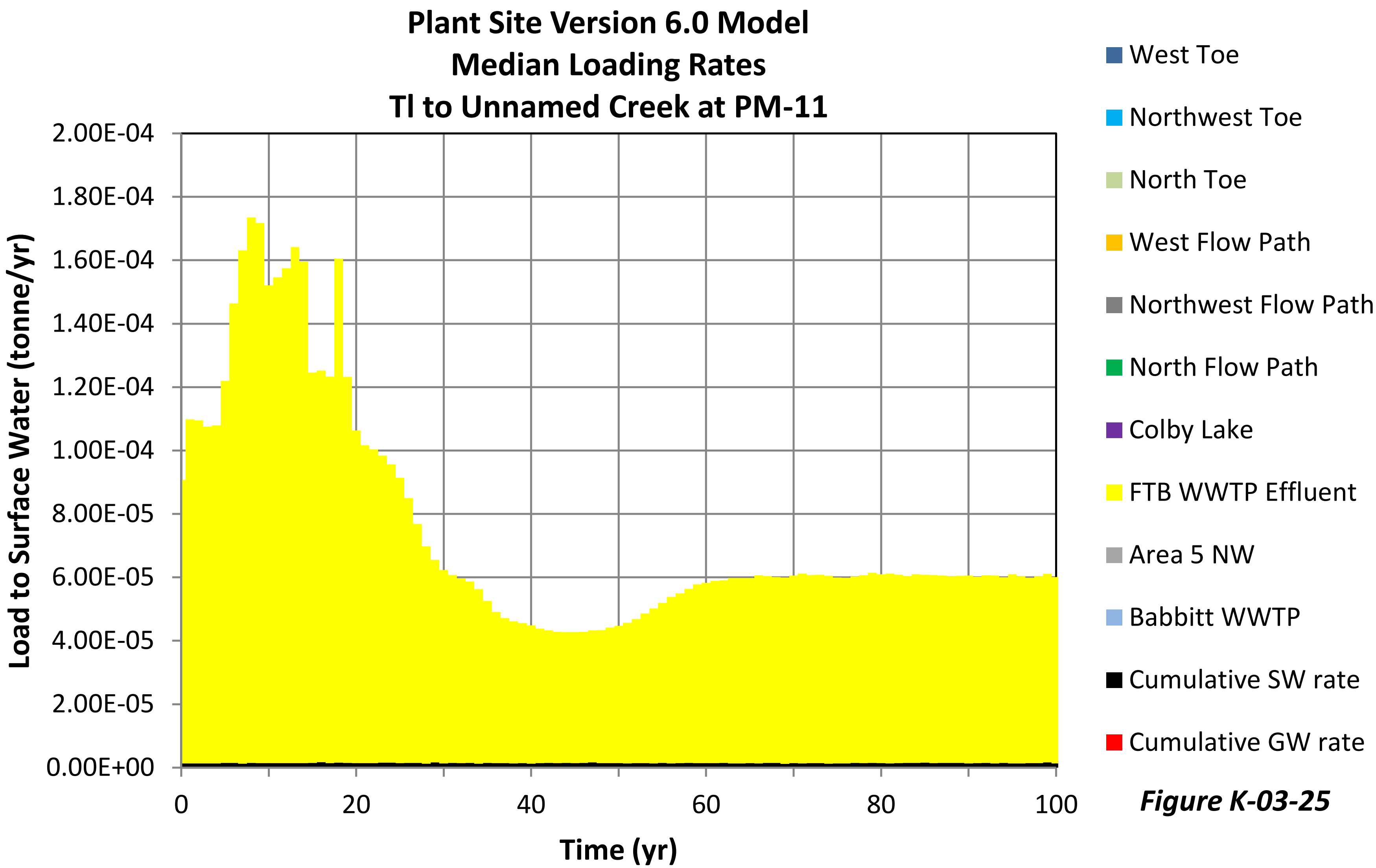

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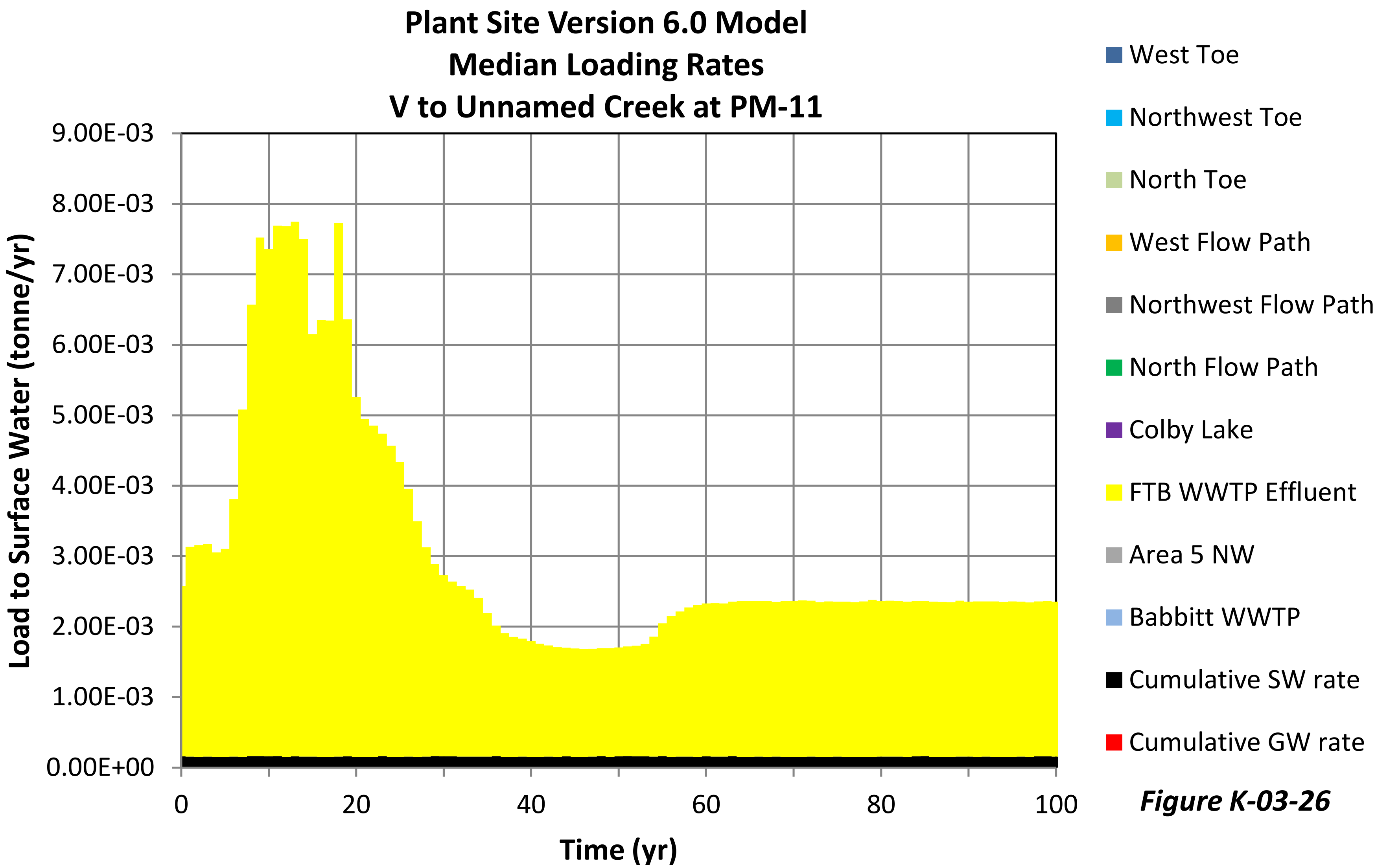

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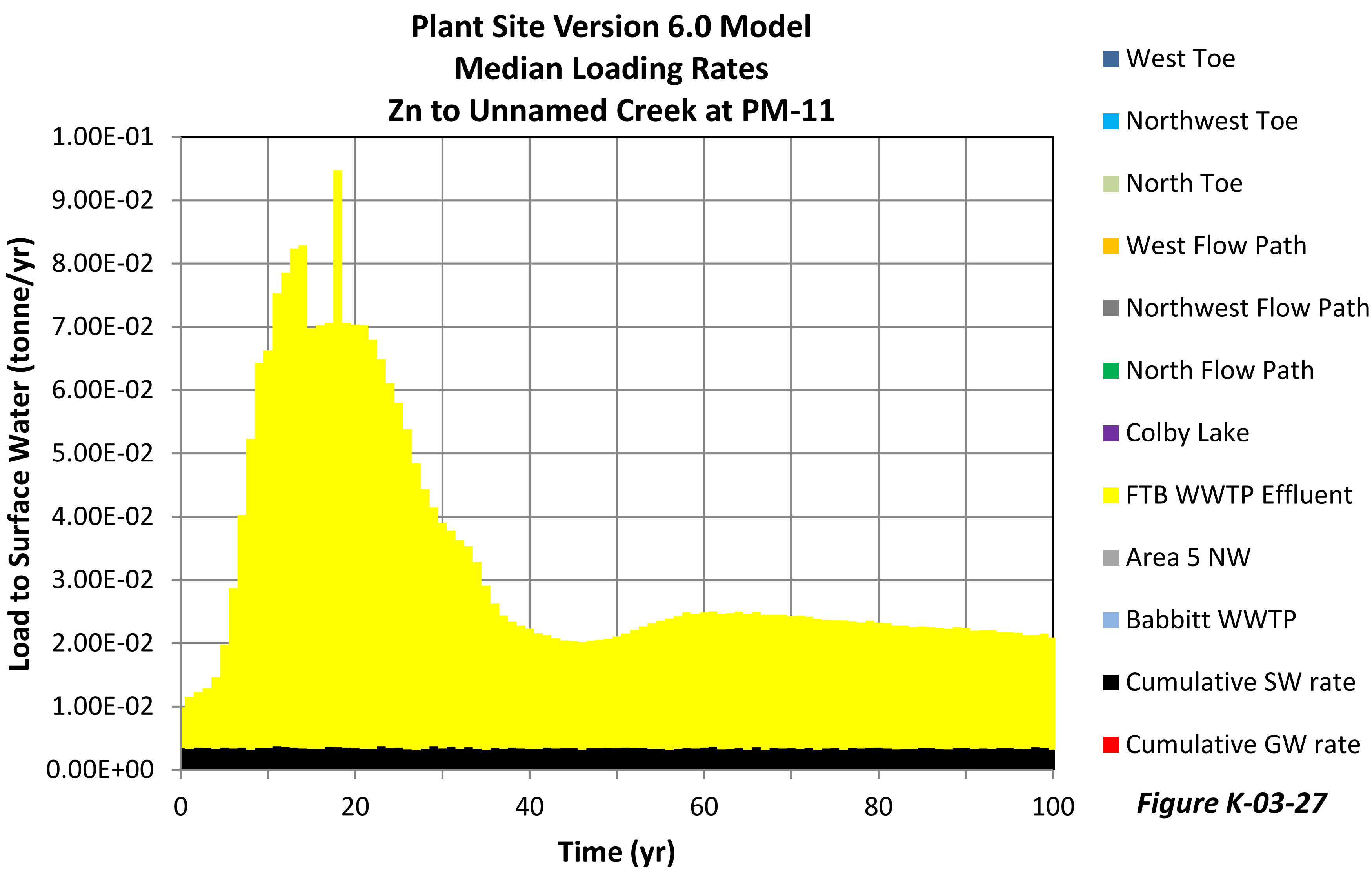

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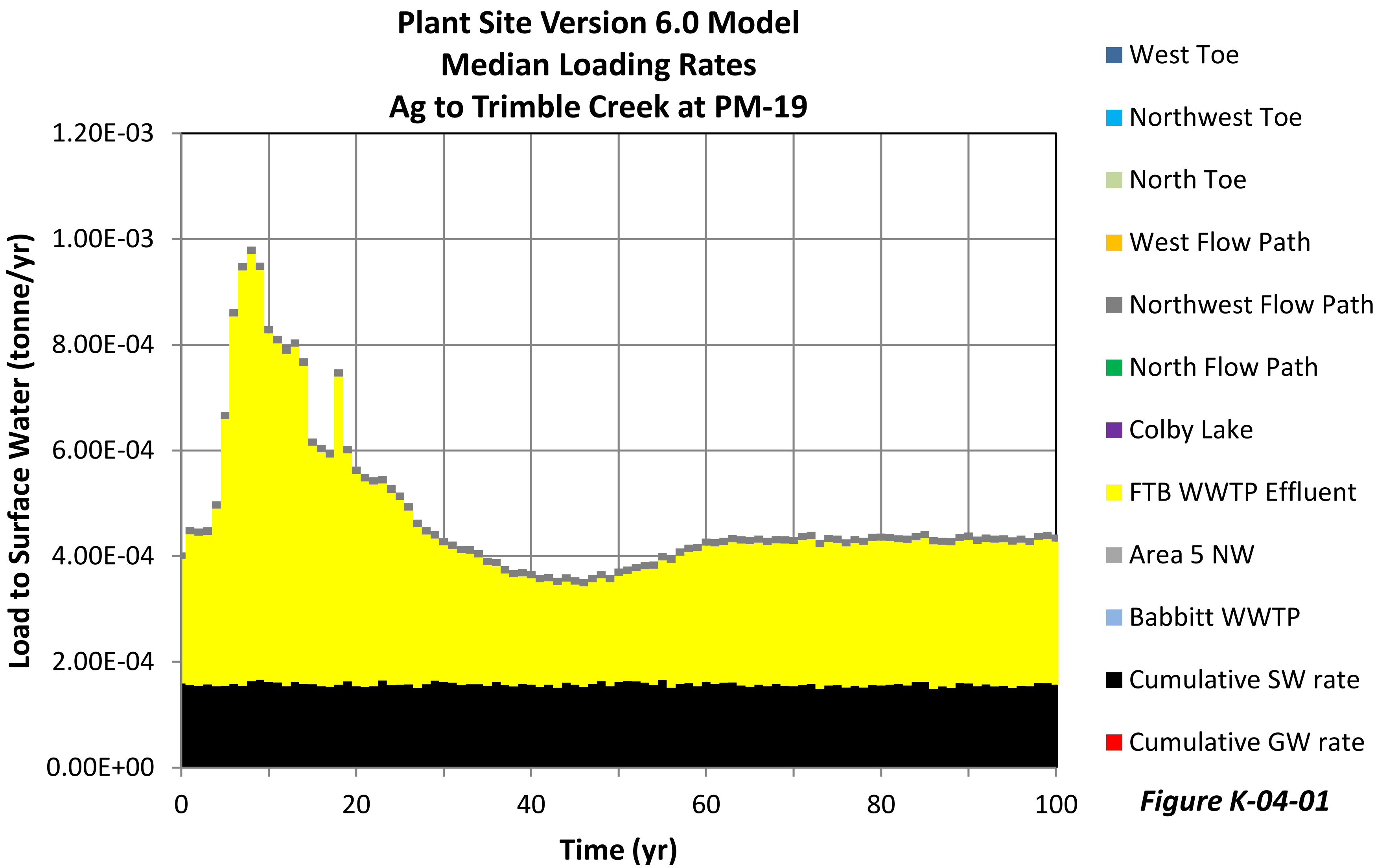

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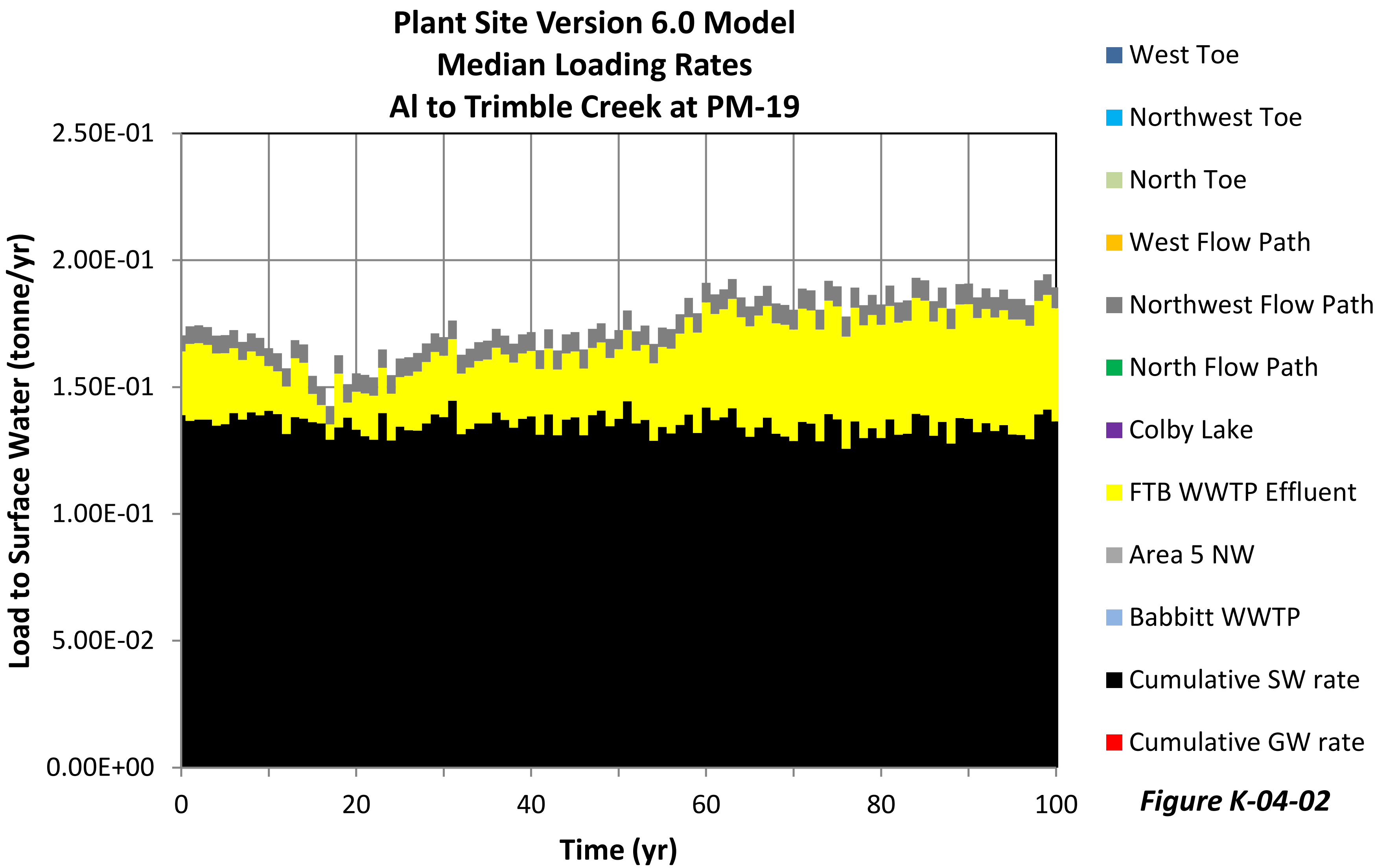

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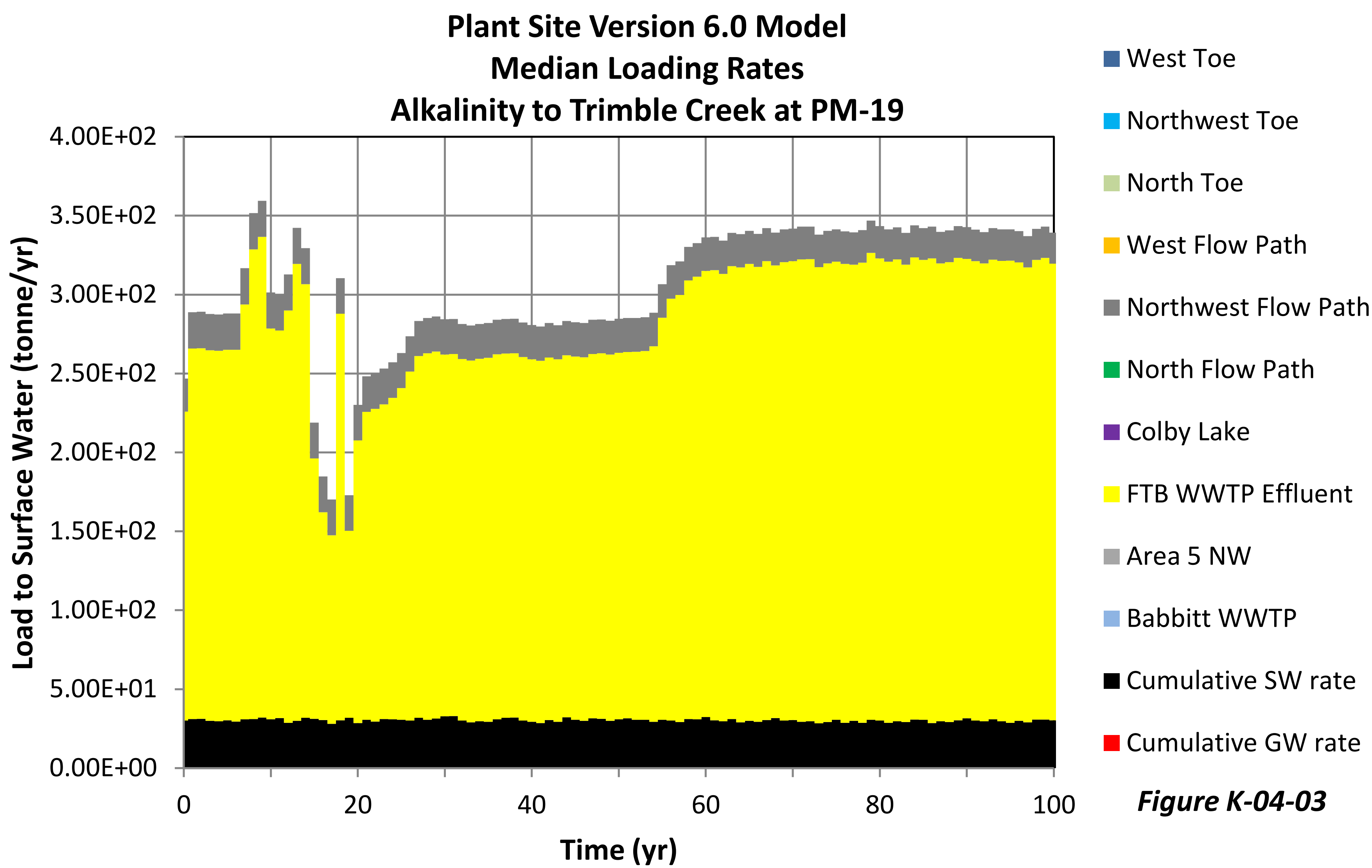

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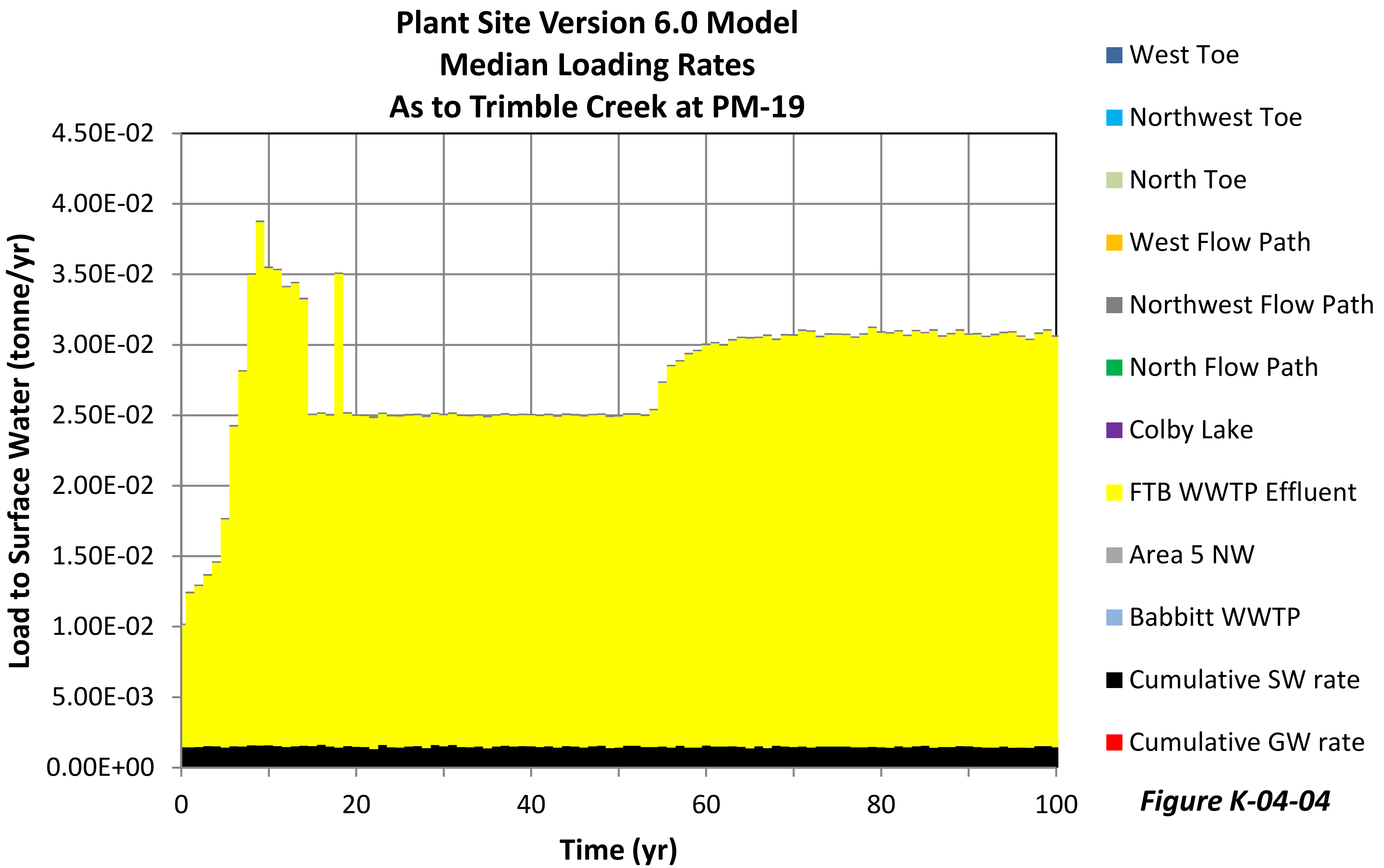

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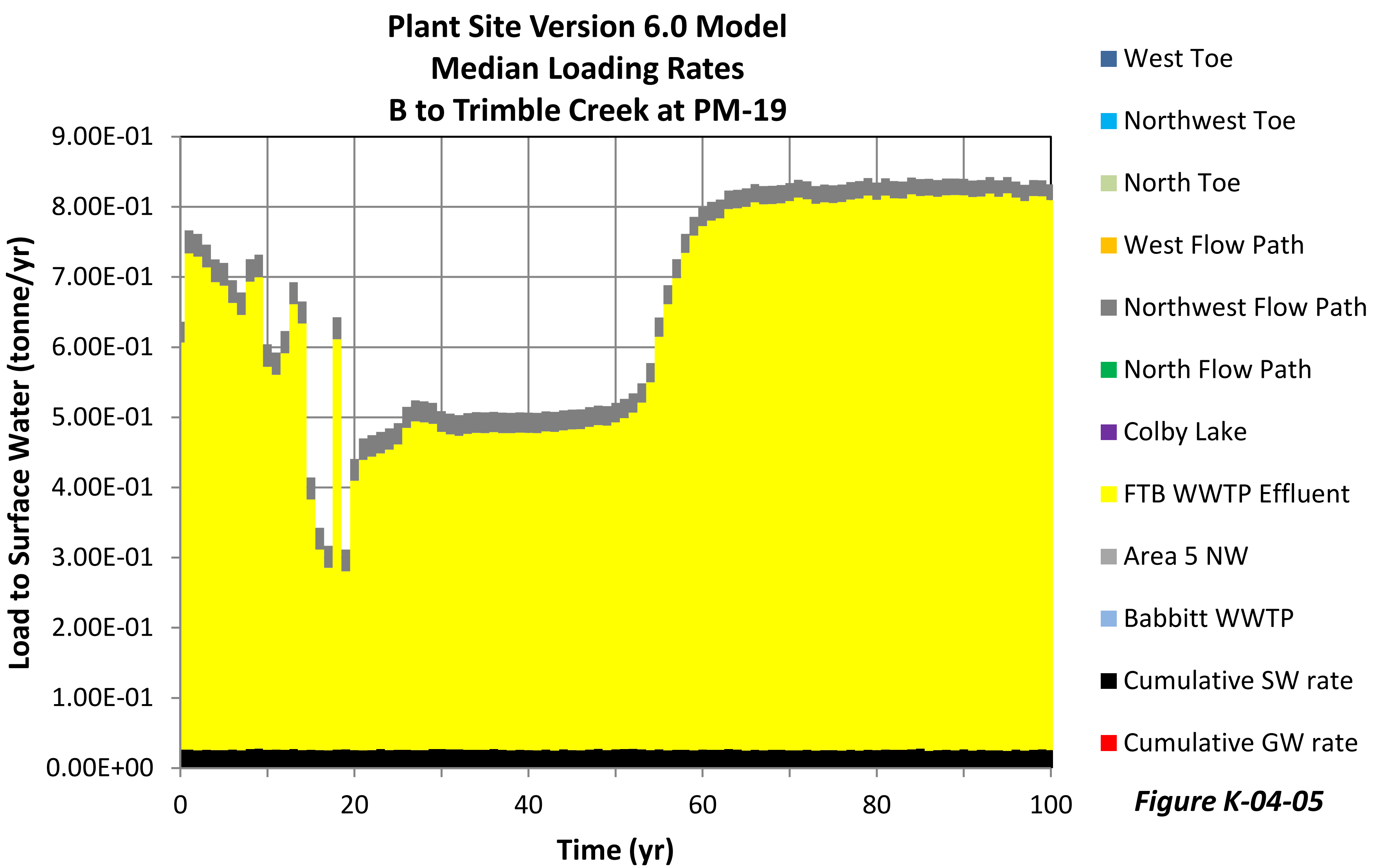

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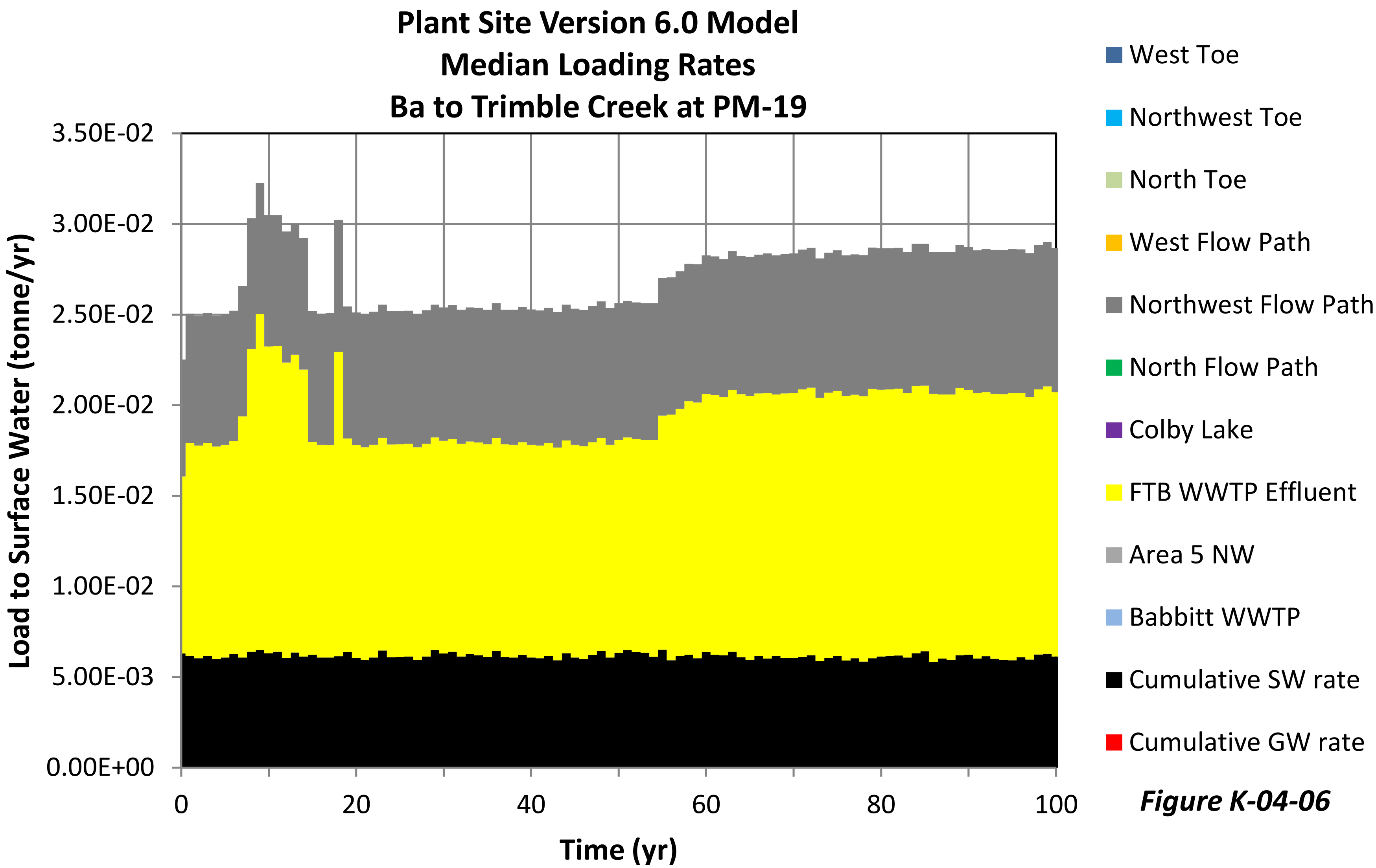

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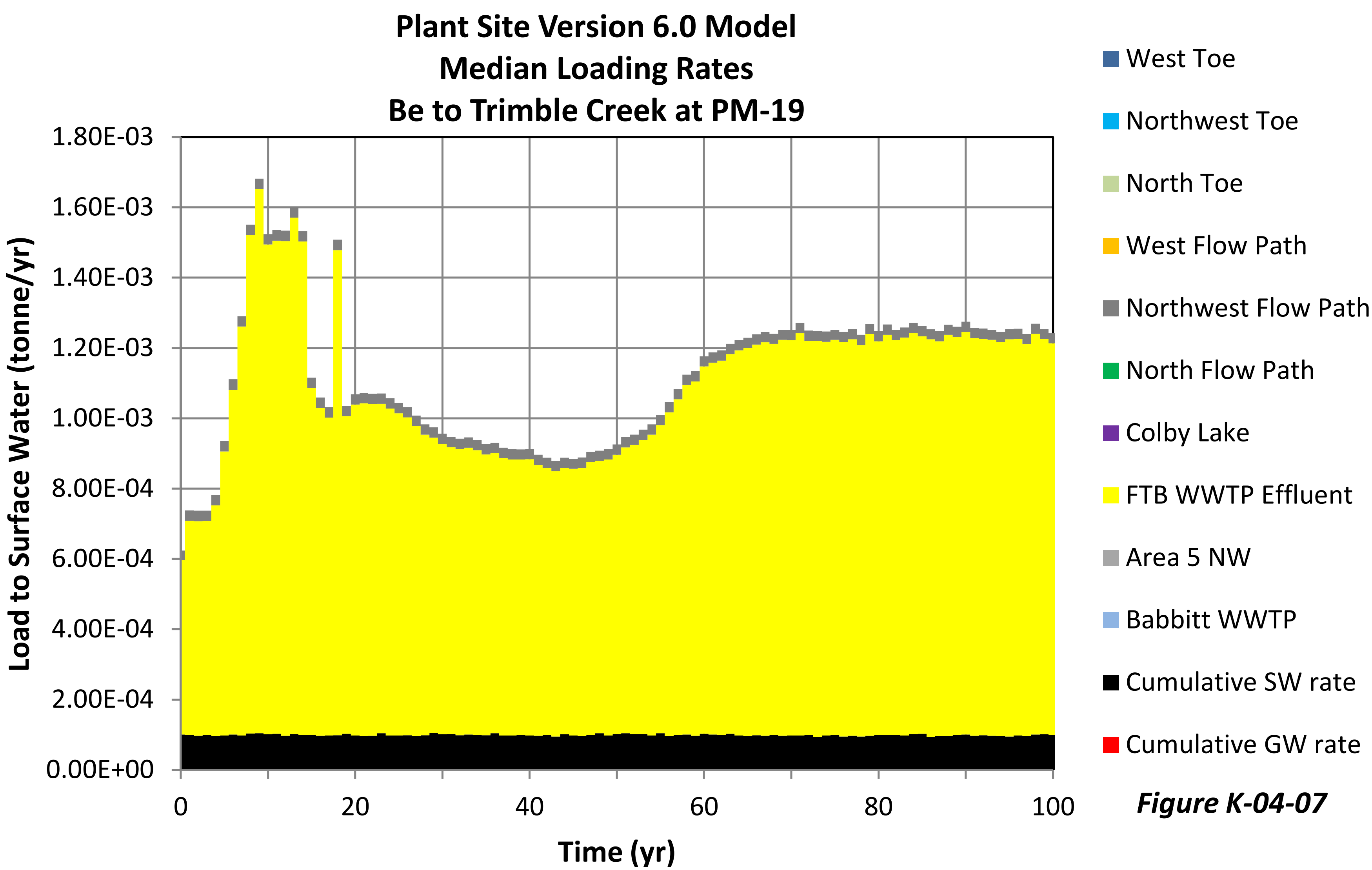

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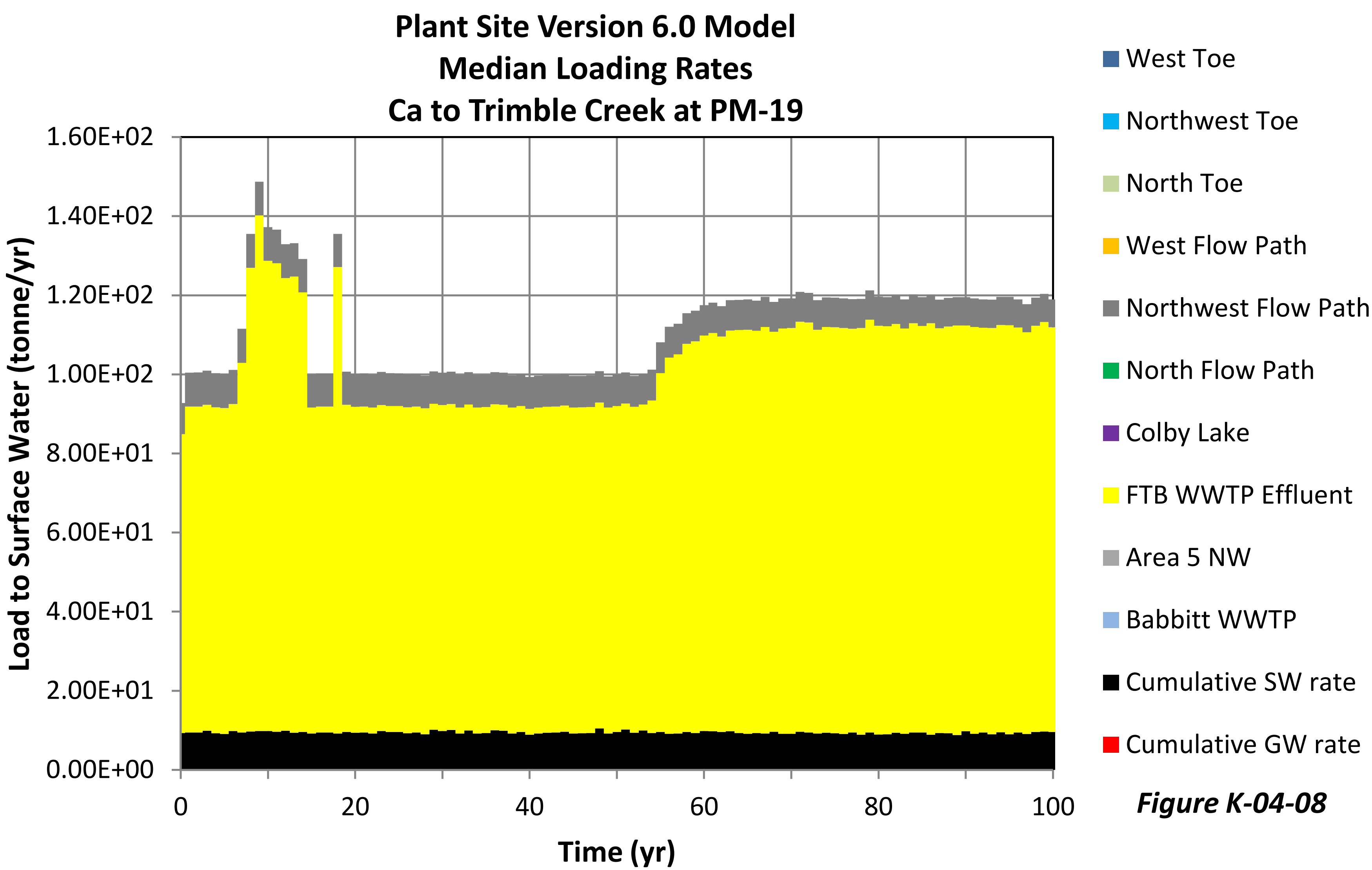

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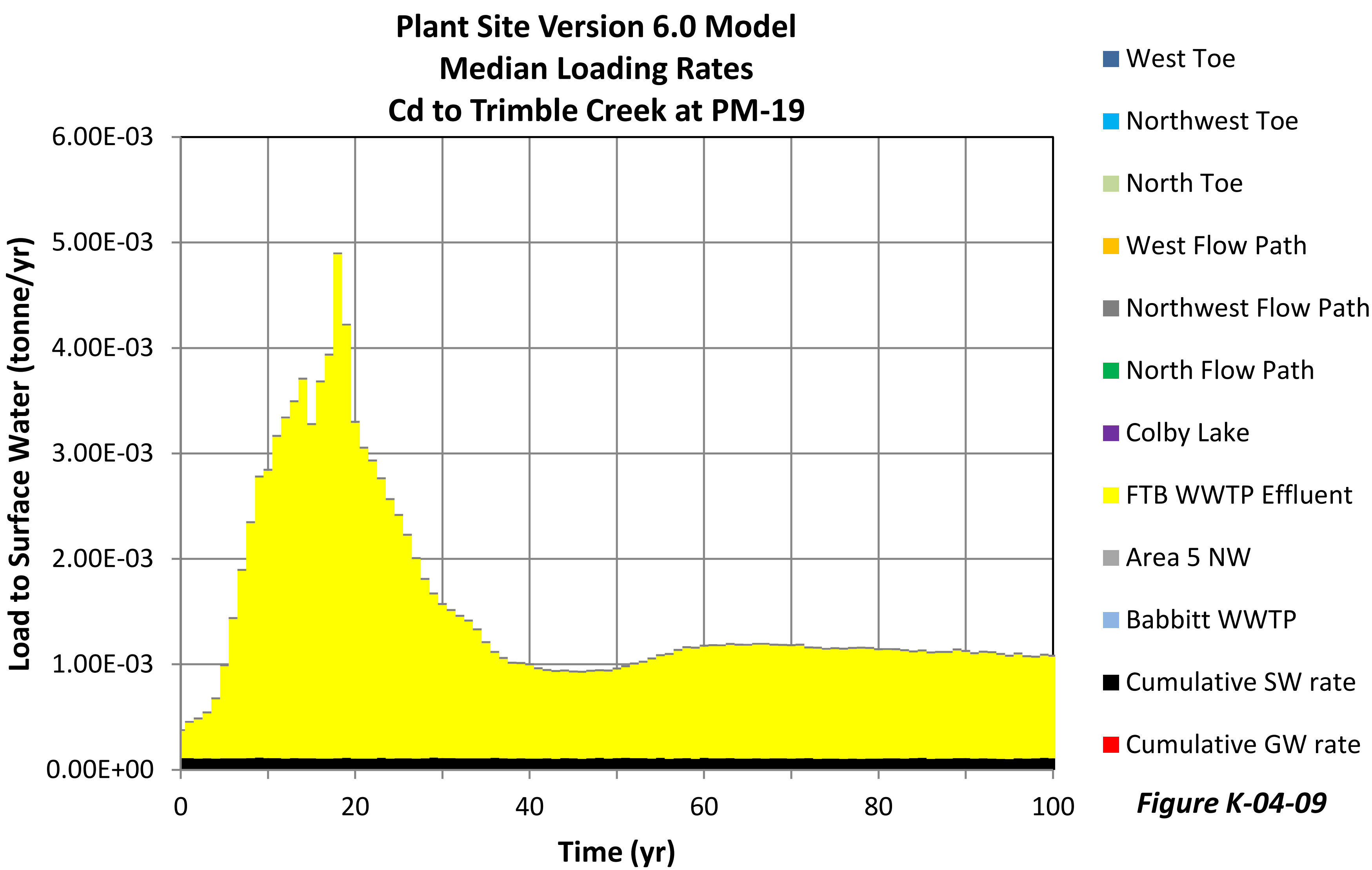

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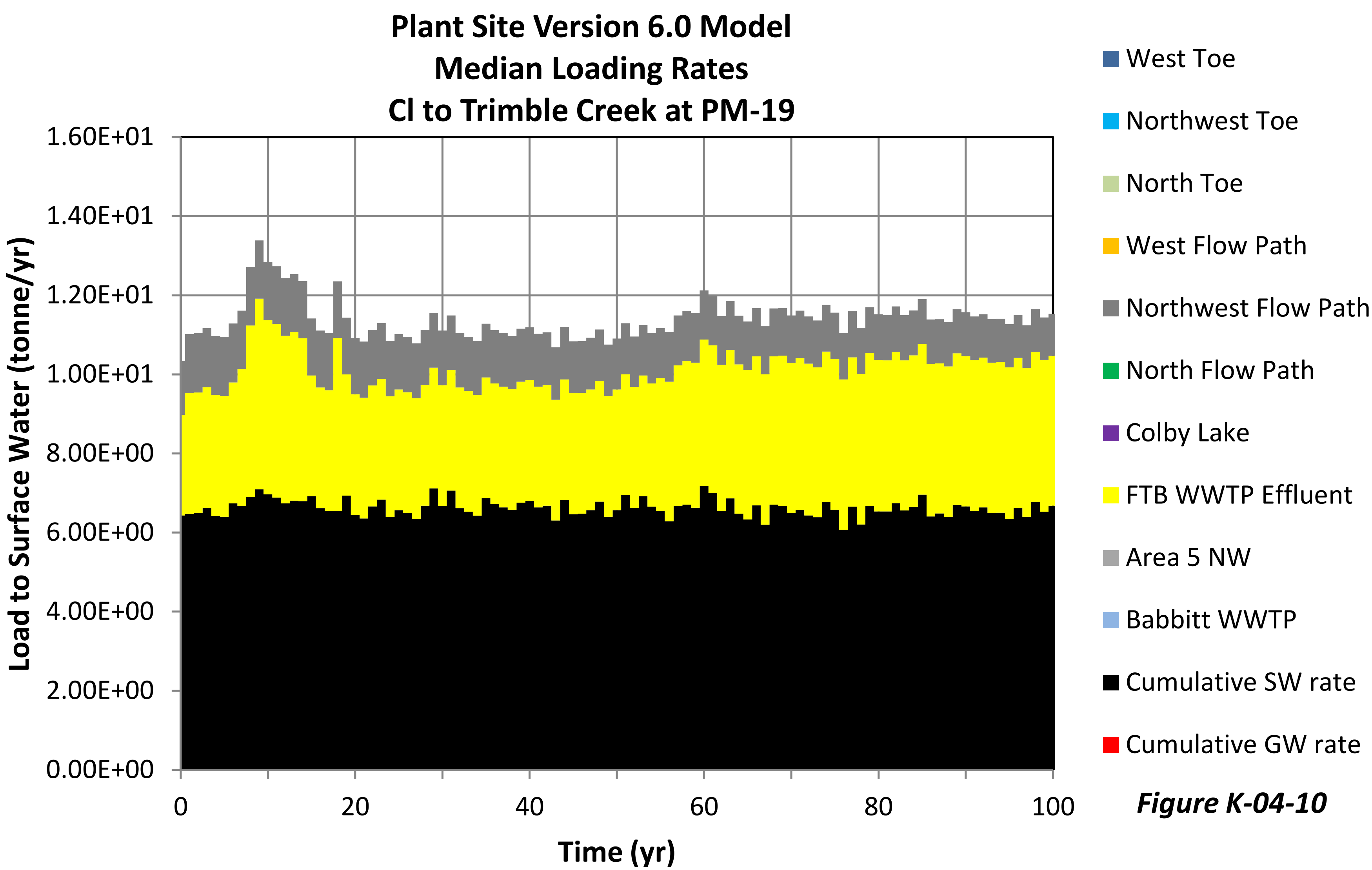

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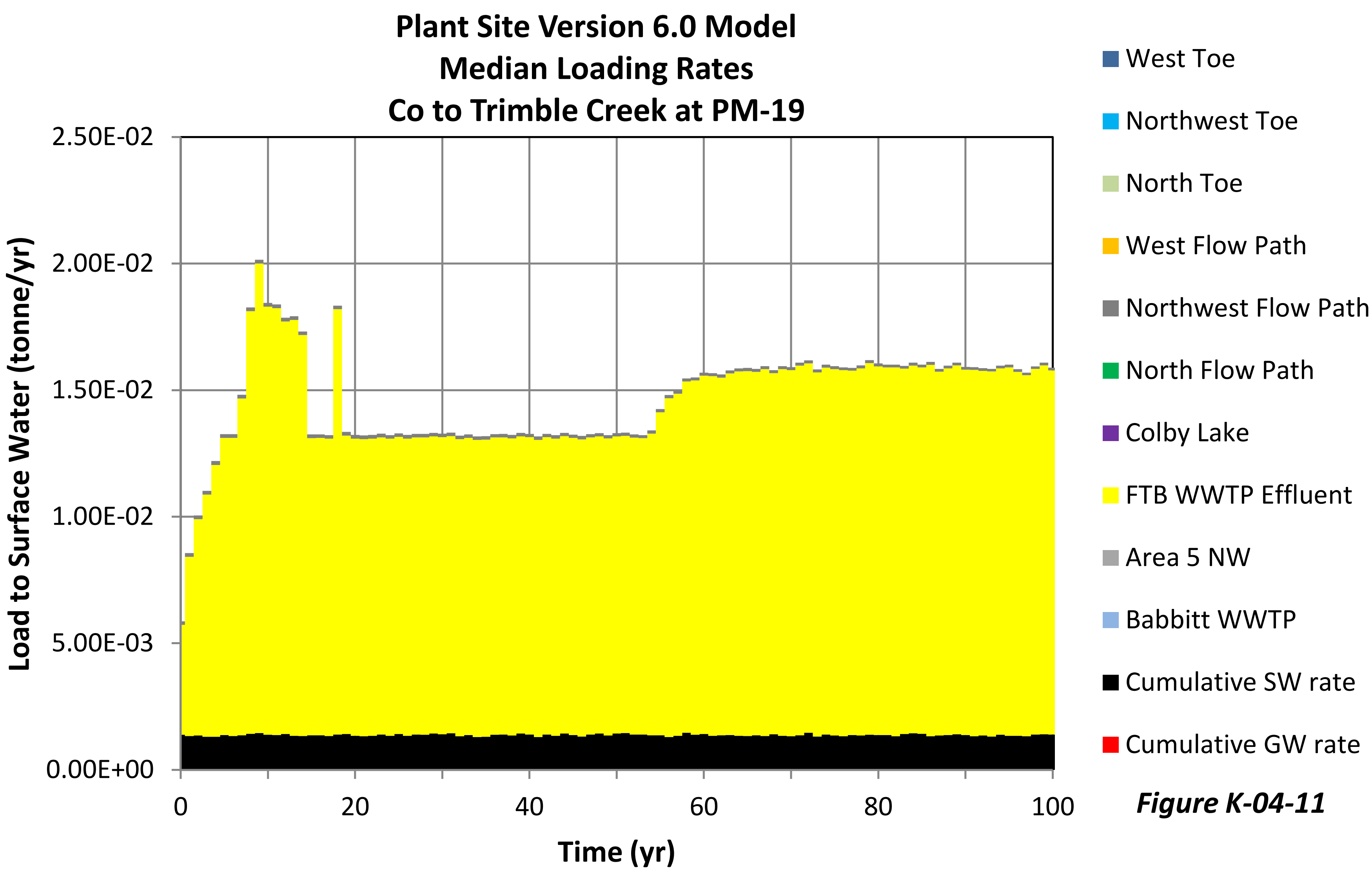

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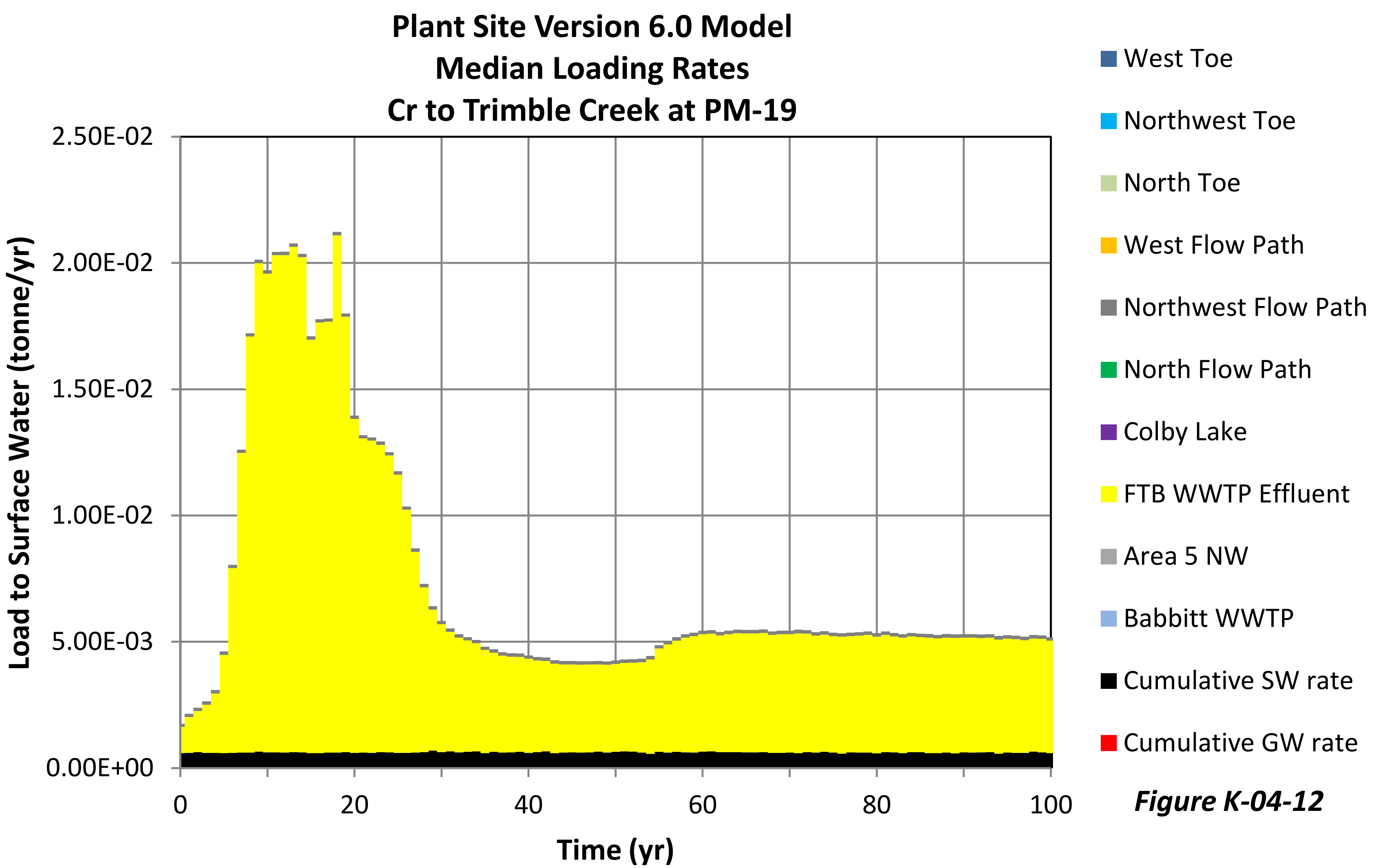

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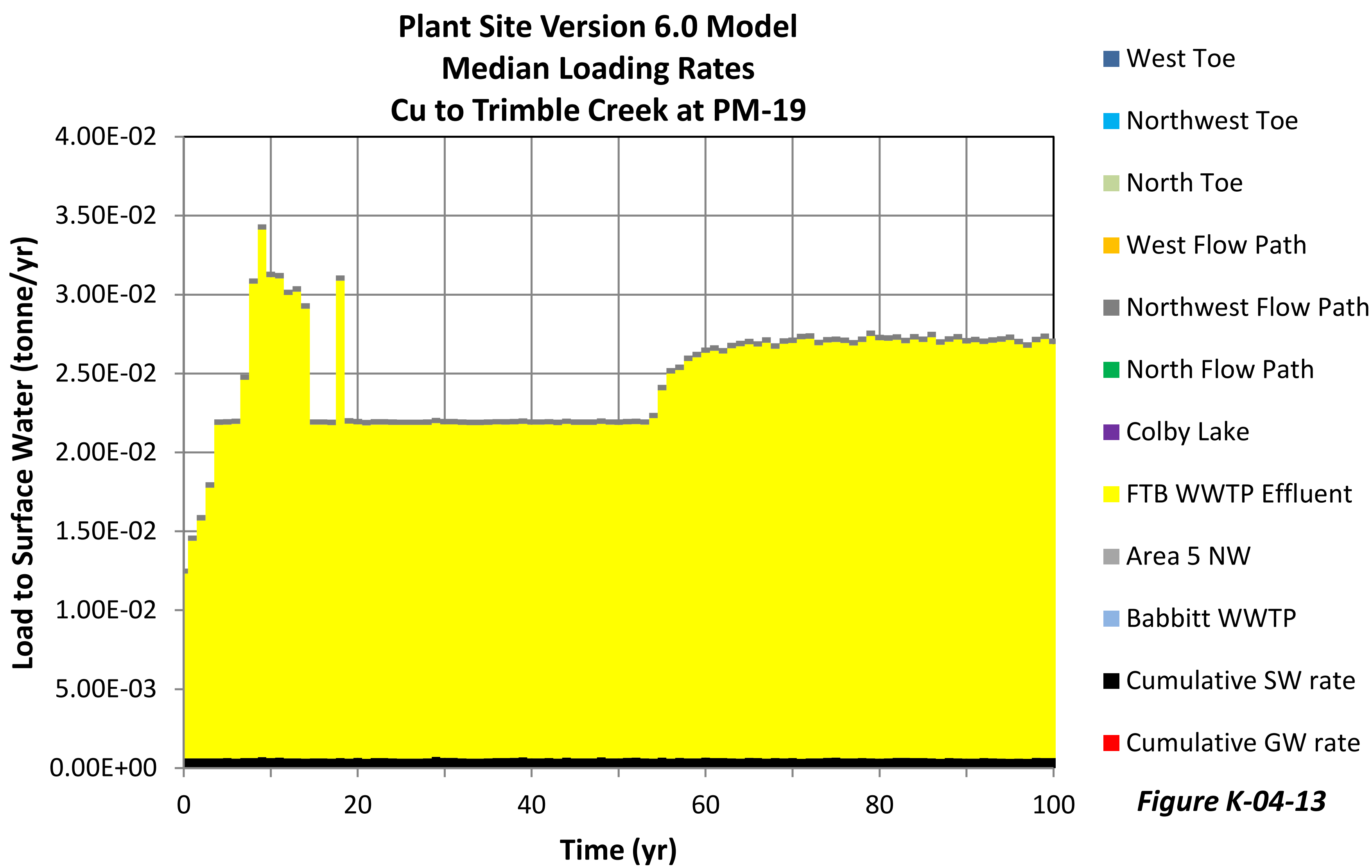

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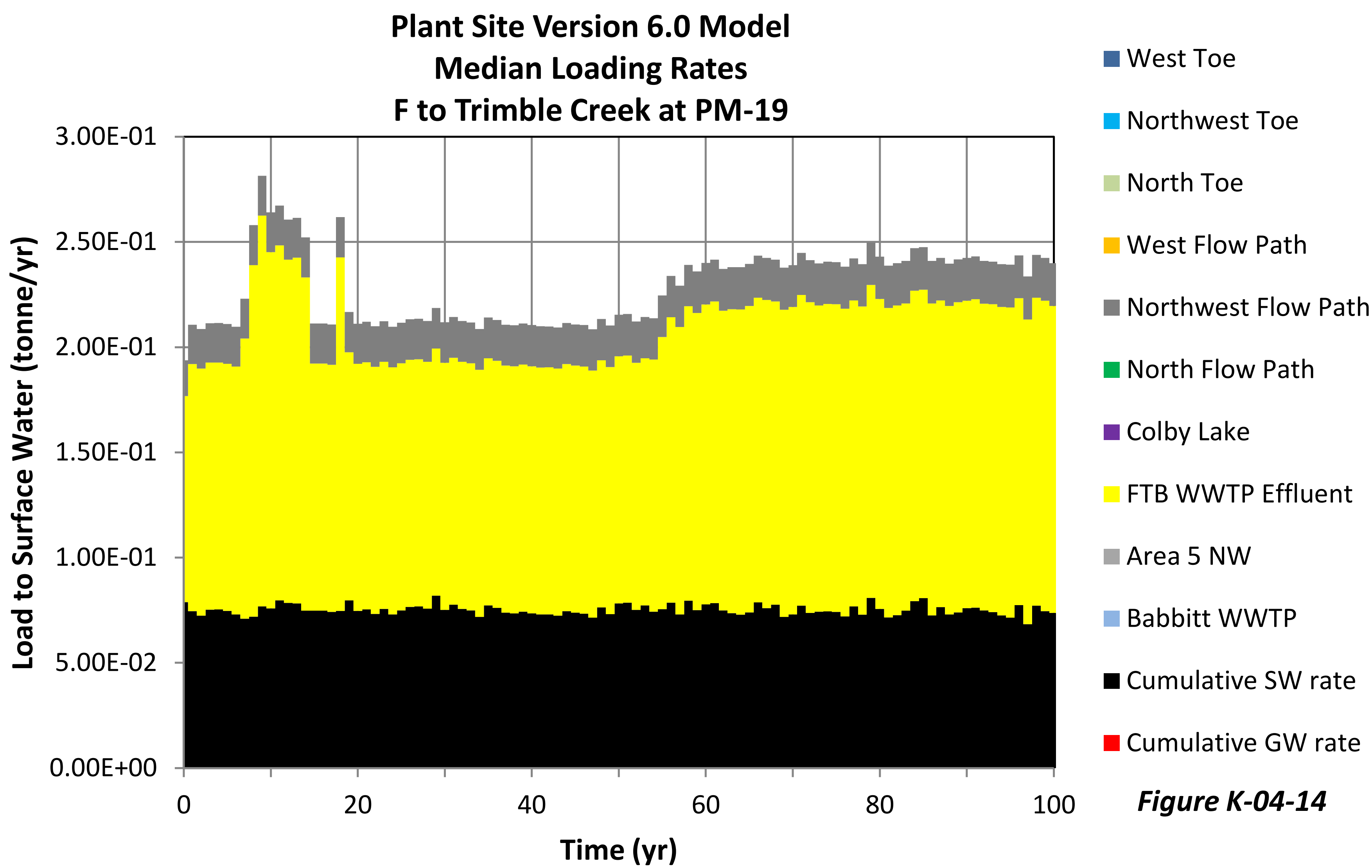

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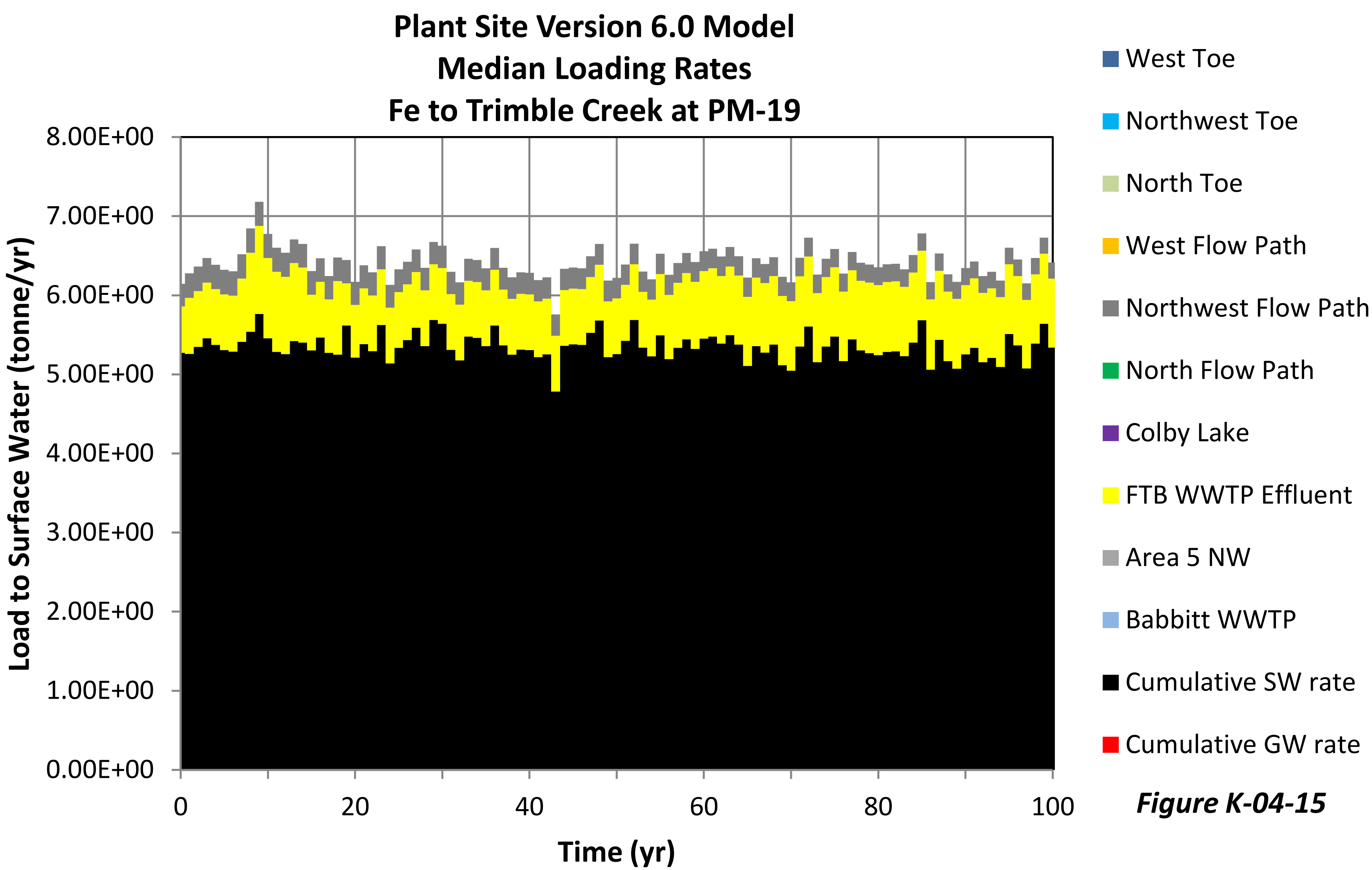

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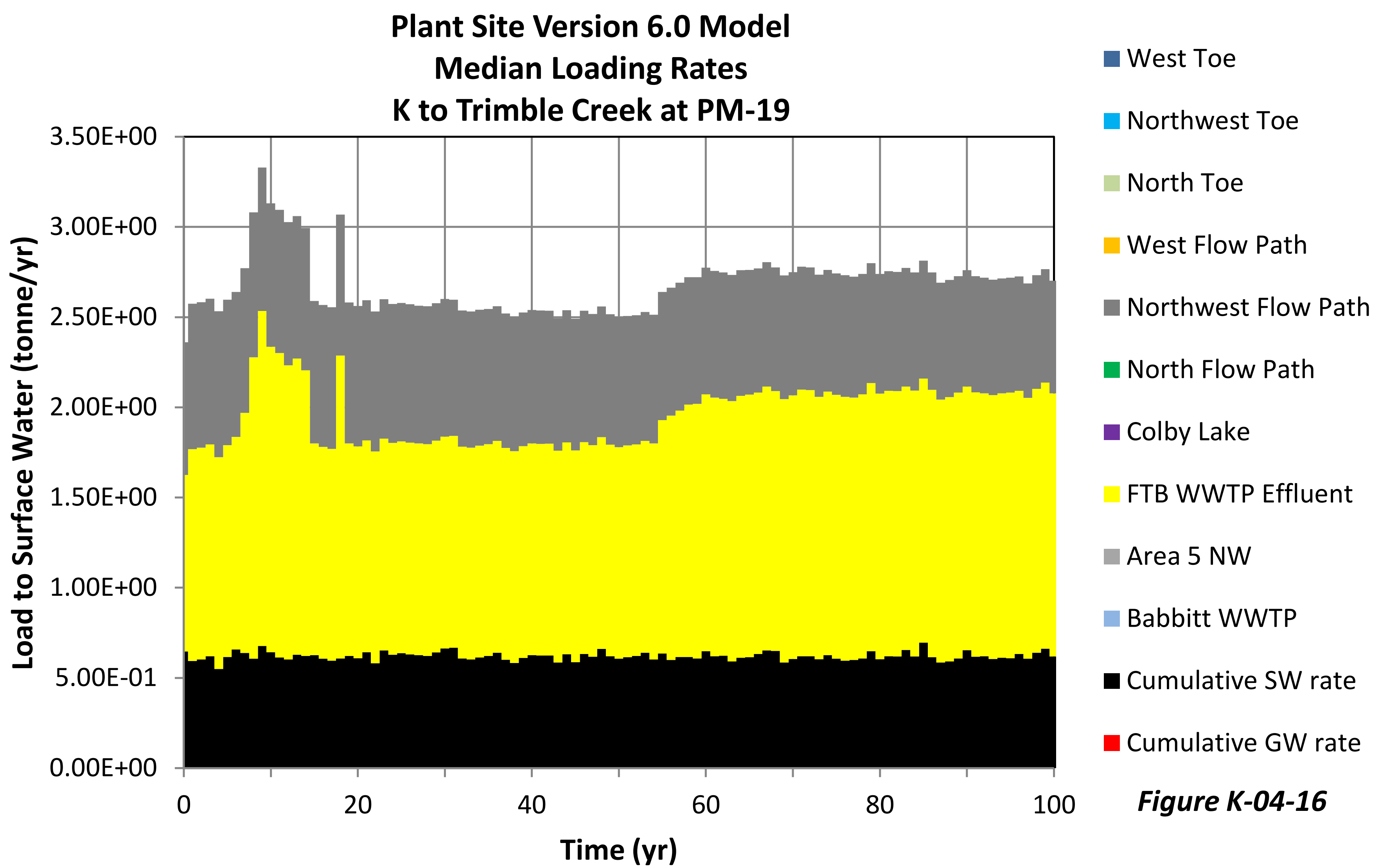

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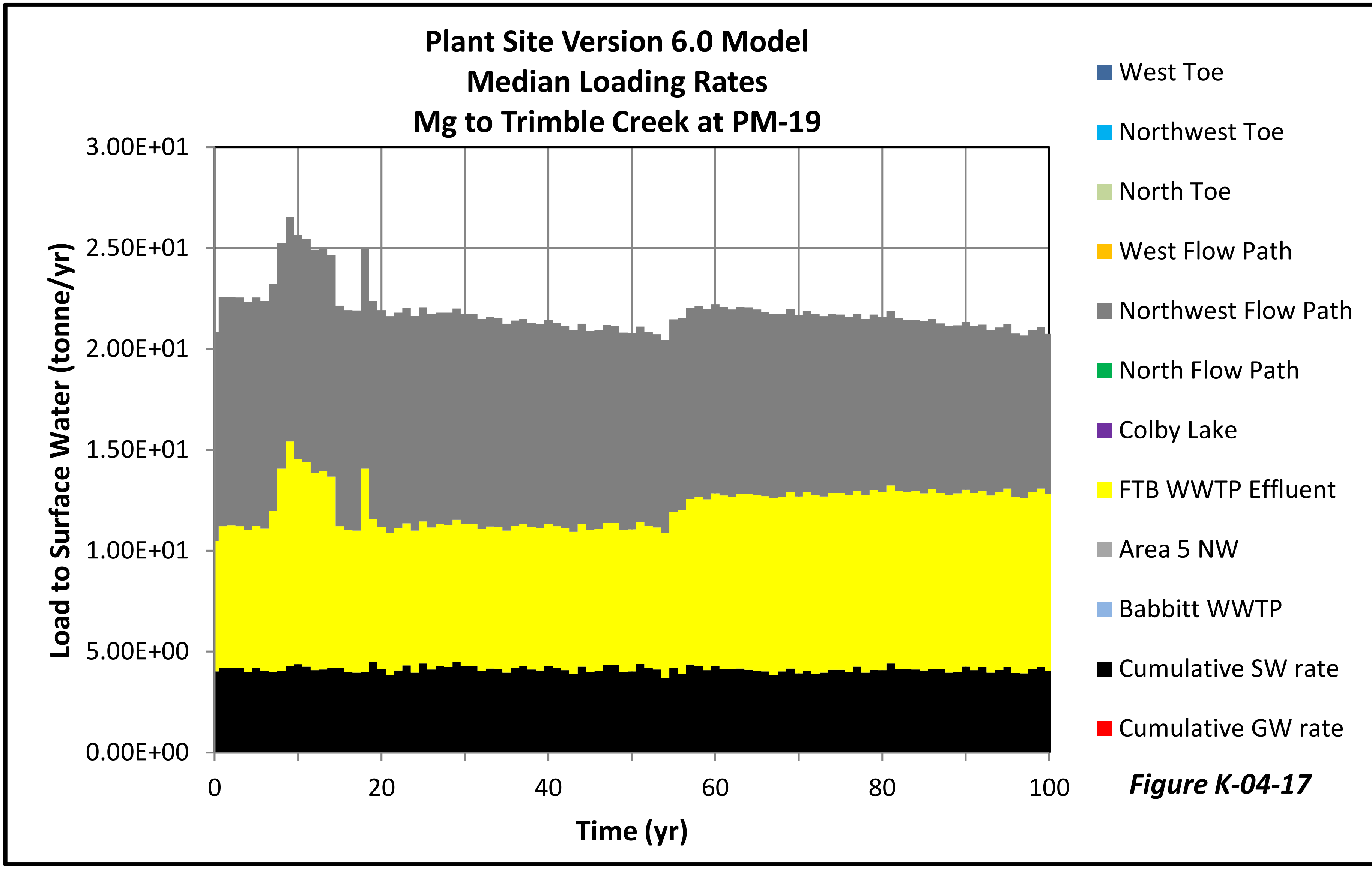

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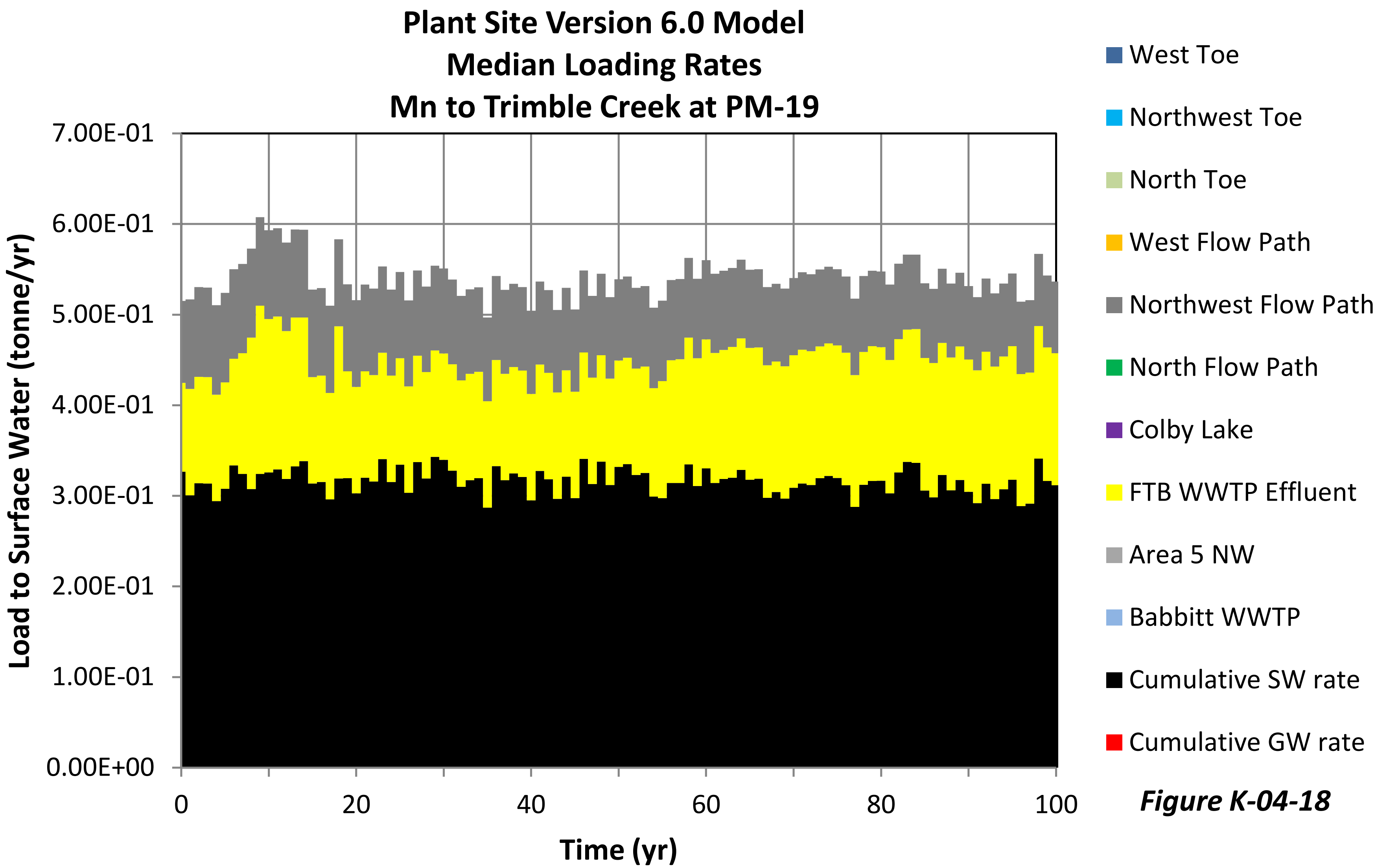

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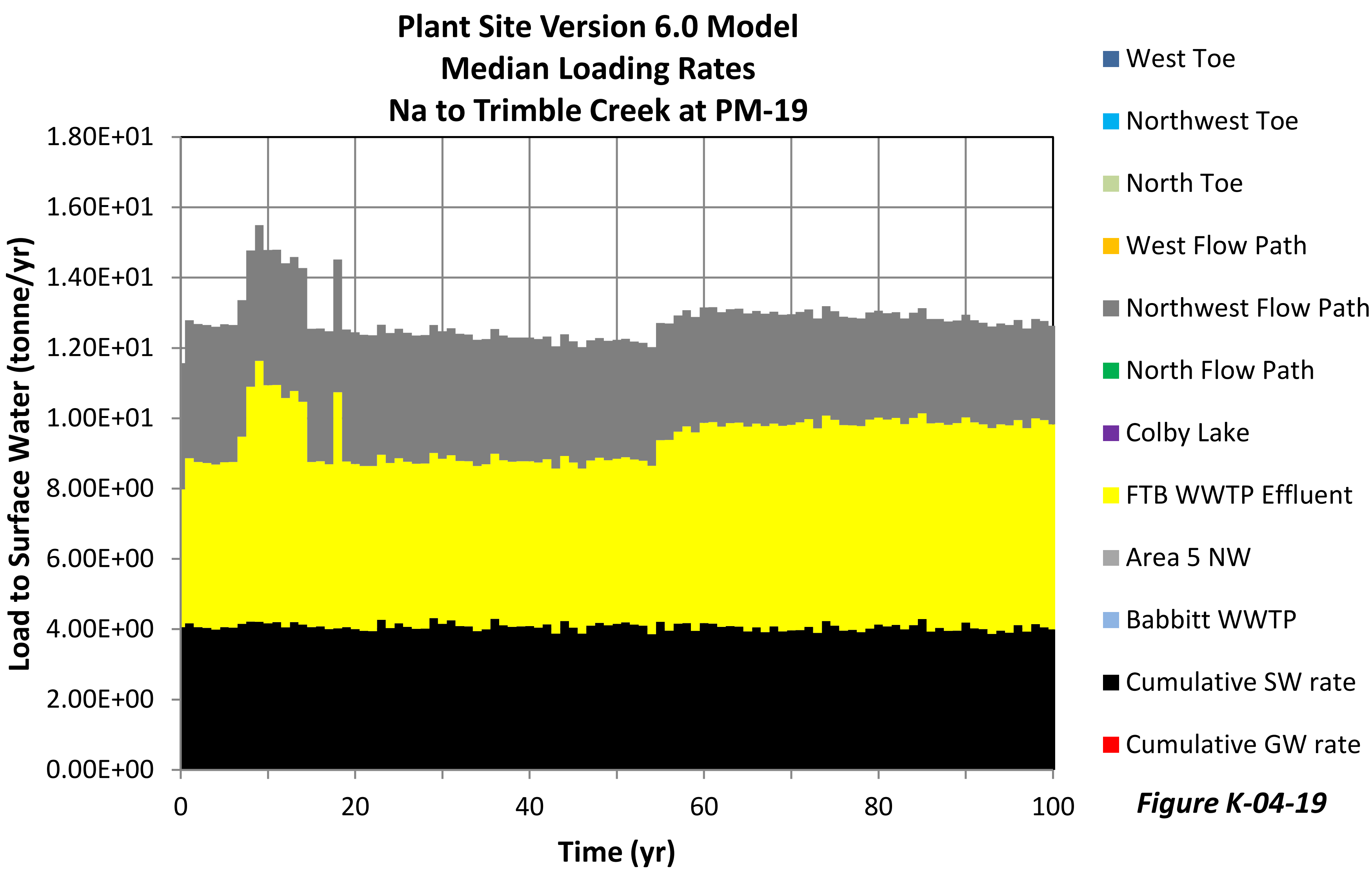

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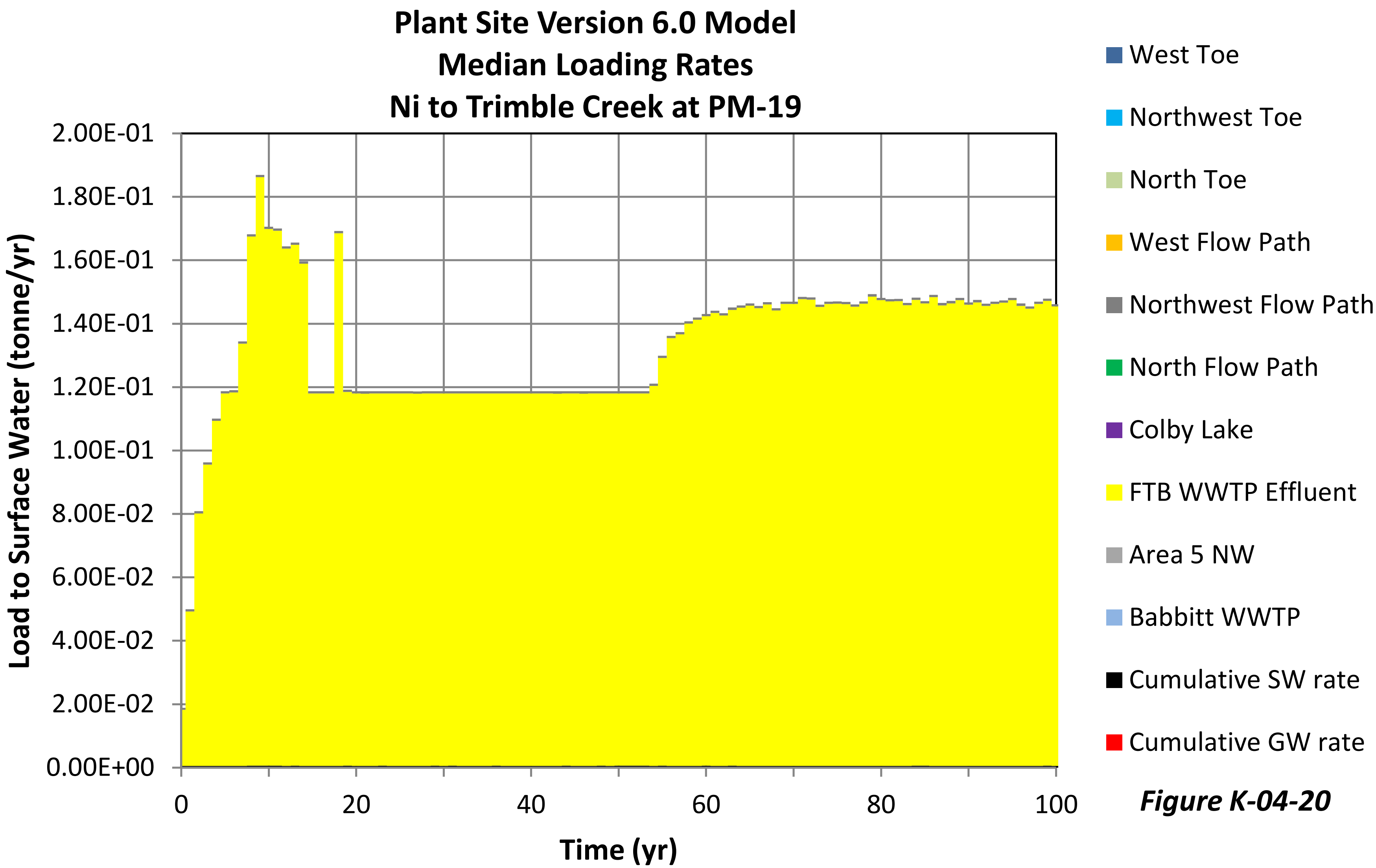

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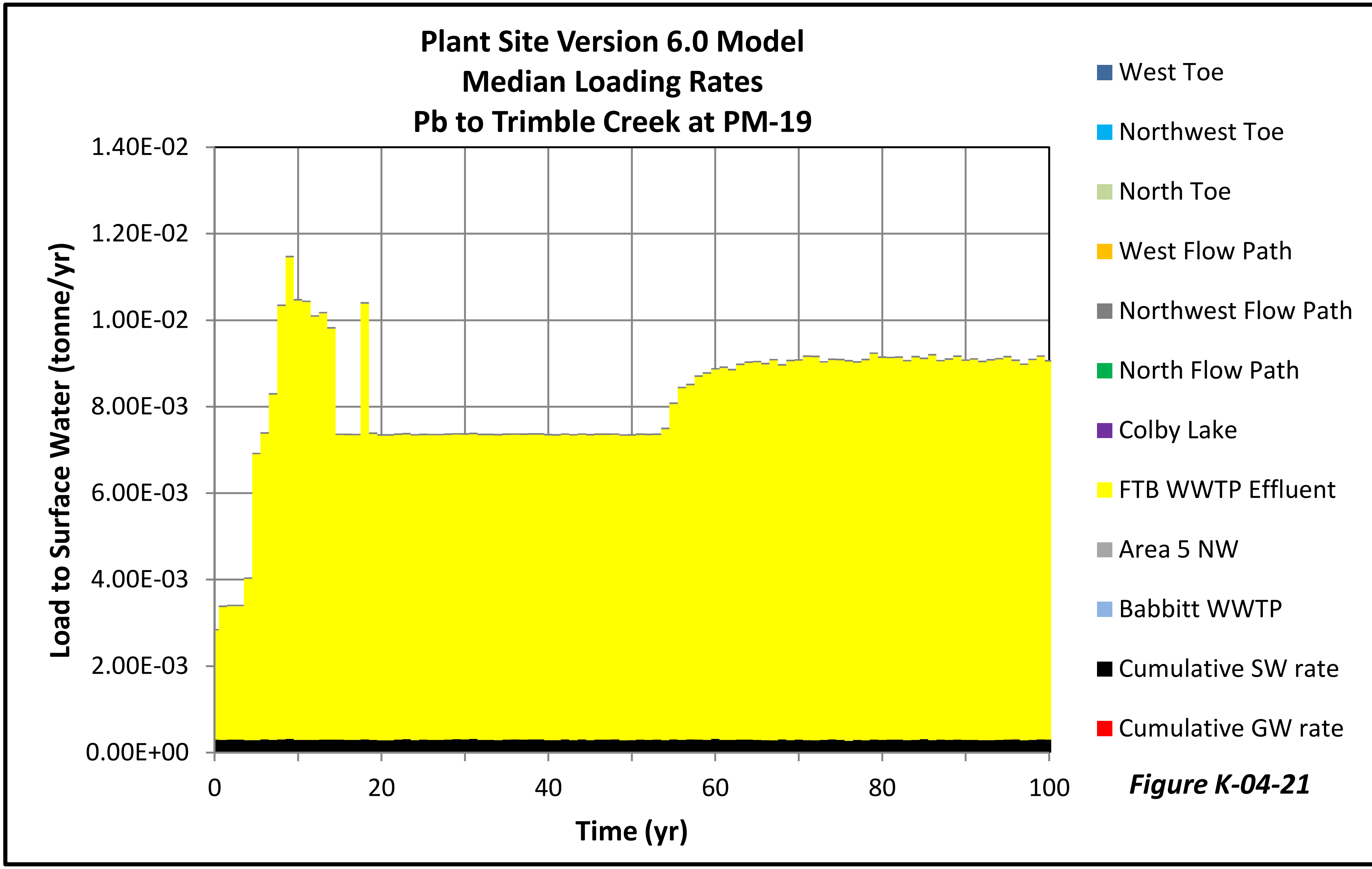

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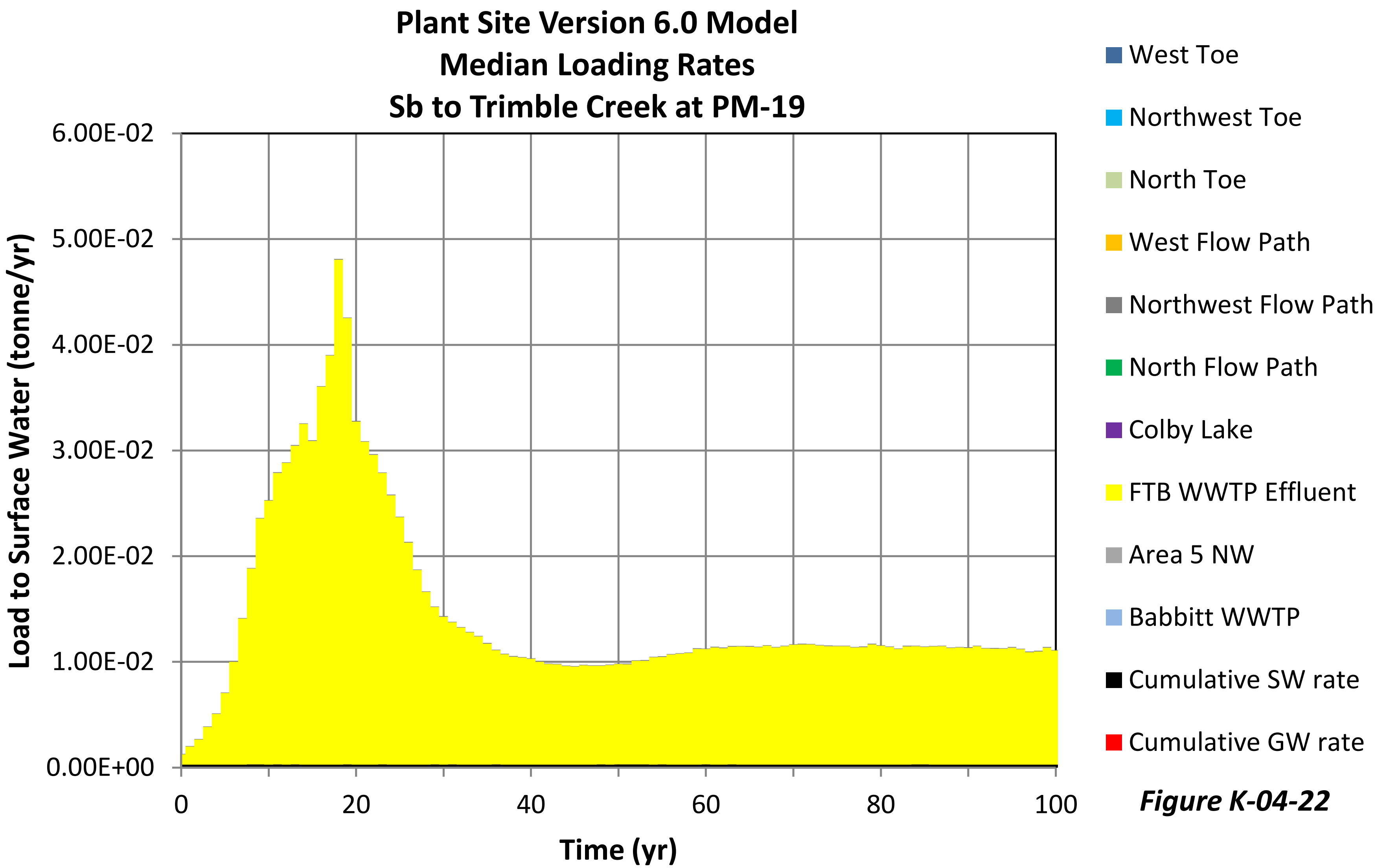

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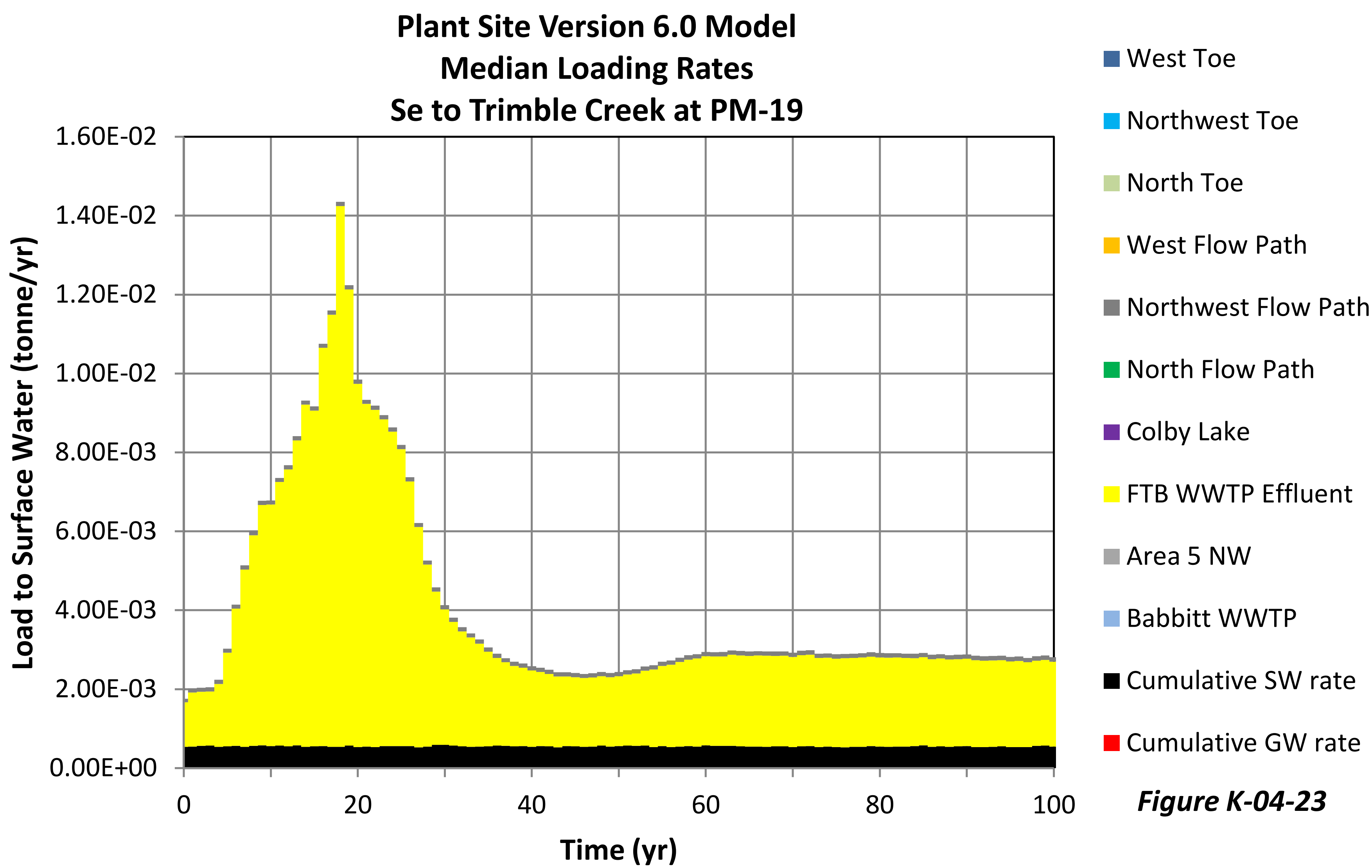

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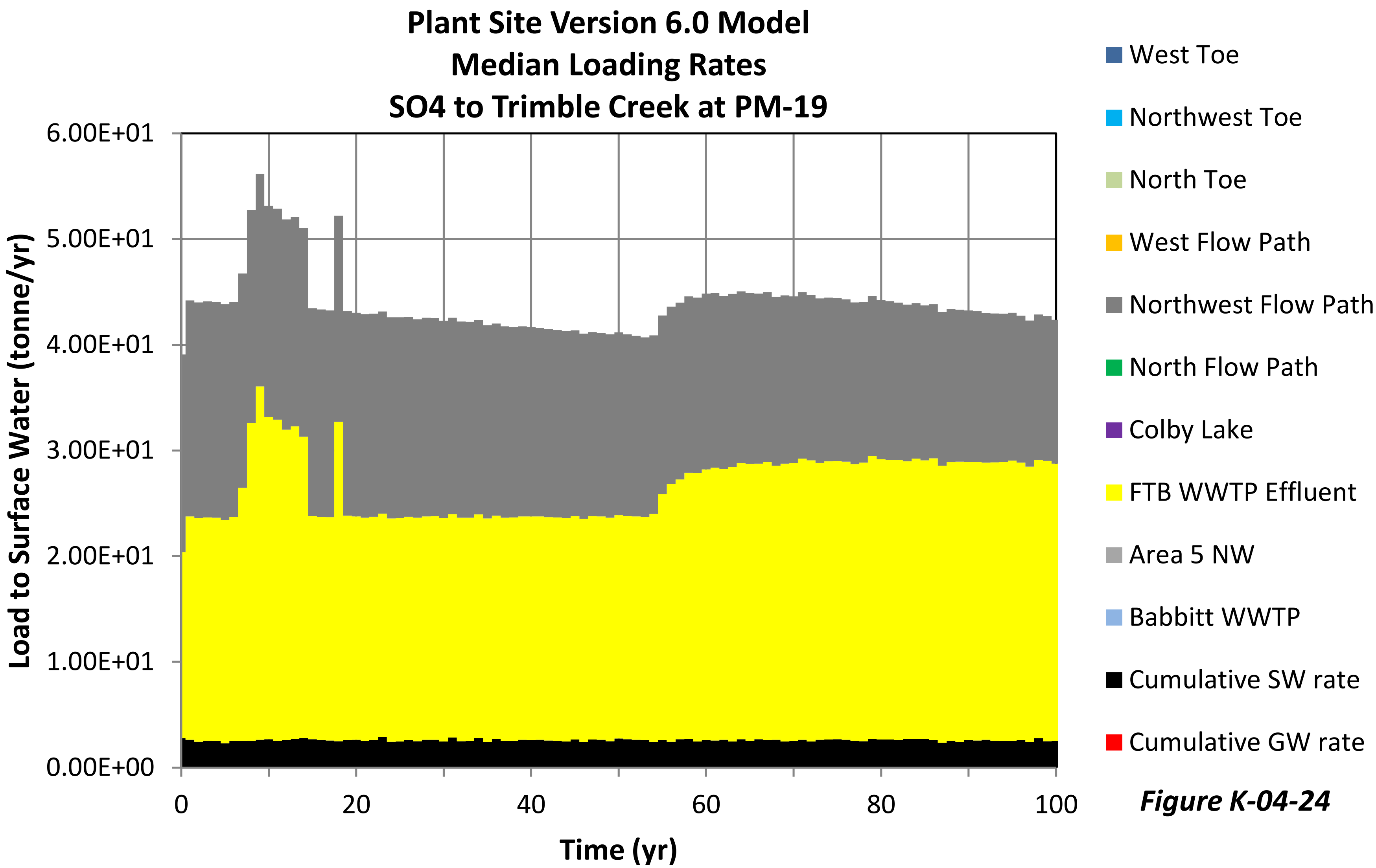

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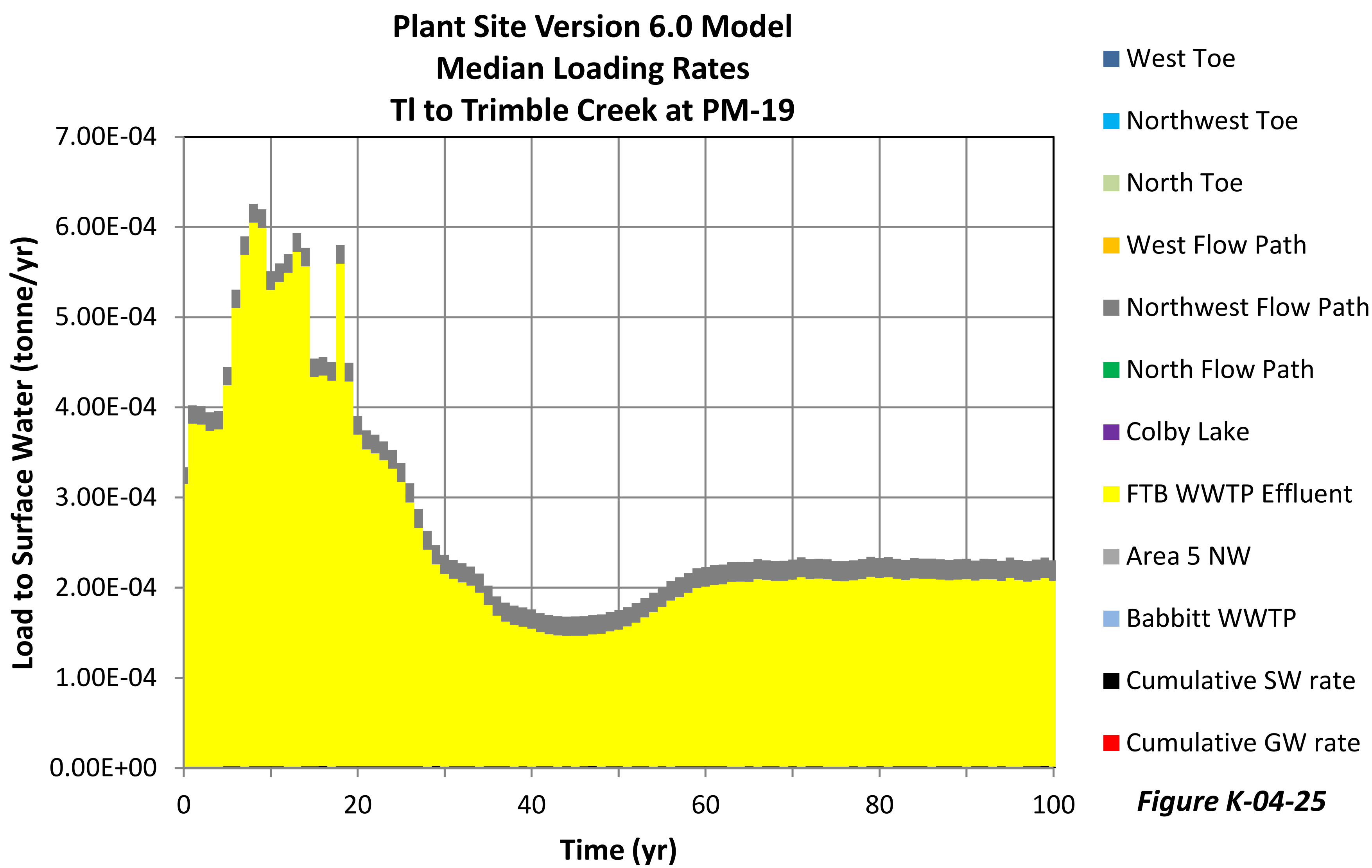

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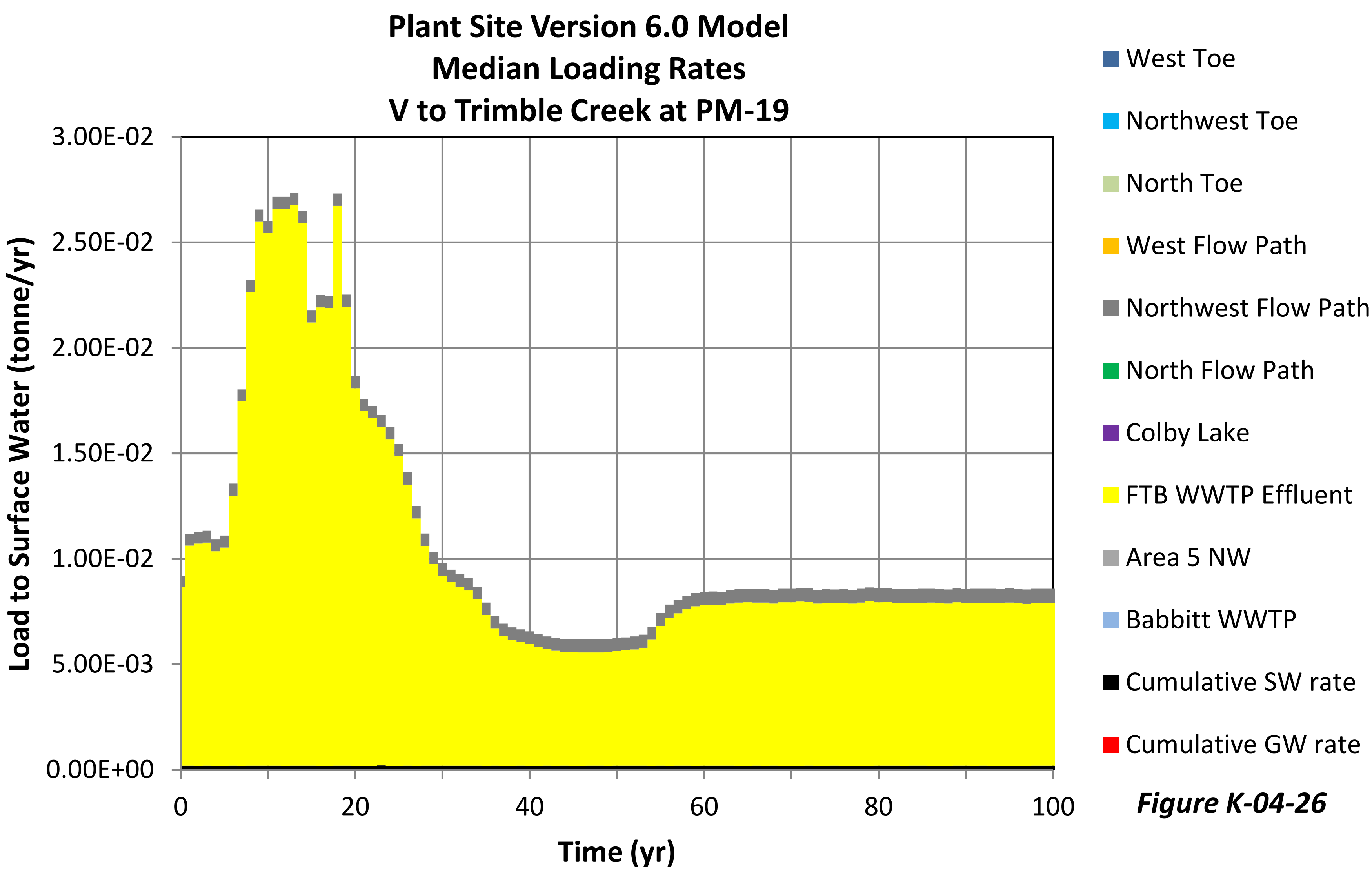

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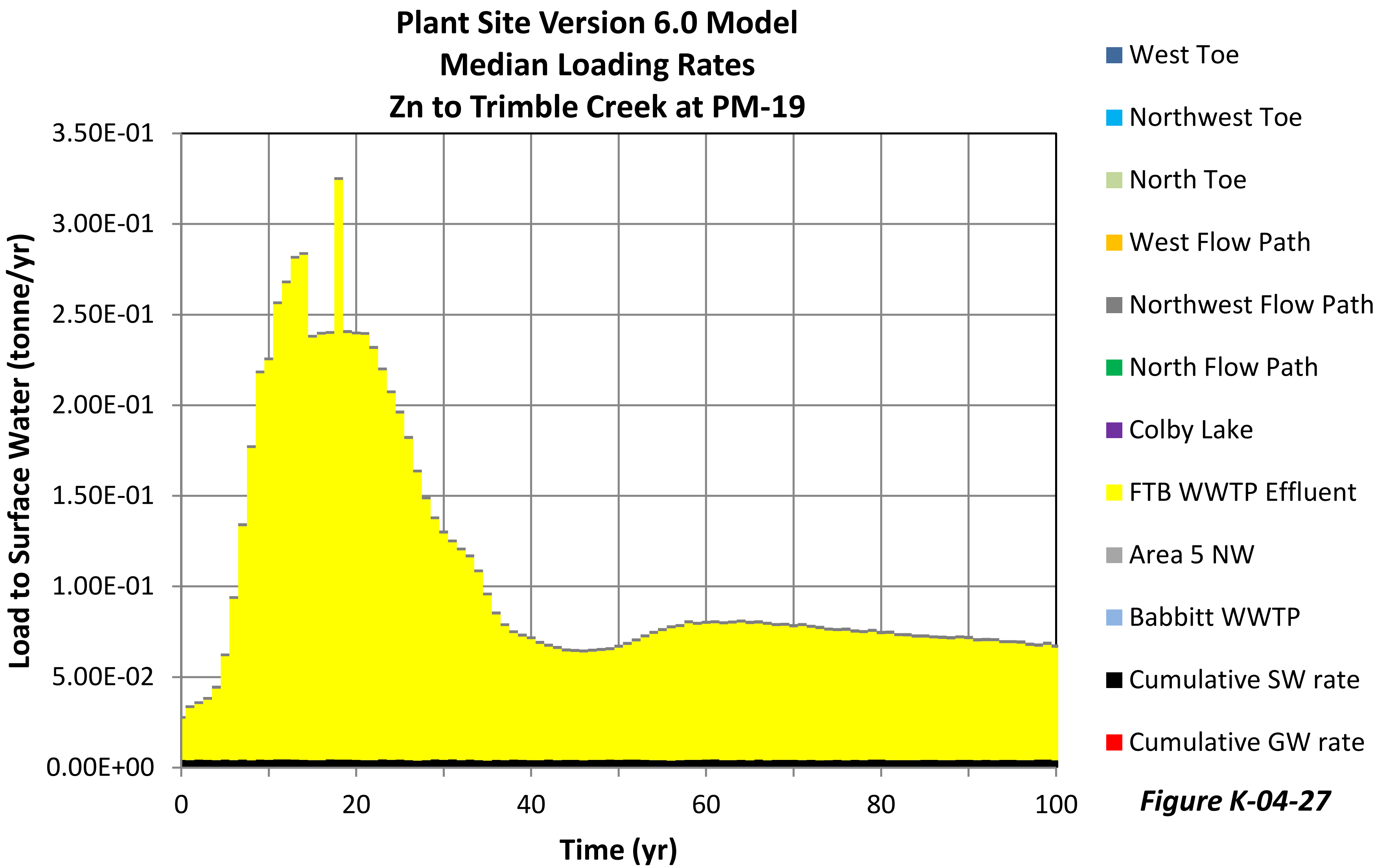

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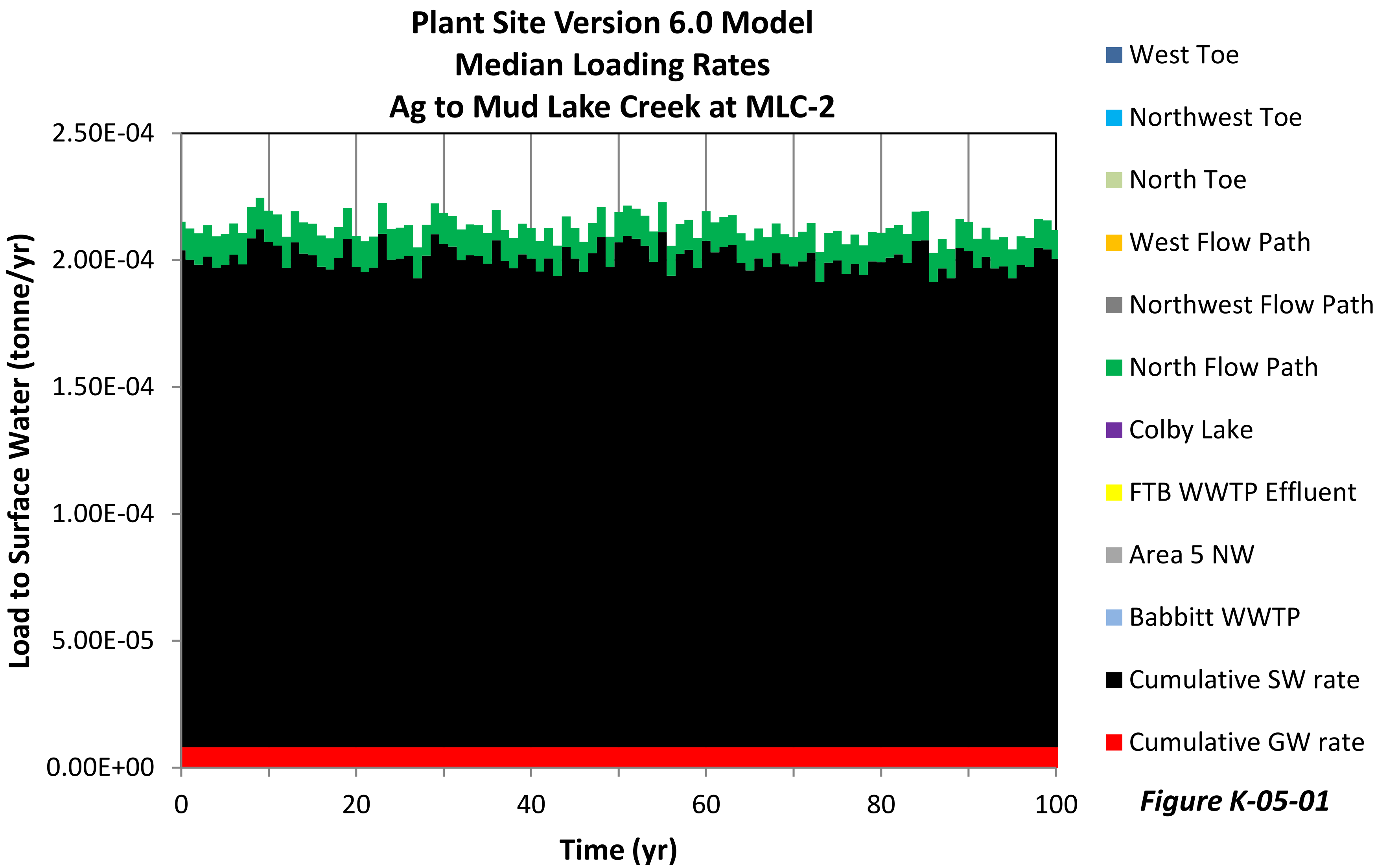

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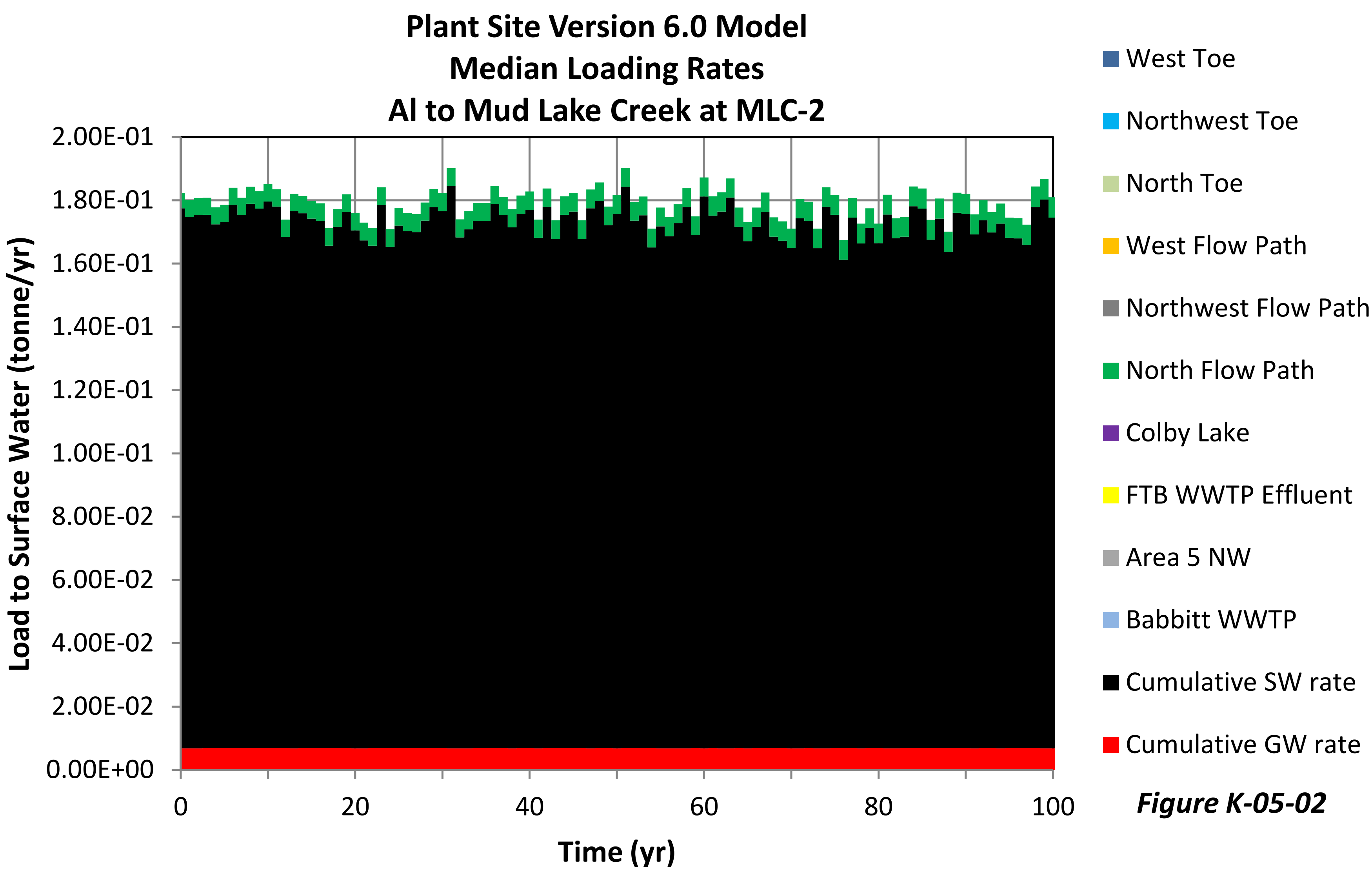

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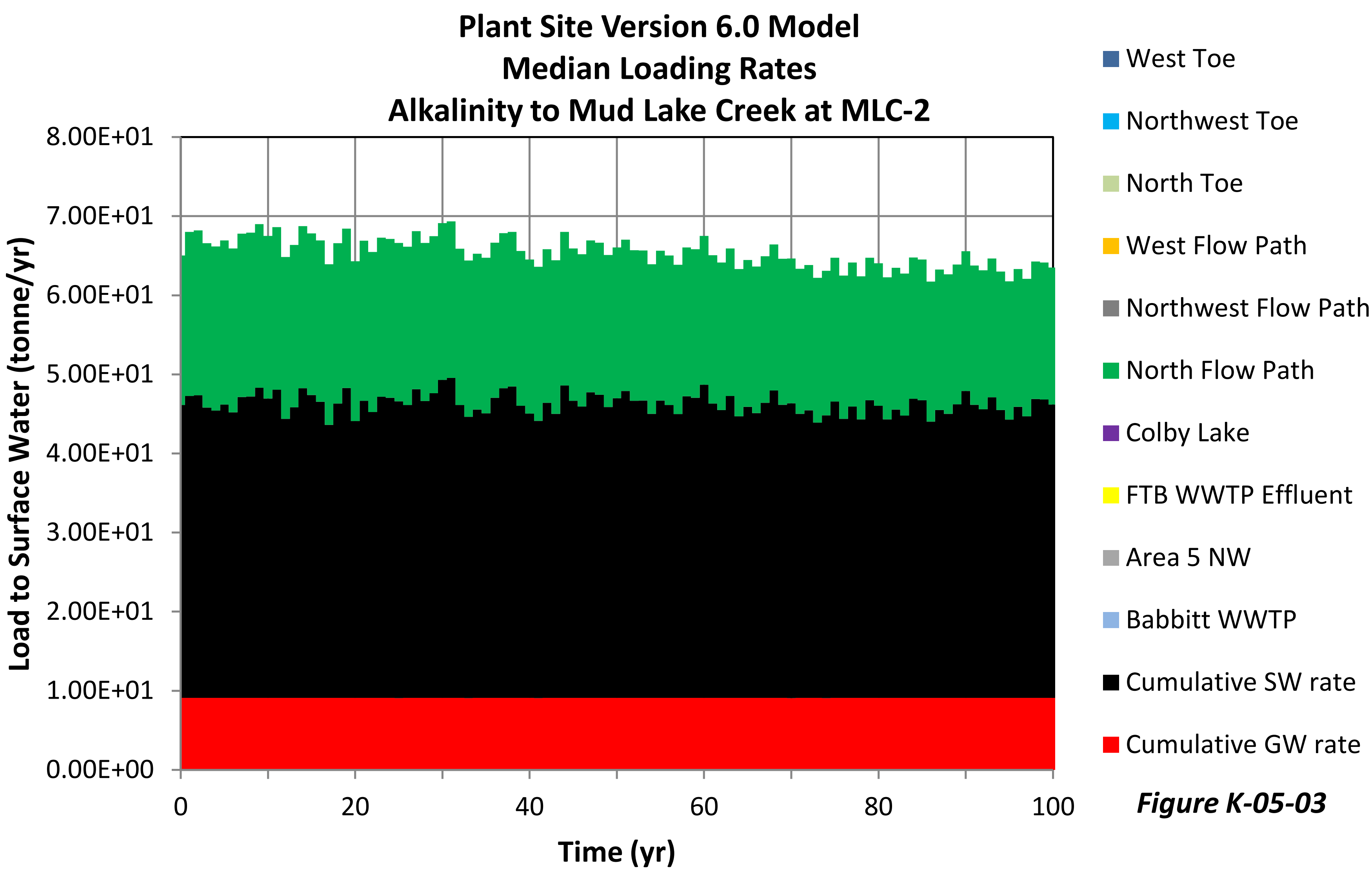

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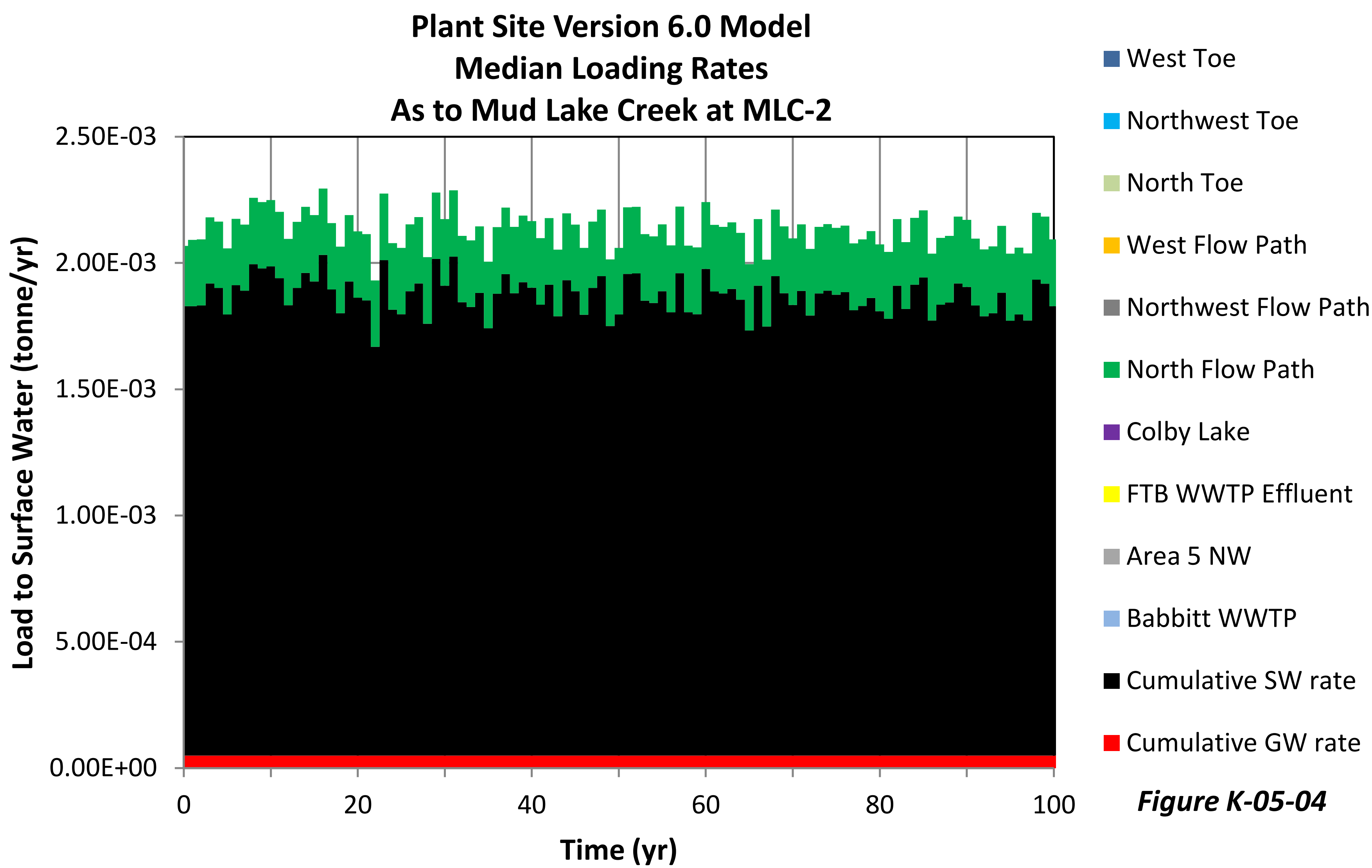

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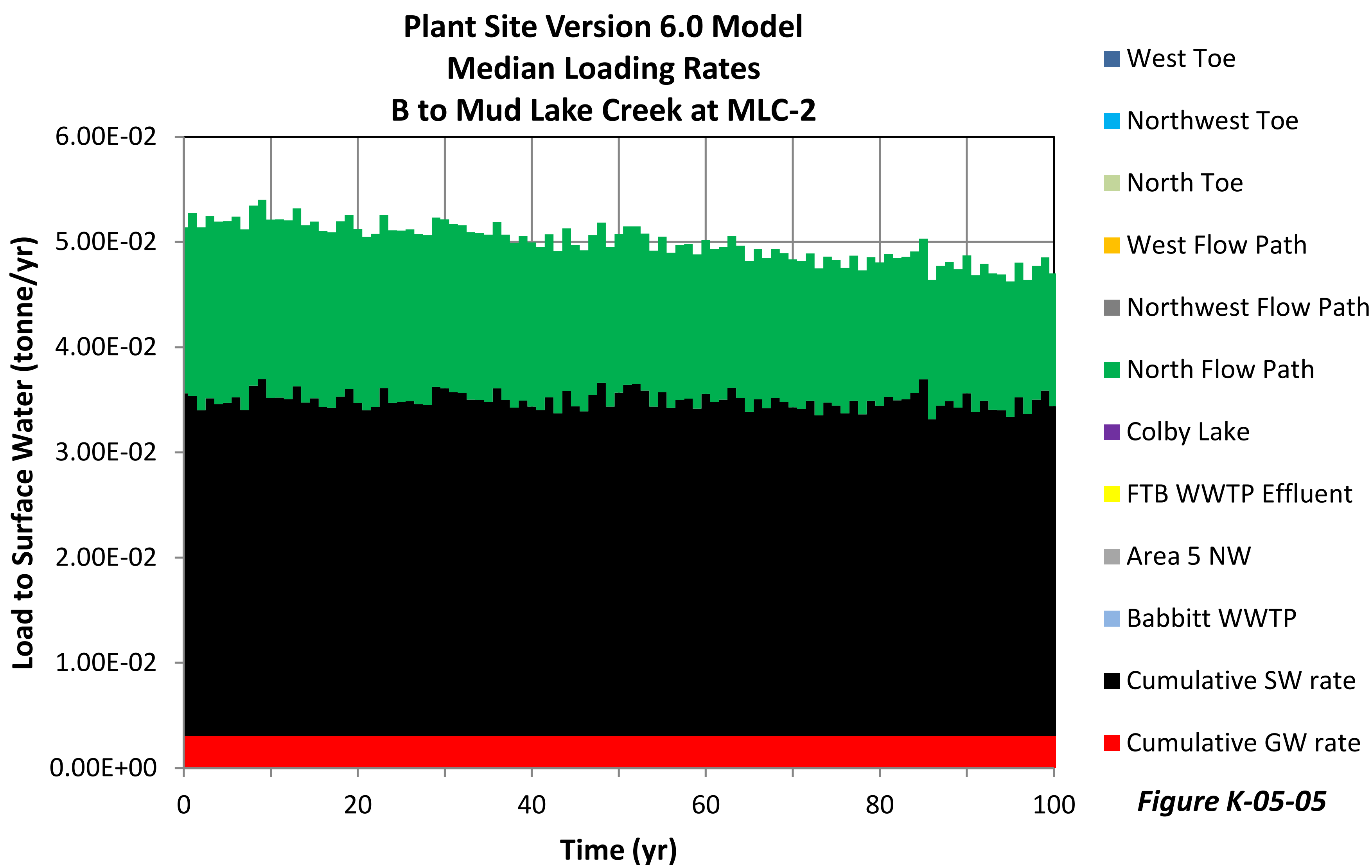

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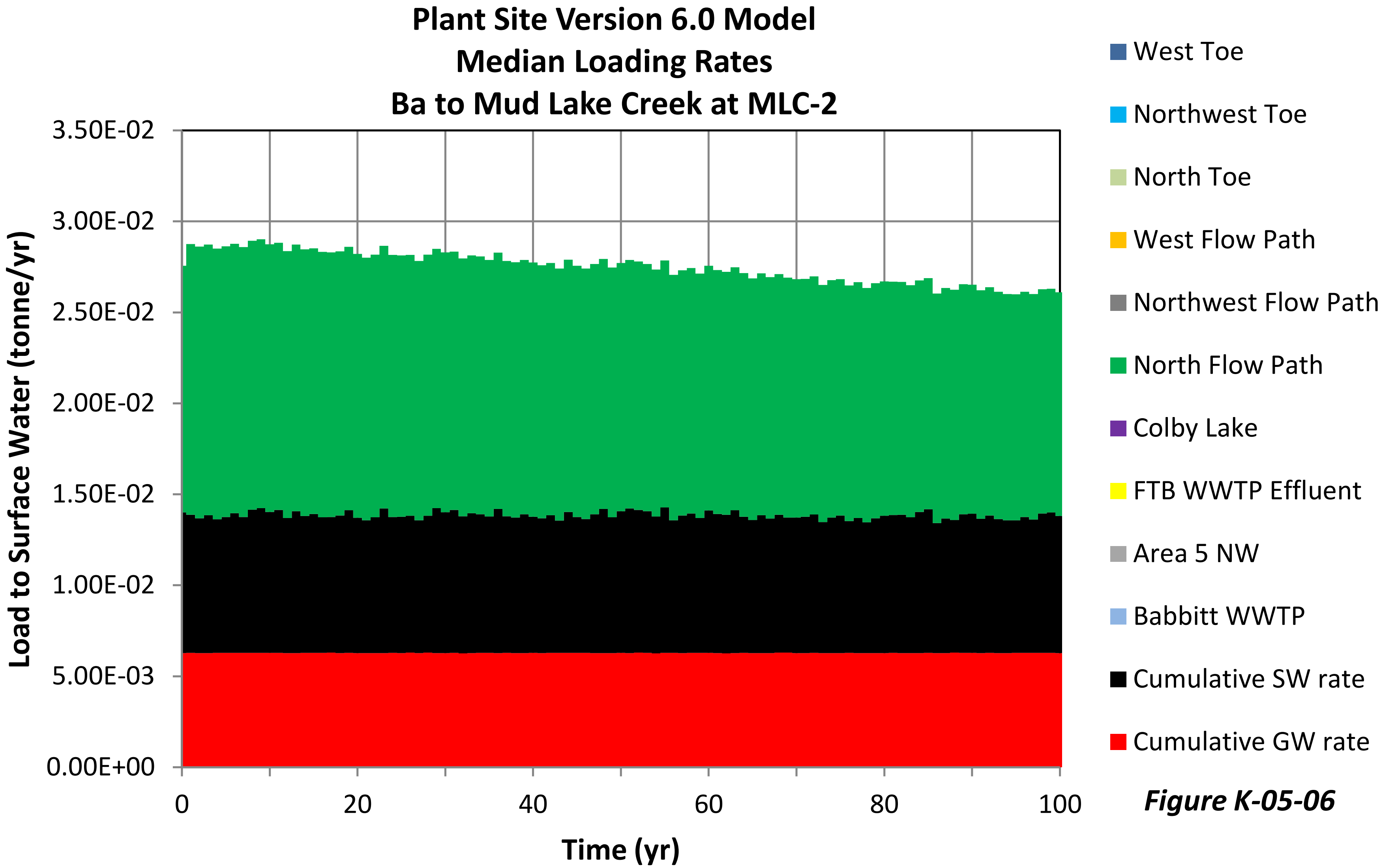

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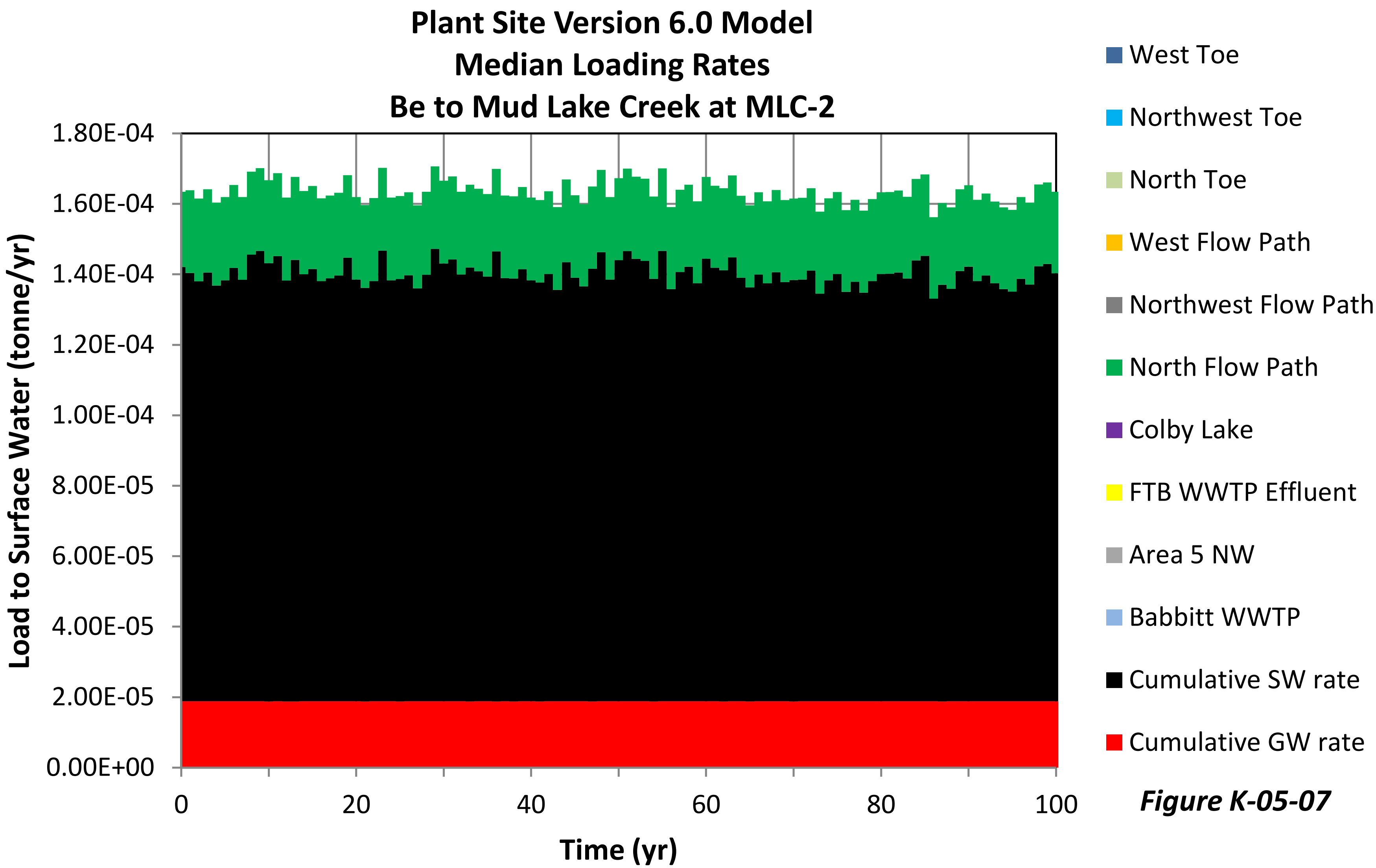

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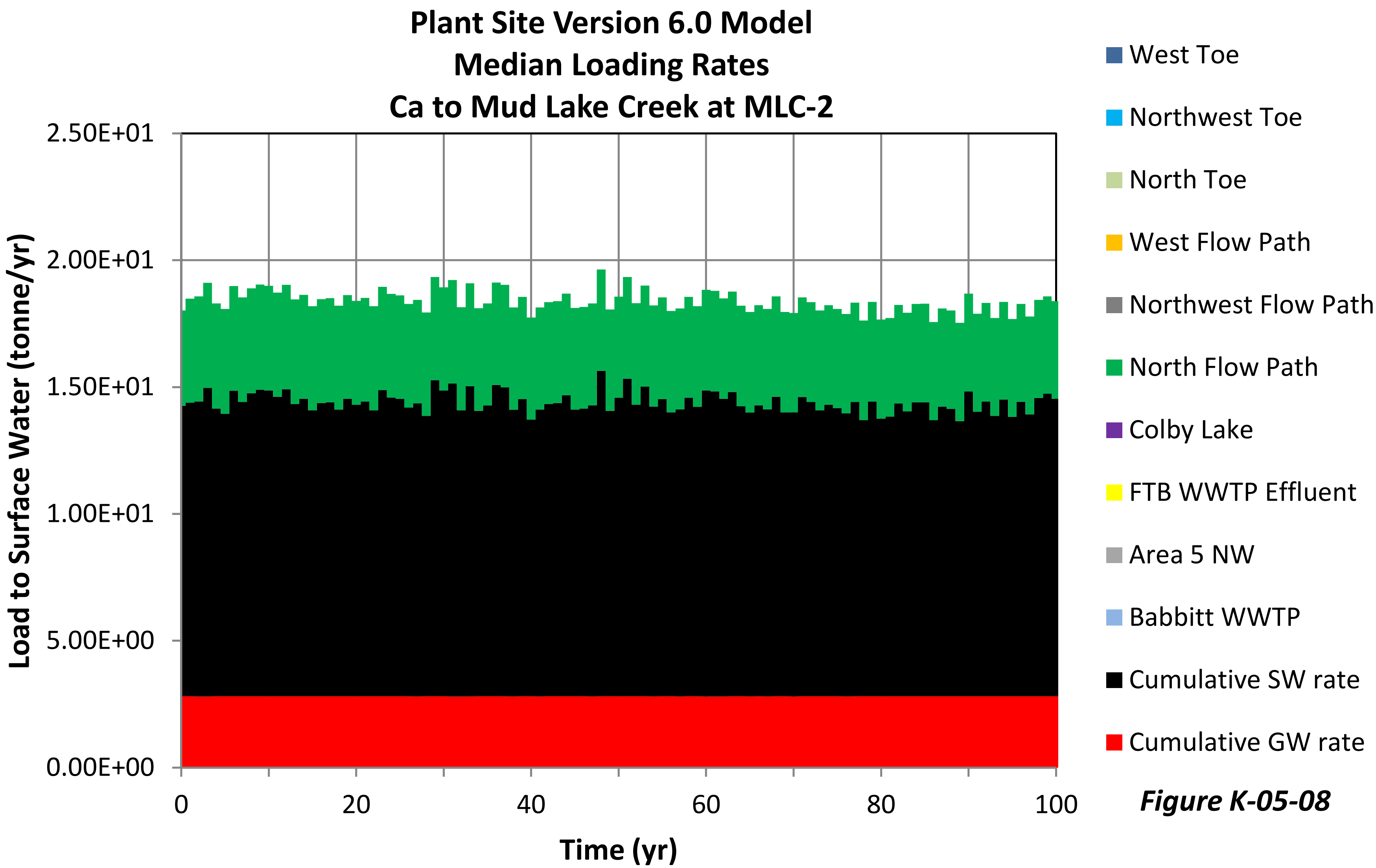

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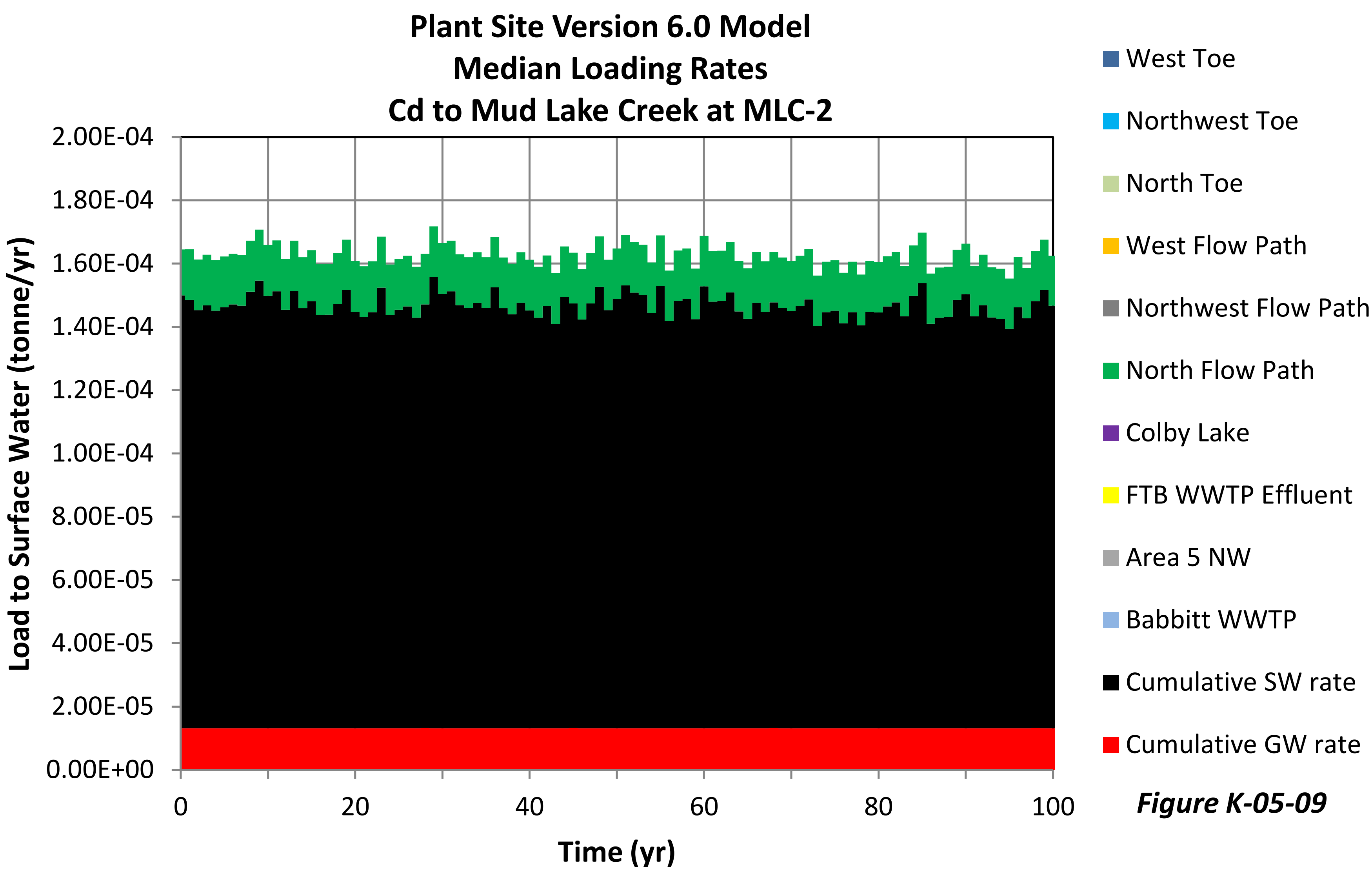

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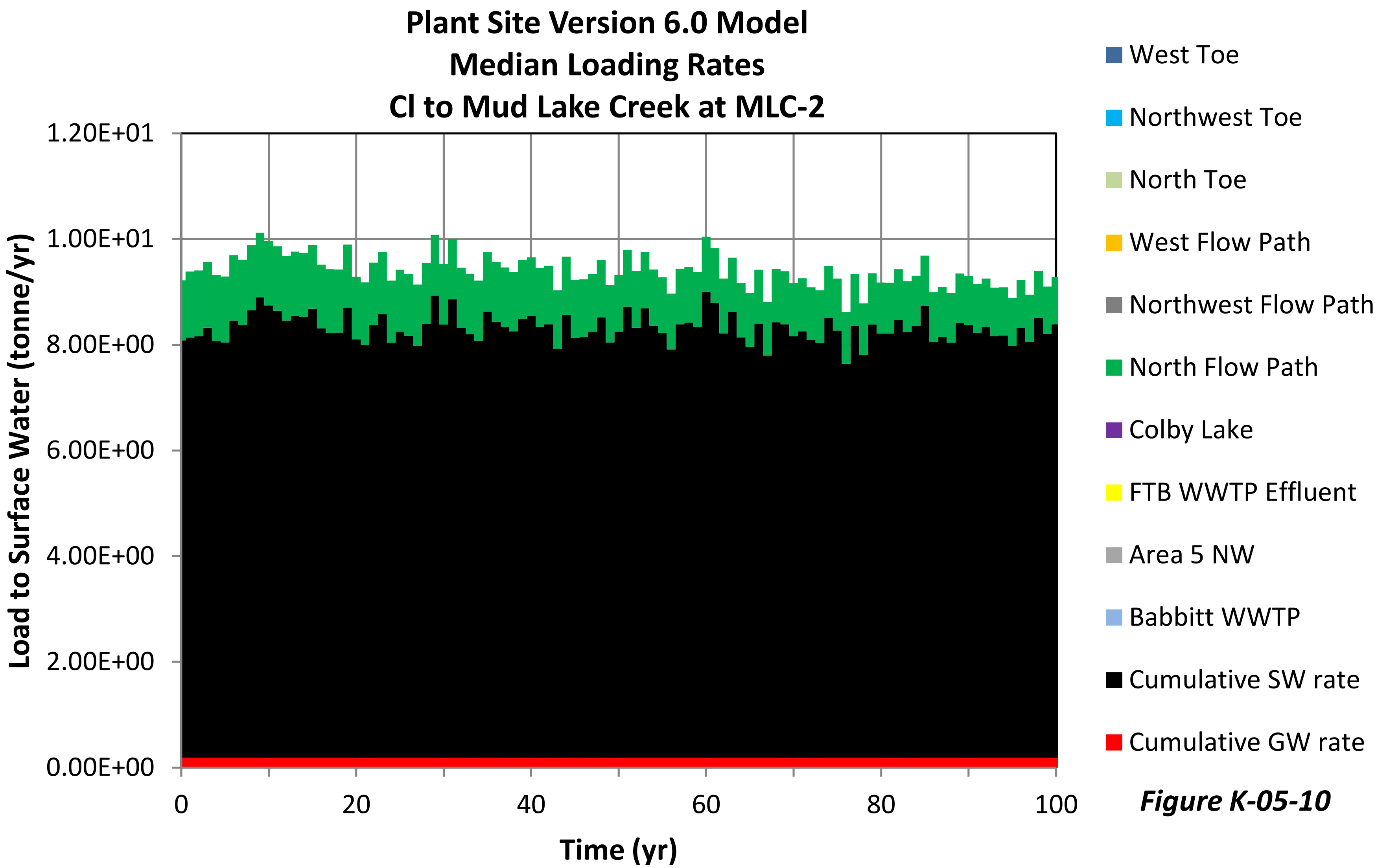

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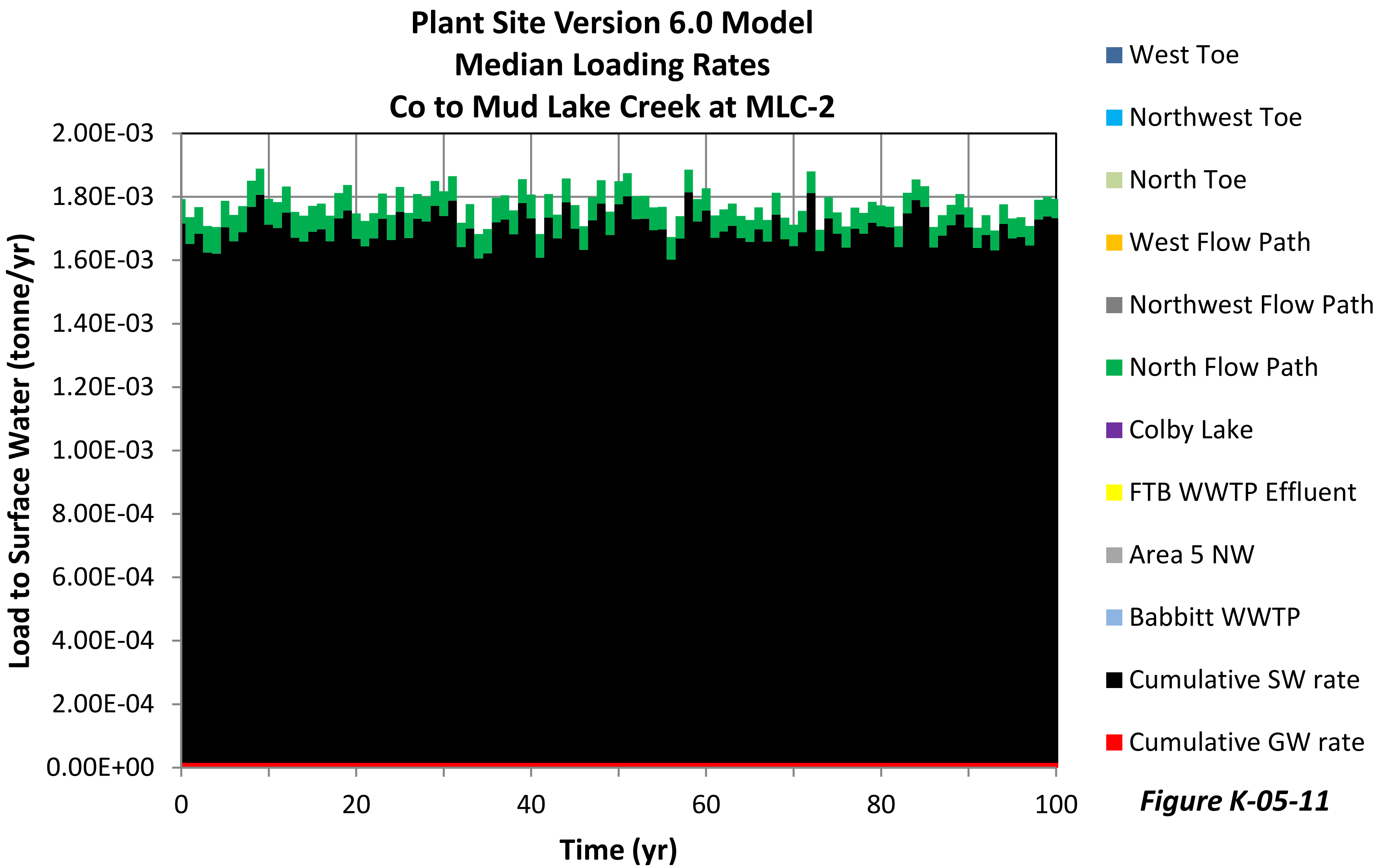

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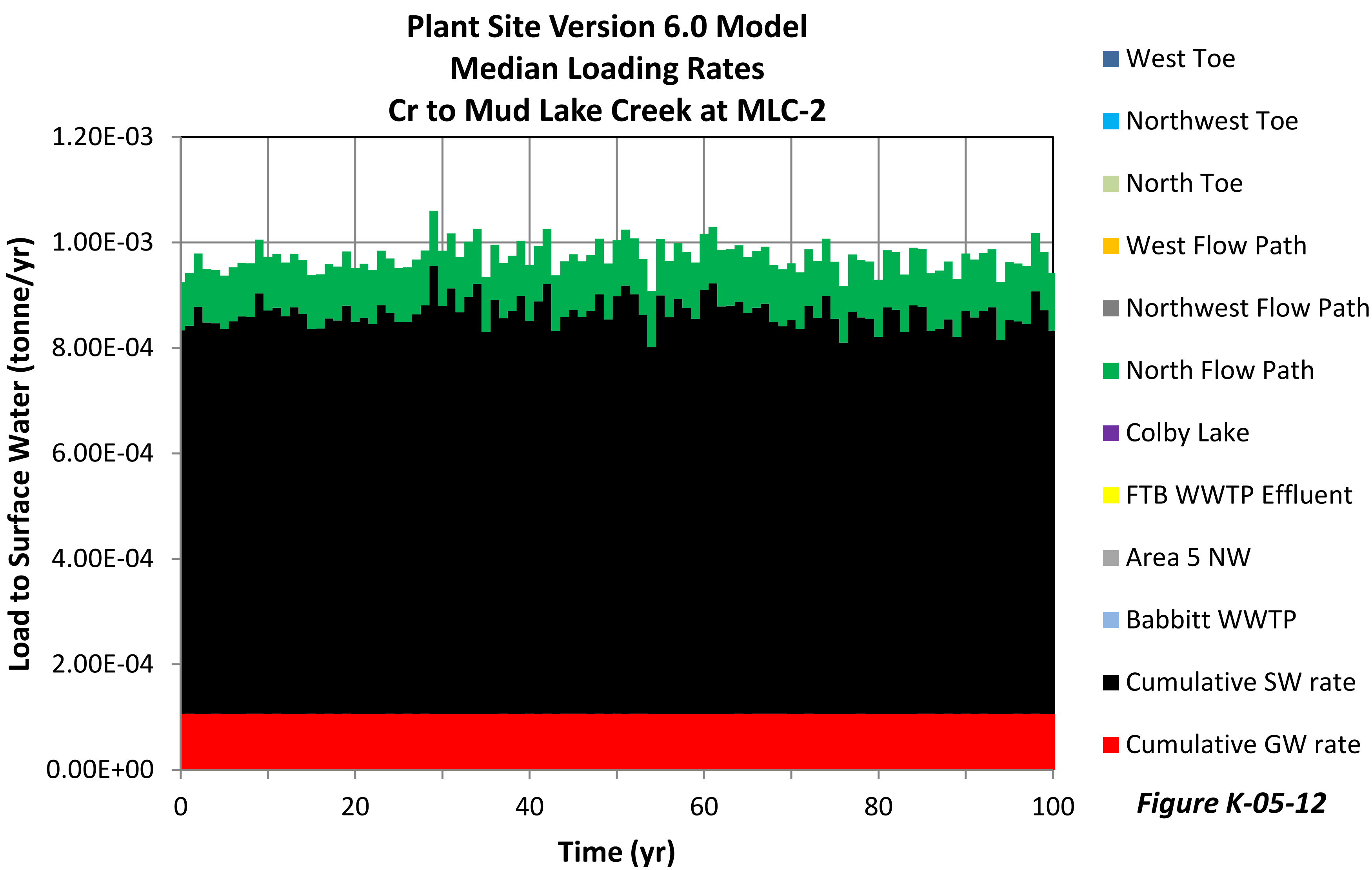

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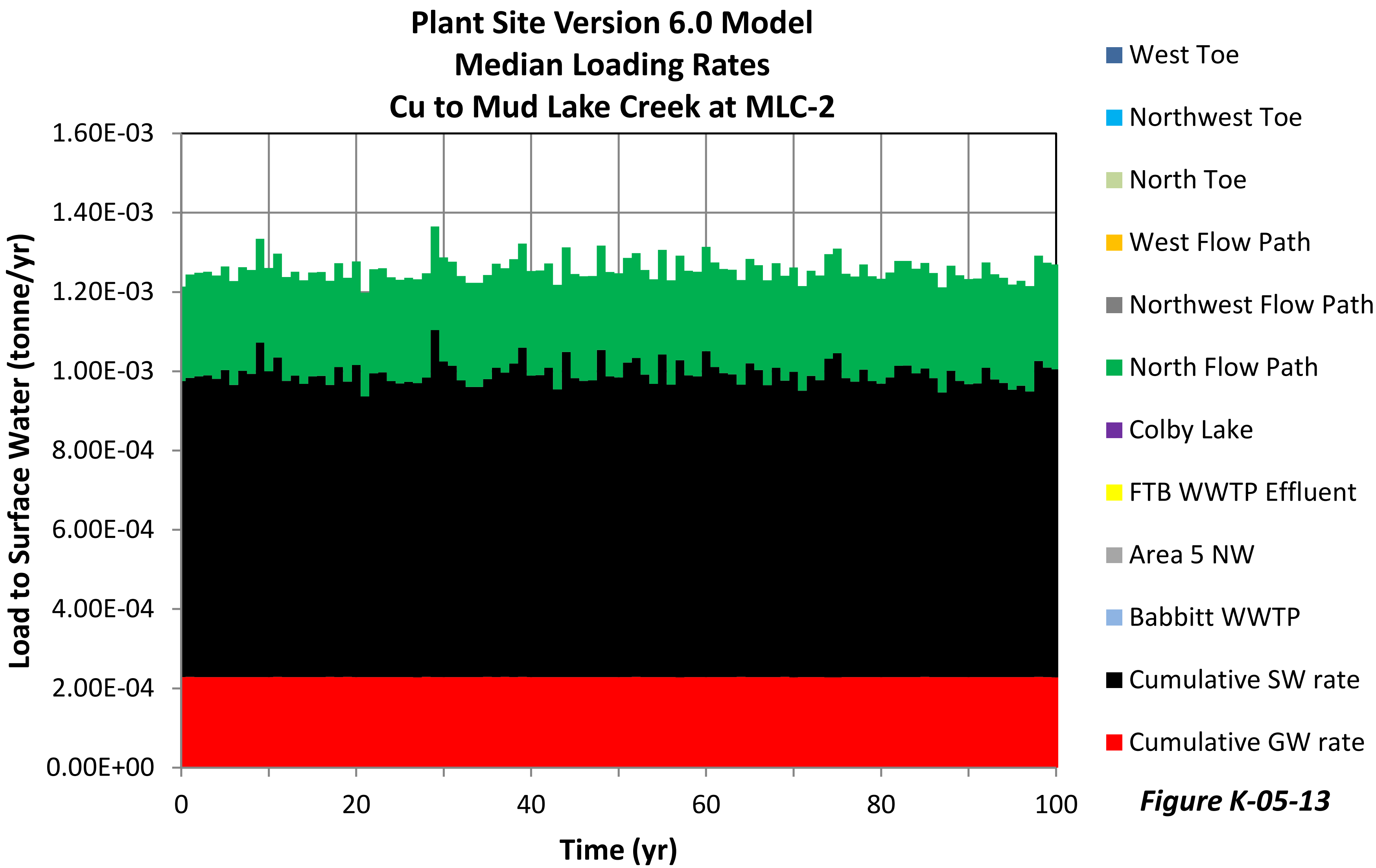

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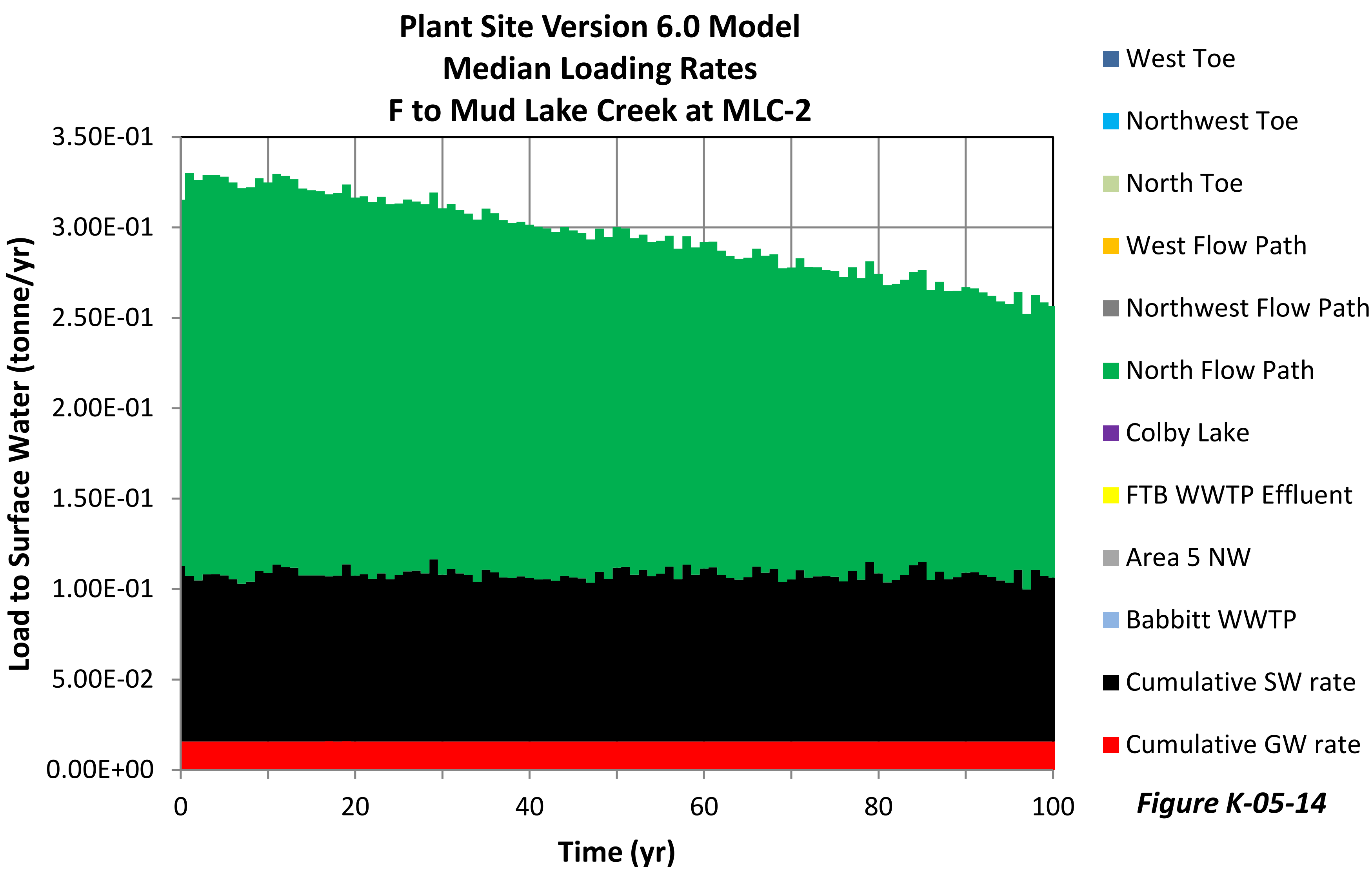

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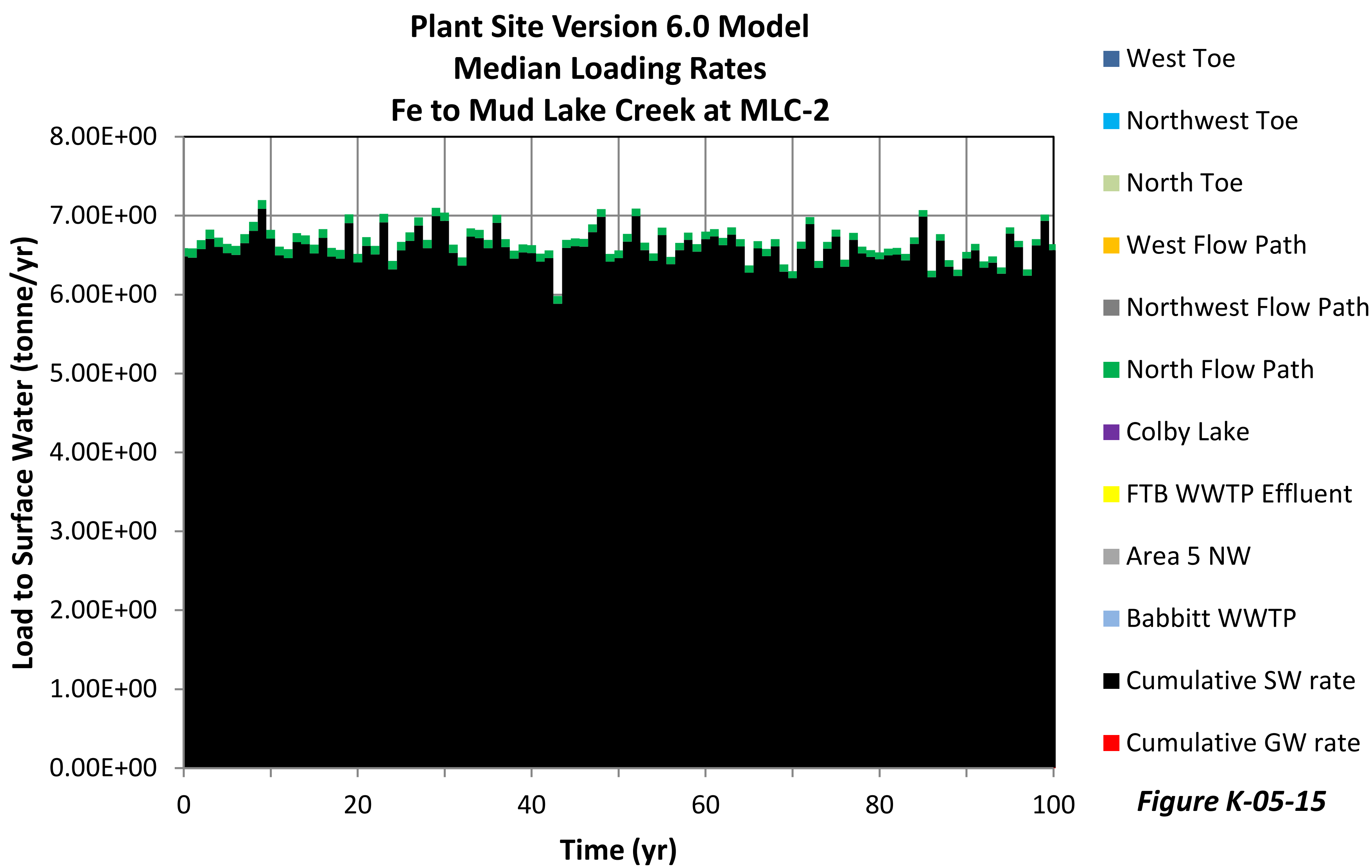

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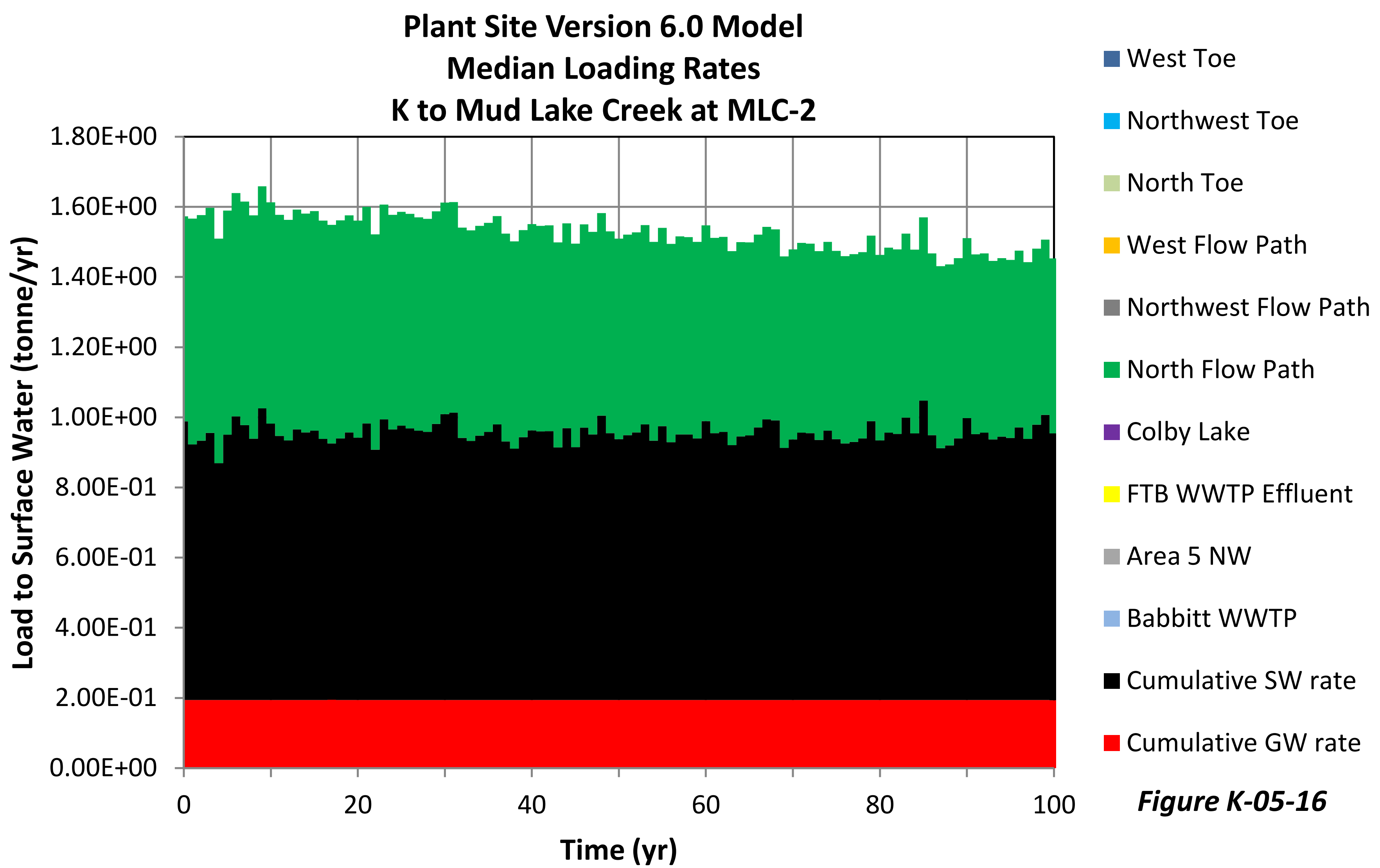

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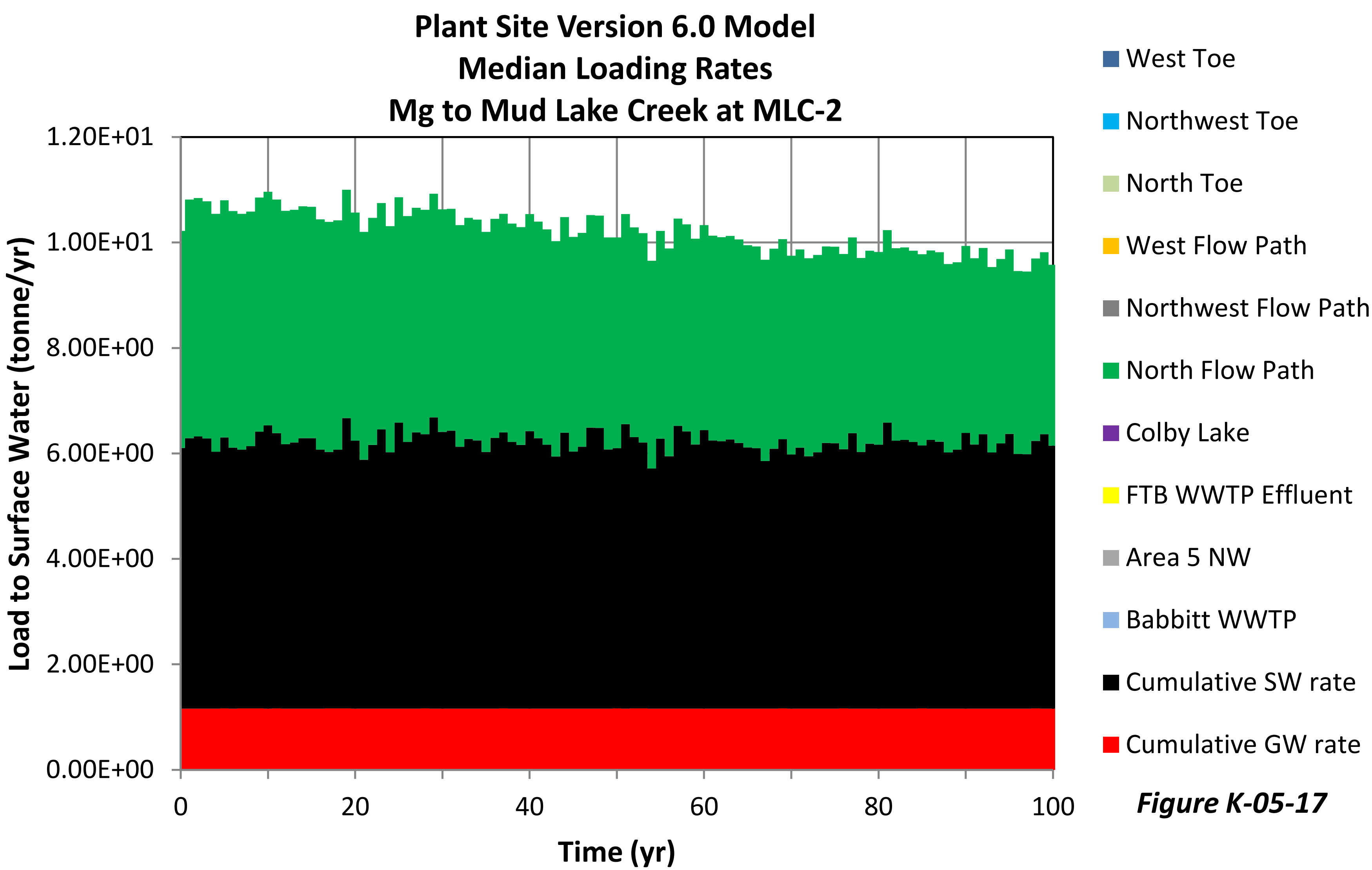

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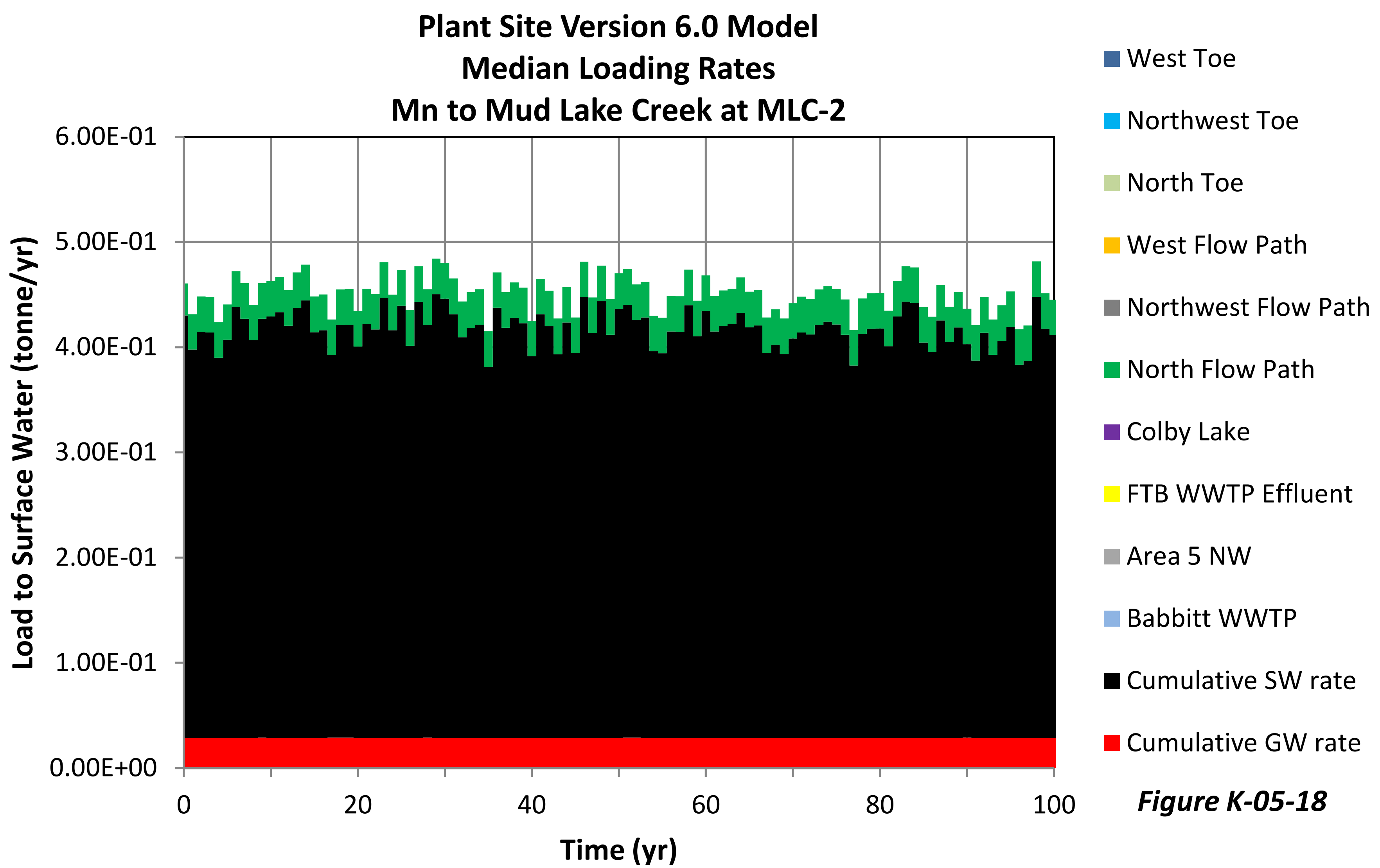

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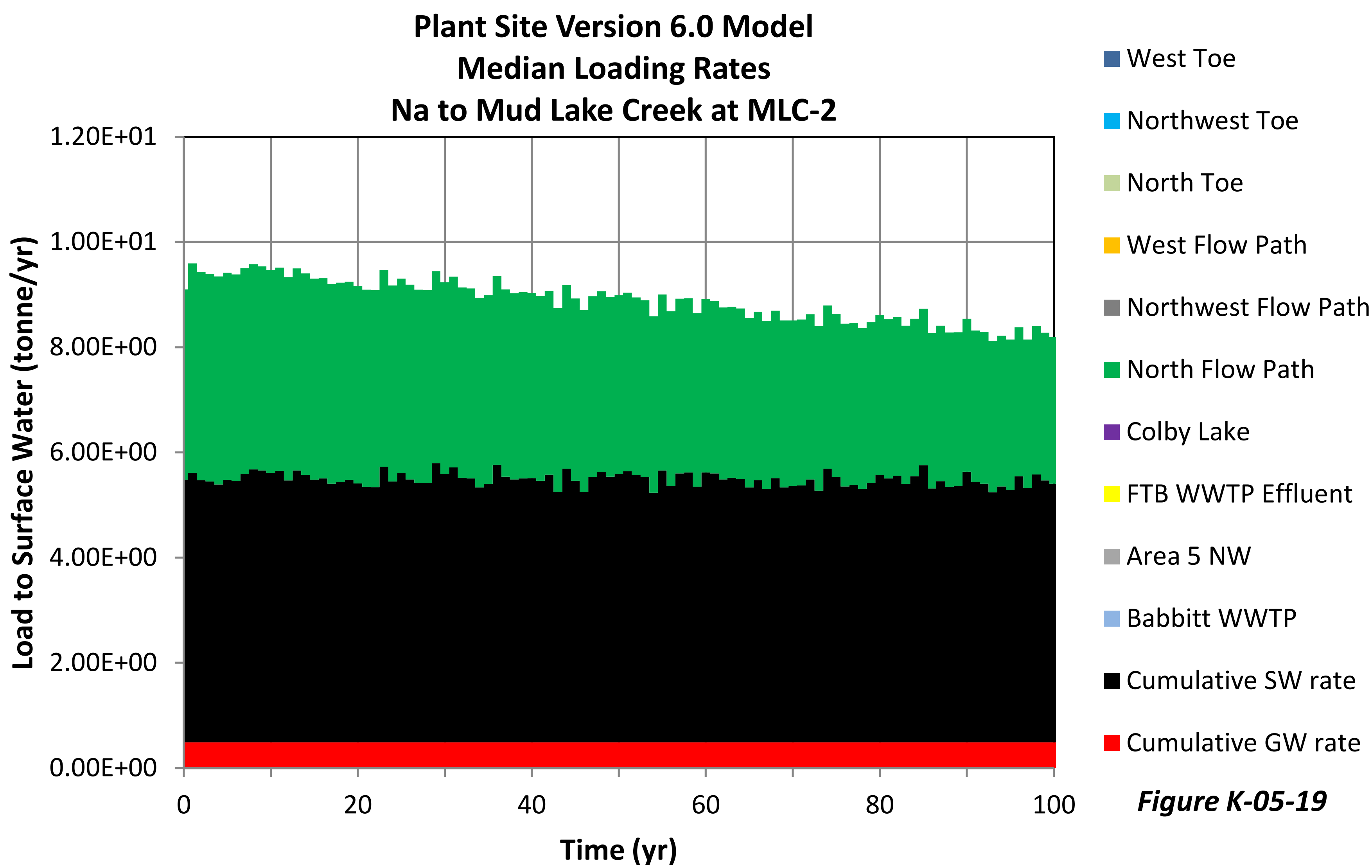

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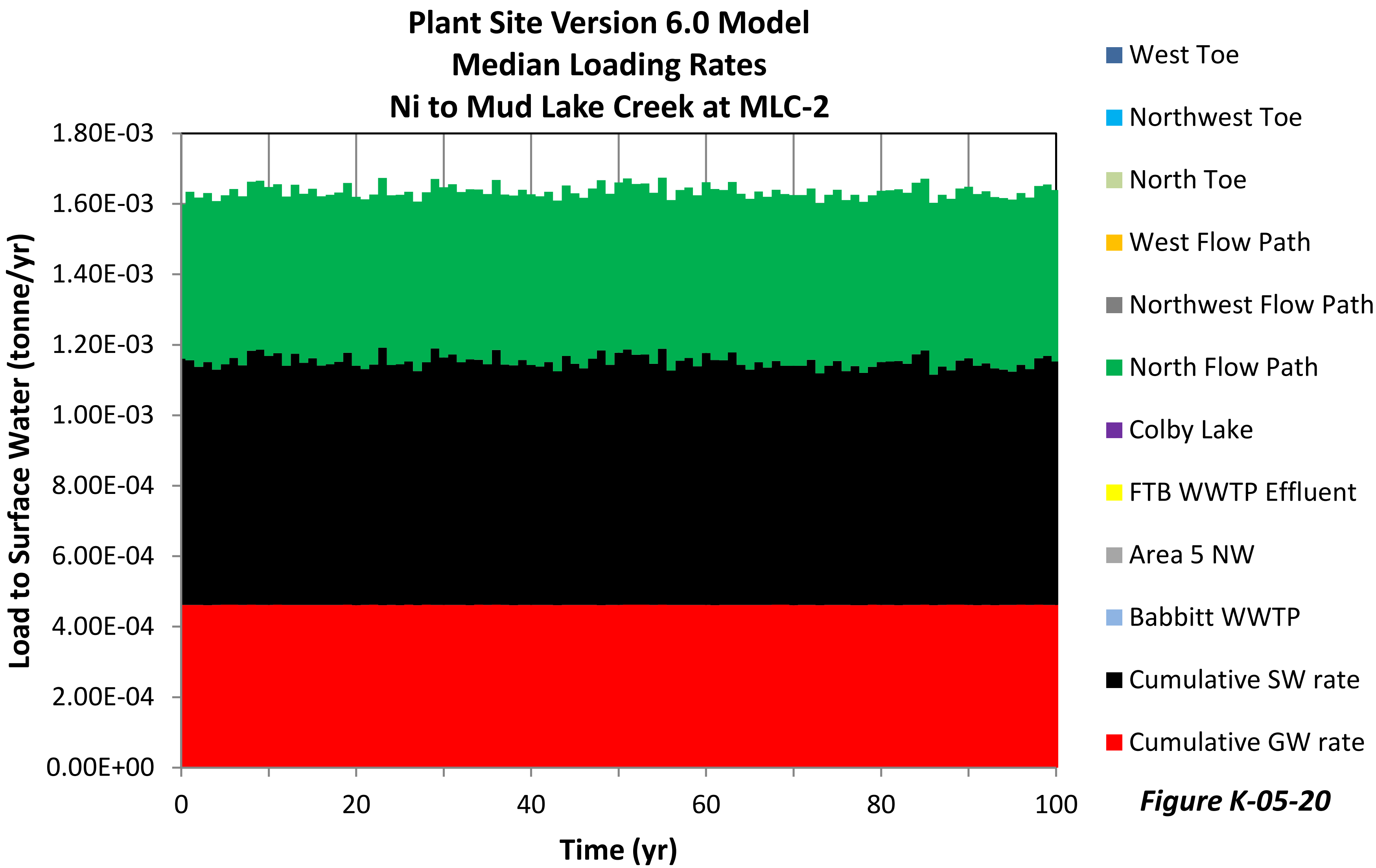

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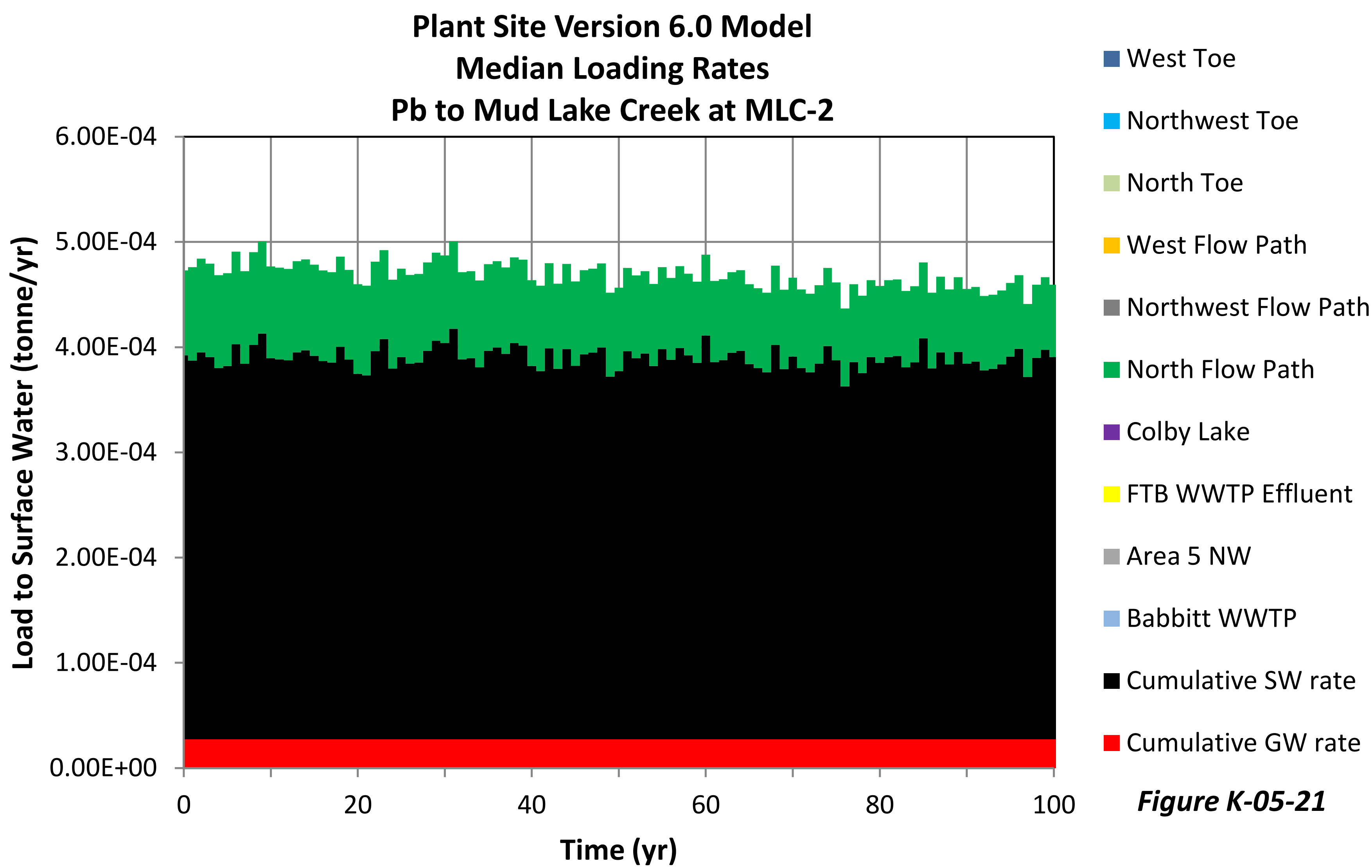

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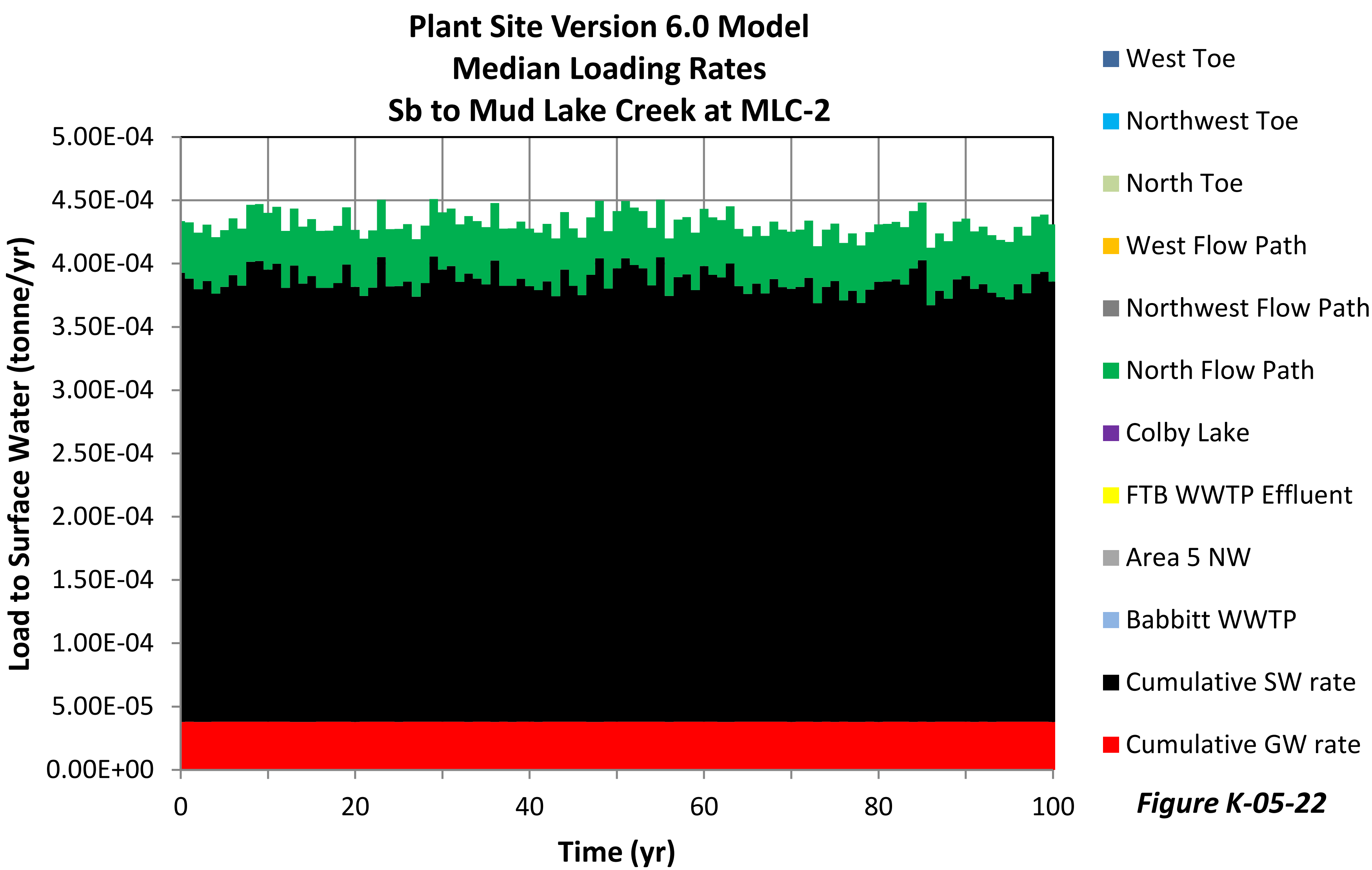

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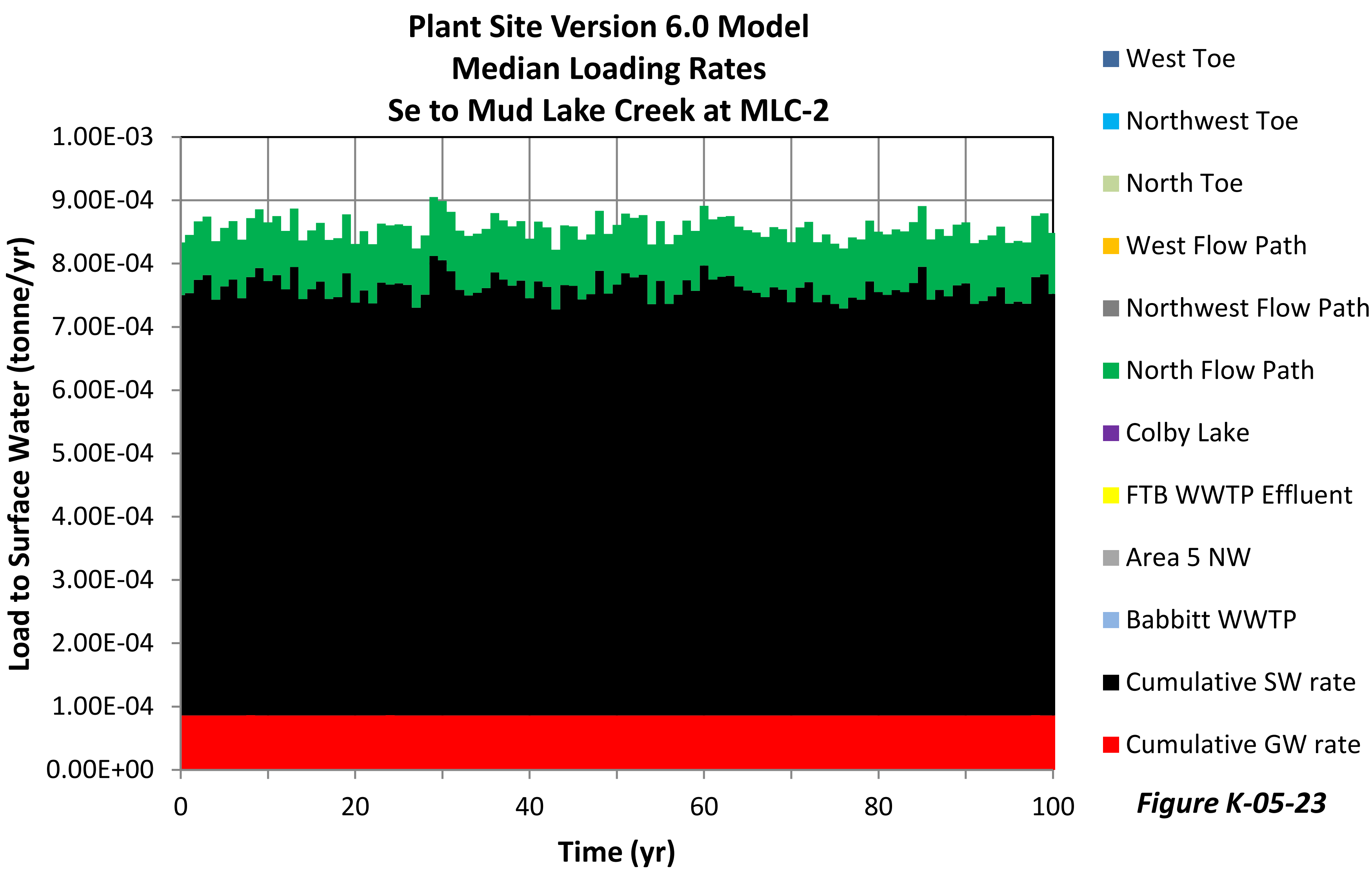

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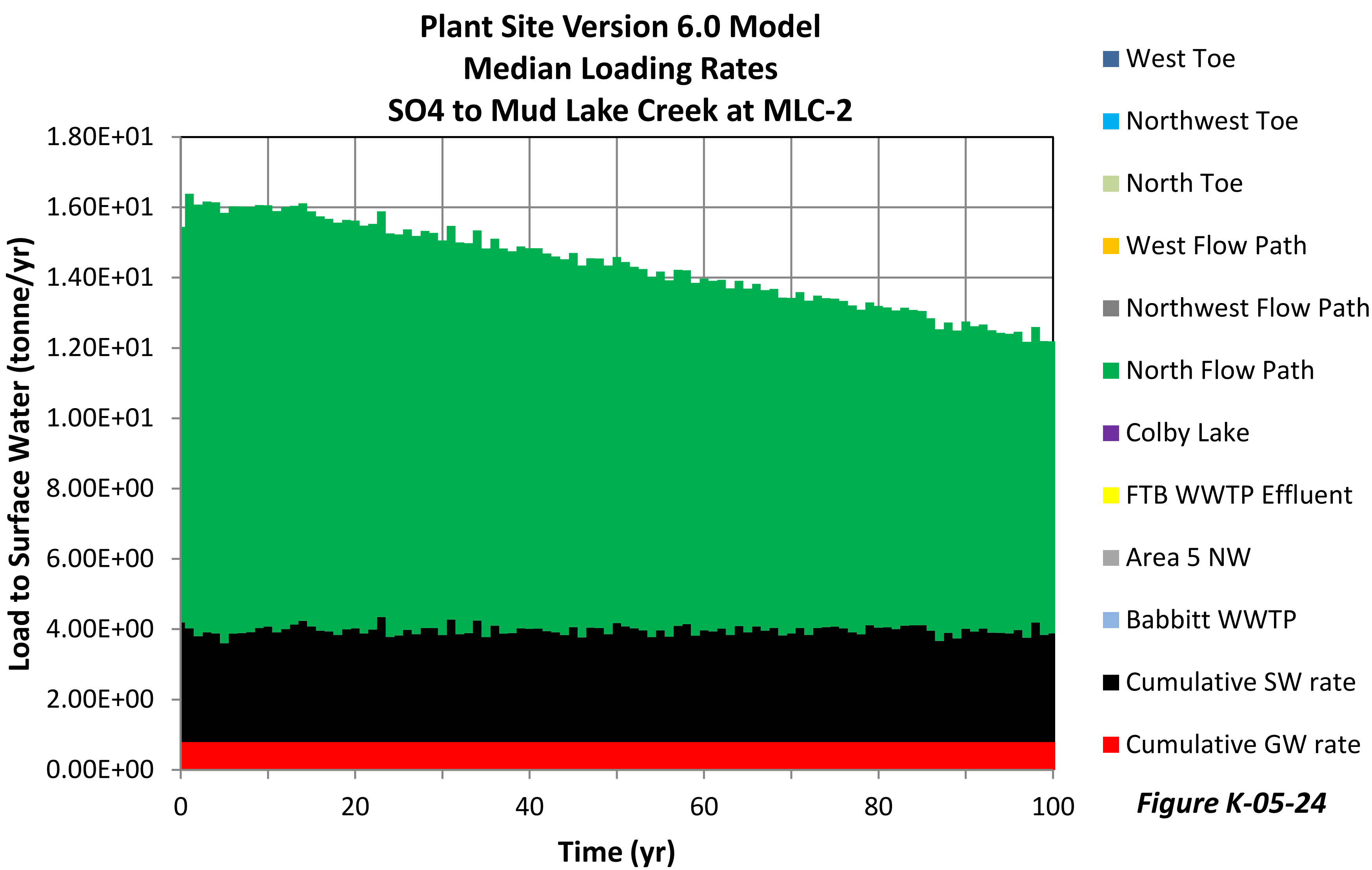

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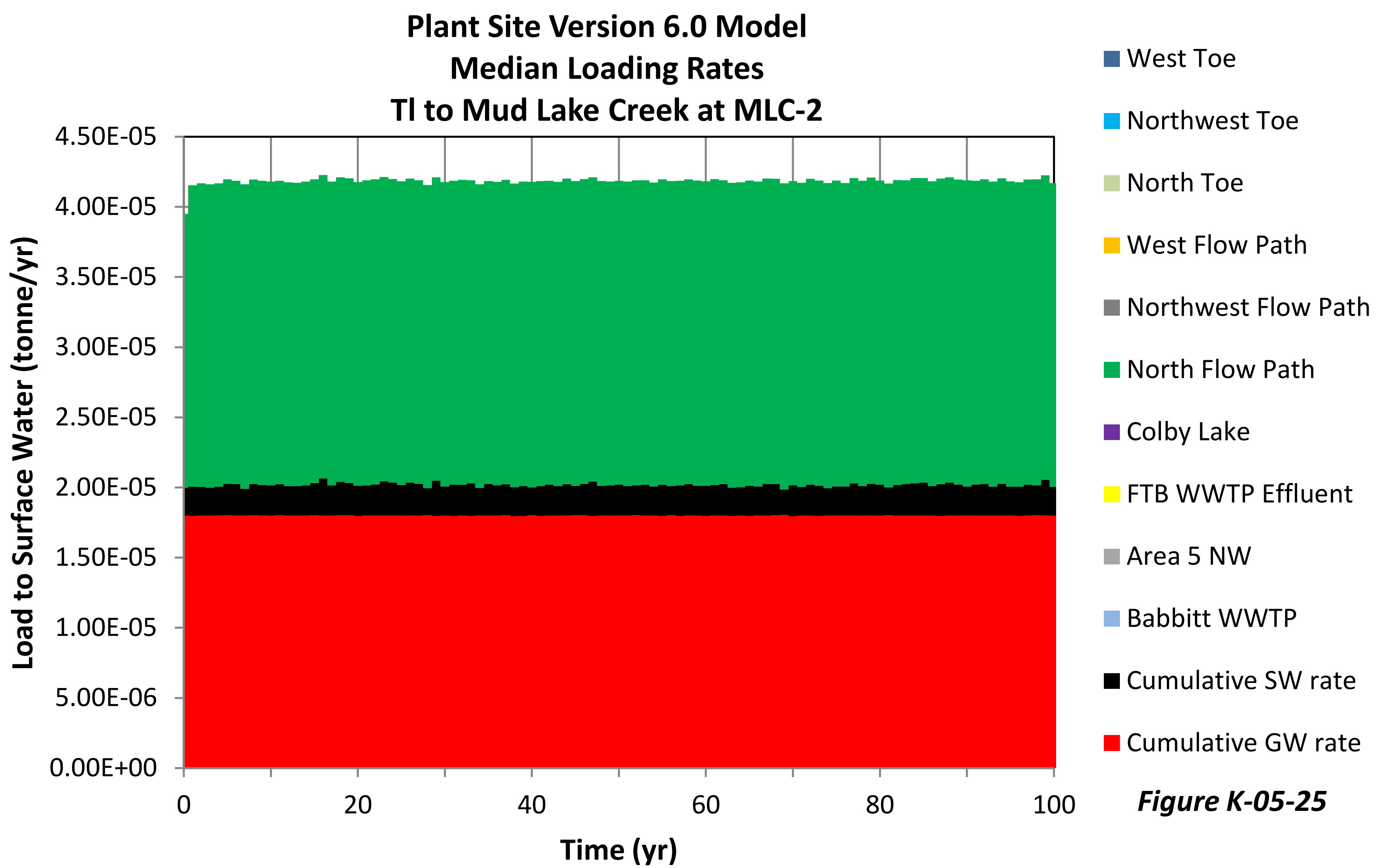

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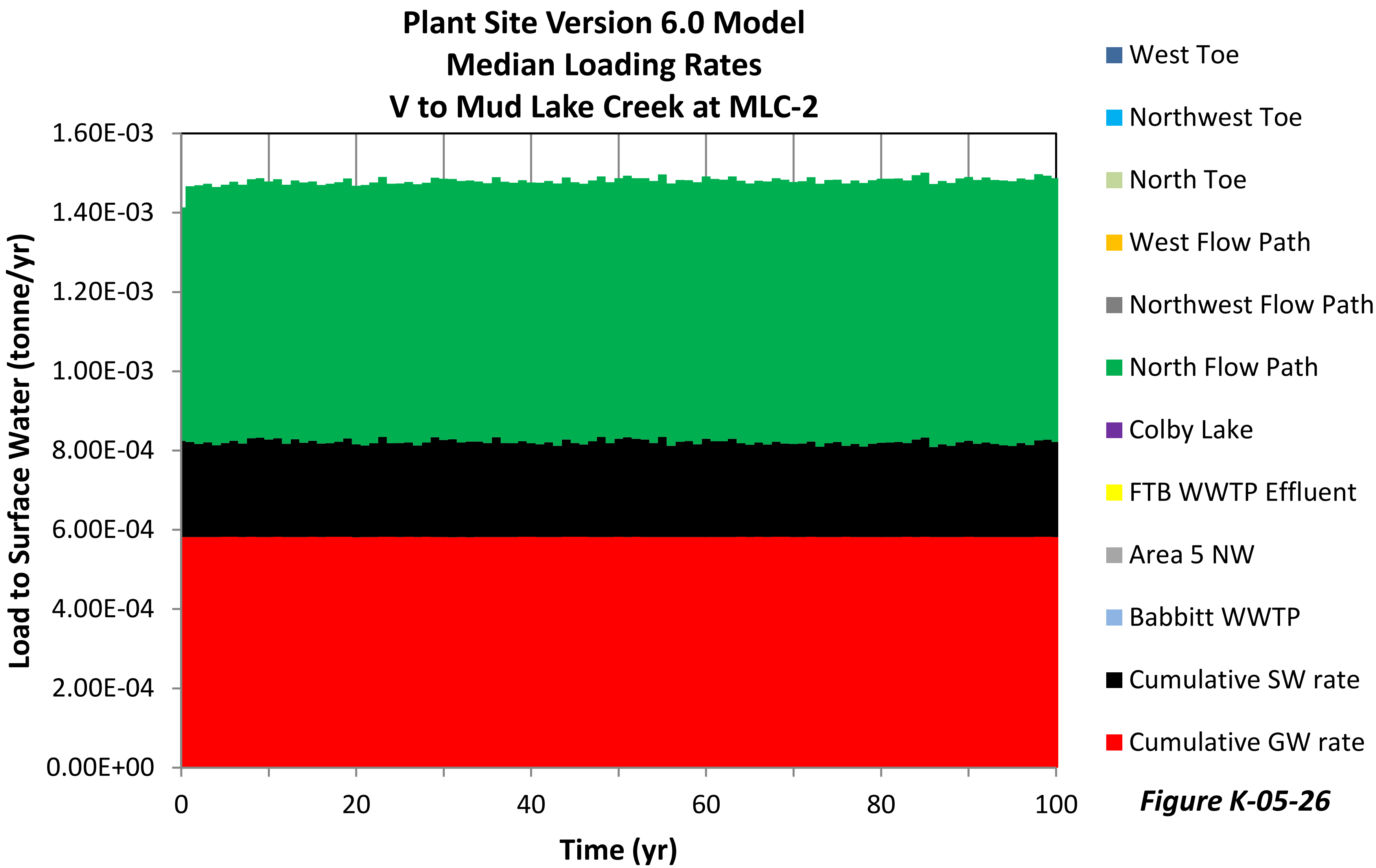

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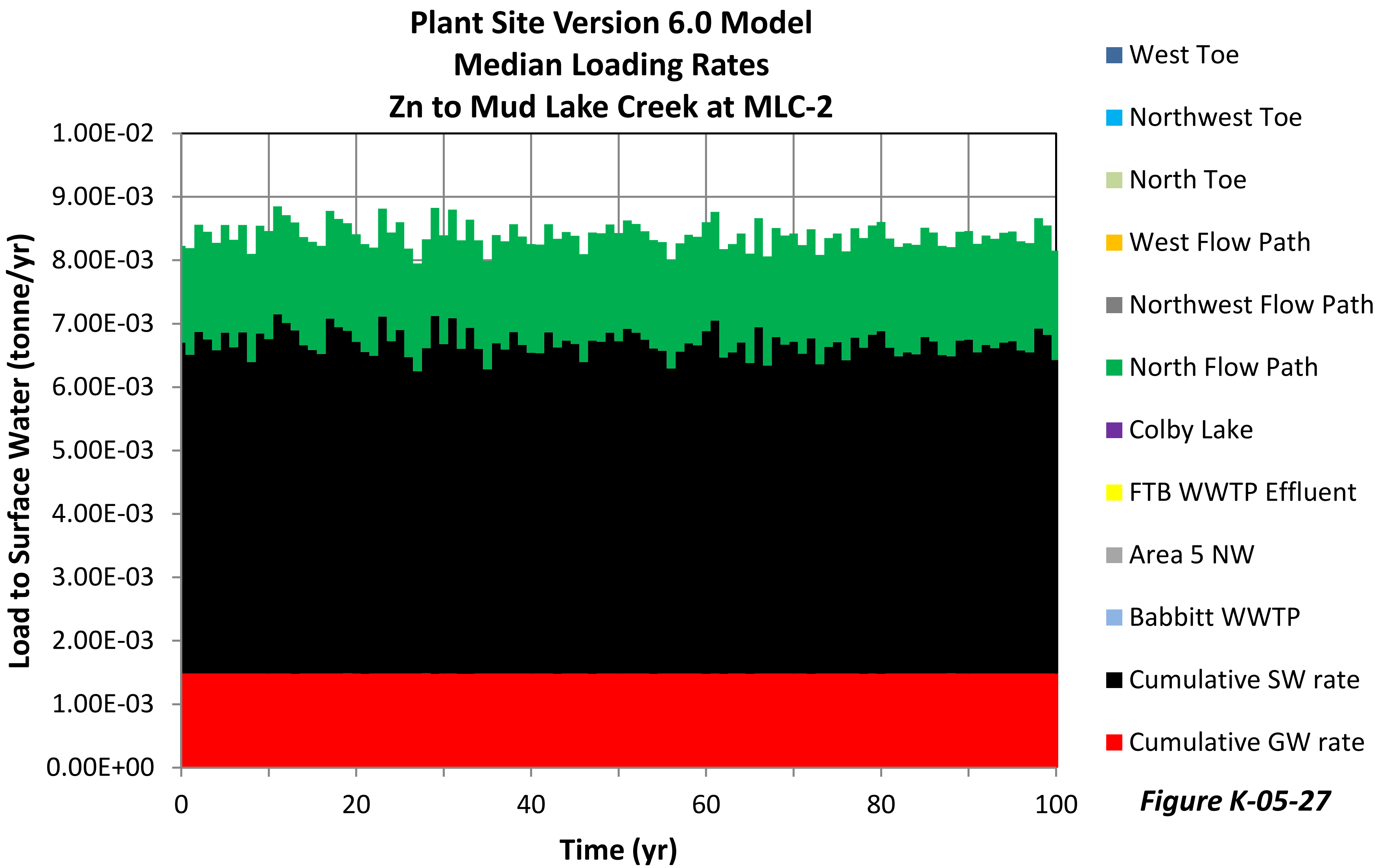


Figure K-05-27

Attachment L

Concentration Statistics of Influent Water Quality to the WWTP

Attachment L Concentration Statistics of Influent Water Quality to the WWTP

Estimated influent water quality to the WWTP is shown in this attachment using a series of concentration statistic plots. Data for these plots were created as follows:

- The probabilistic GoldSim model was run at monthly time steps for 200 years (2401 time steps including the initial time zero). At each time step, the mixed concentration into the WWTP for each constituent was individually recorded.

- After one realization (i.e., one model run) was completed, the process was repeated until 500 model realizations were completed. The result is 500 estimated concentrations into the WWTP of each constituent at every time step.

- At every time step, and for every constituent, the 500 estimated concentrations were sorted smallest-to-largest and 3 single values were chosen to represent the statistics at that particular time step.

- From the 500 estimate concentrations, sorted smallest-to-largest, the 50th value was chosen to represent the 10th percentile (P10), the 250th value was chosen to represent the median (P50), and the 450th value was chosen to represent the 90th percentile (P90). This indicates that at any time, 10% of the model results are less than or equal to the P10 value, 50% are less than or equal to the P50 value, and 90% are less than or equal to the P90 value.

- This process was repeated for all time steps, resulting in 3 time series lines representing the 10th, 50th, and 90th percentiles of concentrations into the WWTP at every time step (monthly results).

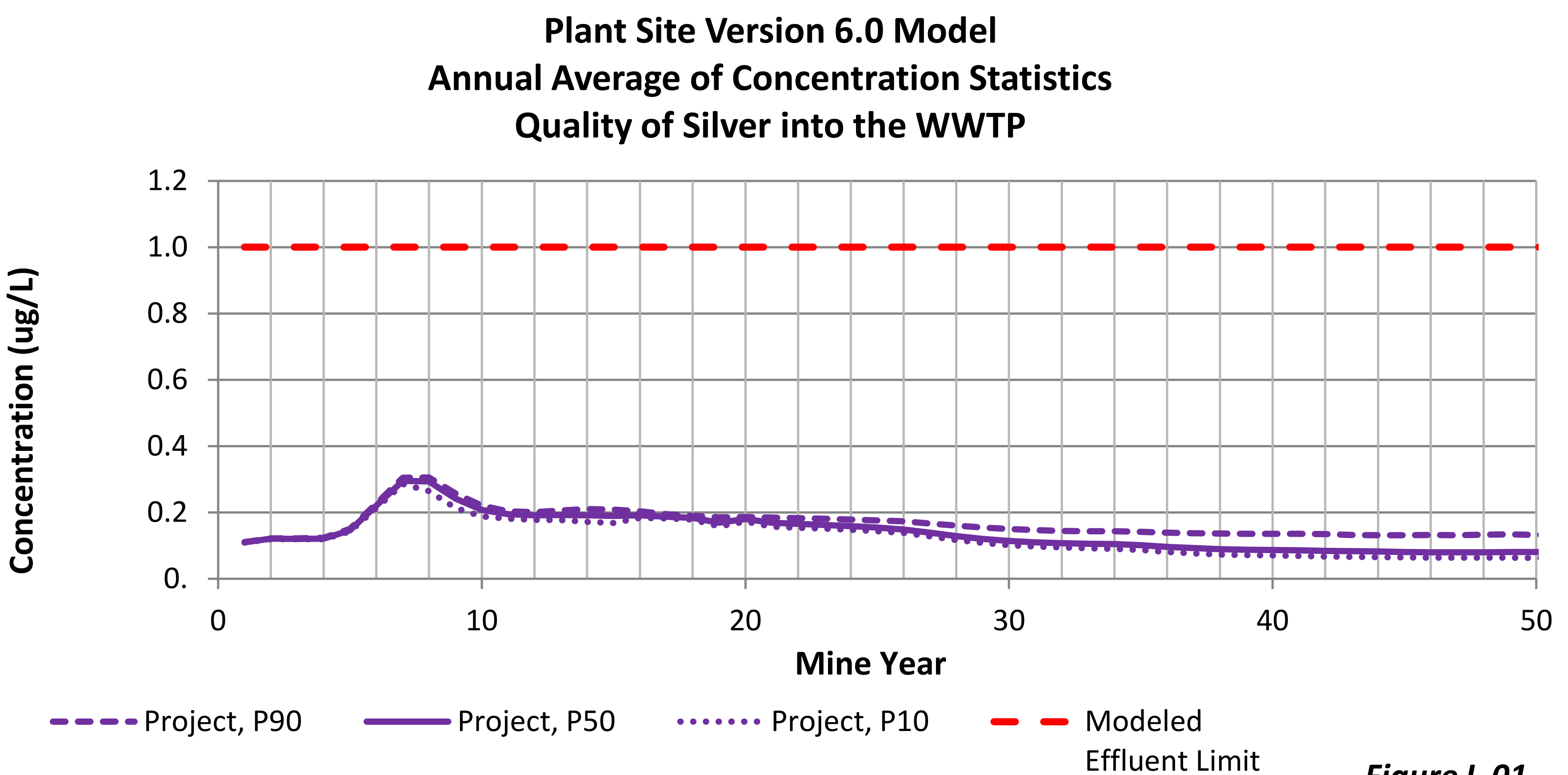
- For plotting the water quality into the WWTP over the entire 200 years of the simulation, the data was summarized by year to make the plots legible. The monthly model outputs for the 10th, 50th, and 90th percentiles are plotted on an annual basis by taking the average value of each percentile for a given year (i.e., the average of 12 90th percentile values).

Also shown on the figure of this attachment is the WWTP effluent limit. If the influent concentration of a particular constituent is less than the prescribed effluent limit, the WWTP is in effect not treating for that constituent. Modeled WWTP effluent limits are described in Table 1-43 of Attachment B.

The figure numbering convention is "**Figure W-YY**" where:

- **W** indicates the Attachment.

- **YY** is a counter indicating the constituent; in this attachment it will count from "01" to "27" to show the 27 independently modeled constituents.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Annual Average of Concentration Statistics
Quality of Silver into the WWTP
1.2
1.0
0.8
0.6
0.4
0.2
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-01

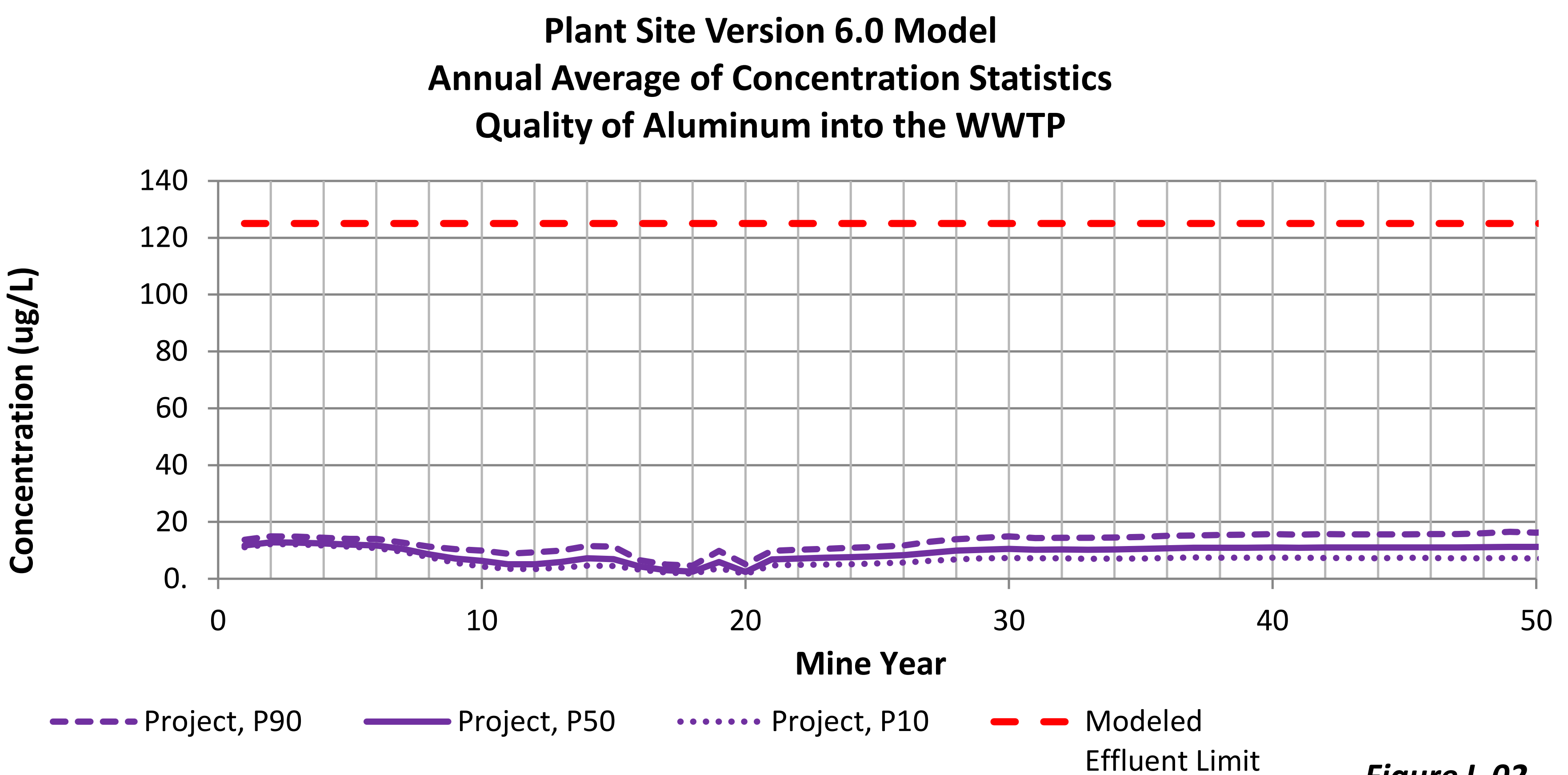

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Aluminum into the WWTP
Concentration (ug/L)
140
120
100
80
60
40
20
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-02

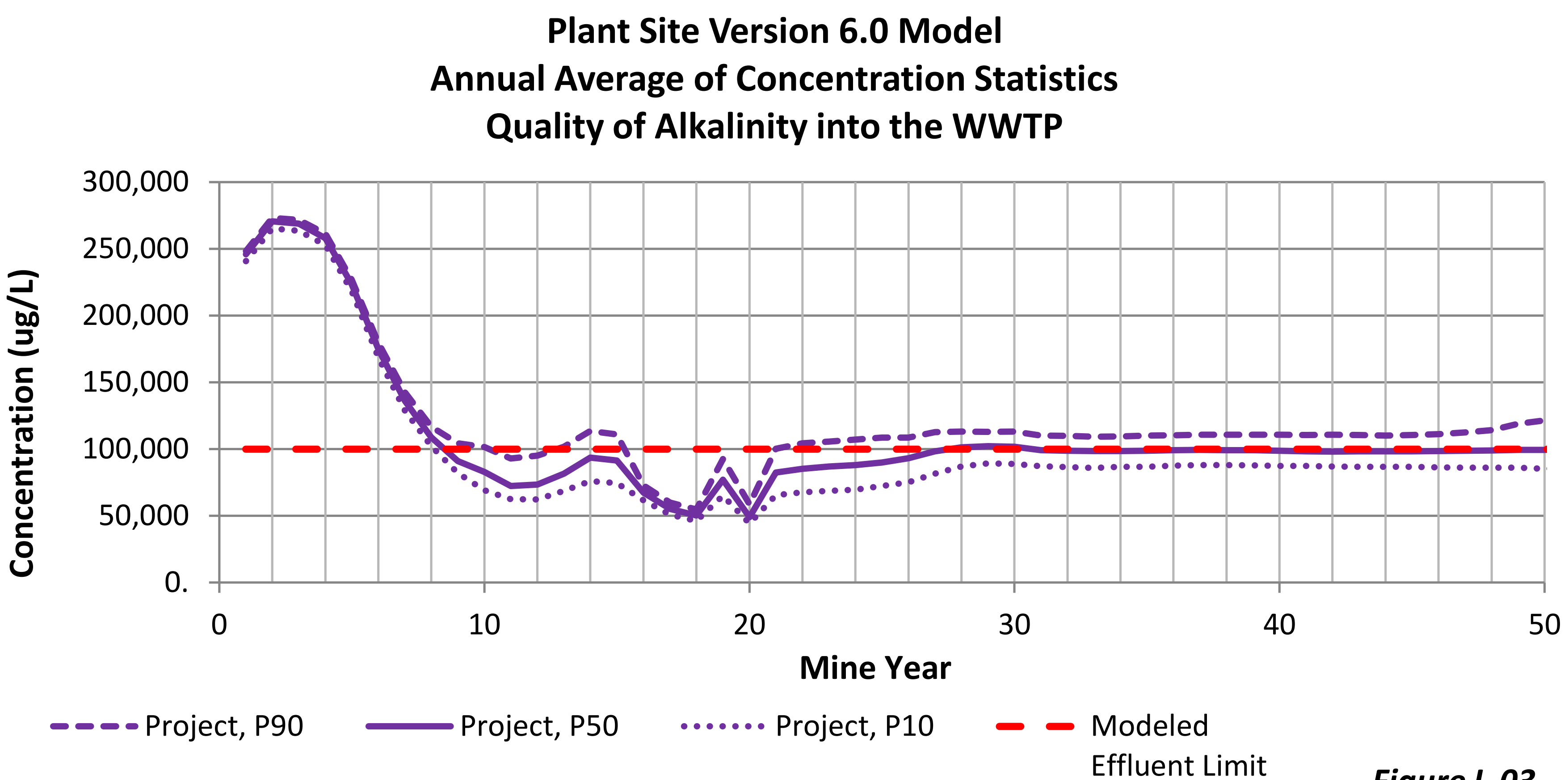

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Alkalinity into the WWTP
Concentration (ug/L)
300,000
250,000
200,000
150,000
100,000
50,000
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-03

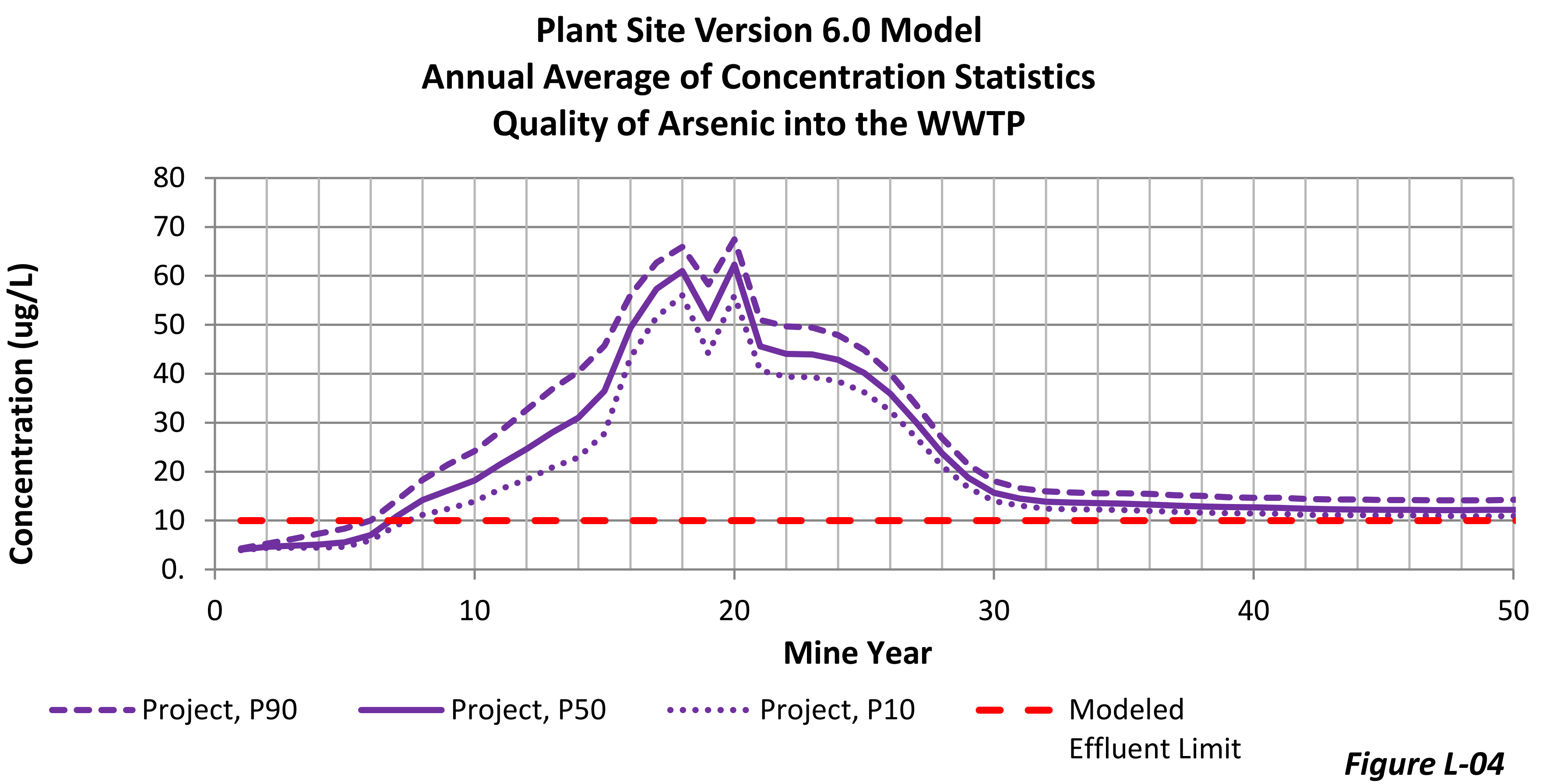

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Arsenic into the WWTP
Concentration (ug/L)
80
70
60
50
40
30
20
10
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-04

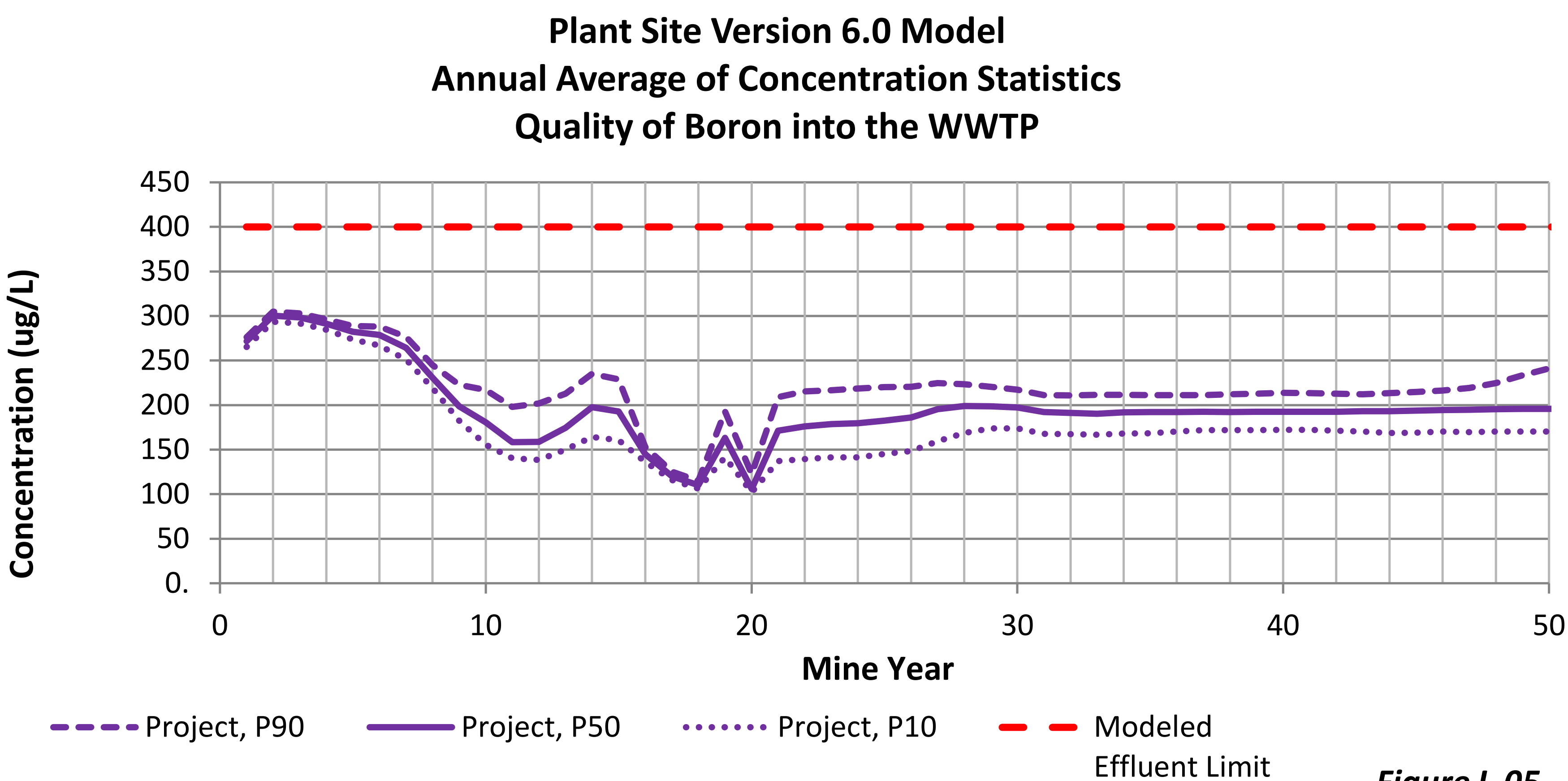

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Boron into the WWTP
Concentration (ug/L)
450
400
350
300
250
200
150
100
50
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-05

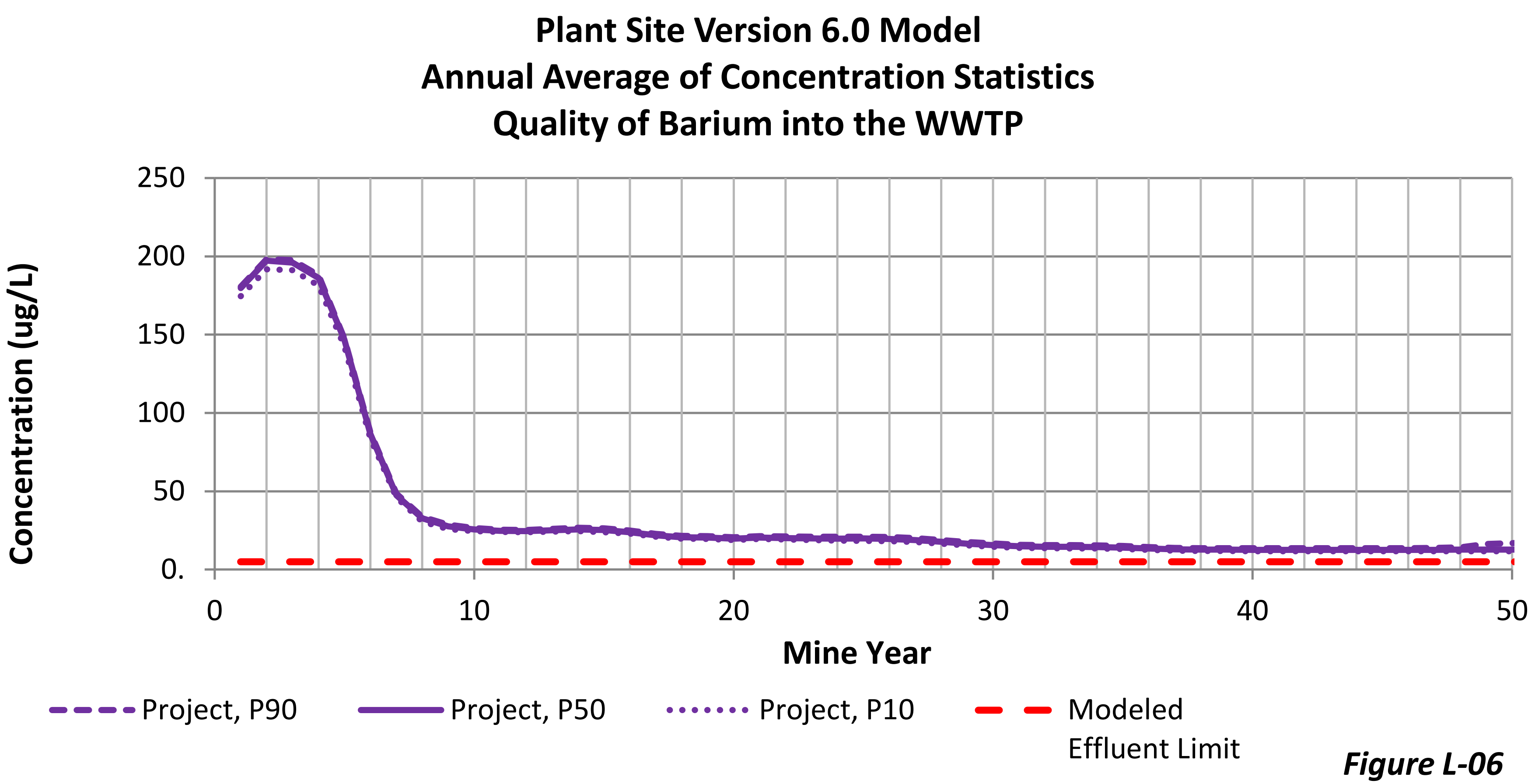

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Barium into the WWTP
Concentration (ug/L)
250
200
150
100
50
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-06

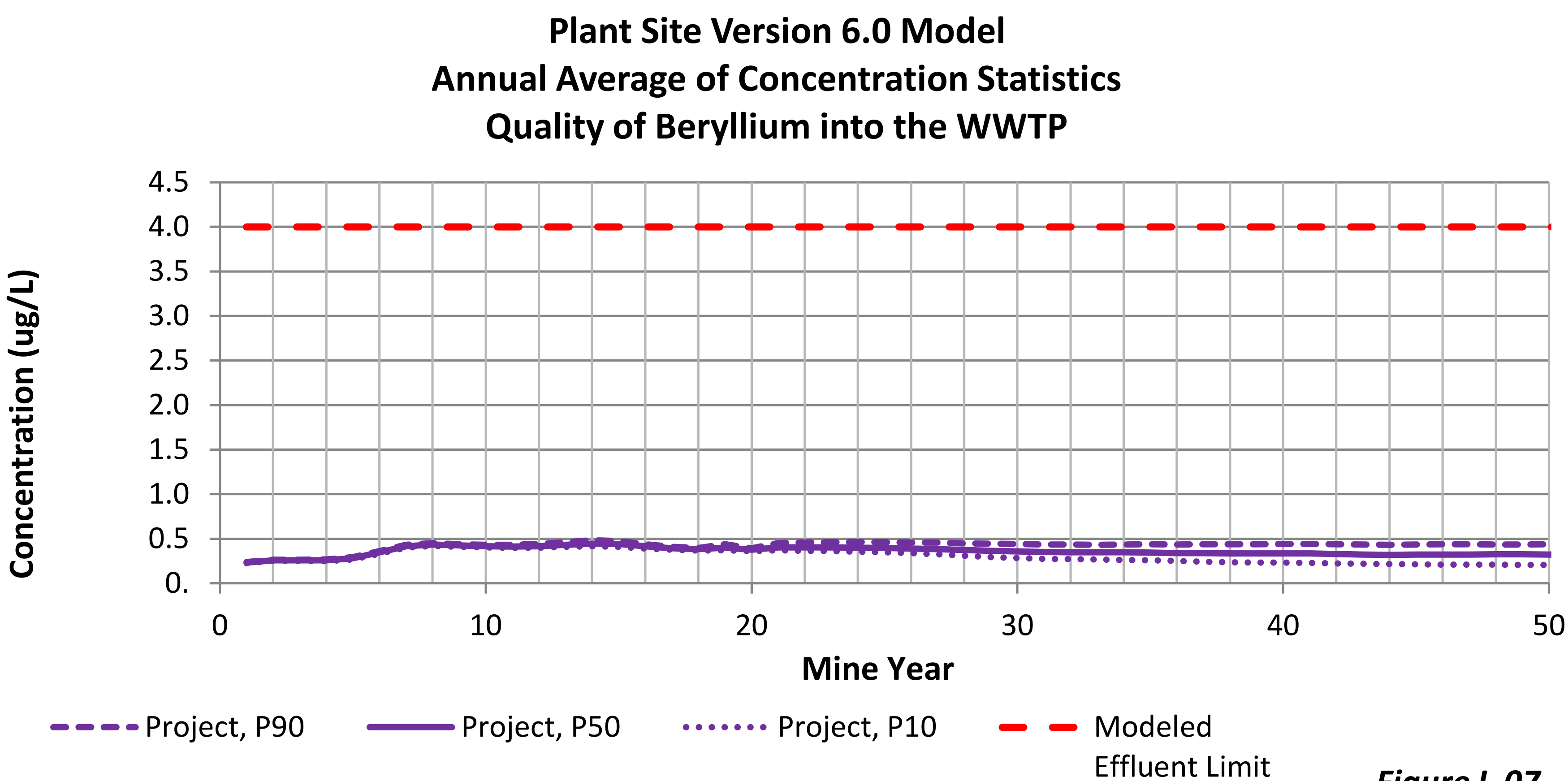

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Beryllium into the WWTP
Concentration (ug/L)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-07

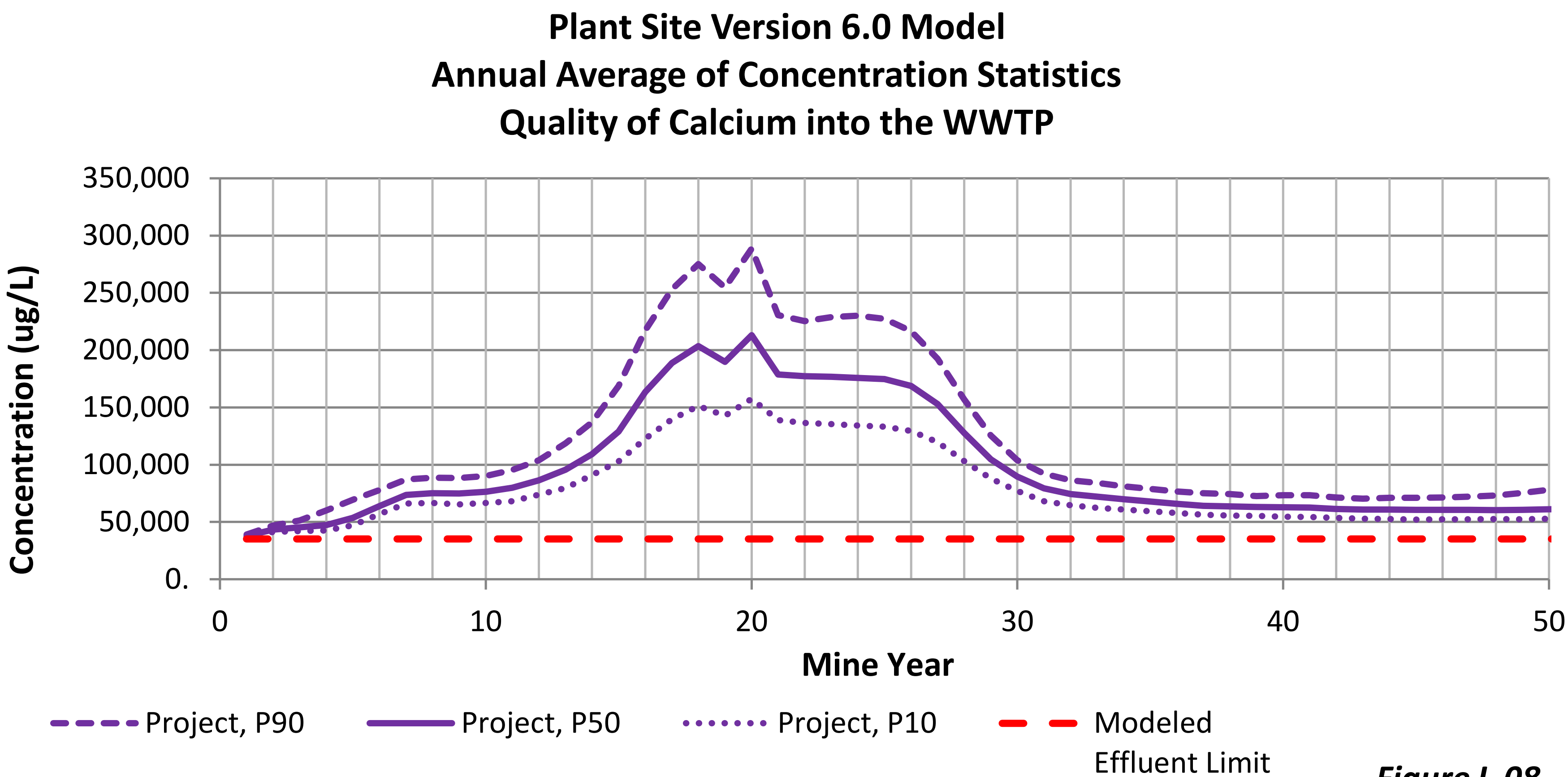
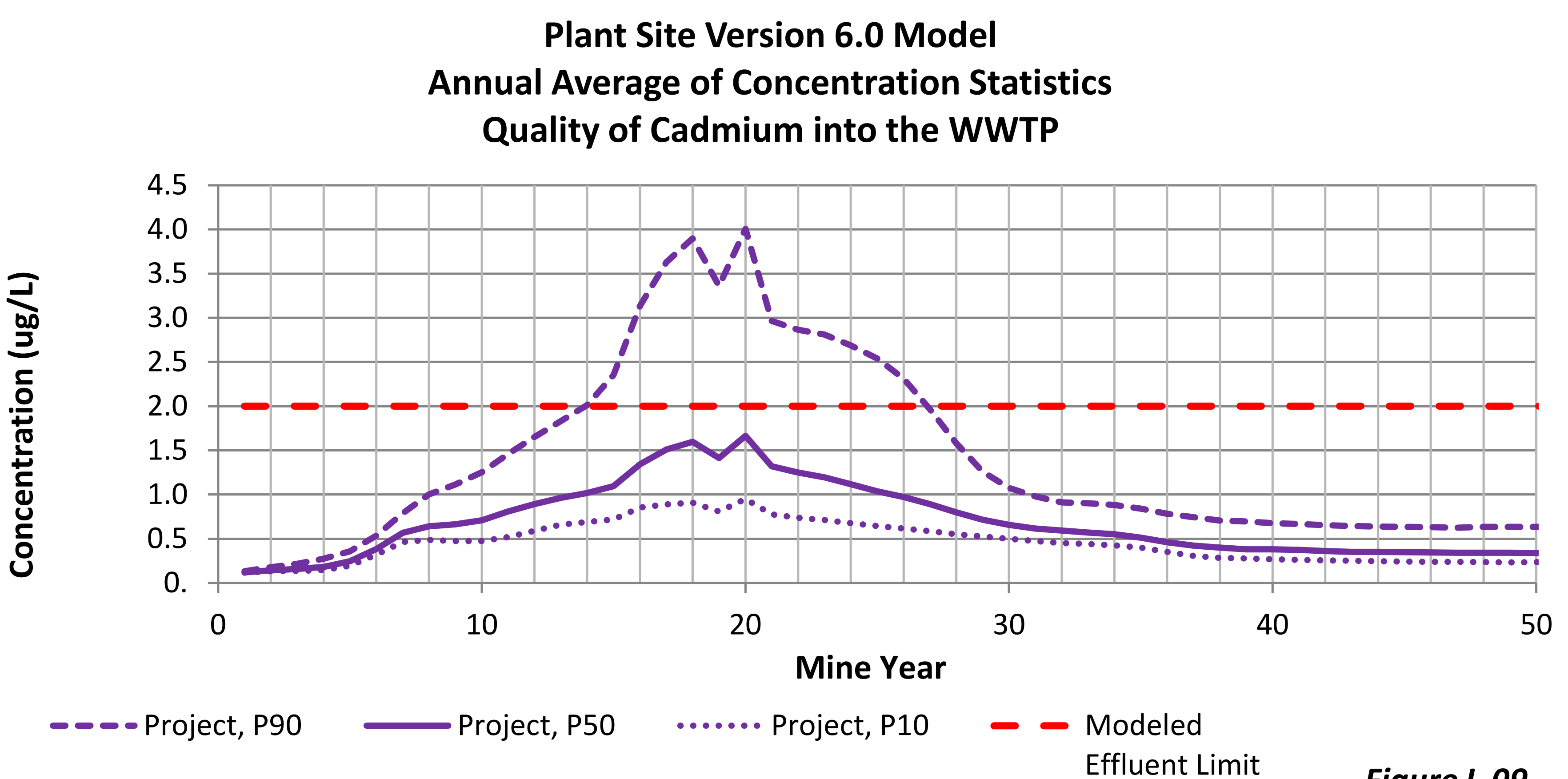
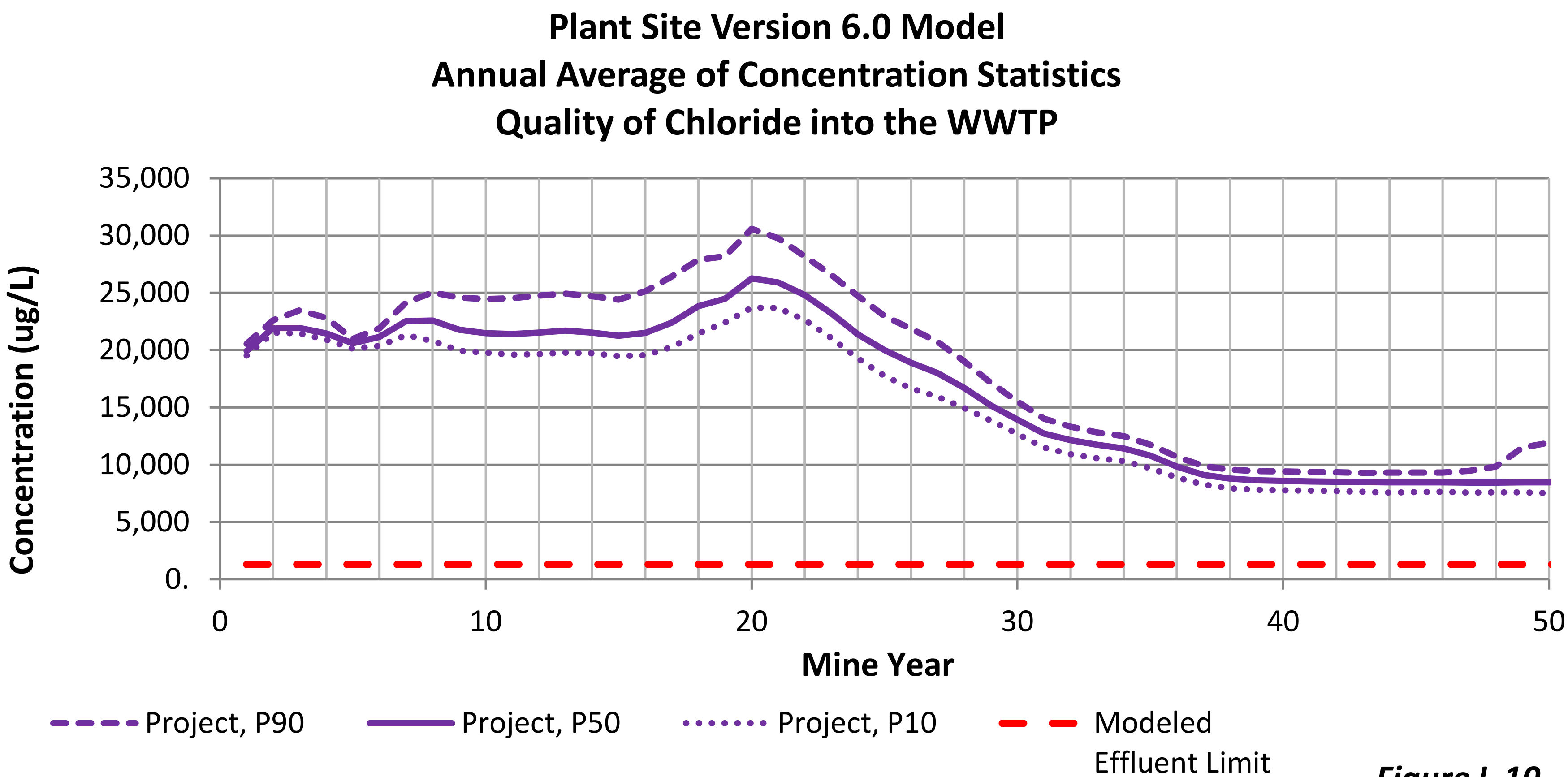

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Calcium into the WWTP
Concentration (ug/L)
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

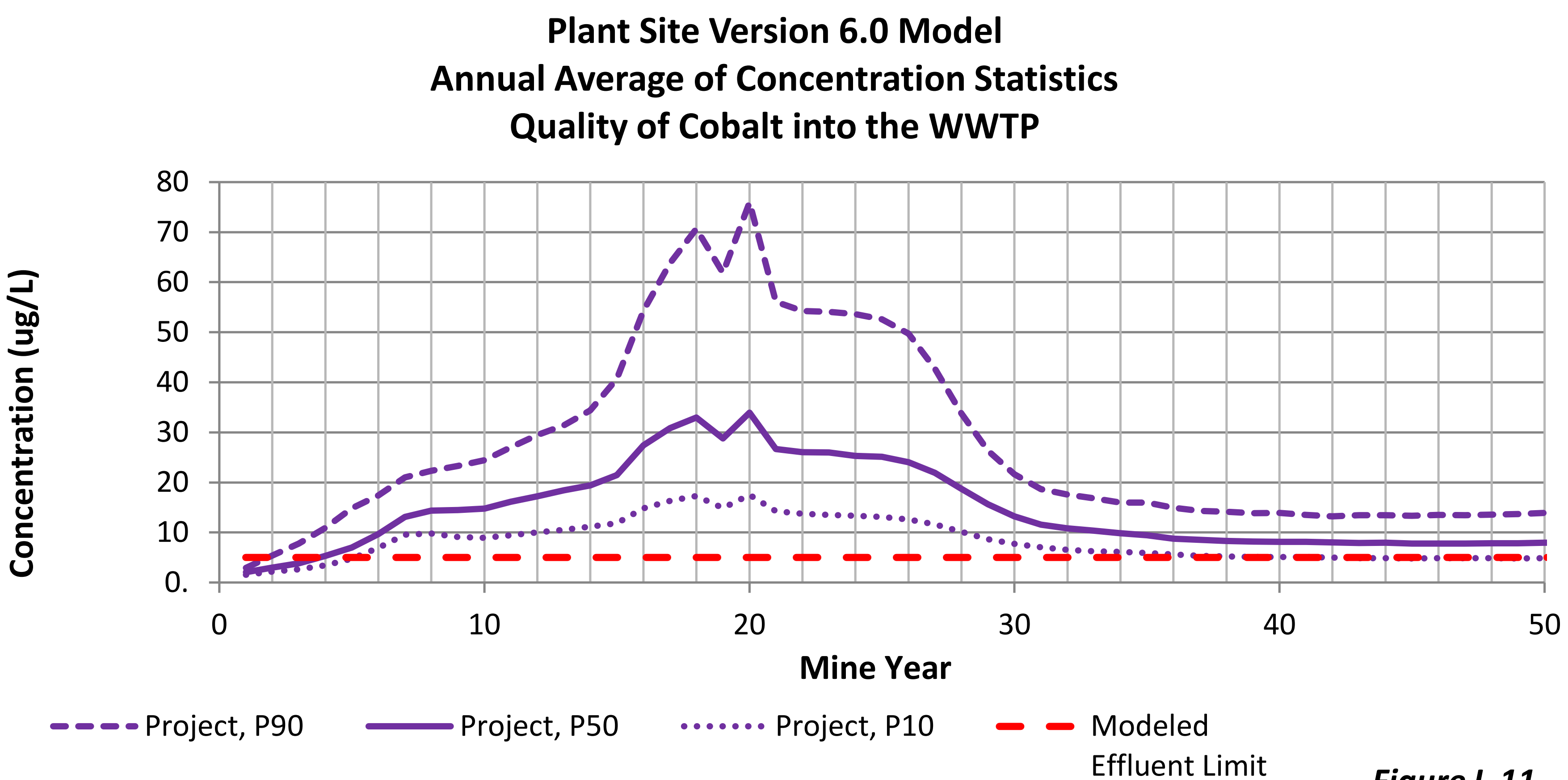
Figure L-08



Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Cadmium into the WWTP
Concentration (ug/L)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-09


Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Chloride into the WWTP
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit
Figure L-10



Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Cobalt into the WWTP
80
70
60
50
40
30
20
10
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-11

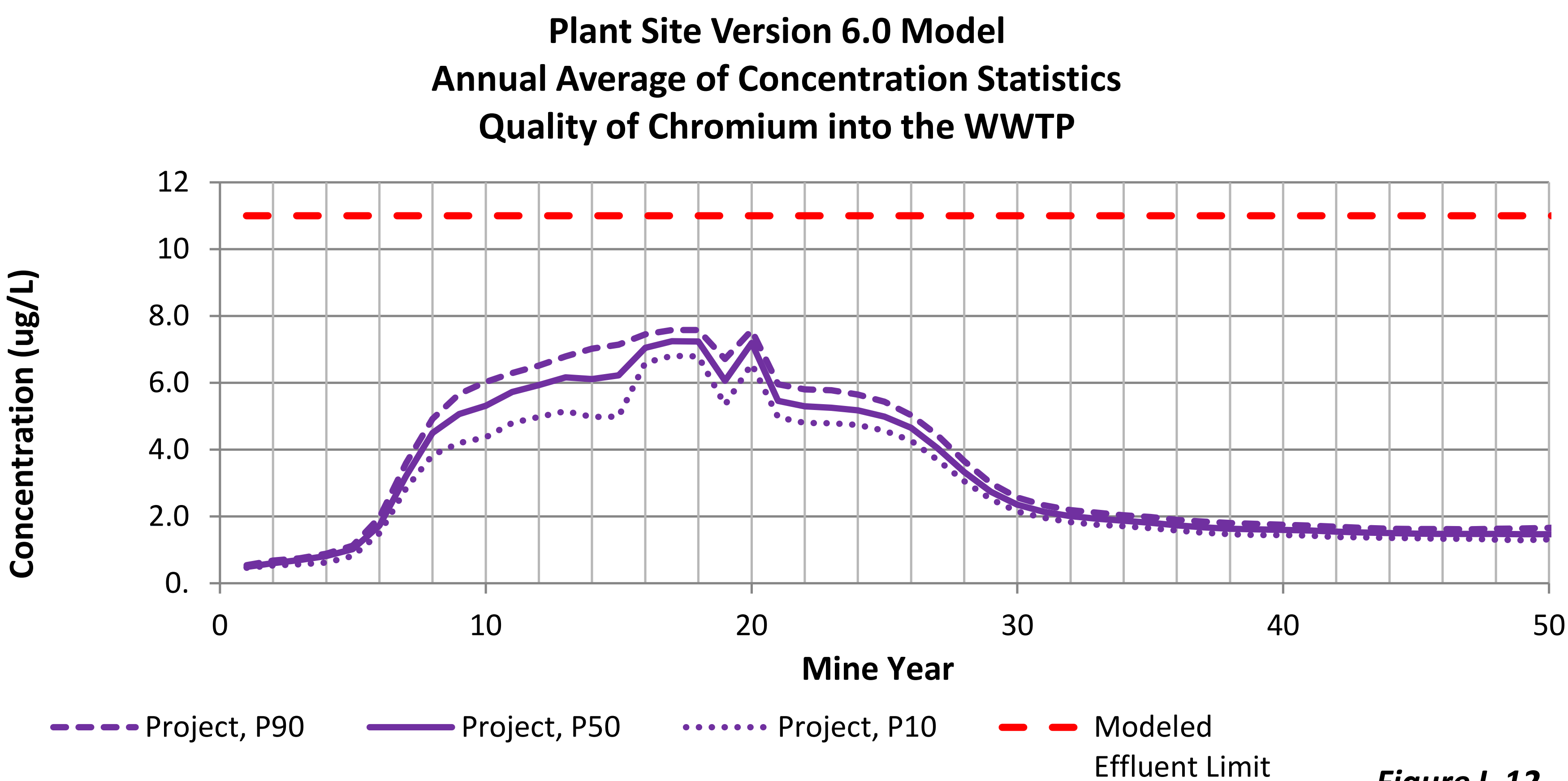

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Chromium into the WWTP
Concentration (ug/L)
12
10
8.0
6.0
4.0
2.0
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-12

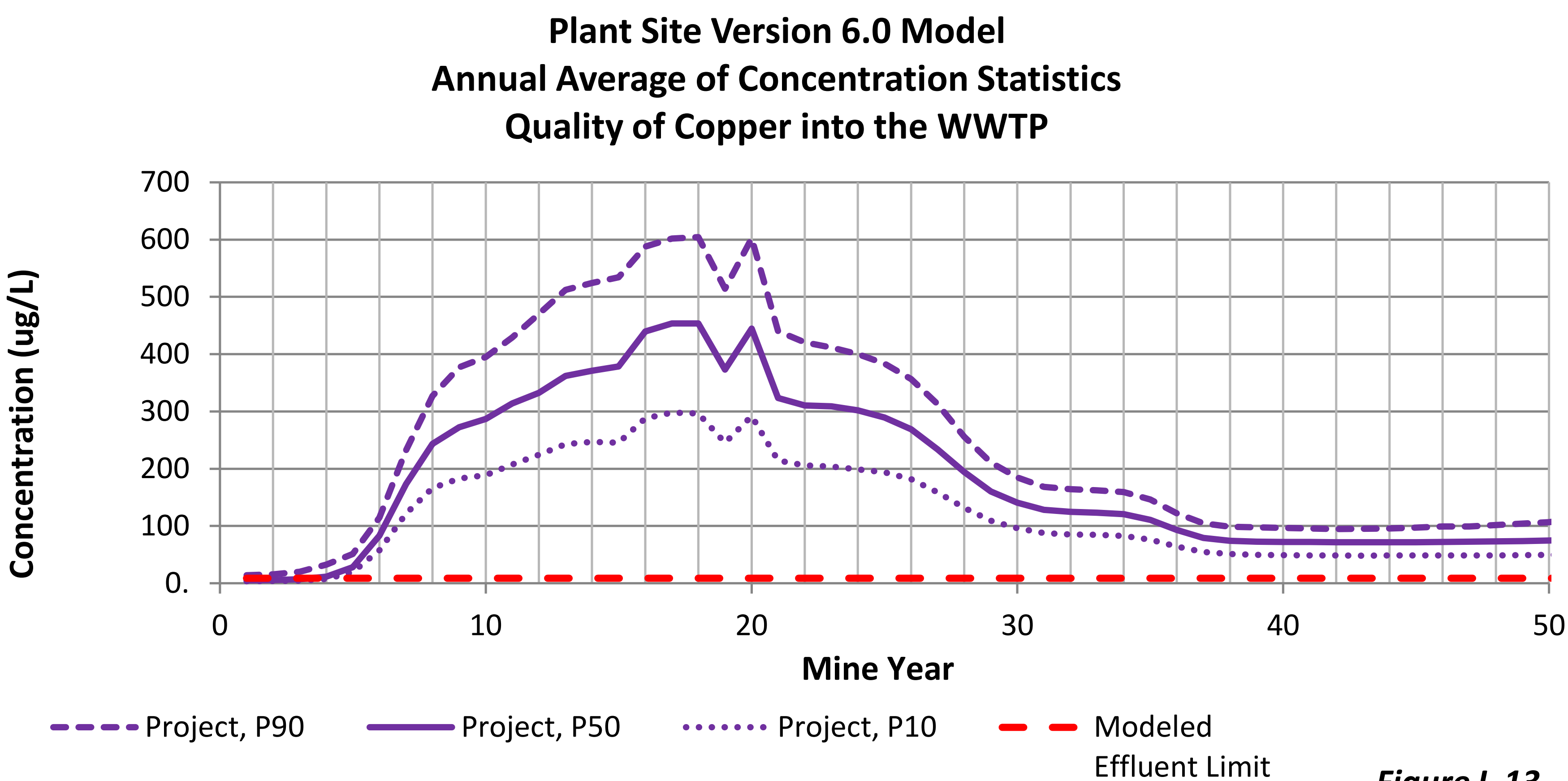

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Copper into the WWTP
Concentration (ug/L)
700
600
500
400
300
200
100
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-13

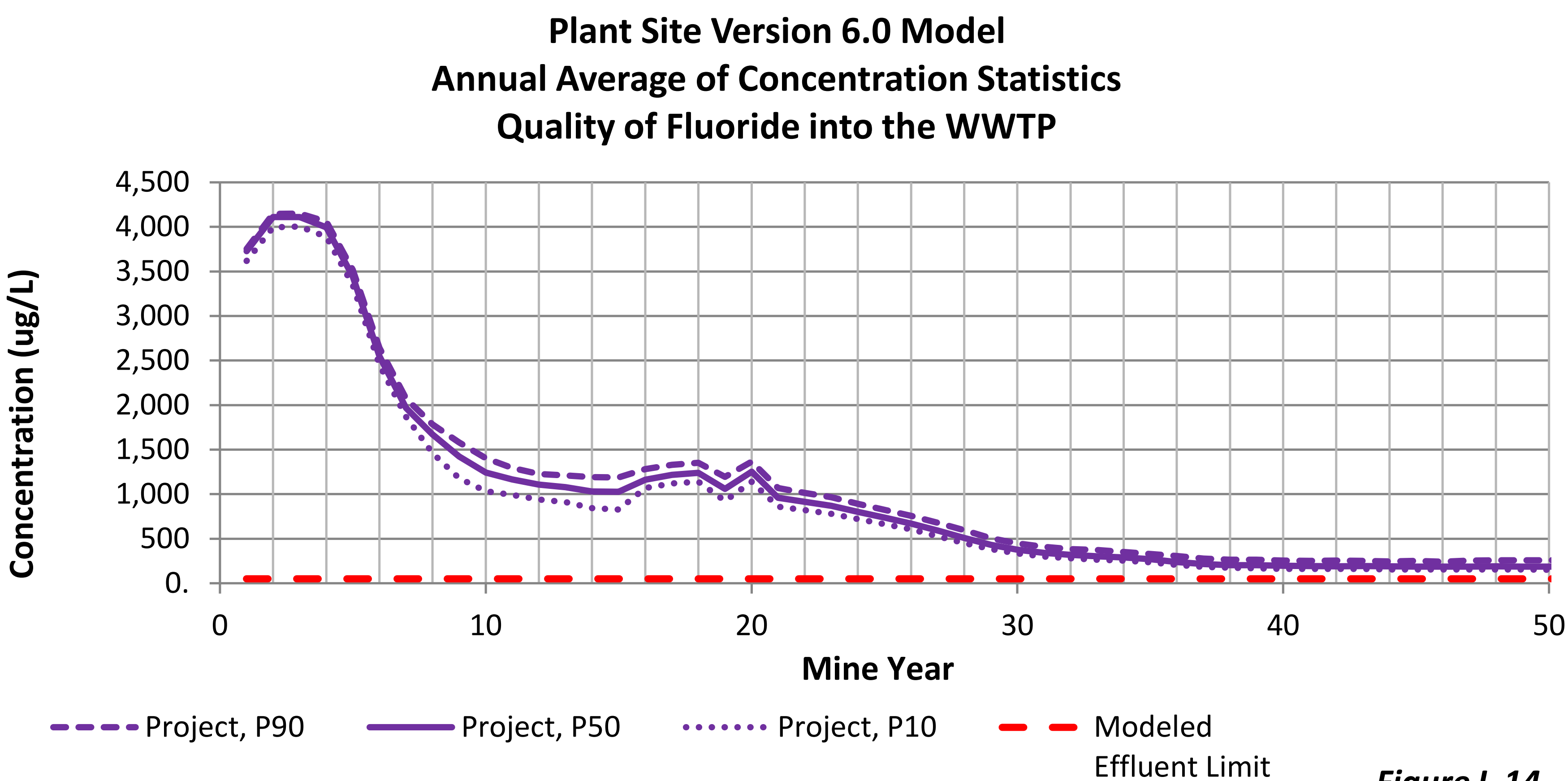
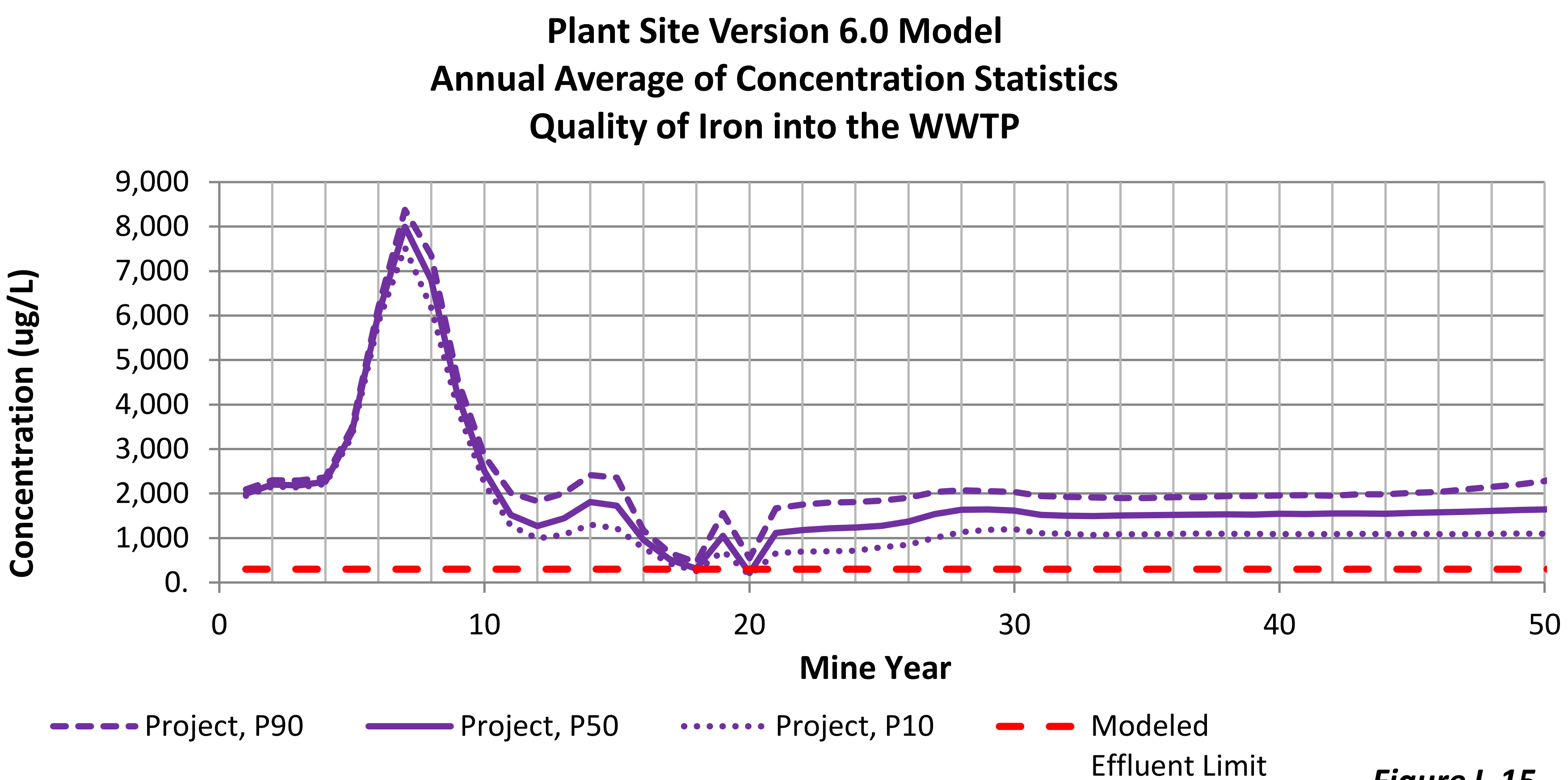
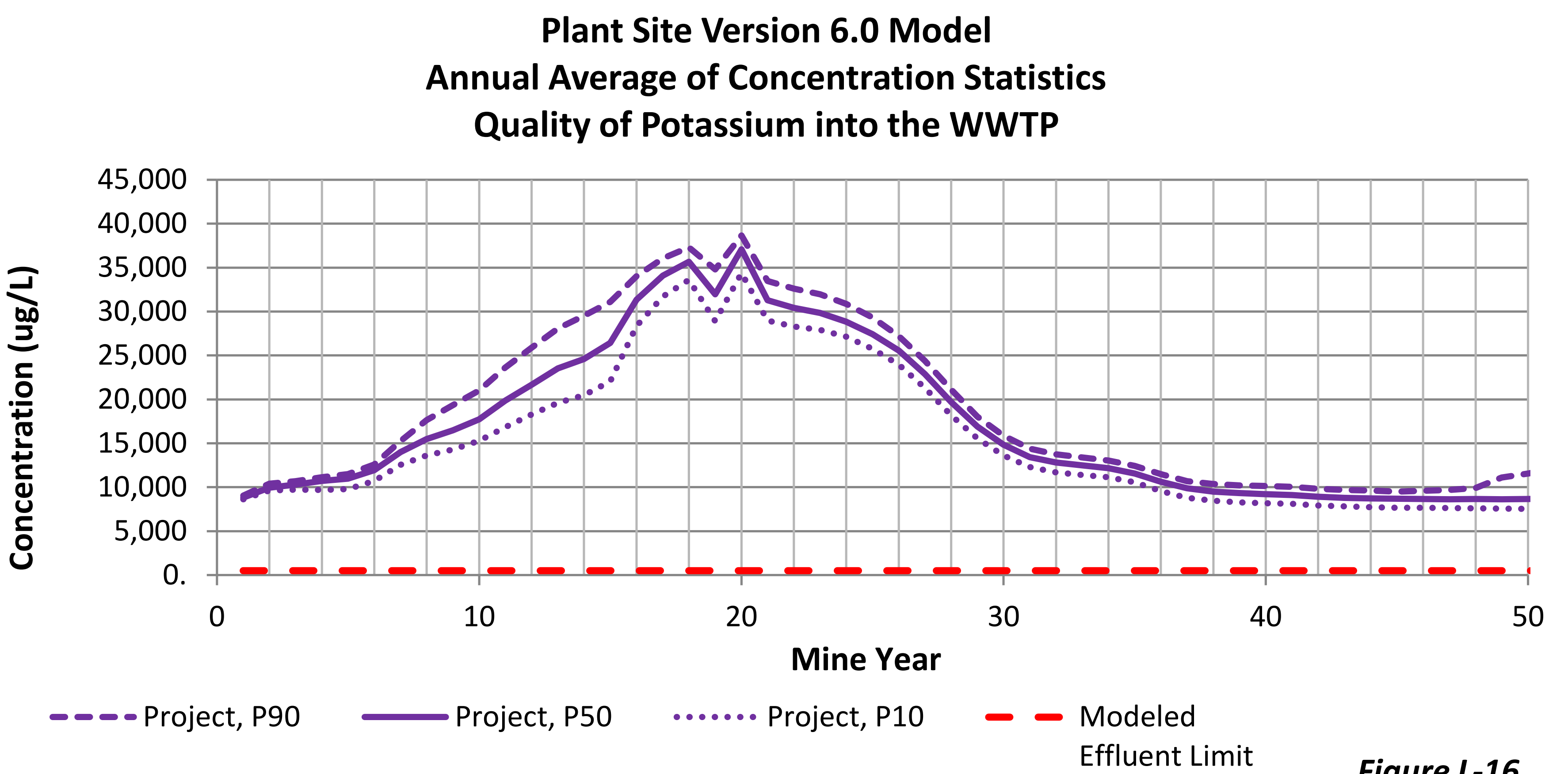

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Fluoride into the WWTP
Concentration (ug/L)
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-14



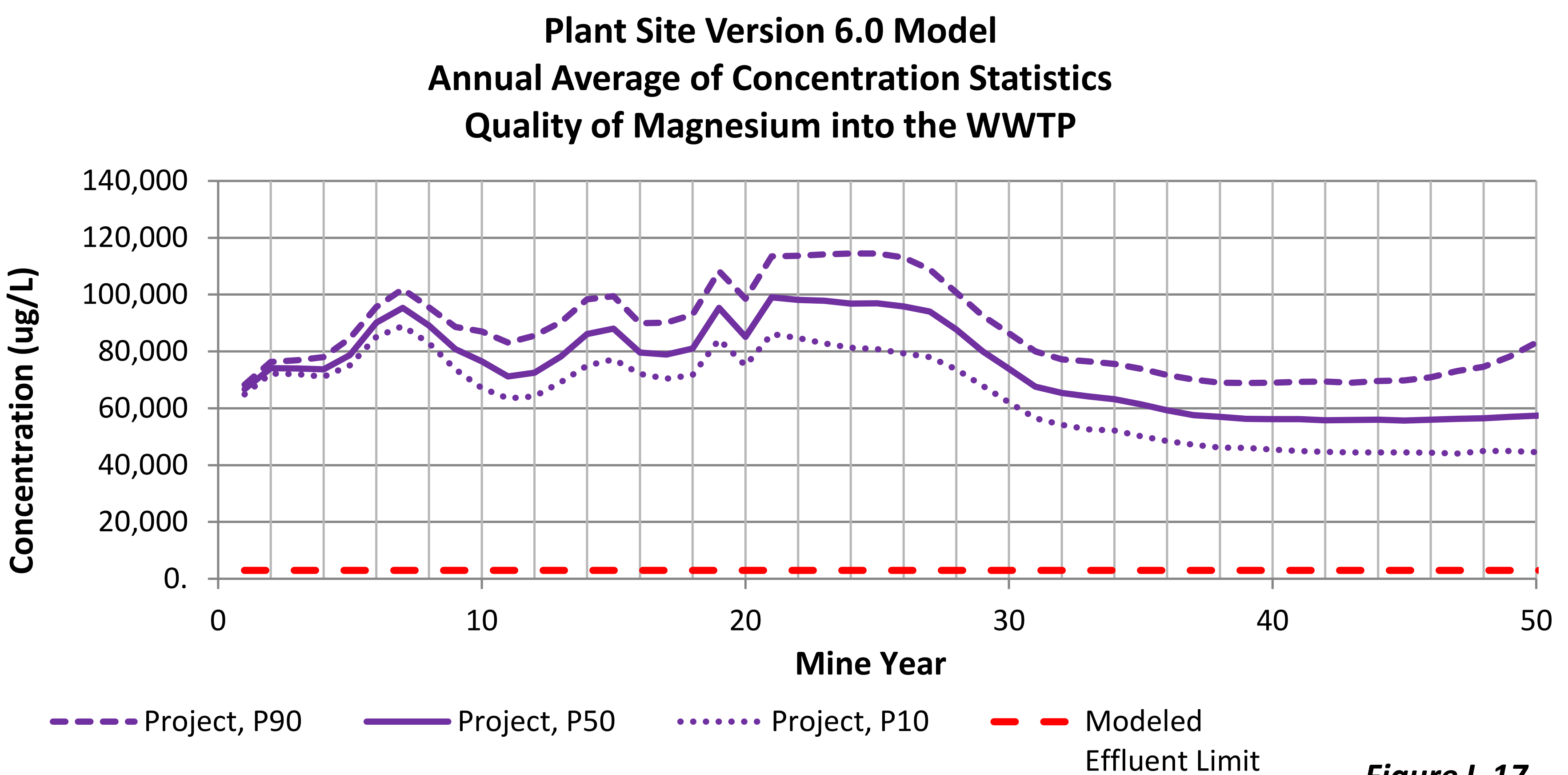
Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Iron into the WWTP
Concentration (ug/L)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-15



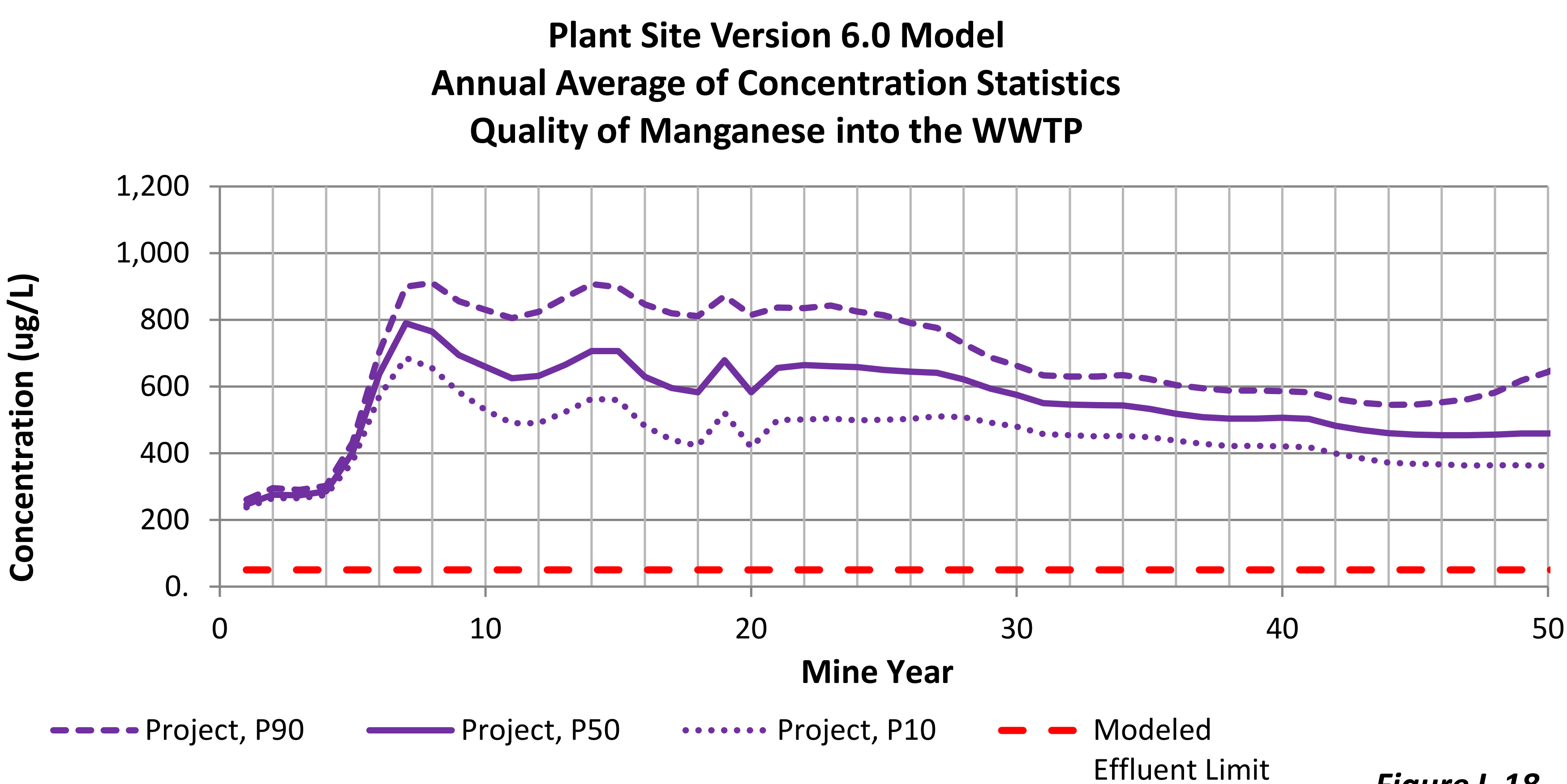
Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Potassium into the WWTP
Concentration (ug/L)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-16



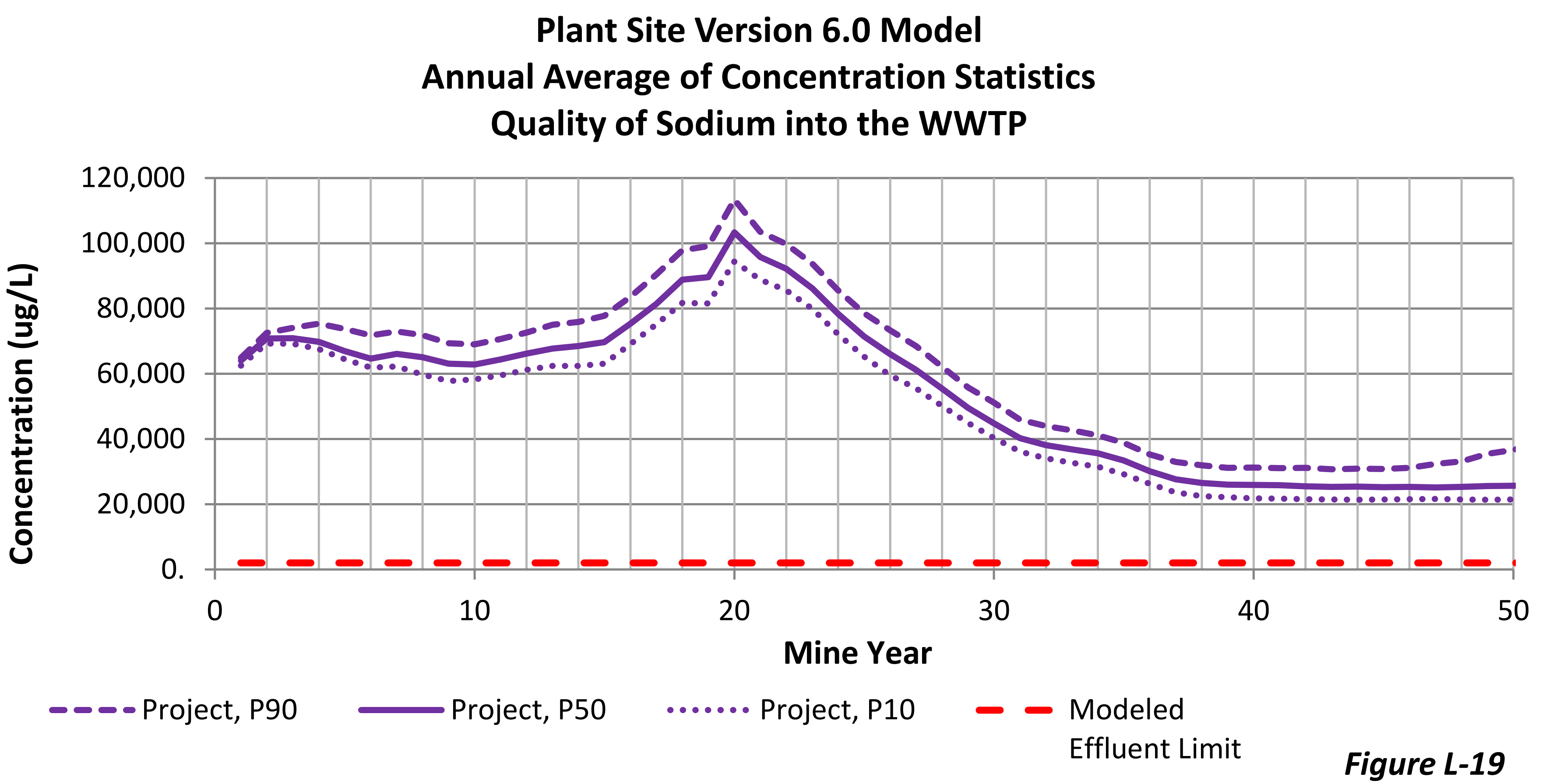
Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Magnesium into the WWTP
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-17



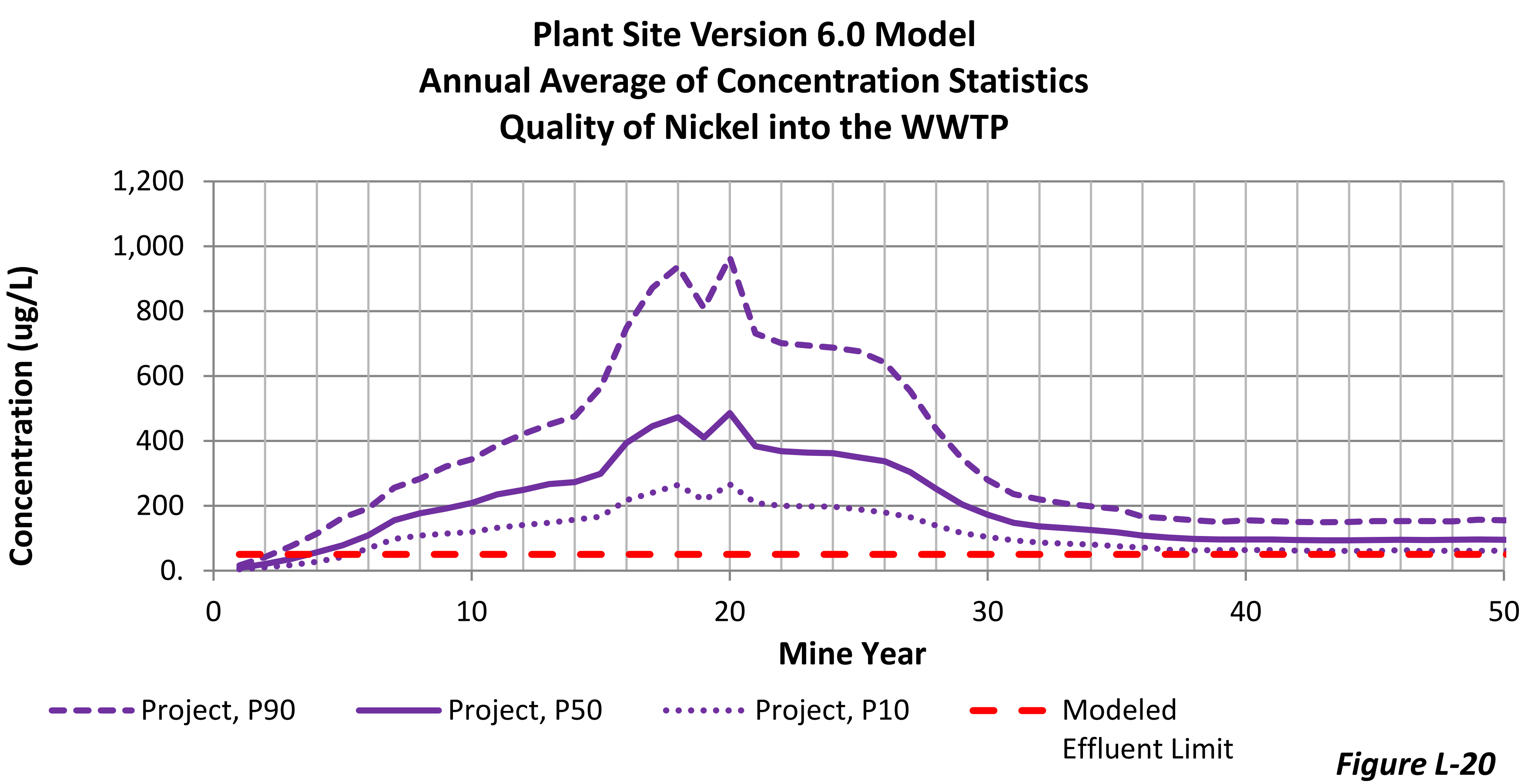
Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Manganese into the WWTP
Concentration (ug/L)
1,200
1,000
800
600
400
200
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-18



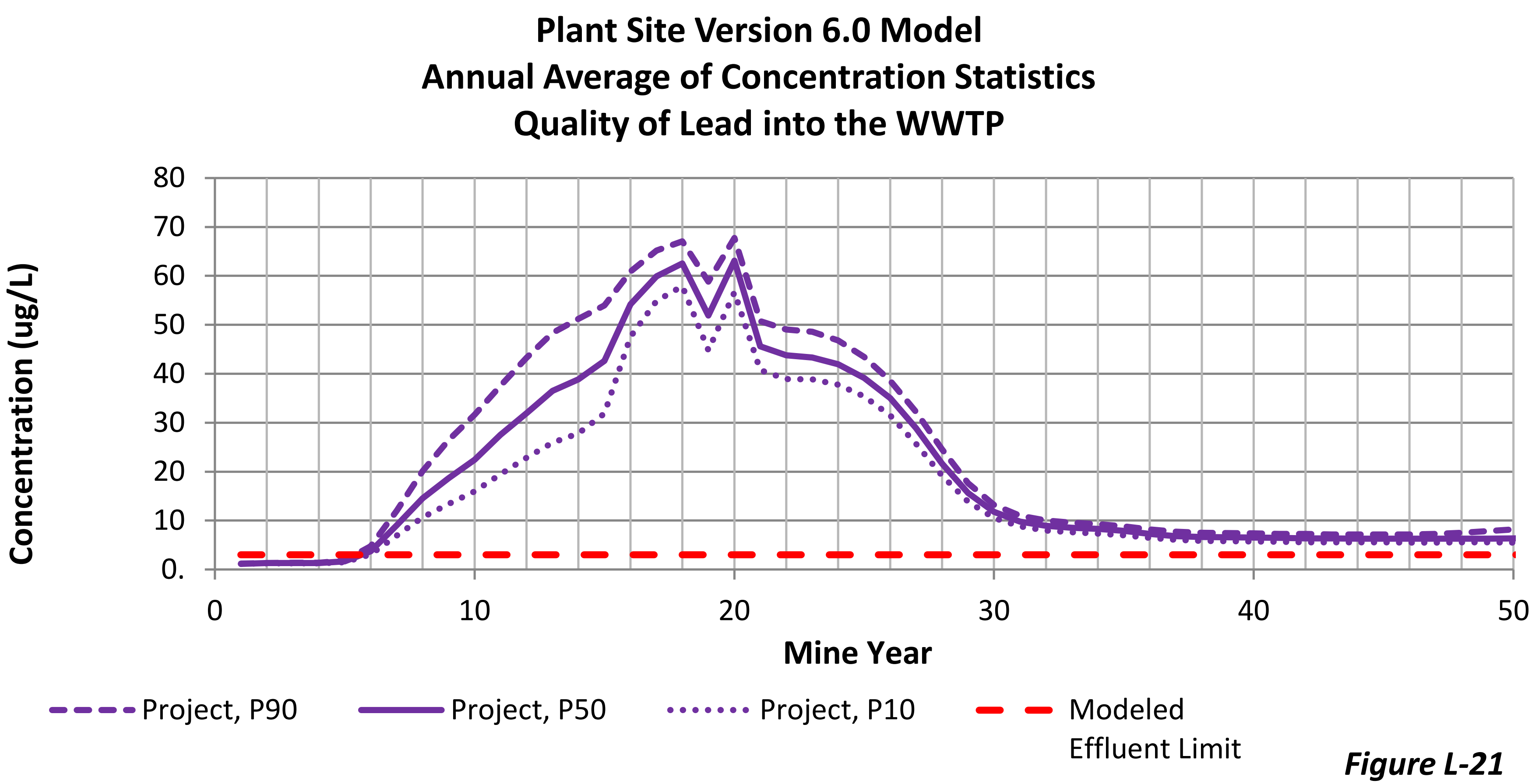
Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Sodium into the WWTP
120,000
100,000
80,000
60,000
40,000
20,000
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-19



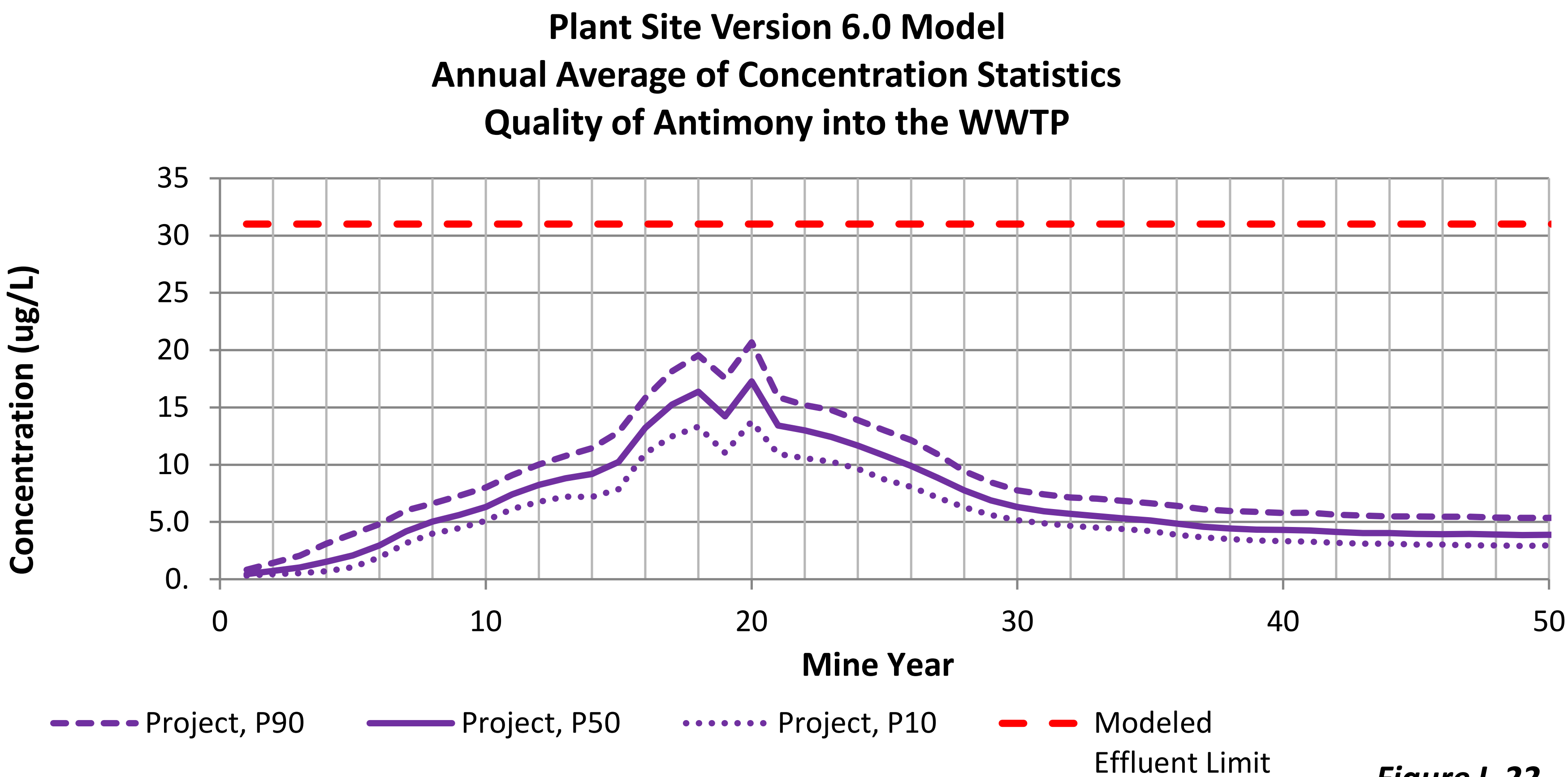
Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Nickel into the WWTP
1,200
1,000
800
600
400
200
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-20



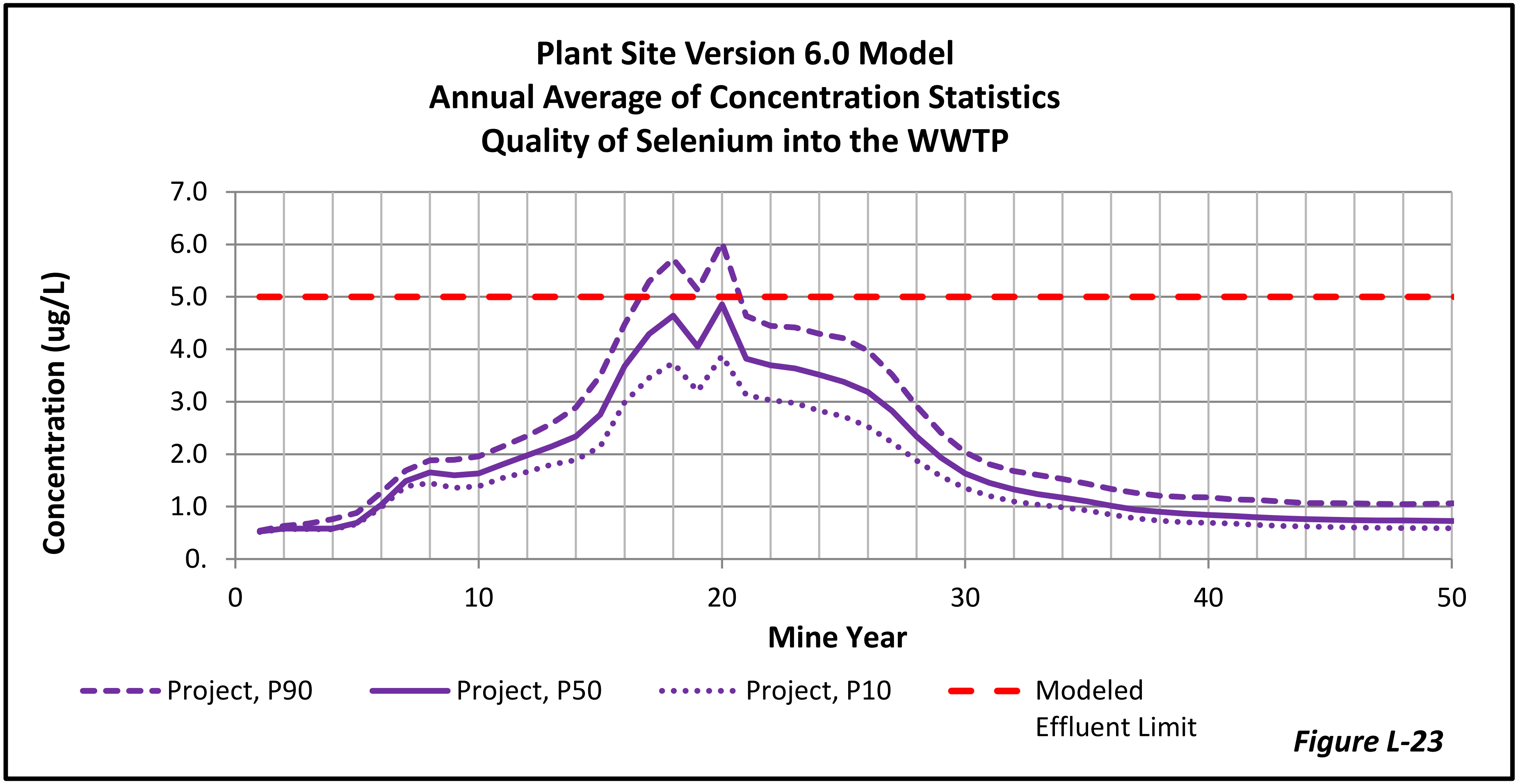
Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Lead into the WWTP
Concentration (ug/L)
80
70
60
50
40
30
20
10
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-21



Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Antimony into the WWTP
Concentration (ug/L)
35
30
25
20
15
10
5.0
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-22


Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Selenium into the WWTP
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit
Figure L-23

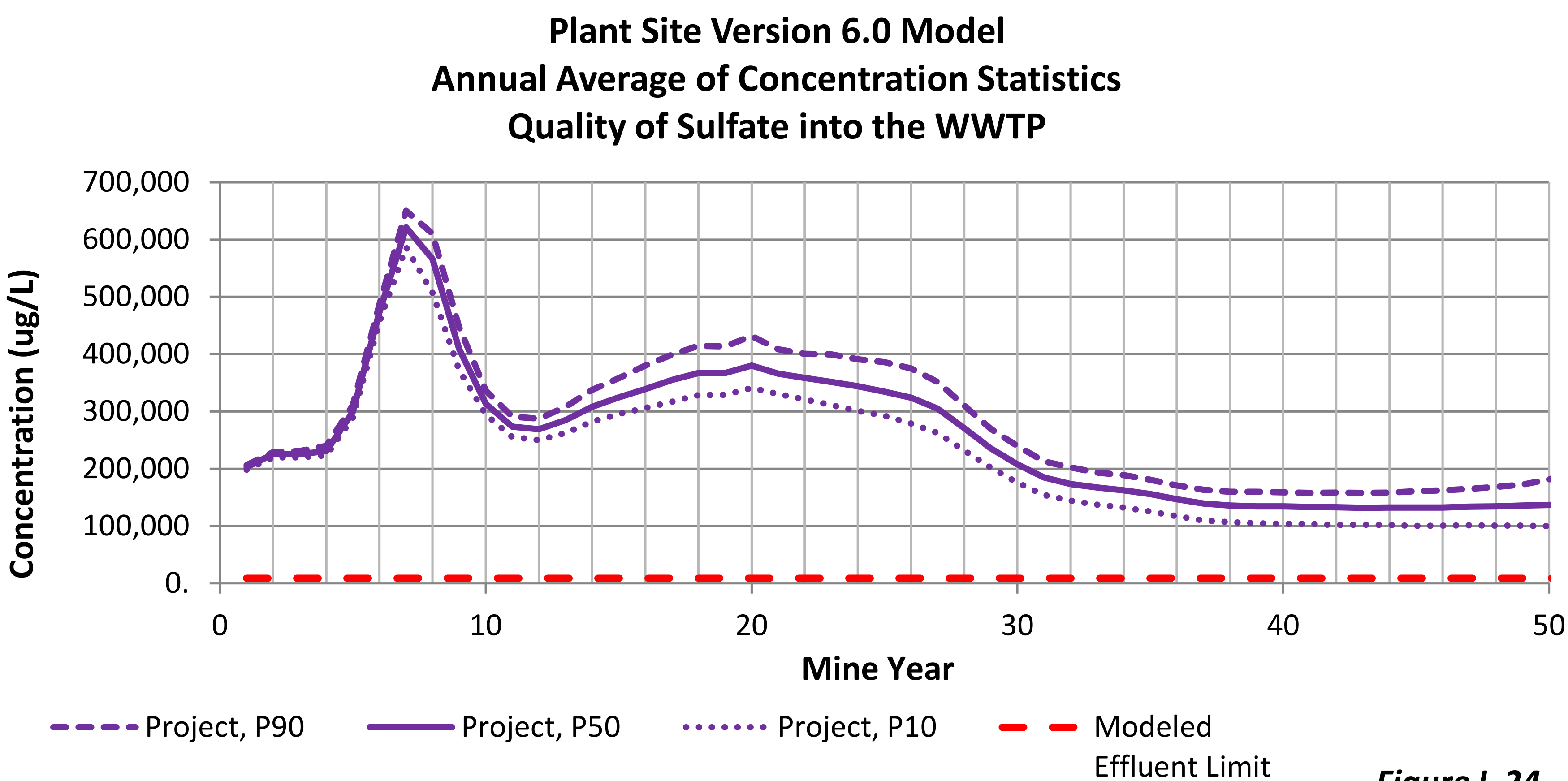
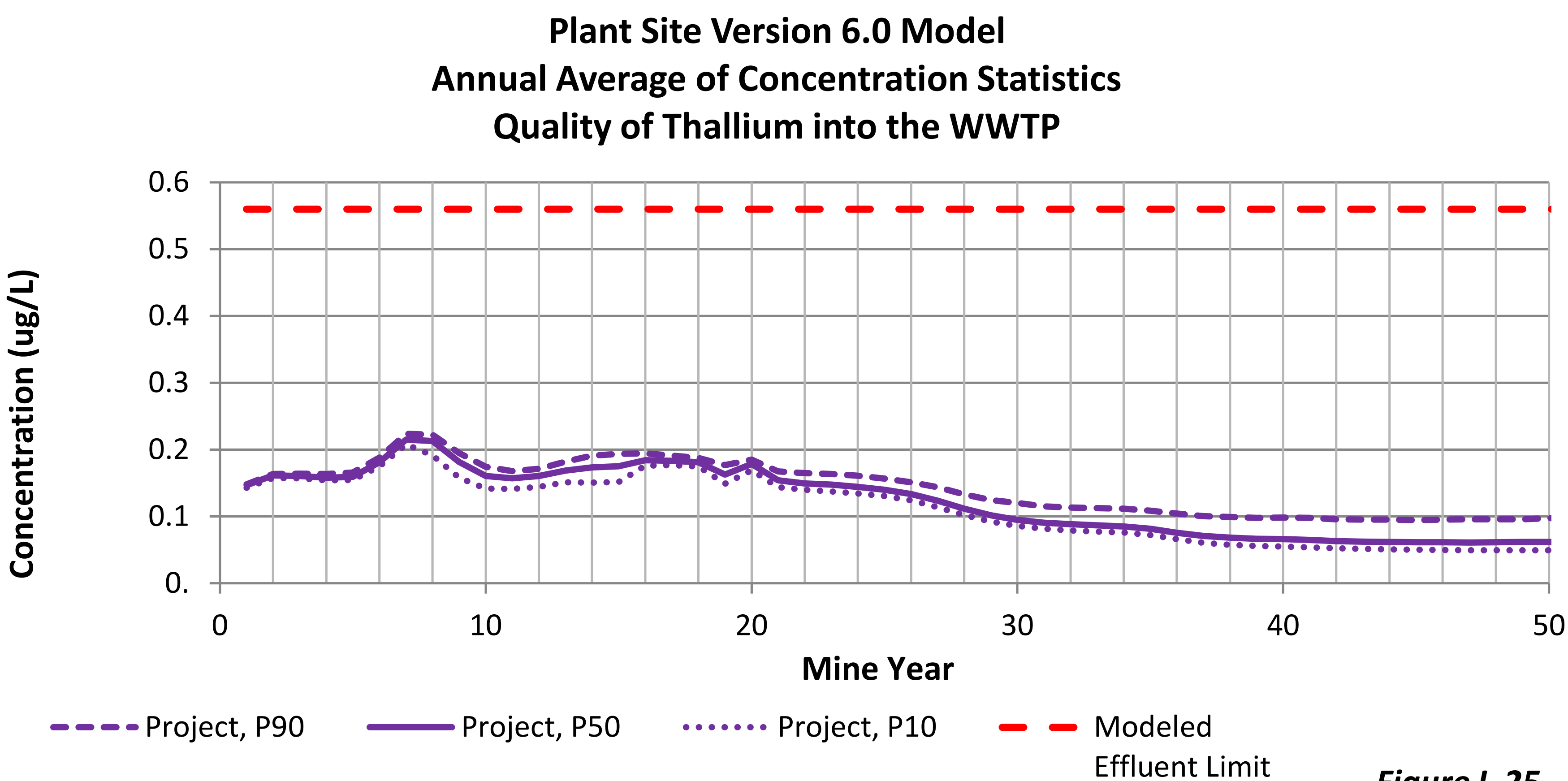

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Sulfate into the WWTP
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled
Effluent Limit

Figure L-24



Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Thallium into the WWTP
Concentration (ug/L)
0.6
0.5
0.4
0.3
0.2
0.1
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-25

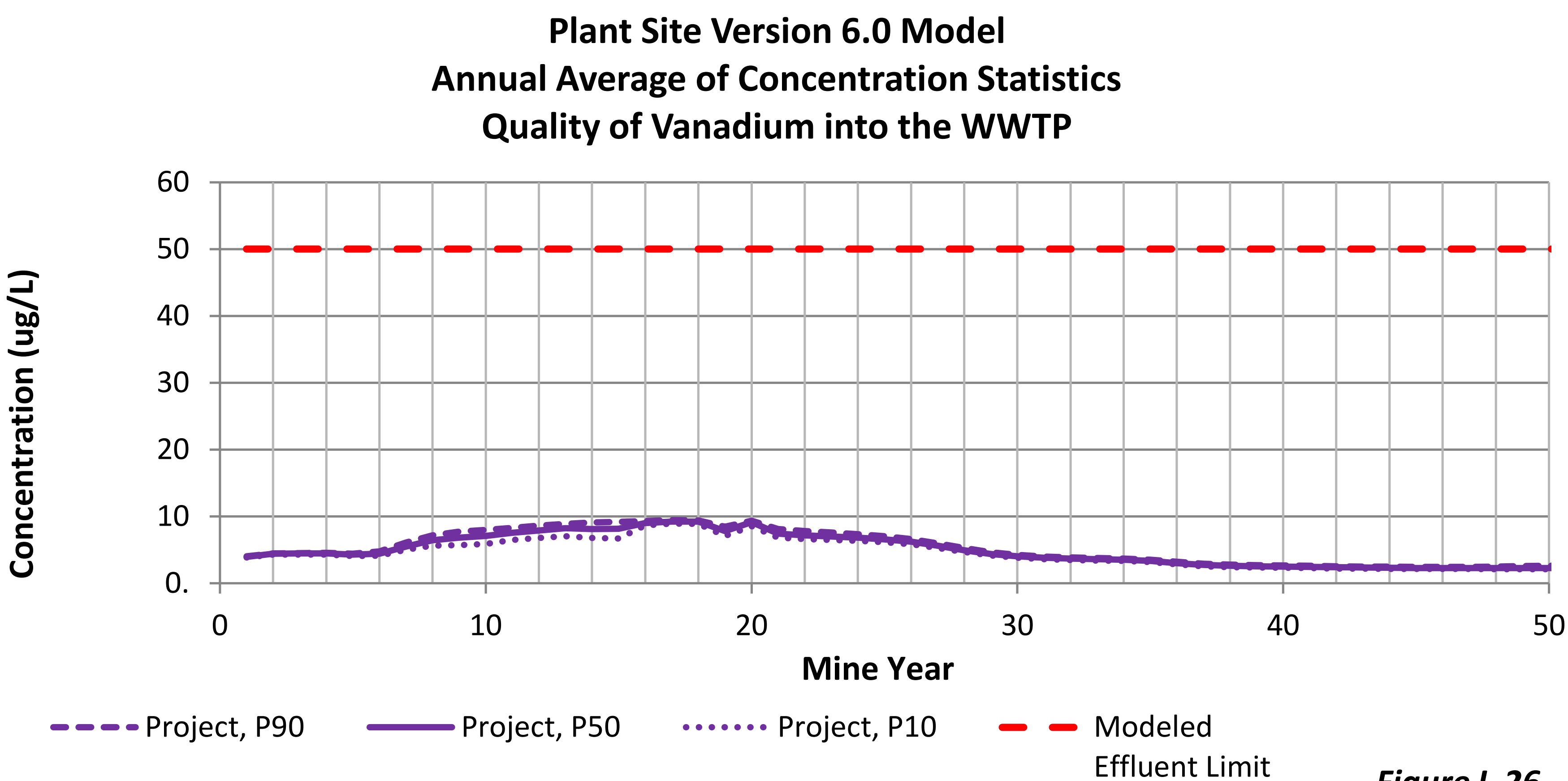
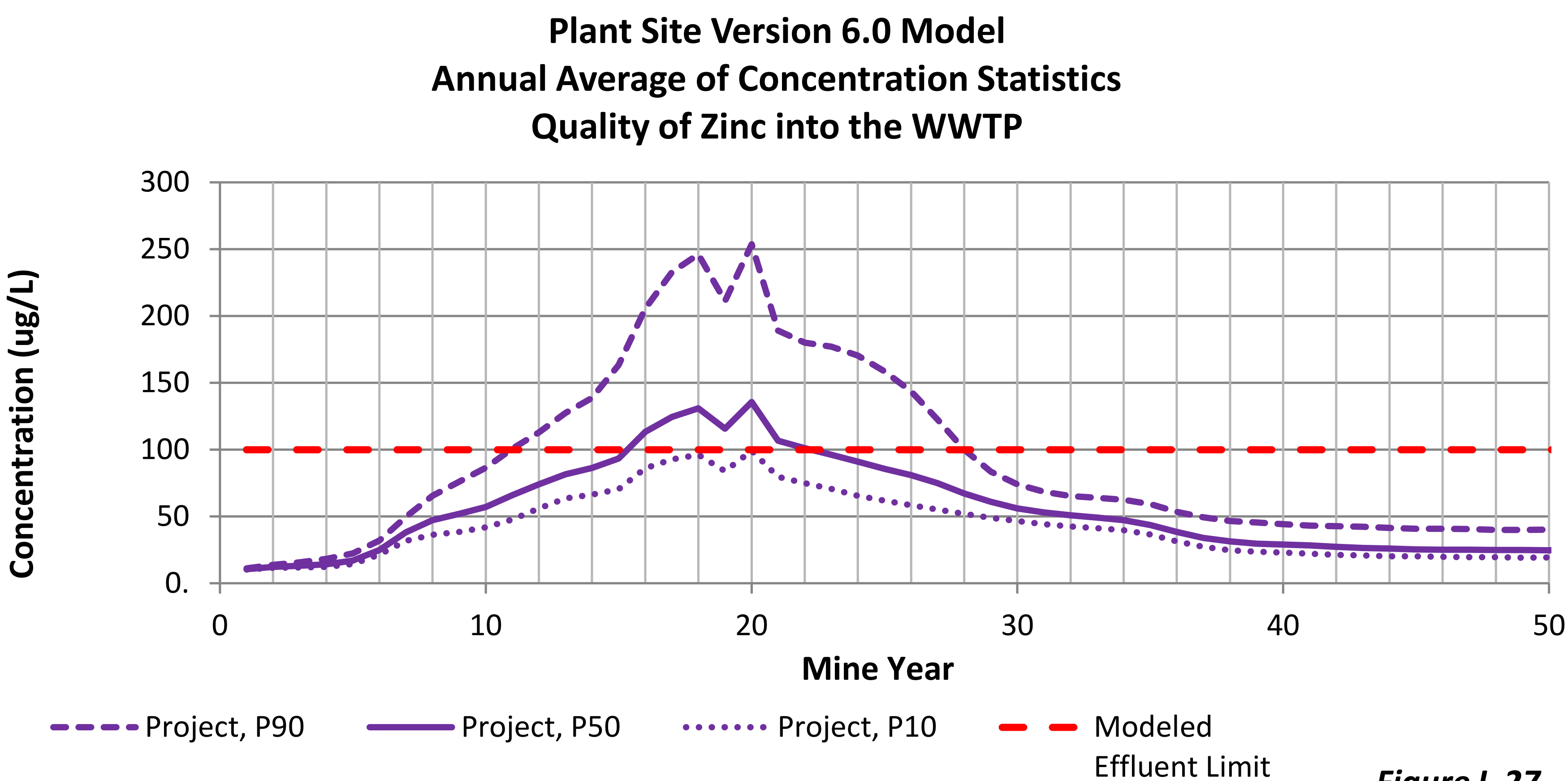

Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Vanadium into the WWTP
60
50
40
30
20
10
0.
Concentration (ug/L)
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-26



Plant Site Version 6.0 Model
Annual Average of Concentration Statistics
Quality of Zinc into the WWTP
Concentration (ug/L)
300
250
200
150
100
50
0.
0
10
20
30
40
50
Mine Year
Project, P90
Project, P50
Project, P10
Modeled Effluent Limit

Figure L-27

Attachment M

Quality Assurance Project Plan (QAPP)

NorthMet Project

Plant Site Water Quality Model
Quality Assurance Project Plan

Prepared by
Barr Engineering Company
On behalf of
PolyMet Mining Inc

Version 2

Issue Date: May 29, 2012

Table of Contents

1.0 Introduction

This document presents the Plant Site Water Quality Model Quality Assurance Project Plan (PSWQ-QAPP, or simply QAPP) for the water quality modeling presented in the Water Modeling Data Package Volume 2 – Plant Site (Reference (1)) and the NorthMet Plant Site Water Modeling Work Plan (Reference (2)). This QAPP follows the general guidance provided by EPA's Guidance for Quality Assurance Project Plans for Modeling (EPA QA/G-5M) as well as Barr Engineering Company's (Barr) Quality Management Plan, which was prepared in accordance to EPA QA/R-2.

1.1 Project Definition and Objectives

The primary objective of the probabilistic water quality model is to compare potential water quality impacts between project alternatives for the NorthMet Project (Project), in this case the No Action alternative and the Proposed Project alternative (also referred to as the Plant Site – Draft Alternative). This work is being conducted in support of the SDEIS for the Project. Details on the Project description are provided in Reference (3), and the model scenarios are documented in Section 3.1 of Reference (1). Water quality impacts are to be evaluated at specified locations within the surficial deposits and in area streams. Locations for evaluation are presented in Reference (1) Section 5.5 (surface water) and Section 5.4.2 (groundwater).

The probabilistic water quality modeling for the Plant Site will be conducted using GoldSim Version 10.5, SP2 (GoldSim Technology Group, 2011). The selection of this modeling platform, including a discussion of modeling needs and other platforms considered, is included in Section 3.2 of Reference (4) .

1.2 Background

The development of the work plan for the water quality modeling covered by this QAPP has been a rigorous process lead by the Co-lead Agencies for the SDEIS. This process, referred to as the Impact Assessment Planning (IAP) process, involved the Co-lead Agencies and Cooperating Agencies, and included the formation of small technical teams to discuss details of the water quality modeling and associated impact criteria. These discussions, and the water modeling work plans and data packages that document the decisions made in these discussions, addressed the following topics:

- Identification of the problem, including types of model output and locations for evaluation;
- Peer review of theory and equations used in the modeling;
- Selection of modeling platform;
- Identification of input parameters needed for modeling

- Assessment of accuracy and appropriateness of input data for use in the modeling; and
- Definition of output data that should be provided from the model.

The work plan and associated data packages, which provide the documentation of assumptions, theory, parameterization and input data discussed during the IAP process, are subject to Co-lead Agency review and approval. These topics will not be discussed in detail in this QAPP. Instead, this QAPP focus on how the model will be reviewed and verified in order to help ensure that the model is constructed consistent with the approved work plans and performs as expected.

1.3 Project/Task Organization

Barr will be performing the modeling work covered in this QAPP under contract to PolyMet Mining Inc (PolyMet). SRK Consultants, also under contract to PolyMet, are providing technical oversight of geochemistry aspects of the modeling which is described in Reference (5). The modeling is being conducted under the direction of the SDEIS Co-lead Agencies: the US Army Corps of Engineers, the US Forest Service, and the Minnesota Department of Natural Resources. The Co-lead Agencies may choose to include Cooperating Agencies, such as the U.S. Environmental Protection Agency, the Fond du Lac Band of Lake Superior Chippewa, the Bois Forte Band of Chippewa, and the Grand Portage Band of Lake Superior Chippewa, as well as the EIS contractor, ERM. The Co-lead Agencies have developed a technical review team for the Plant Site Water Quality Model, consisting of representatives from the Co-lead Agencies, a Regulating Agency (Minnesota Pollution Control Agency) and select Cooperating Agencies.

1.4 Special Training Requirements

The work covered by this QAPP requires the modeling team to have training or experience in several specific areas, including:

- Groundwater flow and contaminant transport modeling;
- Surface water hydrology modeling;
- Aqueous geochemistry; and
- Probabilistic modeling.

All lead modelers executing this work have taken formal training on the use of the modeling platform being used (GoldSim) for probabilistic modeling (training provided by GoldSim Technology Group on September 28-30, 2010).

Model reviewers need to have a basic understanding of the above areas, and must have a working familiarity with GoldSim. GoldSim Technology Group and Barr Engineering have held two “Introduction to GoldSim Probabilistic Simulation Environment” training sessions for the Co-lead and Cooperating Agencies (September 28, 2010 and June 2, 2011).

2.0 Quality Assurance Procedures

2.1 Data Quality Objectives

Because the data needs for the model and sources of data used for model inputs were addressed as part of the IAP and work plan review processes, review of model performance is more appropriate than data quality objectives. This QAPP addresses model performance by focusing on model corroboration and evaluation of model outputs. Section 2.3 documents the peer reviews that will be conducted on the GoldSim model and other associated models. Section 2.4 documents model performance evaluation tests that will be conducted.

Input data used in the model do have limitations due to incompleteness, measurement error, representativeness, etc. These issues are addressed by using a probabilistic modeling approach, which uses explicit representations of uncertainty and variability in defining the distribution parameters for the model inputs. The distributions parameters were subjected to technical review during the IAP and work plan review processes.

2.2 Model Calibration

Portions of the GoldSim model will be calibrated; the MODFLOW model, which provides data for use as input into the GoldSim model, will also be calibrated. Calibration of these models is discussed in the following locations:

- MODFLOW Model, Attachment A of Reference (1)
- GoldSim Model, Section 10.2.1 of Reference (5) and Sections 5.3.2 and 6.1.3.1.1 of Reference (1)

There were several portions of the GoldSim Model that were calibrated. Laboratory release rates for LTVSMC tailings were adjusted to mach field conditions observed at the Tailings Basin (Section 10.2.1 of Reference (5)). The water quality distributions used for groundwater and surface runoff from undisturbed areas will also be calibrated to match observed concentrations in the Embarrass River unimpacted by mining (Sections 5.3.2 of Reference (1)). Finally, evaporation and runoff rates from Cell 2W were calibrated to match the infiltration rates predicted by the MODFLOW model and variability determined from the Meyer Model (see Section 6.1.3.1.1 of Reference (1)).

2.3 Model Peer Review

The GoldSim model will undergo internal peer review using the GoldSim Model Technical Review Checklist provided in Appendix A. This review will focus on a review of model inputs relative to proposed values provided in the approved work plans, consistency of model construction relative to Reference (3), and verification that model equations are consistent with documentation provided in Reference (2) and Reference (1).

The MODFLOW models of the Tailings Basin will undergo peer review using the MODFLOW Model Technical Review Checklist provided in Appendix A. The Tailings Basin MODFLOW model is used to estimate seepage rates from the basin to each groundwater flow path, the sources of seepage for each flow path, and the depth of the phreatic surface within the Tailings Basin.

Each peer review will be conducted by Barr technical staff familiar with the model being reviewed (GoldSim or MODFLOW) and the Project, but not directly responsible for the construction of the models. Model review will be documented with the Model Technical Review Checklists, which will be provided with final model documentation.

2.4 Model Performance Evaluations

Model performance evaluation includes the quantitative and qualitative methods for evaluating the degree to which the model corresponds to reality. Several types of evaluations will be performed:

- Test cases – basic model runs where an analytical solution is available or an empirical solution is known to ensure that algorithms and computational processes are implemented correctly, also known as benchmarking;
- Model check – either simple desktop calculation checks of model results or model mass balance checks;
- Sensitivity analysis; and
- Corroboration of model results with observations.

Several model performance evaluations have already been conducted or scoped through the IAP process. These evaluations are summarized below. Additional evaluations may be identified during the modeling process either as a result of the internal peer reviews of the model, or as a result of the Co-lead Agencies formal review of the model. All model performance evaluations that are performed will be documented with the submittal of the modeling results in Reference (1).

2.4.1 Model Check – Tailings Basin Mass Balance

The contaminant transport functions within the GoldSim software are designed to maintain a consistent mass balance throughout the calculation procedure. Constituent mass is not allowed to enter or leave the system unless a transport pathway is defined by the user. A mass balance check will be implemented for the Tailings Basin to verify this functionality. This model check will help to ensure that all inflows and outflows of constituent mass from each feature are properly accounted for and documented.

2.4.2 Sensitivity Analysis – Interception Wells Capture Efficiency

The sensitivity of model predictions to the amount of Tailings Basin seepage is captured by the groundwater interception wells will be assessed. Interception wells are planned for capturing seepage from the Tailings Basin so that it does not seep water to the environment in excess of 500 gallons per acre per day. Additional seepage collection may be necessary in order to meet applicable water quality standards at the evaluation locations. The effects of collecting more or less seepage will be assessed in terms of both impacts to water quality predations in groundwater and surface water down gradient of the Tailings Basin, and water quality within the Tailings Basin ponds.

2.4.3 Model Corroboration – Existing Conditions Model vs Water Monitoring Data

The proposed modeling methodologies for the generation of load from the LTVSMC Tailings Basin and the transportation of this load to the receiving streams will be corroborated by simulating existing conditions with the GoldSim model.

A model simulation of existing conditions will be prepared and used to compare model estimated and measured concentrations at PM-13, MLC-2, PM-19 and PM-11. A qualitative comparison between the estimated and measured concentrations will be presented initially in a memorandum for Agency review, with eventual incorporation into Reference (4). These monitoring locations are downstream of the Tailings Basin, and in the case of PM-13, downstream of Area 5. This step focused on evaluating the model assumption and initial parameter values associated with the load generation at the Tailings Basin and the transport of this load to the receiving streams.

3.0 Documentation

Reference (4) will document the data, model formulation and details, and assumptions used in the model. This document will also present the methods and results of the Model Peer Review and Model Corroboration steps from Section 2.3 and 2.4 above. Any deviations in the model design, construction, calibration, or input values will be documented. Results of the calibration of the GoldSim model (see Section 2.2) will be presented to the technical review team established by the Co-lead Agencies prior to proceeding with the modeling.

An annotated version of the GoldSim model will be provided to the Co-lead Agencies for their review. All reports will be internally peer reviewed for data accuracy prior to release. Reference (4), Reference (5) and the GoldSim model files will be posted to the project website. In addition, the model files from the MODFLOW model will be made available for review by the Co-lead Agencies.

Revision History

Date	Version	Description
04/20/2012	1	Initial release
5/29/2012	2	Minor changes to text in response to agency comments in Sections 2.4 and 2.4.3

References

1. **PolyMet Mining, Inc.** NorthMet Project - Water Modeling Data Package, Volume 2 - Plant Site (v6). April 2012.

2. —. *NorthMet Project - Plant Site Water Modeling Work Plan (v5).* April 2012.

3. —. NorthMet Project - Project Description (v3). 2011.

4. —. NorthMet Project - Water Modeling Data Package, Volume 1 - Mine Site (v). December 2011.

5. —. NorthMet Project - Waste Characterization Data Package (v8). February 2012.

6. *User's Documentation for MODFLOW-96, an updated to the U.S. Geological Survey Modular Finite-Difference Ground-Water Flow Model.* **McDonald, M.G. and Harbaugh, A.W.** 1996, U.S. Geological Survey Open-File Report 96-485.

7. *MT3DMS: A Modular Three-Dimensional Multispecies Transport Model for Simulation of Advection, Dispersion, and Chemical Reactions of Contaminants in Groundwater Systems; Documentation and User's Guide.* **Zheng, C. and Wang, P.P.** 1999, U.S. Army Corps of Engineers Contract Report SERDP-99-1.

List of Appendices

Appendix A Model Technical Review Checklist

Appendix A

Model Technical Review Checklist

MODEL TECHNICAL REVIEW CHECKLIST

General - GoldSim

1. MODEL NAME:	**2. MODEL DATE:**
3. MODEL LOCATION:	
4. PROJECT NUMBER:	**5. PROJECT PIC:**
6. PRIMARY MODELER:	**7. REVIEWER:**
8. REVIEWER (<u>After</u> review is completed and all comments were resolved):	

printed name ____________________ concurrent signature ____________________ date ____________

No.	Criteria	Comments/Notes
1	Do model input values match documented input values?	

No.	Criteria	Comments/Notes
2	Are model equations consistent with equations or conceptual model document in the Work Plan?	

MODEL TECHNICAL REVIEW CHECKLIST

MODFLOW

1. MODEL NAME:	**2. MODEL DATE:**
3. MODEL LOCATION:	
4. PROJECT NUMBER:	**5. PROJECT PIC:**
6. PRIMARY MODELER:	**7. REVIEWER:**
8. REVIEWER (<u>After</u> review is completed and all comments were resolved):	

printed name   concurrent signature   date

No.	Criteria	Comments/Notes
1	Is the choice of mathematical model appropriate (analytical/numerical)?	
2	Is the purpose of the model (i.e. the problem(s) the model is intended to evaluate) clearly defined?	
3	Is the spatial extent of the model appropriate?	

4	In the number of model layers justified?	
5	Is the model discretization (planer) appropriate?	
6	Is steady state simulated?	
7	Is the stress period reasonable?	
8	Is the number of time steps per stress period justified?	
9	Are the applied boundary conditions plausible and unrestrictive?	
10	Are boundary condition locations consistent with the model grid configuration?	

11	Are the initial conditions defensible?	
12	Do model input values match documented input values?	
13	Are the calibrated parameter distributions and ranges plausible?	
14	Is model mass balance error between -1% and 1%?	
15	Does the calibration statistic satisfy agreed performance criteria if specified, or industry standards if not specified?	
16	Are model predictions made at scales consistent with model space and time scales?	
17	Are model predictions plausible?	

18	Are model predictions likely to be impacted by constraining boundary conditions?	
19	If boundary conditions affect the predictions, are the predictions defensible?	

MODEL TECHNICAL REVIEW CHECKLIST

XP-SWMM

1. MODEL NAME:	**2. MODEL DATE:**
3. MODEL LOCATION:	
4. PROJECT NUMBER:	**5. PROJECT PIC:**
6. PRIMARY MODELER:	**7. REVIEWER:**
8. REVIEWER (<u>After</u> review is completed and all comments were resolved): printed name concurrent signature date	

No.	Criteria	Comments/Notes
1	Is runoff continuity error between -1% to 1%. If not correct or determine why & impacts? (Table R5)	
2	Does the Number of watersheds listed in the output file match Arc View?	
3	Does the Total watershed area listed in the output file match the total study area?	

4	Does the total rainfall amount listed in the output file match the rainfall amount for the storm frequency and duration that is being modeled?	
5	Are the rainfall dates contained within the Runoff simulation dates?	
6	Is the same rainfall global database being used for all the watersheds? (Table R2)	
7	Is the same runoff methodology being used for all the watersheds? (Table R2)	
8	Is the correct rainfall distribution being used for the simulated storm frequency & duration?	
9	Do the Infiltration inputs (global databases) seem reasonable including overland flow roughness and Horton/Green Ampt parameters (Table R2)	
10	Do the infiltration assumptions include water areas when appropriate (Zero % Detention)?	

11	Are there any flow redirections in the Runoff layer? Does redirected flow get added appropriately?	
12	Were correct units assumed during watershed data entry? (Table R1) (Area = ac, Percent Impervious = % (directly connected only), Width = ft, Slope = ft/ft	
13	Do peak watershed runoff rates seems reasonable when compared to "Rules of Thumb", Rational Method, Barr Method, etc? (Table R9)	
14	Does runoff volumes seems reasonable when compared to Barr Method, SCS method, etc? (Table R9)	
15	Have all warnings & errors been corrected prior to final simulation? (Error log prior to simulating the Hydraulics layer)	
16	Does the Hydraulics layer simulation dates span the Runoff simulation dates? If no correct.	
17	Is Hydraulics continuity error between -2% to 2% (Table E22). May be allowable as high as 5% but must be checked and explained.	

18	Are "Special Conduits" (Arches, Ellipses, etc) being modeled correctly by XP-SWMM? Check pipe cross sectional area against manufacturer information to make sure correct area is used. (Table E1)	
19	Have conduit minor losses (entrance/exit, other, expansion/contraction) been entered throughout the model? (Table E2)	
20	Has storage information been entered correctly (Depth = El - Node Inv El & area in acres)?	
21	Was Ponding Allowed used? Where & Why?	
22	Check weir parameters to make sure crown El results in weir surcharging only when appropriate.	
23	Check Orifice parameters.	
24	Check Pump curves	

25	Check User Inflow Hydrographs @ all node they are used	
26	Check user defined rating curves and weirs	
27	Are pipe flow & velocities reasonable? (Table E15)	
28	Is there any water being "Lost from the System"? Check for flooding/surcharge (Table E3B & E20). Lost water must be corrected	
29	Are the correct number of weirs, orifices, and pumps being used? (after Table E20)	
30	Is model simulation stable? (i.e., Are there any flow/elevation oscillations in any nodes/links that impact results?) If unstable the model must be corrected.	
31	Are most nodes converging? (Table E18 or E22) If not some model adjustments may be necessary	

32	Are there any open channels (Trapezoidal or Natural Sections) that overtop during the simulation that most be corrected? (Look for * in Table E10)	
33	Is storage being double counted by using channels and a storage node? If so this must be corrected?	
34	Does Hydraulic simulation extended long enough to capture all the peak flows/elevations?	
35	Have initial depths been entered to account for tailwater conditions and pond normal water levels?	
36	Are the correct boundary conditions being used? (Tailwater Elevations)	

Summary of Quality Assurance Procedure Tasks

QAPP Section	Description	Location
2.2	Documentation of MODFLOW model calibration	Plant Site Water Modeling Data Package, Attachment A
2.2	Documentation of GoldSim model calibration	Plant Site Water Modeling Data Package, Attachment C Also, included in "Summary of Water Related Model Calibrations and Plant Site Corroboration," Technical Memo from Greg Williams (Barr Engineering) to Erik Carlson (MnDNR), July 24, 2012
2.3	GoldSim Model Technical Review Checklist	Following this table
2.3	MODFLOW Model Technical Review Checklist	Following this table
2.4.1	Model Check - Tailings basin mass balance	Plant Site Water Modeling Data Package, Section 6.2
2.4.2	Sensitivity Analysis - Interception Wells Capture Efficiency	Analysis no longer relevent due to project changes
2.4.3	Model Corroboration - Existing Conditions Model vs. Water Monitoring Data	Included in "Summary of Water Related Model Calibrations and Plant Site Corroboration," Technical Memo from Greg Williams (Barr Engineering) to Erik Carlson (MnDNR), July 24, 2012

MODEL TECHNICAL REVIEW CHECKLIST

General - GoldSim

1. MODEL NAME:	**NorthMet_PlantSite_Base_v6.gsm**	**2. MODEL DATE:**	30-Dec-14
3. MODEL LOCATION:	**P:\Mpls\23 MN\69\2369862\WorkFiles\APA\Support Docs\Surface WQ\Workfiles\Models\GoldSim\Tailings Basin\2014 FEIS Model\Base Model**		
4. PROJECT NUMBER:	**23/69-0862.00 042 008**	**5. PROJECT PIC:**	**CDP**
6. PRIMARY MODELER:	**CDA**	**7. REVIEWER:**	**PJH2**

8. REVIEWER (After review is completed and all comments were resolved):

Peter Hinck	Peter Hinck	1/8/2015
printed name	concurrent signature	date

No.	Criteria	Comments/Notes
1	Do model input values match documented input values?	See attached memo from Peter Hinck, dated January 8, 2015, and attached annotated Table 1-1 and other input tables with edits. CDA reviewed the memo and input tables and made the necessary documentation corrections in input tables and the model file. All but one comment was resolved without a change to the model inputs. Upon review of the memo and input tables CDA corrected the input table referencing for model element N_Beach_Sat_Vol and the GoldSim model re-run.
2	Are model equations consistent with equations or conceptual model document in the Work Plan?	See attached memo from Peter Hinck dated January 8, 2015

resourceful. naturally.
engineering and environmental consultants

BARR

Internal Memorandum

To: Project File
From: Peter Hinck
Subject: Plant Site GoldSim Water Quality Model QA/QC
Date: January 8, 2015
Project: 23690862.00-042-008

Peter Hinck was asked to perform a QA/QC check of the inputs to the Plant Site GoldSim model. He was given the model (file name *NorthMet_PlantSite_Base_v6.gsm*, dated 12/30/2014 at 8:06 am) from the folder *P:\Mpls\23 MN\69\2369862\WorkFiles\APA\Support Docs\Surface WQ\Workfiles\Models\GoldSim\Tailings Basin\2014 FEIS Model\Base Model*. The model has been previously reviewed extensively. For this round of review only the inputs that had changed since the previous model review were reviewed, assuming that all other inputs were left alone and had been previously checked and discrepancies had been previously addressed. The input values present in the GoldSim file were checked against the input tables compiled for inclusion in the data package (*All Work Plan Figures and Tables v10 JAN2015.pdf*, dated 12/22/2014 at 4:27 pm). This review did not include water balances or the logic of changed portions of the model, those are being reviewed by others.

The following inconsistencies between the actual GoldSim model and the stated model inputs were found during this model review. Review notes are attached in an annotated version of the compiled input tables.

1) The element description in the input tables (Table 1-1) and the model elements does not match for some elements.
2) Several input tables have very small differences (third decimal place) in input concentration between the model file and the input tables.
3) One element (*N_Beach_Sat_Vol*) appears to reference an incorrect input table in the GoldSim model for one of its input arrays (North Beach), while the other input arrays reference the correct input table (Table 1-28).

These findings were discussed with the primary modeler (Cory Anderson). Item (1) represents minor inconsistencies that Cory will address within the documentation or model as appropriate. Item (2) is due to the compiled input table document not being updated with slightly changed model inputs for several variables; the model is correct and Cory will update the compiled input table document. Item (3) represents a model error that will be corrected and the model re-run.

An additional external peer review of the GoldSim model, including all inputs and multiple calculations within the model file itself, was performed by ERM and submitted to the Co-lead Agencies in several phases. The final comprehensive review document ("NorthMet Mining Project GoldSim Water Quality Model – Phase 3 Quality Assurance", February 25, 2013) is attached. The model that was reviewed by ERM in 2013 was the model modified to create the model reviewed and discussed here. Therefore, this same extensive review of the model itself was not redone. The model will be reviewed again, however, by ERM to ensure that the few and minor changes to the model construction are understood and were complete and accurate.

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Water Quality Standards											
Surface_Constant_Standards	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-2				Constant surface water quality standards applicable to the project	MN Rules 7050 and 7052	Water Section 2.1 - *Minnesota Surface Water Quality Standards*
SW_Hardness_Standard	[mg/L]	Deterministic	N/A	Constant	500	N/A	N/A	N/A	Constant surface water standard for hardness	MN Rule 7050	Water Section 2.1 - *Minnesota Surface Water Quality Standards*
Surface_Hardness_Standards	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-3				Hardness-dependent surface water quality standards applicable to the project	MN Rules 7050 and 7052	Water Section 2.1 - *Minnesota Surface Water Quality Standards*
Ground_Primary_Standards	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-4				Constant Primary groundwater quality standards applicable to the project	MN Rules 7060 and 4717	Water Section 2.3 - *Minnesota Groundwater Standards*
Prim_GW_Hardness_Stand	[mg/L]	Deterministic	N/A	Constant	999999	N/A	N/A	N/A	Placeholder input to model; indicating that there is no applicable standard	MN Rules 7060 and 4717	Water Section 2.3 - *Minnesota Groundwater Standards*
Ground_Secondary_Standards	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-4				Constant Secondary groundwater quality standards presented for reference	MN Rules 7060 and 4717	Water Section 2.3 - *Minnesota Groundwater Standards*
Sec_GW_Hardness_Stand	[mg/L]	Deterministic	N/A	Constant	999999	N/A	N/A	N/A	Placeholder input to model; indicating that there is no applicable standard	MN Rules 7060 and 4717	Water Section 2.3 - *Minnesota Groundwater Standards*
PM13_Hardness_Stndrd	[mg/L]	Deterministic	N/A	Constant	117	N/A	N/A	N/A	Median hardness at PM-13 used for the hardness-based standards at PM-13	Median value of monitoring data at PM-13 between 4/12/04 and 12/19/13	Water Section 2.1.1 - *Hardness-based Standards*
General Engineering Variables											
Closure_Year	[yr]	Deterministic	N/A	Constant	20	N/A	N/A	N/A	Year when operations cease	Project Description	Water Section 5.1.2 - *Project Model*
Water_Depth	[in]	Deterministic	N/A	Constant	0.1	N/A	N/A	N/A	Average depth of water at the bottom of stockpile (for volume calculation)	See Mine Site Work Plan Tables	None
Tiny_Area	[acre]	Deterministic	N/A	Constant	0.001	N/A	N/A	N/A	Tiny area to prevent dividing by zero	See Mine Site Work Plan Tables	None
Tiny_Mass	[kg]	Deterministic	N/A	Constant	0.001	N/A	N/A	N/A	Tiny mass to prevent dividing by zero	See Mine Site Work Plan Tables	None
Tiny_Volume	[m^3]	Deterministic	N/A	Constant	0.001	N/A	N/A	N/A	Tiny volume to prevent dividing by zero	See Mine Site Work Plan Tables	None

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Plant Site Hydrology											
Precip_cuberoot	[--]	Uncertain	Annually	Normal	3.03	0.15	N/A	N/A	Cubed root of the annual precipitation in inches	HiDen Climate network for Mine Site (1981-2010 climate normal)	Water Section 5.2.1.1.1 - *Precipitation*
Annual_P_Variation	[yr/mon]	Deterministic	N/A	Constant	Vector by month. Reference Table 1-51				Fraction of annual precipitation that falls each month	HiDen Climate network for Mine Site (1981-2010 climate normal)	Water Section 5.2.1.1.1 - *Precipitation*
Open_Water_Evap_OPS_Early	[in/yr]	Uncertain	Annually	Normal	32.5	0.56	N/A	N/A	Evaporation rate from open water in Cell 2E only during operations (artificially heated water)	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Open_Water_Evap_OPS_Late	[in/yr]	Uncertain	Annually	Normal	30.8	0.69	N/A	N/A	Evaporation rate from open water in combined Cell2E and 1E during operations (artificially heated water)	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Open_Water_Evap_CLSR	[in/yr]	Uncertain	Annually	Normal	17.1	2.16	N/A	N/A	Evaporation rate from open water after operations (normal temperature water)	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.1.1.2 - *Evaporation (Open Water)*
Annual_E_Variation	[yr/mon]	Deterministic	N/A	Constant	Vector by month. Reference Table 1-51				Fraction of annual evaporation that occurs each month	HiDen Climate network for Mine Site (1981-2010 climate normal)	Water Section 5.2.1.1.2 - *Evaporation (Open Water)*
Beach_Evap_Frac	[--]	Uncertain	Annually	Normal	0.528	0.046	N/A	N/A	Fraction of precipitation that evaporates from the Flotation Tailings beaches	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Beach_RO_Frac	[--]	Uncertain	Annually	Normal	0.195	0.043	N/A	N/A	Fraction of precipitation that becomes runoff from the beaches	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Delta_Evap	[in/yr]	Uncertain	Annually	Normal	46.0	0.69	N/A	N/A	Evaporation rate from the active delta in the Flotation Tailings beach	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Beach_BNT_Evap_Frac	[--]	Uncertain	Annually	Normal	0.662	0.073	N/A	N/A	Fraction of precipitation that evaporates from the bentonite-amended Flotation Tailings beaches	HELP modeling conducted by Golder	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Beach_BNT_RO_Frac	[--]	Uncertain	Annually	Trunc. Normal	0.126	0.063	0	N/A	Fraction of precip that runs off the amended beaches	HELP modeling conducted by Golder	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Rec_Bank_Evap_Frac	[--]	Uncertain	Annually	Normal	0.662	0.073	N/A	N/A	Fraction of precipitation that evaporates from the bentonite-amended dams	HELP modeling conducted by Golder	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Rec_Bank_RO_Frac	[--]	Uncertain	Annually	Trunc. Normal	0.126	0.063	0	N/A	Fraction of precip that runs off the amended dams	HELP modeling conducted by Golder	Water Section 5.2.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
LTVSMC_Tailings_Evap_Frac	[--]	Uncertain	Annually	Normal	0.367	0.037	N/A	N/A	Fraction of precipitation that evaporates from the LTVSMC tailings in Cells 1E, 2E, & 2W	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.1 - *Evapotranspiration, Runoff and Infiltration – Cell 2W*
Cell2W_RO_Frac	[--]	Uncertain	Annually	Normal	0.003	0.0005	N/A	N/A	Fraction of precip that runs off the coarse tailings in Cell 2W	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.1 - *Evapotranspiration, Runoff and Infiltration – Cell 2W*
Cell1E_Coarse_RO_Frac	[--]	Uncertain	Annually	Normal	0.480	0.073	N/A	N/A	Fraction of precip that runs off the coarse tailings in Cell 1E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell1E_Fines_RO_Frac	[--]	Uncertain	Annually	Normal	0.469	0.072	N/A	N/A	Fraction of precip that runs off the fine tailings in Cell 1E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2E_Coarse_RO_Frac	[--]	Uncertain	Annually	Normal	0.423	0.065	N/A	N/A	Fraction of precip that runs off the coarse tailings in Cell 2E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2E_Fines_RO_Frac	[--]	Uncertain	Annually	Normal	0.498	0.076	N/A	N/A	Fraction of precip that runs off the fine tailings in Cell 2E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2E_Bank_Evap_Frac	[--]	Uncertain	Annually	Normal	0.538	0.054	N/A	N/A	Fraction of precip that evaporates from the banks of Cell 2E	Coeff. of Var. from updated Meyer Model, calibrated to updated ex. cond. MODFLOW model	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2W_Bank_Evap_Frac	[--]	Uncertain	Annually	Normal	0.425	0.043	N/A	N/A	Fraction of precip that evaporates from the banks of Cell 2W	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Cell2W_Bank_RO_Frac	[--]	Uncertain	Annually	Normal	0.248	0.038	N/A	N/A	Fraction of precipitation that becomes runoff from the embankments of Cell 2W	Meyer Model, developed for the DEIS modeling (RS-13B), and updated for the new climate normal	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Min_Climate_Infiltration	[in/yr]	Deterministic	N/A	Constant	0.1	N/A	N/A	N/A	Minimum infiltration allowed in the tailings beaches and dams for model stability purposes (eliminate divide by zero)	Assumed	Water Section 5.2.1.2.2 - *Evapotranspiration, Runoff and Infiltration – Cells 1E and 2E*
Bare_ET	[--]	Uncertain	Realization	Normal	0.524	0.020	N/A	N/A	ET from bare waste rock as a fraction of precipitation	See Mine Site Work Plan Tables	None
Bare_RO	[--]	Deterministic	N/A	Constant	0	N/A	N/A	N/A	Runoff from bare waste rock as a fraction of precipitation	See Mine Site Work Plan Tables	None
SnowMelt_Start	[--]	Deterministic	N/A	Constant	4	N/A	N/A	N/A	Month of the year when snow melt starts	Analysis of flow record and watershed yield	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
SnowMelt_Stop	[--]	Deterministic	N/A	Constant	5	N/A	N/A	N/A	Final snow melt month of the year	Analysis of flow record and watershed yield	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Frozen_Period	[mon]	Uncertain	Annually	Triangular	3.4	N/A	2.4	4.4	Number of months each year that the inactive tailings are frozen and limit oxygen diffusion	Analysis of site specific temperature data	Waste Section 10.2 - *Lab to Field Scale Up*

Plant Site Chemistry

GW_Alpha_Rand (see Table 1-5)	[--]	Uncertain	Realization	Normal	GW_Alpha_Mean	GW_Alpha_Stdev	N/A	N/A	Vector by constituent, mean of the LN transformed baseline groundwater quality	Analysis of groundwater on-site groundwater wells	Water Section 5.2.1.3.5 - *Background Groundwater Quality*
GW_Beta	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-5				Standard Deviation of the LN transformed baseline groundwater quality	Analysis of groundwater on-site groundwater wells	Water Section 5.2.1.3.5 - *Background Groundwater Quality*
SW_RO_Concentration (see Table 1-6)	[ug/L]	Uncertain	Timestep	Lognormal	RO_Mean	RO_StDev	N/A	N/A	Concentration of surface runoff in the un-impacted watershed	Calibration to existing water quality in the Embarrass River	Water Section 5.2.1.4.5 - *Background Watershed Runoff Quality*
INIT_Concs	[mg/L]	Deterministic	N/A	Constant	Matrix by constituent and location. Reference Table 1-7				Initial Concentrations in the surface water evaluation locations	Sampled water quality data	Water Section 5.2.3.3 - *Surface Water Initiation*

Mine Site Water

Mine_Site_Flow_Rate	[gpm]	Uncertain	Timestep	Trunc. Normal	Reference Table 1-8		0	1E+10	Flow at any point in time from the Mine Site WWTF to the FTB, auto-correlated (0.9) per data package	Mine Site probabilistic water quality model	Water Section 5.2.2.2.1 - *Inflow from Mine Site WWTF*
Mine_Site_Conc	[mg/L]	Uncertain	Timestep	Trunc. Normal	Table 1-9	Table 1-10	0	1E+10	Concentration for all constituents at any time in the water from the Mine Site WWTF to the FTB	Mine Site probabilistic water quality model	Water Section 5.2.2.2.1 - *Inflow from Mine Site WWTF*

Colby Lake

CL_Quality (see Table 1-44)	[mg/L]	Uncertain	Timestep	Lognormal	CL_Mean	CL_SD	N/A	N/A	Concentration for all constituents at any time in the water from Colby Lake	Sampled Surface Water Data, CDF062	Water Section 5.2.2.8.2 - *Colby Lake*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	Units	Deterministic/ Uncertain	Sampling/ Calculation Frequency	Distribution	Mean or Mode	Standard Deviation	Minimum	Maximum	Description	Source of Input Data	Modeling Package Section
NorthMet Tailings Hydraulic Properties											
NM_SG	[--]	Deterministic	N/A	Constant	3.0	N/A	N/A	N/A	Specific gravity of the NorthMet tailings (both coarse and fine fractions)	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
Beach_Porosity	[cm^3/cm^3]	Uncertain	Annually	Triangular	0.4012	N/A	0.3668	0.4685	Porosity of the tailings in the NorthMet beaches	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Pond_Porosity	[cm^3/cm^3]	Uncertain	Annually	Triangular	0.5602	N/A	0.4049	0.5696	Porosity of the tailings under the Flotation Tailings Basin pond	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Mean_Perc_Fines	[%]	Deterministic	N/A	Constant	35	N/A	N/A	N/A	Average percentage of the flotation tailings beach that is made up of fine flotation tailings	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Perc_Fines_Retained	[%]	Uncertain	Annually	Normal	Mean_Perc_Fines	3.04	N/A	N/A	Percent of the NorthMet tailings in the beaches that are from the fine fraction (by mass)	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Perc_Coarse_Feed	[%]	Uncertain	Annually	Normal	38	1.82	N/A	N/A	Percent of the NorthMet tailings feed that is in the coarse fraction (by mass)	Interpretation of the SAFL Depositional Study	Waste Section 5.1.3.1 - *Depositional Study*
Ksat_Coeff	[--]	Deterministic	N/A	Constant	Function coefficients. Reference Table 1-11				Function coefficients to determine the saturated hydraulic conductivty of the NorthMet tailings	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
ResMoist_Coeff	[--]	Deterministic	N/A	Constant	Function coefficients. Reference Table 1-11				Function coefficients to determine the residual moisture content of the NorthMet tailings	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
AirSuct_Coeff	[--]	Deterministic	N/A	Constant	Function coefficients. Reference Table 1-11				Function coefficients to determine the air entry suction parameter of the NorthMet tailings	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
VGBeta_Coeff	[--]	Deterministic	N/A	Constant	Function coefficients. Reference Table 1-11				Function coefficients to determine the Van Genuchten parameter β of the NorthMet tailings	DBS&A Analysis and Report	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_SG	[--]	Deterministic	N/A	Constant	3.0	N/A	N/A	N/A	Specific gravity of the bentonite amended tailings	The same as the specific gravity of the NorthMet Flotation Tailings	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_Porosity	[cm^3/cm^3]	Deterministic	N/A	Constant	0.36	N/A	N/A	N/A	Porosity of the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_Ksat	[cm/s]	Deterministic	N/A	Constant	5.56E-06	N/A	N/A	N/A	Saturated hydraulic conductivity of the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_ResMoist	[cm^3/cm^3]	Deterministic	N/A	Constant	0.07	N/A	N/A	N/A	Residual moisture content of the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_AirSuct	[1/cm]	Deterministic	N/A	Constant	0.005	N/A	N/A	N/A	Air entry suction parameter for the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
BNT_VGBeta	[--]	Deterministic	N/A	Constant	1.09	N/A	N/A	N/A	Van Genuchten Beta parameter for the bentonite amended tailings	HYDRUS model database for a silty-clay	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC Tailings Hydraulic Properties											
LTVSMC_SG	[--]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Specific gravity of the different classes of the LTVSMC tailings	Unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_Porosity	[cm^3/cm^3]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Porosity of the different classes of the LTVSMC tailings	Unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_Ksat	[cm/s]	Deterministic	N/A	Constant	Matrix by tailings and Cell. Reference Table 1-12a & Table 1-12b				Saturated hydraulic conductivity of the LTVSMC tailings	Unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_ResMoist	[cm^3/cm^3]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Residual moisture content of the LTVSMC tailings	Unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_AirSuct	[1/cm]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Air entry suction parameter for the LTVSMC tailings	Fitted curves to data from the unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
LTVSMC_VGBeta	[--]	Deterministic	N/A	Constant	Vector by tailings type. Reference Table 1-12a				Van Genuchten Beta parameter for the LTVSMC tailings	Fitted curves to data from the unsaturated geotechnical modeling	Waste Section 10.3 - *Saturation and Oxygen Diffusion*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Saturation-Diffusion Inputs											
O2_Air_Diff	$[m^2/s]$	Deterministic	N/A	Constant	1.80E-05	N/A	N/A	N/A	Free diffusion coefficient of oxygen in air	Cussler, 1997	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
O2_Water_Diff	$[m^2/s]$	Deterministic	N/A	Constant	2.20E-09	N/A	N/A	N/A	Free diffusion coefficient of oxygen in water	Cussler, 1997	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
Tortuosity	[--]	Deterministic	N/A	Constant	0.273	N/A	N/A	N/A	Tortuosity factor	Elberling, 1993	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
C	[--]	Deterministic	N/A	Constant	3.28	N/A	N/A	N/A	Empirical coefficient in the Elberling equation	Elberling, 1993	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
KH	[--]	Deterministic	N/A	Constant	33.9	N/A	N/A	N/A	Henry's constant for oxygen	Known value	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
O2_Conc_Air	$[mol/m^3]$	Deterministic	N/A	Constant	8.89	N/A	N/A	N/A	Concentration of oxygen in the air (boundary condition)	Known value	Waste Section 10.3 - *Saturation and Oxygen Diffusion*
Pond_DO (see Table 1-18)	[mg/L]	Uncertain	Monthly	Normal	Pond_DO_Mean	Pond_DO_SD	N/A	N/A	Oxygen concentration in the tailings basin ponds which seeps into the tailings generating chemical load	DO saturation at expected yet conservative pond water temperatures	Waste Section 10.6.1 - *Oxidation of Saturated Tailings*
NorthMet Tailings Chemical Loading											
NM_Fines_Release	[varies]	Uncertain	Realization	Varies	Vector by constituent. Reference Table 1-13				Distribution parameters for constituent release rates and ratios from the fine fraction of the NorthMet tailings	Analysis of HCT, Aqua Regia, and Microprobe data	Waste Section 10.1.1 - *NorthMet Tailings*
NM_Coarse_Release	[varies]	Uncertain	Realization	Varies	Vector by constituent. Reference Table 1-14				Distribution parameters for constituent release rates and ratios from the coarse fraction of the NorthMet tailings	Analysis of HCT, Aqua Regia, and Microprobe data	Waste Section 10.1.1 - *NorthMet Tailings*
Ratio_or_Conc_NM	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-13 & Table 1-14				Defines whether a release rate is from a release ratio (1) or from a concentration (0)	Release Method	Waste Section 10.1.1 - *NorthMet Tailings*
Atmospheric_pH	[--]	Uncertain	Realization	Uniform	N/A	N/A	7.8	8.1	Estimate of the pH in the areas of the FTB dominated by advection of surface water	See Mine Site Work Plan Tables	Waste Section 10.4 - *Concentration Caps*
Enriched_pH	[--]	Uncertain	Realization	Discrete	7.1	N/A	N/A	N/A	Estimate of the pH in the CO2 enriched areas of the FTB	CDF056	Waste Section 10.4 - *Concentration Caps*
NM_Solubility	[mg/L]	Uncertain	Realization	Varies	Vector by constituent. Reference Table 1-15				Concentration cap distributions for each constituent in the NorthMet Tailings	Category 1 Waste Rock	Waste Section 10.4 - *Solubility Limits*
NM_Content	[mg/kg]	Deterministic	N/A	Constant	Matrix by Constituent and Tailings Class. Reference Table 1-16				Whole tailings content for depletion modeling	Aqua Regia data	Waste Section 10.6.6 - *Depletion*
NM_Tailings_Weathering	$[mg/m^2/mon]$	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-17				Weathering rate by the NorthMet tailings beaches	RS46	Waste Section 10.6.2 - *Tailings Weathering*
LTVSMC Tailings Chemical Loading											
Dist_Params_LTVSMC_Release	[varies]	Uncertain	Realization	Varies	Matrix by constituent and parameter. Reference Table 1-19				Distribution parameters for the release rates from the existing LTVSMC tailings	Analysis of HCT, Aqua Regia, and Microprobe data	Waste Section 10.1.2 - *LTVSMC Tailings*
LTVSMC_Flush	[mg/kg]	Uncertain	Realization	Beta	Matrix by constituent and parameter. Reference Table 1-20				One-time loading from the disturbed LTVSMC tailings as the dams are constructed	Analysis of HCT, Aqua Regia, and Microprobe data	Waste Section 10.1.2 - *LTVSMC Tailings*
Coarse_Calib_Fact	[--]	Deterministic	N/A	Constant	0.2	N/A	N/A	N/A	Calibration factor to modify the SO4 release rate from the coarse LTVSMC tailings	Calibration of the existing conditions / No Action Model	Waste Section 10.2.1 - *Scaling / Calibration of LTVSMC Lab Data to Field Data*
Fine_Calib_Fact	[--]	Deterministic	N/A	Constant	0.7	N/A	N/A	N/A	Calibration factor to modify the SO4 release rate from the fine LTVSMC tailings	Calibration of the existing conditions / No Action Model	Waste Section 10.2.1 - *Scaling / Calibration of LTVSMC Lab Data to Field Data*
LTVSMC_Calib_Fact	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-21				Calibration factor applied to each constituent so that the theoretical loading matches the observed seepage data	Calibration of the existing conditions / No Action Model	Waste Section 10.2.1 - *Scaling / Calibration of LTVSMC Lab Data to Field Data*
Ratio_or_Conc_LTV	[--]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-21				Defines whether a release rate is from a release ratio (1) or from a concentration (0)	Release Method	Waste Section 10.2.1 - *Scaling / Calibration of LTVSMC Lab Data to Field Data*
LTVSMC_Content	[mg/kg]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-22				Whole tailings content for depletion modeling	Aqua Regia data	Waste Section 10.6.6 - *Depletion*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Geochemical Parameters for Scaling											
Activation_energy	[kJ/mol]	Uncertain	Realization	Uniform	N/A	N/A	47	63	Activation energy of pyrrhotite for the Arrhenius equation	Literature-reported range	Waste Section 8.3 - *Lab to Field Scale Up*
Contact_factor	[--]	Uncertain	Realization	Triangular	0.5	N/A	0.1	0.9	Fraction of Ore contacted by water	Professional judgement	Waste Section 8.3 - *Lab to Field Scale Up*
Field_temp	[C]	Uncertain	Annually	Normal	2.004	1.388	N/A	N/A	Average annual site air temperature, assumed the same temperature as the Ore and tailings	HiDen Climate data for 1981-2010	Waste Section 8.3 - *Lab to Field Scale Up*
O2_Mol_Weight	[g/mol]	Deterministic	N/A	Constant	32.00	N/A	N/A	N/A	Molecular weight of oxygen	Known value	Waste Section 10.1.1 - *NorthMet Tailings*
SO4_Mol_Weight	[g/mol]	Deterministic	N/A	Constant	96.07	N/A	N/A	N/A	Molecular weight of sulfate	Known value	Waste Section 10.1.1 - *NorthMet Tailings*
S_Mol_Weight	[g/mol]	Deterministic	N/A	Constant	32.07	N/A	N/A	N/A	Molecular weight of sulfide	Known value	Waste Section 10.1.1 - *NorthMet Tailings*
Lab_temp	[C]	Deterministic	N/A	Constant	20	N/A	N/A	N/A	Laboratory temperature (known)	RS 53/42	Waste Section 8.3 - *Lab to Field Scale Up*
Size_factor	[--]	Uncertain	Realization	Trunc. Normal	0.18	0.061	0	1.00E+10	Scaling factor to adjust to field scale Ore	Analysis of Equity Silver Mine data	Waste Section 8.3 - *Lab to Field Scale Up*
Scale_Factor_LAM	[--]	Uncertain	Annually	Beta	0.128	0.085	0.019	0.687	Scaling factor for buttress material	MDNR Analysis of Dunka Mine Data	Waste Section 10.6.5 - *Buttress Material*
Sulfate_gen_ratio	[mol SO4 / mol O2]	Deterministic	N/A	Constant	0.444	N/A	N/A	N/A	Ratio of the number of moles of sulfate produced for every mole of oxygen consumed	Pyrrhotite reaction stoichiometry	Waste Section 10.3 - *Saturation and Oxygen Diffusion*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Engineered Dam Characteristics											
Dam_Volume	[yard^3]	Deterministic	N/A	Time Series	Time series by dam. Reference Table 1-23				Cumulative volume of bulk LTVSMC tailings used to construct the FTB dams through time	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Dam_Outer_Area	[acre]	Deterministic	N/A	Time Series	Time series by dam. Reference Table 1-23				The surface area of the outer slope of the dams of the FTB	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Crest_Elevation	[ft]	Deterministic	N/A	Time Series	Time series. Reference Table 1-24				The elevation of the top of the dams of the FTB	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Crest_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-24				The plan-view area within the dam crest (helps define the storage volume within the FTB)	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Beach_Elevation	[ft]	Deterministic	N/A	Time Series	Time series. Reference Table 1-24				Elevation of the NorthMet tailings beach where it meets the constructed dams of the FTB	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Beach_Areas	[acres]	Deterministic	N/A	Time Series	Time series by dam. Reference Table 1-24				Areas of the NorthMet tailings beaches that are contributing load to the seepage	Flotation Tailings Basin design	Water Section 5.2.2.2 - *Flotation Tailings Basin (FTB)*
Beach_Slope	[%]	Deterministic	N/A	Constant	1.0	N/A	N/A	N/A	The slope of the beach formed using NorthMet tailings from the dam to the pond's edge	Flotation Tailings Basin design, validated by SAFL Deposition study	Waste Section 5.1.3.1 - *Depositional Study*
Beach_Width	[ft]	Deterministic	N/A	Constant	625	N/A	N/A	N/A	The width of the beach formed using NorthMet tailings from the dam to the pond's edge	Flotation Tailings Basin design	Water Section 5.2.2.3 - *Beneficiation Plant Slurry and Beach Development*
Delta_Angle	[deg]	Deterministic	N/A	Constant	75	N/A	N/A	N/A	The angle at which spigotted water and tailings will spread as they flow down the NorthMet tailings beach	Value carried forward from RS-13B	Water Section 5.2.2.3 - *Beneficiation Plant Slurry and Beach Development*
Delta_Flow_Frac	[%]	Deterministic	N/A	Constant	30	N/A	N/A	N/A	The fraction of the delta area that is receiving active flow	Value carried forward from RS-13B	Water Section 5.2.2.3 - *Beneficiation Plant Slurry and Beach Development*
Dam_Flow_Direction	[%]	Deterministic	N/A	Time Series	Time series by dam and by toe. Reference Table 1-25				Time series of the proportion of water that flows through the dams that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Dam_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by dam and by toe. Reference Table 1-26				Time series of the proportion of water that flows through the dams that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Beach_Flow_Direction	[%]	Deterministic	N/A	Time Series	Time series by dam and by toe. Reference Table 1-27				Time series of the proportion of water that flows through the beaches that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Beach_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by dam and by toe. Reference Table 1-28				Time series of the proportion of water that flows through the beaches that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Dam_WT_Depth	[ft]	Deterministic	N/A	Time Series	Time series by Dam. Reference Table 1-29				Time series of the depth to the phreatic surface under each Dam (where chemical production would cease)	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Beach_WT_Depth	[ft]	Deterministic	N/A	Time Series	Time series by Dam. Reference Table 1-29				Time series of the depth to the phreatic surface under each NorthMet tailings beach	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Buttresses											
N_Buttress_Volume	[yard^3]	Deterministic	N/A	Time Series	Time series by buttress. Reference Table 1-23				Volume of the north buttress	Flotation Tailings Management Plan, CDF064	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*
N_Buttress_Area	[acres]	Deterministic	N/A	Time Series	Time series by buttress. Reference Table 1-23				Area of the North Buttress	CAD drawing of the proposed Flotation Tailings Basin, CDF064	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*
S_Buttress_Volume	[yard^3]	Deterministic	N/A	Time Series	Time series by buttress. Reference Table 1-23				Volume of the south buttress	Flotation Tailings Management Plan	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*
S_Buttress_Area	[acres]	Deterministic	N/A	Time Series	Time series by buttress. Reference Table 1-23				Area of the South Buttress	CAD drawing of the proposed Flotation Tailings Basin	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*
Buttress_Sulfur	[%]	Deterministic	N/A	Constant	0.063	N/A	N/A	N/A	Mass-weighted average sulfur content of the buttresses	See Mine Site Work Plan Tables	Waste Section 4.3.2 - *Sulfur Content*
Buttress_Content	[mg/kg]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-16				Content of constituent of concern in waste rock	Analysis of Aqua Regia Data	Waste Section 8.4.1 - *Depletion*
Buttress_Bulk_Density	[lbs/ft^3]	Deterministic	N/A	Constant	140	N/A	N/A	N/A	Bulk density of the material used to form the buttresses	Geotechnical design group	Water Section 5.1.2.2.2 - *FTB Buttress Conceptual Model*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Flotation Tailings Basin Details											
Pond_Bottom_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-30				The plan-view area of the bottom of the FTB pond	Flotation Tailings Basin design	Water Section 5.1.2.2.4 - *FTB Pond Conceptual model*
Pond_Top_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-30				The plan-view area of the top of the FTB pond (where optimum depth is reached and the slope breaks)	Flotation Tailings Basin design	Water Section 5.1.2.2.4 - *FTB Pond Conceptual model*
Design_Depth	[ft]	Deterministic	N/A	Constant	8	N/A	N/A	N/A	Designed optimum depth of the FTB pond	Flotation Tailings Basin design	Water Section 5.1.2.2.4 - *FTB Pond Conceptual model*
Pond_Slope	[%]	Deterministic	N/A	Constant	3	N/A	N/A	N/A	The slope of the NorthMet tailings under the FTB pond water surface	Flotation Tailings Basin design	Water Section 5.1.2.2.4 - *FTB Pond Conceptual model*
Pond_Seepage_Rate	[in/yr]	Deterministic	N/A	Time Series	Time series. Reference Table 1-31				Seepage rate of water from the FTB pond into the saturated NorthMet tailings	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Pond_Seepage_Direction	[%]	Deterministic	N/A	Time Series	Time series by toe. Reference Table 1-31				Time series of the proportion of water that seeps from the pond that will report to each toe of the FTB	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Pond_Saturated_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series. Reference Table 1-31				Time series of the volume of saturated tailings below the NorthMet Flotation Tailings pond	MODFLOW model of the FTB through time	Water Section 5.2.2.6 - *Pond Seepage, Depth to Water and Distribution of Tailings Basin Flows*
Initial_Pond_Volume	[acre-ft]	Deterministic	N/A	Constant	1800	N/A	N/A	N/A	Volume of the water that is currently in Cell 2E where the FTB pond will begin	Using the area of the pond from the MODFLOW model and assuming a 3 meter depth	Water Section 5.1.1.1 - *Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model*
Pond_1E_Volume	[acre-ft]	Deterministic	N/A	Constant	3700	N/A	N/A	N/A	Volume of the water that is currently in Cell 1E	Using the area of the pond from the MODFLOW model and assuming a 3 meter depth	Water Section 5.1.1.1 - *Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model*
Cell1E_Pond_Surf_Area	[m^2]	Deterministic	N/A	Constant	1513672	N/A	N/A	N/A	Existing surface area of the pond in Cell 1E	MODFLOW model of the Tailings Basin	Water Section 5.1.1.1 - *Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model*
Contr_Embank_Area	[acres]	Deterministic	N/A	Time Series	Time series. Reference Table 1-32				Area contributing runoff to Cells 1E & 2E from the embankments of Cell 2W	Contour data and Flotation Tailings Basin Design	Water Section 5.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Contr_Watershed	[acres]	Deterministic	N/A	Time Series	Time series. Reference Table 1-32				Area contributing runoff to Cells 1E & 2E from the surrounding forested areas	Contour data and Flotation Tailings Basin Design	Water Section 5.2.2.4 - *Climate Inputs; Precipitation, Evaporation and Runoff*
Pond_Transport_Time	[yr]	Deterministic	N/A	Constant	5	N/A	N/A	N/A	Transport time for flow and load from under the ponds in the FTB	Assumed value in RS74B, September 2008, Figure 8-11	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Interior_Transport_Time	[yr]	Deterministic	N/A	Constant	7	N/A	N/A	N/A	Transport time for flow and load from the NorthMet beaches and the coarse and fine interior LTVSMC tailings	Assumed value in RS74B, September 2008, Figure 8-10	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Dam_Transport_Time	[yr]	Deterministic	N/A	Constant	10	N/A	N/A	N/A	Transport time for flow and load from the dams of the FTB	Assumed value in RS74B, September 2008, Figure 8-9	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Erlang_Dispersion	[--]	Deterministic	N/A	Constant	25	N/A	N/A	N/A	A value greater than or equal to 1 representing some amount of dispersion where 1 is the maximum amount of dispersion.	Assumed	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Existing LTVSMC Tailings Basin											
Cell_Areas	[m^2]	Deterministic	N/A	Time Series	Time series by Cell and by tailings class. Reference Table 1-33				Reactive areas of the tailings in the existing Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.1.2.2.6 - *Existing LTVSMC Tailings Basin (Tailings Basin) Conceptual Model*
Cell_WT_Depths	[ft]	Deterministic	N/A	Time Series	Time series by Cell and by tailings class. Reference Table 1-34				Depth to the phreatic surface in the existing Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell2W_Seepage_Direction	[%]	Deterministic	N/A	Time Series	Time series by Cell and by tailings class. Reference Table 1-35				Percent of seepage within each zone of Cell 2W that reports to each toe of the Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell2W_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-36				Saturated volume of tailings below each zone in Cell 2W that reports to each toe of the Tailigns Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell2E_Seepage_Direction	[%]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-37				Percent of seepage within each zone of Cell 2E that reports to each toe of the Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell2E_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-38				Saturated volume of tailings below each zone in Cell 2E that reports to each toe of the Tailigns Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell1E_Seepage_Direction	[%]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-39				Percent of seepage within each zone of Cell 1E that reports to each toe of the Tailings Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell1E_Sat_Volume	[acre-ft]	Deterministic	N/A	Time Series	Time series by tailings class and by toe. Reference Table 1-40				Saturated volume of tailings below each zone in Cell 1E that reports to each toe of the Tailigns Basin	MODFLOW Model of the FTB through time	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Initial_Pond_Concs_2E	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-44				Initial concentrations in the pond water in Cell 2E	Samples where available, model calibration of existing conditions at the toes.	Waste Section 10.2.1 - *Scaling / Calibration to LTVSMC Field Data*
Initial_Pond_Concs_1E	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-44				Initial concentrations in the pond water in Cell 1E	Samples where available, model calibration of existing conditions at the toes.	Waste Section 10.2.1 - *Scaling / Calibration to LTVSMC Field Data*
Cell2E_Exist_Seepage	[in/yr]	Deterministic	N/A	Constant	61.5	N/A	N/A	N/A	Seepage rate from the existing pond in Cell 2E	MODFLOW Model of the existing Tailings Basin	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Cell1E_Exist_Seepage	[in/yr]	Deterministic	N/A	Constant	46.6	N/A	N/A	N/A	Seepage rate from the existing pond in Cell 1E	MODFLOW Model of the existing Tailings Basin	Water Section 5.2.1.2.3 - *Pond Seepage, Depth to Water and Flow within the LTVSMC Tailings Basin*
Hydrometallurgical Residue Facility											
V_El	[acre-ft]	Deterministic	N/A	Time Series	Lookup Table. Reference Table 1-41				Volume as a function of elevation of the final constructed HRF	CAD design of the facility	Water Section 5.2.2.5 - *Hydrometallurgical Residue Facility (HRF) Details*
A_El	[acre]	Deterministic	N/A	Time Series	Lookup Table. Reference Table 1-41				Area as a function of elevation of the final constructed HRF	CAD design of the facility	Water Section 5.2.2.5 - *Hydrometallurgical Residue Facility (HRF) Details*
Crest_El	[ft]	Deterministic	N/A	Time Series	Time series. Reference Table 1-42				Crest elevation of the dams constructed to form the HRF	CAD design of the facility	Water Section 5.2.2.5 - *Hydrometallurgical Residue Facility (HRF) Details*
Forest_WS_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-42				Area of the forested contributing watershed to the south-west of the HRF	CAD design of the facility	Water Section 5.2.2.5.1 - *Climate Inputs; Precipitation, Evaporation, and Runoff*
Cell2W_WS_Area	[acre]	Deterministic	N/A	Time Series	Time series. Reference Table 1-42				Area of Cell 2W that contributes runoff to the HRF	CAD design of the facility	Water Section 5.2.2.5.1 - *Climate Inputs; Precipitation, Evaporation, and Runoff*
Residue_Porosity	[cm^3/cm^3]	Uncertain	Realization	Triangular	0.57	N/A	0.53	0.61	Porosity of the hydrometallurgical residue	RS13, March 2007	Water Section 5.2.2.5.3 - *Entrainment*
Residue_Sp_Gr	[--]	Deterministic	N/A	Constant	2.76	N/A	N/A	N/A	Specific gravity of the hydrometallurgical residue	Bateman MetSim model	Water Section 5.2.2.5.3 - *Entrainment*
Residue_Sat_K	[cm/s]	Deterministic	N/A	Constant	3.40E-05	N/A	N/A	N/A	Saturated hydraulic conductivity of the hydrometallurgical residue	NorthMet Data Package - Geotechnical, Volume 2	Water Section 5.2.2.5.4 - *Leakage*
Geomembrane_Defect_Size	[cm]	Deterministic	N/A	Constant	1	N/A	N/A	N/A	Assumed diameter of a circular defect in the upper geomembrane liner under the HRF	Values assumed for the same geomembrane liners at the Mine Site used to determine leakage rates	Water Section 5.2.2.5.4 - *Leakage*
Defects_Per_Acre	[1/acre]	Uncertain	Realization	Lognormal	2	1.82	N/A	N/A	Number of defects per acre in the geomembrane liner	Values assumed for the same geomembrane liners at the Mine Site used to determine leakage rates	Water Section 5.2.2.5.4 - *Leakage*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Beneficiation Plant											
Clean_H2O_Demand	[gpm]	Deterministic	N/A	Constant	3.29	N/A	N/A	N/A	Clean water demand from the concentrator process	RS13B, Attachment A-7, applying Plant_Uptime	Water Section 5.2.2.1 - *Beneficiation Plant*
Total_H2O_Demand	[gal/yr]	Deterministic	N/A	Constant	7.5901E+09	N/A	N/A	N/A	Total flow rate of water needed by the concentrator plant	Bateman Water Balance (June 2011)	Water Section 5.2.2.1 - *Beneficiation Plant*
Process_H2O_Discharge	[gal/yr]	Deterministic	N/A	Constant	7.9217E+09	N/A	N/A	N/A	Flow rate of water discharged from the concentrator process	Bateman Water Balance (June 2011)	Water Section 5.2.2.1 - *Beneficiation Plant*
Other_H2O_Discharge	[gpm]	Deterministic	N/A	Constant	26.3	N/A	N/A	N/A	Flow rate of water discharged to the FTB from other water uses	RS13B, Attachment A-7, applying Plant_Uptime	Water Section 5.2.2.1 - *Beneficiation Plant*
Solids_Discharge	[ton/yr]	Deterministic	N/A	Constant	1.235E+07	N/A	N/A	N/A	Flow rate of solids from the concentrator plant to the FTB	Flotation Tailings Management Plan	Water Section 5.2.2.1 - *Beneficiation Plant*
Reagant_Load	[g/ton]	Deterministic	N/A	Constant	55	N/A	N/A	N/A	Grams CuSO4 per ton of ore processed	RS46, July 2007	Waste Section 10.6.4 - *Process Water Loading to Pond*
Ore_Processing_Rate	[ton/day]	Deterministic	N/A	Constant	30,860	N/A	N/A	N/A	Tons per day of ore processed by the Beneficiation Plant	Mine Plan	Waste Section 10.6.4 - *Process Water Loading to Pond*
SO4_S_Regression	[mg/kg/week/%]	Uncertain	Realization	Normal	13.92	0.581	N/A	N/A	Sulfate release as a function of sulfur content (%S)	See Mine Site Work Plan Table 1-27	Waste Section 8.1.1.1.2 - *Correction for Non-Constant Variance*
OSP_Sulfur	[%]	Deterministic	N/A	Constant	0.608	N/A	N/A	N/A	Mass-weighted average sulfur content of stockpile	See Mine Site Work Plan Tables	Waste Section 4.3.2 - *Sulfur Content*
Ore_Storage_Time	[mon]	Uncertain	Realization	Uniform	N/A	N/A	1	6	Length of time that any unit of ore is stored in in-pit stockpiles	Assumed	Waste Section 10.6.3.1 *Ore Leaching Load*
Plant_Uptime	[%]	Deterministic	N/A	Constant	91.26	N/A	N/A	N/A	Annual average percent of time the plant is running	Bateman Water Balance (June 2011)	Water Section 5.2.2.1 - *Beneficiation Plant*
Hydrometallurgical Plant											
Clean_H2O_Demand	[gpm]	Deterministic	N/A	Constant	124.9	N/A	N/A	N/A	Clean water demand from the hydrometallurgical process	RS13B, Attachment A-7, applying Plant_Uptime	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*
Total_H2O_Demand	[gal/yr]	Deterministic	N/A	Constant	2.342E+08	N/A	N/A	N/A	Total flow rate of water needed by the hydromet plant	Bateman Water Balance (June 2011)	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*
Process_H2O_Discharge	[gal/yr]	Deterministic	N/A	Constant	1.144E+08	N/A	N/A	N/A	Flow rate of water discharged from the hydromet process	Bateman Water Balance (June 2011)	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*
Other_H2O_Discharge	[gpm]	Deterministic	N/A	Constant	26.3	N/A	N/A	N/A	Flow rate of water discharged to the HRF from other water uses	RS13B, Attachment A-7, applying Plant_Uptime	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*
Solids_Discharge	[ton/yr]	Deterministic	N/A	Constant	3.342E+05	N/A	N/A	N/A	Flow rate of solids from the hydrometallurgical plant to the HRF	Residue Management Plan	Water Section 5.2.2.4.1 - *Hydrometallurgical Plant Slurry*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Flotation Tailings Basin Waste Water Treatment Plant											
Effluent_Perc_Influent	[%]	Deterministic	N/A	Constant	95	N/A	N/A	N/A	Percent of the influent flow to the FTB WWTP that is discharged to SD026 and SD006	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
MaxFlow_SD026	[gpm]	Deterministic	N/A	Constant	500	N/A	N/A	N/A	Maximum flow to existing outfall SD026 from the FTB WWTP	Refined Embarrass Lake Wild Rice Mitigation Memo, June 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Backwash_Perc_Influent	[%]	Deterministic	N/A	Constant	5	N/A	N/A	N/A	Percent of the influent flow required for backwashing the greensand filter	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Effluent_Conc	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-43				Quality of the discharge from the Flotation Tailings Basin WWTP	CDF060	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Fe_Backwash_Conc	[mg/L]	Deterministic	N/A	Constant	4	N/A	N/A	N/A	Iron concentration in the greensand filter backwash	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Mn_Backwash_Conc	[mg/L]	Deterministic	N/A	Constant	30	N/A	N/A	N/A	Manganese concentration in the greensand filter backwash	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
K_Backwash_Conc	[mg/L]	Deterministic	N/A	Constant	11	N/A	N/A	N/A	Potassium concentration in the greensand filter backwash	Barr Memo, NorthMet Tailings Basin Water Treatment, August 2011	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
Babbitt WWTP											
Babbitt_Flow	[cfs]	Deterministic	N/A	Constant	0.33	N/A	N/A	N/A	Flow from the Babbitt WWTP	RS74B	Water Section 5.2.1.4.9 - *Babbitt WWTP*
Area 5NW											
Area5_Summer	[cfs]	Uncertain	Timestep	Lognormal	1.87	1.49	N/A	N/A	Flow from Area 5NW during summer months	Analysis of measured flow data at SD033	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Area5_Winter	[cfs]	Uncertain	Timestep	Lognormal	0.97	0.65	N/A	N/A	Flow from Area 5NW during winter months	Analysis of measured flow data at SD033	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Area5_Snowmelt	[cfs]	Uncertain	Timestep	Beta	2.91	1.78	0.75	8.1	Flow from Area 5NW during snowmelt months	Analysis of measured flow data at SD033	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Area5NW_Conc	[mg/L]	Deterministic	N/A	Constant	Vector by constituent. Reference Table 1-44				Concentration of water that discharges from the Area 5NW Pit	RS74B	Water Section 5.2.1.4.10 - *Pit 5NW (SD033) Discharge*
Sewage Treatment Plant											
STP_Discharge_Vol	[gal]	Deterministic	N/A	Constant	5618000	N/A	N/A	N/A	Volume of water discharged from the sewage treatment plant to the FTB, essentially 210 days of storage	DON	
STP_Discharge_Spring_Dur	[mon]	Uncertain	Annual	Uniform	N/A	N/A	1	4	Integer number of months where the sewage treatment plant is discharging to the FTB in the Spring	DON	
STP_Discharge_Fall_Dur	[mon]	Uncertain	Annual	Uniform	N/A	N/A	1	4	Integer number of months where the sewage treatment plant is discharging to the FTB in the Fall	DON	
STP_Effluent_AddConc	[mg/L]	Uncertain	Annual	Uniform	Vector by constituent. Reference Table 1-45				Additional concentration added to the modeled water quality of Colby Lake from domestic water use	DON	

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Groundwater Flow Path Characteristics											
D	[m]	Deterministic	N/A	Constant	7	N/A	N/A	N/A	Aquifer thickness	Average thickness of the saturated material	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
La	[m]	Deterministic	N/A	Constant	Vector by flowpath. Reference Table 1-46				Total flow path length	GIS data/calculations	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
w	[m]	Deterministic	N/A	Constant	Vector by flowpath. Reference Table 1-46				Average flow path width	GIS data/calculations	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Init_Grad	[--]	Deterministic	N/A	Constant	Vector by flowpath. Reference Table 1-46				Initial hydraulic gradient (determines flow capacity)	GIS data/calculations	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Eval_Loc1	[m]	Deterministic	N/A	Constant	Vector by flowpath. Reference Table 1-46				Length from the upstream end to the first evaluation location on the flow path	GIS data/calculations	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Recharge	[in/yr]	Uncertain	Realization	Triangular	0.6	N/A	0.3	1.5	Uniformly distributed recharge rate to the flow path	Most likely based on baseflow estimates, bounds based on using 1/2 the mode and 2.5 times the mode	Water Section 5.2.1.3.2 - *Recharge*
Perc_Flow_to_PM12_4	[%]	Deterministic	N/A	Constant	7.21	N/A	N/A	N/A	Percent of the groundwater flow path discharge that goes to PM-12.4; 0.44 mi2 / 6.10 mi2	CDF051	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Groundwater Flow Variables											
Surficial_Porosity	[--]	Deterministic	N/A	Constant	0.3	N/A	N/A	N/A	Porosity of the surficial aquifer	Assumed value, e.g. Fetter, 2001	Water Section 4.3.3 - *Water Quantity*
K_Surficial	[m/d]	Uncertain	Realization	Lognormal	4.0	1.6	N/A	N/A	Hydraulic Conductivity of the surficial aquifer	Mean based on aquifer tests, minimum value based on the limits of the recharge distribution	Water Section 5.2.1.3.1 - *Groundwater Flow Paths*
Surficial_Density	[kg/m^3]	Deterministic	N/A	Constant	1,500	N/A	N/A	N/A	Dry (bulk) Density of the surficial deposits	USDA St. Louis County Soil Survey Database	Water Section 5.2.1.3.3 - *Sorption*
As_Kd	[L/kg]	Deterministic	N/A	Constant	25	N/A	N/A	N/A	Sorption coefficients for As in the surficial aquifer	EPA screening-level values	Water Section 5.2.1.3.3 - *Sorption*
Cu_Kd	[L/kg]	Deterministic	N/A	Constant	22	N/A	N/A	N/A	Sorption coefficients for Cu in the surficial aquifer	EPA screening-level values	Water Section 5.2.1.3.3 - *Sorption*
Ni_Kd	[L/kg]	Deterministic	N/A	Constant	16	N/A	N/A	N/A	Sorption coefficients for Ni in the surficial aquifer	EPA screening-level values	Water Section 5.2.1.3.3 - *Sorption*
Sb_Kd	[L/kg]	Uncertain	Realization	Triangular	1.6	N/A	1.3	6.1	Sorption coefficients for Sb in the surficial aquifer	EPA screening-level values	Water Section 5.2.1.3.3 - *Sorption*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Stream Reach Characteristics											
Flow_Control	[--]	Deterministic	N/A	Constant	Matrix, location by location. Reference Table 1-47				Controls which nodes contribute flow to other nodes	Surface water layout and stream order	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
XS_Area	[m^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-48				Cross sectional area of each river reach	RS26 geomorphic surveys	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Lengths	[m]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-48				Incremental length upstream of each model node	GIS data	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
GW_Contr_Areas	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Un-impacted area contributing groundwater to the surface water evaluation nodes	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Flowpath_Area	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Area of the modeled flow paths	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
SW_Contr_Areas	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Runoff contributing watershed area to each model node	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
FTBRO_Area	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Cell 2W area that runs off to the adjacent tributaries	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Cell2EFTBRO	[mi^2]	Deterministic	N/A	Constant	Vector by location. Reference Table 1-49				Cell 2E area that runs off to the adjacent tributaries	GIS subwatersheds	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Perc_NToe_MLC3	[%]	Deterministic	N/A	Constant	25	N/A	N/A	N/A	Percentage of the north toe surface seepage that travels to MLC-3 (the remainder goes to TC-1)	CDF051	Water Section 5.2.1.4.1 - *Surface Water Model Evaluation Locations*
Stream Flow Variables											
Watershed_Yield	[cfs/mi^2]	Deterministic	Monthly	User-defined	User-defined Look-up Table by month. Reference Table 1-50				Randomly sampled daily total watershed yield as a function of month	USGS gage data	Water Section 5.2.1.4.3 - *Developing Model Inputs (Watershed Yield)*
Embarrass_Baseflow	[cfs/mi^2]	Deterministic	N/A	Constant	0.045	N/A	N/A	N/A	Baseflow added to Embarrass River nodes	Watershed wide average minimum 30-day flow	Water Section 5.2.1.4.4 - *Watershed Runoff Quantity*
Model Initiation											
Initial_Mass_LTVSMC_Basin	[tonne]	Deterministic	N/A	Constant	Matrix by constituent and location. Reference Table 1-52				Initial mass of each constituent in each zone of existing Tailings Basin features	Average, steady-state results of the existing conditions GoldSim model	Water Section 5.2.3.1 - *Tailings Basin Initiation*
Initial_Mass_Rate	[kg/day]	Deterministic	N/A	Constant	Matrix by constituent and location. Reference Table 1-53				Initial rate at which constituent load is leaving areas of the existing Tailings Basin	Average, steady-state results of the existing conditions GoldSim model	Water Section 5.2.3.1 - *Tailings Basin Initiation*
Expected_Toe_Conc	[ug/L]	Deterministic	N/A	Constant	Matrix by constituent and location. Reference Table 1-54				Expected existing concentrations at the toes of the Tailings Basin to initiate groundwater concentrations	Average, steady-state results of the existing conditions GoldSim model	Water Section 5.2.3.2 - *Groundwater Flow Path Initiation*

Table 1-1 **Input Variables for the Plant Site Model**

Variable Name	*Units*	*Deterministic/ Uncertain*	*Sampling/ Calculation Frequency*	*Distribution*	*Mean or Mode*	*Standard Deviation*	*Minimum*	*Maximum*	*Description*	*Source of Input Data*	*Modeling Package Section*
Additional Inputs											
Max_Vol_To_Mine	[acre-ft]	Deterministic	N/A	Constant	50000	N/A	N/A	N/A	Maximum volume that can be sent to the Mine Site, determined by the Mine Site model	Model determination	Water Section 5.2.2.3 - *FTB Containment System and South Seepage Management System*
HRF_Drainage_Period	[yr]	Deterministic	N/A	Constant	10	N/A	N/A	N/A	Time it takes to drain the HRF	Residue Management Plan	Water Section 5.2.2.5.1 - *Climate Inputs; Precipitation, Evaporation, and Runoff*
OPS_Treatment_Capacity	[gpm]	Deterministic	N/A	Constant	4000	N/A	N/A	N/A	Treatment capacity of the FTB WWTP during operations; capacity during years 1-7 is half this size.	Model determination	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
CLSR_Treatment_Capacity	[gpm]	Deterministic	N/A	Constant	3500	N/A	N/A	N/A	Design flow to the treatment plant during reclamation	Model determination	Water Section 5.2.2.6 - *Waste Water Treatment Plant (WWTP)*
GW_Capture_Eff	[%]	Deterministic	N/A	Constant	90	N/A	N/A	N/A	Efficiency of the groundwater containment system	AWMP	Water Section 5.2.2.3 - *FTB Containment System and South Seepage Management System*
Min_Flow_To_4Tribs_Early	[gpm]	Deterministic	N/A	Constant	1700	N/A	N/A	N/A	Minimum flow to the four tributaries (including SD026)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[N]	[%]	Deterministic	N/A	Constant	0.00	N/A	N/A	N/A	Demand from each tributary to not have significant hydrologic impacts (to Mud Lake Creek)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[NW]	[%]	Deterministic	N/A	Constant	69.38	N/A	N/A	N/A	Demand from each tributary to not have significant hydrologic impacts (to Trimble Creek)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[W]	[%]	Deterministic	N/A	Constant	19.79	N/A	N/A	N/A	Demand from each tributary to not have significant hydrologic impacts (to Unnamed Creek)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[S]	[%]	Deterministic	N/A	Constant	10.83	N/A	N/A	N/A	Demand from each tributary to not have significant hydrologic impacts (to Second Creek)	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*
Trib_Demand_Fracs_Early[E]	[%]	Deterministic	N/A	Constant	0.00	N/A	N/A	N/A	Percent of WWTP effluent to the east of the Basin; should be zero because there is no discharge that direction.	Model determination	Water Section 5.2.2.8.1 - *Flow Augmentation to Prevent Significant Hydrologic Impacts*

Table 1-5 **Average Background Groundwater Quality Distributions**

Constituent	*Source*	*Surficial Aquifer* GW_Alpha_Mean	GW_Beta	GW_Alpha_Stdev
Ag	All	-3.154	1.058	0.107
Al	All	3.004	1.522	0.160
Alk	All	11.020	0.811	0.083
As	PolyMet	-0.927	0.552	0.083
B	PolyMet	3.302	0.302	0.043
Ba	PolyMet	3.225	1.307	0.235
Be	PolyMet	-1.999	0.722	0.102
Ca	All	9.716	0.959	0.098
Cd	PolyMet	-2.214	0.483	0.068
Cl	All	6.889	1.075	0.110
Co	PolyMet	-2.149	0.606	0.109
Cr	All	-0.592	1.082	0.109
Cu	PolyMet	0.311	0.948	0.134
F	All	4.686	0.776	0.082
Fe	PolyMet	3.806	0.733	0.112
K	All	7.068	0.932	0.095
Mg	All	8.841	0.950	0.097
Mn*	PolyMet	271	0.000	56
Na	All	8.210	0.660	0.067
Ni	All	0.766	1.181	0.119
Pb	PolyMet	-1.380	0.033	0.006
Sb	All	-2.329	1.611	0.191
Se	All	-0.467	0.704	0.084
SO_4	PolyMet	8.757	0.542	0.077
Tl	PolyMet	-2.333	1.052	0.149
V	All	1.660	0.239	0.046
Zn	All	1.976	1.143	0.116

Notes

* Manganese is treated differently from the rest because of it's poor fit to a lognormal distribution. Instead, "GW_Alpha_Mean" represents the mean of a normal distribution, and "GW_Alpha_Stdev" represents the standard deviation of a normal distribution. GW_Beta (0.000) is not used.

Table 1-6 **Existing Watershed Runoff Concentrations**

Constituent	*RO_Mean (ug/L)*	*RO_StDev (ug/L)*
Ag	1.17E-01	7.9E-03
Al	1.12E+02	4.9E+01
Alk	3.82E+04	4.8E+04
As	1.76E+00	2.0E+00
B	1.96E+01	3.3E+00
Ba	4.58E+00	4.6E-02
Be	7.35E-02	7.4E-04
Ca	9.47E+03	7.9E+03
Cd	8.11E-02	6.3E-03
Cl	5.68E+03	2.9E+03
Co	1.33E+00	1.0E+00
Cr	7.22E-01	8.0E-01
Cu	7.55E-01	8.9E-01
F	8.51E+01	9.0E+01
Fe	5.56E+03	5.0E+03
K	8.48E+02	1.2E+03
Mg	4.84E+03	5.4E+03
Mn	4.85E+02	8.0E+02
Na	3.30E+03	1.3E+03
Ni	4.18E-01	4.2E-03
Pb	2.60E-01	1.5E-01
Sb	2.11E-01	2.1E-03
Se	4.55E-01	2.0E-01
SO_4	4.79E+03	1.0E+04
Tl	1.33E-02	1.2E-01
V	1.45E-01	1.5E-03
Zn	6.58E+00	1.1E+01

Table 1-8 **Flow Rates from the Mine Site WWTF**

Time (yrs)	*Flow Mean (gpm)*	*Flow Standard Deviation (gpm)*
0	586	70
1	742	87
2	854	93
3	966	118
4	1149	122
5	1313	134
6	1410	180
7	1391	171
8	1590	198
9	1753	220
10	1357	217
11	1397	222
12	1496	150
13	1773	219
14	1686	167
15	151	15
16	0	0
17	95	74
18	291	142
19	191	98
20	0	0
500	0	0

Notes

Source: Mine Site probabilistic water quality model

Table 1-9 Mean Concentration in the Water from the Mine Site CPS (mg/L)

	Time (yrs)																					
Constituent	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***	***500***
Ag	0.000893	0.000817	0.000886	0.00095	0.000913	0.000854	0.00094	0.000987	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000983	0	0
Al	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0	0
Alk	733	556	493	419	293	158	91	52.9	40.7	36.1	34.5	39.9	42.3	39.4	39.9	31.8	36.8	38.9	66.5	37.2	0	0
As	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0
B	0.153	0.139	0.143	0.144	0.135	0.122	0.12	0.118	0.114	0.105	0.103	0.111	0.118	0.108	0.106	0.0903	0.103	0.1	0.111	0.0831	0	0
Ba	0.813	0.605	0.54	0.46	0.317	0.159	0.0928	0.075	0.0727	0.0664	0.066	0.0695	0.0745	0.0504	0.0486	0.0536	0.0842	0.0841	0.112	0.0944	0	0
Be	0.000877	0.000735	0.000792	0.000889	0.000827	0.000745	0.000823	0.000979	0.00112	0.00119	0.00134	0.00121	0.00136	0.00112	0.00115	0.00167	0.0021	0.00191	0.00147	0.000794	0	0
Ca	25.4	34	38	41	43.6	43.7	45.3	44.2	42.4	42.6	44.4	52.1	53.4	55.8	56.5	55.2	56.1	57.1	52.8	58.8	0	0
Cd	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.00379	0.00261	0	0
Cl	105	75.7	69.5	59.3	49.6	42.1	41	46.2	50.1	47.1	51.3	66.1	69.8	44	41.6	48	92.8	105	140	121	0	0
Co	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0	0
Cr	0.00441	0.00447	0.00459	0.00508	0.00505	0.00475	0.00511	0.0051	0.00491	0.00451	0.00521	0.00777	0.00796	0.0082	0.00797	0.00666	0.00711	0.00678	0.00608	0.00516	0	0
Cu	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0	0
F	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0
Fe	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0	0
K	55.8	49.4	48.4	47.9	44.9	40.6	43.7	47.5	52.2	50.5	61.1	92	104	81.5	83.4	91.6	156	168	212	200	0	0
Mg	45.5	40.3	37.8	36	34.4	34.3	33.3	34	35.1	35	33.9	29.2	28.4	27	26.6	27.3	26.8	26.2	28.8	25.1	0	0
Mn	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0	0
Na	315	264	250	235	213	177	175	183	193	176	208	323	331	240	217	236	404	444	604	559	0	0
Ni	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0
Pb	0.0133	0.0112	0.0129	0.0149	0.014	0.0143	0.0187	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0	0
Sb	0.0307	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.0308	0.0241	0	0
Se	0.00488	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.00498	0.00474	0	0
SO_4	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	0	0
Tl	0.000159	0.000205	0.000211	0.000222	0.000223	0.000217	0.000248	0.000295	0.000321	0.000318	0.000316	0.000283	0.000291	0.000271	0.000276	0.000303	0.00036	0.000323	0.000261	0.000162	0	0
V	0.00611	0.00692	0.0071	0.00689	0.00712	0.00706	0.00726	0.00804	0.00877	0.00902	0.00851	0.00971	0.0103	0.00991	0.0102	0.00951	0.0113	0.011	0.00989	0.00827	0	0
Zn	0.386	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.388	0.381	0.326	0	0

Notes

Source: Mine Site probabilistic water quality model

Table 1-10 Standard Deviation of the Concentration in the Water from the Mine Site WWTF (mg/L)

	Time (yrs)																					
Constituent	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***	***500***
Ag	0.0000834	0.000142	0.0000892	0.0000392	0.000068	0.000114	0.0000468	0.0000098	0	0	0	0	0	0	0	0	0	0	0	0.0000102	0	0
Al	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alk	64.1	61.2	57.8	45.3	26.5	17.8	13.1	9.43	8.74	8.12	7.39	7.89	8.97	9.75	9.92	5.86	4.53	5.82	13.8	5.17	0	0
As	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0.0228	0.0204	0.0231	0.0249	0.0232	0.02	0.0199	0.0194	0.0189	0.0173	0.0169	0.0137	0.013	0.00855	0.0089	0.0109	0.0135	0.0128	0.0148	0.0115	0	0
Ba	0.0707	0.0659	0.0585	0.0485	0.031	0.0175	0.0114	0.00817	0.0113	0.0111	0.0125	0.0152	0.0157	0.00869	0.00776	0.0054	0.00734	0.00733	0.0134	0.00717	0	0
Be	0.000304	0.000205	0.000223	0.000272	0.000232	0.000181	0.000219	0.000263	0.000271	0.000303	0.000354	0.000302	0.000305	0.000256	0.00026	0.0004	0.000472	0.00049	0.000407	0.000264	0	0
Ca	4.01	4.6	4.79	4.57	4.72	4.26	4.4	4.64	4.39	4.51	4.98	6.16	6.32	6.91	6.5	7	6.45	5.81	5.33	5.59	0	0
Cd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000161	0.000956	0	0
Cl	17.5	12	13.1	10.3	8.86	8.27	7.34	8.53	11.3	12.2	13.5	18.4	20	11.3	10.2	9.26	14.3	19.8	10.1	9.71	0	0
Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cr	0.00105	0.000636	0.000572	0.000528	0.000608	0.000527	0.000617	0.000604	0.000579	0.000503	0.000572	0.000375	0.000408	0.00036	0.000475	0.00062	0.000469	0.000492	0.000506	0.000492	0	0
Cu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	0.00343	0	0	0	0	0	0	0	0	0	0	0
Fe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	6.96	4.35	4.25	4.08	3.78	3.39	4.29	6	8.17	9.8	11.3	16.7	19.2	11.9	10.9	10.6	18	18.8	28.3	19.1	0	0
Mg	2.44	2.81	2.92	2.79	2.88	2.6	2.68	2.83	2.68	2.75	3.03	3.75	3.85	4.21	3.96	4.27	3.93	3.54	3.25	3.41	0	0
Mn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Na	34.9	37.9	36.4	36.6	31.6	30.1	29.7	33	38.3	35.9	45.6	61.2	69.5	56.8	53.5	42	48.2	61.2	79.1	62.9	0	0
Ni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pb	0.00263	0.00332	0.00325	0.00255	0.00301	0.00269	0.000237	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sb	0.000204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000164	0.00527	0	0
Se	0.0000924	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0000193	0.000203	0	0
SO_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tl	0.0000278	0.0000296	0.0000317	0.0000345	0.0000291	0.0000296	0.0000493	0.0000695	0.0000712	0.0000667	0.0000721	0.0000534	0.0000429	0.0000381	0.0000361	0.0000537	0.0000583	0.0000449	0.0000622	0.0000402	0	0
V	0.000734	0.00068	0.000749	0.000757	0.00081	0.000639	0.000719	0.000829	0.000799	0.000714	0.000697	0.000861	0.000838	0.000454	0.000474	0.000436	0.000548	0.000684	0.00065	0.000411	0	0
Zn	0.00124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00536	0.0439	0	0

Notes

Source: Mine Site probabilistic water quality model

Table 1-12a Hydraulic Properties of Different Classes of the LTVSMC Tailings

		Tailings Class		
Parameter	***Units***	***Coarse***	***Fine***	***Bulk (Other)***
LTVSMC_SG*	*(--)*	2.80	2.90	2.85
LTVSMC_Porosity*	*(cm^3/cm^3)*	0.412	0.493	0.440
LTVSMC_Ksat*	*(cm/s)*	SEE TABLE 1-12b	SEE TABLE 1-12b	8.02E-05
LTVSMC_ResMoist*	*(cm^3/cm^3)*	0.041	0.059	0.048
LTVSMC_AirSuct†	*(1/cm)*	0.024	0.001	0.011
LTVSMC_VGBeta†	*(--)*	2.0	1.6	2.0

Notes

* Source: Unsaturated modeling by the geotechnical group

† Source: CDF055

Table 1-12b Saturated Conductivity of LTVSMC Tailings in Each Cell*

		Tailings Class		
Cell	***Units***	***Coarse***	***Fine***	***Bulk (Other)***
Cell 1E	*(cm/s)*	4.43E-03	2.12E-05	SEE TABLE 1-12a
Cell 2E	*(cm/s)*	1.76E-03	3.77E-04	SEE TABLE 1-12a
Cell 2W	*(cm/s)*	1.42E-03	7.06E-05	SEE TABLE 1-12a

Notes

* Source: Calibrated MODFLOW model of existing conditions from November, 2014

Table 1-19 Distribution Parameters for LTVSMC Tailings Release

Distribution Fit to Humidity Cell Data

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Se	SO_4 rate ratio	HCT	mg Se / mg SO_4	Beta	7.22E-05	4.63E-05	3.04E-05	3.04E-04
SO_4	Rate	HCT	mg SO_4/kg/week	Beta	1.87E+00	5.02E-01	8.13E-01	2.54E+00
Zn	SO_4 rate ratio	HCT	mg Zn / mg SO_4	Beta	5.32E-05	9.20E-06	4.28E-05	8.33E-05

Distribution Fit to Aqua Regia Data

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Ag	S ratio	Aqua Regia	mg Ag / mg S	Beta	1.85E-04	1.51E-04	3.47E-05	1.99E-03
As	S ratio	Aqua Regia	mg As / mg S	Beta	1.11E-01	5.43E-02	2.85E-02	8.75E-01
Cd	S ratio	Aqua Regia	mg Cd / mg S	Beta	7.69E-05	6.83E-05	8.21E-06	4.62E-03
Co	S ratio	Aqua Regia	mg Co / mg S	Beta	4.10E-02	3.17E-02	9.94E-03	3.75E-01
Cu	S ratio	Aqua Regia	mg Cu / mg S	Beta	4.26E-02	3.66E-02	7.95E-03	7.00E-01
Ni	S ratio	Aqua Regia	mg Ni / mg S	Beta	1.71E-02	1.10E-02	3.46E-03	1.92E-01
Pb	S ratio	Aqua Regia	mg Pb / mg S	Beta	6.66E-03	3.95E-03	1.12E-03	4.17E-02
Sb	S ratio	Aqua Regia	mg Sb / mg S	Beta	3.44E-04	2.34E-04	8.93E-05	2.92E-03
Tl	S ratio	Aqua Regia	mg Tl / mg S	Beta	9.04E-05	7.48E-05	1.95E-05	8.33E-04

Distribution Fit to Microprobe Data

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Fe	S ratio	Pyrite microprobe	mg Fe / mg S	Beta	8.85E-01	1.36E-02	8.50E-01	9.06E-01

Distribution Fit to Observed Seepage Data

Constituent	Method	Source	Units	Distribution	Mean/Mode	St. Dev.	Minimum	Maximum
Al	Cap	Well Data	mg/L	Uniform	--	--	5.00E-03	4.00E-02
B	Cap	Well Data	mg/L	Trunc. Normal	4.84E-01	6.0E-02	0.00E+00	1.00E+10
Be	Cap	Well Data	mg/L	Uniform	--	--	1.00E-04	1.00E-03
Ca	Cap	Well Data	mg/L	Trunc. Normal	9.77E+01	1.3E+01	0.00E+00	1.00E+10
Cl	Cap	Well Data	mg/L	Trunc. Normal	2.14E+01	1.6E+00	0.00E+00	1.00E+10
Cr	Cap	Well Data	mg/L	Trunc. Normal	6.00E-04	1.0E-04	0.00E+00	1.00E+10
K	Cap	Well Data	mg/L	Trunc. Normal	1.01E+01	1.9E+00	0.00E+00	1.00E+10
Mg	Ca ratio	Well Data	mg Mg / mg Ca	Trunc. Normal	1.71E+00	2.7E-01	0.00E+00	1.00E+10
Mn	Cap	Well Data	mg/L	Trunc. Normal	1.18E+00	2.4E-01	0.00E+00	1.00E+10
Na	Cap	Well Data	mg/L	Trunc. Normal	5.60E+01	9.9E+00	0.00E+00	1.00E+10
V	Cap	Well Data	mg/L	Uniform	--	--	5.00E-04	1.00E-03

Notes
- HCT indicates average rates from tailings humidity cells over the entire testing period.
- Aqua Regia indicates ratios from whole tailings testing.
- Cat 2/3 HCT (2) indicates average rates from Category 2/3 humidity cells over Condition 2, as defined in Large Table 1.
- All distributions from humidity cell data, aqua regia and microprobe data represent the full range of the observed values, with no weighting. Distributions are shown in Large Figure 50 to Large Figure 52.
- All distributions from well data represent calibrated distributions so that modeled concentrations at the Tailings Basin toes are best fits to observed data in GW001, GW006, GW007, GW012, SD004, SD026, and PM-7. Distributions are shown in Large Figure 53 to Large Figure 55.
- Constituents not shown above are modeled according to the mineral solubility methods described in Section 10.1.2.

Table 1-21 Calibration Factor for LTVSMC Metal Release Ratios

Constituent	***LTVSMC_Calib_Factor (--)***	***Ratio_or_Conc_LTV (--)***
Ag	0.0053	1
Al	1	0
Alk	1	0
As	0.0001	1
B	1	0
Ba	1	0
Be	1	0
Ca	1	0
Cd	0.0135	1
Cl	1	0
Co	0.0005	1
Cr	1	0
Cu	0.0005	1
F	1	0
Fe	0.0524	1
K	1	0
Mg	1	0
Mn	1	0
Na	1	0
Ni	0.0027	1
Pb	0.0002	1
Sb	0.0086	1
Se	0.0189	1
SO_4	1	1
Tl	0.0071	1
V	1	0
Zn	0.1849	1

Notes

If the value is 1, the method of release is not by a release ratio to S (see Table 1-19).

Table 1-25 Percentage of Seepage from Each Dam that Flows to Each Toe of the Tailings Basin

	North Dam					*East Dam*					*South Dam*				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.001	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.001	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	29.6	70.4	0.0
8	99.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	29.6	70.4	0.0
9	99.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	2.3	0.0	28.0	69.8	0.0
10	99.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	4.6	0.0	26.3	69.1	0.0
11	99.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	6.9	0.0	24.7	68.5	0.0
12	99.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	9.2	0.0	23.0	67.8	0.0
13	99.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	11.5	0.0	21.4	67.2	0.0
14	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	13.8	0.0	19.7	66.5	0.0
15	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	16.1	0.0	18.1	65.9	0.0
16	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	18.4	0.0	16.4	65.2	0.0
17	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	20.7	0.0	14.8	64.6	0.0
18	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
18.001	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
19	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
20	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
20.001	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	23.0	0.0	13.1	63.9	0.0
21	99.2	0.8	0.0	0.0	0.0	2.9	0.0	0.1	0.3	96.7	22.2	0.0	12.8	64.9	0.0
22	99.3	0.7	0.0	0.0	0.0	5.8	0.0	0.2	0.6	93.4	21.5	0.0	12.6	65.9	0.0
23	99.3	0.7	0.0	0.0	0.0	8.8	0.0	0.3	0.9	90.1	20.7	0.0	12.3	67.0	0.0
24	99.3	0.7	0.0	0.0	0.0	11.7	0.0	0.3	1.2	86.8	19.9	0.0	12.1	68.0	0.0
25	99.3	0.7	0.0	0.0	0.0	14.6	0.0	0.4	1.5	83.5	19.2	0.0	11.8	69.0	0.0
30	99.5	0.5	0.0	0.0	0.0	29.2	0.0	0.8	2.9	67.1	15.3	0.0	10.6	74.1	0.0
35	99.6	0.4	0.0	0.0	0.0	43.8	0.0	1.3	4.4	50.6	11.5	0.0	9.3	79.2	0.0
40	99.7	0.3	0.0	0.0	0.0	58.3	0.0	1.7	5.9	34.1	7.7	0.0	8.0	84.3	0.0
45	99.9	0.1	0.0	0.0	0.0	72.9	0.0	2.1	7.3	17.7	3.8	0.0	6.8	89.4	0.0
50	100.0	0.0	0.0	0.0	0.0	87.5	0.0	2.5	8.8	1.2	0.0	0.0	5.5	94.5	0.0
500	100.0	0.0	0.0	0.0	0.0	87.5	0.0	2.5	8.8	1.2	0.0	0.0	5.5	94.5	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Tan cells indicate that the feature does not exist at that time.

Table 1-26 Volume of saturated tailings within the Flotation Tailings Basin Dams

Time (yrs)	North Dam (acre-ft)					East Dam (acre-ft)					South Dam (acre-ft)				
	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	284	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	751	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.001	831	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	374	2	0	0	0	0	0	0	0	38	0	0	0	0	0
9	1046	6	0	0	0	0	0	0	0	89	0	0	0	0	0
10	1486	8	0	0	0	0	0	0	0	115	0	0	0	0	0
11	1954	12	0	0	0	0	0	0	0	163	0	0	0	0	0
12	2436	15	0	0	0	0	0	0	0	231	0	0	0	0	0
13	2903	19	0	0	0	0	0	0	0	292	0	0	0	0	0
14	3377	23	0	0	0	0	0	0	0	359	0	0	0	0	0
15	3942	28	0	0	0	0	0	0	0	439	0	0	0	0	0
16	4477	33	0	0	0	0	0	0	0	539	5	0	5	18	0
17	5069	39	0	0	0	0	0	0	0	637	36	0	26	112	0
18	5650	46	0	0	0	0	0	0	0	734	77	0	44	215	0
18.001	5650	46	0	0	0	0	0	0	0	734	77	0	44	215	0
19	6246	50	0	0	0	0	0	0	0	879	107	0	61	297	0
20	6904	56	0	0	0	0	0	0	0	1020	147	0	83	407	0
20.001	6904	56	0	0	0	0	0	0	0	1020	147	0	83	407	0
21	6784	53	0	0	0	29	0	1	3	973	131	0	76	383	0
22	6665	50	0	0	0	58	0	2	6	927	116	0	68	357	0
23	6545	47	0	0	0	86	0	2	9	882	102	0	61	331	0
24	6425	45	0	0	0	113	0	3	11	838	89	0	54	304	0
25	6305	42	0	0	0	139	0	4	14	795	77	0	47	276	0
30	5705	31	0	0	0	257	0	7	26	592	25	0	17	120	0
35	5103	20	0	0	0	356	0	10	36	412	0	0	0	0	0
40	4499	12	0	0	0	435	0	12	44	254	0	0	0	0	0
45	3894	5	0	0	0	493	0	14	50	120	0	0	0	0	0
50	3287	0	0	0	0	532	0	15	54	7	0	0	0	0	0
500	3287	0	0	0	0	532	0	15	54	7	0	0	0	0	0

Notes

The top of the LTVSMC tailings in Cell 2W is approximated as 1727 feet

The base of the LTVSMC Tailings Basin is approximated as 1500 feet.

Table 1-27 Percentage of Seepage from Each NorthMet Tailings Beach that Flows to Each Toe of the Tailings Basin

	North Beach					*East Beach*					*South Beach*					*Closure Beach*				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.001	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	99.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	99.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	99.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	99.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	98.9	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.001	98.9	1.1	0.0	0.0	0.0	57.4	0.0	0.0	0.0	42.6	7.7	0.0	15.3	77.0	0.0	0.0	0.0	0.0	0.0	0.0
8	97.7	2.3	0.0	0.0	0.0	57.4	0.0	0.0	0.0	42.6	7.7	0.0	15.3	77.0	0.0	0.0	0.0	0.0	0.0	0.0
9	97.5	2.5	0.0	0.0	0.0	54.2	0.0	0.0	0.0	45.8	7.6	0.0	14.6	77.9	0.0	0.0	0.0	0.0	0.0	0.0
10	97.2	2.8	0.0	0.0	0.0	51.0	0.0	0.0	0.0	49.0	7.4	0.0	13.9	78.7	0.0	0.0	0.0	0.0	0.0	0.0
11	97.0	3.0	0.0	0.0	0.0	47.8	0.0	0.0	0.0	52.2	7.3	0.0	13.2	79.6	0.0	0.0	0.0	0.0	0.0	0.0
12	96.7	3.3	0.0	0.0	0.0	44.6	0.0	0.0	0.0	55.4	7.1	0.0	12.5	80.4	0.0	0.0	0.0	0.0	0.0	0.0
13	96.5	3.5	0.0	0.0	0.0	41.4	0.0	0.0	0.0	58.6	7.0	0.0	11.8	81.3	0.0	0.0	0.0	0.0	0.0	0.0
14	96.3	3.7	0.0	0.0	0.0	38.2	0.0	0.0	0.0	61.8	6.8	0.0	11.0	82.2	0.0	0.0	0.0	0.0	0.0	0.0
15	96.0	4.0	0.0	0.0	0.0	35.0	0.0	0.0	0.0	65.0	6.7	0.0	10.3	83.0	0.0	0.0	0.0	0.0	0.0	0.0
16	95.8	4.2	0.0	0.0	0.0	31.8	0.0	0.0	0.0	68.2	6.5	0.0	9.6	83.9	0.0	0.0	0.0	0.0	0.0	0.0
17	95.5	4.5	0.0	0.0	0.0	28.6	0.0	0.0	0.0	71.4	6.4	0.0	8.9	84.7	0.0	0.0	0.0	0.0	0.0	0.0
18	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.2	0.0	8.2	85.6	0.0	0.0	0.0	0.0	0.0	0.0
18.001	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.2	0.0	8.2	85.6	0.0	24.8	20.8	25.9	1.4	27.1
19	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.1	0.0	8.1	85.9	0.0	25.3	20.5	25.8	1.2	27.4
20	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.0	0.0	7.9	86.1	0.0	25.8	20.1	25.6	0.9	27.6
20.001	95.3	4.7	0.0	0.0	0.0	25.4	0.0	0.0	0.0	74.6	6.0	0.0	7.9	86.1	0.0	25.8	20.1	25.6	0.9	27.6
21	95.5	4.5	0.0	0.0	0.0	27.8	0.0	0.0	0.0	72.1	5.8	0.0	7.6	86.6	0.0	26.4	19.6	25.0	2.3	26.7
22	95.6	4.4	0.0	0.0	0.0	30.3	0.0	0.0	0.1	69.6	5.6	0.0	7.4	87.0	0.0	27.0	19.0	24.4	3.8	25.8
23	95.8	4.2	0.0	0.0	0.0	32.7	0.0	0.0	0.1	67.1	5.4	0.0	7.1	87.5	0.0	27.6	18.5	23.9	5.2	24.8
24	95.9	4.1	0.0	0.0	0.0	35.2	0.0	0.0	0.2	64.7	5.2	0.0	6.8	88.0	0.0	28.2	18.0	23.3	6.6	23.9
25	96.1	3.9	0.0	0.0	0.0	37.6	0.0	0.0	0.2	62.2	5.0	0.0	6.6	88.4	0.0	28.8	17.4	22.7	8.1	23.0
30	96.9	3.1	0.0	0.0	0.0	49.8	0.0	0.0	0.5	49.7	4.0	0.0	5.3	90.7	0.0	31.8	14.8	19.8	15.2	18.4
35	97.7	2.4	0.0	0.0	0.0	62.0	0.0	0.0	0.7	37.3	3.0	0.0	4.0	93.1	0.0	34.8	12.1	17.0	22.4	13.8
40	98.4	1.6	0.0	0.0	0.0	74.2	0.0	0.0	0.9	24.9	2.0	0.0	2.6	95.4	0.0	37.7	9.4	14.1	29.6	9.2
45	99.2	0.8	0.0	0.0	0.0	86.4	0.0	0.0	1.2	12.4	1.0	0.0	1.3	97.7	0.0	40.7	6.8	11.2	36.7	4.6
50	100.0	0.0	0.0	0.0	0.0	98.6	0.0	0.0	1.4	0.0	0.0	0.0	0.0	100.0	0.0	43.7	4.1	8.3	43.9	0.0
500	100.0	0.0	0.0	0.0	0.0	98.6	0.0	0.0	1.4	0.0	0.0	0.0	0.0	100.0	0.0	43.7	4.1	8.3	43.9	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Tan cells indicate that the feature (unsaturated fine tailings, dams, and the existing pond in Cell 1E) does not exist at that time.

Table 1-28 Volume of saturated tailings within the Flotation Tailings Basin Beaches

	North Beach (acre-ft)					*East Beach (acre-ft)*					*South Beach (acre-ft)*					*Closure Beach (acre-ft)*				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1030	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2052	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3034	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4075	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4891	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	5851	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	6629	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.001	6628	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	6122	144	0	0	0	60	0	0	0	44	0	0	0	0	0	0	0	0	0	0
9	6820	178	0	0	0	163	0	0	0	138	23	0	45	240	0	0	0	0	0	0
10	7259	208	0	0	0	228	0	0	0	219	59	0	110	625	0	0	0	0	0	0
11	7671	239	0	0	0	281	0	0	0	307	96	0	174	1049	0	0	0	0	0	0
12	8088	273	0	0	0	327	0	0	0	406	130	0	228	1474	0	0	0	0	0	0
13	8468	307	0	0	0	360	0	0	0	510	159	0	269	1858	0	0	0	0	0	0
14	8851	344	0	0	0	387	0	0	0	626	186	0	301	2242	0	0	0	0	0	0
15	9271	384	0	0	0	431	0	0	0	801	217	0	337	2708	0	0	0	0	0	0
16	9653	425	0	0	0	462	0	0	0	992	244	0	361	3145	0	0	0	0	0	0
17	10079	471	0	0	0	489	0	0	0	1221	272	0	382	3636	0	0	0	0	0	0
18	10466	516	0	0	0	500	0	0	0	1468	297	0	393	4098	0	0	0	0	0	0
18.001	10466	516	0	0	0	500	0	0	0	1468	297	0	393	4098	0	0	0	0	0	0
19	10807	533	0	0	0	591	0	0	0	1737	308	0	407	4342	0	0	0	0	0	0
20	11196	552	0	0	0	695	0	0	0	2042	323	0	425	4633	0	0	0	0	0	0
20.001	11196	552	0	0	0	695	0	0	0	2042	323	0	425	4633	0	0	0	0	0	0
21	11010	524	0	0	0	761	0	0	1	1972	308	0	406	4597	0	0	0	0	0	0
22	10824	497	0	0	0	827	0	0	3	1902	293	0	386	4560	0	0	0	0	0	0
23	10637	470	0	0	0	893	0	0	4	1833	279	0	367	4522	0	0	0	0	0	0
24	10450	444	0	0	0	959	0	0	5	1763	265	0	349	4484	0	0	0	0	0	0
25	10262	418	0	0	0	1025	0	0	6	1694	251	0	331	4445	0	0	0	0	0	0
30	9311	301	0	0	0	1351	0	0	13	1350	187	0	246	4240	0	0	0	0	0	0
35	8344	201	0	0	0	1675	0	0	19	1008	130	0	171	4019	0	0	0	0	0	0
40	7360	117	0	0	0	1997	0	0	25	669	79	0	104	3781	0	0	0	0	0	0
45	6359	50	0	0	0	2315	0	0	31	333	36	0	48	3528	0	0	0	0	0	0
50	5342	0	0	0	0	2631	0	0	37	0	0	0	0	3257	0	0	0	0	0	0
500	5342	0	0	0	0	2631	0	0	37	0	0	0	0	3257	0	0	0	0	0	0

Notes

The top of the LTVSMC tailings in Cell 2E is approximated as 1570 feet

The top of the LTVSMC tailings in Cell 1E is approximated as 1658 feet

Table 1-29 Average Depth to the Phreatic Surface Within Unsaturated Areas

	North Dam		*East Dam*		*South Dam*		*Closure Beach (feet)*
Time (yrs)	*Dam (feet)*	*Beach (feet)*	*Dam (feet)*	*Beach (feet)*	*Dam (feet)*	*Beach (feet)*	
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.001	44.0	4.2	0.0	0.0	0.0	0.0	0.0
1	44.0	4.2	0.0	0.0	0.0	0.0	0.0
2	50.0	5.3	0.0	0.0	0.0	0.0	0.0
3	55.9	6.4	0.0	0.0	0.0	0.0	0.0
4	61.9	7.5	0.0	0.0	0.0	0.0	0.0
5	67.8	8.6	0.0	0.0	0.0	0.0	0.0
6	73.8	9.7	0.0	0.0	0.0	0.0	0.0
7	79.7	10.8	0.0	0.0	0.0	0.0	0.0
7.001	79.7	10.8	6.0	3.0	46.0	13.2	0.0
8	94.3	16.3	6.0	3.0	46.0	13.2	0.0
9	94.9	16.6	7.1	3.2	46.6	13.0	0.0
10	95.5	17.0	8.2	3.3	47.3	12.8	0.0
11	96.1	17.3	9.3	3.5	47.9	12.7	0.0
12	96.7	17.7	10.4	3.6	48.5	12.5	0.0
13	97.4	18.0	11.5	3.8	49.2	12.3	0.0
14	98.0	18.3	12.6	4.0	49.8	12.1	0.0
15	98.6	18.7	13.7	4.1	50.4	11.9	0.0
16	99.2	19.0	14.8	4.3	51.0	11.8	0.0
17	99.8	19.4	15.9	4.4	51.7	11.6	0.0
18	100.4	19.7	17.0	4.6	52.3	11.4	0.0
18.001	100.4	19.7	17.0	4.6	52.3	11.4	7.2
19	100.8	21.8	17.5	5.3	53.7	12.6	4.8
20	101.1	23.8	18.0	6.0	55.0	13.8	9.6
20.001	101.1	23.8	18.0	6.0	55.0	13.8	9.6
21	102.1	26.2	18.7	6.1	56.0	14.5	10.5
22	103.1	28.5	19.4	6.1	57.1	15.2	11.4
23	104.1	30.9	20.1	6.2	58.1	15.9	12.3
24	105.0	33.3	20.7	6.2	59.2	16.5	13.1
25	106.0	35.6	21.4	6.3	60.2	17.2	14.0
30	110.9	47.5	24.9	6.5	65.4	20.7	18.4
35	115.9	59.3	28.3	6.8	70.7	24.1	22.9
40	120.8	71.1	31.7	7.0	75.9	27.5	27.3
45	125.7	83.0	35.2	7.3	81.1	31.0	31.7
50	130.6	94.8	38.6	7.5	86.3	34.4	36.1
500	130.6	94.8	38.6	7.5	86.3	34.4	36.1

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities.

Tan cells indicate that the feature (unsaturated fine tailings, dams, and the existing pond in Cell 1E) does not exist at that time.

A minimum value of 3 feet in the beaches and 6 feet in the dams was used

Table 1-31 Seepage Quantity and Direction from the NorthMet Flotation Tailings Pond

Time (yrs)	*Pond_Seepage_Rate (in/yr)*	*Pond_Seepage_Direction[N] (%)*	*Pond_Seepage_Direction[NW] (%)*	*Pond_Seepage_Direction[W] (%)*	*Pond_Seepage_Direction[S] (%)*	*Pond_Seepage_Direction[E] (%)*	*Pond_Saturated_Volume (acre-ft)*
0	61.5	100.0	0.0	0.0	0.0	0.0	12796
0.001	5.2	83.2	16.8	0.0	0.0	0.0	23460
1	5.2	83.2	16.8	0.0	0.0	0.0	29772
2	7.6	82.4	17.6	0.0	0.0	0.0	35065
3	9.9	81.7	18.3	0.0	0.0	0.0	40429
4	12.3	80.9	19.1	0.0	0.0	0.0	46293
5	14.6	80.1	19.9	0.0	0.0	0.0	51295
6	17.0	79.4	20.6	0.0	0.0	0.0	57216
7	19.3	78.6	21.4	0.0	0.0	0.0	63615
7.001	19.3	78.6	21.4	0.0	0.0	0.0	153589
8	12.6	75.1	9.2	15.7	0.0	0.0	162136
9	12.7	75.4	8.4	15.2	0.0	1.0	174637
10	12.9	75.6	7.7	14.7	0.0	2.1	183622
11	13.0	75.9	6.9	14.1	0.0	3.1	190235
12	13.1	76.1	6.1	13.6	0.0	4.2	196909
13	13.3	76.4	5.4	13.1	0.0	5.2	203076
14	13.4	76.6	4.6	12.6	0.0	6.2	209297
15	13.5	76.9	3.8	12.1	0.0	7.3	213773
16	13.6	77.1	3.0	11.5	0.0	8.3	217619
17	13.8	77.4	2.3	11.0	0.0	9.4	221968
18	13.9	77.6	1.5	10.5	0.0	10.4	225692
18.001	13.9	77.6	1.5	10.5	0.0	10.4	183101
19	14.6	78.4	1.7	10.3	0.0	9.8	186270
20	15.2	79.1	1.8	10.0	0.0	9.1	189891
30	15.2	79.1	1.8	10.0	0.0	9.1	189891
30.001	6.5	79.1	1.8	10.0	0.0	9.1	189891
50	6.5	93.6	1.4	5.0	0.0	0.0	189891
500	6.5	93.6	1.4	5.0	0.0	0.0	189891

Notes

Values at year 0 represent the existing conditions of the pond in Cell 2E

Table 1-32 Areas Contributing Runoff to the Tailings Basin as it Develops

Time (yrs)	*Contr_Embank_Area_2E (acres)*	*Contr_Embank_Area_1E (acres)*	*Contr_Watershed_2E (acres)*	*Contr_Watershed_1E (acres)*
0	86.6	49.4	112.0	230.7
2	83.8	46.7	100.1	230.7
4	72.0	46.7	72.3	230.7
6	61.8	46.7	62.5	230.7
7	50.5	46.7	51.0	230.7
7.001	0.0	97.2	0.0	281.7
10	0.0	75.7	0.0	245.5
14	0.0	48.4	0.0	194.8
18	0.0	26.4	0.0	159.2
20	0.0	19.1	0.0	138.5
500	0.0	19.1	0.0	138.5

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge,

Year 18 represents the beginning of closure activities, Year 20 represents final closure.

The area contributing runoff to Cell 2E is added to the area contributing to Cell 1E in years after the two cells have merged

Table 1-34 Depth to the Water Table in the Existing LTVSMC tailings

Time (yrs)	Cell 2W			Cell 1E			Cell 2E		
	Coarse Tailings (ft)	Fine Tailings (ft)	Other (ft)	Coarse Tailings (ft)	Fine Tailings (ft)	Other (ft)	Coarse Tailings (ft)	Fine Tailings (ft)	Other (ft)
0	103.5	106.0	88.3	49.9	9.2	0.0	17.6	58.9	40.2
0.001	103.5	106.0	88.3	49.9	9.2	0.0	17.6	58.9	40.2
1	111.7	121.8	91.9	51.1	9.3	0.0	13.1	87.2	33.2
2	110.1	120.2	91.5	49.5	9.0	0.0	10.9	85.0	33.5
3	108.6	118.5	91.2	47.8	8.7	0.0	8.7	82.8	33.7
4	107.0	116.9	90.8	46.2	8.5	0.0	6.6	80.6	34.0
5	105.4	115.2	90.4	44.6	8.2	0.0	4.4	78.4	34.3
6	103.9	113.6	90.1	42.9	7.9	0.0	2.2	76.2	34.5
7	102.3	111.9	89.7	41.3	7.6	0.0	0.0	74.0	34.8
7.001	102.3	111.9	89.7	41.3	7.6	0.0	0.0	74.0	34.8
8	108.1	115.4	93.7	22.4	0.0	0.0	0.0	92.8	41.7
9	106.9	114.6	94.0	24.0	0.0	0.0	0.0	91.9	41.9
10	105.6	113.7	94.2	25.7	0.0	0.0	0.0	91.1	42.2
11	104.4	112.9	94.5	27.3	0.0	0.0	0.0	90.2	42.4
12	103.1	112.0	94.8	28.9	0.0	0.0	0.0	89.4	42.6
13	101.9	111.2	95.1	30.6	0.0	0.0	0.0	88.5	42.9
14	100.7	110.3	95.3	32.2	0.0	0.0	0.0	87.6	43.1
15	99.4	109.5	95.6	33.8	0.0	0.0	0.0	86.8	43.3
16	98.2	108.6	95.9	35.4	0.0	0.0	0.0	85.9	43.5
17	96.9	107.8	96.1	37.1	0.0	0.0	0.0	85.1	43.8
18	95.7	106.9	96.4	38.7	0.0	0.0	0.0	84.2	44.0
18.001	95.7	106.9	96.4	38.7	0.0	0.0	0.0	84.2	44.0
19	96.0	107.1	96.5	38.8	0.0	0.0	0.0	74.3	44.0
20	96.3	107.3	96.5	38.8	0.0	0.0	0.0	64.3	44.0
20.001	96.3	107.3	96.5	38.8	0.0	0.0	0.0	64.3	44.0
21	97.3	108.0	96.9	39.7	0.0	0.0	0.0	66.0	44.2
22	98.3	108.7	97.3	40.6	0.0	0.0	0.0	67.7	44.4
23	99.3	109.5	97.6	41.6	0.0	0.0	0.0	69.4	44.6
24	100.3	110.2	98.0	42.5	0.0	0.0	0.0	71.1	44.8
25	101.4	110.9	98.4	43.4	0.0	0.0	0.0	72.8	45.0
30	106.4	114.5	100.3	48.0	0.0	0.0	0.0	81.3	45.9
35	111.5	118.1	102.2	52.7	0.0	0.0	0.0	89.8	46.9
40	116.5	121.7	104.0	57.3	0.0	0.0	0.0	98.3	47.8
45	121.6	125.3	105.9	61.9	0.0	0.0	0.0	106.8	48.8
50	126.6	128.9	107.8	66.5	0.0	0.0	0.0	115.3	49.7
500	126.6	128.9	107.8	66.5	0.0	0.0	0.0	115.3	49.7

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Tan cells indicate that the feature does not exist at that time.

Table 1-35 Seepage Direction from each zone in Cell 2W

Time (yrs)	Coarse Tailings (%)					Fine Tailings (%)					Other (%)				
	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	14.3	21.7	64.0	0.0	0.0	0.7	48.1	51.2	0.0	0.0	19.3	26.7	52.8	1.2	0.0
0.001	14.3	21.7	64.0	0.0	0.0	0.7	48.1	51.2	0.0	0.0	19.3	26.7	52.8	1.2	0.0
1	0.0	26.1	73.9	0.0	0.0	0.0	46.3	53.7	0.0	0.0	11.2	34.7	53.1	1.0	0.0
2	0.0	25.6	74.5	0.0	0.0	0.0	45.4	54.6	0.0	0.0	9.3	35.4	54.3	1.0	0.0
3	0.0	25.0	75.0	0.0	0.0	0.0	44.6	55.4	0.0	0.0	7.5	36.0	55.5	1.0	0.0
4	0.0	24.5	75.6	0.0	0.0	0.0	43.7	56.3	0.0	0.0	5.6	36.7	56.8	1.0	0.0
5	0.0	23.9	76.1	0.0	0.0	0.0	42.8	57.2	0.0	0.0	3.7	37.3	58.0	1.0	0.0
6	0.0	23.4	76.7	0.0	0.0	0.0	42.0	58.0	0.0	0.0	1.9	38.0	59.2	1.0	0.0
7	0.0	22.8	77.2	0.0	0.0	0.0	41.1	58.9	0.0	0.0	0.0	38.6	60.4	1.0	0.0
7.001	0.0	22.8	77.2	0.0	0.0	0.0	41.1	58.9	0.0	0.0	0.0	38.6	60.4	1.0	0.0
8	0.0	21.3	78.7	0.0	0.0	0.0	40.9	59.1	0.0	0.0	0.4	36.7	61.8	1.1	0.0
9	0.0	20.8	79.2	0.0	0.0	0.0	40.8	59.2	0.0	0.0	0.4	36.4	62.1	1.1	0.0
10	0.0	20.3	79.7	0.0	0.0	0.0	40.8	59.2	0.0	0.0	0.5	36.0	62.4	1.1	0.0
11	0.0	19.8	80.2	0.0	0.0	0.0	40.7	59.3	0.0	0.0	0.5	35.7	62.6	1.2	0.0
12	0.0	19.3	80.7	0.0	0.0	0.0	40.6	59.4	0.0	0.0	0.5	35.4	62.9	1.2	0.0
13	0.0	18.8	81.3	0.0	0.0	0.0	40.6	59.5	0.0	0.0	0.6	35.1	63.2	1.2	0.0
14	0.0	18.2	81.8	0.0	0.0	0.0	40.5	59.5	0.0	0.0	0.6	34.7	63.5	1.2	0.0
15	0.0	17.7	82.3	0.0	0.0	0.0	40.4	59.6	0.0	0.0	0.6	34.4	63.8	1.2	0.0
16	0.0	17.2	82.8	0.0	0.0	0.0	40.3	59.7	0.0	0.0	0.6	34.1	64.0	1.3	0.0
17	0.0	16.7	83.3	0.0	0.0	0.0	40.3	59.7	0.0	0.0	0.7	33.7	64.3	1.3	0.0
18	0.0	16.2	83.8	0.0	0.0	0.0	40.2	59.8	0.0	0.0	0.7	33.4	64.6	1.3	0.0
18.001	0.0	16.2	83.8	0.0	0.0	0.0	40.2	59.8	0.0	0.0	0.7	33.4	64.6	1.3	0.0
19	0.0	16.3	83.7	0.0	0.0	0.0	40.3	59.8	0.0	0.0	0.7	33.5	64.6	1.3	0.0
20	0.0	16.4	83.6	0.0	0.0	0.0	40.3	59.7	0.0	0.0	0.7	33.5	64.5	1.3	0.0
20.001	0.0	16.4	83.6	0.0	0.0	0.0	40.3	59.7	0.0	0.0	0.7	33.5	64.5	1.3	0.0
21	0.0	16.8	83.2	0.0	0.0	0.0	40.4	59.6	0.0	0.0	0.8	33.4	64.5	1.3	0.0
22	0.0	17.1	82.9	0.0	0.0	0.0	40.5	59.5	0.0	0.0	0.9	33.3	64.4	1.3	0.0
23	0.0	17.5	82.5	0.0	0.0	0.0	40.6	59.4	0.0	0.0	1.1	33.3	64.4	1.3	0.0
24	0.0	17.8	82.2	0.0	0.0	0.0	40.7	59.3	0.0	0.0	1.2	33.2	64.3	1.3	0.0
25	0.0	18.2	81.8	0.0	0.0	0.0	40.8	59.2	0.0	0.0	1.3	33.1	64.3	1.3	0.0
30	0.0	19.9	80.1	0.0	0.0	0.0	41.3	58.7	0.0	0.0	1.9	32.7	64.0	1.4	0.0
35	0.0	21.7	78.3	0.0	0.0	0.0	41.9	58.2	0.0	0.0	2.5	32.4	63.8	1.4	0.0
40	0.0	23.5	76.5	0.0	0.0	0.0	42.4	57.6	0.0	0.0	3.0	32.0	63.6	1.4	0.0
45	0.0	25.2	74.8	0.0	0.0	0.0	42.9	57.1	0.0	0.0	3.6	31.6	63.3	1.5	0.0
50	0.0	27.0	73.0	0.0	0.0	0.0	43.4	56.6	0.0	0.0	4.2	31.2	63.1	1.5	0.0
500	0.0	27.0	73.0	0.0	0.0	0.0	43.4	56.6	0.0	0.0	4.2	31.2	63.1	1.5	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Table 1-36 **Volume of saturated tailings under each zone of Cell 2W**

Time (yrs)	Coarse Tailings (acre-ft)					Fine Tailings (acre-ft)					Embankments (acre-ft)				
	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	3887	5898	17395	0	0	634	43539	46345	0	0	6104	8445	16700	380	0
0.001	3887	5898	17395	0	0	634	43539	46345	0	0	6104	8445	16700	380	0
1	0	6623	18752	0	0	0	36437	42260	0	0	3465	10734	16426	309	0
2	0	6571	19148	0	0	0	36316	43616	0	0	2907	11009	16916	311	0
3	0	6516	19548	0	0	0	36173	44993	0	0	2352	11338	17490	315	0
4	0	6457	19952	0	0	0	36009	46391	0	0	1783	11671	18072	318	0
5	0	6394	20360	0	0	0	35823	47811	0	0	1200	11994	18640	322	0
6	0	6328	20771	0	0	0	35617	49252	0	0	606	12320	19214	325	0
7	0	6257	21187	0	0	0	35388	50715	0	0	0	12757	19962	331	0
7.001	0	6257	21187	0	0	0	35388	50715	0	0	0	12758	19963	331	0
8	0	5574	20594	0	0	0	34145	49340	0	0	130	11946	20117	358	0
9	0	5497	20943	0	0	0	34347	49774	0	0	141	11941	20383	368	0
10	0	5417	21296	0	0	0	34547	50210	0	0	152	11935	20651	378	0
11	0	5335	21651	0	0	0	34746	50646	0	0	164	11922	20912	387	0
12	0	5250	22009	0	0	0	34945	51084	0	0	175	11908	21176	397	0
13	0	5162	22370	0	0	0	35142	51522	0	0	187	11892	21443	407	0
14	0	5072	22733	0	0	0	35339	51961	0	0	198	11875	21712	417	0
15	0	4978	23099	0	0	0	35535	52401	0	0	210	11836	21944	427	0
16	0	4882	23469	0	0	0	35730	52842	0	0	222	11795	22178	436	0
17	0	4783	23840	0	0	0	35924	53284	0	0	233	11754	22414	446	0
18	0	4681	24215	0	0	0	36117	53726	0	0	245	11712	22652	456	0
18.001	0	4681	24215	0	0	0	36117	53726	0	0	245	11712	22652	456	0
19	0	4699	24131	0	0	0	36102	53592	0	0	247	11785	22742	458	0
20	0	4717	24047	0	0	0	36086	53458	0	0	248	11859	22833	460	0
20.001	0	4717	24047	0	0	0	36086	53458	0	0	248	11859	22833	460	0
21	0	4782	23760	0	0	0	35961	53044	0	0	289	11810	22775	462	0
22	0	4845	23475	0	0	0	35835	52632	0	0	329	11762	22718	463	0
23	0	4906	23192	0	0	0	35708	52221	0	0	370	11714	22660	465	0
24	0	4965	22910	0	0	0	35579	51811	0	0	410	11666	22602	466	0
25	0	5024	22629	0	0	0	35450	51401	0	0	450	11617	22545	468	0
30	0	5291	21251	0	0	0	34785	49373	0	0	649	11378	22259	475	0
35	0	5518	19912	0	0	0	34093	47372	0	0	844	11142	21974	482	0
40	0	5707	18612	0	0	0	33373	45399	0	0	1035	10908	21690	489	0
45	0	5856	17351	0	0	0	32625	43454	0	0	1223	10676	21408	496	0
50	0	5966	16130	0	0	0	31850	41536	0	0	1406	10447	21128	502	0
500	0	5966	16130	0	0	0	31850	41536	0	0	1406	10447	21128	502	0

Notes

The top of the LTVSMC tailings in Cell 2W is approximated as 1727 feet

The base of the LTVSMC Tailings Basin is approximated as 1500 feet.

Table 1-37 **Seepage Direction from each zone in Cell 2E**

Time (yrs)	Coarse Tailings (%)					Fine Tailings (%)					Dams (%)				
	North	North-West	West	South	East	North	North-West	West	South	East	North	North-West	West	South	East
0	99.0	1.0	0.0	0.0	0.0	99.2	0.8	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
0.001	99.0	1.0	0.0	0.0	0.0	99.2	0.8	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
1	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
2	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
3	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
4	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
5	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
6	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
7	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
7.001	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
8	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
9	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
10	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
11	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
12	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
13	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
14	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
15	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
16	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
17	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
18	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
18.001	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
19	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
20	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
20.001	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
21	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
22	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
23	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
24	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
25	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
30	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
35	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
40	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
45	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
50	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0
500	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.7	1.3	0.0	0.0	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Table 1-38 **Volume of saturated tailings under each zone of Cell 2E**

Time (yrs)	*Coarse Tailings (acre-ft)*					*Fine Tailings (acre-ft)*					*Embankments (acre-ft)*				
	North	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	10390	105	0	0	0	1872	15	0	0	0	2214	29	0	0	0
0.001	13661	138	0	0	0	11805	95	0	0	0	2214	29	0	0	0
1	13856	0	0	0	0	11900	0	0	0	0	2735	36	0	0	0
2	13906	0	0	0	0	11900	0	0	0	0	2715	36	0	0	0
3	13947	0	0	0	0	11900	0	0	0	0	2695	35	0	0	0
4	13979	0	0	0	0	11900	0	0	0	0	2675	35	0	0	0
5	14002	0	0	0	0	11900	0	0	0	0	2655	35	0	0	0
6	14016	0	0	0	0	11900	0	0	0	0	2636	35	0	0	0
7	14020	0	0	0	0	11900	0	0	0	0	2616	34	0	0	0
7.001	14020	0	0	0	0	11900	0	0	0	0	2616	34	0	0	0
8	14020	0	0	0	0	11900	0	0	0	0	2103	28	0	0	0
9	14020	0	0	0	0	11900	0	0	0	0	2086	27	0	0	0
10	14020	0	0	0	0	11900	0	0	0	0	2069	27	0	0	0
11	14020	0	0	0	0	11900	0	0	0	0	2052	27	0	0	0
12	14020	0	0	0	0	11900	0	0	0	0	2035	27	0	0	0
13	14020	0	0	0	0	11900	0	0	0	0	2018	27	0	0	0
14	14020	0	0	0	0	11900	0	0	0	0	2000	26	0	0	0
15	14020	0	0	0	0	11900	0	0	0	0	1983	26	0	0	0
16	14020	0	0	0	0	11900	0	0	0	0	1966	26	0	0	0
17	14020	0	0	0	0	11900	0	0	0	0	1949	26	0	0	0
18	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
18.001	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
19	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
20	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
20.001	14020	0	0	0	0	11900	0	0	0	0	1932	25	0	0	0
21	14020	0	0	0	0	11900	0	0	0	0	1918	25	0	0	0
22	14020	0	0	0	0	11900	0	0	0	0	1904	25	0	0	0
23	14020	0	0	0	0	11900	0	0	0	0	1890	25	0	0	0
24	14020	0	0	0	0	11900	0	0	0	0	1876	25	0	0	0
25	14020	0	0	0	0	11900	0	0	0	0	1861	25	0	0	0
30	14020	0	0	0	0	11900	0	0	0	0	1791	24	0	0	0
35	14020	0	0	0	0	11900	0	0	0	0	1720	23	0	0	0
40	14020	0	0	0	0	11900	0	0	0	0	1650	22	0	0	0
45	14020	0	0	0	0	11900	0	0	0	0	1579	21	0	0	0
50	14020	0	0	0	0	11900	0	0	0	0	1509	20	0	0	0
500	14020	0	0	0	0	11900	0	0	0	0	1509	20	0	0	0

Notes

The top of the LTVSMC tailings in Cell 2E is approximated as 1570 feet

The base of the LTVSMC Tailings Basin is approximated as 1500 feet.

Table 1-39 Seepage Direction from each zone in Cell 1E

	Coarse Tailings (%)					*Fine Tailings (%)*					*Dams (%)*					*Pond (%)*				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	66.5	0.0	1.2	32.3	0.0	62.1	0.0	0.0	37.9	0.0	0.0	0.0	0.0	0.0	0.0	77.3	0.3	1.8	20.6	0.0
0.001	66.5	0.0	1.2	32.3	0.0	62.1	0.0	0.0	37.9	0.0	0.0	0.0	0.0	0.0	0.0	77.3	0.3	1.8	20.6	0.0
1	65.5	0.0	1.3	33.2	0.0	65.9	0.0	0.0	34.1	0.0	0.0	0.0	0.0	0.0	0.0	77.5	1.0	1.8	19.7	0.0
2	59.0	3.1	1.7	35.9	0.4	57.2	3.3	0.4	38.9	0.2	0.0	0.0	0.0	0.0	0.0	69.1	5.3	3.9	21.7	0.0
3	52.4	6.1	2.2	38.6	0.7	48.5	6.5	0.8	43.7	0.4	0.0	0.0	0.0	0.0	0.0	60.7	9.6	6.0	23.8	0.0
4	45.9	9.2	2.6	41.3	1.1	39.9	9.8	1.3	48.6	0.6	0.0	0.0	0.0	0.0	0.0	52.3	13.9	8.1	25.8	0.0
5	39.3	12.3	3.0	44.0	1.4	31.2	13.0	1.7	53.4	0.8	0.0	0.0	0.0	0.0	0.0	43.8	18.1	10.2	27.8	0.0
6	32.8	15.3	3.5	46.7	1.8	22.5	16.3	2.1	58.2	1.0	0.0	0.0	0.0	0.0	0.0	35.4	22.4	12.3	29.9	0.0
7	26.2	18.4	3.9	49.4	2.1	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
7.001	26.2	18.4	3.9	49.4	2.1	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
8	23.0	1.1	2.3	73.6	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
9	20.7	1.0	2.1	76.2	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
10	18.4	0.9	1.8	78.9	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
11	16.1	0.8	1.6	81.5	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
12	13.8	0.7	1.4	84.2	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
13	11.5	0.6	1.2	86.8	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
14	9.2	0.4	0.9	89.4	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
15	6.9	0.3	0.7	92.1	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
16	4.6	0.2	0.5	94.7	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
17	2.3	0.1	0.2	97.4	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
18	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
18.001	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
19	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
20	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
20.001	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
21	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
22	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
23	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
24	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
25	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
30	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
35	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
40	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
45	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
50	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0
500	0.0	0.0	0.0	100.0	0.0	13.8	19.5	2.5	63.0	1.2	0.0	0.0	0.0	0.0	0.0	27.0	26.7	14.4	31.9	0.0

Notes

Year 0 represents existing conditions, Year 7 is the year before Cell 1E and Cell 2E merge, Year 18 represents the beginning of closure activities, Year 20 represents final closure.

Gray cells indicate that the feature (unsaturated fine tailings, dams, and the existing pond in Cell 1E) does not exist at that time.

Table 1-40 **Volume of saturated tailings under each zone of Cell 1E**

	Coarse Tailings (acre-ft)					*Fine Tailings (acre-ft)*					*Embankments (acre-ft)*				
Time (yrs)	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*	*North*	*North-West*	*West*	*South*	*East*
0	20851	0	376	10128	0	18820	0	0	11486	0	0	0	0	0	0
0.001	20852	0	376	10128	0	18820	0	0	11486	0	0	0	0	0	0
1	21344	0	424	10818	0	19958	0	0	10327	0	0	0	0	0	0
2	19562	1018	575	11913	116	17361	986	126	11809	61	0	0	0	0	0
3	17696	2071	732	13036	236	14755	1976	253	13295	122	0	0	0	0	0
4	15748	3160	893	14185	361	12138	2970	381	14788	183	0	0	0	0	0
5	13720	4282	1059	15360	489	9511	3967	509	16286	244	0	0	0	0	0
6	11614	5438	1229	16561	621	6874	4968	637	17789	306	0	0	0	0	0
7	9433	6624	1404	17785	756	4227	5973	766	19298	368	0	0	0	0	0
7.001	11924	8374	1775	22482	956	4441	6275	804	20273	386	0	0	0	0	0
8	10501	502	1050	33603	0	4441	6275	804	20273	386	0	0	0	0	0
9	9450	452	945	34807	0	4441	6275	804	20273	386	0	0	0	0	0
10	8400	402	840	36011	0	4441	6275	804	20273	386	0	0	0	0	0
11	7350	352	735	37217	0	4441	6275	804	20273	386	0	0	0	0	0
12	6301	301	630	38424	0	4441	6275	804	20273	386	0	0	0	0	0
13	5251	251	525	39633	0	4441	6275	804	20273	386	0	0	0	0	0
14	4201	201	420	40843	0	4441	6275	804	20273	386	0	0	0	0	0
15	3151	151	315	42054	0	4441	6275	804	20273	386	0	0	0	0	0
16	2101	100	210	43267	0	4441	6275	804	20273	386	0	0	0	0	0
17	1051	50	105	44482	0	4441	6275	804	20273	386	0	0	0	0	0
18	0	0	0	45699	0	4441	6275	804	20273	386	0	0	0	0	0
18.001	0	0	0	45699	0	4441	6275	804	20273	386	0	0	0	0	0
19	0	0	0	45698	0	4441	6275	804	20273	386	0	0	0	0	0
20	0	0	0	45698	0	4441	6275	804	20273	386	0	0	0	0	0
20.001	0	0	0	45698	0	4441	6275	804	20273	386	0	0	0	0	0
21	0	0	0	45695	0	4441	6275	804	20273	386	0	0	0	0	0
22	0	0	0	45692	0	4441	6275	804	20273	386	0	0	0	0	0
23	0	0	0	45689	0	4441	6275	804	20273	386	0	0	0	0	0
24	0	0	0	45686	0	4441	6275	804	20273	386	0	0	0	0	0
25	0	0	0	45683	0	4441	6275	804	20273	386	0	0	0	0	0
30	0	0	0	45667	0	4441	6275	804	20273	386	0	0	0	0	0
35	0	0	0	45651	0	4441	6275	804	20273	386	0	0	0	0	0
40	0	0	0	45636	0	4441	6275	804	20273	386	0	0	0	0	0
45	0	0	0	45620	0	4441	6275	804	20273	386	0	0	0	0	0
50	0	0	0	45605	0	4441	6275	804	20273	386	0	0	0	0	0
500	0	0	0	45605	0	4441	6275	804	20273	386	0	0	0	0	0

<u>Notes</u>

The top of the LTVSMC tailings in Cell 1E is approximated as 1658 feet

The base of the LTVSMC Tailings Basin is approximated as 1500 feet.

Table 1-44 Other Surface Water Quality Inputs

Constituent	*Area5NW_Conc* (mg/L)*	*Initial_Pond_Concs_1E** (mg/L)*	*Initial_Pond_Concs_2E** (mg/L)*	*CL_Mean (mg/L)*	*CL_SD (mg/L)*
Ag	0.00015	0.0001	0.0001	0.0001	0
Al	0.0125	0.01	0.01	0.094	0.028
Alk (as CaCO3)	96	260	340	47.9	0
As	0.0011	0.0047	0.0054	0.00098	0.00037
B	0.16	0.25	0.3	0.061	0
Ba	0.0036	0.25	0.25	0.008	0
Be	0.0001	0.0002	0.0002	0.0001	0
Ca	86.3	26	34	19.6	4.1
Cd	0.0001	0.0001	0.0001	0.0001	0
Cl	4.28	23	23	4.03	0
Co	0.0004	0.0006	0.0006	0.00033	0
Cr	0.0005	0.0005	0.0005	0.0005	0
Cu	0.0018	0.0013	0.001	0.0041	0
F	0.17	5.9	4.4	0.09	0
Fe	0.093	0.025	0.03	1.52	0.9
K	51.9	8.7	12	1.27	0
Mg	245	47	66	9.06	1.16
Mn	0.804	0.048	0.079	0.103	0.063
Na	89.2	78	77	5.03	0
Ni	0.0036	0.0013	0.001	0.0021	0
Pb	0.00014	0.0016	0.0016	0.0006	0
Sb	0.00025	0.00025	0.00025	0.00025	0
Se	0.0007	0.0005	0.0005	0.0007	0
SO_4	1084	95	130	28.7	13.8
Tl	0.0001	0.00017	0.00017	0.00002	0.00002
V	0.00541	0.00541	0.00541	0.0013	0
Zn	0.003	0.013	0.013	0.0053	0

Notes

Source: Surface Water Samples for Area_5NW_Effluent_Conc from SD-033 through 08/23/2011

* Data not available for Alkalinity, F and V; GW values assumed

** Data not available for Ag, Al, Ba, Be, Cd, Cr, Pb, Sb, Se, Tl, V, & Zn; average concentrations at the North Toe (GW001 & GW012) assumed

Table 1-45 Sewage Treatment Plant Effluent Concentration

Constituent	*Additional_Quality_Lower (mg/L)*	*Additional_Quality_Upper (mg/L)*
Ag*	0	0
Al	0.1	0.2
Alk (as CaCO3)	60	120
As*	0	0
B	0.1	0.4
Ba*	0	0
Be*	0	0
Ca	6	16
Cd*	0	0
Cl	20	50
Co*	0	0
Cr*	0	0
Cu*	0	0
F	0.2	0.4
Fe*	0	0
K	7	15
Mg	4	10
Mn	0.2	0.4
Na	40	70
Ni*	0	0
Pb*	0	0
Sb*	0	0
Se*	0	0
SO_4	15	30
Tl*	0	0
V*	0	0
Zn*	0	0

Notes

Typical mineral increase from domestic water use. Adapted from Metcalf and Eddy (1991) Wastewater Engineering. Treatment Disposal Reuse, G. Tchobanoglous and F.L. Burton (Eds.), 1820 pp. New York: McGraw-Hill.

* Constituents with an asterisk are not considered to increase appreciably due to domestic water use.

Table 1-49a Contributing Areas to each Surface Water Evaluation Point, Existing Conditions

Surface Water Evaluation Point	*Incremental Tributary Area (sq mi)**				
	Surface Water			*Groundwater*	
	Natural Areas	*Cell 2W Dams*	*Cell 2E Dams*	*Non-Modeled Flow Path*	*Modeled Flow Path*
PM-12	18.97	0	0	18.97	0
PM-12.2	14.12	0	0	14.12	0
PM-12.3	41.28	0	0	41.28	0
PM-12.4	11.38	0	0	10.94	0.44
PM-13	8.91	0	0	6.22	5.66
MLC-3	1.36	0	0.04	0.73	0.00
MLC-2	2.17	0	0	1.08	2.42
TC-1	1.94	0.16	0.08	0	0
PM-19	1.76	0	0	0	3.00
UC-1	0	0.03	0	0	0
PM-11	2.97	0.37	0	0	0

Table 1-49b Contributing Areas to each Surface Water Evaluation Point, Project Conditions

Surface Water Evaluation Point	*Incremental Tributary Area (sq mi)**				
	Surface Water			*Groundwater*	
	Natural Areas	*Cell 2W Dams*	*Cell 2E Dams*	*Non-Modeled Flow Path*	*Modeled Flow Path*
PM-12	18.97	0	0	18.97	0
PM-12.2	14.12	0	0	14.12	0
PM-12.3	41.28	0	0	41.28	0
PM-12.4	11.38	0	0	10.94	0.43
PM-13	8.91	0	0	6.22	5.57
MLC-3	2.24	0	0	1.61	0.00
MLC-2	2.17	0	0	1.08	2.34
TC-1	1.83	0	0	0	0
PM-19	1.76	0	0	0	2.95
UC-1**	0	0.03	0	0	0
PM-11	2.87	0	0	0	0
Containment System	*Incremental Tributary Area (sq mi)**				
	Surface Water			*Groundwater*	
	Natural Areas	*Cell 2W Dams*	*Cell 2E Dams*	*Non-Modeled Flow Path*	*Modeled Flow Path*
North	0.08	0	0.12	0	0.08
NorthWest	0.05	0.16	0	0	0.05
West	0.1	0.37	0	0	0.1
South	0	0	0	0	0
East	0.01	0	0	0.01	0

Notes
* Surface runoff areas are equal to or greater than the sum of groundwater areas. This is due to runoff from the Tailings Basin, where recharge is not applied because it is accounted for in seepage.
** All flow leaving UC-1 flows to the West containment system.

Table 1-52 Initial_Mass_LTVSMC_Basin, Initial Mass in the LTVSMC Tailings Basin

Constituent	Toes[N] (tonnes)	Toes[NW] (tonnes)	Toes[W] (tonnes)	Toes[S] (tonnes)	Toes[E] (tonnes)	UnsatFine2W (tonnes)	UnsatCoarse2W (tonnes)	UnsatBanks2W (tonnes)	UnsatFine1E (tonnes)	UnsatCoarse1E (tonnes)	UnsatFine2E (tonnes)	UnsatCoarse2E (tonnes)	UnsatBanks2E (tonnes)
Ag	7.20E-07	6.08E-07	9.33E-07	1.37E-06	1.15E-07	2.90E-03	4.87E-04	1.28E-03	9.70E-05	4.03E-04	2.28E-03	3.14E-05	5.96E-05
Al	6.64E-05	1.34E-04	1.85E-04	1.43E-04	9.84E-05	7.76E-01	9.40E-02	1.50E-01	1.81E-02	4.09E-02	6.42E-02	1.19E-02	1.02E-02
Alkalinity	1.58E+00	1.44E+00	2.01E+00	2.96E+00	1.30E-01	8.30E+03	9.89E+02	1.58E+03	1.90E+02	4.31E+02	6.83E+02	1.25E+02	1.08E+02
As	2.60E-05	7.58E-06	1.23E-05	4.95E-05	7.05E-07	3.49E-02	6.12E-03	1.61E-02	1.21E-03	5.06E-03	2.69E-02	3.99E-04	7.48E-04
B	1.72E-03	2.92E-03	4.03E-03	3.40E-03	4.35E-05	1.69E+01	2.02E+00	3.23E+00	3.88E-01	8.82E-01	1.39E+00	2.56E-01	2.20E-01
Ba	1.16E-03	1.49E-04	2.42E-04	2.39E-03	9.06E-05	8.43E-01	9.13E-02	1.24E-01	1.82E-02	3.42E-02	3.56E-02	1.47E-02	9.87E-03
Be	1.38E-06	3.24E-06	4.49E-06	3.08E-06	2.76E-07	1.88E-02	2.30E-03	3.66E-03	4.42E-04	1.00E-03	1.56E-03	2.91E-04	2.51E-04
Ca	2.29E-01	5.91E-01	8.12E-01	4.57E-01	4.03E-02	3.43E+03	4.08E+02	6.53E+02	7.85E+01	1.78E+02	2.82E+02	5.17E+01	4.45E+01
Cd	7.20E-07	6.81E-07	1.05E-06	1.43E-06	1.84E-07	3.19E-03	5.59E-04	1.46E-03	1.12E-04	4.59E-04	2.47E-03	3.59E-05	6.81E-05
Cl	1.26E-01	1.29E-01	1.81E-01	2.63E-01	2.68E-03	7.47E+02	8.95E+01	1.43E+02	1.72E+01	3.90E+01	6.16E+01	1.13E+01	9.75E+00
Co	8.31E-06	1.31E-05	1.98E-05	1.48E-05	2.15E-07	6.21E-02	1.05E-02	2.77E-02	2.09E-03	8.67E-03	4.74E-02	6.87E-04	1.28E-03
Cr	2.88E-06	3.61E-06	5.03E-06	6.00E-06	1.52E-06	2.09E-02	2.50E-03	4.00E-03	4.81E-04	1.09E-03	1.73E-03	3.17E-04	2.73E-04
Cu	1.11E-05	1.43E-05	2.20E-05	2.25E-05	3.28E-06	6.70E-02	1.18E-02	3.12E-02	2.36E-03	9.86E-03	5.10E-02	7.74E-04	1.45E-03
F	2.38E-02	4.57E-04	1.65E-03	5.55E-02	2.25E-04	1.36E+00	1.63E-01	2.60E-01	3.13E-02	7.11E-02	1.12E-01	2.07E-02	1.78E-02
Fe	1.26E-02	2.98E-02	4.51E-02	2.16E-02	9.01E-05	1.41E+02	2.44E+01	6.41E+01	4.84E+00	2.01E+01	1.11E+02	1.58E+00	2.98E+00
K	5.65E-02	6.08E-02	8.47E-02	1.04E-01	2.77E-03	3.51E+02	4.21E+01	6.72E+01	8.08E+00	1.84E+01	2.90E+01	5.33E+00	4.59E+00
Mg	4.15E-01	1.01E+00	1.39E+00	8.05E-01	1.67E-02	5.85E+03	6.98E+02	1.12E+03	1.34E+02	3.04E+02	4.81E+02	8.84E+01	7.60E+01
Mn	1.44E-03	7.13E-03	9.75E-03	3.02E-03	4.15E-04	4.14E+01	4.92E+00	7.86E+00	9.45E-01	2.15E+00	3.41E+00	6.23E-01	5.36E-01
Na	4.09E-01	3.38E-01	4.76E-01	8.54E-01	7.01E-03	1.94E+03	2.34E+02	3.73E+02	4.49E+01	1.02E+02	1.61E+02	2.96E+01	2.55E+01
Ni	1.77E-05	2.89E-05	4.38E-05	3.27E-05	6.62E-06	1.38E-01	2.33E-02	6.15E-02	4.61E-03	1.92E-02	1.08E-01	1.52E-03	2.84E-03
Pb	7.75E-06	9.54E-07	1.71E-06	1.57E-05	3.83E-07	4.23E-03	7.29E-04	1.92E-03	1.45E-04	5.97E-04	3.30E-03	4.71E-05	8.92E-05
Sb	1.94E-06	1.99E-06	3.06E-06	3.78E-06	5.52E-07	9.35E-03	1.64E-03	4.32E-03	3.26E-04	1.37E-03	7.09E-03	1.07E-04	2.01E-04
Se	3.38E-06	2.64E-06	4.07E-06	6.58E-06	1.23E-06	1.25E-02	2.13E-03	5.61E-03	4.28E-04	1.76E-03	9.93E-03	1.37E-04	2.60E-04
SO4	1.33E+00	1.93E+00	2.94E+00	2.27E+00	1.13E-02	9.17E+03	1.57E+03	4.14E+03	3.13E+02	1.30E+03	7.14E+03	1.02E+02	1.92E+02
Tl	9.41E-07	4.34E-07	6.86E-07	1.90E-06	2.61E-07	2.02E-03	3.49E-04	9.23E-04	6.96E-05	2.91E-04	1.58E-03	2.28E-05	4.27E-05
V	2.55E-05	4.70E-06	7.37E-06	5.24E-05	8.29E-06	2.61E-02	3.13E-03	5.00E-03	6.02E-04	1.37E-03	2.16E-03	3.97E-04	3.41E-04
Zn	6.76E-05	1.95E-05	3.16E-05	1.35E-04	2.13E-05	9.05E-02	1.53E-02	4.05E-02	3.05E-03	1.27E-02	7.03E-02	9.97E-04	1.88E-03

Notes

Table 1-53 Initial_Mass_Rate, Initial Mass Transport Rate in the LTVSMC Tailings Basin

Constituent	Cell2W_Fines (kg/day)	Cell2W_Coarse (kg/day)	Cell2W_Banks (kg/day)	Cell1E_Fines (kg/day)	Cell1E_Coarse (kg/day)	Cell1E_Pond (kg/day)	Cell2E_Fines (kg/day)	Cell2E_Coarses (kg/day)	Cell2E_Banks (kg/day)	Cell2E_Pond (kg/day)
Ag	3.09E-04	1.27E-04	2.22E-04	3.25E-05	8.00E-05	5.17E-04	1.66E-04	1.97E-05	1.68E-05	3.33E-04
Al	8.26E-02	2.45E-02	2.62E-02	6.12E-03	8.25E-03	4.91E-02	4.49E-03	7.49E-03	2.89E-03	3.16E-02
Alkalinity	8.89E+02	2.58E+02	2.76E+02	6.44E+01	8.70E+01	1.28E+03	4.76E+01	7.88E+01	3.05E+01	1.08E+03
As	3.71E-03	1.59E-03	2.80E-03	4.12E-04	1.01E-03	2.34E-02	2.03E-03	2.46E-04	2.12E-04	1.73E-02
B	1.81E+00	5.26E-01	5.64E-01	1.31E-01	1.78E-01	1.23E+00	9.73E-02	1.61E-01	6.23E-02	9.49E-01
Ba	9.02E-02	2.38E-02	2.18E-02	6.15E-03	6.92E-03	1.23E+00	2.49E-03	9.24E-03	2.79E-03	7.91E-01
Be	1.99E-03	5.99E-04	6.40E-04	1.50E-04	2.02E-04	9.81E-04	1.09E-04	1.83E-04	7.09E-05	6.33E-04
Ca	3.67E+02	1.06E+02	1.14E+02	2.66E+01	3.59E+01	1.28E+02	1.97E+01	3.26E+01	1.26E+01	1.08E+02
Cd	3.40E-04	1.46E-04	2.56E-04	3.74E-05	9.32E-05	5.19E-04	1.86E-04	2.25E-05	1.93E-05	3.35E-04
Cl	7.99E+01	2.33E+01	2.50E+01	5.81E+00	7.86E+00	1.13E+02	4.30E+00	7.13E+00	2.76E+00	7.28E+01
Co	6.62E-03	2.73E-03	4.82E-03	7.02E-04	1.72E-03	3.50E-03	3.51E-03	4.22E-04	3.62E-04	2.26E-03
Cr	2.23E-03	6.52E-04	7.00E-04	1.63E-04	2.20E-04	2.45E-03	1.21E-04	1.99E-04	7.73E-05	1.58E-03
Cu	7.11E-03	3.07E-03	5.38E-03	7.93E-04	1.94E-03	6.95E-03	3.87E-03	4.76E-04	4.06E-04	3.54E-03
F	1.45E-01	4.25E-02	4.55E-02	1.06E-02	1.44E-02	2.89E+01	7.83E-03	1.30E-02	5.03E-03	1.39E+01
Fe	1.50E+01	6.33E+00	1.11E+01	1.63E+00	4.01E+00	1.39E+00	8.26E+00	9.81E-01	8.41E-01	9.10E-01
K	3.75E+01	1.10E+01	1.18E+01	2.73E+00	3.70E+00	4.27E+01	2.02E+00	3.36E+00	1.30E+00	3.80E+01
Mg	6.26E+02	1.82E+02	1.95E+02	4.53E+01	6.13E+01	2.31E+02	3.35E+01	5.57E+01	2.15E+01	2.09E+02
Mn	4.43E+00	1.28E+00	1.37E+00	3.20E-01	4.32E-01	2.35E-01	2.38E-01	3.92E-01	1.52E-01	2.50E-01
Na	2.08E+02	6.09E+01	6.52E+01	1.52E+01	2.05E+01	3.83E+02	1.12E+01	1.86E+01	7.20E+00	2.44E+02
Ni	1.46E-02	6.06E-03	1.07E-02	1.56E-03	3.84E-03	7.64E-03	7.97E-03	9.36E-04	8.06E-04	3.98E-03
Pb	4.52E-04	1.89E-04	3.33E-04	4.85E-05	1.20E-04	7.88E-03	2.49E-04	2.94E-05	2.51E-05	5.09E-03
Sb	9.90E-04	4.26E-04	7.42E-04	1.11E-04	2.68E-04	1.31E-03	5.33E-04	6.61E-05	5.64E-05	8.43E-04
Se	1.33E-03	5.57E-04	9.79E-04	1.42E-04	3.55E-04	2.56E-03	7.36E-04	8.65E-05	7.42E-05	1.65E-03
SO4	9.77E+02	4.09E+02	7.20E+02	1.05E+02	2.59E+02	5.48E+02	5.50E+02	6.34E+01	5.44E+01	4.64E+02
Tl	2.16E-04	9.07E-05	1.61E-04	2.32E-05	5.74E-05	8.51E-04	1.18E-04	1.41E-05	1.20E-05	5.49E-04
V	2.79E-03	8.16E-04	8.74E-04	2.04E-04	2.76E-04	2.65E-02	1.50E-04	2.50E-04	9.67E-05	1.71E-02
Zn	9.66E-03	3.99E-03	7.03E-03	1.02E-03	2.53E-03	6.46E-02	5.23E-03	6.18E-04	5.30E-04	4.16E-02

Notes

Table 1-54 Expected_Toe_Conc, Expected Existing Constituent Concentrations at the Toes of the Tailings Basin

Constituent	Expected_Toe_Conc[N] (ug/L)	Expected_Toe_Conc[NW] (ug/L)	Expected_Toe_Conc[W] (ug/L)	Expected_Toe_Conc[S] (ug/L)	Expected_Toe_Conc[E]* (ug/L)
Ag	0.13	0.11	0.12	0.12	0.075
Al	12	22	22	12	64.2
Alkalinity	286000	238000	238000	255000	84900
As	4.7	1.2	1.4	4.3	0.46
B	310	480	480	290	28.4
Ba	210	24.5	29	210	59.1
Be	0.25	0.5	0.5	0.25	0.18
Ca	41400	97200	95800	39100	26300
Cd	0.13	0.11	0.12	0.12	0.12
Cl	22700	21400	21400	22700	1750
Co	1.5	2.2	2.4	1.3	0.14
Cr	0.52	0.6	0.6	0.52	0.99
Cu	2	2.3	2.5	1.9	2.14
F	4300	75	195	4800	147
Fe	2270	4950	5320	1870	58.8
K	10200	10100	10000	9000	1810
Mg	75000	166000	163000	69000	10900
Mn	260	1170	1140	260	271
Na	73800	56100	56500	74000	4570
Ni	3.2	4.9	5.3	2.9	4.32
Pb	1.4	0.2	0.2	1.4	0.25
Sb	0.35	0.32	0.35	0.32	0.36
Se	0.61	0.44	0.48	0.57	0.8
SO4	240000	320000	350000	200000	7360
Tl	0.17	0.07	0.08	0.16	0.17
V	4.6	0.8	0.9	4.6	5.41
Zn	12.2	3.2	3.7	11.8	13.9

Notes

* East toe values are the average background groundwater concentration since the LTVSMC Tailings Basin is not currently affecting this toe.

MODEL TECHNICAL REVIEW CHECKLIST

MODFLOW

1. MODEL NAME:	**NorthMet Site Model**	**2. MODEL DATE:**	Jan-15
3. MODEL LOCATION:	**Polymet facility, northern Minnesota**		
4. PROJECT NUMBER:	**2369862**	**5. PROJECT PIC:**	**CDP/JPB**
6. PRIMARY MODELER:	**Jere Mohr**	**7. REVIEWER:**	**RWW**

8. REVIEWER (After review is completed and all comments were resolved):

Ray W. Wuolo	[signature]	1/2/2015
printed name	concurrent signature	date

No.	Criteria	Comments/Notes
1	Is the choice of mathematical model appropriate (analytical/numerical)?	Yes. MODFLOW-Surfact was used to account for three-dimensional flow and variable saturation. Output from the predicitive simulations were used by GoldSim.
2	Is the purpose of the model (i.e. the problem(s) the model is intended to evaluate) clearly defined?	Yes. The purposes of the model were toL (1) estimate the seepage loss from the LTVSMC tailings basin ponds under existing conditions and the Flotation Tailings Basin (FTB) pond(s) during operations and long-term closure; (2) estimate the average annual infiltration rate throughout the Tailings Basin under existing conditions; (3) stimate the discharge rate of seepage entering each of the five groundwater flow paths represented in the GoldSim during current conditions, operations and long-term closure; (4) estimate what proportion of the water that infiltrates the various material types present at the surface of the Tailings Basin ultimately reports; and (5) estimate the depth of the phreatic surface within each of the material types present at the surface of the Tailings Basin
3	Is the spatial extent of the model appropriate?	Yes. The model is 18 square miles , extending from the Embarrass River in the north and west to the south and east of the former LTVSMC mine pits. The lateral extent of the model area is sufficiently large and distant from the area of interest, so that the model boundaries do not meaningfully affect the model results at the Tailings Basin.

4	In the number of model layers justified?	Yes. The current conditions models have two layers: Layer 1 is modeled as unconfined and represents the LTVSMC tailings, and Layer 2 is modeled as confined and represents the native unconsolidated deposits (glacial drift and peat) and bedrock hills adjacent to the Tailings Basin. Model layers were added to the calibration model to represent the increasing thickness of Flotation Tailings as they will be deposited during operations. For the Mine Year 1 simulation, two additional layers were added, resulting in a total of four model layers. For the Mine Year 7 simulation, an additional three model layers were added to the Mine Year 1 simulation (for a total of seven model layers). One additional layer was added for the Mine Year 18, Mine Year 20, and long-term closure conditions simulations, resulting in a total of eight layers.
5	Is the model discretization (planer) appropriate?	Yes. The model grid was refined in the area of interest, with the final grid coarser at the boundaries and outside of the area of interest (cells of approximately 820 feet on a side) and more refined at the Tailings Basin (cells of approximately 100 to 200 feet on a side)
6	Is steady state simulated?	The calibrated model has an initial steady-state period that represents the period shortly after LTVSMC operations ceased, when a larger groundwater mound was present beneath the Tailings Basin. Subsequent calibration periods are transient, respresenting the dissipation of head. Predictive simulations of operation conditions were steady-state. Linear interpolation was used between the simulated years to provide estimates on an annual basis for inputs to the GoldSim model.
7	Is the stress period reasonable?	Yes. Years of operation with relatively constant stress conditions were used.
8	Is the number of time steps per stress period justified?	Not relevant for the predictive simulation because they were a series of steady-state simulations.
9	Are the applied boundary conditions plausible and unrestrictive?	Yes. During operations, the ponds in Cell 1E and 2E (and the combined FTB Pond starting in Year 8) were represented using specified-head boundaries. For the closure simulation, the pond was represented using river cells.

10	Are boundary condition locations consistent with the model grid configuration?	Yes.
11	Are the initial conditions defensible?	Yes. - these were the product of model calibration.
12	Do model input values match documented input values?	Yes. Regularization and prior knowledge were used in the model calbiration/optimizaion procedure to constrain model parameters to apporximately measured/observed codnitons. It would be helpful to put this information in the text of the report. - Preferred hydraulic conductivity values and anisotropy ratios have been added to the table of calibrated parameter values. Comment has been addressed.
13	Are the calibrated parameter distributions and ranges plausible?	Yes.
14	Is model mass balance error between -1% and 1%?	Yes. The overall mass balance error of the calibration simulation was 1%, consistent with the calibration guidance , which states that "Ideally the error in the water balance is less than 0.1%" and "error of around 1%, however, is usually considered acceptable."
15	Does the calibration statistic satisfy agreed performance criteria if specified, or industry standards if not specified?	Yes. Meets insustry standards and prior performance goals.
16	Are model predictions made at scales consistent with model space and time scales?	Yes.

17	Are model predictions plausible?	Yes. Model predictions are in line with what would be expected from such a system.
18	Are model predictions likely to be impacted by constraining boundary conditions?	No.
19	If boundary conditions affect the predictions, are the predictions defensible?	Not Applicable.