

Mesabi Nugget Phase II Project

Final Scoping Decision

1.0 INTRODUCTION AND PURPOSE

1.1 BACKGROUND

The Minnesota Department of Natural Resources (DNR) in cooperation with the United States Army Corps of Engineers (USACE) will prepare a joint state-federal Environmental Impact Statement (EIS) for Mesabi Nugget Phase II Project (project) to be undertaken by Mesabi Mining, LLC and Steel Dynamics, Inc. These entities are collectively managed by Steel Dynamics, Inc. and are hereafter referred to as “Mesabi Nugget” or the “Proposer” of the project.

The project includes reopening of a taconite mine and construction of a concentrator to produce taconite concentrate. The proposed project will reactivate portions of the former Erie Mining/LTVSMC mine near Hoyt Lakes, Minnesota. Proposed actions include dewatering of existing mine pits in the area to be followed by open pit-type mining operations to remove ore and overburden, or waste rock. Waste rock would be stockpiled near the mine pits while ore would be transported to the proposed crusher and concentrator plant. Tailings from the concentrator are proposed to be discharged to the former Erie Mining Company Area 1 Pit. Taconite concentrate would be delivered to the Mesabi Nugget Large Scale Demonstration Project, or LSDP Plant, sold, or shipped to out-of-state facilities owned by the proposer. The LSDP Plant is a previously permitted operation that is co-located at the proposed project site.

The joint state-federal EIS will allow evaluation of the project in accordance with the National Environmental Policy Act (NEPA; 42 U.S.C. §§ 4321-4347), and the Minnesota Environmental Policy Act (MEPA; Minnesota Statutes Chapter 116D). The proposed Mesabi Nugget Phase II project is located near the cities of Aurora and Hoyt Lakes, St. Louis County, Minnesota.

The Final Scoping Decision (FSD) is a companion to the Scoping Environmental Assessment Worksheet (EAW) prepared for the project. The purpose of the Scoping Decision Document is to identify those project alternatives and environmental effects that will be addressed in the EIS. The Scoping Decision Document also presents a tentative schedule of the environmental review process.

1.2 SELECTION OF APPROPRIATE ENVIRONMENTAL REVIEW DOCUMENT

The EIS is mandatory for this project pursuant to Minnesota Rules part 4410.2000, subpart 2; the rule directs that an EIS shall be prepared if the project meets or exceeds the thresholds of any of the EIS categories listed in part 4410.4400. Minnesota Rules part 4410.4400, subparts 8B and 8C (Metallic Mineral Mining and Processing) prescribe mandatory preparation of an EIS for construction of a new facility for mining metallic minerals or for the disposal of tailings from a metallic mineral mine, and construction of a new metallic mineral processing facility. In addition, because the project includes proposed in-pit disposal of taconite tailings, Minnesota Statutes Section 116.0717 requires the preparation of an EIS and risk assessment to demonstrate the deposition of tailings will not pose an unreasonable risk of pollution or degradation of groundwater.

The EIS will meet applicable requirements of Minnesota Rules parts 4410.0200 to 4410.7800 (Minnesota Environmental Quality Board [EQB] Rules) that govern the Minnesota Environmental Review Program. The DNR is the responsible governmental unit (RGU) under Minnesota Rules part 4410.4400, subpart 8C, but will engage the services of a consultant to assist in EIS preparation. DNR and USACE will retain responsibility for EIS content.

The USACE is serving as co-lead agency in preparation of the EIS with the DNR. The USACE has been notified that Mesabi Nugget intends to apply for a permit to discharge fill material in waters of the U.S., including wetlands, to develop the project. The USACE has determined that its action on the permit would be a major federal action that could significantly affect the quality of the human environment. Such actions require the preparation of a Federal EIS pursuant to the National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321-4347) and its implementing regulations (40 C.F.R. parts 1500-1508). The state EIS will be supplemented where necessary to comply with NEPA and its implementing federal regulations.

1.3 PURPOSE AND NEED OF THE PROJECT

The purpose and need of the project includes reopening of the former Erie Mining/LTVSMC Mine and construction of a concentrator to produce taconite concentrate. The iron concentrate will be used in domestic markets.

2.0 PROJECT ALTERNATIVES

The EQB rules require that an EIS include at least one alternative of each of the following types, or provide an explanation of why no alternative is included in the EIS (Minnesota Rules part 4410.2300, subpart G): alternative sites, alternative technologies, modified designs or layouts, modified scale or magnitude, and alternatives incorporating reasonable mitigation measures identified through comments received during the EIS scoping and draft EIS comment periods. The alternative of no action shall also be addressed.

Minnesota Rules part 4410.2300, subpart G directs that an alternative may be excluded from analysis in the EIS if “it would not meet the underlying need for or purpose of the project, it would likely not have any significant environmental benefit compared to the project as proposed, or another alternative, of any type, that will be analyzed in the EIS would likely have similar environmental benefits but substantially less adverse economic, employment, or sociological impacts.” Selection or dismissal of alternatives will be documented in the EIS.

2.1 PROPOSED ALTERNATIVE

The EIS will describe the proposed project and the potential environmental and socioeconomic effects outlined in Section 3.0.

Low-silica ore will be obtained from three locations: Area 6NW; Area 2WX; and Area 6. Mining of all three locations will be sequenced to coincide with the proposed initial dewatering of Areas 2WX and 6 Pits.

Mining-related preparations will begin first in Area 6NW while the Area 2WX and 6 Pits are dewatered. Once construction and pit stripping are complete, mining will commence in the new Area 6NW Pit and continue to supply the project until Area 2WX is dewatered. Limited mining of Area 6NW will also continue during the remainder of the project.

The second source of ore will be the Area 2WX Pit, which will be pumped dry over a period of about two years and mined over the full project life. Dewatering will be pumped in a pipeline to the Partridge River. Discharge rates are proposed to vary as a function of flow rates measured in the Partridge River; discharge must meet water quality standards and be protective of aquatic life.

The Area 6 Pit will serve as the third source of ore. After the Area 2WX Pit is dewatered, water in the Area 6 Pit will be pumped to the Partridge River over approximately a 10-year period. The 10-year period is based on discharge rates that are protective of water quality, especially for total dissolved solids (TDS) and hardness, where discharge flows are proposed to vary as a function of flow rates measured in the Partridge River. Once the Area 6 Pit is pumped dry, it will be used as an additional source of high-quality Lower Cherty ore for the last 10 years of the project.

2.2 NO ACTION ALTERNATIVE

The EIS will describe the expected condition if the proposed project is not developed, with respect to the potential environmental and socioeconomic effects outlined in Section 3.0. The no-action or “no build” alternative will include the operation of the previously permitted LSDP Plant using purchased concentrate.

2.3 SITE ALTERNATIVES

The MEQB rules allow the RGU to exclude alternative sites if other sites do not have any significant environmental benefit compared to the project as proposed, or if other sites do not meet the underlying need and purpose of the project. The MEQB’s Guide to Minnesota Environmental Review Rules lists a number of factors for the RGU to consider when deciding whether alternative sites would meet the underlying need for or purpose of the project.

2.3.1 Alternative Mine Pit or Plant Site

The DNR and USACE do not propose to evaluate other mine pit or processing plant sites for this project. An alternative mine site at greater distance from the project would not meet the underlying need or purpose of the project because the mineralization of the desired elements within a geologic deposit dictates the location of the mine. Reactivation of an existing mine is also environmentally superior to opening a new mine, the latter of which is expected to have more significant impacts than mining in an existing pit. Alternative processing plant sites (e.g., crusher, concentrator) would either not have significant environmental benefits over the proposed project or would not meet the underlying need and purpose of the project.

The DNR and USACE do propose to evaluate an alternative means of obtaining low-silica ore from the Lower Cherty formation at Area 6. See Section 2.3.1.1.

2.3.1.1 Area 6 Alternative – Do Not Dewater or Mine Area 6 Pit

Low-silica ore will be obtained from two locations: Area 6NW and Area 2WX. Mining will be sequenced to coincide with the proposed initial dewatering of Area 2WX Pit.

Mining will commence in the new Area 6NW Pit; this will be the source of Lower Cherty Ore over the entire project life. No mining will be conducted in the Area 6 Pit.

The second source of ore will be the Area 2WX Pit, which will be pumped dry over a period of two years and mined over the entire life of the project. Dewatering will be pumped in a pipeline to the Partridge River. Discharge rates are proposed to vary as a function of flow rates measured in the Partridge River; discharge must meet water quality standards and be protective of aquatic life. Mining of Area 2WX will continue for the remainder of the project.

2.3.2 Alternative Tailings Basin

The DNR and USACE do not propose to evaluate an alternative tailings basin location in the EIS. Three sites under the control of the proposer were considered for examination in the EIS in this regard. A fourth option, which combined two sub-areas that could be implemented in phases (e.g., 10 years each), was also considered. Each resulted in covertime conversions, especially to wetlands, in excess of the proposed project. Other issues included potential land use conflicts, additional impacts to protected plants, significant disruption of existing infrastructure, or dam-related hazards. The proposer also identified operational challenges that reduced practicability of the potential sites, however cost alone cannot be the basis for eliminating an alternative from consideration. Considering that in-pit disposal does not result in covertime conversion, a tailings basin would not likely provide significant environmental benefit compared to the project as proposed.

The DNR and USACE note that tailings disposal is an integral project component. Final approvals will have the EIS's assessment of potential risks to municipal water supplies available for consideration; see Section 3.3.4. If governmental approval for a means of tailings disposal other than the proposed project is pursued, then this will be considered a phased action requiring detailed evaluation in the EIS, or in a Supplemental EIS, as prescribed under Minn. Rules parts 4410.2000, subpart 4 and 4410.3000, subpart 3c.

2.4 TECHNOLOGY ALTERNATIVES

2.4.1 Mining and Mineral Concentration Technology

The DNR and USACE do not propose to evaluate alternative mining technologies. The proposed project uses conventional open pit mining and magnetic concentrator technology that has been used, and is currently in use, in other mining operations on the Mesabi Iron Range and was previously used at the proposed location. The ore deposit is not suitable for underground mining. Other mining and concentration technologies potentially applicable to the Mesabi Nugget deposit would likely have no significant environmental benefit over the proposed technologies.

2.4.2 Air Pollution Control Technology

The EIS will provide a summary of the Best Available Control Technology (BACT) evaluation to be conducted for the project as part of the Prevention of Significant Deterioration (PSD) air permit application. The BACT analysis will provide an evaluation of alternative air pollution control technologies for the project.

2.4.3 Wastewater Treatment

The EIS will evaluate a wastewater treatment alternative to the proposed discharge to the Partridge River from the Areas 2WX and 6 Pits; both pits exhibit elevated levels of TDS and hardness, while the Area 6 Pit also has elevated sulfate concentrations. The analysis will

principally rely on elements of the non-degradation evaluation the proposer will be required to complete for project-related water quality permitting (e.g., NPDES). At a minimum, an evaluation of membrane-based treatment (e.g., ultrafiltration/nanofiltration) combined with chemical precipitation will be conducted for a portion or all of the discharge from one or both pits.

2.5 MODIFIED DESIGNS OR LAYOUTS

2.5.1 Tailings Disposal

Tailings management and disposal is a primary operational feature of the proposed project, which relies on magnetic separation to produce the fine magnetic iron material for further processing into iron nuggets. The non-magnetic and high silica rock particles that remain constitute the tailings and are considered a waste product. The project cannot occur without creating tailings that require some type of disposal. Potential alternatives include: using other pits; designs for wetlands, littoral areas, and wildlife habitat.

2.5.1.1 Alternative In-Pit Disposal Locations

The DNR and USACE do not propose to evaluate alternative in-pit disposal locations in the EIS. The project proposes to use the Area 1 Pit for tailings disposal. This is the only pit under full control of the proposer (i.e., surface and mineral rights). No other potentially available pits are known to be for sale. Preliminary investigations also indicate that significant iron ore resources still remain at other pits, which is not the situation at the Area 1 Pit. Securing permission or mineral rights to place tailings in other pits is very complex and uncertain. The underlying project need or purpose is not met with use of other pit(s).

2.5.1.2 Alternative Design for Wetlands/Littoral Areas

The DNR and USACE propose to evaluate a(n) alternative design(s) to emphasize creation of wetland and/or littoral areas from the proposed project.

2.5.1.3 Alternative Design for Wildlife Habitat

The DNR and USACE propose to evaluate re-establishment of wildlife habitat either within the former pit or at the perimeter of the pit at the conclusion of mining.

2.5.2 Overburden and Waste Rock Stockpiles

The DNR and USACE propose to evaluate alternative design and location of stockpiles for feasibility, benefits, and impacts. Alternative designs could include in-pit stockpiling to create shallow water aquatic habitat, to reduce production of dissolved solids in waste rock seepage or other designs that could have significant environmental benefits. Alternative designs could include enhanced capping and lining of certain waste rock stockpiles to reduce production of dissolved solids in waste rock seepage. Alternative locations could include stockpiling on public lands in Section 36.

2.6 SCALE OR MAGNITUDE ALTERNATIVES

The DNR and USACE do not propose to evaluate alternative scale or magnitude of the project. The infrastructure requirements to mine and process the ore are such that alternative scale

and/or magnitude would not meet the underlying need for or purpose of the project or would likely not have any significant environmental benefit compared to the project as proposed.

2.7 INCORPORATION OF MITIGATION MEASURES IDENTIFIED THROUGH PUBLIC COMMENTS

The EIS will consider all mitigation measures suggested through public comment. Those mitigation measures that were identified but not carried forward for analysis will be discussed briefly as well as the reasons for their elimination.

3.0 EIS ISSUES

Issues have been identified and described in the Scoping EAW and are categorized below by significance and amount of additional analysis required in the EIS. Mitigation measures that could reasonably be applied to eliminate or minimize adverse environmental effects will be identified in the EIS.

3.1 TOPIC HAS BEEN ADEQUATELY ANALYZED IN THE SCOPING EAW

Several topics are not relevant or so minor that they will not be addressed in the EIS. +The Scoping EAW will be appended to the EIS for reference; the relevant EAW item number is provided in parentheses () after each topic.

Water Surface Use (Item 15)

Vehicle Related Air Emissions (Item 22)

Nearby Resources; Archaeological; Architectural; Unique/Prime Farm Lands; Designated Parks, Recreation Areas, Trails; Scenic Views and Vistas; Other Unique Resources (Item 25)

3.2 SIGNIFICANT IMPACTS ARE NOT EXPECTED BUT ADDITIONAL INFORMATION WILL BE PROVIDED IN THE EIS

Information beyond that provided in the Scoping EAW will be included in the EIS.

3.2.1 Project Description (Item 6)

The EIS will include a complete project description, including the timing of all phases of construction and operation. The status of all project-related mineral rights will be presented in the EIS. The EIS will show the location of tailing disposal areas that include a cross section showing final proposed configuration.

3.2.2 Project Magnitude Data (Item 7)

The EIS will provide updated calculations of project magnitude data that are available as project-related designs are further developed.

3.2.3 Permits and Approvals (Item 8)

The EIS will identify project-related permits and approvals. See Section 7.0.

3.2.4 Land Use (Item 9)

The EIS will discuss how mine and facility planning ensures future access to onsite taconite resources.

3.2.5 Cover Types (Item 10)

Specific mining and plant site development details will be developed prior to or during EIS preparation. The EIS will include updated cover type information and "before and after" cover type maps, and will describe the conversion of existing land cover types that will result from project implementation and reclamation. Other sections of the EIS will address specific environmental impacts associated with changes in cover types, in particular the environmental effects of wetland-related changes. As described below in Section 3.3.7.1, the EIS will include an inventory of greenhouse gas emissions. This will include estimation of project-related changes in carbon sequestration due to cover type conversion, with emphasis on wetland and forest cover.

3.2.6 Fish Resources (Item 11a)

The EIS will describe fish and other aquatic resources using existing data; no new surveys will be conducted. Aquatic toxicity studies and water chemistry data to be generated for the EIS will be interpreted with respect to the potential for impact on the fish habitat and populations in the Partridge and St. Louis Rivers. The EIS will address the potential for establishment of a viable fishery in the mine pits at the conclusion of the project, including potential mitigation strategies available to achieve such an objective. Potential impacts from haul roads will be described.

A Rosgen Level 1 geomorphology assessment and hydrologic assessment will be conducted to assess project-related changes to surface waters; see Sections 3.3.3 and 3.3.4. Projected changes in stream morphology, especially from pit dewatering, will be considered in terms of impacts to fish and aquatic habitat. If adverse impacts are identified, the EIS will detail measures to avoid, minimize, or mitigate these impacts.

Impacts associated with project-related activity in Area 2WX to stream/wetland habitats will be qualitatively assessed. Mitigation for adverse impacts from these activities will be described.

3.2.7 Water-related Land Use Management District (Item 14)

The status of the project with respect to shoreland zoning of Little Mesabi Lake, the Partridge River, Second Creek, Unnamed Creek, and Colby Lake will be identified in the EIS. Potential changes in water levels in Little Mesabi Lake will be discussed in the EIS. The EIS will address proposed changes in zoning overall, including need for variances. Related figures will be updated in the EIS.

3.2.8 Erosion and Sedimentation (Item 16)

Volumes for Phase II earthmoving and main haul road cut and fill will be provided. The EIS will address runoff from erosion-prone areas of the site, including pit slopes and stockpiles as part of the issue of surface water runoff and overall water quality impacts (see Sections 3.3.5 and 3.3.6) and as part of the reclamation plan (see Section 3.2.18). Mitigation measures for adverse impacts will be described.

3.2.9 Geologic Hazards and Soil Conditions (Item 19)

The EIS will include a discussion of the potential for groundwater contamination from process chemicals and hazardous materials used or stored at the project site. The EIS will include an inventory of tanks and major process consumables and will assess the potential for contaminants to reach the Area 1 Pit and thus affect the proposed drinking water system, as well as downstream receptors, either via direct discharges to Second Creek or groundwater seepage. Measures to prevent and contain spills from maintenance and repair of mining equipment will be identified in the EIS. The EIS will report a review of existing records for existence of underground mine workings in the project area.

3.2.10 Solid Wastes, Hazardous Wastes, Storage Tanks (Item 20)

Estimates will be provided for the types, amounts, and compositions of solid and hazardous wastes produced from future operations as listed from Table 20-1. Disposal locations for municipal solid waste and demolition waste will be provided in the EIS. The EIS will detail AST and UST requirements for diesel fuel operations.

3.2.11 Traffic (Item 21)

3.2.11.1 Project-Specific Analysis

Estimates of employee and operational traffic levels will be updated from more detailed project planning data when necessary.

3.2.11.2 Cumulative Effects Analysis

The EIS will assess the potential cumulative effects upon local traffic patterns associated with the construction/operation of the proposed project in conjunction with the PolyMet Project. Mitigation will be identified for any adverse impacts.

3.2.12 Odors, Dust, and Noise (Item 24)

The EIS will require preparation of a limited noise analysis. Baseline data will be used to model future noise levels as a function of operational and blasting activities. The noise analysis will be conducted under generally accepted principles of noise-related impact assessment. Nearest sensitive receptors and potential mitigation will be identified in the EIS.

3.2.13 Historical Resources (Item 25)

Additional Phase I archaeological surveys will be conducted on the water pipeline routes. Any resources identified will be discussed and mitigation to prevent impacts will be proposed.

Historic Mining Landscape Features. There appear to be no features representing a potential large-scale, National Register-eligible historic mining landscape within the project area. *Bulletin 42, Guidelines for Identifying, Evaluating, and Registering Historic Mining Properties*, notes that the mining process during the period of significance, including excavation, processing, and shipment, should be evident as much as possible. Also, related townsites and locations should have a high level of historic integrity. The Mesabi Nugget project area encompasses highly disturbed mine pits that are the result of the activity of several mining companies and several mining methods.

Additional Phase I investigations will be undertaken to inform the EIS. These will focus on specific mining resources that are more than 45 years of age and would have direct effects from the project. These include:

Remaining Railroad Segments. Phase I investigation are recommended for:

- A DM&IR spur in Section 6, T59N, R14W near the Area 2WX Stockpile, and
- Remaining segments of the Erie Mining Company Railroad north of Mine Area 1 in Sections 21, 22, 23, and 24, T59N, R15W and Section 18, T59N, R14W.

The NRHP eligibility of these segments of two important transportation rail resources on the Mesabi Iron Range should be evaluated for their association with the development of the iron ore industry during the period 1886-1957. Although the track has been removed, the roadbed may remain and the route may be discernable.

Historic Roadways. Two historic roadways will also be evaluated.

- The abandoned segment of the former TH 35, known as the Old Aurora Road, which is evident in air photos in Section 34, T59N, R15W. This highway is associated with the development of the mining district between Aurora and the Erie Plant and was rerouted as Erie Mine Area 1 was expanded to the west.
- Evidence of a trail shown by Leith (1909) and later converted to County Highway 110 (later relocated) that extended across Sections 34 and 35, T59N, R15W. This route should be evaluated for its association with the mining locations recorded in the 1910 federal census and its association with early development of the Mesabi Range.

3.2.14 Visual Impacts (Item 26)

3.2.14.1 Project-Specific Analysis

Nearest visual receptors will be reconfirmed and reported in the EIS. Estimates of building and stockpile heights and proposed lighting plans will be checked and updated as needed based on more detailed project information.

3.2.14.2 Cumulative Effects Analysis

The possibility of cumulative visual effects on recreational users of Colby Lake from the construction of the 2WX stockpile will be evaluated. Any cumulative visual effects of the stockpile and possible development of Mesaba Energy will be discussed. Potential mitigation will also be identified, including reclamation strategies to improve the aesthetics of the stockpile view.

3.2.15 Compatibility with Plans and Land Use Regulations (Item 27)

The project's consistency with zoning around Little Mesaba Lake will be reported; future need for project-related rezoning or comprehensive plan amendment will be identified. The western boundary of the City of Aurora's mining district will be reported. The EIS will also evaluate mineland reclamation strategies to develop those designs that are most compatible with surrounding land uses and local community goals.

3.2.16 Impact on Infrastructure and Public Services

3.2.16.1 Direct Demand for Infrastructure and Public Services

Project-related additions to rail lines will be identified.

3.2.17 Mineral Fibers (Item 30)

No additional data collection or testing of ore samples is proposed, however the method of sample collection for the Areas 2WX and 6 Pits' ores will be identified (e.g., core sample, stockpile sample) in addition to the location of the samples and their stratigraphic horizon if collected in situ. The EIS will include figures that show the relationship of the Duluth Complex to the Biwabik Iron Formation and the project; the figures will show known data on the intrusion as well along any appropriate buffer zone to indicate uncertainty in the line. The EIS will include a draft Sill Intersection Contingency Plan prepared by the proposer outlining how to identify such materials and what steps would be taken in the event they are encountered.

3.2.18 Mineland Reclamation (Item 30)

The EIS will present a proposed mineland reclamation plan as follows:

Mine Pit. The size and shape of the mine pits will depend on the location of ore and economic factors. The descriptions provided in response to Item 6 are subject to change as the ore body is better defined. Significant issues that must be addressed as part of reclamation planning are refilling of pit, pit outflow, and potential for construction of littoral zones to enhance productivity.

Overburden, Waste Rock, and Lean Ore Stockpiles. The size and location, of stockpiles needs to address economics of mining, preservation of mineral reserves, wetland impacts and wildlife habitat and travel corridors. Design of stockpile caps and bases to minimize water quality impacts will be a significant issue; see Section 3.3.5.1.

Tailings Facilities. Tailings disposal should evaluate the preservation of mineral reserves, creation of littoral zones and wetland mitigation sites, and possible creation of wildlife habitat and travel corridors.

Site Revegetation. Vegetation and eventual land use of project components will also be important considerations in mine planning. Although the time frame for mining is 20 years, and additional time will be needed for reclamation, there is potential to reclaim the site such that many impacts from the disturbance can be mitigated. Compliance with progressive reclamation requirements under Minn. Rules part 6130.3600, subp. 3 will be discussed.

Watershed Integrity. Watershed restoration compliance with Minn. Rules part 6130.2200 will be discussed. To the extent practicable, all lands disturbed by mining will be reintegrated into their original watersheds. Pre-mining flows and water balance will be reestablished to minimize impacts on the watershed and down stream users.

Site Cleanup. Measures necessary for site cleanup will be discussed.

Data for this discussion will be provided by submittal of the application for the DNR Permit to Mine prior to commencement of preparation of the DEIS.

3.2.19 Climate Change

The EIS will report information available from USEPA on climate change. The discussion will include: 1) background information on climate change; and 2) projected environmental effects due to climate change extrapolated to the state level.

3.3 POTENTIALLY SIGNIFICANT IMPACTS MAY RESULT

Additional information beyond what was provided in the EAW will be included in the EIS.

3.3.1 Wildlife Resources (Item 11a)

3.3.1.1 Project-Specific Analysis

Project-related impacts will be described in terms of:

- Results of available wildlife surveys;
- Quantification of specific types of habitat;
- Suitability and quality of habitats for common wildlife species; and
- Potential mitigation for impacts to wildlife species.

This discussion will make use of existing studies that are appropriate for identification of the potential impact. Examples of studies that may be used include data from the Copper-Nickel Study Plots and previous environmental impact documents for projects in the area.

The EIS will assess project-related effects to wildlife with high cultural and present-day value that are known to occur in the project area. Moose, fisher, beaver, and other game/furbearer species will be specifically addressed. The DNR and USACE will consult with the appropriate Band staff at the commencement of the EIS to identify the species appropriate to the analysis.

3.3.1.2 Cumulative Effects Analysis

The overall cumulative loss of wildlife habitat in the Partridge River Watershed will be evaluated. Studies from the PolyMet Mining EIS will be updated and applied to the Phase II Project, which requires extending the PolyMet analysis to the confluence of the Embarrass River. The original, current, and expected future area of wildlife habitat cover will be tabulated. The EIS will identify potential effects to wildlife resulting from covertype conversion, including habitat fragmentation and reduced connectivity, and travel corridor disruption.

The cumulative effects to wildlife habitat in the vicinity will be determined by use of the National Wetland Inventory Maps, USGS Quadrangle maps from 1949 and 1950 (prior to the beginning of taconite mining), Marschner's Original Land Cover Maps, and DNR Gap Analysis Program landcover data. The extent of land cover types will be tabulated and the current and expected future areas and percentages will also be determined.

The cumulative risk to wildlife from traffic collision will be estimated by considering current traffic volumes on public roadways and predicted increases in traffic from this and surrounding projects.

3.3.2 State-Federal Listed Species, Rare Plant Communities, and Ecologically Sensitive Resources (Item 11b)

3.3.2.1 Project-Specific Analysis

A more complete description of potential lynx habitat will be described in the EIS.

The EIS will include a major discussion of the topic of impacts to protected plant species including:

- Results of more extensive surveys for protected plant species;
- Evaluation of alternative project layouts that may avoid or reduce possible impacts to some populations of protected plant species; and
- Potential mitigation for unavoidable impacts to protected species.

The EIS will use more complete information on species present and population sizes and locations to assess potential project-related impacts and identify options for minimization and mitigation.

Mitigation measures for protected plants to be discussed should include, but not be limited to: preservation and monitoring of existing populations to the extent possible; monitoring of habitat characteristics; and periodic site surveys to document any new populations that may establish. Relocation of populations should be considered a last resort option because of the low probability of relocation success. Preservation of existing populations is preferred whenever possible. Such preservation should include not only the current population but also enough area for colonization of new microsites as woody plant succession closes the canopy. Another option would be to manage vegetation through selective cutting or pruning of woody plants to maintain a moderate level of canopy closure appropriate for *Botrychium* species, although this is an untested option.

3.3.2.2 Cumulative Effects Analysis

Protected plant species losses from other projects with the potential to affect species of interest will be included in a cumulative effects analysis if data are available from the DNR. Data may include information on population sizes, locations and demographic structure from new records in the NHIS database, new records not yet recorded in the NHIS database, and takings permits for regional projects. The risk of decline of a species will be evaluated in the context of the project site, the region, and the state.

3.3.3 Physical Impacts on Water Resources (Item 12)

3.3.3.1 Project-Specific Analysis

The EIS will include a major discussion of this topic including:

- Impacts to open water areas and deepwater habitats (e.g., mine pits);
- Wetland impacts;
- Wetland impact avoidance and minimization; and
- Wetland mitigation.

Wetland impacts will be quantified after completion of additional on-site wetland identification and characterization. Impacted wetlands will be categorized according to primary and secondary type and relative quality. Hydrologic monitoring of wetlands in the vicinity of pits will be conducted and the data will be provided for use in preparing the EIS and as baseline data for future monitoring of impacts. Indirect impacts from dewatering and watershed reduction along with cumulative effects will also be estimated and discussed. The EIS will suggest monitoring and mitigation where warranted. The feasibility of in-pit stockpiling to avoid wetland impacts at Area 2WX and Area 6 will be evaluated. The possibility of using tailings disposal or in-pit stockpiling and mineland reclamation procedures to produce viable wetland and aquatic habitats in the pits at project mid-life will be evaluated.

The EIS will also assess project-related impacts to Public Waters in terms of changes in the course, current, or cross-section of affected waters; see Section 3.3.4. Mitigation for adverse impacts will be identified.

3.3.3.2 Cumulative Effects Analysis

The overall cumulative loss of wetlands in the Partridge River Watershed will be evaluated by updating similar studies to be completed for the PolyMet Mining EIS and extending the analysis to the confluence of the Embarrass River. The original, current, and expected future area of wetland cover and percentage of watershed land cover in wetland will be tabulated. Any cumulative effects to wetland resources will be considered in other EIS-related cumulative effects analyses where appropriate.

3.3.4 Water Use (Item 13)

3.3.4.1 Project-Specific Analysis

The EIS will include a detailed water balance for the project including processing plant water needs and mine pit dewatering. This information will be used to model how affected pit water levels, dewatering rates, and watershed yields will change both during and after mining. Impacts to water bodies will be identified and mitigation/monitoring will be developed to minimize impacts. The EIS will provide a detailed breakdown of the Area 1 Pit water budget; the water budget will account for potential changes in groundwater inflow as a function of decreasing pit level.

Potential impacts to nearby wells and water supply sources due to mine pit dewatering will also be evaluated in the EIS. In order to provide the level of detail that will be needed for the EIS, it will likely be necessary to collect additional information on the hydrogeology of the site (e.g., bedrock permeability), specifically the interconnection between the pits and the potential exchange of water between the pits and the bedrock aquifer. A model of groundwater flow will be used to verify pit dewatering rates and estimate groundwater flow patterns. The EIS will provide a timeline showing the historical sequence of mining at the site, including the depths of or previously dewatered pits to the degree known. Additional areas of inquiry include:

- The presence, precise locations, and hydraulic characteristics of any potential conduits (faults, fractures or underground workings) that may provide rapid flow pathways between the mine pits (particularly between Area Pit 1 and the St. James Pit).
- The potential exchange of water between the pits and glacial sediments.
- The lateral and vertical extent of the Quaternary hydrostratigraphic units.

- The hydraulic characteristics of the Quaternary and bedrock units.

The EIS will include a quantitative assessment of the possibility that dewatering discharges will impact the Hoyt Lakes water supply. The EIS will at a minimum include a mass-balance analysis for the mixing of worst-case (both quantity and quality) discharge effluent with Colby Lake water. Pertinent drinking water standards, as specified in the Safe Drinking Water Act, should serve as the measure against which worst-case contaminant concentrations are compared.

The EIS will include a screening-level assessment for known wells in the project vicinity that may be potentially affected by project-related blasting or machine operation. Mitigation will be identified for any adverse effects.

3.3.4.2 Risk Assessment

Minnesota Statutes section 116.0717 require that an applicant who wishes to deposit tailings from minerals processing facilities into mine pits must conduct a risk assessment to demonstrate that the deposition will not pose an unreasonable risk of pollution or degradation of groundwater. Therefore a human health risk assessment will be conducted to evaluate the risk of pollution or degradation of groundwater.

The risk assessment will focus on the groundwater pathway and will evaluate potential risks to private and public drinking water supplies and to the water quality of the Partridge River. Potential multipathway risks (e.g., inhalation, food consumption) will be evaluated separately as described in response to Item 23. However, potential risks from other media (e.g., inhalation, food consumption) and drinking groundwater will be added together to estimate a “total” potential incremental risk for the project. Major receiving waters of interest are expected to be Colby Lake and the St. James Pit, which are the water supplies for the cities of Hoyt Lakes and Aurora respectively, although the potential for exposure via private wells will also be evaluated.

The risk assessment will be conducted according to standard US Environmental Protection Agency (USEPA) protocols and will use the Minnesota Department of Health study of in-pit tailings disposal at ArcelorMittal’s (formerly the Inland Steel Mining Company) Minorca Pit (Minnesota Department of Health, 1998) as a relevant guide for this analysis. For that analysis, it was assumed that dissolved constituents found in the Minorca Pit would be transported to the Missabe Mountain Pit in similar concentrations, at which point some dilution would occur. This is a conservative approach because follow-up studies at the Minorca project have shown that geochemical reactions are likely to attenuate some dissolved contaminants as they travel through the iron rock formation (Berndt and Liebfried, 2007). Similarly, the proposed risk assessment will be based on an assumption that dissolved constituents found in the Area 1 Pit would be transported to the St. James Pit in similar concentrations. Dilution will be estimated using conservative estimates of groundwater inputs and outputs based on pit water balances and the hydrogeology of the site. The work of Berndt and Liebfried (2007) will be used to provide a context for the conclusions. The scopes of the groundwater analysis and the risk assessment studies will be submitted to the state and federal agencies for review in the late summer of 2008 prior to initiating work on the studies.

As noted in Section 3.3.7.2, the EIS will address potential human health risks from the fish pathway. This will be assessed using the MPCA’s Mercury Risk Estimation Method. This analysis will assess potential impacts to fish in a nearby lake and the potential risks to recreational and subsistence fishers that consume locally caught fish. The potential risks from

inhalation/consumption will be added to the other potential risks (e.g., drinking water) to provide an estimate of “total” incremental risk associated with the project.

3.3.4.3 Cumulative Effects Analysis

Overall cumulative effects to the groundwater resource, including quality, are addressed in Section 3.3.6.2. Potential cumulative effects to municipal water supplies from induced development and other projects are addressed in Section 3.4.

3.3.5 Water Quality: Surface Water Runoff (Item 17)

3.3.5.1 Project-Specific Analysis

The EIS will include a model of the overall watershed balance based on the plant water balance and changes in groundwater flow and watershed runoff due to project mining activities. The model will provide predicted changes in watershed yield and affected water bodies, in particular, the effect of project activities on First Creek, Second Creek, and Unnamed Creek stream stability. Model selection and definition of the modeling approach will be done in consultation with technical staff of the cooperating agencies.

The model will first be calibrated to available flow gauging data. Since no long-term flow gauging has been done on First, Second or Unnamed Creeks, and since the nearest streamflow gauge for the Partridge River is located above the reach of interest, these models will be calibrated to the few available stream measurements and will be checked by application of other simple models such as USGS and DNR regression estimates.

A physical evaluation such as a Rosgen evaluation will be conducted to help evaluate the stability of First Creek, Second Creek, and Unnamed Creek under existing conditions, and the sensitivity of these streams to hydraulic change (e.g., dewatering discharges).

The EIS will include an evaluation of whether dissolved constituents that have been found in the Area 1 Pit, Area 6 Pit, Area 9S Pit, and Second Creek and any changes to the levels of those constituents, from Mesabi Nugget operations, may indirectly impact water quality at the St. James Pit. Primary parameters of note include: sulfate; total dissolved solids; hardness; alkalinity; and specific conductance. The pits and streams mentioned may all affect the St. James Pit, although the degree of hydraulic connection is uncertain. The potential also exists for these water bodies to lose water to the St. James pit in the future, after mining at Area 6 Pit has ceased and water levels rebounded.

The EIS will identify any “sector specific” stormwater requirements for consideration in NPDES permitting and how they apply to the project. The EIS will identify mitigation for adverse impacts, including potential measures included in the respective SWPPPs.

The EIS will consider project-related sulfate contributions to receiving waters, especially potential sources from existing and/or proposed waste rock piles containing high sulfide rock. If waste rock piles are identified as a significant potential source, potential mitigation measures, such as subaqueous disposal, enhanced capping of stockpiles, water treatment, liners, or routing, will be identified to reduce potential contributions and related impacts. Receiving waters include, but are not limited to: First Creek; Second Creek; Unnamed Creek; Unnamed Creek No. 2; Partridge River; and Colby Lake.

3.3.5.2 Cumulative Effects Analysis

The hydrologic models will be modified to assess cumulative effects from actions since: 1) the date of the monitoring, and 2) potential future actions, including:

- Potential future discharges and appropriations at Mesabi Nugget facility.
- Reductions in flow due to filling of Mesabi Nugget pits during reclamation.
- Proposed PolyMet Mine Site impacts to Partridge River, tailings basin activities on Second Creek, and appropriations for PolyMet from Colby Lake.
- Appropriations, discharges and land use changes at proposed Cliffs-Erie Railroad Pellet Transfer Facility construction and operation.
- Changes in runoff quantity due to future development of City of Hoyt Lakes.
- Any reasonably foreseeable changes to discharges from Hoyt Lakes Publicly Operated Treatment Works (POTW) due to development and/or treatment system changes.
- Any potential changes in water discharge from Northshore Mining Company discharges in Partridge River watershed.
- Any reasonably foreseeable changes to timber harvest activities on SNF, state and county lands and private lands.

The threshold of significance for this cumulative effects assessment for streams will be the likelihood of major change in stream morphology as defined by the Rosgen classification method or other applicable method (Rosgen, 1994). This analysis will be based on stream reconnaissance completed in 2007 by Mesabi Nugget as a base condition that will then be modified by predicted changes in streamflow.

Study Data Needs

- Estimated pit dewatering and groundwater flow data (from groundwater model, see response to Item 13).
- Estimated process water appropriations and discharges.
- Stormwater management plan for the proposed Mesabi Nugget facilities.
- Existing hydrologic models of Partridge River.
- Flow data for Partridge River.
- Lake level data for Colby Lake.
- Discharge data for Hoyt Lakes POTW.
- Discharge data for Erie Mining Company and successors LTVSMC and Cliffs-Erie discharges from pits.
- Historic air photos or GIS coverages showing modification of land use (including wetland loss) by past mining practices within the upper Partridge River watershed.
- Discharge data from Northshore Mining Company Mine and Crusher area and evaluation of possibility of changes to Northshore Mining Company discharges in future.
- Appropriations and discharge data for Syl Laskin Energy Center discharges.
- Operation plans and historic lake levels for Whitewater Reservoir.
- Data on typical timber harvest activities on Superior National Forest, state and county lands and private lands.
- Estimates of existing and future land use for City of Hoyt Lakes.
- Estimates of future PolyMet Mine Site flow impacts related to mine development, operation and closure, including long-term flow management of PolyMet mine pit during

and after filling of pit as well as estimates of flow impacts related to alterations to the tailings basin.

- Estimates of potential future discharges and appropriations at Mesabi Nugget facility.
- Water balance for proposed Cliffs-Erie Railroad Pellet Transfer Facility construction and operation.
- Data on geochemistry of existing and proposed stockpiles, especially the Lower Slaty and Virginia Slate waste rock stockpiles.
- Water quality data of pit waters (e.g., chronic toxicity).

3.3.6 Wastewaters (Item 18)

3.3.6.1 Project-Specific Analysis

The EIS will include a water and chemistry balance for plant process water and Area 1 Pit, including the proposed treatment system. The EIS will also include estimates of dewatering discharge rates and volumes for the Areas 2WX, 6, and 6NW Pits, identify receiving waters and the probable quality of such discharges waters, including mercury and sulfate. The effect of stockpile construction and the loss of wetlands will be evaluated using estimates of pollutant export change due to land use change and estimates of pollutant sequestration loss due to loss of wetland storage and vegetation. All of this information will be used to identify potential impacts to First Creek, Second Creek, Unnamed Creek, Unnamed Creek No. 2, Partridge River, and other receiving waters. The addition of the concentrator lines to the wastewater stream relative to sustaining progress in addressing water quality variances will be a topic of study in the EIS.

The EIS will include a detailed listing of all process chemicals that are proposed to be added to make-up water, including those used for iron ore processing and flotation, controlling mineral deposition, balancing pH, inhibiting biological activity or corrosion, coagulating, softening and acids and caustics. This information will be used in the health risk assessment.

The analysis will include a mass-balance analysis for the mixing of worst-case (both quantity and quality) discharge effluent with Colby Lake water. Pertinent drinking water standards, as specified in the Safe Drinking Water Act, will serve as the measure against which worst-case contaminant concentrations are compared. The EIS will evaluate indirect impacts to other possible receptors, including possible groundwater seepage from Area 1 Pit and Area 6 Pit toward the St. James Pit.

A number of models are available to analyze generation, fate and transport of pollutants in streams. Models recently used in Minnesota EISs and NPDES permitting procedures include HSPF and QUAL2E and dilution models. For the Partridge River initial estimates of impact will be completed using a simple dilution model since this was the approach used by PolyMet Mining and that information will form the basis for a cumulative effects analysis of the Partridge River. Final model selection and modeling approach will be determined by consultation among the cooperating agencies.

3.3.6.2 Cumulative Effects Analysis

Cumulative Effects Analysis. A quantitative assessment of cumulative water quality effects will be performed for Second Creek, Unnamed Creek, and to First Creek if dewatering discharges are proposed. The cumulative water quality effects of discharges and wetland losses on the

water quality of the Partridge River will be analyzed for all water quality parameters (other than mercury and sulfate, discussed below) for which the project results in a predicted increase in loading. If significant cumulative effects are noted, the analysis will be extended to the St. Louis River.

The EIS will conduct a cumulative effects analysis of mercury and sulfate loading from the project that is extended to include all major projects in the St. Louis River watershed. The primary purpose of the analysis is to address concerns over the loading of bioaccumulative substances to the St. Louis River, in particular mercury and sulfate loadings. Mercury does bioaccumulate, while sulfate is potentially a contributing factor to mercury methylation and increased availability of mercury (for bioaccumulation). Sulfate is also of concern because of potential low-level effects on wild rice culture. The incremental loading from the projects will be determined at key downstream locations on the Partridge and St. Louis Rivers using the most recent data as a baseline estimate of loading. The DNR and USACE will consult with MPCA on what projects should be considered in the analysis.

The threshold for this cumulative effects assessment will be Minnesota's standards applicable to the respective waters being evaluated and the Safe Drinking Water Act standards that are applicable to Colby Lake as a drinking water source for the City of Hoyt Lakes. Minnesota water quality standards were promulgated to protect a number of uses, including human health (drinking water – Class 1) and aquatic life and recreation (Class 2). They are also in place to protect waters for industrial consumption (Class 3) and agriculture and wildlife (class 4). Standards related to these other classes will be considered in addition to the project-specific assessment of human health and aquatic life protection. The future conditions scenarios will be completed for both operation and post-closure conditions, assuming that all other reasonably known actions have been completed.

Potential cumulative groundwater quality effects associated with the project will be evaluated as part of the EIS. This evaluation will expand upon the work being conducted to assess potential drinking water impacts to also assess overall effects to the groundwater resource.

Data Needs for Analysis of Cumulative Effects

The following data are needed to assess cumulative water quality effects from wastewater discharges:

- Estimates of current and future hydrologic loadings from subwatersheds (see previous cumulative effects discussion for flow).
- Water quality monitoring data for First, Second, Unnamed Creeks, the Partridge River, and St. Louis River (if required).
- Estimates of mercury and sulfate concentrations and load for the Partridge and St. Louis Rivers.
- Data on past and existing Cliffs-Erie/PolyMet tailings basin seepage and pit and plant discharges to Second Creek.
- Data on proposed PolyMet impacts from the Mine Site and predictions of subsequent loads to the Partridge River.
- Discharge data for the Syl Laskin Energy Facility.
- Historic air photos or GIS coverages showing modification of land use (including wetland loss) by past mining practices within the First, Second and Unnamed Creek watersheds.

- All pertinent sources of data on process water discharges and tailings effluent. This includes previous tailings effluent characterization work conducted on the LTVSMC tailings by the DNR (In-Pit Disposal of Taconite Tailings Geochemistry, 1999) and additional work conducted on the same tailings basins by PolyMet. These data, plus any others that are known, should be compiled into a single reference for agency review and use in the EIS.

3.3.7 Stationary Source Air Emissions (Item 23)

3.3.7.1 Project-Specific Analysis

The EIS will provide a major discussion of this topic including: descriptions of air emissions sources; potential control technologies; and any impacts to Class I and Class II areas. A BACT analysis will be completed for particulates (PM10, PM2.5). A MACT analysis will be completed for relevant pollutants. The EIS will also contain the following ambient air quality analyses:

- A Class I PM10 increment;
- Class I visibility impacts (inclusive of PM10, SO2, NOX emissions);
- Class II NAAQS/MAAQS analysis for PM10;
- Class II increment analysis for PM10; and
- Class II NAAQS analysis for PM2.5.

The Class I visibility analysis will assess project-related effects to Voyageurs N.P., BWCAW, and Isle Royale N.P.

Greenhouse gas emissions of the project will be quantified and reported in the EIS as described in MPCA air permitting guidance. The guidance recommends quantification of direct greenhouse gas emissions as well as those generated through the use of energy at the facility.

3.3.7.2 Risk Assessment

The EIS will include an updated Air Emissions Risk Analysis (AERA) conducted according to MPCA guidance (September 2007, Version 1.1). The AERA will assess the potential risks to human health at a conservative screening level from the combined air emissions from both the Phase I and Phase II Projects. Required modeling will follow these protocols:

- The chemicals of potential interest (COPI) for the AERA will be based on potential emissions associated with Phase I nugget operations (material handling, emissions from the rotary hearth furnace related to nugget production and using coal as a reductant) and Phase II mining-related operations (mining, ore hauling, ore crushing-grinding-concentrating, and material handling).
- Air dispersion modeling will be conducted with the AERMOD model to estimate maximum one-hour and annual air concentrations.
- The maximum-modeled air concentrations will be input to the MPCA's Risk Assessment Screening Spreadsheet (RASS) and inhalation and multi-pathway risks will be calculated.

Potential tailpipe emissions of toxic air pollutants from diesel-powered mining vehicles associated with the Phase II project will be calculated and considered in the AERA

The EIS will address potential human health risks from the fish pathway. This will be assessed using the MPCA's Mercury Risk Estimation Method. This analysis will assess potential impacts to fish in a nearby lake and the potential risks to recreational and subsistence fishers that consume locally caught fish.

3.3.7.3 Cumulative Effects Analysis

The cumulative nature of potential air emission effects will be discussed in the EIS. NAAQS and PSD increment analyses include relevant nearby emission sources and can be considered cumulative. Visibility impact analyses are project-specific but extensive data on the cumulative effects of air pollution sources on visibility are available as part of the official record for the MPCA development of Minnesota's proposed Regional Haze State Implementation Plan (SIP). Existing Iron Range sources, including Mesabi Nugget's furnace, were included in the work completed for the SIP. Monitoring data for other relevant pollutants are also available.

The Class I and II increment analyses will be conducted to address cumulative effects; Air Quality Related Values (AQRVs) will be considered in the assessment.

As noted in Section 3.3.4.2, potential impacts from tailings disposal into Area 1 Pit to groundwater will be assessed and potential incremental risk to a person drinking water from St. James Pit or Colby Lake will be estimated. The potential risks from drinking water will be added to the other potential risks (e.g., inhalation, food consumption) to provide an estimate of "total" incremental risk associated with the project.

3.4 Socioeconomic Effects (Item 28)

Consideration of the project's potential economic, employment, and sociological impacts in an EIS is required by state and federal rules.

3.4.1 Economic Effects

The economic effects of the project alone and the cumulative effect of other projects in the area will be evaluated using economic models similar to those previously developed for the PolyMet and Minnesota Steel EISs. A quantitative assessment of cumulative employment and economic effects will be performed; results for both St. Louis County, the East Range, and nearby Indian Reservations, including Fond du Lac, Bois Forte, and Grand Portage, will be reported. Background information on employment and the economy of St. Louis County, the East Range, and the Fond du Lac, Boise Forte, and Grand Portage Indian Reservations, will be summarized in terms of:

- Historical population trends by county and major population centers.
- Historical employment trends by county.
- Historical tax revenue trends by county.
- Summary of historical economic activity (major industries, major sources of employment) by county.
- Summary of population, employment, tax revenue and economic activity in 2002 (the baseline year).

Impact analyses will be completed through input-output mathematical modeling to estimate employment impact, output impact, and value added measures in terms of total (direct, indirect

and induced) impacts for the construction period, operations period and closure period. Analyses will also assess impacts to State, Local, Federal, and Tribal taxes and royalties. All prices will correspond with the most recent data available.

3.4.1.1 Baseline Conditions

Economic activity reported in the most recent tax year available in the County/East Range/Tribal Reservations will establish the baseline condition. Cumulative effects will be assessed by combining the baseline economic activity and projections of average annual employment (year by year) and estimated construction cost (year by year) for each of the following future (if they meet the criterion for “reasonably known”) and past actions:

- The proposed Mesabi Nugget project including both Phase I and Phase II.
- Proposed PolyMet Mining NorthMet Project.
- Proposed Mesaba Energy Project (Excelsior Energy, Inc.).
- Proposed Cliffs-Erie Railroad Pellet Transfer project (Cliffs-Erie, LLC).
- Proposed expansions of existing taconite plants.

The analysis will report findings for a typical year in four discrete periods: baseline year, construction period, operating period and closure period. Findings will be reported as employment, output impact (dollars), value added impact (dollars) and tax impact (dollars).

3.4.2 Demographic Effects

Background information on social structure of the East Range and Fond du Lac, Bois Forte, and Grand Portage Reservations will be summarized for the latest available data year, including population characteristics including: structure by age, sex, family size, ethnicity, income, type of employment (including unemployed).

The probable effect on the population of local communities will be estimated. This will be done by projecting the existing population and demographic trends of the communities in the absence of the project and adding estimated in-migration caused by employment demand. Employment demand will be converted to overall demographic effect by consideration of family size, based on demographic data appropriate to the employment classes being considered.

Location of employees and their families may be based on housing patterns of existing and past projects, if available, (e.g., general data on communities of residence of staff of LTVSMC) or a simplified method of apportionment such as a “gravity” model that assumes that employees will disperse in direct proportion to the population of the community and in inverse proportion to the square of the commuting distance to the community.

The result will be an estimate of population changes in nearby communities with rough estimates of changes in key community demographics (e.g., school census).

3.4.3 Community Effects

3.4.3.1 Infrastructure and Community Services

Where communities show significant predicted changes in demographics, past data on community structure and organization will be collected and summarized. This will include

information for the latest available data year on size of government organizations (cities, townships and counties); participation in voluntary associations (description of groups and linkage to national organizations, if any); and inequities (economic, social or cultural) among community groups.

For communities where changes are likely to be significant, local officials will be consulted to determine the adequacy of existing infrastructure and possible improvements that might be required for infrastructure and community services. Because such local infrastructure improvements are not defined and still speculative, and are likely to be widely dispersed and subject to their own permitting and/or environmental review, no environmental assessment of their secondary impacts will be done. Resulting changes in governmental budgets and procedures will be discussed and evaluated and a qualitative discussion in community organization will be provided, including:

- Analysis of change in community structure: size of government organization (cities, townships and counties); participation in voluntary associations (description of groups and linkage to national organizations, if any); and inequities (economic, social or cultural) among community groups.
- Analysis of projected changes in availability of housing and community services including: municipal water supply, police protection, health care, elderly care, schools, libraries, retail centers, recreational facilities, gathering places, computer access facilities.
- Assessment of stakeholder perception toward proposed projects as related to perceived changes in quality-of-life issues such as: health, safety, security (personal and economic), political power, family stability, use of the natural environment, environmental quality, displacement or relocation, and trust in political and social institutions (intended to gauge community and stakeholder consensus on the cumulative effects of proposed projects on their shared vision for the future of the East Range).
- Potential cumulative effects to municipal water supplies from induced development and other projects.

Data Needs

Data will be collected with the assistance of local planning and resource agencies such as the East Range Joint Powers Board (ERJPB) and the University of Minnesota – Duluth. Working with Iron Range Resources (IRR), St. Louis County Planning Department, Minnesota Department of Employment and Economic Development (DEED), and the Arrowhead Regional Development Commission (ARDC), the consultant team will collect data from the Townships, Cities, St. Louis County, the State of Minnesota, and other sources including the individual projects listed above.

Data pertaining to the following will be collected, examined, and used in the impact modeling process:

- Input – Output mathematical model (e.g., IMPLAN Professional).
- Economic activity data files (e.g., IMPLAN Data Files).
- Average annual employment (year by year) and estimated construction cost (year by year) for proposed projects (see above).
- Population data by county as provided by DEED or similar database.
- Population change projections derived from projected employment changes.

- Projected change in government organization structure as determined by respective government units.
- Projected change in participation in voluntary organizations as determined by respective organizations.
- Description of inequities among community groups as determined by group representatives (responsive government units and responsive voluntary organizations as suggested by government units).
- Projected changes in housing availability as determined by economic input-output analysis.
- Projected changes in availability of community services resulting from projected population changes.
- Change in availability will be determined by responsible governmental units, school districts, care facilities, local Chamber of Commerce, and DEED, as appropriate.
- Identification and definition of stakeholders.

3.4.3.2 Usufructuary Rights - Cultural Resources

3.4.3.2.1 Project-Specific Analysis

The EIS will provide a qualitative assessment of potential effects to the use of resources important to the tribes within the context of the 1854 Ceded Territories. Relevant resources and uses will be identified at the commencement of the EIS in consultation with the respective tribal communities. Areas of evaluation include:

- Potential changes to the exercise of usufructuary rights due to mining activity in terms of access, game species, fish, wild rice, and water resources.
- Potential changes to tribal resources and uses from the project. Possible uses include harvesting wild rice, medicinal wetland plants, and plants used for basket-making (e.g., reeds, willow, birch), as well as wildlife hunting and trapping.
- Potential changes in tribal access to areas where treaty-related or culturally important activities take place and connectivity between these areas.
- Potentially important vegetation effects, from any aspect of the proposed mining activities, on culturally-significant plants like wild rice, birch, wild blueberries, cedar, maple, and sweetgrass.

The EIS will assess the potential for the project to affect Traditional Cultural Properties (TCPs) as defined by National Register Bulletin 38, *Guidelines for Documenting and Evaluating Traditional Cultural Properties*. Areas that occur within or near the project site will be considered. The identification of potential TCP's will occur at the commencement of the EIS. Identification and assessment will occur in cooperation with the appropriate Tribal Historic Preservation Officers and/or cultural resources staff; consultation will also occur within the respective tribal communities as warranted.

3.4.3.2.2 Cumulative Effects Analysis

The EIS will provide a qualitative assessment of potential cumulative effects to the use of resources important to the tribes within the context of the 1854 Ceded Territories. Relevant resources and uses will be identified at the commencement of the EIS in consultation with the respective tribal communities.

The area of analysis will be commensurate with the nature and degree of the effect. The 1854 Ceded Territories will not be treated as a unique, geographically discrete unit of analysis, but impacts will be identified when projected to occur there. Thus the unit of analysis is relevant to the uses being studied, which may or may not align with the project site or area, or for example a watershed.

Cumulative effects will be evaluated in terms of:

- Potential changes in tribal access to areas where treaty-related or culturally important activities take place and connectivity between these areas.
- Potential changes to resources integral to traditional tribal lifeways (e.g., wild rice, moose, fish, medicinal plants, blueberries, birch bark), especially in terms of sufficient quality, availability, and access.

The EIS will identify where other areas of cumulative effect have an implication for use of resources important to the tribes, especially subsistence resources. The method of reporting will be determined in consultation with the EIS consultant.

4.0 IDENTIFICATION OF PHASED OR CONNECTED ACTIONS

No connected actions have been identified for the project.

The project is the second phase of a two-phase project. The first phase was the LSDP currently under construction. This project was exempted from State Environmental Review. The EIS evaluates the combined impacts of the LSDP and Phase II where necessary, in particular for project-related effects to air and water quality and socioeconomic effects.

Although future phases of the project have not been identified beyond the 20-year planning horizon, the mineral deposit has enough ore to supply the current project for a much longer time. It is therefore reasonable to assume that operations may extend beyond this period. If continuation of operations is pursued, or new project activities are proposed, environmental review and permitting will occur subject to the laws and regulations at that time. Minn. Rules part 4410.3000, subpart 3(c) requires preparation of a supplemental EIS whenever after an EIS is completed that a later phase or another component is proposed for approval or implementation that was not evaluated in the initial EIS.

Mesabi Nugget had previously planned to add two additional nugget furnaces at the site. Uncertainty regarding the ability to obtain permits for air emissions led to elimination of that portion of the project. Operation of the LSDP, including testing of air emissions control technologies, may make it feasible to propose additional nugget capacity at the site. This is not included in the current project and, if proposed, would require additional permitting and preparation of a Supplemental EIS.

5.0 EIS Schedule

Aug – Sept 2008	Scoping EAW Comment Period (includes public meeting)
December 2008	Final Scoping Decision
January 2009	EIS Preparation Notice Published
June 2009	Draft EIS Issued for Public Review (includes public meeting)
September 2009	Final EIS Issued
November 2009	EIS Adequacy Determined

6.0 SPECIAL STUDIES OR RESEARCH

6.1 Mine Plan

A proposed mine plan will be submitted by Mesabi Nugget as part of the application for the Permit to Mine and will be available for the use in the EIS. It will describe pit geometry and will show plans for phasing of pit development. It will include materials flow rates for ore, lean ore, waste rock and overburden, broken out by area. It will also describe necessary mine facilities such as haul roads and ramps.

6.2 Stockpile Plan

A conceptual stockpile plan was included in the EAW. A more detailed stockpile plan will be submitted by Mesabi Nugget as part of the application for the Permit to Mine and will be available for use in preparing the EIS. It will include development plans for stockpiles giving geometry, volumes and locations for placement of waste rock, lean ore and overburden.

6.3 Crushed Ore Movement Plan

A conceptual plan detailing ore treatment during processing will be available for the EIS; this will be provided as a part of the application for the Permit to Mine.

6.3 In-Pit Tailings Disposal Plan

A plan for development of the Stage I Tailings Basin will be submitted as part of the application for the Permit to Mine and will be available for use in the EIS. The plan will provide a staging plan for tailings deposition, preliminary geotechnical data for proposed dike locations and typical cross-sections. It will describe initial dike construction, phasing, and reclaim water management. It will provide engineering data upon which the reclamation plan will be based.

6.4 Wetland Inventory Report with Functional Analysis

A report describing wetlands affected by the project will be available for use by the consultant in the EIS. It will include general statistics on wetland type and quality and individual data sheets for wetlands giving general assessments of functions and values using the general approach of the Minnesota Routine Assessment Methodology (MNRAM) for Evaluating Wetland Functions format.

6.5 Wetland Hydrology Monitoring Study

Mesabi Nugget will install shallow monitoring wells in wetlands located adjacent to the proposed pits or pit expansions. Water level readings will be available for use by the consultant in the EIS. The hydrology monitoring will provide a baseline for evaluation of future impacts and will help evaluate the current wetland hydrology for prediction of impacts.

6.6 Wetland Mitigation Plan

A wetland mitigation plan will be submitted as part of the joint state-federal application for wetland impacts. It will be available for use by the consultant in preparing the EIS. The plan will describe specific areas proposed to be used for mitigation of initial impacts and the conceptual

plans for accomplishing the restoration or enhancement of wetlands at the restoration sites. It will describe a long-term strategy for mitigating wetland impacts over the project life and in project closure and reclamation.

6.6 Project Water Balance and Watershed Yield Model

The water balance will describe the major consumptive uses of water and the net appropriation required for project operation. A watershed model for First Creek, Second Creek and Unnamed Creek will be calibrated using available flow data. The model will be used to simulate Mesabi Nugget's impact on watershed yields as well as stream response to high-intensity storm and/or snowmelt conditions. This will be available for use by the consultant in the EIS.

6.7 Groundwater Monitoring

Monitoring wells will be placed in both bedrock and surficial aquifers and will be used to evaluate groundwater flow patterns and groundwater quality. The design and placement of wells and the proposed monitoring parameters and frequency will be defined by a protocol approved by the MPCA and DNR. Monitoring of water levels and water quality in mine pits as described above will also assist in determining groundwater flow. This will be available for use by the consultant in the EIS.

6.8 Groundwater Flow Model

Potential changes to groundwater flow and quality in the project area will be estimated by modeling of the proposed program of pit dewatering and in-pit tailings disposal. The model will be prepared as part of the appropriations permit application and will be available for use by the consultant in preparation of the EIS. It will be calibrated to available data, including new water level data to be collected in 2008. The groundwater model will also be used, along with field observations and watershed modeling, to determine effects on stream flow and on wetlands as outlined in Section 3.3.3. The groundwater flow model will be used to determine whether and how substances in the process water in the tailings basin could be transported to nearby wells or streams. Local wells will be inventoried and the probability of effects on these wells will be analyzed.

6.9 Water Supply Risk Assessment

Mesabi Nugget will prepare a groundwater pathway-based risk assessment to evaluate potential risks to private and public drinking water supplies and to the water quality of the Partridge River. The risk assessment will be based on an assumption that dissolved constituents found in the Area 1 Pit would be transported to the St. James Pit in similar concentrations. Dilution will be estimated using conservative estimates of groundwater inputs and outputs based on pit water balances and the hydrogeology of the site. The scope of the groundwater analysis has been reviewed and received general approval for use in the study. The scope of the risk assessment is still under development and will be submitted to the state and federal agencies for review in late 2008 prior to initiating work on the study. This study is required for the proposed in-pit disposal of tailings and will be available for use of the consultant in preparation of the EIS.

6.10 Stream Geomorphology Study

A Phase I geomorphologic evaluation will be performed using Rosgen methods. The study will evaluate changes in bankfull flows and base flows and provide information for assessing

probable effects of the project on streams. The results of this study will be available for the consultant for use in preparing the EIS.

6.11 Conceptual Stream Augmentation Plans

A statistical analysis of annual watershed yield as a function of watershed area will be incorporated into the watershed modeling study. Using this information, additional runoff yield estimates and the results of the geomorphologic and biological monitoring studies, the EIS will address the need for stream and lake augmentation to maintain the flow and water level of First Creek, Second Creek and Unnamed Creek during pit-refilling and during possible periods of water appropriation for plant use in dry weather. The study will be completed as part of the application for an appropriations permit and will be submitted for use by the consultant in preparing the EIS.

6.12 Biological Monitoring Study

The biological monitoring data will be used to describe the affected environment and used as a resource for the evaluation of potential impacts from flow or quality changes. This will be available for the consultant to use in preparation of the EIS.

6.13 Surface Water Monitoring

A surface water quality and flow monitoring program including sampling of potentially affected pits and streams will be conducted in 2008-09 following a protocol approved by the MPCA and DNR. The program will include continuous flow monitoring of streams and monitoring of water levels in pits. It will also include testing of the pit waters' quality (e.g., chronic toxicity), and evaluation of possible causes and mitigation for any identified toxicity. This information will be available for use by the consultant in preparing the EIS.

6.14 Characterization of Waste Rock and Prediction of Waste Rock Seepage Characteristics

Existing stockpiles will be investigated by placing borings and collecting samples of waste rock and water. Analysis of waste rock and water will provide data for prediction of the chemical loadings and concentrations from future waste rock stockpiles. Methods to reduce loadings will be evaluated. The study will be available for use by the consultant in preparing the EIS.

6.15 Dissolved Solids Balance and Chemical Mass Balance

A model of dissolved solids accumulation in process water will be prepared and available for use in the EIS. It will estimate concentrations of conservative, highly soluble ions including Ca, Na, Mg, SO₄, and Cl as well as TDS. Concentrations of flotation chemical reagents will also be estimated. Modeling results will be available for use by the consultant in preparing the EIS.

6.16 Wastewater Treatment Study

Methods available to treat project-related discharges to the Partridge River from the Areas 2WX and 6 Pits will be identified and discussed. The study will rely primarily on the elements of the non-degradation evaluation for water quality permitting. At a minimum, an evaluation of membrane-based treatment (e.g., ultrafiltration/nanofiltration) combined with chemical precipitation will be conducted for a portion or all of the discharge from one or both pits.

6.17 Environmental Data from Existing Phase I LSDP

Data on chemical concentrations in the process water and solids of the 2003 pilot plant were used to predict wastewater and air quality for the Phase I LSDP Nugget plant. Within the limits of commercial secrecy agreements with vendors, the data from these analyses will be available for use in preparing the EIS.

6.18 Air Quality Studies

The following studies are described in Section 3.3.7 and will be submitted as part of the application for an air emissions permit and will be available for use in by the consultant in preparing the EIS. Specifically:

- Air Emissions Inventory
- PSD Class I Area Impacts Analysis
- PSD Class II Area Impacts Analysis
- BACT Review
- MACT Compliance
- Human Health Risk Assessment (AERA)

6.19 Noise Modeling Study

A limited noise analysis that evaluates potential project-related impacts and identifies potential mitigation will be prepared during the EIS. The EIS consultant will prepare the noise analysis. Baseline data will be used to model future noise levels as a function of facility operation. The noise analysis will be conducted under generally accepted principles of noise-related impact assessment. Nearest sensitive receptors will be identified.

6.20 Sill Intersection Contingency Plan

The EIS will include a draft Sill Intersection Contingency Plan prepared by the proposer. The plan will outline how to identify materials associated with the Aurora Sill geologic feature. It will outline the steps to be taken in the event sill-related materials are encountered.

6.21 Mineland Reclamation Plan

A Draft Mineland Reclamation Plan will be prepared by the proposer and be available for the consultant to use in the EIS; it will be submitted as part of the DNR Permit to Mine application. It will address potential reclamation of significant project features, including: mine pit; waste rock and lean ore stockpiles; tailings disposal; revegetation; and watershed restoration.

7.0 GOVERNMENTAL PERMITS OR APPROVALS

The EIS will identify all permits and approvals required for this project. While some permit application review may occur concurrently with EIS preparation, the EIS will not necessarily contain all information required for a decision on those permits. No permits have been designated to have all information developed concurrently with the preparation. The USACE will prepare a Record of Decision as part of the Clean Water Act; Section 404 permitting process after the Final EIS is issued.

Final Scoping Decision adopted December 9, 2008.