DRAFT SPECIAL CONDITIONS

RECLAMATION OF ENTIRE MINING AREA

1. Full, complete, and appropriate closure in compliance with all applicable standards of the entire area contained within the mining area is the responsibility of the Permittee. With DNR approval, Permittee may modify its mining and reclamation plan in the event that there are mine features, auxiliary facilities, or any other area requiring reclamation that are also within a mining area under a mining and reclamation plan for a separate permit to mine not held by Permittee and such features are not owned by Permittee.

2. Appropriate closure and reclamation of the tailings basin in compliance with all applicable standards is the responsibility of the Permittee regardless of whether any NorthMet generated tailings have ever been placed in the basin.

FINANCIAL ASSURANCE

3. The Permittee must provide financial assurance in accordance with the conditions contained in Attachment 1.

4. In addition to updates through the annual review process, the Permittee's financial assurance must be adjusted to account for any modifications as the project develops.

STATUTORY AND REGULATORY DEFINITIONS APPLY

5. To the extent that there are inconsistencies between terms as used in the Application and as defined in Minnesota Statutes or Minnesota Rules (e.g., "reclamation," "closure," "release"), the Application does not supersede the statutory or regulatory definitions.

TIMELINE MODIFICATION

6. Any Permittee requested modification of a timeline set forth in (i) any special condition or (ii) any subsequently established schedule, may necessitate a permit amendment.

ENVIRONMENTAL REVIEW

7. Decisions regarding the need for environmental review will be made at the time any mining operation modifications are requested or required.

WETLAND REPLACEMENT PLAN

8. If approved, the Permittee's wetland replacement plan will be deemed part of the mining and reclamation plan.

9. Any necessary approvals under the Wetland Conservation Act must be obtained prior to impact of any wetland.

10. The DNR will issue a separate decision on the Permittee's wetland replacement plan and mitigation requirements under the Wetland Conservation Act.

11. Mitigation of impacts to FPn62 - Northern Rich Spruce Swamp will be required in accordance with Attachment 2 as part of the decision on Permittee's wetland replacement plan.

OTHER PERMITS

12. The DNR will resolve any conflict between or among the Permit to Mine, Water Appropriation Permits, Public Waters Work Permit(s), Dam Safety Permits, Wetland Replacement Plan, or Takings Permits governing activity in the mining area.

13. The DNR will consult with other agencies, as needed, to coordinate resolution of conflicts between or among any permits (including, without limitation, Permit to Mine, Water Appropriation Permits, Public Waters Work Permit(s), National Pollution Discharge Elimination System Permits, State Disposal System Permits, Dam Safety Permits, Wetland Replacement Plan, Takings Permits, etc.) governing activity in the mining area.

REQUIRED INSURANCE

14. The Permittee must maintain adequate comprehensive and personal liability insurance policies in place from the time of permit issuance. The Permittee must continuously maintain this required insurance coverage until it obtains a complete release, for the entire mining area, from its permit responsibilities.

DATA SUBMITTALS

15. Upon DNR request, the Permittee must provide any data that it is required to submitted to the DNR in a format in which raw data is accessible (e.g., spreadsheet, GIS) along with narrative explanations of the data.

SUBMISSION OF MONITORING DATA TO THE DNR

16. All collected surface water and ground water quality data required by other permits must be submitted to the DNR for review. Data submitted to the MPCA through the Discharge Monitoring Report (DMR) system (or replacement of such system) satisfies this condition.

SUBMISSION OF FINAL GIS DATA PACKAGE

17. Within 30 days of the issuance of the permit to mine, the Permittee must submit a final geographic information system (GIS) data package to the DNR for the largest footprints planned for each mine feature, including existing and refurbished features. This same package must be submitted to the DNR each year as part of the Annual Report to depict the annual progression of the footprints of each mine feature.

18. The GIS data package must contain a spreadsheet or database linked to map locations with detailed information of each feature associated with the mining operation, including, without

limitation, pits, stockpiles, basins, auxiliary facilities, and surface water and groundwater quality monitoring locations.

VARIANCE REQUESTS IN THE APPLICATION

19. No variance requests are approved at this time.

20. Prior to a determination on the variance request to leave the existing utility tunnels in place at closure, the Permittee must provide, and the DNR must approve,:

    a. a geotechnical review and report of long-term tunnel stability;

    b. a plan for capping and sealing access routes; and

    c. a plan for wildlife enhancement of the utility tunnels for potential bat habitat.

    Unless and until the DNR makes a decision to grant the variance request to leave the existing utility tunnels in place at closure, the Permittee must provide financial assurance sufficient for reclamation of the existing tunnels.

21. Prior to a determination on the variance request to leave the Colby Lake Pipeline in place, the Permittee must provide to the DNR documentation of agreement with all owners of affected surface and mineral interests that the Colby Lake Pipeline may be left in place and not be removed at closure.

STORAGE TANKS

22. All storage tanks that require demolition or site reclamation must be included in the mining and reclamation plan and in the contingency reclamation cost estimate. The Permittee's required reclamation and financial assurance must include all existing tanks in the mining area, as well as those constructed by the Permittee.

BIWABIK IRON FORMATION (BIF) CONSTRUCTION ROCK

23. The Permittee must prepare a BIF construction rock workplan for DNR review and approval no later than 30 days following permit issuance. The workplan must include any modeling, sampling, and analyses necessary to demonstrate to the DNR that the use of the construction material will meet all applicable standards, statutes and regulations to be protective of natural resources. In addition, analysis in the workplan must indicate that transition to non-mechanical treatment is no less likely to occur with the proposed use of BIF construction rock.

24. The Permittee must provide to the DNR the results of the analyses conducted under the approved BIF construction rock workplan for review and approval.

25. No BIF construction rock may be used prior to DNR approval.

TAILINGS BASIN BUTTRESS MATERIAL

26. The Permittee must prepare a tailings basin buttress material workplan for DNR review and approval no later than 30 days following permit issuance. The workplan must include any modeling, sampling, and analyses necessary to demonstrate to the DNR that the use of the buttress material will meet all applicable standards, statutes and regulations to be protective of natural resources. In addition, analysis in the workplan must indicate that transition to non-mechanical treatment is no less likely to occur with the proposed use of buttress material.

27. The Permittee must provide to the DNR the results of the analyses conducted under the approved buttress material workplan for review and approval.

28. No buttress material may be used prior to DNR approval.

BOUNDARY SURVEYS

29. Prior to ground disturbance in a given portion of the mining area, the Permittee must have a boundary survey conducted by a surveyor licensed in the State of Minnesota verifying the location of that portion of the mining area, including all auxiliary facilities, mine pits, stockpiles, and tailings basins.

30. The Permittee must submit the boundary survey results to the DNR prior to ground disturbance in the given portion of the mining area.

31. The Permittee must describe and explain deviations from the legal descriptions or map depictions found in the Application in its boundary survey results submittal. Any such deviations may necessitate a permit amendment.

MODELING AND DATA VERIFICATION WORKPLAN

32. The Permittee must develop, in consultation with the DNR, a modeling and data verification workplan that must be submitted and approved by the DNR within 12 months of permit issuance. Consultation must begin no later than 60 days following permit issuance.

33. This required workplan must detail the requirements for the data analysis and reporting relating to project verification (e.g., modeling, monitoring data, data reporting requirements, revisions to Block Model, etc.). This workplan must also incorporate any revisions to water quantity models. The workplan must include a recurring schedule for reporting project verification data to the DNR.

34. The Permittee must submit the project verification data to the DNR for review and approval.

STORMWATER POLLUTION PREVENTION PLANS AND SPILL PREVENTION CONTROL AND COUNTERMEASURE PLANS

35. Prior to ground disturbance, when the Permittee submits a copy of any construction Stormwater Pollution Prevention Plan (SWPPP) to the MPCA, the Permittee must submit an electronic copy to

the DNR. Updated version of the construction SWPPP's must be submitted electronically to the DNR upon request.

36. When the Permittee submits a copy of any industrial SWPPP to the MPCA, the Permittee must also submit an electronic copy to the DNR. Updated versions of the industrial SWPPP's must be submitted electronically to the DNR upon request.

37. When the Permittee submits a copy of any Spill Prevention, Control, and Countermeasure (SPCC) plan to the MPCA, the Permittee must submit an electronic copy to the DNR. The Permittee must submit any revision of these plans electronically to the DNR with the Annual Report.

CONSTRUCTION MATERIAL SPECIFICATIONS

38. Final construction specifications for construction materials associated with each mine pit, stockpile, tailings basin, and auxiliary facility must be submitted to the DNR for review 30 days prior to construction.

39. Earthen construction materials, except for bentonite, need to be characterized to verify that the use of the material will meet all applicable standards, statutes and regulations to be protective of natural resources prior to use.

DISTURBANCE IN BORROW AREAS

40. The mining area includes preliminarily identified potential borrow source locations. At least 60 days prior to planned disturbance within that portion of the mining area, the Permittee must identify and include anticipated borrow source locations on a map and update the mining and reclamation plan accordingly. This requirement does not apply if the borrow source material is entirely unsaturated mineral overburden and the borrow source location is completely contained within the existing, planned footprints of mine pits, stockpiles, or the tailings basin.

41. The mining area will be modified accordingly after DNR review and approval of the borrow source locations and updated reclamation plan.

42. Prior to disturbance in borrow areas, the Permittee must obtain any required regulatory approvals, including but not limited to those required under the Wetland Conservation Act.

SATURATED MINERAL OVERBURDEN

43. Unless further analysis or information is presented to and approved by the DNR, saturated mineral overburden shall be managed consistently with the Standard Operating Procedures (SOP), regardless of the source or location of use of such overburden.

44. No disturbance of saturated mineral overburden may occur in the Transportation and Utility Corridors without separate and prior approval by the DNR, except to the extent necessary for the installation and maintenance of utility poles.

CHARACTERIZATION OF MATERIAL

45. The Permittee must inform the DNR if new rock type(s) or formations are encountered during mining. All new rock types or formations must be characterized prior to disposal or use.

FUTURE WASTE CHARACTERIZATION TESTING

46. The Permittee must coordinate future waste characterization testing and results with the DNR for review and approval.

47. Work plans for waste characterization must be submitted to the DNR for review and approval prior to initiation of any such characterization testing or data analysis.

48. Waste characterization testing done without DNR review and approval may not be accepted by the DNR.

PROFESSIONAL ENGINEER

49. With the exceptions of plant roads, fences, and sheds, design drawings for constructed or refurbished facilities (including but not limited to mine pits, stockpiles, tailings basins, containment systems, buildings, auxiliary facilities, etc.) in the mining area must be signed by a Minnesota-licensed professional engineer.

50. Confirmation by a Minnesota-licensed professional engineer, post-construction, that all construction specifications were met must be documented and provided to the DNR upon request. If there were deviations from construction specifications, the professional engineer must include in that documentation description and justification of the deviations. Any such deviations may necessitate a permit amendment.

MINE SITE SUMP PERFORMANCE MONITORING

51. The Permittee must develop performance monitoring for stockpile sumps and mine pit sumps, subject to review and approval by the DNR.

FINAL DESIGN DRAWINGS

52. Final design drawings for facilities listed in Application Table 3-2 and others upon DNR request, must be submitted for DNR review upon completion and no later than 30 days prior to construction of each facility. If deviations from the design drawings contained in the Application yield different footprints, additional impacts, or modified closure plans, then a permit amendment may be required prior to construction.

REFURBISHMENT OF AUXILIARY FACILITIES

53. With the exceptions of plant roads, fences, and sheds, final designs for auxiliary facility refurbishment and a comparison to the estimated contingency reclamation cost from the Application must be submitted to the DNR for review.

CATEGORY 1 WASTE ROCK CONTAINMENT SYSTEM DESIGN AND CONSTRUCTION

54. The Category 1 waste rock containment system and cover design and construction must be completed under the direct oversight of a Minnesota licensed professional engineer. All final design drawings and analyses must be presented for review by the DNR no later than 30 days prior to any construction. Inspections and review will be conducted as the DNR deems necessary.

FINAL CUT-OFF WALL DESIGNS

55. Final designs for the cut-off wall for the tailings basin containment system must be submitted to the DNR for review at least 45 days prior to construction of such system. If DNR requests further information, then the Permittee must submit the requested information to the DNR at least 14 days prior to construction of such system.

AS-BUILT DRAWINGS

56. The Permittee must include within its annual report to the DNR as-built drawings for the facilities listed in Application Table 3-2, and others upon DNR request, constructed or refurbished in the preceding calendar year. The drawings must be sufficient for the DNR to verify the location and reclamation cost estimates for the constructed facilities.

RAIL ORE CAR LOADING AND SPILLAGE

57. As a means for evaluating potential loss of material along the rail line, the rail line must be visually inspected and with photo documentation gathered on a monthly basis. The Permittee must report this data each year in the Annual Report or upon DNR request. DNR will assess material segregation during rail car loading through site visits and inspections.

58. If rail car ore spillage is evident from any monthly inspection and surface water sampling indicates any increase in constituent of concern loading, and upon DNR request, the Permittee must submit a spilled ore prevention plan, including an implementation schedule and protective mitigation measure(s), within 45 days to the DNR for review and approval.

59. If spillage results in unacceptable effects on fugitive dust emissions, these must be accounted for in the Fugitive Emission Control plans.

AREAS OF CONCERN

60. Changes to, or identification of new, Areas of Concern (AOC) subject to MPCA requirements within the mining area must be discussed in Permittee's annual report.

OPERATIONAL PLANS

61. Permittee must provide detailed operational plans to the DNR for review and approval at least 90 days prior to ground disturbance in the affected portion of the mining area.

ORE PROCESSING DEVIATIONS

62. At least 90 days prior to implementation, the Permittee must report any deviation from the processing of the ore that would result in chemical or physical changes to the resultant tailings generated compared with the tailings proposed in the Application to the DNR for review and approval. This report must include detailed analysis (which may include modeling) of potential impacts to environmental conditions (e.g., water quality, tailings deposition, tailings chemical composition, etc.). Any such changes may necessitate a permit amendment.

REPORTING OF DUSTY CONDITIONS UNDER FUGITIVE EMISSION CONTROL PLANS

63. The Permittee must report to the DNR any instance where Dusty Conditions persist, as specified in the Fugitive Emission Control plans for the entire mining area.

NON-MECHANICAL WATER TREATMENT SYSTEM PLAN

64. The Permittee's reclamation plan includes mechanical treatment. To further evaluate the goal of non-mechanical water treatment, the Permittee must develop a plan for investigation, design, and pilot testing of non-mechanical water treatment systems. The Permittee must provide this plan to the DNR for review and approval prior to Mine Year 1.

65. Upon DNR approval of the non-mechanical water treatment system plan, the Permittee must provide financial assurance sufficient for the DNR to implement the plan to evaluate non-mechanical water treatment in the event of unplanned closure.

MITIGATION OF ANY EFFECTS FROM NORTHWARD GROUNDWATER FLOW

66. Prior to blasting within any mine pit footprint, the Permittee must submit a report and supporting data assessing the potential for current and future northward groundwater flow at the Mine Site. If the DNR concludes that this report, or other monitoring data, indicates a reasonable likelihood of northward groundwater flow at the Mine Site, then the DNR will require adaptive management or mitigation.

67. Any required management or mitigation must be approved by the DNR.

MINE PIT BENCHES

68. If the separation of mine pit benches is designed to be greater than the recommendations in the "Recommendations for NorthMet Open Pit Rock Slope Designs NorthMet Mine Project" (Golder 2006) report (Reference 8 of the Application), then the Permittee must submit a geotechnical slope stability plan and results to the DNR for review at least 30 days prior to implementation. This analysis must be submitted prior to blasting at a greater bench separation than recommended in said report.

69. If mine pit benches are planned to be removed and the resulting separation between remaining mine pit benches would be greater than the recommendations in the "Recommendations for

NorthMet Open Pit Rock Slope Designs NorthMet Mine Project" (Golder 2006) report (Reference 8 of the Application), then the Permittee must submit a geotechnical slope stability plan and results to the DNR for review at least 30 days prior to implementation. This analysis must be submitted prior to blasting that would create bench separation greater than recommended in said report.

70. When any of the mine pits has reached its final pit shell contours, the Permittee must submit a report detailing the pit shell contours and pit slope stability to the DNR for review in the next annual report.

CATEGORY 1 WASTE ROCK STOCKPILE COVER INSTALLATION

71. Notwithstanding the anticipated timeline in the Application, installation of the Category 1 waste rock stockpile cover must begin once the DNR determines that a large enough portion of the stockpile has reached the maximum height of the permanent Category 1 Waste Rock Stockpile. The DNR will provide a minimum of one year's advance notice to Permittee of the need to begin installation of the cover. The Permittee's anticipated timeline for cover installation must be updated in its annual reports.

SEALING OF EXPLORATORY BOREHOLE LOCATIONS

72. Annual exploration or drilling locations must be reported in the Permittee's annual reports.

73. Unless otherwise approved by the DNR, exploratory borehole in the mining area must be temporarily or permanently sealed as determined by the DNR.

FENCING

74. Fences are auxiliary facilities that the Permittee must reclaim, unless fence installation or maintenance is required by the St. Louis County Mine Inspector.

75. The effective fenceline of the ambient air boundary will entail various potential access control measures. Any necessary approvals under the Wetland Conservation Act must be obtained prior to impact of any wetland for all fencing or any other access control measures.

MINE PIT FLOODING WITH UNTREATED WATER FROM COLBY LAKE

76. Untreated Colby Lake water must not be used to flood mine pits without all required regulatory approvals.

CLOSURE TAILINGS BASIN EMERGENCY SPILLWAY

77. Upon final design of the emergency spillway required at closure, the Permittee must submit to the DNR for review and approval reclamation cost estimates and associated financial assurance for construction and long term maintenance of the spillway.

ADDITIONAL AUXILIARY FACILITIES

78. With the exceptions of plant roads, fences, and sheds, and prior to construction, the Permittee must submit to the DNR for review and approval final drawings for any auxiliary facilities not shown or discussed in the Application. The mining area will be modified accordingly after DNR review and approval. A permit amendment may be required prior to construction.

DUNKA ROAD RECLAMATION

79. When the final design for Dunka Road is confirmed, Permittee's reclamation plans must be revised accordingly to account for any portions of Dunka Road that are modified by the Permittee.

ADAPTIVE WATER MANAGEMENT REVIEW PROCESS

80. Within 90 days of permit issuance, the Permittee must submit to the DNR for review and approval a more detailed and revised adaptive water management review process plan. The process would be implemented if water quality objectives are not met or if an issue is identified with water quantity such that adaptive management systems can be implemented prior to reaching a water quality limit. The process plan must include at least the process by which the monitoring, modeling, and review cycle will be implemented.

ROAD RECLAMATION

81. Once a road is no longer needed for its original purpose or for long term monitoring or maintenance, the Permittee must fully reclaim the road.

EAST PIT HIGHWALL

82. The Permittee must, using all relevant accumulated data and model verification results, determine if alternate closure plans are required for the portion of the East Pit that will remain above the water table on the north side of the pit. Permittee must prepare a verification of East Pit closure workplan for DNR review and approval at least two years prior to the anticipated start of backfilling the East Pit. The workplan must include any data analyses or modeling to demonstrate that the closure of the East Pit will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources.

83. The Permittee must provide to the DNR the results of the analyses conducted under the approved verification of East Pit closure workplan for review and approval prior to the start of backfilling the East Pit.

LEGACY AUXILIARY FACILITIES

84. Existing, legacy, auxiliary facilities that will not be used for the NorthMet project but that are part of the Permittee's legacy assets within the mining area will be removed and the sites reclaimed within three years of permit issuance.

MINE PLANT PIPELINE MONITORING AND SPILL RESPONSE

85. Within 60 days of completion of construction of the MPP, or prior to use, whichever comes first, the Permittee must provide to DNR for its review the monitoring plan and spill response procedures. The Permittee must provide to DNR any revisions to these plans upon finalization of the plan.

TRANSPORTATION AND UTILITY CORRIDORS BLASTING

86. Prior to blasting in the Transportation and Utility Corridors, the Permittee must provide detailed plans for management of Virginia Formation rock. Use of rock is subject to DNR review and approval prior to blasting.

ADDITIONAL STOCKPILES

87. Permittee must obtain DNR approval and any necessary permit amendments for creation of any additional stockpiles prior to disturbance in that portion of the mining area. This condition does not prevent the stockpiling of material for construction use within 120 days of stockpiling or that is completely contained within the footprints of planned features (e.g., mine pits, stockpiles).

PILOT AND FIELD SCALE TESTING OF BENTONITE AMENDMENT OF TAILINGS FOR POND LINER

88. The Permittee must prepare a bentonite amendment of tailings pond liner workplan for DNR review and approval no later than 90 days following permit issuance. The workplan must include any bench or field scale work, sampling, and analyses necessary to demonstrate to the DNR that the tailings amendment with bentonite for the pond bottom will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources, and function in perpetuity.

89. The Permittee must provide to the DNR the results of the analyses conducted under the approved bentonite amendment of tailings pond liner workplan for review and approval prior to NorthMet tailings deposition.

FUGITIVE EMISSION CONTROL PLANS

90. The Permittee must submit revised versions for DNR review and approval of the i) Fugitive Emission Control Plan: Mine Site and ii) Fugitive Emission Control Plan: Plant Site prior to ground disturbance in that portion of the mining area.

ATTACHMENT 1 TO DRAFT SPECIAL CONDITIONS

RARE NATURAL COMMUNITIES

A. Notwithstanding the Permittee's conclusions set forth in § 12.3 of Appendix 18.1 of the Application, and based upon the best information and data currently available to the DNR, FPn62 – Northern Rich Spruce Swamp is a rare natural community as determined by the DNR's natural heritage program under Minn. R. 8420.0515, subp. 3. There are 225 acres of FPn62 – Northern Rich Spruce Swamp located at the Mine Site.

B. Permittee may request that the DNR reevaluate the designation of FPn62 – Northern Rich Spruce Swamp as a rare natural community through submission of additional information and data to the DNR. The DNR will not change this designation unless additional information and data submitted by the Permittee or from other sources demonstrate, to the satisfaction of the DNR, that this natural community is not rare.

C. In order to i) mitigate any adverse effect on the FPn62 – Northern Rich Spruce Swamp rare natural community and ii) to ensure that the Permittee's mining operations do not permanently adversely affect this natural community, the Permittee must demonstrate to the satisfaction of the DNR, and prior to any impact, that it has mitigated impacts through one or a combination of the following required mitigation activities:

    i. Transfer private lands containing FPn62 – Northern Rich Spruce Swamp to the United States Forest Service as part of the proposed NorthMet project land exchange. Any mitigation under this option will be at a 1:1 ratio.

    ii. Restore previously disturbed or protect currently imperiled FPn62 – Northern Rich Spruce Swamp. Any mitigation under this option will be at a 1:1 ratio.

    iii. Permanently protect FPn62 – Northern Rich Spruce Swamp through placement of a conservation easement or deed restriction over presently unprotected lands with this community type. Any mitigation under this option will be at a 2:1 ratio.

D. The DNR will verify the acreage of impacts to FPn62 – Northern Rich Spruce Swamp. Mitigation will be required for the verified acreage through one, or a combination, of the mitigation activities identified in Section C of this Special Condition.

E. The mitigation required to ensure that the FPn62 – Northern Rich Spruce Swamp rare natural community is not permanently adversely affected is in addition to the wetland mitigation and replacement activities detailed in Appendix 18.1 of the Application.

ATTACHMENT 2 TO DRAFT SPECIAL CONDITIONS

FINANCIAL ASSURANCE

A. GENERAL PROVISIONS

1. The purpose of financial assurance is to ensure that there is a source of funds to be used by the DNR if the Permittee fails to perform:

    (i) reclamation activities including closure and post-closure maintenance needed if operations cease; or

    (ii) corrective action as required by the DNR if noncompliance with design and operating criteria in the Permit to Mine occurs.

    All financial assurance must accord with Minnesota Statutes § 93.49, Minnesota Rules part 6132.1200, and these Special Conditions. The terms used in these Special Conditions shall have the meanings provided in applicable statute and rule.

2. Financial Institutions providing financial assurance must be independent of Poly Met Mining, Inc. and PolyMet Mining Corp., their principal shareholders, and each other ("Permittee and Affiliated Persons"). For purposes of this requirement, a Financial Institution is not independent if it holds more than a 10% interest in another participating entity or more than 10% of its assets are invested in the Permittee and Affiliated Persons. "Financial Institution" includes without limitation, bank, insurance company, or bonding company, or their affiliates.

3. Beginning at Mine Year 1 (MY1), no single Financial Institution may hold more than 34% of the total required financial assurance coverage in the form of an Irrevocable Letter of Credit or Surety or Reclamation Bonds.

4. Acceptable financial assurance instruments include the following: (i) Irrevocable Letter of Credit (ILOC); (ii) Surety or Reclamation Bonds; and (iii) Cash. In addition, Permittee will be required to establish and fund a Trust Fund as outlined in Appendix B – Trust Fund.

5. The specific terms of each financial assurance instrument must be acceptable to the DNR prior to becoming effective.

6. For purposes of these conditions, MY1 refers to the first year of production blasting at any of Permittee's mine pits. References to Mine Years after MY1 refer to the calendar years irrespective of the progress of Permittee's mining activities.

B. ENVIRONMENTAL LIABILITY INSURANCE COVERAGE

7. In addition to the financial assurance provided to DNR, the Permittee must maintain environmental liability insurance coverage during the term of the Permit to Mine that covers both sudden, accidental, or gradual pollutant releases from the mine pits, stockpiles, production facilities, waste water treatment facilities, pipelines, tailings basins, and, when constructed, the hydromet residue facility. Permittee's environmental liability insurance policies must be in a form and amount acceptable to the DNR (collectively "environmental liability insurance").

8. Annually, Permittee must submit an analysis of all potential environmental liabilities in the mining area and an analysis of the commercial availability of environmental liability insurance for such liabilities in the upcoming year. These analyses must submitted to the DNR as part of Permittee's annual report. Permittee must annually update its environmental liability insurance to reflect changes to its potential environmental liabilities in the mining area. At the time of permit to mine issuance the Permittee must provide documentation of a minimum of $10,000,000 in existing environmental liability insurance for the project.

9. One year after tailings are first deposited in the tailings basin, Permittee must evaluate and report on the future environmental liability insurance premium costs that the State of Minnesota could incur in the event of unplanned closure of the project. This evaluation and report must be submitted to the DNR no later than two years after tailings are placed in the tailings basin. This evaluation and report must estimate the environmental liability insurance premium costs that the State of Minnesota might incur due to the conditions anticipated to exist in Mine Years 11, 20, and 50 as identified in the Application, notwithstanding the actual occurrence dates. Permittee must include these premium cost estimates in its annual Financial Assurance Calculations.

10. DNR may require Permittee to provide additional evaluations and reports on the future environmental liability insurance premium costs that the State of Minnesota could incur in the event of unplanned closure.

C. FINANCIAL ASSURANCE CALCULATIONS

11. The amount of required financial assurance must be calculated on an annual basis using the methods set forth in Appendix A – Financial Assurance Calculations.

12. For purposes of the Financial Assurance Calculations:

    a. "Reclamation Costs" are costs associated with the reclamation activities expected to be completed within three years after the planned or unplanned cessation of mining operations. Reclamation Costs must include the addition of a 10% contingency factor. Reclamation Costs will not be discounted to present value. Examples of Reclamation Costs include earthwork and demolition of facilities.

    b. "Long-Term Costs" are costs associated with water treatment, maintenance, and monitoring activities expected to continue for more than three years after the end of mining operations. Long-Term Costs must include the addition of a 15% contingency factor. Long-Term Costs will be discounted to present value assuming an effective discount rate of 2.9%. Examples of Long-Term Costs include mine-site and tailings-basin water treatment, monitoring, and maintenance.

    c. "Year" refers to a calendar year, ending on December 31. For discounting purposes, annual costs must be discounted from mid-year.

D. FINANCIAL ASSURANCE – SURETY OR RECLAMATION BONDS

13. Surety or Reclamation Bonds used as financial assurance instruments must meet the following requirements:

a. Must be backed by Financial Institutions licensed in the State of Minnesota that consent to each of the following: (i) exclusive personal jurisdiction in Minnesota, (ii) exclusive venue in Minnesota, (iii) Minnesota law governs without regard to its conflict of laws rules, and (iv) designation of an authorized agent in Minnesota for service of process and any legal notice or orders.

b. Must be issued by a Financial Institution with (i) a current A.M. Best Rating of A- or better,

(ii) a Standard & Poor's insurer's financial strength rating of A or better, or (iii) a better or equivalent rating from another nationally recognized rating service in the United States as approved by the DNR.

c. Must be issued by a Financial Institution that is (i) classified as a Financial Size Category (FSC) of IX or greater (currently requires an adjusted policyholders' surplus of $250 million or better) or (ii) separately approved by the DNR.

d. Must be written to pay cash to the DNR. Surety or Reclamation Bonds cannot provide that the Financial Institution may complete work in lieu of paying cash to the DNR.

e. Must be written to pay cash to the DNR prior to any settlement in bankruptcy court.

f. Must contain a provision requiring that the Financial Institution will give the DNR at least 120 days' written notice prior to cancellation of the Surety or Reclamation Bond by the Financial Institution.

g. Must make funds available and payable to the DNR upon forfeiture in accordance with Minnesota Rule 6132.1200.

E. FINANCIAL ASSURANCE - IRREVOCABLE LETTERS OF CREDIT (ILOC)

14. ILOCs used as financial assurance instruments must meet the following requirements:

a. Must be backed by Financial Institutions that that consent to each of the following: (i) exclusive personal jurisdiction in Minnesota, (ii) exclusive venue in Minnesota, (iii) Minnesota law governs without regard to its conflict of laws rules, and (iv) designation of an authorized agent in Minnesota for service of process and any legal notice or orders.

b. Must be backed by a Financial Institution with (i) the rating of A- or better by Standard & Poor's, or (ii) equivalent rating from another nationally recognized rating service in the United States as approved by the DNR.

c. The DNR must be the sole beneficiary of any ILOC used for financial assurance.

d. Must contain a provision requiring that the Financial Institution give the DNR at least 120 days' written notice prior to cancellation of the ILOC by the Financial Institution.

e. Must include language stating that the ILOC is not an asset of the Permittee in the event of a bankruptcy proceeding.

f. Must have provisions to automatically extend the ILOC period ("Evergreen Provisions").

g. Must make funds available and payable to the DNR upon forfeiture in accordance with Minnesota Rule 6132.1200.

F. FINANCIAL ASSURANCE – TRUST FUND

15. Permittee must fund a Trust Fund as outlined in Appendix B to cover Long-Term Costs.

16. All terms of the Trust Agreement governing the Trust Fund must accord with the requirements identified in Appendix B.

G. REQUIRED AMOUNTS OF FINANCIAL ASSURANCE

17. Prior to issuance of the Permit to Mine, the Permittee:

    a. Must provide to the DNR a total of $75,000,000 of financial assurance in the form of Surety or Reclamation Bonds, ILOCs, or cash for coverage of liabilities associated with (i) the construction of the project, and (ii) the legacy reclamation costs associated with the facilities within the former LTVSMC plant site and tailings basin acquired by Permittee from Cliffs Erie, L.L.C.; and

    b. Must deposit a minimum of $10,000,000 cash into the Trust Fund described in Appendix B. This $10,000,000 is part of the $75,000,000 financial assurance required under 17a.

18. Prior to production blasting in the mine area, the Permittee must adjust the amount of financial assurance coverage to ensure that financial assurance is always equivalent to the total expected liabilities in the upcoming two years, as approved by the DNR. Permittee must adjust its financial assurance in this fashion on an annual basis for each subsequent mine year until one year before the project has reached its maximum financial assurance obligation (expected in MY11 under the current mine plan). After this milestone, the financial assurance must be adjusted annually to provide the required financial assurance for total expected liabilities in the upcoming year.

    - For example, at the start of MY1, Permittee must provide the amount of required financial assurance for total expected liabilities in MY2. Based on the Permittee's current mining plan, the total of Reclamation Costs plus Long Term Costs for MY1 and MY2 are expected to be

      $544,000,000 and $588,000,000, respectively. The actual financial assurance amounts are subject to change based on the specific Financial Assurance Calculations for the relevant mine years, as calculated with the methods presented in Appendix A.

    - For example, at the start of the year in which the project reaches its maximum financial assurance obligation, Permittee must provide the amount of financial assurance for the total expected obligations for the upcoming year. Based on the Permittee's current mining plan, the total of Reclamation Costs plus Long Term Costs at the start of MY11 is $1,039,000,000. The actual financial assurance amounts are subject to change based on the specific Financial Assurance Calculations for the relevant mine years, as calculated with the methods presented in Appendix A.

19. Beginning at MY1, the Permittee must contribute a minimum of $2,000,000 cash per year to the Trust Fund until MY9. Annual contributions must be made no later than December 31 each year.

During this period, any earnings in the Trust Fund do not reduce or otherwise offset Permittee's minimum annual contribution to the Trust Fund.

20. Beginning no later than the start of MY9:

    a. Permittee must commence a ramp up of cash in the Trust Fund through contributions made on an annual basis through the end of MY18. Annual contributions must continue until the value of the Trust Fund has reached the calculated amount needed at MY19 to ensure that the Trust Fund will remain fully funded to cover the Long-Term Costs, assuming an effective discount rate of 2.9%. Based on Permittee's current mining plan, this calculated value at MY19 is expected to be $580,000,000. The actual amount is subject to change based on actual costs calculated at that time, in accordance with the methods presented in Appendix A.

    b. Permittee's minimum annual cash contribution to the Trust Fund during the ramp-up period must be determined by subtracting the current value of the Trust Fund from the calculated value needed in the Trust Fund at MY19 as described in 20.a., and divided by the number of years remaining in the ramp-up period.

        - For example, current analysis indicates that the Trust Fund needs $580,000,000 at MY19 to ensure payment of all Long-Term Costs. If the ramp-up period begins at the start of MY9, then the Trust Fund would have a balance of approximately $26,000,000, and there would be 10 years of ramp-up to MY19. Permittee's minimum annual cash contribution would therefore be ($580M - $26M)/10 = $55.4 M that year. Permittee's annual contribution would be calculated annually during the ramp-up period and these annual calculations must use the then-current value of the Trust Fund and the contribution necessary to meet the MY19 goal.

    c. On an annual basis, the Permittee must conduct an analysis of Long Term Costs at MY19 utilizing the methods described in Appendix A. The amount required in MY19 to ensure that the Trust Fund will remain fully funded to cover Long-Term Costs may increase or decrease as Long-Term Costs are adjusted under this analysis.

H. REQUIRED CASH OR CASH EQUIVALENTS

21. During mining, a portion of the Permittee's required financial assurance must be held in Cash or Cash Equivalents. "Cash or Cash Equivalents" means the combination of (i) funds held in the Trust Fund; (ii) cash deposited with the DNR; and (iii) ILOCs.

22. During mining, the portion of financial assurance that must be in Cash or Cash Equivalents is as follows:

    a. Beginning prior to MY1 and ending at the beginning of the year of maximum financial assurance obligation (currently estimated to be MY11), at least 1/3 of the required financial assurance calculated using the methods set forth in Appendix A for the upcoming year plus $15,000,000 must be in Cash or Cash Equivalents.

        - For example, the current calculated Financial Assurance Costs at MY1 is $544,000,000. Accordingly, $196.3M, i.e., ($544M/3) +$15M, of Permittee's financial

assurance must be in Cash or Cash Equivalents at MY1. The actual financial assurance amounts are subject to change based on the specific Financial Assurance Calculations for the relevant mine years, as calculated with the methods presented in Appendix A

b. Beginning prior to the start of the year of maximum financial assurance obligation (currently estimated to be MY11) and until the Trust Fund is fully funded to cover the Long-Term Costs at MY19, the minimum amount of financial assurance that must be in Cash or Cash Equivalents is the amount needed to yield a Trust Fund that will be fully funded to cover the Long-Term Costs at year MY19 (currently estimated at $580,000,000), assuming an effective discount rate of 2.9%, plus $15,000,000.

- For example, the amount needed in the Trust Fund at MY11 to yield $580,000,000 at MY19 at a 2.9% return is $461,430,000. Accordingly, at least $476,430,000 of the required financial assurance must be in the form Cash or Cash Equivalents at MY11. The actual financial assurance amounts are subject to change based on the specific Financial Assurance Calculations for the relevant mine years, as calculated with the methods presented in Appendix A

I. RELEASE OF FINANCIAL ASSURANCE

23. Upon demonstrating the completion of reclamation activities to the satisfaction of the DNR:

    a. The DNR must release the Permittee from the obligation to maintain financial assurance for the Reclamation Costs associated with the completed reclamation activities.

24. Upon demonstrating the completion of all reclamation activities to the satisfaction of the DNR:

    a. The Permittee remains responsible for maintaining compliance at the mining area and for conducting all necessary water treatment, maintenance, and monitoring in accordance with the closure plan under the Permit to Mine.

    b. The Trust Fund will continue as long as needed, so as to provide a source of funds to the DNR for Long-Term Costs in the event that the Permittee fails to meet long-term treatment, maintenance, and monitoring requirements.

    c. All releases from the Trust Fund must be in accordance with terms of the Trust Agreement outlined in Appendix B.

J. FORFEITURE OF FINANCIAL ASSURANCE

25. Financial assurance can be accessed by the DNR upon any of the following defaulting events:

    a. Permittee's filing for bankruptcy protection.

    b. Permittee's failure to (i) maintain required financial assurance, (ii) maintain required environmental liability insurance, or (iii) make a complete and timely required deposit into the Trust Fund.

c. Permittee's uncorrected violations of the Permit to Mine, Contingency Reclamation Plan, or Corrective Action Plan.

d. Permittee's failure to provide a replacement Surety or Reclamation Bond after notification of non-renewal.

26. The DNR may access financial assurance as follows:

a. DNR must serve an order to forfeit the financial assurance on the person, Financial Institution, or trustee holding the financial assurance and serve a notice of measures required to correct the situation and the time available for correction on the Permittee.

b. If the conditions that provided grounds for the order to forfeit are corrected within a period established by the DNR and if measures approved by the DNR are taken to ensure that the conditions do not recur, then the order to forfeit must be canceled. If the conditions that provided grounds for the order to forfeit are not corrected, then the DNR must proceed with accessing and expending the financial assurance funds to implement the Contingency Reclamation or Corrective Action Plans.

c. After the DNR has provided notice and served an order to forfeit in accordance with 26.a and 26.b, the DNR shall have the unconditional right to withdraw all or any financial assurance funds, without any requirement to seek recourse to judicial proceedings and without demand, appraisal, advertisement, or additional notice of any kind to Permittee.

K. FINANCIAL ASSURANCE REPLACEMENT

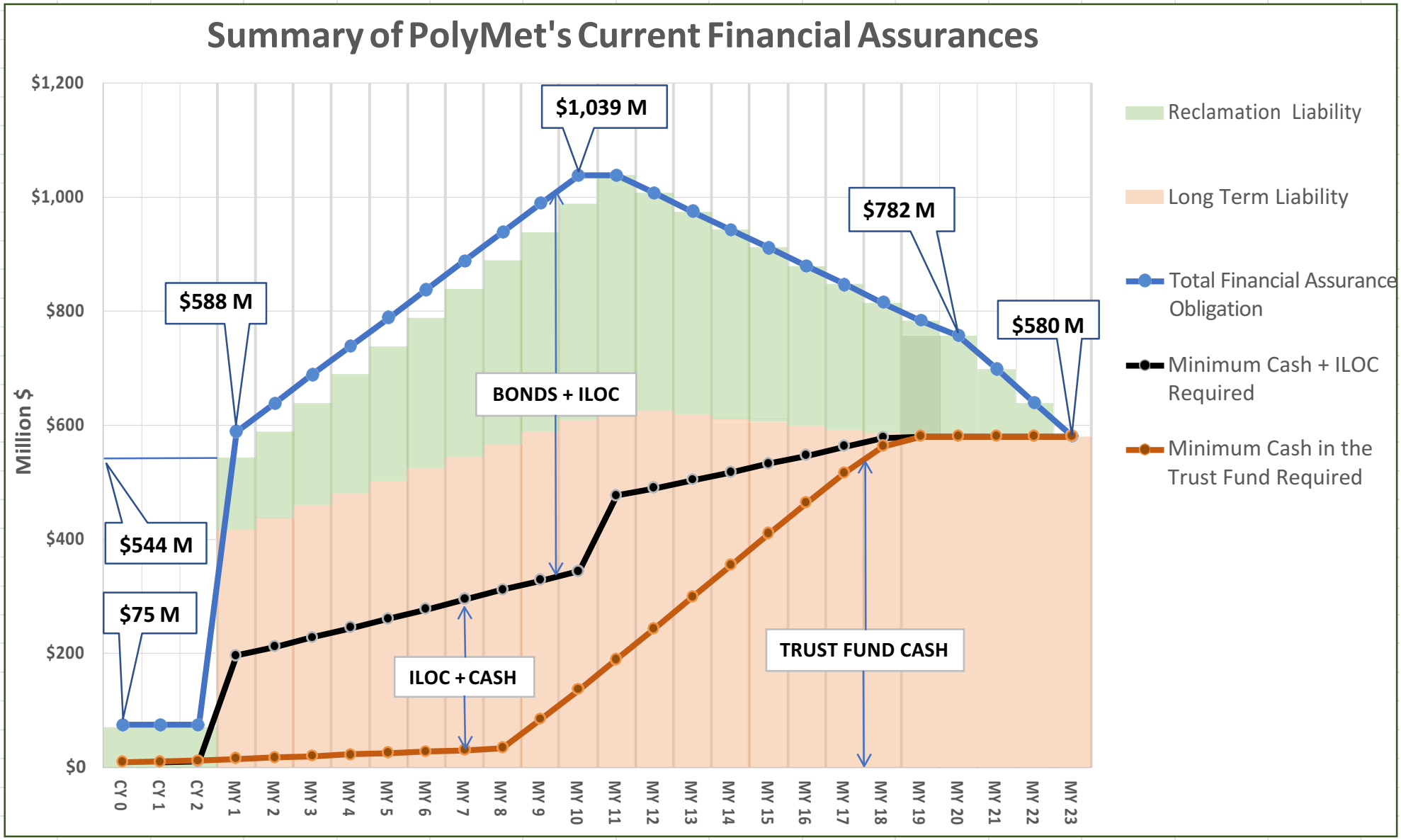
27. Upon the incapacity of any Financial Institution providing financial assurance, by reason of bankruptcy, insolvency, or suspension or revocation of a charter or license, or ratings downgrade, Permittee will be considered to be without required financial assurance. The DNR will determine if such event has occurred and, upon making such determination, DNR will provide Permittee written notice of such determination and require that Permittee immediately provide replacement financial assurance acceptable to the DNR.

L. AMENDMENT TO FINANCIAL ASSURANCE REQUIREMENTS

28. The Special Conditions set forth herein may be amended in the event of an amendment to the Permit to Mine.

Appendix A
Financial Assurance Calculations

Contents


Summary of PolyMet's Current Financial Assurances
$1,200
$1,000
$800
$600
$400
$200
$0
Million $
$1,039 M
$782 M
$588 M
$580 M
$544 M
$75 M
BONDS + ILOC
ILOC + CASH
TRUST FUND CASH
CY 0
CY 1
CY 2
MY 1
MY 2
MY 3
MY 4
MY 5
MY 6
MY 7
MY 8
MY 9
MY 10
MY 11
MY 12
MY 13
MY 14
MY 15
MY 16
MY 17
MY 18
MY 19
MY 20
MY 21
MY 22
MY 23
Reclamation Liability
Long Term Liability
Total Financial Assurance Obligation
Minimum Cash + ILOC Required
Minimum Cash in the Trust Fund Required

Appendix A-1

Financial Assurance Calculations - Construction Period

Construction Period financial assurances are calculated based on three components:

1. Legacy reclamation costs
2. Legacy long term costs
3. Construction reclamation costs

Spreadsheets detailing these cost estimates are attached. The methods used to develop these spreadsheets include:

- Obtaining estimates from qualified contractors for many tasks. These estimates will need to be updated by the contractor, every year.
- Discounting long term costs to the Net Present Value at a 2.9% discount rate. Reclamation costs to be incurred within three years are not discounted.
- Assuming all work will be completed by third party contractors.
- No credit is assigned for the scrap value of the demolished buildings. No disposal costs are included since it is assumed that building materials will be used for scrap rather than landfilled.
- All costs are 2016 costs. For future updates, costs need to reflect current costs at the time.

Attachments referenced in the tables, along with additional supporting information can be found in the Permit to Mine application (See Appendix 15).

The Construction Period financial assurance requirements are summarized in Table 1.

Table 1. Construction Period Financial Assurance

Legacy reclamation costs	$45,143,496
Legacy long term costs	$13,269,809
Construction reclamation costs	$16,271,537
Total Financial Assurance	**$74,684,842**

Legacy Reclamation Costs

Appendix A-1 Legacy Reclamation Cost Estimate

Includes Demo of Legacy Buildings with Abatement and AOCs

	support tabs	Cash $	NPV $	Note	30 Yr Tot	2.9% NPV	Start 01/01/18	Bankruptcy 07/01/18	07/01/19	07/01/20	07/01/21
							1		2	3	4
							Oper	Hold			
						Calendar Year	2018		2019	2020	2021
Legacy Ferrous Total with Indirects		$45,143,496	$41,848,774								
Contingency	10.0%	$4,103,954	$3,804,434								
Adaptive Management	2.0%	$0	$0								
Engineering Redesign	2.0%	$0	$0								
Prime Contractor Markup	2.5%	$1,025,989	$951,108								
Mobilization	4.0%	$0	$0	included in pricing							
Legacy Ferrous Total (no Indirects)		$41,039,542	$38,044,340		41,039,542	38,044,340					
Plant Site		$41,039,542	$38,044,340								
Demo and Abatement		$33,897,717	$31,386,895								
Legacy Structure Removal											
Area 1 Shop Buildings	Demo	$448,916	$430,123		448,916	430,123	0	0	448,916	0	0
Area 2 Shop Buildings	Demo	$556,827	$533,517		556,827	533,517	0	0	556,827	0	0
Main Plant Area - Demoed in Construction	Demo	$1,655,350	$1,541,233		1,655,350	1,541,233	0	0	0	1,655,350	0
Main Plant Area	Demo	$19,888,937	$18,521,989		19,888,937	18,521,989	0	0	4,972,234	9,944,469	4,972,234
Main Gate Colby PH Ad Bldg	Demo	$243,170	$220,026		243,170	220,026	0	0	0	0	243,170
Roads	Demo	$660,000	$597,183		660,000	597,183	0	0	0	0	660,000
Railroads	Demo	$380,000	$343,832		380,000	343,832	0	0	0	0	380,000
Power System	Demo	$97,810	$88,501		97,810	88,501	0	0	0	0	97,810
Piping System	Demo	$2,879,000	$2,604,983		2,879,000	2,604,983	0	0	0	0	2,879,000
Legacy Asbestos Abatement											
Area 1 Shop Buildings	Demo	$98,350	$94,233		98,350	94,233	0	0	98,350	0	0
Area 2 Shop Buildings	Demo	$167,350	$160,344		167,350	160,344	0	0	167,350	0	0
Main Plant Area	Demo	$5,962,607	$5,473,327		5,962,607	5,473,327	0	0	0	2,981,304	2,981,304
Main Gate Colby PH Ad Bldg	Demo	$859,400	$777,604		859,400	777,604	0	0	0	0	859,400
Other		$7,141,825	$6,657,444								
AST Removal	AST	$223,625	$214,264		223,625	214,264	0	0	223,625	0	0
AOCs	AOC	$6,918,200	$6,443,181		6,918,200	6,443,181	0	0	2,283,006	2,352,188	2,283,006

Legacy Remediation - Areas of Concern (AOC) - costs from detailed spreadsheets by NTS [2016] (see Attachment G)

Heavy Border with Bold Amounts are used in Reclamation Estimates

		Cost Per Phase/Task (see separate sheet for details and assumptions)					
AoC No.	WBS No.	Site Name	Phase I ESA/ SAP	Implement SAP	Complete Phase II	Remediation	Total Cost
01	731-1	Area 1 Shops	$7,500	$208,615	$235,615	$380,000	$831,730
06	731-2	Oily Waste Disposal Area	$7,500	$53,190	$100,450	$73,270	$234,410
07	731-3	Bull Gear Disposal	$7,500	$35,600	$0	$0	$43,100
09	731-4	Railroad Panel Yard	$0	$0	$23,010	$1,352,397	$1,375,407
10	731-5	Airport	$7,500	$29,180	$57,580	$60,240	$154,500
11	731-6	Stoker Coal Ash Disposal	$7,500	$30,180	$38,868	$245,120	$321,668
13	731-7	2001 Storage Area	$7,500	$29,180	$57,580	$0	$94,260
14	731-8	Sandblasting and large Equipment Painting Area	$7,500	$57,796	$29,460	$43,570	$138,326
35	731-9	Dunka Water Treatment Plant Sludge	$4,000	$20,800	$37,800	$0	$62,600
37	731-10	Line 9 Area 5 Petroleum Contaminated Soil	$7,500	$0	$0	$0	$7,500
38	731-11	Area 2 Shops	$0	$0	$242,110	$179,796	$421,906
40	731-12	Heavy Duty Garage	$7,500	$21,000	$40,000	$0	$68,500
42	731-13	Bunker C Tank Farm (inc asbestos abatement)	$0	$0	$0	$915,000	$915,000
43	731-14	Administration Building	$7,500	$20,600	$0	$0	$28,100
44	731-15	Main Gate Vehicle Fueling Area	$7,500	$17,000	$34,900	$24,200	$83,600
46	731-16	Plant Site and General Shops	$7,500	$59,344	$189,760	$644,690	$901,294
47	731-17	Tailings Basin Reporting	$7,500	$0	$0	$0	$7,500
48	731-18	Booster Pump House with Transformer	$7,500	$20,900	$38,700	$0	$67,100
49	731-19	Coarse Crusher Petroleum Contaminated Soil	$7,500	$16,700	$35,100	$0	$59,300
51	731-20	Tailings Basin Salvage and Scrap Areas	$7,500	$83,308	$22,450	$408,244	$521,502
52	731-21	Cell 2W Salvage Area	$7,500	$21,000	$0	$0	$28,500
53	731-22	Hornfels Burial	$7,500	$0	$0	$0	$7,500
59	731-23	Colby Lake Pumping Station	$7,500	$21,000	$0	$0	$28,500
61	731-24	Pellet Plant	$7,500	$98,926	$58,425	$258,546	$423,397
	Totals		$154,000	$844,319	$1,241,808	$4,585,073	$6,825,200
		MPCA Coordination Trans 1			$4,024,183	1.5%	$62,000
		MPCA Coordination Trans 2			$2,801,017	1.1%	$31,000
							$6,918,200

Demo Estimate from Lakehead/Rachel, Mavo and Arrowhead Consulting & Testing	Lakehead / Rachel 2016 (Attachments E and F)						Mavo 2016 (Attachment C)	Arrowhead Consulting & Testing 2016 (Attachment D)		
Scope of Work Description	Universal Waste Collection	Galbestos Removal	Demolition	Total Demo	Site Restoration	Recovery (not used - see Summary Scrap Value tab))	Asbestos Lead Paint Mold	Pre Demo Insp	Demo To Rollup	Abatement To Rollup
Pre-Demolition Services										
Legacy with construction				$1,650,850	$4,500	$1,125	$20,500	$4,800	$1,655,350	$25,300
Additive Building & Heating Plant				$1,593,300			Included in Lakehead's total demo			in Main Plant Area below
Bentonite silos				inc in above			n/a			
Area 2 Water Tower (price separate from Heating & Additives buildings)			$30,000	$30,000	$2,500	$1,125	n/a			
Legacy Tailings Basin Buildings - Demoed as part of construction										
Foreman's Office (Bldg. 718)			$9,350	$9,350	$400		$6,500	$1,100		
Reporting Building (Bldg. 719)			$9,900	$9,900	$400		$6,500	$1,100		
Lube House (Bldg. 720)			$2,500	$2,500	$400		$2,500	$850		
Reporting Building (Bldg. 724)			$3,300	$3,300	$400		$2,500	$900		
Lube Oil Building (Bldg. 725)			$2,500	$2,500	$400		$2,500	$850		
Legacy Area 1				$351,597	$97,319	$41,000	$97,500	$850	$448,916	$98,350
Area 1 Shop and Truck Storage (Bldg. 220)	$2,900	$106,900	$103,332	$213,132	$74,669	$37,000	$82,500			
Area 1 Cold Storage (Bldg. 221)	$400	$48,970	$10,860	$60,230	$13,400	$2,800	$5,000			
Area 1 Reporting Building (Bldg. 231)			$9,900	$9,900			$5,000	$850		
Area 1 Boiler House (Bldg. 226)	$200	$13,500	$9,875	$23,575	$3,000	$200	$2,500			
Area 1 Fire Pump House & Water Tank (Bldg. 228)	$410		$11,250	$11,660			$2,500			
Area 1 Locomotive Fueling	$500	$22,500	$10,100	$33,100	$6,250	$1,000				
Legacy Area 2				$474,042	$82,785	$18,315	$164,700	$2,650	$556,827	$167,350
Area 2 Service Shop (Bldg. 201)	$2,200	$160,900	$38,990	$202,090	$37,334	$10,940	$93,050			
Area 2 Truck Storage (Bldg. 202)	$2,000	$63,190	$9,175	$74,365	$13,988	$3,075	$3,000			
Area 2 Cold Storage (204)	$697	$42,560	$13,080	$56,337	$14,100	$1,700	$3,000			
Area 2 Shop Locomotive Service Shop (Bldg. 203)	$3,400	$20,500	$12,300	$36,200	$11,113	$1,625	$52,150			
Area 2 Locomotive Fueling	$2,000	$20,900	$11,800	$34,700	$6,250	$975	$2,500			
Hose House (Bldg. 209) Not to be used in project		$3,000	$9,150	$12,150			$2,500	$850		
Sample House (Bldg. 208) Not to be used in project		$25,400	$20,300	$45,700			$5,000	$950	main plan areas inc tunnels	
Reporting Building (Bldg. 425) Not to be used in project		$3,300	$9,200	$12,500			$3,500	$850	$19,888,937	$5,962,607

Demo Estimate from Lakehead/Rachel, Mavo and Arrowhead Consulting & Testing

	Lakehead / Rachel 2016 (Attachments E and F)						Mavo 2016 (Attachment C)	Arrowhead Consulting & Testing 2016 (Attachment D)		
Scope of Work Description	Universal Waste Collection	Galbestos Removal	Demolition	Total Demo	Site Restoration	Recovery (not used - see Summary Scrap Value tab))	Asbestos Lead Paint Mold	Pre Demo Insp	Demo To Rollup	Abatement To Rollup
Legacy Plant Area				$13,305,631	$3,223,306	$2,890,406	$3,807,340	$2,200	$16,528,937	$3,809,540
Rebuild Shop (Bldg 602)	$3,000	$70,200	$125,600	$198,800	$27,560	$13,940	$85,000			
General Shop (Bldg. 601) Includes Acetylene Building (Bldg.604)	$15,000	$199,190	$353,600	$567,790	$182,300	$113,796	$480,800			
Carpenter Shop (Bldg. 603)	$2,000	$10,200	$13,250	$25,450	$3,300	$100	$2,500			
Coarse Crusher	$10,000	$313,345	$1,551,800	$1,875,145	$593,890	$199,325	$1,070,618			
Drive House 1 conv and housings	$7,500	$165,569	$141,540	$314,609	$46,900	$41,050	incl. in above			
Drive House 2 inc conv and housings		inc in above	inc in above	inc in above	inc in above	inc in above	incl. in Fines Crusher			
Fine Crusher	$45,000	$302,430	$1,373,460	$1,720,890	$203,400	$205,250	$439,686			
Warehouse 49 (Bldg. 920)	$6,500	$27,586	$82,800	$116,886	$15,947	$5,350	$49,000			
Warehouse 45 (Bldg. 921, Electrical)	$2,500	$35,159	$72,700	$110,359	$15,947	$3,590	$13,500			
Lube House (Bldg. 926)	$578	$17,000	$20,550	$38,128	$7,385	$1,600	$52,000			
Rubber Shop (Bldg. 605)	$1,000	$30,464	$36,550	$68,014	$11,269	$5,150	$24,000			
Concentrator Building and Thickeners	$100,000	$1,248,260	$5,895,850	$7,244,110	$1,145,998	$2,141,430	$1,535,236			
A-Lab	$500	$9,400	$14,560	$24,460	$2,940	$2,450	included in Concentrator			
Hinsdale Bridge	$0	$16,700	$616,300	$633,000	$15,200	$148,500	n/a			
Water Reservoir	$5,000		$98,100	$103,100	$914,400	$7,750	n/a			
Plant Site Water Tower			$30,000	$30,000	$2,500	$1,125	n/a			
Water Treatment Plant & Storage Tanks	$1,000	$20,000	$72,600	$93,600	$2,250		$45,000			
Colby Pump House (potential deduct depends on variance request)		$41,000	$8,260	$49,260	$1,500		$2,500	$1,000	$50,760	$3,500
Ad Building inc UST	$3,900		$157,935	$161,835	$18,200		$850,000		$180,035	$850,000
Main Gate	$100		$11,400	$11,500	$875		$5,000	$900	$12,375	$5,900
Booster Pump House #1	$300		$23,500	$23,800	$9,200		included in Concentrator		$243,170	$859,400
Sewage Treatment Plant	$0		$62,700	$62,700	$19,520		$5,000	$900		
Portable Pump Houses	$0		$9,890	$9,890	$3,400		n/a			
Return Water Barge	$0		$44,900	$44,900			$5,000	$1,300		
General Infrastructure (railroads, tunnels, roadways, etc)					$1,504,000	$237,500			$1,504,000	
Legacy Railroads	$0		$380,000	$380,000					$380,000	
Legacy Tunnels	$0		$1,856,000	$1,856,000			$2,127,767		$1,856,000	$2,127,767
Galleries							included in Concentrator			
Sanitary Systems and Wells			$17,500	included in associated areas						
Pipelines					$591,000				$2,879,000	
Colby Lake Pipeline (potential deduct depends on variance request)			$900,000	$900,000	$98,000					
Inter-Pit Pipeline from Reservoir to Areas 1 & 2			$562,000	$562,000						
Natural Gas Pipeline Removal			$150,000	$150,000						
Legacy PipeLines Tailings management above ground			$378,000	$378,000						
Legacy PipeLines Tailings management below ground			$200,000	$200,000						
Legacy Power Lines	$0		$97,810	$97,810					$97,810	
Legacy Roads/Parking Lots	$0		$465,000	$465,000	$195,000				$660,000	

Demo Estimate from Lakehead/Rachel, Mavo and Arrowhead Consulting & Testing

Scope of Work Description	Lakehead / Rachel 2016 (Attachments E and F) Universal Waste Collection	Galbestos Removal	Demolition	Total Demo	Site Restoration	Recovery (not used - see Summary Scrap Value tab))	Mavo 2016 (Attachment C) Asbestos Lead Paint Mold	Arrowhead Consulting & Testing 2016 (Attachment D) Pre Demo Insp	Demo To Rollup	Abatement To Rollup
New - Phase 1 - Plant Site				$2,190,000	$689,000					
Flotation Plant and Reagent Building	$75,000		$621,800	$696,800	$147,600	$242,500			$844,400	
Concentrate Storage and Loadout Facility	$12,000		$273,760	$285,760	$48,100	$37,500			$333,860	
Plant Site Sewage Treatment Plant	$1,000		$118,000	$118,000	$30,000				$148,000	
Railroads	$0		$185,000	$185,000	$111,000				$296,000	
Pipelines	$0		$1,555,000	$1,555,000	$375,000				$1,930,000	
Power Lines	$0			$0	$0				$0	
Roads and Parking Lots	$0			$0	$0				$0	
Plant Site Wastewater Treatment Plant (WWTP) Ponds not included	$0		$245,000	$245,000					$245,000	used long term
New - Phase 1 - Mine Site										
Maintenance Service and Fueling Facility	$1,100		$19,210	$20,310	$7,300	$1,200			$27,610	
Rail Transfer Hopper	$1,100		$40,000	$41,100	$45,000	$1,200			$86,100	
Rail Transfer Hopper Control Bldg	$100		$18,600	$18,700					$18,700	
Rail Transfer Hopper Platform			$60,000	$60,000					$60,000	
Central Pumping Station	$500		$14,000	$14,500	$1,200				$15,700	
Railroads	$0		$45,000	$45,000	$33,750				$78,750	
Pipelines	$0		$580,133	$580,133	$217,000				$797,133	
Power Lines	$0		$83,900	$83,900	$0	$7,175			$83,900	
Roads and Parking Lots	$0		$392,000	$392,000	$132,000				$524,000	
Mine Site Wastewater Treatment Facility (WWTF)	$0		$498,000	$498,000	$14,000				$512,000	
New - Phase 2				$10,735,100	$97,375					
Reagent Building	$15,000		$820,000	$835,000	$4,100	$22,500				
Oxygen Plant	$65,000		$4,238,600	$4,303,600	$16,600	$72,500				
Limestone Preparation	$7,500		$345,000	$352,500	$1,750	$12,500				
Hydrometallurgical Plant	$49,000		$4,365,000	$4,414,000	$13,500	$62,500				
Hydrometallurgical Reagents	$15,000		$815,000	$830,000	$2,200	$17,500				
Railroads	$0									
Pipelines	$0		$1,450,000							
Power Lines	$0									
Roads and Parking Lots	$0		$156,000		$59,225					

	Lakehead	Mavo
Totals	$31,155,813	$7,087,707
Mine Site	$2,203,893	$0
less Mine Site	$28,951,920	$7,087,707

Demo Estimate for Above Ground Storage Tanks from Lakehead Rachel

Heavy Border with Bold Amounts are used in Reclamation Estimates						Lakehead / Rachel 2016 (Attachments E and F)				
Name	Tank #	Fluid	Gallons	Location	Fluid Removal/ Disposal	Demolition/ Removal	Site Restoration	Asbestos Lead Paint	Assets Recovery	Notes
Legacy - Area 1 Shop					$0	$24,100	$3,000	$0		
Portable tank on skids (silver)	048	Fuel Oil	1,800	E of Area 1 Shop		$600				Out of Service - Disconnected, Labeled lube oil, Silver tank
Storage Tank	080		20,000	Area 1 - South of Rail Road Grade		$1,000				BASIS: Costs based on conceptual plan, site experience and historical knowledge.
Storage Tank	358	Used Anti-freeze		N. Side Area 1 Shop		$0				Included as part of Area 1 Shop demo
Storage Tank	420	Used Anti-freeze		N. Side Area 1 Shop		$0				Included as part of Area 1 Shop demo
Black Tank	n/a		20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	
Black Tank	n/a		20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	
3 Blue			20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	Out of Service. Disconnected, Labeled "save for conc."
Locomotive Fueling		# 1,2 Fuel Oil		West end of Panel Yard		-				This tank is no longer on site.
Legacy - Area 2 Shop					$0	$0	$0	$0		
Locomotive Fueling		# 1,2 Fuel Oil								
Legacy - Plant Area					$0	$199,525	$25,700	$0		
Storage Tank	015	# 1,2 Fuel Oil	12,000	E. Side Concentrator		$600				
Storage Tank	032	# 2, 6 Fuel Oil	3,384,000	Tank Farm		$62,000	$8,100.00		$40,000.00	
Storage Tank	033	# 6 Fuel Oil	3,384,000	Tank Farm		$62,000	$8,100.00		$40,000.00	
Storage Tank	034	# 6 Fuel Oil	3,384,000	Tank Farm		$62,000	$8,100.00		$40,000.00	
Storage Tank	304	Mineral Oil	12,000	E. Side Concentrator		$600				
Storage Tank	305	Mineral Oil	12,000	E. Side Concentrator		$600				
Storage Tank	306	Mineral Oil	12,000	E. Side Concentrator		$600				
Storage Tank	408	Lube oil	20,000	SW of Tailings Basin Reporting Area		$0				Out of Service, but piping still in place and no signs are posted
Storage Tank	421	Alcohol	10,000	E side Concentrator		$500				
Storage Tank	506	Fuel Oil	500	Heating Plant		$25				
WTP Backwash (green)			16,000	NE of Drivehouse 1		$5,000	$700.00		$1,000.00	
Tank (white)			14,000	SE of Tailings Basin Reporting Area		$5,000	$700.00		$1,000.00	Out of Service. Disconnected, no visible labels
Dispensing Tanks at Main Gate	121	Gasoline	6,000	See gas station dwg's for reference		$600				
Dispensing Tanks at Main Gate	122	Gasoline	6,000	See gas station dwg's for reference		$600				
New - Phase 1 - Plant Site					$0	$0	$0	$0		to Demo tab
Storage Tank	TBD	CuSO4				$0				tanks provided by supplier
Storage Tank	TBD	Magnafloc 10	10,600			$0				tanks provided by supplier
Storage Tank	TBD	PAX	3,000			$0				tanks provided by supplier
Storage Tank	TBD	Lime	22,500			$0				tanks provided by supplier
New - Phase 1 - Mine Site					$0	$0	$0	$0		to Demo tab
Mine Site Truck Fueling	TBD	# 1,2 Fuel Oil		Fueling and Maintenance Facility		$0				
New - Phase 2 - Plant Site					$0	$0	$0	$0		to Demo tab
Storage Tank	TBD	H2SO4	40,000			$0				tanks provided by supplier
Storage Tank	TBD	HCl	60,000			$0				tanks provided by supplier
Storage Tank	TBD	Liquid SO2	21,000			$0				tanks provided by supplier
Storage Tank	TBD	Magnafloc 342/351				$0				tanks provided by supplier
Storage Tank	TBD	Mg(OH)	80,000			$0				tanks provided by supplier
Storage Tank	TBD	NaHS	13,200			$0				tanks provided by supplier
Storage Tank	TBD	NaOH	40,000			$0				tanks provided by supplier
Removed										
Day Tanks	083	# 6 Fuel Oil	20,000	Tank Farm						
Day Tanks	084	# 6 Fuel Oil	20,000	Tank Farm						
Day Tanks	085	# 6 Fuel Oil	20,000	Tank Farm						
Blue		Waste oil		W side of Coarse Crusher						
Blue		Lube oil		NE cor. Fine Crusher						
White		Anti-Freeze		NW cor. Fine Crusher						
					Total	$223,625				

Legacy Long Term Costs

Appendix A-2 Legacy Long Term Cost Estimate

Includes Tailings Basin Dewatering and 30 Years of MDNR, Site Mgr, Monitoring / Reporting (Water Quality, Dam Safety and Landfill) , Snowplowing/Road Maint and Vehicles

	support tabs	Cash $	NPV $	Note
Legacy Ferrous Total with Indirects		$18,620,179	$13,269,809	
Contingency	10.0%	$1,692,744	$1,206,346	
Adaptive Management	2.0%	$135,100	$100,813	On Water Tailings Basin only
Engineering Redesign	2.0%	$135,100	$100,813	On Water Tailings Basin only
Prime Contractor Markup	2.5%	$423,186	$301,587	
Mobilization	4.0%	$0	$0	included in pricing
Legacy Ferrous Total (no Indirects)		$16,927,435	$12,063,463	
Plant Site		$6,755,021	$5,040,671	
Water - Tailings Basin		$6,755,021	$5,040,671	Water Quality Monitoring Tailings Basin Closure (Site Specific Stds, Dewatering and Dam Breach)
Water Quality Monitoring		$1,395,625	$1,113,516	From PLM FY 2018 Budget (Tailings Basin) - assume reduced to 15% after 5 years
Tailings Basin Seepage Pumping		$1,424,070	$1,255,624	From PLM FY 2018 Budget
Tailings Basin Dewatering	Basin Closure	$3,792,526	$2,558,486	
Monitoring/Application for Site Specific Standards		$142,800	$113,046	$10,000 annually for Biological and $38,400 for Wild Rice Plus $50,000 for Application
Site Administration and Maintenance		$10,172,414	$7,022,792	
Site Manager FTE x $/hr from Unit $ = Annual $	0.5	$108	$112,320	NTS 4/22/16 letter Mid Level Professional
Site Manager	Unit $ Long Term	$3,369,600	$2,262,059	
DNR FTE x $/hr from Unit $ = Annual $	0.5	$116	$120,640	Provided by DNR flat rate for all staff including overhead and expenses
DNR - Reclamation	Unit $ Long Term	$2,412,800	$1,837,496	
DNR FTE x $/hr from Unit $ = Annual $	0.25	$116	$60,320	Provided by DNR flat rate for all staff including overhead and expenses
DNR - Long Term	Unit $ Long Term	$603,200	$296,062	
Dam Instrumentation Field Work + Report per Event from Unit $ Long Term	2	$10,536	$21,072	NTS 4/22/16 letter inactive basin
Geotechnical Inspection and Report from Unit $ Long Term	1	$17,500	$17,500	Barr 4/1/16 letter inactive basin
Dam Safety Monitoring		$585,364	$460,062	Starting at 2 monitoring events/year then reduced to 1 event after 5 years
Landfill Maintenance and Monitoring SW619	Unit $ Long Term	$658,710	$442,201	NTS 4/22/16 letter
Landfill Maintenance and Monitoring Coal Ash	Unit $ Long Term	$34,320	$28,663	PLM 2017 Budget
Tailings Basin Maintenance		$645,000	$445,309	PLM FY 2018 Budget decreased $20K/yr until $10K - Back to Budget + $5K for channels during channel construction then decrease by $20K/yr until $15K
Snow Plowing/Road Maintenance	Unit $ Long Term	$1,338,420	$898,500	Poly Met Snow Plowing (average of 2 highest of 3 years) and One day per month.
Vehicles (25,000 mi x $0.70/mi)	Unit $ Long Term	$525,000	$352,440	NTS Letter of 4/21/16

	2.9%	Start	Bankruptcy																																	
30 Yr Tot	NPV	01/01/18	07/01/18	07/01/19	07/01/20	07/01/21	07/01/22	07/01/23	07/01/24	07/01/25	07/01/26	07/01/27	07/01/28	07/01/29	07/01/30	07/01/31	07/01/32	07/01/33	07/01/34	07/01/35	07/01/36	07/01/37	07/01/38	07/01/39	07/01/40	07/01/41	07/01/42	07/01/43	07/01/44	07/01/45	07/01/46	07/01/47
		Oper	Hold																																	
	Calendar Year	2018		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047
10,172,414	7,022,792																																			
6,755,021	5,040,671																																			
1,395,625	1,113,516	0	159,500	159,500	159,500	159,500	159,500	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925	23,925
1,424,070	1,255,624	0	158,230	158,230	158,230	158,230	158,230	158,230	158,230	158,230	158,230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,792,526	2,558,486	0	0	0	0	0	0	0	0	0	0	254,144	173,281	1,537,421	207,048	196,948	107,301	107,301	107,301	107,301	726,051	149,964	118,464	0	0	0	0	0	0	0	0	0	0	0	0	0
142,800	113,046	0	0	0	0	0	0	0	0	46,400	96,400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,369,600	2,262,059	0	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320	112,320
2,412,800	1,837,496	0	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	0	0	0	0	0	0	0	0	0	0	0	0	0	0
603,200	296,062	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320
585,364	460,062	0	38,572	38,572	38,572	38,572	38,572	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
658,710	442,201	0	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957	21,957
34,320	28,663	0	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
645,000	445,309	0	60,000	40,000	20,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	60,000	40,000	25,000	15,000	15,000	15,000	15,000	60,000	40,000	25,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
1,338,420	898,500	0	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614	44,614
525,000	352,440	0	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500

General Unit Costs Used in Long Term Estimates

Source Column indicates provider and date of unit cost

Source Name	Source Location
Ames 2017	Attachment H2
NTS 2016	Attachment I3
Barr 2016	Attachment K2
DOLI 2016	Attachment L
PolyMet 2016	Attachment M

Item	Description	Unit	Source	Basis for Quantities (drawing # or describe)	Unit Price	Comments
	General Services Reclamation					
	Pick Up Truck	$/mi	NTS 2016		$ 0.70	NTS Letter of 4/21/16
	Pump Maint Truck	$/mi	NTS 2016		$ 1.05	NTS Letter of 4/21/16 x 1.5 to cover truck with lift
	Basic Labor Rates (including OH and profit)					
	Skilled Maintenance	hr	DOLI 2016		$ 68.98	MN DOLI #707 Dec 2016 Electrician * 1.15 to cover employment costs
	Skilled Labor	hr	DOLI 2016		$ 45.99	MN DOLI #102 Dec 2016 Skilled Labor * 1.15 to cover employment costs
	MDNR Rate	hr	DNR		$ 116.00	Provided by DNR flat rate for all staff including overhead and expenses
	Site Manager	yr	NTS 2016		$ 108.00	NTS 4/22/16 letter Mid-Level Professional
	Monitoring and Maintenance					
	Tailings Basin Geotechnical Instruments Field Work	event	NTS 2016		$ 7,686.00	NTS 4/22/16 letter inactive basin
	Tailings Basin Geotechnical Instruments Report	event	NTS 2016		$ 2,850.00	NTS 4/22/16 letter inactive basin
	Tailings Basin Geotechnical Inspection and Report	yr	Barr 2016		$ 17,500.00	Barr 4/1/16 letter inactive basin
	Landfill SW619 Maintenance and Monitoring	yr	NTS 2016		$ 21,957.00	NTS 4/22/16 letter
	Coal Ash Landfill Maintenance and Monitoring	yr	allowance		$ 2,640.00	PLM 2017 Budget
	Snow Plowing	yr	PolyMet 2016		$ 25,414.00	PolyMet Snow Plowing (average of 2 highest of 3 years)
	FTB Dam Containment System Maintenance	yr	allowance		$ 60,000.00	Allowance for maintaining flow in the drain pipe, maintaining surface water controls, repair of cutoff wall. Note most years will be much less but some could be more.
	Legacy Cell 2W Reclamation	yr	allowance		$ 1,000,000.00	Allowance for 6 years to provide stable slopes, adequate vegetation cover, and drainage provisions to resist erosion and route precipitation away from Cell 2W
	Category 1 Stockpile Cover System Maintenance	yr	allowance		$ 24,000.00	Allowance to cover (1) management of plants with deep, woody roots (2) monitoring of the soil surface cover for erosion and (3) repairing erosion damage
	Category 1 Stockpile Containment System Maintenance	yr	allowance		$ 15,000.00	Allowance to cover maintaining flow in the drain pipe, maintaining surface water controls and repairing the cutoff wall. Note that most years will be much less that this but some could be more.
	FTB Maintenance	yr	allowance		$ 10,000.00	PolyMet's experience with vegetation maintenance and erosion control at this facility indicates that $10,000 annually is sufficient for the whole facility once reclamation is complete and $60,000 a year during reclamation ramping down by $20,000 a year until $10,000 a year once reclamation has been completed.
	HRF Maintenance	yr	TBD		$ 10,000.00	Allowance
	Road Grader	hr	Ames 2017		$ 200.00	One grader with Operator Ames Email 11/13/17
	Road Maintenance	yr	calculation	one day per month	$ 19,200.00	One day per month.
	Road Maintenance (during Reclamation)	yr	calculation	one day per week for 9 months	$ 62,400.00	One day per week during 9 month construction season.

Estimate of FTE Required for Remote Alarm Response			
Shifts per week - manned	12	Day Shift Every Day + Afternoon Shift Weekdays	
Shift per week - unmanned	9		
Percent shifts unmanned	43%		
Shifts with alarms	5%	assume 5% of shifts have alarms	
Shifts with alarms requiring OT	2%		
Shifts per year	1092		
Shifts requiring OT	23.4		
Hrs per response	8	assume each OT alarm response generates 8 hrs OT	
OT hrs	187		
OT Premium	150%	assume time and a half for overtime	
Straight Time Hr equivalent to OT	281		
Annual Hrs for 3 FTE	6240		
Percent FTE to add for Alarm Response	5%		

Legacy Tailings Basin Cells 1E and 2E - Order of Magnitude Estimate of Closure Costs (05/24/2017)																		
Item	Description	Unit	Quantity	Unit Cost	Total Cost	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Note
A	Total with Indirects				$3,792,526	$254,144	$173,281	$1,537,421	$207,048	$196,948	$107,301	$107,301	$107,301	$107,301	$726,051	$149,964	$118,464	
1	Mobilization and Demobilization	LS	5%		$178,663	$12,102	$8,209	$71,868	$9,678	$9,378	$5,110	$5,110	$5,110	$5,110	$34,207	$7,141	$5,641	Allowance of 5% of Subtotal 1 Cost
2	Environmental Protection Measures (dust control)	LS	3%		$40,600	$0	$900	$28,200	$3,800	$0	$0	$0	$0	$0	$7,700	$0	$0	Assume Dust Control is Ancillary to Earthwork Items. Provide allowance of 3% of Subtotal 1 costs for erosion and sediment control on exterior of Cell 1E and Cell 2E. All other earthwork is within basin and no additional erosion and sediment control costs are assumed.
	Total (no indirects)				$3,573,263	$242,042	$164,172	$1,437,353	$193,569	$187,569	$102,192	$102,192	$102,192	$102,192	$684,144	$142,823	$112,823	
B	Dewatering				$1,116,071	$161,042	$134,542	$142,156	$102,192	$116,192	$102,192	$102,192	$102,192	$102,192	$51,179	$0	$0	
	Cell 2E to Cell 1E Pumping System				$43,300	$22,767	$10,267	$10,267	$0	$0	$0	$0	$0	$0	$0	$0	$0	
1	New Pole Mount Transformers / Motor Starter	LS	1	$6,500	$6,500	$6,500												
2	Electrical Installation	LS	1	$6,000	$6,000	$6,000												
3	800' of 8" DR11 HDPE fused and installed	LF	2,400	$7.00	$16,800	$5,600	$5,600	$5,600										Pipe length to accommodate decreasing pond footprint as dewatering progresses.
4	Allowance for Pump Relocations	LS	1	$8,000	$8,000	$2,667	$2,667	$2,667										Re-use Existing Pump from Cell 1E
5	Allowance for Electrical Modifications	LS	1	$6,000	$6,000	$2,000	$2,000	$2,000										
	Cell 1E to SD026 Pumping System				$42,000	$14,000		$14,000		$14,000								
6	Piping - 8" DR11 HDPE Procured and Installed	LF	4,000	$7.00	$28,000	$9,333		$9,333		$9,333								Pipe length to accommodate decreasing pond footprint as dewatering progresses.
7	New Pole Mount Transformers / Motor Starter	LS	0	$6,500	$0	$0												Already in Place
8	Electrical Installation	LS	0	$6,000	$0	$0												Already in Place
9	Allowance for Pump	LS	0	$20,000	$0	$0												Already in Place
10	Allowance for Pump Relocations	LS	1	$8,000	$8,000	$2,667		$2,667		$2,667								Pump Relocation Activities as Pond Level Drops
11	Allowance for Electrical Modifications	LS	1	$6,000	$6,000	$2,000		$2,000		$2,000								Electrical Modifications Associated with Pump Relocations
12	pH Adjustment System	LS	0	$45,000	$0	$0												Already in Place
	Pumping and CO2 Treatment O&M				$1,030,771	$124,276	$124,276	$117,889	$102,192	$102,192	$102,192	$102,192	$102,192	$102,192	$51,179	$0	$0	
	Cell 2E Pond Volume	Gal				577,042,805	364,174,805	151,306,805	0	0	0	0	0	0	0	0	0	Initial pond volume based on Barr stage volume model and pond elevation of 1561.4ft
	Cell 2E to Cell 1E Volume Pumped	Gal			577,042,805	212,868,000	212,868,000	151,306,805										450 gpm pump system with 90% availability
13	Cell 2E Dewatering	$	row above	$0	$59,865	$22,084	$22,084	$15,697										Unit Cost from Dewatering UC Development Tab
	Cell 1E Pond Volume	Gal				1,445,376,557	1,445,376,557	1,445,376,557	1,383,815,362	1,170,947,362	958,079,362	745,211,362	532,343,362	319,475,362	106,607,362	0	0	Initial pond volume based on Barr stage volume model and pond elevation of 1655.6ft
	Cell 1E to SD026 Volume Pumped/Treated	Gal			2,022,419,362	212,868,000	212,868,000	212,868,000	212,868,000	212,868,000	212,868,000	212,868,000	212,868,000	212,868,000	106,607,362			450 gpm pump system with 90% availability
14	Cell 1E Dewatering	$	row above	$0	$970,906	$102,192	$102,192	$102,192	$102,192	$102,192	$102,192	$102,192	$102,192	$102,192	$51,179			Unit Cost from Dewatering UC Development Tab
C	Cell 2E - Grading and Dam Breach				$1,467,582	$0	$29,630	$1,295,198	$71,378	$71,378	$0	$0	$0	$0	$0	$0	$0	
1	Mass Grading	CY	100,000	$2.50	$250,000			$250,000										Assume limited grading sufficient to resolve low spots, erosion, slope angle reduction, other. Some areas will require no grading; other areas will require substantial grading. The cubic yards estimated is an allowance; not a detailed estimate.
	Channel from Cell 2E Pond to Exterior of Dam Slope (quantities from Dam Breach Calc Tab)																	
2	Excavate Channel	CY	175,000	$1.60	$280,000			$280,000										Unit Cost from Unit $ Tab (Soil Excavation). See Dam Breach Calcs spreadsheet for channel dimension estimate.
3	Class II Riprap (24" Thick)	CY	1,481	$35.95	$53,260			$53,260										Unit Cost from Unit $ Tab (Rip-Rap Erosion Protection). See Dam Breach Calcs spreadsheet for channel dimension estimate.
4	Filter Material (12" Thick)	CY	741	$35.95	$26,630			$26,630										Assume same Unit Cost as riprap.
	Channel from Elev. 1,568 to Toe of Slope Wetland Area (quantities from Dam Breach Calc Tab)																	
5	Excavate/Grade Channel	CY	18,519	$1.60	$29,630		$29,630											Unit Cost from Unit $ Tab (Soil Excavation). See Dam Breach Calcs spreadsheet for channel dimension estimate.
6	Class II Riprap (24" Thick)	CY	7,407	$35.95	$266,299			$266,299										Unit Cost from Unit $ Tab (Rip-Rap Erosion Protection). See Dam Breach Calcs spreadsheet for channel dimension estimate.
7	Filter Material (12" Thick)	CY	3,704	$35.95	$133,150			$133,150										Assume same Unit Cost as riprap.
	Riprap Delta (450ft x 40ft)																	Assumed 450-ft Length and 40-ft width (FTB-017, Section 5 Stationing) | FTB-017 Riprap Overflow Channel Emergency Dissipater, Section 5
8	Class II Riprap (18" Thick)	CY	1,000	$35.95	$35,950			$35,950										Unit Cost from Unit $ Tab (Rip-Rap Erosion Protection). See Dam Breach Calcs spreadsheet for channel dimension estimate.
9	Filter Material (6" Thick)	CY	333	$35.95	$11,983			$11,983										Assume same Unit Cost as riprap.
10	Initial Seeding (50% Cell area)	AC	310	$768	$237,925			$237,925										Unit Cost from Unit $ Tab (assume seeding 25% slope and 75% flat + mulch))
11	Re-Seeding (15% cell area each year for 2 years)	AC	93	$768	$142,755				$71,378	$71,378								Unit Cost from Unit $ Tab (assume seeding 25% slope and 75% flat + mulch))

Legacy Tailings Basin Cells 1E and 2E - Order of Magnitude Estimate of Closure Costs (05/24/2017)																		
Item	Description	Unit	Quantity	Unit Cost	Total Cost	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Note
D	Cell 1E - Grading and Dam Breach				$858,610	$0	$0	$0	$0	$0	$0	$0	$0	$0	$632,965	$112,823	$112,823	
1	Mass Grading	CY	50,000	$2.50	$125,000										$125,000			Assume limited grading sufficient to resolve low spots, erosion, slope angle reduction, other. Some areas will require no grading; other areas will require substantial grading. The cubic yards estimated is an allowance; not a detailed estimate.
	Channel from Cell 1E to Cell 2E (quantities from Dam Breach Calc Tab)																	
2	Excavate Channel	CY	32,500	$1.60	$52,000										$52,000			Unit Cost from Unit $ Tab (Soil Excavation). See Dam Breach Calcs spreadsheet for channel dimension estimate.
3	Class II Riprap (24" Thick)	CY	1,481	$35.95	$53,260										$53,260			Unit Cost from Unit $ Tab (Rip-Rap Erosion Protection). See Dam Breach Calcs spreadsheet for channel dimension estimate.
4	Filter Material (12" Thick)	CY	741	$35.95	$26,630										$26,630			Assume same Unit Cost as riprap.
5	Initial Seeding (50% Cell area)	AC	490	$768	$376,075										$376,075			Unit Cost from Unit $ Tab (assume seeding 25% slope and 75% flat + mulch))
6	Re-Seeding (15% cell area each year for 2 years)	AC	147	$768	$225,645											$112,823	$112,823	Unit Cost from Unit $ Tab (assume seeding 25% slope and 75% flat + mulch))
E	Other Activities				$131,000	$81,000	$0	$0	$20,000	$0	$0	$0	$0	$0	$0	$30,000	$0	
1	Removal of SD004, SD006 and SD026 Collection and Pumpback Systems	LS	1		$81,000	$81,000												Allowance for Removals - Roughly equal to 3-person crew and equipment at $200/hr, 10 hours per day for 5 days for each system.
2	Removal of Dewatering Pipelines, Electrical and Pumping Systems.	LS	1		$50,000				$20,000							$30,000		Value is a cost allowance assumed for this activity.

Notes:

1) Cell 1E and 2E Order of Magnitude Closure Costs shown are for construction of dam breaches and discharge channels of depths assumed sufficient to drain Cell 1E and 2E ponds.

2) Due to earthwork quantities required it would be impractical to grade Cells 1E and 2E to drain; dam breaches and discharge channels are assumed instead. Feasibility of channel construction has not been confirmed.

3) Closure cost estimate is for closure concept represented by computations and concepts contained in the cost estimate spreadsheet; no accommodation for contingency is included.

4) Costs are estimated present value costs throughout.

Computation Date 04/26/2017

Estimate of Annual Cost - Two pumps running separately with separate inlet lines and moving water simultaneously from Cell 2E to Cell 1E and from Cell 1E to Second Creek		
	Second Creek Pumping and C02 System	Cell 2E Pumping System
Pump Model	GPM Eliminator Model No. – SBLH4S50 - 4T4 - S 40 HP, 460V, 60A	GPM Eliminator Model No. – SBLH4S50 - 4T4 - S 40 HP, 460V, 60A
Flow Rate (gpm)	450	450
Pumping Months per Year	12 months per year	12 months per year
Pumping Days Per Year (assumed 90% availability)	328.5	328.5
Pumping Basis	Inlet lines to be buried to prevent freezing lines, separate inlet, pump and outlet lines	Inlet lines to be buried to prevent freezing lines, separate inlet, pump and outlet lines
Pumping Outlet	Second Creek (SD026)	Cell 1E Pond
Power Consumption (kWh/day)	662.40	662.4
Power Rate ($/kWh)	$0.090	$0.090
Power Cost ($/year)	$19,584	$19,584
CO2 Dewar Tank Fill ($/per)	$98	$0
Dewar Tank Rental ($/day)	$1.25	$0
CO2 Consumption (# Dewar tanks /week)	$3.00	$0
CO2 cost ($/week; includes spare Dewar)	$329	$0
CO2 System Annual Cost ($/year)	$17,108	$0
Pump Maintenance	$2,500	$2,500
Vac Truck service	$0	$0
CO2 System maintenance, calibration, etc.	$3,000	$0
Monitoring Costs (Cell 1E inlet, Second Creek discharge)	$60,000	$0
Annual Maintenance and Monitoring Costs ($/year)	$65,500	$2,500
Annual Operating Costs	$102,192	$22,084
Volume pumped (gals/year)	212,868,000	212,868,000
Annual Operating Cost/1,000 Gallons	$0.480	$0.104

Cell 1E to Cell 2E Dam Breach Excavation Volume Estimate (See Table and Comments Below):

40 foot road width, 30 foot cut, 6H:1V max road grade, 3H:1V north dam slope, 330H:16V beach slope, 40 foot wide flat bottom at cut.

26,000 Cubic Yards (rough estimate)
32,500 Cubic Yards (with 25% additional for unknowns)

Cell 1E Dam Breach	Riprap (24" Loose Lift)	1,481	Cubic Yards
	Filter Material (12" Loose Lift)	741	Cubic Yards
	(riprap on last 200' section of breach, on base and 5 feet up sides)		

Cell 2E Breach Volume Estimate (See Table and Comments Below):

40 foot road width, 35 foot cut, 6H:1V max road grade, 4H:1V exterior dam slope, 330H:16V beach slope; 40 foot wide flat bottom at cut, 2,700 foot long channel (no riprap) with depth from zero at basin center to 10 feet at dam cut.

140,000 Cubic Yards (rough estimate)
175,000 Cubic Yards (with 25% additional for unknowns)

Cell 2E Dam Breach	Riprap (24"Loose Lift)	1,481	Cubic Yards
	Filter Material (12" Loose Lift)	741	Cubic Yards
	(riprap on last 200' section of breach, on base and 5 feet up sides)		
Dam Breach to Toe	Riprap (24"Loose Lift)	7,407	Cubic Yards
	Filter Material (12" Loose Lift)	3,704	Cubic Yards

Cell 1E to Cell 2E Channel - Assume Dam Crest Elevation at channel location is elevation 1674 (at central location on Cell 1E/2E splitter dam). Construct wide drivable channel to elevation 1644; assumed sufficient to accommodate full drainage of Cell 1E to Cell 2E. Assume 100' wide by 260' long riprap zone with gravel infill for driving zone.

Cell 2E to Wetland Channel - Assume Dam Crest Elevation at breach location is elevation 1588 (at eastern side of Cell at dam intersection with existing hillside). Construct channel to elevation 1558; assumed sufficient to accommodate full drainage of Cell 2E. Assume 100' wide by 260' long riprap zone with gravel infill for driving zone.

Cell 2E to Wetland General Earthwork - Assume 1,000 foot long by 100 foot wide earthwork zone with average 5' cut/fill along entire length.

Construction Reclamation Costs

Appendix A - Construction Reclamation Estimate 12/4/2017

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA

	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note
Construction Total with Indirects					$16,271,537	$14,950,953	FA for Cash Amount
Contingency	10.0%	Reclamation			$1,446,359	$1,328,974	
Adaptive Management	0.0%	Quantities			$0	$0	normal construction no water mgt
Engineering Redesign	0.0%	from Changes			$0	$0	normal construction no water mgt
Prime Contractor Markup	2.5%	Over Time			$361,590	$332,243	
		Memo Unless			$0	$0	
Construction Total (no Indirects)		Noted			$14,463,589	$13,289,736	
Mine Site					$8,450,657	$7,755,390	
General Reclamation							
Stockpile Relocation					$0	$0	
Cat 2/3 - rock	Unit $	0	Tons	$2.39	$0		no material in stockpile
Cat 2/3 - sat overburden	Unit $	0	Tons	$2.39	$0		no material in stockpile
Cat 4 - rock	Unit $	0	Tons	$1.79	$0		no material in stockpile
Cat 4 - sat overburden	Unit $	0	Tons	$1.79	$0		no material in stockpile
OSP - rock	Unit $	0	Tons	$2.39	$0		no material in stockpile
Stockpile Footprint Reclamation					$3,414,499	$3,179,110	
Cat 2/3					$1,704,755	$1,587,233	
Drain Pipe Removal and Prep for Transport	Unit $Reclamation & Pipe-Liner Off Site Disposal	45,300	LF	$15.00	$679,500	$632,657	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	1	LS	$7,837	$7,837	$7,297	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Liner Removal and Liner Prep for Transport	Unit $ Reclamation	63	Acre	$8,600	$541,800	$504,449	Remove and haul to East or West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there. [Ames 2016]
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	63	Acre	$152	$9,580	$8,920	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Cover Area (Acres) and Depth (Inches)		63	Acres Inches	12			
Cover Volume (CY) and Haul Distance (Miles)		101,640	CY Miles	1.5			
Cover - Ovb/Soil (12" thick)	Unit $ Reclamation	101,640	CF	$4.40	$447,453	$416,606	Soil Overburden Relocation (excavate, load and dump) [Ames 2016] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016] (1.5 mile haul)
Seeding	Unit $ Reclamation	63	Acres	$295	$18,585	$17,304	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]
Cat 4					$768,042	$715,094	
Drain Pipe Removal and Prep for Transport	Unit $Reclamation & Pipe-Liner Off Site Disposal	21,590	LF	$15.00	$323,850	$301,524	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	1	LS	$3,626	$3,626	$3,376	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Liner Removal and Liner Prep for Transport	Unit $	29	Acre	$8,600	$249,400	$232,207	Remove and haul to East or West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there. [Ames 2016]
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	29	Acre	$152	$4,410	$4,106	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Cover Area (Acres) and Depth (Inches)		29	Acres Inches	12			
Cover Volume (CY) and Haul Distance (Miles)		46,787	CY Miles	1.2			
Cover - Ovb/Soil (12" thick)	Unit $ Reclamation	46,787	CF	$3.81	$178,200	$165,916	Soil Overburden Relocation (excavate, load and dump) [Ames 2016] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016] (1.2 mile haul)
Seeding	Unit $ Reclamation	29	Acres	$295	$8,555	$7,965	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]
OSP					$941,702	$876,783	
Drain Pipe Removal and Prep for Transport	Unit $Reclamation & Pipe-Liner Off Site Disposal	30,000	LF	$15.00	$450,000	$418,978	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	1	LS	$5,597	$5,597	$5,211	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Liner Removal and Liner Prep for Transport	Unit $ Reclamation	32	Acre	$8,600	$275,200	$256,228	Remove and haul to East or West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there. [Ames 2016]
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	32	Acre	$152	$4,866	$4,531	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Cover Area (Acres) and Depth (Inches)		32	Acres Inches	12			
Cover Volume (CY) and Haul Distance (Miles)		51,627	CY Miles	1.2			
Cover - Ovb/Soil (12" thick)	Unit $ Reclamation	51,627	CF	$3.81	$196,599	$183,046	Soil Overburden Relocation (excavate, load and dump) [Ames 2016] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016] (1.2 mile haul)
Seeding	Unit $ Reclamation	32	Acres	$295	$9,440	$8,789	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]
OSLA					$98,932	$92,112	
Grade Stockpiles of Overburden and Peat	Unit $ Reclamation	41.8	Acres	$3,200	$86,601	$80,631	No hauling of material, Mid size dozer work. [Ames 2017]
Seeding	Unit $ Reclamation	41.8	Acres	$295	$12,331	$11,481	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]

Calendar Year	Start of Year 01/01/18 2018	Bankruptcy 07/01/18	07/01/19 2019	07/01/20 2020	07/01/21 2021
			Year of Closure		
			1	2	3	4
14,463,589	13,289,736					
	2.9%	Oper	Hold			
30 Yr Tot	NPV		1	2	3	4
679,500	632,657	0	0	0	679,500	0
7,837	7,297	0	0	0	7,837	0
541,800	504,449	0	0	0	541,800	0
9,580	8,920	0	0	0	9,580	0
447,453	416,606	0	0	0	447,453	0
18,585	17,304	0	0	0	18,585	0
323,850	301,524	0	0	0	323,850	0
3,626	3,376	0	0	0	3,626	0
249,400	232,207	0	0	0	249,400	0
4,410	4,106	0	0	0	4,410	0
178,200	165,916	0	0	0	178,200	0
8,555	7,965	0	0	0	8,555	0
450,000	418,978	0	0	0	450,000	0
5,597	5,211	0	0	0	5,597	0
275,200	256,228	0	0	0	275,200	0
4,866	4,531	0	0	0	4,866	0
196,599	183,046	0	0	0	196,599	0
9,440	8,789	0	0	0	9,440	0
86,601	80,631	0	0	0	86,601	0
12,331	11,481	0	0	0	12,331	0

Appendix A - Construction Reclamation Estimate 12/4/2017

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA

	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note
Construction Total with Indirects					$16,271,537	$14,950,953	FA for Cash Amount
Contingency	10.0%	Reclamation			$1,446,359	$1,328,974	
Adaptive Management	0.0%	Quantities			$0	$0	normal construction no water mgt
Engineering Redesign	0.0%	from Changes			$0	$0	normal construction no water mgt
Prime Contractor Markup	2.5%	Over Time			$361,590	$332,243	
		Memo Unless			$0	$0	
Construction Total (no Indirects)		Noted			$14,463,589	$13,289,736	
Pits					$1,407,425	$1,273,469	
Prepare for Fencing	Unit $ Reclamation	$0	LF	$9.00	$0	$0	Ames 2016
Pit Fence - Barb Wire 4 Strand	Unit $ Reclamation	0	LF	$8.00	$0	$0	MnDOT Standard Plate 9323 Rev. D [Ames 2016]
Pit Fence - Non Climbable	Unit $ Reclamation	0	LF	$22.00	$0	$0	MnDOT Standard Plate 9322 Rev. K [Ames 2016]
Gates	Unit $ Reclamation	0	EA	$5,500	$0	$0	Gate for access road / pit ramp; MnDOT Standard Plate 9322 Rev. K 20' Wide Vehicular Gate (Double Gate) [Ames 2016]
Reduce and Grade Overburden Wall		$0		$0	$0	$0	Overburden sloped and seeded as part of mining - cover of setback area not required by non-ferrous rules (FEIS WQ modeling assumed not covered)
Cover Area (Acres) and Depth (Inches)		95	Acres Inches	24			
Cover Volume (CY) and Haul Distance (Miles)		306,533	CY				
Cover East Pit Expose Rock	Unit $ Reclamation	306,533	CY	$4.50	$1,379,400	$1,248,112	Load, haul and place in East Pit [Ames 2016]
Seeding	Unit $ Reclamation	95	Acres	$295	$28,025	$25,358	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]
Sumps and Ponds					$434,317	$404,376	
Ponds Clean out	Ponds & Unit $ Reclamation	9	EA	$5,000	$45,000	$41,898	Break-out sumps/ clean-out ponds [Ames 2016]
Restore Pond Footprint	Ponds & Unit $ Reclamation	63	Acres	$6,000	$376,200	$350,265	Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill [Ames 2016]
Liner Disposal in Off Site Solid Waste Landfill	Pons & pipe-liner off site disposal	56	Acres	$152	$8,470	$7,886	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Pipe Disposal in Off Site Solid Waste Landfill	Ponds & pipe-liner off site disposal	4,500	LF	$1.03	$4,646	$4,326	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Rail Transfer Hopper					$0	$0	
Haul RTH waste rock to East Pit, Plus Grading					$0		Construct Platform with MDNR approved rock. Cover with 2ft soil and vegetate included with Demo below
Construction					$825,592	$747,014	
Cat 1 Stockpile Footprint Reclamation	SOW3 Cat1 Grading-Seeding(Yr 0)	1	LS	$214,255	$214,255	$193,863	Engineering estimate: Barr Engineering Estimate based on permit level design on drawing SKP-003 and SKP-007 to SKP-010 from Appendix 4 of the PTM Application - May 2016
Cat 1 Stockpile Cont Sys Breaching	SOW21 Cat 1 Cont Sys UC (Yr 0)	1	LS	$611,337	$611,337	$553,151	Engineering estimate: Barr Engineering estimate based on permit level design on drawing GCS-003, GCS-010 and GCS-011 from Appendix 4 of the PTM Application - July 2016
Demo					$2,203,893	$1,999,592	Lakehead / Rachel 2016 (Attachments E and F)
Fueling and Maintenance Facility	Demo	1	LS	$27,610	$27,610	$25,707	
Rail Transfer Hopper	Demo	1	LS	$86,100	$86,100	$80,164	
Rail Transfer Hopper Control Bldg	Demo	1	LS	$18,700	$18,700	$17,411	
Rail Transfer Hopper Platform	Demo	1	LS	$60,000	$60,000	$55,864	
Central Pumping Station	Demo	1	LS	$15,700	$15,700	$14,618	
Railroads	Demo	1	LS	$78,750	$78,750	$71,255	
Pipelines	Demo	1	LS	$797,133	$797,133	$721,264	
Power Lines	Demo	1	LS	$83,900	$83,900	$75,915	
Roads and Parking Lots	Demo	1	LS	$524,000	$524,000	$474,127	
Wasteweater Treatment Facility	Demo	1	LS	$512,000	$512,000	$463,269	
Other					$66,000	$59,718	
Abandon Mine Site Wells	Unit $ Reclamation	33	wells	$2,000	$66,000	$59,718	Based on Costs from other projects, considering mobilization, permitting, and well abandonment. [Barr 11/10/17 email]
Plant Site					$4,233,931	$3,877,491	
General Reclamation		$1	LS		$31,310	$29,152	
HRF Disturbance	SOW11 HRF Cover Sys UC (Yr 0)	1	LS	$31,310	$31,310	$29,152	Engineering estimate: Barr Engineering estimate based on permit level design on drawing HRF-003, HRF-005 and HRF-007 from Appendix 7 of the PTM Application - July 2016
Construction					$405,361	$377,416	
FTB Borrow Area & Disturbed Area	SOW14 FTB Grading-Seeding (Yr0)	1	LS	$405,361	$405,361	$377,416	Engineering estimate: Barr Engineering estimate based on permit level design on drawing FTB-003 and FTB-005 from Appendix 6 of the PTM Application - July 2016 (updated April 2017 and November 2017)
FTB Overflow		0	LS	$239,539	$0	$0	

Calendar Year	Start of Year 01/01/18 2018	Bankruptcy 07/01/18	07/01/19 2019	07/01/20 2020	07/01/21 2021
			Year of Closure		
			1	2	3	4
14,463,589	13,289,736					
	2.9%	Oper	Hold			
30 Yr Tot	NPV		1	2	3	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
1,379,400	1,248,112	0	0	0	0	1,379,400
28,025	25,358	0	0	0	0	28,025
45,000	41,898	0	0	0	45,000	0
376,200	350,265	0	0	0	376,200	0
8,470	7,886	0	0	0	8,470	0
4,646	4,326	0	0	0	4,646	0
214,255	193,863	0	0	0	0	214,255
611,337	553,151	0	0	0	0	611,337
27,610	25,707	0	0	0	27,610	0
86,100	80,164	0	0	0	86,100	0
18,700	17,411	0	0	0	18,700	0
60,000	55,864	0	0	0	60,000	0
15,700	14,618	0	0	0	15,700	0
78,750	71,255	0	0	0	0	78,750
797,133	721,264	0	0	0	0	797,133
83,900	75,915	0	0	0	0	83,900
524,000	474,127	0	0	0	0	524,000
512,000	463,269	0	0	0	0	512,000
66,000	59,718	0	0	0	0	66,000
31,310	29,152	0	0	0	31,310	0
405,361	377,416	0	0	0	405,361	0
0	0	0	0	0	0	0

Appendix A - Construction Reclamation Estimate 12/4/2017

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA

	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note	Calendar Year	Start of Year 01/01/18	Bankruptcy 07/01/18 2018	07/01/19 2019	07/01/20 2020	07/01/21 2021
Construction Total with Indirects					$16,271,537	$14,950,953	FA for Cash Amount						
Contingency	10.0%	Reclamation			$1,446,359	$1,328,974							
Adaptive Management	0.0%	Quantities			$0	$0	normal construction no water mgt						
Engineering Redesign	0.0%	from Changes			$0	$0	normal construction no water mgt					Year of Closure	
Prime Contractor Markup	2.5%	Over Time			$361,590	$332,243		14,463,589	13,289,736				
		Memo Unless			$0	$0			2.9%	Oper	Hold		
Construction Total (no Indirects)		Noted			$14,463,589	$13,289,736		30 Yr Tot	NPV		1	2	3	4
Demo and Abatement					$3,797,260	$3,470,923							
Legacy Structure Removal													
Area 1 Shop Buildings	Demo	0	LS	$448,916	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Area 2 Shop Buildings	Demo	0	LS	$556,827	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Main Plant Area - Demoed in Construction	Demo	0	LS	$1,655,350	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Main Plant Area	Demo	0	LS	$19,888,937	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Main Gate Colby PH Ad Bldg	Demo	0	LS	$243,170	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Roads	Demo	0	LS	$660,000	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Railroads	Demo	0	LS	$380,000	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Power System	Demo	0	LS	$97,810	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Piping System	Demo	0	LS	$2,879,000	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Legacy Asbestos Abatement							in Legacy Reclamation						
Area 1 Shop Buildings	Demo	0	LS	$98,350	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Area 2 Shop Buildings	Demo	0	LS	$167,350	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Main Plant Area	Demo	0	LS	$5,962,607	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Main Gate Colby PH Ad Bldg	Demo	0	LS	$859,400	$0	$0	in Legacy Reclamation	0	0	0	0	0	0
Project Phase 1							Lakehead / Rachel 2016 (Attachments E and F)						
Flotation Plant and Reagent Building	Demo	1	LS	$844,400	$844,400	$786,365		844,400	786,365	0	0	211,100	422,200	211,100
Concentrate Storage and Loadout Facility	Demo	1	LS	$333,860	$333,860	$310,914		333,860	310,914	0	0	83,465	166,930	83,465
Plant Site Sewage Treatment Plant	Demo	1	LS	$148,000	$148,000	$137,828		148,000	137,828	0	0	37,000	74,000	37,000
Railroads	Demo	1	LS	$296,000	$296,000	$267,827		296,000	267,827	0	0	0	0	296,000
Pipelines	Demo	1	LS	$1,930,000	$1,930,000	$1,746,307		1,930,000	1,746,307	0	0	0	0	1,930,000
Power Lines		none constructed												
Roads and Parking Lots		none constructed												
Plant Site Wastewater Treatment Plant	Demo	1	LS	$245,000	$245,000	$221,681		245,000	221,681	0	0	0	0	245,000
Other					$0	$0								
AST Removal	AST	0	LS	$223,625	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
AOCs	AOC	0	LS	$6,918,200	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Site Administration and Maintenance					$1,779,000	$1,656,855								
Legacy					$0	$0								
Site Manager - annual $ / FTE - calc from hourly rate		$0	$/yr $/hr	$ -										
Site Manager		0	FTE	$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Dam Instrumentation Field Work + Report per Event		0	Event	$0										
Geotechnical Inspection and Report from Unit $		0	Year	$0										
Dam Safety Monitoring		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Landfill Maintenance and Monitoring SW619		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Landfill Maintenance and Monitoring Coal Ash		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Tailings Basin Maint		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Snow Plowing/Road Maint		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Vehicles (25,000 mi x $0.70/mi)		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Project Disturbances					$1,779,000	$1,656,855								
Project Manager - annual $ / FTE - calc from hourly rate	Unit $ Reclamation	$286,000	$/yr $/hr	$ 137.50			Barr 2016 Fee Schedule Average of Top Level Engineer [Barr 2016]							
Project Manager		1	FTE	$286,000	$858,000	$799,090		858,000	799,090	0	0	286,000	286,000	286,000
Superintendent's Light Truck - Annual Miles	Unit $ Reclamation	15,000	miles/yr	$0.70	$31,500	$29,337	NTS Letter of 4/21/16	31,500	29,337	0	0	10,500	10,500	10,500
Project Engineer - annual $ / FTE - calc from hourly rate	Unit $ Reclamation	$223,600	$/yr $/hr	$ 107.50			Barr 2016 Fee Schedule Average of Mid Level Engineer [Barr 2016]							
Project Engineer		1	FTE	$223,600	$670,800	$624,743		670,800	624,743	0	0	223,600	223,600	223,600
Engineer's Light Truck - Annual Miles	Unit $ Reclamation	15,000	miles/yr	$0.70	$31,500	$29,337	NTS Letter of 4/21/16	31,500	29,337	0	0	10,500	10,500	10,500
Road Maintenance	Unit $ Long Term	1	yr	$62,400	$187,200	$174,347	One day per week during 9 month construction season.	187,200	174,347	0	0	62,400	62,400	62,400

General Unit Costs Used in Reclamation Estimates

Source Column indicates provider and date of unit cost

Source Name	Source Location
Ames 2016	Attachment H1
Ames 2017	Attachment H2
NTS 2016	Attachment I3
D&T 2016	Attachment J
Barr 2016	Attachment K1
Barr 2017	Barr 11/10/17 email

Ames estimates include mobilization

Item	Description	Unit	Source	Basis for Quantities (drawing # or describe)	Unit Price	Comments
	Rock Moving					
1	Ore Surge Stockpile Relocation	CY	Ames 2016	Load/Haul/Dump by Contractor	$ 4.55	From OSP to floor of East Pit [Ames 2016]
		Ton	calculated	1.9 Ton/CY	$ 2.39	From OSP to floor of East Pit [Ames 2016]
2	Category 2/3 Waste Rock Relocation (used in Stockpile Relocate tab)	CY	Ames 2016	Load/Haul/Dump by Contractor	$ 4.55	From Cat 2/3 stockpile to floor of East Pit [Ames 2016]
		Ton	calculated	1.9 Ton/CY	$ 2.39	From Cat 2/3 stockpile to floor of East Pit [Ames 2016]
3	Category 4 Waste Rock Relocation (used in Stockpile Relocate tab)	CY	Ames 2016	Load/Haul/Dump by Contractor	$ 3.40	From Cat 4 stockpile to floor of East Pit [Ames 2016]
		Ton	calculated	1.9 Ton/CY	$ 1.79	From Cat 4 stockpile to floor of East Pit [Ames 2016]
4	Soil Overburden Relocation (excavate, load and dump) [Ames 2016]	CY	Ames 2016	Excavate, Load and Dump by Contractor	$ 1.60	Material for haul roads, Cat 1 etc. restoration. [Ames 2016]
5	Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016]	$/CY/Mile	Ames 2016	Haul by Contractor	$ 1.85	Material for haul roads, Cat 1 etc. restoration (assume 2-mile avg. haul distance; 4-mile round-trip) [Ames 2016]
	Site Removal and Restoration					
6	Remove & Dispose of Stockpile/Pond Geomembrane Liners (inc soil)	acre	Ames 2016	Cut Geomembrane into Sections/Remove	$ 8,600.00	Remove and haul to East or West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there. [Ames 2016]
7	Remove & Dispose of Collection pipe	LF	Ames 2016	Cut-Up/Remove/Dispose	$ 15.00	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
8	Remove Stockpile Sumps & Ponds	each	Ames 2016	Break-out sumps/ clean-out ponds	$ 5,000.00	Break-out sumps/ clean-out ponds [Ames 2016]
9	Restore Lined Sump & Pond Footprint	acre	Ames 2016	Fill/Grade	$ 6,000.00	Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill [Ames 2016]
	Fencing, Gates, and Barricades					
10	Preparation for Fencing	LF	Ames 2016	Clearing & Grubbing for fencing	$ 9.00	Ames 2016
11	Supply & Install 4 Strand Fence	LF	Ames 2016	Gates & signage separate	$ 8.00	MnDOT Standard Plate 9323 Rev. D [Ames 2016]
12	Supply & Install Non-Climbable Fence	LF	Ames 2016	Gates & signage separate	$ 22.00	MnDOT Standard Plate 9322 Rev. K [Ames 2016]
13	Gates	each	Ames 2016	Per Gate	$ 5,500.00	Gate for access road / pit ramp; MnDOT Standard Plate 9322 Rev. K 20' Wide Vehicular Gate (Double Gate) [Ames 2016]
	Earthworks					
14	Grading uneven area for gentle contour and drainage	acre	Ames 2017	Grading for depths 6" to 16"	$ 3,200.00	No hauling of material, Mid size dozer work. [Ames 2017]
15	Load, Haul & Place Earthfill from Overburden Storage & Laydown Area	CY	Ames 2017		$ 4.50	Load, haul and place in East Pit [Ames 2016]
	General Services Reclamation					
16	Pick Up Truck	$/mi	NTS 2016		$ 0.70	NTS Letter of 4/21/16
17	Abandon Well	$/mi	Barr 2017		$ 2,000.00	Based on Costs from other projects, considering mobilization, permitting, and well abandonment. [Barr 11/10/17 email]
	Basic Labor Rates (including OH and profit)					
18	Project Manager	yr	Barr 2016		$ 137.50	Barr 2016 Fee Schedule Average of Top Level Engineer [Barr 2016]
19	Project Engineer	yr	Barr 2016		$ 107.50	Barr 2016 Fee Schedule Average of Mid Level Engineer [Barr 2016]
20	Project Inspector	yr	Barr 2016		$ 70.00	Barr 2016 Fee Schedule Average of Technician I [Barr 2016]
	Vegetation Establishment					
21	Seed and Fertilize for Vegetation Establishment - Mine Overburden Area	acre	D&T 2016	Assume typical roadway spec. seed, fertilize, mulch	$ 295.00	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]

General Unit Costs Used in Long Term Estimates

Source Column indicates provider and date of unit cost

Source Name	Source Location
Ames 2017	Attachment H2
NTS 2016	Attachment I3
Barr 2016	Attachment K2
DOLI 2016	Attachment L
PolyMet 2016	Attachment M

Item	Description	Unit	Source	Basis for Quantities (drawing # or describe)	Unit Price	Comments
	General Services Reclamation					
	Pick Up Truck	$/mi	NTS 2016		$ 0.70	NTS Letter of 4/21/16
	Pump Maint Truck	$/mi	NTS 2016		$ 1.05	NTS Letter of 4/21/16 x 1.5 to cover truck with lift
	Basic Labor Rates (including OH and profit)					
	Skilled Maintenance	hr	DOLI 2016		$ 68.98	MN DOLI #707 Dec 2016 Electrician * 1.15 to cover employment costs
	Skilled Labor	hr	DOLI 2016		$ 45.99	MN DOLI #102 Dec 2016 Skilled Labor * 1.15 to cover employment costs
	MDNR Rate	hr	DNR		$ 116.00	Provided by DNR flat rate for all staff including overhead and expenses
	Site Manager	yr	NTS 2016		$ 108.00	NTS 4/22/16 letter Mid Level Professional
	Monitoring and Maintenance					
	Tailings Basin Geotechnical Instruments Field Work	event	NTS 2016		$ 7,686.00	NTS 4/22/16 letter inactive basin
	Tailings Basin Geotechnical Instruments Report	event	NTS 2016		$ 2,850.00	NTS 4/22/16 letter inactive basin
	Tailings Basin Geotechnical Inspection and Report	yr	Barr 2016		$ 17,500.00	Barr 4/1/16 letter inactive basin
	Landfill SW619 Maintenance and Monitoring	yr	NTS 2016		$ 21,957.00	NTS 4/22/16 letter
	Coal Ash Landfill Maintenance and Monitoring	yr	allowance		$ 2,640.00	PLM 2017 Budget
	Snow Plowing	yr	PolyMet 2016		$ 25,414.00	PolyMet Snow Plowing (average of 2 highest of 3 years)
	FTB Dam Containment System Maintenance	yr	allowance		$ 60,000.00	Allowance for maintaining flow in the drain pipe, maintaining surface water controls, repair of cutoff wall. Note most years will be much less but some could be more.
	Legacy Cell 2W Reclamation	yr	allowance		$ 1,000,000.00	Allowance for 6 years to provide stable slopes, adequate vegetation cover, and drainage provisions to resist erosion and route precipitation away from Cell 2W
	Category 1 Stockpile Cover System Maintenance	yr	allowance		$ 24,000.00	Allowance to cover (1) management of plants with deep, woody roots (2) monitoring of the soil surface cover for erosion and (3) repairing erosion damage
	Category 1 Stockpile Containment System Maintenance	yr	allowance		$ 15,000.00	Allowance to cover maintaining flow in the drain pipe, maintaining surface water controls and repairing the cutoff wall. Note that most years will be much less that this but some could be more.
	FTB Maintenance	yr	allowance		$ 10,000.00	PolyMet's experience with vegetation maintenance and erosion control at this facility indicates that $10,000 annually is sufficient for the whole facility once reclamation is complete and $60,000 a year during reclamation ramping down by $20,000 a year until $10,000 a year once reclamation has been completed.
	HRF Maintenance	yr	TBD		$ 10,000.00	Allowance
	Road Grader	hr	Ames 2017		$ 200.00	One grader with Operator Ames Email 11/13/17
	Road Maintenance	yr	calculation	one day per month	$ 19,200.00	One day per month.
	Road Maintenance (during Reclamation)	yr	calculation	one day per week for 9 months	$ 62,400.00	One day per week during 9 month construction season.

Estimate of FTE Required for Remote Alarm Response			
Shifts per week - manned	12	Day Shift Every Day + Afternoon Shift Weekdays	
Shift per week - unmanned	9		
Percent shifts unmanned	43%		
Shifts with alarms	5%	assume 5% of shifts have alarms	
Shifts with alarms requiring OT	2%		
Shifts per year	1092		
Shifts requiring OT	23.4		
Hrs per response	8	assume each OT alarm response generates 8 hrs OT	
OT hrs	187		
OT Premium	150%	assume time and a half for overtime	
Straight Time Hr equivalent to OT	281		
Annual Hrs for 3 FTE	6240		
Percent FTE to add for Alarm Response	5%		

Heavy Border with Bold Amounts are used in Reclamation Estimates

Dem-Con Companies General Waste in Keewatin:			
Truck CY	Truck $/Load	Fee /CY	source
29	$415.00	$10.00	4/27/17 emails Attachments I1 and I2

Pipe cut in 40' lengths and not crushed								Unit Cost	
Pipe Size	Pipe OD	Pipe V/ft	Load	Ft Pipe/Load	Transport	Tipping		Load	FT
In	In	CY/ft	CY	FT	Load	CY	Load	$	$
4	4.8	0.00465	29	6231	$415.00	$10.00	$290.00	$705.00	$0.11
6	6.9	0.00962	29	3015	$415.00	$10.00	$290.00	$705.00	$0.23
8	9.1	0.01673	29	1734	$415.00	$10.00	$290.00	$705.00	$0.41
10	11.4	0.02625	29	1105	$415.00	$10.00	$290.00	$705.00	$0.64
12	14.5	0.04247	29	683	$415.00	$10.00	$290.00	$705.00	$1.03

Liner assume 1" thick per acre after cutting and folding							Unit Cost	
Folded Thickness	Liner V/acre	Load	Acres/Load	Transport	Tipping		Load	acre
in/acre	CY/acre	CY	Acres	Load	CY	Load	$	$
1	134.444	29	5	$415.00	$10.00	$290.00	$705.00	$152.07

Mine Year 1	Cat 2/3		Cat 4		OSP	
	Ft*	Disposal $	Ft*	Disposal $	Ft*	Disposal $
Pipe Size	Overliner/Underdrain Piping		Underdrain Piping		Underdrain Piping	
In						
4	32,200	$3,643	14,000	$1,584	19,700	$2,229
6	9,600	$2,245	6,300	$1,473	7,400	$1,730
8	1,400	$569	1,200	$488	1,600	$651
10	2,000	$1,276	30	$19	900	$574
12	100	$103	60	$62	400	$413
Total Ft	45,300		21,590		30,000	
Total $		$7,837		$3,626		$5,597

Mine Year 11	Cat 2/3		Cat 4		OSP	
	Ft*	Disposal $	Ft*	Disposal $	Ft*	Disposal $
Pipe Size	Underdrain Piping		Underdrain Piping		Underdrain Piping	
In						
4	84,900	$9,606	31,000	$3,508	19,700	$2,229
6	25,100	$5,869	9,400	$2,198	7,400	$1,730
8	4,200	$1,708	1,200	$488	1,600	$651
10	5,100	$3,255	30	$19	900	$574
12	200	$207	60	$62	400	$413
Total Ft	119,500		41,690		30,000	
Total $		$20,644		$6,274		$5,597

* Lengths from Barr Changes Over Time Memo 11/15/17

Development of Total Pond and Sump Acres
Heavy Border with Bold Amounts are used in Reclamation Estimates
Mine Year 1 - Pond and Sump Acres from Barr Changes Over Time Memo 11/15/17

Pond	Included	Count	Acres	Liner	Liner Acres	Underdrain Pipe (ft)	Note
Mine Site WWTF Pond - 1	n	1	1	y	1		used long term
Mine Site WWTF Ponds	y	1	29.8	y	29.8		
Mine Site CPS Pond	n	1	1.3	n	0		used long term
Mine Site Ponds (unlined)	y	1	7	n	0		
Mine Site Ponds (lined)	y	4	12.4	y	12.4		
Category 4 Stockpile	y	1	4.5	y	4.5		
OSP	y	1	2.3	y	2.3		
Category 2/3 Stockpile	y	1	6.7	y	6.7		
Total		**9**	**62.7**		**55.7**	**4500**	Pipe ft from Barr Changes Over Time Memo 11/15/17

Mine Year 11 - Pond and Sump Acres from Barr Changes Over Time Memo 11/15/17

Pond	Included	Count	Acres	Liner	Liner Acres	Underdrain Pipe (ft)	Note
Mine Site WWTF Pond - 1	n	1	1	y	1		used long term
Mine Site WWTF Ponds	y	1	29.8	y	29.8		
Mine Site CPS Pond	n	1	1.3	n	0		used long term
Mine Site Ponds (unlined)	y	1	7	n	0		
Mine Site Ponds (lined)	y	6	16.1	y	16.1		
Category 4 Stockpile	y	1	4.5	y	4.5		
OSP	y	1	2.3	y	2.3		
Category 2/3 Stockpile	y	1	12.2	y	12.2		
Total		**11**	**71.9**		**64.9**	**6900**	Pipe ft from Barr Changes Over Time Memo 11/15/17

Mine Year 20 - Pond and Sump Acres from Barr Changes Over Time Memo 11/15/17

Pond	Included	Count	Acres	Liner	Liner Acres	Underdrain Pipe (ft)	Note
Mine Site WWTF Pond - 1	n	1	1	y	1		used long term
Mine Site WWTF Ponds	y	1	29.8	y	29.8		
Mine Site CPS Pond	n	1	1.3	n	0		used long term
Mine Site Ponds (unlined)	y	1	7	n	0		
Mine Site Ponds (lined)	y	6	16.1	y	16.1		
Category 4 Stockpile	y	0	0	y	0		
OSP	y	1	2.3	y	2.3		
Category 2/3 Stockpile	y	0	0	y	0		
Total		**9**	**55.2**		**48.2**	**6900**	Pipe ft from Barr Changes Over Time Memo 11/15/17

SOW 3: Category 1 Cover System: Year 0 (no waste rock on pile)

Barr Engineering Estimate based on permit level design on drawing SKP-003 and SKP-007 to SKP-010 from Appendix 4 of the PTM Application - May 2016 Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Cost Extension	Comments
1	Mobilization/Demobilization	LS	1	See Comments and Notes	$ 25,000	$ 25,000	To Be Determined By Contractor - Mob for General Earthwork, Site Grading and Vegetation Establishment
2	Environmental Protection Measures	LS	0	See Comments and Notes	$ -	$ -	Assume Environmental Protection Measures from Year 0 Site Work Remain In Place and Are Effective
3	Construction QA/QC	LS	1	See Comments and Notes	$ 5,000	$ 5,000	See Note 1.
4	Final Sloping of Category 1 Stockpile	AC	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; No Final Sloping
5	Furnish and Install 6-inch Geomembrane Bedding Layer	CY	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; No Geomembrane Bedding Layer
6	Furnish and Install 1-foot Granular Soil Cover above Geomembrane	CY	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; No Granular Soil Cover above Geomembrane
7	Furnish and Install 1.5-foot Rooting Zone above Granular Cover	CY	32,000	See Comments and Notes	$ 5.5	$ 176,000	Year 0 - 13 acre Area of Disturbance; assume 25% of 127,000 Cubic Yards Excavated is Replaced/Regraded to Facilitate Vegetation Establishment.
8	Furnish and Install 6-Inch Riprap Systems on Stockpile Covers	CY	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; Assume No Steep Slope and No Rip-Rap Required.
9	Furnish and Install 9-Inch Riprap Systems on Stockpile Covers	CY	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; Assume No Steep Slope and No Rip-Rap Required.
10	Furnish and Install 12-Inch Riprap Systems on Stockpile Covers	CY	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; Assume No Steep Slope and No Rip-Rap Required.
11	Furnish and Install 18-Inch Riprap Systems on Stockpile Covers	CY	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; Assume No Steep Slope and No Rip-Rap Required.
12	Furnish and Install Vegetation (grass) on Stockpile Cover Systems	Acre	13	See Comments and Notes	$ 635	$ 8,255	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulch. [D&T 4/5/16 letter]
			13				
13	Reseeding 5% of Vegetation on Stockpile Cover Systems	Acre	1	See Comments and Notes	$ 635	$ 445	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulch. [D&T 4/5/16 letter]
14	Procure and Install 40-mil Geomembrane - Textured	SF	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; No Geomembrane Cover
15	Furnish and Install Geotextile above and below Geomembrane	SF	0	See Comments and Notes	$ -	$ -	Year 0 - No Waste Rock Placed; No Geotextile Required
						$ 214,255	

Notes:

1) Limited QA/QC required. Assume limited amount of surveying for grade confirmation and site review and submittal review to confirm compliance of site restoration activities with specifications.

SOW 11: Hydromet Residue Facility: Year 0 (no residue, only grading/seeding)

Barr Engineering estimate based on permit level design on drawing HRF-003, HRF-005 and HRF-007 from Appendix 7 of the PTM Application - July 2016

Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Cost Extension	Comments
1	Mobilization and Demobilization	LS	1	See Comments and Notes	$ 5,000.00	$ 5,000	To Be Determined By Contractor - Mob for General Earthwork and Vegetation Establishment
2	Environmental Protection Measures	LS	1	See Comments and Notes	$ 5,000.00	$ 5,000	Assume Environmental Protection Measures for Year 0 Construction Remain In Place and Are Effective
3	Construction QA/QC	LS	1	See Comments and Notes	$ 2,000.00	$ 2,000	See Note 2
4.00	General Site Grading	CY	2000	See Comments and Notes	7.75	15500.00	Assume General Grading (not soil import) of 6" Surface in Isolated Areas (assume 2.5 acres) in Prep. for Vegetation Establishment.
5.00	Furnish and Install Vegetation on Disturbed Areas	Acre	5	See Comments and Notes	635.00	3175.00	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulch. [D&T 4/5/16 letter]
	Unit Cost Grade and Vegetate PreLoad Area Variable Only						
6	Reseeding 5% of Vegetation to Correct for Limited Growth	Acre	1	See Comments and Notes	$ 635.00	$ 635	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulch. [D&T 4/5/16 letter]
						$ 31,310	

Notes:

1) Per Hydrometallurgical Residue Management Plan v4 DEC2014 Figure 4-1; Year 0 Activities Include Removal of Various Structures, Rock and Soil from the HRF Footprint Prior Initiation of Year 1 - Lift 1 Pre-Load. Some limited tree clearing and grubbing also anticipated. Assume 20-percent of 25-acre Pre-Load Footprint is Disturbed in Year 0 in Preparation for Access and Delivery of Preload Materials in Year 1.1

2) Limited QA/QC required. Assume limited amount of site review and submittal review to confirm compliance of site restoration activities with specifications.

SOW 14: Flotation Tailings Basin: Year 0 (without NorthMet Tailings)

Barr Engineering estimate based on permit level design on drawing FTB-003 and FTB-005 from Appendix 6 of the PTM Application - July 2016 (updated April 2017 and November 2017)

Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Cost Extension	Comments
1	Mobilization and Demobilization	LS	1	See Comments and Notes	$ 52,000.00	$ 52,000	To Be Determined By Contractor - Mob for General Earthwork, Site Grading and Vegetation Establishment
2	Environmental Protection Measures	LS	-	See Comments and Notes	$ -	$ -	Construction is within FTB Footprint. Assume Dust Control is Ancillary to Earthwork Items and no Additional Environmental Protection Measures are Required.
3	LTVSMC Coarse Tailings Borrow Area Regrading Quantity	CY	105,000	See Comments and Notes	$ 2.50	$ 262,500	See Note 1
4	LTVSMC Coarse Tailings Borrow Area - Seed, Mulch and Fertilize	Acre	65	See Comments and Notes	$ 730.00	$ 47,450	See Note 2 [$1985 replaced by $730 D&T]
			65				
5	LTVSMC Coarse Tailings Borrow Area - Reseeding 5% of Vegetation to Correct for Limited Growth	Acre	3.25	See Comments and Notes	$ 1,985.00	$ 6,451	
6	Dam - Exterior Face Bentonite Augmentation	Acre	-	See Comments and Notes	$ -	$ -	Performed Incrementally as Routine Construction Item Through-out Year 0; Already Complete - No Additional Action Required
7	Dam - Exterior Face Seed, Mulch and Fertilize	Acre	-	See Comments and Notes	$ -	$ -	Performed Incrementally as Routine Construction Item Through-out Year 0; Already Complete - No Additional Action Required
8	Beach Area and Dam Crest - Remove and Replace 30" Tailings Cover Layer to Facilitate Bentonite Augmentation of Soil Layer 30" Below Beach Surface	Acre	-	See Comments and Notes	$ -	$ -	No Flotation Tailings Deposition at End of Year 0 - This Item Not Required
9	Beach Area and Dam Crest - Till Bentonite to 18" Depth	Acre	-	See Comments and Notes	$ -	$ -	No Flotation Tailings Deposition at End of Year 0 - This Item Not Required
10	Beach Area and Dam Crest - Compact 18" Layer of Bentonite Amended Soil	Acre	-	See Comments and Notes	$ -	$ -	No Flotation Tailings Deposition at End of Year 0 - This Item Not Required
11	Beach Area and Dam Crest - Lightly Compact Upper Cover Layer	Acre	-	See Comments and Notes	$ -	$ -	No Flotation Tailings Deposition at End of Year 0 - This Item Not Required
12	Beach Area and Dam Crest - Seed, Fertilize and Mulch (Establish Vegetation on New Dam Construction Areas (Lift 1 Crest and Interior Slope) Only - Vegetation Already In Place Elsewhere. Estimated Restoration Length is 7,000' and Estimated Restoration Width is 250'.)	Acre	40	See Comments and Notes	$ 880.00	$ 35,200	Commercial Fertilizer and Seed for Tailings Basin Slopes – Supply/Apply/Incorporate @ 200 lb/acre [D&T 4/5/16 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulch. [D&T 4/5/16 letter]
13	Beach Area and Dam Crest - Reseeding 5% of Vegetation to Correct for Limited Growth	Acre	2	See Comments and Notes	$ 880.00	$ 1,760	Commercial Fertilizer and Seed for Tailings Basin Slopes – Supply/Apply/Incorporate @ 200 lb/acre [D&T 4/5/16 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulch. [D&T 4/5/16 letter]
14	Pond Bottom - Bentonite Amended Pond Bottom	Acre	-	See Comments and Notes	$ -	$ -	No Flotation Tailings Deposition at End of Year 0 - This Item Not Required
						$ 405,361	

Notes:

1) Tailings Borrow Area Regrading Quantity Based on Assumed Borrow Area Disturbance times Average 1.0-foot Re-Grading Thickness Through-out to Facilitate Turf Establishment.

2) LTVSMC Coarse Tailings Borrow Area Disturbance Estimated from Permit Support Drawings - Flotation Tailings Basin Sheet FTB-003 and Assumed Year 0 Borrow Areas of 25% of Cell 1E/2E Splitter Dam Borrow Area and 25% of Cell 2W/2E Splitter Dam Borrow Area

SOW 21: Category 1 Groundwater Containment System: Year 0

Barr Engineering estimate based on permit level design on drawing GCS-003, GCS-010 and GCS-011 from Appendix 4 of the PTM Application - July 2016

Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Cost Extension	Comments
1	Mobilization and Demobilization	LS	1	See Comments and Notes	$ 15,000.00	$ 15,000	To Be Determined By Contractor - Mob for General Earthwork, Site Grading and Vegetation Establishment
2	Environmental Protection Measures	LS	0	See Comments and Notes	$ -	$ -	Assume Environmental Protection Measures from Year 0 Construction Remain in Place and Are Effective. Assume Dust Control is Ancillary to Earthwork Activities.
3	Construction QA/QC	LS	1	See Comments and Notes	$ 3,000.00	$ 3,000	Includes General Confirmatory Survey and Periodic Reclamation Review
4	Cutoff Wall Breach for CRE	CY	3400	See Comments and Notes	$ 10.00	$ 34,000	Assume 5' Thick Cutoff Wall - 8' Wide Breach at 200-Foot Spacing with Average Breach Depth of 10' and Average Trench Excavation Slopes of 1H:1V [8'x{(10'x10')+(5'x10')}] /27 Breach = 45 CY/Breach for 15,000'
5	Cutoff Wall Breach Backfill for CRE	CY	3400	See Comments and Notes	$ 10.00	$ 34,000	Assume 5' Thick Cutoff Wall - 8' Wide Breach at 200-Foot Spacing with Average Breach Depth of 10' and Average Trench Excavation Slopes of 1H:1V [8'x{(10'x10')+(5'x10')}] /27 Breach = 45 CY/Breach for 15,000'
6	Seepage Collection Pipe Modifications for CRE	LF	0	See Comments and Notes	$ -	$ -	No Seepage Collection Pipe Modifications Anticipated
7	Riser Pipe Modifications for CRE	LS	75	See Comments and Notes	$ 400.00	$ 30,000	Quantity Unconfirmed - Assume 200' Riser Pipe Spacing. Assume Risers are Cut Off Below Ground Surface, Filled with Granular Soil, and Capped with Solid Cap
8	Mine Drainage Ditch Modifications for CRE	CY	21000	See Comments and Notes	$ 10.00	$ 210,000	Assume Ditch is Backfilled Using Adjacent Berm and Roadway Soil. Quantity is [(2.5'x3') + (10'x3')]/27 Per Foot of Trench = 1.4 CY/LF for 15,000 LF
9	Berm Modifications for CRE	CY	0	See Comments and Notes	$ -	$ -	Ancillary to Mine Drainage Ditch Modifications
10	Stormwater Ditch Modifications for CRE	CY	25500	See Comments and Notes	$ 10.00	$ 255,000	Assume Ditch is Backfilled Using Adjacent Berm and Roadway Soil. Quantity is [(3'x3') + (12'x3')]/27 Per Foot of Trench = 1.7 CY/LF for 15,000 LF
11	Perimeter Dike Modifications for CRE	CY	0	See Comments and Notes	$ -	$ -	Ancillary to Perimeter Ditch Modifications
12	Sump/Manhole Modifications	LS	3	See Comments and Notes	$ 1,000.00	$ 3,000	Remove and Salvage Manhole Internals, Remove and Recycle Upper Manhole Riser Section, Fill Manhole with Granular Material and Restore to Surrounding Grade
13	Furnish and Install Vegetation on Disturbed Areas (Assume Average Width of Restoration Zone is 100' and add 20% Additional for Misc. Restoration Areas; 100'x15,000' +20% = 1,800,000 SF = 41 Acre Assume Average Width of Restoration Zone is 100' and add 20% Additional for Misc. Restoration Areas; 100'x15,000' +20% = 1,800,000 SF = 41 Acre)	AC	41	See Comments and Notes	$ 635.00	$ 26,035	Barr 2016 Fee Schedule Average of Mid Level Engineer [Barr 2016] + Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]
14	Reseeding 5% of Vegetation to Correct for Limited Growth	AC	2	See Comments and Notes	$ 635.00	$ 1,302	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulch. [D&T 4/5/16 letter]
						$ 611,337	

Demo Estimate from Lakehead/Rachel, Mavo and Arrowhead Consulting & Testing

	Lakehead / Rachel 2016 (Attachments E and F)						Mavo 2016 (Attachment C)	Arrowhead Consulting & Testing 2016 (Attachment D)		
Scope of Work Description	Universal Waste Collection	Galbestos Removal	Demolition	Total Demo	Site Restoration	Recovery (not used - see Summary Scrap Value tab))	Asbestos Lead Paint Mold	Pre Demo Insp	Demo To Rollup	Abatement To Rollup
Pre-Demolition Services										
Legacy with construction				$1,650,850	$4,500	$1,125	$20,500	$4,800	$1,655,350	$25,300
Additive Building & Heating Plant				$1,593,300			Included in Lakehead's total demo			in Main Plant Area below
Bentonite silos				inc in above			n/a			
Area 2 Water Tower (price separate from Heating & Additives buildings)			$30,000	$30,000	$2,500	$1,125	n/a			
Legacy Tailings Basin Buildings - Demoed as part of construction										
Foreman's Office (Bldg. 718)			$9,350	$9,350	$400		$6,500	$1,100		
Reporting Building (Bldg. 719)			$9,900	$9,900	$400		$6,500	$1,100		
Lube House (Bldg. 720)			$2,500	$2,500	$400		$2,500	$850		
Reporting Building (Bldg. 724)			$3,300	$3,300	$400		$2,500	$900		
Lube Oil Building (Bldg. 725)			$2,500	$2,500	$400		$2,500	$850		
Legacy Area 1				$351,597	$97,319	$41,000	$97,500	$850	$448,916	$98,350
Area 1 Shop and Truck Storage (Bldg. 220)	$2,900	$106,900	$103,332	$213,132	$74,669	$37,000	$82,500			
Area 1 Cold Storage (Bldg. 221)	$400	$48,970	$10,860	$60,230	$13,400	$2,800	$5,000			
Area 1 Reporting Building (Bldg. 231)			$9,900	$9,900			$5,000	$850		
Area 1 Boiler House (Bldg. 226)	$200	$13,500	$9,875	$23,575	$3,000	$200	$2,500			
Area 1 Fire Pump House & Water Tank (Bldg. 228)	$410		$11,250	$11,660			$2,500			
Area 1 Locomotive Fueling	$500	$22,500	$10,100	$33,100	$6,250	$1,000				
Legacy Area 2				$474,042	$82,785	$18,315	$164,700	$2,650	$556,827	$167,350
Area 2 Service Shop (Bldg. 201)	$2,200	$160,900	$38,990	$202,090	$37,334	$10,940	$93,050			
Area 2 Truck Storage (Bldg. 202)	$2,000	$63,190	$9,175	$74,365	$13,988	$3,075	$3,000			
Area 2 Cold Storage (204)	$697	$42,560	$13,080	$56,337	$14,100	$1,700	$3,000			
Area 2 Shop Locomotive Service Shop (Bldg. 203)	$3,400	$20,500	$12,300	$36,200	$11,113	$1,625	$52,150			
Area 2 Locomotive Fueling	$2,000	$20,900	$11,800	$34,700	$6,250	$975	$2,500			
Hose House (Bldg. 209) Not to be used in project		$3,000	$9,150	$12,150			$2,500	$850		
Sample House (Bldg. 208) Not to be used in project		$25,400	$20,300	$45,700			$5,000	$950	main plan areas inc tunnels	
Reporting Building (Bldg. 425) Not to be used in project		$3,300	$9,200	$12,500			$3,500	$850	$19,888,937	$5,962,607

Demo Estimate from Lakehead/Rachel, Mavo and Arrowhead Consulting & Testing

	Lakehead / Rachel 2016						Mavo 2016	Arrowhead Consulting & Testing 2016		
Scope of Work Description	Universal Waste Collection	Galbestos Removal	Demolition	Total Demo	Site Restoration	Recovery (not used - see Summary Scrap Value tab))	Asbestos Lead Paint Mold	Pre Demo Insp	Demo To Rollup	Abatement To Rollup
Legacy Plant Area				$13,305,631	$3,223,306	$2,890,406	$3,807,340	$2,200	$16,528,937	$3,809,540
Rebuild Shop (Bldg 602)	$3,000	$70,200	$125,600	$198,800	$27,560	$13,940	$85,000			
General Shop (Bldg. 601) Includes Acetylene Building (Bldg.604)	$15,000	$199,190	$353,600	$567,790	$182,300	$113,796	$480,800			
Carpenter Shop (Bldg. 603)	$2,000	$10,200	$13,250	$25,450	$3,300	$100	$2,500			
Coarse Crusher	$10,000	$313,345	$1,551,800	$1,875,145	$593,890	$199,325	$1,070,618			
Drive House 1 conv and housings	$7,500	$165,569	$141,540	$314,609	$46,900	$41,050	incl. in above			
Drive House 2 inc conv and housings		inc in above	inc in above	inc in above	inc in above	inc in above	incl. in Fines Crusher			
Fine Crusher	$45,000	$302,430	$1,373,460	$1,720,890	$203,400	$205,250	$439,686			
Warehouse 49 (Bldg. 920)	$6,500	$27,586	$82,800	$116,886	$15,947	$5,350	$49,000			
Warehouse 45 (Bldg. 921, Electrical)	$2,500	$35,159	$72,700	$110,359	$15,947	$3,590	$13,500			
Lube House (Bldg. 926)	$578	$17,000	$20,550	$38,128	$7,385	$1,600	$52,000			
Rubber Shop (Bldg. 605)	$1,000	$30,464	$36,550	$68,014	$11,269	$5,150	$24,000			
Concentrator Building and Thickeners	$100,000	$1,248,260	$5,895,850	$7,244,110	$1,145,998	$2,141,430	$1,535,236			
A-Lab	$500	$9,400	$14,560	$24,460	$2,940	$2,450	included in Concentrator			
Hinsdale Bridge	$0	$16,700	$616,300	$633,000	$15,200	$148,500	n/a			
Water Reservoir	$5,000		$98,100	$103,100	$914,400	$7,750	n/a			
Plant Site Water Tower			$30,000	$30,000	$2,500	$1,125	n/a			
Water Treatment Plant & Storage Tanks	$1,000	$20,000	$72,600	$93,600	$2,250		$45,000			
Colby Pump House (potential deduct depends on variance request)		$41,000	$8,260	$49,260	$1,500		$2,500	$1,000	$50,760	$3,500
Ad Building inc UST	$3,900		$157,935	$161,835	$18,200		$850,000		$180,035	$850,000
Main Gate	$100		$11,400	$11,500	$875		$5,000	$900	$12,375	$5,900
Booster Pump House #1	$300		$23,500	$23,800	$9,200		included in Concentrator		$243,170	$859,400
Sewage Treatment Plant	$0		$62,700	$62,700	$19,520		$5,000	$900		
Portable Pump Houses	$0		$9,890	$9,890	$3,400		n/a			
Return Water Barge	$0		$44,900	$44,900			$5,000	$1,300		
General Infrastructure (railroads, tunnels, roadways, etc)					$1,504,000	$237,500			$1,504,000	
Legacy Railroads	$0		$380,000	$380,000					$380,000	
Legacy Tunnels	$0		$1,856,000	$1,856,000			$2,127,767		$1,856,000	$2,127,767
Galleries							included in Concentrator			
Sanitary Systems and Wells			$17,500	included in associated areas						
Pipelines					$591,000				$2,879,000	
Colby Lake Pipeline (potential deduct depends on variance request)			$900,000	$900,000	$98,000					
Inter-Pit Pipeline from Reservoir to Areas 1 & 2			$562,000	$562,000						
Natural Gas Pipeline Removal			$150,000	$150,000						
Legacy PipeLines Tailings management above ground			$378,000	$378,000						
Legacy PipeLines Tailings management below ground			$200,000	$200,000						
Legacy Power Lines	$0		$97,810	$97,810					$97,810	
Legacy Roads/Parking Lots	$0		$465,000	$465,000	$195,000				$660,000	

Demo Estimate from Lakehead/Rachel, Mavo and Arrowhead Consulting & Testing

	Lakehead / Rachel 2016						Mavo 2016	Arrowhead Consulting & Testing 2016		
Scope of Work Description	Universal Waste Collection	Galbestos Removal	Demolition	Total Demo	Site Restoration	Recovery (not used - see Summary Scrap Value tab))	Asbestos Lead Paint Mold	Pre Demo Insp	Demo To Rollup	Abatement To Rollup
New - Phase 1 - Plant Site				$2,190,000	$689,000					
Flotation Plant and Reagent Building	$75,000		$621,800	$696,800	$147,600	$242,500			$844,400	
Concentrate Storage and Loadout Facility	$12,000		$273,760	$285,760	$48,100	$37,500			$333,860	
Plant Site Sewage Treatment Plant	$1,000		$118,000	$118,000	$30,000				$148,000	
Railroads	$0		$185,000	$185,000	$111,000				$296,000	
Pipelines	$0		$1,555,000	$1,555,000	$375,000				$1,930,000	
Power Lines	$0			$0	$0				$0	
Roads and Parking Lots	$0			$0	$0				$0	
Plant Site Wastewater Treatment Plant (WWTP) Ponds not included	$0		$245,000	$245,000					$245,000	
New - Phase 1 - Mine Site										used long term
Maintenance Service and Fueling Facility	$1,100		$19,210	$20,310	$7,300	$1,200			$27,610	
Rail Transfer Hopper	$1,100		$40,000	$41,100	$45,000	$1,200			$86,100	
Rail Transfer Hopper Control Bldg	$100		$18,600	$18,700					$18,700	
Rail Transfer Hopper Platform			$60,000	$60,000					$60,000	
Central Pumping Station	$500		$14,000	$14,500	$1,200				$15,700	
Railroads	$0		$45,000	$45,000	$33,750				$78,750	
Pipelines	$0		$580,133	$580,133	$217,000				$797,133	
Power Lines	$0		$83,900	$83,900	$0	$7,175			$83,900	
Roads and Parking Lots	$0		$392,000	$392,000	$132,000				$524,000	
Mine Site Wastewater Treatment Facility (WWTF)	$0		$498,000	$498,000	$14,000				$512,000	
New - Phase 2				$10,735,100	$97,375					
Reagent Building	$15,000		$820,000	$835,000	$4,100	$22,500				
Oxygen Plant	$65,000		$4,238,600	$4,303,600	$16,600	$72,500				
Limestone Preparation	$7,500		$345,000	$352,500	$1,750	$12,500				
Hydrometallurgical Plant	$49,000		$4,365,000	$4,414,000	$13,500	$62,500				
Hydrometallurgical Reagents	$15,000		$815,000	$830,000	$2,200	$17,500				
Railroads	$0									
Pipelines	$0		$1,450,000							
Power Lines	$0									
Roads and Parking Lots	$0		$156,000		$59,225					

	Lakehead	Mavo
Totals	$31,155,813	$7,087,707
Mine Site	$2,203,893	$0
less Mine Site	$28,951,920	$7,087,707

Appendix A-2

Financial Assurance Calculations – MY1 and MY2

MY1 and MY2 Financial Assurances are calculated based on two cost estimates:

1. Reclamation costs
2. Long term costs

- The Financial Assurance obligation for year (n) will be the year (n+1) financial liability up until the maximum financial liability year, which will be mine year 11 in the current plan.
- The Financial Assurance obligation for year (n) will be calculated in year (n-1) using (n-1) dollars with no allowance for inflation or discounting.
- Estimated costs will be based on third party contractors (not PolyMet or DNR) completing the work. The estimates will allow for the contractor to earn a profit on his labor, supplies, and equipment plus an allowance for risk and contingency.
- Cost estimates will be updated on an annual basis. The updates will include:
    - Adjustments for inflation. Costs should be adjusted according to changes in the Bureau of Labor Statistics Consumer Price Index.
    - Changes to contractor estimates. Contractor estimates can be used for determining costs of some items. The estimates will be renewed every year.
    - Updates based on actual site data and operating records. Estimated quantities of materials will be updated to reflect actual site conditions as mining progresses. Operating data from water treatment plants and maintenance activities will be used to revise future estimates.
- DNR will provide additional guidance on cost estimates for specific items. The guidance will reflect preferred estimating methods and detailed information obtained from experience working on previous cost estimates for this site.

Reclamation Costs

The methods that will be used to develop reclamation cost estimates include:

- Reclamation is assumed to be completed within 3 years, therefore reclamation costs are not discounted.
- A 10% contingency is included in the cost estimate.
- Financial assurance must be posted for the full value of reclamation liability until each component of the work has been completed to the DNR's satisfaction. The total amount of financial assurance will fluctuate annually as the liability increases and decreases. A percentage of the posted financial assurance will be withheld after 100% of the reclamation has been completed until the DNR has determined that the reclamation for each component is successful.
- The mine and plant site are 8 miles apart, so they are costed separately. During mining, the annual cost to reclaim the site will change as the amount of disturbance changes, as the amount

of material that must be moved to complete the required reclamation changes, and as the unit costs change as a function of revised distance, haul routes, and costs of equipment owning and operating, labor and supplies. The costs will be estimated using engineering cost estimating principles, or quotes from qualified suppliers and contractors.

- The work required to reclaim some of the cost components such as the demolition and reclamation of facility structures, roads, etc. will not change over time. The annual costs for these components will only need to be adjusted for inflation unless DNR elects to update the detailed estimate using revised costs and/or alternative methods.
- The size of the equipment available to contractors will be limited to equipment that can be transported to the job site over the highway without disassembling and reassembling the frames, boxes, etc. This maximum allowable weight and height that can be hauled on the highways is also a factor that controls the maximum size of the loader/truck, depending on how easy it is to disassemble and reassemble the components. This is a practical issue that can be revisited over time as the equipment becomes more modularized.
- Either of two methods will be used to estimate the costs.
    1. Use mining/civil engineering cost estimating principles to estimate the quantities, the distances, the equipment/labor production rates to compute the fleet hours to complete the work, and then multiply the fleet hours by the cost per hour for the labor and equipment. This method is preferred, because it can easily be modified each year to update revised fuel, labor and equipment costs, and then adjusted to reflect the required haul hours if the distances change.
    2. Use contractor estimates. This method is acceptable, but the DNR will need to determine the reliability of the estimate and may require backup or an independent engineering estimate.

Long Term Cost

The methods that will be used to develop long term cost estimates include:

- Future costs are discounted to the Net Present Value (NPV) at a 2.9% discount rate.
- A 15% contingency is included in the cost estimate.
- Water treatment plant operation and site maintenance activities will be required long term. For cost estimating purposes, these ongoing activities costs are estimated to last for 100 years. This 100-year limit is standard practice among other federal and state mining regulation agencies.
- Costs must include environmental liability insurance as specified in the applicable special conditions. At the time of permit issuance the Permittee must provide documentation of a minimum of $10,000,000 in existing environmental liability insurance for the project. The required amount of environmental liability insurance will increase over time as conditions change.
- Cost estimates require:
    - Detailed modeling of the climate to estimate the amount of precipitation and evaporation,

- Detailed modelling of the anticipated geochemistry to estimate the rate and amount of metals and sulfates that would be expected depending on the oxidation rates and closure scenario, and
- Modeling of different water treatment methods to treat the anticipated water flow rates and water chemistry to the State water discharge standards.

Estimates of the annual cost to operate the plant and pumps will be made using current unit costs for the capital and operating costs. This is a complex calculation that contains many assumptions and predictions.

Discount Methodology

The discount rate amount must consider the fluctuations of the investment and inflation. The DNR considered several approaches to perform this calculation and determined that a low risk method was to assume that on the average the difference between the growth of the fund and inflation would be 2.9%, and that all future costs in constant dollars would be discounted to present value at 2.9% per year.

Mathematically the present value of $100 ten years from today discounted at 2.9% will be:

$$\text{Present Value} = 100/(1+i)^n = 100/(1+2.9\%)^{10} = \$75.13$$

The Net Present Value (NPV) is the sum of each of the individual annual present values. For example, the Year 100 present value would be the Year 100 cost multiplied by $1/(1.029)^{100} = 0.057$. Therefore, the discount factor for 100 years at 2.9% is 0.057. The present value of $100 one hundred years from today discounted at 2.9% per year is $5.73.

Annual costs are discounted from mid-year.

Current Financial Liability Estimates for MY1 and MY2

Financial liability estimates will be revised on an annual basis. The estimates presented here illustrate the cost estimating methods used, but the actual estimated costs will be revised before MY1 using the procedures described above.

Financial liability estimates are shown on the attached spreadsheets and are summarized in Table 1.

Table 1. Financial liability estimates for MY1 and MY2

MY1 Reclamation Costs	$133,621,573
MYI Long Term Costs	$410,101,543
Total	**$543,723,116**
MY2 Reclamation Costs	$156,513,552
MY2 Long Term Costs	$431,822,050
Total	**$588,335,602**

MY1 Financial Liability Estimates

Appendix A-1 Mine Year 1 Reclamation Estimate

12/7/2017

Includes Demo of Legacy Buildings (less Abatement and buildings demoed during Construction), Project Buildings, AOCs, Project Construction and Project Operational Disturbances as of the end of MY1

	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note
Reclamation Total with Indirects		Quantities from Barr Changes Over Time Memo Unless Noted			$133,621,573	$121,898,444	FA for Cash Amount
Contingency	10.0%				$11,380,656	$10,382,126	
Adaptive Management	2.0%				$2,225,563	$2,030,658	
Engineering Redesign	2.0%				$2,225,563	$2,030,658	
Performance Bond	1.0%				$1,138,066	$1,038,213	
Prime Contractor Markup	2.5%				$2,845,164	$2,595,531	
Mobilization	4.0%				$0	$0	
Reclamation Total (no Indirects)					$113,806,561	$103,821,258	
Mine Site					$48,879,815	$44,999,799	
General Reclamation							
Stockpile Relocation					$21,462,374	$19,982,800	
Cat 2/3 - rock	Unit $ Reclamation	5,238,766	Tons	$2.39	$12,545,466	$11,680,606	From Cat 2/3 stockpile to floor of East Pit [Ames 2016]
Cat 2/3 - sat overburden	Unit $ Reclamation	192,150	Tons	$2.39	$460,149	$428,427	From Cat 2/3 stockpile to floor of East Pit [Ames 2016]
Cat 4 - rock	Unit $ Reclamation	1,489,201	Tons	$1.79	$2,664,886	$2,481,174	From Cat 4 stockpile to floor of East Pit [Ames 2016]
Cat 4 - sat overburden	Unit $ Reclamation	192,150	Tons	$1.79	$343,847	$320,143	From Cat 4 stockpile to floor of East Pit [Ames 2016]
OSP - rock	Unit $ Reclamation	2,275,000	Tons	$2.39	$5,448,026	$5,072,450	From OSP to floor of East Pit [Ames 2016]
Stockpile Footprint Reclamation					$4,236,751	$3,833,506	
Cat 2/3					$2,152,208	$1,947,365	
Drain Pipe Removal and Prep for Transport	Unit $ Reclamation & Pipe-Liner Off Site Disposal	45,300	LF	$15.00	$679,500	$614,827	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
Pipe Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	1	LS	$7,837	$7,837	$7,091	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Liner/Soil Cover Removal and Liner Prep for Transport	Unit $ Reclamation	63	Acre	$8,600	$541,800	$490,233	Remove and haul to Eastor West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there. [Ames 2016]
Liner Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	63	Acre	$152	$9,580	$8,669	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Cover Area (Acres) and Depth (Inches)		63	Acres Inches	24			to calculate CY
Cover Volume (CY) and Haul Distance (Miles)		203,280	CY Miles	1.5			
Cover - Ovb/Soil (24" thick)	Unit $ Reclamation	203,280	CY	$4.40	$894,906	$809,730	Soil Overburden Relocation (excavate, load and dump) [Ames 2016] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016]
Seeding	Unit $ Reclamation	63	Acres	$295	$18,585	$16,816	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]
Cat 4					$946,242	$856,181	
Drain Pipe Removal and Prep for Transport	Unit $ Reclamation & Pipe-Liner Off Site Disposal	21,590	LF	$15.00	$323,850	$293,027	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
Pipe Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	1	LS	$3,626	$3,626	$3,281	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Liner/Soil Cover Removal and Liner Prep for Transport	Unit $ Reclamation	29	Acre	$8,600	$249,400	$225,663	Remove and haul to Eastor West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there. [Ames 2016]
Liner Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	29	Acre	$152	$4,410	$3,990	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Cover Area (Acres) and Depth (Inches)		29	Acres Inches	24			to calculate CY
Cover Volume (CY) and Haul Distance (Miles)		93,573	CY Miles	1.2			
Cover - Ovb/Soil (24" thick)	Unit $ Reclamation	93,573	CY	$3.81	$356,401	$322,479	Ames 2016 - Soil Overburden Relocation (excavate, load and dump) [Ames 2016] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016]
Seeding	Unit $ Reclamation	29	Acres	$295	$8,555	$7,741	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]
OSP					$1,138,301	$1,029,960	
Drain Pipe Removal and Prep for Transport	Unit $ Reclamation & Pipe-Liner Off Site Disposal	30,000	LF	$15.00	$450,000	$407,170	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
Pipe Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	1	LS	$5,597	$5,597	$5,064	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Liner/Soil Cover Removal and Liner Prep for Transport	Unit $ Reclamation	32	Acre	$8,600	$275,200	$249,007	Remove and haul to Eastor West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there. [Ames 2016]
Liner Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	32	Acre	$152	$4,866	$4,403	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Cover Area (Acres) and Depth (Inches)		32	Acres Inches	24			to calculate CY
Cover Volume (CY) and Haul Distance (Miles)		103,253	CY Miles	1.2			
Cover - Ovb/Soil (24" thick)	Unit $ Reclamation	103,253	CY	$3.81	$393,198	$355,774	Soil Overburden Relocation (excavate, load and dump) [Ames 2016] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016]
Seeding	Unit $ Reclamation	32	Acres	$295	$9,440	$8,542	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]

01/01/18 07/01/19 07/01/20 07/01/21 07/01/22

$112,869,961 $102,973,571

2.9%

				Year of Closure			
				1	2	3	4
				MY			
6 Yr Tot	NPV	Operating	Hold	3	4	5	
12,545,466	11,680,606	0	0	12,545,466	0	0	
460,149	428,427	0	0	460,149	0	0	
2,664,886	2,481,174	0	0	2,664,886	0	0	
343,847	320,143	0	0	343,847	0	0	
5,448,026	5,072,450	0	0	5,448,026	0	0	
679,500	614,827	0	0	0	679,500	0	
7,837	7,091	0	0	0	7,837	0	
541,800	490,233	0	0	0	541,800	0	
9,580	8,669	0	0	0	9,580	0	
894,906	809,730	0	0	0	894,906	0	
18,585	16,816	0	0	0	18,585	0	
323,850	293,027	0	0	0	323,850	0	
3,626	3,281	0	0	0	3,626	0	
249,400	225,663	0	0	0	249,400	0	
4,410	3,990	0	0	0	4,410	0	
356,401	322,479	0	0	0	356,401	0	
8,555	7,741	0	0	0	8,555	0	
						0	
450,000	407,170	0	0	0	450,000	0	
5,597	5,064	0	0	0	5,597	0	
275,200	249,007	0	0	0	275,200	0	
4,866	4,403	0	0	0	4,866	0	
393,198	355,774	0	0	0	393,198	0	
9,440	8,542	0	0	0	9,440	0	

Mine Year 1 Reclamation Estimate

Includes Demo of Legacy Buildings (less Abatement and buildings demoed during Construction), Project Buildings, AOCs, Project Construction and Project Operational Disturbances as of the end of MY1

	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note
Reclamation Total with Indirects		Quantities from Barr Changes Over Time Memo Unless Noted			$133,621,573	$121,898,444	FA for Cash Amount
Contingency	10.0%				$11,380,656	$10,382,126	
Adaptive Management	2.0%				$2,225,563	$2,030,658	
Engineering Redesign	2.0%				$2,225,563	$2,030,658	
Performance Bond	1.0%				$1,138,066	$1,038,213	
Prime Contractor Markup	2.5%				$2,845,164	$2,595,531	
Mobilization	4.0%				$0	$0	
Reclamation Total (no Indirects)					$113,806,561	$103,821,258	
OSLA					$146,091	$128,461	
Grade Stockpiles of Overburden and Peat	Unit $ Reclamation	41.8	Acres	$3,200	$133,760	$117,618	No hauling of material, Mid size dozer work. [Ames 2017]
Seeding acres	Unit $ Reclamation	41.8	Acres	$295	$12,331	$10,843	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 4/5/16 letter]
Pit					$365,200	$330,441	
Prepare for Fencing	Unit $ Reclamation	12,100	LF	$9.00	$108,900	$98,535	Ames 2016
Pit Fence - Barb Wire 4 Strand	Unit $ Reclamation	1,100	LF	$8.00	$8,800	$7,962	MnDOT Standard Plate 9323 Rev. D [Ames 2016]
Pit Fence - Non Climbable	Unit $ Reclamation	11,000	LF	$22.00	$242,000	$218,967	MnDOT Standard Plate 9322 Rev. K [Ames 2016]
Gates	Unit $ Reclamation	1	EA	$5,500	$5,500	$4,977	Gate for access road / pit ramp; MnDOT Standard Plate 9322 Rev. K 20' Wide Vehicular Gate (Double Gate) [Ames 2016]
Reduce and Grade Overburden Wall				$0			Overburden sloped and seeded as part of mining - cover of setback area not required by non-ferrous rules (FEIS WQ modeling assumed not covered)
Plant Seed Mix				$0			
Ponds and Sumps					$434,317	$392,979	
Ponds Clean out	Ponds and Sumps	9	EA	$5,000	$45,000	$40,717	Break-out sumps/ clean-out ponds [Ames 2016]
Restore Pond Footprint	Ponds and Sumps	63	Acres	$6,000	$376,200	$340,394	Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill [Ames 2016]
Liner Disposal in Off Site Solid Waste Landfill	Ponds and Sumps & Pipe-Liner Off Site Disposal	56	Acres	$152	$8,470	$7,664	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Pipe Disposal in Off Site Solid Waste Landfill	Ponds and Sumps & Pipe-Liner Off Site Disposal	4,500	LF	$1.03	$4,646	$4,204	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]
Rail Transfer Hopper					$0	$0	
Haul RTH waste rock to East Pit, Plus Grading					$0		Construct Platform with MDNR approved rock. Cover with 2ft soil and vegetate included with Demo below
Construction					$20,558,890	$18,852,792	
Cat 1 Stockpile Cover	SOW3 Cat 1 Cover Sys UC (Yr 1)	1	LS	$19,104,918	$19,104,918	$17,537,207	Engineer estimate: Barr Engineering Estimate based on permit level design on drawing SKP-011, SKP-013 and SKP-032-035 from Appendix 4 of the PTM Application - May
Cat 1 Stockpile Cont Sys Ext	SOW21 Cat 1 Cont Sys UC (Yr 1)	1	LS	$1,453,972	$1,453,972	$1,315,586	Engineer estimate: Barr Engineering estimate based on permit level design on drawing GCS-003 and GCS-010 to 013 from Appendix 4 of the PTM Application - July 2016
Demo					$1,676,193	$1,478,819	Lakehead / Rachel 2016 (Attachments E and F)
Fueling and Maintenance Facility	Demo	1	LS	$27,610	$27,610	$24,982	
Rail Transfer Hopper	Demo	1	LS	$86,100	$86,100	$77,905	
Rail Transfer Hopper Control Bldg	Demo	1	LS	$18,700	$18,700	$16,920	
Rail Transfer Hopper Platform	Demo	1	LS	$60,000	$60,000	$54,289	
Central Pumping Station	Demo	0	LS	$15,700	$0	$0	used long term
Railroads	Demo	1	LS	$78,750	$78,750	$69,247	
Pipelines	Demo	1	LS	$797,133	$797,133	$700,936	
Power Lines	Demo	1	LS	$83,900	$83,900	$73,775	
Roads and Parking Lots	Demo	1	LS	$524,000	$524,000	$460,765	
Wasteweater Treatment Facility	Demo	0	LS	$512,000	$0	$0	Not constructed under WWTS plan

01/01/18 07/01/19 07/01/20 07/01/21 07/01/22

$112,869,961 $102,973,571

2.9%

				Year of Closure			
				1	2	3	4
				MY			
6 Yr Tot	NPV	Operating	Hold	3	4	5	
133,760	117,618	0	0	0	0	133,760	
12,331	10,843	0	0	0	0	12,331	
108,900	98,535	0	0	0	108,900	0	
8,800	7,962	0	0	0	8,800	0	
242,000	218,967	0	0	0	242,000	0	
5,500	4,977	0	0	0	5,500	0	
45,000	40,717	0	0	0	45,000	0	
376,200	340,394	0	0	0	376,200	0	
8,470	7,664	0	0	0	8,470	0	
4,646	4,204	0	0	0	4,646	0	
19,104,918	17,537,207	0	0	9,552,459	9,552,459	0	
1,453,972	1,315,586	0	0	0	1,453,972	0	
27,610	24,982	0	0	0	27,610	0	
86,100	77,905	0	0	0	86,100	0	
18,700	16,920	0	0	0	18,700	0	
60,000	54,289	0	0	0	60,000	0	
0	0	0	0	0	0	0	
78,750	69,247	0	0	0	0	78,750	
797,133	700,936	0	0	0	0	797,133	
83,900	73,775	0	0	0	0	83,900	
524,000	460,765	0	0	0	0	524,000	
0	0	0	0	0	0	0	

Mine Year 1 Reclamation Estimate

Includes Demo of Legacy Buildings (less Abatement and buildings demoed during Construction), Project Buildings, AOCs, Project Construction and Project Operational Disturbances as of the end of MY1

	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note
Reclamation Total with Indirects		Quantities from Barr Changes Over Time Memo Unless Noted			$133,621,573	$121,898,444	FA for Cash Amount
Contingency	10.0%				$11,380,656	$10,382,126	
Adaptive Management	2.0%				$2,225,563	$2,030,658	
Engineering Redesign	2.0%				$2,225,563	$2,030,658	
Performance Bond	1.0%				$1,138,066	$1,038,213	
Prime Contractor Markup	2.5%				$2,845,164	$2,595,531	
Mobilization	4.0%				$0	$0	
Reclamation Total (no Indirects)					$113,806,561	$103,821,258	
Plant Site					$62,398,345	$56,533,084	
General Reclamation		$1	LS		$249,669	$232,457	
HRF Disturbance	SOW11 HRF Cover Sys UC (Yr 1)	1	LS	$249,669	$249,669	$232,457	Engineer Estimate: Barr Engineering estimate based on permit level design on drawing HRF-007 from Appendix 7 of the PTM Application - July 2016
Construction					$26,299,932	$23,978,818	
FTB Bentonite Amendment (pond, beach, dam top)	SOW14 FTB Cover Sys UC (Yr 1)	1	LS	$26,060,393	$26,060,393	$23,755,792	Engineer Estimate: Barr Engineering estimate based on permit level design on drawing FTB-005, FTB010 and FTB-024 from Appendix 6 of the PTM Application - July 2016 (updated April 2017 and November 2017)
FTB Overflow	SOW 14 FTB Emerg Oflow (Yr 1)	1	LS	$239,539	$239,539	$223,026	Engineer Estimate: Barr Engineering estimate based on permit level design on drawing FTB-xxx to FTB-xxx - April 2017
Demo and Abatement					$28,706,920	$25,852,155	
Legacy Structure Removal							Lakehead / Rachel 2016 (Attachments E and F)
Area 1 Shop Buildings	Demo	1	LS	$448,916	$448,916	$417,969	
Area 2 Shop Buildings	Demo	1	LS	$556,827	$556,827	$518,440	
Main Plant Area - Demoed in Construction	Demo	0	LS	$1,655,350	$0	$0	
Main Plant Area	Demo	1	LS	$19,888,937	$19,888,937	$17,999,627	
Main Gate Colby PH Ad Bldg	Demo	1	LS	$243,170	$243,170	$226,406	
Roads	Demo	1	LS	$660,000	$660,000	$580,352	
Railroads	Demo	1	LS	$380,000	$380,000	$334,142	
Power System	Demo	1	LS	$97,810	$97,810	$86,006	
Piping System	Demo	1	LS	$2,879,000	$2,879,000	$2,531,567	
Legacy Asbestos Abatement							Arrowhead Consulting & Testing 2016 (Attachment D) and Mavo 2016 (Attachment C)
Area 1 Shop Buildings	Demo	0	LS	$98,350	$0	$0	
Area 2 Shop Buildings	Demo	0	LS	$167,350	$0	$0	
Main Plant Area	Demo	0	LS	$5,962,607	$0	$0	
Main Gate Colby PH Ad Bldg	Demo	0	LS	$859,400	$0	$0	
Project Phase 1							Lakehead / Rachel 2016 (Attachments E and F)
Flotation Plant and Reagent Building	Demo	1	LS	$844,400	$844,400	$764,188	
Concentrate Storage and Loadout Facility	Demo	1	LS	$333,860	$333,860	$302,146	
Plant Site Sewage Treatment Plant	Demo	1	LS	$148,000	$148,000	$133,941	
Railroads	Demo	1	LS	$296,000	$296,000	$260,279	
Pipelines	Demo	1	LS	$1,930,000	$1,930,000	$1,697,091	
Power Lines	none constructed						
Roads and Parking Lots	none constructed						
Plant Site Wastewater Treatment Plant	Demo	0	LS	$245,000	$0	$0	used long term
Other					$7,141,825	$6,469,654	
AST Removal	AST	1	LS	$223,625	$223,625	$208,209	Lakehead / Rachel 2016 (Attachments E and F)
AOCs	AOC	1	LS	$6,918,200	$6,918,200	$6,261,445	Legacy Remediation - Areas of Concern (AOC) - costs from detailed spreadsheets by NTS [2016] (see Attachment G)
Project Management					$2,528,400	$2,288,375	
Project Manager - annual $ / FTE - calc from hourly rate	Unit $ Reclamation	$286,000	$/yr $/hr	$137.50			Barr 2016 Fee Schedule Average of Top Level Engineer [Barr 2016]
Project Manager		1	FTE	$286,000	$858,000	$776,549	
Project Managers Light Truck	Unit $ Reclamation	15,000	miles	$0.70	$31,500	$28,510	NTS Letter of 4/21/16
Project Engineer - annual $ / FTE - calc from hourly rate	Unit $ Reclamation	$223,600	$/yr $/hr	$107.50			Barr 2016 Fee Schedule Average of Mid Level Engineer [Barr 2016]
Project Engineers		1	FTE	$223,600	$670,800	$607,120	
Engineer's Light Truck	Unit $ Reclamation	15,000	miles	$0.70	$31,500	$28,510	NTS Letter of 4/21/16
Project Inspector - annual $ / FTE - calc from hourly rate	Unit $ Reclamation	$145,600	$/yr $/hr	$70.00			Barr 2016 Fee Schedule Average of Technician I [Barr 2016]
Project Inspectors		2	FTE	$291,200	$873,600	$790,668	
Inspector's Light Truck	Unit $ Reclamation	30,000	miles	$0.70	$63,000	$57,019	NTS Letter of 4/21/16

01/01/18 07/01/19 07/01/20 07/01/21 07/01/22

$112,869,961 $102,973,571

2.9%

				Year of Closure			
				1	2	3	4
				MY			
6 Yr Tot	NPV	Operating	Hold	3	4	5	
249,669	232,457	0	0	249,669	0	0	
26,060,393	23,755,792	0	0	13,030,196	6,515,098	6,515,098	
239,539	223,026	0	0	239,539	0	0	
448,916	417,969	0	0	448,916	0	0	
556,827	518,440	0	0	556,827	0	0	
0	0	0	0	0	0	0	
19,888,937	17,999,627	0	0	4,972,234	9,944,469	4,972,234	
243,170	226,406	0	0	243,170	0	0	
660,000	580,352	0	0	0	0	660,000	
380,000	334,142	0	0	0	0	380,000	
97,810	86,006	0	0	0	0	97,810	
2,879,000	2,531,567	0	0	0	0	2,879,000	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
844,400	764,188	0	0	211,100	422,200	211,100	
333,860	302,146	0	0	83,465	166,930	83,465	
148,000	133,941	0	0	37,000	74,000	37,000	
296,000	260,279	0	0	0	0	296,000	
1,930,000	1,697,091	0	0	0	0	1,930,000	
0	0	0	0	0	0	0	
223,625	208,209	0	0	223,625	0	0	
6,918,200	6,261,445	0	0	2,306,067	2,306,067	2,306,067	
858,000	776,549	0	0	286,000	286,000	286,000	
31,500	28,510	0	0	10,500	10,500	10,500	
670,800	607,120	0	0	223,600	223,600	223,600	
31,500	28,510	0	0	10,500	10,500	10,500	
873,600	790,668	0	0	291,200	291,200	291,200	
63,000	57,019	0	0	21,000	21,000	21,000	

Mine Year 1 Long Term

Includes 100 Years of MDNR Administration, Site Mgr,Water Treatment,Cover System Maintenance, Monitoring/Reporting (Dam Safety and Landfill) , Snowplowing/Road Maint and Vehicles

	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note
Long Term Total with Indirects					$1,181,141,669	$410,101,543	FA for NPV Amount
Contingency	15.0%				$148,891,223	$51,700,321	
Adaptive Management	2.0%				$17,930,987	$6,218,365	
Contractor Supplies Markup	2.5%				$21,711,307	$7,514,049	
Long Term Total (no Indirects)					$992,608,152	$344,668,807	
Water Treatment					$859,066,077	$293,489,498	
Plant Site					$752,055,909	$252,187,506	
Treatment O&M less Labor (Years 1 to 3)		1	Annual	$2,910,240	$8,730,720	$8,367,299	Annual $ from Barr Water Treatment Memo
Treatment O&M less Labor (Years 4 to 5)		1	Annual	$5,804,160	$11,608,320	$10,355,456	
Treatment O&M less Labor (Years 6 to 9)		1	Annual	$6,543,329	$26,173,316	$21,437,039	
Treatment O&M less Labor (Years 10 to 100)		1	Annual	$5,315,501	$483,710,591	$133,011,153	
Labor - annual $ / FTE - calc from hourly rate	Unit $ Long Term	$95,653	$/yr $/hr	$45.99			MN DOLI #102 Dec 2016 Skilled Labor * 1.15 to cover employment costs
Factor for off shift alarm response	Unit $ Long Term	105%	factor				Estimate of FTE Required for Remote Alarm Response
Labor - annual $ from annual FTE		3.14	FTE	$299,873	$29,987,333	$9,883,433	
Facility Replacement (Year 2 to 100)		1	Annual	$1,804,316	$178,627,284	$57,688,978	Annual $ from Barr Water Treatment Memo
Facility Expansion		1	LS	$11,783,623	$11,783,623	$10,971,283	
Labor - annual $ / FTE - calc from hourly rate	Unit $ Long Term	$143,472	$/yr $/hr	$ 68.98			MN DOLI #707 Dec 2016 Electrician * 1.15 to cover employment costs
Specialized Maintenance		0.1	Annual	$14,347	$1,434,722	$472,865	
Mine Site					$107,010,168	$41,301,992	
Treatment O&M less Labor (Years 1 to 3)		1	Annual	$2,452,740	$7,358,220	$7,051,930	Annual $ from Barr Water Treatment Memo
Treatment O&M less Labor (Years 4 to 6)		1	Annual	$1,237,709	$3,713,127	$3,265,923	
Facility Replacement (Year 2 to 100)		1	Annual	$969,079	$95,938,821	$30,984,139	
Maintenance and Monitoring					$37,483,275	$16,332,881	
Maintenance					$21,504,000	$10,545,235	
Snow Plowing	Unit $ Long Term	1	Annual	$25,414	$2,541,400	$837,612	PolyMet Snow Plowing (average of 2 highest of 3 years)
Road Maintenance - After Reclamation	Unit $ Long Term	1	Annual	$19,200	$1,862,400	$579,162	One grader with Operator Ames Email 11/13/17 One day per month.
Road Maintenance - During Reclamation	Unit $ Long Term	1	Annual	$62,400	$187,200	$174,347	One grader with Operator Ames Email 11/13/17 One day per week during 9 month construction season.
Category 1 Stockpile Cover Maintenance	Unit $ Long Term	1	Annual	$24,000	$2,328,000	$722,006	Allowance to cover (1) management of plants with deep, woody roots (2) monitoring of the soil surface cover for erosion and (3) repairing erosion damage
Category 1 Stockpile Containment System Maintenance	Unit $ Long Term	1	Annual	$15,000	$1,455,000	$451,254	Allowance to cover maintaining flow in the drain pipe, maintaining surface water controls and repairing the cutoff wall. Note that most years will be much less that this but some could be more.
FTB Erosion Maintenance	Unit $ Long Term	1	Annual	$10,000	$1,190,000	$504,213	PolyMet's experience with vegetation maintenance and erosion control at this facility indicates that $10,000 annually is sufficient for the whole facility once reclamation is complete and $60,000 a year during reclamation ramping down by $20,000 a year until $10,000 a year once reclamation has been completed.
FTB Seepage Containment System Maintenance	Unit $ Long Term	1	Annual	$60,000	$5,940,000	$1,918,366	Allowance for maintaining flow in the drain pipe, maintaining surface water controls, repair of cutoff wall. Note most years will be much less but some could be more.
Legacy Cell 2W Reclamation	Unit $ Long Term	1	Annual	$1,000,000	$6,000,000	$5,358,275	Allowance for 6 years to provide stable slopes, adequate vegetation cover, and drainage provisions to resist erosion and route precipitation away from Cell 2W
Monitoring					$15,979,275	$5,787,647	
Water Quality Monitoring - first 5 years	Water Quality Samp-Anal-Rep	1	Annual	$202,193	$1,010,965	$942,071	12/yr surface water & 4/yr groundwater
Water Quality Monitoring - long term		1	Annual	$109,664	$10,418,080	$3,103,428	9/yr surface water & 1/yr groundwater
Dam Safety Monitoring	Unit $ Long Term	1	Annual	$38,572	$3,857,200	$1,271,283	NTS estimate for annual instrumentation data collection and report (2 events) - Barr estimate for geotechnical inspection and report
Landfill Monitoring and Maintenance SW619 (30yrs)	Unit $ Long Term	1	Annual	$21,957	$658,710	$442,201	NTS 4/22/16 letter
Landfill Monitoring and Maintenance Coal Ash (13yrs)	Unit $ Long Term	1	annual	$2,640	$34,320	$28,663	PLM 2017 Budget
Other					$2,871,400	$2,351,796	
NMT Development		1	Total	$2,871,400	$2,871,400	$2,351,796	From Non-Mechanical Treatment Memo - adjusted (-$75,000) for work already done
Site Administration and Management					$93,187,400	$32,494,632	
Site Manager - Holding and Reclamation	Unit $ Long Term	1.0	FTE	$224,640	$1,123,200	$1,046,658	NTS 4/22/16 letter Mid Level Professional
Site Manager -Long Term	Unit $ Long Term	0.5	FTE	$112,320	$10,670,400	$3,178,591	NTS 4/22/16 letter Mid Level Professional
DNR - Holding	Unit $ Long Term	4.0	FTE	$965,120	$965,120	$951,535	Provided by DNR flat rate for all staff including overhead and expenses
DNR - Reclamation	Unit $ Long Term	4.0	FTE	$965,120	$2,895,360	$2,696,566	
DNR - Long Term	Unit $ Long Term	2.0	FTE	$482,560	$46,325,760	$14,080,496	
DNR - Legal	Unit $ Long Term	2.0	FTE	$482,560	$482,560	$475,767	
Misc Energy Services		1.0	Annual	$25,000	$2,400,000	$729,469	allowance
Facility Insurance		1.0	Annual	$150,000	$15,000,000	$4,943,804	estimate from insurance broker
Environmental Insurance		1.0	Annual	$100,000	$10,000,000	$3,295,869	$10M coverage with 1% premium
Pickup Truck (25,000 mi x $0.70/mi)	Unit $ Long Term	25,000	Annual	$17,500	$1,750,000	$576,777	NTS Letter of 4/21/16
Pump Maint Truck (15,000 mi x $1.05/mi)	Unit $ Long Term	15,000	Annual	$15,750	$1,575,000	$519,099	NTS Letter of 4/21/16 x 1.5 to cover truck with lift

Calendar Year	Start of Year 01/01/18	Bankruptcy 07/01/18	07/01/19	07/01/20	07/01/21	07/01/22	07/01/23	07/01/24	07/01/25	07/01/26	07/01/27	07/01/28
	2018		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
992.608	344.669	7.953										Year 11 Continues to Year 100
	2.9%	Operating	Hold	Backfilling			Flushing			Flooding				Pit Oflow	
100 Yr Tot	NPV		1	2	3	4	5	6	7	8	9	10	11
8.731	8.367	0	2.910	2.910	2.910	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11.608	10.355	0	0.000	0.000	0.000	5.804	5.804	0.000	0.000	0.000	0.000	0.000	0.000
26.173	21.437	0	0.000	0.000	0.000	0.000	0.000	6.543	6.543	6.543	6.543	0.000	0.000
483.711	133.011	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.316	5.316
29.987	9.883	0	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
178.627	57.689	0	0.000	1.804	1.804	1.804	1.804	1.804	1.804	1.804	1.804	1.804	1.804
11.784	10.971	0	0.000	0.000	11.784	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.435	0.473	0	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
7.358	7.052	0	2.453	2.453	2.453	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.713	3.266	0	0.000	0.000	0.000	1.238	1.238	1.238	0.000	0.000	0.000	0.000	0.000
95.939	30.984	0	0.000	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
2.541	0.838	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
1.862	0.579	0	0.019	0.000	0.000	0.000	0.019	0.019	0.019	0.019	0.019	0.019	0.019
0.187	0.174	0	0.000	0.062	0.062	0.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.328	0.722	0	0.000	0.000	0.000	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
1.455	0.451	0	0.000	0.000	0.000	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
1.190	0.504	0	0.010	0.060	0.060	0.060	0.040	0.020	0.010	0.010	0.010	0.010	0.010
5.940	1.918	0	0.000	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060
6.000	5.358	0	0.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000
1.011	0.942	0	0.202	0.202	0.202	0.202	0.202	0.000	0.000	0.000	0.000	0.000	0.000
10.418	3.103	0	0.000	0.000	0.000	0.000	0.000	0.110	0.110	0.110	0.110	0.110	0.110
3.857	1.271	0	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039
0.659	0.442	0	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
0.034	0.029	0	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
2.871	2.352	0	0.000	0.000	0.000	0.000	0.000	0.718	0.718	0.718	0.718	0.000	0.000
1.123	1.047	0	0.225	0.225	0.225	0.225	0.225	0.000	0.000	0.000	0.000	0.000	0.000
10.670	3.179	0	0.000	0.000	0.000	0.000	0.000	0.112	0.112	0.112	0.112	0.112	0.112
0.965	0.952	0	0.965	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.895	2.697	0	0.000	0.965	0.965	0.965	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46.326	14.080	0	0.000	0.000	0.000	0.000	0.483	0.483	0.483	0.483	0.483	0.483	0.483
0.483	0.476	0	0.483	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.400	0.729	0	0.000	0.000	0.000	0.000	0.025	0.025	0.025	0.025	0.025	0.025	0.025
15.000	4.944	0	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
10.000	3.296	0	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
1.750	0.577	0	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
1.575	0.519	0	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016

MY2 Financial Liability Estimates

Mine Year 2 Reclamation

Includes Demo of Legacy Buildings (less Abatement and buildings demoed during Construction), Project Buildings, AOCs, Project Construction and Project Operational Disturbances as of the end of MY2	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Cash %	Apply Mob% y/n	Note
Reclamation Total with Indirects					**$156,506,017**	**$133,339,771**			FA for Cash Amount
Contingency	**10.0%**				**$13,330,801**	**$11,358,048**			
Adaptive Management	**2.0%**				**$2,598,736**	**$2,211,438**			
Engineering Redesign	**2.0%**				**$2,598,736**	**$2,211,438**			
Performance Bond	**1.0%**				**$1,333,080**	**$1,135,805**			
Prime Contractor Markup	**2.5%**				**$3,332,700**	**$2,839,512**			
Mobilization	**4.0%**				**$3,949**	**$3,046**			
Reclamation Total (no Indirects)					**$133,308,014**	**$113,580,484**	**100.0%**		
Mine Site					$69,104,620	$56,078,046	48.7%		
General Reclamation									
Stockpile Relocation					$38,124,322	$31,136,934	26.8%		
Cat 2/3 - rock	Unit $	11,025,659	Tons	$2.39	$26,403,553	$21,564,336			From Cat 2/3 dump to floor of East Pit
Cat 2/3 - sat overburden	Unit $	219,051	Tons	$2.39	$524,570	$428,427			From Cat 2/3 dump to floor of East Pit
Cat 4 - rock	Unit $	2,566,936	Tons	$1.79	$4,593,464	$3,751,578			From Cat 4 dump to floor of East Pit
Cat 4 - sat overburden	Unit $	219,051	Tons	$1.79	$391,986	$320,143			From Cat 4 dump to floor of East Pit
OSP - rock	Unit $	2,593,500	Tons	$2.39	$6,210,750	$5,072,450			From OSP to floor of East Pit
Stockpile Footprint Reclamation					$5,087,130	$4,037,674	3.6%		
Cat 2/3					$2,520,206	$2,000,296			
Drain Pipe Removal and Prep for Transport	Unit $	55,974	LF	$15.00	$839,610	$666,401			Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe.
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	1	LS	$9,336	$10,643	$8,447			Transport and Tipping Fees
Liner/Soil Cover Removal and Liner Prep for Transport	Unit $	72	Acre	$8,600	$617,652	$490,233			Remove and haul to East or West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there.
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	72	Acre	$152	$10,922	$8,669			Transport and Tipping Fees
Cover - Ovb/Soil (24" thick)	Unit $	231,739	CF	$4.40	$1,020,192	$809,730			Soil Overburden Relocation (excavate, load and dump) plus Soil Overburden Relocation (haul cost/cubic yard/mile) (1.5 mile haul)
Seeding	Unit $	72	Acres	$295	$21,187	$16,816			Purchase and apply seed and fertilizer
Cat 4					$1,248,833	$991,203			
Drain Pipe Removal and Prep for Transport	Unit $	35,864	LF	$15.00	$537,966	$426,986			Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe.
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	1	LS	$4,802	$5,474	$4,345			Transport and Tipping Fees
Liner/Soil Cover Removal and Liner Prep for Transport	Unit $	33	Acre	$8,600	$284,316	$225,663			Remove and haul to East or West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there.
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	33	Acre	$152	$5,027	$3,990			Transport and Tipping Fees
Cover - Ovb/Soil (24" thick)	Unit $	106,674	CF	$3.81	$406,297	$322,479			Soil Overburden Relocation (excavate, load and dump) plus Soil Overburden Relocation (haul cost/cubic yard/mile) (1.2 mile haul)
Seeding	Unit $	33	Acres	$295	$9,753	$7,741			Purchase and apply seed and fertilizer
OSP					$1,318,092	$1,046,174			
Drain Pipe Removal and Prep for Transport	Unit $	35,568	LF	$15.00	$533,520	$423,457			Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe.
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	1	LS	$5,517	$6,289	$4,992			Transport and Tipping Fees
Liner/Soil Cover Removal and Liner Prep for Transport	Unit $	36	Acre	$8,600	$313,728	$249,007			Remove and haul to East or West Pit. Assume avg. 9" thick soil/rock layer (1,200 CY/acre) to be included with geomembrane liner removal. Liner would be excavated with material and hauled to stockpile. Liner would then be sorted out where visible and left there.
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	36	Acre	$152	$5,548	$4,403			Transport and Tipping Fees
Cover - Ovb/Soil (24" thick)	Unit $	117,709	CF	$3.81	$448,245	$355,774			Soil Overburden Relocation (excavate, load and dump) plus Soil Overburden Relocation (haul cost/cubic yard/mile) (1.2 mile haul)
Seeding	Unit $	36	Acres	$295	$10,762	$8,542			Purchase and apply seed and fertilizer
OSLA					$110,159	$84,970	0.1%		
Grade Stockpiles of Overburden and Peat	SRCE	39	Acres	$2,547	$98,725	$76,150		y	Calculate from SRCE (MY1 Yards Row 85)
Seeding 43 acres	Unit $	39	Acres	$295	$11,434	$8,820			Purchase and apply seed and fertilizer
Pits					$735,898	$584,696	0.5%		
Prepare for Fencing	Unit $	24,282	LF	$9.00	$218,538	$173,454			
Pit Fence - Barb Wire 4 Strand	Unit $	1,596	LF	$8.00	$12,768	$10,134			MnDOT Standard Plate 9323 Rev. D
Pit Fence - Non Climbable	Unit $	22,686	LF	$22.00	$499,092	$396,131			MnDOT Standard Plate 9322 Rev. K
Gates	Unit $	1	EA	$5,500	$5,500	$4,977			Gate for access road / pit ramp; MnDOT Standard Plate 9322 Rev. K 20' Wide Vehicular Gate (Double Gate)
Reduce and Grade Overburden Wall				$0					Overburden sloped and seeded as part of mining - cover of setback area not required by non-ferrous rules (FEIS WQ modeling assumed not covered)
Plant Seed Mix				$0					
Sumps and Ponds					$248,577	$197,297	0.2%		
Ponds Clean out	Ponds & Unit $	13	EA	$5,000	$62,700	$49,765			Break-out sumps/ clean-out ponds
Restore Pond Footprint	Ponds & Unit $	29	Acres	$6,000	$176,472	$140,066			Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill
Liner Disposal in Off Site Solid Waste Landfill	Pons & pipe-liner off site disposal	27	Acres	$152	$4,109	$3,261			Transport and Tipping Fees
Pipe Disposal in Off Site Solid Waste Landfill	Ponds & pipe-liner off site disposal	5,130	LF	$1.03	$5,297	$4,204			Transport and Tipping Fees
Rail Transfer Hopper					$0	$0			
Haul RTH waste rock to East Pit, Plus Grading					$0				Construct Platform with MDNR approved rock. Cover with 2ft soil and vegetate included with Demo below
Construction					$23,122,339	$18,599,333			
Cat 1 Stockpile Cover	SOW3 Cat 1 Cover Sys UC (Yr 1)	1	LS	$18,830,084	$21,466,295	$17,284,925			detailed estimate on Support Tab

Mine Year 2 Reclamation

Includes Demo of Legacy Buildings (less Abatement and buildings demoed during Construction), Project Buildings, AOCs, Project Construction and Project Operational Disturbances as of the end of MY2	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Cash %	Apply Mob% y/n	Note
Reclamation Total with Indirects					**$156,506,017**	**$133,339,771**			FA for Cash Amount
Contingency	**10.0%**				**$13,330,801**	**$11,358,048**			
Adaptive Management	**2.0%**				**$2,598,736**	**$2,211,438**			
Engineering Redesign	**2.0%**				**$2,598,736**	**$2,211,438**			
Performance Bond	**1.0%**				**$1,333,080**	**$1,135,805**			
Prime Contractor Markup	**2.5%**				**$3,332,700**	**$2,839,512**			
Mobilization	**4.0%**				**$3,949**	**$3,046**			
Reclamation Total (no Indirects)					**$133,308,014**	**$113,580,484**	**100.0%**		
Cat 1 Stockpile Cont Sys Ext	SOW21 Cat 1 Cont Sys UC (Yr 1)	1	LS	$1,452,670	$1,656,044	$1,314,408			detailed estimate on Support Tab
Demo					$1,676,193	$1,437,142	1.3%		
Maintenance Service and Fueling Facility	Demo	1	LS	$27,610	$27,610	$24,278			
Rail Transfer Hopper	Demo	1	LS	$86,100	$86,100	$75,710			
Rail Transfer Hopper Control Bldg	Demo	1	LS	$18,700	$18,700	$16,443			
Rail Transfer Hopper Platform	Demo	1	LS	$60,000	$60,000	$52,759			
Central Pumping Station	Demo	0	LS	$15,700	$0	$0			used long term
Railroads	Demo	1	LS	$78,750	$78,750	$67,295			
Pipelines	Demo	1	LS	$797,133	$797,133	$681,182			
Power Lines	Demo	1	LS	$83,900	$83,900	$71,696			
Roads and Parking Lots	Demo	1	LS	$524,000	$524,000	$447,779			
Wasteweater Treatment Facility	Demo	0	LS	$512,000	$0	$0			Not constructed under WWTS plan
Plant Site					$60,832,194	$54,493,856	48.6%		
General Reclamation			LS		$249,669	$232,457			
HRF Disturbance	SOW11 HRF Cover Sys UC (Yr 1)	1	LS	$249,669	$249,669	$232,457			detailed estimate on Support Tab
Construction					$24,733,781	$22,456,108	19.7%		
FTB Bentonite Amendment	SOW14 FTB Cover Sys UC (Yr 1)	1	LS	$24,286,126	$24,494,242	$22,233,083			detailed estimate on Support Tab
FTB Overflow	SOW 14 FTB Emerge Oflow (Yr 1)	1	LS	$239,539	$239,539	$223,026			detailed estimate on Support Tab
Demo and Abatement					$28,706,920	$25,423,028	23.0%		
Legacy Structure Removal		0							
Area 1 Shop Buildings	Demo	1	LS	$448,916	$448,916	$417,969			
Area 2 Shop Buildings	Demo	1	LS	$556,827	$556,827	$518,440			
Main Plant Area - Demoed in Construction	Demo	0	LS	$1,655,350	$0	$0			
Main Plant Area	Demo	1	LS	$19,888,937	$19,888,937	$17,742,362			
Main Gate Colby PH Ad Bldg	Demo	1	LS	$243,170	$243,170	$226,406			
Roads	Demo	1	LS	$660,000	$660,000	$563,996			
Railroads	Demo	1	LS	$380,000	$380,000	$324,725			
Power System	Demo	1	LS	$97,810	$97,810	$83,583			
Piping System	Demo	1	LS	$2,879,000	$2,879,000	$2,460,221			
Legacy Asbestos Abatement									
Area 1 Shop Buildings	Demo	0	LS	$98,350	$0	$0			
Area 2 Shop Buildings	Demo	0	LS	$167,350	$0	$0			
Main Plant Area	Demo	0	LS	$5,962,607	$0	$0			
Main Gate Colby PH Ad Bldg	Demo	0	LS	$859,400	$0	$0			
Project Phase 1									
Flotation Plant and Reagent Building	Demo	1	LS	$844,400	$844,400	$753,266			
Concentrate Storage and Loadout Facility	Demo	1	LS	$333,860	$333,860	$297,827			
Plant Site Sewage Treatment Plant	Demo	1	LS	$148,000	$148,000	$132,027			
Railroads	Demo	1	LS	$296,000	$296,000	$252,944			
Pipelines	Demo	1	LS	$1,930,000	$1,930,000	$1,649,262			
Power Lines		none constructed							
Roads and Parking Lots		none constructed							
Plant Site Wastewater Treatment Plant	Demo	0	LS	$245,000	$0	$0			used long term
Other					$7,141,825	$6,382,262	5.7%		
AST Removal	AST	1	LS	$223,625	$223,625	$208,209			
AOCs	AOC	1	LS	$6,918,200	$6,918,200	$6,174,054			
Site Administration and Maintenance					$3,371,200	$3,008,582	2.7%		
Final Engineering (Bid Package)		0	LS	$390,000	$0	$0			Final Engrg memo - $390K to get bid spec for construction
Project Manager - annual $ / FTE - calc from hourly rate	Unit $	286,000	$/yr $/hr	$137.50					Barr 2016 Fee Schedule Average of Top Level Engineer
Project Manager	Sum of Years	1	FTE	$286,000	$1,144,000	$1,020,947			
Project Managers Light Truck	Unit $	15,000	miles	$0.70	$42,000	$37,482			NTS Letter of 4/21/16
Project Engineer - annual $ / FTE - calc from hourly rate	Unit $	223,600	$/yr $/hr	$107.50					Barr 2016 Fee Schedule Average of Mid Level Engineer
Project Engineers	Sum of Years	1	FTE	$223,600	$894,400	$798,195			
Engineer's Light Truck	Unit $	15,000	miles	$0.70	$42,000	$37,482			NTS Letter of 4/21/16
Project Inspector - annual $ / FTE - calc from hourly rate	Unit $	145,600	$/yr $/hr	$70.00					Barr 2016 Fee Schedule Average of Technician I
Project Inspectors	Sum of Years	2	FTE	$291,200	$1,164,800	$1,039,510			
Inspector`s Light Truck	Unit $	30,000	miles	$0.70	$84,000	$74,965			NTS Letter of 4/21/16

Mine Year 2 Long Term								432								
Includes 100 Years of MDNR Administration, Site Mgr,Water Treatment,Cover System Maintenance, Monitoring/Reporting (Dam Safety and Landfill) , Snowplowing/Road Maint and Vehicles							Apply MU	$0.18		Start of Year	Bankruptcy					
	Support Tab	Quantity	Units	Unit $	Cash $	NPV $				01/01/18	07/01/18	07/01/19	07/01/20	07/01/21	07/01/22	07/01/23
Long Term Total with Indirects					**$1,244,406,255**	**$431,822,050**			Calendar Year		2018	2019	2020	2021	2022	2023
Contingency	**15.0%**				**$159,877,160**	**$55,479,596**										
Adaptive Management	**2.0%**				**$18,681,364**	**$6,478,478**	**S+L**									
Contractor Supplies Markup	**2.5%**				**$22,595,702**	**$7,826,310**	**S**				10.874					
Contractor Labor Markup	**5.0%**				**$1,664,357**	**$543,576**	**L**									
Long Term Total (no Indirects)					**$1,041,587,673**	**$361,494,089**			2.9%	Operating	Hold	Backfilling		Flushing		
								100 Yr Tot	NPV	1		2	3	4	5	6
Water Treatment					**$868,843,672**	**$296,240,701**										
Plant Site					**$759,895,346**	**$253,928,593**										
Treatment O&M less Labor (Years 1 to 3)	Sum of Years	1	Annual	$2,910,240	**$8,730,720**	$8,367,299	S	8.731	8.367	0	2.910	2.910	2.910	0.000	0.000	0.000
Treatment O&M less Labor (Years 4 to 6)	Sum of Years	1	Annual	$5,804,160	$11,608,320	$10,355,456	S	11.608	10.355	0	0.000	0.000	0.000	5.804	5.804	0.000
Treatment O&M less Labor (Years 7 to 9)	Sum of Years	1	Annual	$6,543,329	**$26,173,316**	**$21,437,039**	S	26.173	21.437	0	0.000	0.000	0.000	0.000	0.000	6.543
Treatment O&M less Labor (Years 10 to 100)	Sum of Years	1	Annual	$5,315,501	**$489,026,092**	**$133,311,069**	S	489.026	133.311	0	0.000	0.000	0.000	0.000	0.000	0.000
Labor - annual $ / FTE - calc from hourly rate	Unit $	$95,659	$/yr $/hr	$45.99												
Labor - annual $ from annual FTE	Sum of Years	3.14	FTE	$300,370	$30,337,359	$9,916,746	L	30.337	9.917	0	0.300	0.300	0.300	0.300	0.300	0.300
Facility Replacement (Year 1 to 100)	Sum of Years	1	Annual	$1,804,316	**$182,235,916**	**$59,569,701**	S	182.236	59.570	0	1.804	1.804	1.804	1.804	1.804	1.804
Facility Expansion		1	LS	$11,783,623	**$11,783,623**	**$10,971,283**	S	11.784	10.971	0	0.000	0.000	11.784	0.000	0.000	0.000
Labor - annual $ / FTE - calc from hourly rate	Unit $	$143,478	$/yr $/hr	$68.98												
Specialized Maintenance		0.1	Annual	$14,348	**$1,434,784**	**$459,550**	L	1.435	0.460	0	0	0.014	0.014	0.014	0.014	0.014
Mine Site					**$108,948,326**	**$42,312,108**										
Treatment Hold Year																
Treatment O&M less Labor (Years 1 to 3)	Sum of Years	1	Annual	$2,452,740	**$7,358,220**	**$7,051,930**	S	7.358	7.052	0	2.453	2.453	2.453	0.000	0.000	0.000
Treatment O&M less Labor (Years 4 to 6)	Sum of Years	1	Annual	$1,237,709	**$3,713,127**	**$3,265,923**	S	3.713	3.266	0	0.000	0.000	0.000	1.238	1.238	1.238
Labor - annual $ / FTE - calc from hourly rate	Unit $	$95,909	$/yr $/hr	$46.11												
Labor - eliminated by merging plants	Sum of Years	0.0	FTE	$0	$0	$0	L	0.000	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000
Facility Replacement (Year 2 to 100)	Sum of Years	1	Annual	$969,079	**$97,876,979**	**$31,994,255**	S	97.877	31.994	0	0.969	0.969	0.969	0.969	0.969	0.969
Maintenance and Monitoring					**$65,224,511**	**$26,652,149**										
Maintenance					$49,097,000	$20,856,138										
Misc Maint Service	Sum of Years	0.1	Annual	$15,000	$1,515,000	$495,227	L	1.515	0.495	0	0.015	0.015	0.015	0.015	0.015	0.015
Snow Plowing/Road Maint	Sum of Years	1	Annual	$36,000	**$3,636,000**	**$1,188,544**	S	3.636	1.189	0	0.036	0.036	0.036	0.036	0.036	0.036
Road Maintenance - After Reclamation				$18,000	$1,746,000	$526,233		1.746	0.526	0	0.000	0.000	0.000	0.000	0.018	0.018
Road Maintenance - During Reclamation	Sum of Years	1	Annual	$65,000	$260,000	$245,696	S	0.260	0.246	0	0.065	0.065	0.065	0.065	0.000	0.000
Category 1 Stockpile Maintenance	Sum of Years	1	Annual	$40,000	$3,880,000	$1,169,407	S	3.880	1.169	0	0.000	0.000	0.000	0.000	0.040	0.040
Cat 1 containment Maintenance	included in cover mtce			$15,000												
FTB Erosion Maintenance	Sum of Years	1	Annual	$170,000	$16,660,000	$5,123,799	S	16.660	5.124	0	0.000	0.000	0.000	0.170	0.170	0.170
FTB Seepage Containment System Maintenance	Sum of Years	1	Annual	$120,000	$13,000,000	$4,605,647	S	13.000	4.606	0	0.000	0.120	0.120	0.120	0.120	0.120
Cell 1E and 2W Reclamation	Sum of Years	1	Annual	$1,400,000	$8,400,000	$7,501,586	S	8.400	7.502	0	0.000	1.400	1.400	1.400	1.400	1.400
Monitoring					$16,127,511	$5,796,011										
Water Quality Monitoring - first 5 years	Sum of Years	1	Annual	$202,193	$1,010,965	$942,071	S	1.011	0.942	0	0.202	0.202	0.202	0.202	0.202	0.000
Water Quality Monitoring - long term	Sum of Years	1	Annual	$109,664	$10,527,744	$3,109,616	S	10.528	3.110	0	0.000	0.000	0.000	0.000	0.000	0.110
Dam Safety Monitoring	Sum of Years	1	Annual	$38,572	$3,895,772	$1,273,459	S	3.896	1.273	0	0.039	0.039	0.039	0.039	0.039	0.039
Landfill Monitoring and Maintenance SW619 (30yrs)	Sum of Years	1	Annual	$21,957	$658,710	$442,201	S	0.659	0.442	0	0.022	0.022	0.022	0.022	0.022	0.022
Landfill Monitoring and Maintenance Coal Ash (13yrs)	Sum of Years	1	annual	$2,640	$34,320	$28,663	S	0.034	0.029	0	0.003	0.003	0.003	0.003	0.003	0.003
Other					$2,871,400	$2,351,796										
NMT Development	Sum of Years	1	Total	$2,871,400	$2,871,400	$2,351,796	U	2.871	2.352	0	0.000	0.000	0.000	0.000	0.000	0.718
Site Administration and Management					$104,648,090	$36,249,443										
Site Manager - Holding and Reclamation	Sum of Years	1.0	FTE	$224,640	$1,123,200	$1,046,658	U	1.123	1.047	0	0.225	0.225	0.225	0.225	0.225	0.000
Site Manager -Long Term	Sum of Years	0.5	FTE	$112,320	$10,782,720	$3,184,929	U	10.783	3.185	0	0.000	0.000	0.000	0.000	0.000	0.112
MDNR - Holding	Sum of Years	4.0	FTE	$965,120	$965,120	$951,535		0.965	0.952	0	0.965	0.000	0.000	0.000	0.000	0.000
MDNR - Reclamation	Sum of Years	4.0	FTE	$965,120	$3,860,480	$3,545,217		3.860	3.545	0	0.000	0.965	0.965	0.965	0.965	0.000
MDNR - Long Term	Sum of Years	2.0	FTE	$482,560	$46,325,760	$13,683,398	U	46.326	13.683	0	0.000	0.000	0.000	0.000	0.000	0.483
MDNR - Legal	Sum of Years	2.0	FTE	$482,560	$482,560	$475,767		0.483	0.476	0	0.483	0.000	0.000	0.000	0.000	0.000
Misc Engineering Services	Sum of Years	1.5	Annual	$25,000	$2,400,000	$708,896	U	2.400	0.709	0	0.000	0.000	0.000	0.000	0.000	0.025
Facility Insurance	Sum of Years	1.0	Annual	$150,000	$15,150,000	$4,952,267	U	15.150	4.952	0	0.150	0.150	0.150	0.150	0.150	0.150
Environmental Insurance 1% of $20M	Sum of Years	1.0	Annual	$200,000	$20,200,000	$6,603,023	U	20.200	6.603	0	0.200	0.200	0.200	0.200	0.200	0.200
Pickup Truck (25,000 mi x $0.70/mi)	Sum of Years	25,000	Annual	$17,500	$1,767,500	$577,765	S	1.768	0.578	0	0.018	0.018	0.018	0.018	0.018	0.018
Pump Maint Truck (15,000 mi x $1.05/mi)	Sum of Years	15,000	Annual	$15,750	$1,590,750	$519,988	S	1.591	0.520	0	0.016	0.016	0.016	0.016	0.016	0.016

Appendix A-3

Financial Assurance Calculations – MY11 and MY23

MY11

MY11 Financial Assurance is calculated based on two cost estimates:

1. Reclamation costs
2. Long term costs

- The Financial Assurance obligation for year (n) will be the year (n+1) financial liability up until the maximum financial liability year, which will be mine year 11 in the current plan.
- The Financial Assurance obligation for year (n) will be calculated in year (n-1) using (n-1) dollars with no allowance for inflation or discounting.
- All costs are 2016 costs. For future updates, costs need to reflect current costs at the time.

Reclamation Costs

The methods used to develop reclamation costs include:

- Reclamation is assumed to be completed within 3 years, therefore reclamation costs are not discounted.
- A 10% contingency is included in the cost estimate.

Long Term Costs

The methods used to develop long term costs include:

- Costs are discounted at a 2.9% discount rate
- A 15% contingency is included in the cost estimate.
- Costs are calculated for a 100-year period. This includes the cost to collect and treat the water for 100 years plus the cost to administer the site during this period.
- Costs include Environmental Insurance for the facilities. The amount of environmental insurance required will increase each year of mining as the height and quantity of material in the tailings basin increases and after the HydroMet facility and waste repository are constructed.
- The annual cost to operate the water treatment must be updated every year to reflect actual experience.

Discount Methodology

The discount rate amount must consider the fluctuations of the investment and inflation. The DNR considered several approaches to perform this calculation and determined that a low risk method was to assume that on the average the difference between the growth of the fund and inflation would be 2.9%, and that all future costs in constant dollars would be discounted to present value at 2.9% per year.

Mathematically the present value of $100 ten years from today discounted at 2.9% will be:

$$\text{Present Value} = 100/(1+i)^{n} = 100/(1+2.9\%)^{10} = \$75.13$$

The Net Present Value (NPV) is the sum of each of the individual annual present values. For example, the Year 100 present value would be the Year 100 cost multiplied by $1/(1.029)^{100} = 0.057$. Therefore, the discount factor for 100 years at 2.9% is 0.057. The present value of $100 one hundred years from today discounted at 2.9% per year is $5.73.

Annual costs are discounted to mid-year.

Financial Assurance

The financial assurance calculated requirement for MY11 is estimated to be **$1,039,000,000.**

MY23

The estimated MY23 Financial Assurance cost includes only long term cost since it is assumed that all reclamation work will be finalized within 3 years from the end of mining. The estimate considers the variable costs for the periods when the mine pits will backfill with water and the periods when the mine pits will overflow. Annualized costs are projected for water treatment plant operation and the periodic replacement of capital equipment. All costs are discounted to net present value. The current estimate for cash needed in the trust fund at MY23 is **$580,000,000**.

Appendix B – Requirements for Trust Fund for Long-Term Costs

1. Trust Fund Establishment and Agreement

- Prior to the issuance of any Permit to Mine, Permittee and the DNR will enter into a Trust Agreement establishing a Trust Fund for Long-Term Costs. The DNR will be the beneficiary of the Trust.
- The Trust Fund must be established, and the Permittee must make its first deposit into the Trust Fund, prior to the issuance of any Permit to Mine.
- The conditions of the Permit to Mine require that Permittee maintains a prescribed amount in the Trust Fund that changes over time.
- The Trust Agreement must provide that the amounts in the Trust Fund will be managed by a Trustee, who must manage the trust solely for the purposes set forth in the Trust Agreement.
- The Trust Agreement must recognize that the purpose of the Trust Fund is to provide funds to the DNR (i) to complete all required reclamation activities in the mining area and (ii) to cover the Long-Term Costs associated with the mining area. The Trust Fund is intended for coverage of Long-Term Costs, but, like all financial assurance, it must be available for Reclamation Costs and payment of environmental liability insurance premiums as needed by the DNR. The Trust Agreement must recognize that funds released to the DNR may be paid to DNR contractors for the necessary work.
- The Trust Agreement must prevent the Trustee from disbursing any amounts from the Trust Fund for purposes other than payment of costs for (i) reclamation, (ii) environmental liability insurance premiums by the DNR, and (iii) long-term management of the mining area.
- The form of the Trust Fund and the terms of the Trust Agreement must be acceptable to the DNR.
- The Trust Agreement must provide that the earnings on all amounts Permittee deposits in the Trust Fund shall be retained in the Trust Fund.
- The Trust Agreement must provide that Permittee will deposit funds into the Trust Account in accordance with the Special Conditions of the Permit to Mine.
- The Trust Agreement must provide that Permittee is responsible for all fees, taxes, and costs associated with establishment, maintenance, and management of the Trust Fund by the Trustee. Permittee's responsibility to pay these fees and costs is in addition to the Trust Fund deposits required under the Special Conditions of the Permit to Mine.
- The Trust Agreement must provide that in the event of an unplanned closure, the DNR can deposit forfeited financial assurance into the Trust Fund for Reclamation Costs and Long-Term Costs.
- The Trust Agreement must include accounting and audit mechanisms for the Trustee to ensure that the costs claimed by the DNR or its contractors for long-term treatment, maintenance and monitoring are reasonable.
- The Trust Agreement must include a provision granting a private right of action for ensuring that the Trust Fund is used for its established purpose.

2. Management of the Trust Fund

- The Trustee will be identified in the Trust Agreement and be responsible for managing the Trust Fund.
- The Trust Agreement will address assessment of portfolio management fees.
- An Advisory Board will review the performance of the Trust Fund and discuss investment opportunities with the Trustee. Permittee will have representation on this Advisory Board. Final management decisions rest solely with the Trustee.
- The Trustee must prepare and distribute semiannual reports on the performance of the Trust Fund to the DNR.
- Authorization of the use of any Trust Fund assets by any party for any purpose other than the purposes set forth in the Trust Agreement will constitute a breach of the Trustee's fiduciary obligation.

3. Investment Policy of the Trust Fund

- Investments in the Trust Fund must meet high-quality risk-appropriate standards established by the Trustee.

4. Release of Funds

- The Trust Agreement must provide that funds in the Trust Fund may be released by the Trustee only upon certain pre-determined conditions being met.
- Except as described below, there will be no release of any amounts from the Trust Fund during mining operations. If, based on a financial-risk analysis approved by the DNR and the Trustee that supports the continued long-term viability of the Trust Fund, it is established to the satisfaction of the Trustee, based on certification by the DNR, that the Trust Fund has significantly more funds than are necessary for anticipated Long-Term Costs (whether as a result of a change in project scope, change in applicable law, earnings on fund assets, or otherwise), the Trustee shall distribute the excess amounts to the Permittee.
- If it is established to the satisfaction of the Trustee, based on certification by the DNR, that (i) mining has ceased, (ii) reclamation has been completed, (iii) all of the Long-Term Costs have been funded, and (iv) all of the purposes of the Trust Fund have been met, the Trustee shall distribute assets remaining in the Trust Fund to the Permittee.
- Notwithstanding the foregoing, any right of the Permittee to receive distributions from the Trust Fund is automatically forfeited in the event of Permittee's continuing uncured violation of (i) the Permit to Mine, (ii) the Contingency Reclamation Plan, or (iii) Corrective Action Plan.
- If it is established to the satisfaction of the Trustee, based on certification by the DNR that (i) mining has ceased, (ii) reclamation has been completed, (iii) all of the Long-Term Costs have been funded, and (iv) all of the purposes of the Trust Fund have been met, but the Permittee is not eligible to receive distributions of assets from the Trust Fund, the Trustee shall distribute assets remaining in the Trust Fund as needed to support other reclamation projects in the State of Minnesota that otherwise do not have sufficient funding.
- Funds must be released to pay trust fund management expenses and any taxes levied against the trust.