

**STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES**

Permit to Mine and Assignment

POLYMET MINING CORP.
and
POLY MET MINING, INC.
NorthMet Mining Project

I. INTRODUCTION

After review, due investigation, and consideration of comments, and based on the information and statements contained in the permit applications dated November 2016, revised August 2017, and December 2017 (contents of which are listed in Exhibit A and hereafter referred to as the “Application”), the description of work proposed to be undertaken, the administrative record, and pursuant to Minnesota Statutes 93.44 to 93.51, the Commissioner of the Minnesota Department of Natural Resources (“DNR”):

HEREBY GRANTS PERMISSION

to

PolyMet Mining Corp., a corporation organized under the Canadian Province of British Columbia, authorized to do business in Minnesota, and whose address is First Canadian Place, 100 King Street West, Suite 5700, Toronto, Ontario M5X 1C7, Canada,

and

Poly Met Mining, Inc., a corporation organized under the laws of the State of Minnesota, authorized to do business in Minnesota, and whose address is 444 Cedar Street, Suite 2060, St. Paul, MN 55101,

for the purpose of

developing and mining a copper-nickel and platinum-group elements ore deposit known as the NorthMet Deposit, near Hoyt Lakes, Minnesota and assigning portions of Permit to Mine #1.1 and the Cliffs Erie Closure Plan from Cliffs Erie L.L.C. and Cleveland-Cliffs Inc. (as guarantor) (hereinafter referred to collectively as “Cliffs”) to PolyMet Mining Corp. and Poly Met Mining, Inc. (hereinafter referred to collectively as “Permittee”). The mining area occupies 9,470 acres, including the existing tailings basin and processing plant of the former LTV Steel Mining Company, and includes land in Township 58, Ranges 14, Township 59, Ranges 13, 14, and 15; and Township 60, Ranges 14 and 15 and depicted in Exhibit B.

II. TERM OF PERMIT

The conditions of this permit apply to all mining, auxiliary facilities, reclamation and postclosure activities conducted at the mine facility until the lands are released from reclamation obligations. The planned mining and reclamation activities will be completed in approximately the year 2072 with long term maintenance and active water treatment continuing after that date until such time that continued compliance with the Minnesota Rules 6132.2000 to 6132.3200 has been established and the necessity for postclosure maintenance has ceased.

III. APPROVAL OF ASSIGNMENT

Approval of the Application also constitutes approval of the assignment of the designated portions of the Permit to Mine #1.1 and the Cliffs Erie Closure Plan from Cliffs to Permittee. Permittee will perform all outstanding obligations according to Minnesota Rules Chapter 6132 as evidenced by the Application and in accordance with the Special Conditions.

IV. APPROVAL OF VARIANCE

Subject to Special Conditions 20a and 20b set forth below, Permittee's request for a variance for utility tunnels is partially approved as consistent with the general public welfare and directed toward the attainment of the goals of Minnesota Rules Chapter 6132.

V. CONDITIONS OF PERMIT

This Permit to Mine is subject to the following **GENERAL** and **SPECIAL CONDITIONS**.

A. GENERAL CONDITIONS

Permittee's mining and reclamation activities associated with the NorthMet Mining Project must be conducted in a manner consistent with (i) the **SPECIAL CONDITIONS** set forth below, (ii) the mining and reclamation plans presented in the Application, (iii) the Cliffs Erie Closure Plan (approved April 16, 2004), and all subsequent Closure Plan Update Letters, (iv) applicable portions of the Cliffs Erie Consent Decree, and (v) all subsequent amendments or assignments. All of Permittee's activities under this Permit to Mine are subject to the Nonferrous Metallic Mineral Mineland Reclamation Rules (Chapter 6132 of the Minnesota Rules). This Permit to Mine does not waive the requirements of any other applicable permit or rules of the DNR or any other agency or governmental unit or of any other applicable statute, rule, law, or ordinance.

B. 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 the

exception of 1) a road labeled “CE Road Reclamation” (colored red) on the “Roadway Reclamation” map, 2) roads labeled “CE Road: PolyMet license” (colored blue) on the “Roadway Usage” map, and 3) rail corridors labeled “CE Track” contained in the Schedule 6.6(b) maps in the “Framework Agreement” between Cliffs Erie, L.L.C. and Poly Met Mining, Inc. Appropriate closure in compliance with all applicable standards of the entire mining area includes the requirements associated with the Consent Decree, dated March 25, 2010, filed April 2010, and all associated updates or revisions.

2. Appropriate closure and reclamation of the tailings basin in compliance with all applicable standards is the responsibility of the Permittee regardless of whether or not any NorthMet related construction was ever undertaken or if NorthMet generated tailings have ever been placed in the basin.
- 2a. The mining area as depicted in the Application is replaced in its entirety with the mining area as in Figure 1-2 of the “Modification of the NorthMet Mining Area” memorandum dated October 26, 2018.

FINANCIAL ASSURANCE

3. The Permittee must provide financial assurance in accordance with the conditions contained in Attachment 1.
- 3a. If at any time the Permittee proposes changes to Attachment 1 Financial Assurance, a substantial change amendment will be required prior to implementation of any related changes. A change to specific dollar amounts identified in Appendix A of Attachment 1 will not require a substantial change amendment if such change is a result of calculation using the methods set forth in Attachment 1.
- 3b. Prior to production blasting in the mine area, the Permittee must provide to the DNR for review an updated accounting of the capital that it possesses to conduct the mining operations.
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.
- 4a. The Permittee must submit a format to report and detail annual contingency cost estimates to be reviewed and approved by the DNR within 60 days of permit issuance or at least 60 days prior to the first Annual Report, whichever comes first.
- 4b. Summary statistics and analyses of the performance of the tracking and success of material delivery to the correct destination from the Mine Management/Dispatch System must be submitted to the DNR as a component of the Annual Report each year for the life of the operation. If any alarm alerting that a load is travelling in the wrong direction is triggered and the load was deposited in the incorrect location, Permittee must submit a summary report including plans to avoid future occurrences to the DNR within 30 days. Permittee must include a summary of alerting alarms as part of its Annual Report.
- 4c. The Permittee must provide financial assurance in accordance with Attachment 1 for the reclamation of stormwater ponds and related ditches and dikes as described in Appendix 15.2

("Construction Phase Contingency Reclamation Plan and Estimate") and Appendix 15.4 ("NorthMet Project Feature Changes Over Time Memo") within 20 days of permit issuance.

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.

REFERENCE DOCUMENTS

- 5a. In approving the Application, the DNR is not approving any items that are included in the Application solely as references.

LAND CONTROL AS OPERATOR

- 5b. Any time land control for the lands within the mining area, that could result in changes to closure as in special condition 1, between or among Poly Met Mining, Inc. or PolyMet Mining Corp or any affiliates and any other entity is modified, reissued, or updated in any way, the Permittee must submit copies of such documents to the DNR within 30 days. Upon DNR review of submitted documents, a permit amendment may be required. The Permittee must include in the Annual Report each year, 1) the anticipation of such changes with a description, or 2) a summary of such changes when made.

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. The approved wetland replacement plan (Appendix 18.1 of the Application) is 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.
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.
- 13a. Deposition of NorthMet generated tailings in the FTB must not begin until a NPDES/SDS permit is issued for the operation of the FTB.
- 13b. Permittee must inform the DNR within 30 days after any amendment, modification, or transfer of a related NPDES/SDS permit.

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 submit to the DNR in a format in which raw data is accessible (e.g., spreadsheet, GIS) along with narrative explanations of the data.

MONITORING PLANS

- 16a. At least two calendar years prior to the start of the Reclamation, Closure, and Postclosure Maintenance phases of the project (as defined in the Application glossary), the Permittee must submit a monitoring plan for the upcoming phase, for review and approval by DNR.
- 16b. Each Annual Report must contain a contingency monitoring plan as part of the contingency reclamation plan, subject to review and approval by DNR.
- 16c. Monitoring of the facility in accordance with currently developed plans, and any revised or additional plans, will continue until the Permittee is released from the Permit to Mine or upon approval of the DNR.
- 16d. The Permittee must submit a revised monitoring section as in the Hydromet Residue Management Residue (HRF) Management Plan, for HRF construction to closure, and submit said plan for DNR review and approval no later than 12 months prior to the start of construction of the facility.
- 16e. Prior to construction of the first phase of the Category 1 Waste Rock stockpile cover system, the Permittee must submit for review and approval by DNR a detailed monitoring plan for verification that the system will perform as required. This monitoring plan must specify triggers for evaluation of adaptive management if data reveals that the system is not performing as required.

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. The data for the previous calendar year must be submitted with the Annual Report. Data submitted as required 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 greatest areal extent for each mine feature, including existing and refurbished features and all auxiliary facilities as depicted in the Schedule 6.6(b) maps in the “Framework Agreement” between Cliffs Erie, L.L.C. and Poly Met Mining, Inc. 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 (except for plant roads, fences, and sheds), and surface water and groundwater quality monitoring locations.

VARIANCE REQUESTS IN THE APPLICATION

19. Two variance requests were included with the Application. The variance for utility tunnels is partially approved, as in special conditions 20a and 20b. The variance for the Colby Lake Pipeline is not approved at this time, as in special condition 21.
- 20a. The variance request to leave the existing electrical and service tunnels (as depicted in the “Plant Site Utility Tunnels Existing Layout” Figure of Attachment A of the September 2018 Barr report “Plant Site Utility Tunnel Existing Conditions Assessment and Closure Plan”) in place at closure is approved:
 1. With grading such that all runoff water is diverted away from the tunnels.
 2. Such that all tunnels must be inspected every five years during operation and every 20 years after closure for new cracks, settlement, and erosion. Needed repairs must be addressed within 90 days of inspection and included in the annual report.
 3. With the exception of the “D-3” tunnel. Prior to the construction of the HRF, including preloading, the D-3 tunnel must be removed or filled with cement grout or another flowable fill material. DNR must approve the reclamation of this tunnel as noted prior to the construction of the HRF.
 4. With the exception of tailings tunnels D-1N, D-2N, D-1S, D-2S, T-1N, T-2N, T-3N, T-1S, T-2S, the western half of S-1, and S, N, and E-7 tunnels in the western two-thirds of the existing concentrator building footprint. The Permittee must demolish and fill these tunnels during demolition of infrastructure within the existing concentrator building and construction of the flotation process infrastructure prior to operation. The reclamation plan for these tunnels is outlined in the September 2018 Barr report “Plant Site Utility Tunnel Existing

Conditions Assessment and Closure Plan” Section 4, “Utility Tunnel Future Use and Reclamation Plan.”

5. Such that additional testing and financial assurance may be required if the pending petrographic analysis does not support 1) the visual observations, and 2) the concrete core compressive strength testing which both support that the concrete should be durable into the foreseeable future.
 6. With deed restriction filed, including the location and description of all utility tunnels.
- 20b. If the Permittee identifies any of the following, then the Permittee must submit, within 90 days, an updated tunnel closure plan and associated financial assurance for DNR review and approval.
1. New external loadings applied above the underground utility tunnels since September 1, 2018.
 2. Chemical deterioration of the concrete.
 3. The tunnels are no longer supported in suitably compacted subgrade soils over acceptable natural soils or on bedrock.
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.

LEAN ORE

- 21a. In accordance with the Application, blasted rock must be classified as either waste rock or ore and handled accordingly. No material can be classified or stored as lean ore, as defined in MN Rules 6132.0100, subpart 14. Future lean ore operations will require a permit amendment.

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 updated plan and cost estimate must be included in the first Annual Report due after permit issuance. 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.

ROCK AND OVERBURDEN MANAGEMENT PLAN

- 28a. In addition to special conditions 23 to 28 (inclusive), a revised Rock and Overburden Management Plan (ROMP; Appendix 11.1 of the Application) in its entirety must be submitted to the DNR within 30 days of approval of the BIF construction workplan (as in condition 23) and the buttress workplan (as in condition 26) for DNR review and approval prior to initiation of construction. Any proposed changes to any approved ROMP and affiliated documents require DNR review and approval prior to implementation.

CONSTRUCTION ROCK AND WATER MANAGEMENT PLAN

- 28b. The Permittee must submit for DNR review and approval a Construction Rock and Water Management Plan (CRWM Plan) at least 60 days prior to the initiation of construction in the Mine Site and Transportation and Utility Corridors. A separate plan must be produced if there is to be any material, other than LTV tailings, excavated during construction of the Plant Site. The CRWM Plan must contain plans for 1) handling reactive mine waste and ore (i.e., waste rock, tailings, saturated overburden, peat, and ore), 2) managing any resultant seepage or leachate, and 3) assuring adequate capacity (including long term reductions in capacity) of features where material may be stored in the short- or long-term during the interval between when construction for the mine is to begin and when the WWTS is operational. The CRWM Plan would need to address any impacts in addition to the permitted project and implementation may require a permit amendment. Once the CRWM Plan is approved, construction may begin and the CRWM Plan must be implemented until all of the water management features as depicted in the Application are installed and functional.

BOUNDARY SURVEYS

29. Prior to ground disturbance as authorized by the issuance of this permit the Permittee must have high security monuments installed to resistance and measured to (latitude, longitude, and elevation) by a surveyor licensed in the State of Minnesota. These control points must be spaced no more than two miles apart and ensure that they are at the greatest distance possible from a neighboring control point, yielding at least four at the Plant Site and four at the Mine Site. Locations and limits of all auxiliary facilities (except for plant roads, fences, and sheds), mine pits, stockpiles, and tailings basins must be established in the field using generally accepted construction survey methods and a coordinate system based on Minnesota State Plane, or a local coordinate system established by a licensed surveyor that is tied back to Minnesota State Plane. All final designs and construction must be tied to these control points.
30. The Permittee must submit appropriate documentation verifying the control points and establishment of the coordinate system to the DNR prior to ground disturbance as authorized by the issuance of this permit.
31. The Permittee must describe and explain deviations from the locations and limits found in the Application with its construction review submittals. Any such deviations may necessitate a permit amendment.

WATER 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 (including but not limited to modeling, monitoring data, data reporting requirements, revisions to Block Model, blast hole data, depth of oxygen infiltration in tailings). 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 initiation of construction, 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 with the Annual Report.

37. When the Permittee creates any Spill Prevention, Control, and Countermeasure (SPCC), 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 (including LTV tailings) associated with each mine pit, stockpile, tailings basin, and auxiliary facility must be submitted to the DNR for review 30 days prior to its use in 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.
- 39a. Earthen materials intended for use in construction of any seepage barriers (i.e. cut off walls, stockpile liners, seepage collection systems, etc.) at both the Plant Site and the Mine Site must be classified in accordance with ASTM D-2487 and D-2488. Further, the hydraulic conductivity properties of the soils or soil-bentonite mixes planned for these uses must be tested in accordance with ASTM D-5084 (or similar) to confirm that those materials would meet final design specifications. The report and associated analyses must be provided to the DNR for review and approval at least 45 days prior to construction of any one of the facilities.

GEOTECHNICAL WORKPLAN

- 39b. Prior to the start of construction of the affected facilities, a geotechnical workplan (i.e., Appendix 17.1) must be submitted for review and approval by DNR and the resultant data collected, analyzed, and reported as in the approved workplan.

DISTURBANCE IN BORROW AREAS

40. The mining area includes preliminarily identified potential borrow source locations. At least 60 days prior to initiation of construction 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 permitted footprints of mining area features.
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 initiation of construction or any activity that would directly, indirectly, or temporarily impact wetlands 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. Any saturated mineral overburden sourced outside of the Mining Area must be characterized, processed, and handled according to its chemical and physical characteristics, regardless of quantity. Unless further analysis or information is presented to and approved by the DNR,

saturated mineral overburden must be managed consistently with the approved Standard Operating Procedures (SOP), in accordance with special condition 28a, regardless of the source or location of use of such overburden.

44. Except to the extent necessary for the installation and maintenance of utility poles in the Transportation and Utility Corridors, saturated mineral overburden must be managed consistently with the SOP, as in condition 28a.

CHARACTERIZATION OF MATERIAL

45. The Permittee must inform the DNR through the Annual Report if new rock type(s) or formations are encountered during mining. Any new rock types or formations must be placed in the Category 4 temporary stockpile or backfilled into the East Pit until such time as the new rock types or formations can be characterized and appropriate alternate management plans developed and submitted to DNR for review and approval.
- 45a. Carbon analyses are described in Appendix 2. Each reference to “carbon” within Appendix 2 refers to “total carbon”, as in Section 10 of the Application.
- 45b. Unless prior to blasting in the Transportation and Utility Corridor, the BIF bedrock is characterized and plans for appropriate management developed and approved by DNR, the rock must be disposed of in the Category 4 temporary stockpile or backfilled into the East Pit. It must not be used as construction rock, unless it can be shown to meet all applicable standards, statutes and regulations to be protective of natural resources.

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, when required, 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. Periodic construction reviews and post construction review shall be documented by the design engineer of record or a third party, Minnesota-licensed, professional engineer to confirm whether construction has satisfied the intent of the final designs, drawings, and specifications, and whether the QA/QC performed during construction meets the applicable requirements. Such documentation must be provided to the DNR upon request. Such review must be submitted to the DNR for review for each phase in installation of the Category 1 Stockpile cover and containment systems and must contain a report from the engineer

verifying that the construction and installation of the containment and cover systems met the approved final designs.

- 50a. If there are deviations from final designs, drawings, and specifications, the professional engineer must include in the confirmation documentation a description of the deviations. Any such deviations may necessitate a permit amendment, may require justification from the Permittee, and must be provided to the DNR.
- 50b. Any aspects of the project that are overseen by the independent review board at the FTB may be substituted for the requirements in special condition 50 upon approval by DNR.

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 prior to initiation of construction of any stockpile or blasting of waste rock.

FINAL DESIGN DRAWINGS

- 51a. The design engineer of record or a third party, Minnesota-licensed, professional engineer must confirm that all construction specifications, drawings, monitoring, sampling, and QA/QC plans reasonably represent the designs, studies, tests, or evaluations submitted as support for the Application. If there are deviations from final designs, drawings, and specifications, the professional engineer must include in the confirmation documentation a description of the deviations. Any such deviations may necessitate a permit amendment, may require justification from the Permittee, and must be provided to the DNR.
- 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, or new design drawings submitted after permit issuance, yield different footprints, additional impacts, or modified closure plans, then a permit amendment may be required prior to construction. Any such deviations must be described, analyzed, and presented in the submittal to the DNR. For the Category 2/3, Category 4, and the Ore Surge Pile, in addition to final design drawings, include a reporting of the geotechnical data and analysis of the stockpile foundations and any work to be completed prior to installation of any liner. Final design drawings for these features must be submitted no later than 60 days prior to construction start.
- 52a. Analysis of any influence of stockpile below the “2001 storage area” on the southeast corner of the FTB (located as in Table 8-2 and Figure 8-6 of the Application) must be included and incorporated as necessary when final designs for the FTB are developed and submitted to DNR per special condition 52. If the analysis reveals that the dam construction needs to be modified or other modifications to water seepage are expected due to the stockpile, then the final designs for areas adjacent to the stockpile must be submitted to the DNR for review and approval no later than 45 days, or as per the Dam Safety permit, 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 no later than 30 days prior to any such construction. Any associated financial assurance required must be in place prior to construction. Contingency reclamation cost estimates for plant roads, fences, and sheds must be included with the Annual Report following the year of refurbishment or construction associated with these auxiliary features.

CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM DESIGN AND CONSTRUCTION

54. The Category 1 Stockpile Groundwater Containment System and cover design and construction must be completed under the direct oversight of the engineer of record or a third party 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.

CATEGORY 1 WASTE ROCK STOCKPILE COVER

- 54a. Upon installation of each phase of the Category 1 Waste Rock stockpile geomembrane cover, the Permittee must have the installation verified by an independent, third party by means of appropriate, non-destructive testing methods. A report of such testing must be delivered and reviewed by DNR prior to continuing with the installation of the cover system as a whole.

FINAL CUT-OFF WALL DESIGNS

55. Final designs for the cut-off wall for the FTB Seepage Containment System and for the Category 1 Stockpile Groundwater 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. Each design must achieve the following: 1) cut-off wall keyed to bedrock, 2) seepage is captured such that natural resources are protected, and 3) inward flow gradient maintained in accordance with the NPDES/SDS permit and demonstrated through monitoring.
- 55a. Prior to construction of the FTB Seepage Containment System, the Permittee must submit for review and approval by DNR a detailed monitoring plan for verification that the system will perform as required. This monitoring plan must specify triggers for evaluation of adaptive management if data reveals that the system is not performing as required.
- 55b. Prior to construction of the Category 1 Stockpile Groundwater Containment System, the Permittee must submit for review and approval by DNR a detailed monitoring plan for verification that the system will perform as required. This monitoring plan must specify triggers for evaluation of adaptive management if data reveals that the system is not performing as required.

REACTIVE MINE WASTE STORAGE FACILITY INSPECTION SCHEDULE

- 55c. The Permittee must submit a schedule for inspection for the construction, operation, and reclamation, including closure and post closure maintenance of each of the reactive mine waste storage facilities (FTB, HRF, Category 1, 2/3, and 4 stockpiles, and OSP), by the design engineers, to ensure compliance with the design. In the event that the design engineers become unable to perform the inspections, the engineers must be replaced by persons who meet the qualifications in rule and that can demonstrate an understanding of the design and an ability to perform the necessary inspections. The schedule may be developed in phases based on 1) construction, 2) operation, 3) reclamation, and 4) closure and post closure maintenance. The schedule, or schedule by phase, must be submitted to the DNR for review and approval at least 30 days prior to initiation of construction of each facility, or initiation of each phase as appropriate.

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.
- 57a. Permittee must conduct same type and frequency of monitoring at Unnamed Creek along the railroad corridor as is to be conducted for the three other creek crossings (i.e. Wetlegs, Longnose, and Wyman Creeks). Collected data and any associated analysis is to be submitted along with the other three creeks.
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. With the exception of AOC 45 (Pellet Storage Area and Loadout), all AOCs within the mining area are the responsibility of the Permittee.

ORE PROCESSING DEVIATIONS

62. Prior to finalizing commissioning or at least 90 days prior to implementation once commissioning of the plant is complete, 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.

FUGITIVE EMISSIONS CONTROL PLANS AND REPORTING

- 62a. If substantive changes are made to a Fugitive Emissions Control (FEC) Plan for the Mine Site or for the Plant Site, which would include any reduction in control techniques employed or associated corrective actions, monitoring, recordkeeping, and reporting requirements, the Permittee will submit the respective MPCA-approved FEC Plan to the DNR within 30 days of MPCA approval. The DNR will review and may require modifications in accordance with 6132.2800.
- 62b. All records described in the Mine Site and Plant Site Fugitive Emission Control plans will be available for review during an inspection or will be provided upon request from the DNR.
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, within 60 days of such conditions. That report must include description of where, when, and for how long associated activities were suspended.

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. Operation and financial assurance of the active water treatment system must remain unless and until a non-mechanical substitute is developed, approved through a substantial change amendment, and demonstrated through water monitoring to be successfully implemented.

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 future northward bedrock groundwater flow, based on "Monitoring Wells North of the Mine Site: Installation and Hydrogeologic Monitoring Plan - NorthMet Project, October 2016". If the DNR concludes that this report, or other monitoring data, indicates a possibility of northward bedrock groundwater flow, then the DNR will require adaptive management or mitigation.

67. Any required management or mitigation must be approved by the DNR prior to blasting in the mine pit footprint.

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 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” 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 Permittee must provide an analysis of the size of the stockpile upon which the DNR would base its decision. This analysis will be presented in the Annual Report due five years after the first waste rock is placed in the stockpile or when 75 million tons of rock have been placed in the stockpile, whichever comes first. 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 and stockpile size must be updated in subsequent annual reports until the full cover is installed.

SEALING OF EXPLORATORY BOREHOLE LOCATIONS

72. Annual exploration and drilling locations must be reported in the Permittee’s annual reports.
73. Within 90 days of the completion of drilling, unless otherwise approved by the DNR, any 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, and at least two years prior to planned 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 plans to the DNR for review and approval for any auxiliary facilities, and final drawings as appropriate, 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 1) the process by which the monitoring, modeling, and review cycle will be implemented, 2) the process for reporting of the implementation of any approved adaptive management, and 3) the process by which the AWMP itself would be modified, if needed.
- 80a. Prior to initiation of construction of an adaptive management installation or project modification, all final designs for said installation must be reviewed and approved by the DNR, including those drawings needed for Appendix 17.3 ("NorthMet Pit: Conceptual Plan for Bedrock Groundwater Flow Mitigation," December 2017) of the Application.

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. Dunka Road must be reclaimed in

accordance with the use agreement with Cliff Erie generally as stated in section 3.5.3 of the Application.

EAST PIT BACKFILL AND 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.
- 83a. If the results of the verification of the East Pit closure workplan indicate that the current closure plans for the East Pit highwall (as described in the Application sections 7.3 and 10.4.6.4) would not meet all applicable standards, then a revised closure plan, including any associated financial assurance, must be developed. A revised East Pit highwall closure plan must be developed and submitted to the DNR for approval within 90 days of approval of the results of the verification of the East Pit closure workplan. Construction related to the closure of the East Pit highwall under such approval must begin as detailed in the approval from the DNR.
- 83b. In the Annual Report due at least one year prior to the anticipated start of East Pit backfill, the Permittee must submit a plan for DNR review and approval to amend the backfill with enough neutralization to assure the backfill is non-acidic as in the water quantity and quality model or in such a model revised as in conditions 32 through 34.
- 83c. In the same calendar year as when East Pit backfill is to commence, the Permittee must prepare a plan for DNR review and approval for the establishment of wetland habitat in the footprint of the backfilled mine pit. The preference for the use of appropriate, stockpiled, on-site materials must be included in the plan.

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.
- 84a. The Permittee must submit a set of revised maps based on the Schedule 6.6(b) maps in the "Framework Agreement" between Cliffs Erie L.L.C. and Poly Met Mining, Inc., to be used for the NorthMet project or to be reclaimed by the Permittee. The submittal must contain clear maps and descriptions of which auxiliary features are to be reclaimed and a schedule. The submittal must be presented for DNR review and approval within 60 days of permit issuance. The submittal must also contain a revised mining area (as compared with mining area as described in special condition 2a), if needed.

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 in-place Virginia Formation bedrock to DNR for review and approval.

ADDITIONAL STOCKPILES

87. Permittee must obtain DNR approval and any necessary permit amendments for creation of any additional stockpiles prior to initiation of construction of said stockpile. This condition does not prevent the stockpiling of material approved 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 BOTTOM

88. The Permittee must prepare a bentonite amendment of tailings pond bottom 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. The workplan must also include a detailed construction quality assurance and quality control plan and a schedule for implementation of the workplan and any anticipated phases of work that may result.
89. The Permittee must provide to the DNR the results of the analyses conducted under the approved bentonite amendment of tailings pond bottom workplan for review and approval prior to the third year of NorthMet tailings deposition.

PILOT AND FIELD SCALE TESTING OF BENTONITE AMENDMENT OF TAILINGS FOR DAM SIDE SLOPES

- 89a. The Permittee must prepare a bentonite amendment of tailings dam side slopes workplan for DNR review and approval no later than 90 days following permit issuance. The workplan must include any plans for bench or field scale work, sampling, and analyses necessary to demonstrate to the DNR that the tailings amendment with bentonite for the dam exterior slopes will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources, and function in perpetuity. The workplan must also include a detailed construction quality assurance and quality control plan and a schedule for implementation of the workplan and any anticipated phases of work that may result.

- 89b. The Permittee must provide to the DNR the results of the analyses conducted under the approved bentonite amendment of tailings dam side slopes workplan for review and approval prior to NorthMet tailings dam construction.
- 89c. If any of the testing of bentonite amendment in tailings dam side slopes reveals that the planned use of bentonite would not achieve the necessary condition(s) to allow the facility to be operated in a manner that meets all applicable standards, a revised facility plan must be submitted to the DNR prior NorthMet tailings dam construction.

PILOT AND FIELD SCALE TESTING OF BENTONITE AMENDMENT OF TAILINGS FOR TAILINGS BASIN BEACHES

- 89d. The Permittee must prepare a bentonite amendment of tailings basin beaches workplan for DNR review and approval no later than 90 days following permit issuance. The workplan must include any plans for bench or field scale work, sampling, and analyses necessary to demonstrate to the DNR that the tailings amendment with bentonite for the tailings basin beaches will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources, and function in perpetuity. The workplan must also include a detailed construction quality assurance and quality control plan and a schedule for implementation of the workplan and any anticipated phases of work that may result.
- 89e. The Permittee must provide to the DNR the results of the analyses conducted under the approved bentonite amendment of tailings basin beaches workplan for review and approval prior to the third year of NorthMet tailings deposition.

PILOT AND FIELD SCALE TESTING OF BENTONITE AMENDMENT AT THE TAILINGS BASIN

- 89f. If any of the testing of the two uses of bentonite in and around the Flotation Tailings Basin (i.e. pond bottom or beach amendment) reveal that the planned uses of bentonite would not achieve the necessary condition(s) to allow the facility to be operated in a manner that meets all applicable standards, a revised facility plan must be submitted to the DNR prior to the fourth year of deposition of NorthMet tailings.
- 89g. Within 60 days of the approval of each bentonite usage workplan results (tailings dams, tailings pond beaches, and tailings pond bottom), the Permittee must submit to the DNR for review and approval adaptive management plans that describe the action or actions that would be implemented if water quantity, water quality, or dam safety objectives are not met through the use of the bentonite amendments.

ANNUAL REPORT CONTENTS

91. The Annual Report must contain reporting of extraction of Unsaturated Mineral Overburden (not including remobilization) as well as Saturated Mineral Overburden (e.g., Tables 4 and 6 of Appendix 13 Annual Report V3).
- 91a. The Annual Report must contain information as detailed in Appendix 11.5 of the Application (Flotation Tailings Management Plan), section 6 and similar information in Appendix 11.6 of the Application (Residue Management Plan) section 6.

BLASTING

92. The Permittee must notify the DNR within 30 days of any blast that exceeds standards in MN Rules 6132.2900.

MINE TO PLANT PIPELINE FINAL DESIGNS

93. The Permittee must include an increased factor of safety in the final designs of the Mine to Plant Pipeline that carries high concentration water from the Mine Site Equalization Basins to the Waste Water Treatment System at the Plant Site. The increased factor of safety will be as determined by an October 16, 2018 memo entitled “PolyMet NorthMet Mine to Plant Pipeline HDPE Pipe Design Factors” with confirmation documented in an October 17, 2018 email from PolyMet to the DNR entitled “PolyMet Design of High Concentration Mine Water Pipeline.”

HYDROMETALLURGICAL FACILITY DISPOSAL

95. The Permittee must not dispose of coal-ash, including materials from the former LTVSMC Coal Ash Landfill, or any other non-mining waste into the HRF.

SURFACE, MINERAL, AND PROPERTY RIGHTS

96. The Permittee must not disturb the ground on any property for which it has not received the necessary surface, mineral, and property rights until the Permittee has obtained said rights and provided proof of same to the DNR.

ATTACHMENT 1: 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 be 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 and, to the extent applicable, any taxes and fees that may be necessary for the Trust Fund. 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 consent to each of the following: (i) exclusive personal jurisdiction in Minnesota, (ii) exclusive venue in Minnesota, (iii) the ILOC shall be governed by the laws of the State of New York except where any substantive laws of the State of Minnesota, including but not limited to Minnesota Statute 93 and Minnesota Rule 6132 are applicable, and (iv) designation of an authorized agent in the United States 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 not include language stating that the ILOC is an asset of the Permittee in the event of a bankruptcy proceeding.

f. Must have provisions to automatically extend the ILOC period (“Evergreen Provisions”). This condition does not, in any way, limit any rights a Financial Institution may have to cancel an ILOC, subject to the notification requirements of item 14(d) above.

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 these Special Conditions and per the terms of the Trust Agreement contained in Appendix B.

16. The Permittee must comply with all terms of the Trust Agreement governing the Trust Fund attached 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 \$74,000,000 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 \$74,000,000 financial assurance required under 17a.

18. Prior to production blasting in the mining 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. Release of the Permittee for responsibilities under the Permit to Mine shall be determined in accordance with Minnesota Rule part 6132.4800 and applicable language of Minnesota Rule 6132.1200
24. Release of the Permittee from the Trust Agreement shall be determined based on the terms of the Trust Agreement.

J. FORFEITURE OF FINANCIAL ASSURANCE

25. Any forfeiture of the financial assurance shall be administered in accordance with Minnesota Rule 6132.1200.
26. The DNR may access financial assurance within the Trust Fund in accordance with the applicable terms of the Trust Agreement.

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

Appendix B Requirements for Trust Fund Long-Term Costs

ATTACHMENT 2: 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, including indirect 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.

Dated at St. Paul, Minnesota,
this 1st day of November, 2018.

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

/s/ Tom Landwehr
Tom Landwehr
Commissioner

Received and acknowledged by:

PolyMet Mining Corp.

this 1st day of November, 2018

/s/ Jonathan Cherry
Jonathan Cherry
President and Chief Executive Officer

Received and acknowledged by:

Poly Met Mining, Inc.

this 1st day of November, 2018

/s/ Jonathan Cherry
Jonathan Cherry
President and Chief Executive Officer

EXHIBIT A: CONTENTS OF APPLICATION AND APPROVAL ATTACHMENTS

APPLICATION (Dated: 12/13/2017)

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1. Introduction
2. PolyMet Organizational Information and Documents
3. Overview of the Project's Mining and Reclamation Plan
4. Land Management
5. Environmental Setting Information
6. Related Environmental Review and Permitting
7. Mine Site and Mining Facilities
8. Plant Site and Ore Processing Facilities
9. Transportation and Utility Corridors and Colby Lake Pipeline Corridor
10. Characterization and Management of Mine Waste
11. Water Management
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- Appendix 2 Mine Waste Characterization Documentation and Results
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- Appendix 4 Categories 1, 2/3, and 4 Stockpiles and Ore Surge Pile Design and Category 1 Stockpile Groundwater Containment System Permit Application Support Drawings
- Appendix 5 Mine Site Stormwater Permit Application Support Drawings
- Appendix 6 Flotation Tailings Basin and FTB Seepage Containment and Stream Augmentation Systems Permit Application Support Drawings
- Appendix 7 Hydrometallurgical Residue Facility Permit Application Support Drawings
- Appendix 8 Mechanical Infrastructure Permit Application Support Drawings
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- Appendix 11 Management Plans Updated for Permit to Mine
- Appendix 12 Fugitive Emission Control and Blasting Plans
- Appendix 13 Annual Report
- Appendix 14 Reclamation, Closure, and Postclosure Maintenance Plan
- Appendix 15 Financial Assurance
- Appendix 16 Final Environmental Impact Statement and Related Environmental Reports
- Appendix 17 Work Plans
- Appendix 18 Wetland Related Reports

APPROVAL ATTACHMENTS

Barr Engineering Plant Site Utility Tunnel Conditions Assessment and Closure Plan, September 24, 2018

Barr Engineering Technical Memo: MPP Water Quality, September 26, 2018

Framework Agreement, September 26, 2018

Barr Engineering PolyMet NorthMet Mine to Plant Pipeline HDPE Pipe Design Factors, October 16, 2018

RE: PolyMet Design of High Concentration Mine Water Pipeline, Christie Kearney email to DNR and MPCA, October 17, 2018

Gale-Tec Engineering Review of “Plant Site Utility Tunnel Existing Conditions Assessment and Closure Plan,” October 1, 2018

Gale-Tec Engineering Review of PolyMet “Plant Site Utility Tunnel Existing Conditions Assessment – Tunnel Concrete Core Compressive Strength Tests,” October 24, 2018

Modification of the NorthMet Mining Area, October 26, 2018

Appendix A

Financial Assurance Calculations

Contents

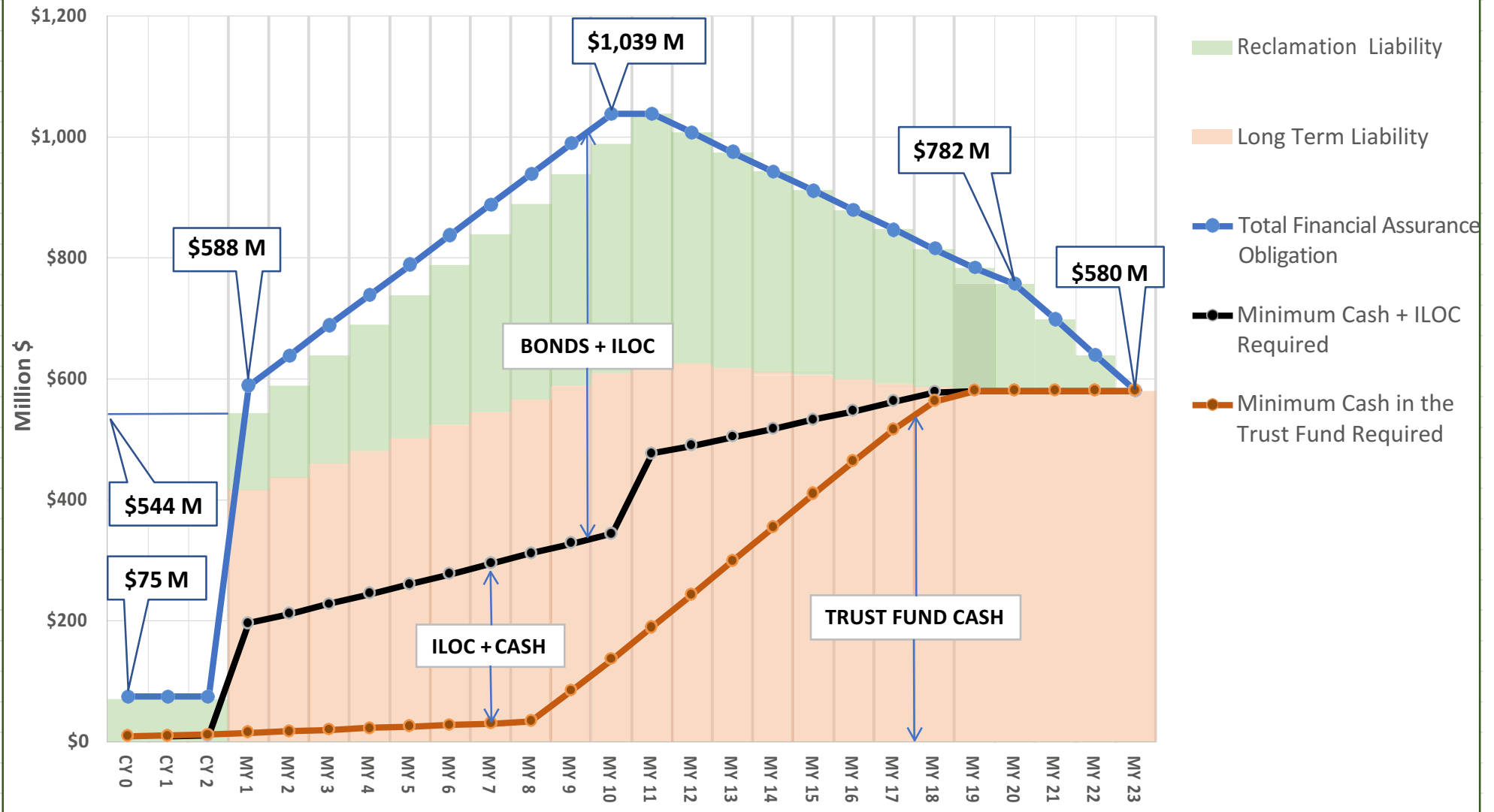
Financial Assurance Summary Graphic

Appendix A-1: Financial Assurance Calculations – Construction

Appendix A-2: Financial Assurance Calculations – MY1 and MY2

Appendix A-3: Financial Assurance Calculations – MY11 and MY23

Summary of PolyMet's Current Financial Assurances



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 (as in January 5, 2018)

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

Table 1. Construction Period Financial Assurance (updated October 31, 2018)

	2017 PTM Application	2018 Supplemental Memo	2017 PTM Application Reference
Legacy Reclamation Costs	\$45,143,496	\$44,090,206	Appendix A of Appendix 15.1 from PTM Application
Legacy Long-Term Costs	\$13,269,809	No change	
Construction Phase Costs	\$16,271,537	No change	Appendix A of Appendix 15.2 from PTM Application
Total Costs	\$74,684,842	\$73,631,552	
Difference		-\$1,053,290 (reduction)	

Legacy Reclamation Costs

Appendix A-1 Legacy Reclamation Cost Estimate

Includes Demo of Legacy Buildings with Abatement and AOCs

	support tabs	Cash \$	NPV \$	Note
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	
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	
Area 2 Shop Buildings	Demo	\$556,827	\$533,517	
Main Plant Area - Demoed in Construction	Demo	\$1,655,350	\$1,541,233	
Main Plant Area	Demo	\$19,888,937	\$18,521,989	
Main Gate Colby PH Ad Bldg	Demo	\$243,170	\$220,026	
Roads	Demo	\$660,000	\$597,183	
Railroads	Demo	\$380,000	\$343,832	
Power System	Demo	\$97,810	\$88,501	
Piping System	Demo	\$2,879,000	\$2,604,983	
Legacy Asbestos Abatement				
Area 1 Shop Buildings	Demo	\$98,350	\$94,233	
Area 2 Shop Buildings	Demo	\$167,350	\$160,344	
Main Plant Area	Demo	\$5,962,607	\$5,473,327	
Main Gate Colby PH Ad Bldg	Demo	\$859,400	\$777,604	
Other		\$7,141,825	\$6,657,444	
AST Removal	AST	\$223,625	\$214,264	
AOCs	AOC	\$6,918,200	\$6,443,181	

30 Yr Tot	NPV	Start Bankruptcy		07/01/19	07/01/20	07/01/21
		01/01/18	07/01/18			
	2.9%	1	2	3	4	
		Oper	Hold			
	Calendar Year	2018	2019	2020	2021	
41,039,542	38,044,340					
448,916	430,123	0	0	448,916	0	0
556,827	533,517	0	0	556,827	0	0
1,655,350	1,541,233	0	0	0	1,655,350	0
19,888,937	18,521,989	0	0	4,972,234	9,944,469	4,972,234
243,170	220,026	0	0	0	0	243,170
660,000	597,183	0	0	0	0	660,000
380,000	343,832	0	0	0	0	380,000
97,810	88,501	0	0	0	0	97,810
2,879,000	2,604,983	0	0	0	0	2,879,000
98,350	94,233	0	0	98,350	0	0
167,350	160,344	0	0	167,350	0	0
5,962,607	5,473,327	0	0	0	2,981,304	2,981,304
859,400	777,604	0	0	0	0	859,400
223,625	214,264	0	0	223,625	0	0
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)		
	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
Scope of Work Description										
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 - Demoad 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		
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)	Demo To Rollup	Abatement To Rollup
	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		
Scope of Work Description										
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 (Attachments E and F)					Mavo 2016 (Attachment C)	Arrowhead Consulting & Testing 2016 (Attachment D)	Demo To Rollup	Abatement To Rollup
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		
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					

Totals	Lakehead	Mavo
Mine Site	\$31,155,813	\$7,087,707
less Mine Site	\$2,203,893	\$0
	\$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				Start Bankruptcy																																	
Includes Tailings Basin Dewatering and 30 Years of MDNR, Site Mgr, Monitoring / Reporting (Water Quality, Dam Safety and Landfill), Stormwatering/Road Maint and Vehicles				2%	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		
	support tabs	Calc \$	NPV \$	Note	30 Yr Tot	NPV	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
					Calendar Year	Oper	Hold	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
Legacy Ferrous Total with Indirects		\$18,620,179	\$13,259,809																																		
Contingency	10.0%	\$1,862,018	\$1,295,909																																		
Adaptive Management	2.0%	\$372,404	\$269,182	On Water Tailings Basin only																																	
Engineering Redesign	2.0%	\$372,404	\$269,182	On Water Tailings Basin only																																	
Prime Contractor Markup	2.5%	\$465,505	\$339,115																																		
Mobilization	4.0%	\$744,808	\$543,586	included in pricing																																	
Legacy Ferrous Total (no Indirects)		\$16,927,435	\$12,063,443		10,175,414	7,022,792																															
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)	6,755,021	5,040,671																															
Water Quality Monitoring		\$1,395,625	\$1,113,516	From PLM FY 2018 Budget (Tailings Basin) - assume reduced to 15% after 5 years	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	
Tailings Basin Seepage Pumping		\$1,424,070	\$1,255,624	From PLM FY 2018 Budget	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
Tailings Basin Dewatering	Basin Closure	\$3,792,526	\$2,558,486		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	107,301	107,301	107,301	107,301	107,301	107,301	107,301	107,301	107,301	107,301		
Monitoring/ Application for Site Specific Standards		\$142,800	\$113,046	\$10,000 annually for Biological and \$38,000 for Wild Rice Plus \$50,000 for Application	142,800	113,046	0	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	
Site Administration and Maintenance		\$10,172,414	\$7,022,792																																		
Site Manager FTE x 5 hr from Unit S = Annual \$	0.5	\$108	\$112,320	NTS 4/22/16 letter M M Level Professional																																	
Site Manager	Unit S Long Term	\$3,369,600	\$2,262,059		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		
DNR FTE x 5 hr from Unit S = Annual \$	0.5	\$116	\$120,640	Provided by DNR flat rate for all staff including overhead and expenses																																	
DNR - Reclamation	Unit S Long Term	\$2,412,800	\$1,837,496		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	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640		
DNR FTE x 5 hr from Unit S = Annual \$	0.25	\$116	\$60,320	Provided by DNR flat rate for all staff including overhead and expenses																																	
DNR - Long Term	Unit S Long Term	\$603,200	\$296,062		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	0	0	0	0	0	0	0	0		
Dam Instrumentation Field Work - Report per Event from Unit S Long Term	2	\$10,536	\$21,072	NTS 4/22/16 letter inactive basin																																	
Geotechnical Inspection and Report from Unit S Long Term	1	\$17,500	\$17,500	Rarr 4/1/16 letter inactive basin																																	
Dam Safety Monitoring		\$85,364	\$460,062	Starting at 2 monitoring events/year then reduced to 1 event after 5 years	85,364	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	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036		
Landfill Maintenance and Monitoring SW619	Unit S Long Term	\$658,710	\$442,201	NTS 4/22/16 letter	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		
Landfill Maintenance and Monitoring Coal Ash	Unit S Long Term	\$34,320	\$28,663	PLM 2017 Budget	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	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	2,640			
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	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	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000		
Snow Plowing/Road Maintenance	Unit S Long Term	\$1,338,420	\$898,500	Poly Mat Snow Plowing (coverage of 2 highest of 3 years) and One day per month.	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		
Vehicles (25,000 mi x \$0.70/mi)	Unit S Long Term	\$525,000	\$352,440	NTS Letter of 4/21/16	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		

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 than 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	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	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 Calks 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 Calks 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 CO2 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) Filter Material (12" Loose Lift) (riprap on last 200' section of breach, on base and 5 feet up sides)	1,481 741	Cubic Yards Cubic Yards
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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) Filter Material (12" Loose Lift) (riprap on last 200' section of breach, on base and 5 feet up sides)	1,481 741	Cubic Yards Cubic Yards
Dam Breach to Toe	Riprap (24" Loose Lift) Filter Material (12" Loose Lift)	7,407 3,704	Cubic Yards 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

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA							Calendar Year							
Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$	Note	1	2	3	4	5	6		
Construction Total with Indirects				\$16,271,537	\$14,950,953	FA for Cash Amount								
Contingency	10.0%			\$1,446,359	\$1,328,974									
Adaptive Management	0.0%	Reclamation 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 Noted		\$0	\$0									
Construction Total (no Indirects)				\$14,463,589	\$13,289,736		14,463,589	13,289,736						
Mine Site				\$8,450,657	\$7,755,390		30 Yr Tot	2.9%	Oper	Hold				
General Reclamation				\$0	\$0									
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]	679,500	632,657	0	0	0	679,500	0
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]	7,837	7,297	0	0	0	7,837	0
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]	541,800	504,449	0	0	0	541,800	0
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]	9,580	8,920	0	0	0	9,580	0
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)	447,453	416,606	0	0	0	447,453	0
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]	18,585	17,304	0	0	0	18,585	0
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]	323,850	301,524	0	0	0	323,850	0
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]	3,626	3,376	0	0	0	3,626	0
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]	249,400	232,207	0	0	0	249,400	0
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]	4,410	4,106	0	0	0	4,410	0
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)	178,200	165,916	0	0	0	178,200	0
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]	8,555	7,965	0	0	0	8,555	0
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]	450,000	418,978	0	0	0	450,000	0
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]	5,597	5,211	0	0	0	5,597	0
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]	275,200	256,228	0	0	0	275,200	0
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]	4,866	4,531	0	0	0	4,866	0
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)	196,599	183,046	0	0	0	196,599	0
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]	9,440	8,789	0	0	0	9,440	0
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]	86,601	80,631	0	0	0	86,601	0
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]	12,331	11,481	0	0	0	12,331	0

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA							Start of							
Construction Total with Indirects	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$	Note	Calendar Year	Year	Bankruptcy	07/01/19	07/01/20	07/01/21	
									01/01/18	07/01/18	2019	2020	2021	
							Year of Closure							
							1	2	3	4				
Contingency	10.0%	Reclamation			\$16,271,537	\$14,950,953	FA for Cash Amount							
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		14,463,589	13,289,736					
		Memo Unless			\$0	\$0			2.9%	Oper	Hold			
		Noted			\$14,463,589	\$13,289,736		30 Yr Tot	NPV			2	3	4
Construction Total (no Indirects)					\$1,407,425	\$1,273,469								
Pits														
Prepare for Fencing	Unit \$ Reclamation	\$0	LF	\$9.00	\$0	\$0	Ames 2016	0	0	0	0	0	0	
Pit Fence - Barb Wire 4 Strand	Unit \$ Reclamation	0	LF	\$8.00	\$0	\$0	MnDOT Standard Plate 9323 Rev. D [Ames 2016]	0	0	0	0	0	0	
Pit Fence - Non Climbable	Unit \$ Reclamation	0	LF	\$22.00	\$0	\$0	MnDOT Standard Plate 9322 Rev. K [Ames 2016]	0	0	0	0	0	0	
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]	0	0	0	0	0	0	
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)	0	0	0	0	0	0	
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]	1,379,400	1,248,112	0	0	0	0	1,379,400
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]	28,025	25,358	0	0	0	0	28,025
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]	45,000	41,898	0	0	0	45,000	0
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]	376,200	350,265	0	0	0	376,200	0
Liner Disposal in Off Site Solid Waste Landfill	Ponds & pipe-liner off site disposal	56	Acres	\$152	\$8,470	\$7,886	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]	8,470	7,886	0	0	0	8,470	0
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]	4,646	4,326	0	0	0	4,646	0
Rail Transfer Hopper					\$0	\$0								
Haul RTH waste rock to East Pit, Plus Grading					\$0	\$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	214,255	193,863	0	0	0	0	214,255
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	611,337	553,151	0	0	0	0	611,337
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		27,610	25,707	0	0	0	27,610	0
Rail Transfer Hopper	Demo	1	LS	\$86,100	\$86,100	\$80,164		86,100	80,164	0	0	0	86,100	0
Rail Transfer Hopper Control Bldg	Demo	1	LS	\$18,700	\$18,700	\$17,411		18,700	17,411	0	0	0	18,700	0
Rail Transfer Hopper Platform	Demo	1	LS	\$60,000	\$60,000	\$55,864		60,000	55,864	0	0	0	60,000	0
Central Pumping Station	Demo	1	LS	\$15,700	\$15,700	\$14,618		15,700	14,618	0	0	0	15,700	0
Railroads	Demo	1	LS	\$78,750	\$78,750	\$71,255		78,750	71,255	0	0	0	0	78,750
Pipelines	Demo	1	LS	\$797,133	\$797,133	\$721,264		797,133	721,264	0	0	0	0	797,133
Power Lines	Demo	1	LS	\$83,900	\$83,900	\$75,915		83,900	75,915	0	0	0	0	83,900
Roads and Parking Lots	Demo	1	LS	\$524,000	\$524,000	\$474,127		524,000	474,127	0	0	0	0	524,000
Wastewater Treatment Facility	Demo	1	LS	\$512,000	\$512,000	\$463,269		512,000	463,269	0	0	0	0	512,000
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]	66,000	59,718	0	0	0	0	66,000
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	31,310	29,152	0	0	0	31,310	0
Construction					\$405,361	\$377,416								
FTB Borrow Area & Disturbed Area	SOW14 FTB Grading-Seeding (Yr 0)	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)	405,361	377,416	0	0	0	405,361	0
FTB Overflow		0	LS	\$239,539	\$0	\$0		0	0	0	0	0	0	

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA							Start of				
Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$	Note	Year	Bankruptcy	07/01/19	07/01/20	07/01/21
							Calendar Year	2018	2019	2020	2021
							Year of Closure				
							1	2	3	4	
Construction Total with Indirects				\$16,271,537	\$14,950,953	FA for Cash Amount					
Contingency	10.0%			\$1,446,359	\$1,328,974						
Adaptive Management	0.0%	Reclamation		\$0	\$0	normal construction no water mgt					
Engineering Redesign	0.0%	Quantities		\$0	\$0	normal construction no water mgt					
Prime Contractor Markup	2.5%	from Changes		\$361,590	\$352,243		14,463,589	13,289,736			
		Over Time		\$0	\$0						
		Memo Unless		\$0	\$0						
		Noted		\$14,463,589	\$13,289,736						
Construction Total (no Indirects)				\$3,797,260	\$3,470,923						
Demo and Abatement							30 Yr Tot	2.9%	Oper	Hold	
Legacy Structure Removal											
Area 1 Shop Buildings	Demo	0	LS	\$448,916	\$0	in Legacy Reclamation	0	0	0	0	0
Area 2 Shop Buildings	Demo	0	LS	\$556,827	\$0	in Legacy Reclamation	0	0	0	0	0
Main Plant Area - Demoeed in Construction	Demo	0	LS	\$1,655,350	\$0	in Legacy Reclamation	0	0	0	0	0
Main Plant Area	Demo	0	LS	\$19,888,937	\$0	in Legacy Reclamation	0	0	0	0	0
Main Gate Colby PH Ad Bldg	Demo	0	LS	\$243,170	\$0	in Legacy Reclamation	0	0	0	0	0
Roads	Demo	0	LS	\$660,000	\$0	in Legacy Reclamation	0	0	0	0	0
Railroads	Demo	0	LS	\$380,000	\$0	in Legacy Reclamation	0	0	0	0	0
Power System	Demo	0	LS	\$97,810	\$0	in Legacy Reclamation	0	0	0	0	0
Piping System	Demo	0	LS	\$2,879,000	\$0	in Legacy Reclamation	0	0	0	0	0
Legacy Asbestos Abatement											
Area 1 Shop Buildings	Demo	0	LS	\$98,350	\$0	in Legacy Reclamation	0	0	0	0	0
Area 2 Shop Buildings	Demo	0	LS	\$167,350	\$0	in Legacy Reclamation	0	0	0	0	0
Main Plant Area	Demo	0	LS	\$5,962,607	\$0	in Legacy Reclamation	0	0	0	0	0
Main Gate Colby PH Ad Bldg	Demo	0	LS	\$859,400	\$0	in Legacy Reclamation	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
Concentrate Storage and Loadout Facility	Demo	1	LS	\$333,860	\$333,860	\$310,914	333,860	310,914	0	0	83,465
Plant Site Sewage Treatment Plant	Demo	1	LS	\$148,000	\$148,000	\$137,828	148,000	137,828	0	0	37,000
Railroads	Demo	1	LS	\$296,000	\$296,000	\$267,827	296,000	267,827	0	0	0
Pipelines	Demo	1	LS	\$1,930,000	\$1,930,000	\$1,746,307	1,930,000	1,746,307	0	0	0
Power Lines											1,930,000
Roads and Parking Lots											
Plant Site Wastewater Treatment Plant	Demo	1	LS	\$245,000	\$245,000	\$221,681	245,000	221,681	0	0	0
Other											245,000
AST Removal	AST	0	LS	\$223,625	\$0	in Legacy Reclamation	0	0	0	0	0
AOCs	AOC	0	LS	\$6,918,200	\$0	in Legacy Reclamation	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	in Legacy Long Term	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	in Legacy Long Term	0	0	0	0	0
Landfill Maintenance and Monitoring SW619		0		\$0	\$0	in Legacy Long Term	0	0	0	0	0
Landfill Maintenance and Monitoring Coal Ash		0		\$0	\$0	in Legacy Long Term	0	0	0	0	0
Tailings Basin Maint		0		\$0	\$0	in Legacy Long Term	0	0	0	0	0
Snow Plowing Road Maint		0		\$0	\$0	in Legacy Long Term	0	0	0	0	0
Vehicles (25,000 m ² x \$0.70/m ²)		0		\$0	\$0	in Legacy Long Term	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
Superintendent's Light Truck - Annual Miles	Unit \$ Reclamation	15,000	miles/yr	\$0.70	\$31,500	\$29,337	31,500	29,337	0	0	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
Engineer's Light Truck - Annual Miles	Unit \$ Reclamation	15,000	miles/yr	\$0.70	\$31,500	\$29,337	31,500	29,337	0	0	10,500
Road Maintenance	Unit \$ Long Term	1	yr	\$62,400	\$187,200	\$174,347	187,200	174,347	0	0	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 than 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

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

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 $[8 \times \{(10 \times 10) + (5 \times 10)\}] / 27$ 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 $[8 \times \{(10 \times 10) + (5 \times 10)\}] / 27$ 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 $[(2.5 \times 3') + (10 \times 3')] / 27$ 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 $[(3 \times 3') + (12 \times 3')] / 27$ 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; $100 \times 15,000' + 20\% = 1,800,000$ SF = 41 Acre Assume Average Width of Restoration Zone is 100' and add 20% Additional for Misc. Restoration Areas; $100 \times 15,000' + 20\% = 1,800,000$ 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)		
	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
Scope of Work Description										
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 - Demoeed 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		
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		
	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
Scope of Work Description										
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					

Totals	Lakehead	Mavo
Mine Site	\$31,155,813	\$7,087,707
less Mine Site	\$2,203,893	\$0
	\$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
MY1 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							NPV \$		Note	
	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$				
Reclamation Total with Indirects					\$133,621,573	\$121,898,444	FA for Cash Amount			
Contingency	10.0%				\$11,380,656	\$10,382,126				
Adaptive Management	2.0%	Quantities from Barr			\$2,225,563	\$2,030,658				
Engineering Redesign	2.0%	Changes Over Time Memo			\$2,225,563	\$2,030,658				
Performance Bond	1.0%	Unless Noted			\$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 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 @ 200lb/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 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 @ 200lb/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 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 @ 200lb/Acre [D&T 4/5/16 letter]			

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6 Yr Tot	NPV	Operating	Hold	Year of Closure					
				1	2	3	4	5	
\$112,869,961	\$102,973,571	2.9%							
12,545,466	11,680,606	0	0	12,545,466	0	0	0	0	
460,149	428,427	0	0	460,149	0	0	0	0	
2,664,886	2,481,174	0	0	2,664,886	0	0	0	0	
343,847	320,143	0	0	343,847	0	0	0	0	
5,448,026	5,072,450	0	0	5,448,026	0	0	0	0	
679,500	614,827	0	0	679,500	0	0	0	0	
7,837	7,091	0	0	7,837	0	0	0	0	
541,800	490,233	0	0	541,800	0	0	0	0	
9,580	8,669	0	0	9,580	0	0	0	0	
894,906	809,730	0	0	894,906	0	0	0	0	
18,585	16,816	0	0	18,585	0	0	0	0	
323,850	293,027	0	0	323,850	0	0	0	0	
3,626	3,281	0	0	3,626	0	0	0	0	
249,400	225,663	0	0	249,400	0	0	0	0	
4,410	3,990	0	0	4,410	0	0	0	0	
356,401	322,479	0	0	356,401	0	0	0	0	
8,555	7,741	0	0	8,555	0	0	0	0	
450,000	407,170	0	0	450,000	0	0	0	0	
5,597	5,064	0	0	5,597	0	0	0	0	
275,200	249,007	0	0	275,200	0	0	0	0	
4,866	4,403	0	0	4,866	0	0	0	0	
393,198	355,774	0	0	393,198	0	0	0	0	
9,440	8,542	0	0	9,440	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					\$133,621,573	\$121,898,444	FA for Cash Amount	
Contingency	10.0%				\$11,380,656	\$10,382,126		
Adaptive Management	2.0%	Quantities from Barr			\$2,225,563	\$2,030,658		
Engineering Redesign	2.0%	Changes Over			\$2,225,563	\$2,030,658		
Performance Bond	1.0%	Time Memo			\$1,138,066	\$1,038,213		
Prime Contractor Markup	2.5%	Unless Noted			\$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	\$56,333,084		
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	Arrowhead Consulting & Testing 2016 (Attachment D) and Mayo 2016 (Attachment C)	
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							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	\$28,310	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	\$28,310	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	

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6 Yr Tot	NPV	Operating	Hold	Year of Closure						
				MY						
				1	2	3	4	5		
\$112,869,961	\$102,973,571	2.9%								
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				
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				
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	28,310	0	0	10,500	10,500	10,500				
670,800	607,120	0	0	223,600	223,600	223,600				
31,500	28,310	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 \$
Long Term Total with Indirects					\$1,181,141,669	\$410,101,543
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
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		\$/yr \$/hr	\$45.99		
Factor for off shift alarm response	Unit \$ Long Term		105%	factor		
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
Facility Expansion	1	LS		\$11,783,623	\$11,783,623	\$10,971,283
Labor - annual \$ / FTE - calc from hourly rate	Unit \$ Long Term		\$/yr \$/hr	\$ 68.98		
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
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		\$969,979	\$9,699,782	\$3,089,199
Maintenance and Monitoring					\$37,483,325	\$16,332,881
Maintenance					\$21,504,000	\$10,545,235
Snow Plowing	Unit \$ Long Term		1	Annual	\$25,414	\$837,612
Road Maintenance - After Reclamation	Unit \$ Long Term		1	Annual	\$19,200	\$1,862,400
Road Maintenance - During Reclamation	Unit \$ Long Term		1	Annual	\$62,400	\$187,200
Category 1 Stockpile Cover Maintenance	Unit \$ Long Term		1	Annual	\$24,000	\$722,006
Category 1 Stockpile Containment System Maintenance	Unit \$ Long Term		1	Annual	\$15,000	\$451,254
FTB Erosion Maintenance	Unit \$ Long Term		1	Annual	\$10,000	\$1,190,000
FTB Seepage Containment System Maintenance	Unit \$ Long Term		1	Annual	\$60,000	\$5,940,000
Legacy Cell 2W Reclamation	Unit \$ Long Term		1	Annual	\$1,000,000	\$6,000,000
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
Water Quality Monitoring - long term		1	Annual	\$109,664	\$1,018,080	\$1,103,428
Dam Safety Monitoring	Unit \$ Long Term		1	Annual	\$38,572	\$3,857,200
Landfill Monitoring and Maintenance SW619 (30yrs)	Unit \$ Long Term		1	Annual	\$21,957	\$658,710
Landfill Monitoring and Maintenance Coal Ash (13yrs)	Unit \$ Long Term		1	annual	\$2,640	\$4,320
Other					\$2,871,400	\$2,351,796
NMT Development		1	Total	\$2,871,400	\$2,351,796	
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
Site Manager - Long Term	Unit \$ Long Term		0.5	FTE	\$112,320	\$1,046,658
DNR - Holding	Unit \$ Long Term		4.0	FTE	\$965,120	\$951,535
DNR - Reclamation	Unit \$ Long Term		4.0	FTE	\$965,120	\$2,895,360
DNR - Long Term	Unit \$ Long Term		2.0	FTE	\$482,560	\$46,325,760
DNR - Legal	Unit \$ Long Term		2.0	FTE	\$482,560	\$475,767
Misc Energy Services		1.0	Annual	\$25,000	\$2,400,000	\$729,469
Facility Insurance		1.0	Annual	\$15,000	\$15,000,000	\$4,943,804
Environmental Insurance		1.0	Annual	\$100,000	\$10,000,000	\$3,295,869
Pickup Truck (25,000 mi x \$0.70/mi)	Unit \$ Long Term		25,000	Annual	\$17,500	\$1,750,000
Pump Maint Truck (15,000 mi x \$1.05/mi)	Unit \$ Long Term		15,000	Annual	\$15,750	\$1,575,000

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	Year 11	
													Continues to Year 100	
100 Yr Tot	NPV	Operating	Hold	Backfilling			Flushing			Floodng		Pit Obw		
				1	2	3	4	5	6	7	8	9	10	11
992.608	344.669		7.953											
8.731	8.367	0	2.910	2.910	0.000	0.000	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	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	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	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	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	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	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	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	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	0.000
95.999	20.984	0	0.000	0.969	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	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	0.019
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	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	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	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	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	0.060
6.000	5.358	0	0.000	1.000	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	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	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	0.039
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	0.022
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	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	0.718	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	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	0.112
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	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	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
0.483	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	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	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	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	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	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	0.016

MY2 Financial Liability Estimates

Mine Year 2 Reclamation							Cash	Apply	
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							%	Mob%	Note
	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$		y/n	
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	Ponds & 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	\$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							Cash	Apply	
	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$	%	Mob%	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			
Wastewater 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

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
	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$
Long Term Total with Indirects					\$1,244,406,255	\$431,822,050
Contingency	15.0%				\$159,877,160	\$55,479,596
Adaptive Management	2.0%				\$18,681,364	\$6,478,478
Contractor Supplies Markup	2.5%				\$22,595,702	\$7,826,310
Contractor Labor Markup	5.0%				\$1,664,357	\$543,576
Long Term Total (no Indirects)					\$1,041,587,673	\$361,494,089
Water Treatment						
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
Treatment O&M less Labor (Years 4 to 6)	Sum of Years	1	Annual	\$5,804,160	\$11,608,320	\$10,355,456 S
Treatment O&M less Labor (Years 7 to 9)	Sum of Years	1	Annual	\$6,543,329	\$26,173,316	\$21,437,039 S
Treatment O&M less Labor (Years 10 to 100)	Sum of Years	1	Annual	\$5,315,501	\$489,026,092	\$133,311,069 S
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
Facility Replacement (Year 1 to 100)	Sum of Years	1	Annual	\$1,804,316	\$182,235,916	\$59,569,701 S
Facility Expansion		1	LS	\$11,783,623	\$11,783,623	\$10,971,283 S
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
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
Treatment O&M less Labor (Years 4 to 6)	Sum of Years	1	Annual	\$1,237,709	\$3,713,127	\$3,265,923 S
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
Facility Replacement (Year 2 to 100)	Sum of Years	1	Annual	\$969,079	\$97,876,979	\$31,994,255 S
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
Snow Plowing/Road Maint	Sum of Years	1	Annual	\$36,000	\$3,636,000	\$1,188,544 S
Road Maintenance - After Reclamation				\$18,000	\$1,746,000	\$526,233 S
Road Maintenance - During Reclamation	Sum of Years	1	Annual	\$65,000	\$260,000	\$245,696 S
Category 1 Stockpile Maintenance	Sum of Years	1	Annual	\$40,000	\$3,880,000	\$1,169,407 S
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
FTB Seepage Containment System Maintenance	Sum of Years	1	Annual	\$120,000	\$13,000,000	\$4,605,647 S
Cell 1E and 2W Reclamation	Sum of Years	1	Annual	\$1,400,000	\$8,400,000	\$7,501,586 S
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
Water Quality Monitoring - long term	Sum of Years	1	Annual	\$109,664	\$10,527,744	\$3,109,616 S
Dam Safety Monitoring	Sum of Years	1	Annual	\$38,572	\$3,895,772	\$1,273,459 S
Landfill Monitoring and Maintenance SW619 (30yrs)	Sum of Years	1	Annual	\$21,957	\$658,710	\$442,201 S
Landfill Monitoring and Maintenance Coal Ash (13yrs)	Sum of Years	1	annual	\$2,640	\$34,320	\$28,663 S
Other					\$2,871,400	\$2,351,796
NMT Development	Sum of Years	1	Total	\$2,871,400	\$2,871,400	\$2,351,796 U
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
Site Manager -Long Term	Sum of Years	0.5	FTE	\$112,320	\$10,782,720	\$3,184,929 U
MDNR - Holding	Sum of Years	4.0	FTE	\$965,120	\$965,120	\$951,535 S
MDNR - Reclamation	Sum of Years	4.0	FTE	\$965,120	\$3,860,480	\$3,545,217 S
MDNR - Long Term	Sum of Years	2.0	FTE	\$482,560	\$46,325,760	\$13,683,398 U
MDNR - Legal	Sum of Years	2.0	FTE	\$482,560	\$482,560	\$475,767 S
Misc Engineering Services	Sum of Years	1.5	Annual	\$25,000	\$2,400,000	\$708,896 U
Facility Insurance	Sum of Years	1.0	Annual	\$150,000	\$15,150,000	\$4,952,267 U
Environmental Insurance 1% of \$20M	Sum of Years	1.0	Annual	\$200,000	\$20,200,000	\$6,603,023 U
Pickup Truck (25,000 mi x \$0.70/mi)	Sum of Years	25,000	Annual	\$17,500	\$1,767,500	\$577,765 S
Pump Maint Truck (15,000 mi x \$1.05/mi)	Sum of Years	15,000	Annual	\$15,750	\$1,590,750	\$519,988 S

432	\$0.18	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
Calendar Year	2018	2019	2020	2021	2022	2023		
100 Yr Tot	2.9% NPV	Operating 1	Hold	Backfilling 2 3		Flushing 4 5 6		
			10.874					
8.731	8.367	0	2.910	2.910	2.910	0.000	0.000	0.000
11.608	10.355	0	0.000	0.000	0.000	5.804	5.804	0.000
26.173	21.437	0	0.000	0.000	0.000	0.000	0.000	6.543
489.026	133.311	0	0.000	0.000	0.000	0.000	0.000	0.000
30.337	9.917	0	0.300	0.300	0.300	0.300	0.300	0.300
182.236	59.570	0	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
1.435	0.460	0	0	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
3.713	3.266	0	0.000	0.000	0.000	1.238	1.238	1.238
0.000	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000
97.877	31.994	0	0.969	0.969	0.969	0.969	0.969	0.969
1.515	0.495	0	0.015	0.015	0.015	0.015	0.015	0.015
3.636	1.189	0	0.036	0.036	0.036	0.036	0.036	0.036
1.746	0.526	0	0.000	0.000	0.000	0.000	0.018	0.018
0.260	0.246	0	0.065	0.065	0.065	0.065	0.000	0.000
3.880	1.169	0	0.000	0.000	0.000	0.000	0.040	0.040
16.660	5.124	0	0.000	0.000	0.000	0.170	0.170	0.170
13.000	4.606	0	0.000	0.120	0.120	0.120	0.120	0.120
8.400	7.502	0	0.000	1.400	1.400	1.400	1.400	1.400
1.011	0.942	0	0.202	0.202	0.202	0.202	0.202	0.000
10.528	3.110	0	0.000	0.000	0.000	0.000	0.000	0.110
3.896	1.273	0	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
0.034	0.029	0	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
1.123	1.047	0	0.225	0.225	0.225	0.225	0.225	0.000
10.783	3.185	0	0.000	0.000	0.000	0.000	0.000	0.112
0.965	0.952	0	0.965	0.000	0.000	0.000	0.000	0.000
3.860	3.545	0	0.000	0.965	0.965	0.965	0.965	0.000
46.326	13.683	0	0.000	0.000	0.000	0.000	0.000	0.483
0.483	0.476	0	0.483	0.000	0.000	0.000	0.000	0.000
2.400	0.709	0	0.000	0.000	0.000	0.000	0.000	0.025
15.150	4.952	0	0.150	0.150	0.150	0.150	0.150	0.150
20.200	6.603	0	0.200	0.200	0.200	0.200	0.200	0.200
1.768	0.578	0	0.018	0.018	0.018	0.018	0.018	0.018
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 Long-Term Costs

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Appendix A: Financial Assurance Calculations

Appendix B: Certificate

Appendix C: Minnesota Statutes 2018

Appendix D: Fee Schedule

**THE NORTHMET PROJECT
LONG-TERM
IRREVOCABLE TRUST**

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THE NORTHMET PROJECT LONG-TERM IRREVOCABLE TRUST

THIS TRUST AGREEMENT (this “Agreement”), dated as of November 1, 2018 is between Poly Met Mining, Inc., a Minnesota corporation (“PolyMet” or the “Grantor”), US Bank, N.A. (the “Trustee”), and the Minnesota Department of Natural Resources, as beneficiary (“DNR” or the “Beneficiary”).

ARTICLE 1 RECITALS

1.1 **Permit to Mine Approval.** Pursuant to Minnesota Statutes Chapter 93 and Minnesota Rules Chapter 6132, Grantor submitted an application for a Permit to Mine, which would authorize Grantor to develop and operate the NorthMet Project in St. Louis County, Minnesota.

1.2 **Financial Assurance.** Prior to any decision by DNR to approve a Permit to Mine for the NorthMet Project, Grantor must provide financial assurance (a) in accordance with the terms outlined in the Special Conditions of the Permit to Mine, attached hereto as Appendix A; and (b) Minnesota Statutes Chapter 93 and Minnesota Rules Chapter 6132. Under the Permit to Mine, a portion of the financial assurance for the NorthMet Project must include a long-term funding mechanism, and the Trust is being established to satisfy this long-term obligation.

1.3 **Purpose of the Trust.** The purpose of the Trust created by this Agreement is to ensure that there is a source of funds to (i) be used by the DNR to perform the NorthMet MRC if Grantor fails to perform the Required NorthMet MRC Work, (ii) maintain environmental liability insurance with respect to the NorthMet MRC, and (iii) pay all taxes and expenses associated with the Trust as set forth in Article 3 (collectively, the “Trust Purposes”).

1.4 **Agreement Limitations.** Creation of this Trust does not relieve or release Grantor from the responsibility to perform under the Permit to Mine, satisfy reclamation obligations or conduct post-closure monitoring and maintenance obligations described in Minnesota Statutes Chapter 93, Minnesota Rules Chapter 6132 and the Permit to Mine, nor may anything herein be construed as limiting or in any way precluding the DNR’s authority to take any action relating to the NorthMet Project as may be required or permitted by applicable law. Creation of this Trust and the designation of the DNR as beneficiary of this Trust do not grant additional enforcement rights to the DNR with respect to the NorthMet Project, and the DNR must act in accordance with the Procedures when enforcing its rights with respect to the Trust Estate. The parties acknowledge that the Trust constitutes a financial assurance regulated under the Mining Laws, title to the assets comprising the Trust Estate is vested in the Trustee, and neither the Trust nor the Trust Estate is intended to be governed by, nor shall Grantor claim protection or rights under, any state’s or governmental entity’s Uniform Commercial Code or other similar laws, rules or regulations governing collateral or secured interests.

ARTICLE 2 CREATION OF TRUST, ADDITIONS AND DISTRIBUTIONS

2.1 **Name of Trust and Beneficiary.** The name of the trust is The NorthMet Project Long-Term Irrevocable Trust (the “Trust”) and the beneficiary of the Trust is the DNR.

2.2 **Establishment of Trust.** The Grantor hereby represents and warrants that applicable law provides that the Grantor may enter into a trust agreement and establish a trust for the sole benefit of the beneficiary. Grantor hereby establishes this Trust for the benefit of the Beneficiary for the Trust Purposes set forth in Section 1.3. The Trustee must hold the Trust Estate, in Trust, as provided herein. The original fund balance and all other monies and other assets transferred to the Trust, together with all earnings and profits thereon, shall be referred to herein as the “Trust Estate.” All earnings or other gains on assets comprising the Trust Estate shall be retained as part of the Trust Estate until distributed in accordance with this Agreement. The Trust Estate shall not be used as financial assurance for, or to satisfy, any obligation other than as set forth in Section 1.3 hereof. The Trustee shall not be responsible for the amount or adequacy of the Trust Estate to satisfy the requirements of the Mining Laws, nor shall the Trustee have any duty to collect from Grantor any payments necessary to discharge any obligations or liabilities of Grantor under this Agreement or otherwise owed by Grantor to the State of Minnesota or the DNR under any applicable laws and regulations.

2.3 **Trust Estate.** The Trustee shall administer and distribute the Trust Estate in accordance with the provisions of this Agreement. The Trustee and Grantor intend that no person, other than the Beneficiary, shall have access to the Trust Estate except as herein provided. Grantor hereby represents and warrants that, immediately before contributing any assets hereto, the Grantor held title free and clear to such assets. Grantor hereby acknowledges that, upon such contribution, the Grantor relinquished its title to such assets. Grantor will fund the Trust with an initial contribution of \$10,000,000.00 immediately prior to the issuance of the Permit to Mine by the DNR.

2.4 **Additions to Trust.**

a. **Required Additions.** Grantor agrees to make additional contributions to the Trust in accordance with the terms outlined in Attachment 1 to the Special Conditions (including appendices thereto) of the Permit to Mine (the “Special Conditions (Attachment 1)”) when required by the Mining Laws. Specifically, Grantor shall contribute \$2,000,000 per year to the Trust beginning in Mine Year One through Mine Year Eight as provided in the Special Conditions (Attachment 1). Thereafter, additional contributions, if any, will be determined using the methodology set forth in the Special Conditions (Attachment 1). Grantor acknowledges that the DNR, in its regulatory capacity, has authority under and in accordance with the Mining Laws to make adjustments to the financial assurance terms in the Special Conditions (Attachment 1), to determine the amount and terms of any additions or reductions to the Trust and the Additional FA Instruments that are required under the Permit to Mine.

b. **No Pour-Over Additions.** In the event that the DNR receives proceeds resulting from disbursements under any of the Additional FA Instruments following a breach by Grantor of such Additional FA Instruments (“Proceeds”), DNR shall not contribute such Proceeds to the Trust and the Proceeds shall not be considered part of the Trust Estate.

2.5 **Certain Additional Procedures.** Grantor and Beneficiary acknowledge that under the Mining Laws, the DNR must annually evaluate the financial assurance amount necessary for the NorthMet MRC and make adjustments to such financial assurance amount (up or down) when required, and nothing herein is intended to alter such requirements under the Mining Laws. In

addition to such annual evaluation, Grantor and Beneficiary agree that at the earlier of: (a) the start of Mine Year 19 or (b) the time that the DNR determines that the Trust Estate is fully funded under the Special Conditions (Attachment 1), Grantor and Beneficiary shall utilize a three-year joint review cycle with respect to the Trust Estate requirements applicable to the NorthMet MRC. On a date agreed by the parties within the first calendar quarter of each three-year cycle, they shall meet to discuss anticipated additions (and the estimated projected amounts of such additions) to the Trust Estate or anticipated reductions (and the estimated projected amounts of such reductions) to the Trust Estate. Distributions of any excess amounts shall be made pursuant to Section 2.7 hereof.

2.6 **Distribution Restrictions.** Distributions from the Trust to the Beneficiary must be used solely for the Trust Purposes as set forth in Section 1.3 hereof. The Trustee shall make distributions of the Trust Estate to the Beneficiary or to Grantor only pursuant to a Certificate in accordance with this Agreement. Grantor may object if the Trust Estate is used for purposes other than those provided in this Agreement and reserves its rights to enforce this Agreement; provided that Grantor's sole remedy in the case of claims that a distribution to the DNR has been used in violation of this Agreement or the Mining Laws is to compel the Beneficiary to reimburse the Trust for funds determined by a court of competent jurisdiction or an administrative proceeding to have been used in violation of this Agreement or the Mining Laws and Grantor may not seek an injunction or other relief intended to prevent a distribution, (including any similar type of relief pursuant to an administrative proceeding) pursuant to a Certificate issued in accordance with this Agreement. Nothing herein waives any defense the Beneficiary may have to enforce the provisions of this Agreement or any rights or remedies the Grantor may have to seek a distribution to Grantor under this Agreement or to secure a release of the Trust Estate under the Mining Laws.

2.7 **Distributions to the Beneficiary or Grantor.**

a. **Forfeiture Distribution.** If a NorthMet Forfeiture occurs, DNR shall issue a Certificate directing distribution of part or all of the Trust Estate into a segregated account(s) identified by the Beneficiary, and such amount, together with accrued earnings thereon, shall be retained as part of such account(s) and shall be used by the Beneficiary only for the Trust Purposes in accordance with Section 1.3 hereof; provided, that if any law, regulation or operating practice of or applicable to any relevant department or agency of the State of Minnesota prohibits the maintenance of such funds or accrued earnings thereon in a segregated account, such funds or accrued earnings thereon may be commingled with other State funds so long as such funds and accrued earnings thereon are accounted for separately from other funds in any such account(s). If the entire Trust Estate is distributed to the Beneficiary and the Trust is terminated, such amount may be distributed less Final Expenses; provided that Grantor shall remain responsible for payment of Final Expenses to the extent not paid from the Trust Estate and any such remaining amounts of Final Expenses shall be paid by Grantor directly to the DNR following the termination of the Trust.

b. **Termination Distribution.** If requirements provided in Section 3.4(a) hereof have been satisfied, then all of the Trust Estate, less Final Expenses, shall be paid to Grantor, and the Trust shall be terminated set forth in Section 3.4(a) hereof.

c. **Distributions Prior to Full Release.** Subject to the timing contemplated in Section 2.5 and to the exception in paragraph (i) of this Section 2.7(c), if the Trust Estate exceeds

the amount determined by the DNR in accordance with the Permit to Mine to be necessary to satisfy the Trust Purposes, then as allowed under Minnesota Rules part 6132.1200 and under the Permit to Mine and the Procedures, excess funds in the Trust Estate shall be distributed to Grantor on one or more occasions prior to the complete release of Grantor from Permit to Mine responsibility for all of the mining area under Minnesota Rule part 6132.4800. Notwithstanding any provisions of the Mining Laws, Grantor agrees it will not request a distribution under this Section more than once every three years as contemplated in Section 2.5 hereof, except as allowed under paragraph (i) below:

i. In the event that any change in the Mining Laws, or any other applicable laws or regulations, may result in a reduction in the amount of the Trust Estate in excess of at least 3% of the Trust Estate balance, then, upon Grantor's request, the DNR shall promptly conduct a review to determine if the Trust Estate balance exceeds the amount necessary to satisfy the Trust Purposes in accordance with the Permit to Mine. Following the implementation of amendments to the Permit to Mine required under the Mining Laws, if any, resulting from said change in law, such excess amount shall be distributed to Grantor, notwithstanding that there has been another distribution to Grantor within three years of such request.

d. Prohibitions on Distributions. Notwithstanding the terms of paragraphs (a) - (c) of this Section 2.7, Grantor shall not be entitled to receive distributions from the Trust Estate during the occurrence of any of the following: (i) the occurrence and continuance of a Bankruptcy Event, or (ii) a NorthMet Forfeiture, provided that if the DNR determines that Grantor has cured the default following such NorthMet Forfeiture, then Grantor shall retain its rights hereunder to receive distributions.

e. Certification of Distributions. Any distributions of the Trust Estate pursuant to this Article shall be made only pursuant to a Certificate delivered by the DNR to the Trustee, with simultaneous notice to the Grantor. The DNR shall use the following forms of Certificate that are attached as Appendix B: a Certificate in the form provided in Exhibit 1 for any distribution under Section 2.7(a), a Certificate in the form provided in Exhibit 2 for any distribution under Section 2.7(b), and a Certificate in the form provided in Exhibit 3 for any distribution under Section 2.7(c). The Trustee shall not be liable for making any distributions or otherwise taking any action permitted to be directed by a Certificate hereunder. The Trustee shall have no obligation to investigate or otherwise interpret the validity of any Certificate and shall be deemed a "directed fiduciary" within the meaning of NRS 163.5549 with regard to distributions of the Trust Estate.

ARTICLE 3 ADMINISTRATION

3.1 Expenses of Trust. The Trustee may, at any time and from time to time, without prior notice, pay or reimburse itself from the Trust Estate all Trust expenses, including investment advisory and custodial fees, legal and accounting fees, and all other direct costs related to managing the Trust Estate. The Trustee may also pay itself on a regular basis the Trustee fees that are authorized pursuant to this Agreement. In the event of any dispute between the Beneficiary and Grantor under this Agreement, if the Beneficiary is the prevailing party, all costs, fees and expenses (including legal fees) incurred by the Beneficiary with respect to said dispute shall be paid or reimbursed by the Trust unless otherwise prohibited by law. All costs, fees and expenses

described in this Section, except for such costs, fees, and expenses for which Grantor is not responsible if it is the prevailing party in any dispute subject to the immediately preceding sentence, shall be funded by Grantor. Required contributions to the Trust under this Section 3.1 are in addition to the amounts required under the Special Conditions (Attachment 1).

3.2 **Taxes.** Grantor and Beneficiary acknowledge that (i) the Trust is a grantor trust under the tax law and that Grantor will be liable for income taxes due as a result of income and realized gains earned by the Trust Estate, and (ii) the Trustee will file and furnish Form 1041 as the Trust's method of reporting using the Trust's EIN and not the Grantor's EIN in all tax filings. Grantor may request from the Trustee the amount necessary to reimburse Grantor for Grantor's federal, state, and local tax liability as a result of income received or gains recognized by the Trust for that respective tax year. Distributions of amounts from the Trust to pay taxes shall not alleviate Grantor from the required minimum funding amounts set forth in Article 2 above and Grantor shall have sole responsibility to pay for or reimburse the Trust with respect to any taxes relating to the Trust or the Trust Estate, including if the Trust does not qualify as or ceases to be a grantor trust.

3.3 **Management of Trust Estate.** The Trustee has sole discretion to manage the Trust Estate subject to the restrictions on permissible investments set forth in Appendix B, including the requirement to invest in Authorized Investments only and in accordance with the Asset Allocation Instruction (collectively "Investment Restrictions"). The Grantor and Beneficiary hereby represent and warrant that the permissible investments set forth herein are acceptable. The following investments are considered "Authorized Investments:" publicly traded domestic equity securities as authorized pursuant to Minn. Stat. 11A.24, subd. 5; international equity securities that are publicly traded on a regulated exchange; government and corporate fixed income securities as authorized by Minn. Stat. 11A.24, subs. 2 and 3; and exchange traded and mutual funds as authorized by Minn. Stat. 11A.24, subd. 1. Grantor and Beneficiary shall from time to time (but no less frequently than annually) jointly provide the Trustee with written instruction for the asset allocation of Authorized Investments for the Trust Estate ("Asset Allocation Instruction") including rebalancing parameters and any other investment restrictions that Grantor and Beneficiary deem appropriate.

3.4 **Termination.**

a. **Termination Due to Satisfaction of Objectives.** The Trust shall terminate when the DNR in its regulatory capacity determines with respect to the NorthMet Property and in accordance with the Mining Laws that: (i) mining has ceased, (ii) all NorthMet MRC has been completed, (iii) all of the Long-Term Costs (as defined in the Permit to Mine) have been fully funded, (iv) all of the Trust Purposes have been met and (v) there are no uncured violations in accordance with applicable laws and regulations or the Permit to Mine.

b. **Termination Due to Lack or Vacation of Permit.** The Trust shall terminate if the DNR fails to make a final decision to issue the Permit to Mine within 120 days following the initial date of this Agreement or if the Permit to Mine is subsequently vacated. Upon termination, the Trustee shall distribute the remaining Trust Estate, if any, to Grantor.

3.5 **Spendthrift Provision.** The assets, income, and principal of the Trust Estate may not be assigned, anticipated or alienated in any manner by the Beneficiary or Grantor, nor shall the

Trust Estate be subject to attachment, bankruptcy proceedings or any other legal process, or to the interference or control of creditors or others. This Trust shall be a spendthrift trust within the meaning of Chapter 166 of the Nevada Revised Statutes; provided, however, pursuant to Article 1.4, above, this Trust is not intended to be a donative transfer to Beneficiary, and thus the provisions of NRS 166.170, Chapter 112 of the Nevada Revised Statutes where claims may be brought against the Grantor or Beneficiary are inapplicable in enforcing claims of a creditor of the Grantor or Beneficiary against the Trust Estate.

ARTICLE 4 POWERS OF THE TRUSTEE

4.1 **Investment Powers.** Subject to the Investment Restrictions, the Trustee has the power to:

a. **Purchase, Hold, and Sell Assets.** Purchase with, and hold as, assets in the Trust Estate without distinction between principal and income any securities or property that are Authorized Investments, including, but not limited to, any securities or property administered, advised, custodied, held, issued, offered, sponsored, supported by the credit of, underwritten, or otherwise serviced by the Trustee or by the Trustee's affiliate.

b. **Process Corporate Actions.** Respond to voluntary corporate actions (such as proxies, redemptions, or tender offers) and mandatory corporate actions (such as class actions, mergers, stock dividends, or stock splits) affecting shareholders of an asset. Notwithstanding anything herein to the contrary, the Trustee will, without providing notice, (i) cause assets to participate in any mandatory exchange transaction that neither requires nor permits approval by the owner of the assets and (ii) file any proof of claim received by the Trustee regarding class-action litigation over a security held in the Trust during the class-action period, regardless of any waiver, release, discharge, satisfaction, or other condition that might result from such filing.

c. **Hire Service Providers.** Hire service providers (including, but not limited to, investment managers, investment advisers, and brokers) to assist the Trustee in exercising the foregoing powers, including any service provider that is affiliated with the Trustee.

d. **Do Other Things.** Perform other acts necessary to the proper discharge of its duties under this Agreement.

4.2 **Administrative Powers.** Subject to the Investment Restrictions, the Trustee has the power to:

a. **Safe-keep Assets.** Safe-keep assets as set forth herein.

b. **Exchange Foreign Currency.** Exchange foreign currency into and out of United States dollars through customary channels, including the Trustee's foreign-exchange department.

c. **Settle Purchases and Sales.** Settle purchases and sales as set forth herein.

d. **Register Assets.** Register any asset in the name of the Trust (with the Trustee designated as trustee), the Trustee (with or without trust designation), or the Trustee's

nominee or to hold any asset in unregistered or bearer form or in such form as will pass title by delivery, provided that the Trustee's records at all times show that all such assets are part of the Trust.

e. Maintain Assets at a Depository or with a Sub-custodian. Maintain assets that are (i) book-entry securities at any central securities depository (such as the DTC), international central securities depository (such as Euroclear Bank SA/NV), or Federal Reserve Bank ("Depository") or with any sub-custodian and to permit such assets to be registered in the name of the Trust (with the Trustee designated as trustee), the Trustee (with or without trust designation), the Trustee's nominee, the Depository, the Depository's nominee, the sub-custodian, or the sub-custodian's nominee and (ii) physical securities at the Trustee's office in the United States and in a safe place.

f. Collect Income. Collect income as set forth herein.

g. Advance Funds or Securities. Advance funds or securities in furtherance of settling securities transactions and other financial-market transactions under this Agreement.

h. Sign Documents. Make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any or all other instruments that may be necessary or appropriate to the proper discharge of its duties under this Agreement.

i. Distribute Assets. Distribute assets as set forth herein.

j. Retain Disputed Funds. Withhold delivery or distribution of assets that are the subject of a dispute pending final adjudication of the dispute by a court of competent jurisdiction, except when delivery of assets is directed by a Certificate as required by the terms of this Agreement.

k. Hold Assets Un-invested. Hold assets un-invested pending investment, distribution, resolution of a dispute, or for other operational reasons, and to deposit the same in an interest-bearing or noninterest-bearing deposit account of the Trustee, notwithstanding any sweep direction for the Trust account or the Trustee's receipt of "float" income from such un-invested cash.

l. Litigate. Bring or defend lawsuits involving the Trust at the sole expense of the Trust and to settle the same, with approval of both Grantor and Beneficiary.

m. Provide Statements. Provide statements as set forth herein.

n. Provide Ancillary Services. Provide ancillary services to the Trust for no more than reasonable compensation.

o. Hire Service Providers. Hire service providers (including, but not limited to, attorneys, depositories, and sub-custodians) to assist the Trust in exercising the foregoing powers, including any service provider that is affiliated with the Trustee.

p. **Do Other Things.** Perform other acts necessary to the proper discharge of its duties under this Agreement.

4.3 **Settle Purchases and Sales.** The Trustee will settle purchases made with assets in the Trust Estate and sales of such assets, according to the Trustee's instruction-deadline schedule, provided that the Trustee has all the information and the Trust has all the assets necessary for the purchase or sale. The Grantor and the Beneficiary hereby represent and warrant that neither the Grantor nor the Beneficiary will (i) notify any third party that, despite the fact that the Trust account has insufficient assets for the transaction, the Trustee will settle the purchase of an asset nor (ii) direct anyone else to provide such notice.

4.4 **Collect Income.** The Trustee will collect all income, principal, and other distributions due and payable on assets in the Trust. The Trustee will, upon call or maturity of any asset, surrender such asset upon condition that the proceeds are paid into the Trust Estate.

ARTICLE 5 STATEMENTS

5.1 **Accounting.** The Trustee will maintain proper books of account and complete records of assets and transactions in the Trust, including increases or decreases in the value of the Trust due to contributions to the Trust Estate, distributions from the Trust, investment experience on assets, and expenses and fees actually charged to the Trust.

5.2 **Statements.**

a. **Account Statements.** The Trustee will furnish the Grantor and the Beneficiary with (i) an account statement with the frequency designated below (or as subsequently agreed upon by the Trustee, the Grantor, and the Beneficiary) within thirty (30) calendar days after the end of the reporting period and (ii) a final account statement within thirty (30) calendar days after the Trustee has transferred all assets from the Trust as provided under this Agreement. Such account statements will reflect asset transactions during the reporting period and ending holdings in the Trust Estate. To the extent the Grantor and Beneficiary have established accounts in the Trustee's on-line portal, the Trustee will furnish such account statements by way of such system. If no frequency is so designated or agreed upon, the Grantor and the Beneficiary will be deemed to have designated "Monthly".

(Check at least one):

- Monthly
- Quarterly
- Semi-annually
- Annually

b. **Client-controlled Assets.** The Trustee will exclude from the account statements any asset that is not registered in the name of the Trust (with the Trustee designated as trustee), the Trustee (with or without trust designation), or the Trustee's nominee. The Trustee will also exclude from the account statements any asset that is not maintained by the Trustee at a Depository or with a sub-custodian nor held by the Trustee in unregistered or bearer form or in such form as will pass title by delivery ("Client-controlled Asset"). The Grantor and the

Beneficiary hereby acknowledge that (i) such assets are not held in the Trust and (ii) the Trustee is not acting as trustee of such assets and not responsible for performing any duties under this Agreement with respect to such assets.

c. Proxy-voting Reports. The Trustee will furnish the Grantor and Trustee with reports of how the Trustee voted proxies with respect to the Trust, in the form and frequency as the Grantor, the Beneficiary, and the Trustee may agree from time to time.

5.3 **Confirmations; Notification by Agreement.** Except to the extent the assets are subject to the Trustee's discretion to manage, the account statements described above (including their timing and form) serve as the sole written notification of any securities transactions effected by the Trustee for the Trust. Even so, the Grantor and the Beneficiary have the right to demand that the Trustee provide written notification of such transactions pursuant to 12 CFR Sections 12.4(a) or (b) at no additional cost to the Grantor or the Beneficiary.

5.4 **Valuation.** For purposes of reporting the value of an asset on an account statement:

a. Pricing, If Available. The Trustee will report a value that is (i) provided to the Trustee by a third-party pricing vendor or (ii) readily determinable on an established market, if such value is available to the Trustee when preparing the statement.

b. Pricing, If Unavailable. If such value is unavailable, the Trustee will report the most recent value that the Trustee received from the asset's broker, fund accountant, general partner, issuer, manager, transfer agent, or other service provider (commonly known as a pass-through price).

c. Limitations. The Grantor and the Beneficiary hereby acknowledge that the Trustee is performing a routine, ministerial, non-discretionary valuation function; that the reported value might be neither fair market value nor fair value (under accounting standards or applicable law); and that the reported value is not a substitute for (i) investigating the asset's value in connection with a decision to acquire, hold, dispose of, or exchange any securities or other investment property; (ii) obtaining and ensuring the reliability of an independent third-party appraisal with respect to such a decision; or (iii) obtaining Investment Advice.

d. Pricing Sources; Methodology. Upon the Grantor's or the Beneficiary's request, the Trustee will provide the same with information about the Trustee's pricing sources and methodologies.

5.5 **Statement Review.** The Grantor and the Beneficiary will review the Account statements promptly upon delivery.

5.6 **Audit.** On at least seven calendar days advance notice from the Grantor or the Beneficiary, the Trustee will permit the same's independent auditors to inspect during the Trustee's regular business hours any books of account and records of assets and transactions in the Trust.

ARTICLE 6 LIMITATION ON DUTIES; INDEMNIFICATION

6.1 **Limitation on Duties.** The duties of the Trustee will be strictly limited to those set forth in this Agreement, and no implied covenants, duties, responsibilities, representations, warranties, or obligations will be read into this Agreement against the Trustee. Without limiting the generality of the foregoing, the Trustee has no duty to:

a. Request or obtain a ruling or other guidance from the IRS or any other governmental authority as to (or otherwise determine, monitor, or question) the tax character or consequences of the form and operation of the Trust.

b. Determine, monitor, or collect contributions from the Grantor or monitor compliance with any applicable funding requirements.

c. (i) Collect any income, principal, or other distribution due and payable on an asset if the asset is in default or if payment is refused after due demand or (ii) except as expressly provided herein, to notify the Grantor or the Beneficiary in the event of such default or refusal.

d. Provide notice of, or forward, mini-tenders (which are tender offers for less than 5% of an outstanding equity or debt issue) for any equity issue or, if any of the following is true, for any debt issue: The debt issue is not registered with the SEC. The debt issue has a “first received, first buy” basis with no withdrawal privilege and includes a guarantee of delivery clause. Or, the tender offer includes the statement that “the purchase price includes all accrued interest on the note and has been determined in the sole discretion of the buyer and may be more than or less than the fair market value of the notes” or similar language.

e. Question whether any direction received under this Agreement is prudent; to solicit or confirm directions; or to question whether any direction received under this Agreement by email or any financial-messaging system, network, or service acceptable to the Trustee, such as the Society for Worldwide Interbank Financial Telecommunication messaging system (“Messaging System”), or entered into the Grantor’s or the Beneficiary’s account in the Trustee’s on-line portal, is unreliable or has been compromised, such as by identity-theft.

f. Calculate, withhold, prepare, sign, disclose, file, report, remit, or furnish to any taxing authority or any taxpayer any federal, state, or local taxes, tax returns, or information returns that may be required to be calculated, withheld, prepared, signed, disclosed, filed, reported, remitted, or furnished with respect to the assets or Trust, except to the extent such duties are required by law to be performed only by the Trustee in its capacity as trustee under this Agreement (such as filing and furnishing any IRS Forms 1041 required to be filed and furnished with respect to the Trust) or are expressly set forth herein.

g. Monitor service providers hired by the Grantor or by the Beneficiary.

h. Maintain or defend any legal proceeding in the absence of indemnification, to the Trustee’s satisfaction, against all expenses and liabilities which it may sustain by reason thereof.

i. Advance funds or securities or otherwise expend or risk its own funds or incur its own liability in the exercise of its powers or rights or performance of its duties under this Agreement.

j. Question whether any assets substituted under this Agreement are of equal fair market value to the assets received therefor.

6.2 **Advance of Funds or Securities.** To the extent of any advance of funds or securities under this Agreement, the Grantor and the Beneficiary hereby grant the Trustee a first-priority lien and security interest in, and right of set-off against, the assets held in the Trust. The Trustee may execute that lien and security interest, and exercise that right, at any time. Furthermore, nothing in this Agreement constitutes a waiver of any of the Trustee's (i) rights as a securities intermediary under Uniform Commercial Code §9-206 or (ii) right of reimbursement under state trust law.

6.3 **Indemnification.** The Grantor hereby indemnifies and releases the Trustee and its affiliates and their directors, officers, employees, successors, and assigns (each, an "Indemnified Person"), and holds each Indemnified Person harmless from and against, and an Indemnified Person will incur no liability to any person for, any Harm that may be imposed on, incurred by, or asserted against an Indemnified Person by reason of the Indemnified Person's action or omission in connection with this Agreement or the Trust (including, but not limited to, an action or omission that is consistent with directions provided under this Agreement), except to the extent that a court of competent jurisdiction has made a final judgment that the Harm resulted directly from the Indemnified Person's willful misconduct, gross negligence, bad faith, material breach of this Agreement, or breach of fiduciary duty. These provisions will survive the termination of this Agreement.

6.4 **Statements.** The Trustee is not liable with respect to the propriety of the Trustee's actions or omissions reflected in a statement provided under this Agreement, except to the extent (i) a statement recipient objects to the Trustee within ninety (90) calendar days after delivery of such statement or (ii) such acts or omissions could not be discovered through reasonable examination of such statement.

ARTICLE 7 RESIGNATION AND REMOVAL

7.1 **Resignation; Removal.** The Trustee may resign under this Agreement by providing notice to the Grantor and the Beneficiary. The Grantor and the Beneficiary may remove the Trustee under this Agreement for any reason by providing joint written notice to the Trustee. The resignation or removal will be effective ninety (90) calendar days after delivery of the notice. By such effective date and subject to the Beneficiary's approval of the appointment, the Grantor will appoint a new trustee and, after obtaining the Beneficiary's approval of such appointment, provide the Trustee with the new trustee's signed, written acknowledgment of trusteeship. If the Grantor fails to do so, the Trustee will have the right to petition a court at the Trust's expense for appointment of a new trustee.

7.2 **Delivery of Trust Estate to Successor.** Upon receiving such acknowledgment or notice of such court-appointment, the Trustee will transfer the Trust Estate to the new trustee as

directed by the Grantor and the Beneficiary or by the court, as the case may be. However, the Trustee will not be required to transfer any assets until the Trustee has received payment or reimbursement for all (i) compensation, expenses, fees, costs, or other charges incurred by the Trustee in providing services under this Agreement and (ii) funds or securities advanced under this Agreement.

7.3 **Eligible Trustees.** Any corporation or other entity authorized by the laws of the United States or by the laws of any state to administer trusts is eligible to serve as the Trustee; provided, however, that neither Grantor nor any person that controls, is controlled by, or is under common control with, Grantor may be eligible to serve as Trustee. A properly appointed successor trustee shall have all the title, rights, powers, immunities, privileges, and duties of the original Trustee. No successor trustee shall be obligated to examine the accounts, records, or acts of any previous trustee or to proceed against any previous trustee or successor trustee for any act or omission.

7.4 **Information Requests.** Minnesota Statutes Section 13.055 applies to this Trust and information of the Trust is subject to the requirements of that chapter.

ARTICLE 8 PROVISIONS APPLICABLE TO TRUSTEE

The following provisions will apply to the Trustee and any duly appointed successor. Such provisions are not intended to permit the establishment of additional powers or authorities for Grantor or the Beneficiary.

8.1 **Bonds Waived.** The Trustee shall be permitted to qualify without giving a bond or other undertaking in any jurisdiction for the performance of its duties, unless a bond is otherwise required by law.

8.2 **Compensation of Trustee.** The Trustee is entitled to reasonable compensation payable from the Trust: (a) as agreed to in writing by the Trustee, Beneficiary, and Grantor; or (b) if not so agreed to, the Trustee's fees, as described in its fee schedule. A copy of the Trustee's fee schedule is attached hereto as Appendix D.

8.3 **Third Party Reliance.** For the purpose of verifying the Trustee's authority to perform any act, any person dealing with the Trustee may rely on a copy of this Agreement or selected excerpts from this Agreement, certified as correct by the Trustee or by a notary public, to the same extent as if the certified copy were the original. No person dealing with the Trustee shall be under any obligation to assure the correct application of any payment made to the Trustee or to inquire into the validity, expediency, or propriety of any acts or omissions of the Trustee.

8.4 **General Provisions Relating to the Trustee.**

a. The duties, responsibilities, and obligations of the Trustee shall be limited to those expressly set forth in this Agreement, and no duties, responsibilities, or obligations are implied or shall be inferred. The Trustee shall not be required to expend or risk any of its own funds or otherwise incur any financial liability in the performance of any of its duties hereunder. The Trustee may conclusively rely upon any document it believes to be genuine and to have been signed or presented by the proper person. The Trustee need not investigate any fact or matter

stated in any such document. The Trustee shall not be accountable for the use or application of any funds paid from the Trust Estate pursuant to any direction given under this Agreement. The Trustee shall not be required to take any action that it determines could adversely affect any of its rights, powers, duties, indemnities, privileges, or immunities hereunder or to expose it to any risk or liability. The Trustee shall have no responsibility with respect to the NorthMet Project or compliance with the Permit to Mine, or any document amending or supplementing either of them by Grantor or any other person. The permissive right of the Trustee to take any action shall not be construed as a duty to so act.

b. If at any time the Trustee is served with any judicial or administrative order, judgment, decree, writ, or other form of judicial or administrative process that in any way affects the Trust Estate (including orders of attachment or garnishment or other forms of levies or injunctions or stays relating to the transfer of any of the Trust Estate), the Trustee is authorized to comply therewith in any manner as it or its legal counsel of its own choosing (other than Grantor's counsel or the Beneficiary's counsel) deems appropriate; and if the Trustee complies with any such judicial or administrative order, judgment, decree, writ, or other form of judicial or administrative process, the Trustee shall not be liable to any of the parties or any other person even though the order, judgment, decree, writ, or process may be subsequently modified or vacated or otherwise determined to have been without legal force or effect. If the Trustee is served with an order relating to this Agreement, the Trust or the Trust Estate, the Trustee shall promptly deliver a copy of such order to the Beneficiary and Grantor.

c. The Trustee shall not be liable for any action taken or omitted or for any loss or injury resulting from its actions or its performance or lack of performance of its duties hereunder or under any contract, obligation, or liability made or incurred by the Trustee hereunder, except to the extent resulting from its gross negligence or willful misconduct.

d. The Trustee shall not be responsible in any respect for the form, execution, validity, value, adequacy, or genuineness of documents, funds, or other property deposited under this Agreement, or for any description therein, or for the identity, authority, or rights of persons executing, delivering, or purporting to execute or deliver, any such document, funds, or other property.

e. In the event of any ambiguity or uncertainty under this Agreement or in any notice, instruction, direction, or other communication received by the Trustee, the Trustee may, in its sole discretion, refrain from taking any action other than to retain possession of the Trust Estate, unless the Trustee receives a written direction from the sender of the notice that eliminates the ambiguity or uncertainty.

f. Except with respect to directions pursuant to a Certificate, in the event of any dispute between or conflicting claims by or among Grantor, the Beneficiary, and any other person with respect to any of the Trust Estate, the Trustee shall be entitled, in its sole discretion, to refuse to comply with any and all claims, demands, instructions, or directions with respect to the Trust Estate so long as the dispute or conflict continues, and the Trustee shall not be or become liable in any way to Grantor or the Beneficiary for failure or refusal to comply with the conflicting claims, demands, instructions, or directions. The Trustee shall be entitled to refuse to act until, in its sole discretion, either: (i) the conflicting or adverse claims or demands shall have been

determined by a final order, judgment, or decree of a court of competent jurisdiction that is not subject to appeal, or has been settled by agreement between the conflicting parties as evidenced in a writing satisfactory to the Trustee, or (ii) the Trustee shall have received security or an indemnity satisfactory to it sufficient to hold it harmless from and against any and all losses that it may incur by reason of so acting. In addition, the Trustee may elect, in its sole discretion, to commence an interpleader action or seek such other judicial relief or orders as it may deem, in its sole discretion, necessary.

g. The Trustee is authorized to comply with and rely upon any notices, instructions, directions, or other communications that it believes to have been sent or given by the Beneficiary or a person or persons authorized by the Beneficiary. Whenever under the terms hereof the time for giving a notice or performing an act falls upon a day other than a Business Day, such time shall be extended to the next Business Day.

h. In no event shall the Trustee be liable for: (i) acting in accordance with or relying upon any instruction, direction, notice, demand, certificate, or document from the DNR, (ii) for any consequential, punitive, or special damages, (iii) for an amount in excess of the value of the Trust Estate at the time of the event giving rise to the Trustee's liability.

i. The Trustee may consult with legal counsel (other than Grantor's or the Beneficiary's counsel) as to any matter relating to this Agreement. The Trustee shall not incur any liability in respect of any action taken, suffered, or omitted by it under this Agreement in good faith and in reliance on any advice of counsel.

j. The Trustee shall not incur any liability for not performing any act or fulfilling any duty, obligation, or responsibility under this Agreement by reason of any occurrence beyond the control of the Trustee (including any act or provision of any present or future law or regulation or civil or governmental authority, any act of God or war, any act of terrorism, any civil or military disturbance, sabotage, epidemic, riot, accident, flood, or labor dispute, any governmental action, any failure, service interruption, or the unavailability of the Federal Reserve Bank wire or telex or other wire or communication facility).

ARTICLE 9 MISCELLANEOUS PROVISIONS

9.1 **Definitions.** Unless the language or context clearly indicates that a different meaning is intended, capitalized terms used herein have the meanings specified in this Article 9.

a. **Additional FA Instrument(s).** "Additional FA Instrument(s)" means one or more of the financial instruments authorized under the Mining Laws, including letters of credit and reclamation bonds, approved by DNR to be used to provide financial assurance applicable to the NorthMet Property pursuant to the Permit to Mine.

b. **Agreement.** "Agreement" has the meaning provided in the introductory paragraph.

c. **Bankruptcy Event.** "Bankruptcy Event" means (i) Grantor's or Parent's (1) application for, or consent (by admission of material allegations of a petition or otherwise) to, the appointment of a receiver, trustee or liquidator for Grantor or for all or substantially all of its assets,

or its authorization of such application or consent, or (2) the commencement of any proceedings seeking such appointment without such authorization, consent or application, which proceedings continue undismissed or unstayed for a period of 60 days from inception; (ii) Grantor's or Parent's (1) authorization or filing of a voluntary petition in bankruptcy or application for or consent (by admission of material allegations of a petition or otherwise) to the application of any bankruptcy, reorganization, readjustment of debt, insolvency, dissolution, liquidation or other similar law of any jurisdiction, or (2) the institution of such proceedings against Grantor without such authorization, application or consent, which proceedings remain undismissed or unstayed for 60 days from inception or which result in adjudication of bankruptcy or insolvency within such time.

d. Beneficiary. "Beneficiary" has the meaning provided in the introductory paragraph.

e. Business Day. A "Business Day" is any day except: (i) a Saturday, (ii) a Sunday, (iii) a day on which the commercial banks in the state of the situs of the administration of the Trust are authorized or required by law to be closed, and (iv) a state holiday in said Trust-situs state on which state employees generally are excused from work. In the event of any conflict between the definitions of "Business Day" hereunder and in any financial instrument subject to the Additional FA Instruments as defined herein, the definition of "Business Day" establishing the latest date shall govern in any circumstances where both definitions are applicable.

f. Certificate. "Certificate" means a certificate executed by the DNR in accordance with this Agreement and in the form of the attached Exhibits to Appendix B. A Certificate shall be delivered to the Trustee directing the Trustee as to the specific amount of the Trust Estate to distribute, the recipient of such amount, payment instructions, and a reference to the section of this Agreement pursuant to which such amounts are being distributed.

g. Control. The term "control" means the ability, alone or in concert with others, to determine, indirectly or directly, the manner in which an entity conducts its activities.

h. DNR or Minnesota Department of Natural Resources. All references to the "DNR" shall mean the Minnesota Department of Natural Resources. For all purposes of this Agreement, any written instructions signed by any person serving as Commissioner of the DNR or his or her designee will be deemed to be the instructions of the DNR. If in the future the DNR is not the agency then statutorily charged with administering the Mining Laws or the Permit to Mine, as amended, then the term "Minnesota Department of Natural Resources" or the "DNR" will mean the agency or agencies then statutorily charged with those responsibilities, and such change in agencies shall not be considered an assignment hereunder.

i. Final Expenses. "Final Expenses" means the final costs, fees and expenses (as set forth in Article 3) of the Trust, any taxes owing with respect to the Trust or not yet reimbursed by Grantor and final payments relating to environmental insurance.

j. Grantor. "Grantor" for purposes of this Agreement means Poly Met Mining, Inc., a Minnesota corporation or any lawful successor.

k. Indemnified Person. "Indemnified Person" has the meaning provided in Section 6.3.

l. Mining Laws. “Mining Laws” means Minnesota Statutes Chapter 93 and any of its implementing regulations, including without limitation, the Nonferrous Metallic Mineral Mining regulations under Minnesota Rules Chapter 6132 and the Permit to Mine.

m. NorthMet Forfeiture. “NorthMet Forfeiture” means the following have occurred: (i) (A) the DNR has determined that (1) Grantor has defaulted in its performance of actions required under this Agreement or the NorthMet MRC, including any Required NorthMet MRC Work, (2) the Commissioner of the DNR has issued an order and notice of such order to Grantor and Trustee specifying such default, the measures required to cure said default and the time allowed to cure such default (the “Order”), and (3) after receiving such Order, Grantor has failed to timely cure that default in accordance with the Order and applicable Mining Laws and Procedures; or (B) Grantor has assigned this Agreement (or engaged in actions or a transaction that would constitute an assignment hereunder) in violation of this Agreement; and (ii) with respect to (A) and (B) above, the DNR has completed and complied with all of the Procedures.

n. NorthMet Long-Term Maintenance, Reclamation, and Corrective Action Plans or NorthMet MRC. The terms “NorthMet Long-Term Maintenance, Reclamation, and Corrective Action Plans” or “NorthMet MRC” mean all maintenance, reclamation, contingency action and corrective action required under the Mining Laws for the NorthMet Property including: (i) carrying out long-term monitoring, maintenance, water treatment, and other activities to address Long-Term Costs (as defined in the Permit to Mine); (ii) performing all reclamation activities, including closure and postclosure maintenance activities; and (iii) completing corrective action, if noncompliance with design or operating criteria in the Permit to Mine occurs.

o. NorthMet Property. The term “NorthMet Property” means those lands, facilities, disturbances, infrastructure and other features in St. Louis County, Minnesota that are included within the mining area defined under and incorporated into the Permit to Mine as approved or may be approved, by DNR for said NorthMet Property; provided that NorthMet Property does not include any lands, facilities, disturbances, infrastructure and other features (“Excluded Properties”) with respect to which any Person other than Grantor is responsible for required long-term costs, monitoring, maintenance, reclamation, contingency action and/or corrective action (collectively, “reclamation” for this paragraph) under a permit to mine issued by the DNR, regardless of whether the same is located within the boundaries of the mining area in the Permit to Mine. For avoidance of doubt, if PolyMet is responsible under the Permit to Mine for reclamation for any facilities, disturbances, or other features located within the boundaries of the Excluded Properties, then such facilities, disturbances, or other features shall not be included within the definition of Excluded Properties.

p. Order. “Order” has the meaning provided in Section 9.1(m).

q. Parent. “Parent” means PolyMet Mining Corp., a Canadian corporation.

r. Permit to Mine. “Permit to Mine” means that certain Permit to Mine issued pursuant to Minnesota Rules Chapter 6132 by the DNR to PolyMet for the NorthMet Property, as said permit may be amended or modified from time to time in accordance with the applicable Mining Laws.

- s. Person. The term “person” means a natural person or any legal entity, including a firm, corporation, a partnership, joint venture, a limited liability company, a trust, and an association.
- t. PolyMet. “PolyMet” has the meaning provided in the introductory paragraph.
- u. Procedures. “Procedures” means in a manner complying with the procedures set forth in Minnesota Rules Chapter 6132.1200 (in effect as of the date of this Agreement).
- v. Proceeds. “Proceeds” has the meaning provided in Section 2.4(b).
- w. Required NorthMet MRC Work. “Required NorthMet MRC Work” means any and all work required under the applicable Mining Laws, including the NorthMet Permit to Mine, to implement and complete any element of the NorthMet MRC.
- x. Special Conditions (Attachment 1). “Special Conditions (Attachment 1)” has the meaning provided in Section 2.4(a).
- y. Trust. “Trust” has the meaning provided in Section 2.1.
- z. Trust Estate. “Trust Estate” has the meaning provided in Section 2.2.
- aa. Trust Purposes. “Trust Purposes” has the meaning provided in Section 1.3.
- bb. Trustee. “Trustee” has the meaning provided in the introductory paragraph, or any duly appointed successor trustee.

9.2 **Constructional Rules**. The following constructional rules shall govern the interpretation of this Agreement.

a. Trust Situs and Governing Law. The situs of the Trust shall be Nevada. Nevada trust law shall apply with respect to all trust-related provisions of this Agreement, and Minnesota law shall apply where specifically referenced in the Trust Agreement and with respect to all mining, reclamation, forfeiture and other laws other than those governing the trust-related provisions of this Agreement. Notwithstanding anything contrary in the foregoing sentence, the Beneficiary, Trustee, and Grantor specifically agree that the exclusive venue for any dispute or other proceeding that may arise under this Agreement shall be any federal or state court within Ramsey County in the State of Minnesota, and the parties hereby consent to such exclusive venue in a court located in the State of Minnesota. In the event the state and federal courts in the State of Minnesota decline jurisdiction over a proceeding that may arise under this Agreement, the Beneficiary, Trustee, and Grantor specifically agree that in such case the exclusive venue for any dispute or other proceeding that may arise under this Agreement shall be any federal or state court within Washoe or Clark County in the State of Nevada.

b. Other Principles of Construction. Words in any gender include the other gender; the singular includes the plural and vice versa; “pay” and “distribute” also include assign,

convey, and deliver; the table of contents, headings, and underlined paragraph titles are for guidance only and shall have no significance in the interpretation of this Agreement; and “including” means including by way of example and not by way of limitation.

c. Miscellaneous. Unless otherwise expressly specified herein, any reference to any law or regulation in this Agreement shall mean such law or regulation as amended from time to time, or if any law or regulation referenced herein is superseded and replaced, then the replacement law or regulation shall be applicable to this Agreement.

d. Limited Amendment Power. The Trust created by this Agreement is irrevocable. Furthermore, this Agreement may not be amended by the Beneficiary or Grantor acting alone, but the Beneficiary and Grantor may at any time jointly amend this Agreement. However, no amendment shall increase, reduce, or otherwise affect the duties and responsibilities or any rights, privileges, indemnities, or immunities of the Trustee without its prior written consent. A fully executed copy of each amendment shall be delivered promptly to the Trustee.

e. Binding Effect; Assignment. This Agreement shall bind Grantor, the Beneficiary, and the Trustee, and their respective assigns and successors in interest. Neither Grantor nor the Beneficiary may assign all or any part of its rights or obligations under this Agreement without the prior written consent of the other; further, any successor or assignee of PolyMet must receive prior approval of the DNR in accordance with the Mining Laws to be the permittee under the Permit to Mine and agree to perform all obligations of PolyMet under the Mining Laws and this Agreement. For purposes of this Agreement, a change to provide any Person with greater than 50% of the shareholder voting control or equity ownership of Grantor or the sale of substantially all of Grantor’s assets constitutes an assignment.

9.3 Authorized Persons. With respect to this Agreement:

a. The Grantor will notify the Trustee of the identity of each (i) employee of the Grantor who is authorized to act on the Grantor’s behalf, (ii) third-party agent that is authorized to act on the Grantor’s behalf, and (iii) employee of each third-party agent who is authorized to act on such agent’s behalf. In no event is any such agent authorized to amend this Agreement or to terminate this Agreement.

b. The Beneficiary will notify the Trustee of the identity of each (i) employee of the Beneficiary who is authorized to act on the Beneficiary’s behalf, (ii) third-party agent that is authorized to act on the Beneficiary’s behalf, and (iii) employee of each third-party agent who is authorized to act on such agent’s behalf. In no event is any such agent authorized to amend this Agreement or to terminate this Agreement.

c. The Trustee may assume that any such employee or agent of the Grantor continues to be so authorized, until the Trustee receives notice to the contrary from the Grantor (or, with respect to any such employee of any such agent, from such agent). The Trustee may assume that any such employee or agent of the Beneficiary continues to be so authorized, until the Trustee receives notice to the contrary from the Beneficiary (or, with respect to any such employee of any such agent, from such agent).

d. The Grantor hereby represents and warrants that any such employee or agent of the Grantor was duly appointed and is appropriately monitored and covenants that the Grantor will furnish such employee or agent with a copy of this Agreement, as amended from time to time, and with a copy of any communications given under this Agreement to the Grantor. The Grantor hereby acknowledges that (i) such employee's or agent's actions or omissions are binding upon the Grantor as if the Grantor had taken such actions or made such omissions itself and (ii) the Trustee is indemnified, released, and held harmless accordingly.

e. The Beneficiary hereby represents and warrants that any such employee or agent of the Beneficiary was duly appointed and is appropriately monitored and covenants that the Beneficiary will furnish such employee or agent with a copy of this Agreement, as amended from time to time, and with a copy of any communications given under this Agreement to the Beneficiary. The Beneficiary hereby acknowledges that (i) such employee's or agent's actions or omissions are binding upon the Beneficiary as if the Beneficiary had taken such actions or made such omissions itself and (ii) the Trustee is indemnified, released, and held harmless accordingly.

9.4 **Notices and Addresses.** All notices, requests, demands, and other communications required or permitted to be given under this Agreement will be in writing and will be deemed to have been duly given if delivered personally; deposited in the United States mail (postage pre-paid), registered or certified mail, return receipt requested (and, in the case of the Trustee, received at its address set forth below); entered into the Grantor's or the Beneficiary's account in the Trustee's on-line portal; sent to the Trustee by Messaging System or faxed (with telephone confirmation of receipt), addressed as follows:

If to Grantor: Poly Met Mining, Inc.
Attn: Chief Financial Officer
444 Cedar Street
Suite 2016
St. Paul, Minnesota 55101

with a copy to: _____

If to the Trustee: Mark J. Simones
Senior Vice President and Relationship Manager
800 Nicollet Mall, BC-MN-H5AM
Minneapolis, Minnesota 55402

If to the Beneficiary: Director of Lands and Minerals
Minnesota Department of Natural Resources
500 Lafayette Road North
Box 45
St. Paul, Minnesota 55155

with a copy to: _____

9.5 **General Provisions.**

a. Each of the parties hereto hereby waives the right to trial by jury.

b. The rights and remedies conferred upon the parties hereto shall be cumulative, and the exercise or waiver of any such right or remedy shall not preclude or inhibit the exercise of any additional rights or remedies. The waiver of any right or remedy hereunder shall not preclude the subsequent exercise of such right or remedy.

c. The Grantor hereby represents and warrants that: (i) this Agreement has been duly authorized, executed, and delivered on its behalf and constitutes its legal, valid, and binding obligation and (ii) the execution, delivery, and performance of this Agreement by it do not and will not violate any applicable law or regulation.

d. If one or more of the covenants, agreements, provisions, or terms of this Agreement are held invalid for any reason whatsoever, those covenants, agreements, provisions, and terms will be treated as severable from the remaining covenants, agreements, provisions, and terms of this Agreement and will in no way affect the validity or enforceability of the remaining covenants, agreements, provisions, and terms of this Agreement. If the invalidity of any covenant, agreement, provision, or term of this Agreement deprives any party of the economic benefit intended to be conferred by this Agreement, the parties must negotiate in good faith to develop and substitute a replacement covenant, agreement, provision, or term having an economic effect that is as nearly as possible the same as the economic effect of this Agreement as intended.

e. This Agreement constitutes the entire agreement of the parties with respect to the subject matter and supersedes all prior oral or written agreements in regard thereto.

f. The provisions herein relating to the limitation of liability, duties, responsibilities, and obligations of the Trustee and indemnification shall survive termination of this Agreement and/or the resignation or removal of the Trustee.

g. No printed or other material in any language, including prospectuses, notices, reports, and promotional material that mentions US Bank, N.A. by name or the rights, powers, or duties of the Trustee under this Agreement shall be issued by any other party hereto, or on such party's behalf, without the prior written consent of the Trustee.

h. This Agreement may be executed by each of the parties hereto in any number of counterparts, each of which counterparts, when so executed and delivered, shall be deemed to be an original and all such counterparts shall together constitute one and the same agreement.

9.6 **Perpetuities.** The parties intend that this Trust be excluded from the statutory rule against perpetuities under NRS 111.1037, due to it being a nondonative transfer. If, however, this Trust is not found to be excluded from the statutory rule against perpetuities, and the Trust is not sooner terminated pursuant to Article 3.4, this Trust shall terminate 365 years after the initial contribution pursuant to Article 2.3 is received by the Trustee. In the event the Trust terminates as a result of the foregoing, the Trustee shall distribute the Trust as directed by the Beneficiary in accordance with the Mining Laws.

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IN WITNESS WHEREOF, the Grantor, the Beneficiary and the Trustee have signed this Agreement on the dates set forth below to be effective for all purposes as of the date first above written.

**MINNESOTA DEPARTMENT OF
NATURAL RESOURCES**

By: /s/ Tom Landwehr

<u>TOM LANDWEHR</u>	<u>COMMISSIONER</u>
Name	Title

POLY MET MINING, INC.

By: /s/ Jonathan Cherry

<u>JONATHAN CHERRY</u>	<u>PRESIDENT & CEO</u>
Name	Title

US BANK, N.A

By: /s/ Mark J. Simones

<u>MARK J. SIMONES</u>	<u>SENIOR VICE PRESIDENT</u>
Name	Title

APPENDIX A

[Special Conditions of Permit to Mine as it may be amended from time to time]

Appendix A

Financial Assurance Calculations

Contents

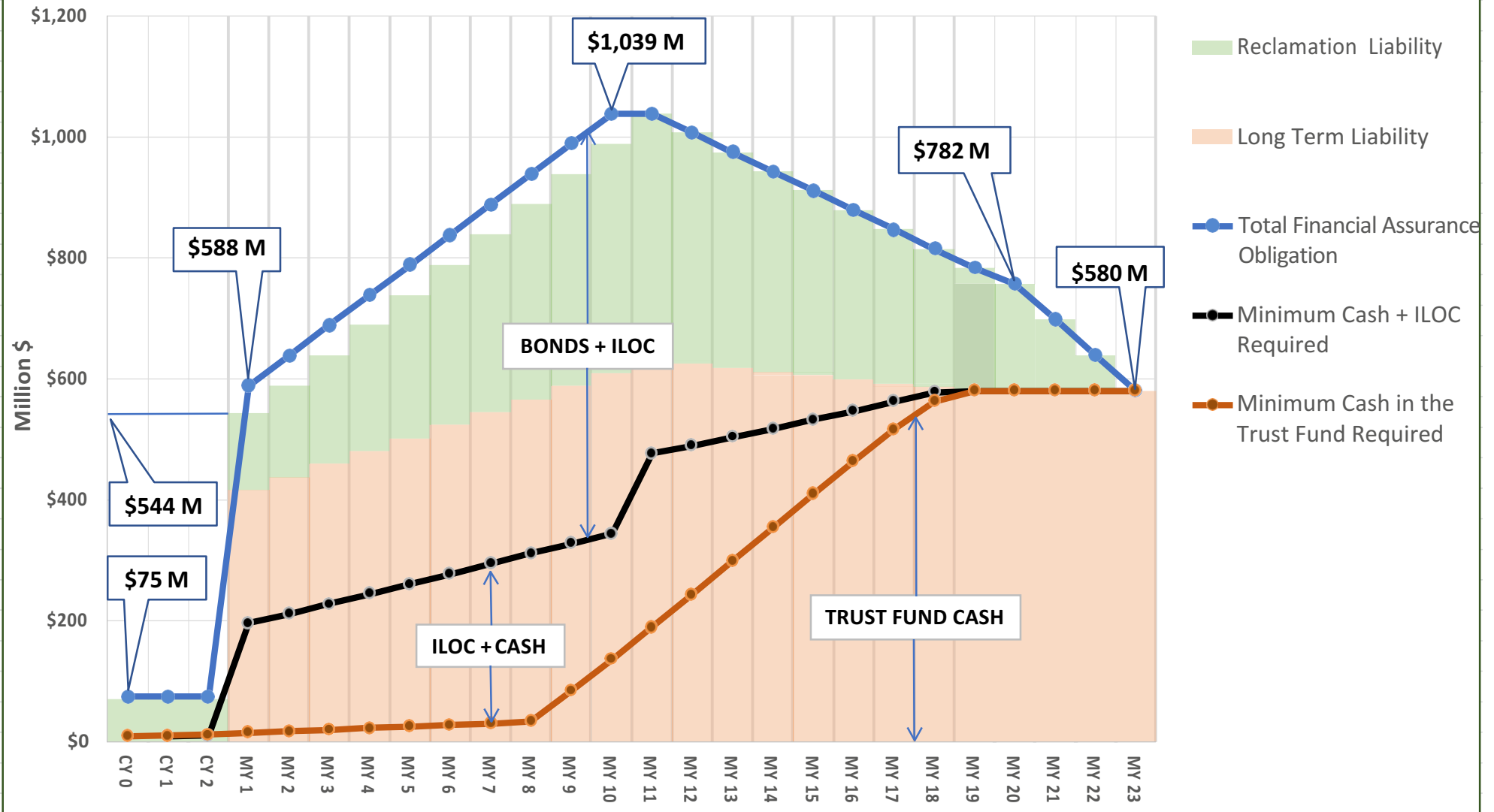
Financial Assurance Summary Graphic

Appendix A-1: Financial Assurance Calculations – Construction

Appendix A-2: Financial Assurance Calculations – MY1 and MY2

Appendix A-3: Financial Assurance Calculations – MY11 and MY23

Summary of PolyMet's Current Financial Assurances



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 (as in January 5, 2018)

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

Table 1. Construction Period Financial Assurance (updated October 31, 2018)

	2017 PTM Application	2018 Supplemental Memo	2017 PTM Application Reference
Legacy Reclamation Costs	\$45,143,496	\$44,090,206	Appendix A of Appendix 15.1 from PTM Application
Legacy Long-Term Costs	\$13,269,809	No change	
Construction Phase Costs	\$16,271,537	No change	Appendix A of Appendix 15.2 from PTM Application
Total Costs	\$74,684,842	\$73,631,552	
Difference		-\$1,053,290 (reduction)	

Legacy Reclamation Costs

Appendix A-1 Legacy Reclamation Cost Estimate

Includes Demo of Legacy Buildings with Abatement and AOCs

	support tabs	Cash \$	NPV \$	Note
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	
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	
Area 2 Shop Buildings	Demo	\$556,827	\$533,517	
Main Plant Area - Demoed in Construction	Demo	\$1,655,350	\$1,541,233	
Main Plant Area	Demo	\$19,888,937	\$18,521,989	
Main Gate Colby PH Ad Bldg	Demo	\$243,170	\$220,026	
Roads	Demo	\$660,000	\$597,183	
Railroads	Demo	\$380,000	\$343,832	
Power System	Demo	\$97,810	\$88,501	
Piping System	Demo	\$2,879,000	\$2,604,983	
Legacy Asbestos Abatement				
Area 1 Shop Buildings	Demo	\$98,350	\$94,233	
Area 2 Shop Buildings	Demo	\$167,350	\$160,344	
Main Plant Area	Demo	\$5,962,607	\$5,473,327	
Main Gate Colby PH Ad Bldg	Demo	\$859,400	\$777,604	
Other		\$7,141,825	\$6,657,444	
AST Removal	AST	\$223,625	\$214,264	
AOCs	AOC	\$6,918,200	\$6,443,181	

30 Yr Tot	NPV	Start Bankruptcy		07/01/19	07/01/20	07/01/21
		01/01/18	07/01/18			
	2.9%					
		1		2	3	4
		Oper	Hold			
	Calendar Year	2018		2019	2020	2021
41,039,542	38,044,340					
448,916	430,123	0	0	448,916	0	0
556,827	533,517	0	0	556,827	0	0
1,655,350	1,541,233	0	0	0	1,655,350	0
19,888,937	18,521,989	0	0	4,972,234	9,944,469	4,972,234
243,170	220,026	0	0	0	0	243,170
660,000	597,183	0	0	0	0	660,000
380,000	343,832	0	0	0	0	380,000
97,810	88,501	0	0	0	0	97,810
2,879,000	2,604,983	0	0	0	0	2,879,000
98,350	94,233	0	0	98,350	0	0
167,350	160,344	0	0	167,350	0	0
5,962,607	5,473,327	0	0	0	2,981,304	2,981,304
859,400	777,604	0	0	0	0	859,400
223,625	214,264	0	0	223,625	0	0
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)		
	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
Scope of Work Description										
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 - Demoeed 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		
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)	Demo To Rollup	Abatement To Rollup
	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		
Scope of Work Description										
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 (Attachments E and F)					Mavo 2016 (Attachment C)	Arrowhead Consulting & Testing 2016 (Attachment D)	Demo To Rollup	Abatement To Rollup
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		
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					

Totals	Lakehead	Mavo
Mine Site	\$31,155,813	\$7,087,707
less Mine Site	\$2,203,893	\$0
	\$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				Start Bankruptcy																																		
Includes Tailings Basin Dewatering and 30 Years of MDNR, Site Mgr, Monitoring / Reporting (Water Quality, Dam Safety and Landfill), Stormwater Management and Vehicles				2%	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			
	Support tabs	Cap \$	NPV \$	Note	30 Yr Tot	NPV	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
					Calendar Year	Oper	Hold	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	
Legacy Ferrous Total with Indirects		\$18,620,179	\$13,259,809																																			
Contingency	10.0%	\$1,862,018	\$1,259,809																																			
Adaptive Management	2.0%	\$372,404	\$251,962	On Water Tailings Basin only																																		
Engineering Redesign	2.0%	\$372,404	\$251,962	On Water Tailings Basin only																																		
Prime Contractor Markup	2.5%	\$465,505	\$339,953																																			
Mobilization	4.0%	\$825,010	\$603,906	included in pricing																																		
Legacy Ferrous Total (no Indirects)		\$16,927,435	\$12,063,443		10,172,414	7,022,792																																
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)	6,755,021	5,040,671																																
Water Quality Monitoring		\$1,395,625	\$1,113,516	From PLM FY 2018 Budget (Tailings Basin) - assume reduced to 15% after 5 years	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	
Tailings Basin Seepage Pumping		\$1,424,070	\$1,255,624	From PLM FY 2018 Budget	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
Tailings Basin Dewatering	Basin Closure	\$3,792,526	\$2,558,486		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	107,301	726,051	149,964	118,464	0	0	0	0	0	0	0		
Monitoring/ Application for Site Specific Standards		\$142,800	\$113,046	\$10,000 annually for Biological and \$38,000 for Wild Rice Plus \$50,000 for Application	142,800	113,046	0	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	
Site Administration and Maintenance		\$10,172,414	\$7,022,792																																			
Site Manager FTE x 5 hr from Unit S = Annual \$	0.5	\$108	\$112,320	NTS 4/22/16 letter M M Level Professional																																		
Site Manager	Unit S Long Term	\$3,369,600	\$2,262,059		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		
DNR FTE x 5 hr from Unit S = Annual \$	0.5	\$116	\$120,640	Provided by DNR flat rate for all staff including overhead and expenses																																		
DNR - Reclamation	Unit S Long Term	\$2,412,800	\$1,837,496		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	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640	120,640		
DNR FTE x 5 hr from Unit S = Annual \$	0.25	\$116	\$60,320	Provided by DNR flat rate for all staff including overhead and expenses																																		
DNR - Long Term	Unit S Long Term	\$603,200	\$296,062		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	0	0	0	0	0	0	0	0	0		
Dam Instrumentation Field Work - Report per Event from Unit S Long Term	2	\$10,536	\$21,072	NTS 4/22/16 letter inactive basin																																		
Geotechnical Inspection and Report from Unit S Long Term	1	\$17,500	\$17,500	Rarr 4/1/16 letter inactive basin																																		
Dam Safety Monitoring		\$85,364	\$460,062	Starting at 2 monitoring events/year then reduced to 1 event after 5 years	85,364	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	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036	28,036		
Landfill Maintenance and Monitoring SW619	Unit S Long Term	\$658,710	\$442,201	NTS 4/22/16 letter	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		
Landfill Maintenance and Monitoring Coal Ash	Unit S Long Term	\$34,320	\$28,663	PLM 2017 Budget	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	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	2,640	2,640	2,640		
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	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	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000		
Snow Plowing/Road Maintenance	Unit S Long Term	\$1,338,420	\$898,500	Poly Mat Snow Plowing (coverage of 2 highest of 3 years) and One day per month.	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		
Vehicles (25,000 mi x \$0.70/mi)	Unit S Long Term	\$525,000	\$352,440	NTS Letter of 4/21/16	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		

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 than 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 Calks 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 Calks 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 Calks 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 Calks 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 Calks 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 Calks 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 Calks 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 CO2 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) Filter Material (12" Loose Lift) (riprap on last 200' section of breach, on base and 5 feet up sides)	1,481 741	Cubic Yards Cubic Yards
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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) Filter Material (12" Loose Lift) (riprap on last 200' section of breach, on base and 5 feet up sides)	1,481 741	Cubic Yards Cubic Yards
Dam Breach to Toe	Riprap (24" Loose Lift) Filter Material (12" Loose Lift)	7,407 3,704	Cubic Yards 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

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA							Calendar Year							
Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$	Note	1	2	3	4	5	6		
Construction Total with Indirects				\$16,271,537	\$14,950,953	FA for Cash Amount								
Contingency	10.0%			\$1,446,359	\$1,328,974									
Adaptive Management	0.0%	Reclamation 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		14,463,589	13,289,736						
		Memo Unless Noted		\$0	\$0			2.9%	Oper	Hold				
Construction Total (no Indirects)				\$14,463,589	\$13,289,736		30 Yr Tot	NPV						
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]	679,500	632,657	0	0	0	679,500	0
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]	7,837	7,297	0	0	0	7,837	0
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]	541,800	504,449	0	0	0	541,800	0
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]	9,580	8,920	0	0	0	9,580	0
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)	447,453	416,606	0	0	0	447,453	0
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]	18,585	17,304	0	0	0	18,585	0
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]	323,850	301,524	0	0	0	323,850	0
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]	3,626	3,376	0	0	0	3,626	0
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]	249,400	232,207	0	0	0	249,400	0
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]	4,410	4,106	0	0	0	4,410	0
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)	178,200	165,916	0	0	0	178,200	0
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]	8,555	7,965	0	0	0	8,555	0
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]	450,000	418,978	0	0	0	450,000	0
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]	5,597	5,211	0	0	0	5,597	0
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]	275,200	256,228	0	0	0	275,200	0
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]	4,866	4,531	0	0	0	4,866	0
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)	196,599	183,046	0	0	0	196,599	0
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]	9,440	8,789	0	0	0	9,440	0
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]	86,601	80,631	0	0	0	86,601	0
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]	12,331	11,481	0	0	0	12,331	0

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA							Start of							
Construction Total with Indirects	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$	Note	Calendar Year	Year	Bankruptcy	07/01/19	07/01/20	07/01/21	
									01/01/18	07/01/18	2019	2020	2021	
							Year of Closure							
							1	2	3	4				
Contingency	10.0%	Reclamation			\$16,271,537	\$14,950,953	FA for Cash Amount							
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		14,463,589	13,289,736					
		Memo Unless			\$0	\$0			2.9%	Oper	Hold			
		Noted			\$14,463,589	\$13,289,736		30 Yr Tot	NPV			2	3	4
Construction Total (no Indirects)					\$1,407,425	\$1,273,469								
Pits														
Prepare for Fencing	Unit \$ Reclamation	\$0	LF	\$9.00	\$0	\$0	Ames 2016	0	0	0	0	0	0	
Pit Fence - Barb Wire 4 Strand	Unit \$ Reclamation	0	LF	\$8.00	\$0	\$0	MnDOT Standard Plate 9323 Rev. D [Ames 2016]	0	0	0	0	0	0	
Pit Fence - Non Climbable	Unit \$ Reclamation	0	LF	\$22.00	\$0	\$0	MnDOT Standard Plate 9322 Rev. K [Ames 2016]	0	0	0	0	0	0	
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]	0	0	0	0	0	0	
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)	0	0	0	0	0	0	
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]	1,379,400	1,248,112	0	0	0	0	1,379,400
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]	28,025	25,358	0	0	0	0	28,025
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]	45,000	41,898	0	0	0	45,000	0
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]	376,200	350,265	0	0	0	376,200	0
Liner Disposal in Off Site Solid Waste Landfill	Ponds & pipe-liner off site disposal	56	Acres	\$152	\$8,470	\$7,886	Transport and Tipping Fees [4/27/17 emails Attachments I1 and I2]	8,470	7,886	0	0	0	8,470	0
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]	4,646	4,326	0	0	0	4,646	0
Rail Transfer Hopper					\$0	\$0								
Haul RTH waste rock to East Pit, Plus Grading					\$0	\$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	214,255	193,863	0	0	0	0	214,255
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	611,337	553,151	0	0	0	0	611,337
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		27,610	25,707	0	0	0	27,610	0
Rail Transfer Hopper	Demo	1	LS	\$86,100	\$86,100	\$80,164		86,100	80,164	0	0	0	86,100	0
Rail Transfer Hopper Control Bldg	Demo	1	LS	\$18,700	\$18,700	\$17,411		18,700	17,411	0	0	0	18,700	0
Rail Transfer Hopper Platform	Demo	1	LS	\$60,000	\$60,000	\$55,864		60,000	55,864	0	0	0	60,000	0
Central Pumping Station	Demo	1	LS	\$15,700	\$15,700	\$14,618		15,700	14,618	0	0	0	15,700	0
Railroads	Demo	1	LS	\$78,750	\$78,750	\$71,255		78,750	71,255	0	0	0	0	78,750
Pipelines	Demo	1	LS	\$797,133	\$797,133	\$721,264		797,133	721,264	0	0	0	0	797,133
Power Lines	Demo	1	LS	\$83,900	\$83,900	\$75,915		83,900	75,915	0	0	0	0	83,900
Roads and Parking Lots	Demo	1	LS	\$524,000	\$524,000	\$474,127		524,000	474,127	0	0	0	0	524,000
Wastewater Treatment Facility	Demo	1	LS	\$512,000	\$512,000	\$463,269		512,000	463,269	0	0	0	0	512,000
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]	66,000	59,718	0	0	0	0	66,000
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	31,310	29,152	0	0	0	31,310	0
Construction					\$405,361	\$377,416								
FTB Borrow Area & Disturbed Area	SOW14 FTB Grading-Seeding (Yr 0)	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)	405,361	377,416	0	0	0	405,361	0
FTB Overflow		0	LS	\$239,539	\$0	\$0		0	0	0	0	0	0	

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA							Start of							
Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$	Note	Calendar Year	Year 01/01/18	Bankruptcy 07/01/18	07/01/19	07/01/20	07/01/21		
							FA for Cash Amount							
							Year 2018				Year of Closure			
							2019				2020			
							2021				2021			
							1				2			
							3				4			
Construction Total with Indirects														
Contingency	10.0%			\$16,271,537	\$14,950,953									
Adaptive Management	0.0%	Reclamation		\$0	\$0	normal construction no water mgt								
Engineering Redesign	0.0%	Quantities		\$0	\$0	normal construction no water mgt								
Prime Contractor Markup	2.5%	from Changes		\$0	\$0									
		Over Time		\$361,590	\$352,243		14,463,589	13,289,736						
		Memo Unless		\$0	\$0									
		Noted		\$14,463,589	\$13,289,736									
Construction Total (no Indirects)				\$3,797,260	\$3,470,923									
Demo and Abatement														
Legacy Structure Removal														
Area 1 Shop Buildings	Demo	0	LS	\$448,916	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Area 2 Shop Buildings	Demo	0	LS	\$556,827	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Main Plant Area - Demoeed in Construction	Demo	0	LS	\$1,655,350	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Main Plant Area	Demo	0	LS	\$19,888,937	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Main Gate Colby PH Ad Bldg	Demo	0	LS	\$243,170	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Roads	Demo	0	LS	\$660,000	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Railroads	Demo	0	LS	\$380,000	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Power System	Demo	0	LS	\$97,810	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Piping System	Demo	0	LS	\$2,879,000	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Legacy Asbestos Abatement														
Area 1 Shop Buildings	Demo	0	LS	\$98,350	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Area 2 Shop Buildings	Demo	0	LS	\$167,350	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Main Plant Area	Demo	0	LS	\$5,962,607	\$0	in Legacy Reclamation	0	0	0	0	0	0		
Main Gate Colby PH Ad Bldg	Demo	0	LS	\$859,400	\$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	in Legacy Reclamation	0	0	0	0	0	0		
AOCs	AOC	0	LS	\$6,918,200	\$0	in Legacy Reclamation	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	in Legacy Long Term	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	in Legacy Long Term	0	0	0	0	0	0		
Landfill Maintenance and Monitoring SW619		0		\$0	\$0	in Legacy Long Term	0	0	0	0	0	0		
Landfill Maintenance and Monitoring Coal Ash		0		\$0	\$0	in Legacy Long Term	0	0	0	0	0	0		
Tailings Basin Maint		0		\$0	\$0	in Legacy Long Term	0	0	0	0	0	0		
Snow Plowing Road Maint		0		\$0	\$0	in Legacy Long Term	0	0	0	0	0	0		
Vehicles (25,000 mi x \$0.70/mi)		0		\$0	\$0	in Legacy Long Term	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	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	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	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 than 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

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

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 $[8 \times \{(10 \times 10) + (5 \times 10)\}] / 27$ 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 $[8 \times \{(10 \times 10) + (5 \times 10)\}] / 27$ 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 $[(2.5 \times 3') + (10 \times 3')] / 27$ 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 $[(3 \times 3') + (12 \times 3')] / 27$ 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; $100 \times 15,000' + 20\% = 1,800,000$ SF = 41 Acre Assume Average Width of Restoration Zone is 100' and add 20% Additional for Misc. Restoration Areas; $100 \times 15,000' + 20\% = 1,800,000$ 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)		
	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
Scope of Work Description										
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 - Demoeed 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		
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		
	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
Scope of Work Description										
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					

Totals	Lakehead	Mavo
Mine Site	\$31,155,813	\$7,087,707
less Mine Site	\$2,203,893	\$0
	\$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
MY1 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 \$
Reclamation Total with Indirects					\$133,621,573	\$121,898,444
Contingency	10.0%				\$11,380,656	\$10,382,126
Adaptive Management	2.0%	Quantities from Barr			\$2,225,563	\$2,030,658
Engineering Redesign	2.0%	Changes Over Time Memo			\$2,225,563	\$2,030,658
Performance Bond	1.0%	Unless Noted			\$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
Cat 2/3 - sat overburden	Unit \$ Reclamation	192,150	Tons	\$2.39	\$460,149	\$428,427
Cat 4 - rock	Unit \$ Reclamation	1,489,201	Tons	\$1.79	\$2,664,886	\$2,481,174
Cat 4 - sat overburden	Unit \$ Reclamation	192,150	Tons	\$1.79	\$343,847	\$320,143
OSP - rock	Unit \$ Reclamation	2,275,000	Tons	\$2.39	\$5,448,026	\$5,072,450
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
Pipe Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	1	LS	\$7,837	\$7,837	\$7,091
Liner/Soil Cover Removal and Liner Prep for Transport	Unit \$ Reclamation	63	Acre	\$8,600	\$541,800	\$490,233
Liner Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	63	Acre	\$152	\$9,580	\$8,669
Cover Area (Acres) and Depth (Inches)		63	Acres Inches	24		
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
Seeding	Unit \$ Reclamation	63	Acres	\$295	\$18,585	\$16,816
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
Pipe Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	1	LS	\$3,626	\$3,626	\$3,281
Liner/Soil Cover Removal and Liner Prep for Transport	Unit \$ Reclamation	29	Acre	\$8,600	\$249,400	\$225,663
Liner Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	29	Acre	\$152	\$4,410	\$3,990
Cover Area (Acres) and Depth (Inches)		29	Acres Inches	24		
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
Seeding	Unit \$ Reclamation	29	Acres	\$295	\$8,555	\$7,741
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
Pipe Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	1	LS	\$5,597	\$5,597	\$5,064
Liner/Soil Cover Removal and Liner Prep for Transport	Unit \$ Reclamation	32	Acre	\$8,600	\$275,200	\$249,007
Liner Disposal in Off Site Solid Waste Landfill	Pipe-Liner Off Site Disposal	32	Acre	\$152	\$4,866	\$4,403
Cover Area (Acres) and Depth (Inches)		32	Acres Inches	24		
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
Seeding	Unit \$ Reclamation	32	Acres	\$295	\$9,440	\$8,542

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

6 Yr Tot	NPV	Operating	Hold	Year of Closure				
				1	2	3	4	5
\$112,869,961	\$102,973,571							
	2.9%							
12,545,466	11,680,606	0	0	12,545,466	0	0	0	0
460,149	428,427	0	0	460,149	0	0	0	0
2,664,886	2,481,174	0	0	2,664,886	0	0	0	0
343,847	320,143	0	0	343,847	0	0	0	0
5,448,026	5,072,450	0	0	5,448,026	0	0	0	0
679,500	614,827	0	0	679,500	0	0	0	0
7,837	7,091	0	0	7,837	0	0	0	0
541,800	490,233	0	0	541,800	0	0	0	0
9,580	8,669	0	0	9,580	0	0	0	0
894,906	809,730	0	0	894,906	0	0	0	0
18,585	16,816	0	0	18,585	0	0	0	0
323,850	293,027	0	0	323,850	0	0	0	0
3,626	3,281	0	0	3,626	0	0	0	0
249,400	225,663	0	0	249,400	0	0	0	0
4,410	3,990	0	0	4,410	0	0	0	0
356,401	322,479	0	0	356,401	0	0	0	0
8,555	7,741	0	0	8,555	0	0	0	0
450,000	407,170	0	0	450,000	0	0	0	0
5,597	5,064	0	0	5,597	0	0	0	0
275,200	249,007	0	0	275,200	0	0	0	0
4,866	4,403	0	0	4,866	0	0	0	0
393,198	355,774	0	0	393,198	0	0	0	0
9,440	8,542	0	0	9,440	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							Note	
	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$		
Reclamation Total with Indirects					\$133,621,573	\$121,898,444	FA for Cash Amount	
Contingency	10.0%				\$11,380,656	\$10,382,126		
Adaptive Management	2.0%	Quantities from Barr			\$2,225,563	\$2,030,658		
Engineering Redesign	2.0%	Changes Over			\$2,225,563	\$2,030,658		
Performance Bond	1.0%	Time Memo			\$1,138,066	\$1,038,213		
Prime Contractor Markup	2.5%	Unless Noted			\$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	\$56,333,084		
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	Arrowhead Consulting & Testing 2016 (Attachment D) and Mayo 2016 (Attachment C)	
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							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	\$28,310	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	\$28,310	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

6 Yr Tot	NPV	Operating	Hold	Year of Closure						
				MY						
				1	2	3	4	5		
\$112,869,961	\$102,973,571	2.9%								
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				
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				
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	28,310	0	0	10,500	10,500	10,500				
670,800	607,120	0	0	223,600	223,600	223,600				
31,500	28,310	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 \$
Long Term Total with Indirects					\$1,181,141,669	\$410,101,543
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
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		\$/yr \$/hr	\$45.99		
Factor for off shift alarm response	Unit \$ Long Term		105%	factor		
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
Facility Expansion	1	LS		\$11,783,623	\$11,783,623	\$10,971,283
Labor - annual \$ / FTE - calc from hourly rate	Unit \$ Long Term		\$/yr \$/hr	\$ 68.98		
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
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		\$969,979	\$9,699,782	\$3,089,199
Maintenance and Monitoring					\$37,483,325	\$16,332,881
Maintenance					\$21,504,000	\$10,545,235
Snow Plowing	Unit \$ Long Term		1	Annual	\$25,414	\$837,612
Road Maintenance - After Reclamation	Unit \$ Long Term		1	Annual	\$19,200	\$1,862,400
Road Maintenance - During Reclamation	Unit \$ Long Term		1	Annual	\$62,400	\$187,200
Category 1 Stockpile Cover Maintenance	Unit \$ Long Term		1	Annual	\$24,000	\$722,006
Category 1 Stockpile Containment System Maintenance	Unit \$ Long Term		1	Annual	\$15,000	\$451,254
FTB Erosion Maintenance	Unit \$ Long Term		1	Annual	\$10,000	\$504,213
FTB Seepage Containment System Maintenance	Unit \$ Long Term		1	Annual	\$60,000	\$1,918,366
Legacy Cell 2W Reclamation	Unit \$ Long Term		1	Annual	\$1,000,000	\$5,358,275
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
Water Quality Monitoring - long term		1	Annual	\$109,664	\$1,018,080	\$3,103,428
Dam Safety Monitoring	Unit \$ Long Term		1	Annual	\$38,572	\$3,857,200
Landfill Monitoring and Maintenance SW619 (30yrs)	Unit \$ Long Term		1	Annual	\$21,957	\$658,710
Landfill Monitoring and Maintenance Coal Ash (13yrs)	Unit \$ Long Term		1	annual	\$2,640	\$4,320
Other					\$2,871,400	\$2,351,796
NMT Development		1	Total	\$2,871,400	\$2,351,796	
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
Site Manager - Long Term	Unit \$ Long Term		0.5	FTE	\$112,320	\$1,046,658
DNR - Holding	Unit \$ Long Term		4.0	FTE	\$965,120	\$951,535
DNR - Reclamation	Unit \$ Long Term		4.0	FTE	\$965,120	\$2,895,360
DNR - Long Term	Unit \$ Long Term		2.0	FTE	\$482,560	\$46,325,760
DNR - Legal	Unit \$ Long Term		2.0	FTE	\$482,560	\$475,767
Misc Energy Services		1.0	Annual	\$25,000	\$2,400,000	\$729,469
Facility Insurance		1.0	Annual	\$15,000	\$15,000,000	\$493,804
Environmental Insurance		1.0	Annual	\$100,000	\$10,000,000	\$3,295,869
Pickup Truck (25,000 mi x \$0.70/mi)	Unit \$ Long Term		25,000	Annual	\$17,500	\$1,750,000
Pump Maint Truck (15,000 mi x \$1.05/mi)	Unit \$ Long Term		15,000	Annual	\$15,750	\$1,575,000

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	Year 11	
													Continues to Year 100	
992,608	344,669		7,953											
100 Yr Tot	NPV	Operating	Hold	Backfilling	Flushing	Flooding	Pit Obw							
		1	2	3	4	5	6	7	8	9	10	11		
8,731	8,367	0	2,910	2,910	0,000	0,000	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	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	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	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	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	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	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	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	0,000
95,999	20,984	0	0,000	0,969	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	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	0,019
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	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	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	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	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	0,060
6,000	5,358	0	0,000	1,000	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	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	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	0,039
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	0,022
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	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	0,718	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	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	0,112
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	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	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
0,483	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	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	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	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	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	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	0,016

MY2 Financial Liability Estimates

Mine Year 2 Reclamation							Cash	Apply	
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							%	Mob%	Note
	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$		y/n	
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	Ponds & 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	\$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							Cash	Apply	
	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$	%	Mob%	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			
Wastewater 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

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
	Support Tab	Quantity	Units	Unit \$	Cash \$	NPV \$
Long Term Total with Indirects					\$1,244,406,255	\$431,822,050
Contingency	15.0%				\$159,877,160	\$55,479,596
Adaptive Management	2.0%				\$18,681,364	\$6,478,478
Contractor Supplies Markup	2.5%				\$22,595,702	\$7,826,310
Contractor Labor Markup	5.0%				\$1,664,357	\$543,576
Long Term Total (no Indirects)					\$1,041,587,673	\$361,494,089
Water Treatment						
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
Treatment O&M less Labor (Years 4 to 6)	Sum of Years	1	Annual	\$5,804,160	\$11,608,320	\$10,355,456 S
Treatment O&M less Labor (Years 7 to 9)	Sum of Years	1	Annual	\$6,543,329	\$26,173,316	\$21,437,039 S
Treatment O&M less Labor (Years 10 to 100)	Sum of Years	1	Annual	\$5,315,501	\$489,026,092	\$133,311,069 S
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
Facility Replacement (Year 1 to 100)	Sum of Years	1	Annual	\$1,804,316	\$182,235,916	\$59,569,701 S
Facility Expansion		1	LS	\$11,783,623	\$11,783,623	\$10,971,283 S
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
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
Treatment O&M less Labor (Years 4 to 6)	Sum of Years	1	Annual	\$1,237,709	\$3,713,127	\$3,265,923 S
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
Facility Replacement (Year 2 to 100)	Sum of Years	1	Annual	\$969,079	\$97,876,979	\$31,994,255 S
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
Snow Plowing/Road Maint	Sum of Years	1	Annual	\$36,000	\$3,636,000	\$1,188,544 S
Road Maintenance - After Reclamation				\$18,000	\$1,746,000	\$526,233 S
Road Maintenance - During Reclamation	Sum of Years	1	Annual	\$65,000	\$260,000	\$245,696 S
Category 1 Stockpile Maintenance	Sum of Years	1	Annual	\$40,000	\$3,880,000	\$1,169,407 S
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
FTB Seepage Containment System Maintenance	Sum of Years	1	Annual	\$120,000	\$13,000,000	\$4,605,647 S
Cell 1E and 2W Reclamation	Sum of Years	1	Annual	\$1,400,000	\$8,400,000	\$7,501,586 S
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
Water Quality Monitoring - long term	Sum of Years	1	Annual	\$109,664	\$10,527,744	\$3,109,616 S
Dam Safety Monitoring	Sum of Years	1	Annual	\$38,572	\$3,895,772	\$1,273,459 S
Landfill Monitoring and Maintenance SW619 (30yrs)	Sum of Years	1	Annual	\$21,957	\$658,710	\$442,201 S
Landfill Monitoring and Maintenance Coal Ash (13yrs)	Sum of Years	1	annual	\$2,640	\$34,320	\$28,663 S
Other					\$2,871,400	\$2,351,796
NMT Development	Sum of Years	1	Total	\$2,871,400	\$2,871,400	\$2,351,796 U
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
Site Manager -Long Term	Sum of Years	0.5	FTE	\$112,320	\$10,782,720	\$3,184,929 U
MDNR - Holding	Sum of Years	4.0	FTE	\$965,120	\$965,120	\$951,535 S
MDNR - Reclamation	Sum of Years	4.0	FTE	\$965,120	\$3,860,480	\$3,545,217 S
MDNR - Long Term	Sum of Years	2.0	FTE	\$482,560	\$46,325,760	\$13,683,398 U
MDNR - Legal	Sum of Years	2.0	FTE	\$482,560	\$482,560	\$475,767 S
Misc Engineering Services	Sum of Years	1.5	Annual	\$25,000	\$2,400,000	\$708,896 U
Facility Insurance	Sum of Years	1.0	Annual	\$150,000	\$15,150,000	\$4,952,267 U
Environmental Insurance 1% of \$20M	Sum of Years	1.0	Annual	\$200,000	\$20,200,000	\$6,603,023 U
Pickup Truck (25,000 mi x \$0.70/mi)	Sum of Years	25,000	Annual	\$17,500	\$1,767,500	\$577,765 S
Pump Maint Truck (15,000 mi x \$1.05/mi)	Sum of Years	15,000	Annual	\$15,750	\$1,590,750	\$519,988 S

432	\$0.18	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
Calendar Year	2018	2019	2020	2021	2022	2023		
100 Yr Tot	2.9% NPV	Operating 1	Hold	Backfilling 2 3		Flushing 4 5 6		
			10.874					
8.731	8.367	0	2.910	2.910	2.910	0.000	0.000	0.000
11.608	10.355	0	0.000	0.000	0.000	5.804	5.804	0.000
26.173	21.437	0	0.000	0.000	0.000	0.000	0.000	6.543
489.026	133.311	0	0.000	0.000	0.000	0.000	0.000	0.000
30.337	9.917	0	0.300	0.300	0.300	0.300	0.300	0.300
182.236	59.570	0	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
1.435	0.460	0	0	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
3.713	3.266	0	0.000	0.000	0.000	1.238	1.238	1.238
0.000	0.000	0	0.000	0.000	0.000	0.000	0.000	0.000
97.877	31.994	0	0.969	0.969	0.969	0.969	0.969	0.969
1.515	0.495	0	0.015	0.015	0.015	0.015	0.015	0.015
3.636	1.189	0	0.036	0.036	0.036	0.036	0.036	0.036
1.746	0.526	0	0.000	0.000	0.000	0.000	0.018	0.018
0.260	0.246	0	0.065	0.065	0.065	0.065	0.000	0.000
3.880	1.169	0	0.000	0.000	0.000	0.000	0.040	0.040
16.660	5.124	0	0.000	0.000	0.000	0.170	0.170	0.170
13.000	4.606	0	0.000	0.120	0.120	0.120	0.120	0.120
8.400	7.502	0	0.000	1.400	1.400	1.400	1.400	1.400
1.011	0.942	0	0.202	0.202	0.202	0.202	0.202	0.000
10.528	3.110	0	0.000	0.000	0.000	0.000	0.000	0.110
3.896	1.273	0	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
0.034	0.029	0	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
1.123	1.047	0	0.225	0.225	0.225	0.225	0.225	0.000
10.783	3.185	0	0.000	0.000	0.000	0.000	0.000	0.112
0.965	0.952	0	0.965	0.000	0.000	0.000	0.000	0.000
3.860	3.545	0	0.000	0.965	0.965	0.965	0.965	0.000
46.326	13.683	0	0.000	0.000	0.000	0.000	0.000	0.483
0.483	0.476	0	0.483	0.000	0.000	0.000	0.000	0.000
2.400	0.709	0	0.000	0.000	0.000	0.000	0.000	0.025
15.150	4.952	0	0.150	0.150	0.150	0.150	0.150	0.150
20.200	6.603	0	0.200	0.200	0.200	0.200	0.200	0.200
1.768	0.578	0	0.018	0.018	0.018	0.018	0.018	0.018
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
CERTIFICATES

IN WITNESS WHEREOF, the undersigned has caused this Certificate to be executed by its authorized officer as of this ____ day of _____, ____.

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

By: _____

Name:

Title:

IN WITNESS WHEREOF, the undersigned has caused this Certificate to be executed by its authorized officer as of this ____ day of _____, _____.

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

By: _____

Name:

Title:

POLY MET MINING, INC.

By: _____

Name:

Title:

APPENDIX C

MINNESOTA STATUTES 2018

Applicable provisions of 11A.24 are set forth in Section 3.3 of the Trust Agreement.

11A.24 AUTHORIZED INVESTMENTS.

Subdivision 1. **Securities generally.** (a) Pursuant to an investment policy adopted by the state board, the state board is authorized to purchase, sell, lend, and exchange the securities specified in this section, for funds or accounts specifically made subject to this section. This authority includes puts and call options, future contracts, and swap contracts marked to market, if these options and contracts are traded on a contract market regulated by a governmental agency or by a financial institution regulated by a governmental agency. These securities may be owned directly or through shares in exchange-traded or mutual funds, or as units in commingled trusts, subject to any limitations as specified in this section.

(b) Any agreement to lend securities must be concurrently collateralized with cash or securities with a market value of not less than 100 percent of the market value of the loaned securities at the time of the agreement. Any agreement for put and call options and futures contracts may only be entered into with a fully offsetting amount of cash or securities. Only securities authorized by this section, excluding those under subdivision 6, paragraph (a), clauses (1) to (3), may be accepted as collateral or offsetting securities.

Subd. 2. **Government obligations.** The state board is authorized to invest funds in governmental bonds, notes, bills, mortgages, and other evidences of indebtedness if the issue is backed by the full faith and credit of the issuer or if the issue is rated among the top four quality rating categories by a nationally recognized rating agency. The obligations in which the board may invest under this subdivision are guaranteed or insured issues of:

(1) the United States, its agencies, its instrumentalities, or organizations created and regulated by an act of Congress;

(2) the Dominion of Canada or any of its provinces, provided the principal and interest are payable in United States dollars;

(3) any of the states or any of their municipalities, political subdivisions, agencies, or instrumentalities; and

(4) any United States government sponsored organization of which the United States is a member, if the principal and interest are payable in United States dollars.

Subd. 3. **Corporate obligations.** (a) The state board is authorized to invest funds in bonds, notes, debentures, transportation equipment obligations, and any other longer term evidences of

indebtedness issued or guaranteed by a corporation organized under the laws of the United States or any state of the United States, or the Dominion of Canada or any Canadian province if:

(1) the principal and interest of obligations of corporations incorporated or organized under the laws of the Dominion of Canada or any Canadian province are payable in United States dollars; and

(2) the obligations are rated among the top four quality categories by a nationally recognized rating agency.

(b) The state board may invest in unrated corporate obligations or in corporate obligations that are not rated among the top four quality categories as provided in paragraph (a), clause (2), if:

(1) the aggregate value of these obligations does not exceed five percent of the market value of the fund for which the state board is investing;

(2) the state board's participation is limited to 50 percent of a single offering subject to this paragraph; and

(3) the state board's participation is limited to 25 percent of an issuer's obligations subject to this paragraph.

Subd. 4. Other obligations. (a) The state board is authorized to invest funds in:

(1) bankers acceptances and deposit notes if issued by a United States bank that is rated in the highest four quality categories by a nationally recognized rating agency;

(2) certificates of deposit if issued by a United States bank or savings institution that is rated in the top four quality categories by a nationally recognized rating agency or whose certificates of deposit are fully insured by federal agencies, or certificates of deposits issued by a credit union in an amount within the limit of the insurance coverage provided by the National Credit Union Administration;

(3) commercial paper if issued by a United States corporation or its Canadian subsidiary and if rated in the highest two quality categories by a nationally recognized rating agency;

(4) mortgage securities and asset-backed securities if rated in the top four quality categories by a nationally recognized rating agency;

(5) repurchase agreements and reverse repurchase agreements if collateralized with letters of credit or securities authorized in this section;

(6) guaranteed investment contracts if issued by an insurance company or a bank that is rated in the top four quality categories by a nationally recognized rating agency or alternative guaranteed investment contracts if the underlying assets comply with the requirements of this section;

(7) savings accounts if fully insured by a federal agency; and

(8) guaranty fund certificates, surplus notes, or debentures if issued by a domestic mutual insurance company.

(b) Sections 16A.58, 16C.03, subdivision 4, and 16C.05 do not apply to certificates of deposit and collateralization agreements executed by the state board under paragraph (a), clause (2).

(c) In addition to investments authorized by paragraph (a), clause (4), the state board is authorized to purchase from the Minnesota Housing Finance Agency all or any part of a pool of residential mortgages, not in default, that has previously been financed by the issuance of bonds or notes of the agency. The state board may also enter into a commitment with the agency, at the time of any issue of bonds or notes, to purchase at a specified future date, not exceeding 12 years from the date of the issue, the amount of mortgage loans then outstanding and not in default that have been made or purchased from the proceeds of the bonds or notes. The state board may charge reasonable fees for any such commitment and may agree to purchase the mortgage loans at a price sufficient to produce a yield to the state board comparable, in its judgment, to the yield available on similar mortgage loans at the date of the bonds or notes. The state board may also enter into agreements with the agency for the investment of any portion of the funds of the agency. The agreement must cover the period of the investment, withdrawal privileges, and any guaranteed rate of return.

Subd. 5. Corporate stocks. The state board is authorized to invest funds in stocks or convertible issues of any corporation organized under the laws of the United States or any of its states, the Dominion of Canada or any of its provinces, or any corporation listed on an exchange that is regulated by an agency of the United States or of the Canadian national government.

An investment in any corporation must not exceed five percent of the total outstanding shares of that corporation, except that the state board may hold up to 20 percent of the shares of a real estate investment trust and up to 20 percent of the shares of a closed-end mutual fund.

Subd. 5a. Asset mix limitations. The aggregate value of investments under subdivision 5, plus the aggregate value of all investments under subdivision 6, must not exceed 85 percent of the market value of a fund.

Subd. 6. Other investments. (a) In addition to the investments authorized in subdivisions 1 to 5, and subject to the provisions in paragraph (b), the state board is authorized to invest funds in:

(1) equity and debt investment businesses through participation in limited partnerships, trusts, private placements, limited liability corporations, limited liability companies, limited liability partnerships, and corporations;

(2) real estate ownership interests or loans secured by mortgages or deeds of trust or shares of real estate investment trusts through investment in limited partnerships, bank-sponsored collective funds, trusts, mortgage participation agreements, and insurance company commingled accounts, including separate accounts;

(3) resource investments through limited partnerships, trusts, private placements, limited liability corporations, limited liability companies, limited liability partnerships, and corporations; and

(4) international securities.

(b) The investments authorized in paragraph (a) must conform to the following provisions:

(1) the aggregate value of all investments made under paragraph (a), clauses (1) to (3), may not exceed 35 percent of the market value of the fund for which the state board is investing;

(2) there must be at least four unrelated owners of the investment other than the state board for investments made under paragraph (a), clause (1), (2), or (3);

(3) state board participation in an investment vehicle is limited to 20 percent thereof for investments made under paragraph (a), clause (1), (2), or (3); and

(4) state board participation in a limited partnership does not include a general partnership interest or other interest involving general liability. The state board may not engage in any activity as a limited partner which creates general liability.

(c) All financial, business, or proprietary data collected, created, received, or maintained by the state board in connection with investments authorized by paragraph (a), clause (1), (2), or (3), are nonpublic data under section 13.02, subdivision 9. As used in this paragraph, “financial, business, or proprietary data” means data, as determined by the responsible authority for the state board, that is of a financial, business, or proprietary nature, the release of which could cause competitive harm to the state board, the legal entity in which the state board has invested or has considered an investment, the managing entity of an investment, or a portfolio company in which the legal entity holds an interest. As used in this section, “business data” is data described in section 13.591, subdivision 1. Regardless of whether they could be considered financial, business, or proprietary data, the following data received, prepared, used, or retained by the state board in connection with investments authorized by paragraph (a), clause (1), (2), or (3), are public at all times:

(1) the name and industry group classification of the legal entity in which the state board has invested or in which the state board has considered an investment;

(2) the state board commitment amount, if any;

(3) the funded amount of the state board’s commitment to date, if any;

(4) the market value of the investment by the state board;

(5) the state board’s internal rate of return for the investment, including expenditures and receipts used in the calculation of the investment’s internal rate of return; and

(6) the age of the investment in years.

Subd. 7. **Appropriation.** There is annually appropriated to the state board, from the assets of the funds for which the state board invests relating to authorized investments under subdivision 6, paragraph (a), sums sufficient to pay the costs for the management of these assets by private management firms.

History: 1980 c 607 art 14 s 22; 1981 c 208 s 3-6,9; 1982 c 587 s 2; 1983 c 216 art 1 s 5; 1983 c 324 s 7-9; 1984 c 382 s 1; 1984 c 383 s 2,3; 1985 c 224 s 3-5; 1987 c 72 s 1; 1987 c 372 art 8 s 2-6; 1988 c 453 s 7,8; 1991 c 47 s 1; 1991 c 206 s 1; 1992 c 539 s 9; 1992 c 587 art 2 s 2; 1992 c 592 s 2; 1993 c 300 s 6,7; 1994 c 604 art 1 s 7-11; 1995 c 122 s 1; 1998 c 386 art 2 s 8; 2000 c 392 s 1,2; 2005 c 156 art 2 s 7; 2005 c 163 s 2; 2009 c 86 art 1 s 90; 2012 c 286 art 10 s 3; 2013 c 111 art 1 s 1

APPENDIX D

FEE SCHEDULE

This Fee Schedule relates to the U.S. Bank National Association (“USBNA”) Institutional Trust & Custody division (“IT&C”) account identified below (such account, including any sub-accounts therein, the “Account”).

Account Name: The Northmet Project Long-Term Irrevocable Trust
Account Number: _____

Account Profile. If the Account is a USBNA trust account, then the undersigned is the trust’s grantor; if the Account is a USBNA custody account, then the undersigned is the Account’s owner (such undersigned, the “Customer”). USBNA has discretion to invest Account assets to the extent (if any) provided in the Account’s governing service contract(s) (to such extent, a “Managed Account”; otherwise, a “Directed Account”).

Fees. See a mutual fund’s prospectus; a private fund’s governing documents (such as a limited liability company agreement, limited partnership agreement, trust agreement, or declaration of trust), offering documents (such as an offering circular, offering memorandum, private placement memorandum, prospectus, or summary description), and subscription documents (such as an adoption agreement or subscription agreement); and any fund’s fund-fact sheet, as applicable, for a description of any fees received by USBNA and its affiliates (collectively, “U.S. Bank”) with respect to the investment of Account assets therein. The fees the Account pays directly to U.S. Bank (the “Account Fees”), which are in addition to fund-level fees and are paid directly to USBNA, are as follows.

Trustee fee (FOR A MANAGED ACCOUNT):	The investment-management fee is calculated in tiers, based on the invested value of Account assets. The rates are as follows, except as may be otherwise indicated below. 40 bps on the first \$5 Million of Account assets 35 bps on the next \$15 Million of Account assets 30 bps on the balance of Account assets For assets invested in the First American Funds or in a deposit account at USBNA, the rate is 0 bps, and the assets are excluded from the tiers above.
Securities processing fees:	Included in Trustee fee.
Distribution fees:	Included in Trustee fee.
Extraordinary-services fee:	Provide services described in neither this Fee Schedule nor the Account’s governing service contract(s). The extraordinary-services fee will be calculated at an hourly rate or expressed as a flat fee. USBNA will obtain the Customer’s consent to the rate, which consent will not be unreasonably withheld.

Minimum Relationship Fees. The Account is subject to minimum relationship fees. For each billing period, they apply as follows. Start with the minimum annual relationship fees stated above. Prorate that amount to reflect the length of the billing period elected below (the “Minimum Relationship Fees”). Find the sum of the Account Fees (other than the Minimum Relationship Fees) and the account fees owed with respect to the Customer’s other Institutional Trust & Custody division accounts (excluding accounts that hold plan assets) for the billing period (the “Actual Relationship Fees”). If the Actual Relationship Fees are less than the Minimum Relationship Fees, then the Account Fees for the billing period are the Account’s proportionate share of the Minimum Relationship Fees (rather than the Account Fees otherwise disclosed under this Fee Schedule). That proportionate share is based on relative account balances as of the end of the billing period or over the billing period, as applicable based on the balance method elected below.

Manner of Receipt. Account Fees will be calculated (*check one and only one*): Monthly / Quarterly / Semi-annually / Annually. Any asset-based Account Fees will be based on (*check one and only one*): the applicable Account balance (or portion thereof) as of the end of the billing period / the average applicable Account balance (or portion thereof) over the billing period. (The asset values used in such calculation may vary from the asset values reported on an asset statement because of timing issues, such as the posting of accruals or the late-pricing of securities.) Account Fees will then be (*check one and only one*): Billed and invoiced to the Customer with instructions on how to remit payment, and the Customer hereby acknowledges that U.S. Bank may, except to the extent expressly forbidden to do so in the Account’s governing service contract(s), charge such fees directly to the Account if the Customer has not paid the invoice within sixty (60) calendar days of receiving it. / Charged directly to the Account, with a subsequent advice to the Customer about the charges.

Expenses. The Customer will reimburse USBNA for expenses, fees, costs, and other charges incurred by USBNA in providing services under the Account’s governing service contract(s) (including, but not limited to, compensation, expenses, fees, costs, commissions, and other charges payable to service providers hired by USBNA under such contract(s)).

Amendment. USBNA may amend this Fee Schedule by delivering an amended and restated Fee Schedule or another written notice to the Customer. Such amendment will be effective thirty (30) calendar days after such delivery.

Approval. The Customer hereby acknowledges that it: (i) is independent of U.S. Bank and has authority to enter into, extend, and renew contracts for the services described herein and to approve the fees described herein; (ii) has received, read, and understands a fully-executed copy of the Account’s governing service contract(s); (iii) understands and approves the services and fees described herein; (iv) agrees to the process described herein for amending the Fee Schedule; and (iv) FOR A MANAGED ACCOUNT, has received, read, and understands USBNA’s Mutual Fund Compensation Disclosure.

Shares of registered investment companies, and units of private funds, are not deposits or obligations of, or endorsed or guaranteed in any way by, any bank, including any bank affiliated with U.S. Bancorp. Nor does the Federal Deposit Insurance Corporation, the Federal Reserve Board, or any other governmental agency insure such products. An investment in such products involves investment risks, including the possible loss of principal, due to fluctuations in each product's net asset value. Deposit products are offered by U.S. Bank National Association, member FDIC