NorthMet Project

2019 NorthMet Financial Assurance Estimate Update

Version 1

Issue Date: March 2019

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Acronyms, Abbreviations and Units

Acronym	Stands For
AOC	Areas of Concern
AST	Aboveground Storage Tank
AWMP	Adaptive Water Management Plan
Cat	Category
DNR	Minnesota Department of Natural Resources
FA	financial assurance
FTB	Flotation Tailings Basin
HRF	Hydrometallurgical Residue Facility
OSP	Ore Surge Pile
O&M	operations & maintenance
PLM	Poly Met Mining, Inc.
PTM	Permit to Mine
WWTS	Waste Water Treatment System

1.0 Introduction

The purpose of this document is to describe Poly Met Mining, Inc.'s (PolyMet) 2019 update of the NorthMet Project Financial Assurance (FA) annual estimates which are included in Appendix 15 of PolyMet's Permit to Mine (PTM) Application of December 2017. The update follows the conditions and provisions contained in Attachment 1 to the NorthMet Mining Project's Nonferrous PTM Special Conditions: Financial Assurance.

Similar to the Annual Report 2018 that is submitted concurrently, this FA update includes work completed through the upcoming year (2020). For the time period covered by this annual update (Calendar Years 2019 and 2020), construction will not be completed. PolyMet is currently in financing and anticipates construction to start in the second half of 2019 and extend through 2021. Therefore, some second-year construction activities will not have started by the end of 2020, and the liabilities associated with those activities are not included in the Construction FA Estimate. Those liabilities will be included in next year's update.

Because mining will not have started and there have been no design changes to the project, the Memo Identifying Changes to the AWMP, the Updated PTM Application Appendix 15.5: O&M for Water Treatment During Reclamation and Postclosure Maintenance After Mine Year 1 – 10 mg/L WWTS Sulfate Target, and the Updated PTM Application Appendix 15.4 NorthMet Project Feature Changes Over Time Memo are not required because those documents are only valid after the mining and ore processing has commenced.

Because the work to be done has not changed, the Updated NorthMet Project Closure Abatement Specification, Updated NorthMet Project Closure and Demolition Specification, Updated PTM Application Appendix 15.1: Legacy Closure Plan, and Updated PTM Application Appendix 15.2: Construction Phase Contingency Reclamation Plan and Estimate have not been updated, because the information in these documents remains valid.

PolyMet has prepared the estimates using Excel spreadsheets in the format submitted in the PTM Application which are identified for each estimate in Section 2. PolyMet has refined this format to include an explanation cost element changes, removals, or additions. The refinement consists of adding Legacy Reclamation Compare, Legacy Long Term Compare, and Construction Compare tabs to the estimates. The added tabs have columns for Previous $, Current $, Difference, and an explanatory note for each of the estimates.

PolyMet has maintained the same costing logic and structure as in the 2017 PTM Application.

1.1 Outline

The outline of this document is:

Section 1.0 Introduction, outline and summary

Section 2.0 Description of the Legacy and Construction FA estimates

Section 3.0 Description of annual update process

This document was developed as required by "NorthMet Project - Process for Updating NorthMet Financial Assurance Estimate" (PolyMet, December 2018) which was developed to meet the requirements of PTM Special Condition 4a. That document was reviewed, and no changes to that document are necessary based on this document. A Revision History is included at the end of this document.

1.2 Summary

The Legacy Reclamation, Legacy Long Term, and Construction FA Estimates have been updated for 2019. The following table summarizes the 2019 update compared to the amounts submitted with the 2017 PTM Application.

Table 1-1 Financial Assurance Estimate Summary

FA Estimate	Submitted with 2017 PTM Application	2019 Update	Change
Legacy Reclamation	$45,143,496	$45,633,344	$489,849
Legacy Long Term	$13,269,809	$13,603,672	$333,863
Construction	$16,271,537	$13,164,826	-$3,106,711
Total	$74,684,841	$72,401,842	**-$2,282,999**

The second-year construction activities that will occur beyond the timeframe covered by this update include:

1. Construction of the Category 2/3 Waste Rock Stockpile foundation and liner system
2. Construction of the Ore Surge Pile foundation and liner system
3. Mine pit stripping

There are other activities that will not be completed by the end of 2020, such as construction of the Flotation Tailings Basin (FTB) dams, FTB seepage capture systems, the Category 1 Stockpile Groundwater Containment System, etc.; however, for ease of this estimate, PolyMet has only removed items that would not yet have been started in 2020.

The Construction FA Estimate covers the demolition and restoration of facilities that will be constructed during the construction phase. Because a number of these facilities are subject to final design approval by DNR before they can be constructed, PTM Special Conditions 4 and 53 require updated financial assurance as the project develops and before construction of each feature, and there may be changes to the project features during final design, PolyMet will update the Construction FA Estimate as part of the final design approval process, as required by these PTM Special Conditions.

2.0 Financial Assurance Estimates

2.1 Legacy Reclamation Financial Assurance Estimate

The Legacy Reclamation FA Estimate covers the demolition and restoration of existing facilities and remediation of known Areas of Concern (AOC) at the Plant Site. Legacy closure cost estimates were updated by third parties in 2019 dollars.

The Legacy Reclamation FA Estimate for 2019 is provided in Attachment 1 and the cash amount totals $45,633,344, which is an increase of $489,849 from the amount on the estimate submitted with the 2017 PTM Application. Updated prices were obtained from the contractors that provided the prices for the previous estimates and updated engineering estimates were obtained from the consultants that provided the previous engineering estimates. Table 2-1 summarizes the changes from the Legacy Reclamation FA Estimate submitted with the 2017 PTM Application.

Table 2-1 Legacy Reclamation FA Estimate Changes

Summary of Changes to Legacy Reclamation FA Estimate Changes for 2019		
Total Change	$489,849	
Changes:		
Contingency	-$47,657	
Legacy Structure Removal: - Area 1 Shop Buildings	-$186,729	discovered that siding not Galbestos - some offset for Lakehead update
Legacy Structure Removal: - Area 2 Shop Buildings	-$335,408	discovered that siding not Galbestos - some offset for Lakehead update
Abatement	-$1,371,939	Mavo update minus work completed
Added:		
Legacy Structure Removal: - Collapse and Fill Tunnels	$180,180	previously assumed tunnel could be sealed
Legacy Structure Removal: - Additional Power Lines	$21,278	to cover power lines south of the Plant Site
ASTs	$59,547	added tanks from SPCC and Lakehead update
SW619 Landfill Cover	$397,791	previously assumed to be installed
Price Update:		
Demo	$516,085	Lakehead update
AOCs	$242,626	NTS update
Calculation Omission	$1,014,074	previously omitted from Total with Indirects

2.2 Legacy Long Term Financial Assurance Estimate

The Legacy Long Term FA Estimate covers the closure (dewatering, reclamation, and dam breach) of the existing tailings basin, Site Manager, DNR staff, dam safety monitoring, landfill and Tailings Basin maintenance, snowplowing/road maintenance, and site vehicle. Legacy closure cost estimates were updated by third parties in 2019 dollars.

The Legacy Long Term FA Estimate for 2019 is provided in Attachment 2 and the NPV amount totals $13,603,672, which is an increase of $333,863 from the amount on the estimate submitted with the 2017 PTM Application. Updated prices were obtained from the contractors that provided the prices for the previous estimates, and updated engineering estimates were obtained from the consultants that provided the previous engineering estimates. For one item (Tailings Basin Dewatering), the cost was escalated using RS Means Construction Cost Index as of January 1, 2019. Table 2-2 summarizes the changes from the Legacy Reclamation FA Estimate submitted with the 2017 PTM Application.

Table 2-2 Legacy Long Term FA Estimate Changes

Summary of Changes to Legacy Long Term FA Estimate Changes for 2019		
Total Change - NPV	$333,863	
Total Change - Cash	$559,695	
Changes:		
Contingency	-$11,086	
Landfill Mantenance and Monitoring Coal Ash	-$2,640	less one year of 30 year plan
Tailings Basin Maintenance	-$50,000	reflects ongoing activity
Price Update:		
Tailings Basin Dewatering	$186,514	estimate update based on RS Means Construction Cost Index as of 1/1/19
Water Quality Monitoring	-$345,625	based on 2019 PLM Budget (was 2018)
Dam Safety Monitoring	$3,800	price update
Seepage Pumping	-$65,326	based on 2018 PLM Cost (was 2018 Budget)
Landfill Maintenance and Monitoring SW619	$241,290	price update
Snow Plowing/Road Maintenance	-$141,270	Snowplowing based on 2017-2018 Cost - Road Maintenance reflects unit price update
Site Manager	$62,400	price update
Calculation Omission	$681,638	previously omitted from Total with Indirects

2.3 Construction Financial Assurance Estimate

The Construction FA Estimate covers the demolition and restoration of facilities that will be constructed during the construction phase. The costs were updated by third parties in 2019 dollars.

The Construction FA Estimate for 2019 is provided in Attachment 3 and the cash amount totals $13,164,826 which is a decrease of $3,106,711 from the amount on the estimate submitted with the 2017 PTM Application. Updated prices were obtained from the contractors that provided the prices for the previous prices and updated engineering estimates were obtained from the consultants that provided the previous engineering estimates. For four items (Category 1 Stockpile Footprint Reclamation, Category 1 Stockpile Groundwater Containment System Breaching, HRF Disturbance, and FTB Borrow Area & Disturbed Area), the cost was escalated using RS Means Construction Cost Index as of January 1, 2019. Table 2-3 summarizes the changes from the Construction FA Estimate submitted with the PTM Application.

Table 2-3 Construction FA Estimate Changes

Summary of Changes to Construction FA Estimate Changes for 2019		
Total Change	-$3,106,711	
Changes:		
Contingency	-$276,152	
Prime Contractor Markup	-$69,038	
Cat 2/3 Stockpile Footprint Reclamation	-$1,704,755	planned for construction in 2021
OSP Footprint Reclamation	-$941,702	planned for construction in 2021
Cover East Pit Exposed Rock	-$1,407,425	planned for construction in 2021
Rail Transfer Hopper Demo	-$164,800	planned for construction in 2021
Added:		
Stormwater System	$386,960	new item
Abandon Mine Site Exploration Boreholes	$500,000	new item
Abandon Mine Site Wells	$157,309	wells added in permitting and updated prices
Price Update:		
Seeding Unit Price	$708	updated
Cat 1 Stockpile Footprint Reclamation	$20,457	estimate updated based on RS Means Index and seeding Unit Price
Cat 1 Stockpile Cont Sys Breaching	$56,774	
HRF Disturbance	$3,024	
FTB Borrow Area & Disturbed Area	$30,079	
Cat 4 Earthwork	$67,205	Ames Unit Price update
OSLA Earthwork	$80,599	Ames Unit Price update and error fixed
Ponds Earthwork	$27,780	Ames Unit Price update
Road Maintenance	$9,360	Ames Unit Price update
Off Site Disposal	$180	Wayne Transport Price and Tipping Fee
Demo	$116,727	Lakehead update

3.0 Annual Update Process

This section describes the process PolyMet used for annual update of the FA estimates, is based on the process laid out in Section 4 of "NorthMet Project - Process for Updating NorthMet Financial Assurance Estimate" (December 2018), and refers to appendices in the NorthMet Project PTM Application of December 2017. Items in italics refer to tabs in the FA estimate spreadsheets.

The process steps were:

1. Review the PTM Application Appendix 11.4: Adaptive Water Management Plan and update based on actual data and any model modifications and prepare a memo identifying any changes in water management and treatment systems or the Category 1 waste rock stockpile cover system. (not required – no changes)
2. Update "PTM Application Appendix 15.5: NorthMet Project – O&M for water treatment during reclamation and postclosure maintenance after Mine Year 1 – 10 mg/L WWTS Sulfate Target based on changes in plan and actual costs/results. Include a section on changes. (not required – no changes)
3. Update PTM Application Appendix 15.4: NorthMet Project Feature Changes Over Time based on changes in plan and activity to date. Include a section on changes. (no change)
4. Update PTM Application Appendix 15.3 - Attachment C1: NorthMet Project Closure Abatement Specification based on work completed and any new requirements. Include a section on changes. (no change)
5. Update PTM Application Appendix 15.3 - Attachment F1 NorthMet Project Closure and Demolition Specification based on work completed and any new requirements. Include a section on changes. (no change)
6. Updated PTM Application Appendix 15.1 - Attachment G: NTS AOC Estimates based on work completed and any new requirements. Prepare a memo summarizing changes.
7. Obtained prices except as noted
    a. Abatement based on #4 above
    b. Demolition based on #5 above
    c. Ames Unit Prices listed on the *Unit $ Reclamation* and *Unit $ Long Term* tabs
    d. NTS Unit Prices listed on the *Unit $ Reclamation, Unit $ Long Term* and *Pipe-Liner Off Site Disposal* tabs
    e. D&T Unit Prices listed on the *Unit $ Reclamation* tab
    f. Barr Unit Prices listed on the *Unit $ Reclamation* and *Unit $ Long Term* tabs
    g. Pace Analytical Price List on the *Water Quality Samp-Anal-Rep* tab (not required)

8. Updated construction project Estimates except as noted
    a. *SOW 3 Cat 1 Cover Sys (Yr0)* tab
    b. *SOW 11 HRF Cover Sys (Yr0)* tab
    c. *SOW 14 FTB Grading Seeding (Yr0)* tab
    d. *SOW 21 Cat 1 Cont Sys (Yr0)* tab
    e. *FTB Emerg OFlow Concept* tab (no change)
    f. *SOW 14 FTB Emerg OFlow (Yr1)* tab (not required)
    g. *SOW 3 Cat 1 Cover Sys (Yr1)* tab (not required)
    h. *SOW 11 HRF Cover Sys (Yr1)* tab (not required)
    i. *SOW 14 FTB Cover Sys (Yr1)* tab (not required)
    j. *SOW 21 Cat 1 Cont Sys (Yr1)* tab (not required)
    k. *Basin Closure* tab
    l. *Dewatering UC Development* tab
    m. *Dam Breach Calcs* tab (no change)
9. Updated the FA estimate Excel spreadsheet
10. Update PTM Application Appendix 15.1: Legacy Closure Plan, PTM Application Appendix 15.2: Construction Phase Contingency Reclamation Plan and Estimate, and PTM Application Appendix 15.3: Mine Year 1 Projected Financial Assurance Estimate (no change except for the attached Legacy and Construction FA Estimates)
11. Update this document to reflect any changes to the update process. (no change)

The FA estimate Excel spreadsheet is designed to summarize Reclamation activities and costs on the Legacy Reclamation and Construction tabs. Typically, the Quantity column is manually entered from the memo developed in #3 above, the Unit $ column is linked from the supporting tab indicated in the Supporting Tab column, and the Cash $ column is calculated as Quantity X Unit $. Information in the supporting tabs is manually entered from information gathered in #3 through #8 above.

The FA estimate Excel spreadsheet also summarizes Long Term activities and costs on the Legacy Long Term tab. Typically, the Quantity column is manually entered, the Unit $ column is the calculation linked from the supporting tab indicated in the Long Term Unit $ Tab column or, for water treatment costs, manually entered from #2 above. Information in the Long Term Unit $ Tab is manually entered from information gathered in #7 above.

New rows were added to the Legacy Reclamation tab for Collapse and Fill Tunnels, Additional Power Lines and SW619 Landfill Cover and new support tabs were developed for these items.

No new rows were added to the Legacy Long Term tab.

New rows were added to the Construction tab for Stormwater Pond - Restore Footprint, Stormwater Ditch Removal, and Abandon Mine Site Exploration Boreholes and new support tabs were developed for these items.

Table 3-1 lists the key deliverables and source for each.

Table 3-2 lists the tabs of the FA estimate Excel spreadsheet, the data to be input on that tab, and the process step where the data is developed.

Table 3-1 Key Deliverables and Sources

Step	Deliverable	Planned Source
1	Memo Identifying Changes to the AWMP	not required
2	Updated PTM Application Appendix 15.5: O&M for Water Treatment During Reclamation and Postclosure Maintenance After Mine Year 1 – 10 mg/L WWTS Sulfate Target	not required
3	Updated PTM Application Appendix 15.4 NorthMet Project Feature Changes Over Time Memo	no change
4	Updated *NorthMet Project Closure Abatement Specification*	no change
5	Updated *NorthMet Project Closure and Demolition Specification*	no change
6	Memo Summarizing Changes to AOC estimates	NTS
7a	Abatement Prices	Mavo
7b	Demolition Prices	Lakehead
7c	Ames Unit Prices	Ames
7d	NTS Unit Prices	NTS
7e	D&T Unit Prices	D&T
7f	Barr Unit Prices	Barr
7g	Pace Analytical Prices	not required
8a	Updated *SOW 3 Cat 1 Cover Sys (Yr0)* tab	Barr (using RS Means Construction Cost Index)
8b	Updated *SOW 11 HRF Cover Sys (Yr0)* tab	
8c	Updated *SOW 14 FTB Grading Seeding (Yr0)* tab	
8d	Updated *SOW 21 Cat 1 Cont Sys (Yr0)* tab	
8e	Updated *FTB Emerg Oflow CONCEPT* tab	no change
8f	Updated *SOW 14 FTB Emerg OFlow (Yr1)* tab	Barr
8g	Updated *SOW 3 Cat 1 Cover Sys (Yr1)* tab	not required
8h	Updated *SOW 11 HRF Cover Sys (Yr1)* tab	not required
8i	Updated *SOW 14 FTB Cover Sys (Yr1)* tab	not required
8j	Updated *SOW 21 Cat 1 Cont Sys (Yr1)* tab	not required
8k	Updated *Basin Closure* tab	Barr (using RS Means Construction Cost Index)
8l	Updated *Dewatering UC Development* tab	
8m	Updated *Dam Breach Calcs* tab	no change
9	Updated FA estimate Excel spreadsheet	PolyMet
10	Updated PTM Application Appendix 15.1: Legacy Closure Plan, PTM Application Appendix 15.2: Construction Phase Contingency Reclamation Plan and Estimate and PTM Application Appendix 15.3: Mine Year 1 Projected Financial Assurance Estimate	no change

Table 3-2 Spreadsheet Update Data Input

Estimate	Tab (*=in multiple estimates)	Input Data	Step Reference
Legacy Reclamation	Legacy Reclamation	quantities	3
	NEW Legacy Reclamation Compare		
	AOC*	NTS estimate	6
	Demo*	Mavo estimate	7a
		Lakehead estimate	7b
	AST*	Lakehead estimate	7a
	NEW SW619 Landfill Cover	Barr estimate	
	NEW Additional Power Lines	Quantity from Barr - Price from Lakehead	7b
	NEW Collapse Tunnels	Barr Estimate	
Estimate	**Tab (*=in multiple estimates)**	**Input Data**	**Step Reference**
Legacy Long Term	Legacy Long Term	quantities	3
	NEW Legacy Long Term Compare		
	Unit $ Long Term *	Ames unit prices	7c
		NTS unit prices	7d
		Barr unit prices	7f
	Basin Closure	Barr estimate	8k
	Dewatering UC Development	Barr estimate	8l
	Dam Breach Calcs	Barr estimate	8m
Estimate	**Tab (*=in multiple estimates)**	**Input Data**	**Step Reference**
Construction	Construction	quantities	3
	NEW Construction Compare		
	Unit $ Reclamation*	Ames unit prices	7c
		NTS unit prices	7d
		D&T unit prices	7e
		Barr unit prices	7f
	Unit $ Long Term *	Ames unit prices	7c
		NTS unit prices	7d
		Barr unit prices	7f
	Pipe-Liner Off Site Disposal*	quantities	3
		Unit Prices	7d
	Ponds*	quantities	3
	NEW Well Abandonment	quantities and prices	3
	SOW 3 Cat 1 Cover Sys (Yr0)	Barr estimate	8a
	SOW 11 HRF Cover Sys (Yr0)	Barr estimate	8b
	SOW 14 FTB Grading-Seedin (Yr 0)	Barr estimate	8c
	SOW 21 Cat 1 Cont Sys (Yr0)	Barr estimate	8d
	FTB Emerg OFlow CONCEPT*	Barr estimate	8e
	SOW 14 FTB Emerg OFlow (Yr1)	Barr estimate	8f
	AOC*	NTS estimate	6
	Demo*	Mavo estimate	7a
		Lakehead estimate	7b
	AST*	Lakehead estimate	7a

Revision History

Date	Version	Description
3/29/2019	1	Initial release to provide 2019 FA estimate update

References

1. Poly Met Mining, Inc. PTM Application: Appendix 15.4: NorthMet Project Feature Changes Over Time Memo. December 2017.

2. –. PTM Application. Appendix 15.1: Legacy Closure Plan. December 2017.

3. –. PTM Application. Appendix 15.2: Construction Phase Contingency Reclamation Plan and Estimate. December 2017.

4. –. PTM Application. Appendix 15.3: Mine Year 1 Projected Financial Assurance Estimate. December 2017.

5. –. PTM Application. 15.5: O&M for Water Treatment During Reclamation and Postclosure Maintenance After Mine Year 1 – 10 mg/L WWTS Sulfate Target Memo. December 2017.

6. –. PTM Application. Appendix 11.4: Adaptive Water Management Plan. December 2017.

7. –. PTM Application. Appendix 15.3 – Attachment C1: NorthMet Project Closure Abatement Specification. December 2017.

8. –. PTM Application. Appendix 15.3 – Attachment F1: NorthMet Project Closure and Demolition Specification. December 2017.

9. –. PTM Application. Appendix 15.1 – Attachment G: NTS AOC Estimate. December 2017.

List of Tables

Attachments

Attachment 1

Legacy Reclamation Estimate with Supporting Documents
March 2019

Attachment 1 - Legacy Reclamation FA Estimate **3/26/2019**

Includes Demo of Legacy Buildings with Abatement and AOCs

	support tabs	Cash $	NPV $	Note	30 Yr Tot	NPV	Start 01/01/19	Bankruptcy 07/01/19	06/30/20	07/01/21	07/01/22
						2.9%	1		2	3	4
							Oper	Hold			
						Calendar Year	2019		2020	2021	2022
Legacy Ferrous Total with Indirects		**$45,633,344**	**$42,312,948**								
Contingency	**10.0%**	**$4,056,297**	**$3,761,151**								
Prime Contractor Markup	**2.5%**	**$1,014,074**	**$940,288**								
Mobilization				included in pricing							
Legacy Ferrous Total (no Indirects)		**$40,562,973**	**$37,611,509**		40,562,973	37,611,509					
Plant Site		$40,562,973	$37,611,509								
Demo and Abatement		$32,721,184	$30,289,905								
Legacy Structure Removal				Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)							
Area 1 Shop Buildings	Demo	$262,187	$251,211	Jan 2019 - siding not Galbestos	262,187	251,211	0	0	262,187	0	0
Area 2 Shop Buildings	Demo	$221,419	$212,149	Jan 2019 - siding not Galbestos	221,419	212,149	0	0	221,419	0	0
Main Plant Area - Demoed in Construction	Demo	$1,688,457	$1,572,058		1,688,457	1,572,058	0	0	0	1,688,457	0
Main Plant Area	Demo	$20,286,716	$18,892,429		20,286,716	18,892,429	0	0	5,071,679	10,143,358	5,071,679
Collapse and Fill Tunnels	Collapse Tunnels	$180,180	$163,031	Tailings Tunnel D-3 Details - Barr 10/26/18 - Updated for 2019 via RS Means Construction Cost Index	180,180	163,031	0	0	0	0	180,180
Main Gate Colby PH Ad Bldg	Demo	$248,033	$224,426		248,033	224,426	0	0	0	0	248,033
Roads	Demo	$673,200	$609,126		673,200	609,126	0	0	0	0	673,200
Railroads	Demo	$387,600	$350,709		387,600	350,709	0	0	0	0	387,600
Power System	Demo	$99,766	$90,271		99,766	90,271	0	0	0	0	99,766
Additional Power Lines	Additional Power Lines	$21,278	$19,253	Power Line Details - Barr 10/26/18 - for 2019 escalate by 2% per 2/28/19 Lakehead email (Attachment A)	21,278	19,253	0	0	0	0	21,278
Piping System	Demo	$2,936,580	$2,657,082		2,936,580	2,657,082	0	0	0	0	2,936,580
Legacy Asbestos Abatement				Arrowhead Consulting & Testing 2019 (Attachment B) and Mavo 2019 (Attachment C)							
Area 1 Shop Buildings	Demo	$116,155	$111,292		116,155	111,292	0	0	116,155	0	0
Area 2 Shop Buildings	Demo	$214,293	$205,322		214,293	205,322	0	0	214,293	0	0
Main Plant Area	Demo	$4,480,820	$4,113,133	accounting for work completed	4,480,820	4,113,133	0	0	0	2,240,410	2,240,410
Main Gate Colby PH Ad Bldg	Demo	$904,500	$818,412		904,500	818,412	0	0	0	0	904,500
Other		$7,841,788	$7,321,604								
SW619 Landfill Cover	Landfill SW619 Cover	$397,791	$381,139	SW619 Landfill Cover Estimate - Barr 10/26/18 - Updated for 2019 via RS Means Construction Cost Index	397,791	381,139	0	0	397,791	0	0
AST Removal	AST	$283,172	$271,318	Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)	283,172	271,318	0	0	283,172	0	0
AOCs	AOC	$7,160,825	$6,669,147	Legacy Remediation - Areas of Concern (AOC) - costs from detailed spreadsheets by NTS [2019] (see Attachment D1)	7,160,825	6,669,147	0	0	2,363,072	2,434,681	2,363,072

Comparison to PTM Legacy Reclamation Submittal of Dec 2017					3/26/2019
Includes Demo of Legacy Buildings with Abatement and AOCs					
		Previous	**Current**	**Difference**	**Note**
Legacy Ferrous Total with Indirects		**$45,143,496**	**$45,633,344**	**$489,849**	
Contingency	**10.0%**	**$4,103,954**	**$4,056,297**	**-$47,657**	
Prime Contractor Markup	**2.5%**	**$0**	**$1,014,074**	**$1,014,074**	calculation omitted in previous
Mobilization					
Legacy Ferrous Total (no Indirects)		**$41,039,542**	**$40,562,973**	**-$476,569**	
Plant Site		$41,039,542	$40,562,973	-$476,569	
Demo and Abatement		$33,897,717	$32,721,184	-$1,176,533	
Legacy Structure Removal:					
Area 1 Shop Buildings		$448,916	$262,187	-$186,729	Jan 2019 - siding not Galbestos and Lakehead update
Area 2 Shop Buildings		$556,827	$221,419	-$335,408	Jan 2019 - siding not Galbestos and Lakehead update
Main Plant Area - Demoed in Construction		$1,655,350	$1,688,457	$33,107	Lakehead update
Main Plant Area		$19,888,937	$20,286,716	$397,779	Lakehead update
Collapse and Fill Tunnels		$0	$180,180	$180,180	Tailings Tunnel D-3 Details - Barr 10/26/18 - Updated for 2019 via RS Means Construction Cost Index
Main Gate Colby PH Ad Bldg		$243,170	$248,033	$4,863	Lakehead update
Roads		$660,000	$673,200	$13,200	Lakehead update
Railroads		$380,000	$387,600	$7,600	Lakehead update
Power System		$97,810	$99,766	$1,956	Lakehead update
Additional Power Lines		$0	$21,278	$21,278	Power Line Details - Barr 10/26/18 - for 2019 escalate by 2% per 2/28/19 Lakehead email (Attachment A)
Piping System		$2,879,000	$2,936,580	$57,580	Lakehead update
Legacy Asbestos Abatement:			$0	$0	
Area 1 Shop Buildings		$98,350	$116,155	$17,805	Mavo update
Area 2 Shop Buildings		$167,350	$214,293	$46,943	Mavo update
Main Plant Area		$5,962,607	$4,480,820	-$1,481,787	Mavo update (accounting for work complete)
Main Gate Colby PH Ad Bldg		$859,400	$904,500	$45,100	Mavo Update
Other		$7,141,825	$7,841,788	$699,964	
SW619 Landfill Cover		$0	$397,791	$397,791	SW619 Landfill Cover Estimate - Barr 10/26/18 - Updated for 2019 via RS Means Construction Cost Index
AST Removal		$223,625	$283,172	$59,547	Lakehead update and added tanks
AOCs		$6,918,200	$7,160,825	$242,626	2016 estimate updated

Summary of Changes to Legacy Reclamation FA Estimate Changes for 2019		
Total Change	$489,849	
Changes:		
Contingency	-$47,657	
Legacy Structure Removal: - Area 1 Shop Buildings	-$186,729	discovered that siding not Galbestos - some offset for Lakehead update
Legacy Structure Removal: - Area 2 Shop Buildings	-$335,408	discovered that siding not Galbestos - some offset for Lakehead update
Abatement	-$1,371,939	Mavo update minus work completed
Added:		
Legacy Structure Removal: - Collapse and Fill Tunnels	$180,180	previously assumed tunnel could be sealed
Legacy Structure Removal: - Additional Power Lines	$21,278	to cover power lines south of the Plant Site
ASTs	$59,547	added tanks from SPCC and Lakehead update
SW619 Landfill Cover	$397,791	previously assumed to be installed
Price Update:		
Demo	$516,085	Lakehead update
AOCs	$242,626	NTS update
Calculation Omission	$1,014,074	previously omitted from Total with Indirects

Legacy Remediation - Areas of Concern (AOC) - costs from detailed spreadsheets by NTS [2019] (see Attachment D1)

Heavy Border with Bold Amounts are used in Reclamation Estimates

	Cost Per Phase/Task (see separate sheet for details and assumptions)					
AoC No.	**Site Name**	**Phase I ESA/ SAP**	**Implement SAP**	**Complete Phase II**	**Remediation**	**Total Cost**
01	Area 1 Shops	$1,304	$230,476	$267,976	$407,798	$907,554
06	Oily Waste Disposal Area	$1,304	$52,320	$96,300	$73,620	$223,544
07	Bull Gear Disposal	$1,304	$39,724	$0	$0	$41,028
09	Railroad Panel Yard	$1,304	$0	$25,400	$1,379,871	$1,406,575
10	Airport	$1,304	$30,040	$58,650	$62,540	$152,534
11	Stoker Coal Ash Disposal	$1,304	$32,806	$45,934	$255,594	$335,638
13	2001 Storage Area	$1,304	$30,040	$58,650	$0	$89,994
14	Sandblasting and Large Equipment Painting Area	$1,304	$63,381	$33,321	$52,470	$150,476
35	Dunka Water Treatment Plant Sludge	$1,304	$21,572	$38,036	$0	$60,912
37	Line 9 Area 5 Petroleum Contaminated Soil	$1,304	$0	$0	$0	$1,304
38	Area 2 Shops	$1,304	$0	$257,356	$187,372	$446,031
40	Heavy Duty Garage	$1,304	$22,121	$40,571	$0	$63,997
42	Bunker C Tank Farm	$0	$0	$0	$944,723	$944,723
43	Administration Building	$1,304	$21,760	$0	$0	$23,064
44	Main Gate Vehicle Fueling Area	$1,304	$16,914	$34,818	$32,464	$85,500
46	Plant Site and General Shops	$1,304	$63,632	$202,480	$665,273	$932,688
47	Tailings Basin Reporting	$1,304	$0	$0	$0	$1,304
48	Booster Pump House with Transformer	$1,304	$21,743	$39,133	$0	$62,180
49	Coarse Crusher Petroleum Contaminated Soil	$1,304	$16,651	$35,029	$0	$52,984
51	Tailings Basin Salvage and Scrap Areas	$1,304	$90,465	$25,500	$477,174	$594,443
52	Cell 2W Salvage Area	$1,304	$22,061	$0	$0	$23,365
53	Hornfels Burial	$1,304	$0	$0	$0	$1,304
59	Colby Lake Pumping Station	$1,304	$22,063	$0	$0	$23,367
61	Pellet Plant	$1,304	$112,228	$65,604	$264,183	$443,318
		$29,992	$909,996	$1,324,758	$4,803,079	$7,067,825
	MPCA Coordination Trans 1			$4,203,436	1.5%	$62,000
	MPCA Coordination Trans 2			$2,864,390	1.1%	$31,000
						$7,160,825

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

	Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)					Mavo 2019 (Attachment C)		Arrowhead Consulting & Testing 2019 (Attachment B)	1.02	
Scope of Work Description	**Universal Waste Collection**	**Galbestos Removal**	**Demolition**	**Total Demo**	**Site Restoration**	**Asbestos Lead Paint Mold**	**Universal Waste Removal & Disposal**	**Pre Demo Insp**	**Demo To Rollup (Escalation Factor Above Applied)**	**Abatement To Rollup**
Pre-Demolition Services										
Legacy with construction				**$1,650,850**	**$4,500**	**$21,525**	**$0**	**$4,800**	$1,688,457	$26,325
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	n/a				
Legacy Tailings Basin Buildings - Demoed as part of construction										
Foreman's Office (Bldg. 718)			$9,350	$9,350	$400	$6,825	$0	$1,100		
Reporting Building (Bldg. 719)			$9,900	$9,900	$400	$6,825	$0	$1,100		
Lube House (Bldg. 720)			$2,500	$2,500	$400	$2,625	$0	$850		
Reporting Building (Bldg. 724)			$3,300	$3,300	$400	$2,625	$0	$900		
Lube Oil Building (Bldg. 725)			$2,500	$2,500	$400	$2,625	$0	$850		
Legacy Area 1		Jan 2019 - siding not Galbestos		**$159,727**	**$97,319**	**$115,305**	**$0**	**$850**	$262,187	$116,155
Area 1 Shop and Truck Storage (Bldg. 220)	$2,900	$0	$103,332	$106,232	$74,669	$98,000	$0			
Area 1 Cold Storage (Bldg. 221)	$400	$0	$10,860	$11,260	$13,400	$5,765	$0			
Area 1 Reporting Building (Bldg. 231)			$9,900	$9,900		$5,765	$0	$850		
Area 1 Boiler House (Bldg. 226)	$200	$0	$9,875	$10,075	$3,000	$2,885	$0			
Area 1 Fire Pump House & Water Tank (Bldg. 228)	$410		$11,250	$11,660		$2,890	$0			
Area 1 Locomotive Fueling	$500	$0	$10,100	$10,600	$6,250	n/a	n/a			
Legacy Area 2		Jan 2019 - siding not Galbestos		**$134,292**	**$82,785**	**$211,643**	**$0**	**$2,650**	$221,419	$214,293
Area 2 Service Shop (Bldg. 201)	$2,200	$0	$38,990	$41,190	$37,334	$118,508	$0			
Area 2 Truck Storage (Bldg. 202)	$2,000	$0	$9,175	$11,175	$13,988	$4,230	$0			
Area 2 Cold Storage (204)	$697	$0	$13,080	$13,777	$14,100	$4,230	$0			
Area 2 Shop Locomotive Service Shop (Bldg. 203)	$3,400	$0	$12,300	$15,700	$11,113	$67,695	$0			
Area 2 Locomotive Fueling	$2,000	$0	$11,800	$13,800	$6,250	$3,200	$0			
Hose House (Bldg. 209) Not to be used in project		$0	$9,150	$9,150		$3,200	$0	$850		
Sample House (Bldg. 208) Not to be used in project		$0	$20,300	$20,300		$6,350	$0	$950	main plan areas inc tunnels	
Reporting Building (Bldg. 425) Not to be used in project		$0	$9,200	$9,200		$4,230	$0	$850	$20,286,716	$4,480,820

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

	Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)					Mavo 2019 (Attachment C)		Arrowhead Consulting & Testing 2019 (Attachment B)	1.02	
Scope of Work Description	**Universal Waste Collection**	**Galbestos Removal**	**Demolition**	**Total Demo**	**Site Restoration**	**Asbestos Lead Paint Mold**	**Universal Waste Removal & Disposal**	**Pre Demo Insp**	**Demo To Rollup (Escalation Factor Above Applied)**	**Abatement To Rollup**
Legacy Plant Area				**$13,305,631**	**$3,223,306**	**$3,525,725**	**$0**	**$2,200**	$16,528,937	$3,527,925
Rebuild Shop (Bldg 602)	$3,000	$70,200	$125,600	$198,800	$27,560	$111,922	$0			
General Shop (Bldg. 601) Includes Acetylene Building (Bldg.604)	$15,000	$199,190	$353,600	$567,790	$182,300	$330,903	$0			
Carpenter Shop (Bldg. 603)	$2,000	$10,200	$13,250	$25,450	$3,300	$3,350				
Coarse Crusher	$10,000	$313,345	$1,551,800	$1,875,145	$593,890	$1,186,298				
Drive House 1 conv and housings	$7,500	$165,569	$141,540	$314,609	$46,900	inc in above				
Drive House 2 inc conv and housings		inc in above	inc in above	inc in above	inc in above	incl in Fine Crusher				
Fine Crusher	$45,000	$302,430	$1,373,460	$1,720,890	$203,400	$1,049,652				
Warehouse 49 (Bldg. 920)	$6,500	$27,586	$82,800	$116,886	$15,947	$46,087	$0			
Warehouse 45 (Bldg. 921, Electrical)	$2,500	$35,159	$72,700	$110,359	$15,947	$10,846	$0			
Lube House (Bldg. 926)	$578	$17,000	$20,550	$38,128	$7,385	$40,377	$0			
Rubber Shop (Bldg. 605)	$1,000	$30,464	$36,550	$68,014	$11,269	$18,689				
Concentrator Building and Thickeners	$100,000	$1,248,260	$5,895,850	$7,244,110	$1,145,998	$688,635				
A-Lab	$500	$9,400	$14,560	$24,460	$2,940	inc in Concentrator				
Hinsdale Bridge	$0	$16,700	$616,300	$633,000	$15,200	n/a				
Water Reservoir	$5,000		$98,100	$103,100	$914,400	n/a				
Plant Site Water Tower			$30,000	$30,000	$2,500	n/a				
Water Treatment Plant & Storage Tanks	$1,000	$20,000	$72,600	$93,600	$2,250	$25,466	$0			
Colby Pump House (potential deduct depends on variance request)		$41,000	$8,260	$49,260	$1,500	$3,350		$1,000	$50,760	$4,350
Ad Building inc UST	$3,900		$157,935	$161,835	$18,200	$892,500			$180,035	$892,500
Main Gate	$100		$11,400	$11,500	$875	$6,750		$900	$12,375	$7,650
Booster Pump House #1	$300		$23,500	$23,800	$9,200	inc in Concentrator			$248,033	$904,500
Sewage Treatment Plant	$0		$62,700	$62,700	$19,520	$6,750		$900		
Portable Pump Houses	$0		$9,890	$9,890	$3,400	n/a				
Return Water Barge	$0		$44,900	$44,900		$6,750		$1,300		
General Infrastructure (railroads, tunnels, roadways, etc)					$1,504,000				$1,504,000	
Legacy Railroads	$0		$380,000	$380,000					$387,600	
Legacy Tunnels	$0		$1,856,000	$1,856,000		$926,570			$1,856,000	$926,570
Galleries						inc in Concentrator				
Sanitary Systems and Wells			$17,500	included in associated areas						
Pipelines					$591,000				$2,936,580	
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					$99,766	
Legacy Roads/Parking Lots	$0		$465,000	$465,000	$195,000				$673,200	

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

	Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)					Mavo 2019 (Attachment C)		Arrowhead Consulting & Testing 2019 (Attachment B)	1.02	
Scope of Work Description	**Universal Waste Collection**	**Galbestos Removal**	**Demolition**	**Total Demo**	**Site Restoration**	**Asbestos Lead Paint Mold**	**Universal Waste Removal & Disposal**	**Pre Demo Insp**	**Demo To Rollup (Escalation Factor Above Applied)**	**Abatement To Rollup**
New - Phase 1 - Plant Site				$2,190,000	$689,000					
Flotation Plant and Reagent Building	$75,000		$621,800	$696,800	$147,600				$861,288	
Concentrate Storage and Loadout Facility	$12,000		$273,760	$285,760	$48,100				$340,537	
Plant Site Sewage Treatment Plant	$1,000		$118,000	$118,000	$30,000				$150,960	
Railroads	$0		$185,000	$185,000	$111,000				$301,920	
Pipelines	$0		$1,555,000	$1,555,000	$375,000				$1,968,600	
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					$249,900	used long term
New - Phase 1 - Mine Site										
Maintenance Service and Fueling Facility	$1,100		$19,210	$20,310	$7,300				$28,162	
Rail Transfer Hopper	$1,100		$40,000	$41,100	$45,000				$87,822	
Rail Transfer Hopper Control Bldg	$100		$18,600	$18,700					$19,074	
Rail Transfer Hopper Platform			$60,000	$60,000					$61,200	
Central Pumping Station	$500		$14,000	$14,500	$1,200				$16,014	
Railroads	$0		$45,000	$45,000	$33,750				$80,325	
Pipelines	$0		$580,133	$580,133	$217,000				$813,076	
Power Lines	$0		$83,900	$83,900	$0				$85,578	
Roads and Parking Lots	$0		$392,000	$392,000	$132,000				$534,480	
Mine Site Wastewater Treatment Facility (WWTF)	$0		$498,000	$498,000	$14,000				$522,240	
New - Phase 2				$10,735,100	$97,375					
Reagent Building	$15,000		$820,000	$835,000	$4,100					
Oxygen Plant	$65,000		$4,238,600	$4,303,600	$16,600					
Limestone Preparation	$7,500		$345,000	$352,500	$1,750					
Hydrometallurgical Plant	$49,000		$4,365,000	$4,414,000	$13,500					
Hydrometallurgical Reagents	$15,000		$815,000	$830,000	$2,200					
Railroads	$0									
Pipelines	$0		$1,450,000							
Power Lines	$0									
Roads and Parking Lots	$0		$156,000		$59,225					

Demo Estimate for Above Ground Storage Tanks from Lakehead Rachel

Heavy Border with Bold Amounts are used in Reclamation Estimates						Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)				
Name	**Tank #**	**Fluid**	**Gallons**	**Location**	**Fluid Removal/ Disposal**	**Demolition/ Removal**	**Site Restoration**	**Asbestos Lead Paint**	**Assets Recovery**	**Notes**
Legacy - Area 1 Shop					$0	$36,570	$3,060	$0	$4,500	
Storage Tank	80		20,000	Area 1 - South of Rail Road Grade		$1,020				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	T500		20,000	N of Area 1 Shop		$7,650	$1,020		$1,500	
Black Tank	T501		20,000	N of Area 1 Shop		$7,650	$1,020		$1,500	
3 Blue	T502		20,000	N of Area 1 Shop		$7,650	$1,020		$1,500	Out of Service. Disconnected, Labeled "save for conc."
Storage Tank	T503	Grease	70	N of Area 1 Shop		$300				Added -Mar 2019
Storage Tank	T504	Grease	70	N of Area 1 Shop		$300				Added -Mar 2019
Storage Tank	9761A	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761B	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761C	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761D	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761E	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761F	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761G	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761H	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761I	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761J	Anti-Freeze	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Legacy - Area 2 Shop					$0	$7,500	$0	$0	$1,000	
Locomotive Fueling	92	# 1,2 Fuel Oil	20,000	Area 2		$7,500			$1,000	
Legacy - Plant Area					$0	$239,102	$26,214	$0	$126,000	
Storage Tank	15	# 1,2 Fuel Oil	12,000	E. Side Concentrator		$612				
Storage Tank	32	# 2, 6 Fuel Oil	3,384,000	Tank Farm		$63,240	$8,262		$40,000	
Storage Tank	033	# 6 Fuel Oil	3,384,000	Tank Farm		$63,240	$8,262		$40,000	
Storage Tank	034	# 6 Fuel Oil	3,384,000	Tank Farm		$63,240	$8,262		$40,000	
Storage Tank	304	Mineral Oil	12,000	E. Side Concentrator		$612				
Storage Tank	305	Mineral Oil	12,000	E. Side Concentrator		$612				
Storage Tank	306	Mineral Oil	12,000	E. Side Concentrator		$612				
Storage Tank	408	Lube oil	20,000	SW of Tailings Basin Reporting Area		$7,500			$1,000	Out of Service, but piping still in place and no signs are posted
Storage Tank	421	Alcohol	10,000	E side Concentrator		$510				
WTP Backwash (green)			16,000	NE of Drivehouse 1		$5,100	$714		$1,000	
Tank (white)	TB-8		14,000	SE of Tailings Basin Reporting Area		$5,100	$714		$1,000	Out of Service. Disconnected, no visible labels
Dispensing Tanks at Main Gate	121	Gasoline	6,000	See gas station dwg's for reference		$612				
Dispensing Tanks at Main Gate	122	Gasoline	6,000	See gas station dwg's for reference		$612				
Storage Tank	83	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	84	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	85	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	TB-1	Poly-Z	1,000	Tailings Basin		$1,000				Added -Mar 2019
Storage Tank	CR-1	Lube oil	785	Fine Crusher		$1,200				Added -Mar 2019
Storage Tank	CR-2	Oil	480	Fine Crusher		$1,200				Added -Mar 2019
Storage Tank	CR-3	Lube oil	785	Lube House		$1,600				Added -Mar 2019

Demo Estimate for Above Ground Storage Tanks from Lakehead Rachel

Heavy Border with Bold Amounts are used in Reclamation Estimates						Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)				
Name	**Tank #**	**Fluid**	**Gallons**	**Location**	**Fluid Removal/ Disposal**	**Demolition/ Removal**	**Site Restoration**	**Asbestos Lead Paint**	**Assets Recovery**	**Notes**
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										
Portable tank on skids (silver)	048	Fuel Oil	1,800	E of Area 1 Shop						
Storage Tank	506	Fuel Oil	500	Heating Plant						
Locomotive Fueling		# 1,2 Fuel Oil		West end of Panel Yard		-				
Blue		Waste oil		W side of Coarse Crusher						
Blue		Lube oil		NE cor. Fine Crusher						
White		Anti-Freeze		NW cor. Fine Crusher						
					Total	$283,172				

AST Tab

SW619 Landfill Cover Estimate - Barr 10/26/18 - Updated for 2019 via RS Means Construction Cost Index

Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Inflation Factor	Cost Extension	Comments
1	Contractor mobilization	LS	1	2016 cost estimates for final closure - SW-619 (2016-03-21)	$10,000	1.10	$11,023	
2	Closure plan	LS	1	2016 cost estimates for final closure - SW-619 (2016-03-21)	$25,000	1.10	$27,558	
3	Final grading	Acre	17	2016 cost estimates for final closure - SW-619 (2016-03-21)	$1,000	1.10	$18,740	See note 2.
4	Common fill (18 inches)	CY	41,140	2016 cost estimates for final closure - SW-619 (2016-03-21)	$3.00	1.10	$136,049	
5	Top soil (6 inches)	CY	14,000	2016 cost estimates for final closure - SW-619 (2016-03-21)	$10.00	1.10	$154,326	
6	Seeding	Acre	17	2016 cost estimates for final closure - SW-619 (2016-03-21)	$645	1.00	$10,965	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
6	ReSeeding (5% of area)	Acre	0.85	2016 cost estimates for final closure - SW-619 (2016-03-21)	$645	1.00	$548	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
7	Final stormwater controls	LS	1	2016 cost estimates for final closure - SW-619 (2016-03-21)	$10,000	1.10	$11,023	See note 3.
8	Final survey	LS	1	2016 cost estimates for final closure - SW-619 (2016-03-21)	$5,000	1.10	$5,512	
9	Construction certification	LS	1	2016 cost estimates for final closure - SW-619 (2016-03-21)	$15,000	1.10	$16,535	
10	Legal notices and deed restriction	LS	1	2016 cost estimates for final closure - SW-619 (2016-03-21)	$5,000	1.10	$5,512	
					Total		**$397,791**	

	2015	2019	
RS Means Construction Cost Index from Cost Index Ref tab	206.2	227.3	1.10

Notes:

1. Assumed the entire footprint will require a complete cover system
2. Assumed final grades of 10 to 15% can be achieved by grading alone and acreage remains the same
3. Stormwater controls include conventional berms conveyance and use existing pond(s)
4. Unit costs are approximate and based on 2015 costs

Power Line Details - Barr 10/26/18 - for 2019 escalate by 2% per 2/28/19 Lakehead email (Attachment A)
Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Inflation Factor	Cost Extension	Comments
1	Removal and recyling of power lines (poles, pole hardware, and conductors) and substations that will not remain as regional infrastructure	LF	20563		$1.01	1.02	$21,278	Foundations and anchors will be removed or demolished to at least ground surface and covered with at least two feet of soil and vegetated to achieve final reclamation.
					Total		**$21,278**	

Notes:

1. Per GIS, the total length of power line added to the Framework Agreement (20,563 feet).
2. The unit cost was determined from the Legacy FA lump sum for Power System by Lakehead ($97,810) divided by the total length (96,412.8 linear feet). The unit cost of the power line is $1.0145/LF.

Tailings Tunnel D-3 Details - Barr 10/26/18 - Updated for 2019 via RS Means Construction Cost Index

Heavy Border with Bold Amounts are used in Reclamation Estimates

PolyMet memo "Plant Site Utility Tunnel Closure Costs," dated October 22, 2018.

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Inflation Factor	Cost Extension	Comments
1	Quantity of asphalt/concrete/soil for off-site disposal - transportation cost	trips	1	See comments and notes	$415	1.02	$423	Haul cost for off-site disposal at Dem-Con Companies General Waste in Keewatin, assuming 25 tons/load. Transportation Cost from PTM Appendix 15.3, Attachment I2.
2	Quantity of asphalt/concrete/soil for off-site disposal - disposal cost	tons	12	See comments and notes	$22.00	1.02	$269	Cost allowance for off-site disposal. Assumes excavation/removal volume for 10' x 20' x 2' volume (includes the tunnel roof segment). Assumes average unit weight of 120 pcf. Approximate disposal cost based on PTM Appendix 15.3, Attachment I.
3	Place bulk-head at east end of tunnel	each	1	See comments and notes	$7,800	1.02	$7,954	Based on opening size of 9 ft. x 9 ft. and 12 inch thick bulk-head.
4	Backfill eastern 600 feet of D-3 tunnel with flowable fill	CY	1800	See comments and notes	$89	1.02	$162,445	Tunnel cross-sectional area is taken as 9 ft. x 9 ft. For cost basis, see RS Means 2017 03 31 13.5 4100.
5	Place soil cover at tunnel opening	CY	30	See comments and notes	$10.00	1.02	$306	Assumes cover volume of 10 times opening size and 4 feet average cover thickness. Unit cost is allowance for soil import, dumping, and spreading.
6	Seeding	acre	0.3	See comments and notes	$645	1.00	$194	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
6	ReSeeding (5% of area)	acre	0.015	See comments and notes	$645	1.00	$10	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
						Cost estimate subtotal	$171,600	
						Mobilization and administration (assumes 5% of subtotal)	$8,580	
						Cost estimate total	**$180,180**	

	2018	2019	
RS Means Construction Cost Index from Cost Index Ref tab	222.9	227.3	1.02

Notes:

1. All information obtained from memorandum to PolyMet, titled "Plant Site Utility Tunnel Closure Costs," dated October 22, 2018.

Historical Cost Indexes

The table below lists both the RSMeans® historical cost index based on Jan. 1, 1993 = 100 as well as the computed value of an index based on Jan. 1, 2019 costs. Since the Jan. 1, 2019 figure is estimated, space is left to write in the actual index figures as they become available through the quarterly *RSMeans Construction Cost Indexes*.

To compute the actual index based on Jan. 1, 2019 = 100, divide the historical cost index for a particular year by the actual Jan. 1, 2019 construction cost index. Space has been left to advance the index figures as the year progresses.

Year	Historical Cost Index Jan. 1, 1993 = 100		Current Index Based on Jan. 1, 2019 = 100		Year	Historical Cost Index Jan. 1, 1993 = 100	Current Index Based on Jan. 1, 2019 = 100		Year	Historical Cost Index Jan. 1, 1993 = 100	Current Index Based on Jan. 1, 2019 = 100	
	Est.	Actual	Est.	Actual		Actual	Est.	Actual		Actual	Est.	Actual
Oct 2019*					July 2004	143.7	63.2		July 1986	84.2	37.1	
July 2019*					2003	132.0	58.1		1985	82.6	36.3	
April 2019*					2002	128.7	56.6		1984	82.0	36.1	
Jan 2019*	227.3		100.0	100.0	2001	125.1	55.0		1983	80.2	35.3	
July 2018		222.9	98.1		2000	120.9	53.2		1982	76.1	33.5	
2017		213.6	94.0		1999	117.6	51.7		1981	70.0	30.8	
2016		207.3	91.2		1998	115.1	50.6		1980	62.9	27.7	
2015		206.2	90.7		1997	112.8	49.6		1979	57.8	25.4	
2014		204.9	90.1		1996	110.2	48.5		1978	53.5	23.5	
2013		201.2	88.5		1995	107.6	47.3		1977	49.5	21.8	
2012		194.6	85.6		1994	104.4	45.9		1976	46.9	20.6	
2011		191.2	84.1		1993	101.7	44.7		1975	44.8	19.7	
2010		183.5	80.7		1992	99.4	43.7		1974	41.4	18.2	
2009		180.1	79.2		1991	96.8	42.6		1973	37.7	16.6	
2008		180.4	79.4		1990	94.3	41.5		1972	34.8	15.3	
2007		169.4	74.5		1989	92.1	40.5		1971	32.1	14.1	
2006		162.0	71.3		1988	89.9	39.5		1970	28.7	12.6	
2005		151.6	66.7		1987	87.7	38.6		1969	26.9	11.8	

Adjustments to Costs

The "Historical Cost Index" can be used to convert national average building costs at a particular time to the approximate building costs for some other time.

Example:

Estimate and compare construction costs for different years in the same city.

To estimate the national average construction cost of a building in 1970, knowing that it cost $900,000 in 2019:

INDEX in 1970 = 28.7

INDEX in 2019 = 227.3

Time Adjustment Using the Historical Cost Indexes:

$$\frac{\text{Index for Year A}}{\text{Index for Year B}} \times \text{Cost in Year B} = \text{Cost in Year A}$$

$$\frac{\text{INDEX 1970}}{\text{INDEX 2019}} \times \text{Cost 2019} = \text{Cost 1970}$$

$$\frac{28.7}{227.3} \times \$900{,}000 = .126 \times \$900{,}000 = \$113{,}400$$

The construction cost of the building in 1970 was $113,400.

Note: The city cost indexes for Canada can be used to convert U.S. national averages to local costs in Canadian dollars.

Example:

To estimate and compare the cost of a building in Toronto, ON in 2019 with the known cost of $600,000 (US$) in New York, NY in 2019:

INDEX Toronto = 110.1

INDEX New York = 132.1

$$\frac{\text{INDEX Toronto}}{\text{INDEX New York}} \times \text{Cost New York} = \text{Cost Toronto}$$

$$\frac{110.1}{132.1} \times \$600{,}000 = .834 \times \$600{,}000 = \$500{,}076$$

The construction cost of the building in Toronto is $500,076 (CN$).

*Historical Cost Index updates and other resources are provided on the following website:
http://info.thegordiangroup.com/RSMeans.html

Attachments to Legacy Reclamation Estimate:

Attachment A - Lakehead Constructors 2/18/19 email

Gmail James Scott <jrscotthl@gmail.com>

FW: Additional Tanks for the Financial Assurance estimate

1 message

Michael Glissman <mglissman@polymetmining.com> Thu, Feb 28, 2019 at 12:47 PM
To: Christie Kearney <ckearney@polymetmining.com>
Cc: James Scott <jrscotthl@gmail.com>

Here is the update from Lakehead / Rachel on the site demo and tank demo.

I had to update our spreadsheet with the 2% escalation.

Use this email as a supporting document for the 2% increase.

From: Bradley Jones <bjones@lakeheadconstructors.com>
Sent: Wednesday, February 27, 2019 1:18 PM
To: Michael Glissman <mglissman@polymetmining.com>
Subject: RE: Additional Tanks for the Financial Assurance estimate

Mike,

I've attached the updated tank spreadsheet, also, I've spoken with Don Ritsen and we are in agreement that you are free to increase the costs on the site closure work by 2%.

Let me know if you have any other questions.

Sincerely,

Bradley Jones

Sr. Estimator

Lakehead Constructors

715-395-2686

218-409-4040

From: Michael Glissman <mglissman@polymetmining.com>
Sent: Monday, February 25, 2019 9:50 AM
To: Bradley Jones <bjones@lakeheadconstructors.com>
Cc: Michael Glissman <mglissman@polymetmining.com>
Subject: Additional Tanks for the Financial Assurance estimate

Brad-

Attached is an updated spreadsheet for the Above Ground Storage Tanks (AST's) at the PolyMet site. It includes additional tanks that were added to the list last year, the new tanks are highlighted in yellow.

I am also including some figures that show you the locations of the new tanks. Most of them are smaller tanks and all are outdoors and easily accessible.

Please update this spreadsheet with the Demo/Removal numbers. I don't believe that any of these tanks will require Site Restoration.

Would like these updates along with your other updates by Wednesday.

Thank you

Mike

Michael Glissman

Project Engineer – Existing Facilities

Mobile: 218-750-2991 | Office: 218-471-2150 | Direct: 218-471-2175

mglissman@polymetmining.com | www.polymetmining.com

Copy of ASTs in FA Estimate with tanks added in Mar 2019.xlsx
49K

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	$36,100	$3,000	$0		
Storage Tank	80		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	T500		20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	
Black Tank	T501		20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	
3 Blue	T502		20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	Out of Service. Disconnected, Labeled "save for conc."
Storage Tank	T503	Grease	70	N of Area 1 Shop		$300				Added -Mar 2019
Storage Tank	T504	Grease	70	N of Area 1 Shop		$300				Added -Mar 2019
Storage Tank	9761A	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761B	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761C	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761D	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761E	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761F	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761G	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761H	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761I	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761J	Anti-Freeze	561	N of Area 1 Shop		$1,200				Added -Mar 2019
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	92	# 1,2 Fuel Oil								
Legacy - Plant Area					$0	$199,500	$25,700	$0		
Storage Tank	15	# 1,2 Fuel Oil	12,000	E. Side Concentrator		$600				
Storage Tank	32	# 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				
WTP Backwash (green)			16,000	NE of Drivehouse 1		$5,000	$700.00		$1,000.00	
Tank (white)	TB-8		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				
Storage Tank	83	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	84	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	85	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	TB-1	Poly-Z	1,000	Tailings Basin		$1,000				Added -Mar 2019
Storage Tank	CR-1	Lube oil	785	Fine Crusher		$1,200				Added -Mar 2019
Storage Tank	CR-2	Oil	480	Fine Crusher		$1,200				Added -Mar 2019
Storage Tank	CR-3	Lube oil	785	Lube House		$1,600				Added -Mar 2019

Attachment B - Arrowhead Consulting and Testing 2/28/19 email

FW: FA Update: Arrowhead

1 message

Michael Glissman <mglissman@polymetmining.com> Thu, Feb 28, 2019 at 12:31 PM
To: Christie Kearney <ckearney@polymetmining.com>
Cc: James Scott <jrscotthl@gmail.com>

Chrisite-

I believe that I have everything updated, so I'm going to start forwarding the spreadsheets and supporting documents to you.

Here is the response from Arrowhead in regard to the pre-abatement inspections. Pricing is still valid.

From: Linda Thiry <thirylt@netzero.com>
Sent: Friday, February 15, 2019 9:57 AM
To: Michael Glissman <mglissman@polymetmining.com>
Subject: Re: FA Update: Arrowhead

The costs are still valid.

Linda

Sent from my iPhone

On Feb 15, 2019, at 8:26 AM, Michael Glissman <mglissman@polymetmining.com> wrote:

> Linda-
>
> Please review your building inspection proposals from 2016 (attached), and let me know what the current costs to inspect these buildings would be based upon 2019 rates. We are required to provide annual cost updates to our facility demolition costs as part of the Permit to Mine Financial Assurance conditions. If I could have the updates by February 27th, that would be fantastic. If you don't foresee any changes, then let me know that as well.

We have not performed any abatement on these buildings yet, but there is a good chance that we will need to this year, so I will be contacting you to perform the actual inspections at some point this summer (depending on financing, etc.). It would most likely be the buildings below.

Building 231 – Reporting Building $850.00

Sewage Treatment Plant $900.00

The Barge (Return Water Barge) $1300.00

Building 724 $900.00

Building 718 $1100.00

Building 719 $1100.00

Building 725 $850.00

Building 720 (Lube House) $850.00

Building 709 (Colby Lake Pump House) $1000.00

Thank you

Mike

Michael Glissman

Project Engineer – Existing Facilities

Mobile: 218-750-2991 | Office: 218-471-2150 | Direct: 218-471-2175

mglissman@polymetmining.com | **www.polymetmining.com**

<Att D2 - Additional Miscellaneous Building - Asbestos Inspection (June 2016).pdf>

<Att D1 - Miscellaneous Building - Asbestos Inspection (May 2016).pdf>

Attachment C - Mavo 3/25/19 email

MAVO SYSTEMS®

AN ASRC INDUSTRIAL SERVICES COMPANY

March 25, 2019

Michael Glissman
Project Engineer – Existing Facilities
PolyMet Mining

RE: Financial Assurance Package – confirmation of totals

Mr. Glissman

Per your request, I have reviewed the attached table and can confirm that this is the current pricing effective for 2019 regarding the Polymet site remedial cleanup. All pricing has been updated to reflect wage, rental and miscellaneous cost escalations to date for the project in the coming year.

If there is additional inforamtion needed, do not hesitate to contact me with those requests.

Sincerely,

John Kraskey

John Kraskey
Project Manager
Mavo Systems, Inc.

Corporate Office:
4330 Centerville Road
White Bear Lake, MN 55127

763.788.7713
763.788.9560 fax
1.888.788.4378

Duluth Office:
2385 Becks Road
Duluth, MN 55810

218.626.1586
218.626.1384 fax

Rochester Office:
3030 Prow Lane NW
Rochester, MN 55901

507.281.4345
507.281.4351 fax

Wausau Office:
4455 Stewart Avenue
Wausau, WI 54401

715.849.9754
715.849.9759 fax

www.mavo.com

POLYMET				
2019 Update				
Description	**Price**	**Universal Waste Portion**	**Total less Universal Waste**	**Note**
Coarse Crusher	$1,186,299		$1,186,299	
Fine Crusher	$1,049,652		$1,049,652	
Service Tunnels	$113,224		$113,224	adjusted for amount already invoiced
Electric Tunnels	$813,346		$813,346	adjusted for amount already invoiced
Concentrator	$688,635		$688,635	adjusted for amount already invoiced
Area 1 Buildings	$248,349	$133,045	$115,304	
Area 2 Buildings	$303,769	$92,125	$211,644	
General Shops	$371,088	$40,185	$330,903	
Rebuild Shop	$125,092	$13,170	$111,922	
Lube House	$45,227	$4,850	$40,377	
Rubber Shop	$18,689		$18,689	
Warehouse 45	$12,236	$1,390	$10,846	
Warehouse 49	$51,632	$5,545	$46,087	
Water Treatment Plant	$28,236	$2,770	$25,466	
Tailings Basin Buildings	$25,846	$4,321	$21,525	
Carpenter Shop (Bldg. 603)	$3,350		$3,350	
Colby Pump House	$3,350		$3,350	
Administration Building	$892,500		$892,500	
Main Gate	$6,750		$6,750	
Sewage Treatment Plant	$6,750		$6,750	
Return Water Barge	$6,750		$6,750	
Project Total	$6,000,771	$297,401	$5,703,370	

Attachment D1 - NTS Estimates for AOC Remediation

Environmental Science & Engineering

To: PolyMet Mining

From: NTS, Jenny M. Holmes

Date: February 22, 2019

Re: Summary of Legacy Remediation Estimated Costs

Estimated costs associated with legacy remediation areas of concern (AOC) have been updated to reflect current rates for consulting, laboratory, and contractor services. The methods used in determining investigation and remediation planning in 2013 were not updated. Documents and / or files used in production of the FY19 Legacy Remediation AOC Summary are presented below followed by rationale for our decision process.

1. 2013, October separate and summary .xls files for 23 AOC which included rates for consulting, laboratory, and contractor services. Initial estimated total of $6,672,000.
2. 2014, October 17 Bunker C Tank Farm Removal Estimate which presented $915,000 in remediation costs for AOC 042.
3. 2015, May .xls file which presented 24 AOC by adding AOC 042 Bunker C Tank Farm with remediation costs of $41,180. Additionally, AOC 059 Colby Lake Pumping Station was adjusted to reflect a change in costs associated with the assumption that mercury contamination would need remediation, increasing total cost to $101,270.
4. 2016, March .xls files which present 23 AOC (not 24). AOC 037 was adjusted by removing additional sampling leaving only Phase I costs ($7500). AOC 046 was adjusted by removing vapor mitigation costs of depressurizing and sealing floor cracks reducing total to $901,294. AOC 059 was not adjusted and reflects no change from 2013 at $28,500.
5. 2018, November 1 .pdf Permit to Mine NorthMet Approval, Minnesota Department of Natural Resources, Appendix A – p.6, Legacy Remediation –AOC costs from detailed spreadsheets by NTS [2016]. There may be a transcription error associated with AOC 035 which shows a total of $62,600, NTS 2016 .xls estimate was $66,100. Additionally, AOC 042 is included for a total of 24 AOC; however, AOC 059 remains $28,500.
6. In summary, a FY19 Legacy Remediation AOC Summary was sent under separate cover which presents our understanding of costs that have been published to date with FY19 adjustments for a total of $7,081,353.

Legacy Remediation Areas of Concern Cost Summary
February 20, 2019

Item Number	Area of Concern Number	Site Name	Estimated Costs (2019)				Estimated Total (2019)	Estimated Total (2016)	Estimated Total (2013)	Total Adjustment
			Phase I ESA	Limited Phase II	Complete Phase II	Remediation				
1	AOC 001	Area 1 Shops	$ 1,304	$ 230,476	$ 267,976	$ 407,798	$ 907,554	$ 831,730	$ 831,730	$ 75,824
2	AOC 006	Oil Waste Disposal Area	$ 1,304	$ 52,320	$ 96,300	$ 73,620	$ 223,544	$ 234,410	$ 234,410	$ (10,866)
3	AOC 007	Bull Gear Disposal	$ 1,304	$ 39,724			$ 41,028	$ 43,100	$ 43,100	$ (2,072)
4	AOC 009	Railroad Panel Yard	$ 1,304		$ 25,400	$ 1,379,871	$ 1,406,575	$ 1,375,407	$ 1,375,407	$ 31,168
5	AOC 010	Airport	$ 1,304	$ 30,040	$ 58,650	$ 62,540	$ 152,534	$ 154,500	$ 154,500	$ (1,966)
6	AOC 011	Stoker Coal Ash Disposal	$ 1,304	$ 32,806	$ 45,934	$ 255,594	$ 335,638	$ 321,668	$ 321,668	$ 13,970
7	AOC 013	2001 Storage Area	$ 1,304	$ 30,040	$ 58,650		$ 89,994	$ 94,260	$ 94,260	$ (4,266)
8	AOC 014	Sandblasting and Large Equipment Painting Area	$ 1,304	$ 63,381	$ 33,321	$ 52,470	$ 150,476	$ 138,326	$ 138,326	$ 12,150
9	AOC 035	Dunka Water Treatment Plant Sludge	$ 1,304	$ 21,572	$ 38,036		$ 60,912	$ 66,100	$ 66,100	$ (5,188)
10	AOC 037	Line 9 Area 5 Petroleum Contaminated Soil	$ 1,304				$ 1,304	$ 7,500	$ 27,800	$ (6,196)
11	AOC 038	Area 2 Shops	$ 1,304		$ 257,356	$ 187,372	$ 446,032	$ 421,906	$ 421,906	$ 24,126
12	AOC 040	Heavy Duty Garage	$ 1,304	$ 22,121	$ 40,571		$ 63,996	$ 68,500	$ 68,500	$ (4,504)
13	AOC 042	Bunker C Tank Farm				$ 944,723	$ 944,723	$ 915,000	$ -	$ 29,723
14	AOC 043	Administration Building	$ 1,304	$ 21,760			$ 23,064	$ 28,100	$ 28,100	$ (5,036)
15	AOC 044	Main Gate Fueling Area	$ 1,304	$ 16,914	$ 34,818	$ 32,464	$ 85,500	$ 83,600	$ 83,600	$ 1,900
16	AOC 046	Plant Site and General Shops	$ 1,304	$ 63,632	$ 202,480	$ 665,273	$ 932,689	$ 901,294	$ 1,639,294	$ 31,395
17	AOC 047	Tailings Basin Reporting	$ 1,304				$ 1,304	$ 7,500	$ 7,500	$ (6,196)
18	AOC 048	Booster Pump House with Transformer	$ 1,304	$ 21,743	$ 39,133		$ 62,180	$ 67,100	$ 67,100	$ (4,920)
19	AOC 049	Coarse Crusher Petroleum Contaminated Soil	$ 1,304	$ 16,651	$ 35,029		$ 52,984	$ 59,300	$ 59,300	$ (6,316)
20	AOC 051	Tailings Basin Salvage and Scrap Areas	$ 1,304	$ 90,465	$ 25,500	$ 477,174	$ 594,443	$ 521,502	$ 521,502	$ 72,941
21	AOC 052	Cell 2W Salvage Area	$ 1,304	$ 22,061			$ 23,365	$ 28,500	$ 28,500	$ (5,135)
22	AOC 053	Hornfels Burial	$ 1,304				$ 1,304	$ 7,500	$ 7,500	$ (6,196)
23	AOC 059	Colby Lake Pumping Station	$ 1,304	$ 22,063			$ 23,367	$ 28,500	$ 28,500	$ (5,133)
24	AOC 061	Pellet Plant	$ 1,304	$ 112,228	$ 65,604	$ 264,183	$ 443,319	$ 423,397	$ 423,397	$ 19,922
Totals:			$ 30,000	$ 909,997	$ 1,324,758	$ 4,803,082	$ 7,067,837	$ 6,828,700	$ 6,672,000	$ 239,137

Site Name: Area 1 Shops
Area of Concern Number: AOC 01 **Date Updated:** 02/21/19
Total acres: 3 to 5 acres
Chemicals of Concern: VOC, SVOC, GRO, DRO, RCRA metals, PCB
Site Summary: Primary maintenance and storage buildings for western mining area and included locomotive and mining equipment fueling

Task Description	Estimated Costs	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 60,000	
Laboratory Costs	$ 114,476	
Contractor Costs	$ 56,000	**$ 230,476**
Complete Phase II Investigation		
Consultant Costs	$ 97,500	
Laboratory Costs	$ 114,476	
Contractor Costs	$ 56,000	**$ 267,976**
Remediation Costs		
Consultant Costs	$ 81,300	
Laboratory Costs	$ 32,708	
Contractor Costs	$ 293,790	**$ 407,798**
TOTALS	**$ 907,554**	

Comments:

Assumptions:

Depth to groundwater	greater than 20-feet
Nearest surface water	none
Identified Vapor receptors	none

Implementation of SAP

Consultant costs will include	Field Work	20 days
	Reporting	Limited Phase II
	Project Coordination	
Laboratory Costs		
	Soil	170 soil samples all COC
	Groundwater	75 water samples all COC
Contractor costs	Drilling	20 days

Complete Phase II Investigation

Consultant costs will include	Field Work	30 days
	Reporting	Phase II Investigation and Response Action Plan
	Project Coordination	
Laboratory Costs		
	Soil	170 soil samples all COC
	Groundwater	75 water samples all COC
Contractor costs	Drilling	20 days

Remediation Costs

Will remediation be required? yes

Risk Criteria

Direct Exposure		Likely
Groundwater	10 to 20 feet.	Groundwater contamination likely. GW discharge to wetlands/ponds nearby.
Surface Water		Ponds and wetland adjacent to site
Vapor Intrusion		Several on-site buildings

Remediation Assumptions

1. Transformer areas will be excavated to 4-feet, and disposed as hazardous waste. COC is PCBs. Total volume is estimated at 90 cubic yards.
2. Excavation of soils along outfall lines, and disposed as Solid waste. COC are VOCs/DRO/GRO. Total volume is estimated at 1,500 cubic yards
3. Surface excavations, related to general industrial use exceedances Total volume is estimated at 1,500 cubic yards
4. Groundwater remediation may be necessary, however the need of this and the cost are unable to be determined at this time.

Remediation Costs

	Cubic Yards		Rate		Totals
Excavation	3090	$	10	$	30,900
Trucking and Disposal					
Hazardous Waste	90	$	300	$	27,000
Solid Waste				$	-
Trucking	3000	$	17	$	51,000
Disposal	3000	$	40	$	120,000
Backfill	3090	$	21	$	64,890
				$	293,790
	Number of Samples				
Laboratory	70	$	467	$	32,708

Site Name: Oily Waste Disposal Area
Area of Concern Number: AOC 006
Total acres: 3 to 5 acres
Chemicals of Concern: DRO, GRO, VOC, RCRA Metals, PAH, PCB
Site Summary:

Oily waste from floor drains from the General Shops area was dumped at the land surface.

Task Description	Estimated Costs		
Phase I ESA/SAP	$ 1,304		
Implementation of SAP			
Consultant Costs	$ 26,000		
Laboratory Costs	$ 15,120		
Contractor Costs	$11,200	**$**	**52,320**
Complete Phase II Investigation			
Consultant Costs	$ 36,100		
Laboratory Costs	$ 37,800		
Contractor Costs	$22,400	**$**	**96,300**
Remediation Costs			
Consultant Costs	$ 29,700		
Laboratory Costs	$ 15,120		
Contractor Costs	$28,800	**$**	**73,620**
TOTALS	**$ 223,544**		

Comments: Assumes that direct exposure is the only risk pathway. Remediation includes hot spot excavation and disposal.

AOC-006 Implementation of SAP Surface soil grid sampling on 5 acre site = approximately 8 samples per acre

Consultant costs

	quantity		avg rate	
Field Work	50	hrs	$110	$5,500
Reporting	100	hrs	$120	$12,000
Project Management	30	hrs	$150	$4,500
Direct Costs				$4,000
				$26,000

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
	40	40	40	40	40	40
Unit cost	$89	$26	$26	$68	$63	$105
Unit total	$3,570	$1,050	$1,050	$2,730	$2,520	$4,200

$15,120

Contractor Costs

Geoprobe	Rate per Day	Number of Days	
Days	2800	4	$11,200
			$11,200

AOC-006 Phase II with Risk Assessment Infill sampling around defined releases. Assume 10 separate hot spots

Consultant costs

	quantity		avg rate	
Field Work	60	hrs	$110	$6,600
Reporting	150	hrs	$120	$18,000
Project Management	50	hrs	$150	$7,500
Direct Costs				$4,000
				$36,100

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
	100	100	100	100	100	100
Unit cost	$89	$26	$26	$68	$63	$105
Unit total	$8,925	$2,625	$2,625	$6,825	$6,300	$10,500

$37,800

Contractor Costs

	Rate per Day	Number of Days	
Geoprobe Days	2800	8	$22,400
			$22,400

AOC-006 Remediation Assume excavation of 4 hotspots with verification sampling.

Consultant costs

	quantity		avg rate	
Reporting	60	hrs	$120	$7,200
Excavation oversight	100	hrs	$110	$11,000
Project Management	50	hrs	$150	$7,500
Direct Costs				$4,000
				$29,700

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
	40	40	40	40	40	40
Unit cost	$89	$26	$26	$68	$63	$105
Unit total	$3,570	$1,050	$1,050	$2,730	$2,520	$4,200

$15,120

Contractor Costs

	Mobilization	$2,000	lump	1	$2,000
	Excavation	$10	cubic yard	400	$4,000
Based on 400 cubic yards waste and disposal	Hauling	$17	cubic yard	400	$6,800
at Canyon, MN	Disposal	$40	cubic yard	400	$16,000
					$28,800

Site Name:	Bull Gear Disposal
Area of Concern Number:	AOC 007
Total acres:	~1 to 2 acres
Chemicals of Concern:	PAH and RCRA metals
Site Summary:	This area reportedly received a one-time disposal of bull gear grease (a heavy lubricant) in the 1970s. No visible signs of the disposal were observed during site reconnaissance in 2002 or on air photos reviewed during the initial investigation.

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 19,200	
Laboratory Costs	$ 9,324	
Contractor Costs	$ 11,200	**$ 39,724**
Complete Phase II Investigation		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	
Remediation Costs		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	
TOTALS	$ 41,028	

Comments:

Assumptions:

Depth to groundwater	greater than 20 feet	
Nearest surface water	approximately 1300 feet SW	
Identified Vapor receptors	none	

Implementation of SAP

Consultant costs will include	Field Work	4 days
	Reporting	Limited Phase II
	Project Coordination	
Laboratory Costs		
	Soil	
		24 composite PAH, 24 cPAH SVOC samples, 24 RCRA metals
	Groundwater	none
Contractor costs	Drilling	4 days

Complete Phase II Investigation

Consultant costs will include	Field Work	-
	Reporting	-
	Project Coordination	
Laboratory Costs		
	Soil	-
	Groundwater	-
Contractor costs	Drilling	-

Remediation Costs

Will remediation be required? no

Risk Criteria

Direct Exposure	Possible.
Groundwater	The anticipated depth to groundwater is more than 20 feet below ground. Groundwater impacts are not anticipated.
Surface Water	The nearest surface water appears to be approximately 1300 feet to the southwest. It is unlikely that the surface water would have been impacted.
Vapor Intrusion	There do not appear to be any nearby structures that would be at risk for vapor intrusion.

Site Name: Railroad Panel Yard
Area of Concern Number: AOC 009
Total acres: approximately 22 acres
Chemicals of Concern: RCRA metals, DRO, PAH
Summary: Railroad panels (prefabricated sections of rail and ties) were constructed in this area. The site includes railroad ties, debris piles, and impacted soil.

Task Description	Estimated Costs	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	**$ -**
Complete Phase II Investigation		
Consultant Costs	$ 19,400	
Laboratory Costs	$ 400	
Contractor Costs	$5,600	**$ 25,400**
Remediation Costs		
Consultant Costs	$ 46,100	
Laboratory Costs	$ 6,664	
Contractor Costs	$1,327,107	**$ 1,379,871**
TOTALS	**$ 1,406,575**	

Comments: This estimate assumes that the only risk is from direct exposure; it is assumed that groundwater in the pond near the waste fill area is not impacted. There are no inhabitable buildings nearby; therefore, it is assumed that there is no risk of vapor intrusion.

Recognized Environmental Conditions	COC	Viable risk pathways	Remediation?
#1 Mercury Contaminated Soil	Mercury	Direct Exposure	Yes
#2 Leaded Grease Spill	Lead, DRO	Direct Exposure	Yes
#3 Waste Fill Area - Ash	RCRA Metals	Direct Exposure	Yes
#4 Waste Fill Area - Railroad Ties	Wood treated with creosote	Direct Exposure	Yes - Removal of ties only
#5 Non-Surficial Arsenic Release	Arsenic	Direct Exposure, Possibly Groundwater	Yes

AOC-009 Complete Phase II Investigation

Consultant costs

	quantity		avg rate	
Field Work	30	hrs	$110	$3,300
Reporting	30	hrs	$120	$3,600
Project Management, MPCA coordination	30	hrs	$150	$4,500
Direct Costs				$8,000
				$19,400

Laboratory Costs

	Total Arsenic	Dissolved Arsenic
#1 Mercury Contaminated Soil	-	-
#2 Leaded Grease Spill	-	-
#3 Waste Fill Area - Ash	-	-
#4 Waste Fill Area - Railroad Ties	-	-
#5 Non-Surficial Arsenic Release	12	8
Quantity	12	8
Unit cost	$20	$20
Unit total	$240	$160
	Lab total	**$400**

Contractor Costs

Contractor Costs Non-Surficial Arsenic Release Assumes 8 soil borings total (2 events with 4 borings each). Estimated depth of borings is 30 feet below ground.	Drilling	$2,800	day	2	$5,600
					$5,600

AOC-009 Remediation

Consultant costs

	quantity		avg rate	
Field Work	150	hrs	$110	$16,500
Reporting	80	hrs	$120	$9,600
Project Management, MPCA coordination	80	hrs	$150	$12,000
Direct Costs				$8,000
				$46,100

Laboratory Costs

	Mercury	TCLP Mercury	DRO	Lead	TCLP Lead	RCRA Metals	Total Arsenic	TCLP Arsenic
#1 Mercury Contaminated Soil	7	2						
#2 Leaded Grease Spill			10	10	2			
#3 Waste Fill Area - Ash						45		
#4 Waste Fill Area - Railroad Ties								
#5 Non-Surficial Arsenic Release							55	10
Quantity	7	2	10	10	2	45	55	10
Unit cost	$35	$60	$26	$20	$60	$89	$20	$60
Unit total	$245	$120	$263	$200	$120	$4,016	$1,100	$600

Lab total **$6,664**

Contractor Costs

Contractor Costs Mercury Contaminated Soil

Assumes remediation driven by field screening with Lumex,disposal as hazardous waste, and mercury levels <260 ppm. Excavation size is assumed to be 20 feet x 20 feet x 3 feet deep. Also assumes soil will be disposed in roll off containers of 20 cubic yards each.

Disposal	$280	ton	65	$18,200	
Hauling	$4,330	roll off box	3	$12,990	Note: Transport price
Roll Off Rental	$15	box, per day	21	$315	includes hauling, roll off
Liner Charge	$60	liner	3	$180	rental, liner charge, and
Demurrage	$100	hour	6	$600	demurrage.
Add'l Fuel Surcharge	26	% of transport price		$3,662	
				$35,947	

Contractor Costs Leaded Grease Spill

Assumes remediation is driven visually and by soils greater than 10 ppm using PID and disposal as hazardous waste. Excavation size is assumed to be 30 feet x 30 feet x 4 feet deep. Also assumes soil will be disposed in roll off containers of 20 cubic yards each.

Disposal	$280	ton	200	$56,000	
Hauling	$4,330	roll off box	7	$30,310	Note: Transport price
Roll Off Rental	$15	box, per day	49	$735	includes hauling, roll off
Liner Charge	$60	liner	7	$420	rental, liner charge, and
Demurrage	$100	hour	14	$1,400	demurrage.
Add'l Fuel Surcharge	26	% of transport price		$8,545	
				$97,410	

Contractor Costs Waste Fill Area - Ash

Estimate assumes excavation 450 feet x 60 feet x 4 feet deep. No hazardous waste. Disposal in CE landfill. No bottom verification samples; assumed arsenic impacted soil below.

Mobilization	$2,000	lump	1	$2,000	
Excavation	$10	cubic yard	4000	$40,000	
Hauling	$17	cubic yard	4000	$68,000	
Disposal	$1,100	day	4	$4,400	
				$114,400	

Contractor Costs Waste Fill Area - Railroad Ties

Assumes collection and disposal is necessary for ~200 railroad ties. No hazardous waste.

Mobilization	$2,000	lump	1	$2,000	
Loading	$10	cubic yard	50	$500	
Hauling	$17	cubic yard	50	$850	
Disposal	$40	cubic yard	50	$2,000	
				$5,350	

Contractor Costs Non-Surficial Arsenic Release

Assumes remediation driven by delineation using soil borings. Estimate assumes excavation 500 feet x 70 feet x 12 feet deep (beneath ash). No hazardous waste.

Mobilization	$2,000	lump	1	$2,000	
Excavation	$10	cubic yard	16000	$160,000	
Hauling	$17	cubic yard	16000	$272,000	
Disposal	$40	cubic yard	16000	$640,000	
				$1,074,000	

$1,327,107

Site Name: Airport
Area of Concern Number: AOC 10
Total acres: 5 to 10 acres
Chemicals of Concern: DRO, GRO, VOC, RCRA Metals, PAH, PCB
Site Summary:

Approximately 5 acres used for equipment teardown and salvage

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 14,900	
Laboratory Costs	$ 15,140	
Contractor Costs	$0	**$ 30,040**
Complete Phase II Investigation		
Consultant Costs	$ 20,800	
Laboratory Costs	$ 37,850	
Contractor Costs	$0	**$ 58,650**
Remediation Costs		
Consultant Costs	$ 18,600	
Laboratory Costs	$ 15,140	
Contractor Costs	$28,800	**$ 62,540**
TOTALS	**$ 152,534**	

Comments: Assumes that direct exposure is the only risk pathway. Remediation includes hot spot excavation and disposal.

AOC-10 Implementation of SAP Surface soil grid sampling on 5 acre site = approximately 8 samples per acre

Consultant costs

	quantity		avg rate	
Field Work	50	hrs	$110	$5,500
Reporting	30	hrs	$120	$3,600
Project Management	12	hrs	$150	$1,800
Direct Costs				$4,000
				$14,900

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
	40	40	40	40	40	40
Unit cost	$90	$26	$26	$68	$63	$105
Unit total	$3,600	$1,050	$1,050	$2,720	$2,520	$4,200

$15,140

Contractor Costs

None

AOC-10 Phase II with Risk Assessment Infill sampling around defined releases. Assume 10 separate releases

Consultant costs

	quantity		avg rate	
Field Work	60	hrs	$110	$6,600
Reporting	60	hrs	$120	$7,200
Project Management	20	hrs	$150	$3,000
Direct Costs				$4,000
				$20,800

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
	100	100	100	100	100	100
Unit cost	$90	$26	$26	$68	$63	$105
Unit total	$9,000	$2,625	$2,625	$6,800	$6,300	$10,500

$37,850

Contractor Costs

None

AOC-10 Remediation Assume excavation of 4 hotspots with verification sampling.

Consultant costs

	quantity		avg rate	
Reporting	60	hrs	$120	$7,200
Excavation oversight	40	hrs	$110	$4,400
Project Management	20	hrs	$150	$3,000
Direct Costs				$4,000
				$18,600

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
	40	40	40	40	40	40
Unit cost	$90	$26	$26	$68	$63	$105
Unit total	$3,600	$1,050	$1,050	$2,720	$2,520	$4,200

$15,140

Contractor Costs

	Mobilization	$2,000	lump	1	$2,000
	Excavation	$10	cubic yard	400	$4,000
Based on 400 cubic yards waste and disposal	Hauling	$17	cubic yard	400	$6,800
at Canyon, MN	Disposal	$40	cubic yard	400	$16,000
					$28,800

Site Name: Stoker Coal Ash Disposal
Area of Concern Number: AOC 11
Total acres: 5 to 10 acres
Chemicals of Concern: B, Mn, SO4, As, Li, Mo, Th
Site Summary:

Unlined landfill for coal ash generated at the heating plant between 1957 and 1989. Volume is unknown but assumed to be approximately 3000 cubic yards.

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 14,900	
Laboratory Costs	$ 3,906	
Contractor Costs	$14,000	**$ 32,806**
Complete Phase II Investigation		
Consultant Costs	$ 20,800	
Laboratory Costs	$ 2,734	
Contractor Costs	$22,400	**$ 45,934**
Remediation Costs		
Consultant Costs	$ 48,200	
Laboratory Costs	$ 4,394	
Contractor Costs	$203,000	**$255,594**
TOTALS	**$ 335,638**	

Comments: Assumes that groundwater is the predominant risk pathway. Remediation includes excavation disposal and groundwater monitoring

AOC-11 Implementation of SAP

Test pits to characterize waste and underlying soils, 12 temporary wells to determine groundwater impacts

Consultant Costs

	quantity		avg rate	
Field Work	50	hrs	$110	$5,500
Reporting	30	hrs	$120	$3,600
Project Management	12	hrs	$150	$1,800
Direct Costs				$4,000
				$14,900

Laboratory Costs

	B, Mn, As, Mo, Li, Th	SO4
Quantity	40	40
Unit cost	$84	$14
Unit total	$3,360	$546

Lab total **$3,906**

Contractor Costs

Contractor costs (Geoprobe drilling)	3 days geoprobe	3 days	$2,800	$8,400
Contractor costs (test pits)	1 day	1 day	$3,000	$3,000
Survey and volume				$2,600
				$14,000

AOC-11 Phase II with Risk Assessment

12 additional temporary wells to define extent of groundwater impacts and install 4 permanent wells with three monitoring events.

Consultant costs

	quantity		avg rate	
Field Work	60	hrs	$110	$6,600
Reporting	60	hrs	$120	$7,200
Project Management	20	hrs	$150	$3,000
Direct Costs				$4,000
				$20,800

Laboratory Costs

	B, Mn, As, Mo, Li, Th	SO4
Quantity	28	28
Unit cost	$84	$14
Unit total	$2,352	$382

Lab total **$2,734**

Contractor Costs

Contractor costs (Geoprobe drilling)	Push probe	3 days	$2,800	**$8,400**
Contractor costs monitoring wells	HSA drilling	4 wells	$3,500	**$14,000**

AOC-11 Remediation

Presumptive remedy of excavating the waste, and groundwater monitoring. Assume 3,000 cubic yards waste and 3 years groundwater monitoring with an annual report

Consultant costs

	quantity		avg rate	
Reporting	60	hrs	$120	$7,200
Excavation oversight	80	hrs	$110	$8,800
Quarterly groundwater monitoring and annual report	210	hrs	$120	$25,200
Project Management	20	hrs	$150	$3,000
Direct Costs				$4,000
				$48,200

Laboratory Costs

	B, Mn, As, Mo, Li, Th	SO4
Quantity	45	45
Unit cost	$84	$ 14
Unit total	$3,780	$ 614

Lab total **$4,394**

Contractor Costs

	Mobilization	$2,000	lump	1	$2,000
	Excavation	$10	cubic yard	3000	$30,000
Based on 3000 cubic yards waste and disposal at Canyon, MN	Hauling	$17	cubic yard	3000	$51,000
	Disposal	$40	cubic yard	3000	$120,000
					$203,000

Site Name: 2001 Storage Area
Area of Concern Number: AOC 13
Total acres: 5 acres
Chemicals of Concern: DRO, GRO, VOC, RCRA Metals, PAH, PCB
Site Summary:

Approximately 5 acres used for equipment storage. Assume no remediation required and Phase II Risk Assessment leads to no action.

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 14,900	
Laboratory Costs	$ 15,140	
Contractor Costs	$0	**$ 30,040**
Complete Phase II Investigation		
Consultant Costs	$ 20,800	
Laboratory Costs	$ 37,850	
Contractor Costs	$0	**$ 58,650**
Remediation Costs		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$0	
TOTALS	**$ 89,994**	

Comments: Assumes that direct exposure is the only risk pathway. Risk assessment results in No action.

AOC-13 Implementation of SAP Surface soil grid sampling on 5 acre site = approximately 8 samples per acre

Consultant costs

	quantity		avg rate	
Field Work	50	hrs	$110	$5,500
Reporting	30	hrs	$120	$3,600
Project Management	12	hrs	$150	$1,800
Direct Costs				$4,000
				$14,900

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
	40	40	40	40	40	40
Unit cost	$90	$26	$26	$68	$63	$105
Unit total	$3,600	$1,050	$1,050	$2,720	$2,520	$4,200

$15,140

Contractor Costs

None

AOC-13 Phase II with Risk Assessment Infill sampling around defined releases. Assume 10 separate releases

Consultant costs

	quantity		avg rate	
Field Work	60	hrs	$110	$6,600
Reporting	60	hrs	$120	$7,200
Project Management	20	hrs	$150	$3,000
Direct Costs				$4,000
				$20,800

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
	100	100	100	100	100	100
Unit cost	$90	$26	$26	$68	$63	$105
Unit total	$9,000	$2,625	$2,625	$6,800	$6,300	$10,500

$37,850

Contractor Costs

None

Site Name: Sandblasting and Large Equipment Painting Area
Area of Concern Number: AOC 014
Total acres: 11 acres
Chemicals of Concern: RCRA metals, VOC, DRO, GRO, PCB, PAH,
Area was used for sandblasting locomotives and other large equipment and to repaint them

Task Description	**Estimated Costs**		
Phase I ESA/SAP	$ 1,304		
Implementation of SAP			
Consultant Costs	$38,600		
Laboratory Costs	$13,581		
Contractor Costs	$11,200	**$63,381**	
Complete Phase II Investigation			
Consultant Costs	$ 32,880		
Laboratory Costs	$ 441		
Contractor Costs	$0	**$**	**33,321**
Remediation Costs			
Consultant Costs	$ 29,200		
Laboratory Costs	$ 270		
Contractor Costs	$23,000	**$**	**52,470**
TOTALS	**$ 150,476**		

Comments: It is anticipated that sand blast waste will be required to be removed due to dermal exposure risk. No groundwater issues anticipated. The Phase II work would consist of preparing a response action plan for excavating and disposing of sand blasting media.

Recognized Environmental Conditions* that Require Further Investigation	**COC**	**Viable risk pathways**	**Remediation?**
Sand blasting media	VOCs, GRO/DRO, RCRA, PCB, PAHs	Direct exposure	Yes
Sidetrack for railroad	VOCs, GRO/DRO, RCRA, PCB, PAHs	Direct exposure	No

AOC-14 Implementation of SAP

Consultant costs

	quantity		avg rate	
Field Work	60	hrs	$110	$6,600
Reporting	100	hrs	$120	$12,000
Project Management	100	hrs	$150	$15,000
Direct Costs				$5,000
				$38,600

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB
Surface sampling	12	12	12	12	12
Geoprobe borings	24	24	24	24	24
Quantity	36	36	36	36	36
Unit cost	$89	$26	$26	$68	$63
Unit total	$3,213	$936	$936	$2,448	$2,268

Lab total **$13,581**

Contractor Costs

Contractor costs (Geoprobe drilling)	geoprobe	4	days	$2,800	**$11,200**
Contractor costs (Test trenches)	excavator		days	$ 3,000.00	**$ -**
				Total	**$11,200**

PAH

12
24

36
$105
$3,780

AOC-14 Phase II with Risk Assessment

Consultant costs

	quantity		avg rate	
Field Work	8	hrs	$110	$880
Reporting	100	hrs	$120	$12,000
Project Management, MPCA coordination	100	hrs	$150	$15,000
Direct Costs				$5,000
				$32,880

Laboratory Costs

	TCLP RCRA Metals	GRO	DRO	VOC	PCB
Waste characterization	4				
Quantity	4	0	0	0	0
Unit cost	$110	$26	$26	$68	$63
Unit total	$441	$0	$0	$0	$0

Lab total **$441**

Contractor Costs

Contractor costs (Geoprobe drilling)	Geoprobe drilling	days	$2,800	**$0**
Contractor costs (bedrock drilling)	Rotosonic drilling	foot with mobe	50	**$0**

PAH

0
$105
$0

AOC-14 Remediation

Consultant costs

	quantity		avg rate	
Field Work	20	hrs	$110	$2,200
Reporting	100	hrs	$120	$12,000
Project Management, MPCA coordination	100	hrs	$150	$15,000
Direct Costs				
				$29,200

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
Verification samples	3					
Quantity	3	0	0	0	0	0
Unit cost	$90	$26	$26	$68	$63	$105
Unit total	$270	$0	$0	$0	$0	$0

Lab total **$270**

Contractor Costs

Contractor Costs Excavate Sand Blasting Materials					
Assumes remediation is to remove sand	Mobilization	$2,000	lump	1	$2,000
blasting materials along 150-feet of track area.	Excavation	$10	cubic yard	250	$2,500
Material is assumed not to be Hazardous	Transport	$17	cubic yard	250	$4,250
Waste. Waste material will be transported off-site	Screen	$1	cubic yard		$0
	Disposal	$57	cubic yard	250	$14,250
					$23,000

Site Name: Dunka Water Treatment Plant Sludge
Area of Concern Number: AOC 035
Total acres: 3 to 5 acres
Chemicals of Concern: RCRA metals
Site Summary:

This area was used to stage sludge generated from the Dunka Water Treatment Plant, which was used to remove metals from stockpile seep water. The sludge was shipped off-site for final disposal.

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 15,072	
Laboratory Costs	$ 900	
Contractor Costs	$ 5,600	**$ 21,572**
Complete Phase II Investigation		
Consultant Costs	$ 31,536	
Laboratory Costs	$ 900	
Contractor Costs	$ 5,600	**$ 38,036**
Remediation Costs		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	
TOTALS	$ 60,912	

Comments:

Assumptions:

Depth to groundwater	greater than 20-feet
Nearest surface water	none
Identified Vapor receptors	none

Implementation of SAP

Consultant costs will include	Field Work	2 days
	Reporting	Limited Phase II
	Project Coordination	
Laboratory Costs		
	Soil	10 RCRA metal
	Groundwater	none
Contractor costs	Drilling	2 days

Complete Phase II Investigation

Consultant costs will include	Field Work	2 days
	Reporting	Complete Phase II
	Project Coordination	
Laboratory Costs		
	Soil	10 RCRA metal
	Groundwater	none
Contractor costs	Drilling	2 days

Remediation Costs

Will remediation be required? No

Risk Criteria

Direct Exposure	Possible, however metals likely are immobilized due to high pH. PH is below 13
Groundwater	The anticipated depth to groundwater is over 20-feet in depth, and because the metals likely are immobile, groundwater impacts are not anticipated.
Surface Water	No surface water identified near the site.
Vapor Intrusion	The COC are non-volatile and there are no structures within 100-feet of the site.

Site Name: Line 9 Area 5 Petroleum Contaminated Soil
Area of Concern Number: AOC37
Total acres: 5 to 6 acres
Chemicals of Concern: DRO
Site Summary: This area was used as a permitted petroleum land application site. Approximately 25,000 cubic yards of soil from the Area 1 Shops Tank Farm cleanup and the Knox Fueling Station cleanup were thin spread at this site. Completion of land treatment soil monitoring documented in MPCA letter dated 02/24/2006.

Worksheet

Task Description	Estimated Costs
Phase I ESA/SAP	$ 1,304
Implementation of SAP	
Consultant Costs	$ -
Laboratory Costs	$ -
Contractor Costs	$ -
Complete Phase II Investigation	
Consultant Costs	$ -
Laboratory Costs	$ -
Contractor Costs	$ -
Remediation Costs	
Consultant Costs	$ -
Laboratory Costs	$ -
Contractor Costs	$ -
TOTALS	$ 1,304

Implementation of SAP

Field Work per day		
Geologist	0	$ -
Equip (soil)	0	$ -
Equip (geoprobe gw)	0	$ -
Equip (wells)	0	$ -
Daily Field Total		$ -
Number of Days	0	$ -
Limited Phase II Report	0	$ -
PM Time (20% of cost)		$ -
Consulting total		**$ -**

Complete Phase II Investigation

Field Work per day		
Geologist	0	$ -
Equip (soil)	0	$ -
Equip (geoprobe gw)	0	$ -
Equip (wells)	0	$ -
Field Total		$ -
Phase II Report	0	$ -
PM Time		$ -
Consulting total		**$ -**

Comments:

Remediation Costs
(none anticipated)

Assumptions:
No non-petroleum Recognized Environmental Conditions will be identified when completing the Phase I ESA for AOC 37.
MPCA will provide Technical Review of the Phase I ESA and agree that no additional work is necessary for AOC 37.
Depth to groundwater greater than 20 feet
Nearest surface water Basin 1E, approximately 800 feet NW
Identified Vapor receptors none

Implementation of SAP
No SAP necessary.

Complete Phase II Investigation
No Phase II Investigation necessary.

Remediation Costs
Will remediation be required? No
Risk Criteria

Direct Exposure	Land treatment soil monitoring requirements met per MPCA letter dated February 24, 2006.
Groundwater	Potential pathway to surface water (see below).
Surface Water	The nearest surface water appears to be Basin 1E, approximately 800 feet to the northwest. It is unlikely that the surface water would have been impacted.
Vapor Intrusion	There do not appear to be any structures within 100 feet of the site.

Site Name: Area 2 Shops
Area of Concern Number: AOC 038
Total acres: 25 acres
Chemicals of Concern: RCRA metals, VOC, DRO, GRO, PCB, PAH,
Includes a train fueling maintenance area, light vehicle fueling, a fabrication shop, laydown areas, and storage

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP	already completed	
Consultant Costs		
Laboratory Costs		
Contractor Costs		
Complete Phase II Investigation		
Consultant Costs	$ 112,800	
Laboratory Costs	$ 41,556	
Contractor Costs	$103,000	**$ 257,356**
Remediation Costs		
Consultant Costs	$ 48,400	
Laboratory Costs	$ 11,792	
Contractor Costs	$127,180	**$ 187,372**
TOTALS	**$ 446,031**	

Comments: The Limited Phase II has confirmed groundwater contamination and surface contamination of metals and PAHs. The groundwater likely discharges to adjacent surface water/wetland features via underground utility line. The petroleum aspect of the contamination has been remediated under the PRP.

Recognized Environmental Conditions* that Require Further Investigation	**COC**	**Viable risk pathways**	**Remediation?**
15A/B Building 201	VOCs, GRO/DRO, RCRA, PCB	Discharge to surface water	Yes
16A/B Building 202	VOCs, GRO/DRO	Discharge to surface water	Yes
17A/B Building 203	VOCs, GRO/DRO, RCRA, PCBs, cPAHs	Discharge to surface water	Yes
18A Building 204	PCBs	TSCA regulated area	Yes
25 New Mound System	VOCs, GRO/DRO, RCRA, PCBs, cPAHs	Discharge to surface water	Yes
27 and 28 SW laydown Area	VOCs, DRO	Discharge to surface water	No
32 South Outfall	VOCs, GRO/DRO, PCBs	Discharge to surface water	Yes
33 Burn Piles	VOCs, DRO	Direct Exposure	Yes

*Represents number assigned to REC in Ph II Investigation SAP, dated May 2006

AOC-38 Implementation of SAP **(This has already been completed)**

Consultant costs

	quantity		avg rate	
Field Work		hrs	$110	$0
Reporting		hrs	$120	$0
Project Management		hrs	$150	$0
Direct Costs				$0
				$0

Laboratory Costs

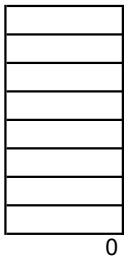
	RCRA Metals	GRO	DRO	VOC	PCB
Quantity	0	0	0	0	0
Unit cost	$90	$26	$26	$68	$63
Unit total	$0	$0	$0	$0	$0

Lab total **$0**

Contractor Costs

Contractor costs (Geoprobe drilling)	days geoprobe	days	$2,800	**$0**

PAH



0

$105

$0

AOC-38 Phase II with Risk Assessment

Consultant costs

	quantity		avg rate	
Field Work	400	hrs	$110	$44,000
Reporting	240	hrs	$120	$28,800
Project Management, MPCA coordination	200	hrs	$150	$30,000
Direct Costs				$10,000
				$112,800

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB
15A/B Building 201	8	8	8	8	12
16A/B Building 202		42	42	42	
17A/B Building 203	62	62	62	62	62
18A Building 204					10
25 New Mound System	9	9	9	9	
27 and 28 SW laydown Area			40	40	
32 South Outfall		15	15	15	
33 Burn Piles			27	27	
Quantity	79	136	203	203	84
Unit cost	$89	$26	$26	$68	$63
Unit total	$7,051	$3,570	$5,329	$13,804	$5,292

Lab total **$41,556**

Contractor Costs

Contractor costs (Geoprobe drilling)	Geoprobe drilling	10	days	$ 2,800	**$28,000**
Contractor costs (bedrock drilling)	Rotosonic drilling	1500	foot with mobe	$ 50	**$75,000**

PAH

62

62
$105
$6,510

AOC-38 Remediation

Consultant costs

	quantity		avg rate	
Field Work	100	hrs	$110	$11,000
Reporting	120	hrs	$120	$14,400
Project Management, MPCA coordination	100	hrs	$150	$15,000
Direct Costs				$8,000
				$48,400

Laboratory Costs

		RCRA Metals	GRO	DRO	VOC	PCB	PAH
15A/B Building 201		16	16	16	16	16	16
16A/B Building 202							
17A/B Building 203							
18A Building 204						16	
25 New Mound System		6	6	6	6	6	6
32 South Outfall		4	4	4	4	4	4
33 Burn Piles				10	10		
	Quantity	26	26	36	36	42	26
	Unit cost	$90	$26	$26	$68	$63	$105
	Unit total	$2,340	$683	$945	$2,448	$2,646	$2,730
	Lab total					**$11,792**	

Contractor Costs

Contractor Costs 15 A/B, 16 A/B,17A/B, 25 and 32

Assumes remediation is driven by utility lines	Mobilization	$2,000	lump	1	$2,000
being excavated to remove preferential	Excavation	$10	cubic yard	1000	$10,000
pathway of groundwater discharge to surface	Hauling	$17	cubic yard	1000	$17,000
water. Includes 820 lf of utility lines.	Disposal	$40	cubic yard	1000	$40,000
					$69,000

Contractor Costs #33 Burn Piles

	Mobilization	$2,000	lump	1	$2,000
Assumes remediation is driven by soils greater	Excavation	$10	cubic yard	740	$7,400
than 10 ppm in the upper two feet. Excavation	Hauling	$17	cubic yard	740	$12,580
size is 100 feet x 100 feetx 2 feet deep.	Disposal	$40	cubic yard	740	$29,600
					$51,580

Contractor Costs #18A Building 204

	Mobilization	$2,000	lump	1	$2,000
Assumes TSCA cleaning of concrete. Estimate	Cleaning	$80	hour	20	$1,600
assumes cleaning 20 feet by 20 feet area. No	Hauling		cubic yard		$0
hazardous waste.	Disposal	$3,000	lump sum	1	$3,000
					$6,600

Site Name: Heavy Duty Garage
Area of Concern Number: AOC 040
Total acres: 1 to 2 acres
Chemicals of Concern: RCRA metals, DRO, VOC

Area was used for maintenance of heavy equipment for approx. 10-years, and has been used as cold storage since the 1960s. One UST was removed from the facility in the 1980s.

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 15,600	
Laboratory Costs	$ 921	
Contractor Costs	$ 5,600	**$ 22,121**
Complete Phase II Investigation		
Consultant Costs	$ 33,600	
Laboratory Costs	$ 1,371	
Contractor Costs	$ 5,600	**$ 40,571**
Remediation Costs		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	
TOTALS	**$ 63,997**	

Comments:

Assumptions:

Depth to groundwater	greater than 20-feet
Nearest surface water	none
Identified Vapor receptors	none

Implementation of SAP

Consultant costs will include	Field Work	2 days
	Reporting	Limited Phase II
Laboratory Costs		
	Soil	5 RCRA metal and 5 DRO/VOC samples
	Groundwater	-
Contractor costs	Drilling	2 days

Complete Phase II Investigation

Consultant costs will include	Field Work	2 days
	Reporting	Phase II Investigation
Laboratory Costs		
	Soil	10 RCRA metals/ and 5 DRO/VOC
	Groundwater	-
Contractor costs	Drilling	2 days

Remediation Costs

Will remediation be required? No

Risk Criteria

Direct Exposure	Possible, however only minor releases are expected
Groundwater	Due to shallow bedrock, groundwater is not anticipated
Surface Water	There is no nearby surface water.
Vapor Intrusion	There are no structures within the AOC; no vapor risk is present.

Site Name: Bunker C Tank Farm
Area of Concern Number: AOC 042
Total acres: approximately 3 acres
Chemicals of Concern: DRO
Site Summary: Large aboveground storage tanks of #4 and #6 fuel oil

Task Description	**Estimated Costs**
Phase I ESA/SAP	
Implementation of SAP	
Consultant Costs	
Laboratory Costs	$ -
Contractor Costs	$ -
Complete Phase II Investigation	
Consultant Costs	$ -
Laboratory Costs	$ -
Contractor Costs	$ -
Remediation Costs	
Consultant Costs	$ 42,360
Laboratory Costs	$ 2,363
Contractor Costs	$ 900,000
TOTALS	$ 944,723

Comments: MPCA closed this leaksite and it is assumed that no additional clean-up of the surface impacts will be required; however, if contaminated soils are encountered during development of this area additional environmental costs will occur.

Assumptions:

Depth to groundwater	greater than 20 feet
Nearest surface water	approximately 600 feet east
Identified Vapor receptors	none

Implementation of SAP

Consultant costs will include	Field Work	-
	Reporting	-
	Project Coordination	
Laboratory Costs		
	Soil	-
	Groundwater	-
Contractor costs	Drilling	-

Complete Phase II Investigation

Consultant costs will include	Field Work	-
	Reporting	-
	Project Coordination	
Laboratory Costs		
	Soil	-
	Groundwater	-
Contractor costs	Drilling	-

Remediation Costs

October 17, 2014 estimate	Unit		Rate	Totals	
Remove tanks and lines	1	$	400,000	$	400,000
Asbestos abatement	1	$	500,000	$	500,000
				$	900,000
	Number of Samples	Rate			
Laboratory	90	$	26	$	2,362.50

Site Name: Administration Building
Area of Concern Number: AOC 043
Total acres: 1 to 2 acres
Chemicals of Concern: DRO and VOC
Site Summary: An underground storage tank (UST) was abandoned in place in the Administration Building. The tank (UST 025) was used for heating oil. Domestic waste was pumped into the plant site wastewater treatment plant; a new well and septic system were installed in 2001. The Administration Building is still in use.

Task Description	Estimated Costs	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 15,312	
Laboratory Costs	$ 848	
Contractor Costs	$ 5,600	**$ 21,760**
Complete Phase II Investigation		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	
Remediation Costs		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	
TOTALS	$ 23,064	

Comments:

Assumptions:

Depth to groundwater	greater than 20 feet
Nearest surface water	approximately 1600 ft E
Identified Vapor receptors	Administration Building

Implementation of SAP

Consultant costs will include	Field Work	2 days
	Reporting	Limited Phase II
Laboratory Costs		
	Soil	8 DRO samples, 8 VOC samples
	Groundwater	1 DRO, 1 VOC (site well)
Contractor costs	Drilling	2 days

Complete Phase II Investigation

Consultant costs will include	Field Work	-
	Reporting	-
	Project Coordination	
Laboratory Costs		
	Soil	-
	Groundwater	-
Contractor costs	Drilling	-

Remediation Costs

Will remediation be required? no

Risk Criteria

Direct Exposure	Surface contamination, and therefore direct exposure, are unlikely.
Groundwater	The anticipated depth to groundwater is more than 20 feet below ground. Groundwater impacts are not anticipated. Note: A domestic well is located adjacent to the Administration Building (Well ID #665923). Static water level information was not found on the well record.
Surface Water	The nearest surface water appears to be approximately 1600 feet to the east. It is unlikely that the surface water would have been impacted.
Vapor Intrusion	The Administration Building is only likely to be at risk for vapor intrusion if contamination is identified.

Site Name: Main Gate Vehicle Fueling Area
Area of Concern Number: AOC 044
Total acres: ~0.25
Chemicals of Concern: GRO, DRO, VOC
Site Summary: This area is several hundred feet from the Administration Building. The fueling area consists of two ASTs (AST 121 and AST 122) that are used for fueling light trucks.

Task Description	Estimated Costs		
Phase I ESA/SAP	$ 1,304		
Implementation of SAP			
Consultant Costs	$ 13,536		
Laboratory Costs	$ 578		
Contractor Costs	$ 2,800	**$**	**16,914**
Complete Phase II Investigation			
Consultant Costs	$ 31,536		
Laboratory Costs	$ 482		
Contractor Costs	$ 2,800	**$**	**34,818**
Remediation Costs			
Consultant Costs	$ 13,536		
Laboratory Costs	$ 1,328		
Contractor Costs	$ 17,600	**$**	**32,464**
TOTALS	**$ 85,500**		

Comments:

Assumptions:

Depth to groundwater	greater than 20 feet
Nearest surface water	approximately 200 ft NE
Identified Vapor receptors	none

Implementation of SAP

Consultant costs will include	Field Work	1 day
	Reporting	Limited Phase II
Laboratory Costs		
	Soil	5 DRO, 5 GRO, 5 VOC samples
	Groundwater	none
Contractor costs	Drilling	1 day

Complete Phase II Investigation

Consultant costs will include	Field Work	1 day
	Reporting	Phase II Investigation
Laboratory Costs		
	Soil	4 DRO, 4 GRO, and 4 VOC
	Groundwater	-
Contractor costs	Drilling	1 day

Remediation Costs

Will remediation be required?	Possible, due to the likely presence of surface contamination in the dispenser area.
Risk Criteria	
Direct Exposure	Possible, if surface contamination is present. The site is not currently listed as a leak site.
Groundwater	The anticipated depth to groundwater is more than 20 feet below ground. Groundwater impacts are not anticipated.
Surface Water	The nearest surface water appears to be approximately 200 feet to the northeast. It is unlikely that the surface water would have been impacted.
Vapor Intrusion	There appears to be a building approximately 10 feet from the western AST; however, the building is not inhabitable.

Site Name: Plant Site and General Shops
Area of Concern Number: AOC 46
Total acres: 60 -80 acres
Chemicals of Concern: RCRA metals, VOC, DRO, GRO, PCB, PAH,
Summary:

Includes the crushers, concentrator, general shops, rebuild garage, warehouses, associated rail, laydown areas, substations.

Task Description	Estimated Costs		
Phase I ESA/SAP	$ 1,304		
Implementation of SAP			
Consultant Costs	$30,800		
Laboratory Costs	$18,832		
Contractor Costs	$14,000	**$**	**63,632**
Complete Phase II Investigation			
Consultant Costs	$ 80,200		
Laboratory Costs	$ 73,080		
Contractor Costs	$49,200	**$**	**202,480**
Remediation Costs			
Consultant Costs	$ 125,600		
Laboratory Costs	$ 58,328		
Contractor Costs	$481,345	**$**	**665,273**
TOTALS	**$**	**932,688**	

Comments: The overriding assumption within this estimate is the near surface bedrock and lack of a groundwater or surface water risk pathway. This assumption limits remediation to direct exposure and vapor which is typically mitigated through engineering controls or limited excavation rather than large scale remediation.

Recognized Environmental Conditions	COC	Viable risk pathways	Remediation?
#1 Concentrator Tank Farm	VOC, DRO, GRO	Vapor intrusion to conveyor tunnel and upper two feet direct exposure.	Yes
#2 Rebuild Garage UST	VOC, DRO, GRO	Upper two feet direct exposure.	Yes
#3 Substation -1	DRO, PCB	TSCA regulated vessel 1 ppm for high occupancy	Yes
#4 Substation-2	DRO, PCB	TSCA regulated vessel 1 ppm for high occupancy	Yes
#5 General Shop Perimeter and Floor Drains	VOC, DRO, GRO, PAH, RCRA Metals	Direct Exposure, Vapor intrusion	Yes
#6 Rebuild Garage Perimeter and Floor Drains	VOC, DRO, GRO, PAH, RCRA Metals	Direct Exposure, Vapor intrusion	Yes
#7 Yard Area	VOC, DRO, GRO, PAH, PCB RCRA Metals	Direct Exposure, Vapor intrusion	Yes
#8 Concentrator	VOC, DRO, GRO, PAH, PCB RCRA Metals	Direct Exposure, Vapor intrusion	No

AOC-46 Implementation of SAP

Consultant costs

	quantity		avg rate	
Field Work	80	hrs	$110	$8,800
Reporting	100	hrs	$120	$12,000
Project Management	40	hrs	$150	$6,000
Direct Costs				$4,000
				$30,800

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
#1 Concentrator Tank Farm		7	7	7		
#2 Rebuild Garage UST		7	7	7		
#3 Substation -1			10		10	
#4 Substation-2			10		10	
#5 General Shop Perimeter and Floor Drains	10	20	20	20	5	5
#6 Rebuild Garage Perimeter and Floor Drains	5	10	10	10	5	5
#7 Yard Area	10	30	30	30	20	10
#8 Concentrator	5	5	5	5	5	5
Quantity	30	79	99	79	55	25
Unit cost	$89	$26	$26	$68	$63	$105
Unit total	$2,678	$2,074	$2,599	$5,392	$3,465	$2,625

Lab total **$18,832**

Contractor Costs

Contractor costs (Geoprobe drilling)	Push probe	5	days	$2,800	**$14,000**

AOC-46 Phase II with Risk Assessment

Consultant costs

	quantity		avg rate	
Field Work	280	hrs	$110	$30,800
Reporting	120	hrs	$120	$14,400
Project Management	180	hrs	$150	$27,000
Direct Costs				$8,000
				$80,200

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
#1 Concentrator Tank Farm		30	30	30		
#2 Rebuild Garage UST		30	30	30		
#3 Substation -1			50		50	
#4 Substation-2			50		50	
#5 General Shop Perimeter and Floor Drains	30	40	40	40	20	20
#6 Rebuild Garage Perimeter and Floor Drains	30	40	40	40	20	20
#7 Yard Area	100	100	10	50	30	100
#8 Concentrator	20	20	20	20	20	20
Quantity	180	260	270	210	190	160
Unit cost	$89	$26	$26	$68	$63	$105
Unit total	$16,065	$6,825	$7,088	$14,333	$11,970	$16,800

Lab total **$73,080**

Contractor Costs

Contractor costs (Geoprobe drilling)	Push probe	14	days	$2,800	**$39,200**
Contractor costs (bedrock drilling)	Rotosonic drilling	200	foot with mob	50	**$10,000**

AOC-46 Remediation

Consultant costs

	quantity		avg rate	
Field Work	480	hrs	$110	$52,800
Reporting	240	hrs	$120	$28,800
Project Management	240	hrs	$150	$36,000
Direct Costs				$8,000
				$125,600

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
#1 Concentrator Tank Farm		30	30	30		
#2 Rebuild Garage UST		30	30	30		
#3 Substation -1			50		50	
#4 Substation-2			50		50	
#5 General Shop Perimeter and Floor Drains	30	40	40	40	20	20
#6 Rebuild Garage Perimeter and Floor Drains	30	40	40	40	20	20
#7 Yard Area	20	50	50	50	30	30
#8 Concentrator	20	20	20	20	20	20
Quantity	100	210	310	210	190	90
Unit cost	$89	$26	$26	$68	$63	$105
Unit total	$8,925	$5,513	$8,138	$14,333	$11,970	$9,450

Lab total **$58,328**

Contractor Costs

Contractor Costs Concentrator Tank Farm

	Mobilization	$2,000	lump	1	$2,000	
Assumes remediation is driven by soils greater	Excavation	$10	cubic yard	740	$7,400	
than 10 ppm in the upper two feet. Excavation	Hauling	$17	cubic yard	740	$12,580	
size is 100 feet x 100 feetx 2 feet deep.	Disposal	$40	cubic yard	740	$29,600	
					$51,580	

Contractor Costs Rebuild Garage UST

	Mobilization	$2,000	lump	1	$2,000	
Assumes remediation is driven by soils greater	Excavation	$10	cubic yard	740	$7,400	
than 10 ppm in the upper two feet. Excavation	Hauling	$17	cubic yard	740	$12,580	
size is 100 feet x 100 feetx 2 feet deep.	Disposal	$40	cubic yard	740	$29,600	
					$51,580	

Contractor Costs Substation 1

Assumes TSCA high occupancy regulation	Mobilization	$2,000	lump	1	$2,000	
applies. Excavate to 1.0 ppm. Estimate	Excavation	$10	cubic yard	463	$4,630	
assumes excavation 50 feet x 50 feet x5 feet	Hauling	$17	cubic yard	463	$7,871	
deep. No hazardous waste.	Disposal	$40	cubic yard	463	$18,520	
					$33,021	

Contractor Costs Substation 2

Assumes TSCA high occupancy regulation	Mobilization	$2,000	lump	1	$2,000	
applies. Excavate to 1.0 ppm. Estimate	Excavation	$10	cubic yard	463	$4,630	
assumes excavation 50 feet x 50 feet x5 feet	Hauling	$17	cubic yard	463	$7,871	
deep. No hazardous waste.	Disposal	$40	cubic yard	463	$18,520	
					$33,021	

Contractor Costs General Shop

	Mobilization	$1,500	lump	1	$1,500	
Assumes vapor mitigation consisting of subslab	Subslab depres.	$4	square foot	90000	$360,000	
depressurization and sealing floor cracks.	Crack sealing	$3	square foot	90000	$270,000	
not included because no occupancy of site and foundation covered with soil					**$631,500**	

Contractor Costs Rebuild Shop

	Mobilization	$1,500	lump	1	$1,500	
Assumes vapor mitigation consisting of subslab	Subslab depres.	$4	square foot	15000	$60,000	
depressurization and sealing floor cracks.	Crack sealing	$3	square foot	15000	$45,000	
not included because no occupancy of site and foundation covered with soil					**$106,500**	

Contractor Costs Yard Area

Assumes remediation is driven by petroleum	Mobilization	$2,000	lump	1	$2,000	
contamination associated with drip pans below	Excavation	$10	cubic yard	4629	$46,290	
the rail tracks. Soils greater than 10 ppm in the	Hauling	$17	cubic yard	4629	$78,693	
upper two feet. Excavation size is 250 feet x	Disposal	$40	cubic yard	4629	$185,160	
250 feet x 2 feet deep.					**$312,143**	**$481,345**

Site Name:	Tailings Basin Reporting
Area of Concern Number:	AOC 047
Total acres:	approximately 3 acres
Chemicals of Concern:	DRO, GRO, VOC
Site Summary:	This site contains a lube station fueling area, a septic tank and a drain field system. Two underground storage tanks (USTs) were removed in 1988. It is a closed leaksite.

Task Description	**Estimated Costs**
Phase I ESA/SAP	$ 1,304
Implementation of SAP	
Consultant Costs	$ -
Laboratory Costs	$ -
Contractor Costs	$ -
Complete Phase II Investigation	
Consultant Costs	$ -
Laboratory Costs	$ -
Contractor Costs	$ -
Remediation Costs	
Consultant Costs	$ -
Laboratory Costs	$ -
Contractor Costs	$ -
TOTALS	$ 1,304

Comments: It is assumed that the leaksite will not need to be reopened due to new MPCA requirements or new site information. Reports associated with the leak site will be reviewed during the Phase I assessment

Assumptions:

Depth to groundwater	greater than 20 feet
Nearest surface water	approximately 600 feet east
Identified Vapor receptors	none

Implementation of SAP

Consultant costs will include	Field Work	-
	Reporting	-
	Project Coordination	
Laboratory Costs		
	Soil	-
	Groundwater	-
Contractor costs	Drilling	-

Complete Phase II Investigation

Consultant costs will include	Field Work	-
	Reporting	-
	Project Coordination	
Laboratory Costs		
	Soil	-
	Groundwater	-
Contractor costs	Drilling	-

Remediation Costs

Will remediation be required? no, unless leak site is reopened based on new information/MPCA requirements

Risk Criteria

Direct Exposure	Unlikely.
Groundwater	The anticipated depth to groundwater is more than 20 feet below ground. Groundwater impacts are not anticipated.
Surface Water	The nearest surface water appears to be Basin 1E, approximately 600 feet to the east. Surface water impacts are not anticipated.
Vapor Intrusion	There do not appear to be any inhabitable structures within 400 feet of the site.

Site Name: Booster Pump House with Transformer
Area of Concern Number: AOC 048
Total acres: approximately 1 acre
Chemicals of Concern: PCB and DRO
Site Summary:

The site consists of several pumping stations and transformers in the area of the Tailings Basin, as well as a substation on the southeast side of the basin. CE records indicated that, at the time of the original investigation in 2002, the transformers contained non-PCB mineral oil.

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 15,072	
Laboratory Costs	$ 1,071	
Contractor Costs	$ 5,600	**$ 21,743**
Complete Phase II Investigation		
Consultant Costs	$ 32,640	
Laboratory Costs	$ 893	
Contractor Costs	$ 5,600	**$ 39,133**
Remediation Costs		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	
TOTALS	**$ 62,180**	

Comments:

Assumptions:

Depth to groundwater	greater than 20 feet	
Nearest surface water	Basin 1E, approximately 250 feet SE	
Identified Vapor receptors	none	

Implementation of SAP

Consultant costs will include	Field Work	2 days
	Reporting	Limited Phase II Report
Laboratory Costs		
	Soil	12 PCB and 12 DRO
	Groundwater	none
Contractor costs	Drilling	2 days

Complete Phase II Investigation

Consultant costs will include	Field Work	2 days
	Reporting	Phase II Investigation
Laboratory Costs		
	Soil	10 PCB and 10 DRO
	Groundwater	none
Contractor costs	Drilling	2 days

Remediation Costs

Will remediation be required? no

Risk Criteria

Direct Exposure	Direct exposure is possible if PCB-containing oil was previously used in the transformers and if PCB-containing oil contacted the soil.
Groundwater	The anticipated depth to groundwater is more than 20 feet below ground. Groundwater impacts are not anticipated.
Surface Water	The nearest surface water appears to be Basin 1E, approximately 250 feet to the southeast. Surface water impacts are not anticipated.
Vapor Intrusion	A booster pump house is located on the south side of the basin, and several smaller booster pump houses are located between Basin 2W and Basin 1E. None of these buildings appear to be inhabitable.

Site Name:	Coarse Crusher Petroleum Contaminated Soil
Area of Concern Number:	AOC 049
Total acres:	approximately 1 acre
Chemicals of Concern:	DRO and VOC
Site Summary:	An object along the railroad track to the north of the plant/general shops punctured a locomotive's saddle tank. Approximately 300 gallons of diesel were spilled. The contaminated soil was excavated and thin spread.

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 13,536	
Laboratory Costs	$ 315	
Contractor Costs	$ 2,800	**$ 16,651**
Complete Phase II Investigation		
Consultant Costs	$ 31,536	
Laboratory Costs	$ 693	
Contractor Costs	$ 2,800	**$ 35,029**
Remediation Costs		
Consultant Costs	$ -	
Laboratory Costs	$ -	
Contractor Costs	$ -	
TOTALS	**$ 52,984**	

Comments:

Assumptions:

Depth to groundwater	greater than 20 feet
Nearest surface water	approximately 1500 feet E
Identified Vapor receptors	building approximately 100 feet SE

Implementation of SAP

Consultant costs will include	Field Work	1 day
	Reporting	Limited Phase II
	Project Coordination	
Laboratory Costs		
	Soil	12 DRO
	Groundwater	none
Contractor costs	Drilling	1 day

Complete Phase II Investigation

Consultant costs will include	Field Work	1 day
	Reporting	Phase II Investigation
	Project Coordination	
Laboratory Costs		
	Soil	5 DRO and 5 VOC
	Soil Vapor	1 TO-15 grab sample
	Groundwater	none
Contractor costs	Drilling	1 day

Remediation Costs

Will remediation be required? no

Risk Criteria

Direct Exposure	Possible.
Groundwater	The anticipated depth to groundwater is more than 20 feet below ground. Groundwater impacts are not anticipated.
Surface Water	The nearest surface water is approximately 1500 feet to the east. Surface water impacts are not anticipated.
Vapor Intrusion	There are buildings located approximately 100 feet to the southeast, 400 feet to the west-northwest, and 500 feet to the southwest. Of these, the only anticipated potential vapor impact is to the nearest building.

Site Name: Tailings Basin Salvage and Scrap Areas
Area of Concern Number: AOC 051
Total acres: 11 acres
Chemicals of Concern: RCRA metals, VOC, DRO, GRO, PCB, PAH,
Surficial laydown area, and an area where general industrial waste has been incorporated into fill material on the edge of the Emergency Basin

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$41,000	
Laboratory Costs	$29,465	
Contractor Costs	$20,000	**$ 90,465**
Complete Phase II Investigation		
Consultant Costs	$ 25,500	
Laboratory Costs	$ -	
Contractor Costs	$0	**$ 25,500**
Remediation Costs		
Consultant Costs	$ 49,000	
Laboratory Costs	$ 1,574	
Contractor Costs	$426,600	**$ 477,174**
TOTALS	**$ 594,443**	

Comments: It is anticipated that only small surface releases will be present at this site. Negligible groundwater contamination is anticipated. The only concern is the presence of buried waste, which would constitute an unpermitted dump. Phase II would consist of preparation of a Response Action Plan to excavate and dispose of waste from unpermitted dump.

Recognized Environmental Conditions* that Require Further Investigation	**COC**	**Viable risk pathways**	**Remediation?**
Laydown areas, including various types of equi	VOCs, GRO/DRO, RCRA, PCB	Discharge to surface water Direct Exposure	No
Buried waste (approx. 2-acres in size)	VOCs, GRO/DRO, RCRA, PCB	Discharge to surface water Constitutes an unpermitted dump	Yes

AOC-51 Implementation of SAP

Consultant costs

	quantity		avg rate	
Field Work	100	hrs	$110	$11,000
Reporting	150	hrs	$120	$18,000
Project Management	80	hrs	$150	$12,000
Direct Costs				
				$41,000

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB
Surface samples	48	48	48	48	48
Geoprobe samples	20	20	20	20	20
Test trench samples	10	10	10	10	10
Quantity	78	78	78	78	78
Unit cost	$89	$26	$26	$68	$63
Unit total	$6,962	$2,048	$2,048	$5,304	$4,914

Lab total **$29,465**

Contractor Costs

Contractor costs (Geoprobe drilling)	push probe	5	days	$ 2,800	**$14,000**
Contractor Costs (Test trenches)	excavation	2	days	$ 3,000	**$6,000**
				Total	**$20,000**

PAH

48
20
10

78
$105
$8,190

AOC-51 Phase II with Risk Assessment

Consultant costs

	quantity		avg rate	
Field Work		hrs	$110	$0
Reporting	150	hrs	$120	$18,000
Project Management, MPCA coordination	50	hrs	$150	$7,500
Direct Costs				
				$25,500

Laboratory Costs

	RCRA Metals	GRO	DRO	VOC	PCB	PAH
Quantity	0	0	0	0	0	0
Unit cost	$89	$26	$26	$68	$63	$105
Unit total	$0	$0	$0	$0	$0	$0

Lab total **$0**

Contractor Costs

Contractor costs (Geoprobe drilling)	push probe	days	$2,800	**$0**
Contractor costs (bedrock drilling)	Rotosonic drilling	foot with mob	$ 50	**$0**

AOC-51 Remediation

Consultant costs

	quantity		avg rate	
Field Work	200	hrs	$110	$22,000
Reporting	100	hrs	$120	$12,000
Project Management, MPCA coordination	100	hrs	$150	$15,000
Direct Costs				
				$49,000

Laboratory Costs

	TCLP RCRA Metals	GRO	DRO	VOC	PCB	PAH
Waste characterization	4	4	4	4	4	4
Quantity	4	4	4	4	4	4
Unit cost	$105	$26	$26	$68	$63	$105
Unit total	$420	$105	$105	$272	$252	$420

Lab total **$1,574**

Contractor Costs

Contractor Costs Excavate Unpermitted Dump					
Assumes remediation is to remove materials	Mobilization	$2,000	lump	1	$2,000
from dump, segregate them between fill and	Excavation	$10	cubic yard	33,000	$330,000
waste materials, and dispose at Industrial	Transport	$17	cubic yard	3,300	$56,100
Waste LF (SW-619)	Screen	$1	cubic yard	33,000	$33,000
	Disposal	$1,100	per day	5	$5,500
					$426,600

Site Name: Cell 2W Salvage Area
Area of Concern Number: AOC 052
Total acres: 1 acre
Chemicals of Concern: DRO, VOC, RCRA metals
Site Summary:

Area was used as a small salvage and laydown area. A mobile Chorerex AST was located here as well. No releases are anticipated.

Task Description	**Estimated Costs**		
Phase I ESA/SAP	$	1,304	
Implementation of SAP			
Consultant Costs	$	15,072	
Laboratory Costs	$	1,389	
Contractor Costs	$	5,600	**$ 22,061**
Complete Phase II Investigation			
Consultant Costs	$	-	
Laboratory Costs	$	-	
Contractor Costs	$	-	
Remediation Costs			
Consultant Costs	$	-	
Laboratory Costs	$	-	
Contractor Costs	$	-	
TOTALS	$	23,365	

Comments:

Assumptions:

Depth to groundwater	greater than 20-feet	
Nearest surface water	none	
Identified Vapor receptors	none	

Implementation of SAP

Consultant costs will include	Field Work	2 days
	Reporting	Limited Phase II
Laboratory Costs		
	Soil	5 RCRA metal and 5 DRO/VOC samples
	Groundwater	5 DRO/VOC
Contractor costs	Drilling	2 days

Complete Phase II Investigation

Consultant costs will include	Field Work	
	Reporting	
Laboratory Costs		
	Soil	
	Groundwater	
Contractor costs	Drilling	

Remediation Costs

Will remediation be required? No

Risk Criteria

Direct Exposure	Possible, however no releases are anticipated.
Groundwater	Possible, however no releases are anticipated.
Surface Water	Possible, however no releases are anticipated.
Vapor Intrusion	There are no structures within the AOC; no vapor risk is present.

Site Name:	Hornfels Burial
Area of Concern Number:	AOC 053
Total acres:	~1-2 acres
Chemicals of Concern:	sulfide minerals
Site Summary:	This area is within Cell 2W and contains buried hornfels, a waste rock type that contains sulfide minerals. The site is surrounded by three monitoring wells, which are monitored as part of a National Pollutant Discharge Elimination System (NPDES) permit.

Task Description	**Estimated Costs**	
Phase I ESA/SAP	$	1,304
Implementation of SAP		
Consultant Costs	$	-
Laboratory Costs	$	-
Contractor Costs	$	-
Complete Phase II Investigation		
Consultant Costs	$	-
Laboratory Costs	$	-
Contractor Costs	$	-
Remediation Costs		
Consultant Costs	$	-
Laboratory Costs	$	-
Contractor Costs	$	-
TOTALS	$	1,304

Comments:

Assumptions:

Depth to groundwater	less than 5 feet
Nearest surface water	none
Identified Vapor receptors	none

Implementation of SAP

Consultant costs will include	Field Work	-
	Reporting	-
	Project Coordination	
Laboratory Costs		
	Soil	-
	Groundwater	-
Contractor costs	Drilling	-

Complete Phase II Investigation

Consultant costs will include	Field Work	-
	Reporting	-
	Project Coordination	
Laboratory Costs		
	Soil	-
	Groundwater	-
Contractor costs	Drilling	-

Remediation Costs

Will remediation be required? no

Risk Criteria

Direct Exposure	Unlikely.
Groundwater	The depth to groundwater is anticipated to be less than 5 feet. However, three monitoring wells surround the site. The wells are sampled as part of a NPDES permit.
Surface Water	The nearest surface water appears to be more than 1,000 feet from the site. Surface water impacts are not anticipated.
Vapor Intrusion	There do not appear to be any vapor receptors in the vicinity of the site.

Site Name:	Colby Lake Pumping Station
Area of Concern Number:	AOC 059
Total acres:	2 to 3 acres
Chemicals of Concern:	DRO, VOC, RCRA metals
Site Summary:	Remote pumping station on Colby Lake that provided drinking water to the plant. Includes former fuel oil AST, transformer, and various mercury containing pressure gauges.

Task Description	**Estimated Costs**		
Phase I ESA/SAP	$	1,304	
Implementation of SAP			
Consultant Costs	$	15,072	
Laboratory Costs	$	1,391	
Contractor Costs	$	5,600	**$ 22,063**
Complete Phase II Investigation			
Consultant Costs	$	-	
Laboratory Costs	$	-	
Contractor Costs	$	-	
Remediation Costs			
Consultant Costs	$	-	
Laboratory Costs	$	-	
Contractor Costs	$	-	
TOTALS	**$**	**23,367**	

Comments:

Assumptions:

Depth to groundwater	greater than 20-feet
Nearest surface water	none
Identified Vapor receptors	none

Implementation of SAP

Consultant costs will include	Field Work	2 days
	Reporting	Limited Phase II
Laboratory Costs		
	Soil	5 RCRA metal and 5 DRO/VOC samples
	Groundwater	5 DRO/VOC
Contractor costs	Drilling	2 days

Complete Phase II Investigation

Consultant costs will include	Field Work	
	Reporting	
Laboratory Costs		
	Soil	
	Groundwater	
Contractor costs	Drilling	

Remediation Costs

Will remediation be required? No

Risk Criteria

Direct Exposure	Possible, however no releases are anticipated.	AST site already closed
Groundwater	Possible, however no releases are anticipated.	AST site already closed
Surface Water	Possible, however no releases are anticipated.	AST site already closed
Vapor Intrusion	Possible, however no releases are anticipated.	AST site already closed

Site Name: Pellet Plant
Area of Concern Number: AOC 061
Total acres: approximately 14.5 acres
Chemicals of Concern: GRO, DRO, PCB, VOC, SVOC, RCRA metals
Summary: The plant on this site was used to make iron ore pellets. The site included an electrical building, transformers, a substation system, pipelines for transformer oil and steam, and above-ground storage tanks for petroleum products. Two closed leak sites are located on adjacent properties.

Task Description	Estimated Costs	
Phase I ESA/SAP	$ 1,304	
Implementation of SAP		
Consultant Costs	$ 44,900	
Laboratory Costs	$ 39,328	
Contractor Costs	$ 28,000	**$ 112,228**
Complete Phase II Investigation		
Consultant Costs	$ 40,500	
Laboratory Costs	$ 11,104	
Contractor Costs	$ 14,000	**$ 65,604**
Remediation Costs		
Consultant Costs	$ 42,700	
Laboratory Costs	$ 6,447	
Contractor Costs	$ 215,036	**$ 264,183**
TOTALS	**$ 443,318**	

Comments: This estimate assumes that the only risk is from direct exposure; it is assumed that the depth to groundwater is greater than 20 feet and that the groundwater is not impacted. There are no inhabitable buildings nearby; therefore, it is assumed that there is no risk of vapor intrusion. PCB remediation is driven by TSCA regulations rather than risk-based guidance.

Recognized Environmental Conditions	COC	Viable risk pathways	Remediation?
#1 Substation System	PCB, DRO	Direct Exposure	Yes
#2 Laydown Areas	VOC, SVOC, DRO, PCB, RCRA Metals	Direct Exposure	No
#3 Former Outdoor Storage Tanks	DRO, GRO, VOC, SVOC	Direct Exposure	Yes
#4 Adjacent Property to Northeast	DRO, VOC	Direct Exposure	No

AOC-061 SAP Implementation

Consultant costs

	quantity		avg rate	
Field Work	90	hrs	$110	$9,900
Reporting	100	hrs	$120	$12,000
Project Management, MPCA coordination	100	hrs	$150	$15,000
Direct Costs				$8,000
				$44,900

Laboratory Costs

	PCB	DRO	GRO	VOC	SVOC	RCRA Metals
#1 Substation System	51	51	-	-	-	-
#2 Laydown Areas	60	60	-	60	60	60
#3 Former Outdoor Storage Tanks	-	36	9	45	18	-
#4 Adjacent Property to Northeast	-	6	-	6	-	-
Quantity	111	153	9	111	78	60
Unit cost	$63	$26	$26	$68	$194	$89
Unit total	$6,993	$4,016	$236	$7,576	$15,152	$5,355

Lab total **$39,328**

Contractor Costs

Contractor Costs - Substation System Assumes 17 soil borings with samples collected from 3 depths. Estimated depth of borings is 30 feet below ground.	Drilling	$2,800	day	3	$8,400
Contractor Costs - Laydown Areas Assumes 20 soil borings with samples collected from 3 depths. Estimated depth of borings is 30 feet below ground.	Drilling	$2,800	day	3	$8,400
Contractor Costs - Former Outdoor Storage Tanks Assumes 15 soil borings with samples collected from 3 depths. Estimated depth of borings is 30 feet below ground.	Drilling	$2,800	day	3	$8,400
Contractor Costs - Adjacent Property to Northeast Assumes 6 soil borings with 1 sample collected from each boring. Estimated depth of borings is 2 feet below ground.	Drilling	$2,800	day	1	$2,800
					$28,000

AOC-061 Complete Phase II Investigation

Consultant costs

	quantity		avg rate	
Field Work	50	hrs	$110	$5,500
Reporting	100	hrs	$120	$12,000
Project Management, MPCA coordination	100	hrs	$150	$15,000
Direct Costs				$8,000
				$40,500

Laboratory Costs

	PCB	DRO	GRO	VOC	SVOC	RCRA Metals
#1 Substation System	60	60	-	-	-	-
#2 Laydown Areas	-	-	-	-	-	-
#3 Former Outdoor Storage Tanks	-	15	15	30	15	-
#4 Adjacent Property to Northeast	-	-	-	-	-	-
Quantity	60	75	15	30	15	0
Unit cost	$63	$26	$26	$68	$194	$90
Unit total	$3,780	$1,969	$394	$2,048	$2,914	$0

Lab total **$11,104**

Contractor Costs

Contractor Costs - Substation System Assumes 30 soil borings with samples collected from 2 depths. Estimated depth of borings is 20 feet below ground.	Drilling	$2,800	day	3	$8,400
Contractor Costs - Former Outdoor Storage Tanks Assumes 10 soil borings with samples collected from 2 depths. Estimated depth of borings is 20 feet below ground.	Drilling	$2,800	day	2	$5,600
					$14,000

AOC-061 Remediation

Consultant costs

	quantity		avg rate	
Field Work	70	hrs	$110	$7,700
Reporting	100	hrs	$120	$12,000
Project Management, MPCA coordination	100	hrs	$150	$15,000
Direct Costs				$8,000
				$42,700

Laboratory Costs

	PCB	DRO	GRO	VOC	SVOC	RCRA Metals
#1 Substation System	25	25	-	-	-	-
#2 Laydown Areas	-	-	-	-	-	-
#3 Former Outdoor Storage Tanks	-	11	11	22	11	-
#4 Adjacent Property to Northeast	-	-	-	-	-	-
Quantity	25	36	11	22	11	0
Unit cost	$63	$26	$26	$68	$194	$89
Unit total	$1,575	$945	$289	$1,502	$2,137	$0

Lab total **$6,447**

Contractor Costs

Contractor Costs - Substation System

Assumes remediation driven by TSCA regulated contamination identified in borings and disposal as hazardous waste.

Disposal	$280	ton	420	$117,600
Hauling	$4,330	roll off box	15	$64,950
Roll Off Rental	$15	box, per day	105	$1,575
Liner Charge	$60	liner	15	$900
Demurrage	$100	hour	30	$3,000
Add'l Fuel Surcharge	26	% of transport price		$18,311
				$206,336

Note: Transport price includes hauling, roll off rental, liner charge, and demurrage.

Contractor Costs - Former Outdoor Storage Tanks

Assumes remediation is driven by soils greater than 10 ppm using PID and disposal as non-hazardous waste.

Mobilization	$2,000	lump	1	$2,000
Excavation	$10	cubic yard	100	$1,000
Hauling	$17	cubic yard	100	$1,700
Disposal	$40	cubic yard	100	$4,000
				$8,700

$215,036

Attachment 2

Legacy Long Term Estimate with Supporting Documents
March 2019

Attachment 2 - Legacy Long Term FA Estimate **3/26/2019**

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

	support tabs	Cash $	NPV $	Note	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
						2.9%	01/01/19	07/01/19	06/30/20	07/01/21	07/01/22	07/01/23	06/30/24	07/01/25	07/01/26	07/01/27	06/30/28	07/01/29	07/01/30	07/01/31	06/30/32	07/01/33	07/01/34	07/01/35	06/30/36	07/01/37	07/01/38	07/01/39	06/30/40	07/01/41	07/01/42	07/01/43	06/30/44	07/01/45	07/01/46	07/01/47	06/30/48
							Oper	Hold																												
						Calandar Year	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	2048
Legacy Ferrous Total with Indirects		**$19,179,873**	**$13,603,672**																																	
Contingency	**10.0%**	**$1,681,658**	**$1,192,022**																																	
Adaptive Management	**2.0%**	**$130,612**	**$96,710**	On Water Tailings Basin only																																
Engineering Redesign	**2.0%**	**$130,612**	**$96,710**	On Water Tailings Basin only																																
Prime Contractor Markup	**2.5%**	**$420,414**	**$298,006**																																	
Mobilization				included in pricing																																
Legacy Ferrous Total (no Indirects)		**$16,816,578**	**$11,920,224**		10,285,994	7,084,720																														
Plant Site		$6,530,584	$4,835,504																																	
Water - Tailings Basin		$6,530,584	$4,835,504	Water Quality Monitoring Tailings Basin Closure (Site Specific Stds, Dewatering and Dam Breach)	6,530,584	4,835,504																																
Water Quality Monitoring		$1,050,000	$837,755	From PLM FY 2019 Budget (Tailings Basin) - assume reduced to 15% after 5 years	1,050,000	837,755	0	120,000	120,000	120,000	120,000	120,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Tailings Basin Seepage Pumping		$1,358,744	$1,198,025	PLM FY 2018 Cost	1,358,744	1,198,025	0	150,972	150,972	150,972	150,972	150,972	150,972	150,972	150,972	150,972	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	$3,979,040	$2,686,678	Legacy Tailings Basin Cells 1E and 2E - Order of Magnitude Estimate of Closure Costs (05/24/2017) - Updated for 2019 via RS Means Construction Cost Index	3,979,040	2,686,678	0	0	0	0	0	0	0	0	0	0	270,445	184,337	1,620,871	216,307	205,603	114,184	114,184	114,184	114,184	751,671	153,296	119,776	0	0	0	0	0	0	0	0	0	0
Monitoring/Application for Site Specific Standards		$142,800	$113,046	$10,000 annually for Biological and $36,400 annually for Wild Rice Plus $50,000 for Application (Reviewed in 2019 - no change in task or Barr rates)	142,800	113,046	0	0	0	0	0	0	0	0	46,400	96,400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Site Administration and Maintenance		$10,285,994	$7,084,720																																	
Site Manager FTE x $/hr from Unit $ = Annual $	0.5	$110	$114,400	NTS 3/22/19 letter Professional II																																
Site Manager	Unit $ Long Term	$3,432,000	$2,303,949		3,432,000	2,303,949	0	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400	114,400
DNR FTE x $/hr from Unit $ = Annual $	0.5	$116	$120,640	Provided by DNR flat rate for all staff including overhead and expenses (FY 2019)																																
DNR - Reclamation	Unit $ 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	0	0	0	0	0	0	0	0	0	0
DNR FTE x $/hr from Unit $ = Annual $	0.25	$116	$60,320	Provided by DNR flat rate for all staff including overhead and expenses (FY 2019)																																
DNR - Long Term	Unit $ 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	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320	60,320
Dam Instrumentation Field Work + Report per Event from Unit $ Long Term	2	$10,536	$21,072	NTS Letter of 3/22/19 no change																																
Geotechnical Inspection and Report from Unit $ Long Term	1	$17,700	$17,700	Barr 3/15/19 letter inactive basin																																
Dam Safety Monitoring		$589,164	$462,994	Starting at 2 monitoring events/year then reduced to 1 event after 5 years	589,164	462,994	0	38,772	38,772	38,772	38,772	38,772	28,236	28,236	28,236	28,236	28,236	28,236	28,236	28,236	28,236	28,236	28,236	28,236	28,236	0	0	0	0	0	0	0	0	0	0	0	0
Landfill Maintenance and Monitoring SW619	Unit $ Long Term	$900,000	$604,182	NTS 3/22/19 letter	900,000	604,182	0	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Landfill Mantenance and Monitoring Coal Ash	Unit $ Long Term	$31,680	$26,817	PLM 2017 Budget (not a separate line item in 2019)	31,680	26,817	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tailings Basin Maintenance		$595,000	$397,117	PLM FY 2018 Budget (not a separate line item in 2019) decreased $20K/yr until $10K - Back to Budget + $5K for channels during channel construction then decrease by $20K/yr until $15K	595,000	397,117	0	40,000	20,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	60,000	40,000	25,000	15,000	15,000	15,000	15,000	60,000	40,000	25,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Snow Plowing/Road Maintenance	Unit $ Long Term	$1,197,150	$803,663	PolyMet Snow Plowing (2017-2018) and Road Grading Normal Maintenance [Ames 2019] for road maintenance	1,197,150	803,663	0	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905	39,905
Vehicles (25,000 mi x $0.70/mi)	Unit $ Long Term	$525,000	$352,440	NTS Letter of 3/22/19 no change	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

Comparison to PTM Legacy Long Term Submittal of Dec 2017					3/26/2019
Includes Tailings Basin Dewatering and 30 Years of MDNR, Site Mgr, Monitoring / Reporting (Water Quality, Dam Safety and Landfill) , Snowplowing/Road Maint and Vehicles					
		Previous	**Current**	**Difference**	**Note**
Legacy Ferrous Total with Indirects - NPV		**$13,269,809**	**$13,603,672**	$333,863	
Legacy Ferrous Total with Indirects - Cash		**$18,620,179**	**$19,179,873**	$559,695	
Contingency	**10.0%**	**$1,692,744**	**$1,681,658**	-$11,086	
Adaptive Management	**2.0%**	**$0**	**$130,612**	$130,612	calculation omitted in previous
Engineering Redesign	**2.0%**	**$0**	**$130,612**	$130,612	calculation omitted in previous
Prime Contractor Markup	**2.5%**	**$0**	**$420,414**	$420,414	calculation omitted in previous
Mobilization				$0	
Legacy Ferrous Total (no Indirects)		**$16,927,435**	**$16,816,578**	-$110,857	
Plant Site		$6,755,021	$6,530,584	-$224,437	
Water - Tailings Basin		$6,755,021	$6,530,584	-$224,437	
Water Quality Monitoring		$1,395,625	$1,050,000	-$345,625	2019 Budget - old permit
Tailings Basin Seepage Pumping		$1,424,070	$1,358,744	-$65,326	was 2018 Budget now 2018 Cost
Tailings Basin Dewatering		$3,792,526	$3,979,040	$186,514	Estimate updated
Monitoring/Application for Site Specific Standards		$142,800	$142,800	$0	
Site Administration and Maintenance		$10,172,414	$10,285,994	$113,580	
Site Manager		$3,369,600	$3,432,000	$62,400	2016 Rate updated
DNR - Reclamation		$2,412,800	$2,412,800	$0	
DNR - Long Term		$603,200	$603,200	$0	
Dam Safety Monitoring		$585,364	$589,164	$3,800	Price updated
Landfill Maintenance and Monitoring SW619		$658,710	$900,000	$241,290	2016 Estimate updated (now based on actual cost)
Landfill Mantenance and Monitoring Coal Ash		$34,320	$31,680	-$2,640	less one year of 30 year plan
Tailings Basin Maintenance		$645,000	$595,000	-$50,000	reflects ongoing activity
Snow Plowing/Road Maintenance		$1,338,420	$1,197,150	-$141,270	
Vehicles (25,000 mi x $0.70/mi)		$525,000	$525,000	$0	

Summary of Changes to Legacy Long Term FA Estimate Changes for 2019		
Total Change - NPV	$333,863	
Total Change - Cash	$559,695	
Changes:		
Contingency	-$11,086	
Landfill Mantenance and Monitoring Coal Ash	-$2,640	less one year of 30 year plan
Tailings Basin Maintenance	-$50,000	reflects ongoing activity
Price Update:		
Tailings Basin Dewatering	$186,514	estimate update based on RS Means Construction Cost Index as of 1/1/19
Water Quality Monitoring	-$345,625	based on 2019 PLM Budget (was 2018)
Dam Safety Monitoring	$3,800	price update
Seepage Pumping	-$65,326	based on 2018 PLM Cost (was 2018 Budget)
Landfill Maintenance and Monitoring SW619	$241,290	price update
Snow Plowing/Road Maintenance	-$141,270	Snowplowing based on 2017-2018 Cost - Road Maintenance reflects unit price update
Site Manager	$62,400	price update
Calculation Omission	$681,638	previously omitted from Total with Indirects

General Unit Costs Used in Long Term Estimates
Source Column indicates provider and date of unit cost

Source Name	Source Location
NTS 2019	Attachment D2
Barr 2019	Attachment E1
PolyMet 2019	Attachment F
Ames 2019	Attachment G
DOLI 2016	

Item	Description	Unit	Source	Basis for Quantities (drawing # or describe)	Unit Price	Comments
	General Services Reclamation					
	Pick Up Truck	$/mi	NTS 2019		$ 0.70	NTS Letter of 3/22/19 no change
	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 emoloyment costs
	Skilled Labor	hr	DOLI 2016		$ 45.99	MN DOLI #102 Dec 2016 Skilled Labor * 1.15 to cover emoloyment costs
	MDNR Rate	hr	DNR 2019		$ 116.00	Provided by DNR flat rate for all staff including overhead and expenses (FY 2019)
	Site Manager	yr	NTS 2019		$ 110.00	NTS 3/22/19 letter Professional II
	Monitoring and Maintenance					
	Tailings Basin Geotechnical Instruments Field Work	event	NTS 2019		$ 7,686.00	NTS Letter of 3/22/19 no change
	Tailings Basin Geotechnical Instruments Report	event	NTS 2019		$ 2,850.00	NTS Letter of 3/22/19 no change
	Tailings Basin Geotechnical Inspection and Report	yr	Barr 2019		$ 17,700.00	Barr 3/15/19 letter inactive basin
	Landfill SW619 Maintenance and Monitoring	yr	NTS 2019		$ 30,000.00	NTS 3/22/19 letter
	Coal Ash Landfill Maintenance and Monitoring	yr	allowance		$ 2,640.00	PLM 2017 Budget (not a separate line item in 2019)
	Snow Plowing	yr	PolyMet 2019		$ 19,745.00	PolyMet Snow Plowing (2017-2018)
	FTB Dam Containment System Maintenance	yr	allowance		$ 60,000.00	Allowance for maintaining flow in the drain pipe, maintaining surface water controls, repair of cutoff wall. Note most years will be much less but some could be more.
	Legacy Cell 2W Reclamation	yr	allowance		$ 1,000,000.00	Allowance for 6 years to provide stable slopes, adequate vegetation cover, and drainage provisions to resist erosion and route precipitation away from Cell 2W
	Category 1 Stockpile Cover System Maintenance	yr	allowance		$ 24,000.00	Allowance to cover (1) management of plants with deep, woody roots (2) monitoring of the soil surface cover for erosion and (3) repairing erosion damage
	Category 1 Stockpile Containment System Maintenance	yr	allowance		$ 15,000.00	Allowance to cover maintaining flow in the drain pipe, maintaining surface water controls and repairing the cutoff wall. Note that most years will be much less that this but some could be more.
	FTB Maintenance	yr	allowance		$ 10,000.00	PolyMet's experience with vegetation maintenance and erosion control at this facility indicates that $10,000 annually is sufficient for the whole facility once reclamation is complete and $60,000 a year during reclamation ramping down by $20,000 a year until $10,000 a year once reclamation has been completed.
	HRF Maintenance	yr	allowance		$ 10,000.00	Allowance
	Road Grader	hr	Ames 2019		$ 210.00	Ames 2/25/19 Email with attachment
	Road Maintenance	yr	calculation	one day per month	$ 20,160.00	Road Grading Normal Maintenance [Ames 2019]
	Road Maintenance (during Reclamation)	yr	calculation	one day per week for 9 months	$ 65,520.00	Road Grading Additional Maintenance during Construction[Ames 2019]

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 Preimum	150%	assume time and a half for overtime	
Straight Time Hr equivelent to OT	281		
FTE to add for Alarm Response	**0.14**		

Legacy Tailings Basin Cells 1E and 2E - Order of Magnitude Estimate of Closure Costs (05/24/2017) - Updated for 2019 via RS Means Construction Cost Index

Item	Description	Unit	Quantity	Unit Cost	Inflation	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**				**Factor**	**$3,979,040**	**$270,445**	**$184,337**	**$1,620,871**	**$216,307**	**$205,603**	**$114,184**	**$114,184**	**$114,184**	**$114,184**	**$751,671**	**$153,296**	**$119,776**	
1	Mobilization and Demobilization	LS	5%		1.06	$187,430	$12,878	$8,735	$75,761	$10,110	$9,791	$5,437	$5,437	$5,437	$5,437	$35,403	$7,300	$5,704	Allowance of 5% of Subtotal 1 Cost
2	Environmental Protection Measures (dust control)	LS	3%		1.06	$43,000	$0	$900	$29,900	$4,000	$0	$0	$0	$0	$0	$8,200	$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)					**$3,748,609**	**$257,567**	**$174,702**	**$1,515,210**	**$202,197**	**$195,812**	**$108,746**	**$108,746**	**$108,746**	**$108,746**	**$708,068**	**$145,996**	**$114,072**	
B	**Dewatering**					**$1,187,654**	**$171,371**	**$143,172**	**$151,273**	**$108,746**	**$123,644**	**$108,746**	**$108,746**	**$108,746**	**$108,746**	**$54,462**	**$0**	**$0**	
	Cell 2E to Cell 1E Pumping System					**$46,077**	**$24,227**	**$10,925**	**$10,925**	$0	$0	$0	$0	$0	$0	$0	$0	$0	
1	New Pole Mount Transformers / Motor Starter	LS	1	$6,500	1.06	$6,917	$6,917												
2	Electrical Installation	LS	1	$6,000	1.06	$6,385	$6,385												
3	800' of 8" DR11 HDPE fused and installed	LF	2,400	$7.00	1.06	$17,878	$5,959	$5,959	$5,959										Pipe length to accommodate decreasing pond footprint as dewatering progresses.
4	Allowance for Pump Relocations	LS	1	$8,000	1.06	$8,513	$2,838	$2,838	$2,838										Re-use Existing Pump from Cell 1E
5	Allowance for Electrical Modifications	LS	1	$6,000	1.06	$6,385	$2,128	$2,128	$2,128										
	Cell 1E to SD026 Pumping System					**$44,694**	**$14,898**		**$14,898**		**$14,898**								
6	Piping - 8" DR11 HDPE Procured and Installed	LF	4,000	$7.00	1.06	$29,796	$9,932		$9,932		$9,932								Pipe length to accommodate decreasing pond footprint as dewatering progresses.
7	New Pole Mount Transformers / Motor Starter	LS	0	$6,500	1.06	$0	$0												Already in Place
8	Electrical Installation	LS	0	$6,000	1.06	$0	$0												Already in Place
9	Allowance for Pump	LS	0	$20,000	1.06	$0	$0												Already in Place
10	Allowance for Pump Relocations	LS	1	$8,000	1.06	$8,513	$2,838		$2,838		$2,838								Pump Relocation Activities as Pond Level Drops
11	Allowance for Electrical Modifications	LS	1	$6,000	1.06	$6,385	$2,128		$2,128		$2,128								Electrical Modifications Associated with Pump Relocations
12	pH Adjustment System	LS	0	$45,000	1.06	$0	$0												Already in Place
	Pumping and CO2 Treatment O&M					**$1,096,883**	**$132,247**	**$132,247**	**$125,450**	**$108,746**	**$108,746**	**$108,746**	**$108,746**	**$108,746**	**$108,746**	**$54,462**	**$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	$0.110	in uc	$63,705	$23,500	$23,500	$16,704										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	$0.511	in uc	$1,033,178	$108,746	$108,746	$108,746	$108,746	$108,746	$108,746	$108,746	$108,746	$108,746	$54,462			Unit Cost from Dewatering UC Development Tab
C	**Cell 2E - Grading and Dam Breach**					**$1,539,803**	**$0**	**$31,530**	**$1,363,937**	**$72,168**	**$72,168**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
1	Mass Grading	CY	100,000	$2.50	1.06	$266,035			$266,035										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	1.06	$297,959			$297,959										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	1.06	$56,676			$56,676										Unit Cost from Unit $ Tab (Rip-Rap Eronsion Protection). See Dam Breach Calcs spreadsheet for channel dimension estimate.
4	Filter Material (12" Thick)	CY	741	$35.95	1.06	$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	1.06	$31,530		$31,530											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	1.06	$283,379			$283,379										Unit Cost from Unit $ Tab (Rip-Rap Eronsion Protection). See Dam Breach Calcs spreadsheet for channel dimension estimate.
7	Filter Material (12" Thick)	CY	3,704	$35.95	1.06	$141,690			$141,690										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	1.06	$38,256			$38,256										Unit Cost from Unit $ Tab (Rip-Rap Eronsion Protection). See Dam Breach Calcs spreadsheet for channel dimension estimate.
9	Filter Material (6" Thick)	CY	333	$35.95	1.06	$12,752			$12,752										Assume same Unit Cost as riprap.
10	Initial Seeding (50% Cell area)	AC	310	$776	1.00	$240,560			$240,560										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	$776	1.00	$144,336				$72,168	$72,168								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) - Updated for 2019 via RS Means Construction Cost Index

Item	Description	Unit	Quantity	Unit Cost	Inflation	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**					**$881,750**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$653,606**	**$114,072**	**$114,072**	
1	Mass Grading	CY	50,000	$2.50	1.06	$133,017										$133,017			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	1.06	$55,335										$55,335			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	1.06	$56,676										$56,676			Unit Cost from Unit $ Tab (Rip-Rap Eronsion Protection). See Dam Breach Calcs spreadsheet for channel dimension estimate.
4	Filter Material (12" Thick)	CY	741	$35.95	1.06	$28,338										$28,338			Assume same Unit Cost as riprap.
5	Initial Seeding (50% Cell area)	AC	490	$776	1.00	$380,240										$380,240			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	$776	1.00	$228,144											$114,072	$114,072	Unit Cost from Unit $ Tab (assume seeding 25% slope and 75% flat + mulch))
E	**Other Activities**					**$139,402**	**$86,195**	**$0**	**$0**	**$21,283**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$31,924**	**$0**	
1	Removal of SD004, SD006 and SD026 Collection and Pumpback Systems	LS	1		1.06	$86,195	$86,195												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		1.06	$53,207				$21,283							$31,924		Value is a cost allowance assumed for this activity.

	2017	2019		
RS Means Construction Cost Index from Cost Index Ref tab	213.6	227.3		1.06

Notes:

1) Cell 1E and 2E Order of Magnitude Closure Costs shown are for construction of dam breaches and discharge channels of depths assumed sufficient to drain Cell 1E and 2E ponds.
2) Due to earthwork quantities required it would be impractical to grade Cells 1E and 2E to drain; dam breaches and discharge channels are assumed instead. Feasibility of channel construction has not been confirmed.
3) Closure cost estimate is for closure concept represented by computations and concepts contained in the cost estimate spreadsheet; no accommodation for contingency is included.
4) Costs are estimated present value costs throughout.

Computation Date 04/26/2017

Estimate of Annual Cost - Two pumps running separately with separate inlet lines and moving water simultaneously from Cell 2E to Cell 1E and from Cell 1E to Second Creek		
	Second Creek Pumping and C02 System	**Cell 2E Pumping System**
Pump Model	GPM Eliminator Model No. – SBLH4S50 - 4T4 - S 40 HP, 460V, 60A	GPM Eliminator Model No. – SBLH4S50 - 4T4 - S 40 HP, 460V, 60A
Flow Rate (gpm)	450	450
Pumping Months per Year	12 months per year	12 months per year
Pumping Days Per Year (assumed 90% availability)	328.5	328.5
Pumping Basis	Inlet lines to be buried to prevent freezing lines, separate inlet, pump and outlet lines	Inlet lines to be buried to prevent freezing lines, separate inlet, pump and outlet lines
Pumping Outlet	Second Creek (SD026)	Cell 1E Pond
Power Consumption (kWh/day)	662.40	662.4
Power Rate ($/kWh)	$0.090	$0.090
Power Cost ($/year)	**$19,584**	**$19,584**
CO2 Dewar Tank Fill ($/per)	$98	$0
Dewar Tank Rental ($/day)	$1.25	$0
CO2 Consumption (# Dewar tanks /week)	3	0
CO2 cost ($/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	**$0.511**	**$0.110**

	2017	2019
RS Means Construction Cost Index from Cost Index Ref tab	213.6	227.3
Inflation Facto applied to $/1000 Gallons above		1.06

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

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

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

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

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

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

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

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

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

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

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

Historical Cost Indexes

The table below lists both the RSMeans® historical cost index based on Jan. 1, 1993 = 100 as well as the computed value of an index based on Jan. 1, 2019 costs. Since the Jan. 1, 2019 figure is estimated, space is left to write in the actual index figures as they become available through the quarterly *RSMeans Construction Cost Indexes*.

To compute the actual index based on Jan. 1, 2019 = 100, divide the historical cost index for a particular year by the actual Jan. 1, 2019 construction cost index. Space has been left to advance the index figures as the year progresses.

Year	Historical Cost Index Jan. 1, 1993 = 100		Current Index Based on Jan. 1, 2019 = 100		Year	Historical Cost Index Jan. 1, 1993 = 100	Current Index Based on Jan. 1, 2019 = 100		Year	Historical Cost Index Jan. 1, 1993 = 100	Current Index Based on Jan. 1, 2019 = 100	
	Est.	Actual	Est.	Actual		Actual	Est.	Actual		Actual	Est.	Actual
Oct 2019*					July 2004	143.7	63.2		July 1986	84.2	37.1	
July 2019*					2003	132.0	58.1		1985	82.6	36.3	
April 2019*					2002	128.7	56.6		1984	82.0	36.1	
Jan 2019*	227.3		100.0	100.0	2001	125.1	55.0		1983	80.2	35.3	
July 2018		222.9	98.1		2000	120.9	53.2		1982	76.1	33.5	
2017		213.6	94.0		1999	117.6	51.7		1981	70.0	30.8	
2016		207.3	91.2		1998	115.1	50.6		1980	62.9	27.7	
2015		206.2	90.7		1997	112.8	49.6		1979	57.8	25.4	
2014		204.9	90.1		1996	110.2	48.5		1978	53.5	23.5	
2013		201.2	88.5		1995	107.6	47.3		1977	49.5	21.8	
2012		194.6	85.6		1994	104.4	45.9		1976	46.9	20.6	
2011		191.2	84.1		1993	101.7	44.7		1975	44.8	19.7	
2010		183.5	80.7		1992	99.4	43.7		1974	41.4	18.2	
2009		180.1	79.2		1991	96.8	42.6		1973	37.7	16.6	
2008		180.4	79.4		1990	94.3	41.5		1972	34.8	15.3	
2007		169.4	74.5		1989	92.1	40.5		1971	32.1	14.1	
2006		162.0	71.3		1988	89.9	39.5		1970	28.7	12.6	
2005		151.6	66.7		1987	87.7	38.6		1969	26.9	11.8	

Adjustments to Costs

The "Historical Cost Index" can be used to convert national average building costs at a particular time to the approximate building costs for some other time.

Example:

Estimate and compare construction costs for different years in the same city.

To estimate the national average construction cost of a building in 1970, knowing that it cost $900,000 in 2019:

INDEX in 1970 = 28.7

INDEX in 2019 = 227.3

Time Adjustment Using the Historical Cost Indexes:

$$\frac{\text{Index for Year A}}{\text{Index for Year B}} \times \text{Cost in Year B} = \text{Cost in Year A}$$

$$\frac{\text{INDEX 1970}}{\text{INDEX 2019}} \times \text{Cost 2019} = \text{Cost 1970}$$

$$\frac{28.7}{227.3} \times \$900{,}000 = .126 \times \$900{,}000 = \$113{,}400$$

The construction cost of the building in 1970 was $113,400.

Note: The city cost indexes for Canada can be used to convert U.S. national averages to local costs in Canadian dollars.

Example:

To estimate and compare the cost of a building in Toronto, ON in 2019 with the known cost of $600,000 (US$) in New York, NY in 2019:

INDEX Toronto = 110.1

INDEX New York = 132.1

$$\frac{\text{INDEX Toronto}}{\text{INDEX New York}} \times \text{Cost New York} = \text{Cost Toronto}$$

$$\frac{110.1}{132.1} \times \$600{,}000 = .834 \times \$600{,}000 = \$500{,}076$$

The construction cost of the building in Toronto is $500,076 (CN$).

*Historical Cost Index updates and other resources are provided on the following website:
http://info.thegordiangroup.com/RSMeans.html

Attachments to Legacy Long Term Estimate:

Attachment D2 - NTS 3/22/19 Letter

Environmental Science & Engineering

March 22, 2019

PolyMet Mining, Inc.
Attn. Steve DeVaney
Via Email
sdevaney@polymetmining.com

RE: Cost Estimates for Financial Assurance

As requested on February 13, 2019 by Ms. Christie Kearney, PolyMet Mining, Inc. (PolyMet), below are Northeast Technical Services, Inc. cost estimates for PolyMet's financial assurance estimates.

1. **Hourly labor rates by staff type –** Reference attached *2019 Labor Rate List*

6. **SW-619 industrial landfill monitoring and maintenance, per annum cost estimate (closed state)**

   Total: $30,000

7. **Tailings basin instrumentation inspection, data collection, per annum cost estimate – no change**

   Total: $15,372

8. **Tailings basin instrumentation report preparation, per annum cost estimate – no change**

   Total: $5,700

Please note that all pricing is based on 2019 dollars. If you should have any questions, please feel free to contact Mr. Bruce Trebnick, Northeast Technical Services Project Manager at telephone number 218-742-1051.

Sincerely,

Bruce F. Trebnick
NTS, Project Manager

cc: C.M. Kearney (PolyMet)

2019 Labor Rate List

Report Date: 3/22/2019

NTS Environmental Science & Engineering

Code	Type	Billing Rate
Laborer/Intern	High school diploma	$50
Clerical	Project support	$60
Technician I	2 year technical degree	$65
Technician II	2 year technical degree, 3+ years experience	$75
WWTP Operator I	Class B, C & D certified	$65
WWTP Operator II	Class A certified	$130
Professional I	4 year science or engineering degree (Field Scientist or Data Mgmt)	$85 to $95
Professional II	4 year science or engineering degree, 3+ years experience	$100 to $120
Professional III	4 year science or engineering degree, 10+ years experience	$125 to $145
Professional IV	4 year science or engineering degree, 20+ years experience	$150 to $165

Attachment E1 - Barr Engineering Geotechnical Inspection 3/15/19 Letter

resourceful. naturally.
engineering and environmental consultants

BARR

March 15, 2019

Ms. Christie Kearney
PolyMet Mining Inc.
6500 County Road 666
P.O. Box 475
Hoyt Lakes, MN 55750

Re: NorthMet Contingency Closure Dam Safety Inspections

Dear Ms. Kearney:

As requested, this letter provides the anticipated scope and cost estimate for complying with Dam Safety Permit 1981-2100, Condition 25 - Inspection, Monitoring and Reporting of Construction; compliance with which would be required in the event of Contingency Closure of the NorthMet Project in 2019.

Much of Condition 25 requires documentation and reporting of current year construction, and proposed next year tailings basin construction activities. No tailings basin construction has occurred to date and none is planned in 2019. Further, in the event of Contingency Closure in 2019, construction may also not occur in 2020. If it did, the scope of work described herein would change minimally. Therefore, under the assumption that the Minnesota Department of Natural Resources takes over the tailings basin and permit compliance responsibility in Contingency Closure, the primary compliance activities would include:

- Performance of Annual Dam Safety Inspection
- Acquisition and Review of Performance Monitoring Instrumentation Data
- Data Review, Inspection Findings Review, and Annual Reporting

Based on the activities noted above, the Tasks for which financial assurance would be required would be anticipated to include:

1) Annual Inspection, Monitoring and Reporting Scope of Work Development
2) Geotechnical Subcontractor Procurement/Contracting
3) Annual Dam Safety Inspection
4) Performance Monitoring Instruments Data Acquisition
5) Data Review, Inspection Findings Review, and Annual Reporting

Table 1 provides a summary of estimated 2019 costs for completion of Tasks 1 through 5. The following notes and assumptions apply:

1) Annual Inspection, Monitoring and Reporting Scope of Work Development – it is assumed that the MDNR would utilize previously prepared maps and reports as source/reference documents for drafting the Scope of Work. Accompanying documents would include items such as Instructions to Bidders, Terms and Conditions, Bid Form, and other administrative documents generally available from/prepared by the Minnesota Department of Administration and/or MDNR for

purposes of geotechnical subcontractor procurement. Other portions of the Financial Assurance Plan incorporate these administration activities and associated costs are excluded from Table 1 so as not to duplicate these costs within the Financial Assurance Plan.

2) Geotechnical Subcontractor Procurement/Contracting – this would include solicitation of geotechnical consultant proposals and contracting. As with Task 1, other portions of the Financial Assurance Plan incorporate these administration activities and such costs are excluded from Table 1 so as not to duplicate these costs.
3) Annual Dam Safety Inspection – includes geotechnical subcontractor performance of the Annual Dam Safety Inspection. It is assumed that the inspection is completed by a two-person team in a single day (max. of 10 hours on site per person, plus 10 hours per person for inspection preparation and travel to/from site).
4) Performance Monitoring Instruments Data Acquisition – includes in-field performance monitoring instruments data acquisition, including piezometers, inclinometers, and weirs. Based on the scope of the existing instrumentation network, it is assumed that this task would be completed within one day or less (max. of 8 hours on-site per person) concurrent with and by the two-person annual dam safety inspection team.
5) Data Review, Inspection Findings Review, and Annual Reporting – consists of draft report preparation, presentation of report findings by the geotechnical sub-consultant to the MDNR, MDNR review and comment, and resolution of comments and report finalization by the sub-consultant. Report content is assumed to cover the requirements of the Dam Safety Permit in affect at the time that the work is performed, and include recommendations for dam maintenance as may be required, as well as recommendations for instrumentation modifications and repairs as necessary.

Table 1 Tailings Basin Inspection and Reporting Cost Estimate (Contingency Closure – Tailings Basin Idle)

Task	Estimated Labor Hours	Estimated Labor Cost (1)	Estimated Expense Cost (2)	Estimated Total Cost
1) Scope of Work Development	See Note 1 Above			
2) Subcontractor Procurement	See Note 2 Above			
3) Annual Dam Safety Inspection	40	$6,000	$1,000	$7,000
4) Data Acquisition	16	$2,400	$800	$3,200
5) Data Review and Annual Reporting	70	$10,500	$200	$10,700
Estimated Year 1 Tailings Basin Inspection and Reporting Cost (Tailings Basin Idle)				**$20,900**

Notes:

1) For estimating future year labor costs, assume an annual total labor rate inflation factor of about 3 – 5 percent. Current year costs are based on an assumed average all-in hourly labor rate of $150/hour.
2) For estimating future year expense costs, assume an annual expense rate inflation factor of about 3 – 5 percent. Expenses shown are allowances for expenses that may be incurred during performance of the task listed.

The costs summarized herein are applicable to complying with Dam Safety Permit 1981-2100, Condition 25, in the event of Contingency Closure in 2019. The hourly labor rate is based on mid- to senior-level geotechnical engineers performing the scope of work described.

Following your review of this cost estimate, please contact us with and questions or comments that you may have.

Sincerely,

Thomas J. Radue

Thomas J. Radue, PE
Vice President

Attachment F - PolyMet Snowplowing Invoices for 2017-2018 Season

Laurentian Monument, Granite & Stone PB8802 - Snow Plowing 2017/2018

Invoice Date		Amount
12/5/2017	$	2,331.88
1/8/2018	$	2,690.01
1/31/2018	$	4,144.07
2/28/2018	$	197.50
2/28/2018	$	6,924.70
2/28/2018	$	148.13
4/17/2018	$	3,308.14
	$	**19,744.43**

Available snow removal equipment for Polymet snow removal requirements 2018/2019 season.

John Deere 624H wheel loader w/12' hyd. Runway plow and 3.5 cu. Yd. bucket	$102.00/hr
Dodge 3500 w/9'2" V plow	$ 72.50/hr
Ford F350 w/8'6" V plow	$ 72.50/hr
Chevrolet 2500 w/8'6" v plow	$ 72.50/hr
Caterpillar 287B w/ 96" snow bucket	$ 98.75/hr
Caterpillar 262 w/ 84" snowblower	$105.00/hr
Int'l S2500 w/11' runway plow, 10' wing plow & spreader	$105.00/hr

Additional wheel loader and plow trucks available if necessary from subcontractors at same rates.

A fuel surcharge not to exceed 5% may apply.

Available Snow removal equipment for Polymet snow removal requirements 2017/2018 season

John Deere 624H wheel loader	w/12 Hyd. Runway plow and 3.5 cu.yd. Bkt	$98.75/hr
Dodge 3500	w/ 9'2" V plow	$72.50/hr
Ford F350	w/8'6" V plow	$72.50/hr
Chevrolet 2500	w/8'6" V plow	$72.50/hr
Caterpillar 287B	w/ 96" snow bucket	$98.75/hr
Caterpillar 262	W/84" snow blower	$105.00/hr

Additional Whl Loader and plow trucks available if necessary from subcontractors at same rate.

Attachment G - Ames Unit Prices – 2/25/19 email

Gmail James Scott <jrscotthl@gmail.com>

Fw: 2019 Updated Reclamation Estimate Unit Prices

1 message

Jim Tieberg <jtieberg@polymetmining.com> Wed, Feb 27, 2019 at 7:28 AM
To: Christie Kearney <ckearney@polymetmining.com>, "Jim Scott - PolyMet Mining (jrscotthl@gmail.com)" <jrscotthl@gmail.com>
Cc: Kevin Pylka <kpylka@polymetmining.com>, Rory Oberhelman <roberhelman@polymetmining.com>, Cameron Trembath <ctrembath@polymetmining.com>

Good morning,

Attached are the revised estimated unit cost numbers from Ames. Contact me with any questions.

Jim

James "Jim" Tieberg
Mining Manager
Office: 218-471-2165 | Mobile: 218-248-0952 | Fax: 218-225-4429

PolyMet Mining
6500 County Road 666, Hoyt Lakes, MN 55750 | 218-471-2150
www.polymetmining.com

From: Benjamin Lovin <BenjaminLovin@amesco.com>
Sent: Monday, February 25, 2019 5:01 PM
To: Jim Tieberg
Cc: Martin Husnik
Subject: 2019 Updated Reclamation Estimate Unit Prices

Jim,

Attached please find Ames Construction's updated 2019 reclamation unit prices. I added a column to the spreadsheet for the 2019 unit prices. The methodology and basis of pricing for each item was kept the same, we simply updated the unit prices to reflect 2019 labor and equipment rates. No labor or equipment escalations beyond 2019 have been included. Please let me know if you have any questions or need any additional information. Thanks Jim.

Regards,

Ben

Ames Construction
2000 Ames Drive
Burnsville, MN 55306
Midwest: 952-435-7106

Benjamin Lovin
Regional Vice President
BenjaminLovin@amesco.com
Mobile: 612-919-1854

2019 Update Ames Source - Updated by Ames.xlsx
34K

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

Ames estimates include mobilization

Item	Description	Unit	Source	Basis for Quantities (drawing # or describe)	2016 Unit Price	2019 Unit Price	Comments
	Rock Moving						
	Soil Overburden Relocation (excavate, load and dump) [Ames 2016]	CY	Ames 2016	Excavate, Load and Dump by Contractor	$ 1.60	$ 1.90	Material for haul roads, Cat 1 etc. restoration. [Ames 2016]
	Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016]	$/CY/Mile	Ames 2016	Haul by Contractor	$ 1.85	$ 2.00	Material for haul roads, Cat 1 etc. restoration (assume 2-mile avg. haul distance; 4-mile round-trip) [Ames 2016]
	Site Removal and Restoration						
	Remove & Dispose of Stockpile/Pond Geomembrane Liners (inc soil)	acre	Ames 2016	Cut Geomembrane into Sections/Remove	$ 8,600.00	$ 9,400.00	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]
	Remove & Dispose of Collection pipe	LF	Ames 2016	Cut-Up/Remove/Dispose	$ 15.00	$ 16.00	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
	Remove Stockpile Sumps & Ponds	each	Ames 2016	Break-out sumps/ clean-out ponds	$ 5,000.00	$ 5,300.00	Break-out sumps/ clean-out ponds [Ames 2016]
	Restore Lined Sump & Pond Footprint	acre	Ames 2016	Fill/Grade	$ 6,000.00	$ 6,400.00	Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill [Ames 2016]
	Ditch to be Removed/Filled (new)	LF			N/A	$ 53.00	Assume 18 feet avg. width, 6 feet avg. depth, 2:1 slope
	Fencing, Gates, and Barricades						
	Preparation for Fencing	LF	Ames 2016	Clearing & Grubbing for fencing	$ 9.00	$ 9.00	Ames 2016
	Supply & Install 4 Strand Fence	LF	Ames 2016	Gates & signage separate	$ 8.00	$ 8.50	MnDOT Standard Plate 9323 Rev. D [Ames 2016]
	Supply & Install Non-Climbable Fence	LF	Ames 2016	Gates & signage separate	$ 22.00	$ 25.00	MnDOT Standard Plate 9322 Rev. K [Ames 2016]
	Gates	each	Ames 2016	Per Gate	$ 5,500.00	$ 5,500.00	Gate for access road / pit ramp; MnDOT Standard Plate 9322 Rev. K 20' Wide Vehicular Gate (Double Gate) [Ames 2016]
	Earthworks						
	Grading uneven area for gentle contour and drainge	acre	Ames 2017	Grading for depths 6" to 16"	$ 3,200.00	$ 4,000.00	No hauling of material, Mid size dozer work. [Ames 2017]
	Load, Haul & Place Earthfill from Overburden Storage & Laydown Area	CY	Ames 2017		$ 4.50	$ 5.00	Load, haul and place in East Pit [Ames 2016]
	General Services Reclamation						
	Road Grader	hr	Ames 2017		$ 200.00	$ 210.00	One grader with Operator Ames Email 11/13/17

Attachment 3

Construction Estimate with Supporting Documents
March 2019

Attachment 3 - Construction FA Estimate **3/26/2019**

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

	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note
Construction Total with Indirects		Quantities from Barr Changes Over Time Memo Unless Noted			**$13,164,826**	**$12,075,648**	FA for Cash Amount
Contingency	**10.0%**				**$1,170,207**	**$1,073,391**	
Adaptive Management							normal construction no water mgt
Engineering Redesign							normal construction no water mgt
Prime Contractor Markup	**2.5%**				**$292,552**	**$268,348**	
Construction Total (no Indirects)					**$11,702,067**	**$10,733,909**	
Mine Site					$5,570,728	$5,090,607	
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					$835,605	$778,000	
Cat 2/3		-	-		$0	$0	planned for construction in 2021
Drain Pipe Removal and Prep for Transport	Unit $ Reclamation & Pipe-Liner Off Site Disposal	0	LF	$16.00	$0	$0	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2019]
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	0	LS	$7,904	$0	$0	Transport and Tipping Fees - emails Attachments D3 (03/8/19) and D4 (2/28/19)
Liner Removal and Liner Prep for Transport	Unit $ Reclamation	0	Acre	$9,400	$0	$0	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 2019]
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	0	Acre	$153	$0	$0	Transport and Tipping Fees - emails Attachments D3 (03/8/19) and D4 (2/28/19)
Cover Area (Acres) and Depth (Inches)		0	Acres Inches	12			
Cover Volume (CY) and Haul Distance (Miles)		0	CY Miles	1.5			
Cover - Ovb/Soil (12" thick)	Unit $ Reclamation	0	CF	$4.93	$0	$0	Soil Overburden Relocation (excavate, load and dump) [Ames 2019] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2019] (1.5 mile haul)
Seeding	Unit $ Reclamation	0	Acres	$305	$0	$0	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter]
Cat 4		-	-		$835,605	$778,000	
Drain Pipe Removal and Prep for Transport	Unit $ Reclamation & Pipe-Liner Off Site Disposal	21,590	LF	$16.00	$345,440	$321,626	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2019]
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	1	LS	$3,657	$3,657	$3,405	Transport and Tipping Fees - emails Attachments D3 (03/8/19) and D4 (2/28/19)
Liner Removal and Liner Prep for Transport	Unit $ Reclamation	29	Acre	$9,400	$272,600	$253,807	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 2019]
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	29	Acre	$153	$4,448	$4,141	Transport and Tipping Fees - emails Attachments D3 (03/8/19) and D4 (2/28/19)
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	$4.29	$200,616	$186,786	Soil Overburden Relocation (excavate, load and dump) [Ames 2019] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2019] (1.2 mile haul)
Seeding	Unit $ Reclamation	29	Acres	$305	$8,845	$8,235	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter]
OSP		-	-		$0	$0	planned for construction in 2021
Drain Pipe Removal and Prep for Transport	Unit $ Reclamation & Pipe-Liner Off Site Disposal	0	LF	$16.00	$0	$0	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2019]
Pipe Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	0	LS	$5,645	$0	$0	Transport and Tipping Fees - emails Attachments D3 (03/8/19) and D4 (2/28/19)
Liner Removal and Liner Prep for Transport	Unit $ Reclamation	0	Acre	$9,400	$0	$0	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 2019]
Liner Disposal in Off Site Solid Waste Landfill	pipe-liner off site disposal	0	Acre	$153	$0	$0	Transport and Tipping Fees - emails Attachments D3 (03/8/19) and D4 (2/28/19)
Cover Area (Acres) and Depth (Inches)		0	Acres Inches	12			
Cover Volume (CY) and Haul Distance (Miles)		0	CY Miles	1.2			
Cover - Ovb/Soil (12" thick)	Unit $ Reclamation	0	CF	$4.29	$0	$0	Soil Overburden Relocation (excavate, load and dump) [Ames 2019] plus Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2019] (1.2 mile haul)
Seeding	Unit $ Reclamation	0	Acres	$305	$0	$0	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter]

Start of Year					01/01/19	07/01/19	06/30/20
Bankruptcy							
Calandar Year					2019		2020
							Year of Closure
							1
					2.9%	Oper	Hold
	30 Yr Tot				NPV	1	
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	345,440	321,626	0	0	0	345,440	0
	3,657	3,405	0	0	0	3,657	0
	272,600	253,807	0	0	0	272,600	0
	4,448	4,141	0	0	0	4,448	0
	200,616	186,786	0	0	0	200,616	0
	8,845	8,235	0	0	0	8,845	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0

Attachment 3 - Construction FA Estimate							3/26/2019							
Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA										Start of Year 01/01/19	Bankruptcy 07/01/19	06/30/20	07/01/21	07/01/22
	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note	Calandar Year		2019		2020	2021	2022
Construction Total with Indirects		Quantities from Barr Changes Over Time Memo Unless Noted			**$13,164,826**	**$12,075,648**	FA for Cash Amount							
Contingency	**10.0%**				**$1,170,207**	**$1,073,391**								
Adaptive Management							normal construction no water mgt				Year of Closure			
Engineering Redesign							normal construction no water mgt				1	2	3	4
Prime Contractor Markup	**2.5%**				**$292,552**	**$268,348**								
									2.9%	**Oper**	**Hold**			
Construction Total (no Indirects)					**$11,702,067**	**$10,733,909**		**30 Yr Tot**	**NPV**	1		2	3	4
OSLA					$179,949	$167,544								
Grade Stockpiles of Overburden and Peat	Unit $ Reclamation	41.8	Acres	$4,000	$167,200	$155,674	No hauling of material, Mid size dozer work. [Ames 2019]	167,200	155,674	0	0	0	167,200	0
Seeding	Unit $ Reclamation	41.8	Acres	$305	$12,749	$11,870	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter]	12,749	11,870	0	0	0	12,749	0
Pits					$0	$0	planned for construction in 2021							
Prepare for Fencing	Unit $ Reclamation	$0	LF	$9.00	$0	$0	Ames 2019	0	0	0	0	0	0	0
Pit Fence - Barb Wire 4 Strand	Unit $ Reclamation	0	LF	$8.50	$0	$0	MnDOT Standard Plate 9323 Rev. D [Ames 2019]	0	0	0	0	0	0	0
Pit Fence - Non Climable	Unit $ Reclamation	0	LF	$25.00	$0	$0	MnDOT Standard Plate 9322 Rev. K [Ames 2019]	0	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 2019]	0	0	0	0	0	0	0
Reduce and Grade Overbuburden 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	0
Cover Area (Acres) and Depth (Inches)		0	Acres Inches	24										
Cover Volume (CY) and Haul Distance (Miles)		0	CY											
Cover East Pit Expose Rock	Unit $ Reclamation	0	CY	$5.00	$0	$0	Load, haul and place in East Pit [Ames 2019]	0	0	0	0	0	0	0
Seeding	Unit $ Reclamation	0	Acres	$305	$0	$0	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter]	0	0	0	0	0	0	0
Sumps and Ponds					$849,168	$790,628								
Ponds Clean out	Ponds & Unit $ Reclamation	9	EA	$5,300	$47,700	$44,412	Break-out sumps/ clean-out ponds [Ames 2019]	47,700	44,412	0	0	0	47,700	0
Restore Pond Footprint	Ponds & Unit $ Reclamation	63	Acres	$6,400	$401,280	$373,617	Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill [Ames 2019]	401,280	373,617	0	0	0	401,280	0
Liner Disposal in Off Site Solid Waste Landfill	Ponds & pipe-liner off site disposal	56	Acres	$153	$8,542	$7,954	Transport and Tipping Fees - emails Attachments D3 (03/8/19) and D4 (2/28/19)	8,542	7,954	0	0	0	8,542	0
Pipe Disposal in Off Site Solid Waste Landfill	Ponds & pipe-liner off site disposal	4,500	LF	$1.04	$4,686	$4,363	Transport and Tipping Fees - emails Attachments D3 (03/8/19) and D4 (2/28/19)	4,686	4,363	0	0	0	4,686	0
Stormwater Pond - Restore Footprint	Unit $ Reclamation	17.4	Acres	$6,400.00	$111,360	$103,683	Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill [Ames 2019]	111,360	103,683	0	0	0	111,360	0
Stormwater Ditch Removal (using Ditch Construction $ as placeholder)	Unit $ Reclamation	5,200	LF	$53.00	$275,600	$256,601	Assume 18 feet avg. width, 6 feet avg. depth, 2:1 slope [Ames 2019]	275,600	256,601	0	0	0	275,600	0
Rail Transfer Hopper					$0	$0								
Haul RTH waste rock to East Pit, Plus Grading					$0		Construct Platform with MDNR approved rock. Cover with 2ft soil and vegetate included with Demo below							
Construction					$902,822	$816,893								
Cat 1 Stockpile Footprint Reclamation	SOW3 Cat1 Grading-Seeding(Yr 0)	1	LS	$234,711	$234,711	$212,372	Engineering estimate: Barr Enginering 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 - Updated for 2019 via RS Means Construction Index	234,711	212,372	0	0	0	0	234,711
Cat 1 Stockpile Cont Sys Breaching	SOW21 Cat 1 Cont Sys UC (Yr 0)	1	LS	$668,111	$668,111	$604,521	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 - Updated for 2019 via RS Means Construction Index	668,111	604,521	0	0	0	0	668,111
Demo					$2,079,875	$1,883,076	Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)							
Fueling and Maintenance Facility	Demo	1	LS	$28,162	$28,162	$26,221		28,162	26,221	0	0	0	28,162	0
Rail Transfer Hopper	Demo	0	LS	$87,822	$0	$0	planned for construction in 2021	0	0	0	0	0	0	0
Rail Transfer Hopper Control Bldg	Demo	0	LS	$19,074	$0	$0	planned for construction in 2021	0	0	0	0	0	0	0
Rail Transfer Hopper Platform	Demo	0	LS	$61,200	$0	$0	planned for construction in 2021	0	0	0	0	0	0	0
Central Pumping Station	Demo	1	LS	$16,014	$16,014	$14,910		16,014	14,910	0	0	0	16,014	0
Railroads	Demo	1	LS	$80,325	$80,325	$72,680		80,325	72,680	0	0	0	0	80,325
Pipelines	Demo	1	LS	$813,076	$813,076	$735,689		813,076	735,689	0	0	0	0	813,076
Power Lines	Demo	1	LS	$85,578	$85,578	$77,433		85,578	77,433	0	0	0	0	85,578
Roads and Parking Lots	Demo	1	LS	$534,480	$534,480	$483,609		534,480	483,609	0	0	0	0	534,480
Wasteweater Treatment Facility	Demo	1	LS	$522,240	$522,240	$472,534		522,240	472,534	0	0	0	0	522,240
Other					$723,309	$654,466								
Abandon Mine Site Exploration Boreholes		1	LS	$500,000	$500,000	$452,411	PLM Estimate 76,000 feet of exploration borehole = approximately $250,000 to grout and seal permanently. Some may require redrilling = $250,000. Total cost = $500,000.	500,000	452,411	0	0	0	0	500,000
Abandon Mine Site Surficial Wells	Well Abandonment	34	wells	$1,841	$62,593	$56,635	Based on 2019 Bids to Barr Engineering	62,593	56,635	0	0	0	0	62,593
Abandon Mine Site Bedrock Wells	Well Abandonment	29	wells	$5,542	$160,716	$145,419	Based on 2019 Bids to Barr Engineering	160,716	145,419	0	0	0	0	160,716

Attachment 3 - Construction FA Estimate **3/26/2019**

Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA								Start of Year	Bankruptcy			
	Support Tab	Quantity	Units	Unit $	Cash $	NPV $	Note	01/01/19	07/01/19	06/30/20	07/01/21	07/01/22
Construction Total with Indirects		Quantities from Barr Changes Over Time Memo Unless Noted			**$13,164,826**	**$12,075,648**	FA for Cash Amount	Calandar Year	2019	2020	2021	2022
Contingency	**10.0%**				**$1,170,207**	**$1,073,391**						
Adaptive Management							normal construction no water mgt			Year of Closure		
Engineering Redesign							normal construction no water mgt			1	2	3	4
Prime Contractor Markup	**2.5%**				**$292,552**	**$268,348**						
									2.9%	Oper	Hold			
Construction Total (no Indirects)					**$11,702,067**	**$10,733,909**		**30 Yr Tot**	**NPV**	1		2	3	4
Plant Site					$4,342,980	$3,977,730								
General Reclamation		$1	LS		$34,334	$31,967								
HRF Disturbance	SOW11 HRF Cover Sys UC (Yr 0)	1	LS	$34,334	$34,334	$31,967	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 - Updated for 2019 via RS Means Construction Index	34,334	31,967	0	0	0	34,334	0
Construction					$435,440	$405,422								
FTB Borrow Area & Disturbed Area	SOW14 FTB Grading-Seedin (Yr 0)	1	LS	$435,440	$435,440	$405,422	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) - Updated for 2019 via RS Means Construction Index	435,440	405,422	0	0	0	435,440	0
FTB Overflow	SOW14 FTB Emerg OFlow (Yr 1)	0	LS	$239,559	$0	$0	Not needed - dry closure of Legacy Tailings Basin	0	0	0	0	0	0	0
Demo and Abatement					$3,873,205	$3,540,341								
Legacy Structure Removal														
Area 1 Shop Buildings	Demo	0	LS	$262,187	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Area 2 Shop Buildings	Demo	0	LS	$221,419	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Main Plant Area - Demoed in Construction	Demo	0	LS	$1,688,457	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Main Plant Area	Demo	0	LS	$20,286,716	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Main Gate Colby PH Ad Bldg	Demo	0	LS	$248,033	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Roads	Demo	0	LS	$673,200	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Railroads	Demo	0	LS	$387,600	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Power System	Demo	0	LS	$99,766	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Piping System	Demo	0	LS	$2,936,580	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Legacy Asbestos Abatement							in Legacy Reclamation							
Area 1 Shop Buildings	Demo	0	LS	$116,155	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Area 2 Shop Buildings	Demo	0	LS	$214,293	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Main Plant Area	Demo	0	LS	$4,480,820	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Main Gate Colby PH Ad Bldg	Demo	0	LS	$904,500	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Project Phase 1							Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)							
Flotation Plant and Reagent Building	Demo	1	LS	$861,288	$861,288	$802,092		861,288	802,092	0	0	215,322	430,644	215,322
Concentrate Storage and Loadout Facility	Demo	1	LS	$340,537	$340,537	$317,132		340,537	317,132	0	0	85,134	170,269	85,134
Plant Site Sewage Treatment Plant	Demo	1	LS	$150,960	$150,960	$140,585		150,960	140,585	0	0	37,740	75,480	37,740
Railroads	Demo	1	LS	$301,920	$301,920	$273,184		301,920	273,184	0	0	0	0	301,920
Pipelines	Demo	1	LS	$1,968,600	$1,968,600	$1,781,233		1,968,600	1,781,233	0	0	0	0	1,968,600
Power Lines		none constructed												
Roads and Parking Lots		none constructed												
Plant Site Wastewater Treatment Plant	Demo	1	LS	$249,900	$249,900	$226,115		249,900	226,115	0	0	0	0	249,900
Other					$0	$0								
AST Removal	AST	0	LS	$283,172	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
AOCs	AOC	0	LS	$7,160,825	$0	$0	in Legacy Reclamation	0	0	0	0	0	0	0
Site Administration and Maintenance					$1,788,360	$1,665,572								
Legacy					$0	$0								
Site Manager - annual $ / FTE - calc from hourly rate		$0	$/yr $/hr	$ -										
Site Manager		0	FTE	$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Dam Instrumentation Field Work + Report per Event		0	Event	$0										
Geotechnical Inspection and Report from Unit $		0	Year	$0										
Dam Safety Monitoring		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Landfill Maintenance and Monitoring SW619		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Landfill Mantenance and Monitoring Coal Ash		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Tailings Basin Maint		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Snow Plowing/Road Maint		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Vehicles (25,000 mi x $0.70/mi)		0		$0	$0	$0	in Legacy Long Term	0	0	0	0	0	0	0
Project Disturbances					$1,788,360	$1,665,572								
Project Manager - annual $ / FTE - calc from hourly rate	Unit $ Reclamation	$286,000	$/yr $/hr	$ 137.50			Barr 2019 Fee Schedule Average of Top Level Engineer [Barr 2019]							
Project Manager		1	FTE	$286,000	$858,000	$799,090		858,000	799,090	0	0	286,000	286,000	286,000
Superintendent's Light Truck - Annual Miles	Unit $ Reclamation	15,000	miles/yr	$0.70	$31,500	$29,337	NTS Letter of 3/22/19 - no change	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 2019 Fee Schedule Average of Mid Level Engineer [Barr 2019]							
Project Engineer		1	FTE	$223,600	$670,800	$624,743		670,800	624,743	0	0	223,600	223,600	223,600
Engineer's Light Truck - Annual Miles	Unit $ Reclamation	15,000	miles/yr	$0.70	$31,500	$29,337	NTS Letter of 3/22/19 - no change	31,500	29,337	0	0	10,500	10,500	10,500
Road Maintenance	Unit $ Long Term	1	yr	$65,520	$196,560	$183,064	Road Grading Additional Maintenance during Construction[Ames 2019]	196,560	183,064	0	0	65,520	65,520	65,520

Comparison to PTM Construction Submittal of Dec 2017					3/26/2019
Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA					
		Previous	Current	Difference	Note
Construction Total with Indirects		**$16,271,537**	**$13,164,826**	($3,106,711)	
Contingency	**10.0%**	**$1,446,359**	**$1,170,207**	($276,152)	
Adaptive Management				$0	
Engineering Redesign				$0	
Prime Contractor Markup	**2.5%**	**$361,590**	**$292,552**	($69,038)	
				$0	
Construction Total (no Indirects)		**$14,463,588**	**$11,702,067**	($2,761,521)	
Mine Site		$8,450,657	$5,570,728	($2,879,929)	
General Reclamation				$0	
Stockpile Relocation		$0	$0	$0	
Cat 2/3 - rock		$0.00	$0	$0	
Cat 2/3 - sat overburden		$0.00	$0	$0	
Cat 4 - rock		$0.00	$0	$0	
Cat 4 - sat overburden		$0.00	$0	$0	
OSP - rock		$0.00	$0	$0	
Stockpile Footprint Reclamation		$3,414,499	$835,605	($2,578,894)	
Cat 2/3		$1,704,755	$0	($1,704,755)	planned for construction in 2021
Drain Pipe Removal and Prep for Transport		$679,500	$0	($679,500)	Unit Cost Update
Pipe Disposal in Off Site Solid Waste Landfill		$7,837	$0	($7,837)	Transport Cost and Tipping Fee Update
Liner Removal and Liner Prep for Transport		$541,800	$0	($541,800)	Unit Cost Update
Liner Disposal in Off Site Solid Waste Landfill		$9,580	$0	($9,580)	Transport Cost and Tipping Fee Update
Cover - Ovb/Soil (12" thick)		$447,453	$0	($447,453)	Unit Cost Update
Seeding		$18,585	$0	($18,585)	Unit Cost Update
Cat 4		$768,042	$835,605	$67,563	
Drain Pipe Removal and Prep for Transport		$323,850	$345,440	$21,590	Unit Cost Update
Pipe Disposal in Off Site Solid Waste Landfill		$3,626	$3,657	$31	Transport Cost and Tipping Fee Update
Liner Removal and Liner Prep for Transport		$249,400	$272,600	$23,200	Unit Cost Update
Liner Disposal in Off Site Solid Waste Landfill		$4,410	$4,448	$38	Transport Cost and Tipping Fee Update
Cover - Ovb/Soil (12" thick)		$178,200	$200,616	$22,415	Unit Cost Update
Seeding		$8,555	$8,845	$290	Unit Cost Update
OSP		$941,702.28	$0	($941,702)	planned for construction in 2021
Drain Pipe Removal and Prep for Transport		$450,000	$0	($450,000)	Unit Cost Update
Pipe Disposal in Off Site Solid Waste Landfill		$5,597	$0	($5,597)	Transport Cost and Tipping Fee Update
Liner Removal and Liner Prep for Transport		$275,200	$0	($275,200)	Unit Cost Update
Liner Disposal in Off Site Solid Waste Landfill		$4,866	$0	($4,866)	Transport Cost and Tipping Fee Update
Cover - Ovb/Soil (12" thick)		$196,599	$0	($196,599)	Unit Cost Update
Seeding		$9,440	$0	($9,440)	Unit Cost Update
OSLA		$98,932	$179,949	$81,017	
Grade Stockpiles of Overburden and Peat		$86,601	$167,200	$80,599	Unit Cost Update and formula correction
Seeding		$12,331	$12,749	$418	Unit Cost Update

Comparison to PTM Construction Submittal of Dec 2017					3/26/2019
Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA					
		Previous	Current	Difference	Note
Construction Total with Indirects		**$16,271,537**	**$13,164,826**	($3,106,711)	
Contingency	**10.0%**	**$1,446,359**	**$1,170,207**	($276,152)	
Adaptive Management				$0	
Engineering Redesign				$0	
Prime Contractor Markup	**2.5%**	**$361,590**	**$292,552**	($69,038)	
				$0	
Construction Total (no Indirects)		**$14,463,588**	**$11,702,067**	($2,761,521)	
Pits		$1,407,425	$0	($1,407,425)	planned for construction in 2021
Prepare for Fencing		$0.00	$0	$0	
Pit Fence - Barb Wire 4 Strand		$0.00	$0	$0	
Pit Fence - Non Climable		$0.00	$0	$0	
Gates		$0	$0	$0	
Reduce and Grade Overbuburden Wall		$0	$0	$0	
Cover East Pit Expose Rock		$1,379,400	$0	($1,379,400)	Unit Cost Update
Seeding		$28,025	$0	($28,025)	Unit Cost Update
Sumps and Ponds		$434,317	$849,168	$414,852	
Ponds Clean out		$45,000	$47,700	$2,700	Unit Cost Update
Restore Pond Footprint		$376,200	$401,280	$25,080	Unit Cost Update
Liner Disposal in Off Site Solid Waste Landfill		$8,470	$8,542	$72	Transport Cost and Tipping Fee Update
Pipe Disposal in Off Site Solid Waste Landfill		$4,646	$4,686	$40	Transport Cost and Tipping Fee Update
Stormwater Pond - Restore Footprint		$0	$111,360	$111,360	added stormwater system
Stormwater Ditch Removal		$0	$275,600	$275,600	added stormwater system
Rail Transfer Hopper		$0	$0	$0	
Haul RTH waste rock to East Pit, Plus Grading		$0	$0	$0	
Construction		$825,591	$902,822	$77,231	
Cat 1 Stockpile Footprint Reclamation		$214,255	$234,711	$20,457	error in supporting tab reseeding omitted, Unit Cost Update (seeding) and estimate updated via RS Means Construction Cost Index
Cat 1 Stockpile Cont Sys Breaching		$611,337	$668,111	$56,774	Unit Cost Update (seeding) and estimate updated via RS Means Construction Cost Index
Demo		$2,203,893	$2,079,875	($124,018)	
Fueling and Maintenance Facility		$27,610	$28,162	$552	Lakehead update
Rail Transfer Hopper		$86,100	$0	($86,100)	planned for construction in 2021
Rail Transfer Hopper Control Bldg		$18,700	$0	($18,700)	planned for construction in 2021
Rail Transfer Hopper Platform		$60,000	$0	($60,000)	planned for construction in 2021
Central Pumping Station		$15,700	$16,014	$314	Lakehead update
Railroads		$78,750	$80,325	$1,575	Lakehead update
Pipelines		$797,133	$813,076	$15,943	Lakehead update
Power Lines		$83,900	$85,578	$1,678	Lakehead update
Roads and Parking Lots		$524,000	$534,480	$10,480	Lakehead update
Wasteweater Treatment Facility		$512,000	$522,240	$10,240	Lakehead update
Other		$66,000	$723,309	$657,309	
Abandon Mine Site Exploration Boreholes		$0	$500,000	$500,000	added borehole abandonment
Abandon Mine Site Wells		$66,000	$223,309	$157,309	wells added in permitting
Plant Site		$4,233,931	$4,342,980	$109,048	
General Reclamation		$31,310	$34,334	$3,024	
HRF Disturbance		$31,310	$34,334	$3,024	Unit Cost Update (seeding) and estimate updated via RS Means Construction Cost Index
Construction		$405,361	$435,440	$30,079	
FTB Borrow Area & Disturbed Area		$405,361	$435,440	$30,079	Unit Cost Update (seeding) and estimate updated via RS Means Construction Cost Index
FTB Overflow		$0	$0	$0	

Comparison to PTM Construction Submittal of Dec 2017					3/26/2019
Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA					
		Previous	Current	Difference	Note
Construction Total with Indirects		**$16,271,537**	**$13,164,826**	($3,106,711)	
Contingency	**10.0%**	**$1,446,359**	**$1,170,207**	($276,152)	
Adaptive Management				$0	
Engineering Redesign				$0	
Prime Contractor Markup	**2.5%**	**$361,590**	**$292,552**	($69,038)	
				$0	
Construction Total (no Indirects)		**$14,463,588**	**$11,702,067**	($2,761,521)	
Demo and Abatement		$3,797,260	$3,873,205	$75,945	
Legacy Structure Removal				$0	
Area 1 Shop Buildings		$0	$0	$0	
Area 2 Shop Buildings		$0	$0	$0	
Main Plant Area - Demoed in Construction		$0	$0	$0	
Main Plant Area		$0	$0	$0	
Main Gate Colby PH Ad Bldg		$0	$0	$0	
Roads		$0	$0	$0	
Railroads		$0	$0	$0	
Power System		$0	$0	$0	
Piping System		$0	$0	$0	
Legacy Asbestos Abatement					
Area 1 Shop Buildings		$0	$0	$0	
Area 2 Shop Buildings		$0	$0	$0	
Main Plant Area		$0	$0	$0	
Main Gate Colby PH Ad Bldg		$0	$0	$0	
Project Phase 1					
Flotation Plant and Reagent Building		$844,400	$861,288	$16,888	Lakehead update
Concentrate Storage and Loadout Facility		$333,860	$340,537	$6,677	Lakehead update
Plant Site Sewage Treatment Plant		$148,000	$150,960	$2,960	Lakehead update
Railroads		$296,000	$301,920	$5,920	Lakehead update
Pipelines		$1,930,000	$1,968,600	$38,600	Lakehead update
Power Lines				$0	
Roads and Parking Lots				$0	
Plant Site Wastewater Treatment Plant		$245,000	$249,900	$4,900	Lakehead update
Other		$0	$0	$0	
AST Removal		$0	$0	$0	
AOCs		$0	$0	$0	
Site Administration and Maintenance		$1,779,000	$1,788,360	$9,360	
Legacy		$0	$0	$0	
Site Manager		$0	$0	$0	
Dam Safety Monitoring		$0	$0	$0	
Landfill Maintenance and Monitoring SW619		$0	$0	$0	
Landfill Mantenance and Monitoring Coal Ash		$0	$0	$0	
Tailings Basin Maint		$0	$0	$0	
Snow Plowing/Road Maint		$0	$0	$0	
Vehicles (25,000 mi x $0.70/mi)		$0	$0	$0	
Project Disturbances		$1,779,000	$1,788,360	$9,360	
Project Manager		$858,000	$858,000	$0	
Superintendent's Light Truck - Annual Miles		$31,500.00	$31,500	$0	
Project Engineer		$670,800	$670,800	$0	
Engineer's Light Truck - Annual Miles		$31,500.00	$31,500	$0	
Road Maintenance		$187,200	$196,560	$9,360	Unit Cost Update

Comparison to PTM Construction Submittal of Dec 2017				3/26/2019
Includes Demo of Project Buildings, Project Construction Disturbances - assume added to Legacy FA				
		Previous	Current	Difference	Note
Construction Total with Indirects		**$16,271,537**	**$13,164,826**	($3,106,711)	
Contingency	**10.0%**	**$1,446,359**	**$1,170,207**	($276,152)	
Adaptive Management				$0	
Engineering Redesign				$0	
Prime Contractor Markup	**2.5%**	**$361,590**	**$292,552**	($69,038)	
				$0	
Construction Total (no Indirects)		**$14,463,588**	**$11,702,067**	($2,761,521)	

Summary of Changes to Construction FA Estimate Changes for 2019		
Total Change	-$3,106,711	
Changes:		
Contingency	-$276,152	
Prime Contractor Markup	-$69,038	
Cat 2/3 Stockpile Footprint Reclamation	-$1,704,755	planned for construction in 2021
OSP Footprint Reclamation	-$941,702	planned for construction in 2021
Cover East Pit Exposed Rock	-$1,407,425	planned for construction in 2021
Rail Transfer Hopper Demo	-$164,800	planned for construction in 2021
Added:		
Stormwater System	$386,960	new item
Abandon Mine Site Exploration Boreholes	$500,000	new item
Abandon Mine Site Wells	$157,309	wells added in permitting and updated prices
Price Update:		
Seeding Unit Price	$708	updated
Cat 1 Stockpile Footprint Reclamation	$20,457	estimate updated based on RS Means Index and seeding Unit Price
Cat 1 Stockpile Cont Sys Breaching	$56,774	
HRF Disturbance	$3,024	
FTB Borrow Area & Disturbed Area	$30,079	
Cat 4 Earthwork	$67,205	Ames Unit Price update
OSLA Earthwork	$80,599	Ames Unit Price update and error fixed
Ponds Earthwork	$27,780	Ames Unit Price update
Road Maintenance	$9,360	Ames Unit Price update
Off Site Disposal	$180	Wayne Transport Price and Tipping Fee
Demo	$116,727	Lakehead update

General Unit Costs Used in Reclamation Estimates
Source Column indicates provider and date of unit cost

Source Name	Source Location	
Ames 2016		Ames estimates include mobilization
NTS 2019	Attachment D2	
Barr 2019	Attachment E2	
Ames 2019	Attachment G	Ames estimates include mobilization
D&T 2019	Attachment H	

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 2019]	CY	Ames 2019	Excavate, Load and Dump by Contractor	$ 1.90	Material for haul roads, Cat 1 etc. restoration. [Ames 2019]
5	Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2019]	$/CY/Mile	Ames 2019	Haul by Contractor	$ 2.00	Material for haul roads, Cat 1 etc. restoration (assume 2-mile avg. haul distance; 4-mile round-trip) [Ames 2019]
	Site Removal and Restoration					
6	Remove & Dispose of Stockpile/Pond Geomembrane Liners (inc soil)	acre	Ames 2019	Cut Geomembrane into Sections/Remove	$ 9,400	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 2019]
7	Remove & Dispose of Collection pipe	LF	Ames 2019	Cut-Up/Remove/Dispose	$ 16.00	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2019]
8	Remove Stockpile Sumps & Ponds	each	Ames 2019	Break-out sumps/ clean-out ponds	$ 5,300	Break-out sumps/ clean-out ponds [Ames 2019]
9	Restore Lined Sump & Pond Footprint	acre	Ames 2019	Fill/Grade	$ 6,400	Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill [Ames 2019]
10	Ditch to be Removed	LF	Ames 2019	Haul Overburden/Fill & Compact	$ 53.00	Assume 18 feet avg. width, 6 feet avg. depth, 2:1 slope [Ames 2019]
	Fencing, Gates, and Barricades					
11	Preparation for Fencing	LF	Ames 2019	Clearing & Grubbing for fencing	$ 9.00	Ames 2019
12	Supply & Install 4 Strand Fence	LF	Ames 2019	Gates & signage separate	$ 8.50	MnDOT Standard Plate 9323 Rev. D [Ames 2019]
13	Supply & Install Non-Climbable Fence	LF	Ames 2019	Gates & signage separate	$ 25.00	MnDOT Standard Plate 9322 Rev. K [Ames 2019]
14	Gates	each	Ames 2019	Per Gate	$ 5,500	Gate for access road / pit ramp; MnDOT Standard Plate 9322 Rev. K 20' Wide Vehicular Gate (Double Gate) [Ames 2019]
	Earthworks					
15	Grading uneven area for gentle contour and drainge	acre	Ames 2019	Grading for depths 6" to 16"	$ 4,000.00	No hauling of material, Mid size dozer work. [Ames 2019]
16	Load, Haul & Place Earthfill from Overburden Storage & Laydown Area	CY	Ames 2019		$ 5.00	Load, haul and place in East Pit [Ames 2019]
	General Services Reclamation					
17	Pick Up Truck	$/mi	NTS 2019		$ 0.70	NTS Letter of 3/22/19 - no change
18	Abandon Well	$/mi	Barr 2017	NOT USED	$ 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)					
19	Project Manager	yr	Barr 2019		$ 137.50	Barr 2019 Fee Schedule Average of Top Level Engineer [Barr 2019]
20	Project Engineer	yr	Barr 2019		$ 107.50	Barr 2019 Fee Schedule Average of Mid Level Engineer [Barr 2019]
21	Project Inspector	yr	Barr 2019		$ 70.00	Barr 2019 Fee Schedule Average of Technician I [Barr 2019]
	Vegetation Establishment					
22	Seed and Fertilize for Vegetation Establishment - Mine Overburden Area	acre	D&T 2019		$ 305.00	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter]

General Unit Costs Used in Long Term Estimates
Source Column indicates provider and date of unit cost

Source Name	Source Location
NTS 2019	Attachment D2
Barr 2019	Attachment E1
PolyMet 2019	Attachment F
Ames 2019	Attachment G
DOLI 2016	

Item	Description	Unit	Source	Basis for Quantities (drawing # or describe)	Unit Price	Comments
	General Services Reclamation					
	Pick Up Truck	$/mi	NTS 2019		$ 0.70	NTS Letter of 3/22/19 no change
	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 emoloyment costs
	Skilled Labor	hr	DOLI 2016		$ 45.99	MN DOLI #102 Dec 2016 Skilled Labor * 1.15 to cover emoloyment costs
	MDNR Rate	hr	DNR 2019		$ 116.00	Provided by DNR flat rate for all staff including overhead and expenses (FY 2019)
	Site Manager	yr	NTS 2019		$ 110.00	NTS 3/22/19 letter Professional II
	Monitoring and Maintenance					
	Tailings Basin Geotechnical Instruments Field Work	event	NTS 2019		$ 7,686.00	NTS Letter of 3/22/19 no change
	Tailings Basin Geotechnical Instruments Report	event	NTS 2019		$ 2,850.00	NTS Letter of 3/22/19 no change
	Tailings Basin Geotechnical Inspection and Report	yr	Barr 2019		$ 17,700.00	Barr 3/15/19 letter inactive basin
	Landfill SW619 Maintenance and Monitoring	yr	NTS 2019		$ 30,000.00	NTS 3/22/19 letter
	Coal Ash Landfill Maintenance and Monitoring	yr	allowance		$ 2,640.00	PLM 2017 Budget (not a separate line item in 2019)
	Snow Plowing	yr	PolyMet 2019		$ 19,745.00	PolyMet Snow Plowing (2017-2018)
	FTB Dam Containment System Maintenance	yr	allowance		$ 60,000.00	Allowance for maintaining flow in the drain pipe, maintaining surface water controls, repair of cutoff wall. Note most years will be much less but some could be more.
	Legacy Cell 2W Reclamation	yr	allowance		$ 1,000,000.00	Allowance for 6 years to provide stable slopes, adequate vegetation cover, and drainage provisions to resist erosion and route precipitation away from Cell 2W
	Category 1 Stockpile Cover System Maintenance	yr	allowance		$ 24,000.00	Allowance to cover (1) management of plants with deep, woody roots (2) monitoring of the soil surface cover for erosion and (3) repairing erosion damage
	Category 1 Stockpile Containment System Maintenance	yr	allowance		$ 15,000.00	Allowance to cover maintaining flow in the drain pipe, maintaining surface water controls and repairing the cutoff wall. Note that most years will be much less that this but some could be more.
	FTB Maintenance	yr	allowance		$ 10,000.00	PolyMet's experience with vegetation maintenance and erosion control at this facility indicates that $10,000 annually is sufficient for the whole facility once reclamation is complete and $60,000 a year during reclamation ramping down by $20,000 a year until $10,000 a year once reclamation has been completed.
	HRF Maintenance	yr	allowance		$ 10,000.00	Allowance
	Road Grader	hr	Ames 2019		$ 210.00	Ames 2/25/19 Email with attachment
	Road Maintenance	yr	calculation	one day per month	$ 20,160.00	Road Grading Normal Maintenance [Ames 2019]
	Road Maintenance (during Reclamation)	yr	calculation	one day per week for 9 months	$ 65,520.00	Road Grading Additional Maintenance during Construction[Ames 2019]

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 Preimum	150%	assume time and a half for overtime	
Straight Time Hr equivelent to OT	281		
FTE to add for Alarm Response	**0.14**		

Development of Costs for Transport and Off-Site Disposal of Membrane and Pipe from Lined Facilities 04/27/17

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	$450.00	$9.00	emails Attachments D3 (03/8/19) and D4 (2/28/19)

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	$450.00	$9.00	$261.00	$711.00	$0.11
6	6.9	0.00962	29	3015	$450.00	$9.00	$261.00	$711.00	$0.24
8	9.1	0.01673	29	1734	$450.00	$9.00	$261.00	$711.00	$0.41
10	11.4	0.02625	29	1105	$450.00	$9.00	$261.00	$711.00	$0.64
12	14.5	0.04247	29	683	$450.00	$9.00	$261.00	$711.00	$1.04

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	$450.00	$9.00	$261.00	$711.00	**$153.36**

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	$3,674	14,000	$1,598	19,700	$2,248
6	9,600	$2,264	6,300	$1,486	7,400	$1,745
8	1,400	$574	1,200	$492	1,600	$656
10	2,000	$1,287	30	$19	900	$579
12	100	$104	60	$62	400	$417
Total Ft	**45,300**		**21,590**		**30,000**	
Total $		**$7,904**		**$3,657**		**$5,645**

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	$9,688	31,000	$3,537	19,700	$2,248
6	25,100	$5,918	9,400	$2,216	7,400	$1,745
8	4,200	$1,723	1,200	$492	1,600	$656
10	5,100	$3,283	30	$19	900	$579
12	200	$208	60	$62	400	$417
Total Ft	**119,500**		**41,690**		**30,000**	
Total $		**$20,820**		**$6,328**		**$5,645**

* Lengths from Barr Changes Over Time Memo

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

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

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

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

Mine Year 20 - Pond and Sump Acres from Barr Changes Over Time Memo

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

Well Abandonment **Based on 2019 Bids to Barr Engineering** **2/26/2019**

Development of Unit Well Abandonment Cost

Task	Quanity	Units	Unit Cost	Inflantion Factor	Cost	Note
Peterson 2019 Bid:						
Sealing Fee	1	per well	$75	1	$75	
Setup on Well	1	per well	$1,500	1	$1,500	
Unit Cost	20	ft	$15.00	1	$300	
Mob/Demob/Admin (% of SubTotal)			15%		$281	
Total					$2,157	
Graves 2019 Bid:						
Sealing Fee	1	per well	$185	1	$185	
Setup on Well	1	per well	$400	1	$400	
Unit Cost	20	ft	$37.00	1	$741	
Mob/Demob/Admin (% of SubTotal)			15%		$199	
Total					$1,525	
Average Surficial Well	20				**$1,841**	average surficial well depth from below
Surficial Well Peterson 2019 Bid:						
Sealing Fee	1	per well	$75	1	$75	
Setup on Well	1	per well	$1,500	1	$1,500	
Unit Cost	144	ft	$15.00	1	$2,157	
Mob/Demob/Admin (% of SubTotal)			15%		$560	
Total					$4,292	
Surficial Well Graves 2019 Bid:						
Sealing Fee	1	per well	$185	1	$185	
Setup on Well	1	per well	$400	1	$400	
Unit Cost	144	ft	$37.00	1	$5,321	
Mob/Demob/Admin (% of SubTotal)			15%		$886	
Total					$6,792	
Average Bedrock Well Cost	144				**$5,542**	average bedrock well depth from below

Mine Site Surficial Wells	
Well ID	Depth
GW002	21
GW009	13.5
GW010	18.1
GW015	22
GW016	13.5
GW236	16
GW237	15
GW402	15
GW403	11
GW405	13.9
GW407	14.3
GW408	14.5
GW409	15
GW411	17.1
GW412	10.3
GW414	17.6
GW415	17
GW416	14.7
GW417	14.6
GW418	15
GW419	30
GW420	13
GW421	10
GW422	30
GW430	30
GW468	30
GW470	30
GW471	30
GW472	30
GW473	30
GW477	30
GW478	30
GW479	30
GW499	19
Average	20
Number of Wells	34

Mine Site Bedrock Wells	
Well ID	Depth
GW109	33
GW110	39
GW115	46
GW116	35
GW121	80
GW501	45
GW502	58
GW504	100
GW505	100
GW506	55
GW507	100
GW508	235
GW509	223
GW510	221
GW512	221
GW514	233
GW515	225
GW516	40
GW517	225
GW518	230
GW519	246
GW521	219
GW522	349
GW523	366
GW524	42
GW525	48
GW530	113
GW531	104.5
GW532	139
Average	144
Number of Wells	29

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

Barr Enginering 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 - Updated for 2019 via RS Means Construction Index

Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Inflation Factor	Cost Extension	Comments
1	Mobilization/Demobilization	LS	1	See Comments and Notes	$25,000	1.10	$27,412	To Be Determined By Contractor - Mob for General Earthwork, Site Grading and Vegetation Establishment
2	Environmental Protection Measures	LS	0	See Comments and Notes	$0			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	1.10	$5,482	See Note 1.
4	Final Sloping of Category 1 Stockpile	AC	0	See Comments and Notes	$0		$0	Year 0 - No Waste Rock Placed; No Final Sloping
5	Furnish and Install 6-inch Geomembrane Bedding Layer	CY	0	See Comments and Notes	$0		$0	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	$0		$0	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	$6	1.10	$192,980	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	$0		$0	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	$0		$0	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	$0		$0	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	$0		$0	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	$645	1.00	$8,385	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
13	Reseeding 5% of Vegetation on Stockpile Cover Systems	Acre	1	See Comments and Notes	$645	1.00	$452	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
14	Procure and Install 40-mil Geomembrane - Textured	SF	0	See Comments and Notes	$0		$0	Year 0 - No Waste Rock Placed; No Geomembrane Cover
15	Furnish and Install Geotextile above and below Geomembrane	SF	0	See Comments and Notes	$0		$0	Year 0 - No Waste Rock Placed; No Geotextile Required

	2016	2019			**$234,711**
RS Means Construction Cost Index	207.3	227.3		1.10	

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: Hydroment 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 - Updated for 2019 via RS Means Construction Index

Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Inflation Factor	Cost Extension	Comments
1	Mobilization and Demobilization	LS	1	See Comments and Notes	$5,000	1.10	$5,482	To Be Determined By Contractor - Mob for General Earthwork and Vegetation Establishment
2	Environmental Protection Measures	LS	1	See Comments and Notes	$5,000	1.10	$5,482	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	1.10	$2,193	See Note 2
4.00	General Site Grading	CY	2000	See Comments and Notes	$8	1.10	$16,995	Assume General Grading (not soil import) of 6" Surface in Isolated Areas (assume 2.5 acres) in Prep. for Vegetion Establishment.
5.00	Furnish and Install Vegetation on Disturbed Areas	Acre	5	See Comments and Notes	$645	1.10	$3,536	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
6	Reseeding 5% of Vegetation to Correct for Limited Growth	Acre	1	See Comments and Notes	$645	1.00	$645	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
		2016	2019				**$ 34,334**	
	RS Means Construction Cost Index	207.3	227.3			1.10		

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) - Updated for 2019 via RS Means Construction Index
Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Inflation Factor	Cost Extension	Comments
1	Mobilization and Demobilization	LS	1.00	See Comments and Notes	$52,000	1.06	$55,335	To Be Determined By Contractor - Mob for General Earthwork, Site Grading and Vegetation Establishment
2	Environmental Protection Measures	LS	0	See Comments and Notes	$0	1.06	$0	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	$3	1.06	$279,336	See Note 1
4	LTVSMC Coarse Tailings Borrow Area - Seed, Mulch and Fertilize (see Note 2)	Acre	65	See Comments and Notes	$914	1.00	$59,410	Commercial Fertilizer and Seed for Tailings Basin Slopes – Supply/Apply/Incorporate @ 500 lb/acre [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
5	LTVSMC Coarse Tailings Borrow Area - Reseeding 5% of Vegetation to Correct for Limited Growth	Acre	3.25	See Comments and Notes	$914	1.00	$2,971	Commercial Fertilizer and Seed for Tailings Basin Slopes – Supply/Apply/Incorporate @ 500 lb/acre [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
6	Dam - Exterior Face Bentonite Augmentation	Acre		See Comments and Notes	$0	1.06	$0	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	$0	1.06	$0	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	$0	1.06	$0	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	$0	1.06	$0	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	$0	1.06	$0	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	$0	1.06	$0	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	$914	1.00	$36,560	Commercial Fertilizer and Seed for Tailings Basin Slopes – Supply/Apply/Incorporate @ 500 lb/acre [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
13	Beach Area and Dam Crest - Reseeding 5% of Vegetation to Correct for Limited Growth	Acre	2.00	See Comments and Notes	$914	1.00	$1,828	Commercial Fertilizer and Seed for Tailings Basin Slopes – Supply/Apply/Incorporate @ 500 lb/acre [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
14	Pond Bottom - Bentonite Amended Pond Bottom	Acre	-	See Comments and Notes	$0	1.06	$0	No Flotation Tailings Deposition at End of Year 0 - This Item Not Required
		2017	2019				**$435,440**	
	RS Means Construction Cost Index	213.6	227.3			1.06		

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 - Updated for 2019 via RS Means Construction Index

Heavy Border with Bold Amounts are used in Reclamation Estimates

Item	Description	Unit	Quantity	Basis for Quantities (drawing # or describe)	Unit Cost	Inflation Factor	Cost Extension	Comments
1	Mobilization and Demobilization	LS	1	See Comments and Notes	$15,000	1.10	$16,447	To Be Determined By Contractor - Mob for General Earthwork, Site Grading and Vegetation Establishment
2	Environmental Protection Measures	LS	0	See Comments and Notes	$0	1.10	$0	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	1.10	$3,289	Includes General Confirmatory Survey and Periodic Reclamation Review
4	Cutoff Wall Breach for CRE	CY	3400	See Comments and Notes	$10	1.10	$37,280	Assume 5' Thick Cutoff Wall - 8' Wide Breach at 200-Foot Spacing with Average Breach Depth of 10' and Average Trench Excavation Slopes of 1H:1V [8'x{(10'x10')+(5'x10')}] /27 Breach = 45 CY/Breach for 15,000'
5	Cutoff Wall Breach Backfill for CRE	CY	3400	See Comments and Notes	$10	1.10	$37,280	Assume 5' Thick Cutoff Wall - 8' Wide Breach at 200-Foot Spacing with Average Breach Depth of 10' and Average Trench Excavation Slopes of 1H:1V [8'x{(10'x10')+(5'x10')}] /27 Breach = 45 CY/Breach for 15,000'
6	Seepage Collection Pipe Modifications for CRE	LF	0	See Comments and Notes	$0	1.10	$0	No Seepage Collection Pipe Modifications Anticipated
7	Riser Pipe Modifications for CRE	LS	75	See Comments and Notes	$400	1.10	$32,894	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	1.10	$230,260	Assume Ditch is Backfilled Using Adjacent Berm and Roadway Soil. Quantity is [(2.5'x3') + (10'x3')]/27 Per Foot of Trench = 1.4 CY/LF for 15,000 LF
9	Berm Modifications for CRE	CY	0	See Comments and Notes	$0	1.10	$0	Ancillary to Mine Drainage Ditch Modifications
10	Stormwater Ditch Modifications for CRE	CY	25500	See Comments and Notes	$10	1.10	$279,602	Assume Ditch is Backfilled Using Adjacent Berm and Roadway Soil. Quantity is [(3'x3') + (12'x3')]/27 Per Foot of Trench = 1.7 CY/LF for 15,000 LF
11	Perimeter Dike Modifications for CRE	CY	0	See Comments and Notes	$0	1.10	$0	Ancillary to Perimeter Ditch Modifications
12	Sump/Manhole Modifications	LS	3	See Comments and Notes	$1,000	1.10	$3,289	Remove and Salvage Manhole Internals, Remove and Recycle Upper Manhole Riser Section, Fill Manhole with Granular Material and Restore to Surrounding Grade
13	Furnish and Install Vegetation on Disturbed Areas (Assume Average Width of Restoration Zone is 100' and add 20% Additional for Misc. Restoration Areas; 100'x15,000' +20% = 1,800,000 SF = 41 AcreAssume Average Width of Restoration Zone is 100' and add 20% Additional for Misc. Restoration Areas; 100'x15,000' +20% = 1,800,000 SF = 41 Acre)	AC	41	See Comments and Notes	$645	1.00	$26,445	Barr 2019 Fee Schedule Average of Mid Level Engineer [Barr 2019] + Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter]
14	Reseeding 5% of Vegetation to Correct for Limited Growth	AC	2	See Comments and Notes	$645	1.00	$1,322	Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate @ 200 lb/Acre/ [D&T 2/25/19 letter] + Mulch – Supply and Incorporate @ 2 ton/acre of Hay or Straw Mulchs. [D&T 2/25/19 letter]
		2016	2019				**$668,111**	
	RS Means Construction Cost Index	207.3	227.3			1.10		

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

	Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)					Mavo 2019 (Attachment C)		Arrowhead Consulting & Testing 2019 (Attachment B)	1.02	
Scope of Work Description	**Universal Waste Collection**	**Galbestos Removal**	**Demolition**	**Total Demo**	**Site Restoration**	**Asbestos Lead Paint Mold**	**Universal Waste Removal & Disposal**	**Pre Demo Insp**	**Demo To Rollup (Escalation Factor Above Applied)**	**Abatement To Rollup**
Pre-Demolition Services										
Legacy with construction				**$1,650,850**	**$4,500**	**$21,525**	**$0**	**$4,800**	$1,688,457	$26,325
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	n/a				
Legacy Tailings Basin Buildings - Demoed as part of construction										
Foreman's Office (Bldg. 718)			$9,350	$9,350	$400	$6,825	$0	$1,100		
Reporting Building (Bldg. 719)			$9,900	$9,900	$400	$6,825	$0	$1,100		
Lube House (Bldg. 720)			$2,500	$2,500	$400	$2,625	$0	$850		
Reporting Building (Bldg. 724)			$3,300	$3,300	$400	$2,625	$0	$900		
Lube Oil Building (Bldg. 725)			$2,500	$2,500	$400	$2,625	$0	$850		
Legacy Area 1		Jan 2019 - siding not Galbestos		**$159,727**	**$97,319**	**$115,305**	**$0**	**$850**	$262,187	$116,155
Area 1 Shop and Truck Storage (Bldg. 220)	$2,900	$0	$103,332	$106,232	$74,669	$98,000	$0			
Area 1 Cold Storage (Bldg. 221)	$400	$0	$10,860	$11,260	$13,400	$5,765	$0			
Area 1 Reporting Building (Bldg. 231)			$9,900	$9,900		$5,765	$0	$850		
Area 1 Boiler House (Bldg. 226)	$200	$0	$9,875	$10,075	$3,000	$2,885	$0			
Area 1 Fire Pump House & Water Tank (Bldg. 228)	$410		$11,250	$11,660		$2,890	$0			
Area 1 Locomotive Fueling	$500	$0	$10,100	$10,600	$6,250	n/a	n/a			
Legacy Area 2		Jan 2019 - siding not Galbestos		**$134,292**	**$82,785**	**$211,643**	**$0**	**$2,650**	$221,419	$214,293
Area 2 Service Shop (Bldg. 201)	$2,200	$0	$38,990	$41,190	$37,334	$118,508	$0			
Area 2 Truck Storage (Bldg. 202)	$2,000	$0	$9,175	$11,175	$13,988	$4,230	$0			
Area 2 Cold Storage (204)	$697	$0	$13,080	$13,777	$14,100	$4,230	$0			
Area 2 Shop Locomotive Service Shop (Bldg. 203)	$3,400	$0	$12,300	$15,700	$11,113	$67,695	$0			
Area 2 Locomotive Fueling	$2,000	$0	$11,800	$13,800	$6,250	$3,200	$0			
Hose House (Bldg. 209) Not to be used in project		$0	$9,150	$9,150		$3,200	$0	$850		
Sample House (Bldg. 208) Not to be used in project		$0	$20,300	$20,300		$6,350	$0	$950	main plan areas inc tunnels	
Reporting Building (Bldg. 425) Not to be used in project		$0	$9,200	$9,200		$4,230	$0	$850	$20,286,716	$4,480,820

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

	Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)					Mavo 2019 (Attachment C)		Arrowhead Consulting & Testing 2019 (Attachment B)	1.02	
Scope of Work Description	**Universal Waste Collection**	**Galbestos Removal**	**Demolition**	**Total Demo**	**Site Restoration**	**Asbestos Lead Paint Mold**	**Universal Waste Removal & Disposal**	**Pre Demo Insp**	**Demo To Rollup (Escalation Factor Above Applied)**	**Abatement To Rollup**
Legacy Plant Area				**$13,305,631**	**$3,223,306**	**$3,525,725**	**$0**	**$2,200**	$16,528,937	$3,527,925
Rebuild Shop (Bldg 602)	$3,000	$70,200	$125,600	$198,800	$27,560	$111,922	$0			
General Shop (Bldg. 601) Includes Acetylene Building (Bldg.604)	$15,000	$199,190	$353,600	$567,790	$182,300	$330,903	$0			
Carpenter Shop (Bldg. 603)	$2,000	$10,200	$13,250	$25,450	$3,300	$3,350				
Coarse Crusher	$10,000	$313,345	$1,551,800	$1,875,145	$593,890	$1,186,298				
Drive House 1 conv and housings	$7,500	$165,569	$141,540	$314,609	$46,900	inc in above				
Drive House 2 inc conv and housings		inc in above	inc in above	inc in above	inc in above	incl in Fine Crusher				
Fine Crusher	$45,000	$302,430	$1,373,460	$1,720,890	$203,400	$1,049,652				
Warehouse 49 (Bldg. 920)	$6,500	$27,586	$82,800	$116,886	$15,947	$46,087	$0			
Warehouse 45 (Bldg. 921, Electrical)	$2,500	$35,159	$72,700	$110,359	$15,947	$10,846	$0			
Lube House (Bldg. 926)	$578	$17,000	$20,550	$38,128	$7,385	$40,377	$0			
Rubber Shop (Bldg. 605)	$1,000	$30,464	$36,550	$68,014	$11,269	$18,689				
Concentrator Building and Thickeners	$100,000	$1,248,260	$5,895,850	$7,244,110	$1,145,998	$688,635				
A-Lab	$500	$9,400	$14,560	$24,460	$2,940	inc in Concentrator				
Hinsdale Bridge	$0	$16,700	$616,300	$633,000	$15,200	n/a				
Water Reservoir	$5,000		$98,100	$103,100	$914,400	n/a				
Plant Site Water Tower			$30,000	$30,000	$2,500	n/a				
Water Treatment Plant & Storage Tanks	$1,000	$20,000	$72,600	$93,600	$2,250	$25,466	$0			
Colby Pump House (potential deduct depends on variance request)		$41,000	$8,260	$49,260	$1,500	$3,350		$1,000	$50,760	$4,350
Ad Building inc UST	$3,900		$157,935	$161,835	$18,200	$892,500			$180,035	$892,500
Main Gate	$100		$11,400	$11,500	$875	$6,750		$900	$12,375	$7,650
Booster Pump House #1	$300		$23,500	$23,800	$9,200	inc in Concentrator			$248,033	$904,500
Sewage Treatment Plant	$0		$62,700	$62,700	$19,520	$6,750		$900		
Portable Pump Houses	$0		$9,890	$9,890	$3,400	n/a				
Return Water Barge	$0		$44,900	$44,900		$6,750		$1,300		
General Infrastructure (railroads, tunnels, roadways, etc)					$1,504,000				$1,504,000	
Legacy Railroads	$0		$380,000	$380,000					$387,600	
Legacy Tunnels	$0		$1,856,000	$1,856,000		$926,570			$1,856,000	$926,570
Galleries						inc in Concentrator				
Sanitary Systems and Wells			$17,500	included in associated areas						
Pipelines					$591,000				$2,936,580	
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					$99,766	
Legacy Roads/Parking Lots	$0		$465,000	$465,000	$195,000				$673,200	

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

	Lakehead / Rachel 2016 - for 2019 escalate by 2% per 2/28/19 email (Attachment A)					Mavo 2019 (Attachment C)		Arrowhead Consulting & Testing 2019 (Attachment B)	1.02	
Scope of Work Description	**Universal Waste Collection**	**Galbestos Removal**	**Demolition**	**Total Demo**	**Site Restoration**	**Asbestos Lead Paint Mold**	**Universal Waste Removal & Disposal**	**Pre Demo Insp**	**Demo To Rollup (Escalation Factor Above Applied)**	**Abatement To Rollup**
New - Phase 1 - Plant Site				$2,190,000	$689,000					
Flotation Plant and Reagent Building	$75,000		$621,800	$696,800	$147,600				$861,288	
Concentrate Storage and Loadout Facility	$12,000		$273,760	$285,760	$48,100				$340,537	
Plant Site Sewage Treatment Plant	$1,000		$118,000	$118,000	$30,000				$150,960	
Railroads	$0		$185,000	$185,000	$111,000				$301,920	
Pipelines	$0		$1,555,000	$1,555,000	$375,000				$1,968,600	
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					$249,900	used long term
New - Phase 1 - Mine Site										
Maintenance Service and Fueling Facility	$1,100		$19,210	$20,310	$7,300				$28,162	
Rail Transfer Hopper	$1,100		$40,000	$41,100	$45,000				$87,822	
Rail Transfer Hopper Control Bldg	$100		$18,600	$18,700					$19,074	
Rail Transfer Hopper Platform			$60,000	$60,000					$61,200	
Central Pumping Station	$500		$14,000	$14,500	$1,200				$16,014	
Railroads	$0		$45,000	$45,000	$33,750				$80,325	
Pipelines	$0		$580,133	$580,133	$217,000				$813,076	
Power Lines	$0		$83,900	$83,900	$0				$85,578	
Roads and Parking Lots	$0		$392,000	$392,000	$132,000				$534,480	
Mine Site Wastewater Treatment Facility (WWTF)	$0		$498,000	$498,000	$14,000				$522,240	
New - Phase 2				$10,735,100	$97,375					
Reagent Building	$15,000		$820,000	$835,000	$4,100					
Oxygen Plant	$65,000		$4,238,600	$4,303,600	$16,600					
Limestone Preparation	$7,500		$345,000	$352,500	$1,750					
Hydrometallurgical Plant	$49,000		$4,365,000	$4,414,000	$13,500					
Hydrometallurgical Reagents	$15,000		$815,000	$830,000	$2,200					
Railroads	$0									
Pipelines	$0		$1,450,000							
Power Lines	$0									
Roads and Parking Lots	$0		$156,000		$59,225					

Attachments to Construction Estimate:

Attachment A - Lakehead Constructors 2/18/19 email

Gmail James Scott <jrscotthl@gmail.com>

FW: Additional Tanks for the Financial Assurance estimate

1 message

Michael Glissman <mglissman@polymetmining.com> Thu, Feb 28, 2019 at 12:47 PM
To: Christie Kearney <ckearney@polymetmining.com>
Cc: James Scott <jrscotthl@gmail.com>

Here is the update from Lakehead / Rachel on the site demo and tank demo.

I had to update our spreadsheet with the 2% escalation.

Use this email as a supporting document for the 2% increase.

From: Bradley Jones <bjones@lakeheadconstructors.com>
Sent: Wednesday, February 27, 2019 1:18 PM
To: Michael Glissman <mglissman@polymetmining.com>
Subject: RE: Additional Tanks for the Financial Assurance estimate

Mike,

I've attached the updated tank spreadsheet, also, I've spoken with Don Ritsen and we are in agreement that you are free to increase the costs on the site closure work by 2%.

Let me know if you have any other questions.

Sincerely,

Bradley Jones

Sr. Estimator

Lakehead Constructors

715-395-2686

218-409-4040

From: Michael Glissman <mglissman@polymetmining.com>
Sent: Monday, February 25, 2019 9:50 AM
To: Bradley Jones <bjones@lakeheadconstructors.com>
Cc: Michael Glissman <mglissman@polymetmining.com>
Subject: Additional Tanks for the Financial Assurance estimate

Brad-

Attached is an updated spreadsheet for the Above Ground Storage Tanks (AST's) at the PolyMet site. It includes additional tanks that were added to the list last year, the new tanks are highlighted in yellow.

I am also including some figures that show you the locations of the new tanks. Most of them are smaller tanks and all are outdoors and easily accessible.

Please update this spreadsheet with the Demo/Removal numbers. I don't believe that any of these tanks will require Site Restoration.

Would like these updates along with your other updates by Wednesday.

Thank you

Mike

Michael Glissman

Project Engineer – Existing Facilities

Mobile: 218-750-2991 | Office: 218-471-2150 | Direct: 218-471-2175

mglissman@polymetmining.com | www.polymetmining.com

Copy of ASTs in FA Estimate with tanks added in Mar 2019.xlsx
49K

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	$36,100	$3,000	$0		
Storage Tank	80		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	T500		20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	
Black Tank	T501		20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	
3 Blue	T502		20,000	N of Area 1 Shop		$7,500	$1,000.00		$1,500.00	Out of Service. Disconnected, Labeled "save for conc."
Storage Tank	T503	Grease	70	N of Area 1 Shop		$300				Added -Mar 2019
Storage Tank	T504	Grease	70	N of Area 1 Shop		$300				Added -Mar 2019
Storage Tank	9761A	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761B	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761C	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761D	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761E	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761F	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761G	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761H	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761I	Oil	561	N of Area 1 Shop		$1,200				Added -Mar 2019
Storage Tank	9761J	Anti-Freeze	561	N of Area 1 Shop		$1,200				Added -Mar 2019
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	92	# 1,2 Fuel Oil								
Legacy - Plant Area					$0	$199,500	$25,700	$0		
Storage Tank	15	# 1,2 Fuel Oil	12,000	E. Side Concentrator		$600				
Storage Tank	32	# 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				
WTP Backwash (green)			16,000	NE of Drivehouse 1		$5,000	$700.00		$1,000.00	
Tank (white)	TB-8		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				
Storage Tank	83	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	84	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	85	# 6 Fuel Oil	20,000	Tank Farm		$7,500			$1,000	Added -Mar 2019
Storage Tank	TB-1	Poly-Z	1,000	Tailings Basin		$1,000				Added -Mar 2019
Storage Tank	CR-1	Lube oil	785	Fine Crusher		$1,200				Added -Mar 2019
Storage Tank	CR-2	Oil	480	Fine Crusher		$1,200				Added -Mar 2019
Storage Tank	CR-3	Lube oil	785	Lube House		$1,600				Added -Mar 2019

Attachment D2 - NTS 3/22/19 Letter

Environmental Science & Engineering

March 22, 2019

PolyMet Mining, Inc.
Attn. Steve DeVaney
Via Email
sdevaney@polymetmining.com

RE: Cost Estimates for Financial Assurance

As requested on February 13, 2019 by Ms. Christie Kearney, PolyMet Mining, Inc. (PolyMet), below are Northeast Technical Services, Inc. cost estimates for PolyMet's financial assurance estimates.

1. **Hourly labor rates by staff type –** Reference attached *2019 Labor Rate List*

6. **SW-619 industrial landfill monitoring and maintenance, per annum cost estimate (closed state)**

   Total: $30,000

7. **Tailings basin instrumentation inspection, data collection, per annum cost estimate – no change**

   Total: $15,372

8. **Tailings basin instrumentation report preparation, per annum cost estimate – no change**

   Total: $5,700

Please note that all pricing is based on 2019 dollars. If you should have any questions, please feel free to contact Mr. Bruce Trebnick, Northeast Technical Services Project Manager at telephone number 218-742-1051.

Sincerely,

Bruce F. Trebnick
NTS, Project Manager

cc: C.M. Kearney (PolyMet)

2019 Labor Rate List

Report Date: 3/22/2019

NTS Environmental Science & Engineering

Code	Type	Billing Rate
Laborer/Intern	High school diploma	$50
Clerical	Project support	$60
Technician I	2 year technical degree	$65
Technician II	2 year technical degree, 3+ years experience	$75
WWTP Operator I	Class B, C & D certified	$65
WWTP Operator II	Class A certified	$130
Professional I	4 year science or engineering degree (Field Scientist or Data Mgmt)	$85 to $95
Professional II	4 year science or engineering degree, 3+ years experience	$100 to $120
Professional III	4 year science or engineering degree, 10+ years experience	$125 to $145
Professional IV	4 year science or engineering degree, 20+ years experience	$150 to $165

Attachment D3 – NTS 3/8/19 email

Fwd: Question on Demo Landfills

1 message

Michael Glissman <mglissman@polymetmining.com> Fri, Mar 8, 2019 at 3:17 PM
To: "jrscotthl@gmail.com" <jrscotthl@gmail.com>, Christie Kearney <ckearney@polymetmining.com>

Sent from my iPhone

Begin forwarded message:

From: Allison Mattson <amattson@netechnical.com>
Date: March 8, 2019 at 8:01:57 AM CST
To: "mglissman@polymetmining.com" <mglissman@polymetmining.com>
Cc: Jenny Holmes <JHolmes@netechnical.com>
Subject: RE: Question on Demo Landfills

Good morning,

I have obtained updated disposal rates for Dem-Con / General Waste, and they are presented below:

Clean construction demo: $8.40 per yard plus $0.60 per yard tax

Industrial Waste: $35.50 per ton plus $0.46 per ton tax

Please let me know if there is anything else I can do to help. Thanks!

Allison Mattson, E.I.T.
Geological Engineer
Northeast Technical Services, Inc. (NTS)
www.netechnical.com

OFFICE: (218) 741-4290
DIRECT: (218) 742-1054
CELL: (218) 404-3193

From: Jenny Holmes
Sent: Thursday, February 28, 2019 12:18 PM
To: Allison Mattson <amattson@netechnical.com>
Subject: FW: Question on Demo Landfills

Jenny Holmes
Senior Project Manager

OFFICE: (218) 741-4290 |
jholmes@netechnical.com
DIRECT:(218) 742-1033 |
www.netechnical.com

From: Michael Glissman [mailto:mglissman@polymetmining.com]
Sent: Thursday, February 28, 2019 12:05 PM
To: Jenny Holmes <JHolmes@netechnical.com>
Subject: RE: Question on Demo Landfills

Jenny-

I would like to get current pricing from Dem-Con / General Waste in Keewatin.

Please have Allison continue pursuing this.

Thank you

Mike

From: Jenny Holmes <JHolmes@netechnical.com>
Sent: Monday, February 25, 2019 9:10 AM
To: Michael Glissman <mglissman@polymetmining.com>
Cc: Kevin Pylka <kpylka@polymetmining.com>
Subject: RE: Question on Demo Landfills

Good morning,

Allison checked on disposal rates which are presented below. Let me know if you have questions or if there is anything else I can do to help.

Thanks!

Jenny Holmes
Senior Project Manager

OFFICE: (218) 741-4290 |
jholmes@netechnical.com
DIRECT:(218) 742-1033 |
www.netechnical.com

From: Allison Mattson
Sent: Monday, February 25, 2019 9:03 AM
To: Jenny Holmes <JHolmes@netechnical.com>
Subject: RE: Question on Demo Landfills

Hello,

Below are updated disposal costs for the FA annual update:

Dem-Con Companies General Waste in Keewatin:

General Waste has not yet responded to our requests for a revised estimate; however, the estimate they gave in 2017 is below. I will reach out again and send an update if we get a revised cost estimate.

Clean Construction Demo - $9.40 plus $0.60 cents per cubic yard (2017 estimate)

SKB Environmental Services – Shamrock Trucking in Cloquet:

Clean Demo - $20 per ton (dependent on quantity) – honoring same pricing as before

Industrial (Contaminated) Waste - $28 per ton (dependent on quantity) – honoring same pricing as before

Waste Management in Canyon:

Special Waste : $30.00/ton 3 ton min

C&D : $42.00/ton 3 ton min

Fuel: * this percentage changes weekly. www.wm.com/fec

Environmental: $24/load

Waste Water Mgmt Fee: 6.5%

Tax: Special Waste: $0.462/ton & $0.375/ton

C&D: $2.00/ton & $0.3750/ton

Profile: $200 (one-time fee)

Let me know if you have any questions about these costs. Thanks!

Allison Mattson, E.I.T.
Geological Engineer
Northeast Technical Services, Inc. (NTS)
www.netechnical.com

OFFICE: (218) 741-4290
DIRECT: (218) 742-1054

CELL: (218) 404-3193

From: Michael Glissman [mailto:mglissman@polymetmining.com]
Sent: Tuesday, February 19, 2019 9:20 AM
To: Jenny Holmes <JHolmes@netechnical.com>
Cc: Kevin Pylka <kpylka@polymetmining.com>; Michael Glissman <mglissman@polymetmining.com>
Subject: FW: Question on Demo Landfills

Jenny-

See email string below. I need to get updated pricing on the tipping fees (highlighted below), for our FA annual update.

If you could have someone get this to me by Monday that would be great.

Thanks

Mike

From: Kevin Pylka
Sent: Thursday, April 27, 2017 12:28 PM
To: Michael Glissman <mglissman@polymetmining.com>
Subject: FW: Question on Demo Landfills

Mike,

See the email and thread below detailing pricing. I can walk you through this if needed, but am headed to a 1:00-3:00 meeting. I can talk after that.

KEvin

From: Jenny Holmes [mailto:JHolmes@netechnical.com]
Sent: Tuesday, April 25, 2017 4:10 PM
To: Kevin Pylka <kpylka@polymetmining.com>
Subject: Question on Demo Landfills

Hi Kevin,

Allison was able to get some answers for you. Please see her message below and let me know if we can help with anything else. Thanks!!

Sent from my iPhone

Begin forwarded message:

> **From:** Allison Smrekar <asmrekar@netechnical.com>
> **Date:** April 25, 2017 at 3:26:44 PM CDT
> **To:** Jenny Holmes <JHolmes@netechnical.com>
> **Subject: RE: Question on Demo Landfills**

Hi Jenny,

To answer the first question, it is $9.40 per cubic yard plus $0.60 per cubic yard as tax.

For the second question, the tax amount depends on the type of material and is usually less than $1 ($0.36 was the original estimate) so if it is $30 per ton for disposal, with tax it would be $30.36 per ton for disposal. We can disregard the $13 per ton tax as that applies for Wisconsin only (she forgot to take it out when sending the quote). The fuel and environmental charges apply, even for disposal only, so fuel tax is approximately 4.8% per load, and environmental is $22 per load.

The costs listed above are for disposal only with no transportation fees included. I hope this helps – please let me know if you need me to clarify anything, or if it just doesn't make sense. Thanks!

Allison Smrekar
Geological Engineer, EIT

OFFICE: (218) 741-4290 | asmrekar@netechnical.com
DIRECT:(218) 742-1054 | www.netechnical.com

From: Jenny Holmes
Sent: Tuesday, April 25, 2017 12:40 PM
To: Allison Smrekar <asmrekar@netechnical.com>
Subject: Fwd: Question on Demo Landfills

Would you check on Kevin's question?

Sent from my iPhone

Begin forwarded message:

> **From:** Kevin Pylka <kpylka@polymetmining.com>
> **Date:** April 25, 2017 at 11:29:26 AM CDT
> **To:** Jenny Holmes <JHolmes@netechnical.com>
> **Subject: RE: Question on Demo Landfills**
>
> Jenny,
>
> Thanks for the info! Is the $9.40 on the Dem Con information $9.40 per load plus $0.60 cents per cubic yard, or $9.40/ton, plus 0.60 per cubic yard?
>
> Thanks
>
> Kevin
>
> ---
>
> **From:** Jenny Holmes [mailto:JHolmes@netechnical.com]
> **Sent:** Tuesday, April 25, 2017 10:51 AM
> **To:** Kevin Pylka <kpylka@polymetmining.com>
> **Cc:** Bruce Trebnick <BTrebnick@netechnical.com>
> **Subject:** RE: Question on Demo Landfills

Good morning,

Below is a cost summary for estimated waste disposal of geomembrane materials and plastic piping from the three closest demo landfills.

Dem-Con Companies General Waste in Keewatin:

Clean Construction Demo - $9.40 plus $0.60 cents per cubic yard

SKB Environmental Services – Shamrock Trucking in Cloquet:

Clean Demo - $20 per ton (dependent on quantity)

Industrial (Contaminated) Waste - $28 per ton (dependent on quantity)

Waste Management in Canyon:

Please note that this is just a general special waste quote.

Disposal: $30 per ton (3 ton minimum)

Fuel: 4.8% *This percentage changes weekly

Environmental: $22 per load

Tax: All applicable taxes, $0.36 per ton, $13/ton

Profile: $200 (onetime fee)

I hope this is what you were looking for. Please let me know if you need additional information or if you have a volume estimate so we can get better pricing for you. Thank you!

cid:image003.jpg@01D2BDB7.30A1A350 cid:image004.jpg@01D2B

Jenny Holmes
Senior Project Manager

OFFICE: (218) 741-4290 | jholmes@netechnical.com
DIRECT:(218) 742-1033 | www.netechnical.com

From: Jenny Holmes
Sent: Friday, April 21, 2017 12:35 PM
To: 'Kevin Pylka' <kpylka@polymetmining.com>; Bruce Trebnick <BTrebnick@netechnical.com>
Subject: RE: Question on Demo Landfills

Absolutely! I will get back to you by early next week with some options. Thank you!

From: Kevin Pylka [mailto:kpylka@polymetmining.com]
Sent: Friday, April 21, 2017 11:21 AM
To: Jenny Holmes <JHolmes@netechnical.com>; Bruce Trebnick <BTrebnick@netechnical.com>
Subject: RE: Question on Demo Landfills

Jenny,

Would you or someone at NTS be able to secure pricing for demolition waste for landfills in the area, maybe the three closest? This is an exercise for cost estimating future reclamation estimates so I don't have a waste or material that is generated. We would have to assume it fits into the appropriate "demolition waste" guidelines but as mentioned previously it would be geomembrane materials and plastic piping removed from a site. Not hazardous material nor containing hazardous waste.

I realize it would have to be contingent upon acceptance of a waste profile. I just need something that can be used as a reference in a cost analysis.

Thanks,

Kevin

From: Jenny Holmes [mailto:JHolmes@netechnical.com]
Sent: Friday, April 21, 2017 10:27 AM
To: Kevin Pylka <kpylka@polymetmining.com>; Bruce Trebnick <BTrebnick@netechnical.com>
Subject: RE: Question on Demo Landfills

Hi Kevin,

Dem-Con companies General Waste located in Keewatin is likely your best bet. Disposal rates are around $21.00 or $22.00 per ton and will depend on current acceptance of the material.

If you need additional assistance, please let me know. We would be happy to coordinate any efforts for the disposal of these materials or obtain a quote based on the amount of material intended for disposal.

Thank you!

cid:image005.jpg@01D2BDB7.30A1A350 cid:image006.jpg@01D2B

Jenny Holmes
Senior Project Manager

OFFICE: (218) 741-4290 | jholmes@netechnical.com
DIRECT:(218) 742-1033 | www.netechnical.com

From: Kevin Pylka [mailto:kpylka@polymetmining.com]
Sent: Friday, April 21, 2017 8:50 AM
To: Bruce Trebnick <BTrebnick@netechnical.com>; Jenny Holmes <JHolmes@netechnical.com>
Subject: Question on Demo Landfills

Bruce / Jenny,

Would you or someone at NTS know the current closest demolition landfills available to dispose of waste like geomembrane liners and plastic piping. I assume it would be either the Canyon Landfill, the Carlton Landfill, or General Waste near Keewatin. If so have you obtained recent pricing for tipping fees?

Kevin

Kevin Pylka

Manager of Environmental Permitting and Compliance

Mobile: 218-750-2054 | Office: 218-471-2150 | Direct: 218-471-2162 |
Fax: 218-471-2159

kpylka@polymetmining.com |www.polymetmining.com

Description:
cid:314A9342-
4694-4DCC-
8F69-

Attachment D4 – NTS 2/28/19 email

FW: Pricing

1 message

Michael Glissman <mglissman@polymetmining.com> Thu, Feb 28, 2019 at 12:41 PM
To: Christie Kearney <ckearney@polymetmining.com>
Cc: James Scott <jrscotthl@gmail.com>

Freight quote update from Wayne Transports.

From: Jeff Hill <JeffH@waynetransports.com>
Sent: Monday, February 25, 2019 3:16 PM
To: Michael Glissman <mglissman@polymetmining.com>
Subject: RE: Pricing

Mike,

Taking a look at this I think we will need to go up to $450.00 per load,

Hope everything is going well,

Jeff

From: Michael Glissman [mailto:mglissman@polymetmining.com]
Sent: Monday, February 25, 2019 11:27 AM
To: Jeff Hill
Subject: FW: Pricing

Jeff-

Please review this proposal you provided in 2017.

We need to update these numbers for our financial assurance package on an annual basis.

Could you please provide some updated pricing on this freight? Use the same information as before.

Thank you

Mike

Michael Glissman

Project Engineer – Existing Facilities

Mobile: 218-750-2991 | Office: 218-471-2150 | Direct: 218-471-2175

mglissman@polymetmining.com | www.polymetmining.com

From: Steve DeVaney
Sent: Thursday, April 27, 2017 10:24 AM
To: Michael Glissman <mglissman@polymetmining.com>; Jim Tieberg <jtieberg@polymetmining.com>
Subject: Fwd: Pricing

Bid on trucking

Sent from my iPhone

Begin forwarded message:

> **From:** Jeff Hill <JeffH@waynetransports.com>
> **Date:** April 27, 2017 at 9:38:20 AM CDT

To: Steve DeVaney <sdevaney@polymetmining.com>
Subject: Re: Pricing

Hi Steve,

Sorry I didn't get back to you sooner, I've been traveling all week and it's been pretty hectic. Anyway the rate would be the same to both places. $415.00 per load, we could haul roughly 50,000 lbs and handle lengths up to 40ft without permitting. If the lengths were longer the rate would go up considerably. I hope this helps you out. If you need more please contact me.

Thanks and have a good day.

Jeff

Sent from my iPhone

On Apr 24, 2017, at 10:10 PM, Steve DeVaney <sdevaney@polymetmining.com> wrote:

> Hi Jeff,
>
> PolyMet is working on a Reclamation Estimate (for permitting purposes) to dispose of geomembrane material and drain pipe from the mine stockpiles (about 6 miles east of the plant site) to either Waste Management's Canyon Landfill or General Waste's Landfill by Keewatin. Quantities are unknown at this time. Please forward a cost per truck, weight limitations and length of loads.
>
> If you have any questions, the technical contact is Mike Glissman: (o) 218-471-2175, (c) 218-750-2991 or mglissman@polymetmining.com
>
> Thank you,
>
> Steve DeVaney
>
> Procurement Manger
>
> PolyMet Mining, Inc.

Attachment E2 – Barr 2019 Fee Schedule

Fee Schedule—2019

Rev. 12/29/18

Description	Rate* (U.S. dollars)
Principal	$145-295
Consultant/Advisor	$155-250
Engineer/Scientist/Specialist III	$125-150
Engineer/Scientist/Specialist II	$95-120
Engineer/Scientist/Specialist I	$65-90
Technician III	$125-150
Technician II	$95-120
Technician I	$50-90
Support Personnel II	$95-150
Support Personnel I	$50-90

Rates for litigation support services will include a 30% surcharge.

A ten percent (10%) markup will be added to subcontracts for professional support and construction services to cover overhead and insurance surcharge expenses.

Invoices are payable within 30 days of the date of the invoice. Any amount not paid within 30 days shall bear interest from the date 10 days after the date of the invoice at a rate equal to the lesser of 18 percent per annum or the highest rate allowed by applicable law.

Meals will be reimbursed on a per diem basis. For travel destinations within the continental U.S. (CONUS) the per diem rate will be as published by the U.S. Internal Revenue Service (IRS) based on the High-Low method. For travel destinations outside the CONUS list, the per diem rate will be as published by the U.S. Department of State for foreign per diem rates. Full day per diem rates will be pro-rated on travel days.

All other reimbursable expenses including, but not limited to, costs of transportation, lodging, parking, postage, shipping and incidental charges will be billed at actual reasonable cost. Mileage will be billed at the IRS-allowable rate.

Materials and supplies charges, printing charges, and equipment rental charges will be billed in accordance with Barr's standard rate schedules.

Principal category includes consultants, advisors, engineers, scientists, and specialists who are officers of the company.

Consultant/Advisor category includes experienced personnel in a variety of fields. These professionals typically have advanced background in their areas of practice and include engineers, engineering specialists, scientists, related technical professionals, and professionals in complementary service areas such as communications and public affairs.

Engineer/Scientist/Specialist categories include registered professionals and professionals in training (e.g. engineers, geologists, and landscape architects), and graduates of engineering and science degree programs.

Technician category includes CADD operators, construction observers, cost estimators, data management technicians, designers, drafters, engineering technicians, interns, safety technicians, surveyors, and water, air, and waste samplers.

Support Personnel category includes information management, project accounting, report production, word processing, and other project support personnel.

*Rates do not include sales tax on services that may be required in some jurisdictions.

Attachment G - Ames Unit Prices – 2/25/19 email

Gmail James Scott <jrscotthl@gmail.com>

Fw: 2019 Updated Reclamation Estimate Unit Prices

1 message

Jim Tieberg <jtieberg@polymetmining.com> Wed, Feb 27, 2019 at 7:28 AM
To: Christie Kearney <ckearney@polymetmining.com>, "Jim Scott - PolyMet Mining (jrscotthl@gmail.com)" <jrscotthl@gmail.com>
Cc: Kevin Pylka <kpylka@polymetmining.com>, Rory Oberhelman <roberhelman@polymetmining.com>, Cameron Trembath <ctrembath@polymetmining.com>

Good morning,

Attached are the revised estimated unit cost numbers from Ames. Contact me with any questions.

Jim

James "Jim" Tieberg
Mining Manager
Office: 218-471-2165 | Mobile: 218-248-0952 | Fax: 218-225-4429

PolyMet Mining
6500 County Road 666, Hoyt Lakes, MN 55750 | 218-471-2150
www.polymetmining.com

From: Benjamin Lovin <BenjaminLovin@amesco.com>
Sent: Monday, February 25, 2019 5:01 PM
To: Jim Tieberg
Cc: Martin Husnik
Subject: 2019 Updated Reclamation Estimate Unit Prices

Jim,

Attached please find Ames Construction's updated 2019 reclamation unit prices. I added a column to the spreadsheet for the 2019 unit prices. The methodology and basis of pricing for each item was kept the same, we simply updated the unit prices to reflect 2019 labor and equipment rates. No labor or equipment escalations beyond 2019 have been included. Please let me know if you have any questions or need any additional information. Thanks Jim.

Regards,

Ben

Ames Construction
2000 Ames Drive
Burnsville, MN 55306
Midwest: 952-435-7106

Benjamin Lovin
Regional Vice President
BenjaminLovin@amesco.com
Mobile: 612-919-1854

2019 Update Ames Source - Updated by Ames.xlsx
34K

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

Ames estimates include mobilization

Item	Description	Unit	Source	Basis for Quantities (drawing # or describe)	2016 Unit Price	2019 Unit Price	Comments
	Rock Moving						
	Soil Overburden Relocation (excavate, load and dump) [Ames 2016]	CY	Ames 2016	Excavate, Load and Dump by Contractor	$ 1.60	$ 1.90	Material for haul roads, Cat 1 etc. restoration. [Ames 2016]
	Soil Overburden Relocation (haul cost/cubic yard/mile) [Ames 2016]	$/CY/Mile	Ames 2016	Haul by Contractor	$ 1.85	$ 2.00	Material for haul roads, Cat 1 etc. restoration (assume 2-mile avg. haul distance; 4-mile round-trip) [Ames 2016]
	Site Removal and Restoration						
	Remove & Dispose of Stockpile/Pond Geomembrane Liners (inc soil)	acre	Ames 2016	Cut Geomembrane into Sections/Remove	$ 8,600.00	$ 9,400.00	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]
	Remove & Dispose of Collection pipe	LF	Ames 2016	Cut-Up/Remove/Dispose	$ 15.00	$ 16.00	Remove and haul to central portion of CAT 1 Stockpile. Assumes a shallow excavation with minimal backfill and cutting of pipe. [Ames 2016]
	Remove Stockpile Sumps & Ponds	each	Ames 2016	Break-out sumps/ clean-out ponds	$ 5,000.00	$ 5,300.00	Break-out sumps/ clean-out ponds [Ames 2016]
	Restore Lined Sump & Pond Footprint	acre	Ames 2016	Fill/Grade	$ 6,000.00	$ 6,400.00	Remove liner, rip-rap, grade and seed, fertilize and mulch; assume 400 CY/acre (3 in depth) of rooting soil fill [Ames 2016]
	Ditch to be Removed/Filled (new)	LF			N/A	$ 53.00	Assume 18 feet avg. width, 6 feet avg. depth, 2:1 slope
	Fencing, Gates, and Barricades						
	Preparation for Fencing	LF	Ames 2016	Clearing & Grubbing for fencing	$ 9.00	$ 9.00	Ames 2016
	Supply & Install 4 Strand Fence	LF	Ames 2016	Gates & signage separate	$ 8.00	$ 8.50	MnDOT Standard Plate 9323 Rev. D [Ames 2016]
	Supply & Install Non-Climbable Fence	LF	Ames 2016	Gates & signage separate	$ 22.00	$ 25.00	MnDOT Standard Plate 9322 Rev. K [Ames 2016]
	Gates	each	Ames 2016	Per Gate	$ 5,500.00	$ 5,500.00	Gate for access road / pit ramp; MnDOT Standard Plate 9322 Rev. K 20' Wide Vehicular Gate (Double Gate) [Ames 2016]
	Earthworks						
	Grading uneven area for gentle contour and drainge	acre	Ames 2017	Grading for depths 6" to 16"	$ 3,200.00	$ 4,000.00	No hauling of material, Mid size dozer work. [Ames 2017]
	Load, Haul & Place Earthfill from Overburden Storage & Laydown Area	CY	Ames 2017		$ 4.50	$ 5.00	Load, haul and place in East Pit [Ames 2016]
	General Services Reclamation						
	Road Grader	hr	Ames 2017		$ 200.00	$ 210.00	One grader with Operator Ames Email 11/13/17

Attachment H – D&T 2/25/19 Letter

D & T Landscaping, Inc.
PO Box 65
Solway, MN 56678
Office Phone & Fax 218-467-9242
Email: dntwinge@paulbunyan.net

Dave's Cell 218-556-4560
Deb's Cell 218-760-0894
Tom's Cell 218-760-3795

February 25, 2019

PolyMet Mining, Inc.
PO Box 475, 6500 Co Rd 666
Hoyt Lakes, MN 55750

Att: Steve DeVaney,

Below, please find some rough estimates for the Contingency Reclamation Estimate:

1.) Commercial Fertilizer and Seed for Tailings Basin Flats – Supply/Apply/ Incorporate Unit Pricing per acre @ 500 lb/acre $390.00/Acre
2.) Commercial Fertilizer and Seed for Tailings Basin Slopes – Supply/Apply/Incorporate Unit Pricing per acre @ 500 lb/Acre $575.00/Acre
3.) Commercial Fertilizer and Seed for Overburden – Supply/Apply/Incorporate Unit Pricing per Acre @ 200 lb/Acre $305.00/Acre
4.) 4.) Mulch – Supply and Incorporate. Unit Pricing per Acre @ 2 ton/acre of Hay or Straw Mulch $340.00/Acre

These prices will fluctuate if hay supply becomes short or fuel prices increase, which also impacts fertilizers costs. Seed costs over the past couple years have been stable, if seed prices fluctuate significantly, substitute varieties will be evaluated. Labor prices are expected to rise over the next couple years, but these prices will be valid over the next two years.

Regards,

David Olson
President