# Financial Assurance and Perpetual Treatment

Testimony by M Watkins, Grand Portage Environmental Department, February 11, 2014, for the Committee on Environment, Natural Resources and Agriculture Finance

- March, 2007, Grand Portage and Fond du Lac staff attended financial assurance workshop presented by US EPA Headquarters Hardrock Mining Team.
- November, 2008, Fond du Lac hosted financial assurance workshop presented by US EPA Headquarters Hardrock Mining Team for MN DNR, MPCA, USFS, ERM (PolyMet third-party contractor)and PolyMet staff.

The State of Minnesota has spent millions of dollars remediating mine sites (e.g. Reserve Mining).

Financial Assurance cost estimation is the process of assessing the amount of funds required to perform the tasks of mine cleanup. Cost estimations are not based on how much it would cost the corporation to perform cleanup tasks, estimates are based on how much it would cost a government agency to hire a contractor to perform clean-up tasks. Generally, the cost for a corporation to clean up a site is half of the cost for a government agency to hire an outside contractor (U.S. EPA).

Considerations for cost estimation:

1) Interim operations and maintenance for agencies when a company declares bankruptcy and leaves the site.
2) Water management and treatment
3) Removal of hazardous wastes and substances
4) Demolition, removal and disposal of facilities and equipment
5) Earthwork(sloping, backfill, grading)
5) Re-vegetation
6) Long-term Operations and Maintenance
7) Monitoring
8) Inflation
9) Cash flow analysis
10) Determination of Risk and Uncertainty

Both the type of wastewater treatment needed to maintain compliance with water quality standards and the number of years required to maintain and operate those treatment systems must be included in the estimation of financial assurance. Financial assurance needs to be increased tenfold when acid mine drainage is likely to occur (Financial Assurance for Hardrock Mine Cleanup, US EPA, 2007). Even stormwater attenuation often requires long term, not walk away treatment (Financial Assurance for Hardrock Mine Cleanup, US EPA, 2007).

Multiple mitigation strategies must be used to prevent pollution of surface and groundwater resources. Active wastewater treatment facilities, liners, caps, pumping systems, permeable reactive barriers, are likely all required for compliance with MN Water Quality Standards.

It is much cheaper (orders of magnitude) to maintain and operate passive treatment systems, but may not be sufficient to meet water quality standards.

First ever letter of credit financial assurance required by MPCA/MN DNR for Mesabi Nugget. 15 million to insure tailings mercury filter and mine area clean-up. Not enough to adequately study the problem(s), much less than needed to comply with MN Water Quality Standards.

Companies receive the profits from mining, the public at large gets the minerals, but the Minnesota public and tribes bear the huge environmental and financial risks. Therefore, companies should be required to share meaningfully in the long-term financial risk that their proposals would create.

Perpetual mechanical treatment will likely be required to meet MN Water Quality Standards for all new non-ferrous mining operations.

Financial assurance for perpetual treatment must include operation and maintenance costs for both passive and active wastewater treatment systems.

**Perpetual treatment requires that the principle balance of the financial assurance mechanism must be enough to cover the costs of maintenance and operation using only the interest accrued. This is in addition to financial assurance set aside for closure and reclamation.**

**Zortman Landusky**

1979 -1998 Zortman Landusky mine (east central Montana). 3,500 acres of disturbed land. No acid generation predicted due to low sulfur content of ore (0.2% Sulfur as compared to PolyMet range ≥ 0.12 – 0.6% Sulfur p.5-100 SDEIS ).

1993 Data shows widespread acid generation.

1995 Law suits filed by US EPA, Montana Department of Environmental Quality, Fort Belnap Indian Community, and Non-Governmental Organizations.

1996 Consent decree to build wastewater treatment systems ($32,000,000 settlement).

1998 Reclamation bond increased to $70,000,000. Pegasus Gold files for bankruptcy.

Originally approved reclamation and closure plan would have cost $54,000,000 more than reclamation bond. Agency preferred reclamation alternative cost $28,000,000 more than available financial assurance.

**Summitville**

In 1984 Canadian-based Glactic Resources Ltd., a subsidiary of Summitville Consolidated Mining Company, Inc., acquired 1,230 acres in Colorado to develop a modern large-scale open pit operation that would disturb 550 acres.

New techniques were used to extract gold from ore that was previously considered uneconomic.

Mining operations ended in October 1991 with the leaching continuing until March 1992.

Galactic Resources filed for bankruptcy in November, 1992.

Interim operations alone cost taxpayers $1,000,000 per month.

After the bankruptcy proceedings were completed in British Columbia, the US Government declared Summitville a superfund site and spent $155,000,000 of public funds for cleanup.

**Idaho Cobalt**

The Idaho Cobalt Project (ICP) is owned by Formation Capital Corp., located in Salmon-Challis National Forest, Idaho. It is a permitted underground mine where ore would be mined from two separate ore bodies with an approximate surface disturbance of 132 acres. Facilities include a lined dry-stack tailings and waste rock disposal facility, a water management pond, water treatment facilities , and various ancillary facilities. Idaho Cobalt was required to set aside $44,000,000 in financial assurance.

Not comparable to PolyMet (PM) due to:

1) area of disturbance ( ICP 132 acres v. PM 1,741 acres);

2) average mining and processing rate ICP 800 tons per day v. PM 32,000 tons per day;

3) ICP underground mine v. PM open pit mine;

4) ICP lined dry-stack tailings v. PM unlined wet tailings;

5) ICP lined wasterock disposal piles v. PM unlined wasterock pile (Category 1) and in-pit disposal of lined temporary wasterock piles.

**Comparison of Flambeau Mine Operations and PolyMet Proposal**

Flambeau mine (FM), Ladsmith, WI, was an open pit mine that operated between 1993 and 1997.

Percent Copper: FM ore approximately 10% copper v. PolyMet (PM) 0.3% copper.

Pit size: FM pit 220 feet deep and 32 acres in size v. PM 630-696 feet deep and 912 acres (SDEIS p. ES-17 and ES-37) . PM 90 times the volume of FM.

Mine life: FM 4 years v. PM 20 years.

FM 8.5 million tons of wasterock v. PM 308 million tons wasterock (SDEIS p. ES-17).

FM no processing of ore on site so no tailings, ore shipped directly off-site. PM will be processing ore on-site.

**ASARCO**

In 2009, as a result of the largest environmental bankruptcy in U.S. history, US EPA, along with other federal and state agencies received $1.79 billion to fund environmental cleanup and restoration of American Smelting and Refining Company LLC (ASARCO) sites. ASARCO operates copper mines, smelters and refineries in the United States.

**Phelps Dodge Corporation Chino and Tryone Copper Mines**

Chino and Tyrone Copper Mines, owned by Phelps Dodge Corporation, located in an historic mining district in New Mexico.

Both are modern large-scale open pit mines, with start-up in 1970's, and expected closure around 2020.

Chino mine is expected to disturb approximately 9,200 acres, and Tyrone 6,000 acres.

Financial assurance set aside for surface reclamation and closure: $228,000,000 for Chino, and; $278,000,000 for Tyrone.

Provisions for both mines require perpetual water treatment to *prevent* the formation of pit lakes to protect groundwater and wildlife that might use the pit lake (waterfowl).

**All of these real-world examples, except for the Flambeau mine, occurred in relatively dry environments, unlike PolyMet. PolyMet will be located in a wet environment with interconnected surface and groundwater. This is a fundamental difference that makes PolyMet unique and creates much more risk than other projects.**

Cost estimates by Barr Engineering for water treatment systems from an actual project proposed in MN (Mesabi Nugget Phase II). These estimates do not include costs associated with liners, caps, and seepage capture systems for tailings basin and waste rock piles that would require perpetual operation and maintenance. Operation and maintenance cost estimates are for twenty years.

| Options | Capital Cost | O&M Cost |
|---|---|---|
| Barium precipitation | $ 51,800,000 | $ 1,359,000,000 |
| Ettringite precipitation | $ 65,600,000 | $ 122,000,000 |
| Ion Exchange | $ 46,800,000 | $ 256,000,000 |
| Nanofiltration | $ 44,500,000 | $ 101,000,000 |
| Alternative discharge to Partridge River[1] | $ 16,600,000 | $ 14,000,000 |
| *In situ* biological treatment[2] | $ 16,600,000 | TBD |

Estimated Annual Cost for Operation and Management of Water Treatment Systems by Government Contractor:

| | | |
|---|---|---|
| Barium Precipitation | 1,359,000,000 x 2= $ 2,718,000,000/20 years | $135,900,000 |
| Ion Exchange | 256,000,000 x 2= $512,000,000/20 years | $25,600,000 |
| Nanofiltration | 101,000,000 x 2 = $202,000,000/20 years | $10,100,000 |

The cost estimates below only consider specific types of wastewater treatment systems and do not include interim operation and maintenance, hazardous waste removal, demolition, earthwork, re-vegetation, monitoring, inflation, long-term operations and maintenance of other required mitigation (e.g. liners, caps and seepage collection systems).

Set aside for each treatment system is based on earning 3% and 6% interest annually without inflation costs.

| | 3rd Party Annual O&M | F A Set Aside 3% Interest | FA Set Aside 6% Interest |
|---|---|---|---|
| Barium Precipitation | $135,900,000 | $ 4,530,000,000 | $ 2,265,000,000 |
| Ion Exchange | $25,600,000 | $853,333,333 | $426,666,667 |
| Nanofiltration | $10,100,000 | $336,666,666 | $168,333,333 |

**Back of the Envelope Calculation of PolyMet Financial Assurance Set Aside For Treatment O&M**

*Using PolyMet SDEIS estimate of long-term post closure operations and maintenance costs: 3.5 – 6 million dollars (SDEIS p. 3-138), does not include inflation or variable interest rates.*

| PolyMet Annual O&M | 3rd Party Annual O&M | F A Set Aside 3% Interest | FA Set Aside 6% Interest |
|---|---|---|---|
| $3,500,000 | $7,000,000 | $233,333,333 | $116,666,666 |
| $6,000,000 | $12,000,000 | $400,000,000 | $200,000,000 |

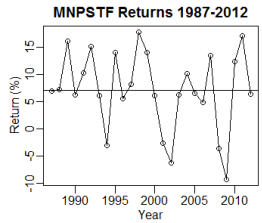
**Spreadsheet Model of PolyMet Financial Assurance Set Aside For Treatment O&M**

** Average Interest Earned by the Minnesota Permanent School Trust Fund (1987-2012)*
** Average Bureau of Labor Statistics Mining Support Services Inflation (1986-2012)*
** Financial Assurance is Minimum Amount Required for Fund Solvency after 500 Years*
*(Spreadsheet Model & Results By Matthew Tyler, Finland MN)*

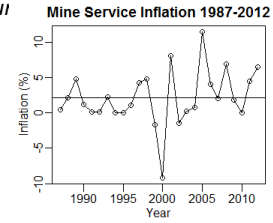
| PolyMet Annual O&M | 3rd Party Annual O&M | Financial Assurance Set Aside Avg MPSTF Interest (7.14%) AND Avg Mining Service Inflation (2.04%) |
|---|---|---|
| $3,500,000 | $7,000,000 | $147,120,000 |
| $6,000,000 | $12,000,000 | $252,210,000 |

## PolyMet Financial Assurance Set Aside For Treatment O&M: Take Market Volatility Into Account

- *Investment returns and inflation are highly variable from year to year, not constant*
- *In* *ion and low retu*




Mean = 7.14
Std Dev = 7.1




Mean = 2.10
Std Dev = 3.8

**Estimate PolyMet Financial Assurance Set Aside For Treatment O&M Using Stochastic Computer Simulation**

**Each Year for 500 years, pick random fund return and inflation rate based on historical data*
**Repeat 10,000+ times for each FA set aside amount. What percent of runs are solvent at end?*
**Minimum amount for which >99% of all runs are solvent is the "volatility proof" FA set aside.*
*(R Statistical Model & Results By Matthew Tyler, Finland MN)*

| PolyMet Annual O&M | 3rd Party Annual O&M | "Volatility Proof" Financial Assurance Set Aside |
|---|---|---|
| $3,500,000 | $7,000,000 | $301,000,000 |
| $6,000,000 | $12,000,000 | $520,000,000 |