SUMMARY OF THE 2005 FINANCIAL SECURITY REVIEW AT THE EQUITY SILVER MINE

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ABSTRACT

The Equity Silver Mine located 35 km southeast of Houston operated between 1980 and 1994, producing silver, gold, and copper from three open pits and a small underground operation. Current and future liability are important at the Equity Silver mine site due to the long term drainage collection and treatment of the high strength acid rock drainage (ARD) produced by waste rock. Additional environmental concerns include the performance of the engineered soil covers and the long term water quality in the tailings impoundment, the backfilled Southern Tail Pit and the Main Zone Pit. As a condition of the Mines Act permit, British Columbia requires the provision of a financial security (funds) that is sufficient to provide interest payments equal to the predicted future annual operating, monitoring and maintenance costs. A review of the financial security at the Equity Silver Mine has been held every five years since 1991. This paper outlines the conclusions of the 2005 Equity Mine Financial Security Technical Advisory Group (EMFSTAG).

INTRODUCTION

The Equity Silver mine is located 35 km southeast of the town of Houston, in northwest British Columbia. Fish occur in all creeks downstream of the mine and there are people living next to the creeks a short distance below the mine. Equity Silver operated between 1980 and 1994, producing silver with lesser amounts of gold and copper from three open pits and a small underground operation. Additional features of the mine site includes a contiguous series of waste rock dumps, a plant site, a flooded tailings impoundment, a clean water diversion system and ditches, ponds, pumps and dams for the collection, treatment and discharge of contaminated drainage.

Equity has a large number of environmental challenges. In addition to long-term collection and treatment with lime of large volumes of high strength acid rock drainage (ARD) produced by the waste rock dumps, other environmental concerns include elevated contaminants in the tailings impoundment water cover, elevated zinc and cadmium in the drainage from the backfilled Southern Tail pit and in surface waters of the Main Zone pit lake, and the loadings of copper, zinc and cadmium in treated drainage discharged to the receiving environment. Large volumes of mine drainage must be stored on site and can only be discharged to the environment during the spring and fall when there is adequate dilution in the receiving environment.

Liability and cost are important concerns at the Equity Silver site as a result of the large costs of operating the drainage collection and treatment system. There also remain a large number of unknowns regarding the future performance of many site components and the potential that deterioration in performance could significantly increase the costs as well as the environmental liability. As a condition of the *Mines Act*

permit, British Columbia requires the provision of a financial security that is sufficient to provide interest payments equal to the predicted future liability and annual operating costs at the Equity Mine. The *Mines Act* permit contains triggers for significant increases or decreases in the liability. Starting in 1991, the Equity Silver Mine and the Ministry of Energy, Mines and Petroleum Resources (MEMPR) committed to having a separate public committee to assess the liability costs for the mine every 5 years. Previous reviews of the financial security at Equity Silver were held in 1991, 1995 and 2000.

All members of Equity Mine Public Advisory Committee (EMPAC) were invited to join the 2005 Equity Mine Financial Security Technical Advisory Group (EMFSTAG). Members that decided to participate were Mike Aziz and Ross Gallinger of Placer Dome Canada (PDC), Glenda Ferris, a local resident, Kim Bellefontaine of MEMPR and Bill Price of Natural Resources Canada. Gary Baptiste and Stefan Schug of Wet'suwet'en Fisheries elected to participate as observers and not participate in final decision making. The EMFSTAG Terms of Reference outline the purpose, membership, decision making, how the group would operate and expected deliverables. The objectives of 2005 EMFSTAG were to:

- determine the requirements for environmental protection and reclamation, and estimate the resulting liabilities (costs),
- identify areas of significant uncertainty and risks to environment, and where necessary recommend additional monitoring or research studies,
- suggest measures, such as conditional triggers, to minimize the environmental and financial risks, and
- outline results of the above and make recommendations to the Chief Inspector of Mines.

Operating objectives included, where possible, reaching consensus and providing supporting information and rationale for statements and conclusions. The main deliverable was a summary document outlining the review process, site management issues, decisions of the committee with supporting rationale, calculation of different cost items and recommendations regarding the financial security and permit conditions. The group also produced a working document that outlines potential failure mechanisms, preventative mechanisms and potential additional requirements to limit environmental risk and liability.

The major cost categories used were lime, annual (non-lime) operating costs and periodic costs. The size of the liability also depends heavily on the projected rate of return.

LIME

Lime[1] is the primary additive in the treatment plant, and at $500,000 to $1,000,000 per year, it is presently the largest single cost item for the mine. Lime consumption primarily depends on acid loadings.

[1] Lime is calcium oxide (CaO). It is also referred to as quick lime and is produced by heating limestone ($CaCO_3$) above 550^oC in a kiln. Lime is used to make calcium hydroxide [$Ca(OH)_2$] or hydrated lime, a cheap neutralizing agent.

Unit Cost of Delivered Lime

There is no local lime supplier and consequently the cost of rail and truck transportation, along with energy surcharges resulting from rising energy costs, are a significant part of a delivered lime cost of $208.68/tonne that EMFSTAG used in the calculation of the predicted cost of future lime use. The group also recommended that the security should be recalculated using updated costs if the cost of delivered lime increases or decreases by more than 10%.

The Present Rate of Lime Use

When evaluating annual lime use, the July-June data is preferred over calendar year because snowfall and the corresponding snowmelt are included in the same year's data. July-June lime use from 88/89 to 93/94, prior to cover completion, varied from 4800 to 6520 t/yr (Table 1). In 8 of the 11 years since the dump cover was completed (94/95 to 04/05), July-June lime use was from 3190 to 4150 t/yr. The three exceptions were 5856 t/yr in 96/97, 5343 t/yr in 01/02 and 5300 t/yr in 04/05. Since 97/98, three years after dump cover completion, the 3-year rolling average of lime use has ranged from 3637 to 4468 t/yr.

Annual precipitation, especially the magnitude of the snow pack and snow melt, has had a large influence on annual lime use and makes it difficult to identify trends and may mask other influential factors. The technique used to reduce the impact of fluctuations in climate was to normalize lime use for the proportional difference from 655.3 mm, the average precipitation at the time of the 2000 review. In the 10 years since the dump cover was completed (94/95 to 04/05), July-June lime use normalized for average precipitation ranged from 3070 to 4630 t/yr. Since 97/98, three years after dump cover completion, the 3 year rolling average of actual lime use normalized for average precipitation has been from 3461 to 4395 t/yr. Notably, 04/05 had the highest single year (4630 t/yr) and three year rolling average (4395 t/yr) normalized lime use since the dump cover was constructed.

Table 1. Actual and normalized July-June lime use

		Actual Lime Use		Normalized Lime Use	
				655.3 mm	
Period	**Precip**	**July to June**	**3yr Rolling Avg**	**July to June**	**3 yr Rolling Avg**
85/86	431	3698.7		5618.4	
86/87	461	4723.0		6720.3	
87/88	620	4117.8	4179.8	4349.5	5562.7
88/89	657	5196.9	4679.2	5185.0	5418.3
89/90	739	6518.1	5277.6	5783.8	5106.1
90/91	474	6056.0	5923.7	8372.3	6447.0
91/92	669	5737.4	6103.8	5619.9	6592.0
92/93	616	4840.4	5544.6	5153.4	6381.9
93/94	740	6278.1	5618.6	5558.7	5444.0
94/95	674	3989.2	5035.9	3876.8	4863.0
95/96	721	4041.0	4769.4	3672.8	4369.4
96/97	902	5856.2	4628.8	4255.0	3934.9
97/98	644	3506.9	4468.0	3570.1	3832.6
98/99	827	3871.9	4411.7	3068.7	3631.3
99/00	619	3533.0	3637.3	3743.2	3460.7
00/01	674	3809.5	3738.1	3715.4	3509.1
01/02	781	5342.6	4228.4	4480.4	3979.7
02/03	456	3189.4	4113.8	4586.4	4260.7
03/04	684	4140.7	4224.2	3968.7	4345.2
04/05	750	5300.7	4210.3	4630.8	4395.3
94/95-04/05	**703**	**4234.6**	**4315.1**	**3893.8**	**4018.7**

Other notable observations about dump performance include the following.

- Approximately half of the lime consumption occurs during 3 months (March, April and May).
- The high acidity during the 2002 freshet, and the normalized lime use of 4480 to 4630 t/yr three of the last four years suggests that geochemical changes in the dump drainage may be occurring. The minimum monthly acidity concentration in the Main ARD Pond has increased since 1999, suggesting that there is less of a decline in acidity during the freshet.
- Temperature and oxygen data indicate that sulphide oxidation continues, although perhaps at a declining rate, within the dumps.
- Analysis of the drill cuttings from the groundwater monitoring holes excavated in 1999 and 2000 indicated that effective NP was not depleted in a significant portion of the waste rock dump.
- Studies at other sites suggest that only a portion of most dumps is leached, and thus the reservoir of acidity and soluble weathering products within the dumps may continue to increase.
- Lime use is roughly following a mass balance with increased flushing of stored oxidation products during years with a large freshet.
- The present rate of lime use is dependent on the cover continuing to function at its present capacity.
- Higher average Cu, Zn and Fe loads occurred in 94/95-98/99 than 99/00-03/04, although two of the highest annual Cu loads were in 99/00 and 03/04.

The conclusion of the EMFSTAG was that actual 3 year rolling average lime use remains the best representation of the existing annual lime use. The existing annual lime use used in the security has increased from 3500 t in 1995 to 4000 t in 2000 to a July to June three year rolling average of 4114 and 4228 t/yr from 01/02 to 04/05 (Table 2). EMFSTAG selected 4200 t/yr, a cost of approximately $876,456/yr, as the present rate of lime use.

Predicted Future Lime Use

The model that EMFSTAG uses for future lime use consists of:

1) a period of years at the existing annual amount of lime consumption;
2) a subsequent reduction in lime consumption;
3) followed by a prolonged lower level of annual lime consumption.

There was considerable discussion regarding the various factors influencing future lime use. The conclusion regarding future lime use was that while a decline in lime use would eventually occur, it was presently impossible to accurately predict the timing and form of the decrease, or whether this might be preceded by a short-term increase due to factors such as changes in climate or waste rock dump geochemistry. Factors that could decrease lime consumption include:

- exhaustion of ARD-weathering products along main flow paths;
- reduced sulphide oxidation due to:
  - exhaustion of most easily oxidized material;
  - decreasing temperatures; and
  - coating by weathering products;
- depletion of drainage within the dump over time after the cover was constructed;
- decrease in precipitation;
- reduction in elevation of groundwater table; and
- a portion of the ARD is not collected and treated.

Factors that could sustain current ARD production and lime consumption or lead to an increase include:

- continual oxidation and flushing of AG waste rock during wet/dry cycles;
- PAG geochemistry of the majority of rock in the waste dumps;
- continual infiltration by precipitation and groundwater resulting in run-off and flushing rates dependent upon weather pattern and climate variability;
- persistent groundwater infiltration due to rebound of regional water table with MZ Pit flooding;
- the ‘dampening effect’ of the soil cover prolongs sulphide oxidation and leaching of the products;
- ARD onset in presently neutral pH PAG rock and breakdown of coarse fragments will compensate for exhaustion of high-sulphide fines;
- depletion or coating of NP minerals increases acidity in drainage;
- build up of ARD-weathering products in the dump (only a limited portion of dump volume is flushed even in high flow events);

- physical changes within waste rock dumps create new flow paths, flushing stored ARD weathering products;
- degradation of the dump cover increase in oxidation and flushing;
- variation in site climate (e.g. snow depth, timing of snow melt and rate of snow melt) increase flushing; and.
- decrease in performance of diversion ditch system

The parameters adopted for use in 2005 security calculation were as follows:

1) the present level of lime consumption (4200 t) should be assumed to continue for 20 years rather than the 10 years used previously;
2) the subsequent ARD/lime consumption reduction rate should be 5% rather than the 10% used previously; and
3) post-reduction ARD/lime consumption should be 25% of present annual lime consumption (25% of 4200 t is 1050 t).

The more conservative values adopted in this review resulted from increased evidence of build-up and flushing of weathering product, lower confidence in the effectiveness of the dry cover and the high environmental risk and high uncertainty. While willing to accept 20 years for the 2005 assessment, due to concerns that existing lime use would continue for 50 to 100 years (or more), MEMPR wanted a much slower rate (5%) of decline rather than the 10% used in the last security review due to significant uncertainties. 25% was selected as the post-reduction rate rather than 1233 t, so the value will change if the present annual lime consumption changes. It also makes the value easier to calculate. Of note, the previous post-reduction rate of 1233 t/yr and 25% of the current lime rate of 4200 t/yr are similar.

PDC accepted the revised values but suggested that the tendency to be overly conservative must be balanced by the need to ensure the criteria used in the security calculation do not result in an excessive and unreasonable security amount.

Security Triggers for Changing Lime Use

An issue that took some time to resolve was what triggers to adopt for dealing with significant changes in annual lime use before the next review in 5 years. One concern was that if there was a lower lime trigger, consecutive low precipitation years could lower the security while the waste rock continued to oxidize, building-up acid weathering products in the dump, increasing the likelihood of a large future flushing event. The net result could be higher future costs and risk but a lower security. Several alternatives for triggers were debated including removal of all lime use triggers and only re-evaluate every 5 years during the bond review, removal of only the lower lime use trigger, and having both an upper and lower trigger. It was argued that there should be incentive and allowance for decreasing the bond, if it could be shown there was going to be a sustained improvement in drainage chemistry.

It was agreed that a trigger of 1000 tonnes above and below the three year rolling average would limit changes due to short-term fluctuations in climate. In the 2000 security conditions, recalculation using

normalized data and a 500 t/yr safety factor were used to minimize the impact of short-term reductions in precipitation. In 2005, EMFSTAG decided that any recalculation should be based on real (non-normalized) data and that a reduction in the security had to be supported by analysis of relevant site information including climate, waste rock weathering, drainage chemistry, hydrology, collection and treatment and site improvements. The resulting process for deciding whether to recalculate the security should be as follows.

1 Company reports when a difference of 1000 t from existing actual 3 year rolling average July to June lime occurs.
2 Company submits a review of performance of relevant site features and a proposal for changing or not changing the amount of security to EMPAC. Relevant site features to be reviewed include climate, waste rock weathering and drainage chemistry, site and waste rock hydrology (e.g., height of the water table and flow volume), collection and treatment, and site improvements.
3 EMPAC reviews the company report and submits its conclusions (including divergent points of view) and supporting rationale to the Chief Inspector.

PREDICTED FUTURE NON-LIME (FIXED AND VARIABLE) ANNUAL OPERATING COSTS

Fixed costs include supervision, salaries for operating, repair and maintenance, services purchased, overhead, road maintenance, heating buildings and equipment. Variable costs include supplies, power and parts for pumps and pipes. The largest cost items are salaries, services and power. Projected future non-lime (fixed and variable) annual operating costs, which were $520,000/yr in 1995 and $490,000/yr in 2000, were predicted to be $596,475/yr (Table 2). Changes in costs compared to 2000 included:

- addition of Cerio daphnia toxicity tests required on discharge from Main Zone Pit by MOE,
- increased natural gas costs and addition of cost of heating High Density Sludge (HDS) plant,
- reduced sludge handling costs with HDS plant and some reduced labour costs because of increased automation and ease of operation of pumping/treatment system,
- decreased supervision, reclamation (supplies) and fuel consumption costs, and
- addition of WCB and insurance costs.

Table 2. Non-lime fixed and variable annual operating costs

Cost Categories	2005 Projected Costs	Average 1995-2000	Average 2001-2004	Budgeted for 2005	Predicted Future
Fixed Costs	$377,400	367,345	$517,936	$499,150	$435,875
Variable Costs	$142,600	122,041	$149,824	$190,900	$159,700
TOTAL	**$520,000**	**489,386**	**$667,759**	**$690,050**	**$595,575**

The addition of WCB and insurance costs was based on the likelihood that if the Province had to take over the site, it would contract out work in the same manner used at the Britannia Mine. All the insurance for operation of the Britannia treatment plant is carried by the contractor, including automobile liability

on all vehicles, commercial/comprehensive general liability insurance ($5 million), all risks property insurance, comprehensive boiler and machinery insurance ($10 million), and WCB insurance. GST would be paid by the contractor, but costs would not be passed on to the Province (contractor would input as tax credit). PST would be paid.

Costs incurred by PDC but not incurred by government when they own a mine and therefore not included in the security included:

1. MOE Permit Fees
2. Mineral Claims, Mining Leases
3. Travel
4. Meals
5. Training
6. Crew functions
7. Safety awards
8. Security coverage
9. Head Office Costs (pension, recruitment)
10. MEMPR premiums

In previous security reviews, projected future non-lime (fixed and variable) annual operating costs were based on costs during the preceding years. This approach was not possible for this security review because a significant part of the 2002 to 2005 operating costs resulted from site improvements following the problems associated with the 2002 spring flood. Non-lime (fixed and variable) annual operating costs were $490,000 in 2001, but rose to $657,000 to $823,000/yr from 2002 to 2004. Although there will be future site improvements, no additional costs of this magnitude are expected. Consequently, EMFSTAG recommended that the mine's current predicted future costs of $596,475 be the projected non-lime (fixed and variable) annual operating costs used to calculate the reclamation security.

Security Triggers for Changing Non-Lime (Fixed and Variable) Annual Operating Costs

Power costs were recognized as being a significant part of the overall non-lime (fixed and variable) annual operating cost and consequently EMFSTAG recommended that security costs for power should be recalculated using new costs if the cumulative increase or decrease in 2 year rolling average electricity cost exceeded 50%. The figure of 50% is based on the relatively small cost of power compared to lime.

EMFSTAG also discussed potential triggers for significant changes in overall costs and site management. An overall cost trigger could provide additional assurance for large unexpected or cumulative increases in costs (i.e. an extra treatment circuit or cumulative cost increases for power, fuel etc.). A drawback with an overall cost trigger would be if it was as a disincentive to the company to conduct site improvements or resulted in cuts to site management to keep costs down. One way to avoid this would be to only have a trigger for the costs to continue to operate the site and not the capital and construction costs of improvements. Another problem with an overall cost trigger was that some increased operating costs were already covered through periodic costs and triggers for inflation, lime and power, and discount rates.

The intent with a trigger for significant changes in site management would be to cover potential negative changes resulting from third party management, reducing staff or using less skilled or experienced staff. Again it was noted that the trigger may deter the company from making improvements. It was also suggested that the proposed site management trigger was outside the mandate of the security review and

unnecessary since the Chief Inspector of Mines has the power of inspection and enforcement and can review the management and financial assurance of the site at anytime.

EMFSTAG felt that where possible, the security should create incentives for the cost-effective detection, resolution and reduction of risks. There needs to continue to be incentives for the proactive approach PDC has taken to mitigation, monitoring, maintenance and communication of the results. While blanket cost-cutting and low standards for maintenance at the Equity Mine site would put local residents, provincial taxpayers and the company at risk, EMFSTAG concluded that triggers for overall non-lime (fixed and variable) annual operating costs and site management should not be included in the security. MEMPR has the ability to become more prescriptive if the approach of the company is no longer consistent with the long-term reclamation and environmental protection needs of the Equity mine site.

PERIODIC REPAIR, REPLACEMENT AND SITE IMPROVEMENT COSTS

Many of the periodic costs in previous security assessments have already been completed; items such as additional sump construction, removal of buildings, completion of the soil cover and improvements to the Berzelius Diversion. Other items that were previously included in the periodic costs, such as annual biological studies and annual repairs of major equipment, the soil cover and drainage features, are now included in the non-lime (fixed and variable) annual operating cost budget. Projected future periodic work whose costs PDC recommended should be used in calculating the security is outlined in the following table.

Table 3. A summary of the timing, frequency, individual and total cost of periodic cost items

Category	Start	End	Frequency	Cost	Count	Total Cost
Major Equipment R&M	2006	2105	Every 5 yr	$50,000	20	$1,000,000
Repairs to Cover, Collection, Diversion and Discharge System	2015	2015	In 2015	$250,000	1	$250,000
Repairs to Cover, Collection, Diversion and Discharge System	2025	2105	Every 10 yr	$100,000	9	$900,000
Lime Tailings Pond[2]	2006	2105	Every 5 yr	$15,000	20	$300,000
Site Improvements	2010	2105	Every 10 yr	$50,000	10	$500,000
EEM Studies	2006	2105	Every 4 yr	$100,000	25	$2,500,000
Major Infrastructure Maintenance	2020	2105	Every 20 yr	$500,000	5	$2,500,000
					Total	**$7,950,000**

Major Equipment R&M refers to major repairs or maintenance to mobile heavy equipment. It is planned every 5 years starting in 2006 (2006, 2011, etc.). The work in the tailings pond is to add sufficient lime slurry to increase the pH to a target of 7.5. The cost estimate is for a $15,000 lime addition every 5 years. The EEM Studies refers to the comprehensive environmental effects monitoring (e.g., fish, sediments, benthics, etc.) required every 4 yrs by the Ministry of Environment Permit PE4475. Work projected for

[2] Lime is added as required and incrementally over several years to avoid large pH swings.

the cover includes a one time $250,000 repair in ten years time (2015) followed by $100,000 repairs starting in 2025 and every ten years thereafter. Although a periodic cost has been assigned to cover repair, there are no clear work tasks assigned to this money. Less specific cost items include miscellaneous unforeseen site improvements every 10 years starting in 2010 and major maintenance of infrastructure (e.g., pump houses, pipelines, treatment plants etc.) every 20 years starting in 2020. The major infrastructure repair is an additional item that was not included in the last security review. In the last security review the EEM studies were not included in the costs.

EMFSTAG accepted the periodic costs proposed by PDC. Additional comments from the members of the group included the following. Because of the unexpected need for site improvements following the problems encountered in 1996 and 2002, periodic costs is the cost item that the 1995 and 2000 reviews were least successful in predicting. In both instances, although concerns were identified concerns, there was inadequate evidence to take action because:

- the issues were in a discipline outside the areas of expertise of the reviewers;
- previous experience with many of the environmental protection measures is limited (e.g., soil covers);
- a lack of data regarding properties and processes, such as drainage paths, height of water table, weathering and water quality, that are continually changing and very difficult to predict.

Following the 2002 flood, PDC made or is making some major site improvements that were unanticipated in the last security review. These included:

- dam raises;
- construction of a high density sludge (HDS) treatment plant ($8 million);
- improvements to the Low Density Sludge (LDS) Plant;
- purchase and installation of new pumps, pipelines, electrical equipment, a new pump house, silo and genset;
- improvements to the Main Zone Pit barge and the Lu Lake dock;
- sludge removal and modifications to the Diversion Pond and construction of an Emergency ARD Storage Pond.

Costs were $3,924,551 for Phase 1 in 2002 and $11,297,476 for Phase 2 in 2003 and 2004. Some of the work was still ongoing in 2005 and will continue this year, most notably the removal of treatment sludge and subsequent modifications to the Diversion Pond, including construction of a splitter dyke and an Emergency ARD Storage Pond.

The proposed periodic costs were considered reasonable budgets for non-failure related repairs, replacement and site improvements. However, if a failure occurred, depending on the failure mode, the repair or additional mitigation costs may again exceed the projected budgets. The security should not discourage the company from conducting studies that will provide science-based explanations for or predictions of mine site conditions. Studies, such as performance assessments and groundwater investigations, reduce long-term site costs and therefore their cost should not increase the size of the

security. It is very important that site improvements and/or other measures are implemented to prevent significant failures before they occur, and that for many site components it is not enough to repair/re-engineer after a failure has occurred. For example, a determination is required of how damage to the cover could occur, and procedures developed to identify the presence, cause and location of a significant deterioration in cover performance.

ECONOMIC AND FINANCIAL ISSUES

The discount rate used in calculating the net present value of costs in 2000 was 4.00% for the first 30 years and 3.5% for the next 70 years. The short-term discount rate was based on the existence of a Government of Canada 4.00% real return bond due 2031. The conclusions of EMFSTAG based on the recommendations of Duane Anderson, MEMPR economist for the revised security were the following:

1. Placer Dome's reserves and low-cost, geographically-diversified operations should enable it to fund all required reclamation at the Equity Silver Mine through this review period and beyond. Similarly, the company's operations, financial resources, and capital market access will allow it to provide any additional security should it be required.
2. A Government of Canada real return bond still represented the best instrument for risk-free, real rates of return.
3. Based on the present low rates of return of Government of Canada real return bonds, the discount rate used in calculating the net present value of costs in the present security should be:
    a. 2.0 % until next review in 2010
    b. 2.5 % from 2011 until 2036
    c. 3.0% from 2036 onwards

<u>Triggers for Change in Bond Yields, Inflation and Financial Status of Parent Company</u>

Real Return Rates: The security should be recalculated if the yield on the Government of Canada 3.00% real return bond, which matures December 1, 2036, exceeds 2% for at least 6 consecutive months and if the use of the new calculated value as the discount rate for the period remaining until the next security review in 2010 will result in a security reduction of at least $1 million dollars.

Inflation: The security should be recalculated using new costs if cumulative inflation exceeds 10%. Inflation is to be measured using the British Columbia Price Index for June 2005 as the base period.

Financial Status: An MEMPR economist should annually review the rate of inflation (the British Columbia Consumer Price Index) and financial status of PDC or its successor, and report the results to the EMPAC by May 31st.

Concerns were expressed that the trigger for return rates only benefited the company, that a multi-year trigger would be more appropriate than the 6 month period and that if company default occurred, the bond could be deficient to generate the income needed to manage the site. MEMPR responded that seeking a security that would provide absolute assurance that no reclamation costs will default to the provincial treasury is not realistic. For mines owned by companies that are assessed as being responsible and financially robust, such as PDC, it is general MEMPR policy to have security equal to the present value of the expected future reclamation costs. It was also expressed that using lower risk-free real return rates would significantly increase the security, without materially reducing the Province's risk of default.

THE TOTAL LIABILITY

The resulting net present value (NPV) of the reclamation liability based on the cost estimates and discount rates accepted by EMFSTAG was **$45.767 million**; $21.657 million for lime, $21.293 million for annual operating costs and $2.817 million for periodic costs. Comparable NPV costs in 2000 were $10.21 million for lime, $12.4 million for annual operating costs, $0.97 million for periodic costs and a total cost of $23.55 million. Approximately half the increase from 2000 to 2005 was due to the projected costs themselves. The other half was due to the reduction in the discount rate. The NPV of the total liability would have been $33.760 million rather than $45.767 million if the 2000 discount rate structure of 4% for 31 years and 3.5% for 69 years had been used.

Provision of the required security and the conditions outlined above will be included in the revised *Mines Act* permit for the Equity Silver Mine. Lime use, unit costs for major cost items and inflation and any other security triggers will be reported in the annual reclamation/environmental report. The EMPAC will annually review site costs as part of the evaluation of the mine's annual reclamation/environmental report. The next comprehensive security review should be conducted no later than 2010. It is expected that the next review will build on the information presented here.

RECOMMENDED FUTURE ACTIONS TO LIMIT ENVIRONMENTAL RISK AND LIABILITY

A *Working Document of Potential Failure Modes, Preventative Measures and Potential Additional Requirements at the Equity Silver Mine* was produced to help ensure that no major costs items were missed and that all significant risks and unknowns identified during the review would be recorded. This document built on the report of a workshop conducted by PDC with a number of its consultants (AMEC, 2005). EMFSTAG did not attempt to reach consensus regarding the suggestions. PDC committed to taking these suggestions under advisement and trying to incorporate them into future plans but cautioned that only a limited number of issues could be addressed each year.

MEMPR indicated that the *Mines Act* permit would contain a similar statement as was used in 2000, requesting a program from the mine to address key outstanding issues. The permit condition would set general objectives and program requirements, but leave PDC to propose the details. The expectation is that the resulting work plan and studies would be reviewed by EMPAC.

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