FORT KNOX MINE FINANCIAL ASSURANCE REVIEW

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1.0 Introduction

The Fort Knox Mine is an open-pit gold mine with related mill facilities located northeast of Fairbanks, Alaska. This mine has been in operation since 1994, and currently operates at a rate of 35,000 to 50,000 tons per day (tpd). Based on an ore deposit of 200 million tons, the Fort Knox Mine is anticipated to operate until 2012 at this production rate. The Fort Knox Mine is owned and operated by Fairbanks Gold Mining, Inc., a subsidiary of Kinross Gold Corporation.

Ore is removed from the 332 acre open pit, crushed, ground, then gold is extracted with cyanide by vat leaching in the mill facility. Next, gold is recovered from the leach solution with activated carbon absorption/desorption and electrowinning. Cyanide in the tailings generated from the vat-leach gold recovery is reduced by the Inco SO_2/Air process to a concentration of approximately 8 parts per million (WAD) before being deposited in the 1,147 acre tailings storage facility. The mine site also contains the following areas of disturbance: 362 acres of waste rock dump piles, 358 acres of topsoil stockpiles and borrow sites, 152 acres of access roads, 203 acres of mine site facilities including the mill, and a 201 acre water supply reservoir.

Fairbanks Gold Mining, Inc. plans to conduct reclamation both concurrent with operations and after mining and milling have ceased. Final reclamation will be conducted in two phases. Phase I is planned to last 2 to 5 years and includes final contouring and revegetation of waste dumps, borrow areas, the tailings impoundment, and mill facilities. Phase II is anticipated to last 10 years and includes water treatment, monitoring and maintenance until closure standards are achieved. At the end of Phase II reclamation the Alaska Department of Natural Resources (ADNR), Alaska Department of Fish and Game (ADF&G), and Fairbanks Gold Mining, Inc. plan to manage the project area as a public use and recreation site, which includes allowing the open-pit to fill with water for wildlife habitat and public recreation.

Current financial assurances (FGMI 2003) are held by the state of Alaska, as a majority of the mine site is located on state lands. The 7,627 acre mine site has 5,797 acres located on state land, 1,709 acres on Alaska Mental Health Trust land, and 121 acres on private land. The ADNR holds financial assurance in the form of a bond in the amount of $2,153,539 (2000 dollars) to cover the cost of mine site reclamation and closure. The Alaska Department of Environmental Conservation (ADEC) holds financial assurance in the form of a bond in the amount of $9,262,340 (2000 dollars) to cover the cost of water treatment; as well as monitoring and maintenance of the tailings dam, tailings impoundment, and surrounding water quality. Additionally, a post reclamation and maintenance fund bond in the amount of $714,536 is held by ADNR for long term maintenance. The total estimated reclamation cost for the Fort Knox Mine is $12,130,415 (2000 dollars).

The Fort Knox Reclamation Plan and Tailings Storage Reclamation and Closure Cost Estimate were prepared in accordance with standard engineering cost estimation procedures and are consistent with methods commonly used by industry as well as state and federal agencies.

Current financial assurance amounts for the Fort Knox Mine used by the ADEC and the ADNR to guarantee reclamation takes place in the event of bankruptcy, or other circumstances where reclamation is not completed by Fairbanks Gold Mining, Inc., are evaluated in this report. This technical review is based on analysis of the existing reclamation plans and financial assurance cost estimates listed below:

- *Fairbanks Gold Mining, Inc. Fort Knox Mine Reclamation Plan, April 2001*

- *Alaska Interstate Construction LLC, Fort Knox Tailing Storage Reclamation and Closure Cost Estimate, December 2000.*

This evaluation was developed to ensure that the financial assurance amounts held by the state of Alaska are adequate to cover the costs of reclamation and closure as required by Alaska statutes and regulations. The state of Alaska is required to obtain financial assurances to ensure that the approved reclamation tasks are completed in the event Fairbanks Gold Mining, Inc. fails to perform the necessary tasks as outlined in the reclamation plan.

2.0 Methods

If the ADNR and ADEC become responsible for reclamation at the Fort Knox Mine it is critical that adequate funding is available for completion of the required tasks. It is well documented at other mine sites (e.g. Summitville Mine in Colorado; Zortman Landusky, Beal, and Basin Creek mines in Montana; and Brohm Mine in South Dakota) that in the event the operating company files bankruptcy costs incurred by the State to perform reclamation are significantly higher than those originally estimated (Kuipers 2000). In some cases costs incurred by state and federal agencies can be 10 to 100 times higher than those estimated in reclamation plans and financial assurance calculations (Kuipers 2000). For these reasons this review of the Fort Knox Mine reclamation plan and financial assurance(s) takes a conservative approach to cost estimating.

Financial assurance estimates calculated in this review were performed in accordance with standard cost estimation procedures and are consistent with methods commonly used by state and federal regulatory agencies. Site-specific reclamation tasks and associated areas of disturbance were developed from the aforementioned financial assurance estimates. Assumptions, reclamation tasks and associated costs used in this estimate are the same as those used in the existing reclamation plan and financial assurance(s), except where noted in the explanations for each scenario.

First, the existing financial assurance estimates were replicated (as Scenario 0) in a format that allows for unit costs to be determined for specific reclamation tasks. Next, four scenarios were developed where unit costs, indirect costs, and project timelines were evaluated and varied as described in the following sections. Finally, cash flow worksheets were generated for each scenario.

Detailed estimate calculations, and the resulting scenarios and assumptions, are provided as Attachment 1 for the Fort Knox Reclamation Plan, and Attachment 2 for the Fort Knox Mine Tailing Storage Reclamation and Closure Cost Estimate. Attachments 3 and 4 illustrate additional calculations made for the developed scenarios. The $714,536 post reclamation and maintenance fund was not evaluated in this review. Table 1 below summarizes the financial assurance amounts calculated for this review.

Table 1. Fort Knox Mine Financial Assurance Costs Summary

	Fort Knox	CSP² Scenarios			
	Scenario 0	**Scenario 1**	**Scenario 2** (CSP² Preferred Scenario)	**Scenario 3**	**Scenario 4**
	Based on 2001 reclamation plan.	Based on 2001 reclamation plan with increased indirect costs.	Based on Scenario 1 with increases to unit costs.	Based on Scenario 2 with 50 years water treatment.	Based on Scenario 2 with 100 years water treatment.
Reclamation Plan	$2,105,383	$2,390,322	$7,224,521	$7,224,521	$7,224,521
Tailing Storage Reclamation and Closure	$9,104,984	$10,337,238	$38,681,742	$94,544,637	$140,341,737
Post Reclamation & Maintenance Fund	$714,536	$714,536	$714,536	$714,536	$714,536
Total	$11,924,903	$13,442,096	$46,620,799	$102,483,694	$148,280,794

3.0 Review of Fort Knox Reclamation Plan and Financial Assurance Calculations

3.1 Fort Knox Scenario 0

For Scenario 0 labor costs, equipment costs, material costs, and acreages for specific reclamation tasks used duplicate those provided in the cost estimation worksheets in the Fort Knox Reclamation Plan and Fort Knox Tailing Storage Reclamation and Closure Cost Estimate. Equipment costs and efficiencies are based on Caterpillar Performance Handbook standards, and wage rates are based on the Davis Bacon Wages for Alaska. Material costs are based on contractor estimates and mine site experience.

Scenario 0 was generated to determine unit costs for specific reclamation tasks used in the Fort Knox cost estimates. These unit costs are evaluated and changed in subsequent scenarios. Although data inputs for Scenario 0 were derived from Fort Knox estimates slight differences in total amounts are observed. The Scenario 0 reclamation plan financial assurance amount differs by $48,156 ($2,153,539 - $2,105,383); and the Scenario 0 tailing storage reclamation and closure financial assurance amount differs by $157,356 ($9,262,340 - $9,104,984). This results in less than a 2% difference when compared to the Fort Knox generated financial assurances.

Review of the Fort Knox Reclamation Plan and associated financial assurance calculation revealed the following oversights in the original calculation:

- Equipment costs were transposed in the cost estimation worksheet for Borrow/Spoil and Miscellaneous Areas. On this worksheet, the 657E costs are listed as $53.62/hour and the Seed/Fertilizer Costs are listed as $236.90/hour. This is inconsistent with all other cost estimation worksheets in this estimate. This results in a cost difference of $ 55,312.07, and was not accounted for in Scenario 0.

- Material costs for fertilizer and seed in the cost estimation worksheet for Borrow/Spoil and Miscellaneous Areas does not include 37 acres listed in the reclaimed dump acres. This was not accounted for in Scenario 0.

- Cost estimation for haul road reclamation seems to exclude 68 acres. Text indicates at the end of 2005 there will be 220 acres of roads (p 27), however the cost estimation worksheet for Haul Roads indicates a total of 152 acres of roads for reclamation. This was not accounted for in Scenario 0.

3.2 CSP² Scenario 1

Scenario 1, developed by CSP², duplicates the Fort Knox Reclamation Plan cost estimate capital and operating costs with changes made to indirect costs as noted below. Scenario 0 indirect costs are calculated at 33% of the estimated contract costs, and Scenario 1 indirect costs are 51% of the estimated contract costs. The difference results from increases in Scenario 1 indirect costs for engineering redesign, procurement, construction management, and contractor overhead.

A financial assurance cost estimate should be performed under the assumption that reclamation is performed by a third-party under contract to the appropriate regulatory agency. Factors including contractor ownership, standby, overhead, engineering redesign, etcetera result in higher costs than those typical of reclamation costs when performed by mining companies. Indirect costs represent one of the most common areas in which financial assurance requirements are underestimated (Kuipers 2000). Indirect costs are added to this estimate to account for additional costs incurred in the event of agency management and oversight of reclamation and closure.

The Fort Knox Mine cost estimate included indirect costs for contingency (5%), mobilization and demobilization (5%), contractor profit (10%), contract administration (5%), and inflation (1.5% per year for 5 years, or 8% of contract cost). In this estimate, indirect costs amount to 33% of the operating and capital contract costs.

The following indirect costs were applied to CSP² Scenario 1:

- *Contingency*. Contingency costs reflect the level of detail and completeness of the cost estimate, as well as the degree of uncertainty of factors and assumptions used in the cost estimate. A contingency amount of 5% was applied to the estimated contract costs in the Scenario 1 cost estimate, which is the same percentage used in the Fort Knox Mine cost estimate.

- *Mobilization / Demobilization*. Mobilization/demobilization costs account for the transport of equipment and materials to and from the mine site, as well as infrastructure needs. A mobilization/demobilization amount of 5% was applied to contract costs estimated in Scenario 1, which is the same percentage used in the Fort Knox Mine cost estimate.

- *Engineering Redesign*. Engineering redesign costs stem from a lack of detailed information and plan development in a financial assurance estimate, as well as the need to account and design for actual conditions at the time of reclamation and closure. An engineering redesign cost of 3% was applied to the estimated contract costs used in Scenario 1. The Fort Knox Mine cost estimate did not include any amount for engineering redesign.

- *Engineering, Procurement, Construction Management*. This indirect cost accounts for the requirement of construction engineering, procurement, and construction management on behalf of the agencies in the event they become responsible for reclamation. An indirect cost of 5% of the contract costs was used in Scenario 1, while the Fort Knox Mine cost estimate does not account for the cost of this activity.

- *Contractor Overhead*. Contractor overhead accounts for administrating, management, public relations, safety, environmental, legal, performance bonding and other costs associated with doing business. A contractor overhead cost of 15% was applied to the estimated contract costs used in the Scenario 1 cost estimate. The Fort Knox Mine cost estimate did not include any amount for contractor overhead.

- *Contractor Profit*. This indirect cost accounts for contractor profit. A contractor profit amount of 10% was applied to contract costs estimated in Scenario 1, which is the same percentage used in the Fort Knox Mine cost estimate.

- *Agency Administration*. Agency administration includes costs incurred by state and federal agencies in situations where reclamation and closure are performed by regulatory agencies. Agency administration costs were accounted for as 5% of the contract costs in both the Fort Knox Mine cost estimate and Scenario 1.

- *Inflation*. Inflation indirect costs account for the difference in the dollar value between the time the estimate was generated and reclamation and closure are performed. An inflation amount of 3% was applied to the contract costs estimated in Scenario 1. The Fort Knox Mine cost estimate uses 8%.

Application of these indirect costs in Scenario 1 results in an increase of 13% over Scenario 0. The Fort Knox Mine Reclamation Plan costs were estimated as $2,390,322, and the Tailing Storage Reclamation and Closure Plan costs were estimated as $10,337,238 under Scenario 1. Indirect costs for Scenario 1 amount to 51% of the estimated operating and capital contract costs, while indirect costs were 33% for Scenario 0.

3.3 CSP² Scenario 2

Scenario 2 includes the addition of indirect costs as described for Scenario 1, as well as changes to unit costs and reclamation tasks as described below.

- *Cover application*. The Fort Knox Mine Reclamation Plan uses a 6 inch cover of growth media where required before revegetation. This cover depth may not be adequate to apply sufficient amount of growth media to all surfaces.

  Scenario 2 assumes application of a 12 inch cover of growth media to ensure that all surfaces are adequately covered with the growth media upon application. Unit costs for this item were increased by 50% to account for additional contouring and cover work required. Unit costs were changed for each specific reclamation task for this item. These changes increased the cover application costs from $3,211,908 in Scenario 1 to $4,817,862 in Scenario 2.

- *Revegetation Costs*. The unit costs estimated in the Fort Knox Reclamation Plan for revegetation assume that only one-time planting is necessary and weed control is not required. The seed application rate of 11 pounds/acre also seems low when compared to other operations.

  Scenario 2 uses a revegetation unit cost of $1,500/acre on flat surfaces and $2,500/acre on sloped surfaces. These unit costs are based on Montana Department of Environmental Quality (MDEQ) financial assurance recommendations based upon agency experience. These changes increased the revegetation costs from $470,383 in Scenario 1 to $3,304,305 in Scenario 2.

- *Building Demolition*. The Fort Knox Mine Reclamation Plan assumes that buildings are removed for salvage prior to the cost estimation for demolition, and only includes demolition costs for removal of foundations. This estimate does not include waste disposal costs associated with demolition.

  In the event of bankruptcy, buildings will most likely be demolished rather than salvaged by the regulatory agencies. Scenario 2 uses unit costs for demolition based on RS Means Heavy Construction Cost Data (Chandler 2001). Demolition and removal of buildings was estimated with a unit cost of $\$0.19/ft^3$. Assumptions were made that buildings are steel with an average height of 30 feet, which resulted in an estimation of building volume at 4,646,460 ft^3 requiring demolition. A unit cost of $\$0.75/ft^2$ was used to estimate the cost of foundation demolition (break and bury), which is based on the MDEQ concrete demolition estimate for the Stillwater Mining Company East Boulder Mine. These changes increased the building demolition costs from $84,566 in Scenario 1 to $998,989 in Scenario 2.

- *Additional reclamation.* The Fort Knox Mine Reclamation Plan does not include reclamation activities for Borrow MB-Pit 1 and Scenic Overlook, Borrow MB-Pit 2, and Borrow #11 due to plans for conversion of the mine site to a recreational facility.

  Scenario 2 assumes that all borrow areas, including those mentioned above, will be reclaimed at closure. Reclamation tasks were assumed to be the same as tasks planned for other borrow areas, with the addition of a 12 inch cover as described above. Acreages for the additional borrow areas were determined from Figure 1 of the Fort Knox Reclamation Plan. A unit cost of $1,733/acre, based on the average unit cost for contouring other borrow areas, was used to calculated the costs of contouring the additional borrow areas. These changes resulted in additional reclamation costs of $30,714 for Borrow MB-Pit 1 and the Scenic Overlook, $17,782 for Borrow MB-Pit 2, and $95,374 for Borrow #11.

- *Wetlands Reclamation*. The Fort Knox Mine Reclamation Plan does not account for additional expenses incurred for wetlands earthwork (contouring) and revegetation.

  The earthwork (contouring) costs assumed for Scenario 1 are $375/acre. Scenario 2 assumes a unit cost of $1,500/acre for both contouring and revegetation activities in wetland areas. These changes increased the wetlands reclamation costs from $38,638 in Scenario 1 to $201,000 in Scenario 2.

- *Water Treatment Plant.* The Fort Knox Mine Reclamation Plan assumes the existing cyanide detoxification plant can be converted to a ferric sulfate water treatment plant at 5% of the total reclamation cost. There is no basis or justification provided for the appropriateness of this cost estimation.

Scenario 2 assumes a water treatment plant cost of $16,337,500 for sulfide precipitation, plus a sludge disposal cost of $100,000. This scenario assumes that the conversion of the existing detoxification plant is not adequate for water treatment. Additional information describing water treatment methods is needed in the reclamation plan to assign a more accurate cost. The water treatment plant cost is based on a unit cost of $6,535/gpm (see Attachment 4) for an average treatment rate of 2,500 gpm as planned in the Fort Knox Reclamation Plan. These changes increased the water treatment costs from $120,756 in Scenario 1 to $16,437,500 in Scenario 2.

Application of these additional costs in Scenario 2 results in an increase of the current financial assurance amount by 291%. The Fort Knox Reclamation Plan costs were estimated as $7,224,521, and the Tailing Storage Reclamation and Closure Plan costs were estimated as $38,681,742 under Scenario 2.

Scenario 2 is the CSP² preferred alternative presented in this review. This scenario includes additional costs for indirect expenses, application of a 12 inch (vs. 6 inch) cover, revegetation, building demolition, reclamation of borrow areas planned for recreational use, wetlands reclamation, and water treatment plant construction. The 5 year duration of water treatment is accepted under Scenario 2, but it is strongly noted that the Fort Knox Mine Reclamation Plan does not include technical justification regarding the estimated 5 year treatment period. For that reason, Scenarios 3 and 4 were developed to assess reclamation and closure costs in the event water treatment is required for longer than 5 years.

3.4 CSP² Scenario 3

Scenario 3 utilizes the same assumptions and changes made in Scenario 2, with the addition of 50 years of water treatment for tailings water and seepage. The Fort Knox Mine Reclamation Plan does not include adequate details regarding water quality and quantity to assess the adequacy of the estimated 5 years of treatment and 30 years of monitoring and maintenance.

Therefore, Scenario 3 was developed to determine the cost differences should water treatment, monitoring, and tailings impoundment/dam maintenance need to be extended for 80 years (50 years water treatment plus 30 years monitoring and maintenance). In this case, water treatment plant operation and maintenance costs were increased to reflect an operational period of 50 years. Water treatment plant capital replacement costs were also assumed. Monitoring and maintenance under this scenario is performed as described in the reclamation plan with the time period extended. See Attachment 3 for detailed calculations and assumptions made in regard to extending water treatment and monitoring.

Application of these additional costs in Scenario 3 results in an increase of the current financial assurance amount by 759%. The Fort Knox Reclamation Plan costs were estimated as $7,224,521, and the Tailing Storage Reclamation and Closure Plan costs were estimated as $94,544,637 under Scenario 3.

3.5 CSP² Scenario 4

Scenario 4 utilizes the same assumptions as Scenario 2, with the addition of 100 years of water treatment for tailings water and seepage. This scenario was developed to determine the cost difference if water quality standards of tailings impoundment water and seepage were not met for 100 years after closure. In this case, water treatment plant operation and maintenance costs were increased to reflect an operational period of 100 years. Water treatment plant capital replacement costs were also assumed. Monitoring and maintenance under this scenario is performed as described in the reclamation plan with the time period

extended to a total of 130 years. See Attachment 3 for detailed calculations and assumption made in regard to extending water treatment and monitoring.

Application of these additional costs in Scenario 4 results in an increase of the current financial assurance amount by 1143%. The Fort Knox Reclamation Plan costs were estimated as $7,224,521, and the Tailing Storage Reclamation and Closure Plan costs were estimated as $140,341,737 under Scenario 4.

4.0 Conclusions

As illustrated by this review, the Fort Knox Mine financial assurance of $12,130,451 currently established may not be adequate to cover the costs of reclamation and closure incurred when these tasks are performed by a regulatory agency. As shown in Scenarios 1 and 2 presented above, financial assurance costs could increase from between 13% and 291% when assuming that water quality standards are met after 5 years of water treatment. If water treatment is required for 50 years the financial assurance amount could increase by 759% and by 1143% if water treatment is required for 100 years. This results in a potential increase of the overall financial assurance amount to between $13,442,096 and $148,280,794.

5.0 References

Alaska Interstate Construction LLC. December 29, 2000. *Fort Knox Tailing Storage Reclamation and Closure Cost Estimate*. Anchorage: Alaska Interstate Construction LLC. 44 pages.

Chandler, HM. 2001. *RSMeans Heavy Construction Cost Data*. 15th edition. Kingston: RSMeans Company, Inc. 470 pages.

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GREENS CREEK MINE FINANCIAL ASSURANCE REVIEW

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1.0 Introduction

The Greens Creek mine is a joint venture between Kennecott Minerals Company (70.3%) and Hecla Mining Company (29.7%) located on Admiralty Island in the Tongass National Forest near Juneau, Alaska. This underground mine and milling operation produces bulk concentrates of silver, zinc, lead, and gold. Greens Creek mine development began in 1987 with operations commencing in 1989. Operations were suspended in 1993 and reinitiated in 1996 after completion of mine development work. The life of mine is estimated to be 17 years at the designed production rate of 1,320 tons per day.

The polymetallic ore is removed from underground workings and transported to the surface mill and concentrator facilities where 3 separate concentrates of zinc, lead, and bulk concentrate are produced in addition to gold/silver doré. Concentrates are transported by road to the Hawk Inlet, loaded onto ships and sent to smelters for further processing. Tailings and waste rock generated during metals recovery are sent back underground (approximately 50%) or to dry storage facilities including a 30 acre tailings impoundment, plus a proposed 32 acre expansion, and 44 acres of production rock sites. The potential of acid rock drainage (ARD) in the tailings area and production rock sites has been identified in the reclamation plan. The mine site also contains 68 acres (13.5 miles) of road surface including 5.7 acres of road constructed from pyritic quarry rock, and 29 acres of mine site facilities including the mill. (KGCMC 2001, USFS 2003)

Reclamation at the Greens Creek mine is planned to occur both concurrent with operations and after mining and milling have ceased. Concurrent reclamation efforts will take place on specific sites, such as production rock sites and lower portions of the tailings impoundment, as reclamation materials become available and sites are no longer needed. Final reclamation and closure monitoring will begin after mine closure. Physical reclamation tasks such as building removal, recontouring, and revegetation are planned for completion within 5 years of closure. Water treatment facilities are anticipated for use no longer than seven years after closure, and environmental monitoring will be conducted for 30 years under this reclamation plan. (KGCMC 2001)

The Greens Creek mine reclamation plan and closure cost estimates were prepared in accordance with standard engineering cost estimation procedures and are consistent with methods commonly used by industry as well as state and federal agencies. Current financial assurances are held by the United States Forest Service (USFS) for the Alaska Department of Environmental Conservation (ADEC) in the amount of $24,400,000 to cover the cost of mine site reclamation and closure, water treatment, as well as monitoring and maintenance of reclamation work, engineered soil covers, and surrounding water quality. The proposed tailings impoundment expansion is estimated to increase the reclamation cost by $1,770,000, which will increase the overall financial assurance amount to $26,170,000 (USFS 2003).

Current financial assurance amounts for the Greens Creek mine held by the USFS guarantee reclamation takes place in the event of bankruptcy, or other circumstances where reclamation is not completed by Kennecott Minerals Company and Hecla Mining Company are evaluated in this report. This technical review is based on analysis of the existing reclamation plans and financial assurance cost estimates listed

in Kennecott Greens Creek Mining Company General Plan of Operations, Appendix 14, Attachment A, "Detail Reclamation Plan Cost Estimates," November 15, 2001; and the planned tailings impoundment expansion discussed in USFS Greens Creek Tailings Disposal Draft EIS, Appendix F, ADEC Draft Waste Management Permit, Section 9.1.2, April 2003.

This evaluation was developed to ensure that the financial assurance amounts held by the USFS for the state of Alaska are adequate to cover the costs of reclamation and closure as required by Alaska statutes and regulations. The state of Alaska is required to obtain financial assurance to ensure that the approved reclamation tasks are completed in the event Kennecott Minerals Company and Hecla Mining Company fail to perform the necessary tasks as outlined in the reclamation plan.

2.0 Methods

If the USFS and/or ADEC become responsible for reclamation at the Greens Creek mine it is critical that adequate funding is available for completion of the required tasks. It is well documented at other mine sites (e.g. Summitville Mine in Colorado; Zortman Landusky, Beal, and Basin Creek mines in Montana; and Brohm Mine in South Dakota) that in the event the operating company files bankruptcy costs incurred by the State to perform reclamation are significantly higher than those originally estimated (Kuipers 2000). In some cases costs incurred by state and federal agencies can be 10 to 100 times higher than those estimated in reclamation plans and financial assurance calculations (Kuipers 2000). For these reasons this review of the Greens Creek mine reclamation plan and financial assurance(s) takes a conservative approach to cost estimating.

Financial assurance estimates calculated in this review were performed in accordance with standard cost estimation procedures and are consistent with methods commonly used by state and federal regulatory agencies. Site-specific reclamation tasks and associated areas of disturbance were developed from the aforementioned financial assurance estimate. Assumptions, reclamation tasks and associated costs used in this estimate are the same as those used in the existing reclamation plan and financial assurance(s), except where noted in the explanations for each scenario.

First, the existing financial assurance estimate was replicated (as Scenario 0) in a format that allows for unit costs to be determined for specific reclamation tasks. Next, four scenarios were developed where unit costs, indirect costs, and project timelines were evaluated and varied as described in the following sections. Finally, cash flow worksheets were generated for each scenario.

Detailed estimate calculations and the resulting scenarios and assumptions are provided as Attachment 1 for the Greens Creek mine reclamation plan. Attachment 2 illustrates additional calculations made for the developed scenarios with extended water treatment and monitoring. This includes year by year costs estimated for the extended water treatment scenarios. Attachment 3 shows CSP² unit costs for water treatment that are utilized in this review. All attachments are Microsoft Excel spreadsheets, available to download at www.csp2.org/Reports.

Table 1 below summarizes the financial assurance amounts calculated for this review. As presented in Table 1, Scenario 2 is the CSP² preferred alternative in this review (see Section 3.3 for a detailed explanation of Scenario 2).

Table 1. Greens Creek Mine Financial Assurance Costs Summary

Greens Creek Mine Reclamation Plan	Greens Creek	CSP² Scenarios			
	Scenario 0	**Scenario 1**	**Scenario 2** (CSP² Preferred Scenario)	**Scenario 3**	**Scenario 4**
	Based on 2001 reclamation plan plus 2003 tailings expansion.	Based on 2001 reclamation plan plus 2003 tailings expansion with increased indirect costs.	Based on Scenario 1 with changes to unit costs.	Based on Scenario 2 with 50 years water treatment.	Based on Scenario 2 with 100 years water treatment.
Capital Costs	$15,475,139	$18,117,236	$21,032,526	$22,270,926	$23,710,926
Operating Costs	$10,573,961	$12,379,271	$14,377,271	$72,319,447	$125,665,735
Total	$26,049,100	$30,496,507	$35,409,797	$94,590,373	$149,376,667

3.0 Review of Greens Creek Mine Reclamation Plan and Financial Assurance Calculations

3.1 Greens Creek Scenario 0

For Scenario 0 labor costs, equipment costs, material costs, and acreages for specific reclamation tasks used duplicate those provided in the cost estimation worksheets in the Greens Creek mine reclamation plan. Equipment costs and efficiencies are based on Caterpillar Performance Handbook standards and historical Greens Creek mine costs. Wage rates are based on the Davis Bacon Wages for Alaska. Material costs are based on contractor estimates and mine site experience.

Scenario 0 was generated to determine unit costs for specific reclamation tasks used in the Greens Creek mine cost estimate. Unit costs are evaluated and changed in subsequent scenarios. Although data inputs for Scenario 0 were derived from the Greens Creek reclamation plan and the tailings impoundment expansion (USFS 2003) slight differences in total amounts are observed. The Scenario 0 reclamation plan financial assurance amount differs by $120,900 ($26,170,000 - $26,049,100). This results in less than a <0.5% difference when compared to the Greens Creek mine generated financial assurance.

Review of the Greens Creek reclamation plan and associated financial assurance calculation revealed the following observations:

- Water treatment after closure will utilize existing water treatment facilities (page 12) until compliance standards are achieved. According to the reclamation plan water treatment facilities are planned for removal within seven (7) years after closure (page 13). The Greens Creek reclamation plan does not provide assurance that ARD problems from mine workings, waste rock piles, the tailings impoundment, and roads will not continue into the future. Based on experience at other mine sites with acid generating materials, ARD impacts can be expected to continue for a significant time period following reclamation. Although conditions will most likely improve following reclamation, water treatment facilities may be needed well into the future.

  Due to the significant impacts on groundwater and surface water quality ARD has been demonstrated to cause, the potential for long-term water treatment should be examined more closely. The possible need for water treatment facilities into the future is addressed in Scenarios

3 and 4 of this review where water treatment is continued for periods of 50 and 100 years respectively.

- Maintenance and monitoring is anticipated to last for a period of thirty (30) years under the Greens Creek reclamation plan. This assumes that water quality standards as well as other performance criteria are met, and no further monitoring and maintenance will be necessary. Based on experience at other mine sites with ARD characteristics, it is unlikely that all monitoring and maintenance will be completed within 30 years. At minimum, a reduced level of monitoring and maintenance should be planned beyond 30 years.

  For example, the planned soil covers over ARD materials are highly engineered and will most likely require a high level of long-term maintenance to ensure optimal performance. The Greens Creek reclamation plan assumes a monitoring and maintenance period of only 5 years. Additionally, if water quality standards are not met after 7 years of water treatment a longer period of water quality monitoring will be required. These issues are addressed in Scenarios 2, 3, and 4 of this review.

- The proposed tailings impoundment expansion approximately doubles the size of the tailings impoundment footprint from 30 acres to 62 acres; however, the unit cost estimated to reclaim the expansion is not comparable to the unit cost applied for reclamation of the original 30 acre impoundment disturbance. The overall unit cost to reclaim the first 30 acres (including the engineered soil cover, revegetation, maintenance and monitoring) was calculated as $101,483 per acre. The overall unit cost for reclamation of the additional 32 acres planned in the expansion is $42,591 per acre.

  This results in an overall unit cost of $71,087 per acre when combining the unit costs for the original 30 acre disturbance with the 32 expansion acres, which is approximately 30% less per unit area when compared to the original cost estimate. Scenarios 2, 3, and 4 utilize the original unit cost (overall $101,483 per acre) for the planned expansion acreage.

3.2 CSP² Scenario 1

Scenario 1 duplicates the Greens Creek mine reclamation plan (Scenario 0) financial assurance capital and operating costs with changes made to indirect costs as noted below. Scenario 0 indirect costs are calculated at 33% of the estimated contract costs, and Scenario 1 indirect costs are 44% of the estimated contract costs. The difference results from increases in Scenario 1 indirect costs to account for engineering redesign, procurement, construction management, contractor overhead, and inflation.

A financial assurance cost estimate should be performed under the assumption that reclamation is performed by a third-party under contract to the appropriate regulatory agency. Factors including contractor ownership, standby, overhead, engineering redesign, etcetera result in higher costs than those typical of reclamation costs when performed by mining companies. Indirect costs represent one of the most common areas in which financial assurance requirements are underestimated (Kuipers 2000). Indirect costs are added to this estimate to account for additional costs incurred in the event of agency management and oversight of reclamation and closure.

The Greens Creek mine cost estimate included indirect costs for contingency (10%), mobilization and demobilization (5%), and agency administration (8%). A contractor profit rate of 10% is included in the capital and operating costs for specific reclamation tasks. In this estimate, indirect costs amount to 33% of the operating and capital contract costs.

The following indirect costs were applied to CSP² Scenario 1:

- *Contingency*. Contingency costs reflect the level of detail and completeness of the cost estimate, as well as the degree of uncertainty of factors and assumptions used in the cost estimate. A contingency amount of 10% was applied to the estimated contract costs in the Scenario 1 cost estimate, which is the same percentage used in the Greens Creek mine cost estimate.

- *Mobilization / Demobilization*. Mobilization/demobilization costs account for the transport of equipment and materials to and from the mine site, as well as infrastructure needs. A mobilization/demobilization amount of 5% was applied to contract costs estimated in Scenario 1. The Greens Creek mine cost estimate also uses 5% for mobilization / demobilization. Additional costs may be incurred for mobilization and demobilization of specialized equipment associated with reclamation of water based facilities.

- *Engineering Redesign*. Engineering redesign costs stem from a lack of detailed information and plan development in a financial assurance estimate, as well as the need to account and design for actual conditions at the time of reclamation and closure. An engineering redesign cost of 3% was applied to the estimated contract costs used in Scenario 1. The Greens Creek mine cost estimate did not include any amount for engineering redesign.

- *Engineering, Procurement, Construction Management*. This indirect cost accounts for the requirement of construction engineering, procurement, and construction management on behalf of the agencies in the event they become responsible for reclamation. An indirect cost of 5% of the contract costs was used in Scenario 1, while the Greens Creek mine cost estimate does not account for the cost of this activity.

- *Contractor Overhead*. Contractor overhead accounts for administration, management, public relations, safety, environmental, legal, performance bonding and other costs associated with doing business. A contractor overhead cost of 15% was applied to the estimated contract costs used in the Scenario 1 cost estimate. The Greens Creek mine cost estimate did not include any amount for contractor overhead.

- *Contractor Profit*. This indirect cost accounts for contractor profit. A contractor profit amount was not applied to Scenario 1 since the Greens Creek mine financial assurance estimate includes a contractor profit rate of 10% rolled into the capital and operating costs.

- *Agency Administration*. Agency administration includes costs incurred by state and federal agencies in situations where reclamation and closure are performed by regulatory agencies. Agency administration costs were accounted for as 8% of the contract costs in both Scenario 1 and the Greens Creek mine cost estimates.

- *Inflation*. Inflation indirect costs account for the difference in the dollar value between the time the estimate was generated and reclamation and closure are performed. An inflation amount of 3% was

applied to the contract costs estimated in Scenario 1. Inflation was not accounted for in the Greens Creek mine estimate.

Application of these indirect costs in Scenario 1 results in an overall increase of 17% over Scenario 0. The Greens Creek mine reclamation plan costs were estimated as $28,533,931 under Scenario 1. Indirect costs for Scenario 1 amount to 44% of the estimated operating and capital contract costs, while indirect costs were 33% for Scenario 0.

3.3 CSP² Scenario 2

Scenario 2 includes the addition of indirect costs as described for Scenario 1, as well as changes to unit costs and reclamation tasks as described below. In general the Greens Creek mine reclamation plan unit costs seem adequate for specific reclamation tasks such as contouring, construction of engineered soil covers, application of growth media, hydroseeding, etcetera. This cost estimate also includes costs for highly specialized reclamation tasks specific to the Greens Creek mine due to the proximity of the mine site to costal areas.

Capital costs for the tailings impoundment were increased in this scenario to reflect the unit costs estimated for tailings impoundment closure before the planned expansion. In this case, the 32 acres of disturbance planned for the tailings expansion were added to the unit costs associated with the original 30 acres. Therefore tailings impoundment reclamation and closure under this scenario is estimated to cost $6,291,884 for the 62 acres at a unit cost of $101,482 per acre. The Greens Creek reclamation plan estimates $4,407,377 for the 62 acres at an overall unit cost of $71,087 per acre.

The only capital cost added under this scenario is related to water treatment facilities. The existing reclamation plan for Greens Creek indicates that sludge disposal into the tailings impoundment will be unavailable within the first two years due to closure of the tailings impoundment. Therefore a unit cost of $20,000/year for sludge disposal, including transport, was assumed in Scenario 2. With seven years of water treatment a cost of $140,000 was included.

Maintenance and monitoring of the engineered soil covers over acid generating materials (waste rock and tailings) was increased to 30 years on an annual basis under Scenario 2 for reasons previously discussed. For the first 5 years a cost of $82,800/year, based on the Greens Creek reclamation plan estimate, is applied. After the first five years it is assumed that maintenance costs for repairs to engineered soil covers will reduce to $55,500/year. This value is based on an approximate reduction in anticipation of reduced maintenance needs, since information on long-term cover maintenance costs is not provided in the reclamation plan. This results in a total cost of $1,801,500 under this scenario, compared to a cost of $414,000 in the Greens Creek reclamation plan.

Application of these additional costs in Scenario 2 results in an increase of the current financial assurance amount by 36%. The Greens Creek mine reclamation plan costs were estimated as $35,409,797 under Scenario 2.

Scenario 2 is the CSP² preferred alternative presented in this review. This scenario includes additional indirect costs and extended water quality and reclamation monitoring, increased reclamation costs for the proposed tailings impoundment expansion, and a minor increase in water treatment costs. It must be strongly noted that in recommending this scenario, the duration of water treatment must match the Greens Creek assumption that water treatment will not be required beyond 7 years – an assumption that has scant

technical justification, and places the public at significant financial risk if it is wrong. For this reason, CSP² has developed Scenarios 3 and 4 to evaluate the costs of longer-term water treatment.

3.4 CSP² Scenario 3

Scenario 3 utilizes the same assumptions and changes made in Scenario 2, with the addition of 50 years of water treatment. As previously discussed, the Greens Creek mine reclamation plan does not include adequate detail regarding water quality, quantity, and acid rock drainage impacts to assess the adequacy of the estimated maximum 7 years of water treatment and 30 years of monitoring and maintenance.

Therefore, Scenario 3 was developed to determine the cost differences should water treatment, monitoring, and maintenance need to be extended for 80 years (50 years water treatment plus 30 years monitoring and maintenance). In this case, water treatment plant operation and maintenance costs were increased to reflect an operational period of 50 years. This includes a sludge disposal cost of $1,000,000 for 50 years of water treatment. Water treatment plant capital replacement costs totaling $7,228,000 were also assumed. For capital replacement costs, a water treatment plant capital cost of $5,228,000 was assumed based on the CSP² water treatment plant capital unit cost of $6,535/gpm and a water treatment plant capacity of 800 gpm. See Attachment 3 for additional details on CSP² unit costs related to water treatment.

Monitoring and maintenance under this scenario is performed as described in the reclamation plan with the time period extended. See Attachment 2 for detailed calculations and assumptions made in regard to extending water treatment and monitoring. General site operation and maintenance costs (labor, power, and service expenses) were increased to $34,722,543; and long-term operation and maintenance expenses increased to $10,479,851. Under this scenario surface and groundwater monitoring is conducted annually for 52 years, biannually for 10 years, every three years for 10 years, and every 5 years for 10 years. Reclamation monitoring will be conducted twice annually for 52 years, then biannually for 10 years, and every five years for 20 years. Reclamation maintenance of engineered soil covers and other sites as necessary will be conducted on the same schedule of reclamation monitoring. Again, the annual cost of reclamation maintenance for engineered soil covers was reduced from $82,800 to $55,500 after the first five years of maintenance for reasons discussed in Scenario 2.

Application of these additional costs in Scenario 3 results in an increase of the current financial assurance amount by 263%. The Greens Creek mine reclamation costs were estimated as $94,590,373 under this scenario.

3.5 CSP² Scenario 4

Scenario 4 utilizes the same assumptions as Scenario 2, with the addition of 100 years of water treatment to mitigate acid generating drainage. This scenario was developed to determine the cost difference if water quality standards were not met for 100 years after closure. Monitoring and maintenance under this scenario continue for 130 years, or 30 years after water quality standards have been met.

In this case, water treatment plant operation and maintenance costs were increased to reflect an operational period of 100 years. Water treatment plant capital replacement costs of $7,228,000 were assumed. Sludge disposal costs for 100 years of treatment were estimated at $2,000,000.

Monitoring and maintenance under this scenario is performed as described in the reclamation plan with the time period extended to a total of 130 years. See Attachment 2 for detailed calculations and assumptions made in regard to extending water treatment and monitoring. General site operation and maintenance costs (labor, power, and service expenses) were increased to $65,359,926; and long-term operation and maintenance expenses increased to $16,888,501. Under this scenario surface and groundwater monitoring is conducted annually for 102 years, biannually for 10 years, every three years for 10 years, and every 5 years for 10 years. Reclamation monitoring will be conducted twice annually for 52 years, then biannually for 10 years, and every five years for the remainder. Reclamation maintenance of engineered soil covers and other sites as necessary will be conducted on the same schedule of reclamation monitoring. Again, the annual cost of reclamation maintenance for engineered soil covers was reduced from $82,800 to $55,500 after the first five years of maintenance for reasons discussed in Scenario 2.

Application of these additional costs in Scenario 4 results in an increase of the current financial assurance amount by 473%. The Greens Creek mine reclamation plan costs were estimated as $149,376,667 under Scenario 4.

4.0 Conclusions

As illustrated by this review, the Greens Creek mine financial assurance, plus tailings impoundment expansion costs, of $26,170,000 currently established may not be adequate to cover the costs of reclamation and closure incurred when these tasks are performed by a regulatory agency. In the event water quality standards are met within the assumed timeframe of 7 years, reclamation and closure costs could increase from between 17% and 36% as shown in Scenarios 1 and 2. If water treatment is required for 50 years the financial assurance amount could increase by 263%, and by 473% if water treatment is required for 100 years. This results in a potential increase of the overall financial assurance amount to between $30,049,100 and $149,376,667.

5.0 References

KGCMC. November, 15, 2001. *Kennecott Greens Creek Mining Company General Plan of Operations Appendix 14 Attachment A Detail Reclamation Plan Cost Estimates*. Kennecott Minerals: Juneau, Alaska. 25 pages.

Kuipers, JR. February 2000. *Hardrock Reclamation Bonding Practices in the Western United States*. Boulder: National Wildlife Federation.

USFS. April 2003. *Greens Creek Tailings Disposal Draft EIS*. USDA Forest Service.

Note: All attachments are Microsoft Excel spreadsheets, available to download at www.csp2.org/Reports

KENSINGTON GOLD PROJECT FINANCIAL ASSURANCE REVIEW

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for the

CENTER for SCIENCE in PUBLIC PARTICIPATION

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1.0 Introduction

The Kensington Gold Project is a proposed underground gold mine and mill located approximately 45 miles north of Juneau, Alaska. This project is proposed for operation by Coeur Alaska, Inc., and is currently under review through a Supplemental Environmental Impact Statement (SEIS) (USDA FS, 2004). The mine is anticipated to begin construction upon completion of the SEIS review. With ore reserves estimated at 7 million tons, the Kensington Gold Project is expected to operate for 10 years at a production rate of 2,000 tons per day (tpd) ore and 400 tpd development waste rock.

Facilities proposed at the Kensington Gold Project include an underground mine, mill site, tailings disposal facility (86.1 acres), borrow areas (8.6 ac), development rock storage (4.8 ac), a heliport, marine terminal (6.0 ac), buildings, roads (7.2 ac), topsoil stockpiles (1.5 ac), stormwater diversions and other minor facilities. The project site covers both private land managed by Coeur Alaska, Inc. and public/federal lands managed by the US Forest Service. The total proposed surface disturbance for this mine facility is 195.5 acres.

The gold ore will be removed through 2 portals and conveyed to the surface mill located adjacent to the Jualin Portal. Gold is proposed for recovery in the mill through a flotation circuit generating a concentrate containing calaverite, native gold, pyrite, chalcopyrite and silicate. Concentrate will be transported off-site for processing. Tailings generated will be piped as a slurry to the proposed tailings storage facility located at Lower Slate Lake. Pre-project test work indicates the potential for acid rock drainage (ARD) is relatively low.

Coeur Alaska, Inc. plans to conduct reclamation both concurrent with operations and after mining operations have ceased. The primary goal of reclamation is to return the land to a safe and stable condition consistent with a productive post-mining land use of wildlife habitat and recreational use. Final reclamation will be conducted in three phases. Phase I is planned to last 2 years and includes site closure, final contouring and reclamation immediately after cessation all of mining activities. Phase II, passive reclamation, is anticipated to last 5 to 20 years and includes monitoring and maintenance, and possibly passive water treatment, until closure standards are achieved. Phase III is the period when the agencies accept reclamation and release the bonds in accordance to the terms of the Record of Decision.

The Kensington Gold Project reclamation plan was prepared in accordance with standard engineering cost estimation procedures and is consistent with methods commonly used by industry as well as state and federal agencies. Costs for individual reclamation tasks were based on unit costs developed during a third party reclamation cost estimate conducted in 1998 (Coeur Alaska, 12 Jun 04, Section 3.7). The proposed financial assurance amount is $3,154,305. Reclamation activities, costs and scheduling will be reviewed by Coeur Alaska, Inc. every 3 years and again 2 years prior to closure.

Current financial assurance amounts proposed for the Kensington Gold Project guarantee that reclamation takes place in the event of bankruptcy, or other circumstances where reclamation is not completed by Coeur Alaska, Inc., are evaluated in this report. This technical review is based on analysis of the existing reclamation plan and financial assurance cost estimate "*Kensington Gold Project Reclamation Principles*" prepared by Coeur Alaska, Inc. in June 2004.

This evaluation was developed to evaluate whether the financial assurance amounts held by the state of Alaska are adequate to cover the costs of reclamation and closure as required by Alaska statutes and regulations. The state of Alaska is required to obtain financial assurances to ensure that the approved reclamation tasks are completed in the event Coeur Alaska, Inc. fails to perform the necessary tasks as outlined in the reclamation plan.

2.0 Methods

If the state of Alaska becomes responsible for reclamation at the Kensington Gold Project it is critical that adequate funding is available for completion of the required tasks. It is well documented at other mine sites (e.g. Summitville Mine in Colorado; Zortman-Landusky, Beal, and Basin Creek mines in Montana; and Brohm Mine in South Dakota) that in the event the operating company files bankruptcy costs incurred by the State to perform reclamation can be significantly higher than those originally estimated (Kuipers 2000). In some cases actual costs incurred by state and federal agencies can be 10 to 100 times higher than those estimated in reclamation plans and financial assurance calculations (Kuipers 2000). For these reasons this review of the Kensington Gold Project reclamation plan and financial assurance takes a conservative approach to cost estimating.

Financial assurance estimates calculated in this review were performed in accordance with standard cost estimation procedures and are consistent with methods commonly used by state and federal regulatory agencies. Site-specific reclamation tasks and associated areas of disturbance were developed from the aforementioned reclamation plan and financial assurance estimate. Assumptions, reclamation tasks and associated costs used in this estimate are the same as those used in the existing reclamation plan and financial assurance, except where noted in the explanations for each scenario.

First, the existing financial assurance estimates were replicated (as Scenario 0) in a format that allows for unit costs ($/acre) to be determined for specific reclamation tasks. Next, three scenarios were developed where unit costs, indirect costs, and project timelines were evaluated and varied as described in the following sections. Finally, cash flow worksheets were generated for each scenario.

Detailed estimate calculations, and the resulting scenarios and assumptions, are provided as Attachment 1. Table 1 below summarizes the financial assurance amounts calculated for this review.

Table 1. Kensington Gold Project Financial Assurance Costs Summary

	Kensington Gold	CSP² Scenarios			
	Scenario 0	**Scenario 1**	**Scenario 2** (CSP² Preferred Scenario)	**Scenario 3**	**Scenario 4**
	Based on 2004 reclamation plan.	Based on 2004 reclamation plan with increased indirect costs.	Based on Scenario 1 with increases to unit costs and additional reclamation tasks.	Based on Scenario 2 with 50 years of water treatment.	Based on Scenario 2 with 100 years of water treatment.
Capital Costs	$2,423,680	$2,953,047	$3,813,946	$4,527,746	$5,357,746
Operating Costs	$680,625	$903,870	$5,402,470	$30,401,330	$54,425,330
Total	$3,104,305	$3,829,692	$9,216,416	$34,929,076	$59,783,076

3.0 Review of Kensington Gold Project Reclamation Plan and Financial Assurance Calculations

3.1 Kensington Gold Project Scenario 0

For Scenario 0 labor costs, equipment costs, material costs, and acreages for specific reclamation tasks used duplicate those provided in the cost estimation worksheets in the Kensington Gold Project reclamation plan. The reclamation plan does not indicate the basis for determining labor, equipment, or material unit costs estimated for reclamation and closure at the Kensington Gold Project. Typically unit costs are determined using Caterpillar Performance Handbook standards for equipment rates and efficiencies, prevailing wage rates from Davis Bacon Wages for Alaska for labor costs, and contractor estimates or mine site experience for material costs.

Scenario 0 was generated to determine unit costs for specific reclamation tasks used in the Kensington Gold Project cost estimate. These unit costs are evaluated and changed in subsequent scenarios. Although data inputs for Scenario 0 were derived from Kensington Gold Project cost estimation worksheets, slight differences in total amounts are observed. The Scenario 0 reclamation plan financial assurance amount differs by $50,000 ($3,154,305 - $3,104,305), which results in a 1.6% difference when compared to the Kensington Gold Project generated financial assurance. This difference can be attributed to a $200,000 cost for mobilization/demobilization being assigned as a direct cost in the Kensington Gold Project reclamation cost estimate, while mobilization/demobilization costs are treated as an indirect cost in Scenario 0.

The following observations were noted during review of the Kensington Gold Project Reclamation Plan:

- The costs in this 2004 reclamation plan appear to be based on engineered unit costs defined in a 1998 reclamation plan submitted to the US Forest Service. The Kensington Gold Project 2004 reclamation plan does not indicate if the unit costs defined in 1998 were escalated to 2004 dollars. This is not addressed in this review of the financial assurance, but would result in a 17% increase of the contract costs from 1998 to 2004. Escalation should be applied in subsequent financial assurance reviews.

- The administrative principles described state that bonding will be based on actual reclamation costs. It is typical in a financial assurance estimate to apply costs for a third party to conduct reclamation in the event of bankruptcy, which is addressed in the direct and indirect costs assigned in subsequent scenarios.

- Costs for reclamation tasks are preliminary in this 2004 reclamation plan and therefore do not provide much detail on the costs of individual reclamation tasks. For example, demolition costs are presented as a single line item cost for different facilities (Slate Creek Cove facilities, Process Area, Roads, etc.) without explanation of the specific buildings, equipment, or other structures present. Typically for demolition costs the building type and size would be defined so that an appropriate demolition and/or burial costs can be assigned and evaluated.

- There are no costs assigned in the estimate for detoxification and disposal of wastes. For the purposes of this review it is assumed that this reclamation task is estimated as part of the demolition line item costs, but more information should be provided in subsequent reclamation plans.

3.2 CSP² Scenario 1

Scenario 1, developed by CSP², duplicates the Kensington Gold Project reclamation plan cost estimate capital and operating costs with changes made to indirect costs as noted below. Scenario 0 indirect costs are calculated at 34% of the estimated contract costs, and Scenario 1 indirect costs are 66% of the estimated contract costs. The difference results from increases in Scenario 1 indirect costs for mobilization/demobilization, engineering redesign, contractor overhead, contractor profit and inflation.

A financial assurance cost estimate should be developed under the assumption that reclamation is performed by a third-party under contract to the appropriate regulatory agency. Factors including contractor ownership, standby, overhead, engineering redesign, etcetera result in higher costs than those typical of reclamation costs when performed by mining companies. Indirect costs represent one of the most common areas in which financial assurance requirements are underestimated (Kuipers 2000). Indirect costs are added to this estimate to account for additional costs incurred in the event of agency management and oversight of reclamation and closure.

The Kensington Gold Project cost estimate included indirect costs for contingency (10%), mobilization and demobilization ($200,000 or 11%), engineering, procurement, construction management (5%), and contract/agency administration (10%). In this estimate, indirect costs amount to 34% of the operating and capital contract costs.

The following indirect costs were applied to CSP² Scenario 1:

- *Contingency*. Contingency costs reflect the level of detail and completeness of the cost estimate, as well as the degree of uncertainty of factors and assumptions used in the cost estimate. A contingency amount of 10% was applied to the estimated contract costs in the Scenario 1 cost estimate, which is the same percentage used in the Kensington Gold Project cost estimate.

- *Mobilization / Demobilization.* Mobilization/demobilization costs account for the transport of equipment and materials to and from the mine site, as well as infrastructure needs. A mobilization/demobilization amount of 10% was applied to contract costs estimated in Scenario 1, while the Kensington Gold Project applied a set dollar amount of $200,000 which is approximately 11%.

- *Engineering Redesign*. Engineering redesign costs stem from a lack of detailed information and plan development in a financial assurance estimate, as well as the need to account and design for actual conditions at the time of reclamation and closure. An engineering redesign cost of 3% was applied to the estimated contract costs used in Scenario 1. The Kensington Gold Project cost estimate did not include any amount for engineering redesign.

- *Engineering, Procurement, Construction Management*. This indirect cost accounts for the requirement of construction engineering, procurement, and construction management on behalf of the agencies in the event they become responsible for reclamation. An indirect cost of 5% of the contract costs was used in Scenario 1, which is the same percentage applied for the Kensington Gold Project cost estimate.

- *Contractor Overhead*. Contractor overhead accounts for administrating, management, public relations, safety, environmental, legal, performance bonding and other costs associated with doing business. A contractor overhead cost of 15% was applied to the estimated contract costs used in the Scenario 1 cost estimate. The Kensington Gold Project cost estimate did not include any amount for contractor overhead.

- *Contractor Profit*. This indirect cost accounts for contractor profit. A contractor profit amount of 10% was applied to contract costs estimated in Scenario 1, while the Kensington Gold Project did not apply a percentage for contractor profit in their cost estimate.

- *Agency Administration.* Agency administration includes costs incurred by state and federal agencies in situations where reclamation and closure are performed by regulatory agencies. Agency administration costs were accounted for as 10% of the contract costs in both the Kensington Gold Project cost estimate and Scenario 1.

- *Inflation*. Inflation indirect costs account for the difference in the dollar value between the time the estimate was generated and reclamation and closure are performed. An inflation amount of 3% was applied to the contract costs estimated in Scenario 1. The Kensington Gold Project cost estimate did not apply inflation.

Application of these indirect costs in Scenario 1 results in an increase of 23% over Scenario 0. The Kensington Gold Project Reclamation Plan costs were estimated as $3,829,692 under Scenario 1. Indirect costs for Scenario 1 amount to 66% of the estimated operating and capital contract costs, while indirect costs were 34% for Scenario 0.

3.3 CSP² Scenario 2

Scenario 2 includes the addition of indirect costs as described for Scenario 1, as well as changes to unit costs and reclamation tasks as described below.

- *Contouring Costs*. The units cost estimated in the Kensington Gold Project reclamation plan for contouring of development rock sites, buildings, roads and other facilities is $249/acre. Although this reclamation plan lacks specific information regarding contouring (i.e. grade slopes from 1.5:1 to 3:1 at closure), the unit cost applied seems low when compared to other operations in Alaska. Scenario 2 uses a contouring unit cost of $1,500/acre. This unit cost is based on the unit cost of contouring activities estimated at the True North Project at $2,044/acre (Fairbanks Gold Mining, December 2001) and the Fort Knox Mine at $1,550/acre (Fairbanks Gold Mining, April 2001). These changes increased the contouring costs from $65,971 in Scenario 1 to $209,060 in Scenario 2.

- *Revegetation Costs*. The unit cost of $525/acre estimated in the Kensington Gold Project reclamation plan for revegetation activities includes the establishment of self-sustaining vegetation communities through native reseeding and promotion of natural invasion and succession. The reclamation plan does not mention plans for more than one seeding event or weed control measures.

  Scenario 2 uses a revegetation unit cost of $1,500/acre on flat surfaces. This cost estimate assumes that all surfaces are flat as detailed information is not provided. These unit costs are based on Montana Department of Environmental Quality (MDEQ) financial assurance recommendations based upon agency experience. These changes increased the revegetation costs from $72,975 in Scenario 1 to $208,500 in Scenario 2.

- *Mine Facility Unit Area*. There is no unit area provided for the following reclamation tasks to assess the area and costs required for contouring, application of cover or growth media, and revegetation activities after demolition has taken place: Administrative Area Buildings, Power/Telephone Lines, Fuel Storage Tank, Infiltration Gallery, and Earth Retaining Walls. It is assumed that these areas are small compared with those acreages provided for other reclamation tasks, but clarification should be provided in future reclamation plans. No cost was assigned in Scenario 2 for earthwork and revegetation required for these areas.

- *Plug Mine Portals*. The Kensington Gold Project reclamation plan discusses activities associated with plugging the 2 portals at closure, however no costs associated with portal plugging tasks are provided. Scenario 2 uses a unit cost of $85,000/portal to plug portals based on the Pogo Project Reclamation Plan (Teck-Pogo, 2002).

- *Water Treatment*. The Kensington Gold Project reclamation plan does not provide costs for water treatment during mine operations or post-closure activities, other than earthwork costs associated with the conversion of storage ponds into subsurface flow wetlands as a passive treatment system.

  Scenario 2 assumes that active water treatment will be required for 7 years after closure to treat drainage from the tailings impoundment, rock piles, mine portals, and other facilities before discharge off-site. Costs for the operation of a reverse osmosis treatment plant at 1,200 gallons per minute are used in this estimate because it is a proven technology for the removal of both aluminum and total suspended solids. Costs for construction and operation of a reverse osmosis treatment system

provided in a technical memorandum by Ed Cryer of MWH dated 4 June 2004 (Coeur Alaska, 5 August 2004) were used in Scenario 2.

- *Sludge Disposal*. This scenario includes 7 years of active water treatment of mine drainage after closure as discussed above. Scenario 2 includes an annual cost of $10,000/year for the proper handing and disposal of sludge and/or brine associated with operation of a reverse osmosis treatment system.

- *Surface and Groundwater Monitoring*. Long-term monitoring and maintenance programs are not defined in the Kensington Gold Project reclamation plan, but Coeur Alaska, Inc. plans to develop these programs as part of the final reclamation plan. At a minimum, the reclamation plan commits to monitor surface and groundwater as required by the NPDES or Solid Waste permits. Currently the reclamation plan assumes a cost of $20,000 per year for 15 years for post closure water monitoring.

  Scenario 2 assumes that post-closure water monitoring will occur as defined in Table 2 of the Draft NPDES permit (USEPA, 2004) issued for the Kensington Project at a minimum of 3 surface water quality monitoring locations. In general water quality parameters and metals will be analyzed quarterly with Whole Effluent Toxicity (WET) testing conducted annually. For this Scenario, post-closure monitoring will take place for 22 years after closure (for the 7 year active water treatment period, and 15 years after cessation of water treatment). The assumed cost of $20,000 per year seems adequate for quarterly surface and groundwater quality monitoring; however actual costs should be applied to the financial assurance estimate once they are determined.

- *Reclamation Monitoring and Maintenance*. Reclamation monitoring and maintenance activities are not specifically defined in the Kensington Gold project reclamation plan, but Coeur Alaska, Inc. plans to develop these programs as part of the final reclamation plan. The 2004 reclamation plan includes 5 years of reclamation monitoring for water and vegetation at $40,000 per year, and 1 year of hydrocarbon monitoring at $44,500 per year. A cost for necessary maintenance of facilities post-closure is not included in the reclamation plan for Kensington Gold Project.

  Scenario 2 assumes that the $40,000 per year for reclamation monitoring includes activities described in Table 2-7 of the Draft SEIS (USDA FS, 2004). This includes bioassays, fish surveys, spawning surveys, benthic macroinvertebrate surveys and community comparisons, and sediment monitoring. These surveys are described to take place annually at a minimum of 3 monitoring locations and a maximum of 7 locations. Reclamation monitoring also includes monthly stability inspections of the tailings facility and annual inspections of the waste rock facilities. For the purposes of this estimate it is assumed that completion of these surveys at 5 monitoring locations on an annual basis will cost $100,000 per year, or $20,000 per year for each monitoring location. Monitoring is assumed to take place annually for the first 5 years, then once every 5 years for the remaining water monitoring period of 17 years. One year of hydrocarbon monitoring at a cost of $44,500 is also included in year one of reclamation monitoring. A more accurate cost and schedule for reclamation monitoring should be applied to this financial assurance once determined in the final reclamation plan.

  Scenario 2 assumes a cost of $10,000 per year for reclamation maintenance activities. This is applied annually for the first 5 years, then once every 5 years for the remaining monitoring period of 17 years. A more accurate cost and schedule for reclamation maintenance should be applied to this financial assurance once determined in the final reclamation plan.

Application of these additional costs in Scenario 2 results in an increase of the current financial assurance amount by 197% over Scenario 0. The Kensington Gold Project reclamation plan costs were estimated as $9,216,416 under this Scenario.

Scenario 2 is the CSP² preferred alternative presented in this review. This scenario includes additional costs for indirect expenses, contouring, revegetation, plugging mine portals, water treatment, sludge/brine disposal, water monitoring, and reclamation monitoring and maintenance. The duration of surface and ground water monitoring of 22 years (15 years after cessation of water treatment) seems adequate given the initial description of geology at this site.

3.4 CSP² Scenario 3

It must be noted that in recommending this scenario, the duration of active water treatment for 7 years assumes acid generation does not become an issue at this mine. Since water treatment is a major component of closure costs, CSP² developed Scenarios 3 and 4 to evaluate the costs of longer-term water treatment for comparison purposes. Scenario 3 utilizes the same assumptions and changes made in Scenario 2, with the addition of 50 years of water treatment.

Scenario 3 was developed to determine the cost differences should water treatment, monitoring, and maintenance need to be extended for 65 years (50 years water treatment plus 15 years monitoring and maintenance). In this case, water treatment plant operation and maintenance costs were increased to reflect an operational period of 50 years. This includes a sludge/brine disposal cost of $500,000 for 50 years of water treatment. Water treatment plant capital replacement costs totaling $4,661,000 were also assumed. For capital replacement costs, a water treatment plant capital cost of $2,661,000 was used based on the costs estimated for construction of a reverse osmosis treatment system provided in a technical memorandum by Ed Cryer of MWH dated 4 June 2004 (Coeur Alaska, 5 August 2004), and a water treatment plant capacity of 1,200 gpm.

Monitoring and maintenance under this scenario is performed as described in Scenario 2 with the time period extended. Surface and groundwater monitoring is assumed to take place for 65 years (50 years during water treatment, 15 years after cessation of water treatment), which increased the cost to $1,300,000. Reclamation monitoring and maintenance, as described in Scenario 2, was extended to a period of 65 years with annual monitoring the first 5 years, and monitoring once every 5 years for the remaining 60 years. Reclamation monitoring costs increased to $1,744,500, and reclamation maintenance costs increased to $170,000.

Application of these additional costs in Scenario 3 results in an increase of the current financial assurance amount by 1,025%. The Kensington Gold Project reclamation costs were estimated as $34,929,076 under this scenario.

3.5 CSP² Scenario 4

Scenario 4 utilizes the same assumptions as Scenario 2, with the addition of 100 years of water treatment to mitigate acid generating drainage – a period that some use to calculate the costs of perpetual treatment.

In this case, water treatment plant operation and maintenance costs were increased to reflect an operational period of 100 years. Water treatment plant capital replacement costs of $4,661,000 were assumed. Sludge/brine disposal costs for 100 years of treatment were estimated at $1,000,000.

Monitoring and maintenance under this scenario is performed as described in Scenario 2 with the time period extended. Surface and groundwater monitoring is assumed to take place for 115 years (100 years during water treatment, 15 years after cessation of water treatment), which increased the cost to $2,300,000. Reclamation monitoring and maintenance, as described in Scenario 2, was extended to a period of 115 years with annual monitoring the first 5 years, and monitoring once every 5 years for the remaining 110 years. Reclamation monitoring costs increased to $2,744,500, and reclamation maintenance costs increased to $270,000.

Application of these additional costs in Scenario 4 results in an increase of the current financial assurance amount by 1,826%. The Kensington Gold Project reclamation plan costs were estimated as $59,783,076 under Scenario 4.

4.0 Conclusions

As illustrated by this review, the Kensington Gold Project financial assurance of $3,104,305 currently estimated may not be adequate to cover the costs of reclamation and closure incurred when these tasks are performed by a regulatory agency. As shown in Scenarios 1 and 2 presented above, financial assurance costs could increase from between 23% and 197% when accounting for additional indirect costs and reclamation tasks.

CSP² recommends a reclamation surety of $9,216,416, based on the assumptions and calculations presented in Scenario 2.

If water treatment were to be required for 50 years the financial assurance amount could increase by 1,025%, and by 1,826% if water treatment is required for 100 years. This would result in a potential increase of the overall financial assurance amount to between $3,856,917 and $59,783,076.

5.0 References

Coeur Alaska, Inc. 12 June 2004. *Kensington Gold Project Reclamation Principles*. Juneau, Alaska.

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POGO PROJECT FINANCIAL ASSURANCE REVIEW

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May 2003

1.0 Introduction

The Pogo Project is a proposed mine located near the Goodpaster River in the Tanana Uplands in interior Alaska 38 miles northeast of Delta. This project is a joint venture between Teck-Pogo Incorporated (mine operator), Sumitomo Metal Mining Company Limited, and Sumitomo Corporation. This underground mine and milling operation will produce gold. Exploration of the Pogo Project claims was conducted from 1991 to 1998, with development beginning in 1999. Operations are anticipated to begin once the Pogo Project is permitted. The ore body is estimated to contain 9 million tons gold averaging 0.57 ounce per ton, and 5.6 million ounces at the 0.1 ounce per ton cutoff grade. The life of mine is estimated to be 11 years at the designed production rate of 2,500 tons per day initially with a maximum of 3,500 tons per day.

The gold ore is removed from underground workings using cut and fill techniques and transported via conveyor to the surface mill and concentrator facilities. Gold is proposed to be recovered in the mill by a combination of gravity concentration, flotation, and cyanide leaching. Tailings generated during metals recovery is prepped with cyanide destruction and filtration before being sent back underground (approximately 50%), or to a 36 acre dry stacked surface tails facility. The potential of acid rock drainage (ARD) in the tailings area and development rock sites was not discussed in the reclamation plan. It was mentioned, however, that the Liese Zone contains two tabular low-sulfide (3%) quartz zones (page 1-8). The mine site project facilities (underground mine, mill complex, miner camp, tailings, water treatment facilities) are proposed to impact approximately 417 acres, with an additional 1,398 acres disturbed for the powerline and the Shaw Creek all-season road.

Reclamation at the Pogo Project is planned to occur both concurrent with operations and after mining and milling have ceased. The two principle objectives for reclamation and closure of the Pogo Project are (1) to stabilize the land for post-mining use, and (2) to ensure water quality is not influenced after mining. The Pogo Project is located on approximately 41,880 acres of state mining claims. Post-mining land use is designated for wildlife habitat and recreation. To achieve post-mining land use, the Pogo Project reclamation plan includes enhancing wildlife habitat in 5 to 15 years by stimulating growth of early successional forests, blending topography, and establishing wetland areas.

Reclamation is described in five phases. Phase I involves reclamation of disturbance from exploration and construction areas not needed for reclamation. Phase II describes concurrent reclamation activities including reclamation of stockpiled mineralized development rock. Phase III includes final reclamation and closure of the mine site including removing facilities not needed for closure, stabilizing the site, and setting up a temporary closure camp. Phase IV, entitled post closure reclamation, begins once mine site closure is complete and includes operation of the water treatment plant for up to ten years and monitoring and maintenance. Phase V is post closure monitoring which will begin once water quality standards are met and all reclamation is complete. This includes a twenty year monitoring period for groundwater, stormwater, surface water, and vegetation.

The Pogo Project reclamation plan and closure cost estimates were prepared in accordance with standard engineering cost estimation procedures and are consistent with methods commonly used by industry as well as state and federal agencies. The proposed financial assurance falls under the regulation of the Alaska Department of Natural Resources Division of Mining, Land, and Water Management (ADNR-DOM), the Alaska Department of Environmental Conservation (ADEC), and the US Army Corps of Engineers (COE). The Pogo Project reclamation and closure costs are estimated at $21,651,000 to cover the cost of mine site reclamation and closure, water treatment, and monitoring and maintenance of reclamation work, and surrounding water quality.

Current financial assurance amounts estimated for the Pogo Project guarantee reclamation takes place in the event of bankruptcy, or other circumstances where reclamation is not completed by Teck-Pogo Incorporated, and joint venture partners, are evaluated in this report. This technical review is based on analysis of the existing reclamation plan and financial assurance cost estimate listed below:

- *POGO Project Documentation Series for Permitting Approval Reclamation & Closure Plan, December 2002.*

This evaluation was developed to ensure that the financial assurance amount held for the Pogo Project by the state of Alaska are adequate to cover the costs of reclamation and closure as required by Alaska statutes and regulations. The state of Alaska is required to obtain financial assurances to ensure that the approved reclamation tasks are completed in the event Teck-Pogo Incorporated and joint venture partners fail to perform the necessary tasks as outlined in the reclamation plan.

2.0 Methods

If the state of Alaska becomes responsible for reclamation at the Pogo Project it is critical that adequate funding is available for completion of the required tasks. It is well documented at other mine sites (e.g. Summitville Mine in Colorado; Zortman Landusky, Beal, and Basin Creek mines in Montana; and Brohm Mine in South Dakota) that in the event the operating company files bankruptcy costs incurred by the State to perform reclamation are significantly higher than those originally estimated (Kuipers 2000). In some cases costs incurred by state and federal agencies can be 10 to 100 times higher than those estimated in reclamation plans and financial assurance calculations (Kuipers 2000). For these reasons this review of the Pogo Project reclamation plan and financial assurance takes a conservative approach to cost estimating.

Financial assurance estimates calculated in this review were performed in accordance with standard cost estimation procedures and are consistent with methods commonly used by state and federal regulatory agencies. Site-specific reclamation tasks and associated areas of disturbance were developed from the aforementioned financial assurance estimate. Assumptions, reclamation tasks and associated costs used in this estimate are the same as those used in the existing reclamation plan and financial assurance, except where noted in the explanations for each scenario.

First, the existing financial assurance estimate was replicated (as Scenario 0) in a format that allows for unit costs to be determined for specific reclamation tasks. Next, four scenarios were developed where unit costs, indirect costs, and project timelines were evaluated and varied as described in the following sections. Finally, cash flow worksheets were generated for each scenario.

Detailed estimate calculations and the resulting scenarios and assumptions are provided as Attachment 1 for the Pogo Project reclamation plan. Attachment 2 illustrates additional calculations made for the developed scenarios with extended water treatment and monitoring. Table 1 below summarizes the financial assurance amounts calculated for this review.

Table 1. Pogo Project Financial Assurance Costs Summary

Pogo Project Reclamation Plan	Pogo Project	CSP² Scenarios			
	Scenario 0	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 4**
	Based on 2002 reclamation plan.	Based on 2002 reclamation plan with increased indirect costs.	Based on Scenario 1 with changes to unit costs.	Based on Scenario 2 with 50 years water treatment.	Based on Scenario 2 with 100 years water treatment.
Capital Costs	$13,474,394	$17,292,139	$19,396,987	$20,628,987	$22,168,987
Operating Costs	$8,177,388	$10,494,315	$15,163,348	$63,572,115	$117,549,115
Total	$21,651,782	$27,786,454	$34,560,335	$84,201,102	$139,718,102

3.0 Review of Pogo Project Reclamation Plan and Financial Assurance Calculations

3.1 Pogo Project Scenario 0

For Scenario 0 labor costs, equipment costs, material costs, and volumes estimated for specific reclamation tasks used duplicate those provided in the cost estimation worksheets in the Pogo Project reclamation plan. Subcontract costs estimated were added into the labor costs. Equipment costs and efficiencies are based on contractor quotes. These costs are typically estimated with the Caterpillar Performance Handbook, but the estimated equipment costs for the Pogo Project tend to coincide with other Alaska mine site estimates. Wage rates are not based on the Davis Bacon Wages for Alaska; however, the hourly wage rates used seem to coincide with labor costs estimated at other mines in Alaska. Material costs are based on contractor estimates.

Scenario 0 was generated to determine unit costs for specific reclamation tasks used in the Pogo Project cost estimate. Unit costs are evaluated and changed in subsequent scenarios. Although data inputs for Scenario 0 were derived from the Pogo Project reclamation plan slight differences in total amounts are observed. The Scenario 0 reclamation plan financial assurance amount differs by $782 ($21,651,000 - $21,651,782). This results in less than a <1.0% difference when compared to the financial assurance generated for the Pogo Project.

Review of the Pogo Project reclamation plan and associated financial assurance calculation revealed the following observations:

- The reclamation plan needs more detail regarding closure tasks. For example, it is unclear in Appendix F of the reclamation plan which rock piles to be reclaimed contain mineralized rock versus non-mineralized rock. Periodic reevaluation of the reclamation plan will be necessary as more accurate volumes and project timelines are determined once operations begin.

- A detailed reclamation and closure schedule illustrating estimated timeframes for closure of major mine components (underground mine, impoundments, etc.) was not included in this reclamation plan. This is commonly used to generate a cash flow worksheet to determine the present dollar amount required to post financial assurance.

- Wetland habitat seems to comprise a significant (40%) portion of the land area proposed for disturbance under this proposal. Wetland reclamation and/or reconstruction for closure is often more costly than revegetation on 'dry land'. The cost estimate provided in Appendix F of the reclamation plan does not readily differentiate between wetlands and 'dry land' reclamation. Additional consideration should be given to the cost of contouring and revegetation planned on wetlands, and these areas should be distinguishable in the detailed cost estimation worksheets.

- The reclamation plan and cost estimate includes costs for salvage of mine site equipment and facilities. No salvage credit was applied to the cost estimate in either the company's reclamation plan or in any of the CSP2 scenarios.

- Water treatment after closure will utilize existing water treatment facilities until compliance standards are achieved. According to the reclamation plan water treatment facilities are planned for use up to 10 years after closure. The Pogo Project reclamation plan does not provide assurance that ARD problems from underground mine workings (a majority of sulfides and CN will be disposed of in paste) have been evaluated and will not occur; while the Liese Zone contains two tabular low-sulfide (3%) quartz zones. Additionally, the draft EIS discusses the potential for arsenic, iron, and nickel to exceed water quality standards at discharge (EPA et al. 2003). Based on experience at other mine sites with acid generating materials, ARD impacts can be expected to continue for a significant time period following reclamation. Although conditions will most likely improve following reclamation, water treatment facilities may be needed well into the future.

  Due to the significant impacts on groundwater and surface water quality ARD and metal/metalloid loading has been demonstrated to cause, the potential for long-term water treatment should be examined more closely. Seepage from the dry stack and RTP facilities is expected to continue until closure, and most likely after closure, as these impoundments will be unlined facilities. The possible need for water treatment facilities into the future is addressed in Scenarios 3 and 4 of this review where water treatment is continued for periods of 50 and 100 years respectively.

- Maintenance and monitoring plans are not adequately described in the reclamation plan. Water quality assurance monitoring is presented as a singe line item for Phases I through IV, and it is not clear if this is intended for site inspections, analysis costs, or both. For all 5 reclamation phases a detailed monitoring schedule including monitoring sites, parameters to be measured, frequency, duration, and cost should be determined.

  In addition to monitoring, a detailed maintenance schedule should be developed. This should include regular inspections and maintenance as needed for the plugged portals, engineered soil covers, impoundment stability, and revegetation success to ensure closure goals are achieved.

3.2 CSP² Scenario 1

Scenario 1 duplicates the Pogo Project reclamation plan (Scenario 0) financial assurance capital and operating costs with changes made to indirect costs as noted below. Scenario 0 indirect costs are calculated at 20% of the estimated contract costs, and Scenario 1 indirect costs are 54% of the estimated contract costs. The difference results from increases in Scenario 1 indirect costs to account for additional mobilization/demobilization, engineering redesign, procurement, construction management, contractor overhead, additional agency administration and inflation.

A financial assurance cost estimate should be performed under the assumption that reclamation is performed by a third-party under contract to the appropriate regulatory agency. Factors including contractor ownership, standby, overhead, engineering redesign, etcetera result in higher costs than those typical of reclamation costs when performed by mining companies. Indirect costs represent one of the most common areas in which financial assurance requirements are underestimated (Kuipers 2000). Indirect costs are added to this estimate to account for additional costs incurred in the event of agency management and oversight of reclamation and closure.

The Pogo Project cost estimate included indirect costs for contingency (5%), mobilization and demobilization (2%), contractor profit and overhead (10%), and agency administration (3%). In this estimate, indirect costs amount to 20% of the operating and capital contract costs.

The following indirect costs were applied to CSP² Scenario 1:

- *Contingency*. Contingency costs reflect the level of detail and completeness of the cost estimate, as well as the degree of uncertainty of factors and assumptions used in the cost estimate. A contingency amount of 5% was applied to the estimated contract costs in the Scenario 1 cost estimate, which is the same percentage used in the Pogo Project cost estimate.

- *Mobilization / Demobilization*. Mobilization / demobilization costs account for the transport of equipment and materials to and from the mine site, as well as infrastructure needs. A mobilization/demobilization amount of 5% was applied to contract costs estimated in Scenario 1. The Pogo Project cost estimate uses 2% for mobilization / demobilization.

- *Engineering Redesign*. Engineering redesign costs stem from a lack of detailed information and plan development in a financial assurance estimate, as well as the need to account and design for actual conditions at the time of reclamation and closure. An engineering redesign cost of 3% was applied to the estimated contract costs used in Scenario 1. The Pogo Project cost estimate did not include any amount for engineering redesign.

- *Engineering, Procurement, Construction Management*. This indirect cost accounts for the requirement of construction engineering, procurement, and construction management on behalf of the agencies in the event they become responsible for reclamation. An indirect cost of 5% of the contract costs was used in Scenario 1, while the Pogo Project cost estimate does not account for the cost of this activity.

- *Contractor Overhead*. Contractor overhead accounts for administration, management, public relations, safety, environmental, legal, performance bonding and other costs associated with doing

business. A contractor overhead cost of 15% was applied to the estimated contract costs used in the Scenario 1 cost estimate. The Pogo Project cost estimate included 5% for contractor overhead.

- *Contractor Profit*. This indirect cost accounts for contractor profit. A contractor profit amount of 10% was applied to Scenario 1. The Pogo Project financial assurance estimate includes a contractor profit rate of 5%.

- *Agency Administration*. Agency administration includes costs incurred by state and federal agencies in situations where reclamation and closure are performed by regulatory agencies. Agency administration costs were accounted for as 8% of the contract costs in Scenario 1, but only 3% of the contract costs for the Scenario 0 cost estimate.

- *Inflation*. Inflation indirect costs account for the difference in the dollar value between the time the estimate was generated and reclamation and closure are performed. An inflation amount of 3% was applied to the contract costs estimated in Scenario 1. Inflation was not accounted for in the Pogo Project estimate.

Application of these indirect costs in Scenario 1 results in an overall increase of 28% over Scenario 0. The Pogo Project reclamation plan costs were estimated as $27,786,454 under Scenario 1. Indirect costs for Scenario 1 amount to 54% of the estimated operating and capital contract costs, while indirect costs were 20% for Scenario 0.

3.3 CSP² Scenario 2

Scenario 2 includes the addition of indirect costs as described for Scenario 1, as well as changes to unit costs and reclamation tasks as described below.

- *Growth Media Application*. The Pogo Project reclamation plan uses a 6 inch cover of growth media where required before revegetation. This cover depth may not be adequate to apply sufficient amount of growth media to all surfaces. For example, the most common surface receiving growth media in this estimate are gravel pads that will most likely require greater than 6 inches of cover for long-term revegetation success and stability.

  Scenario 2 assumes application of a 12 inch cover of growth media to ensure that all surfaces are adequately covered with the growth media upon application. Unit costs and volumes of growth media required were both doubled for each specific reclamation task for this item to account for additional hauling and contouring costs. Contingent growth media stockpiles discussed in the reclamation plan should be evaluated for adequate growth media volume to provide 12 inch covers. These changes increased the cover application costs from $353,358 in Scenario 1 to $1,413,432 in Scenario 2.

- *Re-Seeding Costs*. The unit costs estimated in the Pogo Project reclamation plan for re-seeding seem low when compared to other operations. The revegetation procedures described in Appendix B of the reclamation plan describe different reclamation methods for minimally disturbed and highly disturbed areas. Minimally disturbed areas are to be scarified and fertilized to allow for natural recovery, while highly disturbed areas are prepared and reseeded.

  Scenario 2 uses a revegetation unit cost of $1,500/acre ($0.31/sy) on flat surfaces, and all surfaces are assumed to be flat (detail not provided in cost estimate). These unit costs are based on Montana

Department of Environmental Quality (MDEQ) financial assurance recommendations. In addition, minimally disturbed areas not planned for reseeding in Scenario 0 were included in the revegetation costs of Scenario 2. This includes the drystack cover, solid waste facility cover, and airstrip. These changes increased the revegetation costs from $110,779 in Scenario 1 to $217,509 in Scenario 2.

- *Sludge Disposal*. Sludge from water treatment facilities will be backfilled underground while the mine is operating. After closure of the underground mine, sludge disposal will be required for the 10 year water treatment period. A sludge disposal unit cost of $20,000/year to dispose of sludge generated from water treatment activities was added to Scenario 2.

- *Water Treatment Plant*. The Pogo Project reclamation plan assumes that existing water treatment facilities will be utilized after closure for up to 10 years, or until water quality standards are met. Two processes for water treatment are planned before discharge. The first is high-density sludge treatment to precipitate metals and arsenic, and the second is a lime-softening / recarbonation treatment to remove calcium and magnesium (EPA et al. 2003). The water treatment plant is anticipated to operate at 180 gpm for 8 months per year for 10 years. The estimated cost of $3,500,000 for 10 years of water treatment at this flow rate results in a unit cost of $6.00/ 1000 gallons treated water.

  Scenario 2 assumes a water treatment cost of $10.50/ 1000 gallons treated (see Attachment 2), based on the average unit cost of similar water treatment plants. At the same flow rate, this results in a 10 year water treatment cost of $6,531,840. These changes increased the water treatment costs from $3,500,000 in Scenario 1 to $6,531,840 in Scenario 2.

Application of these additional costs in Scenario 2 results in an increase of the current financial assurance amount by approximately 60%. The Pogo Project reclamation plan costs were estimated as $34,560,335 under Scenario 2.

Scenario 2 is the CSP² preferred alternative presented in this review. This scenario includes additional costs for indirect expenses, application of a 12 inch (vs. 6 inch) cover, revegetation, water treatment plant operation and maintenance, and sludge disposal. The 10 year duration of water treatment is accepted under Scenario 2, but it is strongly noted that the Pogo Project reclamation plan does not include technical justification regarding the estimated 10 year treatment period. For that reason, Scenarios 3 and 4 were developed to assess reclamation and closure costs in the event water treatment is required for longer than 10 years.

3.4 CSP² Scenario 3

Scenario 3 utilizes the same assumptions and changes made in Scenario 2, with the addition of 50 years of water treatment. As previously discussed, the Pogo Project reclamation plan does not include adequate detail regarding water quality, quantity, and acid rock drainage or metal loading impacts to assess the adequacy of the estimated maximum 10 years of water treatment and 20 years of monitoring and maintenance.

Therefore, Scenario 3 was developed to determine the cost differences should water treatment, monitoring, and maintenance need to be extended for 70 years (50 years water treatment plus 20 years monitoring and maintenance). In this case, water treatment plant operation and maintenance costs were increased to reflect an operational period of 50 years. This includes a sludge disposal cost of $1,000,000 for 50 years of water treatment. Water treatment plant operating costs are estimated at $32,550,000 for

this timeframe. Water treatment plant capital replacement costs totaling $4,614,000 were also assumed. For capital replacement costs, a water treatment plant capital cost of $2,614,000 was assumed based on the CSP² water treatment plant capital unit cost of $6,535/gpm and a water treatment plant capacity of 400 gpm. See Attachment 2 for additional details on CSP² unit costs.

Monitoring and maintenance under this scenario is performed as described in the reclamation plan with the time period extended. Long-term operation and maintenance expenses increased to $5,234,490. As mentioned previously, more detail is needed to determine the activities planned for post-closure monitoring to assess its adequacy for evaluating if closure goals are achieved. Under this scenario monitoring planned for Phases I to IV was extended for 50 years at an annual cost of $50,000 per year, and Phase V monitoring was not changed. Monitoring and maintenance costs for plugs, drystack tails, and the RTP impoundment should be evaluated and included here to ensure that post-land uses and goals of reclamation (i.e. no influence on water quality) are achieved.

Application of these additional costs in Scenario 3 results in an increase of the current financial assurance amount by 289%. The Pogo Project reclamation costs were estimated as $84,201,102 under this scenario.

3.5 CSP² Scenario 4

Scenario 4 utilizes the same assumptions as Scenario 2, with the addition of 100 years of water treatment to mitigate acid generating drainage and/or metal and metalloid loading. This scenario was developed to determine the cost difference if water quality standards were not met for 100 years after closure. Monitoring and maintenance under this scenario continue for 120 years, or 20 years after water quality standards have been met.

In this case, water treatment plant operation and maintenance costs were increased to reflect an operational period of 100 years. Water treatment plant operating costs are estimated at $65,100,000 for this timeframe. Water treatment plant capital replacement costs of $4,614,000 were assumed. Sludge disposal costs for 100 years of treatment were estimated at $2,000,000.

Monitoring and maintenance under this scenario is performed as described in the reclamation plan with the time period extended to 120 years. Long-term operation and maintenance expenses increased to $7,734,490. As mentioned previously, more detail is needed to determine the activities planned for post-closure monitoring to assess its adequacy. Under this scenario monitoring planned for Phases I to IV was extended for 100 years at an annual cost of $50,000 per year, and Phase V monitoring was not changed. Monitoring and maintenance costs for plugs, drystack tails, and the RTP impoundment should be evaluated and included here to ensure that post-land uses and goals of reclamation (i.e. no influence on water quality) are achieved.

Application of these additional costs in Scenario 4 results in an increase of the current financial assurance amount by 545%. The Pogo Project reclamation plan costs were estimated as $139,718,102 under Scenario 4.

4.0 Conclusions

As illustrated by this review, the Pogo Project financial assurance of $21,651,000 currently proposed may not be adequate to cover the costs of reclamation and closure incurred when these tasks are performed by a regulatory agency. In the event water quality standards are met within the assumed timeframe of 10 years, reclamation and closure costs could increase from between 28% and 60% as shown in Scenarios 1 and 2. If water treatment is required for 50 years the financial assurance amount could increase by 289%, and by 545% if water treatment is required for 100 years. This results in a potential increase of the overall financial assurance amount to between $27,786,454 and $139,718,102.

5.0 References

EPA, COE, ADNR. March 2003. *Draft Environmental Impact Statement Pogo Gold Mine Project Delta, Alaska National Pollutant Discharge Elimination System (NPDES) Permit Application No. AK-005334-1*.

Kuipers, JR. February 2000. *Hardrock Reclamation Bonding Practices in the Western United States*. Boulder: National Wildlife Federation.

Teck-Pogo Inc. December 2002. *POGO Project Documentation Series for Permitting Approval Reclamation & Closure Plan*.

Note: All attachments are Microsoft Excel spreadsheets, available to download at www.csp2.org/Reports

TRUE NORTH FINANCIAL ASSURANCE REVIEW

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for the

CENTER FOR SCIENCE IN PUBLIC PARTICIPATION

4 March 2004

1.0 Introduction

The True North Project is an open-pit gold mine located 25 miles northeast of Fairbanks, Alaska in the Chatanika River watershed. This mine has been in operation since 2000, and currently operates at a rate of 30,000 to 50,000 tons per day (tpd). Based on estimated gold reserves of 13.1 million tons, the True North Project is anticipated to operate until 2004 at these production rates. The True North Project is owned and operated by Fairbanks Gold Mining, Inc., a wholly owned subsidiary of Kinross Gold Corporation.

The True North Project includes an open-pit, waste rock piles, and facilities for equipment and personnel. Ore from this project is trucked 11 miles to the Fort Knox Mine for processing. The Hindenburg and East Pits were mined with conventional open pit methods during 2000 and 2001, and the Central, Sheppard, and Zeppelin Pits are currently being mined. The open pits at this mine site encompass 352 acres. The True North mine site also contains the following areas of disturbance: 363 acres of waste rock dump piles, 11 acres of growth medium stockpiles and low-grade ore stockpiles, 275 acres of access roads, and 15 acres of mine site facilities including a maintenance complex and blasting storage. A total of 1,014 acres are disturbed or planned for disturbance within the 2,096 acre millsite lease. According to the reclamation plan, approximately 618 acres of disturbance for ancillary facilities, rock dumps, and stockpiles are located on uplands; and 396 acres of disturbance in wetlands is planned for roads and pit development.

Fairbanks Gold Mining, Inc. plans to conduct reclamation both concurrent with operations and after mining operations have ceased. Final reclamation will be conducted in two phases. Phase I is planned to last 2 to 5 years and includes final contouring and revegetation of backfilled open pits, waste rock dumps, growth medium / ore stockpiles, and ancillary facilities. Phase II, passive reclamation, is anticipated to last 30 years and includes water treatment, monitoring and maintenance until closure standards are achieved. At the end of Phase II reclamation the Alaska Department of Natural Resources (ADNR), Alaska Department of Fish and Game (ADF&G), and Fairbanks Gold Mining, Inc. plan to manage the project area as wildlife habitat in addition to a public use and recreation site.

Current financial assurances are held by the state of Alaska, as the mine site is located entirely on state and University of Alaska lands. The ADNR holds financial assurance in the form of a bond in the amount of $2,536,874 (2003 dollars) to cover the cost of mine site reclamation and closure in addition to surface and groundwater monitoring until closure standards are achieved.

The True North Project Reclamation Plan was prepared in accordance with standard engineering cost estimation procedures and is consistent with methods commonly used by industry as well as state and federal agencies. Costs for individual reclamation tasks were based on labor, equipment, and materials.

Labor rates were based on Davis Bacon wages for Alaska. Equipment costs and productivity rates were based on the 29th Edition of the Caterpillar Performance Handbook. Costs for materials were estimated from contractor estimates, and experience from concurrent reclamation.

Current financial assurance amounts for the True North Project used by the ADNR to guarantee reclamation takes place in the event of bankruptcy, or other circumstances where reclamation is not completed by Fairbanks Gold Mining, Inc., are evaluated in this report. This technical review is based on analysis of the existing reclamation plan and financial assurance cost estimate "*True North Project Reclamation Plan*" prepared by Fairbanks Gold Mining, Inc. in December 2001.

This evaluation was developed to ensure that the financial assurance amounts held by the state of Alaska are adequate to cover the costs of reclamation and closure as required by Alaska statutes and regulations. The state of Alaska is required to obtain financial assurances to ensure that the approved reclamation tasks are completed in the event Fairbanks Gold Mining, Inc. fails to perform the necessary tasks as outlined in the reclamation plan.

2.0 Methods

If the ADNR becomes responsible for reclamation at the True North Project it is critical that adequate funding is available for completion of the required tasks. It is well documented at other mine sites (e.g. Summitville Mine in Colorado; Zortman Landusky, Beal, and Basin Creek mines in Montana; and Brohm Mine in South Dakota) that in the event the operating company files bankruptcy costs incurred by the State to perform reclamation are significantly higher than those originally estimated (Kuipers 2000). In some cases costs incurred by state and federal agencies can be 10 to 100 times higher than those estimated in reclamation plans and financial assurance calculations (Kuipers 2000). For these reasons this review of the True North Project reclamation plan and financial assurance(s) takes a conservative approach to cost estimating.

Financial assurance estimates calculated in this review were performed in accordance with standard cost estimation procedures and are consistent with methods commonly used by state and federal regulatory agencies. Site-specific reclamation tasks and associated areas of disturbance were developed from the aforementioned financial assurance estimate. Assumptions, reclamation tasks and associated costs used in this estimate are the same as those used in the existing reclamation plan and financial assurance(s), except where noted in the explanations for each scenario.

First, the existing financial assurance estimates were replicated (as Scenario 0) in a format that allows for unit costs ($/acre) to be determined for specific reclamation tasks. Next, two scenarios were developed where unit costs, indirect costs, and project timelines were evaluated and varied as described in the following sections. Finally, cash flow worksheets were generated for each scenario.

Detailed estimate calculations, and the resulting scenarios and assumptions, are provided as Attachment 1. Attachment 2 illustrates additional calculations made for the scenario 2. Table 1 below summarizes the financial assurance amounts calculated for this review.

Table 1. True North Project Financial Assurance Costs Summary

	True North	CSP² Scenarios	
	Scenario 0	**Scenario 1**	**Scenario 2** (CSP² Preferred Scenario)
	Based on 2001 reclamation plan.	Based on 2001 reclamation plan with increased indirect costs.	Based on Scenario 1 with increases to unit costs and additional reclamation tasks.
Capital Costs	$1,725,290	$2,084,150	$4,251,308
Operating Costs	$388,701	$469,551	$493,753
Total	$2,113,991	$2,553,701	$4,745,061

3.0 Review of True North Project Reclamation Plan and Financial Assurance Calculations

3.1 True North Project Scenario 0

For Scenario 0 labor costs, equipment costs, material costs, and acreages for specific reclamation tasks used duplicate those provided in the cost estimation worksheets in the True North Project Reclamation Plan. Equipment costs and efficiencies are based on Caterpillar Performance Handbook standards, and wage rates are based on the Davis Bacon Wages for Alaska. Material costs are based on contractor estimates and mine site experience.

Scenario 0 was generated to determine unit costs for specific reclamation tasks used in the True North cost estimate. These unit costs are evaluated and changed in subsequent scenarios. Although data inputs for Scenario 0 were derived from True North cost estimation worksheets, slight differences in total amounts are observed. The Scenario 0 reclamation plan financial assurance amount differs by $124,428 ($2,238,419 - $2,113,991), which results in a 5.6% difference when compared to the True North generated financial assurance.

Differences between the True North estimate total and Scenario 0 appear to be with the “Rock Dumps” reclamation costs. The True North cost estimation worksheets have a discrepancy in the total cost of rock dump reclamation where the summary worksheet (Appendix D) costs total $1,038,701, and the sum of the individual cost estimation worksheets for rock dumps totals $947,853. This would result to a small adjustment in the overall reclamation cost estimate and was not addressed in other scenarios.

One other calculation error was noted in the True North Project cost estimation worksheets. The worksheet for “Shop Rock Dump A” does not contain adequate equipment time for seeding and fertilizing on flat slopes of this rock dump. Equipment costs are listed for only 3 hours of use totaling $162 for this task, while the reclaimed acreage of 40.5 flat acres and equipment efficiency of 1 hour /acre would result in an actual cost of $2,187 to complete this task. This would result in a minor adjustment to the total reclamation cost and was therefore not addressed in subsequent scenarios.

The following observations were noted during review of the True North Project Reclamation Plan:

- Backfill of the East Pit is planned for as a concurrent reclamation activity to be completed before final reclamation. Open pit mining operations in the East and Hindenburg Pits was planned for completion in 2001. The agencies should consider the additional cost incurred for backfilling and reclaiming the East and Hindenburg Pits is this task has not been completed.

- The total disturbed acreage of 1,014 acres reported in the reclamation plan text does not correspond to the acreage planned for reclamation activities of 826 acres in cost estimation worksheets of Appendix D. This difference may be due to the reduction of surface acreage available for reclamation due to the backfilling of open pits. Reclamation tasks and associated costs should be identified for the additional 188 acres if this is not the case.

- The reclamation plan anticipates that all reclamation performance standards will be achieved 30 years after final closure, at which time surface and groundwater monitoring activities will be terminated. This time period seems adequate for monitoring of reclamation performance considering this gold deposit is hosted in a calcareous and carbonate-altered schist, and potential for acid generation is reported to be minimal in the reclamation plan.

3.2 CSP² Scenario 1

Scenario 1, developed by CSP², duplicates the True North Reclamation Plan cost estimate capital and operating costs with changes made to indirect costs as noted below. Scenario 0 indirect costs are calculated at 25% of the estimated contract costs, and Scenario 1 indirect costs are 51% of the estimated contract costs. The difference results from increases in Scenario 1 indirect costs for engineering redesign, procurement, construction management, contractor overhead, and inflation.

A financial assurance cost estimate should be developed under the assumption that reclamation is performed by a third-party under contract to the appropriate regulatory agency. Factors including contractor ownership, standby, overhead, engineering redesign, etcetera result in higher costs than those typical of reclamation costs when performed by mining companies. Indirect costs represent one of the most common areas in which financial assurance requirements are underestimated (Kuipers 2000). Indirect costs are added to this estimate to account for additional costs incurred in the event of agency management and oversight of reclamation and closure.

The True North Project cost estimate included indirect costs for contingency (5%), mobilization and demobilization (5%), contractor profit (10%), and contract/agency administration (5%). In this estimate, indirect costs amount to 25% of the operating and capital contract costs.

The following indirect costs were applied to CSP² Scenario 1:

- *Contingency*. Contingency costs reflect the level of detail and completeness of the cost estimate, as well as the degree of uncertainty of factors and assumptions used in the cost estimate. A contingency amount of 5% was applied to the estimated contract costs in the Scenario 1 cost estimate, which is the same percentage used in the True North Project cost estimate.

- *Mobilization / Demobilization.* Mobilization/demobilization costs account for the transport of equipment and materials to and from the mine site, as well as infrastructure needs. A mobilization/demobilization amount of 5% was applied to contract costs estimated in Scenario 1, which is the same percentage used in the True North Project cost estimate.

- *Engineering Redesign*. Engineering redesign costs stem from a lack of detailed information and plan development in a financial assurance estimate, as well as the need to account and design for actual conditions at the time of reclamation and closure. An engineering redesign cost of 3% was applied to the estimated contract costs used in Scenario 1. The True North Project cost estimate did not include any amount for engineering redesign.

- *Engineering, Procurement, Construction Management*. This indirect cost accounts for the requirement of construction engineering, procurement, and construction management on behalf of the agencies in the event they become responsible for reclamation. An indirect cost of 5% of the contract costs was used in Scenario 1, while the True North Project cost estimate does not account for the cost of this activity.

- *Contractor Overhead*. Contractor overhead accounts for administrating, management, public relations, safety, environmental, legal, performance bonding and other costs associated with doing business. A contractor overhead cost of 15% was applied to the estimated contract costs used in the Scenario 1 cost estimate. The True North Project cost estimate did not include any amount for contractor overhead.

- *Contractor Profit*. This indirect cost accounts for contractor profit. A contractor profit amount of 10% was applied to contract costs estimated in Scenario 1, which is the same percentage used in the True North Project cost estimate.

- *Agency Administration.* Agency administration includes costs incurred by state and federal agencies in situations where reclamation and closure are performed by regulatory agencies. Agency administration costs were accounted for as 5% of the contract costs in both the True North Project cost estimate and Scenario 1.

- *Inflation*. Inflation indirect costs account for the difference in the dollar value between the time the estimate was generated and reclamation and closure are performed. An inflation amount of 3% was applied to the contract costs estimated in Scenario 1. The True North Project cost estimate did not apply inflation, with the exception of a 1.5% increase per year for water monitoring activities.

Application of these indirect costs in Scenario 1 results in an increase of 21% over Scenario 0. The True North Project Reclamation Plan costs were estimated as $2,553,701 under Scenario 1. Indirect costs for Scenario 1 amount to 51% of the estimated operating and capital contract costs, while indirect costs were 33% for Scenario 0.

3.3 CSP² Scenario 2

Scenario 2 includes the addition of indirect costs as described for Scenario 1, as well as changes to unit costs and reclamation tasks as described below.

- *Revegetation Costs*. The unit costs estimated in the True North Reclamation Plan for revegetation assume that only one-time planting is necessary and weed control is not required. The seed application rate of 11 pounds/acre also seems low when compared to other operations.

  Scenario 2 uses a revegetation unit cost of $1,500/acre on flat surfaces and $2,500/acre on sloped surfaces. These unit costs are based on Montana Department of Environmental Quality (MDEQ) financial assurance recommendations based upon agency experience. These changes increased the revegetation costs from $163,624 in Scenario 1 to $1,533,800 in Scenario 2.

- *Building Demolition*. The True North Project Reclamation Plan assumes that buildings are removed for salvage prior to the cost estimation for demolition. Costs for demolition of foundations are calculated, and a flat rate of $25,000 was added for building demolition in the event facilities are not removed from the site by Fairbanks Gold Mining, Inc. This estimate does not include waste disposal costs associated with demolition.

  In the event of bankruptcy, buildings will most likely be demolished rather than salvaged by the regulatory agencies. Scenario 2 uses unit costs for demolition based on RS Means Heavy Construction Cost Data (Chandler 2001). Demolition and removal of buildings was estimated with a unit cost of $0.19/ft^3. Assumptions were made that buildings are steel with an average height of 30 feet, which resulted in an estimation of building volume at 421,200 ft^3 (14,040 ft^2 foundation area * 30 ft) requiring demolition. These changes increased the building demolition costs from $38,971 in Scenario 1 to $93,999 in Scenario 2.

- *Detoxification / Disposal of Wastes*. The reclamation plan for True North discusses plans for proper removal and disposal of hazardous and toxic materials, including petroleum products, acids, and solvents, remaining on the mine site but does not account for this in the cost estimation. Scenario 2 includes a one time cost of $10,000 for the proper handing and disposal of hazardous and toxic wastes.

- *Reclamation Monitoring*. Although the True North Reclamation Plan contains action triggers of 30% cover after 3 years of closure, and 70% cover of vegetation for bond release there is no cost estimated for reclamation monitoring in Scenario 1. Scenario 2 includes an operating cost of $16,028 for reclamation monitoring and minor maintenance to be performed annually for the first 10 years after closure, and then every other year until water monitoring is terminated (30 years). See Attachment 2 for additional details on development of these costs.

Application of these additional costs in Scenario 2 results in an increase of the current financial assurance amount by 125%. The True North Reclamation Plan costs were estimated as $4,745,061 under this Scenario.

Scenario 2 is the CSP² preferred alternative presented in this review. This scenario includes additional costs for indirect expenses, revegetation, building demolition, waste disposal, and reclamation

monitoring. The duration of surface and ground water monitoring of 30 years seems adequate given the nature of the ore body and surrounding geology.

4.0 Conclusions

As illustrated by this review, the True North Project financial assurance of $2,238,419 currently established may not be adequate to cover the costs of reclamation and closure incurred when these tasks are performed by a regulatory agency. As shown in Scenarios 1 and 2 presented above, financial assurance costs could increase from between 21% and 125% when accounting for additional indirect costs and reclamation tasks. This results in a potential increase of the overall financial assurance amount to between $2,553,701 and $4,745,061.

5.0 References

Chandler, HM. 2001. *RSMeans Heavy Construction Cost Data*. 15th edition. Kingston: RSMeans Company, Inc. 470 pages.

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Kuipers, JR. February 2000. *Hardrock Reclamation Bonding Practices in the Western United States*. Boulder: National Wildlife Federation.