UNITED KENO HILL MINE
RECLAMATION COST ESTIMATE

Prepared For:

Water Resources Division

Indian Affairs and Northern Development

Whitehorse, Yukon, Y1A 2B5

Prepared By:

Brodie Consulting Ltd.
572 St. Andrews Pl.
West Vancouver, B.C., V7S 1V8

September 2002

UNITED KENO HILL MINE

RECLAMATION COST ESTIMATE

TABLE OF CONTENTS

UNITED KENO HILL MINE
RECLAMATION COST ESTIMATE

1 INTRODUCTION

This report presents an order of magnitude reclamation cost estimate for the mining liabilities within the United Keno Hill Mines Limited (UKHM) claim area in the Elsa/Keno area.

Mining activity over the past 100 years in the Elsa/Keno area has left a legacy of mining liabilities at about 100 mine sites. Of these, approximately 45 are the responsibility of UKHM. These liabilities include unsecured openings to mine workings, unstable waste dumps, and numerous sources of contaminated drainage of which only a few are treated. There are many other lesser liabilities including deteriorated buildings and un-reclaimed dumps and roads.

UKHM is currently under court-supervised financial management as it attempts to re-finance and avoid bankruptcy. The site is in a care and maintenance status. This includes ongoing water management work, site security, and maintaining the company's assets. The latter involves pumping mine workings, heating buildings and measures to prevent theft and vandalism.

There is a possibility that UKHM will not be successful in it's efforts to re-finance the company. If this occurs a receiver will be appointed to sell the company's assets. Considering the reclamation liability of the site, depleted resources, low silver price and generally deteriorated state of the mine equipment and infrastructure, the receiver may not find a purchaser and the site could be orphaned. In this case it would likely be necessary for the government to assume responsibility for the site.

Currently, there is no accepted reclamation plan. Consequently, it would be necessary to maintain the site in a care and maintenance status until such a plan is developed. A description of the scope of work and an estimate of the cost for short-term care and maintenance was presented in a letter submitted in October 2000. A copy is included in Appendix A.

2 INFORMATION SOURCES

A number of documents were reviewed in preparation of this report, including:

- Keno Valley/Dublin Gulch Environmental Baseline Assessment, 5 volumes prepared by: Environmental Services of Public Works and Government Services Canada (PWGSC) on behalf of DIAND, March 2000
- United Keno Hill Mines Limited, Closure Plan for Current Conditions, June 1996
- United Keno Hill Mines Limited, Site Characterization, June 1996
- Conceptual Design Report for Tailings Disposal, Elsa, by Bruce Geotechnical Consultants Inc. for United Keno Hill Mines Limited, Oct. 1996.

A three day site inspection was conducted in September 2000. Due to snow cover and access restrictions some sites where not inspected and are identied as such in the reclamation activities section of the report. The PWGSC report includes a good description of each site. That document has been relied upon for those sites which were not inspected.

3 OBJECTIVES & LIMITATIONS

The objective of this report is to present an order of magnitude reclamation cost estimate for the site. Forty-six of the sites described in the PWGSC report are within the UKHM mining claim area. This report addresses only those 46 sites. Many of the sites inclued multiple sub-sites.

In order to develop a reclamation cost estimate, this report presents general reclamation activities assumed to be necessary for the sites within the UKHM property. General reclamation objectives have been assumed, as noted below. However, there has been limited effort to determine the acceptability of these objectives. Further evaluation of the A & R objectives will be required.

It is important to note that the PWGSC Environmental Baseline Assessment of the Keno Valley provides an initial characterization of the site condition and is an excellent basis for further assessment of the mining liabilities in the region. However, it is not a complete data base for development of a final A & R plan.

The reclamation activities described here should not be read as recommended reclamation measures or as measures sufficient to meet all A & R objectives. Further site characterization, including water and geochemical sampling, assessment of mine openings/crown pillars and quantities of waste rock, is required in order to develop a more confident estimate of the potential reclamation cost. Cost–benefit studies will be required to determine the optimal condition for post-closure water management.

4 RECLAMATION ACTIVITIES

4.1 Reclamation Objectives

The reclamation objectives assumed in the development of this reclamation cost estimate are:

- perpetual collection and treatment of portal drainage with metal content above MMLER limits,
- capping of acid generating mine waste (rock and tailings) to limit the release of contaminants,
- flooding of Elsa tailings to prevent future acid generation,
- demolition and removal of buildings and wastes,
- excavation and sealing/capping of all adits and shafts,
- contouring and revegetation of disturbed areas and non-acid generating mine waste,
- removal of hazardous wastes,
- consolidation and land-farming of hydrocarbon contaminated soil.

Further details regarding the site specific application of the reclamation objectives to the UKHM property are described in the following sections.

4.2 General

The general reclamation concept applied in the development of this cost estimate is the application of proven or conventional technologies. Other technologies, such as use of wetlands for zinc removal, may provide some benefit at this site. However, as they have not been proven at this time, they are not considered here.

Three points of compliance with CCME water quality objectives are assumed for identification of measures to control water quality. These are; Flat Creek just below Dam 3, which is substantially upstream of the South McQuesten River, Lightening Creek, and Christal Lake. Furthermore, portals which have a discharge which is above 0.5 ppm zinc (the MMLER threshold for zinc) are assumed to require collection and treatment. It may be that other mitigation measures could be developed for some of these sites where very small flows or only occasional minor spikes above the MMLER limits occur. However, at this time it is assumed that all such flows would be collected.

In an attempt in the late 1990's to control adit drainage from the Galkeno 900, a bulkhead was constructed in the mine. This was not very successful due to excessive leakage around the bulkhead. Although bulkheads may be effective in controlling drainage water at some locations, the fractured metamorphic rock in the region and the previous failure suggest that this method be considered only after detailed evaluation. This report is based on collection and treatment of drainage, where necessary, for the control of water impacts.

There are 13 sites where contaminated water must be collected for treatment. It is assumed that the most efficient solution will involve routing water via gravity or by pumping through a network of pipes to one of three water treatment plants (rather than treat and discharge water at each location where treatment is required). Heat-traced HDPE pipe laid on surface adjacent to existing roads is assumed for conveying the water. Insulated and heat traced pipe is relatively costly. Appendix B presents a cost estimate for this product from C. E. Franklin, a North America wide pipe manufacturer.

The three treatment plants would be at Bellekeno, Galkeno 900 and Husky SW. In some cases, the option of routing water via a drillhole to connect between underground workings is selected as this avoids the problem of heating a surface pipeline.

As with the water quality, it is assumed that the most efficient reclamation measure for acid generating rock will involve consolidation into several areas where it can be capped. Most of the waste rock does not appear to be strongly acid generating. Therefore, a relatively simple cover is assumed to be acceptable for these materials to limit future release of contaminants. The

assumed cover has a 1 m thick layer of compacted till which is overlain by 0.5 m of non-acid generating rock for control of erosion of the cover.

Very few of the adits and shafts have been closed. Some of those which were backfilled have since shown subsidence. Therefore, it is assumed that closure of all shafts and adits will involve excavation of any debris/backfill followed by capping/backfilling depending the geometry and depth. There is considerable variability in the geometry and condition of the adits and shafts. Ultimately, an individual assessment of the measures to close each one will be required. For the purpose of this assessment, a generic reclamation effort was assumed to apply to adits and shafts. A breakdown of the cost for adit closure and shaft capping is presented in Appendix C. It is assumed that this work would be conducted in groups of many adits and shafts for efficiency of labour and equipment.

Most of the buildings at the UKHM site are relatively small wooden structures. Demolition will be simple and can be carried out using a dozer or excavator. All buildings, except for the larger structures at the Elsa village/mill area are assumed to be removed at an average modest cost.

The PWGSC report identifies many hazardous materials (asbestos, waste hydrocarbon products, PCB's, etc) and areas of hydrocarbon contaminated soil. Quantities of hazardous materials have not been identified at this time. Where these are indicated an allowance for removal or treatment is provided in this cost estimate.

4.3 Reclamation Activities By Site

The following list provides the general reclamation activities assumed to be necessary for the sites within the UKHM property. Post-closure water treatment costs are addressed as a single activity rather than an allowance for each site, where this is required.

In the PWGSC report each site was given a number and that numbering system has been followed here.

1) SILVER KING

- place 1100 t acid generating low grade ore underground,
- contour waste rock by portal,
- pull back waste rock from creek,
- place 1.0 m thick till cover over 0.5 ha of acid generating waste rock,
- remove treatment precipitate,
- collect precipitate released out of ponds,
- place1.0 m thick till cover over 1 ha of waste rock by portal,
- contour waste rock/ soil by road,
- contour pit area,
- revegetate pit area,
- seal 3 adits,
- excavate and backfill 4 raise/shafts,
- route adit drainage approx. 3 km to permanent treatment plant at Husky,
- remove 4 buildings and bury at new landfill near Elsa,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

2) HUSKY & HUSKY SW

Husky

- contour waste rock by shaft area,
- place till cover over 0.5 ha of waste rock,
- revegetate contoured area,
- cap shaft,
- construct permanent treatment plant and new precipitate containment,
- remove 5 buildings and bury at new landfill near Elsa,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

Husky SW

- contour waste rock by shaft area,
- stabilize west toe of waste dump,
- place till cover over 0.5 ha of waste rock,
- stabilize slope behind shaft,
- revegetate contoured area,
- cap shaft,
- route adit drainage approx. 1.5 k to permanent treatment plant at Husky,
- remove transformer compound,
- remove 4 buildings and bury at new landfill near Elsa,
- remove rails and rail cars,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

3) Elsa Mine

- remove waste rock by portals,
- contour portal areas,
- contour pit area,

- revegetate waste rock piles,
- seal 6 adits,
- excavate and backfill 5 raise/shafts,
- enhance U/G drainage for routing to permanent treatment plant at Husky,
- remove 1 building and bury at new landfill near Elsa,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

4) Dixie
   - remove waste rock into Husky dump,
   - contour portal area, bury timber crib at site,
   - revegetate portal area,
   - seal adit,
   - excavate and backfill raise,
   - remove building and bury at new landfill near Elsa,
   - excavate and landfarm contaminated soil,
   - allowance for removal of miscellaneous hazardous materials,

5) Carol & Wigam (not inspected)
   - excavate and backfill 2 shafts,

6) Bermingham & Ruby

   Bermingham
   - contour waste rock by portal,
   - revegetate waste rock piles,
   - excavate and backfill open trenches with possible connection to U/G workings,
   - seal 1 adit,
   - route adit drainage approx. 1.5 k to permanent treatment plant at Husky,
   - excavate and backfill 1 shaft,
   - berms to block entrance & perimeter; 1 pit,
   - doze down crest of dump to improve stability,
   - remove 7 buildings and bury at new landfill near Elsa,
   - excavate and landfarm contaminated soil, minor,
   - allowance for removal of miscellaneous hazardous materials,

   Ruby
   - contour waste rock by portal,
   - contour waste rock/ soil by road,
   - revegetate waste rock piles,
   - seal 1 adit,
   - route adit drainage approx. 0.5 k via Bermingham to permanent treatment plant at Husky,
   - remove 2 buildings and bury at new landfill near Elsa,
   - excavate and landfarm contaminated soil,
   - allowance for removal of miscellaneous hazardous materials,

7) No Cash 500
   - remove waste rock into Husky dump, up to 5,000 m3 (this volume is assumed to be a veneer over the overburden dump),
   - contour portal area,
   - revegetate portal area,
   - seal 2 adits,
   - remove waste rock from trench into Husky dump, up to 40,000 tonnes,
   - contour trench area,
   - route adit drainage approx. 1 k via Dixie to permanent treatment plant at Husky SW (the zinc concentration in drainage from this site has been slowly rising in the last decade),
   - excavate and backfill 1 raise & Brefalt shaft,
   - remove 5 buildings and bury at new landfill near Elsa,
   - remove mid-way tram station and bury nearby,
   - excavate and landfarm contaminated soil,
   - allowance for removal of miscellaneous hazardous materials,

8) Betty
   - no reclamation required,

9) Hector-Calumet
   - contour Hector 400 dump,
   - construct cover on Hector 400 dump, approx. 4 ha,
   - contour Hector/Calumet pits and waste rock,
   - berms to block entrance & perimeter; 3 pits,
   - revegetate Calumet pits,
   - seal 2 adits,
   - remove 3 buildings and bury nearby,
   - remove loading facility,
   - excavate and landfarm contaminated soil,
   - allowance for removal of miscellaneous hazardous materials, minor,

10) Dragon & Miller
   - contour dump,
   - berms to block entrance & perimeter; 1 pit,
   - seal 1 adit,
   - remove 3 buildings and bury nearby,

11) Galkeno 300
   - contour 300 dump,
   - construct cover on 300 dump, approx. 2 ha,
   - contour NW dump,
   - berms to block entrance & perimeter; 3 pits,
   - seal 4 adits,
   - drill hole to route drainage water to Galkeno 900,
   - excavate and backfill 2 shafts,
   - remove 6 buildings and bury nearby,

- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials, minor,

12) Galkeno 900
- contour 900 dump,
- seal 1 adit,
- remove treatment precipitate,
- construct permanent treatment plant and new precipitate containment,
- remove 1 building and bury at new landfill near Keno City,
- allowance for removal of miscellaneous hazardous materials, minor,

14) Bluebird, not inspected,
- excavate and backfill 4 shafts, minor,
-

15) Tin Can, not inspected
- excavate and backfill 2 shafts, minor,

16) Rico, not inspected
- excavate and backfill 1 shaft & 1 adit, minor,

17) Duncan Creek, not inspected
- no reclamation required,

18) Flame & Moth, not inspected
- excavate and backfill 1 shaft,
- contour and cover minor waste dumps, total 0.3 ha.,

19) Onek
- contour dumps by pit to improve toe stability,
- construct cover on waste dumps,
- berms to block entrance & perimeter; 1 pit,
- seal 2 adits (one in pit),
- route adit drainage approx. 1.5 k to permanent treatment plant at Galkeno 900,
- consolidate ARD rock at pit into portal rock pile,
- consolidate and cover ARD rock at portal dumps,
- cap Lone Star shaft,
- remove 15 buildings and bury at new landfill near Keno City,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

20) Klondike Keno, not inspected
- contour dumps and portal area,
- revegetate,
- seal 2 adits,
- remove 15 buildings and bury at new landfill near Keno City,
- excavate and landfarm contaminated soil,

- allowance for removal of miscellaneous hazardous materials,

21) Sadie Ladue/Wernecke Camp, not inspected
- excavate and backfill 5 shafts/raises,
- backfill over collapsed stope,
- contour 5 shallow pits,
- contour 8 minor waste dumps,
- construct permanent containment for tailings,
- remove 18 buildings and bury at new landfill near Keno City,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

22) Bellekeno
- relocate waste rock from Thunder Gulch Creek to south end of dump,
- construct toe buttress around dump to stabilize precipitate ponds,
- remove accumulated precipitate,
- seal 4 adits,
- excavate and backfill 4 shafts,
- backfill an open stope,
- remove 14 buildings and bury at new landfill near Keno City,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials, including sludge in AST's,
- construct permanent treatment plant,

23) Kijo, not inspected
- excavate & backfill 3 adits,

24) Croesus, not inspected
- excavate & backfill 4 adits,

25) Black Cap, Shepherd, Lucky Queen Adit

Black Cap
- contour 5 dumps,
- berms to block entrance & perimeter; 2 pits,
- remove steel waste in dumps,

Shepherd
- seal 1 adit,

Lucky Queen Adit
- contour dump,
- remove steel waste in dumps,
- revegetate dump areas,
- seal 1 adit,
- remove 2 buildings and bury at new landfill near Keno City,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

26) Lucky Queen, not inspected
- excavate and backfill 3 shafts,
- contour trenches and waste dumps,
- vegetate area,
- remove 1 building and bury nearby,

27) Lake, not inspected
- excavate and backfill 2 shafts,
- contour 3 trenches and 5 waste dumps,
- remove 1 building and bury nearby,
- vegetate area,

28) Shamrock, not inspected
- excavate and backfill 2 adits,
- contour 6 trenches and 3 waste dumps,
- remove 2 buildings and bury nearby,
- allowance for removal of miscellaneous hazardous materials,

29) Highlander, not inspected
- excavate and backfill 3 adits,
- contour 3 waste dumps,
- remove 3 buildings and bury nearby,

30) Cub & Bunny, not inspected
- no reclamation required, natural re-vegetation established,

31) Stone, not inspected
- excavate and backfill 3 adits,
- contour 3 waste dumps,
- remove 4 buildings and bury nearby,

32) Keno 700, Porcupine and Comstock
- excavate and backfill 5 adits,
- contour 4 waste dumps,
- route Keno 700 drainage to Bellekeno treatment plant,
- remove 12 buildings and bury at new landfill near Keno City,
- remove 4 rail lines and trestles,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

33) Main Fault & Nabob, not inspected
- excavate and backfill 1 adit and 1 shaft,
- contour 4 trenches and 1 waste dump,
- remove ARD rock at Nabob portal and place in cover area at Onek portal,
- remove 1 building and bury nearby,
- bury solid waste piles nearby,

- allowance for removal of miscellaneous hazardous materials,

34) Lake View, not inspected
- contour 3 trenches,
- remove 1 building and bury nearby,

35) Nabob # 2, not inspected
- excavate and backfill 1 shaft,
- contour 1 trench and 1 waste dump,
- remove 1 building and bury nearby,

36) Keno #9, Main Fault & Shamrock, not inspected
- excavate and backfill 5 adits,
- excavate and backfill 1 raise,
- contour 6 waste dumps,
- berms to block entrance & perimeter; 2 pits,
- route adit/pit/dump drainage via Keno 700 to Bellekeno treatment plant,
- remove 1 building and bury nearby,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

40) Divide, not inspected
- no reclamation requirement,

44) Gold Queen, not inspected
- excavate and backfill 1 adit,
- contour 1 trench,

45) Silver Basin, not inspected
- excavate and backfill 1 shaft,
- contour 3 waste dumps,

59) Eagle, not inspected
- excavate and backfill 1 shaft
- contour 1 waste dump and trench,

63) Gerlitski, not inspected
- remove waste rock piles #2 and #3 to Husky rock pile for covering,
- contour 2 waste dumps,

73) Gambler, not inspected
- excavate and backfill 2 adits,
- contour 2 waste dumps and 6 trenches,
- drill hole underground to route drainage to Keno #9,
- remove 2 buildings and bury nearby,

- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,

76) Townsite Mine
- excavate and backfill 1 adit,
- remove 13,000 tonne waste dump to Husky rock pile for covering,
- contour area after dump removal,
- remove 1 building and bury at new landfill near Elsa,
- bury solid waste piles at new landfill near Elsa,

77) Sadie-Ladue 600, not inspected
- excavate and backfill 1 adit,
- contour waste dump,
- route adit drainage to Galkeno treatment plant (the zinc concentration in drainage from this site has been slowly rising in the last decade),
- remove 2 buildings and bury nearby,

78) Elsa Village
- remove up to 57 buildings and bury at new landfill near Elsa,
- remove fuel tanks and sludges,
- excavate and landfarm contaminated soil,
- allowance for removal of miscellaneous hazardous materials,
- remove transformers containing PCB oil,
- remove hazardous materials from solid waste piles,
- consolidate and bury 8 solid waste piles,

79) Elsa Tailings – see expanded description below
- construct permanent spillways,
- raise dams and relocated tailings to provide permanent underwater containment of acid generating materials,
- place additional fill on crest of dam 1, temporary measure,
- raise dam 1 to flood tailings; fill on crest and D/S slope for stability as required, construct slurry trench cut-off,
- cement backfill in decant pipes,
- raise dam 3 to flood tailings up to dam 1; fill on crest and D/S slope for stability as required, construct slurry trench cut-off,
- doze tailings into area to be flooded,

81) Mackeno
- remove northern tailings into area to be covered,
- 40,000 tonnes tailings, cover in place or relocate to Elsa tailings,
- contour mill site,
- revegetate mill site,

Generic Reclamation Activities

- reclaim roads; scarify, stabilize drainage patterns and revegetate,
- construct regional sludge containment facility,
- development of A & R plan,
- contractor mobilization and demobilization.

Post-closure Activities

- post-closure water quality monitoring will be required to confirm that downstream water quality objectives are being met,
- operation of 3 treatment facilities; Husky, Galkeno and Bellekeno,
- dam and spillway maintenance will be required in perpetuity,
- maintenance of covers on waste rock and tailings will be required to address loss of performance due to erosion, invasion by vegetation, settlement and frost effects.

4.4 Elsa Tailings

There was no containment of the tailings discharged from the Elsa mill prior to 1965, at which time Dam 1 was constructed. It consisted of homogenous silt-till dam constructed on peat and frozen silt-till. Settlement of the structure, due to consolidation of the peat and/or thawing of the silt-till is ongoing. Bruce Geotechnical estimates that settlement could continue for many more years. Dams 2 and 3 have a similar construction and settlement problem. A decant structure passes water through each dam. Additional fill was placed on the downstream face and at the toe of Dam 1 to improve stability.

Approximately 4.6 million tonnes are contained in the Elsa deposit, most of which is contained behind Dam 1. The Elsa tailings are potentially acid generating. Currently, the paste pH ranges from 6.1 to 7.7. Considering the age of the tailings, it appears that the acid generation process is being retarded by geochemical and/or climatic conditions. However, due to the NP/AP ratio being below 0.4 in all samples (PWGSC report) a trend towards more acidic conditions is likely to develop. ARD testing of the tailings, including accelerated weathering tests, should be considered in order to identify the time period until more severe acidic conditions develop.

Water treatment is currently being carried out at the Elsa tailings. If conditions were expected to remain as they are now, then collection and treatment of the tailings water could be the most cost effective solution (because there will be other perpetual water treatment activities in the area).

However, with more severe acid generation expected, long-term water treatment may prove to be more costly, and treatment is generally a less preferred reclamation strategy to prevention. Therefore, this report is based on the assumption that measures to inhibit future acid generation are required.

The assumed reclamation measures for the Elsa tailings are:

- raising the dams by the center-line method by approximately 2.3 m (7.5 feet),
- flattening the upstream and downstream slopes to 2.5:1,
- construction of an impermeable barrier using a bentonite slurry cut-off wall,
- lime addition and relocation of tailings into the flooded area behind Dams 1, 2 and 3, and,
- construction of a permanent spillway at each dam.

A conceptual geometry for dam raising is shown in Figure 1.

The topographic data regarding the tailings is not sufficient to be confident that the reclamation concept for the tailings described above will be effective or cost efficient. It may be necessary to further raise the dams. It may not be possible to relocate all of the exposed tailings after dam raising into the enlarged ponded areas.

An alternative solution could involve construction of a new dam located just downstream of Dam 3. It would be in the order of 15 to 20 m high. This dam would be founded on the silt-till and constructed high enough to flood about 600 m upstream of Dam 1. Tailings relocation would still be required.

5 COST ESTIMATE

A cost estimate for each of the 46 sites is presented in the spreadsheet in Appendix D. The costs are based on the assumption that a general contractor would be hired to carry out the necessary tasks. Contractor rates for equipment and labour would apply. Typical unit costs based on contractor work from other northern projects have been used in developing this estimate. It is further assumed that the work would be tendered in parcels of many sub-sites in order to permit

efficient use of labour, equipment and mobilization/demobilization costs. Higher costs will occur if the work is carried out in small parcels, such as on an individual site basis.

The cost for the Elsa tailings is estimated to be $10.7 million before contingency. Approximately $2.28 million of this cost is for raising and stabilizing the dams and construction of the seepage cut-off wall. The balance is for spillway construction and relocation of the tailings. Construction of a new dam downstream of Dam 3 to a height of approximately 15 m would cost in the order of $3.8 million. There would still be a requirement for tailings relocation in this case. Further engineering is required to identify the most practical solution.

The post-closure costs have been based in consideration of the current level of effort required to maintain the water treatment activities. A reduction from the current level of a supervisor and 4 labourers year round to a supervisor and 2 summer labourers and 3 winter labourers is assumed because there will be less security work required. Lime consumption is assumed to increase from the current level of 1.56 tonnes/week to 8 tonnes/week because better effluent qualtity can be achieved by treating under more alkaline conditions.

An allowance of $\$1/m^2$ per year is provided for maintenance of the covers over the acid generating waste rock. This allowance is expected to address invasion by trees and any minor erosion which may occur. Post-closure costs are assumed to be required in perpetuity and the net present value of this cost has been estimated using a real rate of return of 3%.

The spreadsheet presents the estimated quantities of work and applicable unit costs for the tasks described above. Due to the large number of sub-sites with individual elements to be addressed, an engineering allowance of 5% is provided for tendering and contract management. Due to the uncertainty in the various tasks, a contingency of 50% is provided to allow for problems and unanticipated costs.

Post-closure water management and site maintenance is estimated to be $973,000 per year. Based upon a real rate of return, this cost has a net present value of $32.4 million.

A breakdown of the cost estimate is presented at the beginning of Appendix D and is summarized in the following table.

Summary of UKHM Mine Site Reclamation Costs

ACTIVITY	ESTIMATED COST
Capital costs, surface reclamation & installation of water management facilities	$30.8 million
Perpetual water management	$32.4 million
Indirect costs	$0.7 million
Engineering	$0.8 million
Road reclamation	$0.4 million
Water treatment sludge pond	$0.3 million
Total Reclamation Liability	**$65.3 million**

The total reclamation liability for the site does not include the cost of short-term care and maintenance. This was estimated to be $1.3 million in the first year and 1.1 million/yr. thereafter, as described in Appendix A.

6 CONCLUSIONS & RECOMMENDATIONS

Conclusions regarding the scope and cost of short-term care and maintenance of the UKHM site are:

- The PWGSC Environmental Baseline Assessment of the Keno Valley was used to in preparation of this A & R cost estimate. It provides an initial characterization of the site condition and provides an excellent basis for further assessment of the mining liabilities in the region. However, it is not a complete data base for development of a final A & R plan. Further site characterization will be required.
- Only the 46 sites which lie within the UKHM property limits have been considered. Consideration of the approximately 40 other mining legacies in the area may be required in order to determine the best reclamation plan for the Keno and Elsa valley area.

- This assessment is based upon application of proven technologies and a conservative approach in addressing the current and future uncertainties in the level of environmental impact. Long-term water treatment of contaminated drainage (primarily from portals) is expected. Consolidation of acid generating waste into several areas for covering to limit the release of acidic products is expected.
- The Elsa tailings are expected to become acid generating. Environmental impacts could be controlled with additional water treatment effort. However, prevention is generally preferred to treatment of acid drainage. Two options for prevention of acid drainage have been considered; raising the existing dams and construction of a new dam downstream of Dam 3. The former option is less costly and has been used in this estimate. Further engineering is required to identify the most practical solution.
- A cost-benefit study will be required to determine the best management strategy.

Preliminary recommendations regarding the further development of an A & R plan and cost estimate include:

- Additional data is required to refine the A & R plan and the cost estimate. This data includes:
  - sampling of waste rock and tailings to characterize the distribution of acid generating rocks,
  - surveying to better define the quantities of acid generating rocks and tailings,
  - monitoring of flows which will require treatment to define treatment plant loading and flow rates,
- Identification of the reclamation objectives, particularly the water quality objectives at various points in the receiving environment.
- Carry out the short term dam maintenance activities to ensure that the reclamation liabilities do not increase.

I trust that this report addresses your current requirements. Please call if you require additional comments or clarification.

Yours truly,
Brodie Consulting Ltd.

M. J. Brodie, P.Eng. (B.C. and N.W.T.)

APPENDIX A

Care & Maintenance Cost Estimate

CLOSURE OF ADITS

relocate waste rock into adit,
excavate & backfill adit with weakly cemented rock,

walk excavator to adit, 1 hour @ $275/hr -	$275
dig out debris with excavator, 2 hours @ $275/hr,	$550
dig up supply of inert waste rock, 15 m3, ½ hour @ $275/hr	$140
supply cement, 0.1 m3/m3 of rock, 1.5 m3, allow $50 FOB Keno	$50
transport cement and water to portal, water truck, 4 hours including standby, @ $100/hr	$400
mix with excavator, ½ hour @ $275/hr	$140
place material in portal, 1 ½ hours @ $275/hr	$415
contour slope above/around portal, 2 hours @ $275/hr	$550
supervisor, 4 hours @ $65/hour	$260
Total	$2780

CAPPING OF SHAFTS & RAISES
excavate & backfill shaft,

walk excavator to shaft, 1 hour @ $275/hr -	$275
dig out debris with excavator, 2 hours @ $275/hr,	$550
prepare rough bedrock surface for concrete slab2 hours @ $275/hr,	$550
supply pre-cast concrete slab, 4 each 1 m x 4m by 0.5 m, @ $500/m3	$4000
install concrete slabs including rock bolting to bedrock	$500
supply & install slush concrete to fill gaps	$200
cover concrete cap with fill, 1 m deep, 2 hours @ $275/hr,	$550
contour slope above/around shaft, 2 hours @ $275/hr	$550
supervisor, 6 hours @ $65/hour	$390
Total	$7565

APPENDIX B

PIPE COST ESTIMATE

APPENDIX C

ADIT AND SHAFT CAPPING COST ESTIMATE

APPENDIX D

RECLAMATION COST ESTIMATE

APPENDIX D
RECLAMATION COST ESTIMATE

PROJECT NAME: **UKHM - GENERAL RECLAMATION TASKS** Date: 23-Sep-02

No.	ACTIVITY/MATERIAL	UNITS	QUANTIT	COST CODE	UNIT COST	COST
	TOTALS FOR MINE SITES					
	Sub-total			NA	0	$19,845,467
	Engineering/project managemen	%	5	NA	0	$983,787
	Contingency	%	50	NA	0	$9,922,733
			Total Site Cost			$30,751,987
	INDIRECT COSTS					
	Mobilize workers	men	20	mm<l	175	$3,500
	Mobilize 2 excavators, 455 km	km	910	mherh	10.51	$9,564
	Mobilize 2 dump trucks	km	910	mherh	10.51	$9,564
	Mobilize 4 pick-up trucks	km	1820	mherl	5.1	$9,282
	Mobilize 2 dozers	km	910	mherh	10.51	$9,564
	Mobilize 1 compactor	km	455	mherh	10.51	$4,782
	Mobilize fuel truck	km	455	mherh	10.51	$4,782
	Demobilize workers	men	20	mm<l	175	$3,500
	Demobilize 2 excavators, 455 k	km	910	mherh	10.51	$9,564
	Demobilize 2 dump trucks	km	910	mherh	10.51	$9,564
	Demobilize 4 pick-up trucks	km	1820	mherl	5.1	$9,282
	Demobilize 2 dozers	km	910	mherh	10.51	$9,564
	Demobilize 1 compactor	km	455	mherh	10.51	$4,782
	Demobilize fuel truck	km	455	mherh	10.51	$4,782
		each		NA	0	$0
	worker accomodation	manday	3600	NA	100	$360,000
			Sub-total Indirect Cost			$462,077
	Contingency	%	50			$231,038
			Total Indirect Cost			$693,115
	Engineering - detailed reclamation plan, including permitting					$750,000
	Road reclamation, scarify	km	40	scfyl	3215	$128,600
	Road, re-vegetation	ha	200	vhfl	1450	$290,000
	Pemanent sludge containment pond		1		250000	$250,000
	Post - closure water treatment & site management					
	annual cost			annual cost		$973,018
	bonding for perpetual water treatment, real rate of return				3	%/yr
			Net Present Value			$32,433,920
	GRAND TOTAL					$65,257,622

COMMENTS:

PROJECT NAME: SILVER KING Date: 23-Sep-02
SITE # 1

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
place 700 t low grade ore underground (390 m3)	m3	390	sc1s	14.3	$5,577
place 400 t low grade ore underground	m3	220	sc1s	14.3	$3,146
pull back waste rock from creek	m3	2000	sc1h	6.95	$13,900
contour waste rock by portal	m3	9600	dsh	2.83	$27,168
place 1 m till cover over 0.5 ha of waste rock	m3	5000	sb4h	8.14	$40,700
place 0,5 m rock cover over till	m3	2500	sb3h	4.83	$12,075
remove treatment precipitate	m3	500	NA	150	$75,000
collect precipitate released out of ponds	m3	100	NA	15	$1,500
	m3		NA	0	$0
contour waste rock/ soil by road	m3	700	dsl	0.71	$497
contour pit area	m3	1250	dsl	0.71	$888
revegetate pit area	each	2.5	vhfl	1450	$3,625
seal 3 adits	each	3	NA	2780	$8,340
excavate and backfill 4 raise/shafts	all		NA	7565	$0
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage approx. 3 km to permanent treatment pla	km	3000	ppss	95.12	$285,360
remove 4 buildings and bury at new landfill near Elsa	m2	400	brw1l	19.5	$7,800
excavate and landfarm contaminated soil	allowan	1	NA	2000	$2,000
allowance for removal of miscellaneous hazardous materials	allowan	1	NA	2000	$2,000
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$494,576
Engineering/project management	%	5	NA	0	$24,729
Contingency	%	50	NA	0	$247,288
TOTAL					$766,592

COMMENTS:

PROJECT NAME: HUSKY & HUSKY SW Date:
SITE # 2

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
contour waste rock by shaft area	m3	1600	dsh	2.83	4528
place 1 m till cover over 0.5 ha of waste rock	m3	3600	sb4h	8.14	$29,304
place 0,5 m rock cover over till	m3	1800	sb3h	4.83	$8,694
revegetate contoured area	ha	0.36	vhfl	1450	522
cap shaft	each	1	NA	7565	7565
construct permanent treatment plant and new precipitate containmen		1	NA	50000	50000
remove 5 buildings and bury at new landfill near Elsa	m2	555	brs1l	32	17760
excavate and landfarm contaminated soil	allowan	1	NA	2000	$2,000
allowance for removal of miscellaneous hazardous materials	allowan	1	NA	2000	$2,000
Husky SW					
contour waste rock by shaft area	m3	2000	dsh	2.83	5660
stabilize west toe of waste dump	m3	200	sb1h	4.4	880
place 1 m till cover over 0.5 ha of waste rock	m3	3600	sb4h	8.14	$29,304
place 0,5 m rock cover over till	m3	1800	sb3h	4.83	$8,694
revegetate contoured area	ha	0.2	vhfl	1450	290
stabilize slope behind shaft	m3	360	dsh	2.83	1018.8
revegetate contoured area	ha	0.5	vhfl	1450	725
cap shaft	each	1	NA	7565	7565
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage approx. 0.5 k to pipeline to plant at Husk	km	500	ppss	95.12	$47,560
remove transformer compound	allowan	1	NA	3000	$3,000
remove 4 buildings and bury at new landfill near Elsa	m2	638	brs1l	32	20416
remove rails and rail cars	allowan	1	NA	1500	$1,500
excavate and landfarm contaminated soil	allowan	1	NA	2000	$2,000
allowance for removal of miscellaneous hazardous materials	allowan	1	NA	2000	$2,000
	each		NA	0	0
	each		NA	0	0
	manday		NA	0	0
			NA	0	0
			NA	0	0
			NA	0	0
	tonne		NA	0	0
	tonne		NA	0	0
	tonne		NA	0	0
			NA	0	0
	hours		NA	0	0
Sub-total			NA	0	$257,986
Engineering/project management	%	5	NA	0	$12,899
Contingency	%	50	NA	0	$128,993

TOTAL $399,878

COMMENTS:

PROJECT NAME: ELSA MINE Date: 23-Sep-02
SITE # 3

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
excavate and backfill 5 raise/shafts	m3	5	NA	7565	$37,825
seal 6 adits	each	6	NA	2780	$16,680
remove waste rock by portal	m3	3840	sc2h	8.76	$33,638
	m3		NA	0	$0
contour portal areas	m3	1200	dsh	2.83	$3,396
			NA	0	$0
	each		NA	0	$0
			NA	0	$0
	m3		NA	0	$0
contour pit area	m3	600	dsh	2.83	$1,698
revegetate pit area, portals, waste rock areas	ha	2	vhfl	1450	$2,900
	each		NA	0	$0
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage approx. 1.5 km to permanent treatment p	km	1500	ppss	95.12	$142,680
remove 1 building and bury at new landfill near Elsa	allowan	1	NA	1500	$1,500
excavate and landfarm contaminated soil	all	1	NA	2000	$2,000
allowance for removal of miscellaneous hazardous materials		1	NA	2000	$2,000
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$249,317
Engineering/project management	%	5	NA	0	$12,466
Contingency	%	50	NA	0	$124,659
TOTAL					$386,442

COMMENTS:

PROJECT NAME: DIXIE Date: 23-Sep-02
SITE # 4

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
remove waste rock into Husky dump	m3	9500	sb4h	8.14	$77,330
	m3		NA	0	$0
contour waste rock by portal	m3	1250	dsh	2.83	$3,538
vegetate portal area	ha	0.25	vhfl	1450	$363
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
			NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
seal 1 adit	each	1	NA	2760	$2,760
excavate and backfill 3 raise/shafts	each	3	NA	7565	$22,695
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage approx. 3 km to permanent treatment pla	all	3000	ppss	95.12	$285,360
remove 1 building and bury at new landfill near Elsa		1	NA	1500	$1,500
excavate and landfarm contaminated soil	all	1	NA	2000	$2,000
allowance for removal of miscellaneous hazardous materials		1	NA	3000	$3,000
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$403,545
Engineering/project management	%	5	NA	0	$20,177
Contingency	%	50	NA	0	$201,773
TOTAL					$625,495

COMMENTS:

asbestos in building
intermitent portal drainage - collect for treatment

PROJECT NAME: CAROL & WIGAM Date: 23-Sep-02
SITE # 5

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
	m3		NA	0	$0
	m3		NA	0	$0
contour waste rock by shafts	m3	400	dsh	2.83	$1,132
	each		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
			NA	0	$0
	m3		NA	0	$0
			NA	0	$0
revegetate overburden waste area, allownace	ha	2	vhfl	1450	$2,900
	each		NA	0	$0
excavate and backfill 2 raise/shafts	each	2	NA	7565	$15,130
	all		NA	0	$0
remove 2 buildings and bury at new landfill near Elsa		2	NA	1500	$3,000
excavate and landfarm contaminated soil	all		NA	0	$0
allowance for removal of miscellaneous hazardous materials			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$22,162
Engineering/project management	%	5	NA	0	$1,108
Contingency	%	50	NA	0	$11,081
TOTAL					$34,351

COMMENTS:

site not inspected

PROJECT NAME: BERMINGHAM & RUBY Date: 23-Sep-02
SITE # 6

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
Bermingham					
seal 1 adit	each	1	NA	2760	$2,760
excavate and backfill 1 shaft	each	1	NA	7565	$7,565
contour waste rock/ soil by portal	m3	500	dsh	2.83	$1,415
vegeate waste rock	ha	0.25	vhfl	1450	$363
remove 7 buildings and bury at new landfill near Elsa	each	7	NA	1500	$10,500
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage via Dixie 2 km to treatment plant at Husk	km	2000	ppss	95.12	$190,240
berm to block pit access	m3	405	sb2h	5.43	$2,199
contour waste dump by pit	m3	1500	dsh	2.83	$4,245
revegetate waste dump by pit	ha	1	vhfl	1450	$1,450
	Bermingham subtotal			$225,737	
Ruby					
seal 1 adit	each	1	NA	2760	$2,760[4]
	each	0	NA	7565	$0
contour waste rock/ soil by portal	m3	500	dsh	2.83	$1,415
vegeate waste rock	ha	0.25	vhfl	1450	$363
remove 2 buildings and bury at new landfill near Elsa	each	2	NA	1500	$3,000
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage via Dixie 1 km to treatment plant at Husk	km	1000	ppss	95.12	$95,120
	m3		NA	0	$0
contour pit area	each		NA	0	$0
revegetate pit area	each		NA	0	$0
excavate and landfarm contaminated soil	allowan	1	NA	2000	$2,000
allowance for removal of miscellaneous hazardous materials	allowan	1	NA	2000	$2,000
PCB in two transformers	l	270	NA	30	$8,100
			NA	0	$0
	Ruby Subtotal			$119,758	
	hours		NA	0	$0
Sub-total			NA	0	$345,494
Engineering/project management	%	5	NA	0	$17,275
Contingency	%	50	NA	0	$172,747
TOTAL					$535,516

COMMENTS:

PROJECT NAME: NO CASH 500 Date: 23-Sep-02
SITE # 7

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
No Cash 100 & Brefalt					
remove waste rock to husky dump (from Brefalt shaft)	m3	21000	sb4h	8.14	$170,940
contour waste rock by portal	m3	3750	dsh	2.83	$10,613
vegetate portal area	ha	1.5	vhfl	1450	$2,175
contour trenches	m3	1800	dsh	2.83	$5,094
seal 1 adit	each	1	NA	2760	$2,760
excavate and backfill 2 raise/shafts	each	2	NA	7565	$15,130
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage via Dixie1 km to treatment plant at Husk	km	1000	ppss	95.12	$95,120
remove 5 buildings and bury at new landfill near Elsa	all	5	NA	1500	$7,500
excavate and landfarm contaminated soil			NA	0	$0
allowance for removal of miscellaneous hazardous materials	all	1	NA	1000	$1,000
No Cash 500					
remove waste rock to husky dump	m3	5000	sb4h	8.14	$40,700
contour waste rock/overburden by portal	m3	3750	dsh	2.83	$10,613
vegetate portal area	ha	1.5	vhfl	1450	$2,175
	m3		dsh	2.83	$0
seal 2 adits	each	2	NA	2760	$5,520
excavate and backfill 2 raise/shafts	each	2	NA	7565	$15,130
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage via Dixie1 km to treatment plant at Husk	km	1000	ppss	95.12	$95,120
remove 2 buildings and bury at new landfill near Elsa	all	2	NA	1500	$3,000
remove mid-way tram station	each		NA	5000	$0
excavate and landfarm contaminated soil			NA	0	$0
allowance for removal of miscellaneous hazardous materials	all	1	NA	1000	$1,000
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$493,589
Engineering/project management	%	5	NA	0	$24,679
Contingency	%	50	NA	0	$246,795
TOTAL					$765,063

COMMENTS:

PROJECT NAME: BETTY Date: 23-Sep-02
SITE # 8

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
	m3		NA	0	$0
no reclamation required	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
			NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	all		NA	0	$0
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$0
Engineering/project management	%	5	NA	0	$0
Contingency	%	50	NA	0	$0
TOTAL					$0

COMMENTS:

PROJECT NAME: HECTOR-CALUMET Date: 23-Sep-02
SITE # 9

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
	m3		sb4h	8.14	$0
contour Hector 400 waste rock	m3	16390	dsh	2.83	$46,384
place 1 m till cover over 4 ha of waste rock	m3	40000	sc4h	17.3	$692,000
place 0,5 m rock cover over till	m3	20000	sb4h	8.14	$162,800
contour Hector/Calumet pit area dumps	m3	8750	dsh	2.83	$24,763
vegetate portal area	ha	1.5	vhfl	1450	$2,175
seal 2 adits	each	2	NA	2760	$5,520
berm to block pit access, 3 @ 405 m3	m3	1215	sb2h	5.43	$6,597
	each		NA		$0
	km		NA		$0
remove 3 buildings and bury nearby	all	3	NA	1500	$4,500
remove loading facility	each	1	NA	5000	$5,000
excavate and landfarm contaminated soil	each		NA	0	$0
allowance for removal of miscellaneous hazardous materials	all	1	NA	1000	$1,000
	all		NA	0	$0
	all		NA		$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$950,739
Engineering/project management	%	5	NA	0	$47,537
Contingency	%	50	NA	0	$475,369
TOTAL					**********

COMMENTS:

PROJECT NAME: DRAGON & MILLER Date: 23-Sep-02
SITE # 10

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
contour waste rock	m3	1000	dsh	2.83	$2,830
vegetate portal area	ha	0.5	vhfl	1450	$725
seal 1 adit	each	1	NA	2760	$2,760
berm to block pit access	m3	405	sb2h	5.43	$2,199
	each		NA		$0
	km		NA		$0
remove 3 buildings and bury nearby	all	3	NA	1500	$4,500
	each		NA		$0
excavate and landfarm contaminated soil	each		NA	0	$0
allowance for removal of miscellaneous hazardous materials	all	1	NA	1000	$1,000
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$14,014
Engineering/project management	%	5	NA	0	$701
Contingency	%	50	NA	0	$7,007
TOTAL					$21,722

COMMENTS:

PROJECT NAME: GALKENO 300 Date: 23-Sep-02
SITE # 11

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
contour 300 waste rock	m3	16000	dsh	2.83	$45,280
place 1 m till cover over 2 ha of waste rock	m3	20000	sc4h	17.3	$346,000
place 0,5 m rock cover over till	m3	10000	sb4h	8.14	$81,400
contour Sime/Vien pit area dumps	m3	8750	dsh	2.83	$24,763
vegetate cover and portal area	ha	2.5	vhfl	1450	$3,625
seal 4 adits	each	4	NA	2760	$11,040
berm to block pit access, 3 @ 405 m3	m3	1215	sb2h	5.43	$6,597
excavate and backfill 2 raise/shafts	each	2	NA	7565	$15,130
drill hole to route adit drainage to Galkeno 900	each	1	NA	25000	$25,000
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
remove 6 buildings and bury nearby	all	6	NA	1500	$9,000
excavate and landfarm contaminated soil	each	1	NA	2000	$2,000
allowance for removal of miscellaneous hazardous materials	all	1	NA	1000	$1,000
	all		NA	0	$0
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$575,835
Engineering/project management	%	5	NA	0	$28,792
Contingency	%	50	NA	0	$287,917
TOTAL					$892,544

COMMENTS:

PROJECT NAME: GALKENO 900 Date: 23-Sep-02
SITE # 12
PROJECT NAME:

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
contour 900 waste rock	m3	16000	dsh	2.83	$45,280
construct new precip. settling pond, design	each	1		15000	$15,000
construct new precip. settling pond, earthworks	m3	240		15	$3,600
remove precipitate	m3	240	sc4h	150	$36,000
construct permanent treatment plant	each	1		50000	$50,000
vegetate cover and portal area	ha	1	vhfl	1450	$1,450
seal 1 adit	each	1	NA	2760	$2,760
berm to block pit access, 3 @ 405 m3	m3	1215	sb2h	5.43	$6,597
excavate and backfill 2 raise/shafts	each	1	NA	7565	$7,565
	each		NA	0	$0
	each		NA	0	$0
remove 1 building and bury @ new Keno landfill	all	1	NA	1500	$1,500
excavate and landfarm contaminated soil	each		NA	0	$0
allowance for removal of miscellaneous hazardous materials	all	1	NA	1000	$1,000
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$170,752
Engineering/project management	%	5	NA	0	$8,538
Contingency	%	50	NA	0	$85,376
TOTAL					$264,666

COMMENTS:

BLUEBIRD, TIN CAN, RICO, DUNCAN, FLAME & MOTH Date: 23-Sep-02
SITE # 14, 15,16, 17, 18

place 0,5 m rock cover over till

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
Blue Bird	m3		NA	0	$0
excavate and backfill 4 raise/shafts	each	4	NA	7565	$30,260
	each		NA	0	$0
Tin Can	m3		NA	0	$0
excavate and backfill 2 raise/shafts	each	2	NA	7565	$15,130
	each		NA	0	$0
Rico			NA	0	$0
excavate and backfill 1 raise/shafts	each	1	NA	7565	$7,565
seal 1 adit	each	1	NA	2760	$2,760
Duncan Creek	each		NA	0	$0
no reclamation required	each		NA	0	$0
	each		NA	0	$0
Flame & Moth	all		NA	0	$0
excavate and backfill 1 raise/shafts	each	1	NA	7565	$7,565
contour waste rock	m3	1000	dsh	2.83	$2,830
place 1 m till cover over 0.3 ha of waste rock	m3	3000	sc3h	10.6	$31,800
place 0,5 m rock cover over till	m3	1500	sc3h	10.6	$15,900
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$113,810
Engineering/project management	%	5	NA	0	$5,691
Contingency	%	50	NA	0	$56,905
TOTAL					$176,406

COMMENTS:
Bluebird, not inspected
Tin Can, not inspected
Rico, not inspected
Duncan Creek, not inspected
Flame & Moth, not inspected

PROJECT NAME: ONEK Date: 23-Sep-02
SITE # 19

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
	m3		NA	0	$0
contour waste rock by pit	m3	14000	dsh	2.83	$39,620
berm to block pit access	m3	405	sb2h	5.43	$2,199
seal 2 adits	each	2	NA	2760	$5,520
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage 2 km to treatment at Galkeno	km	2000	ppss	95.12	$190,240
excavate and backfill 1 raise/shaft	each	1	NA	7565	$7,565
consolidate ARD rock from pit to portal area	each	1000	sb4h	8.14	$8,140
contour portal area waste rock	m3	1000	dsh	2.83	$2,830
place 1 m till cover over .175 ha of waste rock	m3	1750	sc4h	17.3	$30,275
place 0,5 m rock cover over till	m3	875	sb4h	8.14	$7,123
vegetate cover and portal area	ha	1	vhfl	1450	$1,450
	each		NA	0	$0
remove 15 buildings and bury @ new Keno landfill	all	15	NA	1500	$22,500
excavate and landfarm contaminated soil	each	300	csrh	50	$15,000
allowance for removal of miscellaneous hazardous materials	all	1	NA	3000	$3,000
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$340,462
Engineering/project management	%	5	NA	0	$17,023
Contingency	%	50	NA	0	$170,231
TOTAL					$527,716

COMMENTS:
no plan for Onek pit dump dimensions, waste rock contouring based on 5% of dump volume

PROJECT NAME: KLONDYKE KENO Date: 23-Sep-02
SITE # 20

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
not inspected					
contour waste rock by portal	m3	150	dsh	2.83	$425
seal 2 adits	each	2	NA	2760	$5,520
	each		NA	0	$0
	each		NA	0	$0
	m3		NA	0	$0
	m3		NA	0	$0
	m3		sb4h	0	$0
vegetate cover and portal area	ha	1	vhfl	1450	$1,450
	each		NA	0	$0
remove 4 buildings and bury @ new Keno landfill	all	4	NA	1500	$6,000
excavate and landfarm contaminated soil	each	1	csrh	1000	$1,000
allowance for removal of miscellaneous hazardous materials	all	1	NA	3000	$3,000
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$17,395
Engineering/project management	%	5	NA	0	$870
Contingency	%	50	NA	0	$8,697
TOTAL					$26,961

COMMENTS:

PROJECT NAME: SADIE LADUE/ WERNECKE CAMP

Date: 23-Sep-02

SITE # 21

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
not inpsected					
contour waste rockoverburden by pit	m3	8000	dsh	2.83	$22,640
contour pits	m3	12500	dsh	2.83	$35,375
berm to block pit access, 2 @ 405 m3	m3	810	sb2h	5.43	$4,398
seal 2 adits	each	2	NA	2760	$5,520
excavate and backfill 5 raise/shafts	each	5	NA	7565	$37,825
contour tailings	m3	7500	dsh	2.83	$21,225
place 1 m till cover over 4 ha of waste rock	m3	48000	sc4h	17.3	$830,400
place 0,5 m rock cover over till	m3	24000	sb4h	8.14	$195,360
	m3		sb4h	0	$0
vegetate cover, dump and pit areas	ha	6.8	vhfl	1450	$9,860
remove 18 buildings and bury nearby	all	18	NA	1500	$27,000
excavate and landfarm contaminated soil	each	300	csrh	50	$15,000
allowance for removal of miscellaneous hazardous materials	all	1	NA	3000	$3,000
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$1,207,603
Engineering/project management	%	5	NA	0	$60,380
Contingency	%	50	NA	0	$603,802
TOTAL					$1,871,785

COMMENTS:

PROJECT NAME: BELLEKENO Date: 23-Sep-02
SITE # 22

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
only 625 level adit inspected					
	m3		NA	0	$0
remove rock from creek - place buttress around 625 dump	m3	4800	sc3h	10.6	$50,880
remove treatment precipitate	m3	240	NA	150	$36,000
up-grade precip. ponds	each	1	NA	2000	$2,000
	m3		NA	0	$0
contour waste & trenches at upper developments	m3	1000	dsl	0.71	$710
	m3		dsl	0	$0
revegetate area	each	2.5	vhfl	1450	$3,625
seal 4 adits	each	4	NA	2780	$11,120
excavate and backfill 4 raise/shafts	all	4	NA	7565	$30,260
backfill open stope	m3	1000	dsh	2.83	$2,830
625 adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
remove 4 buildings and bury at new landfill near Elsa	m2	400	brw1l	19.5	$7,800
excavate and landfarm contaminated soil	allowan	310	csrh	50	$15,500
allowance for removal of miscellaneous hazardous materials	allowan	1	NA	4000	$4,000
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$169,725
Engineering/project management	%		NA	0	$0
Contingency	%	50	NA	0	$84,863
TOTAL					$254,588

COMMENTS:

PROJECT NAME: KIJO, CROESUS Date: 23-Sep-02
SITE # 23, 24

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
	m3		NA	0	$0
not inspected	m3		NA	0	$0
Kijo			NA	0	$0
seal 3 adits	each	3	NA	2670	$8,010
	m3		NA	0	$0
Croesus			NA	0	$0
seal 4 adits	each	4	NA	2670	$10,680
			NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	all		NA	0	$0
			NA	0	$0
excavate and landfarm contaminated soil	all		NA	0	$0
allowance for removal of miscellaneous hazardous materials			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$18,690
Engineering/project management	%	5	NA	0	$935
Contingency	%	50	NA	0	$9,345
TOTAL					$28,970

COMMENTS:

PROJECT NAME: Date: 23-Sep-02

BLACK CAP, SHEPERD, LUCKY QUEEN ADIT

SITE # 25

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
Black Cap	m3		NA	0	$0
contour waste rock/overburden by pit	m3	5000	dsh	2.83	$14,150
berm to block pit access, 2 @ 405 m3	m3	810	sb2h	5.43	$4,398
remove steel waste & bury nearby	each	1		1500	$1,500
vegetate dump and pit areas	ha	4.5	vhfl	1450	$6,525
Sheperd	ha		NA	0	$0
seal 2 adits	each	2	NA	2760	$5,520
Lucky Queen Adit					
seal 1 adit	each	1	NA	2760	$2,760
contour waste rock/overburden by portal	m3	5000	dsh	2.83	$14,150
remove steel waste & bury nearby	each	1		1500	$1,500
vegetate dump and portal areas	ha	0.5	vhfl	1450	$725
			NA	0	$0
remove 2 buildings and bury nearby	all	2	NA	1500	$3,000
excavate and landfarm contaminated soil	allowan	1	NA	2000	$2,000
allowance for removal of miscellaneous hazardous materials	all	1	NA	3000	$3,000
			NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$59,228
Engineering/project management	%	5	NA	0	$2,961
Contingency	%	50	NA	0	$29,614
TOTAL					$91,804

COMMENTS:

PROJECT NAME: Date: 23-Sep-02
LUCKY QUEEN, LAKE, SHAMROCK, HIGHLANDER, CUB & BUNNY, STONE
SITE # 26, 27, 28, 29, 30, 31

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
NONE OF THESE SITE WERE INSPECTED					
LUCKY QUEEN - SITE 26	m3		NA	0	$0
excavate and backfill 3 raise/shafts	each	3	NA	7565	$22,695
contour waste rock & trenches	m3	1750	dsh	2.83	$4,953
remove 1 building and bury nearby	all	1	NA	1500	$1,500
vegetate portal area	ha	1.6	vhfl	1450	$2,320
LAKE - SITE 27					
excavate and backfill 2 raise/shafts	each	2	NA	7565	$15,130
contour waste rock & trenches	m3	750	dsh	2.83	$2,123
remove 1 building and bury nearby	all	1	NA	1500	$1,500
vegetate portal area	ha	0.4	vhfl	1450	$580
SHAMROCK - SITE 28					
seal 2 adit	each	2	NA	2760	$5,520
contour waste rock & trenches	m3	4500	dsh	2.83	$12,735
berm to block pit access	m3	405	sb2h	5.43	$2,199
remove 1 building and bury nearby	all	1	NA	1500	$1,500
vegetate portal area	ha	4	vhfl	1450	$5,800
allowance for removal of miscellaneous hazardous materials	all	1	NA	1000	$1,000
HIGHLANDER - SITE 29					
seal 3 adit	each	3	NA	2760	$8,280
contour waste rock & trenches	m3	500	dsh	2.83	$1,415
remove 3 building and bury nearby	all	3	NA	1500	$4,500
vegetate dump area	ha	4	vhfl	1450	$5,800
CUB & BUNNY - SITE 30					
no reclamation required					
STONE - SITE 31					
seal 3 adit	each	3	NA	2760	$8,280
contour waste rock	m3	500	dsh	2.83	$1,415
remove 4 building and bury nearby	all	4	NA	1500	$6,000
vegetate portal area	ha	0.25	vhfl	1450	$363
			NA	0	$0
Sub-total			NA	0	$115,607
Engineering/project management	%	5	NA	0	$5,780
Contingency	%	50	NA	0	$57,803
TOTAL					$179,190

COMMENTS:

PROJECT NAME: KENO 700, PORCUPINE Date: 23-Sep-02
SITE # 32

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
seal 5 adits	each	5	NA	2760	$13,800
contour portal area waste rock	m3	2250	dsh	2.83	$6,368
thermosiphon to control adit icing	each	1		5000	$5,000
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage 5.5 km to treatment at Bellekeno	km	5500	ppss	95.12	$523,160
vegetate portal areas	ha	1.3	vhfl	1450	$1,885
	m3		sc4h	0	$0
	m3		sb4h	0	$0
	each		NA	0	$0
remove 12 buildings and bury @ new Keno landfill	all	12	NA	1500	$18,000
excavate and landfarm contaminated soil	all	1	NA	3000	$3,000
allowance for removal of miscellaneous hazardous materials	all	1	NA	3000	$3,000
PCB in three transformers	l	617	NA	30	$18,510
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$597,723
Engineering/project management	%	5	NA	0	$29,886
Contingency	%	50	NA	0	$298,861
TOTAL					$926,470

COMMENTS:

PROJECT NAME: Date: 23-Sep-02

MAIN FAULT & NABOB, LAKE VIEW, NABOB
SITE # 33, 34, 35, 36 #2, kENO #9,

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
NONE OF THESE SITE WERE INSPECTED					
MAIN FAULT - SITE 33	m3		NA	0	$0
excavate and backfill 1 raise/shafts	each	1	NA	7565	$7,565
seal 1 adit	each	1	NA	2760	$2,760
contour waste rock & trenches	m3	500	dsh	2.83	$1,415
remove Nabob portal waste rock to cover at Onek	m3	300	sc4h	17.3	$5,190
remove 1 building and bury nearby	all	1	NA	1500	$1,500
vegetate portal area	ha	0.5	vhfl	1450	$725
LAKE VIEW - SITE 34					
contour waste rock & trenches	m3	500	dsh	2.83	$1,415
remove 1 building and bury nearby	all	1	NA	1500	$1,500
vegetate trench area	ha	0.4	vhfl	1450	$580
NABOB #2 - SITE 35					
excavate and backfill 1 raise/shafts	each	1	NA	7565	$7,565
contour waste rock & trenches	m3	500	dsh	2.83	$1,415
remove 1 building and bury nearby	all	1	NA	1500	$1,500
vegetate dumpl area	ha	0.5	vhfl	1450	$725
KENO #9, MAIN FAULT, SHAMROCK - SITE 36					
excavate and backfill 6 raise/shafts	each	6	NA	7565	$45,390
contour waste rock	m3	1500	dsh	2.83	$4,245
berm to block pit access, 2 @ 405 m3	m3	810	sb2h	5.43	$4,398
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
route adit drainage 1.5 km via Keno 700 to treatment at Bell	km	1500	ppss	95.12	$142,680
vegetate portal area	ha	0.25	vhfl	1450	$363
excavate and landfarm contaminated soil	all	1	NA	1000	$1,000
allowance for removal of miscellaneous hazardous materials	all	1	NA	2000	$2,000
PCB in one transformer	l	50	NA	30	$1,500
	hours		NA	0	$0
Sub-total			NA	0	$240,431
Engineering/project management	%	5	NA	0	$12,022
Contingency	%	50	NA	0	$120,215
TOTAL					$372,668

COMMENTS:

PROJECT NAME: Date: 23-Sep-02
DIVIDE, GOLD QUEEN, SILVER BASIN, EAGLE, GERLITSKI, GAMBLER
SITE # 40, 44, 45, 59, 63, 73

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
NONE OF THESE SITE WERE INSPECTED					
DIVIDE - SITE 40					
No reclamation required					0
GOLD QUEEN - SITE 44					
seal 1 adit	each	1	NA	2760	$2,760
SILVER BASIN - SITE 45					
excavate and backfill 1 raise/shaft	each	1	NA	7565	$7,565
contour waste rock & trenches	m3	500	dsh	2.83	$1,415
vegetate shaft and trench area	ha	0.25	vhfl	1450	$363
EAGLE - SITE 59					
excavate and backfill 1 raise/shaft	each	1	NA	7565	$7,565
contour waste rock & trenches	m3	1400	dsh	2.83	$3,962
vegetate shaft and trench area	ha	1.1	vhfl	1450	$1,595
GERLITSKI - SITE 63					
push new road into site	m3	750	dsh	2.83	$2,123
remove waste rock to Husky cover area	m3	4915	sc4h	17.3	$85,030
vegetate area	ha	0.3	vhfl	1450	$435
GAMBLER - SITE 73					
excavate and backfill 2 raise/shafts	each	2	NA	7565	$15,130
contour waste rock & trenches	m3	750	dsh	2.83	$2,123
drill hole to route adit drainage to Keno #9	each	1	NA	25000	$25,000
adit partial bulkhead to collect adit water	each	1	NA	5000	$5,000
remove 2 building and bury nearby	all	2	NA	1500	$3,000
vegetate portal area	ha	0.35	vhfl	1450	$507
			NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
Sub-total			NA	0	$163,572
Engineering/project management	%	5	NA	0	$8,179
Contingency	%	50	NA	0	$81,786
TOTAL					$253,536

COMMENTS:

PROJECT NAME: TOWNSITE MINE Date: 23-Sep-02
SITE # 76

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
seal 1 adit	each	1	NA	2760	$2,760
remove waste rock to Husky cover area	m3	6800	sc4h	17.3	$117,640
contour waste rock & trenches	m3	500	dsh	2.83	$1,415
vegetate portal & dump area	ha	0.25	vhfl	1450	$363
remove 1 building and bury nearby	all	1	NA	1500	$1,500
allowance for removal of miscellaneous hazardous materials	all	1	NA	1000	$1,000
remove waste and dispose in Elsa landfill	m3	6000	sb4h	8.14	$48,840
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$173,518
Engineering/project management	%	5	NA	0	$8,676
Contingency	%	50	NA	0	$86,759
TOTAL					$268,952

COMMENTS:

PROJECT NAME: ELSA VILLAGE Date: 23-Sep-02
SITE # 78

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
	m3		NA	0	$0
demolition of wooden biuldings	m2	13689	brw1h	30	$410,670
demolition of steel buildings	m2	2279	brs1h	48	$109,392
demolition of steel tanks	m2	70	brs1h	48	$3,360
demolition of mill building	m2	11400	brw1h	30	$342,000
removal of mill equipment	allowan	1	NA	100000	$100,000
	each		NA	0	$0
removal of asbestos	allowan	1	NA	100000	$100,000
removal of hazardous materials	allowan	1	NA	75000	$75,000
removal of tank sludge	litr	7000	orh	0.93	$6,510
removal of PCB transformers, documented	ltire	175	NA	30	$5,250
removal of PCB transformers, not documented	allowan	175	NA	30	$5,250
contour disturbed areas	m3	13613	dsh	2.83	$38,525
revegetate disturbed areas	ha	20	vhfl	1450	$29,000
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$1,224,957
Engineering/project management	%	5	NA	0	$61,248
Contingency	%	50	NA	0	$612,478
TOTAL					$1,898,683

COMMENTS:

PROJECT NAME: ELSA TAILINGS Date: 23-Sep-02
SITE # 79

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
DAM 1	m3		NA	0	$0
construct permanent spillway, excavate in rock	m3	1920	rc4h	14.3	$27,456
place fill, raise crest flatten D/S slope, new toe buttress	m3	12684	sc4h	17.3	$219,433
geotextile	m2	1825	NA	5.75	$10,494
soil - bentonite slurry cut-off wall	m2	2366	NA	151	$357,266
doze tailings behind dam 1	m3	440000	dsh	2.83	$1,245,200
truck tailings behind dam 2	m3	440000	sb2h	5.43	$2,389,200
addition of lime to tailings	tonne	880		450	$396,000
DAM 2	m3		NA	0	$0
construct permanent spillway at Dam 2, excavate in soil	m3	6000	sc3h	10.6	$63,600
place rip rap in spillway	m3	825	sc4h	17.3	$14,273
place fill, raise crest flatten D/S slope, new toe buttress	m3	22650	sc4h	17.3	$391,845
geotextile	m2	3050	NA	5.75	$17,538
soil - bentonite slurry cut-off wall	m2	2366	NA	151	$357,266
truck tailings behind dam 2	m3	315000	sb2h	5.43	$1,710,450
addition of lime to tailings	tonne	315		450	$141,750
DAM 3	m3		NA	0	$0
construct permanent spillway at Dam 3, excavate in soil	m3	6000	sc3h	10.6	$63,600
place rip rap in spillway	m3	825	sc4h	17.3	$14,273
place fill, raise crest flatten D/S slope, new toe buttress	m3	31710	sc4h	17.3	$548,583
geotextile	m2	4270	NA	5.75	$24,553
soil - bentonite slurry cut-off wall	m2	2366	NA	151	$357,266
doze tailings behind dam 1	m3	720000	dsh	2.83	$2,037,600
addition of lime to tailings	tonne	720		450	$324,000
			NA	0	$0
			NA	0	$0
Sub-total			NA	0	$10,711,644
Engineering/project management	%	5	NA	0	$535,582
Contingency	%	50	NA	0	$5,355,822
TOTAL					$16,603,048

COMMENTS:

PROJECT NAME: MACKENO Date: 23-Sep-02
SITE # 81

ACTIVITY/MATERIAL	UNITS	QUANTI	COST CODE	UNIT COST	COST
	m3		NA	0	$0
	m3		NA	0	$0
contour upper mill site	m3	625	dsh	2.83	$1,769
vegetate upper & lower mill sites	ha	1.75	vhfl	1450	$2,538
	m3		NA	0	$0
remove northern tailings into area to be covered	m3	300	sc3h	10.6	$3,180
place 1 m till cover over .47 ha of tailings	m3	4700	sc4h	17.3	$81,310
place 0,5 m rock cover over till	m3	2350	sb4h	8.14	$19,129
	m3		sb4h	0	$0
vegetate cover, dump and pit areas	ha	2.2	vhfl	1450	$3,190
	each		NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	all		NA	0	$0
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	all		NA	0	$0
			NA	0	$0
	m2		NA	0	$0
	ha		NA	0	$0
	ha		NA	0	$0
			NA	0	$0
	allowance		NA	0	$0
	allowance		NA	0	$0
	m3		NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$111,115
Engineering/project management	%	5	NA	0	$5,556
Contingency	%	50	NA	0	$55,558
TOTAL					$172,229

COMMENTS:

PROJECT NAME: UKHM

Date: 23-Sep-02

SITE #

POST-CLOSURE COSTS

ACTIVITY/MATERIAL	*UNITS*	*QUANTI*	*COST CODE*	*UNIT COST*	*COST*
Water treatment					
lime @ 8 tonne/wk	tonne	416	ilmh	450	$187,200
power for treatment plants, 3 @ 2.5 kW-hr	kW-h	21900	NA	0.08	$1,752
power for heat trace lines, 20.5 km @ 5 kW-hr/km,	kw-h	516600	NA	0.08	$41,328
sludge disposal, lime mass @ 20% H2O	tonne	2600	NA	25	$65,000
pick-up trucks, 2, monthly rental	month	750		24	$18,000
lime truck, snow plow, monthly rental	month	2000		24	$48,000
fuel, pick-up trucks, 2 @ 100 litre/wk	l	10400	NA	0.95	$9,880
fuel, lime truck, snow plow, @ 200 litre/ wk	l	15600	NA	0.95	$14,820
supervisor	month	12	NA	7500	$90,000
labour, 2 men summer, 3 men winter		30	NA	6000	$180,000
tools & supplies	month	12	NA	500	$6,000
			NA	0	$0
water sampling	year	1	NA	27000	$20,000
water reporting	year	1	NA	30000	$20,000
geotechnical inspection	year	1	NA	5000	$5,000
worker food/housing subsidy	month	12	NA	2400	$28,800
			NA	0	$0
electrician	day/yr	12	NA	560	$6,720
mechanic	day/yr	12	NA	560	$6,720
			NA	0	$0
waste dump cover maintenance	ha	10.95	NA	1000	$10,950
			NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	each		NA	0	$0
	each		NA	0	$0
	manday		NA	0	$0
			NA	0	$0
			NA	0	$0
			NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
	tonne		NA	0	$0
			NA	0	$0
	hours		NA	0	$0
Sub-total			NA	0	$760,170
Engineering/project management	%	3	NA	0	$22,805
Contingency	%	25	NA	0	$190,043
TOTAL					$973,018

COMMENTS: