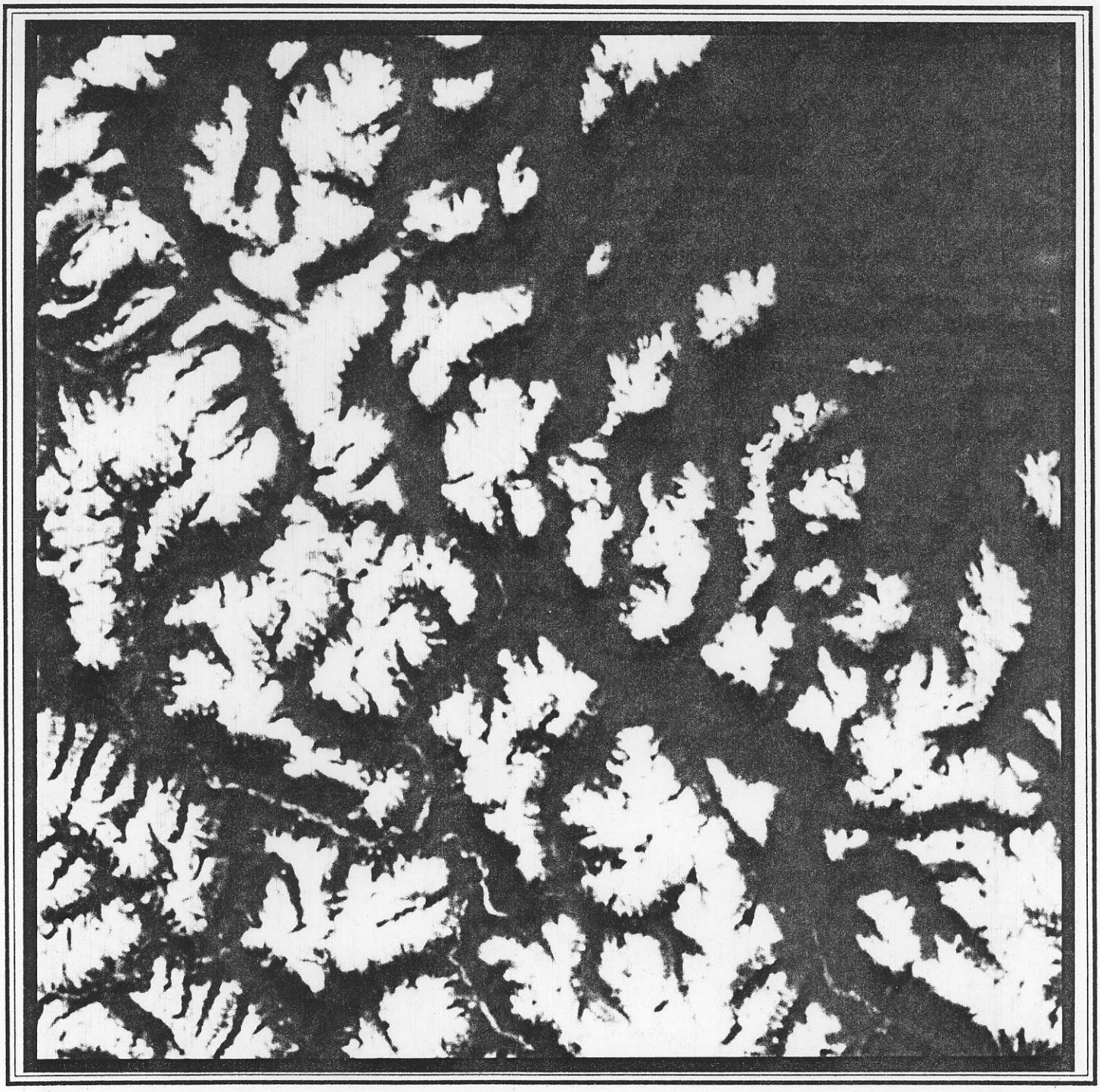

A PROPOSAL FOR THE EXPLORATION AND DEVELOPMENT
OF THE
LINDQUIST LAKE GOLD / SILVER / TUNGSTEN / PROSPECT

"PARCEL B"
TWEEDSMUIR RECREATIONAL AREA, BRITISH COLUMBIA

GRANGES INC. AND DEER HORN MINERAL PARTNERSHIP JOINT VENTURE
JUNE 1989

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SECTION 5 - CONCEPTUAL PLAN FOR ENVIRONMENTAL PROTECTION AND RECLAMATION DURING MINING (cont'd.)

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LINDQUIST LAKE PROPOSAL: SUMMARY

This proposal is submitted on behalf of a Joint Venture between Granges Inc. and the Deer Horn Mineral Partnership and is submitted in response to a Call for Proposals respecting exploration in Parcel "B" at Lindquist Lake in the Tweedsmuir Recreation Area. The proposal outlines two alternative exploration approaches for the site. The first is a comprehensive program of geological, geochemical, engineering and environmental studies, with provision for exploration drilling in the Phase 1 (1989) program. The second is restricted to surface work only and is intended to be environmentally less intrusive during the initial field season. The alternative programs should be considered as two separate proposals.

Both alternatives address the exploration of the gold and silver bearing quartz veins and an extensive zone of pervasive silicification whieh was discovered in 1944 on the southeastern slope of Lindquist Peak near the head of Whitesail Lake. The exploration objectives of the program are:

1. identification of approximately 1 million tons of vein-hosted ore reserves grading approximately 0.35 oz/ton Au equivalent or better amenable to underground mining methods;
2. identification of reserves to the order of about 10 million tons or better grading at least 0.13 oz/ton Au equivalent and amenable to bulk surface mining and enclosed leach recovery methods;
3. establishment of a viable combination of surface and underground extraction and recovery methods.

The Phase 1 exploration program alternatives are intended as preliminary tests of both leading exploration models. The work may reasonably be expected to establish which, if either, is operative and will be used as a basis for Phase 2 and subsequent exploration programs.

The tasks proposed for alternative 1, the more comprehensive proposal, are as follows:

1. Data compilation and assimilation, preparation of maps and photographs, permitting.
2. Mobilize to site, establish base camp.
3. Establish survey grid.
4. Conduct geological mapping, sampling and evaluation of any existing drill core.
5. Conduct soil geochemical surveys.
6. Re-access, map, survey, correlate and sample existing underground and surface workings.
7. Conduct a preliminary diamond drilling program.
8. Carry out repairs and maintenance to barge landing and clear helicopter landing area.
9. Carry out required repair and maintenance to access road.

The specific tasks proposed for alternate 2 are as follows:

1. Compile and assimilate all technical data, prepare maps and acquire necessary permits.
2. Establish helicopter supported base camp at project site.
3. Establish survey grid.
4. Conduct geological mapping.
5. Conduct soil sampling.
6. Conduct orientation geophysical survey.
7. Map and sample accessible underground and surface workings.
8. Carry out hand trenching at selected sites.
9. Carry out necessary repairs and maintenance to barge landing and clear safe helicopter landing area.

The exploration program will be co-ordinated with a preliminary engineering program and environmental baseline studies and monitoring. The preliminary engineering program will address ore body and wall rock criteria pertaining to 1/ rock structural strength, 2/ drillability, 3/ blasting parameters and 4/ tire and tool wear. Additional tasks will be engineering evaluations of the barge landing site and the existing underground workings on the property. Metallurgical sampling and lab testing will also be conducted and a preliminary site examination will be carried out to identify tailings and plant site locations and access corridors.

The Phase 1 environmental program will consist of baseline monitoring and aspects of exploration environmental management including access roads, drill sites, camp sites, sewage treatment, industrial waste and reclamation.

The proposed budget for the first phase of the comprehensive exploration program (alternative 1) is $594,635.00. The proposed budget for the alternative 2, low impact program is $191,919.00. The proposed Phase 2 program budgets, which would be conducted during the 1990 field season are $1 million for alternative 1 and $800,000 for alternative 2. In 1991 and subsequent years, both program budgets would be similar and would vary between $1.4 million and $2 million.

Conceptual plans for resource recovery as well as environmental protection and reclamation are discussed in Section 4 and 5 of this proposal.

SECTION 1

INTRODUCTION

SECTION 1

INTRODUCTION

1.1 TERMS OF REFERENCE AND SCOPE

This proposal is submitted in response to a Call for Proposals issued by the B.C. Ministry of Energy, Mines & Petroleum Resources on April 19, 1989. The proposal pertains to acquisition of mineral rights to Parcel "B" at Lindquist Lake in the Tweedsmuir Recreation Area and is submitted on behalf of a Joint Venture between Granges Inc. and the Deer Horn Mineral Partnership. It was prepared by the Joint Venture in consultation with Wright Engineers Limited (Wright), Nevin Sadlier-Brown Goodbrand Ltd. (NSBG), and Norecol Environmental Consultants Ltd. (Norecol). Information respecting the corporate financial background of the proponents is included in Appendix I of this submission and information respecting the technical experience and capabilities of the proponents and the contributing consulting firms are included in Appendix II.

The technical proposal contained in this submission was prepared in recognition of the project's location within a recreation area adjoining a Provincial Park. Considerable effort has therefore been made to design the program, particularly the high risk Phase I exploration work, in a manner that will minimize environmental impact yet be consistent with good exploration practices. With this in mind two alternative exploration approaches have been considered.

The first alternative assumes that the existing data on the property is all essentially valid and that, based on this data, a full scale exploration program is warranted. This would include physical work such as road repair, reaccessing underground workings and drilling.

The second alternative would consist largely of verification of the existing data in preparation for a more aggressive Phase II program. Field work would consist largely of non intrusive activities such as surface surveys and re-sampling of accessible mineral occurances with access by helicopter only. The Phase I budgets for each alternative are provided in Section 6.1.

The conclusions and the exploration and development plans, both firm and conceptual, based upon them are drawn from a review of a considerable volume of published and unpublished reports and maps as well as from personal communications with individuals who have worked at the site in the past. In addition the property was visited and evaluated by members of the Deer Horn Mineral Partnership on behalf of the Joint Venture in April 1989.

The geological, geographical and historical data is summarized here for reference purposes and as a foundation for the technical proposal. However, the review is purposely brief and is not intended as an independent geological evaluation. Resource recovery and reclamation plans are conceptual and based upon information from the site and comparable case studies conducted by Granges, Wright, NSBG and Norecol.

1.2 DESCRIPTION OF PROPERTY

Parcel B comprises 24 km^2 situated in the Tweedsmuir Recreation Area - Lindquist Lake Site and is depicted on NTS 1:50 000 scale map 93E 6. The parcel is contiguous with a group of twelve mineral claims comprising 48 km^2 which the proponents have acquired by staking. These claims are situated to the northeast and south of Parcel B and include claims numbered XK1010, XK1016*, XK1210, XK1216, XK1410, XK1416, XK1612, XK1614, XK1616*, XK1812, XK1814 and XK1816. The location of parcel B and the adjoining claims is depicted in Figure 2.1.

* title not yet confirmed

1.3 LOCATION, ACCESS AND GEOGRAPHIC SETTING

The prospect under discussion is situated in central B.C. near the southwest end of Whitesail Lake about 165 km south of the town of Smithers. It is readily accessible by helicopter or float plane from Smithers or Houston or by water from Andrew Bay on Ootsa Lake near Wistaria to a barge landing at the head of the lake. The project area lies on the south slope

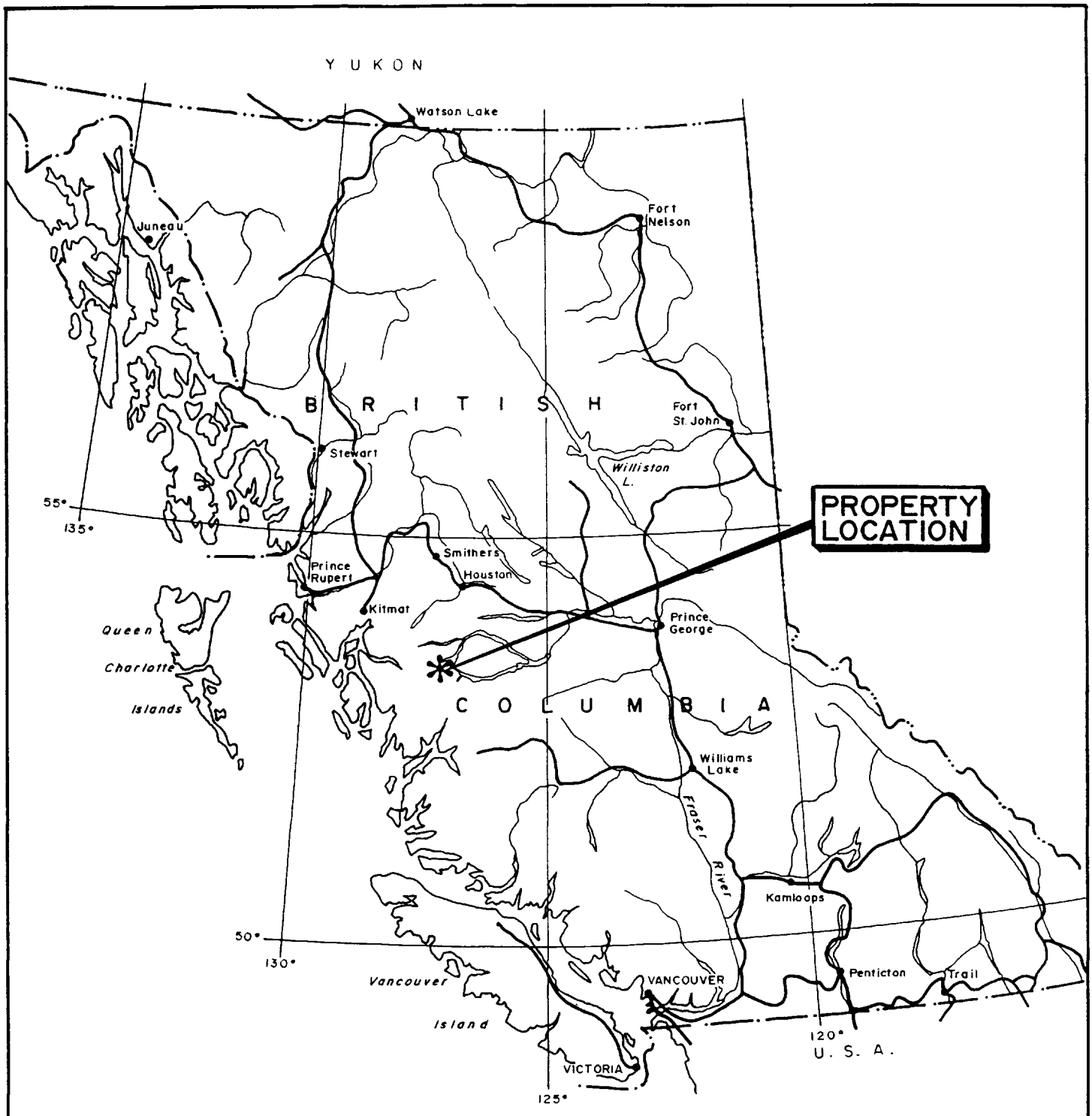
of Lindquist Peak about 4 km southwest of the landing and may be accessed from here either by helicopter or via an abandoned a dirt road to Lindquist Lake, then up the south slope of the mountain. The mineral occurrences lie between elevations of 1280 m and 1525 m in rugged terrain typical of the eastern margin of the Coast Ranges.

The greater part of the area of interest is at or above tree line in an area which is subject to heavy winter snow falls. Both the project area itself and parts of the access route leading to it from Whitesail Lake may be subject to avalanches. Access problems are discussed in greater detail in Section 4.0.

1.4 HISTORY AND PREVIOUS WORK

Mineralization has been known in the area since the discovery of scheelite and staking of the Harrison Claim Group in 1943. The quartz veins carrying the gold and silver values were discovered in 1944 and development work was subsequently conducted by Pioneer Gold Mines Ltd., Deer Horn Mines Ltd. and the Granby Mining Company Ltd., who last worked the property during 1967. In 1975 the mineral claims lapsed and the area was incorporated into Tweedsmuir Provincial Park. No exploration work has been conducted on the property since that date. The area has been geologically mapped by the GSC (Duffell 1959) and by the Geological Survey Branch of the B.C. Ministry of Energy, Mines and Petroleum Resources (Diakow and Koyanagi 1988).

Early in 1989 the area was designated as a Provincial Recreation Area and came open for staking. In April of 1989 the proponent acquired the contiguous claims referred to in Section 1.2.



GRANGES INC. and
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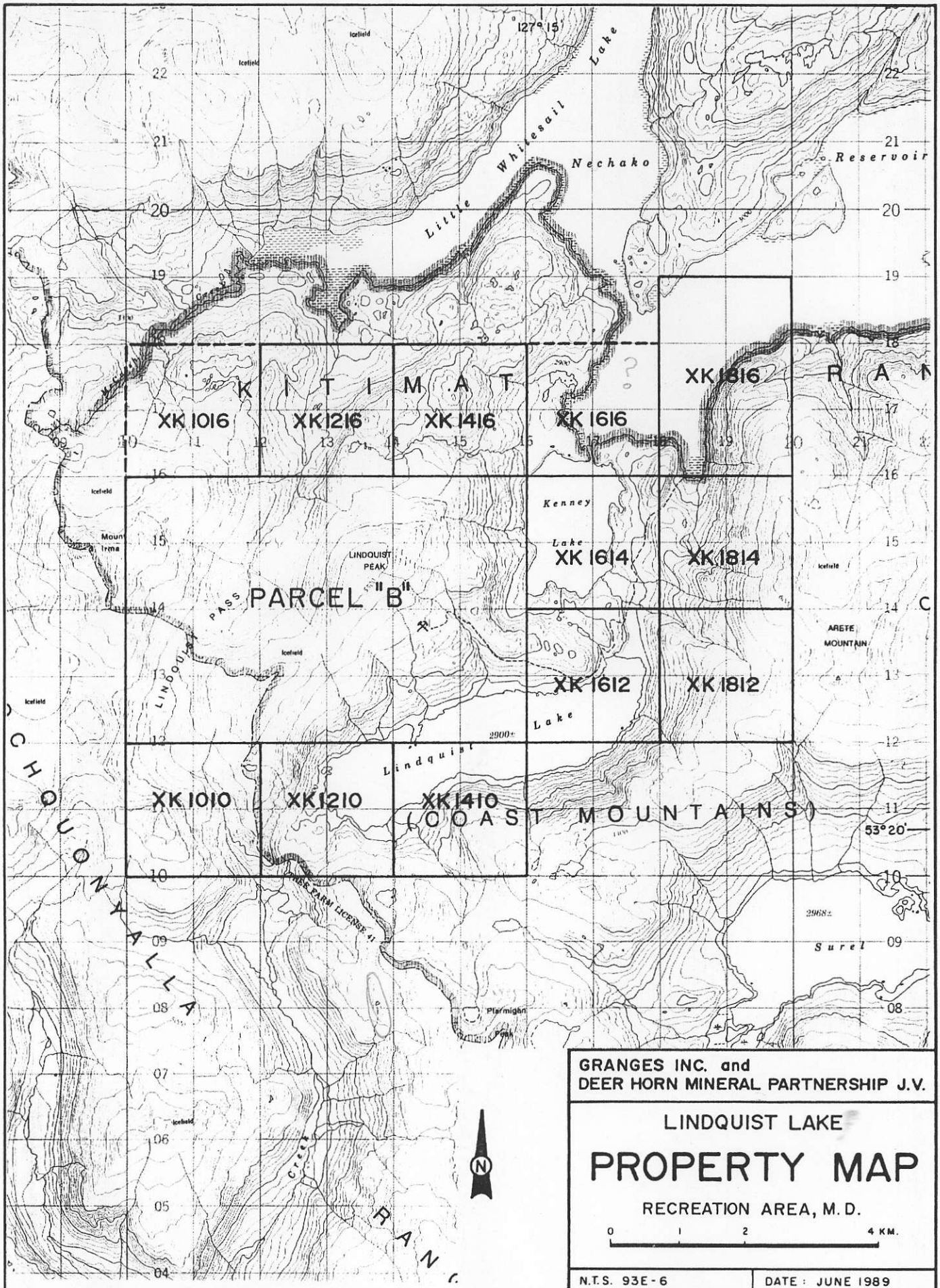
LINDQUIST LAKE
LOCATION MAP
RECREATION AREA, M.D.

0 100 200 300 400 500 KM.

N.T.S. 93E-6	DATE : JUNE 1989
SCALE : AS SHOWN	FIGURE Nº. 1.1

CHONG



GRANGES INC. and
DEER HORN MINERAL PARTNERSHIP J.V.

LINDQUIST LAKE

PROPERTY MAP

RECREATION AREA, M.D.

0 1 2 4 KM.

N.T.S. 93E-6	DATE : JUNE 1989
SCALE : AS SHOWN	FIGURE Nº. 2.1

CHONG

SECTION 2

GEOLOGY

SECTION 2

GEOLOGY

2.1 REGIONAL SETTING

The area of interest lies at a contact between the rocks of the Coast Tectonic Complex and the Mesozoic sedimentary and volcanic rocks of the Intermontaine Belt. The Intermontaine Belt in the area is represented by the lower Cretaceous argillaceous sedimentary rocks of the Skeena Group. The Skeena rocks are deformed by folding and faulting and have been subjected to several stages of post-deformational intrusive activity. They are in both fault and intrusive contact with the Mesozoic granodiorites and Tertiary quartz diorites of the Coast Crystalline Complex.

2.2 PROPERTY GEOLOGY

The oldest rocks within Parcel B are the meta-volcanic tuffs and flows which comprise the Gamsby Group, a pre-Jurassic terrain which is in intrusive contact with a Mesozoic diorite or quartz diorite stock. In the central part of the claim area these rocks are thrust over the Skeena sedimentary rocks along an east-west trending reverse fault with a steep to moderate southerly dip. The Mesozoic rocks are intruded in the southeast and northwest parts of Parcel B by an extensive bodies of Tertiary granodiorite and quartz monzonite. The entire sequence has been subjected to several sets of later faulting which tends to exhibit north-south strikes and right lateral displacements.

The known mineralized structures on the property consist of quartz veins and a broad zone of silicification. These features all lie at or near the contact between the intrusive rocks and the Cretaceous sedimentary terrain. The spatial relationship between the mineralized veins and the thrust fault zone suggests that the latter feature influenced or controlled mineral deposition.

2.3 MINERAL OCCURRENCES

2.3.1 Auriferous Quartz Veins

Known mineralization at Lindquist Lake is associated with quartz veins which lie in the vicinity of the contact between the intrusive and layered rocks. Two principal veins or vein systems have been developed by trenching diamond drilling and drifting. The surface exposures and initial discoveries are on an east-west striking quartz vein with a moderate to gentle northerly dip. This vein flattens with depth and is hosted by foliated diorite. At a depth of approximately 60 m it coalesces with a southerly dipping vein system which lies approximately along the contact between the diorite and the sedimentary rocks to the north. Both vein systems are offset by faulting but have been traced underground and on the surface over an aggregate strike length of about 550 m. The veins contain microscopic native gold associated with pyrite, galena, sphalerite, chalcopyrite, tellurides (hessite and altaite), scheelite and minor argentite.

The southernmost or main zone has been developed over a strike length of 330 m with an average width of 2.9 m and returned values averaging 0.255 oz/ton Au and 6.3 oz/ton Ag. The northern or contact zone has been developed over a strike length of 221 m with an average width of 2.7 m and returned values of 0.407 oz/ton Au and 12.24 oz/ton Ag. Undiluted main zone reserves are calculated to be 170,000 tons (154,000 tonnes). Contact zone reserves are calculated to be 525 tons (475 tonnes) per vertical foot. The continuity of this vein system is not presently known; however drill sections plotted by Deer Horn Mines Ltd. indicate a downdip extension to the order of 85m (280 ft.) which implies reserves of about 147,000 tons. Aggregate possible reserves in the two vein systems within this interval are therefore about 317,000 tons (287,000 tonnes).

2.3.2 Silicified Zone

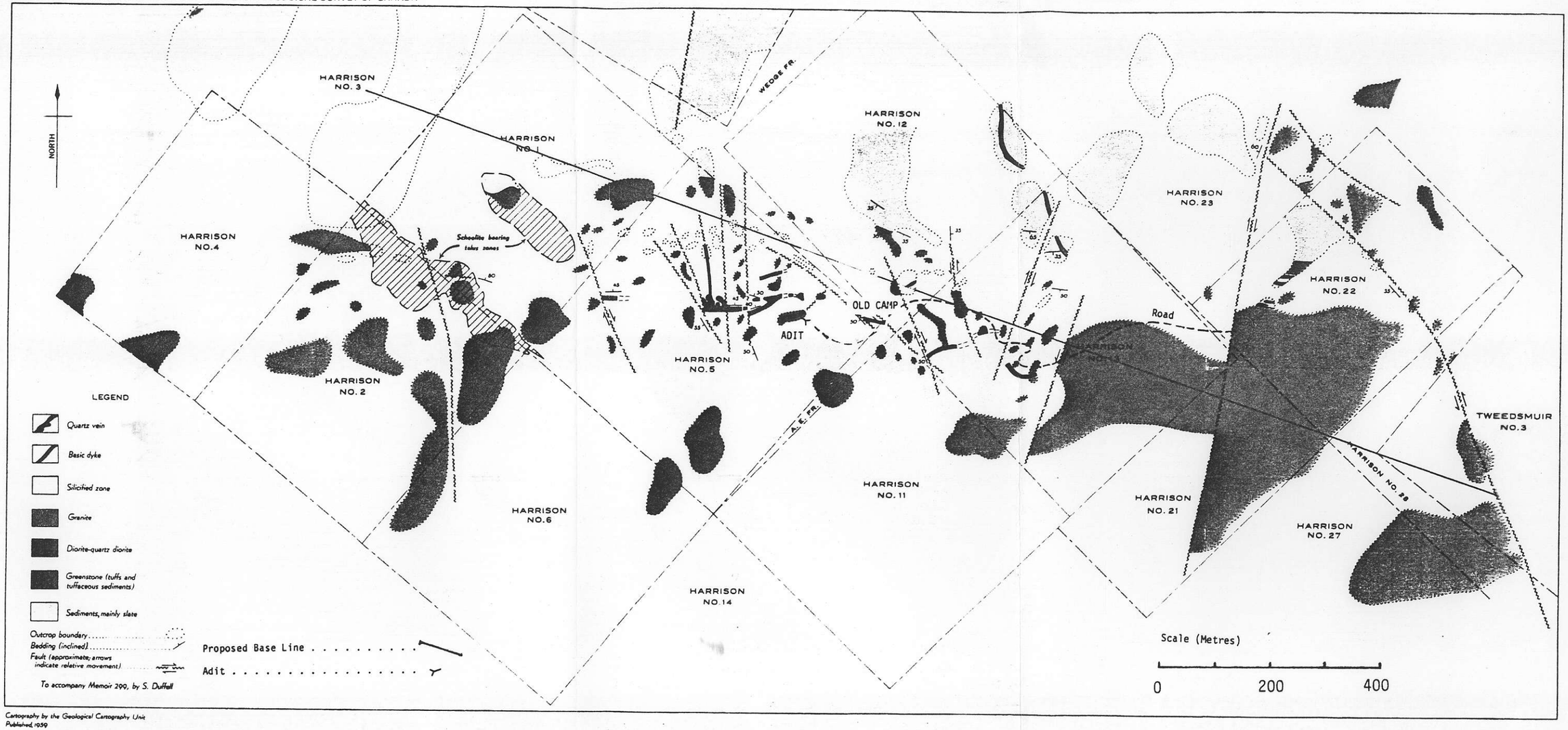
In nddition to the two principal vein structures, several additional smaller veins and a persistent zone of silicification have also been identified on the property. The silicified zone appears to be traceable over a strike length to the order of 1800 m and has an estimated average

width of approximately 60 m. It parallels the contact between the intrusive and layered rocks and, at least in part, envelops the principal vein systems. Gold and silver values are reported to be associated with sulphide mineralization contained within the silicified zone but confirmable analytical data are lacking. The silicified zone, however, could contain reserves to the order of 29 million tons to a depth of 60 m (200 ft). Metallic minerals are reported to include pyrite, pyrrhotite, sphalerite, galena, chalcopyrite, magnetite, sheelite, tellurides and native gold.

2.3.3 Tungsten Occurrence

Scheelite is present in talus near the western end of the system of quartz veining and silicification. The scheelite is hosted by quartz veins as well as by adjacent diorite and volcanic rocks. Representative assays of samples from both bedrock trenches and talus returned values in excess of up to 1.55% contained WO_3. A weighted average for the talus deposit alone is 0.35% contained WO_3 with surface reserves being to the order of 21,000 tons. Although the deposit appears to be extensive, no drilling has been conducted and subsurface data is lacking.

DEPARTMENT OF MINES AND TECHNICAL SURVEYS. GEOLOGICAL SURVEY OF CANADA



Cartography by the Geological Cartography Unit
Published, 1959

Fig. 2.2 Surface Geology of Lindquist Lake Au Ag Showing Area (Modified from plan in GSC M.299)

SECTION 3

EXPLORATION AND DEVELOPMENT PROPOSAL

SECTION 3

EXPLORATION AND DEVELOPMENT PROPOSAL

The proposed initial phase of exploration and development work on Parcel B will include an exploration program, an engineering program and an environmental program. The three programs would be co-ordinated in order to optimize use of camp and transportation facilities but they are outlined below in the three sections which follow because each program requires a distinct expertise and would be conducted by specialists in the particular field.

Given the known project parameters including site location, infrastructure, geological setting, ore controls, grades and recovery options, the alternative exploration objectives are as follows:

1. Identification of approximately 1 million tons of vein hosted ore reserves grading approximately 0.35 oz/ton Au equivalent or better which would be amenable to underground mining methods and conventional milling and cyanide recovery methods.

2. Identification of reserves to the order of about 10 million tons or better grading 0.13 oz/ton and amenable to bulk surface mining and enclosed leach recovery methods.

3. Establish a viable combination of surface and underground extraction and recovery methods.

The Phase I Exploration Program is intended as a preliminary test of both leading models and may reasonably be expected to establish which, if any, is operative. The conceptual recovery plans addressed in Section 4.0 of this proposal are largely contingent upon the nature of the geological model to be established by the Phase I Program.

3.1 PHASE I EXPLORATION PROGRAM

The design of the Phase I Exploration Program is based principally upon information from available reports and maps, from interviews with individuals who have been directly involved in work at the site in the past and, to some extent, upon the experience of the proponents and their consultants in the general area. The intent of the Phase I Program is to confirm the considerable volume of existing data and place it in a contemporary context, to initiate acquisition of new data, and to interpret and evaluate all information in the context of the exploration objectives outlined in Section 3.0 above.

Two alternative Phase I programs are proposed. Alternative 1 will emphasize aquisition of new data while Alternative 2 will emphasize confirmation of previous work. Each alternative is intended as a separate proposal and, as such, each is acceptable to the proponents at the discretion of the Ministry.

3.1.1 Alternative 1

The first alternative is the most comprehensive exploration proposal. Specific tasks are as follows:

1. Compile and assimilate all existing geological and engineering information, including geological reports and maps, analytical data and, where possible, anecdotal data. Air photographs should also be obtained and used in preparation of a detailed topographic map. All necessary permits would be acquired.

2. Establish a base camp at the project site. The camp will be used initially to house exploration personnel only and should be mobilized by helicopter or possibly by boat or barge and helicopter.

3. Establish of a survey grid over the prospect area. The grid should consist of a baseline bearing at 290° from the vicinity of the southeast limit of the known zone

of mineralization and continuing northwesterly for a distance of 2.2 km. Cross lines should be turned off at 100 m intervals and run approximately 400 m to the north and south. All lines should be picketed and chained using slope corrections and hand cut in a manner that will minimize environmental damage.

4. Conduct geological mapping and an orientation geological survey on the outlying parts of Parcel B. The detailed geological mapping will benefit substantially from published geological maps in Duffell (1959) and Diakow and Koyanagi (1988). This work will establish the geological control for geochemical and geophysical surveys, trenching and diamond drilling.

   Existing drill core at the site appears to be in disarray but should be checked to determine whether or not any useful information can be recovered from it.

5. Conduct a soil geochemical survey over the grid area. Samples should be tested for silver, base metals and certain pathfinder elements using ICP analysis, and for gold using atomic adsorption. Stream sediment sampling should be carried out on all drainages within Parcel B with particular emphasis on those proximal to the east-west trending thrust fault which separates the Coast Crystalline terrain to the south from the Jurassic and Cretaceous sedimentary/volcanic complex to the north.

6. Re-access, map and sample existing underground and surface workings.

7. Conduct a preliminary diamond drilling program using large diameter core drilling equipment. The principal purpose of this work will be to provide independent, contemporary confirmation of gold data including lithological, assay and geotechnical information. A limited program of exploration drilling should be initiated to test for both downdip and along strike extensions of known or inferred reserves.

8. Carry out any necessary repairs and maintenance to the barge landing at the southwest end of Whitesail Lake, including the clearing of a safe helicopter landing area.

9. Carry out any required repair and maintenance to the access road leading from the barge landing to the exploration site.

The technical program outlined above would be conducted over a duration of 10 weeks beginning with Task 1 during the week of July 10th. The proposed expenditure for the exploration program is included in Section 6.1 of this proposal.

3.1.2 Alternative 2

The second alternative would mitigate environmental impact by eliminating use of heavy equipment during the 1989 field season. It would also allow a more considered approach to phase II of the program, based on contemporary data. If warranted, phase II would then include the drilling and physical work program described under Alternative 1. The specific tasks in Alternative 2 are as follows:

1. Compile and assimulate all existing geological and engineering data. Acquire all necessary permits.

2. Establish helicopter supported base camp at the project site.

3. Establish survey grid over the prospect area. The grid should consist of a baseline bearing at 290° from the vicinity of the southeast limit of the known zone of mineralization and continuing northwesterly for a distance of 2.2 km. Cross lines should be turned off at 100 m intervals and run approximately 400 m to the north and south. All lines should be picketed and chained using slope corrections and hand cut in a manner that will minimize environmental damage.

4. Conduct geological mapping and an orientation geological survey on the outlying parts of Parcel B. This work will establish the geological control for geochemical and geophysical surveys.

   Examine existing drill core at the site to determine whether or not any useful information can be recovered from it.

5. Conduct a soil geochemical survey over the grid area. Samples should be tested for silver, base metals and certain pathfinder elements using ICP analysis, and for gold using atomic adsorption. Reconnaissance stream sediment sampling should be carried out on selected drainages within Parcel B with particular emphasis on those proximal to the east-west trending thrust fault which separates the Coast Crystalline terrain to the soath from the Jurassic and Cretaceous sedimentary/volcanic complex to the north.

6. Conduct orientation geophysical surveys over selected targets within the prospect area. Provision should be made for application of several different geophysical methods including magnetometer, VLF and time domain EM, Induced Polarization and resistivity surveys.

7. Map and sample accessible underground and surface workings.

8. Carry out hand trenching at selected sites identified by geochemical, geophysical or geological data in the showing area.

9. Carry out any necessary repairs and maintenance to the barge landing at the southwest end of Whitesail Lake, including the clearing of a safe helicopter landing area.

The technical program outlined above would be conducted over a duration of 6 weeks beginning with Task 1 during the week of July 10th. The proposed expenditure for the exploration program is included in Section 6.1 of this proposal.

3.2 PHASE I ENGINEERING PROGRAM

The details of this program will clearly depend upon the results of the geologic investigation. In order to obtain relevant engineering data from the investigation, close liaison will be maintained with the exploration team. The engineering data to be obtained at this time, will include preliminary estimates of ore body and wall rock criteria, as it pertains to:

- rock structural strength
- drillability
- blasting parameters
- tire and tool wear

Preliminary estimates of ground water characteristics should also be obtained. Collecting the above noted information at this stage saves the additional cost of drilling duplication later.

Additionally, specific engineering tasks will be completed.

1. Existing unloading dock at site - this dock is in derelict condition, it must be rehabilitated for Stage I use. A rehabilitation design will be completed, bid documents prepared and suitable local contractors selected to bid.

2. Old workings - these must be rehabilitated in order to provide underground drill locations and sampling points. These must be rehabilitated and made safe in terms of ventilation and support. At this point, i.e. site unseen, it is envisaged that a small crew with fan, pumps, compressor, jackhammers, small diesel L.H.D. unit, ventilation pipes, rock bolts, air/water hose would make safe, clean out any rockfalls and support as necessary.

3. Metallurgical sampling and lab testing to obtain definitive plant design criteria.

4. Site examinations to identify/confirm tailings and plant site locations.

5. Preliminary site and general area inspection for potential land access and site area roads.

The site has not been visited for the purposes of estimating engineering cost for this work. However, as a guideline, excluding the contractor cost of rehabilitation of dock and mine a basic allowance of $70,000 has been made for engineering. The contractor cost can only be guessed, and an allowance of approximately $50,000 has been made for the dock repair and basic mine rehabilitation.

It is understood that road improvement in the mine area proposed for budget alternative 1 will be undertaken by the Cat. 225 backhoe. The prime use of this unit will be exploration trenching.

Stage I equipment access will be via the Alcan barge, which will be rented from Alcan on a mutually acceptable basis. Personnel access will be by helicopter.

3.3 PHASE I ENVIRONMENTAL PROGRAM

3.3.1 Baseline Monitoring

Baseline monitoring will be conducted at the initiation of exploration and throughout this phase to provide a preliminary characterization of the existing environment at Lindquist Lake. This will provide a data base by which to assess potential effects of exploration and also to form the basis for an eventual environmental impact assessment should the project proceed to development. The parameters to be assessed will be water quality, fisheries, and potential for acid drainage from the deposit.

3.3.1.1 Water Quality

The principal water body at the exploration site is Lindquist Lake. The lake is fed by small streams and in turn has an outlet on its eastern side. Quarterly water quality sampling will commence as soon as exploration commences (estimated in July 1989). This will allow a maximum of two sample collections in 1989 while exploration crews are on site: July and late September or early October. The sites to be sampled are shown on Figure 3.1, and include Lindquist Lake, inflow streams draining the deposit at their mouths, and the outflow stream below Lindquist Lake. Samples will be analyzed for the parameters listed in Table 3-1 to the detection limits shown. A total of six sites will be sampled. Following years' exploration will commence earlier and will allow water quality sampling in spring, summer and fall. The program will be continued throughout the exploration phase.

3.3.1.2 Fisheries

Lindquist Lake is downslope from any potential development of mineralization at the property. Therefore fish populations in the lake could potentially be affected by development. Before development occurs it will he important to characterize the current fisheries resources in Lindquist Lake and streams of the area that might support fish either by provision of habitat or food.

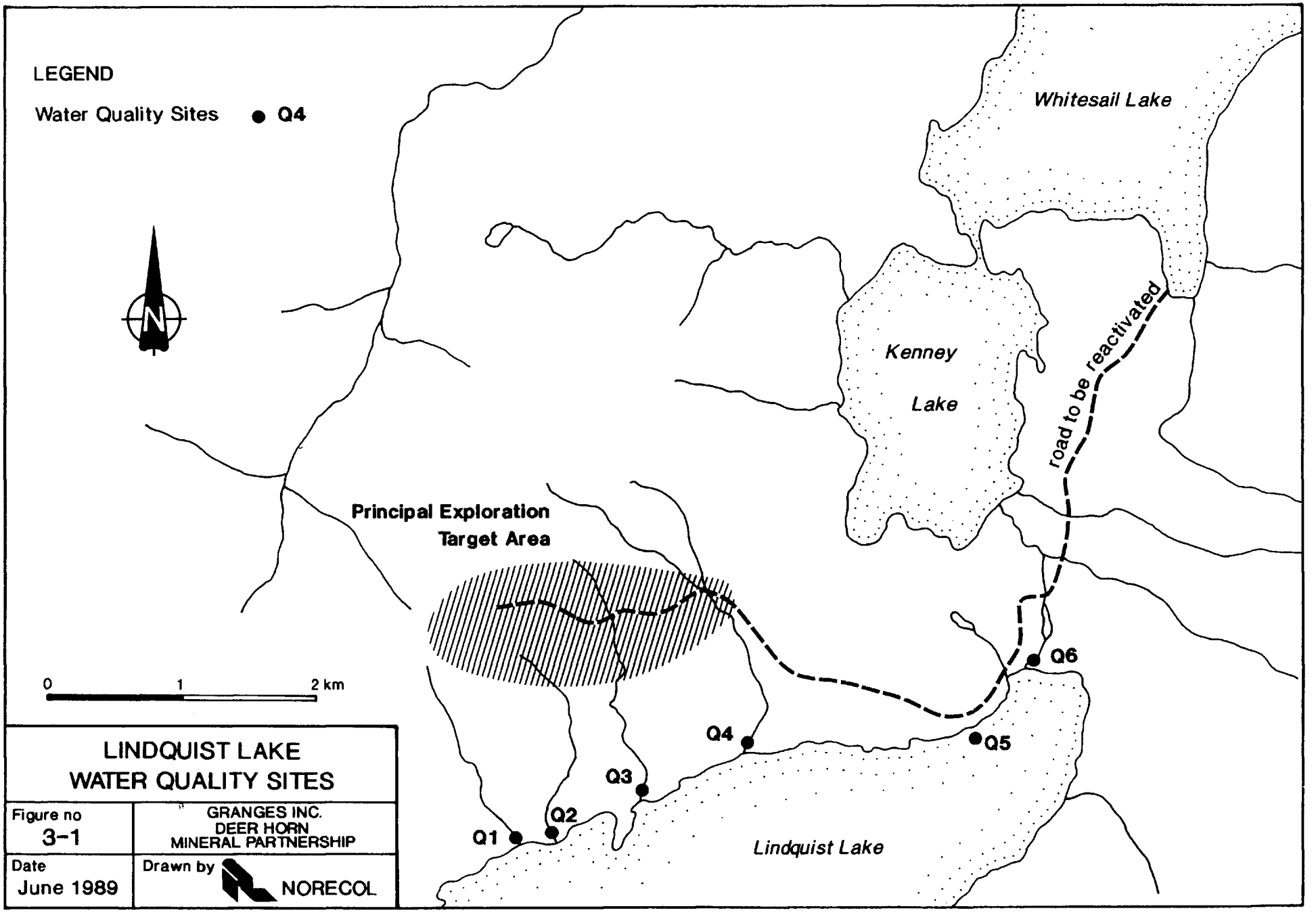

LEGEND
Water Quality Sites ● Q4
N
Whitesail Lake
Kenney
Lake
road to be reactivated
Principal Exploration
Target Area
Q1
Q2
Q3
Q4
Q5
Q6
Lindquist Lake
0
1
2 km
LINDQUIST LAKE
WATER QUALITY SITES
Figure no
3-1
GRANGES INC.
DEER HORN
MINERAL PARTNERSHIP
Date
June 1989
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TABLE 3-1

PROPOSED WATER QUALITY ANALYSIS PROGRAM

Characteristics	Detection Limits
Temperature	field
pH	lab
Total Solids	
Suspended Solids	1 mg/l
Turbidity	0.1 NTU
Specific Conductivity	1 umhos
Total Hardness	1 mg/l
Total Alkalinity	1 mg/l
Sulfate	1 mg/l
Nitrate	5 ug/l as N
Nitrite	2 ug/l as N
Ammonia	5 ug/l as N
Total phosphorus	3 ug/l as P
Dissolved phosphorus	3 ug/l as P
Total Cyanide	1 ug/l
Total Mercury	0.05 ug/l
Total and dissolved	
Aluminum	10 ug/l
Antimony	2 ug/l
Arsenic	1 ug/l
Barium	5 ug/l
Cadmium	0.2 ug/l
Calcium	0.1 mg/l
Cobalt	1 ug/l
Chromium	1 ug/l
Copper	0.5 ug/l
Iron	5 ug/l
Lead	1 ug/l
Magnesium	0.1 mg/l
Manganese	1 ug/l
Molybdenum	5 ug/l
Nickel	2 ug/l
Potassium	0.1 ug/l
Selenium	1 ug/l
Sodium	0.1 ug/l
Silver	0.2 ug/l
Zinc	0.5 ug/l

During the first year of exploration we propose a preliminary assessment of fish populations in Lindquist Lake to be obtained by means of capture and release methods. Inlet and outlet streams will be visually assessed for their potential to support fish populations. Further population studies and assessments of spawning, rearing and fish metal levels will be conducted as appropriate in subsequent years during the exploration and pre-development phases.

3.3.1.3 Acid Production Potential

The development of most ore bodies has the potential for release of acidic drainage to the environment. Part of the preliminary environmental assessment will be to assess the potential of mineralized areas of the Lindquist Lake deposit to generate acid.

Representative drill cores from mineralized and adjacent unmineralized zones of each lithology likely to be exploited will be assayed by the acid-base accounting method to determine potential to generate acid. This program will be undertaken at the end of the field season year one when exploration geologists are able to provide an unequivocal assessment of the geology of the mineralized zones, and once a sufficient store of drill core has been built up.

Failing production of adequately representative core from current drilling, old core from previous exploration activities will be assessed. Since weathering is likely to have altered both sulphides and carbonates present in old core, this is a less preferred strategy.

In addition to testing of materials from the mineralized zone, testing will be undertaken in the areas previously disturbed by mining. In particular, old waste piles will be sampled to see if acid generation is occurring.

3.3.2 Exploration Environmental Management

In order to minimize the environmental impact from exploration, activities will be planned and monitored to assure minimum impact. Planning and monitoring elements include

road rehabilitation, drill sites including any sumps for drilling fluids, trenches for exposing bedrock, camp construction, domestic sewage, and industrial waste.

3.3.2.1 Road Rehabilitation

The old tote road between the west end of Whitesail Lake and Lindquist Lake may be re-opened, if so it will be by means of a back hoe barged to the site, if the accelerated exploration program is adopted. The road width will be kept to a minimum and no windrows will be formed. All wood will be burned in a manner approved by the forest service and hanging trees will be removed from the right-of-way. Before final abandonment of the road the surface will be ripped and a grass seed mixture planted. In consultation with the Forest Service, native species or tree seedlings may be substituted.

3.3.2.2 Drill Sites, Sumps and Trenches

All drill sites in alpine areas will be accessed by helicopter and pads blasted. Pads in treed areas will be constructed with a back hoe and topsoil segregated. At these latter sites, sumps will also be dug with the back hoe to provide exfiltration for waste drilling water.

Trenches will only be dug where other means of bedrock exploration are not practical. They will be only be developed as much as necessary, will be dug with a back hoe and the topsoil segregated for reclamation.

3.3.2.3 Camp Reactivation

If possible the buildings presently on site will be used as part of the exploration camp. Failing that, tents will be used and completely removed at the end of the exploration phase. Disturbance at the camp site, in either case, will be mostly limited to currently disturbed areas.

3.3.2.4 Domestic Sewage

A small exploration camp will employ a standard outhouse construction similar to that used by Ministry of Parks. A large exploration camp (greater than 15 people) will employ a chemical toilet system that will result in a very small volume of waste being generated each year. Sanitary facility sites will be buried and seeded upon termination of the exploration program.

3.3.2.5 Industrial Waste

In a small camp, all burnable waste will be burned in a 205 litre (45 gallon) drum incinerator. In a larger camp (greater than 15 people) an incinerator of approved design will be used. Unburnable garbage will be buried on site or removed. The garbage pit area will be buried and reseeded upon termination of the exploration program.

3.3.3 Reclamation

Surface disturbance will be outlined specifically in the Notice of Work and Reclamation Plan. In general disturbances will be limited to existing disturbed areas. Drill sites in alpine areas will be reached by means of helicopter support. Drill pads will be blasted. On completion of drilling the areas will be reseeded with a grass mixture to arrest erosion and promote a rapid return to natural conditions.

Any trenches required for exploration will be constructed by means of a back hoe and the topsoil segregated. Upon completion of exploration, trenches will be backfilled and the topsoil replaced. Trenched areas will be reseeded with grass in alpine areas or as detailed below in other locations.

Other disturbed areas will be scarified to loosen the surface layer and seeded either with a grass-legume mixture, or on advise from the Forest Service, with native species or tree

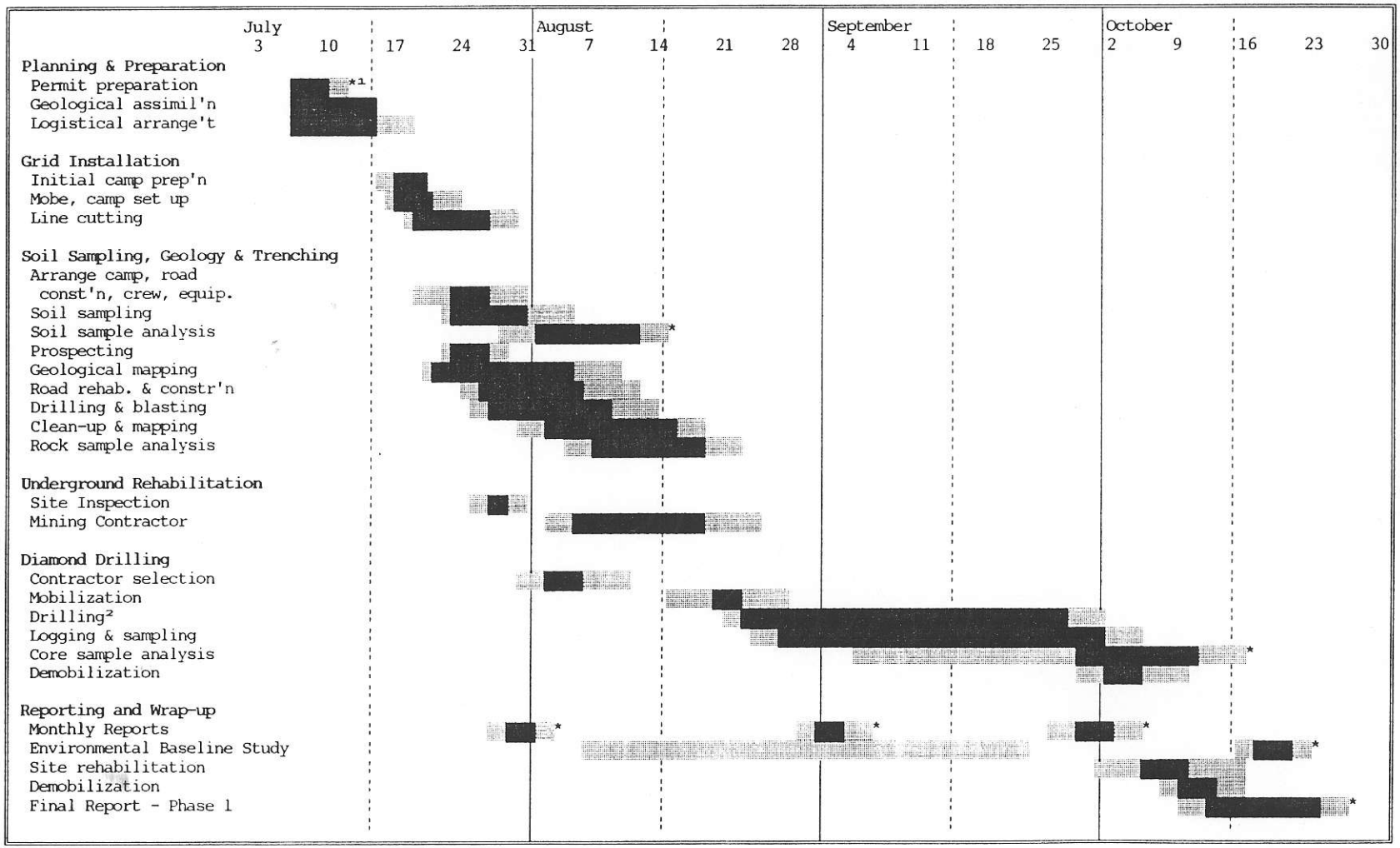
seedlings. Reclamation will be carried out in a progressive manner as disturbed areas are taken out of active exploration.

Table 3.2.1

1989 Exploration Schedule

Alternative 1 Proposal

The 1989 exploration under the Accelerated Program proposed for the Lindquist Lake Prospect is tentatively scheduled as follows:



* Report delivery (or assay report received from lab).

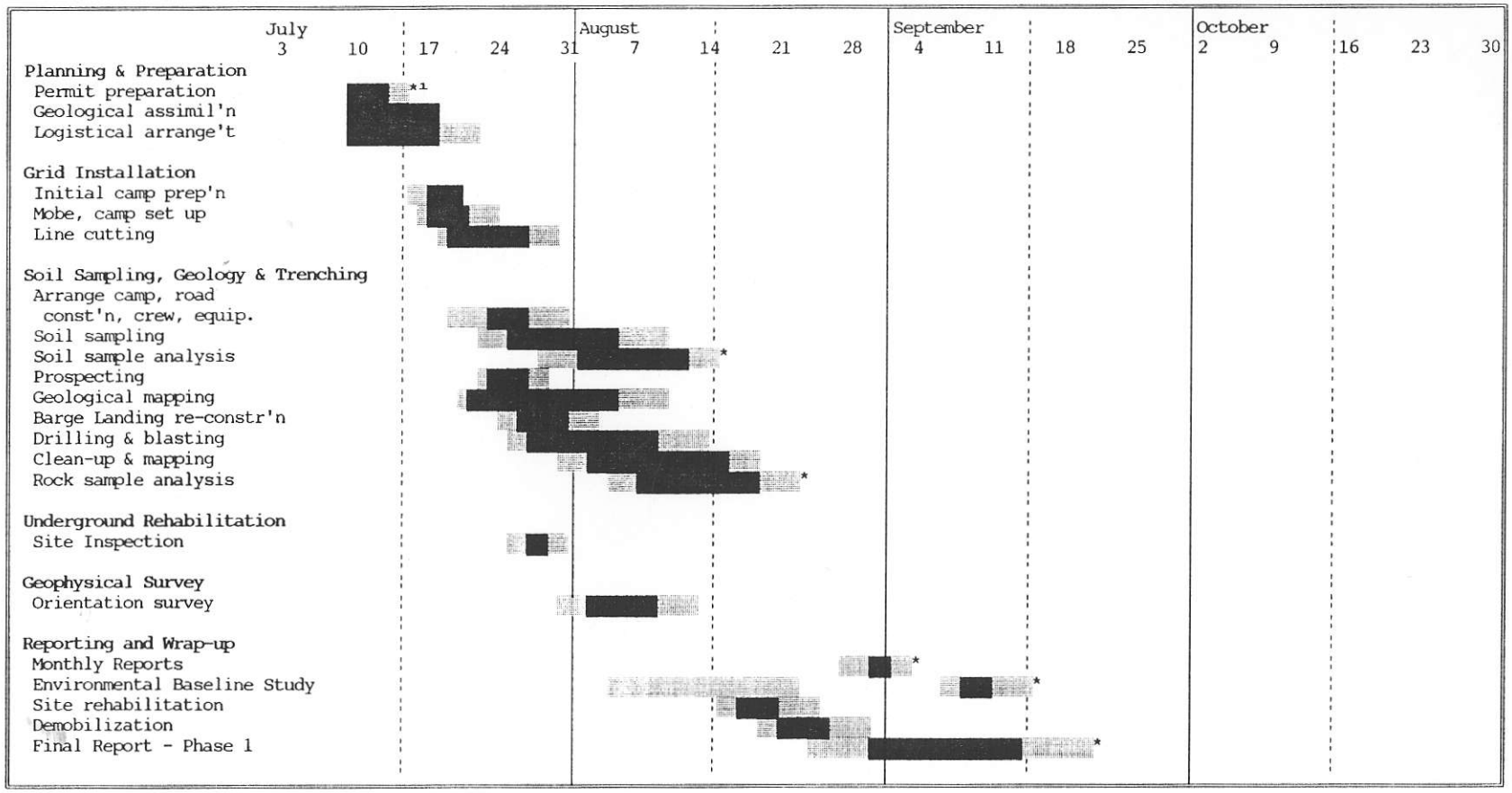
¹ Application approval received.
² Assumes two shifts/day @ 23 m/shift.

Table 3.2.2

1989 Exploration Schedule

Alternative 2 Proposal

The 1989 exploration under the **Low Impact Program** proposed for the Lindquist Lake Prospect is tentatively scheduled as follows:



* Report delivery (or assay report received from lab).

[1] Assumes Exploration Application approval received.

SECTION 4

CONCEPTUAL PLAN FOR RESOURCE RECOVERY

SECTION 4

CONCEPTUAL PLAN FOR RESOURCE RECOVERY

4.1 MINE SIZING AND MINING METHOD

At this time insufficient data is available to specify mining method and mine sizing. The information provided by the R.F.P. indicates a shallow vein type ore body of limited dimensions. A report by Stuart S. Holland of Dec. 1944 indicates a number of discontinuous quartz veins. The reserves noted in the R.F.P. are too small to justify a significant mine. If these reserves are expanded to 1.0 million tonnes, the potential exists for a small 500 tonne per day (tpd) mine/mill complex, with a life of 5 years.

However, geologic exploration of this widely mineralized group of claims may indicate a potential for a moderately large-scale open pit mine. It is not practicable to indicate potential sizing at this time. However, for the purposes of examining likely costs and the requirements for environmental protection a 5000 tpd operation has been considered.

In order to provide some indication of the order-of-magnitude of the costs of such mines it is noted that a 500 tpd open stoping mine, with a cyanided recovery method will probably have a direct operating cost of about $71.00/tonne, with a capital cost for the full complex of about $56.0 million. For a 5000 tonne per day open pit mine the approximate mine operating cost might be $1.68 per tonne moved, with a total operating cost of $21.00/tonne ore, based on a 3.0:1 strip ratio. The capital cost for the full complex for this size of mine might be about $112.00 million.

4.2 ACCESS

The conceptual access plan is based on cost efficiency and minimal environmental impact. Alternative options considered are:

- Road building
- Winter ice road and open lake barge
- Air access

A road currently runs from Houston to the Tahtsa Reach crossing. From here a relatively low cost tote road could be constructed to site. However this road will have some sections with steep switchbacks and will be subject to potential avalanche hazards. Such a road would not be usuable by fuel trucks nor by the 18,000 kg load semi's which would be required in construction. An all weather road with maximum 6% grades will be very costly to build, at perhaps $320,000 per kilometer. The new road will be in excess of 37 kilometers. Therefore, this option would only be justifiable if a major open pit ore body was discovered.

Information provided by Alcnn staff and weather information obtained have shown that a guaranteed winter ice road is not practicable for heavy transportation equipment. The lake is subjected to potential 3.0 m drawdowns and only 60 cm of natural ice is the general case. Accordingly, it is proposed that, for the small underground 500 tpd operating scenario, all major materials and supplies are barged in during the open lake season from May to mid-December. Adequate storage must be provided for operating supplies and particularly fuel oil to cover the period when open water access is not possible.

Personnel transportation in both production scenarios will be by air. For a small 500 tpd mine a 600 m by 50 m strip utilized by Twin Otters or equivalent is proposed. For a large 5000 tpd mine a 1500 m x 75 m strip for 737 and Hercules is suitable. As noted in the environmental impact review section of this report, site locations for minimal impact will be located. A number of potential 600 m strips are available. In the event that a 1500 m strip is required it must be concluded that a significant open pit has been identified. In such an event large amounts of waste rock will be available to facilitate strip construction.

4.3 RECOVERY AND GENERAL PLANT

The vein ore is reported to contain fine free gold with minor sulphides, scheelite and traces of tellurium mineralization. It is assumed that the ore will respond to straight cyanidation of the finely ground ore. A grind of 80% -74 micrometers is assumed for a recovery of 85%-90% of gold and 70%-80% of the silver. The site product will be dore bullion. Metallurgical testwork must be carried out to verify these assumptions and to address scheelite distribution and recovery.

Run-of-mine ore will be trucked to the selected mill site. The recovery process will consist of:

- Two stage crushing to -9 mm.
- Single stage grinding to 80% -74 micrometers in a cyanide circuit.
- Thickening pulp from 15% to 40% solids.
- Agitation cyanide leaching in tanks.
- Two stage filtration of the leached pulp.
- The relatively high silver content indicates Merrill Crowe precipitation.
- Cyanide destruction of effluent from the tailings pond prior to discharge to the environment.

Testwork during the exploration program will establish the viability of this circuit and allow for process options to be evaluated including semi-autogenous grinding instead of crushing and ball milling; carbon-in-pulp and carbon stripping rather than Merrill Crowe.

Power will be supplied by on-site diesel generation. The crew will be accommodated on site in trailer type bunkhouse units, and crew turnaround can be anticipated every 2 to 4 weeks. Operating and construction materials/supplies and construction and mine equipment will be barged in from Andrew Bay near Wisteria to a landing close to the mine site. Sufficient on-site storage will be required to cover the winter period when the lake is not usable. The barge loading and unloading docks must be designed for a variable water level.

In order to reduce road building and trucking costs to a minimum, the plant should be located as close to the mine as possible. Tailings lines should be as short as practicable. Detailed ground inspections and surveys will be required during the exploration stage, before plant site and tailings locations can be specifically identified. A number of sites occur within a 2 miles radius of the mine suitable for up to 1.0 million tonnes of tailings. See Figure 4.1, locations 1, 2, 3, 4. If it is necessary to move the plant site out of the park, location 5 is possible. However, this will impose a significant additional cost for ore transportation. The mine to plant road will involve some steep grades and will also require avalanche control measures.

In the event that a large open pit mine is identified, location 3 could also be utilized. However, more detailed ground stability and environmental studies will be required. It is presumed that the large open pit mine will produce significant rock quantities which will be available for main berm construction for the buildings pond.

LOC.5

LOC.4

LOC.3

LOC.2

LOC.1

PLANT SITE

TAILING

PARCEL "B"

KNOWN AVALANCH AREAS

XK1010 XK1210 XK1410 XK1610 XK1810

XK1014 XK1214 XK1414 XK1614 XK1814

XK1012 XK1212 XK1412 XK1612 XK1812

SIAS MOUNTAIN

ARETE MOUNTAIN

LINDQUIST PEAK

Mount Irma

Kenney Lake

Little Whitesail Reservoir

Nechako

Lindquist

Arels I

MACQUISH PASS

LINDQUIST PASS

TRIBE FARM LICENSE 41

WHITES

R A N G E

C H I K A

(COAST MOUNTAINS)

TOCHOUONAL

Icefield

Deer Horn Mineral Partnership Lindquist Lake		SITE LOCATION	
WRIGHT ENGINEERS LIMITED VANCOUVER CANADA	SCALE:	DRAWING No. B FIG. 4-1	REV.

SECTION 5

CONCEPTUAL PLAN FOR ENVIRONMENTAL PROTECTION

SECTION 5

CONCEPTUAL PLAN FOR ENVIRONMENTAL PROTECTION AND RECLAMATION DURING MINING

5.1 INTRODUCTION

This section is based entirely on a conceptual mine plan and is therefore essentially a guide to proposed future practices. Components to be addressed during mine planning include access, mine and mill water balances; waste management; fuel, explosives and reagent storage and handling; air quality; environmental management and mitigation; and reclamation during and after operation. Mine development will require the project entering the mine development review process and we expect that a Stage I report will be required at this stage, and in conjunction with permit applications, Stage II, detailed environmental management plans will be developed.

5.2 ACCESS

The access options have been discussed in Section 4.2. Environmental considerations of the most likely option will be dealt with in this section.

The access option most likely to be workable is a barge for bulk supplies and an air-strip for access and turn around for personnel and routine supplies.

A suitable air strip site would have to be surveyed. The best areas at lake elevation are within the Kemano flood reserve and are therefore unavailable. For a small underground operation a 600 m strip will be required and for the larger open-pit scenario a 1500 m strip will have to be built.

Access to the barge landing would be via the old road from the west end of Whitesail Lake. This road would require upgrading to a Class 5 Forest Road (10 m width, 5% grade).

5.3 WATER BALANCE

A water balance will be required for the components of the mining operation in order to manage water use for mine and mill and tailings pond and to manage impacts from waste water.

5.3.1 Underground Mine Scenario

The sources of water influx to the underground operation include the following:

- groundwater seepage;
- surface water intentionally pumped underground for drilling; and
- the release of water stored in the bedrock fractures inside the underground excavations.

Estimates of water influx to the underground workings will be determined prior to mine construction. A hydrogeological assessment of the ore body will be required before mining if groundwater flows are found to be significant during underground exploration. An assessment of the modification of the groundwater flow system will need to be established in order to predict the groundwater component of mine water.

5.3.2 Open Pit(s) Scenario

The sources of water influx to the open pit(s) include the following:

- precipitation within the pit limits;

- groundwater seepage from the pit walls; and

- the release of water stored in the bedrock fractures inside the pit limits.

Ditches will divert surface runoff and a substantial quantity of overburden seepage around the perimeter of the open pit(s).

Estimates of water influx to the pit(s) will be determined prior to mine construction. Water influx to the pit(s) due to precipitation depends on the catchment size of the pit and on the rate of precipitation.

A hydrogeological assessment of the pit area(s) will be required before mining. An assessment of the modification of the groundwater flow system will need to be established in order to predict the groundwater component of pit water.

5.3.3 Waste Dumps and Ore Stockpile

An underground operation with about 1.0 million tonnes of reserves will typically produce a relatively small waste dump. An estimated 100,000 t of waste rock might be produced by mining. Much of the waste rock can be stored underground as stope fill and for other uses. The remainder could be used for pads and road surfaces if non acid generating. If the waste rock does produce acid, then waste management of acid generation becomes a special consideration that must be planned for from the earliest stages.

A larger 5000 tpd open pit operation could produce a relatively large waste dump depending on the strip ratio. If waste rock does produce acid, then water management becomes an even larger component of the mine operation.

The sources of water entering the waste dump(s) and ore stockpile include the following:

- precipitation;
- groundwater seepage, if the dump(s) is located in a groundwater discharge area; and
- water held in retention.

Diversion ditches upslope of the dump will divert surface runoff around the piles. Diversion ditches will be designed to convey water based on an appropriate interval return storm.

Water which does not drain out of the waste rock or ore, but is held in retention, will not make up a large quantity of water. Some retained water will, with time, likely drain from the dumps and ore stockpile.

Water from rock storage piles will be stored in sedimentation ponds long enough for settling to occur and then the water will be discharged to natural drainage courses, if not acidic.

Acidic drainage water from ore stockpiles or waste dumps will be directed to the tailings pond for treatment.

5.3.4 Mill and Tailings Pond Water Balance

The water requirements for the mill the amount of recycling of tailings water that can be accommodated by the mill circuit will drive the water balance for the process plant and tailings pond. In addition the surface area of the tailings pond and excess of precipitation over evaporation on a seasonal basis will be important factors in the design of the tailings facility.

The potential for tailings to produce acid will largely determine how tailings are handled and reclaimed. These parameters will require investigation as the mine plan progresses.

The majority of drainage from the surrounding land will be diverted around the tailings pond. Rates of seepage through the embankment will need to be low, but must be determined, during the design phases. A seepage pond below the embankment will be installed to intercept seepage, which will be pumped back to the tailings pond. Subsurface seepage from the tailings pond will also need to be calculated during the design phase. An important component of tailings site selection is the impermeability of the area the impoundment is located.

Discharge of tailings supernatant water will have to be assessed based on the economic necessity to do so, the ability of the environment to absorb the effluent without sustaining harm and the potential for acidic drainage. The major concern at this site would be to prevent impact on the aquatic environment.

5.4 WASTE MANAGEMENT

Components of waste management include waste rock disposal, tailings disposal and domestic and industrial wastes.

5.4.1 Mine Workings, Waste Rock Dumps and Ore Stockpile

In the open pit operation scenario the volume of rock will depend on a number of factors, principal of which is the stripping ratio required to remove the ore. Information to define the amount of waste rock is not available at this time and therefore even preliminary site selection is not possible. Given the topography of the area, some form of side casting is economically attractive. The environmental and visual impact of any disposal concept will require close examination, however.

Drainage from the underground workings or surface open pits, the waste rock and the ore stockpiles could affect surface water quality, depending on the acid generation potential

of the rock. Drainage from acid generating rock is typically low in pH with elevated metals concentrations.

Acid-base accounting tests will be required on representative samples of ore and waste rock from the project area to assess potential acid generation.

Clean water ditches will direct water around dumps and stockpiles while the mine is in operation. Water draining these structures and from underground workings will be directed through sedimentation ponds if acid generation is not a problem and to the tailings pond or an acid treatment pond if it is. If acid generation is a problem all permanent structures such as waste rock dumps and the tailings impoundment will be reclaimed so as to prevent acid generation in perpetuity.

In the case of the open pit scenario, the chemical composition of the pit water will depend on the composition of waters from three different sources: precipitation, groundwater seepage and water releases from storage. Over the course of the year, precipitation will form the majority of the pit discharge; however, during dry spells, the high mineral content of the stored ore zone water may cause the mine discharge water to have high concentrations of iron, manganese, aluminum and possibly barium. Metals concentrations in the pit drainage will depend on the occurrence of acid generation and associated leaching of metals.

Migration of contaminated water from the pits is not viewed as a potential problem. The pits will be drained during normal operations and induced groundwater seepage into the pits should prevent migration of contamination away from the pits. Following mine closure, pits could be flooded to the natural groundwater level if acid generation is likely to be a problem.

Groundwater quality monitoring sites will be established down gradient of the waste dump(s). It is likely that filtration will occur with groundwater seepage, thereby further lessening the potential for impacts.

5.4.2 Tailings

The components of tailings waste management include site selection of the tailings pond, water management, seepage management and detoxification through natural or chemical means.

Preliminary tailings site selection is discussed in section 4.0. Site selection is governed by geotechnical, environmental and economic factors. For this project two areas were examined: inside and outside of the Tweedsmuir Park boundaries. Geotechnical investigations required will include test pits, seismic bedrock profile determinations, boreholes, penetration testing and groundwater drawdown determination. The environmental constraints to be evaluated include water management considerations and assessment of significant environmental risks. Before tailings pond design can be completed background water quality and flow data will have to be obtained for the affected streams.

Site selection will involve detailed aerial stereoscopic mapping at at scale of 1:5000 or larger. This will be followed by a ground reconnaissance. The selection process for potential sites will be based on the aerial stereoscopic maps and ground studies after consideration of existing and future tailings requirements, groundwater and surface water inflow to the impoundment area, potential environmental impact and proximity to the mine and mill. A special consideration for this project is the desirability of siting the tailings facility outside of Tweedsmuir Park.

Seepage from the tailings pond to groundwater will need to be estimated as part of site engineering. Potentially acid generating tailings would possibly require a sealed pond to prevent groundwater contamination. Because cyanided tailings will be likely, the tailings impoundment will have to be relatively impervious to prevent impact on groundwater.

If it is feasible to discharge tailings supernatant water, the main concerns would be the potential increases in metals and cyanide levels in the streams flowing to Little Whitesail

Lake. Mass balance calculations would be required based on assays of detoxified tailings from bench or pilot scale studies and water balances obtained from site hydrological studies.

5.4.3 Sewage

Sewage generated at the plant and camp facilities will require collection and treatment in a biological treatment plant and dispersion in a tile field. Sewage flows will approximately equal the potable water requirements for the site. Consumption of water is usually rated at 295 litres per person per day. A treatment plant capable of handling peak person capacities expected will be required.

5.4.4 Refuse Disposal

A Waste Management Branch Permit will be required for the disposal of industrial and putreucible refuse originating from the mine and camp operations.

In accordance with permit requirements, putreucible and other burnable wastes will be incinerated daily in order to minimize attraction of nuisance wildlife and reduce refuse volumes.

Industrial refuse and non-burnable wastes will be disposed of daily in metal containers placed around the mill and camp and at the pit sites. These wastes will be collected weekly and trucked to a landfill site on the property. The landfill site will consist of till or moraine material and will be well isolated from surface drainage courses. Before completion of mining, industrial refuse will be removed from site if a suitable permanent landfill is not available.

5.4.5 Spill Contingency and Toxic Chemicals Handling

Contingency plans for controlling spills and handling toxic chemicals on an overall site scale will be developed during the feasibility stage of mine planning.

Diesel fuel and propane will be stored in a bermed tank farm capable of containing 125% of the largest container. The berm will be lined with poly liner to prevent seepage of any spills to the environment.

Reagents will be stored in the mill area in a controlled space where any spills will be routed toward the mill and thus escape prevented. Normal precautions will be used in transportation, storage and handling of reagents and fuels.

5.4.6 Dust and Air Quality Control

Air emissions from the project site will comply with air quality criteria established in consultation with Ministry of Environment. The major sources of particulate matter (rock dust) will originate with drilling and blasting associated with haul road construction and with ore crushing. Dust on mine site roads can be minimized by sprinkling during hot dry weather.

Power plant diesel exhaust will be vented to the atmosphere, and the mill building will be equipped with roof fans and vents.

5.5 ENVIRONMENTAL MANAGEMENT

Environmental management consists of measures to mitigate identified potential impacts on the environment. The most important components of the natural environment in the Lindquist Lake area likely to receive on going impacts and not dealt with under waste and water management are fisheries and wildlife, especially large mammal populations.

5.5.1 Fish

Streams draining the deposit have a steep gradient and are unlikely to support fish. Therefore no loss of fish habitat is expected from mine development. The main fisheries concern is the potential effect of mine developments on receiving water quality. If Ministry of Environment Receiving Environment criteria are met in Lindquist and Little Whitesail lakes, fish

populations that may be in the lake are unlikely to be negatively impacted from degradation in water quality. The greatest impact is likely to come from increased fishing pressure due to people being in the area.

5.5.2 Wildlife

Ungulates, or hoofed animals, likely to be in the area are mountain goats and perhaps caribou at higher elevations and moose at lower elevations. Both direct disturbance of critical winter habitat and hunting pressure are possible impacts. Surveys to outline critical habitat, mineral licks, lambing and calving areas and so forth would be carried out as part of mine planning. Policy on hunting would be discussed with Fish and Wildlife Branch officials--a no hunting policy would be possible.

Grizzly bears may also inhabit the area. Because of the very large territories of grizzly bear relative to the disturbance caused by the mine, at most one bear would be disturbed by mining. Development would probably result in the general avoidance of the area by grizzly bears unless attracted by improper disposal of garbage.

A few black bears may also inhabit the area and might become a nuisance if attracted by food. Wildlife surveys of the project area will identify its use by carnivores. This will allow appropriate management plans to be developed in consultation with Fish and Wildlife Branch.

5.6 RESOURCE USE

Potential resource uses for the Lindquist Lake area are recreation and guiding. The amount of competing use would be determined as part of mine pre-planning.

5.7 HERITAGE RESOURCES

A heritage study would be conducted as part of mine pre-planning to determine if any evidence of non European use are present in the area. As a considerable amount of disturbance has taken place historically any such evidence may already have been inadvertently removed.

5.8 CONCEPTUAL RECLAMATION PLAN

Ground disturbance associated with the Lindquist Lake project will result from development of the mine and mill sites and infrastructure, from the access tote road, the airstrip and from necessary upgrading of the tote road from Whitesail Lake to the mine site.

5.8.1 Reclamation Objectives

The reclamation objectives for the project will be to quickly and effectively stabilize the disturbed areas to control soil erosion and to restore the area to wildlife habitat. The objectives can be met through five specific goals:

- to establish immediate soil erosion control;
- to establish a vegetation cover for wildlife use during and after mining activity;
- to provide for natural vegetation cover on exposed sites;
- to restore the mine site to a safe and reasonably appealing appearance after operations have ceased; and
- to achieve the reclamation objectives in an environmentally sound, practical and cost-effective manner.

5.8.2 Reclamation Sequence

The reclamation plan will be integrated with the mine development plans and considered an integral part of the mining operation. It will start with sequential reclamation of disturbed areas during construction followed by operational level reclamation trials, to determine the most effective and practical reclamation abandonment plan.

During the construction of the airstrip, upgrade of the road from the barge landing and construction phase of mine operation, reclamation operations will be directed towards incorporating erosion control structures. Diversion ditches, sediment ponds and culvert installation will be constructed before site disturbance takes place in order to prevent siltation of natural water bodies. Following construction, final site grooming of the disturbed sites will be carried out to aid in revegetation. Where practical, disturbed sites will be immediately revegetated with a site specific prescription of seed mix, fertilizer type and application rate. Selection of the appropriate seed mix and application rate will depend upon a number of site factors such as soil type, moisture regime, elevation, aspect and slope.

Ongoing operational maintenance schedules will include annual spot seeding and fertilizing, if necessary, of previously revegetated areas. The maintenance program will also ensure proper operation of the erosion control structures. This would include removing sediment from ditches, culverts, impoundments and general maintenance and repair of the system.

For the open pit scenario reclamation activities will be kept current with mining operations. Sequential with the pits becoming mined out, final reclamation of the pit infrastructure (haul roads, waste dumps,etc.) will progress as these areas become available.

An important component of the reclamation plan during the mines' operations will be to validate the success of plant growth and reclamation techniques. Operational level reclamation trials will be initiated in the areas of pit development, particularly on areas in the subalpine and alpine with high wind exposure. Species composition, site preparation, seeding time and soil amendments will be recorded on the reclamation trials. The plots will be monitored

in subsequent years and the information and experience gained from these operational trials will guide reclamation activities in subsequent years and assist in determining the most effective reclamation abandonment plan.

5.8.3 Revegetation Objective

The revegetation objective is aimed at restoring the disturbed land to productive wildlife and recreation use. Normally waste rock dumps are not practical to reclaim and may reduce local wildlife habitat capability. However waste rock dumps provide wildlife habitats in the form of den sites and food caches for small mammals, such as marmots and ground squirrels and perching sites for birds. They are not unlike natural talus slopes in this regard.

The reclamation requirements for the tailings pond will depend upon whether tailings have the potential to be acid generating or not. If not acid generating the surface can be returned to natural vegetation cover. If acid generating a wetland or permanent water surface will be required to isolate tailings permanently from oxygen which will allow acid generation to occur. Tailings embankments will be revegetated in either case.

The mine roads and access roads will be ripped, regraded to natural slope and planted, either with a grass-legume mixture, native species, or tree seedlings as appropriate and practical.

SECTION 6

FINANCIAL PROPOSAL

SECTION 6

FINANCIAL PROPOSAL

6.1 PHASE 1 BUDGET

Two alternative Phase I Exploration budgets are presented, with each intended as a separate proposal. Alternative 1 represents a comprehensive exploration program designed to provide a thorough assessment of both existing and new geological information on the Lindquist Lake prospect within the first year of operation. Alternative 2, on the other hand, proposes a somewhat less aggressive approach to exploration with virtually no new surface disturbance and minimal environmental impact.

6.1.1 Alternative 1

Table 6.1.1 summarizes proposed expenditures under the comprehensive Alternative 1 Exploration Program. A tentative breakdown of the exploration budget is presented in Appendix II.

6.1.2 Alternative 2

Table 6.1.2 summarizes proposed expenditures under the "Low Impact" Alternative 2 Exploration Program. A detailed cost estimate for this proposal is included in Appendix III.

Table 6.1.1

PROPOSED BUDGET - YEAR 1
FOR PARCEL B
Alternative 1 — Accelerated Program

1.	Geological Surveys, Map & Report Preparation & Related Costs		$76,880
2.	Geophysical Surveys (line-kilometers) Ground Magnetic Electromagnetic Induced Polarization Radiometric Seismic Other Airborne		$0
3.	Geochemical Surveys (no. of samples analysed for Au, Ag, 32-element ICP) Soil ≈ 600 samples Silt ≈ 50 samples Rock ≈ 600 samples Other misc. assays / shipping	$9,540 $890 $11,550 $4,345	
		$26,325	$26,325
4.	Drilling Surface 1500 m @ $141/m (incl. transp,mobe,etc) Underground 0 m @ =	$211,835 $0	
		$211,835	$211,835
5.	Related Technical Studies Sampling/Assaying (see "assaying") Petrographic (included in "mineralogic") Mineralogic Metallurgic	 $4,950 $0	
		$4,950	$4,950
6.	Preparatory/Physical Line/Grid (kilometers) 18.6 line-km Trenching (linear metres) ≈ 200 m (re-access) Camp Support/Logistics	$21,300 $13,365 $144,720	
		$179,385	$179,385
7.	Tunnelling, Drifting, Other Lateral Excavation (Rehabilitation of old workings)		$28,820
8.	Other Exploration Development Costs (attach detailed schedules) Environmental Baseline Study Road Rehabilitation / Access Investigation	$27,060 $39,380	
		$66,440	$66,440
	TOTAL EXPENDITURES		$594,635

Table 6.1.2

PROPOSED BUDGET - YEAR 1
FOR PARCEL B
Alternative 2 -- Low Impact Program

1. Geological Surveys, Map & Report Preparation & Related Costs			$31,367
2. Geophysical Surveys (line-kilometers)			
Ground			
Magnetic	10 line-km		
Electromagnetic	10 line-km combined	$7,233	
Induced Polarization	10 line-km		
Radiometric			
Seismic			
Other			
Airborne			
		$7,233	$7,233
3. Geochemical Surveys (no. of samples analysed for Au, Ag, 32-element ICP)			
Soil	± 600 samples	$9,540	
Silt	± 50 samples	$893	
Rock	± 100 samples	$2,558	
Other	detailed assays / shipping	$866	
		$13,857	$13,857
4. Drilling			
Surface	0 m @ =		
Underground	0 m @ =		
5. Related Technical Studies			
Sampling/Assaying			
Petrographic			
Mineralogic		$2,475	
Metallurgic			
		$2,475	$2,475
6. Preparatory/Physical			
Line/Grid (kilometers)	18.6 line-km	$7,541	
Trenching (linear metres)	200 m (re-access)	$2,255	
Logistics/Support		$101,452	
		$111,248	$111,248
7. Tunnelling, Drifting, Other Lateral Excavation			
Access Investigation		$2,640	$2,640
8. Other Exploration Development Costs (attach detailed schedules)			
Environmental Baseline Study		$23,100	
		$23,100	$23,100
TOTAL EXPENDITURES			$191,919

6.2 SUMMARY OF ANNUAL EXPENDITURES - 1989 TO 1991

Contingent upon favourable results from the 1989 Phase I Exploration Program, work during succeeding years would proceed with the objectives of delineating further ore reserves. The level of exploration effort will be dependent largely upon the approach to the first year's exploration expenditures. In the event that the Alternative 1 program is acceptable, 1990 would see a continued program of diamond drilling, and further development of underground workings. Information obtained from the 1989 program would be used to determine whether exploration emphasis should be placed on the vein zones, the "silified zones", or both areas.

Should the "Low Impact" (Alternative 2) exploration approach be adopted, the 1990 program would comprise follow-up drilling, and underground workings rehabilitation. The program would be similar in scope to that currently envisioned under the Alternative 1 program.

If warranted, the third season of exploration would see a program designed to accurately delineate ore reserves. By this stage, both programs would be virtually identical in scope, with expenditures totalling approximately $3 million over the course of three years. Should continued exploration development be warranted, on-going exploration would be designed to develop sufficient ore reserves to lead to a feasibility study.

Table 6.2.1 summarizes approximate expenditures during the early phases of development at the Lindquist Lake prospect:

Table 6.2.1

Year	Exploration Objectives	Approximate Expenditure
1989	Alternative 1 -- evaluate new geologic information	$600,000
	or	
	Alternative 2 -- assess existing data in contemporary context	$200,000
1990	Alternative 1 -- continue aggressive drilling to identify further reserves	$1,000,000
	or	
	Alternative 2 -- initiate drilling and rehabilitation of old workings	$800,000
1991	Both programs -- continue ore reserve drilling; possible exploration elsewhere on parcel	$1,400,000 to $2,000,000
	3 year Total Approx.	$3,000,000

6.3 SOURCE OF FUNDING

Funding of the exploration costs of the Lindquist Lake proposal will initially come from Granges Inc.'s flowthrough share funded cash reserves, currently estimated at $20,000,000. Subsequent funding of exploration and development costs, if warranted, may come from any combination of internal cash reserves, equity financing and/or debt financing.

Refer to Appendix I for corporate and financial information.

SECTION 7

UNDERTAKINGS

SECTION 7

UNDERTAKINGS

7.1 COMMITMENT TO PROVIDE ASSESSMENT REPORTS, SUMMARIES OF EXPENDITURES AND FUTURE EXPLORATION, DEVELOPMENT AND RECLAMATION PLANS

In accordance with Section 9 of the proposal format included with the Call For Proposals dated April 19, 1989, the proponents hereby commit to provide the following on an annual basis before the anniversary date of the claims:

A. Two copies of a report in the form of an assessment report giving a full and complete description of all exploration, development, and reclamation work carried out, the geological results and the interpretations.

B. A detailed listing of expenditures made for the year.

C. A detailed plan of exploration, development and reclamation for the following year.

7.2 COMMITMENT TO PROVIDE QUARTERLY PROGRESS REPORTS

The proponents hereby commit to provide quarterly progress reports on the project to the Ministry of Energy, Mines and Petroleum Resources. The reports will include summaries of work completed and expenditures made during the quarter.

REFERENCES

REFERENCES

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APPENDIX I

CORPORATE PROFILE

PROPONENT'S CORPORATE FINANCIAL BACKGROUND

The Granges Inc./Deer Horn Mineral Partnership (DHMP) Joint Venture was formed in 1989 in order to respond to the Call for Proposals of the B.C. Government for the exploration and development of the mineral resources located at Lindquist Lake, B.C. ("Parcel B").

The Joint Venture proposes to conduct exploration studies and, if warranted, the development of an appropriate mining operation at this site.

Granges Inc.'s contribution to the Joint Venture will be mostly technical, operating and financial expertise (see Granges 1988 Annual Report). DHMP will contribute mainly the extensive land position it has acquired adjoining "Parcel B" and extensive published and unpublished information it has obtained in the course of prior research.

Granges Inc. will be the operator of the Joint Venture.

GRANGES INC.

Granges Inc., formerly Granges Exploration Ltd., is a young Vancouver, B.C. based organization. It is headed by an experienced technical and financial team which has successfully transformed Granges Inc. from an exploration company to a profitable operating mining group. Granges Inc. holds major interests in five precious and base metal mines in Canada and the U.S. Granges holds interest in over 110 mineral properties currently at the exploration stage. As of December 1988 the company employed 345 employees.

Granges Inc. has been exploring in British Columbia since 1971. The total exploration expenditures within the province to date have been approximately 15 million dollars. Granges has located two noteworthy deposits, i.e. Capoose Lake (bulk silver-gold deposit) and Windflower (underground gold-silver deposit) and numerous other zones.

Granges has built roads, established camps and developed underground exploration programs using the government environmental regulations.

During the 18 years of operations there have been no significant environmental issues raised by any government or private environmental agencies as to our mode of operation.

The following sets forth the principal occupations of the directors and officers of Granges during the past five years:

M. Normal Anderson is a consultant and corporate director and is a principal of Anderson, Gessler & Schwab Inc., management consultants. Prior to October 1986 he was Chairman and Chief Executive Officer of Cominco Ltd. He is a director of Gulf Canada Resources Inc., G.W. Utilities Limited, Asamera Minerals Inc., Pegasus Gold Corporation, Corona Corporation and Solv-Ex Corporation.

Tryggve Angel has been a director and the Chairman of the board of directors of Granges since its organization in May 1984. Mr. Angel was senior Vice President of Granges AB, a Swedish industrial company, from January 1984 to his retirement in October 1986. From 1963 until January 1984 he was the President of Granges International Mining, a divisions of Granges AB.

Carlo G. Civelli has been a director and the Vice President of Finance, Europe, of Granges since its organization in May 1984, a director of Hycroft since July 1987 and Vice President of Breakwater Resources Ltd. ("Breakwater") since July 1982. Mr. Civelli has been an international financial consultant with Clarion Finanz AG, an investment management company based in Zurich, Switzerland, since 1980. He is also a director of Goldbelt.

Robert A. Donaldson, Q.C. has been a partner of Blake, Cassels & Graydon, Barristers and Solicitors for more than five years.

Martin S. Dorey has been a director of Granges since its organization in May 1984. Mr. Dorey has been a financial consultant to Yorkton Securities Inc. in London since January 1984. From 1979 to January 1984, he was a consultant to A.J. Bekhor & Co., stockbrokers, of London. He is also a director of Goldbelt.

Kenneth Dredge has been Executive General Manager - Mount Isa Operations of MIM Holdings Limited since September 1986. From April 1983 until September 1986 he was General Manager - Personnel of M.I.M. Holdings Limited.

Colin F. Kaiser has been Executive General Manager - Exploration and Gold Operations of M.I.M. Holdings Limited since January 1987. He was General Manager and a director of Carpentaria Exploration Company Pty. Ltd. from 1984 until 1987. He is a director of Teck Corporation and Chairman of the M.I.M. Holdings Limited Group's Boards of Management for Group Exploration, and for Gold Operations.

Kenneth E. Mathews is a consulting mining engineer and is a principal of Mathews & Associates Engineering, mining and geotechnical engineering consultants. He is an Adjunct Professor at the University of British Columbia. From 1978 to January 1989 he was a senior principal and a principal mining engineer of Golder Associates, Consulting Geologists and Mining Engineers.

Douglas E. McRae has been a director and Senior Vice President and Chief Financial Officer of Granges since its organization in May 1984, a director of Hycroft since July 1985 and President and Chief Financial Officer of Hycroft since July 1987. Mr. McRae is responsible for corporate and financial planning for Granges. Mr. McRae has been President of Macrim Investment Corporation, a private investment corporation since 1980, Vice President and a director of Breakwater, a British Columbia publicly traded mining company, since July 1982; and a director and President of Goldbelt since 1982. He also is a director of Nelson Holdings International Ltd., a publicly traded holding company with interests in various entertainment industry entities.

Mike Muzylowski has been a director and the President and Chief Executive Officer of Granges since its organization in May 1984. Mr. Muzylowski has been a director of Hycroft since July 1985 and has been Chairman and Chief Executive Officer of that company since July 1987. He is a geologist and graduate of the University of Manitoba and has been involved in mineral exploration in Canada since 1955. From 1955 to 1970 he was employed by Hudson Bay Mining and Smelting Co. Ltd. ("Hudson Bay") and was a key member of the team involved in the discovery of eleven ore deposits which were placed into production during that time. He was General Manager of Granges Exploration AB ("Gexab"), a subsidiary of Granges AB from 1970 to 1984 and was responsible for all operations of Gexab in Canada (including the discovery of the Trout Lake Mine in 1976) and the organization, management and overseeing of all administrative and technical aspects of that company's activities.

Peter Walton is a chartered accountant and has been a self employed business consultant since 1978. He has been a director of the Hong Kong Bank of Canada since 1987.

Michael Zurowski has been a director of Granges since its organization in May 1984. Mr. Zurowski is a geological engineer, and has been a Vice President of Conwest Exploration Company, a natural resource company, since 1963.

George W. Zbitnoff has been the Vice President Exploration of Granges since its organization in May 1984. From 1971 until May 1984, Mr. Zbitnoff was the Assistant General Manager of Gexab. Mr. Zbitnoff is a professional engineer, geology, and a graduate of the University of Saskatchewan. Prior to joining Gexab, Mr. Zbitnoff was a geologist employed by Hudson Bay and subsequently by Noranda Exploration Company Ltd., in which latter capacity he was responsible for initiating and directing all of that company's mineral exploration activities in the provinces of Manitoba and Saskatchewan.

Gustav Hoberstorfer has been the Vice President of Operations of Granges since January 1987. Prior to January 1987 and for a period of more than five years, he was a self-employed consulting mining engineer and in that capacity provided certain consulting services to

Granges from July 1984 to December 1986, for the most part relating to the design of the Tartan Mine.

Robert J. (Don) MacDonald became Vice President of Finance in September 1987, and Vice President of Finance and Treasurer in November 1988. Mr. MacDonald was the Vice President Administration and Controller of Granges from its organization in May 1984 until September 1987. From June 1983 to May 1984, Mr. MacDonald was the controller of Breakwater. He is chartered accountant and a graduate in engineering from Oxford University. He is also a director and officer of Goldbelt and an officer of Hycroft.

Sheila M. Roberts has been the Secretary of Granges since its organization in May 1984 and is an officer of Hycroft. From 1975 until May, 1984, Ms. Roberts was the Secretary and Controller of Gexab.

DEER HORN MINERAL PARTNERSHIP

The Deer Horn Mineral Partnership is an association formed in early 1989 whose objective has been to acquire, explore and develop and mineral resources located at Lindquist Lake, B.C. It is headed by:

Scott Gifford - a self-employed prospector and businessman who has been the President, since 1986, of Mountainside Management Ltd., an exploration contracting firm. In 1983 he also became a part-owner of Shangri-La Minerals Ltd. He has worked extensively in B.C. and the Yukon where he has overseen several mineral exploration programs and related activities.

Michael Renning - a self-employed prospector and field technician who has been involved in various capacities in the mineral exploration industry since 1981. He has worked throughout Canada with several major mining and exploration companies. Since 1987 he has been President of Amber Minerals Ltd., a private exploration firm. He has been actively involved in numerous mineral exploration programs and has occasionally participated in reclamation activities.

APPENDIX II

SYNOPSIS OF PERSONNEL PREPARING SUBMISSION

NEVIN SADLIER-BROWN GOODBRAND LTD.
PERSONNEL PROFILE

Timothy L. Sadlier-Brown - is a consulting exploration geologist and the President of the consulting firm of Nevin Sadlier-Brown Goodbrand Ltd.

Mr. Sadlier-Brown was educated at Carleton University, Ottawa, Ontario (BSc. Geological Sciences). As an undergraduate he worked with the Geological Survey of Canada in the Northwest Territories and northern British Columbia, and with Hollinger Consolidated Gold Mines, MacIntyre Porcupine Mines and Southwest Potash Corp. in northern Ontario, Quebec and British Columbia. He was subsequently employed as a field geologist and project manager by Mt. Costigan Mines Ltd. in Nova Scotia and moved to western Canada in 1966.

Between 1966 and 1968, Mr. Sadlier-Brown was employed by Atlas Explorations of Vancouver, B.C. conducting and supervising exploration programs throughout the Yukon Territory and northern B.C. He later worked as a consulting geologist with P.H. Sevensma Consultants Ltd. of Vancouver and Derry Michener Booth Ltd. of Toronto, before joining Nicanex Mines Ltd. (a subsidiary of Nippon Mining) as exploration manager.

In 1971 Mr. Sadlier-Brown and his associates A.E. Nevin and D.W. Goodbrand formed the firm of Nevin Sadlier-Brown Goodbrand Ltd. The firm is well known in Western Canada and the U.S. as a mineral exploration service company and for its pioneering work in geothermal exploration.

Mr. Sadlier-Brown is a Fellow of the Geological Association of Canada, member of the Canadian Institute of Mining and Metallurgy and Charter Member of both the Geothermal Resources Council and Canadian Geothermal Energy Association.

NEVIN SADLIER-BROWN GOODBRAND LTD.

Personnel Profile

Stuart A.S. Croft - is a geological engineer and Associate of the consulting firm of Nevin Sadlier-Brown Goodbrand Ltd.

Mr. Croft was educated at the University of British Columbia, Vancouver, B.C., obtaining a B.A.Sc. in Geological Engineering in 1983. As an undergraduate, he worked with NSBG on various mineral and geothermal exploration projects throughout the Canadian Cordillera.

Mr. Croft joined NSBG full time in 1981, and was assigned to the Meager Creek Project, a major geothermal discovery in southwestern B.C. A shift in the resource industry's emphasis towards precious and base metals has subsequently involved Mr. Croft in all aspects of mineral exploration, evaluation, and development.

Mr. Croft is a Registered Member of the Association of Professional Engineer of British Columbia, and is a member of the Canadian Geothermal Energy Association, the Computer Oriented Geological Society, and the Association of Exploration Geochemists.

Norecol

ROBERT A. HAWES

President

EDUCATION

B.Sc., (Hons.) Plant Ecology, University of Victoria, 1969.
M.Sc., Soil Science, University of British Columbia, 1974.
Ph.D., Natural Resources Management, Planning and Policy, Cornell University, 1978.

EXPERIENCE

Dr. Hawes has over 20 years experience in the management of environmental assessments, resource management and planning projects. He has coordinated technical programs and prepared reports for pre-feasibility and feasibility level environmental studies of major mining and industrial projects in western and northern Canada, and has extensive experience in government approval procedures for industrial developments.

1981 to date **NORECOL ENVIRONMENTAL CONSULTANTS LTD.**

President

Responsible for the day to day management and coordination of environmental study teams assigned to a wide range of resource related development projects. Technical, logistic and administrative direction is provided on environmental assessments of coal and metal mines; road and railway transportation projects; reclamation studies; permit applications; consultation and participation for public meetings and hearings; assessments of powerline corridors and energy development projects and studies involving hazardous wastes and environmental risk analysis. He has been responsible for managing numerous studies of mining developments, linear projects and other industrial developments.

1979 to 1981 **B.C. RESEARCH, Vancouver**

Program Manager

From 1980 to 1981, he was responsible for management of the environmental studies program in the Division of Applied Biology. Prime responsibilities included project coordination, technical review, liaison with government and industry contacts and supervision of staff. From 1979 to 1980, he held the position of Senior Environmental Analyst and was responsible for the project management of multi-disciplinary environmental assessments and resource inventories. Responsibilities included project management for

Norecol

BRUCE OTT, Ph.D.

Project Manager

EDUCATION

B.Sc. (Hons.), Biology, Simon Fraser University, 1969.
M.Sc., Marine Biology, McGill University, 1971.
Ph.D., Marine Biology, McGill University, 1975.

EXPERIENCE

Bruce Ott has 10 years of experience in environmental management, including 7 years of practical experience in environmental impact assessment and permitting for mineral exploration and development activity throughout Western and Northern Canada. He has been involved with project coordination and government review with Federal and Provincial environmental regulatory agencies.

1987 to date **NORECOL ENVIRONMENTAL CONSULTANTS LTD.**

Project Manager

Responsible for permitting and environmental impact assessment for Norecol's mining industry clients. Projects include Prospectus preparation through to Stage III permitting, report preparation, field investigations, as well as government and client liaison.

1979 to 1986 **PLACER DEVELOPMENT LTD.**

Environment Scientist

Responsible for permitting and impact assessment of exploration and pre-mining projects in western Canada. Experience included permitting in British Columbia, Saskatchewan, Yukon and Northwest Territories. Dr. Ott authored a comprehensive exploration and environmental manual encompassing the Yukon and Northwest Territories that was subsequently submitted td the Yukon Environmental Protection Service and the Yukon, Northwest Territories and British Columbia Chambers of Mines. Gained familarity will all aspects of exploration and early mine development.

R. JAMES LEADER, P. ENG. - SENIOR MINING ENGINEER

Mr. Leader joined Wright Engineers Limited in 1984 and has worked on feasibility and mine design studies for numerous mining projects. His overall mining engineering experience covers preparation of ore reserve estimates, pit design, underground mine planning, evaluation of haulage systems, and design of waste handling systems and dump sites. He has worked in both open pit and underground mines in a supervisory and planning role. He is experienced in the use of computers for mine modelling, ore reserve estimating, mine design, cost estimating, and economic analysis.

Mr. Leader graduated in 1974 from the Camborne School of Mines in Cornwall, England with a first class A.C.S.M. After graduating, he worked for 4-1/2 years in Zambia at an 18,000 tpd underground copper mine, in both an underground supervisory and a planning position with direct experience in the operation and expansion of mining activities and computer-assisted production planning. He emigrated to Canada in 1979. In 1980 he received an M.Sc. in Mining Engineering from Queens University, Kingston. He subsequently worked in B.C. and Alberta in open pit coal and metal mining operations. Before joining Wright Engineers he was with a large computer company as their Principal Mining Analyst, carrying out reserve estimates and mine designs.

He is a member of the Association of Professional Engineers of B.C., the Institution of Mining and Metallurgy, and the Canadian Institute of Mining and Metallurgy.

R.W. (BOB) LEIGH, SENIOR MINING ENGINEER

R.W. Leigh was educated at the University of London and at the Witwatersrand Technical College. He obtained a D.I.C. (Mining); a B.Sc. (Hons.) Geology and an Advanced Tech. Certificate in Mining. He is a Professional Engineer registered in B.C., Alberta, Ontario, Northwest Territories.

For the first ten years of his career Mr. Leigh was employed on underground gold mines in southern Africa. This work included ore reserves estimation, grade control and mineral inventory accounting, underground supervision, mine planning and industrial engineering. Positions held included sampler/surveyor, shift boss, mine geologist, planning engineer, industrial engineer and chief mining geologist.

In 1965 Mr. Leigh joined the R.T.Z. group where as senior mining engineer he completed detailed planning work on major open pit mines, including the Lornex open pit. He was also involved with mine design and costing of underground uranium mines.

He gained northern operating experience in the Yukon and northern B.C. where at Cassiar, as Assistant Mine Superintendent, he was responsible for the ore section and primary concentrating plant. He joined Costain Mining in 1973. Duties involved the provision of consulting services in Canada, where Syncrude and R.T.Z. (North America) were major clients. He was also responsible for all the technical aspects of contract mining proposals.

In 1982 he resigned from Costain in order to work as an independent consultant. This work included both engineering and supervisory duties. Projects have included the development and start up of an underground coal mine and coal washing plants and has involved the design and construction supervision of erosion and sedimentation control structures. Mine permits were completed. Numerous properties, including coal, silver, and limestone were evaluated.

Mr. Leigh joined Neptune Resources Corp. in 1987. In association with Wright Engineers Ltd. he worked on the definitive feasibility study of the Colomac mine in the Northwest Territories. He was mine manager during the test mining phase.

He joined Wright Engineers Ltd. as Senior Mining Engineer in June 1989.

APPENDIX III

DETAILED BUDGET ESTIMATES

APPENDIX III - Detailed Cost Estimate

Project: Lindquist Lake Location: Tweedsmuir R. A.

Description: **Alternative 1 -- Accelerated Program**
Draft budget proposal to conduct exploration work on the Lindquist Lake Prospect for the purpose of identifying further ore reserves on the property.

1. Start-Up Costs (Compilation, assimilation)

** Professional Fees **					
Planning/Preparation					
Project Mgr.	20 h @	$75.00 /hr	$1,500.00		
Sr. Geologist	20 h @	$50.00 /hr	$1,000.00		
Jr. Geologist	30 h @	$31.47 /hr	$944.00		
Drafter	20 h @	$30.80 /hr	$616.00		
Purch./Logistics	80 h @	$30.80 /hr	$2,464.00		
Applic'n Prep	40 h @	$50.00 /hr	$2,000.00	$8,524.00	
Orthophoto preparation			$3,500.00		
Map repro., etc.			$250.00		
Misc. materials (reports, etc.)			$350.00	$4,100.00	
		Sub-total		$12,624.00	
		≈ 10% contingency		$1,262.40	
		TOTAL		$13,886.40	

2. Mobilization, Establish Survey Grid, Geological Orientation

Grid Specifications				
baseline	2.2 km oriented at 290°			
crosslines at	100 m intervals			
crosslines	800 m long		18.4 line-km	
stations every	25 m	-------->	736 stations	

** Professional Fees **					
Field					
Project Mgr.	10 h @	$75.00 /h	$750.00		
Jr. Geologist	10 d @	$236.00 /d	$2,360.00		
Survey grid crew					
	2 crews	2 line-km per crew-day would			
require approx.	9 days to complete grid.				
Sr. Field Tech	10 d @	$236.00 /d	$2,360.00		
Field Tech I	10 d @	$193.00 /d	$1,930.00		
Cook	10 d @	$297.50 /d	$2,975.00	$10,375.00	
Mining Consultant					
Engineer	4 d @	$650.00 /d	$2,600.00	$2,600.00	
TOTAL	53 estimated field man-days				

** Transportation **					
Barge Landing Inspection and Design				$1,000.00	
lo-bed trans.	15 h @	$50.00 /hr		$750.00	
Materials				$2,500.00	$4,250.00
Road Rehabilitation					
Excavator	180 h @	$125.00 /h		$22,500.00	
supplies (culvert, etc.)				$5,000.00	$27,500.00
barge rental	4 d @	$1,000.00 /d		$4,000.00	
helicopter	20 h @	$625.00 /h		$12,500.00	
float plane	4 trips	$1,000.00 ea		$4,000.00	
2 Suburban	2 wk @	$331.25 /wk		$1,325.00	
milage	2500 km @	$.17 /km		$850.00	
fuel	12 mpg @	$.55 /L		$651.69	
crew travel			est'd	$7,500.00	$30,826.69
** Accomodation **					
hotel/motel			est'd	$400.00	
camp	53 md @	$18.00 /md		$954.00	$1,354.00
** Meals **					
base on per diem charge					
	53 md @	$20.00 /md		$1,060.00	
	25 md @	$30.00 /md		$750.00	$1,810.00
** Camp Construction **					
lumber, and construction materials				$7,000.00	
Constr. staff	9 md @	$219.00 /d		$1,971.00	
sewage containment system				$750.00	
fire protection supplies & equipment rental				$1,500.00	
waste control system				$1,500.00	
generator	3 mo @	$500.00 /mo		$1,500.00	$14,221.00
** Field Supplies **					
Misc. equipment rental and sundry supplies for duration of job				$4,000.00	$4,000.00

** Misc. Expenses **		
Expeditor	$3,000.00	
communications	$2,500.00	
office supplies	$500.00	$6,000.00
Sub-total		$102,936.69
≈ 10% contingency		$10,293.67
TOTAL		$113,230.36
AGGREGATE TOTAL TO DATE:		$127,116.76

Part 3. Soil & Sediment Sampling, Mapping, Prospecting
Underground Rehabilitation, Trenching

** Professional Fees **					
Project Administration					
Project Mgr.	5 h @	$75.00 /hr	$375.00		
Sr. Geologist	15 h @	$50.00 /hr	$750.00	$1,125.00	
Field					
Exploration crew - (soil & sediment sampling, geological assistance, prospecting)					
Jr. Geologist	15 d @	$236.00 /d	$3,540.00		
Sr. Field Tech	15 d @	$236.00 /d	$3,540.00		
Field Tech I	15 d @	$193.00 /d	$2,895.00		
Cook	15 d @	$297.50 /d	$4,462.50		
Prospect/blaster	15 d @	$236.00 /d	$3,540.00	$17,977.50	
Underground Workings Rehabilitation					
Shift boss	14 d @	$400.00 /d	$5,600.00		
Equip. Operator I	14 d @	$325.00 /d	$4,550.00		
Equip. Operatr II	14 d @	$325.00 /d	$4,550.00		
Equipment Rental			$6,500.00		
Expendible Supplies			$3,000.00		
Barge load	2 d @	$1,000.00 /d	$2,000.00	$26,200.00	
TOTAL	127 estimated field man-days				
** Hand Trenching **					
Air compressor	2 wk @	$200.00 /wk	$400.00		
Air drill	2 wk @	$75.00 /wk	$150.00		
Heli. portable Excavator	14 d @	$650.00 /d	$9,100.00		
Misc. expendibles (fuel, steel, etc.) and Blasting mat'ls, safetly supplies, etc.			$2,500.00	$12,150.00	

** Transportation **					
helicopter	25 h @	$625.00 /h		$15,625.00	
float plane chtr.	6 trips	$1,000.00 ea		$6,000.00	
truck rental, milage, and fuel				$2,000.00	
crew travel			est'd	$6,600.00	$30,225.00
** Accomodation **					
hotel/motel	11 md @	$32.00 /md		$352.00	
camp	127 md @	$18.00 /md		$2,286.00	$2,638.00
** Meals **					
base on per diem charge					
	22 md @	$30.00 /md		$660.00	
	127 md @	$20.00 /md		$2,540.00	$3,200.00
** Analysis **					
soil samples	588 sam @	$14.75 /sam		$8,673.00	
silt samples	50 sam @	$16.25 /sam		$812.50	
rock samples	100 sam @	$17.50 /sam		$1,750.00	
misc. assays	25 sam @	$29.50 /sam		$737.50	
shipping				$500.00	$12,473.00
** Interim Reporting **					
Project Mgr.	10 h @	$75.00 /hr		$750.00	
Sr. Geologist	15 h @	$50.00 /hr		$750.00	
drafting	15 h @	$30.80 /hr		$462.00	
typing	20 h @	$24.00 /hr		$480.00	
Administration	10 h @	$36.00 /hr		$360.00	$2,802.00
			Sub-total		$108,790.50
			≈ 10% contingency		$10,879.05
			TOTAL		$119,669.55
			AGGREGATE TOTAL TO DATE:		$246,786.32

4. Diamond Drilling

** Professional Fees **					
Project Administration					
Project Mgr.	5 h @	$75.00 /hr		$375.00	
Sr. Geologist	15 h @	$50.00 /hr		$750.00	$1,125.00

Field (no less than	34 days to complete)			
Jr. Geologist	35 d @	$236.00 /d	$8,260.00	
Field Tech II	35 d @	$219.00 /d	$7,665.00	
Cook	35 d @	$297.50 /d	$10,412.50	$26,337.50
Diamond Drilling Contractor				
Mobe/Demobe			$6,500.00	
Footage	1500 m @	$72.18 /m	$108,267.72	
using	2 per crew			
and	22 m per shift			
and	2 shifts per day			
Job will require	136 md approx.			
Misc. Exp	35% of footage		$37,893.70	$152,661.42
TOTAL	241 estimated field man-days			
Access				
Road Repair / reconstruction			$5,000.00	
Barge	4 d @	$1,000.00 /d	$4,000.00	
D-6 Cat standby	1.2 mo @	$5,500.00/mo stand-by	$6,416.67	
operating cost	35 d @	$150.00 /d	$5,250.00	
4 WD truck rent	2 mo @	$1,325.00 /mo	$2,650.00	
	2000 km @	$.17 /km	$340.00	
	12 mpg @	$.55 /L	$260.68	
Float Plane chtr	16 trips	$1,000.00 ea	$16,000.00	$39,917.34
** Accomodation **				
hotel/motel	2 md @	$32.00 /md	$64.00	
camp	241 md @	$18.00 /md	$4,344.55	$4,408.55
** Meals **				
base on per diem charge				
in camp	241 md @	$20.00 /md	$4,827.27	
in transit	15 md @	$30.00 /md	$450.00	$5,277.27
** Analysis **				
rock samples	500 sam @	$17.50 /sam	$8,750.00	
misc. assays	75 sam @	$29.50 /sam	$2,212.50	
shipping			$500.00	$11,462.50
		Sub-total		$241,189.58
		≈ 10% contingency		$24,118.96
		TOTAL		$265,308.54
		AGGREGATE TOTAL TO DATE:		$512,094.85

5. Reclamation and Demobe

** Professional Fees **					
Project Administration					
Project Mgr.	10 h @	$75.00 /hr		$750.00	
Sr. Geologist	40 h @	$50.00 /hr		$2,000.00	$2,750.00
Field					
Sr. Field Tech	7 d @	$236.00 /d		$1,652.00	
Field Tech I	7 d @	$193.00 /d		$1,351.00	
Cook	7 d @	$297.50 /d		$2,082.50	$5,085.50
TOTAL	21 estimated field man-days				
** Transportation **					
barge rental	4 d @	$1,000.00 /d		$4,000.00	
helicopter	5 h @	$625.00 /h		$3,125.00	
float plane	4 @	$1,000.00 ea		$4,000.00	
truck rental				$2,200.00	
Crew travel			est'd	$3,500.00	$16,825.00
** Accomodation **					
hotel/motel	7 md @	$32.00 /md		$224.00	
camp	21 md @	$18.00 /md		$378.00	$602.00
** Meals **					
base on per diem charge					
in transit	14 md @	$30.00 /md		$420.00	
in camp	21 md @	$20.00 /md		$420.00	$840.00
			Sub-total		$26,102.50
			≈ 10% contingency		$2,610.25
			TOTAL		$28,712.75
			AGGREGATE TOTAL TO DATE:		$540,807.60

Part 5. - Reporting

** Professional Fees **				
Project Administration				
Project Mgr.	15 h @	$75.00 /hr	$1,125.00	$1,125.00
** Reporting **				
Geology Report				
Project Mgr.	35 h @	$75.00 /hr	$2,625.00	
Jr. Geologist	150 h @	$31.47 /hr	$4,720.00	
Ore Micro/Min'lgy			$4,500.00	
Geochem. Interp.	638 sam @	$2.75 /sam	$1,754.50	

drafting	45 h @	$30.80 /hr	$1,386.00	
typing	35 h @	$24.00 /hr	$840.00	
Administration	5 h @	$36.00 /hr	$180.00	
Map prep.			$1,500.00	$17,505.50
Environmental Study				
Coordination	2 d @	$750.00 /d	$1,500.00	
Fish Study	6 d @	$600.00 /d	$3,600.00	
Water Quality	5 d @	$550.00 /d	$2,750.00	
Acid-Base A/C	5 d @	$550.00 /d	$2,750.00	
Assays			$5,000.00	
Misc. Suppl.			$2,500.00	
Travel & airfreight			$6,500.00	$24,600.00
Mine Consult. Rpt	60 h @	$95.00 /hr	$5,700.00	$5,700.00
			Sub-total	$48,930.50
			≈ 10% contingency	$4,893.05
			TOTAL	$53,823.55
			TOTAL ESTIMATED PROJECT COST:	$594,631.15

Project: Lindquist Lake Location: Tweedsmuir R.A.

Description: **Alternative 2 — Low Impact Proposal**
Draft budget proposal to conduct exploration work on the Lindquist Lake Prospect for the purpose of identifying further ore reserves on the property.

1. START-UP COSTS (Compilation, assimilation)

** Professional Fees **					
Planning/Preparation					
Project Mgr.	15 h @	$75.00 /hr	$1,125.00		
Jr. Geologist	10 h @	$31.47 /hr	$314.67		
Drafter	10 h @	$30.80 /hr	$308.00		
Purch./Log'tics	40 h @	$30.80 /hr	$1,232.00		
Permit Appl.	30 h @	$50.00 /hr	$1,500.00	$4,479.67	
Map repro., etc.			$150.00		
Misc. materials (reports, etc.)			$250.00	$400.00	
		Sub-total		$4,879.67	
		≈ 10% contingency		$487.97	
		TOTAL		$5,367.63	

2. Mobilization, Establish Survey Grid, Geological Orientation

Grid Specifications				
baseline	2.2 km	oriented at 290°		
crosslines at	100 m	intervals		
crosslines	800 m	long	18.4 line-km	
stations every	25 m	-------->	736 stations	
** Professional Fees **				
Field				
Project Mgr.	5 h @	$75.00 /h	$375.00	
Jr. Geologist	10 d @	$236.00 /d	$2,360.00	
Survey grid crew				
	2 crews	2 line-km per crew-day would		
require approx.	9 days	to complete grid.		
Field Tech II	10 d @	$219.00 /d	$2,190.00	
Field Tech I	10 d @	$193.00 /d	$1,930.00	$6,855.00
Mining Consultant				
Engineer	2 d @	$450.00 /d	$900.00	$900.00
TOTAL	32 estimated field man-days			

** Transportation **					
Road Repairs & Construction					
Barge Landing Inspection & Design				$1,000.00	
D-6 Cat	7 h @	$95.00 /hr		$665.00	
lo-bed trans.	15 h @	$50.00 /hr		$750.00	
Freight				$1,500.00	
Materials				$2,500.00	$6,415.00
barge rental	3 d @	$1,000.00 /d		$3,000.00	
helicopter	15 h @	$625.00 /h		$9,375.00	
Suburban	2 wk @	$331.25 /wk		$662.50	
milage	2500 km @	$.17 /km		$425.00	
fuel	12 mpg @	$.55 /L		$325.85	
crew travel			est'd	$3,300.00	$17,088.35
** Accomodation **					
hotel/motel	12 md @	$32.00 /md		$384.00	
camp	32 md @	$18.00 /md		$576.00	$960.00
** Meals **					
base on per diem charge	44 md @	$20.00 /md		$880.00	$880.00
** Camp Construction **					
lumber and construction materials				$5,500.00	
sewage containment system				$750.00	
Fire protection supplies and equipment rental				$1,500.00	
waste control system				$1,500.00	
generator	2 mo @	$500.00 /mo		$1,000.00	$10,250.00
** Field Supplies **					
Misc. equipment rental and sundry supplies for duration of job				$3,500.00	$3,500.00
** Misc. Expenses **					
Expediter				$2,500.00	
communications				$2,000.00	
office supplies				$500.00	$5,000.00
			Sub-total		$51,848.35
			≈ 10% contingency		$5,184.83
			TOTAL		$57,033.18

AGGREGATE TOTAL TO DATE: $62,400.81

Part 3. Soil & Sediment Sampling, Mapping, Prospecting

** Professional Fees **						
Project Administration						
Sr. Geologist	10	h @	$50.00 /hr		$500.00	$500.00
Field Crew						
Jr. Geologist	12	d @	$236.00 /d		$2,832.00	
Field Tech II	12	d @	$219.00 /d		$2,628.00	
Field Tech I	12	d @	$193.00 /d		$2,316.00	
Prospector	12	d @	$236.00 /d		$2,832.00	$10,608.00
Geophysics crew						
Sr. Geophysicist	7	d @	$400.00 /d		$2,800.00	
Geop. Field Tech	7	d @	$325.00 /d		$2,275.00	$5,075.00
Environmental Baseline Study						
Sr. Env. Consl't	5	d @	see below /d		$.00	
Assistant	5	d @	see below /d		$.00	$.00
TOTAL	72	estimated field man-days				
** Hand Trenching **						
Air compressor	2	wk @	$200.00 /wk		$400.00	
Air drill	2	wk @	$75.00 /wk		$150.00	
Misc. expendibles (fuel, steel, etc.)					$500.00	
Blasting mat'ls					$1,000.00	$2,050.00
** Transportation **						
helicopter	20	h @	$625.00 /h		$12,500.00	
truck rental					$3,000.00	
float plane ch.	1	@	$750.00 ea		$750.00	
crew travel				est'd	$5,400.00	$21,650.00
** Accomodation **						
hotel/motel*	5	md @	$32.00 /md		$160.00	
camp	72	md @	$18.00 /md		$1,296.00	$1,456.00
** Meals **						
base on per diem charge						
in transit	5	md @	$30.00 /md		$150.00	
in camp	72	md @	$20.00 /md		$1,440.00	$1,590.00

** Analysis **					
soil samples	588 sam @	$14.75 /sam		$8,673.00	
silt samples	50 sam @	$16.25 /sam		$812.50	
rock samples	100 sam @	$23.25 /sam		$2,325.00	
Misc. analyses	15 sam @	$32.50 /sam		$487.50	
shipping				$300.00	$12,598.00
** Interim Reporting **					
Project Mgr.	5 h @	$75.00 /hr		$375.00	
Sr. Geologist	15 h @	$50.00 /hr		$750.00	
drafting	10 h @	$30.80 /hr		$308.00	
typing	10 h @	$24.00 /hr		$240.00	
Administration	3 h @	$36.00 /hr		$108.00	$1,781.00
			Sub-total		$57,308.00
			≈ 10% contingency		$5,730.80
			TOTAL		$63,038.80
			AGGREGATE TOTAL TO DATE:		$125,439.61

Part 4. - Demobe, Reclamation

** Professional Fees **					
Project Administration					
Project Mgr.	2 h @	$75.00 /hr		$150.00	
Sr. Geologist	40 h @	$50.00 /hr		$2,000.00	$2,150.00
Field					
Jr. Geologist	5 d @	$236.00 /d		$1,180.00	
Field Tech II	5 d @	$219.00 /d		$1,095.00	
Field Tech I	5 d @	$193.00 /d		$965.00	
Prospector	5 d @	$236.00 /d		$1,180.00	$4,420.00
TOTAL	20 estimated field man-days				
** Transportation **					
barge rental	2 d @	$1,000.00 /d		$2,000.00	
helicopter	20 h @	$625.00 /h		$12,500.00	
truck rental				$1,100.00	
Crew travel			est'd	$2,400.00	$18,000.00
** Accomodation **					
hotel/motel	5 md @	$32.00 /md		$160.00	
camp	20 md @	$18.00 /md		$360.00	$520.00

** Meals **				
base on per diem charge				
	25 md @	$20.00 /md	$500.00	$500.00
		Sub-total		$25,590.00
		≈ 10% contingency		$2,559.00
		TOTAL		$28,149.00
		AGGREGATE TOTAL TO DATE:		$153,588.61

Part 5. - Reporting

** Professional Fees **				
Project Mgr.	15 h @	$75.00 /hr	$1,125.00	
Sr. Geologist	40 h @	$50.00 /hr	$2,000.00	
Jr. Geologist	120 h @	$31.47 /hr	$3,776.00	
Ore Microsc/Min'ogy			$2,250.00	
drafting	20 h @	$30.80 /hr	$616.00	
typing	25 h @	$24.00 /hr	$600.00	
Administration	5 h @	$36.00 /hr	$180.00	
Map prep.			$300.00	
Geophysicist Rpt.	30 h @	$50.00 /hr	$1,500.00	
Environmental Rpt (including field costs)			$21,000.00	
Mine Consult. Rpt	20 h @	$75.00 /hr	$1,500.00	$34,847.00
		Sub-total		$34,847.00
		≈ 10% contingency		$3,484.70
		TOTAL		$38,331.70
		TOTAL ESTIMATED PROJECT COST:		$191,920.31