



**KLOHN LEONOFF**  
CONSULTING ENGINEERS

007834

**PROPERTY FILE**

Our File: PB 3965 0101

March 15, 1988

Mine Development Steering Committee  
c/o Mineral Policy and Evaluation Branch  
Mineral Resources Division  
Parliament Building  
Victoria, British Columbia  
V8V 1X4

Mr. R. Crook  
Chairman

MINISTRY OF ENERGY MINES AND PETROLEUM RESOURCES MINERAL POLICY EVAL BR.		
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Rec'd		

Project Scope Revision for  
Villalta Gold Project

Dear Sir:

Introduction

Klohn Leonoff Ltd. on behalf of Canamin Resources Ltd. of North Vancouver intends to undertake a feasibility study of the Villalta Gold Project. A prospectus was originally filed with the Mine Development Steering Committee for this project on June 2, 1986. A compendium of comments compiled by the Steering Committee in response to the prospectus was issued on August 15, 1986.

Since 1986, the management of Canamin Resources has changed and the scope of the project has been revised. Drilling in 1987 showed that ore reserves are very limited. The project will be very small, but should be economically feasible provided it can be brought into production quickly and efficiently. Klohn Leonoff has provided engineering design for over 15 heap leach projects, located in the western US, South America and the Yukon and is confident this can be achieved. Consequently, we are submitting this letter to you, advising the Steering Committee of the revisions to the project, describing the presently proposed mine plans, and inviting any comments from the

appropriate authorities at this time. A brief description of the project follows. Previous location drawings were provided in the original prospectus and have not been reproduced here. A drawing with detailed topography and a proposed project layout is included here as Drawing B-1001.

### Project Description

#### Mining Scheme

The Canamin prospect area is located on Vancouver Island at latitude 49° 06' and longitude 124° 28' at elevation 850 m. The area, which is located near the headwaters of the Nanaimo River, has recently been clear cut logged and access to the site by forestry road already exists.

The presently proposed mining operation will consist of a very small open pit 40 m wide, 80 m long and 10 m deep. Total ore mined is expected to be no greater than 40 000 tonnes containing an average of 2.8 gm/tonne gold. Minor silver grades of about 1.4 gm/tonne are also present.

The ore will be mined following conventional drilling and blasting and, if necessary, will be crushed prior to processing. The ore will be stacked over a small heap leach pad to a depth of approximately 6 m. Canamin intends to construct the leach pad in the latter half of 1988. The leaching will start in the spring of 1989 and will operate for one summer only.

The leach pad is expected to cover an area of approximately 40 m square. The pad will be constructed on a relatively flat area a short distance from the pit. The relative locations of the pit and leach pad are shown on Drawing B-1001. The foundation will be shaped using glacial till or other borrow material. A liner system using a combination of glacial till and geomembranes will be designed to collect pregnant solutions and prevent leakage to the environment. The project will be designed so

there will be no effluent discharge to the environment. A double geomembrane liner will be considered for the pad foundations and will be used if the glacial till is not suitable or if insufficient quantity is available.

A layer of coarse drain gravels surrounding a collection pipe system will be placed over the liner system. The gravel will serve to collect the pregnant solution.

Pregnant and barren solution holding ponds will be constructed adjacent to the pad. The ponds will be lined to prevent egress of solution into the groundwater regime. The ponds will be designed, using existing meteorological data, to contain all direct precipitation so that release of contaminated water from the ponds will not be required. A Klohn Leonoff in-house computer program will be used to provide water balance details for leach pad design and operation. Diversion ditches will be used to isolate the heap and the solution ponds from runoff. Existing ditches will be cleaned up and used where possible. Settling ponds will be constructed on the ditch lines if needed.

#### Geology

The Villalta prospect occurs near a small exposure of Buttle Lake limestone close to a contact with volcanic and related sedimentary rocks of the Paleozoic Sicker Myra formation. The limestone is crinoidal and is marked by numerous sink holes.

The limestone is overlain by a green tuff breccia which commonly contain clasts of silicified limestone. The gold mineralization is found in a band of hematite ( $\text{Fe}_2\text{O}_3$ ) which is associated with and surrounded by breccia. Sulphides are not visible in the hematite ore zone so the potential for acid mine drainage (AMD) is low. Testing is underway to confirm this. The near surface hematite is pitted, weathered and (rusty) limonitic. Where erosion has not occurred, the hematite is overlain in

places by a conglomerate of the Nanaimo group sediments. Waste rock cover varies from zero to 5 m over the ore body.

Traces of sulphides have been found in drill core recovered from the breccias below the hematite zone. Tests will be undertaken to define the potential for the production of AMD in the underlying sediments which would be exposed in pit walls and in any of the small amount of waste rock overlying the ore body.

#### Metallurgical Testing

Previous test work done by Canamin indicates the ore is amenable to leaching for gold extraction. Further testing is currently underway using a cyanide leach column to confirm the amenability, to determine the amount of crushing required, and to estimate reagent consumption in the ore. Ore recovery systems will be evaluated to determine the most suitable process of either zinc precipitate or activated carbon. The leached column will be flushed at the end of the test and the barren solution tested for cyanide and metal contamination. A system for neutralizing the barren solution at the end of the project life will be defined.

#### Environmental Monitoring

A tributary creek flows by each side of the property southward into the headwaters of the Nanaimo River. The Nanaimo River is a well catalogued, extremely important fishing resource which must be protected. The project is intended to be a closed circuit with respect to fluids and there will be no discharge allowed to the environment.

Baseline water quality testing is proposed for four surface sites upstream and downstream of the project area. Two will be located on the headwaters of the Nanaimo River. Two will be located on an unnamed tributary creek southeast of the site. The proposed sampling locations will be located as shown on Drawing B-1001.

Groundwater can presently be seen exiting from a limestone cliff downhill and downstream of the project area. A groundwater sample will be recovered from this seep and tested for quality.

Testing will initially be undertaken at all four surface sites on a monthly basis. At a later stage following consultation with the appropriate regulatory agencies and establishment of any pattern, it is anticipated that this testing frequency would be reduced. Testing of the groundwater is planned for once every three months.

As noted above, the fisheries resource of the Nanaimo River is well documented and catalogued. The project will be designed as a closed system with no effluent discharge allowed so the fisheries will not be affected by the Canamin project. Consequently, we do not intend to undertake additional baseline studies for fishery resources at this time.

#### Chemical Storage

Chemicals will be transported to the site in steel drums by truck and stored in a secure structure for the duration of the project. The storage area will be surrounded by a dyke constructed of compacted glacial till. A gated culvert will be used to release excess rainfall from the area. Chemical spills will be contained within the dyked area. We anticipate that chemicals on-site will include sodium cyanide, hydrated lime and hypochlorite.

#### Reclamation and Abandonment

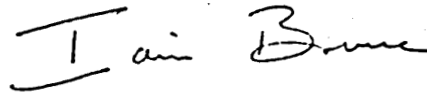
A reclamation plan will be presented in Stage I design. The plan will consider how best to flush and neutralize the heap, how to neutralize and dispose of the barren solution and how best to leave the heap in an environmentally acceptable condition. The pit will be left in a safe condition so as not to form a hazard to the environment or personnel.

March 15, 1988

Schedule

A feasibility study for the Canamin heap leach project is presently underway and should be completed by April 30. If the results of the study are favourable, a Stage I report will be submitted to the Mine Development Steering Committee by May 15. We would hope to begin construction of the mine facilities and the leach pad foundation by the fall of 1988 although mining activity would not start until the spring of 1989.

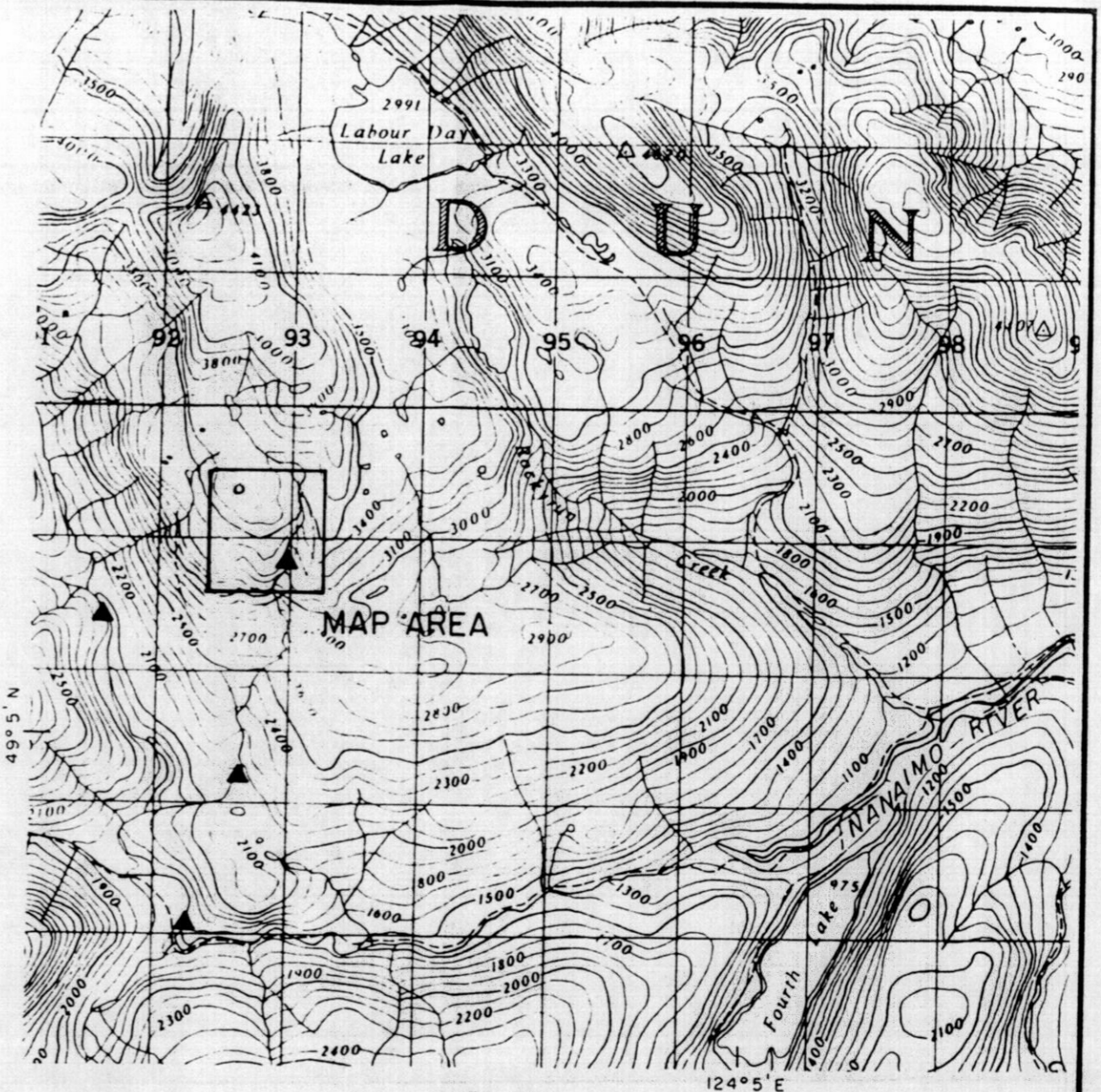
Yours very truly,  
KLOHN LEONOFF LTD.



Iain G. Bruce, P.Eng.  
Project Engineer

cc. S.P. Quin - Canamin Resources Ltd.

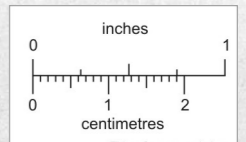
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FROM NANAIMO MAP SHEET 92 F1

**LEGEND**

▲ PROPOSED SURFACE WATER SAMPLING SITES



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TO BE READ WITH KLOHN LEONOFF REPORT DATED **MAR. 15, 1988**

SCALE 1:5000

	<b>PROJECT</b> VILLALTA HEAP LEACH GOLD	
	<b>TITLE</b> LOCATION AND PROJECT LAYOUT	
<b>CLIENT:</b> CANAMIN RESOURCES LTD.	<b>DATE OF ISSUE</b> March 15/88 APPROVED T. Bure	<b>PROJECT No.</b> PB 3965 01
	<b>DWG. No.</b> B-1001	<b>REV.</b>

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