AFTON PROJECT

VOL. I SUMMARY

OWNERSHIP

Afton Mines Ltd., ('Afton') is a Canadian company registered in the province of British Columbia. The company is authorized to issue 5,000,000 common shares of no par value. Of this, 3,777,171 shares or 75.5 percent have been issued and over 98 percent of these shares are held by Canadian shareholders.

GENERAL INFORMATION

Location

The Afton deposit is located eight miles west of Kamloops, B.C. south of Highway B.C. 97. Kamloops is an important interior communications and industrial center with a population of nearly 60,000.

History

Numerous copper occurences have been identified in the general area of the Afton property and considerable exploration and development work has been done on the various properties over the years. Afton, however, is the first discovery of economic significance.

Exploration on the Afton property can be traced back to 1898-99 when a 330 foot shaft was sunk on the Pothook claim. More recently, the following programs have been undertaken:

1951 - 52 Kennco Explorations (Canada) Ltd. completed an electromagnetic survey and then completed 4555 feet of diamond drilling in the vicinity of the Pothook shaft.

1956 - 57 A program was carried out by Graham Bousquet Gold Mines Ltd. and included: another electromagnetic survey, geochemical survey, and geologic mapping.

1958 Noranda prepared a geologic map and drilled nine short diamond drill holes.

1960 New Jersey Zinc: I. P. Survey

1964 The property was acquired by Afton Mines Ltd. Eleven percussion holes were drilled in the vicinity of the Pothook zone. Thirty-eight holes were drilled during the following year and this was followed by 24 during 1967 and 1969.

cont. . .

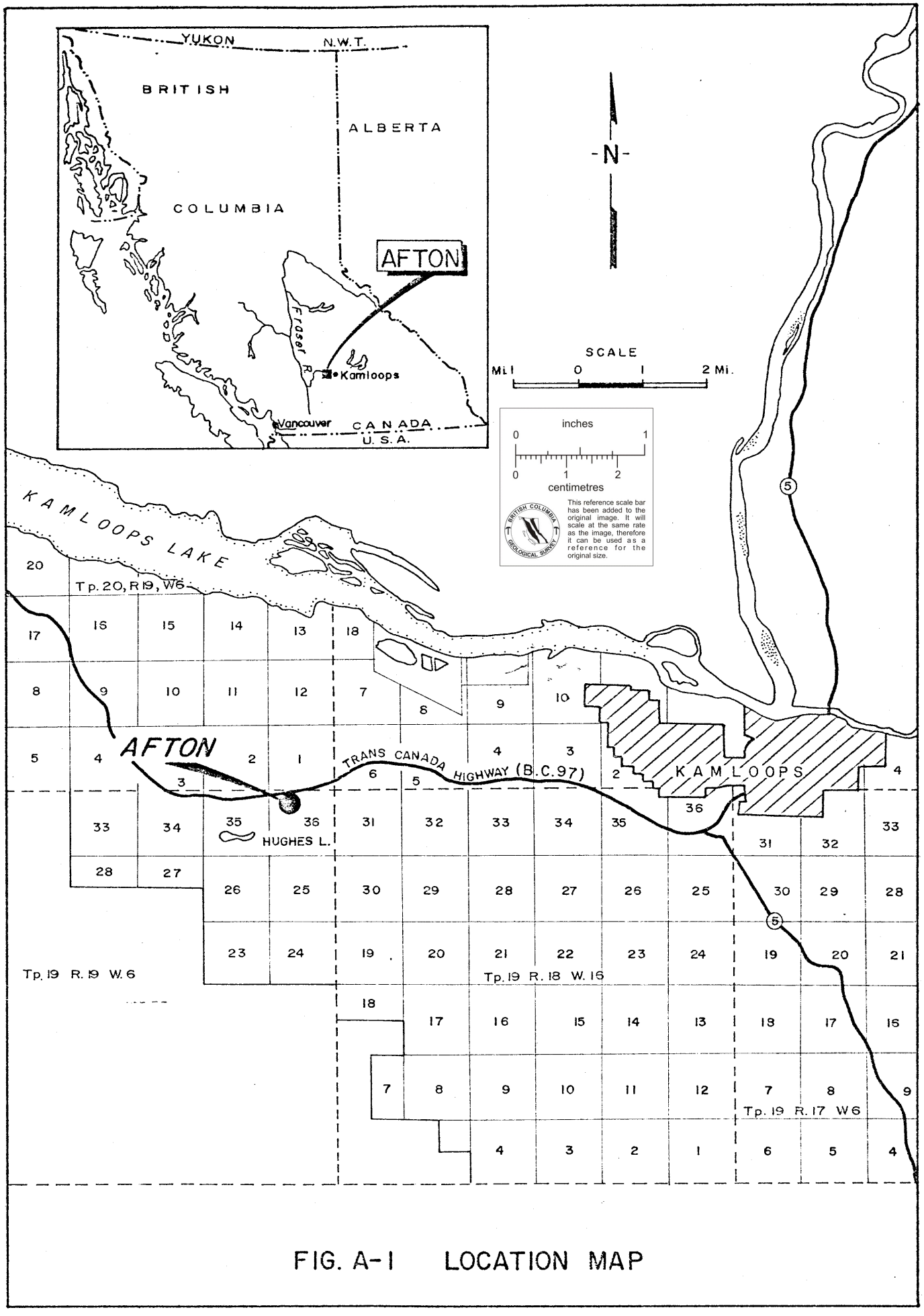


FIG. A-1 LOCATION MAP

GENERAL INFORMATION

History - cont.

1970 Five diamond drill holes totaling 2513 feet were drilled at locations recommended by Chapman, Wood, and Griswold in their report of 9 March 1967. Hole 70-4 encountered sub-economic native copper mineralization.

1971 Quintana Minerals Ltd. optioned the property and drilled 15 percussion holes before dropping it's program.

1971 Afton Mines Ltd. began a percussion drilling program in the vicinity of DDH 70-4. This program led to the discovery of mineralization of potential economic significance.

1972 After further drilling early in the year, Afton Mines Ltd. entered into an agreement with Canadian Exploration Limited with the latter company accepting operating and management responsibilities.

1973 Teck Corporation Limited and Iso Mines Limited jointly purchased the development agreement previously entered into by Afton Mines Ltd. and have proceeded with mine engineering and development.

cont. . .

GENERAL INFORMATION

Land Use and Topography

The topography of this area is characterized by rolling open range land with sagebrush and rabbit-brush as the predominant species of vegetation. The land is used to graze cattle during early spring and late fall. Agricultural productivity is in fact very low. The land falls within classes 5 and 6 of the B.C. land inventory tabulation. Soils in class 5 'have very severe limitations that restrict their capability to produce perennial forage crops, and improvement practices are feasible'. Roughly 60 percent of the land is in class 6, which is a comparatively less productive class. These latter soils are capable of only producing perennial forage crops, and improvement practices are not feasible. Factors that adversely affect soil productivity in this area are topography, presence of soluble salts, presence of bedrock close to surface and climate.

Climate

The climate is typical of valley conditions found in the interior of the province. Total annual precipitation at Kamloops averages 10 inches with 4 to 5 inches occurring in the growing season. Temperatures range from a January average of -6.0° C to 21.0° C in July. Snowfall ranges from 20 to 40 inches at lower elevations to twice this amount in the uplands south of the minesite. On average, the frost-free period extends from April 25 to October 8; frost occurs, however, with great irregularity.

cont. . .

GENERAL INFORMATION

Labour

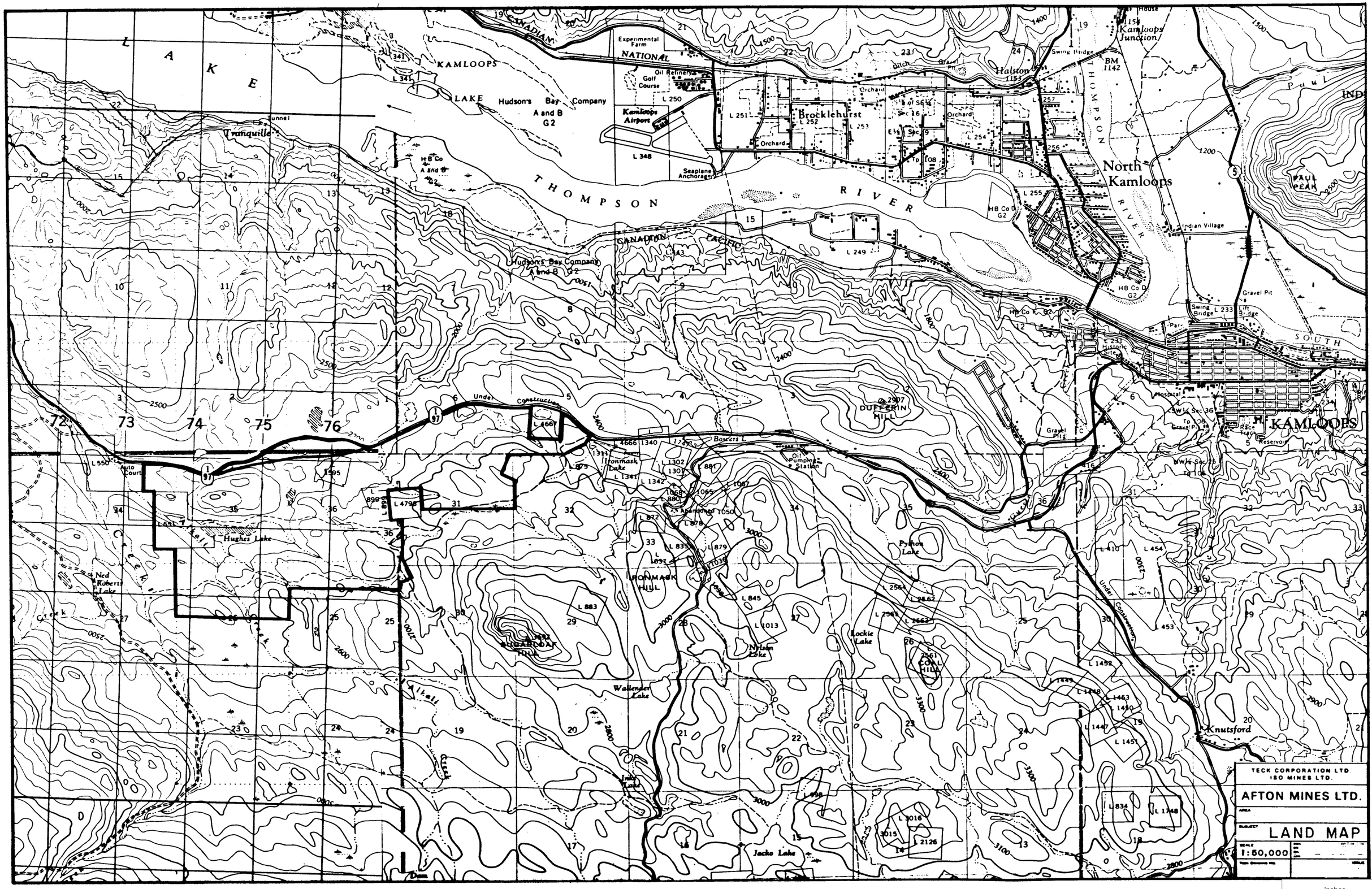
It is believed that the work force in the Kamloops-Merritt-Ashcroft area will provide most of the labour requirements and that only a handful of senior personnel and highly specialized skills will be recruited from beyond this area. The presence of numerous similar operations within the province assures the presence of a local, skilled labour force.

Land and Mineral Claims

Boundry limits of the land held by Afton are shown overleaf.

Claims held by Afton Mines Ltd. are identified and located on the attached drawing. The relevant records are held under separate cover.

cont. . .



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SW 1/4 2-20-19

SE 1/4 2-20-19

SW 1/4 1-20-19

ADD 27

TRANS CANADA HIGHWAY

ON TOP 2 Fr.

ON TOP 1 Fr.

TOP 3 Fr.

TOP 4 Fr.

TOP 1 Fr.

DOMINION MC

POT 4 Fr.

ADD 26 NW 1/4 35-19-19

ADD 25

ADD 4 NE 1/4 35-19-19

ADD 3

NW 1/4 36-19-19

ADD 28

AFTON 7

AFTON Fr.

ADD 24

ADD 23

ADD 2

ADD 1

ADD 29

AFTON 5

AFTON 1

HUGHES LAKE

SE 1/4 35-19-19

SW 1/4 36-19-19

ADD 30

ADD 22

ADD 21

ADD 15

ADD 16

KEN 4

KEN 3 Fr.

BERNIE 7 Fr.

AETON 6

AFTON 2

ADD 19

ADD 17

ADD 18

ADD 20

ADD 1 Fr.

BERNIE 8 Fr.

NW 1/4 26-19-19

ADD 13

ADD 11

ADD 9

NE 1/4 26-19-19

NW 1/4 25-19-19

KEN 2

BERNIE 10 Fr. (Not to legal survey)

BERNIE 9 Fr.

ADD 14

ADD 12

ADD 10

KEN 1

SW 1/4 26-19-19

SE 1/4 26-19-19

SW 1/4 25-19-19

PURCHASE ORDER

ISSUED TO VENDOR	NUMBER	DESCRIPTION

ASSOCIATED DRAWINGS

ISSUED FOR CONSTR.		

inches 0 1

centimetres 0 1 2

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BRITISH COLUMBIA GEOLOGICAL SURVEY

KEY MAP

WEST SHEET | EAST SHEET

SCALE FT 400 0 400 800 FT

NO.	BY/APP.	ISSUE	DES.	DR.	APP.

CERTIFIED FOR CONSTRUCTION

TECK PROJ. ENG.

TECK CORPORATION LTD
ISO MINES LTD

AFTON MINES LTD.

AREA

SUBJECT MINERAL CLAIMS

SCALE

TECK DRAWING NO.

ISSUE

SE 1/4
1-20-19

TRANS CANADA HIGHWAY

SW 1/4
6-20-18

SE 1/4
6-20-18

POT 3 Fr.

POT 5

NE 1/4
36-19-19

POT 10 Fr.

NW 1/4
31-19-18

NE 1/4
31-19-18

POT 12

POT 9

POT 14

POT 6

POT 8

AFTON 3

SE 1/4
36-19-19

AFTON 4

SW 1/4
31-19-18

SE 1/4
31-19-18

NE 1/4
25-19-19

NW 1/4
30-19-18

NE 1/4
30-19-18

ADD 7

ADD 5

ADD 8

ADD 6

SE 1/4
25-19-19

SW 1/4
30-19-18

SE 1/4
30-19-18

PURCHASE ORDER		
SHOWN ISSUED TO VENDOR	NUMBER	DESCRIPTION

ASSOCIATED DRAWINGS		
SHOWN FOR CONTROL		

inches
0 1
0 1 2
centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

BRITISH COLUMBIA GEOLOGICAL SURVEY

KEY MAP

WEST SHEET | EAST SHEET

SCALE
FT 400 0 400 800 FT

NO.	BY/APP	ISSUE	MM.	DA.	APP.

CERTIFIED FOR CONSTRUCTION

TECK RESOURCES LIMITED

TECK CORPORATION LTD
& ISO MINES LTD

AFTON MINES LTD.

AREA

SUBJECT
MINERAL CLAIMS

SCALE

TECK DRAWING NO.

ISSUE

PROJECT DESCRIPTION

Foreword

The exploration program initiated subsequent to the discovery of the deposit in late 1971 provided: a) data for ore reserve calculations and mine production planning, b) sample material for determining metallurgical characteristics, and c) references for plant design. So far, under this program, approximately $2 million has been directed towards the conclusion of those investigations that are a prerequisite for determining the economic viability of this property. Our studies show that this property should be developed as a mine-mill-smelter operation.

This facility will be characterized by the following operational features: 1) ore will be transported to a crushing plant at an average daily rate of 7000 tons by a conventional truck-shovel mining system, 2) on crushing, the ore will be conveyed to a stockpile and then reclaimed as required to feed the grinding mills, 3) native copper will be separated during grinding to produce a gravity concentrate, and the copper sulphides will be recovered as a flotation concentrate, 4) tailings will be impounded on the property 5) smelter effluents will be injected into the tailings, 6) Kamloops Lake will be used to supply fresh water for the plant and for irrigation purposes, 7) the complex will be equipped with the necessary ancillary facilities as, for example, shops, offices, and support equipment, 8) the marketable product is blister copper assaying better than 99% copper.

cont...

Foreword - cont.

These design concepts and related investigations germane to cost estimating have received extensive engineering efforts not only in-house but from consultants as well. Studies have been completed in the following areas: 1) Soil Tests - Plantsite Area and Tailings Pond: by Ripley, Klohn and Leonoff International Ltd. ('RKL'), 2) Freshwater Supply: by Ker, Priestman and Associates Ltd. 3) Trans-Canada Highway Relocation: RKL 4) Afton Mines Ltd. - TBRC Copper Smelter: by Dravo Corporation, Denver, Colorado.

Metallurgical investigations were undertaken at Lakefield Research of Canada Ltd. Pilot Plant results were in agreement with bench scale tests and the final mill flowsheet is essentially that developed in the pilot plant.

The use of semi-autogenous grinding was established in a pilot plant test program conducted at the Ontario Research Foundation.

A smelter test program was conducted at the International Nickel Company research center at Port Colborne, Ontario. This program corroborated the applicability of the TBRC process for this project. The results obtained will be used to formulate operational guidelines.

cont...

PROJECT DESCRIPTION

Mining Program

The most efficient method of recovering the near surface ore is by developing an open pit. Pit mineable reserves are estimated at 34,000,000 tons averaging 1.00% copper above a proposed cut-off grade of 0.25%. The initial stripping ratio is 6.0 to 1.0, this is the ratio of low grade plus waste to ore, and the overall ratio is 4.2. These reserves are sufficient to assure a mine life of 14 years. Preliminary diamond drilling to depth indicates an underground mining potential and therefore operational continuity beyond this point appears reasonably certain. Possible underground mineable reserves are currently placed at 10 million tons averaging 1.55% copper.

The mining system will include a conventional truck-shovel haulage system. Pit waste will be placed on dumps near the mine and the ore will be transported to a crushing plant. The dumps will be terraced for aesthetic reasons and will be reclaimed as they reach the ultimate configuration.

Open pit mining will be divided into an interim first stage followed by a step-back to the final pit limits. The information gathered initially on working conditions, rock behavior and cost factors will allow a more accurate estimation of the ultimate limits.

cont...

PROJECT DESCRIPTION

Milling and Tailings Disposal

The milling system includes crushing, grinding, gravity separation and flotation. The ore is first crushed and ground to mechanically free valuable minerals from the waste rock so that separation and recovery of these minerals can be achieved. Afton will use a single crushing stage and two stages of grinding. This arrangement has been selected to eliminate potential material handling problems that would be inherent to a secondary-tertiary crushing system because of the clay content in the ore.

The Afton mineralization contains variable amounts of relatively fine native copper. Native copper is malleable and tends to flatten during grinding without appreciable reduction in size; it is therefore necessary to incorporate gravity separation as well as the normal flotation process. The mill circuit is designed to remove the native copper as soon as it is liberated. This is achieved by incorporating mechanical jigs in the primary and secondary grinding circuits. The jig product is further reduced by grinding and is then tabled to produce a metallic concentrate assaying better than 90% copper. After grinding and recovery of the relatively coarse native copper fraction, the ore, as a water-solids mixture, is passed through a flotation circuit to recover the remaining copper minerals.

Although the mineral assemblage is unique, the ore responds well to the above treatment procedures allowing the production of a high grade metallic or native copper concentrate and a high grade flotation concentrate. Metallurgical tests have indicated that 30% of the copper can be recovered in a metallic concentrate assaying 98% Cu and 57% in a flotation concentrate assaying approximately 50%.

cont. . .

PROJECT DESCRIPTION

Milling and Tailings Disposal - cont.

The metallic concentrate will be filtered, dried and tote hauled to the smelter. The flotation concentrate will be pumped to a holding tank located adjacent to the smelter.

Tailings, the waste slurry from the mill, will be impounded on the property. The tailings impoundment structures will be constructed from prepared aggregate and run-of-pit waste. An enclosed system will be used. This system will be submitted for approval by the Pollution Control Board and by the Department of Mines.

Smelting

Afton proposes to smelt its concentrate production in a top blown rotary converter. This smelting process is based on technology developed in the steel industry and successfully adapted to nickel and copper production. The process allows single stage smelting - two stages are currently the common practice. TBRC smelting affords economics in both capital outlays and operating costs for small scale plants while at the same time simplifying pollution control.

The Afton concentrate mix is unique in the mining industry. The concentrate is unusually low in sulphur and the available sulphur is insufficient to supply the heat necessary for autogenous concentrate smelting. The TBRC process is particularly suitable for treatment of this feed because it is possible to balance heat requirements by injecting natural gas or oil through the lance that supplies oxygen.

cont. . .

Smelting - cont.

The first step in the smelting process involves mixing the concentrates with lime and iron to obtain a suitable charge. The charge is melted by the heat generated from the combustion of natural gas and oxygen. Oxygen is blown through the bath to: a) drive off sulphur, b) oxidize the iron and c) form a slag containing silica, iron and other impurities. The slag is skimmed off, cooled, crushed and circulated through the mill circuit to recover residual values. Oxygen is again reintroduced to oxidize the remaining sulphur and/or other impurities and this is continued until the desired blister specifications are achieved. The copper is poured into molds; each billet will weigh about 1200 pounds.

Gases from the smelter will be collected and scrubbed to meet Provincial air emission standards. The effluent from the scrubbing plant will be injected into the concentrator tailings system.

A smelter recovery of 99% or better can be achieved when converting the concentrates to blister. The blister castings will assay approximately 99% Copper.

PROPOSED B.C. TEL RELOCATION

PROPOSED HIGHWAY RELOCATION

FRESH WATER LINE

PROPOSED OIL LINE RELOCATION

PROPOSED GAS LINE RELOCATION

B.C. HYDRO

WESTERN PETROLEUM (OIL)
INLAND NATURAL GAS

PIT ROAD

PRIMARY CRUSHER

C.O. STOCKPILE

SHOP WHSE

CONST. CAMP

CONCENTRATOR

OFFICE

ULTIMATE PIT

TAILINGS LINE

INITIAL PIT

PROCESSOR

FRESH WATER TANK

SEEPAGE DAM
Crest elev. 2090

EAST DAM
Crest elev. 2400

WASTE ROCK DUMP

MAIN DAM

TAILINGS POND

LEASED & DEEDED LAND BOUNDARY

PURCHASE ORDER

NUMBER	DESCRIPTION

ASSOCIATED DRAWINGS

inches
0 1
0 1 2
centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

0 400 800 1200
Scale - Feet

ISSUE

CERTIFIED FOR CONSTRUCTION

TECK CORPORATION LTD
ISO MINES LTD

AFTON MINES LTD.

AREA

SUBJECT
PROPOSED GENERAL LAYOUT

SCALE

TECK DRAWING NO.
46-04-02

ISSUE

STATISTICS

Ore Reserves

	Cut-off % Cu	Reserves tons	Reserves % Cu	LG and Waste	SR[1]
Stage I Pit	0.50	9,745	1.37	31,925	3.3
Ultimate Pit	0.25	34,060	1.00	126,310	4.2
Possible Underground	0.50	10,000	1.55		

The specific gravities are 2.75 and 1.80 for rock and overburden respectively. The tonnage factors are therefore equal to 11.6 and 18.0 cubic feet per short ton.

('000) tons

[1] Stripping Ratio = Lowgrade plus waste ÷ ore.

STATISTICS

Five Year Mine Production Schedule

Year	Mill Ore tons	Mill Ore % Cu	Stockpile tons	Stockpile % Cu	Waste	SR
Preprod'n			455	0.58	2,045	
1	2,500	1.35	1,200	0.36	13,800	6.0
2	2,500	1.35	1,000	0.36	14,000	6.0
3	2,500	1.35	600	0.36	14,400	6.0
4	2,500	0.95			15,000	6.0
5	2,500	0.95			15,000	6.0
	12,500	1.21	3,255	0.39	61,645	6.0

('000 tons)

STATISTICS

Copper Production

Year	lbs. of Copper
1	58,137,000
2	58,137,000
3	58,137,000
4	40,911,000
5	40,911,000
6	32,298,000
7	40,911,000
8	43,926,000
9	43,926,000
10	43,926,000
11	43,926,000
12	43,926,000
13	25,408,000
14	10,480,000
	584,960,000

STATISTICS

Operating Costs ($ 1977)

Year	Labour	Other	Total
1	5,200,000	9,825,000	15,025,000
2	5,200,000	10,350,000	15,550,000
3	5,200,000	10,350,000	15,550,000
4	5,200,000	9,675,000	14,875,000
5	5,200,000	9,350,000	14,550,000

The mine will employ about 325 people once full production is attained.

STATISTICS

Capital Cost

		$'000
1)	Mine-Mill Complex	38,916
2)	Smelter Complex	17,717
3)	Inventory: Spares and Consumables [1]	675
4)	Contingency Allowance	3,755
5)	Escalation	6,802
6)	Land Acquisition	500
7)	Preproduction Interest	4,335
8)	Working Capital	3,800
9)	Cost Adjustment [2]	3,825
		80,325
	Say	80,000

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1 Inventory will be expanded during the first year of production.

2 Cost estimates 1 through 8 were based on the assumption that the project would reach a 'go' decision by 1 January, 1975. This study assumes this milestone will be reached by 1 July, 1975.

PROVINCE OF
BRITISH COLUMBIA

3713

WHEN REPLYING PLEASE REFER TO

FILE No.....

MINERAL RESOURCES BRANCH
DEPARTMENT OF MINES AND PETROLEUM RESOURCES
VICTORIA

M E M O

TO: Mr. A.L. Peel, Deputy Minister - Department of Mines and Petroleum Resources.

Dr. J.T. Fyles, Associate Deputy Minister, Mineral Resources Branch - Department of Mines and Petroleum Resources.

Mr. J.W. Peck, P.Eng., Chief Inspector of Mines - Department of Mines and Petroleum Resources.

Mr. J. Poyen, Director, Mineral Development Division - Department of Mines and Petroleum Resources.

Dr. A. Sutherland-Brown, Chief Geologist, Geological Division - Department of Mines and Petroleum Resources.

Mr. E.R. Smith, Grazing Division, Forest Service, - Department of Lands, Forests, and Water Resources.

Mr. J. Zacharias, Field Crop Commissioner - Department of Agriculture.

Mr. B. Pendergast, Fish & Wildlife Branch - Department of Recreation and Conservation.

Mr. T.A.J. Leach, Water Resources Service - Department of Lands, Forests and Water Resources.

Mr. J. Sector, Special Projects - Department of Lands, Forests and Water Resources.

Mr. D. O'Gorman - Environment and Land Use Committee - Secretariat.

Mr. F. Hodgson - Pollution Control Branch.

Mr. J. Rae - Department of Economic Development.

RE: AFTON MINES LTD.

Afton Mines Ltd. proposes to put into production the Afton mine located eight miles west of Kamloops adjacent to the Trans-Canada Highway.

The company will outline their development and operating plans to government agencies at a meeting to be held:-

Date: Monday, December 8th, 1975.

Time: 9:00 A.M.

Location: Cedar Room, Parliament Buildings.

The format of the meeting will be a presentation of the development and operating plans of the Afton project followed by a discussion of potential environmental problems.

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The Department of Mines will forward under seperate cover material describing the Afton project.

J.D. McDonald, P.Eng.,
Senior Reclamation Inspector.

JDM:jau
November 24th, 1975.