

020046

YELLOWSTONE MINES LTD. (N.P.L.)

FEASIBILITY REPORT

ON THE

INTERPRO - ATLIN SILVER MINE

ATLIN, BRITISH COLOMBIA

2 July 1974

Eric R Smith, PEng

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY.....	1
INTRODUCTION.....	3
PROPERTY	
Location and Access.....	5
Claims.....	5
Ownership.....	6
HISTORY.....	7
ECONOMIC GEOLOGY AND MINERALIZATION	
Regional.....	8
Local.....	8
MINING POTENTIAL	
Reserves.....	11
Production.....	14
Costs.....	15
CONCLUSIONS.....	18
RECOMMENDATIONS.....	19
REFERENCES.....	20
CERTIFICATE.....	21

LIST OF MAPS

Property Location Map..... following page 6

Property Claim Map..... following report

Longitudinal Sections

#2 vein - 2X-oreshoot 1" = 100'..... following report

2X-orezone 1" = 20'..... following report

Ore Reserves (other than 2X-orezone)..... available at the  
offices of Yellow-  
stone Mines Ltd.

An attempt at placing the property in production at the rate of 100 tons per day in 1969 was postponed due to an adverse price for silver which developed in that year.

However, a greatly improved price for silver has developed recently, making the property feasible for production. Initially, a 50 ton per day mining and milling operation can be established for \$100,000.00 (Can.). The 2X-oreshoot, consisting of 9,000 tons of proven ore averaging 50.0 ozs/ton silver is ready for immediate extraction. Additional ore reserves can be developed for production while the initial block is being processed, and the milling facility would be expanded to 100 or 150 tons per day.

A summary of the operating cost and profit for the 50 tons per day operation, while mining and processing the 9000 tons from the 2X-orezone, would be as follows:

Revenue

90% recovery on ore at 50.0 ozs/ton Ag (silver at \$5.00 an ounce)	\$225.00 per ton
---	------------------

Operating Cost

mining at 50 tons/day	\$25.00	
milling at 50 tons/day	\$10.00	
freight and smelter	<u>\$10.00</u>	
		<u>\$ 45.00 per ton</u>

Net Revenue

\$180.00 per ton

The 9000 tons in the 2X-orezone would net  $9000 \times \$180.00 =$   
\$1,620,000.00, with the production time at 50 tons per day to be 6 months.

FEASIBILITY REPORT  
ON THE  
INTERPRO - ATLIN SILVER MINE  
ATLIN, BRITISH COLUMBIA

INTRODUCTION

This report is prepared at the request of the Board of Directors of Yellowstone Mines Ltd. (NFL), and reviews the economic potential of the Interpro-Atlin mine in northwestern British Columbia.

The writer examined the underground workings and surface facilities on the property on 19 June 1974. Available for background information and reference material were two previous consultant's reports on the property, a mineralogical study on the ore and concentrate, and many maps and plans prepared by the previous developers of the property - Interprovincial Silver Mines Ltd.

In 1968, Dolmage, Campbell and Associated Ltd. recommended that the property be placed into production at the rate of 100 tons per day increasing to 200 tons per day as the ore reserves and working places are increased. A scheduled start-up date for production was late 1969. The ore reserves including dilution available for this mill were estimated at: 55,830 tons at 25 ozs/ton silver and 5% Pb-Zn. (Proven-Probable) and 63,090 tons of possible ore. Total 118,920 tons. A separate report on the ore reserves was drawn up by Chapman Wood and

Griswold Ltd. in February 1969, which listed the reserves in just two of the main veins to be as follows: "probable" - 19,473 tons grading 0.033 ozs/ton gold and 29.86 ozs/ton silver; 'possible' - 12,837 tons grading 0.078 ozs/ton gold and 31.94 ozs/ton silver. Due to an unfavourable price for silver which developed during 1969, the production plans were postponed and the property has been dormant until this year. In a letter dated 16 April 1974, W.J. Weymark, P.Eng. combined the estimated ore reserves from the two previous reports and calculated a reserves tonnage of 39,289 tons in the #2 and #4 veins to have a value of \$6,801,590.00 in gold and silver at the existing prices.

In June of this year, the writer was requested to prepare a new feasibility study on the property and to outline a possible production system if justified.

THE PROPERTYLocation and Access

The Interpro-Atlin property is located at 59°43'N latitude and 133°30'W longitude. This point is in the extreme northwestern corner of British Columbia, 80 miles southeast of Whitehorse and 10 miles northeast of Atlin. Access to the property is by a gravel road off the Atlin-Whitehorse highway, the total distance to Whitehorse being 90 miles.

All of the property is above the timberline, and covers elevations from 4500 to 6000 feet, encompassing Mt. Vaughan and Mt. Leonard. Most of the showings and workings are on the west slope of Mt. Vaughan, and are accessible by a series of switchback roads coming from Crater Creek and Fourth of July Creek.

Claims

The claims forming the Interpro-Atlin mining property consist of 28 crown granted mineral claims and 2 conventional mineral claims:

## Crown Grants

Lot 1172	Lot 4643
1173	4644
1174	4645
1175	4646
4633	4647
4634	4648
4635	4649
4636	4650
4637	4651
4638	6100
4639	6101
4640	6102
4641	6103
4642	6104

Claims (Continued)

Mineral Claims

Canuck 89

Record No. K7634

AM 2 Fr.

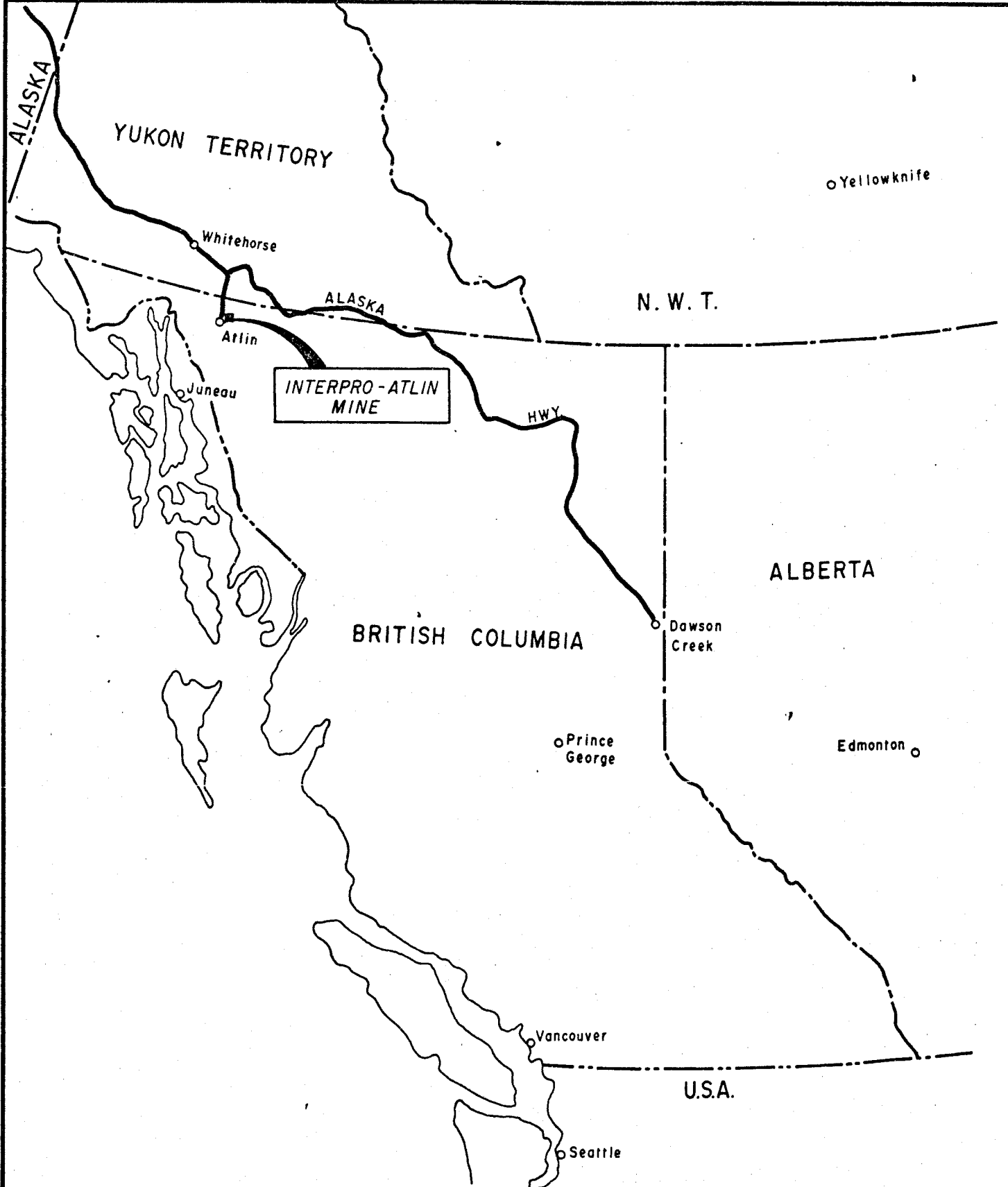
Record No. K6635

Ownership

The registered owner of the 28 crown grants and M.C. AM 2 Fr. is Armore Mines Ltd., 203-27 Carlton Street, Toronto 2, Ontario.

The registered owner of M.C. Canuck 89 is Turismo Industries Ltd.





SCALE IN MILES  
0 100 200



YELLOWSTONE MINES LTD. (NPL)  
INTERPRO-ATLIN MINE  
LOCATION MAP

JUNE 1974

## HISTORY

The original discoveries of silver-lead mineralization in the Mt. Leonard - Mt. Vaughan area were made during the Klondike gold rush days of 1899. Some underground development work was done on the vein zones which resulted in small high grade shipments in the 1920's. The main 2X adit was driven in 1926 by Mr. M.J. Ruffner. Following this period, and up 1967, several interests conducted moderate surface and underground exploration of the many veins exposed on the Interpro property, but no significant production was ever attempted.

In 1968, Interprovincial Silver Mines Ltd., began a substantial program of exploration and development on both the Big Canyon and Ruffner properties, which included diamond drilling from surface and underground, building access roads to many of the old portals, established a camp, and rehabilitated 5 of the adit levels. This program continued until 1969, at which time a proposal to place the property in production had to be postponed indefinitely due to low prices in the silver market.

The property has been known over the years under various names: the Ruffner mine, the Armore property, the Atlin-Ruffner property, Interprovincial Silver Mines, and currently as the Interpro-Atlin mine.

ECONOMIC GEOLOGY AND MINERALIZATIONRegional

The Atlin district lies just to the east of the Coast Range Batholith in northwestern British Columbia. In this area, several intrusive stocks of granitic rocks cut into the regional mass of Paleozoic and older sedimentary rocks. These intrusives are Mesozoic in age, with some zoning in composition.

Mineral occurrences in the area are generally related to the outer fringes of these intrusive stocks. Prospectors noticed the silver-lead deposits during the Klondike gold rush days as they proceeded up the various canyons and draws in search of precious metals. In recent years, exploration in the Atlin area has uncovered a typical suite of intrusive-type mineralization, ranging from high grade gold-silver-lead-zinc vein deposits to low grade molybdenum deposits (Adanac).

Local

The claims forming the Interpro-Atlin property are underlain by granitic rocks of the Coast Range intrusives. These granites are medium to coarse grained, crystalline to moderately foliated, and contain hornblende, plagioclase, biotite and quartz. Some porphyritic varieties are present.

The major structure within this granitic environment is a series of regionally parallel fault zones, showing strong shear movement. These faults strike generally northeast with a 70° dip to the northwest. The distance between the individual shears usually measures hundreds of feet. The ground between

Local (Continued)

the faults is strongly block-jointed as is usual in granitic rocks in the vicinity of major fault zones.

Much of the fault zones is occupied by a andesitic to diabasic material similar to dykes. Post dyke faulting and brecciation within the shear zones is common, with the resulting effect being that of lenses, fingers and bands of dyke material. It is along these dyke-fault zones that silver-bearing mineralization has formed.

The economic mineralization consists of vein material made up of quartz and calcite with galena, sphalerite, chalcopryrite, tetrahedrite, pyrite and pyrrhotite. Arsenopyrite and proustite (ruby silver) are also present. The silver values generally occur with the lead and zinc mineralization.

A mineralogical examination of ore and concentrate from the mine was reported by Dr. J.A. Chamberlain of Dolmage, Campbell and Associates Ltd. Feb. 5, 1969. He identified the following sulphide minerals:

Galena  
Sphalerite  
Arsenopyrite  
Pyrite  
Chalcopyrite  
Marcasite  
Tetrahedrite  
Enargite

A sample of ore was concentrated by Britton Research Ltd., into a lead concentrate and a zinc concentrate. The lead concentrate resulted in the following assay:

Local (Continued)

gold ozs/ton	0.19
silver ozs/ton	233.7
lead %	55.07
zinc %	3.30
iron %	10.31

## The zinc concentrate returned:

gold ozs/ton	0.04
silver ozs/ton	23.1
lead %	1.28
zinc %	48.93
iron %	12.07

MINING POTENTIALReserves

An estimate of the reserves available for mining operations on the Intropro-Atlin mine is given in the following table. These figures are an updated composite of the reserve estimates made by Dolmage-Campbell and Associates, and by Chapman, Wood and Griswold Ltd. in 1968 (see references).

For the purposes of this report, the following terms used in the reserve categories are defined as follows:

- "Proven Ore" - blocks of vein material that have been exposed and sampled by drift or raise development in at least two dimensions, with projections to a maximum of 30 feet beyond exposed openings or diamond drill intersections that fall within the block.
- "Probable Ore" - blocks of vein material that has been intersected by one dimension of development and/or by two or more diamond drill holes with a maximum projection of 30 feet.
- "Possible Ore" - blocks of vein material that have been projected by geological interpretation to a reasonable distance beyond proven or probable ore.

The tonnages included in this reserve estimation are confined to blocks of vein material that average at least 10 ozs/ton silver across 3 feet. In addition to the 34,900 tons classed as ore reserve, an additional 7,000 tons of material averaging 5.13 ozs/ton silver is indicated as low grade reserve in the 2X-adit.

Reserves (Continued)

As mining progresses on the main veins, it is expected that other blocks of vein material will be discovered and exposed to add reserve tonnages to those all ready listed. In fact, the overall potential on the property could be in the vicinity of 200,000 tons.

SUMMARY OF RESERVES

<u>Location</u>	<u>Proven</u>	<u>Ozs/Ton Silver</u>	<u>Probable</u>	<u>Ozs/Ton Silver</u>	<u>Possible</u>	<u>Ozs/Ton Silver</u>
2-C shaft					3,700 tons	34
2-B adit			1,000 tons	13	1,500 tons	13
2-A adit			3,600 tons	13	2,700 tons	13
2-X adit	9,000 tons	50	4,000 tons	15		
4AA-adit			1,000 tons	31	2,400 tons	27
4A-adit			1,500 tons	18	1,500 tons	18
4E-adit			1,000 tons	32	2,000 tons	33
TOTALS	9,000 tons	50	12,100 tons	17.3	13,800 tons	24.5

Total proven, probable and possible: 34,900 tons at 28.6 ozs/ton silver.



### Production

The amount and distribution of the ore reserve available on the property justifies a production facility in the order of 100 to 150 tons per day. This would be possible by operating from 2 working levels at the rate of 50 to 75 tons per day from each level. A centrally located milling facility would process the ore from all locations, in addition to potential ore found elsewhere on the property.

Before a permanent production facility is installed, it is recommended that a temporary milling circuit be set up to process ore from one level. This would be a bulk sampling system which could be installed in 60 days, and which would allow an immediate start on production. A 50 ton per day rate would be operated until the overall characteristics of mining and milling are established, at which time a permanent production facility would be built. In addition, underground development of all the reserve tonnage would be possible in order for a continuous production of 100 to 150 tons per day to be maintained. Currently, only the reserve tonnages listed in the 2X-sdit are available for immediate extraction.

### Costs

#### (1) Pre-production

The initial proposal to install a 50 tons per day mining and milling circuit is designed to extract and process the ore available in the 2X-sdit. This rate of production would be maintained for approximately 6 months during which time the reserves

Costs (Continued)

in other areas could be developed for production.

Facilities required to process the initial run of ore would be as follows: a grinding and concentrating circuit consisting of coarse and fine crushing units, screens, conveyors, and either a mechanical (table and/or jig) or floatation concentrator. This circuit would be installed at the portal of the 2D-adit.

The development headings required to commence stope mining in the 2X-orezone are already completed, and only the supply facilities (air and water) have to be rehabilitated.

A breakdown of the cost estimate required to establish the 50 TPD operation is outlined on page 16.

(2) Operating

An estimate of the operating cost is outlined on page 17.

Cost Estimate

To prepare underground workings for 50 TPD production:

Rehabilitate air and water lines, pumps and electrical system, and compressor	\$ 5,000.00
Upgrade existing track on 2D-level, and install dumping facility at portal	2,000.00
Rehabilitate chutes, ladders and general retimbering	3,000.00

To install complete 50 TPD milling circuit:

Mill equipment and installation	50,000.00
Related buildings and office facilities	10,000.00

Moving stock and surface facilities:

Trammer and ore cars (available locally)	10,000.00
4 x 4 Truck	8,000.00
Upgrade access roads	2,000.00

TOTAL	\$ 90,000.00
-------	--------------

Contingency	10,000.00
-------------	-----------

<u>Total preproduction cost</u>	<u>\$100,000.00</u>
---------------------------------	---------------------

Operating Cost

To operate a 50 tons per day system, the following estimated costs can be used as a guide. Only when the system is operating can accurate cost determinations be made.

MINING (50 TPD)	
contract bases delivered to portal of 2D-adit	\$ 25.00 per ton
MILLING	
all inclusive	\$ 10.00 per ton
FREIGHT AND SMELTER	
assuming a 4 to 1 concentration (\$40.00 per ton of concentrate)	\$ 10.00 per ton
	<hr/>
TOTAL OPERATING COST	\$ 45.00 per ton

CONCLUSIONS

Assuming an operating cost of \$45.00 per ton (including freight and smelter charges), it would be feasible to process ore from the mine which nets at least \$50.00 per ton, or 10 ounces of silver per ton at \$5.00/ounce. No allowance for gold, lead and zinc payments are considered, as they would be required to offset any penalty charges at the smelter for iron, arsenic, etc.

The current ore reserves of 34,900 tons at 28.6 ozs/ton silver justify a production rate of up to 150 tons per day, with an initial rate of 50 tons per day for the first 6 months.

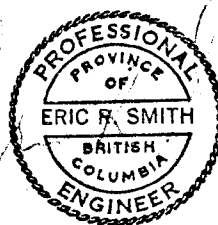
RECOMMENDATIONS

1. It is recommended that the sum of \$190,000.00 be allocated to place the Interpro-Atlin mine in production at the rate of 50 tons per day. This allocation would be used as follows:

Preproduction Cost	\$100,000.00
Operating Capital (2 months at \$45,000.00 per month)	\$ 90,000.00
	<hr/>
TOTAL	\$190,000.00

2. It is recommended that the 2X-orezone be extracted to feed the mill for the first 6 months, during which time consideration be given towards expanding the operation to 100 or 150 tons per day as additional reserves are developed for production.

Respectfully submitted,



2 July 1974

Eric R Smith, PEng

REFERENCES

## Previous feasibility reports and reserve estimations:

1. "Preliminary Feasibility Report, Atlin Properties" for Interprovincial Silver Mines Ltd. (N.P.L.) by Dolmage-Campbell and Associates Ltd., 19 Oct, 1968.
2. "Reserve Tonnage and Grade Estimate, Interprovincial Silver Mines Property", by Chapman, Wood and Griswold Ltd., 19 Feb, 1969.
3. Letter to Yellowstone Mines Ltd. (N.P.L.) by W.J. Weymark, P.Eng., dated 16 April, 1974.

## Mineralogical studies:

1. "Mineralogical Examination of Ore and Concentrate from Interprovincial Silver Mines Ltd." by J.A. Chamberlain of Dolmage-Campbell and Associates Ltd., 5 Feb, 1969.

## Diamond drilling and underground sampling:

1. Maps, plans, logs and reports provided by Interprovincial Silver Mines Ltd.

Note: All these references are available in the offices of Yellowstone Mines Ltd., Vancouver, B.C.

CERTIFICATE

I, Eric R. Smith, of ~~4444~~ - 44B Avenue in the Corporation of Delta, in the province of British Columbia, do hereby certify:

1. That I am a Consulting Geologist with an office at ~~4444~~ - 44B Avenue, Delta, B.C.
2. That I am a graduate of Carleton University, Ottawa, Ontario, and hold a B.Sc. degree in Geology.
3. That I am registered with the Association of Professional Engineers of British Columbia.
4. That I have been practising my profession as a Geologist for the past 8 years.
5. That I have personally examined the underground workings and showings on the Interpro property on the 19th of June 1974, and that I have sampled portions of the mineralized structures under discussion.
6. That I have no interest, direct or indirect in the properties or securities of Yellowstone Mines Ltd., nor do I expect to receive any interest in the future.



Dated at Delta, B.C.  
on the 2nd day of July 1974.

Eric R. Smith, P.Eng.