VIC 177-#318-# 6438

6438

ASSESSMENT REPORT

GEOLOGICAL AND DIAMOND DRILL PROGRAMS

JUNE, 1977

SKI 3 CLAIM, ATAN LAKE PROPERTY

Liard Mining Division, B.C.

Financed by

TOURNIGAN MINING EXPLORATIONS LTD.

Vancouver,B.C.

Report by:

W.G. Smitheringale, Ph.D., P. Eng.

October 5, 1977

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

INTRODUCTION

Between May 18 and June 27, 1977 Tournigan Mining Explorations Ltd. financed a program on the Atan Lake property comprising general geological investigation of the property as a whole and 1000' of diamond drilling and detailed geological mapping on the Ski #3 claim. The Atan Lake property is owned solely by Tournigan Mining Explorations Ltd.

The program was supervised by W.G. Smitheringale & Associates Ltd., of Vancouver, B.C.

LOCATION AND ACCESS

The property is at Lat. 59°12'N - Long. 129°12'W, about 10 miles by bush road off the Stewart - Cassiar - Watson Lake highway. It is about 85 miles by road southwest of Watson Lake, Y.T. and 38 miles by road from Cassiar, B.C. The property is also accessible by float plane to Atan Lake or Dease River.

DIAMOND DRILLING, SKI No.3 CLAIM

Contractor:	Wink International Exploration Drilling Ltd. 105B - 12511 No.2 Road Richmond, B.C. V7E 2G3
Equipment and Core Size:	One Hydra-Wink Drill BQ Core (3.5cm dia.)
Footage and Location:	1000' 5 holes, designated 77-1 through 77-5 Ski #3 claim (see Fig.3 for exact locations)
Core Logging:	by W.G. Smitheringale, P. Eng. (see Appendix II for logs)
Core Storage:	Tournigan Mining Explorations Ltd. warehouse in old hanger at Watson Lake airport.

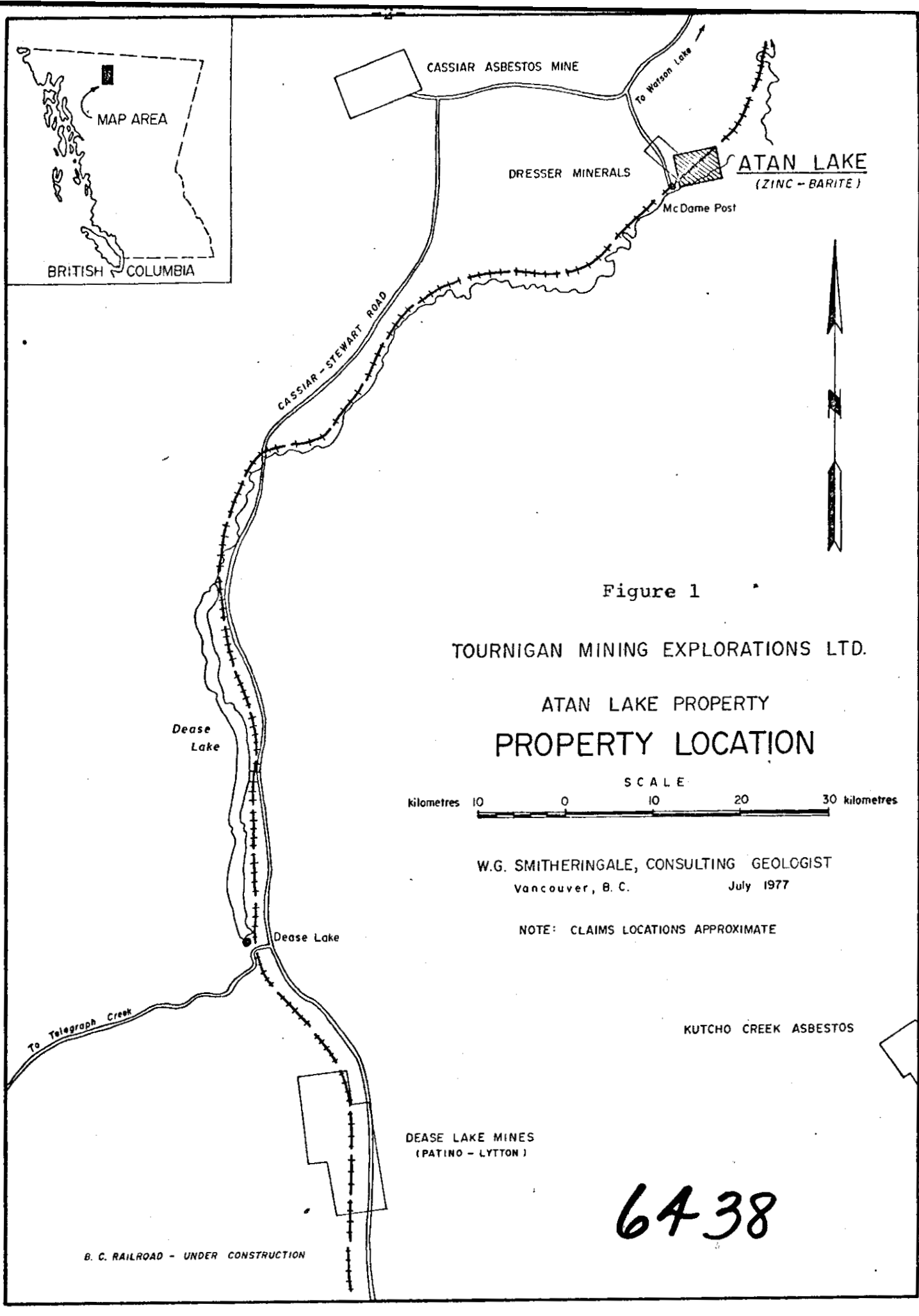


Figure 1

TOURNIGAN MINING EXPLORATIONS LTD.

ATAN LAKE PROPERTY

PROPERTY LOCATION

SCALE

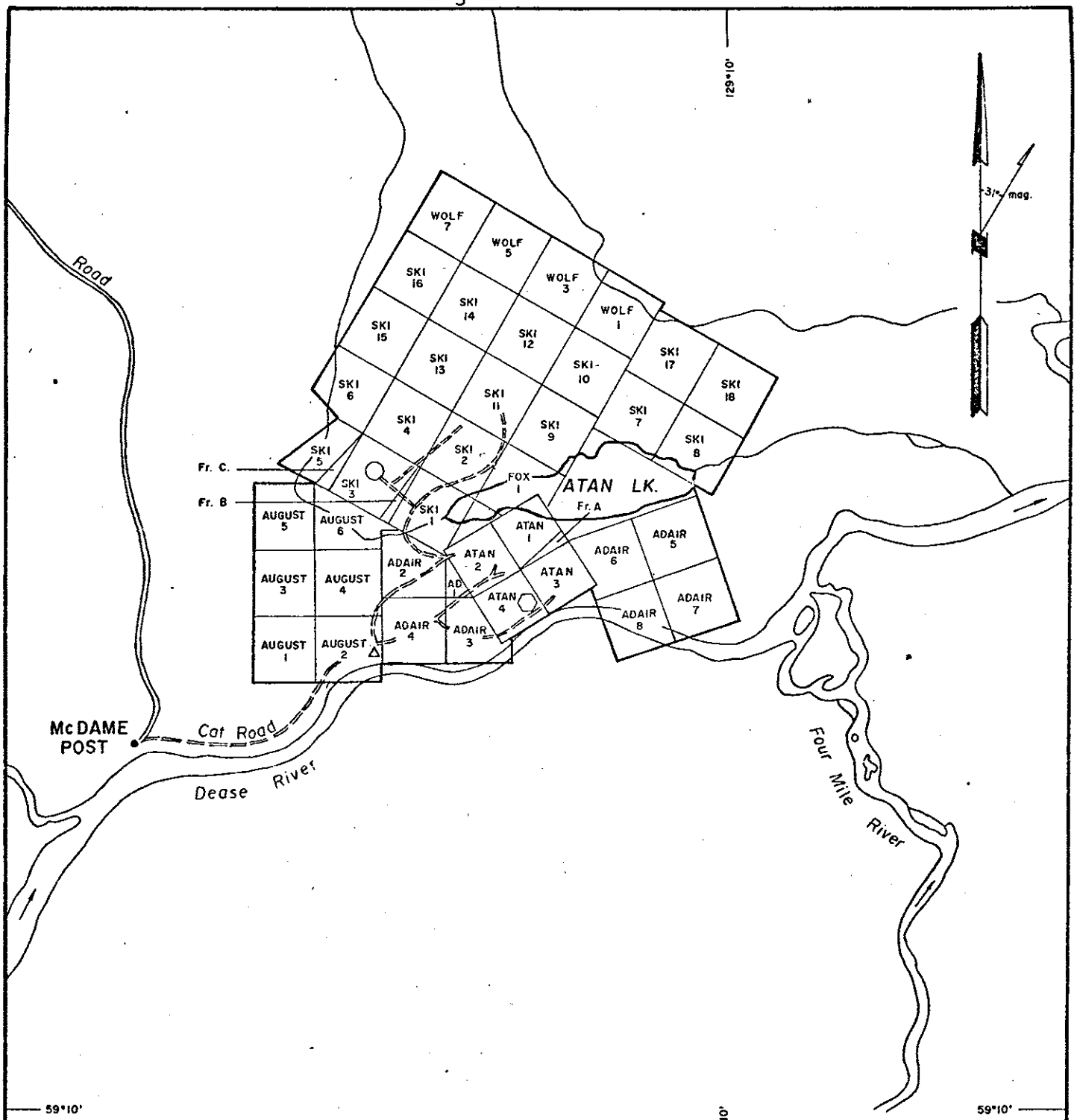
kilometres 10 0 10 20 30 kilometres

W.G. SMITHERINGALE, CONSULTING GEOLOGIST

Vancouver, B. C. July 1977

NOTE: CLAIMS LOCATIONS APPROXIMATE

6438



6498

Figure 2

TOURNIGAN MINING EXPLORATIONS LTD.

ATAN LAKE PROPERTY

CLAIMS AND ROADS

McDAME AREA, CASSIAR REGION
LIARD MINING DIVISION, B. C.

SCALE
kilometres 0 kilometres

W.G. SMITHERINGALE, CONSULTING GEOLOGIST
Vancouver, B. C. July 1977

LEGEND
- Access Roads
- North Zone
- Barite Hill
- Camp

Assays:	Chemex Labs Ltd. 212 Brooksbank Avenue North Vancouver, B.C. (see Appendix II for assay results)
Costs:	$16,617.07 (see Appendix I for drilling contract and invoice)

GEOLOGICAL PROGRAM

The following work was done in connection with geological mapping on the Ski #3 claim.

A grid of reference stations was established on the North Zone by chain and compass survey and tied to the existing baseline.

A contour map of the North Zone was constructed based on elevations obtained with chain and compass.

Locations of previous diamond drill holes, holes drilled during the June 1977 program and important trenches were surveyed by chain and compass.

Some outcrops were sampled.

Geological mapping.

GEOLOGY OF SKI No.3 CLAIM

Rock exposures on Ski No.3 claim are limited to a prominent hill known as the North Zone (Fig.3). The 1977 drilling and geological program was concentrated on this zone. Bedrock underlying the North Zone consists of dolostone of various kinds that in places has been replaced by chert.

The basic type of dolostone is medium to dark grey, mottled to uniformly coloured, fine grained, massive to distinctly bedded, and in places stylolitic and/or graphitic. This type has been modified to varying degrees by solution and attendant collapse brecciation, the formation of vugs and the development of white, medium-to coarse-grained

dolomite healing fractures, lining vugs and replacing fine-grained dolostone adjacent to bedding laminae and stylolites.

In the western part of the North Zone most, although not all, dolostone beds have been replaced by chert to produce a dark grey to black, massive to vuggy rock. This replacement chert is easily distinguished from light grey primary chert that occurs sparingly as thin beds and lenses in some dolostone beds. In the central and eastern portions of the North Zone dolostone is dominant, however, some beds or portions of beds have been replaced by chert. In general the replacement chert bodies are strataform, however, locally the boundaries of chert bodies cut across stratification in the dolostones.

Strata in the North Zone generally strike 320° to 340° and dip 45° to 55° southwestward. Local variations suggest small scale folding and/or penecontemporaneous deformation.

Several northeasterly trending, steeply dipping faults are exposed in trenches, but these do not appear to be important structural features.

The dominant joint set, which locally assumes the appearance of a fracture zone, strikes 060° to 080° and dips 70° to 90°NW. Other joint sets are 005° to 025°/75°to 90°E and 145°/35°SW.

MINERALIZATION ON SKI No.3 CLAIM

Mineralization of economic significance in the North Zone consists of disseminated to 'globular' sphalerite that occurs mainly but not exclusively in beds replaced by chert, and of massive barite that occurs as cavity fillings in fractures and as replacement bodies in dolostone beds. Small amounts of barite are associated with sphalerite in places and some barite bodies contain occasional grains of sphalerite, but

from an economic viewpoint they should be considered as two distinct forms of mineralization.

Galena in minor amounts occurs with sphalerite in places and occasional grains of chalcopyrite and tetrahedrite occur along the margins of some barite bodies. Pyrite is a common although minor constituent of the host rocks in the North Zone.

Small quantities of oxides and/or carbonates of zinc are present in a number of places in outcrop and drill core. These were recognized by a positive reaction to the N,N-diethylaniline-potassium ferricyanide spot test.

Description of Zinc Occurrences

Drilling in 1973 encountered the following intersections containing sphalerite:

D.D.H. No.	Footage	Core Length	% Zinc	Associated Minerals
73-1 (includes 1.7' of 17.0% Zn)	165.0' - 176.3'	11.3'	3.07	Pyrite and white dolomite in dark grey chert
73-2	107.0' - 113.0'	6.0'	0.10	Pyrite, galena
73-3	196.0' - 198.5'	2.5'	3.40	Barite
73-4	12.0' - 21.0'	9.0'	0.30	Pyrite, barite, tetrahedrite

The object of the 1977 drilling program was to explore the 3.4m intersection of 3.07% Zn in DDH 73-1. Three holes, 77-1, 77-2, and 77-3 probed the volume around DDH 73-1 in a triangular pattern, each hole being about 7m from DDH 73-1. These drill holes encountered the mineralized zone but they did not intersect significant widths of high grade mineralization. The results are summarized below.

D.D.H. No.	Interval (Metres)	Core Length	% Zinc	Comments
77-1	56.1 - 57.9	1.8m	1.32	Sphalerite in chert brecciated and healed with white dolomite
	(includes 0.3m of 7.68% Zn)			
77-2	9.1 - 14.0	4.9m	0.25	Light grey, fine-grained, banded dolostone. Pos. Zn spot test. No sulphides
	43.6 - 43.9	0.3m	0.16	Sphalerite in chert.
77-3	55.8 - 56.1	0.3m	0.54	Sphalerite in dolostone

The best intervals of mineralization occur in or immediately adjacent to chert. The sphalerite is reddish brown and occurs as blebs or fine-grained disseminations.

Interpretation of Zinc Mineralization

The drill hole data indicate that sphalerite does not occur as veins or fracture fillings. The absence of intrusive rocks in the area and of contact metasomatic minerals and textures indicates that the mineralization is not directly related to igneous activity.

The nature of the host rocks and the fact that the showing is one of several Zn-Pb showings occurring in the same stratigraphic unit in the McDame-Mt. Haskin region indicates to the writer that the zinc mineralization is of the 'Mississippi Valley' type. In fact, the Atan Lake showing is similar in many respect, particularly in its association with secondary chert, to the zinc deposits in the Tri-state district in the U.S.A. The shape of this type of deposit is characteristically irregular. The most effective exploration techniques are geological mapping and grid drilling.

Description of Barite Occurrences

Two barite occurrences in the North Zone appear to contain sufficient material to support a small open pit operation. These are designated 1 and 2 on Fig.3. Another occurrence, designated 3, might possibly contain mineable widths of barite. The barite in these bodies is high quality and is reported to be suitable for some pharmaceutical uses.

Occurrence 1:

This occurrence is exposed in a bulldozer trench excavated in 1969. The walls of the trench are now slumped and the precise shape of the surface exposure is masked. (The exposure comprises essentially 100 per cent white, very coarse-grained barite). The barite body is 12m long and, judging from the present exposure and from photographs of the fresh excavation, it appears to be about 1m wide and to be exposed for a depth of about 1.5m. The body appears to be tabular in shape and to dip steeply northward.

Occurrence 2:

This occurrence appears to be a tabular body lying parallel to bedding. Bedding in this area dips 45° south-westward.

The body was intersected in diamond drill holes 73-4 and 77-5. In DDH 73-4, the true thickness of the body 10m beneath the surface is approximately 1m. In DDH 77-5 the true thickness of the body 5m beneath the surface is approximately 3m. The two intersections are about 20m apart along strike of the body. Bedrock is not exposed where the body projects to surface, but 5m to 10m in a 'down-ice' (northeast) direction from the surface

projection of the DDH 77-5 intersection much barite rubble on top of bedrock was exposed by stripping.

The intersection in DDH 77-5 consists almost 100 per cent of white, very coarse-grained barite. It is identical in appearance to the barite in occurrence 1. The intersection in DDH 73-4 was logged as "mainly barite".

Occurrence 3:

In DDH 73-3, 0.6m of "massive, white, coarse-grained" barite was intersected 12m vertically beneath the surface. Bedrock is not exposed where this intersection projects up the dip of bedding to surface, but 34m northwest almost exactly along strike from the surface projection there is an outcrop of dolomite containing numerous pods of very coarse-grained white barite. It is probable that a zone containing barite lies parallel to bedding in the vicinity of Occurrence 3.

Barite Hill:

Barite Hill lies 1.3km. southweast of the North Zone on Atan No. 4 claim. It is underlain by limestone, dolostone and chert formed by replacement of dolostone.

Discontinuous outcrops of white, very coarse-grained barite occur in a 30m long zone trending 020^{o} across the top of Barite Hill (Fig.4) Several other more widely spaced outcrops of similar barite along this trend extend the zone to about 55m. The host rock is dolostone.

Inperpretation of Barite Occurrences

For the purpose of estimating the possible tonnage that may be readily accessible in Occurrence 1, it is assumed that the body is 12m long, 1m wide and extends to a depth of 15m. The calculation is limited to 15m because this is

the depth to which an open pit with a favourable ore to waste ratio could be excavated in two benches using small, inexpensive equipment. Assuming the barite has S.G. = 4.3, the possible reserves in the North Zone Occurrence 1 are approximately 770 tonnes.

For purposes of estimating the possible tonnage present in Occurrence 2, it is assumed that the body is 30m long (i.e. that it extends along strike 5m northwest of DDH 73-4 and 5m southeast of DDH 77-5), that it extends down-dip to a depth of 15m beneath the surface (a convenient depth to which to mine), that its average thickness is 2m and that its S.G. is 4.3. On this basis 3,870 tonnes are possibly present in the North Zone Occurrence 2.

No data are available to indicate the size of barite bodies that may be present in the North Zone Occurrence 3. However, considering the size of the zone it could contain a body of 1,500 tonnes.

The apparent minimum dimensions of the zone on Barite Hill, assuming continuity between the close-spaced outcrops, is 1.5m thick and 30m long. Assuming it extends to a depth of 15m and that the S.G. of the body averages 4.3, there is possibly about 2,900 tonnes present. If the body is 55m long there could be an additional 2,420 tonnes present.

In summary, the possible reserves of barite to a depth of 15m are as follows:

North Zone	(A)	(B)
Occurrence 1	770	
Occurrence 2	3,870	
Occurrence 3		1,500
Barite Hill		
Main Zone	2,900	
Extension of main zone		2,420
	7,540	3,920

(A) Based on drill hole data or surface exposures and geology.

(B) Based mainly on geological speculation.

CONCLUSIONS

1. The sphalerite occurrences in the North Zone are stratabound and are spatially related to chert bodies formed by replacement of dolostone. The Zone of replacement chert that is exposed intermittently for 1,500m southeast of the North Zone warrants exploration for zinc deposits by detailed geochemical soil sampling, geological mapping and grid drilling.

2. The main barite occurrences in the North Zone and on Barite Hill warrant exploration by drilling and stripping. In the writer's opinion there is a reasonably good possibility, by mineral exploration standards, that these occurrences contain 7,540 tonnes to 11,460 tonnes of high quality barite within 15m of surface.

3. The barite occurrences appear to be spatially related to the chert bodies. The areas of shallow overburden within the 1,500m long zone of replacement chert southeast of the North Zone warrant exploration for barite.

PERSONNEL AND DATES WORKED

W.G. Smitheringale, Ph.D., P. Eng., Geological Consultant:

Drill Supervision and Geological Mapping,
May 23, to June 27, 35 days.

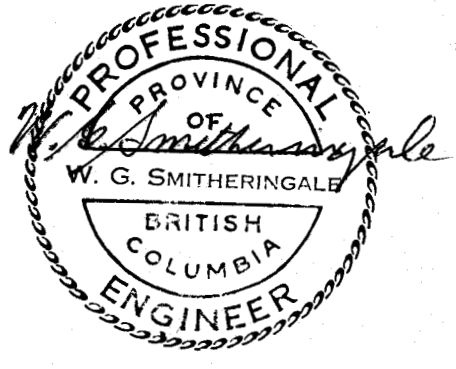
Report Preparation 7.8 days

Marion Smith, Draftswoman:- July 27 - August 3, 4.8 days

EXPENSES

Diamond drilling	$ 16,617.07
Field supervision, W.G. Smitheringale	
35 days at $150/day	5,250.00
Report preparation, W.G. Smitheringale	
7.8 days at $100/day	780.00
Drafting, Altair Drafting Services	
36 hrs. at $12/hr.	432.00
Supplies and reproductions	38.35
Food and accommodation	744.47
Truck rental and gas (4x4 half ton)	632.80
Air travel, Vancouver to Watson Lake including hotel	1,501.34
Air support	
Helicopter	544.00
Fixed-wing	142.80
Field expenses	242.86
Assaying	236.50
	$ 27,162.19

Respectfully submitted



W.G. Smitheringale, P.Eng.
October 5, 1977

CERTIFICATION

I, William G. Smitheringale, do hereby certify that:

1. I am a practicing Professional Geological Engineer, resident in North Vancouver, B.C.

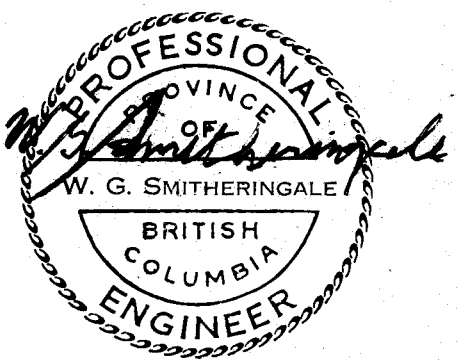
2. I am a graduate of the University of British Columbia with a degree in Geological Engineering (B.Ap.Sc., 1955) and of the Massachusetts Institute of Technology with the degree of Doctor of Philosophy in Geology (Ph.D., 1962).

3. I have practiced my profession continously for fifteen years as geologist with the Geological Survey of Canada, as Assistant and Associate Professor, Department of Geology, Memorial University of Newfoundland, and since 1974 as a Consulting Geologist.

4. I am a member in good standing of the Association of Professional Engineers of the Province of British Columbia and of the Association of Professional Engineers of Newfoundland.

5. This report is based mainly on geological mapping by the author and on a diamond drill program supervised by the author.

6. I have no financial interest in the Atan Lake property or in Tournigan Mining Explorations Ltd.



W.G. Smitheringale, P.Eng.

704-535 Thurlow St,
Vancouver,B.C.

October 5, 1977

APPENDIX I

DIAMOND DRILL CONTRACT

AND INVOICE

Wink International Exploration Drilling Ltd.

EXPLORATION DRILLING · CONSULTING · HYDRA-WINK SALES

105B - 12511 No. 2 ROAD
RICHMOND, B.C., CANADA V7E 2G3

TELEPHONE: (604) 271-7117

1833

THIS AGREEMENT MADE THIS 28TH DAY OF MARCH, 1977

BETWEEN: TOURNIGAN MINING EXPLORATION LTD.,
535 THURLOW,
VANCOUVER, B. C.

Hereinafter referred to as the "COMPANY"

AND: WINK INTERNATIONAL EXPLORATION DRILLING LTD.,
105B, 12511 NO. 2 ROAD,
RICHMOND, B. C., V7E 2G3

Hereinafter referred to as the "CONTRACTOR"

WHEREAS the COMPANY has requested the CONTRACTOR to perform certain surface diamond drilling and related services on their property located in the vicinity of CASSIAR, B. C.

AND WHEREAS the CONTRACTOR has agreed to perform the said diamond drilling and related services requested upon the terms, conditions and provisions hereinafter contained.

NOW THEREFORE THIS AGREEMENT WITNESSETH that in consideration of the payment of the amounts hereinafter stipulated and of the mutual covenants hereinafter contained, the parties hereto agree as specified herein.

THE CONTRACTOR COVENANTS AND AGREES

1. To provide all of the required equipment including but not limited to: One Hydra-Wink drill and equipment including diamond set items to drill to a depth of 400 feet from surface or that of the capacity of the Hydra-Wink drill, to recover BQ size core.

2. That all its labour, diamond wear and loss, and all other operating expenses, except as hereinafter provided, shall be at its own cost and expense and for its own account.

3. To provide a drilling crew consisting of one operator and one helper to work a daily drilling shift of twelve hours seven days each week.

4. That it will be responsible for mobilizing its men, supplies, drill and equipment between VANCOUVER and the property at no cost to the COMPANY. Moving in and setting up the drill on hole No. 1, tearing down and moving out at the completion of the contract will also be the CONTRACTOR'S responsibility at no cost to the COMPANY. The COMPANY will be responsible for clearing all sites necessary for drill set up.

5. To provide a truck to service the drilling operations.

6. To provide camp accommodations for the drill crew, including board.

7. To perform and execute all work and services required pursuant to this agreement in a proper, careful and workmanlike manner and that it will be responsible for and will pay promptly all dues and assessments under any Workmen's Compensation Act or similar acts whether Provincial or Federal in respect of its employees and will indemnify and save harmless the COMPANY against and from all claims whatsoever arising by reason of any injury or injuries sustained by any employee or workman of the CONTRACTOR while engaged in the employment of the CONTRACTOR.

8. That it will carry, and will show proof prior to commencement of work, Third Party Liability Insurance, covering legal liability for bodily injury to or death of any person or for damage to property in the amount of $500,000.00.

9. To recover as high a percentage of core as the drilling conditions allow.

10. Any information regarding drill results will not be revealed by the CONTRACTOR or its employees. Persons other than the COMPANY'S representatives will not be permitted access to the core.

11. That, during the course of the work, the CONTRACTOR shall at all times keep the COMPANY'S premises and drill sites free from waste or rubbish and on completion of work will remove all materials and leave the sites in a clean condition.

THE COMPANY COVENANTS AND AGREES

1. That if cavities or loose ground or other conditions be encountered such that further drilling becomes impractical, the hole may be abandoned by mutual consent and the CONTRACTOR be paid for all footage completed.

2. That the cost of all drilling items left or lost in the hole shall be for the COMPANY'S account at cost except when the items are lost due to the negligence or willful acts or omissions of the CONTRACTOR.

3. That the cost of core boxes and shipping costs of same shall be forthe COMPANY'S account at no cost to the CONTRACTOR.

4. That it will provide access roads to all drill sites and prepare sites suitable for drill set up.

5. That the additional cost to rent or supply extra pumping units and supplies and extra labour and maintence for water supply greater than 3,000 feet in distance and 300 feet in lift, be charged to the COMPANY at the CONTRACTOR'S cost.

6. To pay the CONTRACTOR for footage drilled or other services performed as follows:

   (a) For penetration of overburden at the rate of $15.00 per lineal foot penetrated.

   (b) For diamond drilling to a depth in each hole recovering BQ size core at the rate of $15.00 per lineal foot drilled.

7. To pay the CONTRACTOR an advance of $5,000.00 within the two week period immediately preceding commencement of work. This advance payment will be applied against the CONTRACTOR'S final invoice.

MUTUAL COVENANTS AND AGREEMENTS

IT IS FURTHER MUTUALLY UNDERSTOOD AND AGREED BETWEEN THE PARTIES HERETO:

1. The work is to consist of no more than four holes from a minimum of 200 feet to a maximum of 400 feet deep for a total of 1,000 minimum feet of drilling. This total may be extended by mutual consent.

   No drill holes shall be drilled at angles flatter than 45 degrees to the horizontal. The measurement of all holes shall be from the top of the casing.

2. The work shall commence on or about the 1st day of May, 1977 and will be carried out on a one shift per day basis, operating seven days per week.

3. The content of this agreement shall remain confidential.

4. The CONTRACTOR shall invoice the COMPANY at semi-monthly intervals for services provided and such invoices shall become due and payable within 15 days of receipt.

TOURNIGAN MINING EXPLORATION LTD.

WINK INTERNATIONAL EXPLORATION DRILLING LTD.

Wink International Exploration Drilling Ltd.

EXPLORATION DRILLING · CONSULTING · HYDRA-WINK SALES

105B - 12511 No. 2 ROAD
RICHMOND, B.C., CANADA V7E 2G3

TELEPHONE: (604) 271-7117

June 27, 1977.

I N V O I C E

Tournigan Mining Exploration Ltd.,
535 Thurlow,
VANCOUVER, B. C.

CASSIAR, B. C. Drilling Operations - May 18 - June 23, 1977

1,000 ft. @ $15.00 — 15,000.00

Labour - Cementing Operations

		Hours Runner	Hours Helper	
	June 2	1 ✓	1 ✓	
	3	6 ✓	6 ✓	
	4	1½ ✓	- ✓	
	8	1 ✓	1 ✓	
	9	2 ✓	2 ✓	
	10	10 ✓	8 ✓	
	11	2 ✓	2 ✓	
	13	1 ✓	- ✓	
	14	7½ ✓	7½ ✓	
Moving - 5th Hole	18	8½	8½ ✓	
	19	2	2 ✓	
Trip to Cassiar		6(1/3 of 6 hr) 2	2	- Chg. 1/3 of Grub Chgs.
		9(1/2 of 4 hr) 2	2	- Pick up Cement, Grub, Bits
		46½	42	

88½ Hours @ $10.00		885.00
1/3 of Our Grub Charges ($494.67)		164.89
4 Trips to Cassiar for Cement (63 miles return)	@ .20	50.40
Cement as per attached invoice copies		106.96
40 only BQ Core Boxes @ 5.00		200.00
June 12 - 16 ft. BW Casing		111.75
- 1 only BW Casing Shoe		98.07
		16,617.07

APPENDIX II

DIAMOND DRILL LOGS AND DRILL CORE ASSAYS, 1977 ATAN LAKE PROJECT

TOURNIGAN MINING EXPLORATIONS LTD

Project:	Atan Lake, 1977	Elev. collar:	17.3m
Hole:	DDH 77-1	Started:	June 2nd.
Bearing:	353°	Finished:	June 6
Inclination:	-47°	Logged by:	W.G. Smitheringale
Depth:	72.5m		

Recovery: 22' - 31': 75%, much in small pieces;
31' - 55': 80% but well broken; 55' - 72': 100%;
72' - 94': 80%; 94'-116': 80%; 116' -139': 90%;
139'-165': 100%; 165'-187': 95%; 187' -189': 50%*;
189'-238': 95%.

* This interval of only 50% recovery immediately proceeds the interval of good mineralization.

Feet	
0-22	Overburden
22-25	Massive, coarse-grained, secondary white dolomite; 5% vugs; no mineralization.
25-33	Dolomite. Medium grey, very fine-grained, crystaline; some mottled light-dark grey with stylolites; less than 5% secondary white dolomite in patches and fractures.
33-50	Dolomite. Faintly mottled light-dark grey, fine-grained, crystaline. In places light grey dolomite has interstitial black 'chert'. Occasional stylolite. 5% secondary white dolomite in pods, fractures and between light and dark patches. 44' and 49' bedding ∧ core= 60°
50-65	Dolomite. Irregularly mottled to irregularly colour banded (bedding); light-medium grey, fine-grained, crystaline. Mostly no brecciation and very minor secondary white dolomite; occasional vugs. 63.5'-66': Breccia; 80% composed of secondary white dolomite healing breccia. 65': bedding ∧ core= 75°
65-72	Dolomite. Medium grey with irregular bedding defined by dark grey laminae with white lenses of secondary white dolomite. No brecciation; 20% secondary white dolomite as pods and lenses sub-parallel bedding; occasional vugs. 67.5'-68.5': fracture fillings give positive Zn spot test.

Feet

72-75 Coarse grained, secondary white dolomite comprises 90% of core. Ghost breccia fragments almost completely replaced by secondary white dolomite. A speck of PbS at 75'.

75-88 Dolomite. Mostly irregular and wavey but distinctly banded (bedding); light grey, fine-grained, crystaline dolomite containing bands of dark grey, very fine-grained (argillaceous?) dolomite and white secondary dolomite. Some stylolitic partings with bitumen (hard, graphitic). Several 10cm wide zones of breccia cemented by secondary white dolomite. Secondary white dolomite 15% as lenses parallel bedding.
80'-83': 90% secondary white dolomite containing very minor pyrite and one spec of PbS.
87.5': fault breccia
88': bedding $\wedge$ core= 60^{o}.

88-126 Dolomite. Medium grey, very fine-grained, uniform textured. Small ovoids and spindles of white dolomite (not 'secondary white') 2mm diameter in dark grey aphanitic matrix, probably argillaceous (soft, incipient schistosity). Minor disseminated pyrite, although 1-2% in places.
97.5'-99': light grey, cherty dolomite.
106.5'-109': light-dark grey, cherty dolomite; breccia healed with secondary white dolomite.
Ovoids are probably oolites and pisolites. Some spindles suggest skeletal material. Aphanitic black matrix probably micritic or argillaceous.
118'-119': Cherty
120': 3" identical to 62'-91', hole 77-4
123': Highly fragmented and muddy core - possible fault or indurated cataclastite.
Brecciation confined to scattered small patches except from 106' to 111' which has 70% brecciated with coarse-grained secondary white dolomite forming 50% of rock.
111'-120': 10% secondary white dolomite in fractures and small patches.
120'-126': 50% secondary white dolomite as massive patches.
Mineralization: generally minor disseminated pyrite, although locally 1%-5%; 122': 5cm 20% pyrite; 124.5': 5cm 20% pyrite: 125'-126':20% pyrite.

Feet

126-135 Cherty dolomite. Dark grey, very fine-grained, partly crystaline; small dolomite crystals in black chert matrix; faintly colour banded, otherwise featureless -.
Mostly brecciated with secondary white dolomite cement forming 10% to 20% of core. Occasional vug.

135-138 As from 88-126.

138-148 Cherty dolomite. Same as 126-135. Some bituminous, stylolitic partings (gone to graphite).
135'-156': incipient brecciation with secondary white dolomite filling fractures forming 10% of rock, except local patches well brecciated with 50% secondary white dolomite. Occasional vug.

148-204 Very cherty dolomite (In many places it is a chert) Dark grey, partly crystaline, very fine-grained; small white dolomite crystals in dark grey matrix of chert; irregular graphitic partings common - some stylolites; indistinct bedding due to partings and disturbed colour banding.
171': Bedding ^ core= 45°
Assay: 169'-171' #61801
184'-185' #61802
N.B. 171'-187' Apple green precipitate to Zn test why?.
190'-200': Bedding ^ core= 10° to 50° - looks more like primary structures or slumping than folding.
Brecciation: 156'-191': 25% overall, some 5' sections over 50%; secondary white dolomite cement.
191'-204': common; medium to dark grey fragments in light grey, fine-grained matrix, the whole largely replaced by chert.
Secondary white dolomite: 156'- 191': 30% of core, mostly as breccia cement, some as small lenses, patches and stringers.
191-204': 10% as small pods and lenses and filling small fractures; some white dolomite has been replaced by quartz.
Vugs: 156'-191': occasional
191'-204': none
Mineralization: 156'-204' occasional grain or small patch of pyrite, except 169'to 171': 0.1% to 0.5% disseminated ZnS.
184' to 185': 0.1 to o.5% disseminated ZnS and positive Zn spot test.
185'-189': scattered specs ZnS.
189'-190': 5% to 10% disseminated

red sphalerite (Assay #61800); N.B. Same core core lost in this interval.
191': 3cm of 3% ZnS
193': Speck of ZnS

N.B. The mineralization in the interval 169'to 193' occurs in what appears to be a mosaic to rubble breccia that is partly to completely replaced by chert.

204-225 Dolomite. Mostly slightly cherty although very cherty in places, light-medium grey. Fine-grained white dolomite crystals with dark grey interstitial material (approaches salt & pepper texture) contains broken and irregular beds and fragments of darker grey fine-grained dolomite.
Color banding in places. Graphitic, stylolitic partings common.
Brecciation incipient in a few places; secondary white dolomite comprising 10% of rock fills breccia fractures. Very minor pyrite as scattered grains and dusting in graphitic partings.
205': bedding ^ core= 30°
214': one grain ZnS
218': bed ^ core= 30°

225-235 Dolomite. Light grey, fine-grained (white dolomite crystals with dark interstitial material); faintly banding due to thin discontinuous dark grey laminae and thin irregular lenses of secondary white dolomite. Some graphitic, stylolitic partings. Well banded in places. Bands with S & P' texture common. Cherty in places.
No brecciation. 15% - 20% secondary white dolomite as irregular lenses 1mm to 1cm thick subparallel bedding; some of these lenses contain quartz.
Minor pyrite same as 204' to 225'.
233': small bled of PbS and ZnS.

235-238 Dolomite. Medium grey, fine-grained, minor faint banding; faintly oolitic.

End of hole at 238' (72.5m)

ASSAY RESULTS, DDH 77-1, ATAN LAKE PROJECT

Interval (feet)	Sample No.	Sample Length (metres)	Zn%
164 - 169	61803	1.5	0.01
169 - 171	61801	0.6	0.06
171 - 178	61804	2.1	0.01
178 - 184	61805	1.8	0.01
184 - 185	61802	0.3	0.18
185 - 189	61806	1.2	0.01
189 - 190	61800	0.3	7.68
190 - 195	61807	1.5	0.02

TOURNIGAN MIN G EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77- 2
Inclination: -56°
Depth: 190'
Bearing: 018

Started: June 8, 1977
Finished: June 12, 1977
Logged by: W.G. Smitheringale
Elev. collar relative to local datum: 17.3m.

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-0							0-4: Overburden
-2							
-3							
-4		↑	↑	↑	↑	↑	4'-30' Dolomite - 'S&P'* common. Lt. med. gy., f-gr., mottled to indistinctly banded due to patches and bands of lt. gy. 'S&P' textured dol. and med. gy. finer gr. dolomite.
-6							
-8		15% as frag's	None		Occasional	Very minor disseminated pyrite	Stylolytic in places → graphitic sty's surfaces.
-10		"	"		"	"	
-12		50%; frag's	"	<10% as lenses	"	"	coarse white calcite as well as dol. occurs in pods.
-14			"	sub // banding.	"	"	
-16		10% as frags	"		"	"	Orange calcite (?) occurs in thin fractures and intergrown with white dolomite in pods in places.
-18			"	N.B. some of	"	"	
-20		60%; frgs.	"	these lenses	"	"	
-22		90%, blocky	"	have cores of	"	"	At 12' banding @ core = 55°
-24		"	"	calcite	"	"	At 28' " " " ~45°
-26		"	"	"		Pos reaction to Zn test in several places	Assay 25' - 35.6'
-28	8.22	"	"	"		Orange Calc common	At 8.2m: 0.3m. cherty matrix with pod of galena
							* S&P: salt and pepper texture

TOURNIGAN MINING EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-2
Inclination: -56°
Depth: 190'
Bearing: 018

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-30			None	Some of these lenses have cores of calcite	Scattered	-bleb PbS @31' 'orange calc'	30-46 Dolomite As 4-30 except no 'S&P' and in places banding is very distinct, altho irregular and contorted.
-32			"	"	"		
-34		95%	"	"	"		
	10.8						
-36			"		"		31: banding core =50°.
-38	11.9	15% ground	"	~10% but can't tell	Up to 2 cm	None	Assay 39' - 46'
-40		40%			across, lined with white dol. ~2% of rock		
-42			"			Pos. Zn test in places. Orange 'calc'	← lost water at 42'
-44		40%	"				Specs of PbS at 44' Spec taken for thin section.
-46	-14.		Some				46-56: Dolomite-lt.-dk. gy. mottled; secondary wh. dol abundant orange 'calcite' common in stringers
-48		10%	Some present with wh. dol. cement. Can't tell how much.	Appears from frag's to be common	can't tell	None	
	-14.9						
-50							Assay 49'-56'
-52		8%				Pos. Zn test, orange 'calcite'	56-62: Dol. Appears to be mainly med. gy. f.gr. featureless
-54							
-56	-17.1						Assay 56-62
-58		8%		some present		Wk. pos. Zn test in two places	

TOURNIGAN MINING EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77- 2
Inclination: -56°
Depth: 190'
Bearing: 018

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-60		8%	↓	some present	↓	orange 'calcite'	↓
-62	-18.9						
-64					Occasional	↑	62-73: Dolomite: lt, med.+ dk.gy;
-66		90%	Wk to strong throughout White dol. cement	30% as bx. cement	"	None other than minor pyrite	f-gr. mottled to indistinctly banded. Occasional graphitic stylolite. Bx'd.
-68		80%			"		73-75.5. med.-dk. gy, very f.g., featureless, incipient bx'n.
-70				"	"		
-72				"	"	"	76-105: Dol. lt-dk. gy; very f. gr. to aphanitic; xtles and pellets of dol. in an aphanitic matrix forms most of the rock. Generally no color banding or stylolites. In places the rock feels greasy suggesting clay in matrix.
-74			incipient to weak; white dol. cement	<5% filling fractures except for several 6" intervals of 50%	None	"	
-76						"	
-78		>95%			"	"	78': Schistosity (incip. cleav.) ^ core = 40°. Contains wh. ovoids of dol. in places.
-80		"	"		"	"	
-82		"	"		"	"	76'-80' lt. gy.
-84		"	"	"	"	"	76'-109' 'ovoids' common
-86		"	"	"	"	"	
-88		"	"	"	"	"	
-90		"	"	"	"	"	
-92		"	"	"	"	"	
-94		"	"		"		

TOURNIGAN MINING EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-2
Inclination: -56°
Depth: 190'
Bearing: 018

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-96							95': schistosity (weak cleavage) core = 40°.
-98		> 95%					95'-96': lt. gy. chert (looks to be primary)
-100							97'-102': lt. gy.
-102							
-104							
-106					Occasional	← 2" pod barite	105-123: Cherty Dol. weak to complete replacement of dol. by chert.
-108			Weak to well		"		109': - highly pyrtic and gouge-like. Minor shearing; adjacent rock cleaved.
-110			developed	~15% except	"		
-112			over several	except for	"	Minor pyrite	109'-119': cherty dol., med.-dk.gy., mottled to indistinctly banded.
-114		80%	1' intervals.	well bx'd	"	only	
-116			Coarse white	intervals	"	"	
-118			dolomite	where	"	"	119'-120': Dk. gy. argillaceous, many white dol ovoids.
-120			cement	50%- 80%	"	"	120'-123': Blk. chert; appears pri. Blk. chert bx
-122		50%	"	"	"	"	
-124			"	"	"	"	124-138: Chert: med. gy. formed by replacement of med.dk.gy. mottled to indistinctly banded dol.
-126		80%	"	"	"		
-128			"				128'-129': Fault bx.
-130			"	< 10% filling breccia fractures	None		
-132		> 95%	"		"		
-134			"	"	"		
			"				

TOURNIGAN MINING EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-2
Inclination: -56°
Depth: 190'
Bearing: 018

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-136	41.5	70%	Coarse white	Several bx'd.	Occasional		
-138	42.1		dol cement	sections with	"	Massive barite	138: Minor diss.Red ZnS Assay 138-140.
-140			"	50%; otherwise	"		138-190: Chert formed by replacement of dol; lt,med,dk. gy.
-142		60%	"	5%	"	Pos. Zn test	
-144					"	in places	138-160: mottled; bx'd.
-146					"		Assay 143-144: red,dissem. ZnS.
-148		60%	Well developed		"	-6" 2% ZnS +Zn test	
-150				25%	"		
-152			White dol.		"	None other than pyrite	
-154		50%	cement	25%	"	"	
-156					"	"	
-158					"	"	
-160			Weakly	15% cementing breccia	None	"	160-167: strongly stylolitic
-162		95%	developed		"	"	
-164					"	"	164: stylolites and banding core = 70°.
-166					"	"	
-168			None	5% in	"	"	167-185: some indistinctly banded, some mottled; scattered stylolites; some bx; a few spots approaching 'S&P' texture.
-170			"	occasional fract	"	"	
-172			"	and lens	"	"	
-174			"	"	"	"	
-178			"	"	"	"	

TOURNIGAN MINING EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-2
Inclination: -56°
Depth: 190'
Bearing: 018

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-180		↓	None	5% in occasional fract. and lens	Occasional	None other	
-182			"	"	"	than pyrite	
-184		95%	"	20% in lenses	"	"	
-186		"	"	and pods	"	"	185-190: Chert replaced med. to lt. gy, fine-grained dolomite; indistinct banding; stylolitic; 'S&P' in places; secondary white dolomite in lenses // banding.
-188		"	"	"	"	"	
-190		"	"	"	"	"	
-192							
-194							
-196							
-198				END HOLE 190'			190' = 57.9 m.
-200							

ASSAY RESULTS DDH 77-2, ATAN LAKE PROJECT.

Interval (feet)	Sample No.	Sample Length (metres)	Zn%	Pb%	Cu%
25 - 30	61808	1.5	0.07	0.05	N/A
30 - 35.5	61809	1.7	0.13	0.21	N/A
39 - 46	61810	2.1	0.35	0.09	N/A
49 - 56	61811	2.1	0.02	0.10	N/A
56 - 62	61812	1.8	0.01	0.02	N/A
138 - 140	61813	0.6	0.08	N/A	N/A
140 - 143	61814	0.9	0.01	N/A	N/A
143 - 144	61815	0.3	0.16	N/A	N/A
144 - 149	61816	1.5	0.02	N/A	N/A

TOURNIGAN M[illegible]NG EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-3
Inclination: -55°
Depth: 192'
Bearing: 003

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale
Elev. collar relative to local datum: 17.3m.

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
- 0							0-5: Overburden
- 2							
- 4							
	-1.5						
- 6				↑		Spot pos. Zn test	5-31: Dol.
- 8		40%		50% in small fractures and pods			Lt. - dk. gy; f-gr; distinctly mottled to irregularly banded; stylolites common; occasional spot approaching 'S&P' (salt and pepper texture)
-10			None		Occasional		
-12			"		"	Spot pos've Zn test	
	-4	50%					
-14			"	↓	"		
-16		70%	"		"		
-18	-5.5	50%	"	90% between and replacing prob. ghost bx frags.	"	Pos Zn (& Cu?) test in spots	Assay 18-21.5
-20					"		
-22	-6.5	50%			"		
-24				generally 5%; locally >50%; as lenses // banding and as pods.	"		
-26					"		
-28		75%			"		
-30				↓		Weak pos(?) Zn in spots	31: banding ∧ core = 70°

TOURNIGAN MI NG EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-3
Inclination: -55°
Depth: 192'
Bearing: 003

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

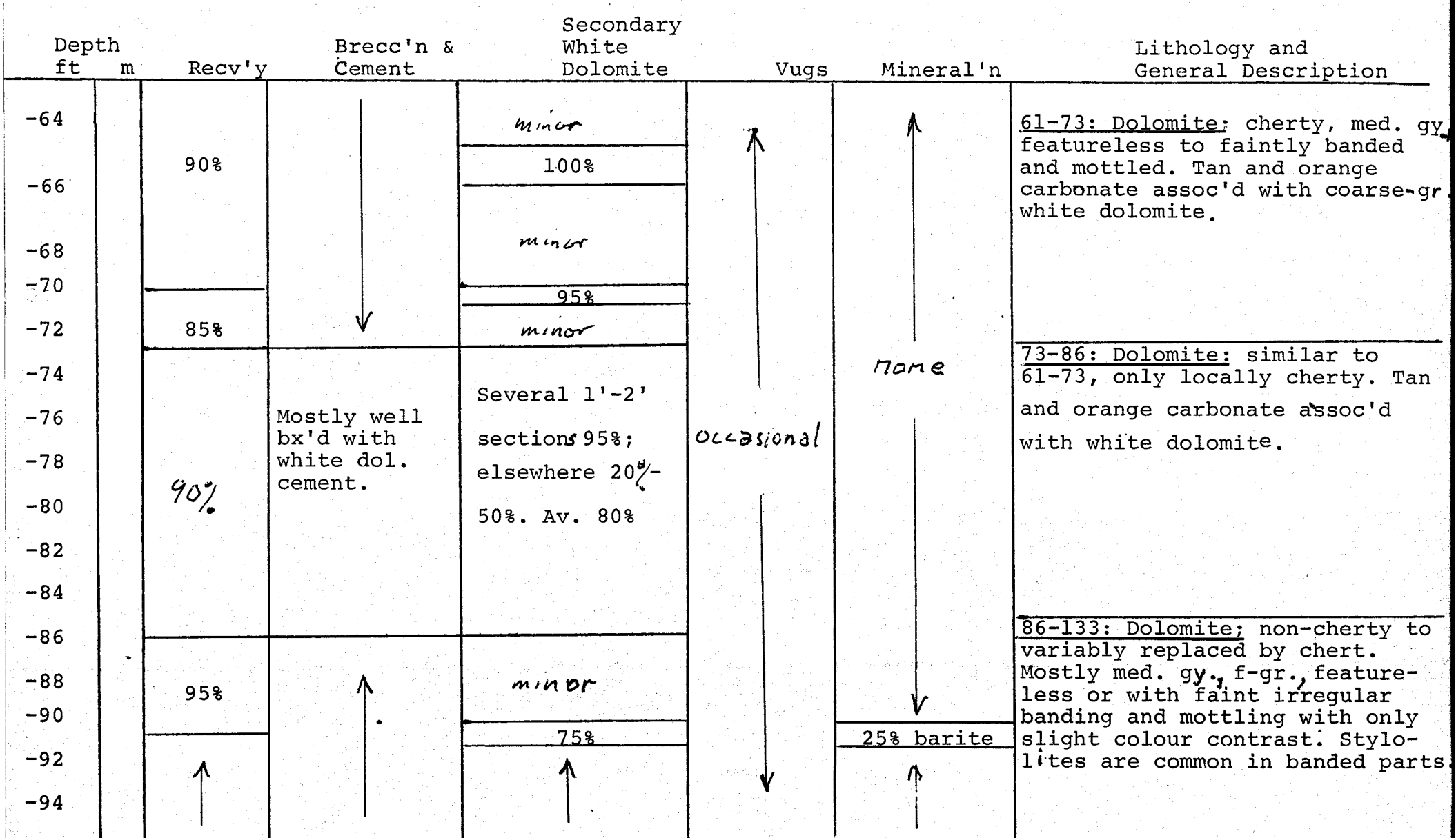
33

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-32			None				Dol. med-dk gy; faintly mottled
-34		90%	Moderate				31-51: Cherty Dolomite. Partial to complete replacement by chert
-36				90%		Weak pos. Zn	
-38				10%			31-37: Lt. & med. gy. indistinctly banded and mottled.
-40		80%					
-42			Incipient to weak	95%		Weak pos. Zn in many places	Assay 40-43
-44							
-46		60%		10% in fracs, lenses & pods			37-51: Med. gy, featureless f.g.
-48							
-50		80%			occasional		
-52						Spot pos've Zn test	51-55: Dolomite. med. gy, f-g gr. featureless patches of orange calcite. (?)
-54			Mostly not bx'd but several int-				
-56		95%	ervals of well developed bx with white dol cement,			Minor barite	55: Banding core = 70°
-58	17.6						55-61 = Dol. Lt. Med. gy, f.g. irreg. banded 'orange calcite' assoc'd with coarse wh. dol. & barite.
-60				95%		Several spots pos've Zn test	
-62	18.7	90%		minor			

TOURNIGAN MI. NG EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-3
Inclination: 55°
Depth: 192'
Bearing: 003

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale



TOURNIGAN MINING EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-3
Inclination: -55°
Depth: 192'
Bearing: 003

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-96		↑	↑	↑		↑	86-133; (Cont'd) Some sections mottled with patches approaching 'S&P' texture. Some 6" intverals of sed. bx.
-98							
-100		95%	Mostly mod. to strongly bx'd altho 1'-4' intervals non bx'd.	Mostly 20-80% except in non-bx'd intervals.	Essentially None	Minor barite associated with white dolomite.	
-102							6" sed. bx.
-104							
-106					2 or 3 in this entire interval		
-108				Mainly cementing bx. frags but 5% as lenses and oval blebs		<5% of rock in blebs 2mm to 4 cm.	109: Sed. bx. 6".
-110							
-112			White dol. cement.				90-113: Some nearly oval structures that would become 'ovoids' if rock were sheared.
-114							114: 2" sed. bx.
-116				1-3m ø which are locally developed.			
-118			In places normal 'stress bx' merges with and overlaps sed. bx.			Minor pyrite	
-120							
-122							124-133: generally featureless medium-dk.gy. but with sect'ns of sed. bx. containing frags of aphanitic lt. gy. rk. with clay matrix and high py. that was
-124							
-126		↓					

TOURNIGAN M. .NG EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-3
Inclination: -55°
Depth: 192'
Bearing: 003

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-128							was encountered in 72-2 at 76' to 80'
-130		95%					
-132							133-173: Chert and very cherty dolomite; formed by replacement. Same textures as 86-133.
-134							
-136							135-168: Sed. bx and 'soft-rock' deformation.
-138							
-140							140-141: very f. gr. uniformly banded and intensely stylolitic like 160-167 in 77-2.
-142							
-144							
-146							
-148							
-150							
-152							-151-152: many stylol tes
-154							-2" band lt. gy. primary chert.
-156							

TOURNIGAN MINING EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77- 3
Inclination: -55°
Depth: 192'
Bearing: 003

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-158	47.95					Massive barite	
	48.31						
-160							
-162							
-164		95%	Mostly not bx'd.	<5% in fract's except 70% at 170 - 171	Occasional	none	
-166					"		
-168					"		
-170					"	30% ba.	
-172			Several short intervals of weak bx'n.		"		
-174					"		173-192: Dolomite; locally chert lt. & dk. gy. mottled to banded, some stylolites, 'S&P' textures common.
-176					"		
-178				15% as lenses and pods with // banding.	"	none	
-180					"		← Banding ^ core = 65°.
-182					"		
-184					"	← PbS & ZnS ← ZnS	{ Coarse reddish brown ZnS in vein of coarse white dolomite. Assay 183-184
					"		184: banding ^ core = 65°.
					"		
					"		

TOURNIGAN MI. NG EXPLORATION LTD.

Project: Atan Lake, 1977
DDH. No. 77-3
Inclination: -55°
Depth: 192'
Bearing: 003

Started: 1977
Finished: 1977
Logged by: W.G. Smitheringale

Depth ft	Depth m	Recv'y	Brecc'n & Cement	Secondary White Dolomite	Vugs	Mineral'n	Lithology and General Description
-186		95%	↓	↓	↓	none	
-188							
-190							
-192							6" barite with a single 2 mm ø bleb of ZnS.
				END HOLE 192'			192' - 58.5 m.

ASSAY RESULTS DDH 77-3, ATAN LAKE PROJECT.

Interval (feet)	Sample No.	Sample Length (metres)	Zn%	Cu%
18 - 21.5	61817	1.1	0.06	0.02
40 - 43	61818	0.9	0.02	N/A
178 - 183	61819	1.5	0.01	N/A
183 - 184	61820	0.3	0.54	N/A
184 - 189	61821	1.5	0.01	N/A

TOURNIGAN MINING EXPLORATIONS LTD.

Project:	Atan Lake, 1977	Date Started:	June 17,1977
Hole:	DDH 77-4	Date Finished:	June 18,1977
Elev. Collar:	21.7m	Logged by:	W.G. Smitheringale
Inclination:	-85°		
Length:	36.9m		
Bearing:	045°		

Collared in bedrock.

Recovery: 0' - 5': 50%; 13' - 17': 75%; 17' - 26': 85%; 26' - 112': 80 to 95%; (probably average nearly 95%) 112' - 117': 40%; 117' - 121': 50%. N.B. Target zone is 112' - 117' interval which has only 50% recovery.

Feet

0-4 Cherty Dolomite. Medium grey, fine-grained dolomite crystals in black cherty matrix. Resembles Pepper and Salt ('P&S') texture. No breccia. Minor white dolomite.

4-55 Dolomite. Mostly light grey with medium grey lenses and laminae. Fine-grained; distinctly but irregularly banded to mottled; stylolites and 'P&S' texture common.

4'-19': dominantly light grey.
19'-30': 50% light grey, 50% finer grained, medium grey as irregular bands and whisps and patches that define bedding.
30'-33': dominantly light grey.
33'-45': similar texture to 4'-19' and 19'-30' but intermediate in colour; medium grey with slightly darker grey and finer grained patches and bands. Mottling and banding not as distinct due to less colour contrast.
45'-55': dominantly light grey with well defined dark grey whisps and bands more like 4'-19'.

Banding (bedding) ^ core: at 14': 60°; at 25': 50° to 70°; at 45': 50°

Brecciation: Minor - over several 6" intervals. Medium-to coarse-grained secondary white dolomite: 4'-19': 10% to 20%, locally 50%, as irregular lenses and patches // banding.

Feet

Has yellow to orange carbonate associated with it in many places, but especially abundant from 12' to 19'. (This looks like an ankeritic alteration of the white dolomite).
19' - 55': generally about 5% although locally 20% over 4" intervals; as lenses and patches // banding.

Vugs: Scattered small vugs, mostly associated in secondary white dolomite.

Mineralization: 0'-17': positive Zinc drop test in many spots.
17'-55': positive Zinc drop test in 4 scattered spots.

Assay: 0'-17': Barite occurs as small patches associated with secondary white dolomite in a number of places but nowhere does it average 10% over a 1' interval.
44': 1cm thick stringer of white dolomite contains a single bleb of medium-and coarse-grained ZnS. Colour of ZnS varies from brownish red to pale greyish cream. The latter is almost impossible to tell from stained dolomite.

55-61.5 Very Cherty Dolomite. Light grey, fine-grained dolomite crystals in black aphanitic chert matrix. Indistinct banding. 'S&P' texture. Brecciated in places with white dolomite cement. White dolomite also occurs in patches. Average 10% white dolomite.

61.5-63.5 90% Medium-coarse-grained white dolomite. Possible blebs of dull brown ZnS at 61.5'. Positive Zinc drop test in many spots.
Assay: 61.5'-62': to determine if unknown dull brown mineral in ZnS.
Assay 62'-63.5'.

63-82 Dolomite. Variably cherty, light-medium and dark grey, fine-grained. Irregularly but distinctly mottled and banded. Moderately brecciated in places. Much white secondary dolomite as fracture fillings but mostly in blebs and lenses. Orange carbonate (ankerite?) commonly associated with white dolomite.

Feet

82-91 Dolomite. Pale greenish grey, very fine-grained. Very fine-grained intergrowth of turbid creamy dolomite grains and clear medium grey dolomite. Contains both dark coloured ovoids (clear grey dolomite) and white dolomite ovoids. Similar to rock in DDH 77-2, 76'-80'.
82'-89': No brecciation. No secondary white dolomite.
89'-91': Strongly brecciated with 50% white dolomite cement.

Mineralization. 82'-91': 1% finely disseminated pyrite, also several 5cm pods of very fine grained pyrite.
89'-91': patches of barite in white dolomite.

91-105 Cherty Dolomite. Mostly very cherty, although variable. Alternating (1) medium-dark grey with faint colour contrast defining mottling and (2) light, medium, and dark grey with distinct mottling and banding; all fine-grained. Brecciation strong in places with 1' and 2' intervals of 50% white dolomite cement. Secondary white dolomite also occurs as pods and lenses // banding.

Mineralization. Single bleb of medium-grained red ZnS occurs at 97' in white dolomite with associated orange carbonate.

At 93': Angle between bedding and core = 68°.

105-109 Dolomite. Light grey, very fine-grained. Various types of round structures (0.5mm to 3mm; clear dolomite to turbid white) in a very fine-grained to aphanitic matrix. In one spot matrix feels clayey. Somewhat similar to 82'-91'. Parts well brecciated with white dolomite cement.
107.5'-109': 70% coarse white dolomite with 30% barite in patches 3cm across. Minor finely disseminated pyrite.

109-112 Chert. Light grey, aphanitic - primary? Well brecciated. 50% of interval consists of coarse white secondary dol. containing patches of barite.

Feet

112-114 (?) Chert. Brecciated with 80% dolomite cement. Chert same as 109'-112'. Dolomite cement is riddled with tiny irregular stringers and pods of fine-grained pyrite. It also contains a pale creamy yellow mineral, an alteration of dolomite or ZnS?. Assay 112'-114'.
N.B. Recovery 112'-117' is only 40%. Only 6" of core sampled and this is assumed to represent 2'.

114-116 Fragments of badly ground chert.

116-121 Dolomite. Cataclastite?
Dark grey, consisting of fragments (?) of dark grey dolomite, chert and white dolomite. Has a peculiar fault breccia-like structure, but there are no slickenslides. Possibly a lithified near-surface fault or slump breccia.
(See log 77-1: 101'-106'). Minor disseminated pyrite. Weak positive Zn test. Assay 116'-121.

End of hole 121' (36.9m)

ASSAY RESULTS, DDH 77-4, ATAN LAKE PROJECT

Interval (feet)	Sample No.	Sample Length (Metres)	Zn%
0 - 10	61822	3.0	0.06
10 - 17	61823	2.1	0.02
27 - 28	61825	0.3	0.02
38.5-43.5	61827	1.5	0.01
43.5-44.5	61828	0.3	0.02
44.5-49.5	61829	1.5	0.02
61.5-62	61830	0.15	0.01
62 - 63.5	61831	0.5	0.01
112- 114	61832	0.6	0.08
116- 121	61833	1.5	0.03

TOURNIGAN MINING EXPLORATIONS LTD.

Project:	Atan Lake, 1977	Length:	79m
Hole:	77-5	Started:	June 19, 1977
Elev. Collar:	19.8m	Finished:	June 21, 1977
Azimuth:	048	Logged by:	W.G. Smitheringale
Inclination:	-57°		
Bearing:	048°		

Recovery: 11' - 17': 15%; 17' - 21': 70%; 21' - 26.5': 75%; 26.5'-35': 90%; 35' - 58': 90%; 58' - 71': 80%; 71' - 83': 95%; 83' - 86': 65%; 86' -116': 95%; 116'-119': 65%; 119'-121': 15%; 121'-130': 50%; 130'-144': 95%.

Feet	
0-11	Overburden
11-12	Dolomite. Light grey with dark grey patches and lenses producing distinct mottling. Stylolitic. Vugs lined with white dolomite and containing barite. Positive Zn drop test in one spot.
12-15	Dolomite. Core badly ground. Looks like 25'-40'. Minor azurite and malachite. Also barite chunks. Small grains unknown brown mineral - assay.
15-25 (3m)	Barite. 100% - Contains very minor scattered specks of pyrite and fractures coated with clay and Fe oxide. Otherwise it looks quite pure.
25-40	Dolomite. Light and dark grey, distinctly mottled and banded. Fine-grained bordering on medium-grained in places. Occasional stylolites. Dominant feature is 'S&P'* texture. Minor local brecciation with white dolomite cement. White secondary dolomite 5 to 10% as breccia cement and in lenses and patches. Orange alteration or intergrowth (ankerite?) is common. Several 2cm wide veins of barite in fractures and some pods of white dolomite contain barite. Very minor disseminated pyrite. Brown unknown with high luster on some stylolitic surfaces - probably Fe oxide. Assay 31'-34'. Angle between bedding and core varies from 60°-90°. Av. 75°. 32': Angle between bedding and core =75°.

* 'S&P' texture: 'salt and pepper' texture

Feet	
40-43.5	Dolomite. Medium grey with indistinct mottling (only faint colour contrast); fine-grained; occasional stylotites. Minor local breccia with white dolomite cement.
43.5-48	Dolomite. Similar to 25'-40', only not as distinct colour contrast, finer grained and 'S&P' not as distinct. Small patches of barite with white dolomite. One bleb of red to pale brown ZnS in white dolomite & barite lens at 44'. Positive Zn test in several spots. Undoubtedly very minor Zn in this interval, but not enough to sample.
48-66	Secondary White Dolomite. Medium-to corase-grained white dolomite containing 5% intergrown barite. Positive Zn and/or Cu drop test throughout. Assay 48'-66'.
66-69	Dolomite. Medium-dark grey mottled and irregularly banded. Fine-grained. Incipient breccia with fractures filled with white dolomite. Some white dolomite in pods. Minor barite in white dolomite pods. Occasional stylolite. Approaches 'S&P' in spots.
69-72.5	Secondary White Dolomite. Same as 48'-66'. Assay 69'-71' for Zn and Cu (Check on Cu drop test).
72.5-78	Dolomite. Light, medium and dark grey mottled to irregularly banded. Fine-grained. Some sections mainly medium-grey, indistinctly mottled and quite fine-grained, other sections mainly light grey, distinctly mottled and banded and fine-to medium-grained and with some 'S&P' texture. Occasional stylolite. Minor brecciation with white dolomite cement. White dolomite with minor barite occurs in pods and lenses. Average 10% white dolomite. 76': Angle between bedding and core= 67°.
78-81	Medium-to coarse-grained secondary white dolomite.
81-95	Dolomite. Same as 72.5'-78'.
95-98	Dolomite. Light and dark grey, very distinctly but irregularly banded. Fine-grained. Areas of light grey and secondary white dolomite have been largely replaced by quartz, which enhances the colour contrast and banded structure. Angle between bedding and core= 65°. Vugs lined with quartz.

Feet	
98-99.5	Dolomite. Light, medium and dark grey, distinctly mottled, fine-grained. Local 'S&P' texture. 20% secondary white dolomite in pods and lenses. Vuggy with white dolomite and quartz in vugs.
99.5-102	Secondary White Dolomite.
102-108	Dolomite. Like 72.5'-78'. Brecciated in places with white dolomite cement. Secondary white dolomite averages 20%, partly as breccia cement and partly in pods and lenses.
108-118	Mostly Secondary White Dolomite. Medium-to coarse-grained. 5% intergrown barite. 1' massive barite 109'-110'. 112'-113': Brecciated dolomite like 72.5'-78'.
118-130	Dolomite. Only fragments of core recovered. These are dolomite similar to 72.5'-78' that has been brecciated and cemented with white dolomite. In places throughout this interval the rock has undergone incipient faulting since some of the rock is a semi-fault breccia.
130-133	80% Secondary White Dolomite. Cements and replaces brecciated dolomite like 72.5'-78'. Contains patches of barite.
133-137	Dolomite. Like 72.5'-78'. Strongly brecciated from 135' to 137' with white dolomite cement.
137-140.5	Dolomite. Medium grey and fine-grained. Uniform textured intergrowth of tiny creamy white and clear grey dolomite grains with numerous very tiny cream coloured crystals of unidentified mineral disseminated throughout. Approximately 2% finely disseminated pyrite. Take specimen for thin section to identify cream crystals. Contains ovoids of white dolomite in places.
140.5-144	Chert. Light grey, aphanitic; Appears to be primary. 143' and 142.5': 4" bands of dolomite like 137'-140.5', only with numerous white dolomite 'ovoids' up to 2mm.
144-168	Dolomite. Very fine-grained, uniform textured dolomite similar to interval from 137' to 140.5' and mottled and banded dolomite similar to interval from 72.5' to 78' in 2'to 5' thick units. The uniform textured units contain 'ovoids' in many places.

Feet	
144-168 (cont'd)	Brecciation with secondary white dolomite cement is common; some 1' intervals are composed 50% of secondary white dolomite. 150': Incipient fault or crush breccia in 'ovoid' type 155': 4" primary chert 156'-161': Quite cherty similar to 77.5'-78' 159'-168': Apart from 'ovoid' type, rock looks like a sedimentary breccia, it even contains fragments of 'ovoid' type. 165'-169': Variably cherty
168-188	Dolomite. Medium grey, faintly mottled with very little colour contrast. Fine-grained. Occasional graphitic stylolite. Incipient "S&P" in spots. Mostly non-brecciated and little secondary white dolomite. 176'-178': Strongly brecciated, 60% white dolomite cement 181'-182': Strongly brecciated, 60% white dolomite cement 185': Faint banding, angle between banding and core= 65°.
188-192	Dolomite. Like 137'-140.5'. 'Ovoids' of cloudy dolomite in places.
192-197	Dolomite. Somewhat cherty. Like 72.5'-78' in colour, texture and structures. Weakly brecciated with white dolomite cement. Secondary white dolomite 10% as breccia cement.
197-230	Chert and Very Cherty Dolomite. Formed by replacement of dolomite with colour, texture and structures like 72.5'-78'. 198'-201': Breccia in minor fault. Fault wall core=15°. Slickensides pitch // core axis. 201'-204': Darkish grey in aspect, well banded to laminated. Laminae form graphitic partings. Laminae core= 75°. 204'-230': Overall medium grey in aspect. Distinct to indistinct mottling - little banding. Brecciated in places over 6"-1' intervals, av. 25% section brecciated. Secondary white dolomite 5% except in brecciated intervals where it forms up to 50% of rocks.
230-246	Dolomite. Light, medium and dark grey, faintly to distinctly mottled and irregularly banded. Overall aspect is light to medium grey, much like 72.5'-78'. Fine-grained. Occasional graphitic stylolite. Very local 'S&P' texture. Not brecciated. Secondary white dolomite 1%, except for 6" of 80% at 238'.

Feet

230-246 (cont'd)N.B. Amount of brecciation and secondary white dolomite is distinctly less than in and above cherty section from 197' to 230'.

235'-236': 'Ovoids' of white dolomite pisolites?

233': Bedding ^ core= 75°.

238': 6" of 60% coarse-grained secondary white dolomite with patches of barite, minor pyrite.

246-260 Dolomite. Medium and light grey (overall aspect light grey) distinctly banded (bands are irregular to relatively uniform). One 2' interval of massive featureless light grey dolomite. Fine-grained. Stylolites common and abundant in spots; stylolites have graphitic surfaces. Not brecciated. Secondary white dolomite generally 5%; occurs as pods and lenses // banding.

258': Angle between bedding and core= 75°.

260' End of hole.

ASSAY RESULTS DDH 77-5, ATAN LAKE PROJECT

Interval (feet)	Sample No.	Sample Length (metres)	Zn%	Cu%
12-15	61834	0.9	0.01	N/A
31-34	61835	0.9	0.01	N/A
48-53	61836	1.52	0.01	N/A
53-58	61837	1.52	0.01	N/A
58-66	61838	2.4	0.01	N/A
69-71	61839	0.6	0.02	<0.01

SKI 6
SKI 4
SKI 5
SKI 3
FRACTION C
SKI 2
SKI 1
FRACTION B
61847
DDH 77-4
61846
61845
DDH 77-4
61844
DDH 77-3
DDH 77-5
DDH 73-3
DDH 73-2
DDH 77-2
DDH 73-1
DDH 77-1
61843
77-10
road
0 Datum Δ 77-1 (50N)
Δ77-5 (56N)
77-7 Δ
77-8
77-6
77-4A
77-3
77-2
77-9
2
4
6
8
10
12
14
16
18
20
22
30
35
45
50
55
58

SCALE
metres 5 0 5 10 15 20 25 metres

Contour interval 2 metres
Datum Δ 77-1 (50+00N) assumed = 0 metres

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6438

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
W. G. SMITHERINGALE

FIGURE 3

LEGEND

61843 Location and number of assayed sample

1 Chert and cherty dolomite
2 Dolomite

B Barite outcrop larger than 1 metre diameter
(B) Barite in drill hole
B Barite outcrop between 0.2 and 1.0 metres diameter

Area of scattered small barite outcrops
Outcrop
Δ77-1 1977 Geology Stations

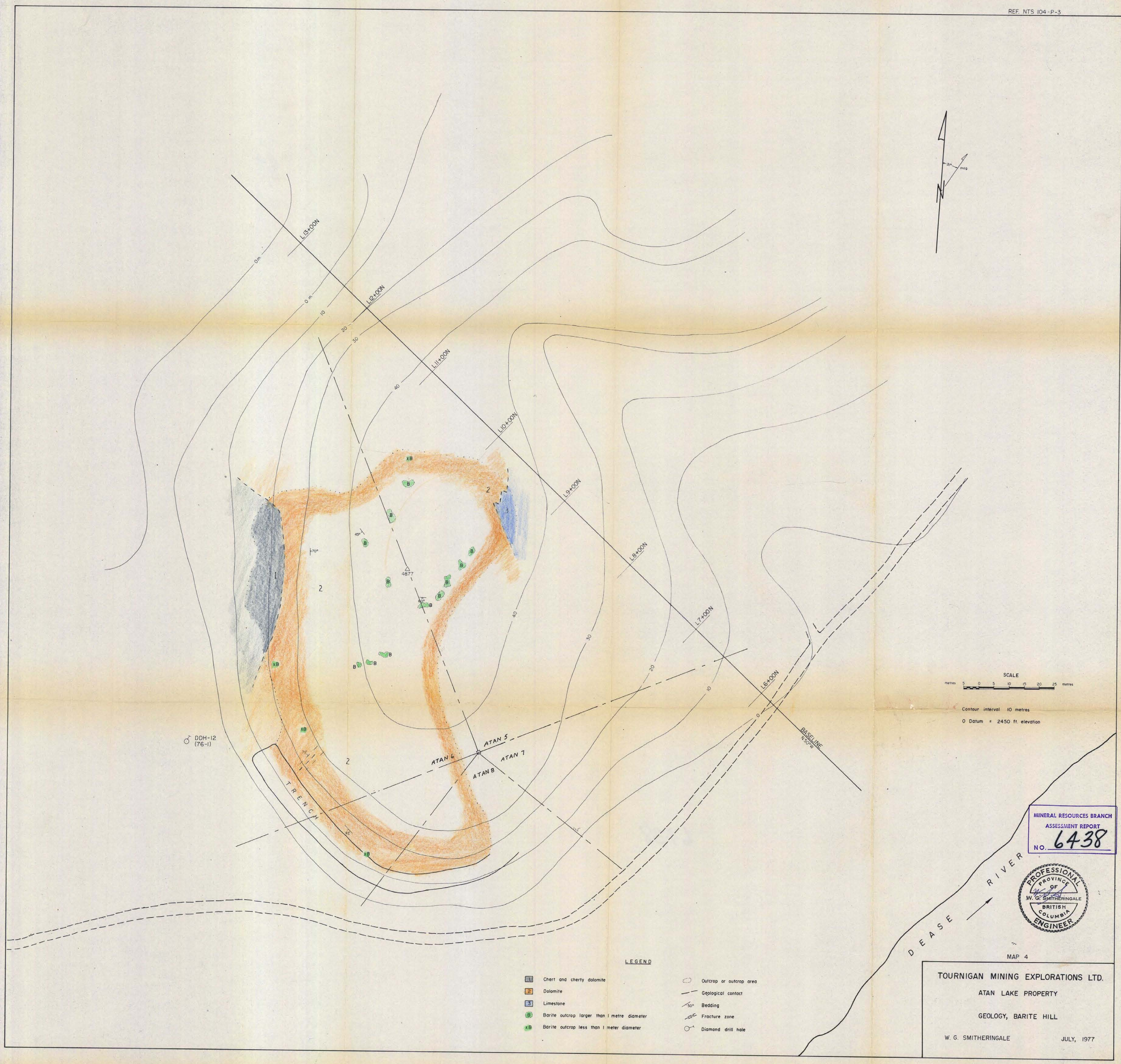
Geological contact, observed or projected to surface from drill hole
Geological contact, assumed
/50 Bedding
Fault
DDH 77-1 Diamond Drill Hole
Trench

TOURNIGAN MINING EXPLORATIONS LTD.

ATAN LAKE PROPERTY

GEOLOGY, NORTH ZONE
SKI CLAIM # 3

W. G. SMITHERINGALE JULY, 1977


REF. NTS 104-P-3
L13+00N
L12+00N
L11+00N
L10+00N
L9+00N
L8+00N
L7+00N
L6+00N
BASELINE
4877
DDH-12
(76-1)
ATAN 5
ATAN 6
ATAN 7
ATAN 8
TRENCH
DEASE RIVER
SCALE
metres 5 0 5 10 15 20 25 metres
Contour interval 10 metres
0 Datum = 2450 ft. elevation
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6438
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
W. G. SMITHERINGALE
MAP 4
LEGEND
1 Chert and cherty dolomite
2 Dolomite
3 Limestone
B Barite outcrop larger than I metre diameter
xB Barite outcrop less than I meter diameter
Outcrop or outcrop area
Geological contact
50° Bedding
Fracture zone
Diamond drill hole
TOURNIGAN MINING EXPLORATIONS LTD.
ATAN LAKE PROPERTY
GEOLOGY, BARITE HILL
W. G. SMITHERINGALE
JULY, 1977