ATAN LAKE BARITE

TOURNIGAN MINING EXPLORATIONS LTD.

H.A. QUIN. March 1974

PROPERTY FILE

PROPERTY FILE

COMPREHENSIVE GEOLOGICAL, GEOPHYSICAL and GEOCHEMICAL REPORT

on

Atan Lake Stratiform Barite-Zinc Prospect at McDame Post, Cassiar District, Liard Mining Division, British Columbia

of

TOURNIGAN MINING EXPLORATIONS LTD. Vancouver, B.C.

59°12'N. 129°12'W.

by

H.A. QUIN

M.E. P.ENG. PH.D. P.GEOL.

F.G.S.A. F.G.A.C. F.R.C.G.S. M.C.I.M.

Consulting Geologist & Mining Engineer

8-784 Thurlow Street Vancouver, B.C. V6E 1V9

Telephone (604) 684-2741

March 1, 1974



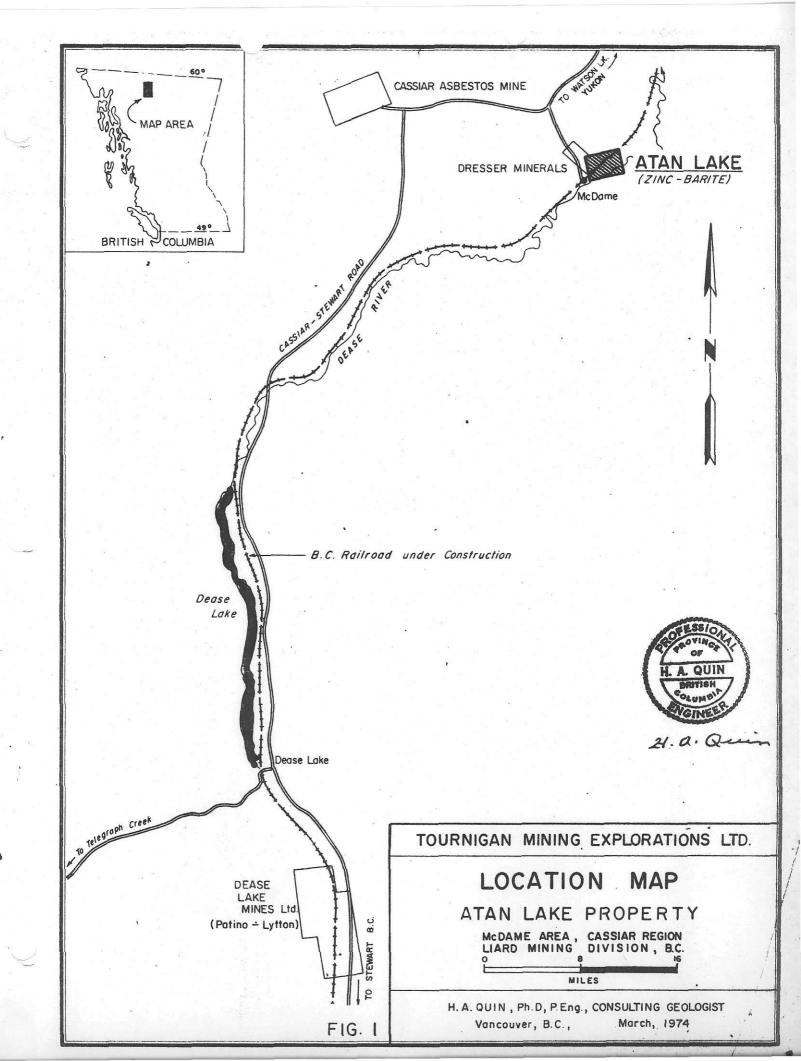
CONTENTS

	Page
SUMMARY	1
INTRODUCTION	2
THE PROPERTY	2
LOCATION AND ACCESS	3
HISTORY	4
REGIONAL GEOLOGY	6
GEOLOGY OF THE PROPERTY	6
SUMMARY OF PREVIOUS WORK	7
Geochemistry Induced Polarization Gravity Survey Geology, trenching	8 8 9 10
CONCLUSIONS	11
RECOMMENDATIONS	12
ESTIMATED COST OF PROGRAM	13
REFERENCES	14
CERTIFICATE	17

MAPS:

- 1. Location Map, 1 inch = 8 miles
- 2. Claims and Roads, 1 inch = 3,000 feet
- 3. General Geology, 1 inch = 4 miles
 4. Compilation: geochem-I.P.-gravity, 1 inch = 400 feet
 5. Geology and Drill Holes, 1 inch = 400 feet





SUMMARY

Tournigan Mining Explorations Ltd. owns a group of 46 contiguous located mineral claims at Atan Lake on northwest bank of Dease River near the abandoned trading post of McDame in the Cassiar region of Liard Mining Division, northern British Columbia. The property is situated at latitude 59 12' north and longitude 129 12' west, 23 air miles S.S.E. of town of Cassiar, B.C. and 60 air miles S. by W. of town of Watson Lake, Yukon Territory. It is accessible by 9½ miles of narrow dirt road from the all-weather gravel Cassiar-Stewart Road.

The 46 mineral claims comprising the property have sufficient assessment work recorded on them to keep them in good standing to 1977 or 1988. The 8 Bill claims adjoining northwest side of Tournigan's property are owned by Dresser Industries Canada Ltd. the operator of the barite-silver-lead-copper-zinc mine at Walton, Nova Scotia.

The property is underlain by the Atan Group of Lower Cambrian sedimentary rocks 6,100 feet thick stratigraphically. These Lower Cambrian rocks are in a northwesterly trending belt dipping southwesterly at 40° to 60° in a southeasterly plunging synclinorium. They include dolomite, limestone, shale, quartzite, chert, dolomitic limestone breccia, oolitic limestone and pyritic argillite.

The \$240,000 spent on the property to date for surface work and a few shallow diamond drill holes has proven the existence of extensive barite mineralization and of sulphides of zinc, lead, silver and copper. The honey coloured sphalerite disseminated in the dolomite appears to be of sedimentary origin, indicating the probable presence of a stratiform Mississippi Valley type zinc deposit. The several bands of 0.3% to 17.0% zinc cut by three of the 1973 diamond drill holes at depth of less than 200 feet may indicate the presence of an important Lower Cambrian stratiform deposit.

Because of the above factors, especially the 1973 discovery of stratiform sedimentary sphalerite, it is recommended that \$120,000 be spent on the property for deep diamond drilling. If results of this work are positive, a further \$250,00 or more should be spent for additional diamond drilling and development work.

QUIN



INTRODUCTION

This report was prepared at the request of Mr. John N. Hembling, president and exploration manager of Tournigan Mining Explorations Ltd., 704-535 Thurlow Street, Vancouver, B.C. A complete and comprehensive report giving the entire history of the company's Atan Lake property and summarizing results of all work and previous reports on it was requested.

THE PROPERTY

Both Tournigan and Cochrane Consultants Limited have advised me that Tournigan owns the 43 contiguous located mineral claims and 3 fractions tabulated hereunder:

CLAIM	RECORD NO.	EXPIRY DATE
ATAN 1 ATAN 2 ATAN 3 ATAN 4 ATAN 5 ATAN 6	28358 28359 28360 28361 28362 28363	Sept. 28, 1977 Sept. 28, 1977 Sept. 28, 1977 Sept. 28, 1977 Sept. 28, 1975 Sept. 28, 1975
FOX 1	26935	May 16, 1984
ADAIR 1 ADAIR 2 ADAIR 3 ADAIR 4 ADAIR 5 ADAIR 6 ADAIR 7 ADAIR 8 SKI 1 SKI 2 SKI 3 SKI 4 SKI 5 SKI 6 SKI 7 SKI 6 SKI 7 SKI 8 SKI 9 SKI 10 SKI 11	26936 26937 26938 26939 26940 26941 26942 26943 26949 26950 26951 26952 26953 26954 26955 26955 26957 26957	May 16, 1976 May 16, 1988 May 16, 1982
SKI 12 SKI 13 SKI 14 SKI 15 SKI 16	26959 26960 26961 26962 26963	May 16, 1982 May 16, 1982 May 16, 1982 May 16, 1982 May 16, 1982



CLAIM	RECORD NO.	EXPIRY DATE
SKI 17 SKI 18	26964 26965	May 16, 1982 May 16, 1982
WOLF 1 WOLF 3 WOLF 5 WOLF 7	26927 26929 26931 26933	May 16, 1977 May 16, 1977 May 16, 1977 May 16, 1977
FRACTION "A" FRACTION "B" FRACTION "C"	38159 38160 38161	June 24, 1978 June 24, 1978 June 24, 1978
AUGUST 1 AUGUST 2 AUGUST 3 AUGUST 4 AUGUST 5 AUGUST 6	31212 31213 31214 31215 31216 31217	Aug. 5, 1977 Aug. 5, 1977 Aug. 5, 1977 Aug. 5, 1977 Aug. 5, 1977 Aug. 5, 1977

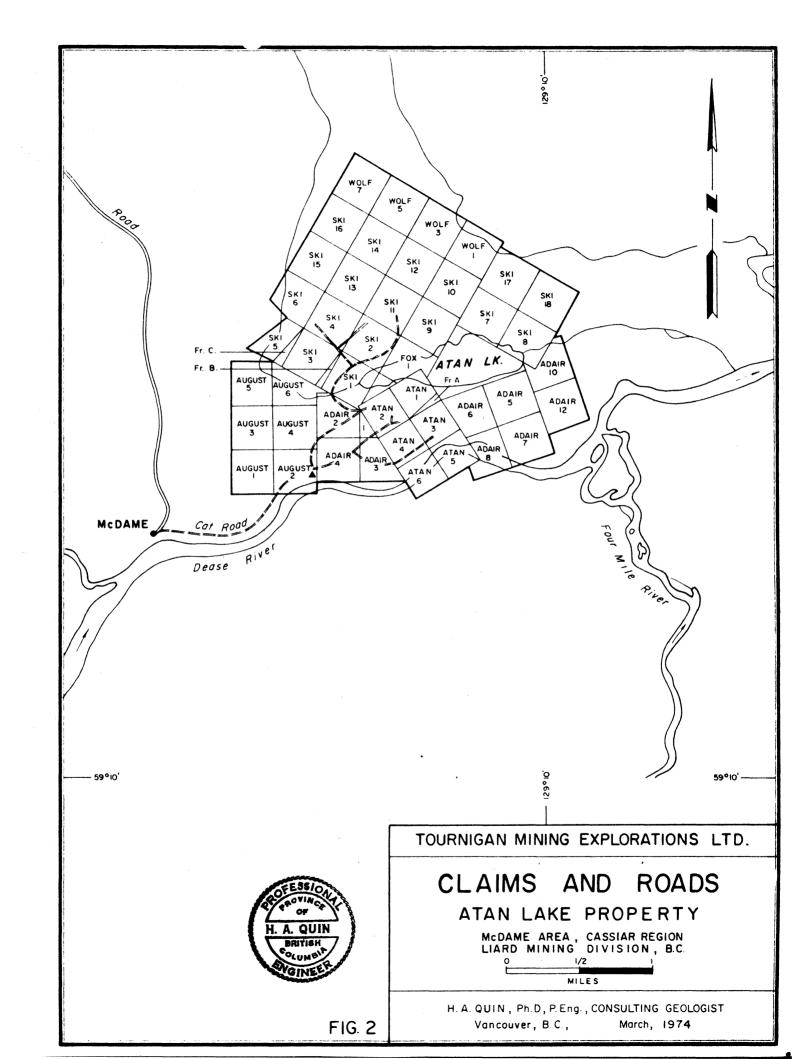
The ATAN GROUP includes the Atan, Fox, Adair, Ski, Wolf and 3 fractional claims. The AUGUST GROUP includes the August 1-6 claims.

LOCATION AND ACCESS

The property surrounds Atan Lake one mile northeast of abandoned hamlet of McDame Post in the Cassiar region of Liard Mining Division, northernmost British Columbia. It is only 55 air miles south of the Yukon border (60°N. lat.). It is situated at latitude 59°12' north and longitude 129°12' west on the northwest bank of Dease River, 23 air miles S.S.E. of town of Cassiar, B.C. and 60 air miles S. by W. of town of Watson Lake, Yukon Territory.

Normal access to the property is by 4 x 4 truck along the McDame Post Road, a narrow dirt track extending southeasterly from the all-weather gravel Cassiar-Stewart Road for 9 miles from the turn-off at 65 road miles from Watson Lake. The Tournigan camp is one mile northeasterly from McDame Post. A network of cat roads gives access to most parts of the property from the camp. Small aircraft can land on Atan Lake or Dease River. The nearestair base is at Watson Lake, Yukon T.

The British Columbia Railway is extending its railroad line northeasterly from Dease Lake along the Dease River to Lower Post, B.C. on the Alaska Highway at confluence of the Dease and Liard rivers. The railway will pass over the Tournigan property, thus providing reliable transportation for mineral products to markets. The area is quite heavily forested. Magnetic declination is approximately 31° east.





HISTORY

The History and General Setting of the property and the area in general have been well described by Donald R. Cochrane, P. Eng. (4), a geologist who has done much work on the property from 1968 onward, as follows:

"GENERAL SETTING

The Atan claim group is situated close to the east boundary of the Stikine Range of the Cassiar Mountain Physiographic Division of British Columbia; and immediately west of the Liard The immediate area is a reasonable rugged mountainous region exhibiting many features characteristic of a complex geologic history and alpine glaciation. The highest peak in the vicinity is Blackfox Mtn. rising to 7,022 feet above mean sea level. The Dease River flows northeasterly through the mountains within a broad "U" shaped valley (elevation just less than 2,500 feet above mean sea level). The property is situated within this valley, at the foot of an unnamed peak which rises to over 6,000 feet to the north of the area surveyed. Geological mapping by H. Gabrielse (2) shows that the claims lie on the west flank of an anti-clinorium, composed of a lower Paleozoic and upper Proterozoic miogeosynclinal rock sequences. The area close to the claims was mapped as Upper Atan Group, consisting mainly of limestones and dolomites with minor interbedded shales.

Exploration interest is centered primarily on a fairly narrow dolomite-limestone member which, in places, is quite oblitic and sometimes brecciated. It is similar in many respects to a "reef type" limestone. This member, between McDame and Mt. Haskin (a distance of 16 miles) is host to five mineral occurrences (including Tournigan Mining's) (Ref. 2, ppg. 113-116). These prospects are characterized by similar mineral assemblages, and include galena, sphalerite, pyrite, chalcopyrite. In the case of the most southerly two prospects (Carlick Group) or the Bill claims, and the Tournigan Mining showings) barite is abundant and occurs with minor siderite.

PREVIOUS WORK

The first recorded observation of the Atan Lake occurence was by G.M. Dawson (ref. Appendix II) in 1887. He reported an "argentiferous lead occurrence", situated a mile down river from McDame Post, and on what is now the Adair and Atan claims. Gabrielse (2) reports that in 1949, Beal Carlick staked a group of claims 2 miles north of McDame on what is now the Bill claims, owned by Dresser-Magcobar Ltd. Gabrielse visited the showings, and described the occurrence as follows: "Galena is the chief metallic mineral and is commonly coarse grained. Minor pyrite, sphalerite, azurite and malachite occur in the deposit. Coarsegrained barite is abundant and occurs with minor siderite" (ref. 1, p.113). A few claims were staked in the Atan Lake area



by local prospectors in the 60's, but allowed to lapse in 1967. During the same year, Tournigan Mining Explorations Ltd. located claims in the Atan Lake area, and added a few claims and fractions in subsequent years.

In August, 1968, a field crew employed by Geo-X Surveys Ltd., and supervised by D.Cochrane completed a total of 12 line miles of an induced polarization and geochemical soil sampling survey over the southwest half of the property (ref. 3). Several strong chargeability anomalies were discovered and some of these correlated with weak Zn, Cu and Pb geochemical soil anomalies. Computer processing of this data is described in a paper presented at a Symposium on Decision Making (Ref. 5).

In the summer of 1969, a program of trenching, geological mapping and diamond drilling was carried out on two of the three chargeability anomalies, (ref. 4). The three drill holes, which tested the southern IP anomaly, immediately south of Atan Lake, encountered minor barite, pyrite, magnesite and scattered amounts of malachite, chalcopyrite and pyrrhotite in a brecciated oolitic dolomite-limestone sequence. Bulldozer trenching on IP Anomaly No. 3 situated just over 3,000 feet northwest of IP Anomaly No. 1 exposed lenses and patches of barite, in an impure limestone member, with knots of galena, and traces of chalcocite, tetrahedrite and chalcopyrite. Trenching on chargeability Anomaly No. 2 was attempted but bedrock was not exposed.

In the fall of 1970, New Jersey Zinc Exploration Company (Canada) Ltd. optioned the claims and conducted a gravity test survey over a portion of the grid area, (ref. 6). The results showed a residual gravity peak of 2.17 milligals coinciding with the high chargeability anomaly designated No. 3. H.E. Swanson, (Geophysicist with New Jersey Zinc Co.) estimated 4½ million tons of excess mass in the IP anomaly No. 3 area, assuming that there is no overburden correction (that is, the overburden is only a few feet thick throughout). Mr. M. Lewis "guesstimated" an excess mass of greater than 3 million tons (ref.9).

In the fall of 1972, a bulldozer trenching and geological mapping program was initiated and most of the work was centered on the north zone coincident with IP and Gravity anomaly No. 3. One trench, excavated to a depth of 7 feet, cut 24 feet of massive barite with minor copper stain and blebs of galena. Pods and lenses of barite have now been partially exposed within an area approximately 1,000 feet long and 500 feet wide in the north zone, and within an area approximately 400 feet in diameter on Barite hill, which is 3,500 feet southeast of the North zone. The area in between these showings is overburden covered and partially flooded by Atan Lake".

In March 1973, while Atan Lake was frozen, that part of the property was gravity surveyed by Cochrane Consultants Ltd.



under the supervision of D.R. Cochrane, P. Eng. In May and June 1973 the land area around Atan Lake was gravity surveyed by Cochrane Consultants Ltd. and tied into the earlier lake survey. A total of 712 gravity stations were established on 22 line miles surveyed.

In October 1973 Brinex (British Newfoundland Exploration Limited) and Metallgesellschaft Aktiengesellschaft optioned the property and in November 8 NQ wireline diamond drill holes from 12 to 221 feet deep were drilled at inclination of 45° at cost of \$35,000 to \$40,000. The drilling was done by Arctic Diamond Drilling of Whitehorse with a water-mud drilling fluid. Recovery of the 1.9 inch diameter core was 85 to 90%. Three of the holes were abandoned in overburden. From 0.3 to 17.0% stratiform zinc from 3 to 9 feet thick was intersected by 4 of the 5 holes which reached bedrock.

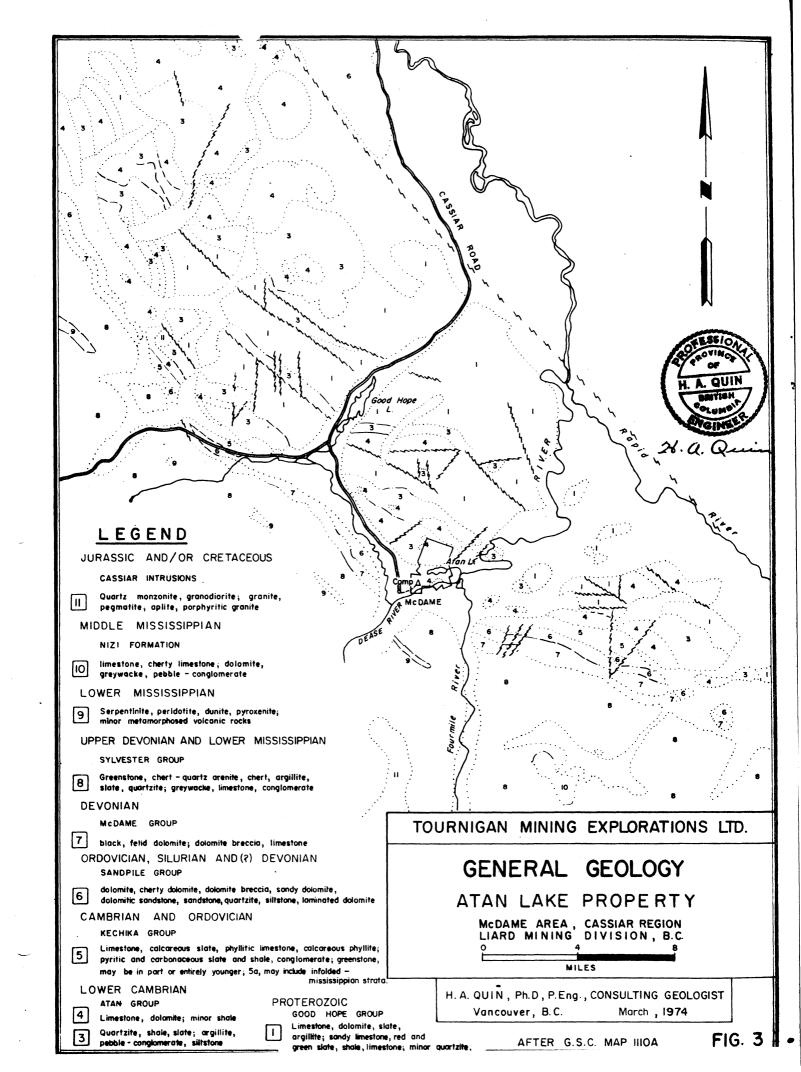
REGIONAL GEOLOGY

According to Gabrielse and Price (1,2) who mapped the reconnaissance geology of the area from 1949 to 1954 for the Geological Survey of Canada, the McDame Post-Atan Lake portion of it is in southeasterly plunging synclinorium of lower Paleozoic and upper Proterozoic miogeosynclinal sedimentary rocks. (See their McDame area Map 1110A in G.S.C. Memoir 319). The Atan Group of lower Cambrian age underlies Atan Lake and extends both northwesterly and southeasterly to beyond the borders of the McDame map sheet, a distance of more than 90 miles. The Group is comprised mainly of limestone, dolomite, minor interbedded shale, quartzite, slate, argillite, pebble conglomerate and siltstone in northwesterly trending beds dipping 15 -60 to southwest or northeast.

Gabrielse notes (1) that, "Several major longitudinal faults have been recognized, along which some movement has taken place in Tertiary or post-Tertiary time. In addition to these faults, numerous northerly and northeasterly trending faults cut strata in the anticlinorium west of Dease and Rapid Rivers and in the structurally complex area southeast of Deadwood Lake".

GEOLOGY OF THE PROPERTY

Geology of parts of the property south of and northwest of Atan Lake was mapped in August 1972 at scale of 50 feet to 1 inch by N.J. Mistry, B.Sc., M.S. while he supervised bulldozer trenching and stripping on the North zone (I.P. anomaly #3). His mapping covered mainly the North zone and the Barite Hill area between Dease River and western part of Atan Lake.





The legend on his map, dated August 10, 1972, shows arenaceous dolomite, argillaceous quartzite with calcite amygdules and recrystallized dolomitic limestone, partly brecciated. He notes that zinc, lead, tetrahedrite, silver, and abundant barite are often associated with the calcareous sediments.

Later detailed mapping and diamond drilling added to and expanded the rock units recorded by Mistry to those shown in Legend of Figure 5 accompanying this report. These are:

ATAN GROUP

Younger

- D₁ Arenaceous dolomite
- Q1 Massive black argillaceous quartzite and chert. Possibly a very old dyke form.
- S₁ Pyritic argillite, shale, calcareous argillaceous sandstone & minor chert
- sandstone & minor chert
 L Bedded grey limestone, often carrying shell fossils
- Lo Oolitic limestone
- D₂ Very fine-grained, pinkish banded dolomite, minor interbeds of grey limestone

Older

- Q_{2} Buff granular quartzite
- S2 Thin-bedded shale

Gabrielse (1,2) notes that the oolitic-brecciated dolomitelimestone member is similar in many respects to a "reef type" limestone and that in the 16 miles between McDame and Mt.Haskin it is host to 5 mineral occurrences. These contain sphalerite, galena, pyrite, chacopyrite and pyrrhotite. The 2 southern occurrences (Tournigan's and the Bill claims of Dresser Industries) also contain abundant barite and minor siderite.

At Mount Haskin, 16 miles northwest of Atan Lake, Della Mines Ltd. (7,8,9,) a private company owned by Iso Mines Ltd., R.& P Metals Corp. Ltd. (Andrew Robertson) and Ashland Oil Canada Ltd., has done extensive surface and underground work on zinc-copper-silver-bismuth and molybdenum mineralization.

SUMMARY OF PREVIOUS WORK

Work done and results obtained on the property to June 14, 1973 have been well summarized by D.R. Cochrane, P.Eng. in his reports of February 23 and July 16, 1973 (4,5). See pages 4 and 5 of this report for his summary of February 23, 1973. Work done in 1973 is described below, plus a few comments on earlier work.



In 1966 J.N. Hembling prospected the Lower Cambrian rocks N.W. and S.E. of McDame Post and did a little geological mapping and soil sampling there. In early spring of 1967 he staked 41 mineral claims on skis around Atan Lake and on north bank of Dease River. Access was by helicopter from Watson Lake to frozen Atan Lake and 3 feet of snow. In summer of 1967 he did reconnaissance geological mapping of the claims and drilled and blasted several highly weathered rock outcrops, exposing minor galena, sphalerite and barite on north bank of Dease River and S.W. shore of Atan Lake.

In subsequent years considerable road building, bulldozer trenching, line cutting, geological mapping, soil sampling, induced polarity and gravity surveys and minor diamond drilling have been done on the western part of the property, particularly northwest of and south of the western end of Atan Lake. See Figures 4 and 5 for results obtained.

Geochemistry

A geochemical survey of 12 line miles was made by Geo-X Surveys Ltd. in August, 1968. This gave arithmetic mean background values of 13 ppm copper, 84 ppm zinc, 14 ppm lead and approx 0.5 ppm silver. Peak geochemical values over No. 3 anomaly in parts per million (ppm) were: copper 20, zinc 320, lead 48, silver 0.5.

The several weak geochemical anomalies found do not appear to truly represent the amounts of mineral visible in the rocks underlying them. It is possible that the calcareous bedrock "fixes" the metals, thus preventing them from migrating to the upper B soil horizon. It seems that detailed geochemical surveys are of limited value in the Atan Lake area.

Induced Polarization

An induced polarity survey of 12 line miles was made by Geo-X Surveys Ltd. in August, 1968 in conjunction with the geochemical survey. This indicated three quite strong chargeability anomalies, Nos.1, 2 and 3. In 1969 anomaly No. 3 of 30 milliseconds chargeability was trenched by bulldozer, exposing lenses and patches of barite, knots of galena, and traces of chalcocite, tetrahedrite and chalcopyrite in an impure limestone. Anomaly No. 1, south of west end of Atan Lake was tested by 3 diamond drill holes in 1969. These encountered minor barite, pyrite, magnesite and scattered amounts of malachite, chalcopyrite and pyrrhotite in a brecciated oolitic dolomite-limestone sequence. Bedrock was not reached by trenching of anomaly No. 2.

A test line of magnetometer readings across I.P. anomaly No. 2 in 1968 indicated that magnetic survey was not useful for distinguishing the various lithologic units. A D.C. resistivity survey, done with the I.P. survey, proved to be a good guide to overall structure.

Gravity Survey

A gravity test survey by New Jersey Zinc Explorations Company (Canada) Ltd. in fall of 1970 showed a residual gravity peak of 2.17 milligals over I.P. anomaly No. 3. H.E. Swanson, geophysicist of N.J.Zinc, estimated 4½ million tons of excess mass in the anomaly, assuming that there is no overburden correction, i.e. the overburden is only a few feet thick. Bulldozer trenching of the anomaly in fall of 1972 exposed 24 feet of massive barite with blebs of galena and copper stains.

In 1973, from March 3 to 13 and from May 14 to June 14, a gravity survey was made over Atan Lake and the land around its western end by D.R. Cochrane, P. Eng. A total of 712 gravity stations were established on the 22 line miles surveyed. Four major gravity highs were found northwest of Atan Lake. These are shown as anomalies A,B,C and D by Figure 4. They have peaks of 2.06, 1.00, 2.00 and 0.57 milligals respectively above the regional background. Cochrane (5) calculated the excess mass of the gravity anomalies as follows:

Anomaly	Peak Value Above Regional (milligals)	Excess Mass (short tons)	Tonnage in sphere at 8 cu. ft. per short ton
Α	2.06	700,000	1,750,000
В	1.00	360,000	900,000
С	2.00	340,000	850,000
D	0.57	200,000	500,000
	<u>:</u>	1,600,000	4,000,000

Michael J. Lewis of Scintrex Surveys Ltd. on October 10,1973 made a map of Residual Gravity Values (contour interval 0.2 milligals) at scale of 200 feet to 1 inch showing a regional gravity high south of west end of Atan Lake and estimating tonnages in the gravity anomalies of Cochrane as follows:

Anomaly	Tons	
A	1,500,000	
В	400,000	
С	400,000	
C ₁	350,000	
c ₁	400,000	



As mentioned on page 6 Brinex and Metallgesellschaft tested some of the residual gravity anomalies by 1388 feet of NQ wireline diamond drilling in 8 holes from October 25 to November 29, 1973. The 5 short holes which reached bedrock did not find a major deposit of barite BUT 4 of the holes found stratiform zinc as honey coloured sphalerite disseminated in the dolomite beds. The importance of this stratiform mineralization was not recognized immediately and fully in the field because of the snow and ice covering the drill cores. The 1973 "joint venture" drill program was terminated in free-zing weather after two unsuccessful attempts to reach bedrock by Hole 8. The casing broke and the hole was losing too much mud and it would have been very expensive (and COLD!) to continue.

Geology, Trenching

Geological mapping, trenching and other similar work were described here and there in earlier parts of this report.





CONCLUSIONS

- 1. Tournigan Mining Explorations Ltd. holds a group of 43 contiguous located mineral claims and 3 fractional claims at Atan Lake on northwest bank of Dease River one mile northeast of abandoned McDame Post in the Cassiar region of Liard Mining Division, northern British Columbia.
- 2. The property is situated at latitude 59°12' north and longitude 129°12' west, 23 air miles S.S.E. of town of Cassiar, B.C. and 60 air miles S. by W. of Watson Lake, Yukon Territory. It is easily accessible by 9 miles of dirt road from the Cassiar-Stewart Road at a point between Cassiar and Watson Lake. The British Columbia Railway is extending its railroad line northeasterly from Dease Lake along the Dease River to Lower Post, B.C. on the Alaska Highway at confluence of the Dease and Liard rivers. The railway will pass over the Tournigan property, thus providing relatively cheap transportation for mineral products to markets.
- 3. The 46 mineral claims comprising the property are Atan 1-6, Fox 1, Adair 1-8, Ski 1-18, August 1-6, A,B and C fractions and Wolf 1,3,5 and 7. Most of them have sufficient assessment work recorded on them to keep them in good standing to 1977 or 1988. The adjoining group of 8 Bill claims is owned by Dresser Industries Canada Ltd., the operator of the barite-silver-lead-copper-zinc mine at Walton, Nova Scotia.
- 4. The property is underlain by a northwesterly trending belt of Lower Cambrian sedimentary rocks dipping southwesterly at 40° to 60°, most commonly at 52°. These rocks include dolomite, limestone, shale, quartzite, chert, dolomitic limestone bréccia and pyritic argillite. Trilobites and other shell fossils are found mainly in the shale and the limestone. The belt of Lower Cambrian rocks is in a southeasterly plunging synclinorium, according to Gabrielse (1,2).
- 5. Several faults occur on the property. Most of these trend northwesterly and northeasterly but a few of them trend easterly. Relatively little is known about them.
- The \$240,000 spent on the property to date for surface work and a few shallow diamond drill holes has proven the existence of extensive barite mineralization and of sulphides of zinc, lead, silver (tetrahedrite) and copper. The honey coloured sphalerite appears to be of sedimentary origin, indicating the probable presence of a stratiform Mississippi Valley type zinc deposit, similar to that being explored on the Bonnet Plume River, Yukon by Barrier Reef Resources Ltd., Conwest Exploration Company Ltd. and Brinco Limited (through its wholly-owned subsidiary British Newfoundland Exploration Ltd., called Brinex for short).

The several bands of 0.3 to 17.0% zinc cut by three of the 1973 diamond drill holes at depth of less than 200 feet may indicate the presence of an important Lower Cambrian stratiform deposit.

7. Because of the above factors, especially the 1973 discovery of stratiform sedimentary sphalerite, the property warrants further substantial and detailed exploration.

RECOMMENDATIONS

It is recommended that a substantial program of deep diamond drilling be done to explore further the zinc and barite mine-ralization found by previous shallow diamond drilling and other surface work on the property. This program should be in two stages, with implementation of Stage 2 being dependent upon the results of Stage 1.

STAGE 1

- Drill ten 500-foot BQ wireline diamond drill holes to explore the known zinc and barite mineralization and the gravity anomalies at depth.
- 2. Have all results of the drilling compiled, interpreted and reported on by an experienced and reliable geologist or mining engineer.

STAGE 2

If warranted by results of Stage 1, spend an additional \$250,000 on further diamond drilling.



ESTIMATED COST OF PROGRAM

Stage 1

1.	Diamond drilling: 5,000 feet @ \$20.00 This cost per foot represents estimated costs for BQ Wireline, drilling, core boxes, camp, radio, moving, delays, fishing, water lines, weather, temperamental drillers and cooks, mobilization, demobilization, etc., etc.	\$100,000
2.	Transportation	3,000
3.	Assaying	3,000
4.	Engineering, supervision and report	5,000
5.	Bulldozing of access roads and trenches	5,000
6.	Contingency	4,000
	Cost of Stage 1	\$120,000

Stage 2

If substantial amounts of zinc minerals or other valuable minerals are encountered by Stage 1, an additional \$250,000 should be provided for a further diamond drilling program.

REFERENCES



McDame Area, B.C.

- 1. Gabrielse, Hubert (1963) McDame Map-area, Cassiar District, B.C.; Geological Survey of Canada, memoir 319, 138 pages, coloured McDame geology map 1110A, scale 4 miles to 1 inch (1: 253,440) of 59 60 N. & 128 130 W. (Geology by L.L. Price 1949 and H. Gabrielse 1950-1954), N.T.S. Sheet 104P, Ottawa.
- Gabrielse, H. (1969) Lower Cambrian Strata and Base Metals;
 Western Miner, pages 22,24,26,28, February, 1969,
 Vancouver.
- 3. Callahan, William H. (1967) —— Some spatial and temporal aspects of the localization of Mississippi Valley-Appalachian type ore deposits; Economic Geology Publishing Co., monograph 3, Genesis of Stratiform Lead-Zinc-Barite-Fluorite Deposits (Mississippi Valley type deposits), a symposium, J.S. Brown, editor, a tribute to Charles H. Behre Jr., pages 14-19, 1967, Ann Arbor.
- 4. Cochrane, Donald R. (1973)—— Report on the Atan Lake
 Property at McDame Post, Cassiar District, Liard
 Mining Div., B.C. for Tournigan Mining Explorations
 Ltd.,; 12 pages and 3 maps, Feb. 23, 1973, Delta.
- 5. Cochrane, D.R. (1973) Geophysical Report on the gravity survey of the Atan Lake barite occurence of Tournigan Mining Explorations Ltd. at McDame Post, Cassiar Dist., Liard M. Div., B.C., 59 12'N., 129 15'W.; 16 pages, 6 figures, July 16, 1973, Delta.
- 6. Reeve, Albert F. (1973) Report to shareholders of Barrier Reef Resources Ltd. (N.P.L.), November 23, 1973; 4 pages and assay plan of Goz Creek Property, Nadaleen River area (north tributary of Bonnet Plume River), Mayo Mining District, Yukon Territory at reduced scale of 480 feet to 1 inch, Vancouver.
- 7. Canadian Mines Handbook 1973-1974 (1973) Information on Della Mines Ltd., 1400-1055 W. Georgia St., Vancouver, a private company owned by Iso Mines Ltd., R&P Metals Corp. Ltd., Ashland Oil Canada Ltd. and the vendors of mineral claims at Mount Haskin, Liard M. Div., B.C., page 107, July 1973, Toronto.

- 8. Geology, Exploration & Mining in B.C. (GEM) 1971 Report by A.D. Tidsbury on 173 Joem, Rain, Dako, etc. claims of Della Mines Ltd. at 5,200 ft. elev. 1 mile S.E. of summit of Mount Haskin, 85 miles S.S.W. of Watson Lake, Y.T., 59°20'N., 129°28.5W., N.T.S. 104P/6W, Liard M.D.; B.C. Dept of Mines & Petroleum Resources, 1973, pages 57 & 58, Victoria.
- 9. G.E.M. 1970, p.34 and G.E.M. 1969, p.41, Victoria.
- 10. Boyle, Robert W. (1962) Geology and Geochemistry of the Magnet Cove Barium-Lead-Zinc-Silver Deposit, Walton, Nova Scotia; Can. Min. Journal, April, 1962, pages 104-109, Gardenvale.
- 11. Mistry, N. (1972) Comprehensive Geology Report on the Atan Lake Property, Liard Mining Division, Northern British Columbia for Tournigan Mining Explorations Ltd.; private report, 5 pages, 2 maps, August 23, 1972, Vancouver.
- 12. Cochrane, D.R. (1968) Geophysical and Geochemical Report on portions of the Adair, Ski, August and Atan claims; B.C. Department of Mines, Assessment Report No. 1813, Delta.
- 13. Swanson, H.E. (1970) Gravity Survey, Atan Lake claim Group; B.C. Dept. Mines, Assess. Report #2762, Vancouver.
- 14. Cochrane, D.R. (1971) Intermediate Economic Geology Report on the Atan Lake Property, Delta.
- 15. Dawson, G.M. (1889) —— Report on an Exploration in Yukon District, N.W.T., and adjacent Northern Portion of British Columbia, Geol. Survey Canada, Annual Report, 1887, vol.3, part B, pages 1-183, Ottawa.
- 16. Cochrane Consultants Ltd. (1973)—— Residual Gravity Plan,
 Atan Lake /Tournigan Project of British
 Newfoundland Exploration Ltd. (Brinex); plan,
 scale 1 inch= 200 feet, December, 1973, Delta.
- 17. Scintrex Surveys Ltd. (1973) Residual Gravity Values,
 Atan Lake Project, Brinex, Liard M.D., B.C.;
 plan, scale 1 inch = 200 feet, contour interval
 0.2 milligal, October, 1973, Vancouver.

QUIN

- 18. Cochrane Consultants Ltd. (1973) Drill Hole Locations,
 Drill Roads, Traverse Lines and Some Outcrops
 and Geology, Atan Lake/ Tournigan Project of
 Brinex, Liard M.D., B.C.; plan, scale 1"= 200
 feet, Delta. (Includes observations of geologist
 K. Barry McHale of Brinex).
- 19. Dept. Mines & Petroleum Resources (1974) Claim Map 104P/3E scale 1" = ½ mile, Victoria.
- 20. Williams, F. Michael G. (1974) Report on Drill Program;
 Atan Lake, McDame, B.C. 1973; British Newfoundland
 Exploration Ltd., 8 pages, map and drill logs,
 March 8, 1974, Vancouver.
- 21. British Newfoundland Exploration Ltd. (1973) Logs and assays of diamond drill holes 73-1 to 73-8A inclusive, 32 pages, McDame and Vancouver.



HAROLD A. QUINN, B.Sc., PH.D., P.ENG.

-17 -CERTIFICATE

- 1. I, Harold Arthur Quin, do hereby certify that: I am a practising Consulting Geologist and Mining Engineer with offices at 8 784 Thurlow Street, Vancouver, Province of British Columbia, Canada.
- 2. I have received the following university degrees:
 - (a) B.Sc. (hons.) in Mining Engineering from Queen's University, Kingston, Ontario, 1941.
 - (b) M.Sc. in Geology from Queen's University, 1942.
 - (c) Ph.D. in Geology from Cornell University, Ithaca, New York, U.S.A., 1950.
- 3. I have practised my profession for more than 25 years.
- 4. I am a member, in good standing, of the Associations of Professional Engineers of the Provinces of Ontario, British Columbia, Alberta and Yukon Territory.
- 5. I am a fellow of the Geological Society of America, the Geological Association of Canada, and the Royal Canadian Geographical Society, and a member of the Canadian Institute of Mining and Metallurgy.
- 6. I am the author of 20 published reports, articles, papers and maps on mining and geological matters in Canada and various other countries.
- 7. This certificate is part of the attached "Comprehensive Geological, Geophysical and Geochemical Report on Atan Lake Stratiform Barite-Zinc Prospect at McDame Post, Cassiar District, Liard Mining Division, B.C. of Tournigan Mining Explorations Ltd." dated March 1, 1974.
- 8. This report is based on study of the References in the report, on discussions with geologists George L. Lamont, John N. Hembling, K. Barry McHale, Donald R. Cochrane, and Michael G. Williams, and on my general experience in northern British Columbia.
- 9. I have no direct, indirect or expected interest in the properties or securities of Tournigan Mining Explorations Ltd.
- 10. Permission is hereby granted for use of this report in a prospectus or for filing with any stock exchange or any securities commission.

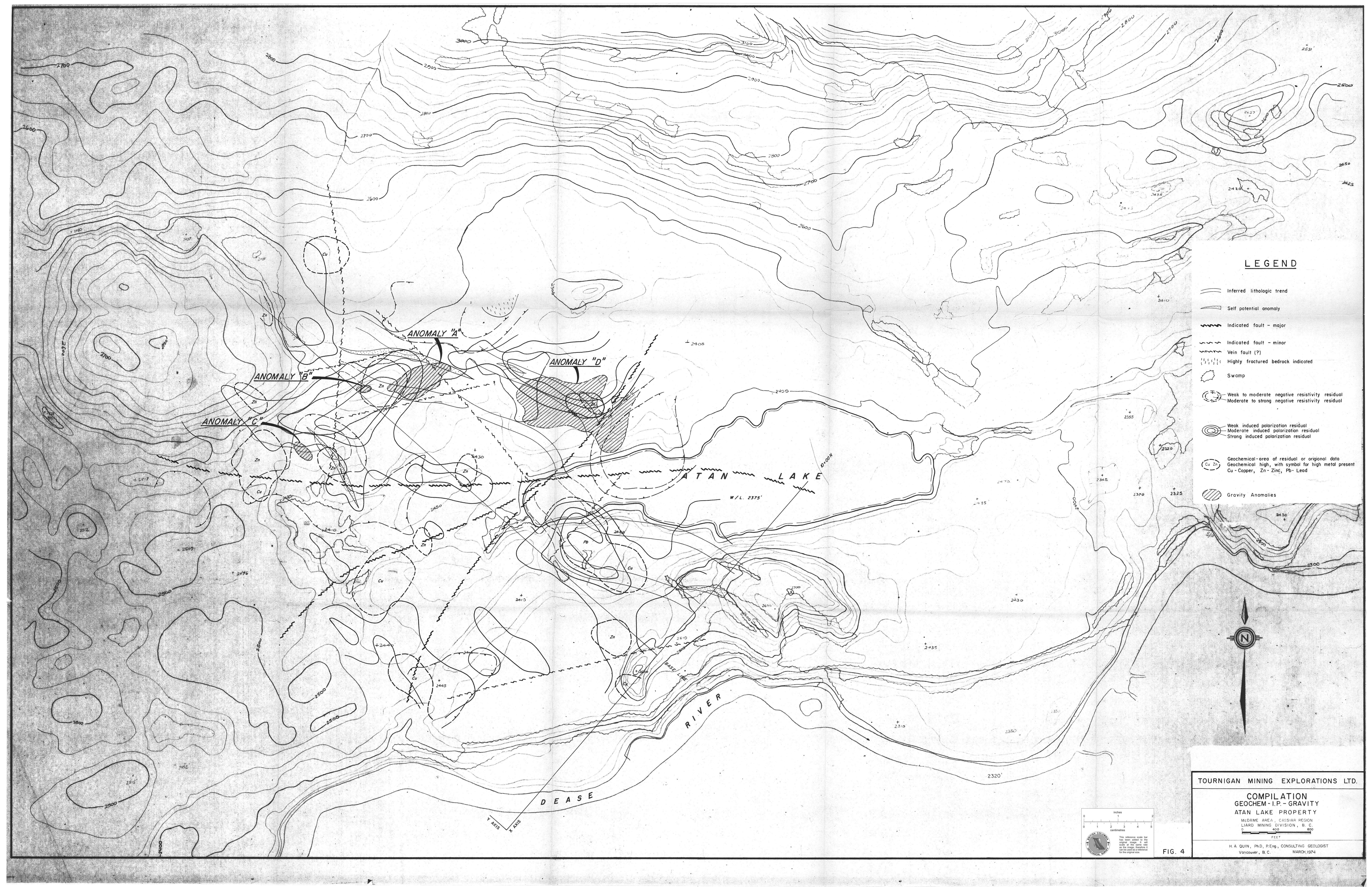



H. A. QUINN
BRITISH
COLUMBIA

Harold A. Quin

M.E. P.Eng. Ph.D. P.Geol. Ontario, B.C., Alberta & Yukon)

Vancouver, B.C., March 1, 1974





See notes to assist
on visit and