GEOLOGICAL AND GEOCHEMICAL REPORT
ON THE
THRALL 1-92 MINERAL CLAIMS

091051

NTS 105 B-11

Latitude - $60^{o}33'N$ Longitude - $131^{o}20'W$

Prepared for Getty Mines, Limited

by Bema Industries Ltd.

January 31, 1982 R.T. Holland

Work conducted from July 26, 1981 to March 15, 1982

091051

This report has been examined by the Geological Evaluation Unit under Section 53 (4) Yukon Quartz Mining Act and is allowed as representation work in the amount of $ 29,800.

MICROFILMED

DATE

P. Watson

for Regional Manager, Exploration and Geological Services for Commissioner of Yukon Territory.

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

YUKON QUARTZ MINING ACT

FORM "C" - APPLICATION FOR A CERTIFICATE OF WORK

RECEIVED
2 JUN 1982
MINING RECORDER
WATSON LAKE, Y.T.
I.A. & N.D.

(This form required in duplicate with sketch showing location of work.)

I (Name) HOLLAND, Robert	Occupation Geologist	
(Postal Address) 12893 - 99th Ave., Surrey, B.C.		OFFICE DATE STAMP

MAKE OATH AND SAY, THAT:

1. I am the owner, or agent of the owner, of the mineral claim(s) to which reference is made herein.
2. I have done, or caused to be done, work on the following mineral claim(s):

(Here list claims on which work was actually done by number and name)

THRALL 2	YA65948
THRALL 39, 41	YA65985, YA65987
THRALL 53 - 56	YA65999 - YA66002

situated at Upper Meister River Claim Sheet No. 105 B/11

in the Watson Lake Mining District, to the value of at least $8,150.00

dollars, since the 26 day of July 19 81,

to represent the following mineral claims under the authority of Grouping Certificate No. ________

(Here list claims to be renewed in numerical order, by grant number and claim name, showing renewal period requested).

GROUP 4 (See enclosed sketch)

Grant Number	Claim Name	Renewal Period	New Expiry Date
YA65948	THRALL 2	5 years	July 2, 1987
YA65969 - YA65974	THRALL 23 - 28	5 years	July 2, 1987
YA65985 - YA65988	THRALL 39 - 42	5 years	July 2, 1987
YA65990	THRALL 44	5 years	July 2, 1987
YA65999 - YA66002	THRALL 53 - 56	5 years	July 2, 1927

TOTAL 80 Claim years applied for

3. The following is a detailed statement of such work: (Set out full particulars of the work done indicating dates work commenced and ended in the twelve months in which such work is required to be done as shown by Section 53.)

Geological and geochemical surveys as detailed in accompanying report:
Geological and Geochemical Report on the Trall 1 - 92 Mineral Claims

Field work was conducted from July 2, 1981 to August 12, 1981 and compilation of data and report preparation continued to March 15, 1982.

Total Assessment work expenditures on THRALL 1 - 64 claims (1981)	30,282.52
Total assessment value previously applied	21,800.00
Total assessment value applied to Group 4 claims	8,000.00
Total value remaining	482.52

Sworn before me at Langley, B.C.

this 17th day of March 1982

[signature]
Notary Public

[signature]
Applicant

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT
YUKON QUARTZ MINING ACT
FORM "C" - APPLICATION FOR A CERTIFICATE OF WORK

RECEIVED
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I.A. & N.D.

(This form required in duplicate with sketch showing location of work.)

OFFICE DATE STAMP

I (Name) HOLLAND, Robert   Occupation Geologist

(Postal Address) 12893 - 99th Ave. Surrey, B.C. V3T 1E6

MAKE OATH AND SAY, THAT:

1. I am the owner, or agent of the owner, of the mineral claim(s) to which reference is made herein.
2. I have done, or caused to be done, work on the following mineral claim(s):

(Here list claims on which work was actually done by number and name)

THRALL 33, 35, 37	YA65979, YA65981, YA65983
THRALL 49 - 50	YA65995 - YA65996
THRALL 58	YA66004

situated at Upper Meister River Claim Sheet No. 105 B/11

in the Watson Lake Mining District, to the value of at least $6,980.00

dollars, since the 26 day of July 19 81,

to represent the following mineral claims under the authority of Grouping Certificate No. ________.

(Here list claims to be renewed in numerical order, by grant number and claim name, showing renewal period requested).

GROUP 3 (See enclosed Sketch)

Grant Number	Claim Name	Renewal Date	New Expiry Date
YA65963 - YA65968	THRALL 17 - 22	4 years	July 2, 1986
YA65979	THRALL 33	4 years	July 2, 1986
YA65980 - YA65984	THRALL 34 - 38	5 years	July 2, 1987
YA65995 - YA65996	THRALL 49 - 50	4 years	July 2, 1986
YA66003 - YA66004	THRALL 57 - 58	4 years	July 2, 1986

Total 69 Claim years applied for

3. The following is a detailed statement of such work: (Set out full particulars of the work done indicating dates work commenced and ended in the twelve months in which such work is required to be done as shown by Section 53.)

Geological and geochemical surveys as detailed in accompanying report:
Geological and Geochemical Report on the Thrall 1 - 92 Mineral Claims

Field work was conducted from July 2, 1981 to August 12, 1981 and compilation of data and report preparation continued to March 15, 1982

Total assessment work expenditures on Thrall 1 - 64 claims (1981)	30,282.52
Total assessment value previously applied	14,900.00
Total assessment value applied to Group 3 Claims	6,900.00
TOTAL Value remaining	8,482.52

Sworn before me at Langley, B.C.

this 17th day of March 1982

[signature]
Notary Public

[signature]
Applicant

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT
YUKON QUARTZ MINING ACT
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(This form required in duplicate with sketch showing location of work.)

OFFICE DATE STAMP

I (Name) HOLLAND, Robert	Occupation Geologist
(Postal Address) 12893 - 99th Ave., Surrey, B.C. V3T 1E6	

MAKE OATH AND SAY, THAT:

1. I am the owner, or agent of the owner, of the mineral claim(s) to which reference is made herein.
2. I have done, or caused to be done, work on the following mineral claim(s):

(Here list claims on which work was actually done by number and name)

THRALL 10	YA65956
THRALL 51 - 52	YA65997 - YA65998
THRALL 60, 62, 64	YA66006, YA66008, YA66010

situated at Upper Meister River Claim Sheet No. 105 B/11

in the WATSON LAKE Mining District, to the value of at least $6,980.00

dollars, since the 26th day of July 1981,

to represent the following mineral claims under the authority of Grouping Certificate No. ____________

(Here list claims to be renewed in numerical order, by grant number and claim name, showing renewal period requested).

GROUP 2 (See enclosed Sketch)

Grant Number	Claim Name	Renewal Period	New Expiry Date
YA65955, YA65957	THRALL 9, 11	4 years	July 2, 1986
YA65956, YA65958	THRALL 10, 12	5 years	July 2, 1987
YA65959, YA65961	THRALL 13, 15	4 years	July 2, 1986
YA65960, YA65962	THRALL 14, 16	5 years	July 2, 1987
YA65997, YA65998	THRALL 51, 52	4 years	July 2, 1986
YA66005 - YA66009	THRALL 59 - 63	4 years	July 2, 1986
YA66010	THRALL 64	5 years	July 2, 1987

TOTAL 69 Claim Years applied for

3. The following is a detailed statement of such work: (Set out full particulars of the work done indicating dates work commenced and ended in the twelve months in which such work is required to be done as shown by Section 53.)

Geological and geochemical surveys as detailed in accompanying report:
Geological and Geochemical Report on the Thrall 1 - 92 Mineral Claims

Field work was conducted from July 2, 1981 to August 12, 1981 and compilation of data and report preparation continued to March 15, 1982.

Total assessment work expenditures on THRALL 1 - 64 claims (1981)	30,282.52
Total assessment value previously applied	8,000.00
Total assessment value applied to Group Claims	6,900.00
Total Value Remaining	15,382.52

Sworn before me at Langley, B.C.

this 17th day of March 1982.

[signature]
Notary Public

[signature]
Applicant

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

YUKON QUARTZ MINING ACT

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I (Name) HOLLAND, Robert Occupation Geologist

(Postal Address) 12893 - 99th Ave., Surrey, B.C. V3T 1E6

MAKE OATH AND SAY, THAT:

1. I am the owner, or agent of the owner, of the mineral claim(s) to which reference is made herein.
2. I have done, or caused to be done, work on the following mineral claim(s):

(Here list claims on which work was actually done by number and name)

THRALL 1, 3 - 8 YA65947, YA65949 - YA65954

situated at Upper Meister River Claim Sheet No. 105 B/11

in the Watson Lake Mining District, to the value of at least $8,150.00

dollars, since the 26 day of July 19 81,

to represent the following mineral claims under the authority of Grouping Certificate No. ____

(Here list claims to be renewed in numerical order, by grant number and claim name, showing renewal period requested).

Group 1 (See Enclosed sketch)

Grant Number	Claim Name	Renewal Period	New Expiry Date
YA65947	THRALL 1	5 years	July 2, 1987
YA65949 - YA65954	THRALL 3 - 8	5 years	July 2, 1987
YA65975 - YA65978	THRALL 29 - 32	5 years	July 2, 1987
YA65989	THRALL 43	5 years	July 2, 1987
YA65991 - YA 65994	THRALL 45 - 48	5 years	July 2, 1987

TOTAL 80 Claim Years applied for

3. The following is a detailed statement of such work: (Set out full particulars of the work done indicating dates work commenced and ended in the twelve months in which such work is required to be done as shown by Section 53.)

Geological and geochemical surveys as detailed in accompanying report:
Geological and Geochemical Report on the Thrall 1 - 92 Mineral Claims

Field work was conducted form July 2, 1981 to August 12, 1981 and compilation of data and report preparation continued to March 15, 1982.

Total Assessment work expenditures on Thrall 1 - 64 claims (1981)	30,282.52
Total Assessment value previously applied	--
Total Assessment Value applied to Group 1 Claims	8,000.00
TOTAL Value remaining	22,282.52

Sworn before me at Langley, B.C.

this 17th day of March 1982

Notary Public

NOTARY PUBLIC IN AND FOR THE PROVINCE OF BRITISH COLUMBIA

Applicant

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF PLATES

SUMMARY AND CONCLUSIONS

The THRALL 1-64 mineral claims were staked in June 1981 to cover a small granodiorite stock containing stockwork quartz-molybdenite mineralization. Surface exposure is limited and mineralization is restricted to talus and float occurrences. Molybdenite mineralization has not previously been reported in this area and the showing appears to be a new and significant find.

The stockwork appears to be related to a quartz-feldspar porphyry phase of the intrusion and was noted over a distance of at least 200 metres. Quartz veining and occasional disseminated molybdenite occur throughout the granodiorite stock. At the main showing the mineralized talus is scattered and diluted by barren granodiorite debris. Molybdenite occurs in minor to abundant amounts mainly along the vein walls. A grab sample of rusty mineralization ran 0.036% Mo and 0.23 oz/ton Ag. K-feldspar alteration envelopes are common and strongly developed adjacent to some veins and weak pervasive clay, chlorite and sericite alteration is common.

A grid soil geochemistry program outlined broad coincidental or near coincidental anomalies for Mo, Cu, W, Pb, Ag and F associated with the trace of the stock. Local peak values occurred over areas of observed mineralization and in several areas of overburden cover. The strongest and best defined anomaly was that for Mo which runs the length of the grid area (3,600 metres) and is open at both ends. Values to 230 ppm Mo were obtained. Many of the other metal anomalies were also open to the northwest and additional claims were staked in October 1981, to cover extensions of these anomalies.

The Thrall mineralization is considered significant for the following reasons:

1. Favourable geological environment including a quartz-feldspar porphyry intrusive.

2. Presence of quartz stockwork with molybdenite.

3. Weak pervasive alteration and strong k-feldspar alteration envelopes.

4. Strong soil geochemistry response particularly for molybdenum.

5. Good size and depth potential.

The following work is recommended for 1982:

1. Preparation of topographic base.

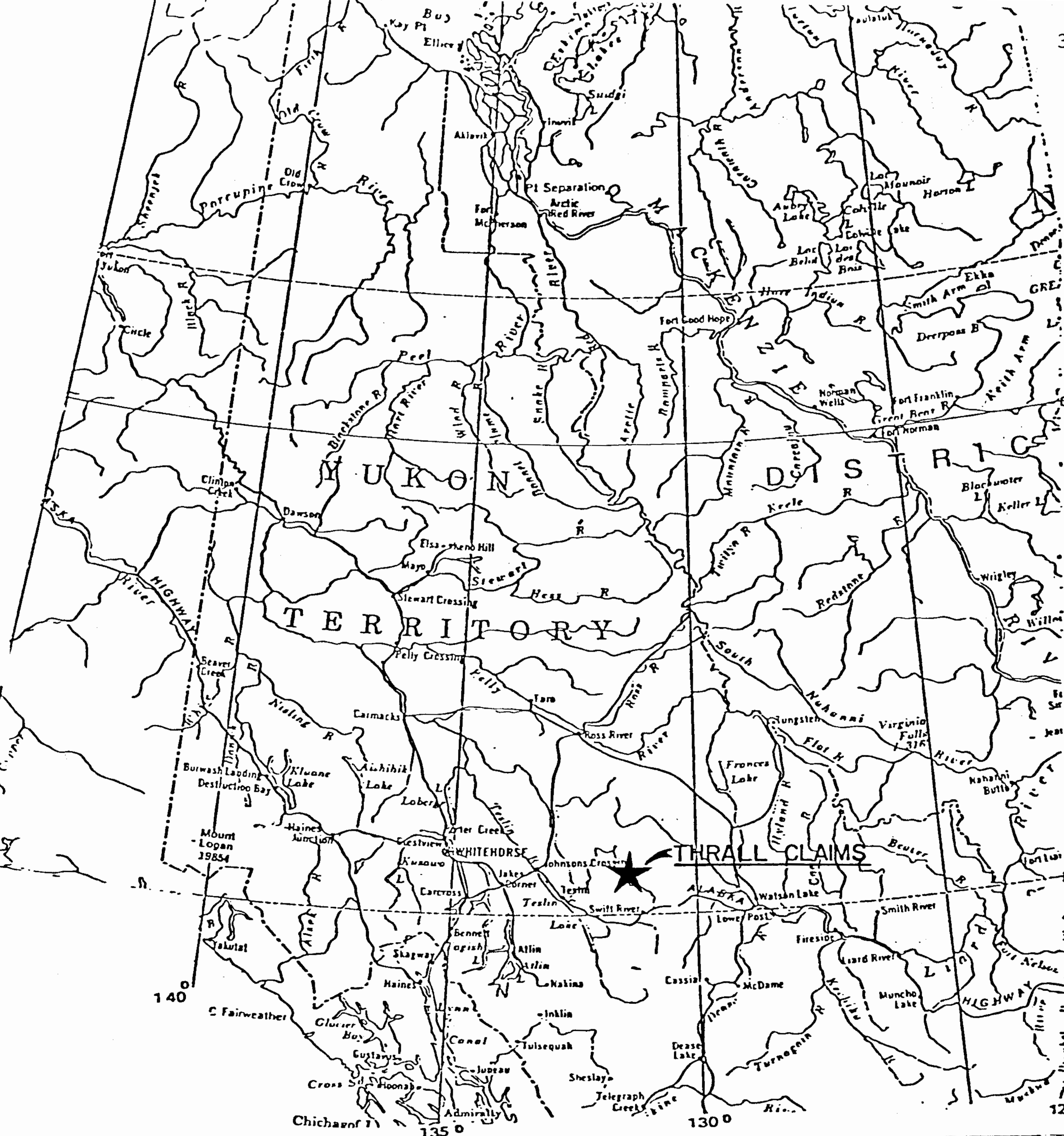
2. Install 70.8 kilometres of cut line grid.

3. Detailed geological mapping on grid.

4. Soil sample new grid where it extends beyond the present grid particularly in areas of anomalous values.

5. Run Magnetometer and I.P. surveys over the new grid.

6. Three diamond drill holes totalling at least one thousand metres.



SCALE 1:6,336,000

Miles 100 50 0 100

Kilometres 100 0 100 200

CASSIAR PROJECT 1982 (THRALL Mo PROSPECT)	
LOCATION MAP	
DRAWN BY: L. C	DATE: MAR., 1982
CHECK'D BY: B. BOWEN	DRAW'G No: FIGURE I
N.T.S.: 105-B	SCALE: 1:6336000

Getty Mines, Limited

1.0 INTRODUCTION AND HISTORY

In the past, prospecting and mining exploration activity around Wolf Lake has been hampered by poor access. Prospecting of the Upper Liard River during the 1870's resulted in placer gold discoveries just to the northeast, however, after that the area was largely neglected until construction of the Alaska Highway in 1942. Subsequent exploration was concentrated along this route and hence most discoveries were in this region.

In 1978 the Geological Survey of Canada initiated a regional stream sediment survey over the Wolf Lake map sheet as part of its Uranium Reconnaissance Program (U.R.P.). As a result of this program coincidental anomalous values were obtained for molybdenum (11 ppm), tungsten (22 ppm), and copper (58 ppm) on a north draining tributary of Irvine Creek. Local area highs were also obtained for lead (22 ppm) and zinc (110 ppm) at the same site. Normal background values in the area are 1 ppm Mo, 2 ppm W, 20 ppm Cu, 4 ppm Pb, and 60 ppm Zn. This anomaly prompted the area to be staked in 1979, however there is no record or sign of any work being done and the claims lapsed.

Getty Mines Limited, in 1981, proposed a regional reconnaissance molybdenum program for the south and central Yukon. Research and data compilation revealed that the above mentioned anomaly was unstaked and a prospecting crew was dispatched in June 1981 to investigate. Molybdenite mineralization was located in association with quartz veining in talus of quartz-felspar porphyry granodiorite. Minor disseminated molybdenite was also located in float and rare outcrop of granodiorite over a wide area of poor rock exposure. The Thrall 1-64 claims were staked and later a program of grid soil geochemistry and limited mapping was undertaken. The results of this work are detailed in this report. The Thrall 65-92 claims were added in October 1981 to cover extensions of soil geochemistry anomalies.

1.1 LOCATION AND ACCESS

The THRALL 1-92 mineral claims are located in the Wolf Lake area of the Yukon Territory at latitude 60°33'N and longitude 131°20'W. The city of Whitehorse, Yukon Territory lies 200 air kilometres to the west and the Alaska Highway 60 kilometres to the south.

The claim block is situated at the headwaters of, the informally named, Thrall Creek. Thrall Creek is a northwest flowing tributary of Irvine Creek which flows west into Wolf Lake and the Yukon River system. The area lies within the Cassiar Mountains with moderate to steep glaciated ridges reaching 1,500 to 1,800 metres elevation. The intervening valleys are generally broad and U-shaped with often thick marshy glacial overburden cover. The claim area is above tree line with the main vegetation being alder and willow bush, known as "buck brush", occurring in the valleys. Scattered clusters of stunted spruce are common throughout the area.

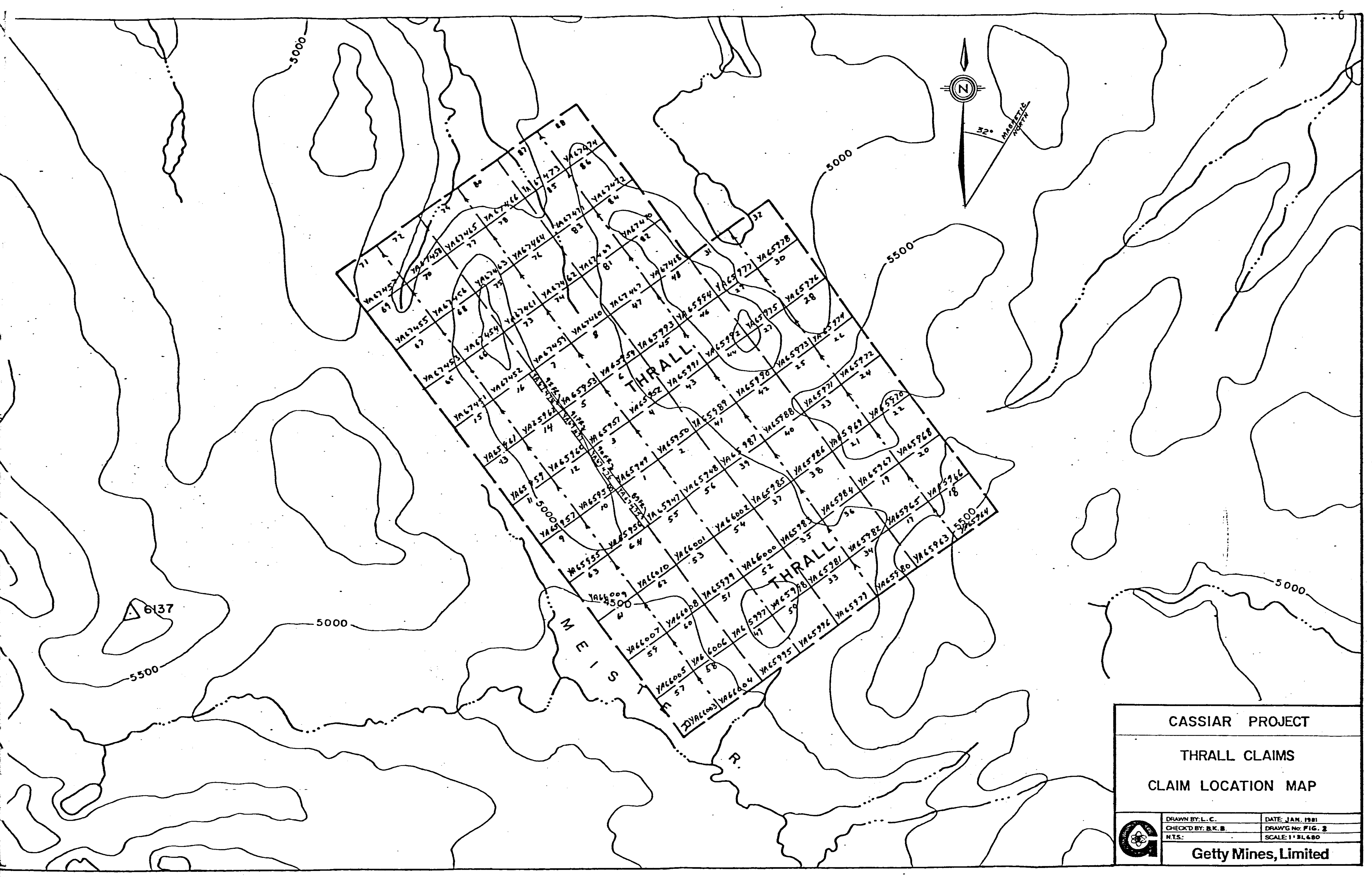
Outcrop exposure is generally restricted to the ridges, with some exposure in creek cuts and in the narrower valley bottoms. Talus and felsenmeer is abundant along ridge flanks. Small frost boils and seeps are common near the base of the ridges.

Access to the area is by long range helicopter from Whitehorse or Watson Lake, approximately a one hour flight each way. Helicopters have also been based, during previous summers, at much closer settlements such as Teslin and Swift River along the Alaska Highway. Equipment and supplies can be transported by float plane from either Whitehorse or Watson Lake to Wolf Lake and ferried by helicopter fourteen (14) kilometres to the property.

1.2 CLAIM STATUS

The following 92 contiguous mineral claims comprise the THRALL Claim Group and are located in the Watson Lake Mining Division of the Yukon Territory (see Figure 2).

	Grant No.	Record Date	Expiry Date
Thrall 1-64	YA65947-YA66010	July 2, 1981	July 2, 1982
Thrall 65-88	YA67451-YA67474	Oct. 30, 1981	Oct. 30, 1982
Thrall 89F-92F	YA67475-YA67478	Oct. 30, 1981	Oct. 30, 1982



CASSIAR PROJECT

THRALL CLAIMS

CLAIM LOCATION MAP

DRAWN BY: L. C.	DATE: JAN. 1981
CHECK'D BY: B.K.B.	DRAW'G No: FIG. 2
N.T.S.:	SCALE: 1": 31,680

Getty Mines, Limited

2.0 REGIONAL GEOLOGY

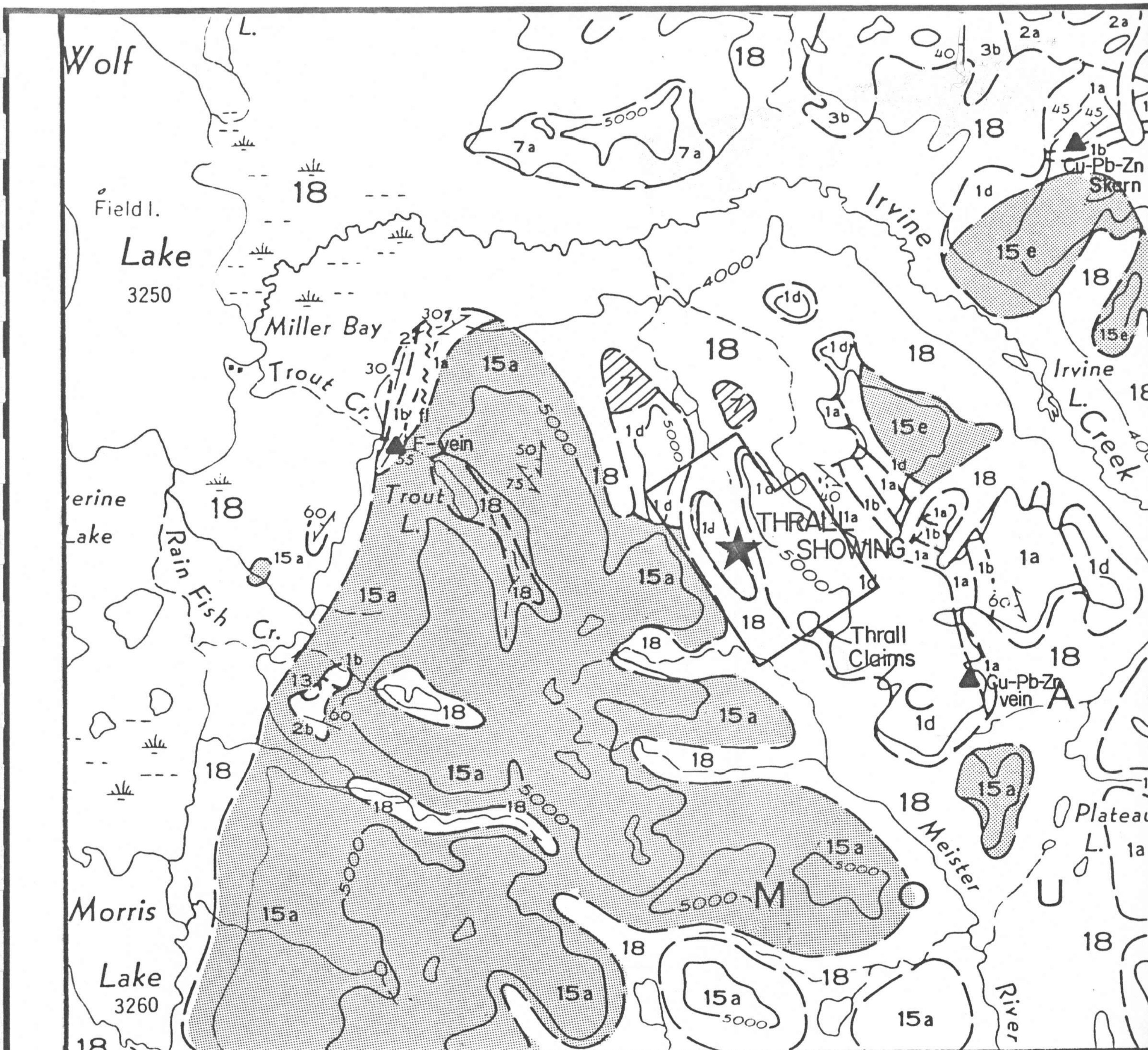
The Wolf Lake region is dominated by the Cretaceous Cassiar Intrusions which cut a sequence of largely calcareous lower Paleozoic sediments and their metamorphic equivalents. This intrusive complex can be separated into several components including, among others, the Seagull and Cassiar Batholiths. The Seagull Batholith lies to the south of the Wolf Lake area and is noted for its anomalous fluorine, tin and tungsten content and associated mineral occurrences such as the Logjam Creek tungsten-molybdenum and the Swift River tin deposits. Northeast of the Seagull Batholith lies the large, northwest trending Cassiar Batholith which is composed of mainly biotite quartz monzonites and granodiorites. A smaller unnamed batholith lies further to the northeast, along Irvine Creek. The "Irvine Creek Batholith" consists of largely biotite-muscovite granodiorite.

The THRALL claims are located between these latter two batholiths in an area underlain by a small unmapped granodiorite stock. This stock intrudes rocks mapped by the Geological Survey of Canada as Cambrian or earlier, biotite schists and gneisses; with Devono-Mississippian greenstones and related metasediments occurring to the north along Irvine Creek (Units 1d and 7 respectively, Figure 3).

Within the Wolf Lake-Irvine Creek region only three (3) mineral occurrences, other than the Thrall showings, have been reported. These are: 1) a quartz-fluorite vein on Trout Creek, 2) a copper-lead-zinc vein north of the Meister River, and 3) a copper-lead-silver skarn northeast of Irvine Creek (see Figure 3). The last of these showings is held as the COM 21-26 claims, owned by Dayton Silver Mines Ltd. and the SOURCE 1-24 claims (staked September 1981) owned by Serem Ltd. The remaining mineral occurrences are open and no other valid mineral claims are located within a thirty kilometre radius of the THRALL claims. Other known porphyry molybdenum occurrences in the region include the Red Mountain deposit (Amoco Canada Petroleum) 140 kilometres to the northwest, and Logjam Creek deposit (Amax Exploration) 60 kilometres to the south.

2.1 PROPERTY GEOLOGY

A limited amount of geological mapping was carried out using one (1) inch equals one half (1/2) mile government airphotos for control. Plate 1 shows the geology and claim outlines on an enlargement of one of these airphotos. A suite of eight (8) rocks was sent in for petrographic study and a copy of this report is included in the Appendix.



LEGEND

LITHOLOGY

PLEISTOCENE AND RECENT

- 18 — Overburden

JURASSIC AND/OR CRETACEOUS

- 15 — 15a, CASSIAR BATHOLITH: mainly biotite quartz monzonite and granodiorite; 15e, mainly biotite-muscovite granodiorite

DEVONIAN AND MISSISSIPPIAN

- Greenstone, metasediments

CAMBRIAN AND (?) EARLIER

- 1d — Biotite schist and gneiss
- 1a,b — Metasediments

SYMBOLS

- Mineral occurrence
- Bedding
- Schistosity

SCALE

0 5 10

KILOMETRES

CASSIAR PROJECT 1981 (THRALL CLAIMS)	
GEOLOGY OF IRVINE CREEK AREA	
DRAWN BY: L. CONNOR	DATE: MARCH, 1982
CHECK'D BY: B.H, B.K.B.	DRAW'G No: FIGURE 3
N.T.S.: 105-B-11	SCALE: 1:155,000
Getty Mines, Limited	

The country rocks underlying much of the claim area consist of an intercalated package of greenstones, dioritized greenstones, and metasediments intruded locally by medium to coarse grained diorites and quartz diorites. Intruding all the above rocks is a small dyke-like stock of granodiorite and associated quartz-feldspar porphyry granodiorite.

Greenstones

The greenstones are fine grained, usually grey-green to dark green in colour and are generally andesitic in composition although dacites and rhyolitic rocks have been recognized. The mineralogy consists mainly of plagioclase and green hornblende, in approximately equal proportions, with minor quartz and sphere. Pyrite is common in amounts up to five percent and occurs principally in fine irregular stringers and fine disseminations with quartz. Quartz is locally abundant and rounded bluish quartz eyes were noted occasionally.

Texturally the greenstones are variable from massive and often finely porphyritic (white plagioclase) to strongly foliated. Strongly foliated phases are frequently intermixed and gradational into hornfelsed metasediments. Locally minor small seams of weak skarn are common and many of these rocks could be tuffaceous in origin. Strong dioritization is common in the vicinity of diorite-quartz diorite intrusions, particularly in sediment-poor areas. Dioritized greenstones are fine to medium grained, massive to foliated and are similar compositionally to the andesites with which they are intergradational.

The greenstone lithologies occur intermixed with metasediments throughout the claim area, however the greatest concentrations occur along the two ridges flanking the main showing and Thrall Creek. Here the sedimentary component is minimal and dioritization strongest.

Metasediments

These rocks are largely fine grained and argillaceous with a high but variable volcanic component. Some quartz-rich sediments occur locally but are not abundant. Carbon content is generally low and minerals such as chlorite, purple biotite, and dark green to black hornblende are abundant, particularly near the granodiorite stock where hornfelsing is common. Minor seams of weak skarn are also common near the intrusive. Colour is variable from dark grey to dark green and purple-grey, and foliation is moderate to strong. The metasediments are most abundant in the northeastern half of the claims, away from the granodiorite and mineralization.

Diorite-Quartz Diorite

These intrusive rocks occur mainly in the southwestern half of the claims and appear to be spatially related to the greenstone rich areas. Compositionally they are similar to the greenstones and dioritized greenstones, consisting principally of white plagioclase (20-60%), green to black hornblende (20-70%) and quartz (0-30%). The diorite-quartz diorites are generally non-foliated, equigranular and medium to coarse grained, however thin section examination shows some strain and possible recrystalization textures suggesting some metamorphism.

Contacts with the greenstones are frequently sharp, however irregular contacts and intermixing also occur and compositional similarities and contamination often make differentiation difficult. It is possible that the diorite-quartz diorite units are recrystallized greenstones and are part of the greenstone package.

Granodiorite

The granodiorite occurs as a long northwest trending body along or adjacent to Thrall Creek, cutting and intruding the older diorites, greenstones and metasediments. Intrusion of this stock is probably related to the implacement of the Cassiar and, informally named, Irvine Creek Batholiths to the southwest and northeast respectively and, hence, are of Cretaceous age. Exposure within the claim boundaries is generally poor and the surface trace of the stock was determined largely from talus and frost boil mapping. Float mapping suggests the intrusive to have a length of at least 1,500 metres and a width of 200 to 500 metres. The intrusive contact is not exposed within the claims and at this time its nature is not known.

The rock is mainly comprised of plagioclase (35-50%), quartz (25-35%) and K-feldspar (12-15%) with lesser amounts of muscovite, biotite, chlorite and apatite. The mafic content, represented mainly by biotite, is low making up less than ten percent of the unaltered rock. Chlorite and muscovite are principally alteration minerals of biotite and to a lesser extent plagioclase. Pyrite is commonly present as fine disseminations and fracture fillings in amounts up to two percent. The rocks are fine to coarse grained and porphyritic with phenocrysts of plagioclase, quartz and occasional K-feldspar forming 50 to 80 percent of the rock. The fine grained matrix is largely quartz and K-feldspar.

Quartz-Feldspar Porphyry

Associated with the granodiorite in at least two localities is a fine grained porphyritic felsite of granodiorite to quartz diorite composition. Anhedral to euhedral phenocrysts of plagioclase and quartz, generally 1 to 5 millimetres in size comprise up to 25 percent of the rock. The groundmass consists mainly of plagioclase (40-50%), quartz (25-40%), K-feldspar (5-25%) and chlorite-biotite (0-10%). No contact relationships were observed, however compositionally and texturally the quartz-felspar porphyry is similar to the granodiorite and is probably related to it. It is also apparently related to the mineralizing event as it hosts much of the best stockwork quartz-molybdenum veinlets exposed on surface.

Other Rock Types

Aplitic and lamprophyre dykes were observed at several localities within the greenstone-metasediment package. These appear minor and not directly associated with the stock.

Along the northeastern edge of the claim group is a package of impure quartzites and siliceous marbles with at least one occurrence of strongly graphitic phyllite and serpentinized basalt. The extent and contact relationship of these with other rocks in the area is not known.

The contact of the Cassiar Batholith occurs on the ridge just to the southwest of the claims. Rusty hornfelsed sediments and coarse grained, muscovite quartzites were observed along the contact during a very brief visit to this area.

2.2 MINERALIZATION AND ALTERATION

The granodiorite stock appears to be anomalously high in molybdenum with rare disseminated specks of molybdenite occurring at many localities both within the stock and in the surrounding rocks. Quartz veining is not common throughout most of the stock although occasional veinlets do occur.

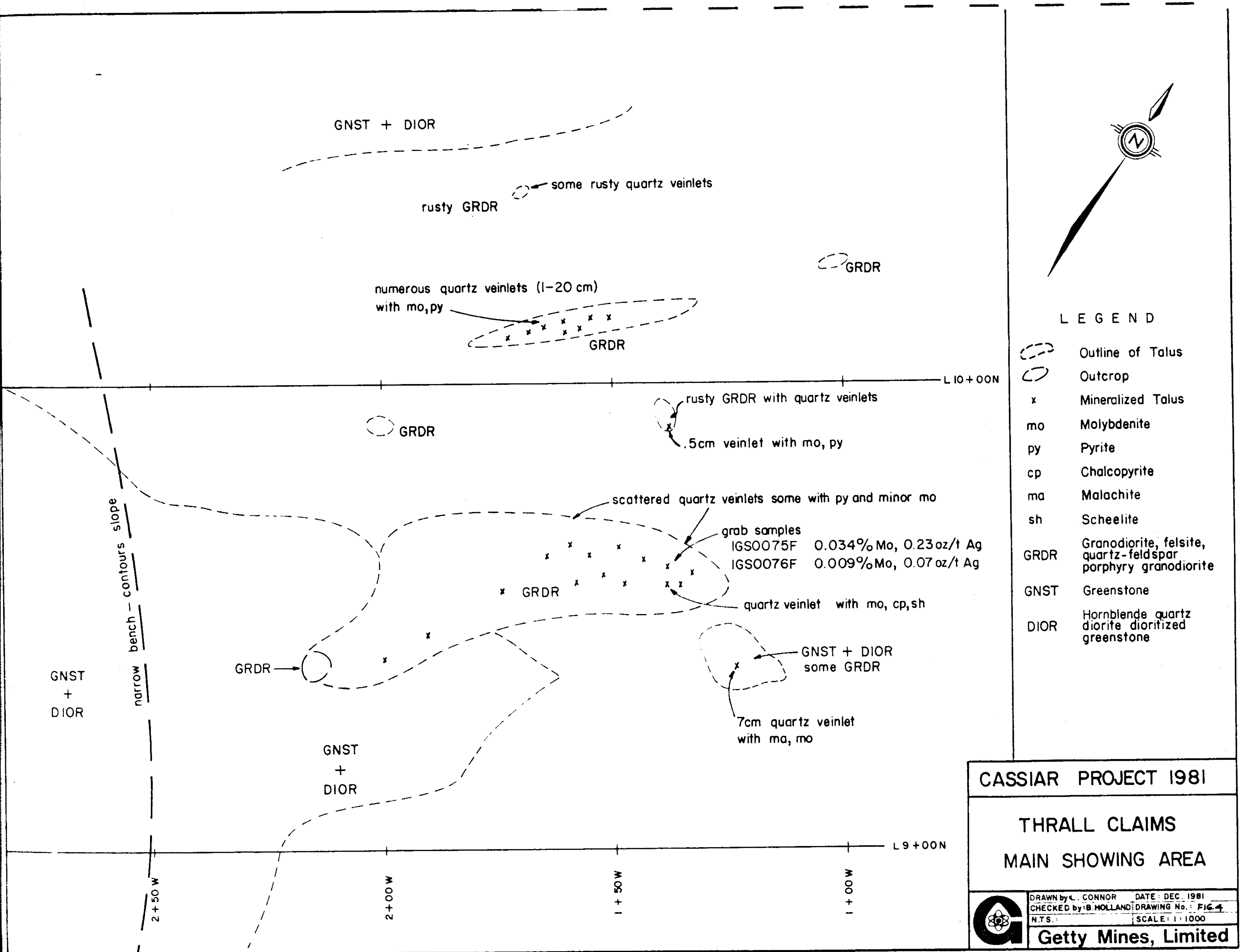
The main showing area consists of talus exposure of both granodiorite and quartz-feldspar porphyry as shown in Figure 4. Minor scattered molybdenite bearing quartz veinlets occur within this talus, associated largely with the quartz-feldspar porphyry and finer phases of the granodiorite. Unmineralized and often rusty quartz veins are common and some of these may also have contained sulfides prior to surface weathering and leaching. Two grab samples of mineralized vein material ran 0.034 percent Mo, 0.23 oz/ton Ag and 0.009 percent Mo, 0.07 oz/ton Ag respectively. Most of the mineralized material has molybdenite within or adjacent to the veins, most commonly in the selvage area. Some float of intensely rusty granodiorite was also observed and often contains minor to abundant disseminated molybdenite. Copper mineralization is not common, however one large piece of float was found to contain significant amounts of chalcopyrite, molybdenite and scheelite in a narrow veinlet. Another occurrence of minor malachite associated with molybdenite in a seven centimetre quartz vein was also noted.

Mineralized vein material similar to the main showing is exposed in float along a dry seep rivlet approximately 200 metres to the northwest. The exposure is poor and limited in size however it suggests continuity of mineralization in this direction.

A third exposure of interest is a strongly gossanous talus and suboutcrop exposure in a creek cut near line 0+00S, 2+50E. This material is similar to the rusty granodiorite noted at the main showing and occurs adjacent to a narrow talus exposure of quartz-felspar porphyry. Exposure is poor in this area however one quartz vein with minor molybdenite and some minor disseminated molybdenite was observed.

Alteration envelopes are well developed around many of the mineralized veinlets. Strong secondary K-feldspar replaces plagioclase, often completely, over widths of one to two centimetres with weaker replacement over greater widths.

Other alteration assemblages are not readily distinguished in the field and poor exposure prevents recognition of alteration halos. In addition altered rocks often occur near fresh looking speciments. The thin section study shows that most of the granodiorite rocks have some clay alteration of plagioclase and chloritization of biotite. Sericite alteration of plagioclase and biotite is also common with biotites often totally replaced. Strong gossanous alteration occurs locally over narrow widths with the rock generally crumbly and well fractured suggesting a zone of shearing or crackling. Minor pyrite is common in most of the granodiorites however no pyrite enriched halo was outlined.


GNST + DIOR
some rusty quartz veinlets
rusty GRDR
GRDR
numerous quartz veinlets (1-20 cm)
with mo, py
GRDR
L 10+00N
rusty GRDR with quartz veinlets
GRDR
.5cm veinlet with mo, py
scattered quartz veinlets some with py and minor mo
grab samples
IGS0075F 0.034% Mo, 0.23 oz/t Ag
IGS0076F 0.009% Mo, 0.07 oz/t Ag
GRDR
quartz veinlet with mo, cp, sh
narrow bench — contours slope
GRDR
GNST + DIOR
some GRDR
GNST
+
DIOR
7cm quartz veinlet
with ma, mo
GNST
+
DIOR
L 9+00N
2+50 W
2+00 W
1+50 W
1+00 W
LEGEND
Outline of Talus
Outcrop
x Mineralized Talus
mo Molybdenite
py Pyrite
cp Chalcopyrite
ma Malachite
sh Scheelite
GRDR Granodiorite, felsite, quartz-feldspar porphyry granodiorite
GNST Greenstone
DIOR Hornblende quartz diorite dioritized greenstone
CASSIAR PROJECT 1981
THRALL CLAIMS
MAIN SHOWING AREA
DRAWN by: L. CONNOR
DATE: DEC. 1981
CHECKED by: B. HOLLAND
DRAWING No.: FIG.4
N.T.S.:
SCALE: 1:1000
Getty Mines, Limited

3.0 GEOCHEMISTRY - INTRODUCTION

A soil geochemistry program was undertaken in late July 1981 over the showing area. A flag and compass grid was established using one of the claim lines as a baseline. The ends of the lines were tied into adjacent claim lines for control. Samples were collected at 50 metre intervals along lines spaced 150 metres apart. Sampling of the baseline at 50 metre intervals and silt sampling of creeks and seeps were also done. A total of 700 soil samples, 49 stream sediment samples, and 13 rock samples were collected. The grid covers an area 3,550 metres long (N35^{o}W) by 800 to 1,600 metres wide (N55^{o}E).

A prospector's grub hoe or mattock was used to collect each soil sample from a depth of approximately 15 to 25 centimetres. An effort was made to sample the B horizon where possible. Samples were collected in brown kraft paper bags and dried prior to shipment to the Bondar-Clegg and Company laboratory in Whitehorse, Yukon Territory for geochemical analysis. Upon arrival at the laboratory the samples were dried for 24 hours then sieved to minus 80 mesh. The coarse fraction was discarded. A 0.5 gram portion of the sample was dissolved in hot Lefort aqua regia and analysed by atomic absorption for molybdenum, copper, lead and silver. Another two gram portion of the sample was treated by basic oxidizing fusion and analysed by colorimetric methods for tungsten. Fluorine was also run using basic fusion extraction and citrate buffer-specific ion analysis. All results are given in parts per million (ppm).

A histogram plot of the soil results was made for each element analysed to determine anomalous and background populations. Values for each element were then plotted and contoured according to population divisions and shown in Plates 2 to 7.

3.1 GEOCHEMISTRY - DISCUSSION OF RESULTS

Molybdenum

Soil results have outlined a strong nothwest trending molybdenum anomaly which extends the full length of the grid area (3,600 metres) and is open at both ends (see Plate 2). The threshold between the anomalous and background values is sharply defined at five ppm Mo. Within the overall weakly anomalous trend are numerous anomalous and highly anomalous peaks with values to 230 ppm Mo. These peaks are strongest and most abundant in the central and northwestern areas of the grid where they are centred on known talus and outcrop exposures of granodiorite and quartz-feldspar porphyry.

The anomaly also extends well into the surrounding country rock suggesting a molybdenum enriched aureole adjacent to the intrusive. A good molybdenum response was obtained over the main showing (159 ppm Mo), however the strongest response occurs further to the northwest. This zone saw little exploration work and is still open to the west and south.

The weaker but still well defined southwestern portion of the anomaly has values to 42 ppm Mo. No granodiorite, or molybdenite mineralization, was found in this area and talus and outcrop exposures consist predominantly of diorite, greenstone and lesser hornfelsed sediments.

The only other anomalies within the survey area occur as several small scattered highs in the southern corner of the grid. This area is underlain by flat swampy drainage and thick glacial overburden cover. Molybdenum values to 34 ppm were obtained.

Copper

The anomalous threshold for copper is sharply defined at 100 ppm with the majority of the anomalies occurring in the northwestern half of the survey area (see Plate 3). Within this area strong copper responses were encountered over the main showing and to the northwest, coincidental with the strongest molybdenum responses. Values to 509 ppm copper were obtained. The general cluster of anomalous values is encompassed by an extensive halo of weakly anomalous copper (51-100 ppm range). This forms a zone of copper enrichment open to the northwest and coincidental but broader than the corresponding portion of the molybdenum anomaly. Similarly this zone is centred on and appears related to surface exposures of the granodiorite stock.

Copper anomalies in the southeastern grid area are not generally coincidental with responses for molybdenum or any other metal analysed. These anomalies also tend to be small, erratic and scattered, however several very high values (up to 359 ppm copper) were obtained. For the most part these anomalies occur in areas of thick overburden and flat swampy drainage.

Tungsten

The areas of anomalous tungsten geochemistry are generally coincidental but far less extensive than those for molybdenum and define the same linear belt (see Plate 4). The less extensive nature of tungsten may be due in part to the fact that the threshold of two ppm is also the detection limit of analysis. The anomalies can be grouped into three main clusters which increase in size and intensity to the northwest and correspond to the more intense portions of the molybdenum anomaly. The strongest tungsten response, as for copper and molybdenum, occurs in the western corner of the survey area, where values range to 50 ppm. This anomaly is still open to the west and south. Values over the main showing are generally low despite the occurrences of some scheelite in this area.

Lead

The lead soil geochemistry shows a large, U-shaped anomalous trend within the northwestern half of the grid (see Plate 5). This anomalous area is in part coincidental and in part flanking the anomalous molybdenum belt and corresponding granodiorite contact. The anomalous threshold is well defined at 20 ppm and values to 1,275 ppm lead were obtained. The highest values for lead are found in two clusters, one in the central grid region and the other in the northernmost corner. Only a weak response occurs over the main showing and no significant anomalous values are found in the southeastern parts of the grid.

Silver

Silver anomalies are generally small and dispursed with the main concentrations occurring near the baseline in the central portion of the grid, coincidental with the widest part of the granodiorite stock (see Plate 6). Values to 4.9 ppm silver are found in this region. A moderate response, which is an extension of this main anomalous zone, is also found down hill from the main showing. This overall trend although coincidental with the general anomalous trends for molybdenum, copper and fluorine, does not correspond to any strongly anomalous zones for these elements. Scattered anomalies further north and south of the base line in the central and north-western grid regions, outline a poorly defined U-shaped trend coincidental with that described for lead. Anomalies to the southeast are weak and scattered with no apparent relationship to other anomalies in this area.

Fluorine

Fluorine, like tungsten, is coincidental with, but far less extensive than molybdenum, forming a belt of somewhat spotty and erratic anomalies extending the length of the grid area (see Plate 7). Threshold is taken as 300 ppm and values to 750 ppm fluorine were obtained. The highest fluorine peaks generally correspond to areas of stronger molybdenum response including the main showing, westernmost grid corner, and central portions of the grid. A small but strong peak also occurs in the southeasternmost part of the grid.

In addition to the main northwest trending anomalous zone, several other small scattered anomalies were outlined with values to 520 ppm. These occur well away from the intrusive exposures to the north and south.

4.0 RECOMMENDATIONS

Further work on the THRALL claims is definitely warranted with the main emphasis on delineating the extent of the intrusives, the relationships of the granodiorite and quartz-feldspar porphyry, and, the extent and grade of mineralization. Based on this, the following two phase program is proposed to commence in 1982.

Phase I

1. Preparation of a pencil manuscript base map, covering the claim area at a scale of 1:5000 using a 20 metre contour interval. This is required to provide topographical and survey control on previous and future work and should be started as soon as possible to ensure completion for the field season.

2. A sloped corrected cut line grid totalling 70.8 line kilometres should be installed to replace and extend the present flagged grid. The present baseline can be reused with slope correcting and some straightening probably necessary. Cross lines should be run, as previously, at N55°E with line spacings of 150 metres. Lines should extend to 1,000 metres east and west of the baseline and the grid should be extended as far as stations 18+00S and 30+00N (measured from the present line 0+00S).

3. The old grid should be tied into the new one so the 1981 geochemical data can be transferred. Soil sampling of the extended and new lines should also be conducted to close off open-ended anomalies. These new samples should be run for Mo, Cu, Pb, Ag, W and optionally for F.

4. Using the grid and topographic base for control, the grid area should be geologically mapped in detail noting outcrop, talus and float occurrences.

5. A ground magnetometer survey should be conducted reasonably early in the program as it is a quick and inexpensive tool and may be useful in outlining the granodiorite stock. An I.P. survey should also be considered in conjunction with the magnetometer survey, to define potential sulphide areas for follow up drill testing.

6. The geology and mineral potential of the surrounding region is not well known and should be explored by a small mobile prospecting-geology crew based out of the Thrall camp. Many of the other regional targets which originally attracted Getty crews to the area should also be re-examined in more detail at this time.

Phase II

1. Follow up diamond drilling of mineralized zones and targets defined by geochemistry, geophysics and geology. A minimum of three (3) holes totalling 1,000 metres is suggested and could be drilled in late summer or early fall 1982 upon completion of Phase I.

APPENDIX I

PETROGRAPHIC REPORT ON A SUITE OF EIGHT SAMPLES FROM THE THRALL CLAIMS, YUKON TERRITORY

Vancouver Petrographics Ltd.

JAMES VINNELL, Manager
JOHN G. PAYNE, Ph. D. Geologist

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Report for: Bob Holland,
Bema Industries Ltd.,
203 - 19945 56th Avenue,
LANGLEY, B.C., V3A 3Y2

Invoice 2972

Samples: 8 samples from Porphyry Molybdenum property in Yukon Terr.
Cassiar Project 2035

Summary:

The rocks are grouped into the following types:

1. Intrusive and related Porphyritic Hypabyssal Rocks of the Cretaceous plutonic suite

   A. medium to coarse grained granodiorite-quartz monzonite possibly the major intrusion

      1GS-75F : plagioclase slightly altered to sericite ± calcite
      mafic minerals altered to muscovite
      veins
      1) quartz ± pyrite with halo of K-feldspar and sericite-muscovite (K-feldspar replaces plagioclase)
      2) sericite-muscovite-limonite veins and veinlets, probably related to type 1 vein
      3) molybdenite on fracture surfaces, no apparent alteration (alteration halo would overlap with strong alteration about quartz vein)

   B. granodiorite porphyry
   medium to very coarse phenocrysts in less abundant groundmass of similar composition, but more alkalic. Phenocrysts of plagioclase, quartz, and lesser K-feldspar and micas. Variable alteration.

      1H-15 : zoned plagioclase phenocrysts slightly altered to sericite-muscovite and calcite; biotite altered on grain borders to muscovite-Ti oxide, a few grains altered to chlorite; one grain of hornblende; pyrite in scattered clusters

      1H-16A : less altered than 1H-15; plagioclase slightly altered to sericite-kaolinite and patches of calcite; biotite partly altered to chlorite-Ti oxide; minor muscovite; minor magnetite; one patch of epidote with chlorite. veinlets of zeolites?

      1H-37 : slightly coarser than 1H-15 and 1H-16A; plagioclase variably altered to sericite-muscovite, and in places strongly altered to kaolinite; mafic minerals altered to muscovite-Ti-oxide-calcite; patches of calcite-pyrite; veinlets of calcite.

   C. felsite porphyritic, composition from granodiorite to quartz diorite scattered phenocrysts of plagioclase, quartz in very fine grained groundmass

      1H-40A : plagioclase slightly to strongly altered to sericite in phenocrysts; one megacryst of skeletal garnet intergrown with quartz; muscovite is main mica; veins of quartz with

(continued)

strong halos of K-feldspar; wispy veinlets of sericite limonite-hematite (alteration similar to that in 1GS-75F) (granodiorite composition [in fresh rock])

1H-42B : groundmass contains patches of coarser grained quartz-biotite-chlorite with epidote,apatite; other patches of K-feldspar (quartz diorite composition)

2. Older? Plutonic Rock Series

medium to coarse grained quartz diorite

1H-27 : hornblende in part altered to secondary amphibole, irregular patches of chlorite, minor sericite; veins of epidote with patches of chlorite.
plagioclase in rock strongly altered in patches to epidote and minor chlorite

3. Metamorphosed Andesite

strongly foliated, contact? metamorphism in hornblende hornfels facies, probably originally andesite flow.

1H-18A : plagioclase altered in patches to sericite; hornblende fresh, abundant sphene;
veins of quartz-pyrite-(biotite?), a few of fine grained pyrite

John Payne

John Payne,
November 1981

1GS-75F Granodiorite-Quartz Monzonite with veins of
1) Quartz-(Pyrite) with halo of K-feldspar,sericite-muscovite
2) Molybdenite
3) Sericite-Limonite

The rock is a medium to coarse grained plutonic rock with subhedral plagioclase and anhedral quartz and K-feldspar, and scattered grains and clusters of muscovite. It is cut by a major quartz vein with a prominent halo in which K-feldspar replaces plagioclase, and sericite-muscovite is abundant. A fracture surface in the hand sample contains moderately abundant molybdenite clusters. Sericite, with or without limonite, forms abundant veinlets extending out from the main quartz vein.

plagioclase	30-35% (% of freshest rock)
quartz	30-35
K-feldspar	25-30
muscovite	4- 5
pyrite	½- 1
apatite	trace

veinlets and veins
1) quartz -(pyrite) with K-feldspar-sericite-muscovite halo
2) molybdenite
3) sericite-limonite

Plagioclase forms subhedral to locally euhedral grains from 1 to 2 mm in average size. It is slightly altered to very fine grained sericite and minor calcite. A few finer grains intergrown with K-feldspar have a myrmekitic texture with very fine grained wormy quartz inclusions.

Quartz forms medium to coarse grained patches up to a few mm across, with grain size averaging 0.5-1.5 mm. It is interstitial to plagioclase and to K-feldspar (after plagioclase).

K-feldspar forms grains from 0.5 to 2 mm in size, commonly with anhedral borders.

Muscovite forms scattered grains and clusters of flakes averaging 0.05-0.2 mm in size, with a few up to 0.5 mm across.

Pyrite forms scattered grains and clusters of grains averaging 0.15-0.2 mm in size, with a few up to 0.3 mm across. Pyrite is completely altered to pseudomorphic aggregates of hematite-limonite.

Apatite forms a few anhedral grains up to 0.15 mm long.

The main quartz vein averages a few mm across, and consists of a medium to coarse grained aggregate of anhedral grains. Pyrite forms one cluster 2 mm across. Pyrite is replaced by hematite, which is translucent along the borders of grains and opaque in their cores. The cores may contain a few relics of pyrite.

Bordering the quartz vein, the rock has been strongly replaced by addition of K-feldspar as a replacement of plagioclase, and by addition of sericite-muscovite. The former replaces anhedral to subhedral plagioclase grains moderately to completely. Sericite-muscovite forms irregular fine to medium grained patches and veinlets, and one subradiating aggregate of grains up to 1 mm long.

The sericite-muscovite in the alteration halo grades outwards from the vein into veinlets of sericite-muscovite, in part with limonite.

The quartz vein is vuggy on one weathered surface, suggesting that it contains patches up to a few mm across of calcite.

Molybdenite occurs in clusters up to 1.5 mm across on some fracture surfaces. It does not appear to be associated with the K-feldspar alteration, but because the main molybdenite vein is so close to the main quartz vein, it is difficult to separate any possible alteration effects.

One vein is dominated by limonite, with an irregular halo? containing very fine to fine grained patches of sericite-muscovite.

1H-15 Granodiorite Porphyry (Biotite-Muscovite)

The rock contains phenocrysts of feldspars, quartz, and mica with a moderate to sparse groundmass of quartz-K-feldspar and lesser mica. Most of the K-feldspar in the rock is in the groundmass.

plagioclase	45-50%
quartz	25-30
K-feldspar	12-15
biotite	3- 4
muscovite	4- 5
chlorite	0.5
apatite	0.3
hornblende	trace
zircon	trace
pyrite (opaque)	0.3

Plagioclase forms prismatic phenocrysts up to a few mm long. Grain borders commonly are strongly indented by rounded grains of groundmass minerals (quartz and K-feldspar). Plagioclase commonly shows concentric compositional zoning from more-calcic cores to more-sodic rims. Alteration is slight to moderate to very fine to fine grained sericite-muscovite flakes, and scattered irregular patches of calcite up to 0.3 mm across. Minor plagioclase occurs as finer grains intergrown in the groundmass with quartz and K-feldspar.

Quartz forms anhedral phenocrysts from 1.5 to a few mm in size, commonly grouped in clusters of a few grains. It also forms rounded grains intergrown with K-feldspar in the groundmass averaging 0.1-0.2 mm in size.

K-feldspar forms a few phenocrysts up to a few mm across, but is mainly present as irregular interstitial grains in the groundmass averaging 0.1-0.3 mm in size. A few coarser grains contain irregular inclusions of plagioclase up to 0.1 mm in size.

Micas form a few phenocrysts up to 1.5 mm in size. These consist mainly of biotite replaced in part, especially along grain borders by muscovite with moderately abundant very fine grained Ti-oxide. Some grains are altered partly or completely to chlorite and Ti-oxide. Biotite is pleochroic from pale to medium reddish brown. Chlorite is pleochroic from almost colorless to light green, with purplish grey interference color. Muscovite also occurs as irregular to subradiating clusters of grains averaging 0.2-0.4 mm in length.

Apatite is associated with micas as subhedral prismatic grains up to 0.4 mm long and 0.15 mm across.

Hornblende forms one grain 0.3 mm across associated with a cluster of muscovite. It is pleochroic from light to medium orangish brown.

Zircon forms scattered subhedral grains up to 0.05 mm across.

Pyrite forms scattered clusters of subhedral, equant grains from 0.3-0.5 mm in average size, with one irregular patch up to 1.5 mm across.

1H-16A Granodiorite Porphyry (Biotite-Chlorite)

The rock is somewhat similar to 1H-15, but is less altered, and phenocrysts stand out more sharply against the groundmass.

plagioclase	45-50%
quartz	25-30
K-feldspar	12-15
biotite	4- 5
chlorite	4- 5
muscovite	0.3
apatite	0.3
Ti-oxide	0.3
opaque	minor (slightly magnetic locally)
sphene	trace
epidote	one patch
veinlets	
zeolite?	minor

Plagioclase forms subhedral to euhedral prismatic to tabular phenocrysts from 1 to 3 mm in size. They commonly show irregular composition zoning, with a general tendency towards more-sodic rims. Alteration is variable and generally slight to extremely fine grained sericite-kaolinite in irregular patches, commonly associated with cleavage, and to a few patches of calcite, also concentrated along cleavage.

Quartz forms subrounded phenocrysts up to a few mm across.

K-feldspar forms one megacryst, possibly a phenocryst, nearly 1 cm long. It is slightly zoned, with zones showing slightly different perthitic textures. Zones show a crude concentric arrangement.

The groundmass is dominated by an anhedral aggregate of K-feldspar, quartz, and plagioclase grains averaging 0.1-0.3 mm in size. K-feldspar is slightly dominant, but the rock contains more plagioclase in the groundmass than other samples of porphyry (15 and 37).

Biotite and chlorite occur as books up to 2 mm across. Some are of biotite, others are of biotite altered mainly along grain borders and cleavage to chlorite, and still others are of chlorite. Ti-oxide is associated with chlorite as very fine grained aggregates. Biotite is pleochroic from light to very dark brown. Chlorite is pleochroic from light to medium-dark green, with purplish to maroon interference color. Muscovite forms a few flakes averaging 0.2-0.3 mm in length associated with chlorite.

Apatite forms subhedral to euhedral prismatic grains up to 0.3 mm long. It commonly is associated with micas.

Opaque, possibly magnetite in part altered to hematite and pyrite, forms scattered subhedral to anhedral grains averaging 0.05-0.15 mm in size, with a few grains up to 0.5 mm across. It commonly is associated with chlorite and biotite.

Sphene forms a few anhedral grains 0.05 mm long associated with chlorite and biotite.

Epidote forms one patch 0.7 mm across associated with chlorite. Epidote is in a fine to medium grained aggregate of grains nearly in optical continuity.

The rock is cut by several veinlets up to 0.05 mm wide of a mineral with moderate relief and low R.I. Birefringence appears to be variable from very low to 0.012. The mineral is length-fast. Probably it is a zeolite. Because of the very fine grain size and lack of good cleavage or crystal faces, no positive identification could be made.

1H-37 Granodiorite Porphyry (Muscovite)

The rock is very similar to 1H-15 but is slightly coarser grained and has a stronger alteration, with some plagioclase altered to kaolinite as well as sericite-muscovite, and micas altered to muscovite-Ti-oxide.

plagioclase	35-40%
quartz	30-35
K-feldspar	12-15
muscovite	8-10
calcite	2- 2½
pyrite	1- 1½
apatite	1- 1½
Ti-oxide	0.3
zircon	trace
veinlets	
calcite	0.3

Plagioclase forms subhedral prismatic grains up to a few mm long. They are variably altered. Some are slightly to moderately altered to sericite-muscovite flakes from 0.1-0.3 mm long. Others are strongly altered, especially in their cores to extremely fine grained patches of kaolinite, with sericite common towards the borders. Plagioclase forms scattered grains in the groundmass, averaging 0.2-0.3 mm in size. These are much fresher than coarser plagioclase, suggesting that they have a more-sodic composition.

Quartz forms subrounded phenocrysts up to 5 mm across. These commonly occur in clusters, separated in part by thin selvages of very fine to fine grained K-feldspar and plagioclase. Quartz also occurs in the groundmass as subrounded grains averaging 0.05-0.2 mm in size, intergrown with K-feldspar and lesser plagioclase.

K-feldspar forms a few coarser grains and patches of grains up to 1.5 mm in size. Many of these contain irregular networks of calcite veinlets. In the groundmass, grains average 0.05-0.2 mm in size.

Muscovite forms ragged phenocrysts up to 1.7 mm in size, generally with the original texture of biotite? destroyed. Associated with muscovite are clusters of Ti-oxide grains averaging 0.05-0.15 mm in size. Some muscovite is associated in irregular patches around pyrite grains and clusters.

Calcite forms irregular alteration patches in three main modes. It occurs intergrown with muscovite in some alteration patches after biotite. It occurs as patches up to 2 mm across with an intergrown network of pyrite grains averaging 0.05-0.1 mm in size. Some of this carbonate has higher relief than normal, suggesting that it is siderite.

Pyrite forms subhedral to anhedral grains from 0.3-1 mm in size. They commonly are associated with muscovite and/or calcite.

Apatite forms grains averaging 0.1-0.3 mm in size associated with muscovite, and also occurs as a few slightly tapered prismatic crystals from 0.5 to 1 mm in length.

Ti-oxide occurs with muscovite as described above.

Zircon forms scattered subhedral to euhedral grains up to 0.05 mm in length.

The rock is cut by an irregular veinlet up to 0.2 mm wide of very fine grained calcite.

1H-40A Porphyritic Felsite (Granodiorite Composition) with
1) Quartz veins with K-feldspar halos
2) Sericite-(Hematite) veinlets

The rock contains phenocrysts of plagioclase, quartz, and K-feldspar, and a few of muscovite in a very fine to fine grained groundmass dominated by feldspars and quartz. It is cut by two quartz veins with K-feldspar alteration halos, and several wispy sericite-(hematite) veinlets with no apparent alteration halos.

phenocrysts		
plagioclase	10-15%	
K-feldspar	4- 5	(possibly secondary)
quartz	3- 4	
muscovite	0.3	
megacryst		
garnet	one grain	
groundmass		
plagioclase	30-35	
quartz	20-25	
K-feldspar	17-20	
muscovite	0.5	
biotite	minor	
Ti-oxide	minor	
zircon	trace	
opaque	0.3	
calcite	trace	

veins
1) quartz with K-feldspar halo
2) sericite-(hematite)

Plagioclase forms euhedral to subhedral phenocrysts and clusters of grains from 0.5-1 mm in size, with a few up to 2 mm long. They are variably altered to sericite, with the intensity of alteration from slight to strong.

Quartz forms anhedral coarse grains and patches of grains, some of which may be phenocrysts. These are up to 1.5 mm in size, with grain size from 0.3-0.8 mm.

K-feldspar forms subhedral to anhedral grains from 0.7-1.2 mm in size. Some show moderate exsolution perthite textures. The origin of these is uncertain; they probably are associated with the K-feldspar alteration about the quartz vein.

Muscovite forms a few ragged flakes up to 1.5 mm long.

Garnet occurs in one very skeletal grain 2 mm across, strongly intergrown with quartz averaging 0.05-0.3 mm in size. The presence of garnet suggests some measure of metamorphism (not necessary).

The groundmass is dominated by an anhedral aggregate of feldspars and quartz with grains averaging 0.1-0.3 mm in size. Muscovite forms ragged grains as do biotite and minor chlorite. Ti-oxide is associated with all sheet silicates as very fine to extremely fine grained aggregates. Opaque forms scattered grains and clusters averaging 0.03-0.07 mm in size, with a few grains and clusters associated with muscovite patches containing abundant flakes from 0.1-0.5 mm long. These are intimately intergrown with muscovite in patches up to 1.2 mm across.

Calcite forms scattered very fine to fine grained patches up to 0.3 mm across. Zircon forms a few grains from 0.05-0.1 mm in size.

The rock is cut by a medium to coarse grained quartz vein up to 2 mm wide, and another finer grained vein up to 0.5 mm wide nearby. Along the border of the main vein, quartz contains minor to moderately

(continued)

1H-40A (page 2)

abundant very fine grained inclusions of plagioclase. This zone is up to about 1 mm wide. Outside this zone, the rock has been strongly altered by addition of K-feldspar to the groundmass and as megacrysts. The latter possibly formed from original plagioclase phenocrysts, but no partially altered grains are present to substantiate this suggestion. The K-feldspar alteration halo is about 2 cm wide.

The rock is cut by a few wispy veinlets up to 0.05 mm wide composed of sericite and locally with moderately abundant hematite veinlets and patches along the zone.

lH-42B Porphyritic Quartz Diorite

The rock is a very fine grained phase of the intrusive complex, possibly a late-stage intrusion. It contains phenocrysts and clusters of coarser grains of plagioclase and scattered phenocrysts of quartz in a very fine grained groundmass dominated by plagioclase and lesser quartz. Coarser patches in the groundmass contain quartz with biotite and chlorite, with lesser apatite and epidote. K-feldspar occurs in the groundmass in fine grained patches.

phenocrysts	
plagioclase	17-20%
quartz	5- 7
groundmass	
coarser	
quartz	10-15
biotite	3- 4
chlorite	2- 3
epidote	minor
apatite	0.3
K-feldspar	2- 3
finer	
plagioclase	35-40
quartz	10-15
calcite	minor
sphene	trace
zircon	trace

Plagioclase forms grains and clusters of grains from 0.5 to 1.5 mm in average size, with a few up to 2.5 mm across. These are slightly to moderately altered to flakes of sericite-muscovite and to scattered patches of calcite. Grains are subhedral to anhedral in outline, with borders in part intergrown with groundmass.

Quartz forms subhedral phenocrysts from 0.3-1.5 mm in size. A few coarser grains up to 3 mm across are recrystallized? into anhedral aggregates with slightly sutured borders.

Patches in the groundmass have irregular outlines, and grade into finer grained groundmass locally. Coarser patches consists mainly of quartz aggregates averaging 0.1-0.3 mm in size. Biotite and chlorite form scattered grains and clusters of grains averaging 0.1-0.2 mm in size, with a few up to 0.5 mm across. Chlorite is an alteration product of biotite, and generally is accompanied by moderate Ti-oxide. Muscovite locally forms as an alteration of biotite. Biotite is pleochroic from pale straw to medium reddish brown. Chlorite is pleochroic from colorless to pale green, with light brown interference color.

Associated with biotite and chlorite are irregular patches of epidote up to 0.3 mm across. Apatite forms euhedral to subhedral grains from 0.05-0.2 mm in size.

Generally separate from the quartz-rich patches are patches up to 1.5 mm in size composed mainly of fine grained K-feldspar aggregates, with scattered apatite. Grains of K-feldspar average 0.05-0.15 mm in size.

The finer grained groundmass averages 0.02-0.03 mm in grain size and consists of anhedral aggregates of plagioclase with scattered to locally abundant, in part rounded grains of quartz.

Sphene and zircon, along with biotite and chlorite form scattered grains in the finer grained groundmass. Zircon and sphene grains average 0.05 mm in size, with a few sphene grains up to 0.15 mm across.

1H-27 Hornblende Quartz Diorite cut by Epidote Veins

The rock is a medium to coarse grained massive quartz diorite, whose texture is not distinctively igneous. That is, grains of plagioclase and hornblende are anhedral, and quartz forms irregular patches and lenses with moderately strained extinction and in part very irregular grains with sutured borders. Thus it is possible that the rock is metamorphosed. The original rock might have been a quartz diorite or less probably an intermediate volcanic rock.

plagioclase	40-45%
hornblende	30-35 (in part altered to secondary amphibole)
quartz	17-20
chlorite	4- 5
opaque	1½-2
apatite	minor
zircon	one grain
sericite	trace

veins with halos
epidote with halo of epidote, lesser chlorite

Plagioclase forms anhedral grains and aggregates of grains averaging 0.5-1 mm in size. It is strongly altered to patches of extremely fine grained epidote, with local patches of fine grained chlorite.

Hornblende forms anhedral grains from 1 to 2 mm in average size. It is medium yellow green to green in color. It is slightly to moderately altered to secondary, plaer green actinolite, commonly associated with patches of chlorite. Chlorite forms patches up to 1 mm in size, averaging 0.3-0.5 mm across, of slightly radiating aggregates. The mineral is pleochroic from pale to light green with purple to maroon interference color.

Quartz occurs in patches up to a few mm across of irregular aggregates of grains, commonly with strongly sutured grain borders and irregular strained extinction.

Opaque grains average 0.05-0.3 mm in size, with a few up to 0.7 mm across. They are disseminated in hornblende and altered hornblende grains, and in part associated with chlorite patches. Most grains are equant and anhedral in outline. They possibly are hematite after magnetite or ilmenite.

Apatite forms subhedral to euhedral grains averaging 0.05-0.1 mm in size, with a few up to 0.3 mm across.

Zircon forms one grain 0.1 mm long.

Sericite forms a few flakes up to 0.1 mm long associated with chlorite.

The rock is cut by a few veins composed of very fine to fine grained epidote, with alteration halos up to 1 mm away from the vein of fine to medium grained epidote and in places of chlorite. This epidote alteration appears to postdate the extremely fine grained alteration of plagioclase. Locally epidote forms very irregular very fine grained patches with cores of opaque up to 0.15 mm across.

1H-18A   Metamorphosed Andesite cut by Quartz-Pyrite Veins

The rock is strongly foliated, with foliation defined by elongation of hornblende and slight banding of plagioclase-rich layers. Several veins consist mainly of quartz with patches of pyrite and minor extremely fine grained biotite?

plagioclase	40-45%
hornblende	40-45
quartz	4- 5
sphene	4- 5
apatite	0.3
pyrite (opaque)	0.5

veins
quartz-pyrite-(biotite) 4- 5%

Plagioclase occurs as very fine grained (0.05-0.15 mm) aggregates intergrown with coarser grained hornblende (0.3-0.8 mm). Some plagioclase grains contain very abundant extremely fine grained inclusions of plagioclase and/or quartz. Locally plagioclase is slightly to strongly altered to very fine grained sericite. A few megacrysts are up to 0.5 mm across.

Hornblende forms anhedral, commonly prismatic grains intergrown with plagioclase. Pleochroism is from light to medium green. Grains have irregular borders against plagioclase.

A few lenses consist of mosaic aggregates of plagioclase averaging 0.02-0.03 mm in grain size.

Quartz forms scattered grains averaging 0.03-0.05 mm in size, and is locally concentrated in layers as grains from 0.03-0.1 mm across.

Sphene forms irregular grains and trains of grains parallel to foliation, and commonly associated with hornblende. Some sphene grains contain inclusions of opaque up to 0.03 mm across. Sphene grains average 0.05-0.1 mm in size, with trains up to 1 mm long.

Pyrite forms scattered anhedral to subhedral, equant grains from 0.05-0.3 mm in size.

Apatite forms subhedral grains from 0.02-0.05 mm in size, with a few anhedral grains up to 0.2 mm across.

The rock is cut by several veins from 0.2-1.5 mm wide of fine to medium grained quartz with scattered fine to medium grained pyrite. Locally some veins contain patches up to 0.25 mm across of extremely fine grained aggregates of secondary biotite?. Some irregular veins consist of fine grained pyrite.

The original rock was an andesite with a generally uniform texture. The only variation is local porphyroblasts up to 0.5 mm in size of plagioclase. These may represent original crystal fragments in a tuff, but evidence is not sufficient to suggest this origin. Rather, the parent probably was an andesite flow.

APPENDIX II

STATEMENT OF COSTS

STATEMENT OF COSTS

The following costs were incurred while performing work on the THRALL 1 - 92 mineral claims during 1981.

Camp Maintenance - 44 man-days @ $18.26 per day		$ 803.44
Drafting and Office Supplies		200.00
Field Equipment and Supplies		250.00
Geochemical Analysis - 739 samples @ $12.10 per sample		8,941.90
Fixed Wing Aircraft		1,666.36
Geological Studies - Vancouver Petrographics		358.00
Helicopter - 8.1 hours @ $500.00 per hour	$4,050.00	
Fuel	235.32	
	$4,285.32	4,285.32
Salaries:		
R. Holland - 41 days @ $250.00	$10,250.00	
S. Clemmer - 2 days @ $140.00	280.00	
C. White - 15 days @ $ 91.00	1,365.00	
L. Elgert - 14 days @ $ 42.00	588.00	
L. Conner - 7½ days @ $ 95.00	712.50	
N. Gillard - 4 days @ $104.00	416.00	
D. Allan - 2 days @ $ 83.00	166.00	
	$13,777.50	13,777.50
TOTAL		$30,282.52

APPENDIX III

PERSONNEL

PERSONNEL

Name	Address	Dates Worked 1981/82
Robert Holland Project Geologist	12893 - 99th Ave. Surrey, B. C.	July 27 - Aug. 7, 11 Sept. 15 - 17, 21 - 24 Oct. 2, 6, 28 Nov. 2 - 6, 10, 13, 16 17, 19, 20 25 - 27, 30 Jan. 25, 29, Feb. 5 March 15
Stan Clemmer Geologist	101 - 1045 Haro St. Vancouver, B. C.	July 27, 28
Chris White Geological Assistant	3625 West 24th Ave. Vancouver, B.C.	July 26 - Aug 7, Aug. 11, 12
Larry Elgert Geological Assistant	15477 - 14th Ave. Whiterock, B. C.	July 26 - Aug. 7 Aug. 11, 12
Linda Conner Draftsperson	850 English Bluff Rd. S. Delta, B. C.	Nov. 23 - 27 Dec. 1 - 3
Nicole Gillard Draftsperson	401 - 1219 Harwood St. Vancouver, B. C.	Nov. 23 - 27
Deanna Allan Drafting Assistant	4920 McClure St. Richmond, B. C.	March 2 - 3

APPENDIX IV

LIST OF CLAIMS ON WHICH
WORK WAS DONE.

List of Thrall Claims on Which Soil Geochemical Survey and Geological Mapping was Carried Out - July to August, 1981.

Soil Geochemical Survey

Grant No.	Thrall Claim No.
YA65947-54	1- 8
YA65956	10
YA65979	33
YA65981	35
YA65983	37
YA65985	39
YA65987	41
YA65989	43
YA65991	45
YA65993	47
YA65995-66002	49-56
YA66004	58
YA66006	60
YA66008	62
YA66010	64
YA67459	73
YA67467	81
YA67475	89 Fr.
YA67476	90 Fr.

Geological Mapping

Grant No.	Thrall Claim No.
YA65947-66010	1-64
YA67452	66
YA67454	68
YA67459-61	73-75
YA67467-68	81-82
YA67470	84
YA67475-78	89F-92F

Holder of claims - Getty Canadian Metals, Ltd.
Work done for - Getty Canadian Metals, Ltd.

APPENDIX V

STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, ROBERT T. HOLLAND OF BEMA INDUSTRIES LTD. DO HEREBY CERTIFY THAT:

1. I am a graduate of the University of British Columbia and hold the following degrees:

   B.Sc. Geology, 1976

2. I have practised my profession as a geologist since 1976.

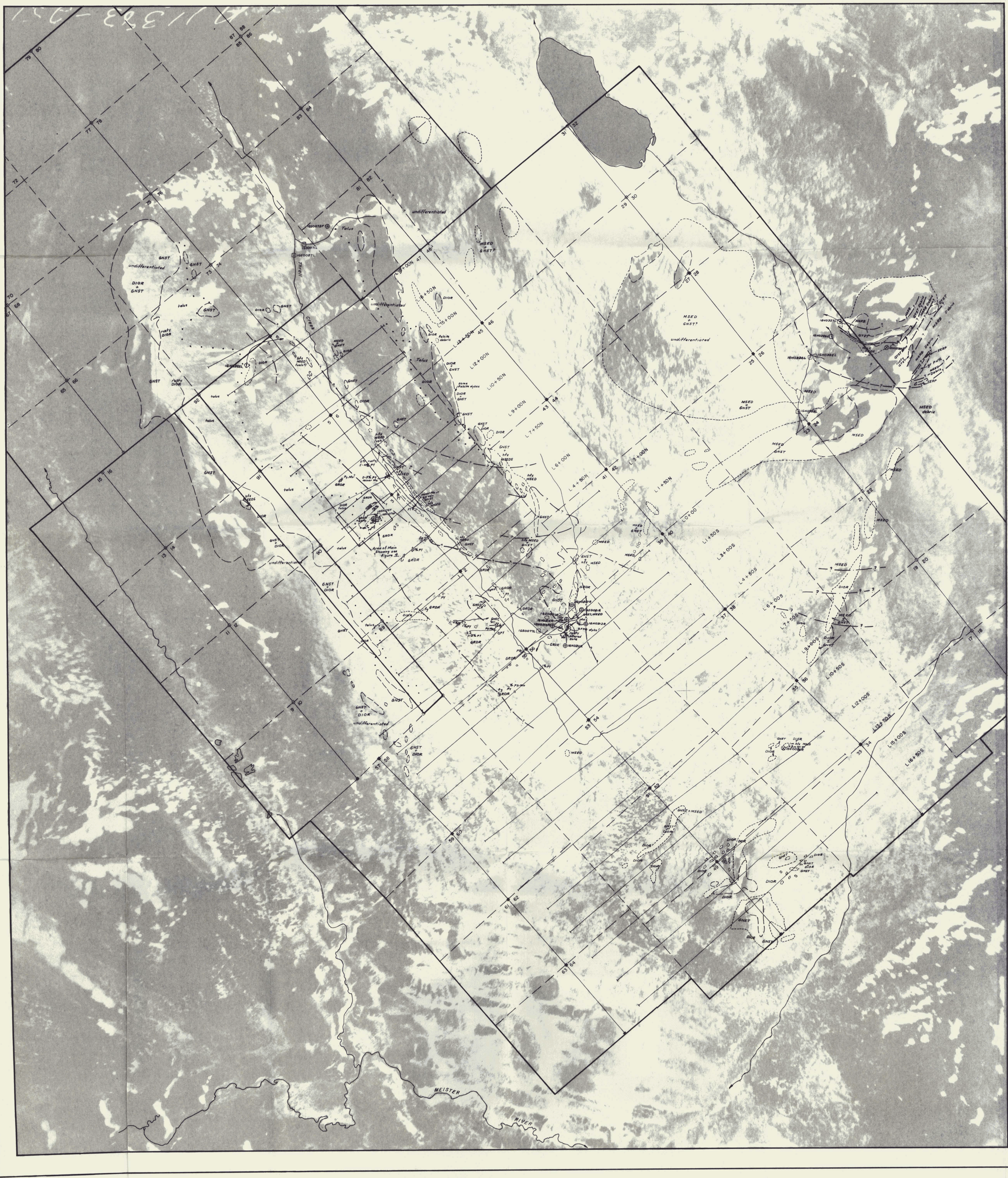
3. I have no interest, direct or indirect, in the property or shares of GETTY MINES LTD. nor do I expect to receive any such interest.

4. That the information contained in this report is both true and correct to the best of my knowledge.

Signed: Robert Holland

Robert T. Holland, B.Sc.
Geologist

Date: March 17/82



LEGEND

SYMBOLS

hfs	Hornfelsed
py	Pyrite (<1% unless indicated)
mo	Molybdenite
fg	Fine grained
gr	Graphite
	Area of talus
	Area of felsenmeer
	Area of outcrop
x	Molybdenite occurrence
1GH0312R	Rock chip sample site and number
1GS0077L	Stream sediment sample site and number
	Claim posts, located / approximate
	Claim line
	Individual claim boundary
	Claim group boundary
? ?	Geological contact approximate/ doubtful
L 4 + 50N	Compass and chain, flagged grid line
	Creek

LITHOLOGY

JURASSIC AND/OR CRETACEOUS

QFPO	Quartz-feldspar porphyry granodiorite
GRDR	Granodiorite

DEVONIAN AND MISSISSIPPIAN

DIOR	Hornblende quartz diorite, hornblende diorite
GNST	Greenstone, dioritized greenstone, andesite
MSED	Metasediments, volcanic metasediments

CAMBRIAN AND EARLIER (?)

VOLC SEDS	Volcanic sediments
QTZT	Quartzite
MARB	Marble
PHYL	Phyllite
SERP	Serpentinite, serpentine basalt

Colour coding of outcrop of felsenmeer represents the most important lithological member, other lithologies are present as indicated.

TO ACCOMPANY THE CASSIAR PROJECT REPORT 1981, by : B. HOLLAND, BEMA INDUSTRIES.

METRES

200 100 0 200 400

(Scale Approximate)

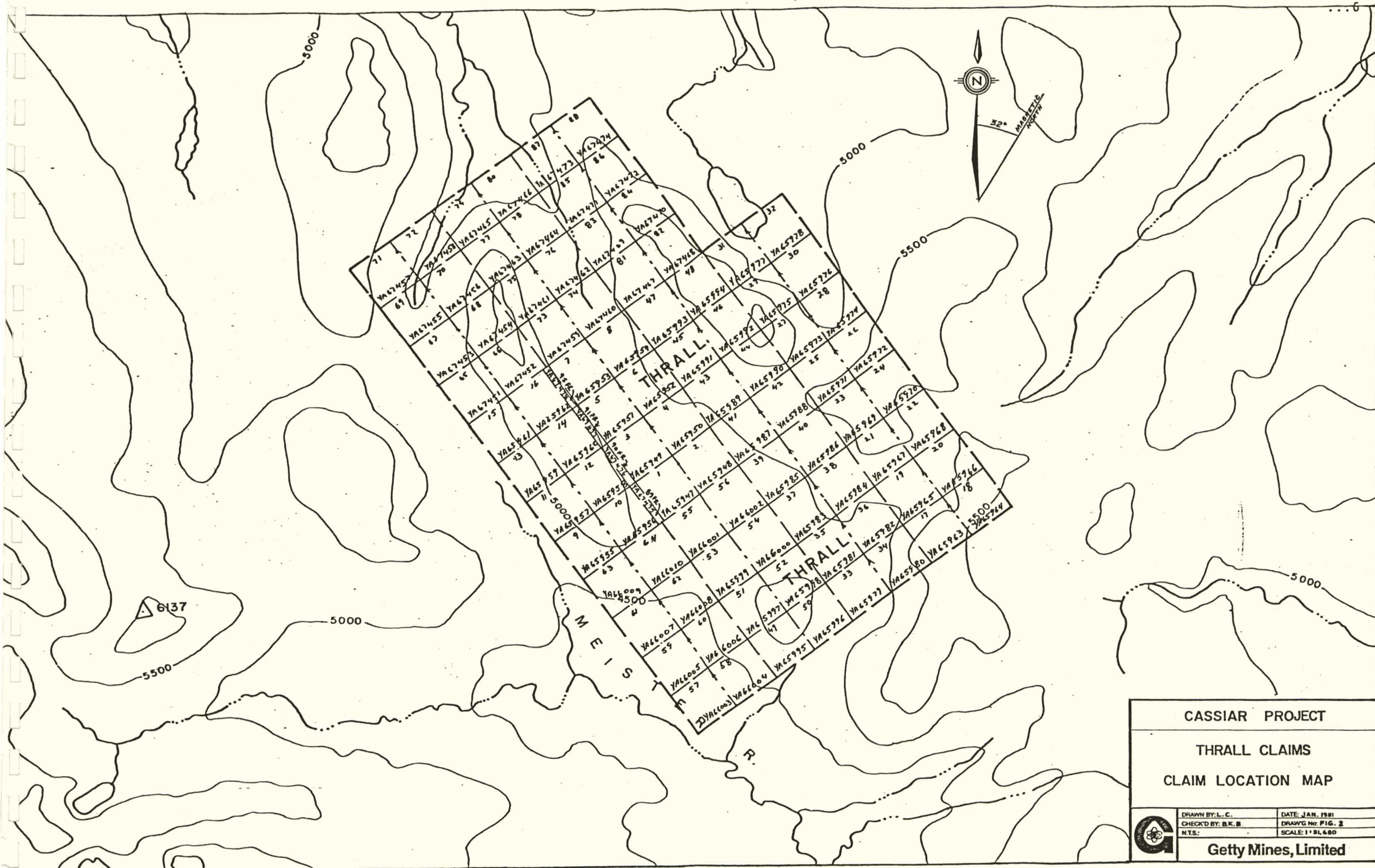
CASSIAR PROJECT

THRALL CLAIMS

GEOLOGY 091051

DRAWN BY: L. CONNOR	DATE: MARCH , 1982
CHECK'D BY: B.H., B.K.B.	DRAW'G No: PLATE 1
N.T.S.: 105 B/11	SCALE: 1 : 8,000 (approx.)

Getty Mines, Limited



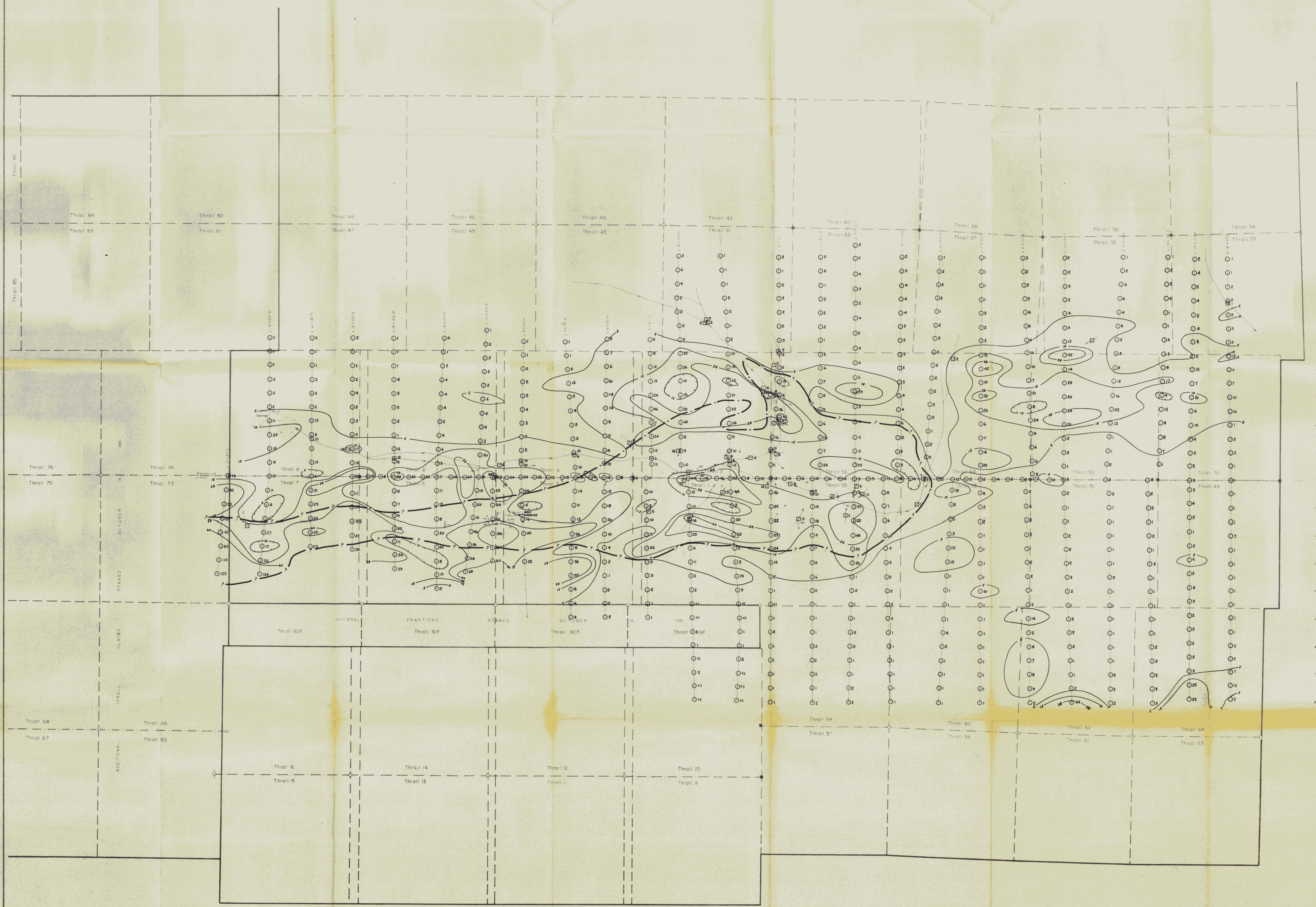
CASSIAR PROJECT

THRALL CLAIMS

CLAIM LOCATION MAP

DRAWN BY: L. C.	DATE: JAN. 1981
CHECK'D BY: B.K.B.	DRAW'G No: FIG. 2
N.T.S.:	SCALE: 1 : 31,680

Getty Mines, Limited



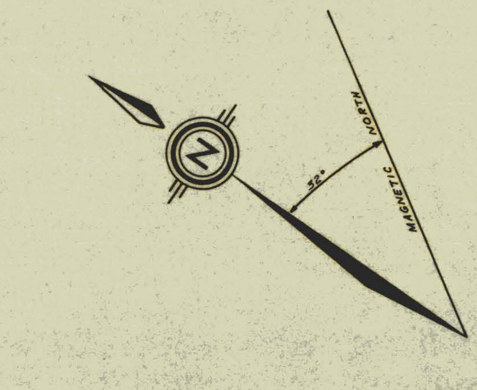
○20	Soil sample site and value of in ppm.
⊡20	Silt sample site and value of in ppm.
×	Minor MoS2 in float or talus
═?═	Outline of quartz monzonite stock approximate / assumed

Sample population distribution
(all levels in ppm)

○	Highly anomalous	>28
○	Anomalous	16 - 28
○	Weakly anomalous	6 - 15
○	Background	0 - 5

Contours at: 5ppm, 15ppm, 28ppm, 60ppm

———	Boundary of claim group
— —	Individual claim boundaries
—·—	Claim line
✦ ✧	Thrall claim posts-located, approximate
▫	Old claim post
⟶	Stream



TO ACCOMPANY THE CASSIAR PROJECT REPORT
1981, by: B. HOLLAND, BEMA INDUSTRIES.

METRES

100 50 0 100 200 300 400

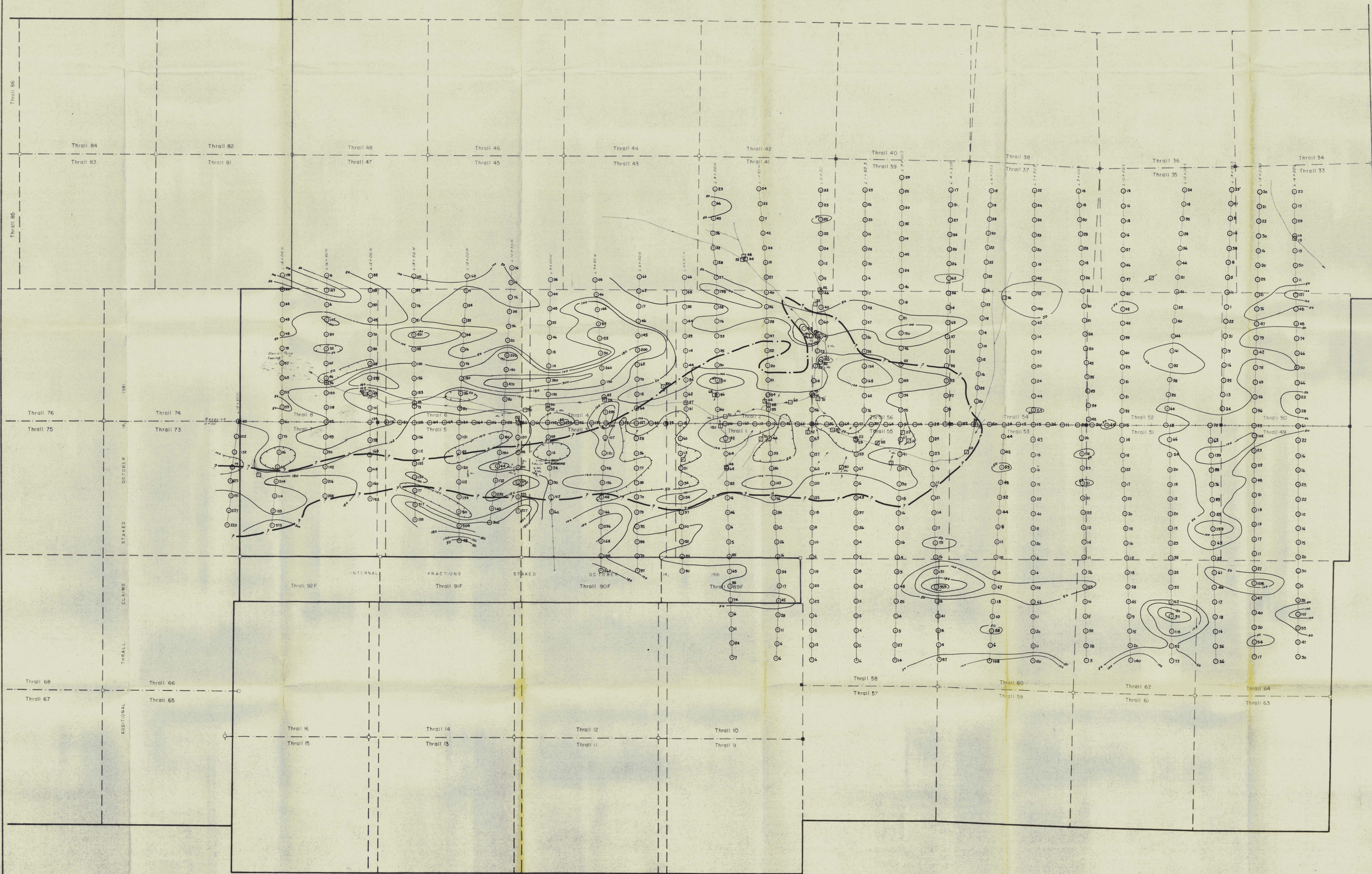
CASSIAR PROJECT 1981

THRALL CLAIMS
SOIL AND SILT GEOCHEMISTRY
MOLYBDENUM

091051

DRAWN BY: B. H. / L.C.	DATE: NOV. 1981
CHECK'D BY: B.K.B	DRAW'G No: PLATE 2
N.T.S.: 105 B/11	SCALE: 1 : 5000

Getty Mines, Limited



○20 Soil sample site and value of in ppm.

⊡20 Silt sample site and value of in ppm.

× Minor MoS_2 in float or talus

=?= Outline of quartz monzonite stock approximate / assumed

Sample population distribution
(all levels in ppm)

○	Highly anomalous	>180
○	Anomalous	101–180
○	Weakly anomalous	51–100
○	Background	0–50

Contours at: 50ppm, 100ppm, 180ppm, 200ppm

Boundary of claim group

Individual claim boundaries

Claim line

Thrall claim posts-located, approximate

Old claim post

Stream

TO ACCOMPANY THE CASSIAR PROJECT REPORT
1981, by: B. HOLLAND, BEMA INDUSTRIES.

METRES

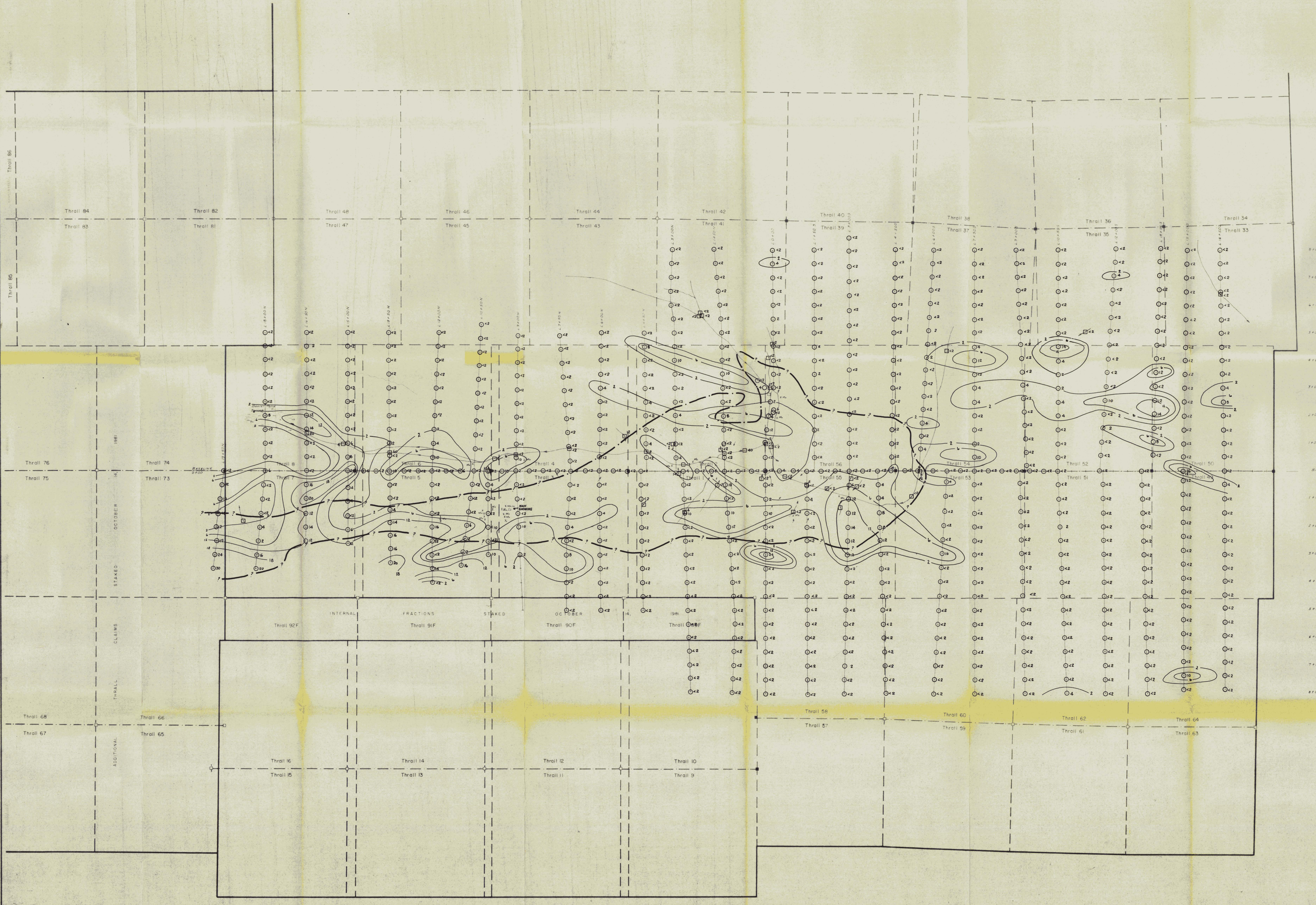
100 50 0 100 200 300 400

CASSIAR PROJECT 1981

THRALL CLAIMS
SOIL AND SILT GEOCHEMISTRY
COPPER 091051

DRAWN BY: B. H. / L.C.	DATE: NOV. 1981
CHECK'D BY: B.K.B	DRAW'G No: PLATE 3
N.T.S.: 105 B/11	SCALE: 1 : 5000

Getty Mines, Limited



○20 Soil sample site and value of in ppm.

□20 Silt sample site and value of in ppm.

× Minor MoS_2 in float or talus

Outline of quartz monzonite stock approximate / assumed

Sample population distribution (all levels in ppm)

- Highly anomalous >12
- Anomalous 7-12
- Weakly anomalous 2-6
- Background <2

Contours at: 2ppm, 6ppm, 12ppm, 18ppm

Boundary of claim group

Individual claim boundaries

Claim line

Thrall claim posts-located, approximate

Old claim post

Stream

TO ACCOMPANY THE CASSIAR PROJECT REPORT 1981, by: B. HOLLAND, BEMA INDUSTRIES.

METRES

100 50 0 100 200 300 400

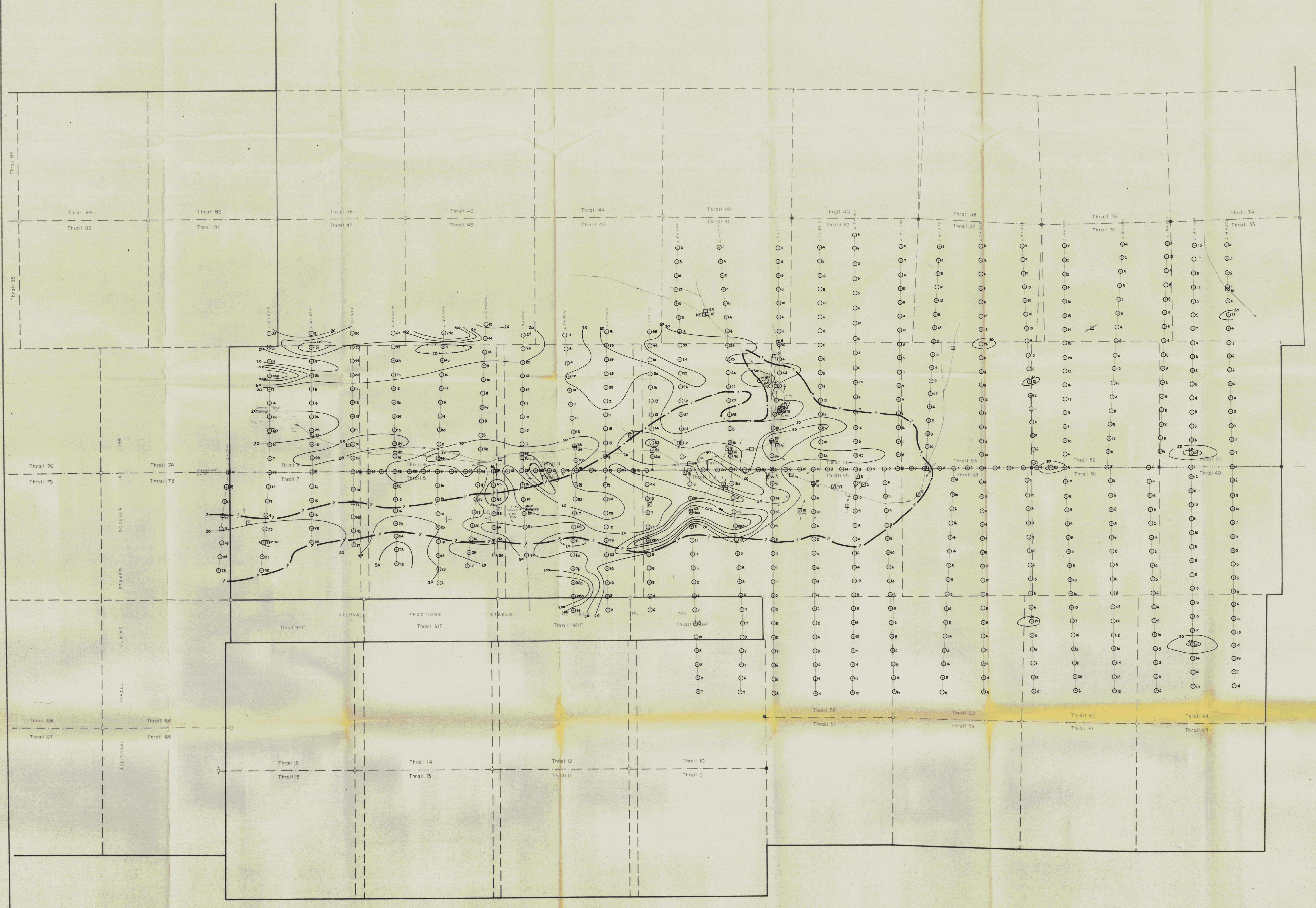
CASSIAR PROJECT 1981

THRALL CLAIMS
SOIL AND SILT GEOCHEMISTRY
TUNGSTEN

091051

DRAWN BY: B. H. / L.C.	DATE: NOV. 1981
CHECK'D BY: B.K.B	DRAW'G No: PLATE 4
N.T.S. 105 B/11	SCALE: 1 : 5000

Getty Mines, Limited



○20 Soil sample site and value of in ppm.

⊡20 Silt sample site and value of in ppm.

× Minor MoS_2 in float or talus

Outline of quartz monzonite stock approximate / assumed

Sample population distribution
(all levels in ppm)

○	Highly anomalous	>100
○	Anomalous	51–100
○	Weakly anomalous	21–50
○	Background	0–20

Contours at: 20ppm, 50ppm, 100ppm, 200ppm

Boundary of claim group

Individual claim boundaries

Claim line

Thrall claim posts-located, approximate

Old claim post

Stream

TO ACCOMPANY THE CASSIAR PROJECT REPORT 1981, by: B. HOLLAND, BEMA INDUSTRIES.

METRES

100 50 0 100 200 300 400

CASSIAR PROJECT 1981

THRALL CLAIMS

SOIL AND SILT GEOCHEMISTRY

LEAD 091051

DRAWN BY: B. H. / L.C.	DATE: NOV. 1981
CHECK'D BY: B.K.B	DRAW'G No: PLATE 5
N.T.S.: 105 B/11	SCALE: 1 : 5000

Getty Mines, Limited

○20	Soil sample site and value of in ppm.
⊡20	Silt sample site and value of in ppm.
×	Minor MoS_2 in float or talus
═?═	Outline of quartz monzonite stock approximate / assumed

Sample population distribution
(all levels in ppm)

○	Highly anomalous	>2.5
○	Anomalous	1.0 - 2.5
○	Weakly anomalous	0.6 - 0.9
○	Background	0 - 0.5

Contours at: 0.5ppm, 0.9ppm, 2.5ppm

———	Boundary of claim group
— —	Individual claim boundaries
—·—	Claim line
✦ ✧	Thrall claim posts-located, approximate
□	Old claim post
⟶	Stream

TO ACCOMPANY THE CASSIAR PROJECT REPORT 1981, by: B. HOLLAND, BEMA INDUSTRIES.

METRES

100 50 0 100 200 300 400

CASSIAR PROJECT 1981

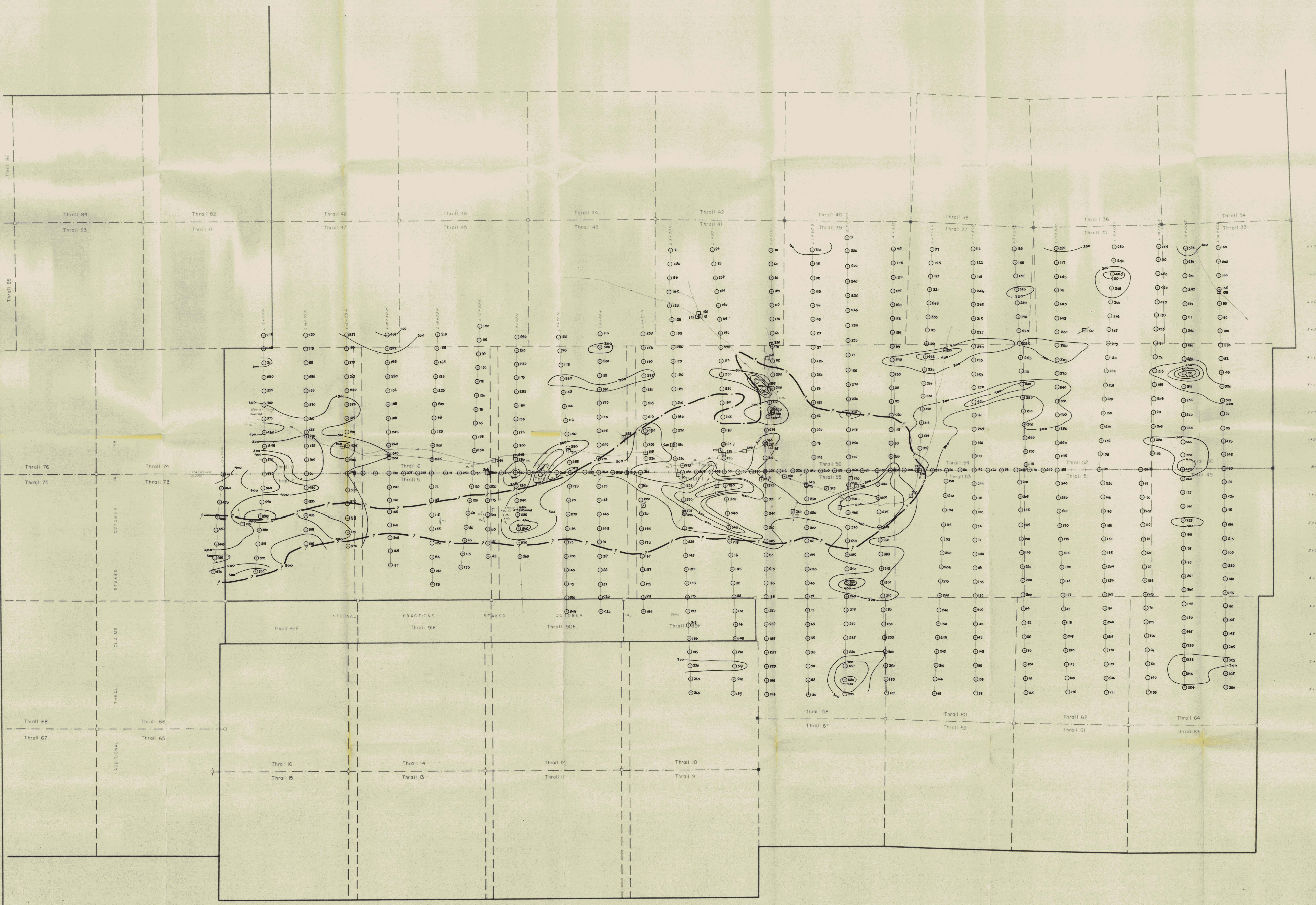
THRALL CLAIMS

SOIL AND SILT GEOCHEMISTRY

SILVER 091051

DRAWN BY: B. H. / L.C.	DATE: NOV. 1981
CHECK'D BY: B.K.B	DRAW'G No: PLATE 6
N.T.S.: 105 B/11	SCALE: 1 : 5000

Getty Mines, Limited



○20 Soil sample site and value of in ppm.

⊡20 Silt sample site and value of in ppm.

× Minor MoS2 in float or talus

Outline of quartz monzonite stock approximate / assumed

Sample population distribution (all levels in ppm)

○	Highly anomalous	>500
○	Anomalous	401-500
○	Weakly anomalous	301-400
○	Background	0-300

Contours at: 300ppm, 400ppm, 500ppm, 600ppm

Boundary of claim group

Individual claim boundaries

Claim line

Thrall claim posts-located, approximate

Old claim post

Stream

TO ACCOMPANY THE CASSIAR PROJECT REPORT 1981, by: B. HOLLAND, BEMA INDUSTRIES.

METRES

100 50 0 100 200 300 400

CASSIAR PROJECT 1981

THRALL CLAIMS
SOIL AND SILT GEOCHEMISTRY
FLOURINE

09.051

DRAWN BY: B. H. / L.C.	DATE: NOV. 1981
CHECK'D BY: B.K.B	DRAW'G No: PLATE 7
N.T.S.: 105 B/11	SCALE: 1 : 5000

Getty Mines, Limited