180-440-48774

GEOLOGICAL AND GEOCHEMICAL PROGRAM

HUSTON - M502

HUSTON 1, 2 and 3 CLAIMS

SKEENA MINING DIVISION MORESBY ISLAND, B. C.

N.T.S. 103B, 3E and 6E

131° 12'W, 52° 16'N



Owner:

G. R. Richards

Operator: Chevron Standard Limited

June 1980

L. Dick

D. Arscott

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INTRODUCTION

Between 27th May and 1st June 1980, a preliminary geological and geochemical program was conducted by Chevron Standard personnel. The program was a response to regional data collected a year earlier by JMT Services Corp., and on the basis of which the Huston claims had been staked.

The program was an attempt to assess 1. the relationship between geochemically anomalous gold and previously known magnetite-copper skarn mineralization, and 2. the amplitude, coherency, and significance of the anomalies.

CLAIMS

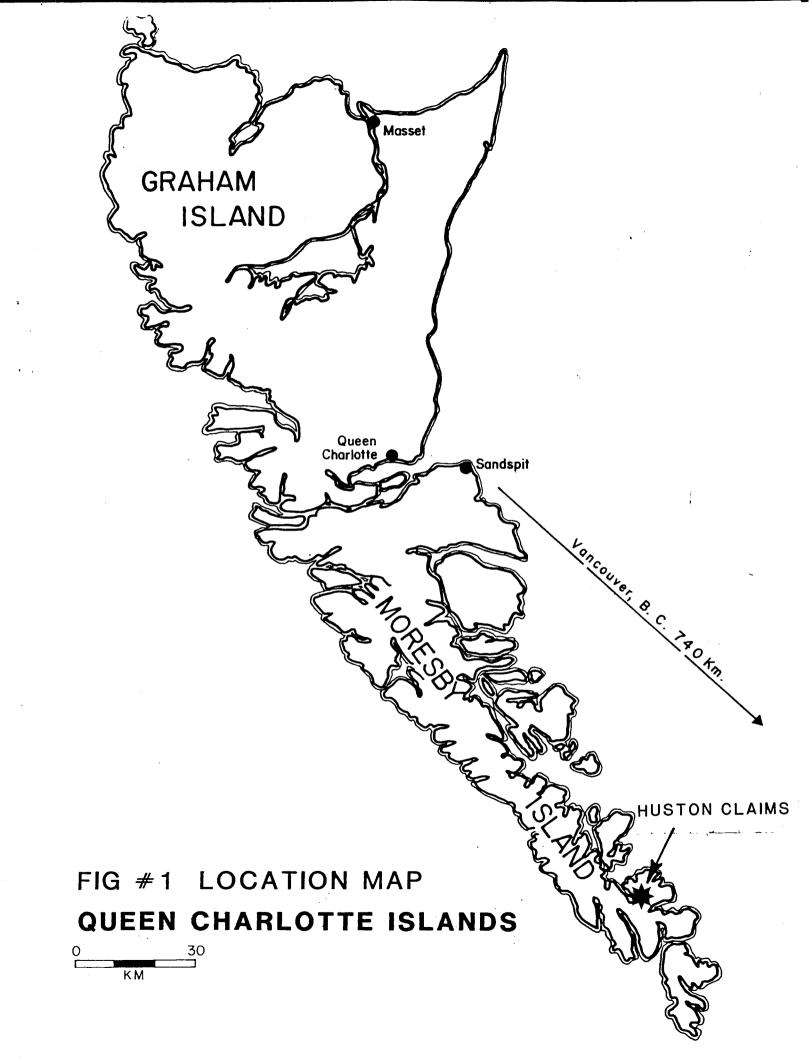
The property comprises the following:

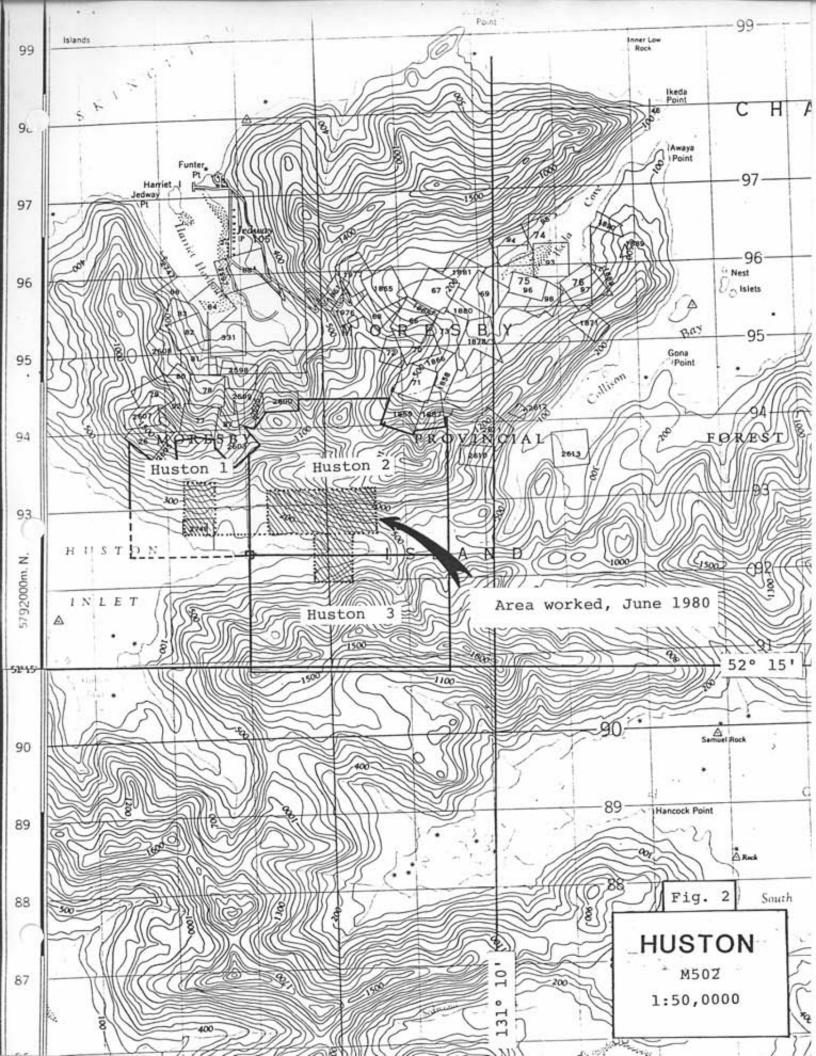
Claim	Record No.	No. of Units	Expiry (prior to this work)
Huston #1	1355	9	14 June 1980
Huston #2	1356	20	14 June 1980
Huston #3	1617	<u>15</u>	7 August 1980
		44	

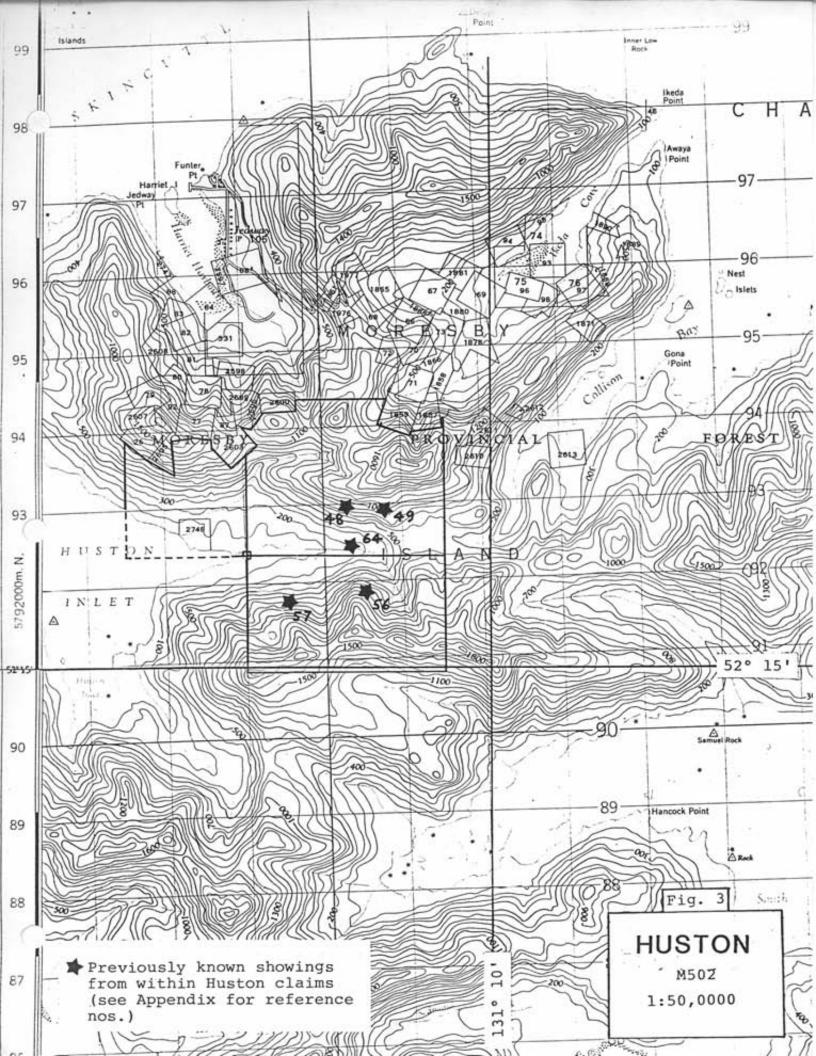
These claims were staked by Gordon G. Richards in 1979.

HISTORY

First interest in the Huston Inlet area occurred at the turn of the century with the discovery of the Jedway iron-copper deposit.







Mineralization, on what later became the Jedway Iron Ore Ltd. property (immediately north of the Huston claims), was first explored by Francis Poole in 1863. Intermittent exploration followed until 1959, when major evaluation began. The Jedway property was in production from 1962 until 1968 producing 4.3 million tons of magnetite averaging 62% iron.

The interest spawned by the progressive development of the Jedway ore led to extensive exploration in adjacent areas, including that now covered by the Huston claims. Five iron and/or copper showings are recorded on the Huston ground. The Hercules and Ida were worked in 1906 and 1907, the Ivan in 1913, the Hope in 1960, and the Plunger in 1962. A description of these showings is included in the Appendix. Their location is shown on Figure 3.

GEOLOGY OF THE HUSTON PROPERTY

General Statement

The property is underlain by Triassic-age Karmutsen basalt and limestone, and a conglomerate or breccia unit of unknown affinity. These units have been intruded by a granodiorite stock and later, by a NW-SE-trending swarm of rhyolite dykes.

Physiography and Vegetation

Rock outcrop is most extensive on steeper slopes and higher elevations within the Huston property. The valley floor and gentler slopes, regardless of elevation, contain little outcrop. The topography is moderately steep and the vegetation typical west coast rain forest. The area is as yet unlogged. The valley bottom is poorly drained

with some swampy areas. Approximately 60% of the claims are underlain by glacial and alluvial cover. Outcrop is more extensive within the eastern part of the claim group; most of the outcrop in the western part being restricted to creek beds and ridge tops.

Geology

Regional geologic mapping carried out by Sutherland-Brown (1968), shows the Huston property to be underlain by Triassic-age Karmutsen volcanic rocks and Triassic to Jurasic-age Kunga formation limestones. The units have been intruded by Cretaceous-age granodiorite and dioritic stocks.

The geology of the Huston property, showing the distribution of outcrops, is shown on Figure 4. Figure 5 is a simplified, general geological map of the property.

Six rock types were observed during geologic mapping on the property.

These are:

- 1. basaltic volcanic rocks
- 2. limestone
- 3. conglomerate
- 4. skarn
- 5. granodiorite and diorite
- 6. rhyolite

A brief description of each rock type follows below:

1. Basalts

Basalts and basaltic andesites of the Karmutsen formation underlie approximately 70 percent of the claim group. These rocks vary from blackish-green to purple in colour and their texture is variable from massive to vesicular and amygdaloidal. The basalts tend to be fine grained and equigranular although, locally, porphyritic varieties are observed. Vesicular basalts can contain quartz or zeolite(?) minerals within the vesicles but more commonly vesicles are not infilled. Occasional olivine phenocrysts occur but are not common. In the northwest part of the map area the basalts are especially quartz rich. The quartz occurs as coarse-grained "sweats", some with boudinaged form, and occasionally with reaction rims of soft, chloritic material gaurding the quartz from the unaltered basalt.

The volcanic rocks appear, visually, to be dacitic in composition locally, especially the large, ridge-top outcrops at the northeastern extreme of the mapped area. Contacts between various textural types of basalt are commonly observed but cannot be followed during mapping due to the paucity of outcrop. However, in the northwest corner of the map-area, the highly vesicular variety of basalt can be observed to overlie the more massive, non-vesicular variety.

Volcanic rocks at the Huston property are variably altered and the intensity of alteration appears to be related to the intensity of fracturing of the rock. Types of alteration are (a) pyritization (b) epidotization and (c) silicification. Pyrite is common on

fracture faces within the basalt but not as pervasive disseminations. It generally accompanies fracture-filling epidote and quartz. Epidotization of basaltic rocks is widespread and more pervasive in nature. Quartz veins are not abundant in basalts, however quartz is abundant as irregular pods and "sweats" as described above. Quartz veins are most abundant where the basalts have been faulted and heavily fractured. In the northwest part of the mapped area, fine grained silica was observed to cement fault gouge, and found accompanied by fine-grained epidote and pyrite.

2. Limestone

Two types of limestone crop out on the property:

- 1. Coarsely-crystalline white limestone and marble.
- 2. Coarsely-crystalline, black, fetid limestone and marble.

Outcrops of marble are sporadically distributed and largely confined to the lower elevations of the eastern part of the property. A second area of limestone is in the vicinity of BL 12 + 00E, in the western part of the claims. Extensive drift cover and lack of bedding plane orientations precludes correlation of the limestone between the two areas.

The limestones have been designated by Sutherland-Brown (1968) as belonging to the Triassic to Jurassic-age Kunga formation and as overlying the Triassic-age Karmutsen basalts. On the claims this age relationship is not clear. The highest elevations on both the north and south sides of the property are underlain by basalt and it appears that the limestone in part, at least, underlies the basalts.

If the limestone is younger, then extensive block faulting must have occurred in order for the limestone to crop out at lower elevations. As shown on the geologic maps, Figures 4 and 5, the intermixed nature of basalt and limestone outcrops in the eastern part of the property indicates that much faulting has taken place. Only infrequently, however, can faults be mapped on the ground.

White and grey-white marble and limestone is much more common than black limestone, the latter giving off a foul smell when broken. These two limestone types have not been distinguished on the geological maps (Figures 4 and 5).

3. Conglomerate

A highly siliceous conglomerate/breccia unit of unknown thickness and extent, crops out in a major, north-flowing drainage at the eastern border of the map area.

The conglomerate is composed of subangular to rounded clasts of basalt, argillaceous siltstone, and granodiorite set in a sugary-textured, white, very fine-grained matrix. The fragments, or clasts, are extremely variable in size and appear to constitute all of the rock types, except limestone, observed on the property. The origin of this rock type is not clear. It could have formed as the result of the incorporation of country rocks into an intruding rhyolite dyke or stock-like body, but the extent of the unit, and the absence of country-rock fragments in other rhyolitic bodies on the property argues against this hypothesis.

4. Skarn

Skarn is an important rock type underlying the eastern part of the property, at lower elevations. It has formed where marble has been metasomatically altered in the vicinity of the (grano) diorite and rhyolite. Exposures of skarn are numerous and Figures 4 and 5 show the aerial extent of observed skarn outcrops on the property. The skarns have formed in a zone where there is a spatial coincidence of marble, (grano) diorite, and rhyolite.

Three types of skarns occur:

- 1. Magnetite-chalcopyrite (bornite) skarn
- 2. Magnetite skarn
- 3. Silicate skarn

Magnetite-chalcopyrite skarn is only locally observed and chalcopyrite is, on the whole, a rare mineral. The most common skarn type is a nearly-massive magnetite rock with occasional pods and lenses of green to brown-coloured andradite garnet.

Large masses of calc-silicate skarn which either lack, or contain only minor amounts of magnetite, occur locally. The most abundant silicate mineral is medium to coarse-grained andradite garnet.

Pyroxene also occurs but is usually subordinate to the garnet. Other calc-silicate minerals such as epidote and amphibolite are not observed in the skarns at the Huston property. The silicate-rich skarn can contain abundant pyrite but less magnetite. In general, the proportion of garnet and pyrite decreases at the expense of magnetite. Massive magnetite skarns are pyrite-free.

The Huston skarns are, with one important exception which will be discussed below, mineralogically analogous to those at the Jedway deposit, 2 km north of the northern border of the claim group (Figure 2).

Unlike the skarns which comprise the Jedway deposit, those at the Huston are locally highly silicated. A characteristic of many of the skarns on the property, which range up to 20 m thick, is the preponderance of quartz veins which cross-cut the earlier formed silicate and magnetite skarns. Coarse, euhedral to subhedral, prismatic quartz crystals grow in the veins. In addition, quartz fills vugs and open spaces in the skarns or occurs as 'blobs' which weather more resistantly than the skarn. In highly siliceous skarns, quartz and chlorite are the most common minerals.

In the vicinity of skarn outcrops, the black, fetid limestones and marbles are absent and only white limestones occur, perhaps indicating that the black marble is bleached in the vicinity of the skarn. While Sutherland-Brown (1968) divided the marbles in the region into two distinct units, based on their colour, evidence for this subdivision at the Huston property is lacking, and the change in colouration may be largely due to bleaching of black carbonates coincident with metasomatism.

Skarns are generally in contact with either rhyolite, granodiorite, or both. All three rock types are intimately intermixed. There is very little lateral continuity to the skarns. It is not possible

to determine whether skarn formed during the intrusion of the grano-diorite or the rhyolite. However, it is likely that skarn formed during intrusion of the granodiorite stock and that subsequent rhyolite dyke intrusion, quartz veining, and silicification of the skarn occurred contemporaneously. At the Jedway Pit, neither rhyolites nor the intense silicification common to the Huston skarns were observed, supporting the suggestion that silicification of skarn and intrusion of rhyolites are genetically related.

Skarns formed only in the region where limestones occur on the Huston property and therefore it is likely that limestone was the protolith of the skarns. There is no evidence of skarn having formed from basic volcanic rocks. However, as has been suggested by others, the ferruginous basalts may have supplied much of the ferric iron necessary for the deposition of magnetite in the skarns.

5. Granodiorite and diorite

Intrusive rocks varying in composition between granodiorite and diorite are extensively exposed in the eastern part of the area and form small, irregular dyke-like bodies in the northwest. The rock is medium grained and even-textured and forms irregular apophyses intermixed with all other rock types. A continuous intrusive body likely underlies this part of the claims at a shallow depth.

The (grano) diorite is generally pervasively, but weakly, chloritized and locally epidotized. The rock is generally only weakly fractured; fracture faces are weakly iron stained.

6. Rhyolite

A northwest-southeast trending area of rhyolite dykes bisects the claim group. Rhyolite has been observed to cross-cut all other rock types and is therefore the youngest rock type on the property. The rhyolite weathers the typical white colour. Very weakly disseminated pyrite can occur but more commonly, the pyrite occurs as fracture fillings. No other alteration is observed.

Structure

Only one bedding attitude could be obtained from limestone, near 33E, lN, of 290/35S. Lack of bedding attitudes precluded detailing the attitude of the unit. Juxtaposed outcrops of limestone/skarn and of basalt in the region of skarns on the property, indicate that vertical or block faulting may have occurred, as was discussed. A few vertically dipping normal faults were mapped but in general, few were observed. Prominent linear features taken from airphotos are shown on the geological maps (Figure 4). Few were observed within the area of the detailed grid coverage, perhaps due to the very heavy timber growth.

The zone of rhyolite dykes defines a broadly linear trend in the NW-SE direction, and the emplacement of these dyke-like bodies may have been controlled by a pre-existing structural feature.

The rocks which underlie the Huston property are little-deformed and non-metamorphosed in the regional sense.

Summary

The geological history of the Huston property is summarized as follows:

- Deposition of Karmutsen basalts of alternating massive and vesicular flows.
- Deposition of black and grey limestones with intermittent basaltic volcanism.
- 3. Intrusion of granodiorite and resultant formation of skarn.
 Chloritization, epidotization, pyritization, and perhaps silicification of basalts may have occurred at this time.
- 4. Intrusion of the swarm of rhyolite dykes and the co-eval intense silicification and quartz veining of the skarns.

GEOCHEMISTRY

A total of 410 soil and rock chip samples were collected and analyzed for Au, As, and Cu. Of the total samples, 312 were taken on the grid and the remainder were collected during traverses across the property. Samples on the grid were collected every 50 m on grid lines which were 100 m apart. The geochemical maps for Au, As, and Cu are shown on Figures 6 to 8.

Discussion of Soil Geochemistry Results

Anomalous values for Au, As, and Cu occur in soil over parts of the eastern half of the gridded area. The highest values for gold, and preponderance of gold anomalies occur from 2S to 6N in this part of the property. The highest value obtained is 700 ppb.

Like gold, arsenic is most concentrated in soil in the same region, and exhibits a fair, positive spatial correlation with the anomalous gold values (Figure 10). However, not everywhere on the grid do anomalous values of gold and arsenic coincide.

Relationship Between Soil Geochemistry and Bedrock Geology

Comparison of Figure 4 (general geology) and Figure 9 (contoured geochemical values) shows that this is a well defined correlation between soil geochemistry and general geology.

Values for all metals over the western part of the claims are low. In this region, Karmutsen basalts predominate, and intrusive rocks, with the exception of a few diorite dykes, are absent. Arsenic values over the Karmutsen are very low, and nowhere anomalous. One station (10E, 1N) in this western part of the claims, gave a value of 120 ppb Au and 144 ppb Cu but there was no outcrop with which to correlate the anomaly. The highest copper value obtained in the region (256 ppm) occurs over the contact area between Karmutsen basalt and Kunga? limestone.

There is a clear correlation between anomalous soil values and regions underlain by a mixture of rhyolite, granodiorite, limestone, and skarn, in the eastern part of the grid. This indicates that metals have been introduced, or upgraded, during intrusion of rhyolite and granodiorite. The correlation between anomalous soil values and areas of limestone suggests that the high values may reflect anomalous values within the skarns. The anomalous area in the

eastern part of the grid extends beyond that area outlined as the outer limit of observed skarn. These anomalies could be reflecting the presence of skarn beneath the cover.

There is a good positive correlation between area of high Cu geochemistry and skarn. Skarns on the property are known to contain minor amounts of Cu, and thus Cu values likely reflect the presence of underlying skarn. There is also a good positive correlation between high values of Au and of Cu. This indicates that Au values might also be a reflection of the presence of underlying skarn.

The highest Au value obtained from a rock chip specimen was from skarn (150 ppb), suggesting that this rock type has resulted in the anomalous soil values. A composite rock chip sample of the Jedway Fe-Cu skarn ore, however, returned a value of only 20 ppb Au and 4 ppb As indicating that the skarns on the Huston property are more enriched in Au than those from Jedway. The higher gold value of the Huston skarn may be related genetically to the period of silicification which has affected the rock.

CONCLUSION

Geological and geochemical study of the Huston property has revealed the presence of geochemically anomalous soils and rocks from a region of geological complexity. The anomalies coincide with a region underlain by two intrusive phases and limestone and skarn.

RECOMMENDATIONS

An easterly extension of the current grid is required to ascertain the full extent of the Au-As anomalies now partially delineated in this area.

Further on-property reconnaissance and/or broad scale grid mapping and sampling is necessary to ascertain the value of ground within large gaps within the present coverage.

Continued attention needs to be paid to rock sampling as a corroboration wherever possible of soil geochemical values, and as an aid to understanding the source of the Au.

O. Arreatt

L. Dick

D. Arscott

APPENDIX

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1980 PROGRAM HUSTON CLAIMS

GRAHAM ISLAND, B. C.

PERIOD: 27 May to 1 June 1980

COSTS:

	Name	Position	Field Days	Office or Travel Days
D.	Arscott	Geologist	3	4
	Dick	ก็	5	2
G.	Walton	11	5	3
T.	Zanger	Assistant	5	1
D.	Madsen	11	5	1
Η.	Johnson	11	5	1
D.	Abercrombie		5	_1
			33	13

Total labour cost \$98.52 per man day, or

\$4,335.00

EXPENSES

Airfare, prorated, 20% x \$174.95 x 7	\$ 244.93				
Hotel, 3 rooms @\$30.	90.00				
Groceries, 33 x \$12. per man day	396.00				
Air Charter, 4 otter trips					
4 x \$370.00	1,480.00				
Analyses, minimum of 300 samples to be					
analysed for Cu, Au and As @ \$8.00	2,400.00				

TOTAL PROGRAM COST

Javid Arscatt, P. Erg.

4,610.93 \$4,610.93

FIELD TECHNIQUES

Grid:

The grid was established by hip chain and compass, all distances being slope corrected. Stations were marked every 50 m by flagging tape of two colours, and the intervening lines with a single colour. Additional control for part of the area covered, was provided by an orthophoto (Figure 10).

Soil Sampling:

Soils were collected by prospecting pick and wherever possible from the 'B' horizon. Sample depths being generally 10 to 30 cm. The samples were placed in high wet-strength paper bags and shipped to Vangeochem Lab Ltd. for metal analysis. The gold content was determined by atomic absorption analysis with prior fireassay, and the arsenic by the standard atomic absorption method.

Geological Mapping

Detailed geological mapping was carried out on the Huston property first using compass, hip-chain, altimeter, topographic maps and airphotos, and later the flagged grid as control.

PREVIOUSLY KNOWN SHOWINGS OUTCROPPING WITHIN HUSTON CLAIMS (Excerpts from Sutherland-Brown 1968)

Plunger Iron Ore Limited and The Granby Mining Company Limited, (56) specifically the Plunger 1 to 4 held by Granby. It seems likely these showings were originally called the Ivan in 1913. They are 1 mile east of the southeast end of Huston Inlet and scattered on the south side of the valley from about 300 to 850 feet. There are two principal showings: one at about 550 feet elevation is a blob-like body some 50 by 30 feet on the surface, composed of magnetite and garnet; the other, between 700 and 825 feet elevation, is a planar deposit some 500 feet long and 25 feet or less wide, composed of skarn with magnetite, pyrite, and chalcopyrite. The upper deposit apparently is a replacement of a northwest-trending shear zone and is of interest primarily for copper content. A number of pits dating from the early exploration expose the mineralization. A small adit of similar age below the showings fails to reach the mineralization.

The showings are all very near the contact of the Carpenter quartz monzonite stock, and the lower magnetite deposit is actually a local flatish contact. Most of the replacement is of metamorphosed Karmutsen greenstones, some of granitic rock. Post-ore rhyolite and basalt dykes are common in the area. In 1962 Jedway did 150 feet of packsack drilling on the property.

[References: Minister of Mines, B.C., Ann. Rept., 1913, p. 101; Young and Uglow, Geol. Surv., Canada, Iron Ores of Canada, Vol. I, Ec. Geol. Ser. No. 3, 1926, pp. 42-43.]

Ida Jedway Iron Ore Limited, about a mile east of the southeast end (48) of Huston Inlet and about 1,000 feet west of the Hercules. The showing, at an elevation of about 800 feet, is a vertical dyke-like body of magnetite-rich skarn striking north 10 degrees east. The magnetite contains green garnet and calcite in variable amounts and minor sulphides. The body can be traced for nearly 200 feet and is up to 25 feet wide.

[References: Minister of Mines, B.C., Ann. Rept., 1907, p. 68; Young and Uglow, Geol. Surv., Canada, Iron Ores of Canada, Vol. I, Ec. Geol. Ser. No. 3, 1926, p. 43.]

This property is part of the Jim group of recorded claims held by Hercules Jedway Iron Ore Limited. The showing is 1¼ miles east of the (49) southeast end of Huston Inlet at an elevation of about 1,100 feet. It was discovered about 1906 by McMillin, Watson, and McEachern. The showing consists of the irregular metasomatic replacement of the contact of the Karmutsen Formation with the Carpenter quartz monzonite stock, near the base of the Kunga limestone and is up to 100 feet thick. The purity of the skarn varies widely, much being quite garnetiferous. Some cuts and two small adits expose the ore on the steep but covered slope.

[References: Minister of Mines, B.C., Ann. Repts., 1907, p. 68; 1913, p. 101; Young and Uglow, Geol. Surv., Canada, Iron Ores of Canada, Vol. I, Ec. Geol. Ser. No. 3, 1926, pp. 43-44.]

This property is part of a group of located claims held by The Granby Mining Company Limited. The showings are about 1 mile east of the southeast end of Huston Inlet at about 300 feet elevation.

The showings consist of a duke like repleasment had a of sulchide.

The showings consist of a dyke-like replacement body of sulphiderich skarn, of interest primarily for its copper content. The body is exposed for about 80 feet and is up to 20 feet wide, although the copper-rich portion is narrower. Grades of the order of 2.7 per cent copper across 10 feet are reported (Ann. Rept., 1918). It strikes north 60 degrees west and dips steeply east. A similar showing occurs several hundred feet to the south along strike. The body occurs near the contact of the Carpenter quartz monzonite but is seemingly entirely within that body. Silver Standard Mines Limited drilled one short packsack hole in February, 1960, which intersected 20 feet of magnetite with 5 feet containing 0.85 per cent copper.

[References: Minister of Mines, B.C., Ann. Repts., 1913, p. 101; 1918, pp. 39-40; 1929, p. 61.]

Ivan (57) Cu, Fe replacement in Karmusten.

CERTIFICATE

I, David Philip Arscott am a Professional Engineer, registered in British Columbia with office address at 901 - 355 Burrard Street, Vancouver, B. C. V6C 2G8.

I have practiced Mineral Exploration almost continuously since 1961, and hold degrees in Mining Engineering (1963) and Mineral Exploration (1966).

The described 1980 program on the Huston claims was carried out at my general direction, and with some personal involvement.

DAVID ARSCOTT, P.Eng.

David arscott

June 1980

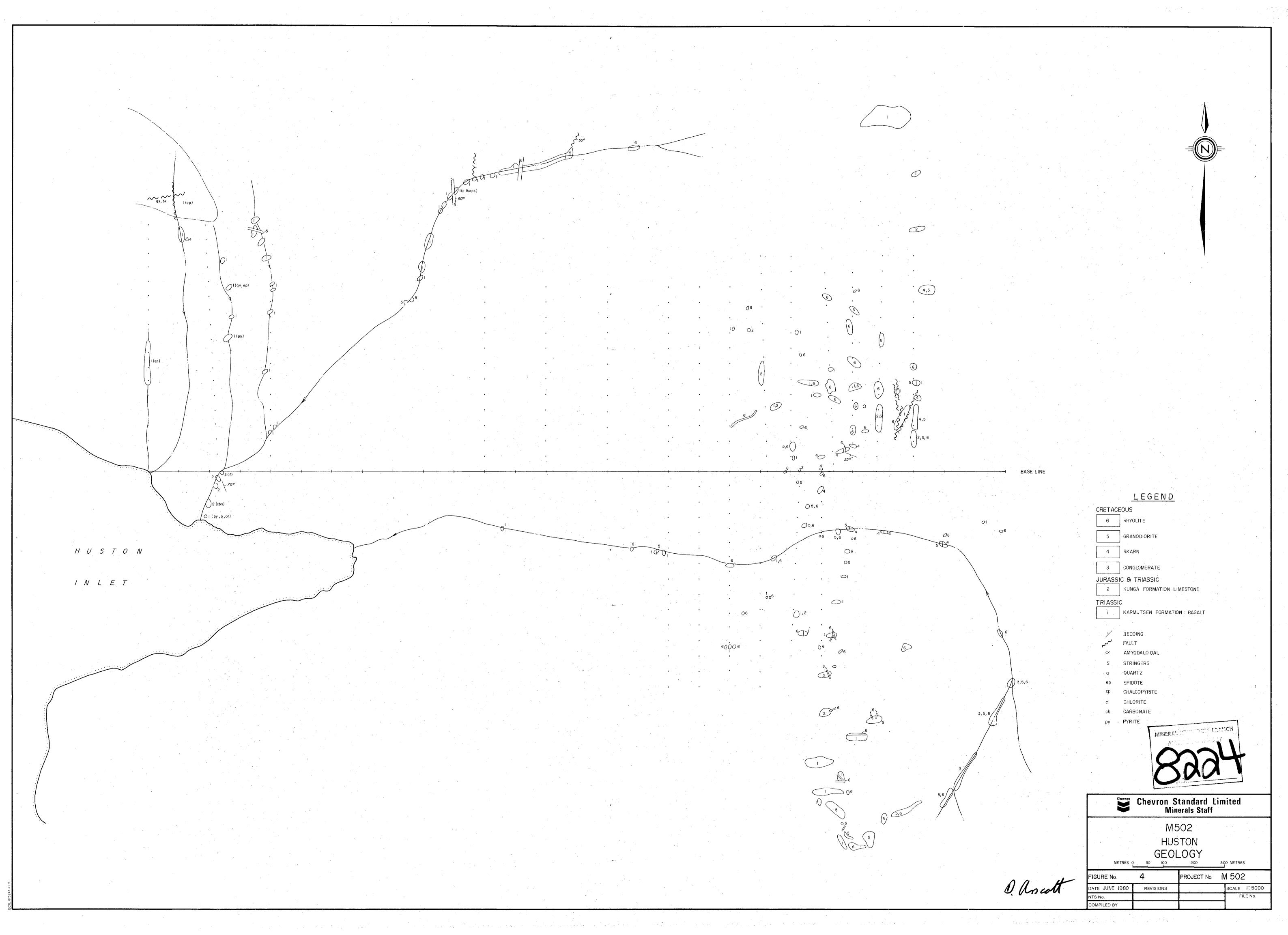
STATEMENT OF QUALIFICATIONS

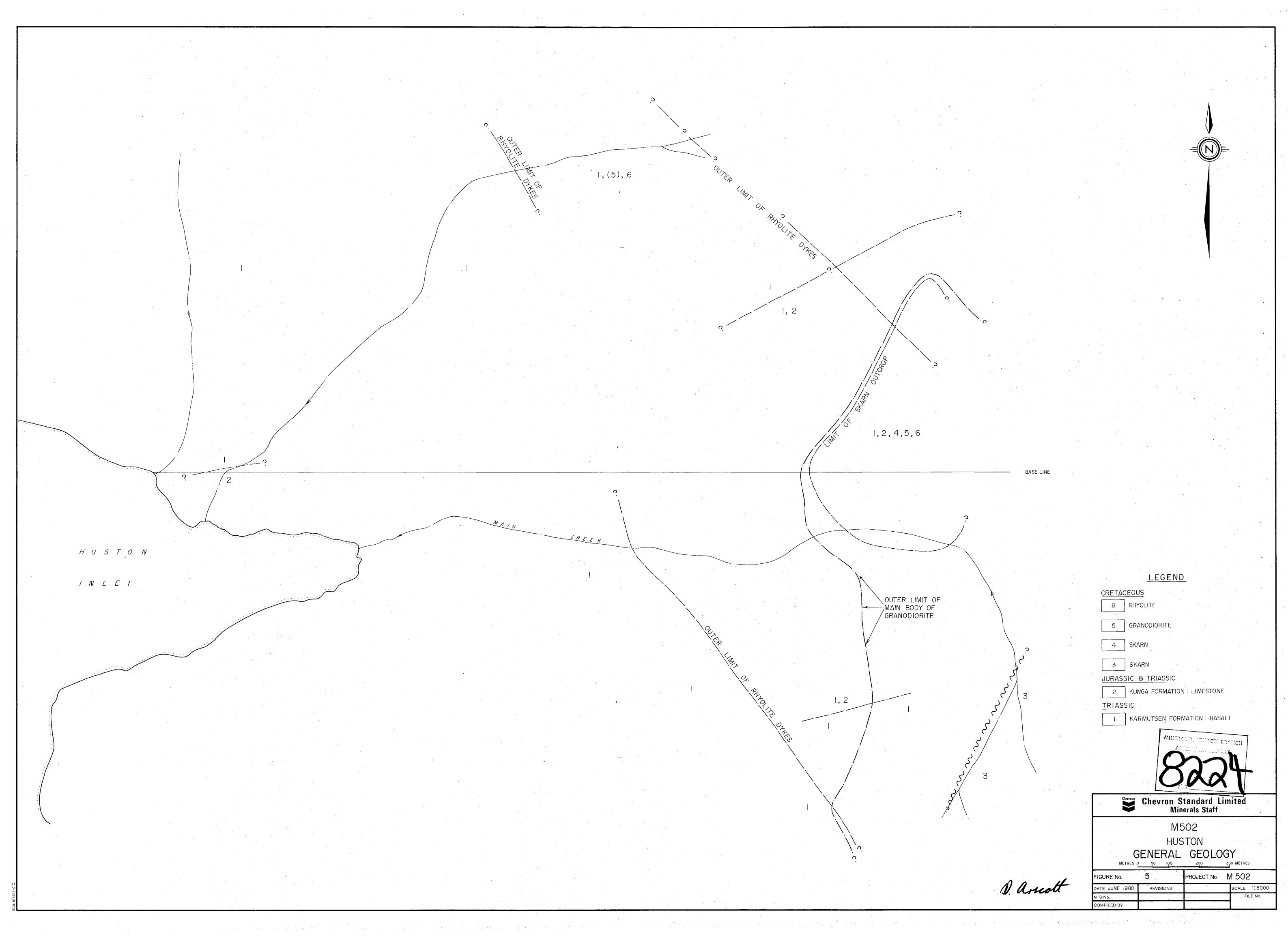
I, Lawrence Allan Dick, am a professional geologist with office at 901 - 355 Burrard St., Vancouver, B. C. V6C 2G8.

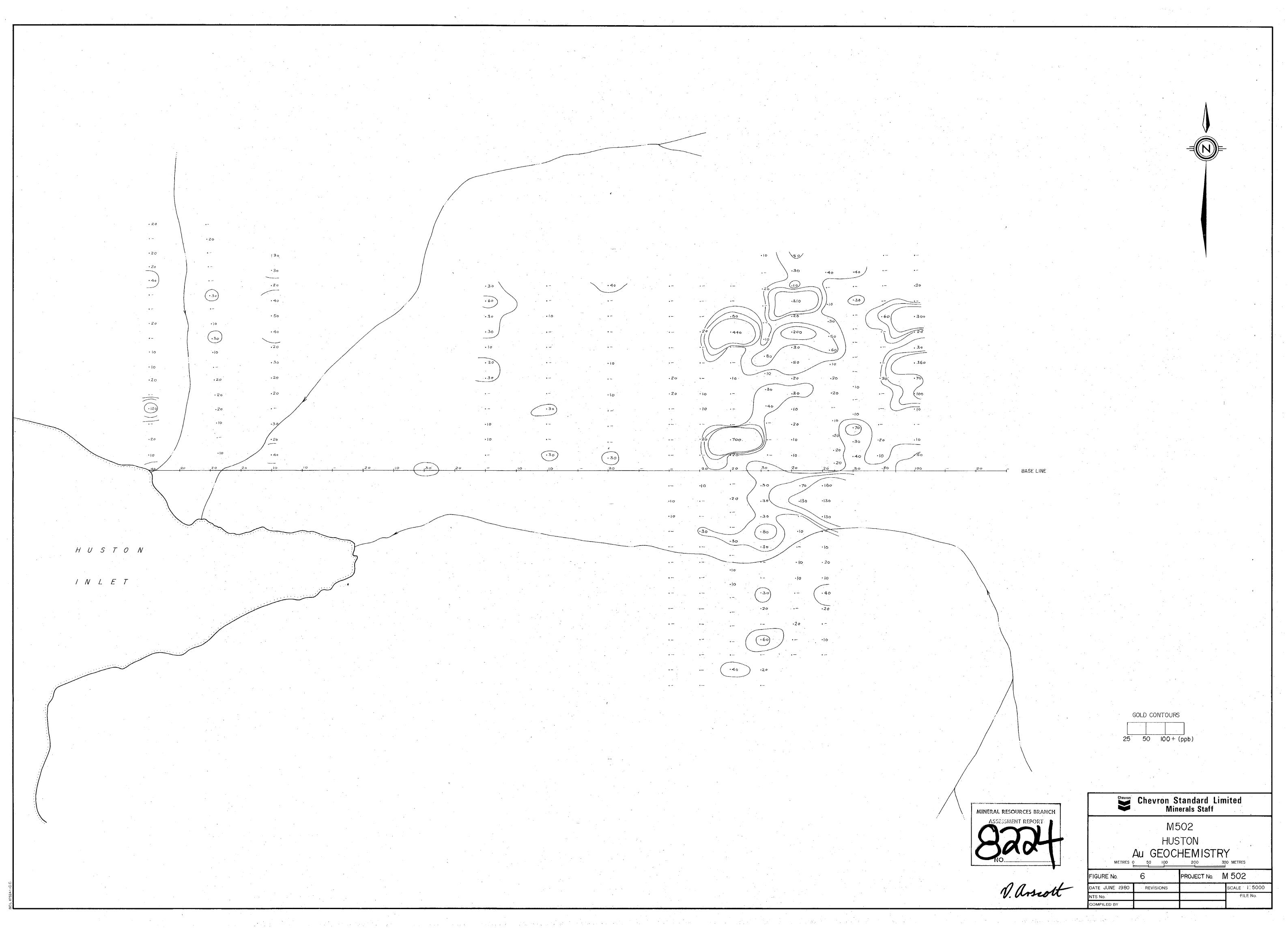
I am a graduate of the University of British Columbia (B.Sc. 1973) and Queen's University (M.Sc. 1977, Ph.D. current). I have worked in mineral exploration, mainly seasonally, since 1969, and am a member of the Geological, Association of Canada and of the Mineralogical Association of Canada.

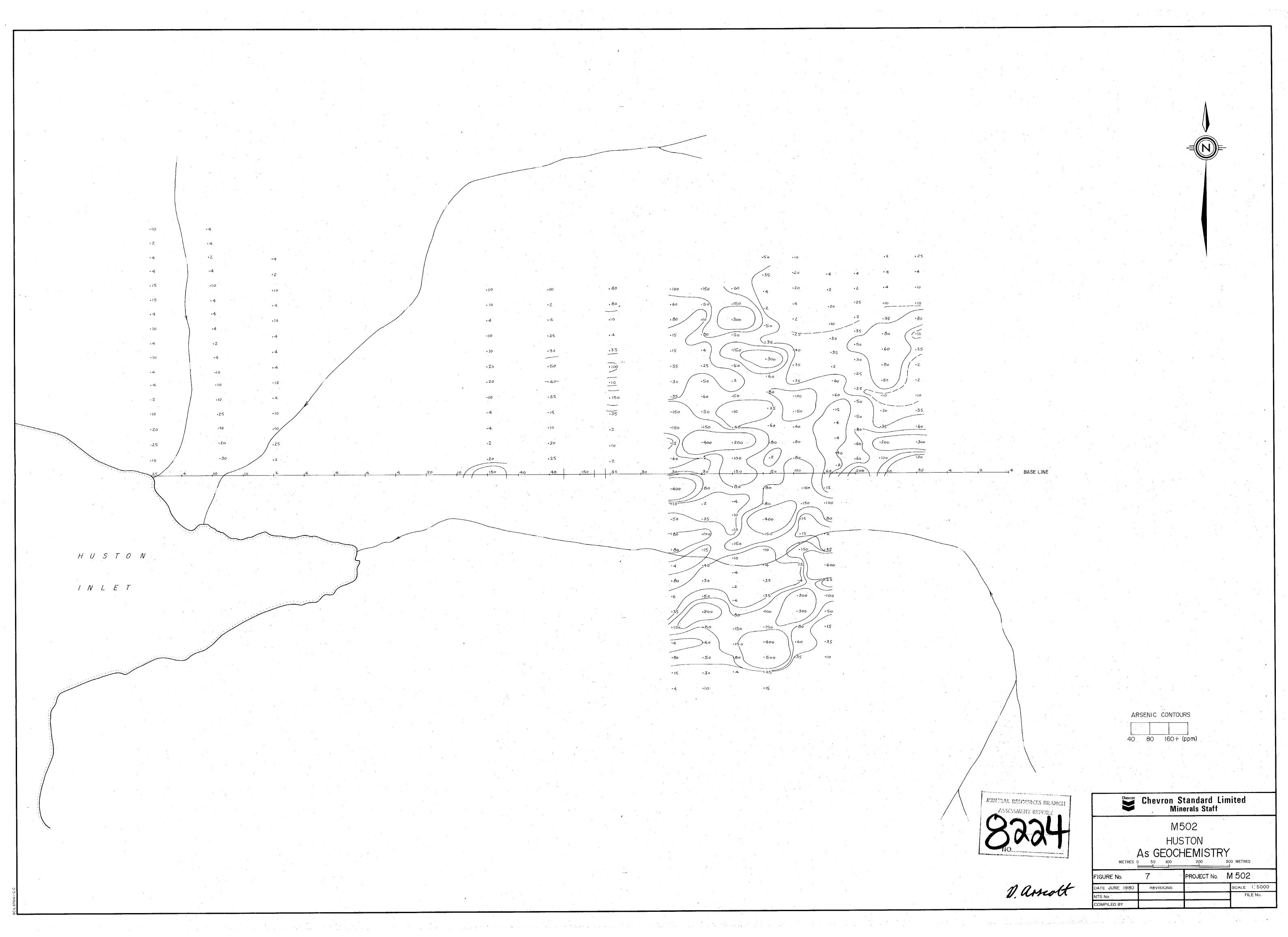
LAWRENCE ALLAN DICK June 1980.

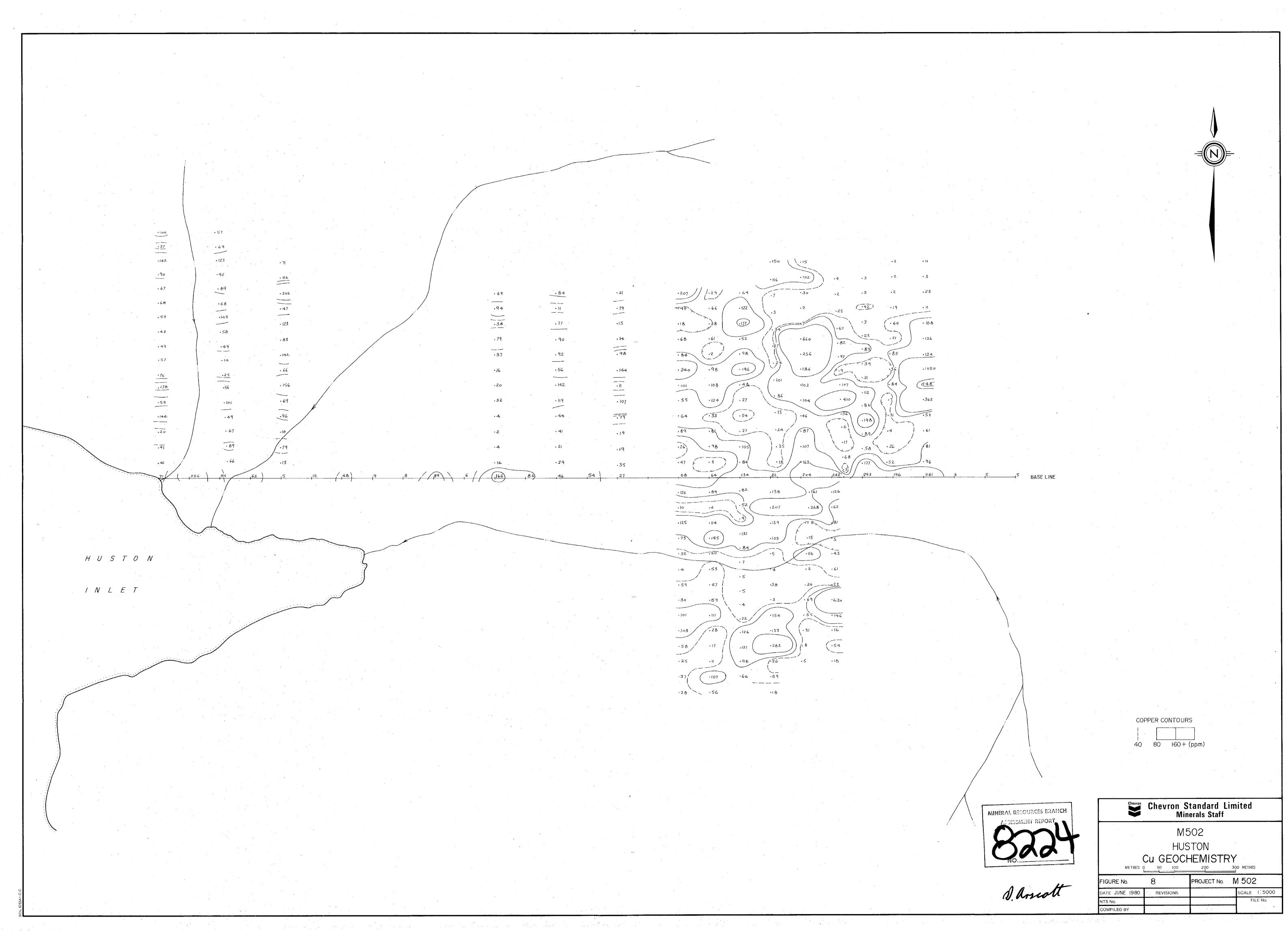
J.A. Dick



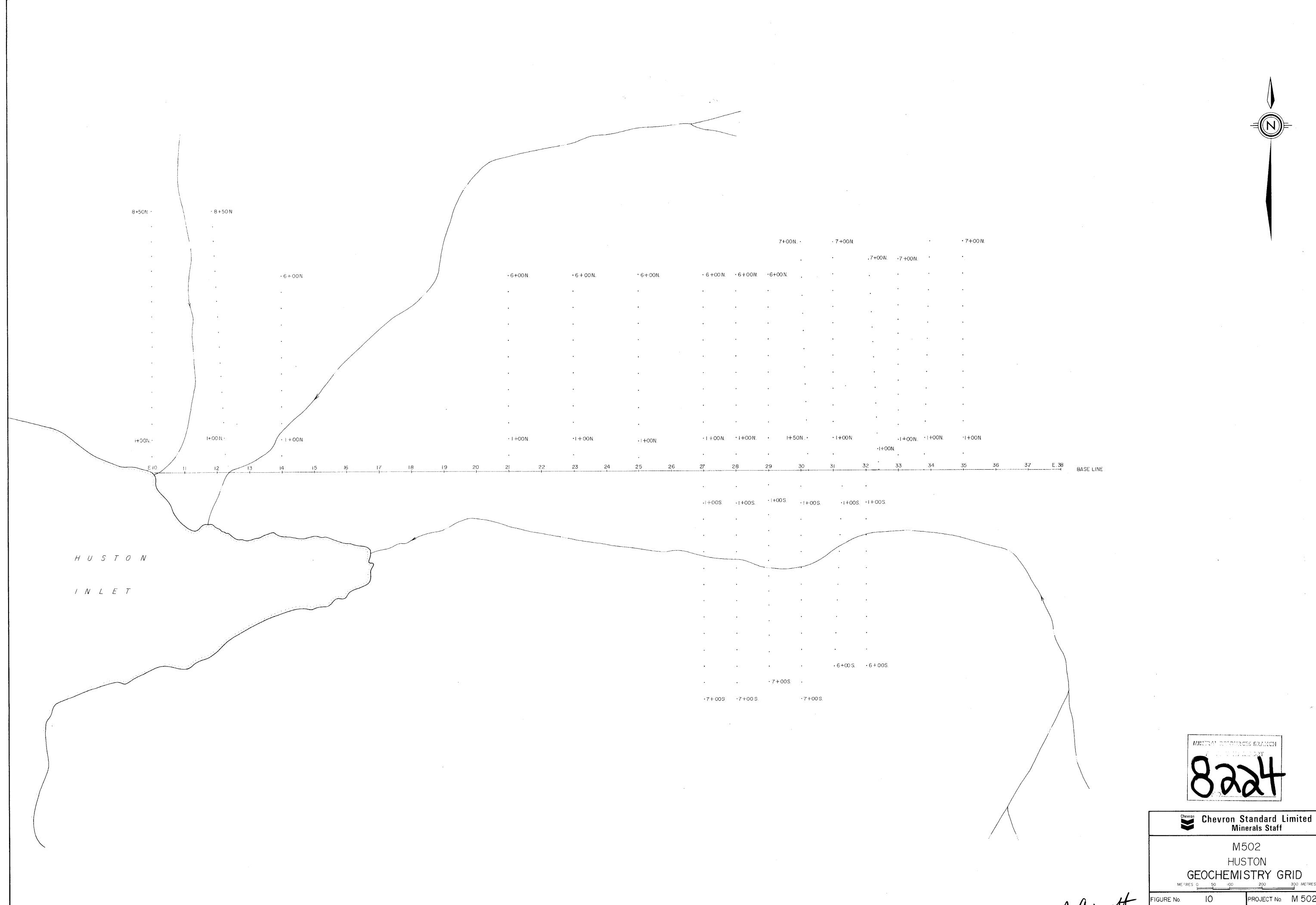






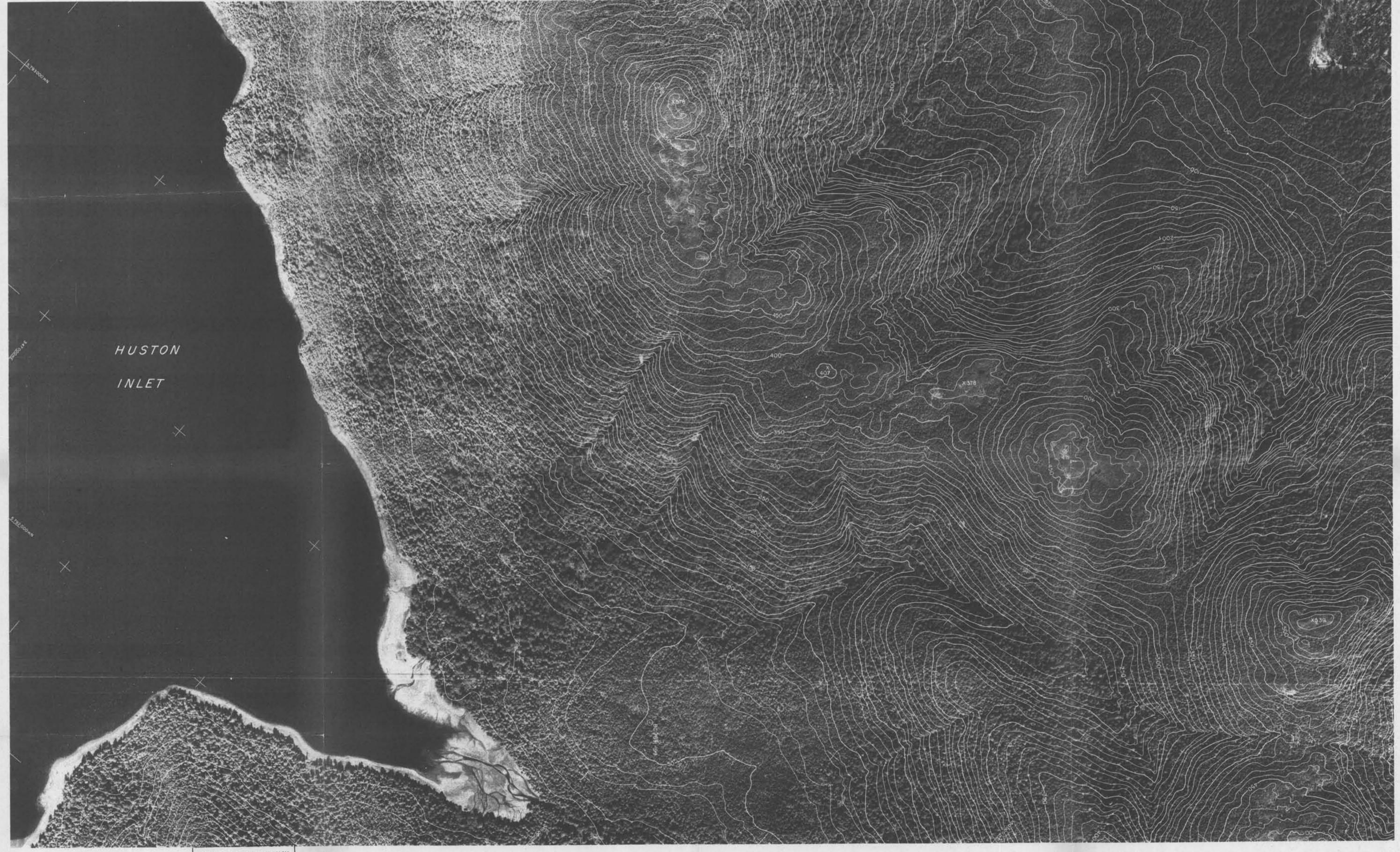






PROJECT No. M 502

DATE JUNE 1980 REVISIONS SCALE 1:5000



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HUSTON

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