REPORT

ON

PHASE I

GEOPHYSICAL SURVEYS
SAVANT LAKE PROJECT

June 8, 1977

W. G. Wahl Limited

Suite 1101, 302 Bay Street
Toronto, Ontario
M5H 2P3

June 8, 1977

Dr. E. L. Evans
Director of Exploration
Denison Mines Limited
4 King Street West
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Dear Dr. Evans:

Submitted herewith is our report on:

PHASE I

GEOPHYSICAL SURVEYS

SAVANT LAKE PROJECT

Three major, apparently stratabound, conductive zones were located. The conductivity-thickness products are suggestive of sulphide mineralization. Depth to top estimates for these zones from electromagnetic and correlated magnetic data range from 45 to 80 metres. As this range is just near the threshold of detectability at 120m coil spacing for an horizontal-loop survey, it is recommended that selected areas be re-surveyed at 180m coil spacing utilizing all frequencies in order to screen some of the anomalies. With the sources at such depths, there may not be any surficial geologic expression and consequently a judicious diamond drilling programme is necessary.

INTRODUCTION

LOCATION AND ACCESS

The Savant Lake Claim Block is located on the eastern shore of Savant Lake, approximately 70 air miles northeast of Sioux Lookout, Ontario, and is most easily accessible by charter aircraft from Sioux Lookout. It lies within NTS Nos. 52 J/8 and 9.

GENERAL

A combined electromagnetic horizontal-loop and total-field gradient magnetometer survey was conducted on the Savant Lake property in order to delineate the source of massive sulphide float found to the south of the property.

The interpreted results are subject to revision as more geological information is made available from field mapping in progress.

ELECTROMAGNETIC - HORIZONTAL-LOOP SURVEY

The electromagnetic data was observed employing an Apex MaxMin II horizontal-loop unit in the maximum-coupled mode. The transmitter frequencies were 444 Hz and 1777 Hz utilizing a 120 metre coil separation. Three distinctly anomalous zones were detected during the course of the survey. These anomalous areas have been designated as Anomaly A, Anomaly B and Anomaly C for discussion purposes only, and no priority significance should be attached to their order of discussion.

ANOMALY A

Anomaly A is a northeast trending conductor having a strike length of about 500 metres. It is situated between lines 900 east and 1500 east and lies between stations 750 north and 795 north. The negative peak value (relative to background) ratios of the in-phase to quadrature (or out-of-phase) anomaly amplitudes average about 1.0 at 444 Hz and 0.55 at 1777 Hz. The decrease of this ratio with frequency, rather than the normally expected increase, indicates a complex-conductivity situation.

The low frequency depth to top estimate is 0.5 times the coil spacing or 60 metres, while at the high frequency it is 0.3 times the coil spacing or about 35 metres.

The width of the zone, as determined by the amount in excess of the coil spacing from the 0 cross-over points of the anomaly, varies from thin to about 30 metres. The variations in conductivity-thickness, along strike, only partially correlate to the variations in the thickness, thereby implying a heterogeneity to the zone.

ANOMALY B

Anomaly B is a northeast trending conductor having a strike length of about 600 metres. It is situated from line 960 east to line 1560 east and lies between stations 420 north and 510 north (this is assuming a continuous conductor across a claim not at present held by W. G. Wahl Limited). The discontinuous magnetic high associated with this zone suggests that it may be a pyrrhotite containing conductor. The estimated depth to top is 0.35 times the coil separation or 42 metres at 444 Hz and 0.15 times the coil separation or 18 metres at 1777 Hz. The zone differs in thickness from 15 metres to 45 metres. The maximum and minimum conductivity-thickness products are not always coincident with the maximum and minimum thicknesses of the conductor, thereby implying a heterogeneity to the zone.

ANOMALY C

Anomaly C consists of a north-south trending conductor that extends from line 420 east to line 1720 east. The estimated conductivity-thickness products decrease with an increase in frequency. The conductivity-thickness values are 36 mhos to 120 mhos at 444 Hz and 20 mhos to 40 mhos at 1777 Hz. The depth to top estimates at both frequencies average about 0.55 times the coil separation or 66 metres. On average, the zone appears to be less than 30 metres thick. As this conductor has a high conductivity-thickness product, appears to lie within the magnetically mapped felsic intrusive, and is found near the edge of swamp, it presents an enigma.

MAGNETOMETER SURVEY

The magnetometer survey was conducted using a geoMetrics G-816 total-field magnetometer in the gradient configuration. Stations were occupied every 15 metres and two readings per station were obtained.

Based on the contoured magnetic expression, the survey area can easily be divided into two major units. The southeast portion has a low, broad uniform magnetic expression and correlates to the regionally mapped felsic intrusive. The northwest portion consists of a series of narrow, parallel, continuous to lensoid, northeast-trending magnetic highs, 2,000 gammas and greater, above a background of 59,000 gammas. This zone reflects the regionally mapped mafic to intermediate volcanics.

The sequence of the mafic to intermediate volcanics consists predominantly of pillowed lavas and subsidiary fine- to medium-grained massive flows of the same composition with local pillow breccias, flow-top breccias, amygdaloidal flows, porphyritic flows, volcanic conglomerate, lapilli-tuff, tuff-breccia, crystal tuff, variolitic flows and metasedimentary iron formation present. The different rock types imply quite a range in the magnetic expressions.

A very strong magnetic anomaly (up to 10,000 gammas above background) trends north to northwest between lines 1260 east and 1380 east. This anomaly is also coincident with a strong positive in-phase electromagnetic anomaly and consequently must be due to magnetite.

Magnetic lenses in excess of 3,000 gammas above background are correlated to conductors in quite a few cases. These are probably pyrrhotite lenses and/or more iron-rich parts of some horizons. Zones in excess of 3,000 gammas are thought to reflect flows and pillowed lavas. Zones in the 1,500 to 1,900 gamma range are probably tuffs or more felsic components.

Over the lake, the estimated depth to top varies from 15 metres to 30 metres or so. The station spacing of every 15 metres, however, precludes any more precise determinations. The depth to top estimates associated with the conductors is at least 30 metres in most cases and as such, is comparable to the electromagnetic interpretations, within limits of resolution.

Off-sets and abrupt terminations of some of the magnetic trends suggest at least two east-west trending faults. The sense of the off-sets in both cases is left-lateral.

CONCLUSIONS

The causative body for Anonaly A may be a relatively narrow, stratabound zone of sulphide mineralization. As the estimated conductivity-thickness product is moderate, the composition of the zone could be of a more disseminated nature and/or sphalerite and galena rich.

The causative body of Anomaly B may be a zone of sulphide mineralization containing pyrrhotite as evidenced by sporadic high magnetic lenses. The lensoid magnetic expression and variable conductivity-thickness product also reflect the heterogeneity of the zone.

Anomaly C is physically correlatable to an edge of a swamp, but it does give a distinct in-phase anomaly rather than a quadrature anomaly resulting in conductivity-thickness of up to 120 mhos. As it is parallel to the trend of the other conductors and is at the stratigraphic bottom and physically at depth, it warrants further investigation.

RECOMMENDATIONS

As all the anomalies appear to be at depths of 45 metres or more, and the present geophysical expression is weak, selected areas should be re-surveyed at 180 metre coil separation utilizing all four transmitter frequencies in order to better screen or define the nature of these anomalies. Since these zones are deep, and may not have a surficial expression, diamond drilling is a must.

All of which is respectfully submitted.

Yours very truly,

W. G. WAHL LIMITED

Arnis Gubins

A. Gubins, B.A.Sc.

June 8, 1977

REPORT

ON

PHASE II

GEOLOGICAL SURVEY

SAVANT LAKE PROJECT

November 9, 1977

W. G. Wahl Limited

Suite 1101, 302 Bay Street
Toronto, Ontario
M5H 2P3

November 9, 1977

Dr. E. L. Evans
Director of Exploration
Denison Mines Limited
P. O. Box 40
Royal Bank Plaza
Toronto, Ontario M5J 2K2

Dear Dr. Evans:

Submitted herewith is our report entitled:

PHASE II

GEOLOGICAL SURVEY

SAVANT LAKE PROJECT

The geologic mapping determined that both an epigenetic environment and a syngenetic depositional environment occurred on the Savant Lake property.

Epigenetic mineralization in the form of pyrite, chalcopyrite, sphalerite and galena was noted in quartz veins. Although no surficial expression of syngenetic sulphide mineralization was found, the presence of iron formation suggests an environment favourable to the deposition of massive sulphide type mineralization.

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LOCATION AND ACCESS

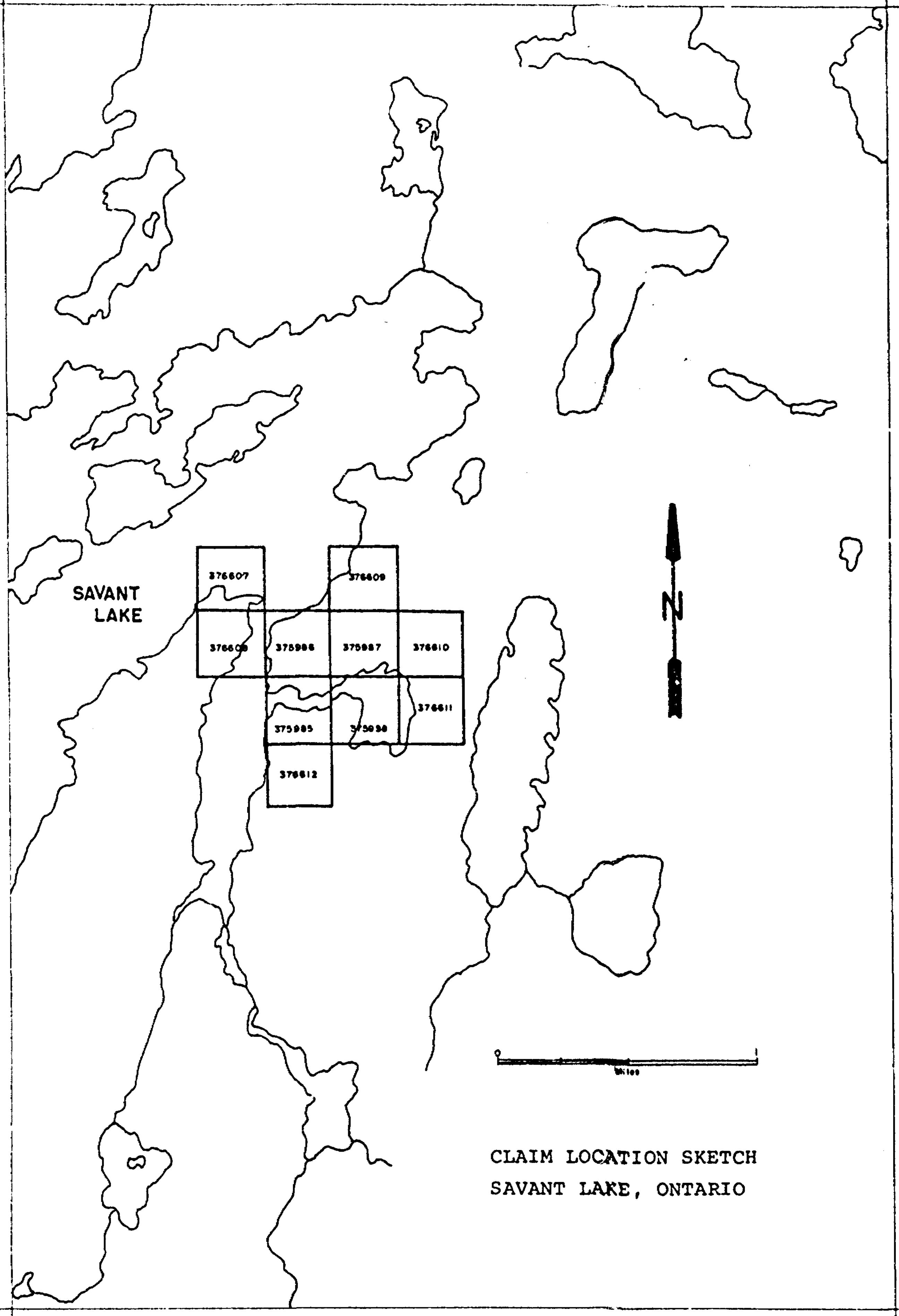
The Savant Lake Claim Block is located on the eastern shore of Savant Lake, approximately 70 air miles northeast of Sioux Lookout, Ontario, and is most easily accessible by charter aircraft from Sioux Lookout. It lies within NTS Nos. 52 J/8 and 9.

GENERAL

The geological mapping programme discussed in this report and completed by W. G. Wahl Limited in June, 1977, was part of an integrated geophysical, geochemical and geological programme initiated to evaluate the economic potential of the Savant Lake area.

The geophysical portion of this programme was completed during March, 1977. At that time, conductive zones were delineated on the basis of the MaxMin II horizontal loop electromagnetic data. The highly variable magnetic responses reported for the study area, and the lack of geological data, precluded a detailed assessment of the geophysical data until the geologic mapping had been completed. Both the electromagnetic and magnetic data were clarified by the geologic mapping.

The results of the geochemical work will be reported at a later date.



CLAIM LOCATION SKETCH
SAVANT LAKE, ONTARIO

GENERAL GEOLOGY

Archean mafic and intermediate rocks of basaltic-andesitic composition are present as massive fine-grained pillowed lavas, chlorite schists and medium-grained tuffs. These rock types represent the majority of the volcanic rocks in the study area. Discontinuous magnetite-rich iron formations are present and represent the only reliable marker horizon within the otherwise massive mafic volcanics. Numerous quartz veins of varying width and mineralization also occur. The other major rock type, also Archean in age, is a large felsic (granodiorite) intrusive, restricted to the east and southeast portion of the study area.

Mineralization, in some cases significant, is predominantly associated with the quartz veins, and minor concentrations of disseminated pyrite were noted in the mafic metavolcanic rocks.

GEOLOGY

GEOLOGY

GENERAL

On a regional scope the rocks of the Savant Lake property are representative of the Mafic to Intermediate Metavolcanic and Foliated Felsic Intrusive rocks, which are shown in their proper sequence in Table 1. The remainder of the rock types outlined in the table were not encountered on the property although minor felsic metavolcanics and metasedimentary rock units were reported from diamond drilling to the north and northwest of the property.

Pleistocene and Recent features dominate sections of the study area and are represented by till, ribbed moraines and muskeg swamps.

The geology of the area as mapped by the Ontario Department of Natural Resources has been published on or in the following maps and reports:

Moore, E. S., Lake Savant Area, District of Thunder Bay; Ont. Dept. Mines, Vol. 37, Pt. 4, p. 53 - 82, 1928 (Pub. 1929). Accomp. by Map 37j, 1 in. = 2 mi.

Skinner, R., Geology of the Sioux Lookout Map Area, Ontario, on Part of the Superior Province of the Precambrian Shield (52J); Can. Geol. Surv. Pap. 68-45, 10 p. Accomp. by Map 14-1968, 1 in. = 4 mi.

Prelim. Geol. Map. P.962, Pashkokogan-Caribou Lakes Sheet, Dist. of Thunder Bay, 1 in. = 2 mi.

In order to relate the geology of the Savant Lake property to the regional geologic setting, reference was made to Ontario Ministry of Natural Resources Geoscience Report 160, "Geology of McCubbin, Poisson, and McGillis Townships",

TABLE 1 | TABLE OF LITHOLOGIC UNITS FOR McCUBBIN, POISSON AND McGILLIS TOWNSHIPS. (from ODM Geosc. Rpt. 160, 1977)

PHANEROZOIC
- CENOZOIC
  - QUATERNARY
    - RECENT
      - Swamp and stream deposits (unconsolidated)
    - PLEISTOCENE
      - Silt, sand, gravel and boulders (unconsolidated)

UNCONFORMITY

PRECAMBRIAN
- LATE PRECAMBRIAN
  - MAFIC INTRUSIVE ROCKS
    - Diabase[b]

INTRUSIVE CONTACT

- EARLY PRECAMBRIAN (ARCHEAN)
  - FELSIC INTRUSIVE ROCKS
    - MASSIVE FELSIC INTRUSIVE ROCKS
      - Porphyritic granodiorite; granodiorite, quartz monzonite; aplite dikes

INTRUSIVE CONTACT

    - FOLIATED FELSIC INTRUSIVE ROCKS
      - Granodiorite to quartz monzonite, granodiorite to quartz monzonite with biotite-rich xenoliths, hybrid granitic rocks

INTRUSIVE CONTACT

    - METAMORPHOSED FELSIC INTRUSIVE ROCKS
      - HERON LAKE STOCK
        - Trondhjemite; quartz-rich trondhjemite; quartz-poor trondhjemite; quartz, quartz-feldspar porphyry[b]

INTRUSIVE CONTACT

  - MAFIC INTRUSIVE ROCKS
    - Metagabbro[a]; metadiorite[a], porphyritic metagabbro[ab]

INTRUSIVE CONTACT

  - METASEDIMENTS
    - ARENACEOUS METASEDIMENTS
      - Greywacke, siltstone; tuffaceous metasediments; siliceous sandstone, in part tuffaceous metasediments, subgreywacke sandstone
    - FERRUGINOUS METASEDIMENTS
      - Greywacke, subgreywacke and sandstone; siltstone; quartz-magnetite iron formation; tuffaceous metasediments; jasper chert-magnetite iron formation
    - CONGLOMERATIC METASEDIMENTS
      - Polymictic orthoconglomerate with metavolcanic clasts; polymictic granitoid boulder-bearing orthoconglomerate

FAULT CONTACT

  - METAVOLCANICS
    - FELSIC TO INTERMEDIATE METAVOLCANICS
      - Rhyodacitic to rhyolitic metavolcanics; dacitic to andesitic metavolcanics; tuff; lapilli-tuff; tuff-breccia to agglomerate; fine-to medium-grained flows, porphyritic flows; quartz-carbonate schist; reworked tuff
    - MAFIC TO INTERMEDIATE METAVOLCANICS
      - Chloritic metavolcanics; actinolitic metavolcanics, pillowed lavas; pillow breccia; flow-top breccia; fine-to medium-grained flows[c]; crystal tuff; iron formation; volcanic conglomerate; variolitic flows

a - occurs as small dikes or sills
b - occurs as small dikes only
c - may be intrusive in part
d - may be extrusive in part

(Savant Lake Area), District of Thunder Bay, by W. D. Bond, 1977. The three townships covered in this report lie immediately to the south and southwest of Savant Township.

ROCK TYPES

Mafic - Intermediate Metavolcanics

The mafic to intermediate metavolcanic rocks of the study area are restricted to the northwest portion of the area. Basaltic to andesitic pillowed lavas and subsidiary fine- to medium-grained flows occur, the basalts being most common. Bond (1977) reports local occurrences of pillow breccia, flow top breccia, amygdaloidal flows, porphyritic flows, tuff breccia, crystal tuff and variolitic flows present in the mafic metavolcanic sequences to the south of the Savant Lake property. Being of a restricted distribution, these features, although not identified on the property, may be present but hidden by glacial material.

In addition to the massive flows, a chlorite schist and a "tuffaceous" unit were mapped. The chlorite schist is fine-grained and highly schistose, reflecting the high chlorite content. The "tuffaceous" unit is medium-grained and schistosity is only poorly developed. The massive pillowed lavas and flows are fine-grained and massive. Schistosity is only developed along flow boundaries. Both the chlorite schist and "tuffaceous" unit are present as discontinuous lenses of varying thickness, thereby preventing surface delineation of these units over any distance.

The chemical data of the mafic metavolcanic samples demonstrate that both basaltic and andesitic members predominate in the survey area (Fig. 1). Figures 2 to 4 illustrate that both of these rock types occur as flows, tuffs and schists, with the basaltic varieties accounting for the greater

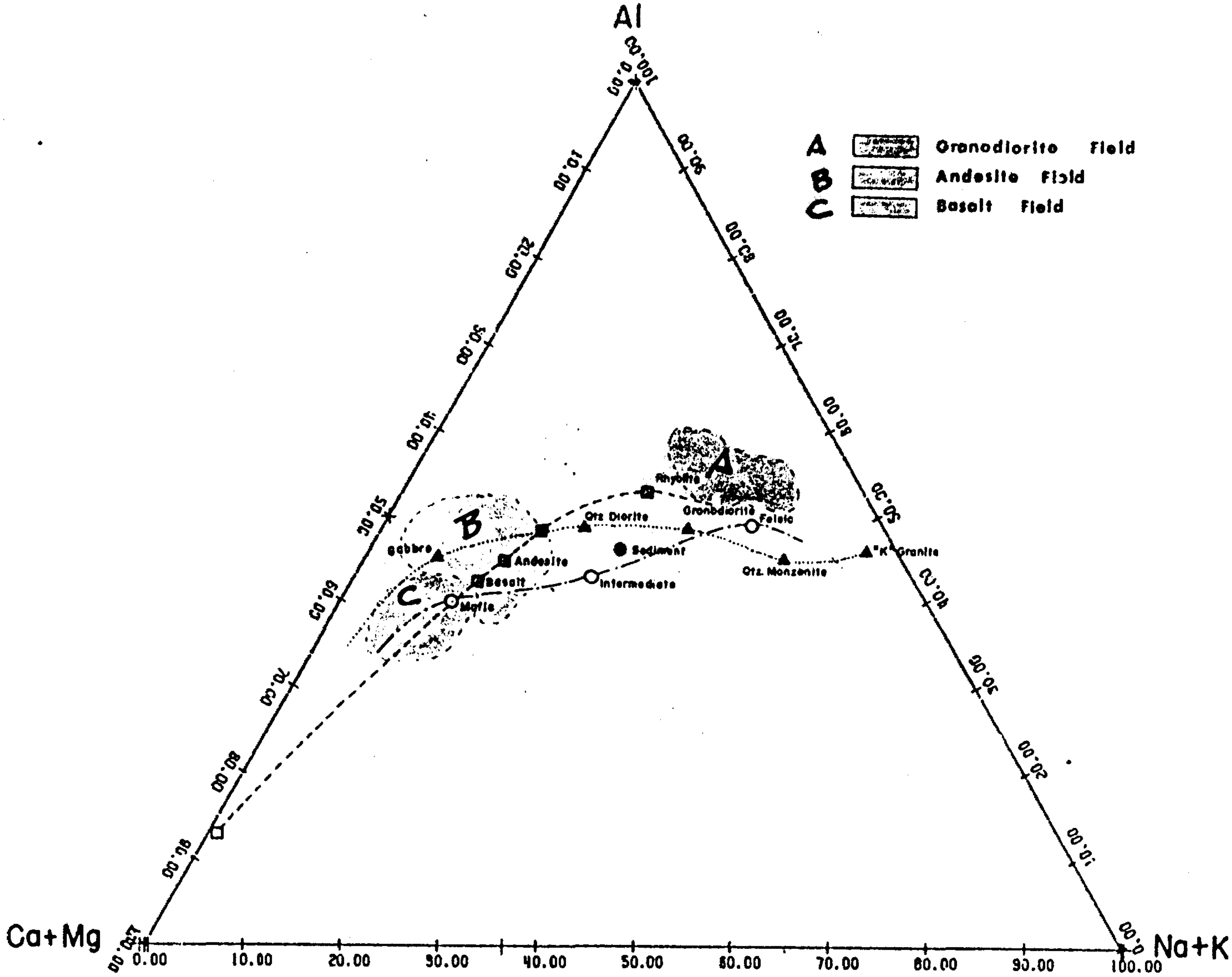
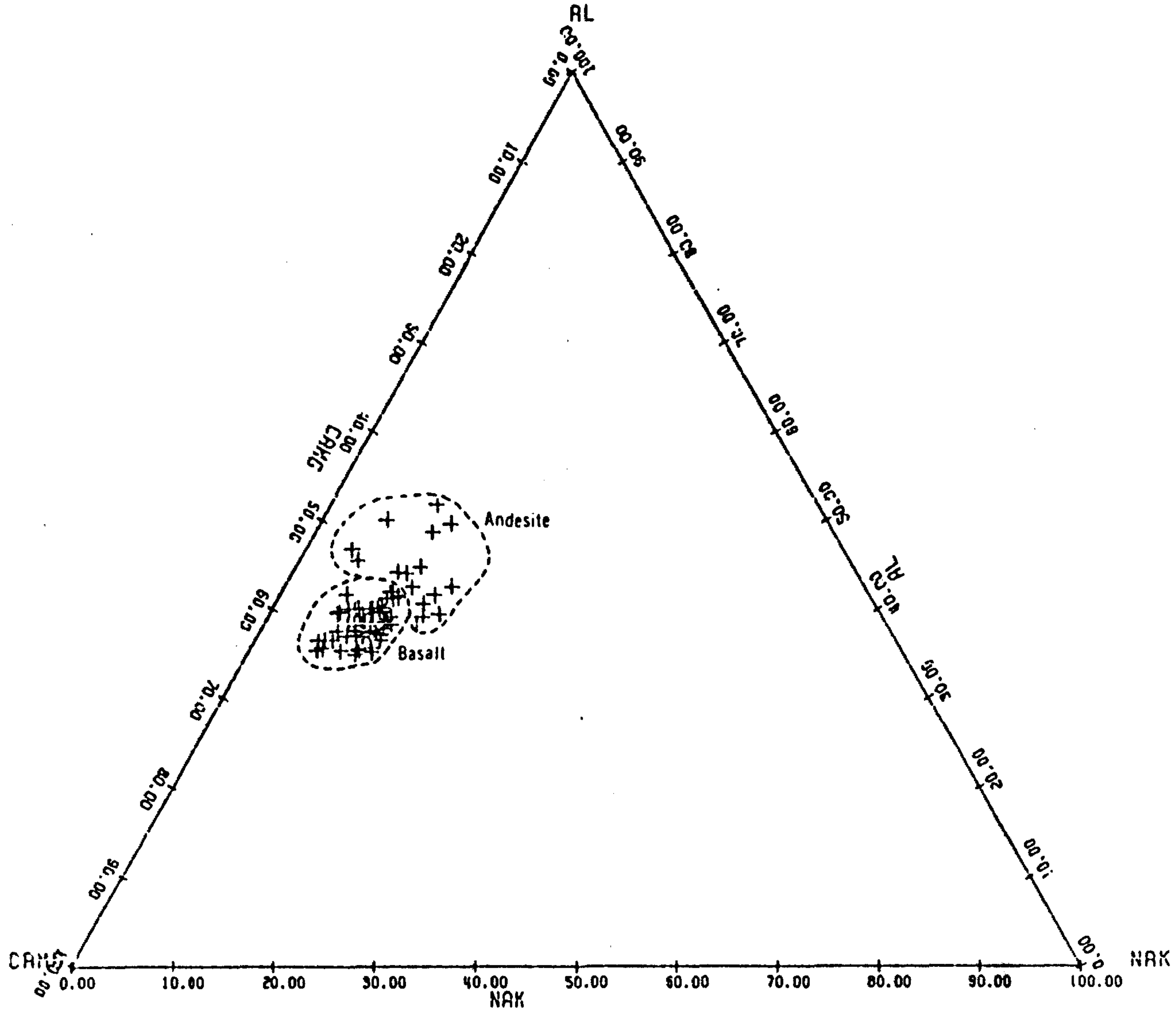
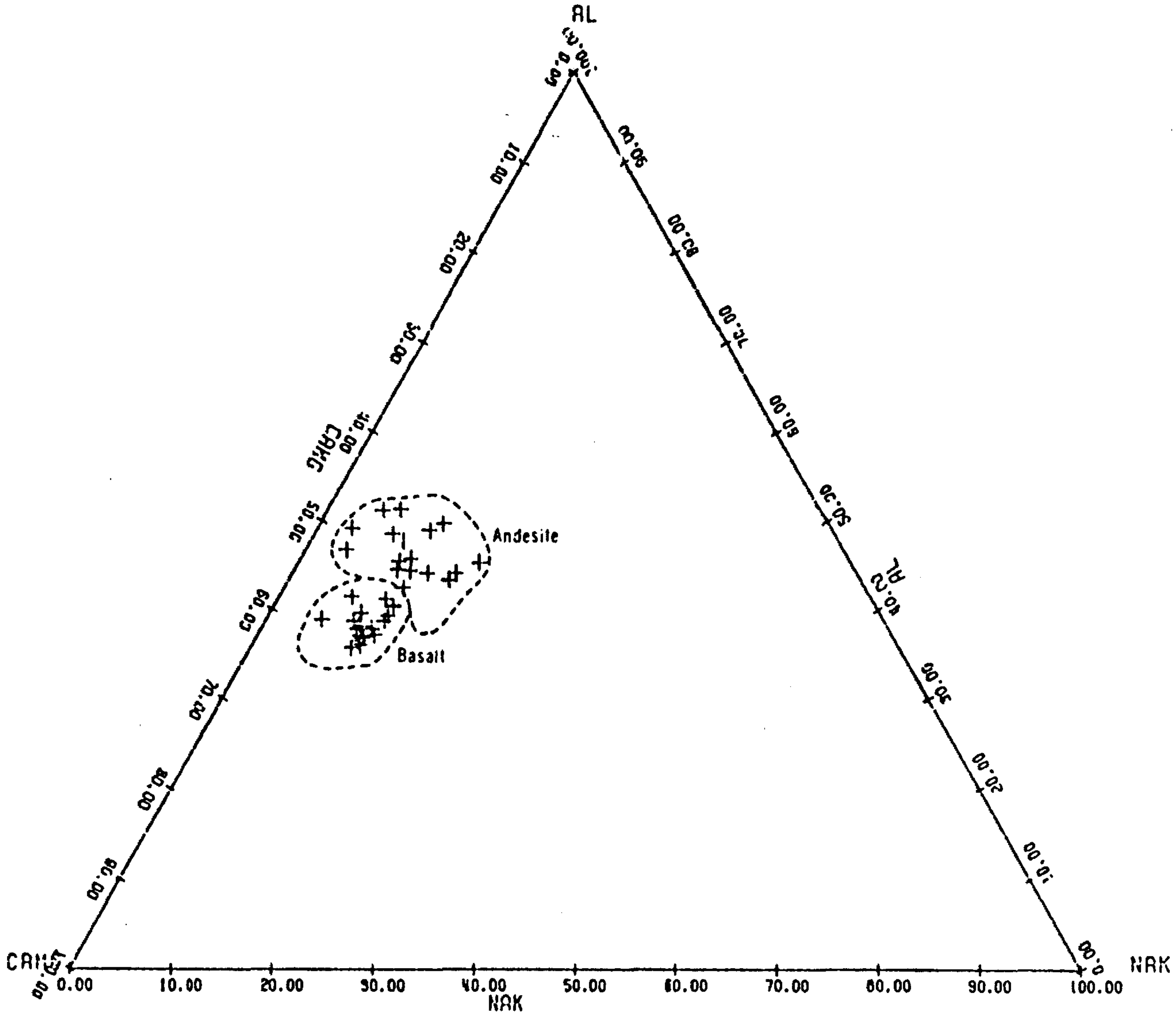

Al
A Granodiorite Field
B Andesite Field
C Basalt Field
Rhyolite
A
Qtz Diorite
Granodiorite
Felsic
B
Gabbro
Sediment
Andesite
Basalt
Intermediate
"K" Granite
Qtz. Monzonite
C
Mafic
Ca+Mg
Na+K
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00

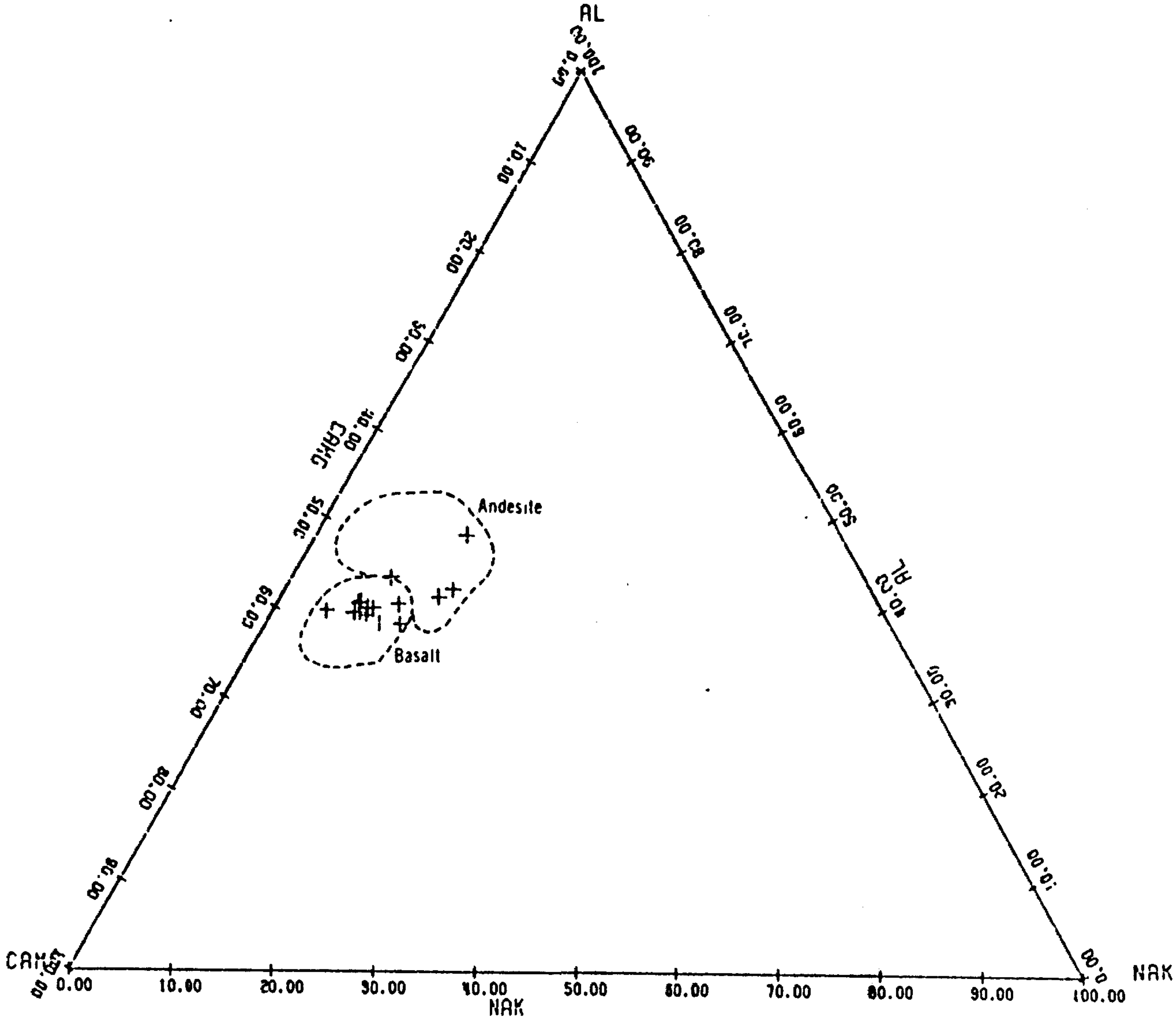
FIG. 1



MAFIC VOLCANICS FLOWS FIG. 2



MAFIC VOLCANICS CHLORITE SCHIST FIG. 3


AL
CAMG
NAK
Andesite
Basalt
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00

proportion of samples collected.

In the southeast portion of the property, these metavolcanics are intruded by the intrusive felsic unit.

Iron Formations

Interbedded with the mafic and intermediate metavolcanic sequence are magnetite-rich iron formations. These units are typically highly magnetic, fine-grained and well laminated, and range from less than 5 cm up to 1 metre in thickness. The iron formations, although numerous, were found to have a limited spatial distribution in the stratigraphic sequence on the property. Although surface exposure of the iron formation was similarly intermittent due to glacial cover, the magnetic data proved a useful tool in extending the surface mapping of the distribution of the iron formations.

Chemically, the iron formations sampled compare well with other Precambrian iron formations in that the Al, Na, K, Ti, P, Ca, Mg and Sr concentrations are low. Iron (as Fe) content of the samples ranges between 32.9% and 41.7%.

Foliated Felsic Intrusive Rocks

The felsic intrusion is located in the eastern and southeastern portion of the study area. Based on mineralogical studies (Bond, 1977), the felsic unit is granodioritic to quartz monzonitic in composition. Chemical data of samples collected on the property, illustrated in Fig. 1 , further support this rock type classification. The unit is massive and weathers light pink to white. It is generally medium-grained with coarser grained sections.

The contact of the granodiorite with the host mafic metavolcanics is marked by an altered sheared zone of granodiorite. This zone is characterized by alteration of the plagioclase feldspars, fractured quartz phenocrysts and a predominance of sericite with minor chlorite. Chemical data of samples from this contact zone are in close agreement with the data of the unaltered granodiorite (Fig.5). Mineralogically, the decrease in Na and K occurs due to the alteration of the plagioclase and some of the potassic feldspars. Sericite is the dominant alteration product. The sheared zone is foliated parallel to the contact with quartz grains being rounded and flattened parallel to foliation, rendering a quartz eye appearance. Minor sulphide mineralization in the form of pyrite and arsenopyrite is present. Alteration of the mafic metavolcanic host rock is marked by an increased zone of chloritization. The width of the altered zone, including both sheared granodiorite and altered host rocks, is variable but is generally about 30 metres. Stringers of the granodiorite are noted in the mafic metavolcanic units near the granodiorite contact.

Quartz Veins

The quartz veins sampled on the property vary from unaltered, highly siliceous and unmineralized to intensely altered, mineralized types. Figure 5 illustrates the position of the quartz veins relative to both the altered and unaltered granodiorite. No distinction between the altered and unaltered quartz veins is possible on this figure. This is due to the high silica content of both these groups, implying that any

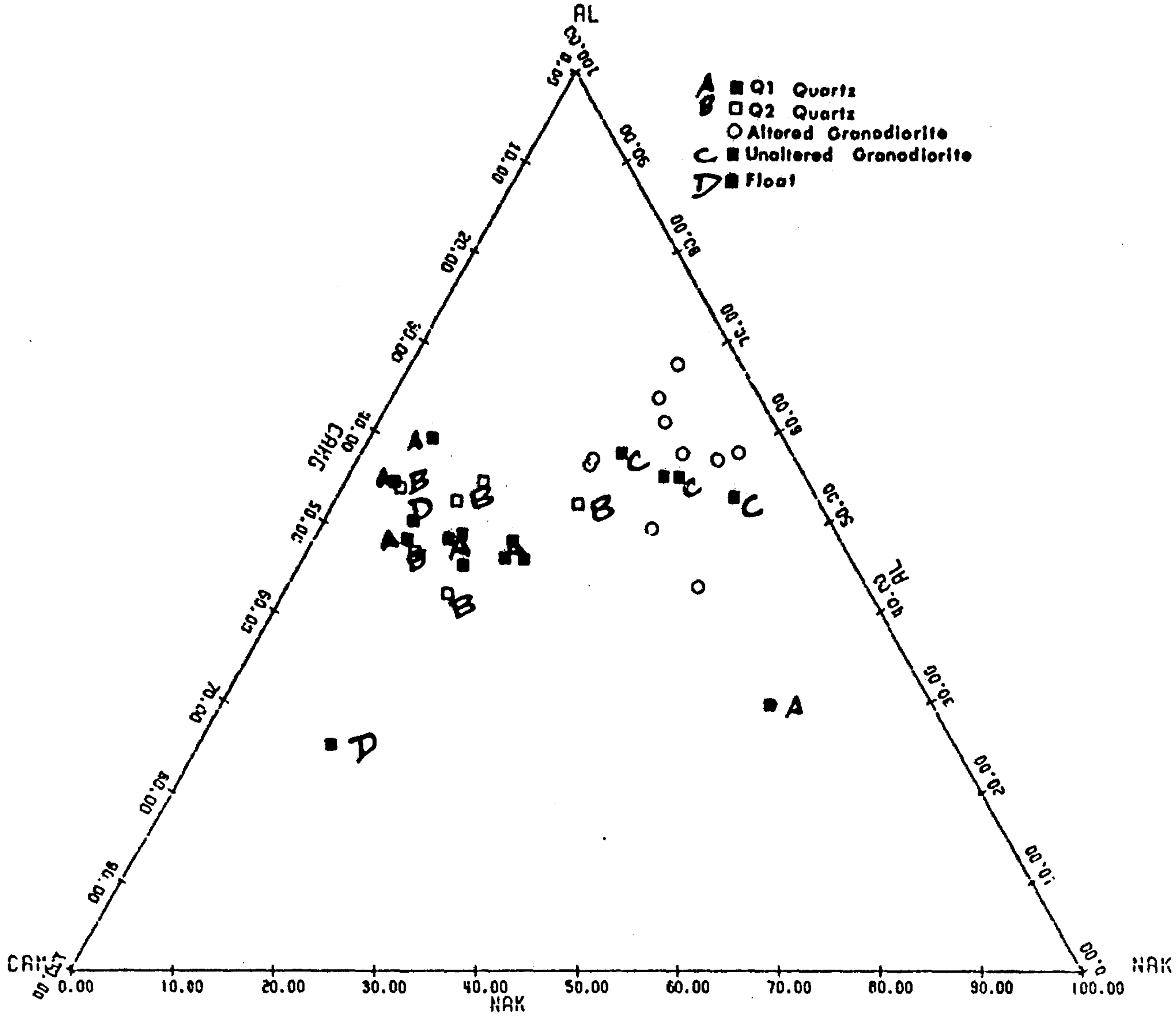

AL
A ■ Q1 Quartz
B □ Q2 Quartz
○ Altered Granodiorite
C ■ Unaltered Granodiorite
D ■ Float
CANK
NAK
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
A
B
C
D

FIG. 5

variations of the remaining major elements are of such a minor nature that their overall effect is small. Separation is, however, possible using the trace elements, as outlined in Table 2. On Map 1 the quartz veins have been separated into groups Q_1 and Q_2, based on degree of visible alteration and mineralization. Massive blebs, stringers and disseminated forms of mineralization are present and consist of pyrite, pyrrhotite, chalcopyrite, galena and minor sphalerite. Significant quantities of silver are also reported. Alteration in the form of sericite and chlorite in the contact zone between the quartz and host rock is variable, being most prominent about the Q_1 mineralized quartz veins to minor about the Q_2 mineralized quartz veins. Dissemination of sulphides into the wall rock is minor.

One of the mineralized quartz veins contained 7.06% copper, while another contained zinc and lead values of 4.95% and 4.03% respectively. Barren quartz veins contained copper, lead and zinc values of 6 ppm, 17 ppm and ND respectively.

Both Q_1 and Q_2 quartz veins are extensively clustered about fault traces and are most numerous where the structure is most complex, as in the area bounded by lines 1080 east and 1140 east between the base line and 200 south.

Unlike the Q_1 veins, the Q_2 veins appear to be more stratigraphically controlled and there is no distinguishable mineralogical alteration halo within the host metavolcanics.

TABLE 2. TRACE ELEMENTS, QUARTZ VEINS

Sample No.	Cu	Pb	Zn	Co	Ni	Ag	Cr	Sr
			(all values ppm)					
Q_2								
13	444	8	29	11	10	7	72	4
66	92	12	258	13	6	ND	65	5
67	30	ND	24	16	6	ND	59	1
70	107	74	41	38	16	ND	57	11
72	9	ND	30	ND	2	ND	59	3
73	811	193	54	10	12	ND	77	3
123	4	ND	26	8	3	ND	59	4
Q_1								
8	3590	935	277	ND	13	81	74	4
10	70600	477	825	95	26	171	88	3
18	1070	552	383	ND	5	10	73	3
27	1070	42	102	26	33	17	134	6
35	501	546	451	11	10	5	78	6
42	6330	1610	2650	15	18	46	143	16
43	982	106	74	ND	8	19	64	1
44	864	279	308	13	31	7	209	23
46	282	568	163	3	3	15	64	6
64	3700	40300	49500	40	11	180	67	4
65	285	1050	1880	ND	4	7	36	4
68	607	8160	2670	4	3	65	55	3

STRUCTURE

Schistosity

Schistosity (S_0) is poorly developed for the majority of the mafic sequences observed. The pillowed lavas and massive flows are for the most part featureless. Only at the contact between flows is S_0 developed. The chlorite schist, and to a lesser extent the "tuffaceous" units, exhibit well developed schistosity. The majority of the schistosity measurements were determined on these two units. Being essentially parallel to bedding, they provided some stratigraphic control in the otherwise massive units, especially where marker horizons such as the iron formation units were not present. Dips of the measured foliations were steep, varying ± 20° from vertical.

Folding

Micro-folds of carbonate and quartz lenses within the mafic metavolcanics, contorted configuration of the mapped iron formations and absence of a predominant S_1 cleavage indicate that the area of study has been subjected to one major period of folding, with possible minor secondary periods of folding. These features support the observations of Bond (1977), who reports only one major period of folding, having a northeast-southwest axis. He also reports that the tops of pillowed lavas to the southeast of the property indicate that the mafic sequences are overturned and are now facing northwest. This observation was confirmed on the property, where pillow tops indicate a "stratigraphic up" direction to the northwest. The general northeast-southwest direction of the chlorite schists, "tuffaceous" units and schistosity supports a similar trend of folds observed by Bond (1977).

Faulting

At least two periods of faulting can be identified on the property. The first period, confined to the mafic sequences, represents a major stage of uplift faulting, while the second, post intrusive stage, is typified by limited displacement strike-slip and uplift faulting.

The first period of faulting, having a general northwest-southeast trend, and being perpendicular to the major northeast-southwest fold axis, may therefore be related to, but later than, the period of folding. Although strike-slip movement may have occurred, the primary movement is believed to be that of uplift. The abrupt termination of rock types, and greater representation of varied rock types, on opposite sides of the fault, would tend to support this. The fault traces within the mafic sequences are also readily apparent on the magnetic data map, Map 2. The fault locations further explain the abrupt termination of the electromagnetic conductors.

The second period of faulting, having a northeast-southwest trend, is parallel to both the major Savant Lake fault and the major fold axis. The second set of faults is best illustrated in the felsic intrusion. On Map 1 only major traceable lineations within the granodiorite intrusion are marked. The northeast-southwest lineament of the granodiorite outcrop, expressed as ridges in the field, in places exceeding 10 metres in elevation, indicates an extensive period of faulting. These faults that are so pronounced in the granodiorite, may be present in the mafic sequence but are not as readily apparent. Minor shearing and silicification were noted along the fault traces. The lack of significant remobilization or introduction of fluids along the fault traces is supported by the continuity of magnetic data across the traces. Remobilization along the first period's traces may have occurred, but the relative movement in either the northwest-southeast or northeast-southwest direction is believed minor because the contact zone between mafic and granodiorite units is generally regular.

METAMORPHISM

The predominance of chlorite, and to a lesser degree, sericite, indicates a lower greenschist regional metamorphic grade in the area of study.

Bond (1977) reports local development of amphibolite-grade contact metamorphism along the boundary of the larger intrusive bodies to the south. Contact metamorphism of this grade was not observed in the study area.

GEOLOGIC HISTORY

GEOLOGIC HISTORY

The geologic history of the Savant Lake area, and more precisely the area within the claim block studied, is complex, involving a variety of geologic events. The inferred history of the property is outlined below, from youngest to oldest, relative to the present.

Muskeg, Alluvium	RECENT	PHANEROZOIC
Glaciation	PLEISTOCENE	
----------unconformity----------		
Quartz Veining (unmineralized)	ARCHEAN	PRECAMBRIAN
Faulting		
Felsic Intrusive (contact metamorphism)		
--------intrusive contact-------		
Quartz Veining (mineralized) (hydrothermal alteration)		
Faulting		
Folding (regional metamorphism)		
Mafic Volcanism (interbedded) - Flows (quiet) - Tuffs(explosive) - Iron Formation (quiet)		

The following discussion reverses the sequence given in the above table.

The predominance of massive flows and pillowed lavas implies a period of "quiet" volcanism intermittently interrupted by more explosive periods, indicated by the "tuffaceous" units.

Periods of quiescence are known to have occurred during the deposition of the mafic sequence, evidenced by the presence of iron formations. The rapid interchange of stratigraphic horizons in the vicinity of the iron formations, however, indicated that this quiescence was interrupted by periods of volcanism, in some cases explosive in nature.

The next major geologic event to affect the area of study was a period of folding occurring about a northeast-southwest trending axis that resulted in the development of very steep to isoclinal to overturned folds. This folding in turn resulted in the development of schistosity essentially parallel to bedding. Contemporaneous with the folding, regional metamorphism left primary structures of the sedimentary iron formations intact, permitting bedding - schistosity correlations.

Faulting accompanied the folding of the mafic sequence on the property and is marked by major northwest-southeast traces. Introduction of mineralized quartz veining accompanied the initial faulting stage, resulting in the hydrothermal alteration of the surrounding host rocks. The degree and extent of alteration is variable and is most extensive where clusters of veins occur. The period of faulting culminated with a major uplift, thrusting taking place along earlier formed fault fractures.

The next major geologic event to affect the study area was the intrusion of the granodiorite stock. The ensuing contact metamorphism resulted in intensified chloritization and sericitization of the wall rock at the contact. The intrusive contact is best illustrated by the abrupt termination of the iron formation units of the central grid area against the granodiorite. Subsequent faulting of the granodiorite stock may have resulted from either cooling or later periods of deformation. Some movement along the fault traces may have occurred although displacement along the granodiorite-related faults is not believed to be substantial.

Following the second period of faulting, a second set of unmineralized quartz veins (Q_2) were emplaced. A post granodiorite intrusion emplacement of these veins is suggested by their identification in the granodiorite mass (sample 123). These veins are similar to those described by Bond (1977), who believed them to be metamorphic in origin.

The effect of the granodiorite intrusion, faulting and introduction of the Q_2 veins on the Q_1 veins was extensive. The combination of these three events resulted in the intense shearing of the original mineralized Q_1 veins, giving them a false "pyroclastic" texture. Alteration is reflected in intense sericitization with minor chlorite.

Glaciation was the next event that affected the prospect area, resulting in the deposition of a coarse boulder till of varying thickness. Ribbed (washboard) moraines, located immediately to the east of the property, and glacial striations, indicate a south-southwest direction of ice movement. Numerous pieces of mineralized float material were located and subjected to chemical analysis. The chemical data indicates that at least two depositional environments are represented by the float, a hydrothermal environment similar to that present for the quartz veins, and a chemical precipitate type environment typical of the volcanogenic massive sulphide class. A more in-depth study of the mineralized float will be discussed in the forthcoming report on the geochemistry of the area.

Recent deposits of bogs and swamps are restricted to the north, east and south of the property and it is only along these property margins that the recent deposits become the major geographic feature.

All of which is respectfully submitted.

Yours very truly,

W. G. WAHL LIMITED

John L. Wahl

John L. Wahl, Ph.D.
Consulting Geologist

JLW/mhc

November 9, 1977

REPORT

ON

PHASE III

ROCK GEOCHEMICAL PROGRAMME

SAVANT LAKE PROJECT

November 23, 1977

W. G. Wahl Limited

Suite 1101, 302 Bay Street
Toronto, Ontario
M5H 2P3

November 23, 1977

Dr. E. L. Evans
Director of Exploration
Denison Mines Limited
P. O. Box 40
Royal Bank Plaza
Toronto, Ontario
M5J 2K2

Dear Dr. Evans:

Submitted herewith is our report entitled

PHASE III

ROCK GEOCHEMICAL PROGRAMME

SAVANT LAKE PROJECT

The rock geochemical programme identified the granodiorite intrusive and the Q_1 quartz veins as sources of hydrothermal alteration, and the existence of patterns characteristically associated with massive sulphide mineralization of the sedimentary volcanogenic type. The hydrothermal alteration was identifed on the basis of major element concentration variations.

Two prominent massive sulphide-related alteration patterns were identified on the property. Representations of areas of alteration that occupy both proximal and distal positions relative to the primary vent area, the most favourable location for sulphide deposition, were recognized. The absence of any pronounced trace element alteration within the major element alteration zone, especially in the proximal location, indicates that the primary vent is located at depth. This supports the geophysical data where deep plunging sources are indicated. From the rock geochemical data a depth to the source of alteration is believed to be not in excess of 120 metres.

The mineralized lead-silver float was found to be similar to the Q_1 quartz veins distributed throughout the claim block in both degree of alteration and mineralization.

It is recommended that the geophysical conductors be re-surveyed with the MaxMin II electromagnetic system, employing various frequencies and cable lengths to arrive at a more quantitative estimation of the source geometry.

It is further recommended that the Q_1 quartz vein material already collected be subjected to additional analytical determinations, for gold. If significant amounts of gold were to be found, further field evaluation of the quartz vein systems located on the property would be warranted.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF MAPS

(in back pocket)

INTRODUCTION

INTRODUCTION

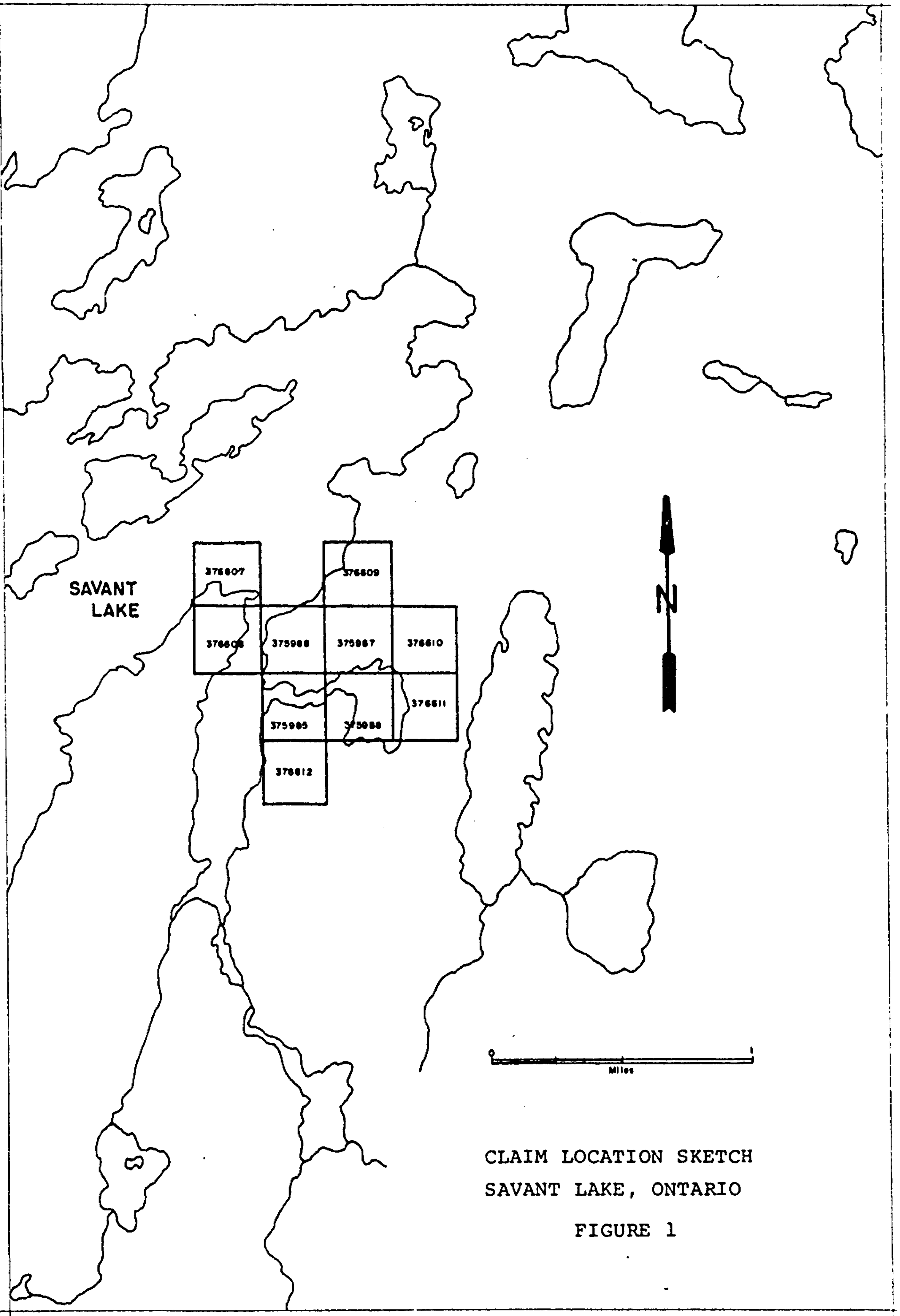
LOCATION AND ACCESS

The Savant Lake Claim Block is located on the eastern shore of Savant Lake, approximately 70 air miles northeast of Sioux Lookout, Ontario, and is most easily accessible by charter aircraft from Sioux Lookout. It lies within NTS Nos. 52 J/8 and 9.

GENERAL

The rock geochemical programme discussed in this report, completed by W. G. Wahl Limited in 1977, was part of an integrated geophysical, geological and geochemical programme initiated to evaluate the economic potential of the Savant Lake area.

The rock geochemical survey carried out over the Savant Lake property and surrounding area involved the collection of 174 rock samples, the locations of which are given on Map 1 (refer to Appendix I for Sample Collection and Preparation). Each sample was crushed and ground to -200 mesh, and subjected to a complete $HF-HClO_4-HNO_3$ acid digestion (refer to Appendix II for Sample Digestion and Instrument Parameters). The resulting sample solutions were analysed on a Plasma Torch Emission System from which element determinations for Al, Ti, Fe, Na, K, Ca, Mg, Mn, P, Cu, Pb, Zn, Co, Cr, Zr, V, Sr, Cd and Be were made. Sample variation and reproducibility during the analytical period was monitored by the ingestion of standard



CLAIM LOCATION SKETCH
SAVANT LAKE, ONTARIO

FIGURE 1

samples at the beginning, throughout and at the end of the run (refer to Appendix III for Sample Variation and Reproducibility). A total of 3,298 units of analytical data were acquired and are tabulated as to rock type in Appendix IV.

GENERAL GEOLOGY

Archean mafic and intermediate volcanic rocks of basaltic-andesitic composition are present as massive fine-grained pillowed lavas, chlorite schists and medium-grained tuffs. These rock types represent the majority of the volcanic rocks in the study area. Discontinuous magnetite-rich iron formations are present and represent the only reliable marker horizon within the otherwise massive mafic volcanics. Numerous quartz veins of varying width and mineralization also occur. The other major rock type, also Archean in age, is a large felsic (granodiorite) intrusive, restricted to the east and southeast portion of the study area.

Mineralization, in some cases significant, is predominantly associated with the quartz veins, and minor concentrations of disseminated pyrite were noted in the mafic volcanic rocks.

ROCK GEOCHEMISTRY

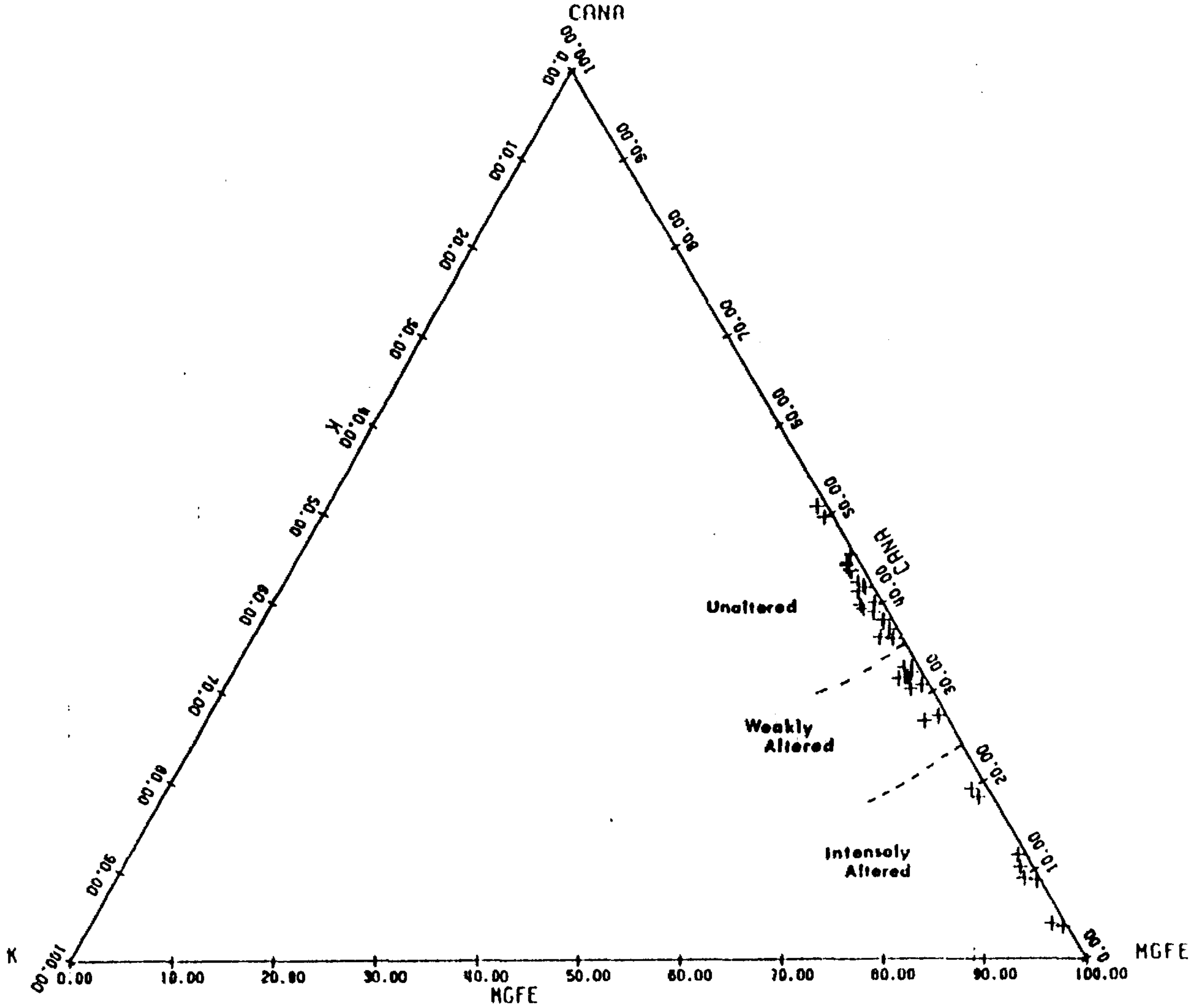
ROCK GEOCHEMISTRY

GENERAL

The employment of rock geochemistry for exploration is based on the ability of this technique to detect specific element distribution patterns within rocks that can be directly to the presence of ore forming processes. Maximum chemical variations occur from processes that result in the formation of new minerals and/or the destruction of pre-existing minerals. Of the ore forming processes, the movement of hot hydrothermal fluids are known to result in extensive mineralogic changes, a fact that is reflected in the chemistry of the rocks through which the fluids pass. Formation or destruction of minerals requires the movement either into or out of the system of the major rock forming elements Ca, Na, K, Mg, Fe, Al and Ti. Geochemical studies of hydrothermal alteration have demonstrated that of these elements, Al and Ti remain virtually unchanged while Ca and Na characteristically decrease in concentration and Mg, Fe and K increase in concentration. Mineralogically the decrease in Na and Ca is reflected in the destruction of feldspars, predominantly the plagioclase, while the increase in K, Mg and Fe is reflected predominantly in the development of chlorite and sericite. The recognition of these general characteristic distribution patterns provides a means for a rapid testing of chemical data derived from rock samples. Plotting of unknown data on a triangular diagram with apices of Na + Ca, Mg + Fe, and K, would show those samples that have been intensely altered by hydrothermal activity to lie in the Mg + Fe field while those samples exhibiting unaltered or regional character would be shown to lie outside this range.

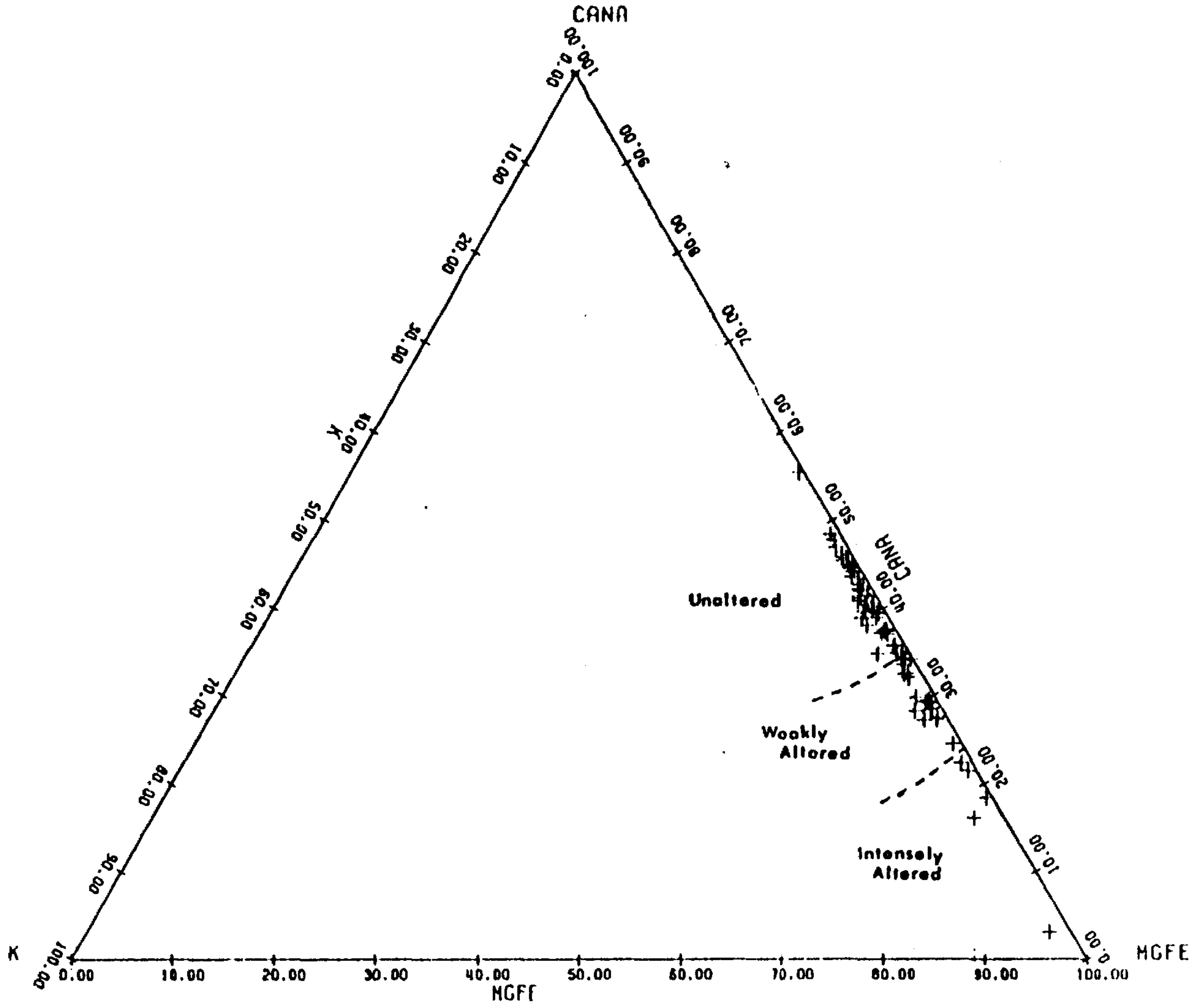
The distribution of the Savant Lake basaltic and andesitic samples on such a diagram are given on Figures 2 and 3. It is apparent from the distribution that the majority of both the basaltic and andesitic rock units, within and about the immediate vicinity of the property, fall in a tightly grouped area of the plots equivalent to unaltered or regional samples. The inherently low concentration of K in mafic volcanic rocks is reflected in the clustering of the samples along the Mg + Fe and Na + Ca side of the plot. Despite the concentration of samples within the unaltered range there is also a pronounced scattering of samples trending from the unaltered range toward and terminating in the intensely altered field. Such a scattered distribution is strongly suggestive of an increasing degree of hydrothermal alteration.

Alteration is further indicated by the respective major element frequency percent histograms given on Figures 4 through 7 inclusive. For those major elements, Fe, Mg and K, that typically increase with proximity to an alteration zone, the distributions are marked by pronounced negative skews for Fe and K, for both rock types. The Mg population is also negatively skewed, but the skew is less pronounced than that of the Fe and K. These distributions are indicative of an addition in element concentrations due to secondary processes. For the major elements that decrease with proximity to an alteration zone, Ca and Na, a positive skewed distribution is apparent. The degree of skewness is significantly greater for Ca and Na.



ANDESITES

FIG 3 2



BASALTS

FIGURE 3

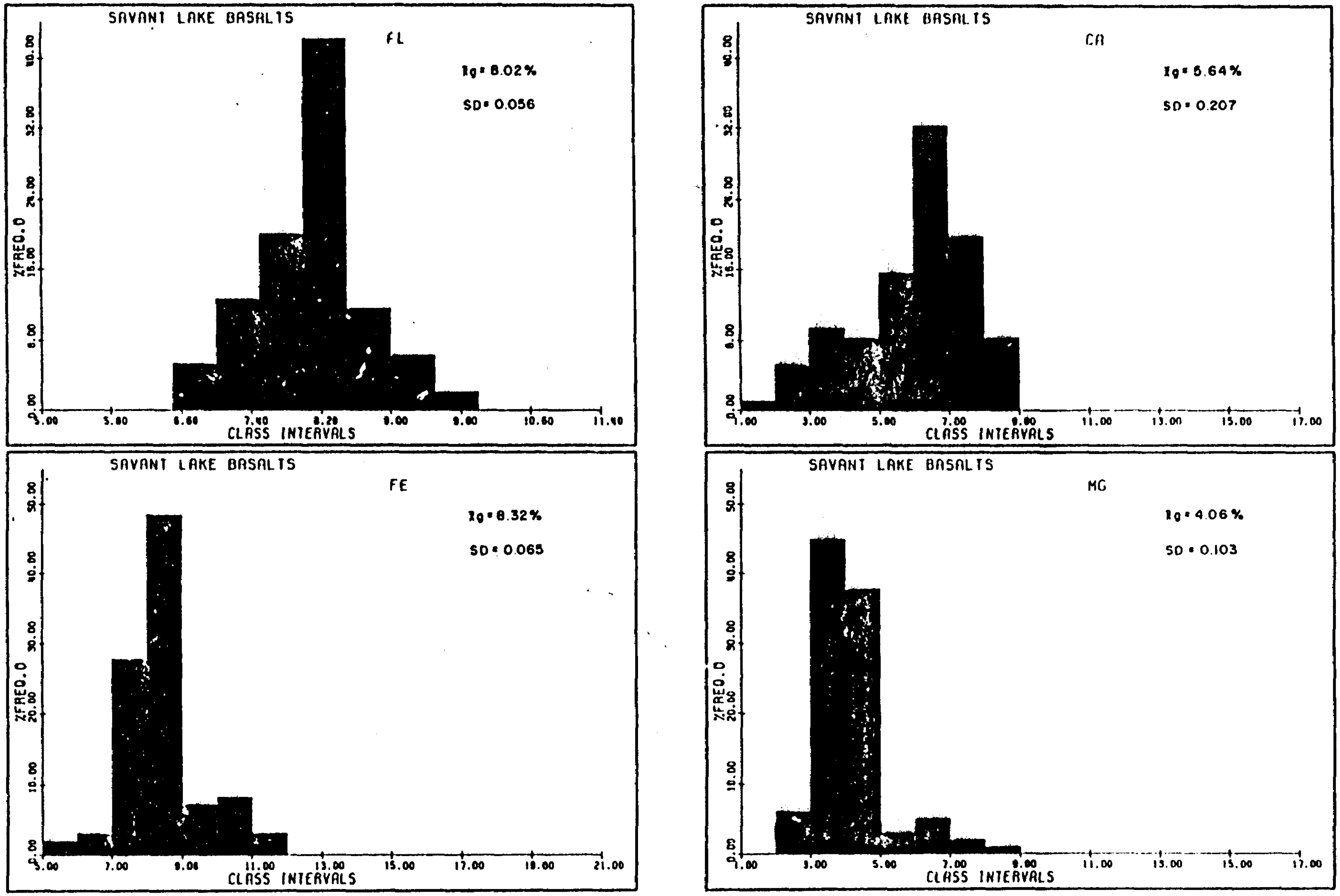

SAVANT LAKE BASALTS
AL
x̄g= 8.02%
SD= 0.056
%FREQ.O
0.00
8.00
16.00
24.00
32.00
40.00
5.00
5.80
6.60
7.40
8.20
9.00
9.80
10.60
11.40
CLASS INTERVALS
SAVANT LAKE BASALTS
CA
x̄g= 5.64%
SD= 0.207
%FREQ.O
0.00
8.00
16.00
24.00
32.00
40.00
1.00
3.00
5.00
7.00
9.00
11.00
13.00
15.00
17.00
CLASS INTERVALS
SAVANT LAKE BASALTS
FE
x̄g= 8.32%
SD= 0.065
%FREQ.O
0.00
10.00
20.00
30.00
40.00
50.00
5.00
7.00
9.00
11.00
13.00
15.00
17.00
19.00
21.00
CLASS INTERVALS
SAVANT LAKE BASALTS
MG
x̄g= 4.06%
SD= 0.103
%FREQ.O
0.00
10.00
20.00
30.00
40.00
50.00
1.00
3.00
5.00
7.00
9.00
11.00
13.00
15.00
17.00
CLASS INTERVALS

FIGURE 4

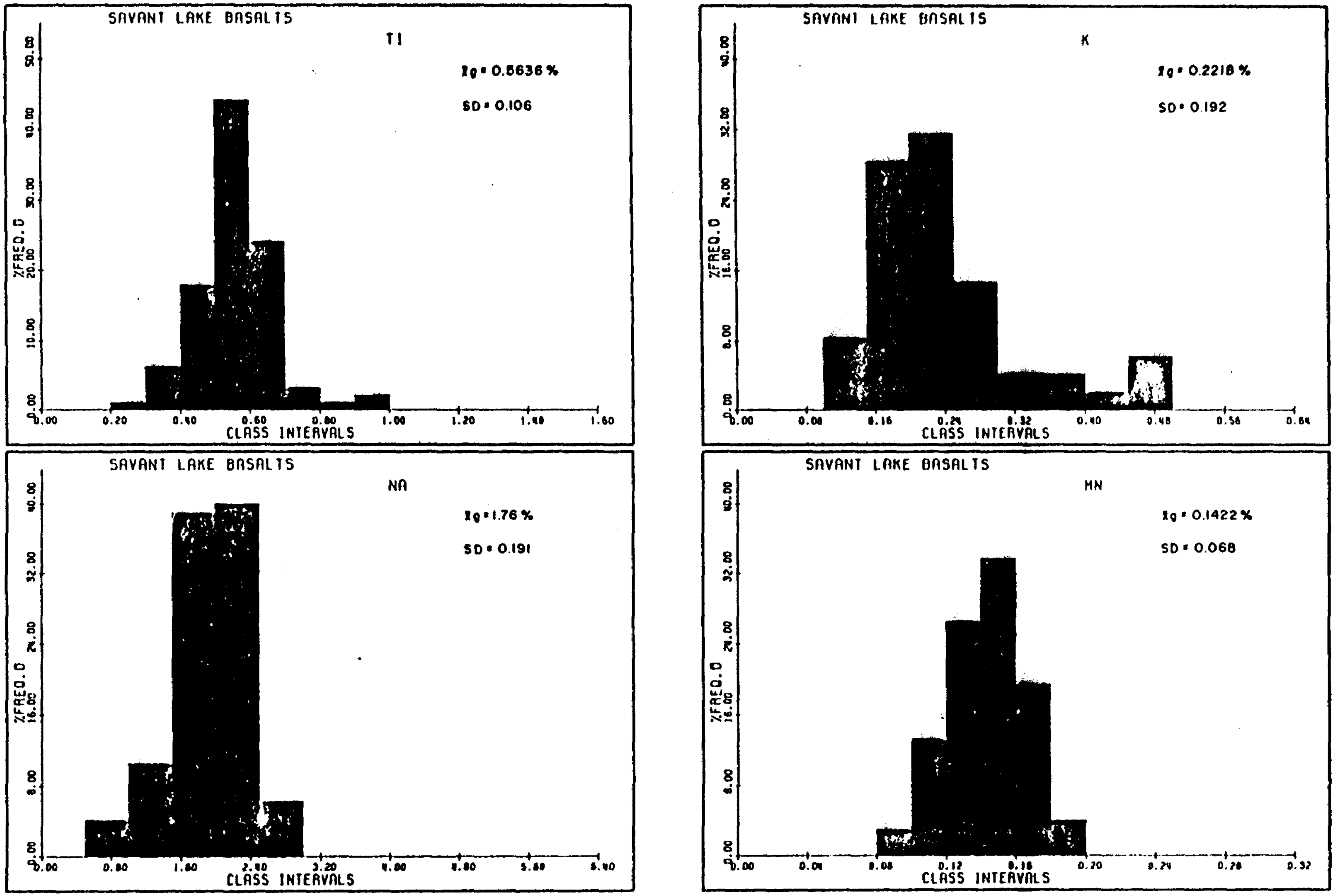

SAVANT LAKE BASALTS
TI
x̄g = 0.5636 %
SD = 0.106
%FREQ.D
0.00
10.00
20.00
30.00
40.00
50.00
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
CLASS INTERVALS
SAVANT LAKE BASALTS
K
x̄g = 0.2218 %
SD = 0.192
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
0.64
CLASS INTERVALS
SAVANT LAKE BASALTS
NA
x̄g = 1.76 %
SD = 0.191
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
0.80
1.60
2.40
3.20
4.00
4.80
5.60
6.40
CLASS INTERVALS
SAVANT LAKE BASALTS
MN
x̄g = 0.1422 %
SD = 0.068
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
0.04
0.08
0.12
0.16
0.20
0.24
0.28
0.32
CLASS INTERVALS

FIGURE 5

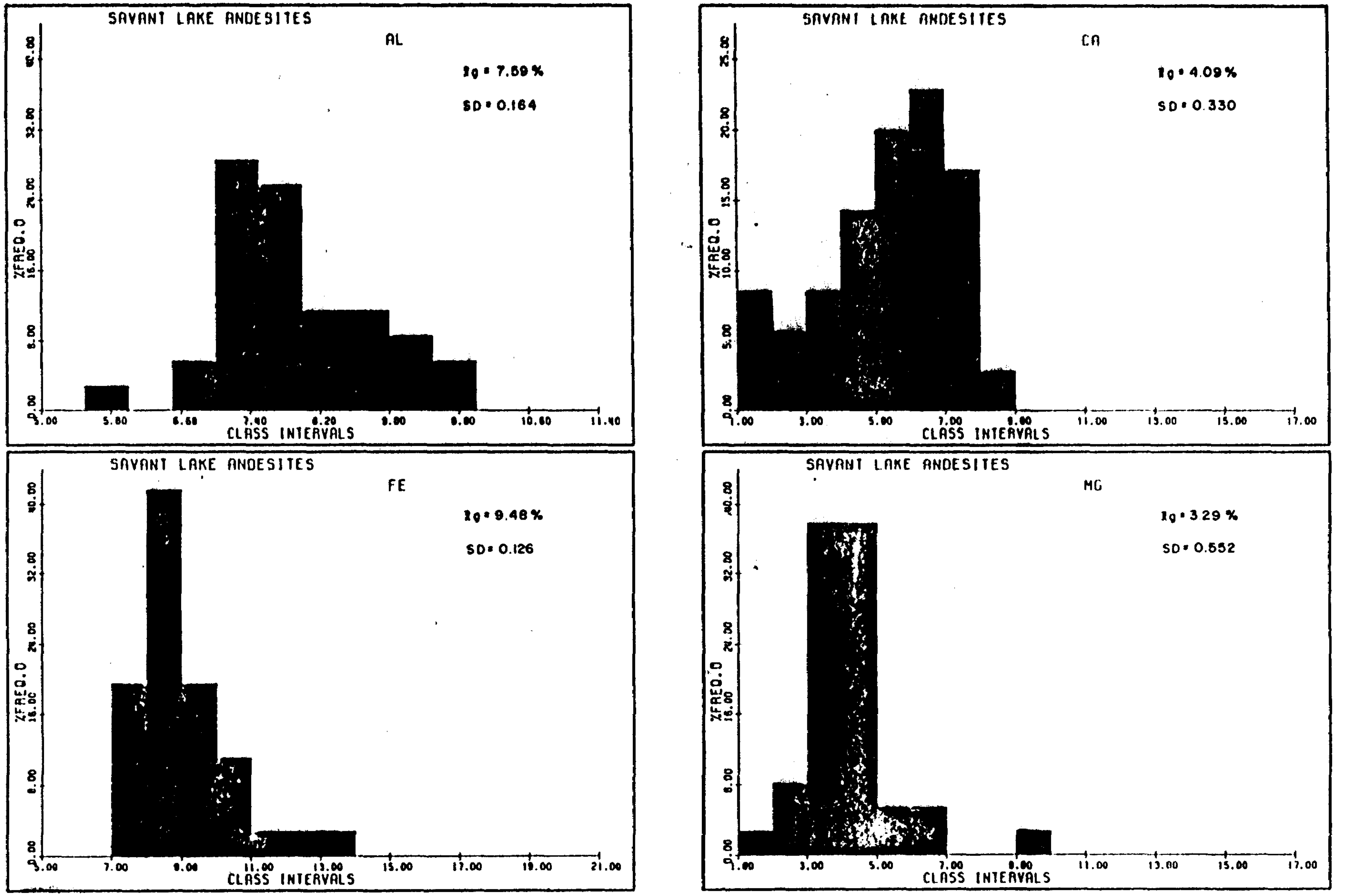

SAVANT LAKE ANDESITES
AL
x̄g = 7.59 %
SD = 0.164
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
5.00
5.80
6.60
7.40
8.20
9.00
9.80
10.60
11.40
CLASS INTERVALS
SAVANT LAKE ANDESITES
CA
x̄g = 4.09 %
SD = 0.330
%FREQ.D
0.00
5.00
10.00
15.00
20.00
25.00
1.00
3.00
5.00
7.00
9.00
11.00
13.00
15.00
17.00
CLASS INTERVALS
SAVANT LAKE ANDESITES
FE
x̄g = 9.48 %
SD = 0.126
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
5.00
7.00
9.00
11.00
13.00
15.00
17.00
19.00
21.00
CLASS INTERVALS
SAVANT LAKE ANDESITES
MG
x̄g = 3.29 %
SD = 0.552
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
1.00
3.00
5.00
7.00
9.00
11.00
13.00
15.00
17.00
CLASS INTERVALS

FIGURE 6

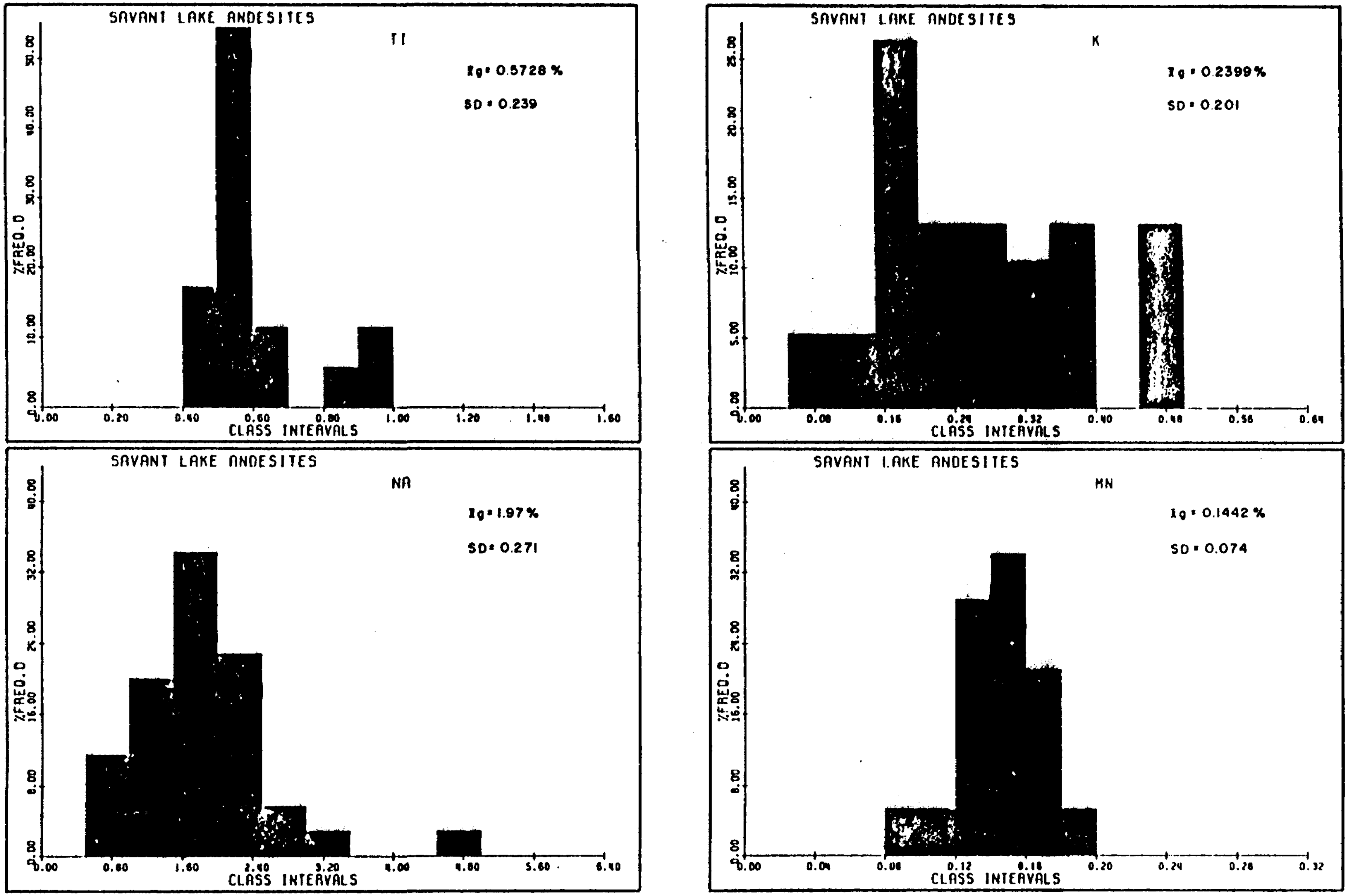

SAVANT LAKE ANDESITES
TI
x̄g = 0.5728 %
SD = 0.239
%FREQ.D
0.00
10.00
20.00
30.00
40.00
50.00
CLASS INTERVALS
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
SAVANT LAKE ANDESITES
K
x̄g = 0.2399 %
SD = 0.201
%FREQ.D
0.00
5.00
10.00
15.00
20.00
25.00
CLASS INTERVALS
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
0.64
SAVANT LAKE ANDESITES
NA
x̄g = 1.97 %
SD = 0.271
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
CLASS INTERVALS
0.00
0.80
1.60
2.40
3.20
4.00
4.80
5.60
6.40
SAVANT LAKE ANDESITES
MN
x̄g = 0.1442 %
SD = 0.074
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
CLASS INTERVALS
0.00
0.04
0.08
0.12
0.16
0.20
0.24
0.28
0.32

FIGURE 7

To determine the areal distribution of those samples that reflect weak to intense alteration, the Mg + Fe contribution to the triangular plot for each sample was plotted on the surface geologic map in an attempt to delineate any distinguishable patterns and to possibly explain the cause of the apparent alteration (Map 2).

QUARTZ VEIN RELATED ALTERATION

The surface geologic mapping carried out over the study area revealed that two distinct quartz vein systems were present and that each system represented a separate mode of formation. Segregation into groups was made on degree of visible mineralogic alteration and amount of mineralization. The earliest emplaced group of quartz veins, designated Q_1, were highly mineralized and exhibited a high degree of mineralogic alteration. The second or later group of quartz veins, designated Q_2, were generally unaltered and carried only minor amounts of ore elements. The mafic wall rocks enclosing the Q_1 veins exhibited pronounced mineralogic alteration whereas the mafic wall rock enclosing the Q_2 veins exhibited no detectable mineralogic alteration features. On the basis of the noted differences between the two quartz vein systems a hydrothermal origin of the Q_1 veins was suggested, while the mode of formation of the Q_2 veins was suggested to be a result of regional metamorphic processes.

The rock geochemistry of the mafic wall rocks reaffirms these hypotheses. Two supportive examples are given by the geochemical data derived from the mafic wall rock enclosing the quartz veins represented by sample 27 and sample 8. These two examples were chosen on the basis of their location, that is, remote from any other possible source of alteration. Sample 27 is representative of a Q_2 unmineralized vein and the geochemical data derived from the mafic wall rock (sample 28) exhibits no major element alteration characteristics. Sample 8, however, represents a Q_1 mineralized vein within an enclosing mafic wall rock (sample 9) which exhibits an intense degree of major element variations characteristically associated with hydrothermal alteration. The area of influence of the hydrothermal activity associated with the Q_1 veins is not believed to exceed 30 metres on either side of the vein. The recognition of altered mafic rock associated with the quartz veins explains several of the samples classified as weakly and intensely altered based on major element concentrations identified on the property.

GRANODIORITE RELATED ALTERATION

The granodiorite intrusive results in further hydrothermal alteration of the mafic volcanic rocks identified on the property. Samples 121 and 125 were collected in close proximity to the granodiorite contact and both exhibit an intense degree of alteration based on major element concentrations. With increasing distance from the contact, for example sample 118, degree of alteration decreases. The lack of any detectable degree of alteration in samples 25, 30 and 31, located in the vicinity of the suspected northern intrusive contact implies that hydrothermal activity associated with the granodiorite intrusive does not extend any significant distance into the wall rocks. This conclusion supports the geologic findings where only minimal host rock mineralogic alteration attributable to the granodiorite intrusion was noted.

The minimal apparent hydrothermal alteration associated with the granodiorite intrusion indicates that the large anomalous mineralogic and geochemical zone about the Q_1 and Q_2 quartz vein concentration located between Line 1020 East and Line 1080 East and the Base Line and Line 200 South is not due to any significant degree to the granodiorite intrusive but is a result of hydrothermal activity associated with the formation of the Q_1 quartz veins.

MASSIVE SULPHIDE RELATED ALTERATION

The data discussed in the preceeding sections enabled the source determination of several of the weakly and intensely altered samples identified on the property. However, a significant number of altered samples remain to be explained. Although sporadic anomalous values are expected in any normal population, the concentration in a given area of a significant number of samples which were classified as weakly or intensely altered warrants further study. Several such sample concentrations present on the property can not be adequately explained by the presence of either the quartz veins or the granodiorite. It is these anomalous grouping of weakly and intensely altered samples for which a primary sulphide-bearing fumerolic source is suggested. Two areas in particular form the basis of the following discussion.

One of these areas is located in the vicinity of the main concentration of iron formations centered about Lines 1320 East and 1380 East and north of the Base Line to the lake. The iron formations, by their very nature of formation, mark a horizon along which conditions compatible with sulphide deposition are known to occur. The presence of the iron formation also indicates that significant amounts of iron were present at a time of deposition, the source of which may be volcanic. Further, iron formations provide stratigraphic control in that they are always located stratigraphically above and/or laterally from massive sulphide concentrations. On the basis of geologic data, a stratigraphic younging direction for the map area was determined to be to the northwest. To the south of the iron formation, which would be the footwall rocks by this geologic interpretation, the geochemistry of the mafic volcanic rocks outlines a broad zone of samples that exhibit weak to intense alteration characteristics. In this zone the degree of alteration increases with proximity to the iron formations. To the north of the iron formations the mafic volcanic rocks exhibit regional chemical characteristics. Knowing that primary alteration is present in all cases in the footwall, the geologic interpretation with respect to stratigraphy is confirmed by the geochemistry. The width of the alteration zone delineated does not extend more than 100 metres into the footwall suggesting a position for this area that is distal to the fumerolic vent. Similarly the iron formation located about Line 600 East and the Base Line indicates a younging direction to the southwest by virtue of the alteration being present on the north side of the iron formation.

The second area of anomalous concentration of altered samples is tnat area bounded by the two faults running essentially parallel to Lines 720 East and 960 East and by the granodiorite in the southeast and by Savant Lake to the northwest. Dividing this area is a narrow stretch of water that forms the inlet of the small bay located to the south of the property. As will be demonstrated, distinct geochemical, geological and geophysical differences exist between the mafic volcanic rocks located to the northwest and southeast of this stretch of water, suggesting that a stratigraphic break occurs in this area. For these reasons and for ease of discussion, this area of the inferred stratigraphic break will be referred to as "The Narrows Break". The most apparent chemical differences between the north and south blocks is the greater percentage (80%) of the mafic volcanic samples identified to the south of The Narrows Break that exhibit weak to intense alteration characteristics. To the north of The Narrows Break the majority of the samples reflect unaltered or regional characteristics. The presence of a geophysically inferred iron formation located immediately to the north of The Narrows Break also suggests that a change in the depositional history occurs in this area. Further geophysical evidence for a stratigraphic break at The Narrows is implied by the identification of an electromagnetic conductive source following The Narrows Break. The anomalous samples located in the large area to the southeast of The Narrows Break suggest a stratigraphic position that is more proximal to the fumerolic vent than is present under the iron formation. It is therefore suggested that the mafic volcanic sequences located to the northwest of The Narrows Break represent hanging wall rocks while those to the southeast of The Narrows Break represent footwall rocks within close proximity to the primary vent. Although the varying degrees of alteration suggest proximity to a zone of alteration the geophysical data indicates the source of the identified conductors to be at a depth of at least 60 metres. The geochemistry supports this interpretation in that the primary vent and the area most likely to be associated with massive sulphides is also at depth. It is known that detectable major element alteration limits exceed those of the associated trace element alteration zone. Characteristically within the trace element alteration zone Cu, Pb, Zn, Co and Cr increase while Ni and Sr decrease. Erratic high values for those trace elements that increase characterize the trace element alteration zone resulting in a pronounced negative skew of the respective element frequency distribution. From the frequency percent histograms for these trace elements for both basaltic and andesitic rock types given on Figures 8 through 11 inclusive, no distribution patterns indicative of any significant element introduction is apparent for any of the samples collected. Conversely, for those elements which decrease, Ni and Sr, the decrease in concentration would result in a positive skew distribution. From the histograms only Sr exhibits a distinguishable positive skew which may be explained by Sr substitution for Ca in rock forming processes, in which case Sr would reflect similar alteration characteristics previously noted for Ca. Comparison of the respective Ca and Sr distributions supports this contention.

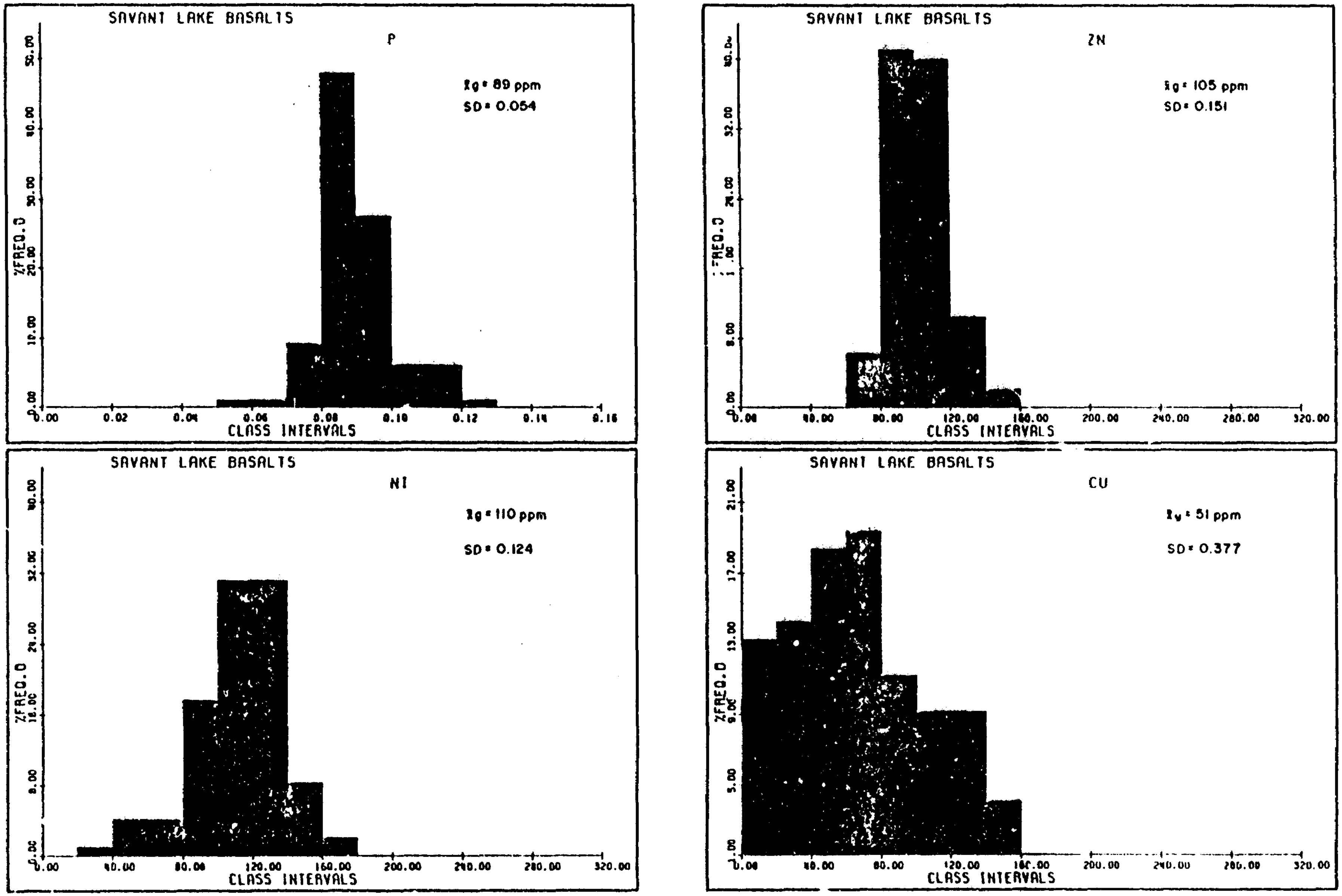

SAVANT LAKE BASALTS
P
x̄g = 89 ppm
SD = 0.054
%FREQ.D
0.00
10.00
20.00
30.00
40.00
50.00
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
CLASS INTERVALS
SAVANT LAKE BASALTS
ZN
x̄g = 105 ppm
SD = 0.151
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280.00
320.00
CLASS INTERVALS
SAVANT LAKE BASALTS
NI
x̄g = 110 ppm
SD = 0.124
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280.00
320.00
CLASS INTERVALS
SAVANT LAKE BASALTS
CU
x̄g = 51 ppm
SD = 0.377
%FREQ.D
1.00
5.00
9.00
13.00
17.00
21.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280.00
320.00
CLASS INTERVALS

FIGURE 8

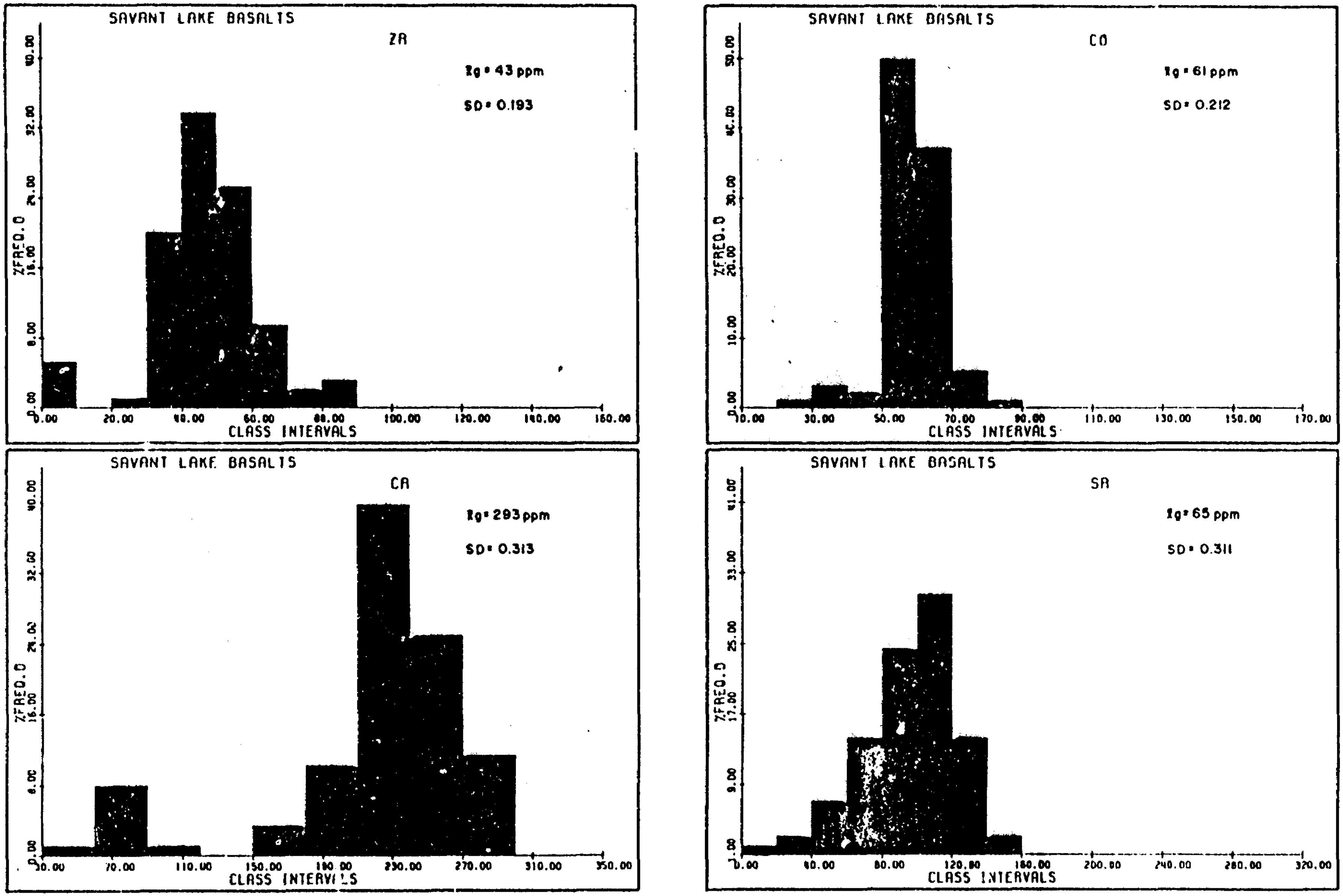

SAVANT LAKE BASALTS
ZR
x̄g = 43 ppm
SD = 0.193
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
CLASS INTERVALS
SAVANT LAKE BASALTS
CO
x̄g = 61 ppm
SD = 0.212
%FREQ.D
0.00
10.00
20.00
30.00
40.00
50.00
10.00
30.00
50.00
70.00
90.00
110.00
130.00
150.00
170.00
CLASS INTERVALS
SAVANT LAKE BASALTS
CR
x̄g = 293 ppm
SD = 0.313
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
30.00
70.00
110.00
150.00
190.00
230.00
270.00
310.00
350.00
CLASS INTERVALS
SAVANT LAKE BASALTS
SR
x̄g = 65 ppm
SD = 0.311
%FREQ.D
0.00
9.00
17.00
25.00
33.00
41.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280.00
320.00
CLASS INTERVALS

FIGURE 9

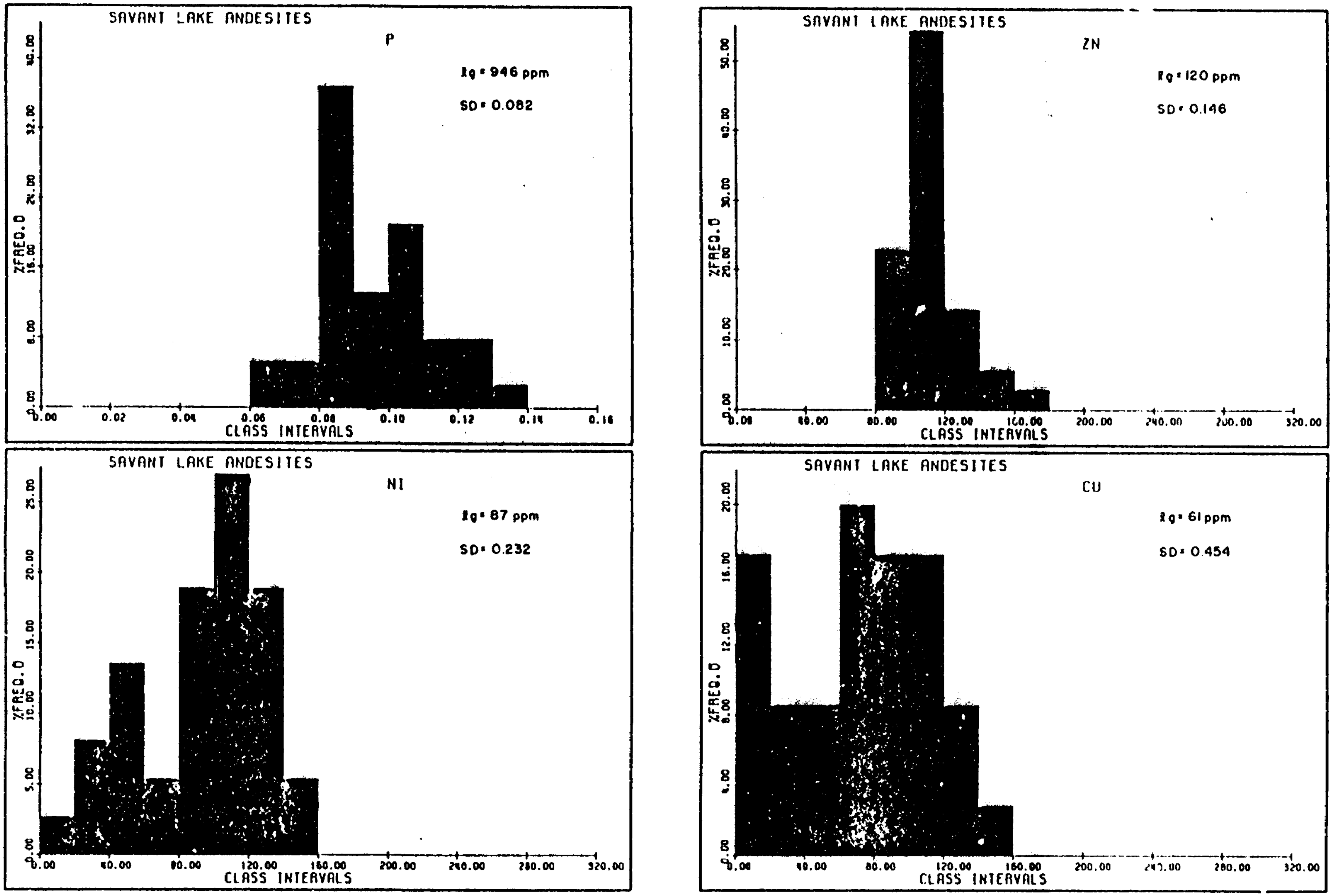

SAVANT LAKE ANDESITES
P
x̄g = 946 ppm
SD = 0.082
%FREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
CLASS INTERVALS
SAVANT LAKE ANDESITES
ZN
x̄g = 120 ppm
SD = 0.146
%FREQ.D
0.00
10.00
20.00
30.00
40.00
50.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280.00
320.00
CLASS INTERVALS
SAVANT LAKE ANDESITES
NI
x̄g = 87 ppm
SD = 0.232
%FREQ.D
0.00
5.00
10.00
15.00
20.00
25.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280.00
320.00
CLASS INTERVALS
SAVANT LAKE ANDESITES
CU
x̄g = 61 ppm
SD = 0.454
%FREQ.D
0.00
4.00
8.00
12.00
16.00
20.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280.00
320.00
CLASS INTERVALS

FIGURE 10

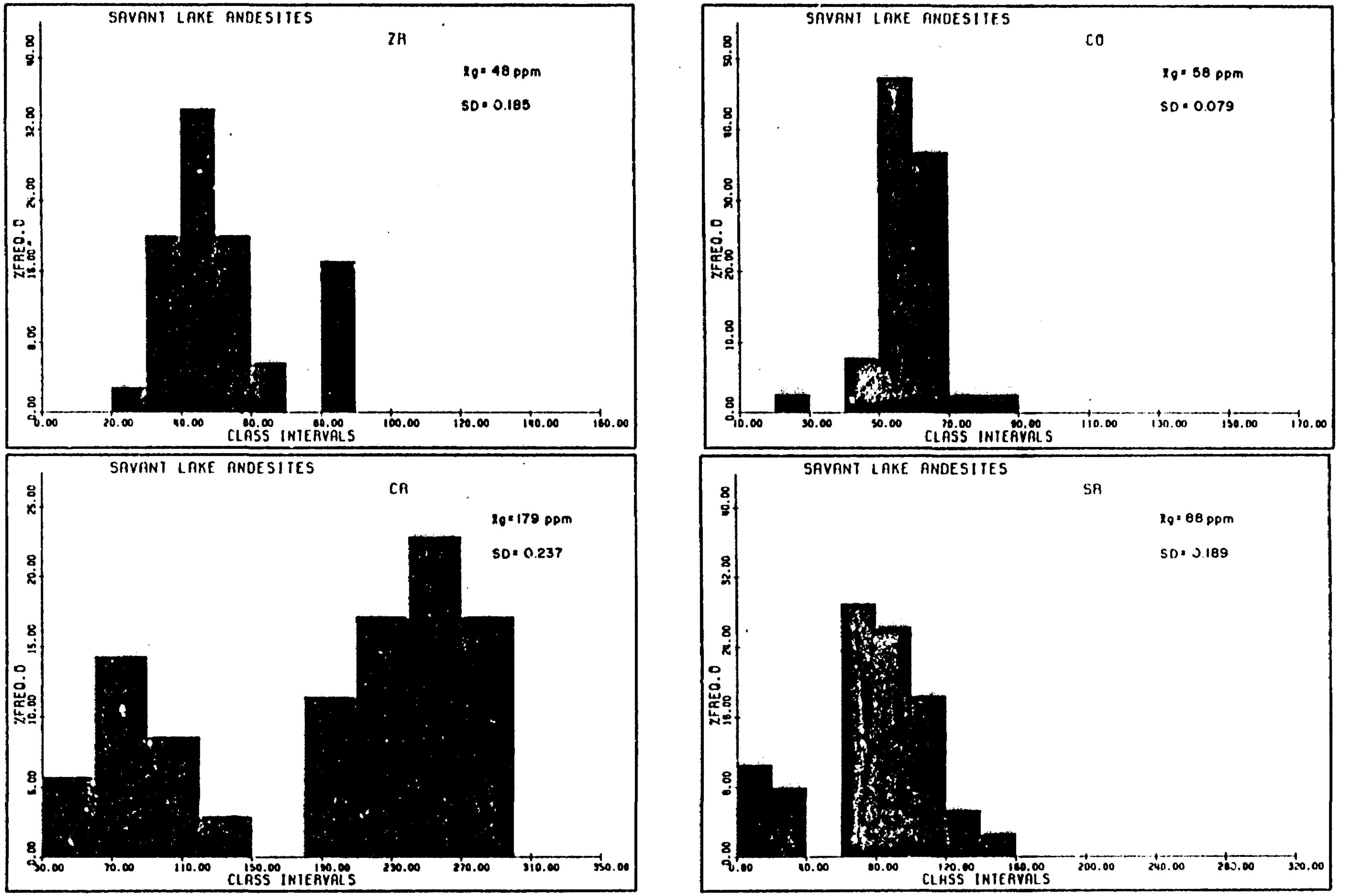
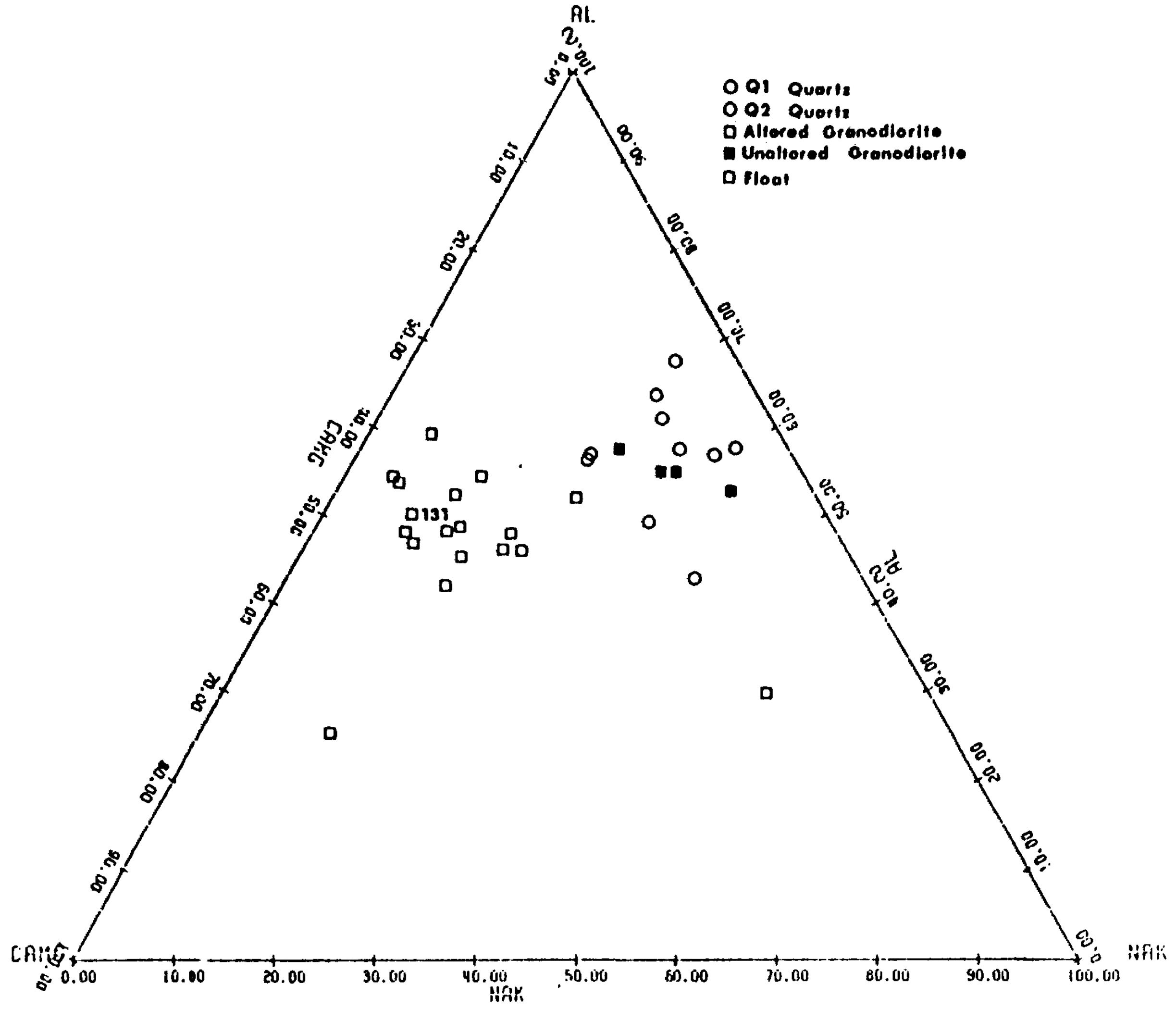

SAVANT LAKE ANDESITES
ZR
X̄g= 48 ppm
SD= 0.185
ZFREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
CLASS INTERVALS
SAVANT LAKE ANDESITES
CO
X̄g= 58 ppm
SD= 0.079
ZFREQ.D
0.00
10.00
20.00
30.00
40.00
50.00
10.00
30.00
50.00
70.00
90.00
110.00
130.00
150.00
170.00
CLASS INTERVALS
SAVANT LAKE ANDESITES
CR
X̄g= 179 ppm
SD= 0.237
ZFREQ.D
0.00
5.00
10.00
15.00
20.00
25.00
30.00
70.00
110.00
150.00
190.00
230.00
270.00
310.00
350.00
CLASS INTERVALS
SAVANT LAKE ANDESITES
SR
X̄g= 88 ppm
SD= 0.189
ZFREQ.D
0.00
8.00
16.00
24.00
32.00
40.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280.00
320.00
CLASS INTERVALS

FIGURE 11

The presence of massive sulphide mineralization in the vicinity of the study area was confirmed with the identification of numerous pieces of highly mineralized material along the northwest shore of The Narrows Break. The sulphides, predominantly pyrite, are well-bedded and although exhibiting a massive texture were found to possess low conductivity. Fourteen separate pieces of mineralized material were identified in the space of only 60 metres along the shore line. These mineralized samples were not in situ but are not believed to be glacially transported because of their location outside the primary glacial depositional area, absence of other glacial debris, angularity and limited distribution. Similar material was not identified either up or down ice from the area of sulphide concentration. Fragments of massive sulphide-rich material similar in appearance to that found on the beach were identified incorporated within nearby mafic volcanic rocks. The incorporation of sulphide rich material in a stratigraphically younger rock indicates a source of the sulphide material to be from a position immediately lower in the stratigraphic section. All indications, geological, geochemical and geophysical, would suggest that The Narrows Break is the most likely source area. Collection of this previously unknown sulphide material was facilitated by the unusually low water levels experienced in Savant Lake during the period of investigation. The low water levels also enabled sampling of a glacially transported boulder, sample 137, that exhibited prominent sedimentary bedding features. Sample 137 is located approximately 800 metres down ice from the area designated as The Narrows Break. Chemical analysis of the boulder proved to be siderite. With the identification of the sedimentary iron formation, the identification of laminated siderite-rich material can be easily reconciled with the massive sulphide genetic model. Deposition of the siderite and the iron formations would follow actual sulphide deposition.

MINERALIZED QUARTZ FLOAT AND QUARTZ VEINS

The final aspect of the geochemical study to be considered in this report deals with the mineralized float (sample 131) located to the south of the property. There has been extensive exploration for the source of this lead-rich material since its discovery in the early 1950's. In the area of study glacial striae and ribbed moraines indicate a southerly direction of ice movement. Utilizing chemical data of this sample and that of the other quartz-rich material collected on the property and plotting it on a triangular plot with apices Al, Mg + Ca and Na + K, Figure 12 illustrates that the float sample 131 falls in the distribution field of the other quartz material. This in turn indicates that the float is quartz vein material similar to that located on the property. In addition, the highly altered texture and significant mineralization suggest that the float boulder is representative of the Q_1 quartz vein variety. The highly variable trace element concentration experienced for the Q_1 veins identified on the property precluded precise designation of the source of the float. The trace element concentration within the float sample does however most approximate that of sample 64.



FLOAT

FIGURE 12

CONCLUSIONS

CONCLUSIONS

The completion of the rock geochemical survey marks the completion of the first stage of exploration for sulphide mineralization on the Savant Lake Claim Block. During this exploration a geophysical programme, geologic mapping and a rock geochemical survey were completed. The primary conclusions are given below.

GEOPHYSICAL SURVEYS

The electromagnetic surveys identified three major conductive zones, the causative bodies of which are believed to be massive sulphides that are at a depth of greater than 60 metres. The conductors are believed to be plunging to the south although precise determinations were not possible from the data due to the depth to the conductors being equal to or greater than the coil separation used during the survey. Reliable interpretation of the gradient magnetic data was not possible until completion of the geologic mapping, at which time re-evaluation of the data was possible.

The near shore location of the conductor following The Narrows Break (Conductor B) permitted both geological and rock geochemical interpretations to be related to this conductor. The locations of the remaining conductors, however, lying beneath Savant Lake and beyond the limits of interpretation of both the detailed geologic and rock geochemical surveys precluded a meaningful discussion at this time.

GEOLOGICAL MAPPING

The geological mapping determined that both an epigenetic environment and a syngenetic depositional environment occurred on the Savant Lake property.

Epigenetic mineralization in the form of pyrite, chalcopyrite, sphalerite and galena was noted in quartz veins. Although no surficial expression of syngenetic sulphide mineralization was found, the presence of iron formation suggests an environoment favourable to the deposition of massive sulphide type mineralization.

GEOCHEMICAL SURVEY

The rock geochemical programme identified the granodiorite intrusive and the Q_1 quartz veins as sources of hydrothermal alteration and the existence of alteration patterns characteristically associated with massive sulphide mineralization of the sedimentary volcanogenic type.

The alteration patterns on the property that are similar to those characteristically associated with massive sulphides were suggested as representing both distal and proximal alteration patterns. The distal alteration pattern was found to lie stratigraphically below the iron formations of the north-central portion of the claim block. The alteration exhibiting more proximal conditions was found to be located in the footwall rocks stratigraphically below a geologically anomalous stratigraphic break. The absence of any pronounced trace element alteration within the major element alteration zone indicates that the primary vent, and similarly the most likely location for sulphide deposition, is located at depth. This supports the geophysical data where a deep plunging source is indicated. From the rock geochemical data a depth to the source of the alteration is not believed to be in excess of 120 metres.

The mineralized lead-silver float was found to be similar to the Q_1 quartz veins distributed throughout the claim block.

RECOMMENDATIONS

RECOMMENDATIONS

The encouraging geophysical, geological and rock geochemical results obtained from this phase of exploration warrant continued work on the Savant Lake Claim Block.

It is recommended that the geophysical conductors be re-surveyed with the MaxMin II electromagnetic system, employing various frequencies and cable lengths to arrive at a more quantitative estimation of the source geometry.

Before further field work is undertaken with respect to the Q_1 quartz veins, it is recommended that additional analytical determinations for gold be made on the Q_1 quartz vein material already collected. This data would determine whether or not the primary Q_1 quartz vein solutions contain any gold with the copper, lead, silver and zinc already determined to be present. If significant amounts of gold were found, further field evaluation of the quartz vein systems located on the property would be recommended.

All of which is respectfully submitted.

Yours very truly,

W. G. WAHL LIMITED

John L Wahl

John L. Wahl, Ph.D.

Toronto, Ontario
November 23, 1977

JLW/mhc

APPENDIX I

SAMPLE COLLECTION AND PREPARATION

SAMPLE COLLECTION AND PREPARATION

1. Approximately 1 to 1.5 kg of rock were collected from each outcrop site. An attempt was made in all cases to collect material from below the weathered surface.
2. From each sample one piece was retained as a hand specimen for later reference.
3. Each sample was then crushed to 1/2 size and split several times to obtain a 50 gm homogenious sample.
4. The 50 gms were then ground to -200 mesh in a "puck and ring" grinder.
5. From this ground sample a 0.025 gm aliquot was used for digestion.

APPENDIX II

SAMPLE DIGESTION AND ANALYTICAL PRECISION

REPORT ON
MULTIELEMENT ANALYSIS BY RADIO FREQUENCY PLASMA EMISSION SPECTROSCOPY (MRFPES) OF ROCK POWDERS

PREPARED FOR
W. G. WAHL LTD.

This report describes the analytical procedures used for the analysis of rock powders sent to Barringer Research Limited, by Dr. John Wahl. It covers sample preparation and instrumental analysis by MRFPES.

I. SAMPLE PREPARATION

(a) 0 250 grams of sample were weighed out into a 30 ml. teflon beaker.

(b) Seven mls. of HF and 2.5 mls. of HNO_3-$HClO_4$ (3:2) were added.

(c) The mixture was refluxed for 2 hours then evaporated to dryness over medium heat.

(d) Another 2.5 mls. of HNO_3-$HClO_4$ were added, and the mixture evaporated to dryness until $HClO_4$ fumes disappeared.

(e) The residue was taken up in 4 percent HNO_3 and made up to 25 mls. in a volumetric flask.

(f) The resulting solution was used for multielement analysis.

II. INSTRUMENTAL PARAMETERS

An inductively coupled argon plasma was used in the spectroscopic excitation source, the emissions for which were quantified by a QA-317 optical emission spectrometer (Applied Research Laboratories). A radio frequency current, at a frequency of 27.12 MHz and power of 1,600 watts is supplied to a two turn induction coil that surrounds the quartz plasma torch.

The plasma gas flow is maintained at 1 l/min. and an outer shield of argon coolant at 10 l/min. isolates the plasma from the walls of the torch and keeps it from melting. Only high purity 99.999 percent argon (Liquid Carbonic) was used.

A cross flow nebuliser which requires argon at a pressure of 12 psi was used to aspirate the sample at 2 - 3 mls./min. The solution goes into a scaled-down Scott nebuliser chamber where the large droplets are removed by impaction, the very fine aerosols, (approximately 3 percent of the total amount nebulised) remaining is injected into the centre of the plasma by an argon carrier gas flow at 1.0 ± 0.1 l/min.

Emission measurements were made at a height of 16.5 mm above the induction coil. Optimisation of this observation position in the plasma is achieved by measuring the vertical and the horizontal profile of Mg emission.

The optical system consists of a 1-metre spectrometer, Paschen-Runge mounting, with an entrance slit of 12 microns and exit slits of 50 microns. It has a Bausch and Lomb grating with 1,960 grooves/mm. (blazed at 3,000 Å) giving a reciprocal linear dispersion of 5.1 Å/mm. and a spectral bandpass of 0.26 Å.

Emission signals were measured by multiplier photo tubes and their electrical outputs integrated over a 10-second period. Charge amplifiers for each element hold the signal for sequential transmission to an A/D converter and a digital data dump in millivolts (mv) is obtained from an HP-Thermoprinter, Model 9866.

The entire system is kept in a controlled environment room at 21° C ± 1° C and 50 percent relative humidity to minimise wavelength variations in the multi-channel optical system.

III. CALIBRATION AND SAMPLE ANALYSIS

Stock solutions for the preparation of multielement standards are prepared from Specpure or Analar grade reagents. The range of concentrations per element (typically 3 - 4 orders of magnitude above the detection limit) is designed to cover that normally expected in the samples being analysed. Samples that exceed the calibration range are diluted 1:10 or 1:100, using a Repipet automatic dilutor.

At the start of the day, the instrument is calibrated using a series of multielement standard solutions (to provide at least 3 calibration points, excluding the zero standard). A least-squares linear/parabolic fit is applied by a programmable Hewlett-Packard calculator, Model 9830, coupled to an HP Thermo-printer, Model 9866. The calibration coefficients are regularly updated throughout the day by aspiration of the standards.

Approximately one minute is required for the complete analysis of one sample. Uptake rate of the solution is 2 - 3 mls./min. A sample is first aspirated for 20 seconds before the emission signal is integrated for 10 seconds. At the end of the integration period, the integration signal is digitally transmitted to the calculator. The thermo-printer outputs in ppm of the analyte in solution, with the number of significant digits internally controlled by the calculator, based on the detection limits for that particular run.

Software developed by Barringer Research is used for further data reduction and data listing.

IV. DETECTION LIMITS

	µg/g (ppm)		µg/g (ppm)		µg/g (ppm)
Ag	10	Eu	10	Se	150
Al	1	Fe	1	Si	1
As	500	K	1000	Sn	500
Au	50	Mg	1	Sr	.1
B	15	Mn	5	Te	100
Be	.1	Mo	20	Ti	1
Ca	1	Na	1000	U	90
Cd	5	Ni	1	V	1
Co	2	P	1000	W	200
Cr	1	Pb	5	Zn	1
Cu	0.5	Ba	5		

The above detection limits in the solid samples were obtained by the method.

V. LITERATURE REFERENCES

1. Velmer A. Fassel and Richard N. Kniseley, "ICP-Optical Emission Spectroscopy", Analytical Chemistry, 46 (1974): 1110A - 1120A, 1155A - 1164A.

2. J. D. Winefordner, J. J. Fitzgerald, and N. Omenetto, "Review of Multielement Spectroscopic Methods", Applied Spectroscopy, 29 (1975): 369 - 383.

APPENDIX III

SAMPLE VARIATION AND REPRODUCIBILITY

SAMPLE VARIATION AND REPRODUCIBILITY

Element reproducibility and sample variation were monitored throughout the analytical process by the inclusion of replicate samples at the beginning of the analytical run, after every 35 samples during the run and again at the end of the run. For this monitoring process sample SL 1 was used for which six separately digested portions were required. The analytical results, for the replicate samples, are given on the accompanying table.

A high degree of reproducibility for the major elements, Al through P on the table, is indicated by the low standard deviation values calculated for these elements. For the trace elements, Cu through V on the table, the reproducibility is not as good as for the major elements and is reflected in the higher reported standard deviation values. These higher standard deviation values however, were not unexpected because the trace elements are generally present as or incorporated within sulphide complexes. In any particular sample the sulphides represent a heterogenic distribution resulting in inhomogeneities in the ground portion. It is these inhomogeneities that cause the greater variation of the trace element data.

STANDARD SL 1

		Al	Fe	Ca	Mg	Ti	Na	K	Mn	P
Concentrations percent	$\bar{x}g$	8.17	8.17	7.60	3.41	0.6223	2.30	0.2323	0.1393	0.0865
	SD	0.016	0.013	0.019	0.066	0.021	0.024	0.073	0.045	0.020
	Max	8.71	8.57	8.15	4.08	0.6592	2.45	0.2766	0.1581	0.0900
	Min	7.87	7.94	7.24	2.86	0.5848	2.14	0.1799	0.1219	0.0800
	Range	0.84	0.63	0.91	1.22	0.0744	0.31	0.0967	0.0362	0.0100

		Cu	Zn	Ni	Co	Cr	Zr	Sr	V
Concentrations (ppm)	$\bar{x}g$	65.0	102.0	102.0	84.0	350.0	59.0	316.0	192.0
	SD	0.117	0.020	0.025	0.397	0.397	0.500	1.149	0.418
	Max	87.0	105.0	109.0	540.0	600.0	60.0	---	302.0
	Min	39.0	93.0	92.0	55.0	228.0	30.0	103.0	27.0
	Range	48.0	12.0	17.0	485.0	372.0	30.0	---	275.0

$\bar{x}g$ = geometric mean
SD = standard deviation
Max = maximum
Min = minimum

COMPARATIVE DATA FOR U.S.G.S. AND C.R.M.P. ROCK STANDARDS
(MAJOR ELEMENTS, PERCENT)

	MgO		TiO_2		MnO	
	BRL	Recommended	BRL	Recommended	BRL	Recommended
AGV-1	1.39	1.49	1.06	1.08	0.095	0.098
RSD % *	1.6		4.4		1.3	
Δ %	-6.7		-1.9		-3.1	
BRC-1	2.70	3.28	2.18	2.23	0.174	0.176
RSD %	0.5		2.5		1.2	
Δ %	-18		-2.2		-1.1	
G-2	0.753	0.782	0.503	0.531	0.033	0.037
RSD %	1.4		1.2		0.5	
Δ %	-3.7		-5.3		-11	
GSP-1	0.965	0.957	0.691	0.699	0.040	0.044
RSD %	0.9		2.7		1.5	
Δ %	+0.8		-1.1		-9.1	
SY-2	2.10	2.66	0.132	0.15	0.292	0.32
RSD %	1.1		1.2		1.4	
Δ %	-21		-12		-8.8	

* n = 4

COMPARATIVE DATA FOR U.S.G.S. AND C.R.M.P. ROCK STANDARDS
(MAJOR ELEMENTS, PERCENT)

	SiO_2		Al_2O_3		Fe_2O_3		CaO	
	BRL	Recommended	BRL	Recommended	BRL	Recommended	BRL	Recommended
AGV-1	60.0	59.00	17.7	17.01	6.96	6.80	5.04	4.98
RSD % *	0.8		1.9		2.5		1.2	
Δ %	+1.6		+4.1		+2.4		+1.2	
BCR-1	55.6	54.48	13.6	13.66	14.6	13.51	6.82	6.95
RSD %	0.3		0.7		1.0		0.5	
Δ %	+2.1		-0.4		+8.1		-1.9	
G-2	69.9	69.19	16.2	15.34	2.67	2.77	1.96	1.99
RSD %	2.0		1.5		1.1		1.4	
Δ %	+1.0		+5.6		-3.6		-1.5	
GSP-1	67.7	67.28	15.9	15.12	4.49	4.33	2.05	2.03
RSD %	0.5		0		1.4		0.6	
Δ %	+0.6		+5.2		+3.7		+1.0	
SY-2	63.9	60.07	11.8	12.15	6.08	6.34	7.74	8.03
RSD %	0.9		1.1		1.2		1.1	
Δ %	+6.4		-2.9		-4.1		-3.6	

* n = 4

COMPARATIVE DATA FOR U.S.G.S. AND C.R.M.P. ROCK STANDARDS
(TRACE ELEMENTS, PARTS PER MILLION)

	Ba		Zn		Ni	
	BRL	Recommended	BRL	Recommended	BRL	Recommended
AGV-1	1290	1410	106	112	15	17.8
RSD %*	1.6		3.0		22	
Δ %	-9.5		-5.4		-16	
BCR-1	695	790	137	132	16	15.0
RSD %	5.7		0.5		5.5	
Δ %	-12		+3.8		+6.7	
G-2	1940	1950	89.6	74.9	3.1	6.4
RSD %	0.3		2.8		8.0	
Δ %	-0.5		+20		-52	
GSP-1	1390	1360	109	143	7	10.7
RSD %	5.4		3.4		16	
Δ %	+2.2		-24		-35	
SY-2	508	450	205	250	12	10
RSD %	7.6		1.1		3.3	
Δ %	+13		-18		+20	

* n = 4

COMPARATIVE DATA FOR U.S.G.S. AND C.R.M.P. ROCK STANDARDS
(TRACE ELEMENTS, PARTS PER MILLION)

	Cu		Sr		V		Be	
	BRL	Recommended	BRL	Recommended	BRL	Recommended	BRL	Recommended
AGV-1	61.7	63.7	654	657	116	121	2.2	1.8
RSD %*	3.0		3.0		3.0		2.6	
Δ %	-3.1		-0.5		-4.1		+22	
BRC-1	22.1	22.4	315	345	362	384	2.9	2.6
RSD %	9.2		0.4		1.2		6.4	
Δ %	-1.3		-8.7		-5.7		+11	
G-2	11.9	10.7	488	463	38	37.0	1.9	2.4
RSD %	4.2		1.9		1.2		1.8	
Δ %	+11		+5.4		+2.7		-21	
GSP-1	36.6	35.2	238	247	56	52.0	1.3	0.8
RSD %	1.2		0.9		0.8		3.1	
Δ %	+4.0		-3.6		+7.7		+62	
SY-2	5.4	5	242	250	50	50	14.6	20
RSD %	13		2.9		1.5		1.3	
Δ %	+8.0		-3.2		0		-27	

* n = 4

APPENDIX IV

ROCK TYPES AND DATA

BASALTS

Flows

Chlorite Schists

Tuffs

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
[illegible]	0	2	0	81500	87900	83300	30500	6400	19100	2500	1470	880
[illegible]	0	4	0	85500	81200	71900	33400	5120	20100	[illegible]	1240	870
[illegible]	0	5	0	81900	82600	82100	29000	6140	22000	2000	1520	920
[illegible]	0	6	0	83800	83600	56600	71000	5340	22800	3000	1390	960
[illegible]	0	7	0	83500	79000	56600	68300	5870	26700	2300	1280	880
[illegible]	0	16	0	82300	85400	68100	33300	6690	21200	2000	1330	950
[illegible]	0	17	0	83100	83800	72000	33300	6760	23300	2200	1320	890
[illegible]	0	19	0	78100	84400	[illegible]	36100	6200	21200	[illegible]	1220	840
[illegible]	0	20	0	80300	84000	74800	32400	6610	19300	1300	1150	880
[illegible]	0	21	0	81800	87300	65800	36100	5840	17800	2500	1350	850
[illegible]	0	24	0	86300	77700	62500	44800	5310	24000	2800	1280	880
[illegible]	0	25	0	80800	73200	72700	38100	5530	24600	1800	1120	840
[illegible]	0	26	0	82000	79100	64300	41300	6530	22700	2200	1110	870
[illegible]	0	29	0	81400	[illegible]	75500	35100	[illegible]	24600	[illegible]	1470	950
[illegible]	0	32	0	77700	84100	71500	33300	6570	21900	1500	1370	890
[illegible]	0	33	0	77200	76200	83800	33300	6190	20800	2200	1530	860
[illegible]	0	34	0	78770	72790	[illegible]	41300	4280	19700	2200	1130	810
[illegible]	0	38	0	74300	76400	[illegible]	39100	5920	18400	2200	1280	830
	0	41	0	81200	[illegible]	66600	43600	5890	18300	[illegible]	1300	940
	0	48	0	86500	79700	69000	43600	4930	17800	2300	1160	830

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	49	0	83200	49400	54300	67700	4140	17500	2200	1260	790
0	0	52	0	81900	84600	73000	43600	6360	18500	4600	1410	920
0	0	53	0	80000	81000	70900	35100	6630	24200	1300	1630	930
0	0	54	0	81900	92600	65600	34200	6720	19800	2200	1590	940
0	0	58	0	73300	67200	53900	38100	4980	26600	2200	1070	700
0	0	58	0	81800	76000	67800	43600	5075	17900	3400	1200	710
0	0	59	0	93500	77200	76100	41300	5130	20800	1900	1180	860
0	0	60	0	84900	79200	76700	41300	4930	16900	1500	1370	900
0	0	61	0	96500	77600	69200	39105	4730	22800	2800	1310	960
0	0	62	0	84900	81100	68400	44800	5370	21400	1800	1600	880
0	0	63	0	85400	83700	82800	34200	3390	23700	2600	1310	1010
0	0	78	0	132000	75800	53800	42400	4760	22000	5000	1230	1090
0	0	82	0	65600	77700	55800	33300	5740	19300	3600	1490	760
0	0	84	0	75500	79000	74900	36100	5710	23500	1800	1530	830
0	0	87	0	77800	85700	26000	79900	4820	7090	6000	1280	950
0	0	88	0	85100	77400	65900	40200	4720	20700	2500	1410	810
0	0	94	0	91600	111000	48300	26500	10400	19200	2700	1710	1180
0	0	96	0	70400	107000	46300	26500	11300	23500	2500	1510	1160
0	0	97	0	90000	85900	66000	38100	5370	20600	2800	1690	950
0	0	99	0	98700	81400	62000	38100	6600	22200	3200	1630	950

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	101	0	75200	107000	45700	26500	11700	26900	2500	1720	1220
0	0	107	0	77500	87200	44600	3710	561	21300	1800	1720	870
0	0	110	0	79600	91400	64000	39100	5770	14000	2200	1680	870
0	0	117	0	77000	103000	45500	39100	7270	24300	3600	1550	1110
0	0	125	0	84000	97900	1920	85600	2880	4120	4100	1600	910
0	0	132	0	80600	81000	51200	42400	6820	29000	2500	1380	1050
0	0	133	0	71900	71300	36600	54600	3380	16400	2200	1490	750
0	0	136	0	81000	118000	39400	38100	6820	20000	2400	2050	1170
0	0	138	0	80400	99300	73000	38100	6880	17300	1700	1650	930
0	0	139	0	84800	85700	76700	39100	6060	20200	1700	1530	870
0	0	140	0	52900	67700	27600	38100	3880	7150	1200	989	600
0	0	142	0	85500	84200	71700	38100	6050	16700	1400	1500	960
0	0	143	0	83800	90200	69600	41300	5820	17600	1800	1740	880
0	0	149	0	85500	84200	82600	38100	5920	19900	1700	1670	930
0	0	151	0	74500	73000	83000	39100	4850	12400	1700	1470	850
0	0	152	0	75800	80600	65000	43600	4990	19600	1900	1720	880
0	0	153	0	80800	75000	68700	40200	5330	12300	1600	1430	900
	0	154	0	78000	75300	74900	39100	5170	14200	1700	1350	850
0	0	163	0	84500	85700	24900	65600	3650	9680	1100	1630	770
0	0	164	0	80300	83500	80900	43600	5490	13400	1700	1430	840

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	170	0	78900	88500	37600	43600	5400	17200	1400	1520	850
0	0	172	0	77500	90200	72800	36100	6600	17700	1900	1520	940
0	0	174	0	43300	53200	37300	21200	5160	1350	200	877	570
0	0	11	0	83300	72800	31800	58000	5250	20800	2200	992	920
0	0	23	0	81000	83700	87400	39100	5430	21800	2300	1420	870
0	0	28	0	79000	83100	76800	35100	6790	20700	2000	1370	890
0	0	30	0	79400	79100	68200	39100	5300	20000	3000	1290	820
0	0	31	0	73200	86200	70000	41300	6690	17600	2800	1170	900
0	0	40	0	80200	77500	35800	41300	5810	21500	2600	1170	880
0	0	76	0	91500	81100	66900	40200	5180	21600	2200	1180	930
0	0	94	0	85600	79600	65200	41300	4680	22200	3600	1390	790
0	0	95	0	78530	113000	65800	27300	10800	19400	3600	1880	1190
0	0	108	0	77800	87800	69500	39100	5100	17000	2400	1670	900
0	0	109	0	69500	84900	57400	37100	5080	10800	6200	1580	870
0	0	112	0	74600	104000	28500	59700	7500	19400	2400	1290	1010
0	0	113	0	76900	84400	69000	41300	5370	19800	2200	1570	880
0	0	127	0	71500	84800	[illegible]	39100	5540	16600	1800	1530	860
0	0	146	0	70100	107000	34400	31500	12700	24000	1800	1390	1090
0	0	148	0	88600	101000	33600	46100	8520	26600	5800	1580	1030
0		15[illegible]	0	72900	94700	44400	48700	3770	18000	4000	1830	880

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	155	0	72900	78300	64300	36100	5540	20300	2200	1530	850
0	0	159	0	93700	103000	27700	67700	5030	19500	1900	1700	950
0	0	162	0	71500	75400	17800	40200	5560	26800	1400	1150	850
0	0	165	0	83500	87600	57400	46100	4880	12800	1600	1590	940
0	0	36	0	87200	82300	43000	67700	3940	17800	1900	1410	820
0	0	47	0	80000	79900	59200	42400	5220	22000	5500	1180	850
0	0	51	0	81500	54100	64600	42400	6470	17400	2200	1240	930
0	0	55	0	83200	83300	57900	48700	5230	16700	2300	1160	730
0	0	80	0	88500	80100	66500	44800	5250	19700	1600	1540	820
0	0	83	0	90700	88100	59000	39100	5110	18100	2300	1520	850
0	0	92	0	83500	82300	69600	40200	4410	13700	4600	1580	870
0	0	129	0	80900	88500	68700	34200	6280	13500	2500	1650	880
0	0	160	0	69500	105700	53400	43600	4970	4100	5000	1910	1170
0	0	161	0	69600	89400	37300	44800	4440	18800	1700	1645	920
0	0	166	0	80300	86900	56400	44800	5460	14500	1600	1450	880
0	0	167	0	83100	83200	64300	46100	5840	15100	1900	1510	870
0	0	168	0	65300	66900	122000	34200	4760	5360	1255*	1540	780
0	0	171	0	83800	81200	69300	41300	5440	22400	1600	1655	880

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	2	0	112	120	1[illegible]2	0	286	105	0	0	0	0
0	0	4	0	120	108	88	0	264	101	0	0	0	0
0	0	5	0	99	114	61	0	279	107	0	0	0	0
0	0	6	0	104	90	86	0	281	104	0	0	0	0
0	0	7	0	103	86	52	0	270	125	0	0	0	0
0	0	16	0	96	117	159	0	296	130	0	0	0	0
0	0	17	0	92	108	59	0	296	125	0	0	0	0
0	0	19	0	108	122	112	0	292	107	0	0	0	0
0	0	20	0	108	116	94	0	288	135	0	0	0	0
0	0	21	0	112	121	75	0	282	115	0	0	0	0
0	0	24	0	136	89	43	0	249	121	0	0	0	0
0	0	25	0	103	87	20	0	262	140	0	0	0	0
0	0	26	0	96	106	28	0	279	135	0	0	0	0
0	0	29	0	96	126	35	0	298	75	0	0	0	0
0	0	32	0	93	102	39	0	286	99	0	0	0	0
0	0	33	0	103	88	17	0	275	96	0		0	0
0	0	34	0	121	83	3[illegible]	0	242	85	0	0	0	0
0	0	38	0	103	92	62		265	109	0	0	0	0
0	0	41	0	135	108	63	0	273	116	0	0	0	0
0	0	46	0	129	93	105	0	255	94	0		0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	49	0	223	103	91	0	293	42	0	0	0	0
0	0	52	0	103	104	92	0	290	112	0	0	0	0
0	0	53	0	105	89	41	0	284	96	0	0	0	0
0	0	54	0	99	90	16	0	294	117	0	0	0	0
0	0	58	0	105	78	25	0	227	68	0	0	0	0
0	0	58	0	103	100	69	0	260	100	0	0	0	0
0	0	59	0	127	94	28	0	257	123	0	0	0	0
0	0	60	0	124	103	127	0	254	98	0	0	0	0
0	0	61	0	135	97	7	0	246	103	0	0	0	0
0	0	62	0	129	92	26	0	273	96	0	0	0	0
0	0	63	0	127	99	44	0	293	173	0	0	0	0
0	0	78	0	135	104	98	0	241	104	0	0	0	6
0	0	82	0	123	108	92	0	257	75	0	0	0	0
0	0	84	0	122	93	30	0	265	99	0	0	0	0
0	0	87	0	148	200	6	0	207	46	0	0	0	0
0	0	88	0	100	77	25	0	261	77	0	0	0	0
0	0	95	0	38	124	57	0	389	112	0	0	0	0
0	0	96	0	49	124	52	0	374	62	0	0	0	0
0	0	97	0	99	96	48	0	282	85	0	0	0	0
0	0	99	0	96	83	25	0	276	74	0	0	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	101	0	46	140	51	0	335	69	0	0	0	0
0	0	107	0	114	100	120	0	290	63	0	0	0	0
0	0	110	0	113	113	74	0	298	91	0	0	0	0
0	0	117	0	93	94	10	0	297	140	0	0	0	4
0	0	125	0	143	108	4	0	252	12	0	0	0	0
0	0	132	0	148	83	26	0	261	77	0	0	0	6
0	0	133	0	99	93	48	0	225	48	0	0	0	10
0	0	136	0	70	153	51	0	418	80	0	0	0	4
0	0	138	0	131	113	65	0	319	117	0	0	0	0
0	0	139	0	117	102	53	0	276	111	0	0	0	0
0	0	140	0	72	1850	121	0	196	28	0	0	0	0
0	0	142	0	97	115	79	0	272	128	0	0	0	3
0	0	143	0	131	110	42	0	268	102	0	0	0	0
0	0	149	0	125	96	60	0	268	142	0	0	0	0
0	0	151	0	126	75	122	0	236	88	0	0	0	0
0	0	152	0	132	92	123	0	257	85	0	0	0	0
0	0	153	0	125	81	65	0	255	114	0	0	0	0
0	0	154	0	116	75	115	0	256	108	0	0	0	0
0	0	163	0	185	100	4	0	208	30	0	0	0	0
0	0	164	0	125	91	147	0	258	139	0	0	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	170	0	134	108	163	0	252	39	0	0	0	0
0	0	172	0	90	99	34	0	292	109	0	0	0	0
0	0	174	0	81	60	111	0	157	65	0	0	0	0
0	0	11	0	120	216	71	0	274	76	0	0	0	0
0	0	23	0	112	100	19	0	262	112	0	0	0	0
0	0	28	0	83	110	74	0	302	124	0	0	0	0
0	0	30	0	104	108	84	0	258	108	0	0	0	23
0	0	31	0	75	96	41	0	317	99	0	0	0	0
0	0	40	0	116	109	8	0	267	110	0	0	0	0
0	0	76	0	121	88	45	0	263	123	0	0	0	3
0	0	94	0	105	90	76	0	268	110	0	0	0	0
0	0	95	0	49	130	46	0	431	121	0	0	0	0
0	0	108	0	109	104	68	0	276	103	0	0	0	0
0	0	109	0	131	108	144	0	283	78	0	0	0	0
0	0	112	0	133	128	27	0	261	45	0	0	0	0
0	0	113	0	167	107	127	0	265	137	0	0	0	0
0	0	120	0	111	111	85	0	271	81	0	0	0	0
0	0	146	0	46	135	100	0	401	94	0	0	0	2
	0	148	0	146	137	144	0	324	63	0	0	0	0
0	0	150	0	148	114	126	0	300	41	0	0	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	155	0	102	84	77	0	254	94	0	0	0	0
0	0	158	0	162	119	15	0	328	16	0	0	0	0
0	0	162	0	113	91	66	0	252	42	0	0	0	0
0	0	165	0	130	100	74	0	259	99	0	0	0	0
0	0	36	0	156	89	5	0	208	74	0	0	0	0
0	0	47	0	119	91	61	0	252	95	0	0	0	0
0	0	51	0	93	109	132	0	283	100	0	0	0	12
0	0	55	0	132	89	12	0	259	103	0	0	0	0
0	0	80	0	148	95	97	0	244	86	0	0	0	0
0	0	83	0	132	96	8	0	242	84	0	0	0	0
0	0	92	0	124	99	57	0	213	84	0	0	0	0
0	0	129	0	85	105	73	0	282	101	0	0	0	0
0	0	160	0	63	114	132	0	305	105	0	87000	0	0
0	0	161	0	116	100	98	0	267	54	0	0	0	0
0	0	166	0	133	98	118	0	281	120	0	0	0	0
0	0	167	0	116	88	48	0	268	119	0	0	0	0
0	0	168	0	111	69	110	0	219	92	0	0	0	0
0	0	171	0	148	84	109	0	262	91	0	0	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
			PPM							PPB	
0	0	2	0	0	0	50	257	64	0	0	0
0	0	4	0	0	0	60	243	59	0	4000	0
0	0	5	0	0	0	50	243	22	0	4000	0
0	0	6	0	0	0	60	213	54	14	3000	0
0	0	7	0	0	0	60	213	53	0	4000	0
0	0	16	0	0	0	50	225	58	0	3000	0
0	0	17	0	0	0	40	219	50	0	3000	0
0	0	19	0	0	0	40	221	58	18	3000	0
0	0	20	0	0	0	50	208	56	0	0	0
0	0	21	0	0	0	60	221	30	0	3000	0
0	0	24	0	0	0	70	237	55	0	4000	0
0	0	25	0	0	0	50	227	53	7	4000	0
0	0	26	0	0	0	50	231	52	19	4000	0
0	0	29	0	0	0	50	224	68	16	3000	0
0	0	32	0	0	0	40	215	60	0	3000	0
0	0	33	0	0	0	50	226	59	0	4000	0
0	0	34	0	0	0	40	209	54		4000	0
0	0	38	0	0	0	50	216	56	0	4000	0
0	0	41	0	0	0	50	228	57	0	4000	0
0	0	48	0	0	0	50	291	59	0	4000	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
			PPM							PPB	
0	0	49	0	0	0	40	271	68	0	0	0
0	0	52	0	40	240	0	6283	0	0	0	800
0	0	53	0	0	0	40	237	48	0	4000	0
0	0	54	0	0	0	40	246	59	0	0	0
0	0	58	0	0	5	2	1300	5000	8	0	0
0	0	58	0	0	0	30	286	52	12	4000	0
0	0	59	0	0	0	40	302	59	29	4000	0
0	0	60	0	0	0	30	269	65	6	4000	0
0	0	61	0	0	0	30	295	63	0	4000	0
0	0	62	0	0	0	40	304	66	0	4000	0
0	0	63	0	0	0	40	243	60	10	3000	0
0	0	78	0	0	0	30	243	63	19	4000	0
0	0	82	0	0	0	60	191	54	0	4000	0
0	0	84	0	40	203	0	5704	0	0	0	0
0	0	87	0	0	0	70	.282	54	0	3000	0
0	0	88	0	0	0	40	253	55	0	3000	0
0	0	95	0	0	0	80	69	61	0	6000	0
0	0	96	0	0	0	100	59	57	0	0	0
0	0	97	0	0	0	50	201	57	12	0	0
0	0	90	0	0	0	30	244	54	100	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
			PPM							PPB	
0	0	101	0	0	0	100	61	52	15	0	0
0	0	107	0	0	0	40	252	61	0	0	0
0	0	110	0	0	0	50	218	53	0	8000	0
0	0	117	0	0	0	50	75	69	18	0	400
0	0	125	0	0	0	60	232	57	0	0	800
0	0	132	0	0	0	50	284	61	0	3000	0
0	0	133	0	0	0	40	224	57	0	0	0
0	0	136	0	0	0	40	81	78	0	0	0
0	0	138	0	0	0	30	243	71	0	7000	0
0	0	139	0	0	0	30	210	60	0	8000	0
0	0	140	0	0	0	30	178	42	2570	4000	0
0	0	142	0	0	0	40	224	57	19	0	0
0	0	143	0	0	0	40	235	63	0	0	0
0	0	149	0	0	0	40	193	60	0	0	0
0	0	151	0	0	0	30	246	56	10	8000	0
0	0	152	0	0	0	30	289	64	14	8000	0
0	0	153	0	0	0	40	290	55	8	8000	0
0	0	154	0	0	0	40	256	63	14	8000	0
0	0	163	0	0	0	30	376	60	0	0	0
0	0	164	0	0	0	30	210	64	0	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
			PPM							PPB	
0	0	170	0	0	0	20	222	39	9	7000	0
0	0	172	0	0	0	40	219	53	7	7000	0
0	0	174	0	0	0	0	170	39	8	0	0
0	0	11	0	0	0	50	246	52	0	0	0
0	0	23	0	0	0	50	230	59	0	3000	0
0	0	28	0	0	0	50	214	83	17	3000	0
0	0	30	0	0	0	40	230	56	19	4000	0
0	0	31	0	0	0	50	214	55	14	3000	0
0	0	40	0	0	0	40	216	57	0	4000	0
0	0	76	0	0	0	40	268	63	7	4000	0
0	0	94	0	0	0	40	238	58	0	3000	0
0	0	95	0	0	0	60	64	67	0	5000	0
0	0	108	0	0	0	50	224	52	0	0	0
0	0	109	0	0	0	30	267	66	0	0	0
0	0	112	0	0	0	80	70	78	0	0	0
0	0	113	0	0	0	50	199	60	24	0	0
0	0	120	0	0	0	40	184	63	11	0	0
0	0	146	0	0	0	120	69	61	0	0	0
0	0	148	0	0	0	80	205	76	0	0	0
0	0	150	0	40	233	0	7300	0	10	0	0

SAMPLE CLASSIFICATION, LOCATICN, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FUOTG	SAMPLE NUMBFR	RT	SF	TE	ZR	CR	CO	PR	CD	BE
			PPM							PPB	
0	0	155	0	0	0	30	222	55	9	8000	0
0	0	158	0	0	0	40	339	79	9	5000	0
0	0	162	0	0	0	30	282	53	6	0	0
0	0	165	0	0	0	30	244	65	0	7000	0
0	0	36	0	0	0	50	334	63	8	4000	0
0	0	47	0	0	0	60	249	57	12	4000	0
0	0	51	0	0	0	50	223	57	8	3000	0
0	0	55	0	0	0	30	298	60	13	3000	0
0	0	80	0	0	0	40	251	57	0	4000	0
0	0	83	0	0	0	40	250	59	0	0	0
0	0	92	0	0	0	50	264	57	0	0	0
0	0	129	0	0	0	40	151	60	0	0	0
0	0	160	0	0	0	60	106	64	6	5000	0
0	0	161	0	0	0	40	265	63	8	0	0
0	0	166	0	0	0	40	210	65	0	0	0
0	0	167	0	0	0	40	221	60	0	0	0
0	0	168	0	0	0	30	195	53	18	0	0
0	0	171	0	0	0	30	307	60	0	8000	0

ANDESITES

Flows

Chlorite Schists

Tuffs

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	12	0	79200	71900	54400	33300	5900	31100	2000	1080	860
0	0	56	0	74600	75600	51800	65600	4170	17500	1600	1230	670
0	0	77	0	71500	84800	65300	37100	4850	17100	1500	1330	840
0	0	79	0	82100	83600	45300	47400	5420	17200	3800	1390	820
0	0	81	0	122000	75500	53900	38100	5370	28400	3600	1630	1030
0	0	91	0	77000	79800	76300	43600	5310	21000	2700	1250	780
0	0	98	0	75700	85500	68900	37100	5440	23000	2700	1580	890
0	0	100	0	92400	80800	59100	44800	5540	23000	3000	1570	950
0	0	103	0	96400	86600	73000	36100	5870	24600	3000	1710	1040
0	0	116	0	72600	83500	77800	39100	5310	12500	1900	1620	850
0	0	118	0	77700	87900	77400	41300	5130	11300	5100	1670	890
0	0	134	0	70500	77800	51800	46100	4360	18700	1900	1570	720
0	0	135	0	85800	403000	9110	65600	8980	9260	1800	1450	1120
0	0	156	0	74500	76000	70000	29800	5170	16700	2400	2060	850
0	0	169	0	84900	82400	73300	38100	5770	14200	1700	1350	940
0	0	173	0	79600	78900	86000	39100	5840	12700	900	1540	850
0	0	9	0	75400	98300	12300	95500	5630	7440	3200	1290	930
0	0	14	0	79100	87600	7760	56300	6050	9040	2000	952	890
0	0	15	0	87900	91500	38000	41300	5720	12400	1500	1280	890
0	0	37	0	9110	157000	15000	13300	331	1720	730	1400	610

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	75	0	92800	103000	56200	33300	4740	4970	1400	1340	1020
0	0	85	0	97300	84400	46500	41300	4360	13500	5000	1530	950
0	0	86	0	89500	84300	68800	20	5300	20100	1800	1520	870
0	0	89	0	74800	109000	41300	28900	11600	25000	2200	1260	1180
0	0	93	0	101000	87500	55400	40200	4840	19300	4600	1510	850
0	0	104	0	68800	102000	21300	46100	3590	12200	2700	961	1170
0	0	106	0	59400	94900	15100	47400	9120	3830	1300	1220	1060
0	0	111	0	74100	133000	2970	59700	6760	5170	2700	1410	1000
0	0	114	0	76600	94800	35900	40200	6320	15100	4600	1180	1060
0	0	121	0	91000	123000	24500	49600	10400	17200	3600	1960	1710
0	0	144	0	81000	87600	63700	41300	5670	16500	1800	1730	860
0	0	147	0	70900	82300	65300	38100	5250	15600	4600	1780	830
0	0	157	0	72600	94600	65000	38100	6610	17600	2100	1730	1020
0	0	159	0	78700	96100	65700	41300	5750	15900	1900	1560	1030
0	0	3	0	84900	86400	68100	32500	5790	50800	2200	1280	900
0	0	102	0	89100	107000	42100	26500	11600	24300	3500	1580	1280
0	0	105	0	71800	110000	43800	31500	10600	23400	3600	16[illegible]	1270
0	0	115	0	66900	95500	34400	31500	10700	22400	3800	1480	1220

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	12	0	104	112	67	0	279	85	0	0	0	0
0	0	56	0	223	112	75	0	233	68	0	0	0	0
0	0	77	0	72	106	91	0	263	71	0	0	0	3
0	0	79	0	159	105	96	0	262	64	0	0	0	0
0	0	81	0	154	117	221	0	261	61	0	0	0	0
0	0	91	0	108	96	6	0	266	102	0	0	0	0
0	0	98	0	109	88	63	0	284	90	0	0	0	0
0	0	100	0	99	85	23	0	278	91	0	0	0	0
0	0	103	0	114	112	79	0	287	119	0	0	0	0
0	0	116	0	109	98	115	0	268	109	0	0	0	0
0	0	118	0	113	102	51	0	281	86	0	0	0	0
0	0	134	0	88	96	130	0	249	74	0	0	0	2
0	0	135	0	126	269	7	0	291	18	0	0	0	90
0	0	156	0	127	91	109	0	261	150	0	0	0	0
0	0	169	0	93	89	46	0	283	104	0	0	0	0
0	0	173	0	93	87	114	0	292	90	0	0	0	0
0	0	9	0	80	168	38	0	262	25	0	0	0	0
0	0	14	0	107	127	72	0	267	26	0	0	0	0
0	0	15	0	131	131	72	0	265	81	0	17	0	0
0	0	37	0	13	351	282	7	34	5	0	0	0	70

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	75	0	120	114	61	0	237	108	0	0	0	5
0	0	85	0	136	105	4	0	252	86	0	0	0	0
0	0	86	0	135	108	146	0	288	91	0	0	0	0
0	0	89	0	36	133	84	0	353	61	0		0	0
0	0	93	0	103	107	36	0	277	105	0	0	0	0
0	0	104	0	47	118	86	0	367	34	0	0	0	0
0	0	106	0	53	100	15	0	374	13	0	0	0	9
0	0	111	0	38	368	347	0	265	18	0	0	0	0
0	0	114	0	63	124	16	0	278	95	0	0	0	0
0	0	121	0	51	150	103	8	475	63	0	0	0	9
0	0	144	0	136	115	96	0	274	95	0	0	0	0
0	0	147	0	113	103	139	0	256	122	0	0	0	0
0	0	157	0	85	101	111	0	311	78	0	0	0	0
0	0	159	0	92	100	102	0	320	78	0	0	0	0
0	0	3	0	104	113	134	0	294	121	0	0	0	0
0	0	102	0	38	125	47	0	363	61	0	0	0	0
0	0	105	0	59	146	96	0	381	101	0	0	0	0
0	0	115	0	50	110	7	0	362	71	0	0	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
				PPM						PPB	
0	0	12	0	0	0	50	240	49	0	0	0
0	0	56	0	0	0	40	321	68	0	4000	0
0	0	77	0	0	0	40	253	61	14	3000	0
0	0	79	0	0	0	40	273	61	0	3000	0
0	0	81	0	0	0	30	272	67	0	4000	0
0	0	91	0	0	0	40	246	58	0	3000	0
0	0	98	0	0	0	50	200	56	0	0	0
0	0	100	0	0	0	50	254	57	0	3000	0
0	0	103	0	0	0	40	250	58	0	0	0
0	0	116	0	0	0	50	208	55	30	0	0
0	0	118	0	0	0	40	222	54	8	0	0
0	0	134	0	0	0	50	180	63	0	0	0
0	0	135	0	0	0	80	261	61	0	0	200
0	0	156	0	0	0	40	228	47	8	0	0
0	0	169	0	0	0	40	251	51	0	8000	0
0	0	173	0	0	0	20	309	57	0	8000	0
0	0	9	0	0	0	60	250	61	41	0	0
0	0	14	0	0	0	50	243	59	0	0	400
0	0	15	0	0	0	40	283	65	8	0	0
0	0	37	0	0	0	30	120	26	234	9000	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
			PPM							PPB	
0	0	75	0	0	0	30	301	71	0	0	0
0	0	85	0	0	0	30	295	59	0	3000	0
0	0	86	0	0	0	30	299	62	0	3000	0
0	0	89	0	0	0	100	55	55	0	0	0
0	0	93	0	0	0	40	282	53	0	0	0
0	0	104	0	0	0	100	65	57	0	0	0
0	0	106	0	0	0	80	73	54	0	0	0
0	0	111	0	0	0	90	84	43	33	3000	400
0	0	114	0	0	0	50	99	58	0	0	0
0	0	121	0	0	0	120	119	84	379	0	100
0	0	144	0	0	0	30	214	66	0	0	0
0	0	147	0	0	0	30	110	64	0	0	0
0	0	157	0	0	0	40	211	63	0	6000	0
0	0	159	0	0	0	40	214	66	6	6000	0
0	0	3	0	0	0	60	237	59	11	3000	0
0	0	102	0	0	0	90	57	52	0	0	0
0	0	105	0	0	0	90	78	67	0	0	0
0	0	115	0	0	0	80	69	58	0	0	0

QUARTZ MATERIAL

Q_1

Q_2

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	8	0	3410	14200	143	2620	182	120	800	92	0
0	0	10	C	1490	92600	95	1360	120	270	500	53	0
C	0	18	C	5130	18000	238	3680	290	0	500	151	0
0	0	27	C	23500	61000	280	13600	1770	1310	1000	600	170
0	0	35	C	10500	26200	476	8570	507	1490	2200	167	100
0	0	42	0	25700	53300	998	18200	1900	5220	5700	459	0
0	0	43	0	5050	17900	143	4400	360	440	500	132	0
0	0	44	0	38800	55600	2990	32700	2350	6020	2500	470	340
0	0	46	0	7790	37300	265	5280	394	1440	2200	172	230
0	0	64	C	3630	44800	0	2010	28	6160	400	46	0
0	0	65	C	9840	8880	48	7520	55	550	2300	70	0
0	0	68	C	4100	21600	48	2790	57	660	1000	37	0
0	0	13	C	5830	15200	143	3860	419	700	600	163	0
0	0	66	C	8070	8970	151	3630	48	1500	2200	53	80
0	0	67	C	3210	7870	23	3210	28	810	400	60	0
0	0	70	0	34600	17600	1110	11300	145	3920	10000	222	350
0	0	72	0	4870	6780	23	2890	24	0	1200	24	0
0	0	73	C	10100	23600	238	7420	347	440	400	258	60
0	0	123	C	37600	12100	7150	6620	1390	30900	5000	249	450

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	8	0	13	277	3590	81	11	4	0	0	0	0
0	0	10	0	26	825	70600	171	15	3	0	0	0	0
0	0	18	0	5	383	1070	10	17	3	0	0	0	0
0	0	27	0	33	102	1070	17	99	6	0	0	0	7
0	0	35	0	10	451	501	5	34	6	0	1230	0	80
0	0	42	0	18	2650	6330	46	112	16	0	560	0	0
0	0	43	0	8	74	982	19	20	1	0	0	0	0
0	0	44	0	31	308	864	7	166	23	0	0	0	0
0	0	46	0	3	163	282	15	28	6	0	0	0	0
0	0	64	0	11	49500	3700	180	6	4	0	50	0	0
0	0	65	0	4	1880	258	7	7	4	0	0	0	0
0	0	68	0	3	2670	607	65	7	3	0	30	0	33
0	0	13	0	10	29	444	7	23	4	0	0	0	9
0	0	66	0	6	258	92	0	7	5	0	0	0	26
0	0	67	0	6	24	30	0	6	1	0	0	0	37
0	0	70	0	16	41	107	0	13	11	0	0	0	73
0	0	72	0	2	30	9	0	2	3	0	0	0	0
0	0	73	0	12	54	81	0	28	3	0	0	0	0
0	0	123	0	3	26	4	0	11	4	0	0	0	9

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
				PPM						PPB	
0	0	8	0	0	0	0	74	0	935	0	0
0	0	10	0	0	0	0	88	95	477	3000	0
0	0	18	0	0	0	0	73	0	552	0	0
0	0	27	0	0	0	0	134	26	42	0	0
0	0	35	0	0	0	0	78	11	546	0	0
0	0	42	0	0	0	40	143	15	1610	0	200
0	0	43	0	0	0	0	64	0	106	0	0
0	0	44	0	0	0	30	209	13	279	0	300
0	0	46	0	0	0	0	64	3	568	0	0
0	0	64	0	0	0	0	67	40	40300	99999	0
0	0	65	0	0	0	0	36	0	1050	0	0
0	0	68	0	0	0	0	55	4	8160	4000	0
0	0	13	0	0	0	0	72	11	8	0	0
0	0	66	0	0	0	0	65	13	12	0	100
0	0	67	0	0	0	0	59	16	0	0	0
0	0	70	0	0	0	50	57	38	74	0	300
0	0	72	0	0	0	0	59	0	0	0	0
0	0	73	0	0	0	0	77	10	193	0	0
0	0	123	0	0	0	0	59	8	0	0	0

IRON FORMATIONS

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	22	0	3480	255700	82000	8460	106	1260	400	4050	580
0	0	39	0	4100	354000	33500	12200	89	1090	400	1570	980
0	0	45	0	2730	329000	10300	11600	89	670	300	1250	800
0	0	50	0	740	417000	5470	7520	18	290	100	469	1060

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	22	0	35	417	964	8	32	10	0	0	0	728
0	0	39	0	29	130	38	0	39	6	0	0	0	0
0	0	45	0	26	137	108	0	38	3	0	40	0	0
0	0	50	0	23	102	21	0	31	2	0	0	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
			PPM							PPH	
0	0	22	0	0	0	0	78	55	0	6000	0
0	0	39	0	0	0	0	67	56	0	10000	0
0	0	45	0	0	0	0	128	42	0	13000	0
0	0	50	0	0	0	0	42	33	0	17000	0

GRANODIORITE AND ALTERED GRANODIORITE

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	AL	FE	CA	MG	TI	NA	K	MN	P
				PPM								
0	0	69	0	44400	5460	760	5220	303	18700	9100	52	270
0	0	71	0	65400	10500	689	10900	368	14700	15700	90	430
0	0	74	0	42700	9990	4610	11100	176	7210	10200	234	250
0	0	119	0	26300	21500	2600	7120	244	14500	3000	226	210
0	0	122	0	37600	12100	8150	6620	1390	30900	5000	246	450
0	0	126	0	39100	10900	285	3330	305	2260	13000	46	340
0	0	127	0	41300	14000	309	6230	458	2870	14300	62	340
0	0	128	0	84400	21500	1660	14200	866	6600	10000	276	750
0	0	130	0	103000	20100	1810	7700	1510	6870	60000	260	870
0	0	176	0	67500	6130	18900	752	582	21500	8600	582	590
0	0	177	0	81200	8700	1200	4420	350	37200	13000	350	500
0	0	178	0	781 0	11700	14900	2860	974	38200	8000	192	670
0	0	179	0	85000	15100	17900	3910	1520	36500	12000	263	720

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FUR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	NI	ZN	CU	AG	V	SR	AU	AS	SN	MO
				PPM									
0	0	69	0	3	221	26	0	7	17	0	0	0	4
0	0	71	0	4	79	22	0	9	23	0	0	0	3
0	0	74	0	2	84	9	0	10	27	0	0	0	0
0	0	119	0	3	21	4	0	15	20	0	0	0	27
0	0	122	0	3	26	4	0	20	55	0	0	0	13
0	0	126	0	4	42	21	11	9	11	0	0	0	0
0	0	127	0	18	48	47	6	12	16	0	4[illegible]	0	16
0	0	128	0	14	56	11	0	61	24	0	0	0	24
0	0	13[illegible]	0	18	53	16	0	26	33	0	0	0	27
0	0	176	0	4	18	7	0	8	194	0	0	0	11
0	0	177	0	4	22	8	0	5	29	0	0	0	0
0	0	178	0	0	23	5	0	12	150	0	0	0	0
0	0	179	0	0	37	1[illegible]	0	19	136	0	0	0	0

SAMPLE CLASSIFICATION, LOCATION, AND RESULTS FOR TOTAL PLASMA DETERMINATIONS

DDH	FOOTG	SAMPLE NUMBER	RT	SE	TE	ZR	CR	CO	PB	CD	BE
			PPM							PPB	
0	0	69	0	0	0	70	56	0	329	0	800
0	0	71	0	0	0	100	97	3	506	0	1500
0	0	74	0	0	0	500	560	0	175	0	700
0	0	119	0	0	0	50	45	12	7	0	300
0	0	122	0	0	0	80	3	60000	0	90000	800
0	0	126	0	0	0	50	45	0	404	0	700
0	0	127	0	0	0	60	43	7	43	0	900
0	0	128	0	0	0	110	60	13	54	0	1800
0	0	130	0	0	0	180	49	19	35	0	3600
0	0	176	0	0	0	90	46	5	70	0	1400
	0	177	0	0	0	110	45	0	65	0	2100
0	0	178	0	0	0	140	46	0	21	0	1600
0	0	179	0	0	0	150	34	0	18	0	1400

Ontario

Ministry of Natural Resources

File [illegible]

900

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

RECEIVED
NOV 7 . 19
PROJECTS UNIT

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Geophysical -Geological - Geochemical
Township or Area SAVANT
Claim Holder(s) W.G. WAHL LTD,
1101, 302 BAY ST TORONTO ONT M5H 2P3
Survey Company W.G. WAHL LTD
Author of Report J.L. WAHL AND A. GUBINS
Address of Author 1101-302 BAY ST TORONTO ONT M5H 2P3
Covering Dates of Survey June '77 through Nov '77
(linecutting to office)
Total Miles of Line Cut 19.0 miles

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

DAYS per claim

Geophysical
--Electromagnetic 40 Jr
--Magnetometer 20
--Radiometric
--Other
Geological 20 Jr
Geochemical 20

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer ______ Electromagnetic ______ Radiometric ______
(enter days per claim)

DATE: November 24 1977 SIGNATURE: John L. Wahl
Author of Report ~~or Agent~~

L.D.

Res. Geol. ______ Qualifications on this file

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

Mag

1/2	PA (prefix)	-	375985 (number)
✓	PA	-	375986
✓	PA	-	375987
N.C	PA	-	375988
✓	PA	-	376607
✓	PA	-	376608
✓	PA	-	376609
3/4	PA	-	376610
N.C	PA	-	376611
N.C	PA	-	376612

Mag 3 claims not covered 2 claims 1/2 credits partly traversed

If space insufficient, attach list

TOTAL CLAIMS 10

Ontario

Ministry of Natural Resources

File

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

RECEIVED
NOV 30 1977
PROJECTS UNIT

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Geophysical-Geological-Geochemical
Township or Area SAVANT LAKE
Claim Holder(s) W.G. WAHL LTD,
1101-302 BAY ST. TORONTO ONT M5H 2P3
Survey Company W.G. WAHL LTD
Author of Report J.L. WAHL AND A. GUBINS
Address of Author 1101-302 BAY ST. TORONTO ONT M5H 2P3
Covering Dates of Survey June'77 through Nov'77 (linecutting to office)
Total Miles of Line Cut 14.0 MILES

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
–Electromagnetic	40
–Magnetometer	20
–Radiometric	
–Other	
Geological	20
Geochemical	20

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer ______ Electromagnetic ______ Radiometric ______
(enter days per claim)

DATE November 24 1977 SIGNATURE: John L. Wahl
Author of Report or Agent

Res. Geol. ______ Qualifications ______

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
PA	375985
PA	375986
PA	375987
PA	375988
PA	376607
PA	376608
PA	376609
PA	376610
PA	376611
PA	376612

If space insufficient, attach list

TOTAL CLAIMS 10

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations 1520 Mag, 730 EM Number of Readings 4920 Mag, 1460 EM

Station interval 30 meters EM, 15 meters Mag Line spacing 60 meters

Profile scale 1" = 20%

Contour interval as indicated

MAGNETIC

Instrument Geometric G-816 Magnetometer

Accuracy – Scale constant ±1 gamma, +59,000 gammas

Diurnal correction method time extrapolated

Base Station check-in interval (hours) 1/2 - 1 hour

Base Station location and value all base line stations standardized as indicated by ■

ELECTROMAGNETIC

Instrument Apex Maxmin II

Coil configuration horizontal

Coil separation 400 feet

Accuracy ±1/2% to ±1%

Method: ☐ Fixed transmitter ☐ Shoot back ☑ In line ☐ Parallel line

Frequency 444 Hz AND 1777 Hz
(specify V.L.F. station)

Parameters measured IN PHASE + QUADRATURE

GRAVITY

Instrument

Scale constant

Corrections made

Base station value and location

Elevation accuracy

INDUCED POLARIZATION

RESISTIVITY

Instrument

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time Frequency

– Off time Range

– Delay time

– Integration time

Power

Electrode array

Electrode spacing

Type of electrode

GROUND SURVEYS If more than one survey, specify data for each type of survey

Number of Stations 1520 Mag, 730 EM — Number of Readings 4520 Mag, 1460 EM

Station interval 30 meters EM, 15 meters Mag — Line spacing 60 meters

Profile scale 1" = 20%

Contour interval As Indicated

MAGNETIC

Instrument Geometric G-816 Magnetometer

Accuracy – Scale constant ± 1 gamma, +59,000 γ

Diurnal correction method time extrapolated

Base Station check-in interval (hours) ½ to 1 hour

Base Station location and value all base line stations standardized as indicated by ■

ELECTROMAGNETIC

Instrument Apex Maxmin II

Coil configuration horizontal

Coil separation 400 feet

Accuracy ± ½% to ± 1%

Method: ☐ Fixed transmitter ☐ Shoot back ☑ In line ☐ Parallel line

Frequency 444 Hz AND 1777 Hz (specify V.L.F. station)

Parameters measured IN PHASE AND QUADRATURE

GRAVITY

Instrument

Scale constant

Corrections made

Base station value and location

Elevation accuracy

RESISTIVITY

Instrument

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time — Frequency

– Off time — Range

– Delay time

– Integration time

Power

Electrode array

Electrode spacing

Type of electrode

GEOCHEMICAL SURVEY PROCEDURE RECORD

Numbers of claims from which samples taken 376607, 376608, 376609, 376610, 376612, 375985
375986, 375987, 375988

Total Number of Samples 175

Type of Sample Rock
(Nature of Material)

Average Sample Weight 1-1½ kg.

Method of Collection Outcrop

Soil Horizon Sampled —

Horizon Development —

Sample Depth —

Terrain —

Drainage Development —

Estimated Range of Overburden Thickness —

SAMPLE PREPARATION

(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis
Crushing & Grinding to -200 mesh.

General

ANALYTICAL METHODS

Values expressed in:
per cent ☑
p. p. m. ☑
p. p. b. ☐

[✓ Cu] [✓ Pb] [✓ Zn] [✓ Ni] [✓ Co] [✓ Ag] [✓ Mo] [✓ As] (circle)

Others Fe, Al, Ca, Mg, Na, K, P, Mn, Cr, Cd, Be,

Field Analysis (— tests)

Extraction Method ~~HF-HClO4-HNO3~~

Analytical Method ~~Plasma~~

Reagents Used

Field Laboratory Analysis

No. (tests)

Extraction Method

Analytical Method

Reagents Used

Commercial Laboratory (175 tests)

Name of Laboratory Barringer Research.

Extraction Method Complete

Analytical Method Plasma

Reagents Used HF-HClO4-HNO3

General

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken 376607, 376608, 376609, 376610, 376612, 379985, 375986, 375987, 375988.

Total Number of Samples 175
Type of Sample Rock
(Nature of Material)
Average Sample Weight 1-1½ kg
Method of Collection Outcrop

Soil Horizon Sampled
Horizon Development
Sample Depth
Terrain

Drainage Development
Estimated Range of Overburden Thickness

SAMPLE PREPARATION

(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis
Crushed + Ground to -200 mesh

General

ANALYTICAL METHODS

Values expressed in: per cent ☑ p. p. m. ☑ p. p. b. ☐

[✓ Cu] [✓ Pb] [✓ Zn,] [✓ Ni,] [✓ Co,] [✓ Ag,] [✓ Mo,] [✓ As,] (circle)

Others Al, Fe, Mn, Ca, Mg, Na, K, P, Cd, Cr, Be.

Field Analysis (tests)
Extraction Method
Analytical Method
Reagents Used

Field Laboratory Analysis
No. (tests)
Extraction Method
Analytical Method
Reagents Used

Commercial Laboratory (175 tests)
Name of Laboratory Barringer
Extraction Method Complete
Analytical Method Plasma
Reagents Used HF-HNO$_3$-HClO$_4$

General

Ministry of
Natural
Resources
Ontario

Your file:

1978 10 06

Our file: 2.2544

Mrs. Doris Cosco
Acting Mining Recorder
Ministry of Natural Resources
P.O. Box 669
Court House
Sioux Lookout, Ontario
POV 2TO

Dear Mrs. Cosco:

Re: Mining Claims Pa. 375985 et al. Savant Township
File 2.2544

The Geophysical (Electromagnetic & Magnetometer), Geochemical and Geological assessment work credits as listed with my Notice of Intent dated April 21, 1978 have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours very truly,

J.R. McGinn
Director
Lands Administration Branch

Whitney Block, Room 6404
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-6918

DN:ie

cc: W.G. Wahl Ltd.
Toronto, Ontario

Resident Geologist
Sioux Lookout, Ontario

MINISTRY OF NATURAL RESOURCES
RECEIVED
OCT 9 1978
RESIDENT GEOLOGIST'S OFFICE
SIOUX LOOKOUT

REVISED

(Supersedes Notice of Intent statement dated April 21st, 1973)

Recorded Holder W.H. Hall Limited

Township or Area Savant Township

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	
Electromagnetic ______ days	Pa. 375985 to 88 inclusive
Magnetometer 20 days	376607 to 12 "
Radiometric ______ days	
Induced polarization ______ days	
Section 86 (18) ______ days	
Geological ______ days	
Geochemical ______ days	
Man days ☐ Airborne ☐	
Special provision ☒ Ground ☒	
☐ Credits have been reduced because of partial coverage of claims.	
☐ Credits have been reduced because of corrections to work dates and figures of applicant.	

Special credits under section 86 (15a) for the following mining claims

No credits have been allowed for the following mining claims

☐ not sufficiently covered by the survey ☐ Insufficient technical data filed

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical — 80; Geological — 40; Geochemical — 40; Section 86(18) 60:

828

Ministry of Natural Resources
Ontario

[illegible] 52J/12SW

Your file:

Our file: 2.2544

1979 01 12

MINISTRY OF NATURAL RESOURCES
RECEIVED
JAN 23 1979
RESIDENT GEOLOGIST'S OFFICE
SIOUX LOOKOUT

Mr. Albert Hanson
Mining Recorder
Ministry of Natural Resources
P.O. Box 669, Court House
Sioux Lookout, Ontario
POV 2TO

Dear Sir:

Re: Geophysical (Electromagnetic & Magnetometer)
Geological and Geochemical surveys
Mining Claims Pa. 375985 et al.
Savant Twp.
File 2.2544

I have re-examined and assessed the Magnetometer survey on the above mining claims in regards to additional data (new plan) being submitted.

Attached herewith is a revised statement which supersedes the list sent with my Notice of Intent dated April 21st, 1978 and is finalized as of the previous 'date of approval' October 6th, 1978.

Yours very truly,

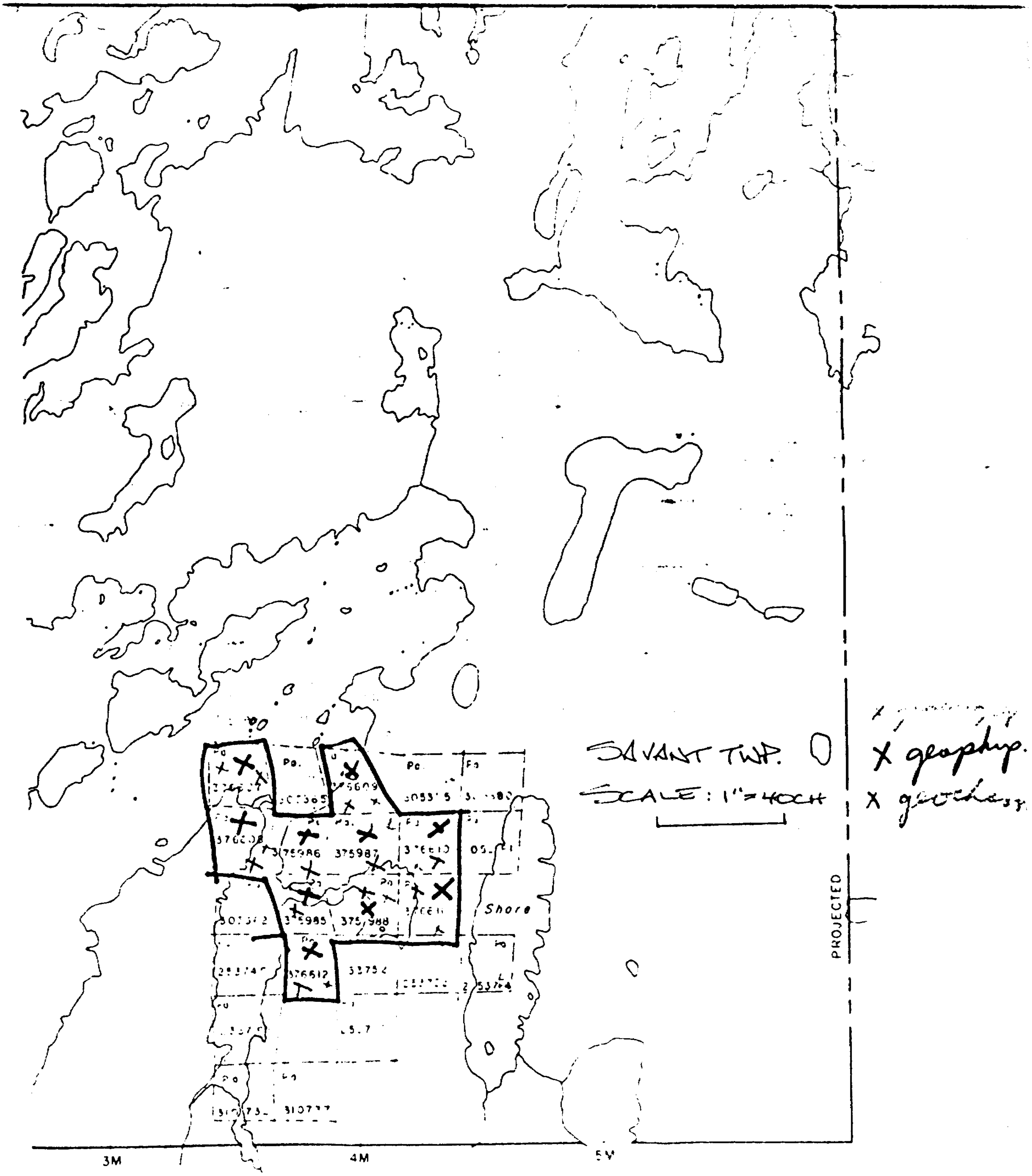
J.R. Morton
Acting Director
Lands Administration Branch

Whitney Block, Room 6450
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-6918

OJ:ie

cc: W.G. Wahl Limited
Toronto, Ontario
Attn: Mr. John L. Wahl

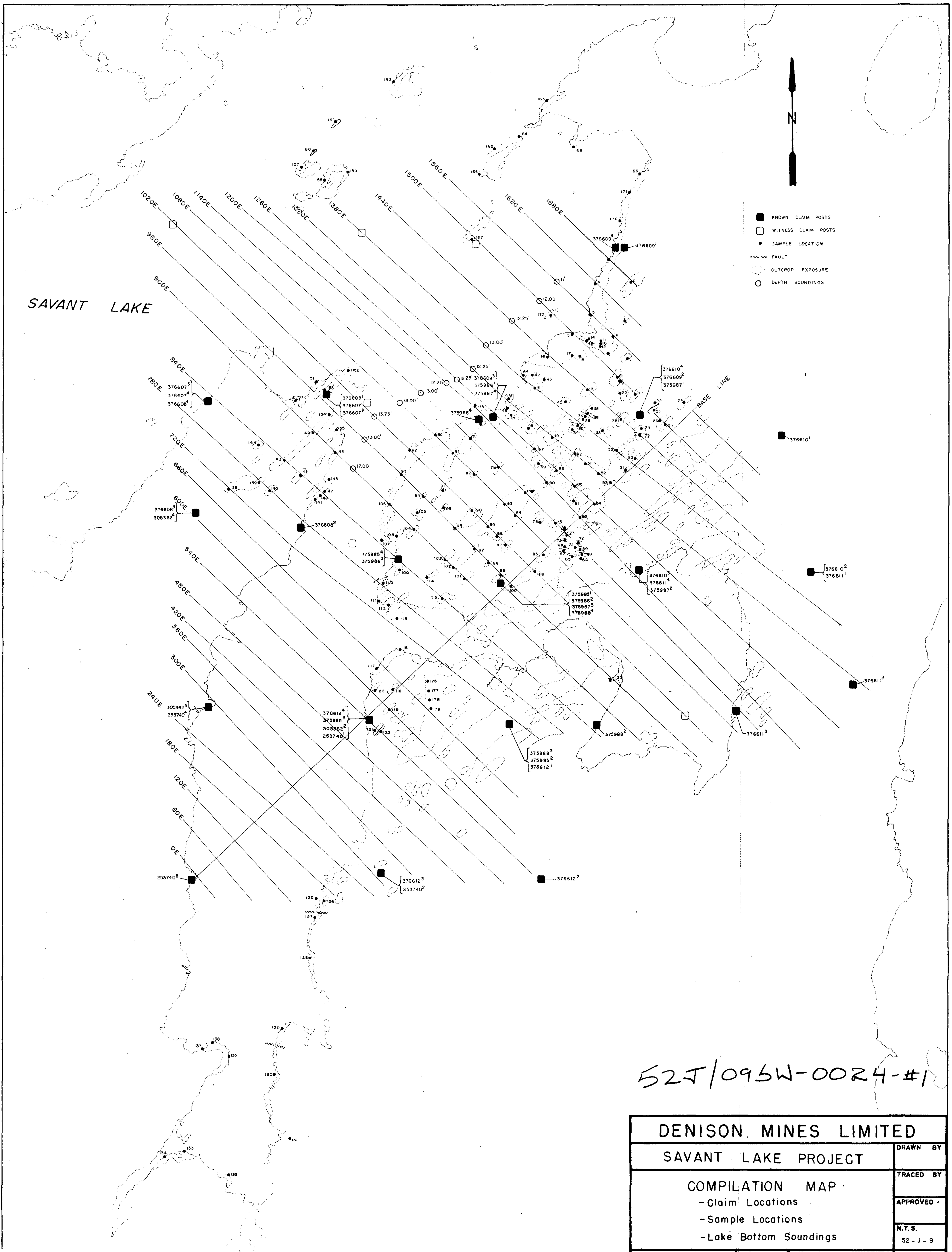
Resident Geologist
Sioux Lookout, Ontario

Po.
Pc
Fo
376608
375986
375987
375985
375/988
376612
375609
307365
305315
33754
310777
Shore
PROJECTED
3M
4M
5M
SAVANT TWP.
SCALE: 1"=40CH
X geophy.
X geochem.

Gillis Twp.

FOR ADDITIONAL INFORMATION SEE MAPS:

52J/09SW-0024 #1-#7



52J/09SW-0024-#1

DENISON MINES LIMITED

SAVANT LAKE PROJECT

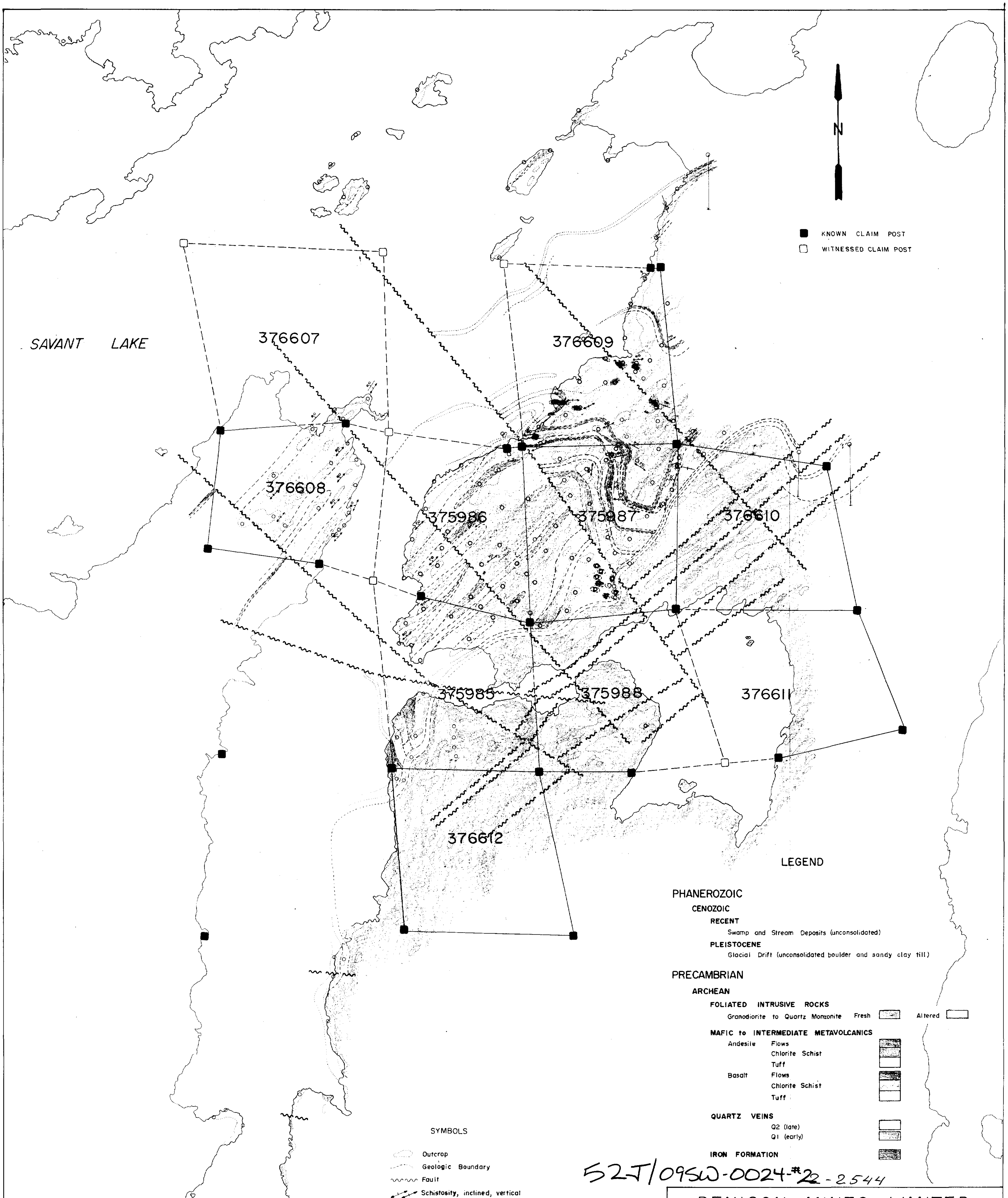
COMPILATION MAP

- Claim Locations
- Sample Locations
- Lake Bottom Soundings

DRAWN BY	
TRACED BY	
APPROVED	
N.T.S.	52 - J - 9
DWG. NO.	1

SEPTEMBER 1977

1" = 400'



LEGEND

PHANEROZOIC

CENOZOIC

RECENT

Swamp and Stream Deposits (unconsolidated)

PLEISTOCENE

Glacial Drift (unconsolidated boulder and sandy clay till)

PRECAMBRIAN

ARCHEAN

FOLIATED INTRUSIVE ROCKS

Granodiorite to Quartz Monzonite Fresh ▨ Altered ☐

MAFIC to INTERMEDIATE METAVOLCANICS

Andesite	Flows	▨
	Chlorite Schist	▨
	Tuff	☐
Basalt	Flows	▨
	Chlorite Schist	▨
	Tuff	☐

QUARTZ VEINS

Q2 (late)	☐
Q1 (early)	▨

IRON FORMATION ▨

SYMBOLS

- Outcrop
- Geologic Boundary
- Fault
- Schistosity, inclined, vertical
- Bedding, inclined, vertical
- Pillows
- Glacial Striations
- Sample Locations
- Drill Holes

52J/09SW-0024-#2-2.544

DENISON MINES LIMITED

SAVANT LAKE PROJECT

GEOLOGY

DRAWN BY

TRACED BY

APPROVED BY

N.T.S. 52-J-9

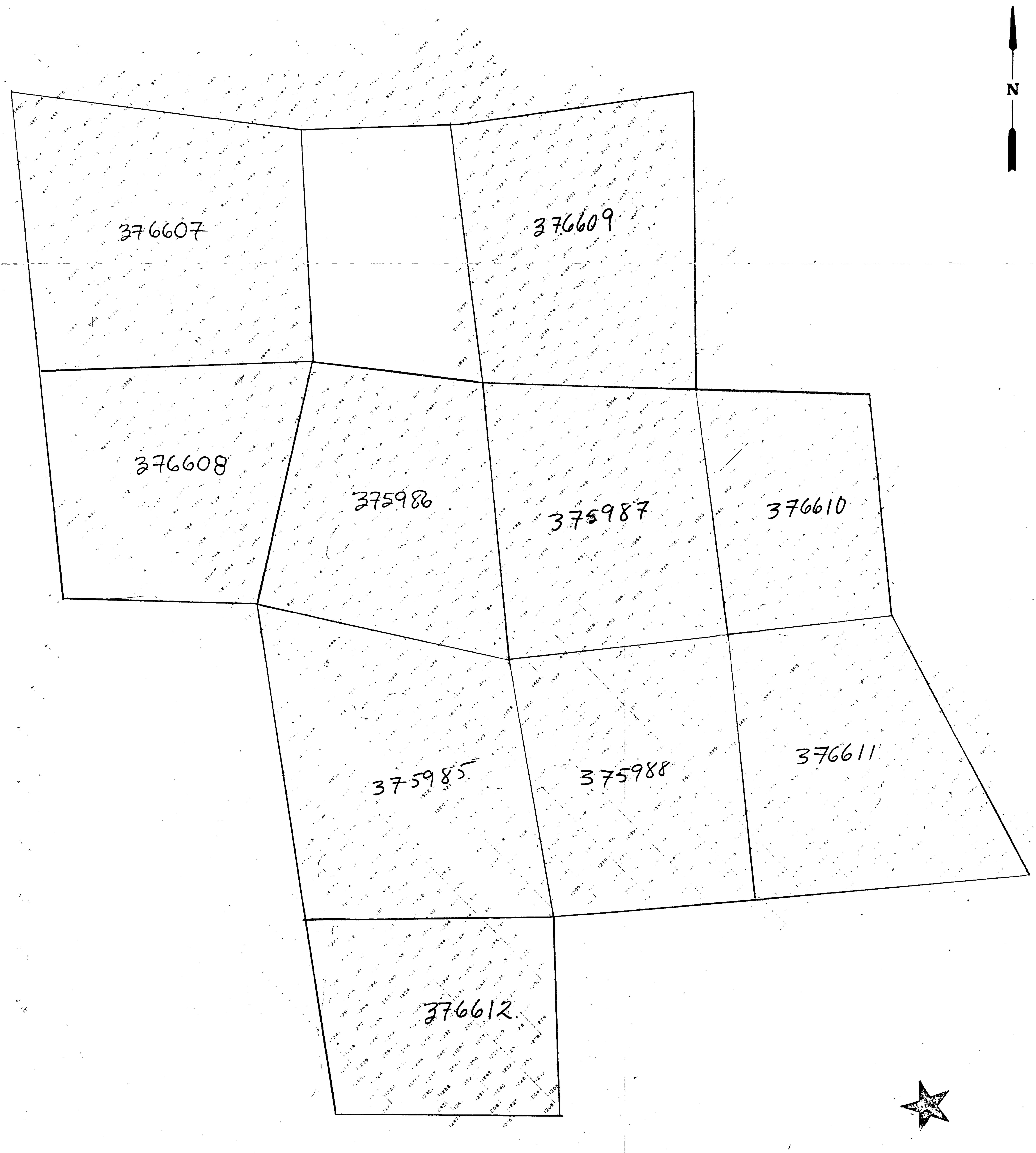
DWG. NO.

SEPTEMBER 1977

1" = 400'

John S. Wahl.

2.2544



52J/09SW-0024-#3

DENISON MINES LTD.

SAVANT LAKE PROJECT

MAGNETOMETER SURVEY

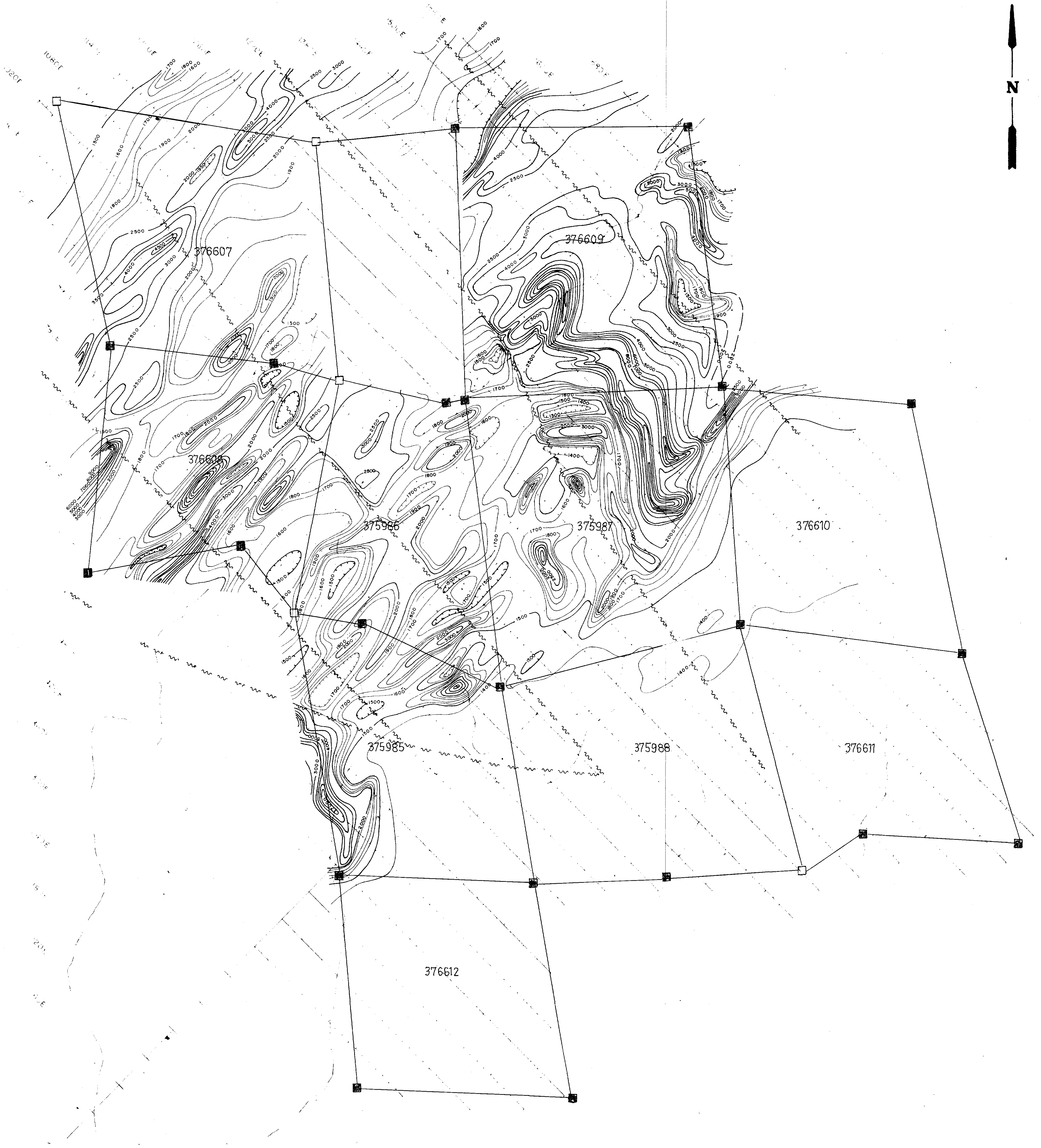
Corrected Total Field Values in Gammas

BACKGROUND: 59,000 gammas

52-J 9

W G WAHL Limited

1cm = 30m



52J/09SW-0024-#4

DENISON MINES LTD.

D. G. WAHL

SAVANT LAKE PROJECT

CONTOURED MAGNETIC DATA

Corrected Total Field Values in Gammas

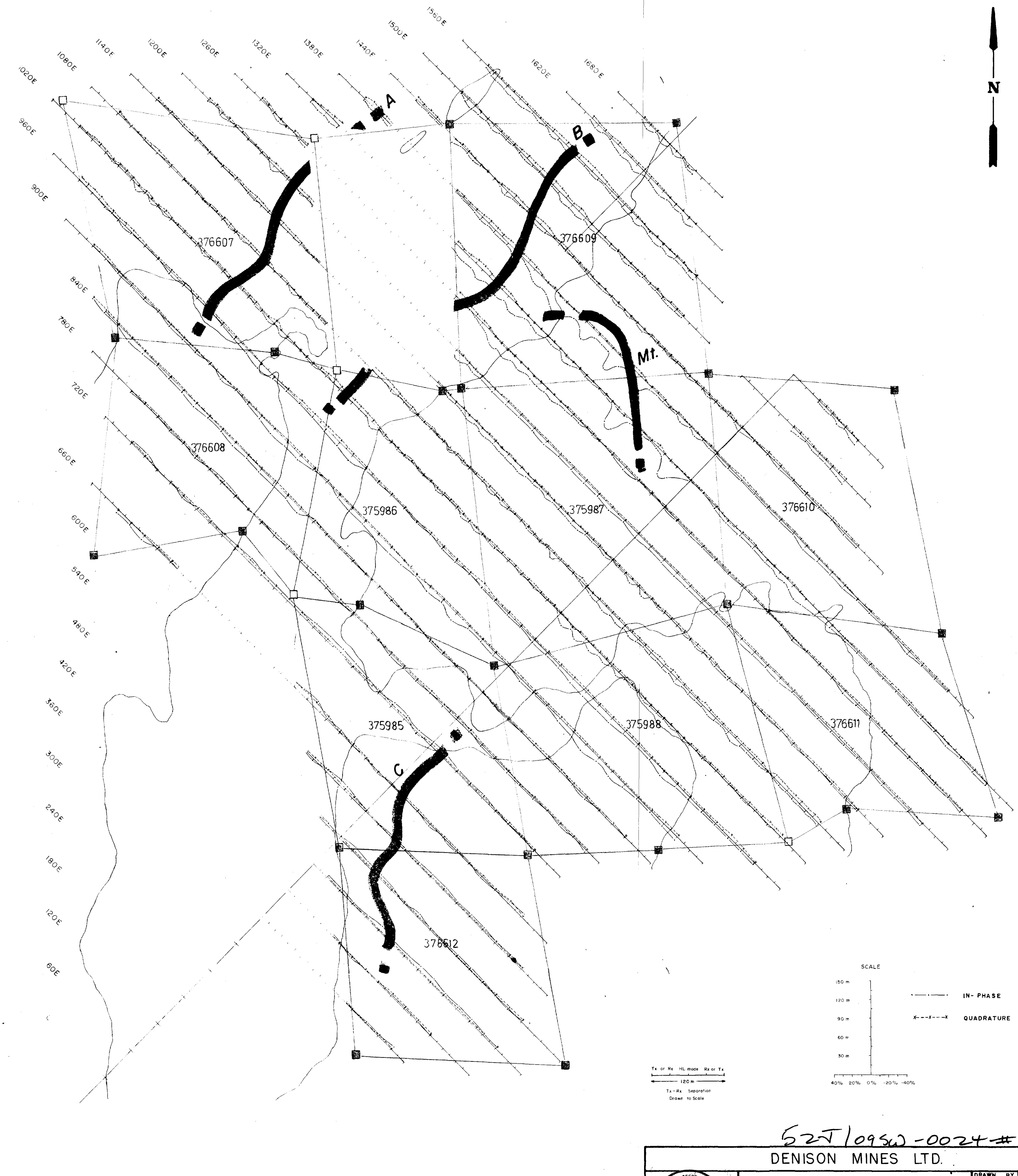
Background – 59,000 gammas

W.G.WAHL Limited

WGL

1cm = 30m

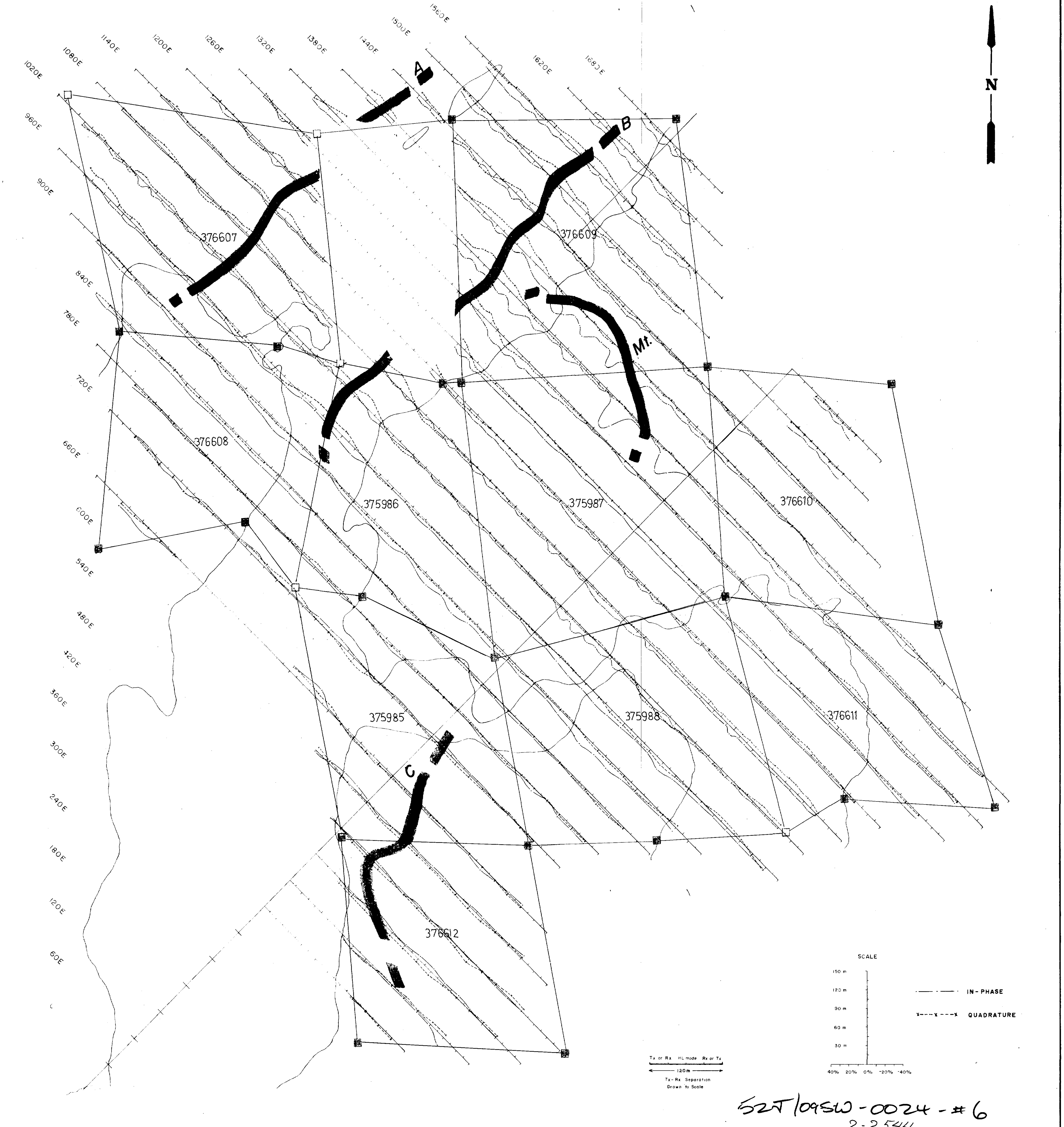
DRAWN BY	REV.
TRACED BY	REV.
APPROVED	REV.
N.T.S. 52-J-9	REV.
DWG. NO.	



▬ ▬ ▪ CONDUCTOR AXIS

52J/09SW-0024 #5

DENISON MINES LTD.		
REGISTERED PROFESSIONAL ENGINEER D. G. WAHL PROVINCE OF ONTARIO	SAVANT LAKE PROJECT	DRAWN BY	REV.
	MAXMIN II HORIZONTAL LOOP SURVEY 444 Hz	TRACED BY	REV.
		APPROVED	REV.
		N.T.S. 52-J-9	REV.
John L. Wahl	W.G. WAHL Limited	WGL	1cm = 30m	DWG. NO.



▬ ▬ ▬ CONDUCTOR AXIS

52J/09SW-0024-#6
2-2544

DENISON MINES LTD.

SAVANT LAKE PROJECT

MAXMIN II
HORIZONTAL LOOP SURVEY
1777 Hz

D. G. WAHL

John S. Wahl

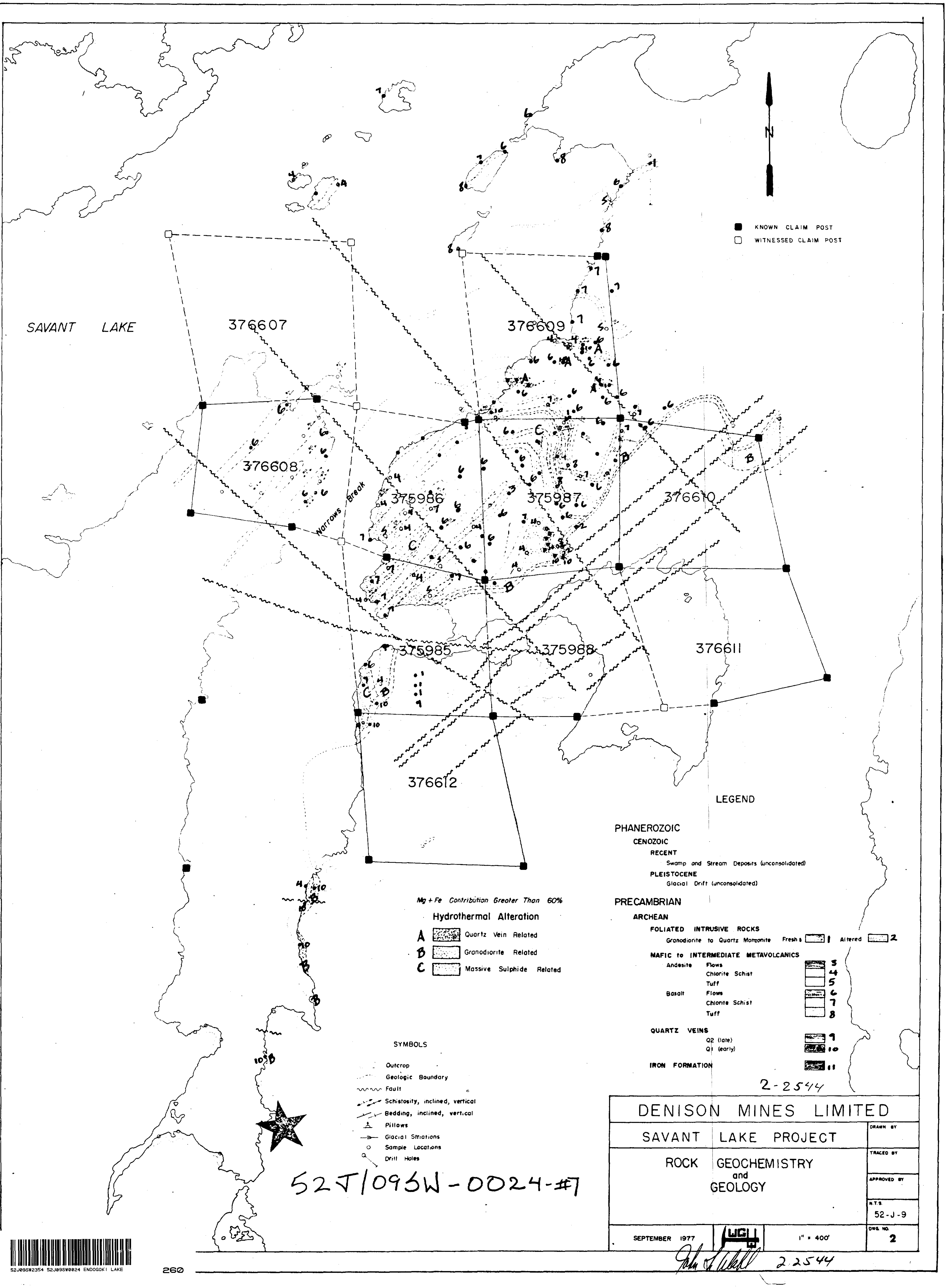
W.G.WAHL Limited

1cm = 30m

DRAWN BY	REV.
TRACED BY	REV.
APPROVED	REV.
N.T.S. 52-J-9	REV.
DWG. NO.	

2-2544

250



LEGEND

PHANEROZOIC
CENOZOIC
RECENT
Swamp and Stream Deposits (unconsolidated)
PLEISTOCENE
Glacial Drift (unconsolidated)

PRECAMBRIAN
ARCHEAN
FOLIATED INTRUSIVE ROCKS
Granodiorite to Quartz Monzonite Fresh 1 Altered 2
MAFIC to INTERMEDIATE METAVOLCANICS

Andesite	Flows	3
	Chlorite Schist	4
	Tuff	5
Basalt	Flows	6
	Chlorite Schist	7
	Tuff	8

QUARTZ VEINS
Q2 (late) 9
Q1 (early) 10

IRON FORMATION 11

Mg + Fe Contribution Greater Than 60%

Hydrothermal Alteration

A Quartz Vein Related
B Granodiorite Related
C Massive Sulphide Related

SYMBOLS

Outcrop
Geologic Boundary
Fault
Schistosity, inclined, vertical
Bedding, inclined, vertical
Pillows
Glacial Striations
Sample Locations
Drill Holes

2-2544

DENISON MINES LIMITED

SAVANT LAKE PROJECT

ROCK GEOCHEMISTRY
and
GEOLOGY

DRAWN BY
TRACED BY
APPROVED BY
N.T.S. 52-J-9
DWG. NO. 2

SEPTEMBER 1977
1" = 400'

52J/09SW-0024-#7

2.2544