CASSIAR PROJECT - 3991P

1979 REPORT

NTS 104P 1,4,5,6

Lat. 59° 15'

Long. 129° 46' 30"

By: Christopher J. Bloomer
March, 1980

Introduction

Shell Canada Resources Limited entered into an option agreement in March of 1979 with W. J. Storie on an 86 claim property near Cassiar, British Columbia after recognizing a potential for significant tin mineralization on the property (Figure 2).

Within the property are lead-zinc-silver occurrances known since 1922. Since that time several exploration companies have worked on the property. From the past work several bodies with an aggregate total of approximately 600,000 tonnes of mineralization grading 171 grams ag/tonne, 5% Pb, 4% zinc and trace Au were outlined. A stratabound, possibly volcanogenic, copper-zinc body of 90,000 tonnes grading 1.2% Cu and 0.9% Zn is also situated on the property. Another portion of the property is underlain by the Cassiar Batholith containing disseminated molybdenum mineralization. In addition there is an extensive quartz vein system outcropping on the property with potential for gold mineralization.

Tin potential of the silver-lead-zinc bodies became known during the summer of 1978 when samples taken by British Columbia Department of Mines Geologist Andre Panteleyev returned significant tin assays; one sample assayed 1.5% Sn across 3.6 (Pant Showing) metres and a grab sample from another showing assayed 3.5% Sn (Middle D-Zone). The tin values were proven to be from cassiterite.

Immediately following the signing of the option agreement with Storie, Shell staked 113 additional claims to cover favourable ground. These lands form the after acquired portion of the option agreement.

Beginning June 15, 1979 Shell personnel began detailed geological mapping of the property at a scale of 1:5,000 on orthophotgraphic base maps prepared by McElhanney Engineering. All known showings were prospected and accurately sampled and all mineralized sections from past drilling were sampled and assayed for tin. Pan concentrate and stream silt samples were taken in all drainages at 50 metre contour intervals. Pan concentrate samples were analyzed for Sn/Wo and silts were run for Cu/Pb/Zn. A total of 360 samples were taken. Routine soil samples were taken while mapping flat areas of the property and run for Cu/Pb/Zn along with Au near quartz veins.

The mapping programme showed that the Pb/Zn/Ag mineralization was hosted exclusively by Cambrian Atan Group Carbonates as replacements along major east-west and to a lesser extent southeast-northwest structural zones. One new showing was discovered during mapping (Granite Creek Showing) which ran 1.4% Pb, 0.63% Zn, 57 grams/tonne Ag, 0.12% Sn and 1.0 grams/tonne Au over 1 metre.

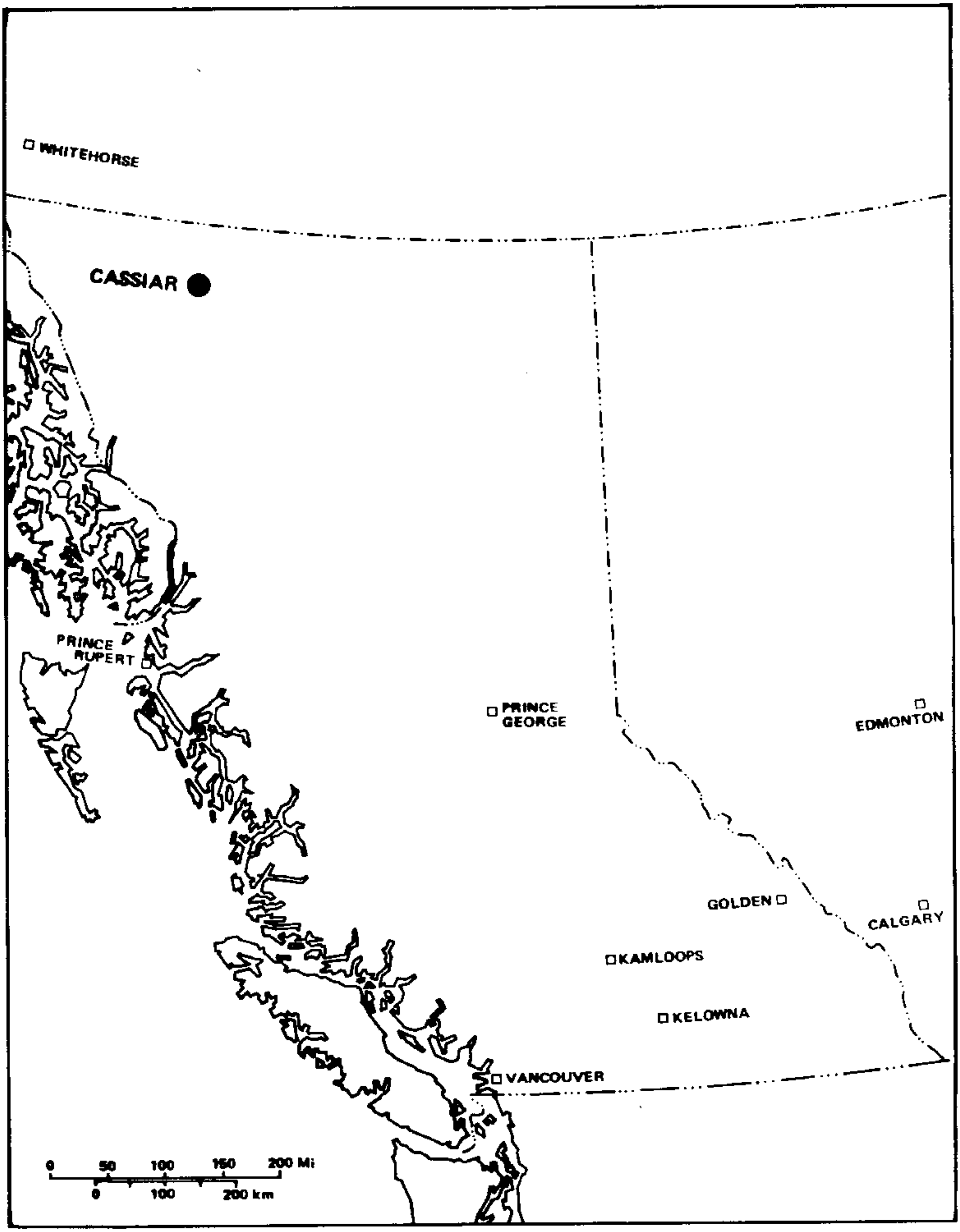

WHITEHORSE
CASSIAR
PRINCE RUPERT
PRINCE GEORGE
EDMONTON
GOLDEN
CALGARY
KAMLOOPS
KELOWNA
VANCOUVER
0 50 100 150 200 Mi
0 100 200 km

FIGURE 1

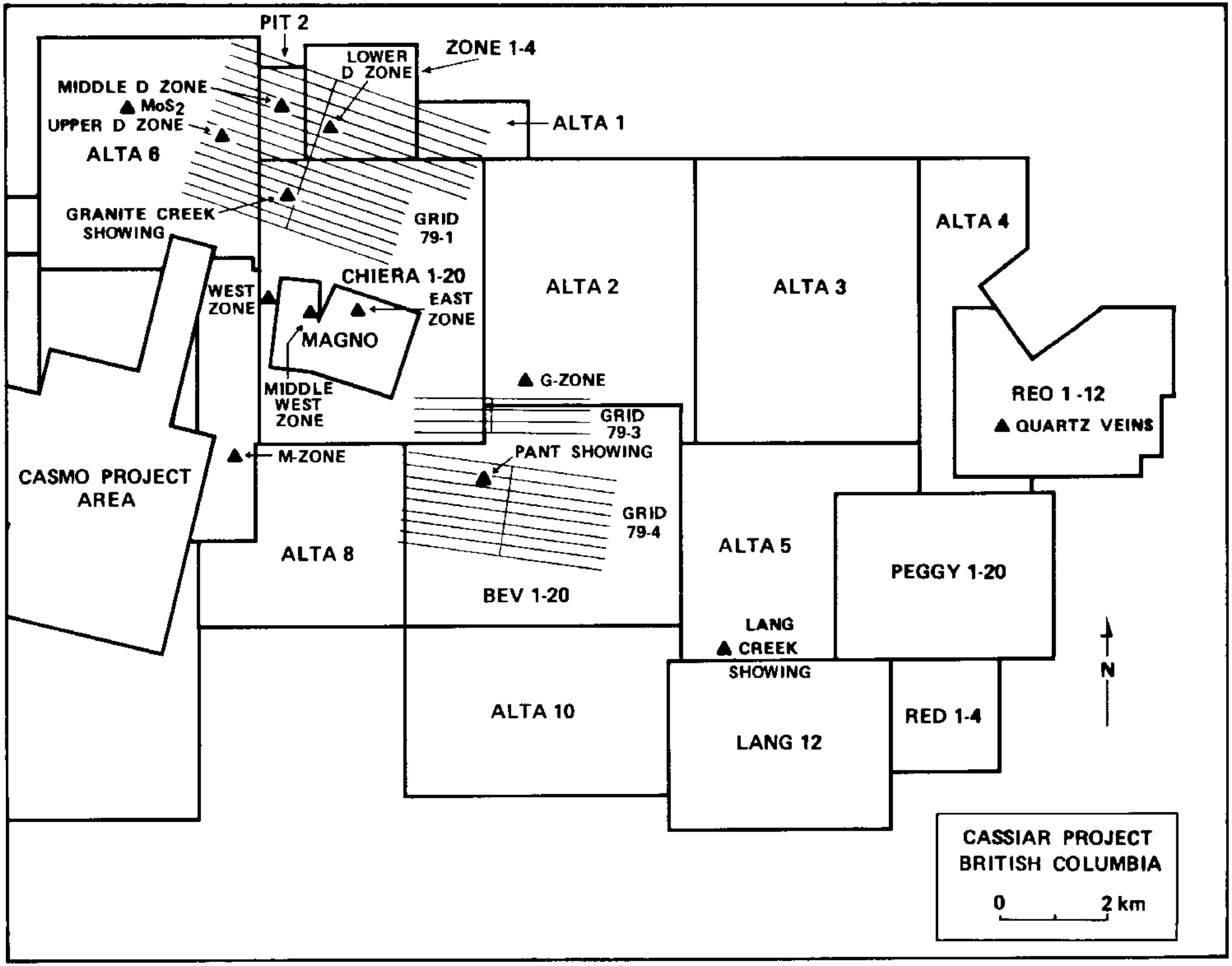

PIT 2
ZONE 1-4
LOWER D ZONE
MIDDLE D ZONE
MoS2
UPPER D ZONE
ALTA 1
ALTA 6
GRANITE CREEK SHOWING
GRID 79-1
ALTA 4
CHIERA 1-20
ALTA 2
ALTA 3
WEST ZONE
EAST ZONE
MAGNO
MIDDLE WEST ZONE
G-ZONE
REO 1-12
QUARTZ VEINS
GRID 79-3
M-ZONE
PANT SHOWING
CASMO PROJECT AREA
GRID 79-4
ALTA 5
ALTA 8
PEGGY 1-20
BEV 1-20
LANG CREEK SHOWING
N
ALTA 10
RED 1-4
LANG 12
CASSIAR PROJECT
BRITISH COLUMBIA
0
2 km

FIGURE 2

All tin bearing and lead/zinc/silver bearing occurrences are related to structural zones and are deposited as replacements in the Atan Carbonates. Mineralization in the "D" Zone and Magno area are situated immediately along and proximal to east-west faults. The Pant Showing occurs along the northwest-southeast trending faulted contact between Atan carbonates and Kechika shales.

During the second phase of exploration on the Cassiar Project further detailed work was concentrated within the D-Zone from the presumed contact between the Atan and the Cassiar Batholith and the Atan-Kechika contact and along the Atan-Kechika contact related to the Pant Showing.

Three grids were cut during the second phase; Grid 79-1, approximately 40 line kilometres over the D-Zone area, Grid 79-4, approximately 20 line kilometres over the Pant Showing area and Grid 79-4, approximately 6 line kilometres over the Atan-Kechika contact. Grids 79-1 and 79-4 were surveyed with I.P., Mag, and Crone Shootback E.M.. Only Mag was run over Grid 79-3. The I.P. survey was run over every second line with readings every 100 metres and 50 metres over anomalies, using a pole-dipole array. Mag was run on every line at 25 metre stations and 12.5 metre stations over anomalies. Shootback was run over those lines surveyed with I.P. and in between lines near anomalies using a horizontal loop mode (380 Hz and 1830 Hz) with 25 meter stations. Grids 79-1 and 79-4 were mapped at a scale of 1:2,500.

The I.P. Survey on Grid 79-1 served to outline the underlying lithologies and structures. Atan quartzites are shown to be resistivity highs, while the carbonates are moderately resistive. The Atan-Kechika contact is an extreme resistivity low. A mild chargability high is related to the Middle D-Zone and the Granite Creek Showing. The Atan-Kechika Contact is a zone of extremely high chargeability. Structural interpretation showed that the Middle D-Zone is situated along a nearly east-west trending fault and that the Granite Creek Showing is along a similar parallel fault.

An almost identical magnetic high is associated with the Middle D-Zone and the Granite Creek Showing. A slight magnetic trend follows the Atan-Kechika Contact. Several local mag highs were also outlined on Grid 79-1.

Shootback showed the Atan-Kechika Contact to be a multiple conductive zone. The Granite Creek Showing and the Middle D-Zone are both weakly conductive. Profiles across other areas of the grid were flat.

Similar results were obtained from the IP Survey on Grid 79-4. The Atan-Kechika Contact was especially well outlined as an extreme chargeability high and resistivity low. Contrary to Grid 79-1 the Atan carbonate unit on Grid 79-4 is present only as a thin wedge which pinches out along its contact with the Kechika Group. From resistivity, a west dipping thrust fault is interpreted along the Atan-Kechika Contact.

The Mag response on Grid 79-4 is flat except for a slight high along the Atan-Kechika Contact. Shootback was also flat except along the Atan-Kechika Contact where there is a broad multiple conductor zone.

The Mag Survey run over Grid 79-3 outlined an isolated anomaly within tremolitized Atan carbonates. Past drilling to test this anomaly cut 7.6 metres of massive pyrrhotite which when assayed returned nil values for Cu/Pb/Zn/Ag and Sn.

Exploration work carried out on the Cassiar Project during 1979 confirmed the presence of tin mineralization within sulphide replacement bodies in Cambrian Atan Group carbonates. The mineralization is emplaced along east-west structural zones as irregular shoots and lenses and along the structural contact zone between the Atan Group and the Kechika Group.

During 1980 a programme of approximately 700 metres of diamond drilling is proposed to test Mag and I.P. anomalies within carbonates underlying Grid 79-1 and to test the Atan-Kechika Contact on both Grids 79-1 and 79-4. Grid 79-1 is to be extended along Granite Creek with additional Mag, Shootback, and I.P. A grid controlled geochemical survey and a test VLF Survey is to be run over the Reo Claim quartz veins. A Shootback Survey with 400 metre line spacing will be carried out in Lang Valley to try and locate an extension of the Lang Creek Showing.

Summary

The 1979 field programme on the Cassiar Project commenced June 15, 1979 and terminated October 1, 1979. The following is a summary of field activities and results (Figures 1 and 2).

Shell optioned 86 claims from W. J. Storie near Cassiar, British Columbia. In May of 1978, 84 additional units were staked to tie up favourable ground surrounding the optioned claims; Alta 1 - 6 inclusive. Another 29 claims were added during August 1979; Alta 8 and 10. 115 units fall within the after acquired clause of the Option Agreement, Alta 1 - 6 inclusive and Alta 8. The 15 units of Alta 10 are 100% Shell.

The lithologies underlying the Cassiar Project are hosts for numerous mineralized occurrences which have been subjected to varying degrees of exploration since 1922. Six significant mineralized areas have been outlined by past exploration.

1. D-Zone (Pit, Zone and Chiera Claims): Pb/Zn/Ag mineralization as galena, sphalerite, magnetite, pyrite, pyrrhotite, pyrolusite, and siderite replacement bodies in Cambrian Atan Group carbonates. The best occurrence is 90,000 tonnes of drill indicated reserves grading 75 grams/tonne Silver, 3.3% Pb, and 6.3% zinc.

2. Magno Property: Pb/Zn/Ag mineralization in three zones as galena, sphalerite, magnetite, pyrite, pyrrhotite, pyrolusite, and siderite in Cambrian Atan Group carbonates. The three zones and their respective drill indicated ore potential are as below:

- East Zone - 142,500 tonnes of 4.06% Pb, 4.40% Zn, 110 grams/tonne Ag, 1 gram/tonne Au, over an average width of 5.5 metres.
- Middle West Zone - 85,000 tonnes of 9.43% Pb, 5.34% Zn, 250 grams/tonne Ag over an average width of 3 metres.
- West Zone - 221,000 tonnes of 5.4% Pb, 3.4% Zn, 200 grams/tonne Ag over an average width of 2.5 metres.

The East Zone and Middle West Zone underlay the Magno Claims held by Balfour Mines. The West Zone is covered by the Chiera Claim.

3. M-Zone (Northeast of the Alta-8 Claim): MoS_2 in fluorite, sericite, quartz fracture fillings. As well as disseminated in a Cretaceous quartz monzonite porphyry of the Cassiar Batholith. Past drilling indicated mineralization in quantities of less than 0.1% MoS_2; one hole assayed 0.23% MoS_2 over 5 metres. A small garnet-diopside, garnet-actinolite skarn with trace scheelite also outcrops proximal to the M-Zone.

4. Lang Creek Showing (Alta-5 and Lang Claims): 27,000 tonnes of 1.2% Cu, 0.9% Zn in chalcopyrite, chalcocite, sphalerite, pyrite massive sulphide lens in Devonian-Mississippian volcano-sedimentary rocks of the Sylvester Group.

5. Pant Showing (BEV Claim): 1.2% Sn in a cassiterite-bearing, arsenopyrite, pyrite, marcasite, siderite massive sulphide body. The mineralization occurs at a faulted contact between Cambrian Atan Group Carbonates and Cambrian-Ordovician argillites of the Kechika Group.

6. Quartz Veins (Reo Claim): Tetrahedrite and pyrite in massive quartz veins. Visible gold reported in the past. Soil samples gave consistant values greater than 1,000 ppb with a high of 3,600 ppb.

The initial phase of the exploration programme involved mapping and prospecting of the property at a scale of 1:5000 utilizing orthophotographic base maps. The primary object of the initial phase was to locate and sample all showings to determine their tin content and geological setting and to outline areas with potential for additional mineralization. A geochemical survey was also undertaken during the first phase.

Geological mapping was successfull in locating one new showing within the D-Zone along Granite Creek. The Granite Creek showing assayed 1.4% Pb, 0.63% Zn, 0.12% Sn, 57 grams/tonne Ag and 1.0 gram/tonne Au.

Soil samples taken near massive quartz veins on the Reo Claim gave values as high as 3,600 ppb. Otherwise, the geochemical survey failed to outlined any new anomalous areas other than those related to known mineralization.

Assays of mineralized core sections from past drilling indicated interesting tin mineralization in the Middle D-Zone and Magno areas. Three holes sampled from the Middle D-Zone returned the following:

R - 8	3.0 metres	0.86% Sn
R - 3	0.9 metres	0.22% Sn
	1.2 metres	0.33% Sn
R - 10	0.9 metres	6.5% Sn

One hole from the Middle West Zone ran 4.6 metres of 0.32% Sn.

As only a small fraction of mineralized core from past work was intact, a complete picture of the tin mineralization in the various zones could not be constructed.

Resampling of the Pant Showing confirmed previous assays. One small sulphide lens above the Pant Showing assayed 0.13% Sn over 0.5 metre while other sulphide "pods" were barren. 30 element spectrographs run on all samples showed a direct correlation between arsenic and tin.

Sampling of the showings confirmed the presence of tin mineralization in the replacement bodies. Assays from the past drill core showed substantial Sn mineralization in some of the drilled bodies; with a best assay of 6.5% Sn over 1 metre from one hole.

Two areas with favourable geology structure proximal to known mineralization were outlined for detailed geophysics and geological mapping. Approximately 60 line kilometres in two grids were cut over which 30 line kilometres of I.P. Surveys, 58 line kilometres of Magnetometer Surveys and 56 line kilometres of Shootback E.M. Surveys were run.

Geophysics further outlined the favourable structural and geological zones and pinpointed areas of potential mineralization warrenting diamond drilling.

No new geochemical anomalies were outlined other than those related to known mineralization.

Diamond drilling, further geophysical surveys, and geological mapping are proposed for 1980. The drilling will test geophysical anomalies within favourable structural zones as well as those mineralized showings not yet tested by diamond drilling. Grid 79-1 will be extended to cover favourable terrain that was not available for testing during 1979 and to close geophysical anomalies along its fringes.

While the Cassiar Project area is underlain by abundant scattered highgrade mineralization, to date the mineralization has proven to be irregular and widely dispersed along structural zones. The work completed to date by Shell has outlined favourable untested structures that may contain consistant strong mineralization. The work planned for 1980 is designed to test the potential of these structures and the continued viability of the property in terms of developing minable tonnages is contingent upon the results of this programme. There also exists a possibility for a buried cupola underlying the tremolatized limestone area, G-Zone, covered by Grid 79-3. This postulation is based on the presence of a pyrrhotite-pyrite-magnetite body within the altered limestone at depth and upon incipient quartz veining and trace sphalerite along hairline fractures, downslope of Grid 79-3 and upslope of Grid 79-4. No contingency has been made to drill this area in 1980, however, further detailed examination of the area will be carried out.

Table of Contents

Table of Contents (continued)

LIST OF TABLES

List of Figures

1. Property

Shell Canada Resources Limited has 17 contiguous claims consisting of 199 units. These claims are:

Alta 1:	Consisting of 2 units recorded on May 31, 1979
Alta 2:	Consisting of 20 units recorded on May 31, 1979
Alta 3:	Consisting of 20 units recorded on May 31, 1979
Alta 4:	Consisting of 10 units recorded on May 31, 1979
Alta 5:	Consisting of 16 units recorded on May 31, 1979
Alta 6:	Consisting of 16 units recorded on May 31, 1979
Alta 8:	Consisting of 14 units recorded on August 21, 1979
Alta 10	Consisting of 15 units recorded on August 21, 1979
Pit 1 & 2:	Consisting of 2 units recorded on April 9, 1973
Zone 1-4:	Consisting of 4 units recorded on April 4, 1975
Chiera 1-20:	Consisting of 20 units recorded on March 31, 1975
Reo 1-12:	Consisting of 12 units recorded on May 27, 1976
Peggy 1-12:	Consisting of 12 units recorded on Febuary 15, 1977
Red 1-4:	Consisting of 4 units recorded on June 29, 1977

Assessment credit applied for in this report is for all of the claim units (195) with the exception of Zone 1-4 (4 units) and Pit 1 & 2 (2 units)

2. Location and Access

The Cassiar Project area is situated approximately 2 kilometres southeast of the town of Cassiar. The town of Cassiar is unincorporated and is operated by the Cassiar Asbestos Corporation.

Cassiar is situated approximately 500 kilometres from Whitehorse, Yukon Territory and 480 kilometres from Stewart, British Columbia via all-weather gravel highways. A gravel airstrip capable of receiving up to twin otter size aircraft lies 3 kilometres from the townsite.

The town is serviced by regular bus service to Watson Lake, Yukon Territory and by trucking service to Watson Lake and Stewart.

The project area is easily accessed with a four wheel drive vehicle via mumerous bulldozer roads criss crossing the property.

3. Geology

3.1 General

The following geological summary is based on reconnaissance and detailed geological mapping during 1979 by Shell personnel and on maps and reports from the Geological Survey of Canada (G.S.C. Memoir 319 McDame Map Area, Cassiar District, British Columbia, 1963).

The project area is situated on the western limb on the McDame Synclinorium; a major northwest striking structural feature. Pre-cambrian through Devonian sedimentary rocks form the east and west limbs of the synclinorium with a Devono-Mississippian volcanic and sedimentary package forming the core.

The lowermost unit outcropping on the property are quartzites and carbonates of the Lower Cambrian Atan Group. Conformably overlying the Atan Group to the east is the Cambrian and Ordovician Kechika Group, a shale and slate sequence with some argillaceous sections. The Kechika Group is conformably overlain to the east by Ordovician and Silurian carbonate rocks of the Sandpile Group and Middle to Upper Devonian Carbonate rocks of the McDame Group. A thrust fault is proposed between McDame Group rocks and Devonian-Mississippian volcano-sedimentary rocks of the Sylvester Group.

To the west the quartzite unit of the Atan Group is in contact with Cretaceous intrusive rocks of the Cassiar Batholith.

Strikes of N20^{o}E to N20^{o}W and dips of from 30^{o} to 70^{o} east are consistant across the property for all rock units; minor variations caused by folding and faulting occur locally.

Regionally, contacts between the various rock units are considered to be conformable while faulted contacts are interpreted between units within the project area. This may be due to movement along the contact planes during the formation of the synclinorium. Overall, the lithologies underlying the project area are transected by several major east-west trending and northwest-southeast trending strike slip faults and local splays off the major faults.

Pb, Zn, Ag, Sn mineralization is localized proximal to east-west structural zones as replacement bodies hosted in the Atan Carbonate Member and are considered to be genetically related to MoS_2 bearing intrusive phases of the Cassiar Batholith outcropping immediately to the west of the property.

Cu/Zn mineralization occurs at the contact between Sylvester Group cherty argillites and andesitic-dacite pyroclastic volcanics.

The project area was mapped at a scale of 1:5000 on orthophotographs prepared by McElhanney Engineering and are included as Figures 1 - 6. Detailed geology is presented on 1:2,500 scale grid maps included as Figures 7 and 8.

3.2 Lithology

3.2.1 Lower Cambrian

3.2.1.1 Atan Group

The Atan Group attains a maximum thickness of 1,000 metres over its regional exposure. Within the project area the Atan Group appears to be no more than 500 metres thick. The group comprises limestone, dolomite, quartzite, shale, slate, siltstone, and minor argillite.

3.2.1.1.1 Atan Group - Lower Quartzite Member

Compositionally the quartzite varies from pure quartzite to one in which an argillaceous component forms the bulk of the rock. The quartzite is thickly bedded in its lower section grading upward into thinly bedded to crossbedded to laminated sections at the top of the section. Interbeds can be tan, rose, white, maroon, and green. The fine grained, green, chloritic beds predominante in the basal section. The argillaceous component increases toward the top of the sections where there are interbeds up to 10 cm thick between quartzite beds.

Pyrite and pyrrhotite are common throughout the quartzite section, occurring as disseminations, stringers, platy partings along bedding surfaces, and as disseminations and clots in chloritic patches.

Where the quartzite unit is in contact with the intrusive rocks, along the western border of the property, it is severely hornfelsed. The hornfelsic quartzite is distinguished by recrystallization of the purer quartzite beds, the development of andalusite, chlorite, and biotite in the more argillaceous beds, and the development of micaceous-andalusite schists in the dominantly argillaceous beds. Pyrite and pyrrhotite content also increase with the degree of hornfelsing to the point where conformable lenses of mainly pyrite are formed within the quartzite along the immediate contact with the intrusive*. The increase in pyrite - pyrrhotite is especially notable in the green chloritic beds. One section of bleached siltstone - argillite was noted on Grid 79-4 along the extreme eastern contact with the intrusive, with remnant cubic pyrite up to 5 mm. Some of the pyrite lenses contain trace amounts of chalcopyrite.

* Garnet-diopside and garnet-actinolite skarn is sometimes present along the intrusive contact containing minor scheelite.

The only observed lithological contact between the Atan Quartzite Member and the overlying Atan Carbonate Member lies within Granite Creek on Grid 79-1. There, the contact is gradational over a 10 metre section with laminated interbeds of argillaceous quartzite in laminated blue-grey to light grey siliceous limestone grading into massive limestone. Other contacts on the property between the quartzite and the carbonate are zones of extreme faulting and brecciation.

3.2.1.1.2 Atan Group - Upper Carbonate Member

The carbonate unit of the Atan Group is composed of laminated to thickly bedded to massive blue-grey to dark grey limestones, buff, pink, and light grey dolomite, massive and fine grained buff coloured marble, and minor intercalations of quartzite, shale and slate.

Near the contact with the underlying quartzite unit the limestone is blue-grey to dark grey laminated with intercalated argillaceous quartzites. One breccia section was noted near the contact. Throughout most of the section the limestone is thickly bedded to massive with intermittent flaggy portions.

Dolomite occurs as yellow, buff, brown and rose in small and large scale patches in structural zones within the limestone. The pinkish sections are due to the presence of rhodocrosite and chlorite, as local stringers and patches with tremolite in the more altered and broken sections. Locally within the more altered sections, dark brown sphalerite crystals are lightly dispersed along hairline fractures.

Marble occurs as irregular patches within the limestone. Some areas are massive, consisting of mostly calcite crystals 2 - 5 mm in size, weathering in places to calcite sand. The marble can also be fine grained and well indurated and sometimes siliceous. Fine grained marble has also weathered to a sandy material in some areas. Trace chalcopyrite and pyrite as pyritohedrons are also associated with the dolomite.

Calcite "veins" up to 1 cm thick occur as swarms shot throughout highly broken unaltered limestone.

A large area of the limestone has also been totally altered to tremolite. This may be a thermal metamorphic effect of a shallow (?) cupola off the main batholith underlying the altered area. Some minor quartz veining and trace sphalerite was also noted associated with the tremolite zone.

Silver-lead-zinc mineralization is

emplaced as irregular replacement shoots along east-west structural zones within the Atan Carbonate Unit. The structures appear to be tensional features possibly related to the intrusive body to the west. Locally, the replacement bodies are conformable but are mostly confined to the structural zone. Galena with a silver-lead ratio of approximately 1:1 and sphalerite comprise the bulk mineralogy of the showings. Gangue material is usually siderite, carbonate tremolite and silica with varying quantites of pyrolusite. Fine grained cassiterite is associated with arsenopyrite, in some showings. Pyrrhotite, pyrite, and magnetite also occur in varying quantities within the mineralized showings. Barren pyrite-pyrrhotite, pyrite, and pyrrhotite massive sulphide bodies also replace the limestone irregularly along the structural zones. The limestone is universally altered to dolomite proximal to the sulphide bodies. Mineralization is sometimes spatially related to basic dykes situated along the structures.

The mineralized shoots vary in thickness from several centimetres to up to 7 metres. Diamond drilling has shown that the mineralization can achieve volumes of up to a few hundred thousand tonnes with average grades of 171 grams/tonne Ag, 5% Pb, and 4% Zn with some Au and Sn.

3.2.2 Cambrian and Ordovician

3.2.2.1 Kechika Group

The Kechika Group is dominantly a dark grey to black weathering sequence of argillite, cherty argillite, carbonaceous argillite, calcareous argillite and minor dark grey coarse limestone. The group is thinly bedded to laminated with a pervasive slatey cleavage. Structurally the rocks are tightly folded and crumpled.

While a conformable contact with the underlying Atan Group is presumed, within the project area this contact is a zone of intense faulting.

Pyrite is present as disseminations throughout the sequence. The more carbonaceous sections can contain up to 1% pyrite as wisps along bedding planes, disseminations, and clots up to 1 cm.

A faulted zone also defines the upper contact of the Kechika Group with the overlying Sandpile Group.

3.2.3 Ordovician and Silurian

3.2.3.1 Sandpile Group

Within the project area the Sandpile Group is a distinctive sequence of laminated light grey to grey dolomite and dolomitic sandstone with local interbeds of dark grey quartzite. Bedding is generally laminated to thinly bedded with a few dolomite beds up to 1 metre in thickness.

The Sandpile Group is structurally competant and thus only slightly folded.

A fault is interpreted between the Sandpile Group and the overlying McDame Group.

3.2.4 Middle and Upper Devonian

3.2.4.1 McDame Group

Dark grey dolomite and limestone constitute the McDame Group. The group is well bedded with thicknesses of from several centimetres to one metre for individual beds. Seams of white chert and chert nodules are common throughout.

Within the project area the McDame is highly folded and contorted with breccia sections. The contact with the overlying Sylvester Group is faulted.

3.2.5 Devonian-Mississippian

3.2.5.1 Sylvester Group

The Sylvester Group is a sequence of intercalated basic to intermediate volcanic flows and pyroclastics, argillite and minor limestone. The Group occupies the core of the McDame Synclinorium.

3.2.5.1.1 Sylvester Group - Volcanic Unit

The volcanic unit of the McDame Group is dominantly basalt to andesite with horizons of dacite. Flow rocks are the predominant lithology, with intercalated horizons of tuff through agglomerate. The pyroclastic varieties are mostly intermediate in composition. Pillowed sections and pillow breccia sections of limited extent were also noted.

The flow rocks are massive, fine to medium grained, and sometime porphyritic. Pyroxene and to a lesser degree plagioclase make up the porphyritic phase. A common characteristic of the fine grained flow rocks are networks of hairline fractures filled with chlorite or epidote.

The pyroclastic rocks are mostly fine grained tuffs occurring as thin lenses and horizons within the flows. Agglomerate phases outcrop in an arcuate zone peripheral to a small planer area atop a peak at the eastern extreme of the project area within the Alta-3 Claim. The agglomerate consists of angular pieces of from 2 to 10 cm set in a fine grained tuffaceous matrix grading into tuff. A collapsed volcanic vent area is presumed to be outlined by the agglomerate zone.

3.2.5.1.2 Sylvester Group - Argillite Member

Intercalated within the volcanic rocks are laminated to thinly bedded cherty argillites, calcareous argillites and graphitic argillites. They are light grey to grey-black to black with minor interbeds of grey-green tuff. A medium grained pyritic "grit" is presently in some sections.

Exposed along Lang Creek is a Cu/Zn massive sulphide body at the contact between a pyritic cherty argillite and an intermediate tuff horizon. The mineralization is a seemingly conformable body of chalcopyrite, chalcocite, and pyrite. The tuff horizon is stained with malachite and contains disseminated chalcopyrite and chalcocite. Past diamond drilling on the showing has outlined 27,000 tonnes of 1.2% Cu and 0.9% Zn.

To the north of the showing along the same stratigraphic horizon are several patches of malachite staining with disseminations of chalcopyrite and chalcocite; no other sulphide lens were associated with the disseminated mineralization.

3.2.6 Cretaceous

3.2.6.1 Cassiar Batholith

A porphyritic quartz monzonite and granodioritic phase of the Cassiar Batholith outcrops on the southern portion of the property on the Alta-8 Claim and in the northwest underlying the Alta-6 Claim. The lithology to the southwest is mainly a light grey to grey biotite granodiorite grading into a pink porphyritic quartz monzonite to the east at the contact. Phenocryst are mainly plagioclase feldspar up to 1.5 cm in size with minor phenocrysts of microcline feldspar. The rock is locally kaolinized and sericitized with some pyrite. Pneumatolytic fracture fillings of quartz, sericite, and light purple fluorite occur locally within the quartz monzonite phase and sometimes contain molybdenite. Some small aplite dykes occur along the contact zone. To the northwest, on the Alta-8 Claim, the intrusive is a quartz monzonite porphyry, pinkish in colour, with mantled plagioclase crystals up to 2 cm. An area of massive quartz appearing as a small dome approximately 2 metres across and a quartz vein or dyke approximately 0.5 of a metre thick outcrops on a peak within the middle of the claim and contains rosettes of molybdenite.

A pervasive jointing pattern striking roughly east-west and dipping shallowly to the north is present throughout the intrusive.

Along the southwest contact with the Atan Group sediments immediately northwest of the Alta-8 Claim, are garnet-diopside, garnet-actinolite, skarn lenses and massive pyrite magnetite replacement bodies within dolomitized limestone. The skarns contain traces of disseminated scheelite mineralization while the pyrite bodies are barren.

Within the project area the contact of the batholith is generally flat lying in the southwest to vertical in the northwest.

3.2.7 Quartz Veins and Greenstone Dykes

An extensive zone of massive quartz veins outcrops within the Reo Claim Group. The quartz is exposed for about 300 metres along a cat road on the claim group, occurring as veins of up to 5 metres in thickness emplaced in a carbonatized zone within andesites of the Sylvester Group. The quartz varies from massive white "bull" quartz to vuggy, graphitic quartz to massive white vuggy quartz with patches and knots of tetrahedrite and lesser chalcopyrite. Visible gold has been reported in the tetrahedrite-bearing quartz and soil samples taken along the cat road ran from 100's of ppb to a high of 3,600 ppb. The veins strike approximately north-south and appear to have an almost vertical dip.

Quartz veins also occur along the batholith contact and within Atan sediments proximal to the contact. These veins are small and discontinuous and are unmineralized.

Within the Alta-6 Claim Group is an area of massive quartz with rosettes of molybdenite within a quartz monzonite porphyritic rock of the Cassiar Batholith.

East-west striking greenstone dykes irregularly crosscut all the lithologies on the property. The dykes are dark green to light grey in colour and fine grained and sometimes porphyritic. The phenocrysts vary from euhedral plagioclase up to 1 cm in size to rounded knots of pink k-feldspar to rounded and fractured quartz phenocrysts up to 5 mm in size. Some of the dykes carry disseminated pyrite. Thickness varies from 0.5 of a metre to 2 metres. The largest dyke occurs with Pb/Zn/Ag mineralization along an east-west structure on the Magno Property and is of an andesitic composition. .

The presence of quartz and k-feldspar and the porphyritic nature of some of the dykes along with the east-west orientation points to a possible genetic relationship with the Cassiar Batholith. However, if Sylvester Group volcanic rocks have a conformable relationship with the underlying Paleozoic sediments, the dykes may be feeder dykes for the volcanic rocks.

4. Structure

Regionally, the rocks underlying the Cassiar Project fall along the western margin of the McDame Synclinorium and are considered to be a conformable sequence. However, within the project area, faulted contacts were observed between all the rock units which may be due to movement related to the formation of the synclinorium.

Northwest-southeast strikes and easterly dips are consistant across the property with local variation attributed to internal folding and faulting.

Vertical east-west trending fault zones are hosts for Pb/Zn/Ag replacement mineralization and to a lesser degree fault zones trending approximately N160^{o}E. The east-west fault system is the most prominent and best developed structural feature. This east-west trend is also reflected within the intrusive rocks by a pervasive jointing system trending N70^{o}E with 10 - 15^{o} dips to the north.

Both Granite Creek and Marble Creek appear to be fault controlled.

5. Grid Geology

5.1 Grid 79-1

Grid 79-1 is situated over the D-Zone and covers an area south between Granite and Marble Creeks. The grid is underlain by Atan Group quartzites and carbonates and Kechika Group argillites and shales. Geological mapping was completed over the grid at a scale of 1:2,500 and is presented as Figure 9.

Quartzites and hornfelsic quartzites are exposed along the western margin of the grid between lines 7+00S and 13+00S and within Granite Creek. Between lines 7+00 south and 13+00S the rock is a hornfelsed, bedded to laminate, green, maroon, rose and tan quartzite with disseminated pyrite and pyrrhotite. The hornfelsing is strongest at the ends of lines 12+00S and 13+00S where the rock is buff to rose colour with a sandy texture; quartz veining is also present in the area with one large quartz vein at the end of line 13+00S. Intrusive rocks outcrop approximately 200 metres west of line 13+00S with the actual contact with the quartzites near the western edge of the grid. The quartzite exposed within Granite Creek are a less hornfelsed laminated to thinly bedding quartzite with some pyrite. Along the exposure in Granite Creek the quartzite unit grades into a laminated blue-grey limestone with interbeds of argillaceous quartzite. A thin breccia section is present along the contact zone within the limestone. A fault zone defines the contact between the quartzite and limestone at the western limit of line 9+00S.

The center portion of the grid is underlain by the Atan Carbonate. The best exposures occur at the confluence of Granite and Marble Creeks and on Marble Creek between lines 14+00S and 15+00 south from 2+50 East to 4+25 East. Blue-grey laminated, bedded, and flaggy limestone form the unaltered limestone in Marble Creek and buff to grey dolomite and massive tremolite represent the altered limestone in Granite Creek. A 3 metre thick band of argillaceous quartzite within blue-grey limestone outcrops within Marble Creek.

Four showings outcrop on Grid 79-1; the Lower, Upper and Middle "D" Zone, and the Granite Creek Showing; all are hosted in the Carbonate Rocks. The Middle and Upper "D" Zone and the Granite Creek Showing are mainly composed of galena, sphalerite, siderite, pyrolusite, pyrite, pyrrhotite, and magnetite associated with faults. The Lower "D" Zone is a pyrrhotite-pyrite showing along the faulted contact between the Atan and Kechika Groups. A small galena, sphalerite, pyrite, siderite showing fills 10 cm fault gash outcropping in Marble Creek.

Only one outcrop of the Kechika Group occurs on the grid; at the eastern ends of lines 14+00S and 15+00S graphitic argillite, cherty argillite, and shale with some disseminated pyrite constitute the Kechika Group. A small pyritic and graphitic shale unit is exposed along line 3+00 South at 2+50 East in a fault zone in contact with limestone and dolomite and may also be Kechika Group.

The contact between the Atan Group and Kechika Group is considered to be faulted.

Three main fault zones were identified on the grid, one situated along Granite Creek, an east-west fault running through the Middle "D" Zone, and an east-west fault near the Granite Creek Showing. The junction between Granite Creek and Marble Creek is heavily faulted and the limestone altered to dolomite as is the quartzite-carbonate contact in the Upper "D" Zone.

5.2 Grid 79-4

Grid 79-4 is situated on the south facing slope north of Lang Creek. The baseline on Grid 79-4 essentially marks the contact between the Atan Quartzites on the western half and the Kechika Argillites on the eastern half. A thin wedge of recrystallized Atan Limestone pinches out against the Kechika Group in the northern portion of the grid near the baseline. The grid was mapped at a scale of 1:2,500 and is presented as Figure 10.

The quartzites are laminated to thinly bedded green, rose, and buff in colour with some pyrite and pyrrhotite which grade to the west into hornfelsed quartzite. The hornfelsic quartzite is maroon to buff in colour with patches of andalusite and andalusite schists in the more argillaceous beds. Small quartz veins perhaps related to the intrusive outcrop along line 6+00N at 6+50W.

The Kechika Group is made up of argillite, graphite argillite, cherty argillite, and minor shale. A graphitic phyllite with pyrite as stringers marks the contact and disseminations zone with the Atan Group.

The Pant Showing outcrops between lines 6+00N and 7+00N at 1+00 West and is situated along the fault contact between the Atan and Kechika Groups. The showing is bounded by a graphitic phyllite on the east and a recrystallized light grey banded limestone with tremolite on the west. The limestone appears to pinch out immediately south of the showing and widens out into a wedge shaped feature to the north. Cassiterite along with pyrite, arsenopyrite, marcasite and siderite make up the mineralogy of the showing.

6. Geochemistry

6.1 Reconnaissance Geochemistry

Two hundred and twenty-seven geochemical samples were taken across the property during 1979. Samples were taken of all drainages at a minimum of 50 metre intervals along with some soil samples in low lying areas especially near quartz veins. Samples were analysed by Chemex Labs in Vancouver.

6.1.1 Method

When sampling drainages a 1 kg to 2.25 kg sample was taken at each station. The sample was then screened to -20 mesh and split in two. One split was bagged and sent as a silt sample and run for Cu/Pb/Zn/Mo and sometimes Sn. The other portion was panned and run for Sn/Wo.

Soil samples were taken from the B-1 horizon.

6.1.2 Results

Geochemistry failed to outline any new areas warrenting further follow up for copper, lead, zinc, tin or tungsten. Anomalies in these elements were readily found to be due to known mineralization.

Gold values in soils proximal to quartz veins always returned anomalous values, especially near the Reo Claim quartz system. This area is sufficiently anomalous to warrent further follow up.

Interesting molybdenum anomalies were outlined in the G-Zone Area on Map Sheet 5. Further follow up is also necessary for this area.

Calculations for background and anomalous values were made for Cu, Pb, Zn, and Mo and are presented below:

	Cu	Pb	Zn
Background (ppm)	96	134	530
Third Order (ppm)	96 - 135	134 - 216	530 - 799
Second Order (ppm)	153 - 210	216 - 297	799 - 1068
First Order (ppm)	+210	+297	+1068

	Mo	Sn (Panned Concentrate)
Background (ppm)	35	64
Third Order (ppm)	35 - 59	64 - 116
Second Order (ppm)	59 - 83	116 - 168
First Order (ppm)	+83	+168

In general, the background and anomalous values are high; this is despite the elmination of the high end members for each group. A better geochemical evaluation could be achieved with more samples however a large programme is not recommended. A detailed reconnaissance follow up geochemical sampling programme over anomalous Mo and Au areas since anomalies in the other elements can be readily related to known mineralization.

Geochemistry results are presented in Appendix I and 1:5000 geochemical location maps are presented as Figures 11 - 13.

A great deal of geochemical sampling has been carried out in the past over the property and is readily available in the assessment files indicated in the bibliography. Past results show the same distribution as the results outlined during 1979.

6.2 Assays and Spectrographic Analyses

All sulphide showings were sampled and assayed for Cu/Pb/Zn/Sn and some for Au. Those showings returning good metal values were then channel sampled and ré-assayed.

Quartz veins were sampled and assayed for gold and silver.

The assay results are presented in Appendix I under Assays.

Spectrographs were run on several samples and showed a direct correlation between tin and arsenic. The spectrographs are presented in Appendix I under Spectrographs.

Sample locations are plotted on Figures 11 to 13.

7. Geophysics (By Sacit Saydam)

The type and amount of geophysical surveys done in the Cassiar Project area in 1979 are summarized in Table 2. Survey descriptions and a brief discussion of the results are given below. Geophysical maps are presented as Figures 14 - 28.

7.1 Survey Descriptions

7.1.1 Induced Polarization and Resistivity

A Huntec Mark III time domain induced polarization receiver with a 7.5 kW power transmitter was used to do the survey. A pole-dipole Survey with an electrode separation of a=100 metres and n = 1, 2, and 3 were used. Reading interval was normally 100 metres but it was reduced to 50 metres over the anomalous areas.

Four measurements were taken on the chargeability curve at every station (M1, M2, M3, and M4). Delay time of measurements (td) was 240 milliseconds and the unit integration time (tp) was 60 milliseconds. A receiver specification sheet which indicates how delay and integration times are related to individual chargeabilities is enclosed at the end. The final chargeability value (M) was calculated from:

$$M = tp\ (M1+2M2+4M3+8M4) \times .01 \qquad \text{(milliseconds)}$$

Kenting Limited was hired to supply the equipment and a field geophysicist and a technician. Additional help to complete the survey was provided by Shell.

7.1.2 Magnetic

A scintrex MP-2 proton precession magnetometer was used to do the survey. The accuracy of the instrument was ± 1 gamma. Readings were normally taken at 12.5 metre intervals. A Barringer BM-123 base station magnetometer was used to record the diurnal variation and the field data was corrected accordingly.

7.1.3 Shootback Electromagnetic

A Crone Shootback EM device was used to do the survey. A coil separation of 100 metres was used and the survey was conducted using the horizontal loop mode. The station interval was 25 metres. At every station tilt angle and quadrature measurements were taken at frequencies 390 Hz and 1830 Hz. The technique is insensitive to variations in topographic elevation and to minor changes in coil separation.

7.1.4 Results

The geological features (contacts, faults) interpreted from the geophysics are indicated on the enclosed maps. The survey results are discussed below for each grid separately.

Grid 79-1

The magnetometer survey outlined several "Bull's eye" type anomalies in this grid. Previously drilled Middle and Upper D zones were delineated as isolated magnetic anomalies. The Lower D zone happens to be located at the north end of an approximately 800 metre long northerly striking magnetic trend. This magnetic trend marks the contact between the Atan and the Kechika Group of rocks as also evidence by the resistivity and the Shootback EM data.

At least four more isolated magnetic anomalies which were never tested before were detected within the grid area. One of the largest anomaly was detected over the Granite Creek showing at about L-12S and 2+80W, which is greater in amplitude and width than the anomaly obtained over the Middle D Zone (ie. approximately 90,000 tonnes of sulfides). Located at about 300 metres southeast of the Granite Creek showing, there is another isolated anomaly which indicates a deeper source than the other anomalies. Two other smaller and shallower isolated anomalies are located at L-12S and 8+50W, and L-5S and 8+00W.

Magnetic susceptibility measurements were done on the samples collected in the Cassiar Project area and the results are presented in Table 3. The ground magnetometer survey results and the susceptibility measurements are generally in good agreement.

Every second line was surveyed using the Induced Polarization method. The Induced Polarization background level within the grid area was generally quite high (about 30 milliseconds); indicating presence of above average amount graphite and sulfide minerals in the underlying rocks. The highest chargeability values were obtained in the vicinity of Atan-Kechika contact and over the graphitic Kechika rocks. Previous drilling at the Lower D Zone indicated presence of abundant graphite with pyrite and pyrrhotite at the contact. Above average chargeability responses were obtained over the isolated magnetic anomalies but the responses were much smaller than those obtained over the graphitic rocks.

The apparent resistivity data outlined different lithologies very well in the area and gave abundant structural information. Resistivity values over the Kechika group of rocks drop down to about 1 Ohm-metre or less from those in the order of a few thousand Ohm-metres obtained over the Atan Group. The Atan Group of rocks are highly variable among themselves in terms of their resistivity responses. The highest resistivity values (upwards of 2000 Ohm-metre) were obtained in the west-central portion of the grid area and are believed to be associated with the limestone-marble units in the Atan Group. Quartzites appear to be associated with moderate resistivities in the order of 1000 Ohm-metres or less.

Shootback EM Survey clearly delineated the Atan-Kechika contact zone. The Kechika group of rocks were treated by the method as one great big conductor and the measurements were extremely anomalous. At least two individual conductive zones were detected by the method at the Atan-Kechika contact. No Shootback EM anomalies were obtained over the previously outlined sulfide bodies and isolated magnetic anomalies, probably indicating a small size for the massive portions of these bodies.

<u>Grid 79-2</u>

The geophysical survey results for this grid are discussed in a separate report entitled "Geophysical Test Results over the Storie MoS_2 Property, Cassiar, B.C." by the author.

<u>Grid 79-3</u>

The grid was surveyed using only the magnetic method. The survey detected a narrow anomaly which extends over two lines and located close to the center of the grid. Two holes drilled in 1969 intersected barren pyrrhotite explaining the cause of the anomaly.

<u>Grid 79-4</u>

No significant magnetic anomaly was detected except a few spot highs within this grid area. The contact zone between the Atan-

Table 2: Geophysical Surveys Done in Cassiar in 1979

	Survey Lengths in Kilometres				
Type of Survey	Grid 79-1	Grid 79-2	Grid 79-3	Grid 79-4	Total length (km)
Induced Polarization & Resistivity	20	4.2	-	10	34.2
Magnetometer	39.7	2.5	6	18	66.2
Shootback EM	26.3	-	-	10	36.3
				Grand Total	136.7

Note: Every other line was surveyed using Shootback EM and Induced Polarization methods. Every line was surveyed using magnetometer.

Table 3: Susceptibility Measurements on Cassiar Samples

Sample	Meter Reading	Pad	Susceptibility X10^6 (cgs)	Remarks
A.017.2	.2		< 100	Gray argillite.
A.0407.2	4		400	Greenish porphyritic igneous.
A.0507.1	.2		< 100	Hematite, Fe oxide.
A.0507.2	2.5		250	Dark fine grained igenous.
A.0607.1	.4		< 100	Banded fine grain, grey igneo
A.0607.2	0		< 100	Light aphanitic igneous.
A.0607.3	1.5		150	Light granitic: intrusive.
A.071.1	0		< 100	Quartz vein & argillite.
A.157.1	4		400	Greenish porphyritic igneous.
A.167.1	.8		< 100	Dark volcanics.
A.167.2	.3		< 100	Gray schistous.
A.167.3	.5		< 100	Breccia with argillite fragme
A.236.1	0		< 100	Gray argillite.
A.236.2	.2		< 100	Greenish fine grained igneous
A.246.1	.2		< 100	Gray argillite.
A.246.2	0		< 100	Gray argillite.
A.256.1	0		< 100	Crystalline limestone?
A.266.1	0		< 100	Greenish, calcite veins.
A.266.2	.2		< 100	Dark schistous.
A.266.3	.2		< 100	Dark, igneous, fine grain.
A.276.1	.4		< 100	Dark schistous.
C.028.2	1.2		120	Large Sn showing grab samples.
C.028.4	54		6600	Rusty sphalerite crystals.
C.048.1	.8		< 100	Granite Creek showing, sphalerite contact.
C.058.1	.9		< 100	Dark Gray crystalline Dyke ro
C.058.2	42		4700	Sulfides, FeO (gossan?)
C.058.3	2.8		280	Gray crystalline.
C.058.7	.7		< 100	Gray crystalline.
C.088.1	3.4		340	Hematite etc.
C.094.4	1.2		120	Dark dyke rock.
C.098.1	.7		< 100	Cu stained gray argillite.
C.098.2	9		900	Dark porphyritic igneous.
C.098.3	2.6		260	Dark porphyritic igneous.
C.101.1	>100	✓	>100000	Solid magnetite.
C.107.1	1.2		120	Vesicular volcanic.
C.17.1	.9		< 100	Gray crystalline volcanic.
C.17.2	.4		< 100	Crystalline volcanic.
C.17.4	0		< 100	Limestone (banded?).
C.17.5	0		< 100	Gray, otzite or limestone.
C.17.6	7		700	Hematite and limonite.
C.227.2	.5		< 100	Schistous (igneous).
C.227.3	.3		< 100	Gray crystalline igneous.
C.227.4	.5		< 100	Gray argillite.
C.227.5	0		< 100	Crystalline marble.
C.227.7	13		1300	Limonite and hematite.
C.227.8	.3		< 100	Sulfides & FeO (gossanous).

Sample	Meter Reading	Pad	Susceptibility $X10^{-6}$ (cgs)	Remarks
C.240.5	.7		< 100	Gray argillite.
C.246.1	1.2		120	
C.246.3	1.3		130	
C.256.2	4		400	Greenish, igneous.
C.256.5	.6		< 100	Gray fine grained igneous.
C.317.4	.3		< 100	Porous, skarn.
C.317.5	13		1300	Coarse grained granitic rock.
C.317.7	64		8500	Rusty, pyritic, porphyritic magnetite.
C.37.1	1.7		170	Crystalline gray volcanic.
C.37.2	.3		< 100	Marble.
C.37.5	6.6		660	Schistous volcanic.
C.37.6	42		4700	Sulfides & magnetite.
C.377.3	.7		< 100	Pyritic dark gray brown.
C.67.6	29	✓	20000	Solid magnetite.
C.67.6B	30	✓	21000	Sulfides and magnetite.
C.77.1	2.4		240	
C.77.2	44		440	
C.77.3	20	✓	12500	
C.77.4	12		120	
C.77.6	58		7400	
D.017.1	0		< 100	Black argillite.
D.017.2	.2		< 100	Gray argillite, quartz veins.
D.017.3	0		< 100	Black argillite.
D.047.3	0		< 100	Quartzite?
D.218.1	64		8500	Dark crystalline pyritic igneo
D.228.1	25		2600	Fe oxides & sulfides, brown.
D.246.1	.3		< 100	Porphyritic, medium grained, igneous.
D.246.4	.4		< 100	Gray, schistous.
D.276.1	.2		< 100	Quartz veins.
ES.186.1-1	.7		< 100	
ES.186.1-2	.4		< 100	
ES.186.1-3	.4		< 100	
ES.286.1	.4		< 100	Gray, quartz veins.
J.027.1	0		< 100	Dark limestone.
J.027.3	0		< 100	Dark limestone.
J.027.4	0		< 100	Limestone breccia.
J.047.1	.3		< 100	Marble, bleached.
J.047.2	.6		< 100	Dark dyke rock.
J.047.3	0			Pure marble.
J.047.4	.3		< 100	Brown crystalline quartzite.
J.047.5	>100	✓	>100000	Magnetite.
J.057.1	.6		< 100	Rusty hematite.
J.057.2	80	✓	>100000	Solid magnetite.
J.057.4	96	✓	>100000	Solid magnetite.
J.057.6	4.2		420	Solid iron oxides (hem etc.)

Sample	Meter Reading	Pad	Susceptibility X10^{-6} (cgs)	Remarks
J.067.1	>100	✓	>100000	Porphyritic abundant magnetite crystals.
J.067.1b	22	✓	1800	Dark sample - abundant magnetit crystals.
J.067.2	78		>10000	Light porphyritic.
J.067.3	28	✓	19000	Magnetite in a white matrix.
J.067.5	>100	✓	>100000	Magnetite pyrrhotite-arsenopyri
J.067.6	.7		<100	Solid hematite.
J.067.7	24	✓	1600	Magnetite and pyrrhotite.
J.067.8	50		5800	Pyrite, pyrrhotite, magnetite.
J.077.1	11		1100	Pyritic dark volcanic.
J.087.1	.2		<100	Zebra rock.
J.088.1	.1		<100	Porphyritic gray volcanic.
J.088.2	4.4		440	Vesicular volcanic & dyke.
J.097.6	17		1700	Pyrrhotite, hematite, magnetite.
J.097.9	60	✓	50000	Solid magnetite.
J.097.10	42		4700	Pyrrhotite magnetite.
J.097.13	23		2300	Dark grey igneous.
J.098.1	6.5		650	Dark fine grained igneous.
J.098.2	2.5		250	Vesicular dark gray igneous.
J.127.1	.7		<100	Pyritic volcanic, purplish.
J.127.2	.3		<100	Hornfels?
J.127.3	.2		<100	Sheared volcanics.
J.127.4	1.7		170	Purplish crystalline igneous.
J.127.5	.9		<100	Banded volcanics.
J.137.1	.2		<100	Black volcanic, vesicules.
J.167.1	.4		<100	Dark volcanics.
J.168.2	58		7400	Sulfides in dark igneous.
J.168.3	1.7		170	Black pyritic volcanic.
J.186.1	14		1400	Rusty marble.
J.186.3	0		<100	Dark limestone.
J.186.4	>100	✓	>100000	Magno, Pb, Zn, Ag
J.187.1	1.4		140	Dark igneous.
J.187.2	.6		<100	Dark porphyritic volcanic.
J.187.3	0		<100	Dark limestone.
J.187.4	22		2200	Dark gray igneous.
J.217.1	.7		<100	Vesicular dark volcanic.
J.227.1	84	✓	>100000	Magnetite rich boulder.
J.227.2	45		5200	Amphibole rich boulder(intrusiv
J.227.3	.4		<100	Schistous quartzite.
J.236.1	.7		<100	Sylvester light volcanic.
J.237.1	.6		<100	Dark igneous, extrusive.
J.247.1	.7		<100	Gray volcanic.
J.266.1	2.4		240	Greenish pyritic igneous.
J.266.2	.8		<100	Sylvester coarse volcanic flow.
J.266.3	.3		<100	Sylvester? argillite.
J.266.4	.5		<100	Shaly Sylvester tuff.
J.266.6	1		<100	Gray volcanic Sylvester.

Sample	Meter Reading	Pad	Susceptibility $X10^{-6}$ (cgs)	Remarks
J.276.1	.2		< 100	Res Qtz zone - brown rusty.
J.276.2	1.7		170	Sylvester dark volcanic.
J.277.1	0		< 100	Dark gray limestone?
J.286.1	.8		< 100	Sylvester dark volcanic.
J.286.3	.5		< 100	Rusty argillite, Sylvester.
J.286.5	0		< 100	Quartz tetrahedrite.
J.297.1	.5		< 100	Brecciated argillite.

Kechika rocks does not have any magnetic expression as it is the case in Grid 79-1. The only anomalous feature which is about 200 gammas in magnitude is located at the west end of the lines 5N and 6N. This feature is believed to be caused by some pyrrhotite in quartzites.

The IP Survey results for this grid are quite similar to those observed over the Grid 79-1. There is a well defined chargeability anomaly located over the inferred Atan-Kechika contact. A tin bearing showing (Pant Showing) is located about 50 metres west of the I.P. anomaly peak and the inferred Atan-Kechika contact.

The apparent resistivity data for the Grid 79-4 is also quite similar in nature to that of the Grid 79-1, possibly indicating a variation in the composition of the Atan rocks from one grid to the other. The resistivity data outlined the Atan-Kechika contact well, and the data at different n separations suggest that the contact may possibly be a reverse fault.

As in the Grid 79-1, the Shootback EM Survey delineated the Atan-Kechika contact very well in this grid. No significant Shootback E.M. anomaly which can be attributed to massive sulfide mineralization in the Atan rocks was observed within the grid area (excepting the contact zone).

8. Economic Geology

8.1 General Statement

The lithologies within the immediate vicinity of the town of Cassiar are hosts for a wide variety of mineral commodities. Two mines are currently producing in the area; the asbestos mine of the Cassiar Asbestos Corporation and a small gold mine owned by NuEnergy and Erickson Gold Mines Limited. A potential molybdenum deposit is currently undergoing detailed evaluation by Shell and is situated immediately west of the Cassiar Project claims. Several lode gold occurrences, tungsten bearing skarn occurrences along with tungsten-gold bearing Placer occurrences are presently being evaluated by several companies, including Shell.

Within the Cassiar Project Claims are Pb/Zn/Ag/Sn/Au bearing vein-type replacement bodies, a Cu/Zn stratabound, possibly volcanogenic, body, a molybdenum occurrence in rocks similar to those hosting Shell's moly prospect, and large quartz veins with gold and silver mineralization.

The object of the 1979 exploration on the Cassiar Project was to evaluate the extent of tin mineralization within the known Pb/Zn/Ag bodies and to determine the potential for locating additional minable volumes of mineralization of that type. Field work was successful in finding a new Pb/Zn/Ag/Sn/Au showing on the property which underlined the potential for new discoveries. All mineralization was found to be related to east-west trending structural zones and to a lesser degree northwest-southeast structures. From geology and geophysics several large favourable structures with related mineralization were identified for further followup via diamond drilling. To date, previous exploration has outlined several of the Pb/Zn/Ag pods with an aggregate volume of approximately 600,000 tonnes grading 171 grams Ag/tonne, 5% Pb, 4% Zn which is too small a volume to support a large scale mine. The proposed diamond drilling programme should determine whether or not significant volumes exist along the untested structures.

Some time was spent examining other mineral occurrences on the property. Soil samples were taken along a 300 metre long exposure of quartz veins with several samples returning values of over 1,000 ppb and a high of 3,600 ppb or 3.4 grams/tonne Au. Gold is currently being produced at the NuEnergy Mine from a similar quartz vein system on strike approximately 4 kilometres to the south. Mapping along strike from the Lang Creek Showing produced several small copper showings in similar rock types. The molybdenum showing, M-Zone and on Alta-6, while small may indicate a possible buried equivalent of the adjoining moly property.

Exploration carried out to date by Shell has not exhausted all the potential on the property. The initial target has been shown to be high grade but discontinuous fault controlled mineralization. The drilling of untested structures should be sufficient to evaluate the overall potential of the property with respect to this type of mineralization. The extent and style of gold mineralization in the quartz veins is yet to be determined but indications so far have shown it to be a worthwhile target. The Lang Creek Showing may prove to be a Beshi type volcanogenic massive sulphide occurrence and past work has not tested for the existence of down strike mineralization or the possibility of structural displacement of the mineralized zone. Finally, the area of exposed Atan Group sedimentary rocks is almost certainly underlain by the Cassiar Batholith at an unknown depth that may be molybdenum bearing.

8.2 D-Zone

The D-Zone constitutes the area underlain by Atan Group carbonates between Granite Creek and Troutline Creek. Four main showings, the Lower "D" Zone, Middle "D" Zone, Upper "D" Zone and the Granite Creek Showing, are located within the zone and a portion of Grid 79-1 covers all the showings. The mineralized showings within the D Zone have been known since the late 1950's. The first systematic exploration work was carried out by Coast Silver Mines during 1968 and subsequently worked in 1969 and 1975 and 1978.

The 1968 - 1969 programme commenced with an airborne magnetics survey which outlined the D-Zone as a favourable target area. Grid controlled induced polarization, magnetic, and geochemical surveys followed and pinpointed the Lower, Upper, and Middle D Zones as drilling targets.

The Lower D-Zone is a chargeability high with coincident magnetic anomalies. Five holes were drilled by Coast Silver none of which intersected mineralization. The chargeability highs were due to disseminated pyrite in argillite and magnetic anomalies were due to barren pyrrhotite lenses.

The Upper D-Zone is a small magnetite, pyrolusite, galena showing within heavily faulted and dolomitized limestone. The dolomite contains patches and scales of rhodochrosite and chlorite. Unaltered limestones on the periphery of the showing are brecciated with stringers of massive white calcite . Five holes were drilled by Coast Silver with two hitting mineralization. The best intersection ran 7.6 metres of 4.73% lead, 4.74% zinc, 240 grams/tonne silver and 0.069 grams/tonne gold. Trenching around the showing within the Atan Quartzite Unit failed to located any additional mineralization.

The largest portion of the exploration effort on the D-Zone was conducted on the Middle D-Zone. Prior to ground geochem and geophysics the Middle D-Zone area was notable for high grade float. Previous I.P. and Mag Surveys by Coast Silver produced significant magnetic anomalies with associated chargeability highs all in areas of geochemical highs. Coast Silver has drilled 15 holes in the Middle D Zone and has outlined 90,000 tonnes grading 3.3% lead, 6.3% zinc and 70 grams/tonne silver. According to Coast Silver's reports the Middle D Zone has been delimited in its strike extent but has only been tested to a vertical depth of 90 metres.

The Granite Creek Showing was discovered during the course of mapping by Shell in 1979. The showing is situated at the 1,235 metre elevation on Granite Creek and outcrops as a 1 metre thick replacement vein within a recrystallized white to buff limestone. Galena, sphalerite, pyrite, pyrrhotite, siderite, and magnetite comprise the mineralogy which assayed 1.4% Pb, 0.63% Zn, 0.12% Sn, 59 grams/tonne Ag and 1.0 grams/tonne Au. The Granite Creek Showing has the same geophysical response with respect to magnetics and I.P. as the Middle "D" Zone and may be of a similar size.

At the 1,315 metre elevation of Granite Creek there is an outcropping of a 10 cm gash filling of siderite, limonite, galena, and pyrite. The host limestone is dolomitised with chlorite patches and scales on the west side of the creek. No significant geophysical anomaly was obtained over the area.

All showings within the D-Zone appear to be related to east-west trending fault zones and possibly to a fault zone at the Atan-Kechika contact.

8.3 Magno Property

The Magno Property is situated at the head of Marble Creek and is underlain by the Atan Group carbonates. Mineralization on the Magno Property consists of replacement bodies of galena, sphalerite, magnetite, pyrrhotite, pyrite, siderite, and pyrolusite emplaced as irregular shoots along a 1200 metre long east-west trending fault zone. Closely associated with the mineralization on the western extent of the fault zone is an intermediate dyke. Toward the east no dyke has been found. The limestone has been irregularly dolomitized with intense dolomitization closest to mineralization. Patches of chlorite along with rhodocrosite appear in the more altered rocks.

During 1968 and 1969 Coast Silver carried out ground magnetic, VLF and geochemical surveys over the property followed by 3,700 metres of diamond drilling in 45 holes. This work served to outline three mineralized zones: the East Zone, Middle West Zone, and the West Zone. During 1971 two adits were driven on the West Zone, each 200 metres long. 520 metres of underground drilling was then conducted in the adits. In 1976 an additional 1,400 metres of surface drilling was done on the West and Middle West Zone and 147 metres of underground drilling in the adits.

The past work conducted by Coast Silver has indicated the following drill indicated potential:

<u>EAST ZONE</u> 128,820 tonnes

0.69 grams/tonne	Au
131 grams/tonne	Ag
4.06%	Pb
4.40%	Zn

<u>AVERAGE WIDTH</u> 5.76 metres

<u>MIDDLE WEST ZONE</u> 97,110 tonnes

258.5 grams/tonne	Ag
9.43%	Pb
5.34%	Zn

<u>AVERAGE WIDTH</u> - 3.4 metres

WEST ZONE 200,487 tonnes

198.8 grams/tonne Ag
5.4% Pb
3.4% Zn

AVERAGE WIDTH 2.8 metres

WITH A GEOLOGICALLY INFERRED POTENTIAL OF 349,265 TONNES.

The East Zone and Middle West Zone fall within claims currently held by Balfour Mines. The adits and the mineralization within them fall within the Chiera Claim held by Shell. The mineralized structure appears to have been tested to a depth of only 100 metres.

8.4 G-Zone

This zone is situated on the ridge between Marble Creek Basin and Lang Valley. Attention was drawn to this area by an airborne magnetic anomaly from a survey flown for Coast Silver in 1968. A follow up geochemical survey isolated two lead-zinc anomalies and an interesting Mo anomaly. Mag anomalies coincident with the Pb-Zn anomalies and two other isolated Mag anomalies resulted from a gound Mag Survey. Four holes were drilled to test the Mag and Geochem anomalies. No mineralization was found in holes drilled on the geochemical anomalies, one Mag high was shown to be due to a pyrrhotite-magnetite body, with traces of lead and copper. Hole H-1: Assayed 0.20% Sn over 2.0 metres. No explanation for the Mo anomaly was found.

The "G" Zone is underlain by Atan limestones which have been altered to massive tremolite (skarn). The intensity of alteration in the limestone coupled with the intersection of a pyrrhotite-magnetite body in the drilling points to the possibility of a buried cupola at depth. When the unexplained Mo anomaly is considered, there exists the possibility of a buried cupola with Mo mineralization.

8.5 M-Zone

The M-Zone is situated on the southern slope of the ridge dividing Granite Creek Valley from Lang Valley at the southwestern edge of the property immediately adjacent to Shell's Casmo molybdenum prospect.

The molybdenum occurs as disseminations and fine grained fracture fillings with sericite, pyrite, gypsum, quartz and fluorite. The fractures strike east-west and dip gently north.

Four holes were drilled on the showing by Coast Silver in

1968. Mineralization was reported to be erratic and generally less than 0.1% MoS_2. One hole, M-2 had 130 metres of 0.23% MoS_2. Only portions of the core were split and assayed and some sections with visible mineralization remain unassayed.

8.6 Lang Creek Showing

A portion of the Lang Creek mineralization outcrops directly on Lang Creek on the Lang Claim. The showing is a massive lense of pyrite, chalcopyrite, marcasite, and chalcocite along the contact between a cherty pyritic argillite and an intermediate tuff with minor chalcopyrite. The showing was drilled by Cominco in the late 1950's following a Rotary Field E.M. Survey flow by Werner Gren which showed the showing to be coincident with a large conductive trend.

Cominco outlined a 27,000 tonne 1 metre thick massive sulphide body grading 1.52% copper and 0.90% zinc.

Crown Point Exploration ran Mag and E.M. Surveys over untested conductors during 1964 through 1967. Their work failed to find any additional mineralization. However, their work did delimit the mineralization outlined by Cominco along strike.

The Lang Creek Showing remains untested at depth and several untested conductive zones lie to the northeast of the showing which could represent displaced portions of the mineralization.

8.7 Quartz Veins

A system of massive quartz veins cut through Sylvester Group volcanic rocks on the Reo Claim in Lang Valley. The veins are exposed along several cat trenches and vary from massive white "bull" quartz, to hackly, vuggy, graphitic quartz, to tetrahedrite-chalcopyrite bearing hackly, vuggy quartz. The contact with the volcanic rocks is always carbonatized.

Soil samples taken along the cat trenches all returned anomalous gold values with some over 1,000 ppb and a high of 3,600 ppb. A grab sample of tetrahedrite bearing quartz assayed 2,726 grams/tonne silver and 4.25 grams/tonne gold and a grab sample of the graphitic quartz ran 52 grams/tonne silver and 1.02 grams/tonne gold.

No detailed work or drilling has been conducted on the Quartz Zone.

The Nu Energy gold mine is currently producing gold and silver from a similar quartz system approximately 4 kilometres to the south of the Reo quartz zone.

9. Conclusions

Exploration should be directed toward further evaluating the property with respect to the following:

Further exploration for tin bearing Pb/Zn/Au replacement bodies within Atan Group Carbonates and evaluation of present target via diamond drilling.

Exploration to discern the possibility of a buried MoS_2 bearing cupola of the Cassiar Batholith extending from the M-Zone to the tremolatized zone (G-Zone).

Further detailed exploration of lode gold mineralization on the Reo Claim.

Exploration for additional mineralization of the Lang Creek Showing type within Sylvester Group rocks.

Pb/Zn/Au/Sn bearing sulphide bodies are hosted by the Atan Group Carbonates along east-west trending fault zones and along a northwest-southeast trending fault contact between the Atan and Kechika Groups. The mineralization is of the vein replacement type and is presumed to be genetically related to MoS_2 bearing phases of the Cassiar Batholith. Mineralization is emplaced as shoots and lenses along the structures and is discontinuous overall.

Past exploration has outlined several small high grade areas of Pb/Zn/Au/(Sn) mineralization dispersed within the Atan Group. While it may be possible to expand the volumes of known mineralization the greatest potential for outlining sizeable tonnages exists within large untested mineralized structures such as the Atan-Kechika Contact.

MoS_2 mineralization within the M-Zone is similar to that found on the adjacent Casmo project area. Past work has served only to show that MoS_2 mineralization exists on the M-Zone and has not determined the true potential of the zone. The immediate area of the M-Zone and east to the tremolite zone is a favourable region for the existence of a buried MoS_2 bearing cupola.

Gold bearing quartz veins on the Reo Claim are similar to those being mined at Nu Energy approximately four kilometres to the south and may be along the same structural break.

The Lang Creek Showing has been delimited on its strike extent but not to depth by past work. Additional mineralization of a similar type may exist as a faulted off segment of the Lang Creek Showing.

Future geochemical work should consist of detailed grid controlled surveys. Since the tin mineralization is always associated with arsenopyrite, arsenic may prove to be an important geochemical marker for this type of mineralization.

APPENDIX I

Qualifications of Authour

I, Christopher J.C. Bloomer state that I am a geologist in Minerals Exploration of Shell Canada Resources Limited of Calgary, Alberta. I have obtained a B.Sc., '77 degree at the University of Toronto and have practiced my profession since graduation. I was directly involved with the work submitted here in this report.

C. J. C. Bloomer
Geologist
Minerals Exploration
Shell Canada Resources

A. S. Saydam, P. Geophy.
Geophysicist
Minerals Exploration
Shell Canada Resources Limited

APPENDIX II

Appendix II

General Statement

Included in Appendix I are all reconnaissance geochemical results, spectrographic results, and a standard statistical treatment of the reconnaissance results.

Background and anomalous values were calculated using the following:

Background:	$\bar{x} + s$
Third Order:	$\bar{x} + s$ to $\bar{x} + 2s$
Second Order:	$\bar{x} + 2s$ to $\bar{x} + 3s$
First Order:	$+ \bar{x} + 3s$

A true geochemical cross section of the property was not achieved as there is a large variation between results obtained near known mineralization and those in drift areas. In addition a great amount of geochemical sampling was done in the past over the greater portion of the property revealing similar values and also failing to locate new mineralization.

Future sampling should be restricted to detailed programmes on grids. A detailed sampling of the grids was not undertaken during 1979 primarily due to a lack of man power and because the areas covered by the grids had been sampled in the past.

Reconnaissance Geochemistry

CHEMEX

CALGARY 2021 - 41 AVE. N.E. CALGARY, CANADA T2E 6P2
TELEPHONE (403) 276-9627 TELEX 038-25541
EDMONTON 6112 DAVIES ROAD, EDMONTON, CANADA T6E 4M9
TELEPHONE (403) 465-9877 TELEX 037-41596

CERTIFICATE OF ANALYSIS

• MINERAL • GAS • WATER • OIL • SOILS • VEGETATION • ENVIRONMENTAL ANALYSIS

SHELL CANADA RESOURCES LTD.

DATE JULY 23,

PROJECT NO. 816-1-702

GEOCHEMICAL ANALYSES

LOCATION	Ag (oz/ton)
C-17-8	65.60
C-17-9	1.02

LOCATION	Cu %	Zn %	Pb %
C-276-3	2.20	1.02	
C-17-8		4.50	55.0
C-17-9		0.52	0.63

Reconnaissance Panned Concentrates

LOCATION	Sn (ppm)
P 2000	3
2001	7
2002	3
2003	22
3000	120
3001	115
3002	46
3003	77
3004	120
S 2000	4
2001	5
2002	4
2003	18
3000	46
3001	40
3002	51
3003	42
3004	105

LOCATION	Sn %
C-17-3	<0.01
8	0.05
C-17-9	0.04
C-276-3	0.02
ES-17-1	<0.01
ES-17-2	0.01
H16-1	0.02
2	0.16
3	0.24
4	0.55
H16-5	0.01
R3-1	0.30
2	0.22
R3-3	0.33
R6-1	0.07
2	0.04
3	0.61
R8-1	0.03
2	0.04
3	0.02
4	0.01
5	0.01
6	0.01
7	1.32
[illegible]	[illegible]

Certified by ....

212 BROOKSBANK AVE
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE [redacted] 984-0221
AREA CODE 604
TELEX 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49249
INVOICE NO. 31686
RECEIVED August 1, 1979
ANALYSED August 7, 1979

TO: Shell Canada Resources Ltd.,
Minerals Dept.,
P.O. Box 100
Calgary, Alta.
T2P 2H5

ATTN:

c.c. Bloomer

SAMPLE NO.	PPM Cu	PPM Pb	PPM Zn	PPM Ag	PPB Au	PPM Sn	PPM W
S 1012	14	52	160			9	
P 1012						110	>400
S 1013	14	34	100			4	
P 1013						53	400
SL 1001	38	1	98		220		
1002	28	2	36		<10		
SL 1003	12	1	36		80		
3005	178				3600		
3006	46				300		
3007	42				1080		
3008	170				1060		
3009	48				140		
3010	178	10	118	0.1		24	375
3011	1150	4	154	0.1		95	55
3012	550	1	62	0.2		40	375
3013	1200	8	86	0.2		5	350
3014	410	245	770	4.0		19	>400
3015	960	1	38	0.2		99	>400
3016	910	8	52	0.2		55	>400
3017	1450	50	78	0.6		61	>400
S 4000	30	24	250			2	
P 4000						2	
S 4001	22	42	196			7	
P 4001						12	
S 4002	48	28	300			3	
P 4002						4	

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY Hart Bichler

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE [redacted] 984-0221
AREA CODE 604
TELEX 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49649
INVOICE NO. 31973
RECEIVED Aug. 13/79
ANALYSED Aug. 20/79

TO: Shell Canada Resources Ltd.,
Minerals Dept.
P.O. Box 100
ATTN: Calgary, Alta T2P 2H5
PROJECT: PM 59464 - Panned Silt CC: Bloomer

SAMPLE NO.	PPM Sn	PPM W
P 1020	1	
1021	660	
1023	8	
1024	6	
1025	1	
1026	2	
1027	1	
1028	3	
1029	1	
1030	1	
1031	3	>400
1032	1	>400
1033	2	>400
1034	1	>400
1035	1	>400
1036	2	
1037	1	
1038	10	
3018	10	
3019	12	
3020	9	
3021	14	
3022	3	
3023	6	
3024	3	
3025	6	
3026	2	
3027	3	
3028	1	
3029	2	
3030	58	
3031	13	
3032	47	
3033	8	
3034	9	
3035	17	
3036	47	
3037	19	
3038	4	
P 3039	6	

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Hart Bichler

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE [redacted] 984-0221
AREA CODE 604
TELEX 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49650
INVOICE NO. 31072
RECEIVED Aug. 13/79
ANALYSED Aug. 19/79

TO: Shell Canada Resources Ltd.,
Minerals Dept.
P.O. Box 100
Calgary, Alta.

ATTN: PROJECT: PM 59464 - Panned Silt CC. Bloomer

SAMPLE NO.	PPM Sn	PPM W
P 3040	1	
3041	11	
3042	10	
3043	3	
3044	1	
3045	1	
3046	1	
3047	1	
3048	1	
3049	1	
4003	6	
4004	3	
4005	2	
4006	1	
4007	4	
4008	1	
4009	1	
4010	1	
4011A	1	
4011B	1	
4012	1	
4013	1	
4014	1	
4015	1	
4016	1	
4017	1	
4018	2	
4019	1	35
4020	3	8
4021	2	400
4022	1	400
4023	2	45
4024	1	50
4025	1	275
4026	1	300
4027	1	125
4028	1	225
4029	1	100
4030	2	175
P 4031	1	

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY Hart Bichler

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE [redacted] 984-0221
AREA CODE 604
TELEX 043 52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49651
INVOICE NO. 31073
RECEIVED Aug. 13/79
ANALYSED Aug. 19/79

TO: Shell Canada Resources Ltd.,
Minerals Dept.
P.O. Box 100
Calgary, Alta.

ATTN: CC. Bloomer

PROJECT: PM 59464 - Panned Silt

SAMPLE NO. :	PPM Sn	PPM W
P 4032	1	
4033	1	
4034	1	
4035	1	
4036	1	
4037	1	
4038	1	
4039	1	
4040	3	
4041	1	
4042	1	
4043	1	
4044	2	
4045	6	
4046	1	
4047	1	
4048	1	
4049	1	
4050	1	
4051	2	
4052	1	15
4053	1	30
4054	1	30
4055	1	1
4056	1	70
4057	1	20
4058	1	40
4059	1	
4060	1	
5052	1	
5053	1	
5054	1	
5055	1	
5056	1	
5057	1	
5058	1	
5059	7	
5060	9	
5061	1	
P 5062	5	

CERTIFIED BY: Hart Bichler

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE 984-0221
AREA CODE 604
TELEX 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49652
INVOICE NO. 31[illegible]
RECEIVED Aug. 13/79
ANALYSED Aug. 19/79

TO: Shell Canada Resources Ltd.,
Minerals Dept.
P.O. Box 100
Calgary, Alta.

ATTN:
PROJECT: PM 59464 - Panned Silt CC. Bloomer

SAMPLE NO.	PPM Sn
P 5063	1
5064	2
5065	1
5066	1
5067	1
5068	1
5069	1
5070	1
5071	1
5072	1
5073	1
5074	1
5075	1
5076	1
P 5077	1

CERTIFIED BY: Hart Bichler

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE [redacted] 984-0221
AREA CODE 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 50969
INVOICE NO. 33180
RECEIVED October 4, 1979
ANALYSED October 12, 1979

TO: Shell Canada Resources Ltd.
Minerals Dept.
P.O. Box 100
Calgary, Alta.
ATTN: T2P 2H5 C.C. 1, Cassiar, B.C. PM 59464

SAMPLE NO.	PPB Au
9000	20
9001	< 10
9002	200
9003	980
9004	3000
9005	120
9006	260
9007	1100
9008	320
9009	100
9010	520
9011	1300
9012	340
9013	360
9014	< 10
9015	< 10
9016	1120
9017	440
9018	1200
9019	260
9020	< 10
9021	20
9022	500
9023	< 10

CERTIFIED BY

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE [redacted] 984-0221
AREA CODE 604
TELEX 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

TO: Shell Canada Resources Ltd.
Minerals Dept.
P.O. Box 100
Calgary, Alta.
ATTN: T2P 2H5 PM 59464

CC. Cassiar, B.C.

CERTIFICATE NO. 49654
INVOICE NO. 31921
RECEIVED Aug. 13/79
ANALYSED Aug. 16/79

SAMPLE NO.	PPM Cu	PPM Pb	PPM Zn	
5011	20	64	260	
5012	16	46	180	
5013	10	56	160	
5014	12	102	370	
5015	14	106	390	
5016	12	92	560	
5017	12	68	470	
5018	12	82	780	Test Grid Near Granite Creek Showing
5019	12	84	410	Not Used in Statistical Calculations
5020	12	112	395	
5021	14	98	420	
5022	12	98	470	
5023	12	42	75	

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY. Hart Bichler

Assay Results

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 584-0221
AREA CODE 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 66051

INVOICE NO. 32751

RECEIVED Aug. 22/79

ANALYSED Sept. 21/79

TO: Shell Canada Resources Ltd.,
Minerals Dept.
P.O. Box 100
Calgary, Alta.

ATTN: PM 59464

CC. C. Bloomer

SAMPLE NO. :	% Cu	% Pb	% Zn	% Sn	oz/ton Ag
C-028-1	0.08	0.05	0.01	0.97	0.58
C-028-3	0.03	29.0	8.89	0.01	27.34
C-317-6	0.05	1.40	0.63	0.12	1.72
J-148-1				0.08	Hole H-1 36-43.3 feet
2				0.05	Hole H-1 635-75.5 feet
3				0.20	Hole H-1 121.5 - 128 feet
4				0.05	Hole H-1 154 - 155.6 feet
5				0.04	Hole H-1 145 - 147 feet
6				0.10	Hole H-1 80 - 82 feet
7				6.52	Hole R-10 254 - 257 feet
8				0.14	Hole R-9 228 - 230 feet
J-148-9				0.10	Hole R-9 232 - 233 feet
C-028-1 (Re-run)	0.09	0.04	0.01	0.99	

C-028-1 Pan Showing chip sample over 3.6 metres.
C-028-3 Vein from lower adit.
C-317-6 Granite Creek Showing over 1 metre.

Hole H-1 is from the G-Zone.

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX

CALGARY 2021 - 41 AVE. N.E. CALGARY, CANADA T2E 6P2
TELEPHONE (403) 276-9627 TELEX 038-25541

EDMONTON 6112 DAVIES ROAD, EDMONTON, CANADA T6E 4M9
TELEPHONE (403) 465-9877 TELEX 037-41596

CERTIFICATE OF ANALYSIS

• MINERAL • GAS • WATER • OIL • SOILS • VEGETATION • ENVIRONMENTAL ANALYSIS

[illegible] RESOURCES LTD.

DATE [illegible]

PROJECT NO. [illegible]

[illegible]

[illegible]		[illegible]	
[illegible]	Upper D-Zone (Grab)	[illegible]	(Galena)
[illegible]	Upper D-Zone (Grab)	[illegible]	(Pyrolusite and magnetite)

[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	Lang Creek Showing (0.75 m dip)	[illegible]	[illegible]	
[illegible]			[illegible]	[illegible]
[illegible]			[illegible]	[illegible]

[illegible]	Sn (ppm)	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	Lang Valley North Slope
[illegible]	113	[illegible]	[illegible]	Lang Valley North Slope
[illegible]	[illegible]	[illegible]	[illegible]	(265 ft. - 269.8 ft.)
[illegible]	[illegible]		[illegible]	(240 ft. - 245 ft.)
[illegible]	[illegible]		[illegible]	(275 ft. - 280 ft.)
[illegible]	5	[illegible]	[illegible]	(150.5 ft. - 151.25 ft.)
[illegible]	4	[illegible]	[illegible]	(160 ft. - 163 ft.)
[illegible]	[illegible]	[illegible]	[illegible]	(175 ft. - 179 ft.)
3000	[illegible]	[illegible]	[illegible]	
[illegible]	40	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	(151 ft. - 153 ft.)
[illegible]	105	[illegible]	[illegible]	
			[illegible]	(314 ft. - 319 ft.)
			[illegible]	(309 ft. - 314 ft.)

CTA MEMBER CANADIAN TESTING ASSOCIATION

Certified by ....

212 BROOKSBANK AVE
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 65570
INVOICE NO. 31211
RECEIVED July 11/79
ANALYSED July 19/79

TO: Shell Canada Resources Ltd.
Minerals Dept.
P.O. Box 100
Calgary, Alta.

ATTN PROJECT: 3991 P CC: Chris Bloomer

SAMPLE NO. :	% Cu	% Pb	% Zn	% Sn	oz/ton Ag	oz/ton Au
C-67-1				0.02		
C-77-1	0.02	1.02	<0.01	0.08	6.00	0.009
C-77-2	0.06	0.44	10.9	0.13	1.34	0.003
C-77-3	0.04	0.20	0.19	0.52	1.02	0.003
C-77-4	0.03	14.8	5.14	0.13	19.80	0.025
C-77-5				<0.01		
C-77-6	0.03	10.8	3.58	0.04	15.72	0.010
D-047-1		5.00	6.41	0.32		
C-047-2				0.09		

C-67-1 Lower D-Zone (Grab)
C-77-2 Granite Creek Showing (Grab) Py, Po, Sp
C-77-3 Granite Creek Showing (Grab) Py, Po, gn
C-77-4 Granite Creek Showing (Grab) Py, Po, gn, Sp

C-77-1 GRANITE CREEK SHOWING Py
C-77-5 Float on Granite Creek Road
C-77-6 Lower D-Zone (Grab)
D-047-1 0.25 metre channel sample of showing on Marble Creek
D-047-2 Sample from vein near lower adit on Magno Property

CTA MEMBER CANADIAN TESTING ASSOCIATION

[signature]
REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE [redacted] 984-0221
AREA CODE 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 65610
INVOICE NO. 31404
RECEIVED July 16/79
ANALYSED July 27/79

TO: Shell Canada Resources Ltd.,
Minerals Division.
P.O. Box 100
Calgary, Alta.

ATTN:

Project 3991 P

SAMPLE NO. :	% Cu	% Pb	% Zn	% Sn	oz/ton Ag	oz/ton Au	
J-186-2		1.45	9.20	0.39	1.56		Marble Creek
J-057-1		1.68	1.86	0.06	1.70		Grab samples from
2		2.37	0.38	0.03	2.32		showings above the
3		0.32	1.20	0.03	0.30		Magno adits. Map
4		1.96	0.76	0.01	2.04		Sheet 5.
J-057-5		27.9	0.52	0.02	9.50		Elevation 1660 m.
J-067-3		0.90	0.03	0.06	0.82		
J-067-4		2.22	0.07	0.02	2.08		Grab from sulphide
J-097-1		0.10	0.02	0.03	0.16		lenses at elevation
2	0.34	0.10	0.01	0.05			1710 metres on side
3	0.25	0.06	0.01	0.03			cut 500 metres N.W.
4	0.40	0.03	0.01	< 0.01			of M-Zone - Map
5	0.24	0.02	0.01	0.03			Sheet 5
6	0.08	0.02	0.01	< 0.01			
7	0.15	0.01	< 0.01	0.02			
8	0.63	0.02	0.02	0.02			Massive pyrite
9	0.38	0.01	0.01	0.01			replacement lenses
10	0.28	0.02	0.02	0.07			near M-Zone along
11	0.12	0.02	0.02	0.04			intrusive contact
J-097-12	0.01	0.01	0.02	0.02			Map Sheet 5.
J-286-4 (Vein quartz, Map Sheet 2)						0.012	

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 65800
INVOICE NO. 31729
RECEIVED Aug. 1/79
ANALYSED Aug. 8/79

TO: Shell Canada Resources Ltd.,
Minerals Dept.,
P.O. Box 100
Calgary, Alta T2P 2H5

ATTN:
PROJECT: DM 59464 CC: Bloomer

SAMPLE NO. :	% Cu	% Pb	% Zn	% Sn	oz/ton Ag	oz/ton Au
C-227-1	0.10	0.01	0.01	<0.01	Hornfels with Py/Po, Granite Creek.	
C-227-4			<0.01			
C-227-8	0.02	15.4	2.60	0.49	12.62	0.038
C-297-1	0.05	1.21	0.47	0.06	1.26	0.005

C-227-8 Vein showing on Marble Creek, same as D-047-1, 0.25 metre channel.
C-297-1 Granite Creek Showing, channel sample across 1 metre.

Also Cert. #SP 0939 on 227-8 & SP 0967 on 297-1.

CTA MEMBER CANADIAN TESTING ASSOCIATION

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 985-0648
AREA CODE: 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 65416
INVOICE NO. 30848
RECEIVED June 24/79
ANALYSED July 3/79

TO: Shell Canada Resources Ltd.,
Minerals Div.
P.O. Box 100
Calgary, Alta. T2P 2H5
ATTN: Christopher Bloomer

cc: Cassiar

SAMPLE NO. :	% Sn	Sample Interval
ES176-1	<0.01	Grab
2	<0.01	Grab
176-3	<0.01	Grab
186-1	1.62	3.6 metres
2	0.80	3.6 metres
3	<0.01	Grab
186-4	0.10	Grab
196-1	0.04	Grab
2	0.06	Grab
3	0.32	Grab
4	0.40	Grab
5	0.03	Grab
6	0.02	Grab
196-7	0.16	Grab

All samples from north slope of Lang Valley

ES 186-1
ES 186-2 Pant Showing

MEMBER CANADIAN TESTING ASSOCIATION

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 65465
INVOICE NO. 30939
RECEIVED June 28/79
ANALYSED July 9/79

TO: Shell Canada Resources Ltd.
Minerals Dept.
P.O. Box 100
ATTN: Calgary, Alta. T2P 2H5

CC: Chris Bloomer

SAMPLE NO. :	% Cu	% Sn
ES 206-1		0.02
226-1		<0.01
236-1		0.02
236-2		<0.01
236-3		0.02
236-4		<0.01
236-5		0.03
236-6		0.04
236-7		0.01
236-8		0.02
236-9		0.02
246-1		0.01
ES 256-1	0.92	<0.01

All grab samples from sulphide lenses near M-Zone.

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX

CALGARY 2021 - 41 AVE. N.E. CALGARY, CANADA T2E 6P2
TELEPHONE (403) 276-9627 TELEX 038-25541

EDMONTON 6112 DAVIES ROAD, EDMONTON, CANADA T6E 4M9
TELEPHONE (403) 465-9877 TELEX 037-41596

CERTIFICATE OF ANALYSIS

• MINERAL • GAS • WATER • OIL • SOILS • VEGETATION • ENVIRONMENTAL ANALYSIS

SHELL CANADA RESOURCES LTD.

DATE AUGUST 1, 1979

PROJECT NO. 016-19856

ASSAY ANALYSES

LOCATION	Pb %	ZN %	Ag oz/ton
R8-1	0.43	0.35	1.50
R8-2	0.06	0.05	0.60
R8-3	0.15	0.02	0.90
R8-4	0.04	0.09	0.10
R8-5	0.69	0.07	2.75
R8-6	0.10	0.30	0.60
R8-7	0.12	0.02	0.70
R8-8	0.11	0.01	0.23
H16-1	0.22	0.01	1.75
H16-2	0.04	<0.01	0.27
H16-3	0.19	0.32	1.00
H16-4	0.09	0.04	1.10
H16-5	0.03	[illegible]	0.11

R holes are from the D-Zone.
H holes are from the Magno Area.

Certified by ....

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ASSAY

CERTIFICATE NO. 66590
INVOICE NO. 34034
RECEIVED Oct. 4/79
ANALYSED Nov. 26/79

TO: Shell Canada Resources Ltd.
Minerals Dept.
P.O. Box 100
Calgary, Alta. T2P 2H5
ATTN: C. Bloomer

SAMPLE NO. :	% Cu	% Zn	% Sn	oz/ton Ag	oz/ton Au
C-925-3				1.53	0.030
C-925-5				79.52	0.124
C-925-A	0.06	0.01	< 0.01		

C-925-3 Grab sample of vuggy graphitic quartz vein on Reo Claim.
C-925-5 Selected sample of tetrahedrite bearing quartz on Reo Claim.
C-925-A Banded Py/Po from Atan Hornfelsed quartzite

CTA MEMBER CANADIAN TESTING ASSOCIATION

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

Spectrographic Results

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. SP 0967
INVOICE NO. 32095
RECEIVED Aug. 1/79
ANALYSED Aug. 20/79

TO: Shell Canada Resources Ltd.,
Minerals Dept.
P.O. Box 100
Calgary, Alta.

ATTN: DM 59464 CC. Chris Bloomer

SAMPLE NO. :	Lower Concentration Limit (PPM)	C-297-1 Granite Creek Showing
Antimony	50	bcl
Arsenic	50	3000
Barium	5	10
Beryllium	5	bcl
Bismuth	5	10
Boron	20	bcl
Cadmium	20	bcl
Calcium	0.05%	1%
Chromium	10	50
Cobalt	10	bcl
Copper	1	1000
Gallium	5	bcl
Germanium	20	bcl
Indium	50	bcl
Iron	0.05%	10%
Lead	5	5000
Magnesium	0.02%	0.2%
Manganese	5	5,000
Molybdenum	10	bcl
Nickel	5	bcl
Niobium	50	bcl
Silver	1	20
Strontium	2	bcl
Tellurium	200	bcl
Thorium	200	bcl
Tin	10	500
Titanium	5	50
Vanadium	20	20
Zinc	50	10,000
Zirconium	20	bcl

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

>5000 ppm	= > 5000 ppm	50 ppm	= 25–100 ppm
5000 ppm	= 2500–10000 ppm	20 ppm	= 10–50 ppm
2000 ppm	= 1000–4000 ppm	10 ppm	= 5–20 ppm
1000 ppm	= 500–2000 ppm	5 ppm	= 2–10 ppm
500 ppm	= 250–1000 ppm	2 ppm	= 1–4 ppm
200 ppm	= 100–400 ppm	1 ppm	= 0.5–2 ppm
100 ppm	= 50–200 ppm	bcl	= below concentration limit

Ranges for Iron, Calcium & Magnesium are reported in %

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: ....

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. SP0928
INVOICE NO. 31409
RECEIVED July 26/79
ANALYSED July 30/79

TO: Shell Canada Resources Ltd.
Minerals Dept.
P.O. Box 100
Calgary, Alta. T2P 2H5

ATTN:

From Assay #65416, 65570

SAMPLE NO. :	Lower Concentration Limit (PPM)	ES-186-2	ES-196-3	ES-196-4	D-047-1
Antimony	50	bcl	bcl	bcl	100
Arsenic	50	>10000	>10000	>10000	10000
Barium	5	20	10	15	15
Beryllium	5	bcl	bcl	bcl	bcl
Bismuth	5	70	bcl	bcl	bcl
Boron	20	bcl	bcl	bcl	bcl
Cadmium	20	bcl	bcl	bcl	200
Calcium	0.05%	3	7	7	10
Chromium	10	<100	<100	<100	<100
Cobalt	10	bcl	bcl	bcl	bcl
Copper	1	1000	300	500	700
Gallium	5	bcl	bcl	5	bcl
Germanium	20	bcl	bcl	bcl	bcl
Indium	50	bcl	bcl	bcl	100
Iron	0.05%	>20	>20	>20	20
Lead	5	300	70	50	>5000
Magnesium	0.02%	0.7	3	2	7
Manganese	5	>10000	>10000	>10000	>10000
Molybdenum	10	bcl	bcl	bcl	bcl
Nickel	5	bcl	bcl	bcl	bcl
Niobium	50	bcl	bcl	bcl	bcl
Silver	1	10	2	2	200
Strontium	2	5	10	10	10
Tellurium	200	bcl	bcl	bcl	bcl
Thorium	200	bcl	bcl	bcl	bcl
Tin	10	10000	3000	2000	5000
Titanium	5	200	100	70	700
Vanadium	20	20	50	70	70
Zinc	50	50	50	150	>10000
Zirconium	20	20	20	30	bcl

ES 186-2 Pant Showing
ES 186-3 Lense Above Pant
ES 186-4 Showing

D-047-1 Vein on Marble Creek

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

>5000 ppm	= >5000 ppm	50 ppm	= 25–100 ppm
5000 ppm	= 2500–10000 ppm	20 ppm	= 10–50 ppm
2000 ppm	= 1000–4000 ppm	10 ppm	= 5–20 ppm
1000 ppm	= 500–2000 ppm	5 ppm	= 2–10 ppm
500 ppm	= 250–1000 ppm	2 ppm	= 1–4 ppm
200 ppm	= 100–400 ppm	1 ppm	= 0.5–2 ppm
100 ppm	= 50–200 ppm	bcl	= below concentration limit

Ranges for Iron, Calcium & Magnesium are reported in %

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: ....

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. SP0928

INVOICE NO. 31409

RECEIVED July 26/79

ANALYSED July 30/79

TO: Shell Canada Resources Ltd.
Minerals Dept.
P.O. Box 100
Calgary, Alta. T2P 2H5

ATTN:

From Assay #65416, 65570

SAMPLE NO. :	Lower Concentration Limit (PPM)	Granite Creek Showing C-77-2	C-77-3	C-77-4	Pant Showing ES-186-1
Antimony	50	bcl	bcl	700	150
Arsenic	50	1000	10000	7000	>10000
Barium	5	5	10	10	70
Beryllium	5	bcl	bcl	bcl	bcl
Bismuth	5	50	30	50	70
Boron	20	bcl	bcl	bcl	bcl
Cadmium	20	700	150	500	bcl
Calcium	0.05%	0.2	5	0.2	3
Chromium	10	<100	<100	<100	<100
Cobalt	10	bcl	bcl	bcl	bcl
Copper	1	700	700	700	1000
Gallium	5	bcl	10	15	10
Germanium	20	bcl	bcl	bcl	bcl
Indium	50	100	bcl	70	bcl
Iron	0.05%	>20	>20	>20	>20
Lead	5	5000	2000	>5000	500
Magnesium	0.02%	0.2	3	0.2	1
Manganese	5	10000	>10000	10000	>10000
Molybdenum	10	bcl	bcl	bcl	bcl
Nickel	5	bcl	bcl	bcl	bcl
Niobium	50	bcl	bcl	bcl	bcl
Silver	1	50	30	700	10
Strontium	2	bcl	5	bcl	10
Tellurium	200	bcl	bcl	bcl	bcl
Thorium	200	bcl	bcl	bcl	bcl
Tin	10	700	5000	2000	>10000
Titanium	5	70	70	70	500
Vanadium	20	bcl	100	50	50
Zinc	50	>10000	1500	>10000	50
Zirconium	20	30	50	50	30

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

>5000 ppm	=> 5000 ppm	50 ppm	= 25–100 ppm
5000 ppm	= 2500–10000 ppm	20 ppm	= 10–50 ppm
2000 ppm	= 1000–4000 ppm	10 ppm	= 5–20 ppm
1000 ppm	= 500–2000 ppm	5 ppm	= 2–10 ppm
500 ppm	= 250–1000 ppm	2 ppm	= 1–4 ppm
200 ppm	= 100–400 ppm	1 ppm	= 0.5–2 ppm
100 ppm	= 50–200 ppm	bcl	= below concentration limit

Ranges for Iron, Calcium & Magnesium are reported in %

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: ....

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. SP 0983
INVOICE NO. 32355
RECEIVED Aug. 22/79
ANALYSED Sept. 3/79

TO: Shell Canada Resources Ltd.
Minerals Dept.
P.O. Box 100
Calgary, Alta. T2P 2H5

ATTN: P.O. # PM 59464 CC: C. Bloomer

SAMPLE NO. :	Lower Concentration Limit (PPM)	C-317-6	Granite Creek Showing
Antimony	50	bcl	
Arsenic	50	5000	
Barium	5	bcl	
Beryllium	5	bcl	
Bismuth	5	bcl	
Boron	20	bcl	
Cadmium	20	bcl	
Calcium	0.05%	1	
Chromium	10	<50	
Cobalt	10	bcl	
Copper	1	1000	
Gallium	5	5	
Germanium	20	bcl	
Indium	50	bcl	
Iron	0.05%	20	
Lead	5	5000	
Magnesium	0.02%	0.2	
Manganese	5	10000	
Molybdenum	10	bcl	
Nickel	5	bcl	
Niobium	50	bcl	
Silver	1	50	
Strontium	2	bcl	
Tellurium	200	bcl	
Thorium	200	bcl	
Tin	10	700	
Titanium	5	bcl	
Vanadium	20	20	
Zinc	50	10000	
Zirconium	20	bcl	

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

>5000 ppm	= >5000 ppm	50 ppm	= 25–100 ppm
5000 ppm	= 2500–10000 ppm	20 ppm	= 10–50 ppm
2000 ppm	= 1000–4000 ppm	10 ppm	= 5–20 ppm
1000 ppm	= 500–2000 ppm	5 ppm	= 2–10 ppm
500 ppm	= 250–1000 ppm	2 ppm	= 1–4 ppm
200 ppm	= 100–400 ppm	1 ppm	= 0.5–2 ppm
100 ppm	= 50–200 ppm	bcl	= below concentration limit

Ranges for Iron, Calcium & Magnesium are reported in %

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: ....

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. SP 0940

TO:

INVOICE NO.

RECEIVED

ATTN:

ANALYSED

SAMPLE NO. :	Lower Concentration Limit (PPM)	816-1-702 R8-7	816-1-702 R8-8
Antimony	50	bcl	bcl
Arsenic	50	> 10,000	> 10,000
Barium	5	10	5
Beryllium	5	bcl	bcl
Bismuth	5	bcl	bcl
Boron	20	bcl	bcl
Cadmium	20	bcl	bcl
Calcium	0.05%	7%	15%
Chromium	10	bcl	bcl
Cobalt	10	bcl	bcl
Copper	1	1500	700
Gallium	5	10	bcl
Germanium	20	bcl	bcl
Indium	50	bcl	bcl
Iron	0.05%	> 20%	> 20%
Lead	5	1500	1500
Magnesium	0.02%	5%	20%
Manganese	5	> 10,000	> 10,000
Molybdenum	10	bcl	bcl
Nickel	5	bcl	bcl
Niobium	50	bcl	bcl
Silver	1	15	15
Strontium	2	10	10
Tellurium	200	bcl	bcl
Thorium	200	bcl	bcl
Tin	10	10,000	7,000
Titanium	5	300	70
Vanadium	20	50	50
Zinc	50	200	70
Zirconium	20	30	bcl

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

>5000 ppm	=> 5000 ppm	50 ppm	= 25–100 ppm
5000 ppm	= 2500–10000 ppm	20 ppm	= 10–50 ppm
2000 ppm	= 1000–4000 ppm	10 ppm	= 5–20 ppm
1000 ppm	= 500–2000 ppm	5 ppm	= 2–10 ppm
500 ppm	= 250–1000 ppm	2 ppm	= 1–4 ppm
200 ppm	= 100–400 ppm	1 ppm	= 0.5–2 ppm
100 ppm	= 50–200 ppm	bcl	= below concentration limit

Ranges for Iron, Calcium & Magnesium are reported in %

CERTIFIED BY: ....

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. SP 0940

INVOICE NO.

RECEIVED

ANALYSED

TO:

ATTN:

SAMPLE NO. :	Lower Concentration Limit (PPM)	816-1-702 R8-7	816-1-702 R8-8
Antimony	50	bcl	bcl
Arsenic	50	> 10,000	> 10,000
Barium	5	10	5
Beryllium	5	bcl	bcl
Bismuth	5	bcl	bcl
Boron	20	bcl	bcl
Cadmium	20	bcl	bcl
Calcium	0.05%	7%	15%
Chromium	10	bcl	bcl
Cobalt	10	bcl	bcl
Copper	1	1500	700
Gallium	5	10	bcl
Germanium	20	bcl	bcl
Indium	50	bcl	bcl
Iron	0.05%	> 20%	> 20%
Lead	5	1500	1500
Magnesium	0.02%	5%	20%
Manganese	5	> 10,000	> 10,000
Molybdenum	10	bcl	bcl
Nickel	5	bcl	bcl
Niobium	50	bcl	bcl
Silver	1	15	15
Strontium	2	10	10
Tellurium	200	bcl	bcl
Thorium	200	bcl	bcl
Tin	10	10,000	7,000
Titanium	5	300	70
Vanadium	20	50	50
Zinc	50	200	70
Zirconium	20	30	bcl

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

>5000 ppm	=> 5000 ppm	50 ppm	= 25–100 ppm
5000 ppm	= 2500–10000 ppm	20 ppm	= 10–50 ppm
2000 ppm	= 1000–4000 ppm	10 ppm	= 5–20 ppm
1000 ppm	= 500–2000 ppm	5 ppm	= 2–10 ppm
500 ppm	= 250–1000 ppm	2 ppm	= 1–4 ppm
200 ppm	= 100–400 ppm	1 ppm	= 0.5–2 ppm
100 ppm	= 50–200 ppm	bcl	= below concentration limit

Ranges for Iron, Calcium & Magnesium are reported in %

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: ....

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. SP 0938
INVOICE NO. 31629
RECEIVED Aug. 1/79
ANALYSED Aug. 3/79

TO: Shell Canada Resources Ltd.,
Minerals Dept.
P.O. Box 100
Calgary, Alta.
ATTN: BLOOMER - Cassiar

CHARGE: DM 5964

SAMPLE NO.:	Lower Concentration Limit (PPM)	C-227-8	Vein Showing on Marble Creek
Antimony	50	1000	
Arsenic	50	10,000	
Barium	5	70	
Beryllium	5	bcl	
Bismuth	5	bcl	
Boron	20	bcl	
Cadmium	20	200	
Calcium	0.05%	0.2%	
Chromium	10	< 50	
Cobalt	10	bcl	
Cooper	1	500	
Gallium	5	10	
Germanium	20	bcl	
Indium	50	bcl	
Iron	0.05%	> 20%	
Lead	5	> 10,000	
Magnesium	0.02%	0.05%	
Manganese	5	300	
Molybdenum	10	bcl	
Nickel	5	bcl	
Niobium	50	bcl	
Silver	1	700	
Strontium	2	10	
Tellurium	200	bcl	
Thorium	200	bcl	
Tin	10	7,000	
Titanium	5	70	
Vanadium	20	20	
Zinc	50	> 10,000	
Zirconium	20	20	

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

>5000 ppm	= >5000 ppm	50 ppm	= 25–100 ppm
5000 ppm	= 2500–10000 ppm	20 ppm	= 10–50 ppm
2000 ppm	= 1000–4000 ppm	10 ppm	= 5–20 ppm
1000 ppm	= 500–2000 ppm	5 ppm	= 2–10 ppm
500 ppm	= 250–1000 ppm	2 ppm	= 1–4 ppm
200 ppm	= 100–400 ppm	1 ppm	= 0.5–2 ppm
100 ppm	= 50–200 ppm	bcl	= below concentration limit

Ranges for Iron, Calcium & Magnesium are reported in %

CTA MEMBER CANADIAN TESTING ASSOCIATION

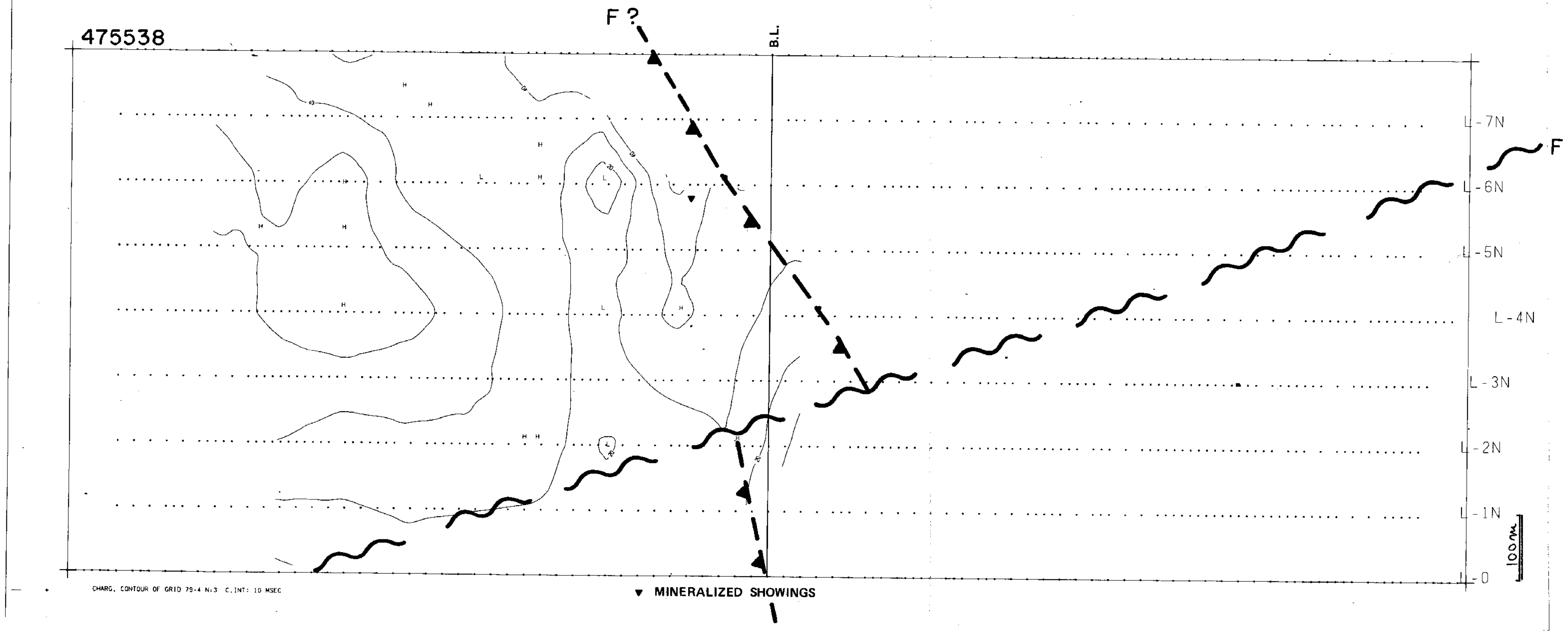
CERTIFIED BY: [signature]

APPENDIX III

Summary Of Expenditures

Labour	$37,725.00
Room and Board	$29,720.00
Camp Supplies and General Materials	$ 5,519.00
McElhanney Surveying (orthophotographs)	$15,813.00
Geophysical Contraction (Kenting Geophysics)	$16,701.00
Line Cutting (66 line Kilometres @ $270.00/line km)	$17,860.00
Truck Rental	$ 3,545.00
Helicopter (12.04 hours @ $365.00/hour)	$ 4,395.00
Aircraft	$ 8,851.00
Fuel and Lubricants	$ 3,420.00
Labratory and Analytical Servises	$ 3,321.00
Postage and Express	$ 1,027.00
Crew Travel Expenses	$ 8,214.00
Total Expenditures:	$156,021.00

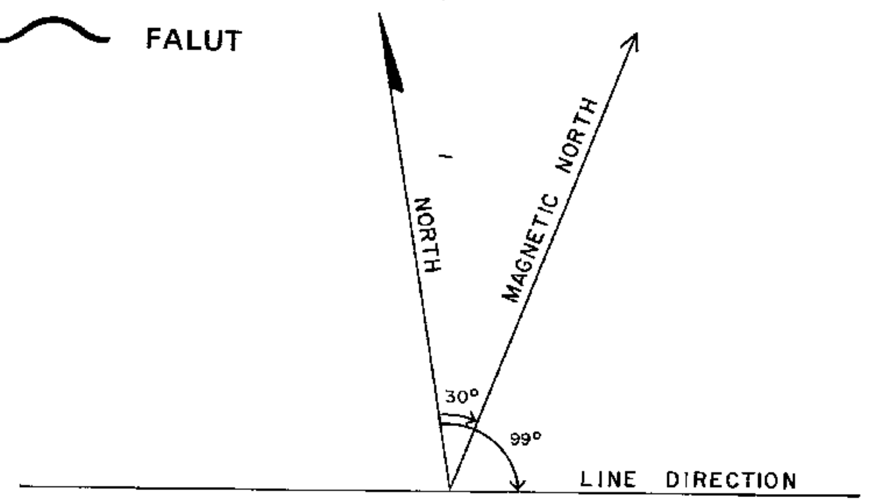
APPENDIX IV



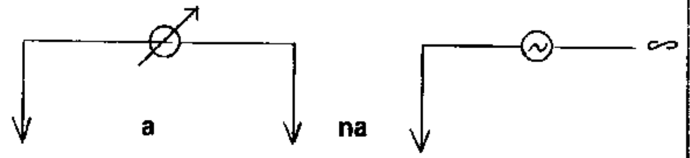
LEGEND

CONTACT

FALUT



POLE DIPOLE ARRAY



a = 100 m

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
No. 3991-P
GRID 79-4
APPARENT CHARGEABILITY CONTOUR MAP
n = 3

475538

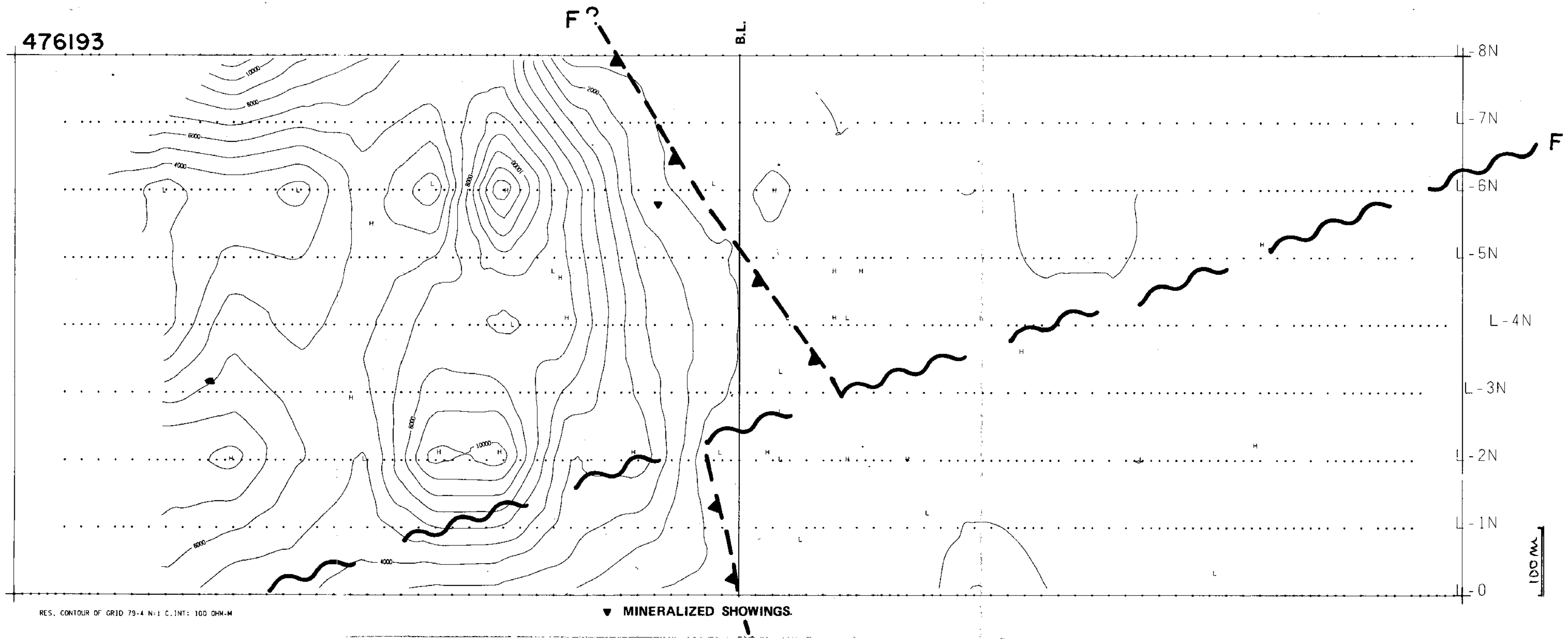
AUTHOR: S. SAYDAM	SCALE: 1:5000	DRAWING No.: VA08I-I
DATE: NOV '79	REVISED:	ENCLOSURE No.:
To Accompany		

SHELL CANADA RESOURCES LIMITED
EXPLORATION - MINERALS

CASSIAR PROJECT
No. 3991-P
GRID 79-4
APPARENT CHARGEABILITY CONTOUR MAP
n = 1

475539

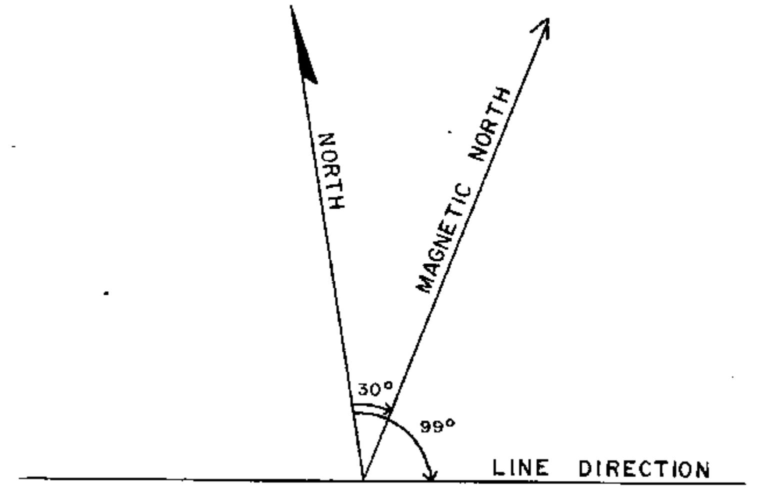
AUTHOR: S. SAYDAM	SCALE: 1:5000	DRAWING No.: VA081-4
DATE: NOV '79	REVISED:	ENCLOSURE No.:
To Accompany		



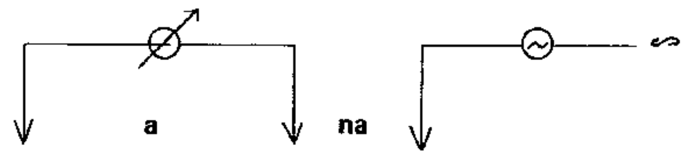
LEGEND

CONTACT

FAULT



POLE DIPOLE ARRAY



a = 100 m

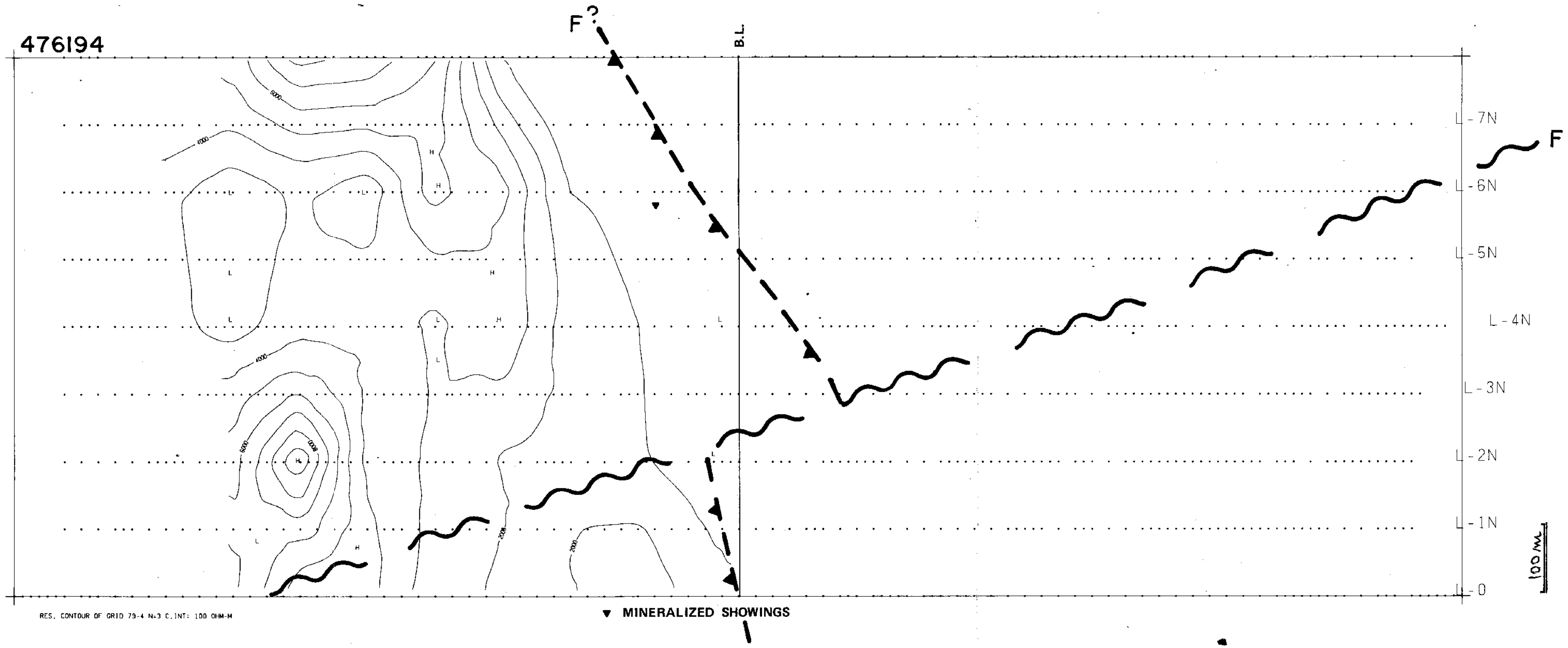
Apparent Resistivity: 1/10 of Contour Value

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

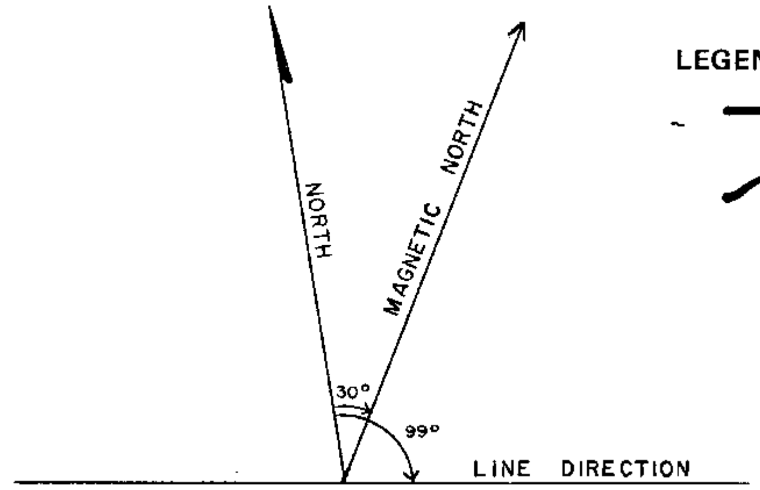
CASSIAR PROJECT
No. 3991-P
GRID 79-4
APPARENT RESISTIVITY CONTOUR MAP
n = 1

476193

AUTHOR: S. SAYDAM	SCALE: 1:5000	DRAWING No.: VA-81-F
DATE: NOV '79	REVISED:	ENCLOSURE No.:
To Accompany		



▼ MINERALIZED SHOWINGS

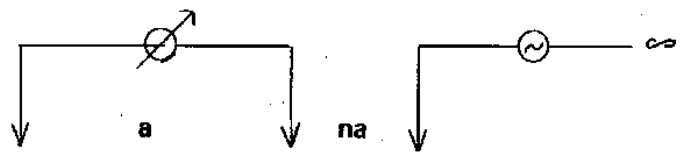


LEGEND

— — — CONTACT

∿∿ FAULT

POLE DIPOLE ARRAY



a = 100 m

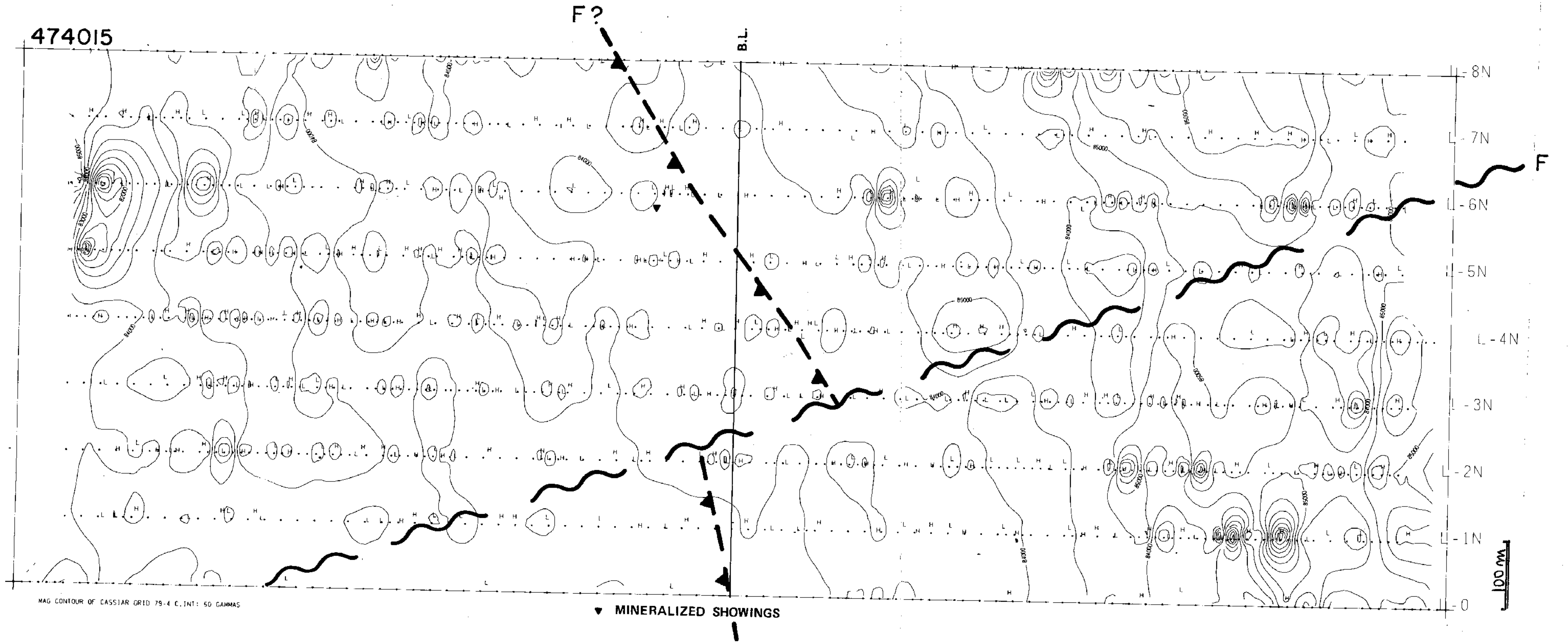
Apparent Resistivity: 1/10 of Contour Value

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
No. 3991-P
GRID 79-4
APPARENT RESISTIVITY CONTOUR MAP
n = 3

476194

AUTHOR: S. SAYDAM	SCALE: 1:5000	DRAWING No.: VA081-H
DATE: NOV '79	REVISED:	ENCLOSURE No.:
To Accompany		



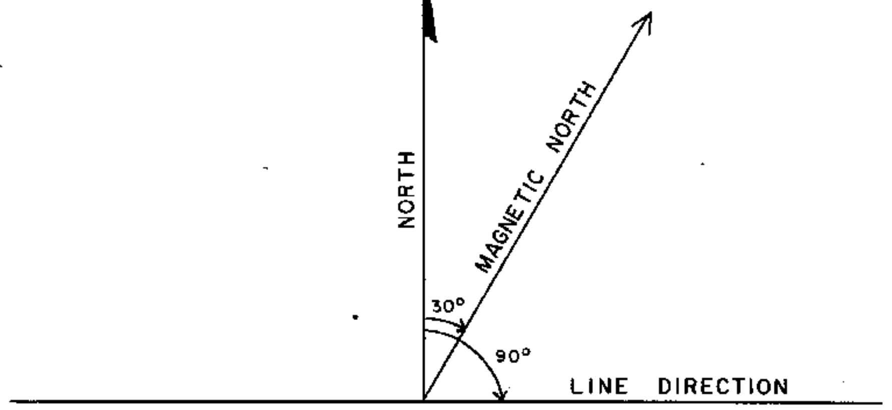
C. INT: 50 GAMMAS
(FINAL CONTOUR VALUES: 50 000 GAMMAS SUBTRACTED FROM FIELD READINGS AND MULTIPLIED BY TEN)

SHELL CANADA RESOURCES LIMITED
EXPLORATION - MINERALS

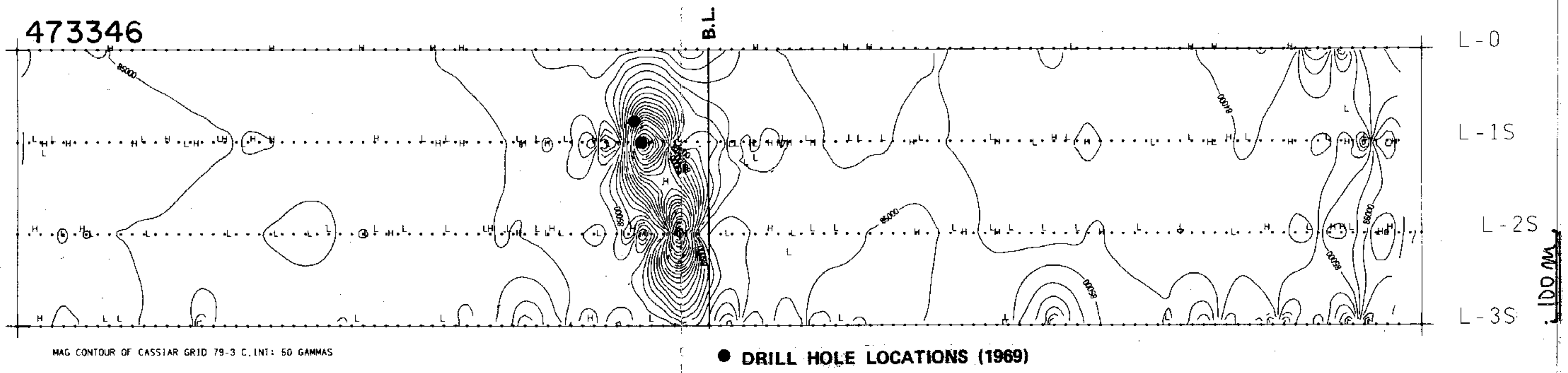
CASSIAR PROJECT
No. 3991-P
GRID 79-4
CONTOUR OF TOTAL FIELD MAGNETICS

474015

AUTHOR: S. SAYDAM	SCALE: 1:5000	DRAWING No. VAoBl-J
DATE: NOV '79	REVISED:	ENCLOSURE No.:
To Accompany		



C. INT: 50 GAMMAS
(FINAL CONTOUR VALUES: 50 000 GAMMAS SUBTRACTED FROM FIELD READINGS AND MULTIPLIED BY TEN)



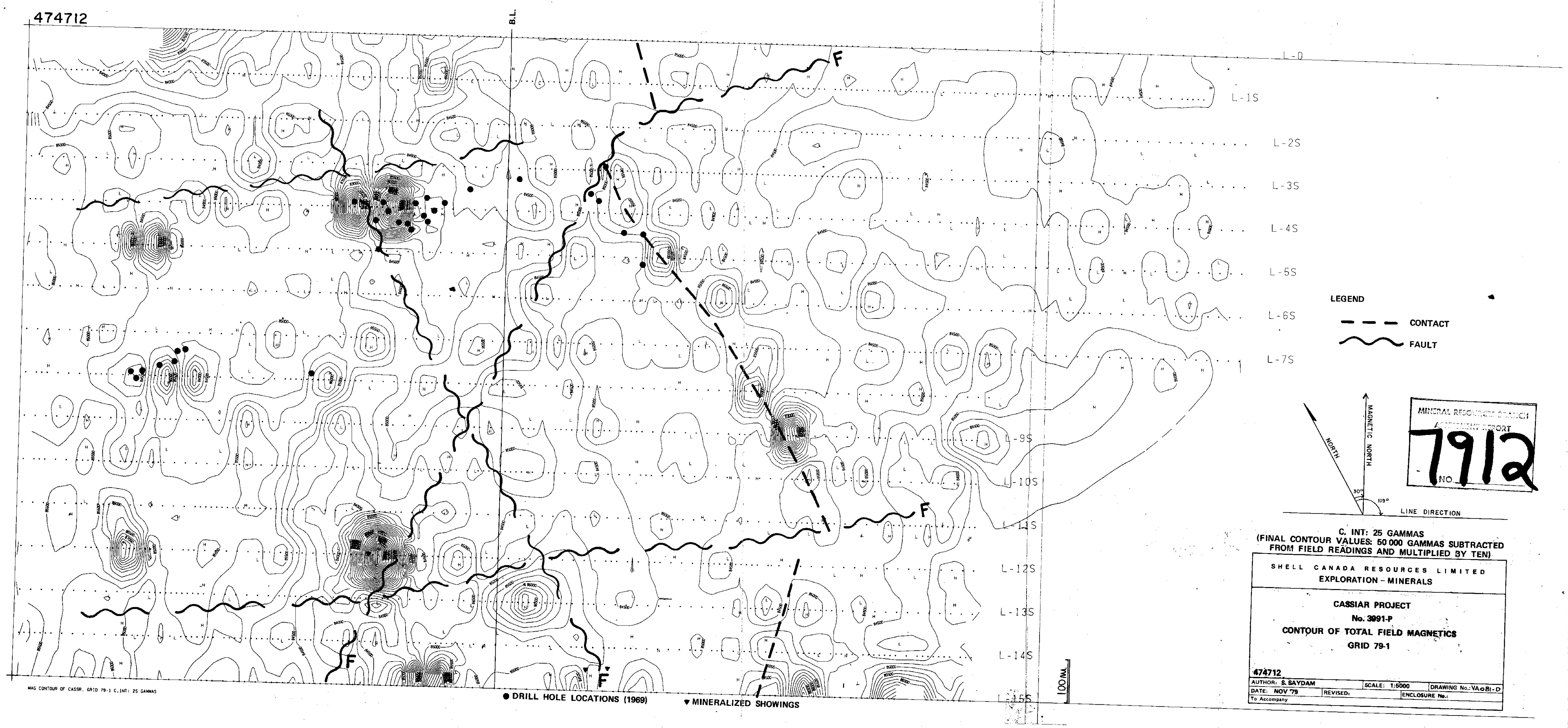
● DRILL HOLE LOCATIONS (1969)

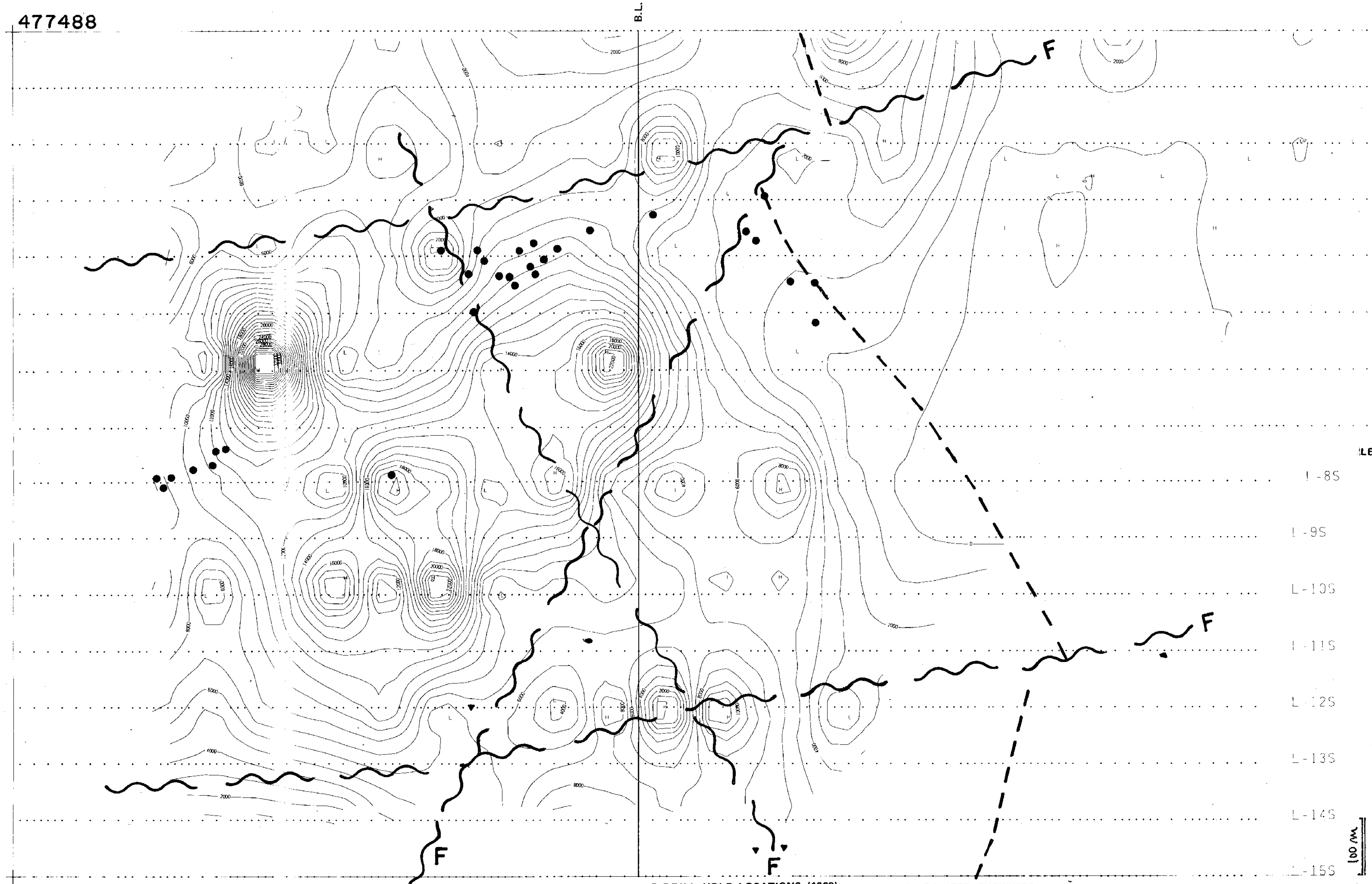
SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
No. 3901-P
CONTOUR OF TOTAL FIELD MAGNETICS
GRID 79-3

473346

AUTHOR: S. SAYDAM	SCALE: 1:5000	DRAWING No.: VA081-E
DATE: NOV '79	REVISED:	ENCLOSURE No.:
To Accompany		

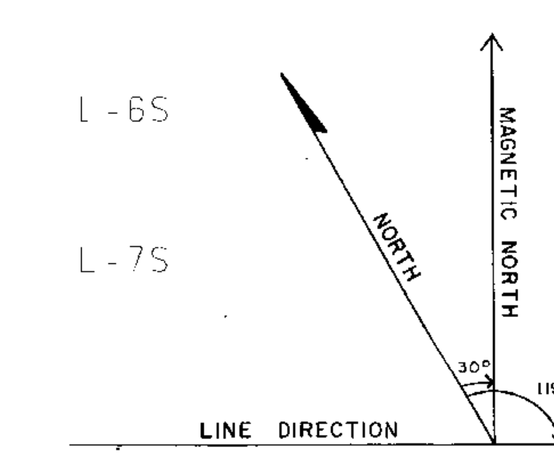

474712
B.L.
L-0
L-1S
L-2S
L-3S
L-4S
L-5S
L-6S
L-7S
L-9S
L-10S
L-11S
L-12S
L-13S
L-14S
L-15S
F
100M
LEGEND
CONTACT
FAULT
NORTH
MAGNETIC NORTH
30°
119°
LINE DIRECTION
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 7912
C. INT: 25 GAMMAS
(FINAL CONTOUR VALUES: 50 000 GAMMAS SUBTRACTED FROM FIELD READINGS AND MULTIPLIED BY TEN)
SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS
CASSIAR PROJECT
No. 3991-P
CONTOUR OF TOTAL FIELD MAGNETICS
GRID 79-1
474712
AUTHOR: S. SAYDAM
SCALE: 1:5000
DRAWING No.: VA081-D
DATE: NOV '79
REVISED:
ENCLOSURE No.:
To Accompany
MAG CONTOUR OF CASSR. GRID 79-1 C. INT: 25 GAMMAS
● DRILL HOLE LOCATIONS (1969)
▼ MINERALIZED SHOWINGS



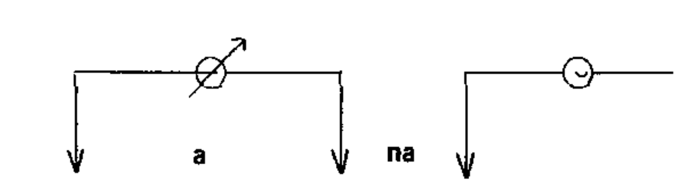
LEGEND

CONTACT

FAULT



POLE DIPOLE ARRAY



a = 100 m

Apparent Resistivity: 1/10 of Contour Value

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

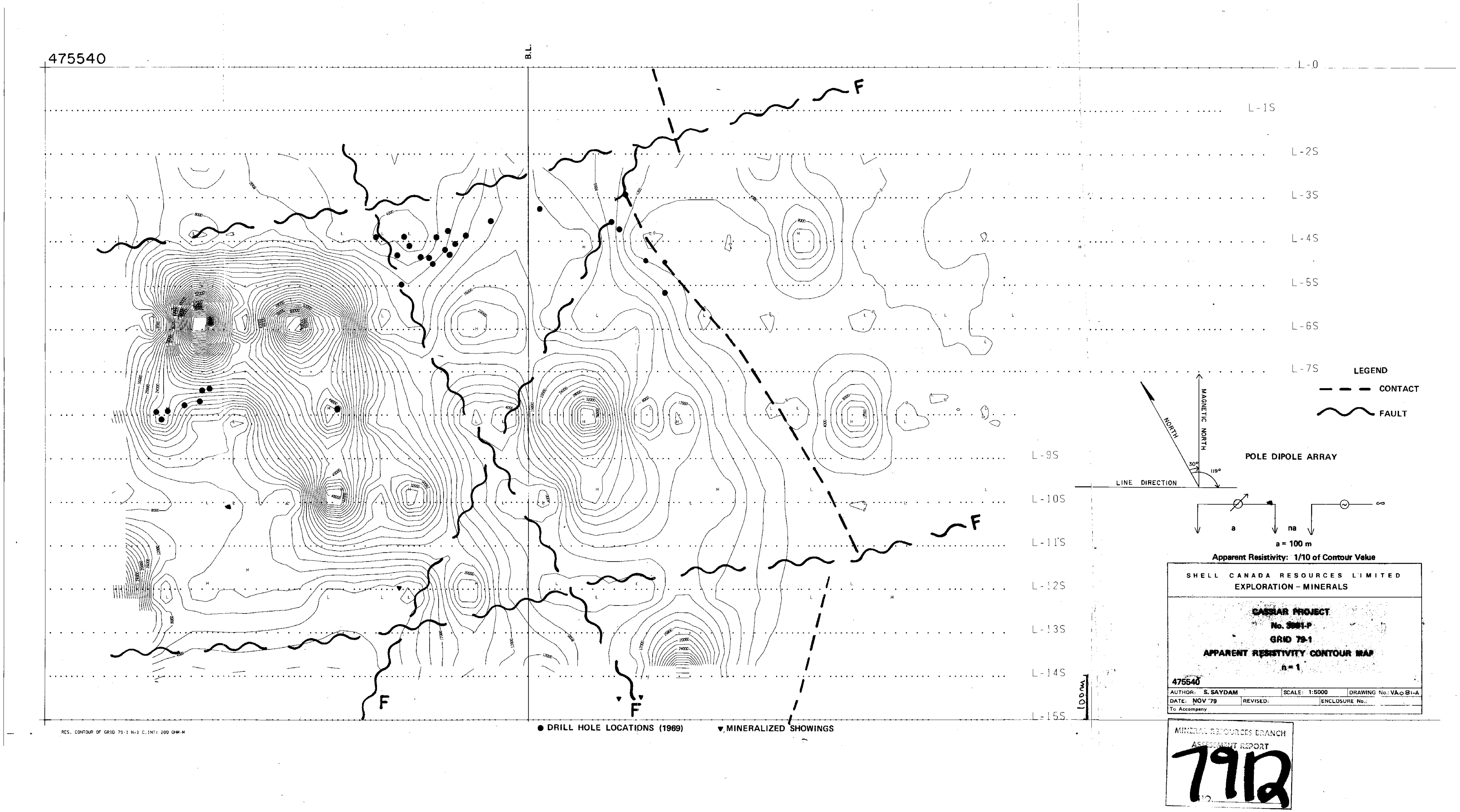
CASSIAR PROJECT
No. 3991-P
GRID 79-1
APPARENT RESISTIVITY CONTOUR MAP
n = 3

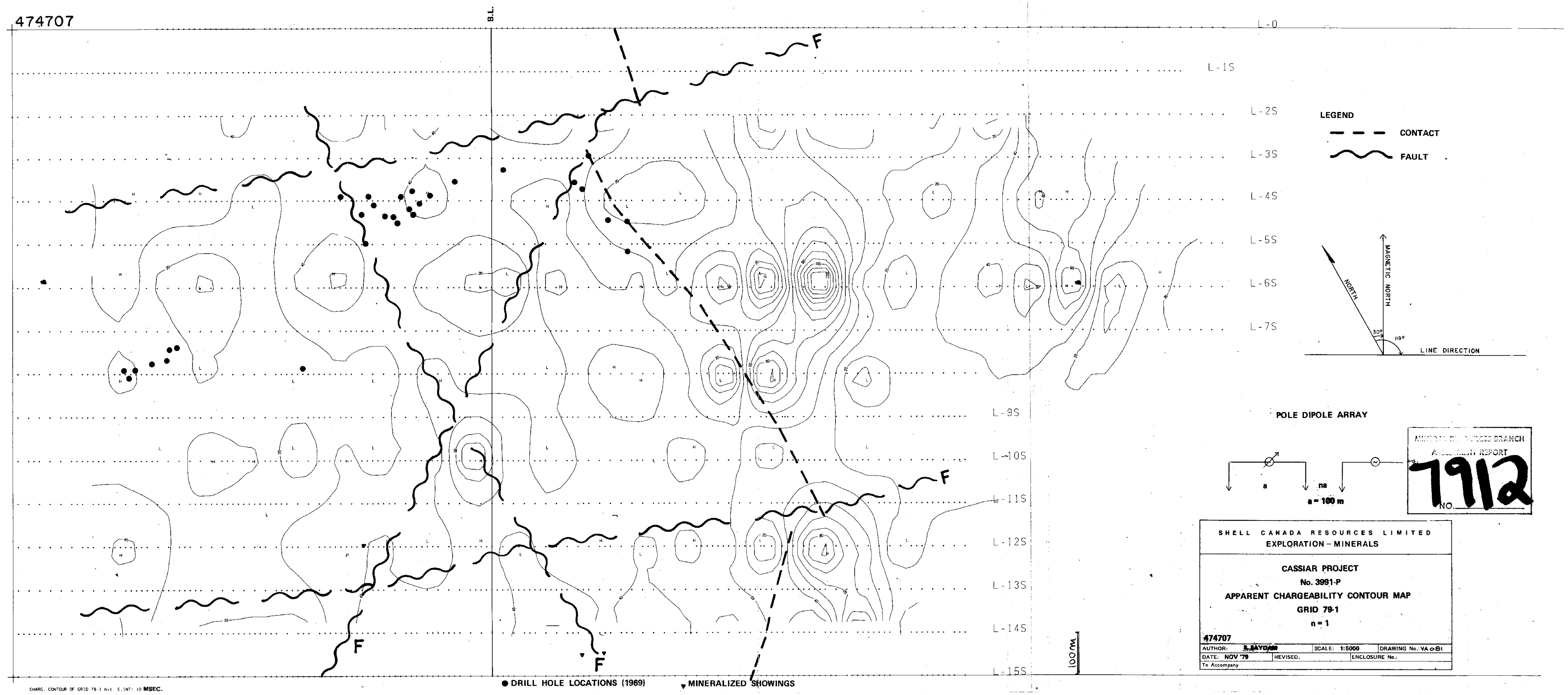
477488

AUTHOR: S. SAYDAM	SCALE: 1:5000	DRAWING No.: VAoBI-C
DATE: NOV '79	REVISED:	ENCLOSURE No.:
To Accompany		

7912
NO.


475533
B.L.
L-0
L-1S
L-0
L-3S
L-4S
L-5S
L-6S
L-7S
L-8S
L-9S
L-10S
L-11S
L-12S
L-13S
L-14S
L-15S
F
F
F
F
100 M
LEGEND
CONTACT
FAULT
MAGNETIC NORTH
NORTH
30°
119°
LINE DIRECTION
7912
NO.
POLE DIPOLE ARRAY
a
na
a = 100 m
SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS
CASSIAR PROJECT
No. 3991-P
APPARENT CHARGEABILITY CONTOUR MAP
GRID 79-1
n = 3
475533
AUTHOR: S. SAYDAM
SCALE: 1:5000
DRAWING No.: VA081-8
DATE: NOV '79
REVISED:
ENCLOSURE No.:
To Accompany
CHARG. CONTOUR OF GRID 79-1 N=3 C.INT: 10 MSEC
● DRILL HOLE LOCATIONS (1969)
▼ MINERALIZED SHOWINGS


475540
B.L.
L-0
L-1S
L-2S
L-3S
L-4S
L-5S
L-6S
L-7S
L-9S
L-10S
L-11S
L-12S
L-13S
L-14S
L-15S
F
LEGEND
CONTACT
FAULT
MAGNETIC NORTH
NORTH
LINE DIRECTION
POLE DIPOLE ARRAY
a = 100 m
Apparent Resistivity: 1/10 of Contour Value
100m
● DRILL HOLE LOCATIONS (1969)
▼ MINERALIZED SHOWINGS
RES. CONTOUR OF GRID 79-1 N=1 C.INT= 200 OHM-M
SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS
CASSIAR PROJECT
GRID 79-1
APPARENT RESISTIVITY CONTOUR MAP
n = 1
475540
AUTHOR: S. SAYDAM
SCALE: 1:5000
DATE: NOV '79
REVISED:
ENCLOSURE No.:
To Accompany
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
7912



MINERAL RESOURCES BRANCH ASSESSMENT REPORT NO. 7912

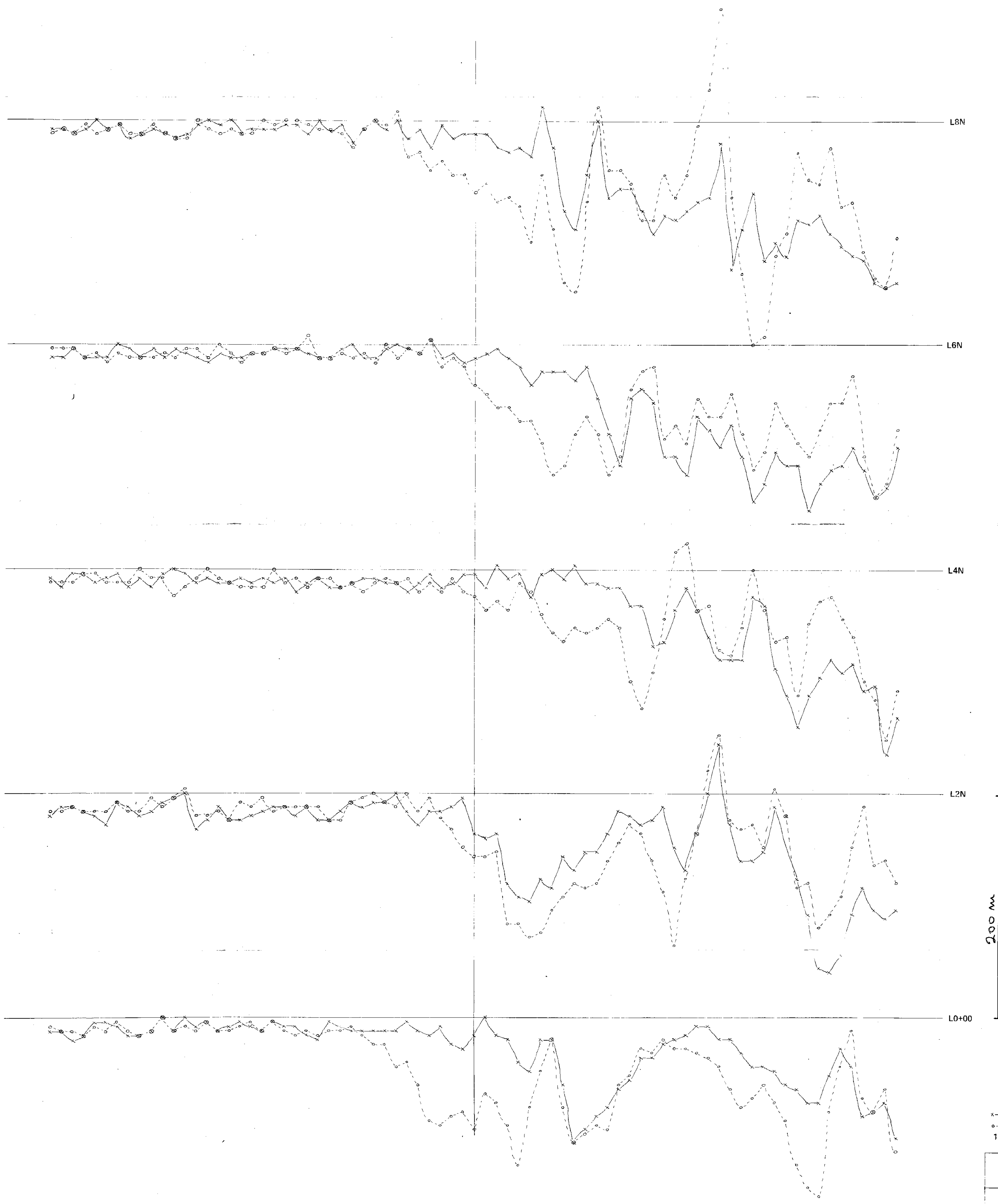
SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
No. 3991-P
APPARENT CHARGEABILITY CONTOUR MAP
GRID 79-1
n = 1

474707

AUTHOR: S. SAYDAM	SCALE: 1:5000	DRAWING No.: VA o 81
DATE: NOV '79	REVISED:	ENCLOSURE No.:
To Accompany		

CHARG. CONTOUR OF GRID 79-1 N=1 C.INT. 10 MSEC.

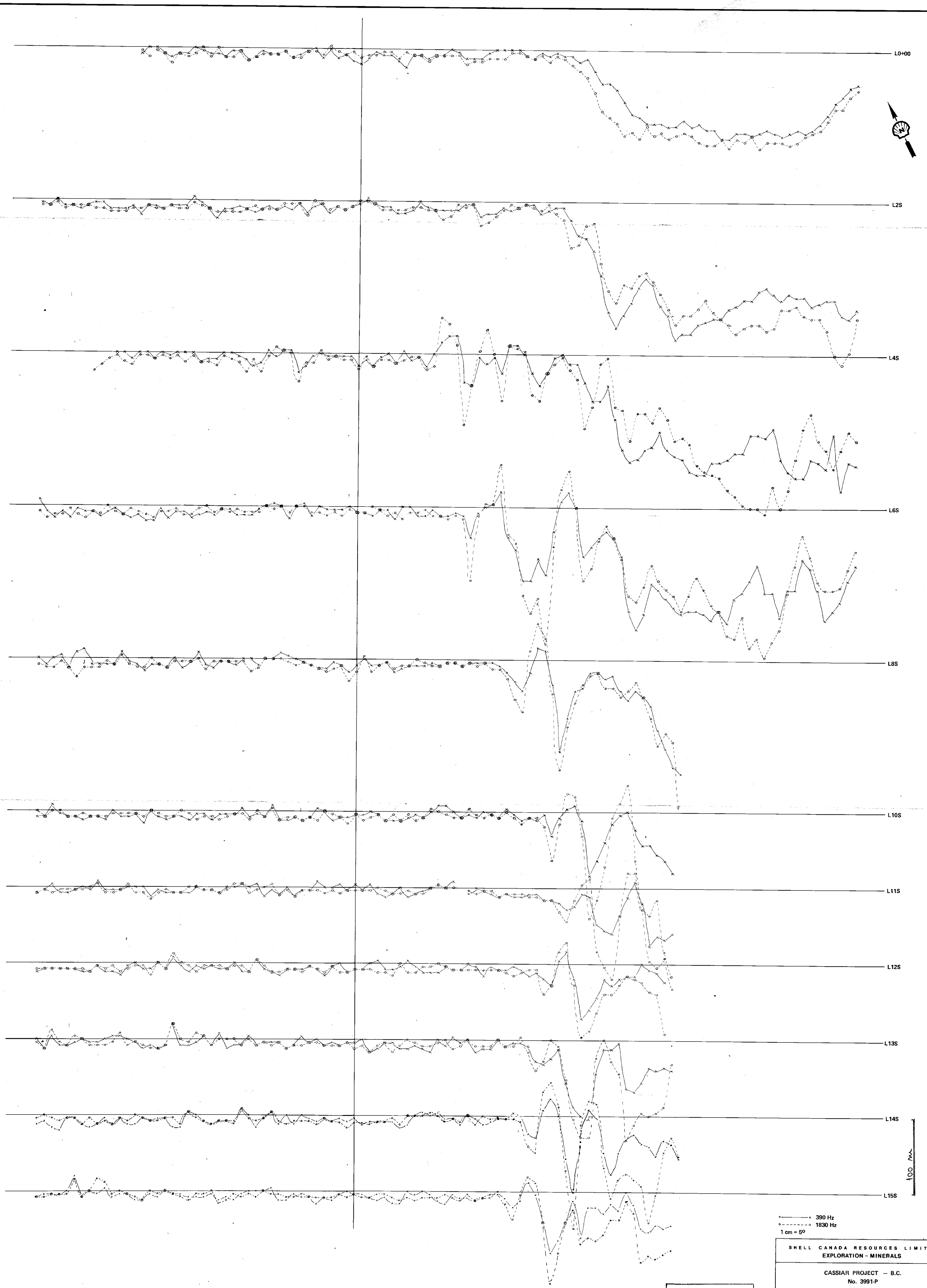


x——x 390 Hz
o- - -o 1830 Hz
1 cm = 5°

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT – B.C.
No. 3991-P
GRID 79-4
SHOOTBACK EM TILT ANGLE PROFILES
SCALE: 1/5000 ALONG LINES
1/2000 ALONG BASELINE

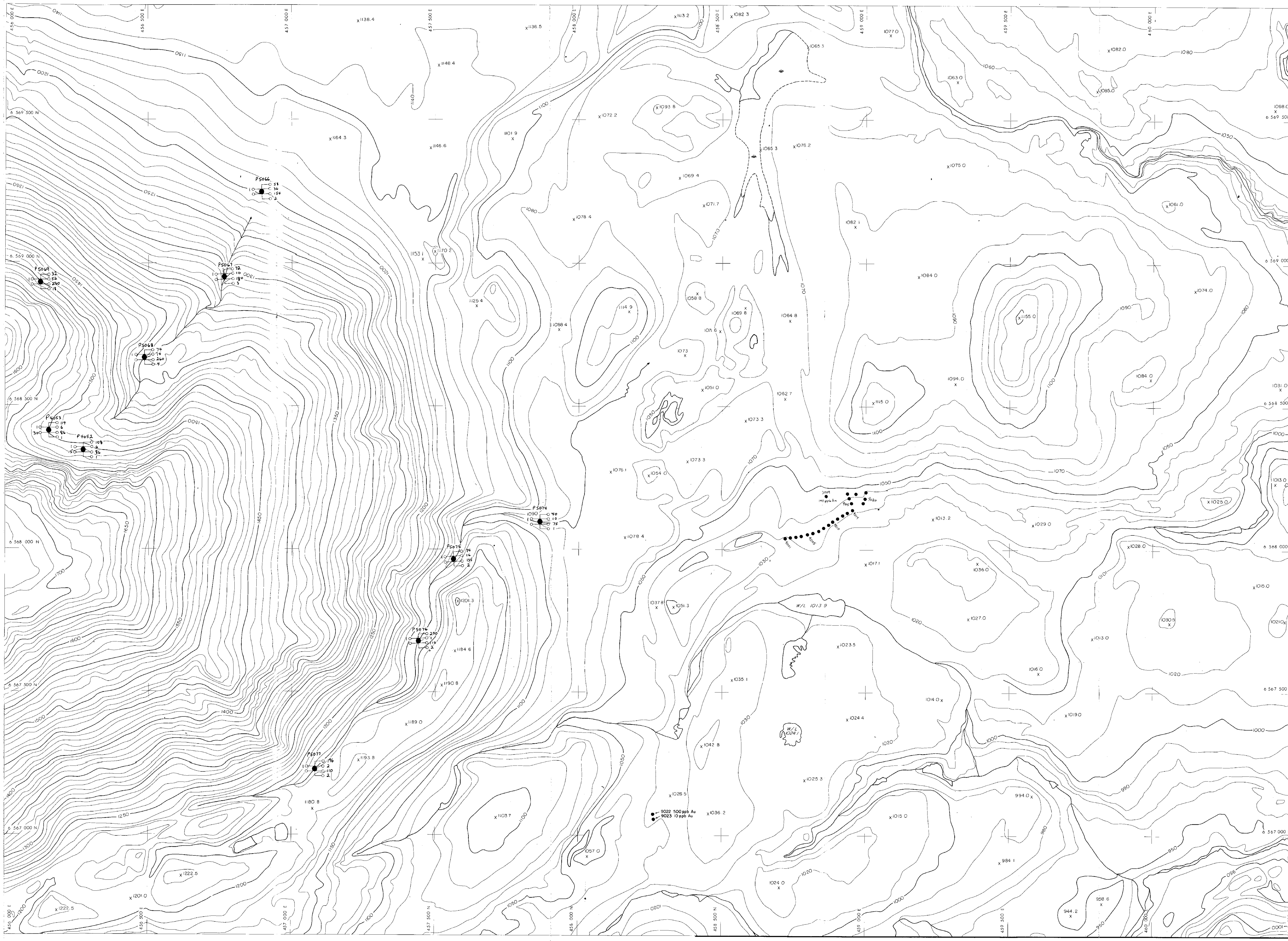
AUTHOR: S. SAYDAM	SCALE:	DRAWING No.: VEo82A
DATE: NOV. 1979	REVISED:	ENCLOSURE No.
To Accompany		



SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT – B.C.
No. 3991-P
GRID 79-1
SHOOTBACK EM TILT ANGLE PROFILES
SCALE: 1/5000 ALONG LINES
1/2000 ALONG BASELINE

AUTHOR: S. SAYDAM		SCALE:	DRAWING No.: VE082
DATE: NOV. 1979	REVISED:		ENCLOSURE No.:
To Accompany			

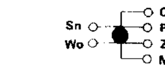


Au in ppb

SAMPLE NO.	READING
9001	20
9002	200
9003	980
9004	3000
9005	120
9006	260
9007	1100
9008	320
9009	100
9010	520
9011	1300
9012	340
9013	360
9014	10
9015	10
9016	1120
9017	440
9018	1200
9019	260
9020	10
9021	20
9022	500
9023	10

	Cu	Pb	Zn
BACKGROUND (ppm)	96	134	530
THIRD ORDER (ppm)	96 - 135	134 - 216	530 - 799
SECOND ORDER (ppm)	153 - 210	216 - 297	799 - 1068
FIRST ORDER (ppm)	+210	+297	+1068

	Mo	Sn (Panned Concentrate)
BACKGROUND (ppm)	35	64
THIRD ORDER (ppm)	35 - 59	64 - 116
SECOND ORDER (ppm)	59 - 83	116 - 168
FIRST ORDER (ppm)	+83	+168



SCALE 1:5000

0 150 300 m

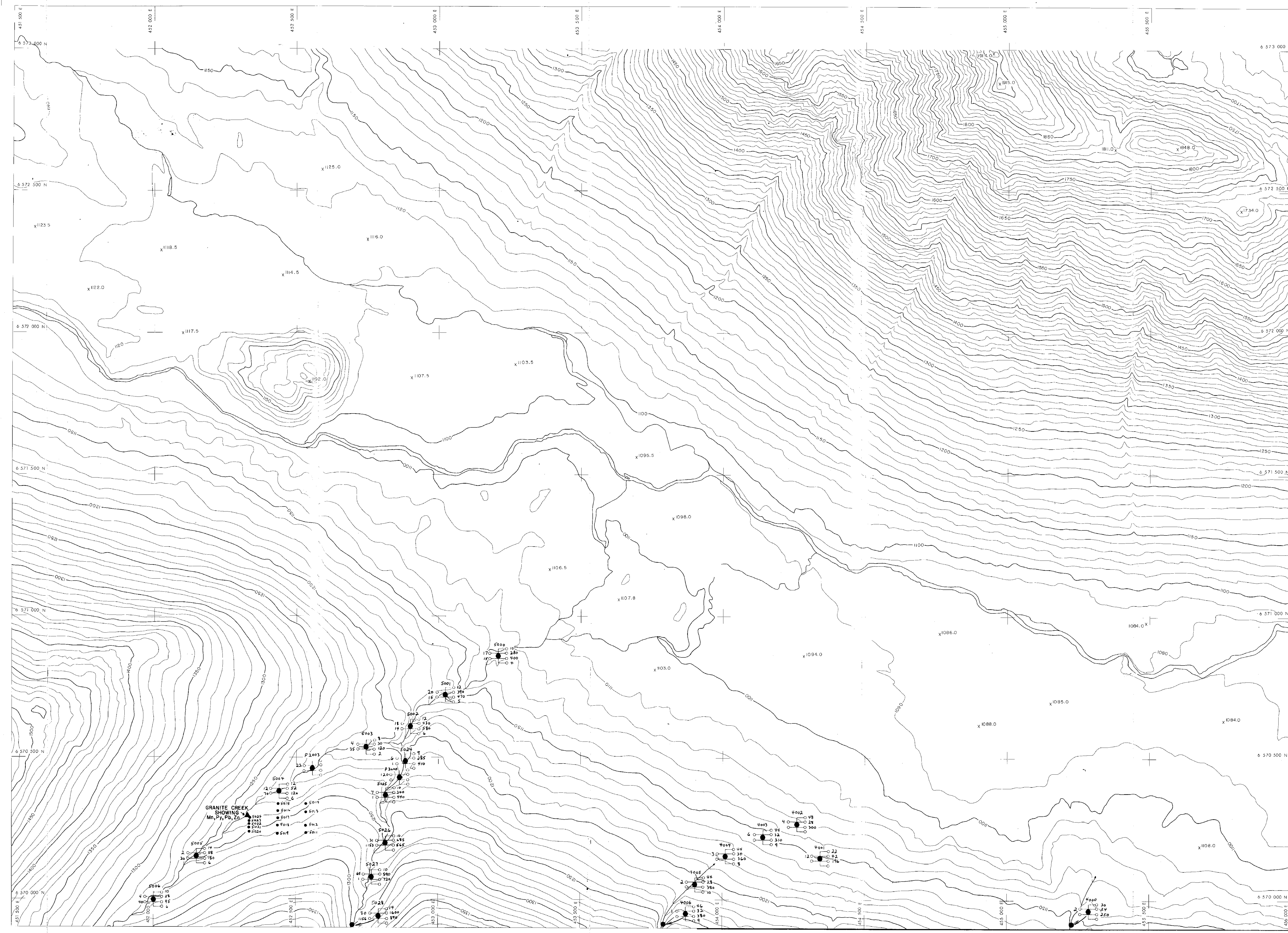
SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT – B.C.
NO. 3991P
GEOCHEMICAL RESULTS
MAP 2

AUTHOR: C. BLOOMER	SCALE: 1:5000	DRAWING No.:
DATE: MARCH 1980	REVISED:	ENCLOSURE No.:
To Accompany		

SHEET INDEX

8	6	3
8	5	2
7	4	1



	Cu	Pb	Zn
BACKGROUND (ppm)	96	134	530
THIRD ORDER (ppm)	96 - 135	134 - 216	530 - 799
SECOND ORDER (ppm)	153 - 210	216 - 297	799 - 1068
FIRST ORDER (ppm)	+210	+297	+1068

	Mo	Sn (Panned Concentrate)
BACKGROUND (ppm)	35	64
THIRD ORDER (ppm)	35 - 59	64 - 116
SECOND ORDER (ppm)	59 - 83	116 - 168
FIRST ORDER (ppm)	+83	+168

SAMPLE NO.	PPM Cu	PPM Pb	PPM Zn
5011	20	64	260
5012	16	46	180
5013	10	56	160
5014	12	102	370
5015	14	206	390
5016	12	92	560
5017	12	68	470
5018	12	82	780
5019	12	84	410
5020	12	112	395
5021	14	98	420
5022	12	98	470
5023	12	42	75
5024	8	285	410

▲ ASSAY LOCATION

Sn, Wo — Cu, Pb, Zn, Mo

SCALE 1:5000

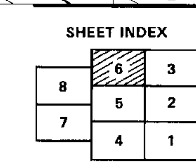
0 150 300 m

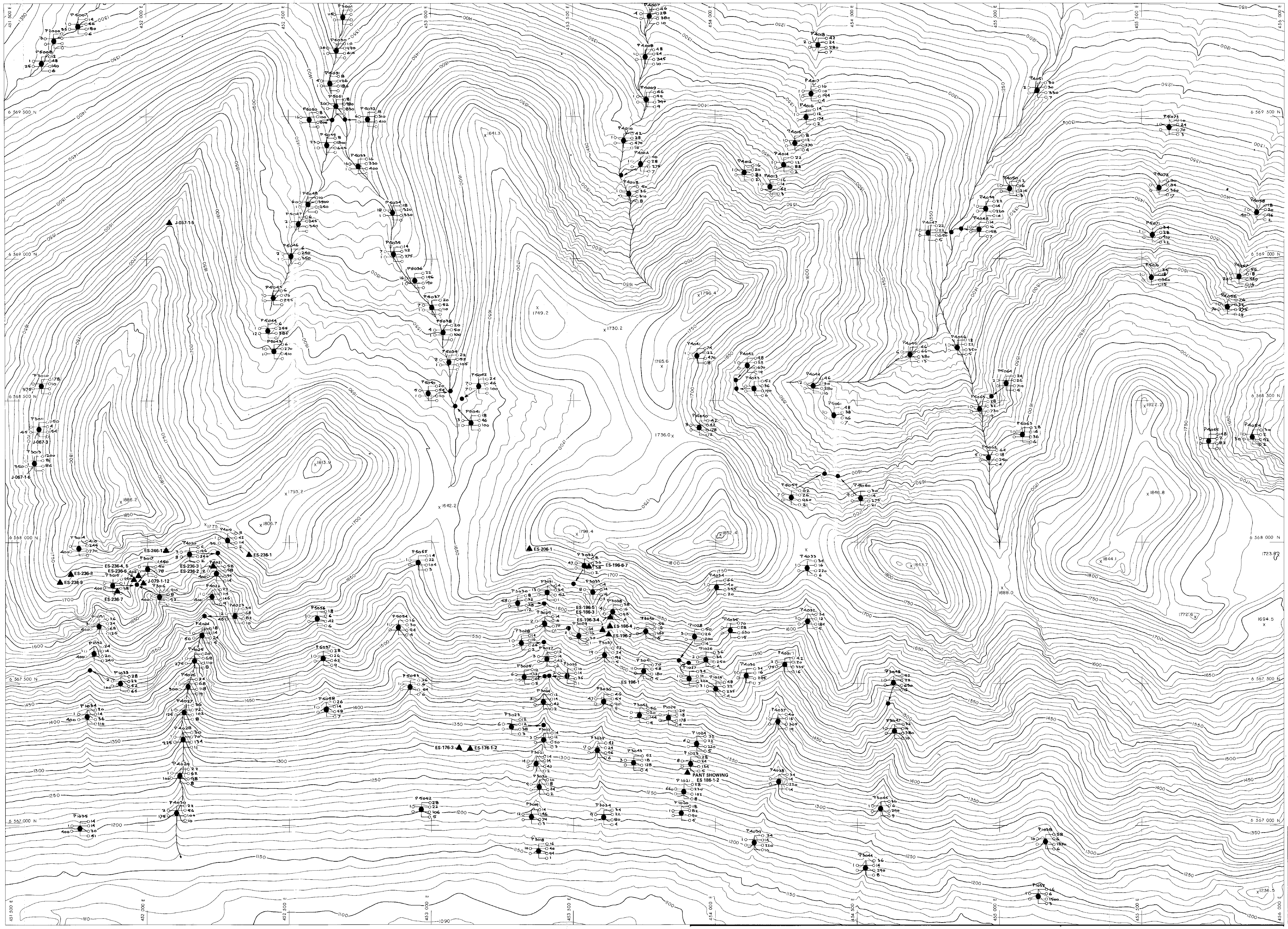
SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT – B.C.
NO. 3991-P
GEOCHEMICAL RESULTS
MAP 6

AUTHOR: C. BLOOMER	SCALE: 1:5000	DRAWING No.:
DATE: MARCH 1980	REVISED:	ENCLOSURE No.:
To Accompany		

SHEET INDEX





	Cu	Pb	Zn
BACKGROUND (ppm)	96	134	530
THIRD ORDER (ppm)	96 - 135	134 - 216	530 - 799
SECOND ORDER (ppm)	153 - 210	216 - 297	799 - 1068
FIRST ORDER (ppm)	+210	+297	+1068

	Mo	Sn (Panned Concentrate)
BACKGROUND (ppm)	35	64
THIRD ORDER (ppm)	35 - 59	64 - 116
SECOND ORDER (ppm)	59 - 83	116 - 168
FIRST ORDER (ppm)	+83	+168

▲ ASSAY LOCATION

Sn, Wo — Cu, Pb, Zn, Mo

SCALE 1:5000

0 150 300 m

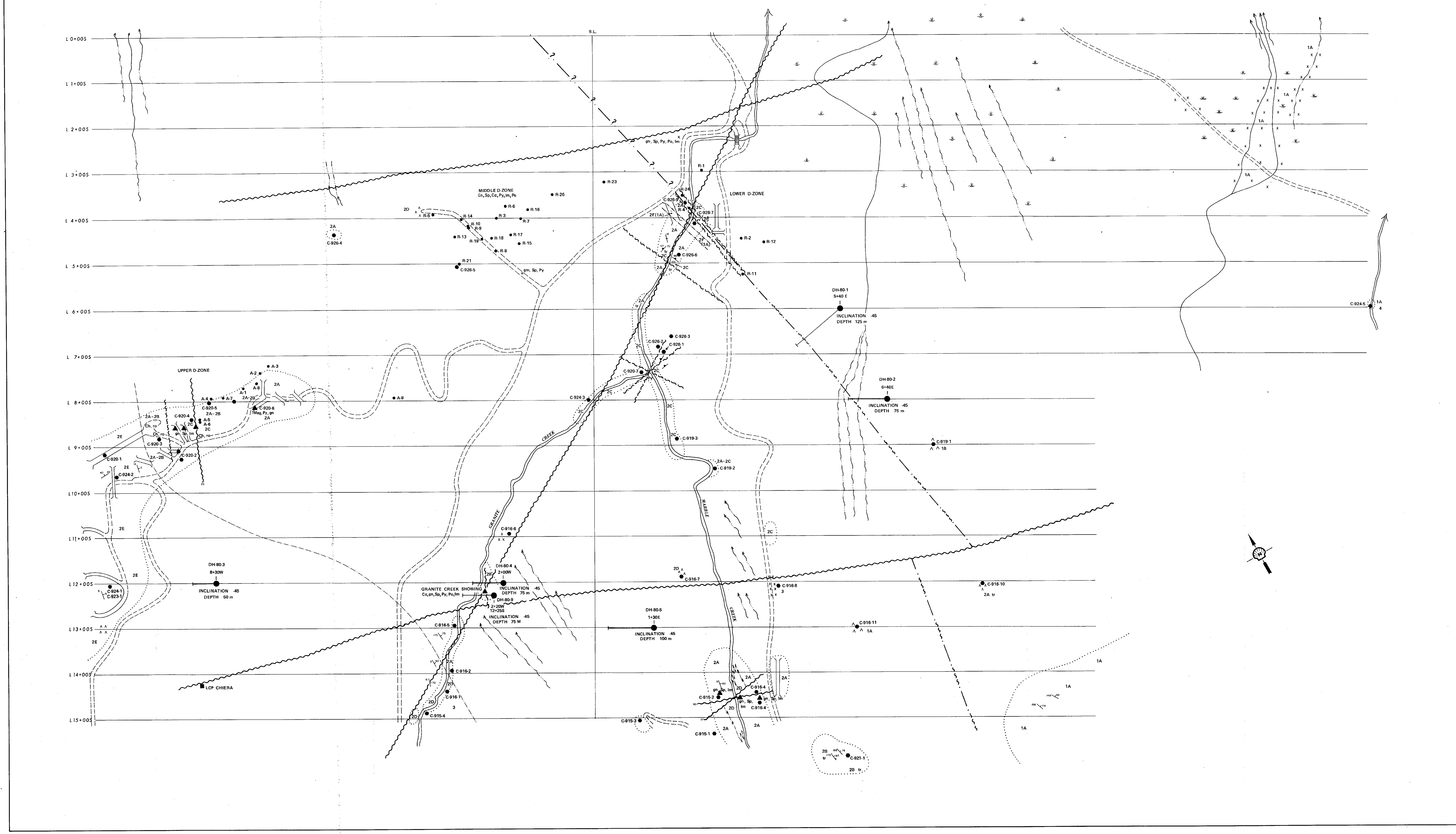
SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT – B.C.
NO. 3991P
GEOCHEMICAL RESULTS
MAP 5

AUTHOR: C. BLOOMER	SCALE: 1:5000	DRAWING No.:
DATE: MARCH 1980	REVISED:	ENCLOSURE No.:
To Accompany		

SHEET INDEX

8	6	5	3
7		4	2
			1



CAMBRIAN AND ORDOVICIAN

1 KECHIKA GROUP

1A ARGILLITE, SHALE, SLATE;
black to grey-black; mostly argillite with a pervasive mild slaty cleavage, some sections of shale and slate; cherty and calcareous sections throughout, laminated to bedded, pyrite occures as fine disseminations up to 1% and as fine streaks.

1B PHYLLITE;
black, friable, carbonaceous, with minor pyrite.

1C ARGILLACEOUS LIMESTONE;
grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

2 ATAN GROUP

2A LIMESTONE;
blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections.

2B RECRYSTALLIZED LIMESTONE (MARBLE);
buff, white, massive and as stringers and patches in 2A, large rhombohedric crystals.

2C DOLOMITE;
yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

2D QUARTZITE;
maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

2E HORNFELSIC QUARTZITE;
maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

2F SHALE AND SLATE;
black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

3 FINE GRAINED DARK GREEN DIKE ROCK ANDESITIC IN COMPOSITION

4 QUARTZ VEINING

LEGEND

BEDDING
FOLIATION
LINEATION
OUTCROP AREA
GEOPHYSICALLY INFERRED FAULT
INFERRED FAULT
APPROXIMATE CONTACT / FAULTED
DIAMOND DRILL HOLES (COAST SILVER)
TRENCHES
SHOWING
CLAIM POST
ROAD
INTERMITTENT STREAM
SWAMP
BOULDERS
SUBCROP
SAMPLE LOCATION

Ca - CASSITERITE
Ch - CHLORITE
gn - GALENA
lm - LIMONITE
mag - MAGNETITE
Py - PYRITE
Pz - PYROLOSITE
Po - PYRRHOTITE
ro - RHODOCHROSITE
Sp - SPHALERITE
tr - TREMOLITE

MIDDLE D-ZONE:	DRILL INDICATED POTENTIAL 90 000 TONNES 3.3% Pb 8.3% Zn 70 g/TONNE Ag
GRANITE CREEK SHOWING:	BEST ASSAY 1.4% Pb 0.63% Zn 5 g g/TONNE Ag 0.12% Sn

SCALE 1:2500

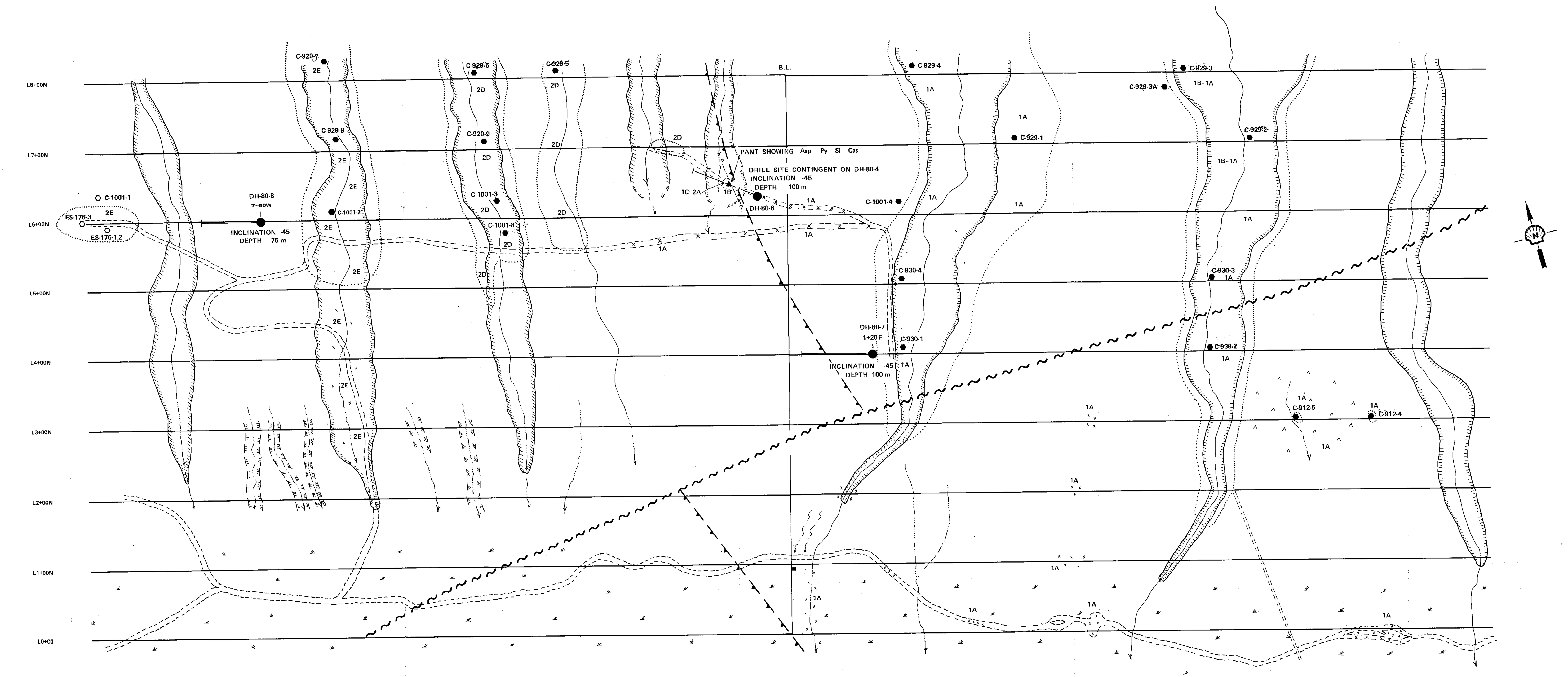
0 50 100 m

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

FIG. 9 & FIG. 27

CASSIAR PROJECT 3991-P
GRID 79-1
GEOLOGICAL MAP
1980 DRILLING LOCATIONS

AUTHOR: C. BLOOMER	SCALE: 1:2500	DRAWING No.:
DATE: JAN. 1980	REVISED:	ENCLOSURE No.:
To Accompany		



CAMBRIAN AND ORDOVICIAN

1. KECHIKA GROUP

1A. ARGILLITE, SHALE, SLATE;
black to grey-black; mostly argillite with a pervasive mild slaty cleavage, some sections of shale and slate; cherty and calcareous sections throughout, laminated to bedded, pyrite occurs as fine disseminations up to 1% and as fine streaks.

1B. PHILLITE;
black, friable, carbonaceous, with minor pyrite.

1C. ARGILLACEOUS LIMESTONE;
grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

2. ATAN GROUP

2A. LIMESTONE;
blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections.

2B. RECRYSTALLIZED LIMESTONE (MARBLE);
buff, white, massive and as stringers and patches in 2A, large rohmbohedric crystals.

2C. DOLOMITE;
yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

2D. QUARTZITE;
maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

2E. HORNFLESIC QUARZITE;
maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

2F SHALE AND SLATE;
black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

PANT SHOWING: BEST ASSAY 1.5% Sn OVER 3.6 m

LEGEND

- OUTCROP AREAS
- GEOPHYSICAL INFERRED THRUST FAULT, TEETH DOWN DIP
- GEOPHYSICALLY INFERRED FAULT
- GEOLOGICAL CONTACT, INFERRED
- SUBCROP
- TILL
- SHOWING
- ROCK SAMPLE LOCATION
- CLAIM POST
- SLIDE CHUTE
- ESCARPMENT
- SWAMP
- INTERMITTENT STREAM
- ROAD

Asp - ARSENOPYRITE
CaS - CASSITERITE
Py - PYRITE
Si - SIDERITE

1:2500

0 50 100 150 m

SHELL CANADA RESOURCES LIMITED
EXPLORATION - MINERALS

FIG. 10 & FIG. 28

GRID 79-4
CASSIAR PROJECT
CASSIAR B.C., LIARD MINING DIVISION
1980 DRILLING LOCATIONS

AUTHOR: C. BLOOMER	SCALE: 1:2500	DRAWING No.:
DATE:	REVISED:	ENCLOSURE No.:
To Accompany		

JURASSIC AND CRETACEOUS

1. CASSIAR BATHOLITH - Endocontact phase pink to grey Quartz-Monzonite, Fine to medium grained with some Quartz-Feldspar Porphyritic sections. Well jointed, fractured with some Quartz, Flourite, Sericite, Beryl fracture fillings. Trace Wolramite.

UPPER DEVONIAN AND LOWER MISSISSIPPIAN

2. SYLVESTER GROUP

2A. BASALT AND ANDESITE – dark green, grey green, fine to medium grained, mostly flow rocks with some Tuff (2A-T), Agglomerate (2A-AGG), Breccia (2A-BX), and Pillows (2A-P). The massive flow rocks have hairline fractures with Chlorite or Epidote. Pyrite occurs as minor disseminations.

2B. DACITE – Light grey-green, fine and medium grained. Mostly Lapilli size Pyroclastic (2B-L) and Breccia or Pillow fragments (2B-BX) or as fine grained possibly sheared Tuff (2B-T) containing disseminated Chalcocite and lesser Chalcopyrite near the Lang Creek Showing.

2C. DIORITE – Dark green, medium to coarse grained also as dikes and sills within 1A.

2D. ARGILLITE – Black and grey-black, laimnated to thinly bedded to massive; cherty sections and interbeds, Graphitic and sometimes Pyritic minor grit or micro-conglomerate interbeds, Shale and Slate, and Limestone.

MIDDLE AND UPPER DEVONIAN

3. McDAME GROUP

3A. DOLOMITIC SANDSTONE, SANDSTONE, CHERT, QUARTZITE – blue-grey, grey, thinly bedded to laminated. Interbeds and Laminations of Quartlite and Chert.

ORDOVICIAN, SILURIAN AND (?) DEVONIAN

4. SANDPILE GROUP

4A. LIMESTONE – Grey, light grey, and lesser grey-black, massive, highly folded and contorted, sometimes fissile. Recrytallized Quartz veining throughout.

CAMBRIAN AND ORDOVICIAN

5. KECHIKA GROUP

5A. ARGILLITE, SHALE, SLATE – black to grey-black; mostly argillite with a pervasive mild slatey cleavage, some sections of shale and slate; cherty and calcareous sections throught, laminated to bedded, pyrite occurs as fine disseminations up to 1% and as fine streaks.

5B. PHYLLITE - black, friable, carbonaceous, with minor pyrite.

5C. ARGILLACEOUS LIMESTONE – grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

6. ATAN GROUP

6A. LIMESTONE – blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections. (6A-BX)

6B. RECRYSTALLIZED LIMESTONE (MARBLE) – buff, white, massive and as stringers and patches in 2A, large rohmbohedric crystals.

6C. DOLOMITE – yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

6D. QUARTZITE – maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

6E. HORNFELSIC QUARTZITE – maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

6F. SHALE AND SLATE – black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

7. TACTITE

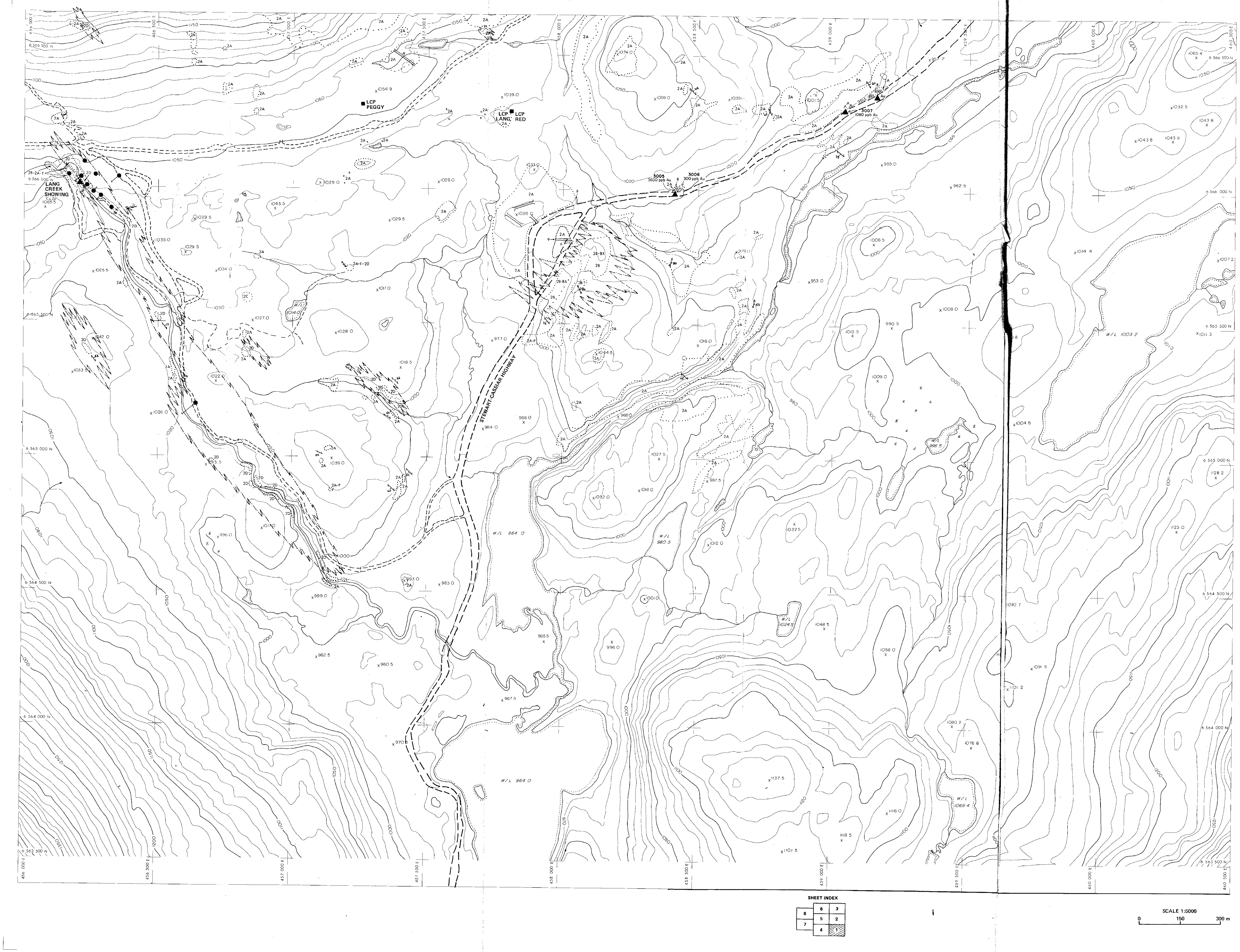
GARNET - DIOPSIDE AND GARNET ACTINOLITE - minor scheelite mineralization.

8. QUARTZ VEINING

Massive white "Bull Quartz", sections of hackly graphitic quartz and vuggy quartz with tetrahedrite, chalcopyrite, and pyrite. Contacts are Carbonatized

9. INTERMEDIATE DIKE:

10. CONGLOMERATE: KECHIKA, SANDPILE ATAN, LOOSELY CEMENTED



JURASSIC AND CRETACEOUS

[1.] CASSIAR BATHOLITH - Endocontact phase pink to grey Quartz-Monzonite, Fine to medium grained with some Quartz-Feldspar Porphyritic sections. Well jointed, fractured with some Quartz, Flourite, Sericite, Beryl fracture fillings. Trace Wolramite.

UPPER DEVONIAN AND LOWER MISSISSIPPIAN

[2.] SYLVESTER GROUP

2A. BASALT AND ANDESITE – dark green, grey green, fine to medium grained, mostly flow rocks with some Tuff (2A-T), Agglomerate (2A-AGG), Breccia (2A-BX), and Pillows (2A-P). The massive flow rocks have hairline fractures with Chlorite or Epidote. Pyrite occurs as minor disseminations.

2B. DACITE – Light grey-green, fine and medium grained. Mostly Lapilli size Pyroclastic (2B-L) and Breccia or Pillow fragments (2B-BX) or as fine grained possibly sheared Tuff (2B-T) containing disseminated Chalcocite and lesser Chalcopyrite near the Lang Creek Showing.

2C. DIORITE – Dark green, medium to coarse grained also as dikes and sills within 1A.

2D. ARGILLITE – Black and grey-black, laimnated to thinly bedded to massive; cherty sections and interbeds, Graphitic and sometimes Pyritic minor grit or micro-conglomerate interbeds, Shale and Slate, and Limestone.

MIDDLE AND UPPER DEVONIAN

[3.] McDAME GROUP

3A. DOLOMITIC SANDSTONE, SANDSTONE, CHERT, QUARTZITE – blue-grey, grey, thinly bedded to laminated. Interbeds and Laminations of Quartlite and Chert.

ORDOVICIAN, SILURIAN AND (?) DEVONIAN

[4.] SANDPILE GROUP

4A. LIMESTONE – Grey, light grey, and lesser grey-black, massive, highly folded and contorted, sometimes fissile. Recrytallized Quartz veining throughout.

CAMBRIAN AND ORDOVICIAN

[5.] KECHIKA GROUP

5A. ARGILLITE, SHALE, SLATE – black to grey-black; mostly argillite with a pervasive mild slatey cleavage, some sections of shale and slate; cherty and calcareous sections throught, laminated to bedded, pyrite occurs as fine disseminations up to 1% and as fine streaks.

5B. PHYLLITE - black, friable, carbonaceous, with minor pyrite.

5C. ARGILLACEOUS LIMESTONE – grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

[6.] ATAN GROUP

6A. LIMESTONE – blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections. (6A-BX)

6B. RECRYSTALLIZED LIMESTONE (MARBLE) – buff, white, massive and as stringers and patches in 2A, large rohmbohedric crystals.

6C. DOLOMITE – yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

6D. QUARTZITE – maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

6E. HORNFELSIC QUARTZITE – maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

6F. SHALE AND SLATE – black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

[7.] TACTITE

GARNET - DIOPSIDE AND GARNET ACTINOLITE - minor scheelite mineralization.

[8.] QUARTZ VEINING

Massive white "Bull Quartz", sections of hackly graphitic quartz and vuggy quartz with tetrahedrite, chalcopyrite, and pyrite. Contacts are Carbonatized

[9.] INTERMEDIATE DIKE:

[10.] CONGLOMERATE: KECHIKA, SANDPILE ATAN, LOOSELY CEMENTED

■ LEGAL CORNER POST
▲ SHOWING
TRENCH
DIAMOND DRILL HOLE WITH DIRECTION
Λ SUBCROP
x^{X} LARGE BOULDERS
SWAMP
POND OR LAKE
ADIT WITH DUMP
LIMIT OF OUTCROP
CONTACT
INTERCALATED CONTACT
INTRUSIVE CONTACT
FAULT
DIKE
SCHISTOSITY WITH DIP
BEDDING WITH DIP
ROAD
TRAIL OR TRACK

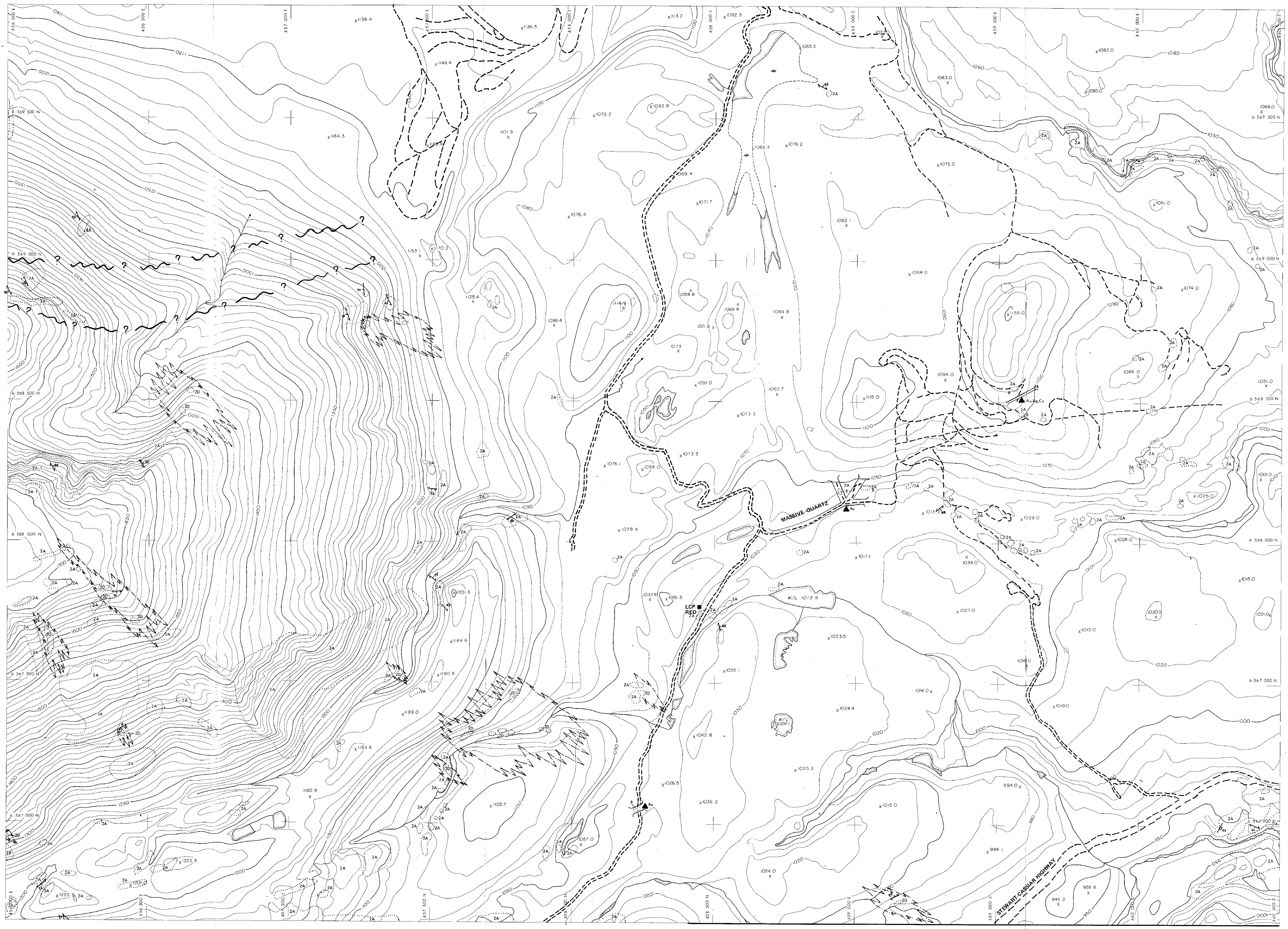
A — A = INITIAL POST PIT - 1, INITIAL POST PIT - 2
B — B = FINAL POST PIT -1, FINAL POST PIT - 2
C — C = FINAL POST MAGINO 3,4
D — D = INITIAL POST MAGINO 1, 2, 3, 4

Ca -	CASSITERITE
Asp -	AXSENOPYRITE
Ch -	CHLORITE
gn -	GALENA
lm -	LIMONITE
mag -	MAGNETITE
Py -	PYRITE
Pz -	PYROLOSITE
Po -	PYRRHOTITE
ro -	PHODOCHROSITE
Sp -	SPHALERITE
tr -	TREMOLITE
Cp -	CHALCOPYRITE
Sn -	TIN
Wo -	TUNGSTEN
MoS_2 -	MOLYBDENITE
qu -	QUARTZ VEIN

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
3991 - P
GEOLOGICAL RECON.
FIGURE 3

AUTHOR: C. BLOOMER	SCALE: 1:5,000	DRAWING No.:
DATE:	REVISED:	ENCLOSURE No.:
To Accompany		



SHEET INDEX

SCALE 1:5000

0 150 300 m

JURASSIC AND CRETACEOUS

1. CASSIAR BATHOLITH - Endocontact phase pink to grey Quartz-Monzonite, Fine to medium grained with some Quartz-Feldspar Porphyritic sections. Well jointed, fractured with some Quartz, Flourite, Sericite, Beryl fracture fillings. Trace Wolramite.

UPPER DEVONIAN AND LOWER MISSISSIPPIAN

2. SYLVESTER GROUP

2A. BASALT AND ANDESITE – dark green, grey green, fine to medium grained, mostly flow rocks with some Tuff (2A-T), Agglomerate (2A-AGG), Breccia (2A-BX), and Pillows (2A-P). The massive flow rocks have hairline fractures with Chlorite or Epidote. Pyrite occurs as minor disseminations.

2B. DACITE – Light grey-green, fine and medium grained. Mostly Lapilli size Pyroclastic (2B-L) and Breccia or Pillow fragments (2B-BX) or as fine grained possibly sheared Tuff (2B-T) containing disseminated Chalcocite and lesser Chalcopyrite near the Lang Creek Showing.

2C. DIORITE – Dark green, medium to coarse grained also as dikes and sills within 1A.

2D. ARGILLITE – Black and grey-black, laimnated to thinly bedded to massive; cherty sections and interbeds, Graphitic and sometimes Pyritic minor grit or micro-conglomerate interbeds, Shale and Slate, and Limestone.

MIDDLE AND UPPER DEVONIAN

3. McDAME GROUP

3A. DOLOMITIC SANDSTONE, SANDSTONE, CHERT, QUARTZITE – blue-grey, grey, thinly bedded to laminated. Interbeds and Laminations of Quartlite and Chert.

ORDOVICIAN, SILURIAN AND (?) DEVONIAN

4. SANDPILE GROUP

4A. LIMESTONE – Grey, light grey, and lesser grey-black, massive, highly folded and contorted, sometimes fissile. Recrytallized Quartz veining throughout.

CAMBRIAN AND ORDOVICIAN

5. KECHIKA GROUP

5A. ARGILLITE, SHALE, SLATE – black to grey-black; mostly argillite with a pervasive mild slatey cleavage, some sections of shale and slate; cherty and calcareous sections throught, laminated to bedded, pyrite occurs as fine disseminations up to 1% and as fine streaks.

5B. PHYLLITE - black, friable, carbonaceous, with minor pyrite.

5C. ARGILLACEOUS LIMESTONE – grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

6. ATAN GROUP

6A. LIMESTONE – blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections. (6A-BX)

6B. RECRYSTALLIZED LIMESTONE (MARBLE) – buff, white, massive and as stringers and patches in 2A, large rohmbohedric crystals.

6C. DOLOMITE – yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

6D. QUARTZITE – maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

6E. HORNFELSIC QUARTZITE – maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

6F. SHALE AND SLATE – black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

7. TACTITE

GARNET - DIOPSIDE AND GARNET ACTINOLITE - minor scheelite mineralization.

8. QUARTZ VEINING

Massive white "Bull Quartz", sections of hackly graphitic quartz and vuggy quartz with tetrahedrite, chalcopyrite, and pyrite. Contacts are Carbonatized

9. INTERMEDIATE DIKE:

10. CONGLOMERATE: KECHIKA, SANDPILE ATAN, LOOSELY CEMENTED

- LEGAL CORNER POST
- SHOWING
- TRENCH
- DIAMOND DRILL HOLE WITH DIRECTION
- SUBCROP
- LARGE BOULDERS
- SWAMP
- POND OR LAKE
- ADIT WITH DUMP
- LIMIT OF OUTCROP
- CONTACT
- INTERCALATED CONTACT
- INTRUSIVE CONTACT
- FAULT
- DIKE
- SCHISTOSITY WITH DIP
- BEDDING WITH DIP
- ROAD
- TRAIL OR TRACK

Ca -	CASSITERITE
Asp -	AXSENOPYRITE
Ch -	CHLORITE
gn -	GALENA
lm -	LIMONITE
mag -	MAGNETITE
Py -	PYRITE
Pz -	PYROLOSITE
Po -	PYRRHOTITE
ro -	PHODOCHROSITE
Sp -	SPHALERITE
tr -	TREMOLITE
Cp -	CHALCOPYRITE
Sn -	TIN
Wo -	TUNGSTEN
MoS_2 -	MOLYBDENITE
qu -	QUARTZ VEIN

A A = INITIAL POST PIT - 1
INITIAL POST PIT - 2

B B = FINAL POST PIT -1
FINAL POST PIT - 2

C C = FINAL POST MAGINO 3,4

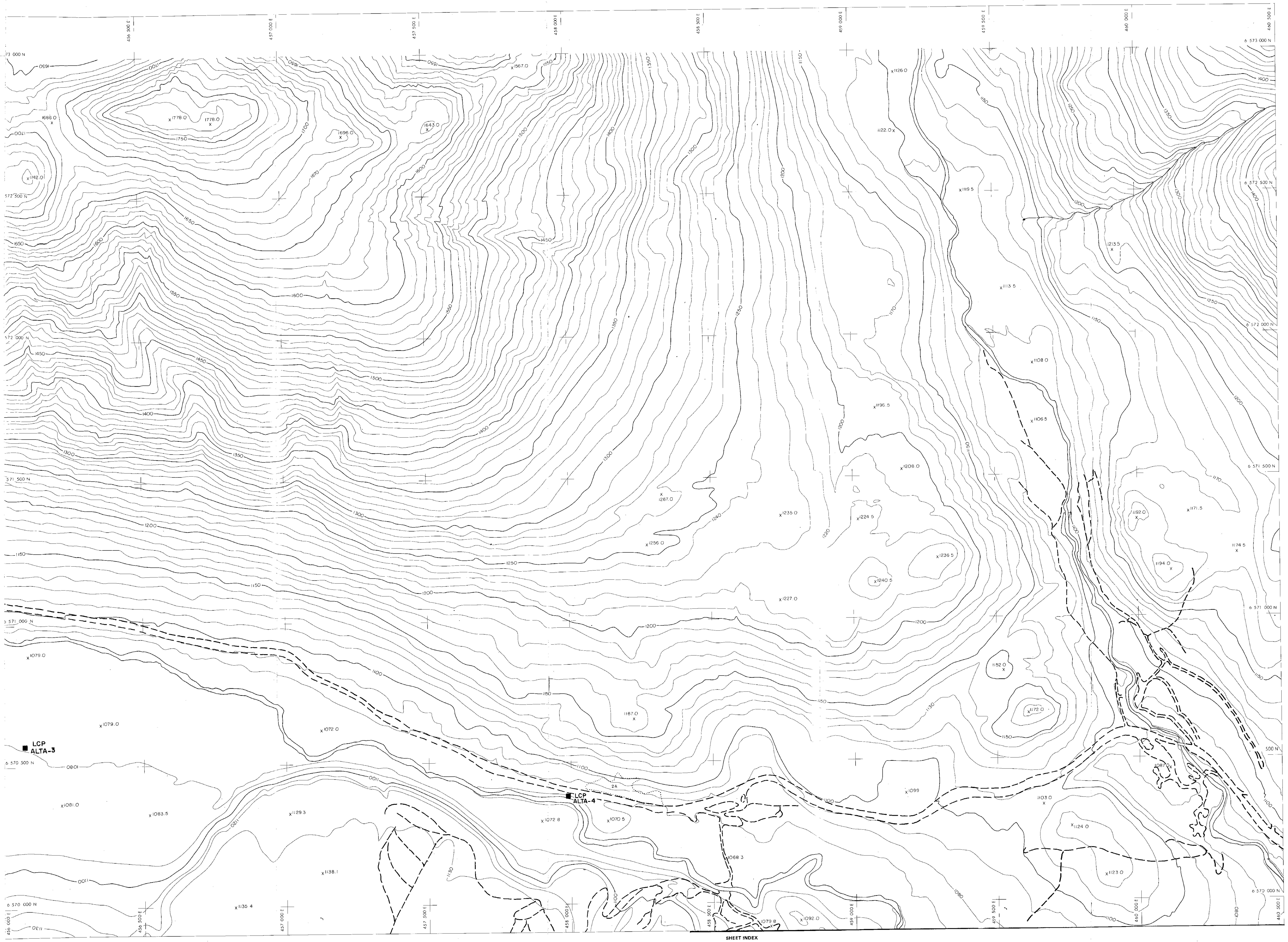
D D = INITIAL POST MAGINO 1, 2, 3, 4

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
3991 - P
GEOLOGICAL RECON.

FIGURE 4

AUTHOR: C. BLOOMER	SCALE: 1:5,000	DRAWING No.:
DATE:	REVISED:	ENCLOSURE No.:
To Accompany		



SHEET INDEX

	6	3
8	5	2
7	4	1

SCALE 1:5000

0 150 300 m

JURASSIC AND CRETACEOUS

[1.] CASSIAR BATHOLITH - Endocontact phase pink to grey Quartz-Monzonite, Fine to medium grained with some Quartz-Feldspar Porphyritic sections. Well jointed, fractured with some Quartz, Flourite, Sericite, Beryl fracture fillings. Trace Wolramite.

UPPER DEVONIAN AND LOWER MISSISSIPPIAN

[2.] SYLVESTER GROUP

2A. BASALT AND ANDESITE – dark green, grey green, fine to medium grained, mostly flow rocks with some Tuff (2A-T), Agglomerate (2A-AGG), Breccia (2A-BX), and Pillows (2A-P). The massive flow rocks have hairline fractures with Chlorite or Epidote. Pyrite occurs as minor disseminations.

2B. DACITE – Light grey-green, fine and medium grained. Mostly Lapilli size Pyroclastic (2B-L) and Breccia or Pillow fragments (2B-BX) or as fine grained possibly sheared Tuff (2B-T) containing disseminated Chalcocite and lesser Chalcopyrite near the Lang Creek Showing.

2C. DIORITE – Dark green, medium to coarse grained also as dikes and sills within 1A.

2D. ARGILLITE – Black and grey-black, laimnated to thinly bedded to massive; cherty sections and interbeds, Graphitic and sometimes Pyritic minor grit or micro-conglomerate interbeds, Shale and Slate, and Limestone.

MIDDLE AND UPPER DEVONIAN

[3.] McDAME GROUP

3A. DOLOMITIC SANDSTONE, SANDSTONE, CHERT, QUARTZITE – blue-grey, grey, thinly bedded to laminated. Interbeds and Laminations of Quartlite and Chert.

ORDOVICIAN, SILURIAN AND (?) DEVONIAN

[4.] SANDPILE GROUP

4A. LIMESTONE – Grey, light grey, and lesser grey-black, massive, highly folded and contorted, sometimes fissile. Recrytallized Quartz veining throughout.

CAMBRIAN AND ORDOVICIAN

[5.] KECHIKA GROUP

5A. ARGILLITE, SHALE, SLATE – black to grey-black; mostly argillite with a pervasive mild slatey cleavage, some sections of shale and slate; cherty and calcareous sections throught, laminated to bedded, pyrite occurs as fine disseminations up to 1% and as fine streaks.

5B. PHYLLITE - black, friable, carbonaceous, with minor pyrite.

5C ARGILLACEOUS LIMESTONE -- grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

[6.] ATAN GROUP

6A. LIMESTONE – blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections. (6A-BX)

6B RECRYSTALLIZED LIMESTONE (MARBLE) – buff, white, massive and as stringers and patches in 2A, large rohmbohedric crystals.

6C. DOLOMITE – yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

6D. QUARTZITE – maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

6E. HORNFELSIC QUARTZITE – maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

6F SHALE AND SLATE – black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

[7.] TACTITE

GARNET - DIOPSIDE AND GARNET ACTINOLITE - minor scheelite mineralization.

[8.] QUARTZ VEINING

Massive white "Bull Quartz", sections of hackly graphitic quartz and vuggy quartz with tetrahedrite, chalcopyrite, and pyrite. Contacts are Carbonatized

[9.] INTERMEDIATE DIKE:

[10.] CONGLOMERATE: KECHIKA, SANDPILE
ATAN, LOOSELY CEMENTED

■ LEGAL CORNER POST
▲ SHOWING
TRENCH
DIAMOND DRILL HOLE WITH DIRECTION
Λ SUBCROP
xX LARGE BOULDERS
SWAMP
POND OR LAKE
ADIT WITH DUMP
LIMIT OF OUTCROP
CONTACT
INTERCALATED CONTACT
INTRUSIVE CONTACT
FAULT
DIKE
SCHISTOSITY WITH DIP
BEDDING WITH DIP
ROAD
TRAIL OR TRACK

A A = INITIAL POST PIT - 1
INITIAL POST PIT - 2

B B = FINAL POST PIT -1
FINAL POST PIT - 2

C C = FINAL POST MAGINO 3,4

D D = INITIAL POST MAGINO 1, 2, 3, 4

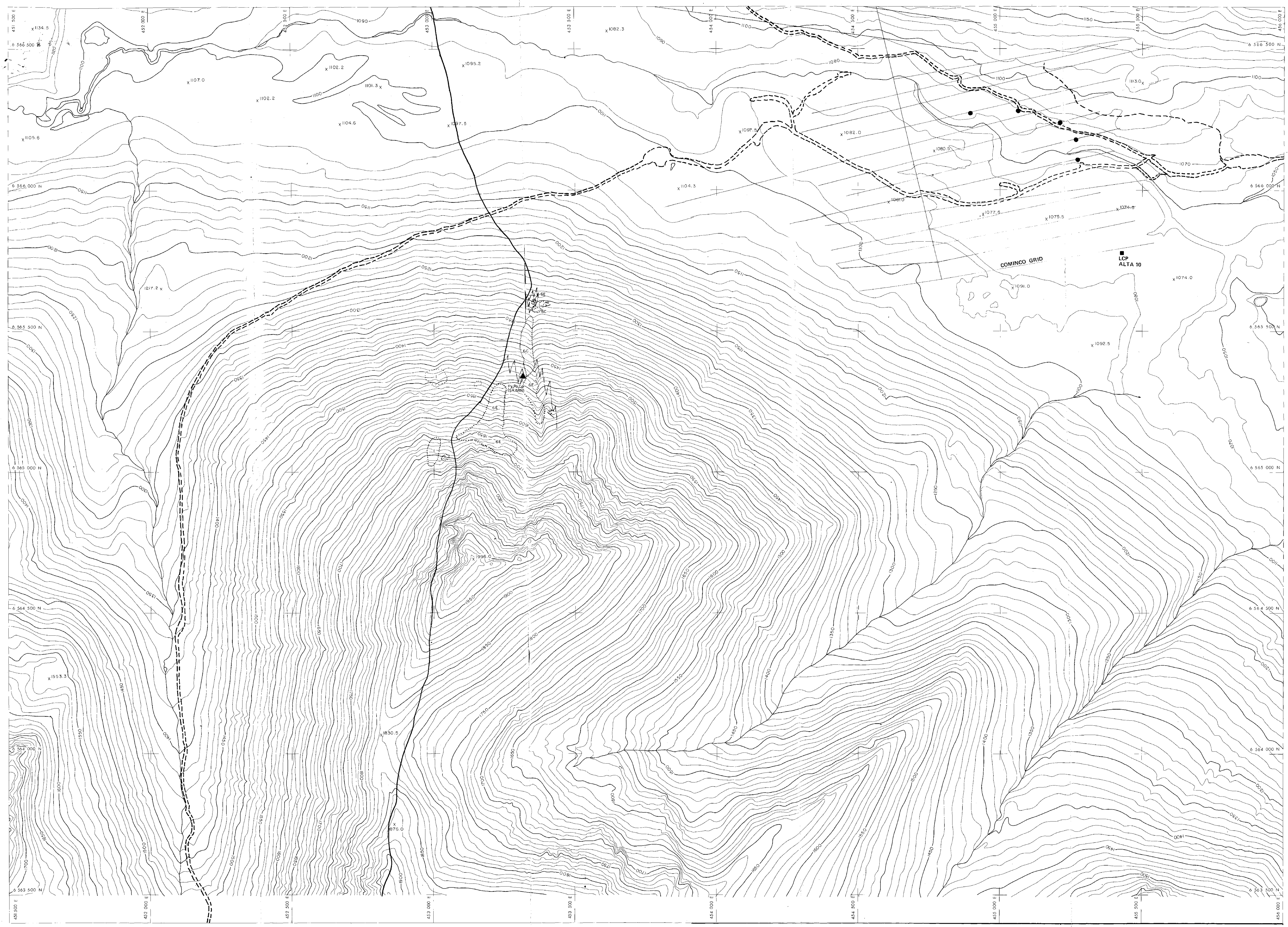
Ca – CASSITERITE
Asp - AXSENOPYRITE
Ch - CHLORITE
gn - GALENA
lm - LIMONITE
mag - MAGNETITE
Py - PYRITE
Pz - PYROLOSITE
Po - PYRRHOTITE
ro - RHODOCHROSITE
Sp - SPHALERITE
tr - TREMOLITE
Cp - CHALCOPYRITE
Sn - TIN
Wo - TUNGSTEN
MoS_2 - MOLYBDENITE
qu - QUARTZ VEIN

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

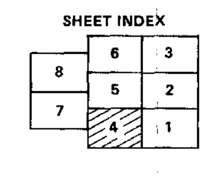
CASSIAR PROJECT
3991 - P
GEOLOGICAL RECON.

FIGURE 5

AUTHOR: C. BLOOMER	SCALE: 1:5,000	DRAWING No.:
DATE:	REVISED:	ENCLOSURE No.:
To Accompany		



SHEET INDEX



SCALE 1:5000

0 150 300 m

JURASSIC AND CRETACEOUS

[1.] CASSIAR BATHOLITH - Endocontact phase pink to grey Quartz-Monzonite, Fine to medium grained with some Quartz-Feldspar Porphyritic sections. Well jointed, fractured with some Quartz, Flourite, Sericite, Beryl fracture fillings. Trace Wolramite.

UPPER DEVONIAN AND LOWER MISSISSIPPIAN

[2.] SYLVESTER GROUP

2A. BASALT AND ANDESITE – dark green, grey green, fine to medium grained, mostly flow rocks with some Tuff (2A-T), Agglomerate (2A-AGG), Breccia (2A-BX), and Pillows (2A-P). The massive flow rocks have hairline fractures with Chlorite or Epidote. Pyrite occurs as minor disseminations.

2B. DACITE – Light grey-green, fine and medium grained. Mostly Lapilli size Pyroclastic (2B-L) and Breccia or Pillow fragments (2B-BX) or as fine grained possibly sheared Tuff (2B-T) containing disseminated Chalcocite and lesser Chalcopyrite near the Lang Creek Showing.

2C. DIORITE – Dark green, medium to coarse grained also as dikes and sills within 1A.

2D. ARGILLITE – Black and grey-black, laimnated to thinly bedded to massive; cherty sections and interbeds, Graphitic and sometimes Pyritic minor grit or micro-conglomerate interbeds, Shale and Slate, and Limestone.

MIDDLE AND UPPER DEVONIAN

[3.] McDAME GROUP

3A. DOLOMITIC SANDSTONE, SANDSTONE, CHERT, QUARTZITE – blue-grey, grey, thinly bedded to laminated. Interbeds and Laminations of Quartlite and Chert.

ORDOVICIAN, SILURIAN AND (?) DEVONIAN

[4.] SANDPILE GROUP

4A. LIMESTONE – Grey, light grey, and lesser grey-black, massive, highly folded and contorted, sometimes fissile. Recrytallized Quartz veining throughout.

CAMBRIAN AND ORDOVICIAN

[5.] KECHIKA GROUP

5A. ARGILLITE, SHALE, SLATE – black to grey-black; mostly argillite with a pervasive mild slatey cleavage, some sections of shale and slate; cherty and calcareous sections throught, laminated to bedded, pyrite occurs as fine disseminations up to 1% and as fine streaks.

5B. PHYLLITE - black, friable, carbonaceous, with minor pyrite.

5C. ARGILLACEOUS LIMESTONE – grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

[6.] ATAN GROUP

6A. LIMESTONE – blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections. (6A-BX)

6B. RECRYSTALLIZED LIMESTONE (MARBLE) – buff, white, massive and as stringers and patches in 2A, large rohmbohedric crystals.

6C. DOLOMITE – yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

6D. QUARTZITE – maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

6E. HORNFELSIC QUARTZITE – maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

6F. SHALE AND SLATE – black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

[7.] TACTITE

GARNET - DIOPSIDE AND GARNET ACTINOLITE - minor scheelite mineralization.

[8.] QUARTZ VEINING

Massive white "Bull Quartz", sections of hackly graphitic quartz and vuggy quartz with tetrahedrite, chalcopyrite, and pyrite. Contacts are Carbonatized

[9.] INTERMEDIATE DIKE:

[10.] CONGLOMERATE: KECHIKA, SANDPILE ATAN, LOOSELY CEMENTED

■ LEGAL CORNER POST
▲ SHOWING
TRENCH
DIAMOND DRILL HOLE WITH DIRECTION
∧ SUBCROP
x[X] LARGE BOULDERS
SWAMP
POND OR LAKE
ADIT WITH DUMP
LIMIT OF OUTCROP
CONTACT
INTERCALATED CONTACT
INTRUSIVE CONTACT
FAULT
DIKE
SCHISTOSITY WITH DIP
BEDDING WITH DIP
ROAD
TRAIL OR TRACK

A A = INITIAL POST PIT - 1
INITIAL POST PIT - 2

B B = FINAL POST PIT -1
FINAL POST PIT - 2

C C = FINAL POST MAGINO 3,4

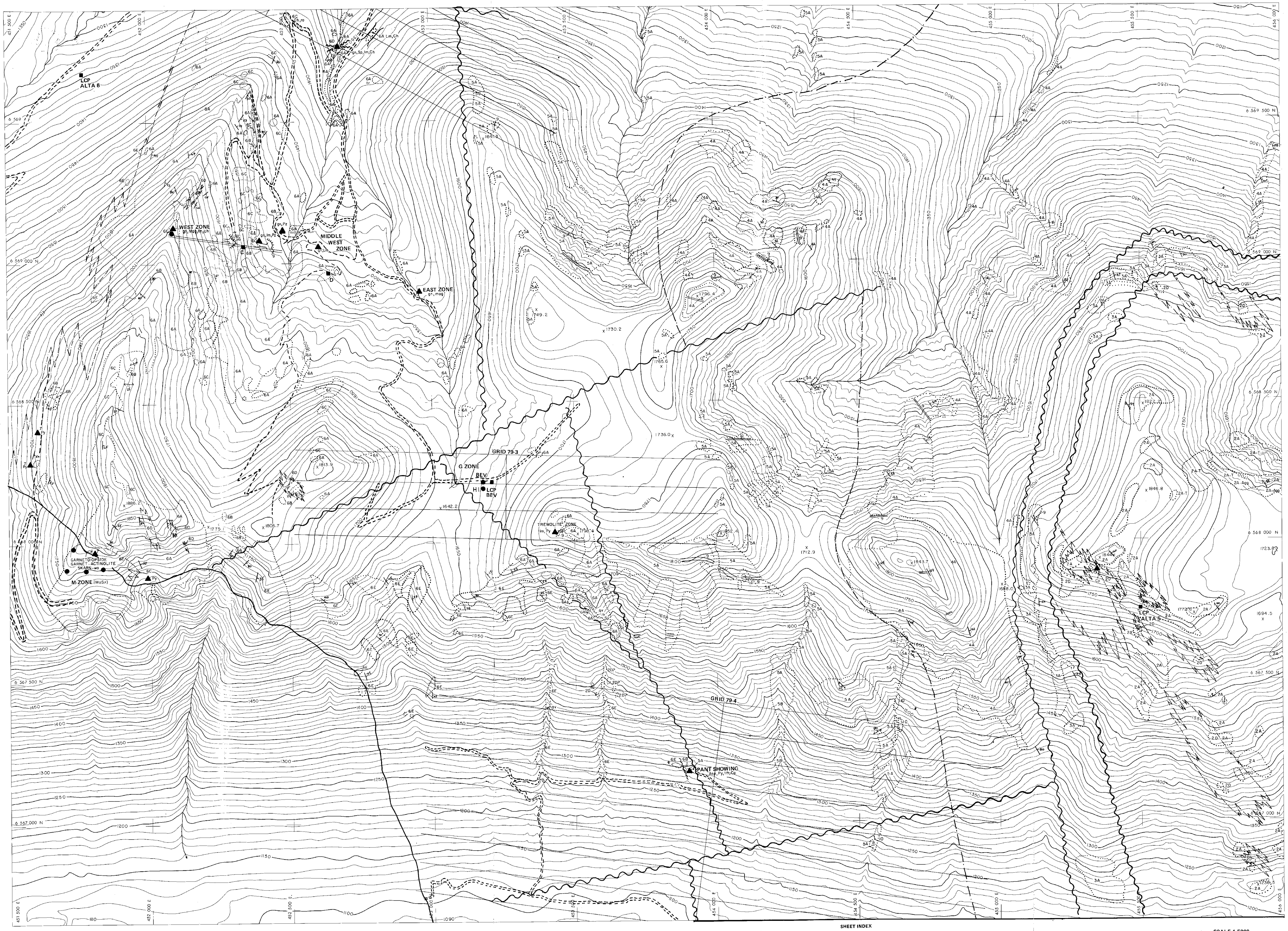
D D = INITIAL POST MAGINO 1, 2, 3, 4

Ca - CASSITERITE
Asp - AXSENOPYRITE
Ch - CHLORITE
gn - GALENA
lm - LIMONITE
mag - MAGNETITE
Py - PYRITE
Pz - PYROLOSITE
Po - PYRRHOTITE
ro - PHODOCHROSITE
Sp - SPHALERITE
tr - TREMOLITE
Cp - CHALCOPYRITE
Sn - TIN
Wo - TUNGSTEN
MoS_2 - MOLYBDENITE
qu - QUARTZ VEIN

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
3991 - P
GEOLOGICAL RECON.
FIGURE 6

AUTHOR: C. BLOOMER		SCALE: 1:5,000	DRAWING No.:
DATE:	REVISED:		ENCLOSURE No.:
To Accompany			



SHEET INDEX

	6	3
8	5	2
7	4	1

SCALE 1:5000

0 150 300 m

JURASSIC AND CRETACEOUS

[1.] CASSIAR BATHOLITH - Endocontact phase pink to grey Quartz-Monzonite, Fine to medium grained with some Quartz-Feldspar Porphyritic sections. Well jointed, fractured with some Quartz, Flourite, Sericite, Beryl fracture fillings. Trace Wolramite.

UPPER DEVONIAN AND LOWER MISSISSIPPIAN

[2.] SYLVESTER GROUP

2A. BASALT AND ANDESITE – dark green, grey green, fine to medium grained, mostly flow rocks with some Tuff (2A-T), Agglomerate (2A-AGG), Breccia (2A-BX), and Pillows (2A-P). The massive flow rocks have hairline fractures with Chlorite or Epidote. Pyrite occurs as minor disseminations.

2B. DACITE – Light grey-green, fine and medium grained. Mostly Lapilli size Pyroclastic (2B-L) and Breccia or Pillow fragments (2B-BX) or as fine grained possibly sheared Tuff (2B-T) containing disseminated Chalcocite and lesser Chalcopyrite near the Lang Creek Showing.

2C. DIORITE – Dark green, medium to coarse grained also as dikes and sills within 1A.

2D. ARGILLITE – Black and grey-black, laimnated to thinly bedded to massive; cherty sections and interbeds, Graphitic and sometimes Pyritic minor grit or micro-conglomerate interbeds, Shale and Slate, and Limestone.

MIDDLE AND UPPER DEVONIAN

[3.] McDAME GROUP

3A. DOLOMITIC SANDSTONE, SANDSTONE, CHERT, QUARTZITE – blue-grey, grey, thinly bedded to laminated. Interbeds and Laminations of Quartlite and Chert.

ORDOVICIAN, SILURIAN AND (?) DEVONIAN

[4.] SANDPILE GROUP

4A. LIMESTONE – Grey, light grey, and lesser grey-black, massive, highly folded and contorted, sometimes fissile. Recrytallized Quartz veining throughout.

CAMBRIAN AND ORDOVICIAN

[5.] KECHIKA GROUP

5A. ARGILLITE, SHALE, SLATE – black to grey-black; mostly argillite with a pervasive mild slatey cleavage, some sections of shale and slate; cherty and calcareous sections throught, laminated to bedded, pyrite occurs as fine disseminations up to 1% and as fine streaks.

5B. PHYLLITE - black, friable, carbonaceous, with minor pyrite.

5C. ARGILLACEOUS LIMESTONE – grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

[6.] ATAN GROUP

6A. LIMESTONE – blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections. (6A-BX)

6B. RECRYSTALLIZED LIMESTONE (MARBLE) – buff, white, massive and as stringers and patches in 2A, large rohmbohedric crystals.

6C. DOLOMITE – yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

6D. QUARTZITE – maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

6E. HORNFELSIC QUARTZITE – maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

6F. SHALE AND SLATE – black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

[7.] TACTITE

GARNET - DIOPSIDE AND GARNET ACTINOLITE - minor scheelite mineralization.

[8.] QUARTZ VEINING

Massive white "Bull Quartz", sections of hackly graphitic quartz and vuggy quartz with tetrahedrite, chalcopyrite, and pyrite. Contacts are Carbonatized

[9.] INTERMEDIATE DIKE:

[10.] CONGLOMERATE: KECHIKA, SANDPILE ATAN, LOOSELY CEMENTED

- ■ LEGAL CORNER POST
- ▲ SHOWING
- TRENCH
- DIAMOND DRILL HOLE WITH DIRECTION
- SUBCROP
- LARGE BOULDERS
- SWAMP
- POND OR LAKE
- ADIT WITH DUMP
- LIMIT OF OUTCROP
- CONTACT
- INTERCALATED CONTACT
- INTRUSIVE CONTACT
- FAULT
- DIKE
- SCHISTOSITY WITH DIP
- BEDDING WITH DIP
- ROAD
- TRAIL OR TRACK

A A = INITIAL POST PIT - 4
INITIAL POST PIT - 2

B B = FINAL POST PIT - 1
FINAL POST PIT - 2

C C = FINAL POST MAGINO 3,4

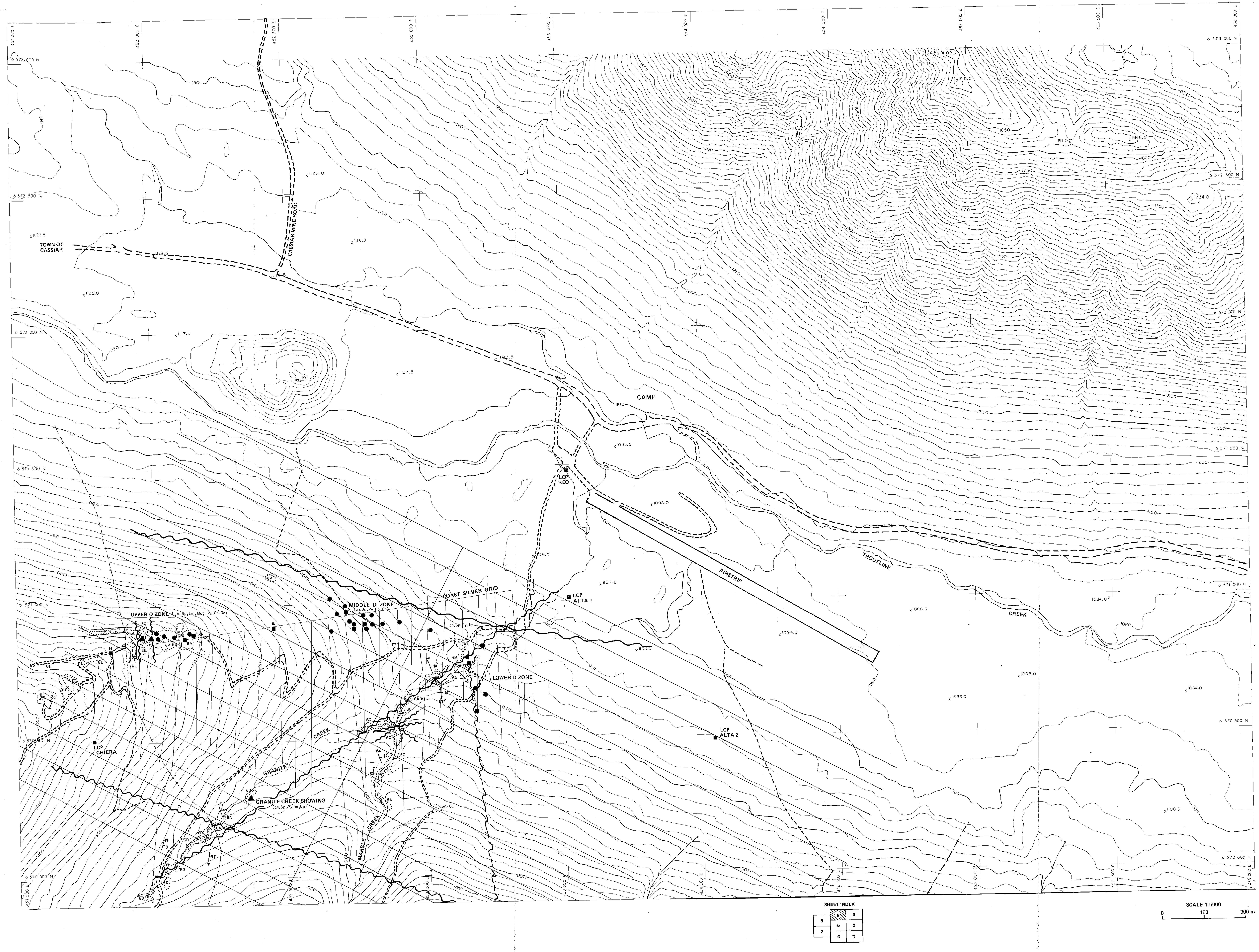
D D = INITIAL POST MAGINO 1, 2, 3, 4

Ca - CASSITERITE
Asp - AXSENOPYRITE
Ch - CHLORITE
gn - GALENA
lm - LIMONITE
mag - MAGNETITE
Py - PYRITE
Pz - PYROLOSITE
Po - PYRRHOTITE
ro - PHODOCHROSITE
Sp - SPHALERITE
tr - TREMOLITE
Cp - CHALCOPYRITE
Sn - TIN
Wo - TUNGSTEN
MoS_2 - MOLYBDENITE
qu - QUARTZ VEIN

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
3991 - P
GEOLOGICAL RECON.
FIGURE 7

AUTHOR: C. BLOOMER	SCALE: 1:5,000	DRAWING No.:
DATE:	REVISED:	ENCLOSURE No.:
To Accompany		



JURASSIC AND CRETACEOUS

[1.] CASSIAR BATHOLITH - Endocontact phase pink to grey Quartz-Monzonite, Fine to medium grained with some Quartz-Feldspar Porphyritic sections. Well jointed, fractured with some Quartz, Flourite, Sericite, Beryl fracture fillings. Trace Wolramite.

UPPER DEVONIAN AND LOWER MISSISSIPPIAN

[2.] SYLVESTER GROUP

2A. BASALT AND ANDESITE – dark green, grey green, fine to medium grained, mostly flow rocks with some Tuff (2A-T), Agglomerate (2A-AGG), Breccia (2A-BX), and Pillows (2A-P). The massive flow rocks have hairline fractures with Chlorite or Epidote. Pyrite occurs as minor disseminations.

2B. DACITE – Light grey-green, fine and medium grained. Mostly Lapilli size Pyroclastic (2B-L) and Breccia or Pillow fragments (2B-BX) or as fine grained possibly sheared Tuff (2B-T) containing disseminated Chalcocite and lesser Chalcopyrite near the Lang Creek Showing.

2C. DIORITE – Dark green, medium to coarse grained also as dikes and sills within 1A.

2D. ARGILLITE – Black and grey-black, laimnated to thinly bedded to massive; cherty sections and interbeds, Graphitic and sometimes Pyritic minor grit or micro-conglomerate interbeds, Shale and Slate, and Limestone.

MIDDLE AND UPPER DEVONIAN

[3.] McDAME GROUP

3A. DOLOMITIC SANDSTONE, SANDSTONE, CHERT, QUARTZITE – blue-grey, grey, thinly bedded to laminated. Interbeds and Laminations of Quartlite and Chert.

ORDOVICIAN, SILURIAN AND (?) DEVONIAN

[4.] SANDPILE GROUP

4A. LIMESTONE – Grey, light grey, and lesser grey-black, massive, highly folded and contorted, sometimes fissile. Recrytallized Quartz veining throughout.

CAMBRIAN AND ORDOVICIAN

[5.] KECHIKA GROUP

5A. ARGILLITE, SHALE, SLATE – black to grey-black; mostly argillite with a pervasive mild slatey cleavage, some sections of shale and slate; cherty and calcareous sections throught, laminated to bedded, pyrite occurs as fine disseminations up to 1% and as fine streaks.

5B. PHYLLITE – black, friable, carbonaceous, with minor pyrite.

5C. ARGILLACEOUS LIMESTONE – grey-black, massive, with argillite and shale fragments.

CAMBRIAN

LOWER CAMBRIAN

[6.] ATAN GROUP

6A. LIMESTONE – blue-grey to dark grey, laminated to well-bedded to massive, with flaggy patches and minor fragmental or breccia sections. (6A-BX)

6B. RECRYSTALLIZED LIMESTONE (MARBLE) – buff, white, massive and as stringers and patches in 2A, large rohmbohedric crystals.

6C. DOLOMITE – yellow, buff, brown, rose, crystalline, massive, with some friable sections, minor pyritohedrons in the crystalline portions.

6D. QUARTZITE – maroon, green, brown, and tan, well-bedded with cross bedded sections, pyrite and lesser pyrrhotite as disseminations and stringers.

6E. HORNFELSIC QUARTZITE – maroon, green, buff, and brown; pure quartzite beds are crystalline, less pure beds are schistose and contain andalusite patches; chlorite clots occur in the chlorite-rich green beds; more abundant pyrite and pyrrhotite than in 2D as stringers and scales along fracture surfaces and minor massive banded pyrite-pyrrhotite.

6F. SHALE AND SLATE – black, grey, and buff, laminated, pyritic, and carbonaceous, with some calcareous interbeds.

[7.] TACTITE

GARNET - DIOPSIDE AND GARNET ACTINOLITE - minor scheelite mineralization.

[8.] QUARTZ VEINING

Massive white "Bull Quartz", sections of hackly graphitic quartz and vuggy quartz with tetrahedrite, chalcopyrite, and pyrite. Contacts are Carbonatized

[9.] INTERMEDIATE DIKE:

[10.] CONGLOMERATE: KECHIKA, SANDPILE ATAN, LOOSELY CEMENTED

■ LEGAL CORNER POST
▲ SHOWING
TRENCH
DIAMOND DRILL HOLE WITH DIRECTION
SUBCROP
LARGE BOULDERS
SWAMP
POND OR LAKE
ADIT WITH DUMP
LIMIT OF OUTCROP
CONTACT
INTERCALATED CONTACT
INTRUSIVE CONTACT
FAULT
DIKE
SCHISTOSITY WITH DIP
BEDDING WITH DIP
ROAD
TRAIL OR TRACK

A — A = INITIAL POST PIT - 1; INITIAL POST PIT - 2
B — B = FINAL POST PIT - 1; FINAL POST PIT - 2
C — C = FINAL POST MAGINO 3,4
D — D = INITIAL POST MAGINO 1, 2, 3, 4

Ca -	CASSITERITE
Asp -	AXSENOPYRITE
Ch -	CHLORITE
gn -	GALENA
lm -	LIMONITE
mag -	MAGNETITE
Py -	PYRITE
Pz -	PYROLOSITE
Po -	PYRRHOTITE
ro -	PHODOCHROSITE
Sp -	SPHALERITE
tr -	TREMOLITE
Cp -	CHALCOPYRITE
Sn -	TIN
Wo -	TUNGSTEN
MoS_2 -	MOLYBDENITE
qu -	QUARTZ VEIN

SHELL CANADA RESOURCES LIMITED
EXPLORATION – MINERALS

CASSIAR PROJECT
3991 - P
GEOLOGICAL RECON.
FIGURE 8

AUTHOR: C. BLOOMER	SCALE: 1:5,000	DRAWING No.:
DATE:	REVISED:	ENCLOSURE No.:
To Accompany		