

GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL REPORT

RAIN PROJECT

July 21 - August 6, 1983

Rain Claims 1-48 (YA75517 - YA75564) Incl.

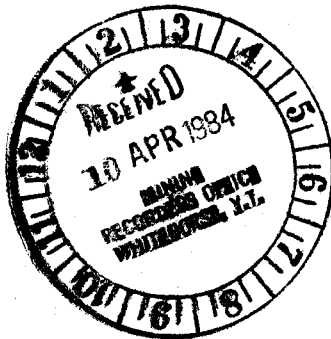
Latitude 62°31'30"N - Longitude 137°44'30"W

N.T.S. 115-I-5 & 12

MINING DISTRICT OF WHITEHORSE

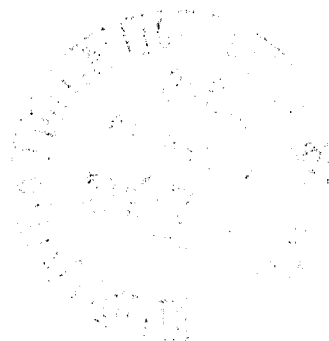
YUKON TERRITORY

091530



W. O. Manson  
Canadian Nickel Company Limited  
Copper Cliff, Ontario  
January, 1984

0112100



This report has been examined by  
the Geological Evaluation Unit  
under Section 53-41 Yukon Quartz  
Mineral Act and is allowed as  
representation with the amount  
of \$ 33,750.00.

*K. Grapes*

for Regional Director, Mineral Resources and  
Geological Survey, Commissioner  
of Yukon Territory.

Table of Contents

	<u>Page</u>
SUMMARY	1
INTRODUCTION	2
LOCATION AND ACCESS	2
PHYSIOGRAPHY	2
PROPERTY STATUS	3
HISTORY	3
GENERAL GEOLOGY	3
ECONOMIC GEOLOGY	4
GEOLOGICAL/GEOCHEMICAL/GEOPHYSICAL SURVEYS	6
(a) Geological Survey Results	6
(b) Geophysical Survey Results	8
(c) Geochemical Survey Results	8
X-RAY DIFFRACTION STUDY	8
FLUID INCLUSION STUDY	9
CONCLUSIONS AND RECOMMENDATIONS	9
BIBLIOGRAPHY	11

## APPENDICES

- Appendix A - Field Descriptions
- Appendix B - VLF Receiver - Instrument Specifications
- Appendix C - Gas Chromatography Analytical Methods & Results & Site Descriptions
- Appendix D - Rock Sample Analytical Results
- Appendix E - X-Ray Diffraction Report
- Appendix F - Fluid Inclusion Study Report
- Appendix G - List of Personnel
- Appendix H - Certificate of Qualifications
- Appendix I - Statement of Expenditures

## MAPS

- Map 1 Location Map, Canadian Nickel Co. Ltd. RAIN PROJECT  
Scale 1:4,295,000
- Map 2 Location Map Canadian Nickel Co. Ltd. RAIN PROJECT  
Scale 1:250,000
- Map 3 Claim Locations, Rain 1-48, Scale 1:50,000
- Map 4 Grid Location, Rain Project, Scale 1:50,000

## MAPS IN POCKETS

- |                               |               |              |
|-------------------------------|---------------|--------------|
| Topography & Altimeter Survey | Scale 1:5,000 | Sheets 1 & 2 |
| Geological Survey             | "             | "            |
| Rock Sample Assays            | "             | "            |
| Electromagnetic Survey        | "             | "            |
| Rainbow Zone Trench #1        | Scale 1:2,000 |              |
| Rubble Zone                   | Scale 1:1,000 |              |

## FIGURES

- Figure 1 Epithermal Alteration Model (L. Buchanan)
- Figure 2 Gas Chromatography Survey Line 785S (Trench 1)
- Figure 3 Gas Chromatography Survey Line 2000S
- Figure 4 Gas Chromatography Survey Line 2250S (Rubble Zone)

## SUMMARY

The Rain 1-48 claim group is located approximately 90 km northwest of Carmacks, Yukon on NTS sheets 115-I-5 & 12, (Map 1 - Location Map). Access to the property is by helicopter from Carmacks, Minto or Revenue Creek (Map 2). The claims were acquired by staking in March 1983, (Map 3 - Claim Location).

The claims were acquired to protect areas of reported epithermal vein systems. These vein systems could host precious metal deposits of the type proposed by L. Buchanan et al. No precious metal occurrences are known on the property, but are known in the area at Mount Freegold and at Mount Nansen.

The general geology of the property consists of Proterozoic/Paleozoic Yukon Metamorphic Complex schists and gneisses, Triassic age Klotassin Batholith quartz monzonite and mafic to intermediate pyroclastic rocks of the Eocene Carmacks Group volcanics. Brecciated, clay altered and chalcedonic veined epithermal vent systems occur in the quartz monzonite (Rainbow Zone) and in the ash flow tuffs (Rubble Zone) of the Carmacks Group.

A grid system with lines at 500 metre intervals and 50 metre stations was established on the property and provided the control for the geological, geophysical and geochemical surveys, (Map 4 - Grid Location).

Geological mapping and sampling as well as a VLF EM survey were carried out along all of the established grid lines.

A total of 62 rock samples was collected of which 44 were analyzed. Analysis by ICP methods for 30 elements (see Appendix D) and by AA methods for Au and Hg was utilized.

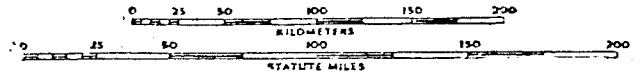
Four samples from the epithermal zones were submitted for X-ray diffraction study of the clay minerals and 4 samples from the epithermal zones were submitted for fluid inclusion study.

Gas chromatography surveys were carried out over the Rainbow Zone (20 samples) and over the Rubble Zone (40 samples). The collected gases were analyzed for CS<sub>2</sub>, SO<sub>2</sub>, COS and CO<sub>2</sub> gases.

Geological field observations, X-ray diffraction study and fluid inclusion study indicate that the Rainbow and Rubble alteration zones are representative of the upper portions of epithermal vein systems. Anomalous Au at the Rainbow Zone and anomalous pathfinder elements such as As, Hg and Sb, on both the Rainbow and Rubble zones, suggest that these zones could host economic precious metal deposits at depth.

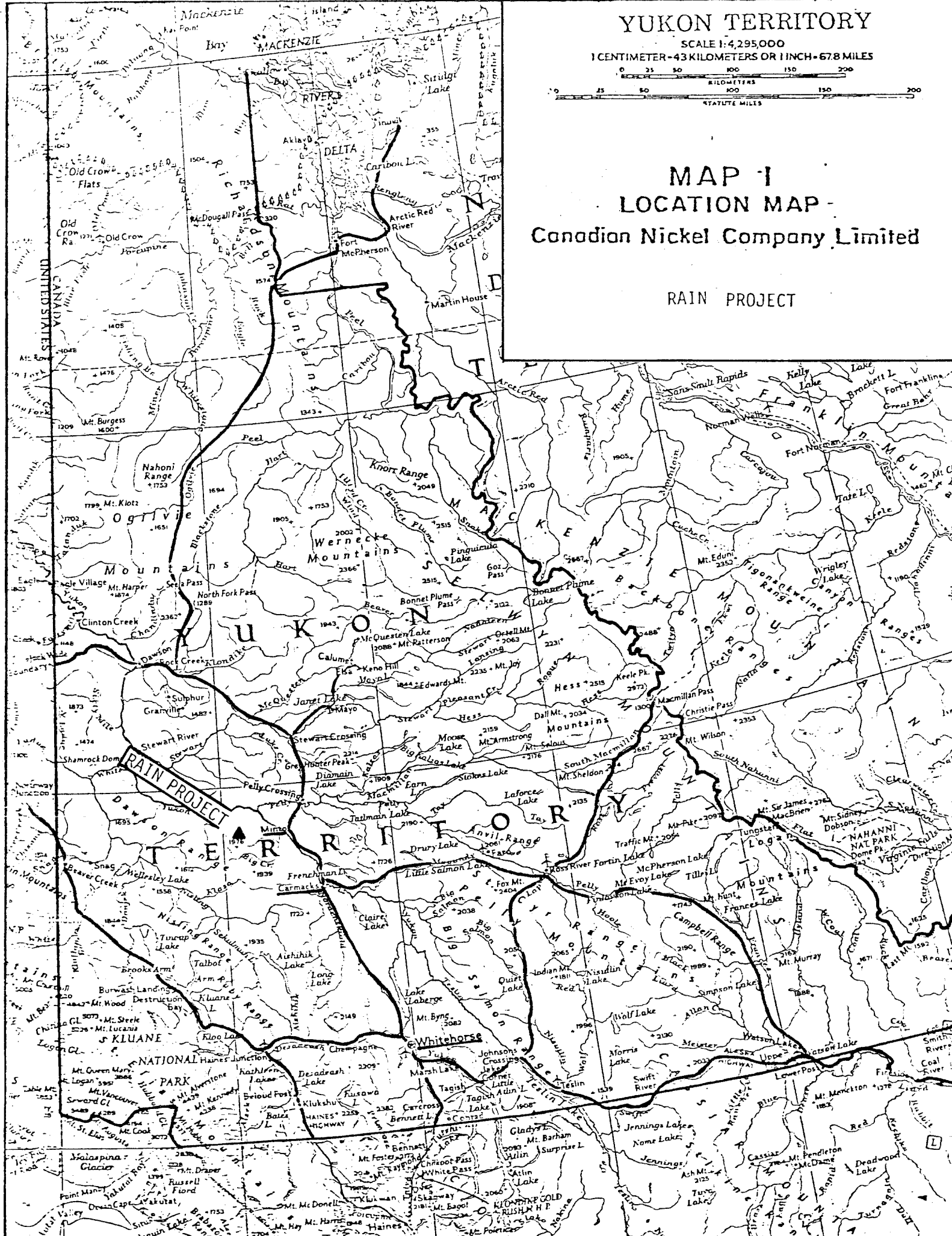
# YUKON TERRITORY

SCALE 1:4,295,000  
1 CENTIMETER = 43 KILOMETERS OR 1 INCH = 67.8 MILES



## MAP 1 LOCATION MAP - Canadian Nickel Company Limited

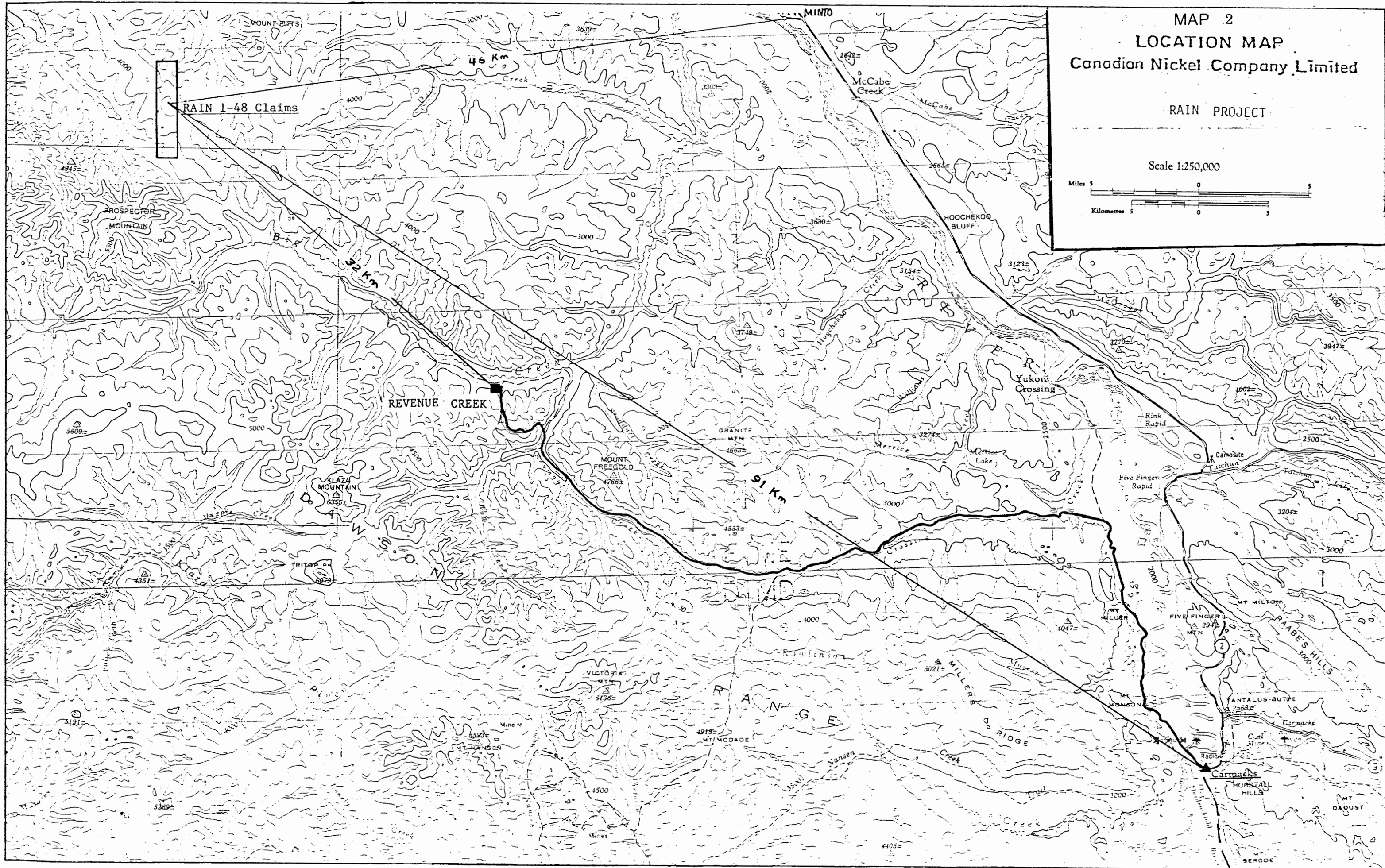
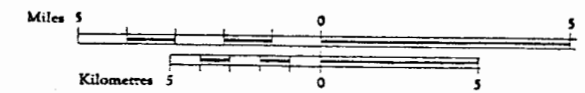
RAIN PROJECT



MAP 2  
LOCATION MAP  
Canadian Nickel Company Limited

RAIN PROJECT

Scale 1:250,000



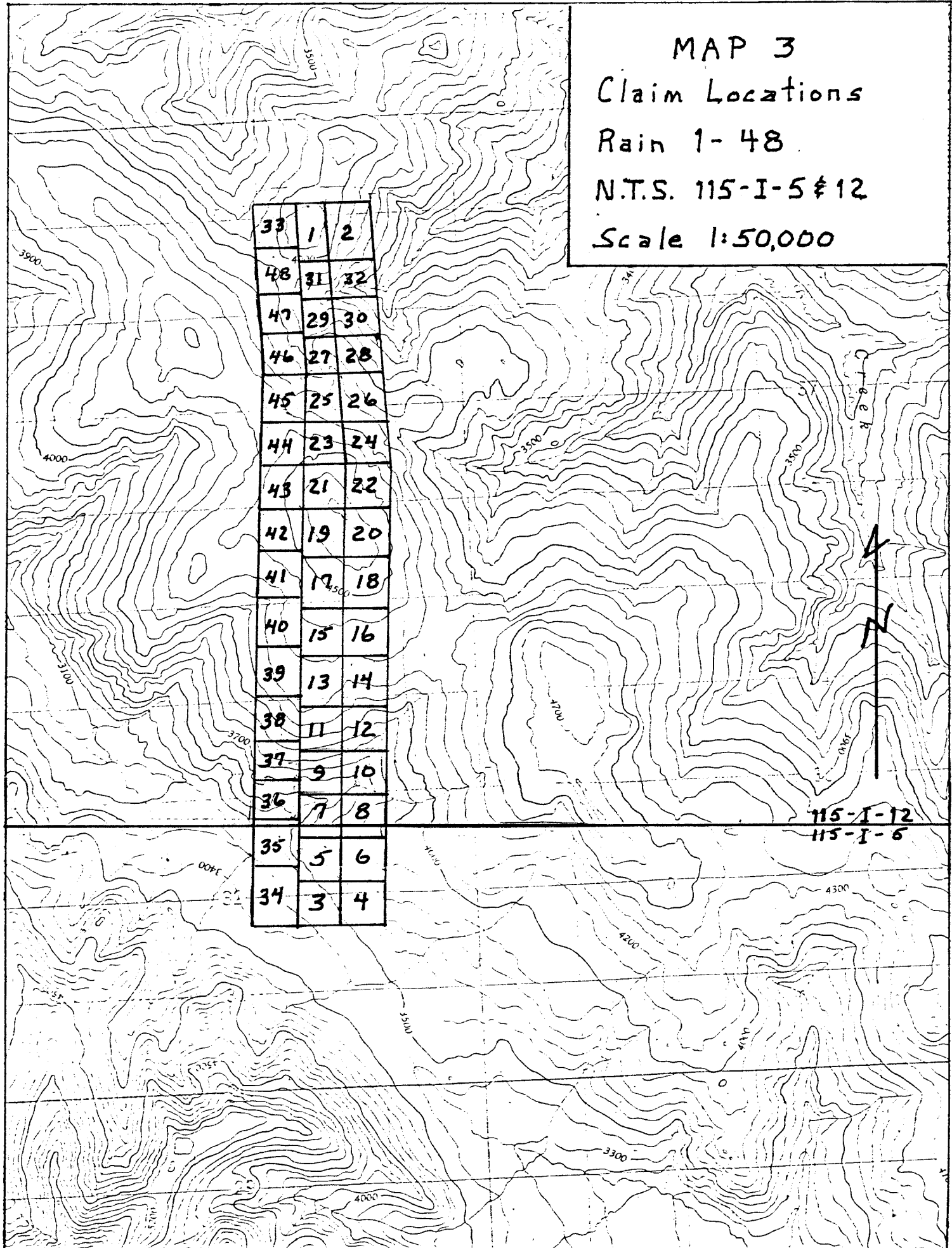
MAP 3  
 Claim Locations  
 Rain 1-48  
 N.T.S. 115-I-5 & 12  
 Scale 1:50,000

33	1	2
48	31	32
47	29	30
46	27	28
45	25	26
44	23	24
43	21	22
42	19	20
41	17	18
40	15	16
39	13	14
38	11	12
37	9	10
36	7	8
35	5	6
34	3	4

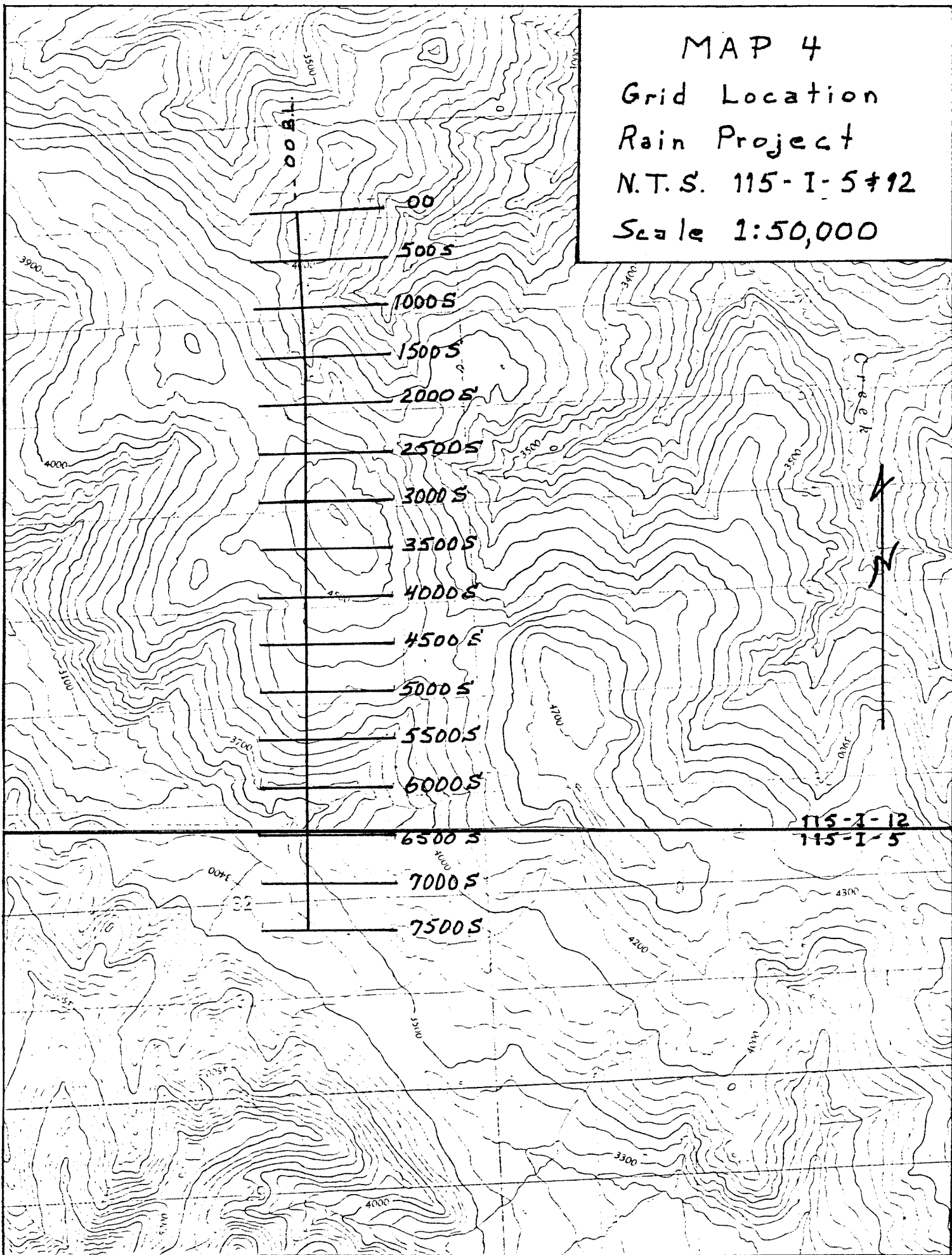
115-I-12  
 115-I-5



Creek



MAP 4  
Grid Location  
Rain Project  
N.T.S. 115-I-5#12  
Scale 1:50,000



## INTRODUCTION

The RAIN 1-48 mineral claims were acquired by Canadian Nickel Company Limited by staking. The claims were staked March 30, 1983 and were recorded April 5, 1983. The claims were staked to protect two reported areas of hydrothermal alteration and chalcedonic silicification. These areas had been previously explored by trenching and sampling as well as soil geochemistry. Canadian Nickel Company Limited felt the area had not been sufficiently evaluated with respect to the Buchanan Model (Figure 1) of epithermal precious metal deposits. To further this evaluation Canadian Nickel Company Limited, during July 21 - August 6, 1983, carried out a VLF EM survey, a geological survey, a limited gas chromatography survey and rock sampling. Rock samples were submitted for ICP, Hg, Au analysis. In addition some samples were selected for fluid inclusion (4 samples) and X-ray diffraction (4 samples) studies. The results of the 1983 field and laboratory studies are summarized in this report.

## LOCATION AND ACCESS

The RAIN 1-48 mineral claims are located approximately 90 km northwest of Carmacks, Yukon (Maps 1 & 2) and are astride the headwaters of Hayes Creek and Wolverine Creek. The claims are centered about latitude  $62^{\circ}31'30''$  north and longitude  $137^{\circ}44'30''$  west on N.T.S. sheets 115-I-5 & 12.

Access to the property is by helicopter from Carmacks, Minto or Revenue Creek (Map 2). Carmacks and Minto are accessible by Yukon Territory Highway 2. The Revenue Creek airstrip and placer mining area is accessible via an 80 km seasonal (summer only) tote road from Carmacks. An old winter tractor road from the Revenue Creek airstrip bisects the southwest corner of the claim group.

During the course of the 1983 exploration program helicopter service was provided, on a casual charter basis, by Trans North Air from their Carmacks base.

## PHYSIOGRAPHY

The claim group lies along the north central flank of the Dawson Range. The terrain is characterized by moderately to steeply sloping rounded hills with V shaped drainage valleys. The drainage pattern is dendritic to subdendritic. No glaciation has taken place in the claim group area. Elevations range from about 1000 metres in the extreme southern portion of the claim group to about 1475 metres in the central portion. About 20% of the property is above the tree line. Alder and willow shrubbery with interspersed spruce cover most of the slopes. Spruce with willow and alder underbrush occupy the valleys. Some of the better drained south facing slopes are birch and aspen covered. Most of the moderate to gently sloping areas are poorly drained and are moss covered muskeg. A headwaters tributary of Hayes Creek drains the southern portion of the property and a tributary of Wolverine Creek drains the northern portion. During the period of the exploration program temperatures ranged

from night time lows of 5-8°C to maximum day time highs of 20-25°C. Rain showers were frequent during the period with some 1-2 day periods of drizzle.

#### PROPERTY STATUS

The RAIN 1-48 claims form a contiguous claim group (Map 3). The property lies within the Yukon Mining District of Whitehorse. The RAIN 1-48 claims are held by Canadian Nickel Company Limited, Copper Cliff, Ontario, POM 1NO. A summary of the claim status is shown below.

<u>Claim Name</u>	<u>Grant Number</u>	<u>Date Staked</u>	<u>Date Recorded</u>
RAIN 1-48	YA75517 - YA75564	March 30, 1983	April 5, 1983

At the time the field program was in progress all ground surrounding the RAIN 1-48 claims was open for staking. All grant number claim tags were affixed to their respective claim posts during the course of the exploration program.

#### HISTORY

The Rainbow and Panther prospects were originally located by the D.C. Syndicate (Dome - Cominco) in 1974, during a regional reconnaissance program. In 1975 claims were staked over the prospects and exploration was carried out. Exploration included geological and geochemical surveys, as well 2000 metres of bulldozed trenching was carried out on the Rainbow prospect. Geological mapping and soil geochemical surveys were carried out on the Panther prospect. These exploration efforts did not locate any significantly anomalous gold values and the properties were allowed to lapse.

The Rainbow prospect was investigated by J. A. Morin of D.I.A.N.D., in 1980, as part of an element distribution study of Au/Ag deposits in the Yukon. Morin's investigation indicated that the alteration and quartz (chalcedony) veining at the Rainbow prospect had similarities to the upper portions, i.e. above the precious metal zone, of an epithermal precious metal vein system as proposed by L. Buchanan et al.

J. A. Morin's investigation led to the Rainbow prospect being restaked as the MUT 1-24 group by Stephen Explorations Ltd. in 1980. During 1980 Stephen Explorations Ltd. carried out geological and geochemical surveys in the area of the bulldozed trenches on the Rainbow prospect. These surveys determined a weak geochemical (arsenic, antimony) anomaly over the Rainbow prospect, however, no follow-up work was carried out and the claims were allowed to lapse.

No further exploration work was carried out on the prospects prior to the staking of the RAIN 1-48 claims in March 1983 by Canadian Nickel Co. Ltd.

#### GENERAL GEOLOGY

The regional geology of the area is summarized by D. J. Tempelman-Kluit in G.S.C. Open File 200, scale 1:250,000. More recently the mineral occurrences of the area have been examined by J. A. Morin of D.I.A.N.D. The results are

given in a paper titled; Element Distribution in Yukon Gold-Silver Deposits by J. A. Morin published in Yukon Geology and Exploration 1979-1980. The Northern Cordillera Mineral Inventory by Archer, Cathro and Associates Ltd. gives brief histories and descriptions of the mineral occurrences of the area.

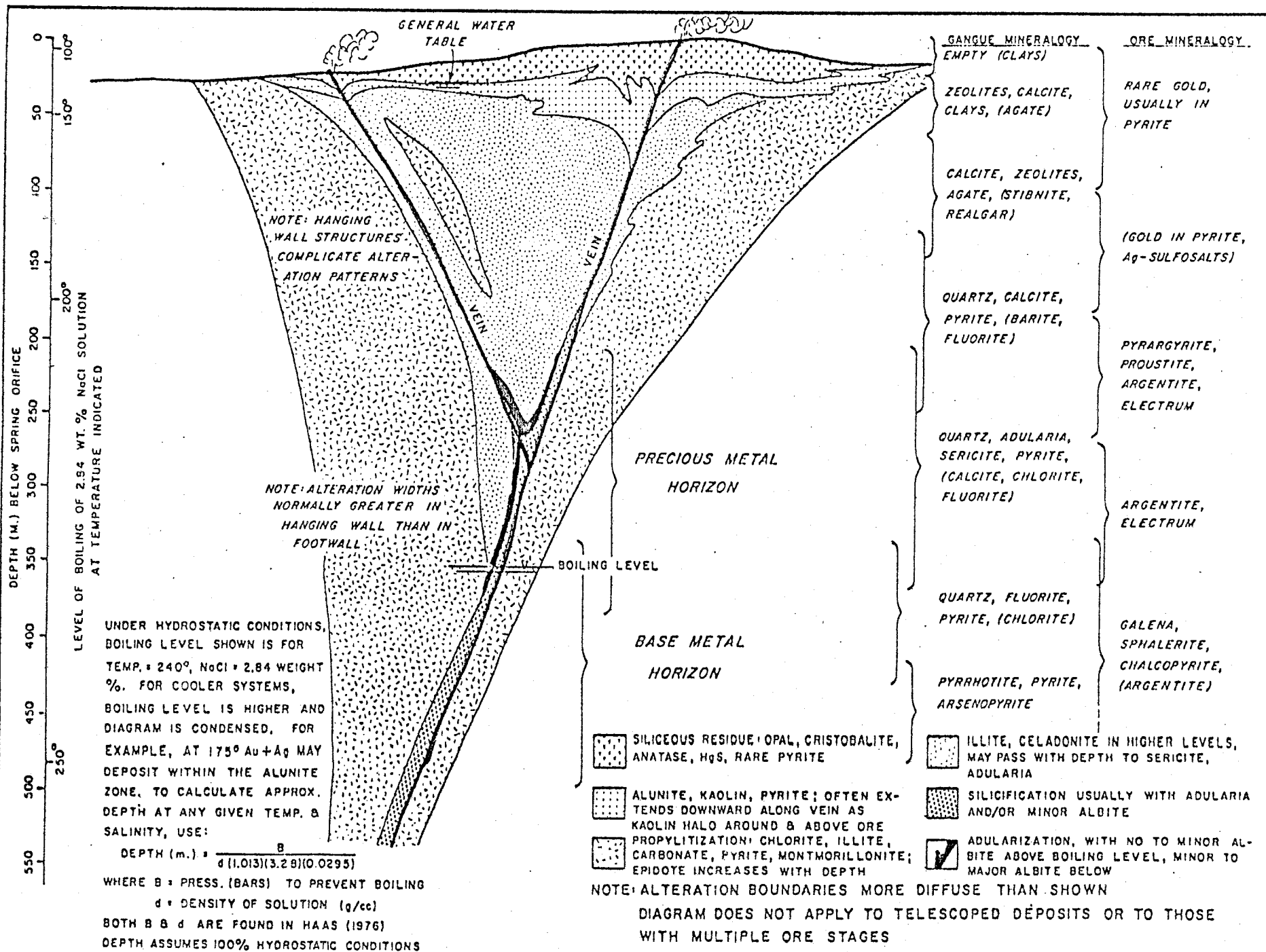
The RAIN claims area is underlain by schists and gneisses of the Proterozoic - Paleozoic age Yukon Metamorphic Complex (Yukon Group). These metasediments are in turn intruded by hornblende granodiorite, quartz diorite and quartz monzonite of the Triassic age Klotassin Batholith. Cenozoic (Eocene) feldspar porphyry intrusives and contemporaneous intermediate to acid tuff and tuff breccia of the Mount Nansen group discordantly and unconformably intrude/overlie the above units. All of the above rocks are unconformably overlain by the mafic flows and tuffs of the Eocene or younger Carmacks Group volcanics. Hydrothermal (epithermal) events have produced brecciated alteration zones with chalcedonic quartz veins and vein stockworks on the RAIN claims, on Prospector Mountain, Freegold Mountain and Mount Nansen.

#### ECONOMIC GEOLOGY

Chalcedonic quartz veins and vein stockworks in brecciated and hydrothermally altered rocks occur at the Rainbow Zone and the Rubble Zone on the RAIN claims. The Rainbow Zone occurs within the intrusive quartz monzonite rocks of the Triassic age Klotassin Batholith. The Rubble Zone occurs in the mafic ash flow tuffs of the Carmacks Group. The brecciation and clay (kaolin) alteration of the wall rocks and the inclusion of basement rock clasts in the quartz vein material suggest that these zones may be related to explosive and episodic boiling of a hydrothermal system. The fine grained, banded nature and low (<200°C) temperature of formation suggests the exposed stockworks of the Rainbow and Rubble zones may represent the near surface portions of epithermal systems such as host precious metal deposits in the southwest U.S.A. (e.g. Comstock and Creede).

A model for the vein stockwork precious metal deposits of the southwest U.S.A. has been developed by Larry J. Buchanan and associates. This model is summarized below:

- (i) Host rocks are largely Tertiary calc-alkaline extrusions with associated hypabyssal intrusions. Andesites are the most common host to ore shoots.
- (ii) Generally there are pre-ore felsic tuffs, volcanogenic sediments, dykes, sills and plugs often in a cauldron.
- (iii) The PM veins are vertically zoned as follows (see Figure 1).
  - Top
    - Agate & clay near paleosurface
    - passing into barren calcite
    - then quartz and calcite
    - then quartz, calcite, adularia and PM's
    - then quartz, adularia and base metals
  - Bottom



Buchanan Model of a Vein

Figure 1

- (iv) The interface between the upper precious metals and the lower base metals seems to be the zone of episodic boiling. At this level,  $\text{CO}_2$  and  $\text{H}_2\text{S}$  are released to the vapour phase, pH rises in the remaining fluid and  $f(\text{O}_2)$  increases. This results in the release of base metals firstly, silver sulphide secondly and gold finally in the temporal sense and the vertical sequence sense.
- (v) Episodic sealing of the fracture, followed by refracturing (faulting) causes episodic boiling and mineral deposition at depths greater than normal hydrostatic conditions normally allow (shock release into instant openings). This produces intra-mineralization brecciation, banding of the ore and grading of blocks. Sudden boiling causes fluidization of breccia and separates larger blocks towards the footwall of the vein and smaller blocks towards the hanging wall.
- (vi) A low pH assemblage genetically related to the PM mineralization can be recognized. Alteration assemblages are as follows:
- widespread propylitic alteration, namely, chlorite, pyrite, carbonate, montmorillonite and illite, forms a halo around most ores.
  - silicified walls, often adularia or albite can form a thick selvage around PM-bearing veins. This selvage can be several metres to less than 1 m wide. The width of this selvage diminishes upwards and vanishes just above the ore zone.
  - silification, in general, has a great vertical extent both above and well below the ore.
  - neither the widespread propylitic alteration nor the more restricted silicification/adularization/albitization serve as very useful ore guides. The former is much too widespread and the latter too narrow, often being found where ore is found.
  - What Buchanan suggests is a target that is directly related to PM deposition and extends well above the ore horizon. This is his low pH assemblage consisting of one or more of the following: Alunite, sericite, illite, kaolinite, montmorillonite, or any of the kaolin clay minerals. This is often referred to as bleaching and forms a halo around the cap of PM ore shoots. It is virtually absent below the PM horizon. It forms a narrow but ever widening halo in the hanging wall of the ore shoot.
- (vii) The PM horizon has a restricted vertical interval averaging close to 350 m. Often this interval forms a discrete level in a district (if post ore faulting is taken into account).
- (viii) Though quartz extends above the ore horizon, it may be represented at the top by agate, chalcedony or a paper-thin fracture coating.

Buchanan and others emphasize the importance of boiling for deposition of ores of the epithermal class. Studies of several deposits in the southwestern USA and Mexico have shown that the zone of boiling occurs at the base of

the precious metal zone (top of the base metal zone). In complex systems (i.e. more than one hydrothermal episode) boiling was noted only in those zones of precious metal mineralization, and not in the base metal zones. Most of the evidence for boiling has been taken from fluid inclusion studies done on these deposits.

The above model as proposed by Buchanan and others provided the basis on which the exploration program on the RAIN 1-48 claims was initiated and carried out.

#### GEOLOGICAL/GEOPHYSICAL/GEOCHEMICAL SURVEYS

During July 21 - August 6, 1983, geological, geophysical and geochemical surveys were carried out on the RAIN claim group. The objective of the program was to locate and evaluate the economic potential of the hydrothermal (epithermal) alteration zones on the claim group. Of particular interest was the potential for epithermal vein stockwork precious metal deposits based on the model proposed by L. Buchanan et al.

Topographic control for the surveys was accomplished by the establishment of a flagged grid (Map 4). Grid lines were established by compass and topofil and the lines were marked by orange flagging tape. The grid lines were established at 500 metre intervals with stations on the cross lines at 50 metre intervals. The stations, were marked by green flagging tape on which the appropriate grid co-ordinate was marked. Altimeter readings were recorded for each grid station and general topographic features were recorded schematically. The elevations and topographic features are shown on the topography and altimeter survey map (Sheet 1 & 2) scale 1:5,000.

#### (a) Geological Survey Results

The geological survey was able to delineate areas within the claim group which are underlain by metasedimentary schists and gneisses of the Proterozoic/Paleozoic Yukon Metamorphic Complex (Map unit 1). These metamorphic rocks are intruded by quartz monzonite rocks of the Triassic Age Klotassin Batholith (Map Unit 2). The metamorphic and intrusive rocks are unconformably overlain by variably textured mafic to intermediate pyroclastic tuffs of the Eocene Age Carmacks Group volcanics (Map unit 3). The characteristics of these lithologic units are described below, and their distribution is shown on the 1:5,000 scale Geological Survey plans (sheets 1 and 2).

The Yukon Metamorphic Complex is comprised primarily of metasedimentary rocks that are regionally metamorphosed to amphibolite facies. They are generally steeply dipping and complexly folded. Quartzite, muscovite/biotite schists and amphibole gneisses were the only units observed on the claim group. No attempt was made to differentiate these various units for mapping purposes. The distribution of the Yukon Metamorphic Complex rocks are shown on the 1:5,000 scale Geological Survey plan as map unit 1.

The Klotassin Batholith rocks within the claim group area are comprised of light pink to gray, medium grained, equigranular massive quartz monzonite. Biotite is present in small (less than 2%) amounts. The rock is frequently crosscut by quartz veins which are coarse milky quartz probably formed as late stage segregation veins during the period of cooling of the intrusive. These quartz veins vary from a few millimeters thick to locally 15-20 centimeters. These unaltered intrusive rocks are shown on the 1:5000 scale geological survey plan as map unit 2a.

Some portions (Rainbow Zone) of the quartz monzonite intrusive have been brecciated, hydrothermally altered and silicified. The major alteration mineral observed is kaolinite after feldspar, which in some places is up to 50% of the rock. Silicification is represented by veins and masses of microcrystalline to cryptocrystalline banded quartz, i.e. chalcedonic quartz with millimeter scale banding as evidence of a pulsating (episodic) style of deposition. This brecciated, altered and silicified zone in the quartz monzonite intrusive is shown on the 1:5000 scale Geological Survey plan as map unit 2b. Details of the alteration zone in trench 1 are shown on the 1:2000 scale map of the Rainbow Zone.

The Carmacks Group Volcanics overlie all other units on the property with distinct unconformity. These rocks dip gently to the southwest, although a rubbly weathered surface makes bedding thicknesses and attitudes indistinguishable in most places. On the Rain claims these volcanic units are comprised of variable pyroclastic deposits of mafic to intermediate composition. These units are interbedded and the order of position shown on the Geological Legend does not represent stratigraphic position. Map unit 3a represents the ash flow tuff facies of the volcanoclastic package and is the most commonly observed facies on the property. The ash flow tuff is generally fine grained, massive to rarely flow banded, light pink to brown, often contains phenoclasts of a pale green pyroxene (aegirine augite?). The clast size is generally 1-2 mm with some to 4-5 mm. Clasts often have altered rims. The pyroxene clasts probably occurred as crystals in the magma and some have been slightly rounded during deposition. These pyroxene phenoclasts often weather out of the rock leaving excellent molds showing crystal faces. Locally the ash flow tuff becomes medium grained with angular clasts of varying composition. The rubbly weathered nature of the outcrop is such that grading of the ash flows was not observable in outcrop. Map unit 3b represents a lapilli tuff. It is compositionally similar to the ash flow tuff but contains numerous to abundant lapilli size clasts. Some pyroxene phenoclasts were observed. This unit tends to weather into blocky fragments and is commonly a brown colour. Fresh surface is dark green to black. This unit is the dominant lithology in the southern portion of the claim group and may be a more proximal facies of the unit 3a ash flow tuff. A welded tuff facies is represented as map unit 3c and is commonly interbedded with the unit 3a ash flow tuff. It weathers buff to pink and generally has good flow banding with numerous coarse clasts which show plastic deformation. Map unit 3d represents a Plinian Air Fall tuff. This unit is very localized in its distribution. It weathers dark brown and is dark green on fresh surface with a mottled appearance. The rock has abundant pyroxene phenoclasts to 5 mm and numerous mixed clasts of wall rock from 1 mm to 10 cm. The matrix is fine to medium grained ash tuff that is variously

graded, usually fining upwards. Some of the larger clasts show some rounding and some are streamlined, i.e. volcanic bombs. Some of the large clasts (bombs) warp the underlying beds of finer ash tuff. A zone of hydrothermally altered, brecciated and silicified ash flow tuff is represented as map unit 3e. The zone has limonite and clay alteration, is strongly brecciated and cut by veins and veinlets of microcrystalline and chalcedonic quartz. Rare basement rock fragments occur as breccia fragments in some places. The dominant alteration mineral is kaolin, locally to 40% of the rock. The zone is up to 2 metres wide and was traced for a strike length of about 100 metres. The zone becomes overburden covered at both ends. Field descriptions of all samples collected are included in this report as Appendix A. Details of the geology and sampling of the Rubble Zone are shown on the 1:1000 scale map, Rubble Zone.

#### (b) Geophysical Survey Results

An electromagnetic survey was carried out over all of the grid lines on the property. The survey was completed utilizing a Crone "Radem" VLF EM receiver. Total field strength and dip angles were recorded. The recorded data was plotted as profiles and is shown on the 1:5000 scale electromagnetic survey plans (sheets 1 & 2).

Several zones of variable strength conductivity were found to occur in the northern and central portions of the claim group. No conductivity was found to occur in the southern portion of the property. Some of the conductivity occurs coincidental with the hydrothermal alteration zones, i.e. Rainbow Zone and Rubble Zone on the property. No bedrock cause of the conductivity was observed in the field. Instrument specifications are included as Appendix B.

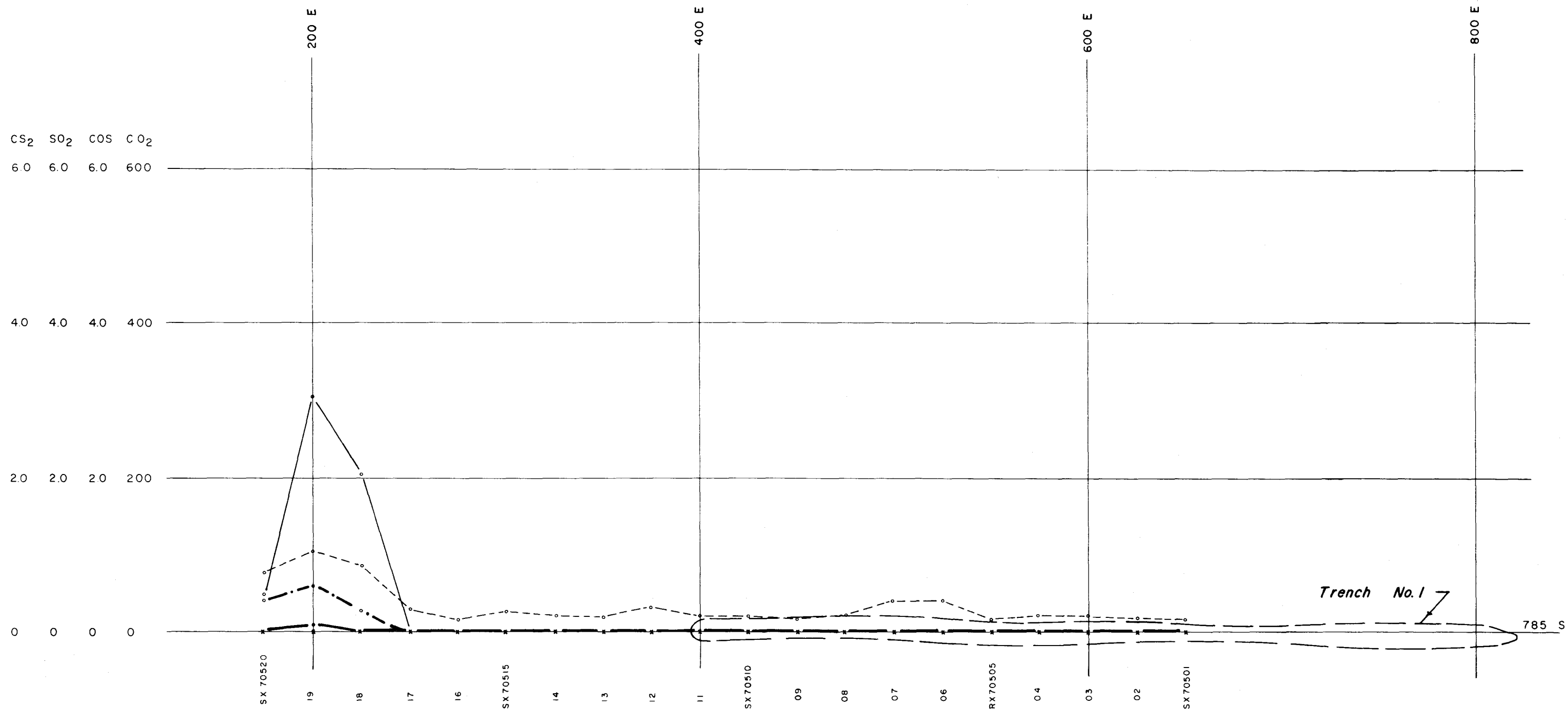
#### (c) Geochemical Survey Results

Gas chromatography surveys were carried out over the areas of hydrothermal alteration at the Rainbow Zone and the Rubble Zone. These surveys provide a measurement of the production of  $CS_2$ ,  $SO_2$ ,  $COS$  and  $CO_2$  from the soil and rock underlying the collection site. The results of this survey are plotted as profiles on the 1:2000 scale Gas Chromatography Survey, figures 2, 3 and 4. The results of this survey do not appear to correlate with any known anomalous bedrock or soil feature. The analytical data is included as Appendix C.

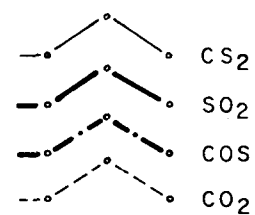
A total of forty four rock samples was submitted for analysis by the ICP method and AA method for gold and mercury. Some of the rocks from the Rainbow Zone and the Rubble Zone are anomalous in mercury and arsenic and in a few places on the Rainbow Zone are anomalous in gold. The results of these analyses are plotted for Au, Ag, Hg, As, Cu and Pb on the 1:5000 scale Rock Sample Assays plan. Analytical values for all other elements analyzed are included in Appendix D, Analytical Results.

#### X-RAY DIFFRACTION STUDY

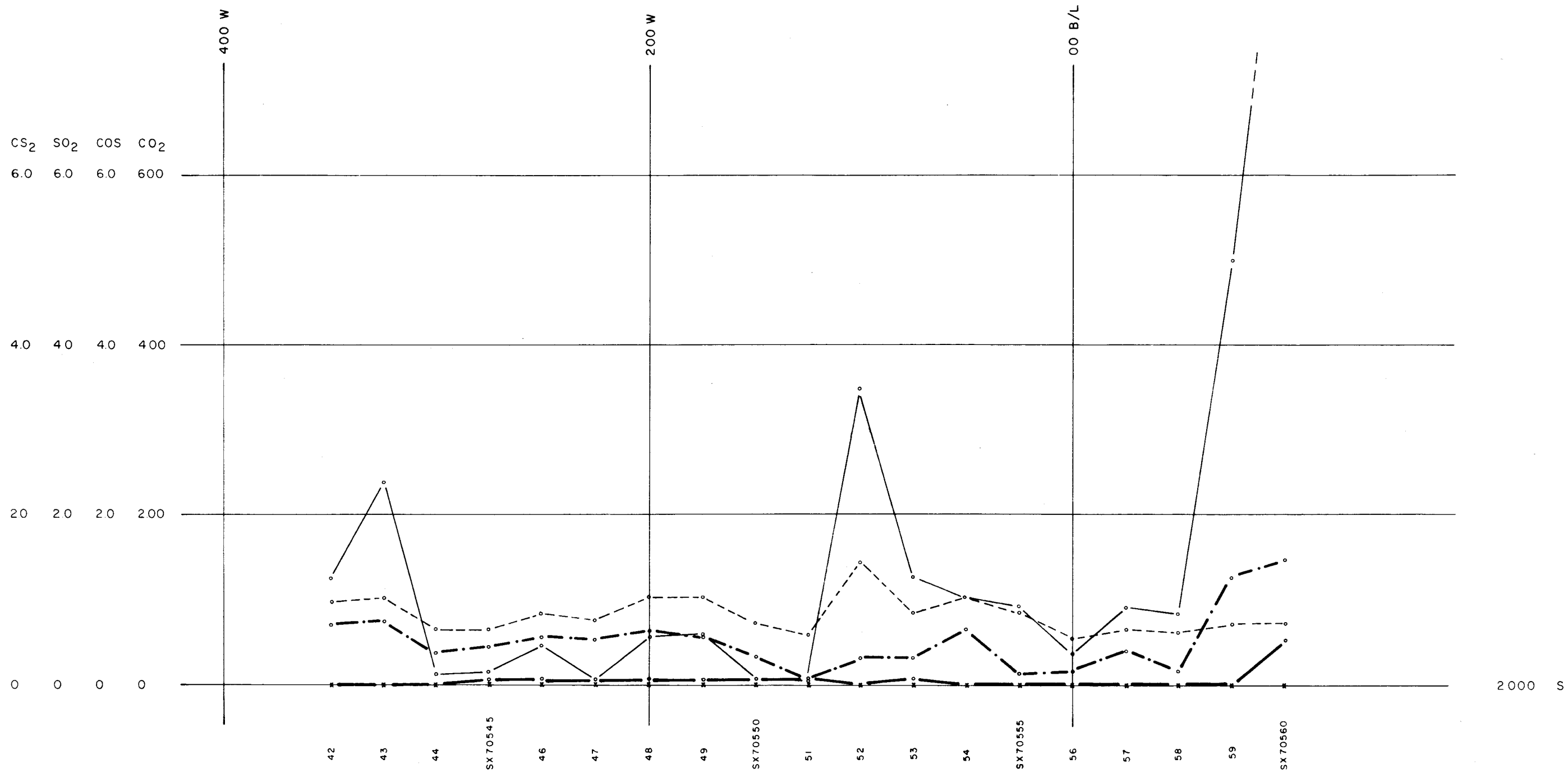
X-ray diffraction studies were carried out on three samples of altered rock from the Rainbow Zone and one sample from the Rubble Zone. These studies identified kaolinite as the major alteration mineral in both of these zones.



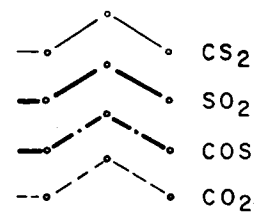
NOTE: Units are micrograms of gas absorbed by 1 gram of sorbent material per day.



<b>Canadian Nickel Company Limited</b>		Copper Cliff, Ontario POM 1N0	
<b>GAS CHROMATOGRAPHY</b>		SHEET	FIGURE
Project: PRIMROSE (Rain Claims)		Area: MOUNT PITTS	
Supervisor: E.J. Debicki	Instrument:	Survey date: July - Aug, 1983.	
Compiled by: W.O. Manson	Drawn by: D.W. Walsh	Date drawn: November, 1983	Revised:
Scale: 1:2000	File:	N.T.S. 115 1 5 & 12	



NOTE: Units are micrograms of gas absorbed by 1 gram of sorbent material per day



### Canadian Nickel Company Limited

Copper Cliff, Ontario  
POM INO

### GAS CHROMATOGRAPHY

SHEET  
FIGURE  
**3**

Project: PRIMROSE (Rain Claims)

Area: MOUNT PITTS

Supervisor: E.J. Debicki

Instrument:

Survey date: July - Aug, 1983

Compiled by: W. O. Manson

Drawn by: D. W. Walsh

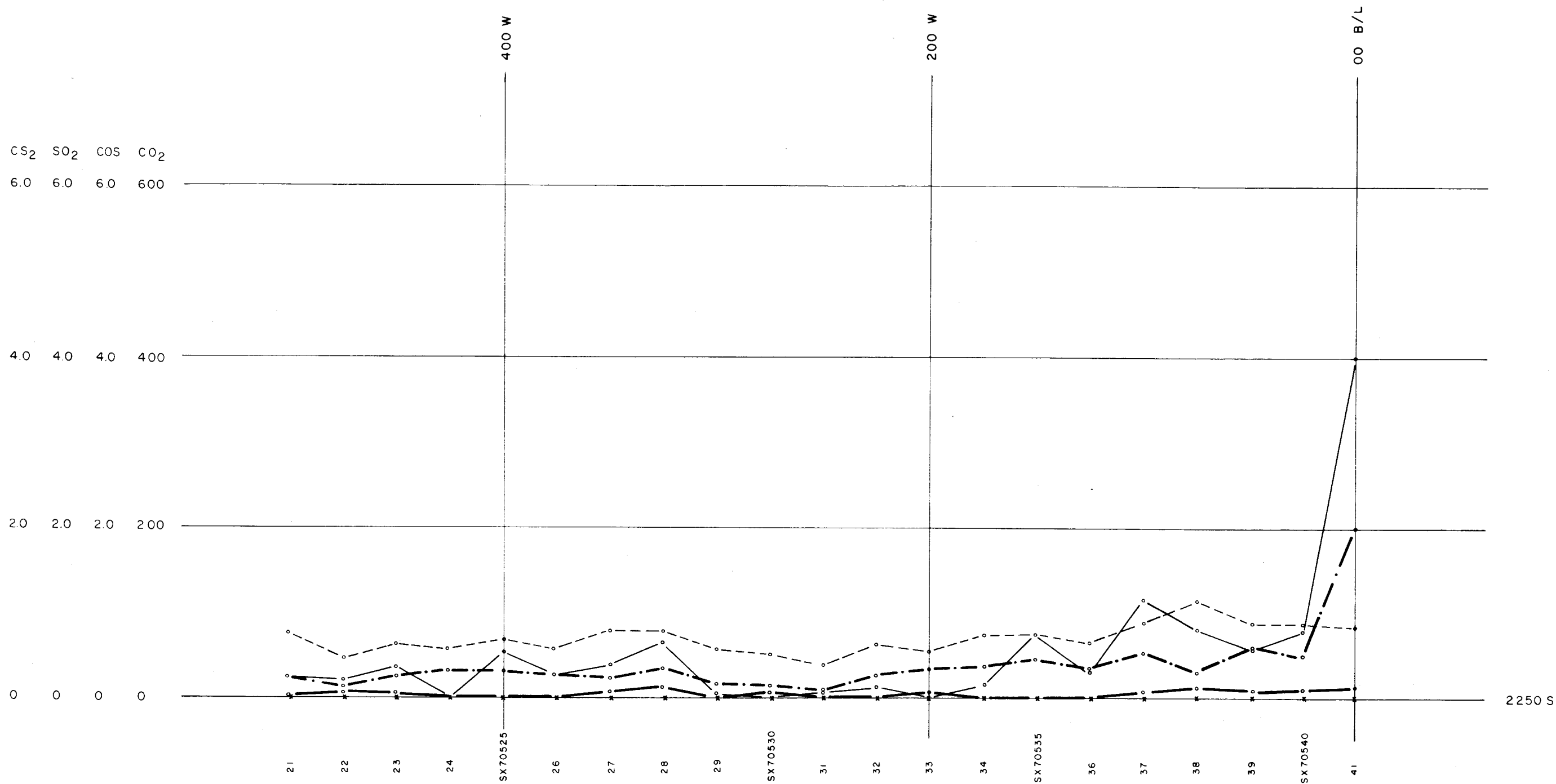
Date drawn:  
November, 1983

Revised:

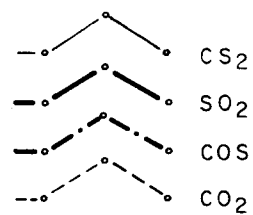
Scale: 1:2000

File:

N.T.S. 115 1 5 & 12



NOTE: Units are: micrograms of gas absorbed by 1 gram of sorbent material per day.



### Canadian Nickel Company Limited

Copper Cliff, Ontario  
POM 1N0

### GAS CHROMATOGRAPHY

SHEET	FIGURE
	4

Project: PRIMROSE (Rain Claims)

Area: MOUNT PITTS

Supervisor: E. J. Debicki

Instrument:

Survey date: July - Aug, 1983.

Compiled by: W. O. Manson

Drawn by: D. W. Walsh

Date drawn:  
November, 1983

Revised:

Scale: 1:2000

File:

N.T.S. 115 15 8 12

The detailed results of this study are shown on the laboratory report in Appendix E.

#### FLUID INCLUSION STUDY

Fluid inclusion studies were carried out on three samples from the Rainbow Zone and on one sample from the Rubble Zone. The objective of the study was to characterize the environment of vein formation in these two hydrothermal alteration zones. The results of the study indicate that the fluid inclusions and quartz veins formed at low temperature (less than 200°C) and are typical of those found in epithermal ore deposits. The details of this fluid inclusion study are included as Appendix F.

#### CONCLUSIONS AND RECOMMENDATIONS

The 1983 field program was able to define the distribution of the various rock types which occur on the RAIN claims. Two zones of hydrothermal (epithermal) alteration were defined, although the reported Panther zone of hydrothermal alteration was not located. The VLF EM survey has defined several zones of variable strength conductivity, portions of which are coincident with known zones of hydrothermal alteration. No field evidence which could directly explain the cause of the conductivity was observed, however the high clay content (up to 40% kaolin) of the alteration zones may be a factor.

The high proportion of kaolin as the major alteration mineral was confirmed by X-ray diffraction analysis. The fluid inclusion study indicates a formation temperature of the chalcedonic quartz veins to be less than 200°C. Field observation of the brecciation of the host rocks, the banded nature of the chalcedonic quartz veins in conjunction with the abundant kaolin and low temperature of formation, strongly indicate that the Rainbow and Rubble zones are upper portions of epithermal vein systems. These characteristics are compatible with that portion of the "Buchanan Model" which would be located stratigraphically above any zone of precious metal deposition in the vein system.

Although the Rainbow and Rubble zones are similar in the nature of their formation, no evidence was observed which could indicate they are the result of the same event in time. No specific time frame can be assigned to either event other than they postdate the host rocks.

Geochemically the rocks of the Rainbow and Rubble Zones are variously and sporadically anomalous in arsenic, mercury, antimony and on the Rainbow Zone there are some anomalous gold values up to 75 ppb.

The Rainbow and Rubble Zones represent the upper portions of epithermal vein systems and are anomalous in the precious metal pathfinder elements (plus gold at the Rainbow Zone). When the model for epithermal precious metal deposits according to Buchanan et al is applied to the Rainbow and Rubble Zones, then the prospects of a precious metal occurrence at depths of 200-300 metres below surface are a reasonable expectation.

Further exploration to evaluate the economic potential of the Rainbow and Rubble zones should be carried out. As the anomalous epithermal environment has been defined the next phase of exploration would have to involve testing of the lower levels of the epithermal system, to determine if any economic precious metals do occur.

Further detailed prospecting of the property should also be carried out to locate any other epithermal occurrences which may be located on the property.

BIBLIOGRAPHY

1. Archer, Cathro & Associates Ltd., 1972: Northern Cordillera Mineral Inventory; Pitts (Rainbow) Property, Occurrence No. 100, N.T.S. 115-I-12
2. Buchanan, L. J., 1981: Precious Metal Deposits associated with Volcanic Environments in the Southwest; in Relations of Tectonics to Ore Deposits in the Southern Cordillera; Arizona Geological Society Digest, Vol. XIV, Tuscon, Arizona
3. Morin, J. A., 1982: Element Distribution in Yukon Gold - Silver Deposits in D.I.A.N.D. Report of Yukon Geology and Exploration 1979-1980
4. Tempelman-Kluit, D. J., 1974: Reconnaissance Geology of Aishihik Lake, Snag and part of Stewart River Map Areas, West Central Yukon. G.S.C. Paper 73-41 and Maps 16-73, 17-73, 18-73 scale 1:250,000
5. 1974: Geological Compilation of the Carmacks Map Sheet 115-I. G.S.C. Open File 200
6. Butler, H. R., 1982: Gold Deposits in the Cordillera - Memorandum 1. Inco Memo to E. J. Debicki
7. J.C. Stephens Explorations Ltd., 1982: "RAINBOW PROJECT". An in house report of exploration on the Rainbow Zone.

APPENDIX "A"

Field Descriptions

TRaverse NUMBER Trench #1PROJECT RAIN ClaimsGEOLOGIST(S) Manson/RupoliN.T.S. 115-I-5, 12AREA Mt. PittsDATE July 27, 1983

SAMPLE NUMBER	SAMPLE TYPE			SAMPLE LENGTH, WIDTH, AREA	LATITUDE, LONGITUDE and/or U.T.M. Grid Co-Ord.	SAMPLE DESCRIPTION Rock type, lithology, character of soil, stream silt, etc. Formation Mineralization, etc.	RESULTS (p.p.m. / % / oz. per ton)								
	RX Rock, Talus	SX Stream Silt, Soil	Grab, Chip, Channel				Au ppb	Ag ppm	As ppm	Hg ppb	Sb ppm	Cu ppm	Pb ppm		
Stop #1						Hydrothermal alteration zone. Brecciated granite with with chalcedony veins and open space fillings. Chalcedony veins vary from irregular boxwork veinlets of 1-2 mm to local veins to 5 cm thick. The primary quartz grains of the granite are intact but the feldspar have all undergone alteration varying from argillic to buff clay masses. Some large masses (veins) to 2 m wide near east side of zone are banded indicating pulses of chalcedonic deposition.									
RX 28919	Rock		Grab		785S 825E	Altered granite rubble in Trench #1, weakly brecciated (fractured) with some chalcedony veins to 1.5 cm.	5	0.1	31	50	2	7	19		
RX 28920	Rock		Grab		785S 775E	Rubble in bottom of Trench #1. Dominantly weakly altered and fractured granite with minor chalcedony. Numerous pieces of impure quartzite probably from the schists and gneisses intruded by the granite. Also some vein (bull) quartz that is probably a late stage segregation of the granite.	5	0.1	66	70	2	21	16		
RX 28921	Rock		Grab		785S 725E	Trench rubble. Very weakly altered to fresh granite. Quartz veins are late stage segregation veins from the granite. No chalcedony observed.	5	0.1	7	30	2	6	15		
RX 28922	Rock		Grab		785S 675E	Ditto RX 28921	5	0.2	46	20	2	3	16		

TRaverse NUMBER Trench #1PROJECT RAIN ClaimsGEOLOGIST(S) Manson/RupoliN.T.S. 115-I-5, 12AREA Mt. PittsDATE July 27, 1983

SAMPLE NUMBER	SAMPLE TYPE			SAMPLE LENGTH, WIDTH, AREA	LATITUDE, LONGITUDE and/or U.T.M. Grid Co-Ord.	SAMPLE DESCRIPTION Rock type, lithology, character of soil, stream silt, etc. Formation Mineralization, etc.	RESULTS (ppm. /% /oz. per ton)						
	RX Rock, Talus	SX Stream Silt, Soil	Grab, Chip, Channel				Au ppb	Ag ppm	As ppm	Hg ppb	Sb ppm	Cu ppm	Pb ppm
RX 28923	Talus?		Grab		785S 625E	Trench rubble includes vein quartz and metamorphic dirty quartzite and weakly altered and fresh granite rubble. The vein quartz appears to be associated with the quartzite.	5	0.1	42	10	2	12	19
RX 28924	Rock		Grab		785S 575E	Large boulders & trench rubble. Moderately altered granite with veins and veinlets of chalcedony.	5	0.1	21	80	2	2	18
RX 28925	Rock		Grab		785S 525E	Strongly brecciated and altered granite with veins to 2 cm and irregular veinlets of chalcedony.	5	0.2	89	180	2	3	10
RX 28926	Rock		Grab		785S 475E	Ditto RX 28925. Some of the chalcedony veins (masses) are vaguely layered. (Several pulses of deposition?).	15	0.2	454	100	10	3	11
RX 28927	Rock		Grab		785S 425E	Granite. Fresh unaltered. Massive coarse grained equigranular. Pink feldspar quartz and biotite. Deeply weathered on surface to form 10-30 cm regolithic soil with rock chips. Very crumbly weathered surface.	5	0.1	5	10	2	5	12
RX 28928	Rock Felsenmeer		Grab		180S 025W	Intrusive. Syenitic granite. Medium-grained, equigranular massive locally quite weathered and crumbly.	5	0.1	9	5	2	5	10



TRaverse NUMBER \_\_\_\_\_

PROJECT RAIN ClaimsGEOLOGIST(S) Manson/RupoliN.T.S. 115-I-5, 12AREA Mt. PittsDATE July 29, 1983

SAMPLE NUMBER	SAMPLE TYPE			SAMPLE LENGTH, WIDTH, AREA	LATITUDE, LONGITUDE and/or U.T.M. Grid Co-ord.	SAMPLE DESCRIPTION Rock type, lithology, character of soil, stream silt, etc. Formation Mineralization, etc.	RESULTS (ppm. / % / oz. per ton)						
	RX Rock, Talus	SX Stream Silt, Soil	Grab, Chip, Channel				Au ppb	Ag ppm	As ppm	Hg ppb	Sb ppm	Cu ppm	Pb ppm
RX 28937	Rock		Grab		525S 440E	Trench #3, brecciated and altered granite, chalcedony veins & jasper veinlets.	5	0.2	53	70	2	2	7
RX 28938	Rock		Grab		525S 395E	Trench #3, breccia with basement clasts and chalcedonic cement.	5	0.2	24	110	7	26	24
RX 28939	Rock		Grab		525S 350E	Trench #3, brecciated and altered granite with chalcedony cement.	5	0.3	266	40	8	3	11
RX 28940	Rock		Grab		625S 375E	Trench #2, intensely altered granite with minor chalcedony, abundant chalcedony in area.	5	0.1	22	110	2	2	25
RX 28941	Rock		Grab		650S 360E	Outcrop 25 m south of Trench #3. Banded chalcedony from 1 m <sup>3</sup> mass of open space filled by chalcedony.	75	0.1	243	10	7	2	4
RX 28942	Rock		Grab		625S 420E	Trench #2. Massive chalcedony with fragments of altered granite as inclusions.	5	0.1	23	140	2	2	11
RX 28943	Rock		Grab		625S 675E	Trench #2. Altered granite with large $\pm$ 1-2 m <sup>3</sup> open spaces filled by massive vaguely banded chalcedony.	5	0.1	10	70	4	4	19
RX 28944	Rock		Grab		1950S 240W	Basalt. Dark green fine-grained groundmass with phenocrysts of olivene and pyroxenite 2-3 mm. No bedding attitude observed on outcrop as outcrop is badly frost fractured. Rare phenocrysts of black crystalline mineral is probably magnetite as rock is distinctly magnetic. The trend of the outcrop of this rock suggests it may be a subvolcanic dike.	5	0.1	5	30	2	26	9

TRAVERSE NUMBER \_\_\_\_\_

PROJECT RAIN Claims

GEOLOGIST(S) Manson/Rupoli

N.T.S. 115-I-5, 12

AREA Mt. Pitts

DATE July 30, 1983

SAMPLE NUMBER	SAMPLE TYPE			SAMPLE LENGTH, WIDTH, AREA	LATITUDE, LONGITUDE and/or U.T.M. Grid Co-ord.	SAMPLE DESCRIPTION Rock type, lithology, character of soil, stream silt, etc. Formation Mineralization, etc.	RESULTS (ppm. / % / oz. per ton)						
	RX Rock, Talus	SX Stream Silt, Soil	Grab, Chip, Channel				Au ppb	Ag ppm	As ppm	Hg ppb	Sb ppm	Cu ppm	Pb ppm
RX 28945	Rock		Grab		2015S 450W	Ash flow tuff, dark gray, weathers pinkish to purple. Clastic texture with clasts 1-2 mm of various rock and mineral grains. Numerous phenocrasts of crystals of a pale green pyroxene (aegerine augite?). These phenocrasts are sometimes slightly rounded and many of the clasts have altered rims. The degree of alteration varying with the composition of the clasts. On the weathered surface, the pyroxene often weathers out and leaves an excellent mold showing crystal faces.	5	0.1	2	5	2	40	5
RX 28946	Rock		Grab		2250S 215N	Tuff coarsely clastic, angular clasts. Limonitically altered possibly due to epithermal zone at 245W.	5	0.1	6	40	2	58	17
RX 28947	Rock		Grab		2250S 230W	Tuff. Ash flow tuff altered and bleached, clays probably dominate. Wall rock on the east wall of breccia epithermal zone 2-3 m thick.	5	0.1	111	100	3	57	17
RX 28948	Rock		Grab		2250S 225W	Tuff. Limonitically altered ash flow tuff. Forms next outward alteration phase from the clay altered zone of RX 28947.	5	0.1	17	30	2	130	21
RX 28949	Rock		Grab		2250S 240W	Brecciated and clay altered tuff within sili- cified epithermal zone.	5	0.1	142	100	5	84	15

TRaverse NUMBER \_\_\_\_\_

PROJECT RAIN ClaimsGEOLOGIST(S) Manson/RupoliN.T.S. 115-I-5, 12AREA Mt. PittsDATE July 30, 1983

SAMPLE NUMBER	SAMPLE TYPE			SAMPLE LENGTH, WIDTH, AREA	LATITUDE, LONGITUDE and/or U.T.M. Grid Co-ord.	SAMPLE DESCRIPTION Rock type, lithology, character of soil, stream silt, etc. Formation Mineralization, etc.	RESULTS (ppm. /% /oz. per ton)						
	RX Rock, Talus	SX Stream Silt, Soil	Grab, Chip, Channel				Au ppb	Ag ppm	As ppm	Hg ppb	Sb ppm	Cu ppm	Pb ppm
RX 28950	Rock		Grab		2250S 240W	Silicified breccia. Quartz $\pm$ chalcedony with brecciated clasts of tuff and in some places small fragments that may be basement rock.	5	0.1	38	220	3	11	8
RX 28951	Rock		Grab		2250S 240W	Similar to RX 28950, all clasts appear to be altered ash flow tuff. The silicified breccia zone is about 2-3 metres wide and was traced through 250W from 2230S to 2330S. It disappears under overburden at both ends.	5	0.1	10	80	2	3	3
RX 28952	Talus in Frost Heave		Grab		2800S 320E	Tuff. Welded tuff with graded texture and flow banding, air fall tuff. Bleached chalky white, may be degassed top of ash fall. Found in talus over 25 x 25 m area.	5	0.1	2	10	2	1	30
RX 28953	Rock		Grab		2650S 500E	Ash flow tuff with abundant coarse clasts to 1 cm.	5	0.1	10	5	2	26	4
RX 28954	Rock		Grab		2650S 500E	Ash flow tuff medium grained clasts and rare coarse clast in fine ash matrix.	5	0.1	6	20	2	17	6
RX 28955	Rock		Grab		2650S 500E	Ash flow tuff, fine-grained minor clasts, vague flow banding.	5	0.1	5	10	2	15	5
RX 28956	Rock		Grab		2650S 500E	Plinian air fall tuff. Ash tuff matrix with phenoclasts of pyroxene to 5 mm and mixed clasts 1 mm to 10 cm. Outcrop is variously graded usually fining upwards. Some of the larger clasts (bombs) warp the underlying beds.	5	0.3	6	30	2	33	4

TRaverse NUMBER \_\_\_\_\_

PROJECT RAIN ClaimsGEOLOGIST(S) Manson/RupoliN.T.S. 115-I-5, 12AREA Mt. PittsDATE July 31, 1983

SAMPLE NUMBER	SAMPLE TYPE			SAMPLE LENGTH, WIDTH, AREA	LATITUDE, LONGITUDE and/or U.T.M. Grid Co-ord.	SAMPLE DESCRIPTION Rock type, lithology, character of soil, stream silt, etc. Formation Mineralization, etc.	RESULTS (ppm. / % / oz. per ton)						
	RX Rock, Talus	SX Stream Silt, Soil	Grab, Chip, Channel				Au ppb	Ag ppm	As ppm	Hg ppb	Sb ppm	Cu ppm	Pb ppm
RX 28957	Rock		Grab		2250S 1100E	Ash flow tuff. Fine-grained clastic ash matrix with up to 15% phenoclasts of pyroxene crystals 2 mm to 5 mm in some places.	5	0.3	9	40	2	40	4
RX 28958	Rock		Grab		2385S 1100E	Welded ash flow tuff. Fine-grained flow banded, locally vague grading. Bleach to light tan colour. Probably to post depositional degassing of the flow through local hot springs. No veining or mineral deposition, just alteration of the tuff.	5	0.1	3	30	2	2	8
RX 28959	Rock		Grab		2600S 900E	Ash flow tuff, clastic fine-grained, vaguely flow banded, rare pyroxene less than 1 mm. This is the most common facies of the ash flow tuffs.	5	0.3	14	20	2	82	5
RX 28960	Rock		Grab		2250S 250W	Silicified breccia zone, highly altered breccia.	5	0.2	33	50	2	11	6
RX 28961	Rock		Grab		2250S 250W	Along same zone. Unaltered chalcedony zone with large fragments that look like chert. May be a different phase of the silicification.	5	0.2	12	160	2	7	4
RX 28962	Rock		Grab		2250S 250W	Same zone. Chalcedony cemented clasts of ash flow tuff?	5	0.1	51	130	3	13	9





SAMPLE NUMBER SX 70561

HEAVY MINERAL SAMPLE FORM

LOCATION

N.T.S. 115-I-5, 12 LAT. \_\_\_\_\_  
 LONG. \_\_\_\_\_  
 GRID CO-ORDS. - N/S 950S  
 - E/W 850E

SAMPLE LOCATION DESCRIPTION (ie. creek name, road name, signs, culvert or post markers, etc.)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

STREAM CHARACTERISTICS

STREAM DIMENSIONS - WIDTH 1 m  
 - DEPTH 10-15 cm  
 DIRECTION OF FLOW NE  
 STREAM VELOCITY (ie. fast, medium, slow)  
Medium  
 GRADIENT Moderate  
 AREA OF CATCHMENT BASIN (ie. square km)  
1-2 Km<sup>2</sup>  
 STREAM CATEGORY (ie. main, main tributary, secondary tributary)  
Main tributary  
 POSTION OF SAMPLE IN STREAM  
Active zone (point bar)  
 DISTANCE UPSTREAM FROM ACCESS  
 \_\_\_\_\_

DESCRIBE STREAM BED (ie. wet, dry, gravel, swamp, etc.)  
Boulders and gravel  
 OVERALL RATING OF STREAM (ie. excellent, good, moderate, fair, poor)  
Good

SAMPLE CHARACTERISTICS

SAMPLE PREPARATION  
 DRY SIEVE \_\_\_\_\_  
 WET SIEVE - AT SITE \_\_\_\_\_  
 - AT WHEEL X  
 WEIGHT OF SAMPLE 8-10 Kg  
 SAMPLE COMPOSITION  
 % ORGANIC 0%  
 % SILT, CLAY 5%  
 SAMPLE COLLECTION  
 EASY X  
 MODERATE \_\_\_\_\_  
 DIFFICULT \_\_\_\_\_  
 SAMPLE QUALITY  
 EXCELLENT \_\_\_\_\_  
 GOOD X  
 MODERATE \_\_\_\_\_  
 FAIR \_\_\_\_\_  
 POOR \_\_\_\_\_

ADDITIONAL COMMENTS  
 \_\_\_\_\_  
 \_\_\_\_\_

GOLDWHEEL SAMPLE CHARACTERISTICS

% MAGNETITE % SAND % HEAVY MINERALS  
 \_\_\_\_\_  
 WEIGHT OF FINAL SAMPLE \_\_\_\_\_  
 ADDITIONAL OBSERVATIONS (ie. minerals identified, colour, etc.)  
 \_\_\_\_\_  
 \_\_\_\_\_

COMMENTS

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

RESULTS

Au	Ag	As	Sb	Pb	Zn	Cu	W	Hg	Mo	Ni	Cd	Sr			
p.p.b.	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.b.	p.p.m.	p.p.m.	p.p.m.	p.p.m.			
5	0.1	6	2	7	13	9	2	50	1	15	1	21			

SAMPLE NUMBERX 70561

SAMPLE NUMBL. SX 70562

HEAVY MINERAL SAMPLE FORM

LOCATION

N.T.S. 115-I-5. 12 LAT. \_\_\_\_\_  
 LONG. \_\_\_\_\_  
 GRID CO-ORDS. - N/S 910S  
 - E/W 800E  
 SAMPLE LOCATION DESCRIPTION (ie. creek name, road name, signs, culvert or post markers, etc.)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

STREAM CHARACTERISTICS

STREAM DIMENSIONS - WIDTH 1 m  
 - DEPTH 10-15 cm  
 DIRECTION OF FLOW North  
 STREAM VELOCITY (ie. fast, medium, slow)  
Medium  
 GRADIENT Moderate  
 AREA OF CATCHMENT BASIN (ie. square km)  
1 Km<sup>2</sup>  
 STREAM CATEGORY (ie. main, main tributary, secondary tributary)  
Main tributary  
 POSTION OF SAMPLE IN STREAM  
Active zone  
 DISTANCE UPSTREAM FROM ACCESS  
 \_\_\_\_\_  
 DESCRIBE STREAM BED (ie. wet, dry, gravel, swamp, etc.)  
Gravel + boulders  
 OVERALL RATING OF STREAM (ie. excellent, good, moderate, fair, poor)  
Good

SAMPLE CHARACTERISTICS

SAMPLE PREPARATION  
 DRY SIEVE \_\_\_\_\_  
 WET SIEVE - AT SITE \_\_\_\_\_  
 - AT WHEEL X  
 WEIGHT OF SAMPLE 8-10 Kg  
 SAMPLE COMPOSITION  
 % ORGANIC 0%  
 % SILT, CLAY 5%  
 SAMPLE COLLECTION  
 EASY \_\_\_\_\_  
 MODERATE X  
 DIFFICULT \_\_\_\_\_  
 SAMPLE QUALITY  
 EXCELLENT \_\_\_\_\_  
 GOOD X  
 MODERATE \_\_\_\_\_  
 FAIR \_\_\_\_\_  
 POOR \_\_\_\_\_  
 ADDITIONAL COMMENTS  
 \_\_\_\_\_  
 \_\_\_\_\_

GOLDWHEEL SAMPLE CHARACTERISTICS

% MAGNETITE % SAND % HEAVY MINERALS  
 \_\_\_\_\_  
 WEIGHT OF FINAL SAMPLE \_\_\_\_\_  
 ADDITIONAL OBSERVATIONS (ie. minerals identified, colour, etc.)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

COMMENTS

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

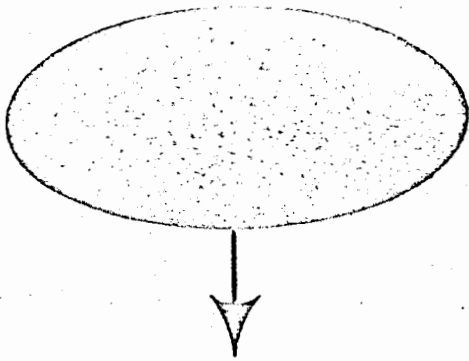
SAMPLE NUMBER SX 70562

RESULTS

Au	Ag	As	Sb	Pb	Zn	Cu	W	Hg	Mo	Ni	Cd	Sr			
p.p.b.	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.b.	p.p.m.	p.p.m.	p.p.m.	p.p.m.			
5	0.1	4	2	7	17	8	2	70	1	30	1	14			

APPENDIX B

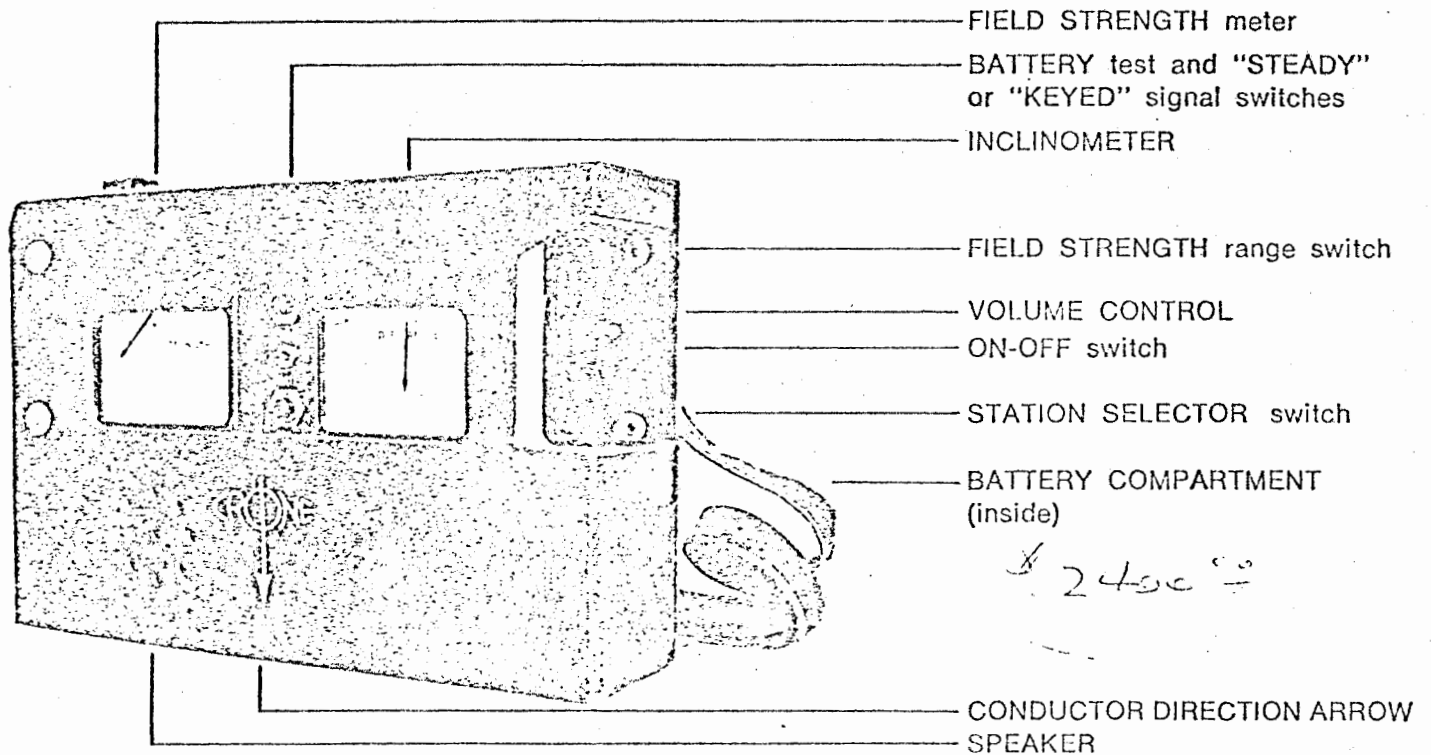
VLF Receiver Instrument Specifications



# CRONE GEOPHYSICS LIMITED

3607 WOLFEDALE ROAD,  
MISSISSAUGA, ONTARIO,  
CANADA.

Phone: 270-0096



This is a rugged, simple to operate, ONE MAN EM unit. It can be used without line cutting and is thus ideally suited for GROUND LOCATION OF AIRBORNE CONDUCTORS and the CHECKING OUT OF MINERAL SHOWINGS. This instrument utilizes higher than normal EM frequencies and is capable of detecting DISSEMINATED SULPHIDE DEPOSITS and SMALL SULPHIDE BODIES. It accurately isolates BANDED CONDUCTORS and operates through areas of HIGH HYDRO NOISE. The method is capable of deep penetration but due to the high frequency used its penetration is limited in areas of clay and conductive overburden.

The DIP ANGLE measurement detects a conductor from a considerable distance and is used primarily for locating conductors. The FIELD STRENGTH measurement is used to define the shape and attitude of the conductor.

## SPECIFICATIONS

Source of Primary Field: VLF Communication Stations 12 to 24 KHz

Number of Stations: 7 switch selectable

Stations Available: The seven standard stations are Cutler, Maine, 17.8; Seattle, Washington, 18.6; Collins, Colorado, 20.0; Annapolis, Md., 21.4; Panama, 24.0; Hawaii, 23.4; England, 16.0. Alternative stations which may be substituted are: Gorki, Russia, 17.1; Japan, 17.4; England, 19.6; Australia, NWC, 22.3 KHz.

Check that Station is Transmitting: Audible signal from speaker.

### Parameters Measured and Means:

(1) DIP ANGLE in degrees, from the horizontal of the magnetic component of the VLF field. Detected by minimum on the field strength meter and read from an inclinometer with a range of  $\pm 80^\circ$  and an accuracy of  $\pm \frac{1}{2}^\circ$ .

(2) Field Strength (total or horizontal component) of the magnetic component of the VLF field. Measured as a per cent of normal field strength established at a base station. Accuracy  $\pm 2\%$  dependent on signal. Meter has two ranges: 0 — 300% and 0 — 600%. Switch for "keyed" or "F.S." (steady) signal.

(3) Out of Phase component of the magnetic field, perpendicular in direction to the resultant field, measured without sign, as a per cent of normal field strength. This is the minimum reading of the Field Strength meter obtained when measuring the dip angle. Accuracy  $\pm 2\%$ .

Operating Temperature Range:  $-20^\circ$  to  $+110^\circ$  F.

Dimensions and Weight: 3.5"  $\times$  7.5"  $\times$  10.5" — 6 lb.

Shipping: Foam lined wooden case — shipping wt. — 15 lb.

Batteries: 2 of 9 volt: Eveready 216, Burgess 2U6, Mallory M-1604  
Average life expectancy — 3 weeks to 3 months dependent on amount of usage.

*Units Available on a Rental or Purchase Basis.*

*Contract Services Available for Field Surveys.*

APPENDIX C

Gas Chromatography Analytical Methods and  
Results and Site Descriptions

The gas chromatography results as reported by Exploration Research Laboratories are in the following terms:

Total micrograms of gas per 200 milligrams of sorbent material contained in each bottle over the entire collection time.

As the collection time for any given survey can vary from 14 days to more than 30 days the values were standardized to micrograms of gas in 1 gram of sorbent material per day. The standardized values have been used to produce the profiles presented in this report.

Example:

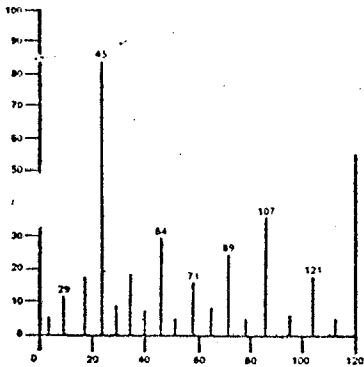
Lab Report = 110 micrograms of gas/200 milligrams of sorbent material

Survey time = 20 days

Therefore = 27.5 micrograms/gram/day

# EXPLORATION RESEARCH LABORATORIES

"Specialists in Vapor Phase Geochemistry"



## ANALYTICAL LAB:

MIDECO  
420 Chipeta Way, Suite 280  
Salt Lake City, Utah 84108  
801-582-3136 • 800-453-0090

## FIELD OFFICE:

Corvallis Mail Center • Box 200  
131 North West 4th St.  
Corvallis, Oregon 97330  
503-753-4078

04 Jan 84

Mr. Ed Debicki  
Canadian Nickel LTD.  
P.O. Box 12134  
808 Nelson Street  
Vancouver, B.C. V6Z 2H2

Dear Mr. Debicki:

As you requested in our telephone conversation of 03 Jan 84, I am enclosing the procedure we use to desorb the gas trapping vials.

I am also enclosing three copies of our most recent brochures for Exploration Research Laboratories for your perusal.

Thank you for your interest in ERL and the techniques we are developing.

Respectfully,

David N. Osborne  
Laboratory Director  
Trace Analysis Division

ph

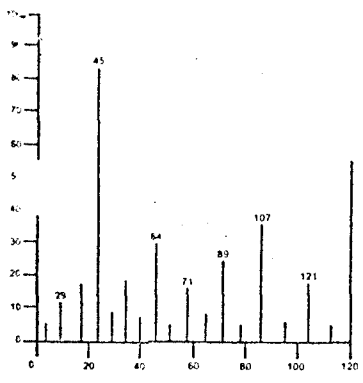
Enclosures:3

Copy work Jan 18/84

The gas trapping bottles are placed into an aluminum block heated to 175°C for 5 minutes. A gas-tight syringe with a stopcock is used to withdraw a 0.2 cc sample of the headspace gases. The sample is injected into a Hewlett-Packard 5880 Gas Chromatograph. The gases are separated on a 6' long 2 mm i.d. column of 1% SP1000 on Carbopak B (Supelco Inc.). The effluent of the GC column is split (60:40) to the 5880's Flame Ionization Detector (FID) and to a Hewlett-Packard 5970 Mass Spectrometer, respectively. The response of the FID is used to quantitate the volatile hydrocarbon gases of propane and butane. The mass spectrometer is tuned to monitor masses of carbon dioxide (CO<sub>2</sub>), carbon disulfide (CS<sub>2</sub>), carbonyl sulfide (COS), sulfur dioxide (SO<sub>2</sub>), and hydrogen sulfide (H<sub>2</sub>S). The mass spectrometer is calibrated with a standard mix of gases and the amounts of gas present in the sample bottles are calculated from the area response factors.

# EXPLORATION RESEARCH LABORATORIES

"Specialists in Vapor Phase Geochemistry"



ANALYTICAL LAB:

FIELD OFFICE:

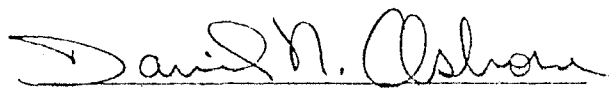
MIDECO  
420 Chipeta Way, Suite 280  
Salt Lake City, Utah 84108  
801-582-3136 • 800-453-0090

Corvallis Mail Center • Box 200  
131 North West 4th St.  
Corvallis, Oregon 97330  
503-753-4078

LABORATORY NUMBER: 50358  
SPONSOR: CANADIAN NICKEL  
TEST REQUESTED: GC/MS ANALYSIS  
IDENTIFICATION: SAMPLES INDIVIDUALLY IDENTIFIED  
STARTING DATE: 01 DEC 83  
COMPLETION DATE: 07 DEC 83  
REPORT DATE: 11 DEC 83

\*\*\*\*\*

THE ATTACHED TABLE SUMMARIZES  
THE TEST RESULTS OF THE INDIVIDUALLY  
IDENTIFIED SAMPLES FROM CANADIAN NICKEL  
LABORATORY NUMBER 50358

  
David N. Osborne  
Laboratory Director  
Trace Analysis Division

12-12-83  
Date

md

CANADIAN NICKEL CO. LTD.  
GC/MS ANALYSIS  
LAB #50358  
RAIN CLAIMS YUKON

SAMPLE	CS <sub>2</sub>	SO <sub>2</sub>	COS	CO <sub>2</sub>
SX70-501	ND	ND	ND	47
-502	ND	ND	ND	48
-503	ND	ND	ND	58
-504	ND	ND	ND	61
-505	ND	ND	ND	50
-506	ND	ND	ND	123
-507	.04	ND	TR	113
-508	ND	ND	TR	55
-509	ND	ND	ND	40
-510	ND	ND	ND	57
-511	ND	ND	ND	53
-512	ND	ND	ND	93
-513	ND	ND	ND	56
-514	ND	ND	ND	62
-515	ND	ND	ND	75
-516	ND	ND	ND	37
-517	ND	ND	ND	77
-518	6.54	.11	.81	224
-519	9.68	.25	1.78	320
-520	.47	ND	1.23	233
-521	.71	ND	1.13	227
-522	.64	.20	.40	149
-523	1.19	.20	.83	193

CANADIAN NICKEL CO. LTD.  
GC/MS ANALYSIS  
LAB #50358  
RAIN CLAIMS YUKON  
Page 3

SAMPLE	CS <sub>2</sub>	SO <sub>2</sub>	COS	CO <sub>2</sub>
SX70-524	.04	.20	1.0	182
-525	1.67	ND	.95	218
-526	.76	ND	.85	186
-527	1.14	.26	.73	256
-528	2.03	.34	1.12	248
-529	.15	ND	.45	183
-530	.01	.23	.42	167
-531	.18	ND	.24	118
-532	.34	ND	.82	195
-533	.02	.24	1.01	170
-534	.39	ND	1.15	229
-535	2.38	ND	1.43	241
-536	.93	ND	1.14	203
-537	3.71	.17	1.61	269
-538	2.66	.36	.88	377
-539	1.75	.22	1.9	273
-540	2.33	.21	1.55	273
-541	12.7	.33	6.26	263
-542	3.95	ND	2.25	314
-543	7.68	ND	2.35	337
-544	.40	ND	1.20	221
-545	.52	.20	1.47	216
-546	1.45	.25	1.76	271
-547	.082	.22	1.72	236

CANADIAN NICKEL CO. LTD.  
GC/MS ANALYSIS  
LAB #50358  
RAIN CLAIMS YUKON  
Page 4

SAMPLE	CS <sub>2</sub>	SO <sub>2</sub>	COS	CO <sub>2</sub>
SX70-548	3.40	.27	1.97.	330
-549	3.51	.16	1.89	335
-550	.20	.24	1.05	231
-551	.02	.20	.15	192
-552	11.24	ND	1.06	460
-553	5.67	.21	1.04	266
-554	3.39	ND	3.68	244
-555	2.98	ND	.44	275
-556	1.2	ND	.56	179
-557	3.01	ND	1.30	218
-558	2.64	ND	.54	205
-559	15.97	.10	5.67	236
-560	34.13	3.38	6.3	241















APPENDIX D

Rock Sample Analytical Results

## ICP GEOCHEMICAL ANALYSIS

A .500 GRAM SAMPLE IS DIGESTED WITH 3 ML OF 3:1:3 HCL TO HNO<sub>3</sub> TO H<sub>2</sub>O AT 90 DEG.C. FOR 1 HOUR. THE SAMPLE IS DILUTED TO 10 MLS WITH WATER.  
THIS LEACH IS PARTIAL FOR: Ca, P, Mg, Al, Ti, La, Na, K, W, Ba, Si, Sr, Cr AND B. Au DETECTION 3 ppm.  
AU ANALYSIS BY AA FROM 10 GRAM SAMPLE. Hg ANALYSIS BY FLAMELESS AA FROM .500 GRAM SAMPLE. SAMPLE TYPE - ROCK CHIPS

DATE RECEIVED AUG 30 1983

DATE REPORTS MAILED Sept 2/83ASSAYER D. Toye

DEAN TOYE, CERTIFIED B.C. ASSAYER

CANADIAN NICKEL PROJECT # 61013 FILE # 83-1915

PAGE # 1

SAMPLE #	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Au	Hg
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	%	%	%	%	ppm	ppb	ppb
RI-28919	2	7	19	14	.1	3	1	76	.80	31	2	ND	22	5	1	2	2	4	.02	.01	12	8	.01	93	.01	2	.26	.01	.06	2	5	50
RI-28920	2	21	16	27	.1	?	2	158	.78	66	2	ND	12	10	1	2	2	12	.04	.01	8	9	.02	278	.01	2	.26	.01	.07	2	5	70
RI-28921	1	5	15	10	.1	2	1	263	.73	7	2	ND	26	4	1	2	2	2	.01	.01	13	8	.01	50	.01	2	.18	.04	.08	2	5	30
RI-28922	1	3	16	14	.2	2	1	170	.67	46	2	ND	27	4	1	2	2	2	.01	.01	12	5	.01	29	.01	2	.28	.01	.09	2	5	20
RI-28923	6	12	19	19	.1	10	2	247	.96	42	2	ND	13	7	1	2	2	13	.04	.03	8	10	.01	217	.01	2	.24	.01	.06	2	5	10
RI-28924	19	2	18	14	.1	3	2	240	.90	21	2	ND	17	8	1	2	2	5	.02	.01	9	5	.01	147	.01	2	.26	.01	.05	2	5	80
RI-28925	1	3	10	6	.2	2	1	117	.46	89	2	ND	22	12	1	2	2	3	.01	.01	11	5	.01	43	.01	2	.29	.01	.07	2	5	180
RI-28926	2	3	11	12	.2	3	1	241	.71	454	5	ND	10	15	1	10	2	5	.03	.01	6	6	.01	183	.01	2	.25	.01	.06	2	15	100
RI-28927	1	5	12	38	.1	4	3	804	1.44	5	2	ND	27	8	1	2	2	17	.12	.04	7	8	.28	52	.03	2	.51	.05	.14	2	5	10
RI-28928	1	5	10	14	.1	4	1	252	.78	9	2	ND	34	2	1	2	2	3	.02	.01	17	9	.05	23	.01	2	.26	.04	.12	2	5	5
RI-28929	2	11	25	18	.2	3	3	591	.55	32	2	ND	12	5	1	3	2	3	.01	.01	15	7	.01	131	.01	6	.23	.01	.06	2	5	130
RI-28930	9	2	18	3	.5	2	1	72	.70	69	2	ND	12	15	1	2	2	2	.01	.01	7	6	.01	26	.01	2	.24	.01	.08	2	5	30
RI-28931	1	3	5	1	.1	2	1	61	.49	2	2	ND	2	1	1	2	2	2	.01	.01	2	8	.01	7	.01	2	.09	.03	.05	2	5	5
RI-28932	1	2	4	2	.3	2	1	55	.46	283	2	ND	2	12	1	7	2	2	.01	.01	2	8	.01	263	.01	2	.13	.01	.03	2	65	20
RI-28933	1	3	32	18	.1	3	2	570	.94	18	2	ND	27	6	1	2	2	6	.04	.02	12	7	.01	60	.01	2	.29	.02	.10	2	5	100
RI-28934	1	4	14	8	.1	2	1	98	.67	7	2	ND	26	9	1	2	2	2	.01	.01	14	5	.01	16	.01	2	.29	.01	.08	2	5	70
RI-28935	2	3	19	24	.8	3	1	101	2.60	1234	2	ND	9	38	1	34	2	7	.02	.01	5	5	.01	315	.01	3	.33	.01	.08	2	45	2400
RI-28936	7	74	15	79	.2	42	15	2405	3.65	106	2	ND	3	69	1	2	3	44	.07	.04	5	24	.05	467	.01	3	.48	.01	.13	2	5	50
RI-28937	1	2	7	3	.2	1	1	55	.38	53	2	ND	9	20	1	2	2	2	.01	.01	7	7	.01	30	.01	5	.32	.01	.03	2	5	70
RI-28938	49	26	24	90	.2	29	10	1008	3.11	24	2	ND	2	11	1	7	2	41	.01	.01	3	35	.03	468	.01	3	.32	.01	.04	2	5	110
RI-28939	2	3	11	14	.3	2	1	475	.74	266	2	ND	11	4	1	8	2	6	.01	.01	8	7	.01	124	.01	2	.22	.01	.07	2	5	40
RI-28940	2	2	25	10	.1	4	5	227	.54	22	2	ND	22	18	1	2	2	7	.03	.01	8	7	.01	52	.01	2	.41	.01	.10	2	5	110
RI-28941	1	2	4	1	.1	2	1	66	.36	243	2	ND	2	9	1	7	2	2	.01	.01	2	8	.01	242	.01	6	.20	.01	.02	2	75	10
RI-28942	3	2	11	12	.1	3	1	90	.74	23	2	ND	7	26	1	2	2	4	.01	.01	5	7	.01	273	.01	2	.24	.01	.06	2	5	140
RI-28943	1	4	19	4	.1	3	1	195	.44	10	2	ND	16	5	1	4	2	2	.02	.01	14	5	.01	113	.01	2	.29	.01	.06	2	5	70
RI-28944	1	26	9	80	.1	14	19	715	4.70	5	3	ND	2	57	1	2	2	62	.56	.17	13	10	2.18	75	.18	8	.60	.08	.11	2	5	30
RI-28945	1	40	5	62	.1	35	15	814	3.90	2	5	ND	2	120	1	2	2	85	.87	.19	14	21	1.33	94	.03	6	.87	.15	.11	2	5	5
RI-28946	1	59	17	47	.1	26	10	848	3.33	6	4	ND	3	66	1	2	2	111	.49	.24	5	72	.07	152	.04	5	.68	.01	.15	2	5	40
RI-28947	1	57	17	122	.1	51	21	262	4.14	111	3	ND	4	15	1	3	2	93	.20	.16	2	109	.08	20	.01	4	.79	.01	.09	2	5	100
RI-28948	1	130	21	133	.1	52	19	308	4.96	17	3	ND	3	18	1	2	2	152	.20	.17	2	74	.07	54	.01	5	.89	.01	.09	2	5	30
RI-28949	2	84	15	72	.1	36	13	84	3.86	142	2	ND	5	7	1	5	2	141	.02	.08	2	64	.04	12	.01	3	.55	.01	.05	2	5	100
RI-28950	1	11	8	13	.1	13	4	165	1.36	38	2	ND	2	10	1	3	2	36	.04	.03	2	11	.02	43	.01	2	.25	.01	.03	2	5	220
RI-28951	1	3	3	10	.1	8	2	84	.98	10	2	ND	2	10	1	2	2	21	.01	.01	4	9	.01	13	.01	2	.27	.01	.03	2	5	80
RI-28952	1	1	30	27	.1	13	2	437	.88	4	2	ND	5	11	1	2	2	12	.06	.01	6	11	.10	153	.01	2	.58	.01	.17	2	5	10
RI-28953	1	26	4	36	.1	18	6	578	2.30	10	18	ND	8	94	1	2	2	91	2.57	.21	15	33	1.26	53	.03	3	.64	.04	.09	2	5	5
RI-28954	1	17	6	49	.1	17	8	480	2.78	6	2	ND	8	83	1	2	2	105	1.44	.23	19	24	.68	68	.03	5	.62	.05	.12	2	5	20
RI-28955	1	15	5	54	.1	20	10	568	3.05	5	2	ND	8	48	1	2	2	106	.94	.25	20	24	.42	82	.03	6	.60	.05	.12	2	5	10
STD A-1/AU-0.5	1	30	37	185	.3	35	12	1066	2.79	10	2	ND	2	34	1	2	2	57	.56	.10	7	72	.73	277	.08	6	2.07	.02	.19	2	510	50

## CANADIAN NICKEL PROJECT # 61017 FILE # 83-1915

PAGE #

SAMPLE #	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Mu ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	R ppm	Al %	Na %	K %	W ppm	AgI ppb	HgI ppb
RI-28956	1	33	4	62	.3	409	43	726	4.59	6	9	ND	2	267	1	2	2	25	.69	.09	5	62	8.59	611	.02	24	.90	.29	.21	2	5	20
RX-28957	1	40	4	66	.3	22	20	674	4.33	9	2	ND	2	106	1	2	2	57	.74	.18	12	16	2.41	132	.11	39	.90	.14	.10	2	5	40
RX-28958	1	2	8	13	.1	3	1	39	.45	3	2	ND	4	15	1	2	2	3	.11	.04	6	6	.07	77	.01	30	.61	.01	.12	2	5	30
RX-28959	4	82	5	65	.3	16	11	508	3.62	14	2	ND	5	84	1	2	2	133	1.36	.26	24	12	.74	99	.09	37	.91	.10	.13	2	5	20
RX-28960	1	11	6	28	.2	27	6	94	2.18	33	2	ND	2	11	1	2	2	44	.01	.03	2	35	.03	31	.01	31	.29	.01	.01	2	5	50
RX-28961	1	7	4	6	.2	7	2	129	1.25	12	2	ND	2	9	1	2	2	13	.01	.01	2	8	.01	35	.01	32	.23	.01	.01	2	5	160
RX-28962	1	13	9	8	.1	8	2	67	.96	51	2	ND	2	11	1	3	2	20	.01	.01	2	11	.01	46	.01	34	.32	.01	.03	2	5	130

ACME ANALYTICAL LABORATORIES LTD. 852 E. HASTINGS, VANCOUVER B.C. PH:253-3158 TELEX:04-53124

ICP GEOCHEMICAL ANALYSIS

A .500 GRAM SAMPLE IS DIGESTED WITH 3 ML OF 3:1:3 HCL TO HNO3 TO H2O AT 90 DEG.C. FOR 1 HOUR. THE SAMPLE IS DILUTED TO 10 MLS WITH WATER.  
 THIS LEACH IS PARTIAL FOR: Ca, P, Mg, Al, Ti, La, Na, K, W, Ba, Sr, Cr AND B. Au DETECTION 3 ppb.  
 Au: ANALYSIS BY AA FROM 10 GRAM SAMPLE. Hg: ANALYSIS BY FLAMELESS AA FROM .500 GRAM SAMPLE. SAMPLE TYPE - HEAVY MINERAL

DATE RECEIVED SEPT 19 1983 DATE REPORTS MAILED Sept 22/83 ASSAYER N. Toye DEAN TOYE, CERTIFIED B.C. ASSAYER

CANADIAN NICKEL PROJECT # 61013-14050 FILE # B3-2205

PAGE # 1

SAMPLE #	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Au	Hg
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SX-070561	1	9	7	13	.1	15	6	239	2.64	6	2	ND	3	21	1	2	2	64	.47	.07	7	74	.39	658	.04	18	.27	.01	.02	2	5	50
SX-070562	1	8	7	17	.1	30	7	220	2.79	4	2	ND	4	14	1	2	2	62	.33	.05	8	64	.62	126	.03	5	.24	.01	.02	2	5	70

APPENDIX E

X-Ray Diffraction Report

INCO METALS COMPANY

R.A. Alcock

J. Roy Gordon Research Laboratory

November 15, 1983

W. O. Manson

The results of our XRD evaluation of the samples you submitted for investigation of "amount and type of clay minerals present" are presented in the attached tabulation.

RAA/rb

xc: J. F. Church

A handwritten signature or set of initials, possibly 'JF', written in dark ink.

B.C. AND YUKON GOLD EXPLORATION  
W.O. MANSON'S SAMPLES

CLAY MINERALOGY AS DETERMINED BY SEMI-QUANTITATIVE XRD ANALYSIS

<u>Sample No.</u>	<u>Location</u>	<u>CLAY MINERALS</u>			<u>OTHER</u>			
		<u>Montmorillonite</u>	<u>Kaolinite</u>	<u>Illite</u>	<u>Mica</u>	<u>Quartz</u>	<u>Feldspar</u>	<u>Dolomite</u>
RX28925	} Rainbow Zone	-	41-50	-	-	39-45	9-13	-
RX28932		-	24-31	-	-	67-79	-	-
RX28940		-	34-42	-	-	50-58	7-11	-
RX28960	- Rubble Zone	-	18-22	-	-	75-85	-	-

APPENDIX F

Fluid Inclusion Study Report

December 20, 1983

FLUID INCLUSION STUDIES OF PRECIOUS METAL PROSPECTS  
FOR CANADIAN NICKEL COMPANY LIMITED

OBJECTIVE OF STUDY: To characterize the environment of vein formation.

RESULTS: RAIN; RX28925, f.g. qtz with few small H<sub>2</sub>O incs crosscutting  
qtz w/abundant 2 phase H<sub>2</sub>O+CO<sub>2</sub> inclusions  
RAIN; RX28932, f.g. qtz with few small H<sub>2</sub>O incs  
RAIN; RX28941, f.g. qtz with few small H<sub>2</sub>O incs  
RAIN; RX28961, f.g. qtz with few small H<sub>2</sub>O incs

CONCLUSIONS: The microcrystalline to cryptocrystalline quartz and late, clear, euhedral quartz present in all other samples are typically found in epithermal ore deposits. These quartz textures are indicative of temperatures of formation <200°C.

RECOMMENDATIONS: Further fluid inclusion work on these samples is not advisable, as the general environment of formation of the prospects has been defined, and exact temperatures and salinities would not alter the general conclusions.

SUBMITTED TO: Ed Debicki  
Canadian Nickel Company Limited

SUBMITTED BY: T. James Reynolds  
FLUID INC.  
Denver, CO  
303-388-6583

Ed Debicki submitted 19 samples from various precious metal prospects for standard fluid inclusion analysis. Doubly-polished plates were prepared without subjecting the samples to temperatures exceeding room temperature during the polishing process. All plates were then surveyed to determine the types, kinds, sizes, and relative abundances of fluid inclusions present.

Most of the samples contain very few, very small (<1.5µm) H<sub>2</sub>O fluid inclusions in quartz of different varieties. Textures of quartz (microcrystalline, cryptocrystalline, amorphous, and drusy) in these samples are common in the epithermal environment. It is probable (based on experience) that the quartz of these samples grew from dilute fluids at low temperatures (<200°C), but this conclusion would be very costly to prove because of the paucity and size of inclusions present.

One sample from the Rain property (RX 28925) contains early quartz with abundant H<sub>2</sub>O-CO<sub>2</sub> inclusions, crosscut by later quartz with few small H<sub>2</sub>O inclusions. This is indicative of quartz of vastly different origins in the same prospect; a fact which may be important in deciphering the geologic history and in understanding the presence of any precious metal geochemical anomalies.

APPENDIX G

List of Personnel

Personnel employed during the course of the work covered by this report.

<u>Name</u>	<u>Address</u>
W. O. Manson	19 Market Street Copper Cliff, Ontario POM 1N0
G. A. Sorensen	111 Sauger Thompson, Manitoba R8N 1B5
J. Roque	365 Janet Street Sudbury, Ontario P3B 2Z7
D. Rupoli	Married Students Residence Laurentian University Sudbury, Ontario
C. Bell	574 Patricia Drive Oakville, Ontario L6K 1M2
D. Walsh (Drafting)	Calford Street Naughton, Ontario

APPENDIX H

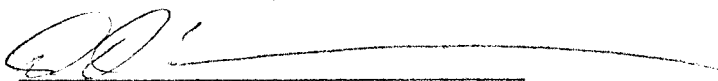
Certificate of Qualifications

Certificate of Qualifications

I, WAYNE O. MANSON, of the City of Sudbury, in the Province of Ontario,  
HEREBY CERTIFY:

1. That I reside at 19 Market Street, Copper Cliff, Ontario,  
POM INO
2. That I am a graduate of the University of Saskatchewan, Saskatoon,  
Saskatchewan, with a degree of Bachelor of Science (Advanced) (1974).
3. That I am a Project Geologist with the Canadian Nickel Company Limited,  
(subsidiary of Inco Limited) of Copper Cliff, Ontario, POM INO.
4. That I have practised my profession as a geologist since 1974, having  
worked in Ontario, Quebec, Saskatchewan, British Columbia, the Northwest  
Territories and the Yukon Territory.
5. That I visited the areas discussed in this report and that the work  
described in this report was carried out under my supervision.
6. That I am a member of the Canadian Institute of Mining and Metallurgy.

Dated at Copper Cliff, Ontario, this 24 day of January, 1984.



WAYNE O. MANSON

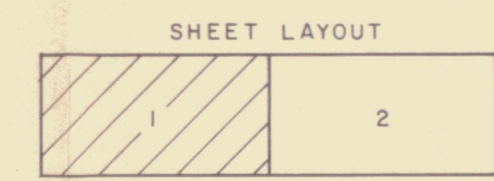
APPENDIX I

Statement of Expenditures

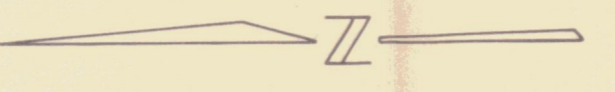
RAIN CLAIMS 1-48

Statement of Expenditures, July 19 - August 9, 1983

<u>General</u>		
Salaries & Fringes	780.00	
Personnel Expenses	486.00	
Misc. Supplies, Services & Rentals	<u>355.00</u>	\$ 1,621.00
<u>Geological Surveys</u>		
Salaries & Fringes	10,417.00	
Personnel Expenses	817.00	
Transportation (Helicopter & Truck)	4,802.00	
Supplies & Equipment	667.00	
Analytical Services	649.00	
Drafting Services	<u>797.00</u>	18,149.00
<u>Geophysical Surveys</u>		
Salaries & Fringes	2,679.00	
Personnel Expenses	586.00	
Transportation (Helicopter & Truck)	3,443.00	
Supplies & Equipment	478.00	
Drafting Services	<u>571.00</u>	7,757.00
<u>Geochemical Surveys</u>		
Salaries & Fringes	789.00	
Personnel Expenses	138.00	
Transportation (Helicopter & Truck)	815.00	
Supplies & Equipment	113.00	
Analytical Services	1,165.00	
Drafting Services	<u>135.00</u>	<u>3,155.00</u>
Field Cost Sub-Total		\$30,682.00
Overhead @ 10% of Field Cost		<u>3,068.00</u>
Grand Total		\$33,750.00

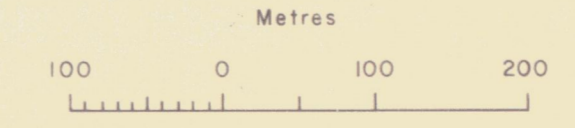
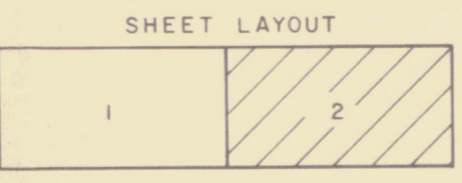


Canadian Nickel Company Limited		Copper Cliff, Ontario POM 1NO	
TOPOGRAPHY and ALTIMETER SURVEY			SHEET 1
Project: PRIMROSE (Rain Claims)		Area: MOUNT PITTS	
Supervisor: E. J. Debicki	Instrument:	Survey date: July - Aug. 1983.	
Compiled by: C. Bell	Drawn by: D. W. Walsh	Date drawn: November, 1983.	Revised:
Scale: 1:5000	File: 091530	NTS 115 1 5 B 12	

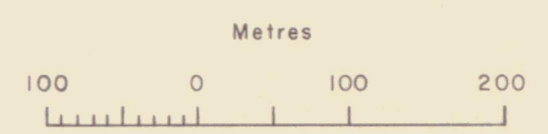
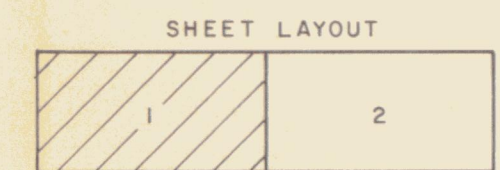
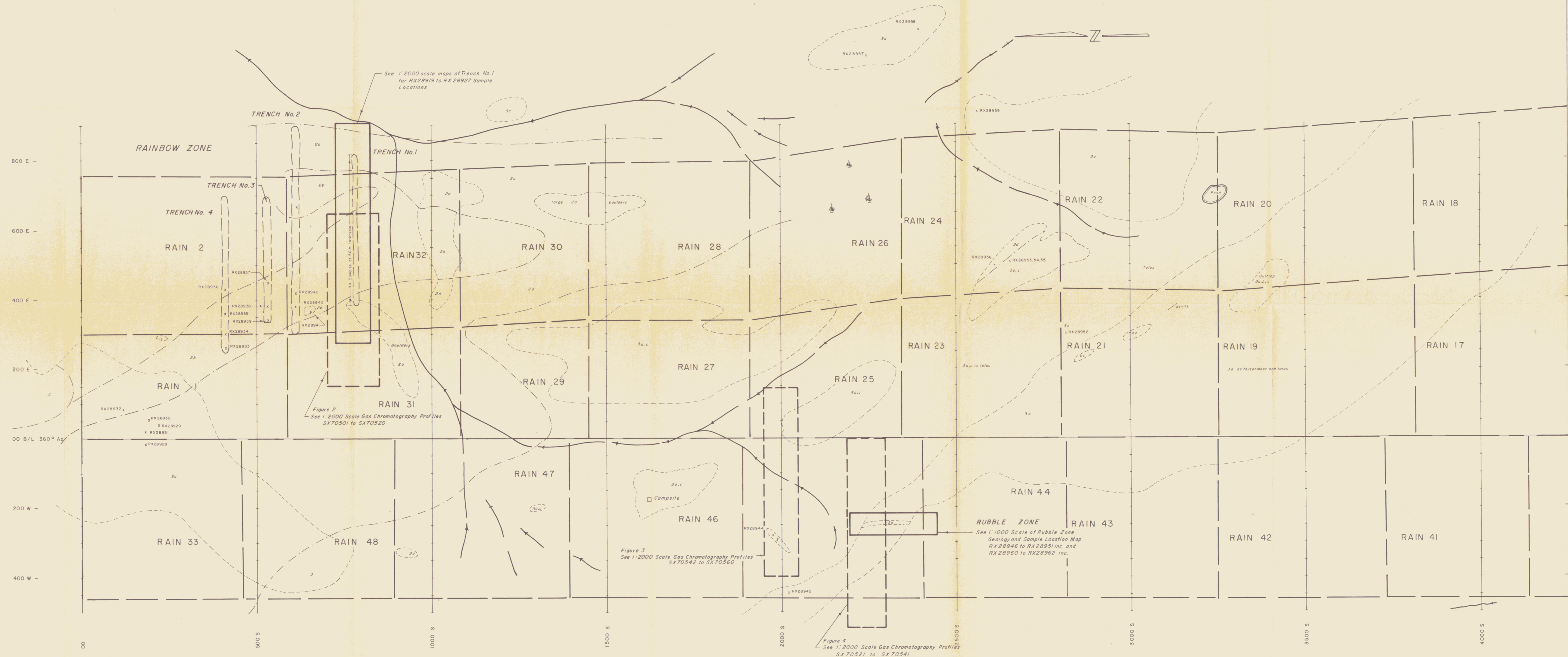


**LEGEND**

- Direction and Degree of Slope
- Stream Showing Direction of Flow
- Intermittent Stream Showing Direction of Flow
- Swampy or Marshy Ground
- Elevation Shown in Metres



Canadian Nickel Company Limited		Copper Cliff, Ontario POM 1NO	
TOPOGRAPHY and ALTIMETER SURVEY		SHEET	FIGURE
Project PRIMROSE (Rain Claims)		Area MOUNT PITTS	
Supervisor E. J. Debicki	Instrument	Survey date July - Aug, 1983.	
Compiled by C. Bell	Drawn by D. W. Walsh	Date drawn November, 1983	Revised
Scale 1:5000	File <b>OP 1 # 30</b>	NTS 115 1 5 8 12	



Canadian Nickel Company Limited		Copper Cliff, Ontario POM 1NO	
GEOLOGICAL SURVEY		SHEET	FIGURE
		I	1
Project PRIMROSE (Rain Claims)		Area MOUNT PITTS	
Supervisor E. J. Debicki	Instrument	Survey date July - Aug, 1983.	
Compiled by W. O. Manson	Drawn by D. W. Walsh	Date drawn November, 1983	Revised
Scale 1:5000	File 091530	NTS 115 1 5 8 12	

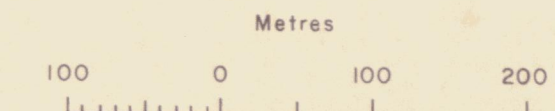
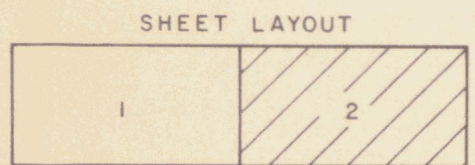


**LEGEND**

- EOCENE or YOUNGER**
- 3** CARMACKS GROUP
- 3 Undivided tuffs and flows
  - 3a Ash flow tuff. Brown-pink, fine grained, clastic, rare flow texture.
  - 3b Lapilli tuff. Black to brown, ash tuff with lapilli size rock fragments and phenoclasts of pyroxene to 5mm.
  - 3c Welded ash tuff. Brown-pink, fine grained, flow banded.
  - 3d Plinian airfall tuff. Phenoclasts of pyroxene 5-8 mm and subrounded to angular rock clasts to 5cm in mafic ash tuff matrix, locally graded.
  - 3e Hydrothermal Zone: Brecciated, argillized and silicified ash tuff. Chaledonic quartz veins and masses as open space fillings.
- Unconformity
- TRIASSIC**
- 2** KLOTASSIN BATHOLITH:
- 2a Quartz monzonite. Pink, medium grained equigranular, massive. Some late stage quartz veins.
  - 2b Hydrothermal Zone: Brecciated, argillized and silicified. Locally abundant clay and banded chaledonic quartz.
- Intrusive contact
- PROTEROZOIC / PALEOZOIC**
- 1** Yukon Metamorphic Complex: Quartzite, mica schists and amphibole gneisses of regionally metamorphosed sediments.

**SYMBOLS**

- x R123456 Rock Sample Location and Number
- x JR 40 Reference Sample Location and Number
- Limits of Area of Outcrop and/or Felsenmeer
- Geological Contact Inferred
- Trench No. Bulldozer Trench



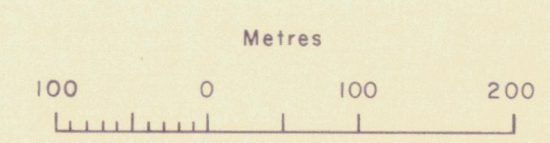
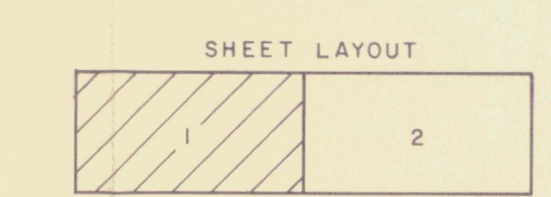
Canadian Nickel Company Limited		Copper Cliff, Ontario POM 1NO	
GEOLOGICAL SURVEY		SHEET	FIGURE
		2	
Project PRIMROSE (Rain Claims)		Area MOUNT PITTS	
Supervisor E. J. Debicki	Instrument	Survey date July-Aug, 1983.	
Compiled by W. O. Manson	Drawn by D. W. Walsh	Date drawn November, 1983	Revised
Scale 1:5000	File 091530	NTS 115 1 5 8 12	



800 E -  
600 E -  
400 E -  
200 E -  
00 B/L 360° Az  
200 W -  
400 W -

0 500 S 1000 S 1500 S 2000 S 2500 S 3000 S 3500 S 4000 S

RX 28950 Rock Sample Location and Number  
 \* 5/0 1/10/5/6/5 \* 5/0 1/10/5/6/5  
 # (ppb)/Ag (ppm)/Hg (ppb)/As (ppm)/Cu (ppm)/Pb (ppm)



Canadian Nickel Company Limited		Copper Cliff, Ontario POM 1NO	
ROCK SAMPLE ASSAYS			SHEET 1
Project PRIMROSE (Rain Claims)		Area MOUNT PITTS	
Supervisor E. J. Debicki	Instrument	Survey date July - Aug, 1983.	
Compiled by W. O. Manson	Drawn by D. W. Walsh	Date drawn November, 1983	Revised
Scale 1: 5000	File 091530	NTS IIS 1 5 8 12	

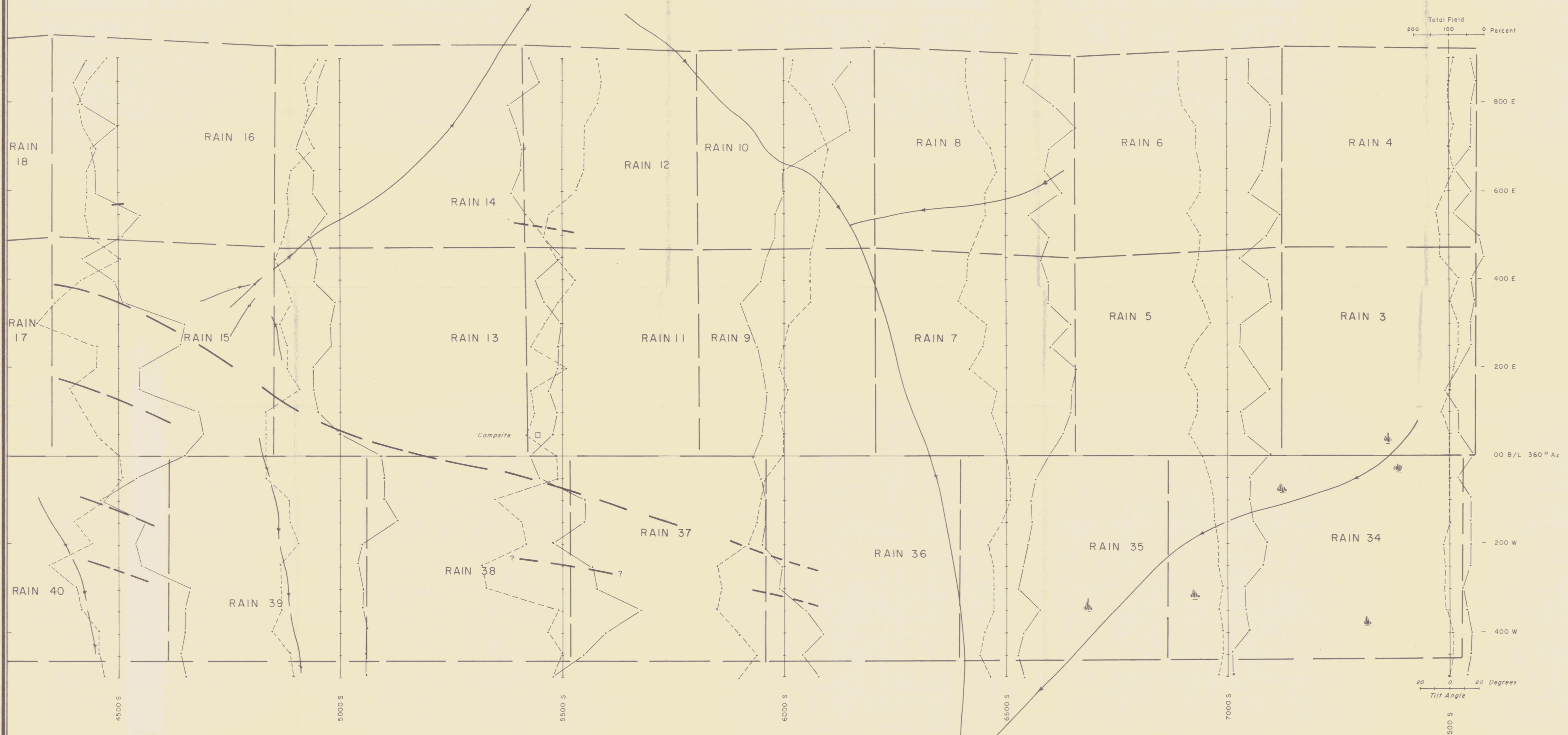
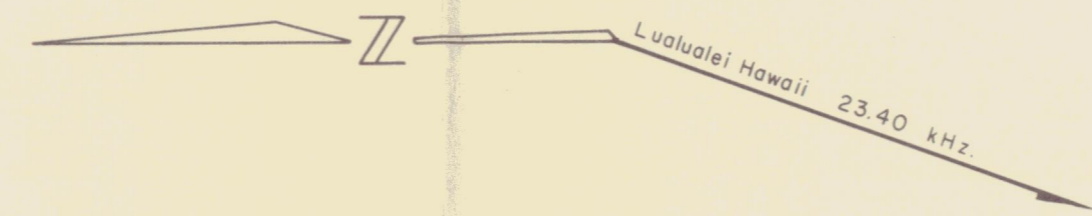


RX28950 Rock Sample Location and Number  
 5/0/10/6/4/5 Cu(ppm)/Ag(ppm)/Hg(ppm)/Pb(ppm)/Zn(ppm)

Canadian Nickel Company Limited		Copper Cliff, Ontario POM 1NO	
ROCK SAMPLE ASSAYS			SHEET 2
Project PRIMROSE (Rain Claims)		Area MOUNT PITTS	
Supervisor E. J. Debicki	Instrument	Survey date July - Aug, 1983.	
Compiled by W.O. Manson	Drawn by D.W. Walsh	Date drawn November, 1983	Revised
Scale 1:5000	File 091530	NTS IIS 1 5 B 12	



Canadian Nickel Company Limited		Copper Cliff, Ontario	
ELECTROMAGNETIC SURVEY		SHEET	FIGURE
Project: PRIMROSE (Rain Claims)		Area: MOUNT PITTS	
Supervisor: E. J. Debicki	Instrument: Radem V.L.F. E.M.	Survey date: July - Aug, 1983.	
Compiled by: C. Bell	Drawn by: D. W. Walsh	Date drawn: November, 1983	Revised:
Scale: 1:5000	File: 091530	NTS 115 1 5 & 12	



**LEGEND**

Tilt Angle in Degrees 1 cm = 10°

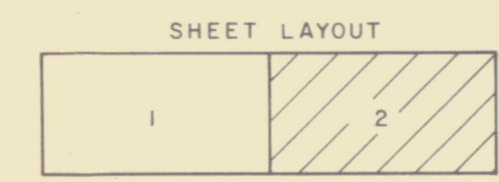
Total Field Strength in Percent 1 cm = 50%

**CONDUCTOR CLASSIFICATION**

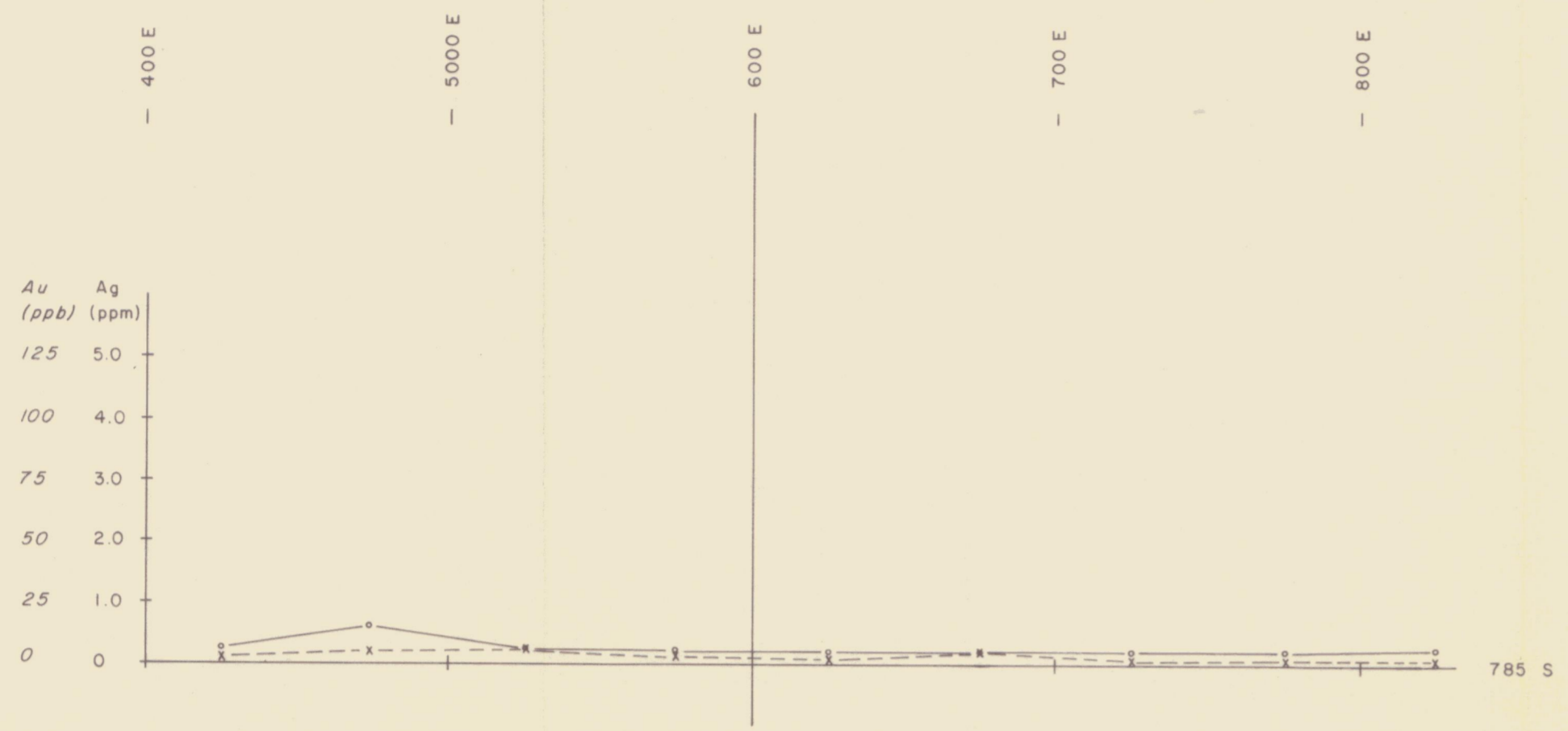
— Strong

--- Medium

--- Weak

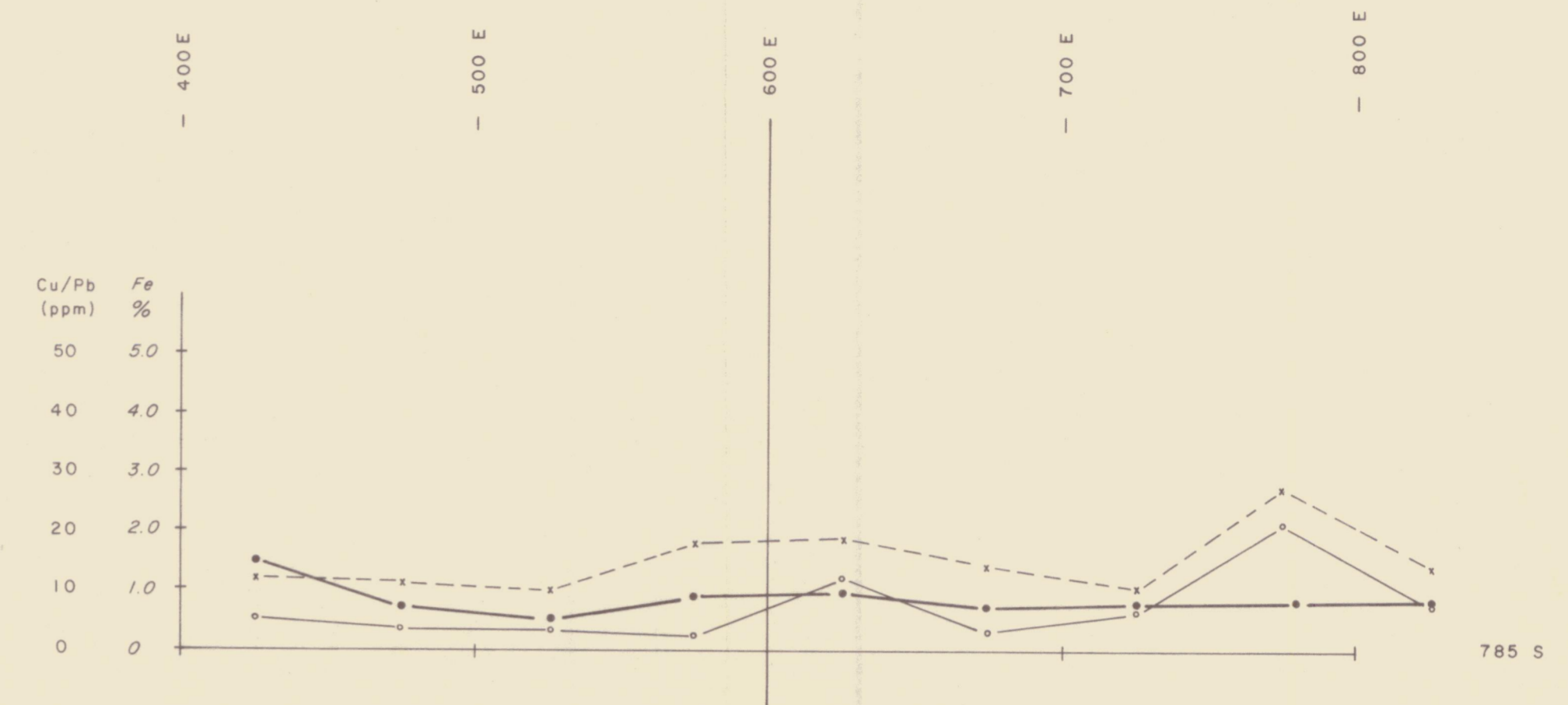


Canadian Nickel Company Limited		Copper Cliff, Ontario	
ELECTROMAGNETIC SURVEY		SHEET	FIGURE
		2	
Project PRIMROSE (Rain Claims)		Area MOUNT PITTS	
Supervisor E. J. Debicki	Instrument Rodem V.L.F. EM	Survey date July - Aug, 1983.	
Compiled by C. Bell	Drawn by D. W. Walsh	Date drawn November, 1983	Revised
Scale 1:5000	File 091530	NTS 115 1 5 8 12	



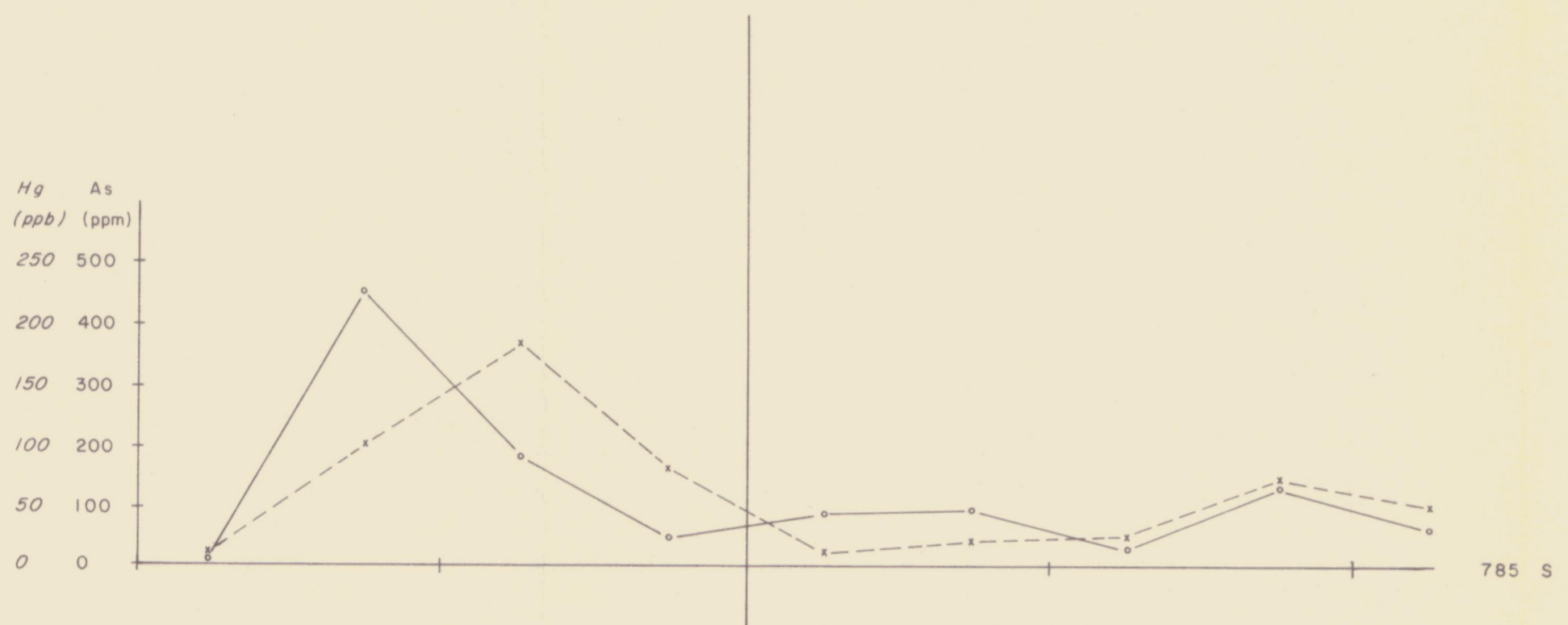
○ — Au profile in ppb  
 x - - - Ag profile in ppm

*Au, Ag Profiles*



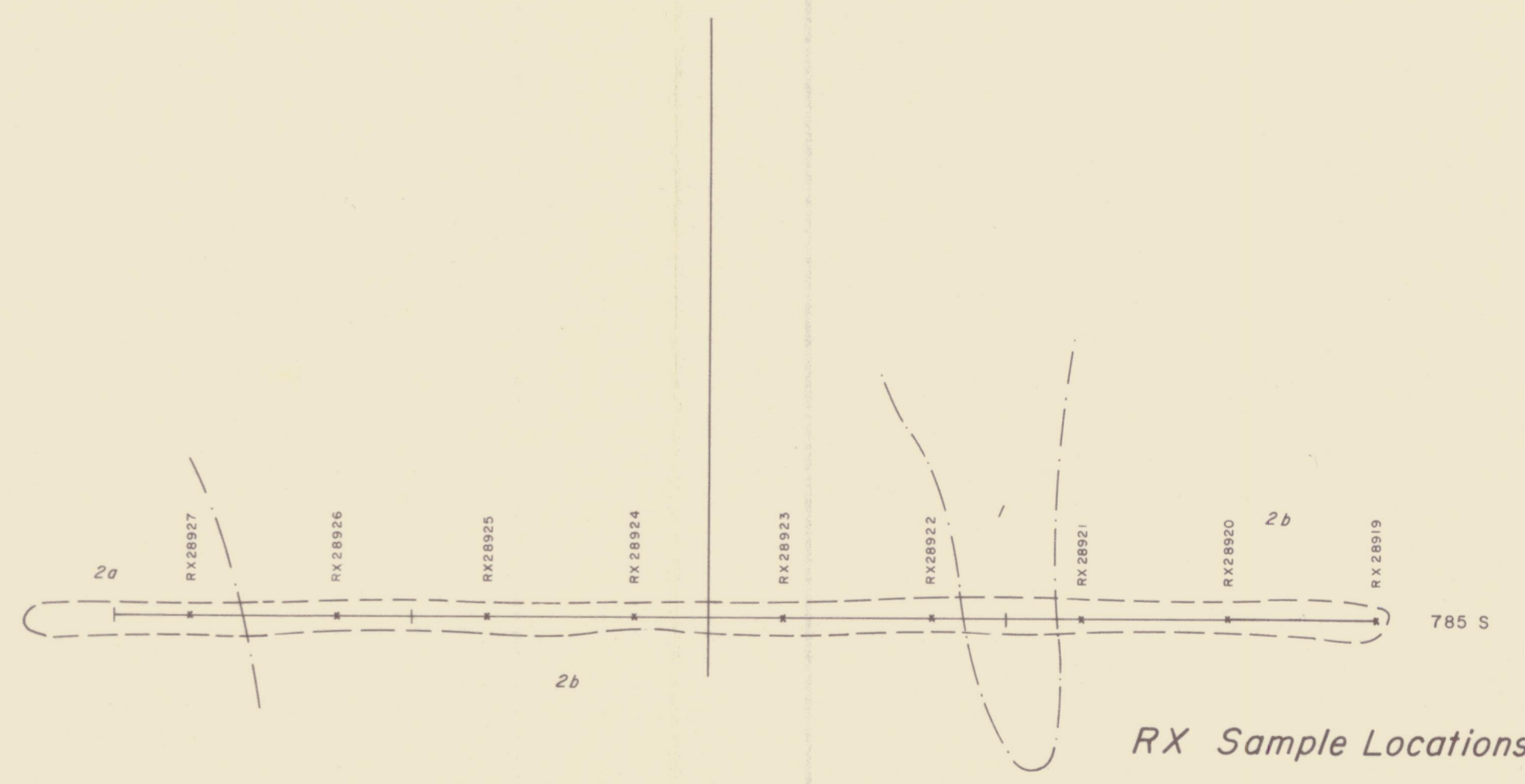
○ — Cu profile in ppm  
 x - - - Pb profile in ppm  
 ● — Fe profile in %

*Cu, Pb, Fe Profiles*



○ — As profile in ppm  
 x - - - Hg profile in ppb

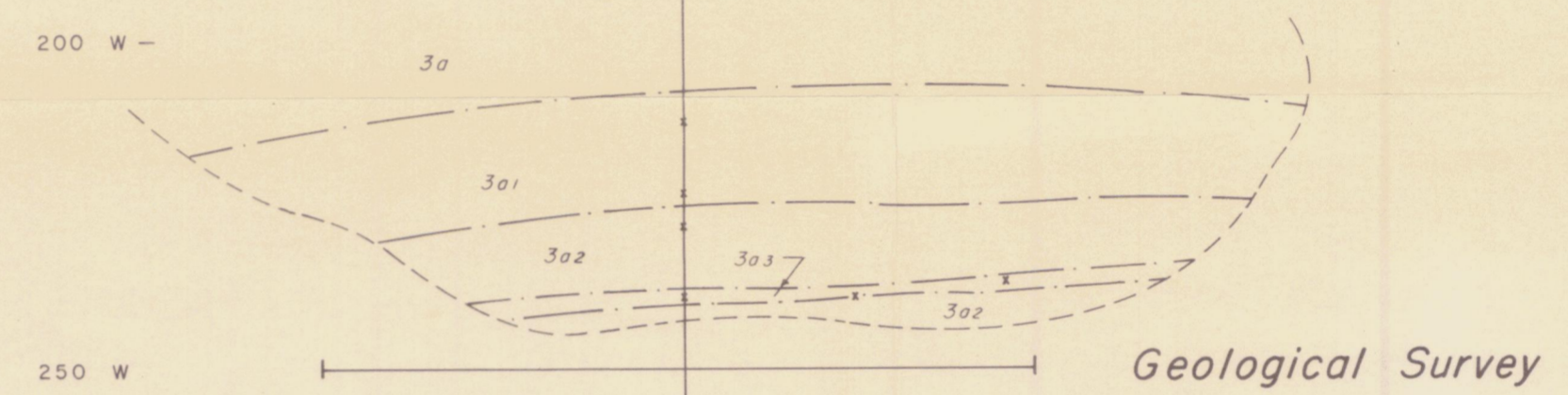
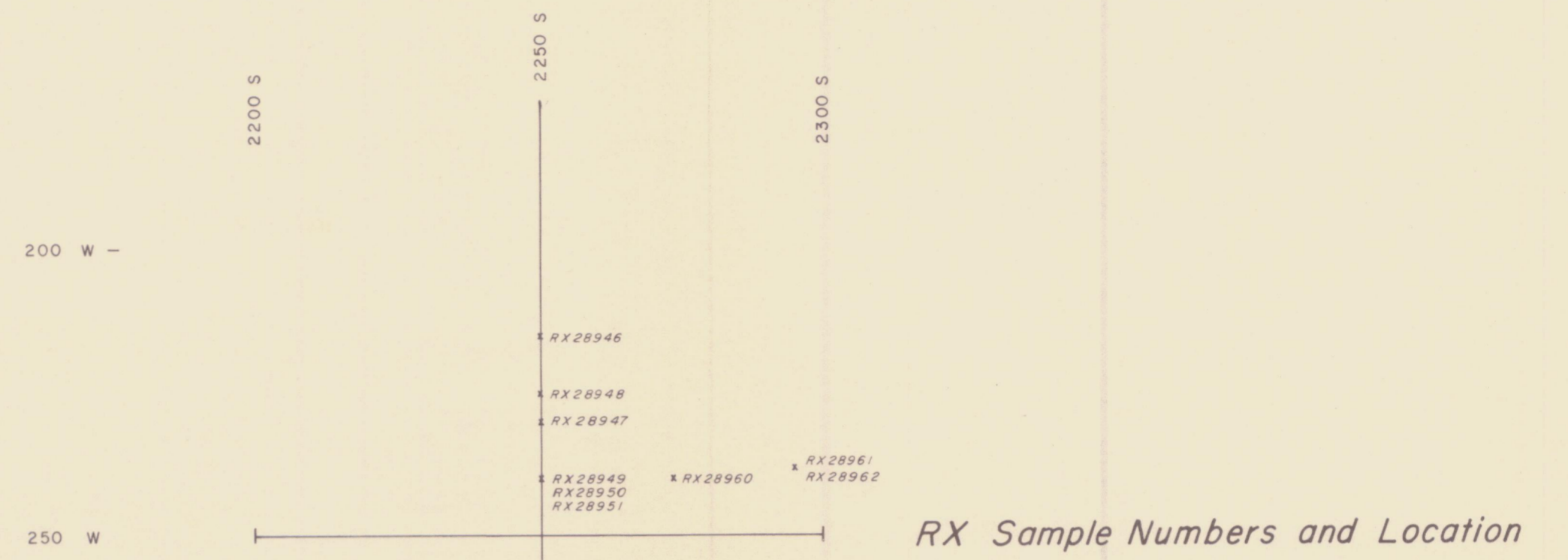
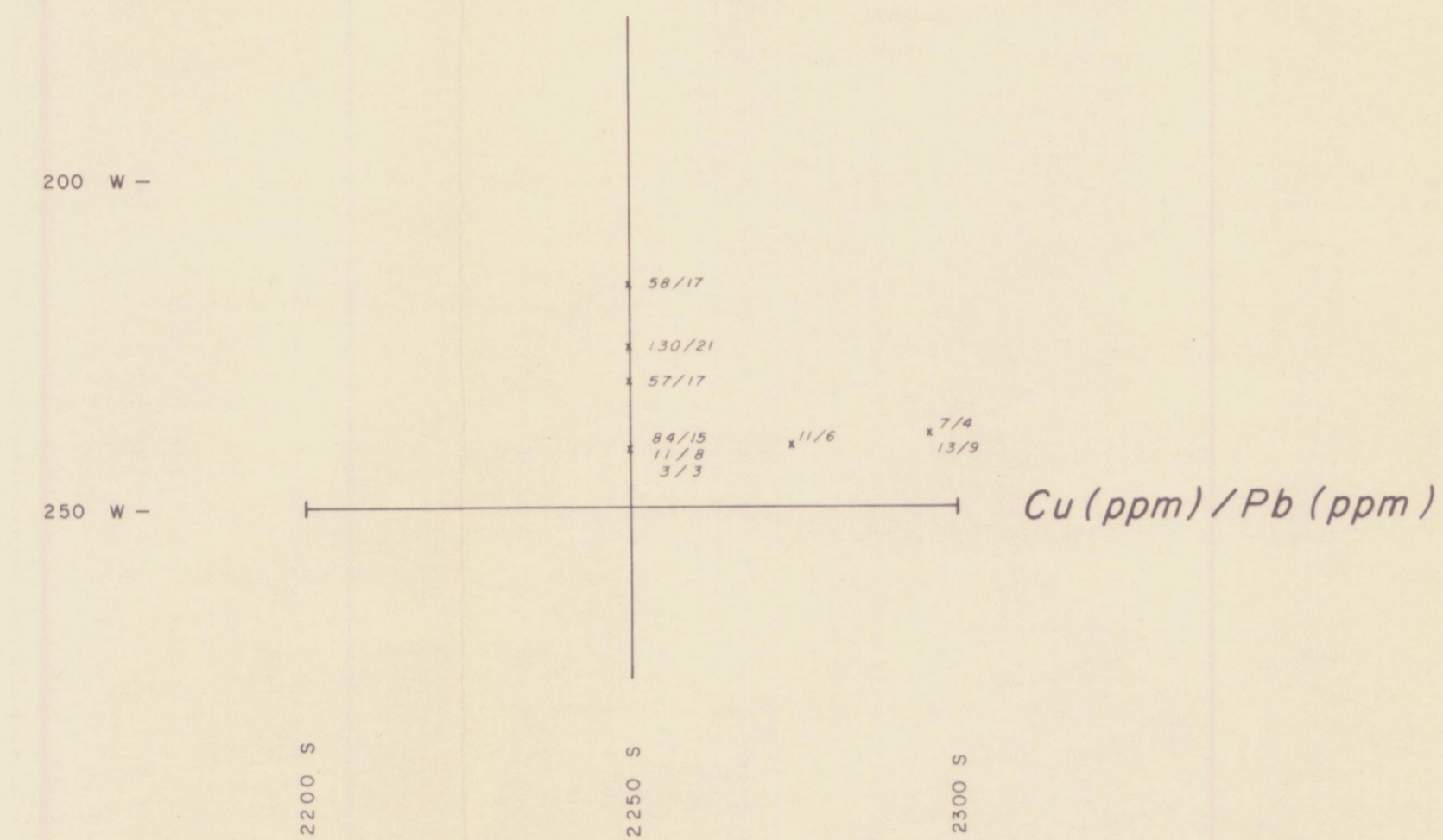
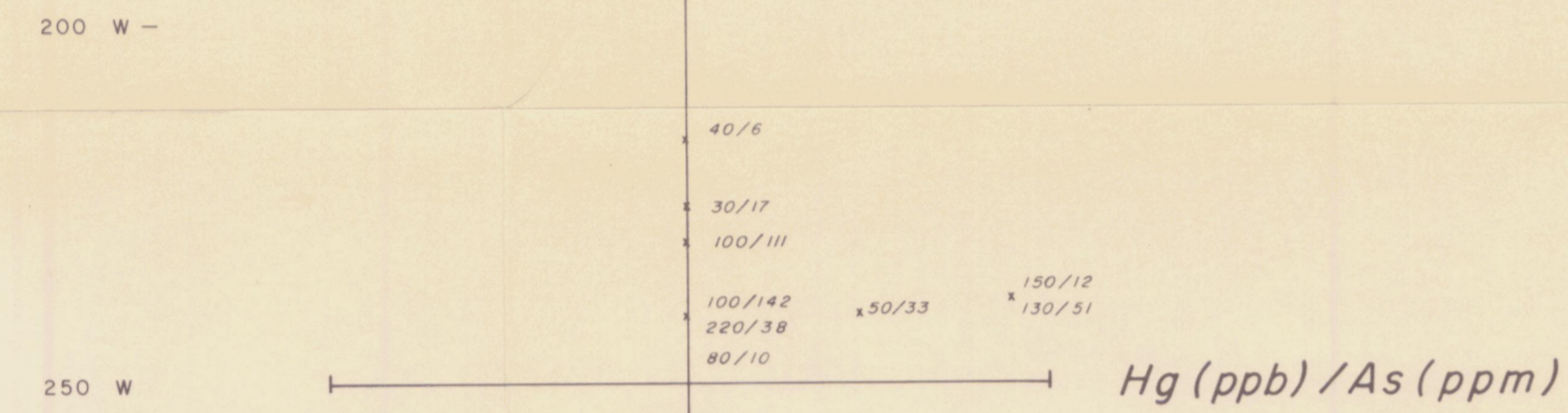
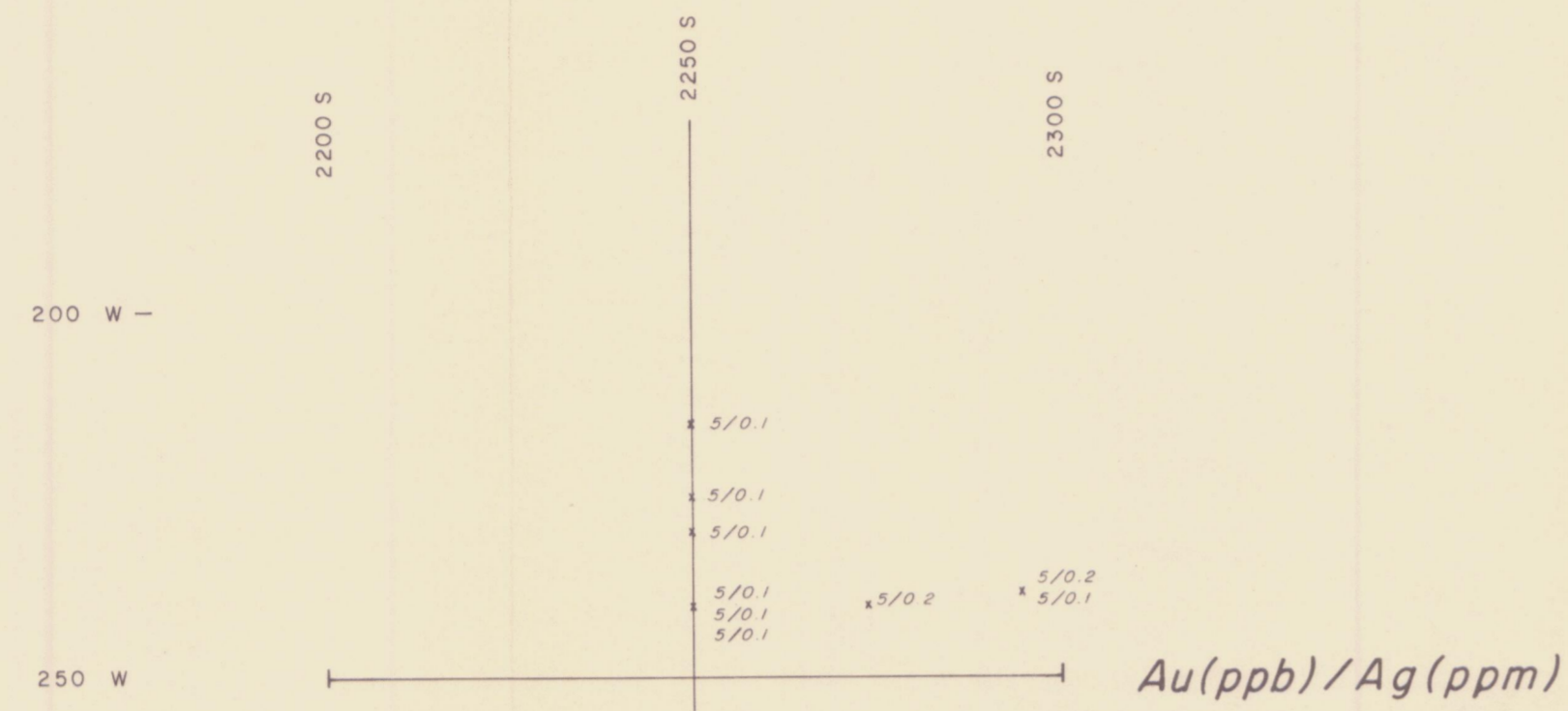
*As, Hg Profiles*



See 1:5000 scale Geology Map for Legend

*RX Sample Locations*

Canadian Nickel Company Limited		Copper Cliff, Ontario POM 1NO	
RAINBOW ZONE Trench No. 1		SHEET	FIGURE
Project: PRIMROSE (Rain Claims)		Area: MOUNT PITTS	
Supervisor: E. J. Debicki	Instrument:	Survey date: July - Aug, 1983.	
Compiled by: W. O. Manson	Drawn by: D. W. Walsh	Date drawn: November, 1983	Revised:
Scale: 1:2000	File: 091530	N.T.S. 115 1 5 & 12	



**LEGEND**

- 3a Carmack Group ash flow tuff as in Legend of 1:5,000 scale geology map.
- 3a1 Limonite facies of the hydrothermal (epithermal) altered unit 3a.
- 3a2 Clay facies of the hydrothermal (epithermal) altered unit 3a.
- 3a3 Brecciated, ± quartz veins, ± chalcedony, ± clay, ± basement fragments hydrothermal (epithermal) vent fracture within unit 3a.



Canadian Nickel Company Limited		Copper Cliff, Ontario POM INO	
RUBBLE ZONE		SHEET	FIGURE
Project: PRIMROSE (Rain Claims)		Area: MOUNT PITTS	
Supervisor: E. J. Debicki	Instrument:	Survey date: July - Aug, 1983	
Compiled by: W. O. Manson	Drawn by: D. W. Walsh	Date drawn: November, 1983	Revised:
Scale: 1:1000	File: <b>091530</b>	N.T.S. 115   58 12	