

827171

1988 EXPLORATION PROGRAM

FORDING COAL LEASE

MT. SICKER PROPERTY

Victoria Mining Division

NTS 92 B/13W

48° 59' Latitude, 123° 51' Longitude

G. S. Wells  
Minnova Inc.  
Vancouver, B.C.  
January 24, 1989

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1. Introduction

This report summarizes the 1988 exploration program on the Fording Coal Lease area which encompasses part of Minnova's Mt. Sicker property. Twenty-one diamond drill holes totalling 7091.3 meters were completed. In addition, a CSAMT test survey was carried out over 4 widely spaced, north-south oriented lines.

a. Location and Access

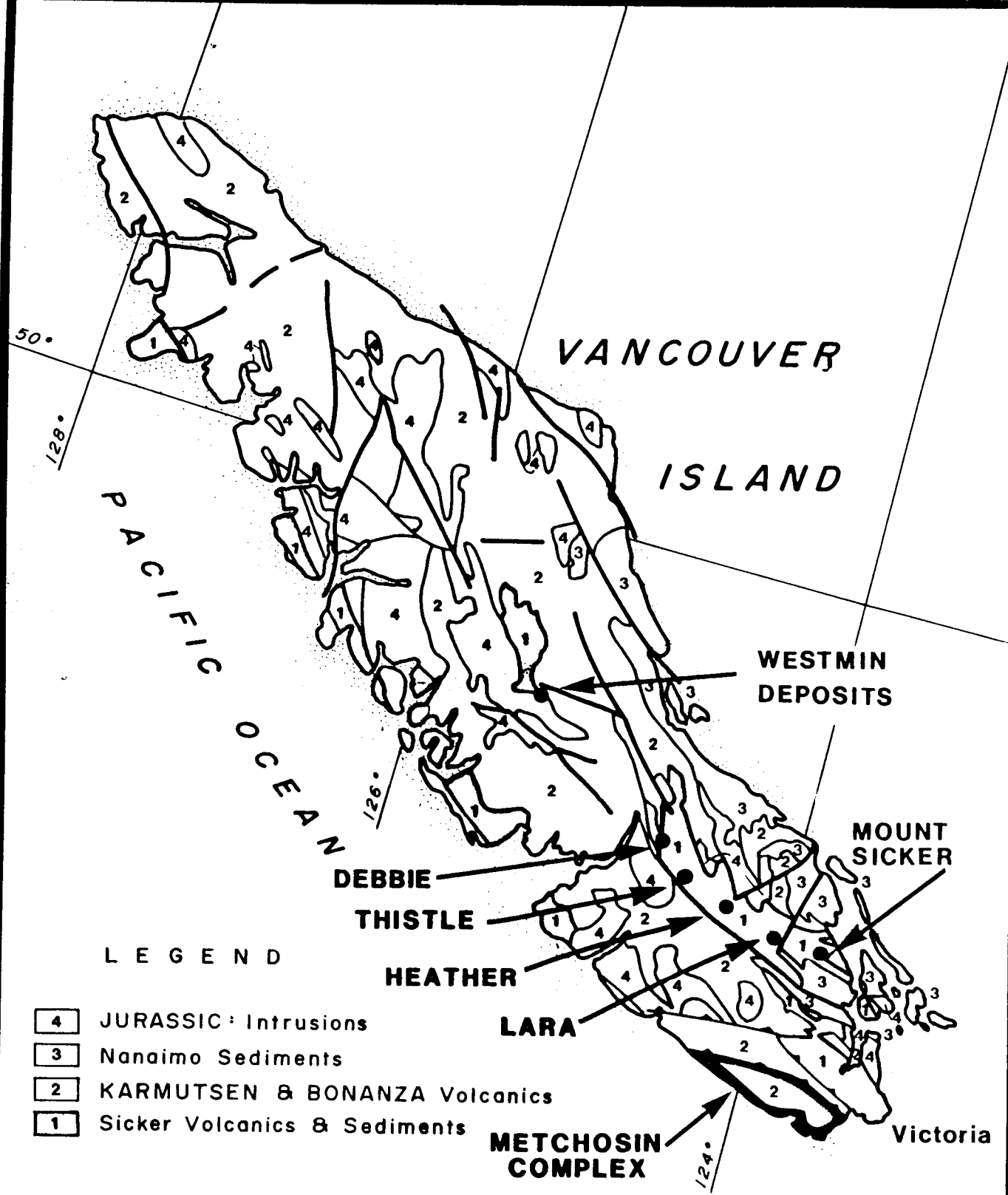
The Mt. Sicker property is located 40 km and 10 km north of Victoria and Duncan respectively (Figure 1). An extensive system of logging roads from the Island Highway provides excellent access to the property. Topographic relief is moderate with elevations ranging from 150 to 700 meters above sea level. The property is covered by a mixed forest of Douglas fir, alder and cedar. Active logging is currently underway in several parts of the property.

b. Property Status

Minnova's Mt. Sicker property consists of 4 contiguous options (Postuk-Fulton, Peppa, Lieberman and Canamera Options) and Minnova claims for a total of 213 units. The ground leased for base metal rights from Fording Coal is located on precious metal mineral claims optioned from Peppa Resources, Postuk-Fulton and Canamera (Figure 2).

c. History

Two former producers - the Lenora and Tyee mines occur on the Mt. Sicker property. These deposits were discovered in 1898 and were largely mined out by 1909 although they were worked periodically until 1947. A total of 300,000 tons grading 3.31% Cu,



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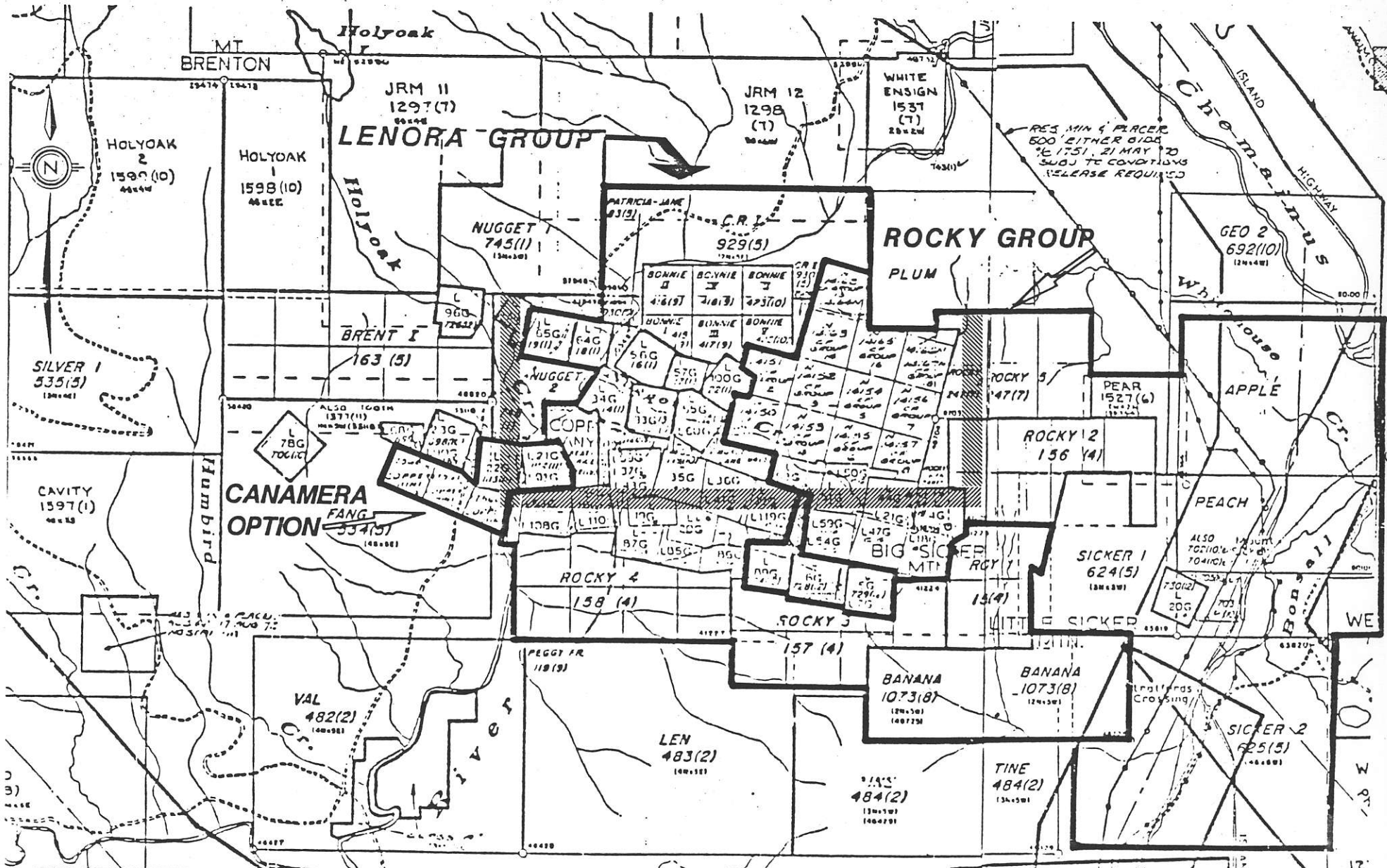
- 4 JURASSIC Intrusions
- 3 Nanaimo Sediments
- 2 KARMUTSEN & BONANZA Volcanics
- 1 Sicker Volcanics & Sediments

VANCOUVER ISLAND

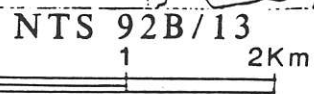
GEOLOGY

SCALE: 1:2,000,000

MINNOVA



 FORDING COAL LEASE BOUNDARY



**MT. SICKER PROPERTY  
CLAIM MAP**

**MINNOVA**

1:50,000

7.5% Zn, 2.75 oz/ton Ag and 0.13 oz/ton Au were recovered from these 2 mines. Recent exploration on the property has been done by Duncanex, Mt. Sicker Mines and Serem in the vicinity of the former mines and the Postuk-Fulton and NE Copper showings.

## 2. Geology

### a. Regional Geology

The Mt. Sicker property is located in the Cowichan-Horne Lake uplift which is one of 3 fault-bounded areas that expose the Paleozoic Sicker Group on Vancouver Island (Figure 1). Muller (1980) subdivided the Sicker Group as follows, in order of increasing age:

1. Buttle Lake Formation - consists of recrystallized crinoidal limestone interbedded with calcareous siltstone and chert.
2. Sediment - Sill Unit - thinly bedded to massive argillite, siltstone and chert interlayered with diabase sills.
3. Myra Formation - basic to rhyodacitic banded tuff, breccia and lava with interbedded argillite, siltstone and chert.
4. Nitinat Formation - basaltic lavas and agglomerates with minor to massive banded tuff layers.

Cretaceous sediments of the Nanaimo Group unconformably overly the Sicker Group; the contact is commonly marked by a basal conglomerate containing volcanic fragments derived from the Sicker Group.

b. Geology of the Mt. Sicker Property

The Mt. Sicker property is underlain by Sicker Group volcanic rocks, Nanaimo Group sediments and flat-lying dioritic intrusions of possible Triassic age (Figure 3). The Sicker Group can be subdivided into the Myra and Nitinat formations. The Myra formation, which outcrops in the central part of the property, consists of thick units of felsic pyroclastics and flows with minor ash, argillaceous sediments and cherts. The Nitinat formation is restricted to the east end of the property and is well exposed along the Island Highway. The formation consists of epidotized pyroxene and/or plagioclase porphyritic andesitic-basaltic flows, flow breccias and debris flows.

The Lenora-Tyee massive sulphide deposits are hosted in felsic volcanics of the Myra formation. They are considered to be the stratigraphic equivalent of Westmin's Myra-Lynx-Price ore bodies.

The structure of the Mt. Sicker property is dominated by a large asymmetric, west-northwesterly trending, shallow west-plunging anticline. The fold axis is interpreted to lie 300 m north of the Lenora-Tyee deposits. The axial plane of the anticline is reflected by a pervasive moderately to intensely developed, vertically dipping foliation. Small drag folds associated with the Mt. Sicker anticline occur at NE Copper and Lenora-Tyee.

3. Work Completed

Twenty-one diamond drill holes totalling 7,091.3 meters were completed on the Fording Coal lease area in 1988. Lithogeochemical samples were taken routinely throughout the holes and analyzed for major and trace elements ( $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{CaO}$ ,  $\text{Na}_2\text{O}$ ,  $\text{K}_2\text{O}$ ,  $\text{MgO}$ ,  $\text{MnO}_2$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Pb}$ ,  $\text{Ba}$ ,  $\text{Cu}$ ,  $\text{Zn}$ ,  $\text{Sr}$ ,  $\text{Zr}$ ,  $\text{Sb}$ ,  $\text{As}$ ,  $\text{Au}$ ) using ICP and atomic absorption techniques at Min-En Laboratories

Table 1. Summary of Drilling Data - Fording Coal Lease Area

Area	Hole #	Location	Azimuth	Collar Dip	Final Depth (m)
1. Canamera	CM-7	14+48W; 7+00S	20	-45	194.8
	CM-8	15+52W; 6+72S	20	-45	227.1
	CM-9	14+96W; 4+40S	20	-45	150.9
	CM-10	13+20W; 7+40S	20	-45	190.7
2. Key City	MTS-23D*	8+61W; 7+30S	360	-50	399.3
	MTS-58	8+85W; 4+55S	180	-45	346.6
	MTS-59	8+85W; 4+55S	180	-90	352.7
	MTS-60	7+58W; 6+00S	180	-60	278.9
3. Lenora-Tyee	MTS-52	4+27E; 9+50S	360	-65	477.0
	MTS-53	2+03W; 9+47S	360	-60	324.9
	MTS-54	1+14W; 9+90S	360	-55	351.9
	MTS-55	0+90E; 9+50S	4	-53	328.0
	MTS-56	0+90E; 9+50S	4	-68	401.7
	MTS-57	1+83E; 9+30S	360	-65	354.8
4. Mona	MTS-48	9+70E; 10+30S	20	-70	549.6
	MTS-49	8+16E; 8+35S	360	-90	471.5
	MTS-41D*	9+02E; 9+37S	360	-90	596.5
	MTS-62	9+38E; 10+80S	20	-75	587.0
	MTS-65	11+10E; 8+65S	20	-80	502.6
5. Other	MTS-50	7+35E; 6+05S	30	-55	190.8
	MTS-51	12+96E; 1+74S	200	-55	192.1

\* holes were deepened in 1988 : MTS-23 deepened by 200.3 m  
: MTS-41 deepened by 417.6 m



in Vancouver. Mineralized sections were analyzed for Cu, Zn, Ag, Au, Ba. The drill core is stored at 6722 Lakes Road, Duncan, B.C.

A CSAMT (controlled source audio-magnetic telluric) survey was carried out over 4 north-south oriented lines spaced at wide intervals across the Mt. Sicker property. Approximately 7.7 km of this survey was done on the Fording Coal lease area.

4. Drill Hole Summary and Results

Drill hole locations are given in Table 1 and shown in plan view in Figure 3. A summary log for each hole is presented below. Holes are grouped as per area of drilling.

a. Canamera

Four holes were drilled on the Victoria claim of the Canamera option in 1988. Holes CM-7, 8 and 10 tested a VLF anomaly associated with the Victoria shaft showing. Pyritic argillites and coarse-grained pyritic stringers were intersected but metal values of these zones are low. Hole CM-9 tested a weak VLF anomaly associated with Ba and Zn-enriched felsic tuffs which are located 100 to 150 meters north of the Victoria shaft. Although there was sufficient disseminated pyrite to explain the VLF anomaly, no zones of economic mineralization were intersected.

CM-7 - Victoria Shaft

0 - 9.1	Overburden
9.1 - 49.7	Intermediate Tuff: weak - moderate chlorite 43.3 - 46.6 Felsic Ash: moderate sericite 46.6 - 47.1 Andesitic Ash: moderate chlorite
49.7 - 57.8	Felsic Ash: moderate sericite
57.8 - 61.4	Intermediate Ash: weak - moderate chlorite, weak sericite

61.4 - 66.0	Andesitic Tuff, Crystal Tuff: weak - moderate chlorite
66.0 - 80.2	Intermediate to Felsic Ash: weak chlorite, weak sericite 73.2 - 73.6: 70% py 73.8 - 74.35: 85% py
80.2 - 87.2	Andesitic Crystal Tuff
87.2 - 89.0	Intermediate Tuff: 2 - 3% py
89.0 - 95.45	Intermediate to Felsic Ash and Tuff: moderate sericite, weak chlorite, weak epidote 89.0 - 92.5: 3 - 5% py, tr chalcopyrite 94.0 - 95.45: moderate - strong sericite
95.45 - 95.7	Fault Gouge = Argillite <u>320 ppm Cu, 275 ppm Zn</u>
95.7 - 98.3	Diorite
98.3 - 103.6	QFP Flow?
103.6 - 118.8	Andesitic Ash, Tuff & chert: 103.6 - 104.5: argillaceous wisps, 5% py 111.2 - 111.9: 5% py, 1% cpy 118.6 - 118.8: argillaceous layers, 2 - 3% FS
118.8 - 191.9	QP Tuff, Felsic Ash, moderate sericite 118.8 - 119.5: argillite wisps, 2 - 3% py: <u>240 ppm Cu, 119 ppm Zn</u> 122.5 - 124.5: moderate - strong chlorite, 2 - 3% py 124.5 - 126.4: 3 - 4% py 129.0 - 147.8: moderate chlorite 132.0 - 132.3: quartz vein, 10% py 170.0 - 188.1: moderate - strong sericite 187.8 - 188.1: quartz vein, 10% py
191.9 - 194.8	Chloritic Ash
194.8	EOH

**CM-8: Victoria showing**

0 - 6.7	Overburden
6.7 - 19.5	Mafic Ash, Chert
19.5 - 43.8	Felsic Ash & Andesite Crystal Tuff
43.8 - 51.05	Mafic Tuff
51.05 - 80.8	Felsic Tuff and Andesite Crystal Tuff
80.8 - 81.05	Chert - 5% py: <u>290 ppm Cu, 14 ppm Zn, 1920 ppm Ba, 100 ppb Au</u>
81.05 - 82.7	QP Flow
82.7 - 87.0	Intermediate Ash - 3 - 5% py
87.0 - 93.75	Felsic Ash
93.75 - 106.1	Intermediate Ash, minor chert 102.8 - 106.1 - 5% py
106.1 - 115.2	Felsic Lapilli Tuff/Flow?
115.2 - 119.5	Intermediate to Mafic Ash, 1 - 2% py
119.5 - 131.3	Felsic Tuff/Lapilli Tuff
131.3 - 132.2	Pyritic (10-15%) Felsic Tuff and Fault Gouge: <u>2183 ppm Cu, 1672 ppm Zn</u>
132.2 - 211.65	Felsic Flow/Tuff - weak sericite - chlorite
211.65 - 220.9	Intermediate Tuff/Ash - patchy strong chlorite
220.9 - 225.8	QP Tuff
225.8 - 227.1	Intermediate Ash, Tuff, minor chert
227.1	EOH

**CM-9: Northern IP/VLF anomaly**

0 - 6.1	Overburden
6.1 - 102.9	Felsic Ash, Tuff, weak chlorite, weak - moderate sericite 6.1 - 35.1 - 1 - 2% py 76.4 - 77.9 - 10% py - stringers
102.9 - 113.9	Mafic Ash, Tuff, strong chlorite, 1 - 2% py 113.45 - 114.2 - 2 - 3% py, tr cp
113.9 - 150.9	Felsic Ash, Tuff
150.9	EOH

**CM-10: Victoria showing**

0 - 9.3	Overburden
9.3 - 54.2	Intermediate Crystal Tuff, FP
54.2 - 81.6	Felsic Ash, Tuff
81.6 - 83.25	Fault gouge: <u>473 ppm Cu, 116 ppm Zn</u>
83.25 - 87.3	Felsic Tuff
87.3 - 113.5	Mafic - Intermediate Ash/Tuff; moderate to strong chlorite, 5% py
113.5 - 118.9	QP Tuff, moderate sericite, py stringers
118.9 - 120.3	Pyritic Mud/Chert, 5% py: <u>64 ppm Cu, 355 ppm Zn</u>
120.3 - 162.7	Felsic Tuff 158.5 - 159.3 - 10 - 15% py in q.v.
162.7 - 183.7	Diorite
183.7 - 190.7	Felsic Tuff, QP
190.7	EOH

b. Key City

One hole was deepened (MTS-23D) and 3 new holes were drilled in the Key City area to test the lateral extent of the Lenora-Tyee horizons. Hole MTS-23 was deepened as re-interpretation and relogging of the upper part of the hole suggested that the original hole stopped just short of the Lenora-Tyee stratigraphy. It intersected a sequence of sulphide-rich cherts and intermediate ashes which are characteristic of the down-dip extent of the Lenora-Tyee orebodies. The shallow core angles for the cherty beds suggest that the volcanic sequence dips gently (20°) to the north. This indicates rotational movement along the northeasterly trending Lenora fault which is located between the Key City shaft area and the old Lenora mine. Holes MTS-58, 59 and 60 tested the down-dip extent of the chert horizons but no zones of economic mineralization were encountered.

**MTS-23 (deepening)**

199.0 - 242.0	Intermediate Ash, Chert, 3-5% py bedding parallel to core axis
242.0 - 267.5	Intermediate Tuff, 1-2% py
267.5 - 291.5	Chert, Intermediate Ash 1-2% py
291.5 - 304.1	Mafic tuff, ash, moderate chlorite
304.1 - 311.9	QP Tuff - 1 cm of black py mud at upper contact
311.9 - 319.3	Felsic Tuff
319.3 - 366.6	Andesitic Crystal Tuff/Ash
	319.3 - 336.1 qtz-chl-py stringer zone
366.6 - 399.6	Felsic tuff, Flow?
- 399.3	E.O.H.

MTS-58

0.0 - 3.7	Overburden
3.7 - 35.2	Diorite
35.2 - 47.4	Andesite Crystal Tuff
47.4 - 102.5	Felsic Tuff/Flow? -siliceous
102.5 - 139.3	Diorite
139.3 - 146.1	Felsic Tuff/Flow? -siliceous
146.1 - 151.1	Mafic Dikes & Felsic Tuff 1-2% py
151.1 - 188.8	Felsic tuff -weak to moderate sericite. py stringers at: 157.25-157.9; 160.15- 160.45; 169.8-169.9
188.8 - 213.2	Diorite
213.2 - 227.3	Chert, Intermediate Tuff - 2-3% py - finely bedded py layers associated with cherts
227.3 - 231.15	Diorite
231.15 - 237.4	Chert, Intermediate Tuff
237.4 - 239.85	Diorite
239.85 - 241.8	Felsic Tuff 239.85 - 240.4 1% py, cp as thin micro- veinlets near upper contact
241.8 - 269.0	Diorite
269.0 - 301.25	Felsic Tuff
301.25 - 315.4	Intermediate Tuff - moderate chlorite; 1-2% py, tr. cp.
315.4 - 346.6	Felsic Flow - siliceous
- 346.6	E.O.H.

MTS-59

0.0 -	3.0	Overburden
3.0 -	33.9	Diorite
33.9 -	61.8	Andesitic Crystal Tuff.
61.8 -	68.0	Intermediate Ash
68.0 -	71.6	Diorite
71.6 -	77.1	Felsic Tuff
77.1 -	89.8	Andesitic Crystal Tuff.
89.8 -	109.2	Felsic Tuff, Flow?
109.2 -	122.1	Diorite
122.1 -	141.9	Felsic Flow, QFP, siliceous
141.9 -	174.2	Diorite
174.2 -	206.1	Felsic Tuff
206.1 -	208.2	Pyritic Ash - 5-10% py
208.2 -	241.9	Intermediate Tuff; minor chert
241.9 -	244.8	Felsic Flow/Tuff? -siliceous
244.8 -	293.5	Intermediate Tuff
	290.2 - 290.6	black pyritic mud - 5% py
293.5 -	352.7	Felsic Tuff
	300.2 - 340.8	qtz-pyrite stringers throughout
-	352.7	E.O.H.

MTS-60

0.0 - 12.2	Overburden
12.2 - 73.0	Felsic Tuff py stringers at: 33.6 - 35.1 (30% py); 41.3 - 42.8 (5-7% py); 42.8 - 44.2 (3% py).
73.0 - 115.0	Diorite
115.0 - 168.6	Felsic Tuff, Flow? -siliceous
168.8 - 174.9	Intermediate Ashes; Cherts
174.9 - 201.2	Felsic Tuff with mafic dikes. 197.3 - 197.9 -pyritic argillite (2-3%)
201.2 - 216.8	Diorite
216.8 - 229.2	Felsic Ash Flow -siliceous
229.2 - 250.0	Intermediate Tuff 1-3%
250.0 - 258.7	Intermediate to felsic Lapilli Tuffs -py stringers.
258.7 - 278.9	Felsic Flow -siliceous
- 278.9	E.O.H.

3. Lenora-Tyee

Six holes tested the down-dip potential of the Lenora-Tyee horizons. Although no economic sulphides were intersected, the drill hole information helped to resolve the stratigraphic and structural problems in the vicinity of the old mines.

The old Lenora-Tyee deposits occur as 2 zones. Previous interpretations had the south zone occurring as a fault-bounded horizon which was thought to correlate with the north zone. Our recent drilling has suggested that there is little or no movement



along the Mine fault and that the south zone is a distinct sulphide horizon which occurs at the contact between andesitic crystal tuffs and intermediate ashes. This zone is defined down-dip by thin, well-defined barium (6700 ppm) and zinc (430 ppm) enriched cherts, argillites and fine-grained pyritic tuffs.

The north horizon is a second mineralized zone which occurs approximately 30-40 meters lower in the stratigraphy. The zone is hosted in felsic ashes and tuffs and consists of interlayered graphitic argillite and fine-grained pyrite. In the Lenora-Tyee area both the north and south zones dip to the south at 70 - 75°.

**MTS-52 - Richard III - Lenora-Tyee**

0 - 3.65	Overburden
3.65 - 69.1	Diorite
69.1 - 147.8	QFP fragmental flow
147.8 - 192.25	Diorite
192.25 - 192.70	Argillite in fault gouge
192.70 - 199.4	Felsic Tuff in fault gouge
199.4 - 206.5	Cherty Argillite - 5% py parallel to bedding: <u>67 ppm Cu, 106 ppm Zn</u>
206.5 - 211.6	Felsic Tuff - fault gouge - strongly sericitic (ICP sample: <u>810ppb Au, 564ppm Zn</u> )
211.6 - 392.1	Diorite
392.1 - 477.0	Felsic Ash Tuff - weakly sericitic 391.0 - 407.3 - 3 - 5% py stringers
477.0	EOH

**MTS-53 - Lenora-Tyee**

0 - 4.1	Overburden
4.1 - 36.65	Diorite
36.65 - 60.55	QFP flow
60.55 - 149.8	Andesitic - Mafic Tuff, moderate chlorite, 1 - 2% carb-hematite veins, patchy epidote
149.8 - 159.05	Intermediate to Mafic Ash with interbedded chert- ash - moderately chloritic, 1 - 2% bedded py in chert
159.05 - 164.05	QP crystal tuff
164.05 - 225.7	Andesitic Ash - Crystal Tuff
225.7 - 238.9	Intermediate Ash Tuff, minor chert
238.9 - 248.35	Mafic Crystal Tuff - weak epidote
248.35 - 284.2	Intermediate Tuff, minor chert, moderately chloritic, tr - 1% py, tr cp <u>cherty areas: 122 - 1065ppm Cu, 186 - 431ppm Zn, 2450 - 6700ppm Ba</u>
284.2 - 286.25	Mine Fault - argillite bands at 285.6 - 286.25 284.2 - 285.6: <u>447ppm Cu, 249ppm Zn, 35ppb Au, 4650ppm Ba</u>
286.25 - 295.6	Diorite
295.6 - 324.9	Rhyolite Flow
324.9	EOH

**MTS-54 - Lenora-Tyee**

0 - 3.5	Overburden
3.5 - 76.8	Diorite
76.8 - 95.15	QP flow
95.15 - 183.0	Andesitic Ash, Crystal Tuff, ashy layers strongly chloritic

183.0 - 217.0	Mafic Ash, Tuff with minor chert - moderate to strong chlorite
217.0 - 236.9	Andesitic Crystal Tuff, moderate to strong hematite-carbonate, moderate epidote
236.9 - 253.0	Interbedded Chert and strongly chloritic Mafic Ash
253.0 - 269.25	Andesitic Crystal Tuff - moderate epidote
269.25 - 273.9	QFP Crystal Tuff
273.9 - 292.45	Intermediate Ash, Tuff with minor chert 285.9 - 292.45 - fault zone with argillite wisps between 292.1 - 292.45 283.2 - 292.45: <u>708 ppm Cu, 160 ppm Zn</u>
292.45 - 304.0	Diorite
304.0 - 307.7	Felsic Flow breccia
307.7 - 321.0	Diorite
321.0 - 351.7	Rhyolite Flow - massive unaltered
351.7	EOH

**MTS-55 - Lenora-Tyee**

0 - 3.2	Overburden
3.2 - 78.0	Diorite
78.0 - 112.3	QP tuff - weak chlorite
112.3 - 159.1	Andesitic Ash, Crystal Tuff - weak to moderate epidote, chlorite 142.9 - 143.45 - mt - hematite beds or vein?
159.1 - 183.7	Mafic dike, weak epidote - strongly magnetic
183.7 - 193.2	Andesite Crystal Tuff - moderate epidote
193.2 - 196.05	Felsic Tuff, Argillite - strongly sericitic, 2 - 3% py: <u>98 ppm Cu, 116 ppm Zn</u>
196.05 - 204.8	Andesitic Crystal Tuff - moderate epidote

204.8 - 224.2	Intermediate Ash, Tuff with grey cherty Zones
224.2 - 244.6	Mafic Ash, Tuff - moderate to strong chlorite
244.6 - 248.9	Mafic and Felsic Ash with minor argillite - moderate chlorite, sericite & silica alteration, 2 - 3% py, tr cp as fine disseminations parallel to bedding: <u>523 ppm Cu, 82 ppm Zn</u> 247.7 - 248.9 - fault gouge
248.9 - 328.0	Felsic to Intermediate Ash, Crystal tuff 248.9 - 288.6 - strong sericite - silica 266.4 - 288.6 - <u>py stringer zone</u> - 7 - 8% py, tr cp 288.6 - 328.0 - weak chlorite
328.0	EOH

**MTS-56 - Lenora-Tyee**

0 - 3.0	Overburden
3.0 - 76.0	Diorite
76.0 - 114.65	QP Tuff
114.65 - 182.9	Andesitic Ash, Crystal Tuff
182.9 - 193.6	Intermediate tuff, chloritic
193.6 - 228.75	Andesitic Ash, Crystal Tuff 199.7 - 202.0 - strong hematite-carb
228.75 - 235.2	Intermediate Tuff
235.2 - 236.1	Felsic Tuff with argillite fragments = South Zone
236.1 - 259.0	Intermediate Tuff
259.0 - 281.4	Intermediate Ash, chert
281.4 - 291.5	Mafic Ash, strong chlorite
291.5 - 298.4	Felsic Ash, chert, 2 - 3% py = North Zone

298.4 - 305.3	Interbedded mafic & felsic ash, chert; argillite in 0.2m wide fault gouge
305.3 - 371.55	Felsic Ash, Tuff & chert, weak sericite 305.3 - 346.7 - 1 - 3% py
371.55 - 374.65	Argillite with felsic tuff fragments; v.f.gr. pyrite associated with argillite (footwall zone?)
374.65 - 384.85	Felsic Tuff - weak sericite
384.85 - 401.7	Diorite
401.7	EOH

**MTS-57 - Lenora-Tyee**

0 - 90.3	Diorite
90.3 - 103.2	QP Tuff
103.2 - 117.8	Andesite Ash, weak chlorite
117.8 - 149.7	QP Tuff - weak chlorite
149.7 - 171.0	Andesite Ash Tuff, weak chlorite, weak - moderate epidote
171.0 - 187.6	Mafic Dike
187.6 - 223.4	Andesite Ash, crystal tuff - weak chlorite, epidote, hematite
223.4 - 223.8	Fault gouge/argillite = South Zone
223.8 - 239.4	Intermediate Tuff, minor chert
239.4 - 261.9	Felsic Ash, weak to moderate sericite, chlorite, 3 - 5% py 259.5 - 261.9 - 5 - 10% py, tr cp (part of North Zone?)
261.9 - 263.2	Argillite, 2 - 3% py - v.f.gr. = North Zone

263.2 - 328.3	Felsic Ash 298.4 - 308.5 - strong sericite, 5% py - stringer zone
328.3 - 354.8	QP Tuff, weak sericite, chlorite
354.8	EOH

4. Mona

Five holes were drilled in the Mona area to test the extent of pyritic exhalites were intersected in shallow drilling (MTS-38) beneath a thick (200 m+), flat lying dioritic intrusion. All of the holes intersected a zone of intermediate ash and sulphide-rich cherts. This sequence is underlain by felsic ashes which are locally intensely sericitic and contain quartz-sulphide stringer zones. Hole MTS-48 intersected abundant semi-massive sulphide stringer mineralization but metal values of these zones are generally low. In hole MTS-41, a zone of disseminated sphalerite (1%) occurs in an andesitic crystal tuff which immediately underlies a cherty sequence. Well-defined bedding in the cherts indicates that within the Mona fault block, dips are shallow (20°-25°) towards the south.

Diamond drilling the Mona area has intersected abundant sulphide mineralization in the Mona area even though grades are subeconomic. The presence of sulphide stringers and intense sericite alteration is an indication of a well-defined hydrothermal system which is associated with a volcanogenic massive sulphide zone. Further drill testing of the chert-intermediate ash unit which locally overlies the alteration is warranted.

MTS-48 - Mona Area

0 - 9.1	Overburden
9.1 - 10.2	Felsic Crystal Tuff
10.2 - 95.9	Diorite
95.9 - 101.45	Felsic Ash - Chert
101.45 - 108.5	Diorite
108.5 - 117.3	Chert, Felsic Ash
117.3 - 281.55	Diorite
281.55 - 312.0	Felsic Ash - Tuff, weak to moderate sericite, tr - 1% py
312.0 - 318.9	QP crystal Tuff, weak to moderate sericite, tr - 1% py
318.9 - 353.7	Felsic Tuff, weak to moderate sericite cp - py stringers at: 324.9 - 325.3 (0.84% Cu) 326.1 - 326.5 (0.64% Cu)
353.7 - 400.2	Intermediate Tuff; weak to moderate chlorite, weak sericite sulphide stringers at: 390.5 - 390.8 - 15% py (331ppm Cu) 392.15 - 392.4 - 25% py 392.6 - 393.5 - 7 - 8% py
400.2 - 411.05	Diorite
411.05 - 417.8	Felsic Tuff, strong silica - sericite 411.05 - 413.95 5% py, tr cp 413.95 - 414.25 30% py, 1 - 2% cp (0.51% Cu) 414.25 - 415.15 1 - 2% py 415.6 - 417.8 30 - 35% py, 1% sph, tr cp <u>0.11% Cu; 0.16% Zn;</u> <u>2.55 g/T ag, 0.23 g/T</u> <u>Au.</u>
417.8 - 425.8	Feldspar-rich crystal tuff, weak to moderate sericite, 1% py

425.8 - 460.95 Felsic Ash  
438.35 - 460.95 strong silica-sericite  
with sulphide-rich  
stringers at:  
445.75 - 447.7 - 10-12% py  
450.6 - 451.5 - 35-40% py, tr cp  
452.4 - 452.55 - 30% py  
453.5 - 455.2 - 20% py  
456.4 - 457.4 - 50-55% py, 1-2% cp 0.37%  
Cu; 3.4 g/T Ag; 0.18 g/T Au  
458.2 - 460.95- 60-70% py, 1-2% cp, 0.64%  
Cu; 4.85 g/T Ag; 0.31 g/T Au

460.95 - 480.35 Diorite  
480.35 - 491.6 Felsic Ash, weak to moderate chlorite, weak  
sericite, 1 - 2% py  
491.6 - 549.6 QP + FP crystal tuff, weak to moderate  
sericite, tr - 1% py  
549.6 EOH

**MTS-49 - Mona Area**

0 - 3.6 Overburden  
3.6 - 64.75 Diorite  
64.75 - 70.5 Felsic Ash, moderate to strong silica-sericite  
70.5 - 72.2 Intermediate Tuff, Chert, strong carbonate  
veining,  
5% v fgr py  
72.2 - 100.15 QP crystal tuff/flow?  
100.15 - 130.8 Felsic Ash, minor Chert, 1 - 2% py  
130.8 - 314.25 Diorite  
314.25 - 354.5 Felsic QP crystal tuff  
314.25 - 336.35 2 - 3% py, tr cp  
382.2 - 382.7 py stringer: 1.06% Cu, 591  
ppm Zn; 6.0 ppm Ag; 115 ppb Au/0.5 m  
354.5 - 386.3 Intermediate Volcaniclastic with well-bedded  
Chert Layers, 5% py  
- v.f.gr. bedded py associated with chert



386.3 - 424.6 Felsic FP crystal tuff, 1 - 2% py with sulphide-rich stringers at:  
391.4 - 392.9 3 - 5% cp, 10% py:1.37% Cu, 380 ppm Zn; 4.4 ppm Ag, 95 ppb Au  
394.05 - 394.3 15 - 20% py, tr cp  
395.45 - 396.1 5% py, tr cp  
406.5 - 420.9 - gouge zones marking Fortuna Fault

424.6 - 442.2 Diorite

442.2 - 471.5 Felsic Tuff, Lapilli Tuff, weak sericite, chlorite

471.5 EOH

**MTS-41 - deepening**

178.9 - 341.7 -Diorite with QFP dikes

341.7 - 358.9 -Felsic Tuff

358.9 - 362.5 -Mafic dike

362.5 - 390.3 -Felsic Lapilli Tuff

390.3 - 446.8 -Intermediate Lapilli/Lithic Tuff -moderate chlorite

446.8 - 473.6 -Diorite

473.6 - 486.1 -Felsic Flow - siliceous, massive

486.1 - 514.8 -Intermediate to Mafic Ash with well-bedded cherts  
479.65 - 491.3 silica-rich stringer zone with 1-2% py

514.8 - 521.35 -Felsic Tuff -moderately siliceous, 1% py, tr. cp, sph

521.35 - 529.4 -Andesite Crystal Tuff/Chert  
-1% sph as f. g. disseminations  
522.4 - 527.4: 0.3% Zn; 335 ppm Cu

529.4 - 530.4 -Felsic Tuff -fault sliver

530.4 - 534.0 -Andesite Crystal Tuff tr. py, cp, sph

534.0 - 545.9 -Felsic Tuff - feldspar porphyritic  
545.9 - 553.2 -Diorite  
553.2 - 575.5 -Felsic Tuff  
575.5 - 596.5 -Intermediate Tuff -feldspar porphyritic 1-2%  
py  
- 596.5 -EOH

**MTS-62**

0 - 12.2 -Overburden  
12.2 - 33.5 -Diorite  
33.5 - 61.7 -Felsic Tuff, Flow? 1-2% py stringers  
61.7 - 274.25 -Diorite  
274.25 - 288.8 -Felsic Flow 1-2% py stringers  
288.8 - 356.1 -Diorite  
356.1 - 359.5 -Felsic Tuff  
359.5 - 366.2 -FP dike  
366.2 - 382.95 -Felsic Tuff py (3-10% py) at 371.35 - 371.95;  
381.0 - 381.??; 381.6 - 381.8  
382.95 - 420.15 -Intermediate Lithic Tuff -1-2% v. f. g. diss  
py  
-strongly chloritic  
420.15 - 435.5 -Diorite  
435.5 - 460.4 -Intermediate Lithic Tuff - 1-2% v. f. g. diss  
py  
460.4 - 477.9 -Diorite

477.9 - 587.0 -Felsic Tuff, Ash -feldspar and quartz  
porphyritic locally  
492.2 - 530.85 py stringer zone with  
tr cpy, sph  
492.2 - 492.5: 1.26% Cu; 700 ppm Zn,  
58 ppm Ag; 200 ppb Au  
496.8 - 497.2: 0.88% Cu; 4.3 ppm Ag;  
95 ppb Au  
530.1 - 530.85: 0.84% Cu; 4.7 ppm Ag;  
260 ppb Au

- 587.0 -EOH

**MTS-65 - Mona Area**

0.0-3.0 -Overburden

3.0-149.40 -Felsic Tuff

3.0-62.0 3-5% py, tr cp as stringers  
5.2-6.05 0.32% Cu / 0.85 m

105.65-105.9 15% py, 1-2% cp - 0.6% Cu / 0.25 m  
-stringer

149.4-294.9 -Diorite

294.9-317.8 -QP tuff/flow?

317.8-321.85 -Intermediate Tuff/Chert 1-3% f.gr. py = L-T horizon

321.85-324.5 -QP tuff

324.5-332.15 -Diorite

329.4-329.8 qtz-chl vein with 10% po, 5% cp, 3-  
4% py, 2.96% Cu, 9.0 ppm Ag, 125 ppb  
Au / 0.4 m

332.15-380.65 -Felsic Ash/Flow?

380.65-404.7 -Diorite

404.7-424.65 -Felsic Ash -weak to moderate sericite

412.05-424.65 qtz-py stringer zone with traces of  
cp, sph and gal.

best assays: 421.7-422.5 0.16% Cu / 0.8 m  
423.1-423.9 0.16% Cu, .07% Zn,  
.49% Pb, 6.0 ppm Ag, 140 ppb Au/0.8m

424.65-491.0 -Interbedded QP flow and Felsic Ash  
491.0-502.6 -Andesite Tuff  
502.6 -EOH

5. Other

Two other drill holes (MTS-50, 51) tested IP anomalies with associated lithogeochemical anomalies which occur in felsic volcanics located north of the Mona area. Pyritic stringer zones were intersected in both holes but no zones of economic mineralization are present.

MTS-50 - Central Panel

0 - 6.1 Overburden  
6.1 - 6.3 Intermediate Tuff, argillite  
6.3 - 15.8 Felsic Intrusion  
15.8 - 25.4 Intermediate Ash Tuff, 3% py  
25.4 - 39.05 Felsic Intrusion  
39.05 - 41.85 Mafic Tuff, 1 - 2% py  
41.85 - 47.10 Intermediate to Felsic Ash with cherty  
interbeds  
v.f.gr. syngenetic pyritic layers in  
cherty sections  
47.10 - 56.6 Felsic Intrusion  
56.6 - 59.65 QFP crystal tuff  
59.65 - 72.25 Intermediate Ash  
63.10 - 72.25 - 2 - 3% py  
72.25 - 170.4 QP Felsic Flow/Tuff? - pyrite stringers  
throughout  
170.4 - 190.8 Diorite  
190.8 EOH

MTS-51 - MTS-32 area

0 - 9.1	Overburden
9.1 - 131.2	QFP Flow/Tuff?, weak to moderate chlorite, weak sericite, patchy silicified areas
	68.3 - 69.9                      7 - 8% py
	69.9 - 131.2                    1 - 2% py
	114.0 - 114.25                15 - 20% py
	114.9 - 115.45                45 - 50% py, 5 - 10% mt
131.2 - 155.2	Felsic Tuff, weak chlorite, silica, 1 - 2% py
155.2 - 160.2	Mafic Dike - strong carbonate magnetic
160.2 - 192.0	QFP Flow/Tuff? - weak chlorite, 1 - 2% py
	174.05 - 177.15                25 - 30% py
192.0	EOH

5. Geophysics

A controlled source audio magnetotelluric (CSAMT) survey was completed by Pacific Geophysical over 4 test lines on the Mt. Sicker property. A total of 7.7 km of surveying or 65% of the program was carried out on the Fording Coal lease area. The objective of the CSAMT survey was to test for deep conductive sulphide zones and to define fault structures. The detailed report prepared by Paul Cartwright of Pacific Geophysical is included as Appendix I.

The survey was successful in outlining several areas of low resistivity. Anomalous zones have been plotted on Figure 3. All of the anomalies can be correlated with known shallow (< 100 m) sulphide zones. No deep conductors or structures were defined by the survey.

6. Conclusions

No zones of economic mineralization were intersected during the 1988 drill program. The down dip testing of the Lenora-Tyee ore bodies indicated that the lateral equivalent of the ore zones consists of a sequence of interlayered intermediate ashes, tuffs, cherts and argillites. This package of rocks has been recognized in the Key City, Lenora-Tyee and Mona areas. Further drill testing of this stratigraphy is warranted to evaluate the massive sulphide potential of the property.

The Mona area contains the most sulphide mineralization noted on the property outside of the old mine workings. Although most of the sulphides are pyritic stringers, zones enriched in chalcopyrite and sphalerite have been outlined. Further drilling is warranted in these areas to evaluate the extent and significance of these zones.

The CSAMT test survey outlined several known, shallow sulphide zones. No deep conductive bodies appear to be present on the lines which were surveyed.

7. References

- Muller, J. E., 1980: The Paleozoic Sicker Group of Vancouver Island, B.C., GSC paper 79-30, 22 p.
- Gibson, H. L. 1987: 1986 Diamond Drill Programme on the Fording Coal Lease, Mt. Sicker Property; Internal Minnova report.
- Wells, G.S., 1988: 1987 Exploration Program, Fording Coal Lease, Mt. Sicker Property; Internal Minnova report.

8. Itemized Cost Statement

1. 1988 Drill Programs - Fording Coal Lease

1. Contract Costs

(Burwash Contract Drilling) 449,191.15

2. Salaries

G. S. Wells	58 days @ \$350/day	20,300.00
P. Baxter	54 days @ \$300/day	16,200.00
M. Fulton	10 days @ \$100/day	1,000.00
N. Trafford	20 days @ \$100/day	2,000.00
A. Brielsman	9 days @ \$100/day	900.00

3. Field Expenses

Truck	100 days @ \$50/day	5000.00
Food & Accommodation	142 man-days @40/day	5680.00

4. Analyses

9014.93

=====

\$509,286.08

2. 1988 CSAMT Survey

Contract Costs (Pacific Geophysical) 7.7 km 12,447.50

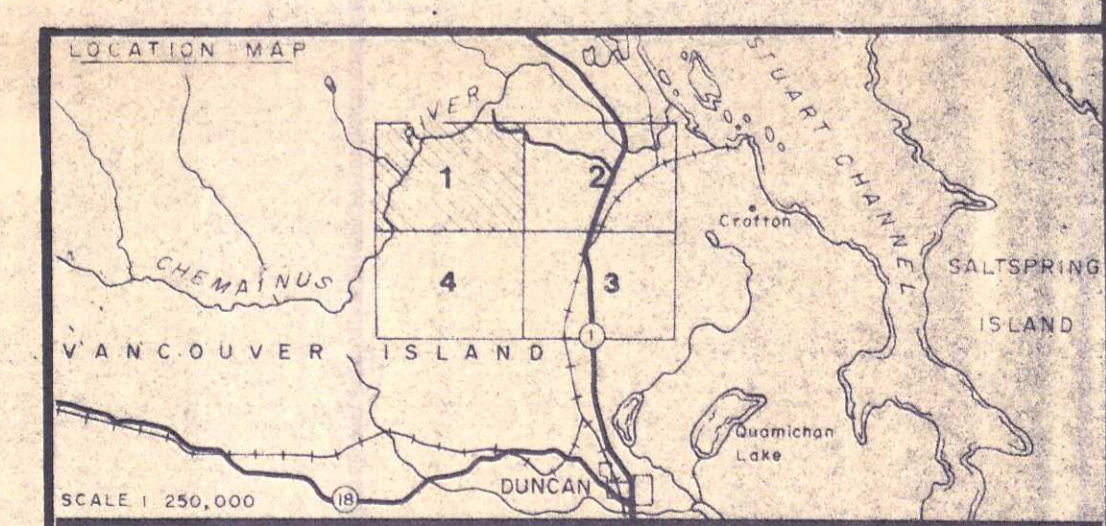
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\$521,733.58



LEGEND

- CRETACEOUS**
- 4 Nanaimo Group Sediments
  - 3 Diorite intrusions (age unknown)
- PALEOZOIC SICKER GROUP**
- 2 Rhyolitic-Dacitic Volcanics
  - 1 Andesitic Volcanics
- Mineralized chert, ash argillite (mine package)
- SYMBOLS**
- Shaft/old workings
  - Bedding
  - Anticline
  - Syncline
- Fording Coal Lease Boundary
- MTS40 1987 Drill Hole Collar Location
  - ▨ IP Chargeability Anomaly
  - ▭ IP Survey December 1987
  - ◆ 1988 drill hole location
  - CSAMT Anomaly



**MINNOVA Inc.**

**MT. SICKER PROPERTY**

**GENERALIZED GEOLOGY + DRILL HOLE LOCATIONS**

0 50 100 200 300 400 500 m

SCALE: 1:5000

November 1987  
 DRAWN BY: HLG/SW  
 DATE: DEC. 1986

REVISED JAN. 1989  
 N.T.S. 92 B / 13

FIG. NO. 3

PACIFIC GEOPHYSICAL LTD.

REPORT

ON THE

CONTROLLED SOURCE AUDIO MAGNETOTELLURIC SURVEY  
(CSAMT)

ON THE

MT. SICKER PROPERTY  
VICTORIA MINING DIVISION  
BRITISH COLUMBIA

FOR

MINNOVA, INC.

LATITUDE:  $48^{\circ}52'N$  LONGITUDE:  $123^{\circ}46'W$

NTS 92B/13

OWNER: MINNOVA INC.

OPERATOR: MINNOVA INC.

BY

PAUL A. CARTWRIGHT, P.Geoph.  
GEOPHYSICIST

GRANT D. LOCKHART, B.Sc.  
GEOPHYSICIST

DATED: APRIL 15, 1988

# TABLE OF CONTENTS

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## PART A REPORT

1)	Introduction.....	1
2)	Presentation of Data.....	2
3)	Discussion of Results.....	2
4)	Summary and Recommendations.....	5

## PART B ILLUSTRATIONS

Location Map.....Figure 1

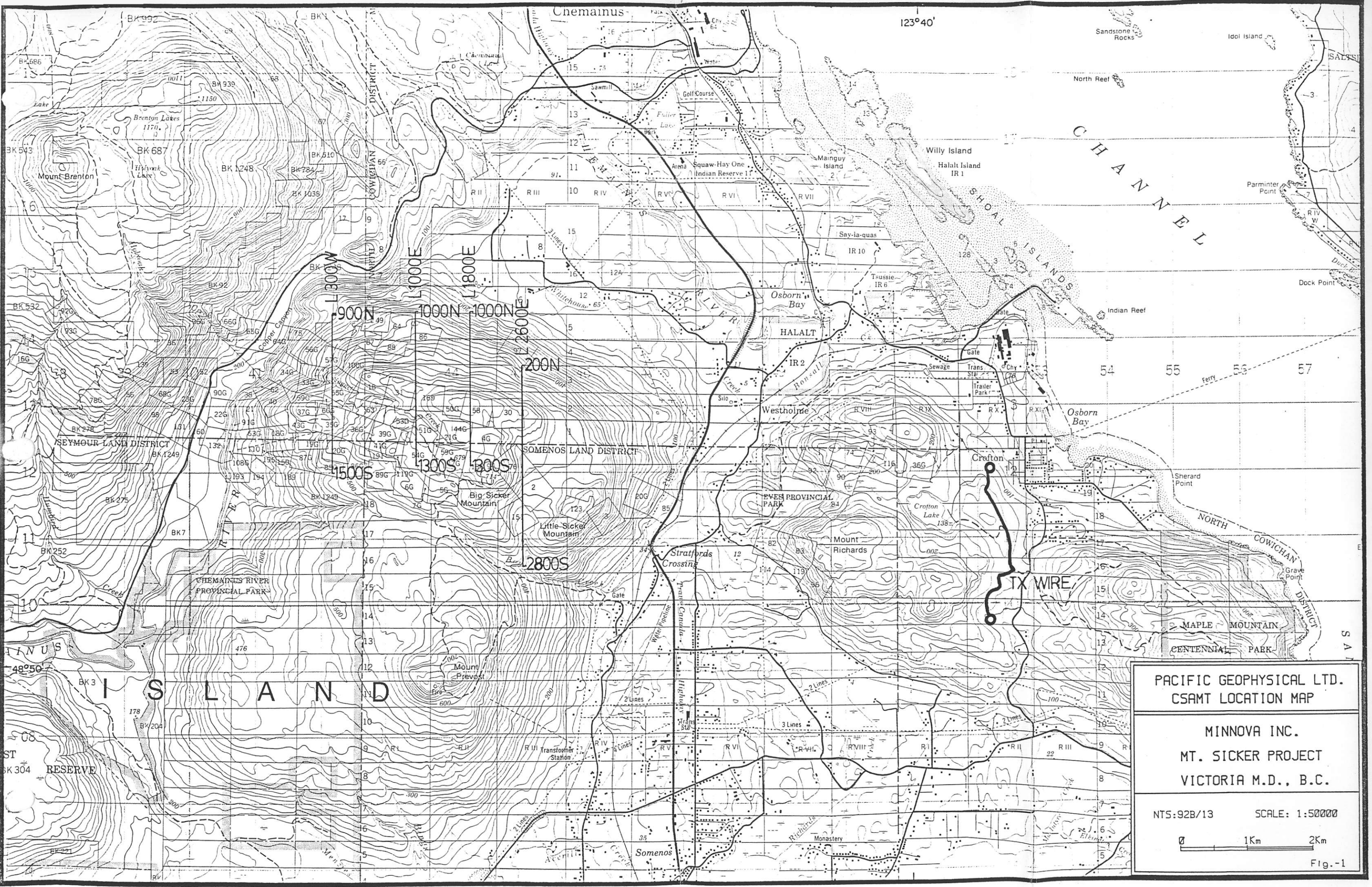
CSAMT Pseudo-Section Data Plot, Line 300W  
(uncorrected & corrected).....Dwg. No. AMT 5889-1

CSAMT Pseudo-Section Data Plot, Line 1000E  
(uncorrected & corrected).....Dwg. No. AMT 5889-2

CSAMT Pseudo-Section Data Plot, Line 1800E  
(uncorrected & corrected).....Dwg. No. AMT 5889-3

CSAMT Pseudo-Section Data Plot, Line 2600E  
(uncorrected & corrected).....Dwg. No. AMT 5889-4

CSAMT Plan Map, 1:5,000.....Dwg. No. AMT 2030



PACIFIC GEOPHYSICAL LTD.  
 CSAMT LOCATION MAP

MINNOVA INC.  
 MT. SICKER PROJECT  
 VICTORIA M.D., B.C.

NTS:92B/13      SCALE: 1:50000

0      1Km      2Km

Fig.-1

## PART A REPORT

### 1) Introduction

A Controlled Source Audio Magnetotelluric (CSAMT) survey has been completed on the Mt. Sicker property on behalf of Minnova, Inc. in the Victoria Mining Division, British Columbia.

The property is located approximately 10 km north-northwest of Duncan, B.C. Access is by wheeled vehicle over a system of logging roads leading west from the Trans-Canada Highway.

The objective of the CSAMT survey was to evaluate the property for zones of low resistivity which could be indicative of conductive sulphide mineralization similar to the Cu-Zn-Au-Ag ore of the H.W. orebody located 155 km northwest at Myra Falls, B.C.

A Phoenix Model V-3 CSAMT receiver unit was used to make the geophysical measurements in conjunction with a Phoenix IPT-1/AC 3004 transmitter powered by a 3 kw motor generator. Two parallel copper wires approximately 2.5 km in length and grounded at the ends were used as the transmitter dipole, as illustrated on Figure 1, a 1:50,000 location map showing the survey lines and the transmitter wire.

Six electric field measurements and one magnetic field measurement were made simultaneously at each setup. The electric field measurements used an interelectrode spacing of 50 meters along Line 300W and 100 meters along Lines 1000E, 1800E, and 2600E, while a horizontal magnetic measurement was made perpendicular to the line at 300 meter and 600 meter intervals respectively. Data was recorded at 14 frequencies ranging in binary steps from 8192 Hz to 1.0 Hz.

Field work took place during March 1988, primarily under the direction of Paul A. Cartwright, P.Geoph., and completed under the direction of Grant D. Lockhart, B.Sc.

## 2) **Presentation of Data**

The CSAMT resistivity results are displayed on the data plots as apparent resistivity vs frequency pseudo-sections. It should be made clear that this presentation cannot be viewed as a true section of earth resistivity, particularly in the vertical direction, i.e., top of section to bottom of section, as the depth of penetration is dependent upon the resistivities encountered as well as the frequency employed to make measurement.

Drawing Nos. AMT 5889-1 to 4 show the uncorrected CSAMT resistivity data as well as data that has been corrected for the position of the transmitter wire relative to the survey lines.

Also enclosed with this report is Dwg. No. AMT-2030, a plan map of the Mt. Sicker Property CSAMT grid at a scale of 1:5,000. The definite, probable and possible CSAMT conductivity anomalies are indicated by bars, in the manner shown in the legend, on this plan map as well as on the corrected CSAMT pseudo-sections. These bars represent the interpreted surface projections of the anomalous zones.

## 3) **Discussion of Results**

Five separate conductivity zones are interpreted to be present in the area evaluated by the present Controlled Source Audio Magnetotelluric (CSAMT) survey. These features are marked in plan form on Dwg. No. AMT-2030, and in pseudo-section form on Dwg. No. 5889-1 to 4. Each zone is discussed below.

### **Zone A**

Two known areas of mineralization are coincident with CSAMT Zone A, which is interpreted to strike across the northern

part of the geophysical grid.

The Fortuna showing located on Line 1800E at Station 90N suggests that the source of the conductive CSAMT response is due to the sulphide mineralization exposed at the showing. Since the conductor is detected at the highest frequency (8192Hz), the depth to the top is poorly constrained. It can be said though, the maximum depth to the top of the conductor is 100 meters - 150 meters from the surface. However, at Station 90N, the Fortuna showing places the mineralization within the first 10 meters of the surface.

Another zone of mineralized chert is mapped coincident with the position of CSAMT Zone A in the region between Line 300W and Line 1000E; however, this interpretation is made uncertain by the large distance between the adjacent CSAMT anomalies, as well as the mapped presence of cross-cutting fault structure.

### **Zone B**

Zone B is comprised of the most conductive CSAMT anomalies detected by the present survey. This feature strikes across the central part of the geophysical grid and correlates with one area of known mineralization.

The Postuk-Fulton zone of mineralized chert apparently strikes through the central section of the Zone B CSAMT anomaly recorded on Line 300W, and therefore, it is possible that the conductive CSAMT response is caused by the mineralization.

In addition, Zone B is composed of other very conductive CSAMT responses which are measured on Line 1800E and 2600E, in areas devoid of mapped mineralization.

Depths to the sources of the Zone B conductivity anomalies are estimated to be no deeper than 50 meters - 100 meters from the surface.

### **Zone C**

Zone C is shown to strike across the southern part of the geophysical grid. This CSAMT zone overlaps the Lenora-Tyee mine workings.

The Lenora-Tyee mineralized zone located on Line 300W suggests that the source of the conductive CSAMT response is due to sulphide mineralization. The maximum depth to the top of the conductor is estimated to be 100 meters - 150 meters from the surface.

In addition, Zone C is interpreted to be comprised of less conductive, near-surface CSAMT anomalies which are located on Line 1000E, Line 1800E, and Line 2600E.

### **Zone D**

Zone D is a one conductor zone that is located at the southern end of Line 300W. The mapped geology suggests that the CSAMT response is due to the presence of the Yankee Fault.

### **Zone E**

The conductive CSAMT response of Zone E is almost certainly due to the presence of the Nanaimo Sediments that are mapped as underlying the most southern part of Line 2600E.



Another aspect of the Mt. Sicker CSAMT data is the pronounced resistivity low which can be seen in all of the data at a frequency of 128 Hz. This feature is almost certainly the "near field dip" and resistivity values recorded in this region, the transition zone between the far field (frequencies above) and the near field (frequencies below), are artificially low. Extreme care should be taken when interpreting data in this frequency range.

#### 4) **Summary and Recommendations**

A Controlled Source Audio Magnetotelluric (CSAMT) survey has been carried out on the Mt. Sicker property, Victoria Mining Division, British Columbia, on behalf of Minnova, Inc.

At least five relatively near-surface zones of anomalous conductivity are interpreted to be present in the data. Parts of Zone A, Zone B, and Zone C appear to be coincident with areas of known mineralization. Therefore, it is recommended that these trends be evaluated further, particularly in the vicinity of Zone B where it is marked as intersecting Line 1800E and Line 2600E. A drill hole collared so as to pass approximately 100 meters beneath Station 500S on Line 1800E is suggested. Should results of such a drill test be encouraging, additional CSAMT surveying on infill lines would be recommended to more accurately map the location of the CSAMT conductive zone, prior to further drilling.

CSAMT Zone D apparently marks the presence of the Yankee Fault, while CSAMT Zone E correlates with Nanaimo Group sedimentary rocks. There are also a number of other isolated CSAMT conductivity anomalies on Line 300W and Line 2600E, for which sources are unknown.

No deeply buried conductivity events, similar to the H.W. orebody

response, are interpreted in the present CSAMT data. All of the CSAMT anomalies detected appear to be caused by sources buried no deeper than 100 meters to 150 meters sub-surface.

**PACIFIC GEOPHYSICAL LTD.**

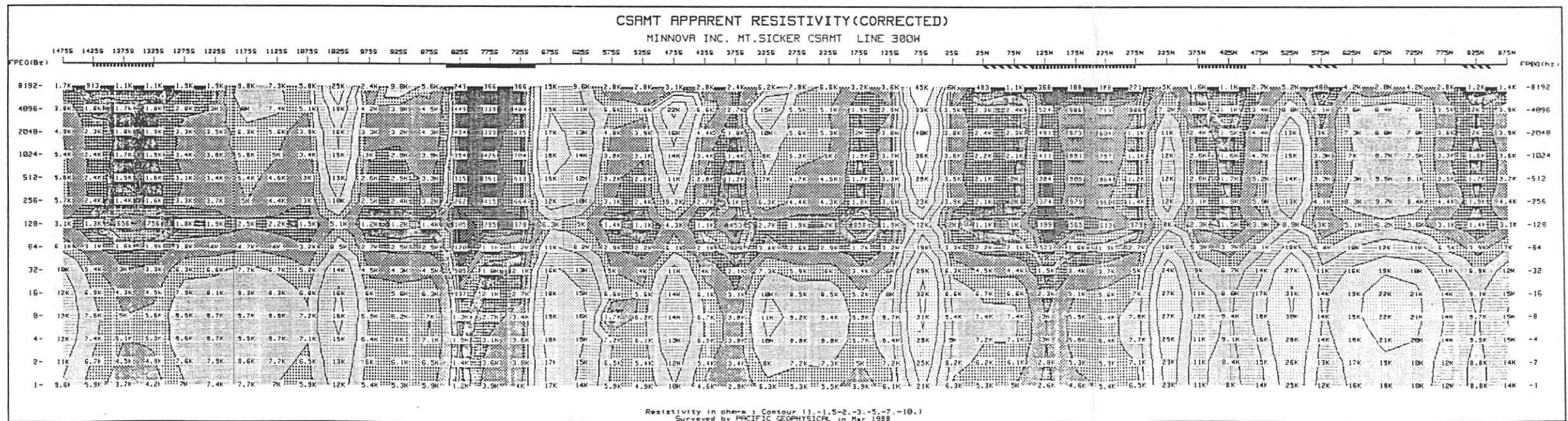
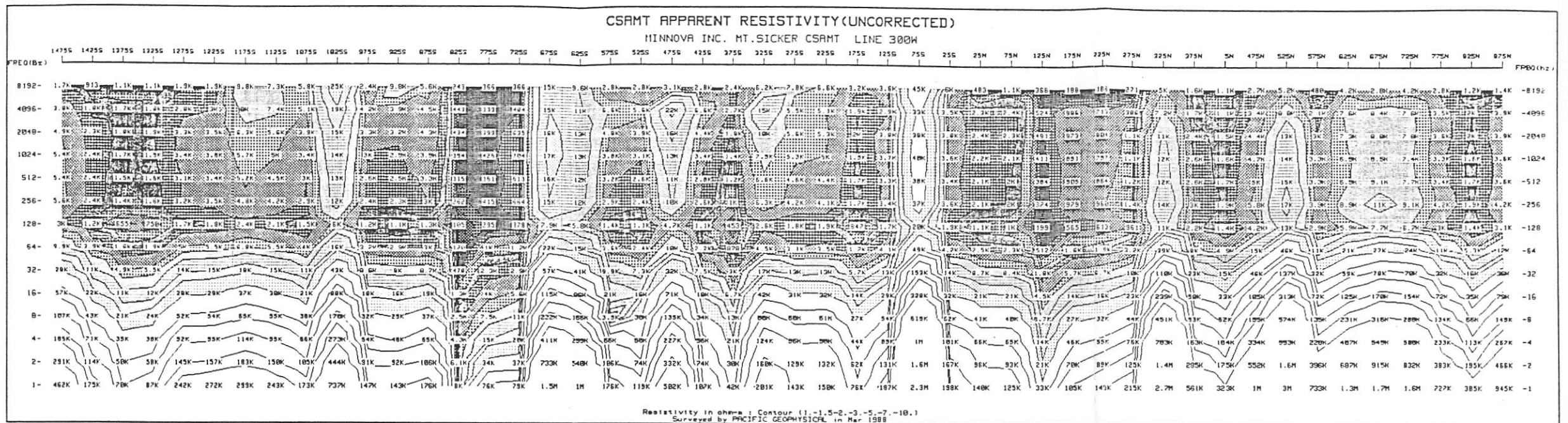
Paul A. Cartwright

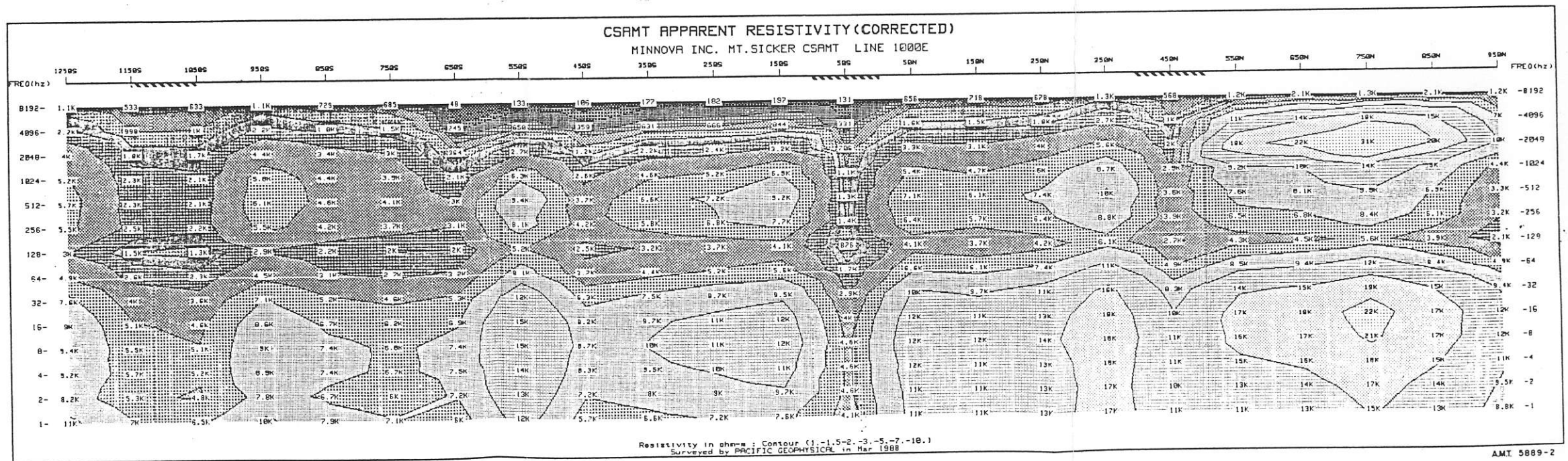
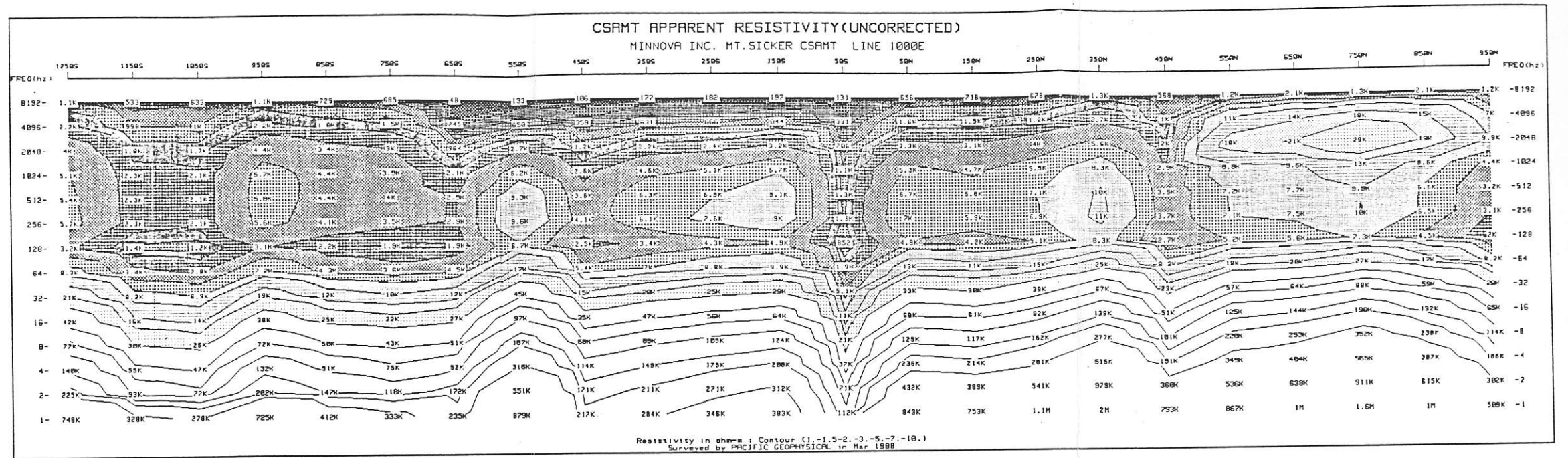
Paul A. Cartwright, P.Geoph.  
Geophysicist

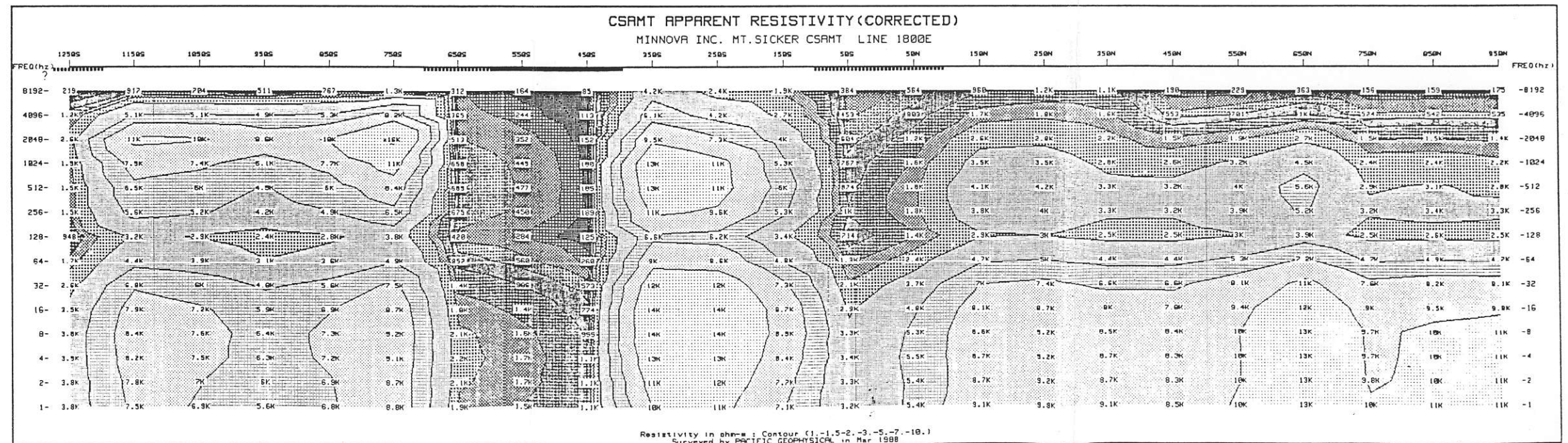
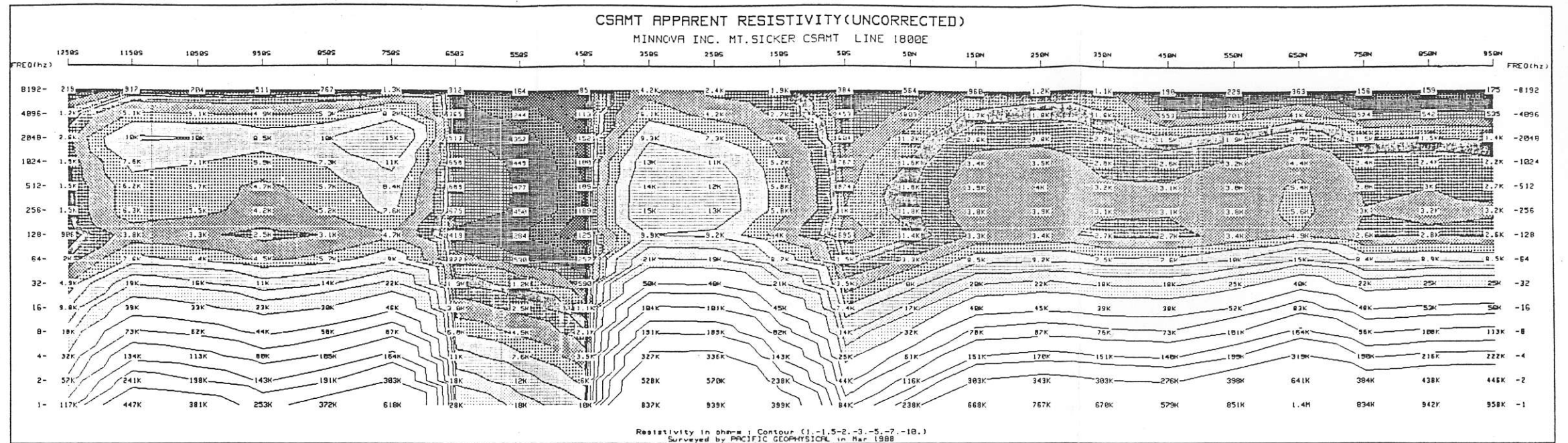
Grant D. Lockhart

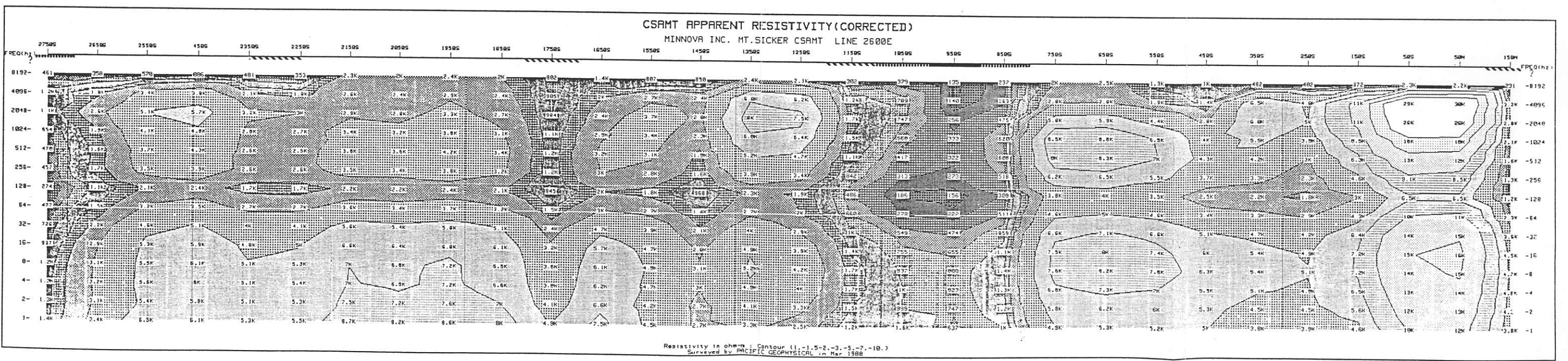
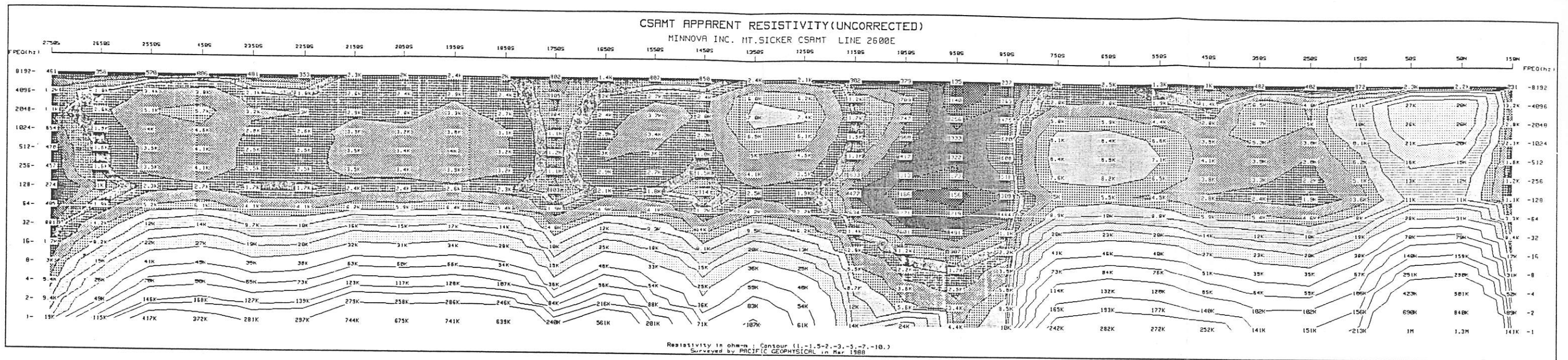
Grant D. Lockhart, B.Sc.  
Geophysicist.

Dated: 15 April 1988









map from Paul Cartwright's  
report enclosed with report  
sent to Fording Coal

J.R.