REPORT ON THE VLF-EM SURVEY CONDUCTED ON THE BASE METAL CLAIMS IN BOSTON TOWNSHIP FOR MARSHALL BOSTON IRON MINES LIMITED

137 Huron Heights Drive
Newmarket, Ontario
L3Y 4Z6

BY

A. C. A. HOWE INTERNATIONAL LTD.
Suite 826, 159 Bay Street
Toronto, Ontario
M5J 1J7

T. P. MacMichael, B.Sc.

Report No. 426
June 19, 1981

Toronto, Ontario

SUMMARY

Marshall Boston Iron Mines Ltd. holds a group of 41 contiguous claims for iron and base metals in Boston Township, Ontario. On nine of these claims, a Radem VLF-EM survey was completed.

In 1979 an Airborne Electromagnetic Survey was completed for the Ontario Geological Survey. The data was published on Preliminary Map P2270. A number of electromagnetic anomalies (conductors) were located on Marshall Boston Iron Mines Ltd. property. A comparison of their plotted locations with previous diamond drilling showed that most of these conductors had not been tested. As a result of this and the fact that previous diamond drilling had encountered base metal mineralization, a Radem VLF-EM survey was undertaken to locate the conductors on the ground. The ground geophysical survey confirmed the location of the airborne anomalies and showed that most had not been investigated by earlier work.

Six near-vertical, strongly conductive features were delineated, any one of which has potential for mineralization. Further investigation of these conductors is warranted.

The property has the potential for gold and base metal mineralization.

A program consisting of a Maxmin survey, overburden stripping, and possibly diamond drilling is warranted.

PROPERTY

Marshall Boston Iron Mines Ltd. holds a group of contiguous claims for iron and base metals in Boston Township, Larder Lake Mining Division, Ontario. Marshall Boston controls 41 leased claims, of which 13 are owned and 28 are held under option, 2 patented, and 1 staked claim. These claims may be more particularly described as:

LEASED CLAIMS (Owned)	LEASED CLAIMS (Optioned)	
L72990	L56467	L71473
L72991	L56468	L71474
L72993	L56502	L71475
L73002	L56503	L71471
L73068	L56504	L71477
L73069	L56505	L71478
L73070	L56506	L72986
L73124	L56507	L72987
L74842	L65200	L73003
L74843	L65363	L77287
L74844	L65364	L101539
L74845	L67559	L104740
L91027	L67560	L213495
	L71472	L213496

PATENTED CLAIMS	STAKED CLAIM	DATE RECORDED
L36693	L579084	Oct. 22/80
L39083		

CLAIMS SURVEYED

The Radem VLF-EM survey was conducted over six leased claims, two patented claims and one staked claim. The claims may be more particularly described as follows:

LEASED CLAIMS	PATENTED CLAIMS	DATE RECORDED
L71472	L36693	Oct. 22/81
L71476	L39083	
L71477		
L71478	STAKED CLAIM	
L77287	L579084	
L213495		

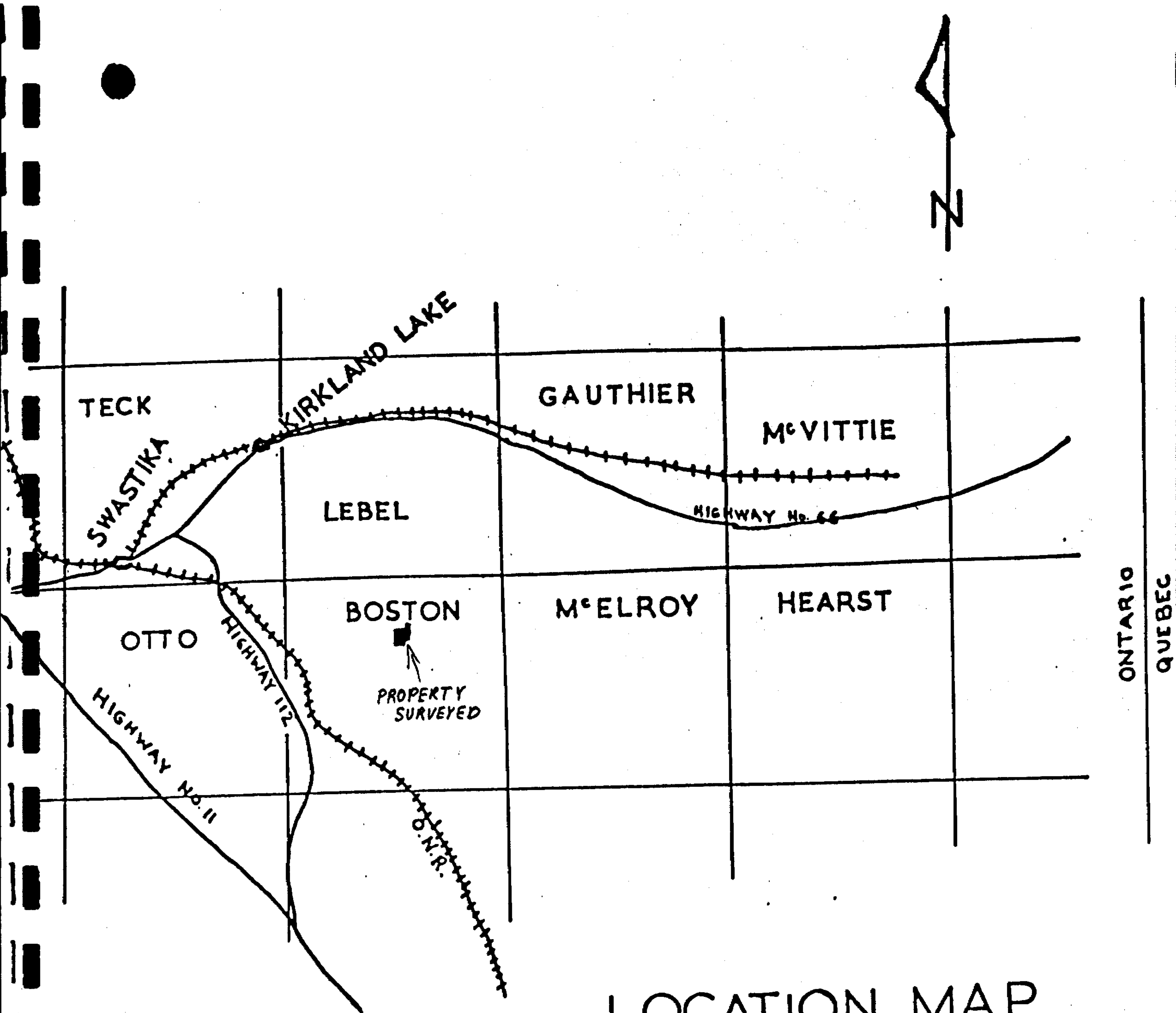
LOCATION & ACCESS

The Marshall Boston Iron Mines Limited iron and base metal property is located immediately north of the Adams Mine Road (#650) between Dane townsite and the Adams Mine. Highway #650 can be reached from Kirkland Lake on highway #112.

TOPOGRAPHY

The topography of the property may be described as having moderately high rock ridges with differences in elevation not exceeding 100 feet.

Outcrops are usually restricted to higher ground where the light overburden, consisting chiefly of peat, moss and immature soils rarely exceed one foot in thickness.



LOCATION MAP

MARSHALL BOSTON IRON MINES LTD

A.C.A. HOWE INTERNATIONAL LTD.

Scale 1" = 4 miles

In the low-lying regions, the swampy terrain has accumulated to thicknesses in the order of twenty feet.

The majority of the trees on the property consist of conifers of which the pines and spruces dominate, while the deciduous varieties appear to be restricted to poplars and birch. Alders are abundant in the low-lying swampy areas.

HISTORY OF THE PROPERTY

In 1951, Dominion Gulf Company acquired the Boston Iron range and sold it to Jones and Laughlin Steel Corporation. The Adams Mine is now located on this ground.

Previous to their acquisition, the main property held by Marshall Boston Iron Mines Ltd. underwent a history of exploration related to exploration of the Boston Iron range. Past holders of portions of the claim group include Charles Marshall, Sr., Mike Lunge, E.R. Ostrom, Norman Evoy and Fred Healy. A complete history of these ownerships, development activities and general geology can be found in a report entitled "Geology of Boston Township and Part of Pacaud Township", Ontario Department of Mines, Volume LXVI, Part 5, 1947, by K.D. Lawton.

In 1951, Dominion Gulf Company Limited held options on the Lunge claims and portions of the Marshall claims, but subsequently dropped them after conducting ground geological and magnetometer surveys.

Early development of the main property was directed to the determination of iron ore potential. During July of 1964, a magnetometer survey of claims L73002, L72990, L72991 was conducted under the direction of G.E. Moody. The resulting report exists in company files and will not be detailed at present.

Considerable work in the form of diamond drilling, stripping and trenching was performed in 1965 and 1966. The greater portion of this work was concentrated on claims L72990 and L72991.

During 1967 and 1968 work was confined to that portion of the northeast grid covered by claims L71472, L71473 and patented claim L39083. Occurrences of pyrite, pyrrhotite, sphalerite, and minor chalcopyrite were located. These were further explored in November of 1967 by a limited electromagnetic survey in an attempt to locate mineral concentrations. Further work consisted of exploratory diamond drilling which encountered disseminations and blebs of sphalerite, after which it was decided that additional geological and geophysical information was required. In October of 1968 a reconnaissance geochemical survey for copper and zinc was conducted on the above claims and anomalous conditions for copper and zinc were encountered. It was recommended that further work of the same nature be carried out.

In his report dated August 17, 1970, Dr. W.D. Beaton outlined the results of a program of trenching, stripping, and geological mapping which, combined with information obtained from geophysical surveys (located in company files) led him to indicate several zones of promising potential. Based on conclusions from that phase of activity, Dr. Beaton made several recommendations for further exploration of the northeast grid.

During the period of March 9th to March 20th, 1971, electromagnetic and magnetic surveys were conducted by Shield Geophysics over the north and south grids. Reports indicating results of this work can be found in the company files.

More recently, Marshall Boston Iron Mines Limited engaged L.G. Hobbs, P.Eng. to supervise trenching, geological mapping, diamond drilling and geophysical work, and to explore the property's base metal and iron potential. The results of this work are summarized in reports dated October 1, 1971, and October 29, 1971, respectively which can be located in the company files.

Marshall Boston Iron Mines Limited engaged A. C. A. Howe International Limited to supervise a diamond drilling program between December, 1971, and April, 1972, recommended as a result of previous work on the property. In this program, diamond drilling has been carried out on the northeast, south and north grids. Numerous progress reports on this activity are available from the company files.

GENERAL GEOLOGY OF THE AREA

The geology of Boston Township and part of Pacaud Township have been described in a report by K.D. Lawton, Ontario Department of Mines, Volume LXVI, Part V, 1957. The following is an abstract from this report:

The consolidated rocks of the area are Precambrian in age, consisting mainly of Archean volcanics, sediments, and intrusives. Late diabase dikes intrude the Archean rocks and are the sole representatives of the Proterozoic era in the area.

Members of the Keewatin series of early Precambrian rocks are the dominant formations outcropping in Boston Township. They consist of lava flows, volcanic fragmental rocks, and sedimentary rocks. A small area of Timiskaming clastic sedimentary rocks outcrops in the northeast corner of Boston Township. Here, the Keewatin and Timiskaming series are in faulted contact. Field relationships in nearby townships, however, indicate that the rocks of Timiskaming age stratigraphically overlie the Keewatin series. In the Kirkland Lake area, Thomson[1] has shown that a great structural unconformity separates the Timiskaming series from the underlying Keewatin rocks.

---

[1] J.E. Thomson, "The Keewatin-Timiskaming Unconformity in the Kirkland District," Transactions, Royal Soc. Can., Sect. IV, Third Series, Vol. XL, 1946, pp. 113-122.

There are two groups of basic intrusives of post-Keewatin age. The older of the two is composed of diorite and meta-diorite, wheras the younger includes serpentinite, hornblendite, diorite, and minor diorite porphyry.

The Keewatin, Timiskaming, and "post-Keewatin" rocks are folded and faulted, and intruded by a variety of igneous rocks classified as Algoman in age. The Algoman series includes rocks of the following composition: granite, syenite, porphyries, diorite, and lamprophyre.

Much of the bedrock is covered by a mantle of unconsolidated clay, sand, and gravel, laid down during the period of Pleistocene glaciation that affected this area.

The rock classification used in this report conforms generally, but with some revision, to that adopted by Abraham[2] for McElroy Township and the eastern part of Boston Township. In the following table of formations, the members range from oldest at the bottom of the list to youngest at the top, though the rocks within a given group are not necessarily arranged in chronological order.

---

[2] E.M. Abraham, "Geology of McElroy and Part of Boston Townships," Ontario Department of Mines, Vol. LIX, 1950, pt. 6, p. 8.

TABLE OF FORMATIONS

CENOZOIC RECENT AND PLEISTOCENE:	Clay, sand, gravel, and boulders.
	Great Unconformity
PRECAMBRIAN KEWEENAWAN OR MATACHEWAN:	Diabase.
	Intrusive Contact
ALGOMAN:	Basic syenite; syenite and porphyritic syenite; syenite porphyry; quartz porphyry; granite (dikes and small stocks); lamprophyre; diorite and metadiorite; quartz-feldspar porphyry; felsite. Batholithic granite (Round Lake batholith).
	Intrusive Contact
HAILEYBURIAN: (?)	Diorite; gabbro; hornblendite; serpentinite diorite porphyry.
	Intrusive Contact
TIMISKAMING:	Fine-grained sedimentary rocks; greywacke; arkose; quartzite; slate. Conglomerate; conglomerate with some inter-bedded arkose, slate, and greywacke.
	Great Unconformity
POST-KEEWATIN (?):	Diorite and metadiorite.
	Intrusive Contact
KEEWATIN:	Basic and Intermediate Volcanics: Greenstone; brecciated and carbonate-veined greenstone; andesite, basalt, and pillow lava; dioritic, diabasic, and gabbroic lava; amphibolite; sheared basic lava; fragmental lava; basic lava containing horizons of tuff; injection gneisses, and metamorphosed basic lava and tuff adjacent to the Lebel and Otto syenite stocks; variolitic lava.

TABLE OF FORMATIONS - Cont'd

KEEWATIN:	Intermediate and Acid Volcanics: Fragmental volcanics, generally porphyritic; porphyritic andesite, dacite, and rhyolite, containing horizons of acid and cherty tuff; dacite; andesite, occasionally fragmental.
	Iron formation, including banded silica rock ("lean iron formation").
	Acid volcanics, Tuff, Quartzite, etc.: Rhyolite; acid tuff and cherty tuff; agglomerate conglomerate; tuffs, and sediments interbedded with volcanic rocks; tuff and iron formation; tuff, tuffaceous sediments, and their altered equivalents; cherty quartzite.

GEOLOGY OF THE PROPERTY

The claim group is underlain by Precambrian rocks consisting chiefly of the syenitic members of the Algoman series and the basic to intermediate volcanics of the Keewatin series.

The Algoman syenites are present as zenoliths, originating probably from the Lebel syenite stock located to the north of the property.

The Keewatin volcanics are present chiefly in the form of andesites, dacites, basalts, diorites and tuffs.

A pronounced east-west structural strike is present within this series which is readily visible in the iron formation that is found as irregularly distributed sections within the Keewatin. The iron formation for the most part is composed of alternating layers of siliceous magnetite, massive magnetite, sugary quartzite, and cherty quartzite with individual bandings usually not exceeding about ½ inch in width.

Although the formational strike of the Keewatin volcanics is east-west, the structural strike within the property has a pronounced north-south, north-north-west--south-south-east trend with the Boston Creek-Long Lake fault being the most salient structural feature. This fault strikes S15°W, follows the valley of Boston Creek, and is considered as being an off-shoot of the Boston fault, the major structural feature in Boston Township, located to the south of the main claim group.

MINERALIZATION

Three types of mineralization may occur in this area:

(1) Massive Sulfides. "Remobilized" massive zinc has been observed in north trending shear zones. Mineralization has also been noted in a previous drill hole near anomaly F.

(2) Gold-bearing Iron Formation. Gold deposits associated with banded iron formation in Archean greenstone belts have been recognized in many parts of the world including Canada.

(3) Gold-Quartz Veins in Shear and Fracture Zones. Numerous gold showings related to shears and fractures are evident in Boston Township. In addition, greenstones often have gold-bearing quartz veins in fractures parallel to granite contacts. These fractures are caused by the intrusion of the granite plutons. Conductor A may be of this type which has in addition an interesting cross-cutting lineament.

RADEM VLF-EM GEOPHYSICAL SURVEY

In 1979, the Ontario Geological Survey published an Airborne Electromagnetic Survey of Boston Township, preliminary map P2270. A number of good conductors were delineated on Marshall Boston's base metal claims. Most of the airborne anomalies plotted do not coincide with previous drilling. A radem VLF-EM survey was initiated to confirm their locations compared with the previous drilling. The Radem survey verified the fact that a number of good conductors have not been investigated by surface exploration or diamond drilling.

From March 16 to 24, 1981, the VLF-EM geophysical survey was undertaken over the base metal claims north of the Dane Road in Boston Township. The claims may be more particularly described as:

L 39083	L 71478
L 36693	L 77287
L 71472	L 213495
L 71476	L 579084
L 71477	

A .6 mile base line was established in an east-west direction with perpendicular offsets every 400 feet. 5.5 miles of line were compassed and paced with a numbered red flag every 100 feet. Intermediate fill-in lines were added in two areas to better define anomalies.

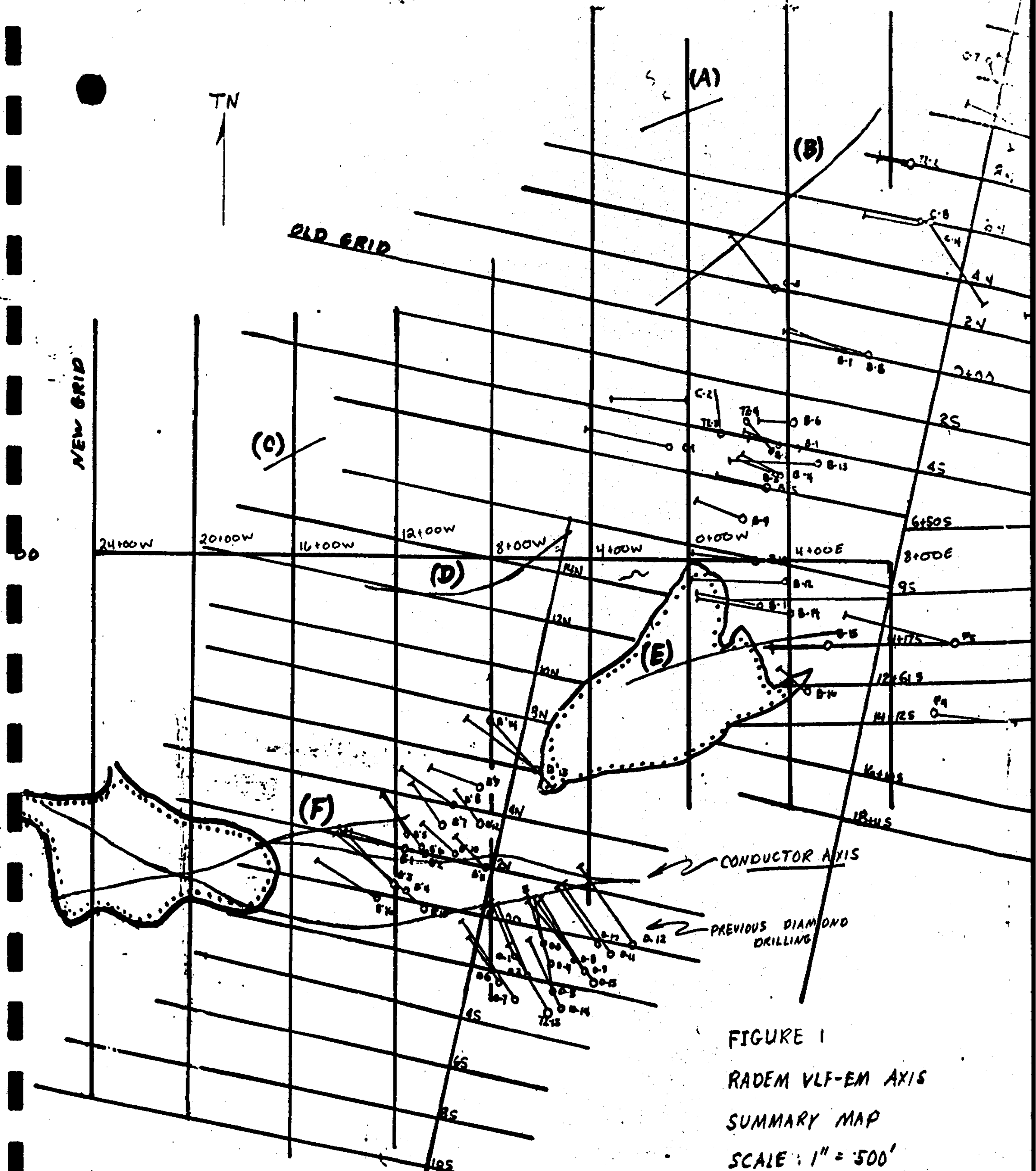


FIGURE 1
RADEM VLF-EM AXIS
SUMMARY MAP
SCALE : 1" = 500'

A Radem VLF-EM receiver, tuned to Cutler, Maine, was utilized for the survey. Readings were taken on the north-south offset lines every 50 feet. Where conductors were encountered, blue flagging was used for later recovery. Maps have been produced at a scale of 1 inch = 200 feet. See the appendix for the Radem VLF-EM Survey Maps of the Fraser Filter Contour and the Field Strength Contour.

Six east-west to north-east trending conductors were delineated. The axes of these priority conductors are plotted on the accompanying summary map (Fig. 1) and lettered A through F for easy identification. As can be seen on the map, previous drilling encountered little if any of the outlined conductors.

FRASER FILTER INTERPRETATION

Dip angle readings were processed using the Fraser Filter technique and the values contoured for better interpretation of the conductors. Anomalous field strength corresponds to all conductors picked. (See attached maps). Conductors trended east-west to northeast-southwest. The axes of the priority conductors are plotted on Figure 1 and lettered A through F for easy identification. The conductors are described as follows:

Anomaly A

Classed as a first priority anomaly, this conductor occurs under a lake on claim L 71476. It is essentially a one line anomaly trending northeast. Fillin lines have almost closed off the anomaly. A prominent lineament crosses the conductor in a northwest direction. The anomaly occurs very near the greenstone-granite contact. No diamond drilling has intersected anomaly A.

Anomaly B

Classed as a first priority anomaly, conductor B is a 1300 foot feature open to the northeast and weakening to the southwest. A small exposure of a rusty coloured zone with contorted foliation containing pyrite was noted at 14N + 4E striking N78^{O}F and dipping 68^{O} to the south. The anomaly is located crossing the boundary between claims L 71477 and L 71476. It is possible that one diamond drill hole intersected this zone, but the core log doesn't indicate any mineralization.

Anomaly C

Classed as a second priority anomaly, this conductor occurs as a one line high in a six line weaker anomaly trending northeast. The conductor can be traced over the entire widths of claims L 77287 and L 71478. No diamond drilling has been done in this area.

Anomaly D

Classed as a first priority anomaly, the conductor occurs as a boomerang shaped anomaly near the baseline.

It extends for 1300 feet with the highest readings on 15S+12W. No diamond drilling has been undertaken near this zone.

Anomaly E

Classed as a second priority anomaly, this conductor extends for 1200 feet. The most anomalous area occurs on the boundary of claims L 39083 and L 71472 under a lake. Two diamond drill holes are located near conductor E, but may not have intersected it.

Anomaly F

Classed as a first priority anomaly, anomaly F appears as an irregular double east-west trending structure. A number of diamond drill holes have been drilled in the eastern half of this conductor and base metal mineralization has been encountered. The western extension, which is mostly overlain by a lake has higher field strength values than the east.

INTERPRETATION OF THE RADEM SURVEY BY THE KAROUS-HJELT METHOD

The results of the VLF survey were examined and traverses 24W to 4E processed by the Karous-Hjelt method.

Even after Karous-Hjelt filtering a fair amount of ambiguity remains. However, several areas are discussed in detail and possible alternative interpretations mentioned.

Anomaly A (See Figure 1 for positions)

This area of anomaly on the northern ends of lines 4W, 00, 4E and possibly 8E coincides with an area of swamp traversed by a fault. On lines 4E+00, there is evidence on the K-H pseudosections of a weak, southerly dipping conductor; this is confirmed on the fillin traverse. However, its continuation west is problematical--the single point anomaly at 18.5N looks as though it could be spurious and a couple of fillin stations either side of the peak of 10N are needed to confirm the anomaly. If genuine, the conductor here appears to have a northerly dip. The swamp has possibly enhanced the anomalies, causing the broadening of the Fraser contour spacings, but a weak linear feature is indicated.

Anomaly B

A strong vertical to slightly S-dipping tabular conductor is indicated here, although it appears to die out rapidly to the W of line 00. It appears most conductive at an apparent depth of +100 feet on 4E, where it is vertical. The true depth is likely to be shallower due to the oblique angle of intersection of traverse and anomaly.

A possible deeper, subparallel structure is indicated beneath the major conductor on line 00; this deeper structure does not reach surface.

Anomaly C

This weak, northerly dipping anomaly can be traced from line 24W to 16W, where it is strongest and is very near surface--in fact it is so shallow it looks artificial although it has a slight N dip. To the east it fades away, dying out on 4W.

Anomaly D

On lines 4W and 8W this feature resembles anomaly B in pseudosection, while on line 12W it is stronger but still seems related. The strength of the anomaly on line 12W is probably due to its perpendicular intersection of the traverse line. The evidence of discontinuity of anomalies westward of line 2W and the similarity of this anomaly in form, strength and pseudosection to anomaly B suggests a major N-S dislocation just W of line 2W. This is supported by a possible dislocation between the southern part of F and E3. A dextral movement of some 800 feet would be required, or appreciable downthrow to the east.

Anomaly E

This linear feature has a weak southerly dip and is strongest on 00 where it appears as a block-edge fault or contact structure with more conductive material to the south. On 4E its maximum is much weaker and deeper though. The anomaly contoured in as the west continuation of the feature on the Fraser plot, on 4W, bears little resemblance in pseudo-section to that on 00.

Anomaly F

This area of strong, confused anomalies is difficult to interpret at the traverse spacing used, and fillin traverses should be conducted. The pseudo-sections are confused due to the close proximity of several strong anomalies; however, similarities may be seen, particularly on lines 8, 12 and 16W where a northerly feature dips N and a southerly feature sips S.

To the west, coincident with the area of swamp, a relatively deep, (150 feet) plug-like or wide dike feature is suggested. It appears from the pseudo-sections that anomaly F has two components; namely the dipping tabular features to the east and a deeper, vertical plug-like or wide dike feature to the west. The latter may, however, be a false impression due to the overlying conductive overburden 'smearing' out the anomaly. There is, however, evidence of a similar deep-seated feature to the east on 16W and 12W.

CONCLUSIONS

In 1979 an Airborne Electromagnetic Survey was completed for the Ontario Geological Survey. The data was published on

Preliminary Map P2270. A number of electromagnetic anomalies (conductors) were located on Marshall Boston Iron Mines Ltd. property. A comparison of their plotted locations with previous diamond drilling showed that most of these conductors had not been tested. As a result of this and the fact that previous diamond drilling had encountered base metal mineralization, a Radem VLF-EM survey was undertaken to locate the conductors on the ground. The ground geophysical survey confirmed the location of the airborne anomalies and showed that most had not been investigated by earlier work.

Six near-vertical conductive features have been distinguished, any one of which has potential for mineralization. A number of these conductors require fillin traverses to better define the zones.

A possible north-south dislocation with a dextral displacement of some 800 feet or considerable downthrow to the east is indicated between lines 2W and 4W. An east-west traverse across this possible feature should indicate if the structure is present.

RECOMMENDATIONS

Due to the quality and strength of these six conductors combined with the possibility of different types of mineralization, namely gold in iron formation and in shear zones, and massive sulfides, all six conductors have potential and warrant further investigation. A program consisting of the following is recommended.

(1) Geophysics. A Maxmin survey should be conducted over the Radem anomalies at a 100m (300') line spacing with a 25m (80') station interval along line. The Maxmin instrument will aid in distinguishing unwanted barren fault or fracture zones and give better depth definition.

(2) Surface Stripping and Trenching. Bedrock exposure of the outlined conductors may be obtained by overburden stripping. The conductors can then be examined and sampled.

(3) Diamond Drilling. Drilling may be warranted on some of the conductors.

COST ESTIMATE FOR RECOMMENDED PROGRAM

Line cutting - 6 miles at $300/mile	$ 1,800.00
Maxmin instrument rental	1,000.00
Machine costs for trenching (9 days)	7,000.00
Diamond drilling allowance - 2,000 feet	40,000.00
Assay allowance	4,000.00
Geologist for three months	13,200.00
Geological Assistant for 2½ montsh	7,500.00
Accommodation - Rent at $225/month	675.00
- Board at $18/day/man	3,089.00
Vehicle (rental & fuel)	2,000.00
Movilization - Toronto for 2 men	300.00
Supervision plus onsite visits	3,000.00
Miscellaneous (taxis, drafting materials)	1,500.00
	$85,064.00
+ Contingencies of 10T	8,506.40
TOTAL	$93,570.40

Respectfully submitted by

A. C. A. HOWE INTERNATIONAL LTD.

T. P. MacMichael, B.Sc.

KAROUS-HJELT PSEUDOSECTIONS

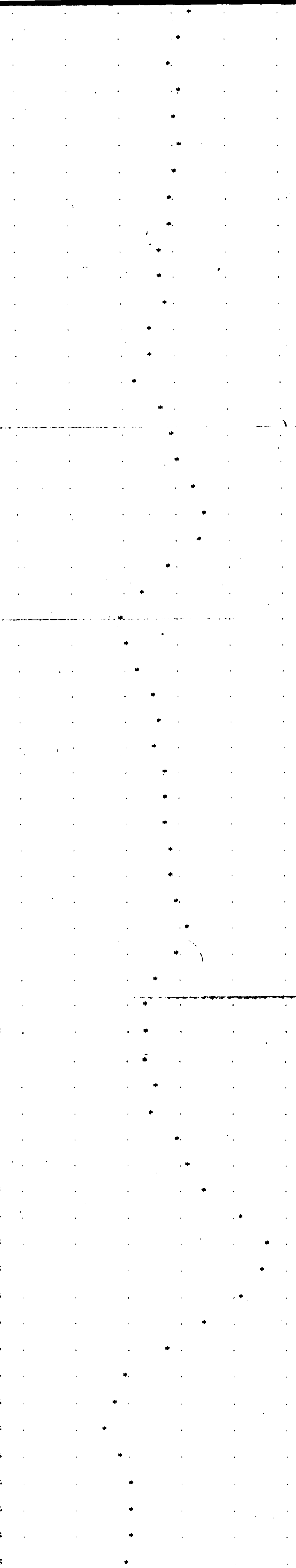
LINE 4W

45.00 30.00 15.00 0.00 -15.00 -30.00

ANOMALY A

ANOMALY D

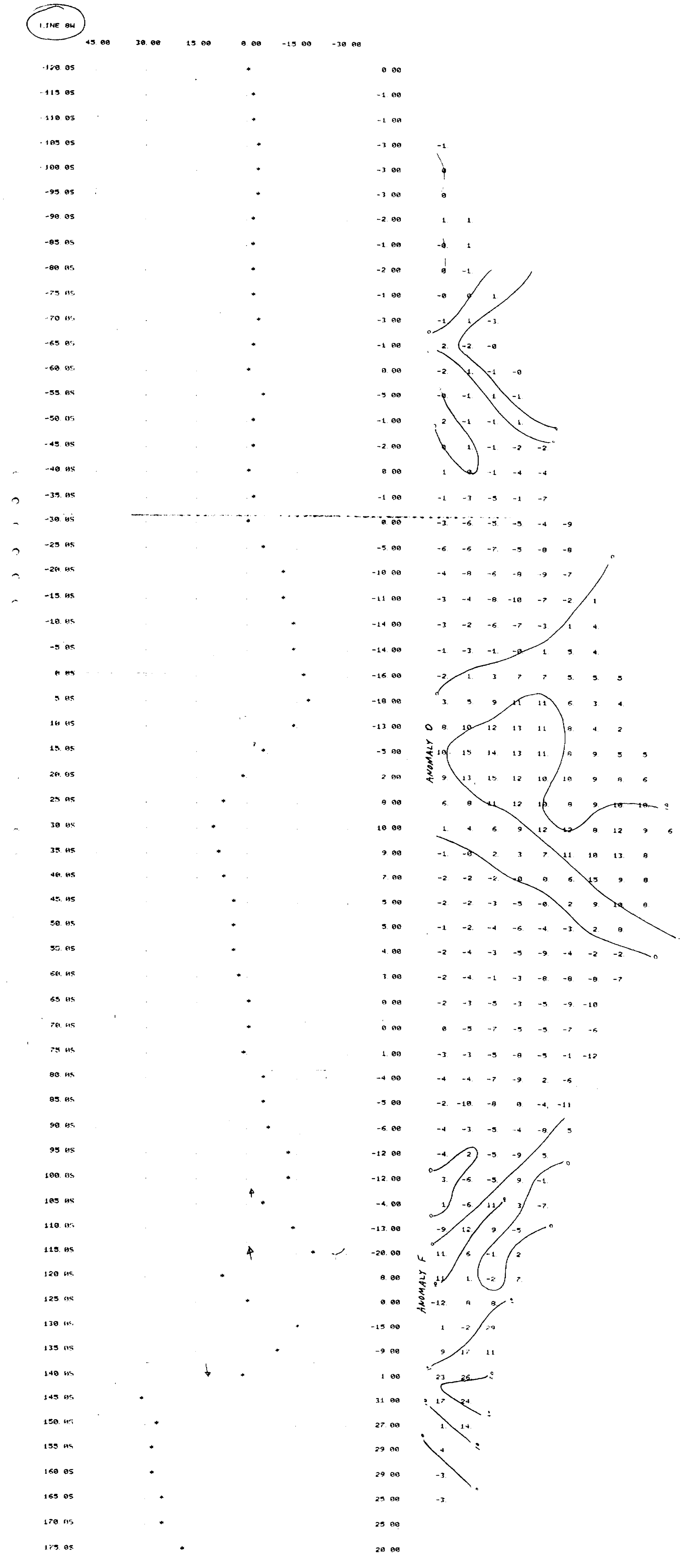
-235.0S	-1.00										
-230.0S	0.00										
-225.0S	0.00										
-220.0S	0.00	-0.									
-215.0S	-1.00	1.									
-210.0S	1.00	1.									
-205.0S	1.00	1.	-1.								
-200.0S	3.00	-1.	-0.								
-195.0S	-2.00	-2.	5.								
-190.0S	0.00	7.	-0.	0.							
-185.0S	10.00	1.	2.	-1.							
-180.0S	3.00	-5.	2.	-0.							
-175.0S	2.00	1.	-7.	-1.	1.						
-170.0S	3.00	-3.	-3.	-6.	-0.						
-165.0S	-2.00	-2.	-1.	-3.	-0.						
-160.0S	-1.00	0.	-2.	-4.	-4.	-9.					
-155.0S	-1.00	-1.	-3.	-4.	-4.	-4.					
-150.0S	-1.00	-2.	-3.	-1.	-5.	-4.					
-145.0S	-5.00	-2.	-3.	-2.	-2.	-5.	-2.				
-140.0S	-5.00	-1.	-2.	-4.	-3.	-0.	-2.				
-135.0S	-6.00	-0.	0.	-3.	-1.	0.	3.				
-130.0S	-5.00	0.	-1.	0.	0.	2.	-0.	1.			
-125.0S	-6.00	-0.	1.	1.	3.	0.	1.	-1.			
-120.0S	-6.00	2.	2.	5.	2.	4.	-0.	-1.			
-115.0S	-4.00	2.	5.	2.	4.	2.	2.	1.	3.		
-110.0S	-2.00	4.	3.	4.	2.	2.	2.	4.	5.		
-105.0S	2.00	0.	3.	3.	4.	3.	3.	7.	7.		
-100.0S	-2.00	-1.	1.	3.	4.	3.	6.	0.	6.	7.	
-95.0S	0.00	1.	0.	2.	2.	4.	6.	6.	9.	8.	
-90.0S	-1.00	-0.	2.	1.	3.	4.	6.	9.	8.	10.	
-85.0S	0.00	2.	2.	4.	1.	3.	7.	9.	10.	5.	5.
-80.0S	1.00	1.	4.	3.	2.	4.	7.	0.	5.	4.	3.
-75.0S	1.00	2.	3.	2.	4.	7.	7.	3.	3.	3.	2.
-70.0S	5.00	3.	1.	4.	6.	9.	4.	-1.	1.	-0.	0.
-65.0S	5.00	-1.	3.	3.	9.	5.	1.	-0.	-5.	-3.	-0.
-60.0S	3.00	2.	2.	5	5.	2.	-0.	-3.	-4.	-4.	3
-55.0S	7.00	2.	3.	1	3.	0.	-2.	-4.	-4.	3.	5
-50.0S	8.00	2.	1.	-0.	-2.	-3.	-4.	-4.	2.	5.	10.
-45.0S	12.00	-2.	-3.	0.	-5.	-6.	-3.	0.	6.	10.	8.
-40.0S	5.00	-6.	-4.	-5.	-6.	-6.	-1.	5.	9.	9.	6
-35.0S	2.00	-3.	-8.	-8.	-7.	0.	3.	7.	9.	6	1
-30.0S	0.00	-4.	-5.	-10.	-3	1.	7.	7.	5	3	-1
-25.0S	-4.00	-4.	-4.	-1.	-1.	5.	5.	7.	3	-0.	-0
-20.0S	-7.00	-0.	1.	4.	6.	2.	3.	1.	2.	-1.	-3.
-15.0S	-6.00	6.	7.	9.	7.	4.	-2.	0	0.	-2.	-1.
-10.0S	3.00	10.	12.	10.	7.	3.	2.	-1.	-2	-4.	1.
-5.0S	10.00	8.	12.	10.	6.	4.	4.	0.	-6.	-4.	-1.
0.0S	16.00	4.	5.	6.	7.	7.	4.	1.	-3.	-6.	-1
5.0S	15.00	-2.	-2.	1	7.	8.	6.	2.	-2.	-1	-3.
10.0S	12.00	-4.	-5.	-2.	1.	7.	6.	2.	0	2.	-1.
15.0S	7.00	-4.	-3.	-7.	-3.	1.	5	3.	2	2.	3
20.0S	6.00	-1.	-3.	-5.	-6.	-4.	-1.	2.	4.	6.	7



-115.0S	-4.00	2.	5.	2.	4.	2.	2.	1.	3.		
-110.0S	-2.00	4.	3.	4.	2.	2.	2.	4.	5.		
-105.0S	2.00	0.	3.	3.	4.	3.	3.	7.	7.		
-100.0S	-2.00	-1.	1	3.	4.	3.	6.	0.	6.	7.	
-95.0S	0.00	1.	0.	2.	2.	4.	6.	6.	9.	8.	
-90.0S	-1.00	-0.	2.	1.	3.	4.	6.	9.	8.	10.	
-85.0S	0.00	2.	2.	4.	1.	3.	7.	9.	10.	5.	5.
-80.0S	1.00	1.	4.	3.	2.	4.	7.	8.	5.	4.	3.
-75.0S	1.00	2.	3.	2.	4.	7.	7.	3.	3.	3.	2.
-70.0S	5.00	3.	1.	4.	6.	9.	4.	-1.	1.	-0.	0.
-65.0S	5.00	-1.	3.	3.	9.	5.	1.	-0.	-5.	-3.	-0.
-60.0S	3.00	2.	2.	5.	5.	2.	-0.	-3.	-4.	-4.	3
-55.0S	7.00	2	3.	1.	3.	0.	-2.	-4.	-4.	3.	5
-50.0S	8.00	2.	1.	-0.	-2.	-3.	-4.	-4.	2.	5.	10.
-45.0S	12.00	-2.	-3.	0.	-5.	-6.	-3.	0.	6.	10.	8.
-40.0S	5.00	-6.	-4.	-5.	-6.	-6.	-1.	5.	9.	9.	6.
-35.0S	2.00	-3.	-8.	-8.	-7.	0.	3.	7.	9.	6.	1
-30.0S	0.00	-4.	-5.	-10	-3	1.	7.	7.	5.	3.	-1
-25.0S	-4.00	-4.	-4.	-1.	-1	5.	5.	7.	3.	-0.	-0
-20.0S	-7.00	-0.	1.	4.	6.	2.	3.	1.	2.	-1.	-3.
-15.0S	-6.00	6.	7.	9.	7.	4.	-2.	0.	0.	-2.	-1.
-10.0S	3.00	10.	12.	10.	7.	3.	2.	-1.	-2.	-4.	1.
-5.0S	10.00	0.	12.	10.	6.	4.	4.	0.	-6.	-4.	-1.
0.0S	16.00	4.	5.	6.	7.	7.	4.	1.	-3.	-6.	-1.
5.0S	15.00	-2.	-2.	1.	7.	8.	6.	2.	-2.	-1.	-3.
10.0S	12.00	-4.	-5.	-2.	1.	7.	6.	2.	0.	2.	-1.
15.0S	7.00	-4.	-3.	-7.	-3.	1.	5.	3.	2.	2.	3.
20.0S	6.00	-1.	-3.	-5.	-6.	-4.	-1.	2.	4.	6.	7.
25.0S	7.00	-1.	-1.	-3.	-6.	-9.	-8.	-4.	6.	11.	11.
30.0S	5.00	-1.	-2.	0.	-4.	-10.	-13.	-6.	5	12.	14.
35.0S	5.00	-1.	-3.	-0.	-2.	-9.	-12.	-5.	4.	8.	
40.0S	4.00	-2.	-1.	-3.	-3.	-5.	-6.	-1.	1.	3.	
45.0S	3.00	-1.	-2.	-4.	-3.	-2.	-0.	2.	0.	-2.	
50.0S	3.00	-1.	-2.	-3.	0.	1.	3.	4.	-0.		
55.0S	1.00	-2.	-1.	0.	0.	3.	5.	3.	2.		
60.0S	-1.00	0.	2.	3.	0.	4.	6.	3.	-2		
65.0S	1.00	5.	5.	3.	1.	4.	7.	8.			
70.0S	7.00	5.	6.	3.	1.	6.	3.	-1.			
75.0S	10.00	3.	4.	2.	4.	2.	1.	-4.			
80.0S	11.00	1.	-1.	2.	3.	1.	-4.				
85.0S	10.00	-2.	-2.	-4.	1.	-2.	-10.				
90.0S	0.00	-1.	-7.	-6.	-5.	-9.	-14.				
95.0S	9.00	-4.	-7.	-8.	-12.	-17.					
100.0S	2.00	-7.	-8.	-12.	-19.	-18.					
105.0S	-1.00	-6.	-14.	-15.	-10.	-15.					
110.0S	-6.00	-10.	-14.	-15.	-13.						
115.0S	-16.00	-11.	-10.	-9.	-8.						
120.0S	-24.00	-3.	-5.	-3.	3.						
125.0S	-22.00	5.	6.	6.							
130.0S	-16.00	11.	16.	18.							
135.0S	-6.00	14.	21	25.							
140.0S	5.00	15.	[illegible]								
145.0S	17.00	10.	17								
150.0S	20.00	4.	10.								
155.0S	22.00	[illegible]									
160.0S	10.00	-4.									
165.0S	15.00	-2.									
170.0S	15.00										
175.0S	15.00										
180.0S	16.00										

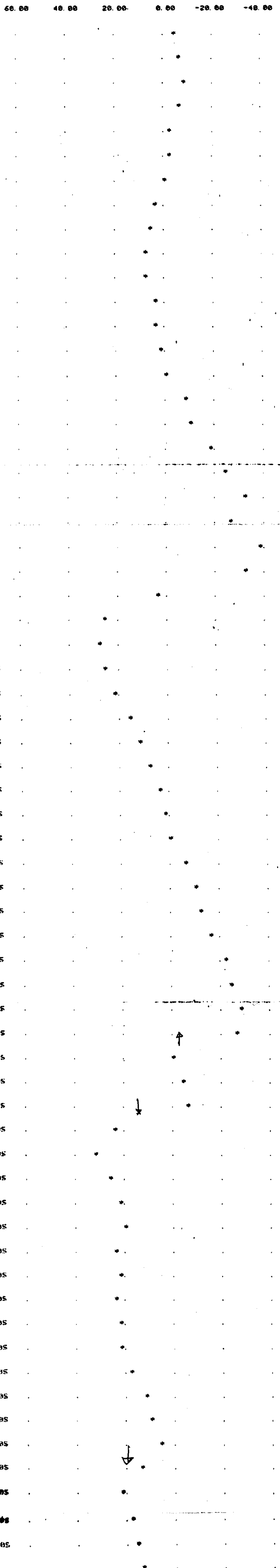
ANOMALY D

ANOMALY E ?



LINE 8W
45.00
30.00
15.00
0.00
-15.00
-30.00
ANOMALY O
ANOMALY F

LINE 12W



-100. 0S	-4. 00										
-95. 0S	-7. 00										
-90. 0S	-8. 00										
-85. 0S	-6. 00	3.									
-80. 0S	-3. 00	3.									
-75. 0S	-2. 00	3.									
-70. 0S	0. 00	4.	5.								
-65. 0S	4. 00	4.	5.								
-60. 0S	6. 00	2.	4.								
-55. 0S	7. 00	1.	-0.	0.							
-50. 0S	7. 00	-2.	-2.	-3.							
-45. 0S	4. 00	-2.	-4.	-5.							
-40. 0S	4. 00	-2.	-6.	-10.	-5.						
-35. 0S	2. 00	-4.	-9.	-11.	-8.						
-30. 0S	-1. 00	-7.	-10.	-10.	-12.						
-25. 0S	-8. 00	-7.	-14.	-10.	-17.	-19.					
-20. 0S	-11. 00	-8.	-15.	-14.	-16.	-24.					
-15. 0S	-18. 00	-8.	-11.	-12.	-22.	-20.					
-10. 0S	-24. 00	-10.	-4.	-17.	-16.	0.	11.				
-5. 0S	-32. 00	-2.	-9.	-12.	5.	15.	13.				
0. 0S	-26. 00	-1.	-4.	11.	20.	19.	13.				
5. 0S	-38. 00	-0.	20.	27.	24.	19.	15.	11.			
10. 0S	-32. 00	26.	29.	32.	26.	21.	13.	12.			
15. 0S	3. 00	34.	36.	27.	28.	20.	15.	12.			
20. 0S	26. 00	16.	33.	33.	21.	21.	18.	17.	12.		
25. 0S	27. 00	3.	11.	25.	25.	15.	20.	20.	14.		
30. 0S	25. 00	-1.	-5.	4.	19.	20.	16.	22.	14.		
35. 0S	22. 00	-6.	-5.	-12.	-3.	19.	23.	15.	16.	8.	
40. 0S	16. 00	-8.	-6.	-13.	-16.	-3.	10.	17.	11.	10.	
45. 0S	11. 00	-6.	-10.	-12.	-10.	-19.	-5.	12.	13.	3.	
50. 0S	7. 00	-6.	-10.	-9.	-16.	-17.	-21.	-9.	6.	8.	-0.
55. 0S	3. 00	-4.	-9.	-9.	-14.	-10.	-24.	-28.	-16.	2.	8.
60. 0S	2. 00	-4.	-10.	-12.	-11.	-19.	-25.	-30.	-32.	-17.	19.
65. 0S	-1. 00	-6.	-10.	-11.	-6.	-16.	-26.	-32.	-32.	-14.	-3.
70. 0S	-6. 00	-6.	-11.	-11.	-8.	-12.	-26.	-29.	-17.	-10.	-10.
75. 0S	-10. 00	-5.	-11.	-14.	-11.	-15.	-19.	-11.	-17.	-19.	-2.
80. 0S	-13. 00	-5.	-8.	-12.	-16.	-11.	1.	-10.	-14.	-1.	4.
85. 0S	-16. 00	-7.	-7.	-11.	-16.	4.	1.	-7.	6.	7.	1.
90. 0S	-22. 00	-5.	-10.	-7.	2.	-0.	-1.	15.	13.	7.	2.
95. 0S	-24. 00	-2.	-4.	7.	2.	-2.	19.	22.	15.	6.	
100. 0S	-29. 00	-2.	16.	6.	3.	17.	25.	21.	14.	8.	
105. 0S	-27. 00	17.	13.	8.	22.	23.	21.	20.	16.	12.	
110. 0S	0. 00	17.	13.	27.	30.	21.	18.	23.	21.		
115. 0S	-4. 00	-1.	29.	35.	28.	22.	19.	25.	23.		
120. 0S	-7. 00	19.	20.	30.	20.	23.	24.	22.	23.		
125. 0S	24. 00	22.	19.	13.	25.	29.	25.	23.			
130. 0S	32. 00	2.	20.	14.	12.	20.	20.	23.			
135. 0S	26. 00	-2.	1.	17.	15.	13.	26.	25.			
140. 0S	22. 00	-3.	-5.	1.	10.	15.	10.				
145. 0S	20. 00	-0.	0.	-3.	1.	15.	10.				
150. 0S	23. 00	1.	3.	1.	-2.	-5.	9.				
155. 0S	22. 00	-0.	0.	2.	-2.	-12.					
160. 0S	23. 00	-0.	-3.	2.	-3.	-8.					
165. 0S	22. 00	-2.	-3.	-3.	-2.	-7.					
170. 0S	21. 00	-3.	-5.	-8.	-8.						
175. 0S	17. 00	-6.	-7.	-12.	-3.						
180. 0S	12. 00	-5.	-9.	-6.	1.						
185. 0S	9. 00	-3.	-3.	-1.							
190. 0S	6. 00	2.	4.	2.							
195. 0S	13. 00	0.	6.	3.							
200. 0S	21. 00	4.	6.								
210. 0S	10. 00	-3.	-5.								
215. 0S	16. 00	-3.									
	13. 00	-3.									

ANOMALY D

ANOMALY F

LINE 16W

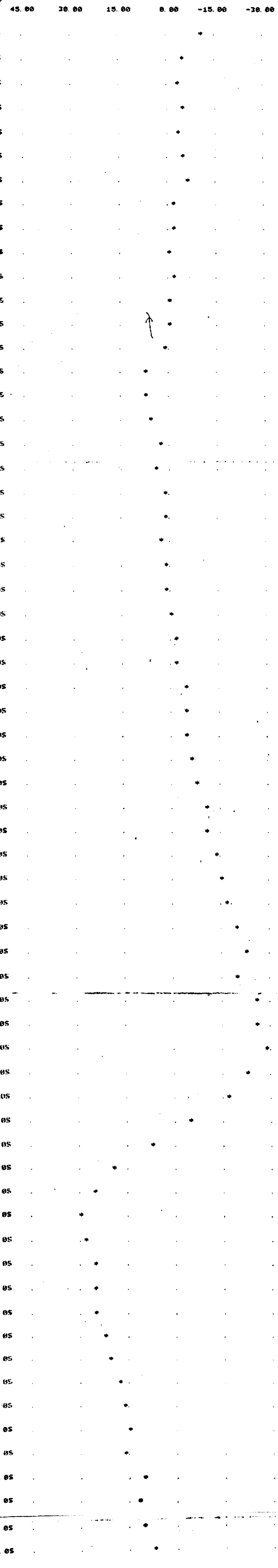
45.00 30.00 15.00 0.00 -15.00 -30.00

-100.0S	-5.00										
-95.0S	-7.00										
-90.0S	-3.00										
-85.0S	-5.00	-2.									
-80.0S	-6.00	-0.									
-75.0S	-6.00	-8.									
-70.0S	-6.00	-1.	-1.								
-65.0S	-7.00	-2.	-0.								
-60.0S	-9.00	-5.	-0.								
-55.0S	-14.00	2.	-8.	5.							
-50.0S	-9.00	-1.	7.	19.							
-45.0S	-21.00	6.	23.	13.							
-40.0S	2.00	27.	13.	13.	11.						
-35.0S	26.00	7.	17.	11.	14.						
-30.0S	14.00	-7.	4.	10.	11.						
-25.0S	9.00	-1.	-9.	5.	17.	8.					
-20.0S	9.00	-1.	-1.	-9.	3.	15.					
-15.0S	10.00	-0.	4.	-4.	-11.	3.					
-10.0S	10.00	-1.	-0.	0.	-3.	-11.	2.				
-5.0S	9.00	-2.	-3	2.	-2	-5.	-11.				
0.0S	7.00	-1.	-1.	2.	-1.	-1.	-6.				
5.0S	7.00	1.	-1.	-2.	1.	-3.	-4.	-7.			
10.0S	9.00	0.	-0.	-3.	-1.	-4.	-5.	-0.			
15.0S	8.00	-1.	0.	-2.	-1.	-2.	-6.	-4.			
20.0S	7.00	-0.	-3.	-3.	-3.	-2.	-0.	-5.	-7.		
25.0S	0.00	-1.	-3.	-4.	-5.	-5.	-2.	-6.	-8.		
30.0S	6.00	-3.	-3.	-4.	-8.	-5.	-2.	-6.	-7.		
35.0S	4.00	-2.	-4.	-7.	-8.	-9.	-3.	-4.	-9.	-10.	
40.0S	3.00	-1.	-6.	-8.	-9.	-8.	-5.	-5.	-8.	-11.	
45.0S	3.00	-4.	-5.	-8.	-11.	-6.	-4.	-8.	-8.	-10.	
50.0S	-3.00	-5.	-6	-8.	-9.	-6.	-7.	-9.	-9.	-11.	-13.
55.0S	-4.00	-2.	-8.	-8.	-5.	-6.	-14.	-8.	-11.	-11.	-15.
60.0S	-6.00	-3.	-4.	-8.	-4.	-8.	-10.	-10.	-10.	-13.	-15.
65.0S	-8.00	-2.	-4.	-5.	-6.	-9.	-11.	-11.	-12.	-13.	10.
70.0S	-8.00	-1.	-4.	-3.	-2.	-11.	-10.	-13.	-11.	9.	11.
75.0S	-9.00	-1.	-4.	-0.	-7.	-7.	-11.	-12.	12	12	11.
80.0S	-10.00	-3.	-3.	-1.	-7.	-8.	-7.	10.	13.	14.	12
85.0S	-13.00	-2.	-1.	-4.	-7.	-6.	15.	16.	10.	14.	6.
90.0S	-12.00	-2.	-0.	-6.	-6.	10.	10.	16.	15.	8.	4
95.0S	-16.00	-3.	-2.	-5.	10.	20.	10.	17.	9.	6.	
100.0S	-17.00	2.	-2.	19.	21.	19.	10.	11.	7.	7.	
105.0S	-19.00	1.	21.	22.	22.	19.	12.	8.	12.	15.	
110.0S	-18.00	24.	23.	25.	22.	14.	9.	12.	16.		
115.0S	21.00	26.	26.	25.	17.	10.	14.	17.	19.		
120.0S	25.00	3.	26.	19.	14.	16.	19.	21.	20.		
125.0S	25.00	3.	-2.	15.	19.	22.	23.	20.			
130.0S	25.00	-6.	-8.	-3.	23.	26.	24.	21.			
135.0S	13.00	-10.	-3.	-1.	3.	25.	23.	22.			
140.0S	7.00	0.	3.	2.	1.	2.	24.				
145.0S	13.00	8.	8.	4.	-0.	0.	1.				
150.0S	22.00	7.	10.	10.	1.	-0.	-3.				
155.0S	26.00	3.	4.	14.	10.	-3.					
160.0S	26.00	-1.	0.	6.	10.	4.					
165.0S	23.00	-1.	-1.	-3.	7.	9.					
170.0S	25.00	0.	-3.	-6.	2.						
175.0S	24.00	-4.	-1.	-5.	-6.						
180.0S	19.00	-3.	-4.	-3.	-7.						
185.0S	19.00	-0.	-5.	-3.							
190.0S	19.00	-2.	-2.	-4.							
195.0S	17.00	-1	-2	-3.							
200.0S	17.00	-1.	-3.								
205.0S	16.00	-2.	-2.								
210.0S	15.00	-1.	-3.								

ANOMALY C

ANOMALY F

LINE 20W

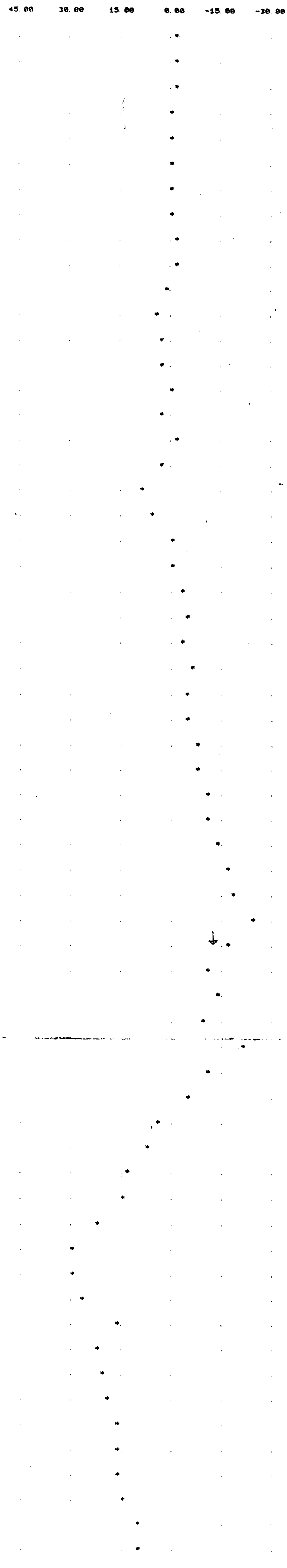


ANOMALY C

ANOMALY F

-80.0S	-10.00										
-75.0S	-5.00										
-70.0S	-3.00										
-65.0S	-5.00	0.									
-60.0S	-3.00	0.									
-55.0S	-5.00	-2.									
-50.0S	-6.00	2.	2.								
-45.0S	-2.00	3.	3.								
-40.0S	-1.00	1.	4.								
-35.0S	0.00	0.	2.	4.							
-30.0S	-1.00	0.	1.	2.							
-25.0S	0.00	1.	1.	5.							
-20.0S	0.00	1.	5.	4.	5.						
-15.0S	2.00	4.	4.	4.	2.						
-10.0S	7.00	3.	3.	2.	3.						
-5.0S	7.00	-0.	1.	3.	1.	2.					
0.0S	6.00	-2.	-1.	-0.	1.	1.					
5.0S	3.00	-1.	-3.	-3.	1.	0.					
10.0S	5.00	-1.	-2.	-3.	-3.	-0.	-1.				
15.0S	2.00	-2.	-0.	-2.	-3.	-5.	-3.				
20.0S	2.00	1.	-2.	-0.	-4.	-5.	-6.				
25.0S	3.00	-1.	-1.	-3.	-3.	-5.	-7.	-7.			
30.0S	2.00	-1.	-2.	-2.	-4.	-5.	-7.	-7.			
35.0S	2.00	-1.	-3.	-4.	-4.	-6.	-5.	-7.			
40.0S	0.00	-2.	-3.	-5.	-4.	-4.	-8.	-5.	-4.		
45.0S	-1.00	-1.	-4.	-5.	-5.	-6.	-6.	-7.	-2		
50.0S	-2.00	-2.	-3.	-4.	-6.	-7.	-7.	-3.	-6		
55.0S	-4.00	-2.	-2	-5.	-7.	-9.	-6.	-4.	-5.	-9	
60.0S	-4.00	-0.	-3.	-5.	-8.	-8.	-6.	-5.	-7.	-10	
65.0S	-4.00	-2.	-3.	-6.	-7.	-9.	-6.	-6	-9.	-12.	
70.0S	-6.00	-2.	-5.	-5.	-9.	-7.	-5.	-8.	-11.	-12.	-15
75.0S	-8.00	-3.	-5.	-7.	-7.	-7.	-6.	-9.	-11	-16	-16.
80.0S	-11.00	-2	-6.	-8.	-8.	-6.	-8.	-8.	-14	-15.	-18.
85.0S	-10.00	-2.	-5.	-8.	-8.	-6.	-7.	-12.	-14.	-16	-14.
90.0S	-14.00	-4.	-5.	-8.	-7.	-5.	-11.	-12.	-15	-12.	-9.
95.0S	-15.00	-2.	-7.	-6.	-4.	-8.	-11.	-14.	-10.	-8.	
100.0S	-17.00	-3.	-6.	-4.	-5.	-8.	-13.	-11.	-7.	-0	
105.0S	-20.00	-4.	-3.	-5	-6.	-9.	-8.	-6.	-0.	6.	
110.0S	-22.00	-1.	-5.	-4.	-6.	-7.	-3.	2.	6.		
115.0S	-20.00	-3.	-2	-4.	-3.	-1	3.	9.	14.		
120.0S	-26.00	-3.	-2.	1.	1.	6.	11.	16.	20.		
125.0S	-26.00	-1.	1.	5.	10.	14.	19.	22.			
130.0S	-29.00	3.	8.	10.	17.	22.	24.	24.			
135.0S	-23.00	9.	15.	20.	22.	27.	28.	25.			
140.0S	-16.00	13.	22.	26.	30.	28.	28.				
145.0S	-4.00	16.	25.	32.	31.	30.	25.				
150.0S	7.00	16.	25.	31.	33.	29.	28.				
155.0S	19.00	13.	21.	26.	28.	30.					
160.0S	26.00	8.	15.	17.	23.	27.					
165.0S	30.00	3.	6.	12.	17.	21.					
170.0S	29.00	-2.	2.	6.	9.						
175.0S	25.00	-2.	-1.	1.	2.						
180.0S	25.00	-1.	-3.	-2.	-3.						
185.0S	25.00	-3.	-2.	-3.							
190.0S	22.00	-3.	-5.	-3.							
195.0S	21.00	-3.	-6.	-5.							
200.0S	18.00	-3.	-5.								
205.0S	16.00	-3.	-4.								
210.0S	15.00	-1.	-5.								
215.0S	16.00	-3.									
220.0S	11.00	-3.									
225.0S	12.00	-1.									
230.0S	10.00										
235.0S	8.00										
[illegible]	6.00										

LINE 24W

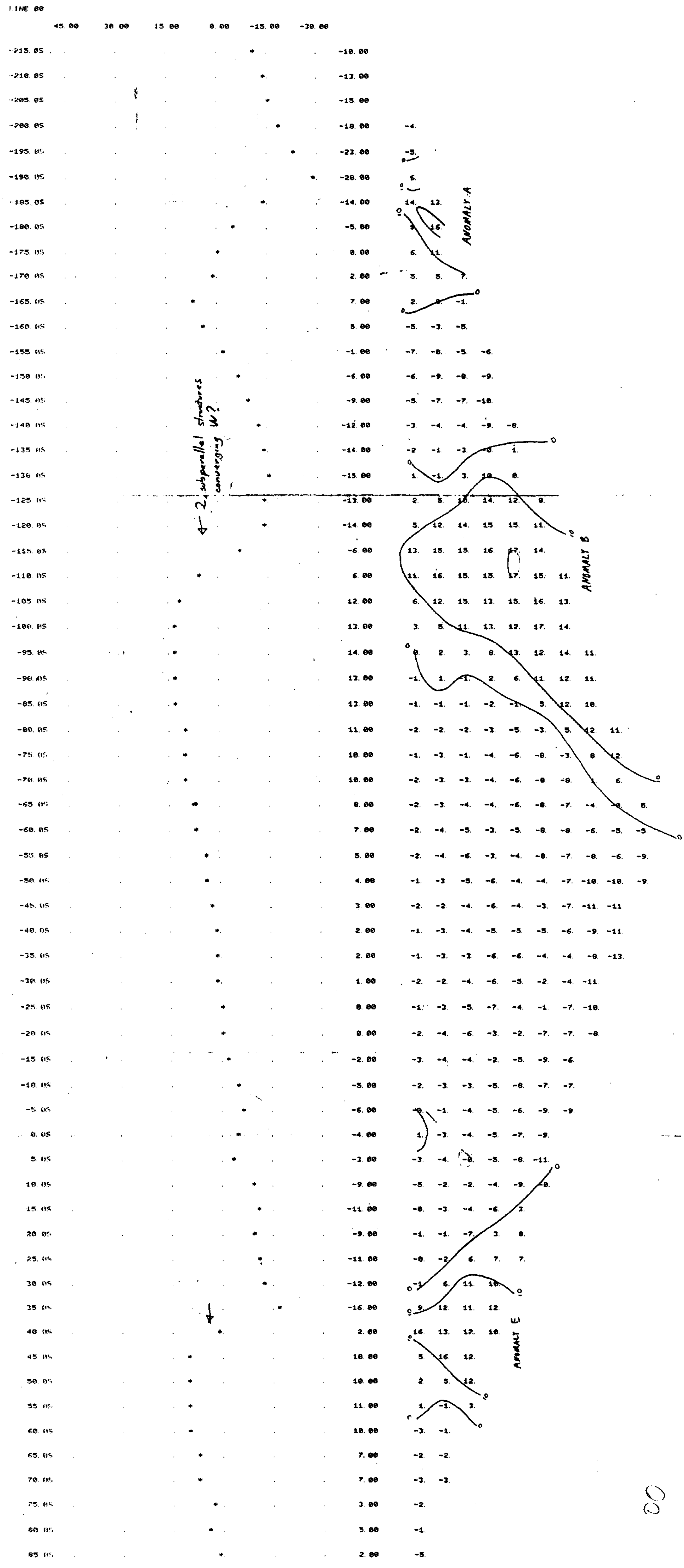


-100.0S	-1.00										
-95.0S	-1.00										
-90.0S	-2.00										
-85.0S	0.00	1.									
-80.0S	0.00	-0.									
-75.0S	0.00	0									
-70.0S	0.00	-0	-0.								
-65.0S	0.00	-0.	-1.								
-60.0S	-1.00	-1.	1.								
-55.0S	-2.00	2.	2.	3.							
-50.0S	2.00	3.	2.	2.							
-45.0S	4.00	0.	3.	1.							
-40.0S	3.00	0.	-0.	2.	-0.						
-35.0S	3.00	-2.	-0.	-2.	2.						
-30.0S	0.00	0.	-3	-1.	4.						
-25.0S	3.00	-0	0.	3.	1	-2.					
-20.0S	-1.00	-0.	5.	1.	-2.	-3.					
-15.0S	3.00	5.	1.	0.	-2.	-4.					
-10.0S	9.00	1	0	-2.	-2.	-5.	-4.				
-5.0S	6.00	-5	-2.	-2	-4.	-3.	-5.				
0.0S	0.00	-3.	-7.	-5.	-2.	-7.	-3.				
5.0S	0.00	-2.	-6.	-8.	-6.	-3.	-5.	-3.			
10.0S	-3.00	-3.	-2.	-8.	-9.	-5.	-4.	-4.			
15.0S	-4.00	-0.	-4.	-3.	-8.	-9.	-5.	-4.			
20.0S	-3.00	-2	-2.	-4.	-5.	-7.	-10.	-5.	-3		
25.0S	-6.00	-1.	-2.	-3.	-4.	-7.	-8.	-11.	-7		
30.0S	-4.00	0.	-3.	-4.	-4.	-6.	-6.	-9.	-12		
35.0S	-5.00	-2.	-2.	-6.	-3.	-6.	-7.	-6.	-15.	-13.	
40.0S	-7.00	-1.	-5.	-3.	-7.	-5.	-6.	-10.	-8.	-8.	
45.0S	-7.00	-3.	-4.	-6	-6.	-7.	-8.	-5.	-4.	-7.	
50.0S	-11.00	-2.	-5.	-6.	-9.	-8.	-4.	-2.	-5.	-5.	-12.
55.0S	-10.00	-2.	-4.	-8.	-11.	-5.	1.	-5.	-2	-10.	-6.
60.0S	-14.00	-5.	-4.	-10.	-4.	-1.	-3.	-8.	-10.	-4.	
65.0S	-16.00	-2	-8.	-3.	-0.	-2.	-2.	-9.	-2	-0	
70.0S	-18.00	-4.	-3.	2.	0.	1.	-7.	-4.	0.	5.	
75.0S	-24.00	0	3.	1.	3.	-4.	-2.	2.	5.		
80.0S	-17.00	0.	3.	5.	-1.	-0.	3.	6.	0.		
85.0S	-10.00	0.	10.	-0.	5.	7.	7.	11.	11.		
90.0S	-14.00	2.	-1.	9.	9.	12.	12.	12			
95.0S	-9.00	-3	1.	10.	16.	15.	17.	15.			
100.0S	-21.00	-0.	8.	10.	14.	21.	19.	21.			
105.0S	-11.00	11.	11.	14.	13.	19.	26.				
110.0S	-4.00	9.	19.	13.	17	19.	26.				
115.0S	4.00	9.	16.	22.	18.	25.	22.				
120.0S	8.00	7.	12.	21.	29.	21.					
125.0S	13.00	6.	11.	21.	25.	27.					
130.0S	15.00	7.	15.	15.	19.	15.					
135.0S	23.00	9.	12.	12.	9.						
140.0S	30.00	4.	8.	3.	8.						
145.0S	30.00	-1.	-3.	7.	5.						
150.0S	27.00	-8.	-4.	1.							
155.0S	16.00	-3.	-4.	-4.							
160.0S	22.00	2.	-3.	-7.							
165.0S	21.00	-2.	0.								
170.0S	20.00	-2.	-4.								
175.0S	17.00	-2.	-4.								
180.0S	17.00	-1.									
185.0S	17.00	-2.									
190.0S	15.00	-4.									
195.0S	11.00										
200.0S	10.00										
205.0S	10.0[illegible]										

ANOMALY C

ANOMALY F

24W


LINE 00
45.00 30.00 15.00 0.00 -15.00 -30.00
ANOMALY A
ANOMALY B
ANOMALY E
2 subparallel structures converging W?

LINE 4E

45.00 30.00 15.00 0.00 -15.00 -30.00

100.0S	-3.00										
-235.0S	-6.00										
-230.0S	-7.00										
-225.0S	-7.00										
-220.0S	-8.00	-2.									
-215.0S	-9.00	-0.									
-210.0S	-8.00	-5.									
-205.0S	-17.00	-3.	-1.								
-200.0S	-13.00	3.	-1.								
-195.0S	-11.00	1.	1.								
-190.0S	-9.00	-1.	-1.	4.							
-185.0S	-13.00	-3.	-2.	1.							
-180.0S	-13.00	-8.	-5.	-1.							
-175.0S	-13.00	-3.	-1.	-3.	-5.						
-170.0S	-10.00	-4.	0.	-3.	-2.						
-165.0S	-19.00	-0.	-1.	1.	10.						
-160.0S	-19.00	1.	4.	12.	19.	21.					
-155.0S	-20.00	6.	15.	22.	21.	22.					
-150.0S	-13.00	16.	23.	24.	25.	21.					
-145.0S	5.00	21.	25.	26.	25.	22.	17.				
-140.0S	20.00	13.	23.	20.	23.	21.	18.				
-135.0S	24.00	6.	12.	19.	21.	19.	17.				
-130.0S	26.00	1.	1.	7.	15.	19.	17.	16.			
-125.0S	24.00	-4.	-1.	-3.	4.	14.	17.	15.			
-120.0S	20.00	-5.	-4.	-6.	-5.	3.	12.	14.			
-115.0S	17.00	-4.	-6.	-6.	-7.	-7.	1.	11.	14.		
-110.0S	14.00	-4.	-5.	-4.	-9.	-10.	-7.	-0.	11.		
-105.0S	11.00	-2.	-5.	-4.	-8.	-11.	-11.	-8.	0.		
-100.0S	11.00	-1.	-5.	-5.	-4.	-10.	-12.	-9.	-8.	1.	
-95.0S	10.00	-2.	-4.	-4.	-3.	-6.	-10.	-11.	-10.	-8.	
-90.0S	8.00	-3.	-3.	-5.	-2.	-3.	-8.	-10.	-13.	-11.	
-85.0S	6.00	-1.	-4.	-5.	-2.	-2.	-4.	-10.	-11.	-12.	-12.
-80.0S	7.00	-1.	-2.	-4.	-4.	0.	-3.	-7.	-9.	-12.	-14.
-75.0S	5.00	-1.	-1.	-3.	-4.	-2.	-1.	-5.	-8.	-11.	-13.
-70.0S	6.00	1.	-1.	-1.	-4.	-3.	-1.	-2.	-7.	-9.	-10.
-65.0S	6.00	-0.	-0.	-3.	-4.	-4.	-1.	-2.	-5.	-7.	-10.
-60.0S	6.00	-0.	-2.	-2.	-4.	-4.	-1.	-2.	-3.	-6.	-10.
-55.0S	6.00	-1.	-2.	-3.	-3.	-6.	-3.	0.	-3.	-6.	-8.
-50.0S	4.00	-2.	-2.	-3.	-4.	-5.	-4.	-0.	-2.	-5.	-8
-45.0S	3.00	-1.	-2.	-4.	-5.	-4.	-4.	-3.	-1.	-4.	
-40.0S	3.00	-1.	-2.	-4.	-4.	-5.	-6.	-4.	-3.	-1.	
-35.0S	2.00	-1.	-3.	-2.	-5.	-6.	-7.	-7.	0.	-1.	
-30.0S	1.00	-2.	-2.	-2.	-5.	-5.	-7.	-5.	-2.		
-25.0S	-1.00	-0.	-2.	-4.	-3.	-5.	-5.	-6.	-5.		
-20.0S	1.00	-0.	-2.	-3.	-4.	-2.	-4.	-7.	-7.		
-15.0S	-1.00	-3.	-2.	-3.	-1.	-3.	-4.	-6.			
-10.0S	-3.00	-1.	-3.	0.	-1.	-3.	-4.	-5.			
-5.0S	-3.00	-1.	0.	-1.	-1.	-3.	-3.	-4.			
0.0S	-4.00	1.	1.	-1.	-3.	-1.	-2.				
5.0S	0.00	2.	0.	-1.	-2.	-2.	0.				
10.0S	-1.00	-2.	0.	-0.	0.	1.	1.				
15.0S	-3.00	-1.	-1.	1.	2.	4.					
20.0S	-4.00	-0.	-0.	-0.	5.	4.					
25.0S	-3.00	1.	2.	3.	3.	4.					
30.0S	-2.00	2.	5.	5.	3.						
35.0S	0.00	4.	4.	5.	2.						
40.0S	4.00	3.	3.	3.	2.						
45.0S	5.00	0.	1.	2.							
50.0S	4.00	-2.	-1.	1.							
55.0S	1.00	-2.	-1.	-1.							
60.0S	1.00	1.	-0.								
65.0S	[illegible]	1.	2.								
70.0S	3.00	1.	2.								

ANOMALY A

ANOMALY B

ANOMALY E

0 10 20

Ontario

Ministry of N

GEOPHYSICAL – GEOL
TECHNICAL D

32D04SW0322 2.4171 BOSTON

RECEI
OCT 1 - 900
MINING LANDS

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

Type of Survey(s) GEOPHYSICAL RADEM VLF-EM
Township or Area BOSTON TOWNSHIP
Claim Holder(s) MARSHALL BOSTON IRON MINES LTD.

Survey Company A.C.A. HOWE INTERNATIONAL LTD.
Author of Report T. P. MacMichael
Address of Author Suite 826-159 Bay St, Toronto, Ont.
Covering Dates of Survey March 16 - June 19, 1981
(linecutting to office)
Total Miles of Line Cut

SPECIAL PROVISIONS
CREDITS REQUESTED

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

ENTER 20 days for each additional survey using same grid.

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

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

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

DATE: Sept. 21/81 SIGNATURE: T. P. MacMichael
Author of Report or Agent

MINING CLAIMS TRAVERSED
List numerically

L579084 ✓
(prefix) (number)

If space insufficient, attach list

TOTAL CLAIMS 1

OFFICE USE ONLY

Res. Geol. ______ Qualifications 2.3766

Previous Surveys

File No.	Type	Date	Claim Holder

GEOPHYSICAL TECHNICAL DATA

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

Number of Stations 65 Number of Readings 130

Station interval 50 feet Line spacing ______

Profile scale ______

Contour interval Fraser Filter: From 0 upwards every 20 units.
Field Strength: From 100 upwards every 20%.

MAGNETIC

Instrument ______

Accuracy – Scale constant ______

Diurnal correction method ______

Base Station check-in interval (hours) ______

Base Station location and value ______

ELECTROMAGNETIC

Instrument Crone Radem VLF-EM

Coil configuration ______

Coil separation ______

Accuracy ______

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

Frequency Cutler Maine
(specify V.L.F. station)

Parameters measured Dip Angle and Field Strength

GRAVITY

Instrument ______

Scale constant ______

Corrections made ______

Base station value and location ______

Elevation accuracy ______

INDUCED POLARIZATION RESISTIVITY

Instrument ______

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time ______ Frequency ______

– Off time ______ Range ______

– Delay time ______

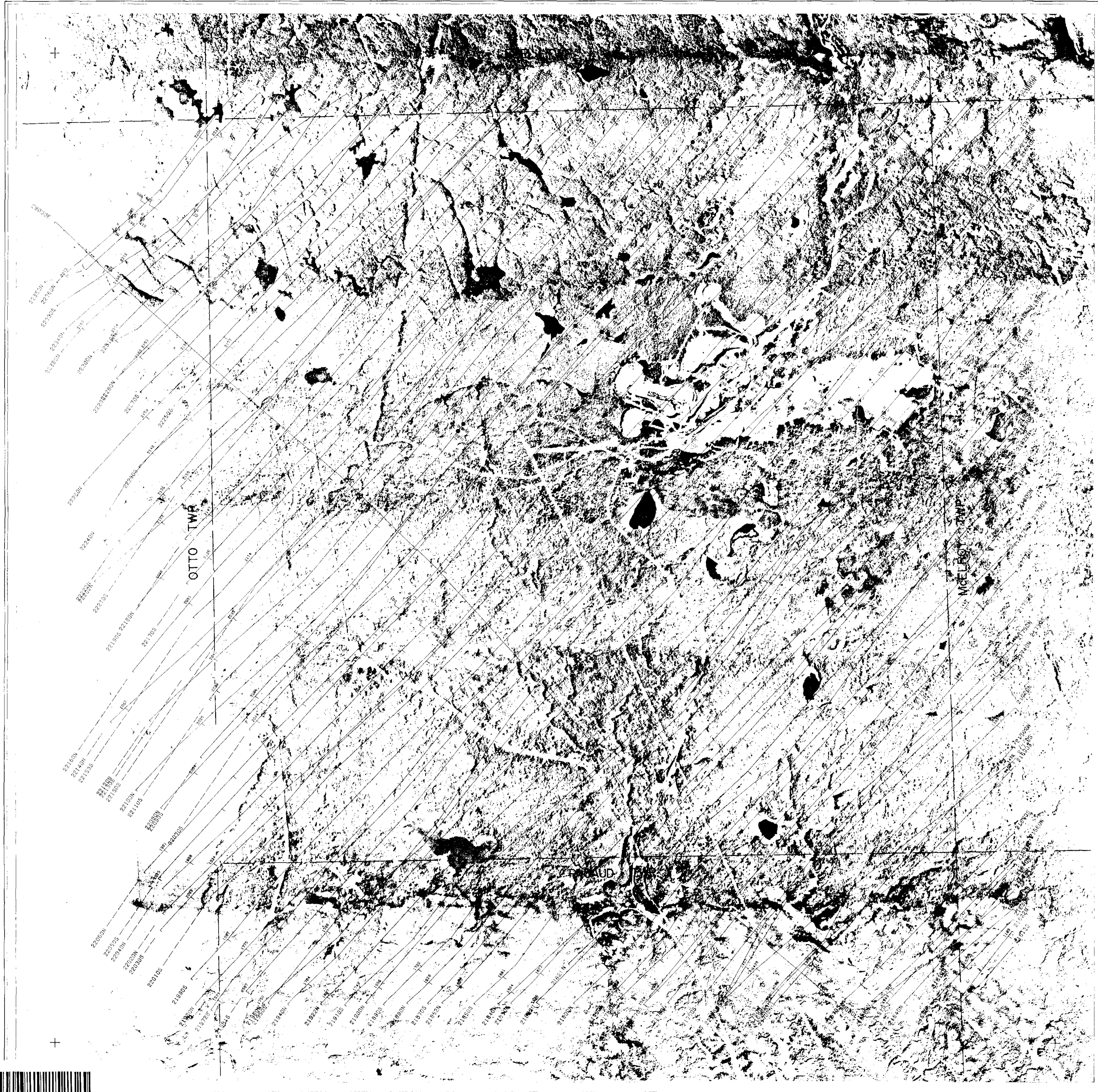
– Integration time ______

Power ______

Electrode array ______

Electrode spacing ______

Type of electrode ______



Ministry of Natural Resources
Ministry of Northern Affairs
Ontario
Hon. James A.C. Auld, Minister
Dr. J.K. Reynolds, Deputy Minister

ONTARIO GEOLOGICAL SURVEY
PRELIMINARY MAP P.2270

KIRKLAND LAKE AREA
BOSTON TOWNSHIP
Airborne Electromagnetic Survey

DISTRICT OF TIMISKAMING

INDEX MAP

LEGEND

6 Channel Anomaly
5 Channel Anomaly
4 Channel Anomaly
3 Channel Anomaly
2 Channel Anomaly
Magnetic Correlation

Anomaly Letter
Apparent Conductivity Width

DESCRIPTIVE NOTES

[illegible]

*Registered Trade Mark of Barringer Research Limited

INTERPRETATION REFERENCES

[illegible]

COMPILATION NOTES

Mosaic preparation, data compilation, and drafting was done by Questor Surveys Limited, Toronto, Ontario, during February and March, 1979. The mosaic was prepared using Ontario Ministry of Natural Resources 1 inch to 4 mile air photographs. Magnetic contours plotted by [illegible] Services Limited, Toronto, Ontario.

Funding for this geophysical survey project was received from the Ontario Ministry of Northern Affairs.

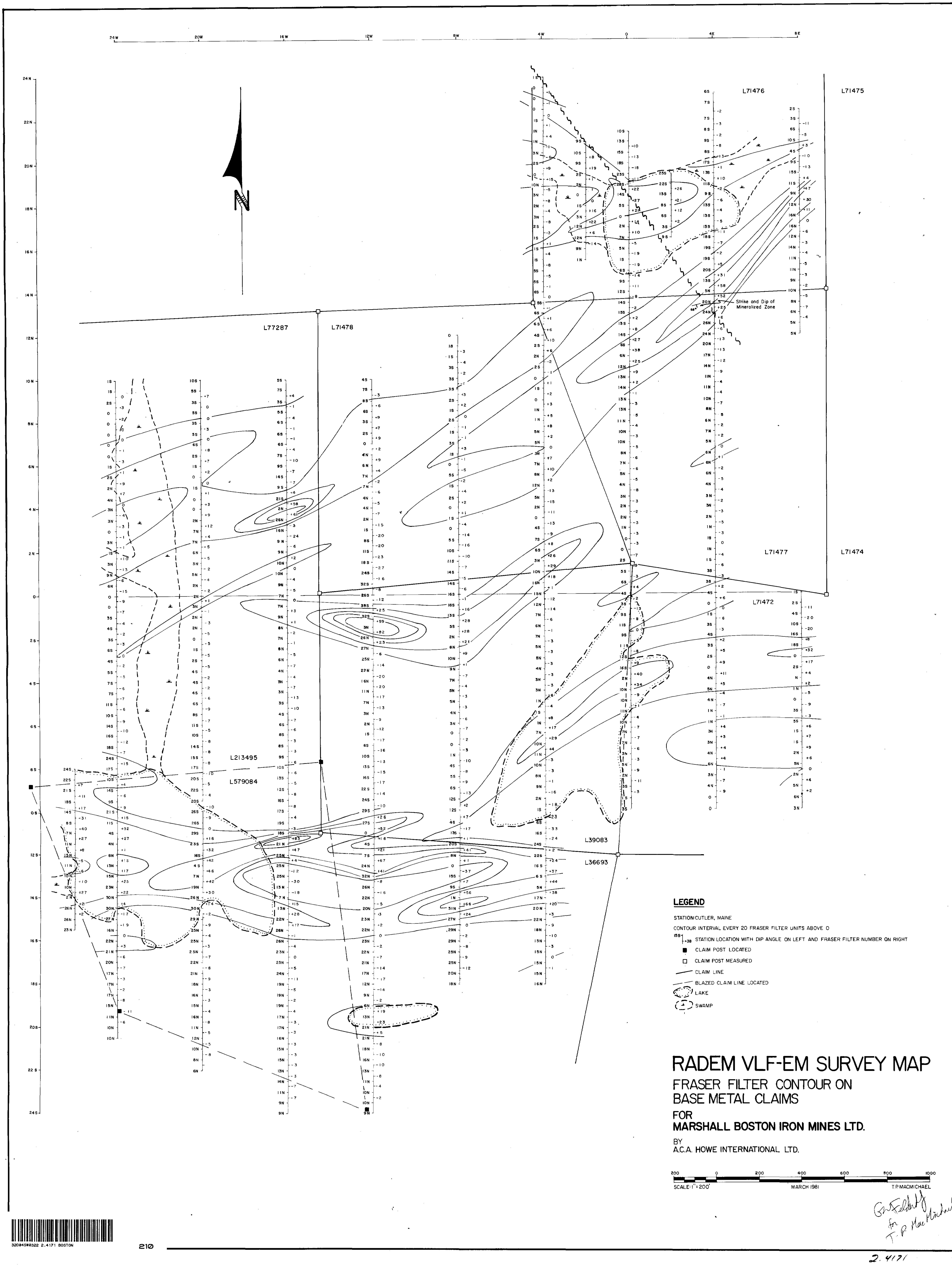
This map is published with the permission of E.G. Pye, Director, Ontario Geological Survey.

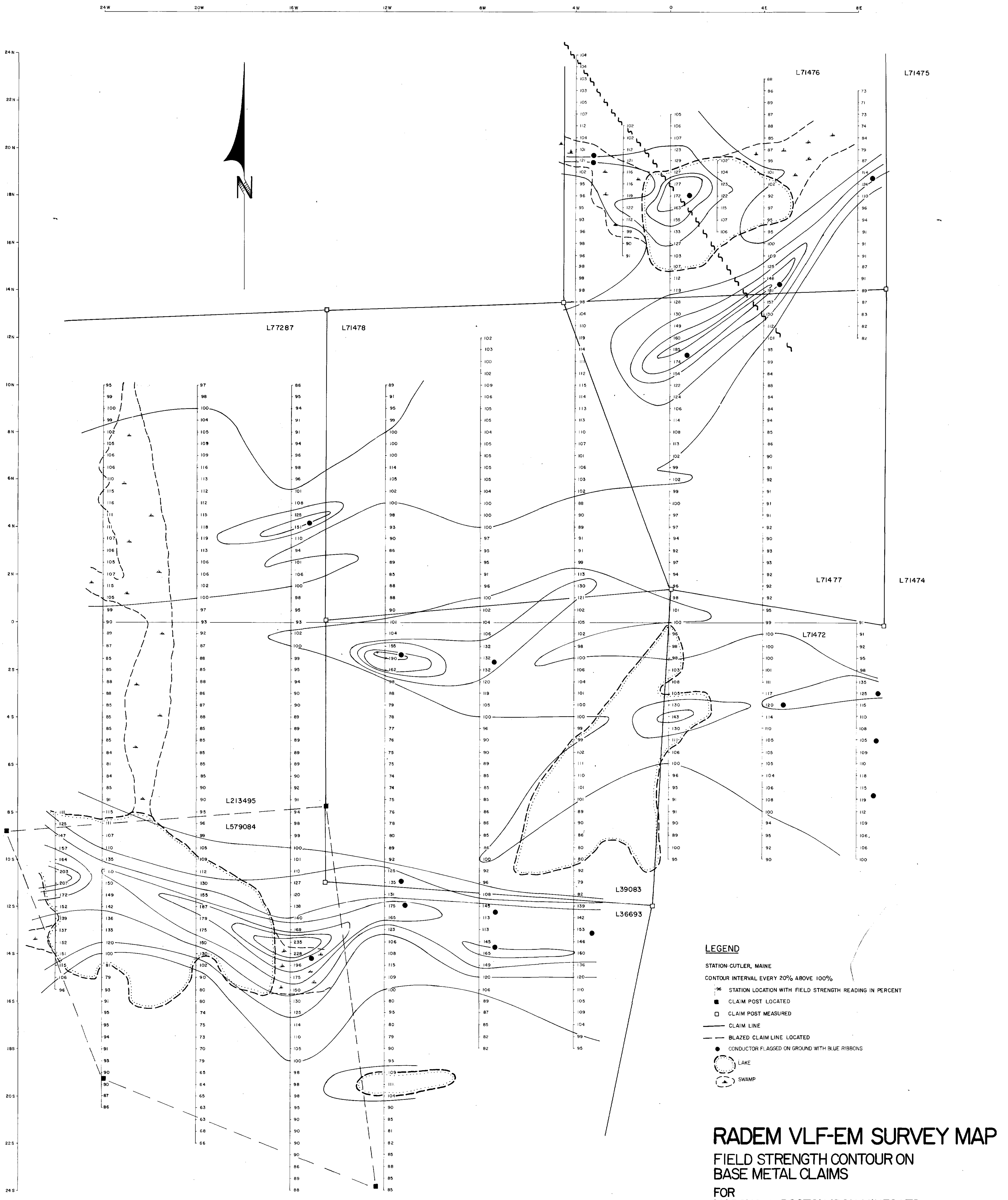
Magnetic declination approximately 10°19'W in 1979.

Issued 1979.

Information from this publication may be quoted if credit is given. It is recommended that reference be made in the following form:

[illegible]
1979: Airborne Electromagnetic and Total Intensity Magnetic Survey, Kirkland Lake Area, Boston Township, District of Timiskaming; by Questor Surveys Limited for the Ontario Geological Survey, Prelim. Map P.2270 Geophys. Ser., scale 1:20,000. Survey and compilation, February and March 1979.


L71476
L71475
L77287
L71478
Strike and Dip of Mineralized Zone
L71477
L71474
L71472
L213495
L579084
L39083
L36693
LEGEND
STATION-CUTLER, MAINE
CONTOUR INTERVAL EVERY 20 FRASER FILTER UNITS ABOVE 0
STATION LOCATION WITH DIP ANGLE ON LEFT AND FRASER FILTER NUMBER ON RIGHT
CLAIM POST LOCATED
CLAIM POST MEASURED
CLAIM LINE
BLAZED CLAIM LINE LOCATED
LAKE
SWAMP
RADEM VLF-EM SURVEY MAP
FRASER FILTER CONTOUR ON
BASE METAL CLAIMS
FOR
MARSHALL BOSTON IRON MINES LTD.
BY
A.C.A. HOWE INTERNATIONAL LTD.
SCALE 1" = 200'
MARCH 1981
T.P. MACMICHAEL
210
2.4171



RADEM VLF-EM SURVEY MAP

FIELD STRENGTH CONTOUR ON BASE METAL CLAIMS

FOR

MARSHALL BOSTON IRON MINES LTD.

BY

A.C.A. HOWE INTERNATIONAL LTD.

200 0 200 400 600 800 1000

SCALE: 1" = 200'   MARCH 1981   T.P. MACMICHAEL

G.N. Fletcher for T.P. MacMichael

320845W0322 2.4171 BOSTON

2.4171