GEOLOGICAL AND GEOPHYSICAL REPORT

on the

EXPO 1983 - A and B GROUPS

Owned by: Utah Mines Ltd.
Located: 25 km WSW of Port Hardy, B.C.

NANAIMO MINING DIVISION

50°N 127°W

N.T.S. 92 L/12

Report By:
H.R. Muntanion
& G.A. Clarke

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INTRODUCTION

Geological and geophysical surveys were carried out for Cu-Mo-Au exploration on Expo 1983-A and B Groups, located within the Nanaimo Mining District about 25 km WSW of Port Hardy on Vancouver Island (Fig. 1). The work was carried out by Utah Mines Ltd. from July 8 to October 7, 1983 with crews varying from two to seven men. Linecutting and surveying was done by contractors during the same time period.

The claims on which work was performed cover about 4 sq. km and include Expo No.'s 243, 245, 247, 249, 251, 263 - 273, 286, 288 - 294, 308, 310, 312, 502 Fr, 1013 Fr, 1014 Fr, Don 11 Fr and Don 12 Fr (Plate 1). The groups affected by this report consist of 117 units. The above claims owned by Utah Mines Ltd. are part of a large west-northwest trending claim block occupying an area of approximately 24 by 11 km.

During the 1983 field season the following work was performed:

a.) 13.8 km of linecutting and an additional 14.8 km of refurbishing existing grid lines;

b.) 10.0 km of transit line survey;

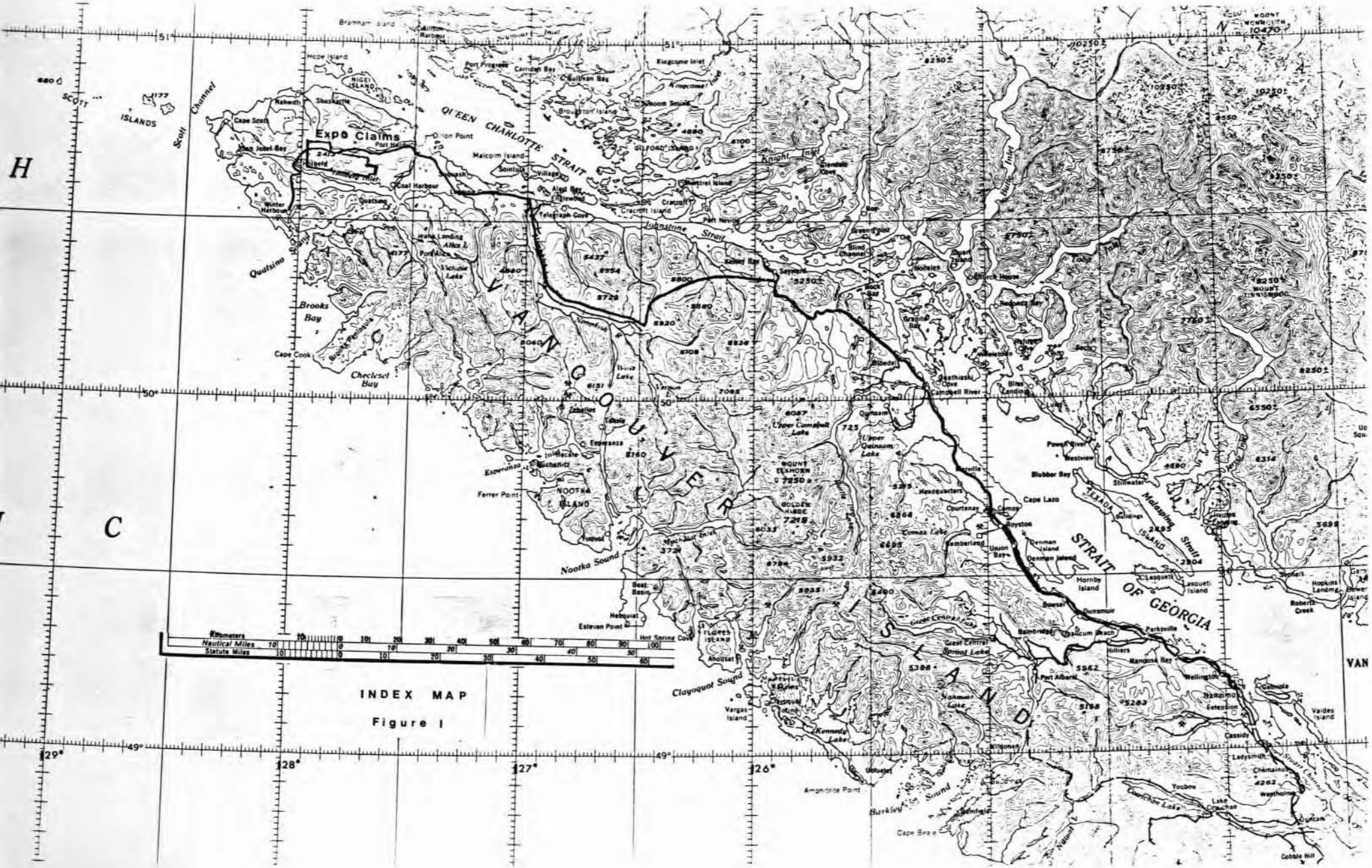
c.) geological mapping, on a scale of 1:2400, to evaluate an area of strong hydrothermal alteration and pyritization;

d.) 10.7 line km of magnetometer survey;

e.) 25.2 line km of induced polarization geophysics in an attempt to delimit the extent of an anomalous zone partially outlined during an earlier Utah Mines Ltd. survey.

All field work was performed or caused to be performed by Utah Mines Ltd. Personnel employed by the company to carry out and supervise the work were: geologists H. Muntanion and J.B. Richards; geophysicist G. Clarke; consulting geologist S.A. Taylor; geophysical technician G. Treadwell; and assistants T. Sedun, J. Young, M.R. Nikolic, A. Sussbauer, M. Lowe, B. Gibbons and D.E. Lovestad.

Accomodation for Utah personnel and linecutting crews was found at the Trails End Motel in Holberg and the Pioneer Inn and the Glenn Lyon Inn in Port Hardy. Statements of qualifications and costs, together with contractors' invoices, are included in this report in Appendices A and C, respectively.


Expo Claims
QUEEN CHARLOTTE STRAIT
VANCOUVER ISLAND
STRAIT OF GEORGIA
Johnstone Strait
Nootka Sound
Clayoquot Sound
Scott Channel
Kilometers
Nautical Miles
Statute Miles
INDEX MAP
Figure 1

Location and Access

The work area is centred on 50°39'N latitude and 127°51'W longitude, north of Holberg Inlet about 25 km WSW of Port Hardy and 11 km east of Holberg on Vancouver Island (Fig. 1).

The western portion of the area of study is accessible by roads NE Main and NE 150 which ends on claim Expo 245 about 14 km west of its junction with the Port Hardy - Holberg road and a foot path which was constructed eastward from the end of the road. Hushamu 1000, 1100, 1110 and 1120 all branches of the Hushamu Main logging road which joins the Port Hardy - Coal Harbour road, provides access to the eastern portion of the claims (Plate 1). During the execution of the programs the road extended only as far as the southeastern extreme of the work area, about 20 km west from Coal Harbour. Construction of this road system is being continued and will improve the access significantly.

Pacific Western and Air B.C. flights originate daily from Vancouver and service Port Hardy. A helicopter charter is available at the Port Hardy airport.

Physiography

The area of study occupies the southeastern slope and the eastern crest of McIntosh Mountain which attains an elevation of 2282' (696m) further to the northwest. The terrain is drained by Hushamu Creek on the north and east and by Clesklagh Creek on the south.

The land rises from about 240m along the southern edge of the area, some 30m above the Clesklagh Creek Valley, to about 620m on the southeast sloping crest of McIntosh Mountain. The topography is rugged and slopes are moderate to steep with numerous moderately to steeply incised stream valleys. Cliffs with reliefs in excess of 30m, consisting of resistant siliceous rocks, are scattered across the area. Swampy areas are rare and do not exceed diameters of 100m.

The area is covered with mature stands of hemlock, spruce, cedar and balsam which become somewhat stunted 500m above sea level. Western Forest Products, which owns the timber licence in this area commenced logging operations in the fall of this year. It is anticipated that most of the area of study will be logged-off by the end of 1984.

At Holberg the average annual precipitation is about 400 cm. At sea level snow rarely remains for more than a few days at a time but depths increase rapidly with an increase in altitude. At elevations of 600m the cummulative annual snowfall is about 240 cm. The period from mid June to early September is normally relatively dry. Mean daily temperatures range from a few degrees above zero centigrade in January to about 14 degrees centigrade in July.

History

Government sponsored geological field parties have been active in the northern part of Vancouver Island since 1887. In 1962, the B.C. Department of Mines released data from an airborne magnetometer survey of Northern Vancouver Island which generated an interest in a search for iron deposits. During 1963 and 1964 copper exploration programs consisting mainly of stream sediment sampling were conducted by numerous companies.

Utah's initial effort in the area was the staking of a few claims in the Wanokana River and Hep Creek areas between 1961 and 1965. In 1967 Utah staked the Expo claim block (661 claims) following the discovery of the Island Copper deposit. Discovery of the minerals generated considerable interest in the northern part of the island by the competitors. Internal to the Expo ground, the Red Dog claims were staked in the same year by Westcoast Mining Co.

Between 1967 and 1969 the claim block was covered with detailed soil sampling and was geologically mapped on a scale of 1 inch to 1,000 feet. Between 1970 and 1973 areas of primary interest, totalling 70.4 sq. km., were mapped on a scale of 1 inch = 200 feet and covered by magnetometer surveys on lines spaced 400 ft. (120m) to 500 ft. (150m) apart. The bulk of this area was also covered by induced polarization surveys. A small amount of EM and seismic geophysical work was also done.

Between 1966 and 1977 a total of 146 holes were diamond drilled, most of which tested Cu-Mo zones in the Hushamu and Hep Creek valley.

In 1980 a relatively small portion of the claim group was allowed to lapse. In the spring of 1982 Utah Mines Ltd. staked the Wanokana 1 to 3 and Pemberton 1 to 6 blocks in the Youghpan and Wanokana River areas and the Expo 900 claim adjoining the northwestern end of the block. Competitors also staked some claims in the former region.

During 1982 an additional three holes were diamond drilled in the Hushamu Valley and deep-test induced polarization and soil geochemistry were done in a very restricted area in the Hushamu region.

Claim Status

The Expo claim block currently consists of 630 units. Apart from claims Expo 274 and 882 due to expire this year, but for which several years of work has been applied, claim expiry dates range from 1984 to 1998.

WORK DESCRIPTION

The field work carried out by Utah Mines Ltd. on the Expo claim block consisted of geological mapping and magnetic and induced polarization geophysical surveys. For control Van Alphen Exploration Services were employed to extend existing grid lines, designed to be 500' (150m) apart, southward by the compass and chain method, correcting for slope where necessary (Plate 1). Pickets were placed at 100' (30.5m) intervals. To facilitate the I.P. survey, part of which was extended northward into the previously gridded area, a total of 14.25 km of line refurbishing had to be done. Table 1 presents a breakdown of the linecutting program but does not include the east-west transit lines.

To accurately locate the grid David C. Bazett surveyed the perimeter of the study area using a Sokkheisha Total Station instrument with a built-in distance meter and a Wild T-1A theodolite with an HP-3800 distance meter (Plate 1). This was considered necessary since mapping revealed significant deviations in the grid. Elevations at all the transit hubs were also obtained during the land survey (Appendix B).

The survey data and the topography obtained from 1:4,800 scale Western Forest Products maps, fabricated from aerial photographs, was computor digitized by H.A. Simons International. A base map on a scale of 1"=200' (1:2400) was then generated by the MIN-GRAPH GEOCHEM system. The elevations obtained from the land survey may eventually be used to correct errors in the topographic map.

Geological Mapping

Geological mapping was done on a scale of 1" to 200' (1:2400) over an area of 1.6 sq. km. The newly constructed portion of the grid, described in Table 1, was employed as a base for the mapping. The geology to the west, north and east has been documented in previous assessment reports.

The geological data was drafted onto a 1:2400 scale grid topographic base generated by H.A. Simons International (Plate 2).

Magnetics Survey

The area covered by the geological mapping was also surveyed with a magnetometer. A total of about 360 readings were taken with a

TABLE 1

1983 Expo Linecutting Program

Lines	New Construction (stations)	Length (m)	Refurbishing (stations)	Length (m)
2333E			2366N - 2425N	1800
2338E			2366N - 2407N	1250
2343E	2364N - 2397N	1000	2397N - 2407N	300
2348E	2361N - 2396N	1070	2396N - 2429N	1010
2353E	2356N - 2391N	1070	2391N - 2423N	980
2358E	2357N - 2389N	980	2389N - 2419N	910
2363E	2355N - 2387N	980	2387N - 2419N	980
2368E	2353N - 2385N	980	2385N - 2419N	1040
2373E	2351N - 2379N	850	2379N - 2401N	670
2378E	2350N - 2377N	820	2377N - 2401N	730
2383E	2349N - 2373N	730	2373N - 2389N	490
2388E	2349N - 2371N	670	2371N - 2383N	370
2393E	2349N - 2367N	550	2367N - 2389N	670
2398E	2349N - 2363N	430	2363N - 2389N	790
2403E	2349N - 2361N	370	2361N - 2395N	1040
2408E	2349N - 2357N	240	2357N - 2397N	1220
Total		10,740m		14,250m

proton magnetometer at stations about 30m (100') apart. The data was filed into the H.A. Simons MIN-GRAPH system and was computer contoured with the KONTUR system at 100 gamma intervals (Plate 3).

I.P. Survey

A total of 25.2 line km of induced polarization geophysics was done by Utah Mines Ltd. staff using a Scintrex IPR-11 time-domain receiver. This is an extension of the 1972 survey which covered areas to the north and west. G.A. Clarke was responsible for both the field work and interpretation of this part of the program. The anomalous areas are shown on Plate 4 and the data is presented on pseudosections for each of the grid lines (Plates 5 to 20).

GEOLOGY

REGIONAL GEOLOGY

The regional geology of the northern portion of Vancouver Island is described by Muller et al (1974). The geology of the Expo claims is summarized below from company reports written by Rugg (1972) and Bowen (1975).

The area lies within the Nahwitti fault block and is underlain by rocks of the Vancouver Group which include: the Karmutsen, Quatsion, Parson's Bay and Bonanza formations. These were deposited between the Upper Triassic and Lower Jurassic periods in an island arc setting (Muller et al, 1974). The Vancouver Group is intruded by rocks of Jurassic and Tertiary age and is disconformably overlain by Cretaceous sedimentary rocks.

The claim block is located in the trough of one of two northwest trending synclinal folds in the Holberg Inlet area. Major faults trending parallel to the fold axes cause both repetition and loss of parts of the stratigraphic section with movement in the order of hundreds to thousands of feet. A subordinate northeasterly trending fault system has lateral displacement in the order of hundreds of feet. Generally, the regional dip of the bedding is gentle to moderate, southwesterly, and folding is rarely observed.

Karmutsen Formation

The Karmutsen Formation is of Upper Triassic age and is estimated to consist of between 10,000' and 20,000' of volcanic flows and minor pyroclastics and sediments (Muller et al, 1973). Flows are predominantly porphyritic and amygdaloidal basalt, with rare units of pillow basalt, formational breccias and tuffs. Two thin bands of limestone occur as a series of lenses near the top of the Karmutsen Formation.

Low-grade metamorphism of the Karmutsen Formation rocks has resulted in pervasive chloritization and amygdules filled with epidote, carbonate, zeolite, prehnite, chlorite, and quartz. Basaltic rocks along contacts with intrusive stocks the basalts are often metamorphosed to dark-coloured hornblende hornfels. Skarn zones occur sporadically along these contacts, both in the inter-lava limestones and in the basalts.

Quatsino Formation

The Quatsino Formation of Upper Triassic age, ranges from 200 to 3500 feet in thickness and consists almost entirely of limestone with a few thin andesite or basalt flows (Hoadley 1953 and Muller and Carson 1969). It has conformable contacts with both the overlying Parson's Bay sediments and the underlying Karmutsen volcanics. The upper contact with the Parson's Bay Formation is gradational with limestone grading upward into carbonaceous argillites.

Within the contact metamorphic/metasomatic aureoles adjacent to intrusive stocks, skarn development and silicification of limestone, accompanied by chalcopyrite-magnetite or galena, sphalerite and silver mineralization have been noted.

Parson's Bay Formation

The Parson's Bay Formation of Upper Triassic age has a thickness ranging from 500 to 600 feet in the area of study. It lies conformably between the Quatsino and Bonanza Formations and consists of argillite, minor limestone, agglomeratic and tuffaceous limestone, tuff, quartzite and minor conglomerate. At both its base and top, the unit exhibits gradational contacts with the Quatsino and Bonanza Formations, respectively.

On a regional scale, the rocks are unmetamorphosed. Locally, adjacent to intrusive contacts, pyrite-magnetite replacement bands up to one-half inch thick in banded tuffs have been observed.

Bonanza Volcanic Formation

The Bonanza Volcanic Formation has an estimated thickness of about 8500' (Muller et al 1973). The lower portion of the Bonanza Formation consists of bedded and massive tuffs, formational breccias and rare amygdaloidal porphyritic flows, in the compositional range andesite to basalt. Porphyritic dikes and sills intrude the lower part of the unit. In the upper part of the Bonanza, rhyodacite flows and breccias become more numerous and are interbedded with andesite and basalt flows, tuffs and tuff breccias.

Regional metamorphism within the Bonanza Volcanics is very low grade, possibly zeolite facies. Plagioclase commonly is albitized and saussuritized. Chlorite, epidote and laumontite occur within the

matrix of volcanic breccias, in veinlets, and in amygdules. Coarse intraformational breccias locally are hematized. Adjacent to stocks, which intrude the sequence, biotite and amphibolite hornfelses often occur.

Intrusive Rocks

A northwest trending zone of early to middle Jurassic intrusive stocks extends from the east end of Rupert Inlet to the mouth of the Stranby River. These stocks range in composition from granite to diorite, with diorite and granodioritic varieties being most common. A WNW trend of small syenitic plugs intrude the Bonanza Volcanics in the area between Hepler and Wanokana Creeks.

Quartz-feldspar porphyry dikes and irregular bodies occur along the south edge of the zone of stocks and are thought to be differentiates of the intrusive stocks. They are commonly extensively altered and pyritized. Other dikes include felsic dikes and sills around the margins of some intrusive stocks; dikes of andesitic composition which cut the Karmutsen, Quatsino, Parson's Bay Formations and represent feeders for Bonanza volcanism; and Tertiary basalt-dacite dikes intruding Cretaceous sediments.

Mineral Deposits and Regional Alterations

Northcote (1970) describes the various mineral occurrences on northern Vancouver Island. In the Expo area two main types of mineral occurrences are known: porphyry copper deposits and skarn deposits.

The claim area occupies a large part of a scattered but widespread zone of propylitic and more local argillic, pyrophyllitic, phyllic, siliceous and pyritic alteration of Bonanza volcanics. It is closely related, spatially, to a northwest trend of intermediate intrusive stocks. Younger quartz-feldspar porphyry dikes are intermittently exposed between the stocks and alteration zones. These are thought to generate the hydrothermal solutions. Centres of hydrothermal alteration occur at Island Copper, Apple Bay, Wanokana Creek, Pemberton Hills, Hushamu Creek, Hepler Creek, Red Dog Property, Northwest Expo and Knob Hill. Apart from the mine, porphyry copper mineralization is known at Hushamu, Hep and Red Dog.

PROPERTY GEOLOGY

The claims are underlain by pyroclastics and flows of the Bonanza Volcanic Formation which, over most of the study area, have been affected by hydrothermal alteration. The sequence has been intruded by dioritic dikes and by a later series of mafic dikes. The structural geology appears to be complexed by several fault sets. The Bonanza section has a regional strike of approximately N60°W and dips are generally 20 - 40° to the southwest (Clouthier, 1971).

Rock exposures are available in stream valleys and some ridge crests. The scarcity of outcrops over relatively large areas makes the correlation of rock types difficult.

Bonanza Volcanics

The Bonanza sequence in the study area consists essentially of porphyries, flows and pyroclastics including breccias, tuffs and lapilli tuffs. Strong hydrothermal alteration has obliterated original compositions and has obscured textures across most of the region. It is assumed that these volcanics are predominately andesitic since that is the composition of the sequence outside of the zones of intense alteration.

Proylitized Volcanics

Relatively unaltered volcanics occur west of line 2353E south of about 238,500N, east of line 2398E and along the southern limits of the area mapped during this survey. These are propylitically altered and contain weakly pervasive chlorite replacing the mafic minerals; clay and minor sericite replacing feldspar; epidote occuring as disseminations and stringers, magnetite, mostly as disseminations and zeolite and carbonate in fracture and joint-controlled veinlets. Pyrite is locally disseminated.

Argillized and Phyllitized Volcanic

In a general sense the propylitically altered volcanics envelope flows and pyroclastics strongly affected by argillic and phyllic alteration. These are generally white to light grey in colour and are strongly altered to pervasive clay, sericite, silica and locally contain minor amounts of pyrophyllite. The mafic minerals have been essentially removed or replaced by pyrite.

These rocks are strongly fractured, generally containing 5 - 10% very finely disseminated and fracture controlled pyrite. Locally quartz veining is also conspicuous.

Due to the scarcity of exposures and the intensity of alteration distinctions between pyroclastics and flows are often impossible to make. Locally relatively unaltered porphyritic andesites occur adjacent to the strongly altered rocks. Contact relationships are lacking to establish whether this juxtapositioning is the result of diking or faulting.

Intensely Silicified Volcanics

Three zones of intense silicification are outlined on the geological map. These are surrounded by predominately argillized rocks with which they appear to be gradational, depending on the degree of silicification. Several zones of this alteration type lie along a WNW trend across the Expo claims and are thought to occupy explosive volcanic centres. These rocks are bleached creamy white to buff in colour, often mottled and are made up entirely of quartz-clay and/or sericite mixtures. Locally pyrophyllite is an important constituent. Pyrite has generally been leached with resultant limonite-coated cavities. Locally, it does occur as very fine disseminations ranging up to 25% (239,400E and 235,900N) and as veinlets. Fragmental textures are commonly distinct ranging from coarse ash and lapilli tuffs to coarse breccias with fragments in excess of 10cm. They are mostly subrounded to subangular with a composition similar to that of the matrix. Narrow quartz veining is widespread.

Because of the uniform composition textural distinctions are very vague. It is probable that at least some of the fragmentals are flow breccias. This speculation is consistant with the uniformity in composition between fragments and matrix and the widespread distribution of flow breccias in the relatively unaltered volcanic sequence.

Intrusives

Several apparently narrow intermediate to mafic dikes are scattered throughout the area. Diorite is the dominant compositional variety but gabbro or diabase and lamprophyre were also noted. Continuity between exposures is difficult to establish due to the lack of exposure. Aerial extents may be inferred by magnetics since the magnetic response over intrusive bodies is higher than over the Bonanza rocks. A positive association with resistivity highs is also

apparent, though less pronounced. The extent of the diorite body with questionable limits at about 234,000E and 237,000N is inferred from a magnetic high (1200 to 2400 gammas) and an overlapping resistivity high (Plate 3). These bodies are probably apophyses of a large WNW trending intermediate intrusive mass centred at 242,000E and 241,000N.

The diorites are fine to medium-grained and generally porphyritic, although equigranular varieties occur. The mafic minerals, mostly hornblende and minor pyroxene, are typically chloritized and the feldspars are weakly altered to clay and sericite. Disseminations of magnetite and pyrite occur with rare exceptions.

An exposure of unaltered black gabbro or diabase occurs at about 234,000E and 236,400N. It is strongly magnetic and is cut by zeolite veinlets. A lamprophyre consisting of 20% very weakly chloritized hornblende phenocrysts, set in a black magnetic matrix with a trace of pyrite outcrops at 236,300E and 237,000N. The mafic units are probably late-stage dikes or plugs.

Structure

Bedding features in this area are inconspicuous. In this region the Bonanza section is reported to strike at N60°W with dips from 20 to 40° the south-southwest (Clouthier, 1971).

The majority of the airphoto lineaments, believed to represent fault traces, have northwest-southeast and northeast-southwest trends. Common shear attitudes are northeast-southwest. Many of the north-south trending creeks are probably also fault controlled. Multidirectional jointing is strongly developed except in the intensely silicified exposures.

Mineralization

Pyrite is the most abundant sulphide mineral in the study area. In the unaltered volcanics it normally occurs only in trace amounts except adjacent to fractures. The strongest concentrations of pyrite, occuring as disseminations and irregular stringers and fracture controlled veinlets, are consistently found in argillized and phyllitized volcanics. In the zones of intense silicification pyrite is typically absent, having been leached from exposed rock. However, concentrations ranging up to 25% are found in very restricted zones.

At 238,900E and 236,800N traces of disseminated chalcopyrite and bornite were found with about 2% pyrite in a silicified and somewhat chloritized trachytic andesite flow adjacent to a porphyritic diorite dike.

GROUND MAGNETIC SURVEY

The area which was geologically mapped was covered by a total field magnetometer survey (Plate 3).

Field Procedures

Initially a McPhar GP-70 proton unit with a +/- gamma accuracy was employed. However, due to instrumental circuitry problems a UNIMAG G-836 proton magnetometer with an accuracy of +/- 10 gammas had to be used to complete the survey. Readings were taken every 100' along the new grid. The data was corrected for duirnal variation using a system of base station ties and closed loop traverses. A number of tie on's were performed to earlier Utah data on the surrounding Expo grid to integrate the two sets of data.

Discussion

Background for the magnetics in this area is in the 1300 to 1600 gammas range. Anomalous zones, which on the Expo claims are defined by the 2000 gammas contour, have an isolated distribution across the survey area with values of two times background (2820 gammas).

The anomaly centred at 239,800 and 235,200N is open-ended to the south and coincides with relatively unaltered magnetite-rich autobrecciated porphyritic andesite flows. It is associated with low chargeability and low resistivity trends. The only other anomaly of significant dimension is situated in the southwest corner of the grid and is part of a larger NNW-trending magnetic high which occupies an area of overburden cover. The inferred dimension of a magnetite-bearing diorite is based on this high. The centre of the anomaly is associated with a narrow east-west trending and coinciding chargeability high and resistivity low. There is some evidence that the one and two station anomalies recorded on the northern portions of lines 2343E to 2348E, 2358E and 2368E may be related to unaltered andesites, possibly late dikes.

INDUCED POLARIZATION SURVEY

FIELD PROCEDURES

IP and resistivity surveys were conducted over a porphyry Cu-Mo-Au targets in the South McIntosh area. A pole-dipole array, with a dipole of 300 feet, acquiring separations of n=1, n=2 and n=3 was used along parallel lines spaced 500 feet apart. For lines 2333E through 2353E the infinity was at 2320E and 2407N and C_1 was to the north. For lines 2358E through 2408E, the infinity was at 2365E and 2335N with C_1 to the south. The current survey adjoins data collected in 1972 to the north of the present grid.

The surveys were performed using a Scintrex IPR-11 receiver except on line 2333E where a Scintrex IPR-7 receiver was employed. Both are time-domain instruments, measuring the voltage decay curve resulting from the instantaneous shut-off of a two-second high voltage pulse of alternating polarity DC current. The IPR-7 integrates over a period from .45 to 1.1 seconds after the current shut-off and the data collected by the IPR-11 was filtered to fit this time window. The IPR-7 is a single-channel analog unit while the IPR-11 is capable of measuring up to six channels simultaneously. The units of measurement are milli-volt seconds per volt, normally abreviated milli-sec or simply msec. Two transmitters were employed for the survey - an Elliott transmitter powered by a 5 hp motor generator for lines 2343E through 2403E and a Crone transmitter powered by 24V battery sources for 2333E, 2338E and 2408E.

DISCUSSION

Plate 4 outlines six IP anomalies. Anomalies A, A_1 and B show similarities in the chargeability pattern and in their relationships to the resistivity data. Treated in conjunction with fourth chargeability anomaly on the 1972 data, these anomalies form a linear trend striking, N 55^{o} W across the map area. Because of these relationships, as well as inferred geologic relationships, these anomalies are treated together. Two small anomalies, C and D have several attributes in common and because they appear to represent similar geologic phenomena, are treated together.

Anomaly A

This is a large, irregularly shaped zone of high and very high chargeability located in the northwest corner of the map area. It extends from line 2338E to 2363E roughly centred on line 2348E at 2403N and is elongated in a WNW-ESE direction. Because of the survey limits, both the 1972 and current data are needed to close off the anomaly.

On lines 2338E, 2343E and 2358E the anomaly shows a decrease with depth although it is still significant on the N=3 data. The most intense portion of the anomaly is on line 2348E about 2400N to 2403N. The associated sharp resistivity low indicates that mineralization may be concentrated along a fault zone cutting into the main anomaly. A resistivity low on lines 2353E to 2363E may indicate an eastward extension of this inferred fault. On line 2363E, the anomaly source is deeper and narrower indicating an easterly plunge. This pattern continues on line 2368E where a possible extension of the anomaly appears on the N=3 data at 2395N to 2398N.

The chargeability anomaly is generally within a region of moderate resistivity which is flanked to the northeast by a pronounced high resistivity zone.

Anomaly A_1

This anomaly is found at the north limits of lines 2333E, 2348E and 2353E, open to the north on all three lines on the present survey, and continues on the 1972 work. Chargeabilities are fairly high on 2333E and 2353E and some very high (110 msec) values appear on 2348E. On 2338E and 2353E, the data are inadequate to define the anomaly source. On 2348E the anomaly source has a limited depth extent, dying out on the n3 data. The limited data indicate that the chargeability anomaly lies within or on the north flank of a resistivity high.

Anomaly B

This zone of moderate to high chargeabilities is located toward the eastern edge of the grid on lines 2393E to 2408E. It is roughly a northwest-southeast trending ellipse centred at 2398E and 2375N about 450m long and 300m wide. It appears to fork to the east on line 2408E and while both forks have only moderate values, the northern one at 2375N to 2380N has a larger areal extent. The anomaly source is most intense but is depth-restricted on lines 2393E

and 2398E. On 2403E, the chargeabilities are somewhat decreased, but extend to the N=3 data. The 2408E data described above may indicate that the anomaly dissipates eastward.

A resistivity high is associated with the anomaly to the north and north-east. The current data detects this feature only on line 2408E, but the 1972 data outlines it quite well.

Interpretation

The resistivity highs associated with anomalies A, A_1 and B correlate quite well with the diorite intrusive mapped in the region. The major exception is the high on 2338E to 2353E around 2415N. It may be that an intrusive in this area, if present, doesn't quite subcrop or outcrop. The association of all of the anomalies with the flanks of these resistivity highs indicates that they are likely caused by mineralization related to the diorite intrusives but generally within the host volcanics. Sulphide contents are variable but generally lie in the 2 - 5% range, where mapped.

Anomaly C

This narrow, dike-like feature runs ENE-WSW across 2368E to 2378E centered at 2389N. Chargeabilities are moderate and increase with depth. There is an associated narrow resistivity low on lines 2368E and 2373E. A slight decrease in resistivity is also present on 2378E.

Anomaly D

This feature is also narrow and dike-like. It trends approximately east-west on lines 2383E and 2388E. A narrow resistivity low is also associated with this anomaly. The anomaly source appears to plunge westward on line 2383E. On 2388E, the source appears to die out with depth.

Both anomalies C and D are aligned with the peak values of chargeability anomalies related to the diorite intrusive body. Anomaly D appears to be an off-shoot of anomaly B while anomaly C is related to an anomaly on the 1972 data. The dike-like nature of these two features suggests they may represent leakage of sulphides along faults which intersect the major mineralization zones to the east.

Anomaly E

This anomaly is detected at or near the south ends of lines 2338E to 2353E with a possible extension to line 2333E on its western end. It runs roughly east-west at 2375N. Chargeabilities are generally moderate except on line 2343E where they are very high at the south-most station. The anomaly is open to the south on 2343E so its physical nature is indeterminate other than the fact that it reaches the bedrock surface.

On lines 2338E, 2348E and 2353E the source is narrow and quite deep. A narrow resistivity high is centred over the anomaly on lines 2338E, 2343E and 2353E and is present, although subdued, on 2348E.

Diorite intrusives are present in the anomaly area near 2338E but little additional outcrop is available. The resistivity indicates that this intrusive extends into the covered area. The chargeability anomaly is related to this inferred intrusive and is contained either in the wall rock or in a mineralized phase of the intrusive.

Other Anomalies

In addition to the anomalous zones described above, a small, one line feature is noted on line 2338E at 2391N. This correlates with a fault which can be seen on the resistivity data on lines 2333E to 2348E trending about N 70 W. This fault is observed in outcrop on 2338E. It appears that the N=2 chargeability anomaly is caused by a local increase in mineralization associated with this fault.

CONCLUSIONS

The mapping program, with the aid of ground magnetic data, essentially delineated a zone of extensively argillized and phyllitized Bonanza Volcanics which underlies most of the survey area. A large zone and two smaller zones of intensely siliceous and predominately fragmental volcanics have been mapped, which possibly represent volcanic centres. This alteration is associated with strong pyritization, normally ranging from 5 to 10%, although sulphides are leached from most intensely silicified exposures. It is not reflected by high chargeabilities but is associated with resistivity and magnetic lows.

The zone of extensive alteration is fringed by weakly propylitized volcanics which have a considerably weaker pyrite content. These contain magnetite reflected by the magnetometer survey.

A northwest trending zone of resistivity and chargeability highs correlate with a large parallel-trending diorite body which was mapped during the 1972 program. The sulphide content in the adjacent volcanics averages 3 - 5%.

Significant economic mineralization was not found in the study area.

REFERENCES

Hoadley, J.W., 1953, Geology and Mineral Deposits of the Zeballos - Nimpkish Area, Vancouver Island, B.C. Geological Survey of Canada Mem. 272

Muller, J.E. and Carson, D.J.T., 1969, Geology and Mineral Deposits of Alberni Map Area, B.C. (92 F). Geological Survey of Canada Paper 68-50.

Muller, J.E., Northcote, K.E., Carlisle, D., 1974, Geology and Mineral Deposits of Alert-Cape Scott Map Area, Vancouver Island, British Columbia. Geological Survey of Canada Paper 74-8.

Northcote, K.E., 1970, Geology, Exploration and Mining in British Columbia. B.C. Department of Mines and Petroleum Resources, pp. 267 - 269.

In addition, the following Utah Mines Ltd. assessment and internal reports provided reference data:

Ascencios, A., Geological and Geophysical Report on the Expo Groups 1, 10, 11, 12, 13 and 15 and Hep-Expo Groups 2, 3, 4, 5, 6 and 7 located 21 miles west and southwest of Port Hardy, B.C. Assessment Report, December 1973.

Bowen, B., Expo-Hep Copper Project, Holberg Inlet Area, Vancouver Island, B.C., May 1975.

Clouthier, G. Geological and Geophysical Report, Expo Groups #13, #14, #15, #16, #17, #18, #19, #20, #21. Nanaimo Mining Division. September, 1971.

Rugg, E., Progress Report, Expo-Hep Copper Project, Holberg Inlet Area, Vancouver Island, B.C., September 1972.

APPENDIX A

STATEMENT OF QUALIFICATIONS

The professional qualifications for Utah staff involved with the fieldwork are as outlined below:

H. Muntanion — Project Geologist for Utah Mines Ltd., Vancouver, B.C.

Completed B.Sc. in 1970 at the University of Manitoba; employed by: Canadaian Nickel Co. in the summers of 1969 and 1971 as a student and field geologist, respectively; Amax, Vancouver, B.C. during the summer of 1970 as a geological assistant in the Yukon; The Manitoba Mines Branch during the 1972 field season as a field geologist; Hudson Bay Oil and Gas Ltd., Toronto, Ontario during May to December, 1973 as a temporary geologist; Mindeco Ltd., Lusaka, Zambia from May 1974 to May 1977 as a geologist; Canadian International Development Agency, Ottawa, Ontario from August, 1977 to December, 1979 as geologist in Malaysia; Utah Mines Ltd. from April, 1980 to present under the supervision of D.N. leNobel, P. Eng.

G.A. Clarke — Geologist for Utah Mines Ltd., Port Hardy, B.C.

Completed B.Sc. (honors), (Geophysics) at University of Manitoba, in 1976; employed by Hudson Bay Oil and Gas, and Saskatchewan Dept., of Mineral Resources during the 1975 and 1976 summer field seasons as geophysical assistant; September 1976 to February 1977, Inco Limited as a geologist in Thompson, Manitoba; Lloyd Geophysics, February 1977 to May 1979, as a geophysicist; Utah Mines Ltd., from October 1979 to present, as geologist/geophysicist, presently under supervision of John Fleming.

J.B. Richards Senior Geologist for Utah Mines Ltd., Vancouver, B.C.

B.A.Sc., University of British Columbia, 1970

Registered as P. Eng., B.C., 1973, Geological. Continuously employed as an exploration geologist from 1970 to 1973 for various employers in B.C., Yukon, Washington and Costa Rica.

1973 to 1978 - Geologist for Equity Mining, developing Sam Goosly Deposit.

1980 to 1983 - Senior geologist, Utah Mines in Vancouver on various development projects.

S.A. Taylor Exploration Consultant, North America, for Utah International Inc., Reno, Nevada.

Geologist and Project Geologist, Bear Creek Mining Co., Tucson, Arizona; June 1959 to July 1964. Exploration for copper, molybdenum and coal in Arizona and Nevada. Work on Delineating a copper deposit at Chilito, Arizona.

Geologist, Utah Construction & Mining Co., Reno, Nevada; July 1964 to July 1968. Exploration for base and precious metals in Nevada, Arizona, New Mexico, California, Utah and Colorado.

Senior Geologist, Utah Construction & Mining Co., Reno, Nevada; July 1968 to February 1970. Exploration for base and precious metals in Nevada and Arizona.

District Geologist, Utah Construction & Mining Co./Utah International Inc.; February 1970 to July 1976. Management of the Reno District Exploration Office. Exploration for base and precious metals in Nevada, Arizona, California, Oregon, Idaho, Montana, Colorado, New Mexico and Wyoming. Search for base and precious metals plus sulphur, barite and fluorite.

Regional Exploration Manager, Western U.S. Metals for Utah International Inc.; July 1976 to August 1982. Exploration for base and precious metals plus sulphur, fluorite, barite ang gem stones throughout all states west of Colorado plus Oklahoma, Kansas and Texas.

Exploration Consultant, North America, for Utah International Inc.; August 1982 to present. Involving assisting in exploration for base and precious metals in the U.S. and Canada including Alaska. Also perform some training and lectures in metals exploration, develop some exploration techniques and undertake limited sporadic research.

APPENDIX B

Expo Grid Survey Data, South McIntosh Area
Work done by David C. Bazett, B.C. Land Surveyor

STA.	LATITUDE	DEPARTURE	ELEV.
38A	240375.97	239725.43	1776.0
83-01	240116.76	239814.92	1621.7
83-02	240176.07	239610.01	1741.4
0	240313.61	239827.66	1673.3
83-04	240204.87	239822.79	1648.2
83-05	240105.06	239824.82	1584.3
83-06	240001.41	239819.87	1525.9
83-07	239921.18	239807.92	1492.0
83-09	239765.48	239869.66	1446.6
83-10	239731.32	239991.49	1504.2
A	239704.60	234090.27	1602.8
83-13	239617.24	234261.36	1487.3
83-14	239534.22	234443.70	1496.5
83-15	239617.60	234527.73	1466.3
83-16	239670.74	234607.63	1449.9
83-17	239744.63	234734.21	1410.7
83-18	239768.79	234852.22	1442.3
83-19	239706.51	234948.15	1439.1
83-20	239706.87	235135.45	1417.7
83-21	239564.49	239826.15	1361.7
83-22	239613.74	233727.01	1434.3
83-23	239547.50	239968.70	1435.9
83-24	239406.96	236379.40	1636.6
83-25	239398.39	236603.69	1717.5
83-26	239403.98	236641.60	1764.3
83-27	239395.30	236755.01	1786.8
83-28	239395.89	236911.72	1818.0
83-29	239411.36	237137.44	1855.9
83-30	239427.02	237351.69	1881.5
83-31	239428.71	237453.04	1897.1
83-32	239444.16	237628.98	1947.9
83-33	239296.98	237732.73	1945.0
83-34	239246.88	237916.50	1968.6
83-35	239185.77	238152.67	1927.5
83-36	239106.26	238170.30	1953.9
83-37	239078.09	238206.03	1919.6
46	238668.46	238252.05	1867.5
46	238784.49	238346.06	1862.3
47	238879.16	238226.13	1853.4
48	238268.88	238325.02	1832.5
49	238241.76	238347.36	1777.7
50	238278.96	238500.17	1673.6
51	238344.96	238790.64	1597.7
52	238190.16	238689.05	1581.5
53	238274.34	238943.92	1513.8
54	238290.36	239085.58	1614.5
55	238296.52	239252.64	1794.2
56	238311.34	239481.44	1815.0
57	238295.62	239646.94	1837.9
58	238293.63	239750.53	1768.1
59	238231.01	240070.60	1664.7
60	238229.42	240354.53	1678.3
61	238179.99	240493.86	1660.5
62	238121.89	240546.86	1733.1

STA.	LATITUDE	DEPARTURE	ELEV.
63	237934.45	240637.54	1778.6
64	237759.61	240627.99	1817.2
65	237451.12	240729.14	1765.7
66	237195.94	240807.87	1786.1
67	237043.79	240604.12	1768.8
68	236857.68	240657.05	1773.9
69	236546.41	240760.46	1734.7
70	236369.08	240733.20	1739.3
71	235879.31	240744.84	1746.8
72	235658.77	240753.91	1720.1
73	235513.79	240752.28	1673.3
74	235231.94	240760.63	1632
1	236041.88	240497.65	918.9
2	235706.49	239819.10	1113.1
3	235530.88	239501.69	1171.8
4	235199.38	239152.46	1125.5
5	234985.06	238604.70	773.6
6	235413.38	238146.21	797.9
7	234941.52	236564.80	936.3
8	234940.43	236218.72	1044.4
9	234647.16	236099.56	9701
10	236084.19	236828.63	10086
11	236492.96	235918.56	10288
12	236725.81	236776.06	10562
13	236621.93	235609.55	10479
14	236903.86	235448.28	10413
15	236015.01	235299.68	10446
16	236043.60	236143.93	10116
17	236026.97	234989.75	9552
18	236091.97	234320.93	9208
19	236078.66	234726.65	9060
20	236073.95	234647.72	9734
21	236104.96	234457.68	8303
22	236118.36	234363.96	7785
23	236296.64	234261.20	8776
24	236611.84	234207.36	8438
25	236554.98	234225.42	8632
26	236813.39	234211.16	9397
27	237092.22	234217.35	10221
28	237181.05	234205.09	10336
29	237341.19	234207.27	10415
30	237461.43	234212.46	10805
31	237606.33	234216.28	10427
32	237935.25	234220.69	10182
33	238122.19	234221.70	9726
34	238219.08	234223.71	9735
35	238303.37	234231.69	10297
36	238028.56	234229.13	11134
37	238693.95	234239.43	11706
38	238780.07	234254.47	12205
39	238934.99	234259.90	12382
40	239047.65	234256.17	13268
41	239249.18	234256.31	14041
42	239476.06	234259.08	14535

APPENDIX C

STATEMENT OF COSTS AND INVOICES

Line-cutting and Land Survey

Contract Costs:	Van Alphen Expl. Serv. (Invoice 1)	$10,281.55
	D.C. Bazett, Land Surveyor (Invoice 2)	7,167.60
Salaries (preparatory, supervision):		
	J.B. Richards, Sr. Geol. 8 days @ $222.37	1,778.96
	D.S. McLennan, Assistant 7 days @ $60.50	423.50
Accomodation:	15 man days @ $40.00/day	600.00
Vehicle Expenses:	8 days @ $45.00/day	360.00
	TOTAL	$20,611.61

Geological Survey

Salaries:	H.R. Muntanion, Proj. Geol.	18 days @ $189.69	3,414.42
	J.B. Richards, Sr. Geol.	4 days @ $222.37	889.48
	S.A. Taylor, Consult. Geol.	3 days @ $561.23	1,683.69
	J. Young, Asst.	9 days @ $66.92	602.28
	T. Sedun, Asst.	9 days @ $66.92	602.28
Accomodation:	36 man days @ $35.00/day		1,260.00
Vehicle Expenses:	22 days @ $45.00/day		990.00
Airfares (J.B. Richards & H.R. Muntanion):	2 fares @ $91.80		183.60
	TOTAL		$ 9,625.75

Magnetics Survey

Salaries:	H.R. Muntanion, Proj. Geol.	2 days @ $189.69	379.38
	J. Young, Asst.	9 days @ $66.92	602.28
	T. Sedun, Asst.	4 days @ $66.92	267.68
Accomodation:	17 man days @ $35.00/day		595.00
Vehicle Expenses:	9 days @ $45.00/day		405.00
	TOTAL		$ 2,249.34

I.P. Survey

Salaries:		
J.B. Richards, Sr. Geol.	3 days @ $222.37 (preparatory, supervision	$ 667.11
G.A. Clarke, Geophysicist	29 days @ $170.86	4,954.94
G. Treadwell, Technician	15 days @ $132.00	1,980.00
M. Lowe, Assistant	17 days @ $99.00	1,683.00
D.E. Lovestad, Assistant	9 days @ $93.50	841.50
M.R. Nikolic, Assistant	26 days @ $93.50	2,431.00
A. Sussbaner, Assistant	26 days @ $93.50	2,431.00
B. Gibbons, Assistant	15 days @ $93.50	1,402.50
Accomodation (G. Treadwell):	15 days @ $40.00/day	600.00
Airfare (G. Treadwell):		1,031.00
Airfreight (I.P. equipment):		708.57
Vehicle Expenses:	29 days @ $45.00/day	1,305.00
	TOTAL	$20,035.62

Data Interpretation and Report Writing

Salaries:	J.B. Richards, Sr. Geol.	2 days @ $222.37	$ 444.74
	H.R. Muntanion, Proj. Geol.	9 days @ $189.69	1,707.21
	G.A. Clarke, Geophysicist	6 days @ $170.86	1,025.16
	R. Gopal, Draftsman	3 days @ $113.31	339.93
	C. Stewart, Secretary	1 day @ $74.31	74.31
Computer Digitization (Simons Engineering Int.):			1,730.00
Map Reproduction:			40.00
		TOTAL	$ 5,361.35

Miscellaneous Costs

Field Supplies:	$ 150.00
Telephone:	540.97
TOTAL	$ 690.97

TOTAL SURVEY COST $58,574.64

Invoice 1.

STATEMENT

VAN Alphen Exploration Services
Box 754 Smithers, B.C.
V0J 2N0

DATE Aug 2 19 83

Utah Mines Ltd
Suite 1600, 1050 W. Pender str.
Vancouver B.C. V6E 3S7

DATE	DETAILS	DEBIT		CREDIT		BALANCE	
	Lines in Logged Area						
	541 Meters @ .45	243	45				
	Lines cleared						
	14827 Meters @ .30	4448	10				
	NEW Lines						
	13840 Meters @ .375	5190	00				
	mob + demob	400	00				
	total	10281	55			10281	55 ✓

OK
B Richards
Exp

D101

received
09/14/83

(Invoice 2)

IN ACCOUNT WITH

DAVID C. BAZETT

B.C. LAND SURVEYOR

Phone 949-7821
7070 Shornciiffe Ave.
P.O. Box 94
PORT HARDY, B.C.
V0N 2P0

October 17 1983

Utah Mines Ltd.
1600 - 1050 W. Pender St.
Vancouver, B.C.

Attention: Byron Richards

RE: Expo Claims - Survey of Geophysical Lines

TO: Professional services rendered including field survey and related office calculations and drafting in preparation of a plan showing location of geophysical lines and control traverse run.

MY FEE:

B.C.L.S.	7 hrs @	$60.00	$ 420.00
Sen. Inst. Man	43 hrs @	45.00	1935.00
Jun. Inst. Man	76 hrs @	33.10	2515.60
Assistant	36 hrs @	25.00	900.00
Draftsman	19 hrs @	25.00	475.00
Vehicle	76 hrs @	3.50	266.00
SUB-TOTAL:			$ 6511.60

Disbursements Paid:

Cansel Survey Equipment Ltd. (Rental of EDM)	600.00
Pacific Western Airlines (freight)	56.00
TOTAL:	$ 7167.60

2152 Expo. Richards

RECEIVED PAYMENT

B.C.L.S.

FILE NO. H434

Terms: Net 30 days, 1½ % per month interest on overdue accounts (18 % per annum)

OCTOBER 12, 1983 4:30 PM VIA L. ALFORD

TO: BYRON RICHARDS, VANCOUVER
FROM: S. A. TAYLOR
SUB: ASSESSMENT WORK DOLLARS SPENT, U.S. FUNDS, AT THE EXPO PROJECT, VANCOUVER ISLAND, B.C., CANADA -- AUGUST 1983. FUNDS SPENT BY S. A. TAYLOR.

MY DAILY COST FOR FIELD WORK IS $455.00, U.S. FUNDS, WHICH INCLUDES ALL FRINGE. THE DAILY COST FOR OFFICE IS $355, U.S. FUNDS.

FOR THE EXPO PROJECT, MY AUGUST 1983 CHARGES, U.S. FUNDS, ARE:

FIELD DAYS @ AUGUST 9 THRU AUGUST 17, 9 DAYS @ $455.00/DAY = $4,095.00

OFFICE DAYS:
4 DAYS @ $355/DAY = $1,420.00 PLUS PHOTO PRINTS @ $100.00;
TOTAL @ $1,520.00.

TOTAL CHARGE: $5,615.00 U.S.

SANFORD A. TAYLOR

B.S., GEOLOGY, STANDFORD UNIVERSITY, STANFORD, CALIFORNIA.

GEOLOGIST AND PROJECT GEOLOGIST, BEAR CREEK MINING CO., TUCSON, ARIZONA; JUNE 1959 TO JULY 1964. EXPLORATION FOR COPPER, MOLYBDENUM AND COAL IN ARIZONA AND NEVADA. WORK ON DELINEATING A COPPER DEPOSIT AT CHILITO, ARIZONA.

GEOLOGIST, UTAH CONSTRUCTION & MINING CO., RENO, NEVADA: JULY 1964 TO JULY, 1968. EXPLORATION FOR BASE AND PRECIOUS METALS IN NEVADA, ARIZONA, NEW MEXICO, CALIFORNIA, UTAH AND COLORADO.

SENIOR GEOLOGIST, UTAH CONSTRUCTION & MINING CO., RENO, NEVADA; JULY 1968 TO FEBRUARY, 1970. EXPLORATION FOR BASE AND PRECIOUS METALS IN NEVADA AND ARIZONA.

DISTRICT GEOLOGIST, UTAH CONSTRUCTION & MINING CO./UTAH INTERNATIONAL INC.; FEBRUARY, 1970 TO JULY, 1976. MANAGEMENT OF THE RENO DISTRICT EXPLORATION OFFICE. EXPLORATION FOR BASE AND PRECIOUS METALS IN NEVADA, ARIZONA, CALIFORNIA, OREGON, IDAHO, MONTANA, COLORADO, NEW MEXICO AND WYOMING. SEARCH FOR BASE AND PRECIOUS METALS PLUS SULFUR, BARITE AND FLUORITE.

REGIONAL EXPLORATION MANAGER, WESTERN U.S. METALS FOR UTAH INTERNATIONAL INC.; JULY 1976 TO AUGUST, 1982. EXPLORATION FOR BASE AND PRECIOUS METALS PLUS SULFUR, FLUORITE, BARITE AND GEM STONES THROUGHOUT ALL STATES WEST OF COLORADO PLUS OKLAHOMA, KANSAS AND TEXAS.

EXPLORATION CONSULTANT, NORTH AMERICA, FOR UTAH INTERNATIONAL INC.; AUGUST 1982 TO PRESENT. INVOLVING ASSISTING IN EXPLORATION FOR BASE AND PRECIOUS METALS IN THE U.S. AND CANADA INCLUDING ALASKA. ALSO PERFORM SOME TRAINING AND LECTURES IN METALS EXPLORATION, DEVELOP SOME EXPLORATION TECHNIQUES AND UNDERTAKE LIMITED, SPORADIC RESEARCH.

SAT/LA

10/12/83D 16:41:14 LIST

EXPO 245
EXPO 264
EXPO 263
EXPO 284
EXPO 283
EXPO 304
DON 11 Fr.
EXPO 503 Fr.
EXPO 306
EXPO 245
EXPO 286
EXPO 285
ROAD TO E50
EXPO 266
EXPO 265
1900
1800
1700
EXPO 247
EXPO 288
1900
1800
1700
2000
EXPO 287
EXPO 308
EXPO 267
EXPO 267
EXPO 1013 Fr.
EXPO 290
EXPO 249
EXPO 270
EXPO 269
1500
1600
EXPO 289
1400
1100
1200
EXPO 310
EXPO 291
1500
700
800
1000
900
EXPO 271
EXPO 292
EXPO 272
EXPO 251
1400
1300
1000
EXPO 312
800
900
1100
EXPO 293
EXPO 274
EXPO 294
700
EXPO 253
EXPO 502
EXPO 1014 Fr.
EXPO 314
EXPO 273
600
800

Line cutting
Station
1983 Linecutting

N

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

W	83/08/03	CLAIM MAP/ STATIONS REVISIONS			
ISSUING NO.	D/M/Y	ISSUE	DR.	CH.	APP.
CLIENT PROJECT NO.		DRN.	DAY	MO.	YR.
		DR.		DEC.	83
		CH.			
		APP.			
CLIENT DRAWING NO.		H. A. S. DRAWING NO.		ISSUE	
		AX-7296-110-003		01	

UTAH MINES LTD.

EXPO GROUP

CLAIM & LINECUTTING MAP

1:4800
SCALE 1 inch = 400 feet
400 Ft
0 50 100 m

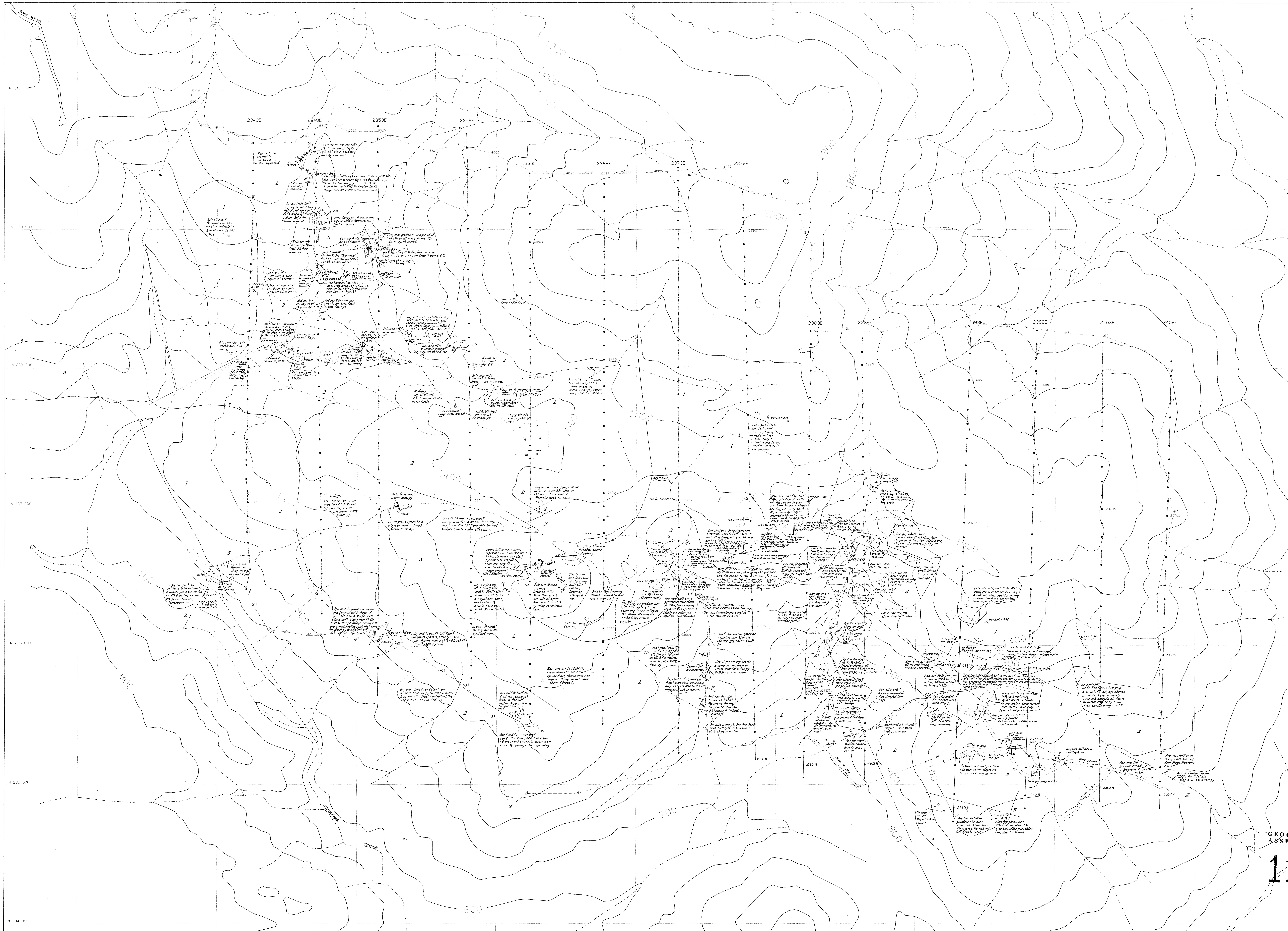
PROJECT: 7296A

DATE: NOV. 22, 83 | CADD OPER: S. L. NOEL | PRF: UTAHCLAIM

H. A. SIMONS (INTERNATIONAL) LTD.

CAD INTERGRAPH
Q52:[210,.65]AA242002.DGN

PLATE 1



LEGEND

INTRUSIVES

4	Diabase, lamprophyre dikes
3	Diorite, diorite porphyry, feldspar-hornblende porphyry

BONANZA VOLCANIC ROCKS

2	Andesite, dacite ? : porphyry flows, tuffs, lapilli tuffs, tuff breccias, flow breccias
1	Intensely silicified volcanics, siliceous breccias, minor pyrophyllite breccias

Outcrop boundary

Geologic contact

Fault (inclined, vertical)

Fault (inferred)

Air photo lineament

Float

Joints (showing intensity and attitude)

Shears (inclined, vertical)

Rock sample location

Swamp

ISSUE NO.	D/M/Y	ISSUE	DR.	CH.	APP.

CLIENT PROJECT NO.		DAY	MO.	YR.
	DSN. H.M.		Dec.	'83
	DR. R.N. Gopal			
	CH.			
	APP.			

CLIENT DRAWING NO.	H. A. S. DRAWING NO.	ISSUE
	AX-7296-110-001	01

UTAH MINES LTD.

EXPO GROUP

GEOLOGY

1:2400
SCALE 1 inch = 200 feet

METRES 50 25 0 50 100 METRES
FT. 200 150 100 50 0 200 400 FT.

PROJECT: 7296A

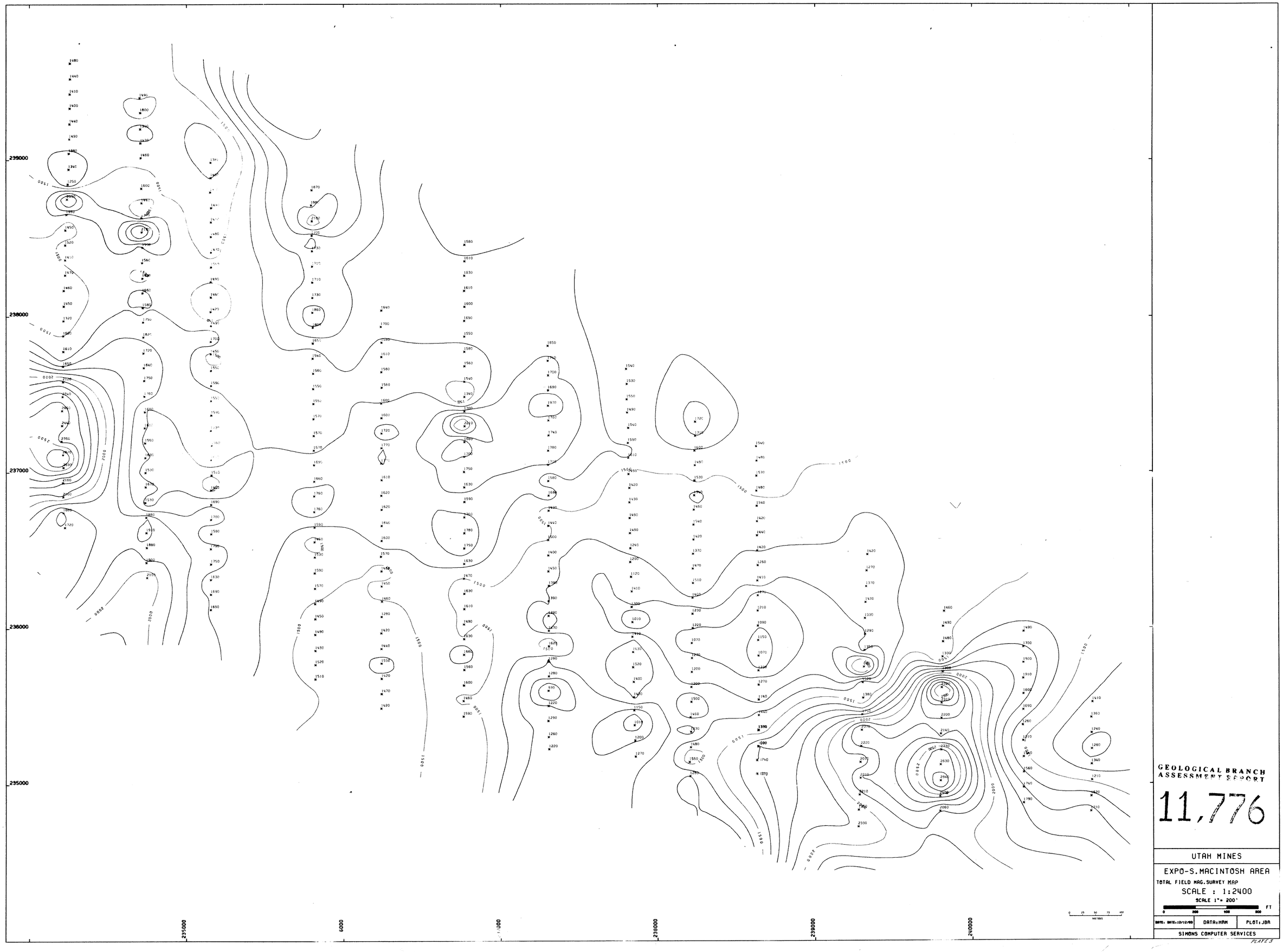
DATE: NOV. 1, 83	CADD: OPER S. L. NOEL	PRF:

H. A. SIMONS (INTERNATIONAL) LTD.

CAD INTERGRAPH
QS2:[210,.65]AA242002.DGN

PLATE 2

12-DEC-83 15:22:19 MUTAH JBR MACMAG200



GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

UTAH MINES

EXPO-S.MACINTOSH AREA

TOTAL FIELD MAG.SURVEY MAP

SCALE : 1:2400

SCALE 1"= 200'

FT

DATE: DATE:12/12/83 | DATA:MAM | PLOT:JBR

SIMONS COMPUTER SERVICES

PLATE 5

ANOMALY A, A,

ANOMALY C

ANOMALY E

ANOMALY D

ANOMALY B

245 OCT. 19

264 OCT. 19

263

284

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245

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503 FR. OCT. 17

306 OCT. 19

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308 NOV. 13

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310 NOV. 13

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291 OCT. 19

312 NOV. 13

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293

252

502 OCT. 19

274 OCT. 19

OCT. 19

OCT. 19

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

ISSUE NO.	D/M/Y	ISSUE	DR. CH. APP.
CLIENT PROJECT NO.		DRN.	DATE NOV. 22
		CH.	DRG. # 2
		APP.	
CLIENT DRAWING NO.		H. A. S. DRAWING NO. AX-7296-110-003	ISSUE 01

UTAH MINES LTD.

EXPO GROUP

IP ANOMALY MAP

(1:4800)

STAFF (1 inch = 400 feet)

FEET 0 400

METRES 0 100

PROJECT: 7296A

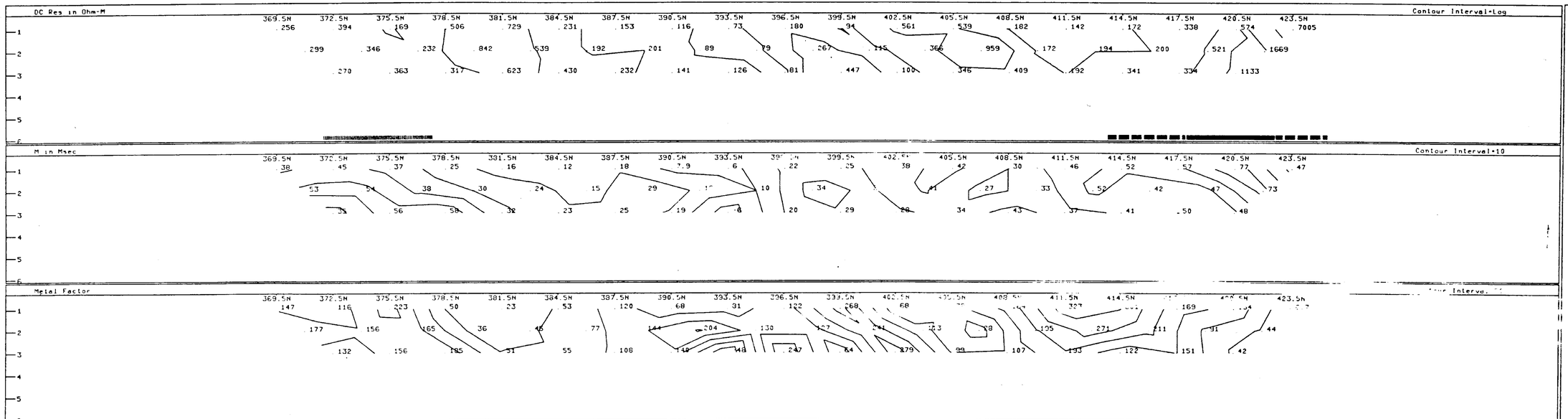
DATE: NOV. 22, 83 | CADD OPER: S.L. NGEL | PRF: CLAIMITAH

H. A. SIMONS (INTERNATIONAL) LTD.

CAD INTERGRAPH: GS2+L210,,65\AA242002.DGN

PLATE 4

PLOT DATE DEC 1983



EXPO 83

Line 2333E

IP SURVEY
05/09/83
P-Dp array

COMMENTS:

CRONE Tx: IPR-7

Filename: EX333E

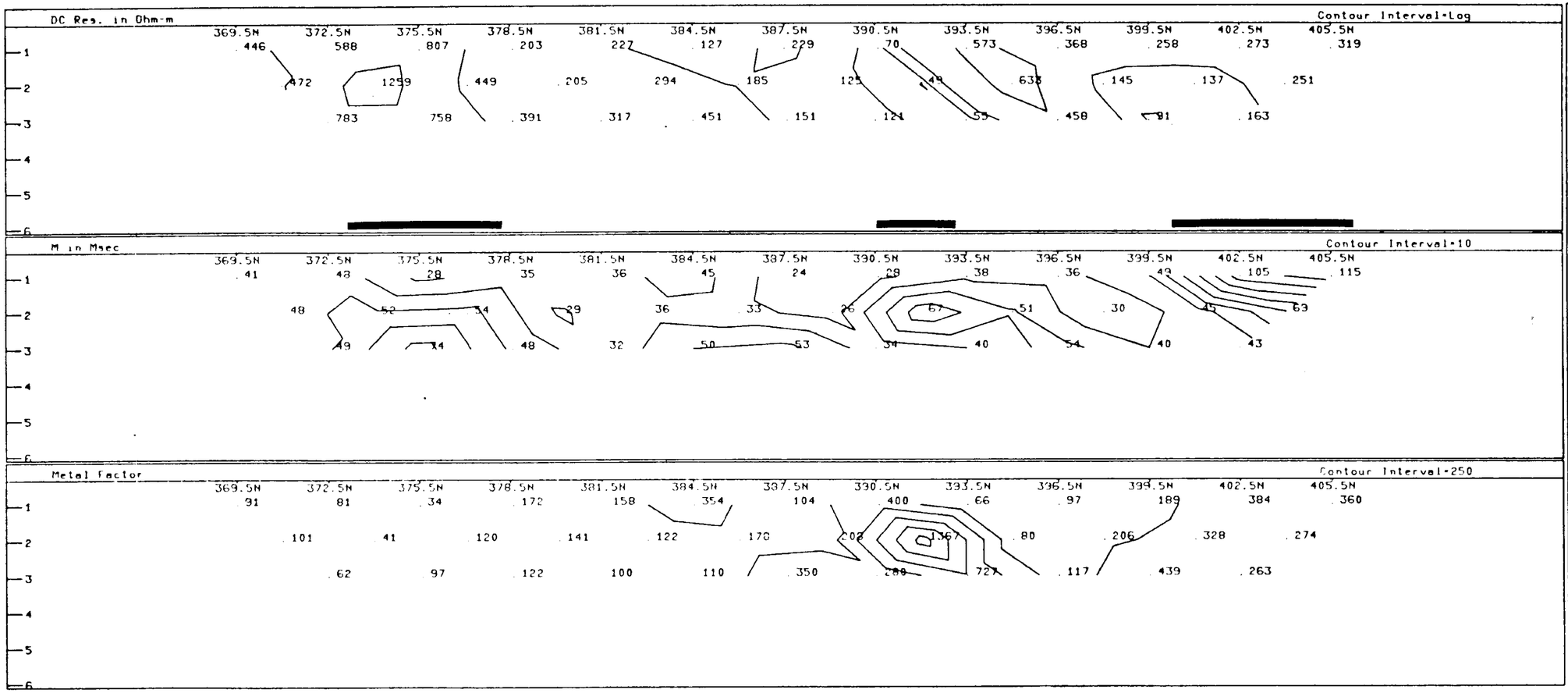
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 5



EXPO 83

Line 2338E

IP SURVEY
30/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX338E

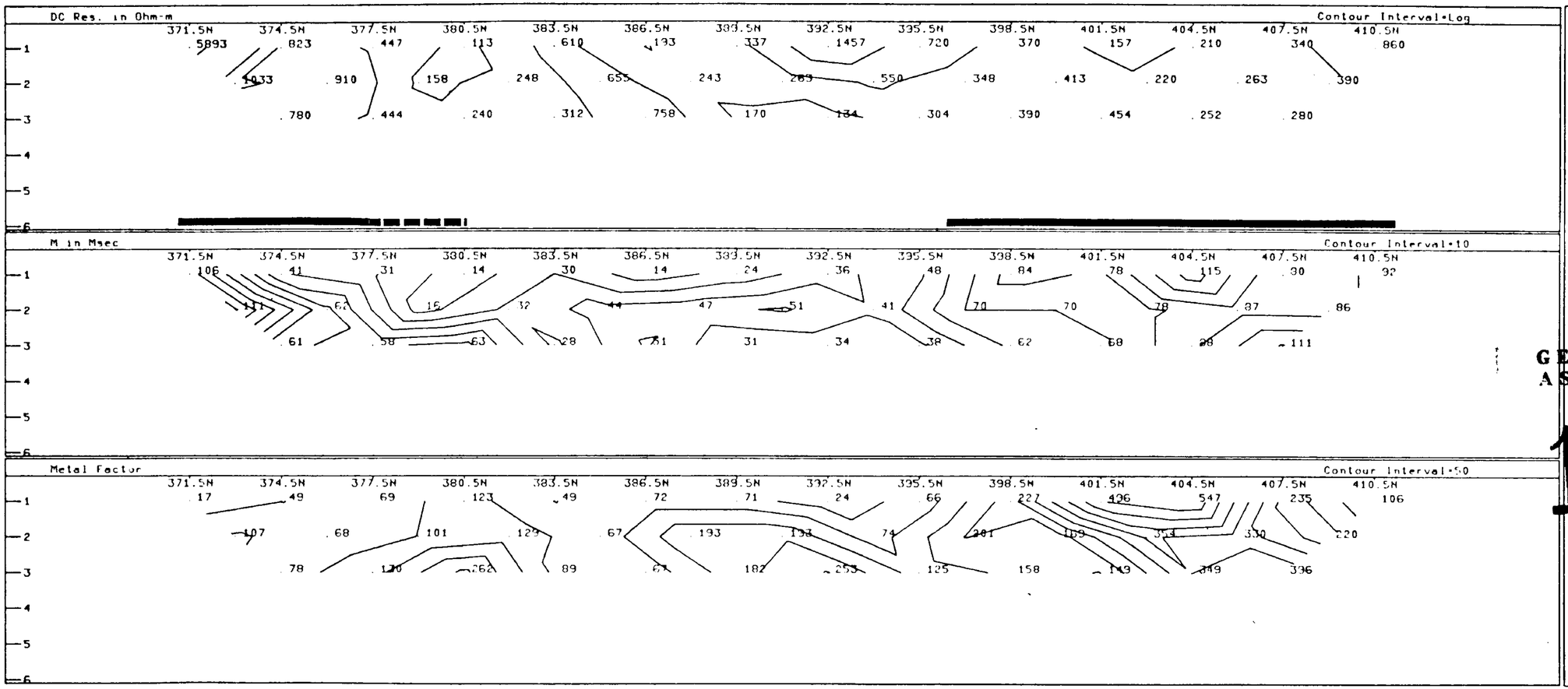
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 6



EXPO 83

Line 2343E

IP SURVEY
10/09/83
P-Dp array

COMMENTS:

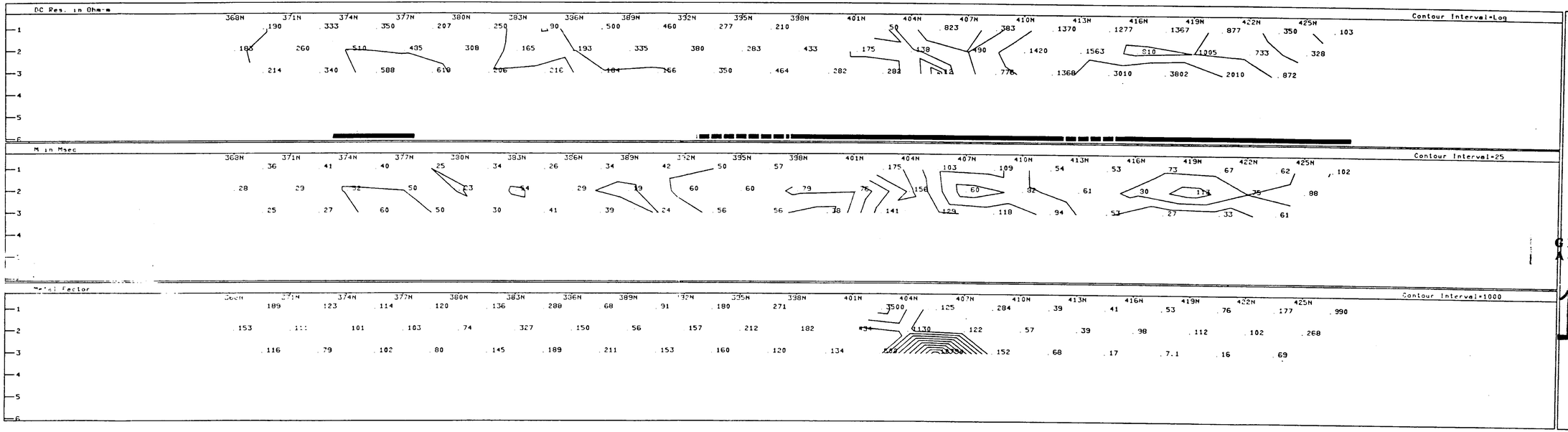
IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX343E

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 7



EXPO 83

Line 2348E

IP SURVEY
14/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX348E

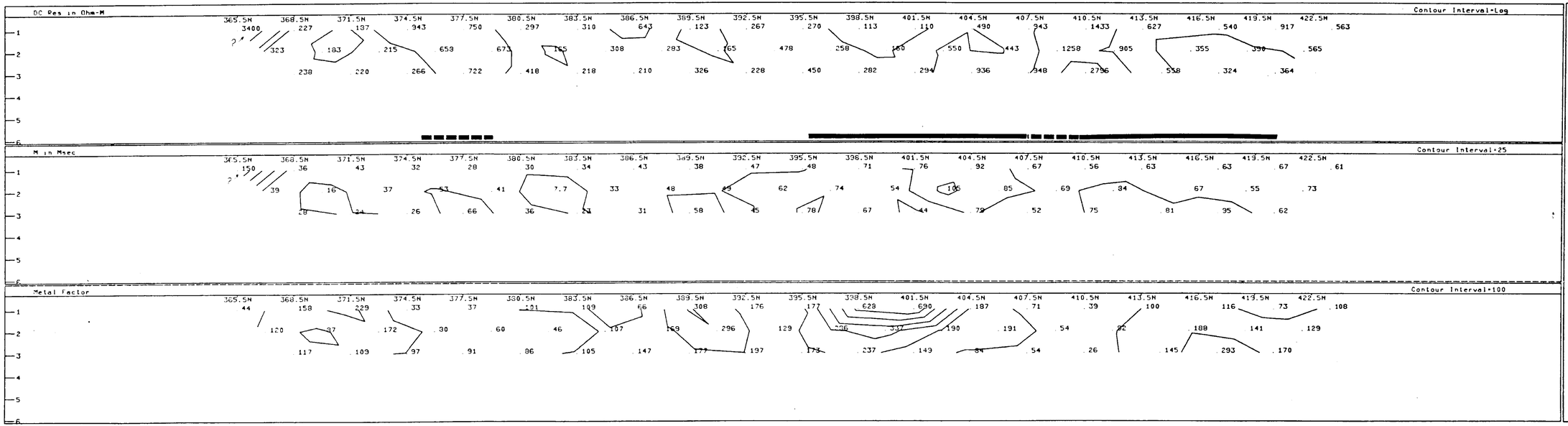
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 8



EXPO 83

Line 2353E

IP SURVEY
15/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX353E

0 300 600
Feet

UTAH MINES
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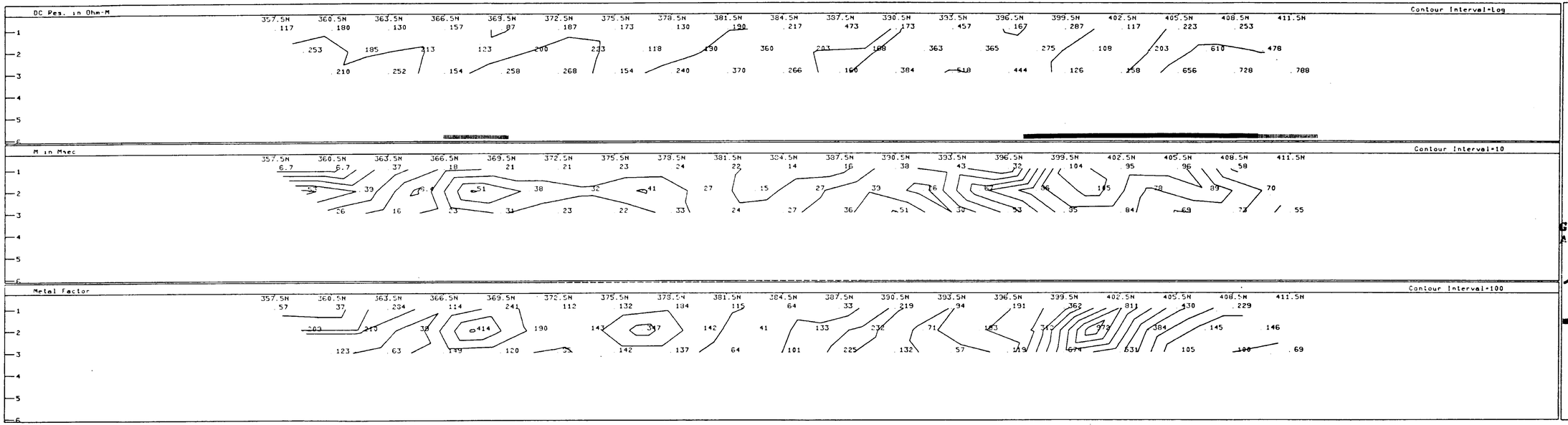
VANCOUVER, B.C.

PLATE 9



EXPO 83

Line 2358E

IP SURVEY
18/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX358E

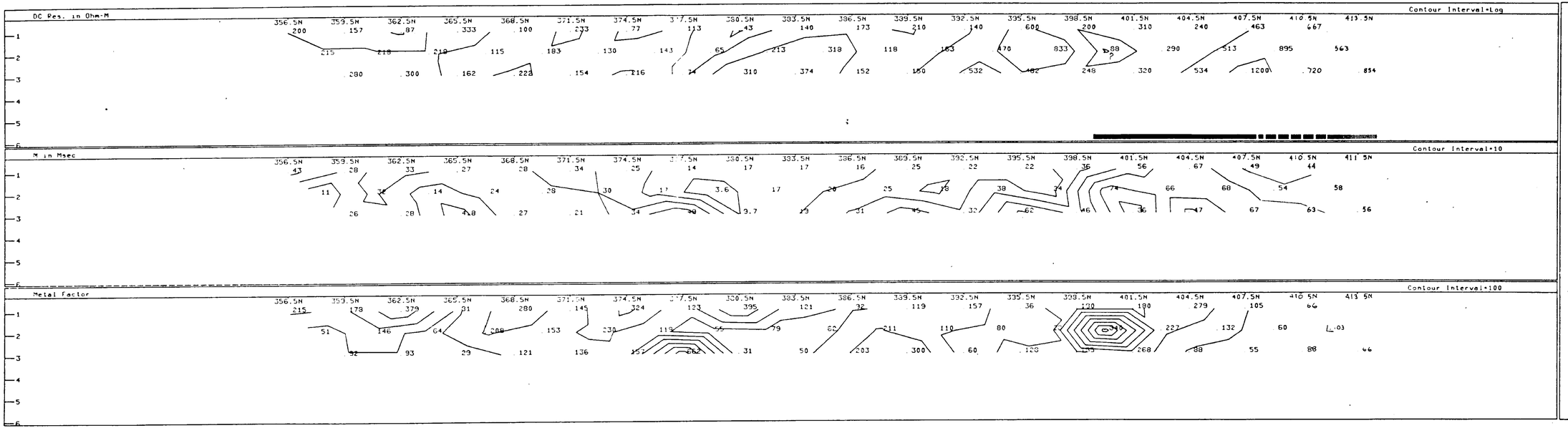
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 10



EXPO 83

Line 2363E

IP SURVEY
19/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

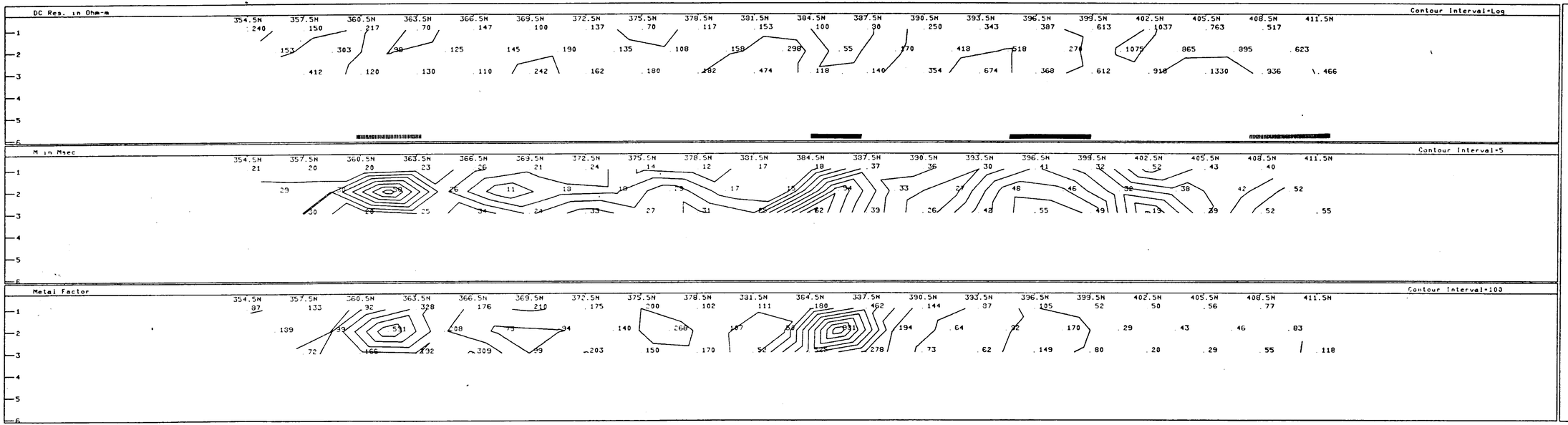
Filename: EX363E

11,776

0 300 600
Feet

UTAH MINES Ltd.
VANCOUVER, B.C.

PLATE 11



EXPO 83

Line 2368E

IP SURVEY
20/09/83
P-Dp array

COMMENTS:

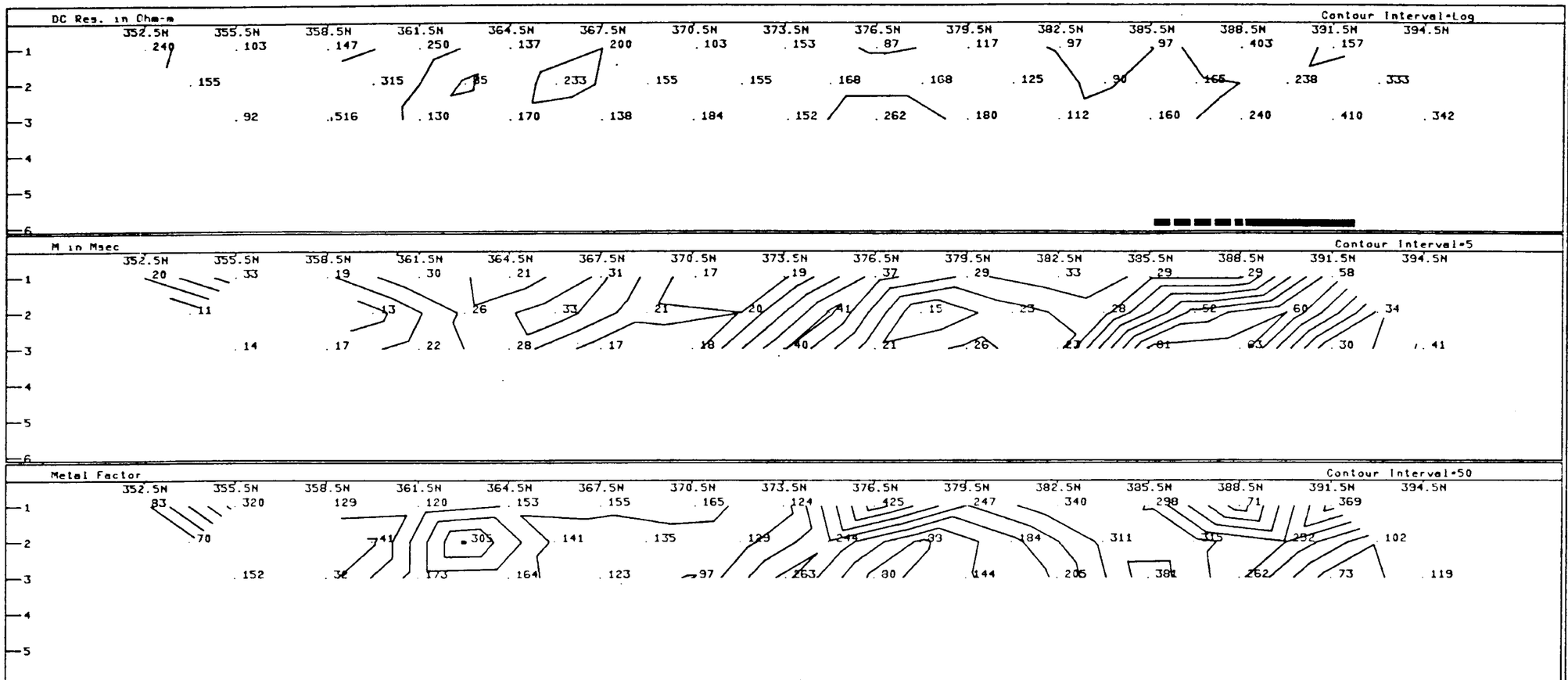
IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX368E

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 12



EXPO 83

Line 2373E

IP SURVEY
21-22/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX373E

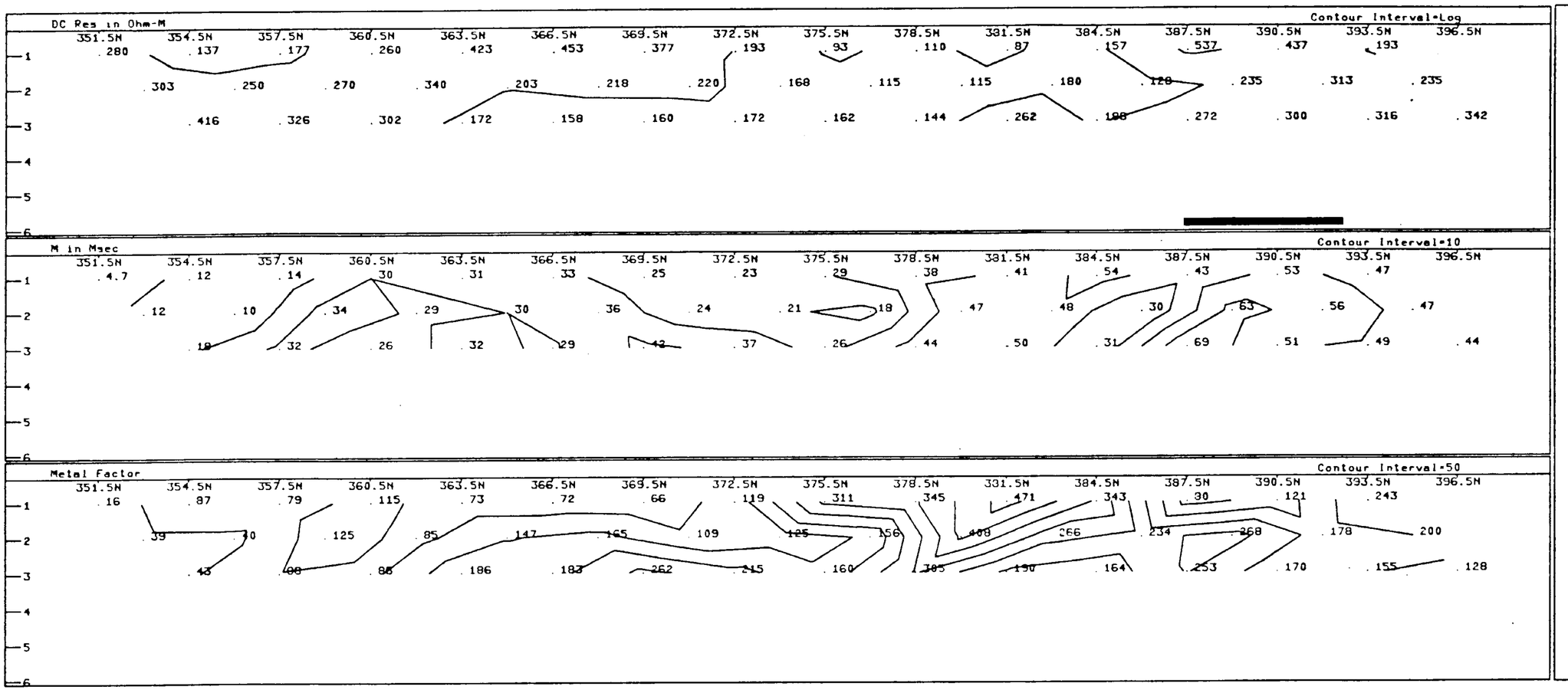
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

0 300 600
Feet

UTAH MINES Ltd.
VANCOUVER, B.C.

PLATE 13



EXPO 83

Line 2378E

IP SURVEY
23/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

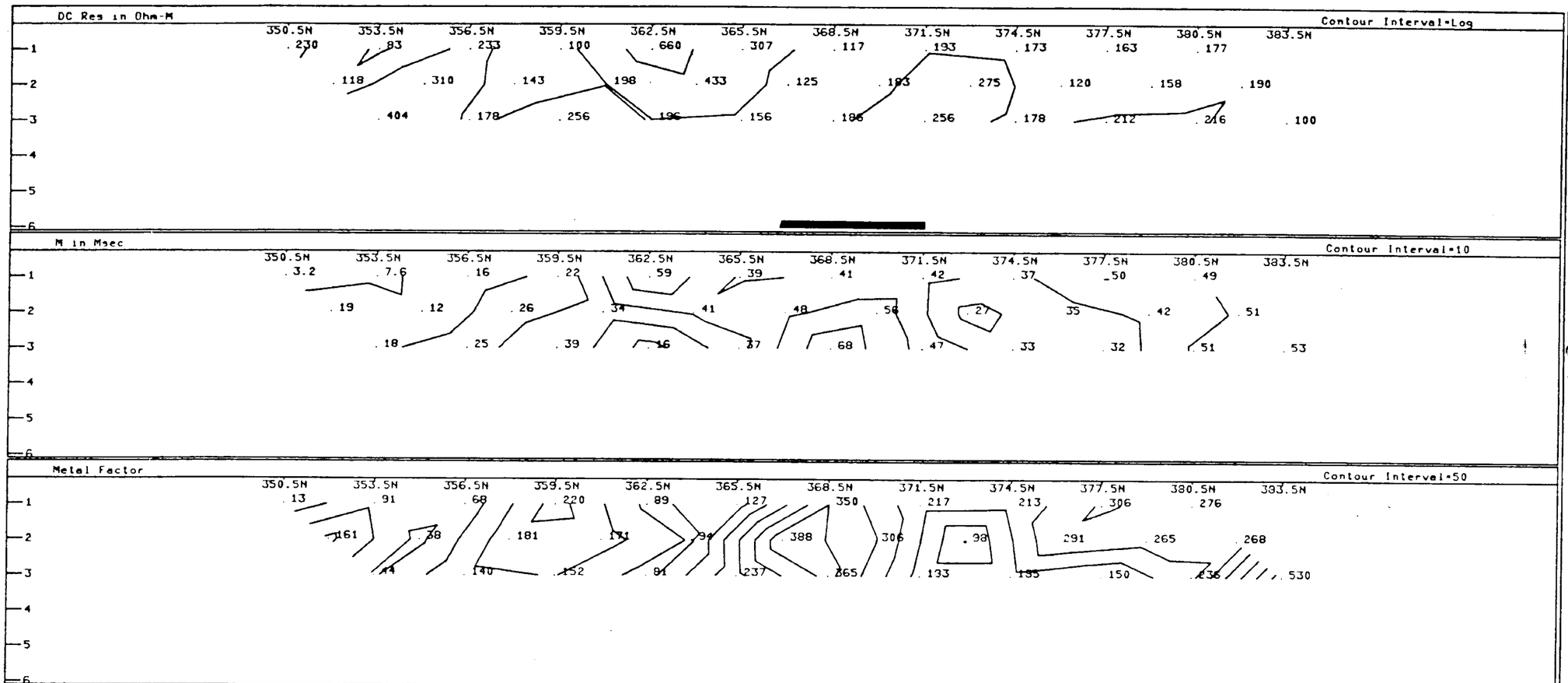
Filename: EX378E

11,776

0 300 600
Feet

UTAH MINES Ltd.
VANCOUVER, B.C.

PLATE 14



EXPO 83

Line2383E

IP SURVEY
25/27/09/83
P-Dp array

COMMENTS:

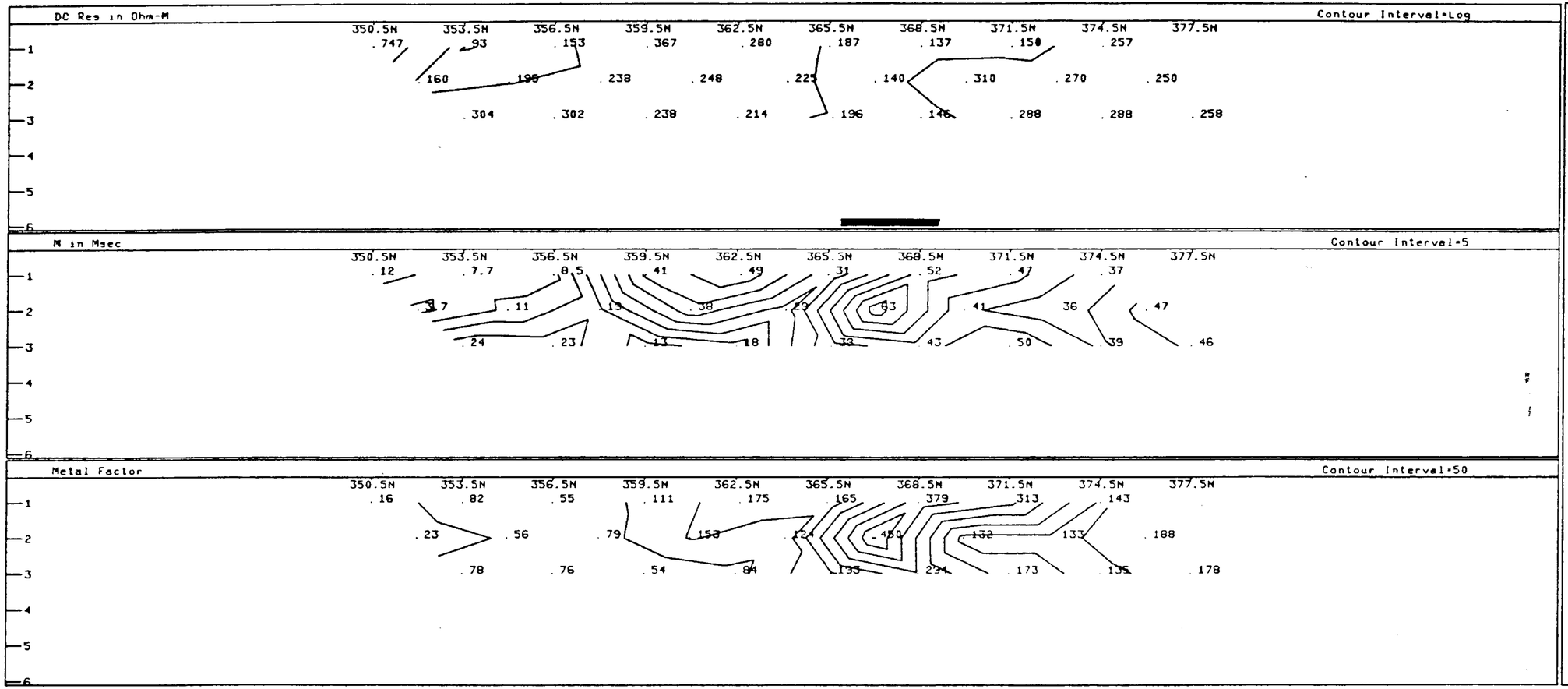
IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX398E

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 15



EXPO 83

Line 2388E

IP SURVEY
25/27/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX398E

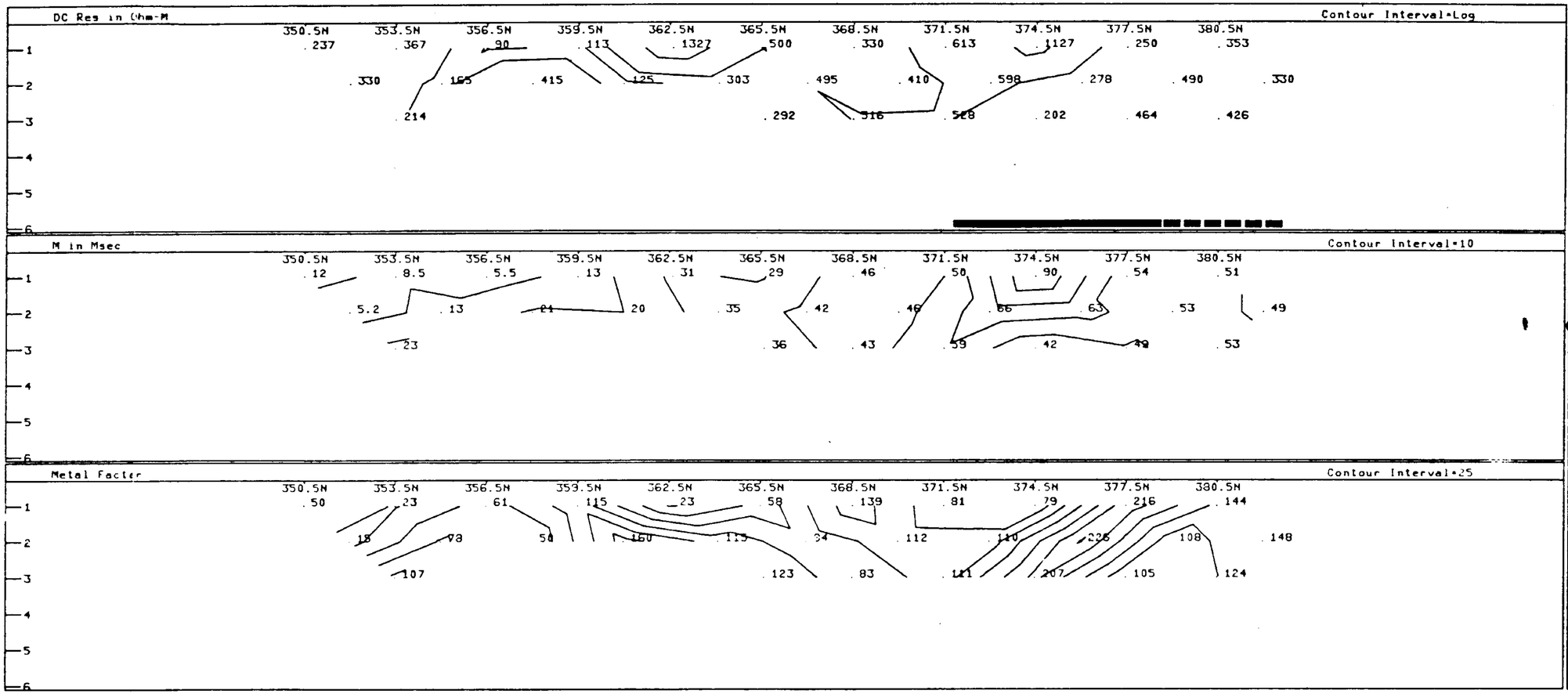
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 16



EXPO 83

Line 2393E

IP SURVEY
25/27/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX398E

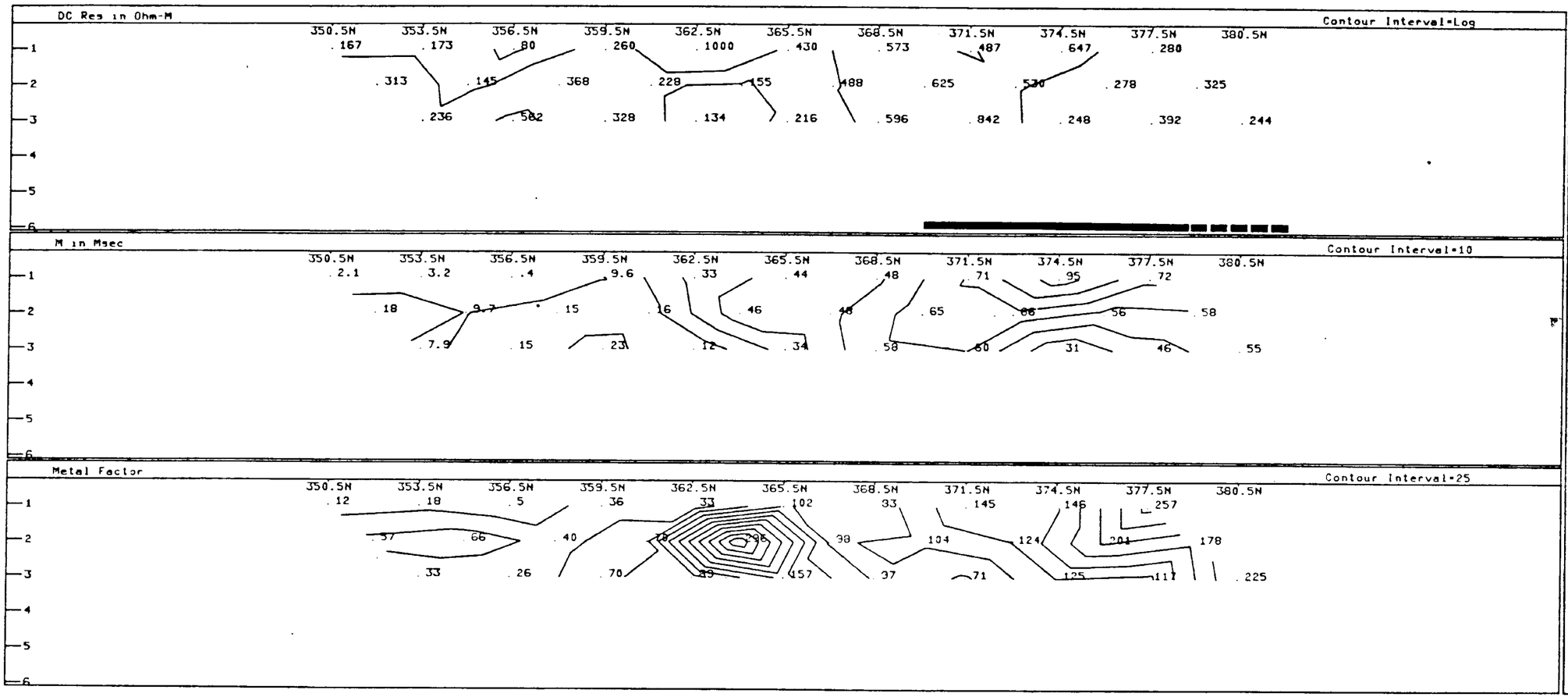
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 17



EXPO 83

Line 2398E

IP SURVEY
25/27/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

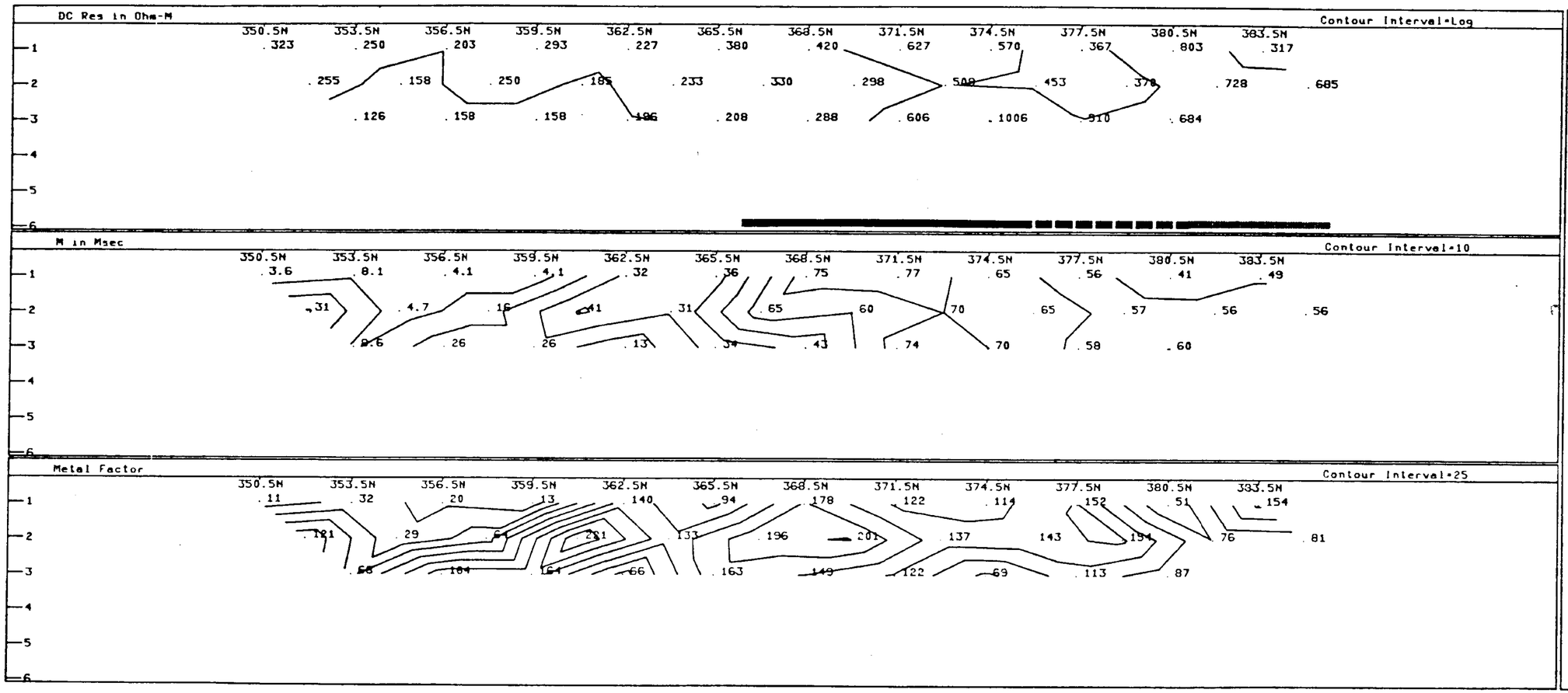
Filename: EX398E

GEOLOGICAL BRANCH ASSESSMENT REPORT

11,776

UTAH MINES Ltd.
VANCOUVER, B.C.

PLATE 18



EXPO 83

Line2403E

IP SURVEY
28/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX403E

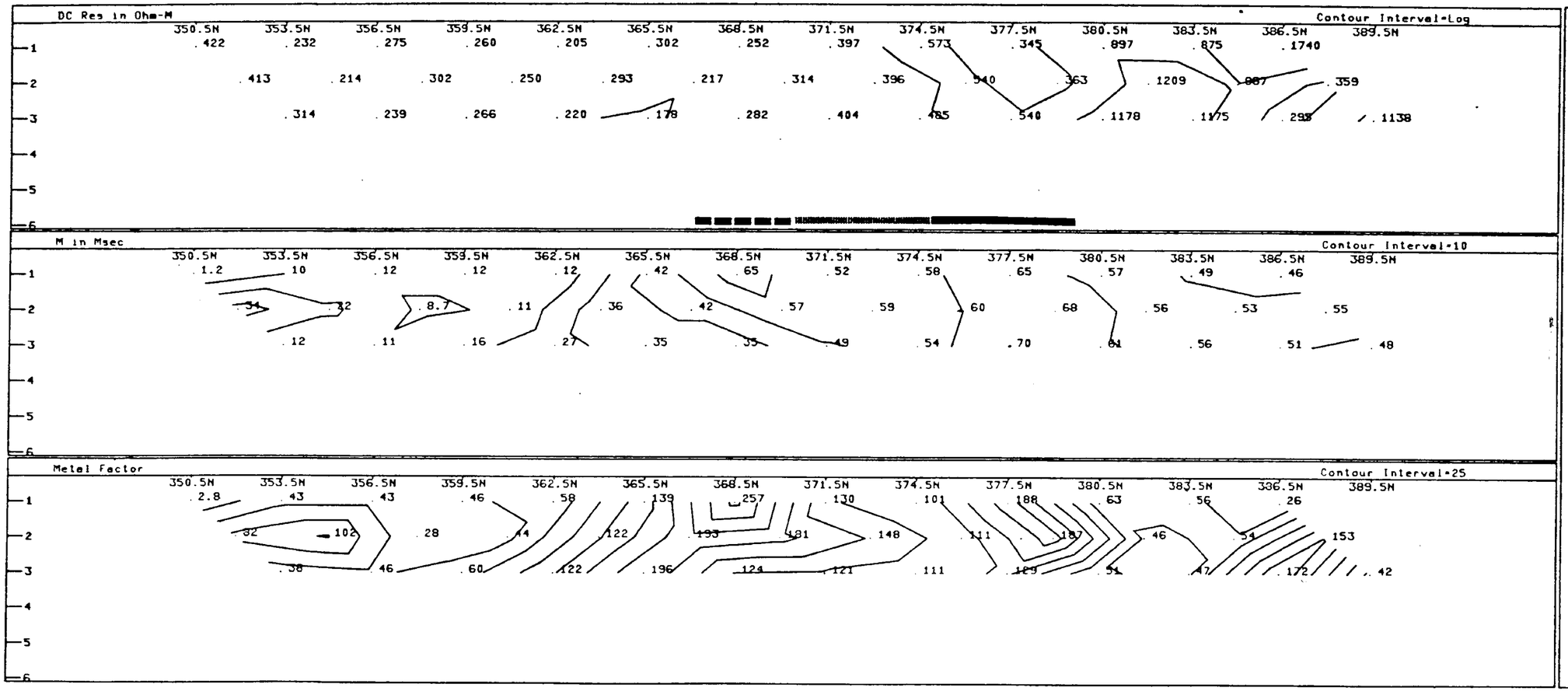
GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,776

0 300 600
Feet

UTAH MINES
Ltd.
VANCOUVER, B.C.

PLATE 19



EXPO 83

Line 2408E

IP SURVEY
29/09/83
P-Dp array

COMMENTS:

IPR-11 DATA
M .45 to 1.1 Sec

Filename: EX408E

0 300 600
Feet

UTAH MINES
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VANCOUVER, B.C.

PLATE 20