REPORT ON PHASE 1a EXPLORATION PROGRAM ON THE SHUNSBY PROPERTY, CUNNINGHAM TWP of KIRKTON RESOURCES CORP.

December, 1990
Toronto, Ontario

P.A. Sobie, B.Sc.
MPH CONSULTING LIMITED

SUMMARY

A major exploration program has been completed on the Shunsby base metals property during 1990 on behalf of Kirkton Resources Corp. by MPH Consulting Limited of Toronto.

Located in the south portion of the Swayze greenstone belt some 130 km southwest of Timmins, Ontario, the Shunsby property has a history of exploration dating back to the early 1900's when the area was examined for its iron potential. In excess of 200 diamond drill holes have been completed on the property to date. This work has been focused on two small copper-zinc (± lead, silver, cadmium) deposits, the so-called "Main" and "South" zones. Virtually all of this drilling has been relatively shallow and some of it rather poorly directed. Very small areas in the Main Zone, for example, may contain upwards of 10-15 drill holes.

The present work completed on behalf of Kirkton Resources Corp. consisted of:

(a) A comprehensive compilation of all existing drill data and the generation of vertical cross-sections using Micromine computer software. Considerable time was spent in the field in locating and accurately positioning previous drill collars. Lack of accurate drill collar locations has led to problems in previous interpretations and has necessitated the invention of numerous faults to explain offsets in mineralized units.

Considerable time was spent in re-logging and re-sampling the old core found on the property to the extent that condition of the core permitted. This information, both assay and geological, was then integrated into that of the previous workers. A significant amount of mineralization was discovered in the old core in the course of this work.

(b) A large surface stripping and trenching program on the known mineralized zones and on geophysical targets located by the 1989 surveying. One of the highlights of this work was the discovery of massive chalcopyrite-sphalerite ± galena mineralization in Upper Cherts of both the Main and South Zones.

(c) Detailed geological mapping over all the stripped areas along with limited property-wide traversing. One observation from this latter work is that there are a great deal more volcanics on the property in areas where gabbroic intrusives were previously indicated to be the predominant rock type. As well, results of geological mapping filed for assessment credit on adjoining properties have been integrated with our work. All of the various geological nomenclatures have been rationalized to produce consistent identifiers for the various rock units.

(d) Detailed geophysical surveys (MaxMin II EM, magnetics) on detailed, 50 m lines over the area encompassing the known mineralized

stratigraphy and priority geophysical targets from the previous (1989) surveying.

Geologically, our work determined that the geology of the deposits area, and that of the property as a whole, is relatively simple. Copper and zinc mineralization is hosted by two chert-argillite units ("Upper" and "Lower" cherts) separated by a variolitic basalt unit. The sedimentary sequence has a true thickness of up to 200 m or more with the Upper Cherts being considerably thicker then the Lower Cherts. The sediments are floored by a conformable mafic volcanic/sill complex and are capped by a quartz and feldspar phyric intermediate volcaniclastic unit. These units form a north-striking, shallow (30^0-40^0) west-dipping, upwards-facing homoclinal sequence. Copper-zinc mineralization occurs as stratiform to stratabound matrix fillings, blebs, disseminations, fracture filings and thin, massive, laminated material, the latter typically associated with argillitic interbeds. Lead occupies late fractures and openings which often trend perpendicular to the host units.

In the larger sense, the mineralization seems to be occupying a distinct shale basin off a local volcanic centre located directly to the southwest. It is best characterized as being of distal volcanogenic origin, although there are some sedex-type characteristics present.

The computer software utilized to generate the cross-sections was also utilized to calculate a geological mineral inventory as follows:

Main Zone: Lower Cherts Near Surface	464,460 tonnes grading 1.14% Cu, 1.56% Zn
Main Zone: Upper Cherts	201,449 tonnes grading 0.81% Cu, 1.94% Zn
South Zone: Lower Cherts Near Surface	1,218,638 tonnes grading 0.63% Cu, 3.15% Zn
South Zone: Upper Cherts	1,374,338% tonnes grading 0.22% Cu, 2.67% Zn
TOTAL POTENTIALLY OPEN PITTABLE	3,258,855 tonnes grading 0.54% Cu, 2.65% Zn
Main Zone: Lower Cherts Down-Dip	447,526 tonnes grading 1.10% Cu, 1.49% Zn
TOTAL MINERAL INVENTORY	~4,000,000 tonnes grading 0.59% Cu, 2.56% Zn

These are "first-pass" computer-calculated approximations only, which simply average the values found within block outlines, without weighting or the use of geostatistics.

Block outlines themselves are geologically inferred based on knowledge of the deposits, and are not in any way meant to reflect mineable blocks, or mineability scenarios.

Also, it is believed that economically significant amounts of Pb, Ag ± Cd will be added to the above numbers through further work.

Attempts to trench the Lower Cherts south of the Joubin Fault and certain EM conductors east of the known mineralization were unsuccessful. This work however did locate high grade Cu float (to 11% +) in till directly over the conductors in question (particulary conductors 40b(1d) and 40a(12)). These float occurrences are herein felt to be related to historical, high grade copper-zinc float on the property in the area of 5+00S, 2+00E. Collectively, these mineralized boulders appear to define a Cu-rich dispersion train the source of which appears with certainty to be these untested EM targets with some contribution from the up-dip portion of the Lower Cherts.

Chemical results and petrographic studies point to significant hydrothermal alteration in the mafic rocks underlying both the upper and lower chert mineralization. These data, along with metal ratios, further suggest that the exhalative vent area may be located down-dip along the known mineralized stratigraphy. This raises the attendant possibilities for a massive, higher grade, more proximal deposit in the untested down-dip (down-basin?) area.

In all, we are considerably encouraged by results to date. The known deposits may turn out to be peripheral to or up-dip from a much more substantial body. We further feel that if more of the low grade near-surface material can be outlined, an open pit operation could be viable.

A next round of work is strongly recommended for the Shunsby property. This should consist of additional surface work plus diamond drilling and is budgeted at $620,000.00

The surface work should be a continuation of that carried out in 1990 with efforts concentrated in the following areas:

(a) south of the existing stripping on line 1+00S in the South Zone to try and extend the known mineralization here to the south

(b) on either side and to the west of the present trench on line 1+00N to try and locate at surface the mineralization known to be in this area from drill results

(c) on the extensive swarm of geophysical conductors including 48(14a), 54(14b), 55 and 56 in the upper cherts of the Main Zone. This area is known to be Zn-bearing but has only been superficially investigated

(d) in the west portion of the property on conductor 18c, 19b, 20 etc. (Another base metal-bearing sedimentary sequence unrelated to the foregoing is present in this area).

Also, the existing trenches in the area of line 1+00S and line 3+00N should be properly blasted and re-sampled in the course of the above.

This first phase of diamond drilling should be directed towards the following targets:

(a) testing of the up-dip portion of the lower cherts in the South Zone as marked by EM conductors 40a(2c), 41(2d) and 49 from the Joubin Fault to line 3+00S (1500 m of drilling)

(b) testing of EM targets 40b(1d), 42a(12), 28, 16, 42b(13b), 13c and 14d (1000 m of drilling) which encompasses the northern strike extent of the Main Zone lower cherts as well as the presumed source(s) of the Cu-rich float.

(c) deep drill testing of the area down-dip from the Main and South Zones; four 400 m holes should be drilled on lines 5+00N, 3+00N, 1+00N and 1+00S at 7+00W. A contingency allowance of an additional 1400 m should be made available for two deeper tests based on the results of the foregoing for a total of 3000 m.

The above program is considered to be a critical phase in the exploration of the Shunsby claims and will determine to a large degree the economic possibilities for the property.

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1.0 INTRODUCTION

The Shunsby property, located southwest of Timmins, contains two known copper-zinc deposits which are, by far, the most significant concentrations of base metals within the Swayze greenstone belt. The Swayze represents the westward continuation of the prolific Abitibi greenstone belt which hosts the gold-base metal camps of Timmins-Porcupine, Noranda, Val d'Or and Chibougamau.

Extensive exploration efforts on the present property between 1954 and 1981 by several groups included 67,000 feet of drilling in 225 holes, the majority of which were concentrated in the known areas of mineralization. This work was constantly hampered by poor access and technical problems, but was successful in delineating two small deposits of reportedly distal volcanogenic character. Relatively low grades deterred these previous operators who, for the most part, were attempting to establish an underground mining operation. Kirkton's inital interest revolved around the potential for establishing an open-pit operation on the property supplemented by selective underground mining of some higher grade zones. As well, the property as a whole was felt to be highly pregnant base metal ground which had never been thoroughly explored.

Initial work by Kirkton on the property during the 1989/90 fall and winter consisted of extensive data compilation combined with linecutting, preliminary geological investigations and blanket geophysical surveying (magnetic and horizontal loop EM).

Work during the past summer field season included a large stripping/trenching program, careful relogging and resampling of the old core as well as accurate location of these holes relative to the grid system, along with detailed geological mapping. Most recently, additional detailed linecutting and geophysics were carried out over the area hosting the Main and South deposits. The new geophysical data were integrated with the previous survey results and the entire geophysical picture was re-interpreted in light of our improved understanding of property geology. The aim of all this work was to better understand the nature and distribution of the mineralization, and to correlate the copper and zinc values in drill core with known surface mineralization and the various geophysical zones.

As well, a number of footwall volcanic/intrusive samples were collected to help characterize the hydrothermal alteration assemblage associated with mineralization on the property. And finally, a computer-aided mineral inventory was calculated for the two deposits.

Results of all of the latest work, as well as re-interpretation of some of the 1989 work, form the subject of this report.

2.0 LOCATION, ACCESS AND INFRASTRUCTURE

The Shunsby property is located in the central portion of Cunningham Township, approximately 50 kilometres south of Foleyet and 60 kilometres east of Chapleau (Figure 1). The large mining centres of Timmins and Sudbury are approximately 130 and 180 kilometres to the northeast and southeast, respectively. The property is centred at 47°43'N latitude and 82°39'30"W longitude, within NTS area 41 0/10.

An existing network of gravel logging roads established by E.B. Eddy Forest Products Ltd. off the Timmins-Sudbury highway, no. 144, provides easy truck access to the south end of the property. To reach the property, it is necessary to follow the Ramsey-Sultan road west from highway 144 thence north along the Cunningham Township spur of the Blamey Road to the property. It is approximately 90 km from highway 144 to the property. The Cunningham Township road in turn connects with a number of old drill roads and trails which provide access to the balance of the claims. Alternatively, the Dore Road of Foleyet Timber Limited can be followed south from Highway 101 just east of the town of Foleyet to the Ramsey-Sultan Road. A wagon trail/drill road connects the Shunsby property to the Dore Road at Garnet Lake, just south of the Wakami River crossing. Up-grading of this road would cut the road distance to Timmins to approximately 160 kilometres.

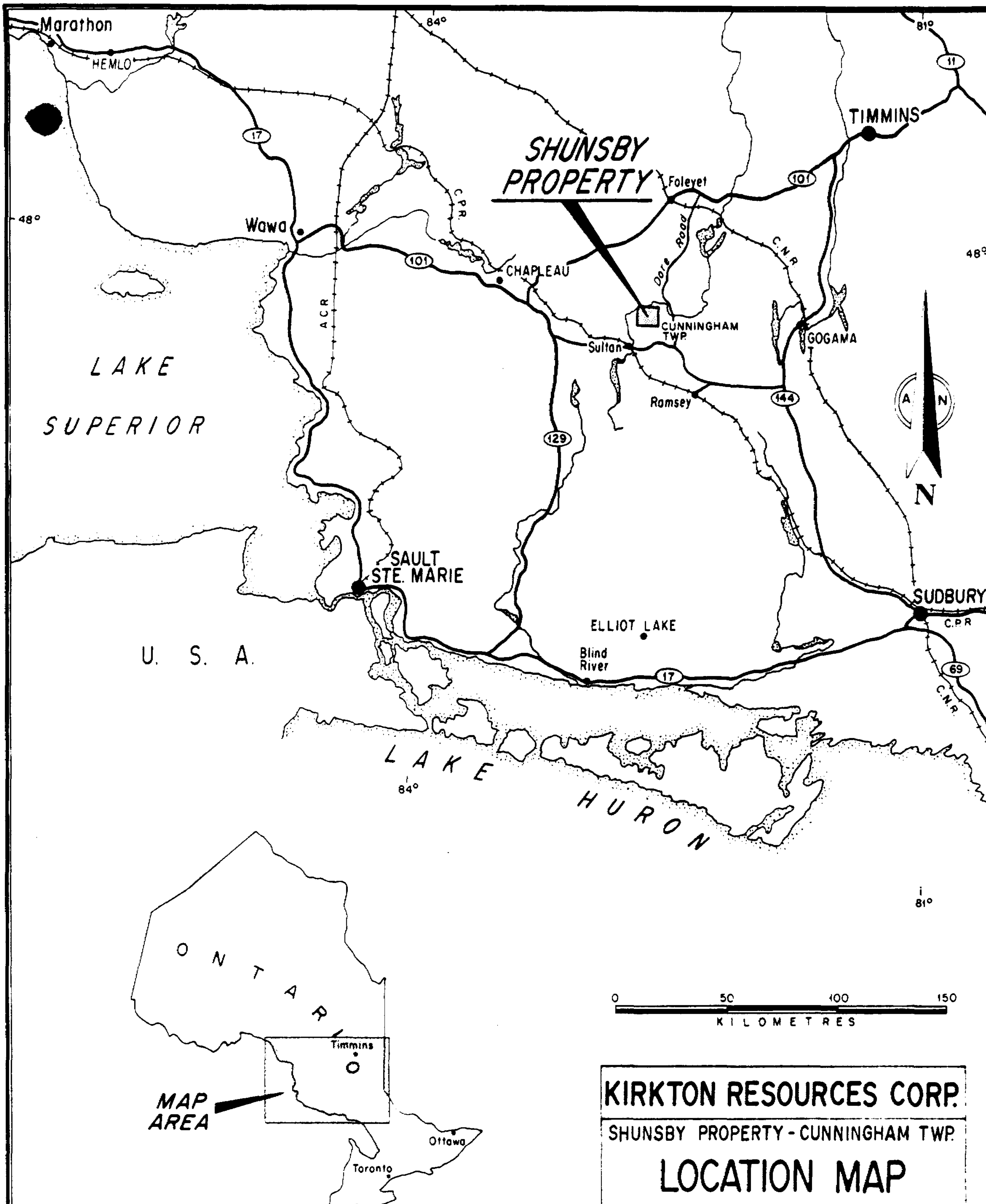
The E.B. Eddy logging operations have currently covered the three southernmost claims and much of the western portion of the property.

The property is well located in terms of exploration and mining supplies, services, etc., being approximately equidistant from Marathon/Manitouwadge/Wawa, Timmins and Sudbury. There is a large and relatively stable work force in the region from which to draw miners for any new mining operation.

The CPR main line passes through the small railhead of Sultan, approximately 30 kilometres by road to the southwest of the property. E.B. Eddy maintains a large camp at Ramsay, approximately 65 km by road to the southeast, also on the CPR line.

The original drill camp on the property at Hiram Lake still includes one cabin in good condition as well as all of the core racks. There is an old MNR forestry tower camp, which includes two winterized cabins in excellent condition, approximately 1.5 kilometres to the northwest.

Abundant fresh water is available on the property from Edwards Lake. The nearest hydro-electric power is at Sultan, 16 km across country to the south-southwest. There is also an old telegraph line and right-of-way which extends from Sultan to the forestry tower.



KIRKTON RESOURCES CORP.

SHUNSBY PROPERTY - CUNNINGHAM TWP.

LOCATION MAP

Project No	C - 1251	By	P. Sobie
Scale		Drawn	A B N Cartographics
Drawing No	Figure 1	Date	December 1989

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3.0 PROPERTY AND LEGAL

The Shunsby property is within the Porcupine Mining Division of Ontario and consists of 20 patented mining claims and 10 mining leases (Figure 2) more properly described as follows:

Patented Mining Claims	Number	Mining Rights Only	Surface and Mining Rights
S34944-34947	4		x
S43946-43948	3		x
S57536-57544	9	x	
S57585	1	x	
S61828-61830	3	x	
	20		

Mining Leases	Number	Mining Rights Only	Surface and Mining Rights
P90411-90412	2	x	
P90413-90415	3		x
P121298	1	x	
P147117-147118	2	x	
P121596-121597	2	x	
	10		

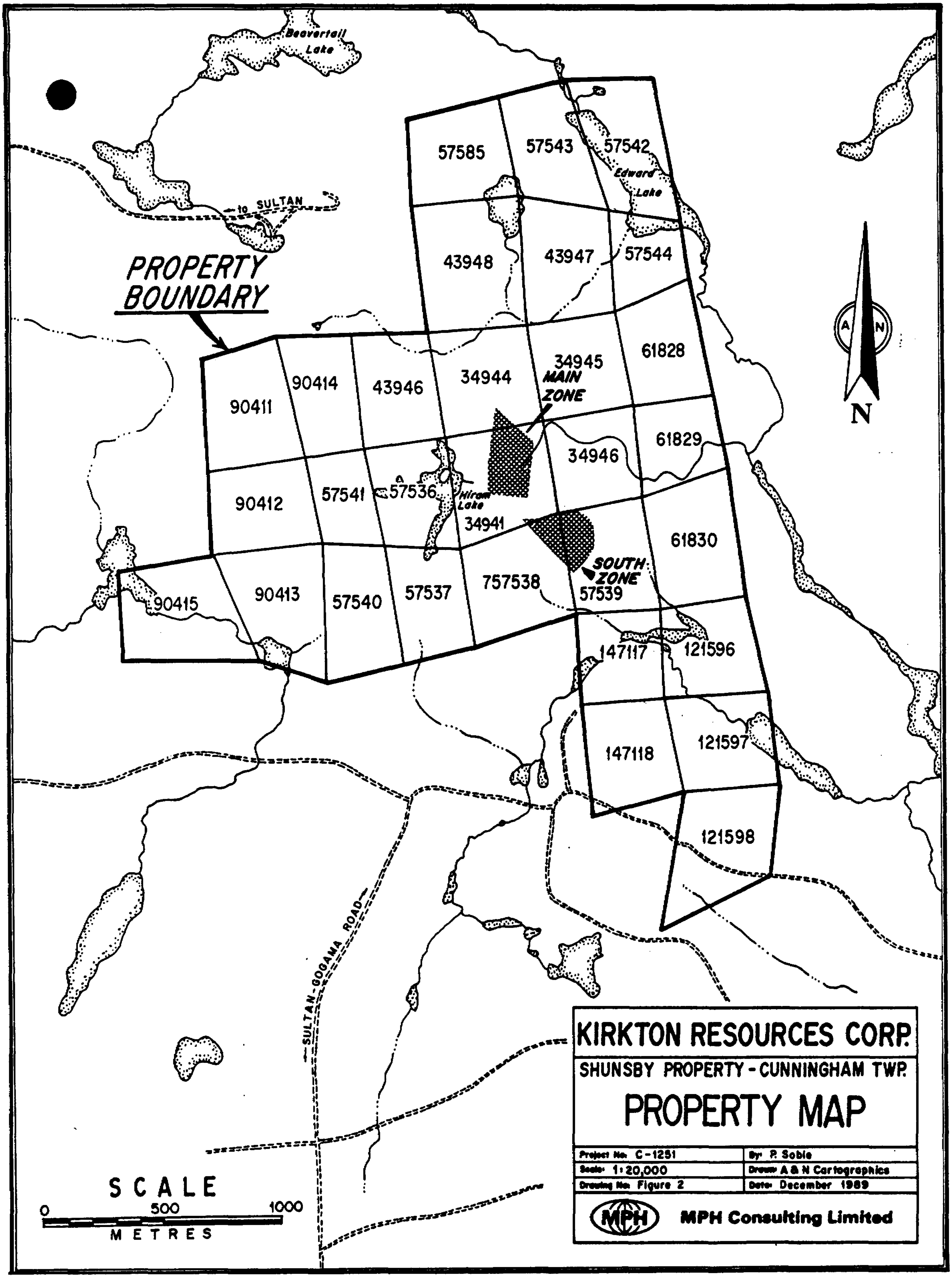
Under the current Mining Act in Ontario, leases are granted on mining claims following completion of required amounts of assessment work for an initial 21 year term. This is renewable in perpetuity.

Where both surface and mining rights are leased, a payment to the Crown of $1.00 per acre the first year and $0.25 per acre for each subsequent year is required. For mining rights only the required payments is $1.00 per acre for the first year and $0.10 per acre for each subsequent year.

For all of the Shunsby patented claims, an acreage tax of $0.50 per acre payable to the Crown is required on or before October 1 of each year.

We have not independently verified the ownership and status of the above claims. Also, there may be some changes to the above payments following implementation of the new Ontario Mining Act expected sometime in 1991.

Kirkton Resources Corporation may earn a 100% undivided interest in the property, subject to a 12-1/2% net profits royalty, by carrying out exploration totalling $2,750,000 and making cash payments totalling $250,000 to MW Resources Ltd., Toronto and Chelsea Resources Ltd., Vancouver by four years after the date that the


Beavertail Lake
to SULTAN
PROPERTY BOUNDARY
57585
57543
57542
Edward Lake
43948
43947
57544
61828
90411
90414
43946
34944
34945
MAIN ZONE
61829
34946
90412
57541
57536
Hiram Lake
34941
61830
SOUTH ZONE
90415
90413
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147117
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SULTAN-GOGAMA ROAD
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KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY - CUNNINGHAM TWP.
PROPERTY MAP
Project No. C-1251
By: P. Sobie
Scale: 1:20,000
Drawn: A & N Cartographics
Drawing No. Figure 2
Date: December 1989
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Ontario Securities Commission issues a receipt for a final prospectus regarding an initial public financing for the company. Kirkton may earn a 20% undivided interest after exploration expenditures of $750,000 and option payments of $50,000, after which the interest of the company shall be calculated by the lesser of either:

(a) percentage amount of exploration expenditures in relation to $2,750,000; or

(b) percentage amount of option payments in relation to $250,000.

In the event that Kirkton does not acquire 100% of the property, the option agreement calls for the formation of a joint venture to further explore the claims.

Kirkton has expended approximately $450,000.00 on the claims to date.

4.0 PREVIOUS WORK

The property has been the subject of extensive exploration dating back to the turn of the century when the iron formation in central Cummingham Township was first staked for its iron content. Table 1 summarizes the exploration history of the Shunsby property.

TABLE 1 - EXPLORATION HISTORY

Date	Company	Interest	Diamond Drill Holes	Drilling Footage	Claims Worked	Work Performed
1904-07	Ridout Mining	Iron	-	-	-	Staking
1927-29	Ridout Cunningham	Zn, Pb	some	?	34944 to 47	Trenching Drilling
1954	Am Metal Co.	Zn, Cu, Pb	1	560	121596, 597	Drilling
1954	Cominco	Zn, Cu, Pb	4	1,500	57539, 57543	Drilling
1955-57	Shunsby Gold Mines, Teck etc. Syndicate	Zn, Cu, Pb	74	20,336	34947 etc.	Geology, Trenching Drilling
1957	Martin Shunsby	Zn, Cu, Pb	3	200	90415	Packsack Drilling
1960-61	Shunsby Mines	Zn, Cu, Pb	9 9	3,605 4,110	34947	EM, Geology, Drilling
1965-66	FRJ Prospecting Syndicate	Zn, Cu, Pb	41	14,279	34944 to 47	EM, Geology Drilling
1968-69	Con. Shunsby Mines Ltd.	Zn, Cu, Pb	23	9,091	34945 46, 47 57539	Geology, Drilling
1969-70	Umex	Zn, Cu, Pb	Nil	Nil	-	Geology
1974-75	Grandora Explorations	Zn, Cu, Pb	21	7,444	57539 34947	Trenching, Drilling Geochemical
1978	MW Resources	Zn, Cu, Pb Ag, Au	5	1,237	Tower Group	Geology, Drilling
1979-80	Placer Development	Zn, Cu, Pb Ag, Au	4	1,250	Southern Extension	EM, Geochemistry, Mag, Drilling
1981	MW Resources	Zn, Cu, Ag, Au	30	3,474	34947 57539	Map, Drilling
			224+	67,000+		

Initial interest in the iron ore possibilities of the property by Ridout Mining quickly waned when it was determined that the iron content of the chert formations was non-economic. Subsequent discoveries of lead and zinc-bearing veins(?) within the iron formation prompted a 1927 exploration campaign over the entire strike length of the iron formation under the merged Ridout Cunningham Mines, Limited. While no record of this work remains, Meen (1942) reports that, "systematic prospecting of the many claims along with some diamond drilling was undertaken in 1928-29, but no body of economic importance was discovered and no further work has been carried out". He reports on the discovery of many showings however, and it seems probable that this work first identified what would become the Texas Gulf deposit located 3 km to the northwest and the Shunsby deposit, the latter named after prospector Martin Shunsby.

The present property was staked in central Cunningham Township by Earle Sootheran and Hiram Paul. In 1954 it was optioned to Cominco Ltd. who drilled 1499 feet in 4 holes designated A through D. Three of these were in the area of the present South Zone and one was drilled in the northeast corner near Edwards Lake. The southern drilling encountered several narrow, zinc ± lead-bearing horizons, while the northern hole encountered felsic volcaniclastics and graphitic sediments.

Also in 1954, American Metal Company drilled a single, 559.5 ft hole in the area of present line 9+00S at 5+00E. No assays are reported but the section from 29 to 30.1 feet is described as "tuffaceous material ... heavily mineralized by pyrrhotite with pyrite, chalcopyrite and sphalerite". The section from 192.6 to 195.6 feet is described as "highly altered rock ... pyrrhotite, chalcopyrite and sphalerite disseminated throughout ...".

In 1955 Nipiron Mines, Ltd., who optioned the property from Shunsby Gold Mines Ltd., funded and directed the drilling of 57 diamond drill holes mostly in the so-called Main Zone area. Much of this work was rather poorly directed and W.S. Savage (1956), the Department of Mines resident geologist at that time, noted: "It is obvious that some of the long sulphide-bearing intersections in the diamond drill holes resulted from inadvertently drilling down the dip of a mineralized bed". Nipiron reportedly defined 100,000 tons of 1% copper mineralization from their drilling, but negotiated a termination to their option agreement in the summer of 1956.

A syndicate consisting of Teck Explorations, Cochenour-Willans Mines, Northern Canada Mines, Nipiron Mines and Shunsby Mines was subsequently formed to further explore the property. This group drilled a further 17 holes during the fall of 1956 and winter of 1957. Three holes were drilled into the Main Zone deposit, with most of the others directed towards the South Zone. As well, deep holes 72 and 74 were drilled in the vicinity of the Hiram Lake camp to test for down-dip extensions of the Main Zone. Copper-zinc mineralization was encountered and this became known as the West Zone. Virtually all of the Syndicate holes encountered encouraging to potentially economic mineralization, however, falling base metal prices forced a halt to the program during March of 1957. Teck Explorations calculated an ore reserve for the Main Zone of 152,000 tons grading 1.35% Cu and 1.22% Zn at this time. Also during this period, the east-west access road linking the property to the Sultan-Kenty

Mine road was cut. Shunsby Mines Ltd. also completed the purchase of the optioned Southeran-Paul property. In addition, flotation tests were run on lead-zinc and copper ore samples by the metallurgical division of the Department of Mines, indicating that there would be no apparent difficulty in producing commercial grade concentrates.

Nipiron Mines Ltd. under an option agreement with Shunsby Mines undertook further exploration in the winter of 1960. Nine holes (75-83) were completed during December and January totalling 3,605 feet. These were again directed towards the Main and West Zones, apparently to replace/legitimize much of the earlier, down-dip intersections. Geological mapping as well as EM and magnetic surveys were reported as being completed during this campaign. A further nine diamond drill holes totalling 4,110 feet were completed the following summer. This consisted of several holes (85, 90, 91 and 92) drilled vertically. These successfully intersected the down-dip projection of the Main Zone, between the camp and the main showings to the east. Significantly, the other five holes were again drilled down-dip in this same area, possibly to avoid a topographic rise represented by a large diorite intrusive.

During the summer of 1964, Nipiron extended hole 82 from 503 feet to 836 feet and encountered the down-dip projection of the Main Zone, i.e. the West Zone.

This is the most westerly hole drilled in this portion of the deposit to date. This hole encountered some significant copper values including 4.2% Cu over 4.1 ft and 4.3% Cu over 5.5 ft. The mineralization is completely open in the down-dip direction beyond this hole.

The F.R. Joubin Prospecting Syndicate became involved with the property in 1965, with Joubin becoming president of the reorganized/refinanced Consolidated Shunsby Mines Ltd. in 1966 following the death of Martin Shunsby. The syndicate itself consisted of personnel from mining organizations including Leitch Gold Mines Ltd., Noranda Explorations, Ltd. and Wright-Hargreaves Mines Ltd.

Joubin instigated an aggressive exploration campaign which included much staking of surrounding ground followed by geochemical, magnetometer and Turam EM surveying, step-out drilling along strike to both the north of the Main Zone and the south of the South Zone, as well as limited drilling and trenching in the western property area. The two holes drilled by Joubin on the western property showings both intersected an "upper" low grade zinc-mineralized chert horizon but were felt to be of insufficient length to test the "Basal Chert" he thought to be present here. This latter unit hosts much of the potentially economic base metal mineralization in the Main, South and West Zones. Stratigraphy here was thought to correspond to the western limb of a major syncline which transects the property. We doubt the existence of such a structure, and feel that Joubin was drilling stratigraphy correlative with the Texas Gulf and Tower Group iron formation.

Joubin's work on the South Zone was designed to better understand stratigraphy as

well as confirm a number of previous, high-grade intersections. The program, which included lengthening several holes to the "footwall diorite", was felt to indicate that an upper (middle?) chert horizon hosted high grade copper-zinc mineralization here, while the "basal" chert intersections were of lower grade.
The Syndicate's work to the north consisted of several in-fill holes within the Main Zone, as well as holes designed to:

(a) further define the down-dip extension (West Zone);
(b) extend the Main-West zones to the north; and
(c) explore the area in between the Main and South Zones.

In general, results indicated that:

(a) significant mineralization in the West Zone persists to a vertical depth of at least 840 feet;
(b) significant copper ± zinc, lead mineralization within the chert extends at least 1,200 feet to the north of the Main Zone but is offset; and
(c) the intermediate area between the Main and South Zones is of high potential but is complicated by a fault.

Within the Main Zone, Joubin calculated an average grade of 1.2% copper and 1.28% zinc over a true width of 26 to 27 feet. He recommended shallow underground investigations and states (1966):

> "There is sound reason to believe that this drill-indicated average grade will be raised by bulk sampling. This is because the copper values appear to be controlled by both disseminations in the Basal Chert and also as narrow chalcopyrite-filled fractures. It is improbable that the several vertical drill holes have intersected a representative amount of the vertical fracture mineralization.
>
> I concur with and endorse the opinion of other geologists that the Main Zone section justifies shallow level underground exploration intended to check on (a) grade, (b) mineral distribution characteristics, (c) the attitude of cross and strike fracturing and relationship to mineralization, (d) the attitude and relationship (if any) to the post-mineral "D" dyke, and (e) general rock characteristics as these would relate to possible underground mining and/or some limited open-pit extraction."

A qualifying report written by W.F. Atkins, P.Eng. in 1968 raised $100,000 for Consolidated Shunsby Mines Ltd. through a public underwriting which was used to finance a 1968 drill program of 23 holes. The majority of this work was directed towards the South Zone and the intermediate area, with several holes (68-7, 8 and 9) spotted to test a showing within granitic(?) rocks to the west of the present property. This campaign allowed for a calculation of geologic reserves for both the South and

Main zones.

Joubin then brought the property to the attention of Union Miniere Explorations and Mining Corporation Limited (UMEX) in March of 1969. Their examinations and compilations allowed for reserve calculations by P. Potapoff of:

UPPER CHERT ZONE -	929,000 tons averaging 0.24% Cu, 2.25%
(middle chert, South and Main Zones)	Zn + Pb from surface to -300 feet over 2,700 foot strike extent.
LOWER CHERT ZONE -	1,684,000 tons averaging 0.59% Cu, 1.6%
(middle chert, South and Main Zones)	Cu + Pb from surface to -900 feet over 2,400 foot strike length.

Potapoff notes that some of the mineralized zones form discontinuous blocks due to faulting, and some of the better intersections appear isolated. However, A.J. Hough of UMEX notes that reported collar elevations and locations at that time were suspect. This, of course, can have a major bearing on the inferred continuity of mineralized zones. Potapoff concluded that the chances were good of firming up a large tonnage (~10,000,000 tons), low grade (0.5% Cu, 2.0% Zn + Pb, 0.25 oz/ton Ag) deposit. He recommended a program of deep drilling for down-dip extensions as well as comprehensive property-wide follow-up drilling of old Turam anomalies and surface showings which had not been drilled and were located in otherwise geologically favourable areas. It appears that UMEX subsequently returned the property to Consolidated Shunsby Mines without doing any further work and it sat idle until 1974.

In 1973, B.D. Weaver, a consulting geologist, reviewed the historical data on the Shunsby property. He concluded that all drilling thus far was of little value and that the Main Zone should be drilled off vertically on 100 foot centres.

Grandora Explorations Ltd. in the fall of 1974 optioned the property from Consolidated Shunsby Mines and instigated a program of geochemical sampling, bulldozer trenching and 7,444 feet of diamond drilling in 21 holes. During the initial phase of the drill program, 10 holes were targeted on the Main Zone, to extend and delimit the eastern extent of the mineralization. Holcapek (1975) states that the boundaries of the "possible open pit ore zone" are marked by two northerly trending fault zones.

Grandora drilled 11 holes in the South Zone spaced at approximately 200 feet centres to extend the known mineralization and clarify the structural setting. Inexplicably, most of these holes were stopped before reaching the basal chert and footwall diorite. Holcapek states, however:

"The results of this drill program showed that the best mineralized sections are located within the argillites or along the argillite-chert contact, localized along the crestal region of tight, low amplitude folds. Anticlinal folds appear to be more favourable for localizing mineralization because of greater thickening of the sedimentary units and more intense brecciation, but in the vicinity of the fault zones, strong brecciation of the synclinal crestal region can carry good widths of ore grade mineralization as is evident in the eastern part of the Main Zone.

Further, the bedded mineralization suggests that the original sulphides are syngenetic in origin and have been partially remobilized from the limbs of the fold structures into the crestal regions. More work will be necessary to definitely confirm this model."

Holcapek calculated geologic, drill indicated reserves totalling some 1.6 million tons as follows:

Main Zone-Basal Cherts	528,160 tons grading 1.0% Cu and 1.2% Zn
Main Zone-Middle Cherts	350,000 tons grading 1.0% Cu and 1.5% Zn
South Zone-Basal Cherts	400,900 tons grading 0.27% Cu and 2.48% Zn
South Zone-Middle Cherts	320,000 tons grading 0.58% Cu and 2.48% Zn

He further concluded that approximately 1.16 million tons of this material was mineable by open pit. Holcapek recommended linecutting along with detailed lithologic/structural mapping of the whole property and magnetic and EM surveying, to be followed by deep drilling of the down-dip extensions of the known mineralized zones.

In 1978, the renamed MW Resources drilled five holes in the vicinity of the Forestry Tower, then part of the Shunsby property, with little success.

Placer Development Limited optioned the property from MW Resources Ltd. in 1980 and completed geochemical and EM-17 surveying. Placer then drilled four holes, all in the southern portion of the property as it existed at that time. Two holes were drilled on what is now Cominco ground to the southwest of the present Shunsby property. The holes intersected massive pyrite horizons in explanation of the EM conductivity. Placer calculated their own ore reserve figure for the Shunsby deposit, arriving at 2.4 million tons grading 0.4% Cu and 2.4% Zn.

The final phase of exploration was conducted by MW Resources in 1981 and was directed towards delineating a small, high-grade pod within the Main Zone which could be extracted to generate cash-flow. To this end, D. Fairbairn, P.Eng., President of MW Resources Ltd., reviewed all past data and identified a "flat-lying ore zone" of dimensions 1,000 feet long by 130 feet wide by 7 feet thick. This was estimated to contain some 80,000 tons of material grading 3.9% Cu, 6.2% Zn, 1.2 oz/ton Ag and

0.03 oz/t Au. He proposed mining this zone by room-and-pillar methods using a decline from surface, with the ore to be milled at Manitouwadge (Geco). In order to prove up this reserve, Fairbairn proposed a program of short vertical holes as well as stripping and trenching in the Basal Chert horizon of the Main Zone. He was also encouraged by the work to date on the South Zone basal chert, and the middle chert horizons of both zones. Fairbairn calculated reserves of 970,000 tons grading 1.2% Cu and 5.0% Zn for the South Zone, and notes that no assays for Au or Ag were performed.

In the interim, L.B. Goldsmith, P.Eng. reviewed the Placer geophysics and concluded that Placer had not comprehensively compiled known geology with respect to their EM-17 results. He recommended that an EM-17 survey be run over the North (Main) Zone and the results used to re-interpret the Placer results.

A 1981 drill program initiated by Fairbairn for MW Resources consisted of 30 vertical or near vertical holes in the Main Zone. These he concluded were successful in proving up 50,000 tons of material grading 5.2% equivalent copper (3.2% Cu + 3.1% Zn along with 0.02 oz/ton Au and 0.75 oz/ton Ag) over approximately half of the inferred 1,000 foot strike length of the zone. Fairbairn recommended another 2,000 feet of drilling to evaluate the northern and southern quarters of this shallow, high grade zone, and postulated that the base metal enrichment was the result of post-depositional sedimentary dewatering, and as such, more high grade pods could be expected. He further recommended that a program of thorough geological mapping, geophysical surveying and diamond drilling be initiated to locate more zones before any production attempts. The suggestion was also made that MW might entice a major mining company, via a suitable option agreement, to get involved in the project.

In 1982, a lake sediment and water sampling program was performed in the vicinity of Tower, Mink and Edwards lakes by The Environmental Applications Group Ltd. (EAG) for MW Resources. The lake sediment survey, although encompassing a very small number of samples, suggested that a high metal background was present, with possible bedrock related responses noted in the area of Beavertail Lake, Tower Lake and downstream of Edwards Lake. Water at all sites did not reflect these concentrations and was deemed of excellent quality for both potable and mill uses.

In 1983, a fully independent review and assessment of all previous exploration work was performed by Hill, Goettler, De Laporte Ltd. of Toronto for MW Resources. Significantly, they conclude that "sufficient uncertainties with respect to the results and interpretations of both the Placer and recent MW work on the property cast doubts upon the conclusions of the previous work and the reserves supposedly established. Despite extensive drilling in the North and South Zones of the property, therefore, it is H.G.D.'s opinion that the property has not been fully tested... There is enough information presently available in core and reports to enable a thorough assessment to be made and an attractive exploration programme to be outlined by MW preparatory to seeking such a partner".

To this end, Brian Wilson and Associates Ltd., was contracted in 1989 to compile the exploration data and recommend an integrated exploration plan. Wilson's work arrived at a geological reserve figure of approximately 1.0 million tonnes grading 1.0% Cu and 1.5% Zn. He further noted that the two mineralized horizons are open to depth and, in part, along strike. He also concluded that Fairbairn's calculation of 80,000 tons at 3.9% Cu, 6.2% Zn and 1.2 oz/ton Ag for the high grade pod was reasonable, but that extraction of this ore would break even at best. Wilson recommended a one million dollar, two-phase exploration program to consist of:

Phase One
- Re-establish access road.
- Re-logging/re-sampling old core.
- Linecutting.
- Geological mapping.
- HLEM and gradient magnetic surveying.
- Detailed levelling survey to locate old drill collars.

Phase Two
- 10,000 feet of anomaly drilling.
- 25,000 feet of detailed drilling.

5.0 EXPLORATION PROGRAM - OPERATIONS

5.1 General

MPH personnel established a permanent 6-8 man tent camp in late May of 1990 at the end of the logging road, just west of #4 post, claim S-147118 in the southern property area. This was used to accommodate and feed all company and contract personnel for the duration of the field season, and has been left intact for future work.

The project essentially consisted of three phases: an initial heavy equipment-intensive stripping and washing program during which all of the old drill core was extensively examined and re-sampled, a subsequent mapping and trenching program, and a final linecutting/detailed geophysical surveying/geological mapping program through September and October.

MPH personnel involved with the project consisted of :

W.E. Brereton, P.Eng	Consultant
P. Sobie, B.Sc.	Project Manager
D. Jones, M.Sc.	Geophysical Consultant
A. Kamo, B.Sc.	Field Geologist
D. Croft	Geological Technician
B. Mortson	Geological Technician
K. Blackshaw	Senior Geophysical Operator
R. Chasse	Geophysical Technician

As well, in-house computer and drafting personnel were utilized as needed.

5.2 Historical Drill Core Recovery

The vast majority of the old drill core was stored at the Shunsby Mines camp on Hiram Lake, while that from MW Resources' 1981 program was stored at the MNR fire tower to the northwest of the property.

Initial work consisted of locating the old drill collars and accurately chaining these in relative to the new Kirkton grid. This was relatively simple for the step-out holes and those in the less densely drilled areas. Some uncertainty remains however, in the Main and South zone areas, particularly with the locations of several Grandora Explorations holes drilled in 1974. Careful attention was also paid to topography by surveying lines with a Brunton compass to more accurately ascertain collar elevations. The initial surveying of the first 74 holes by the workers of that era served as control for this work.

All of the core stored at Hiram Lake was carefully examined and resampled during the course of this program. While approximately 10-20% of the boxes had either rotted, been dumped or had sunk into the ground, a significant portion of most holes was available. Past samples were duplicated with the remaining split and have been stored for eventual re-assay (plus lead and silver). Where these splits were re-assayed as part of broader zones, the copper and zinc numbers were uniformly within an acceptable margin of the original assays. Much of our assaying was on whole core samples of low grade material to fill in gaps between previous intersections. All analytical work was performed by Swastika Laboratories of Swastika, Ontario. Certificates of analysis are presented in Appendix 2.

Generally, extensive weathering made identification of mineralization difficult and precluded comprehensive logging of the old core. It was possible, however, to check the old work and often elaborate on or correct vague or confusing descriptions in many cases. A uniform descriptive legend for all of the different drill campaigns was constructed for all of our work.

5.3 Stripping and Trenching

The mechanical stripping and washing was sub-contracted to D.P. Larche Mining Exploration Ltd. of Timmins, Ontario. Equipment supplied included:

Fiat Allis 16B Bulldozer
Caterpillar D-4D Wide-track Bulldozer
John Deere 690B Excavator
Bombardier Muskeg-mounted Backhoe
Timberjack-mounted Backhoe
Wajax high-pressure pump + hoses
Honda Four-trax utility vehicle

Along with the above, Larche supplied three operators and fuel, supplies etc. for the equipment.

The general methodology involved clearing a swath of ground to be stripped with the Fiat Allis bulldozer (approximately the size of a Caterpillar D-7) and pushing as much overburden to the sides as possible. This was followed by major overburden removal with the excavator afterwhich the Timberjack backhoe did the final clean-up of loose overburden.

All bedrock exposed by the stripping operations was thoroughly washed with the Wajax high pressure pump by Larche/MPH personnel. The newly exposed rock was then examined and various mineralized areas were selected for rock saw channel sampling and/or trenching and sampling. The trenching was carried out by drilling short blast holes with a gasoline plugger followed by loading and blasting with stick powder.

Operations were concentrated in the following areas:

AREA	LINE	FROM	TO
"A"	0+75S	0+25E	0+75E
"A"	1+00S	0+00	3+00E
"A"	1+00S	5+00E	5+25E
"B"	3+00S	0+50W	2+25E
"C"	1+00N	1+50W	1+00E
"D"	3+00N	0+50E	0+75E
"E"	1+00N	3+00E	3+50E
"MZ"	3+00N	2+25W	0+75W

Also, an extensive portion of the Lower Cherts in the Main Zone between 2+75N and 4+00N was stripped and washed.

5.4 Geological Mapping

Computer compilation work had determined that 1:500 and 1:125 were the two scales most effective for dealing with the drill data. These were therefore used in the detailed mapping work of the above stripped areas. The 1:500 detailed map of the deposits area (Map 2) as well as the drill sections have been photo-reduced to 1:1000 to allow integration with the geophysical data.

As well, limited 1:2500 scale property mapping was performed to clear up some of the ambiguities through the central and western property regions.

Results of mapping on surrounding properties, specifically Cominco to the south and Grand American Metals to the west, have been filed for assessment credit with the Ministry of Northern Development and Mines. We have obtained copies of this material and have integrated this work with ours.

5.5 Linecutting

The linecutting was sub-contracted to Halo Explorations of Connaught, Ontario who established a detailed grid totalling 15 km between line 9+00N and 4+00S, from approximately 5+00W to 5+00E. These new lines consisted of intermediate 50 m crosslines extending off the baseline between the existing 100 m crosslines, and as well, tielines were established at 4+00W, 2+00W, 2+00E and 4+00E. Picket stations were established at 25 m intervals on all lines.

Deviations have been accurately determined on all lines, and this entire portion of the grid has been digitized to provide a truer representation of the grid for all relevant maps.

5.6 Geophysical Surveying

5.6.1 Magnetometer Survey

Total field magnetic surveys were carried out along all new crosslines within the detailed grid area. These data were integrated with that gathered last year in this portion of the property grid.

Readings were taken at 25 m station intervals with intermediate readings at 12.5 m in areas of high magnetic gradients.

An OMNI PLUS magnetometer was used to measure total field values. An OMNI-IV base station was employed to record and correct for diurnal variations.

The corrected total field magnetic data are presented in contour form on Maps 4a, 4b and 7. Several contouring intervals have been used to accommodate the range in anomaly amplitudes. No attempt was made to bias the contours.

5.6.2 Horizontal Loop Electromagnetic (HLEM) Survey

All of the new crosslines within the detailed grid area were surveyed with an Apex Parametrics MaxMin II EM unit utilizing a 100 m coil separation and transmitting frequencies of 444 Hz and 1777 Hz. Readings were taken at 25 m station intervals. Topographic corrections were performed at every station to ensure optimum alignment of the transmitter and receiver coils in the often rough terrain.

Also, the detail grid area from 4+00S to 7+00N, encompassing both the new and the existing lines, was resurveyed with a 50 m coil separation to more sharply define the several zones of multiple conductivity.

The horizontal loop electromagnetic data is presented as in-phase and quadrature profiles at a vertical scale of 1 cm to 20% with positive facing.

The new 100 m cable data has been integrated with the property wide data set acquired in 1989/90, and is presented at a scale of 1:2500 on Maps 5a and b (1777 Hz), and 6a and b (444 Hz).

The 50 m cable 1777 Hz and 444 Hz data is presented on Maps 8 and 9, respectively. The 50 m 444 Hz data was utilized for the bulk of the interpretation through this detailed area.

6.0 GEOLOGY

6.1 Regional Geology and Mineralization

The Shunsby property lies within the Swayze greenstone belt. This is considered to be the southwest extension of the Abitibi belt which hosts the Timmins, Kirkland Lake-Noranda, Val d'Or, Mattagami and Chibougamau mining camps. North to northwest striking faults and granodiorite/monzonite batholiths partially disconnect the Swayze from the Abitibi belt (Figure 3).

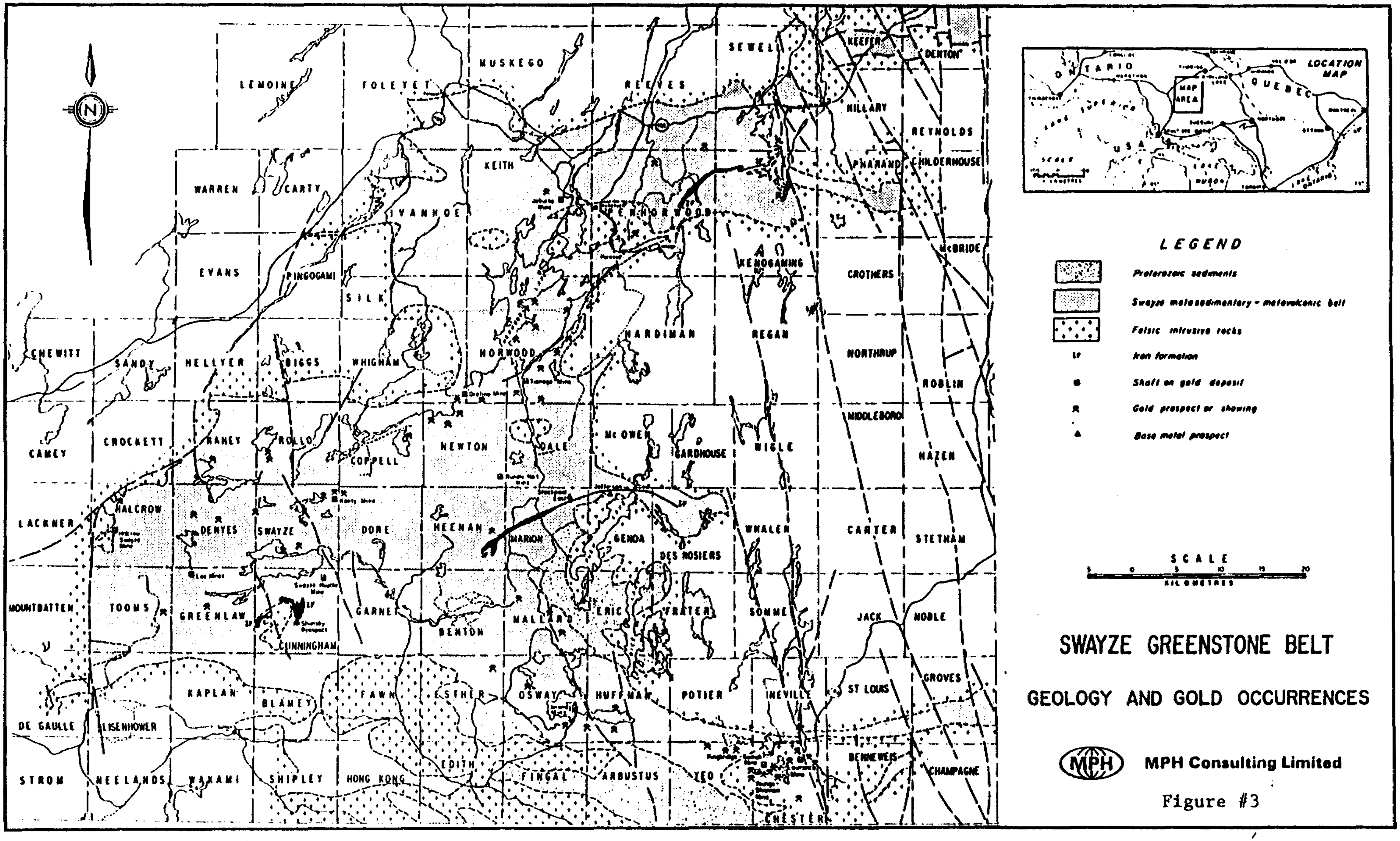
The Swayze can be thought of as an arcuate volcano-sedimentary belt, convex to the west, extending from Sewell Township in the northeast, through Swayze Township in the central region, to Groves Township in the southeast. The volcanics consist primarily of mafic rocks which floor some substantial intermediate-felsic eruptive centres. Clastic and chemical sedimentary rocks, including major banded iron formations, are intercalated with the volcanics. A variety of synvolcanic to post-volcanic intrusions have invaded the supracrustal rocks. The Swayze belt is truncated to the west by the fault-bounded, north-northeast trending Kapuskasing Structural Zone, which contains high grade metamorphic rocks and associated carbonatite intrusive complexes.

Within the southeast Swayze, mapping and lithogeochemical studies by the O.G.S. (Siragusa, personal communication, 1985) have revealed a sequence of tholeiitic and komatiitic volcanics overlain by assorted calc-alkaline volcanics and sediments, in marked similarity to the Deloro/Tisdale Groups at Timmins. Structural and geophysical evidence also suggests that the Destor-Porcupine Fault extends through the northeast portion of the Swayze into at least Newton Township.

No base metal deposits have been mined in the Swayze to date although the proper geological conditions for such deposits would certainly appear to be present. Gold production has been limited to approximately 1,000,000 tons of ore from seven rather small-scale producers. By far the largest base metal deposit in the belt is the present Shunsby deposit with the Texas Gulf deposit immediately to the northwest reportedly containing 100,000 tons of drill indicated material grading 3% zinc, 1% lead and 0.5% copper to a depth of 100 ft (Rye, 1984). The base metal sulphides occur in a sequence of mafic tuffs, chert breccias and sulphide facies iron formation.

The geology of Cunningham Township has been described by Siragusa (1978) as follows; and is presented in Figure 4:

> "Metamorphosed volcanic flows interpreted as high-magnesium tholeiitic basalt are predominant in the northern half of Cunningham Township and over most of Garnet Township. The metavolcanics trend east-southeast, are locally pillowed, vesicular



SWAYZE GREENSTONE BELT

GEOLOGY AND GOLD OCCURRENCES

MPH Consulting Limited

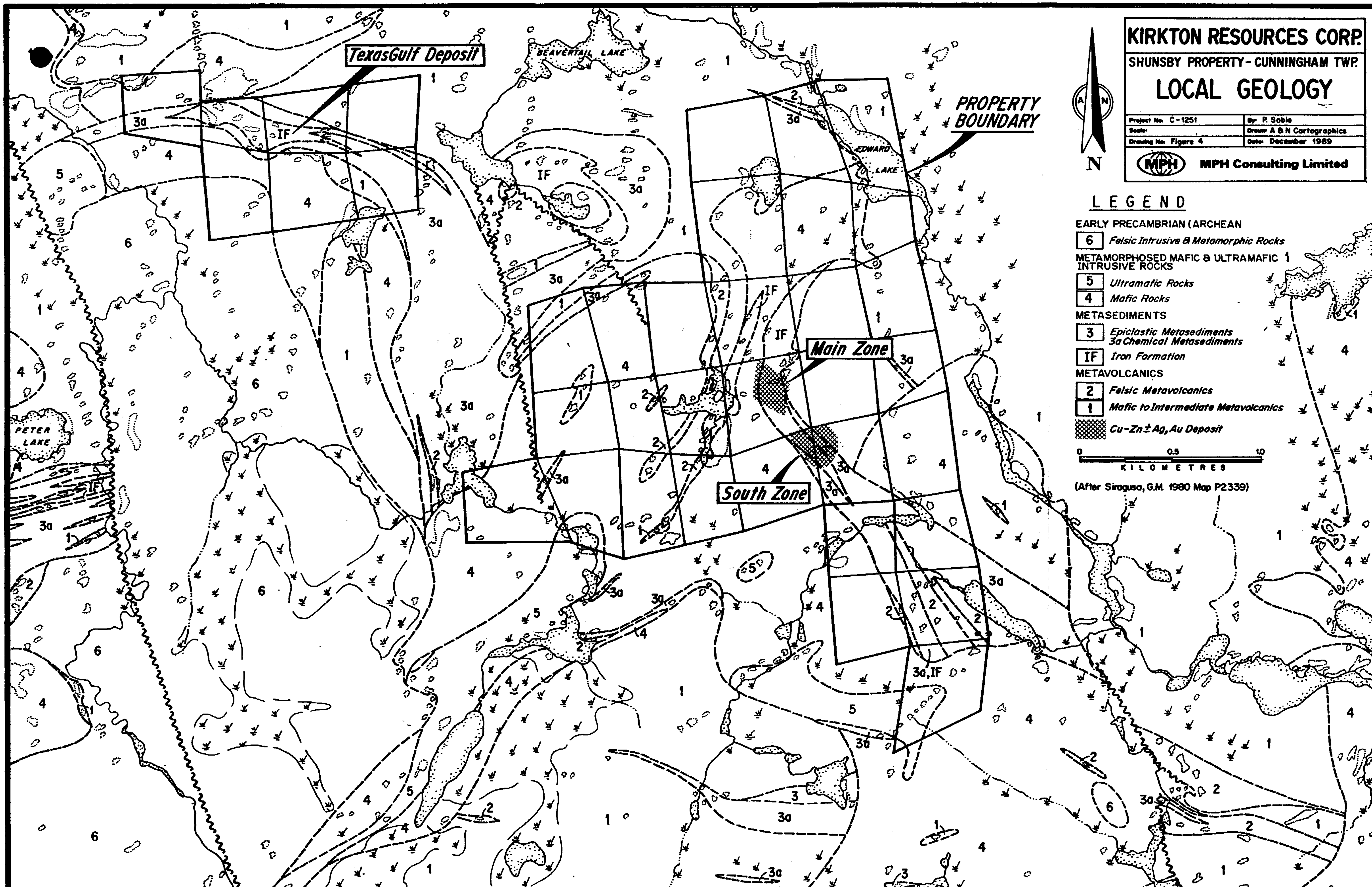
Figure #3

or amygdaloidal and rarely variolitic, have undergone metamorphism which seldom exceeds greenschist rank, and evidence of primary features, notably selvage margins of pillows, may be found even in foliated or sheared flows. The pillows tend to have lobate or irregular outlines which may locally reflect conditions of near parallelism between the depositional plane of the flows and the present erosional surface, and, at any rate, rarely permit top determinations. Determinations made at a few localities suggest that tops face north. Thin layers of dacitic crystal tuff occur in the upper section of the (assumedly) north-facing series, but owing to scanty outcrop distribution these units, which otherwise would be excellent marker horizons, cannot be traced laterally for significant distances.

Cycles of chemical and clastic sedimentation occurred during development of the basaltic series and resulted in the deposition of chert iron formation, and epiblastic rocks in the middle and upper section of the series. The chert units consist mostly of laminated to medium-bedded, barren to ferruginous chert which is commonly interbedded with iron-rich layers containing an estimated 20 to 60 percent magnetite, and which is locally the host of sulphide mineralization. Deformation and fracturing of chert has resulted in conspicuous development of chert breccia in some of these units.

The main chert units are in Cunningham Township and stratigraphically are in the middle section of the basaltic sequence of the map-area. The largest chert body is located about 1600 m south of Mink Lake, has an unusual broadly triangular outline, and has a planimetric area of about 2 km^2. The strike of the chert varies from west-northwest on the west side of the body to north-northeast on the east side of it. This change, as well as the unusual shape of the body itself, are the effects of displacement in the west side of the body (i.e. Isaiah Creek Fault), and folding in the east. A displaced western lobe of this body presently found about 2000 m south of the latter in the Peter Lake area, trends east-northeast and is about 1800 m long and 700 m wide. Another significant chert unit trending north-northeast to south-southeast occurs eastward of a small lake located at the very centre of Cunningham Township (Hiram Lake). Most of the drilling conducted by Consolidated Shunsby Mines Limited prior to 1970 and which indicated a 1.1 million ton copper-zinc deposit was concentrated on one claim (S34947) within this chert unit.

Closely associated (spatially) with the main chert units of Cunningham Township are relatively small bodies of feldspar porphyry with aphanitic matrix and feldspar crystals that are



KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY - CUNNINGHAM TWP.
LOCAL GEOLOGY
Project No. C-1251
By: P. Sobie
Drawn: A & N Cartographics
Drawing No. Figure 4
Date: December 1989
MPH Consulting Limited
N
LEGEND
EARLY PRECAMBRIAN (ARCHEAN
6 Felsic Intrusive & Metamorphic Rocks
METAMORPHOSED MAFIC & ULTRAMAFIC INTRUSIVE ROCKS
5 Ultramafic Rocks
4 Mafic Rocks
METASEDIMENTS
3 Epiclastic Metasediments 3a Chemical Metasediments
IF Iron Formation
METAVOLCANICS
2 Felsic Metavolcanics
1 Mafic to Intermediate Metavolcanics
Cu-Zn ± Ag, Au Deposit
0 0.5 1.0
KILOMETRES
(After Siragusa, G.M. 1980 Map P2339)
TexasGulf Deposit
PROPERTY BOUNDARY
Main Zone
South Zone
BEAVERTAIL LAKE
EDWARD LAKE
PETER LAKE

mostly 2 to 3 mm in size. The porphyry, which is thought to be a subjacent felsic volcanic rock, is well exposed along the northern shore of the tiny lake about 350 m southwest of the fire tower, at the very core of the folded eastern tip of the Mink Lake chert deposit. A prominent, although rather heavily forested, ridge of this rock is also found about 3.4 km north and 2.3 km west of the southeastern corner of Cunningham Township.

Interbedded with the metavolcanics in the upper and central sections of the basaltic sequence are bands of epiblastic metasediments trending east-northeast, northwest and west, occurring in northwestern Cunningham Township, and northeastern and west-central Garnet Township, respectively. These metasediments include dominant matrix-supported polymictic conglomerate, and subordinate arkosic arenite and minor slate which are of only local occurrence. The coarse fraction of the conglomerate consists largely of variably deformed pebbles and boulders of chert, felsic metavolcanics, and minor granitic rocks. The latter are thought to represent early granitic rocks which predate the quartz monzonite underlying southwestern Cunningham Township.

Mafic intrusive rocks in bodies of irregular shape and variable size are commonly found spatially associated with the metavolcanics, and are particularly frequent in southern Cunningham Township and northeastern Garnet Township. These rocks have composition varying from diorite to gabbro, the latter being dominant, and are massive although commonly affected by variably well developed jointing. In general they have medium-grained diabasic texture which locally gives way to a very coarse knotty pyroxenite where hornblende may be pseudomorphed after brown pryoxene.

Porphyritic varieties with tabular plagioclase phenocryst up to 4 cm in size are also present in a few localities. Basaltic and chert xenoliths are occasionally found within these rocks and where these occur the rock's intrusive nature is clearly indicated.

Gabbro is affected by retrograde metamorphism along a north-northeast-trending shear zone extending eastward of Isaiah Lake (Cunningham Township). This zone is thought to post-date regional metamorphism and to be a local feature related to the emplacement of quartz monzonite west of Isaiah Lake.

Discrete intrusions of peridotite occur in a few localities of southern Cunningham Township. Peridotite is massive, serpertinized to variable extent, and is locally much more magnetic than interbedded chert-magnetite. Although in some areas exposures of peridotite and gabbro occur only a few metres apart, exposed contacts between these rocks were never found. No peridotite was found in Garnet Township but a large outcrop was found in the northwestern corner of Benton Township, approximately 700 m east of the present map area.

A small pluton of massive porphyritic quartz monzonite of about 13 km^2 underlies parts of western and southwestern Cunningham Township. The pluton is poorly exposed and is bisected by the Isaiah Creek Fault so that the western half of the pluton is displaced about 2000 m south of the eastern half of it. Two small peridotite bodies are in contact with the northern and southern tips of the eastern half of the pluton adjacent to the trace of the fault plane.

Lamprophyre is of rare occurrence and consists of minette dikelets 2 m or less in thickness, cutting metavolcanics or gabbro at a few localities. A dike about 4 m thick of hornblende syenite was found to intrude sheared basalt at one locality along the shear zone east of Isaiah Lake. Both the lamprophyre and syenite dikelets are thought to have about the same age as the quartz monzonite. Only one diabase cutting quartz monzonite was found and this is thought to be the youngest rock in the map-area."

6.2 Property Geology

6.2.1 General

As a general statement, it is our feeling, as well as that of other exploration groups in the township, that a great deal more volcanics are present than indicated by Siragusa. In particular, much of the area mapped as diorite/gabbro through the centre of the Shunsby property, as well as south of it, is in fact mafic to felsic metavolcanics. As well, a large felsic pyroclastic centre would appear to occupy the area just south of the property, approximately due south of Hiram Lake. This is evidenced by coarse felsic pyroclastic breccia outcrops throughout that region. Sulphide clasts are present in some of these breccias. Much of the rock mapped as feldspar porphyry by previous workers in the area is in fact quartz or feldspar-phyric felsic metavolcanics and pyroclastics. Such rocks cap the Shunsby sedimentary-volcanic stratigraphy in the deposit area.

6.2.2 Lithologies and Stratigraphy

All evidence gathered thus far from field mapping, drill core examination and geophysical dip estimates suggests that the Shunsby lithologies lie in the form of a west dipping, upwards-younging, homoclinal sequence with shallow dips (30-40^{0}) to the west. Later north-south cross folding resulting in locally steeper dips would appear to be present. As well, local troughs thought to be a function of primary basement topography appear to be present based on thickening of the lower cherts.

(a) Footwall Rocks

Lowermost in the stratigraphy and covering the eastern portion of the Shunsby property (Maps 1 and 2) is an extensive mafic volcanic/synvolcanic sill unit locally termed the "Footwall Diorite". These rocks vary from aphanitic fine-grained mafic flows through to coarse-grained gabbros, with generally a gradual transition between the two. Siragusa (1987) has also noted both (i) presence of basaltic xenoliths in gabbro and (ii) presence of gabbro xenoliths in basalt and feels that "the contact relationships of gabbro and basalt reflect differences in the depth at which the present erosional surface intersects the former volcano-plutonic edifice." Chemically, these rocks are generally basaltic in composition and tholeiitic in classification, and indeed, the coarse-grained rocks are probably better described as gabbros.

The footwall rocks to the Shunsby metasediments form a prominent N-S ridge through the southern property area south of line 1+00N. This ridge includes some of the highest ground on the property, and throughout this area the rocks most certainly are gabbros. A small trench on line 1+00S targeted on Conductor 1c exposed a graphitic zone at the east base of the gabbroic ridge here.

The "Footwall Diorite" rocks within the wedges formed by conductors 43 (13a) and 42a(12) north of the Joubin Fault, and conductors 41(2d) and 40b(1d) (see Maps 5a, b, and 8) to the south of the fault, have been intersected by numerous drill holes and exposed in the Main Zone contact area between lines 3+00 and 4+00N. On surface this rock appears as a light grey-blue, fine-to-medium grained mafic volcanic, somewhat hydrated but not excessively altered. Drill holes which have penetrated deeply into the footwall have generally intersected this mafic volcanic which grades into a coarse-grained gabbro at depths of 10-50 feet below the main footwall contact. The deepest hole to probe the Footwall Diorite complex, no. 56-51, drilled vertically, penetrated three gabbroic bodies with apparent thickness of 100-200 feet separated by "andesite" or "grey lava" units less than 100 feet thick.

Attempts to trench conductors 42a(12) and 40b(1d) were unsuccessful in reaching bedrock, but did encounter significant mineralized chert, graphite and argillite lithologies. The relationship of these sediments to the Lower Cherts and Footwall Diorite is still unknown at this point, however, dips appear steeper and there seems to be marked lithologic similarities to the Lower Chert package.

(b) Lower Cherts

Surface stripping (Map 3) and extensive drill core examination have revealed the Lower Chert sedimentary package to be a complex of graphitic argillite, argillite, argillaceous chert and chert with minor mafic flows and tuffs. The package as a whole would appear to represent a quiescent, deep basinal environment relatively distal to a volcanic vent given the relative lack of intercalated flows.

An idealized section through the Lower Cherts, included on Map 3, suggests that the stratigraphy consists of, from lower to upper, approximately 10 m of schistose argillite, graphitic argillite with subordinate chert locally referred to as the Basement Fault; an overlying 5-7 m of argillaceous chert, chert and mafic flows; approximately 7-10 m of banded cherts and argillite capped by a thin ash tuff unit; a highly mineralized 6-8 m argillaceous chert breccia unit with subordinate graphitic argillite; and an uppermost 10-20 metres of argillaceous chert, graphitic argillite and chert with some volcanic breccia near the contact. This 38-55 metres of surface/drill core exposure would appear to have a true thickness of approximately 35 m, however, differential weathering as well as an apparent cross-fold controlled "bulge" in the sediments at the Main Zone complicates the picture locally.

In detail the various units mentioned above are more accurately described as:

Graphitic Argillite

Very fine-grained, black, carbonaceous, generally highly contorted schist, usually containing interbeds of massive py ± cp, sp

Argillite

Very fine-grained, grey to black, carbonaceous to feldspathic pelite, variably schistose and mineralized with thin beds of massive py ± cp, sp

Argillaceous Chert

Very fine-grained to cryptocrystalline, grey to black, carbonaceous, laminated to medium-bedded, variably brecciated and mineralized with cp, py, sp as matrix-filling and fracture-fillings

Massive Chert

White cryptocrystalline to micritic, thickly-bedded and generally fractured and cross-cut with quartz-carbonate ± py, sp, gn veinlets

Banded Chert
White to greenish-brown, cryptocrystalline to micritic, laminated to medium bedded with very thin argillite interbeds ± massive py, cp. This is probably the rock which prompted the "iron-formation" field classification of past workers.

Ash Tuff
Fine-to-medium-grained, light grey, thinly-bedded, feldspathic lithic tuff

Limited drilling of the lower cherts in the south property area suggests that the stratigraphy here is virtually identical, with generally more argillaceous cherts and argillites than to the north.

(c) Variolitic Basalt
Serving as a marker horizon between the two sedimentary packages, the "Variolitic Andesite" ranges in thickness from 30-50 metres. In outcrop and drill core, the unit appears to consist of several flows, not all of which contain feldspar spherulites. Pillowed and massive flows are common within the unit, which chemically is basaltic in composition.

(d) Upper Cherts
The upper sedimentary package is much thicker than the lower cherts, and, based on stripping and drill core examination, much more predictable and less chaotic in terms of internal stratigraphy. In general, chert is much more abundant than argillite and graphite, and "clean" chert predominates over "dirty", or argillaceous chert. As well, debris-flow breccias and a variety of soft sediment slumpage features are common, suggesting that at least a portion of the upper cherts represent gravity controlled deposition.

The package appears to have a true thickness exceeding 100 m and consists of, from lower to upper, a thin 3-5 m graphitic argillite and argillaceous chert unit; a thick 20-25 m sequence of clean cherts and banded cherts with subordinate interbedded chloritic argillite, all grading over the upper 10 m to an angular chert breccia; 10-15 m of argillite, graphitic argillite, greywacke and chert; an upper 50-75 m of a rounded chert debris-flow type breccia; and an uppermost 10 m argillite unit. Mineralization is primarily limited to the three argillite units.

The debris-flow/sedimentary chert breccia is a rather exotic unit composed of rounded, clean chert cobbles and is matrix-supported with a matrix of iron carbonate, chert and pyrrhotite. Occasional clasts of argillite and greywacke are also found within the breccia.

(e) Intermediate to Felsic Metavolcanics
These rocks cap the sedimentary sequence within the Main and South deposits area, and to the south become intercalated with the upper cherts. For the most part they are pyroclastics and massive porphryitic flows with subordinate intercalated graphitic argillite.

Past workers on the property have referred to these rocks as quartz-feldspar porphyry of intrusive origin related to the cross-cutting quartz-feldspar porphyry dykes. Detailed examination of these rocks on surface and in drill core however, clearly shows the bedded and fragmented nature of these lithic tuffs. It appears that the blocky weathering nature of these outcrops gave the impression of dykes and domes. Within the deposits area, the capping sequence appears to have a true thickness of approximately 20 metres and the graphite units are well-mineralized with coarse-grained euhedral pyrite.

The intercalated felsic metavolcanics in the south property area are seen primarily in hole 74-16, and are found down-dip within the upper cherts. These are generally cherty ash tuffs which are likely related to the chert beds seen up-dip and along-strike to the north.

(f) "Digestive Diorite"
Intruding into the Shunsby stratigraphy north of the Joubin Fault, this unit dips steeply to the east and, based on drill sections, would appear to have a laccolith form. The "bowl" of the laccolith appears to extend to a maximum depth of 50 m with a surface width of 75 m. One possible intrusive feeder area or "neck" is thought to be in the area of line 3+75N with possibly another at 5+50N. The rock appears in the field as a greenish, medium to coarse-grained diorite, however, chemically it would appear to be basaltic in composition, and therefore possibly associated with the footwall rocks.

Rounded chert xenoliths and the clearly intrusive nature of this unit distinguish it from the stratifrom gabbro/diorite sills elsewhere on the property. It should be noted that this intrusive does not appear to be present south of the Joubin Fault. This probably relates to vertical movement on this structure, possibly of a south side up, ie reverse, sense.

(g) Central Property Area
Limited mapping suggests that the Shunsby sedimentary sequence is overlain by a thick volcano-plutonic complex consisting primarily of mafic volcanics and gabbro with some felsic pyroclastics.

Immediately above the Shunsby sedimentary-volcanic sequence is a large conformable gabbro body which is in fault contact with the Digestive

Diorite to the north. The offset equivalent of the conformable sill to the north of the Joubin Fault is believed to be present west of Hiram Lake.

Several hundred metres of intermediate to felsic metavolcanics and pyroclastics are indicated to overlie the gabbro. A second large mafic volcanic/sill complex is indicated to then extend to the western sedimentary unit.

(h) Western Sediments

This sedimentary package strikes northerly in the extreme west portion of the Shunsby property, but immediately to the north warps around to the west, where a small deposit has been outlined by Texas Gulf (now Falconbridge, Figure 4). Road-building and logging activity by E.B. Eddy this past fall have now made this region of the property easily accessible, and has exposed much outcrop. This package of sediments has seen very limited trenching and diamond drilling in the past (Holes Jim 1 and 2, 1965) on the Shunsby property.

A comprehensive description of stratigraphy is provided by Rye (1984) who reports on an overturned, south-dipping sequence of basalts stratigraphically underlying a 430 m thick intermediate to felsic flow and tuff unit with minor chert which grades into a 200 m thick iron-formation, all overlain by intermediate to mafic flows.

In detail on the Falconbridge property, the iron-formation consists of an underlying mafic tuff unit; a lowermost 20 m chert breccia unit with intercalated tuffs, pyritic shales and graphitic cherts; approximately 25 m of sulphide facies iron-formation consisting of finely laminated black pyritic shales up to 1.5 m thick with interbedded cherts and chert breccia up to 2 m thick and an uppermost 125 m thick oxide iron-formation unit which consists of clean massive cherts up to 30 cm thick separated by magnetite bands of 1 to 5 cm.

The oxide facies iron-formation is characterized by the absence of tuffs and sulphides, and by the presence of actinolite and grunerite within the cherts. All base metal sulphide mineralization is found within the lower sequence of the formation, i.e. within the footwall tuffs, chert-breccias and pyritic shales.

The overturned relationship seen on the Falconbridge ground would not appear to extend onto the Shunsby property, as both Jim holes (drilling easterly), passed through much chert before argillite, and then into footwall volcanics.

(i) Intrusive Dykes

Narrow dykes of felsic (quartz-feldspar porphyry) through to intermediate (lamprophyre) and mafic (diorite-gabbro) compositions were noted in drill core and mapping on the property.

The quartz-feldspar porphyry dykes appear in all cases to trend E-W and dip steeply southward and are thought to cut all lithologies of at least, the Shunsby sedimentary sequence and most likely, the footwall and hanging wall rocks. Lamprophyre has been mapped in several localities south of the Main Fault and appears concordant with stratigraphy. Dioritic to gabbroic dykes and dyklets are common in the Main Zone area striking WNW and steeply dipping, and would appear to be intimately related to the Digestive Diorite intrusive on the basis of appearance and location.

The quartz-feldspar porphyry dykes seen on surface are up to three metres in width, grey to light pink, medium-grained with phenocryst of feldspar up to 1 cm in length. The rock is very similar in appearance to the massive, intermediate to felsic rocks described above, and may be intimately related to these rather than the Isaiah Lake granitic batholith to the southwest.

Lamprophyre dykes appear in the field as a dark greenish brown, fine to medium-grained rock with biotite aggregates plainly visible. These dykes are narrow, to a maximum of two metres in width, and would appear to have a rather short strike extent as they are not traceable from hole to hole or between adjacent surface exposures.

6.2.3 Structure

Rock units on the property generally trend slightly west of north and dip 25^0-40^0 on average to the west. Strikes swing markedly to the west off the northwest portion of the claims, in the area of the Forestry Tower. Strikes to the south of the property are to the southeast or east-west. The north-south strikes on the property are a local aberration in terms of the general east-west strikes in the Swayze and appear to reflect regional warping around the Isaiah Lake granitic stock located to the west. This stock may, in turn, represent the remnants of a large scale volcanic centre possibly analogous to the Dufault/Flavrian/Powell grantic complexes at Noranda, Quebec.

Previous workers (e.g. Mudford 1956) consistently refer to a large, overturned, west-verging synclinal fold on the property. This presumed fold would have a recumbent nature and plunge gently ($10^0\pm$) to the south. The fold interpretation was apparently based on the assumption of stratigraphic equivalence between the cherts containing base metal mineralization east of Hiram Lake with the iron formation along the west property boundary. The gentle south plunge was invoked to explain the gradual disappearance of the cherts in the "up-plunge", i.e. north, direction.

Our interpretation at this point is one of a west dipping (and facing), north striking homoclinal sequence. The chert and the iron formation are lithologically dissimilar, mainly in the presence of magnetite in the latter. The gradual disappearance of the cherts to the north on the present property may well reflect original basin morphology.

Detailed mapping on the property has clarified the rather complicated fault picture presented in our 1989 report. While the structures and trends noted by Holcapek (1975) and earlier workers would appear to be present, many of those interpreted from the recent geophysical surveying are now felt to be either absent or of minor consequence. Also, even in cases wherer linear structures do exist, offset along these appears to be generally of small scale. Specific structural trends present are:

<u>"090° trend"</u>

This is the most important trend on the property and is manifested by shear zones, faults, fractures and joints as well as quartz-feldspar porphyry dykes and quartz-carbonate veinlets which carry galena plus chalcopyrite, sphalerite and pyrite.

Detailed mapping in the Main Zone lower cherts (Map 3) reveals this to be the latest trend, cross-cutting and sporadically slightly offsetting stratigraphy and older structures. The remobilized aspect of some of the mineralization appears to be at least partially related to this trend, as mineralized horizons show definite enrichment or "podding" adjacent to these fractures and faults.

Stripping on line 1+00N has revealed a sinuous E-W shear zone approximately 5 metres in width and dipping steeply southward. The shear cuts a large portion of Upper Cherts debris flow material with no apparent lateral movement. Where the zone cuts the cherty debris flow breccia there is a definite rotation of clasts into the plane of foliation, and as well massive mineralized argillite clasts are sporadically seen. Quartz-carbonate galena veins are common within the shear. Iron-carbonate alteration is intense.

The Main Fault (Joubin Fault) also occupies this trend, and also dips steeply south. From surface exposures and drill core examination this feature would appear to be a zone(s) of highly sheared rock with left-lateral displacement of approximately 225 metres. Several splays are thought to be present, complicating the structural and stratigraphic picture in the vicinity of line 2+00N (ie. Hole 56-49 area).

"120° trend"

Older than the 090° trend, but still cutting older structures, are faults, fractures and joints of this orientation seen primarily in the Main Zone but also in both the "A" and "C" stripped areas. Drag-folding along this direction is also seen in the Main Zone at 4+00N, although the amplitude of the fold is relatively minor, ie. less than 5 metres. As well, a diorite dyke occupies this trend in the Main Zone at 3+40N and is surrounded by highly brecciated chert and argillite units. Hole 81-22 intersected this dyke for some 40 of its 76 feet.

Fractures and joints along this trend are variably mineralized with chalcopyrite, sphalerite and pyrite within mineralized horizons of the Main Zone. The mineralization does not appear to transgress stratigraphic horizons within these structures, while that within the quartz-carbonate veins trending 090° does.

Similar structures seen in the Upper Cherts of the South Zone are mineralized with iron carbonate, pyrrhotite, pyrite and galena.

"0° trend"

This trend actually varies from approximately 330° to 030° and is approximately parallel to the strike and dip of bedding. This bedding trend is cut by the two structural trends above, and would therefore appear to be oldest. It is manifested by shearing within the argillites, graphitic argillites and cherts of the lowermost Main Zone Lower Cherts ("Basement Fault"), and by joints within the footwall volcanics and the more brittle cherts horizons.

A similar sheared graphitic argillite package is found at the base of the Upper Cherts in contact with the Variolitic Basalt.

These structures would appear to be bedding faults, and "draping" exposed in the Main Zone suggests that these were caused by slippage of the incompetent units over the more competent volcanics. The magnitude of this movement is not known, but does not appear significant in the field.

At odds with the above west-dipping trend is the east-dipping shear which marks the eastern contact of the intrusive gabbro (Digestive Diorite). It is not known how deeply this structure penetrates, nor whether the west contact also dips easterly, however the indicated laccolithic form to the digestive diorite suggests these are shallow structures.

6.3 Mineralization

The descriptions of mineralization style by particularity Holcapek (1975), and Fairbairn (1982) included in the 1989 MPH report have proven to be excellent, but incomplete. Surface exposures as well as extensive re-examination of the historical drill core has shown the following distinctive mineralization styles to be present:

(1) Argillaceous breccia with sulphide matrix (cp & py, sp, bn) ± graphite

(2) Argillaceous chert/sulphide breccia with cp, py as blebs, disseminations

(3) Massive argillaceous chert carrying disseminated sp & py, cp as well as fracture-filling sp, py ± gn

(4) Massive banded py-sp-cp ± po horizons within argillite

(5) Late cross-cutting quartz-carbonate veins, veinlets carrying gn + cp, sp, py.

Pyrrhotite is present at the expense of pyrite within the upper cherts while pyrite is the predominant accessory sulphide in the lower cherts. With the exception of the late veins, all mineralization appears to be stratabound in the sense that local remobilization appears to have resulted in the textures seen above, but these have not been observed transgressing stratigraphic contacts.

The observed sulphide mineralization at Shunsby is considered to be originally of distal volcanogenic origin. The mineralization in the upper cherts is felt to represent further pulses of hydrothermal activity which probably utilized the same conduit system as that in the lower cherts. The variably remobilized nature of much of the mineralization is related to subsequent tectonic activity.

Detailed studies on the Texas Gulf mineralization are of some interest in this regard as follows (Rye, 1984):

(1) "Grains of chalcopyrite, concentrically rimmed by galena and sphalerite from centre to margin, occur within the tuffs."

(2) "Within the chert breccias near the base of the iron formation, sulphides occur as coarse aggregates of chalcopyrite, sphalerite, galena and pyrrhotite."

(3) "Sphalerite is the most abundant sulphide in the veins, with lesser amounts of galena, chalcopyrite and pyrite. Where they occur

> together, there is a distinct zoning of the sulphides in which sphalerite is typically adjacent to the vein wall, with galena and chalcopyrite respectively situated towards the vein centre. Sphalerite has commonly exsolved chalcopyrite in these veinlets, and is was noted by Mullen (1974), that sphalerite in carbonate veins is darker red than the lighter brown sphalerite in the iron formation adjacent to the vein."

Despite the complexity of textures related above, crude lateral and vertical metal zoning is present at Shunsby.

Within both the Upper and Lower Cherts, individual mineralized beds or units grade from Cu-rich bases to Zn-rich tops. This is particularly evident in the Main Zone where several units display this characteristic over distances of a metre or less.

Within both the overall Lower Chert and Upper Chert formations, the zoning includes an upwards gradation from Cu-rich to Zn-rich to Fe-rich mineralized beds. This is particularly obvious in the Upper Cherts where Cu-rich argillite interbeds are overlain by Cu-breccia, Cu-Zn breccia, massive Zn-Cu, and Zn-py breccia mineralization styles. Pyrrhotite with iron-carbonate caps this sequence in the form of the matrix of the extensive chert slumpage breccia. Pyrrhotite and pyrite with minor sphalerite appear to be the primary sulphides found within the uppermost argillaceous section of the Upper Cherts. In the Lower Cherts, a very pronounced Cu-rich base to the sequence is gradually superseded by an extremely Zn-rich, fractured argillaceous chert unit near the top of the sequence. This relationship is seen in even the deepest holes to penetrate the Lower Chert, for example no. 64-82e on Section 3+00N (Appendix 1). Pyrrhotite is not evident within the Lower Cherts until the upper 10m or so.

At the property or deposit scale, an upwards and outwards metal distribution from Cu to Zn to Fe is also seen. This is particularly obvious in the Main Zone where the Lower Cherts are much more Cu-rich than the Zn-rich Upper Cherts. Also, the South Zone is much more Zn-rich than the Main Zone, however there also, the Lower Cherts contain more copper than the Upper Cherts.

Float examined from the inferred lowest stratigraphic unit marked by conductors 42a(12) and 40b(1d) is extremely Cu-rich, containing significant amounts of bornite, suggesting this may be the lowest, and richest, mineralized horizon.

6.4 Lithogeochemistry and Petrography

One is immediately struck by the impressive amount of iron-carbonate seen when walking around the Shunsby exposures. Iron carbonate is seen in shear zones, late quartz-carbonate veins, and forms a major component of the matrix of the chert breccia lithologies. While always present with mineralization, iron carbonate would appear to be ubiquitous throughout the Shunsby sedimentary basin lithologies, and as such possibly represents an alteration "halo" rather than a pipe-like feature.

Also present at surface, albeit locally, is chlorite in the form of chloritic argillite interbeds within the banded chert units of the Main Zone lower cherts, and the upper cherts of both zones. Green argillite appears to be related to mineralization specifically, as these beds are invariably mineralized with chalcopyrite and sphalerite plus pyrite. It is unknown whether the chloritic component of these argillites is a metamorphic or hydrothermal alteration product. Chloritic argillite "veins" do cut stratigraphy though, but have the appearance of being squeezed into pre-existing fractures.

Sericite has been noted in the Variolitic Basalt unit, often near the contacts as in shear zones on lines 1+00N and 1+00S.

The footwall rocks, where exposed and from drill core examination, have a somewhat pale, bleached appearance. This is true of both the "Variolitic Andesite" and "Footwall Diorite" units and likely promoted the previous "intermediate" compositional field terms, while the rocks, are in fact, mafic.

Chemical analysis of 26 "Footwall Diorite" and 16 "Variolitic Andesite" samples suggests that, within the limits of sampling thus far, these rocks display significant hydrothermal alteration trends with more intense alteration proximal to base metal mineralization. Table 3 summarizes the results of this lithogeochemical processing which is elaborated upon in Appendix 4.

General chemical trends include:
(1) slight MgO depletion
(2) slight K_2O enrichment
(3) modest Zn enrichment
(4) slight Cu enrichment
(5) high LOI and CO_2

Chemical trends proximal to base metal mineralization consist of:
(1) negligible to moderate MgO enrichment
(2) negligible to slight K_2O enrichment
(3) moderate FeT enrichment
(4) moderate Na_2O depletion
(5) strong CaO depletion
(6) sporadic SiO_2 depletion
(7) strong $A1_2O_3$ enrichment
(8) slight MnO enrichment
(9) strong Zn enrichment

(10) strong Cu enrichment
(11) low LOI, CO_2

These chemical trends are recognizable in both the footwall and variolitic basalt units.

This alteration assemblage would appear to be analogous to that seen at the Mattabi Mine in the Sturgeon Lake Camp with variations due to fundamental footwall rock differences. At Mattabi, a regional dolomitic chemistry exists which is overprinted by an alkali-depleted siderotic alteration pipe containing highly elevated Cu and Zn values at its centre. Proximal to massive ore are local chlorite pods, a semi-conformable quartz-andalusite-chloritoid zone at the base of the mineralization and local sericite-chloritoid nodes. Siderite, chloritoid and andalusite contents increase toward the ore (Franklin et al., 1975).

The chemical work was supplemented by limited petrographic studies on some of the key samples in an attempt to correlate the chemical data with mineralogy. In general, chemical trends, have quite obvious mineralogic correlations in thin section. For example, increased CO_2 and Mg ($\pm$ Fe) contents clearly relate to anomalous carbonate and chlorite $\pm$ biotite contents respectively. Na depletion correlates closely with enhanced sericite contents formed by the destruction of plagioclase.

Comments on specific samples are as follows:

65-70e-FWb (Footwall Mafic Complex, south of South Zone)
- no chemical alteration of note
- petrographically a massive medium-grained dioritic rock with large ragged hornblende grains enclosing and intermixed with sericitized, often lathy plagioclase; minor carbonate; a few weakly pleochroic epidote crystals are evident.

65-70e-FWa (Footwall Mafic Complex, south of South Zone, above b)
- a fine grained, slightly schistose mafic rock; there is strong alteration as suggested by the chemistry consisting of extensive sercitization, chloritization and carbonitization, much of the carbonate ($\pm$ quartz) occurs in distinct microveinlets; ragged green chlorite masses are typically opaque under crossed nicols.

SE-1-FW (Footwall Mafic Complex, South Zone)
- chemically a highly altered rock with Si and CO_2 enrichment, Na depletion and anomalous Cu-Zn
- petrographically a moderately schistose fine-grained mosaic of interlocking quartz $\pm$ feldspar anhedra and carbonate; abundant fine

TABLE 2 - LITHOGEOCHEMICAL SUMMARY

SAMPLE	SECTION	FROM	TO	TAAS	PERAL	CU	ZN	CU:ZN	MGO	K2O	FE2O3	NA2O	CAO	SIO2	N-D SC	DF2	DF3	DF4	DF5	JENSEN	LOI	CO2	CIPW NORM	COMMENTS
66-101-FW	6+50N	109.76	110.06	38.18	1.08	95	125	0.760	-1.48	0.10	-5.19	-1.33	-1.07	3.35	-0.76	-6.77	-7.15	-5.98	-3.73	THOL BASALT	HIGH	7.36		shallow hole, barren, much dyke
66-110-FW	5+00N	189.94	190.24	48.51	1.07	60	30	2.000	3.72	-0.26	-5.63	-1.03	-0.45	4.66	1.01	-9.82	-10.31	-5.05	1.09	KOM BAS KOMATIITE	HIGH	5.09		deep hole, in dyke for much of lc
56-44-FW	5+00N	77.13	77.44	43.42	4.32	115	50	2.300	-1.00	0.54	-4.30	-1.85	-2.02	1.75	-0.39	-7.17	-7.63	-4.63	-3.10	THOL BASALT	HIGH	7.05		shallow hole, barren, much dyke
66-108-FW	4+25N	235.37	235.67	39.64	1.58	95	80	1.188	-3.12	1.38	-2.89	-1.78	-2.81	-1.32	-0.24	-5.71	-6.12	-3.36	-3.91	C-A BASALT	HIGH	5.27		deep hole, good mineralization
SH-01-FW	3+75N	0.00	0.30	73.64	4.82				-0.06	0.18	3.10	-3.34	-4.26	-0.02	1.55			4.12	3.45	THOL DACITE		0.03	norm c 10.8%	surface sample, good HZ mineralization
SH-02-FW	3+50N	0.00	0.30	81.27	9.41				-4.17	0.02	2.93	-1.87	-11.21	-10.61	1.32			4.73	-0.35	THOL DACITE		0.04	norm c 23.8%	surface sample, good HZ mineralization
65-72e-FW	3+50N	251.22	251.52	35.74	1.04	70	80	0.875	-1.44	0.15	-2.42	-1.00	-0.47	2.88	-1.11	-4.90	-5.20	-2.71	-1.74	THOL BASALT	HIGH	6.77		deep hole, good Zn, no Cu assays
64-82e-FW	3+00N	252.13	252.44	91.80	10.18	335	100	3.350	5.44	0.18	1.95	-1.29	-13.39	-2.50	4.11	0.92	0.74	5.71	7.48	KOM BAS KOMATIITE		0.51	norm c 17.0%	deep hole, good Cu
61-91-FW	2+75N	152.44	152.74	28.83	0.89	85	120	0.708	-3.44	0.40	-3.95	-1.87	1.88	4.10	-1.88	-5.77	-6.23	-5.47	-4.76	THOL BASALT	HIGH	9.30		mod. deep hole, good mineralization
60-79-FW	2+75N	35.98	36.28	79.23	8.06	105	155	0.677	-1.68	0.29	5.71	-3.17	-7.70	-3.78	1.18	3.33	2.85	7.55	4.37	THOL ANDESITE		0.23	norm c 16.3%	shallow hole, good HZ mineralization
66-94-FW	2+25N	122.56	122.87	46.32	1.43	75	155	0.484	0.02	0.09	-2.34	-2.04	-2.64	2.51	0.36	-3.55	-4.01	-2.26	-0.55	THOL BASALT	HIGH	5.93		mod. deep hole, poor mineralization
60-78-FW	2+25N	55.18	55.49	71.26	5.34	275	255	1.078	-3.97	1.21	3.73	-1.83	-10.72	-8.33	0.96	4.74	4.40	5.86	0.23	THOL ANDESITE		0.48	norm c 16.1%	shallow hole, good HZ mineralization
56-27-FW	2+00N	62.80	63.11	69.32	4.69	150	920	0.163	-3.42	1.60	0.72	-1.61	-9.44	-9.41	1.58	12.92	12.56	2.02	-2.03	THOL DACITE		0.55	norm c 17.6%	shallow hole, good mineralization (UC?)
56-49-FW	2+00N	65.85	66.16	37.66	1.12	85	175	0.486	-1.88	0.67	-3.84	-2.15	0.14	2.44	-0.66	-4.54	-5.07	-4.86	-3.42	THOL BASALT	HIGH	7.91		shallow hole Joubin Fault Zone, barren
68-6-FW	1+00N	155.18	155.49	69.91	3.25	25	730	0.034	0.89	1.12	2.28	-3.23	-6.23	-0.79	1.64	10.69	10.94	3.66	3.46	THOL BASALT		2.53	norm c 7.3%	mod. deep hole, in dyke through LC
68-13-FW	1+00N	86.28	86.59	39.35	1.11	80	110	0.727	-0.11	0.29	-2.59	-0.88	-0.40	1.38	-0.70	-4.62	-4.82	-2.66	-0.23	THOL BASALT		3.77		shallow hole, barren
SE-1-FW	0+50N	52.44	52.74	32.01	0.90	235	1220	0.193	0.12	-0.04	-0.24	-3.94	3.03	7.60	-0.49	14.51	13.61	-1.18	2.00	THOL BASALT	HIGH	5.78		shallow hole, barren
68-16-FW	0+00N	136.28	136.59	37.76	1.05	80	270	0.296	-2.05	0.32	-5.14	-0.79	-1.49	2.02	-0.95	-3.90	-4.17	-5.02	-4.37	THOL BASALT	HIGH	7.36		mod. deep hole, good mineralization
68-20-FW	0+75S	96.95	97.26	38.79	1.14	80	185	0.432	-1.22	0.32	-3.50	-1.36	-0.95	2.27	-0.66	-4.10	-4.44	-3.96	-2.30	THOL BASALT	HIGH	1.68		shallow hole, good Zn mineralization
SE-2-FW	1+25S	103.66	103.96	40.65	0.98	50	1040	0.048	-2.45	1.40	-5.22	-1.36	-1.63	3.84	-0.77	9.50	9.10	-6.10	-5.12	THOL BASALT	HIGH	8.60		shallow hole, barren
57-69-FW	1+50S	187.50	187.80	60.55	2.83	130	2100	0.062	-0.06	0.12	4.02	-2.01	-5.33	0.90	0.03	35.61	35.17	6.66	3.86	THOL ANDESITE		0.51	norm c 8.2%	mod. deep hole, barren
65-70-FWa	2+00S	152.44	152.74	38.96	1.09	70	220	0.318	-3.10	1.54	-4.53	-2.42	-0.45	2.02	-0.62	-4.24	-4.85	-5.85	-5.16	THOL BASALT	HIGH	8.02		mod. deep hole, barren
65-70-FWb	2+00S	163.41	163.72	46.14	1.16	165	90	1.833	1.09	1.08	-2.36	-0.98	-1.14	0.76	-0.15	-4.77	-4.99	-2.09	1.39	THOL BASALT		1.46		same as above, FW changed with depth
SE-4-FW	3+00S	98.48	98.78	42.49	1.15	60	60	1.000	-2.61	1.53	-4.82	-2.15	-1.83	2.77	-0.32	-7.32	-7.87	-5.82	-5.02	THOL BASALT	HIGH	8.16		shallow hole, barren
SE-3-FW	3+50S	33.99	34.30	37.21	1.06	110	40	2.750	-3.46	1.26	-5.24	-2.14	-0.56	3.15	-0.86	-8.09	-8.64	-6.67	-5.97	THOL BASALT	HIGH	8.05		shallow hole, barren
68-17-FW	4+00S	130.79	131.10	46.33	1.37	90	95	0.947	0.59	0.31	-1.21	-1.28	-2.54	1.40	0.01	-3.69	-3.94	-0.65	1.66	THOL BASALT	HIGH	3.99		shallow hole, barren
66-108-VB	4+25N	136.89	137.20	43.96	2.36	55	825	0.067	-4.04	0.28	1.00	-1.71	-6.01	-2.42	-0.33	12.40	12.11	1.64	0.70	THOL HIGH-FE BASALT	HIGH	4.43	norm c 4.1%	mod. deep, no mineralization
SH-05-VBL	3+50N	0	.33	48.40	1.79				-1.07	1.42	-1.45	-3.39	-2.15	.52	.55			-1.82	-.5	C-A BASALT	HIGH	5.06		surface sample above HZ
SH-05-VBU	3+50N	0	.33	55.37	3.46				-1.8	1.52	-3.83	-2.75	-4.04	-6.91	2.18			-4.06	-3.95	C-A RHYOLITE		.03	norm c 12.8%	surface sample, higher above HZ
61-91-VB	2+75N	71.95	72.26	33.79	1.09	15	130	0.115	-2.32	0.14	-3.81	-2.78	0.75	4.18	-0.93	-5.89	-6.35	-5.15	-0.92	THOL BASALT	HIGH	9.08		shallow, below dig. diorite, no min.
56-37-VB	1+87N	99.09	99.39	89.27	9.23	140	135	1.037	5.77	-0.23	4.58	-3.01	-9.32	1.46	3.21	2.04	2.36	7.75	9.76	KOM BAS KOMATIITE		0.97	norm c 13.3%	shallow, poor mineralization
56-52-VB	1+87N	72.56	72.87	47.42	1.86	5	450	0.011	-2.70	0.96	-0.41	-2.24	-4.89	0.43	-0.02	3.74	3.26	-0.12	-0.59	THOL BASALT	HIGH	5.02		shallow, good mineralization
68-6-VB	1+00N	98.48	98.78	46.35	2.34	100	1815	0.055	-2.62	0.25	4.46	-2.76	-4.77	0.43	-0.55	32.65	32.05	5.52	3.39	THOL HIGH-FE BASALT	HIGH	4.58	norm c 3.0%	mod. deep, good mineralization
68-13-VB	1+00N	6.71	7.01	45.98	2.31	370	255	1.451	-2.79	0.07	5.26	-2.73	-5.11	1.52	-0.78	5.03	5.41	0.51	4.69	THOL HIGH-FE BASALT		5.45	norm c 2.8%	near surface, prob. reamed in min.
68-16-VB	0+00N	60.06	60.37	30.46	1.28	100	125	0.800	-3.96	0.86	-3.42	-2.20	0.04	0.37	-1.12	-5.30	-5.82	-4.71	-3.53	C-A BASALT	HIGH	7.80		shallow, barren
68-20-VB	0+75S	14.63	14.94	78.20	3.75	5	300	0.017	2.97	0.86	-1.22	-3.29	-5.12	-1.14	3.05	-2.03	-2.74	-0.34	2.68	C-A BASALT		1.68	norm c 9.7%	near surface, good mineralization
66-62e-VB	0+75S	115.85	116.16	87.13	7.99	85	790	0.108	2.24	0.39	2.01	-3.10	-9.02	-2.53	2.85	11.53	10.89	4.06	4.69	THOL BASALT		0.79	norm c 15.5%	mod. deep, good mineralization
56-61-VB	0+75S	64.33	64.63	61.42	2.87	75	985	0.076	-0.06	0.88	2.25	-3.35	-4.77	-0.37	1.12	14.68	13.98	3.19	3.50	THOL BASALT		3.67	norm c 6.1%	shallow, good mineralization
sh-03-vb	1+00s	0	.33	45.06	1.37				1.45	-.33	-.93	-.39	-3.03	1.58	-.14			.13	2.75	THOL BASALT		3.08		surface sample, sheared, qfp close
57-69-VB	1+50S	72.56	72.87	44.70	1.58	55	85	0.647	-2.73	1.85	-2.70	-2.41	-2.68	-0.95	0.03	-5.96	-5.61	-3.25	-3.47	C-A BASALT	HIGH	6.22		shallow, barren
56-64-VB	1+50S	42.68	42.99	65.26	2.83	100	225	0.444	-0.12	1.08	-0.03	-3.17	-4.31	-4.86	2.02	-2.00	-2.64	0.44	0.89	C-A ANDESITE		0.77	norm c 11.5%	shallow, good mineralization
65-70e-VB	2+00S	52.13	52.44	32.12	1.33	70	120	0.583	-3.56	0.64	-2.52	-2.51	-0.35	1.17	-1.06	-4.56	-5.12	-3.59	-1.29	C-A BASALT	HIGH	7.03		shallow, good mineralization

sericite $\pm$ chlorite defines schistosity; rock is probably a highly altered mafic volcanic.

68-6-FW (Footwall Mafic Complex, between Main and South Zones)

- an Fe enriched, Na, Ca depleted rock
- in thin section a fine-grained distinctly schistose rick with abundant sericite-chlorite in anhedral quartzo-feldspathic groundmass; a few larger quartz grains and minor carbonate veining; high Fe levels explained by presence of considerable opaque Fe oxides.

64-82e-FW (Footwall Mafic Complex, deep Main Zone hole)

- chemically a highly altered rock with strong Ca depletion and Mg enrichment.
- distinct brecciated aspect
- in thin section extensive chlorite superimposed on a very fine anhedral quartzo-feldspathic groundmass; outlines of original plagroclose laths still visible - now completely altered to chlorite $\pm$ quartz; fine-grained, brownish biotite (?) forms small irregular patches intimately associated with chlorite; coarser quartz and carbonate occur in factures.

65-72e-FW (Footwall Mafic Complex, deep Main Zone hole)

- chemically, a CO_2 enriched rock
- in thin section a strongly chloritic rock with chlorite superimposed on a fine, anhedral quartzo-feldspathic groundmass; some twinned plagioclase still visible; much carbonate occurs in east-west microfactures, and disseminated throughout groundmass.

66-108-FW (Footwall Mafic Complex, deep Main Zone hole)

- chemically depleted in most elements save for pronounced CO_2 enrichment
- in thin section a massive fine-grained rock with abundant sericite-carbonate $\pm$ chlorite superimposed on a fine quartzo-feldspathic groundmass

66-110-FW (Footwall Mafic Complex, north of Main Zone)

- chemically there is strong Mg, Si, CO_2 enrichment
- petrographically a coarser, massive dioritic intrusive(?) rock with hornblende laths in a matrix of quartz, sericitized twinned feldspar and carbonate.

68-6-VB (Variolitic Basalt, between Main and South Zones)

- Fe, CO_2 enriched, Na, Ca depleted rock
- petrographically, Fe enrichment seen to be due to prominent "Berlin-blue" Fe-chlorite which occurs in quartz-chlorite

microveinlets in a generally very fine grained, moderately schistose sericite - chlorite - quartzo-feldspathic aggregate; some biotite may be present in a section of the slide rich in fine Fe-oxides.

66-108-VB (Variolitic Basalt, Main Zone)

- a strong Mg, Ca, SiO_2 depleted, CO_2 enriched rock
- in thin section, a strongly schistose, very fine-grained sericite-chlorite-quartzo-feldspathic rock with abundant fine opaques; numerous tiny laths are plagioclase microlites; carbonate occurs in schistosity-parallel laminae.

The key conclusion to be derived from this work is that the deepest samples seem to be the most intensely altered. This, combined with greatly increased Cu/Cu + Zn ratios in hole 82e may be suggestive of increased proximity to an exhalative source in the down-dip basinal direction west of hole 82e.

7.0 SAMPLING RESULTS

7.1 Historical Drill Core

Detailed examination of the core showed a surprising amount of unsampled, albeit primarily low-grade mineralization. Much of the past sampling was very obviously high-grade specific, with no thought given to the bulk mineability of much of the material. Our sampling was directed towards increasing the length of old intersections with wing and intermediate samples. As well, as a better understanding of the geological picture emerged, it became quite clear that, often, mineralized horizons had been ignored by past workers simply because they did not understand the relative position of these units within the drill hole. This was particilarily true in the South Zone, where a large amount of mineralization, primarily breccia type but also some massive Cu-Zn, was left unsampled in several of the holes.

Table 3 presents the results of the sampling to date, together with comments on the accomplishments of the particular hole. It became increasingly obvious during this work that the vast majority of the holes in the Main Zone were poorly directed. Core from the 1981 drill campaign has not, as yet been re-examined but the logs suggest a considerable amount of mineralization was left in these holes as well. Re-sampling generally returned assays within the same order-of-magnitude as the originals, and the results in Table 3 represent an averaging of the two values, where applicable, for that sample.

A significant amount of lead was observed in the core, which, for the most part, was never assayed for in the past. Our sampling suggests that this metal as well as silver will form a significant component of any ore that is developed in the Shunsby deposits. Our sampling failed to turn up more than trace amounts of gold from any but the most Cu-rich samples, and has down-graded the gold potential of any polymetallic ore scenario from the known deposits. Minor amounts of cobalt and cadmium were noted within massive mineralization, however the economic manifestations of their presence are not known at this point.

Weight averaging of all of the historical Shunsby drill core intersections plus our additional sampling gave an average value of 0.79% Cu and 1.99% Zn over an average core length of 6.79 m, as well as 1.86% Pb over 5.32 m. Higher-grade sections averaged 1.30% Cu and 2.21% Zn over an average core length of 5.61 m with 0.96% Pb over 2.83 m.

7.2 Stripping and Trenching

Stripping was primarily limited to portions of the Upper Chert stratigraphy, as the high chert component to these sediments has resulted in this unit weathering quite high. Both the Variolitic Basalt and the Lower Cherts have weathered substantially lower.

[redacted] E 3 [redacted] TOR [redacted] RIL [redacted] INT [redacted] TION [redacted]

HOLE	FROM-TO	CORLGTH	CU(%)	ZN(%)	PB(%)	INCLUDING	CORLGTH	CU(%)	ZN(%)	PB(%)	COMMENTS
55-03	2.43-10.24	7.81	1.17	1.31	-	7.64-10.24	2.60	2.59	2.72	-	Down-dip beneath Copper Breccia Showing (Cu-Bx)
55-04	3.66-9.45	5.79	0.53	4.39	0.87	-	-	-	-	-	Down-dip from Main Zone (MZ), missed most Lower Chert (LC) mineralization
56-05	25.24-29.07	3.83	2.57	0.14	-	26.48-29.07	2.59	3.38	0.14	-	Steeper down-dip from same set-up as 04; caught upper LC mineralization
	50.69-52.30	1.61	2.50	0.09	-	-	-	-	-	-	
56-06	14.63-18.64	4.01	1.51	0.53	-	14.63-16.90	2.27	2.59	0.21	-	Section from same set-up as 04,05; caught lowermost LC mineralized horizon
56-08	0.91-7.62	6.71	0.63	6.09	-	-	-	-	-	-	Down-dip at 4+25N of MZ, caught only uppermost LC mineralization
56-09	12.80-15.06	2.26	1.33	1.08	-	-	-	-	-	-	Section beneath Copper Knob Showing (Cu-Knob), in dig. diorite through LC
56-11	40.54-42.67	2.13	1.02	0.14	-	-	-	-	-	-	Section at 3+50N of MZ, caught lowermost LC mineralization
56-12	4.27-10.67	6.40	0.06	1.27	-	7.62-9.14	1.52	0.20	2.82	-	Along strike under Cu-Bx
	42.29-43.89	1.60	0.91	0.01	-	-	-	-	-	-	
56-14	1.22-12.19	10.97	2.72	1.00	-	2.74-12.19	9.45	3.14	1.02	-	Along strike under Cu-Bx
	-	-	-	-		7.32-10.36	3.04	5.41	0.54	-	
56-15	11.28-12.19	0.91	7.40	0.70	-	-	-	-	-	-	Along strike under Cu-Bx
56-16	14.73-19.16	4.43	1.58	0.32	-	14.73-17.65	2.92	2.10	0.29	-	Along strike under Cu-Bx
56-17	17.22-23.17	5.95	0.41	2.35	-	-	-	-	-	-	Down-dip at 2+50N of MZ, missed lowermost LC mineralization
	31.39-40.54	9.15	1.89	0.74	-	-	-	-	-	-	
	44.96-46.02	1.06	3.31	0.08	-	-	-	-	-	-	
	50.72-54.07	3.35	1.87	0.30	-	-	-	-	-	-	
56-20	24.84-26.06	1.22	1.17	1.82	-	-	-	-	-	-	Down-dip obliquely from same set-up as 17, caught lower LC mineralization
	34.75-38.01	3.26	2.33	0.81	-	-	-	-	-	-	
	44.19-47.55	3.26	0.86	7.53	-	-	-	-	-	-	
56-21	10.67-56.39	45.72	0.96	1.05	-	10.67-18.08	7.41	1.23	0.83	-	Down-dip from same set-up as 17,20; caught lower mineralized horizons
	-	-	-	-		25.76-56.39	30.63	1.03	1.26	-	
56-22	7.93-14.48	6.55	0.16	0.87	-	-	-	-	-	-	Down-dip from same set-up as 17,20,21; caught lower mineralized horizons
	33.99-40.42	6.43	2.11	0.19	-	36.27-40.42	4.15	3.01	0.01	-	
	67.36-68.28	0.92	0.35	2.04	-	-	-	-	-	-	
56-25	43.16-64.62	21.46	0.77	1.06	-	52.43-53.95	1.52	1.89	3.67	-	Section at 2+50N of MZ, caught all LC mineralized horizons
	-	-	-	-		61.27-62.94	1.67	2.75	0.89	-	
56-26	12.19-39.62	27.43	1.58	0.59	-	12.19-21.64	9.45	1.43	0.72	-	Down-dip at 3+00N of MZ, missed lowermost LC mineralization
	-	-	-	-		28.65-39.62	10.97	2.63	0.64	-	
	-	-	-	-		28.65-30.78	2.13	5.14	0.28	-	
	-	-	-	-		28.65-33.53	4.88	-	-	-	
56-27	12.50-17.07	4.57	0.61	1.80	-	-	-	-	-	-	Section at 2+00N, caught Upper Chert (UC) Cu-Bx mineralization
	37.19-43.59	6.40	0.52	1.16	-	-	-	-	-	-	
	48.77-55.78	7.01	1.05	0.67	-	48.77-52.12	3.35	1.63	0.81	-	
56-28	57.30-66.45	9.15	0.33	0.64	-	-	-	-	-	-	Section at 2+00N, UC Cu-Bx mineralization in Joubin Fault zone?
56-31	6.10-9.14	3.04	0.22	1.29	-	-	-	-	-	-	Down-dip at 4+25N of MZ, caught only part of lowermost LC mineralization
56-32	71.02-73.76	2.74	0.13	4.49	-	-	-	-	-	-	Section at 1+25N of UC, hole stopped short of variolitic basalt
56-33	6.10-25.91	19.81	1.63	1.56	-	-	-	-	-	-	Section at 3+25N of MZ, missed uppermost LC mineralization
56-35	3.35-24.99	21.64	1.02	1.28		3.35-9.45	6.10	2.86	1.58	-	Vertical at 3+25N of MZ, missed uppermost LC mineralization
	-	-	-	-		18.90-21.95	3.05	0.46	3.87	-	
56-36	3.96-13.41	9.45	1.65	4.87	-	-	-	-	-	-	Down-dip at 3+25N of MZ, caught only uppermost LC mineralization
56-37	90.53-92.81	2.28	0.36	2.17	-	-	-	-	-	-	Section at 1+75N, caught only UC mineralization just above variolitic bas.
56-38	19.20-20.73	1.53	0.50	2.85	-	-	-	-	-	-	Section at 5+25N, caught min. in both cherts but did not reach FW diorite
	64.77-68.58	3.81	0.93	1.58	-	-	-	-	-	-	
56-39	51.82-53.65	1.83	0.41	3.41	-	-	-	-	-	-	Down-dip at 2+00N of MZ, caught only uppermost LC mineralization
56-43	21.34-29.87	8.53	0.57	0.36	-	25.30-27.43	2.13	1.02	0.30	-	Along strike across Joubin Fault, caught part of UC Cu-Bx mineralization
56-47	6.40-27.43	21.03	0.49	2.00	-	6.40-21.33	14.93	0.67	2.38	-	Drilled southeasterly just south of Joubin Fault, caught UC mineralization
	40.84-47.55	6.71	0.35	3.95	-	16.15-21.33	5.18	1.36	3.12	-	
56-48	5.49-14.02	8.53	0.18	2.25	-	5.49-11.28	5.79	0.21	2.82	-	Section at 2+75N of MZ, caught all mineralized LC horizons
	28.04-32.92	4.88	0.67	0.73	-	28.04-30.18	2.14	1.07	0.76	-	
56-51	18.59-41.15	22.56	1.61	1.27	-	18.59-21.03	2.44	1.37	6.27	-	Vertical at 2+50N of MZ, caught all mineralized LC horizons
	-	-	-	-		27.74-41.15	13.41	2.27	0.80	-	
56-52	63.09-71.62	8.53	0.74	1.74	-	63.09-66.44	3.35	0.82	4.26	-	Vertical at 1+75N, caught UC mineralization just above variolitic basalt
56-53	85.66-87.17	1.51	1.10	4.74	-	-	-	-	-	-	Vertical at 1+50N, caught some UC mineralization
56-56	79.23-96.16	16.93	0.11	0.88	-	85.66-87.47	1.81	0.65	1.63	-	Vertical at 0+50N, caught low-grade mineralization in both cherts
	145.39-149.66	4.27	0.56	1.58	-	-	-	-	-	-	
56-57	9.45-35.05	25.60	0.08	2.33	-	27.13-35.05	7.92	0.21	4.16	-	Vertical at 0+50S of South Zone (SZ), caught mineralization in both cherts
	42.06-52.07	10.01	0.06	4.93	-	-	-	-	-	-	
	122.23-125.58	3.35	0.08	2.08	-	122.23-124.05	1.82	0.09	2.93	0.80	

TABLE 3 - HISTORICAL DRILLCORE INTERSECTIONS

HOLE	FROM-TO	CORLGTH	CU(%)	ZN(%)	PB(%)	INCLUDING	CORLGTH	CU(%)	ZN(%)	PB(%)	COMMENTS
56-60	13.87-39.32	25.45	0.74	2.54	-	13.87-33.83	19.96	0.92	2.54	-	Vertical at 3+00N of NZ, caught all mineralized LC horizons
66-61e	2.13-40.23	38.10	0.07	2.95	-	17.36-37.19	19.83	0.07	4.45	-	Vertical at 0+75S of SZ, caught mineralization in both cherts
	97.66-105.12	7.46	0.22	1.99	-	97.66-100.71	3.05	0.31	3.34	0.50	
	116.44-126.71	10.27	0.47	2.41	-	-	-	-	-	-	
66-62e	2.13-15.09	12.96	0.07	1.31	-	-	-	-	-	-	Section at 0+75S of SZ, caught mineralization in both cherts
	20.87-47.83	26.96	0.03	3.85	-	31.10-37.20	6.10	0.02	8.07	-	
	90.03-113.65	23.62	0.77	2.23	-	-	-	-	-	-	
56-63	5.61-31.55	25.94	0.03	1.14	-	17.06-18.90	1.84	0.18	3.28	-	Vertical at 1+25S of SZ, stopped in variolitic basalt
56-64	40.22-42.45	2.23	0.04	3.58	-	-	-	-	-	-	Vertical at 1+50S, values found only above variolitic basalt in UC
56-65	29.81-32.00	2.19	0.09	7.02	0.51	-	-	-	-	-	Vertical at 0+25S, hole stopped in variolitic basalt
56-67	128.25-134.35	6.10	0.04	2.49	-	-	-	-	-	-	Vertical at 1+50S, values found only in LC
	137.17-142.03	4.86	0.17	2.74	-	137.17-138.52	1.35	0.57	6.83	-	
57-68	50.00-55.94	5.94	0.05	2.59	-	50.00-53.05	3.05	0.10	1.95	-	Vertical at 1+75S, values found only in UC
65-70e	39.01-48.79	9.78	0.00	1.81	-	-	-	-	-	-	Vertical at 2+25S, values found only in UC
60-71e	118.57-120.41	1.84	0.36	1.62	0.21	-	-	-	-	-	Vertical at 1+00S in SZ, values in LC
	126.18-128.02	1.84	0.24	2.23	0.36	-	-	-	-	-	
	140.81-145.70	4.89	0.29	3.23	-	142.36-145.70	3.34	0.38	4.47	-	
65-72e	172.97-184.25	11.28	0.37	2.03	-	-	-	-	-	-	Vertical at 3+50N of NZ, values in LC
	193.70-195.21	1.51	0.31	2.18	-	-	-	-	-	-	
57-74	96.00-97.54	1.54	0.73	2.44	1.57	-	-	-	-	-	Vertical at 2+75N of NZ, values in both cherts
	153.90-157.51	3.61	1.64	0.70	-	155.68-157.51	1.83	2.78	0.57	-	
	175.89-180.45	4.56	0.48	2.55	-	-	-	-	-	-	
54-C	72.82-73.03	0.21	0.10	6.20	1.20	-	-	-	-	-	Section at 1+50S of SZ, values in LC, core unavailable
60-75	30.48-32.00	1.52	0.13	4.78	-	-	-	-	-	-	Vertical at 2+40N of NZ, caught most mineralized horizons
	38.86-53.34	14.48	0.49	2.84	-	41.30-51.51	10.21	0.68	3.61	-	
60-76	14.94-17.98	3.04	0.08	2.04	0.78	21.95-24.32	2.37	0.11	2.75	-	Section at 2+25N of NZ, caught all mineralized horizons
	21.95-49.53	27.58	0.34	1.03	-	30.14-35.75	5.61	0.37	1.73	-	
	-	-	-	-		39.93-49.53	9.60	0.73	1.26	-	
	-	-	-	-		42.98-49.53	6.55	1.07	1.42	-	
60-77	10.21-14.45	4.24	0.90	3.59	-	-	-	-	-	-	Vertical at 2+75N of NZ, caught all mineralized horizons (+/- dykes)
	25.60-35.97	10.37	4.56	1.27	-	31.70-35.97	4.27	7.38	1.85	-	
60-79	9.75-30.79	21.04	0.66	1.87	-	12.80-16.49	3.69	1.13	2.95	-	Section at 2+75N of NZ, caught all mineralized horizons
	-	-	-	-	-	28.44-30.79	2.35	1.01	5.32	-	
60-80	8.05-9.54	1.49	0.72	4.76	-	-	-	-	-	-	Long down-dip at 3+00N of NZ, caught all upper near-surface LC min.
	14.63-45.14	30.51	0.87	1.06	-	31.36-44.14	12.78	1.76	1.08	-	
61-81	115.67-118.87	3.20	0.51	2.17	-	-	-	-	-	-	Long SURVEYED down-dip at 3+00N of NZ, caught all upper LC mineralized
	128.93-137.43	8.50	0.33	1.73	-	-	-	-	-	-	horizons 150m down-dip
	142.49-148.93	6.44	0.38	1.42	-	-	-	-	-	-	
	159.26-189.89	30.63	1.14	1.56	-	159.26-176.39	17.13	1.87	1.33	-	
	-	-	-	-	-	182.03-189.89	7.86	0.24	2.33	-	
64-82e	192.33-193.12	0.79	2.25	0.00	0.70	-	-	-	-	-	Vertical deep NZ hole at 3+00N, caught all LC mineralized horizons at depth
	211.84-214.00	2.16	0.79	0.71	-	-	-	-	-	-	of 250m, 350m down-dip...VERY GOOD COPPER GRADES
	235.24-236.51	1.27	1.55	0.00	-	-	-	-	-	-	
	243.60-244.85	1.25	4.20	0.00	-	-	-	-	-	-	
	249.86-251.52	1.66	4.30	0.55	-	-	-	-	-	-	
61-83	121.62-142.25	20.63	0.40	0.96	-	131.98-142.25	10.27	0.64	1.14	-	Vertical NZ hole at 3+00N, caught all LC mineralized horizons at depth of
	-	-	-	-	-	134.42-139.60	5.18	1.03	1.46	-	150m, 200m down-dip
61-85	68.88-76.81	7.93	0.56	1.51	-	73.76-76.81	3.05	1.11	2.76	-	Vertical at 2+75N of NZ, caught LC mineralization 75m down-dip
61-87	4.79-6.86	2.07	1.30	0.27	-	-	-	-	-	-	Steep down-dip hole at 3+25N, caught lowermost UC as well as LC at depth
	84.13-87.17	3.04	0.96	1.79	-	-	-	-	-	-	
61-88	4.88-7.32	2.44	2.37	0.33	-	-	-	-	-	-	Down-dip at 3+25N, caught lowermost UC as well as all upper LC mineralized
	78.79-92.66	13.87	0.16	1.45	-	-	-	-	-	-	horizons 125m down-dip
	111.86-115.82	3.96	2.59	1.33	-	-	-	-	-	-	
	132.28-163.37	31.09	0.78	0.88	-	141.12-163.37	22.25	1.00	1.04	-	
	-	-	-	-	-	141.12-147.52	6.40	1.20	1.74	-	
	-	-	-	-	-	159.11-163.37	4.26	2.72	1.43	-	
61-89	103.33-116.13	12.80	0.54	1.35	-	106.99-113.08	6.09	0.70	2.13	-	Down-dip NZ hole at 3+00N, caught all LC mineralized horizons
61-91	99.67-114.30	14.63	0.22	1.80	-	112.47-114.30	1.83	0.46	7.24	2.40	Vertical NZ hole at 2+75N, caught all LC mineralized horizons at depth of
	126.19-129.85	3.66	1.22	3.14	-	-	-	-	-	-	150m, 200m down-dip
	133.50-142.65	9.15	2.15	0.80	-	136.55-142.65	6.10	2.61	0.99		

TABLE 3 - HISTORICAL DRILLCORE INTERSECTIONS

HOLE	FROM-TO	CORLGTH	CU(%)	ZN(%)	PB(%)	INCLUDING	CORLGTH	CU(%)	ZN(%)	PB(%)	COMMENTS
61-92	73.33-74.86	1.53	0.48	1.35	1.08	-	-	-	-	-	Vertical at 2+75N, in dyke through most of LC
	120.70-125.58	4.88	0.06	1.26	0.35	-	-	-	-	-	
65-93	8.87-12.07	3.20	0.08	2.89	-	-	-	-	-	-	Section at 2+40N of NZ, apparently caught only upper and lowermost horizons
	30.69-32.67	1.98	0.23	2.84	-	-	-	-	-	-	
65-94	102.35-106.77	4.42	0.10	1.60	0.29	105.19-106.77	1.58	0.13	3.00	0.80	Vertical at 2+25N, values in LC 150m down-dip
65-95	86.05-89.09	3.04	0.47	0.98	0.30	-	-	-	-	-	Section at 3+50N of NZ, in dyke through most of LC
65-98	30.72-31.49	0.77	1.71	2.96	-	-	-	-	-	-	Section at 3+75N of NZ, hit dyke for most of upper LC
65-102	59.31-60.84	1.53	0.20	2.56	4.85	-	-	-	-	-	Vertical at 2+25N, values in UC
	96.07-97.17	1.10	-	-	10.12	-	-	-	-	-	
65-103	129.78-133.59	3.81	0.30	2.48	-	-	-	-	-	-	Section through UC at 5+00N, possibly intersected extension of Cu-Knob
65-104	238.72-240.55	1.83	1.47	-	-	-	-	-	-	-	Vertical NZ hole at 3+50N, caught LC 350m down-dip...NO ZINC ASSAYS
	253.04-255.79	2.75	1.13	-	-	-	-	-	-	-	
66-108	216.41-227.08	10.67	0.98	1.42	-	218.24-223.42	5.18	1.37	1.97	-	Vertical NZ hole at 4+25N, caught LC 250m down-dip
66-110	158.53-160.20	1.67	-	3.98	0.60	-	-	-	-	-	Vertical NZ hole at 5+00N, hole in dyke for much of LC
66-112	110.49-112.62	2.13	0.86	0.76	-	-	-	-	-	-	Vertical at 0+50N, values in LC
68-1	48.77-50.29	1.52	1.60	4.89	-	-	-	-	-	-	Vertical at 0+00N, values in both UC and LC
	149.66-157.28	7.62	0.10	2.00	-	155.45-157.28	1.83	0.07	3.21	-	
68-4	57.30-66.75	9.45	0.24	3.44	0.56	60.35-64.92	4.57	0.29	4.49	0.50	Steep hole at 1+00N, values in UC, hole in dyke through LC
68-6	81.69-89.31	7.62	0.06	5.38	-	-	-	-	-	-	Vertical hole at 1+00N, values in UC, LC highly sheared/faulted
68-10	78.64-82.30	3.66	0.04	2.80	0.28	79.86-82.30	2.44	0.11	3.34	0.28	Steep section at 1+00N, values in UC
68-11	21.64-25.91	4.27	1.49	0.77	-	21.64-23.47	1.83	2.16	1.70	-	Vertical hole at 2+25N, Cu-Bx min. near surface, deeper values in LC
	70.55-81.38	1.83	0.22	1.33	0.54	-	-	-	-	-	
	91.74-94.18	2.44	0.08	2.54	0.68	-	-	-	-	-	
68-12	69.49-71.93	2.44	0.15	2.46	0.25	-	-	-	-	-	Vertical hole at 1+00N, values in LC
68-16	97.84-100.58	2.74	0.42	1.33	-	-	-	-	-	-	Vertical hole at 0+00N, values in LC, hole in dyke in UC
	106.68-110.34	3.66	0.32	1.75	-	-	-	-	-	-	
	115.82-121.77	5.95	2.11	3.05	-	-	-	-	-	-	
68-18	5.18-8.53	3.35	1.62	4.12	-	-	-	-	-	-	Vertical SZ hole at 0+75S, values in UC near-surface and LC 75m down-dip
	45.42-52.43	7.01	0.10	1.74	-	45.42-51.21	5.79	0.09	1.90	-	
	64.31-65.99	1.68	0.58	1.06	0.05	-	-	-	-	-	
68-19	18.59-23.16	4.57	0.11	2.12	-	-	-	-	-	-	Vertical hole at 0+00N, values in both UC and LC
	99.06-102.11	3.05	0.20	1.93	-	-	-	-	-	-	
68-20	7.32-11.58	4.26	0.68	5.25	-	-	-	-	-	-	Section at 0+75S of SZ, values in UC near-surface and LC 50m down-dip
	44.20-55.17	10.97	0.18	2.62	-	-	-	-	-	-	
	64.92-69.19	4.27	0.40	3.33	-	-	-	-	-	-	
74-1	3.66-9.75	6.09	0.99	0.63	-	-	-	-	-	-	Apparent NZ hole at 3+25N, PROBABLY MISLOCATED
	24.99-28.04	3.05	0.45	1.96	-	-	-	-	-	-	
74-5	6.40-10.06	3.66	1.09	0.64	-	8.84-10.06	1.22	3.10	0.55	-	Apparent NZ hole at 2+40N, values possibly Cu-Bx stratigraphy, MISLOCATED?
74-6	40.48-45.42	4.58	0.80	2.07	-	-	-	-	-	-	Apparent NZ hole at 2+50N, PROBABLY MISLOCATED
74-7	2.44-6.71	4.27	0.49	2.63	-	-	-	-	-	-	Apparent NZ hole at 2+75N, caught only lowermost LC horizon
74-8	4.57-6.71	2.14	1.01	1.35	-	-	-	-	-	-	Apparent NZ hole at 3+25N, caught only lowermost LC horizon
74-9	60.35-66.45	6.10	0.09	1.51	0.27	63.40-65.23	1.83	0.09	3.36	0.20	Apparent SZ hole at 0+50S, hole in dyke through much of LC
74-10	54.25-73.76	19.51	0.73	1.68	-	-	-	-	-	-	Southeasterly NZ section at 2+75N, apparently caught all mineralization
	54.25-78.94	24.69	0.73	1.36	-	-	-	-	-	-	
74-11	18.90-35.97	17.07	0.10	2.15	0.59	24.99-35.97	10.98	0.10	2.97	-	Southeasterly SZ section at 0+75S, values in both UC and LC
	46.02-56.69	10.67	0.19	1.65	0.37	-	-	-	-	-	
	121.62-129.24	7.62	0.43	3.74	-	-	-	-	-	-	
	143.26-149.96	6.70	0.72	2.56	-	-	-	-	-	-	
74-12	50.90-61.57	10.67	0.52	1.09	-	60.05-61.57	1.52	1.23	0.02	-	Apparent NZ hole at 3+00N, hole in dyke through part of LC
74-13	14.63-18.89	4.26	0.06	2.99	0.21	-	-	-	-	-	Southeasterly SZ section at 0+60S, values in both UC and LC, hole stopped
	24.99-47.85	22.86	0.97	2.75	10.10	-	-	-	-	-	short of FW
	100.89-117.35	16.46	0.82	5.50	1.01	100.89-107.59	6.70	1.55	11.67	2.40	
74-14	8.40-10.67	4.27	0.02	1.19	0.59	9.45-10.67	1.22	0.04	1.98	0.70	Southeasterly SZ hole at 1+25S, values in UC, very good mineralization
	17.37-39.32	21.95	0.16	1.13	0.02	17.37-19.51	2.14	0.37	2.16	0.40	noted in LC but no assays, core dumped and missing
	-	-	-	-	-	25.60-29.57	3.97	0.44	2.36	0.40	
	-	-	-	-	-	36.58-39.32	2.74	0.36	3.12	0.40	
74-15	172.52-175.57	3.05	0.07	2.70	0.31	-	-	-	-	-	Southeasterly SZ hole at 1+00S, values in LC
74-16	185.62-191.72	6.10	0.27	1.16	6.98	-	-	-	-	-	Southeasterly SZ hole at 2+50S, values in LC
74-17	6.71-28.96	22.25	0.55	4.17	-	-	-	-	-	-	Southeasterly SZ hole at 0+75S, values in both UC and LC

TABLE 3 - HISTORICAL DRILLCORE INTERSECTIONS

HOLE	FROM-TO	CORLGTH	CU(%)	ZN(%)	PB(%)	INCLUDING	CORLGTH	CU(%)	ZN(%)	PB(%)	COMMENTS
74-18	18.59-25.30	6.71	0.15	3.30	0.12	-	-	-	-	-	Southeasterly SZ hole at 1+00S, values in both UC and LC, good min. in
	71.78-74.37	2.59	2.65	15.24	-	-	-	-	-	-	dumped core
74-20	28.96-33.22	4.26	0.10	3.69	0.02	-	-	-	-	-	Southeasterly SZ hole at 0+50S, values in both UC and LC
	77.42-83.09	5.67	0.25	1.85	0.33	-	-	-	-	-	
74-21	26.06-30.63	4.57	0.38	4.38	0.23	-	-	-	-	-	Southerly SZ hole at 0+50S, values in both UC and LC
	68.28-72.54	4.26	0.17	2.34	0.83	-	-	-	-	-	
	102.41-103.78	1.37	0.29	1.77	0.43	-	-	-	-	-	
81-1	10.97-12.80	1.83	0.39	3.08	-	-	-	-	-	-	NZ at 2+80N, sampled all horizons
	18.59-21.03	2.44	1.05	7.71	-	-	-	-	-	-	
	26.37-36.42	10.05	2.54	0.89	-	-	-	-	-	-	
81-2	20.73-28.35	7.62	1.42	2.88	-	-	-	-	-	-	NZ at 2+80N, 10m west of 81-1, STOPPED SHORT OF LOWERMOST HORIZON
	34.90-39.01	4.11	1.53	1.05	-	-	-	-	-	-	
81-3	23.16-28.19	5.03	1.56	0.53	-	-	-	-	-	-	NZ at 2+80N, 15m east of 81-1, DRILLED DOWN FAULT MISSING UPPER HORIZONS
	31.39-32.31	0.92	1.19	0.12	-	-	-	-	-	-	
81-5	17.37-22.40	5.03	1.17	1.25	-	17.37-18.44	1.07	4.99	0.29	-	NZ at 2+60N, caught all mineralised horizons, slightly down-dip
	5.49-8.23	2.74	0.08	2.71	-	-	-	-	-	-	
	26.82-27.43	0.61	0.84	2.57	-	-	-	-	-	-	
	32.92-41.00	8.08	1.08	0.64	-	-	-	-	-	-	
81-6	47.85-52.88	5.03	2.95	2.85	-	-	-	-	-	-	NZ at 2+30N, hole mainly in variolitic basalt, caught only lowermost min.
81-7	43.28-47.09	3.81	1.80	0.76	-	-	-	-	-	-	NZ at 2+30N, hole mainly in variolitic basalt, missed all upper min.
81-8	51.82-62.79	10.97	1.66	4.82	-	-	-	-	-	-	NZ at 2+30N, caught all mineralization down-dip of NZ "pod"
81-10	2.74-6.71	3.97	1.17	0.25	-	-	-	-	-	-	NZ at 3+10N, missed uppermost mineralization
	15.85-17.22	1.37	4.32	0.46	-	-	-	-	-	-	
81-11	8.69-12.80	4.11	1.08	2.85	-	-	-	-	-	-	NZ at 3+10N, 10m east of 81-10, missed all upper mineralization
81-12	5.18-12.80	7.62	1.58	1.81	-	-	-	-	-	-	NZ at 3+14N, missed much mineralization due to dykes
	26.06-26.97	0.91	2.11	0.19	-	-	-	-	-	-	
81-13	16.00-18.69	2.69	0.32	1.99	-	-	-	-	-	-	NZ at 3+30N, missed upper mineralized horizons
81-14a	29.11-29.57	0.46	4.10	0.06	-	-	-	-	-	-	NZ at 3+30N, caught only lowermost mineralization
	33.83-36.12	2.29	1.83	0.01	-	-	-	-	-	-	
81-15	7.92-9.20	1.28	6.54	0.82	-	-	-	-	-	-	NZ at 3+35N, 15m east of 81-13, caught only lowermost mineralization
81-16	7.62-12.19	4.57	0.62	1.08	-	-	-	-	-	-	NZ at 4+25N, hole in dyke through much of LC, stopped short of FW
81-18	2.44-6.10	3.66	0.03	3.27	-	-	-	-	-	-	NZ at 4+25N, hole in dyke through much of LC
	24.99-26.21	1.22	0.15	3.94	-	-	-	-	-	-	
81-19	1.68-4.27	2.59	0.47	3.05	-	-	-	-	-	-	NZ at 3+81N, caught a portion of uppermost mineralization, HOLE ENDED IN
	7.16-9.45	2.29	1.72	4.30	-	-	-	-	-	-	LOWERMOST MINERALIZED HORIZON
	7.16-12.34	5.18	1.04	2.09	-	-	-	-	-	-	
	22.71-22.86	0.15	0.88	6.43	-	-	-	-	-	-	
81-20	6.40-15.29	8.99	0.37	2.52	-	-	-	-	-	-	NZ at 3+81N, caught part of uppermost mineralization, HOLE STOPPED IN DYKE
81-21	20.12-23.77	3.65	0.69	0.05	-	-	-	-	-	-	NZ at 3+64N, missed all upper mineralization due to dyke
81-22	3.66-6.40	2.74	0.39	2.85	-	-	-	-	-	-	NZ at 3+40N, caught only lowermost mineralization
81-23	25.76-26.21	0.45	0.98	7.87	-	-	-	-	-	-	NZ at 3+43N, caught only lowermost mineralization
81-24	6.10-8.84	2.74	0.32	5.11	-	-	-	-	-	-	NZ at 3+00N, caught all mineralized horizons, PROBABLY REAMED IN ORE
	13.41-14.94	1.53	0.32	2.10	-	-	-	-	-	-	
	20.73-23.47	2.74	0.55	2.06	-	-	-	-	-	-	
	26.21-26.97	0.76	1.62	1.37	-	-	-	-	-	-	
	29.41-31.70	2.29	1.47	1.11	-	-	-	-	-	-	
81-25	18.29-22.10	3.81	0.87	5.72	-	-	-	-	-	-	NZ at 3+43N, probably caught all mineralised horizons
	33.28-49.53	16.25	2.87	0.90	-	33.28-37.03	3.75	3.97	1.50	-	
	-	-	-	-	-	38.86-41.76	2.90	4.06	0.40	-	
	-	-	-	-	-	43.89-44.96	1.07	10.10	2.31	-	
81-30	4.88-10.36	5.48	0.76	3.72	-	-	-	-	-	-	NZ at 2+90N, probably caught all mineralized horizons
	18.90-20.12	1.22	0.48	3.45	-	-	-	-	-	-	
	21.95-35.66	13.71	1.76	1.26	-	-	-	-	-	-	
81-31	17.22-18.59	1.37	0.27	2.76	-	-	-	-	-	-	NZ at 2+90N, upper mineralization not sampled pending results of 81-30
	25.91-28.65	2.74	1.11	1.03	-	-	-	-	-	-	(4.88-10.36)
81-101	15.54-16.46	0.92	0.38	3.39	-	-	-	-	-	-	SZ at 0+50S, missed uppermost LC stratigraphy
	17.07-19.20	2.13	1.08	1.69	-	-	-	-	-	-	
81-104	*3.96-5.18*	*1.22*	*0.52*	*1.64*	-	-	-	-	-	-	SZ at 0+50S, values in lowermost UC
	13.11-15.24	2.13	0.04	4.05	-	-	-	-	-	-	

Stripping operations were concentrated in the following areas:

AREA	LINE	FROM	TO
"A"	0+50S	0+25E	0+75E
"A"	1+00S	0+00	3+00E
"A"	1+00S	5+00E	5+25E
"B"	3+00S	0+50W	2+25E
"C"	1+00N	1+00E	1+50W
"MZ"	3+00N	0+75W	2+25W

Also, an extensive portion of the Lower Cherts in the Main Zone between about 2+75N to 4+00N was stripped and washed. Additional, unsuccessful attempts were made to reach bedrock in the area of 1+20N, 3+40E (conductor 40b(1d), Trench "D") and 3+00N, 0+60E (conductor 42a(12), Trench "E").

An initial round of channel sampling was performed on the "A" stripped area utilizing a rock saw which helped to ascertain mineralization distribution. This was followed by rock trenching and chip sampling where possible. Analytical results for this work are presented in Appendix 2. The following table summarizes the trench sampling results. Some of the trenches, eg "C" Area, were of a purely exploratory nature and the generally low values were not unexpected. Also, considerable difficulty was encountered in getting into fresh rock in a number of cases such that some of the following values are biased on the low side. A further round of deeper blasting and sampling would be required for definitive sampling.

TRENCH	MIDPOINT LOCATION	LENGTH (m)	Cu%	Pb%	Zn%	Cd%	Ag oz/ton
A-00-A	0+96S,1+94E	2.0	0.007	0.10	0.24	---	---
A-00-B	0+96S,1+90E	3.5	0.13	0.67	2.25	0.01	---
A-01-A/B/C	0+95S,1+17E	12.0	0.08	2.22	3.39	*0.01	**0.06
A-02	1+00S,1+11E	3.5	0.05	0.16	1.15	---	---
A-03	0+76S,1+15E	15.0	0.03	0.10	1.21	---	---
A-03-B	0+80S,1+05E	1.0	0.07	0.94	10.58	0.03	0.08
A-04-A	0+64S,0+66E	5.0	0.04	0.60	1.66	---	0.06
A-04-B	0+64S,0+61E	1.5	0.005	0.01	0.03	---	---
A-04-C	0+67S,0+57E	2.5	0.02	0.08	0.39	---	---
A-04-D	0+71S,0+46E	4.5	0.03	0.16	0.70	---	---
A-04-E	0+71S,0+39E	1.5	0.08	0.44	6.04	0.02	---
MZ-01	3+12N,2+25W	11.0	0.005	0.04	0.07	---	---
MZ-O2-A/B/C	3+14N,2+11W	5.0	0.03	0.13	0.34	---	---
MZ-O2D	3+14N,2+08W	0.5	3.89	1.27	5.68	0.02	0.50
MZ-03-A/B/C	3+14N,2+03W	6.5	0.21	0.26	1.21	---	---
MZ-04	3+15N,1+94W	0.5	0.04	0.01	0.17	---	---
C-01	1+03N,1+24W	2.5	0.02	0.005	0.07	---	---
C-02	0+95N,1+02W	5.0	0.01	0.005	0.06	---	---
C-03	0+93N,0+91W	1.0	0.05	7.58	0.13	---	---

C-04A/B	0+84N,0+03E	16.0	0.02	0.04	0.20	---	---

* to 0.06% Cd (in subsample A-01-C)
** to 0.56 oz/ton Ag (in subsample A-01-C)
\+ 0.01, 0.02% Co (in subsamples MZ-03-A,B)

Results of the above work suggest that:

1) The ore-making potential of the Upper Cherts has been consideratly upgraded. For example, the stripping and trenching has revealed the presence of a thin bed or beds of virtually massive sphalerite + chalcopyrite, galena in the area of 1+00S 1+00E. Similar high grade mineralization in the area of 3+00N, 2+00W is virtually certainly a continuation of the same material.

2) There is a great deal more galena then previous work suggests. Much of this is in local veins and pods, most of which crosscut stratigraphy, and were missed by previous drilling.

3) There is east-west cross-faulting in the mineralized stratigraphy although this is not as extensive as originally suspected. Also, re-mobilization of mineralization along later dykes, which occupy some of these east-west structures, is not as extensive as originally suspected. It is clear however that some of the mineralization, particularly the galena with minor sphalerite, is occurring in east-west structures. It is further clear that much or most of the old drilling, which was vertical or easterly directed, would have been relatively ineffective in locating this sort of mineralization.

4) Some known breccia-style copper + zinc mineralization in the area of 2+50N, 2+25W (Copper Breccia Showing) was thoroughly stripped and washed in the course of the present work. This zone looks quite spectacular at surface with previous sampling results indicating an average grade of 1-2% copper over widths of 9-12 m. This mineralization would tentatively appear to be correlative with the "Copper Knob" high-grade showing.

5) The stratiform nature of the copper-rich mineralization in the Lower Cherts of the Main Zone has been clearly revealed. Very detailed mapping here has again revealed the presence of a number of east-west fault zones although of generally insignificant displacement. Previous drill hole 81-03 was drilled directly down one of these faults and encountered considerable difficulty although it did intersect high grade Cu + Zn mineralization at depth.

6) Conductors 1d(40b) and 12(42a) may well represent additional zones of copper-rich mineralization. Attempts to trench these zones proved unsuccessful due to thicker overburden than anticipated. Copper-rich debris from the overburden trench "D" on conductor 1d assayed 11.13% Cu along with 3.56% Zn. Similar material from trench "E" on conductor 12 assayed 3.60% Cu.

8.0 MINERAL INVENTORY

8.1 Past Reserve Estimates

Reserve estimates by past operators were all hampered by several factors including variety of azimuths of the various drill campaigns, uncertainty regarding collar locations, and less than comprehensive sampling. In spite of these, the various groups have calculated reserves as per Table 4, below:

TABLE 4 - PAST RESERVE ESTIMATES

Operator	Year	Ore Zone Estimated	Tons	Cu(%)	Zn(%)	
Teck Explorations	1957	Main Zone - Basal Chert	152,000	1.35	1.22	
FRJ Prospecting Syndicate (Joubin)	1966	Main Zone + South Zone Basal Cherts	500,000	1.20	1.40	
UMEX (Potapoff)	1969	Main Zone + South Zone Basal and Middle Cherts	2,614,000	0.47	-	1.84% Zn+Pb, 0.25oz/t Ag
Grandora Explorations (Holcapek)	1975	Main Zone - Basal Chert				
		(indicated)	416,160	1.0	-	
		(possible)	112,000	1.0	1.2	
			528,160			
		- Middle Chert	350,000	1.0	1.5	
		South Zone - Basal Chert	320,000	0.58	2.48	
		- Middle Chert	400,900	0.27	3.17	
Placer Development	1980	Main Zone + South Zone Basal and Middle Cherts	2,400,000	0.40	2.40	
MW Resources	1982	Main Zone - Basal Chert	50,000	3.2	3.1	+0.75oz/t Ag, 0.02oz/tAu
(Fairbairn)		(high grade zone) South Zone	970,000	1.2	5.0	
B. Wilson & Associates (Wilson)		Main + South Zones	1,000,000	1.0	1.5	

A conversation with Placer personnel this past autumn confirmed that their figure was strictly a "back of the envelope" calculation. It is felt that most of the other calculations were likely of similar quality, if only because of the then-perceived complexity of the data.

Fairbairns' attempt at outlining a high-grade pod within the Main Zone lower cherts was assessed independently by Hill, Goettler and de Laporte Ltd. in 1983 who noted, "the continuity of mineralization depicted in cross-sections by Fairbairn (1982) is not substantiated by the data in detail and that therefore there may be considerable doubt that a reserve of the size Fairbairn had estimated, exists. It is felt that some of the data may have made to fit a model of continuity, where continuity should not be expected geologically."

Continuity does exist, and if anything, is simpler than his portrayal. He, as well as others have needed numerous faults, both lateral and thrust, to explain the relative position of equivalent horizons within individual drill holes. Our work suggests that past discrepancies were caused by lack of accurate collar co-ordinates and elevations, and the almost complete absence of down-hole directional testing. This is especially critical in light of the variety of azimuths and dips used, and the differing hardnesses of rock units, which undoubtably resulted in significant deviations.

It is our opinion that the mineralization is predominately stratiform and continuity of individual horizons is essentially uninterrupted save for sparse dykes and low-order displacement by faulting and/or drag-folding.

State-of-the-art computer technology has allowed us to rationalize all of the previous drill results and calculate for the first time a realistic geologic mineral inventory. This exercise along with generation of the sections in Appendix I represents several man-months of work inclusive of the field drill collar location program, rationalization of geological nomenclature, re-logging, re-sampling and actual computer time.

8.2 Geological Mineral Inventory

The sections presented in Appendix 1 show "reserve" blocks with grade and tonnage figures assigned to each. The various blocks are designated as follows:

UC1, 2, 3	Upper Chert blocks corresponding to the three mineralized horizons between the Variolitic Basalt and the Digestive Diorite (Main Zone) or Chert slump breccia (South Zone)
NS, 1, 2, 3	Lower Chert Near Surface blocks
LCUG	Lower Chert Down-dip blocks

These are "first-pass" computer calculated approximations only, which simply average the values found within the block outlines, without weighting or the use of geostatistics. Block outlines themselves are geologically inferred based on knowledge of the deposits, and are not in any way meant to reflect mineable blocks, or mineability scenarios.

Mineral inventory calculations are presented in Table 5 and are summarized following:

Main Zone:	Lower Cherts Near Surface	464,460 tonnes grading 1.14% Cu, 1.56% Zn

TABLE 5 - MINERAL INVENTORY

SECTION	CODE	AREA	WIDTH	SG	VOLUME	TONNES	CU(%)	ZN(%)	WT% CU	WT% ZN	
2+75N	lcug	1200	25.0	3.0	30000.00	90000.0	1.11	1.43	99900.00	128700.00	
3+00N	lcug	2715	25.0	3.0	67875.00	203625.0	1.14	1.04	232132.50	211770.00	
3+25N	lcug	173	25.0	3.0	4325.00	12975.0	1.15	1.76	14921.25	22836.00	
3+50N	lcug	896	25.0	3.0	22400.00	67200.0	0.61	2.16	40992.00	145152.00	
4+25N	lcug	494	49.75	3.0	24576.50	73729.5	1.42	2.17	104695.89	159993.02	
MAIN ZONE: LOWER CHERTS DOWN - DIP						447,529.5			492,641.64	668,451.02	= 1.10% Cu,1.49% Zn
1+50S	ns	938	37.5	3.0	35175.00	105525.0	0.07	1.66	7386.75	175171.50	
1+25S	ns	1514	25.0	3.0	37850.00	113550.0	1.54	9.49	174867.00	1077589.50	
1+00S	ns	4049	25.0	3.0	101225.0	303675.0	0.68	3.66	206499.00	1111450.50	
0+75S	ns	4208	25.0	3.0	105200.0	315600.0	0.43	2.10	135708.00	662760.00	
0+50S	ns	1079	37.5	3.0	40462.50	121387.5	0.22	1.67	26705.25	202717.13	
0+00S	ns	1726	50.0	3.0	86300.00	258900.0	0.82	2.36	212298.00	611004.00	
SOUTH ZONE: LOWER CHERTS NEAR SURFACE						1,218,637.5			763,464.0	3,840,692.63	= 0.63% Cu,3.15% Zn
2+50N	ns	1696	25.0	3.0	42400.00	127200.0	1.11	1.17	141192.00	148824.00	
2+75N	ns	1136	25.0	3.0	28400.00	85200.0	1.44	1.35	122688.00	115020.00	
3+00N	ns	1152	25.0	3.0	28800.00	86400.0	0.90	1.27	77760.00	109728.00	
4+25N	ns	88	49.75	3.0	4378.00	13134.0	0.98	5.33	12871.32	70004.22	
2+00N	ns1	57	18.75	3.0	1068.75	3206.3	1.63	0.81	5226.27	2597.10	
2+25N	ns1	570	25.0	3.0	14250.00	42750.0	1.48	2.49	63270.00	106447.50	
3+25N	ns1	373	25.0	3.0	9325.00	27975.0	1.58	0.79	44200.50	22100.25	
3+50N	ns1	51	25.0	3.0	1275.00	3825.0	1.20	0.06	4590.00	229.50	
3+75N	ns1	259	37.25	3.0	9647.75	28943.3	0.71	2.06	20549.74	59623.20	
2+00N	ns2	72	18.75	3.0	1350.00	4050.0	0.61	1.44	2470.50	5832.00	
2+25N	ns2	62	25.0	3.0	1550.00	4650.0	0.32	1.65	1488.00	7672.50	
3+25N	ns2	235	25.0	3.0	5875.00	17625.0	0.91	1.60	16038.75	28200.00	
3+50N	ns2	114	25.0	3.0	2850.00	8550.0	1.36	1.98	11628.00	16929.00	
3+75N	ns2	98	37.25	3.0	3650.50	10951.5	0.70	2.70	7666.05	29569.05	
MAIN ZONE: LOWER CHERTS NEAR-SURFACE						464,460.1			531,639.13	722,776.32	= 1.14%Cu,1.56% Zn
0+75S	uc	3789	25.0	3.0	94725.00	284175.0	0.33	2.77	93777.75	787164.75	
1+50S	uc1	350	37.5	3.0	13125.00	39375.0	0.06	3.75	2362.50	147656.25	
1+25S	uc1	1968	25.0	3.0	49200.00	147600.0	0.16	1.40	23616.00	206640.00	
1+25S	uc2	315	25.0	3.0	7875.00	23625.0	0.24	2.91	5670.00	68748.75	
1+25S	uc3	1023	25.0	3.0	25575.00	76725.0	0.01	1.24	767.25	95139.00	
1+00S	uc1	1008	25.0	3.0	25200.00	75600.0	0.18	2.06	13608.00	155736.00	
1+00S	uc2	1085	25.0	3.0	27125.00	81375.0	0.07	2.49	5696.25	202623.75	
0+75S	uc1	3747	25.0	3.0	93675.00	281025.0	0.33	2.77	92738.25	778439.25	
0+50S	uc1	638	37.5	3.0	23925.00	71775.0	0.16	4.70	11484.00	337342.50	
0+50S	uc2	855	37.5	3.0	32062.50	96187.5	0.12	3.19	11542.50	306838.13	
0+50S	uc3	1150	37.5	3.0	43125.00	129375.0	0.12	2.56	15525.00	331200.00	
0+00N	uc2	450	50.0	3.0	22500.00	67500.0	0.40	3.65	27000.00	246375.00	
SOUTH ZONE: UPPER CHERTS						1,374,337.5			303,787.50	3,663,903.38	= 0.22%Cu, 2.67% Zn
1+00N	uc1	569	50.0	3.0	28450.00	85350.0	0.06	4.42	5121.00	377247.00	
1+00N	uc2	525	50.0	3.0	26250.00	78750.0	0.17	2.60	13387.50	204750.00	
1+50N	uc?	180	50.0	3.0	9000.00	27000.0	1.10	4.74	29700.00	127980.00	
INTERMEDIATE AREA: UPPER CHERTS						191,000.0			48,208.50	709,977	= 0.25%Cu, 3.72% Zn
1+87.5N	uc1	524	18.75	3.0	9825.00	29475.0	0.30	3.26	8842.50	96088.50	
1+87.5N	uc2	1019	18.75	3.0	19106.25	57318.8	0.55	2.11	31525.34	120942.67	
1+87.5N	uc?	198	18.75	3.0	3712.50	11137.5	0.73	4.57	8130.38	50898.38	
2+00N	uc3	68	18.75	3.0	1275.00	3825.0	1.02	0.30	3901.50	1147.50	
2+00N	uc2	735	18.75	3.0	13781.25	41343.8	0.53	1.75	21912.21	72351.65	
2+25N	uc1	177	25.0	3.0	4425.00	13275.0	1.57	0.89	20841.75	11814.75	
2+25N	uc2	105	25.0	3.0	2625.00	7875.0	0.99	0.46	7796.25	3622.50	
2+50N	uc1	37	25.0	3.0	925.00	2775.0	0.87	0.98	2414.25	2719.50	
2+50N	uc2	125	25.0	3.0	3125.00	9375.0	0.87	0.62	8156.25	5812.50	
2+50N	uc3	154	25.0	3.0	3850.00	11550.0	2.78	0.83	32109.00	9586.50	
2+75N	uc3	29	25.0	3.0	725.00	2175.0	0.20	2.82	435.00	6133.50	
3+25N	uc1	53	25.0	3.0	1325.00	3975.0	1.84	0.30	7314.00	1192.50	
3+75N	uc1	65	37.25	3.0	2421.25	7263.8	1.33	1.08	9660.85	7844.90	
4+00N	uc1	57	.50	3.0	28.50	85.5					
MAIN ZONE: UPPER CHERTS						201,449.0			163,039.28	390,155.35	= 0.81%Cu, 1.94% Zn
TOTAL INVENTORY						3,897,514			2,302,779.9	9,995,955.6	= 0.59%Cu, 2.56% Zn

Main Zone: Upper Cherts	201,449 tonnes grading 0.81% Cu, 1.94% Zn
South Zone: Lower Cherts Near Surface	1,218,638 tonnes grading 0.63% Cu, 3.15% Zn
South Zone: Upper Cherts	1,374,338% tonnes grading 0.22% Cu, 2.67% Zn
TOTAL POTENTIALLY OPEN PITTABLE	3,258,855 tonnes grading 0.54% Cu, 2.65% Zn
Main Zone: Lower Cherts Down-Dip	447,526 tonnes grading 1.10% Cu, 1.49% Zn
TOTAL MINERAL INVENTORY	~4,000,000 tonnes grading 0.59% Cu, 2.56% Zn

It is believed that economically significant amounts of Pb, Ag ± Cd will be added to the above numbers.

9.0 GEOPHYSICAL SURVEYING

9.1 General

The October 1990 geophysical surveying was carried out on the Shunsby property to supplement exploration surveying conducted earlier and reported on in "Report on the Shunsby Copper Zinc Property of Kirkton Resources Corporation, Cunningham Township, Porcupine Mining Division, Ontario. February 1990" by Riddell et al. Section 10.0 of the 1989 report which outlined the geophysical results and interpretation is attached as Appendix 3 and provides a base for the additional detailed geophysical information presented following.

9.2 Total Field Magnetics

The total field magnetic survey conducted in the detailed grid area did not significantly add to the original interpretation. The area surveyed during the present program included the Main and South Zones of the Shunsby property. The very high gradients and short strike length of the magnetic features observed, is believed to reflect, to some degree, metallic surface debris from previous drill programmes.

From these observations it is believed that whilst the total field magnetic response can be broadly divided into three major magnetic domains, no individual magnetic signatures can be associated with particular stratigraphic units (Appendix 3). The complex structural picture portrayed on the earlier version of property-wide magnetics was not substantiated by the geological field work and additional geophysical surveying. Formerly, truncations and offsets of conductors and magnetic domains was interpreted to be due to extensive faulting. It is now felt that local folding and/or facies changes, and not the strike-slip component of faulting are the causes of the above.

The revised magnetic interpretation is presented on Maps 4a and b (1:2500) and Map 7 (1:000).

9.3 Horizontal Loop Electromagnetic

The known multiplicity of conductive zones in the deposits area and the relatively shallow overburden indicated from the previous survey dictated that a shorter (50 metre) cable separation be utilized during the present surveying. This has the advantage of increased resolution while not compromising adequate depth of investigation.

Interpretation of the 50 metre cable information has been superimposed on and integrated with the 100 metre data. Although largely similar to the 100 meter data, the 50 metre data has repositioned several conductive axes and has, in some cases, resolved multiple anomalies; an example being anomaly 13a which has been resolved as anomalies 43 and 44 on line 2+50N.

To maintain integrity of the data set, the present detailed survey area has been reinterpreted and all of the conductors re-labelled as anomalies 40 through 53. Where the detailed HLEM anomaly is obviously reflecting a conductive body previously labelled and interpreted, its present label maintains the previous designation; example anomaly 47(6) is described as anomaly 47 in the present text and is cross-referenced as anomaly 6 in the previous report (Appendix 3).

Thirteen conductors were outlined from the detailed survey. Of these thirteen conductors, three (40, 41 and 42) have been subdivided for ease of interpretation.

Anomaly 40
From the present surveying, anomaly 40 extends from 300N at approximately 350E to 400S at approximately 450E (Map 8). The anomaly is bounded at its northern extent by a regional east-west fault (Main/Joubin Fault) and may continue south of 400S as anomaly 2a (100 metre data, Map 5a).

From the 50 metre data, Anomaly 40 is subdivided as 40a(2c) and 40b(1d?).

Anomaly 40a(2c) extends from 450E, line 400S to 350E on line 150S. The conductor pinches and swells along its strike length and appears to be relatively wide on lines 400S, 200S and 150S. The data indicate an apparent westward dip of 30^0 and a relatively shallow depth of 10-20 meters, with moderate conductivity thickness of 15 mhos.

Anomaly 40a(2c) is hosted by epiclastic and chemical metasediments which have been labelled as the "Lower Cherts" and has been intersected in a number of drill holes, with the best intersection being on section 150S (hole 56-57).

It should be noted that this horizon has only been tested at depths well in excess of the depth of investigation of the HLEM survey. Thus the near surface conductivity reflected in the HLEM data is untested.

Anomaly 40b(1d?) extends from approximately 325E on line 100S to 362E on line 300N at the Joubin Fault. The anomaly is outlined as a reasonably well defined conductive zone although the observed signature at its southern extent is somewhat obscured by mutual interference from anomaly 41(2d) immediately to the west. The anomaly is best defined on lines 100N, 150N and 200N (map 8).

The data indicate a westward dip varying from 30^0 to 60^0 with a depth to the top of the conductive axis of 15 to 20 meters. Conductivity thickness products for this anomaly vary from 15 to 70 mhos at 444 Hz (Map 7).

The zone is interpreted to be located within a relatively discrete cherty horizon containing graphitic argillite. This horizon may possibly be reflecting the

Shunsby Lower Cherts (map 2) although it is more probable that it actually reflects a new underlying zone.

This zone has not been previously tested by diamond drilling.

Anomaly 41(2d) extends from approximately 225E on line 050S to approximately 150E on line 250N where it is truncated by the Main (Joubin) fault. The anomaly may extend southward from 050S to 100S where it would coalesce with anomaly 40. Although it appears to be of relatively large amplitude with a high inphase-quadrature ratio near its northern extent, no definitive anomaly parameters can be interpreted for anomaly 41(2d) due to mutual interference from anomalies 40 at its southern extent and 49 at its northern extent.

Anomaly 41(2d) has been sporadically tested by diamond drilling and is known to be reflecting the surface expression of the Lower Cherts to the south of the Joubin Fault.

Anomaly 42 has been subdivided into 42a(12) and 42b(13b). The anomaly as 42a(12) extends from approximately 050E on line 250N, where it is truncated by the Main (Joubin) Fault, to approximately 025E on line 450N. Although appearing as a northerly continuation of 42a(12), to approximately 050E on line 700N, the northern extent is designated as 42b(13b) since it is apparent (map 8) that the conductor shows characteristics which suggest that it may very possibly be a northern extension of anomaly 43(13a).

Anomaly 42a(12) is outlined as a strong conductive zone with an inphase-out of phase ratio of approximately 4:1. The electromagnetic response is affected by adjacent conductive responses such that a normal interpretation of the curves would indicate an eastward dip while geological information indicates a westward dip of approximately 30^0. Given this constraint, a depth to the body of approximately 15 m and a conductivity thickness of 30 mhos can be interpreted.

From compilation of the historical drilling data it appears that anomaly 42a(12) has not been tested. It is felt that anomaly 42a(12) is the northern extent of 40b(1d?) across the Joubin Fault.

Anomaly 42b(13b) is interpreted as the northern continuation of 42a(12) with generally a lower amplitude and a lower inphase-out of phase ratio than 42a(12).

Interpretation of the observed signatures indicates that anomaly 42b(13b) is dipping approximately 30^0 to the west with a depth to the conductive source ranging from 10-15 meters. Conductivity thickness is interpreted as 350 mhos on line 500N.

Anomaly 42b(13b) does not appear to have been adequately tested and may be a northern extension of anomaly 43a(13a) which is, in turn, reflecting the Main Zone Lower Cherts.

Anomaly 43(13a) extends from 075W on lines 300N to 075W on line 450N and represents the surface expression of the Lower Cherts within the Main Zone Anomaly 43(13a) includes the largest amplitudes recorded during the electromagnetic survey and the inphase-out of phase ratio observed is approximately 2:1 which indicates a moderate conductive body.

Interpretation of the electromagnetic response indicates that the zone is subvertical to steeply the east dipping, although interference from the adjacent feature is not conducive to a definitive interpretation. Width values range up to 15-20 m and the depth to the anomaly is interpreted as 5-10 meters with conductively thickness values up to 80 mhos.

The north portion of anomaly 43(13a) appears to coalesce with anomaly 42a(12) at 012E between line 450N and 500N. The joint anomaly continues to the north as anomaly 42b(13b) as discussed earlier.

Anomaly 44 has been outlined on lines 250N and 300N at approximately 075W and 100W respectively, approximately 25 meters due west of anomaly 43(13a). Anomaly 44 was not resolved by the original 100 meter cable electromagnetic surveying.

No anomaly parameters can be interpreted from the data due to mutual interference. On line 300N the anomaly is adjacent to high grade surface copper mineralization hosted by graphitic argillite.

The anomaly appears to be truncated by a diorite dyke to the north and by the main Joubin Fault at its southern extent. Anomaly 44 has been tested by previous diamond drilling.

Extending from 125W on line 200N to 175W on line 050N, **Anomaly 45** is a low amplitude, poorly conducting zone which was not outlined during the previous survey. This, coupled with the ill-defined response observed with the low frequency 50 m cable, indicates a poorly conductive zone.

Anomaly 46(8) exhibits a good response only on line 100N although it extends from 050N to 200N, straddling the baseline. The northern extent of the feature is truncated by the Main (Joubin) Fault whilst the southern extent appears to be truncated by an east-west trending porphyry dyke.

The anomaly is interpreted to be dipping westward at 60^0 at a depth of 12 meters, with a conductivity thickness of 110 mhos. The zone has been tested by previous diamond drilling and no further work is recommended at this time.

Anomaly 47(6) is a weakly conductive zone extending from 175E on line 200S to and 150E line and is truncated at its north extent by a porphyry dyke.

Anomaly 48(14a) is interpreted to extend from line 450N to 650N at approximately 260W. With an inphase-out of phase ratio approaching 4:1, anomaly 48(14a) is a strongly conductive zone which displays its largest amplitudes on lines 500N and 550N. Fifty m to the west, **Anomaly 55** subparallels anomaly 48(14a) and, although a much weaker zone, produces mutual interference such that definitive interpretation of the anomaly parameters for either feature are not possible.

Neither of the two features have been extensively tested save for holes 110, 109 and possibly 108 at depth. Anomaly 48(14a) is by far the strongest of the two features and from geologic mapping appears to be reflecting a Zn-beariing graphitic unit within argillites of the Upper Cherts.

Anomaly 49 extends from line 250N to line 050N and is parallel to, and located approximately 25-50 m due west of, anomaly 41(2d). Due to mutual interference it is not possible to interpret anomaly parameters.

The anomaly is believed to reflect a more conductive zone near the top of the Lower Chert horizon which also hosts anomaly 41(2d), and is in all probability mapping a graphitic or sulphide-rich section within argillite.

Anomaly 50 is located at 050E and extends from line 050N to 200N. This feature is bounded at both ends with its northern extent truncated by the Main (Joubin) Fault and its south end abutting an east-west striking porphyry dyke. Geologic information indicates that this feature is located at the base of the Upper Chert unit and is reflecting a graphitic argillite.

Anomalies 51(7) and 52 are subparallel zones extending from lines 150S to 350S. The northern extent of both features abuts an east-west striking porphyry dyke. Anomaly 51(7) displays the more pronounced response but the presence of the second feature induces a high degree of mutual interference such that it is not possible to calculate anomaly parameters for either. Neither appears to have been extensively drill tested although hole 57-64 would appear to have encountered graphitic units within metasediments which in all probability explains the conductive responses.

Anomaly 53 is a short strike length zone located parallel to and, approximately 50 meters west of, anomaly 42a(2c), extending from line 300S to 200S. Anomaly 53 is a weakly conductive zone whose signature is overwhelmed by anomaly 40a(2c) such that no anomaly parameters can be interpreted.

Anomaly 54(14b) is a short strike length feature observed on lines 650N and 600N at approximately 137W. A low amplitude zone which was not amenable to detailed interpretation, anomaly 54(14b) correlates with a magnetic feature and is interpreted to reflect discrete sulphide mineralization and/or graphitic argillite within cherts. The more conductive portions are possibly reflecting local increases in sulphide mineralization. Anomaly 54(14b) does not appear to have been previously tested.

A number of short strike length conductive features are located in the northwest corner of the detailed survey area (map 8). These features were not resolved by the 50 m cable survey, and beyond the location of their axis, cannot be interpreted to provide anomaly parameters.

10.0 DISCUSSION

The known geological and mineralogical characteristics of the Shunsby deposits are suggestive of both sedimentary exhalative (sedex) and volcanogenic massive sulphide (VMS) mineralization styles. As a continuum likely exists between the two styles, the Shunsby deposits are herein interpreted as hybrid distal volcanogenic types.

The sediments hosting the base metal mineralization are deep water, quiescent facies. To the south, the base metal content dies out in the area of 2+50S even though the associated graphitic/pyrite conductive zones continue. Concomitant with the disappearance of base metals, the lithologies exhibit a facies change to shallower water arenites and volcaniclastic units. These same sorts of relationships are inferred to the north in the area of 9+00N although our database is less complete in this area. The inference to be drawn from these observations is that the base metal mineralization is hosted within a distinct shale basin floored by a mafic volcanic/intrusive complex. This basin lies immediately off a volcanic centre located directly to the south of the property. It is further interesting to note that the variolitic basalt marker unit on the property seems largely restricted to the shale basin.

Mineralization is almost exclusively hosted by argillaceous to graphitic sediments and is predominately in the form of disseminations, fracture-fillings and matrix material; all sedex characteristics. The gross geologic setting, eg on the township scale is, however, distinctly volcanic. Metal zoning patterns are consistent with both styles of deposits.

The widespread footwall alteration indicated to be present and the specific mineralogical assemblage seen point to hydrothermal fluids as the source of the metals at Shunsby. Deposition appears to have occurred at the sediment-water interface within porous, organic material allowing reduction to occur. It is also apparent that at least four, and probably several more, "pulses" of mineralizing fluids have occurred.

To this point, little is known about the lowermost sediments marked by conductors 42a (12) and 40b(1d), however all indications thus far are that Main Zone-like, but possibly more copper-rich units are present here. The sediments are indicated to be much more steeply dipping, with at least 100 m (at surface) of intervening mafic flows and coarse-grained rocks between these and the Lower Cherts.

The presence of the cherty slump breccia within the upper cherts may be significant in that it, as well as a variety of soft sediment deformation features seen in the Upper Cherts, suggests extensive gravity-induced flowage. In some VMS settings, Cu-rich massive sulphides will be found on paleotopographic high areas near discharge conduits, and Cu-poor deposits downslope. In this regard, the relative location and direction of this slumpage on the Shunsby property becomes critical.

The presence of massive sulphide mineralization, and its apparent continuity and increase in grade at depth (ie Section 3+00N, Appendix 1) is considered to be highly significant. As well, the strong alteration seen beneath the mineralization within hole 64-82e, and the increased amount of intercalated volcanics within the Lower Cherts here, all suggest increasing proximity to a major volcanic vent and/or exhalative centre. This has the implication of pointing to what may be significant down-dip potential for larger, more massive (and higher grade) deposits.

11.0 CONCLUSIONS AND RECOMMENDATIONS

The results of all work on the Shunsby property to date have demonstrated considerable potential for the definition of an economic base metal deposit. In particular we conclude that:

(a) EM conductors 40b(1d) and 42a(12) located peripheral to and stratigraphically beneath the known deposits seem with certainty to be the source of the Cu-rich glacial dispersion train in the eastern portion of the property. Values to 7.04% Cu and 4.15% Zn were obtained from overburden trenches at 5+00S in 1989 while trenching efforts over the above conductors this past summer obtained values to 11.13% Cu and 3.56% Zn from highly mineralized argillaceous chert debris at the bottom of the trenches. It is felt that we were extremely close to bedrock with these trenches. There are also short-strike length conductive features 16 and 28 to be tested as well in this portion of the property.

(b) There would appear to be sufficient room to substantially expand the known reserves in the up-dip, near surface portion of the Lower Cherts south of the Joubin Fault and both the Lower and Upper Cherts north of the fault such that, in conjunction with (a) an open pit operation might be viable. Conductors 48(14a) and 42b(13b)/56(13c) would appear to be mapping the mineralized Upper and Lower Chert stratigraphy respectively.

(c) The down-dip potential for a large massive sulphide deposit of VMS character within the known mineralized stratigraphy is perhaps the most intriguing aspect of the property. Chemical and petrological work suggest intense hydrothermal alteration of a style similar to that at Mattabi in the footwall rocks beneath the deepest, and in the most copper-rich hole on the property, no. 64-82e. Metal ratios as well as significantly greater volcanic content within the Lower Cherts, imply closer proximity to a volcanic vent and/or exhalative centre with increasing depth.

(d) The western sedimentary units, which host two small Zn-Cu-Pb deposits on adjoining properties, are known to be base metal-bearing on the present property and have only been superficially tested. This stratigraphic package includes several strong EM conductors not previously tested (18c, 19b, 20) as well as a major oxide iron formation unit. We recognize that the shallow west dips quickly take these units off the property but the intent again would be to establish open pit potential.

Geologically, our detailed work has demonstrated the stratiform, relatively continuous nature of the mineralization, and the simplicity of the gross stratigraphic picture. All indications are that neither cross-structures nor the "Digestive Diorite" are serious disruptive features.

It is recommended that a program of diamond drilling plus surface stripping be instigated to continue the comprehensive evaluation of the Shunsby property

The surface work should be a continuation of that carried out in 1990 with efforts concentrated in the following areas:

(a) south of the existing stripping on line 1+00S in the South Zone to try and extend the known mineralization here to the south

(b) on either side and to the west of the present trench on line 1+00N to try and locate at surface the mineralization known to be in this area from drill results

(c) on the extensive swarm of geophysical conductors including 48(14a), 54(14b), 55 and 56 in the upper cherts of the Main Zone. This area is known to be Zn-bearing but has only been superficially investigated

(d) in the west portion of the property on conductor 18c, 19b, 20 etc.

Also, the existing trenches in the area of line 1+00S and line 3+00N should be properly blasted and re-sampled in the course of the above.

This first phase of diamond drilling should be directed towards the following targets:

(a) testing of the up-dip portion of the lower cherts in the Main Zone as marked by EM conductors 40a(2c), 41(2d) and 49 from the Joubin Fault to line 3+00S (1500 m of drilling)

(b) testing of EM targets 40b(1d), 42a(12), 28, 16, 42b(13b), 13c and 14d (1000 m of drilling)

(c) deep drill testing of the area down-dip from the Main and South Zones; four 400 m holes should be drilled on lines 5+00N, 3+00N, 1+00N and 1+00S at 7+00W. A contingency allowance of an additional 1400 m should be made available for two more deeper tests based on the results of the foregoing for a total of 3000 m.

This work is budgeted as follows:

Diamond Drilling - BQ	
5500 m @ $75/m all inclusive	$412,500
Stripping, trenching sampling	

2 months @ $50,000/mo all inclusive	$100,000
Reporting, drafting, re-calculation of mineral inventories, engineering	$ 25,000
	$537,500
Contingency @ 15%	80,000
GRAND TOTAL APPROXIMATELY	$620,000

This phase of exploration is highly critical, and will determine whether further expenditures are warranted on the Shunsby Property.

Respectfully submitted,

Paul Sobie

P.A. Sobie, B.Sc.
MPH CONSULTING LIMITED

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APPENDIX 2 - ANALYTICAL RESULTS

14 VARIABLES

```
HOLE       C  8  0
[illegible]SAMPLEC 11  0
FROM       N  8  2
TO         N  8  2
WIDTH      N  6  2
CU(%)      N  6  2
ZN(%)      N  6  2
PB(%)      N  6  2
AVE CU(%)  N  9  2
AVE ZN(%)  N  9  2
AG(PPM)    N  8  2
AU(PPB)    N  8  3
CHKCU(%)   N  8  2
CHKZN(%)   N  8  2
```

55-03		0.00	2.43	2.43	0.00	0.00							
55-03	55-03-01	2.43	5.09	2.66	0.90	1.18				1.90	26.000		
55-03		5.09	7.64	2.55	0.00	0.00							
55-03	55-03-02	7.64	10.24	2.60	2.59	2.72		1.04	1.75	1.10	7.000	0.40	1.53
55-03	55-03-02	10.24	11.75	1.49	0.10	0.66		1.04	1.75	1.10	7.000	0.40	1.53
55-03	55-03-03	11.75	14.63	2.90	0.10	0.20				0.30	NIL		
55-03		14.63	33.99	19.36	0.00	0.00							
55-03	55-03-05	33.99	35.10	1.11	1.00	0.52				3.60	NIL	0.74	0.55
55-03		35.10	38.71	3.61	0.00	0.00							
55-03	55-03-04	38.71	40.35	1.64	0.21	0.85				1.20	NIL	0.15	0.65
55-03		40.35	46.33	5.98	0.00	0.00							
55-03	55-03-06	46.33	48.13	1.80	0.01	0.19		0.01	0.27	0.20	3.000	tr	0.21
55-03	55-03-06	48.13	49.97	1.86	0.01	0.47		0.01	0.27	0.20	3.000	tr	0.21
55-03		49.97	67.03	17.07	0.00	0.00							
55-04		0.00	3.67	3.66	0.00	0.00							
55-04	55-04-01	3.67	5.28	1.62	0.25	3.17	1.23	0.52	4.69	2.70	28.000	0.25	3.17
55-04	55-04-01	5.28	7.12	1.85	1.25	8.88	1.23	0.52	4.69	2.70	28.000	0.25	3.17
55-04	55-04-02	7.12	9.45	2.32	0.14	1.66	0.34			1.50	7.000		
55-04		9.45	10.07	0.61	0.00	0.00							
55-04	55-04-03	10.07	14.01	3.96	0.03	0.09	0.03			0.40	7.000		
55-04	55-04-04	14.01	19.82	5.79	0.07	0.13	0.02			0.60	24.000		
55-04	55-04-05	19.82	21.33	1.53	0.49	0.52	0.00						
55-04	55-04-05	21.33	23.16	1.83	0.20	0.24							
55-04	55-04-05	23.16	26.21	3.04	0.11	0.05							
55-04	55-04-05	26.21	27.72	1.53	0.57	0.42							
55-04	55-04-06	27.72	31.99	4.26	0.06	1.30	0.41			0.70	14.000		
55-04		31.99	91.11	59.14	0.00	0.00							
56-05		0.00	1.84	1.83	0.00	0.00							
56-05	55-05-01	1.84	4.89	3.05	0.03	0.25				0.50	NIL		
56-05	55-05-02	4.89	6.66	1.77	0.20	1.22		0.12	1.22	0.80	8.000	0.04	1.22
56-05		6.66	7.71	1.06	0.00	0.00							
56-05	55-05-03	7.71	10.37	2.65	0.02	0.39				0.20	27.000		
56-05		10.37	14.27	3.91	0.00	0.00							
56-05	55-05-04	14.27	16.77	2.49	0.34	0.97				0.50	17.000	0.07	
56-05		16.77	20.41	3.66	0.00	0.00							
56-05	55-05-05	20.41	22.83	2.44	0.01	0.23				0.20	NIL		
56-05	55-05-06	22.83	25.23	2.38	0.13	0.35				0.50	NIL		
56-05	55-05-07	25.23	26.48	1.24	0.88	0.14		1.40	0.14	1.30	14.000	1.13	0.14
56-05	55-05-07	26.48	27.76	1.28	3.53	0.14		1.40	0.14	1.30	14.000	1.13	0.14
56-05	55-05-07	27.76	29.07	1.31	3.23	0.14		1.40	0.14	1.30	14.000	1.13	0.14
56-05	55-05-07	29.07	31.36	2.32	0.17	0.14		1.40	0.14	1.30	14.000	1.13	0.14
56-05		31.36	45.11	13.72	0.00	0.00							
56-05	55-05-08	45.11	47.67	2.56	0.34	0.01		0.39	0.01	0.70	7.000	0.22	0.01
56-05	55-05-08	47.67	50.26	2.59	0.78	0.01		0.39	0.01	0.70	7.000	0.22	0.01

56-05	55-05-09	50.26	50.69	0.43	0.31	0.09	0.80	0.09	1.10	21.000	0.48	0.09
56-05	55-05-09	50.69	52.30	1.61	2.50	0.09	0.80	0.09	1.10	21.000	0.48	0.09
56-05	55-05-09	52.30	54.13	1.86	0.12	0.09	0.80	0.09	1.10	21.000	0.48	0.09
[illegible]		54.13	62.17	8.02	0.00	0.00						
56-06		0.00	3.05	3.05	0.00	0.00						
56-06	55-06-01	3.05	9.15	6.09	0.05	0.79			0.60	3.000		
56-06	55-06-02	9.15	14.63	5.49	0.04	0.17			0.30	NIL		
56-06	55-06-03	14.63	16.90	2.27	2.59	0.21	0.97	0.31	3.20	64.000	0.99	0.21
56-06	55-06-03	16.90	18.64	1.74	0.11	0.94	0.97	0.31	3.20	64.000	0.99	0.21
56-06	55-06-03	18.64	21.00	2.36	0.00	0.21	0.97	0.31	3.20	64.000	0.99	0.21
56-06		21.00	36.75	15.76	0.00	0.00						
56-06		36.75	38.32	1.56	0.00	0.01						
56-06		38.32	59.42	21.12	0.00	0.00						
56-07		0.00	50.16	50.16	0.00	0.00						
56-07		50.16	52.76	2.60	0.01	0.00						
56-07		52.76	99.64	46.91	0.00	0.00						
56-08		0.00	0.92	0.91	0.00	0.00						
56-08	56-08-01	0.92	3.54	2.63	0.16	3.52						
56-08	56-08-01	3.54	6.36	2.82	0.51	3.60						
56-08	56-08-01	6.36	7.61	1.26	1.87	17.01						
56-08		7.61	129.20	121.60	0.00	0.00						
56-09		0.00	1.84	1.83	0.00	0.00						
56-09	56-09-01	1.84	5.48	3.66	0.13	0.25			0.90	14.000		
56-09	56-09-02	5.48	9.74	4.26	0.03	0.05			0.30	NIL		
56-09		9.74	12.80	3.05	0.00	0.00						
56-09	56-09-04	12.80	15.06	2.26	1.33	1.08						
56-09		15.06	17.98	2.92	0.00	0.00						
56-09	56-09-05	17.98	19.82	1.84	0.05	0.66	0.04	0.63	0.60	3.000	0.02	0.60
56-09		19.82	24.31	4.49	0.00	0.00						
56-09	56-09-06	24.31	27.30	3.00	0.61	0.04						
56-09		27.30	45.73	18.42	0.00	0.00						
56-09	56-09-07	45.73	48.13	2.40	0.10	0.00						
56-09		48.13	86.19	38.09	0.00	0.00						
56-09	56-09-08	86.19	88.39	2.17	0.46	0.28						
56-09		88.39	129.20	40.85	0.00	0.00						
56-10		0.00	48.16	48.16	0.00	0.00						
56-11		0.00	17.68	17.68	0.00	0.00						
56-11	56-11-01	17.68	20.11	2.44	0.01	0.01			0.10	NIL		
56-11	56-11-02	20.11	21.62	1.52	0.30	0.52						
56-11		21.62	22.54	0.91	0.00	0.00						
56-11	56-11-03	22.54	25.59	3.05	0.08	0.47				20.000		
56-11	56-11-03	25.59	28.35	2.75	0.08	0.28				20.000		
56-11		28.35	29.86	1.52	0.00	0.00						
56-11	56-11-04	29.86	32.32	2.44	0.05	1.50						
56-11	56-11-05	32.32	35.66	3.35	0.02	0.22			0.40	7.000		
56-11	56-11-06	35.66	39.01	3.35	tr	0.05			0.20	NIL		
56-11		39.01	40.52	1.53	0.00	0.00						
56-11	56-11-07	40.52	42.65	2.13	1.02	0.14						
56-11	56-11-07	42.65	45.70	3.05	0.23	0.28						
56-11	56-11-07	45.70	47.54	1.83	0.08	0.33						
56-11		47.54	58.20	10.67	0.00	0.00						
56-12		0.00	4.27	4.27	0.00	0.00						
56-12	56-12-01	4.27	6.10	1.83	0.01	0.99						
56-12	56-12-01	6.10	7.61	1.52	0.01	0.19						
56-12	56-12-01	7.61	9.15	1.52	0.20	2.82						
56-12	56-12-01	9.15	10.66	1.53	0.01	1.12						
56-12	56-12-01	10.66	13.71	3.05	0.00	0.01						
56-12	56-12-02	13.71	17.06	3.35	0.01	0.08			0.30	NIL		
56-12	56-12-03	17.06	20.11	3.05	0.05	0.51			1.40	30.000		
56-12	56-12-04	20.11	23.16	3.04	0.01	0.05			0.10	7.000		

56-12	56-12-05	23.16	25.89	2.75	0.01	0.01	0.10	NIL
56-12	56-12-06	25.89	28.64	2.74	0.01	0.01	0.10	NIL
56-12	56-12-07	28.64	31.36	2.74	0.01	0.06	0.10	7.000
56-12	56-12-08	31.36	34.12	2.75	0.03	0.11	0.20	NIL
56-12	56-12-09	34.12	37.17	3.05	0.02	0.07	0.10	NIL
56-12	56-12-10	37.17	40.22	3.04	0.15	0.11	0.90	7.000
56-12	56-12-11	40.22	42.29	2.06	0.10	0.73	0.60	NIL
56-12	56-12-12	42.29	43.86	1.60	0.91	0.01		
56-12		43.86	56.07	12.19	0.00	0.00		
56-13		0.00	3.64	3.65	0.00	0.00		
56-13	56-13-01	3.64	6.00	2.36	0.10	0.85	1.20	NIL
56-13	56-13-02	6.00	9.15	3.13	0.01	0.32	0.50	NIL
56-13	56-13-03	9.15	12.20	3.05	0.02	0.34	0.40	NIL
56-13	56-13-04	12.20	14.93	2.75	0.06	0.19	1.20	12.000
56-13		14.93	26.80	11.86	0.00	0.00		
56-14		0.00	1.21	1.22	0.00	0.00		
56-14	56-14-01	1.21	2.76	1.52	0.15	0.84		
56-14	56-14-01	2.76	4.30	1.56	3.82	1.78		
56-14	56-14-01	4.30	5.77	1.49	1.99	0.66		
56-14	56-14-01	5.77	7.32	1.53	1.53	1.83		
56-14	56-14-01	7.32	8.83	1.52	4.28	0.80		
56-14	56-14-01	8.83	10.37	1.52	6.53	0.28		
56-14	56-14-01	10.37	11.29	0.92	0.87	0.04		
56-14	56-14-01	11.29	12.20	0.91	1.27	1.55		
56-14	56-14-02	12.20	16.14	3.96	0.06	0.07	0.40	NIL
56-14	56-14-03	16.14	19.19	3.05	0.16	0.32	0.90	NIL
56-14	56-14-04	19.19	22.24	3.05	0.09	0.06	0.40	NIL
56-14	56-14-05	22.24	25.30	3.05	0.05	0.21	0.30	NIL
56-14	56-14-06	25.30	28.35	3.05	0.06	0.30	0.30	3.000
56-14	56-14-07	28.35	32.32	3.96	0.11	0.03	0.60	NIL
56-15		0.00	0.62	0.61	0.00	0.00		
56-15	56-15-01	0.62	4.49	3.90	0.06	0.70	0.40	7.000
56-15		4.49	11.29	6.77	0.00	0.00		
56-15	56-15-02	11.29	12.20	0.91	7.40	0.70		
56-15	56-15-02	12.20	14.63	2.44		0.00		
56-15		14.63	19.19	4.57	0.00	0.00		
56-16		0.00	0.85	0.85	0.00	0.00		
56-16	56-16-01	0.85	3.05	2.20	0.01	0.03	0.10	NIL
56-16	56-16-02	3.05	6.10	3.05	0.01	0.19	0.20	NIL
56-16	56-16-03	6.10	9.15	3.04	0.01	0.17	0.50	NIL
56-16	56-16-04	9.15	12.20	3.05	0.02	0.10	0.20	3.000
56-16	56-16-05	12.20	14.73	2.54	0.06	0.27	0.30	NIL
56-16	56-16-06	14.73	16.14	1.41	3.26	0.01		
56-16	56-16-06	16.14	17.65	1.51	1.02	0.56		
56-16	56-16-06	17.65	19.16	1.51	0.56	0.38		
56-16	56-16-07	19.16	21.75	2.59	0.06	0.06	0.30	NIL
56-16	56-16-08	21.75	24.21	2.46	0.25	0.19		
56-16	56-16-09	24.21	26.71	2.52	0.05	0.21	0.30	NIL
56-16		26.71	37.47	10.76	0.00	0.00		
56-17		0.00	3.72	17.22	0.00	0.00		
56-17	56-17-01	3.72	6.10					
56-17	56-17-02	6.10	9.14					
56-17	56-17-03	9.14	12.19					
56-17	56-17-04	12.19	15.24					
56-17	56-17-05	15.24	17.22					
56-17	56-17-06	17.22	19.03	1.83	0.35	1.50		
56-17	56-17-06	19.03	21.95	2.90	0.31	2.73		
56-17	56-17-06	21.95	23.16	1.22	0.76	2.73		
56-17	56-17-06	23.16	24.34	1.18	0.05	0.38		
56-17	56-17-07	24.34	29.86	5.52	0.00	0.00		

56-17	56-17-08	29.86	31.36	1.52	0.15	0.00					
56-17	56-17-08	31.36	32.32	0.92	0.51	1.60					
56-17	56-17-08	32.32	33.20	0.91	1.63	0.00					
[illegible]	56-17-08	33.20	35.04	1.83	1.63	0.35					
56-17	56-17-08	35.04	36.88	1.83	2.19	0.80					
56-17	56-17-08	36.88	38.71	1.83	1.07	0.56					
56-17	56-17-08	38.71	40.52	1.83	3.47	1.17					
56-17		40.52	44.95	4.42	0.00	0.00					
56-17	56-17-09	44.95	46.00	1.06	3.31	0.08	0.02	2.68			2.04
56-17		46.00	50.72	4.70	0.00	0.00					
56-17	56-17-10	50.72	51.77	1.05	3.16	0.30	0.02	1.70			1.53
56-17	56-17-10	51.77	52.85	1.08	0.20	0.30	0.02	1.70			1.53
56-17	56-17-10	52.85	54.07	1.22	2.24	0.30	0.02	1.70			1.53
56-17		54.07	74.67	20.61	0.00	0.00					
56-18		0.00	1.84	1.83	0.00	0.00					
56-18	56-18-01	1.84	4.86	3.04	0.02	0.12			0.40	41.000	
56-18	56-18-02	4.86	7.94	3.06	0.01	0.18			0.20	NIL	
56-18		7.94	24.11	16.18	0.00	0.00					
56-18	56-18-03	24.11	27.00	2.89	tr	0.00					
56-18	56-18-03	27.00	27.13	0.13	0.00	0.00					
56-18	56-18-03	27.13	29.72	2.59	tr	0.00					
56-18		29.72	33.27	3.55	0.00	0.00					
56-18	56-18-04	33.27	35.10	1.83	tr	0.00					
56-18		35.10	46.62	11.53	0.00	0.00					
56-19		0.00	20.14	20.14	0.00	0.00					
56-19	56-19-01	20.14	21.62	1.48	0.15	0.00					
56-19		21.62	26.51	4.90	0.00	0.00					
56-20		0.00	14.63	14.63	0.00	0.00					
56-20	56-20-02	14.63	15.65	1.03	0.30	0.00					
56-20		15.65	21.33	5.68	0.00	0.00					
56-20	56-20-01	21.33	24.84	3.50	0.03	0.11			0.30	NIL	
56-20	56-20-03	24.84	26.05	1.22	1.17	1.82					
56-20		26.05	30.77	4.71	0.00	0.00					
56-20	56-20-04	30.77	32.61	1.84	0.51	0.65					
56-20	56-20-04	32.61	34.74	2.14	0.30	0.00					
56-20	56-20-04	34.74	35.66	0.91	1.37	1.96					
56-20	56-20-04	35.66	36.78	1.13	0.10	0.00					
56-20	56-20-05	36.78	37.99	1.22	5.10	0.70					
56-20		37.99	41.90	3.90	0.00	0.00					
56-20	56-20-06	41.90	44.19	2.28	0.46	0.00					
56-20	56-20-07	44.19	47.54	3.36	0.86	7.53					
56-20		47.54	226.12	178.60	0.00	0.00					
56-21		0.00	10.66	10.67	0.00	0.00					
56-21	56-21-03	10.66	12.80	2.13	0.92	1.63					
56-21	56-21-03	12.80	14.01	1.22	0.15	0.18					
56-21	56-21-04	14.01	16.01	1.98	2.60	0.70					
56-21	56-21-05	16.01	18.08	2.08	0.87	0.51					
56-21		18.08	20.87	2.80	0.00	0.00					
56-21	56-21-06	20.87	24.21	3.35	0.36	0.65					
56-21	56-21-06	24.21	25.75	1.53	0.15	0.70					
56-21	56-21-07	25.75	28.05	2.29	2.96	0.60					
56-21	56-21-08	28.05	29.56	1.52	0.46	0.47					
56-21	56-21-08	29.56	31.07	1.52	0.87	0.75					
56-21	56-21-08	31.07	32.74	1.65	0.46	0.23					
56-21	56-21-09	32.74	33.92	1.21	1.12	0.23					
56-21	56-21-09	33.92	36.25	2.32	0.51	2.29					
56-21	56-21-10	36.25	38.81	2.56	0.66	2.71					
56-21	56-21-11	38.81	41.90	3.06	2.24	1.49					
56-21	56-21-12	41.90	42.85	0.97	1.43	1.73					
56-21	56-21-12	42.85	44.88	2.04	0.56	0.98					

56-21	56-21-01	44.88	47.90	3.01	0.02	1.17	0.14	0.30	10.000
56-21	56-21-13	47.90	48.65	0.77	2.40	6.45			
[illegible]	56-21-14	48.65	50.13	1.46	0.20	0.47			
[illegible]	56-21-14	50.13	51.80	1.68	1.58	1.26			
56-21	56-21-15	51.80	54.86	3.04	1.17	0.65			
56-21	56-21-15	54.86	56.36	1.53	1.22	0.56			
56-21	56-21-02	56.36	58.50	2.13	0.30	0.22		0.40	7.000
56-21		58.50	63.09	4.57	0.00	0.00			
56-22		0.00	7.94	7.93	0.00	0.00			
56-22		7.94	10.96	3.04	0.10	0.89			
56-22		10.96	12.20	1.22	0.25	1.32			
56-22		12.20	13.42	1.22	0.00	0.00			
56-22	56-22-01	13.42	14.47	1.07	0.41	1.30			
56-22		14.47	16.60	2.13	0.00	0.00			
56-22	56-22-02	16.60	18.77	2.14	0.05	0.00			
56-22	56-22-02	18.77	21.16	2.43	0.02	1.93			
56-22		21.16	27.72	6.56	0.00	0.00			
56-22	56-22-03	27.72	30.09	2.34	0.20	0.91			
56-22	56-22-03	30.09	31.69	1.62	0.02	0.01			
56-22	56-22-04	31.69	33.99	2.29	0.07	0.01			
56-22	56-22-04	33.99	35.66	1.67	0.46	0.71			
56-22	56-22-04	35.66	36.25	0.61	0.46	0.00			
56-22	56-22-05	36.25	37.17	0.92	2.85	0.01			
56-22	56-22-06	37.17	38.45	1.28	0.07	0.01			
56-22	56-22-06	38.45	39.60	1.15	1.28	0.01			
56-22	56-22-07	39.60	40.42	0.80	10.40	0.01			
56-22		40.42	51.97	11.55	0.00	0.00			
56-22		51.97	52.56	0.61	0.05	0.00			
56-22		52.56	55.61	3.05	0.00	0.00			
56-22		55.61	56.23	0.61	0.15	0.00			
56-22		56.23	62.76	6.55	0.00	0.00			
56-22	56-22-08	62.76	63.98	1.22	0.30	1.17			
56-22	56-22-09	63.98	65.22	1.22	0.02	0.25			
56-22	56-22-09	65.22	67.36	2.13	0.03	0.25			
56-22	56-22-10	67.36	68.27	0.92	0.35	2.04			
56-22	56-22-11	68.27	70.08	1.82	0.05	0.28			
56-22		70.08	73.43	3.36	0.02	0.15			
56-22		73.43	124.34	50.90	0.00	0.00			
56-23		0.00	22.57	22.56	0.00	0.00			
56-23	56-23-01	22.57	24.38	1.82	0.05	0.00			
56-23		24.38	85.33	60.96	0.00	0.00			
56-24		0.00	55.15	55.17	0.00	0.00			
56-25		0.00	40.81	40.34	0.00	0.00			
56-25	D12-168	40.81	43.14	2.32	0.03	0.17		1.00	22.000
56-25	56-25-01	43.14	44.65	1.49	0.77	0.66			
56-25	56-25-01	44.65	46.42	1.77	0.41	1.58			
56-25	56-25-01	46.42	49.05	2.65	0.51	0.77			
56-25	56-25-02	49.05	50.59	1.53	0.92	0.51			
56-25	56-25-02	50.59	52.43	1.83	0.20	0.05			
56-25	56-25-03	52.43	53.94	1.52	1.89	3.67			
56-25	56-25-04	53.94	55.77	1.83	0.46	0.05			
56-25	56-25-04	55.77	57.28	1.52	0.77	1.02			
56-25	56-25-04	57.28	57.87	0.61	0.20	0.07			
56-25	56-25-05	57.87	59.12	1.22	0.26	1.27			
56-25	56-25-05	59.12	61.25	2.14	0.46	1.53			
56-25	56-25-06	61.25	62.93	1.67	2.75	0.89			
56-25	56-25-07	62.93	64.60	1.68	0.41	1.48			
56-25		64.60	94.46	29.87	0.00	0.00			
56-26		0.00	12.20	12.19	0.00	0.00			
56-26	56-26-01	12.20	14.34	2.14	1.43	0.51			

56-26	56-26-01	14.34	16.47	2.13	2.09	0.30		
56-26	56-26-01	16.47	18.60	2.13	1.53	0.91		
56-26	56-26-02	18.60	20.11	1.53	0.46	1.22		
56-26	56-26-02	20.11	21.62	1.52	1.32	0.86		
56-26	56-26-03	21.62	24.97	3.35	0.05	0.15		
56-26	56-26-03	24.97	28.64	3.66	0.25	0.46		
56-26	56-26-04	28.64	30.77	2.13	10.45	0.51		
56-26	56-26-04	30.77	33.53	2.75	1.02	0.10		
56-26	56-26-05	33.53	36.58	3.05	0.45	0.40		
56-26	56-26-05	11.15	12.07	3.04	0.81	1.47		
56-26		12.07	17.83	18.90	0.00	0.00		
56-26		17.83	18.68	2.74	0.09	0.00		
56-26		18.67	23.96	17.38	0.00	0.00		
56-27		0.00	0.85	2.74	0.00	0.00		
56-27	56-27-01	0.84	1.77	3.05	0.06	0.44	0.50	NIL
56-27	56-27-02	1.76	2.68	3.05	0.02	0.18	0.20	NIL
56-27	56-27-03	2.69	3.81	3.66	0.01	0.02	0.20	NIL
56-27	56-27-04	3.81	4.27	1.52	0.61	3.11		
56-27	56-27-05	4.27	4.72	1.53	0.82	1.02		
56-27	56-27-05	4.74	5.21	1.52	0.41	1.27		
56-27		5.20	11.34	20.12	0.00	0.00		
56-27	56-27-06	11.33	11.80	1.52	0.77	3.26		
56-27	56-27-07	11.80	12.74	3.05	0.15	0.41		
56-27	56-27-07	12.73	13.29	1.83	0.92	0.66		
56-27		13.28	14.84	5.18	0.00	0.00		
56-27	56-27-08	14.86	15.88	3.35	1.63	0.81		
56-27	56-27-09	15.88	17.01	3.66	0.51	0.55		
56-27		17.00	24.14	23.47	0.00	0.00		
56-28		0.00	16.61	54.55	0.00	0.00		
56-28	56-28-01	16.62	17.47	2.75	0.08	0.30	1.20	48.000
56-28	56-28-02	17.46	18.38	3.05	0.21	0.76		
56-28	56-28-02	18.39	19.32	3.05	0.46	0.61		
56-28	56-28-03	19.32	20.24	3.05	0.31	0.56		
56-28	56-28-03	20.25	21.18	3.04	0.20	0.15		
56-28	56-28-04	21.17	22.10	3.05	0.10	0.00		
56-28		22.10	28.41	20.73	0.00	0.00		
56-29		0.00	1.49	4.88	0.00	0.00		
56-29		1.49	2.13	2.13	0.05	0.01		
56-29		2.14	4.94	9.14	0.00	0.00		
56-29		4.92	5.39	1.53	0.02	0.01		
56-29		5.39	22.37	55.77	0.00	0.00		
56-29		22.38	22.77	1.23	0.04	0.01		
56-29		22.76	24.35	5.18	0.00	0.00		
56-29		24.34	24.72	1.22	0.01	0.86		
56-29		24.71	27.13	7.92	0.00	0.00		
56-30		0.00	16.73	54.86	0.00	0.00		
56-31		0.00	0.73	2.44	0.00	0.00		
56-31	56-31-01	0.74	1.40	2.13	0.09	0.71	0.50	236.000
56-31		1.39	1.86	1.53	0.00	0.00		
56-31	56-31-02	1.86	2.77	3.04	0.22	1.29	1.50	27.000
56-31	56-31-03	2.79	3.54	2.44	0.01	0.04	0.10	3.000
56-31		3.53	6.95	11.28	0.00	0.00		
56-31	56-31-04	6.96	7.89	3.05	0.01	0.46		
56-31		7.89	13.84	19.51	0.00	0.00		
56-32		0.00	10.88	35.66	0.00	0.00		
56-32	56-32-01	10.87	11.52	2.14	0.10	0.92		
56-32		11.52	20.91	30.78	0.00	0.00		
56-32	56-32-02	20.90	21.64	2.44	tr	0.41		
56-32	56-32-03	21.64	22.49	2.74	0.13	4.49		
56-32		22.48	23.41	3.05				

56-32		23.41	27.95	14.93	0.00	0.00			
56-33		0.00	1.86	6.10	0.00	0.00			
56-33	56-33-01	1.86	2.77	3.04	1.02	0.76			
56-33	56-33-01	2.79	3.72	3.05	0.97	0.56			
56-33	56-33-02	3.72	4.66	3.05	0.86	0.56			
56-33	56-33-03	4.65	5.58	3.05	2.80	0.76			
56-33	56-33-04	5.57	6.13	1.83	4.38	0.51			
56-33	56-33-05	6.13	6.68	1.83	3.26	7.80			
56-33	56-33-06	6.69	7.89	3.96	0.25	1.94			
56-33		7.89	11.43	11.58	0.00	0.00			
56-34		0.00	8.08	26.52	0.00	0.00			
56-34	56-34-01	8.08	9.02	3.04	tr	0.07			
56-34		9.01	13.93	16.16	0.00	0.00			
56-34	56-34-05	13.93	14.84	3.05	0.02	0.02	tr		
56-34	56-34-06	14.86	15.79	3.05	0.02	0.09	0.03		
56-34	56-34-07	15.79	17.10	4.26	0.01	0.05	0.01		
56-34	56-34-02	17.09	18.01	3.05	0.06	0.16	0.01		
56-34		18.02	20.91	9.45	0.00	0.00			
56-34	56-34-03	20.90	21.82	3.05	0.01	0.07			
56-34		21.83	22.77	3.05	0.00	0.00			
56-34	56-34-04	22.76	23.68	3.04	tr	0.03			
56-34		23.68	27.40	12.20	0.00	0.00			
56-35		0.00	1.04	3.35	0.00	0.00			
56-35	56-35-04	1.02	1.95	3.05	3.98	2.70			
56-35	56-35-04	1.95	2.87	3.05	1.73	0.46			
56-35	56-35-01	2.88	3.81	3.05	0.51	0.47		2.00	3.000
56-35	56-35-02	3.81	4.72	3.05	0.18	0.75		0.90	NIL
56-35	56-35-03	4.74	5.76	3.35	0.08	0.28		0.40	14.000
56-35	56-35-05	5.76	6.68	3.05	0.46	3.87			
56-35		6.69	7.62	3.04	0.30	0.56			
56-35		7.61	8.93	4.27	0.00	0.00			
56-36		0.00	1.22	3.96	0.00	0.00			
56-36	56-36-01	1.21	1.36	2.14	1.02	5.46			
56-36	56-36-02	1.86	2.77	3.04	2.35	6.48			
56-36	56-36-03	2.79	3.72	3.05	1.68	4.44			
56-36	56-36-04	3.72	4.08	1.22	0.97	0.92			
56-36	56-36-05	4.09	4.54	1.53	0.01	0.50			
56-36		4.55	12.98	27.73	0.00	0.00			
56-37		0.00	6.49	21.34	0.00	0.00			
56-37	56-37-01	6.50	7.44	3.04	tr	0.01		0.40	NIL
56-37		7.43	11.03	11.89	0.00	0.00			
56-37		11.05	11.43	1.22	0.04	0.01			
56-37		11.42	21.09	31.70	0.00	0.00			
56-37	56-37-02	21.08	22.19	3.66	0.10	0.28		1.80	10.000
56-37		22.20	26.09	12.80	0.00	0.00			
56-37	56-37-03	26.10	27.04	3.05	tr	0.01		0.30	NIL
56-37	56-37-04	27.03	27.58	1.83	tr	0.12		0.10	3.000
56-37	56-37-06	27.59	28.29	2.28	0.36	2.17			
56-37		28.28	28.71	1.37	0.00	0.00			
56-37	56-37-05	28.70	29.72	3.36	0.02	0.10		0.50	14.000
56-37		29.72	32.31	8.53	0.00	0.00			
56-38		0.00	3.54	11.58	0.00	0.00			
56-38		3.53	3.99	1.53	0.00	0.00			
56-38		4.00	5.85	6.09	0.00	0.00			
56-38	56-38-03	5.85	6.31	1.53	0.50	2.85			
56-38		6.32	15.79	31.09	0.00	0.00			
56-38	56-38-05	15.79	16.25	1.52	0.00	1.37			
56-38	56-38-01	16.25	17.19	3.05	0.01	0.93	0.26	0.60	NIL
56-38		17.18	18.56	4.57	0.00	0.00			
56-38	56-38-02	18.57	19.60	3.35	0.11	0.64	0.24	1.00	24.000

56-38		19.60	19.75	0.46	0.00	0.00			
56-38	56-38-04	19.74	20.42	2.29	1.07	1.58			
56-38	56-38-04	20.43	20.91	1.52	0.71	1.58			
56-38		20.90	21.82	3.05	0.07	0.00			
56-38		21.83	26.46	15.24	0.00	0.00			
56-39		0.00	15.79	51.82	0.00	0.00			
56-39	56-39-01	15.79	16.34	1.83	0.41	3.41			
56-39		16.35	17.28	3.04	0.00	0.00			
56-40		0.00	4.54	14.94	0.00	0.00			
56-40	56-40-03	4.55	5.49	3.04	0.05	1.48			
56-40	56-40-01	5.48	6.40	3.05	0.01	0.38	0.13	0.60	NIL
56-40	56-40-02	6.41	7.35	3.05	0.01	0.61	0.26	1.20	48.000
56-40		7.34	10.88	11.58	0.00	0.00			
56-41		0.00	16.73	54.86	0.00	0.00			
56-42		0.00	4.94	16.15	0.00	0.00			
56-42	56-42-01	4.92	5.85	3.05	0.02	0.24		0.60	14.000
56-42	56-42-02	5.85	6.89	3.36	0.02	1.12			
56-42		6.88	13.47	21.64	0.00	0.00			
56-43		0.00	3.72	15.24	0.00	0.00			
56-43	D12-151	3.72	4.66						
56-43	D12-152	4.65	5.58	3.05	0.35	0.76		1.60	10.000
56-43	D12-153	5.57	6.49	3.05	0.04	0.07		0.30	NIL
56-43		6.50	6.92	1.37	0.81	0.76			
56-43	D12-154	6.92	7.71	2.59	0.02	0.20		0.30	NIL
56-43	56-43-01	7.71	8.35	2.13	1.02	0.30			
56-43	56-43-01	8.36	9.11	2.44	0.61	0.35			
56-43		9.10	15.97	22.56	0.00	0.00			
56-44		0.00	18.38	60.35	0.00	0.00			
56-44	56-44-01	18.39	19.32	3.05	0.35	0.61			
56-44		19.32	26.67	24.08	0.00	0.00			
56-45		0.00	17.65	57.91	0.00	0.00			
68-46e		0.00	22.37	73.46	0.00	0.00			
68-46e		22.38	22.86	1.52	0.02	0.03			
68-46e		22.85	33.89	36.27	0.00	0.00			
68-46e		33.90	34.33	1.53	0.03	0.50			
68-46e		34.37	40.33	19.50	0.00	0.00			
68-46e		40.31	41.24	3.05	0.05	0.21			
68-46e		41.24	62.88	71.02	0.00	0.00			
56-47		0.00	1.95	6.40	0.00	0.00			
56-47	56-47-01	1.95	2.59	2.13	0.92	1.17			
56-47	D12-155	2.60	3.90	4.27	0.14	2.32		1.40	17.000
56-47	D12-156	3.90	4.54	2.14	0.10	2.53		5.40	255.000
56-47	56-47-02	4.55	4.94	1.21	0.15	1.27			
56-47	56-47-02	4.92	5.58	2.14	1.99	4.79			
56-47	56-47-02	5.57	6.49	3.04	0.92	1.94			
56-47	D12-157	6.50	7.44	3.05	0.01	0.07	0.19	0.30	3.000
56-47	D12-158	7.43	8.35	3.05	0.12	2.05	0.37	1.60	NIL
56-47		8.36	11.80	11.28	0.00	0.00			
56-47	D12-159	11.80	12.44	2.13	0.01	0.22		0.40	27.000
56-47	D12-160	12.44	12.98	1.83	0.12	4.69		2.30	21.000
56-47	56-47-03	13.00	13.47	1.53	0.30	4.69			
56-47	56-47-03	13.47	13.93	1.52	0.92	4.94			
56-47	56-47-03	13.93	14.48	1.83	0.15	1.78			
56-47		14.49	18.47	13.11	0.00	0.00			
56-48		0.00	1.68	5.49	0.00	0.00			
56-48	D12-161	1.67	2.68	3.35	0.13	2.61	0.76	2.00	28.000
56-48	56-48-01	2.69	3.44	2.44	0.33	3.11			10.000
56-48	D12-162	3.44	4.27	2.74	0.11	1.04	0.34	1.30	
56-48		4.27	7.16	9.45	0.00	0.00			
56-48		7.15	7.53	1.22	0.10	0.66			

56-48		7.52	8.53	3.35	0.00	0.00			
56-48	56-48-02	8.54	9.20	2.14	1.07	0.76			
56-48	56-48-02	9.20	10.03	2.74	0.35	0.71			
56-48		10.03	11.89	6.09	0.00	0.00			
56-49		0.00	59.65	195.60	0.00	0.00			
56-50		0.00	14.11	46.33	0.00	0.00			
56-51		0.00	3.17	10.36	0.00	0.00			
56-51	D12-163	3.16	3.81	2.14	0.01	0.08		0.30	17.000
56-51	D12-164	3.81	4.72	3.05	0.03	0.18		0.70	21.000
56-51	D12-165	4.74	5.67	3.04	0.12	0.52		1.80	48.000
56-51		5.67	6.40	2.44	1.37	6.27			
56-51		6.41	7.71	4.27	0.30	0.56			
56-51		7.71	8.44	2.44	0.51	0.14			
56-51		8.45	9.02	1.83	2.90	2.14			
56-51		9.01	9.57	1.82	3.62	0.73			
56-51		9.56	10.70	3.66	0.66	0.56			
56-51		10.68	11.25	1.83	3.11	0.33			
56-51		11.24	11.98	2.44	1.73	0.45			
56-51		11.98	12.53	1.83	3.41	0.91			
56-51		12.54	12.98	1.52	0.25	0.10			
56-51		13.00	93.45	263.90	0.00	0.00			
56-52		0.00	19.23	63.09	0.00	0.00			
56-52	56-52-01	19.23	19.78	1.84	0.05	3.57			
56-52	56-52-01	19.78	20.24	1.51	1.75	5.10			
56-52	56-52-02	20.24	21.18	3.05	0.10	0.20			
56-52	56-52-02	21.17	21.82	2.13	1.55	0.00			
56-52		21.82	27.04	17.08	0.00	0.00			
56-53		0.00	5.21	17.07	0.00	0.00			
56-53	D12-167	5.20	6.13	3.05	0.03	0.10		0.60	21.000
56-53	D12-166	6.13	6.89	2.43	0.06	0.84		2.40	58.000
56-53		6.87	26.09	63.11	0.00	0.00			
56-53	56-53-01	26.10	26.55	1.51	1.10	4.74			
56-53		26.56	29.90	10.99	0.00	0.00			
56-53	56-53-02	29.91	30.82	2.99	0.15	0.89			
56-53		30.82	35.20	14.37	0.00	0.00			
68-54E		0.00	5.30	17.37	0.00	0.00			
68-54E	56-54-01	5.29	7.16	6.10	0.01	0.05			
68-54E	56-54-02	7.15	7.62	1.52	0.02	0.47	0.09		
68-54E		7.61	7.71	0.31	0.00	0.00			
68-54E	56-54-03	7.71	7.99	0.91	0.02	0.05			
68-54E		7.99	22.86	48.77	0.00	0.00			
56-55		0.00	4.94	16.15	0.00	0.00			
56-55	56-55-04	4.92	5.85	3.05	0.02	0.15			
56-55	56-55-05	5.85	6.80	3.05	0.02	0.04			
56-55	56-55-06	6.78	7.99	3.96	0.05	0.12			
56-55	56-55-07	7.99	9.30	4.27	0.04	0.53			
56-55		9.29	16.73	24.38	mssg	0.00			
56-55		16.72	18.75	6.71	0.00	0.00			
56-55	56-55-02	18.76	20.15	4.57	tr	0.09			
56-55	56-55-01	20.15	20.79	2.13	0.10	0.51			
56-55	56-55-01	20.80	21.55	2.43	0.10	0.09			
56-55	56-55-01	21.54	22.10	1.84	0.20	0.51			
56-55	56-55-03	22.10	22.98	2.90	0.01	0.16			
56-55	56-55-08	22.99	23.84	2.74	0.06	1.35	0.26		
56-55	56-55-09	23.82	24.90	3.50	0.02	0.20	0.05		
56-55		24.89	28.41	11.59	0.00	0.00			
56-56		0.00	8.84	28.96	0.00	0.00			
56-56	56-56-04	8.82	9.66	2.74	0.01	0.40	0.11		
56-56		9.66	22.49	42.06	0.00	0.00			
56-56	56-56-05	22.48	23.32	2.75	tr	0.04	0.02		

56-56	56-56-06	23.31	24.14	2.72	tr	0.01	tr		
56-56	D12-169	24.14	25.18	3.37	0.10	0.60		1.00	NIL
56-56	D12-170	25.17	26.09	3.06	0.04	0.20		0.30	NIL
56-56	56-56-01	26.10	26.64	1.81	0.65	1.63			
56-56	D12-171	26.65	27.58	3.06	0.05	1.04		0.40	NIL
56-56	D12-172	27.59	28.83	4.12	0.01	0.69		0.50	NIL
56-56	56-56-02	28.84	29.29	1.51	0.01	2.14			
56-56		29.30	44.29	49.23	0.00	0.00			
56-56	56-56-03	44.30	44.65	1.22	0.60	1.02			
56-56	56-56-03	44.67	45.60	3.05	0.55	1.80			
56-56	D12-173	45.60	46.54	3.05	0.07	0.02		0.60	NIL
56-56	56-56-08	46.53	47.55	3.35	0.02	0.40	0.15		
56-56	56-56-09	47.55	48.59	3.35	0.01	0.27	0.09		
56-56	56-56-10	48.58	49.59	3.35	0.01	0.26	0.06		
56-56		49.60	53.31	12.20	0.00	0.00			
56-57		0.00	2.04	6.71	0.00	0.00			
56-57	D12-285	2.05	2.87	2.74	0.04	0.53	0.12		
56-57	D12-174	2.88	3.81	3.05	0.06	1.51		1.00	NIL
56-57	D12-175	3.81	4.94	3.65	0.04	3.04	0.62	1.80	NIL
56-57		4.92	5.79	2.90	0.00	0.00			
56-57	D12-284	5.80	6.49	2.29	0.02	1.47	0.20		
56-57	D12-176	6.50	7.44	3.04	0.01	1.11		0.80	NIL
56-57	D12-177	7.43	8.26	2.75	0.01	1.52		0.70	12.000
56-57	56-57-01	8.27	8.84	1.84	0.90	9.08			
56-57	56-57-02	8.83	9.75	3.02	0.00	0.30			
56-57	56-57-03	9.75	10.70	3.06	0.01	5.00			
56-57		10.68	12.83	7.01	0.00	0.00			
56-57	56-57-04	12.82	13.56	2.43	0.01	5.61			
56-57	56-57-04	13.56	14.20	2.13	0.00	5.81			
56-57	56-57-05	14.21	14.97	2.46	0.01	2.75			
56-57	56-57-06	14.96	15.88	2.99	0.20	5.56			
56-57		15.87	29.99	46.39	0.00	0.00			
56-57	56-57-07	30.00	30.94	3.04	0.13	1.06	0.12		
56-57	56-57-07	30.93	31.67	2.44	0.07	0.29	0.09		
56-57	56-57-08	31.67	32.49	2.74	0.06	0.24	0.02		
56-57	56-57-09	32.51	33.53	3.35	0.02	0.48	0.13		
56-57		33.53	34.47	3.05	0.00	0.00			
56-57	56-57-10	34.46	35.39	3.05	0.12	0.36	0.03		
56-57	56-57-11	35.39	36.30	3.05	0.08	0.48	0.12		
56-57	56-57-12	36.32	37.25	3.05	0.14	0.39	0.05		
56-57	56-57-13	37.25	37.80	1.82	0.09	2.93	0.83		
56-57	56-57-14	37.80	38.25	1.53	0.06	1.06	0.17		
56-57		38.27	40.20	6.40	0.00	0.00			
56-57	56-57-15	40.22	41.06	2.74	0.02	0.33	0.05		
56-57		41.05	43.01	6.40	0.00	0.00			
56-57	56-57-16	43.00	43.65	2.14	0.03	0.06	0.01		
56-57		43.65	49.99	20.72	0.00	0.00			
65-58e		0.00	29.41	96.52	0.00	0.00			
65-58e	65-58e-01	29.41	30.05	2.10	0.04	0.71			
65-58e		30.05	36.03	19.64	0.00	0.00			
56-59		0.00	18.56	60.96	0.00	0.00			
56-60		0.00	3.54	11.58	0.00	0.00			
56-60	D12-178	3.53	4.24	2.29	0.01	0.16		0.40	3.000
56-60	56-60-01	4.23	5.15	3.05	0.50	4.95			
56-60	56-60-01	5.16	6.10	3.04	0.94	4.43			
56-60	56-60-02	6.08	7.01	3.05	0.30	0.10			
56-60	56-60-03	7.01	7.96	3.05	0.98	4.04			
56-60	56-60-04	7.94	8.87	3.05	0.83	1.92			
56-60	56-60-05	8.87	9.81	3.05	1.00	0.78			
56-60	56-60-05	9.80	10.30	1.67	1.82	0.75			

56-60		10.31	10.88	1.83	0.00	0.00							
56-60	D12-179	10.87	11.98	3.66	0.08	1.31				0.80	78.000		
56-60		11.98	19.69	25.30	0.00	0.00							
66-61e		0.00	0.64	2.13	0.00	0.00							
66-61e	56-61-01	0.65	1.58	3.05	0.14	1.30							
66-61e	56-61-01	1.58	2.50	3.05	0.09	1.42							
66-61e	D12-180	2.51	3.90	4.57	0.02	0.17				0.40	NIL		
66-61e	56-61-02	3.90	4.82	3.00	0.10	3.29							
66-61e		4.81	5.30	1.56	0.00	0.00							
66-61e	56-61-03	5.29	6.22	3.06	0.11	4.03							
66-61e	D12-181	6.22	6.68	1.53	0.03	0.96				0.60	NIL		
66-61e	56-61-04	6.69	7.62	3.04	0.08	3.82							
66-61e	56-61-04	7.61	8.53	3.05	0.00	3.11							
66-61e	56-61-05	8.54	9.48	3.05	0.06	3.45							
66-61e	56-61-06	9.47	10.39	3.05	0.17	8.30							
66-61e	56-61-07	10.40	11.34	3.05	0.05	5.75							
66-61e	56-61-08	11.33	12.25	3.04	0.00	1.65							
66-61e	D12-182	12.26	12.95	2.29	tr	0.05				0.20	10.000		
66-61e	D12-183	12.96	13.66	2.29	tr	0.36				0.10	NIL		
66-61e	56-61-09	13.66	14.57	3.04	0.09	1.65							
66-61e	D12-184	14.58	15.24	2.14	0.02	0.12				1.20	NIL		
66-61e	D12-185	15.23	16.22	3.20	tr	0.01				0.20	NIL		
66-61e		16.21	29.75	44.47	0.00	0.00							
66-61e	66-61e-01	29.76	30.69	3.05	0.31	3.34	0.52				160.000		
66-61e	66-61e-02	30.69	31.30	1.98	0.12	1.02	0.20						
66-61e	D12-197	31.29	32.03	2.43	0.18	1.08							
66-61e	D12-198	32.03	32.95	3.05	0.04	0.54							
66-61e	D12-198	32.96	33.89	3.05	0.10	0.82							
66-61e	D12-199	33.89	34.81	3.05	0.08	0.32							
66-61e	D12-199	34.82	35.48	2.17	0.08	0.43							
66-61e	66-61e-03	35.48	35.94	1.51	1.32	0.65							
66-61e	D12-195	35.94	36.88	3.06	0.09	0.49							
66-61e	D12-196	36.87	37.83	3.10	0.27	2.11							
66-61e	66-61e-04	37.82	38.62	2.60	0.65	6.05	0.56						
66-61e		38.61	43.46	15.94	0.00	0.00							
66-62e		0.00	0.64	2.13	0.00	0.00							
66-62e	56-62-01	0.65	1.58	3.05	0.08	1.29							
66-62e	56-62-01	1.58	2.50	3.05	0.14	1.22							
66-62e	56-62-02	2.51	3.44	3.05	0.04	1.19							
66-62e	D12-186	3.44	4.60	3.81	0.02	1.51				1.10	NIL		
66-62e		4.60	6.37	5.78	0.00	0.00							
66-62e	56-62-03	6.36	6.83	1.54	0.05	7.23							
66-62e	D12-237	6.83	7.62	2.58	0.02	1.58	0.30						
66-62e	D12-238	7.61	8.53	3.05	0.04	2.63	0.71			2.06			
66-62e	D12-187	8.54	9.48	3.06	0.02	3.43	0.39			1.50	NIL		
66-62e	56-62-04	9.48	10.39	3.05	0.03	7.96							
66-62e	56-62-05	10.41	11.34	3.05	0.01	8.17							
66-62e	56-62-06	11.34	12.25	3.02	0.03	2.93							
66-62e	56-62-07	12.26	13.20	3.05	0.01	0.44							
66-62e	56-62-08	13.19	14.11	3.06	0.01	2.43							
66-62e	56-62-08	14.12	14.57	1.50	0.15	2.10							
66-62e		14.58	27.43	42.20	0.00	0.00							
66-62e	66-62e-01	27.44	28.01	1.93	0.50	3.43	0.30						
66-62e	66-62e-02	28.02	28.44	1.38	0.50	6.26	0.90	0.63	6.38			0.76	6.50
66-62e		28.44	29.54	3.58	0.00	0.00							
66-62e		29.54	29.99	1.51	0.74	5.89	NO C						
66-62e		29.99	30.51	1.67	3.72	1.09	NO C						
66-62e	66-62e-03	30.50	31.33	2.75	0.18	2.38	NO C						
66-62e	66-62e-04	31.34	32.37	3.34	0.34	1.24	0.06	0.39	1.08			0.44	0.93
66-62e	66-62e-05	32.36	33.38	3.36	0.19	1.30	0.02	0.19	1.18			0.19	1.05

66-62e	66-62e-06	33.38	33.83	1.51	0.18	4.00	0.00		
66-62e	66-62e-07	33.84	34.63	2.59	2.56	2.13	0.00		
66-62e	D12-200	34.63	35.17	1.78	0.04	0.04			
66-62e		35.17	35.45	0.94	0.00	0.00			
66-62e	D12-201	35.46	36.24	2.56	0.04	0.05			
66-62e		36.24	37.00	2.53	0.00	0.00			
66-62e	D12-202	37.01	38.31	4.21	0.08	0.11			
66-62e		38.30	40.20	6.31	0.00	0.00			
56-63		0.00	1.71	5.61	0.00	0.00			
56-63	D12-239	1.71	2.04	1.12	tr	1.12	0.46		
56-63	56-63-01	2.05	2.99	3.01	0.00	1.41			
56-63	56-63-01	2.97	3.87	3.00	0.00	1.46			
56-63	D12-240	3.88	4.36	1.53	tr	0.39	0.11		
56-63	56-63-02	4.35	4.82	1.51	0.00	1.95			
56-63	D12-241	4.81	5.21	1.28	tr	0.29	0.10		
56-63	56-63-03	5.20	5.49	0.92	0.00	1.68			
56-63	56-63-03	5.48	5.76	0.92	0.36	4.89			
56-63	D12-242	5.76	7.07	4.26	tr	0.02	0.01		
56-63	56-63-04	7.06	7.96	2.93	0.06	1.17			
56-63		7.95	9.24	4.24					
56-63	D12-243	9.24	9.60	1.22	0.09	1.19	0.38		
56-63		9.61	12.04	7.95	0.00	0.00			
56-63	D12-244	12.04	12.92	2.87	tr	0.02	tr		
56-63	D12-245	12.91	13.78	2.83	tr	0.04	0.01		
56-63	56-63-05	13.77	14.54	2.53	0.00	1.22			
56-63		14.55	19.23	15.36	0.00	0.00			
56-64		0.00	0.85	2.74	0.00	0.00			
56-64	D12-247	0.84	1.77	3.05	0.02	0.15	0.02		
56-64	D12-248	1.76	2.68	3.05	0.01	0.10	0.01		
56-64	D12-249	2.69	3.63	3.05	0.01	0.04	tr		
56-64	D12-250	3.62	4.54	3.05	0.03	0.13	0.04		
56-64	D12-251	4.55	5.58	3.35	0.01	0.03	tr		
56-64	D12-252	5.57	6.40	2.74	0.05	0.73	0.14		
56-64	D12-253	6.41	7.10	2.29	0.02	0.63	0.19		
56-64	D12-254	7.10	7.80	2.28	0.02	0.02	tr		
56-64	D12-188	7.80	8.26	1.53	0.03	0.39		0.30	NIL
56-64	D12-255	8.27	9.20	3.05	tr	0.13	0.01		
56-64	D12-256	9.20	10.12	3.04	0.06	0.71	0.13		
56-64	D12-257	10.12	11.03	3.05	tr	0.19	tr		
56-64	D12-258	11.05	12.07	3.35	tr	0.01	tr		
56-64	D12-259	12.07	12.25	0.60	0.01	0.04	0.02		
56-64	56-64-01	12.26	12.65	1.32	0.00	2.86			
56-64	56-64-01	12.66	12.95	0.91	0.11	4.63			
56-64		12.94	32.83	65.29	0.00	0.00			
56-64	56-64-02	32.83	33.25	1.38	0.10	0.83			
56-64	56-64-02	33.25	33.53	0.92	0.00	0.10			
56-64	56-64-02	33.53	33.99	1.51	0.02	0.61			
56-64	56-64-03	33.99	34.32	1.08	0.07	0.92			
56-64	56-64-03	34.32	34.78	1.51	0.00	0.30			
56-64	56-64-03	34.78	35.23	1.54	0.00	0.36			
56-64		35.25	37.25	6.53	0.00	0.00			
56-64	56-64-04	37.24	37.67	1.38	0.00	0.16			
56-64		37.66	39.29	5.34	0.00	0.00			
56-65		0.00	1.95	6.40	0.00	0.00			
56-65	56-65-04	1.95	3.35	4.57	tr	0.01	tr		
56-65	56-65-05	3.34	4.54	3.97	0.01	0.18	0.08		
56-65		4.55	5.58	3.35	0.00	0.00			
56-65	56-65-06	5.57	6.95	4.57	0.02	0.52	0.14		
56-65		6.96	7.99	3.35	0.00	0.00			
56-65	56-65-02	7.99	9.08	3.60	0.04	0.13	0.03		

56-65	56-65-01	9.08	9.75	2.19	0.09	7.02	0.51	0.08	5.64	1.37		0.06	4.26
56-65		9.75	20.33	34.75	0.00	0.00							
56-66		0.00	6.46	21.18	0.00	0.00							
56-66	D12-260	6.45	7.38	3.05	0.02	tr	tr						
56-66	D12-261	7.38	7.56	0.61	0.03	0.07	tr						
56-66		7.57	9.02	4.73	0.00	0.00							
56-66	D12-262	9.01	9.94	3.04	tr	0.02	tr						
56-66	D12-263	9.94	10.82	2.90	0.02	0.04	tr						
56-66		10.82	11.70	2.89	0.00	0.00							
56-66	D12-264	11.70	12.34	2.14	0.02	0.01	tr						
56-66	D12-265	12.35	12.98	2.13	0.05	0.08	0.01						
56-66		13.00	27.49	47.55	0.00	0.00							
56-67		0.00	1.04	8.84	0.00	0.00							
56-67	D12-266	1.02	1.86								30.000		
56-67	D12-267	1.86	2.68								30.000		
56-67	D12-268	2.69	3.75	3.50	0.01	0.05	tr						
56-67	D12-269	3.76	4.82	3.51	0.02	0.08	0.01						
56-67		4.83	6.74	6.25	0.00	0.00							
56-67	D12-270	6.73	7.62	2.89	0.01	0.05	tr						
56-67	D12-271	7.61	8.44	2.75	0.01	0.23	0.05						
56-67	D12-272	8.45	9.30	2.74	0.01	0.03	tr						
56-67	D12-273	9.29	10.12	2.74	0.01	0.06	0.01						
56-67		10.12	18.81	28.50	0.00	0.00							
56-67	56-67-10	18.81	19.42	1.98	0.02	0.22	0.04						
56-67	56-67-00	19.41	19.78	1.22	0.01	0.10	0.04						
56-67	56-67-01	19.78	20.24	1.52	0.01	0.67	0.07		0.45				0.23
56-67		20.24	36.52	53.34	0.00	0.00							
56-67	56-67-02	36.50	36.97	1.55	0.00	0.36							
56-67	56-67-02	36.97	37.43	1.50	0.00	0.16							
56-67	56-67-03	37.43	37.70	0.86	0.00	0.31							
56-67	56-67-03	37.69	38.16	1.51	0.00	0.25							
56-67	56-67-03	38.15	38.62	1.54	0.00	0.00							
56-67	56-67-03	38.62	39.08	1.51	0.00	0.00							
56-67	56-67-04	39.08	40.02	3.05	0.04	3.29							
56-67	56-67-05	40.01	40.93	3.05	0.03	1.68							
56-67	56-67-06	40.94	41.39	1.54	0.00	0.00							
56-67	56-67-06	41.41	41.79	1.28	0.00	0.04							
56-67	56-67-07	41.80	42.21	1.35	0.57	6.83							
56-67	56-67-08	42.21	42.55	1.08	0.00	0.30							
56-67	56-67-09	42.54	43.28	2.43	0.02	1.56							
56-67		43.28	46.45	10.37	0.00	0.00							
57-68		0.00	3.08	10.07	0.00	0.00							
57-68	57-68-01	3.07	3.54	1.51	0.00	0.80							
57-68	57-68-01	3.53	3.99	1.54	0.00	0.32							
57-68	57-68-01	4.00	4.82	2.73	0.08	0.24							
57-68	57-68-02	4.83	5.76	3.05	0.00	0.01							
57-68	57-68-02	5.76	6.68	3.00	0.00	0.39							
57-68	D12-274	6.67	7.16	1.55	0.02	0.06	0.01						
57-68	D12-275	7.15	8.47	4.37	0.02	0.26	0.08						
57-68	D12-276	8.48	8.75	0.83	0.03	0.34	0.06						
57-68		8.73	9.11	1.22									
57-68	D12-277	9.10	10.00	2.90	0.02	0.21	0.05						
57-68		9.99	10.88	2.89	0.00	0.00							
57-68	57-68-03	10.87	11.34	1.54	0.00	0.44							
57-68	57-68-03	11.34	11.98	2.10	0.00	0.34							
57-68	57-68-03	11.98	12.53	1.84	0.00	0.00							
57-68	57-68-04	12.54	13.01	1.54	0.16	2.50					50.000		
57-68	57-68-05	13.01	13.75	2.43	0.00	0.00							
57-68	57-68-06	13.75	14.20	1.51	0.09	1.78							
57-68	57-68-07	14.21	14.78	1.84	0.00	0.00							

57-68	57-68-07	14.77	15.24	1.54	0.00	0.09				
57-68	57-68-08	15.24	15.70	1.51	0.00	1.94				
57-68	57-68-08	15.70	16.18	1.54	0.19	1.95				
[illegible]8	57-68-09	16.17	16.64	1.51	0.00	0.00				
57-68	57-68-10	16.63	17.04	1.38	0.00	6.84				
57-68		17.04	37.95	68.57	0.00	0.00				
57-68	57-68-11	37.94	38.65	2.29	0.00	0.00	0.01		0.01	0.07
57-68	57-68-11	38.64	39.56	3.06	0.00	0.00	0.01		0.01	0.07
57-68	57-68-12	39.57	40.48	3.01	0.00	0.00	tr		tr	0.02
57-68	57-68-12	40.49	41.42	3.06	0.00	0.00	tr		tr	0.02
57-68	57-68-13	41.42	42.34	3.05	0.00	0.00	tr		tr	0.01
57-68	57-68-13	42.35	43.28	3.05	0.00	0.00	tr		tr	0.01
57-68	57-68-14	43.28	44.04	2.46	0.00	0.00	tr		tr	0.03
57-68	57-68-15	44.03	44.62	1.93	0.01	0.12	0.02			
57-68	57-68-16	44.62	45.42	2.60	0.00	0.00	0.01		0.01	0.01
57-68	57-68-16	45.41	45.96	1.87	0.00	0.00	0.01		0.01	0.01
57-68		45.98	47.27	4.25	0.00	0.00				
57-69		0.00	9.42	30.94	0.00	0.00				
57-69	57-69-01	9.43	9.75	1.06	0.08	0.00				
57-69	D12-283	9.75	10.45	2.29	0.02	0.14	tr	NIL		
57-69		10.45	11.43	3.21	0.00	0.00				
57-69	57-69-02	11.43	11.89	1.51	0.04	0.01				
57-69		11.89	12.04	0.46	0.00	0.03				
57-69	D12-286	12.03	12.98	3.20	0.01	0.05	tr			
57-69		13.00	14.02	3.36	0.00	0.00				
57-69	D12-287	14.03	15.33	4.26	0.01	0.01	tr			
57-69		15.33	15.61	0.92	0.00	0.00				
57-69	D12-288	15.61	16.43	2.74	0.02	0.07	tr			
57-69		16.44	17.10	2.12	0.00	0.00				
57-69	57-69-03	17.09	17.37	0.93	0.00	0.53				
57-69		17.37	41.61	79.55	0.00	0.00				
57-69	57-69-08	41.61	42.92	4.27	0.01	0.04	tr			
57-69		42.91	46.21	10.82	0.00	0.00				
57-69	57-69-04	46.21	46.66	1.52	0.01	0.13	tr			
57-69		46.67	47.73	3.50	0.00	0.00				
57-69	57-69-05	47.74	48.62	2.89	0.00	0.00	0.01		0.01	0.04
57-69	57-69-05	48.62	49.23	2.00	0.00	0.00	0.01		0.01	0.04
57-69		49.23	50.66	4.72	0.00	0.00				
57-69	57-69-06	50.67	51.18	1.68	0.00	0.00	0.01	40.000	0.02	0.06
57-69	57-69-06	51.18	51.63	1.51	0.00	0.00	0.01	40.000	0.02	0.06
57-69	57-69-07	51.64	52.12	1.54	0.07	0.24	0.09	40.000		
57-69		52.11	57.30	17.06	0.00	0.00				
65-70e		0.00	1.13	39.01	0.00	0.00				
65-70e	D12-289	1.12	2.23					10.000		
65-70e	D12-290	2.23	3.44					20.000		
65-70e		3.44	4.45		0.00	0.00				
65-70e	D12-291	4.46	5.21					NIL		
65-70e	D12-292	5.20	5.94					10.000		
65-70e		5.95	6.58		0.00	0.00				
65-70e	D12-293	6.60	7.62							
65-70e	D12-294	7.62	8.53							
65-70e	D12-295	8.55	9.48							
65-70e	D12-296	9.48	10.55							
65-70e		10.55	11.89		0.00	0.00				
65-70e	57-70-01	11.89	12.34	1.54	0.00	3.06				
65-70e	57-70-02	12.36	13.29	3.05	0.00	0.24				
65-70e	57-70-02	13.29	13.90	1.97	0.00	0.87				
65-70e	57-70-03	13.89	14.39	1.67	0.00	3.68				
65-70e	57-70-03	14.40	14.87	1.55	0.00	2.86				
65-70e	D12-190	14.87	15.61	2.42	0.01	0.19				

65-70e		15.61	44.35	94.33	0.00	0.00			
65-70e	D12-207	44.35	46.36	6.56	0.10	0.08	0.03		
65-70e		46.35	49.99	11.88	0.00	0.00			
68-71e		0.00	0.82	21.49	0.00	0.00			
68-71e	D12-297	0.84	1.86						
68-71e	D12-298	1.86	2.77						
68-71e	D12-299	2.79	3.81						
68-71e	D12-300	3.81	4.82						
68-71e	D12-301	4.83	5.85						
68-71e	D12-302	5.85	6.55						
68-71e	56-71-01	6.55	7.10	1.84	0.00	0.26			
68-71e	56-71-01	7.11	7.56	1.51	0.08	0.72			
68-71e	D12-303	7.57	7.80	2.44					
68-71e		7.80	8.29		0.00	0.00			
68-71e	D12-304	8.31	9.30	3.20	0.02	0.08	0.01		10.000
68-71e	D12-305	9.29	10.30	3.35	0.01	0.08	0.01		20.000
68-71e	D12-306	10.31	10.97	2.14	0.01	0.12	0.03		NIL
68-71e	D12-307	10.96	11.61	2.13	0.02	0.53	0.17		10.000
68-71e		11.61	12.25	2.13	0.00	0.00			
68-71e	D12-308	12.26	12.68	1.37	0.02	0.02	tr		
68-71e	56-71-02	12.68	13.14	1.54	0.07	0.21			NIL
68-71e	56-71-02	13.15	13.62	1.51	0.04	0.18			
68-71e		13.61	16.43	9.30	0.00	0.00			
68-71e	56-71-03	16.44	17.37	3.05	0.01	0.90	0.02		
68-71e	56-71-04	17.37	18.29	3.05	0.01	0.17	tr		
68-71e		18.30	36.12	58.52	0.00	0.00			
68-71e		36.13	36.70	1.84	0.36	1.62	0.21		
68-71e		36.69	38.47	5.77	0.00	0.00			
68-71e	68-22-01	38.45	39.01	1.84	0.24	2.23	0.36		
68-71e	D12-400	39.01	40.11	3.65	0.02	0.21	0.02		
68-71e		40.12	41.97		0.00	0.00			
68-71e	D12-401	41.98	42.92		0.01	0.12	0.02		
68-71e	68-22-02	42.91	43.37	1.55	0.11	0.55			
68-71e	68-22-03	43.38	43.74	1.21	0.74	6.98	1.50		
68-71e	68-22-04	43.75	44.41	2.13	0.17	1.91			
68-71e		44.40	44.96	1.31	0.00	0.00			
68-71e	68-22-05	44.95	45.84	3.00	0.05	0.21			
68-71e		45.86	51.72	19.26	0.00	0.00			
65-72e		0.00	7.71	25.30	0.00	0.00			
65-72e	D12-204	7.71	8.17	1.52	0.02	tr			
65-72e		8.17	9.75	5.18	0.00	0.00			
65-72e	D12-203	9.75	10.49	2.44	0.05	0.46			
65-72e		10.49	14.69	13.72	0.00	0.00			
65-72e	D12-205	14.68	15.61	3.05	0.06	0.37		45.00	
65-72e		15.61	52.70	121.70	0.00	0.00			
65-72e	57-72-01	52.71	53.19	1.54	0.20	5.66			
65-72e	57-72-01	53.18	53.64	1.51	0.11	4.05			
65-72e	57-72-02	53.64	54.10	1.54	0.00	0.00			
65-72e	57-72-03	54.11	54.56	1.51	0.84	1.71			
65-72e	57-72-03	54.57	55.02	1.51	1.06	1.56			
65-72e	57-72-04	55.03	55.41	1.24	0.39	0.99			
65-72e	57-72-04	55.40	56.14	2.43	0.15	0.77			
65-72e		56.14	59.01	9.45	0.00	0.00			
65-72e	57-72-05	59.02	59.47	1.51	0.31	2.18			
65-72e		59.48	61.48	6.57	0.00	0.00			
65-72e	D12-206	61.49	62.15	2.13	0.01	0.04			
65-72e		62.14	65.62	11.44	0.00	0.00			
65-72e		65.62	66.02	1.35	-	3.65	1.15		
65-72e	D12-313	66.03	66.32		0.01	0.02	0.02		
65-72e	D12-314	66.33	66.69		0.02	0.48	0.19		

65-72e		66.71	69.49	12.99	0.00	0.00			
65-72e	D12-315	69.49	69.98						
65-72e		69.99	70.41	1.38	-	3.38	0.71		
[illegible]2e		70.41	80.07	31.67	0.00	0.00			
57-73		0.00	7.71	25.30	0.00	0.00			
57-74		0.00	29.26	96.00	0.00	0.00			
57-74	57-74-01	29.25	29.72	1.54	0.73	2.44	1.57		
57-74	D12-191	29.72	30.36	2.13	tr	0.01	0.01		
57-74	D12-192	30.37	30.85	1.52	0.03	0.12	0.04		
57-74		30.83	43.10	40.24	0.00	0.00			
57-74	D12-193	43.10	43.46	1.22	0.03	1.27	0.65		NIL
57-74		43.47	46.91	11.25	0.00	0.00			
57-74	57-74-02	46.90	47.43	1.78	0.47	0.63			
57-74	57-74-02	47.44	48.01	1.83	2.78	0.57			
57-74		48.00	50.20	7.23	0.00	0.00			
57-74	D12-194	50.20	50.54	1.07	0.20	0.40	0.10		
57-74	57-74-03	50.53	51.45	3.05	0.12	0.38			
57-74	57-74-03	51.46	52.40	3.06	0.11	0.40			
57-74	57-74-04	52.39	53.28	2.98	0.13	0.57			
57-74		53.29	53.58	0.99	0.00	0.00			
57-74	57-74-05	53.60	54.35	2.42	0.29	1.61			
57-74		54.34	54.44	0.30	0.00	0.00			
57-74	57-74-06	54.43	54.99	1.84	0.30	4.21			
57-74	57-74-07	54.99	55.93	3.05	0.05	0.26			
57-74	57-74-07	55.92	56.85	3.05	0.06	0.23			
57-74	57-74-08	56.85	57.76	2.98	0.05	0.23			
57-74		57.75	62.42	15.29	0.00	0.00			
57-74		62.41	63.34	3.00	0.03	0.38			
57-74		63.33	64.92	5.24	0.00	0.00			
57-74		64.93	65.20	0.92	0.00	0.01			
57-74		65.20	65.38	0.60	0.00	0.00			
54-305		0.00	51.97	170.50	0.00	0.00			
54-A		0.00	20.54	67.36	0.00	0.00			
54-A		20.53	20.63	0.31	0.10	0.40	0.20		0.020
54-A		20.62	21.09	1.55	0.00	0.00			
54-A		21.09	21.21	0.37	0.01	0.40	0.20		0.005
54-A		21.20	22.34	3.68	0.00	0.00			
54-A		22.33	22.52	0.71	0.10	0.70	0.10		0.010
54-A		22.54	37.16	47.94	0.00	0.00			
54-B		0.00	28.07	92.14	0.00	0.00			
54-C		0.00	14.54	47.76	0.00	0.00			
54-C		14.55	14.63	0.25	0.40	0.80	0.01		
54-C		14.63	15.58	3.08	0.00	0.00			
54-C		15.57	15.64	0.24	0.10	1.10	0.01		
54-C		15.64	16.86	3.99	0.00	0.00			
54-C		16.86	16.89	0.15	0.00	1.50	0.01		
54-C		16.90	17.10	0.67	0.00	0.00			
54-C		17.11	17.28	0.55	0.01	1.00	0.30		
54-C		17.27	22.19	16.13	0.00	0.00			
54-C		22.19	22.25	0.21	0.10	6.20	1.20		
54-C		22.25	36.12	45.54	0.00	0.00			
54-D		0.00	37.89	124.30	0.00	0.00			
60-75		0.00	8.41	27.58	0.00	0.00			
60-75	D12-208	8.40	9.30	2.90	0.09	1.82	0.48		
60-75	D12-209	9.29	9.75	1.52	0.13	4.78			
60-75		9.75	11.86	6.86	0.00	0.00			
60-75	60-75-01	11.84	12.59	2.44	0.06	0.70			
60-75	60-75-02	12.59	13.08	1.59	1.75	13.11		3.20	0.040
60-75	60-75-03	13.07	13.50	1.37	0.85	2.32			
60-75	60-75-04	13.49	13.90	1.31	0.30	1.27			

60-75	60-75-04	13.89	14.84	3.20	0.18	1.48			
60-75	60-75-05	14.86	15.70	2.74	0.74	2.35		0.27	0.060
60-75	60-75-06	15.70	16.25	1.83	0.02	1.40			
60-75	D12-210	16.25	16.73	1.52	0.01	0.06			
6[illegible]		16.72	19.96	10.67	0.00	0.00			
60-76		0.00	4.54	14.94	0.00	0.00			
60-76	D12-211	4.55	5.49	3.04	0.08	2.04	0.78	1.03	
60-76		5.48	6.68	3.97	0.00	0.00			
60-76	60-76-01	6.69	7.07	1.25	0.18	3.57			
60-76	D12-212	7.07	7.41	1.12	0.04	1.83	0.53		
60-76		7.41	9.17	5.82	0.00	0.00			
60-76	60-76-02	9.18	9.75	1.86	0.24	3.82			
60-76		9.75	10.18	1.44	0.00	0.00			
60-76	60-76-03	10.19	10.88	2.31	0.71	1.12			
60-76		10.89	12.16	4.18	0.00	0.00			
60-76	D12-213	12.17	13.11	3.05	tr	0.94			
60-76	60-76-04	13.10	13.47	1.22	0.02	2.94			
60-76	60-76-04	13.47	13.99	1.67	0.77	0.83			
60-76	60-76-05	13.98	14.45	1.53	1.10	1.24			
60-76	60-76-05	14.44	14.81	1.22	2.84	1.40		0.79	0.020
60-76	60-76-05	14.82	15.09	0.91	0.64	0.76		0.68	0.010
60-76		15.09	21.37	20.57	0.00	0.00			
60-77		0.00	3.11	10.21	0.00	0.00			
60-77		3.11	3.69	1.89	0.40	2.74			
60-77		3.69	4.39	2.35	1.30	4.28		1.06	0.005
60-77		4.40	7.80	11.15	0.00	0.00			
60-77		7.80	8.05	0.83	1.18	0.38			
60-77		8.05	8.20	0.44	0.00	0.00			
60-77		8.19	8.53	1.11	10.44	1.29			
60-77		8.53	9.05	1.74	0.23	0.28			
60-77		9.06	9.66	1.98	1.45	1.53			
60-77		9.66	10.09	1.37	3.58	1.94			
60-77		10.08	10.45	1.19	0.00	0.00			
60-77		10.44	10.97	1.71	15.55	3.06		0.88	0.020
60-77	60-77-01	10.96	11.89	3.04	0.21	0.34			
60-77		11.89	15.79	12.81	0.00	0.00			
60-78		0.00	13.66	44.81	0.00	0.00			
60-79		0.00	2.99	9.75	0.00	0.00			
60-79	D12-214	2.97	3.90	3.05	0.67	2.22			
60-79	60-79-01	3.90	4.33	1.37	1.39	5.17			
60-79	D12-215	4.32	4.66	1.07	0.19	0.82			
60-79	60-79-02	4.65	5.03	1.25	1.64	2.34			
60-79	D12-215	5.03	5.15	0.43	0.19	0.82			
60-79	60-79-03	5.16	5.88	2.37	0.96	1.46			
60-79	D12-216	5.88	6.80	3.05	0.16	0.68	0.03		
60-79	D12-217	6.81	7.86	3.45	0.35	0.64	0.02		
60-79	60-79-04	7.86	8.05	0.64	1.93	1.67			0.015
60-79		8.05	8.66	2.01	0.00	0.00			
60-79	60-79-05	8.67	9.39	2.35	1.01	5.32		0.55	
60-79	D12-218	9.38	9.94	1.82	0.04	0.16	0.03		
60-79		9.94	14.20	14.02	0.00	0.00			
60-80		0.00	2.44	8.05	0.00	0.00			
60-80	60-80-01	2.45	2.90	1.49	0.72	4.76			
60-80		2.91	4.45	5.09	0.00	0.00			
60-80	D12-226	4.46	5.49	3.35	0.07	1.29	0.31		
60-80	D12-227	5.48	6.49	3.36	0.13	0.92	0.25		
60-80	D12-219	6.50	7.16	2.13	0.20	0.66	0.08		
60-80	D12-220	7.15	7.62	1.52	0.05	1.74	0.21		
60-80	D12-221	7.61	8.08	1.53	0.23	1.94	0.13		
60-80	D12-222	8.08	8.93	2.74	0.18	0.84	0.24		

60-80	D12-223	8.92	9.30	1.22	0.19	0.95	0.21		
60-80	60-80-02	9.29	9.57	0.88	1.17	0.39			
60-80	D12-224	9.56	10.30	2.47	0.33	1.40	0.15		
60-80	D12-225	10.31	11.06	2.50	0.09	0.94	0.19		
60-80	60-80-03	11.07	11.86	2.53	4.79	2.18		0.48	
60-80		11.84	11.95	0.34	0.00	0.00			
60-80	60-80-04	11.95	12.31	1.19	1.99	0.70			
60-80	60-80-05	12.31	12.98	2.28	0.16	0.44			
60-80	60-80-06	13.00	13.44	1.47	4.48	0.44			
60-80	60-80-07	13.45	13.75	1.00	0.74	0.22			
60-80	60-80-07	13.76	14.23	1.53	0.42	0.08			0.030
60-80		14.22	70.77	185.50	0.00	0.00			
61-81		0.00	35.23	115.60	0.00	0.00			
61-81	61-81-01	35.25	36.21	3.20	0.51	2.17		0.68	0.010
61-81		36.22	39.29	10.06	0.00	0.00			
61-81	61-81-02	39.29	40.02	2.38	0.51	1.87			
61-81	61-81-03A	40.01	40.51	1.58	0.00	0.00			
61-81	61-81-03	40.50	41.06	1.83	0.44	1.29			
61-81	61-81-03	41.05	41.48	1.37	0.24	0.90			
61-81	61-81-03	41.47	41.88	1.34	0.34	1.81			
61-81	61-81-03B	41.88	42.37		0.00	0.00			
61-81		42.36	43.43						
61-81	61-81-04	43.42	44.14	2.41	0.74	0.94		0.56	0.005
61-81		44.15	44.41	0.86	0.00	0.00			
61-81	61-81-04A	44.42	45.38	3.17	0.21	2.18			
61-81		45.33	48.52	10.33	0.00	0.00			
61-81	61-81-05	48.53	49.35	2.68	2.25	0.60			
61-81	61-81-05	49.35	50.29	3.07	4.00	1.59		0.58	0.015
61-81	61-81-06	50.28	50.90	2.05	2.44	0.30		0.62	0.015
61-81	61-81-06	50.91	51.79	2.90	0.29	0.68			
61-81	61-81-07	51.79	52.21	1.34	3.44	0.61			
61-81		52.20	52.61	1.37	0.00	0.00			
61-81	61-81-08	52.62	52.79	0.61	3.73	1.13			
61-81		52.80	53.25	1.43	0.00	0.00			
61-81	61-81-09	53.24	53.77	1.68	0.57	7.26			
61-81	61-81-10	53.75	54.53	2.59	0.17	1.56			
61-81	61-81-10	54.54	55.20	3.05	0.17	0.84			
61-81	61-81-11	55.18	56.48	3.29	0.27	2.70			
61-81	61-81-12	56.47	57.85	4.57	0.21	2.07			
61-81	D12-228	57.86	59.04	3.84	0.03	0.13			
61-81		59.03	83.88	81.50	0.00	0.00			
64-82e		0.00	7.77	53.95	0.00	0.00			
64-82e	61-82-01	7.76	9.30						
64-82e		9.31	16.43		0.00	0.00			
64-82e	61-82-04	16.44	17.37	3.05	0.02	tr	tr		
64-82e		17.37	18.96	5.18	0.00	0.00			
64-82e	61-82-05	18.95	20.24	4.27	0.02	0.20	0.04		
64-82e		20.25	22.59	7.62	0.00	0.00			
64-82e	61-82-06	22.57	23.32	2.44	0.04	0.10	0.02		
64-82e	61-82-07	23.31	23.90	1.88	0.04	0.06	tr		
64-82e	D12-230	23.89	24,35	1.53	0.04	0.75			
64-82e	61-82-02	24.35	24.81	1.52	0.04	0.15	0.01		
64-82e	D12-231	24.82	25.73	2.99	0.06	0.19			
64-82e		25.73	26.18	1.52	0.00	0.00			
64-82e	D12-229	26.19	26.70	1.68	0.06	0.56			
64-82e	61-82-03	26.70	27.34	2.13	0.08	0.25	0.03		
64-82e		27.35	58.61	102.50	0.00	0.00			
64-82e		58.61	58.86	0.79	2.25	-	0.70	0.74	
64-82e		58.85	59.80	3.08	0.00	0.00			
64-82e		59.79	60.20	1.37	0.22	0.70	0.32		

64-82e		60.20	64.56	14.27	0.00	0.00							
64-82e		64.55	64.80	0.76	2.15	-	-						
64-82e		64.79	65.14	1.10	0.00	0.00							
64-82e		65.12	65.20	0.30	0.25	5.10	0.00			0.13			
64-82e		65.21	66.42	3.93	0.00	0.00							
64-82e		66.41	67.12	2.35	0.08	0.28	0.33			0.03	0.010		
64-82e		67.12	70.81	12.04	0.00	0.00							
64-82e		70.79	71.26	1.52	0.30	0.15	0.00						
64-82e		71.26	71.54	0.85	0.55	-	0.00						
64-82e		71.52	71.69	0.55	0.00	0.00							
64-82e		71.68	71.78	0.28	1.90	-							
64-82e		71.77	72.09	0.99	1.45	-				0.16			
64-82e		72.07	73.18	3.64	0.00	0.00							
64-82e		73.18	73.61	1.40	0.55	-							
64-82e		73.61	74.22	2.05	0.00	0.00							
64-82e		74.23	74.62	1.25	4.20	-	0.00						
64-82e		74.61	76.14	5.01	0.00	0.00							
64-82e		76.14	76.66	1.66	4.30	0.55	0.00						
64-82e		76.65	77.66	3.29	0.00	0.00							
61-83		0.00	12.92	42.37	0.00	0.00							
61-83	61-83-01	12.91	13.56	2.13	0.03	0.01							
61-83	61-83-01	13.56	14.26	2.29	0.03	0.07							
61-83	61-83-01	14.26	15.18	3.04	0.03	0.16							
61-83	61-83-02	15.19	15.85	2.14	0.02	0.04				0.20			
61-83	61-83-02	15.84	16.58	2.44	0.10	0.15							
61-83		16.58	29.72	43.13	0.00	0.00							
61-83	61-83-03	29.72	30.66	3.04	0.04	0.12							
61-83		30.65	36.36	18.75	0.00	0.00							
61-83	61-83-04	36.36	37.06	2.29	0.03	0.29							
61-83	61-83-05	37.06	37.70	2.13	0.13	1.35	0.57	0.12	1.34		0.020	0.10	1.32
61-83		37.71	38.07	1.22	0.00	0.00							
61-83	61-83-06	38.08	38.56	1.52	0.50	1.61	0.29	0.50	1.84			0.50	2.06
61-83	61-83-07	38.55	39.29	2.44	0.15	0.26	0.09	0.11	0.48			0.10	0.47
61-83	61-83-07	39.29	40.20	3.05	0.10	0.68	0.09	0.11	0.48			0.10	0.47
61-83	61-83-08	40.22	40.97	2.44	0.25	0.36	0.03	0.73	0.44			0.58	0.33
61-83	61-83-08	40.96	41.61	2.13	1.60	0.79	0.03	0.73	0.44			0.58	0.33
61-83	61-83-09	41.61	42.55	3.05	0.63	1.93	0.47	0.45	1.54			0.45	1.48
61-83	61-83-09	42.54	43.34	2.65	0.24	1.22	0.47	0.45	1.54			0.45	1.48
61-83	61-83-10	43.35	44.96	5.27	0.15	0.13							
61-83	61-83-11	44.95	46.82	6.10	0.07	0.44	0.12						
61-83		46.81	48.49	5.49	0.00	0.00							
61-84		0.00	28.22	92.66	0.00	0.00							
61-85		0.00	21.00	68.88	0.00	0.00							
61-85	61-85-01	20.99	21.82	2.75	0.29	0.80							
61-85		21.83	22.01	0.61	0.00	0.00							
61-85	61-85-02	22.01	22.23	0.91	0.29	1.45							
61-85		22.29	22.49	0.61	0.00	0.00							
61-85	61-85-03	22.48	22.86	1.22	2.04	2.87							
61-85	61-85-03	22.85	23.41	1.83	0.49	2.69							
61-85		23.41	29.44	19.81	0.00	0.00							
61-86		0.00	19.05	62.48	0.00	0.00							
61-86	61-86-01	19.04	19.96	3.05	0.12	1.24							
61-86	D12-232	19.97	20.63	2.14	0.01	0.32	0.09						
61-86		20.62	22.49	6.09	0.00	0.00							
61-86	61-86-02	22.48	23.41	3.05	0.00	0.00							
61-86		23.41	26.00	8.53	0.00	0.00							
61-87		0.00	1.46	4.79	0.00	0.00							
61-87	61-87-01	1.46	2.10	2.07	1.30	0.27							
61-87	D12-374	2.09	2.93	2.74	0.25	0.84	0.26						
61-87	D12-375	2.93	3.84	3.05	0.50	0.75	0.14						

61-87		3.86	20.06	55.63	0.00	0.00	
61-87	61-87-02	20.07	20.82		0.00	0.00	
61-87	D12-376	20.81	21.55	2.43	0.25	0.82	0.36
61-87	D12-377	21.55	22.59	3.36	0.05	0.37	0.08
[illegible]	D12-378	22.57	24.14	5.18	0.17	0.32	0.08
61-87	D12-379	24.15	25.63	4.88	0.04	0.31	0.07
61-87	61-87-03	25.64	25.88	0.76	3.10	3.41	
61-87		25.87	26.09	0.76	0.00	0.00	
61-87	D12-380	26.10	26.55	1.52	0.36	1.88	0.65
61-87	D12-381	26.56	28.50	6.40	0.03	0.20	0.04
61-87		28.51	39.65	36.58	0.00	0.00	
61-88		0.00	1.49	4.88	0.00	0.00	
61-88	61-88-01	1.49	2.23	2.44	2.37	0.33	
61-88		2.23	4.39	7.01	0.00	0.00	
61-88	D12-382	4.37	6.00	5.33	0.01	0.76	0.04
61-88		5.99	24.02	59.13	0.00	0.00	
61-88	61-88-02	24.01	24.72	2.29	0.39	2.71	
61-88	61-88-02	24.71	25.45	2.44	0.33	3.26	
61-88	D12-383	25.45	26.67	3.96	0.04	0.30	
61-88	61-88-03	26.66	27.61	3.20	0.11	1.49	
61-88	61-88-04	27.63	28.22	1.98	0.00	0.00	
61-88		28.23	32.61	14.33	0.00	0.00	
61-88	D12-384	32.60	34.08	4.87	0.34	0.42	0.01
61-88	61-88-05	34.09	34.66	1.83	4.73	1.57	
61-88	61-88-05	34.64	35.30	2.13	0.75	1.13	
61-88	D12-385	35.29	36.27	3.20	0.04	0.04	0.01
61-88	D12-386	36.27	37.25	3.21	0.08	0.16	0.06
61-88		37.25	39.84	8.53	0.00	0.00	
61-88	D12-387	39.85	40.33	1.52	0.04	0.36	0.07
61-88	61-88-06	40.31	40.78	1.53	0.55	0.51	
61-88	D12-388	40.78	41.88	3.66	0.19	0.69	0.04
61-88	D12-389	41.89	43.01	3.65	0.15	0.26	0.02
61-88	61-88-07	43.00	43.56	1.83	3.24	1.83	
61-88	61-88-07	43.56	44.04	1.53	0.76	1.91	
61-88	D12-390	44.03	44.96	3.04	0.19	1.61	0.65
61-88	D12-391	44.95	45.96	3.36	0.22	0.91	0.27
61-88	61-88-09	45.98	47.46	4.87	0.07	0.19	0.09
61-88	D12-392	47.46	48.13	2.14	0.30	0.66	0.07
61-88	61-88-08	48.11	48.49	1.22	0.94	0.33	
61-88	61-88-08	48.48	49.04	1.82	4.39	1.16	
61-88	61-88-08	49.04	49.77	2.44	1.11	1.64	
61-88	D12-393	49.78	50.90		0.21	0.26	0.06
61-88	D12-394	50.91	51.66		0.00	0.00	
61-88	61-88-10	51.65	53.34		0.07	1.17	0.38
61-88	61-88-11	53.33	55.08	17.38	0.05	0.18	0.12
61-89		0.00	23.68	77.72	0.00	0.00	
61-89	61-89-05A	23.68	25.36	5.49	0.02	0.05	0.02
61-89	D12-316	25.36	26.09	2.44	0.11	0.61	0.18
61-89	D12-317	26.10	26.85	2.44	0.27	1.03	0.25
61-89	D12-318	26.84	27.68	2.74	0.13	0.69	0.14
61-89	D12-319	27.68	28.99	4.27	0.00	0.00	
61-89	D12-320	28.98	30.39	4.60	0.00	0.00	
61-89	D12-321	30.38	30.94	1.80	0.25	0.60	0.08
61-89	D12-322	30.93	31.49	1.83	0.03	0.08	
61-89	61-89-01	31.49	31.94	1.52	1.20	0.18	
61-89	61-89-02	31.95	32.61	2.14	0.18	0.25	
61-89	61-89-03	32.60	33.25	2.19	0.36	1.94	
61-89	61-89-07	33.27	33.44	0.60	0.00	0.00	
61-89	61-89-04	33.45	34.47	3.30	1.05	2.64	
61-89	D12-323	34.46	34.93	1.53	0.01	0.25	

61-89	D12-324	34.92	35.39	1.52	0.27	2.02					
61-89	D12-325	35.39	36.21	2.74	0.02	0.65					
61-89	61-89-08	36.22	37.98	5.79	0.03	0.49	0.06				
61-89		37.99	53.49	50.90	0.00	0.00					
61-90		0.00	8.17	26.82	0.00	0.00					
61-90	D12-326	8.17	8.84	2.14	0.11	0.35					
61-90	D12-327	8.82	10.03	3.96	0.04	0.10					
61-90	61-90-01	10.03	11.16	3.66	0.00	0.00					
61-90	D12-328	11.15	12.34	3.96	0.06	0.24					
61-90	D12-329	12.35	13.20	2.74	0.04	0.25					
61-90		13.19	27.61	47.40	0.00	0.00					
61-90	61-90-02	27.63	28.22	1.96	0.00	0.00					
61-90		28.23	44.78	54.27	0.00	0.00					
61-90	D12-330	44.77	45.69	3.05	0.01	0.30					
61-90		45.70	50.90	17.07	0.00	0.00					
61-91		0.00	15.79	51.82	0.00	0.00					
61-91	D12-331	15.79	16.79	3.35	0.01	0.18	0.06				
61-91	D12-332	16.81	17.83	3.35	0.13	0.70	0.27				
61-91	D12-333	17.83	18.84	3.35	0.03	0.23	0.09				
61-91	D12-334	18.85	19.87	3.36	0.01	0.14	0.07				
61-91	D12-335	19.88	20.82	3.05	0.01	0.41	0.16				
61-91		20.81	30.36	31.39	0.00	0.00					
61-91	D12-336	30.37	31.58	3.96	0.27	1.65	0.33				
61-91	D12-337	31.58	32.49	3.05	0.33	0.41	0.13				
61-91	D12-338	32.51	33.59	3.51	0.10	1.53	0.45				
61-91		33.58	34.26	2.28	0.00	0.00					
61-91	D12-339	34.27	34.84	1.83	0.46	7.24	2.41				
61-91		34.83	36.21	4.57	0.00	0.00					
61-91	D12-340	36.22	37.16	3.05	0.03	0.18	0.07				
61-91	D12-341	37.15	37.89	2.44	0.03	0.33	0.14				
61-91	61-91-01	37.90	38.47	1.83	0.28	0.60					
61-91	61-91-02	38.45	39.14	2.25	1.74	3.88					
61-91	61-91-03	39.14	39.56	1.41	0.40	1.95					
61-91		39.57	40.02	1.46	0.00	0.00					
61-91	D12-342	40.01	40.69	2.19	0.13	0.47	0.11				
61-91	61-91-04	40.68	41.33	2.14	1.52	0.53					
61-91	61-91-05	41.33	41.61	0.91	0.34	0.88					
61-91	61-91-06	41.61	42.28	2.13	2.84	0.70					
61-91	61-91-07	42.26	42.70	1.53	0.84	0.40					
61-91	61-91-08	42.72	43.46	2.44	3.60	1.33					
61-91	61-91-09	43.47	43.65	0.61	0.38	0.35					
61-91	D12-343	43.65	44.59	3.04	0.06	0.40	0.12				
61-91		44.58	49.13	14.94	0.00	0.00					
61-92		0.00	21.37	70.10	0.00	0.00					
61-92	D12-344	21.36	22.34	3.23	0.01	0.21	0.08				
61-92	D12-345	22.34	22.80	1.53	0.48	1.35	1.08				
61-92		22.81	35.84	42.79	0.00	0.00					
61-92	D12-346	35.85	36.79	3.05	0.00	0.00					
61-92	D12-347	36.78	37.52	2.44	0.07	1.51	0.44				
61-92	D12-348	37.52	38.25	2.44	0.04	1.00	0.25				
61-92		38.27	42.92	15.24	0.00	0.00					
61-92	61-92-01	42.91	43.46	1.83	0.54	1.82					
61-92	D12-349	43.47	44.17	2.28	0.03	0.17	0.05				
61-92	D12-350	44.16	44.71	1.83	0.29	0.88	0.11	0.29	0.96		0.29	1.03
61-92		44.72	44.96	0.76	0.00	0.00					
61-92	D12-351	44.95	45.69	2.44	0.02	0.61	0.20				
61-92		45.70	49.77	13.41	0.00	0.00					
65-93		0.00	1.58	5.18	0.00	0.00					
65-93	65-93-01	1.58	1.86	0.89	0.10	0.68					
65-93		1.85	1.95	0.36	0.00	0.00					

65-93	65-93-02	1.96	2.71	2.44	0.06	0.27	
65-93	65-93-03	2.70	3.69	3.20	0.08	2.89	
65-93	65-93-04	3.68	4.82	3.78	0.10	0.65	
65-93	65-93-05	4.83	5.76	3.05	0.02	0.35	
65-93	65-93-06	5.76	6.68	3.05	0.06	0.71	
65-93	65-93-07	6.69	7.62	3.04	0.19	0.16	
65-93	65-93-08	7.61	8.53	3.05	0.01	0.08	
65-93	65-93-09	8.54	9.36	2.65	0.02	0.44	
65-93	65-93-10	9.35	9.94	1.98	0.23	2.84	
65-93	65-93-11	9.95	10.76	2.63	0.06	0.71	
65-93	65-93-12	10.76	11.49	2.43	0.08	0.38	
65-93	65-93-13	11.50	12.44	3.08	0.05	0.44	
65-93		12.44	15.06	8.57	0.00	0.00	
65-94		0.00	31.18	102.30	0.00	0.00	
65-94	65-94-01	31.19	32.06	2.84	0.08	0.82	-
65-94	65-94-02	32.05	32.52	1.58	0.13	3.00	0.81
65-94	65-94-03	32.53	33.47	3.05	0.04	0.22	-
65-94		33.46	34.50	3.35	0.00	0.00	
65-94	65-94-04	34.49	35.48	3.29	0.08	0.71	-
65-94		35.49	43.28	25.58	0.00	0.00	
65-95		0.00	6.74	22.10	0.00	0.00	
65-95	65-95-01	7.39	9.27		0.09	-	
65-95		9.25	26.21	57.86	0.00	0.00	
65-95	65-95-02	26.22	27.16	3.04	0.47	0.98	0.30
65-95	65-95-02	27.15	27.74	1.92	0.29	0.38	
65-95	65-95-03	27.73	28.35	1.95	0.18	-	
65-95	65-95-03	28.33	29.26	3.05	0.31	-	
65-95		29.25	32.03	9.15	0.00	0.00	
65-97		0.00	0.98	3.20	0.00	0.00	
65-97	65-97-01	0.98	1.25	0.95	0.51	0.30	
65-97		1.26	19.14	58.67	0.00	0.00	
65-97	65-97-02	19.14	20.09	3.11	0.22	0.20	
65-97		20.09	33.04	42.58	0.00	0.00	
65-98		0.00	5.73	18.75	0.00	0.00	
65-98	65-98-01	5.72	6.83	3.65	0.26	0.68	
65-98		6.82	9.36	8.32	0.00	0.00	
65-98	65-98-02	9.36	9.60	0.77	1.71	2.96	
65-98		9.60	10.49	2.95	0.00	0.00	
65-98	D12-233	10.49	11.03	1.83	0.02	0.21	0.10
65-98		11.05	14.78	12.19	0.00	0.00	
65-99		0.00	27.68	90.83	0.00	0.00	
65-100		0.00	1.98	6.46	0.00	0.00	
65-100	65-100-01	3.76	4.79	3.35	0.07	1.50	0.35
65-100		2.99	23.13	66.09	0.00	0.00	
65-101		0.00	17.31	56.81	0.00	0.00	
65-101	65-101-01	17.31	18.23	3.05	-	0.50	0.20
65-101	65-101-01	18.24	18.96	2.32	-	0.33	0.33
65-101		18.95	21.79	9.33	0.00	0.00	
65-101	65-101-02	21.79	22.22	1.37	-	0.10	
65-101		22.21	22.77	1.86	0.00	0.00	
65-101	65-101-03	22.77	23.90	3.65	-	0.10	
65-101		23.89	41.61	58.16	0.00	0.00	
65-102		0.00	5.03	16.46	0.00	0.00	
65-102	65-102-01	5.02	5.58	1.83	-	0.22	
65-102		5.57	9.81	13.87	0.00	0.00	
65-102	65-102-02	9.80	10.30	1.67	0.11	0.66	
65-102		10.31	18.07	25.48	0.00	0.00	
65-102	65-102-03	18.07	18.53	1.53	0.20	2.56	4.85
65-102	D12-234	18.54	19.02	1.55	0.03	0.15	0.06
65-102		19.01	19.32	1.00	0.00	0.00	

65-102	D12-235	19.32	19.90	1.90	0.07	0.80	0.33
65-102	D12-236	19.89	20.82	3.05	tr	0.10	0.04
65-102		20.82	29.29	27.73	0.00	0.00	
65-102	65-102-04	29.28	29.60	1.10	0.00	0.00	10.12
65-102		29.61	59.95	99.58	0.00	0.00	
65-103		0.00	39.38	129.20	0.00	0.00	
65-103	D12-309	39.38	39.56	0.54	0.05	0.01	
65-103	65-103-01	39.55	40.42	2.90	-	2.00	
65-103	65-103-02	40.43	40.72	0.91	0.12	4.00	
65-103	D12-310	40.71	40.97	0.83	0.01	0.11	
65-103	65-103-03	40.96	41.79	2.74	-	1.73	
65-103	D12-311	41.79	42.43	2.10	0.01	0.03	
65-103	65-103-04	42.43	42.76	1.07	-	1.77	
65-103		42.76	42.92		0.00	0.00	
65-103	D12-312	42.91	43.49		0.01	0.03	
65-103		42.76	46.39	11.92	0.00	0.00	
65-104		0.00	72.27	237.10	0.00	0.00	
65-104	65-104-01	72.26	72.76	1.59	0.12	-	
65-104	65-104-02	72.74	73.30	1.83	1.47	-	
65-104	65-104-03	73.30	73.82	1.67	0.15	-	
65-104		73.81	74.43	1.99	0.00	0.00	
65-104	65-104-04	74.42	74.92	1.67	0.12	-	
65-104	65-104-05	74.93	75.86	3.05	0.08	-	
65-104		75.86	77.11	4.11	0.00	0.00	
65-104		77.11	77.94	2.75	1.13	-	
65-104		77.94	84.34	20.97	0.00	0.00	
65-105		0.00	30.08	98.76	0.00	0.00	
65-106		0.00	11.67	38.34	0.00	0.00	
65-106	65-106-01	11.68	12.22	1.74	0.07	0.10	
65-106		12.21	13.84	5.34	0.00	0.00	
66-107		0.00	7.25	37.80	0.00	0.00	
66-107	65-107-01	7.25	7.71				
66-107		7.71	11.52				
66-107	D12-352	11.52	11.98	1.52	0.01	0.17	0.11
66-107		11.98	16.06	13.38	0.00	0.00	
66-107	65-107-02	16.06	17.13	3.51	0.02	-	
66-107	65-107-02	17.13	17.71	1.92	0.06	-	
66-107		17.71	34.66	55.59	0.00	0.00	
66-107	65-107-03	34.65	35.36	2.29	0.12	0.44	
66-107	D12-353	35.35	36.61	4.11	0.04	0.31	0.05
66-107		36.60	41.67	16.58	0.00	0.00	
66-107	65-107-04	41.66	42.09	1.44	0.14	-	
66-107		42.09	43.62	5.02	0.00	0.00	
66-107	65-107-05	43.62	44.56	3.05	0.07	-	
66-107		44.55	49.68	16.86	0.00	0.00	
66-108		0.00	0.73	2.44	0.00	0.00	
66-108	66-108-01	0.74	1.62	2.89	0.07	-	
66-108	66-108-01	1.62	2.56	3.05	0.03	-	
66-108		2.55	6.92	14.33	0.00	0.00	
66-108	D12-354	6.92	7.86	3.05	0.04	0.01	tr
66-108	66-108-02	7.85	8.60	2.43	0.17	-	
66-108	66-108-03	8.59	9.60	3.36	0.04	-	
66-108	66-108-03	9.61	10.73	3.65	0.06	-	
66-108	66-108-04	10.73	11.86	3.66	0.05	-	
66-108	66-108-05A	11.84	12.77	3.05	0.07	-	
66-108	66-108-05A	12.77	13.47	2.29	0.07	-	
66-108	66-108-05	13.47	14.57	3.65	0.07	-	
66-108		14.58	25.66	36.34	0.00	0.00	
66-108	D12-355	25.66	26.55	2.98	tr	0.17	tr
66-108		26.56	30.11	11.71	0.00	0.00	

66-108	66-108-06	30.13	30.60	1.52	-	0.44	-
66-108		30.59	45.78	49.87	0.00	0.00	
66-108	66-108-07	45.79	46.24	1.52	0.00	0.00	0.09
66-108		46.25	54.80	28.04	0.00	0.00	
[illegible]8	66-108-08	54.80	55.99	3.96	0.07	-	
66-108	66-108-08	56.00	56.57	1.83	0.12	-	
66-108		56.56	65.20	28.35	0.00	0.00	
66-108	66-108-09	65.20	65.93	2.44	0.07	0.98	
66-108	66-108-10	65.94	66.51	1.83	0.67	1.09	
66-108	66-108-10	66.50	67.15	2.13	1.68	3.24	0.29
66-108	66-108-11	67.15	68.09	3.05	1.16	1.09	0.07
66-108	66-108-11	68.08	68.73	2.13	0.32	0.60	
66-108	66-108-11	68.73	69.19	1.53	0.95	1.07	
66-108	66-108-11	69.20	70.13	3.04	0.18	0.71	
66-108		70.12	72.36	7.32	0.00	0.00	
66-109		0.00	15.27	206.50	0.00	0.00	
66-109	66-109-01	15.28	16.22				
66-109		16.20	18.87		0.00	0.00	
66-109	66-109-02	18.83	19.32				
66-109		19.32	62.94		0.00	0.00	
66-109	D12-356	62.93	63.86	3.05	tr	0.03	0.04
66-109	66-109-03	63.86	64.31	1.52	0.08	0.39	3.16
66-109	D12-357	64.32	64.86	1.83	0.01	0.12	0.05
66-109		64.87	65.96	3.57	0.00	0.00	
66-109	D12-358	65.96	67.03	3.44	0.01	0.46	0.15
66-109	66-109-04	67.01	67.57	1.83	0.21	0.11	1.42
66-109	66-109-04	67.57	68.03	1.53	0.04	0.14	1.36
66-109	D12-359	68.03	68.92	2.89	0.03	0.25	0.04
66-109		68.92	74.68	18.90	0.00	0.00	
66-110		0.00	14.87	118.20	0.00	0.00	
66-110	66-110-01	14.88	15.88				
66-110		15.88	32.46		0.00	0.00	
66-110	66-110-02	32.47	34.29				
66-110		34.28	36.03		0.00	0.00	
66-110	D12-360	36.04	36.97	3.05	tr	0.01	tr
66-110	D12-361	36.97	37.89	3.05	0.01	0.27	0.04
66-110		37.90	40.08	7.16	0.00	0.00	
66-110	D12-362	40.08	41.00	3.05	0.06	0.41	0.01
66-110	66-110-03	41.01	41.54				
66-110		41.54	48.31	23.96	0.00	0.00	
66-110	66-110-04	48.31	48.83	1.67	-	3.98	0.60
66-110		48.82	61.60	45.24	0.00	0.00	
66-110	66-110-06	61.60	62.61				
66-110	66-110-05	62.60	63.06	1.52	0.06	1.91	0.33
66-110	66-110-07	63.07	63.83				
66-110		63.82	66.78	12.19	0.00	0.00	
66-111		0.00	7.35	24.17	0.00	0.00	
66-111	66-111-01	7.36	8.53	3.87	0.01	0.08	0.01
66-111	66-111-02	8.54	9.66	3.63	0.03	0.36	0.05
66-111		9.65	11.16	4.91	0.00	0.00	
66-111	66-111-03	11.15	12.53	4.57	tr	0.13	0.02
66-111	66-111-04	12.54	14.17	5.39	tr	0.06	0.02
66-111		14.18	22.34	26.76	0.00	0.00	
66-111	66-111-05	22.34	23.10	2.50	0.09	1.12	0.16
66-111		23.10	36.61	44.29	0.00	0.00	
66-111	66-111-06	36.59	36.97	1.22	0.14	0.54	
66-111		36.97	38.56	5.18	0.00	0.00	
66-111	66-111-07	38.55	39.01	1.53	0.06	0.21	
66-111		39.01	41.67	8.68	0.00	0.00	
66-112		0.00	10.76	35.36	0.00	0.00	

66-112	D12-363	10.77	11.40	2.01	tr	tr						
66-112	D12-364	11.39	12.22	2.71	0.01	0.06						
66-112	66-112-01	12.21	13.08	59.16								
66-112		13.08	30.24		0.00	0.00						
66-112	66-112-02	30.24	30.66	1.34	0.02	0.09	tr					
66-112	66-112-03	30.65	31.21	1.83	0.17	0.76						
66-112	D12-365	31.21	32.43	3.97	0.05	0.08	0.02					
66-112	66-112-04	32.42	33.04	2.13	0.15	1.40						
66-112	66-112-05	33.06	33.68	1.98	0.08	0.10						
66-112	66-112-06	33.67	34.32	2.13	0.86	0.76						
66-112	66-112-06	34.32	34.84	1.68	0.33	0.54						
66-112	D12-366	34.83	35.30	1.52	0.00	0.00						
66-112	D12-366	35.29	36.21	3.05	0.20	0.49						
66-112		36.22	38.07	6.10	0.00	0.00						
66-113		0.00	4.27	38.25	0.00	0.00						
66-113	D12-369	4.27	5.67									
66-113		5.67	11.67		0.00	0.00						
66-114		0.00	2.13	7.01	0.00	0.00						
66-114	D12-367	2.14	4.27	6.95	tr	0.01	tr					
66-114	D12-363	4.26	5.58	4.39	tr	0.01	tr					
66-114		5.59	14.48	29.20	0.00	0.00						
66-115		0.00	44.23	145.00	0.00	0.00						
66-116		0.00	13.90	45.57	0.00	0.00						
66-116	66-116-01	13.89	15.88	6.55	tr	0.01	tr					
66-116		15.88	29.90	46.02	0.00	0.00						
JIM-1		0.00	7.99	29.23	0.00	0.00						
JIM-1	JIM-01-01	7.99	8.90									
JIM-1	JIM-01-02	8.91	10.03	3.66	0.00	0.10						
JIM-1	JIM-01-03	10.02	10.82									
JIM-1		10.82	19.05	29.59	0.00	0.00						
JIM-1	D12-402	19.04	19.84	2.63	tr	0.10	0.01					
JIM-1	JIM-01-04	19.84	20.67	2.68	0.00	0.54	0.22		0.60	NIL	0.01	0.66
JIM-1	JIM-01-05	20.66	21.58	3.05	0.00	1.35	0.20		1.58	NIL	0.04	1.47
JIM-1	JIM-01-05	21.59	22.52	3.04	0.00	2.05	0.20		1.58	NIL	0.04	1.47
JIM-1	D12-403	22.51	23.32	2.62	0.01	0.09	tr					
JIM-1		23.31	38.07	48.47	0.00	0.00						
JIM-2		0.00	14.90	48.92	0.00	0.00						
JIM-2	JIM-02-01	14.91	15.36	1.52	0.09	0.46						
JIM-2		15.37	23.50	26.67	0.00	0.00						
JIM-2	D12-404	23.50	24.60	3.66	0.02	0.10	tr					
JIM-2		24.61	38.25	44.81	0.00	0.00						
SE-1		0.00	5.55	18.20	0.00	0.00						
SE-1	SE-01-01	5.55	6.04	1.61	0.09	0.44	0.02	0.07	0.41		0.05	0.38
SE-1		6.04	6.95	3.02	0.00	0.00						
SE-1	SE-01-02	6.96	7.41	1.49	0.08	0.28	0.01					
SE-1		7.41	13.93	21.40	0.00	0.00						
SE-1	SE-01-03	13.93	14.84	3.05	0.04	0.19	0.01	0.02	0.23		0.01	0.27
SE-1	SE-01-03	14.86	15.79	3.05	0.03	0.15	0.03					
SE-1		15.79	23.23	24.38	0.00	0.00						
SE-2		0.00	16.86	55.29	0.00	0.00						
SE-2	SE-02-04	16.85	17.40	1.77	0.06	0.20	0.01					
SE-2	SE-02-05	17.39	18.56	3.90	tr	0.10	0.03					
SE-2	SE-02-06	18.57	19.69	3.66	tr	tr	tr					
SE-2		19.69	22.16	11.12	0.00	0.00						
SE-2	D12-405	22.16	23.07		0.01	0.33	0.13					
SE-2	SE-02-02	23.08	24.02	3.05	0.01	0.07	0.03					
SE-2	SE-02-03	24.01	24.78	2.53	tr	0.03	0.01					
SE-2		24.78	26.12	4.39	0.00	0.00						
SE-2	SE-02-01	26.12	26.97	2.83	0.07	0.22						
SE-2	SE-02-01	26.98	27.74	2.44	0.09	0.63	0.11					

SE-2		27.72	34.08	20.88	0.00	0.00						
SE-3		0.00	8.32	39.01	0.00	0.00						
SE-3	SE-03-01	8.33	10.12									
SE-3		10.12	11.89		0.00	0.00						
[illegible]		0.00	16.28	109.70	0.00	0.00						
SE-4	D12-406	16.29	17.40		0.02	0.02						
SE-4		17.40	18.59		0.00	0.00						
SE-4	D12-407	18.58	19.14		0.01	0.01						
SE-4		19.14	26.94		0.00	0.00						
SE-4	D12-408	26.94	28.62		0.01	0.02						
SE-4		28.63	33.44		0.00	0.00						
68-1		0.00	5.76	18.89	0.00	0.00						
68-1	68-01-01	5.76	6.68	3.06	tr	tr	tr					
68-1	68-01-02	6.69	7.16	1.52	0.02	0.24	tr					
68-1		7.15	10.24	10.21	0.00	0.00						
68-1	68-01-03	10.26	11.67	4.57	0.04	0.13	tr					
68-1		11.66	14.84	10.52	0.00	0.00						
68-1	68-01-04	14.86	15.33	1.52	1.60	4.89						
68-1		15.33	24.60	30.48	0.00	0.00						
68-1	68-01-10	24.61	25.63	3.35	tr	0.09	0.01					
68-1	68-01-11	25.63	26.49									
68-1		26.48	42.82	56.39	0.00	0.00						
68-1	68-01-05	42.82	43.19	1.22	0.01	0.03	tr					
68-1	68-01-06	43.19	43.74	1.83	0.22	0.85						
68-1	68-01-07	43.74	44.50	2.44	0.16	0.72	0.14					
68-1		44.49	44.87	1.22	0.00	0.00						
68-1	D12-372	44.86	45.60	2.44	0.05	0.37	0.11					
68-1	68-01-08	45.60	46.09	1.52	0.14	1.75						
68-1	D12-373	46.07	47.37	4.27	0.10	1.57	0.15					
68-1	68-01-09	47.37	47.91	1.83	0.07	3.21						
68-1		47.93	51.08	10.36	0.00	0.00						
68-2		0.00	16.89	55.47	0.00	0.00						
68-2		16.90	17.56	2.14	0.05	0.57						
68-2		17.56	30.75	43.28	0.00	0.00						
68-3		0.00	2.50	8.23	0.00	0.00						
68-3		2.51	2.83	1.07	0.01	0.01						
68-3		2.83	8.23	17.67	0.00	0.00						
68-3		8.22	8.63	1.28	0.01	0.01						
68-3		8.61	11.40	9.18	0.00	0.00						
68-3		11.41	11.70	0.97	0.01	0.03						
68-3		11.70	18.99	23.93	0.00	0.00						
68-3		18.99	19.48	1.53	0.06	0.26						
68-3		19.46	19.90	1.52	0.40	5.05						
68-3		19.92	20.39	1.52	0.23	0.36						
68-3		20.39	20.85	1.53	0.12	0.28						
68-3		20.85	29.17	27.28	0.00	0.00						
68-4		0.00	7.99	26.21	0.00	0.00						
68-4	68-04-01	7.99	9.05	3.57	0.01	0.10	0.04					
68-4		9.07	14.48	17.77	0.00	0.00						
68-4	68-04-02	14.49	15.33	2.74	tr	tr	tr					
68-4		15.33	16.79	4.86	0.00	0.00						
68-4	68-04-03	16.81	17.47	2.13	tr	0.05	0.03					
68-4	68-04-04	17.46	17.92	1.53	0.20	2.54	0.80	0.16	2.70	2.06	0.12	2.86
68-4	68-04-05	17.93	18.38	1.52	0.18	3.16	0.82					
68-4	68-04-05	18.39	18.84	1.52	0.22	6.03	0.39					
68-4	68-04-06	18.85	19.32	1.53	0.20	2.54	0.27	0.14	2.40	1.71	0.09	2.27
68-4	68-04-07	19.32	19.78	1.52	0.46	4.92	0.90					
68-4	68-04-08	19.78	20.33	1.83	0.17	1.78	0.25	0.10	1.50		0.04	1.21
68-4	68-04-09	20.34	22.59	7.32	0.01	0.10	0.02					
68-4	68-04-10	22.57	23.13	1.83	0.21	1.51	0.21	0.16	1.36		0.11	1.21

68-4	68-04-11	23.13	24.35	3.96	0.03	0.21	0.03				
68-4	68-04-12	24.34	25.63	4.26	tr	0.04	0.01				
68-4	68-04-13	25.63	25.91	0.92	0.07	1.13	0.02	0.04	1.16	0.02	1.20
68-4	68-04-14	25.91	27.86	6.40	0.01	0.08	0.01				
[illegible]	68-04-15	27.86	28.35	1.52	0.29	1.30	0.08	0.17	0.52	0.14	0.32
68-4	68-04-15	28.33	28.90	1.83	0.12	0.23	0.08	0.17	0.52	0.14	0.32
68-4	68-04-16	28.89	29.72		0.01	0.02	0.01				
68-4		29.73	48.59	64.62	0.00	0.00					
68-5		0.00	12.34	40.54	0.00	0.00					
68-5	68-05-02	12.35	13.11	2.44	0.01	0.04	0.01	0.02	0.22	0.01	0.04
68-5	68-05-02	13.10	13.75	2.13	0.04	0.54	0.01	0.02	0.22	0.01	0.04
68-5	68-05-02	13.75	14.48	2.44	0.03	0.76	0.01	0.02	0.22	0.01	0.04
68-5	68-05-02	14.49	14.69	0.61	0.01	0.04	0.01	0.02	0.22	0.01	0.04
68-5		14.68	16.43	5.79	0.00	0.00					
68-5	68-05-01	16.44	16.64	0.61	0.03	0.11	tr	0.04	0.18	0.03	0.11
68-5	68-05-01	16.63	17.19	1.83	0.05	0.43	tr	0.04	0.18	0.03	0.11
68-5	68-05-01	17.18	17.65	1.52	0.10	0.43	tr	0.04	0.18	0.03	0.11
68-5	68-05-01	17.64	18.75	3.66	0.03	0.11				0.03	0.11
68-5		18.76	18.96	0.61	0.00	0.00					
68-5		18.95	19.69	2.44	0.03	0.15					
68-5		19.69	24.51	15.85	0.00	0.00					
68-5		24.52	24.99	1.52	0.02	0.14					
68-5		24.98	25.73	2.44	0.04	0.23					
68-5	68-05-03	25.73	27.22	4.88	tr	0.05	0.01				
68-5		27.22	57.49	99.36	0.00	0.00					
68-6		0.00	6.13	20.12	0.00	0.00					
68-6		6.13	6.68	1.83	0.02	0.11					
68-6		6.69	7.44	2.43	0.00	0.00					
68-6		7.43	8.08	2.14	0.04	0.44					
68-6		8.08	8.93	2.74	0.00	0.00					
68-6		8.92	9.30	1.22	0.07	0.57					
68-6		9.29	9.48	0.61	0.00	0.00					
68-6		9.47	9.94	1.52	0.06	0.66					
68-6		9.94	10.39	1.53	0.04	0.84					
68-6		10.40	11.89	4.87	0.00	0.00					
68-6		11.89	12.53	2.14	0.03	0.49					
68-6		12.54	20.54	26.21	0.00	0.00					
68-6	68-06-01	20.53	21.18	2.13	0.04	0.84	0.10	0.02	0.48	tr	0.40
68-6	68-06-01	21.17	21.55	1.22	0.03	0.05	0.10	0.02	0.48	tr	0.40
68-6		21.55	22.10		0.00	0.00					
68-6	68-06-02	22.11	24.44	9.45							
68-6	68-06-03	24.43	24.90	1.53	0.02	0.11	0.05	0.04	4.18	0.02	3.86
68-6	68-06-03	24.89	25.36	1.52	0.03	4.00	0.05	0.04	4.18	0.02	3.86
68-6	68-06-03	25.36	25.82	1.52	0.04	4.27	0.05	0.04	4.18	0.02	3.86
68-6	68-06-03	25.82	26.30	1.53	0.09	7.32	0.05	0.04	4.18	0.02	3.86
68-6	68-06-03	26.29	26.76	1.52	0.08	8.12	0.05	0.04	4.18	0.02	3.86
68-6	68-06-03	26.75	27.22	1.53	0.05	3.21	0.05	0.04	4.18	0.02	3.86
68-6	68-06-04	27.22	28.59	4.57	0.01	0.57	0.01				
68-6	68-06-05	28.61	29.17	1.83	0.01	0.74	0.05			0.01	0.42
68-6	68-06-05	29.17	29.72	1.83	0.01	0.82	0.11			0.01	0.42
68-6		29.72	38.47	28.65	0.00	0.00					
68-6		38.45	38.74	0.91	0.06	0.05					
68-6	68-06-06	38.73	39.56	2.75	tr	0.01	tr				
68-6		39.57	42.28	8.83	0.00	0.00					
68-6		42.26	42.70	1.53	0.12	0.29					
68-6		42.72	43.56	2.74	0.62	0.07					
68-6		43.56	44.04	1.53	0.22	0.74					
68-6		44.03	46.18	7.01	0.00	0.00					
68-6		46.16	46.63	1.52	0.10	0.56					
68-6		46.63	53.77	23.47	0.00	0.00					

68-10		0.00	4.72	15.54	0.00	0.00					
68-10		4.74	5.39	2.14	0.01	0.01	-				
68-10		5.39	7.35	6.40	0.00	0.00					
6[illegible]		7.34	8.35	3.35	0.08	0.69	-				
68-10		8.36	23.96	51.21	0.00	0.00					
68-10	68-10-01	23.96	24.35	1.22	0.03	0.70	0.28	0.06	2.63	0.04	2.80
68-10	68-10-01	24.34	25.09	2.44	0.11	3.34	0.28			0.04	2.80
68-10		25.08	37.34	40.23	0.00	0.00					
68-10	68-10-02	37.34	38.16	2.74	0.15	0.48	0.09				
68-10		38.17	39.38	3.97	0.06	0.80	0.10				
68-10	68-10-03	39.38	41.33	6.40	0.01	0.39	0.13				
68-10		41.33	41.70	1.22	0.04	0.64	0.16				
68-10		41.70	42.15	1.52	0.04	0.62	0.13				
68-10		42.17	42.64	1.52	0.06	0.04	0.15				
68-10		42.63	46.18	11.59	0.00	0.00					
68-11		0.00	2.50	8.23	0.00	0.00					
68-11	D12-409	2.51	3.44	3.05	0.02	0.15	0.03				
68-11	68-11-01	3.44	3.99	1.83	0.11	1.22					
68-11	D12-410	4.00	4.54	1.83	0.02	0.29	0.05				
68-11	68-11-02	4.55	5.30	2.43	0.07	0.69					
68-11	D12-411	5.29	6.58	4.27	0.04	0.13	tr				
68-11	68-11-03	6.59	7.16	1.83	2.16	1.70					
68-11	68-11-03	7.15	7.89	2.44	0.98	0.08					
68-11		7.89	23.87	52.42	0.00	0.00					
68-11	D12-412	23.87	24.23	1.22	0.01	0.05	tr				
68-11	68-11-04	24.24	24.81	1.83	0.22	1.33	0.54				
68-11	68-11-04	24.80	25.27	1.53	0.05	0.29	0.15				
68-11	D12-413	25.26	26.55	4.26	tr	0.02	0.02				
68-11	D12-414	26.56	27.95	4.57	tr	0.08	0.04				
68-11	68-11-05	27.96	28.71	2.44	0.08	2.54	0.68				
68-11	68-11-05	28.70	29.08	1.22	0.04	0.64	0.27				
68-11	68-11-06	29.07	30.66	5.18	0.05	0.42	0.02				
68-11	D12-415	30.65	32.16	4.88	0.02	0.25	0.04				
68-11		32.14	38.25	20.12	0.00	0.00					
68-12		0.00	0.91	3.05	0.00	0.00					
68-12	68-12-01	0.93	2.32	4.57	0.01	0.05	tr				
68-12		2.32	20.24	58.83	0.00	0.00					
68-12	68-12-02	20.25	21.18	3.04	0.03	0.27	0.25	0.12	1.01	0.14	0.86
68-12	68-12-02	21.17	21.92	2.44	0.15	2.46	0.25	0.12	1.01	0.14	0.86
68-12	68-12-02	21.92	22.28	1.22	0.24	0.32	0.25	0.12	1.01	0.14	0.86
68-12	68-12-03	22.29	23.68	4.57	tr	0.19	0.09				
68-12		23.68	25.63	6.41	0.00	0.00					
68-12	68-12-04	25.64	26.55	3.04	tr	0.01	tr				
68-12		26.56	32.61	19.81	0.00	0.00					
68-13		0.00	1.31	4.27	0.00	0.00					
68-13		1.30	1.58	0.91	0.04	0.16					
68-13		1.58	18.11	54.26	0.00	0.00					
68-13	68-13-01	18.11	19.42	4.26	0.04	0.18	0.06				
68-13	68-13-02	19.41	19.87	1.53	0.05	1.48	0.07	0.04	1.28	0.03	1.08
68-13	68-13-04	19.88	20.82	3.05	tr	0.18	0.03				
68-13		20.81	22.59	5.79	0.00	0.00					
68-13	68-13-05	22.57	23.50	3.04	tr	tr	tr				
68-13		23.50	24.14	2.14	0.00	0.00					
68-13	68-13-03	24.15	25.27	3.66	0.01	0.06	0.02				
68-13		25.26	39.11	45.41	0.00	0.00					
68-14		0.00	6.28	20.57	0.00	0.00					
68-14	D12-416	6.27	7.19	3.05	0.01	0.09	tr				
68-14		7.20	10.49	10.82	0.00	0.00					
68-14	68-14-01	10.49	11.03	1.83	0.02	0.21					
68-14		11.05	12.65	5.18	0.00	0.00					

68-14	68-14-03	12.63	13.56	3.05	0.04	0.21	tr				
68-14		13.56	16.06	8.23	0.00	0.00					
68-14	68-14-02	16.07	17.28	3.96	0.02	0.05	0.01				
68-14	D12-417	17.27	18.11	2.75	0.05	0.22	0.06				
68-14		18.11	47.27	95.70	0.00	0.00					
68-54e		22.85	33.71	35.66	0.00	0.00					
68-54e	68-15-01	33.71	34.08	1.22	0.01	0.08	0.03				
68-54e	68-15-02	34.09	34.56	1.53	0.11	0.93	0.30				
68-54e	68-15-02	34.55	35.48	3.04	0.07	0.83	0.26				
68-54e	68-15-03	35.48	36.42	3.05	0.02	0.42	0.08				
68-54e	68-15-03	36.41	36.88	1.53	0.10	0.11	0.03				
68-54e		36.87	60.75	78.33	0.00	0.00					
68-16		0.00	12.07	39.62	0.00	0.00					
68-16	68-16-01	12.07	12.25	0.55	0.12	0.95					
68-16		12.24	28.22	52.49	0.00	0.00					
68-16	D12-395	28.23	29.26	3.35	0.01	0.11	0.01				
68-16	68-16-02	29.25	29.81	1.83	0.04	0.21					
68-16	68-16-03	29.82	30.21	1.22	0.30	1.40					
68-16	68-16-03	30.19	30.66	1.52	0.51	1.27					
68-16	D12-396	30.65	31.58	3.05	0.01	0.01	0.04				
68-16	D12-397	31.58	32.49	3.05	0.04	0.21	0.05				
68-16	68-16-04	32.51	33.62	3.66	0.32	1.75					
68-16	D12-398	33.62	35.30	5.48	0.03	0.13	0.03				
68-16	68-16-05	35.29	35.57	0.92	0.78	1.22					
68-16	68-16-05	35.57	36.42	2.74	0.52	0.95					
68-16	68-16-06	36.41	37.09	2.29	4.54	6.31					
68-16	68-16-07	37.11	37.61	1.67	0.25	0.17					
68-16	68-16-07	37.62	38.56	3.05	0.39	0.42					
68-16	68-16-08	38.55	39.47	3.05	0.17	1.09					
68-16	68-16-08	39.47	40.11	2.13	0.19	0.37					
68-16		40.12	43.01	9.45	0.00	0.00					
68-17		0.00	23.41	76.81	0.00	0.00					
68-17		23.41	23.68	0.91	0.10	0.27					
68-17		23.68	38.07	47.25	0.00	0.00					
68-17		38.08	38.56	1.52	0.03	0.19					
68-17		38.55	40.02	4.88	0.00	0.00					
68-18		0.00	1.58	5.18	0.00	0.00					
68-18		1.58	2.13	1.83	0.12	4.00					
68-18		2.14	2.59	1.52	3.42	4.27					
68-18		2.60	12.53	32.62	0.00	0.00					
68-18	68-18-02	12.54	13.47	3.05	0.02	1.09	0.23				
68-18	68-18-02	13.47	13.84	1.22	0.06	0.90	0.13				
68-18	68-18-02	13.84	14.17	1.06	0.20	4.27	1.30				
68-18	68-18-01	14.16	15.61	4.73	0.07	1.37	0.19				
68-18		15.61	15.97	1.22	0.14	1.00	0.23				
68-18		15.98	19.60	11.88	0.00	0.00					
68-18		19.60	20.12	1.68	0.58	1.06	0.05				
68-18		20.11	20.42	1.07	0.00	0.00					
68-18	68-18-03	20.43	22.86	7.92	0.05	0.30	0.05				
68-18		22.85	24.14	4.27	0.00	0.00					
68-18	68-18-04	24.15	24.72	1.83	0.12	1.58	0.21	0.10	1.12	0.08	0.65
68-18		24.71	28.04	10.97	0.00	0.00					
68-19		0.00	5.12	16.76	0.00	0.00					
68-19	68-19-04	5.11	5.67	1.83	0.20	0.85	0.36	0.13	1.79	0.12	1.82
68-19	68-19-04	5.67	6.13	1.53	0.19	1.80	0.36	0.13	1.79	0.12	1.82
68-19	68-19-04	6.13	6.58	1.52	0.04	1.43	0.36	0.13	1.79	0.12	1.82
68-19	68-19-04	6.59	7.07	1.52	0.10	3.12	0.36	0.13	1.79	0.12	1.82
68-19		7.06	9.30	7.32	0.00	0.00					
68-19	68-19-03	9.29	10.21	3.05	0.01	0.01	tr				
68-19	68-19-07	10.22	11.43	3.96	0.05	0.03	0.06				

68-19		11.42	22.86	37.49	0.00	0.00						
68-19	68-19-02	22.85	23.32	1.52	0.04	0.37						
68-19	68-19-02	23.31	23.68	1.22	0.25	0.95						
68-19	68-19-02	23.68	24.14	1.53	0.18	0.70						
68-19		24.15	27.95	12.49	0.00	0.00						
68-19	68-19-06	27.96	28.99	3.36	tr	0.02	0.01					
68-19		28.98	30.21	3.96	0.00	0.00						
68-19	68-19-01	30.19	30.66	1.52	0.32	2.28	0.22					
68-19	68-19-01	30.65	31.12	1.53	0.08	1.59	0.50					
68-19	68-19-01	31.11	31.49	1.22	0.06	0.42	-					
68-19		31.49	32.16	2.13	0.00	0.00						
68-19		32.14	32.61	1.52	0.02	0.16						
68-19	68-19-05	32.60	33.53	3.05	0.03	0.17	0.03					
68-19		33.53	36.70	10.37	0.00	0.00						
68-20		0.00	2.23	7.32	0.00	0.00						
68-20	68-20-01	2.23	2.99	2.43	0.23	7.10	0.02	0.62	4.75	1.71	0.56	4.25
68-20	68-20-01	2.97	3.54	1.83	1.22	2.79	0.02	0.62	4.75		0.56	4.25
68-20		3.53	12.98	31.09	0.00	0.00						
68-20	68-20-02	13.00	13.47	1.53	0.04	0.08	0.03					
68-20	68-20-03	13.47	14.02	1.82	0.42	7.10	1.14					
68-20	68-20-03	14.02	14.57	1.83	0.14	2.17	0.41					
68-20	68-20-04	14.58	15.70	3.66	0.08	1.23	0.35					
68-20	68-20-05	15.70	16.43	2.44	0.13	2.12	0.24					
68-20		16.44	16.79	1.22	0.31	1.74	0.18					
68-20	68-20-06	16.81	18.20	4.57	0.05	0.33	0.02					
68-20	68-20-07	18.21	19.78	5.18	0.02	0.36	0.02					
68-20	68-20-08	19.78	20.24	1.53	0.32	3.30	0.12					
68-20	68-20-08	20.25	21.09	2.74	0.44	3.34	0.11					
68-20		21.08	21.55	1.52	0.00	0.00						
68-20		21.55	23.23	5.49	0.12	1.06	0.14					
68-20		23.22	24.72	4.88	0.00	0.00						
68-20		24.71	26.76	6.70	0.16	0.56	-					
68-20		26.75	27.77	3.36	0.04	0.21	-					
68-20		27.77	29.54	5.79	0.00	0.00						
68-21		0.00	2.99	9.75	0.00	0.00						
68-21	D12-370	2.97	3.90	3.05	tr	0.30	0.10					
68-21		3.90	10.88	22.86	0.00	0.00						
68-21	D12-371	10.87	11.80	3.05	0.01	0.02	tr					
68-21		11.80	29.63	58.52	0.00	0.00						
68-21	68-21-01	29.63	30.08	1.53	0.04	0.56	0.08					
68-21	68-21-01	30.09	30.54	1.52	0.05	0.41						
68-21	68-21-01	30.56	31.03	1.52	0.06	0.29						
68-21		31.02	33.80	9.15	0.00	0.00						
74-1		0.00	1.13	3.66	0.00	0.00						
74-1		1.12	1.58	1.52	1.70	0.37						
74-1		1.58	2.04	1.53	0.31	0.39						
74-1		2.05	2.50	1.52	1.03	1.02						
74-1		2.51	2.99	1.52	0.91	0.76						
74-1		2.97	3.44	1.53	0.09	0.43						
74-1		3.44	4.39	3.05	0.00	0.00						
74-1		4.37	4.82	1.52	0.07	0.11						
74-1		4.83	5.30	1.52	0.12	0.05						
74-1		5.29	5.76	1.53	0.10	0.01						
74-1		5.76	6.22	1.52	0.02	0.02						
74-1		6.22	6.68	1.53	0.04	0.23						
74-1		6.69	7.16	1.52	0.06	0.19						
74-1		7.15	7.62	1.52	0.10	0.03						
74-1		7.61	8.08	1.53	0.33	1.21						
74-1		8.08	8.53	1.52	0.57	2.72						
74-1		8.54	9.02	1.53	0.54	0.06						

74-1		9.01	9.66	2.13	0.10	0.29			
74-1		9.66	24.60	49.07	0.00	0.00			
74-2		0.00	20.54	67.36	0.00	0.00			
74-2		20.53	20.82	0.92	0.02	0.06			
[illegible]		20.81	28.04	23.77	0.00	0.00			
74-3		0.00	19.78	64.92	0.00	0.00			
74-3		19.78	20.24	1.53	0.05	0.26			
74-3		20.25	20.70	1.52	0.05	0.07			
74-3		20.71	21.18	1.52	0.05	0.52			
74-3		21.17	21.64	1.53	0.06	0.48			
74-3		21.64	28.04	21.03	0.00	0.00			
74-4		0.00	20.24	66.45	0.00	0.00			
74-4		20.25	20.70	1.52	0.02	0.06			
74-4		20.71	21.18	1.52	0.04	0.03			
74-4		21.17	21.64	1.53	0.04	0.23			
74-4		21.64	22.10	1.52	0.04	0.09			
74-4		22.10	22.65	1.83	0.03	0.05			
74-4		22.66	23.23	1.83	0.01	0.02			
74-4		23.22	25.54	7.62	0.00	0.00			
74-5		0.00	0.55	1.83	0.00	0.00			
74-5		0.56	1.04	1.52	0.01	0.09			
74-5		1.02	1.49	1.53	0.06	0.10			
74-5		1.49	1.95	1.52	0.24	0.13			
74-5		1.95	2.23	0.92	0.24	1.82			
74-5		2.23	2.68	1.52	0.00	0.00			
74-5		2.69	3.08	1.22	3.10	0.55			
74-5		3.07	24.05	68.88	0.00	0.00			
74-5		24.05	24.51	1.53	0.05	0.05			
74-5		24.52	24.99	1.52	0.03	0.10			
74-5		24.98	25.09	0.31	0.00	0.00			
74-5		25.08	25.54	1.52	0.53	0.36			
74-5		25.54	26.00	1.52	0.03	0.28			
74-5		26.01	26.46	1.53	0.07	0.36			
74-5		26.47	26.94	1.52	0.03	0.13			
74-5		26.94	27.40	1.53	0.07	0.07			
74-5		27.40	30.75	10.97	0.00	0.00			
74-6		0.00	12.44	40.84	0.00	0.00			
74-6		12.44	13.84	4.58	0.80	2.07			
74-6		13.84	18.75	16.15	0.00	0.00			
74-7		0.00	0.73	2.44	0.00	0.00			
74-7		0.74	2.04	4.27	0.49	2.63			
74-7		2.05	19.32	56.69	0.00	0.00			
74-8		0.00	0.91	3.05	0.00	0.00			
74-8		0.93	1.40	1.52	0.46	0.28			
74-8		1.39	2.04	2.14	1.01	1.35			
74-8		2.05	2.50	1.46	0.08	0.08			
74-8		2.49	2.99	1.58	0.28	1.35			
74-8		2.97	3.44	1.53	0.02	0.24			
74-8		3.44	18.11	48.16	0.00	0.00			
74-9		0.00	1.13	3.66	0.00	0.00			
74-9	74-09-05	1.12	1.58	1.52	0.02	0.02	tr	0.24	0.42
74-9	74-09-05	1.58	2.13	1.83	0.02	0.02	tr	0.24	0.42
74-9	74-09-05	2.14	2.68	1.83	0.02	0.14	tr	0.24	0.42
74-9	74-09-04	2.69	3.26	1.83	tr	0.02	tr	0.11	0.20
74-9	74-09-04	3.25	3.72	1.52	tr	0.01	tr	0.11	0.20
74-9	74-09-04	3.72	4.18	1.53	tr	0.01	tr	0.11	0.20
74-9		4.18	15.15	35.96	0.00	0.00			
74-9	74-09-03	15.14	15.61	1.53	0.09	0.06	0.16	0.61	0.77
74-9	74-09-03	15.61	16.06	1.52	0.09	0.08	0.16	0.61	0.77
74-9	74-09-03	16.07	16.52	1.52	0.09	0.43	0.16	0.61	0.77

74-9	74-09-03	16.53	17.01	1.53	0.09	1.23	0.16		0.61		0.77
74-9		17.00	17.92	3.05	0.09	0.03					
74-9	74-09-02	17.93	18.38	1.52	0.01	0.06	tr				
7[illegible]	74-09-01	18.39	18.84	1.52	0.09	1.48	0.27	0.11	1.32	0.13	1.12
7[illegible]	74-09-01	18.85	19.32	1.53	0.09	0.43	0.27	0.11	1.32	0.13	1.12
74-9	74-09-01	19.32	19.87	1.83	0.09	3.36	0.27	0.11	1.32	0.13	1.12
74-9	74-09-01	19.88	20.24	1.22	0.09	0.14	0.27	0.11	1.32	0.13	1.12
74-9		20.25	22.65	7.92	0.00	0.00					
74-9		22.66	23.32	2.13	0.00	0.01					
74-9		23.31	24.23	3.05	0.00	0.00					
74-9		24.24	24.51	0.92	0.00	0.07					
74-9		24.52	25.36	2.74	0.00	0.00					
74-10		0.00	16.52	54.25	0.00	0.00					
74-10		16.53	17.01	1.53	0.73	1.68					
74-10		17.00	17.47	1.52	0.73	0.64					
74-10		17.46	17.92	1.53	0.73	3.15					
74-10		17.93	18.38	1.52	0.73	5.31					
74-10		18.39	18.84	1.52	0.73	1.48					
74-10		18.85	19.69	2.75	0.73	0.02					
74-10		19.69	20.15	1.52	0.73	0.03					
74-10		20.15	20.63	1.53	0.73	0.48					
74-10		20.62	21.09	1.52	0.73	1.33					
74-10		21.08	21.55	1.52	0.73	0.72					
74-10		21.55	22.01	1.53	0.73	2.92					
74-10		22.01	22.49	1.52	0.73	3.72					
74-10		22.48	23.04	1.83	0.73	0.02					
74-10		23.03	23.59	1.83	0.73	0.40					
74-10		23.59	24.05	1.52	0.73	0.01					
74-10		24.05	24.44	1.22	0.00						
74-11		0.00	1.13	3.66	0.00	0.00					
74-11	74-11-14	1.12	1.58	1.52	tr	0.15	0.01		0.19		0.05
74-11	74-11-14	1.58	2.04	1.53	tr	0.03	0.01		0.19		0.05
74-11	74-11-14	2.05	2.50	1.52	tr	0.79	0.01		0.19		0.05
74-11	74-11-13	2.51	2.99	1.52	0.01	0.01	0.08		0.12		0.20
74-11	74-11-13	2.97	3.44	1.53	0.01	0.01	0.08		0.12		0.20
74-11	74-11-13	3.44	3.90	1.52	0.01	0.10	0.08		0.12		0.20
74-11	74-11-12	3.90	4.39	1.53	tr	0.07	0.01		0.11		0.16
74-11	74-11-12	4.37	4.82	1.52	tr	0.05	0.01		0.11		0.16
74-11	74-11-12	4.83	5.30	1.52	tr	0.07	0.01		0.11		0.16
74-11	74-11-12	5.29	5.76	1.53	tr	0.05	0.01		0.11		0.16
74-11	74-11-11	5.76	6.22	1.52	0.10	0.74	0.50		1.23		1.73
74-11	74-11-11	6.22	6.68	1.53	0.10	1.37	0.50		1.23		1.73
74-11	74-11-11	6.69	7.16	1.52	0.10	0.06	0.50		1.23		1.73
74-11	74-11-10	7.15	7.62	1.52	0.05	0.50	0.57		1.75		1.99
74-11	74-11-10	7.61	8.08	1.53	0.10	3.31	0.57	0.08	1.75	0.05	1.99
74-11	74-11-10	8.08	8.53	1.52	0.10	0.52	0.57	0.08	1.75	0.05	1.99
74-11	74-11-09	8.54	9.02	1.53	0.10	3.84	0.42	0.12	2.61	0.15	1.78
74-11	74-11-09	9.01	9.48	1.52	0.10	4.26	0.42	0.12	2.61	0.15	1.78
74-11	74-11-09	9.47	9.75	0.91	0.10	1.39	0.42	0.12	2.61	0.15	1.78
74-11	74-11-08	9.75	10.39	2.14	0.10	4.70	0.39	0.10	3.43	0.09	3.56
74-11	74-11-08	10.40	10.97	1.83	0.10	1.66	0.89	0.10	3.43	0.09	3.56
74-11		10.96	11.89	3.04	0.00	0.16					
74-11		11.89	14.02	7.01	0.00	0.00					
74-11	74-11-07	14.02	14.48	1.53	0.19	1.65	0.38	0.14	2.02	0.10	2.39
74-11	74-11-07	14.49	14.94	1.52	0.19	1.65	0.38	0.14	2.02	0.10	2.39
74-11	74-11-07	14.95	15.42	1.53	0.19	1.65	0.38	0.14	2.02	0.10	2.39
74-11	74-11-06	15.42	15.88	1.52	0.19	1.65	0.36	0.20	1.33	0.21	1.01
74-11	74-11-06	15.88	16.34	1.52	0.19	1.65	0.36	0.20	1.33	0.21	1.01
74-11	74-11-06	16.35	16.79	1.53	0.19	1.65	0.36	0.20	1.33	0.21	1.01
74-11	74-11-06	16.81	17.28	1.52	0.19	1.65	0.36	0.20	1.33	0.21	1.01

74-11		17.27	37.06	64.93	0.00	0.00						
74-11	74-11-05	37.06	38.01	7.62	0.43	3.74						
74-11	74-11-04	38.00	39.38									
74-11	74-11-03	39.38	41.24	6.09	0.00	0.00						
74-11	74-11-02	41.24	43.65	7.93	0.00	0.00						
74-11	74-11-01	43.65	45.69	6.70	0.72	2.56						
74-11		45.70	46.82	3.66	0.00	0.00						
74-12		0.00	15.51	50.90	0.00	0.00						
74-12		15.51	15.97	1.53	1.62	1.07						
74-12		15.98	16.43	1.52	0.38	2.70						
74-12		16.44	16.89	1.52	0.13	1.20						
74-12		16.90	17.37	1.53	0.04	0.62						
74-12		17.37	17.83	1.52	0.13	1.83						
74-12		17.83	18.29	1.53	0.10	0.20						
74-12		18.30	18.75	1.52	1.23	0.02						
74-12		18.76	19.23	1.52	0.64	0.17						
74-12		19.23	19.69	1.53	0.16	0.02						
74-12		19.69	20.42	2.44	0.11	0.03						
74-12		20.43	23.68	10.66	0.00	0.00						
74-13		0.00	1.68	5.49	0.00	0.00						
74-13	74-13-A	1.67	2.59	3.04	0.00	0.28	0.13		0.85		0.03	0.59
74-13	74-13-A	2.60	3.54	3.05	0.06	0.41	0.13	0.05	0.85		0.03	0.59
74-13	74-13-A	3.53	4.45	3.05	0.11	1.03	0.13	0.05	0.85		0.03	0.59
74-13	74-13-A	4.46	5.39	3.05	0.06	2.74	0.13	0.05	0.85		0.03	0.53
74-13	74-13-10	5.39	5.76	1.21	0.06	3.62	0.42			2.06		
74-13		5.76	6.95	3.97	0.00	0.00						
74-13	74-13-09a	6.96	7.62	2.13	0.02	2.00	0.18					
74-13	74-13-09b	7.61	8.35	2.44	tr	0.03	tr					
74-13	74-13-08	8.36	9.48	3.66	0.02	2.47	0.27					
74-13	74-13-07	9.47	10.21	2.44	0.08	6.13	0.20			1.71		
74-13	74-13-06	10.22	12.07	6.09	0.05	3.17	0.09					
74-13	74-13-05	12.07	12.98	3.05	0.30	1.93	0.02					
74-13	74-13-05	13.00	13.93	3.05	3.93	2.62	0.02	2.14	2.28		0.30	1.93
74-13	74-13-04	13.93	14.57	2.13	3.99	2.62	0.08	3.26	1.89	7.54	2.54	1.16
74-13		14.58	30.75	53.04	0.00	0.00						
74-13		30.74	30.94	0.61	2.50	9.60						
74-13	74-13-03	30.93	32.80	6.09	1.46	11.88	2.47			8.23		
74-13	74-13-02	32.78	33.71	3.05	0.28	2.57	0.29					
74-13		33.71	34.93	3.96	0.10	0.15	0.01					
74-13	74-13-01	34.93	35.75	2.75	0.69	1.43	0.03					
74-13		35.76	38.56	9.14	0.00	0.00						
74-13	74-13-11	38.55	39.11	1.83	0.07	0.29	tr					
74-13		39.10	42.55	11.28	0.00	0.00						
74-14		0.00	1.95	6.40	0.00	0.00						
74-14	74-14-09	1.95	2.50	1.83	0.03	1.46	0.49					
74-14		2.51	2.87	1.22	0.00	0.00						
74-14	74-14-08	2.88	3.26	1.22	0.04	1.98	0.73					
74-14		3.25	3.90	2.13	0.00	0.00						
74-14	74-14-07	3.90	4.72	2.75	0.01	0.15	0.03					
74-14		4.74	5.30	1.82	0.00	0.00						
74-14	74-14-01	5.29	5.94	2.14	0.37	2.16	0.49	0.32	2.12		0.26	2.09
74-14	74-14-02	5.94	7.80	6.09	tr	0.08	0.02					
74-14	74-14-03	7.80	9.02	3.97	0.44	2.36	0.41	0.52	2.61		0.60	2.86
74-14	74-14-04	9.01	10.03	3.35	0.01	0.34	0.08					
74-14	74-14-05	10.03	11.16	3.66	0.01	0.19	0.04					
74-14	74-14-06	11.15	11.98	2.74	0.36	3.12	0.46					
74-14		11.98	38.56	87.17	0.00	0.00						
74-15		0.00	2.99	9.75	0.00	0.00						
74-15	74-15-07	2.97	4.66	5.49	0.02	0.15	tr					
74-15	74-15-08	4.65	6.49	6.10	0.02	0.34	0.07					

74-15	74-15-09	6.50	7.80	4.26	tr	0.01	tr						
74-15		7.80	8.44	2.14	0.00	0.00							
74-15	74-15-10	8.45	9.94	4.87	0.02	0.49	-						
74-15		9.94	15.79	19.21	0.00	0.00							
74-15	74-15-11	15.79	17.47	5.48	0.01	0.04	tr						
74-15	74-15-12	17.46	18.75	4.27	0.01	0.27	tr						
74-15	74-15-13	18.76	19.69	3.05	tr	0.07	tr						
74-15	74-15-14	19.69	20.63	3.05	tr	tr	tr						
74-15		20.62	25.63	16.46	0.00	0.00							
74-15	74-15-15	25.64	26.55	3.04	tr	0.01	tr						
74-15	74-15-06	26.56	27.68	3.66	0.01	0.22	0.09						
74-15		27.68	48.13	67.06	0.00	0.00							
74-15	74-15-05	48.11	49.59	4.87	0.01	0.06	tr						
74-15	74-15-04	49.60	50.90	4.27	0.05	1.10	0.15						
74-15	74-15-03	50.90	51.54	2.13	0.03	0.71	0.03						
74-15		51.55	52.58	3.36	0.00	0.00							
74-15	74-15-02	52.57	53.49	3.05	0.07	2.70	0.31						
74-15	74-15-01	53.50	56.57	10.05	0.05	0.42	0.09						
74-15		56.56	58.34	5.79	0.00	0.00							
74-16		0.00	23.23	76.20	0.00	0.00							
74-16	74-16-06	23.22	25.09	6.10	0.02	0.13				0.90	NIL		
74-16		25.08	27.31	7.31	0.00	0.00							
74-16	74-16-05	27.31	28.93	5.49	0.01	0.10				1.20	31.000		
74-16		28.93	52.36	76.81	0.00	0.00							
74-16	74-16-04	52.38	52.85	1.52	0.09	1.16				1.80	38.000		
74-16		52.85	55.53	8.84	0.00	0.00							
74-16	74-16-03	55.54	56.57	3.35	0.21	0.62	0.09			1.40	NIL		
74-16	74-16-02	56.56	57.49	3.05	0.27	1.16	6.98	0.22	1.12	1.40	24.000	0.17	1.32
74-16	74-16-01	57.49	58.43	3.05	0.27	1.16	6.98	0.22	1.12	1.40	3.000	0.18	0.84
74-16		58.42	60.66	7.31	0.00	0.00							
74-16	74-16-07	60.65	61.30	2.14	0.02	0.17				0.30	50.000		
74-16		61.30	62.97	5.48	0.00	0.00							
74-17		0.00	2.04	6.71	0.00	0.00							
74-17	74-17-01	2.05	3.72	5.48	0.55	4.17							
74-17	74-17-02	3.72	5.49	5.79	0.55	4.17							
74-17	74-17-03	5.48	7.25	5.79	0.55	4.17							
74-17	74-17-04	7.25	8.84	5.19	0.55	4.17							
74-17		8.82	26.46	57.91	0.00	0.00							
74-17		26.47	29.72	10.67	0.78	1.48							
74-17		29.72	32.37	8.71	0.78	1.48							
74-17		32.38	38.83	21.16	0.00	0.00							
74-18		0.00	1.13	3.66	0.00	0.00							
74-18	74-18-01	1.12	1.77	2.13	0.02	1.18	0.15	0.02	1.32			0.02	1.18
74-18	74-18-01	1.76	2.41	2.13	0.02	1.74	0.15	0.02	1.32			0.02	1.18
74-18		2.41	5.67	10.67	0.00	0.00							
74-18	74-18-02	5.67	6.37	2.32	0.14	1.70	0.12	0.14	3.58			0.14	3.85
74-18	74-18-02	6.37	6.92	1.80	0.31	1.12	0.12	0.14	3.58			0.14	3.85
74-18	74-18-02	6.92	7.71	2.59	0.04	6.26	0.12	0.14	3.58			0.14	3.85
74-18		7.71	21.85	46.48	0.00	0.00							
74-18	74-18-03	21.87	22.65	2.59	2.65	15.24				0.46	219.000	1.96	16.36
74-18		22.66	35.97	43.59	0.00	0.00							
74-18	74-18-04	35.95	37.25	4.27	0.04	0.32	0.01						
74-18		37.25	39.65	7.92	0.00	0.00							
74-19		0.00	5.67	18.59	0.00	0.00							
74-19	74-19-02	5.67	6.22	1.83	0.17	1.35	0.53						
74-19		6.22	13.20	22.86	0.00	0.00							
74-19	74-19-03	13.19	14.30	3.66	0.01	0.06	0.01						
74-19		14.30	23.96	31.69	0.00	0.00							
74-19	74-19-04	23.96	24.90	3.05	0.01	0.22	0.08						
74-19		24.89	31.21	20.73	0.00	0.00							

74-19	74-19-01	31.21	32.40	3.96	0.02	0.32	0.08						
74-19		32.41	39.93	24.69	0.00	0.00							
74-20		0.00	0.85	2.74	0.00	0.00							
74-20	74-20-08	0.84	2.65	5.98	0.02	0.20	0.03						
74-20	74-20-07	2.66	3.35	2.25	tr	tr	tr						
74-20	74-20-06	3.34	4.27	3.05	tr	0.05	tr						
74-20	74-20-01	4.27	5.61	4.42	0.02	0.73	0.06						
74-20	74-20-05	5.62	7.07	4.73	0.01	1.52	0.02						
74-20	74-20-04	7.06	7.89	2.74	tr	1.24	tr						
74-20	74-20-03	7.89	8.84	3.05	0.03	0.52	0.05						
74-20	74-20-02	8.82	9.94	3.65	0.05	2.62	0.02						
74-20		9.94	10.12	0.61	0.37	10.08							
74-20		10.12	22.95	42.07	0.00	0.00							
74-20	74-20-10	22.94	23.59	2.13	0.02	0.08	0.02						
74-20	74-20-09	23.59	25.33	5.67	0.25	1.85	0.33	0.11	1.70			0.11	1.54
74-20		25.32	31.30	19.63	0.00	0.00							
74-21		0.00	7.96	26.06	0.00	0.00							
74-21	74-21-01	7.94	8.41	1.52	0.13	5.63	0.23	0.21	3.24			0.04	2.11
74-21	74-21-01	8.40	9.33	3.05	0.50	3.75	0.23	0.21	3.24			0.04	2.11
74-21		9.33	20.82	37.65	0.00	0.00							
74-21	74-21-02	20.81	22.10	4.26	0.17	2.34	0.83			4.46			
74-21	74-21-07	22.10	23.04	3.05	0.04	0.26	0.11						
74-21	74-21-06	23.03	24.14	3.65	0.05	0.51	0.11						
74-21		24.15	26.76	8.54	0.00	0.00							
74-21	74-21-05	26.75	28.13	4.57	0.31	1.78	0.14						
74-21		28.14	28.59	1.53	0.00	0.00							
74-21	74-21-04	28.61	29.90	4.27	0.07	0.49	0.11						
74-21		29.91	31.21	4.26	0.00	0.00							
74-21	74-21-03	31.21	31.64	1.37	0.29	1.77	0.43						
74-21		31.62	33.35	5.64	0.00	0.00							
81-1		0.00	1.49	4.88	0.00	0.00							
81-1		1.49	1.95	1.52	0.02	0.07	-			nil	nil		
81-1		1.95	2.13	0.61	0.00	0.00							
81-1		2.14	2.59	1.52	0.08	1.00	0.27			0.02	0.002		
81-1		2.60	3.35	2.44	0.07	1.33	0.42			0.03	0.002		
81-1		3.34	3.90	1.83	0.39	3.08	-			-	-		
81-1		3.90	5.67	5.79	0.00	0.00							
81-1		5.67	6.04	1.22	0.25	2.83	-			-	-		
81-1		6.04	6.40	1.22	1.84	12.59	0.16			0.16	0.002		
81-1		6.41	6.80	1.22	0.00	0.21	-			-	-		
81-1		6.78	7.44	2.13	0.00	1.86	-			-	-		
81-1		7.43	8.05	1.99	0.17	0.88	-			-	-		
81-1		8.03	8.44	1.37	1.11	0.44	-			-	-		
81-1		8.45	9.05	1.98	0.03	2.24	-			-	-		
81-1		9.06	9.30	0.76	3.65	4.78	-			0.39	nil		
81-1		9.29	9.57	0.91	0.00	0.00							
81-1		9.56	10.12	1.83	1.81	0.05	-			-	-		
81-1		10.12	10.58	1.53	1.32	0.03	-			-	-		
81-1		10.59	10.91	1.06	3.75	0.05	-			0.28	0.002		
81-1		10.91	11.09	0.61	19.38	0.07	-			1.32	0.005		
81-1		11.10	11.43	1.07	0.55	0.02	-			0.04	nil		
81-1		11.42	11.98	1.83	0.00	0.00							
81-2		0.00	6.31	20.73	0.00	0.00							
81-2		6.32	6.80	1.52	0.83	1.29	0.27			0.08	nil		
81-2		6.78	7.25	1.52	1.20	2.30	0.99			0.13	0.002		
81-2		7.25	7.71	1.53	2.00	2.96	0.71			0.16	nil		
81-2		7.71	8.17	1.52	1.72	3.00	0.49			0.12	nil		
81-2		8.17	8.63	1.53	1.34	4.86	0.92			0.10	0.005		
81-2		8.64	10.21	5.18	0.00	0.00							
81-2		10.22	10.49	0.91	1.29	0.72				0.05	0.002		

81-2	10.49	10.64	0.46	0.00	0.00		
81-2	10.63	10.97	1.07	2.80	0.12	0.09	0.002
81-2	10.96	11.09	0.45	0.00	0.00		
[illegible]	11.10	11.52	1.38	1.99	1.28	0.07	0.002
81-2	11.52	11.89	1.21	0.45	2.00	0.02	0.002
81-2	11.89	12.44	1.83	0.00	0.00		
81-3	0.00	6.58	21.64	0.00	0.00		
81-3	6.59	7.07	1.52	0.56	0.00		
81-3	7.06	7.35	0.92	2.04	1.96		
81-3	7.34	7.53	0.61	0.00	0.00		
81-3	7.52	7.96	1.37	2.98	0.54	0.21	0.002
81-3	7.94	8.53	1.98	0.00	0.00		
81-3	8.54	8.60	0.15	12.56	0.85		
81-3	8.59	9.57	3.20	0.00	0.00		
81-3	9.56	9.85	0.92	1.19	0.12	0.07	0.002
81-3	9.85	10.39	1.83	0.00	0.00		
81-3	10.40	10.82	1.37	0.38	0.84		
81-3	10.82	11.25	1.37	0.19	0.11	0.43	0.002
81-3	11.24	12.16	3.05	0.00	0.00		
81-5	0.00	1.31	4.27	0.00	0.00		
81-5	1.30	1.68	1.22	0.04	1.05		
81-5	1.67	2.01	1.06	0.07	3.37		
81-5	2.00	2.50	1.68	0.08	2.29		
81-5	2.51	5.30	9.14	0.00	0.00		
81-5	5.29	5.61	1.07	4.99	0.29		
81-5	5.62	5.94	1.07	0.00	0.00		
81-5	5.94	6.64	2.28	0.02	2.29		
81-5	6.64	6.83	0.61	0.85	1.28		
81-5	6.82	7.35	1.68	0.00	0.00		
81-5	7.34	7.74	1.37	0.11	1.48		
81-5	7.75	8.17	1.37	0.00	0.00		
81-5	8.17	8.35	0.61	0.84	2.57		
81-5	8.36	10.03	5.49	0.00	0.00		
81-5	10.03	10.45	1.37	0.87	2.70		
81-5	10.45	10.82	1.22	0.00	0.00		
81-5	10.82	10.97	0.46	4.91	0.16		
81-5	10.96	11.03	0.30	0.00	0.00		
81-5	11.05	11.43	1.22	1.87	0.14		
81-5	11.42	11.89	1.52	0.07	0.03		
81-5	11.89	12.50	1.99	1.44	0.58		
81-5	12.49	13.47	3.20	0.00	0.00		
81-6	0.00	14.02	46.02	0.00	0.00		
81-6	14.02	14.57	1.83	1.37	0.27	0.09	0.005
81-6	14.58	15.06	1.53	2.17	2.69	0.13	0.010
81-6	15.05	15.70	2.13	1.30	0.64	0.09	0.005
81-6	15.70	16.12	1.37	6.37	6.45	0.33	0.020
81-6	16.11	18.38	7.47	0.00	0.00		
81-7	0.00	11.16	36.58	0.00	0.00		
81-7	11.15	11.70	1.82	0.18	0.00		
81-7	11.70	12.34	2.14	0.68	0.44		
81-7	12.35	13.20	2.74	0.00	0.00		
81-7	13.19	13.75	1.83	2.93	1.00	0.22	0.002
81-7	13.75	14.36	1.98	0.75	0.54	0.06	0.002
81-7	14.35	19.05	15.39	0.00	0.00		
81-8	0.00	15.79	51.82	0.00	0.00		
81-8	15.79	16.73	3.04	3.57	7.68	0.27	0.002
81-8	16.72	17.28	1.83	1.89	2.99	-	-
81-8	17.27	17.65	1.22	1.23	1.63	-	-
81-8	17.64	17.92	0.92	0.08	0.37	-	-
81-8	17.93	18.68	2.43	0.38	6.51	0.06	0.010

81-8	18.67	19.14	1.53	0.89	3.85	0.07	0.020
81-8	19.13	19.32	0.61	0.19	1.24	-	-
81-8	19.32	20.91	5.18	0.00	0.00		
81-10	0.00	0.85	2.74	0.00	0.00		
81-10	0.84	1.31	1.53	0.97	0.12		
81-10	1.30	1.77	1.52	1.27	0.06		
81-10	1.76	2.04	0.92	1.32	0.76		
81-10	2.05	2.13	0.30	0.00	0.00		
81-10	2.14	2.59	1.52	0.51	0.69		
81-10	2.60	3.08	1.53	0.53	0.92		
81-10	3.07	3.20	0.46	0.00	0.00		
81-10	3.21	3.47	0.91	0.55	1.70		
81-10	3.48	3.90	1.37	0.11	0.29		
81-10	3.90	4.39	1.53	0.54	0.78		
81-10	4.37	4.82	1.52	0.51	0.19		
81-10	4.83	4.94	0.37	9.82	0.16	0.74	0.020
81-10	4.94	5.12	0.54	0.00	0.00		
81-10	5.11	5.24	0.46	4.69	1.25		
81-10	5.25	5.49	0.76	0.00	0.00		
81-10	5.48	6.13	2.14	0.06	0.02		
81-10	6.13	7.16	3.35	0.07	0.40		
81-10	7.15	8.08	3.05	0.00	0.00		
81-11	0.00	2.23	7.32	0.00	0.00		
81-11	2.23	2.65	1.37	0.69	0.04		
81-11	2.65	2.83	0.61	4.31	0.20		
81-11	2.83	3.08	0.76	0.36	2.36		
81-11	3.07	3.44	1.22	0.83	3.84	0.06	nil
81-11	3.44	3.90	1.52	0.35	3.37	0.04	0.002
81-11	3.90	4.39	1.53	0.11	1.36		
81-11	4.37	4.88	1.67	0.04	0.50		
81-11	4.88	8.08	10.52	0.00	0.00		
81-12	0.00	1.58	5.18	0.00	0.00		
81-12	1.58	2.01	1.37	3.28	1.71		
81-12	2.00	2.87	2.90	0.33	1.62		
81-12	2.88	3.17	0.91	0.84	5.26	0.12	0.002
81-12	3.16	3.38	0.77	6.15	1.95	0.56	0.002
81-12	3.39	3.44	0.15	0.00	0.00		
81-12	3.44	3.90	1.52	0.60	0.30		
81-12	3.90	7.35	11.28	0.00	0.00		
81-12	7.34	7.80	1.52	0.14	0.48		
81-12	7.80	7.96	0.46	0.00	0.00		
81-12	7.94	8.23	0.91	2.11	0.19	0.14	0.002
81-12	8.22	9.94	5.64	0.00	0.00		
81-13	0.00	4.88	16.00	0.00	0.00		
81-13	4.88	5.67	2.59	0.33	2.07	0.07	0.002
81-13	5.67	6.13	1.53	0.00	0.00		
81-13	6.13	6.49	1.22	0.07	0.06	0.01	0.002
81-13	6.50	9.39	9.44	0.00	0.00		
81-14a	0.00	8.87	29.11	0.00	0.00		
81-14a	8.87	9.02	0.46	4.10	0.06		
81-14a	9.01	9.33	1.06	0.00	0.00		
81-14a	9.33	9.66	1.07	0.06	0.04		
81-14a	9.66	10.30	2.13	0.33	0.08		
81-14a	10.31	11.00	2.29	1.83	0.01		
81-14a	11.01	11.28	0.91	0.38	0.02		
81-14a	11.28	11.52	0.77	0.38	0.01		
81-14a	11.52	11.89	1.21	0.00	0.00		
81-14	0.00	2.04	6.71	0.00	0.00		
81-14	2.05	2.59	1.82	0.06	0.02		
81-14	2.60	3.20	1.99	0.00	0.00		

81-14	3.21	3.66	1.52	0.18	0.35		
81-14	3.67	6.10	7.92	0.00	0.00		
81-14	6.08	6.68	1.99	0.09	0.66		
8[illegible]	6.69	6.89	0.61	0.00	0.00		
81-14	6.88	7.53	2.13	0.24	0.42		
81-15	0.00	1.22	3.96	0.00	0.00		
81-15	1.21	1.95	2.44	0.41	0.36		
81-15	1.95	2.41	1.52	0.00	0.00		
81-15	2.41	2.80	1.28	6.54	0.82	0.38	0.005
81-15	2.80	3.90	3.60	0.14	0.18		
81-15	3.90	9.02	16.77	0.00	0.00		
81-16	0.00	2.32	7.62	0.00	0.00		
81-16	2.32	2.44	0.37	5.53	15.39	0.51	0.002
81-16	2.44	3.38	3.14	0.00	0.00		
81-16	3.39	3.72	1.06	0.73	2.40	0.09	nil
81-16	3.72	4.33	1.98	0.02	0.13		
81-16	4.32	4.45	0.46	0.00	0.00		
81-17	0.00	4.72	15.54	0.00	0.00		
81-18	0.00	0.73	2.44	0.00	0.00		
81-18	0.74	1.40	2.13	0.03	4.50	0.05	0.002
81-18	1.39	1.86	1.53	0.03	1.56		
81-18	1.86	2.59	2.43	0.05	0.92		
81-18	2.60	3.08	1.53	0.14	1.14		
81-18	3.07	5.94	9.45	0.00	0.00		
81-18	5.94	6.37	1.37	0.01	0.80		
81-18	6.36	7.62	4.11	0.00	0.00		
81-18	7.61	7.99	1.22	0.15	3.94	0.07	nil
81-18	7.99	8.44	1.53	0.00	0.00		
81-19	0.00	0.52	1.68				
81-19	0.51	1.31	2.59	0.47	3.05	0.07	0.002
81-19	1.30	1.80	1.67	0.05	1.09		
81-19	1.81	2.19	1.22	0.03	0.16		
81-19	2.18	2.50	1.07	0.69	8.12	0.14	nil
81-19	2.51	2.87	1.22	2.62	0.95	0.28	0.002
81-19	2.88	3.75	2.89	0.51	0.33		
81-19	3.76	4.18	1.38	0.16	1.64		
81-19	4.18	6.92	8.99	0.00	0.00		
81-19	6.92	6.95	0.15	0.88	6.43	0.14	0.002
81-20	0.00	1.40	4.57				
81-20	1.39	1.95	1.83	0.08	0.58		
81-20	1.95	2.38	1.37	0.49	1.47		
81-20	2.37	2.77	1.37	0.46	2.47		
81-20	2.79	3.20	1.38	0.12	3.69		
81-20	3.21	3.63	1.37	0.54	2.96	0.09	nil
81-20	3.62	4.08	1.52	0.06	0.31		
81-20	4.09	4.45	1.22	0.50	3.74		
81-20	4.46	4.69	0.76	0.55	4.02	0.08	0.002
81-20	4.69	5.39	2.29	0.00	0.00		
81-21	0.00	6.13	20.12				
81-21	6.13	6.80	2.13	0.88	0.06		
81-21	6.78	7.16	1.22	0.00	0.00		
81-21	7.15	7.25	0.30	2.15	0.20	0.13	nil
81-21	7.25	9.11	6.10	0.00	0.00		
81-22	0.00	1.13	3.66	0.00	0.00		
81-22	1.12	1.49	1.22	0.70	4.77		
81-22	1.49	1.58	0.30	0.00	0.00		
81-22	1.58	1.95	1.22	0.17	1.62		
81-22	1.95	3.02	3.51	0.05	0.68		
81-22	3.02	7.07	13.25	0.00	0.00		
81-23	0.00	7.86	25.76	0.00	0.00		

81-23	7.85	7.99	0.45	0.98	7.87		0.15	0.020
81-23	7.99	9.94	6.40	0.00	0.00			
81-24	0.00	0.37	1.22	0.00	0.00			
8[illegible]	0.37	0.64	0.91	0.02	0.41	0.12	0.01	-
81[illegible]	0.65	0.91	0.92	0.05	2.04	0.46	0.02	-
81-24	0.93	1.40	1.52	0.16	0.80	0.20	0.03	0.002
81-24	1.39	1.86	1.53	0.40	0.91	0.01	0.05	0.002
81-24	1.86	2.23	1.22	0.16	7.50	1.32	0.09	0.005
81-24	2.23	2.68	1.52	0.45	3.19	0.94	0.01	0.002
81-24	2.69	3.17	1.52	0.19	0.48	0.16	0.02	-
81-24	3.16	3.63	1.53	0.03	0.63	0.11	0.01	-
81-24	3.62	4.08	1.52	0.05	1.38	0.25	0.01	-
81-24	4.09	4.27	0.61	0.63	2.25	0.13	0.03	0.005
81-24	4.27	4.54	0.92	0.11	2.00	0.37	0.03	0.002
81-24	4.55	5.03	1.52	0.35	0.80	0.14	0.03	0.005
81-24	5.02	5.49	1.52	0.10	0.74	0.03	0.01	0.002
81-24	5.48	5.94	1.53	0.51	0.53	0.04	0.05	-
81-24	5.94	6.31	1.22	0.05	1.46	0.05	0.01	-
81-24	6.32	6.68	1.22	0.18	1.92	0.07	0.03	-
81-24	6.69	7.16	1.52	0.84	2.17	0.60	0.12	0.002
81-24	7.15	7.53	1.22	0.25	0.05	0.03	0.03	-
81-24	7.52	7.99	1.52	0.37	0.81		0.04	-
81-24	7.99	8.23	0.76	1.62	1.37		0.17	0.002
81-24	8.22	8.63	1.38	0.07	0.39		-	-
81-24	8.64	8.96	1.06	0.44	0.08		-	-
81-24	8.96	9.30	1.07	2.26	1.93		0.16	0.002
81-24	9.29	9.51	0.76	0.57	0.56		0.07	0.002
81-24	9.52	9.66	0.46	1.14	0.13		0.07	0.002
81-24	9.66	12.74	10.06	0.00	0.00			
81-25	0.00	3.54	11.58	0.00	0.00			
81-25	3.53	3.99	1.53	0.11	1.79	-		
81-25	4.00	4.66	2.13	0.13	1.12	-		
81-25	4.65	5.58	3.05	0.08	0.79	-		
81-25	5.57	6.04	1.52	0.14	5.91	2.23	0.17	0.005
81-25	6.04	6.28	0.76	0.60	3.79			
81-25	6.27	6.74	1.53	1.73	6.48		0.45	0.002
81-25	6.73	10.15	11.18	0.00	0.00			
81-25	10.14	10.73	1.92	2.84	2.56	-	0.15	0.002
81-25	10.73	11.28	1.83	5.16	0.39		-	-
81-25	11.28	11.86	1.83	0.94	0.27		-	-
81-25	11.84	12.44	1.98	3.08	0.48		-	-
81-25	12.44	12.74	0.92	6.18	0.24		0.26	nil
81-25	12.73	13.38	2.13	0.44	1.04		-	-
81-25	13.37	13.72	1.07	10.10	2.31		0.37	0.005
81-25	13.70	14.11	1.37	1.54	0.39			
81-25	14.12	14.69	1.83	1.32	0.69			
81-25	14.68	15.09	1.37	1.49	0.60			
81-25	15.09	16.52	4.72	0.00	0.00			
81-26	0.00	14.39	47.24	0.00	0.00			
81-30	0.00	1.49	4.88	0.00	0.00			
81-30	1.49	2.13	2.13	0.56	2.72			
81-30	2.14	2.59	1.52	0.31	2.66			
81-30	2.60	3.17	1.83	1.38	5.77		0.24	0.002
81-30	3.16	4.45	4.27	0.00	0.00			
81-30	4.46	5.12	2.13	0.26	0.89			
81-30	5.11	5.76	2.14	0.00	0.00			
81-30	5.76	6.13	1.22	0.48	3.45			
81-30	6.13	6.68	1.83	0.00	0.00			
81-30	6.69	6.92	0.76	1.84	6.33		0.26	nil
81-30	6.92	7.44	1.67	0.00	0.00			

81-30	7.43	7.99	1.83	0.51	2.29	0.06	nil
81-30	7.99	8.44	1.53	0.75	0.53		
81-30	8.45	8.87	1.37	1.33	1.00		
[illegible]	8.87	9.30	1.37	0.86	2.25		
81-30	9.29	9.66	1.22	1.75	1.65		
81-30	9.66	9.81	0.46	0.00	0.00		
81-30	9.80	10.21	1.37	1.14	0.54	0.06	0.002
81-30	10.22	10.39	0.61	1.00	0.24	0.05	0.002
81-30	10.40	10.88	1.52	8.76	0.11	0.29	0.002
81-30	10.87	12.07	3.96	0.00	0.00		
81-31	0.00	3.75	12.34	0.00	0.00		
81-31	3.76	4.15	1.22	0.66	0.71		
81-31	4.13	5.24	3.66	0.00	0.00		
81-31	5.25	5.67	1.37	0.27	2.76		
81-31	5.67	6.92	4.12	0.00	0.00		
81-31	6.92	7.62	2.28	0.26	0.85		
81-31	7.61	7.89	0.92	0.00	0.00		
81-31	7.89	8.05	0.46	1.36	1.27		
81-31	8.03	8.29	0.91	0.00	0.00		
81-31	8.31	8.75	1.37	1.76	1.64	0.15	nil
81-31	8.73	9.20	1.53	0.51	0.23	0.05	nil
81-31	9.20	11.34	7.01	0.00	0.00		
81-101	0.00	4.27	14.02	0.00	0.00		
81-101	4.27	4.72	1.52	0.13	0.69		
81-101	4.74	5.03	0.92	0.38	3.39		
81-101	5.02	5.21	0.61	0.00	0.00		
81-101	5.20	5.85	2.13	1.08	1.69		
81-101	5.85	6.22	1.22	0.28	0.31		
81-101	6.22	8.08	6.10	0.00	0.00		
81-101	8.08	8.63	1.83	0.23	1.17	0.05	0.002
81-101	8.64	13.93	17.37	0.00	0.00		
81-101	13.93	14.39	1.52	0.04	0.17	0.02	0.002
81-101	14.40	15.06	2.14	0.03	0.06		
81-101	15.05	15.33	0.91	0.05	0.06		
81-101	15.33	17.47	7.01	0.00	0.00		
81-104	0.00	1.22	3.96	0.00	0.00		
81-104	1.21	1.58	1.22	0.52	1.64	0.05	nil
81-104	1.58	3.60	6.55	0.00	0.00		
81-104	3.58	3.99	1.38	0.07	1.04	-	-
81-104	4.00	4.54	1.83	0.02	2.80	-	-
81-104	4.55	4.66	0.30	0.13	11.68	0.11	0.002
MW-80-1	0.00	8.93	29.26	0.00	0.00		
MW-80-1	8.92	9.39	1.53	0.02	0.02		0.005
MW-80-1	9.38	9.85	1.52	0.07	0.24		0.005
MW-80-1	9.85	23.32	44.20	0.00	0.00		
MW-80-2	0.00	39.47	129.50	0.00	0.00		
MW-80-2	39.47	39.65	0.61	0.00	0.00		0.005
MW-80-2	39.66	41.24	5.18	0.00	0.00		
MW-80-2	41.24	41.33	0.31	0.00	0.00		0.005
MW-80-2	41.33	46.36	16.46	0.00	0.00		

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Date: JUN-07-90

Project:

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Attn: MR. BILL BRERETON

We hereby certify the following Geochemical Analysis of 73 WHOLE CORE samples submitted JUN-04-90 by DOUG CROFT.

Sample Number	Au ppb	Au check ppb	Ag ppm	Cu %	Pb %	Zn %
55-03-01	31	21	1.9	0.9		1.18
55-03-02	7		1.1	0.4		1.53
55-03-03	Nil		0.3	0.1		0.20
55-03-04	Nil		1.2	0.15		0.65
55-03-05	Nil		3.6	0.74		0.55
55-03-06	3		0.2	0.005		0.21
55-04-01	31	24	2.7	0.25	1.23	3.17
55-04-02	7		1.5	0.14	0.34	1.66
55-04-03	7		0.4	0.03	0.03	0.09
55-04-04	24		0.6	0.07	0.02	0.13
55-04-06	14		0.7	0.06	0.41	1.30
55-05-02	10	7	0.8	0.04		1.22
55-05-03	27		0.2	0.02		0.39
55-05-04	17		0.5	0.07		0.97
55-05-05	Nil		0.2	0.01		0.23
55-05-06	Nil		0.5	0.13		0.35
55-05-07	14		1.3	1.13		0.14
55-05-08	7		0.7	0.22		0.01
55-05-09	21		1.1	0.48		0.09
55-06-01	3		0.6	0.05		0.79
56-05-01	Nil		0.5	0.03		0.25
56-06-02	Nil		0.3	0.04		0.17
56-06-03	58	69	3.2	0.99		0.21
56-09-01	14		0.9	0.13		0.25
56-09-02	Nil		0.3	0.03		0.05
56-09-05	3		0.6	0.02		0.60
56-10-01	Nil		0.1	0.01		0.01
56-10-05	7		0.4	0.02		0.22
56-10-06	Nil		0.2	0.005		0.05
56-12-02	Nil		0.3	0.01		0.08

Certified by G. Lebel

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0
Telephone (705) 642-3244. FAX (705)642-3300

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We hereby certify the following Geochemical Analysis of 73 WHOLE CORE samples submitted JUN-04-90 by DOUG CROFT.

Sample Number	Au ppb	Au check ppb	Ag ppm	Cu %	Pb %	Zn %
56-12-03	34	27	1.4	0.05		0.51
56-12-04	7		0.1	0.01		0.05
56-12-05	Nil		0.1	0.005		0.01
56-12-06	Nil		0.1	0.005		0.01
56-12-07	7		0.1	0.01		0.06
56-12-08	Nil		0.2	0.03		0.11
56-12-09	Nil		0.1	0.02		0.07
56-12-10	7		0.9	0.15		0.11
56-12-11	Nil		0.6	0.10		0.73
56-13-01	Nil		1.2	0.10		0.85
56-13-02	Nil		0.5	0.01		0.32
56-13-03	Nil		0.4	0.02		0.34
56-13-04	14	10	1.2	0.06		0.19
56-14-02	Nil		0.4	0.06		0.07
56-14-03	Nil		0.9	0.16		0.32
56-14-04	Nil		0.4	0.09		0.06
56-14-05	Nil		0.3	0.05		0.21
56-14-06	3		0.3	0.06		0.30
56-14-07	Nil		0.6	0.11		0.03
56-15-01	7		0.4	0.06		0.70
56-16-01	Nil		0.1	0.005		0.03
56-16-02	Nil		0.2	0.01		0.19
56-16-03	Nil		0.5	0.01		0.17
56-16-04	3		0.2	0.02		0.10
56-16-05	Nil		0.3	0.06		0.27
56-16-07	Nil		0.3	0.06		0.06
56-16-09	Nil		0.3	0.05		0.21
56-18-01	41	41	0.4	0.02		0.12
56-18-02	Nil		0.2	0.01		0.18
56-20-01	Nil		0.3	0.03		0.11

Certified by G. Lebel

G. Lebel / Manager

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Attn: MR. BILL BRERETON

We hereby certify the following Geochemical Analysis of 73 WHOLE CORE samples submitted JUN-04-90 by DOUG CROFT.

Sample Number	Au ppb	Au check ppb	Ag ppm	Cu %	Pb %	Zn %
56-21-01	10		0.3	0.02	0.14	1.17
56-21-02	7		0.4	0.30		0.22
56-27-01	Nil		0.5	0.06		0.44
56-27-02	Nil		0.2	0.02		0.18
56-27-03	Nil		0.2	0.005		0.02
56-28-01	48		1.2	0.08		0.30
56-31-01	245	226	0.5	0.09		0.71
56-31-02	27		1.5	0.22		1.29
56-31-03	3		0.1	0.005		0.04
56-35-01	3		2.0	0.51		0.47
56-35-02	Nil		0.9	0.18		0.75
56-35-03	14		0.4	0.08		0.28
74-18-03	219	219	13.8	1.96		16.36

Certified by G. Lebel

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0

Telephone (705) 642-3244 FAX (705)642-3300

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Geochemical Analysis Certificate

0W-0775-RG1

Company: MPH CONSULTING LTD.
Project: C-1302
Attn: MR. BILL BRERETON

Date: JUN-14-90
Copy 1. 2406-120 ADELAIDE ST.W.TOR.ONT. M5H 1T1
2. FAX TO 416-365-1830
3. HOLD COPY FOR MR. P. SOBIE

We hereby certify the following Geochemical Analysis of 27 CORE samples submitted JUN-11-90 by MR. P. SOBIE.

Sample Number	Au ppb	Au check ppb	Ag ppm	Cu %	Pb %	Zn %
56-37-01	Nil		0.4	0.005		0.01
56-37-02	10		1.8	0.10		0.28
56-37-03	Nil		0.3	0.005		0.01
56-37-04	3		0.1	0.005		0.12
56-37-05	14		0.5	0.02		0.10
56-38-01	Nil		0.6	0.01	0.26	0.93
56-38-02	24		1.0	0.11	0.24	0.64
56-40-01	Nil		0.6	0.01	0.13	0.38
56-40-02	38	58	1.2	0.01	0.26	0.61
56-42-01	14		0.6	0.02		0.24
D12-152	10		1.6	0.35		0.76
D12-153	Nil		0.3	0.04		0.07
D12-154	Nil		0.3	0.02		0.20
D12-155	17		1.4	0.14		2.32
D12-156	267	243	5.4	0.10		2.53
D12-157	3		0.3	0.01	0.19	0.07
D12-158	Nil		1.6	0.12	0.37	2.05
D12-159	27		0.4	0.01		0.22
D12-160	21		2.8	0.12		4.69
D12-161	31	24	2.0	0.13	0.76	2.61
D12-162	10		1.3	0.11	0.34	1.04
D12-163	17		0.3	0.01		0.08
D12-164	21		0.7	0.03		0.18
D12-165	48		1.8	0.12		0.52
D12-166	58		2.4	0.06		0.84
D12-167	21		0.6	0.03		0.10
D12-168	27	17	1.0	0.03		0.17

Certified by G. Lebel

G. Lebel / Manager

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Geochemical Analysis Certificate

0T-0308-RG1

Company: MPH CONSULTING LTD.
Project: C-1302
Attn: BILL BRERETON

Date: JUN-18-90

Copy 1. 2406-120 ADELAIDE ST.W.TORONTO, ONT.
2. M5H 1T1 FAX TO 416-365-1830
3. HOLD COPY AND ALSO FAX TIMMINS LAB

We hereby certify the following Geochemical Analysis of 27 CORE samples submitted JUN-13-90 by P. SOBIE.

Sample Number	Au ppb	Au check ppb	Ag ppm	Cu %	Pb %	Zn %
74-16-01	3		1.4	0.18	0.23	0.84
74-16-02	24		1.4	0.17	0.55	1.32
74-16-03	Nil		1.4	0.21	0.09	0.62
74-16-04	45	31	1.8	0.09		1.16
74-16-05	31		1.2	0.01		0.10
74-16-06	Nil		0.9	0.02		0.13
74-16-07	41	58	0.3	0.02		0.17
D12-169	Nil		1.0	0.10		0.60
D12-170	Nil		0.3	0.04		0.20
D12-171	Nil		0.4	0.05		1.04
D12-172	Nil		0.5	0.01		0.69
D12-173	Nil		0.6	0.07		0.02
D12-174	Nil		1.0	0.06		1.51
D12-175	Nil		1.8	0.04	0.62	3.04
D12-176	Nil		0.8	0.01		1.11
D12-177	12		0.7	0.01		1.52
D12-178	3		0.4	0.01		0.16
D12-179	74	82	0.8	0.08		1.31
D12-180	Nil		0.4	0.02		0.17
D12-181	Nil		0.6	0.03		0.96
D12-182	10		0.2	0.005		0.05
D12-183	Nil		0.1	0.005		0.36
D12-184	Nil		1.2	0.02		0.12
D12-185	Nil		0.2	0.005		0.01
D12-186	Nil		1.1	0.02		1.51
D12-187	Nil		1.5	0.02	0.39	3.43
D12-188	Nil		0.3	0.03		0.39

Certified by G. Lebel

G. Lebel / Manager

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Assay Certificate

0T-0320-RA1

Company: MPH CONSULTING LTD.
Project: C-1302
Attn: B. BRERETON

Date: JUN-22-90

Copy 1. TORONTO
2. FAX TO TORONTO AND SWASTIKA LABS
3. HOLD FOR P. SOBIE

We hereby certify the following Assay of 20 ROCK AND CORE samples submitted JUN-18-90 by .

Sample Number	Cu %	Pb %	Zn %
66-61-04E	0.76	0.77	6.50
74-15-01	0.05	0.09	0.42
74-15-02	0.07	0.31	2.70
74-15-03	0.03	0.03	0.71
74-15-04	0.05	0.15	1.10
74-15-05	0.01	0.005	0.06
74-15-06	0.01	0.09	0.22
74-15-10	0.02		0.49
D12189	0.03		0.08
D12190	0.01		0.19
D12191	0.005	0.01	0.01
D12192	0.03	0.04	0.12
D12193	0.03	0.65	1.27
D12194	0.20	0.10	0.40
D12200	0.04		0.04
D12201	0.04		0.05
D12202	0.08		0.11
A90-01	0.01	0.11	0.23
A90-02	0.13	0.12	0.48
A90-03	0.02	0.005	0.06

Certified by G. Lebel

G. Lebel / Manager

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Assay Certificate

0T-0328-RA1

Company: MPH CONSULTING LTD.
Project: C-1302
Attn: B. BRERETON/P.SOBIE

Date: JUN-26-90
Copy 1. 2406-120 ADELAIDE ST.W.TORONTO,M5H 1T1

We hereby certify the following Assay of 62 CORE samples submitted JUN-21-90 by PAUL SOBIE.

Sample Number	Cu %	Pb %	Zn %
56-17-09	2.04	0.02	0.08
56-17-10	1.53	0.02	0.30
57-68-08	0.04	0.11	1.62
57-07-03	0.07	0.26	1.93
61-82-02	0.04	0.01	0.15
61-82-03	0.08	0.03	0.25
66-62E-04	0.44	0.06	0.93
66-62E-05	0.19	0.02	1.05
74-13-01	0.69	0.03	1.43
74-13-02	0.28	0.29	2.57
74-13-03	1.46	2.47	11.88
74-13-04	2.54	0.08	1.16
74-13-05	0.30	0.02	1.93
74-13-06	0.05	0.09	3.17
74-14-01	0.26	0.49	2.09
74-14-03	0.60	0.41	2.86
74-14-04	0.01	0.08	0.34
74-14-05	0.01	0.04	0.19
74-14-06	0.36	0.46	3.12
74-19-01	0.02	0.08	0.32
74-19-02	0.17	0.53	1.35
74-20-01	0.02	0.06	0.73
74-20-02	0.05	0.02	2.62
74-21-01	0.04	0.23	2.11
74-21-02	0.17	0.83	2.34
74-21-03	0.29	0.43	1.77
A-90-04	0.02	0.005	0.06
A-90-05	0.03	0.01	0.08
A-90-06	0.02	0.08	0.60
A-90-07	0.10	0.48	1.07

Certified by G. Lebel

G. Lebel / Manager

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Company: MPH CONSULTING LTD.
Project: C-1302
Attn: B. BRERETON/P.SOBIE

Date: JUN-26-90
Copy 1. 2406-120 ADELAIDE ST.W.TORONTO,M5H 1T1

We hereby certify the following Assay of 62 CORE samples submitted JUN-21-90 by PAUL SOBIE.

Sample Number	Cu %	Pb %	Zn %
A-90-08	0.04	0.45	1.09
A-90-09	0.02	0.24	0.25
A-90-10	0.10	0.05	0.31
D12-203	0.05		0.46
D12-204	0.02		0.005
D12-205	0.06		0.37
D12-206	0.01		0.04
D12-207	0.10	0.03	0.08
D12-208	0.09	0.48	1.82
D12-209	0.13		4.78
D12-210	0.005		0.06
D12-211	0.08	0.78	2.04
D12-212	0.04	0.53	1.83
D12-213	0.005		0.94
D12-214	0.67		2.22
D12-215	0.19		0.82
D12-216	0.16	0.03	0.68
D12-217	0.35	0.02	0.64
D12-218	0.04	0.03	0.16
D12-219	0.20	0.08	0.66
D12-220	0.05	0.21	1.74
D12-221	0.23	0.13	1.94
D12-222	0.18	0.24	0.84
D12-223	0.19	0.21	0.95
D12-224	0.33	0.15	1.40
D12-225	0.09	0.19	0.94
D12-226	0.07	0.31	1.29
D12-227	0.13	0.25	0.92
D12-228	0.03		0.13
D12-229	0.06		0.56

Certified by G. Lebel

G. Lebel / Manager

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Assay Certificate

0T-0328-RA1

Company: **MPH CONSULTING LTD.**
Project: C-1302
Attn: B. BRERETON/P.SOBIE

Date: JUN-26-90
Copy 1. 2406-120 ADELAIDE ST.W.TORONTO,M5H 1T1

We hereby certify the following Assay of 62 CORE samples submitted JUN-21-90 by PAUL SOBIE.

Sample Number	Cu %	Pb %	Zn %
D12-230	0.04		0.75
D12-231	0.06		0.19

Certified by ____________________

G. Lebel / Manager

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Assay Certificate

0T-0335-RA1

Company: MPH CONSULTING LTD.
Project: C-1302
Attn: W. Brereton / P. Sobie

Date: AUG-02-90

Copy 1. 2406-120 ADELAIDE ST.W.,TORONTO, ONT
2. FAX TO 416-365-1830
3. FAX TO SWASTIKA LAB TIMMINS

We hereby certify the following Assay of 55 ROCK/CORE samples submitted JUN-25-90 by P. SOBIE.

Sample Number	Au g/tonne	Cu %	Pb %	Zn %
A90-11		0.03	0.07	1.38
A90-12		0.005	0.005	0.10
A90-13		0.005	0.01	0.04
A90-14		0.005	0.005	0.04
A90-15		0.005	0.005	0.04
A90-16		0.005	0.005	0.06
A90-18		0.005	0.005	0.05
A90-19		0.005	0.005	0.04
A90-20		0.005	0.005	0.05
A90-21		0.01	0.005	0.03
D12-232		0.01	0.09	0.32
D12-233		0.02	0.10	0.21
D12-234		0.03	0.06	0.15
D12-235		0.07	0.33	0.80
D12-236		0.005	0.04	0.10
D12-237		0.02	0.30	1.58
D12-238		0.04	0.71	2.63
D12-239		0.005	0.46	1.12
D12-240		0.005	0.11	0.39
D12-241		0.005	0.10	0.29
D12-242		0.005	0.01	0.02
D12-243		0.09	0.38	1.19
D12-244		0.005	0.005	0.02
D12-245		0.005	0.01	0.04
D12-247		0.02	0.02	0.15
D12-248		0.01	0.01	0.10
D12-249		0.01	0.005	0.04
D12-250		0.03	0.04	0.13
D12-251		0.01	0.005	0.03
D12-252		0.05	0.14	0.73

Certified by G. Lebel

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0
Telephone (705) 642-3244 FAX (705)642-3300

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Assay Certificate

0T-0335-RA1

Company: MPH CONSULTING LTD.
Project: C-1302
Attn: W. Brereton / P. Sobie

Date: AUG-02-90

Copy 1. 2406-120 ADELAIDE ST.W.,TORONTO, ONT
2. FAX TO 416-365-1830
3. FAX TO SWASTIKA LAB TIMMINS

We hereby certify the following Assay of 55 ROCK/CORE samples submitted JUN-25-90 by P. SOBIE.

Sample Number	Au g/tonne	Cu %	Pb %	Zn %
D12-253		0.02	0.19	0.63
D12-254		0.02	0.005	0.02
D12-255		0.005	0.01	0.13
D12-256		0.06	0.13	0.71
D12-257		0.005	0.005	0.19
D12-258		0.005	0.005	0.01
D12-259		0.01	0.02	0.04
D12-260		0.02	0.005	0.005
D12-261		0.03	0.005	0.07
D12-262		0.005	0.005	0.02
D12-263		0.02	0.005	0.04
D12-264		0.02	0.005	0.01
D12-265		0.05	0.01	0.08
D12-268		0.02	0.01	0.08
D12-269		0.01	0.005	0.05
D12-270		0.01	0.05	0.23
D12-271		0.01	0.01	0.02
D12-272		0.005	0.005	0.03
D12-273		0.01	0.01	0.06
D12-283	Nil	0.02	0.005	0.14
D12-284		0.02	0.20	1.47
D12-285		0.04	0.12	0.53
D12-286		0.01	0.005	0.05
D12-287		0.01	0.005	0.01
D12-288		0.02	0.005	0.02

Certified by G. Lebel

G. Lebel / Manager

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Assay Certificate

0T-0336-RA1

Company: MPH CONSULTING LTD.
Project: C-1302
Attn: W.Brereton / P. Sobie

Date: JUL-03-90
Copy 1. TORONTO, ONT. MH5 1T1

We hereby certify the following Assay of 36 CORE samples submitted JUN-26-90 by P. SOBIE.

Sample Number	Cu %	Pb %	Zn %
56-65-01	0.06	0.51	4.26
56-65-02	0.04	0.03	0.13
56-65-04	0.005	0.005	0.01
56-65-05	0.01	0.08	0.18
56-65-06	0.02	0.14	0.52
74-11-06	0.21	0.36	1.01
74-11-07	0.10	0.38	2.39
74-11-08	0.09	0.89	3.56
74-11-09	0.15	0.42	1.78
74-11-10	0.05	0.57	1.99
74-11-11	0.10	0.50	1.73
74-11-14	0.005	0.01	0.05
74-13-07	0.08	0.20	6.13
74-13-08	0.02	0.27	2.47
74-13-09A	0.02	0.18	2.00
74-13-09B	0.005	0.005	0.03
74-13-10	0.06	0.42	3.62
74-14-02	0.005	0.02	0.08
74-14-07	0.03	0.49	1.46
74-14-08	0.04	0.73	1.98
74-14-09	0.01	0.03	0.15
74-15-07	0.02	0.005	0.15
74-15-08	0.02	0.07	0.34
74-15-09	0.005	0.005	0.01
74-15-11	0.01	0.005	0.04
74-15-12	0.01	0.005	0.27
74-15-13	0.005	0.005	0.07
74-15-14	0.005	0.005	0.005
74-15-15	0.005	0.005	0.01
74-19-03	0.01	0.01	0.06

Certified by [signature]

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0
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Assay Certificate

0T-0336-RA1

Company: MPH CONSULTING LTD.
Project: C-1302
Attn: W.Brereton / P. Sobie

Date: JUL-03-90
Copy 1. TORONTO, ONT. MH5 1T1

We hereby certify the following Assay of 36 CORE samples submitted JUN-26-90 by P. SOBIE.

Sample Number	Cu %	Pb %	Zn %
74-20-03	0.03	0.05	0.52
74-20-04	0.005	0.005	1.24
74-20-05	0.01	0.02	1.52
74-20-06	0.005	0.005	0.05
74-20-07	0.005	0.005	0.005
74-20-08	0.02	0.03	0.20

Certified by G. Lebel
G. Lebel / Manager

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Telephone (705) 642-3244, FAX (705)642-3300

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Assay Certificate

0T-0350-RA1

Company: **MPH CONSULTING LTD.**

Date: JUL-10-90

Project:

Copy 1. MPH,TORONTO,FAX
2. COPY TO TIMMINS FOR P.SOBIE, FAX

Attn: P.SOBIE/W.BRERETON

We hereby certify the following Assay of 52 CORE samples submitted JUL-05-90 by .

Sample Number	Cu %	Pb %	Zn %
56-32-04	0.01	0.005	0.02
65-104-01	0.13		0.09
65-104-02	1.32		0.47
66-108-08	0.04	0.07	0.28
68-04-01	0.01	0.04	0.10
68-04-02	0.005	0.005	0.005
68-04-03	0.005	0.03	0.05
68-04-04	0.12	0.80	2.86
68-04-06	0.09	0.27	2.27
68-04-08	0.04	0.25	1.21
68-04-09	0.01	0.02	0.10
68-04-10	0.11	0.21	1.21
68-04-11	0.03	0.03	0.21
68-04-12	0.005	0.01	0.04
68-04-13	0.02	0.02	1.20
68-04-14	0.01	0.01	0.08
68-04-15	0.14	0.08	0.32
68-05-01	0.03	0.005	0.11
68-05-02	0.01	0.01	0.04
68-06-01	0.005	0.10	0.40
68-06-03	0.02	0.05	3.86
68-06-04	0.01	0.01	0.57
68-06-05	0.01	0.12	0.42
68-10-01	0.04	0.28	2.80
68-12-01	0.01	0.005	0.05
68-12-02	0.14	0.25	0.86
68-13-01	0.04	0.06	0.18
68-13-02	0.03	0.07	1.08
68-13-03	0.01	0.02	0.06
68-18-01	0.07	0.19	1.37

Certified by G. Lebel

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0
Telephone (705) 642-3244 FAX (705)642-3300

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Assay Certificate

0T-0350-RA1

Company: MPH CONSULTING LTD.
Date: JUL-10-90

Project:
Copy 1. MPH,TORONTO,FAX

Attn: P.SOBIE/W.BRERETON
2. COPY TO TIMMINS FOR P.SOBIE, FAX

We hereby certify the following Assay of 52 CORE samples submitted JUL-05-90 by .

Sample Number	Cu %	Pb %	Zn %
68-18-03	0.05	0.05	0.30
68-18-04	0.08	0.21	0.65
68-19-03	0.01	0.005	0.01
68-19-04	0.12	0.36	1.82
68-20-01	0.56	0.02	4.25
68-20-04	0.08	0.35	1.23
68-20-06	0.05	0.02	0.33
68-20-07	0.02	0.02	0.36
79-09-01	0.13	0.27	1.12
79-09-02	0.01	0.005	0.06
79-09-03	0.09	0.16	0.77
79-09-04	0.005	0.005	0.20
79-09-05	0.02	0.005	0.42
74-13-A	0.03	0.13	0.59
D12-309	0.05		0.01
D12-310	0.01		0.11
D12-311	0.02		0.13
D12-312	0.01		0.03
D12-313	0.01	0.02	0.02
D12-314	0.02	0.19	0.48
D12-315	0.12	0.20	0.51
D12-316	0.11	0.18	0.61

Certified by G. Lebel

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0

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0T-0351-RA1

Company: M.P.H. CONSULTING LIMITED
Date: JUL-09-90
Project:
Copy 1. MPH TORONTO FAX
2. COPY TO TIMMINS FOR P.SOBIE,FAX
Attn: P.SOBIE/W.BRERETON

We hereby certify the following Assay of 52 CORE samples submitted JUL-05-90 by .

Sample Number	Cu %	Pb %	Zn %
D12-317	0.27	0.25	1.03
D12-318	0.13	0.14	0.69
D12-321	0.25	0.08	0.60
D12-322	0.03		0.08
D12-323	0.01		0.25
D12-324	0.27		2.02
D12-325	0.02		0.65
D12-326	0.11		0.35
D12-327	0.04		0.10
D12-328	0.06		0.24
D12-329	0.04		0.25
D12-330	0.01		0.30
D12-331	0.01	0.06	0.18
D12-332	0.13	0.27	0.70
D12-333	0.03	0.09	0.23
D12-334	0.01	0.07	0.14
D12-335	0.01	0.16	0.41
D12-336	0.27	0.33	1.65
D12-337	0.33	0.13	0.41
D12-338	0.10	0.45	1.53
D12-339	0.46	2.41	7.24
D12-340	0.03	0.07	0.18
D12-341	0.08	0.14	0.33
D12-342	0.13	0.11	0.47
D12-343	0.06	0.12	0.40
D12-344	0.01	0.08	0.21
D12-345	0.48	1.08	1.35
D12-347	0.07	0.44	1.51
D12-348	0.04	0.25	1.00
D12-349	0.03	0.05	0.17

Certified by G. Lebel

G. Lebel / Manager

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Assay Certificate

Company: M.P.H. CONSULTING LIMITED

Date: JUL-09-90

Project:

Attn: P.SOBIE/W.BRERETON

Copy 1. MPH TORONTO FAX
2. COPY TO TIMMINS FOR P.SOBIE,FAX

We hereby certify the following Assay of 52 CORE samples submitted JUL-05-90 by .

Sample Number	Cu %	Pb %	Zn %
D12-350	0.29	0.11	1.03
D12-351	0.02	0.20	0.61
D12-352	0.01	0.11	0.17
D12-353	0.04	0.05	0.31
D12-354	0.04	0.005	0.01
D12-355	0.005	0.005	0.17
D12-356	0.005	0.04	0.03
D12-357	0.01	0.05	0.12
D12-358	0.01	0.15	0.46
D12-359	0.03	0.04	0.25
D12-360	0.005	0.005	0.01
D12-361	0.01	0.04	0.27
D12-362	0.06	0.01	0.41
D12-363	0.005		0.005
D12-364	0.01		0.06
D12-365	0.05	0.02	0.08
D12-366	0.17	0.05	0.05
D12-367	0.005	0.005	0.01
D12-368	0.005	0.005	0.01
SE1-01	0.05	0.02	0.38
SE1-02	0.08	0.01	0.28
SE1-03	0.01	0.01	0.27

Certified by G. Lebel

G. Lebel / Manager

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Assay Certificate

0T-0379-RA1

Company: M.P.H. CONSULTING
Project:
Attn: W. BRERETON

Date: JUL-25-90
Copy 1. FAX 416-365-1830

We hereby certify the following Assay of 62 CORE samples submitted JUL-23-90 by .

Sample Number	Cu %	Pb %	Zn %
56-34-01	0.005		0.07
56-34-02	0.06	0.01	0.16
56-34-03	0.01		0.07
56-34-04	0.005		0.03
56-54-01	0.01		0.05
56-54-02	0.01	0.09	0.47
56-54-03	0.02		0.08
56-55-02	0.005		0.09
56-55-03	0.01		0.16
56-55-04	0.02		0.15
56-55-05	0.02		0.04
56-55-06	0.05		0.12
56-55-07	0.04		0.53
66-116-01	0.005	0.005	0.01
68-01-01	0.005	0.005	0.005
68-01-02	0.02	0.005	0.24
68-01-03	0.04	0.005	0.13
D-12-370	0.005	0.10	0.30
D-12-371	0.01	0.005	0.02
D-12-372	0.05	0.11	0.37
D-12-373	0.10	0.15	1.57
D-12-374	0.25	0.26	0.84
D-12-375	0.50	0.14	0.75
D-12-376	0.25	0.36	0.82
D-12-377	0.05	0.09	0.37
D-12-378	0.17	0.08	0.32
D-12-379	0.04	0.07	0.31
D-12-380	0.36	0.65	1.88
D-12-381	0.03	0.04	0.20
D-12-382	0.01	0.04	0.76

Certified by G. Lebel

G. Lebel / Manager

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0T-0379-RA1

Company: M.P.H. CONSULTING

Date: JUL-25-90

Project:

Copy 1. FAX 416-365-1830

Attn: W. BRERETON

We hereby certify the following Assay of 62 CORE samples submitted JUL-23-90 by .

Sample Number	Cu %	Pb %	Zn %
D-12-383	0.04		0.30
D-12-384	0.34	0.01	0.42
D-12-385	0.04	0.01	0.04
D-12-386	0.08	0.06	0.16
D-12-387	0.04	0.07	0.36
D-12-388	0.19	0.04	0.69
D-12-389	0.15	0.02	0.26
D-12-390	0.19	0.65	1.61
D-12-391	0.22	0.27	0.91
D-12-392	0.30	0.07	0.66
D-12-393	0.21	0.06	0.26
D-12-397	0.04	0.05	0.21
D-12-398	0.03	0.03	0.13
D-12-400	0.02	0.02	0.21
D-12-402	0.005	0.01	0.10
D-12-403	0.01	0.005	0.09
D-12-404	0.02	0.005	0.10
D-12-405	0.01	0.13	0.33
D-12-406	0.02		0.02
D-12-407	0.01		0.01
D-12-408	0.01		0.02
D-12-409	0.02	0.03	0.15
D-12-410	0.02	0.05	0.29
D-12-411	0.04	0.005	0.13
D-12-412	0.01	0.005	0.05
D-12-413	0.005	0.02	0.02
D-12-414	0.005	0.04	0.08
D-12-415	0.02	0.04	0.25
D-12-416	0.01	0.005	0.09
D-12-417	0.05	0.06	0.22

Certified by G. Lebel

G. Lebel / Manager

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Company: M.P.H. CONSULTING Date: JUL-25-90

Project: Copy 1. FAX 416-365-1830

Attn: W. BRERETON

We hereby certify the following Assay of 62 CORE samples submitted JUL-23-90 by .

Sample Number	Cu %	Pb %	Zn %
JIM-01-04	0.01	0.22	0.66
JIM-01-05	0.04	0.20	1.47

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G. Lebel / Manager

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0W-1070-PA1

Company: MPH CONSULTING
Project: C-1302
Attn: BILL BRERETON

Date: JUL-31-90
Copy 1. TORONTO, ONTARIO M5H 1T1
2. FAX TO 416-365-1830

We hereby certify the following Assay of 11 PULP samples submitted JUL-27-90 by B. BRERETON.

Sample Number	Ag oz/ton	Cd %
74-13-07	0.05	0.019
74-13-10	0.06	0.013
56-65-01	0.04	0.015
74-13-03	0.24	0.041
74-13-04	0.22	0.005
74-21-02	0.13	0.009
D12-211	0.03	0.008
D12-238	0.06	0.010
68-20-01	0.05	0.014
68-04-04	0.06	0.011
68-04-06	0.05	0.008

Certified by G. Lebel

G. Lebel / Manager

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0T-0401-RA1

Company: MPH CONSULTING
Project: C-1302
Attn: P.SOBIE/W.BRERETON

Date: AUG-03-90
Copy 1. TORONTO,ONTARIO M5H 1T1

We hereby certify the following Assay of 60 CORE samples submitted JUL-31-90 by .

Sample Number	Au g/tonne	Au check g/tonne	Cu %	Pb %	Zn %
56-11-03	0.02				
56-34-05			0.02	0.005	0.02
56-34-06			0.02	0.03	0.09
56-34-07			0.01	0.01	0.05
56-55-08			0.06	0.26	1.35
56-55-09			0.02	0.05	0.20
56-56-04			0.01	0.11	0.40
56-56-05			0.005	0.02	0.04
56-56-06			0.005	0.005	0.01
56-56-07			0.04	0.04	0.27
56-56-08			0.02	0.15	0.40
56-56-09			0.01	0.09	0.27
56-56-10			0.01	0.06	0.26
56-57-08			0.06	0.02	0.24
56-57-09			0.02	0.13	0.48
56-57-10			0.12	0.03	0.36
56-57-11			0.08	0.12	0.48
56-57-12			0.14	0.05	0.39
56-57-13			0.09	0.83	2.93
56-57-14			0.06	0.17	1.06
56-57-15			0.02	0.05	0.33
56-57-16			0.03	0.01	0.06
56-67-00			0.01	0.04	0.10
56-67-01			0.01	0.07	0.23
56-67-10			0.02	0.04	0.22
57-68-04	0.05	0.05			
57-68-11			0.01	0.01	0.07
57-68-12			0.005	0.005	0.02
57-68-13			0.005	0.005	0.01
57-68-14			0.005	0.005	0.03

Certified by ____________

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0
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Company: MPH CONSULTING
Project: C-1302
Attn: P.SOBIE/W.BRERETON

Date: AUG-03-90
Copy 1. TORONTO,ONTARIO M5H 1T1

We hereby certify the following Assay of 60 CORE samples submitted JUL-31-90 by .

Sample Number	Au g/tonne	Au check g/tonne	Cu %	Pb %	Zn %
57-68-15			0.01	0.02	0.12
57-68-16			0.01	0.01	0.01
57-69-04			0.01	0.005	0.13
57-69-05			0.01	0.01	0.04
57-69-06	0.04		0.02	0.01	0.06
57-69-07	0.04		0.07	0.09	0.24
57-69-08			0.01	0.005	0.04
57-71-02	Nil				
57-71-03			0.01	0.02	0.90
57-71-04			0.01	0.005	0.17
61-82-04			0.02	0.005	0.005
61-82-05			0.02	0.04	0.20
61-82-06			0.04	0.02	0.10
61-82-07			0.04	0.005	0.06
61-83-05			0.10	0.57	1.32
61-83-06			0.50	0.29	2.06
61-83-07			0.10	0.09	0.47
61-83-08			0.58	0.03	0.33
61-83-09			0.45	0.47	1.48
61-83-11			0.07	0.12	0.44
61-88 09			0.07	0.09	0.19
61-88-10			0.07	0.38	1.17
61-88-11			0.05	0.12	0.18
61-89-05A			0.02	0.02	0.05
61-89-08			0.03	0.06	0.49
66-61e-01	0.16	0.16			
66-111-01			0.01	0.01	0.08
66-111-02			0.03	0.05	0.36
66-111-03			0.005	0.02	0.13
66-111-04			0.005	0.02	0.06

Certified by G. Lebel

G. Lebel / Manager

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Project: C-1302
Attn: P.SOBIE/W.BRERETON

Date: AUG-02-90
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We hereby certify the following Assay of 56 CORE samples submitted JUL-31-90 by .

Sample Number	Au g/tonne	Au check g/tonne	Cu %	Pb %	Zn %
66-111-05			0.09	0.16	1.12
66-112-02			0.02	0.005	0.09
68-01-05			0.01	0.005	0.03
68-01-07			0.16	0.14	0.72
68-01-10			0.005	0.01	0.09
68-04-16			0.01	0.01	0.02
68-05-03			0.005	0.01	0.05
68-06-06			0.005	0.005	0.01
68-10-02			0.15	0.09	0.48
68-10-03			0.01	0.13	0.39
68-12-03			0.005	0.09	0.19
68-12-04			0.005	0.005	0.01
68-13-04			0.005	0.03	0.18
68-13-05			0.005	0.005	0.005
68-14-02			0.02	0.01	0.05
68-14-03			0.04	0.005	0.21
68-19-05			0.03	0.03	0.17
68-19-06			0.005	0.01	0.02
68-19-07			0.05	0.03	0.06
74-11-12			0.005	0.01	0.16
74-11-13			0.01	0.08	0.20
74-13-11			0.07	0.005	0.29
74-13-12			0.10	0.01	0.15
74-18-01			0.02	0.15	1.18
74-18-02			0.14	0.12	3.85
74-18-04			0.04	0.01	0.32
74-19-04			0.01	0.08	0.22
74-20-09			0.11	0.33	1.54
74-20-10			0.02	0.02	0.08
74-21-04			0.07	0.11	0.49

Certified by G. Lebel

G. Lebel / Manager

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Company: MPH CONSULTING
Project: C-1302
Attn: P.SOBIE/W.BRERETON

Date: AUG-02-90
Copy 1. TORONTO, ONTARIO M5H 1T1

We hereby certify the following Assay of 56 CORE samples submitted JUL-31-90 by .

Sample Number	Au g/tonne	Au check g/tonne	Cu %	Pb %	Zn %
74-21-05			0.31	0.14	1.78
74-21-06			0.05	0.11	0.51
74-21-07			0.04	0.11	0.26
D-12-266	0.03	0.03			
D-12-267	0.03				
D-12-274			0.02	0.01	0.06
D-12-275			0.02	0.08	0.26
D-12-276			0.03	0.06	0.34
D-12-277			0.02	0.05	0.21
D-12-289	0.01				
D-12-290	0.02				
D-12-291	Nil				
D-12-292	0.01	0.01			
D-12-304	0.01		0.02	0.01	0.08
D-12-305	0.02		0.01	0.01	0.08
D-12-306	Nil		0.01	0.03	0.12
D-12-307	0.01		0.02	0.17	0.53
D-12-308			0.02	0.005	0.02
D-12-395			0.01	0.01	0.11
D-12-396			0.01	0.01	0.04
D-12-401			0.01	0.02	0.12
SE-02-02			0.01	0.03	0.07
SE-02-03			0.005	0.01	0.03
SE-02-04			0.06	0.01	0.20
SE-02-05			0.005	0.03	0.10
SE-02-06			0.005	0.005	0.005

Certified by G. Lebel

G. Lebel / Manager

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Telephone (705) 642-3244. FAX (705)642-3300

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Assay Certificate

0W-1195-RA1

Company: MPH CONSULTING LTD
Project: C-1302
Attn: W. BRERETON

Date: AUG-23-90

Copy 1. Suite 2406-120 Adelaide St.W. T.O.
2. M5H 1T1
3. fax to 416-365-1830

We hereby certify the following Assay of 31 ROCK samples submitted AUG-17-90 by P. SOBIE.

Sample Number	Au g/tonne	Au check g/tonne	Ag oz/ton	Cd %	Co %	Cu %	Pb %	Zn %
KRW-90-01	0.16	0.15	0.02	0.005	0.005	0.06	0.005	0.57
TR-A-00-A	0.01			0.005	0.005	0.007	0.10	0.24
TR-A-00-B	Nil			0.01	0.005	0.13	0.67	2.25
TR-A-01-A	0.02		0.04	0.01	0.005	0.05	1.80	2.32
TR-A-01-B	Nil		0.05	0.02	0.005	0.05	3.10	4.46
TR-A-01-C	0.04		0.56	0.06	0.01	0.86	5.96	15.80
TR-A-02	0.03		0.02	0.005	0.005	0.05	0.16	1.15
TR-A-03	Nil		0.01	0.005	0.005	0.03	0.10	1.21
TR-A-03-B	Nil		0.08	0.03	0.005	0.07	0.94	10.58
TR-A-04-A	0.01		0.06	0.005	0.005	0.04	0.60	1.66
TR-A-04-B	Nil		0.01	0.005	0.005	0.005	0.01	0.03
TR-A-04-C	Nil		0.01	0.005	0.005	0.02	0.08	0.39
TR-A-04-D	0.01		0.01	0.005	0.005	0.03	0.16	0.70
TR-A-04-E	Nil		0.04	0.02	0.005	0.08	0.44	6.04
TR-A-05 (grab)	Nil	Nil						
TR-MZ-01	Nil			0.005	0.005	0.005	0.04	0.07
TR-MZ-02-A	Nil		0.01	0.005	0.005	0.02	0.01	0.03
TR-MZ-02-B	0.01		0.05	0.005	0.005	0.04	0.32	0.78
TR-MZ-02-C	0.01		0.03	0.005	0.005	0.02	0.01	0.05
TR-MZ-02-D	Nil		0.50	0.02	0.01	3.89	1.27	5.68
TR-MZ-03-A	Nil		0.22	0.02	0.02	1.53	0.43	6.96
TR-MZ-03-B	Nil		0.03	0.005	0.01	0.14	0.35	0.86
TR-MZ-03-C	Nil		0.02	0.005	0.005	0.03	0.05	0.93
TR-MZ-04	Nil			0.005	0.005	0.04	0.01	0.17
TR-C-01	0.01			0.005	0.005	0.02	0.005	0.07
TR-C-02	Nil			0.005	0.01	0.01	0.005	0.06
TR-C-03	Nil			0.005	0.005	0.05	7.58	0.13
TR-C-04-A	Nil			0.005	0.005	0.03	0.07	0.27
TR-C-04-B	Nil			0.005	0.005	0.01	0.01	0.10
TR-B-01 (grab)	0.11	0.10	0.02	0.005	0.005	0.01	0.03	0.02
TR-B-02 (grab)	0.02		0.05	0.005	0.01	0.10	0.005	0.33

Certified by G. Lebel

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0

Telephone (705) 642-3244 FAX (705)642-3300

Swastika Laboratories

A Division of Assayers Corporation Ltd.

Established 1928

Assaying - Consulting - Representation

Assay Certificate

0W-1224-RA1

Company: MPH CONSULTING LTD.
Project:
Attn: MR. W. BRERETON

Date: AUG-24-90
Copy 1. 2406-120 ADELAIDE ST.W.TORONTO,ONT
2. M5H 1T1 FAX TO 416-365-1830

We hereby certify the following Assay of 1 ROCK samples submitted AUG-21-90 by MR. BRERETON.

Sample Number	Au g/tonne	Ag oz/ton	Cd %	Cu %	Pb %	Zn %
D-90-01	0.11	0.38	0.012	11.13	0.05	3.56

Certified by G. Lebel

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0
Telephone (705) 642-3244 FAX (705)642-3300

Swastika Laboratories

A Division of Assayers Corporation Ltd.

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Assaying - Consulting - Representation

Assay Certificate

0W-1277-RA1

Company: M.P.H. CONSULTING LTD.
Project:
Attn: W. BRERETON

Date: AUG-31-90
Copy 1. 2406-120 ADELAIDE ST. W. TORONTO
2. FAX TO TORONTO

We hereby certify the following Assay of 1 ROCK samples submitted AUG-29-90 by P. SOBIE.

Sample Number	Au g/tonne	Ag oz/ton	Cd %	Co %	Cu %	Pb %	Zn %
E-90-01	0.04	0.35	0.001	0.005	3.60	0.02	0.46

Certified by [signature]

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0
Telephone (705) 642-3244, FAX (705)642-3300

Swastika Laboratories
A Division of Assayers Corporation Ltd.
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Assaying - Consulting - Representation

Assay Certificate

0W-1467-RA1

Company: MPH CONSULTING LTD

Date: OCT-02-90

Project:

Copy 1. 2406-120 ADELAIDE ST.W.TORONTO, ONT

Attn:

2. M5H 1T1 FAX TO 416-365-1830

We hereby certify the following Assay of 1 ROCK samples submitted SEP-28-90 by P. SOBIE.

Sample Number	Au g/tonne	Au check g/tonne	Ag oz/ton	Cu %	Pb %	Zn %
A-90-01	0.08	0.10	0.32	8.08	0.04	1.84

*Certified by*________________________

G. Lebel / Manager

P.O. Box 10, Swastika, Ontario P0K 1T0

Telephone (705) 642-3244 FAX (705)642-3300

T S L LABORATORIES
DIVISION OF BURGENER TECHNICAL ENTERPRISES LIMITED
2031 RIVERSIDE DRIVE, UNIT #2
TIMMINS, ONTARIO
P4N 7C3
(705) 268-4441 FAX: (705) 268-4420

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM MPH Consulting Ltd.
120 Adelaide St. West
Suite 2406
Toronto, Ontario
M5H 1T1

REPORT No. W4965

SAMPLE(S) OF core

INVOICE #: 4990
P.O.: C-1302

William Brereton
Shunsby

	CO2 Percent
SE-1-FW	5.78
SE-2-FW	8.60
SE-3-FW	8.05
SE-4-FW	8.16
56-27-FW	0.55
56-37-FW	0.97
56-44-FW	7.05
56-49-FW	7.91
56-52-FW	5.82
56-69-FW	0.51
56-61-VB	3.67
56-62-VB	0.79
56-64-VB	0.77
56-69-VB	6.22
57-70-VB	7.03
60-76-FW	0.48
60-79-FW	0.23
61-91-FW	9.30
61-91-VB	9.08
65-70E-FWA	8.02

COPIES TO: Toronto
INVOICE TO: Toronto

Nov 29/90

SIGNED Diane Michaud for Evelyn White

CTA

For enquiries on this report, please contact Customer Service Department.
Samples, Pulps and Rejects discarded two months from the date of this report.

T S L LABORATORIES
DIVISION OF BURGENER TECHNICAL ENTERPRISES LIMITED
2031 RIVERSIDE DRIVE, UNIT #2
TIMMINS, ONTARIO
P4N 7C3
(705) 268-4441 FAX: (705) 268-4420

CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM MPH Consulting Ltd.
120 Adelaide St. West
Suite 2406
Toronto, Ontario
M5H 1T1

REPORT No.
W4965

INVOICE #: 4990
P.O.: C-1302

SAMPLE(S) OF Core

William Brereton
Shunsby

	CO2 Percent
65-70E-FWB	1.46
65-72E-FW	6.77
65-94-FW	5.93
65-101-FW	7.36
66-108-FW	5.27
66-110-FW	5.09
66-108-VB	4.43
68-6-VB	4.58
68-13-VB	5.45
68-16-VB	7.80
68-20-VB	1.68
68-6-FW	2.53
68-13-FW	3.77
68-16-FW	7.36
68-17-FW	3.99
68-20-FW	6.95
64-82e-FW	0.51

COPIES TO: Toronto
INVOICE TO: Toronto

Nov 29/90

SIGNED Diane Michaud for Evelyn White

CTA

For enquiries on this report, please contact Customer Service Department.
Samples, Pulps and Rejects discarded two months from the date of this report.

[redacted]

T S L LABORATORIES WOFHP
2031 RIVERSIDE DRIVE, UNIT 2, TIMMINS, ONTARIO P4N 7C3
TELEPHONE #: (705) 268 - 4441
FAX #: (705) 268 - 4420

[redacted]

I.C.A.P. WHOLE ROCK ANALYSISWOFHP

Lithium MetaBorate Fusion

[redacted]PH CONSULTING
[redacted]20 Adelaide St. W.
Toronto, Ontario

T.S.L. REPORT No. : W4965
T.S.L. File No. : M8486
T.S.L. Invoice No. : 4990

[redacted]OUR REFERENCE - P.O. C-1302 - Project Shunsov

[redacted]SAMPLE #	SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	Na2O %	K2O %	TiO2 %	MnO %	P2O5 %	LOI %	TOTAL %
SE-1-FW	61.01	8.14	7.47	8.19	3.19	0.40	0.86	0.42	0.16	0.06	8.40	98.29
[redacted]2-FW	41.93	12.35	10.91	10.53	6.61	1.01	1.30	0.71	0.16	0.08	13.11	98.71
[redacted]3-FW	41.62	12.94	11.04	11.56	5.87	0.30	1.16	0.74	0.18	0.06	12.78	98.25
SE-4-FW	41.79	13.26	11.30	10.41	6.51	0.31	1.40	0.74	0.16	0.06	12.16	98.13
[redacted]27-FW	47.04	24.38	13.76	1.01	3.65	1.41	1.82	1.48	0.15	0.10	4.87	99.67
56-37-FW	46.86	14.22	17.35	1.36	12.21	0.12	0.10	0.74	0.10	0.36	7.15	100.58
[redacted]44-FW	43.12	14.09	11.06	9.66	7.37	0.75	0.62	0.51	0.15	0.06	12.13	99.54
[redacted]-49-FW	43.59	13.47	11.22	11.34	6.42	0.54	0.76	0.77	0.17	0.06	12.53	100.86
56-52-FW	43.81	15.23	14.13	6.86	5.63	0.51	1.02	0.86	0.25	0.10	10.29	98.69
56-69-FW	60.40	14.13	12.40	0.66	3.15	2.03	0.98	0.60	0.07	0.08	4.53	99.03
[redacted]61-VB	+51.75	15.76	13.20	3.82	5.33	0.36	1.32	0.87	0.19	0.08	7.44	100.12
56-62-VB	✓48.56	17.83	14.27	1.08	8.40	0.27	0.74	0.93	0.13	0.14	5.87	98.21
[redacted]64-VB	58.53	19.75	8.53	2.01	3.50	0.82	1.82	1.10	0.11	0.10	4.61	100.88
[redacted]69-VB	✓44.40	16.44	11.82	8.50	5.34	0.40	1.86	0.90	0.17	0.06	10.69	100.57
57-70-VB	45.68	14.56	11.46	10.07	4.20	0.53	0.82	0.78	0.36	0.06	10.61	99.14
[redacted]76-FW	43.25	21.36	18.13	1.61	4.63	0.71	1.26	1.27	0.21	0.06	5.33	97.81
60-79-FW	53.19	18.90	15.90	0.52	3.40	0.59	0.84	1.13	0.21	0.04	4.34	99.06
61-91-FW	44.04	12.08	10.98	12.65	4.94	0.88	0.54	0.71	0.19	0.06	12.86	99.92
[redacted]91-VB	45.16	12.03	10.64	11.23	5.52	0.28	0.36	0.63	0.35	0.06	12.84	99.11
[redacted]70E-FWA	42.20	13.19	11.33	11.41	5.92	0.13	1.44	0.79	0.17	0.06	12.40	99.05
[redacted]70E-FWB	46.17	14.86	11.26	9.13	8.16	1.89	1.29	0.77	0.20	0.09	3.96	97.77
[redacted]72E-FW	44.92	13.04	11.85	10.26	6.31	1.74	0.36	0.85	0.16	0.06	10.60	100.16
65-94-FW	44.55	13.40	12.12	8.52	7.73	0.79	0.30	0.81	0.15	0.08	10.89	99.33
65-101-FW	43.01	12.75	10.43	10.54	7.01	1.20	0.24	0.64	0.18	0.04	11.65	97.90
[redacted]108-FW	46.43	16.75	10.77	7.59	4.28	1.25	1.52	0.99	0.17	0.06	9.43	99.25
66-110-FW	48.68	11.42	7.43	8.85	9.60	1.50	0.16	0.57	0.13	0.24	9.63	98.25
[redacted]108-VB	40.53	17.75	16.56	7.18	5.64	0.40	0.30	1.00	0.39	0.10	9.10	99.24
[redacted]-6-VB	45.40	15.19	17.81	6.20	5.06	0.21	0.48	0.84	0.29	0.08	8.66	100.23
68-13-VB	45.26	14.23	18.54	5.99	5.00	0.24	0.30	0.78	0.35	0.08	6.87	97.63
[redacted]-16-VB	45.36	15.26	10.79	10.55	3.94	0.75	1.00	0.87	0.28	0.08	11.55	100.41

[redacted]DATE : NOV-29-1990

SIGNED : Diane Wischand
for Evelyn White

T S L LABORATORIES WOFHP
2031 RIVERSIDE DRIVE, UNIT 2, TIMMINS, ONTARIO P4N 7C3
TELEPHONE #: (705) 268 - 4441
FAX #: (705) 268 - 4420

[illegible]1EB

I.C.A.P. WHOLE ROCK ANALYSISWOFHP

Lithium MetaBorate Fusion

MP[illegible] CONSULTING

T.S.L. REPORT No. : W4965
T.S.L. File No. : M5486
T.S.L. Invoice No. : 4990

YO[illegible] REFERENCE - P.O. C-1302 - Project Shunsby

SAMPLE #	SiO2	Al2O3	Fe2O3	CaO	MgO	Na2O	K2O	TiO2	MnO	P2O5	LOI	TOTAL
	%	%	%	%	%	%	%	%	%	%	%	%
-2[illegible]-VB	58.36	16.17	7.49	1.43	6.41	0.80	1.58	0.91	0.06	0.06	5.19	98.48
-6-FW	46.91	16.24	14.38	3.47	7.06	0.18	1.42	0.85	0.13	0.06	7.60	100.29
-1[illegible]FW	45.58	14.32	11.35	10.05	7.25	1.91	0.52	0.83	0.19	0.06	6.90	98.98
-[illegible]FW	41.73	13.20	11.02	10.72	7.00	1.45	0.38	0.73	0.18	0.06	11.82	98.31
-17-FW	46.58	14.30	12.18	7.73	7.55	1.69	0.58	0.82	0.20	0.08	8.32	100.00
-2[illegible]FW	44.16	13.60	11.26	10.15	6.78	1.32	0.48	0.78	0.18	0.06	11.40	100.16
-32e-FW	39.33	17.88	18.32	0.81	14.67	0.51	0.16	0.98	0.12	0.14	7.72	100.65

[illegible]T[illegible] NOV-29-1990

SIGNED : Diane [illegible]
for Evelyn White

[redacted]EG

T S L LABORATORIES WOFHP
2031 RIVERSIDE DRIVE, UNIT 2, TIMMINS, ONTARIO P4N 7C3
TELEPHONE #: (705) 268 - 4441
FAX #: (705) 268 - 4420

[redacted]EG

I.C.A.P. ANALYSISWOFHP

Minor Elements by Fusion

[redacted]FH CONSULTING

T.S.L. REPORT No. : W4965
T.S.L. File No. : M8486
T.S.L. Invoice No. : 4990

[redacted]OUR REFERENCE - P.O. C-1302 - project Shunsov

ALL RESULTS PPM

[redacted]SAMPLE #	Be ppm	Co ppm	Cr ppm	Cu ppm	Ni ppm	Pb ppm	V ppm	Zn ppm	Th ppm	W ppm	Mo ppm	Ag ppm	Nb ppm
5E-1-FW	< 1	24	110	233	70	150	92	1220	< 30	< 30	< 10	< 10	< 30
[redacted]2-FW	< 1	50	170	50	170	< 50	220	1040	< 30	< 30	< 10	< 10	< 30
[redacted]3-FW	< 1	46	210	110	130	< 50	250	40	< 30	< 30	< 10	< 10	< 30
5E-4-FW	< 1	44	210	60	120	< 50	282	60	< 30	< 30	< 10	< 10	< 30
[redacted]27-FW	< 1	58	395	150	190	200	486	920	< 30	< 30	< 10	< 10	< 30
56-37-FW	< 1	66	1135	140	260	100	192	135	< 30	< 30	< 10	< 10	< 30
[redacted]44-FW	< 1	56	320	115	160	< 50	188	50	< 30	< 30	< 10	< 10	< 30
[redacted]49-FW	< 1	50	225	.85	150	< 50	234	175	< 30	< 30	< 10	< 10	< 30
[redacted]52-FW	< 1	62	550	5	200	150	316	450	< 30	< 30	< 10	< 10	< 30
56-69-FW	< 1	54	160	130	90	250	162	2100	< 30	< 30	< 10	< 10	< 30
[redacted]61-VB	< 1	54	540	75	120	150	320	985	< 30	< 30	< 10	< 10	< 30
56-62-VB	< 1	62	625	85	170	100	332	790	< 30	< 30	< 10	< 10	< 30
[redacted]64-VB	< 1	66	705	100	140	< 50	334	225	< 30	< 30	< 10	< 10	< 30
[redacted]69-VB	< 1	36	360	55	170	50	262	85	< 30	< 30	< 10	< 10	< 30
57-70-VB	< 1	48	505	70	130	< 50	242	120	< 30	< 30	< 10	< 10	< 30
[redacted]76-FW	< 1	94	345	275	210	< 50	394	255	< 30	< 30	< 10	< 10	< 30
[redacted]79-FW	< 1	74	290	105	170	< 50	362	155	< 30	< 30	< 10	< 10	< 30
61-91-FW	< 1	50	180	85	120	< 50	214	120	< 30	< 30	< 10	< 10	< 30
[redacted]91-VB	< 1	38	445	15	170	50	234	130	< 30	< 30	< 10	< 10	< 30
[redacted]70E-FWA	< 1	50	230	70	120	< 50	238	220	< 30	< 30	< 10	< 10	< 30
[redacted]70E-FWB	< 1	46	225	165	160	< 50	266	90	< 30	< 30	< 10	< 10	< 30
[redacted]72E-FW	< 1	46	220	70	90	< 50	304	80	< 30	< 30	< 10	< 10	< 30
65-94-FW	< 1	46	220	75	140	100	270	155	< 30	< 30	< 10	< 10	< 30
65-101-FW	< 1	42	310	95	130	< 50	258	125	< 30	< 30	< 10	< 10	< 30
[redacted]108-FW	< 1	46	260	95	160	< 50	312	80	< 30	< 30	< 10	< 10	< 30
66-110-FW	< 1	44	890	60	230	< 50	146	30	< 30	< 30	< 10	< 10	< 30
[redacted]108-VB	< 1	38	650	55	150	50	348	825	< 30	< 30	< 10	< 10	< 30
[redacted]6-VB	< 1	60	525	100	150	250	280	1815	< 30	< 30	< 10	< 10	< 30
68-13-VB	< 1	114	505	370	150	50	412	255	< 30	< 30	< 10	< 10	< 30
[redacted]16-VB	< 1	60	565	100	220	< 50	290	125	< 30	< 30	< 10	< 10	< 30

[redacted]ATE : NOV-29-1990

SIGNED : Diane Michaud
for Evelyn White

[illegible]EG

T S L LABORATORIES WOFHP

2031 RIVERSIDE DRIVE, UNIT 2, TIMMINS, ONTARIO P4N 7C3
TELEPHONE #: (705) 268 - 4441
FAX #: (705) 268 - 4420

MW1EG

I.C.A.P. ANALYSISWOFHP

Minor Elements by Fusion

MPH CONSULTING

T.S.L. REPORT No. : W4965
T.S.L. File No. : M8486
T.S.L. Invoice No. : 4990

YOUR REFERENCE - P.O. C-1302 - project Shunsoy

ALL RESULTS PPM

SAMPLE #	Be ppm	Co ppm	Cr ppm	Cu ppm	Ni ppm	Pb ppm	V ppm	Zn ppm	Th ppm	W ppm	Mo ppm	Ag ppm	Nb ppm
68-20-VB	< 1	52	580	< 5	120	< 50	268	300	< 30	< 30	< 10	< 10	< 30
68-6-FW	< 1	64	415	25	180	100	332	730	< 30	< 30	< 10	< 10	< 30
[illegible]13-FW	< 1	48	245	80	150	< 50	286	110	< 30	< 30	< 10	< 10	< 30
[illegible]16-FW	< 1	50	205	80	140	< 50	254	270	< 30	< 30	< 10	< 10	< 30
68-17-FW	< 1	56	220	90	170	< 50	290	95	< 30	< 30	< 10	< 10	< 30
[illegible]20-FW	< 1	54	205	80	150	< 50	296	185	< 30	< 30	< 10	< 10	< 30
64-82e-FW	< 1	86	265	335	160	< 50	276	100	< 30	< 30	< 10	< 10	< 30

DATE : NOV-29-1990

SIGNED : Diane Michaud
for Evelyn White

[redacted]EG

T S L LABORATORIES WOFHP
2031 RIVERSIDE DRIVE, UNIT 2, TIMMINS, ONTARIO P4N 7C3
TELEPHONE #: (705) 268 - 4441
FAX #: (705) 268 - 4420

[redacted]EG

I.C.A.P. WHOLE ROCKWOFHP
LITHIUM METABORATE FUSION

[redacted]H CONSULTING
[redacted]0 Adelaide St. W.
Toronto, Ontario

T.S.L. REPORT No. : W4965
T.S.L. File No. : M8486
T.S.L. Invoice No. : 4990

[redacted]UR REFERENCE - P.O. C-1302 - project Shunsby

ALL RESULTS PPM

[redacted]AMPLE #	Ba ppm	Sr ppm	Zr ppm	Y ppm	Sc ppm
SE-1-FW	326	41	45	14	12
S[redacted]2-FW	115	57	49	17	29
S[redacted]3-FW	162	86	60	17	29
SE-4-FW	174	57	29	17	31
5[redacted]27-FW	197	83	90	24	56
56-37-FW	8	23	139	19	25
5[redacted]44-FW	32	57	42	12	31
5[redacted]49-FW	42	85	59	17	32
5[redacted]52-FW	141	65	80	24	38
56-69-FW	84	52	105	10	21
5[redacted]61-VB	194	40	70	22	39
56-62-VB	126	29	83	23	43
5[redacted]64-VB	348	85	108	25	44
5[redacted]69-VB	559	74	64	21	37
57-70-VB	172	127	66	23	34
6[redacted]76-FW	119	49	70	21	49
6[redacted]79-FW	49	21	71	15	31
61-91-FW	209	61	35	19	27
6[redacted]91-VB	28	41	65	31	36
6[redacted]70E-FWA	182	52	56	19	32
6[redacted]70E-FWB	152	158	54	19	31
6[redacted]72E-FW	97	70	48	19	34
65-94-FW	27	50	45	17	32
65-101-FW	13	79	49	15	33
6[redacted]108-FW	149	65	73	17	36
66-110-FW	40	235	108	21	21
6[redacted]108-VB	55	70	92	35	49
6[redacted]6-VB	68	44	70	34	39
68-13-VB	21	29	63	32	46
6[redacted]16-VB	121	83	73	26	40

[redacted]ATE : NOV-29-1990

SIGNED : Diane Michaud for Evelyn White

M[illegible]ES

T S L LABORATORIES WOFHP
2031 RIVERSIDE DRIVE, UNIT 2, TIMMINS, ONTARIO P4N 7C3
TELEPHONE #: (705) 268 - 4441
FAX #: (705) 268 - 4420

MW1ES

I.C.A.P. WHOLE ROCKWOFHP
LITHIUM METABORATE FUSION

MPH CONSULTING

T.S.L. REPORT No. : M4965
T.S.L. File No. : M8466
T.S.L. Invoice No. : 4990

YOUR REFERENCE - P.O. C-1302 - project Shunsov

ALL RESULTS PPM

SAMPLE #	Ba ppm	Sr ppm	Zr ppm	Y ppm	Sc ppm
6[illegible]20-VB	445	119	95	19	36
68-6-FW	90	31	59	12	43
6[illegible]13-FW	66	116	48	18	34
6[illegible]16-FW	54	90	37	19	30
68-17-FW	107	140	50	18	33
6[illegible]20-FW	33	75	58	17	31
64-82e-FW	42	15	68	15	40

DATE : NOV-29-1990

SIGNED : Diane Michaud for Evelyn White

Swastika Laboratories

A Division of Assayers Corporation Ltd.

Established 1928

Assaying - Consulting - Representation

Certificate of Analysis

Certificate No. 76773 Date Nov 8, 1989

Received Nov. 5, 1989 19 Rock Samples

Submitted by MPH Consulting Ltd., Toronto, Ontario.

Job #1251 ATT'N: P. Sobie

SAMPLE NO.	GOLD Oz/ton	SILVER Oz/ton	COPPER %	LEAD %	ZINC %
KRS-01	0.004	0.07	0.04	0.03	0.07
02	0.002	0.07	0.04	0.005	0.08
03	Nil	0.01	0.005	0.005	None
04	0.006/0.004	0.02	0.05	None	0.25
05	Nil	0.59	6.04	0.04	0.28
06	Nil	0.54	3.60	0.01	1.56
07	0.002	0.01	0.02	None	0.01
08	0.002	0.12	2.88	0.005	0.02
09	Nil	0.01	0.02	0.005	0.02
10	Nil	Nil	0.01	None	0.02
11	Nil	0.01	0.79	0.08	2.05
12	0.002	0.04	0.05	1.10	2.87
13	Nil	0.51	3.63	0.24	2.13
14	Nil/0.002	0.43	2.35	2.48	15.38
15	0.002	Trace	0.02	0.02	0.05
16	Nil	0.04	0.04	0.02	0.92
17	Nil	0.02	0.01	0.26	1.51
18	Nil	Trace	0.02	None	0.02
19	Nil	0.01	0.005	0.09	0.25

Per [signature]

G. Lebel - Manager /ns

P.O. Box 10, Swastika, Ontario P0K 1T0

Telephone (705) 642-3244. FAX (705)642-3300

ASSAYERS ONTARIO LABORATORIES

A DIVISION OF ASSAYERS CORPORATION LTD.

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FAX (416) 239-4012

Certificate of Analysis

Certificate No. MPH-36 Date: November 21, 1989

Received 8 Samples of Rock

Submitted by MPH Consulting Limited Att'n: Mr. Paul Scobie

PROJECT: C 1251

Sample No.	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm
BSH 89-1	65	9.3	7.04%	366	4.15%
89-2	105	5.3	5.93	112	1457
BSH 89-3		5.8	.86%	2.04%	6.55%
KRS 20	751	1.3	609	2001	4172
21	39	.3	102	143	202
22	42	1.8	277	5782	8049
23	55	.3	117	582	1443
KRS 24	53	.6	110	1120	2185

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Per ______________________

J. van Engelen Mgr.

APPENDIX 3 - 1989 MPH COMPILATION REPORT
SECTION 10.0 - GEOPHYSICAL RESULTS
AND INTERPRETATION

10.0 GEOPHYSICAL RESULTS AND INTERPRETATION

10.1 General Comments and Exploration Models

The interpretation has been divided into several sections in order to present a logical progression in the interpretation of the reuslts of the various surveys and the incorporation of the known geological information.

First, the generalized interpretation of structural events crosscutting and conformable to the underlying lithologies on the property is presented with reference to the geophysical surveys and geological results.

The magnetic results are then interpreted and discussed with reference to HLEM conductors when the trend of individual magnetic units is in question.

The various HLEM conductors are subsequently presented in tabular form with their respective trend, strike extent, quality rating and structural and geophysical correlations. The various MaxMin conductors are described individually and rated as to quality.

Throughout, an attempt is made to draw overall conclusions from the results of both surveys with respect to the geophysical signatures of known mineralized occurrences on the property and in terms of the geological information currently available from previous exploration.

This information is integrated with, and utilized to identify possible causal sources of, the various geophysical responses currently untested.

Five distinct types of mineralization have been identified in the area and all are associated with the brecciated chert horizon, argillaceous tuffs or argillites (see Section 7.1). The exploration models for these targets are as follows:

1. *Bedded massive sulphides (cp., sph. + cp., sph. + py. or py. + po.) with some crosscutting sulphide veinlets.*

   Moderate to high conductance with a higher percentage sphalerite content reducing the overall conductance. Pyrrhotite concentrations will give discrete magnetic signatures.

2. *Disseminated and fracture fillings in chert breccia (cp., py., sph.).*

   Weak to moderate conductance, the higher conductances associated with chalcopyrite and pyrite.

3. *Pyrite and/or pyrrhotite chert breccia in argillite near faults and shear zones (5-50% sulphides).*

Moderate to high conductance with pyrrhotite concentrations having discrete magnetic signatures.

4. *Quartz-carbonate veinlets carrying minor galena and sphalerite.*

   Weak to moderate (?) conductance.

5. *Sulphide breccia consisting of chalcopyrite ± sphalerite fragments in an argillite matrix.*

   Moderate to strong conductance.

10.2 Structure: Faults

Inspection of government regional airborne EM and magnetic data and the datasets from the current ground geophysical surveys resulted in the interpretation of twenty (20) faults, labelled f_1 to f_{20}. Two of these faults, f_3 and f_7, have been further subdivided for ease of reference and interpretation. Elements of the four fault systems described in Section 6.2.3 can be identified on the property. In addition, a regional east-west fault, f_2 is inferred to cross the grid at its southern extent, an interpretation supported by airborne magnetic results. A single northeast trending fault, f_{20}, is more tentatively interpreted and is in the northern quarter of the grid, being subparallel to lineament/fault (?) L1 (see section 10.3). All those faults/lineaments which have been interpreted and are supported by the geophysical and geological datasets are identified on all geophysical maps.

The parameters of the twenty faults and their relationship with the interpreted geophysical results are presented in Table 4.

The structural interpretation confirms, and is consistent with, the structural regime described in Section 6.2.3. The N60E to N80E family of faults appears to be regional in nature with lateral displacement, mainly left-handed, noted about the plane of some faults. The N to N20W and N to N30E trending faults, more difficult to interpret confidently as they are generally oblique or conformable to the lithologic trend, are apparently more local in nature and, in most cases, their location and extent have been only tentatively identified.

The structural regime on the property is too complex to be more fully interpreted with the current data available. However, both horizontal and vertical displacement of lithologic units has been noted in the field, locally up to 250 m, creating possible horst and graben effects of varying scales in some areas.

A number of the faults/lineaments warrant further discussion as follows:

1. N-N20W set

   Faults f_{13} and f_{18} are tentatively interpreted from the magnetic response pattern and are supported in part by the EM dataset. Both are inferred to have north orientations within the lithologies underlying magnetic subdomain .

TABLE 4 - INTERPRETED FAULTS AND GEOPHYSICAL CORRELATION AND SUPPORT

Fault	Rating (1)	Fault Set (2)	Extent (3)	HLEM (4) Correlating (a)	Crosscutting (b)	Bounded (c)	Horizontally Displaced (d)	Sense of Displacement	Comments
f1	?	3	R		2a?	2a?, 3? 4a, 32, 33?			
f2	D	6	R			4a?			
f3	D	3	R			3, 4b, 5a	1a, 1b, 2a, 2b	L L	Abrupt change in lithologies across fault
f3a	?	3	L			5, 5a			
f4	D	3	R			5, 6, 7, 11?	1b, 1c 2b, 2c	L L	
f5	P	3	L		6?, 11?	7, 11?			
f6	P	3	R		29?	6, 8, 10 11?, 29?	1c, 1d 2c, 2d	L L	
f7	D	3	R			2d, 8, 9, 12 13a, 15, 17, 18a, 28, 29		L	Horizontal displacements of between 150 and 250 m reported locally at Main Zone General lithologic trend changes across this fault from NNW-N to the south to N-NNE to the north
f7a	?	3	L			10			
f7b	?	3	L		17?		17? 18a, 18b	L? L?	
f8	D	3	L		15?	13a, 13b, 13c?, 14a, 14b, 14c, 16			Shear in Cherts mapped at baseline
f9	?	3	L		18b?		19a, 19b	R	
f10	P	3	L				18b, 18c 19b, 19c	R R	
f11	?	3	R	27?	27?	13c, 14b, 14c, 14d?, 18c, 19c, 20, 21	18c?, 18d?	L	
f12	?	1 or 2?	L		2a?	3			
f13	?	1	L/R?	1d?	27?				
f14	P	2	L			10?, 12, 13a?			Bounds southern extent of Main Zone?
f15	P	2	R	15?					
f16	P	2	L			18b?	18c?, 18d	L	
f17	D	1	R	17?	17?				
f18	?	1	L	23?, 25?	23?				
f19	D	4	R	26		27?			Graphite schist in volcanics?
f20	?	5	L	27	13c? 14b?	13b, 13c? 26?	13b?, 13c?	L?	

Confidence rating in interpretation of some extent of fault with reference to geological data:

D	=	Definite
P	=	Probable
?	=	Possible

(2) Fault sets identified:

1	=	N-N20W
2	=	N-N30E
3	=	N60E-N80E
4	=	N30W-N50W
5	=	~NE
6	=	~E

(3) Interpreted nature of fault (extent)

R	=	Regional
L	=	Local

(4) Relationship with HLEM conductors

(a) Those conductors which correlate with and support the interpretation of a fault
(b) Those conductors crosscut by the fault
(c) Those conductors bounded by the fault
(d) Those conductors horizontally displaced about the plane of the fault with inferred handedness of displacement

III and may extend southwards into subdomain I_A and further to the lithologies hosting the known mineralization on the property (see Section 10.4).

Fault f_{13} is semi-coincident with conductor 1d and adjacent to conductor 28 along part of its length.

Fault f_{18} is described, in part, by weak responses from which no geometrical parameters can be calculated and may be related to conductors 23 and 25.

Fault f_{17} is the only regional fault in this set which can be interpreted with confidence. The basis of interpretation of this feature is primarily from geological information immediately west of the grid. Fault f_{17} is centred near 15+00W and is closely related to conductor 17, believed to reflect magnetite-rich iron formation (see Section 10.5).

2. N-N30E set

Fault f_{14} is clearly indicated by the magnetic response pattern and is interpreted to reflect the structural regime bounding the southern extent of the Main Zone mineralization. Vertical displacement associated with this fault direction has been reported from previous work (Section 7.2).

Fault f_{14} is inferred to have an approximate 500 m strike extent and may extend over a greater distance but this is not evident from the current geophysical datasets.

Fault f_{15} is tentatively interpreted about 5+00W to explain magnetic response variations and describes the general western limit of conductivity associated with the main body of cherts hosting the Shunsby deposits. The fault is also supported by topography, being coincident with the southern arm of Hiram Lake. While interpreted to be a regional feature, the continuity of fault f_{15} north of 8+00N is not immediately apparent. It is possible that fault f_{18} is the northern expression of fault f_{15}.

3. N60E - N80E set

Fault f_3 marks a distinct change in lithologies near 5+00S with apparent left-lateral displacement about the plane of the fault. South of this fault two discrete units of chert are known to exist. One has an associated discrete magnetic signature (subdomain I_C) indicating concentrations of pyrrhotite mineralization. North of fault f_3, however, while cherts are known to be more extensive, there is little evidence of concentrations of pyrrhotite in the immediate area. This suggests that fault f_3 is closely related to the mineralized horizons in this sector where high-grade copper-zinc float has been found.

Fault f_7 is the other major family of faults within this fault set. Located near the centre of the grid, fault f_7 marks the abrupt change from NNW-N trending conductors, magnetic features and lithologies(?) to the south from an overall N-NNE trend of conductors and possibly magnetic features and lithologies to the north.

Fault f_7 is well-defined by drilling as separating the Main and South Zones of the Shunsby deposit and has been referred to as the Joubin Fault in past reports. Left-lateral displacement of 150-250 m is reported (see Section 6.4), similar in magnitude to the apparent displacement about the plane of the fault between conductors 13a and 2d. These conductors are interpreted to be the surface expressions of the Main and South Zones, respectively (see Section 10.5).

Fault f_7 is interpreted to be regional in extent. The degree and orientation of heave along its length appears to vary, particularly in areas where the geological control is limited. The structure described by fault f_7 is, in all probability, not linear and can be expected to deviate north and south. Two subfaults have been interpreted on the basis of this inference.

Fault f_{7a}, the more important of the two, is about 100 m south of fault f_7 and extends from 7+00W to the Main Zone at 2+00W. Fault f_{7a} is at an oblique angle to fault f_7 and may reflect a splay to the southwest. Fault f_{7a} is interpreted primarily from the magnetic dataset.

Fault f_8, interpreted partly from the geophysical datasets, reflects a shear zone in the cherts near 6+25N on the baseline.

4. N30W-N50W Set

Fault f_{19} is a known regional fault crossing the northeast corner of the grid at Edward's Lake. HLEM conductor 26 (see Section 10.5) correlates with this fault. In 1954 Cominco tested this feature with drillhole D and intersected graphitic schist in volcanics.

10.3 Structure: Lineaments

Two regional lineaments/faults(?) have been interpreted on the basis of the airborne and ground geophysical results. There is currently limited geological evidence for the existence of local faults or shear zones with similar orientations and at these locations on the property. However, these lineaments are considered significant as they define the apparent limits of the surface expression of the mineralized chert horizons hosting the Shunsby deposit.

Lineament L_1 has a northeasterly trend across the property from 15+50W, 4+00S to 7+00E, 17+00N. There is strong supporting evidence for this lineament in the airborne magnetic response pattern (OGS, 1982). This pattern is confirmed on a local scale on the ground survey grid. Lineament L_1 bounds the north and western extent of the majority of the interpreted conductive features and the more intense magnetic activity within domain I - the exception is the magnetite iron formation at the western extent of the grid.

There is evidence for lineaments with this orientation in the known regional geology especially to the south and west of the grid. Support for this interpretation is also provided by fault f_{20} and HLEM conductor 28 in the northeast corner of the grid.

The majority of the diamond drilling completed to date has been collared south and east of this structure. The core from drill holes 103 and 106(?) may contain evidence as to the causal source of lineament L_1.

Lineament L2 has a northwesterly orientation similar to regional fault f_{19} at Edwards Lake and extends from 7+00E, 15+00S to 9+50W, 8+00N. Lineament L2, interpreted purely on the basis of the geophysical signatures recorded, defines the western extent of the multiple discrete conductors delineated on the known chert horizons in the vicinity of the Shunsby deposit.

10.4 Total Field Magnetics (Maps 2a, 2b, 5a and 5b)

The corrected total field data present a complex structural picture which indicates five to, possibly, seven directions of faulting. The data are presented in colour contour format in Figure 8 as an overview and for ease of reference for the descriptions below. A certain degree of regional folding is hinted at. Folding on a scale smaller than detectable with the 100 m line spacing may possibly be present but cannot be interpreted.

The measured total field magnetic amplitudes range from 54370 to 70927 nT with the majority of the readings being in the range of 58000 to 63000 nT. The contouring intervals have served to highlight the more subtle features without distorting the more readily identifiable responses. The higher amplitude responses are generally recorded in the southern and western quarters of the property where ultramafic rocks and magnetite iron formation, respectively, are prevalent.

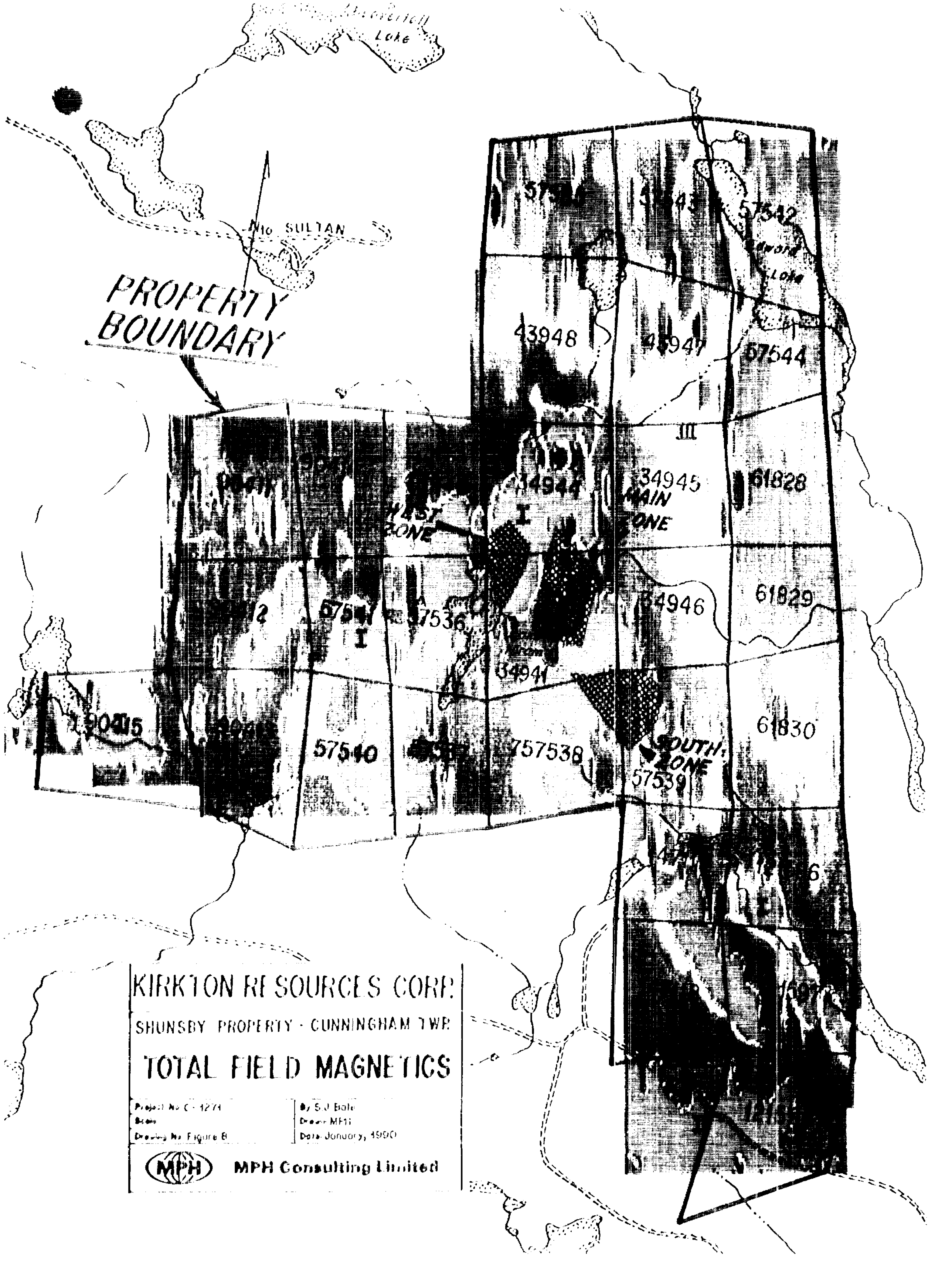
A number of discrete high amplitude, short wavelength features, believed to reflect diamond drill collars, were manually removed from the dataset. As many of the collar coordinates were not surveyed in, several suspect responses semi-coincident with indicated drill hole locations were manually suppressed.

Depths to magnetic features are generally shallow, in the range of 10 m or less.

Where average dips can be ascertained, the underlying lithologies appear to generally have a shallow dip to the west.

The first step in the interpretation was to outline the causative bodies and classify them into three major categories:

(i) broad, high susceptibility features;
(ii) broad, moderate to low susceptibility features; and
(iii) narrow, linear features.



Lake
SULTAN
PROPERTY BOUNDARY
43948
57544
III
34944
34945
MAIN ZONE
61828
WEST ZONE
34946
61829
57536
34941
61830
57540
757538
SOUTH ZONE
57539
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY - CUNNINGHAM TWP.
TOTAL FIELD MAGNETICS
Drawing No. Figure 8
Drawn MPH
MPH Consulting Limited

Several faults and/or magnetic lineaments are discernable from truncations of and/or disruption to magnetic features. These have had the effect of dividing the property into a combination of linear and arcuate horizons and areas of different magnetic background amplitudes. The subareas defined by the structural analysis were subsequently employed in determining subareas of similar magnetic character.

It is not possible to differentiate separate and distinct magnetic response signatures for the epiclastic and chemical metasediments, "iron formation", mafic, intermediate or felsic metavolcanics, mafic-to-intermediate intrusives and feldspar intrusions underlying the majority of the grid. Rather the magnetic dataset appears to reflect stratiform and/or stratabound concentrations of magnetic sulphide mineralization, particularly in the vicinity of the known copper-zinc mineralization. It may be possible to determine physical signatures for individual lithologic units in a given area with good geological control.

Given the current uncertainty as to the actual lithologic and structural regime under the majority of the property, the magnetic responses currently interpreted have been divided into three magnetic domains, labelled I to III. Domains I and II have been further subdivided due to the complexity of the results and for ease of reference and interpretation.

Domain I encompasses the western, central and southern two-thirds of the grid, hosting all the more conductive horizons as well as the Shunsby deposit and other known mineralization. Individual magnetic trends of north-northwest, north, north-northeast and northeast are noted throughout the domain. The magnetic response pattern and the correlating conductive horizons present a complex geological picture such that domain I has been subdivided into ten subdomains labelled I_A to I_J. The background amplitudes in domain I are in the order of 58200 nT and amplitudes are recorded in the range 54370 to 70244 nT. Domain I is in contact with magnetic domain III to the northeast and, domain II to the south in the vicinity of 12+00S.

Subdomains I_A and I_B describe the generally quiescent magnetic background observed throughout 50 percent of domain I. The lithologies underlying the various elements of subdomains I_A and I_B are inferred, from mapping and diamond drilling results, to include mafic intrusives, mafic to intermediate metavolcanics, some felsic metavolcanics, metasediments and some elements of felsic intrusives. The amplitudes recorded within subdomains I_A and I_B generally vary over a 200 nT range about the background of 58200 nT. Isolated weak to moderate, sometimes highly, magnetic features are noted within subdomains I_A and I_B and are interpreted to reflect more mafic intrusive or volcanic components and/or concentrations of magnetic sulphide mineralization. However, it is clear that in general no magnetic distinction can be made in this region between the various lithologic units known to exist.

The elements of subdomain I_A form a 200 to 400 m wide band across the grid at the northeastern limits of magnetic domain I where it is in contact with domain III. The location of the contact between domains I and III is only tentatively interpreted as there is almost no geological information for this specific area. While the lithologies underlying domain III are believed to have a shallow dip to the west, conformable to those mapped elsewhere on the grid, it is also possible that an additional discrete lithologic package of different overall magnetic signature to domain III and subdomain I_B underlies the elements of subdomain I_A.

Subdomain I_C is a linear horizon with a north-northwest trend and widths varying from 75 to 130 m. The subdomain describes an area of generally elevated magnetic signature with amplitudes up to 800 nT above background and a certain degree of structural displacement and truncation is indicated by faults f_1 and f_{12}. Depths to the magnetic features increase slightly from south to north where subdomain I_C is bounded to the north by fault f_3 at 5+00S. At this point an abrupt change in lithologies is noted from the mapping and diamond drill results and any continuity of subdomain I_C to the north is uncertain.

Subdomain I_C has a correlating HLEM feature, conductor 3, and is coincident with a unit of metasediments (cherts). Testing by diamond drill holes MW-80-1 and 54-305 indicates that the causal source of the magnetic feature is pyrrhotite mineralization within cherts.

The main element of **subdomain I_D** is subparallel and 200 m southwest of subdomain I_C. This element of subdomain I_D is bounded to the north by fault f_3 in a similar manner to subdomain I_C but additional elements of subdomain I_D are interpreted further to the northwest as far as 2+00S and apparently displaced some 200 m west.

While the elements of subdomain I_D have similar magnetic amplitudes to those recorded within subdomain I_C, there are no correlating conductive features. Mapping and drill results in the region indicate that subdomain I_D is underlain by cherts, mafic to intermediate metavolcanics and mafic intrusives. Subdomain I_D is therefore interpreted to reflect more mafic elements of these lithologies.

The interpreted elements of **subdomain I_E** are confined to an area between 2+00S, 9+00N and 3+50E, 3+00W. Individual elements vary in width from 125 to 200 m and contain multiple moderate and strongly magnetic features of strike extents varying from less than 50 to 200 m. Magnetic amplitudes of these features are commonly 1000 to 2000 nT above background and are known, from extensive diamond drilling results, to reflect pyrrhotite mineralization within the metasediments and cherts.

The elements of subdomain I_E are concentrated in two areas centred approximately 300 and 250 m west of the conductors interpreted to reflect the Main and South Zones, respectively, of the Shunsby deposit. These two areas with elements of subdomain I_E also exhibit an apparent horizontal left lateral displacement in the order of 300 m about the plane of faults f_7 and f_{7a} and a change in orientation from north-northwest to north-northeast, south and north of these structures. The structural scenario is somewhat complex but the general character of the elements of subdomain I_E and the semi-coincident electromagnetic activity support the interpretation of similar causal sources - possibly multiple pyrrhotite-rich zones.

Subdomain I_F is centred about 7+00W between lines 4+00S and 1+00N, where it is bounded by fault f_7, but may continue further north where the character of the magnetic response pattern and the lack of correlating conductivity indicate a probably complex collection of elements of subdomains I_B and I_F. Subdomain I_F is characterized by multiple horizons and similar magnetic amplitudes to subdomain I_E although a greater degree of continuity from line to line is apparent. There is limited geological information as the bulk of the diamond drilling completed to date is immediately north of this area. Subdomain I_F is interpreted to reflect mafic intrusives and/or more mafic volcanic units in the lithologic package.

Subdomain I_G is characterized by narrow highly magnetic units with amplitudes up to 2400 nT above background in individual elements varying in width from 40 to 90 m. Three elements of subdomain I_G are interpreted and extend from 11+00W on line 4+00S, where the subdomain is open to the south, to 9+50W on line 1+00N where lineament L1 bounds the northern extent of this horizon. The individual magnetic features within these elements exhibit primarily north to slightly east of north orientations and the individual elements appear to be displaced horizontally in a left-handed manner about faults f_6 and f_7. There is little geological information in this area, and the character of subdomain I_G is indicative of a gabbroic intrusive. This interpretation is supported by the lack of any correlating conductive horizon.

Subdomain I_H is a gently arcuate horizon up to 100 m wide, extending from 11+75W on line 0+00 to 10+50W on line 2+50N and continuing with a more northeasterly trend to 8+75W on line 4+00N. The anomalous magnetic amplitudes vary from 100 to 800 nT above background and describe short strike length, broad, moderately to strongly magnetic features of uncertain orientation individually. However, the presence of a continuous broadly magnetic arcuate feature cannot be ruled out and might be confirmed by surveying at a closer line spacing.

Isolated weak to moderately conductive features are interpreted coincident with the more magnetic features suggesting a local increase in pyrrhotite mineralization as a possible causal source. The current interpretation of the lithologies underlying this sector of the grid is an assemblage of mafic intrusives and mafic to intermediate volcanics. There is limited geological information in the vicinity of subdomain I_H and it is therefore possible that the subdomain reflects, at least in part, a chert horizon with variable concentration of pyrrhotite mineralization.

Subdomains I_I and I_J are situated at the extreme western edge of the grid and remain open to the west and north, being truncated to the south by regional fault f_7. Subdomain I_I is characterized by moderate to strongly magnetic linear features, both narrow and broad, with amplitudes up to 2100 nT above background. Semi-coincident and coincident conductive horizons are interpreted along the length of all elements of subdomain I_I. Both the geophysical datasets indicate fairly extensive horizontal lateral displacement. Subdomain I_I and its associated conductivity has been tested by diamond drill holes JIM 1 and JIM 2 and is interpreted to reflect magnetite-rich iron formation and graphitic/sulphidic argillites.

The elements of subdomain I_J are only partially surveyed at the extreme western limit of the grid but contain some of the highest amplitudes recorded within magnetic domain I, being up to 11750 nT above background. The magnetic response pattern indicates multiple, narrow highly magnetic features with a general northerly orientation and correlating strongly conductive features. North to north-northwest trending regional fault f_{17} (see Section 10.2) is known to be semi-coincident with subdomain I_J which is interpreted to reflect very much higher concentrations of magnetic sulphide (magnetite ± pyrrhotite?) mineralization associated with iron formation. In other words, subdomain I_J is interpreted to reflect a sulphide enriched element of the iron formation underlying subdomain I_I.

Domain II is situated wholly south of line 11+00S and is bounded to the north by east-west regional fault f_2. The domain has been subdivided into two subdomains based primarily upon the distribution of total field magnetic amplitudes but is believed to collectively reflect an ultramafic intrusive body.

Subdomain II_A contains the highest amplitudes in domain II with values ranging up to 70927 nT. The subdomain is characterized by highly magnetic narrow and broadly magnetic features with apparent northerly orientations extending over two or more lines. This orientation of individual magnetic features is supported by semi-coincident, weakly conductive horizons interpreted from the HLEM datasets. The response character of subdomain II_A is entirely consistent with ultramafic intrusives. Subdomain II_A adjoins subdomain II_B to the northwest across tentatively interpreted fault f_1 which has a N60E orientation.

Subdomain II_B covers an area approximately 200 x 150 m, is open to the west and has similar characteristics to subdomain II_A. However, the magnetic amplitudes are very much lower, generally extending up to 60200 nT, with higher amplitudes in the order of 61200 nT at its western extent. The response character is more characteristic of a mafic to ultramafic intrusive and the apparent lack of a correlating conductive horizons suggests a possible different causal source to that underlying subdomain I_A.

Domain III covers the entire northeastern quarter to one-third of the grid and has a fairly uniform magnetic signature with the majority of amplitudes ranging from 58300 nT to 58500 nT as can be seen from Figure 8. Several isolated discrete magnetic features with higher and lower magnetic amplitudes are recorded and are interpreted to reflect slightly more mafic volcanic units and possible structural features, respectively. An example is the interpretation of north trending fault f_{13} which is semi-coincident with a narrow low magnetic feature with amplitudes down to 57750 nT at about 3+00E between lines 5+00N and 10+00N.

The magnetic response pattern of domain III is characteristic of mafic to intermediate volcanics with narrow and broad moderately magnetic features of uncertain strike extent and orientation uniformly distributed throughout the domain. Domain III clearly reflects a different lithologic package to those underlying domains I and II to the south. This information was not previously known and will warrant limited geological mapping at some future date. Extensive follow-up investigation is not recommended at this time as very few conductors are interpreted within domain III and those identified are of moderate to weak conductance and are generally believed to reflect mineralized faults and/or shear zones as suggested by the results of drilling HLEM conductor 26 (see Table 5).

As noted in the discussion of subdomain I_A, the lithologies underlying domain III in all probability have a shallow dip to the west, conforming to the stratigraphic dip in this area, but it is uncertain whether there is a discrete or transitional change in lithologies so that the contact with magnetic domain I to the south and west is only tentatively interpreted.

10.5 Horizontal Loop EM Survey (Maps 3a, 3b, 4a, 5b, 5a, 5b)

The MaxMin II survey delineated 33 conductive horizons, labelled 1 to 33, the majority of which are delineated at both transmitting frequencies. Nine of the conductors have been further subdivided: Conductors 1, 2, 4, 5, 13, 14, 18, 19 and 30.

The parameters of these conductive horizons and their relationship with the magnetic results and structural interpretation are presented in Table 5. The probable geologic host and whether the conductor would have been tested by previous drilling and/or trenching are also indicated.

The dominant conductor trends are NNW to N and N to NNE in the southern and northern halves of the grid, respectively. The trends listed in Table 5 and referenced in the text below are relative to grid north. The individual horizons have strike extents ranging from 50 to 1400 m.

The anomalous zones have been interpreted as either strong, moderate, weak or questionable bedrock conductors. Any uncertainty in conductor continuity is indicated by question marks. In places reference was made to the magnetic data when conductor continuity and/or trend was in question.

As the conductors are often closely-spaced with respect to the coil separation used, their dips cannot always be estimated due to mutual interference between adjacent responses. However, the lithologies hosting the known mineralization on the property have an average dip of 30° to the west and the sulphide mineralization conforms to the stratigraphy. Therefore, except where near vertical dips to mineralized horizons are suspected, all parameters have been derived from Strangway's nomogram for thin sheets dipping at 30° (Mining Geophysics, Vol. I).

TABLE 5: INTERPRETED HLEM CONDUCTORS WITH GEOPHYSICAL, STRUCTURAL AND GEOLOGICAL CORRELATIONS

	HLEM			Magnetics (2)					Structure (3)				AEM	Drilled	Geology
Conductor	Rating (1)	Trend	Extent (m)	C	PC	F	N	Env.	Fault	Trend	C	B	(4)	(5)	(6)
1a	S-VS	N15W	400+				x	IA	ƒ3	3		N	6	-	Mafic to Intermediate Volcanics and/or Chemical Sediments
1b	VS	N10W	150-200				x	IA	ƒ3 ƒ4	3 3		S N	6	-	Mafic to Intermediate Volcanics and/or Chemical Sediments
1c	VS	N10W	350		x			IA/III	ƒ4 ƒ6	3 3		S N	4-6	-	Mafic to Intermediate Volcanics and/or Chemical Sediments
1d	M-S	N	125				x	IA	ƒ6 ƒ13	3 1/2	 C	S	?	-	Mafic to Intermediate Volcanics and/or Chemical Sediments
2a	M	N20W- N25W	600				x	IA	ƒ1 ƒ3 ƒ12	3 3 1/2	 x?	S N	6	113? 114? 54-305	Sediments
2b	M-S	N25W	200 -250		x			IA/IC	ƒ3 ƒ4	3 3		S N	6	SE4?	Sediments, Basal Chert?
2c	M-S	N10W	300		x			IA/IB	ƒ4 ƒ6	3 3		S N	6	SE1? C?, SE2? 68-20?	Basal Chert
2d	S	N20W	200 -250	x				IA/IB	ƒ6 ƒ7	3 3		S N	6	SE1, 49 68-13	South Zone, Basal Chert
3	Q-W	N25W	500 -600	x				IC	ƒ12 ƒ3	1/2 3		S N	6?	MW-80-1 54-305	Sediments
4a	Q-W	N35W	400		x			IB/ID	ƒ1	3		S	6?	-	Mafic to Intermediate Volcanics
4b	Q	N15W	150?				x	IB	ƒ3	3		N?	-	-	Mafic to Intermediate Volcanics
5	W-M	?	?			x		IB/IC	ƒ3a ƒ4	3 3		S N	6?	A?	Sediments
5a	Q	?	?				x	IB/IC	ƒ3 ƒ3a	3 3		S N	-	68-17? 115?	Sediments Tr. Samples 01, 09, BSH-1. Samples 10 to South Samples 02, 08, 24, BSH-2 and copper-zinc float to north
6	W	N5E	350				x	IB	ƒ4 ƒ6 ƒ5	3 3 3	 x?	S N	-	A? 79-18? +others	Middle Chert
7	W-M	N10W	150		?		?	IB	ƒ4 ƒ5	3 3		S N	6?	A? 74-18? 74-14, 68? 70? +others	Sediments
8	W-M	N5W	150 -200	?		?		IE	ƒ6 ƒ7	3 3		S N	6?	56? 111, 68-6 68-10, 68-14	Middle Chert(?)/Sediments
9	W-M	N15E	150 -200			x		IE	ƒ7	3		N	4?	32, 37 68-3, 68-4	Sediments
10	Q-W	N10W	150		x			IB	ƒ6 ƒ7a ƒ14	3 3 2	 x?	S N		68-15?	Sediments?/Mafic Intrusives?

Conductor	HLEM Rating (1)	Trend	Extent (m)	Magnetics (2) C	PC	F	N	Env.	Structure (3) Fault	Trend	C	B	AEM (4)	Drilled (5)	Geology (6)
11	Q	N15W	50 -250				x	IB	f4 f5 f6	3 3 3	 x? 	S? S? N	2?	-	Sediments?
12	M	N15W	150				x	IA/IB	f7 f14	3 2		S N	6	-	Mafic Intrusives/Volcanics?
13a	VS	N20E	400				x	IA/IB	f7 f8	3 3		S N	6	multiple holes	Main Zone, Basal Chert Tr. Samples 11,13,14,15,16,BSH-3,KRS-20
13b	Q-W	N10E	150 -200				x	IA/IB	f8 f20	3 5		S N	5?	-	Mafic Intrusives/Volcanics and/or Basalt Chert?
13c	M-VS	N10W	125 -225				x	IA/IB	f8 f11 f20	3 3 5	 x?	S? N S?	6	-	Basal (?) Chert
14a	S-VS	N15E	150 -200		x			IB/IE	f8	3		N	6	108, 109? 110	Tr. Sample 21
14b	M	N10E	250	x				IE	f8 f11	3 3		S N?	6	-	Sediments
14c	W-S	N5E -10E	250 -300		x			IE	f8 f11	3 3		S N	?	-	Sediments
14d	Q-M?	?- N20E	50 -150				x	IA/IB?	f11	3		S?	?	-	Sediments
15	W-VS?	N5E -N15E	450 -500		x	x		IB/IE	f7 f8 f15	3 3 2	 x? C	S N? 	6	103, 106	Sediments ± Mafic Volcanics
16	Q-W	N10W	150				x	IA	f8	3		N	?	-	Mafic Volcanics/Intrusives?
17	VS	N25W?	200+	x				II/IJ	f7 f7b f17	3 3 1/2?	 x? C	S	6	-	Magnetite Iron Formation Tr. Samples KRS-17, KRS-19 Sample KRS-07?
18a	M	?	50 -100?				x	IB	f7 f7b	3 3		S N	-	Jim 1?	Sediments/Magnetite Iron Formation?
18b	VS	N10W -N15E	550 -600	x?	?			IB/II	f7b f9 f10	3 3 3	 x? 	S N	6	Jim 1 Jim 2	Magnetite Iron Formation Tr.? Sample KRS-02
18c	VS	N10E	150 -200			x		IB?/II	f10 f11	3 3/6		S N	6	-	Magnetite Iron Formation?
18d	VS	?	50+	x				II	f16	2		S	6	-	Magnetite Iron Formation
19a	M	?	50 -100?				x	IB	f9	3		N	-	-	Sediments
19b	S	N20E	300		x	?		IB	f9 f10	3 3		S N	3?	-	Sediments
19c	Q-W	N5E	150				x	IB	f10 f11	3 3/6		S N	3?	-	Mafic Volcanics/Intrusives?
20	VS	?	50+				x	IB	f11	3/6		S	6?	-	Sediments?

Conductor	HLEM Rating (1)	HLEM Trend	HLEM Extent (m)	Magnetics (2) C	Magnetics (2) PC	Magnetics (2) F	Magnetics (2) N	Magnetics (2) Env.	Structure (3) Fault	Structure (3) Trend	Structure (3) C	Structure (3) B	AEM (4)	Drilled (5)	Geology (6)
21	M	?	50+	?			x	IB	ƒ11	3/6		S	-	-	Mafic Volcanics/Intrusives
22	W-M	?	?	x				IH					4	-	Porphyry Dyke/Mafic Volcanics?
23	W-M	N25W				?	?	III	ƒ18	1/2	x?		4-5	-	Mafic Volcanics ± Intrusives
24	W-M	N10W?		x				III					5	-	Mafic Volcanics ± Intrusives
25	W-M	?	?				x	III	ƒ18	1/2	C?		4-5	-	Mafic Volcanics ± Intrusives
26	W-M	NW	500+?				x	III	ƒ19 ƒ20	4 5	C	 S?	4-5	Cominco D-1954	Mafic Volcanics ± Intrusives Reflects major regional fault through Edwards Lake? Graphite schist in volcanics
27	Q-W	N55W -N35W	650				x	III	ƒ19 ƒ20	4 5	 C	N	-	-	Mafic Volcanics ± Intrusives
28	W-M	?	?				x	III	ƒ7 ƒ13	3 1/2	 C?	S	6	-	Mafic Volcanics ± Intrusives
29	W	N20W?	150 -200+?				x	III	ƒ6 ƒ7	3 3	x?	S? N	3?	-	Mafic Volcanics ± Intrusives
30	Q-W	N5E	350+	x		x		IIA					2	-	Ultramafics Sample KRS-01
31	Q-W	N10E	250	x				IIA					2	-	Ultramafics
32	Q-W	N10E	200 -250		x			IIA	ƒ1	3		N?	-	-	Ultramafics
33	W	?	?		x	x		IIA					4?	-	Ultramafics

(1) Range of ratings of conductive horizon based upon in phase/quadrature ratios at lowest interpretable frequency:

Q	=	weak, quadrature only
W	=	weak
M	=	moderate
S	=	strong
VS	=	very strong

The trends of the conductors are given relative to grid north only.

(2) Relationship of magnetic features and conductive horizons:

C	=	Coincident
PC	=	Partially coincident
F	=	Flanking
N	=	No coincidence
Env.	=	Subdomain

(3) Structural features interpreted from both geophysical datasets and the available geologic information. Relationship to conductive horizon:

C	=	Crosscutting (x) or coincident or partially coincident - subparallel (c)
B	=	Bounding
N	=	Northern extent of horizon
S	=	Southern extent of horizon
Trend	=	1 for N-N20W set
	=	2 for N-N30E set
	=	3 for N60E-N80E set
	=	4 for N30W-N50W set
	=	5 for ~NE set
	=	6 for ~E set

(4) Indication of whether conductive horizon tested by any of diamond drill holes identified in report or on previous geological maps.

Tr. Sample	=	rock sample from trench
Sample	=	grab sample from outcrop

(5) Correlating airborne electromagnetic features from OGS 1982 (see References).

(6) Possible causal source(s) of anomalous response are derived from drill logs and/or mapping.

As the causal sources are also often at or near surface the HLEM responses obtained using the relatively large 100 m coil separation are often distorted so that true inphase and quadrature amplitudes cannot be obtained to plot on the nomograms used. In addition, the short strike lengths of individual elements of a conductive horizon relative to the coil separation used have also given rise to distorted responses. Those results which are most in question are indicated by question marks on Maps 3a, 3b, 4a and 4b.

The estimated parameters should therefore be viewed as illustrating relative conductances between horizons rather than definitive geometric and physical parameters.

Depths to the conductors are generally shallow, 10 m or less. Where the depth estimate is <10 m for the 100 m cable separation data the conductor could be at surface or at any depth up to 10 m.

Conductor quality varies from very weak to strong with estimated conductances ranging from 7 to 315 mhos in the 444 Hz dataset and 1.5 to 155 mhos in the 1777 Hz dataset.

While sulphide mineralization is thought to be a primary factor giving rise to the conductive responses, graphite is also a causal source as the higher concentrations of sulphides are commonly hosted in finely interbedded cherts and argillites.

The majority of the interpreted conductors and certainly those with conductances strongly indicative of massive sulphides, are located within magntic **domain I**. The more significant of these are described below.

Conductive horizon 1 exhibits trends varying from N15W to north along its length from approximately 7+50E on line 8+00S to 3+35E on line 2+00N. The horizon has been divided into four individual conductors, each displaying apparent left lateral displacement with respect to each other about faults with inferred orientations of N60E to N80E. The horizon is situated almost entirely in magnetic subdomain I_A where metasediments and mafic to intermediate metavolcanics are inferred to predominate. No mapping, trenching or diamond drill testing of conductor 1 is reported.

Conductor 1a, the southernmost component of horizon 1 as surveyed on the property, extends from line 5+00S to 8+00S where it is open to the southeast. The conductor is only partially surveyed on most lines due to the proximity of the property boundary but on line 5+00S a conductance of 70 to 85 mhos and depth to the source of less than 10 m were calculated. Conductor 1a is 25 m wide and has no correlating magnetic features and is therefore interpreted to reflect graphite mineralization and/or non-magnetic sulphides, possibly hosted by cherts.

Conductor 1b describes the northward continuation of horizon 1 to line 3+00S with an orientation N10W. Conductor 1b exhibits the same geophysical characteristics as conductor 1a with the exception that the causal source is narrower, less than 10 m wide, and appears to be more conductive. A conductance of 230 mhos is estimated on line 3+00S.

The interpretation of conductor 1b is identical to that for conductor 1a.

Conductor 1c is bounded to the south and north by faults f_4 and f_6, respectively, and describes that portion of conductor 1 between lines 2+00S and 1+00N. Conductor widths are 10 m or less at the transmitting frequency of 444 Hz and the causal source is estimated to be at a depth of 10 m below surface and have conductances varying from 55 to 170 mhos. Semi-coincident, moderately magnetic features are interpreted on lines 0+00 and 1+00S indicating a possible increase in magnetic sulphide (pyrrhotite?) mineralization on these lines. In all other respects the interpretation of conductor 1c is identical to that for conductor 1a.

Conductor 1d? is interpreted to extend due north from 3+35E on line 1+00N to line 2+00N where conductive horizon 1 appears to be bounded by the lithologies underlying magnetic domain III and possibly a structural event related to regional fault f_7. Conductor 1d, the weakest section of horizon 1, is a weak to moderate conductor possibly reflecting or related to mineralization associated with a north trending fault/shear zone, f_{13}, interpreted primarily from the magnetics (see Section 9.2).

Conductive horizon 2, subparallel to and between 150 and 200 m west of horizon 1, extends from line 10+00S, where it is bounded to the south by fault f_1, to line 2+00N. At this location horizon 2 is bounded by regional fault f_7 and any continuity of the conductive horizon to the north cannot be interpreted with certainty due to the apparent horizontal displacements of up to 300 m in a left lateral sense about the plane of f_7. Horizon 2 has been tested by diamond drilling as the basal chert horizon of the South Zone, more intensely at its northern limit, and is interpreted to reflect sulphide mineralization often associated with graphite in the chert iron formation.

The conductances calculated for horizon 2 are generally lower than those estimated for horizon 1 indicating that the sulphide and/or graphite mineralization is present in lower concentrations along horizon 2 than that associated with horizon 1.

Conductor 2a is a generally narrow, moderately conductive feature at depths in the order of 10 m or less below surface. Conductor 2a has a N20W to N25W orientation from the southern extent of horizon 2 to 5+00E on line 5+00S. Located wholly within subdomain I_A, conductor 2a has no correlating magnetic features and has probably been tested by drill hole 54-305 which intersected non-magnetic sulphides in a chert-argillite matrix.

There is an apparent left lateral displacement in the order of 50 m between conductors 2a and 2b about the plane of fault f_3 with **conductor 2b** continuing with an N25W orientation to line 3+00S. The calculated physical parameters are similar to those obtained for conductor 2a and the interpretation of conductor 2b is therefore the same. Hole SE-4 may have tested conductor 2b.

Conductor 2c has slightly different characteristics to those associated with conductors 2a and 2b to the south. The main difference is the apparent increasing width of the conductor to the north and the semi-coincidence of moderately magnetic features at line 0+00, the northern extent of the conductor. The conductances calculated for conductor 2c are generally 50 percent higher, ranging from 30 to 40 mhos, than those estimated for conductors 2a and 2b. The response of conductor 2c on line 0+00 indicates a 50 m wide causal source in the 1777 Hz dataset whereas the 444 Hz dataset hints at possibly two narrow causal sources 35 m apart.

The causal source of conductor 2c is interpreted to be at or near surface with depths computed as less than 10 and up to 13 m and is believed to be sulphide mineralization and/or graphite in the sediments and argillites of the Basal Chert. At least four diamond drill holes appear to have tested the conductor 2c (see Table 5) and on closer examination will possibly indicate a higher pyrrhotite content on line 0+00.

Conductor 2d reflects the northern extent of horizon 2 being interpreted as a N20W oriented conductor on lines 1+00N and 2+00N. The overall extent of this conductor is 200 to 250 m and it is known to reflect the surface expression of the South Zone of the Shunsby deposit. A narrow, moderately magnetic linear feature is coincident with conductor 2d along its length indicating magnetic sulphide mineral content. The host unit of the conductor is known to be the Basal Chert. The calculated conductances, in the order of 50 mhos, indicate that conductor 2d probably reflects the highest sulphide mineral content along horizon 2.

Conductor 3 is a narrow, weakly conductive horizon subparallel to and 75 to 100 m west of conductor 2a. Conductor 3 is situated in the centre of magnetic subdomain I_C and is bounded in a similar fashion to the north by fault f_3. Diamond drill holes MW-80-1 and 54-305 have tested this conductive horizon and found pyrrhotite and pyrite mineralization in cherts to be the causal source.

Conductor 4a is best defined in the 1777 Hz dataset where the response is primarily quadrature in nature except for that on line 11+00S where moderate inphase and quadrature responses are recorded. Conductor 4a is situated west of conductor 3 and has a N35W trend from 5+25E on 11+00S to line 8+00S where the causal source appears to pinch out or is truncated by a structural event which has not been interpreted or identified at this time. No physical parameters could be estimated for this conductor due to the low amplitude and poor character of the responses. Conductor 4a is situated within an element of subdomain I_B and on the eastern flank of subdomain I_D. Conductor 4a is interpreted to reflect weak sulphide mineralization in the mafic to intermediate volcanics with possible graphite mineralization if chert iron formation is the host lithology. No diamond drilling of this conductor is recorded and none is recommended at this time.

Conductor 4b is a possible northward continuation of conductor 4a to line 6+00S with a probable right handed displacement of horizon 4 in the vicinity of 7+50S. Conductor 4b is tentatively interpreted on the 1777 Hz data only and has a similar interpretation to conductor 4a.

Conductor 5 is a moderate 15 mho conductor interpreted at 1+75E on line 4+00S. The conductor may have a strike length of up to 100 m but is bounded north and south by faults f_4 and f_{3a}, respectively. The causal source is interpreted as being 30 m wide in the 1777 Hz data but as possibly two narrow, moderately conductive features in the 444 Hz dataset. Conductor 5 lies on the western flank of a moderately magnetic feature bounded by the same structures within magnetic subdomain I_B/I_C?. Conductor 5 is interpreted to reflect weak sulphide and/or graphite mineralization associated with chert iron formation and may have been tested by diamond drill hole A. Due to its proximity to the copper-zinc float found near low 5+00S, conductor 5 is considered a priority target. The angular nature of this float suggests that it is of quite local origin.

Conductor 5a is a very weak conductive source southeast of conductor 5 on line 5+00S. A conductance of only 3 mhos has been calculated from the 1777 Hz data with the causal source being at or near surface. Conductor 5a has probably been tested in the trenches indicated in this area and possibly by diamond drill holes 68-17 and 115. Conductor 5a is tentatively interpreted as being associated with conductor 5 due to their relative orientation being similar to that of conductive horizons in the immediate area.

Conductor 6 is a weakly conductive horizon with an average north trend from 1+50E on line 3+00S to line 0+00 where it is bounded by fault f_6. Situated wholly within an element of magnetic subdomain I_B, conductor 6 is interpreted geologically to be situated within metasediments and close to the southern margin of what is believed to be the Middle Chert. Conductor 6 would have been investigated by numerous drill holes in previous programs and no further evaluation is recommended at this time.

Conductor 7 is a moderately conductive horizon subparallel to and about 50 m west of conductor 6 on lines 3+00S and 2+00S. The magnetic setting of conductor 7 is similar to that for conductor 6 and it is also believed to be hosted within metasediments. The causal source is therefore interpreted to be non-magnetic sulphide and/or graphite mineralization which would have been tested by numerous drill holes (see Table 5).

Conductors 8 and 9 have approximate north orientations. They are 50 to 75 m apart and within an element of magnetic subdomain I_B immediately west of the baseline on lines 1+00N and 2+00N. Both conductors are bounded north and south by regional faults f_7 and f_6, respectively. No parameters could be estimated from the responses recorded and detailed surveying with a 50 m cable would be required to present a more confident interpretation. However, both conductors appear to be of weak to moderate conductance and overall strike length of 150 to 200 m. Conductors 8 and 9 are inferred to be hosted by cherts of the metasedimentary sequence and possibly, in part, reflect local increases in pyrrhotite mineralization as indicated by discrete correlating magnetic features. Both conductors have been tested by numerous drill holes in the course of evaluation of the South Zone.

Conductor 12 is bounded to the south by regional fault f_7 but extends with a N15W orientation from 0+60E on line 3+00N to line 4+00N where it is bounded by fault f_{14}. Conductor 12 is situated within magnetic subdomain I_A and/or I_B and has no correlating discrete magnetic signature. A conductance in the order of 20 mhos and a depth to the causal source of about 20 m are calculated from both datasets assuming the causal source has a dip of about 30W. Given the proximity of conductor 12 to both the Main and South Zones (conductors 13a and 2d, respectively) conductor 12 is interpreted to reflect non-magnetic sulphides and/or graphite mineralization associated with the main chert iron formation horizon. It is uncertain whether any of the drill holes completed in previous programs would have been extended far enough to adequately test conductor 12 but a more riguous examination of the available data may identify the causal source.

The surface expression of the Main Zone is traced by **conductor 13a** which has an orientation of N20E from 0+75W on line 3+00N to line 6+00N where it is bounded by fault f_8, interpreted and mapped as a shear within the cherts. This region is known to be structurally very complex with the southern extent of the Main Zone bounded by an ENE regional fault f_7 with left lateral displacement and a more local NNE fault, f_{14}, with possible associated vertical displacement.

The causal source of conductor 13a is interpreted in general to be narrow, 15 m or less in width, at depths in the order of 10 m or less on all lines except for line 6+00N where a depth of 20 m is computed. Calculated conductances range from 30 to 230 mhos, the higher conductances being considered more diagnostic given the distorted nature of several of the responses. An apparent conductance of 4 mhos, computed from the 1777 Hz data on line 6+00N may reflect either a pinching out of the Main Zone or an increase in sphalerite mineralization at the north end of the Main Zone. Geological information about the Main Zone is extensive and will not be repeated here. The lack of any coincident magnetic feature is consistent with the conclusion that there is little or no pyrrhotite associated with the Main Zone.

The Main Zone horizon is interpreted to continue northwards as **conductors 13b and 13c** in an area of apparent structural complexity. **Conductor 13b** is described on lines 7+00N and 8+00N by very low amplitude responses of poor character from which no physical parameters can be calculated. This conductor is only tentatively inferred and no further interpretation or evaluation is considered warranted at this time. **Conductor 13c**, however, is a strongly conductive feature with an orientation of N10W from 0+25W on line 8+00N to line 9+00N. The conductor is bounded north and south by tentatively interpreted faults f_{11} and f_{20}, respectively, and also to the north by lineament L1 (see Section 10.3). The best response is recorded on line

9+00N where a 25 m wide causal source is interpreted to have a conductance in excess of 100 mhos and be at or near surface. The conductive horizon appears to plunge to the south where a conductance in the order of 40 mhos is interpreted at a depth of about 20 m below surface. Conductor 13c has no correlating magnetic features and is situated within what are believed to be cherts, possibly the Basal Chert, underlying this element of subdomain I_A. Conductor 13c does not appear to have been tested previously by diamond drilling and is considered a priority target for future evaluation.

Horizon 14 exhibits variable conductance and continuity along its length between lines 4+00N and 10+00N with gradually decreasing conductance from south to north. Horizon 14 is situated within an element of magnetic subdomain I_B along much of its length with the northernmost element, conductor 14d, being wholly situated within an element of magnetic subdomain I_A.

Conductor 14a is interpreted to extend in a N10E direction from 2+60W on line 4+00N to 5+00N where it is bounded by fault f_8. Conductor 14a contains the strongest conductance as calculated along horizon 14 with the depth to the causal source being estimated at 15 m or so below surface. The responses associated with conductor 14a exhibit mutual interference with those of conductor 15 immediately to the west and also indicate a much shallower causal source, the estimated depth probably being in error due to distorted responses. Conductor 14a, located at the eastern margin of an element of magnetic subdomain I_B, exhibits no correlating magnetic features and is interpreted to reflect non-magnetic sulphide and/or graphite mineralization associated with chert.

Conductors 14b and 14c are approximately 60 m apart and exhibit an average N10E orientation from 1+75W on line 6+00N to line 8+00N where lineament L1 and fault f_{11} bound both horizons. The conductors appear to be similar in nature in that they are both of variable character and conductance along their lengths with the more conductive responses correlating with highly magnetic features within subdomain I_B. Conductors 14b and 14c are interpreted to reflect discrete sulphide and/or graphite mineralization in what are believed to be cherts underlying subdomain I_B with the more conductive portions, with conductances in the order of 15 to 20 mhos, reflecting local increases in pyrrhotite mineralization. Neither conductor appears to have been tested by previous diamond drilling.

Conductor 14d is the northernmost expression of horizon 14 being best defined on line 10+00N where the response character for both transmitting frequencies indicates a conductor over 30 m wide and at or extremely close to surface at 1+50W. No physical parameters could therefore be calculated. The conductor has no correlating magnetic features and is believed to reflect non-magnetic sulphide and/or graphite mineralization within cherts or possibly associated with a fault/shear zone in mafic volcanics. If not actually at surface, conductor 14d could probably be investigated by trenching.

Conductor 15, a broad conductive horizon with an orientation slightly east of north, is situated at the west margin of an element of magnetic subdomain I_B on lines 2+00N to 6+00N. The conductor is coincident with the northern arm of Hiram Lake and is semi-coincident with moderate to strongly magnetic features within subdomain I_B. The HLEM survey results indicate a shallow or near surface conductor of good conductance but, due to the distorted responses, no confident estimate of parameters could be made. Conductor 15 is interpreted to reflect sulphide and/or graphite mineralization in cherts and/or mafic volcanics with local increases in pyrrhotite mineralization indicated by the magnetic results. Conductor 15, if it has a dip of 30W conformable to the stratigraphy, would have been tested by holes 103 and 106 both of which indicate extensive pyrrhotite mineralization in a chert unit.

Conductor 17 is situated at approximately 15+00W on lines 1+00S and 0+00 where it is open to the north due to the proximity of the property boundary. The responses are complex, indicating a broad conductive source which may possibly be resolved into multiple horizons if a shorter coil separation is employed. The conductances calculated from the 444 Hz data are in the order of 300 mhos and the conductor is believed to be at or near surface. This interpretation is supported by the magnetic results with coincident highly magnetic features within subdomain I_I/I_J reflecting the magnetite iron formation known to exist at this location.

Conductor 17 does not continue south of line 1+00S and is believed to be bounded by a major regional structural feature indicated by fault f_7. The edge of conductor 17 may have been tested near surface by drill hole S-57-3, completed with a packsack drill, and identified in trenches at its eastern margin on line 1+00S but the main body of the conductor remains to be properly investigated.

Horizon 18, situated on the eastern margin of the magnetite-rich iron formation described with conductor 17 above, is interpreted to have four separate components, two of which have been tested by diamond drilling. The results obtained in the current geophysical program, acknowledging that the line spacing is relatively coarse with respect to the geology, indicate a degree of crossfaulting and right handed displacement about east-northeast trending faults. This sense of displacement is contrary to the left lateral displacement inferred elsewhere on the property but must be considered a possibility given both the known structural complexity to the north and the proximity of the major felsic intrusive immediately west of the grid. This sense of right lateral displacement is also supported by displacement of elements of conductive horizon 19 (see below).

Conductor 18a is a single line response interpreted at 13+40W on line 1+00S being bounded to the south and north by faults f_7 and f_{7b}, respectively. The causal source is interpreted to be at a depth of up to 30 m below surface and have a conductance in the order of 50 mhos. Conductor 18a is situated on the east flank of a broad moderately magnetic feature which may reflect a component of the magnetite iron formation or a locally more mafic element of the volcanic package. Conductor 18a is therefore interpreted to reflect sulphide and/or graphite mineralization probably associated with chert and is believed to have been tested by drill hole JIM1.

Conductor 18b has an average northerly trend from 14+00W on line 0+00 to 5+00N where it is bounded by fault f_{10}. The conductor is only partially surveyed on most lines due to the proximity of the property boundary but is fully surveyed on line 0+00 where a conductance of 300 mhos and a depth of less than 10 m to the causal source were interpreted from the 444 Hz dataset. Conductor 18b is coincident with magnetic features along its entire length, the features being moderately magnetic in comparison to the features associated with conductor 17 immediately to the west. However, conductor 18b is also believed to reflect primarily magnetite-rich iron formation with associated sulphide minerals and graphite. Hole JIM 2 tested conductor 18b in the vicinity of 4+00N.

Conductor 18b appears to be displaced horizontally in a left-lateral sense by about 50 m from conductor 18a to the south. In contrast, right lateral displacement in the order of 100 m is inferred about the plane of fault f_{10} at 5+50N between conductors 18b and 18c. **Conductor 18c** is a highly conductive, discrete feature which may be locally confined or have a strike extent up to 250 m. This uncertainty in the strike extent of conductor 18c is due to the deviation of the survey lines from an idealized grid at this location. The conductances and magnetic setting of conductor 18c are identical to those for conductor 18b but a slightly greater depth to the causal source of 15 m is calculated. The interpretation of conductor 18c is identical to that for conductor 18b.

Conductor 18d is only partially defined on line 8+00N at the western extent of the grid but indicates a highly magnetic and conductive feature of similar quality to conductors 18b and 18c.

Conductive horizon 19 is 150 to 200 m east of and subparallel to horizon 18 and has been dividied into three conductive elements. The horizon as a whole is interpreted to reflect a narrow, moderately conductive feature which is situated wholly within an element of subdomain I_B. Horizon 19 is interpreted to reflect non-magnetic sulphide and/or graphite mineralization in cherts or possibly mafic to intermediate volcanics with local concentrations of magnetic (pyrrhotite?) mineralization where semi-coincident isolated, moderately magnetic features are recorded. Horizon 19 does not appear to have been tested by either diamond drilling or surface mapping and trenching.

Horizon 19 extends from line 2+00N to 7+00N where it is bounded by fault f_{11} and may continue further north but this cannot be interpreted with certainty at this time. The strongest portion of horizon 19 is **conductor 19b** which has an orientation of N20E from 12+50W on line 3+00N to 5+00N with conductances of up to 40 mhos recorded in the 444 Hz dataset. Depths to the causal source are in the order of 15 to 20 m and the conductance of conductor 19b appears to decrease in a south to north direction with a conductance of only 8.5 mhos being calculated on line 5+00N.

Parameters could not be calculated for the other elements of horizon 19.

Conductor 20 is a very strong, single line conductor open to the north and interpreted to be centred at 10+60W on line 8+00N. The response recorded in the 1777 Hz dataset is distorted due to mutual interference with the response of weak conductor 21 some 90 m to the east but it was possible to estimate a conductance of 230 mhos from the 444 Hz dataset (see Maps 3a and 4a). The causal source is estimated to be in the order of 10 m below surface and is situated within an element of magnetic subdomain I_B with no correlating magnetic features. Conductor 20, while exhibiting similar conductance to horizon 18 immediately to the west and southwest, is interpreted to reflect a totally different mineralized horizon. Conductor 20 most probably reflects non-magnetic sulphide and/or graphite mineralization associated with cherts and remains untested at this time.

Conductor 22 is interpreted to reflect two narrow, weakly conductive features centred about 10+00W on line 3+00N. No physical parameters could be estimated for these features which are considered to be of some interest as they correlate with the broad highly magnetic feature within magnetic subdomain I_H. At present mafic intrusives and/or mafic to intermediate volcanics are believed to underlie this sector of the property but no detailed mapping is recorded in this area. It is therefore possibly that conductor 22 reflects weak sulphide mineralization associated with cherts but is not considered a priority target at this time.

There are several conductors within magnetic **domain III**, some of which may warrant further investigation. The mafic to intermediate volcanics inferred to underlie domain III are interpreted to belong to a different lithologic package than that underlying domain I. The orientation and strike extent of individual features cannot be defined with confidence.

The first of these is **conductor 23** which has an orientation of N25W from approximately 2+00W on line 15+00N to line 16+00N where the conductive horizon pinches out or is bounded by a structural feature. Conductor 23 is of moderate conductance on line 16+00N and is interpreted to have an approximate dip of 60W and be at a depth of 10 to 15 m below surface. The conductor has no persistent correlating magnetic feature but is either crosscut by or coincident with fault f_{18} which is tentatively interpreted from both the magnetic and HLEM datasets. Conductor 23 is therefore interpreted to reflect non-magnetic sulphide and/or graphite(?) mineralization possibly associated with a fault/shear zone within mafic to intermediate metavolcanics and/or mafic intrusives. No further interpretation can be made at this time.

Conductor 24 is situated on the west end of a lake, immediately southeast of conductor 23, on lines 14+00N and 13+00N. A conductance of 8.5 mhos and a depth to the causal source of 30 m were computed from the 1777 Hz data on line 14+00N. These results illustrate the generally low amplitudes and somewhat nebulous response character associated with conductor 24. The interpretation of conductor 24 is similar to that of conductor 23 although the presence of a correlating fault/shear zone is much less certain.

Conductor 25 is a single line response at 2+75W on line 13+00N of similar character and magnetic correlation to conductor 24. No physical parameters can be calculated from the response which indicates low conductivity. However, conductor 25 is of some interest as it is semi-coincident with fault f_{18} and extremely weak, possible bedrock conductors are tentatively identified by question marks immediately to the north and south. The causal source of conductor 25 is interpreted to be weak sulphide mineralization associated with a fault or shear zone in mafic to intermediate volcanics.

Conductor 26 is coincident with Edwards Lake on line 14+00N to the northern property boundary at 17+00N. The orientation of conductor 26, which is approximately NW, is coincident with a major regional fault. The conductor is of variable quality along its length, the strongest responses being recorded on lines 15+00N and 16+00N. A conductance of 5.5 mhos and a depth to the target of 10 m were estimated on the latter line from the 1777 Hz dataset. It is at this location that conductor 26 was tested by Cominco hole D in 1954 which intersected graphite schist in volcanics. No further investigation of this conductor is recommended at this time.

Conductor 27 is of more immediate interest in the current exploration program given its approximate northeast orientation and proximity to lineament L1 which is discussed in Section 9.3. Weak responses, primarily quadrature in nature, are recorded from 1+00E on line 9+00N to 5+75E on line 13+00N where the conductor is bounded by regional fault f_{19}. Conductor 27 is coincident with a creek from Edwards Lake along the majority of its length and, while there is definitely a topographic component to the response, is tentatively interpreted to reflect weak mineralization associated with a northeast fault or shear zone. The best response is recorded on line 12+00N where a conductance of 25 mhos and depth to the target of 30 m were computed from the 444 Hz dataset.

Conductor 28 is a single line response at 3+75E on line 4+00N which may be related to horizon 1. This inference is only tentative as conductor 28 is situated wholly within magnetic domain III but is not far displaced from fault f_{13} which is interpreted to correlate with conductor 1d to the south. Conductor 28 is estimated to have a moderate to strong conductance, in the order of 75 mhos, and be at a depth of about 30 m below surface as computed from the 1777 Hz dataset. The causal source is interpreted to be near vertical but the profiles from both datasets suggest a possible easterly dip to the conductor. The parameters estimated from the 444 Hz dataset are in general agreement from those from the 1777 Hz data but, due to the distorted response, are not felt to reflect representative amplitudes.

Conductor 28 does not have any correlating magnetic features and is interpreted to reflect non-magnetic sulphide and/or graphite mineralization possibly associated with a fault or shear zone in mafic to intermediate volcanics, mafic intrusives or in cherts. As it is known that it is not possible to delineate these different lithologies from the dataset in its current form and given the available geological information, the interpretation of the causal source of conductor 28 must remain tentative at this time.

Magnetic domain II is characterized by narrow, weakly conductive horizons of a north to slightly east of north orientation conforming to that described by the ultramafics underlying this domain.

Conductors 30, 30a, 31, 32 and 33 generally have correlating magnetic features and are interpreted to reflect weak sulphide mineralization possibly associated with sheared volcanic/sedimentary units in the ultramafics. Parameters can only be calculated from the higher transmitting frequency results. Conductances range from 5.5 to 15 mhos and depths are highly variable, being estimated at less than 10 m and up to 40 m below surface. No further interpretation of these conductors can be made at this time.

APPENDIX 4 - LITHOGEOCHEMICAL PROCESSING TECHNIQUE

METHODS OF MICROCOMPUTER-BASED

DATA PROCESSING APPLIED TO THE

LITHOGEOCHEMICAL EXPLORATION FOR

VOLCANOGENIC MINERALIZATION

John M. Siriunas, P.Eng.
MPH Consulting Limited
Toronto, Ontario

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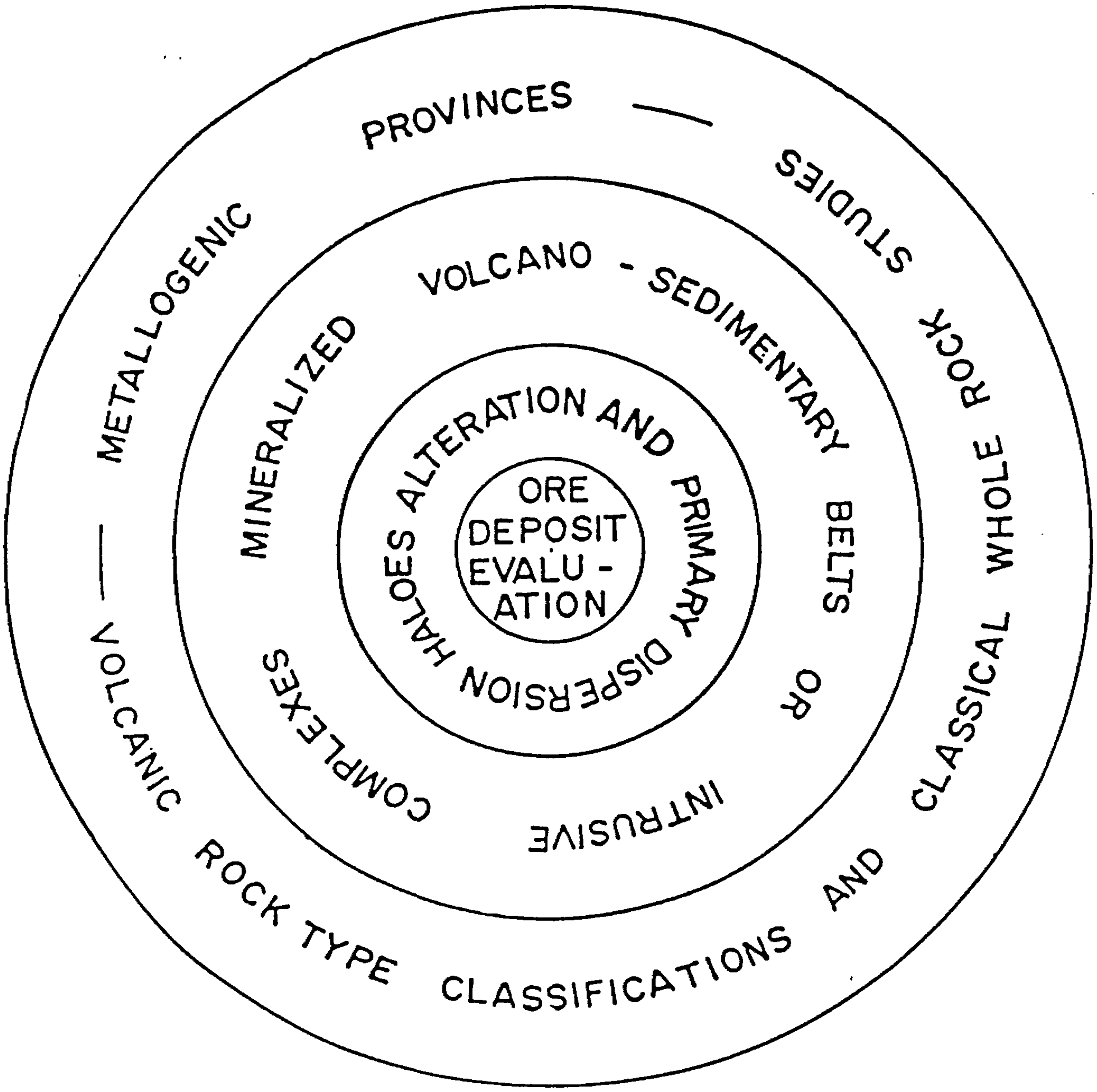
METHODS OF MICROCOMPUTER-BASED DATA PROCESSING APPLIED TO THE LITHOGEOCHEMICAL EXPLORATION FOR VOLCANOGENIC MINERALIZATION

GENERAL OVERVIEW

In their 1979 review of the subject, Govett and Nichol (1979, p. 339) defined lithogeochemistry as "the determination of the chemical composition of bedrock material with the objective of detecting distribution patterns of elements that are spatially related to mineralization". Within the framework of this definition, lithogeochemical techniques can be used at a variety of scales or levels, all of which can aid the explorationist in pinpointing a possible mineral deposit. From the most regional or megascopic scale to the most detailed or macroscopic these approaches (Figure 1) include:

1) the resolution of metallogenic provinces and/or rock type classifications and studies (100-1000 km scale)
2) the identification of mineralized volcano-sedimentary belts or mineralized intrusives (10-100 km scale)
3) the identification of alteration trends, primary dispersion halos and favourable stratigraphic horizons (0.1-10 km scale)
4) ore deposit evaluation (including classical assaying)

At MPH Consulting Limited, microcomputer-based data processing methods are applied to lithogeochemical studies used on a variety



USES OF LITHOGEOCHEMICAL STUDIES

Figure 1.

of these exploration levels, particularly in association with programmes of exploration for volcanogenic base metal and gold deposits. These methods are routinely utilized to aid concurrent geological mapping and sampling or alternatively they can be undertaken as independent study projects.

CONCEPTUAL MODEL

Base and precious metal mineral deposits occur under special geological conditions where the commodities sought after occur in concentrations on the order of 500 to 5,000 times background crustal abundances and may therefore be exploited at a profit.

To realize these geological concentrations, metals must be extracted or leached from a relatively diffuse environment and transported to a locus where conditions are favourable for their deposition. The hydrodynamic systems which are generated around thermal anomalies in the crust (e.g. volcanic centres) are the principal method to achieve this end. Heat conduction and fluid convection through the surrounding rocks are integral factors of the processes that control the geochemical environment for the dissolution and precipitation of metallic and other components (see Figure 2).

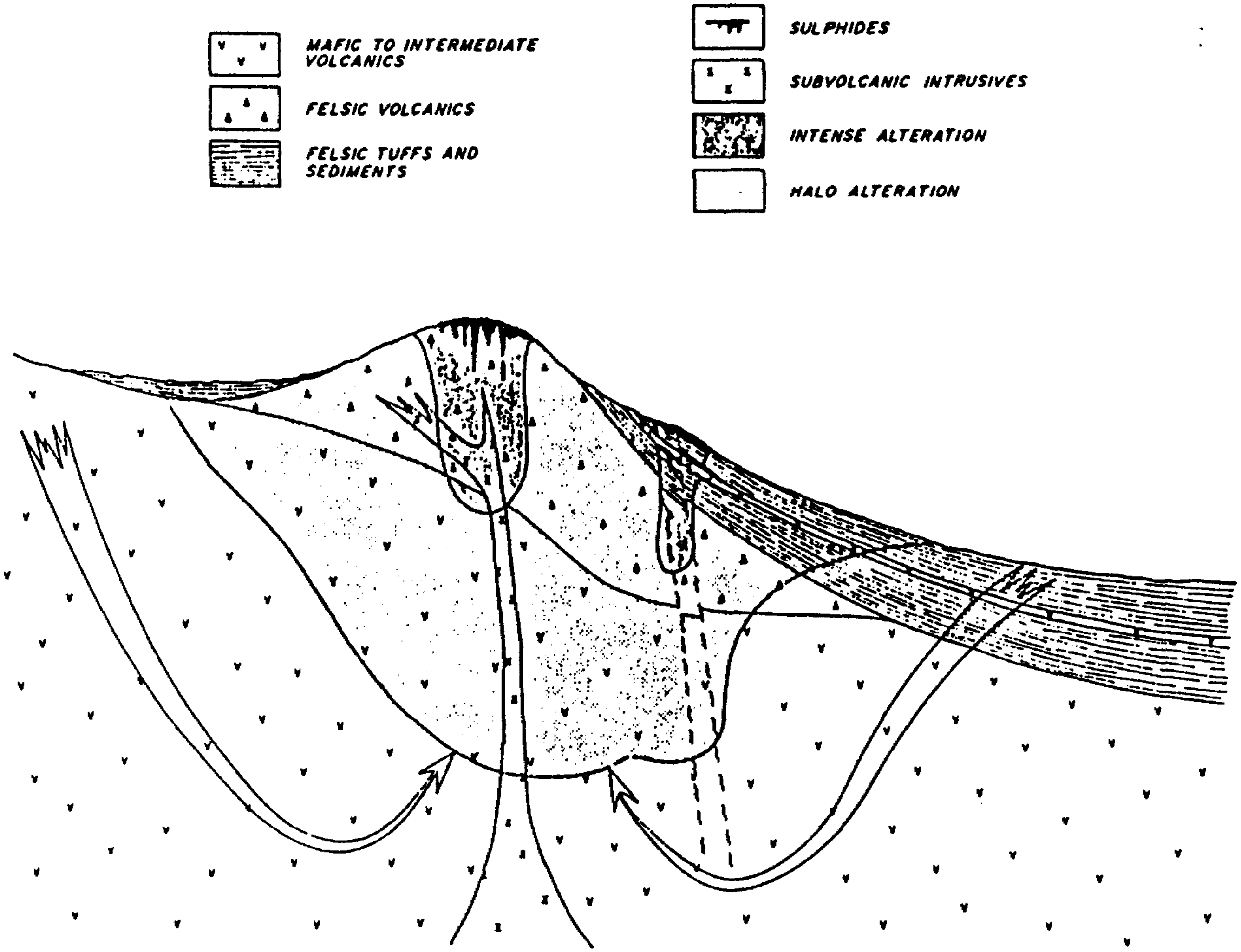


Figure 2: Conceptual model for the generation and disposition of alteration patterns related to volcanogenic mineralization.

Consistent and distinctive patterns of elemental or oxide enrichment or depletion are documented to occur within the rocks in the vicinity of felsic volcanic centres where solfataric activity is known to have taken place; of course, it is those patterns which were developed concomitant with the significant enrichment of base and precious metals which are the ones that the explorationist wishes to study. Briefly, the element and oxide patterns of major importance to the study include the enrichment of magnesia, total iron, silica, carbon dioxide, with or without potash, and the depletion of soda and lime (or magnesia around gold deposits).

The close spatial and time relationship between chemical sediments and syngenetic ore in many Archean base metal and gold deposits intimates that these sediments may be used as indicators of possible stratigraphic zones in which economic stratabound sulphide mineral accumulations may be located. Primary dispersion from a volcanic centre as exemplified by trace element data can be used to identify or map mineralized horizons or to define multi-element haloes around mineralized zones (Scott et al, 1982). These types of studies can be greatly enhanced by the examination of only specific mineral fractions (e.g., sulphides or chlorites). Some enrichment of the trace elements may also be identified in the host rocks immediately stratigraphically below an ore deposit.

The principles of the mineralization process are universal. It requires only that the proper pathfinders be employed in the exploration effort.

MICROCOMPUTER UTILIZATION

In conjunction with a geological survey, the geochemical analysis of rock and drill core or cutting samples for the major and minor rock-forming oxides and/or trace elements can be used to help characterize rock types or to aid in identifying unusual chemical features or elemental distributions which may be present due to some mineralizing process. These features may be recognized on both a regional or local scale. At MPH, specialized microcomputer software has been assembled, which in combination with a variety of standard in-house petrographic and mineralogical investigations is used to evaluate lithogeochemical data for the purposes of volcanic rock classification and the identification of specific geochemical conditions that may be the result of volcanogenic mineralization processes in Archean rocks.

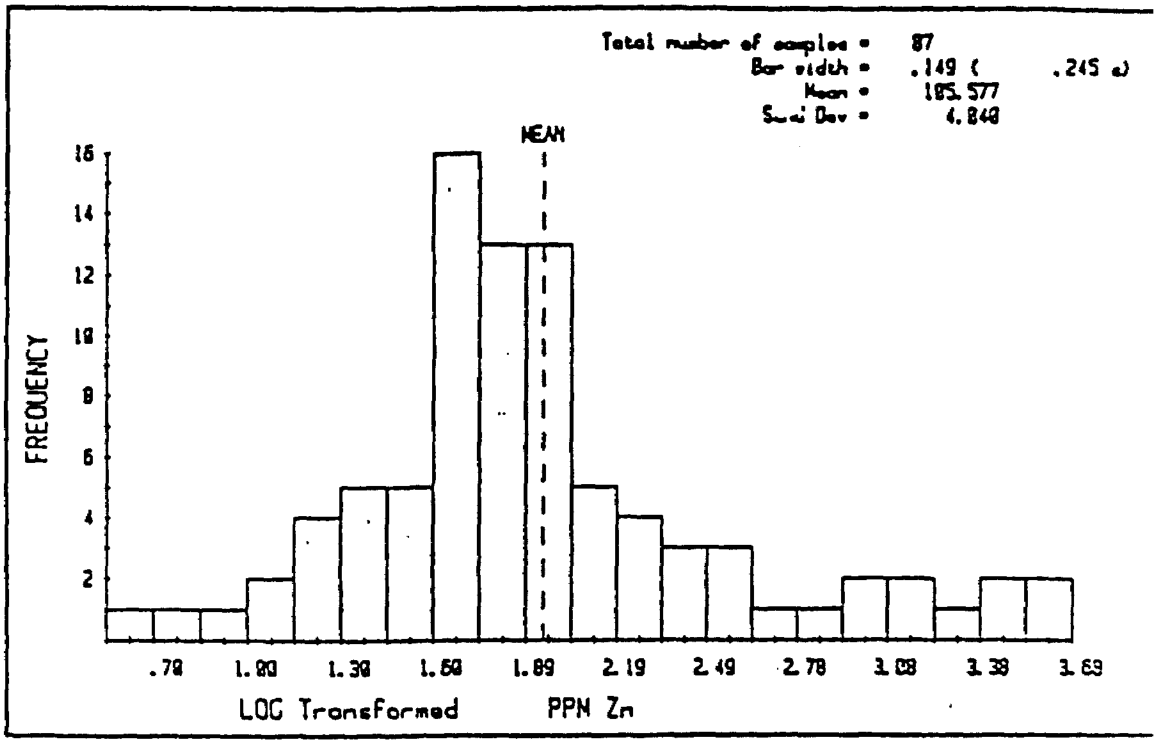
The main microcomputer hardware used at MPH is comprised of a Z-80 microprocessor with 64K bytes of RAM and dual 390K byte floppy disks. This is teamed with an intelligent terminal, a long-axis bi-directional plotter/printer and a modem to allow for a variety of input and output versatilities. Smaller field portable microcomputers are routinely interfaced with the system, especially for the handling of geophysical data.

The data base used for the archiving of geochemical data allows for the storage of 32 major and minor oxide and trace element components as well as latitude, departure, subsetting qualifiers and the field description of each sample. Data is generally input from the keyboard, though it is possible to accept the data from remote sources using the modem.

STATISTICAL METHODS

A number of statistical methods are used for the preliminary interactive study of lithogeochemical data in conjuntion with volcanogenic mineral exploration. Many univariate statistical methods are found to be useful in the study and interpretation of various types of geochemical media and are exemplified by the examination of computer-generated histograms, their log-transformed equivalents and derived probability plots (Figure 3).

Multivariate techniques are used to carry out correlations and to evaluate the presence or extent of various geochemical anomalies. An extremely useful multivariate technique which is employed is the examination of bivariate (scatter) plots for a variety of data variables (Figure 4). These plots are particularly useful when



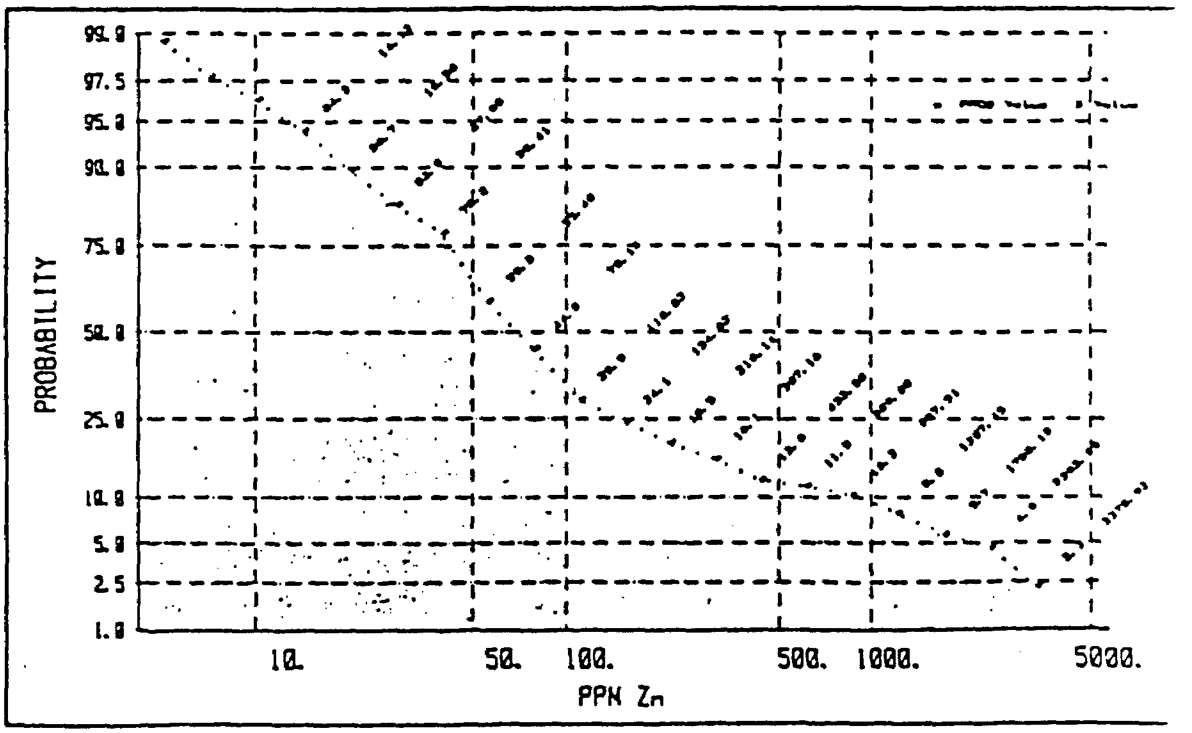


Figure 3 : Basic statistical manipulations utilizing $\log_1$ transformed data and corresponding probability plot.

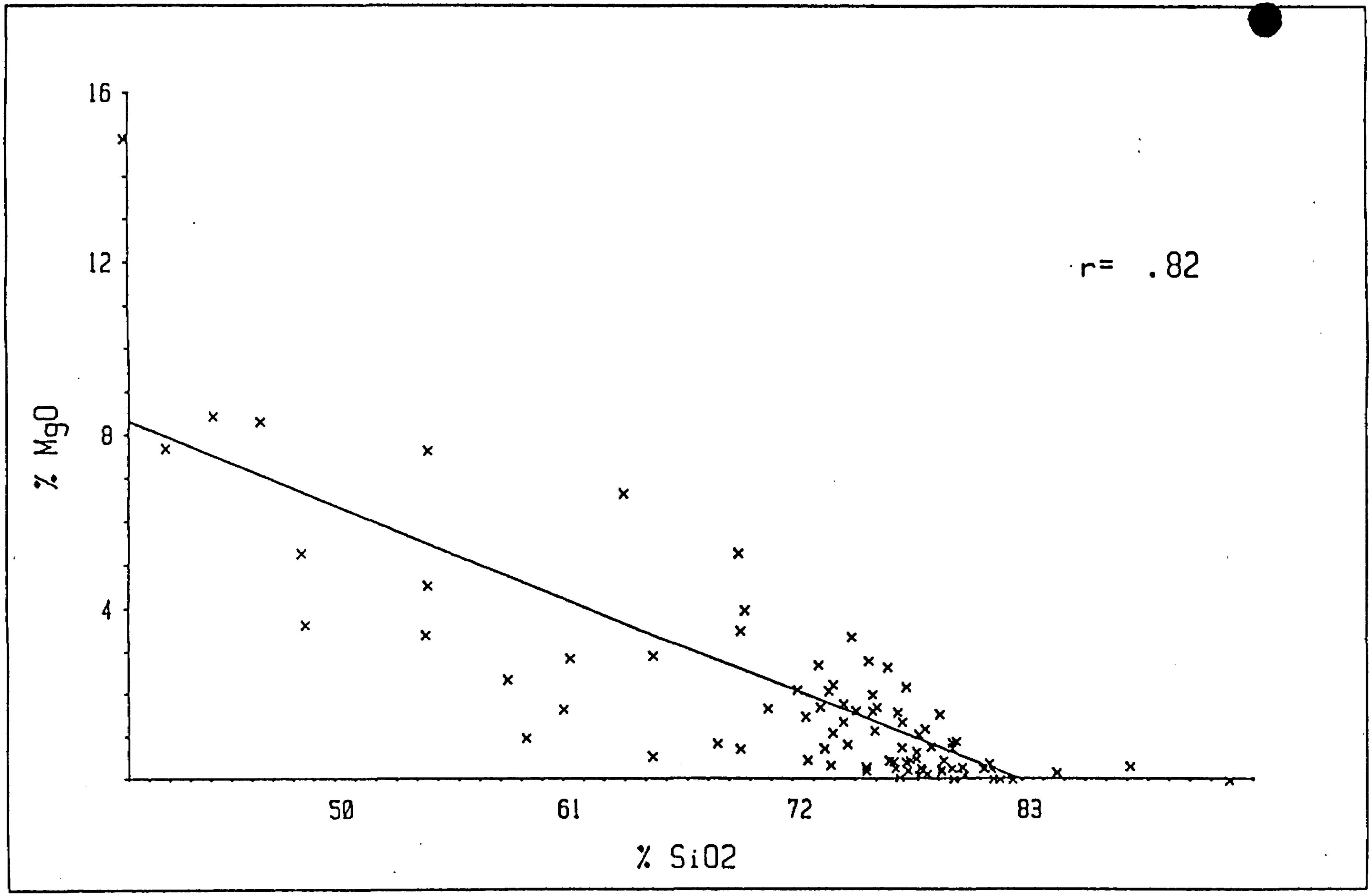
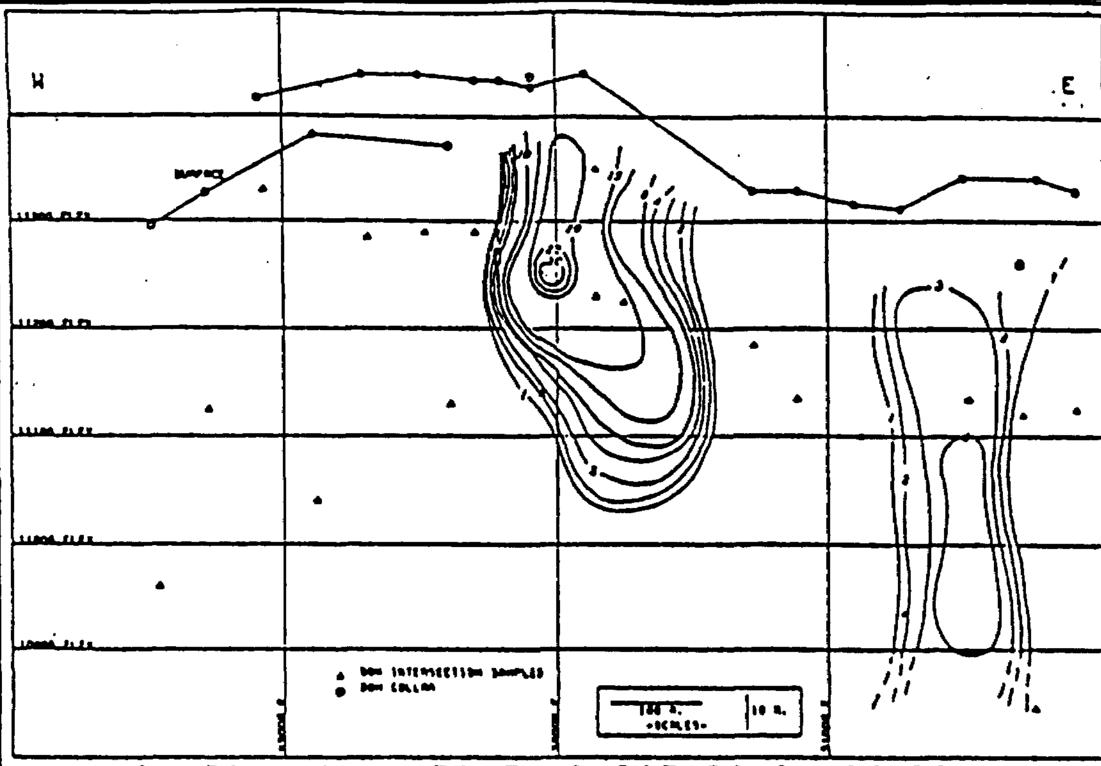


Figure 4: Bivariate (scatter) plot with best-fit straight line and correlation coefficient (r)

making chemo-stratigraphic correlations, when studying alteration patterns on a local scale or when examining other alteration phenomena.

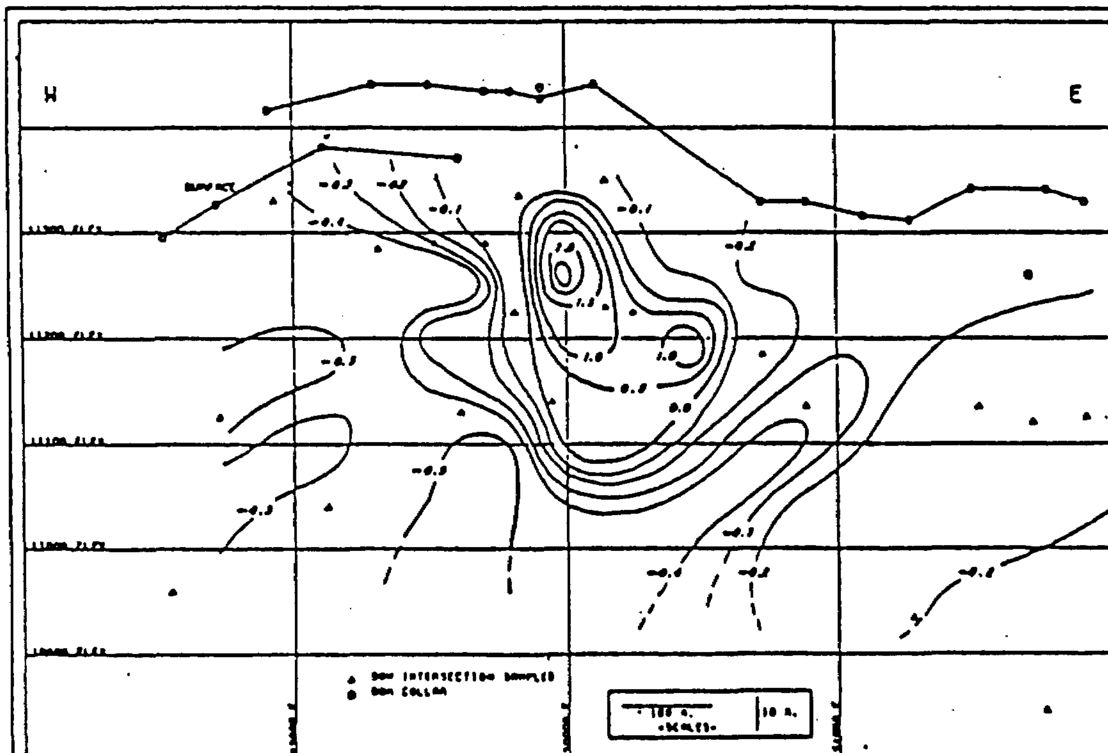
Factor analysis was originally developed for use in experimental psychology but has been extensively applied to geology and geochemistry. The main use of factor analysis is to combine a group of intercorrelated data and plot a representation of the combined element variation so that a better exploration halo than could be recognized by any single element analysis can be defined. As an example of this, the observed distribution of zinc values in the favourable horizon surrounding an Archean stratabound ore body (Willroy No. 4 Zone, Manitouwadge) can be compared with factor scores for the model employing zinc-antimony-arsenic and tin components. A larger detectable halo is observed to be present using the factor model (Figure 5).

However, the main emphasis of the MPH approach to lithogeochemical exploration is by way of what is termed the volcanogenic evaluation. The key to this method is the examination of the alteration components that might affect the classification of rock type or be closely related to the processes of proximal volcanogenic mineralization.



WILLROY NO. 4 ZONE LONGITUDINAL SECTION

ZN: C.I. 1.0 %



WILLROY NO. 4 ZONE LONGITUDINAL SECTION

SULPHIDE FACTOR 2

Figure 5: Comparison of Zn distribution and factor scores for the model employing Zn-Sb-As-Sn (Sulphide Factor 2) at Willroy No. 4 ore zone.

GEOCHEMICAL ROCK CLASSIFICATIONS

One of the main pitfalls in classifying rocks geochemically is the sensitivity of the main classifying components (e.g., K_2O, Na_2O, Fe_2O_3, MgO) to alteration processes. Also, one system of classification may identify a particular rock differently from some other method of classification, especially when the rock has been severely altered. However, if we recognize that this may be the case, this circumstance can be used to our advantage when attempting to identify alteration patterns in volcanic rocks. If a number of classification methods including mineralogical or petrographic methods are utilized, any major discrepancy can be assumed to be associated with some style of geochemical abnormality that may be worthy of further investigation.

The classification schemes used by MPH include the Jensen Cation Plot (Jensen, 1976; Grunsky, 1981) and the method described by Irvine and Baragar (1971). The Jensen scheme is based strictly on the chemistry of the (subalkaline) volcanic rock while the Irvine and Baragar method is based in part on the normative mineral percentages calculated from the major rock forming components and on an AFM ternary plot. In addition to these two schemes, rocks are classified based on their silica and titania content. These latter methods, though not nearly as complex, are less sensitive (especially titania) to alteration processes (Spitz and Darling, 1975). Since all these classification schemes are designed to be used exclusively on volcanic rocks, all terminology contained therein for the classification of non-extrusive volcanic rock types is in terms of chemo-volcanic equivalents.

In addition to the major classifications that are performed, minor features such as high values for loss on ignition or potash to soda ratios are noted for the information of the interpreter. All computer classifications are performed using arithmetic algorithms so that plotting is not inherently necessary, however, it is the option of the user to have ternary plots made by the online plotter (Figure 6).

ALTERATION FEATURES

Alteration components that might affect the classification of rock type or be closely related to volcanogenic mineralization are examined within the computer programme. These are divided into those inherently associated with base metal mineralization and those closely allied to mafic-hosted gold mineralization.

Volcanogenic Base Metals Evaluation

The key to this evaluation method is the identification of depletion or enrichment trends in total iron, the alkali oxides and alkali earth oxides within felsic volcanic rocks. These

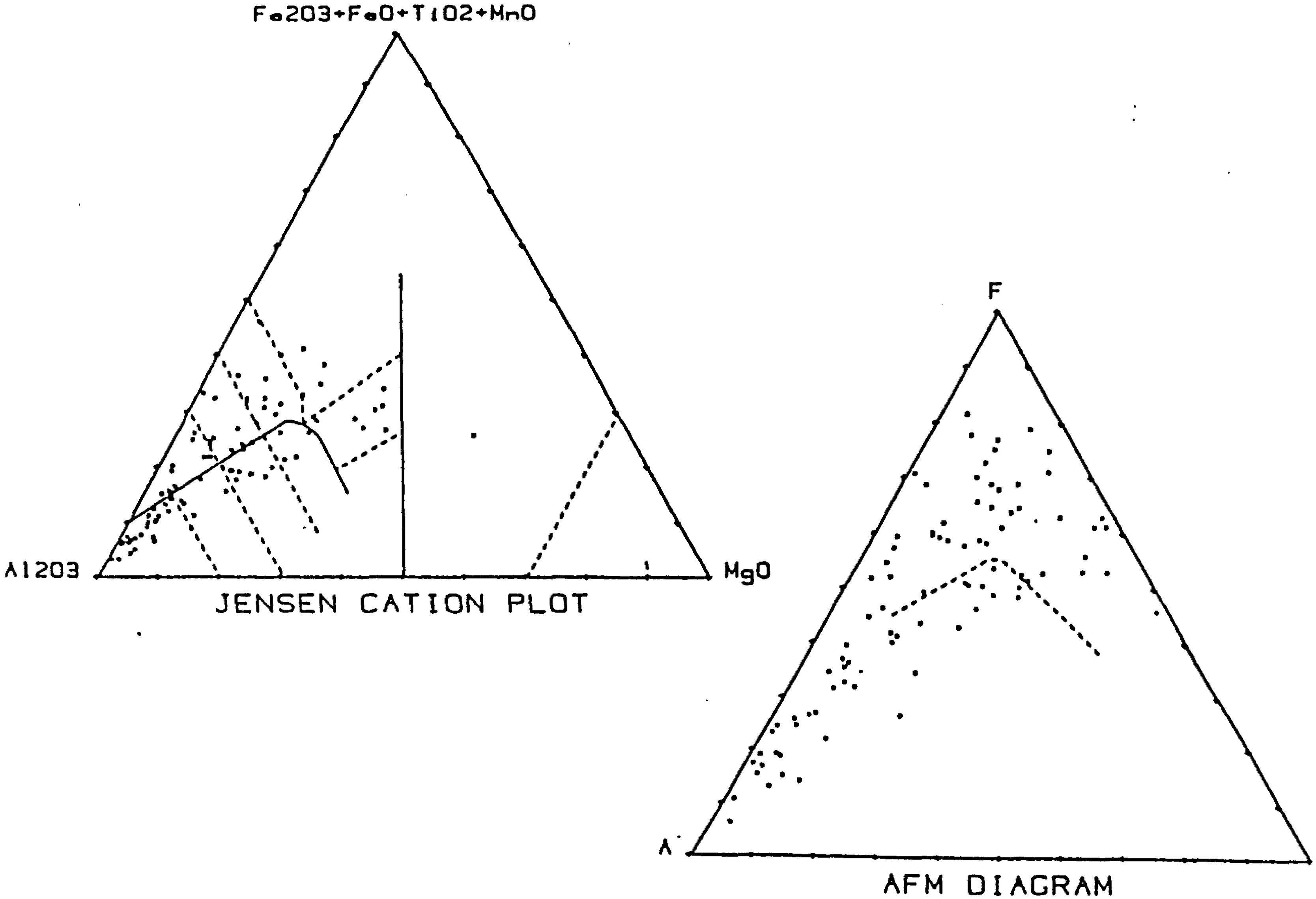


Figure 6: Ternary plots for rock classification

trends as were examined earlier, are recognized to form integral parts of the overall ore-forming process in mineralized Archean systems. These features are examined by a number of methods. Qualitative enrichment or depletion trends or "residuals" are calculated by a comparison of observed versus "average" ratios of alkali or iron to silica as observed in suites of rock studied in a number of published and unpublished studies (Descarreux, 1973; Lavin, 1976; McConnell, 1976; Sopuck, 1977). An indication of the residual silica content is derived from a comparison with the alumina content of the rock. Suites of rocks from the Abitibi orogenic belt form a large portion of this "average" population.

A more quantitative evaluation is provided by calculating what is herein designated as the "total alkali alteration score" or TAAS. This alteration score is derived from the ratio of those oxides expected to be enriched due to alteration with respect to the total alkali content (i.e. $(MgO+K_2O)/(CaO+Na_2O+K_2O+MgO) \times 100$, after Hashimoto, 1977). As the magnesia and potash contents of a volcanic rock increase with respect to the total alkali content, the TAAS approaches 100. Average values for subalkaline mafic to felsic volcanics lie between 35 and 50. Subalkaline komatiites and alkaline volcanics will typically exhibit alteration scores greater than 70 due to their inherently high magnesia and potash contents respectively. Highly altered felsic volcanic rocks will have values in excess of 80 or 90.

Discriminant analysis is a statistical technique that can be used to help "discriminate" between different populations (for example a background and anomalous population) within a larger population of multivariate data. Based on known data, an equation with varying proportions or weightings of the component elements is generated. When the equation is solved with the various data from a sample point, the magnitude of the scalar product sum is used to classify that particular sample as "background" or "anomalous". As with most populations there is some overlap, but the equation is selected so as to minimize the overlap between the two populations. It is anticipated that more subtle geochemical alteration features may be indicated by this technique and hence increase the areal extent over which an alteration halo can be observed.

Within the MPH computer programme, five discriminant functions with varying components are used to classify the samples; the higher the discriminant score the more anomalous the sample. A table of the components of these functions is presented in Table 1. These particular discriminant functions were derived from published and unpublished studies of felsic volcanic rocks in the Abitibi, Wabigoon and Uchi belts of the Superior Province. Questions have been raised as to the universality of discriminant functions; contentions are that they are valid only for their specific test populations. For this reason the five discriminant functions are utilized so that the responses that work in different geological settings may be compared.

TABLE 1
DISCRIMINANT FUNCTIONS

Equation	Components*	Source
DF1	TiO_2,$-Na_2O$,MgO,-CaO,$-Fe_T$	(1)
DF2	Fe_T, Zn	(2)
DF3	Fe_T, Na_2O, Zn	(3)
DF4	Fe_T, Na_2O, MgO,-CaO	(4)
DF5	MgO, Fe_T, Mn	(2)

(1) Marcotte and David, 1981 (See also Valiquette et al, 1980)
(2) Sopuck, 1977
* Components for DF2 through DF5 are all residual values.

Volcanogenic Gold Evaluation

Analogous to the evaluation for base metal potential, there are geochemical features that can allude to the presence of syngenetic gold mineralization in mafic Archean terrains. Just as felsic volcanic environments are important to the prospects of base metal mineralization, the presence of magnesium-rich tholeiites or komatiitic rocks is recognized to be important to the prospects of syngenetic gold mineralization (Fyon and Crocket, 1981). Though minor felsic volcanics are occasionally present, the largest proportion of wall rock is expected to be the komatiites and/or tholeiites supposedly as a source rock for much of the gold. The primary distinction in evaluating a suite of mafic volcanic rocks for gold is, therefore, made by determining its rock classification.

The most obvious alteration patterns associated with gold mineralization tend to be related to the development of carbonate minerals (especially magnesium-bearing carbonates) (Fyon and Crocket, 1981; Whitehead et al, 1981). Carbonatization can be recognized by a ratio of weight percent carbon dioxide to lime, a ratio greater than 1.5 being considered significant. In that typically only LOI analyses will be available for most whole rock analyses, carbon dioxide content can be conservatively approximated by a portion of the LOI content. Alteration mineral assemblages in komatiitic rocks and high magnesium tholeiites can also be estimated from LOI analyses and are included as a measure of the degree of alteration (i.e., carbonatization).

Anomalies in the peraluminosity index ($Al_2O_3/(CaO+K_2O+Na_2O) \times 100$) of volcanic rocks are reported to surround the producing mines in the Red Lake mining camp (MacGeehan and Hodgson, 1981). This relative enrichment in alumina is primarily due to the local depletion of soda near the deposits.

The old adage that "gold is the best indicator of gold" is still one of the most important factors when engaged in the search for gold mineralization. High gold contents in volcanic rocks and chemical sediments are cited as good indicators of gold mineralization by many investigators. Good success in discriminating between volcanic rocks associated with gold mineralization from those which are not is also reported by the use of the absolute potash and arsenic contents of those rocks (Whitehead et al, 1981).

PRESENTATION OF RESULTS

Results of the volcanogenic evaluation are available to the user in a number of formats. A data set can be quickly and interactively reviewed on the terminal. Information displayed includes rock type designations, residual, discriminant function and ratio calculations and the original data can be accessed for interpretive comparison. The evaluation portion has been separated into those features which, as discussed, are intrinsically associated with base metal deposits and those which are associated with gold mineralization. Anomalous or favourable results of the evaluations are flagged and highlighted.

Hard copy output are available for each sample (Figure 7) or summaries of the anomalous quantities for each sample may be tabulated.

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$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> SAMPLE <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

      JENSEN CLASSIFICATION: Suite and rock type (1)

      IRVINE/BARAGAR CLASSIFICATION: Suite, rock type and division (2)

      SiO2 CLASSIFICATION: Rock type (3)

      TiO2 CLASSIFICATION: Rock type (3)

                                 ******* <- Flag classification discrepancy

           Rock is highly altered (carbonate etc) <- Flag high LOI content
           Rock is potash- or soda-rich           <- (4)


--------------------Volcanogenic base metals Evaluation--------------------
[ Highlight heading if favourable rock type, underline if numerous anomalies ]
  ***WARNING*** SiO2 content TOO LOW for accepted volcanogenic studies ***
                    ^- Flag samples with < 60% SiO2 -^
                              Residuals:
    MgO        K2O        CaO        Na2O       Fe2O3       SiO2      TAAS
    (5)        (5)        (5)        (5)         (5)        (6)       (7)
  *******    ******     <- Flag anomalous (8) residuals

                        Discriminant Functions:
                    DF1      DF2      DF3      DF4      DF5
                    (9)      (10)     (10)     (10)     (10)
                  *******   <- Flag anomalous discriminant functions

----------------------------Volcanogenic Au Evaluation-----------------------
[ Highlight heading if favourable rock type, underline if numerous anomalies ]
                   *** Favourable wall rock is present ***
      ^- Flag Mg-tholeiites and komatiites (Jensen classification) -^
     Na2O(R)    K2O(%)      Au        As      Per. Index(11)    CO2/CaO
     (5, 13)     (12)      (13)      (12)         (13)            (12)
     *******   *******     <- Flag anomalous quantities

     Carbonate_alteration assemblage present (14)

******************************************************************************
                              Original Data
-----Subset--Rock type--Latitude--Departure-------------Comments---------
  SiO2      Al2O3     Fe2O3     FeO       CaO       MgO      Na2O      K2O
  TiO2      MnO       P2O5      LOI       CO2       Cr2O3    Zr        Sr
  Rb        BaO       W         U         Th        Cu       Zn        Pb
  Ni        Au        Ag        S         As        Sb       X1        X2
******************************************************************************
       References and explanations:
        1) Jensen, 1976; Grunsky, 1981
        2) Irvine and Baragar, 1971
        3) Spitz and Darling, 1975
        4) Brooker, 1979
        5) Sopuck, 1977
        6) from Al2O3(R); Sopuck, 1977
        7) "Total Alkali Alteration Score", after Hashimoto, 1977 in
           Brooker, 1979
        8) MgO, CaO, Na2O, Fe2O3 limits from McConnell, 1976
           K2O, SiO2 limits from Descarreaux, 1973
        9) Marcotte and David, 1981
       10) Sopuck, 1977
       11) Peraluminosity Index
       12) Whitehead et al, 1981
       13) MacGeehan and Hodgson, 1981
       14) Fyon and Crocket, 1981
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Figure 7: Presentation format of evaluation output

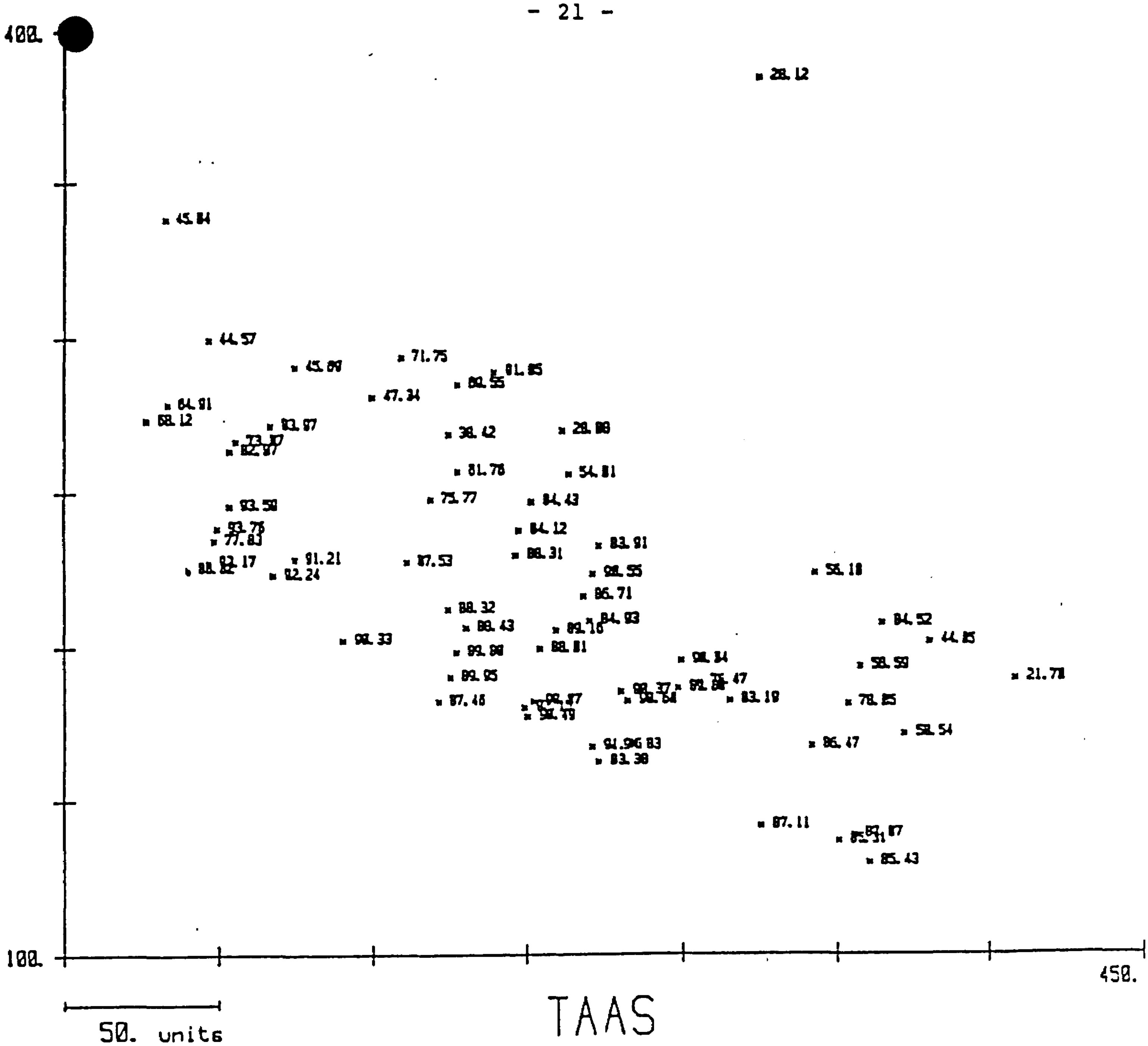

Figure 8: X-Y plot (TAAS values posted)

Where spatial information is available for the data, small scale plots may be generated on the plotter (Figure 8). Alternatively, the data may be transferred to a remote facility for the plotting and contouring of large scale plots. The evaluation features of the output may furthermore be presented in vector-style histograms for easier visual examination (see Figure 9). Favourable results are plotted in the upper halves of the circles. Full height of each histogram is approximately equal to the corresponding 3s level or equivalent. If "favourable" rock types are not present for a particular evaluation (e.g. less than 60% SiO_2 for the base metals evaluation, or no Jensen-classified komatiites or Mg-tholeiites for the gold evaluation), the histogram lines are drawn in a dashed fashion. If half the evaluation factors have been identified as being anomalous, a heavy ring is drawn near the centre of the diagram indicating such.

THE APPLICATION OF LITHOGEOCHEMISTRY

The acceptance of lithogeochemistry as an exploration tool is not prevalent in the exploration community. In fact, in Canada geochemical techniques in general have had their credibility questioned over the past several years. Part of the reason for this lack of accreditation may arise from the fact that univariate statistics are believed to be as sophisticated a level as one needs to attain to explain most geochemical data. To a degree this is understandable; the extreme tenor of alteration that is present in a particular volcanic rock sample, while accurately

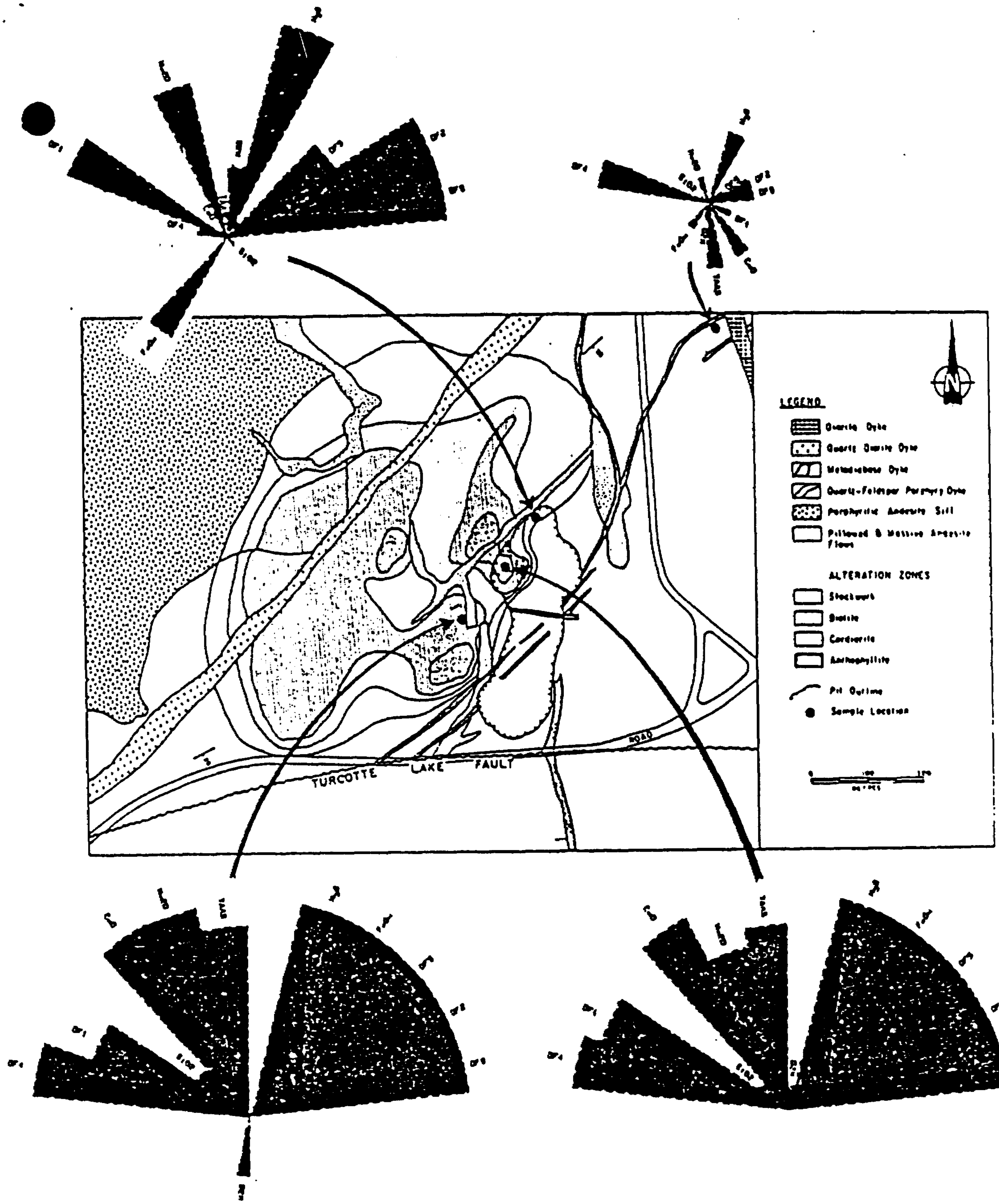

Figure 9 : Evaluation results for bedrock pillowed volcanic samples from Amulet Upper 'A' deposit (Geology and analytical data from Hall, 1982)

portrayed in the chemistry of the rock, was known weeks (or months) previous by the mere examination of the sample in hand specimen or outcrop. But today, now that rapid and inexpensive, reproducable geochemical analyses are available for a great number of elements or oxides and now that a variety of research and/or case history studies are generally available, many new opportunities may be presented and applied to mineral exploration.

The effectiveness in lithogeochemistry lies in the ability of the explorationist to rapidly and cost-effectively, through the use of microcomputers, examine data, within the context of favourable geologic environments, and to select subtle or multivariate trends which may occur even within areas which are intensely and apparently uniformly altered. These trends, whether determined by discriminant analysis, factor analysis, residual mapping or some other technique can ideally "vector" an exploration effort towards mineralized volcano-sedimentary rocks and/or towards locales of syngenetic mineral accumulation.

The lack of outcrop in many areas of Archean bedrock (especially in Canada) or deep (i.e. expensive) diamond drill holes raises some questions about how to accumulate a statistically significant sample population. With the adoption of the results of regional or "universal" studies (as have been incorporated in the procedures at MPH), information from small sets of data can be comparatively examined with some degree of confidence.

Lithogeochemistry is not to be promoted as the ultimate solution to volcanogenic mineral exploration but neither is it merely a superfluous distraction. When utilized in intimate conjunction with proper geological information or assisted by geophysical methods and data processing techniques, lithogeochemical methods can be employed to yield information that will be of prime importance to exploration strategy and decisions.

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APPENDIX 5 - EQUIPMENT SPECIFICATIONS

OMNI PLUS
VLF/Magnetometer System

Major Benefits of the OMNI PLUS

- Combined VLF/Magnetometer/Gradiometer System
- No Orientation Required
- Three VLF Magnetic Parameters Recorded
- Automatic Calculation of Fraser Filter
- Calculation of Ellipticity
- Automatic Correction of Primary Field Variations
- Measurement of VLF Electric Field

OMNI PLUS
VLF / Magnetometer System

Description

The "OMNI PLUS" geophysical system combines the OMNI IV "Tie-Line" magnetometer and gradiometer together with a VLF measurement capability.

The OMNI PLUS VLF/Magnetometer System has been developed in co-operation with Geophysical Surveys Inc. of Quebec, Canada.

This brochure concentrates on the VLF magnetic and electric field parameters measured and recorded by the OMNI PLUS. More information on the OMNI PLUS magnetometer system and tie-line capability is available in the OMNI IV brochure.

Features

Each OMNI PLUS incorporates the following features:

- Measurement and recording in memory of the following VLF data for each field reading:
  - total field strength,
  - total dip,
  - vertical quadrature or, alternately, horizontal amplitude,
  - apparent resistivity,
  - phase angle,
  - time,
  - grid co-ordinates,
  - direction of travel along grid lines, and
  - natural and cultural features.
- Complete data protection for a number of years by an internal lithium backup battery.
- "Tie-Line" or "Looping" algorithm, unique only to EDA's OMNI IV and OMNI PLUS Series, for the self-correction of atmospheric variations and variations in the primary field from the VLF transmitter.
- Measurement of up to three VLF transmitting stations to provide complete coverage of an anomaly regardless of the orientation of the survey grid or of the anomaly itself.
- Display descriptors to monitor the quality of the VLF signal being measured.
- Choice of three data storage modes:
  - spot record, for readings without grid co-ordinates
  - multi record, for multiple readings at one station
  - auto record, for automatic update of station number
- Output of grid co-ordinates with the designated compass bearing, using N, S, E, W descriptors.

Major Benefits

• Combined VLF/Magnetometer/Gradiometer System

The OMNI PLUS incorporates the capabilities of the OMNI IV "Tie-Line" Magnetometer and Gradiometer System with the ability to measure the VLF magnetic and electric fields.

Only one OMNI PLUS is needed to record all of the following geophysical parameters:

1. The total magnetic field
2. The simultaneous gradient of the total magnetic field
3. The VLF magnetic field, including:
   - the total dip
   - the total field strength of the VLF magnetic field
   - the vertical quadrature, or alternately, the horizontal amplitude
4. The VLF electric field, including:
   - the phase angle
   - apparent resistivity

As an example, at each location the OMNI PLUS can calculate and record in a matter of seconds, three VLF magnetic field and two VLF electric field parameters from two different transmitters, a magnetic total field reading and a simultaneous magnetic gradient reading.

• No Orientation Required

The OMNI PLUS requires no orientation, by the operator, of the sensor head toward the transmitter station. This simplifies field procedures as well as saving considerable survey time. When two VLF transmitters are measured, the benefits of this time-saving feature are automatically doubled. There is no requirement for the operator to orient himself and the sensor head toward the first selected transmitting station and then re-orient towards the second transmitting station.

Consistent high quality data is achieved in the OMNI PLUS due to the utilization of three orthogonal sensor coils rather than two sensor coils used in conventional systems. The quality of data is not then dependent on the operator's ability to correctly orient the sensor head for optimum coupling with the transmitting station.

The OMNI PLUS compensates automatically for the direction of travel along the grid lines as well as for the angle of the sensors from the vertical plane through the use of tiltmeters.

• Three VLF Magnetic Parameters Recorded

The OMNI PLUS calculates and records in memory the:
- total dip
- total field strength
- vertical quadrature

The operator has the option to substitute the horizontal amplitude for the vertical quadrature. The OMNI PLUS calculates each of these parameters from the in-phase and quadrature measurements of all three components.

Automatic Calculation of Fraser Filter

The OMNI PLUS automatically calculates the Fraser Filter, from the dip angle data, regardless of the interval between the stations along the grid lines. The operator no longer has to manually perform this mathematical calculation thereby reducing the possibility of human error. The Fraser Filter algorithm follows established conventions.

The operator can choose to output either the total dip or the Fraser filtered data, or both.

Calculation of Ellipticity

The OMNI PLUS calculates the true ellipticity of the VLF magnetic field from the measurement of the in-phase and quadrature of all three components. The ellipticity provides more interpretative information about the anomaly than the dip angle and is less influenced by overburden shielding.

Automatic Correction of Primary Field Variations

The OMNI PLUS can be used as a base station to monitor primary field changes from up to three VLF transmitters as well as alternately measuring the variations in the magnitude of the earth's magnetic field. Only one OMNI PLUS is needed to perform both functions.

The OMNI PLUS base station can then automatically correct, by linear interpolation, the field units for these drift variations in the primary VLF and total magnetic fields.

• Measurement of VLF Electric Field

The OMNI PLUS calculates and records the apparent resistivity and phase angle from the measurement of the VLF electric field. This VLF electric field measurement can be accomplished by using capacitively or resistively coupled electrodes at spacings of 5, 10 or 20 meters.

Other Benefits

• Automatic Tuning

The OMNI PLUS automatically tunes up to three VLF transmitters within a frequency range of 15 to 30 kHz, once the operator has programmed in the specific frequencies.

• Base Station Synchronization

The OMNI PLUS has a unique "count-down" feature which can be activated in the field unit upon synchronization with the base station. The field unit then displays and decrements the remaining time, in seconds, until the base station is scheduled to take a measurement. The operator can obtain a field reading at exactly the same time as the base station. The simultaneous field and base station measurements significantly improve the automatic correction accuracy.

• Automatic "Tie-Line" Correction

The OMNI PLUS can automatically correct by itself the VLF field data for atmospheric variations and changes in the primary field originating from the VLF transmitter. By tieing-back into one or several tiepoints on the grid, the OMNI PLUS will automatically calculate and apply the drift measured to the field data previously recorded in memory. More information on this unique "tie-line" method can be obtained from page 3 of the OMNI IV brochure.

• Notation of Natural and Cultural Features

The OMNI PLUS can record natural and cultural features unique to each grid location. This capability eliminates the need for a field notebook and provides additional information that can assist in interpreting recorded data.

• Analogue Output

Since VLF as well as magnetic data is often easier to interpret as a profile plot, data collected by the OMNI PLUS can be represented in analogue format at a vertical scale best suited for data presentation. The operator can selectively output in analogue and/or digital format, up to 10 of the following parameters:

- total dip
- Fraser filtered data
- ellipticity
- VLF total field strength
- vertical quadrature
- horizontal amplitude
- apparent resistivity
- phase angle
- magnetic total field strength
- magnetic vertical gradient

• Computer Interface

The OMNI PLUS can transfer uncorrected, corrected or filtered data to most computers with a RS232C port. In some cases, a DCA-100 Data Communications Adaptor may be required. Computers with collection packages including either "X-ON, X-OFF" or "ENQ/ACK" communications protocol formats are also compatible.

Specifications*

Frequency Tuning Range	15 to 30 kHz, with bandwidth of 150 Hz; tuning range accommodates new Puerto Rico station at 28.5 kHz
Transmitting Stations Measured	Up to 3 stations can be automatically measured at any given grid location within frequency tuning range
Recorded VLF Magnetic Parameters	Total field strength, total dip, vertical quadrature (or alternately, horizontal amplitude)
Standard Memory Capacity	800 combined VLF magnetic and VLF electric measurements as well as gradiometer and magnetometer readings
Display	Custom designed, ruggedized liquid crystal display with built-in heater and an operating temperature range from −40°C to +55°C. The display contains six numeric digits, decimal point, battery status monitor, signal strength status monitor and function descriptors.
RS232C Serial I/O Interface	2400 baud rate, 8 data bits, 2 stop bits, no parity
Test Mode	A. Diagnostic Testing (data and programmable memory) B. Self Test (hardware)
Sensor Head	Contains 3 orthogonally mounted coils with automatic tilt compensation
Operating Environmental Range	−40°C to +55°C; 0 – 100% relative humidity; Weatherproof
Power Supply	Non-magnetic rechargeable sealed lead-acid 18V DC battery cartridge or belt; 18V DC disposable battery belt; 12V DC external power source for base station operation only.
Weights and Dimensions	
Instrument Console	2.8 kg, 128 x 150 x 250 mm
Sensor Head	2.1 kg, 130 dia. x 130 mm
VLF Electronics Module	1.1 kg, 40 x 150 x 250 mm
Lead Acid Battery Cartridge	1.8 kg, 235 x 105 x 90 mm
Lead Acid Battery Belt	1.8 kg, 540 x 100 x 40 mm
Disposable Battery Belt	1.2 kg, 540 x 100 x 40 mm

*Preliminary

EDA Instruments Inc.,
4 Thorncliffe Park Drive,
Toronto, Ontario
Canada M4H 1H1
Telex: 06 23222 EDA TOR,
Cables: Instruments Toronto
(416) 425-7800

In USA,
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5151 Ward Road,
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U.S.A. 80033
(303) 422-9112

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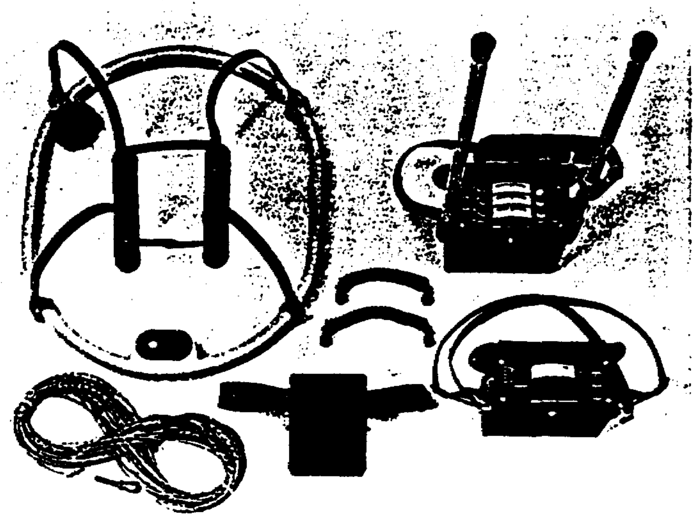
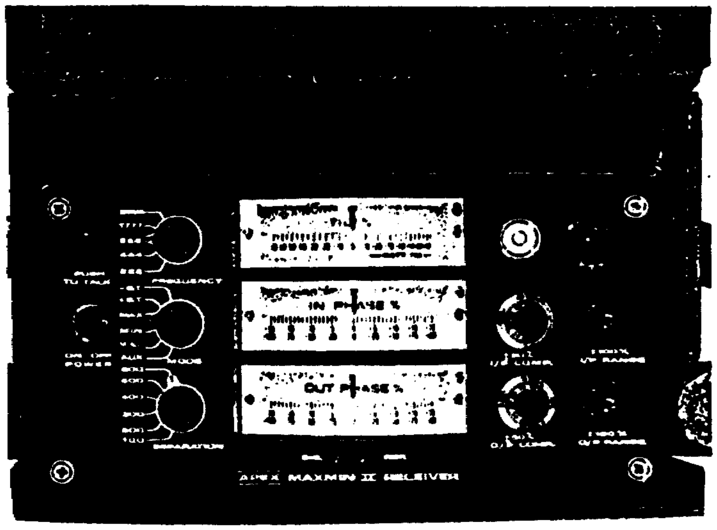
APEX MAXMIN II PORTABLE EM

- Five frequencies: 222, 444, 888, 1777 and 3555 Hz.
- Maximum coupled (horizontal-loop) operation with reference cable.
- Minimum coupled operation with reference cable.
- Vertical-loop operation without reference cable.
- Coil separations: 25, 50, 100, 150, 200 and 250 m (with cable) or 100, 200, 300, 400, 600 and 800 ft.
- Reliable data from depths of up to 180 m (600 ft).
- Built-in voice communication circuitry with cable.
- Tilt meters to control coil orientation.





SPECIFICATIONS:

Frequencies: 222, 444, 888, 1777 and 3555 Hz.

Modes of Operation:

- MAX: Transmitter coil plane and receiver coil plane horizontal (Max-coupled; Horizontal-loop mode). Used with refer.cable.
- MIN: Transmitter coil plane horizontal and receiver coil plane vertical (Min-coupled mode). Used with reference cable.
- V.L.: Transmitter coil plane vertical and receiver coil plane horizontal (Vertical-loop mode). Used without reference cable, in parallel lines.

Coil Separations: 25, 50, 100, 150, 200 & 250m (MMII) or 100, 200, 300, 400, 600 and 800 ft. (MMIIF). Coil separations in V.L. mode not restricted to fixed values.

Parameters Read:

- In-Phase and Quadrature components of the secondary field in MAX and MIN modes.
- Tilt-angle of the total field in V.L. mode.

Readouts:

- Automatic, direct readout on 90 mm (3.5") edgewise meters in MAX and MIN modes. No nulling or compensation necessary.
- Tilt angle and null in 90 mm edgewise meters in V.L. mode.

Scale Ranges:

In-Phase: ±20%, ±100% by push-button switch.
Quadrature: ±20%, ±100% by push-button switch.
Tilt: ±75% slope.
Null (V.L.): Sensitivity adjustable by separation switch.

Readability: In-Phase and Quadrature: 0.25% to 0.5%; Tilt: 1%.

Repeatability: ±0.25% to ±1% normally, depending on conditions, frequencies and coil separation used.

Transmitter Output:

- 222 Hz : 220 Atm^2
- 444 Hz : 200 Atm^2
- 888 Hz : 120 Atm^2
- 1777 Hz : 60 Atm^2
- 3555 Hz : 30 Atm^2

Receiver Batteries: 9V trans. radio type batteries (4). Life: approx. 35 hrs. continuous duty (alkaline, 0.5 Ah), less in cold weather.

Transmitter Batteries: 12V 6 Ah Gel-type rechargeable battery. (Charger supplied).

Reference Cable: Light weight 2-conductor teflon cable for minimum friction. Unshielded. All reference cables optional at extra cost. Please specify.

Voice Link: Built-in intercom system for voice communication between receiver and transmitter operators in MAX and MIN modes, via reference cable.

Indicator Lights: Built-in signal and reference warning lights to indicate erroneous readings.

Temperature Range: -40°C to +60°C (-40°F to +140°F).

Receiver Weight: 8 kg (13 lbs.)

Transmitter Weight: 13 kg (29 lbs.)

Shipping Weight: Typically 60 kg (135 lbs.), depending on quantities of reference cable and batteries included. Shipped in two field/shipping cases.

Specifications subject to change without notification.

APEX PARAMETRICS LIMITED

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63.6118

REPORT ON

1991 EXPLORATION PROGRAM
ON THE
SHUNSBY BASE METAL PROSPECT,
SWAYZE GREENSTONE BELT, ONTARIO
FOR
KIRKTON RESOURCES CORP.

OM90 - 28

W.E. Brereton, P.Eng.
P.A. Sobie, B.Sc.
MPH CONSULTING LIMITED

November, 1991
Toronto, Ontario

SUMMARY

A major exploration program has been completed on the Shunsby base metals property during 1991 on behalf of Kirkton Resources Corp. by MPH Consulting Limited of Toronto.

Located in the south portion of the Swayze greenstone belt some 130 km southwest of Timmins, Ontario, the Shunsby property has a history of exploration dating back to the early 1900's when the area was examined for its iron potential. In excess of 200 diamond drill holes have been completed on the property to date. This work has been focused on two small copper-zinc (± lead, silver, cadmium) deposits, the so-called "Main" and "South" zones.

Significantly, good quality logging roads into the property area have recently been established. Kirkton's original interest in the property focused on the potential to develop an open pittable Cu-Zn reserve relative to previous operators who mostly seemed to be trying to delineate a higher grade, underground mine. It was recognized by Kirkton that the greatly improved access into the area would play a significant role in the economics of the property and might permit the mining of lower grades.

The 1991 program has completed the surface exploration and computer-aided drillhole compilation work at Shunsby which commenced in 1989 with an extensive linecutting and ground geophysical program. This was followed in 1990 with a program focused primarily on a large stripping and trenching exercise aimed at locating some of the drill-indicated mineralization at surface. The 1991 program again had a large stripping, trenching and sampling component in follow-up to work commenced last year, but also included comprehensive geological mapping both on a property-wide scale and of a very detailed nature in the area of the deposits. Extensive petrographic and computer-supported lithogeochemical processing work was also carried out this year to assist in the classification of the various lithologies in the deposits area and the identification of hydrothermal alteration signatures associated with mineralization.

The results of the 1991 program, in concert with all of the previous work, allow a comprehensive understanding of the Shunsby property in terms of both geology and mineralization.

Geologically, it now appears incontrovertible that the entire sequence at Shunsby is overturned to the west such that true stratigraphic tops are, in fact, to the east. This has some critical, and previously unrecognized, exploration implications.

Three generalized geologic domains can be recognized from west to east, ie. oldest to youngest, on the Shunsby property namely a mafic volcanic-gabbro-iron formation domain exposed in the extreme west-central portion, a major pyroclastic-chemical sedimentary - clastic sedimentary domain with minor basalt which underlies the central and southwest portion of the property and an easterly/northeasterly mafic (basalt-gabbro) domain. This geological picture has been greatly complicated by folding, faulting and intrusive activity. The central domain is the most economically significant in that the Shunsby Cu-Zn deposits occur near its stratigraphic top in a distinctive chert/argillite sequence.

Structurally, there do not appear to be any major fold closures on the property although considerable drag-folding, quite large scale in some cases and often related to east-west shearing, has been identified in a number of areas.

Evaluation of all of the exploration results to date suggests that the Shunsby mineralization consists of a large, structurally-controlled stringer system(s) centred on a thick, grossly pod-like or lensoid unit of predominantly cherty chemical sediments and their brecciated equivalents. This chert accumulation represents chemical sedimentation in a quiescent basinal environment on the flank of a major felsic-intermediate pyroclastic eruptive centre located to the south and west. Lithogeochemical processing as well as field and thin-section observations indicate a large-scale hydrothermal alteration system accompanies the mineralization.

Individual mineralized structures trend 120^0 on average and dip vertically. Very little of the mineralization is stratiform, ie N-S striking and 30^0 - 50^0 W dipping. With virtually all of the old work predicated on a statiform model, it is now easy to understand why few of the old intersections "line-up" in a bedding-plane sense and hence the property's reputation as "erratic" or "difficult". This further has the ramification that the old drilling is virtually useless from an ore reserve standpoint and all of the previous ore reserve calculations, MPH's included, should be discarded. It is felt that at least seven individual structures are present within the overall stringer system with definite evidence in float of at least one more copper-bearing structure to the north of any presently known mineralization. The central structures appear to be the most copper rich. Those on the peripheries both to the north and south are more Zn-Pb rich. There is also a great deal more Pb on the property than previously recognized with much of this in very late E-W fractures.

The stripping and trenching work, in 1991 particularly, indicates some attractive copper ($\pm$ zinc) grades and widths associated with the known structurally-controlled mineralization and suggests that this material has ore-making potential if sufficient of it can be outlined. A trench across a portion of the Copper Breccia showing, for example, averaged 3.53% Cu over 5.0m. Similarly, a 3.0m sample across the Copper Knob structure averaged 2.59% Cu. A trench across the South Zone structure in the area of line 100S averaged 10.77% Zn, 2.75% Pb and 0.75% Cu over 4.8m.

Depending on the timing of the mineralizing hydrothermal event relative to volcanism, the entire system may have vented at the sea floor at the top of the Shunsby sedimentary sequence. Now that top directions are known, this venting, if it occurred, would have taken place along the string of strong, generally untested EM conductors to the east of the surface showings. Present (and previous) work has disclosed the presence of a mineralized glacial dispersion train along this corridor with some quite high grade samples pointing to the presence of some form of undiscovered mineralization here. Individual samples have returned up to 11% Cu.

It is concluded that a diamond drilling campaign is strongly warranted based on results to date and should proceed. An initial 10,000 feet of drilling should be allocated at a budget of $300,000.00. This work should focus on an evaluation of the ore-making potential of the known stringer mineralization along with testing of key EM targets at the top of the Shunsby sedimentary sequence. All holes should be drilled on a northeasterly azimuth at - 45^0. The stringer zones should be investigated by a number of continuous cross-sectional profiles with the EM targets being tested by a number of conductor-specific holes.

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1.0 INTRODUCTION

The Shunsby property, located southwest of Timmins, contains two historic copper-zinc deposits which are, by far, the most significant concentrations of base metals within the Swayze greenstone belt. The Swayze represents the westward continuation of the prolific Abitibi greenstone belt which hosts the gold-base metal camps of Timmins-Porcupine, Noranda-Val d'Or and Chibougamau.

Extensive exploration efforts on the present property between 1954 and 1981 by several groups included 67,000 feet of drilling in 225 holes, the majority of which were concentrated in the known areas of mineralization. This work was constantly hampered by poor access and technical problems, but was successful in delineating two small deposits of reportedly distal volcanogenic character. Relatively low grades deterred these previous operators who, for the most part, were attempting to establish an underground mining operation. Kirkton's initial interest revolved around the potential for establishing an open-pit operation on the property supplemented by selective underground mining of some higher grade zones. As well, the property as a whole was felt to be highly pregnant base metal ground which had never been thoroughly explored.

Initial work by Kirkton on the property during the 1989/90 fall and winter consisted of extensive data compilation combined with linecutting, preliminary geological investigations and blanket geophysical surveying (magnetics and horizontal loop EM).

Work during 1990 included a large stripping/trenching program, careful relogging and resampling of the old core as well as an attempt at accurate location of these holes relative to the grid system, along with some geological mapping. As well, additional detailed linecutting and geophysics were carried out over the area hosting the Main and South deposits. The new geophysical data were integrated with the previous survey results and the entire geophysical picture re-interpreted. The aim of all this work was to better understand the nature and distribution of the mineralization, and to correlate the copper and zinc values in drill core with known surface mineralization and the various geophysical zones. As well, a number of samples of the volcanic/intrusive assemblage were collected to help characterize any hydrothermal alteration associated with mineralization on the property. And finally, a computer-aided mineral inventory was calculated for the two deposits.

The 1991 program was essentially a continuation of the surface work begun in 1990 and was designed to:

a) further evaluate by stripping and trenching mineralized showings discovered during 1990
b) investigate, by stripping and trenching, geophysical targets identified by the re-interpreted geophysical database
c) comprehensively map the property as a whole, and the stripped areas in detail to come to as full an understanding as possible of the Shunsby geology and mineralization
d) augment the existing geochemical/petrographic database through further sampling and petrographic work

2.0 LOCATION, ACCESS AND INFRASTRUCTURE

The Shunsby property is located in the central portion of Cunningham Township, approximately 50 kilometres south of Foleyet and 60 kilometres east of Chapleau (Figure 1). The large mining centres of Timmins and Sudbury are approximately 130 and 180 kilometres to the northeast and southeast, respectively. The property is centred at 47°43'N latitude and 82°39'30"W longitude, within NTS area 41 0/10.

An existing network of gravel logging roads established by E.B. Eddy Forest Products Ltd. off the Timmins-Sudbury highway, no. 144, provides easy truck access to the south and central portions of the property. To reach the property, it is necessary to follow the Ramsey-Sultan road west from highway 144 thence north along the Cunningham Township spur of the Blamey Road to the property. It is approximately 90 km from highway 144 to the property. The Cunningham Township road in turn connects with a number of old drill roads and trails which provide access to the balance of the claims. Alternatively, the Dore Road of Foleyet Timber Limited can be followed south from Highway 101 just east of the town of Foleyet to the Ramsey-Sultan Road. A wagon trail/drill road connects the Shunsby property to the Dore Road at Garnet Lake, just south of the Wakami River crossing. Up-grading of this road would cut the road distance to Timmins to approximately 130 kilometres.

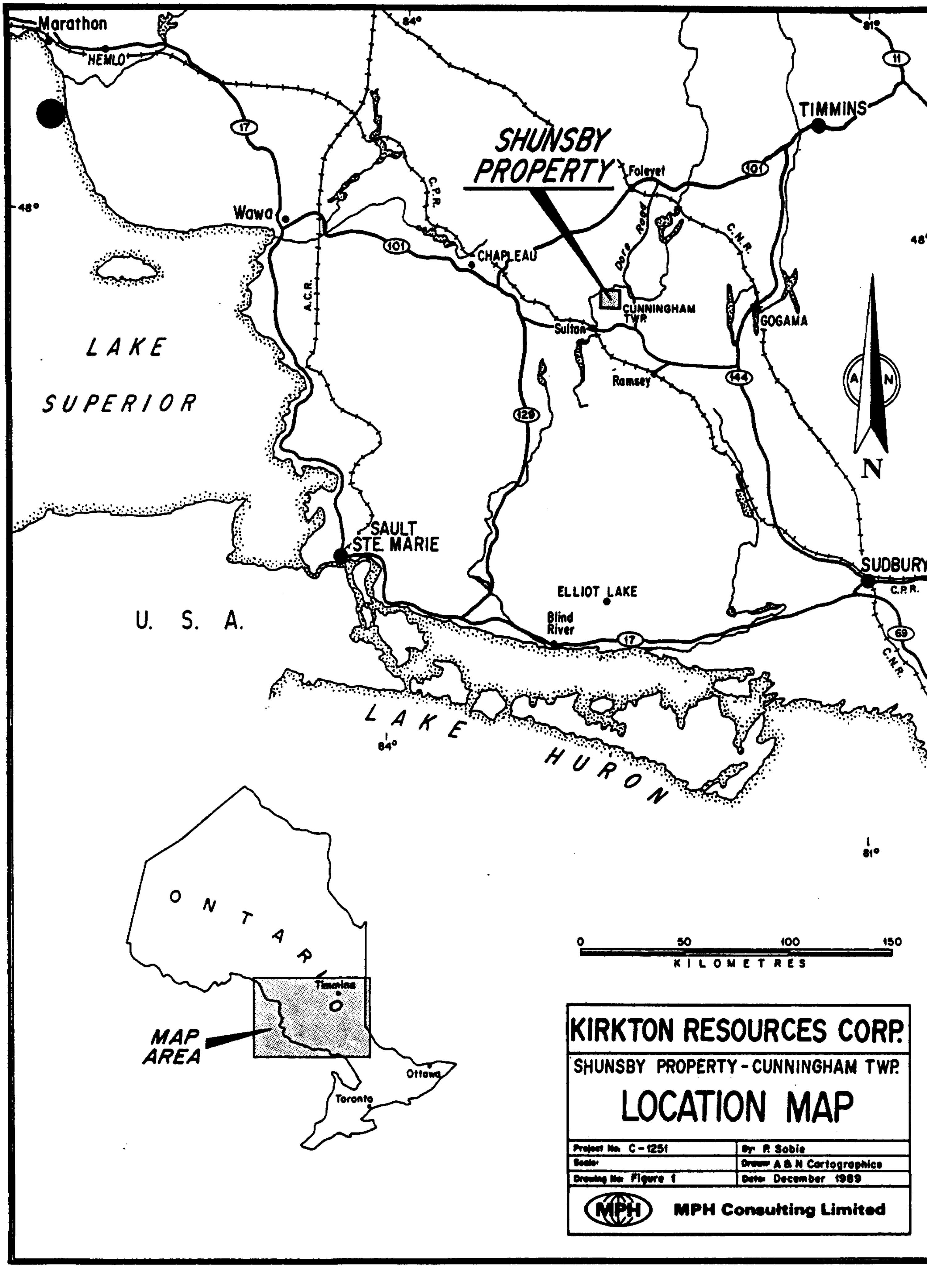
The E.B. Eddy logging operations have currently covered the three southernmost claims and much of the western portion of the property.

The property is well located in terms of exploration and mining supplies, services, etc., being approximately equidistant from Marathon/Manitouwadge/Wawa, Timmins and Sudbury. There is a large and relatively stable work force in the region from which to draw miners for any new mining operation.

The CPR main line passes through the small railhead of Sultan, approximately 30 kilometres by road to the southwest of the property. E.B. Eddy maintains a large camp at Ramsay, approximately 65 km by road to the southeast, also on the CPR line.

The original drill camp on the property at Hiram Lake still includes one cabin in fair condition as well as all of the core racks. There is an old MNR forestry tower camp, which includes two winterized cabins in excellent condition, approximately 1.5 kilometres to the northwest.

Abundant fresh water is available on the property from Edwards Lake. The nearest hydro-electric power is at Sultan, 16 km across country to the south-southwest. There is also an old telegraph line and right-of-way which extends from Sultan to the forestry tower.


Marathon
HEMLO
84°
81°
11
17
TIMMINS
SHUNSBY PROPERTY
Foleyet
101
C.P.R.
48°
Wawa
Dore Road
C.N.R.
101
CHAPLEAU
A.C.R.
CUNNINGHAM TWP.
GOGAMA
Sulton
LAKE SUPERIOR
Ramsey
144
129
N
SAULT STE. MARIE
SUDBURY
ELLIOT LAKE
C.P.R.
U. S. A.
Blind River
17
69
C.N.R.
LAKE HURON
84°
81°
ONTARIO
0 50 100 150
KILOMETRES
Timmins
MAP AREA
Ottawa
Toronto
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY - CUNNINGHAM TWP.
LOCATION MAP
Project No. C-1251
By: P. Sobie
Scale:
Drawn: A & N Cartographics
Drawing No: Figure 1
Date: December 1989
MPH
MPH Consulting Limited

3.0 PROPERTY AND LEGAL

The Shunsby property is within the Porcupine Mining Division of Ontario and consists of 20 patented mining claims and 10 mining leases (Figure 2) more properly described as follows:

Patented Mining Claims	Number	Mining Rights Only	Surface and Mining Rights
S34944-34947	4		x
S43946-43948	3		x
S57536-57544	9	x	
S57585	1	x	
S61828-61830	3	x	
	20		
Mining Leases	**Number**		
P90411-90412	2	x	
P90413-90415	3		x
P121298	1	x	
P147117-147118	2	x	
P121596-121597	2	x	
	10		

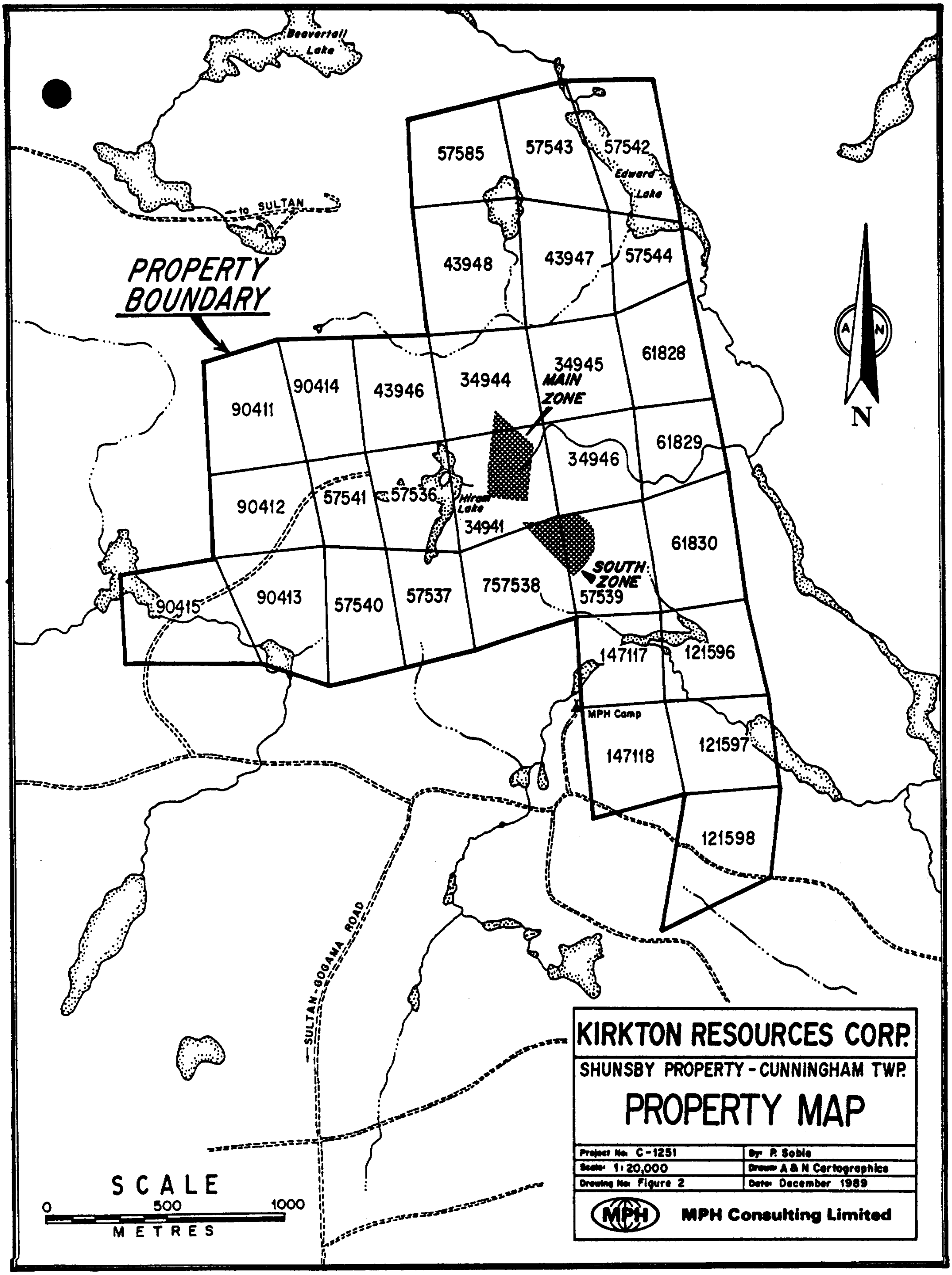
Under the new Mining Act in Ontario, leases are still granted on mining claims following completion of required dollar amounts of assessment work for an initial 21 year term. This is now renewable only at the discretion of the Minister.

Where both surface and mining rights are leased, an annual rental payment to the Crown of $5.00 per hectare is now required. For mining rights only the annual rental is $3.00 per hectare.

For all of the Shunsby patented claims, a mining land tax is payable to the Crown each year according to the following schedule:

(a) $1.2356 per hectare for 1991;
(b) $2 per hectare for 1992 and 1993;
(c) $4 per hectare for 1994 and 1995; and
(d) $8 per hectare for 1996 and each subsequent year.

Kirkton Resources Corporation may earn a 100% undivided interest in the property, subject to a 12-1/2% net profits royalty, by carrying out exploration totalling $2,750,000 and making cash payments totalling $250,000 to MW Resources Ltd., Toronto and Chelsea Resources Ltd., Vancouver by four years after the date that the Ontario Securities Commission issues a receipt



Beavertail Lake
to SULTAN
PROPERTY BOUNDARY
57585
57543
57542
Edward Lake
43948
43947
57544
90411
90414
43946
34944
34945
MAIN ZONE
61828
61829
34946
90412
57541
57536
Hiram Lake
34941
61830
90415
90413
57540
57537
757538
SOUTH ZONE
57539
147117
121596
MPH Camp
147118
121597
121598
SULTAN-GOGAMA ROAD
N
SCALE
0
500
1000
METRES
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY - CUNNINGHAM TWP.
PROPERTY MAP
Project No. C-1251
By: P. Sobie
Scale: 1:20,000
Drawn: A & N Cartographics
Drawing No: Figure 2
Date: December 1989
MPH Consulting Limited

for a final prospectus regarding an initial public financing for the company. Kirkton may earn a 20% undivided interest after exploration expenditures of $750,000 and option payments of $50,000, after which the interest of the company shall be calculated by the lesser of either:

(a) percentage amount of exploration expenditures in relation to $2,750,000; or

(b) percentage amount of option payments in relation to $250,000.

In the event that Kirkton does not acquire 100% of the property, the option agreement calls for the formation of a joint venture to further explore the claims.

To the end of 1991, Kirkton will have spent in excess of $750,000.00 on the property and will have made option payments totalling $50,000.00, thereby earning a 20% interest.

4.0 PREVIOUS WORK

The property has been the subject of extensive exploration dating back to the turn of the century when the iron formation in central Cummingham Township was first staked for its iron content. Table 1 summarizes the exploration history of the Shunsby property.

TABLE 1 - EXPLORATION HISTORY

Date	Company	Interest	Diamond Drill Holes	Drilling Footage	Claims Worked	Work
1904-07	Ridout Mining	Iron	-	-	-	Staking
1927-29	Ridout Cunningham	Zn, Pb	some	?	34944 to 47	Trenching Drilling
1954	Am Metal Co.	Zn, Cu, Pb	1	560	121596, 597	Drilling
1954	Cominco	Zn, Cu, Pb	4	1,500	57539, 57543	Drilling
1955-57	Shunsby Gold Mines, Teck etc. Syndicate	Zn, Cu, Pb	74	20,336	34947 etc.	Geology, Trenching Drilling
1957	Martin Shunsby	Zn, Cu, Pb	3	200	90415	Packsack Drilling
1960-61	Shunsby Mines	Zn, Cu, Pb	9 9	3,605 4,110	34947	EM, Geology, Drilling
1965-66	FRJ Prospecting Syndicate	Zn, Cu, Pb	41	14,279	34944 to 47	EM, Geology Drilling
1968-69	Con. Shunsby Mines Ltd.	Zn, Cu, Pb	23	9,091	34945 46, 47 57539	Geology, Drilling
1969-70	Umex	Zn, Cu, Pb	Nil	Nil	-	Geology
1974-75	Grandora Explorations	Zn, Cu, Pb	21	7,444	57539 34947	Trenching, Drilling Geochemical
1978	MW Resources	Zn, Cu, Pb Ag, Au	5	1,237	Tower Group	Geology, Drilling
1979-80	Placer Development	Zn, Cu, Pb Ag, Au	4	1,250	Southern Ext.	EM, Geochemistry Mag Drilling
1981	MW Resources	Zn, Cu, Ag, Au	30	3,474	34947 57539	Map, Drilling
			224+	67,000+		

Initial interest in the iron ore possibilities of the property by Ridout Mining quickly waned when it was determined that the iron content of the chert formations was non-economic. Subsequent discoveries of lead and zinc-bearing veins(?) within the iron formation prompted a 1927 exploration campaign over the entire strike length of the iron formation under the merged Ridout Cunningham Mines, Limited. While no record of this work remains, Meen (1942) reports that, "systematic prospecting of the many claims along with some diamond drilling was undertaken in 1928-29, but no body of economic importance was discovered and no further work has been carried out". He reports on the discovery of some base metal showings however, and it seems probable that this work first identified what would become the Texas Gulf deposit located 3 km to the northwest and the Shunsby deposit, the latter named after prospector Martin Shunsby.

The present property was staked in central Cunningham Township by Earle Sootheran and Hiram Paul. In 1954 it was optioned to Cominco Ltd. who drilled 1499 feet in 4 holes designated A through D. Three of these were in the area of the present South Zone and one was drilled in the northeast corner near Edwards Lake. The southern drilling encountered several narrow, zinc ± lead-bearing horizons, while the northern hole encountered felsic volcaniclastics and graphitic sediments.

Also in 1954, American Metal Company drilled a single, 559.5 ft hole in the area of present line 900S at 500E. No assays are reported but the section from 29 to 30.1 feet is described as "tuffaceous material ... heavily mineralized by pyrrhotite with pyrite, chalcopyrite and sphalerite". The section from 192.6 to 195.6 feet is described as "highly altered rock ... pyrrhotite, chalcopyrite and sphalerite disseminated throughout ...".

In 1955 Nipiron Mines, Ltd., who optioned the property from Shunsby Gold Mines Ltd., funded and directed the drilling of 57 diamond drill holes mostly in the so-called Main Zone area. Much of this work was rather poorly directed and W.S. Savage (1956), the Department of Mines resident geologist at that time, noted: "It is obvious that some of the long sulphide-bearing intersections in the diamond drill holes resulted from inadvertently drilling down the dip of a mineralized bed". Nipiron reportedly defined 100,000 tons of 1% copper mineralization from their drilling, but negotiated a termination to their option agreement in the summer of 1956.

A syndicate consisting of Teck Explorations, Cochenour-Willans Mines, Northern Canada Mines, Nipiron Mines and Shunsby Mines was subsequently formed to further explore the property. This group drilled a further 17 holes during the fall of 1956 and winter of 1957. Three holes were drilled into the Main Zone deposit, with most of the others directed towards the South Zone. As well, deep holes 72 and 74 were drilled in the vicinity of the Hiram Lake camp to test for down-dip extensions of the Main Zone. Copper-zinc mineralization was encountered and this became known as the West Zone. Virtually all of the Syndicate holes encountered encouraging to potentially economic mineralization, however, falling base metal prices forced a halt to the program during March of 1957. Teck Explorations calculated an ore reserve for the Main Zone of 152,000 tons grading 1.35% Cu and 1.22% Zn at this time. Also during this period, the east-west access road linking the property to the Sultan-Kenty Mine road was cut. Shunsby Mines Ltd. also completed the purchase of the optioned Southeran-Paul property. In addition, flotation tests were run on lead-zinc and copper ore samples by the metallurgical division of the Department of Mines, indicating that there would be no apparent difficulty in producing commercial grade concentrates.

Nipiron Mines Ltd. under an option agreement with Shunsby Mines undertook further exploration in the winter of 1960. Nine holes (75-83) were completed during December and January totalling 3,605 feet. These were again directed towards the Main and West Zones, apparently to replace/legitimize much of the earlier, down-dip intersections. Geological mapping as well as EM and magnetic surveys were reported as being completed during this campaign. A further nine diamond drill holes totalling 4,110 feet were completed the following summer. This consisted of several holes (85, 90, 91 and 92) drilled vertically. These successfully intersected the down-dip projection of the Main Zone, between the camp and the main showings to the east. Significantly, the other five holes were again drilled down-dip in this same area, possibly to avoid a topographic rise represented by a large diorite intrusive.

During the summer of 1964, Nipiron extended hole 82 from 503 feet to 836 feet and encountered the down-dip projection of the Main Zone, i.e. the West Zone. This is the most westerly hole drilled in this portion of the deposit to date. This hole encountered some significant copper values including 4.2% Cu over 4.1 ft and 4.3% Cu over 5.5 ft. The mineralization is completely open in the down-dip direction beyond this hole.

The F.R. Joubin Prospecting Syndicate became involved with the property in 1965, with Joubin becoming president of the reorganized/refinanced Consolidated Shunsby Mines Ltd. in 1966 following the death of Martin Shunsby. The syndicate itself consisted of personnel from mining organizations including Leitch Gold Mines Ltd., Noranda Explorations, Ltd. and Wright-Hargreaves Mines Ltd.

Joubin instigated an aggressive exploration campaign which included much staking of surrounding ground followed by geochemical, magnetometer and Turam EM surveying, step-out drilling along strike both to the north of the Main Zone and the south of the South Zone, as well as limited drilling and trenching in the western property area. The two holes drilled by Joubin on the western property showings both intersected an "upper" low grade zinc-mineralized chert horizon but were felt to be of insufficient length to test the "Basal Chert" he thought to be present here. This latter unit hosts much of the potentially economic base metal mineralization in the Main, South and West Zones. Stratigraphy here was thought to correspond to the western limb of a major syncline which transects the property. No field or geophysical evidence has been found to confirm the existence of such a structure, therefore Joubin was drilling stratigraphy correlative with the Texas Gulf and Tower Group iron formation.

Joubin's work on the South Zone was designed to better understand stratigraphy as well as confirm a number of previous, high-grade intersections. The program, which included lengthening several holes to the "footwall diorite", was felt to indicate that an upper (middle?) chert horizon hosted high grade copper-zinc mineralization here, while the "basal" chert intersections were of lower grade.

The Syndicate's work to the north consisted of several in-fill holes within the Main Zone, as well as holes designed to:

(a) further define the down-dip extension (West Zone);
(b) extend the Main-West zones to the north; and
(c) explore the area in between the Main and South Zones.

In general, results indicated that:

(a) significant mineralization in the West Zone persists to a vertical depth of at least 840 feet;
(b) significant copper ± zinc, lead mineralization within the chert extends at least 1,200 feet to the north of the Main Zone but is offset; and
(c) the intermediate area between the Main and South Zones is of high potential but is complicated by a fault.

Within the Main Zone, Joubin calculated an average grade of 1.2% copper and 1.28% zinc over a true width of 26 to 27 feet. He recommended shallow underground investigations and states (1966):

> "There is sound reason to believe that this drill-indicated average grade will be raised by bulk sampling. This is because the copper values appear to be controlled by both disseminations in the Basal Chert and also as narrow chalcopyrite-filled fractures. It is improbable that the several vertical drill holes have intersected a representative amount of the vertical fracture mineralization.
>
> I concur with and endorse the opinion of other geologists that the Main Zone section justifies shallow level underground exploration intended to check on (a) grade, (b) mineral distribution characteristics, (c) the attitude of cross and strike fracturing and relationship to mineralization, (d) the attitude and relationship (if any) to the post-mineral "D" dyke, and (e) general rock characteristics as these would relate to possible underground mining and/or some limited open-pit extraction."

A qualifying report written by W.F. Atkins, P.Eng. in 1968 raised $100,000 for Consolidated Shunsby Mines Ltd. through a public underwriting which was used to finance a 1968 drill program of 23 holes. The majority of this work was directed towards the South Zone and the intermediate area, with several holes (68-7, 8 and 9) spotted to test a showing within granitic(?) rocks to the west of the present property. This campaign allowed for a calculation of geologic reserves for both the South and Main zones.

Joubin then brought the property to the attention of Union Miniere Explorations and Mining Corporation Limited (UMEX) in March of 1969. Their examinations and compilations allowed for reserve calculations by P. Potapoff of:

UPPER CHERT ZONE - (middle chert, South and Main Zones)	929,000 tons averaging 0.24% Cu, 2.25% Zn + Pb from surface to -300 feet over 2,700 foot strike extent.
LOWER CHERT ZONE - (middle chert, South and Main Zones)	1,684,000 tons averaging 0.59% Cu, 1.6% Cu + Pb from surface to -900 feet over 2,400 foot strike length.

Potapoff notes that some of the mineralized zones form discontinuous blocks due to faulting, and some of the better intersections appear isolated. However, A.J. Hough of UMEX notes that reported collar elevations and locations at that time were suspect. This, of course, can have a major bearing on the inferred continuity of mineralized zones. Potapoff concluded that the chances were good of firming up a large tonnage (~10,000,000 tons), low grade (0.5% Cu, 2.0% Zn + Pb, 0.25 oz/ton Ag) deposit. He recommended a program of deep drilling for down-dip extensions as well as comprehensive property-wide follow-up drilling of old Turam anomalies and surface showings which had not been drilled and were located in otherwise geologically favourable areas. It appears that UMEX subsequently returned the property to Consolidated Shunsby Mines without doing any further work and it sat idle until 1974.

In 1973, B.D. Weaver, a consulting geologist, reviewed the historical data on the Shunsby property. He concluded that all drilling thus far was of little value and that the Main Zone should be drilled off vertically on 100 foot centres.

Grandora Explorations Ltd. in the fall of 1974 optioned the property from Consolidated Shunsby Mines and instigated a program of geochemical sampling, bulldozer trenching and 7,444 feet of diamond drilling in 21 holes. During the initial phase of the drill program, 10 holes were targeted on the Main Zone, to extend and delimit the eastern extent of the mineralization. Holcapek (1975) states that the boundaries of the "possible open pit ore zone" are marked by two northerly trending fault zones.

Grandora drilled 11 holes in the South Zone spaced at approximately 200 feet centres to extend the known mineralization and clarify the structural setting. Inexplicably, most of these holes were stopped before reaching the basal chert and footwall diorite. Holcapek states, however:

> "The results of this drill program showed that the best mineralized sections are located within the argillites or along the argillite-chert contact, localized along the crestal region of tight, low amplitude folds. Anticlinal folds appear to be more favourable for localizing mineralization because of greater thickening of the sedimentary units and more intense brecciation, but in the vicinity of the fault zones, strong brecciation of the synclinal crestal region can carry good widths of ore grade mineralization as is evident in the eastern part of the Main Zone.

Further, the bedded mineralization suggests that the original sulphides are syngenetic in origin and have been partially remobilized from the limbs of the fold structures into the crestal regions. More work will be necessary to definitely confirm this model."

Holcapek calculated geologic, drill indicated reserves totalling some 1.6 million tons as follows:

Main Zone-Basal Cherts	528,160 tons grading 1.0% Cu and 1.2% Zn
Main Zone-Middle Cherts	350,000 tons grading 1.0% Cu and 1.5% Zn
South Zone-Basal Cherts	400,900 tons grading 0.27% Cu and 2.48% Zn
South Zone-Middle Cherts	320,000 tons grading 0.58% Cu and 2.48% Zn

He further concluded that approximately 1.16 million tons of this material was mineable by open pit. Holcapek recommended linecutting along with detailed lithologic/structural mapping of the whole property and magnetic and EM surveying, to be followed by deep drilling of the down-dip extensions of the known mineralized zones.

In 1978, the renamed MW Resources drilled five holes in the vicinity of the Forestry Tower, then part of the Shunsby property, with little success.

Placer Development Limited optioned the property from MW Resources Ltd. in 1980 and completed geochemical and EM-17 surveying. Placer then drilled four holes, all in the southern portion of the property as it existed at that time. Two holes were drilled on what is now Cominco ground to the southwest of the present Shunsby property. The holes intersected massive pyrite horizons in explanation of the EM conductivity. Placer calculated their own ore reserve figure for the Shunsby deposit, arriving at 2.4 million tons grading 0.4% Cu and 2.4% Zn.

The final phase of exploration was conducted by MW Resources in 1981 and was directed towards delineating a small, high-grade pod within the Main Zone which could be extracted to generate cash-flow. To this end, D. Fairbairn, P.Eng., President of MW Resources Ltd., reviewed all past data and identified a "flat-lying ore zone" of dimensions 1,000 feet long by 130 feet wide by 7 feet thick. This was estimated to contain some 80,000 tons of material grading 3.9% Cu, 6.2% Zn, 1.2 oz/ton Ag and 0.03 oz/t Au. He proposed mining this zone by room-and-pillar methods using a decline from surface, with the ore to be milled at Manitouwadge (Geco). In order to prove up this reserve, Fairbairn proposed a program of short vertical holes as well as stripping and trenching in the Basal Chert horizon of the Main Zone. He was also encouraged by the work to date on the South Zone basal chert, and the middle chert horizons of both zones. Fairbairn calculated reserves of 970,000 tons grading 1.2% Cu and 5.0% Zn for the South Zone, and notes that no assays for Au or Ag were performed.

In the interim, L.B. Goldsmith, P.Eng. reviewed the Placer geophysics and concluded that Placer had not comprehensively compiled known geology with respect to their EM-17 results. He recommended that an EM-17 survey be run over the North (Main) Zone and the results used to re-interpret the Placer results.

A 1981 drill program initiated by Fairbairn for MW Resources consisted of 30 vertical or near vertical holes in the Main Zone. These he concluded were successful in proving up 50,000 tons of material grading 5.2% equivalent copper (3.2% Cu + 3.1% Zn along with 0.02 oz/ton Au and 0.75 oz/ton Ag) over approximately half of the inferred 1,000 foot strike length of the zone. Fairbairn recommended another 2,000 feet of drilling to evaluate the northern and southern quarters of this shallow, high grade zone, and postulated that the base metal enrichment was the result of post-depositional sedimentary dewatering, and as such, more high grade pods could be expected. He further recommended that a program of thorough geological mapping, geophysical surveying and diamond drilling be initiated to locate more zones before any production attempts. The suggestion was also made that MW might entice a major mining company, via a suitable option agreement, to get involved in the project.

In 1982, a lake sediment and water sampling program was performed in the vicinity of Tower, Mink and Edwards lakes by The Environmental Applications Group Ltd. (EAG) for MW Resources. The lake sediment survey, although encompassing a very small number of samples, suggested that a high metal background was present, with possible bedrock related responses noted in the area of Beavertail Lake, Tower Lake and downstream of Edwards Lake. Water at all sites did not reflect these concentrations and was deemed of excellent quality for both potable and mill uses.

In 1983, a fully independent review and assessment of all previous exploration work was performed by Hill, Goettler, De Laporte Ltd. of Toronto for MW Resources. Significantly, they conclude that "sufficient uncertainties with respect to the results and interpretations of both the Placer and recent MW work on the property cast doubts upon the conclusions of the previous work and the reserves supposedly established. Despite extensive drilling in the North and South Zones of the property, therefore, it is H.G.D.'s opinion that the property has not been fully tested... There is enough information presently available in core and reports to enable a thorough assessment to be made and an attractive exploration programme to be outlined by MW preparatory to seeking such a partner".

To this end, Brian Wilson and Associates Ltd., was contracted in 1989 to compile the exploration data and recommend an integrated exploration plan. Wilson's work arrived at a geological reserve figure of approximately 1.0 million tonnes grading 1.0% Cu and 1.5% Zn. He further noted that the two mineralized horizons are open to depth and, in part, along strike. He also concluded that Fairbairn's calculation of 80,000 tons at 3.9% Cu, 6.2% Zn and 1.2 oz/ton Ag for the high grade pod was reasonable, but that extraction of this ore would break even at best. Wilson recommended a one million dollar, two-phase exploration program to consist of:

Phase One	-	Re-establish access road.
	-	Re-logging/re-sampling old core.
	-	Linecutting.
	-	Geological mapping.
	-	HLEM and gradient magnetic surveying.
	-	Detailed levelling survey to locate old drill collars.
Phase Two	-	10,000 feet of anomaly drilling.
	-	25,000 feet of detailed drilling.

Most of Wilson's Phase 1 recommendations have been carried out in the course of the work reported upon herein.

5.0 EXPLORATION PROGRAM - OPERATIONS

5.1 General

MPH personnel utilized a permanent 10 man tent camp established in May, 1990 at the end of the logging road, just west of #4 post, claim S-147118 in the southern property area. This was used to accommodate and feed all company and contract personnel for the duration of the field season, and has been left intact for future work.

The field project consisted essentially of two phases: an initial heavy equipment-intensive stripping and washing program during which extensive trenching and sampling of priority mineralization was carried out and a subsequent mapping program through August and September. The report writing and map preparation phase was completed from October to December during which time extensive petrographic work, computer processing of geochemical data and geophysical re-interpretation were also carried out. Considerable time was also spent in digitizing all of the geological, sampling and assay data in the key mineralized area such that computer-generated maps of all or any part of the mineralized area at any scale for a large number of parameters such as copper : zinc ratios, individual mineralized intercepts, etc. can be readily produced. As well as various plan presentations, vertical sections at any azimuth can also now be produced. This computer database will be a tremendous asset once diamond drilling commences in terms of both spotting holes and instantly relating new information to all of the existing drill, assay and geological data.

MPH personnel involved with the project consisted of :

W.E. Brereton, P.Eng	Consultant
P. Sobie, B.Sc.	Project Manager
A. Kamo, B.Sc.	Field Geologist
D. Brunne	Geological Technician
R. Chasse	Geological Technician

In-house computer and drafting personnel were utilized as needed.

5.2 Stripping and Trenching

The mechanical stripping and washing was sub-contracted to D.P. Larche Mining Exploration Ltd. of Timmins, Ontario. Equipment supplied (with rates) included:

Caterpillar D-7 Bulldozer	($100/hr)
John Deere 690B Excavator	($ 90/hr)
Timberjack-mounted Backhoe	($ 50/hr)
Wajax high-pressure pump + hoses	($120/day)
Honda Four-trax utility vehicle	($ 65/day)

Along with the above, Larche supplied three operators and fuel, supplies etc. for the equipment.

The general methodology involved clearing a swath of ground to be stripped with the bulldozer and pushing as much overburden to the sides as possible. This was followed by major overburden removal with the excavator after which the Timberjack backhoe did the final clean-up of remaining overburden.

All bedrock exposed by the stripping operations was thoroughly washed with the Wajax high pressure pump by MPH personnel. The newly exposed rock was then examined and various mineralized areas were selected for trenching and sampling. The trenching was carried out by drilling short blast holes with a gasoline plugger followed by loading and blasting with stick powder.

Operations this year were carried out to close up the spacing between areas stripped last year, and as well to investigate the area north and west of the Main Zone. Specifically, stripping was carried out in the following areas:

LINE/AREA	FROM	TO
6+25N	3+00W	0+50W
5+00N	5+50W	1+25W
5+00N	0+75W	0+00
4+50N	1+25W	0+25W
4+00N	1+60W	0+50W
3+00N[1]	2+50W	1+50W
3+00N[2]	0+50E	0+75E
2+75N	2+60W	1+50W
2+50N[3]	2+40W	2+00W
1+75N/1+50N	2+00W	2+00E
1+00N[4]	3+00E	3+50E
0+50N	1+25W	0+25E
0+50N	1+50E	2+75E
0+00	1+00W	2+00E
0+50S[5]	0+25E	1+25e
1+00S[6]	0+75E	1+25E
1+75S	0+40E	2+25E

[1]widening of former "Main Zone" trench

[2]another attempt at overburden trench "E" which contains high grade Cu+Zn rubble

[3]additional exposure of Copper Breccia showing

[4]another attempt at previous trench "D" which contains high grade Cu+Zn rubble

[5]includes additional exposure of 1990 trench at 0+75S

[6]more exposure of 1990 trench "A" in South Zone high grade zinc area

As well, a N-S exposure was stripped from 500N to 625N at approximately 275W.

This large amount of work was made possible by the excellent performance of all equipment and personnel and by the positioning of the trench areas themselves which were virtually all in shallow overburden so as to lessen wasteful searching for bedrock.

5.3 Geological Mapping

Comprehensive property-wide mapping at a scale of 1:2500 was completed following re-establishment of grid lines through the western property area which has been logged off by E.B. Eddy. In addition to providing road access to the centre of the property, their operations exposed a great deal of outcrop and rubble which proved invaluable for mapping and prospecting purposes. Property geology, as well as results of mapping to the south and west by Cominco and Grand American Metals respectively, is presented on Maps 1a and 1b (East and West Sheets) at the back of this report.

Detailed 1:500 mapping was carried out covering all of the stripped areas and cut lines between lines 750N and 350S and is presented as Map 2 (North and South Sheets).

5.4 Geochemistry and Petrography

A total of eighty samples from surface and drill core have now been collected and analyzed for major and trace elements. Most of these have also been examined in thin section. These comprise a comprehensive sampling of the variolitic basalt and hanging wall "Footwall Diorite" volcanic units, with several samples also of the footwall intermediate-felsic volcaniclastic package. These samples were run through an in-house lithogeochemical processing program which helps to chemically characterize hydrothermal alteration trends. Sixty-eight samples collected by Siragusa in 1979 for the O.G.S. throughout Cunningham Township in rocks thought to be generally correlative with the Shunsby hangingwall volcanics served as background for this study. Results of this work are presented in section 7.3 and figures 5 a to k.

5.5 Historical Drillhole Compilation

Much of the historical drillcore was again re-examined as required to sort out geological ambiguities, although it was decided to curtail any re-sampling not completed in 1990 because of uncertainties regarding the locations of the 1974 (Grandora) and 1981 (MW Resources) holes.

Revised geological sections were again plotted at 1:500 to aid in preparing the Deposits Area geological plan, although these have not been included in the report. The sections are available for viewing at the offices of MPH Consulting Limited, 150 York Street, Toronto.

Downhole as well as surface assay results in the deposits area have been compiled and presented in plan form at a scale of 1:500 on Maps 3a and 3b at rear as well as in Tables 3 and 4, sections 7.4 and 7.5 respectively.

6.0 REGIONAL GEOLOGY AND MINERALIZATION

The Shunsby property lies within the Swayze greenstone belt. This is considered to be the southwest extension of the Abitibi belt which hosts the Timmins, Kirkland Lake, Noranda-Val d'Or, Mattagami and Chibougamau mining camps. North to northwest striking faults and granodiorite/monzonite batholiths partially disconnect the Swayze from the Abitibi belt (Figure 3).

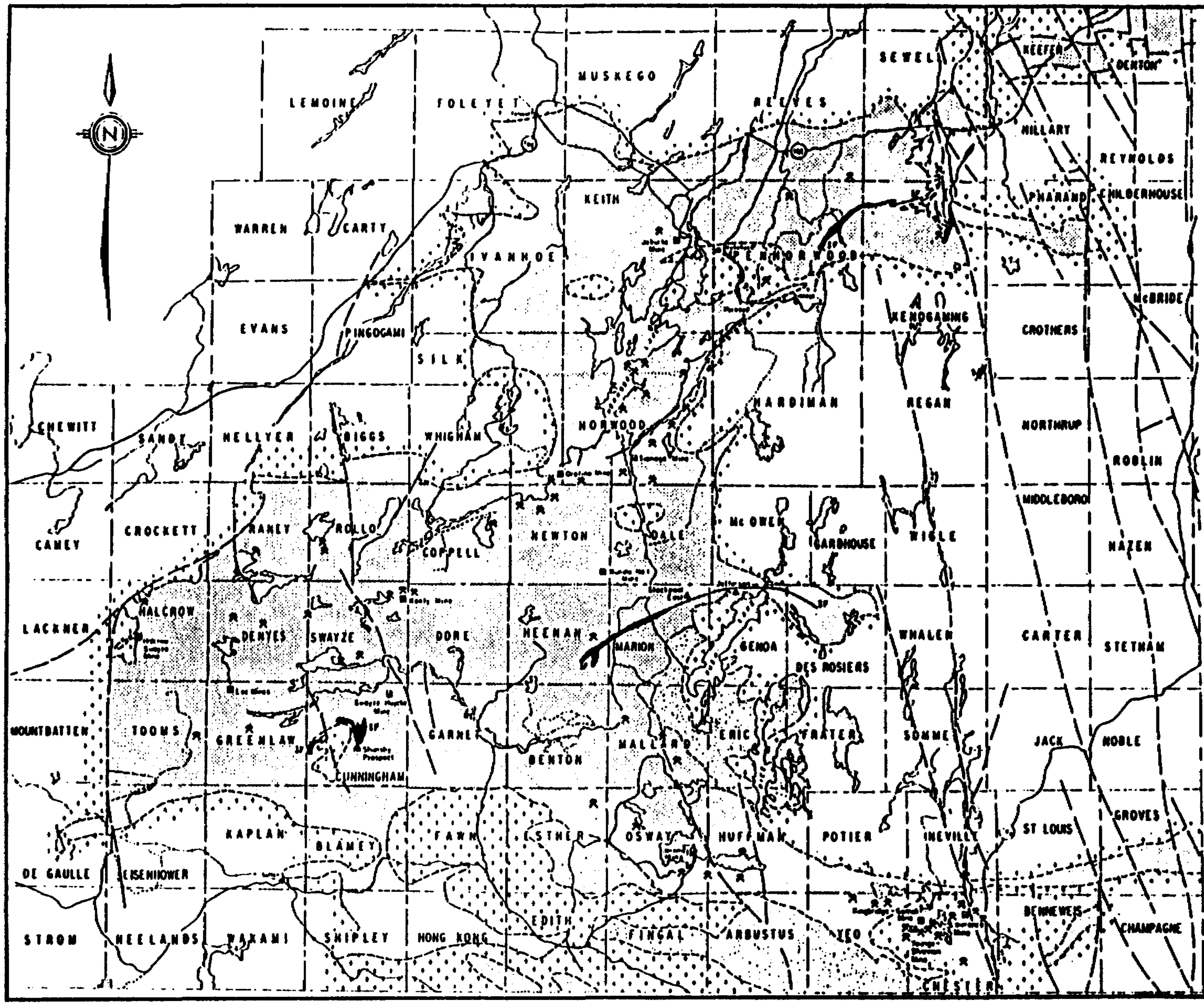
The Swayze can be thought of as an arcuate volcano-sedimentary belt, convex to the west, extending from Sewell Township in the northeast, through Swayze Township in the central region, to Groves Township in the southeast. The volcanics consist primarily of mafic rocks which floor some substantial intermediate-felsic eruptive centres. Clastic and chemical sedimentary rocks, including major banded iron formations, are intercalated with the volcanics. Younger, probably Temiskaming-equivalent, clastic sediments unconformably overlie the older rocks. A variety of synvolcanic to post-volcanic intrusions have invaded the supracrustal rocks. The Swayze belt is truncated to the west by the fault-bounded, north-northeast trending Kapuskasing Structural Zone, which contains high grade metamorphic rocks and associated carbonatite intrusive complexes.

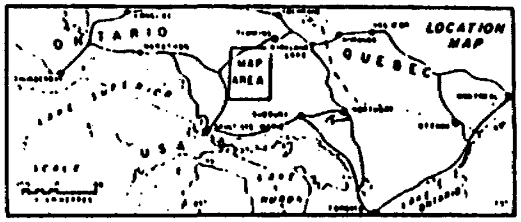
A number of major regional east-west alteration/deformation zones are present in particularly the north and south Swayze. It is felt that these represent extensions of, or analogies to, some of the major "Breaks" of the central Abitibi belt.

No base metal deposits have been mined in the Swayze to date although the proper geological conditions for such deposits would appear to be present. Gold production has been limited to approximately 1,000,000 tons of ore from seven rather small-scale producers. By far the largest known base metal concentration in the belt is on the present Shunsby property with the Texas Gulf deposit immediately to the northwest reportedly containing 100,000 tons of drill indicated material grading 3% zinc, 1% lead and 0.5% copper to a depth of 100 ft (Rye, 1984). The base metal sulphides in this latter deposit occur in a sequence of mafic tuffs, chert breccias and sulphide facies iron formation.

The geology of Cunningham Township has been described by Siragusa (1978) as follows; and is presented in Figure 4:

> "Metamorphosed volcanic flows interpreted as high-magnesium tholeiitic basalt are predominant in the northern half of Cunningham Township and over most of Garnet Township. The metavolcanics trend east-southeast, are locally pillowed, vesicular or amygdaloidal and rarely variolitic, have undergone metamorphism which seldom exceeds greenschist rank, and evidence of primary features, notably selvage margins of pillows, may be found even in foliated or sheared flows. The pillows tend to have lobate or irregular outlines which may locally reflect conditions of near parallelism between the depositional plane of the flows and the present erosional surface, and, at any rate, rarely permit top determinations.





LEGEND

- Proterozoic sediments
- Swayze metasedimentary – metavolcanic belt
- Felsic intrusive rocks
- IF Iron formation
- Shaft on gold deposit
- Gold prospect or showing
- Base metal prospect

SCALE

KILOMETRES

SWAYZE GREENSTONE BELT

GEOLOGY AND GOLD OCCURRENCES

MPH Consulting Limited

Figure #3

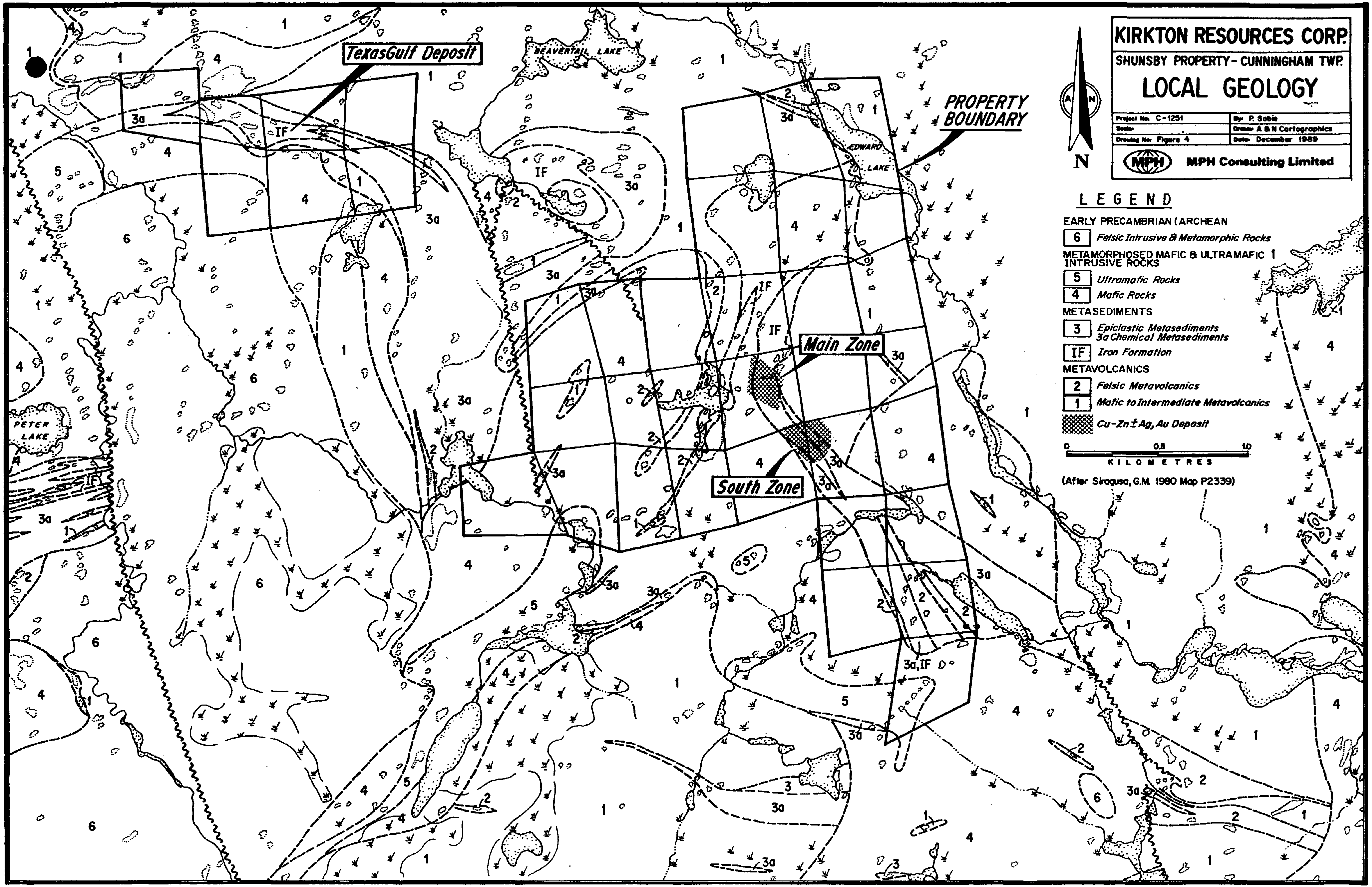
Determinations made at a few localities suggest that tops face north. Thin layers of dacitic crystal tuff occur in the upper section of the (assumedly) north-facing series, but owing to scanty outcrop distribution these units, which otherwise would be excellent marker horizons, cannot be traced laterally for significant distances.

Cycles of chemical and clastic sedimentation occurred during development of the basaltic series and resulted in the deposition of chert iron formation, and epiclastic rocks in the middle and upper section of the series. The chert units consist mostly of laminated to medium-bedded, barren to ferruginous chert which is commonly interbedded with iron-rich layers containing an estimated 20 to 60 percent magnetite, and which is locally the host of sulphide mineralization. Deformation and fracturing of chert has resulted in conspicuous development of chert breccia in some of these units.

The main chert units are in Cunningham Township and stratigraphically are in the middle section of the basaltic sequence of the map-area. The largest chert body is located about 1600 m south of Mink Lake, has an unusual broadly triangular outline, and has a planimetric area of about 2 km^2. The strike of the chert varies from west-northwest on the west side of the body to north-northeast on the east side of it. This change, as well as the unusual shape of the body itself, are the effects of displacement in the west side of the body (i.e. Isaiah Creek Fault), and folding in the east. A displaced western lobe of this body presently found about 2000 m south of the latter in the Peter Lake area, trends east-northeast and is about 1800 m long and 700 m wide. Another significant chert unit trending north-northeast to south-southeast occurs eastward of a small lake located at the very centre of Cunningham Township (Hiram Lake). Most of the drilling conducted by Consolidated Shunsby Mines Limited prior to 1970 and which indicated a 1.1 million ton copper-zinc deposit was concentrated on one claim (S34947) within this chert unit.

Closely associated (spatially) with the main chert units of Cunningham Township are relatively small bodies of feldspar porphyry with aphanitic matrix and feldspar crystals that are mostly 2 to 3 mm in size. The porphyry, which is thought to be a subjacent felsic volcanic rock, is well exposed along the northern shore of the tiny lake about 350 m southwest of the fire tower, at the very core of the folded eastern tip of the Mink Lake chert deposit. A prominent, although rather heavily forested, ridge of this rock is also found about 3.4 km north and 2.3 km west of the southeastern corner of Cunningham Township.

Interbedded with the metavolcanics in the upper and central sections of the basaltic sequence are bands of epiclastic metasediments trending east-northeast, northwest and west, occurring in northwestern Cunningham Township, and northeastern and west-central Garnet Township, respectively. These metasediments include dominant matrix-supported polymictic conglomerate, and subordinate arkosic arenite and minor slate which are of only local occurrence.



KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY - CUNNINGHAM TWP.
LOCAL GEOLOGY
Project No. C-1251
By: P. Sobie
Scale:
Drawn: A & N Cartographics
Drawing No. Figure 4
Date: December 1989
MPH Consulting Limited
LEGEND
EARLY PRECAMBRIAN (ARCHEAN
6 Felsic Intrusive & Metamorphic Rocks
METAMORPHOSED MAFIC & ULTRAMAFIC INTRUSIVE ROCKS
5 Ultramafic Rocks
4 Mafic Rocks
METASEDIMENTS
3 Epiclastic Metasediments
3a Chemical Metasediments
IF Iron Formation
METAVOLCANICS
2 Felsic Metavolcanics
1 Mafic to Intermediate Metavolcanics
Cu-Zn ± Ag, Au Deposit
0 0.5 1.0
KILOMETRES
(After Siragusa, G.M. 1980 Map P2339)
TexasGulf Deposit
PROPERTY BOUNDARY
Main Zone
South Zone
BEAVERTAIL LAKE
EDWARD LAKE
PETER LAKE
N

The coarse fraction of the conglomerate consists largely of variably deformed pebbles and boulders of chert, felsic metavolcanics, and minor granitic rocks. The latter are thought to represent early granitic rocks which pre-date the quartz monzonite underlying southwestern Cunningham Township.

Mafic intrusive rocks in bodies of irregular shape and variable size are commonly found spatially associated with the metavolcanics, and are particularly frequent in southern Cunningham Township and northeastern Garnet Township. These rocks have composition varying from diorite to gabbro, the latter being dominant, and are massive although commonly affected by variably well developed jointing. In general they have medium-grained diabasic texture which locally gives way to a very coarse knotty pyroxenite where hornblende may be pseudomorphed after brown pryoxene.

Porphyritic varieties with tabular plagioclase phenocrysts up to 4 cm in size are also present in a few localities. Basaltic and chert xenoliths are occasionally found within these rocks and where these occur the rock's intrusive nature is clearly indicated.

Gabbro is affected by retrograde metamorphism along a north-northeast-trending shear zone extending eastward of Isaiah Lake (Cunningham Township). This zone is thought to post-date regional metamorphism and to be a local feature related to the emplacement of quartz monzonite west of Isaiah Lake.

Discrete intrusions of peridotite occur in a few localities of southern Cunningham Township. Peridotite is massive, serpertinized to variable extent, and is locally much more magnetic than interbedded chert-magnetite. Although in some areas exposures of peridotite and gabbro occur only a few metres apart, exposed contacts between these rocks were never found. No peridotite was found in Garnet Township but a large outcrop was found in the northwestern corner of Benton Township, approximately 700 m east of the present map area.

A small pluton of massive porphyritic quartz monzonite of about 13 km^2 underlies parts of western and southwestern Cunningham Township. The pluton is poorly exposed and is bisected by the Isaiah Creek Fault so that the western half of the pluton is displaced about 2000 m south of the eastern half of it. Two small peridotite bodies are in contact with the northern and southern tips of the eastern half of the pluton adjacent to the trace of the fault plane.

Lamprophyre is of rare occurrence and consists of minette dikelets 2 m or less in thickness, cutting metavolcanics or gabbro at a few localities. A dike about 4 m thick of hornblende syenite was found to intrude sheared basalt at one locality along the shear zone east of Isaiah Lake. Both the lamprophyre and syenite dikelets are thought to have about the same age as the quartz monzonite. Only one diabase cutting quartz monzonite was found and this is thought to be the youngest rock in the map-area."

7.0 EXPLORATION RESULTS - 1991 PROGRAM

7.1 Property Geology

7.1.1 General

Property mapping and working in the area for two field seasons have shown that a great deal more volcanics are present in the area than indicated by Siragusa. In particular, much of the area mapped as diorite/gabbro through the centre and to the south of the Shunsby property, is in fact mafic to felsic metavolcanics. As well, a large felsic pyroclastic centre would appear to occupy the area just south of the property, approximately due south of Hiram Lake. This is evidenced by extensive coarse pyroclastic breccia outcrops throughout that region. Sulphide clasts are present in some of these breccias. Much of the rock mapped as feldspar porphyry by previous workers in the area is in fact quartz or feldspar-phyric intermediate to felsic metavolcanics and pyroclastics. Such rocks occur within the Shunsby sedimentary-volcanic stratigraphy in the Cu-Zn deposits area.

Three generalized geologic domains can be recognized on the Shunsby property namely an easterly/northeasterly mafic (basalt-gabbro) domain, a pyroclastic-chemical sedimentary - clastic sedimentary domain with minor basalt which underlies the central and southwest portions of the property and a mafic volcanic-gabbro-iron formation domain exposed in the extreme west-central portion of the property. This geological picture has been greatly complicated by folding, faulting and intrusive activity. The central domain is the most economically significant in that the Shunsby Cu-Zn deposits occur near its stratigraphic top in a distinctive chert/argillite sequence.

Structurally, there do not appear to be any major fold closures on the property although considerable drag-folding, quite large scale in some cases and often related to east-west shearing, has been identified in a number of areas.

The most visible direction of shearing and faulting is approximately east-west with the most notable example being the Joubin Fault. This deformation event was relatively late and may have been the last major event in the region. Considerable strike-parallel shearing is also suggested by the highly sheared nature of various interflow graphite units. Another significant direction of faulting and fracturing is approximately south-southeast. This direction hosts the known stringer-type base metal mineralization in the Shunsby chert/argillite sequence.

Rock units trend in a general northerly direction across the property with shallow to moderate west dips. As will be discussed in more detail in subsequent sections, the entire sequence appears to be overturned such that stratigraphic tops are to the east. This has profound implications for further exploration on the property.

east. This has profound implications for further exploration on the property.

7.1.2 Lithologies and Stratigraphy

a) West-Central Mafic Volcanic-Gabbro-Iron Formation Domain

These are the oldest rocks on the property and occupy the three westernmost claims in the central portion of the property. The banded iron formations here comprise both chert-magnetite and chert-sulphide varieties. These have marked magnetic and electromagnetic signatures respectively.

Where observed, the cherts of the oxide facies iron formation occur as layers, often rusty and of up to 30 cm or more separated by 1 to 5 cm magnetite bands. Strongly chloritic or amphibolitic magnetite-bearing bands may be present. Two main oxide facies units would appear to be present separated by mafic breccias and sulphide iron formation.

The sulphide iron formations are very poorly exposed on the property although their character is inferred from abundant float, two drill holes and from descriptions on adjoining properties (eg Rye, 1984). The sulphide facies consists of finely laminated black pyritic and pyrrhotitic shales, individual beds being up to 1.5 metres thick and containing up to 80% sulphides. The shales are interbedded with chert and chert breccia units up to 2 metres thick. Fine-grained bedded and laminated pyrite is the most common sulphide, with varying amounts of pyrrhotite, chalcopyrite, sphalerite and galena. Although the sulphides are frequently bedded, disseminated, massive and stringer textures are also present. Graphite layers, ranging in thickness from paper thin to several millimetres, are common in the sulphide facies. Where graphite occurs, there are indicated to be corresponding increases in metal content.

At least three Cu +/- Zn occurrences are known or can be inferred to be associated with these west iron formations on the present property. These include previous drill hole Jim 1 at the extreme southern end of the assemblage which returned 1.69% Zn over 28.8 ft, the presence of minor sphalerite-chalcopyrite in outcrop at 14W on line 0 and the discovery of massive pyrite float with 3-5% chalcopyrite at 1060W on line 2N.

A very distinctive mafic fragmental rock is interbedded with and contained within the oxide facies iron formation units. This is best displayed in the area of 1150W on line 8N. The rock here has an agglomeratic character and consists of clasts of chert, mafic volcanics and dacitic (?) volcanics in a variolitic basalt matrix. Additional, quite distinctive coarse mafic pillow breccias and flow breccias are exposed in the area between lines 2N and 3N at about 1125W associated with iron formation.

The balance of this assemblage is composed of relatively fine-grained mafic flows intruded by quite irregular to more regular, sill-like gabbro bodies. Some of these gabbros here, and in the rest of the area in general, probably represent feeders to overlying flows. Much of the gabbro in this older assemblage displays a marked glomeroporphyritic nature (rock type 5c) in which the rock contains whitish feldspar crystals or crystal aggregates to 2 cm or more. This is particularly well displayed in the area between 10W to 12W on line 4N, an area that in turn seems to represent the centre of the gabbro body.

Meen (1942, p. 9-10) describes a similar rock in adjoining Garnet Township. He reached the conclusion that this "leopard rock" was in fact a basalt porphyrite flow. This possibility should therefore be borne in mind for the present 5c classification. Meen goes on to describe similar occurrences in Cunningham Township - possibly including these on the present property (?) - which he describes as being rather striking in appearance. In this case however, he is unsure as to whether or not the rock is of intrusive or extrusive origin.

More typical massive, medium to locally coarse-grained gabbro composed of dark green-black mafic crystals in a whitish feldspathic groundmass is well exposed, for example, in an outcrop surrounded by dense cedar bush on the 10W tie-line just north of line 6N.

This entire assemblage is strongly disrupted by an east-west fault in the area of line 0. It is then truncated against a large gabbro intrusive in the extreme southwest corner of the property. To the north, the iron formation units warp around the Isaiah Creek stock and continue onto adjoining properties, where they host additional base metal mineralization.

b) <u>Central-Southeast Pyroclastic-Chemical and Clastic Sedimentary Domain</u>
The Shunsby volcano-sedimentary sequence dominates the central portion of the property and is the key rock assemblage on the claims in terms of known base metal mineralization.

The bottom of the sequence is marked by a major pyroclastic accumulation of mainly coarse feldspar porphyritic tuff breccia and lesser lapilli tuff and ash tuff in the area west and southwest of Hiram Lake. These pyroclastics are heterolithic and are generally characterized by an aphyric matrix. The matrix is generally relatively felsic but is markedly chloritic in some cases as in the outcrop area on the east side of Hiram Lake at the creek outlet. The coarse feldspar porphyritic tuff breccias along the west end of line 0 also have a notably chloritic ash tuff matrix. Individual clasts range up to 0.5m in greatest dimension although they are typically much less than this. The clast population includes plagioclase +/- quartz phyric intermediate to felsic volcanics, massive and flow-banded rhyolite and fine-grained mafic volcanics. Overall this rock is probably of intermediate composition although some phases are very siliceous. Notable in this regard are some of the pyroclastics along the south part of the 10W tie-line which are locally very siliceous and contain disseminated pyrrhotite and pyrite.

There are also some true mafic pyroclastic tuff breccias, consisting of angular mafic clasts in a mafic matrix, as along the east side of Hiram Lake.

There is a lithologically and structurally complex unit(s) of coarse mafic to intermediate pyroclastics and mafic volcanic fragmentals along and to the north and west of the west arm of Hiram Lake. This includes chloritic versions of the "2b" rock type, some mafic pyroclastics with variolitic matrix, mafic pillow breccia and an outcrop, at L6N/5W, of chloritic volcanics containing small chert breccia fragments.

The coarse tuff breccias in general appear to form thick massive units in which bedding is not obvious. Bedding is only discernible where laminated ash tuff or lapilli tuff units are interbedded with the coarser material with some of the best examples found in the extreme southwest portion of the property.

Although there are considerable variations in clast size and type and matrix composition, these pyroclastics all seem to be variations on a common theme and appear to have been derived largely or wholly from a volcanic centre located immediately south of the present property.

These pyroclastics are also considerably invaded and broken up by and/or interbedded with gabbro. For example, a thick unit(s) of coarse pyroclastics has been impressively invaded and broken up and individual blocks displaced by gabbro in the area of 7W-10W on line 4S. Likewise, these coarse pyroclastic rocks have been strongly invaded by gabbro in the area south/southeast of Hiram Lake where a particularly large gabbro unit is present. In some cases, blocks of coarse intermediate-felsic pyroclastics can be seen at the outcrop scale as large xenoliths in gabbro as in the area of L1S/4W.

An area of intriguing lithologies and alteration is present near the north end of the coarse pyroclastic unit west of Hiram Lake in the area of L3N/10W. Here what appears to be a feldspar porphyritic/dioritic phase of the gabbro is in gradational contact with feldspar porphyritic tuff breccias with a thin argillaceous unit immediately to the west. There are local feldspar porphyry fragments within the "diorite" such that this unit may be a subvolcanic porphyry or may be in part pyroclastic. The intrusive nature of this body is confirmed by the observation that it engulfs and truncates the north end of the weakly conductive argillite unit at the stripping at 10W on L3N. A number of the outcrops of this material, particularly along the road, show considerable sericitization and chloritization. Strong chloritic shearing is also present. The weight of evidence suggests that there may be a local volcanic edifice in this area immediately west of Hiram Lake.

The coarse pyroclastics are overlain by a thick and lithologically complex sequence comprising finer grained feldspar porphyritic pyroclastics (ash and lapilli tuffs), fine to coarse clastic and epiclastic sediments (argillites, greywackes, arenites, conglomerates) with a thick accumulation of chemical sediments (chert, oxide and sulphide iron formation, argillaceous chert) in the area east of Hiram Lake. The fine clastic sediments may be variably graphitic and sulphidic and typically have pronounced electromagnetic signatures. Two units of chloritic oxide iron formation in the southeast portion of the property have prominent magnetic expressions. A distinctive variolitic basalt unit divides the chert sequence east of Hiram Lake into Upper and Lower members.

In terms of specific rock types, white weathering, thinly bedded feldspar porphyritic crystal lithic tuff is well exposed in a trench at about 075E on line 3S. Scattered pyrite clots are present here and elsewhere in this unit. There is a thick accumulation of this material towards the west ends of lines 8N-9N with considerable east-west shearing in some of these outcrops with attendant sericitization and pyritization. Another quite distinctive rock type found in this sequence consists of chloritic conglomerate, rock type 7b. This consists of fragments of chert, chert-magnetite iron formation, mafic volcanics and feldspar porphyry in a chloritic matrix. The fragments range up to 3 cm or more and are generally variably angular. A unit of this material appears to be the facies equivalent of chloritic oxide iron formation in the area of 2E on line 6S. The key chert/argillite lithologies which host the historic Main and South Zone deposits and the specific volcanic and intrusive units found in this immediate area are discussed in detail in section 6.3.

The top of the central Shunsby volcano-sedimentary assemblage is marked by a series of graphitic/sulphidic argillite units with strong electromagnetic responses represented by conductors 14d, 56 (13c), 42b (13b), 42a (12), 40b (2d), 40a (2c) and 2a (Map 4a).

To the north, this assemblage both pinches out and truncates against gabbro such that a maximum extent to the stratigraphy on the property is approximately 2.2 km. The main chert unit in particular seems to thin out very rapidly to the north. To the south, there is a major facies change within the upper portion, as the thick chert accumulation east of Hiram Lake thins rather abruptly and grades into a complex sequence of arenites with some pyroclastic members which contain thin chert interbeds (eg <1 m). This transition seems to be concentrated in the area around lines 5S-6S. The marker variolitic basalt unit also appears to pinch out to the south or is truncated by a local fault in the area of line 5S-6S.

The clastic sediments as exposed along the east end of line 11S comprise a diverse assemblage of greywacke/argillite, quartzite/arkose and fine-grained conglomerate and conglomeratic greywacke with subordinate cherty beds. There is also a unit of rusty weathering, siliceous carbonate sediment containing disseminated pyrite and pyrrhotite (rock type 6f). The pyroclastic outcrop at about 6E on line 10S shows a sharp bedding contact with intermediate crystal tuff to the east and intermediate ash and lapilli tuff to the west.

To the southeast, this volcano-sedimentary assemblage truncates against, and partially warps around, a large gabbro body which in turn has been intruded by a central peridotite mass. This latter rock is distinguished by its magnetite content, serpentinized nature and characteristic jointing and weathering pattern. This peridotite is indicated by airborne magnetics to be related to other peridotite exposures to the west along line 4S. The strongly magnetic ultramafics are indicated to continue for several kilometres to the southwest of the present property.

The large gabbro mass in contact with sediments east of the MPH camp displays an ill defined, often quite chloritic, notably leucocratic feldspar porphyritic/dioritic border phase which looks very similar in many cases to some of the massive feldspar porphyritic pyroclastics. The "feldspar porphyry" designation in some previous drill holes, eg Placer hole MW-80-2, almost certainly refers to this rock. This rock can be virtually indistinguishable in the field from massive feldspar porphyritic pyroclastics as in the area of 5E on line 11S. Petrographically, its igneous nature is quite obvious.

A sample (SH-WR-20) of massive, medium-grained leucocratic feldspar porphyry/diorite from 7S, 2W was studied in thin section. Mineralogically, the rock is quite simple consisting essentially of plagioclase feldspar, quartz and chlorite. The rock is not a true porphyry in the sense of having well defined phenocrysts in a fine-grained matrix, rather it is an interlocking aggregate of unoriented plagioclase crystals with a "crystal mush" aspect in which a few of the crystals are somewhat larger than the rest. The crystals are rarely euhedral and are distinctly anhedral in most cases. There has been considerable mutual interference during plagioclase crystallization resulting in complexly interlocking grain boundaries. Perhaps most striking, a great deal of the interstitial material consists of granophyric quartz-feldspar intergrowths, often with distinctly radiating, "starburst" patterns. This granophyric material seems to radiate from or replace (?) plagioclase crystals in some cases. The balance of the rock consists of 5-7% of scattered irregular chlorite aggregates. These are often distinctly elongate being controlled by microfractures in the rock. Small opaque saussurite clusters are typically closely associated with chlorite as is a very minor calcite content. There is a minor content of very fine, light-greenish rod-like or needle-like apatite crystals in the rock.

Granophyric intergrowths as observed in this rock indicate rapid and simultaneous crystallization of the quartz and feldspar, ie a quench phenomenon, in a relatively near surface environment. This dioritic rock is therefore interpreted to represent a late, granophyric border phase of the main gabbro body with the actual quenching probably related to some form of tectonic activity.

c) Easterly/Northeasterly Mafic (Basalt-Gabbro) Domain

A thick, monotonous mafic unit comprising both volcanics and gabbro intrusives overlies the foregoing volcano-sedimentary assemblage. Previous (1989) processing of the MPH ground magnetic data shows this domain to be of distinctly different magnetic character from the rest of the property; namely being characterized by generally low magnetic amplitudes and little magnetic relief.

The mafic volcanics are of both green and grey colouration and comprise a diverse assemblage of fine to somewhat coarser flows, pillowed and variolitic flows and flow breccias. The gabbros form thick, fairly regular sills to the south. To the north, in addition to some small sills, there appears to be a large, irregular body centred southeast of the small pond. The portrayal of the gabbros as abruptly cutting across stratigraphy as in the area just north of 450E, on L5N appears to be valid as this sort of behaviour can be observed at the outcrop scale.

A number of thin, variably graphitic argillite +/- chert units are present in this sequence. A thin, fine-grained conglomeratic unit is present in the conductive chert/graphitic argillite unit at the north end of Edwards Lake drilled by Cominco in 1954.

7.1.3 Structure

Rock units on the property generally strike in a northerly direction varying from north-northwest in the east through to northerly to north-northeasterly in the west. Bedding dips are generally 30^0 - 50^0 to the west. One notable exception to this is in the area immediately west of Hiram Lake where dips in coarse pyroclastics and argillite are vertical to subvertical.

The Joubin Fault, the major structural feature, trends east-west, dips 55^0 - 60^0 south and has left-lateral displacement in the Shunsby cherts east of Hiram Lake of 225 m. It can be traced with some confidence from the east property boundary through to the west side of Hiram Lake, as indicated on Map 1a, by mappable displacements of diagnostic rock units, displacement and truncation of geophysical trends, and a marked topographic expression in the form of creek valleys along much of its length. The fault cannot be traced with any confidence west of Hiram Lake although it is felt that the Joubin Fault re-appears to the west in the form of a strong, south-dipping east-west fault along the west end of line 0. This structure can be clearly observed at the bend in the road in the area of 14W, line 0, where it offsets iron formation units by 50m or so.

A number of other east-west faults were identified by the geological mapping and inspection of geophysical results. A major fault is present in the area of 7N at, and to the west of, the baseline. An EM conductive unit here is offset about 25m left-laterally with clearly discernible drag along the fault. One or more strong east-west faults and/or shear zones are present in the area of 100S to 150S in the area of the baseline. A prominent east-west fault valley is present to the west of the baseline in the area of 050S that may relate to the foregoing structure. It is also possible that these structures in the area of 1S in the east part of the property are related to the strong, Joubin-extension (?) fault along line 0. They may well be conjugate splays off the primary feature.

It became evident during the mapping that the pyroclastic rocks, particularly the finer varieties, and sediments in the central portion of the property east and north of Hiram Lake have been mildly to strongly affected by east-west shearing and are noticeably more schistose than the flanking mafic terrains.

The area of most intense schistosity, which is seen in all rocks of the central pyroclastic-sedimentary domain, extends from the ash tuff accumulation along the west end of line 9N to about line 5S-6S. This east-west schistosity is so intense in many areas as to completely obliterate primary north-south bedding features, a good example being in the outcrop area along the 2W tieline between 050S to 1S. This schistosity is concentrated in the more ductile rock types while the less ductile cherts generally yield by brittle fracturing. The shearing becomes so concentrated in some areas as to form intense east-west shear zones up to 3m across. Considerable drag has taken place along some of these zones producing folding on a number of different scales.

This deformation was of sufficient intensity as to affect the gabbros along the south arm of Hiram Lake such that they are now moderately to locally strongly schistose and display variable carbonatization. Local occurrences of sheared, carbonatized gabbro to the west along line 1S probably mark a westward continuation of this alteration/deformation corridor. The gabbro units elsewhere are typically massive and featureless. A foliation is sometimes present in the intervening mafic volcanics but is usually very weak. One exception to this is the presence of a strong, east-southeasterly trending shear with associated pyritization and carbonatization on the pond at line 13N.

There appears to be an arcuate fault/shear zone along the creek network which crosses the southeast part of the property. A number of units seem to be disrupted, change magnetic character or terminate, in this area between lines 5S and 6S. The prominent flexure in the EM conductor in the area of 5W, 5S may reflect displacement along this structure. The fault would not appear to have penetrated the flanking gabbro sill as the EM conductor on the east side of the intrusive has not been affected. This structure is interpreted by workers on the adjoining ground (Smith, 1989) to continue along the same watercourse in a southerly direction.

Northerly trending faulting and shearing is well known in this area with the major Isaiah Creek fault to the west of the property being a good example. Perhaps the best example of this set on the present property was exposed by stripping on a weak EM zone in peridotite on line 14S.

It also appears that there has been considerable bedding plane shear involving particularly the graphitic units. In many cases, intervening mafic sill/flow complexes seem to have behaved as relatively rigid blocks during deformation with the bulk of the strain taken up by the flanking graphitic units.

There do not appear to be any major fold closures on the property such that the rocks are on the overturned east limb of a regional anticline (or west limb of a regional syncline). The disposition of ultramafic units to the south may be indicative of a gentle anticlinal warping here. The north strikes on the Shunsby property are anomalous with respect to the belt as a whole and seem to be due to warping about the Isaiah Creek pluton.

7.2 Deposits Area Detailed Geology

7.2.1 General

This section describes the geological relationships in the area of the Main and South Zone Cu-Zn deposits. As noted in the previous section, the Shunsby deposits area is interpreted to be floored by proximal to vent facies intermediate-to-felsic tuffs and tuff breccias. These are overlain by a considerable thickness of chert believed to be phreaticly brecciated. The cherts host thin massive pyrite-pyrrhotite horizons and a relatively thin variolitic and pillowed basaltic unit which is traceable over a kilometre or more. The variolitic basalt horizon has served as a stratigraphic marker for past workers, allowing a division into structurally "Upper" and "Lower" chert units. Various argillite and graphitic argillite units are present throughout and at the top of the chert sequence.

7.2.2 Lithologies and Stratigraphy

a) **Footwall Intermediate to Felsic Volcanics and Pyroclastics**

Past workers have made numerous references to quartz and feldspar porphyritic rocks to the west of the chert deposits, but only recently have these been recognized as extensive units of feldspar phyric ash and lapilli tuffs and tuff breccias as well as quartz-eye ash tuffs. Subordinate to the above within the sequence are felsic flows and thin graphitic argillite units. As the chert contact is approached an exotic volcanic sediment is encountered which consists of rectangular chert blocks aligned parallel to stratigraphy hosted by a chloritic tuffaceous matrix.

The basal pyroclastic unit shows extensive chloritization and sericitization as exposed at the west end of the L500N stripping where clast margins are, in some cases, nearly obliterated by black chlorite-pyrrhotite systems working through the matrix. Sericite-chlorite alteration is observed peripheral to the more intensive systems and generally does not affect the clasts as markedly. Petrographically, sample SH-WR-01 from the west end of the 500N stripping, shows grains and fragments of quartz and partially resorbed lithic fragments surrounded by an anhedral assemblage of quartzo-feldspathic material, chlorite, sericite, carbonate and saussurite per Appendix 3.

The breccia unit is overlain by up to 200m of quartz and feldspar phyric lapilli tuffs. Alteration has been observed changing these hard, grey to pink-white, blocky weathering outcrops with bedding quite often clearly visible (ie. samples WR-09, L625N/400W and WR-11, L300S) to soft, black chlorite-quartz eye rocks with abundant coarse, euhedral pyrite (SH-WR-05). Sample SH-WR-11 of rather pristine crystal tuff shows siliceous fragments consisting of very fine-grained anhedral sericitic quartzo-feldspathic material interspersed with quartz and feldspar crystals and grains, chloritic patches and carbonate. At the other end of the alteration spectrum, sample SH-WR-05 petrographically shows scattered quartz crystals and crystal fragments in a very fine-grained schistose matrix of anhedral quartzo-feldspathic material and chlorite, all overprinted by carbonate. The carbonization and chloritization appear to be later than the schistosity and associated quartz-pyrite veining.

Graded bedding on the scale of individual beds and entire units (ie pyroturbidite sequences) predominately indicate tops down, ie eastward. Especially good examples of this are found in the new exposures at the west end of the L500N stripping where several thin laminated ash tuff horizons are also present as indicators and point to tops being to the east.

The tuffs grade with proximity to the chert contact into 30-40m of cherty ash tuffs and the exotic chert breccia-tuff unit mentioned above. Seen at the L625N stripped area and in talus below the Joubin Fault at 200N/200W, it appears to consist of clast-supported brecciated chert horizons with an ash tuff matrix that is heavily chloritized. A very similar rock has been found along strike in the south property area which appears to be a conglomeratic facies equivalent.

The footwall package is capped by a complex assemblage of tuffs, argillite and chert that appears to have a true thickness of 40-50m and includes graphitic horizons and thin massive pyrite beds.

This complex pyroclastic/sedimentary assemblage is overlain by a thick, predominantly chemical sedimentary assemblage known as the "Upper" and "Lower" cherts with the separation between the two defined by the variolitic basalt marker unit. Note that the "Upper" cherts are structurally above the "Lower" cherts but are now indicated to be stratigraphically beneath them.

b) <u>"Upper" Chert Complex</u>

Within the deposits area this unit attains a maximum thickness of 200m in the Main Zone, and now with abundant exposure, can be seen to be a grossly predictable exhalative/chemical sedimentary sequence. In general, the sequence consists of 100-150m of monolithic chert breccia overlain by a thin (10-15m) massive sulphide-argillite-argillaceous chert package, in turn overlain by 20-25m of clean bedded and brecciated cherts with subordinate argillite interbeds, and a capping 2-3m graphitic argillite-argillaceous chert unit.

The chert breccia unit, previously called a slump breccia, is composed of clean chert cobbles and pebbles in a matrix of iron carbonate, chert and pyrrhotite. A typical sample, Miron-08, is composed of 81.50% SiO_2, 5.41% Fe_T, 4.25% CaO, 1.75% MgO, 5.40% CO_2 with 4.81% LOI. Weathering of surface exposures and drill core gives the impression that the clasts are rounded because of the rusty pyrrhotite and carbonate, but closer examination shows them to be jagged and angular as well as commonly brecciated individually. The rock as a whole is clast-supported and chaotic, showing no evidence of sorting. Individual massive chert blocks up to several metres surrounded by matrix and breccia have been noted. It is now felt that the above characteristics are phreatic phenomena.

The breccia unit grades after approximately 100m into massive and banded clean chert units although these show local, later brecciation related to faulting. Thin interbeds of argillite and pyrrhotite are present but sparse.

The massive and banded chert unit grades into a banded chert-massive sulphide-argillite unit of approximately 15-20m true thickness with the massive sulphides attaining a maximum exposed thickness of 3-4m on lines 500N, 325N and 275N. The sulphides are laminated, very fine-grained and dominated by pyrite in the Main Zone exposures and pyrrhotite to the north (L500N) and south (L100S). Finely laminated cherty sulphidic tuffs underlie the massive sulphides and chloritic argillites, chert, iron-formation and banded cherts occur above. The massive sulphides appear to wane between the Main and South Zones as sulphide iron-formation or sulphidic argillite is exposed on lines 175N, 100N and 000N. Chalcopyrite, sphalerite and galena locally are present but appear to be secondary replacement features as opposed to primary syngenetic sulphides, possibly with the exception of a minor portion of the sphalerite.

Stratigraphically higher is a 25-30m thickness of cherts with subordinate argillite interbeds that consists of: 1) approximately 10m of extremely angular chert breccia which contains occasional chloritic argillite clasts; 2) approximately 15m of banded clean cherts with chloritic (+/- sulphidic) argillite interbeds and; 3) an argillaceous chert-laminated ash tuff-chloritic magnetite IF-argillite unit which exhibits pronounced soft sediment deformation features. Within these units, half-filled amygdules show an upper half of iron-carbonate-pyrrhotite matrix material and lower half of calcite (or vacant) in confirmation that the rocks are overturned and tops are to the east. Capping the "Upper Chert" unit is a 3-5m graphitic argillite and argillaceous chert unit that is geophysically traceable into the southern property area.

A sample of clean, massive chert, Miron-07, returned oxide values of 88.30% $Si0_2$, 2.44% Fe_2, 2.52% Ca0, 1.19% Mg0, 3.32% $C0_2$ and 3.10% LOI. Alteration and mineralization is locally present in all of the units described above, manifested by "corridors" of gossanous sulphidic chlorite breccia which will be described more fully in section 7.2.4.

c) <u>Variolitic Basalt</u>

Ranging in thickness from approximately 30 to perhaps 75m, the variolitic basalt marker horizon includes massive flows, flow-top breccias, hyaloclastite units and pillowed flows in which variolites are sporadically present. Variolites appear to be concentrated in the pillowed flows and hyaloclastite material on the basis of stripping along L050N and L175N. Disposition of variolites within the lower half of individual pillows adjacent to the central pillow void suggests that tops are to the east. Nipples within the stacking pattern are difficult to discern but vaguely suggest that tops are again to the east. Several samples examined petrographically (ie 61-91-VB1, 56-64-VB, etc) suggest that tuffaceous mafic units are also present.

The upper 5-10m of the basalt unit is a complex breccia which includes angular chert clasts in a mafic matrix, rather similar to the contact rock at the Upper Cherts described earlier though clast orientation is much more chaotic. Chloritization, sericitization and carbonatization have been variously noted within the variolitic basalt unit and appear to be most intense near the Lower Chert contact. As well, the rock is highly schistose, sericitized and carbonatized in the "Joubin" and "1S" fault zones.

Sample 66-62e-VB2, taken from roughly midway through the unit may be considered as "typical" Shunsby variolitic basalt. In thin section, individual variolites are seen to be dense, semi-opaque ultrafine aggregates of mainly quartzo-feldspathic material, chlorite and carbonate with a very distinct feathery, outward radiating pattern. These are set in a very fine-grain groundmass of chlorite, quartzo-feldspathic material and sericite with accessory opaques.

d) <u>"Lower" Chert Complex</u>

Far more argillaceous than the "Upper" Cherts, the "Lower" Chert package appears to have a true thickness of approximately 35-50m, and consists, on surface in the Main Zone, of: 1) the contact volcanic-chert breccia noted above; 2) 10-20m of argillaceous chert, graphitic argillite, and laminated tuff; 3) 7-10m of clean banded chert with subordinate argillaceous interbeds; 4) 10m of argillaceous chert, chert and mafic flows; and 5) approximately 10m of schistose argillite, graphitic argillite with subordinate chert locally referred to as the "Basement Fault".

The surface stripping in the Main Zone area has emphasized the sulphide iron formation aspect of the argillites, which in most cases are mineralized with massive coarse-grained euhedral pyrite +/- chalcopyrite and sphalerite. The argillaceous chert units also are mineralized with pyrite +/- chalcopyrite and sphalerite, but in the form of matrix-fillings, disseminations and fracture-fillings. Chert units are generally unmineralized save for late cross-cutting quartz-carbonate veins, but locally are altered to sugary, calcitic chert and quartz and carry sulphides

A stripped section of presumed "Lower Chert" on L050N is markedly different than the assemblage described above. Here the graphitic argillite component is much less, a semi-conformable 5 metre wide quartz-feldspar porphyry dike/sill is present in the structural upper portion of the stratigraphy, and the banded and massive cherts have a re-crystallized, sheared texture. It appears that this area of the "Lower Cherts" between the Main and South Zones is influenced by the quartz-feldspar porphyry dike, which experience on the property has shown to occupy shear zones. It is possible that an unknown shear is present in the area, which is quite close to the junction of the "Lower" cherts and the inferred copper bearing higher argillite-chert package marked by overburden trenches "D" and "E".

Most drill logs in the area similarly report one or more quartz-feldspar porphyry intersections in the "Lower Cherts", suggesting that a sill-like body(ies) has intruded the stratigraphy, presumably along the basement fault/shear zone. This may be related to the quartz-feldspar porphyry dikes mapped on L100S.

e) <u>Hangingwall Volcanics</u>

These rocks are known locally as "Footwall Diorite" and have been shown to be an extensive mafic flow/gabbro regime which covers most of eastern and northern Cunningham Township. Chemically these rocks are generally basaltic in composition and tholeiitic in classification, although altered appreciably in many cases which might account for the intermediate intrusive field terminology. Mafic flows vary from fine-grained aphanitic to medium-to-coarse-grained porphyritic types, whereas the gabbros show true intrusive contact relationships with a dioritic border phase and there should have been little confusion differentiating in the past between the two.

That the "FW diorites" include both fine and coarse-grained mafic rocks is well-illustrated by samples 65-70-FWa and b which grades from a fine-grained schistose (related to "Basement Fault"?) sericitized and chloritized mafic volcanic to a medium-grained actinolite-plagioclase rock, similarly altered (Appendix 3).

A wedge of volcanics lying between the Main Zone "Lower" cherts and the upper sedimentary package marked by conductor 42a (12) north of the Joubin Fault, and 40b (12) south of the fault is thought to consist of several coarse-grained flows separated by 100-200 feet of mafic flow units and in one case, an 85ft "gray lava" zone with a graphitic shear. It is not known at this stage whether these "wedge" rocks represent an intrusive complex that split the "Lower" cherts, or a local extrusive accumulation with later sedimentary deposition. A very high degree of hydrothermal alteration would appear to be a common characteristic of these rocks though, given the geochemical results to date.

Attempts to trench conductors 42a (12) and 40b (1d) with overburden trenches "E" and "D", respectively, the past two summers were unsuccessful in reaching bedrock, but did encounter large angular boulders of chert, argillaceous chert, chloritic argillite and graphitic argillite. Mineralization and lithologies encountered are markedly similar to the "Lower" cherts, although geophysical dip estimates are much steeper. It is unclear at this point whether these two sedimentary packages are related.

f) **"Digestive Diorite"**

This intrusive gabbro appears to exist in the form of narrow dikes and sills throughout the deposits area stratigraphy, and blossoms out to a larger, laccolith type structure in the Main Zone area. To the north it appears to be sill-like and conformable but within the deposits area to be fault controlled. Digestive diorite has been noted in NW (120^0) vertical structures as dikes, as the laccolith which is apparently bounded by NNE striking, easterly dipping shears, and as conformable thin sills.

Chert xenoliths and the presence of greyish-whitish-purple leucoxene crystals and a petrographically-determined, very high degree of alteration clearly distinguish this gabbroic rock from the regional gabbros seen elsewhere on the property.

A sample of digestive diorite (SH-WR-19) from L450N/125W was studied in thin section. Megascopically, this is a dark, mottled green-black, generally medium-grained rock which contains irregular 1-2 mm grains of a diagnostic greyish-white mineral with a slight purplish tinge. In thin section, the most notable feature of this rock is the complete and total alteration of whatever primary minerals were present to an alteration/hydrothermal assemblage of chlorite, epidote-saussurite, kaolin, abundant carbonate, sericite, leucoxene and hematite. Some shattered quartz grains may be primary. Remnants of original feldspar (plagioclase?) crystals can be discerned in a few instances. The diagnostic purplish mineral can be identified as leucoxene, pseudomorphous after illmenite.

The pervasive alteration noted, and the surprising number of samples previously called either "Variolitic Basalt" or "Footwall Diorite" but positively identified as "Digestive Diorite" by the petrographic work is critically important. These observations suggest that while the dike swarm certainly intruded the entire central pyroclastic-sedimentary stratigraphy in the deposits area, this occurred before the mineralization event. All chemical, mineralogical and structural manifestations of the hydrothermal systems appear to be present in the "Digestive Diorite" rocks, and therefore past references to mineralization being "digested" are likely misinterpretations. Rather, it would appear the dikes were an integral part of the Shunsby deposits assemblage, and were "stewed" by the same hydrothermal event as the other lithologies.

g) **Intrusives Dikes**

"Basic", "trap" and "intermediate" dikes as well as ambiguously logged "feldspar porphyry", "feldspar-andesite porphyry" and "quartz-feldspar porphyry" are common in the historical work giving one the sense that the property is inundated with quartz-feldspar porphyry and lamprophyre dike swarms. The extensive stripping operations have shown this not to be the case, with in fact, only a few late quartz-feldspar porphyry and lamprophyre dikes present in the deposits area. Virtually all references to feldspar porphyries have now been correlated with feldspar phyric intermediate to felsic pyroclastics, while basic dikes etc. are generally mafic flows.

With the exception of the laccolith, lamprophyre as well as "Digestive Diorite" dikes preferentially occupy late NW (120^0) structures. Quartz-feldspar porphyry dikes have been noted in later EW (090^0) structures only, and as mentioned earlier, as local sill-like bodies roughly concordant with stratigraphy.

7.2.3 Structure

The additional stripping through the deposits area has further clarified the structural picture and shown small scale folding to be far more common than previously thought. The stripping has also served to further refine the fault/shear zone picture in the deposits area, particularly to emphasize the pervasive nature of NW-SE trending structural zones and the E-W, southerly dipping shearing. While in general rock units do trend slightly west of north, left-lateral shear related drag-folding in the South Zone at 100S moves units further eastward and results in local east-west strikes and flatter dips from approximately L000 southward. Drag-folding has also been exposed in the Joubin Fault zone on L250N and is again left-lateral in orientation with Main Zone "Lower" chert argillites rotated into the plane of the fault. A major fold has also been located in the north Main Zone area which warps stratigraphy around north-eastwardly before swinging back and trending towards the northwest in the north property area.

a) **E-W Faulting/Structural Trend**

All observations suggest that E-W faulting and shearing and related drag-folding was a very late event, post-dating all other folding, faulting and mineralization events and overprinting original textures with a pervasive foliation in many areas. This grades to intense schistosity in the fault/shear zones themselves. While the Joubin Fault is regional in extent, two other faults, at 700N and 100S, appear to terminate against the gabbro regime to the east. A quartz-feldspar porphyry dike system occupies the core of the 100S shear which is apparently sub-vertical, while the Joubin Fault dips southerly at approximately 60^{0}. A possibly related trend is the 100^0 microfracture system seen in some of the brittle lithologies such as the chert breccia and massive cherts.

b) **NW-SE Hydrothermal Breccia/Fault Zones**

Pervasive 120° jointing as well as dikes and faults in this orientation had been noted in the Main Zone "Lower" cherts previously. Subsequent stripping further to the west and north has allowed several individual "zones" to be mapped for several hundred metres through the "Upper" cherts and into the footwall pyroclastics. The structures trend 120° on average, and manifest themselves as steeply dipping shear/alteration zones (chlorite-pyrrhotite) in the Footwall Pyroclastics; as brecciated and microjointed chlorite-pyrrhotite +/- pyrite, chalcopyrite, sphalerite zones within the chert breccia lithology; as purple, densely carbonatized to calcitic massive and banded chert lithologies with chloritic seams and chloritic argillite interbeds (often base metal mineralized); as chlorite-chalcopyrite-sphalerite-pyrite microjoint systems through the argillaceous chert-argillite +/- massive sulphide-iron formation assemblages in the "Upper" and "Lower" cherts; and as chloritized, fractured-mineralized zones in the variolitic basalt and hangingwall volcanic units.

In several locations, particularly along the L300N stripping, a breccia zone shows true left-lateral displacement and would appear to represent later reactivation of a pre-existing mineralized structure on the basis of boudinaged mineralized clasts within the fault gouge. Where this zone cuts the thin massive sulphide horizon, the copper and zinc content of this unit is enriched considerably by 1) chalcopyrite +/- sphalerite replacing pyrite-pyrrhotite and 2) chalcopyrite-sphalerite-galena in microfractures.

It is difficult to ascertain exactly how many structures are present and at what density. It would appear that through the Main Zone area they are virtually adjacent to one another although barren intervals, and less mineralized zones within individual structures certainly exist. At only one locale, the Copper Knob and L400N area, have outside limits to an individual structure been established, giving it a width in the order of 50-60m. High-grade mineralization is present to the north at the L425-450N area, and in many drillholes to the south extending to deep hole 64-82e, suggesting that the distance between structures is not great. The stripping to the north and west, and as well in the South Zone area suggests that density of mineralized structures is decreasing to the north and south. It is apparent that only by drilling several fences of northeasterly trending holes through the entire Shunsby basin, will one positively ascertain number and density of structures that constitute the system.

As mentioned previously, folding has also been observed about a 120° axis including drag-folding along small-scale shears, and also a major fold which affects the Main Zone area. In addition, tiny sulphide veinlets, fracture sets and a pervasive crenulation cleavage in the massive sulphide horizon exposed on lines 325N and 275N are oriented at 120^0.

c) **NNE (030^0) Shear Zones/Structural Trend**

Shears of this orientation are known only at the contact of the "Digestive Diorite" bodies in the L300N and L625N stripped areas. These particular structures have an anomalous eastward dip of $50\text{-}55^0$. This shearing would appear to be controlling the east margin of the laccolith, and based on drill records may not extend to depth in any significant fashion. There is some evidence that there has been movement along this structure, in the order of 25-50m in a left-lateral sense. It is also possible that vertical movement along this shear has had some influence on the shape (and mineralization ?) within the Main Zone near-surface "bulge" in the "Lower" cherts. (ie. dips steepen considerably here to near vertical).

Occasional outcrops show a 030^0 joint set, particularly incompetent, brittle lithologies such as the massive cherts. Where observed, these are seen to be cutting all other trends, including E-W joints.

d) **Bedding Parallel Trend**

Manifested primarily by the sheared upper contacts of the two chert packages, this trend is cut by all others and would therefore appear to be the oldest. The so-called "Basement Fault" is a highly strained, boudinaged melange of graphitic argillite, argillite and chert units at the "Lower" chert "FW Diorite" contact which appear to be draped over the overlying volcanics, suggesting that movement was primarily in a reverse dip-slip, ie thrust, sense.

A similar sheared graphitic argillite package is found at the "Upper" Chert/ variolitic basalt contact exposed on the L175N, L000 and L100S stripped areas.

Graphitic argillite units are also known to exist along the pyroclastic "Upper" chert contact, and as well in the overlying volcanic flow/sill regime (trenched at L100S, 500E). Additional thrust-type movements may also have taken place along these units during regional folding, to result in the rather exotic subvolcanic environment now exposed at surface.

7.2.4 Alteration and Mineralization

The extensive additional stripping during the current program has shown that most of the mineralization present on the property is not stratiform or even stratabound, but is in fact hosted by late hydrothermal breccia/fault zones which trend 120^0 on average and dip vertically. Confusion has resulted in the past because most of the previous work, including the 1990 MPH work, was predicated on a stratiform model based on the identification of some stratiform/stratabound mineralization in the argillaceous horizons.

True primary stratiform/stratabound sulphide mineralization has been found in two distinct styles:

1) Banded massive pyrite-pyrrhotite +/- sphalerite in the "Upper" cherts associated with chert-magnetite iron formation (ie L500N, L325N, L275N)

2) Sedimentary-exhalative style disseminated to semi-massive sphalerite +/- pyrite within an argillaceous chert horizon near the base of the "Lower" cherts (ie L425N, L400N, etc.)

All other mineralization has a distinct structurally controlled aspect and, save for very late E-W quartz-carbonate-galena +/- sphalerite, chalcopyrite veins, would appear to be associated with the 120^0 breccia/fault zones. These include:

3) Chlorite-chert-chalcopyrite-pyrite +/- sphalerite, galena breccia zones within the "Upper" cherts (ie Cu-Knob and Cu-Breccia showings, L075S South Zone "Upper" cherts)

4) Chloritic volcanic/chloritic argillite-sulphide breccia zones with pervasive joint systems carrying chalcopyrite, sphalerite, galena (ie L425N, L400N and L300N Main Zone "Lower" cherts, L325N "Upper" cherts cutting massive sulphide stratigraphy and L100S South Zone "Upper" cherts where Zn predominates)

5) Chloritic argillite-pyrite horizons with chalcopyrite, sphalerite preferentially replacing iron sulphides for short strike extents (ubiquitous)

Variably tectonized versions of the above styles have also been observed, particularly in the vicinity of the L325N stripping where a fault zone cuts through the "Upper" cherts, and also in float from the eastern overburden trenches. Virtually all of the mineralization styles described above have been found in coarse angular rubble in these trenches, including high-grade tectonized chalcopyrite-pyrite (+/- bornite) sulphide clasts.

Within the footwall pyroclastics and lower portion of the "Upper" cherts, pyrrhotite is the predominant sulphide at the expense of pyrite and the base metals although all of mineralization styles 3, 4 and 5 are present. Crude grading of Fe to Zn to Cu (+Ag) (repeated in "Lower" cherts) appears to be present as one works upwards in the stratigraphy, and as well as one moves from the peripheries to structures in the Main Zone area. Several holes illustrate the base metal zoning relationship extremely well, particularly hole 81-24 (Table 3), where Cu:Zn ratios steadily increase from 0.063 to 1.324 over 5 mineralized intervals through the "Lower" cherts. Pb appears in dominantly E-W, late veins, and seems to be more common on the peripheries (ie L625N, L100S and a massive galena intersection in hole 74-16 at approximately L300S) than in the Main Zone area.

Alteration occurs in several forms because of the variety of host rocks but is thought to be primarily of hydrothermal origin related to the structurally-controlled stringer-type mineralization discussed above. A possible exception is the impressive amount of iron carbonate on the property which is found in E-W shear zones and quartz-carbonate veins and as a major component of the matrix of the "Upper" chert breccia. As well most of the volcanics analyzed have high CO_2 contents suggestive of a rather widespread "dolomitic" background chemistry in the deposits area such that much of this material may be of primary origin. Some of the low rank alteration minerals in these rocks, eg chlorite, sericite, are also undoubtedly a product of regional metamorphism. Leucoxene pseudomorphic after illmenite is common in all volcanic lithologies but especially seems to be prevalent in the "Digestive Diorite" dikes.

The footwall pyroclastic assemblage shows intense chloritization and sericitization within structures in the Main Zone area while peripheries show less intensive chloritization and more sericitization. Intense pyrrhotite-chlorite-iron carbonate gossanous mineralization is common within these rocks with some impressive Pb, Zn+Cu credits (L625N).

Structures passing through the chert breccia unit appear to re-brecciate the unit and alter the chert clasts to a carbonate or calcitic chert with some free quartz. Again gossanous mineralization is encountered which is primarily pyrrhotite-chlorite-Fe carbonate but higher Zn-Cu-Pb-Ag values are present and a pervasive microjoint system is generally discernable (L625N, N-S stripping at L550N, LO00).

Massive and banded chert lithologies are generally altered to a purplish (hematitic?) colour and sugary texture with chlorite seams transgressing stratigraphy within the structures, but are unmineralized with the exception of the argillite interbeds (type 5 mineralization, eg L500N, L325N etc).

Where structures pass through the banded chert-massive sulphide-argillite complex of the "Upper" cherts, and the entire "Lower" chert assemblage, alteration and mineralization is intensive. Chloritization of argillite beds is pervasive, and type 3, 4 and 5 mineralization is present in all suitable host lithologies.

Several exposures of the variolitic basalt-"Lower" chert contact area and numerous references in drill logs suggest that typical VMS stringer-type mineralization is present, within these structures, both stratigraphically below and above the "Lower" cherts. Where exposed on surface in the Main Zone (L425N, L400N, L300N), chloritization and silicification virtually obliterate primary textures in the variolitic basalt and rich type 4 mineralization is present.

7.3 Lithogeochemistry and Petrography

Petrographic examinations on the Shunsby samples collected thus far have found that the suite includes 27 "FW Diorites" of which all but two are from drillcore, 5 surface samples of the footwall pyroclastic suite, 8 surface samples and 3 from core of dike rocks and "Digestive Diorite", 33 variolitic basalt samples of which 7 are from surface, and two surface chert samples. As well, for control purposes, 69 regional samples collected by the OGS (Siragusa, 1987) in Cunningham Township have been included in the database. These rocks are interpreted to be equivalent to the Shunsby "FW Diorite" stratigraphy. All of this data is presented in worksheet form in Table 2, and the 28 surface samples (designated SH-WR- and Miron-) are plotted on Map 2.

The total of 11 "Digestive Diorite" samples includes rocks collected from all of the Shunsby stratigraphic members, and the identification of these as dike rocks came as quite a surprise in some cases.

Average raw analytical and lithogeochemical processed results are as follows:

Raw Analytical Data

	SiO_2	Al_2O_3	Fe_T	CaO	MgO	Na_2O
Cunningham Twp.Basalts	48.46	15.20	11.50	9.46	6.46	2.34
Shunsby Hangingwall "FW Diorites"	46.54	15.14	12.38	7.09	6.10	0.97
Shunsby Variolitic Basalts	51.18	16.57	11.79	4.42	4.87	1.06
Shunsby Footwall Pyroclastics	61.58	13.80	10.71	2.06	2.22	1.21
Shunsby "Digestive Diorite" Intrusives	47.77	14.41	11.42	6.67	7.47	1.43

	K_2O	TiO_2	P_2O_5	MnO	LOI	CO_2
Cunningham Twp. Basalts	0.27	0.93	0.08	0.21	3.05	1.41
Shunsby Hangingwall "FW Diorites"	0.91	0.85	0.08	0.17	9.30	5.44
Shunsby Variolitic Basalts	1.04	0.90	0.10	0.19	7.08	3.45
Shunsby Footwall Pyroclastics	1.94	0.33	0.08	0.41	4.89	3.30
Shunsby "Digestive Diorite" Intrusives	0.68	0.77	0.10	0.18	8.39	4.47

TABLE 2 - LITHOGEOCHEMICAL SUMMARY

Shunsby "Variolitic Basalt" Marker Horizon

SAMPLE	LOCATION SECTION	FROM	TO	FIELD	CLASSIFICATIONS JENSEN	TITANIA	RAW DATA SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Na2O	K2O	TiO2	P2O5	MnO	LOI	CO2	RESIDUALS MGO	K2O	FE2O3	NA2O	CAO	SIO2	DISCRIMINANT FUNCTIONS M-D SC	DF2	DF3	DF4	DF5	TAAS	PERAL	Cu	Zn	Cu:Zn	CIPW NORM	COMMENTS
57-70-VB	2+00S	52.13	52.44	lq	C-A basalt	dacite	45.68	14.56	11.46		10.07	4.20	0.53	0.82	0.78	0.06	0.36	10.61	7.03	-3.56	0.64	-2.52	-2.51	-0.35	1.17	-1.06	-4.56	-5.12	-3.59	-1.29	32.12	1.33	70	120	0.58		just below sig. Zn mnln
57-69-VB	1+50S	72.56	72.87	lq	C-A basalt	dacite	44.40	16.44	11.82		8.50	5.34	0.40	1.86	0.90	0.06	0.17	10.69	6.22	-2.73	1.85	-2.70	-2.41	-2.68	-0.95	0.03	-5.06	-5.61	-3.25	-3.47	44.70	1.58	55	85	0.65		just below dyke & UC, no sig mnln
57-64-VB	1+50S	42.68	42.99	lq	C-A andesite	dacite	58.53	19.75	8.53		2.01	3.50	0.82	1.82	1.10	0.10	0.11	4.61	0.77	-0.12	1.08	-0.03	-3.17	-4.31	-4.86	2.02	-2.00	-2.64	0.44	0.89	65.26	2.83	100	225	0.44	norm c 11.5%	just below sig UC Zn mnln
MIRON-03	1+00S	0	0.1	lq,ser	Thol basalt	dacite	51.20	14.00	10.50		5.59	6.88	3.02	0.18	0.78	0.19	0.18	6.19	3.08	1.45	-0.33	-0.93	-0.39	-3.03	1.58	-0.14			0.13	2.75	45.06	1.37					altered var. basalt
56-61-VB	0+75S	64.33	64.63	lq/5a(dig)	Thol basalt	dacite	51.75	15.76	13.20		3.82	5.33	0.36	1.32	0.87	0.08	0.19	7.44	3.67	-0.06	0.86	2.25	-3.35	-4.77	-0.37	1.12	14.68	13.98	3.19	3.50	61.42	2.87	75	985	0.08	norm c 6.1%	mid lq, poss 5a(dig), good mnln in UC &
66-62E-VB1	0+75S	49.38	49.68	lq	Thol basalt	dacite	43.19	16.50	16.94		0.38	11.72	0.17	0.66	0.90	0.06	0.09	7.20	0.49	3.94	0.56	2.43	-2.46	-12.34	-1.01	3.67	2.03	1.60	5.55	5.97	95.73	12.38	15	180	0.08	norm c 16.0%	just below UC Zn mnln
56-62-VB?	0+75S	54.86	55.16	lq	Thol basalt	dacite	48.56	17.83	14.27		1.08	8.40	0.27	0.74	0.93	0.14	0.13	5.87	0.79	2.24	0.39	2.01	-3.10	-9.02	-2.53	2.85	11.53	10.89	4.06	4.69	87.13	7.99	85	790	0.11	norm c 15.5%	upper lq
66-62E-VB2	0+75S	65.08	65.38	lq	C-A andesite	dacite	52.09	17.82	6.49		4.31	3.98	4.07	1.52	0.92	0.12	0.10	6.35	3.92	-1.43	1.09	-4.95	0.68	-4.14	-2.69	-0.38	-0.91	-0.87	-4.68	-4.27	39.63	1.46	120	520	0.23	norm c 0.4%	mid lq
66-62E-VB3	0+75S	89.61	89.92	lq	Thol basalt	andesite	41.87	19.72	18.83		0.66	9.03	0.43	0.92	1.11	0.08	0.17	6.72	0.77	0.36	0.89	3.79	-1.88	-12.37	-4.51	2.47	3.37	3.11	6.71	4.23	90.17	8.57	1200	160	7.50	norm c 17.6%	just above LC Cu-Zn mnln
68-20-VB	0+75S	14.63	14.94	lq	C-A basalt	dacite	58.36	16.17	7.49		1.43	6.41	0.80	1.58	0.91	0.06	0.06	5.19	1.68	2.97	0.86	-1.22	-3.29	-5.12	-1.14	3.05	-2.03	-2.74	-0.34	2.68	78.20	3.75	5	300	0.02	norm c 9.7%	just below UC Zn mnln
68-01-VB	0+00N	132.59	132.89	lq	Thol high-Fe bas.	dacite	50.30	16.75	20.43		0.59	3.04	0.30	0.80	0.88	0.02	0.25	4.61	0.62	-3.03	0.38	9.50	-3.26	-8.84	-1.40	-0.08	5.34	4.95	11.98	6.05	81.20	8.88	50	30	1.67		just above LC Zn mnln
68-16-VB1	0+00N	51.21	51.51	lq	Thol dacite	dacite	50.66	19.01	10.98		4.49	3.35	0.96	0.72	0.99	0.08	0.14	6.76	3.29	-2.60	0.29	-0.66	-2.61	-4.49	-3.92	0.51	-3.26	-3.79	-0.55	-2.10	42.78	2.95	50	130	0.38		just below UC, no Zn mnln at ct
68-16-VB	0+00N	60.06	60.37	lq	C-A basalt	dacite	45.36	15.26	10.79		10.55	3.94	0.75	1.00	0.87	0.08	0.28	11.55	7.80	-3.96	0.86	-3.42	-2.20	0.04	0.37	-1.12	-5.30	-5.82	-4.71	-3.53	30.46	1.28	100	125	0.80		mid lq
68-16-VB2	0+00N	89.61	89.91	lq	Thol andesite	dacite	64.18	10.86	10.14		3.67	2.04	0.44	0.60	0.53	0.06	0.24	5.84	6.73	-0.47	-0.46	3.83	-3.80	-1.17	4.17	0.12	-1.82	-2.47	4.28	5.41	39.10	2.31	35	85	0.41		just abole LC, sig Cu-Zn mnln
68-6-VB	1+00N	98.48	98.78	lp	Thol high Fe bas.	dacite	45.40	15.19	17.81		6.20	5.06	0.21	0.48	0.84	0.08	0.29	8.66	4.58	-2.62	0.25	4.46	-2.76	-4.77	0.43	-0.55	32.65	32.05	5.52	3.39	46.35	2.34	100	1815	0.06	norm c 3.0%	mid lq, sig Zn mnln above in UC
68-13-VB	1+00N	6.71	7.01	lq	Thol high Fe bas.	dacite	45.26	14.23	18.54		5.99	5.00	0.24	0.30	0.78	0.08	0.35	6.87	5.45	-2.79	0.07	5.26	-2.73	-5.11	1.52	-0.78	5.83	5.41	6.51	4.69	45.98	2.31	370	255	1.45	norm c 2.8%	shallow, just below UC, no sig mnln
56-37-VB?	1+87N	99.09	99.39	l	Kom bas komatiite	dacite	46.86	14.22	17.35		1.36	12.21	0.12	0.10	0.74	0.36	0.10	7.15	0.97	5.77	-0.23	4.56	-3.01	-9.32	1.46	3.21	2.84	2.36	7.75	9.76	89.27	9.23	140	135	1.04	norm c 13.3%	just below UC Zn mnln
61-91-VB	2+75N	71.95	72.26	lp/lq	Thol basalt	dacite	45.16	12.03	10.64		11.23	5.52	0.28	0.36	0.63	0.06	0.35	12.84	9.08	-2.32	0.14	-3.81	-2.78	0.75	4.16	-0.93	-5.69	-6.35	-5.15	-0.92	33.79	1.09	15	130	0.12		just below UC, no sig mnln
61-91-VB2	2+75N	97.54	97.84	lp/lq	Thol high-Fe bas.	dacite	67.89	10.27	12.93		0.72	2.64	0.24	0.18	0.52	0.04	0.15	3.83	1.35	0.80	-1.05	7.91	-3.82	-3.47	4.33	0.74	15.95	15.33	9.71	8.47	74.69	8.33	200	880	0.23	norm c 8.8%	just above sig LC Cu-Zn mnln
SH-WR-07	3+00N	0	0.1	lq,chl	C-A dacite	andesite	57.20	22.49	8.52		1.01	2.37	1.32	2.20	1.21	0.12	0.12	4.24	0.68	-1.63	1.53	-0.55	-2.58	-5.73	-7.62	1.81	-3.25	-3.77	-0.05	-0.87	66.20	4.11	30	170	0.18	norm c 14.6%	highly altered var. basalt near LC ct
65-104-VB1	3+50N	147.83	148.13	lq	Thol andesite	andesite	48.21	20.58	15.36		3.15	4.19	0.58	0.42	1.12	0.10	0.25	5.57	1.20	-2.46	0.06	3.00	-2.67	-6.77	-5.44	0.78	0.44	0.00	4.17	2.07	55.22	4.82	160	100	1.60	norm c 14.3%	just below UC, no sig mnln
65-104-VB2	3+50N	199.03	199.33	lq	Thol andesite	dacite	44.52	17.34	12.86		6.00	4.22	2.09	1.56	0.94	0.06	0.22	8.22	4.94	-3.95	1.52	-1.48	-0.54	-5.45	-1.96	-0.84	-3.68	-3.78	-1.08	-3.14	41.68	1.64	110	95	1.16		lower lq, above sig LC Cu mnln
MIRON-06	3+50N	0	0.1	lq	C-A rhyolite	andesite	60.90	21.50	4.28		1.69	1.39	1.31	2.32	1.23	0.30	0.06	3.63	0.03	-1.80	1.52	-3.63	-2.75	-4.04	-6.91	2.16			-4.06	-3.95	55.37	3.46					mid lq above sig LC Cu
MIRON-05	3+50N	0	0.1	lq	C-A basalt	dacite	50.60	15.00	10.30		6.65	4.76	0.28	1.74	0.76	0.19	0.17	8.90	5.06	-1.07	1.42	-1.45	-3.39	-2.15	0.52	0.55			-1.82	-0.50	48.40	1.79					lower lq above sig LC Cu
SH-WR-13	4+00N	0	0.1	lq,chl	C-A dacite	dacite	57.58	21.10	5.42		0.91	3.10	6.86	1.74	1.14	0.12	0.05	2.83	0.42	-0.76	1.01	-3.57	3.12	-5.61	-6.09	-0.70	-9.00	-8.33	-2.07	-3.05	38.37	1.51	15	15	1.00	norm c 4.8%	highly altered var. basalt Cu-Knob struc
65-109-VBa?	4+25N	226.47	226.77	lq?	Thol basalt	dacite	44.97	13.73	11.72		9.70	5.57	0.85	0.76	0.78	0.04	0.17	11.50	8.27	-2.28	0.60	-2.59	-2.04	-1.10	2.13	-0.75	-6.10	-6.55	-3.21	-2.91	37.51	1.24	140	30	4.67		altered lq, Cu-Knob, above sig LC Cu-Zn
65-109-VBb?	4+25N	243.84	244.14	lq?	Thol basalt	dacite	45.61	12.54	12.26		8.29	6.93	1.54	0.08	0.87	0.06	0.17	10.42	6.88	-0.47	-0.21	-1.64	-1.36	-2.43	3.49	-0.27	-5.27	-5.54	-1.39	-0.29	41.62	1.23	80	30	2.67		poss lq, just below UC Pb mnln
66-108-VB	4+25N	136.89	137.2	lq	Thol high Fe bas.	dacite	40.53	17.75	16.86		7.18	5.64	0.40	0.30	1.00	0.10	0.39	9.10	4.43	-4.04	0.28	1.00	-1.71	-6.01	-2.42	-0.33	12.48	12.11	1.64	0.78	43.96	2.36	55	825	0.07	norm c 4.1%	poss mid lq, hole never reached FW
66-108-VB2	4+25N	178.92	179.22	lq	Thol rhyolite	dacite	60.94	21.37	6.81		0.37	1.32	1.29	2.20	1.11	0.12	0.10	3.42	0.25	-1.86	1.38	-0.95	-2.76	-5.39	-6.76	1.85	-6.19	-6.75	-0.66	-1.49	68.01	4.42	150	65	2.31	norm c 14.8%	just below UC, no sig mnln
SH-WR-14	4+25N	0	0.1	lq,chl	Thol dacite	dacite	58.74	18.22	10.96		0.48	2.45	0.98	1.62	0.98	0.08	0.19	3.71	0.17	-1.20	0.88	2.63	-3.07	-5.96	-3.34	1.37	-1.15	-1.69	3.71	2.77	73.68	4.80	20	130	0.15	norm c 13.2%	altered lq, 425N, just below sig LC Zn-C
68-46E-VB?	5+00N	109.73	110.03	lq	C-A Andesite	dacite	54.57	15.71	8.45		6.91	3.41	0.60	0.60	0.82	0.10	0.24	8.19	5.64	-1.30	-0.03	-1.74	-3.36	-0.41	-0.44	0.31	-6.81	-7.52	-2.49	0.18	34.83	1.98	130	30	4.33	norm c 1.2%	just above LC, no sig mnln
65-101-VB?	6+50N	109.76	110.06	l	Thol basalt	dacite	43.01	12.75	10.43		10.54	7.01	1.20	0.24	0.64	0.04	0.18	11.85	7.36	-1.48	0.10	-5.19	-1.33	-1.07	3.35	-0.76	-6.77	-7.15	-5.98	-3.73	38.18	1.08	95	125	0.76		shallow hole, barren, much dyke
SH-WR-08	7+00N	0	0.1	lq?	Thol rhyolite	dacite	64.79	20.39	5.57		0.20	0.74	1.13	2.68	1.10	0.12	0.11	3.04	0.32	-1.68	1.70	-0.89	-2.98	-4.57	-5.95	2.02	-6.50	-7.08	-0.73	-1.07	72.01	4.12	45	75	0.60	norm c 13.1%	sheared variolitic basalt at 7N?
						average	51.18	16.57	11.79	ERR	4.42	4.87	1.06	1.04	0.90	0.10	0.19	7.08	3.45	-1.03	0.60	0.26	-2.31	-4.58	-1.26	0.67	0.73	0.27	0.90	0.96	55.70	3.68	127	288	1.07		
						maximum	67.89	22.49	20.43	ERR	11.23	12.21	6.86	2.68	1.23	0.36	0.39	12.84	9.08	5.77	1.85	9.50	3.12	0.75	4.33	3.67	32.65	32.05	11.98	9.76	95.73	12.38	1200	1815	7.50		
						minimum	40.53	10.27	4.28	ERR	0.20	0.74	0.12	0.08	0.52	0.02	0.05	2.83	0.03	-4.04	-1.05	-5.19	-3.82	-12.37	-7.62	-1.12	-9.00	-8.33	-5.98	-4.27	30.46	1.08	5	15	0.00		
						std. dev.	7.33	3.16	4.14	ERR	3.56	2.64	1.32	0.73	0.18	0.07	0.09	2.79	2.83	2.25	0.69	3.56	1.37	3.18	3.44	1.39	8.89	8.83	4.52	3.75	19.19	2.90	211	391	1.61		

SHUNSBY "DIGESTIVE DIORITE" INTRUSIVE GABBROIC DIKES/SILLS

SAMPLE	LOCATION SECTION	FROM	TO	FIELD	CLASSIFICATIONS JENSEN	TITANIA	RAW DATA SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Na2O	K2O	TiO2	P2O5	MnO	LOI	CO2	RESIDUALS MGO	K2O	FE2O3	NA2O	CAO	SIO2	DISCRIMINANT FUNCTIONS M-D SC	DF2	DF3	DF4	DF5	TAAS	PERAL	Cu	Zn	Cu:Zn	CIPW NORM	COMMENTS
SH-WR-10	1+50S	0	0.1	2a?	Thol basalt	dacite	50.67	14.27	11.25		8.29	7.87	1.64	0.84	0.69	0.06	0.20	3.24	0.76	2.29	0.40	-0.34	-1.77	-0.27	1.26	0.06	-4.65	-4.98	0.17	4.19	46.74	1.28	80	20	4.00		unaltered int. lithic tuff
68-01-FW	0+00N	166.73	166.93	1/5a	Thol basalt	dacite	44.19	13.49	11.02		10.08	6.62	0.68	0.60	0.72	0.04	0.16	12.10	8.56	-1.41	0.46	-3.80	-2.12	-1.03	2.43	-0.36	-7.21	-7.72	-4.53	-3.00	40.15	1.24	160	30	5.33		just below LC Zn mnln
SH-WR-16	0+00N	0	0.1	2a/5a(dig)	Thol Mg basalt	dacite	46.01	15.79	11.58		4.24	9.37	2.05	0.88	0.58	0.04	0.18	8.64	3.66	2.42	0.67	-2.16	-0.81	-6.70	-0.24	1.13	7.53	7.28	-0.67	2.63	62.00	1.93	110	780	0.14	norm c 3.2%	dyke/2a exposed in UC on LO
SH-WR-17	1+00N	0	0.1	5a dike	Thol Mg basalt	dacite	47.66	14.64	14.32		1.81	10.12	1.43	0.24	0.78	0.06	0.16	7.19	1.53	3.85	0.11	1.67	-1.73	-8.69	1.01	2.24	1.72	1.43	4.22	6.65	76.17	3.44	90	250	0.36	norm c 9.6%	strange dyke/flow in UC on 11N
SH-WR-15	1+75N	0	0.1	2a?	C-A Basalt	dacite	54.43	14.10	7.72		4.76	5.52	3.72	1.16	0.62	0.24	0.10	6.60	3.88	0.96	0.58	-2.57	0.09	-2.80	1.32	-0.48	-0.83	-0.85	-1.82	0.06	44.06	1.21	110	410	0.27		2a unit just below UC contact
MIRON-04	3+00N	0	0.1	5a(dig)	Thol basalt	dacite	46.40	15.10	13.10		5.26	7.55	1.72	0.85	0.69	0.18	0.19	7.68	3.35	0.53	0.63	-0.29	-1.24	-5.38	0.52	0.31			0.90	2.07	54.62	1.77				norm c 1.4%	Dig. diorite, above UC Cu-Zn mnln
SH-WR-02	5+00N	0	0.1	2?,ser	Thol Mg-rich bas.	dacite	48.11	12.66	9.25		8.23	8.54	0.99	0.24	0.69	0.08	0.25	10.93	7.03	2.31	-0.14	-3.82	-2.33	-1.39	3.26	0.99	-5.94	-6.49	-3.92	2.51	48.77	1.35	100	140	0.71		intermediate? flow within 2a sequence
SH-WR-03	5+00N	0	0.1	2a?	Thol basalt	dacite	52.08	14.18	9.16		9.45	6.97	0.97	0.12	0.75	0.08	0.19	7.05	3.95	1.80	-0.43	-1.98	-2.66	1.47	1.32	0.31	-5.04	-5.62	-2.37	2.46	40.49	1.38	95	110	0.86		intermediate? tuff within 2a sequence
SH-WR-04	5+00N	0	0.1	2a?	Thol basalt	dacite	46.45	13.83	11.93		8.81	6.17	0.29	0.80	0.97	0.06	0.19	10.95	7.28	-0.99	0.57	-1.59	-2.87	-1.44	1.96	0.39	-4.07	-4.68	-1.95	-0.48	43.36	1.48	65	100	0.65		felsic? tuff within 2a sequence
SH-WR-18	5+00N	0	0.1	1/5a dike	Thol andesite	andesite	45.70	20.69	18.30		1.06	3.91	0.66	2.06	1.43	0.08	0.22	5.59	0.92	-3.68	1.95	5.01	-2.24	-10.86	-5.52	1.13	3.27	2.97	7.01	1.64	77.62	4.83	150	120	1.25	norm c 14.5%	strange dyke/flow in UC on 5N
68-46E-FWb	5+00N	205.44	205.74	1	Thol basalt	dacite	42.80	12.69	11.93		9.15	7.34	1.45	0.22	0.73	0.04	0.19	11.05	7.58	-1.18	0.09	-3.51	-1.00	-2.80	3.41	-0.54	-6.71	-6.96	-3.58	-2.12	41.66	1.16	100	30	3.33		furter below LC
66-110-VB?	5+00N	189.94	190.24	1	Kom Bas Komatiite	dacite	48.68	11.42	7.43		8.88	9.60	1.50	0.16	0.57	0.24	0.13	9.63	5.09	3.72	-0.26	-5.63	-1.83	-0.45	4.66	1.01	-9.82	-10.31	-5.85	1.09	48.51	1.07	60	30	2.00		deep hole, in dyke for much of LC

TABLE 2 - LITHOGEOCHEMICAL SUMMARY

SAMPLE	LOCATION SECTION	FROM	TO	FIELD	CLASSIFICATIONS JENSEN	TITANIA	RAW DATA SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Na2O	K2O	TiO2	P2O5	MnO	LOI	CO2	RESIDUALS MGO	K2O	FE2O3	NA2O	CAO	SIO2	DISCRIMINANT FUNCTIONS M-D SC	DF2	DF3	DF4	DF5	TAAS	PERAL	Cu	Zn	Cu:Zn	CIPW NORM	COMMENTS
						average	47.77	14.41	11.42	ERR	6.67	7.47	1.43	0.68	0.77	0.10	0.18	8.39	4.47	0.89	0.39	-1.58	-1.71	-3.30	1.28	0.52	-2.89	-3.27	-1.03	1.48	52.01	1.85	102	184	1.58		
						maximum	54.43	20.69	18.30	ERR	10.08	10.12	3.72	2.06	1.43	0.24	0.25	12.10	8.56	3.85	1.95	5.01	0.09	1.47	4.66	2.24	7.53	7.28	7.01	6.65	77.62	4.83	160	780	5.33		
						minimum	42.80	11.42	7.43	ERR	1.06	3.91	0.29	0.12	0.57	0.04	0.10	5.59	0.92	-3.68	-0.43	-5.63	-2.87	-10.06	-5.52	-0.54	-9.82	-10.31	-5.85	-3.00	40.15	1.07	60	30	0.00		
						std. dev.	3.17	2.20	2.87	ERR	2.98	1.72	0.85	0.53	0.22	0.07	0.04	2.53	2.56	2.20	0.59	2.72	0.81	3.46	2.43	0.78	4.97	5.06	3.55	2.53	12.63	1.09	30	219	1.66		

SHUNSBY FOOTWALL PYROCLASTIC ASSEMBLAGE

SAMPLE	LOCATION SECTION	FROM	TO	FIELD	CLASSIFICATIONS JENSEN	TITANIA	RAW DATA SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Na2O	K2O	TiO2	P2O5	MnO	LOI	CO2	RESIDUALS MGO	K2O	FE2O3	NA2O	CAO	SIO2	DISCRIMINANT FUNCTIONS M-D SC	DF2	DF3	DF4	DF5	TAAS	PERAL	Cu	Zn	Cu:Zn	CIPW NORM	COMMENTS
SH-WR-11	3+00S	0	0.1	2a	C-A basalt	rhyolite	61.31	16.85	4.49		2.68	2.29	2.19	4.24	0.37	0.10	0.09	4.43	2.28	-0.77	3.53	-3.28	-1.84	-2.90	-2.06	0.28	-9.46	-9.87	-3.42	-2.06	57.28	1.58	15	20	0.75		unaltered felsic lithic tuff
SH-WR-01	5+00N	0	0.1	3h,ser	C-A andesite	rhyolite	73.73	12.11	4.48		0.98	1.70	0.27	2.88	0.31	0.10	0.11	2.76	0.79	0.51	1.53	0.74	-3.34	-2.16	1.70	1.64	-6.41	-7.04	1.06	2.82	78.51	2.72	90	70	1.29	norm c 4.0%	altered felsic fragmental adjacent to po
SH-WR-09	6+25N	0	0.1	2a	C-A rhyolite	dacite	64.80	16.73	2.85		3.82	1.29	3.36	2.00	0.43	0.10	0.05	3.86	2.30	-1.13	1.00	-3.75	-0.60	-0.83	-2.19	-0.62	-9.83	-9.98	-4.07	-3.25	31.42	1.50	30	55	0.55	norm c 0.2%	unaltered felsic tuff
SH-WR-05	6+25N	0	0.1	3h/7b?,chl	Thol high Fe bas.	rhyolite	41.84	8.14	29.54		2.37	3.79	0.03	0.02	0.21	0.02	1.53	10.34	10.58	-5.82	-0.10	16.70	-2.49	-11.30	8.82	-3.41	15.60	15.56	20.65	27.77	61.26	3.64	15	130	0.12	norm c 4.5%	chloritic quartz-eye rock
SH-WR-06	6+25N	0	0.1	3d	Thol andesite	rhyolite	66.21	15.16	12.17		0.47	2.04	0.20	0.56	0.35	0.06	0.29	3.08	0.53	-0.10	-0.56	6.42	-3.83	-3.99	-0.66	0.54	0.82	0.23	7.88	8.25	79.35	11.07	10	85	0.12	norm c 13.4%	unaltered quartz-eye tuff
						average	61.58	13.80	10.71	ERR	2.06	2.22	1.21	1.94	0.33	0.08	0.41	4.89	3.30	-1.46	1.08	3.37	-2.42	-4.24	1.12	-0.31	-1.86	-2.22	4.42	6.71	61.56	4.10	32	72	0.56		
						maximum	73.73	16.85	29.54	ERR	3.82	3.79	3.36	4.24	0.43	0.10	1.53	10.34	10.58	0.51	3.53	16.70	-0.60	-0.83	8.82	1.64	15.60	15.56	20.65	27.77	79.35	11.07	90	130	1.29		
						minimum	41.84	8.14	2.85	ERR	0.47	1.29	0.03	0.02	0.21	0.02	0.05	2.76	0.53	-5.82	-0.56	-3.75	-3.83	-11.30	-2.19	-3.41	-9.83	-9.98	-4.07	-3.25	31.42	1.50	10	20	0.12		
						std. dev.	10.67	3.31	9.96	ERR	1.21	0.85	1.33	1.53	0.07	0.03	0.56	2.79	3.72	2.25	1.43	7.60	1.14	3.68	4.10	1.71	9.53	9.63	9.17	11.29	17.50	3.57	30	36	0.44		
OGS-60					C-A rhyolite	rhyolite	72.70	15.10	0.47	0.91	1.09	0.66	4.90	2.15	0.22	0.05	0.02	0.98	0.48	-0.65	0.80	-2.61	1.36	-2.15	-1.26	-0.98			-1.93	-1.97	31.92	1.33					

SHUNSBY "FOOTWALL DIORITE" UPPER MAFIC VOLCANIC COMPLEX

SAMPLE	LOCATION SECTION	FROM	TO	FIELD	CLASSIFICATIONS JENSEN	TITANIA	RAW DATA SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Na2O	K2O	TiO2	P2O5	MnO	LOI	CO2	RESIDUALS MGO	K2O	FE2O3	NA2O	CAO	SIO2	DISCRIMINANT FUNCTIONS M-D SC	DF2	DF3	DF4	DF5	TAAS	PERAL	Cu	Zn	Cu:Zn	CIPW NORM	COMMENTS
68-17-FW	4+00S	130.79	131.1	1p/5a	Thol Basalt	dacite	46.58	14.30	12.18		7.73	7.55	1.69	0.58	0.82	0.08	0.20	8.32	3.99	0.59	0.31	-1.21	-1.28	-2.54	1.40	0.01	-3.69	-3.94	-0.65	1.66	46.33	1.37	90	95	0.95		shallow hole, south of known mnln, barre
SE-3-FW	3+50S	33.99	34.3	1p	Thol Basalt	dacite	41.62	12.94	11.04		11.56	5.87	0.30	1.16	0.74	0.06	0.18	12.78	8.05	-3.46	1.26	-5.24	-2.14	-0.56	3.15	-0.86	-8.09	-8.64	-6.67	-5.97	37.21	1.06	110	40	2.75		shallow hole, south of known mnln, barre
SE-4-FW	3+00S	98.48	98.78	1a	Thol Basalt	dacite	41.79	13.26	11.30		10.41	6.51	0.31	1.40	0.74	0.06	0.16	12.18	8.16	-2.61	1.53	-4.82	-2.15	-1.83	2.77	-0.32	-7.32	-7.87	-5.82	-5.02	42.49	1.15	60	60	1.00		shallow hole, south of known mnln, barre
65-70e-FWa	2+00S	152.44	152.74	1a	Thol Basalt	dacite	42.20	13.19	11.33		11.41	5.92	0.13	1.44	0.79	0.06	0.17	12.40	8.02	-3.10	1.54	-4.53	-2.42	-0.45	2.82	-0.62	-4.24	-4.85	-5.85	-5.16	38.96	1.09	70	220	0.32		mod. deep hole, no sig LC mnln
65-70e-FWb	2+00S	163.41	163.72	1p/5b	Thol Basalt	dacite	46.17	14.86	11.26		9.13	8.16	1.89	1.28	0.77	0.08	0.20	3.96	1.46	1.09	1.08	-2.36	-0.98	-1.14	0.76	-0.15	-4.77	-4.99	-2.09	1.39	46.14	1.16	165	90	1.83		same as above, courser with depth
57-69-FW	1+50S	187.5	187.8	1p/5a	Thol Andesite	dacite	60.40	14.13	12.40		0.66	3.15	2.03	0.98	0.60	0.08	0.07	4.53	0.51	-0.06	0.12	4.82	-2.01	-5.33	0.90	0.03	35.61	35.17	6.66	3.86	60.55	2.83	130	2100	0.06	norm c 8.2%	mod. deep hole SW of South Zone
SE-2-FW	1+25S	103.66	103.96	1/5a,sch	Thol Basalt	dacite	41.93	12.35	10.91		10.53	6.61	1.01	1.30	0.71	0.08	0.16	13.11	8.60	-2.45	1.40	-5.22	-1.36	-1.63	3.84	-0.77	9.58	9.10	-6.10	-5.12	40.65	0.98	50	1040	0.05		shallow hole SE of South Zone, barren?
66-62E-FW	0+75S	131.37	131.67	1,5a	Thol basalt	dacite	47.20	14.56	11.95		7.72	7.91	1.78	0.92	0.76	0.04	0.19	5.97	2.95	1.20	0.65	-1.16	-1.26	-2.26	1.08	0.07	-4.84	-5.08	-0.53	2.26	48.17	1.33	150	30	5.00		within SZ structure?
68-20-FW	0+75S	96.95	97.26	1p/5a	Thol basalt	dacite	44.16	13.60	11.26		10.15	6.78	1.32	0.48	0.78	0.06	0.18	11.40	1.68	-1.22	0.32	-3.50	-1.36	-0.95	2.27	-0.66	-4.10	-4.44	-3.96	-2.30	38.79	1.14	80	185	0.43		shallow hole, below good LC Zn
68-16-FW	0+00N	136.28	136.59	1p	Thol basalt	dacite	41.73	13.20	11.02		10.72	7.00	1.45	0.38	0.73	0.06	0.18	11.82	7.36	-2.05	0.32	-5.14	-0.79	-1.49	2.82	-0.95	-3.90	-4.17	-5.82	-4.37	37.76	1.05	80	270	0.30		NW of SZ below good LC Zn
SE-1-FW	0+50N	52.44	52.74	1p	Thol basalt	dacite	61.01	8.14	7.47		8.19	3.19	0.40	0.86	0.42	0.06	0.16	8.40	5.78	0.12	-0.04	-0.24	-3.94	3.03	7.60	-0.49	14.51	13.61	-1.18	2.00	32.01	0.90	235	1220	0.19		apparently barren area between NZ and SZ
68-6-FW	1+00N	155.18	155.49	1c,sch	Thol basalt	dacite	48.91	16.24	14.38		3.47	7.06	0.18	1.42	0.85	0.06	0.13	7.60	2.53	0.89	1.12	2.28	-3.23	-6.23	-0.79	1.64	10.69	10.04	3.66	3.46	69.91	3.25	25	730	0.03	norm c 7.3%	just below LC at 1N/50W, no sig mnln
68-13-FW	1+00N	86.28	86.59	1a,sch	Thol basalt	dacite	45.58	14.32	11.35		10.05	7.25	1.91	0.52	0.83	0.06	0.19	6.90	3.77	-0.11	0.29	-2.59	-0.88	-0.40	1.38	-0.70	-4.62	-4.82	-2.66	-0.23	39.35	1.11	80	110	0.73		barren area between NZ and SZ?
56-52-VB?	1+87N	72.56	72.87	1	Thol basalt	dacite	43.81	15.23	14.13		6.86	5.63	0.51	1.02	0.86	0.10	0.25	10.29	5.82	-2.70	0.96	-0.41	-2.24	-4.89	0.43	-0.02	3.74	3.26	-0.12	-0.59	47.42	1.86	5	450	0.01		just below LC Cu-Zn mnln in Joubin flt z
56-27-VB?	2+00N	62.8	63.11	1	Thol Dacite	andesite	47.04	24.38	13.76		1.01	3.65	1.41	1.82	1.48	0.10	0.15	4.87	0.55	-3.42	1.60	0.72	-1.61	-9.44	-9.41	1.58	12.92	12.56	2.02	-2.03	69.32	4.69	150	920	0.16	norm c 17.6%	just below LC Cu-Zn mnln in Joubin flt z
56-49-FW	2+00N	65.85	66.16	1c	Thol Basalt	dacite	43.59	13.47	11.22		11.34	6.42	0.54	0.76	0.77	0.06	0.17	12.53	7.91	-1.88	0.67	-3.84	-2.15	0.14	2.44	-0.66	-4.54	-5.07	-4.86	-3.42	37.66	1.12	85	175	0.49		eastern Joubin Fault Zone, barren
65-94-FW	2+25N	122.56	122.87	1a	Thol Basalt	dacite	44.55	13.40	12.12		8.52	7.73	0.79	0.30	0.81	0.08	0.15	10.89	5.93	0.02	0.09	-2.34	-2.04	-2.64	2.51	0.36	-3.55	-4.01	-2.26	-0.55	46.32	1.43	75	155	0.48		just north of Joubin fault, poor mnln
60-76-FW	2+25N	55.18	55.49	1a,chl	Thol Andesite	andesite	43.25	21.36	18.13		1.61	4.63	0.71	1.26	1.27	0.06	0.21	5.33	0.48	-3.97	1.21	3.73	-1.83	-10.72	-6.33	0.96	4.74	4.48	5.66	0.23	71.26	5.34	275	255	1.08	norm c 16.1%	shallow hole, good NZ mineralization
61-91-FW	2+75N	152.44	152.74	1a/5a	Thol Basalt	dacite	44.04	12.08	10.98		12.65	4.94	0.88	0.54	0.71	0.06	0.19	12.86	9.30	-3.44	0.40	-3.95	-1.87	1.88	4.10	-1.88	-5.77	-6.23	-5.47	-4.76	28.83	0.89	85	120	0.71		just below sig LC mnln, Cu-Bx structure?
60-79-FW	2+75N	35.98	36.28	1a	Thol Andesite	andesite	53.19	18.90	15.90		0.52	3.40	0.59	0.84	1.13	0.04	0.21	4.34	0.23	-1.68	0.29	5.71	-3.17	-7.70	-3.78	1.18	3.33	2.85	7.55	4.37	79.23	8.06	105	155	0.68	norm c 16.3%	shallow hole, good NZ LC mineralization
64-82e-FW	3+00N	252.13	252.44	1a,sch	Kom Bas Komatiite	dacite	39.33	17.88	18.32		0.81	14.67	0.51	0.16	0.98	0.14	0.12	7.72	0.51	5.44	0.18	1.95	-1.29	-13.39	-2.50	4.11	0.92	0.74	5.71	7.48	91.80	10.18	335	100	3.35	norm c 17.0%	just below v. deep LC Cu mnln
65-72e-FW	3+50N	251.22	251.52	1a?	Thol Basalt	dacite	44.92	13.04	11.85		10.26	6.31	1.74	0.36	0.85	0.06	0.18	10.60	6.77	-1.44	0.15	-2.42	-1.00	-0.47	2.88	-1.11	-4.98	-5.20	-2.71	-1.74	35.74	1.04	70	80	0.88		deep hole, good Zn, no Cu assays
MIRON-02	3+50N	0	0.1	1p,chl	Thol Dacite	andesite	45.00	25.50	16.70		0.19	3.66	0.89	1.00	1.33	0.27	0.22	4.83	0.04	-4.17	0.82	2.93	-1.87	-11.21	-10.61	1.32			4.73	-0.35	81.27	9.41				norm c 23.8%	surface sample, just below sig LC NZ Cu
MIRON-01	4+00N	0	0.1	1p,chl	Thol Dacite	dacite	65.40	14.60	9.16		0.47	2.21	0.76	1.24	0.84	0.18	0.10	3.23	0.03	-0.06	0.18	3.10	-3.34	-4.26	-0.02	1.55			4.12	3.45	73.64	4.82				norm c 10.8%	surface sample, just below sig LC NZ Cu
66-108-FW	4+25N	235.37	235.67	1a	C-A Basalt	dacite	46.43	16.75	10.77		7.59	4.28	1.25	1.52	0.99	0.06	0.17	9.43	5.27	-3.12	1.38	-2.89	-1.78	-2.81	-1.32	-0.24	-5.71	-6.12	-3.36	-3.91	39.64	1.58	95	80	1.19		deep hole, just below sig LC mnln
68-46E-FWa	5+00N	175.87	176.17	1r	Thol basalt	dacite	43.68	13.00	12.27		8.26	6.79	0.38	0.52	0.75	0.06	0.15	12.41	4.48	-1.46	0.40	-2.68	-2.42	-3.45	3.07	0.19	-6.07	-6.61	-2.88	-2.34	45.82	1.50	120	30	4.00		just below LC, no sig mnln
56-44-FW	5+00N	77.13	77.44	1	Thol Basalt	dacite	43.12	14.09	11.08		9.66	7.37	0.75	0.62	0.51	0.06	0.15	12.13	7.05	-1.00	0.54	-4.30	-1.85	-2.02	1.75	-0.39	-7.17	-7.63	-4.83	-3.10	43.42	1.32	115	50	2.30		shallow hole, barren, much dike
						average	46.54	15.14	12.38	ERR	7.09	6.10	0.97	0.91	0.85	0.08	0.17	8.92	4.34	-1.26	0.70	-1.24	-1.94	-3.44	0.49	0.12	0.51	0.09	-1.03	-0.77	50.73	2.65	114	350	1.07		

TABLE 2 - LITHOGEOCHEMICAL SUMMARY

SAMPLE	LOCATION SECTION	FROM	TO	FIELD	CLASSIFICATIONS JENSEN	TITANIA	RAW DATA SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Na2O	K2O	TiO2	P2O5	MnO	LOI	CO2	RESIDUALS MGO	K2O	FE2O3	NA2O	CAO	SIO2	DISCRIMINANT FUNCTIONS M-D SC	DF2	DF3	DF4	DF5	TAAS	PERAL	Cu	Zn	Cu:Zn	CIPW NORM	COMMENTS
						maximum	65.40	25.50	18.32	ERR	12.65	14.67	2.03	1.82	1.48	0.27	0.25	13.11	9.30	5.44	1.60	5.71	-0.79	3.03	7.60	4.11	35.61	35.17	7.55	7.48	91.80	10.18	335	2100	5.00		
						minimum	39.33	8.14	7.47	ERR	0.19	2.21	0.13	0.16	0.42	0.04	0.07	3.23	0.03	-4.17	-0.04	-5.24	-3.94	-13.39	-10.61	-1.88	-8.09	-8.64	-6.67	-5.97	28.83	0.89	5	30	0.00		
						std. dev.	6.20	3.65	2.45	ERR	4.14	2.36	0.58	0.43	0.23	0.05	0.04	3.27	3.11	2.07	0.52	3.24	0.78	3.97	3.97	1.18	9.71	9.67	4.37	3.46	16.80	2.64	73	484	1.29		
						SHUNSBY "UPPER" CHERTS																															
NIRON-07	3+00N	0	0.1	6c	Kom bas komatiite	rhyolite	88.30	0.21	2.44		2.52	1.19	0.01	0.07	0.03	0.21	0.14	3.10	3.32	0.32	-2.04	2.10	-1.48	0.43	12.04	1.17			2.69	4.78	33.17	0.09				norm q 87.7%	massive chert
NIRON-08	1+00S	0	0.1	6a	Kom Bas komatiite	rhyolite	81.50	0.20	5.41		4.25	1.75	0.01	0.07	0.03	0.26	0.21	4.81	5.40	1.03	-1.77	3.82	-2.77	2.08	13.43	0.28			4.25	7.47	30.02	0.05				norm q 76.7%	chert breccia
SH-WR-12	1+00S	0	0.1	1a?,ser	Thol basalt	dacite	43.59	14.03	11.89		9.95	5.25	1.59	0.62	0.65	0.04	0.18	11.05	8.05	-3.24	0.51	-3.10	-0.96	-1.46	1.81	-1.68	-5.94	-6.17	-3.64	-4.10	33.72	1.14	110	55	2.00		altered mafic? flow in 2a package

CUNNINGHAM TOWNSHIP BASALTS

OGS SAMPLE	CLASSIFICATIONS JENSEN	TITANIA	RAW DATA SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Na2O	K2O	TiO2	P2O5	MnO	LOI	CO2	RESIDUALS MGO	K2O	FE2O3	NA2O	CAO	SIO2	M-D Sc	DISCRIMINANT FUNCTIONS DF4	DF5	TAAS	PERAL	CIPW NORM
1	Thol basalt	dacite	44.30	16.20	2.00	10.80	8.55	9.30	1.48	0.38	1.02	0.07	0.22	4.44	0.22	1.59	0.18	-0.29	-1.12	-2.53	-0.64	0.5	0.65	3.43	49.11	1.53	
2	Thol basalt	dacite	50.10	15.10	1.76	8.77	8.80	6.41	2.66	0.32	0.91	0.06	0.20	2.78	0.48	0.56	-0.13	-0.32	-0.63	0.05	0.4	-0.86	0.13	2.34	37.01	1.19	
3	Thol basalt	dacite	47.00	15.20	2.10	9.34	9.90	7.74	2.22	0.24	0.90	0.07	0.20	3.03	0.16	0.92	-0.08	-0.65	-0.72	0.02	0.37	-0.68	-0.22	2.34	39.71	1.18	
4	Thol basalt	dacite	50.70	15.60	1.95	8.65	6.89	6.82	3.59	0.28	0.96	0.08	0.18	3.19	0.28	1.18	-0.2	0.01	0.27	-1.73	-0.14	-0.69	1.15	3	40.39	1.25	
5	Thol basalt	dacite	46.40	15.40	1.40	10.60	8.98	7.96	2.57	0.17	0.93	0.07	0.21	3.51	0.54	0.94	-0.13	-0.19	-0.28	-1.19	0.18	-0.67	0.64	2.78	41.34	1.22	
6	Thol basalt	dacite	44.30	15.60	3.00	9.50	12.90	6.95	1.29	0.05	0.93	0.07	0.22	3.07	0.56	-0.90	-0.17	-0.76	-1.31	2.08	0	-1.36	-1.14	0.45	33.02	1.12	
7	C-A basalt	dacite	47.30	15.30	1.65	8.69	12.90	5.55	2.22	0.09	0.97	0.07	0.19	2.66	0.68	-1.28	-0.26	-1.75	-0.76	3.31	0.26	-1.88	-2.46	-0.89	27.16	0.99	
8	Thol basalt	dacite	44.00	15.20	0.80	10.50	9.77	8.49	1.09	0.05	1.02	0.08	0.20	5.35	3.26	0.63	-0.16	-2.12	-1.53	-1.41	0.43	0.39	-1.98	0.94	44.01	1.42	
9	Thol basalt	dacite	50.10	12.40	0.56	7.81	11.80	5.42	1.62	0.01	0.69	0.06	0.16	3.88	5.48	-0.50	-0.48	-2.82	-1.81	3.37	3.4	-1.44	-3.87	-0.98	28.8	0.92	
10	Thol basalt	dacite	49.90	14.90	0.10	10.50	8.32	6.54	3.59	0.01	0.98	0.08	0.21	3.25	0.94	0.63	-0.45	-0.12	0.36	-0.52	0.62	-1.2	0.73	2.67	35.46	1.11	
11	Thol basalt	dacite	47.40	15.70	1.60	11.10	9.88	7.27	1.75	0.07	1.01	0.07	0.22	3.14	0.14	0.56	-0.28	1.05	-1.26	0.16	-0.15	-0.63	1.58	3.43	38.7	1.32	
12	Thol basalt	dacite	47.00	15.00	0.90	12.20	10.20	7.23	2.20	0.01	0.92	0.07	0.23	3.12	0.46	0.37	-0.32	1.41	-0.74	0.34	0.58	-1.23	2.08	3.59	36.85	1.16	
13	Thol basalt	dacite	49.00	14.40	0.90	11.30	10.20	6.71	2.53	0.01	0.85	0.08	0.23	2.49	0.42	0.51	-0.4	1.26	-0.64	1.1	1.15	-1.5	1.81	3.73	34.54	1.07	
14	Thol basalt	dacite	47.80	14.70	1.00	11.20	10.50	6.61	2.21	0.08	0.87	0.06	0.22	2.85	0.92	0.01	-0.29	0.72	-0.84	0.97	0.89	-1.42	1.07	2.62	34.48	1.11	
15	Thol basalt	dacite	44.90	13.90	0.01	12.20	9.53	6.78	1.82	0.01	0.86	0.07	0.22	5.16	5.24	-0.90	-0.24	-0.49	-0.88	-1.29	1.88	-1.07	-0.16	0.73	37.43	1.19	
16	Thol basalt	dacite	49.50	14.50	1.70	10.40	11.00	6.90	1.09	0.01	0.86	0.08	0.21	2.90	0.52	0.87	-0.42	1.26	-2.2	2.12	1.04	-0.75	1.32	3.88	36.37	1.23	
17	Thol basalt	dacite	50.10	14.50	0.90	11.20	8.90	7.52	1.59	0.01	0.89	0.08	0.18	3.40	0.20	1.71	-0.45	1.61	-1.75	0.15	1.03	-0.26	2.31	4.64	41.78	1.35	
18	Thol basalt	dacite	48.10	15.50	0.70	10.60	10.20	6.19	2.85	0.08	0.84	0.07	0.22	2.62	1.36	-0.33	-0.3	-0.16	-0.2	0.77	0.03	-1.72	0.15	1.66	32.43	1.1	
19	Thol high Fe bas.	andesite	46.80	15.70	1.40	11.40	11.10	4.52	0.94	0.08	1.15	0.10	0.29	3.66	1.96	-2.58	-0.24	0.95	-2.07	1.22	-0.15	-1.24	0.55	1	27.68	1.34	
20	Thol high Fe bas.	andesite	45.40	15.30	1.50	13.80	8.96	3.53	2.95	0.05	1.17	0.09	0.29	2.77	2.96	-4.18	-0.22	3.27	0.28	-1.65	0.31	-2.7	4.09	0.81	23.08	1.17	
21	Thol basalt	dacite	46.20	16.20	0.80	11.20	9.36	8.01	2.45	0.48	0.90	0.07	0.23	2.96	0.30	0.91	0.2	-0.21	-0.37	-0.86	-0.65	-0.71	0.54	3	41.82	1.24	
22	Thol basalt	dacite	46.20	16.30	2.30	10.50	11.50	7.14	2.38	0.13	0.88	0.07	0.22	2.46	0.38	0.00	-0.16	0.55	-0.43	1.35	-0.75	-1.63	0.9	2.44	34.35	1.12	
23	Thol basalt	dacite	45.70	15.30	1.70	9.82	7.81	7.02	2.66	0.07	0.85	0.06	0.21	5.24	4.88	-0.32	-0.21	-1.15	-0.08	-2.82	0.3	-0.82	-0.39	0.82	40.39	1.33	
24	Thol basalt	dacite	47.20	15.00	1.30	10.10	8.88	8.62	2.20	0.19	0.84	0.06	0.20	3.56	1.40	1.92	-0.14	-0.52	-0.77	-0.97	0.58	-0.23	0.26	3.5	44.27	1.26	
25	Thol basalt	dacite	47.70	15.30	2.00	9.10	11.00	7.71	2.52	0.01	0.83	0.06	0.20	2.37	0.56	1.12	-0.35	-0.71	-0.5	1.44	0.25	-1.17	-0.44	2.56	36.36	1.08	
26	Thol basalt	dacite	47.60	14.10	2.20	9.90	10.40	7.20	1.89	0.01	0.83	0.07	0.19	3.47	2.48	0.57	-0.35	0.38	-1.16	0.79	1.53	-1.05	0.71	2.56	36.98	1.12	
27	C-A basalt	dacite	50.60	14.70	1.30	9.26	8.43	4.27	3.72	0.07	0.82	0.05	0.27	3.11	3.44	-1.55	-0.43	-0.02	0.43	-0.15	0.82	-2.29	0.43	1.35	26.3	1.06	
28	Thol high Fe bas.	dacite	48.20	14.00	2.40	11.70	9.56	4.52	2.14	0.26	1.04	0.08	0.26	3.34	2.58	-2.07	-0.11	2.99	-0.97	0.14	1.63	-1.94	3.51	2.63	29.03	1.12	
29	Thol high Fe bas.	dacite	46.30	14.30	3.10	12.20	10.70	5.48	1.39	0.01	1.13	0.10	0.22	2.97	0.64	-1.71	-0.29	3.43	-1.51	0.59	1.34	-1.56	3.89	2.58	31.23	1.19	
30	Thol high Fe bas.	dacite	47.70	14.60	2.30	12.60	8.71	4.24	2.65	0.21	1.09	0.09	0.25	2.77	1.44	-2.54	-0.14	3.71	-0.36	-0.96	1	-2.19	4.62	2.35	28.14	1.17	
31	Thol basalt	dacite	45.40	16.60	2.40	10.40	8.44	7.21	2.35	0.20	0.92	0.06	0.25	4.19	1.64	-0.22	-0.06	0.19	-0.37	-2.17	-1.08	-0.8	1.03	2.4	40.7	1.41	
32	Thol basalt	dacite	49.50	14.80	1.60	9.34	9.70	8.40	2.86	0.34	0.73	0.05	0.21	1.62	0.18	2.40	-0.08	-0.07	-0.35	0.76	0.72	-0.89	0.69	4.6	41.03	1.07	
33	Thol basalt	dacite	49.50	14.70	1.50	9.50	11.40	8.39	1.45	0.13	0.70	0.06	0.20	1.76	0.18	2.39	-0.3	0.01	-1.79	2.5	0.82	-0.59	0.13	4.51	39.84	1.14	
34	Thol basalt	dacite	48.80	14.80	1.20	9.82	9.82	8.50	2.41	0.27	0.72	0.06	0.20	2.01	0.12	2.30	-0.12	-0.22	-0.74	0.62	0.74	-0.69	0.42	4.22	41.79	1.12	
35	Thol basalt	dacite	47.30	15.40	1.70	11.00	9.36	6.62	3.21	0.01	0.94	0.07	0.21	2.75	0.36	-0.15	-0.33	0.99	0.28	-0.42	0.16	-1.67	1.87	2.49	34.53	1.12	
36	Thol basalt	dacite	49.30	16.30	1.60	9.98	9.20	6.33	2.85	0.03	0.97	0.08	0.19	2.55	0.28	0.22	-0.39	0.58	-0.34	0.17	-0.82	-1.19	1.19	2.44	34.56	1.25	
37	Thol basalt	dacite	47.00	14.90	2.40	9.58	12.30	5.82	1.47	0.10	0.88	0.07	0.22	2.46	0.96	-1.11	-0.22	-0.06	-1.52	2.56	0.69	-1.64	-0.48	0.84	30.08	1.09	
38	Thol basalt	dacite	47.40	15.10	2.00	10.90	9.78	6.69	3.10	0.16	0.91	0.08	0.22	2.34	0.40	-0.05	-0.18	1.23	0.15	0.05	0.47	-1.76	2.06	2.9	34.72	1.06	
39	Thol basalt	dacite	46.20	14.00	0.80	10.10	7.87	7.51	2.09	0.06	0.89	0.07	0.18	5.05	5.00	0.42	-0.25	-1.58	-0.79	-2.57	1.75	-0.17	-1	0.91	43.19	1.31	
40	C-A basalt	dacite	46.80	16.10	0.85	8.69	9.06	4.26	2.86	0.65	0.97	0.07	0.19	3.79	5.12	-2.95	0.38	-2.96	-0.02	-0.99	-0.59	-1.63	-3.27	-3.47	29.19	1.18	
41	Thol basalt	dacite	47.40	15.40	2.86	8.86	10.30	5.01	1.86	0.15	0.91	0.08	0.22	3.14	1.96	-1.86	-0.2	-0.24	-1.18	0.62	0.16	-1.54	-0.42	0.04	29.77	1.22	

TABLE 2 - LITHOGEOCHEMICAL SUMMARY

	LOCATION				CLASSIFICATIONS				RAW	DATA												RESIDUALS				DISCRIMINANT	FUNCTIONS										
SAMPLE	SECTION	FROM	TO	FIELD	JENSEN	TITANIA	SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Na2O	K2O	TiO2	P2O5	MnO	LOI	CO2	MGO	K2O	FE2O3	NA2O	CAO	SIO2	M-D SC	DF2	DF3	DF4	DF5	TAAS	PERAL	Cu	Zn	Cu:Zn	CIPW NORM	COMMENTS
42					Thol high Fe bas.	dacite	47.80	14.50	2.80	9.02	11.80	4.34	0.48	0.18	1.09	0.09	0.24	3.84	3.24	-2.45	-0.19	0.07	-2.74	2.41	1.13	-1.1			-0.84	-0.1	26.88	1.24					
43					Thol basalt	dacite	48.70	14.50	2.30	10.10	8.75	7.29	1.71	0.22	1.11	0.09	0.22	3.41	0.38	1.03	-0.18	1.2	-1.48	-0.53	1.08	-0.08			1.89	4.08	41.78	1.32					
44					Thol dacite	dacite	54.60	16.20	1.18	7.41	5.90	2.87	2.47	1.17	1.11	0.05	0.21	3.59	3.14	-1.85	0.59	-0.65	-1.27	-1.48	-0.96	-0.43			-0.58	-0.01	32.58	1.52					
45					Thol basalt	dacite	46.80	14.20	1.08	8.21	9.32	5.84	1.51	1.04	0.92	0.08	0.18	4.23	7.08	-1.23	0.82	-3.34	-1.54	-0.71	1.53	-0.38			-3.86	-2.04	38.87	1.18					
46					C-A basalt	dacite	52.20	16.40	1.63	7.16	6.42	5.05	3.03	0.58	1.00	0.07	0.20	3.73	2.30	-0.21	0.06	-1.46	-0.47	-1.72	-1.06	-0.39			-1.02	0.81	37.35	1.43					
47					C-A basalt	dacite	44.40	15.20	2.10	10.40	10.40	5.94	1.96	0.03	1.02	0.07	0.25	3.94	2.76	-1.99	-0.2	-0.62	-0.64	-0.54	0.43	-1.39			-0.57	-0.14	32.55	1.19					
48					Thol basalt	dacite	46.20	16.20	2.50	9.58	9.56	6.50	1.92	0.22	1.04	0.09	0.22	3.88	1.20	-0.68	-0.07	-0.31	-0.94	-0.66	-0.67	-0.74			-0.03	1.07	36.9	1.34					
49					Thol basalt	dacite	50.40	14.90	1.60	10.10	6.79	7.64	3.90	0.09	1.03	0.09	0.22	2.88	0.24	1.92	-0.38	1.18	0.62	-1.92	0.59	-0.7			2.78	5.12	41.96	1.17					
50					C-A basalt	dacite	54.00	14.50	1.89	7.57	7.77	5.06	4.85	0.50	0.82	0.07	0.24	2.45	0.48	0.32	-0.11	0.05	1.28	0.32	0.86	-2.15			0.96	3.06	30.55	0.93					
51					Thol basalt	dacite	51.60	14.80	2.01	7.73	9.27	6.26	4.38	0.31	0.80	0.07	0.22	2.02	0.40	0.86	-0.2	-0.62	1	1.06	0.75	-1.98			0.07	2.8	32.5	0.92					
52					Thol basalt	dacite	45.90	16.50	2.40	10.10	10.10	7.51	2.23	0.16	0.91	0.07	0.24	3.05	0.36	0.28	-0.11	0.06	-0.55	-0.2	-0.96	-0.98			0.59	2.63	38.35	1.27					
53					Thol basalt	dacite	46.60	16.10	2.69	8.29	11.60	7.67	1.63	0.11	0.80	0.07	0.21	2.64	0.16	0.70	-0.2	-1.42	-1.28	1.64	-0.56	-0.83			-1.58	1.69	37.03	1.21					
54					Thol basalt	dacite	47.60	15.10	2.29	8.29	11.60	5.93	1.72	0.09	0.81	0.06	0.22	2.71	1.86	-0.79	-0.26	-1.43	-1.34	2.08	0.48	-1.43			-1.93	0.25	31.14	1.12					
55					Thol basalt	dacite	48.00	14.70	2.25	8.69	11.90	6.19	1.87	0.23	0.80	0.07	0.21	2.46	1.70	-0.37	-0.14	-0.8	-1.22	2.53	0.88	-1.56			-1.16	1.04	31.78	1.04					
56					Thol basalt	dacite	48.30	13.70	2.20	12.90	8.10	6.78	2.35	0.17	1.03	0.09	0.24	3.24	0.22	0.35	-0.21	4.16	0.75	-1.35	1.91	-1.13			5.62	5.66	39.94	1.2					
57					Thol basalt	dacite	45.80	15.50	1.10	9.31	9.46	5.82	3.21	0.08	0.97	0.05	0.32	3.74	4.12	-1.59	-0.2	-2.37	0.5	-0.95	0.08	-1.59			-2.22	0.2	31.77	1.11					
58					Thol basalt	dacite	48.40	14.60	5.00	7.56	10.70	7.71	2.49	0.49	0.90	0.05	0.22	1.44	0.48	1.33	0.12	0.91	-0.6	1.37	0.95	-1.15			1.51	4.1	38.33	1.02					
59					Kom bas komatiite	dacite	44.60	14.60	1.90	12.00	8.27	11.80	1.54	0.34	0.94	0.04	0.25	4.07	0.44	4.27	0.12	1.13	-1.08	-2.64	1.04	1.01			2.81	7.71	55.31	1.4					
61					C-A andesite	dacite	57.60	16.60	2.89	4.40	7.55	3.34	1.20	3.07	0.92	0.08	0.15	1.77	0.44	-0.50	2.37	-1.14	-2.67	1.19	-1.48	0.15			-1.72	0.22	42.3	1.36					
62					Thol andesite	basalt	55.80	15.50	3.90	7.56	2.13	4.52	5.50	0.14	1.60	0.30	0.15	2.80	0.48	0.24	-0.56	2.82	1.82	-4.93	-0.26	-0.4			5.24	3.67	37.9	1.39					
63					Thol basalt	dacite	53.00	14.30	1.37	8.31	11.60	6.33	1.51	0.57	0.80	0.09	0.19	1.05	0.42	1.33	0.01	-0.04	-2.06	3.9	1.1	-0.87			-0.4	3.25	34.46	1.05					
64					Thol basalt	dacite	44.50	17.80	2.13	10.70	10.50	7.90	1.38	0.43	1.05	0.09	0.22	3.02	0.34	0.17	0.23	-0.18	-1.23	-0.37	-1.77	-0.33			0.15	2.03	41.24	1.41					
65					C-A basalt	dacite	51.20	17.00	2.17	8.23	8.93	5.57	2.13	0.71	1.07	0.15	0.16	1.22	0.24	0.02	0.23	-0.04	-1.28	0.58	-1.6	-0.52			0.12	1.37	36.2	1.37					
66					C-A basalt	dacite	57.00	16.20	1.33	7.65	5.91	3.37	2.64	1.44	0.94	0.21	0.21	1.71	0.26	-0.63	0.74	0.72	-1.19	-0.67	-1.05	-0.61			1.14	2.26	36.04	1.44					
171					Thol basalt	dacite	48.80	15.80	1.34	9.34	8.15	8.05	2.86	0.16	0.83	0.07	0.22	3.07	0.50	1.85	-0.24	-0.65	-0.28	-1.11	-0.29	-0.44			0.24	3.7	42.74	1.29					
172					C-A basalt	dacite	59.00	15.00	1.79	4.78	8.44	4.16	3.39	0.04	0.80	0.10	0.14	1.35	0.42	0.66	-0.79	-1.32	-0.49	2.49	0.07	-1.16			-1.41	1.27	26.2	1.13					
						average	48.46	15.20	1.79	9.71	9.46	6.46	2.34	0.27	0.93	0.08	0.21	3.05	1.41	0.01	-0.11	0.06	-0.73	0.07	0.34	-1.01			0.45	2.14	36.12	1.20					
						maximum	59.00	17.80	5.00	13.80	12.90	11.80	5.50	3.07	1.60	0.30	0.32	5.35	7.08	4.27	2.37	4.16	1.82	3.90	3.40	1.01			5.62	7.71	55.31	1.53					
						minimum	44.00	12.40	0.01	4.40	2.13	2.87	0.48	0.01	0.69	0.04	0.14	1.05	0.12	-4.18	-0.79	-3.34	-2.74	-4.93	-1.77	-2.70			-3.87	-3.47	23.00	0.92					
						std. dev.	3.19	0.88	0.82	1.71	1.79	1.59	0.91	0.44	0.14	0.04	0.03	0.92	1.62	1.46	0.41	1.49	0.88	1.67	0.93	0.68			1.90	1.84	5.01	0.14					

Lithogeochemical Processed Data

	RMg0	RK_20	RFe_20_3	RNa_20	RCa0	$RSi0_2$
Cunningham Twp. Basalts	.01	-0.11	0.06	-0.73	0.07	0.34
Shunsby Hangingwall "FW Diorites"	-1.26	0.70	-1.24	-1.94	-3.44	0.49
Shunsby Variolitic Basalts	-1.03	0.60	0.26	-2.31	-4.58	-1.26
Shunsby Footwall Pyroclastics	-1.46	1.08	3.37	-2.42	-4.24	1.22
Shunsby "Digestive Diorite" Intrusives	0.89	0.39	-1.58	-1.71	-3.30	1.28

	M-D Sc.	DF_5	TAAS	Peral	Cu	Zn	Cu-Zn
Cunningham Twp. Basalts	-1.01	2.14	36.12	1.20	-	-	(-)
Shunsby Hangingwall "FW Diorites"	0.12	-0.77	50.73	2.65	114	350	(1.07)
Shunsby Variolitic Basalts	0.67	0.96	55.70	3.68	127	288	(1.07)
Shunsby Footwall Pyroclastics	0.31	6.71	61.56	4.10	32	72	(0.56)
Shunsby "Digestive Diorite" Intrusives	0.52	1.48	52.01	1.85	102	184	1.58

Note: RMg0 etc. denotes residual oxide values expressed as ratios to silica, or silica to alumina
M-D Sc. denotes Marcotte-David Score ($Ti0_2$, $-Na_20$, Mg0, -Ca0, $-Fe_T$)
DF_5 denotes discriminant function 5 (residual Mg0, Fe_T, Mn0)
TAAS denotes $(Mg0+K_20)/(Ca0 + Na_20 + K_20 + Mg0) \times 100$ ie. influx of Mg, K at expense of alkalis
Peral denotes $[Al_20_3/ (Ca0 + K_20 + Na_20) \times 100]$ ie alumina enrichment at expense of alkalis.
(See Appendix 2 for details)

While the pyroclastics have been insufficiently sampled thus far to reliably discern any trends and the intrusive dikes are still somewhat of an unknown, a general comparison of the basic groups is possible.

Raw chemistry suggests that:

1) the Shunsby rocks are strongly depleted in Na_20 and Ca0 with the "FW diorites" more so
2) the Shunsby rocks are strongly enriched in K_20 with the "Variolitic Basalts" more so
3) the Shunsby rocks are strongly enriched in volatiles on the basis of high LOI and $C0_2$ values, with the "FW diorites" significantly higher in both

4) the Shunsby "Variolitic Basalts" appear to be enriched in alumina and magnesium-depleted with respect to the other groups

In terms of the lithogeochemical processing one can discern:

1) moderate residual $Mg0$ depletion at Shunsby
2) moderate residual K_20 enrichment at Shunsby
3) moderate to strong residual Fe_20_3 depletion amongst the "FW diorites" at Shunsby
4) strong residual Na_20 depletion at Shunsby
5) very strong residual $Ca0$ depletion at Shunsby (strongest in "Variolitic Basalt")
6) slight residual $Si0_2$ enrichment in "FW diorites", depletion in "Variolitic Basalts"
7) anomalous average discriminant function scores at Shunsby including:

    a) M-D Sc of 0.67 for "Variolitic Basalts"
    b) TAAS values for both Shunsby basaltic groups (especially "Variolitic Basalt")
    c) Peral values for both Shunsby basaltic groups (especially "Variolitic Basalt")
    d) markedly lower DF_5 values (especially "FW diorites")

Together the above observations suggest that the Shunsby rocks have been significantly hydrothermally altered relative to the background Cunningham Township rocks. Whereas samples last year were principally taken structurally just below mineralization, sampling this year was done representatively through the "Variolitic Basalt" and as far into the "FW diorites" as possible. In several cases sampling through the "Variolitic Basalt" has yielded results suggesting that alteration and mineralization are increasing as one approaches the "Lower" chert contact. With this methodology in mind it is important to note that alteration trends are as prevalent, and in some cases more so, in the hangingwall "FW diorites" relative to the "Variolitic Basalts". It is believed that comprehensive sampling through the "FW diorites" may well yield similar, more intensive alteration patterns as one approaches the uppermost chert-argillite package marked by conductors 42a (12) and 40b (1d).

As has been expressed earlier, mineralization and alteration are felt to be primarily controlled by subvertical 120^0 structural zones. Plots of contoured lithogeochemical data as well as base metal values have therefore been prepared as plans, with all data points projected to surface. No directional bias was forced on the contouring program.

Figure 5a presents contoured Cu:Zn data for all assayed drillhole (projected to surface) and surface samples, excluding the lithogeochemical samples. This plot, interestingly, confirms the mapped 120° trends, and as well suggests (albeit partly on the basis of float) that a more northerly copper-bearing structure is present north of the Main Zone. As well, copper:zinc ratios can be seen increasing eastwardly, suggesting that increasing primary precipitation occurred in this direction. This figure also emphasizes the "copper core" aspect to the Main Zone mineralization with peripheral, more Zn (+/-Pb)-rich

MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : ASSKIRK
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP1a

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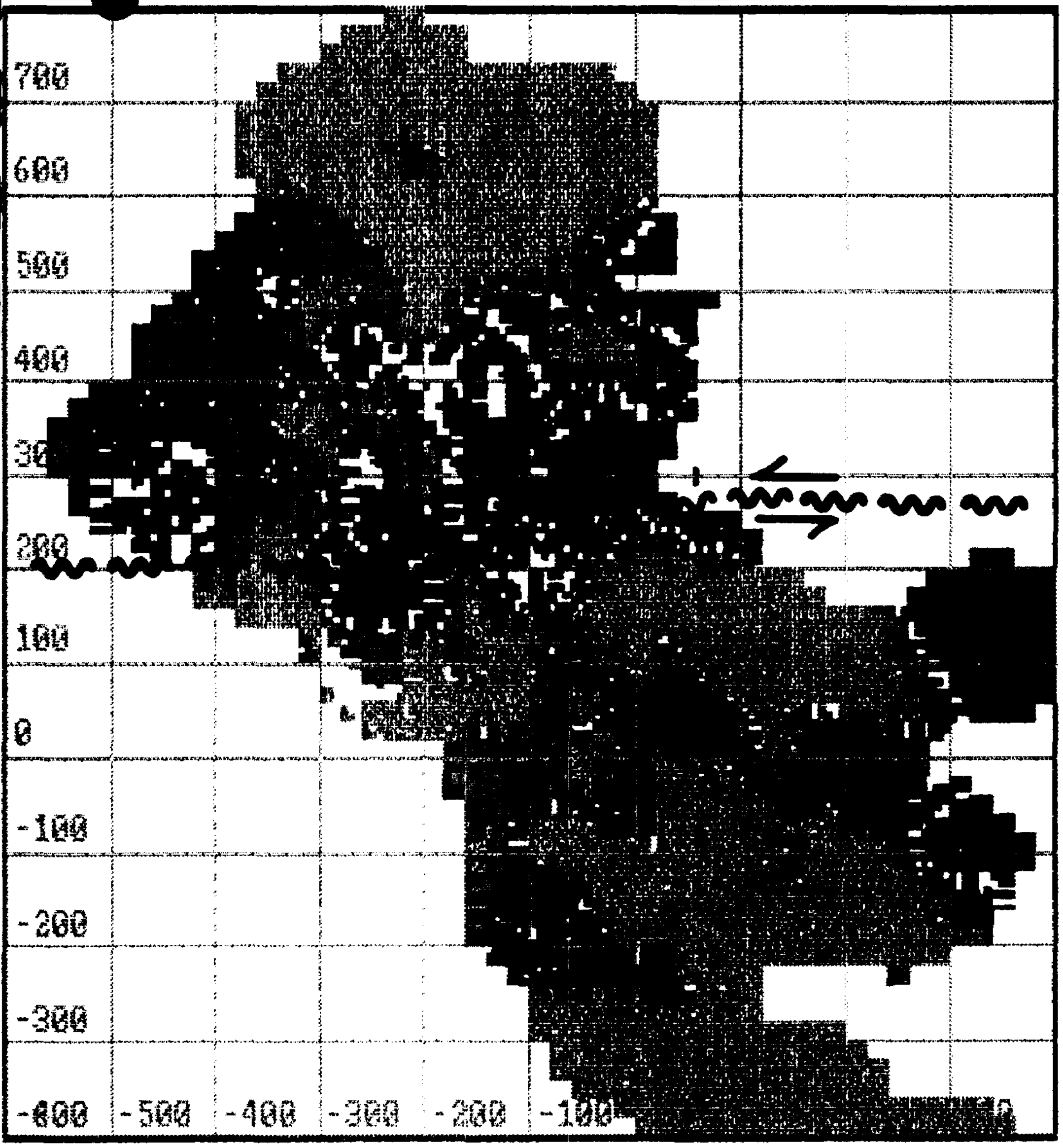
CONTOUR DISPLAY Figure 5a - Cu:Zn Assay Ratios



X-AXIS easting
Y-AXIS northing
CONTOURS CU:ZN

GX;GY 20.00, 20.00
RX;RY 100.00, 100.00
Sx;Pow 0.0, 4.0

CU:ZN Color 1
CONTOUR COLOR CODE

Color	Min	Max
	0	.24
	.25	.49
	.50	.74
	.75	.99
	1.00	1.49
	1.50	1.99
	2.0	3.99
	4.00	100

mineralization to the south in the South Zone and to the north as exposed in the stripping along line 625N. A prominent east-west trend in the L0-L1S area is likely reflecting the shear zone and associated drag-folding mapped here.

Figure 5b presents contoured TAAS values from the 78 non-chert lithogeochemical samples, which approximate chlorite and sericite development along with alkali depletion. The highest values are found adjacent to structurally-controlled mineralization and argillites in accord with the known chloritic association. A discrete zone of high values is found in the South Zone including samples in holes 66-61E, 66-62E, 68-20 and 56-64 with additional anomalous values to the northwest in sample 68-01-VB. Interestingly, a spot high to the southwest of the South Zone has shown up in sample 57-69-FW. The Main Zone "Lower" cherts contain a discrete anomalous zone represented by samples 56-37-VB?, 56-27-VB?, 60-76-FW, 60-79-FW, SH-WR-07(VB), Miron-02 (FW), Miron-01 (FW) and SH-WR-14(VB). In the "Upper" cherts of the Main Zone, a subtle spot high is seen near the Cu Breccia showing in sample 61-91-VB2, along with a pronounced high to the west in hole 64-82E, as well as in sericitic felsic tuff- breccia sample SH-WR-01 to the northwest. To the north, samples SH-WR-05 and 06, in a mapped chlorite alteration zone, sample SH-WR-18 of highly altered "Digestive Diorite" and variolitic sample SH-WR-08 at the baseline form spot TAAS anomalies.

Figure 5c presents MacGeehan and Hodgson's (1981) peraluminosity index which approximates alumina development at the expense of the alkalis. While normally a gold indicator, it is a useful discriminant function here as the Shunsby alteration shows marked similarities to that at the Mattabi area, where andalusite is a prominent alteration mineral (although no andalusite has been observed here). This diagram perhaps best illustrates the pronounced NW-SE trend with the South and Main Zones clearly outlined. Anomalous samples not previously mentioned include those in the variolitic basalt of hole 108 and in hole 68-13 at 100N/100E which suggests a mapped structure here showing similar chemical alteration.

Figure 5d is of Marcotte-David scores which ranks scores of greater than 1.5 as 80% probably mineralized and scores between 0.5 and 1.5 as being in the overlap of mineralized and unmineralized populations. High M-D scores include unmineralized, but highly altered, samples SH-WR-01 at the west end of L500N, 56-37-VB? at 175N/025W and many anomalous samples previously mentioned. The plot again suggests a NW-SE orientation to the anomalous values.

Figure 5e presents contoured CO_2 data which have been observed to diminish to practically zero from a high property background in the most altered samples. This figure clearly shows relative lows in the vicinity of the South Zone (57-64-VB, 66-62E-VB1, VB, VB3, 68-01-VB, 68-20-VB, FW), a separate zone to the south west (SH-WR-10, 57-69-FW), the hole 64-82e and L500N/500W areas (SH-WR-01), the immediate Copper Knob-Main Zone "Lower" chert area (60-76-FW, 60-79-FW, SH-WR-07, Miron-06 (VB),

MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP2

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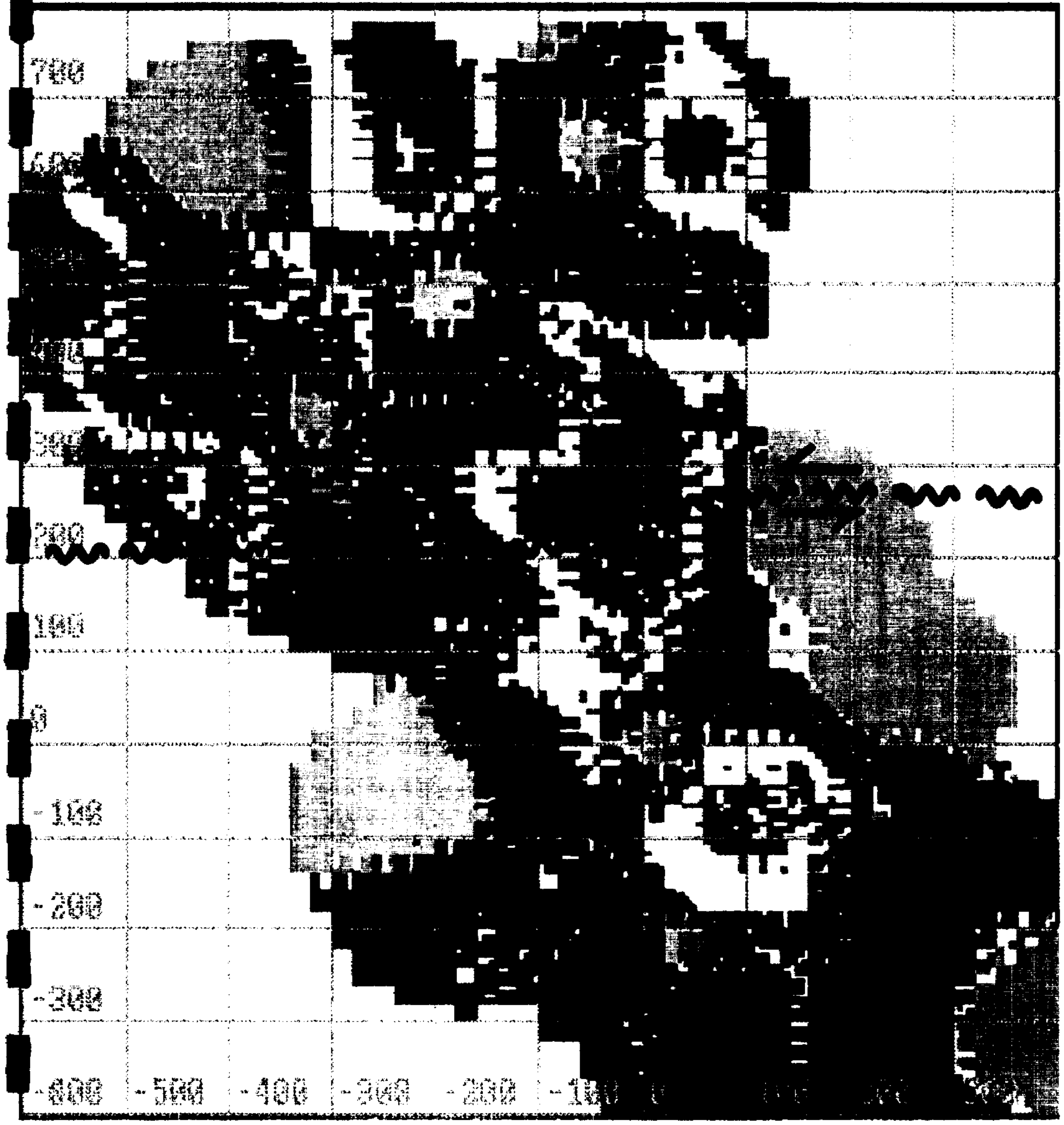
CONTOUR DISPLAY Figure 5b - Total Alkali Alteration Scores (TAAS)



X-AXIS easting
Y-AXIS northing
CONTOURS taas

GX;GY 20.00, 20.00
RX;RY 150.00, 150.00
Sk;Pow 0.0, 4.0

taas Color 2
CONTOUR COLOR CODE

Color	Min	Max
	0	24
	25	39
	40	49
	50	59
	60	69
	70	79
	80	89
	90	100

MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP3

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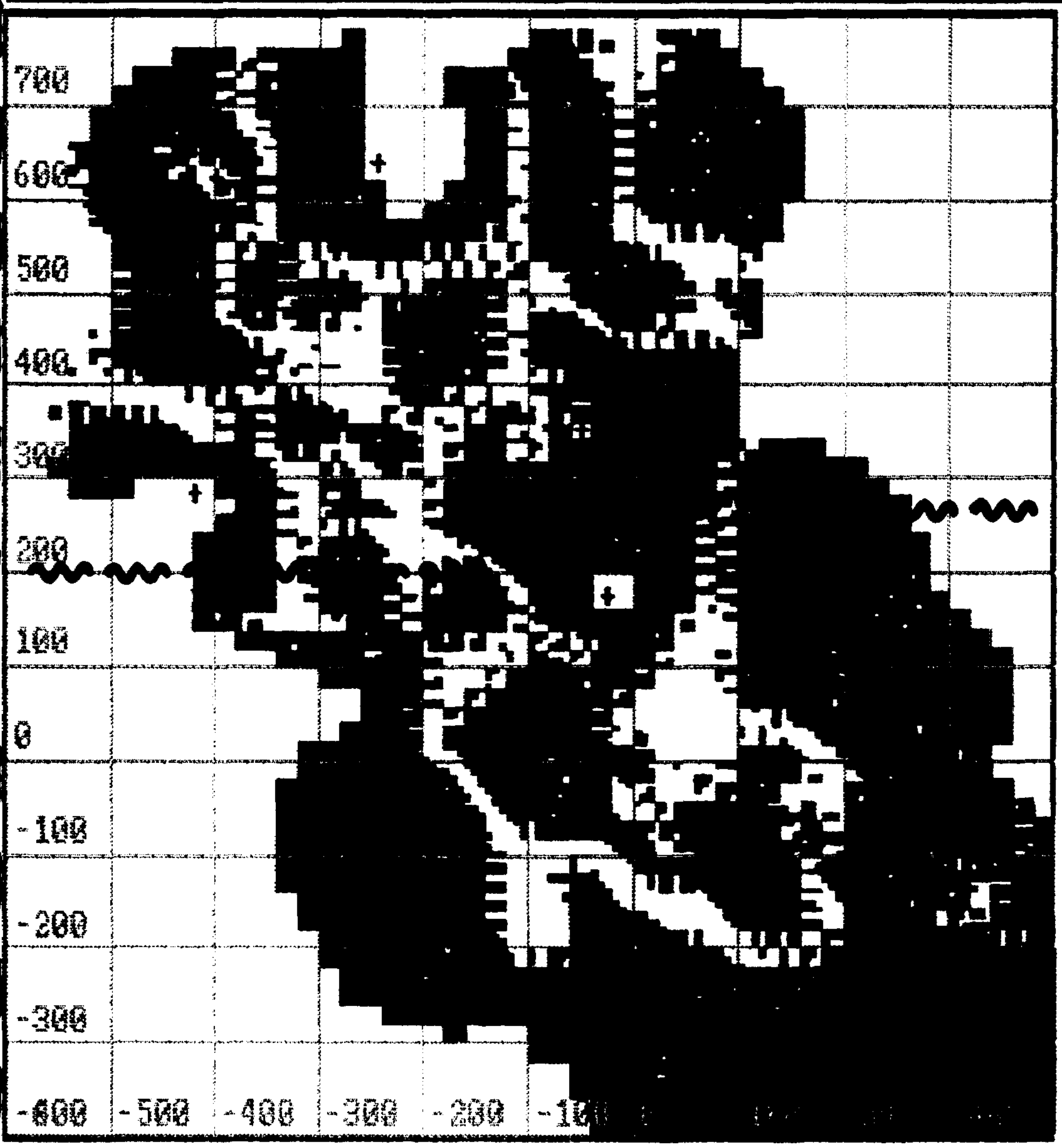
CONTOUR DISPLAY Figure 5c - Peraluminosity Index



X-AXIS easting
Y-AXIS northing
CONTOURS peral

GX,GY 20.00, 20.00
RX,RY 150.00, 150.00
Sk;Pow 0.0, 4.0

peral Color 6
CONTOUR COLOR CODE

Color	Min	Max
▩	0	.5
■	.51	1.00
■	1.01	1.50
■	1.51	2.00
□	2.01	3.00
■	3.01	4.00
■	4.01	8.00
■	8.01	100

MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP4

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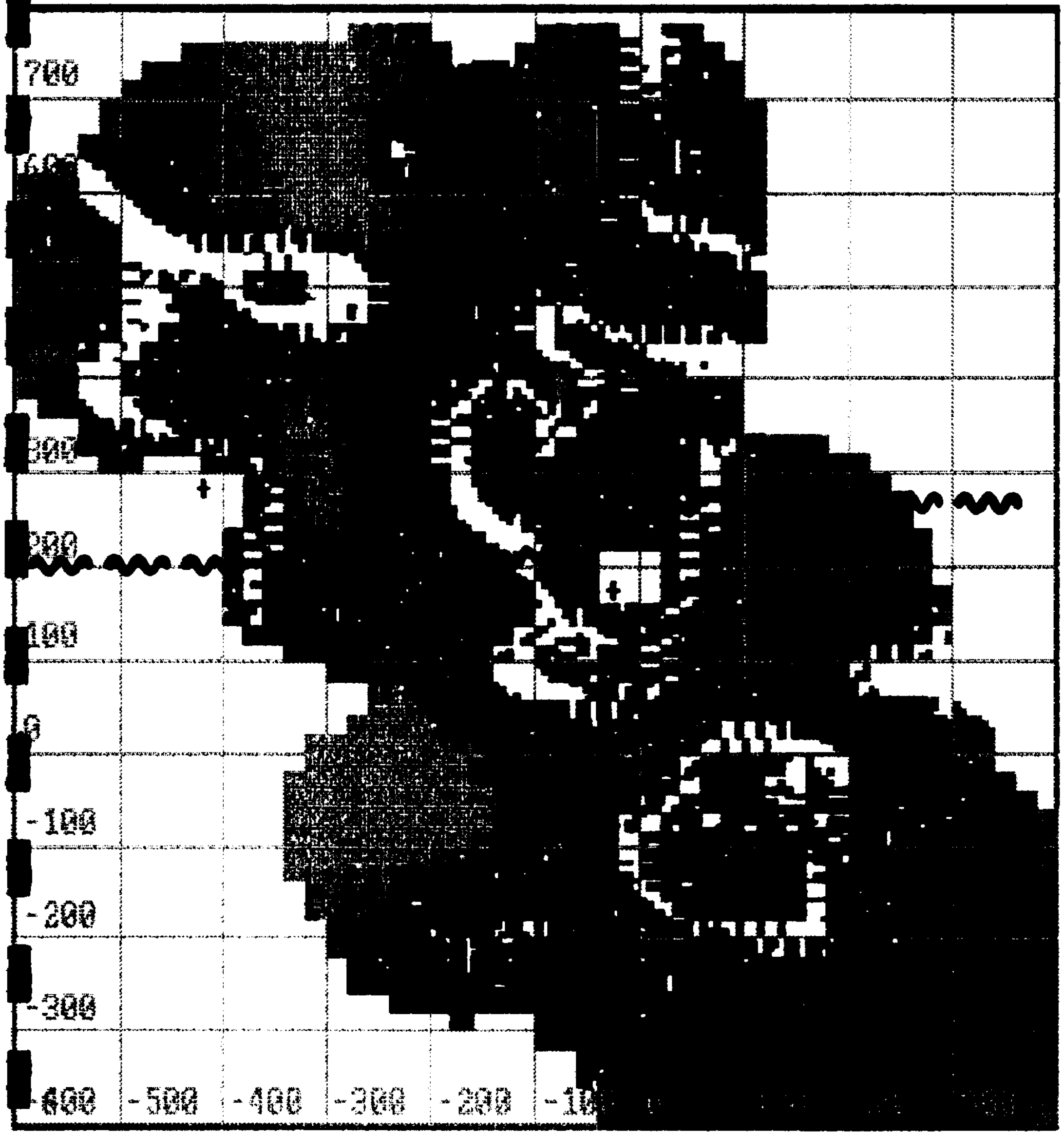
CONTOUR DISPLAY Figure 5d - Marcotte-David Scores



X-AXIS easting
Y-AXIS northing
CONTOURS M-d SC

GX;GY 20.00, 20.00
RX;RY 150.00, 150.00
Sk;Pow 0.0, 4.0

M-d SC Color 8
CONTOUR COLOR CODE

Color	Min	Max
	-10.00	-1.0
	-.99	-.50
	-.49	0
	.01	.5
	.51	1.0
	1.01	1.5
	1.51	2.00
	2.01	10

MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP5

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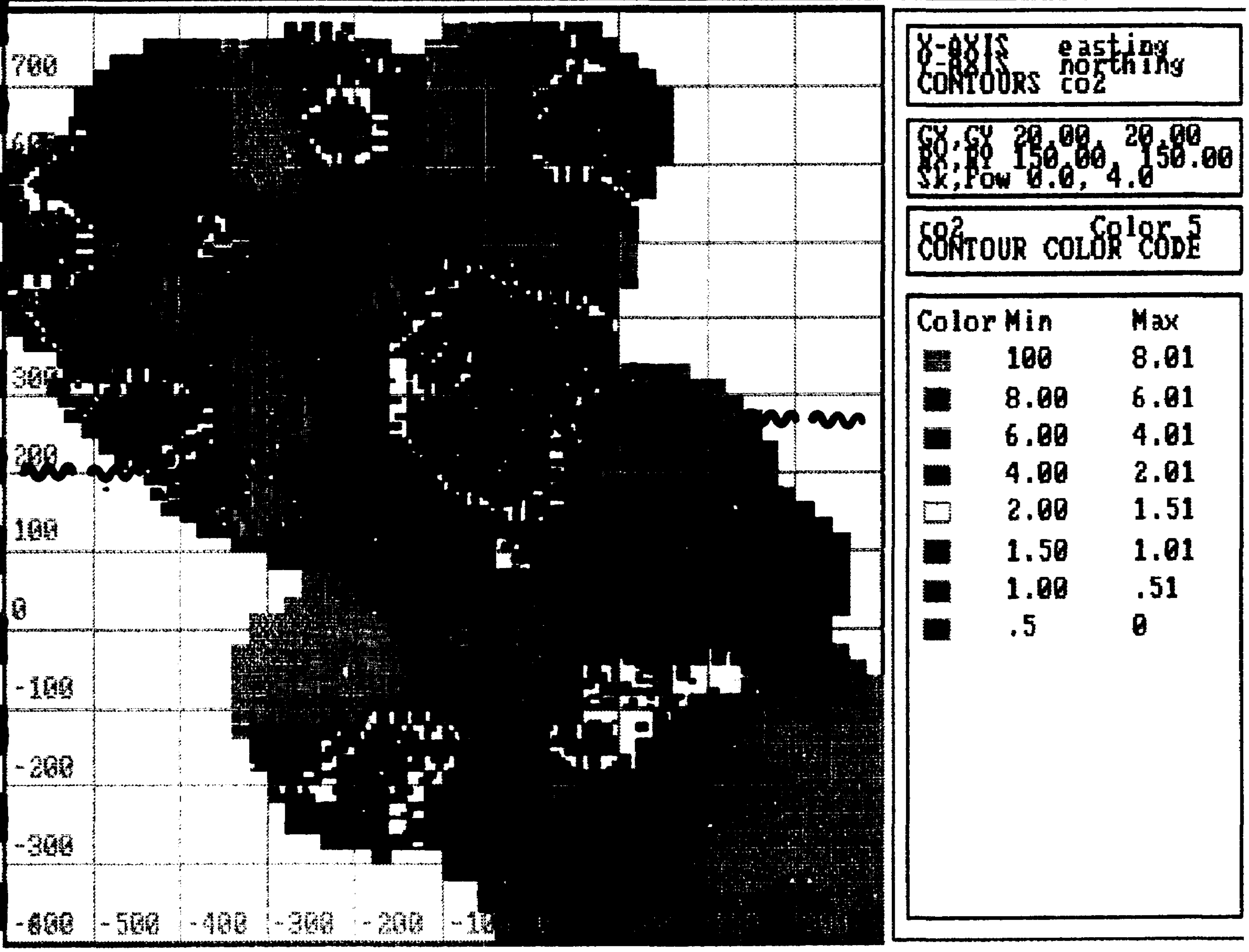
CONTOUR DISPLAY Figure 5e - CO2 contents



Miron-02(FW), SH-WR-13, Miron-01(FW), and as well in the northern property area at 650N/250W (SH-WR-06) and 650N/0W (SH-WR-08).

Figure 5f plots the raw sodium values of the samples and illustrates the near ubiquitous, intense soda depletion in the deposits area, and the apparent structural control.

Figure 5g plots raw potassium content of the Shunsby samples. High values are concentrated around the footwall pyroclastics, the Main Zone/Copper Knob area and in a somewhat east-west area through the South Zone. Spot highs between the Main Zone and the pyroclastics, in holes 65-104 and 66-108 and sample SH-WR018, give some suggestion of NW-SE structural control to the data north of the Joubin Fault. To the south of the fault, a pronounced break along L000 exists which conforms to known, late E-W drag-fold/shear zone structures which appear to have skewed the data here. High potassium contents reappear south of the South Zone and extend off the plot on the basis of high values in several samples (SH-WR-11, SE-4-FW, 65-70-FWa, 57-69-VB), which along with the northeastern sample SH-WR-08 and northwestern sample SH-WR-09, is perhaps emphasizing the peripheral nature of the sericitization.

Figure 5h presents raw calcium contents and principally re-emphasizes the structural control and mineralization specific aspect to depletion trends as outlined previously by several of the plots (ie. peraluminosity, TAAS, Na_20).

Figure 5i presents residual magnesium contents (used rather than raw values because of the greatly different lithologies involved, and their respective Mg0 contents) which can be seen to be extremely localized in terms of enriched areas. Pronounced lows through most of the Main Zone and South Zone areas suggests that the megascopically and petrographically observed chloritization is principally due to an iron chlorite. Local exceptions include samples 66-110-VB, 64-82e-FW, 56-37-VB? and the hole 66-62E samples. Mildly anomalous residual values were returned by several of the pyroclastic samples (ie SH-WR-01, 02, 10).

Figure 5j presents residual Fe_20_3 contents and appears to confirm the ferrous nature of the chlorite seen in altered samples (ie SH-WR-05, 06 area to the NW, Main Zone area and South Zone area)

Figure 5k presents the contoured residual silica data which shows an interesting pattern consisting of dominantly depleted areas around the two deposits, and dominantly enrichment elsewhere. In detail it can be seen that virtually all of the samples proximal to surface Main Zone "Lower" chert mineralization, regardless of whether footwall (ie "Variolitic Basalt") or hangingwall ("FW Diorite") are strongly depleted. This appears to be the case to the north as well where sample SH-WR-08 has resulted in a similar anomaly. To the west, depleted zones are centred around well-mineralized holes 82E, 104 and 108 with spot lows to the northwest in samples SH-WR-18, 09 and 06. In the South Zone area, an interesting silica depleted zone has been outlined consisting of highly mineralized holes 66-61E, 66-62E, 68-20-VB, 68-16, 68-01 and as well 57-69-VB and

MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP6

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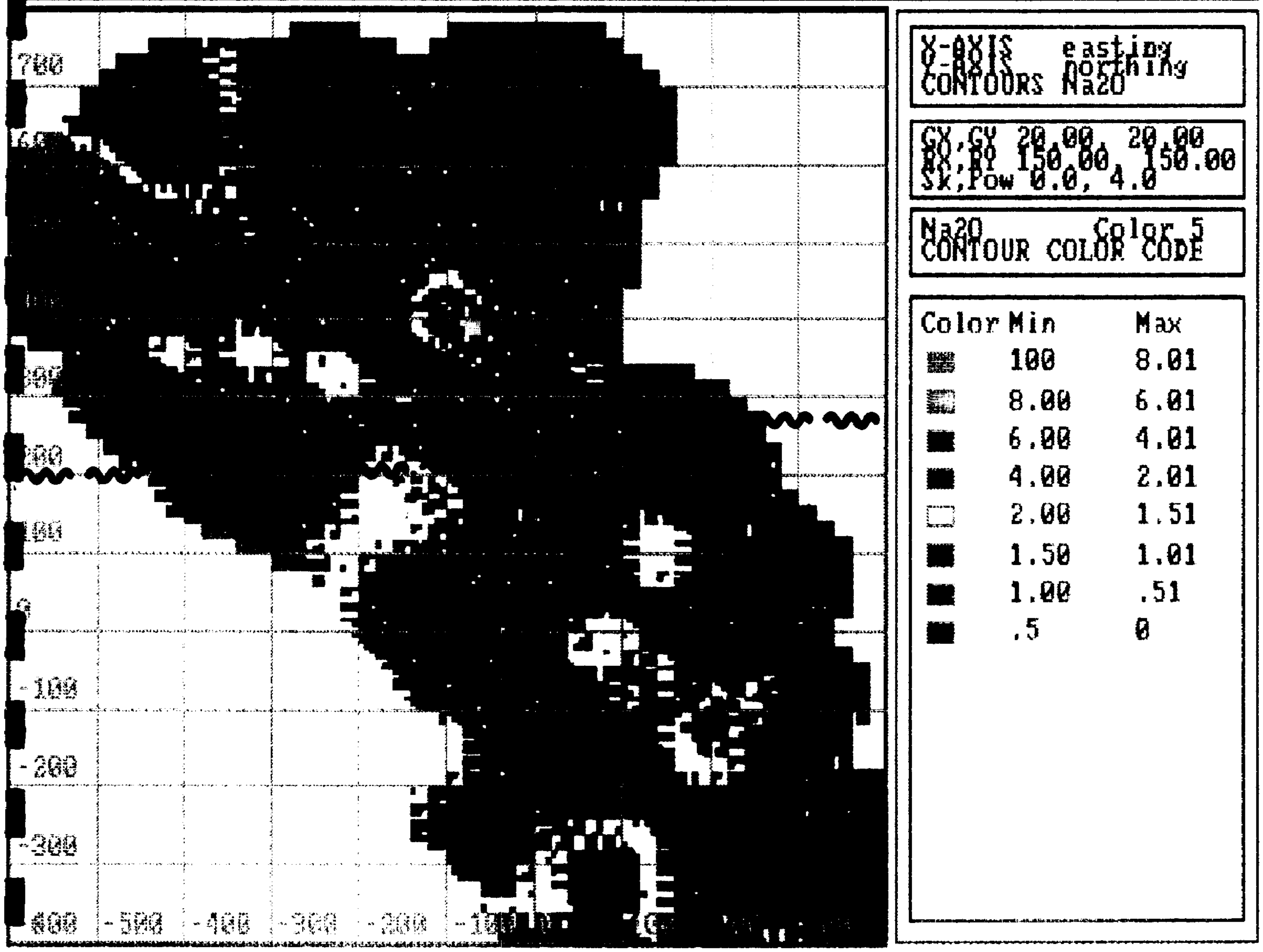
CONTOUR DISPLAY Figure 5f - Raw Na2O contents



MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP7

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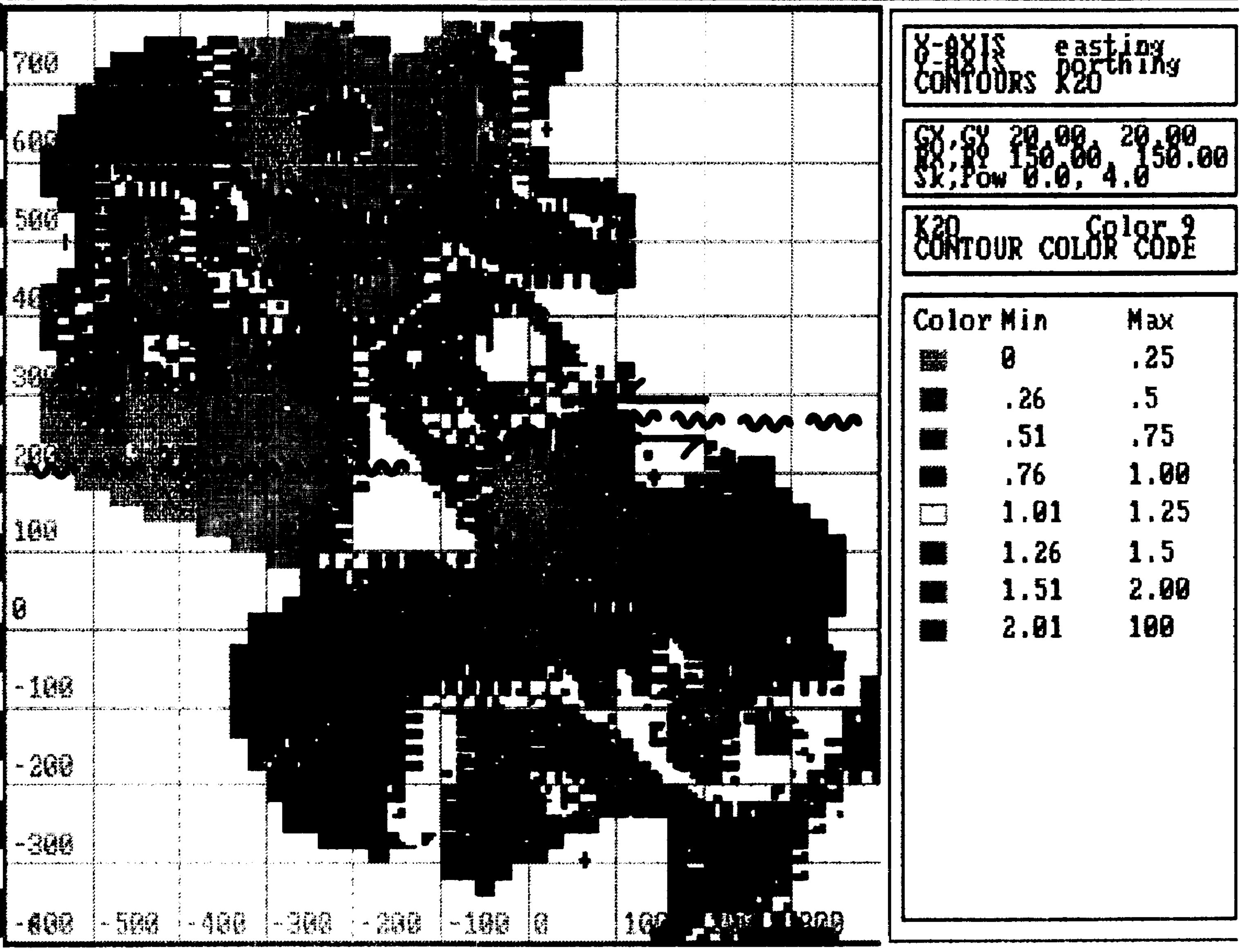
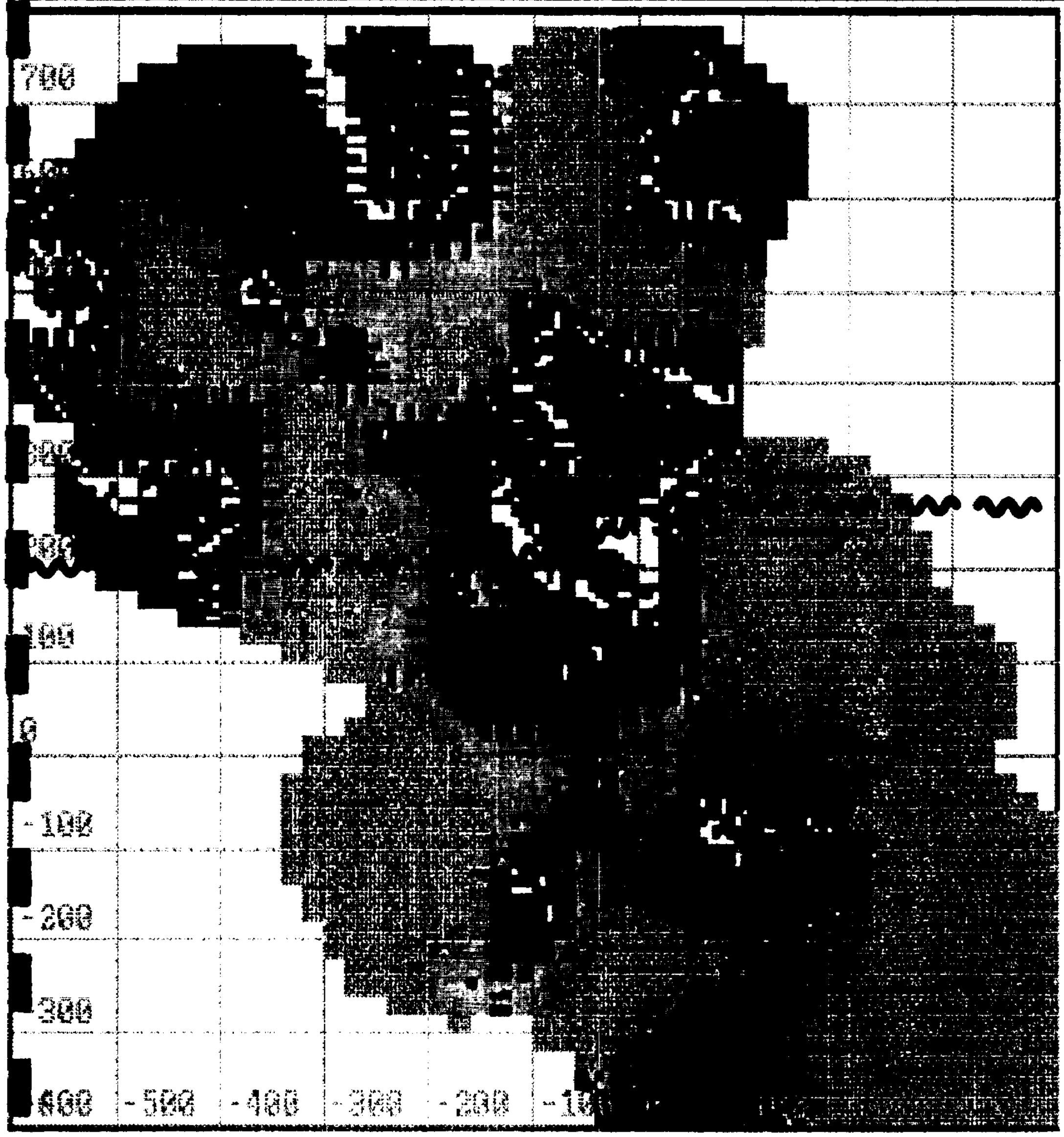
CONTOUR DISPLAY Figure 5g - Raw K2O contents



MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP8

Tue Dec 10 18:19
CONTOUR DISPLAY Figure 5h - Raw CaO contents



X-AXIS easting
Y-AXIS northing
CONTOURS CaO

GX,GY 20.00, 20.00
RX,RY 150.00, 150.00
Sk,Pow 0.0, 4.0

CaO Color 5
CONTOUR COLOR CODE

Color	Min	Max
	100	8.01
	8.00	6.01
	6.00	4.01
	4.00	2.01
	2.00	1.51
	1.50	1.01
	1.00	.51
	.5	0

MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP9

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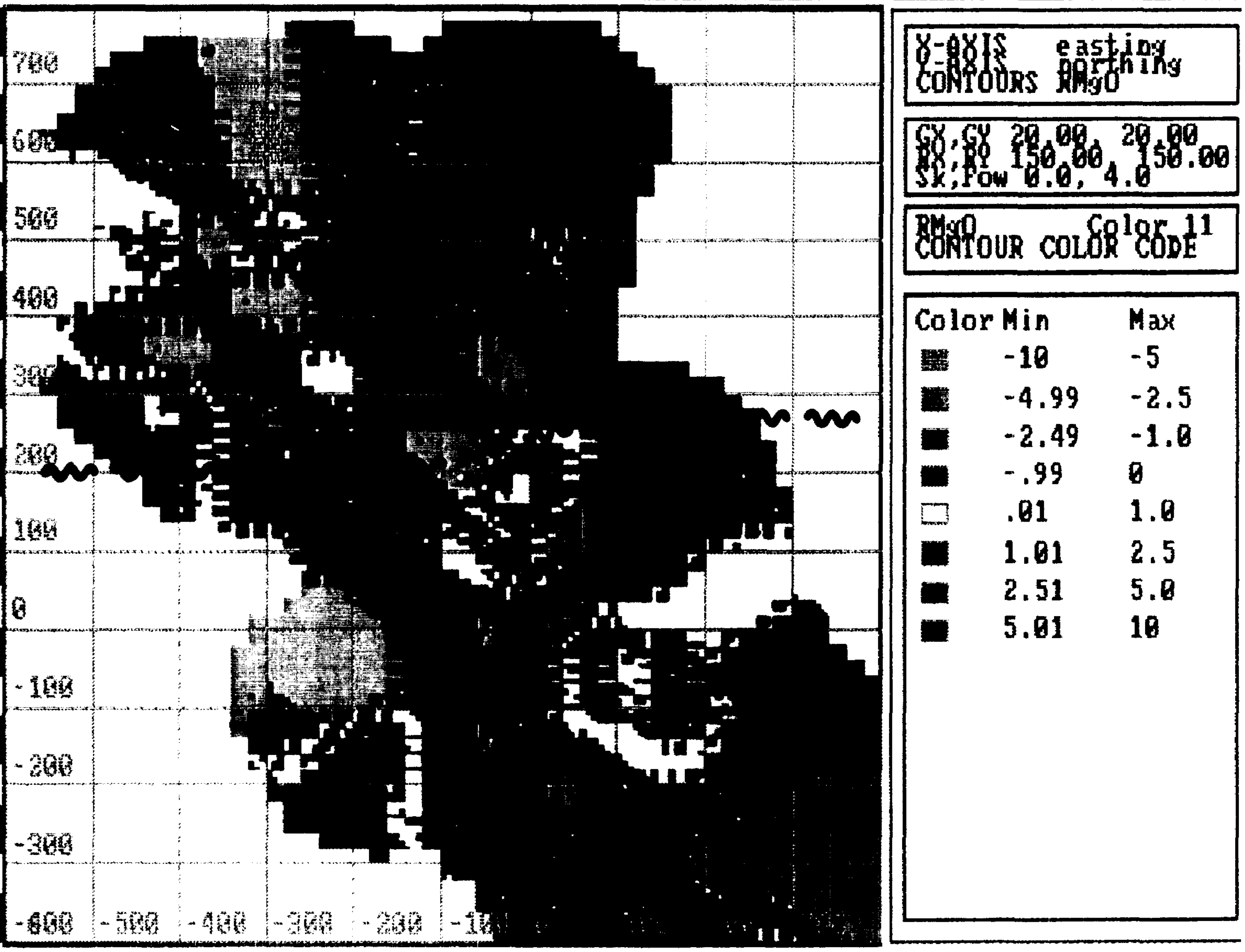
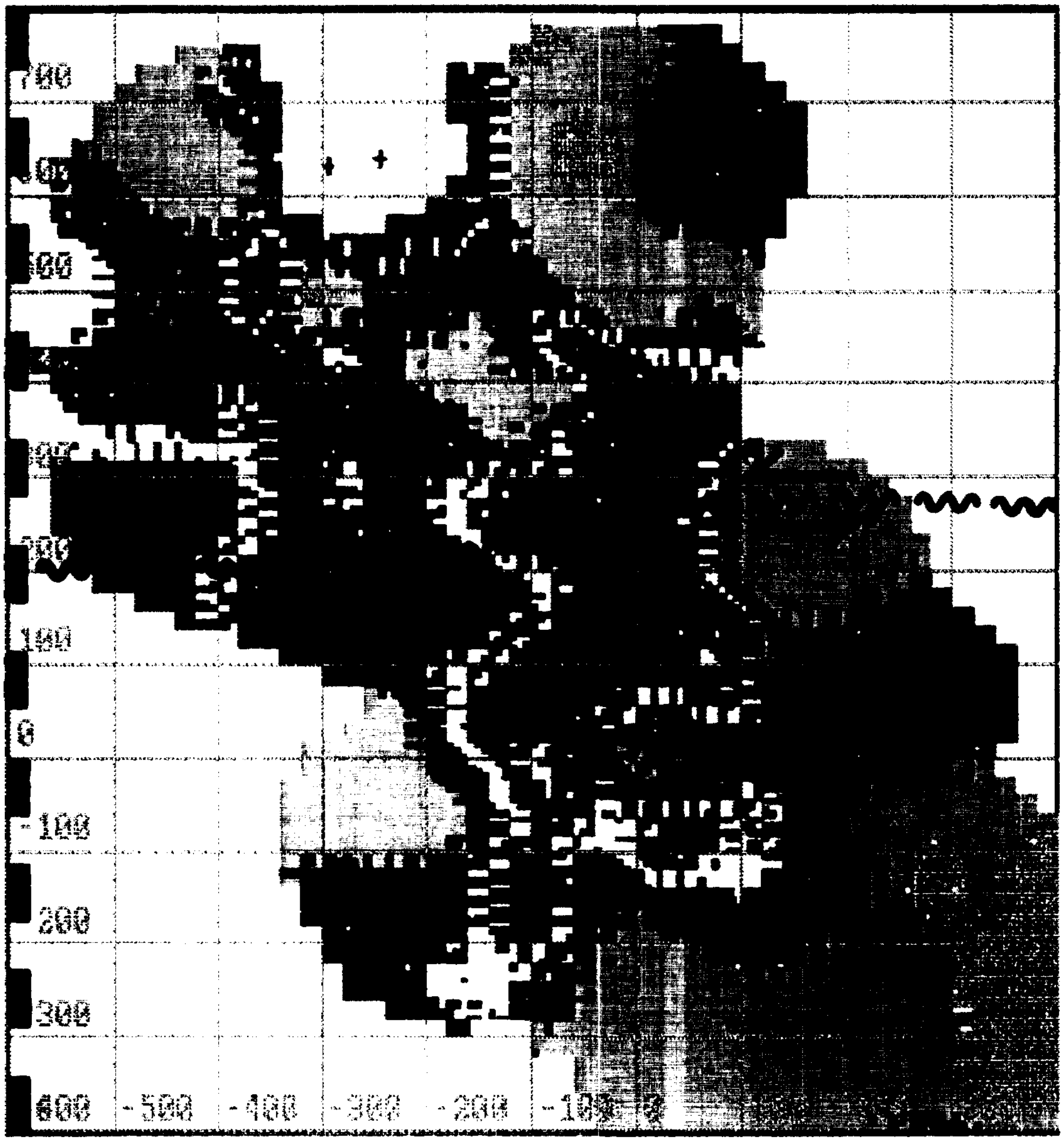
CONTOUR DISPLAY Figure 5i - Residual MgO values



MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP10

Tue Dec 10 18:35
CONTOUR DISPLAY Figure 5j - Residual Fe2O3 values



X-AXIS easting
Y-AXIS northing
CONTOURS Rfe2o3

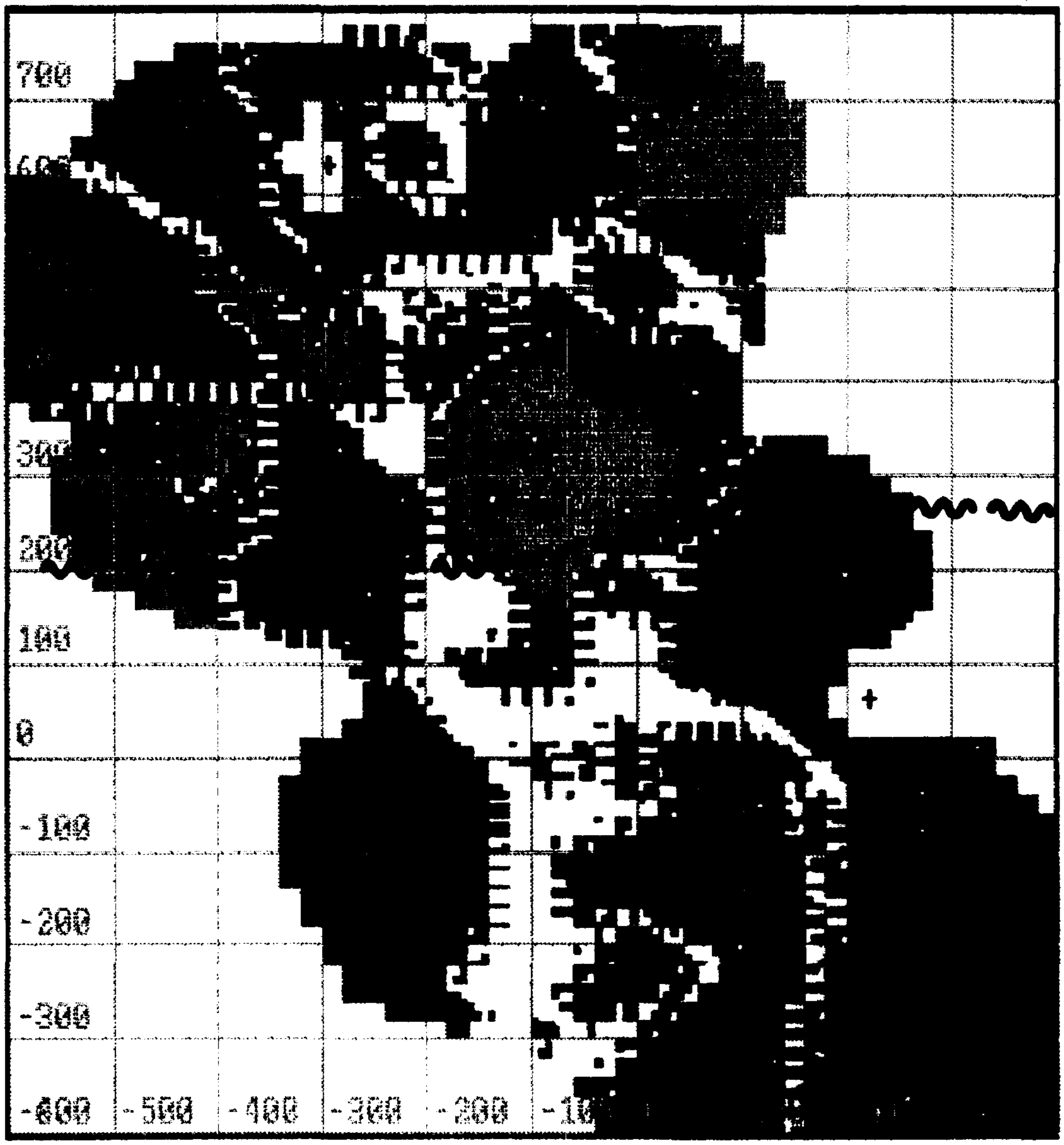
GX,GY 20.00, 20.00
RX,RY 150.00, 150.00
Sk,Pow 0.0, 4.0

Rfe2o3 Color 14
CONTOUR COLOR CODE

Color	Min	Max
	-20	-5
	-4.99	-2.5
	-2.49	-1.0
	-.99	0
	.01	1.0
	1.01	2.5
	2.51	5.0
	5.01	20

MICROMINE PROJECT : c-1302 Version 6.41 April 1991 DATA FILE : litho91
PARAMETER FILE : CDISP kirkton/shunsby PIC FILE : CDISP11

T Dec 10 18:32
CONTOUR DISPLAY Figure 5k - Residual SiO2 values



X-AXIS easting
Y-AXIS northing
CONTOURS Rsio2

GX,GY 20.00, 20.00
RX,RY 150.00, 150.00
Sk,Pow 0.0, 4.0

Rsio2 Color 14
CONTOUR COLOR CODE

Color	Min	Max
	-20	-5
	-4.99	-2.5
	-2.49	-1.0
	-.99	0
	.01	1.0
	1.01	2.5
	2.51	5.0
	5.01	20

sample SH-WR-11. Silica is not a major constituent of these highly altered, apparently mineralized samples, as confirmed by petrographic work, despite chemical classifications that range from calc-alkaline rhyolite (SH-WR-09) to komatiitic basaltic komatiite (64-82E).

The mapped structural orientation of alteration and mineralization appear to be confirmed by the lithogeochemical work carried out thus far. The deposits area as a whole would appear to be Na_20, CaO, MgO and Fe_T depleted and enriched in $C0_2$, K_20 and $Si0_2$. Samples lying within or proximal to known hydrothermal breccia structures appear to show intense depletion in $C0_2$, Na_20, CaO and $Si0_2$ and preferential enrichment in K_20, MgO and/or Fe_T, Cu and/or Zn, Cu:Zn, as well as relative Al_20_3. Of the common discriminant functions used as alteration indices/mineralization indicators, the Peraluminosity Index of MacGeehan and Hodgson is perhaps most effective for mapping mineralization/alteration trends although TAAS, the Marcotte-David score and DF_5 work quite well.

In addition to the petrographic descriptions related in the geology section of the report, examinations of the chemically altered/mineralized samples mentioned above is also illuminating. The work was particularly effective in differentiating between dike rocks and volcanics, and as well characterizing the alteration assemblages of the various lithologies. Complete descriptions are presented in Appendix 3.

Amongst the Footwall Pyroclastics, sample SH-WR-01 well illustrates a "2b" tuff-breccia rock immediately adjacent to a hydrothermal breccia structure as a schistose, chloritized and sericitized fragmental. Similarly, sample SH-WR-05 is known from mapping to be a highly altered "2a" quartz-eye lithic tuff in the heart of a structure further north and shows intensive chloritization and carbonatization overprinting schistosity-parallel quartz microveinlets. Sample SH-WR-06, located on the periphery of the same structure shows ubiquitous sericite stringers in a more recognizable, but still chloritic, pyroclastic. Sample SH-WR-11, located south of any known mineralization or alteration systems, would appear to be our best sample of pristine footwall lithic tuff, showing only mild sericitization.

Highly altered Variolitic Basalt samples known to lie within hydrothermal breccia structure have been found to include: 1) Samples 6-62e-VB1 to 3 and 68-01 from the South Zone structure; 2) Samples 61-91-VB1 and 2 and 65-104-VB1 and 2 from the Copper Breccia structure; 3) Sample SH-WR-13 from the Copper Knob structure; and 4) SH-WR-14 from the 425N mineralized structure.

These samples for the most part show intense chloritization, sericitization and saussuritization with carbonate, opaque sulphides and leucoxene common accessories. Quartz-veining, chlorite (+/- graphite) seams and shearing are also common within these rocks.

Of the "FW Diorites" samples 68-06-FW (South Zone), 61-91-FW (Copper Breccia), 64-82e-FW (possible unmapped structure), 65-72e-FW (between structures) and 68-46e-FWa (Copper Knob structure?) are felt to be proximal to or within mineralized structures. In general these rocks are schistose, pervasively chloritized and carbonatized with accessory biotite, leucoxene and sulphides. Chlorite-graphite microshears and fracture- fillings are noted in several of the samples, consistent with the chlorite-breccia aspect of these structures mapped at surface.

The pervasive alteration seen in the "Digestive Diorites", and its similarity to that described above in the mafic volcanics was perhaps the greatest revelation of the petrographic work. There is little doubt now that this dike system was an integral part of the Shunsby stratigraphy prior to the onset of the hydrothermal alteration/mineralization event.

7.4 Historical Drill Core

No further sampling was carried out on the historical core because of considerable doubts in many cases about hole locations and downhole deviations. Also, the past drilling was for the most part designed to test stratigraphy and was therefore completely ineffective in evaluating the hydrothermal stringer systems oriented at 120^0. Many or most of the old drill results must be disregarded other than as indicators of the presence or absence and possible grade of mineralization. Still, it is possible given the known collar locations, to estimate whether individual holes intersected known structures, and Map 3 attempts to discern these relationships. Table 3 presents the results of all sampling of Shunsby drill core organized chronologically from the 1955 drill campaign through to 1981. All lengths are in meters.

7.5 Stripping and Trenching

In addition to those specific zones described above, geochemical and mapping evidence, as well as mineralized float, suggest that at least one other structure exists north of the "425 N" structure. To the south, several significant intersections (holes 74-15, 56-67, 56-63, 56-68, 56-64, 65-70e and 74-16) suggest that one or two peripheral zinc-rich structures are present.

Extensive areas of the "Upper" cherts and footwall pyroclastics were exposed, and a substantial number of mineralized zones blasted and representatively sampled. This included re-blasting and sampling of some of the surface exposures initially worked last summer. As well, a number of grab samples of in-situ mineralization not amenable to representative chip sampling were taken from freshly blasted material. Table 4 presents the significant results of this work, as well as that of past field seasons, together with comments as to location and relative significance. Some of the trenches sampled in 1990 have misleadingly low values as the drilling and blasting was insufficient to reach fresh rock.

TABLE 3 - HISTORICAL DDH INTERSECTIONS

HOLE	COLLAR	AZ.	DIP	FROM-TO	LGTH	CU(%)	PB(%)	ZN(%)	CU:ZN	INCLUDING	LGTH	CU(%)	PB(%)	ZN(%)
55-03	[illegible]N/1+71W	316	-20	2.43-10.24	7.81	1.17	-	1.31	0.89	7.64-10.24	2.60	2.59	-	2.72
55-04	3+32N/0+90W	316	-25	3.66-9.45	5.79	0.53	0.87	4.39	0.12	-	-	-	-	-
56-05	3+31N/0+89W	316	-60	25.24-29.07	3.83	2.57	-	0.14	18.36	26.48-29.07	2.59	3.38	-	0.14
				50.69-52.30	1.61	2.50	-	0.09	27.78	-	-	-	-	-
56-06	3+31N/0+89W	136	-60	14.63-18.64	4.01	1.51	-	0.53	2.85	14.63-16.90	2.27	2.59	-	0.21
56-08	4+22N/0+60W	316	-54	0.91-7.62	6.71	0.63	-	6.09	0.10	-	-	-	-	-
56-09	3+93N/1+62W	104	-45	12.80-15.06	2.26	1.33	-	1.08	1.23	-	-	-	-	-
				24.31-27.31	3.00	0.61	-	0.04	15.25	-	-	-	-	-
				86.22-88.39	2.17	0.46	-	0.26	1.77	-	-	-	-	-
56-11	3+73N/1+10W	136	-45	40.54-42.67	2.13	1.02	-	0.14	7.29	-	-	-	-	-
56-12	2+91N/2+26W	176	-45	4.27-10.67	6.40	0.06	-	1.27	0.05	7.62-9.14	1.52	0.20	-	2.82
				42.29-43.89	1.60	0.91	-	0.01	91.00	-	-	-	-	-
56-14	2+42N/2+34W	29	-30	1.22-12.19	10.97	2.72	-	1.00	2.72	2.74-12.19	9.45	3.14	-	1.02
				-	-	-	-	-	-	7.32-10.36	3.04	5.41	-	0.54
56-15	2+41N/2+34W	29	-60	11.28-12.19	0.91	7.40	-	0.70	10.57	-	-	-	-	-
56-16	2+21N/2+12W	356	-45	14.73-19.16	4.43	1.58	-	0.32	4.94	14.73-17.65	2.92	2.10	-	0.29
56-17	2+57N/0+88W	271	-45	17.22-23.17	5.95	0.41	-	2.35	0.17	-	-	-	-	-
				31.39-40.54	9.15	1.89	-	0.74	2.55	-	-	-	-	-
				44.96-46.02	1.06	3.31	-	0.08	41.38	-	-	-	-	-
				50.72-54.07	3.35	1.87	-	0.30	6.23	-	-	-	-	-
56-20	2+57N/0+88W	332	-45	24.84-26.06	1.22	1.17	-	1.82	0.64	-	-	-	-	-
				34.75-38.01	3.26	2.33	-	0.81	2.88	-	-	-	-	-
				44.19-47.55	3.26	0.86	-	7.53	0.11	-	-	-	-	-
56-21	2+57N/0+88W	301	-45	10.67-56.39	45.72	0.96	-	1.05	0.91	10.67-18.08	7.41	1.23	-	0.83
				-	-	-	-	-	-	25.76-56.39	30.63	1.09	-	1.26
56-22	2+57N/0+88W	301	-60	7.93-14.48	6.55	0.16	-	0.87	0.18	-	-	-	-	-
				33.99-40.42	6.43	2.11	-	0.19	11.11	36.27-40.42	4.15	3.01	-	0.01
				67.36-68.28	0.92	0.35	-	2.04	0.17	-	-	-	-	-
56-25	2+43N/1+44W	96	-55	43.16-64.62	21.46	0.77	-	1.06	0.73	52.43-53.95	1.52	1.89	-	3.67
				-	-	-	-	-	-	61.27-62.94	1.67	2.75	-	0.89
56-26	3+02N/0+80W	316	-45	12.19-39.62	27.43	1.58	-	0.59	2.68	12.19-21.64	9.45	1.43	-	0.72
				-	-	-	-	-	-	28.65-39.62	10.97	2.63	-	0.64
				-	-	-	-	-	-	28.65-30.78	2.13	5.14	-	0.28
				-	-	-	-	-	-	28.65-33.53	4.88	-	-	-
56-27	2+15N/1+33W	101	-45	12.50-17.07	4.57	0.61	-	1.80	0.34	-	-	-	-	-
				37.19-43.59	6.40	0.52	-	1.16	0.45	-	-	-	-	-
				48.77-55.78	7.01	1.05	-	0.67	1.57	48.77-52.12	3.35	1.63	-	0.81
56-28	2+19N/1+57W	101	-45	57.30-66.45	9.15	0.33	-	0.64	0.52	-	-	-	-	-
56-31	4+20N/0+32W	281	-45	6.10-9.14	3.04	0.22	-	1.29	0.17	-	-	-	-	-
56-32	1+21N/1+23W	91	-45	71.02-73.76	2.74	0.13	-	4.49	0.03	-	-	-	-	-
56-33	3+15N/0+94W	136	-50	6.10-25.91	19.81	1.63	-	1.56	1.05	-	-	-	-	-
56-35	3+15N/0+94W	136	-80	3.35-24.99	21.64	1.02	-	1.28	0.80	3.35-9.45	6.10	2.86	-	1.58
				-	-	-	-	-	-	18.90-21.95	3.05	0.46	-	3.87
56-36	3+13N/0+32W	316	-45	3.96-13.41	9.45	1.65	-	4.87	0.34	-	-	-	-	-
56-37	1+79N/0+95W	91	-45	90.53-92.81	2.28	0.36	-	2.17	0.17	-	-	-	-	-
56-38	5+52N/1+00W	136	-45	19.20-20.73	1.53	0.50	-	2.85	0.18	-	-	-	-	-
				64.77-68.58	3.81	0.93	-	1.58	0.59	-	-	-	-	-
56-39	2+08N/0+77W	281	-45	51.82-53.65	1.83	0.41	-	3.41	0.12	-	-	-	-	-
56-43	2+18N/2+12W	171	-45	21.34-22.71	1.37	0.81	-	0.76	1.07	-	-	-	-	-
				25.30/29.87	4.57	0.80	-	0.33	2.42	25.30-27.43	2.13	1.02	-	0.30
56-47	2+01N/1+82W	141	-45	6.40-27.43	21.03	0.49	-	2.00	0.25	6.40-21.33	14.93	0.67	-	2.38
				40.84-47.55	6.71	0.35	-	3.95	0.09	16.15-21.33	5.18	1.36	-	3.12
56-48	2+94N/1+04W	123	-45	5.49-14.02	8.53	0.18	-	2.25	0.08	5.49-11.28	5.79	0.21	-	2.82
				28.04-32.92	4.88	0.67	-	0.73	0.92	28.04-30.18	2.14	1.07	-	0.76
56-51	2+62N/1+14W	270	-90	18.59-41.15	22.56	1.61	-	1.27	1.27	18.59-21.03	2.44	1.37	-	6.27
				-	-	-	-	-	-	27.74-41.15	13.41	2.27	-	0.80
56-52	1+79N/1+28W	270	-90	63.09-71.62	8.53	0.74	-	1.74	0.43	63.09-66.44	3.35	0.82	-	4.26
56-53	1+46N/1+45W	270	-90	85.66-87.17	1.51	1.10	-	4.74	0.23	-	-	-	-	-
56-56	0+60N/0+50W	270	-90	79.23-96.16	16.93	0.11	-	0.88	0.13	85.66-87.47	1.81	0.65	-	1.63
				145.39-149.66	4.27	0.56	-	1.58	0.35	-	-	-	-	-

TABLE 3 - HISTORICAL DDH INTERSECTIONS

HOLE	COLLAR	AZ.	DIP	FROM-TO	LGTH	CU(%)	PB(%)	ZN(%)	CU:ZN	INCLUDING	LGTH	CU(%)	PB(%)	ZN(%)
56-57	[illegible]7S/0+37E	270	-90	9.45-35.05	25.60	0.08	-	2.33	0.03	27.13-35.05	7.92	0.21	-	4.16
				42.06-52.07	10.01	0.06	-	4.93	0.01	-	-	-	-	-
				122.23-125.58	3.35	0.08	-	2.08	0.04	122.23-124.05	1.82	0.09	0.80	2.93
56-60	3+03N/1+03W	270	-90	13.87-39.32	25.45	0.74	-	2.54	0.29	13.87-33.83	19.96	0.92	-	2.54
66-61e	0+86S/0+48E	270	-90	2.13-40.23	38.10	0.07	-	2.95	0.02	17.36-37.19	19.83	0.07	-	4.45
				97.66-105.12	7.46	0.22	-	1.99	0.11	97.66-100.71	3.05	0.31	0.50	3.34
				116.44-126.71	10.27	0.47	-	2.41	0.20	-	-	-	-	-
66-62e	0+86S/0+48E	270	-45	2.13-15.09	12.96	0.07	-	1.31	0.05	-	-	-	-	-
				20.87-47.83	26.96	0.03	-	3.85	0.01	31.10-37.20	6.10	0.02	-	8.07
				90.03-113.65	23.62	0.77	-	2.23	0.35	-	-	-	-	-
56-63	1+30S/0+25E	270	-90	5.61-31.55	25.94	0.03	-	1.14	0.03	17.06-18.90	1.84	0.18	-	3.28
56-64	1+53S/0+62E	270	-90	40.22-42.45	2.23	0.04	-	3.58	0.01	-	-	-	-	-
56-65	0+21S/0+31E	270	-90	29.81-32.00	2.19	0.09	0.51	7.02	0.01	-	-	-	-	-
56-67	1+40S/0+14W	270	-90	128.25-134.35	6.10	0.04	-	2.49	0.02	-	-	-	-	-
				137.17-142.03	4.86	0.17	-	2.74	0.06	137.17-138.52	1.35	0.57	-	6.83
57-68	1+80S/0+28E	270	-90	50.00-55.94	5.94	0.05	-	2.59	0.02	50.00-53.05	3.05	0.10	-	1.95
65-70e	2+16S/0+39E	270	-90	39.01-48.79	9.78	-	-	1.81	0.00	45.57-48.79	3.22	-	-	3.29
68-71e	0+36S/0+09S	270	-90	118.57-120.41	1.84	0.36	0.21	1.62	0.22	-	-	-	-	-
				126.18-128.02	1.84	0.24	0.36	2.23	0.11	-	-	-	-	-
				140.81-145.70	4.89	0.29	-	3.23	0.09	142.36-145.70	3.34	0.38	-	4.47
65-72e	3+60N/2+94W	270	-90	172.97-184.25	11.28	0.37	-	2.03	0.18	-	-	-	-	-
				193.70-195.21	1.51	0.31	-	2.18	0.14	-	-	-	-	-
57-74	2+85N/3+17W	270	-90	96.00-97.54	1.54	0.73	1.57	2.44	0.30	-	-	-	-	-
				153.90-157.51	3.61	1.64	-	0.70	2.34	155.68-157.51	1.83	2.78	-	0.57
				175.89-180.45	4.56	0.48	-	2.55	0.19	-	-	-	-	-
54-C	1+61S/2+29E	55	-47	72.82-73.03	0.21	0.10	1.20	6.20	0.02	-	-	-	-	-
60-75	2+38N/1+19W	270	-90	30.48-32.00	1.52	0.13	-	4.78	0.03	-	-	-	-	-
				38.86-53.34	14.48	0.49	-	2.84	0.17	41.30-51.51	10.21	0.66	-	3.61
60-76	2+25N/1+25W	98	-65	14.94-17.98	3.04	0.08	0.78	2.04	0.04	21.95-24.32	2.37	0.11	-	2.75
				21.95-49.53	27.58	0.34	-	1.03	0.33	30.14-35.75	5.61	0.37	-	1.73
				-	-	-	-	-	-	39.93-49.53	9.60	0.73	-	1.26
				-	-	-	-	-	-	42.98-49.53	6.55	1.07	-	1.42
60-77	2+84N/1+11W	270	-90	10.21-14.45	4.24	0.90	-	3.59	0.25	-	-	-	-	-
				25.60-35.97	10.37	4.56	-	1.27	3.59	31.70-35.97	4.27	7.38	-	1.85
60-79	2+84N/1+11W	86	-60	9.75-30.79	21.04	0.66	-	1.87	0.35	12.80-16.49	3.69	1.13	-	2.95
				-	-	-	-	-	-	28.44-30.79	2.35	1.01	-	5.32
60-80	2+98N/0+92W	267	-50	8.05-9.54	1.49	0.72	-	4.76	0.15	-	-	-	-	-
				14.63-45.14	30.51	0.87	-	1.06	0.82	31.36-44.14	12.78	1.76	-	1.08
61-81	2+93N/1+62W	267	-50	115.67-118.87	3.20	0.51	-	2.17	0.24	-	-	-	-	-
				128.93-137.43	8.50	0.33	-	1.73	0.19	-	-	-	-	-
				142.49-148.93	6.44	0.38	-	1.42	0.27	-	-	-	-	-
				159.26-189.89	30.63	1.14	-	1.56	0.73	159.26-176.39	17.13	1.87	-	1.33
				-	-	-	-	-	-	182.03-189.89	7.86	0.24	-	2.33
64-82e	2+92N/3+75W	270	-90	192.33-193.12	0.79	2.25	0.70	-	-	-	-	-	-	-
				211.84-214.00	2.16	0.73	-	0.71	1.11	-	-	-	-	-
				235.24-236.51	1.27	1.55	-	-	-	-	-	-	-	-
				243.60-244.85	1.25	4.20	-	-	-	-	-	-	-	-
				249.86-251.52	1.66	4.30	-	0.55	7.82	-	-	-	-	-
61-83	3+04N/2+62W	270	-90	121.62-142.25	20.63	0.40	-	0.96	0.42	131.98-142.25	10.27	0.64	-	1.14
				-	-	-	-	-	-	134.42-139.60	5.18	1.03	-	1.46
61-85	2+81N/1+67W	270	-90	68.88-76.81	7.93	0.56	-	1.51	0.37	73.76-76.81	3.05	1.11	-	2.76
61-87	3+14N/1+56W	286	-70	4.79-6.86	2.07	1.30	-	0.27	4.82	-	-	-	-	-
				84.13-87.17	3.04	0.96	-	1.79	0.54	-	-	-	-	-
61-88	3+14N/1+56W	268	-55	4.88-7.32	2.44	2.37	-	0.33	7.18	-	-	-	-	-
				78.79-83.52	4.73	0.36	-	2.99	0.12	-	-	-	-	-
				111.86-115.82	3.96	2.59	-	1.33	1.95	-	-	-	-	-
				132.28-163.37	31.09	0.78	-	0.88	0.89	141.12-163.37	22.25	1.00	-	1.04
				-	-	-	-	-	-	141.12-147.52	6.40	1.20	-	1.74
				-	-	-	-	-	-	157.89-163.37	5.48	2.33	-	1.19
61-89	2+93N/1+62W	257	-60	103.33-116.13	12.80	0.54	-	1.35	0.40	106.99-113.08	6.09	0.70	-	2.13

TABLE 3 - HISTORICAL DDH INTERSECTIONS

HOLE	COLLAR	AZ.	DIP	FROM-TO	LGTH	CU(%)	PB(%)	ZN(%)	CU:ZN	INCLUDING	LGTH	CU(%)	PB(%)	ZN(%)
61-91	[illegible]6N/2+62W	270	-90	99.67-114.30	14.63	0.22	-	1.80	0.12	112.47-114.30	1.83	0.46	2.40	7.24
				126.19-129.85	3.66	1.22	-	3.14	0.39	-	-	-	-	-
				133.50-142.65	9.15	2.15	-	0.80	2.69	136.55-142.65	6.10	2.64	-	0.88
61-92	2+64N/2+67W	270	-90	73.33-74.86	1.53	0.48	1.08	1.35	0.36	-	-	-	-	-
				120.70-125.58	4.88	0.06	0.35	1.26	0.05	-	-	-	-	-
65-93	2+39N/1+12W	98	-45	8.87-12.07	3.20	0.08	-	2.89	0.03	-	-	-	-	-
				30.69-32.67	1.98	0.23	-	2.84	0.08	-	-	-	-	-
65-94	2+28N/2+56W	270	-90	105.19-106.77	1.58	0.13	0.80	3.00	0.04	-	-	-	-	-
65-95	3+37N/1+89W	88	-45	86.05-89.09	3.04	0.47	0.30	0.98	0.48	-	-	-	-	-
65-98	3+69N/1+02W	108	-45	30.72-31.49	0.77	1.71	-	2.96	0.58	-	-	-	-	-
65-102	4+26N/0+83W	270	-90	59.31-60.84	1.53	0.20	4.85	2.56	0.08	-	-	-	-	-
				96.07-97.17	1.10	-	10.12	-	-	-	-	-	-	-
65-103	4+99N/4+38W	88	-35	129.78-133.59	3.81	0.30	-	2.48	0.12	-	-	-	-	-
65-104	3+59N/3+63W	270	-90	238.72-240.55	1.83	1.47	-	-	-	-	-	-	-	-
				253.04-255.79	2.75	1.13	-	-	-	-	-	-	-	-
66-108	4+28N/2+74W	270	-90	216.41-227.08	10.67	0.98	-	1.42	0.69	218.24-223.42	5.18	1.37	-	1.97
66-110	4+89N/2+84W	270	-90	158.53-160.20	1.67	-	0.60	3.98	0.00	-	-	-	-	-
66-112	0+62N/0+32E	270	-90	110.49-112.62	2.13	0.86	-	0.76	1.13	-	-	-	-	-
68-1	0+02S/0+41W	270	-90	48.77-50.29	1.52	1.60	-	4.89	0.33	-	-	-	-	-
				149.66-157.28	7.62	0.10	-	2.00	0.05	155.45-157.28	1.83	0.07	-	3.21
68-4	1+21N/1+23W	87	-80	57.30-66.75	9.45	0.24	0.56	3.44	0.07	60.35-64.92	4.57	0.29	0.50	4.49
68-6	1+13N/0+38W	270	-90	81.69-89.31	7.62	0.06	-	5.38	0.01	-	-	-	-	-
68-10	1+14N/0+38W	98	-60	78.64-82.30	3.66	0.04	0.28	2.80	0.01	79.86-82.30	2.44	0.11	0.28	3.34
68-11	2+20N/2+05W	270	-90	21.64-25.91	4.27	1.49	-	0.77	1.94	21.64-23.47	1.83	2.16	-	1.70
				70.55-81.38	1.83	0.22	0.54	1.33	0.17	-	-	-	-	-
				91.74-94.18	2.44	0.08	0.68	2.54	0.03	-	-	-	-	-
68-12	1+15N/0+72E	270	-90	69.49-71.93	2.44	0.15	0.25	2.46	0.06	-	-	-	-	-
68-16	0+00N/0+25E	270	-90	97.84-100.58	2.74	0.42	-	1.33	0.32	-	-	-	-	-
				106.68-110.34	3.66	0.32	-	1.75	0.18	-	-	-	-	-
				115.82-121.77	5.95	2.11	-	3.05	0.69	-	-	-	-	-
68-18	0+76S/1+56E	270	-90	5.18-8.53	3.35	1.62	-	4.12	0.39	-	-	-	-	-
				45.42-52.43	7.01	0.10	-	1.74	0.06	45.42-51.21	5.79	0.09	-	1.90
				64.31-65.99	1.68	0.58	0.05	1.06	0.55	-	-	-	-	-
68-19	0+00N/0+65E	270	-90	18.59-23.16	4.57	0.11	-	2.12	0.05	-	-	-	-	-
				99.06-102.11	3.05	0.20	-	1.93	0.10	-	-	-	-	-
68-20	0+76S/1+56E	88	-52	7.32-11.58	4.26	0.68	-	5.25	0.13	-	-	-	-	-
				44.20-55.17	10.97	0.18	-	2.62	0.07	-	-	-	-	-
				64.92-69.19	4.27	0.40	-	3.33	0.12	-	-	-	-	-
74-6	2+57N/1+12W	270	-90	40.43-45.42	4.58	0.80	-	2.07	0.39	-	-	-	-	-
74-7	2+83N/0+74W	270	-90	2.44-6.71	4.27	0.49	-	2.63	0.19	-	-	-	-	-
74-8	3+19N/0+71W	270	-90	4.57-6.71	2.14	1.01	-	1.35	0.75	-	-	-	-	-
74-9	0+43S/1+42E	270	-90	60.35-66.45	6.10	0.09	0.27	1.51	0.06	63.40-65.23	1.83	0.09	0.20	3.36
74-10	2+94N/1+62W	124	-45	54.25-78.94	24.69	0.73	-	1.36	0.54	-	-	-	-	-
74-11	0+76S/0+26E	124	-45	18.90-35.97	17.07	0.10	0.59	2.15	0.05	24.99-35.97	10.98	0.10	-	2.37
				46.02-56.69	10.67	0.19	0.37	1.65	0.12	-	-	-	-	-
				121.62-129.24	7.62	0.43	-	3.74	0.12	-	-	-	-	-
				143.26-149.96	6.70	0.72	-	2.56	0.28	-	-	-	-	-
74-12	3+17N/1+45W	124	-45	50.90-61.57	10.67	0.52	-	1.09	0.48	60.05-61.57	1.52	1.23	-	0.02
74-13	0+59S/0+37E	124	-45	14.63-18.89	4.26	0.06	0.21	2.99	0.02	-	-	-	-	-
				24.99-47.85	22.86	0.97	10.10	2.75	0.35	-	-	-	-	-
				100.89-117.35	16.46	0.82	1.01	5.50	0.15	100.89-107.59	6.70	1.55	2.40	11.67
74-14	1+21S/0+85E	124	-45	6.40-10.67	4.27	0.02	0.59	1.19	0.02	9.45-10.67	1.22	0.04	0.70	1.98
				17.37-39.32	21.95	0.16	0.02	1.13	0.14	17.37-19.51	2.14	0.37	0.40	2.16
				-	-	-	-	-	-	25.60-29.57	3.97	0.44	0.40	2.36
				-	-	-	-	-	-	36.58-39.32	2.74	0.36	0.40	3.12
74-15	0+92S/0+77W	124	-45	172.52-175.57	3.05	0.07	0.31	2.70	0.03	-	-	-	-	-
74-16	2+47S/0+55W	124	-45	135.62-191.72	6.10	0.27	6.98	1.16	0.23	-	-	-	-	-
74-17	0+64S/0+79E	124	-45	6.71-23.96	22.25	0.55	-	4.17	0.13	-	-	-	-	-
				86.87-106.25	19.33	0.78	-	1.46	0.53	-	-	-	-	-
74-18	0+87S/1+18E	124	-45	18.59-25.30	6.71	0.15	0.12	3.30	0.05	22.71-25.30	2.59	.12	-	6.26

TABLE 3 - HISTORICAL DDH INTERSECTIONS

HOLE	COLLAR	AZ.	DIP	FROM-TO	LGTH	CU(%)	PB(%)	ZN(%)	CU:ZN	INCLUDING	LGTH	CU(%)	PB(%)	ZN(%)
				71.78-74.37	2.59	2.65	-	15.24	0.17	-	-	-	-	-
74-20	0+41S/0+75E	124	-60	28.96-33.22	4.26	0.10	0.02	3.69	0.03	-	-	-	-	-
				77.42-83.09	5.67	0.25	0.33	1.85	0.14	-	-	-	-	-
74-21	0+38S/1+11E	149	-60	26.06-30.63	4.57	0.38	0.23	4.38	0.09	-	-	-	-	-
				68.28-72.54	4.26	0.17	0.83	2.34	0.07	-	-	-	-	-
				87.75-92.35	4.57	0.31	0.14	1.78	-	-	-	-		
				102.41-103.78	1.37	0.29	0.43	1.77	0.16	-	-	-	-	-
81-1	2+80N/1+08W	270	-90	10.97-12.80	1.83	0.39	-	3.08	0.13	-	-	-	-	-
				18.59-21.03	2.44	1.05	-	7.71	0.14	-	-	-	-	-
				26.37-36.42	10.05	2.54	-	0.89	2.85	-	-	-	-	-
81-2	2+82N/1+20W	270	-90	20.73-28.35	7.62	1.42	-	2.88	0.49	-	-	-	-	-
				34.90-39.01	4.11	1.53	-	1.05	1.46	-	-	-	-	-
81-3	2+83N/0+92W	270	-90	23.16-28.19	5.03	1.56	-	0.53	2.94	-	-	-	-	-
				31.39-32.31	0.92	1.19	-	0.12	9.92	-	-	-	-	-
81-5	2+59N/0+99W	288	-80	17.37-22.40	5.03	1.17	-	1.25	0.94	17.37-18.44	1.07	4.99	-	0.29
				5.49-8.23	2.74	0.08	-	2.71	0.03	-	-	-	-	-
				26.82-27.43	0.61	0.84	-	2.57	0.33	-	-	-	-	-
				32.92-41.00	8.08	1.08	-	0.64	1.69	-	-	-	-	-
81-6	2+33N/1+25W	270	-90	47.85-52.88	5.03	2.95	-	2.85	1.04	-	-	-	-	-
81-7	2+34N/1+24W	108	-73	43.28-47.09	3.81	1.80	-	0.76	2.37	-	-	-	-	-
81-8	2+32N/1+25W	198	-80	51.82-62.79	10.97	1.66	-	4.82	0.34	-	-	-	-	-
81-10	3+12N/0+92W	270	-90	2.74-6.71	3.97	1.17	-	0.25	4.68	-	-	-	-	-
				15.85-17.22	1.37	4.32	-	0.46	9.39	-	-	-	-	-
81-11	3+10N/0+83W	270	-90	8.69-12.80	4.11	1.08	-	2.85	0.38	-	-	-	-	-
81-12	3+14N/1+00W	270	-90	5.18-12.80	7.62	1.58	-	1.81	0.87	-	-	-	-	-
				26.06-26.97	0.91	2.11	-	0.19	11.11	-	-	-	-	-
81-13	3+30N/0+86W	270	-90	16.00-18.69	2.69	0.32	-	1.99	0.16	-	-	-	-	-
81-14a	3+31N/0+97W	270	-90	29.11-29.57	0.46	4.10	-	0.06	68.33	-	-	-	-	-
				33.83-36.12	2.29	1.83	-	0.01	183.00	-	-	-	-	-
81-15	3+35N/0+72W	270	-90	7.92-9.20	1.28	6.54	-	0.82	7.98	-	-	-	-	-
81-16	4+21N/0+77W	98	-70	7.62-12.19	4.57	0.62	-	1.08	0.57	-	-	-	-	-
81-18	4+22N/0+65W	98	-60	2.44-6.10	3.66	0.03	-	3.27	0.01	-	-	-	-	-
				24.99-26.21	1.22	0.15	-	3.94	0.04	-	-	-	-	-
81-19	3+81N/0+77W	176	-60	1.68-4.27	2.59	0.47	-	3.05	0.15	-	-	-	-	-
				7.16-12.34	5.18	1.04	-	2.09	0.50	7.16-9.45	2.29	1.72	-	4.30
				22.71-22.86	0.15	0.88	-	6.43	0.14	-	-	-	-	-
81-20	3+81N/0+77W	98	-70	6.40-15.29	8.99	0.37	-	2.52	0.15	-	-	-	-	-
81-21	3+64N/0+81W	270	-90	20.12-23.77	3.65	1.04	-	0.08	13.00	-	-	-	-	-
81-22	3+40N/0+73W	270	-90	3.66-6.40	2.74	0.39	-	2.85	0.14	-	-	-	-	-
81-23	3+43N/0+90W	270	-90	25.76-26.21	0.45	0.98	-	7.87	0.13	-	-	-	-	-
81-24	2+96N/0+97W	270	-90	6.10-8.84	2.74	0.32	-	5.11	0.06	-	-	-	-	-
				13.41-14.94	1.53	0.32	-	2.10	0.15	-	-	-	-	-
				20.73-23.47	2.74	0.55	-	2.06	0.27	-	-	-	-	-
				26.21-26.97	0.76	1.62	-	1.37	1.18	-	-	-	-	-
				29.41-31.70	2.29	1.47	-	1.11	1.32	-	-	-	-	-
81-25	2+43N/1+14W	278	-80	18.29-22.10	3.81	0.87	-	5.72	0.15	-	-	-	-	-
				33.28-49.53	16.25	2.87	-	0.90	3.19	33.28-37.03	3.75	3.97	-	1.50
				-	-	-	-	-	-	38.86-41.76	2.90	4.06	-	0.40
				-	-	-	-	-	-	43.89-44.96	1.07	10.10	-	2.31
81-30	2+91N/1+05W	98	-75	4.88-10.36	5.48	0.76	-	3.72	0.20	-	-	-	-	-
				18.90-35.66	16.76	1.93	-	1.68	1.15	18.90-20.12	1.22	0.48	-	3.45
				-	-	-	-	-	-	21.95-35.66	13.71	2.08	-	1.26
81-31	2+91N/1+05W	98	-80	17.22-18.59	1.37	0.27	-	2.76	0.10	-	-	-	-	-
				25.91-28.65	2.74	1.11	-	1.03	1.08	-	-	-	-	-
81-101	0+50S/2+16E	270	-90	15.54-16.46	0.92	0.38	-	3.39	0.11	-	-	-	-	-
				17.07-19.20	2.13	1.03	-	1.69	0.64	-	-	-	-	-
81-104	0+55S/1+36E	270	-90	3.96-5.18	1.22	0.52	-	1.64	0.32	-	-	-	-	-
				13.11-15.24	2.13	0.04	-	4.05	0.01	-	-	-	-	-

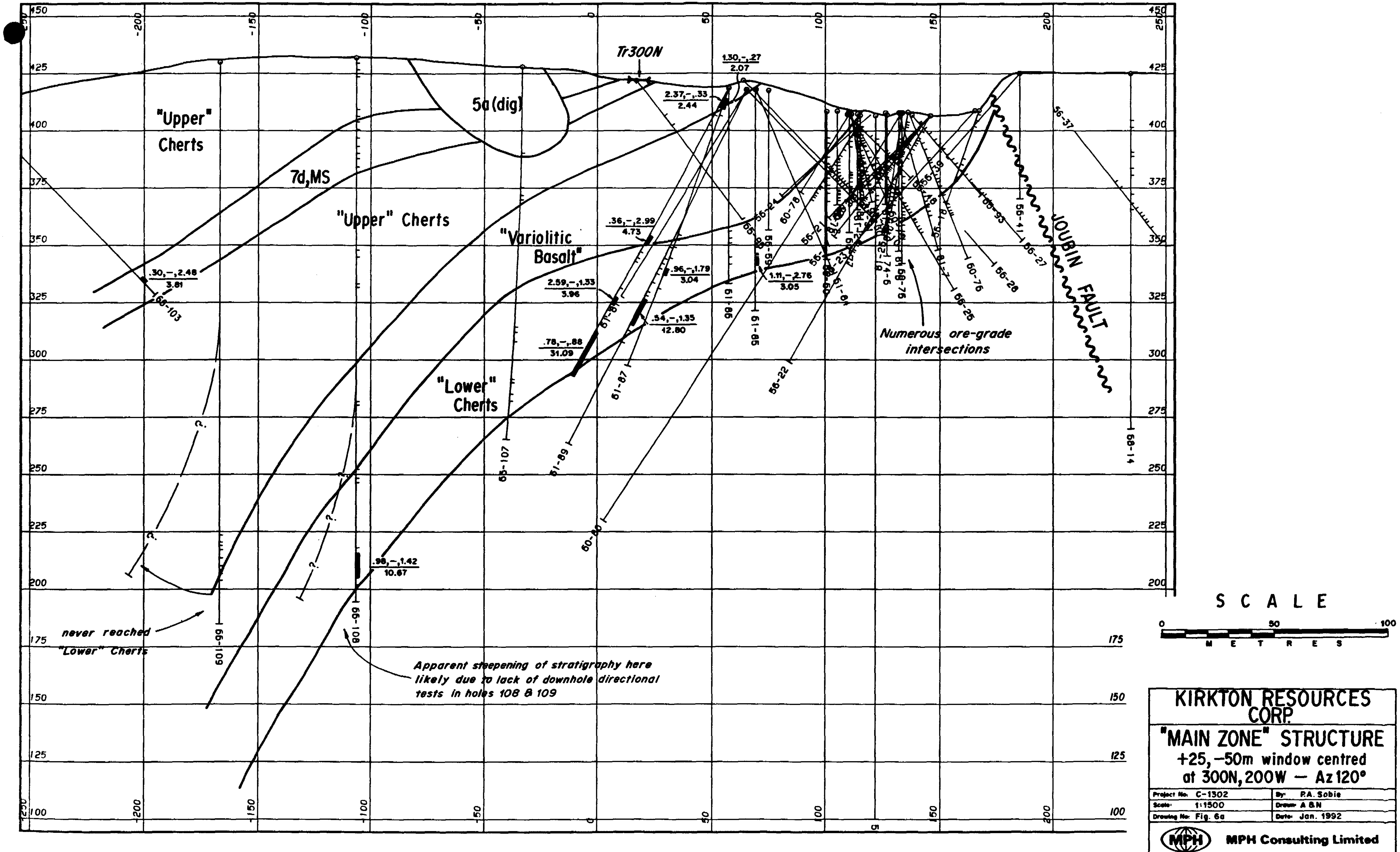
TABLE 4 - SURFACE SAMPLING RESULTS

TRENCH/SAM	LOCATION	LENGTH	AZIMUTH	CU(%)	PD(%)	ZN(%)	AG(OZ/T)	COMMENTS
SH-91-54	7+05N/2+25W	grab	-	.02	2.68	9.00	.20	sulphide vein material north of any known mineralization
SH-91-10	6+61N/2+91W	grab	-	.02	.76	2.25	.06	lge blasted grab of ESE ineralization on N-S stripping
SH-91-11	6+36N/2+54W	grab	-	-	3.34	12.08	.18	lge blasted grab of ESE trending mineralization on 625N
SH-91-53	6+36N/1+85W	grab	-	.13	.21	2.84	.05	lge blasted grab of Cu-Zn material at highgrade PbS showing
SH-91-12	6+34N/2+29W	grab	-	.31	.24	.77	.05	lge blasted grab of ESE trending mineralization on 625N
SH-91-52	6+34N/2+46W	grab	-	.81	1.61	4.04	.36	lge blasted grab of ESE trending mineralization on 625N
SH-91-13	6+14N/2+88W	grab	-	.14	.51	2.12	.08	E-W shear hosted (.5m) massive sulphides at 2a-"UC" contact
SH-91-01	4+97N/0+15W	float?	-	1.00	-	.15	-	lge blocky float from east end of 500N ob trench
SH-91-01C	4+92N/0+52W	float?	-	-	.63	1.70	.06	lge blocky float from west end of 500N ob trench
SH-91-01A	4+89N/0+69W	float?	-	.43	.08	.28	-	lge blocky float from west end of 500N ob trench
SH-91-06	4+56N/0+31W	grab	-	.15	1.71	5.31	.08	prob Main Zone "Lower Chert" stratiform Zn hrzn at 4+50N
Tr425N	4+24N/0+42W	8.0	322	.67	1.15	4.30	.12	stratigraphic "LC" Zn hrzn sample within ESE struct on 425N
CuKnob	4+10N/1+20W	3.0	172	2.59	.02	.32	.41	portion of ESE structure at CuKnob, taken across structure
Tr400N	3+83N/0+72W	7.4	039	2.87	.78	2.97	.38	portion of CuKnob structure but in"LC", sampled across
Tr300N	3+13N/2+01W	7.5	319	.20	.26	1.17	.04	composite stratigraphic sample of "UC" massive sulphides
E-90-01	3+20N/0+60E	rubble	-	3.60	.02	.46	.35	lge blocky rubble from ob trench over conductor 12(42a)
Tr275Na	2+81N/2+25W	4.0	112	.15	.05	.59	.07	stratigraphic sample of "UC" massive sulphides on 275N
Tr275Nb	2+78N/1+99W	1.0	030	.69	1.30	5.97	.20	across portion of ESE structure on 275N
CuBx	2+39N/2+29W	5.0	030	3.53	.02	.52	.54	across portion of CuBx structure on 250N
Tr175N	1+69N/0+32E	5.0	041	.16	.35	2.34	.18	across portion of ESE structure on 175N
D-90-01	1+23N/3+33E	rubble	-	11.13	.05	3.56	.38	lge blocky rubble from ob trench over conductor 1d(40b)
Tr075Nb	0+75N/0+07E	2.0	080	.06	.47	2.09	.16	Zn-rich "UC" horizon, poss along strike from "UC" VMS
SH-91-05	0+73N/0+09E	grab	-	.48	-	.98	-	copper-pyrite within "UC" argillites adjacent to Tr075Nb
SH-91-40	0+59N/1+15W	grab	-	.08	.01	1.18	.05	west end of 050N stripping, vague ESE structure
SH-91-55	0+13S/0+90W	grab	-	3.71	2.75	5.30	1.16	high-grade ESE showing at west end of 000N stripping
SH-91-27	0+13S/0+85W	grab	-	4.17	1.38	5.34	1.27	high-grade ESE showing at west end of 000N stripping
TrA-04-A(1990)	0+57S/0+66E	5.0	062	.04	.60	1.66	.06	stratigraphic sample at east end of 075S in "UC" argillites
Tr075Sa	0+63S/0+39E	7.0	112	.42	.40	8.40	.12	stratigraphic sample at west end of 075S in SZ cht bx
Tr075Sb	0+65S/0+44E	5.0	082	.53	.52	3.37	.12	stratigraphic sample at west end of 075S in SZ cht bx
TrA-03-A(1990)	0+80S/1+08E	15.0	062	.03	.10	1.31	-	poorly blasted SZ gossan
TrA-03-B(1990)	0+82S/1+02E	1.0	062	.07	.94	10.58	.08	SZ ZnS-rich argillites in ESE drag-fold
SH-91-36	0+93S/1+19E	grab	-	.66	3.24	13.96	.05	adjacent to main SZ trenched area
TrA-00-B(1990)	0+97S/1+89E	3.5	072	.13	.67	2.25	-	graphitic argillites at SZ "UC"-variolitic basalt contact
Tr100S	0+98S/1+10E	4.8	052	.75	2.76	10.77	.35	across portion of SZ ESE structure
TrA-02	1+03S/1+12E	3.5	062	.05	.16	1.15	-	poorly blasted across portion of SZ ESE structure
A-90-01	1+00S/2+85E	float?	-	8.00	.04	1.84	.32	lge blocky float from ob trench over SZ "Lower Cherts"
KRS-08	4+80S/2+90E	float	-	2.88	.05	.02	.12	lge blocky float from historical ob trenches on L5+00S
BSH-01	4+80S/2+60E	float	-	7.04	tr	4.15	.27	lge blocky float from historical ob trenches on L5+00S
BSH-02	4+80S/2+90E	float	-	5.93	tr	.15	.18	lge blocky float from historical ob trenches on L5+00S

These results have been included on Map 3, the assay plan, as well.

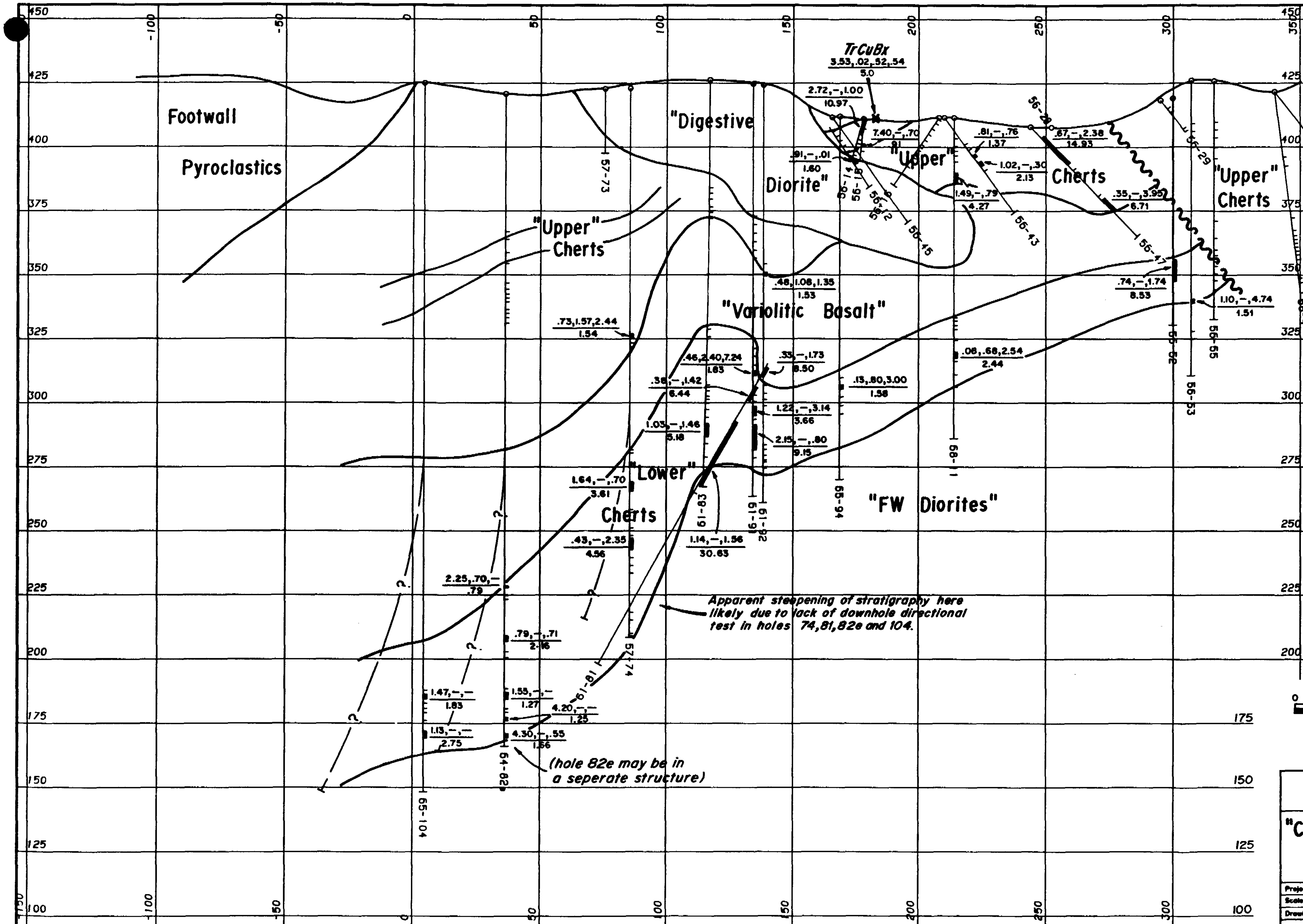
It is believed that the hydrothermal breccia zones are relatively closely spaced through the Shunsby deposits area although they appear to be less dense peripherally. Through the Main Zone/South Zone area it is thought that the following seven mineralized structures are present.

STRUCTURE	APPROXIMATE EXTENT	SIGNIFICANT SAMPLING
"425 North"	- extends from strongly altered/mineralized FW pyroclastics at 625N/300W through to Tr 425N area and possibly to conductor 40a(12)-Ob trench "E" area	- Samples SH-91-10, 11, 12, 13, 52 ± 53, 54 in pyroclastics - "Upper" chert contact area DDH 56-40 in "Upper" chert - DDH's 56-08, 56-31, 81-16, 17, 18, Tr 425N, grab SH-91-06 in "Variolitic Basalt" - "Lower" chert area
"Copper Knob"	- extends from chl-po gossan in "Upper" chert at 550N/275W through to Copper Knob - Tr 400N area into "Lower" cherts and possibly to Joubin Fault	- possibly holes 65-110, 68-46e in "Upper" cherts - hole 56-09, Tr Cu Knob near "Variolitic Basalt"-"Upper" chert contact - Tr 400N, holes 81-10, 11, 13, 14a, 15, 19, 20, 21, 22, 23 plus 56-06, 11, 26, 33, 35, 36 and 55-04, 05 through Main Zone "Lower" chert area
"Main Zone" (Figure 6a)	- primarily inferred from drill intersections and topography; may well be several individual structures - appears to extend from at least L550N/400W in FW pyroclastics through to Tr 300N area of the "Upper" cherts and down through "Variolitic Basalt" into "Lower" cherts in vicinity of the L250N stripping	- sampled in "Upper" cherts by holes 65-103, upper intersections in 61-87 and 88 and by Tr 300N - sampled in "Lower" cherts by at least holes 65-108, 56-17, 19, 20, 21, 22, 23, 48, 51, 60, 74, 80, 75, 76 & 93, 74-06, 07, 10 and 81-01, 02, 03, 05, 06, 07, 25 and 26 - as well, holes 56-27, 28 and 39 intersected Main Zone "Lower" cherts in the footwall of the Joubin Fault



Tr300N
1.30,–,.27
2.07
2.37,–,.33
2.44
"Upper"
Cherts
5a (dig)
7d,MS
"Upper" Cherts
"Variolitic
Basalt"
.36,–,2.99
4.73
.30,–,2.48
3.81
68-103
2.59,–,1.33
3.96
.96,–,1.79
3.04
1.11,–2.76
3.05
.54,–,1.35
12.80
.78,–,.88
31.09
"Lower"
Cherts
61-87
61-89
65-107
60-80
56-22
61-85
56-37
68-14
JOUBIN FAULT
Numerous ore-grade
intersections
.98,–,1.42
10.67
never reached
"Lower" Cherts
66-109
66-108
Apparent steepening of stratigraphy here
likely due to lack of downhole directional
tests in holes 108 & 109
SCALE
0
50
100
METRES
KIRKTON RESOURCES
CORP.
"MAIN ZONE" STRUCTURE
+25, –50m window centred
at 300N, 200W — Az 120°
Project No. C-1302
By: P.A. Sobie
Scale: 1:1500
Drawn: A & N
Drawing No. Fig. 6a
Date: Jan. 1992
MPH Consulting Limited

STRUCTURE	APPROXIMATE EXTENT	SIGNIFICANT SAMPLING
"Copper Breccia" (Figure 6b)	- probably extends from the altered FW pyroclastics at L500N/500W through the CuBx Showing and on to the Joubin Fault - across the fault, the extension to this structure is believed to run along a prominent topographic ridge to the area of Ob Trench "D" - conductor 40b(1d)	- holes 56-14, 15, 16, 43 and 47, 64-82e(?), 65-104, 69-11, 74-5(?) and Tr CuBx in "Upper" cherts - holes 65-104, 64-82(e)?, 57-74, 61-91, 61-80, 81,87, 65-94, 68-11, and 56-52 and 53 in "Lower" cherts
"Hole 82e"?	- possibly related to Copper Breccia structure above although a distinct structure has been mapped south of the Joubin Fault which appears to line up with alteration mapped in vicinity of hole 64-82e	- holes 64-82e and 65-102 north of fault - holes 68-12 plus Tr175N south of the fault
"100 North"	- no known corollary to the north of Joubin Fault (would lie under Hiram Lake) - extends from approximately L200N/150W through "Upper" cherts at L100N/0W and on towards hole 81-101 and into "Lower" cherts in area of sample A-90-01	- probably includes holes 56-37, 68-06, 10, 19 and 20, Tr 075N, 71-09, and 81-101
"South Zone" (Figure 6c)	- probably exists as several en echelon zones due to offsets resulting from late E-W faulting and drag-folding - believed to extend from prominent NW-SE topographic low at L100N/200W through South Zone "Lower" cherts to hole 54-C area	- thought to include surface samples SH-91-27,36, 40, 55, Tr 075Sa & b, Tr A-04-A, Tr A-03a & b, Tr 100S, Tr A-02 and Tr A-00B as well as SH-91-36 - "Upper" chert sampled by holes 56-57, 65, 68-1, 16, 18 and 20, 74-11, 13, 17, 18, 19, 20 and 21, and 81-104 - most of above holes passed through "Variolitic Basalt" to "Lower" chert as well - hole 54-C represents easternmost test



SCALE

0 50 100

METRES

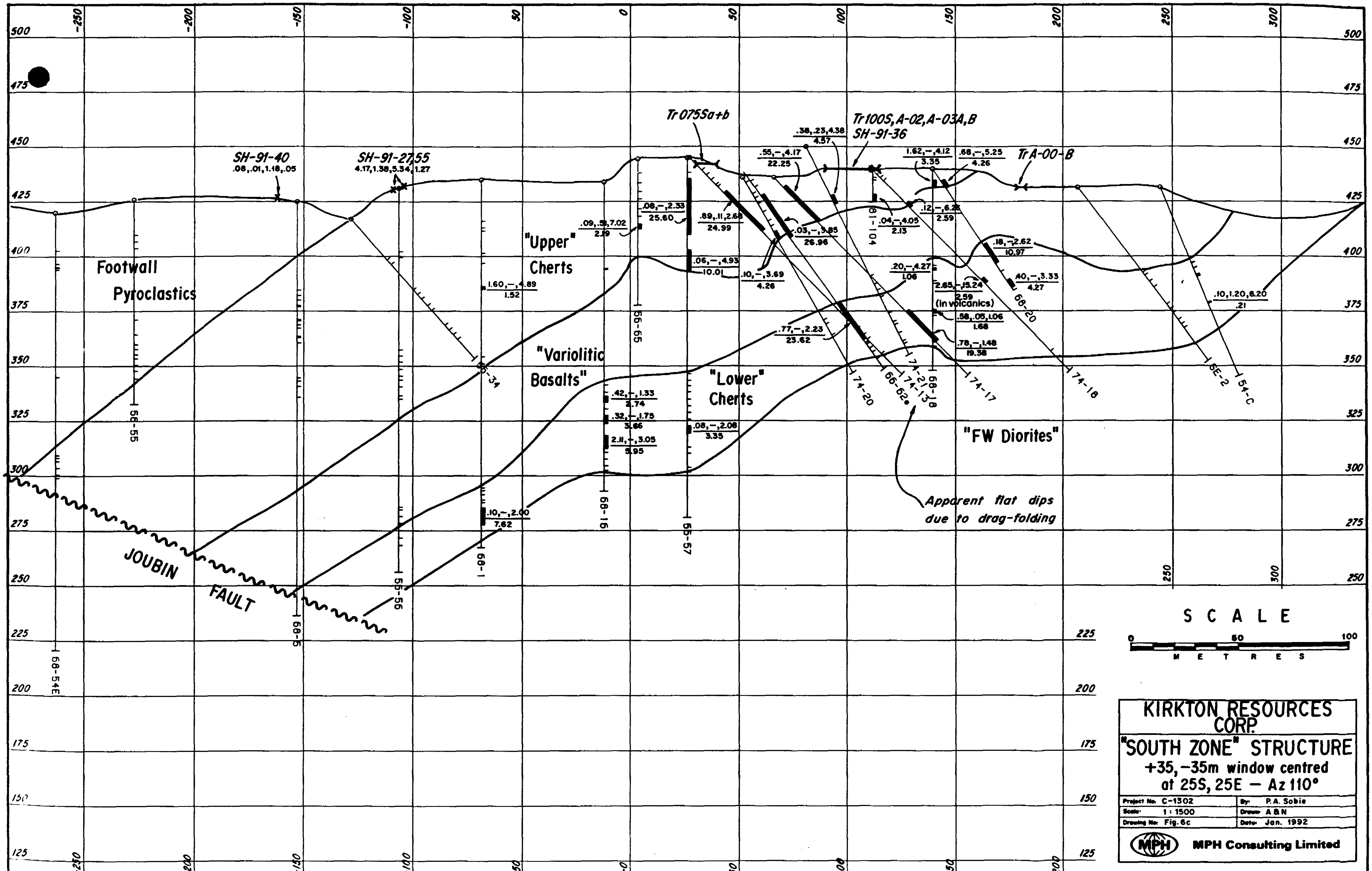
KIRKTON RESOURCES CORP.

"COPPER BRECCIA" STRUCTURE

+35, −50m window centred at 350N, 375W − Az 120°

Project No. C-1302	By: P.A. Sobie
Scale: 1:1500	Drawn: A & N
Drawing No: Fig. 6b	Date: Jan. 1992

MPH Consulting Limited



KIRKTON RESOURCES CORP.
"SOUTH ZONE" STRUCTURE
+35, -35m window centred at 25S, 25E — Az 110°
Project No. C-1302
Scale: 1 : 1500
Drawing No. Fig. 6c
By: P.A. Sobie
Drawn: A & N
Date: Jan. 1992
MPH Consulting Limited
SCALE
0 50 100
METRES
Footwall Pyroclastics
"Upper" Cherts
"Variolitic Basalts"
"Lower" Cherts
"FW Diorites"
JOUBIN FAULT
Apparent flat dips due to drag-folding
Tr 075Sa+b
Tr 100S, A-02, A-03A, B
SH-91-36
Tr A-00-B
SH-91-40
.08,.01,1.18,.05
SH-91-27,55
4.17,1.38,3.34,1.27
(in volcanics)
68-54E
56-55
68-5
55-56
56-34
68-1
68-16
56-65
55-57
81-104
74-20
66-62
74-21
74-13
68-18
74-17
74-18
68-20
SE-2
54-C

Results of the surface work and drillhole compilation suggest:

1) The highest grade mineralization is hosted by ESE-trending zones which have not been evaluated by the past work, although numerous drillholes have undoubtedly cut portions of these zones.

2) Only drillholes and trenches trending north-easterly can comprehensively sample these zones.

3) The thin massive sulphide horizon found in the "Upper" cherts has no economic potential in itself.

4) The stratiform Zn-rich horizon within the "Lower" cherts appears to be continuous and relatively consistent in grade (4-5% Zn/5m?) over a short strike length to the Main Fault. This same horizon is indicated by drilling to be present in the South Zone "Lower" cherts.

5) More galena is present in the ESE stringer systems than previously thought, and is commonly also found in very late cross-cutting E-W quartz-carbonate vein systems.

6) Silver values to 0.5 oz/ton are common, usually closely associated with copper.

7) Cadmium values to 0.05-0.06% are common, closely associated with zinc.

8) No nickel (or platinum) is associated with the pyrrhotite-rich stringer systems lower in the stratigraphy.

9) No gold values of any significance have been found associated with the known mineralization.

7.6 Geophysics

Results of the extensive stripping and mapping completed in 1990 and 1991 have necessitated numerous revisions to the ground geophysical interpretation with the geophysical picture as presently accepted portrayed on Maps 4a and 4b.

7.6.1 Magnetics

The overall magnetic picture as described in previous reports has not changed although a number of modifications have been made. A number of spot highs and lows in the area of the Main and South Zones which were determined to be due to cultural effects, eg drill rods etc, have been removed. A number of other suspicious-looking, highly localized magnetic highs and lows for which there is no obvious cultural explanation have been left in the dataset. The best example of this is probably along line 1S just east of the baseline when there is absolutely no geological rationale for the intense low here. Similarly, a weak high under the south arm of Hiram Lake does not relate to the pyrrhotite/magnetite-bearing cherts north and east of the lake as the contouring infers. The cause of the high is unknown but may reflect a large iron formation boulder(s) or metal objects left by previous operators.

The overall contouring program has also been modified to more appropriately contour the various ranges present in the data.

There are also now geological explanations for virtually all of the magnetic anomalies. The elongate north-northwest magnetic highs between lines 6S to 11S east of the baseline, for example, represent magnetite-bearing chlorite iron formation. The magnetically-indicated flatter west dip of the westernmost unit and steeper dip of the east unit were confirmed by field measurements. The west dipping magnetic feature in the area of line 4S at the baseline, previously thought to represent gabbro, is now known to represent the continuation of the iron formation unit from the south-southeast.

The intense magnetic activity in the extreme southeast portion of the grid reflects magnetite-bearing peridotite as previously suspected. The arcuate magnetic high in the area of 7W, lines 1S to 4S reflects identical peridotitic intrusive rocks. Line 4S does not extend far enough to the west for the magnetics to properly reflect the peridotite here.

The intense, relatively erratic, often highly localized magnetic activity in the South and Main Zones reflects a variably magnetite/pyrrhotite content in the underlying cherts. There still may be some cultural noise as noted. Much of the high gradient activity in the magnetic pattern is due to the presence of highly magnetic material under thin to virtually nil overburden. It is difficult to discern individual magnetic units in these areas. One exception is the string of magnetic highs associated with conductor 48 (14a) and 54 (14b) which the stripping has shown to represent a massive pyrrhotite-pyrite unit. The north end of the area of magnetic activity associated with the Main Zone, ie in the area of 9N, 175W, corresponds closely with the mapped north end of the chert/argillite sequence. Likewise, to the south, the chert/argillite sequence has lost most of its magnetic character by about line 2S. This reflects increasing overburden cover in part but also reflects a fundamental facies change to the south wherein magnetite-pyrrhotite content rapidly dies out and the chert sequence itself is rapidly thinning.

The indicated north magnetic trends in the magnetically bland, northeast portion of the grid are somewhat misleading as bedrock strikes here are northwest to north-northwest as evidenced by conductor 26. This discrepancy is a function of the right angle, line-to-line computer contouring.

Exactly the same phenomenon was encountered at the extreme west ends of lines 5N to 8N. The iron formation units here trend northeasterly, not north-northwesterly as suggested by the magnetics.

The indicated abnormal steep to vertical dips suggested by the weak magnetic anomaly associated with conductor 22 were confirmed by field measurements. The magnetic response here is due to a modest pyrrhotite +/- magnetite content in an argillitic iron formation unit.

The north-south, elongate magnetic high along the south part of the 10W tie-line and the feature in the area of 8W, lines 1N-2N appear to relate to a disseminated pyrrhotite content in pyroclastic rocks. These particular rocks were notably siliceous in some cases.

7.6.2 Electromagnetics

Considerable revisions have been made to the previous EM interpretations with the new conductor axes superimposed in the magnetics on Maps 4a and 4b. Previous conductor designations have been retained wherever possible.

In the north, the south end of conductor 24 coincides with a small pond in an area of considerable relief and it is uncertain if it (and conductor 25?) represent discrete bedrock sources. These may be conductive overburden/topographic responses. There are some definite bedrock conductive features in the immediate area however based on the discovery of pyrite/graphite-bearing chert float in the area of 12N, 1W.

In the southeast, conductor 41 (2d), 40a (2c) and 2a are now interpreted to form a stratigraphically continuous unit with a possible slight fault offset in the area between lines 4S and 5S. Conductor 40b (1d) represents a distinct unit to the east which extends from the Joubin Fault south to line 050S. Likewise, the offset continuations of these features north of the Fault have been re-interpreted such that previous conductors 43 (13a), 42b (13b), 56 (13c) and 14d represent the same conductive unit with a local fault offset in the area of 7N. Conductor 42a (12) represents the north continuation across the Joubin Fault of conductor 40b (1d). These two untested conductors are considered the most significant on the property in light of the high grade copper +/- zinc, lead, silver rubble uncovered by backhoe trenching in overburden immediately above them (Ob trenches "E" and "D").

The most changes to the EM interpretation have been made in the area to the west of the Main Zone northeast of Hiram Lake. Previous conductors 40 (14a) and 54 (14b) are now indicated to represent the same unit. This in turn is known to be a massive pyrite-pyrrhotite unit. Conductor 55 as previously portrayed does not exist. Previous conductor swarm 56 has been replaced with two conductors as indicated. The westernmost of these represents a well defined sulphidic argillite unit tested by previous hole 65-103. The effects of strong cross folding can be seen in this immediate area.

Also in the east, previous conductors 51 (7), 52 and 5a are now felt to represent a single graphitic unit which was drill tested by Cominco hole A in 1954.

In the west, previous, seemingly isolated EM responses are now known to form continuous units, notably EM zones 18b, 18c and 20 and a unit represented by conductors 19b, 19c and 21. Conductors 17 and 18a are known to be offset slightly from the main units to the north.

8.0 DISCUSSION

Evaluation of all of the exploration results to date suggests that the Shunsby Main and South Zones represent part of a large, structurally-controlled stringer system(s) centred on a thick, grossly pod-like or lensoid unit of predominantly cherty chemical sediments and their brecciated equivalents. This chert accumulation represents chemical sedimentation in a quiescent basinal environment on the flank of a major felsic-intermediate pyroclastic eruptive centre located to the south and west. Base metal mineralization at Shunsby is restricted to the thickest portion of the chert assemblage, representing the deepest portion of the basin. Figure 7 presents a schematic vertical stratigraphic section which attempts to summarize the relationship of the known mineralization to the Shunsby lithologies displayed in their proper stratigraphic position using the top of the Shunsby pyroclastic-sedimentary assemblage as the datum plane.

Chemically and petrographically, some of the classic hydrothermal alteration patterns associated with Archean VMS deposits seem to be present in the volcanic portion of the stratigraphy.

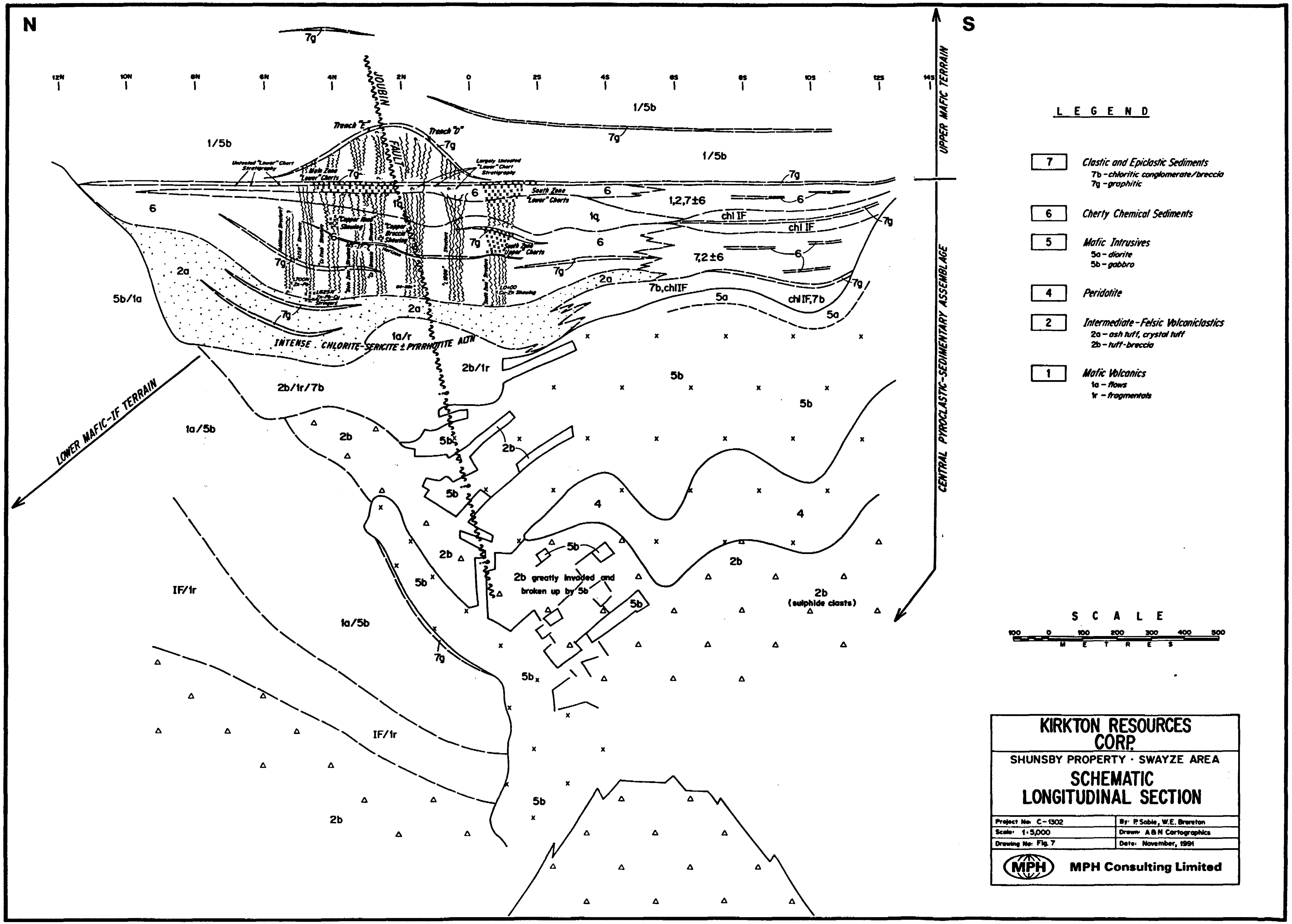
In terms of number and density of mineralized structures, it would appear that a dense "core" of relatively closely-spaced systems underlies the Main Zone "Lower" cherts. Mineralized structures become more widely-spaced laterally towards the north and to the south where the South Zone area would appear to mark the southern periphery of the system.

One important question is the timing of the event that created the mineralization relative to the volcanic history of the area. That is, was this event broadly synchronous with volcanism such that the system may have vented at the seafloor or superimposed on the rock assemblage long after the overlying rocks had been laid down with the mineralizing event triggered by subsequent tectonism, igneous intrusive activity, etc. This is a critical consideration in that if the system did vent at the seafloor, large massive sulphide deposits may have formed given the relatively large scale of the stringer system. Whether or not this happened, it is certainly clear that the Cu-Zn host fracture systems did not penetrate into the overlying mafic terrain.

Another topic of interest is the source of the metals. Were these introduced from the substrate or were they derived from primary syngenetic mineralization in the chert basin and simply re-mobilized and re-distributed during a subsequent tectonic/intrusive event?

The recognition that tops are to the east clearly defines the string of largely untested EM conductors at the top of the central pyroclastic-sedimentary assemblage as being the obvious targets for more massive deposits. The existence of a mineralized glacial dispersion train along this EM trend with some quite high grade individual samples is well documented.

The results in previous hole 64-82e are intriguing. This hole contained some of the best copper grades in all of the drilling on the property and is also one of the deepest/most westerly tests of the cherts. There was indicated to be more volcanic material in this hole at the expense of chert



N
S
12N
10N
8N
6N
4N
2N
0
2S
4S
6S
8S
10S
12S
14S
JOUBIN FAULT
Trench "E"
Trench "D"
UPPER MAFIC TERRAIN
CENTRAL PYROCLASTIC-SEDIMENTARY ASSEMBLAGE
LOWER MAFIC-IF TERRAIN
INTENSE CHLORITE-SERICITE ± PYRRHOTITE ALTN
South Zone "Lower" Cherts
South Zone "Upper" Cherts
2b greatly invaded and broken up by 5b
2b (sulphide clasts)
L E G E N D
7 Clastic and Epiclastic Sediments
7b - chloritic conglomerate/breccia
7g - graphitic
6 Cherty Chemical Sediments
5 Mafic Intrusives
5a - diorite
5b - gabbro
4 Peridotite
2 Intermediate - Felsic Volcaniclastics
2a - ash tuff, crystal tuff
2b - tuff-breccia
1 Mafic Volcanics
1a - flows
1r - fragmentals
S C A L E
100 0 100 200 300 400 500
M E T R E S
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY · SWAYZE AREA
SCHEMATIC LONGITUDINAL SECTION
Project No: C-1302
Scale: 1:5,000
Drawing No: Fig. 7
By: P. Sobie, W.E. Brereton
Drawn: A & N Cartographics
Date: November, 1991
MPH Consulting Limited

such that the "Lower" chert may be undergoing a facies change in the present down-dip direction into a more volcanic-dominated environment. Again, there may be very real potential for copper-rich, more massive deposits in this direction. Lithogeochemical results tentatively suggest that alteration intensity is increasing in the down-dip direction.

Possibilities for classical VMS deposits notwithstanding, the economic possibilities of the known, structurally-controlled mineralization should not be overlooked. Some of the trenching results during the current program clearly indicate that the stringer mineralization is of ore grade and potentially open pittable, if sufficient material can be outlined. It is critical that holes be drilled northeasterly in evaluating these structures, and therefore virtually all past work is useless in this regard.

It has become obvious that all previous mineral inventory calculations, including the '1990 MPH figure, can be discarded given the direction of drilling relative to the attitude of mineralized structures. Whilst it is certain that some stratiform mineralization is present in especially the argillites, the strike extent and continuity is very limited, making any section to section correlation invalid. It is perhaps enlightening to recall the assessment of consulting mining engineers Hill, Goether and de Laporte Ltd. in 1983 who, in assessing the "Lower" cherts near surface inventory, noted "the continuity of mineralization depicted in cross-sections by Fairbairn (1982) is not substantiated by the data in detail and that therefore there may be considerable doubt that a reserve of the size Fairbairn had estimated, exists. It is felt that some of the data may have been made to fit a model of continuity, where continuity should not be expected geologically".

9.0 CONCLUSIONS AND RECOMMENDATIONS

The geology and nature of the mineralization on the Shunsby property is finally understood to the extent that an effective drill campaign can be mounted and it is concluded that such a campaign is strongly warranted based on results to date and should proceed.

The drilling overall should focus on three aspects:

(a) drill testing of priority, near surface EM zones along the top of the central volcano-sedimentary unit for VMS deposits.

(b) systematic evaluation of the ore potential of the known, stringer-type mineralization

(c) "wildcat" testing of other concepts such as the down-dip extension of the cherts, several short strike length EM features, and the western IF domain.

A minimum of 10,000 feet of drilling budgeted at an all-inclusive cost of $300,000 should be carried out with the initial emphasis on a) and b) above. The drilling to evaluate the known mineralized systems should be carried out on cross-sectional profiles as indicated on Map 3 with holes drilled in a northeasterly direction at -45° and terminating in the "Footwall Diorite" complex. Specific tests of conductors 40b (1d) with -45°, northeasterly directed holes should also be made on lines 050N, 100N, 150N, 200N and 250N. Conductor 42a (12) should likewise be tested on lines 300N and 350N. These conductor-specific holes would be relatively short tests (50-75m) terminating in the overlying gabbroic rocks.

Further drilling would be based on the above relative to our exploration models for the property.

Respectfully submitted,

Paul A. Sobie, B.Sc.

W.E. Brereton, P.Eng.

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APPENDIX 1 - ANALYTICAL RESULTS

Swastika Laboratories

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Established 1928

Assaying - Consulting - Representation

Geochemical Analysis Certificate

1W-3162-RG1

Company: MPH CONSULTING LTD.

Date: JUN-21-91

Project:

Attn: MR. W. BRERETON

Copy 1. 2406-120 ADELAIDE ST.W.TORONTO,ONT
2. M5H 1T1
3. FAX TO 416-365-1830

We hereby certify the following Geochemical Analysis of 4 ORE samples submitted JUN-17-91 by .

Sample Number	Au ppb	Cu %	Zn %
SH-91-01	24	1.00	0.15
SW-91-01	Nil		
SW-91-02	Nil		
SW-91-03	55/41		

Certified by Donna Gardner

P.O. Box 10, Swastika, Ontario P0K 1T0
Telephone (705) 642-3244 FAX (705)642-3300

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Assaying - Consulting - Representation

Geochemical Analysis Certificate

1W-3405-RG1

Company: **MPH CONSULTING LIMITED**
Date: JUL-22-91
Project: C-1302
Attn:

Copy 1. 2406-120 ADELAIDE ST.W. TORONTO,ONT
2. M5H 1T1
3. FAX TO 416-365-1830

We hereby certify the following Geochemical Analysis of 61 ROCK samples submitted JUL-11-91 by .

Sample Number	Au ppb	Au check ppb	Ag ppm	Cd ppm	Cu %	Ni ppm	Pb %	Zn %	Pt ppb
SH-91-01A	120	106			0.43	361	0.08	0.28	
SH-91-01B	62				0.02			0.18	
SH-91-01C			2.0				0.63	1.70	
SH-91-02	24				0.03			0.04	
SH-91-03	14		0.7		0.05		0.005	0.12	
SH-91-03A	226	254							
SH-91-04	21				0.03			0.18	
SH-91-04A	31				0.13	243			
SH-91-05	89				0.48			0.98	
SH-91-06	86		2.6	216	0.15		1.71	5.31	
SH-91-07	175				0.12				
SH-91-08	48				0.01	190		0.05	<10
SH-91-09	Nil				0.01				
SH-91-10	Nil		2.2		0.02		0.76	2.25	
SH-91-11			6.2	507			3.34	12.08	
SH-91-12	34		1.7		0.10		0.24	0.77	
SH-91-12A	45				0.31				
SH-91-13	106	103	2.7	99	0.14		0.51	2.12	
SH-91-14	41		5.1	94	1.38		0.65	3.62	
SH-91-14A	58				0.08				
SH-91-15	76		4.6	251	0.28		2.49	6.94	
SH-91-16	Nil		1.7	119	0.15		0.73	3.37	
SH-91-17	Nil		5.0	122	0.86		0.72	3.25	
SH-91-18	34		14.2		2.59		0.02	0.32	
SH-91-19	41		2.8	81	0.46		0.27	2.26	
SH-91-20	31		1.8		0.22		0.51	1.61	
SH-91-21	Nil		0.6		0.04		0.20	0.52	
SH-91-22	10		0.4		0.03		0.04	0.13	
SH-91-23	41		6.8	237	0.69		1.30	5.97	
SH-91-24	55		2.4		0.15		0.05	0.59	

Certified by G. Lebel

Swastika Laboratories

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Established 1928

Assaying - Consulting - Representation

Geochemical Analysis Certificate

1W-3405-RG1

Company: **MPH CONSULTING LIMITED**
Project: C-1302
Attn:

Date: JUL-22-91

Copy 1. 2406-120 ADELAIDE ST.W. TORONTO,ONT
2. M5H 1T1
3. FAX TO 416-365-1830

We hereby certify the following Geochemical Analysis of 61 ROCK samples submitted JUL-11-91 by .

Sample Number	Au ppb	Au check ppb	Ag ppm	Cd ppm	Cu %	Ni ppm	Pb %	Zn %	Pt ppb
SH-91-24A	45				0.39				
SH-91-25	41		18.5		3.53		0.02	0.52	<10
SH-91-26	31		0.8		0.06		0.01	0.19	
SH-91-26A								0.41	
SH-91-27	38		43.6	206	4.17		1.38	5.34	
SH-91-28	10		0.7		0.08		0.23	0.73	
SH-91-29	38		1.7	287	0.05		0.34	8.40	
SH-91-30	48		7.2	312	0.92		0.48	8.39	
SH-91-31			5.8	170	0.72		0.45	4.61	
SH-91-32			2.3	86	0.33		0.59	2.13	
SH-91-33	24		6.8	408	0.14		1.41	12.12	
SH-91-34	38		8.6	351	0.21		4.08	9.62	
SH-91-35	27	38	20.5	386	1.89		2.78	10.58	
SH-91-36	45		11.2	517	0.66		3.24	13.96	
SH-91-37			2.8	11	0.07		0.04	0.52	
SH-91-38	34		3.2		0.10	152			
SH-91-39			5.4	101	0.06		0.47	2.09	
SH-91-40			1.7		0.08		0.01	1.18	
SH-91-41			0.7		0.03		0.005	0.23	
SH-91-42			7.1		0.12		0.30	1.81	
SH-91-43			5.5	103	0.20		0.40	2.87	
SH-91-44			1.4		0.06			0.45	
SH-91-45	17		0.6		0.05	88			
SH-91-46			0.7		0.02			0.05	
SH-91-47	31		0.9						
SH-91-48	24		4.5	154	0.71	144	1.11	3.90	
SH-91-49	38	38	8.4	158	1.37		1.21	4.97	
SH-91-50	45		29.9	16	7.11		0.21	0.52	
SH-91-51	Nil		9.4	48	2.44		0.30	1.64	

Certified by

P.O. Box 10, Swastika, Ontario P0K 1T0
Telephone (705) 642-3244. FAX (705)642-3300

Swastika Laboratories

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Assaying - Consulting - Representation

Established 1928

Assay Certificate

1W-3945-RA1

Company: **M.P.H. CONSULTING LTD.**
Project: C-1302
Attn: W. BRERETON

Date: SEP-16-91

We hereby certify the following Assay of 4 ROCK samples submitted SEP-11-91 by .

Sample Number	Ag %	Cu %	Pb %	Zn %
SH-91-52	0.36	0.81	1.61	4.04
SH-91-53	0.05	0.13	0.21	2.84
SH-91-54	0.20	0.02	2.68	9.00
SH-91-55	1.16	3.71	2.75	5.30

Certified by Donna Gardner

P.O. Box 10, Swastika, Ontario P0K 1T0
Telephone (705) 642-3244, FAX (705)642-3300

APPENDIX 2 - LITHOGEOCHEMICAL PROCESSING TECHNIQUE

METHODS OF MICROCOMPUTER-BASED DATA PROCESSING APPLIED TO THE LITHOGEOCHEMICAL EXPLORATION FOR VOLCANOGENIC MINERALIZATION

John M. Siriunas, P.Eng.
MPH Consulting Limited
Toronto, Ontario

Paper prepared for the Computer Applications in Mineral Exploration 1984, Conference and Exhibition, Toronto, January, 1984

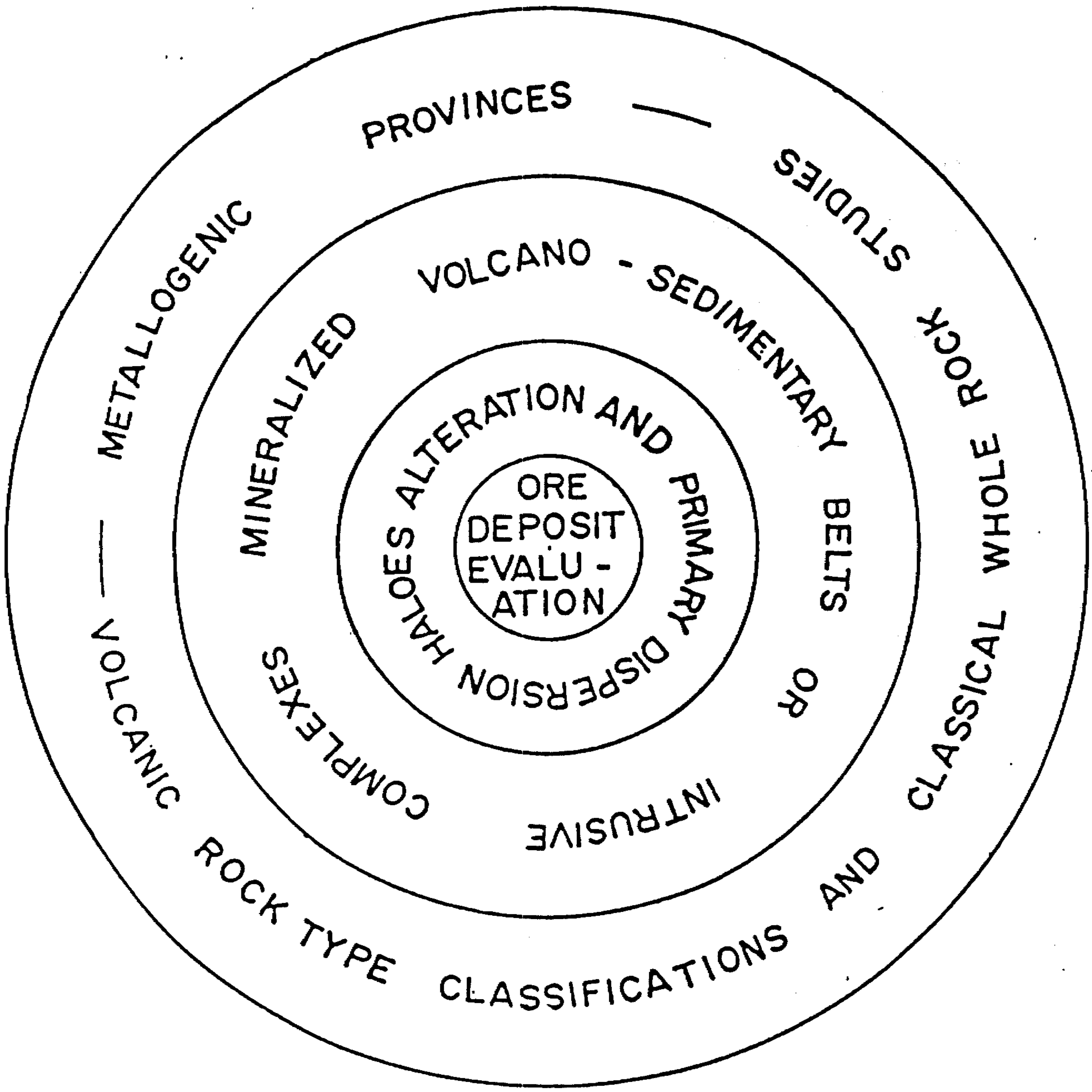
METHODS OF MICROCOMPUTER-BASED DATA PROCESSING APPLIED TO THE LITHOGEOCHEMICAL EXPLORATION FOR VOLCANOGENIC MINERALIZATION

GENERAL OVERVIEW

In their 1979 review of the subject, Govett and Nichol (1979, p. 339) defined lithogeochemistry as "the determination of the chemical composition of bedrock material with the objective of detecting distribution patterns of elements that are spatially related to mineralization". Within the framework of this definition, lithogeochemical techniques can be used at a variety of scales or levels, all of which can aid the explorationist in pinpointing a possible mineral deposit. From the most regional or megascopic scale to the most detailed or macroscopic these approaches (Figure 1) include:

1) the resolution of metallogenic provinces and/or rock type classifications and studies (100-1000 km scale)
2) the identification of mineralized volcano-sedimentary belts or mineralized intrusives (10-100 km scale)
3) the identification of alteration trends, primary dispersion halos and favourable stratigraphic horizons (0.1-10 km scale)
4) ore deposit evaluation (including classical assaying)

At MPH Consulting Limited, microcomputer-based data processing methods are applied to lithogeochemical studies used on a variety



USES OF LITHOGEOCHEMICAL STUDIES

Figure 1.

of these exploration levels, particularly in association with programmes of exploration for volcanogenic base metal and gold deposits. These methods are routinely utilized to aid concurrent geological mapping and sampling or alternatively they can be undertaken as independent study projects.

CONCEPTUAL MODEL

Base and precious metal mineral deposits occur under special geological conditions where the commodities sought after occur in concentrations on the order of 500 to 5,000 times background crustal abundances and may therefore be exploited at a profit.

To realize these geological concentrations, metals must be extracted or leached from a relatively diffuse environment and transported to a locus where conditions are favourable for their deposition. The hydrodynamic systems which are generated around thermal anomalies in the crust (e.g. volcanic centres) are the principal method to achieve this end. Heat conduction and fluid convection through the surrounding rocks are integral factors of the processes that control the geochemical environment for the dissolution and precipitation of metallic and other components (see Figure 2).

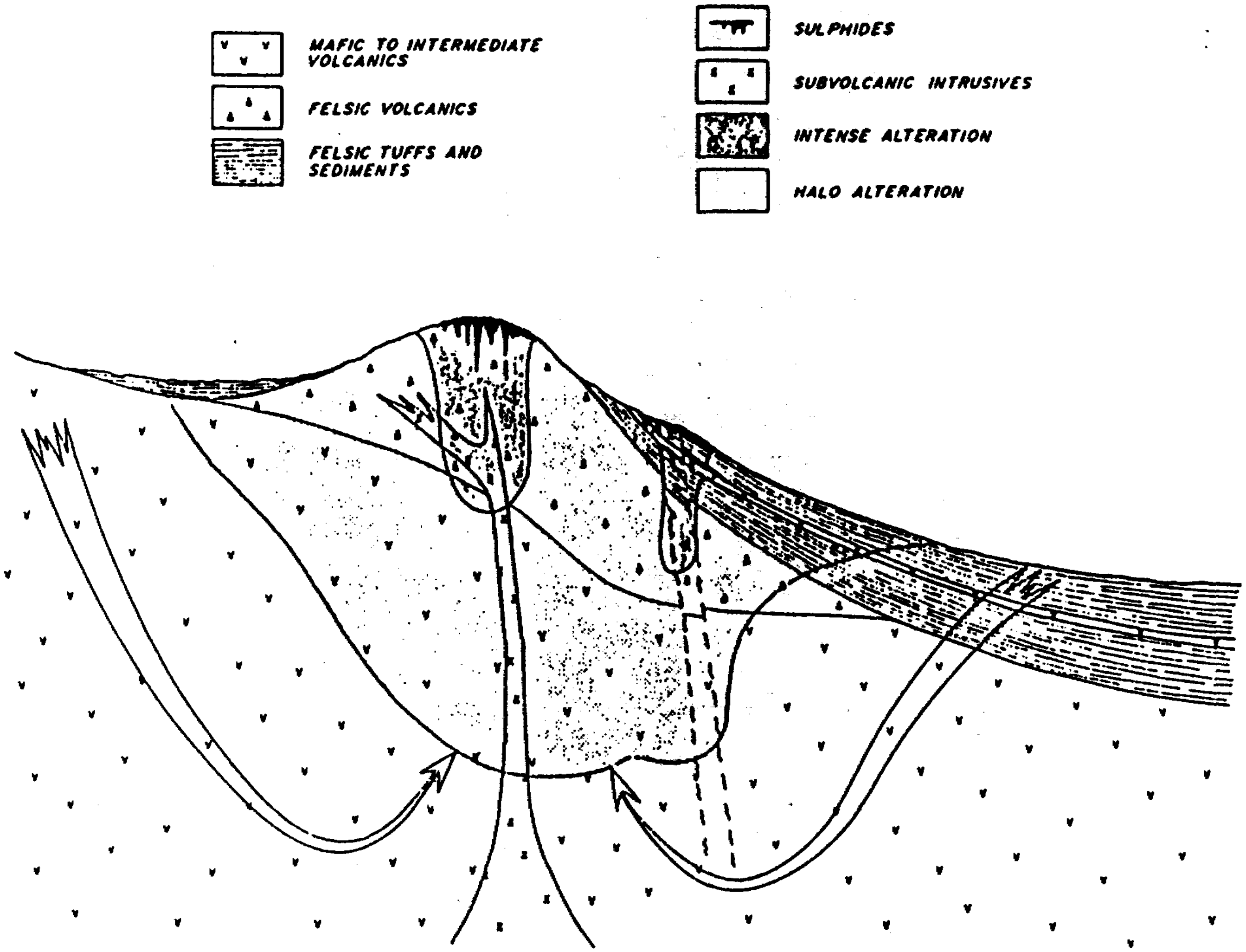


Figure 2: Conceptual model for the generation and disposition of alteration patterns related to volcanogenic mineralization.

Consistent and distinctive patterns of elemental or oxide enrichment or depletion are documented to occur within the rocks in the vicinity of felsic volcanic centres where solfataric activity is known to have taken place; of course, it is those patterns which were developed concomitant with the significant enrichment of base and precious metals which are the ones that the explorationist wishes to study. Briefly, the element and oxide patterns of major importance to the study include the enrichment of magnesia, total iron, silica, carbon dioxide, with or without potash, and the depletion of soda and lime (or magnesia around gold deposits).

The close spatial and time relationship between chemical sediments and syngenetic ore in many Archean base metal and gold deposits intimates that these sediments may be used as indicators of possible stratigraphic zones in which economic stratabound sulphide mineral accumulations may be located. Primary dispersion from a volcanic centre as exemplified by trace element data can be used to identify or map mineralized horizons or to define multi-element haloes around mineralized zones (Scott et al, 1982). These types of studies can be greatly enhanced by the examination of only specific mineral fractions (e.g., sulphides or chlorites). Some enrichment of the trace elements may also be identified in the host rocks immediately stratigraphically below an ore deposit.

The principles of the mineralization process are universal. It requires only that the proper pathfinders be employed in the exploration effort.

MICROCOMPUTER UTILIZATION

In conjunction with a geological survey, the geochemical analysis of rock and drill core or cutting samples for the major and minor rock-forming oxides and/or trace elements can be used to help characterize rock types or to aid in identifying unusual chemical features or elemental distributions which may be present due to some mineralizing process. These features may be recognized on both a regional or local scale. At MPH, specialized microcomputer software has been assembled, which in combination with a variety of standard in-house petrographic and mineralogical investigations is used to evaluate lithogeochemical data for the purposes of volcanic rock classification and the identification of specific geochemical conditions that may be the result of volcanogenic mineralization processes in Archean rocks.

The main microcomputer hardware used at MPH is comprised of a Z-80 microprocessor with 64K bytes of RAM and dual 390K byte floppy disks. This is teamed with an intelligent terminal, a long-axis bi-directional plotter/printer and a modem to allow for a variety of input and output versatilities. Smaller field portable microcomputers are routinely interfaced with the system, especially for the handling of geophysical data.

The data base used for the archiving of geochemical data allows for the storage of 32 major and minor oxide and trace element components as well as latitude, departure, subsetting qualifiers and the field description of each sample. Data is generally input from the keyboard, though it is possible to accept the data from remote sources using the modem.

STATISTICAL METHODS

A number of statistical methods are used for the preliminary interactive study of lithogeochemical data in conjuntion with volcanogenic mineral exploration. Many univariate statistical methods are found to be useful in the study and interpretation of various types of geochemical media and are exemplified by the examination of computer-generated histograms, their log-transformed equivalents and derived probability plots (Figure 3).

Multivariate techniques are used to carry out correlations and to evaluate the presence or extent of various geochemical anomalies. An extremely useful multivariate technique which is employed is the examination of bivariate (scatter) plots for a variety of data variables (Figure 4). These plots are particularly useful when

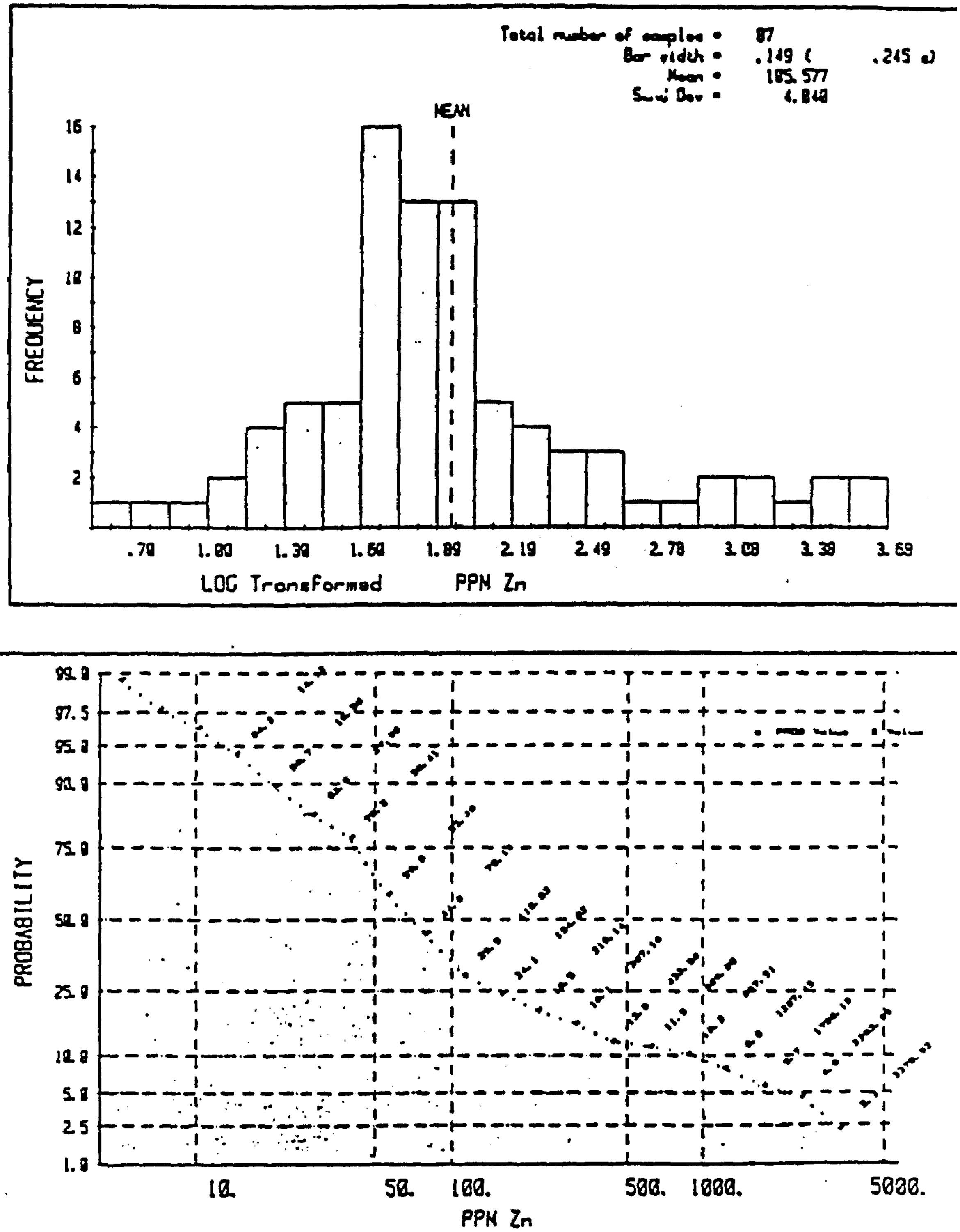


Figure 3 : Basic statistical manipulations utilizing $\log_1$ transformed data and corresponding probability plot.

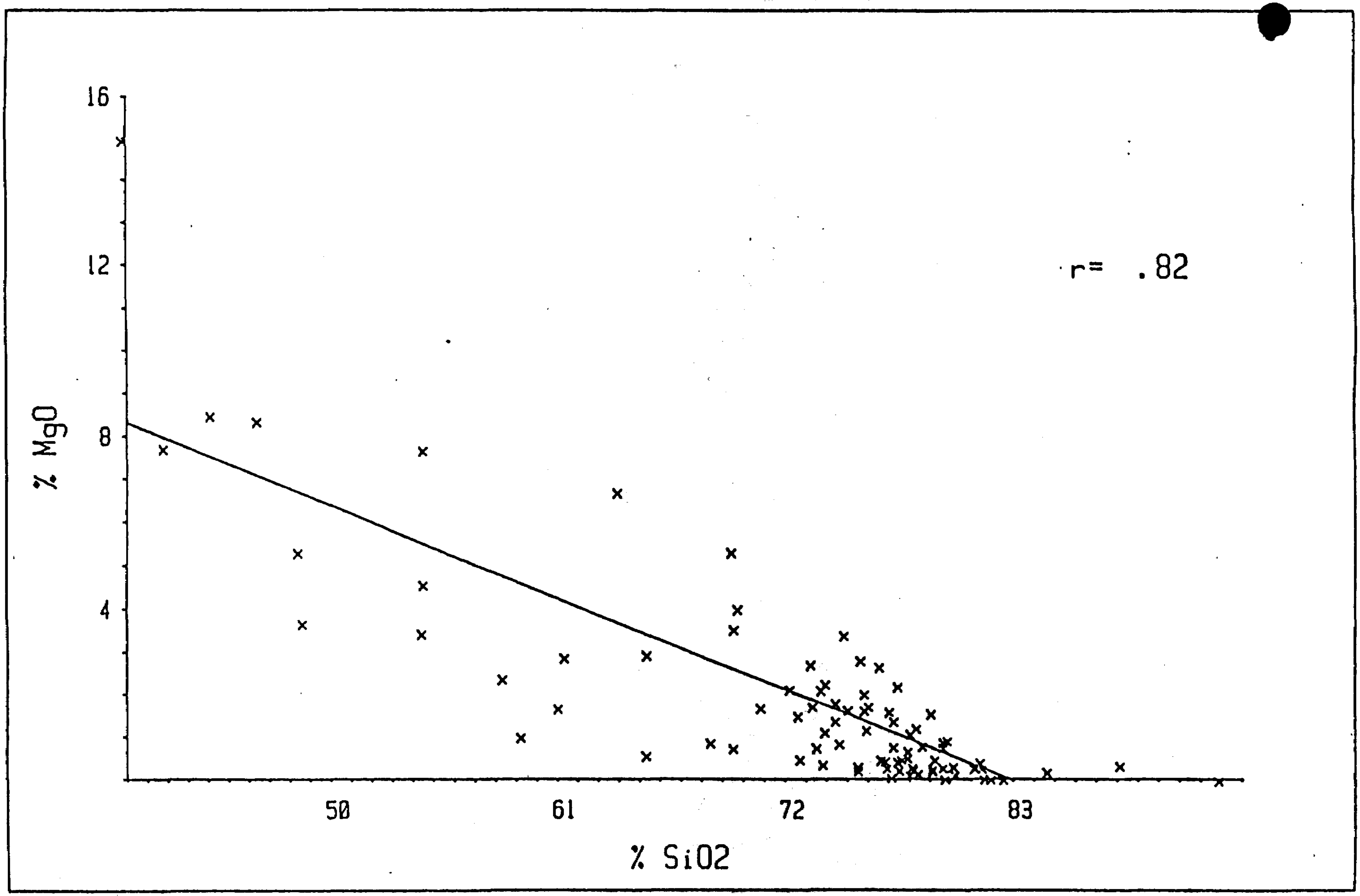
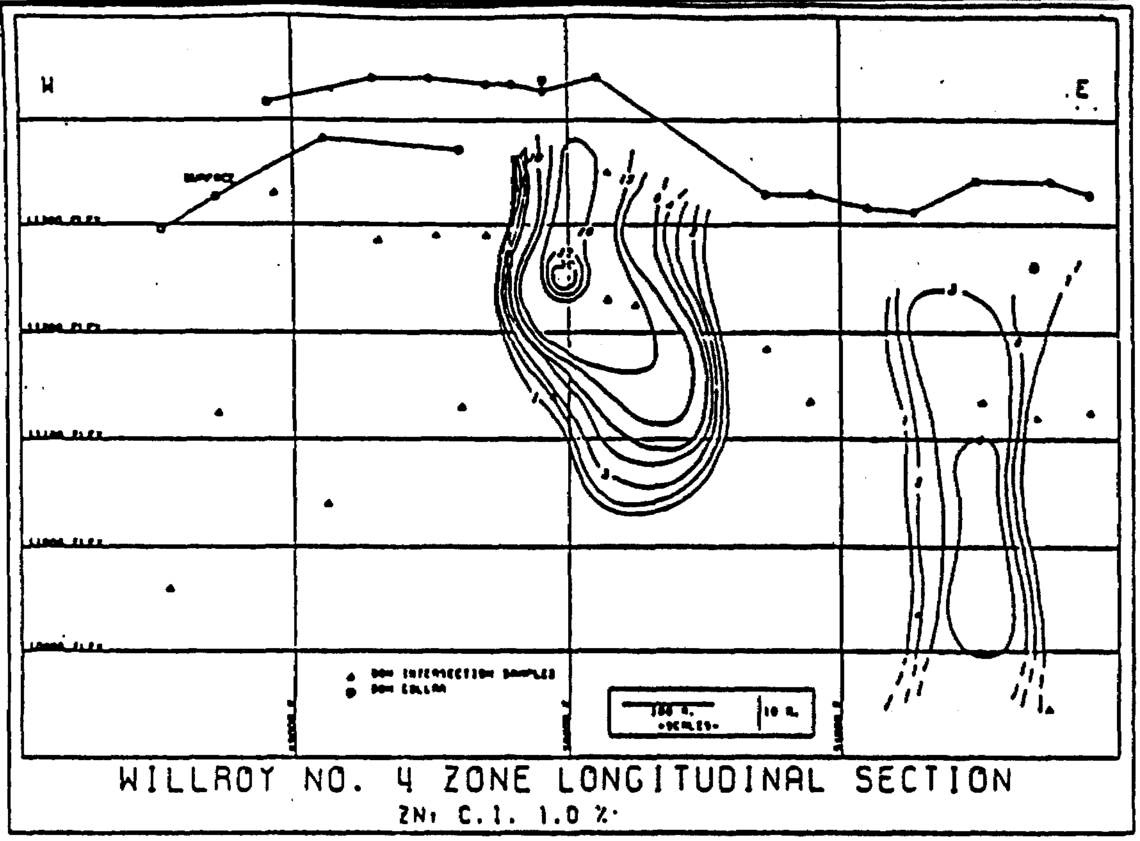


Figure 4: Bivariate (scatter) plot with best-fit straight line and correlation coefficient (r)

making chemo-stratigraphic correlations, when studying alteration patterns on a local scale or when examining other alteration phenomena.

Factor analysis was originally developed for use in experimental psychology but has been extensively applied to geology and geochemistry. The main use of factor analysis is to combine a group of intercorrelated data and plot a representation of the combined element variation so that a better exploration halo than could be recognized by any single element analysis can be defined. As an example of this, the observed distribution of zinc values in the favourable horizon surrounding an Archean stratabound ore body (Willroy No. 4 Zone, Manitouwadge) can be compared with factor scores for the model employing zinc-antimony-arsenic and tin components. A larger detectable halo is observed to be present using the factor model (Figure 5).

However, the main emphasis of the MPH approach to lithogeochemical exploration is by way of what is termed the volcanogenic evaluation. The key to this method is the examination of the alteration components that might affect the classification of rock type or be closely related to the processes of proximal volcanogenic mineralization.



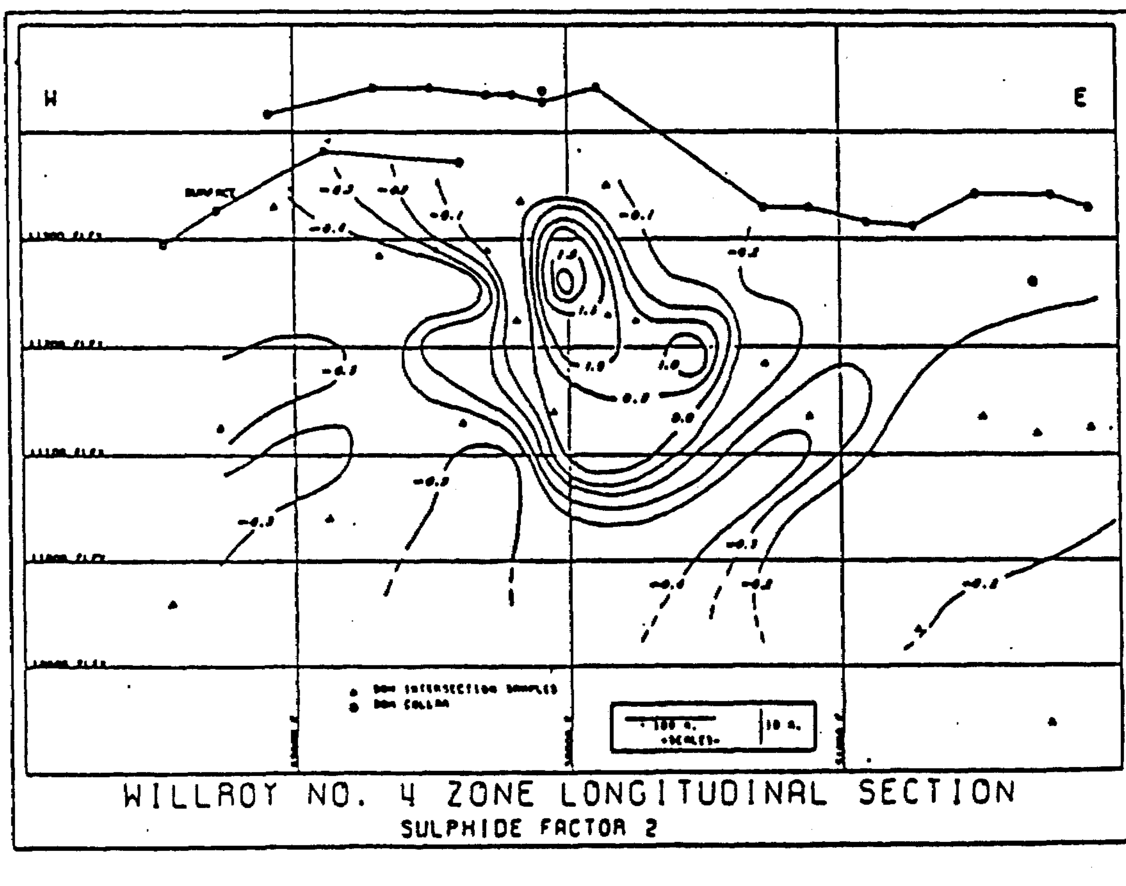


Figure 5: Comparison of Zn distribution and factor scores for the model employing Zn-Sb-As-Sn (Sulphide Factor 2) at Willroy No. 4 ore zone.

GEOCHEMICAL ROCK CLASSIFICATIONS

One of the main pitfalls in classifying rocks geochemically is the sensitivity of the main classifying components (e.g., K_2O, Na_2O, Fe_2O_3, MgO) to alteration processes. Also, one system of classification may identify a particular rock differently from some other method of classification, especially when the rock has been severely altered. However, if we recognize that this may be the case, this circumstance can be used to our advantage when attempting to identify alteration patterns in volcanic rocks. If a number of classification methods including mineralogical or petrographic methods are utilized, any major discrepancy can be assumed to be associated with some style of geochemical abnormality that may be worthy of further investigation.

The classification schemes used by MPH include the Jensen Cation Plot (Jensen, 1976; Grunsky, 1981) and the method described by Irvine and Baragar (1971). The Jensen scheme is based strictly on the chemistry of the (subalkaline) volcanic rock while the Irvine and Baragar method is based in part on the normative mineral percentages calculated from the major rock forming components and on an AFM ternary plot. In addition to these two schemes, rocks are classified based on their silica and titania content. These latter methods, though not nearly as complex, are less sensitive (especially titania) to alteration processes (Spitz and Darling, 1975). Since all these classification schemes are designed to be used exclusively on volcanic rocks, all terminology contained therein for the classification of non-extrusive volcanic rock types is in terms of chemo-volcanic equivalents.

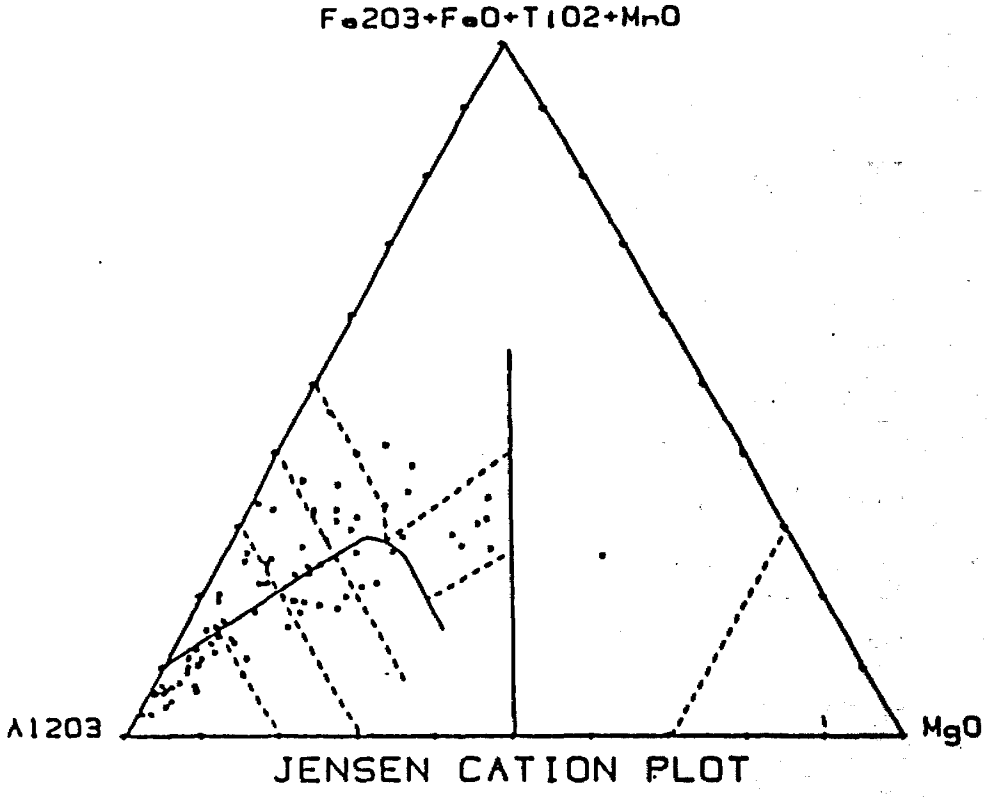
In addition to the major classifications that are performed, minor features such as high values for loss on ignition or potash to soda ratios are noted for the information of the interpreter. All computer classifications are performed using arithmetic algorithms so that plotting is not inherently necessary, however, it is the option of the user to have ternary plots made by the online plotter (Figure 6).

ALTERATION FEATURES

Alteration components that might affect the classification of rock type or be closely related to volcanogenic mineralization are examined within the computer programme. These are divided into those inherently associated with base metal mineralization and those closely allied to mafic-hosted gold mineralization.

Volcanogenic Base Metals Evaluation

The key to this evaluation method is the identification of depletion or enrichment trends in total iron, the alkali oxides and alkali earth oxides within felsic volcanic rocks. These



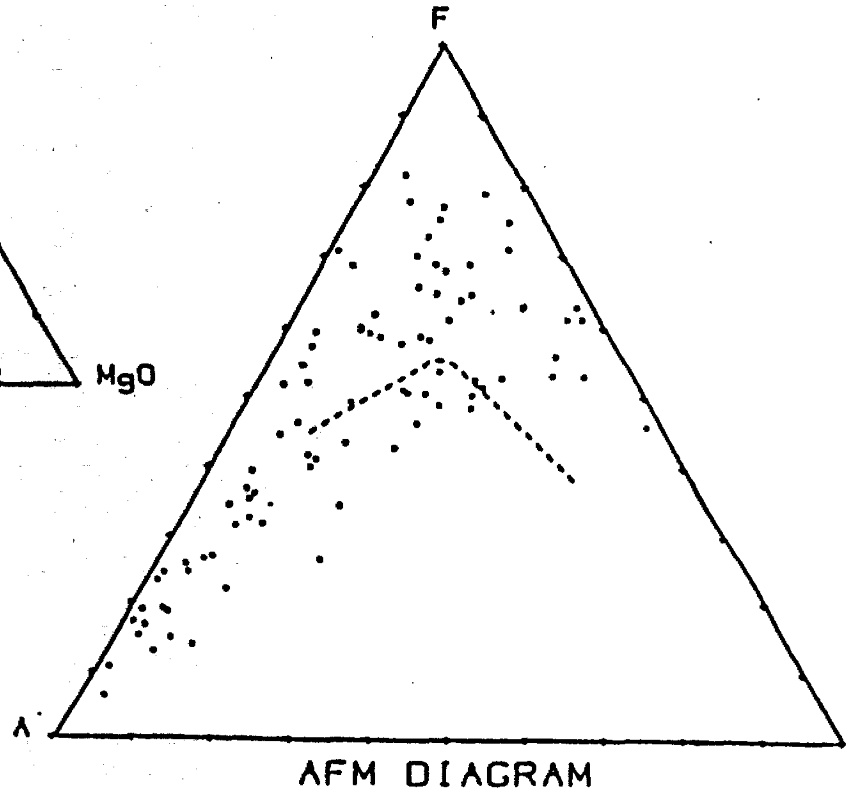


Figure 6: Ternary plots for rock classification

trends as were examined earlier, are recognized to form integral parts of the overall ore-forming process in mineralized Archean systems. These features are examined by a number of methods. Qualitative enrichment or depletion trends or "residuals" are calculated by a comparison of observed versus "average" ratios of alkali or iron to silica as observed in suites of rock studied in a number of published and unpublished studies (Descarreux, 1973; Lavin, 1976; McConnell, 1976; Sopuck, 1977). An indication of the residual silica content is derived from a comparison with the alumina content of the rock. Suites of rocks from the Abitibi orogenic belt form a large portion of this "average" population.

A more quantitative evaluation is provided by calculating what is herein designated as the "total alkali alteration score" or TAAS. This alteration score is derived from the ratio of those oxides expected to be enriched due to alteration with respect to the total alkali content (i.e. $(MgO+K_2O)/(CaO+Na_2O+K_2O+MgO) \times 100$, after Hashimoto, 1977). As the magnesia and potash contents of a volcanic rock increase with respect to the total alkali content, the TAAS approaches 100. Average values for subalkaline mafic to felsic volcanics lie between 35 and 50. Subalkaline komatiites and alkaline volcanics will typically exhibit alteration scores greater than 70 due to their inherently high magnesia and potash contents respectively. Highly altered felsic volcanic rocks will have values in excess of 80 or 90.

Discriminant analysis is a statistical technique that can be used to help "discriminate" between different populations (for example a background and anomalous population) within a larger population of multivariate data. Based on known data, an equation with varying proportions or weightings of the component elements is generated. When the equation is solved with the various data from a sample point, the magnitude of the scalar product sum is used to classify that particular sample as "background" or "anomalous". As with most populations there is some overlap, but the equation is selected so as to minimize the overlap between the two populations. It is anticipated that more subtle geochemical alteration features may be indicated by this technique and hence increase the areal extent over which an alteration halo can be observed.

Within the MPH computer programme, five discriminant functions with varying components are used to classify the samples; the higher the discriminant score the more anomalous the sample. A table of the components of these functions is presented in Table 1. These particular discriminant functions were derived from published and unpublished studies of felsic volcanic rocks in the Abitibi, Wabigoon and Uchi belts of the Superior Province. Questions have been raised as to the universality of discriminant functions; contentions are that they are valid only for their specific test populations. For this reason the five discriminant functions are utilized so that the responses that work in different geological settings may be compared.

TABLE 1
DISCRIMINANT FUNCTIONS

Equation	Components*	Source
DF1	TiO_2,$-Na_2O$,MgO,-CaO,$-Fe_T$	(1)
DF2	Fe_T, Zn	(2)
DF3	Fe_T, Na_2O, Zn	(3)
DF4	Fe_T, Na_2O, MgO,-CaO	(4)
DF5	MgO, Fe_T, Mn	(2)

(1) Marcotte and David, 1981 (See also Valiquette et al, 1980)
(2) Sopuck, 1977
* Components for DF2 through DF5 are all residual values.

Volcanogenic Gold Evaluation

Analogous to the evaluation for base metal potential, there are geochemical features that can allude to the presence of syngenetic gold mineralization in mafic Archean terrains. Just as felsic volcanic environments are important to the prospects of base metal mineralization, the presence of magnesium-rich tholeiites or komatiitic rocks is recognized to be important to the prospects of syngenetic gold mineralization (Fyon and Crocket, 1981). Though minor felsic volcanics are occasionally present, the largest proportion of wall rock is expected to be the komatiites and/or tholeiites supposedly as a source rock for much of the gold. The primary distinction in evaluating a suite of mafic volcanic rocks for gold is, therefore, made by determining its rock classification.

The most obvious alteration patterns associated with gold mineralization tend to be related to the development of carbonate minerals (especially magnesium-bearing carbonates) (Fyon and Crocket, 1981; Whitehead et al, 1981). Carbonatization can be recognized by a ratio of weight percent carbon dioxide to lime, a ratio greater than 1.5 being considered significant. In that typically only LOI analyses will be available for most whole rock analyses, carbon dioxide content can be conservatively approximated by a portion of the LOI content. Alteration mineral assemblages in komatiitic rocks and high magnesium tholeiites can also be estimated from LOI analyses and are included as a measure of the degree of alteration (i.e., carbonatization).

Anomalies in the peraluminosity index ($Al_2O_3/(CaO+K_2O+Na_2O) \times 100$) of volcanic rocks are reported to surround the producing mines in the Red Lake mining camp (MacGeehan and Hodgson, 1981). This relative enrichment in alumina is primarily due to the local depletion of soda near the deposits.

The old adage that "gold is the best indicator of gold" is still one of the most important factors when engaged in the search for gold mineralization. High gold contents in volcanic rocks and chemical sediments are cited as good indicators of gold mineralization by many investigators. Good success in discriminating between volcanic rocks associated with gold mineralization from those which are not is also reported by the use of the absolute potash and arsenic contents of those rocks (Whitehead et al, 1981).

PRESENTATION OF RESULTS

Results of the volcanogenic evaluation are available to the user in a number of formats. A data set can be quickly and interactively reviewed on the terminal. Information displayed includes rock type designations, residual, discriminant function and ratio calculations and the original data can be accessed for interpretive comparison. The evaluation portion has been separated into those features which, as discussed, are intrinsically associated with base metal deposits and those which are associated with gold mineralization. Anomalous or favourable results of the evaluations are flagged and highlighted.

Hard copy output are available for each sample (Figure 7) or summaries of the anomalous quantities for each sample may be tabulated.

```
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> SAMPLE <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

        JENSEN CLASSIFICATION: Suite and rock type (1)

        IRVINE/BARAGAR CLASSIFICATION: Suite, rock type and division (2)

        SiO2 CLASSIFICATION: Rock type (3)

        TiO2 CLASSIFICATION: Rock type (3)

                                       ******* <- Flag classification discrepancy

              Rock is highly altered (carbonate etc) <- Flag high LOI content
              Rock is potash- or soda-rich           <- (4)


--------------------Volcanogenic base metals Evaluation--------------------
[ Highlight heading if favourable rock type, underline if numerous anomalies ]
  ***WARNING*** SiO2 content TOO LOW for accepted volcanogenic studies ***
                    ^- Flag samples with < 60% SiO2 -^
                                Residuals:
     MgO        K2O        CaO        Na2O       Fe2O3       SiO2       TAAS
     (5)        (5)        (5)        (5)        (5)         (6)        (7)
   *******    ******       <- Flag anomalous (8) residuals

                         Discriminant Functions:
                    DF1       DF2       DF3       DF4       DF5
                    (9)       (10)      (10)      (10)      (10)
                  *******   <- Flag anomalous discriminant functions

------------------------Volcanogenic Au Evaluation------------------------
[ Highlight heading if favourable rock type, underline if numerous anomalies ]
                   *** Favourable wall rock is present ***
      ^- Flag Mg-tholeiites and komatiites (Jensen classification) -^
     Na2O(R)     K2O(%)      Au          As       Per. Index(11)     CO2/CaO
    (5, 13)      (12)       (13)        (12)          (13)            (12)
    *******    *******      <- Flag anomalous quantities

      Carbonate alteration assemblage present (14)

--------------------------------------------------------------------------------
                               Original Data
-----Subset--Rock type--Latitude--Departure-------------Comments---------
   SiO2      Al2O3      Fe2O3      FeO       CaO       MgO       Na2O      K2O
   TiO2      MnO        P2O5       LOI       CO2       Cr2O3     Zr        Sr
   Rb        BaO        W          U         Th        Cu        Zn        Pb
   Ni        Au         Ag         S         As        Sb        X1        X2
--------------------------------------------------------------------------------
```

References and explanations:

1) Jensen, 1976; Grunsky, 1981
2) Irvine and Baragar, 1971
3) Spitz and Darling, 1975
4) Brooker, 1979
5) Sopuck, 1977
6) from Al2O3(R); Sopuck, 1977
7) "Total Alkali Alteration Score", after Hashimoto, 1977 in Brooker, 1979
8) MgO, CaO, Na2O, Fe2O3 limits from McConnell, 1976
   K2O, SiO2 limits from Descarreaux, 1973
9) Marcotte and David, 1981
10) Sopuck, 1977
11) Peraluminosity Index
12) Whitehead et al, 1981
13) MacGeehan and Hodgson, 1981
14) Fyon and Crocket, 1981

Figure 7: Presentation format of evaluation output

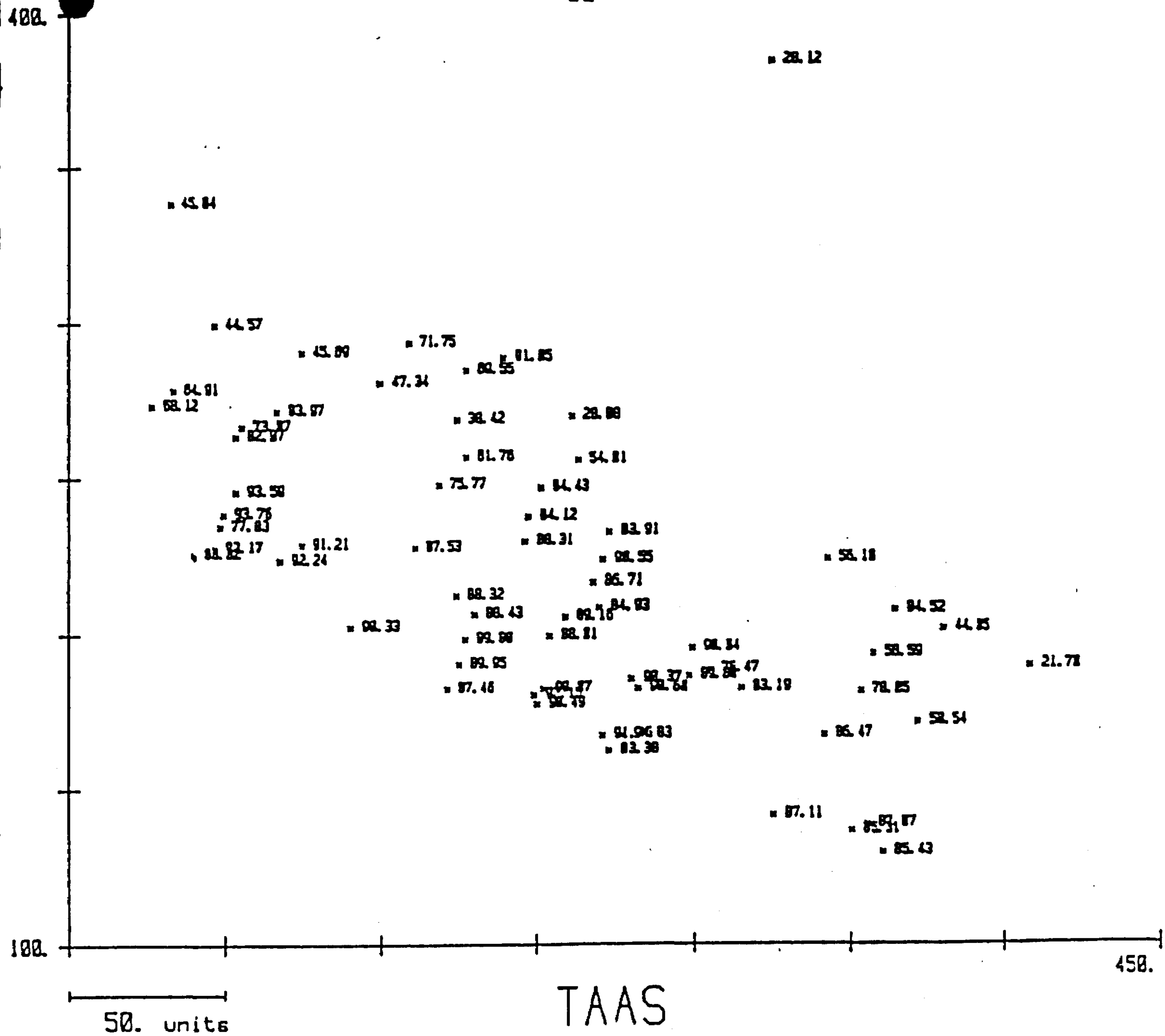


Figure 8: X-Y plot (TAAS values posted)

Where spatial information is available for the data, small scale plots may be generated on the plotter (Figure 8). Alternatively, the data may be transferred to a remote facility for the plotting and contouring of large scale plots. The evaluation features of the output may furthermore be presented in vector-style histograms for easier visual examination (see Figure 9). Favourable results are plotted in the upper halves of the circles. Full height of each histogram is approximately equal to the corresponding 3s level or equivalent. If "favourable" rock types are not present for a particular evaluation (e.g. less than 60% SiO_2 for the base metals evaluation, or no Jensen-classified komatiites or Mg-tholeiites for the gold evaluation), the histogram lines are drawn in a dashed fashion. If half the evaluation factors have been identified as being anomalous, a heavy ring is drawn near the centre of the diagram indicating such.

THE APPLICATION OF LITHOGEOCHEMISTRY

The acceptance of lithogeochemistry as an exploration tool is not prevalent in the exploration community. In fact, in Canada geochemical techniques in general have had their credibility questioned over the past several years. Part of the reason for this lack of accreditation may arise from the fact that univariate statistics are believed to be as sophisticated a level as one needs to attain to explain most geochemical data. To a degree this is understandable; the extreme tenor of alteration that is present in a particular volcanic rock sample, while accurately

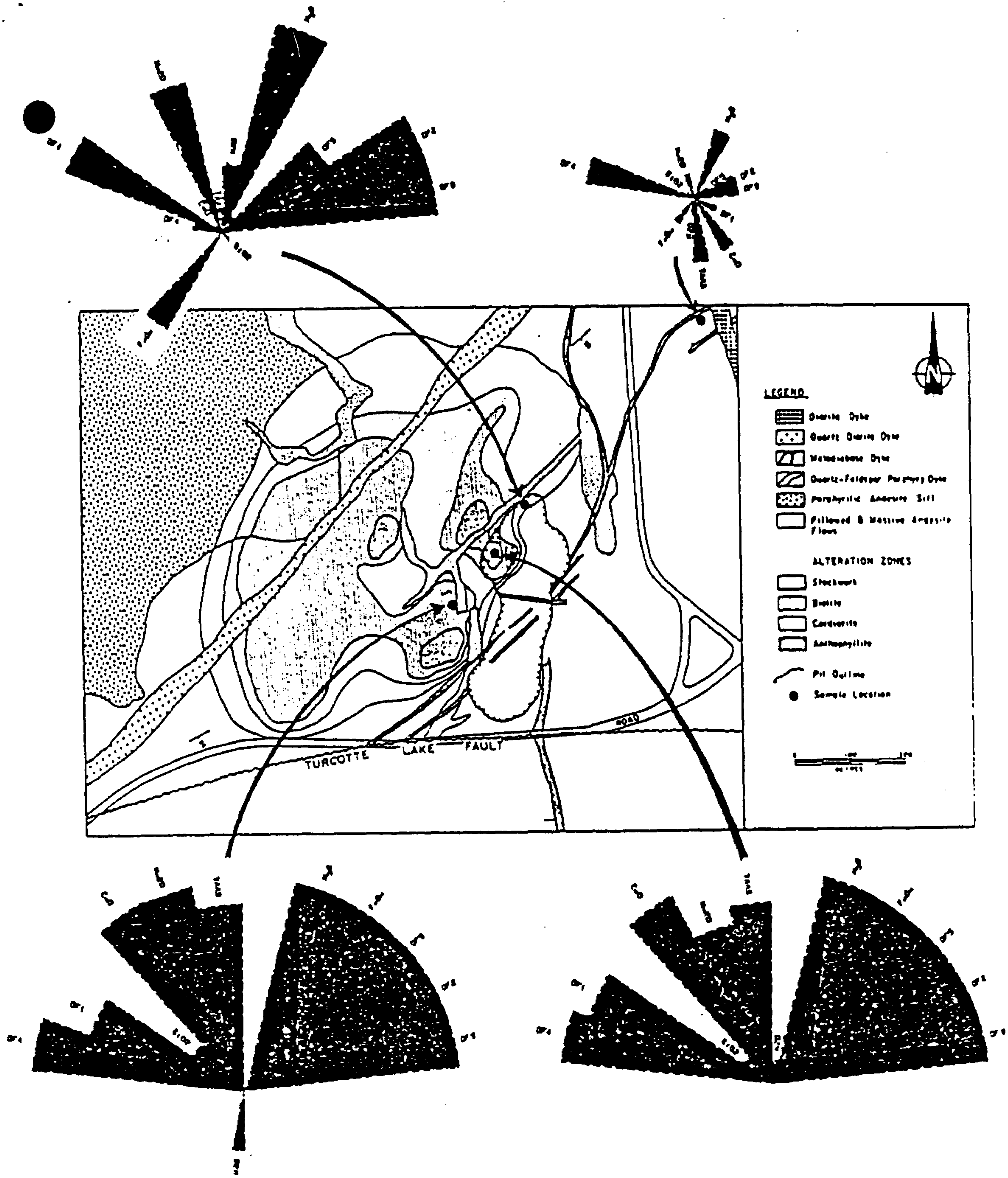


Figure 9 : Evaluation results for bedrock pillowed volcanic samples from Amulet Upper 'A' deposit (Geology and analytical data from Hall, 1982)

portrayed in the chemistry of the rock, was known weeks (or months) previous by the mere examination of the sample in hand specimen or outcrop. But today, now that rapid and inexpensive, reproducable geochemical analyses are available for a great number of elements or oxides and now that a variety of research and/or case history studies are generally available, many new opportunities may be presented and applied to mineral exploration.

The effectiveness in lithogeochemistry lies in the ability of the explorationist to rapidly and cost-effectively, through the use of microcomputers, examine data, within the context of favourable geologic environments, and to select subtle or multivariate trends which may occur even within areas which are intensely and apparently uniformly altered. These trends, whether determined by discriminant analysis, factor analysis, residual mapping or some other technique can ideally "vector" an exploration effort towards mineralized volcano-sedimentary rocks and/or towards locales of syngenetic mineral accumulation.

The lack of outcrop in many areas of Archean bedrock (especially in Canada) or deep (i.e. expensive) diamond drill holes raises some questions about how to accumulate a statistically significant sample population. With the adoption of the results of regional or "universal" studies (as have been incorporated in the procedures at MPH), information from small sets of data can be comparatively examined with some degree of confidence.

Lithogeochemistry is not to be promoted as the ultimate solution to volcanogenic mineral exploration but neither is it merely a superfluous distraction. When utilized in intimate conjunction with proper geological information or assisted by geophysical methods and data processing techniques, lithogeochemical methods can be employed to yield information that will be of prime importance to exploration strategy and decisions.

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APPENDIX 3 - PETROGRAPHICAL DESCRIPTIONS

Footwall Pyroclastics

SH-WR-11
- ash/crystal tuff from L3+00S
- megascopically a distinctly fragmental pyroclastic rock with predominantly aphantic whitish siliceous clasts to 1cm by 1-2mm in a darker matrix.
- chemically Fe_2O_3, Na_2O, CaO, SiO_2 + CO_2 depleted; K_2O enriched; Cu:Zn = 0.75
- fragmental nature of rock is highly evident in thin section; can see that siliceous fragments are of rhyolitic composition consisting of very fine, anhedral sericitic quartzo-feldspathic material interspersed with quartz and feldspar crystals and grains, chloritic patches and carbonate. Rock is a crystal lithic tuff of intermediate-felsic composition.

SH-WR-01
- westernmost sample of footwall tuff-breccia (2b unit) adjacent to mineralized structure at L500N/550W,
- megascopically a mottled green-black rock with waxy green sericitic shear surfaces and recognizable lithic fragments to 5mm.
- chemically CO_2, Na_2O and Ca0 depleted; K_20 and Al_20_3 enriched; high TAAS and M-D score; classified as rhyolite.
- in thin section, a markedly schistose felsic pyroclastic rock with grains and fragments of mainly quartz to 1 mm $\pm$ along with large, partially resorbed lithic fragments (occuring as patches of ultrafine grained chlorite and sericitic siliceous material) surrounded by an anhedral assemblage of quartzo-feldspathic material, chlorite, sericite, carbonate and saussurite.

SH-WR-09
- Footwall pyroclastic (2a) from 625N/4+00W
- megascopically, a greenish-grey, generally fine-grained, distinctly fragmental tuff with both lithic fragments and scattered crystals to 5mm +/-.
- chemically Fe_20_3 and $Si0_2$ depleted; $C0_2$, slightly K_20 enriched; classified as rhyolite
- Petrographically, larger crystals and crystal fragments of mainly feldspar in an extremely fine-grained quartzo-feldspathic groundmass. The rock is schistose and is highly altered with abundant fine disseminated carbonate in the matrix along with considerable very fine sericite +/- minor very fine chlorite(?). Some of the larger feldspar grains are variably saussuritized. This is a highly altered lithic crystal tuff and an excellent example of the "2a" unit.

SH-WR-05
- highly altered footwall pyroclastic at 600N/300W
- megascopically a schistose, green-black, fine-grained rock with fine black quartz eyes, quartz veined and well mineralized with coarse pyrite.
- chemically Mg0, Na_20 and Ca0 depleted; $C0_2$, Fe_20_3, $Si0_2$ enriched with moderatley high Peral, TAAS, very high DF_5; classified as rhyolite

- petrographically consists of scattered quartz crystals and crystal fragments and patches of very fine-grained quartz in a matrix of very fine-grained anhedral quartzo-feldspathic material and chlorite. There is abundant fine carbonate in the matrix and as larger crystals and crystal aggregates along with fine-grained anhedral quartz. A minor amount of chlorite is altered to brownish biotite. The rock is notably schistose and the slide is traversed by thin schistosity-parallel veinlets of ultrafine anhedral quartz with some associated very coarse pyrite. The carbonatization and chloritization were later events relative to the quartz veining in that tiny veinlets of these former minerals traverse the latter. This rock would appear to be an altered intermediate crystal tuff.

SH-WR-06
- northern sample of footwall pyroclastics at 625N/250W
- megascopically a mottled grey fine-grained rock with occasional whitish crystals or crystal fragments
- chemically $C0_2$, Na_20 and $Ca0$ depleted; Fe_20_3, Al_20_3 enriched with high TAAS, Peral, DF_5, classified as rhyolite
- Petrographically a quite featureless rock consisting of dark irregular chlorite-epidote-saussurite patches and aggregates in an anhedral quartzo-feldspathic matrix of variable but often ultrafine grain size. There is one larger (1mm) quartz grain and a clastic or fragmental aspect to both the mafic and felsic components in some cases. Wispy sericite stringers occur throughout the rock. Twinned plagioclase constitutes 5-7% of the rock and occur as lathy crystals. This rock would appear to be an altered felsic pyroclastic.

"Digestive Diorites" and Other Intrusive Rocks

SH-WR-10
- from L1+50S/2+00W
- megascopically a relatively even, medium-grained dioritic-looking rock with abundant amphibole needles and fine leucoxene.
- chemically, CO_2 + Na_2O depleted; MgO + SiO_2 enriched; Cu:Zn = 4.00
- in thin section a massive dioritic intrusive rock composed essentially of saussuritized and sericitized plagioclase, actinolite and quartz with scattered leucoxene crystals and grains; this is an altered version of the dioritic border phase of a large gabbro intrusive.

68-01-FW
- below "LC" Zn mineralization
- megascopically a fine-grained, greenish mafic rock with some coarser light speckling
- chemically Mg0, Fe_20_3, Na_20 depleted; $C0_2$, $Si0_2$, Cu enriched; Cu:Zn=5.33
- in thin section, the prominent speckling is seen to be due to abundant leucoxene crystals to 1mm or more. These, along with a few fractured quartz grains are set in a strongly schistose mass of alteration products dominated by chlorite, carbonate and sericite. Occasional vague plagioclase crystal outlines are visible. This is a sample of highly altered, finer grained, digestive diorite.

SH-WR-16
- "Digestive Diorite" dike (?) on L0
- megascopically a medium-grained, mottled greenish-greyish, massive dioritic rock with abundant fine leucoxene
- chemically depleted in Fe_20_3, Ca0 + Na_20; Mg0, Cu, Zn +Al_20_3 enriched; mod TAAS, Peral, DF_5, M-D Score
- in thin section, the characteristic "digestive diorite" rock is seen with highly altered plagioclase crystals (sericite, kaolin, chlorite) and chloritic aggregates with 5-7% carbonate and distinctive black skeletal leucoxene crystals

SH-WR-17
- strange dike (?) on L1+00N, extremely chloritic
- megascopically a mottled greenish grey microfractured rock
- chemically $C0_2$, Na_20 and Ca0 depleted; Mg0, Fe_20_3, $Si0_2$ and Al_20_3 enriched; good TAAS, Peral, M-D score and DF_5
- in thin section, a dense fine-grained mass of chlorite and anhedral quartzo-feldspathic material containing a few scattered, tiny quartz-chlorite-feldspar pseudomorphous after original plagioclase. Some of the chlorite is altered to fine biotite. The rock is weakly carbonatized and contains abundant tiny saussurite clusters. It is not clear whether this is a highly altered flow or an intrusive rock.

SH-WR-15 - Ash tuff(?) near "UC" contact on L175N
- megascopically a strange-looking, greyish/brownish/greenish medium-grained rock with books of black chlorite to 2mm
- no chemical alteration of note other than weak Fe_20_3, Ca0 depletion
- in thin section see larger aggregates of chlorite (+/- carbonate, quartz-feldspar, sericite) which have square or rectangular outlines in many cases and are clearly pseudomorphous alter an original mineral (plagioclase??) These are set in a finer anhedral interlocking igneous matrix of quartz and twinned feldspar and considerable secondary carbonate and scattered high relief apatite grains. Some of the chlorite is altered to fine biotite. In total this rock is a highly altered dioritic intrusive

SH-WR-02,03,04 - originally thought to be altered flows/tuffs within 2a unit at L500N/500W
- megascopically, sample 02 contains 30-40% of 1-2mm whitish aggregates in a light greyish matrix with abundant finely disseminated leucoxene; sample 03 is a distinctive greyish green, relatively fine rock with a 5mm, light coloured weathering rind and finely disseminated leucoxene; sample 04 is a slightly more greyish, mottled version of 03
- petrographically, sample 02 is a highly altered rock consisting of clear quartz grains, larger, completely re-crystallized feldspar crystals and 3-4% leucoxene crystals in a groundmass of carbonate, ultrafine siliceous material, sericite and chlorite (?). The original feldspar crystals have been replaced by very fine anhedral quartzo-feldspathic material, sericite and carbonate. Sample 03 is a slightly coarser, more medium-grained rock relative to 02. In addition, it contains 10% saussurite/epidote mostly pseudomorphous after plagioclase in some cases. There are also some granophyric-like textures in some larger quartzo-feldspathic aggregates. Sample 04 likewise consists of relict plagioclase crystals, quartz grains and fairly abundant leucoxene in a carbonate-quartzo-feldspathic-sericite-chlorite-saussurite groundmass. These three rocks appear to represent very highly altered versions of the digestive diorite, with this degree of alteration amongst the highest observed on the property.

SH-WR-18 - dyke rock on L500N/375W thought to be a feeder to Digestive Diorite
- megascopically a relatively fine, greenish rock with abundant finely disseminated leucoxene as above
- chemically $C0_2$, Mg0, Na_20, Ca0 and $Si0_2$ depleted; K_20, Fe_20_3, Al_20_3 and $Ti0_2$ enriched; high TAAS, Peral, classified as andesite
- In thin section see 5-7% small clear quartz grains and fine leucoxene grains and patches in a matrix of chlorite and sericitized, very fine-grained quartzo-feldspathic material. This rock has a finely fragmental almost tuffaceous-like aspect although its intrusive nature is unequivocal.

68-46e-FWb - megascopically a fine-grained greyish/greenish, moderately schistose, volcanic-like rock with considerable finely desseminated, purplish leucoxene.

- chemically Mg0, Fe_20_3, Ca0 depleted; $C0_2$, $Si0_2$ enriched; Cu:Zn = 3.33
- petrographically, rock has a finely fragmented aspect with highly fractured and altered plagioclase crystals and crystal remnants and clear quartz grains surrounded by very fine siliceous material, schistose chlorite and considerable carbonate. The abundant leucoxene occurs as skeletal, diamond shaped crystal remnants in some cases. This is a highly altered, relatively fine dioritic intrusive and is virtually identical to samples SH-WR-02, 03, 04.

66-110-VB - deep hole on L500N/275W reportedly in much dyke material while drilling through variolitic basalt/LC

- chemically Fe_20_3 and Na_20 depleted; $C0_2$, Mg0, $Si0_2$ enriched; Cu:Zn=2.00
- petrographically a coarser, massive dioritic intrusive rock with crystals of actinolite and highly altered plagioclase (sericitized, saussuritized) laths in a quartzo-feldspathic groundmass with minor carbonate

SH-WR-19 - A sample of digestive diorite from L4+50N/1+25W was studied in thin section. Megascopically, this is a dark mottled green-black, generally medium-grained rock which contains irregular 1-2 mm grains of a diagnostic greyish-white mineral with a slight purplish tinge. In thin section, the most notable feature of this rock is the complete and total alteration of whatever primary minerals were present to an alteration/hydrothermal assemblage of chlorite, epidote-saussurite, kaolin, abundant carbonate, sericite, leucoxene and hematite. Some shattered quartz grains may be primary. Remnants of original feldspar (plagioclase?) crystals can be discerned in a few instances.

In one case, a feldspar crystal has been virtually completely altered to kaolin, epidote-saussurite, carbonate and chlorite. In another case, what appears to have been a plagioclase crystal is now virtually completely replaced by sericite.

Weakly foliated chlorite-sericite-epidote-saussurite material with associated ultrafine quartzo-feldspathic material constitutes approximately 40% of the rock with fine-grained auhedral carbonate constituting a like amount. Larger grains of quartz, remnant plagioclase and leucoxene constitute the bulk of the remainder. The leucoxene is pseudomorphous after illmenite and forms distinct skeletal crystals along with smaller distinctly rhombohedral grains. A minor hematite content was identified by its deep ruby red colour in thin section. A few scattered apatite crystals were also noted.

SH-WR-20 - A sample of massive, medium-grained leucocratic feldspar porphyry/diorite from 7S, 2W was studied in thin section. Mineralogically, the rock is quite simple consisting essentially of plagioclase feldspar, quartz and chlorite. The rock is not a true porphyry in the sense of having well defined phenocrysts in a fine-grained matrix, rather it is an interlocking aggregate of unoriented plagioclase crystals with a "crystal mush" aspect in which a few of the crystals are somewhat larger than the rest. Maximum crystal size observed was approximately 3 mm. Plagioclase crystals constitute 50-65% or more of the rock. The plagioclase crystals are typically twinned and generally have a pervasive speckling or dusting of very fine sericite shreds and kaolin. A unique determination could not be made on the plagioclase but this would appear to be relatively albitic, possibly Ab 70-90. The crystals are rarely euhedral being distinctly euhedral in most cases. There has been considerable mutual interference during plagioclase crystallization resulting in complexly interlocking grain boundaries. Perhaps most striking, a great deal of the interstitial material consists of granophyric quartz-feldspar intergrowths, often with distinctly radiating, "starburst" patterns. This granophyric material seems to radiate from or replace (?) plagioclase crystals in some cases.

The balance of the rock consists of 5-7% of scattered irregular chlorite aggregates. These are often distinctly elongate being controlled by microfractures in the rock. Small opaque saussurite clusters are typically closely associated with chlorite as is a very minor calcite content. There is a minor content of very fine, light-greenish rod-like or needle-like apatite crystals in the rock. These are segmented in some cases.

Granophyric intergrowths as observed in this rock indicate rapid and simultaneous crystallization of the quartz and feldspar, ie a quench phenomenon, in a relatively near surface environment. This dioritic rock is therefore interpreted to represent a late, granophyric border phase of the main gabbro body with the actual quenching probably related to some form of tectonic activity.

Variolitic Basalts

57-64-VB -
near "UC" contact just below significant Zn mineralization on L1+50S/0+50E
- megascopically a very fine-grained, greenish, vaguely variolitic (?) mafic volcanic
- chemically, CO_2, Na_2O, CaO and SiO_2 depleted; K_2O, Al_2O_3 + Cu, Zn enriched; moderately high TAAS, Peral, M-D score; Cu:Zn = 0.44
- in thin section an ultrafine-grained, vaguely fragmental, highly altered mafic volcanic with scattered tiny plagioclase laths or crystallites in a densely chloritic matrix interspersed with some lighter, finely anhedral quartz-chlorite material.

66-62E-VB1 -
near "UC" contact below significant South Zone Zn mineralization
- megascopically a very fine-grained, moderately schistose, greenish mafic volcanic.
- chemically, CO_2, Na_2O, CaO, + SiO_2 depleted; MgO, Fe_2O_3, Al_2O_3 enriched; very high TAAS, Peral, M-D score, DF_5 values; Cu:Zn = 0.08
- in thin section, a few tiny skeletal remnant plagioclase laths, often arranged in a distinctly radiating pattern, in a very fine, strongly chloritic, quartzo-feldspathic groundmass with some very fine sericite and scattered, very small sometimes rounded aggregates of finely anhedral quartz.

66-62E-VB2 -
roughly mid-variolitic basalt unit
- megascopically a distinctly variolitic mafic volcanic with variolites to 1mm separated by clear material.
- chemically, MgO, Fe_2O_3, CaO, SiO_2 depleted; CO_2, K_2O, Cu, Zn, + Na_2O enriched; Cu:Zn = 0.23
- in thin section, individual variolites are seen to be dense, semi-opaque ultrafine aggregates of mainly quartzo-feldspathic material, chlorite and carbonate with a very distinct feathery, outward radiating pattern in a number of cases. There is also a very distinct zonation in some cases with radiating quartzo-feldspathic cores surrounded by a carbonate-rich zone and finally a chloritic rim; intervening clear material is composed of quartz, carbonate and chlorite.

66-62E-VB3 -
near "LC" contact just above significant Cu-Zn mineralization.
- megascopically, a fine-grained greenish amygdular (?) mafic volcanic in contact with a coarser green-black rock
- chemically, CO_2, Na_2O, CaO, SiO_2 depleted; Fe_2O_3, Cu + K_2O enriched; very high TAAS, Peral, M-D score, DF_5 values; Cu:Zn = 7.50
- in thin section see 5-10% tiny remnant, skeletal, highly altered plagioclase laths in a sericitic quartzo-feldspathic groundmass with considerable very fine opaques; "amygdules" seen in hand specimen are strongly chloritic and also contain tiny plagioclase crystals and may be fragments rather than

in-fillings of gas bubbles. Darker material in hand specimen is strongly chloritic with some black graphite (?) fragments and overall has a finely fragmental aspect. This rock overall appearst to be a fine mafic fragmental.

68-01-VB
- near "LC" contact, above "LC" Zn mineralization to NW of South Zone
- megascopically a very fine-grained distinctly foliated mafic volcanic
- chemically $C0_2$, Mg0, Na_20, Ca0 + $Si0_2$ depleted; Fe_20_3, Al_20_3 enriched with high TAAS, Peral, DF_5; Cu:Zn =1.67
- in thin section, see tiny plagioclase laths and altered skeletal plagioclase (?) remnants in a predominantly fine chloritic groundmass along with minor but pervasive fine carbonate and 1-3% fine opaques. A few, somewhat larger sericite-chlorite aggregates also appear to be pseudomorphous after plagioclase

68-06-VB
- near "UC" contact at 100N/50W, below significant Zn mineralization
- megascopically a very fine-grained mafic fragmental
- chemically Mg0, Na_20, Ca0 depleted; $C0_2$, Fe_20_3, Zn + Al_20_3 enriched; moderate Peral, DF_5 values
- petrographically iron enrichment is seen to be due to prominent "Berlin-blue" Fe-chlorite occurring in microveinlets in a generally very fine-grained, moderately schistose sericite-chlorite-quartzo-feldspathic aggregate; some biotite may be present in a section of the slide rich in fine fre-oxides.

56-37-VB(?)
- probable altered variolitic basalt in hangwall of Joubin Fault
- megascopically a dark green, slightly coarser mafic volcanic or intrusive
- chemically $C0_2$, Na_20 and Ca0 depleted; Mg0, Fe_20_3, $Si0_2$, Al_20_3 enriched; very high TAAS, Peral, M-D score, DF_5; Cu:Zn =1.04
- thin section a schistose, overwhelmingly chloritic rock with scattered grains and aggregates of quartz and wispy carbonate along foliation planes; abundant semi-opaque saussuritic (?) patches and "trains" may be pseudomorphous after plagioclase. In all this rock appears to be an intensely chloritized, ie Mg-metasomatized, mafic volcanic

61-91-VB1
- near "UC" contact, proximal to Copper Breccia structure?
- megascopically a greenish, fine-grained mafic fragmental with considerable carbonate veining
- chemically Mg0, Fe_20_3 and Na_20 depleted; $C0_2$, $Si0_2$ enriched
- in thin section, a highly altered mafic fragmental/aquagene tuff? now composed of fine anhedral quartzo-feldspathic material, chlorite, sericite and carbonate. There is a considerable amount of late quartz-carbonate +/- pyrite vein material in the slide. The rock is variably schistose and portions contain abundant fine opaque.

61-91-VB2 - near "LC" contact, just above significant Cu-Zn mineralization
- megascopically a greenish-grey, fine volcanic with abundant <1mm whitish blebs or crystals
- chemically $C0_2$, Na_20 and Ca0 depleted; Fe_20_3, $Si0_2$, Al_20_3 +Mg0 enriched; high TAAS, Peral, DF_5, Cu, Zn; Cu:Zn =0.23
- in thin section rock is composed of 10-15% tiny, highly saussuritized plagioclase laths and clusters of laths in an anhedral matrix of sericitic quartzo-feldspathic material. Numerous rounded to ellipsoidal quartzo-feldspathic aggregates are present which may represent altered spherulites or variolites. The mafic volcanic material is in microfault contact in the slide with variably banded argillitic(?) sediment composed of fine anhedral quartz aggregates, chlorite, some sericite and abundant black graphite.

SH-WR-07 - altered variolitic basalt near LC contact on L300N
- megascopically a very fine-grained, medium grey mafic volcanic
- chemically CO_2, MgO, Na_2O, CaO, SiO_2 depleted; K_2O, Al_20_3 enriched; high TAAS, M-D score, Peral
- in thin section a very fine, moderately schistose rock with abundant tiny, variably saussuritized plagioclase crystals in a groundmass of quartzo-feldspathic material, sericite and chlorite with 3 - 5% finely disseminated opaques.

65-104-VB1 - near "UC" contact in hole at 350N/350W, proximal to Copper Breccia structure.
- megascopically an ultrafine grained, greenish mafic volcanic
- chemically MgO, Na_2O, CaO, SiO_2, + CO_2 depleted; Fe_2O_3 + Al_2O_3 enriched; high Peral, Cu:Zn = 1.60
- petrographically a very fine, dense aggregate of carbonate, chlorite anhedral quartzo-feldspathic material, sericite, saussurite and fine opaques; tiny remnant plagioclose laths are visible now completely replaced by carbonate, quartz, etc.

65-104-VB2 - near "LC" contact above significant "LC" Cu mineralization
- megascopically a very fine-grained, hyaloclastitic mafic volcanic
- chemically, MgO, CaO, Fe_2O_3, SiO_2 depleted; CO_2, K_2O enriched; Cu:Zn = 1.16
- petrographically, an altered mafic aquagene tuff (or hyaloclastite) consisting of vesicular/spherulitic basaltic glass material now altered to fine sericite/chlorite and extremely fine-grained anhedral quartzo-feldspathic material. There is also a great deal of carbonate in the rock. Finely botryoidal, semi-opaque saussurite clusters are scattered throughout the rock along with generally fine, completely opaque leucoxene. This section shows the characteristic, swirly, plastic-like outlines of individual glass fragments.

SH-WR-13 - altered variolitic basalt in Copper Knob structure at 400N
- megascopically see very fine dark blebs in an ultrafine greenish, sericitic-looking volcanic.
- chemically CO_2, Fe_2O_3, CaO, SiO_2 $\pm$ MgO depleted; Na_2O + K_2O, Al_2O_3 enriched
- In thin section, rock is seen to be a very distinctive, highly anomalous specimen. It consists essentially of an interlocking mat of radiating columnar laths to fibrous to feathery to sheaf-like plagioclase (?) (albite?) material with considerable amounts of very fine, chlorite (?) trains which define individual members of the plagioclase aggregates. Sericite is present as an extremely fine speckling in the rock and also occurs along microshears. Abundant (10-15%) finely disseminated saussurite is also present, typically with a finely botryoidal character. This rock appears to be a spilitic basalt.

66-108-VB1 - near "UC" contact, deep hole at 425N/275W
- megascopically a strongly schistose, ultra fine-grained greenish-greyish mafic volcanic .
- chemically MgO, Na_2O, CaO, SiO, depleted, CO_2, Zn enriched
- in thin section, a strongly foliated aggregate of tiny plagioclase crystals, sericite and chlorite in an indistinct quartzo-feldspathic matrix with abundant (10 - 12%) fine, variably opaque leucoxene. A prominent microshear filled with quartz and carbonate itself cut by numerous chloritic shear planes crosses the slide. This is a highly altered, strongly sheared fine-grained mafic volcanic

66-108-VB2 - near "LC" contact above good Cu:Zn mineralization
- megascopically a greyish, vaguely mottled, clearly highly altered mafic volcanic, not noteably shistose.
- chemically CO_2, MgO, Na_2O, CaO, SiO_2 $\pm$ Fe_2O_3 depleted; K_2O, Al_2O_3, enriched; high TAAS, Peral and M-D score, Cu:Zn = 2.31
- In thin section, see basically an assemblage of alteration products, with 10 - 20% tiny saussuritic plagioclase crystals (a la SH-WR-14) in a very fine groundmass of shreddy sericite, chlorite and quartzo-feldspathic material. Numerous tiny amygdular-like quartz-sericite blebs are present. There are also some epidote-sericite aggregates with a radiating, variolitic-like aspect.

SH-WR-14 - indicated to be an altered basalt within the 425N mineralized structure
- megascopically, a very fine-grained, creamy greenish/greyish, siliceous looking, obviously highly altered rock with some vague stretched variolites.
- chemically, CO_2, Na_2O, CaO, SiO_2 $\pm$ MgO depleted; K_2O, Fe_2O_3 + Al_2O_5 enriched; high TAAS, Peral
- in thin section, see 10-15% of very small, subhedral to euhedral, plagioclase crystals now largely altered to saussurite in most cases. These are set in a very fine-grained mass of shreddy sericite and quartzo-

feldspathic material with some chlorite patches. A prominent chloritic microshear band crosses the slide. This is a fairly typical example of altered mafic volcanics on the property.

68-46e-VB

- hole in vicinity of Copper Knob structure, no economic mineralization intersected
- megascopically a very-fine grained, creamy greyish, silicified-looking volcanic
- chemically MgO, Fe_2O_3, Na_2O depleted; CO_2 enriched; Cu:Zn = 4.33
- petrographically, scattered patches of very-fine grained quartzo-feldspathic material in a pervasively carbonatized ultrafine chloritic siliceous matrix containing considerable fine disseminated opaques (leucoxene?). Some of the above patches have crystal or crystal remnant outlines. Rock looks like a fine, highly altered intermediate to mafic volcanic.

SH-WR-08

- northernmost sample of variolitic basalt at 700N/25E
- megascopically a buff, blotchy rock with very fine grained matrix and vague, light green to buff variolites (?)
- chemically CO_2, MgO, Na_2O, CaO, SiO_2 depleted; K_2O, Al_2O_3 enriched with high TAAS, Peral, M-D score
- petrographically consists of tabular, elongate pseudo-radiating, twinned crystals of saussuritic feldspar in a schistose matrix of quartzo-feldspathic material and chlorite, Occasional chlorite-quartzo-feldspathic aggregates with sericite boundaries represent variolites. Accessory opaques form a very small constituent of the rock.

"FW Diorites"

65-70e-FWa

- SW of South Zone on L200S, just below barren "LC".
- megascopically a very fine-grained, moderately schistose mafic volcanic
- chemically depleted in MgO, Fe_2O_3, Na_2O; enriched in CO_2, K_2O, SiO_2; Cu:Zn = 0.32
- petrographically a fine-grained, slightly schistose mafic volcanic showing extensive sericitization, chloritization and carbonatization. Much of the carbonate ($\pm$ quartz) occurs in distinct microveinlets while ragged green chlorite masses are typiclly opaque under crossed micols.

65-70e-FWb

- just below sample FWa, above
- megascopically a massive, medium-grained dioritic rock, greenish in colour, with dissemminated leucoxene.
- chemically depleted in CO_2 + Na_2O, Fe_2O_3, CaO; modestly enriched in MgO, K_2O and SiO_2; Cu:Zn = 1.83
- petrographically a massive medium-grained dioritic rock with large ragged actinolite grains enclosing and intermixed with sericitized, kaolinized often lathy plagioclase. Assessories include minor carbonate, patches of high relief epidote and skeletal leucoxene crystals

66-62E-FW

- just below significant Cu-Zn mineralization.
- megascopically, a fine-grained greenish, mafic volcanic (?)
- chemically, shows modest Fe_2O_3, Na_2O, CaO depletion and CO_2, MgO, K_2O and SiO_2 enrichment; Cu:Zn = 5.0
- in thin section a few twinned plagioclase laths and scattered quartz grains and fragments in a schistose alteration assemblage of chlorite, carbonate, quartzo-feldspathic material and black leucoxene. This rock has a finely intrusive aspect and may be a fine version of the "digestive diorite" or a coarse flow.

SE-1-FW

- in "FW Diorite" complex beneath barren schistose chert on L0+50N
- megascopically a fine grained, greenish, distinctly schistose, vaguely compositionally banded mafic volcanic
- chemically Na_2 depleted; $C0_2$, Ca0, $Si0_2$, Cu, Zn enriched; Cu:Zn =0.19
- petrographically a moderately schistose, fine-grained mosaic of interlocking quartz +/- feldspar anhedra and carbonate. Abundant fine sericite +/- chlorite defines schistosity. Occasionally tiny, highly saussuritized plagioclase crystals are present along with minor leucoxene

68-06-FW

- below "LC", no significant mineralization
- chemically Na_20, Ca0 + $Si0_2$, $C0_2$ depleted; Mg0, K_20, Fe_20_3, Al_20_3, Zn enriched, good TAAS, Peral, M-D score, DF_5
- petrographically, a fine-grained, distinctly schistose mafic volcanic with abundant sericite-chlorite in anhedral quartzo-feldspathic groundmass. A few larger quartz grains and minor carbonate veining. High Fe explained by considerable opaque Fe-oxides

56-52-(VB?) - in footwall of Joubin Fault at 175N/125W below good Cu-Zn mnln
- megascopically a very fine-grained greenish mafic volcanic
- chemically Mg0, Na_20 and Ca0 depleted; $C0_2$, K_20 enriched
- petrographically an ultrafine anhedral mosaic of quartzo-feldspathic material, sericite, chlorite and epidote (?) with tiny skeletal remnant plagioclase crystals

56-27-VB(?) - in footwall of Joubin Fault, below good Cu-Zn mineralization
- megascopically a fine-grained greenish volcanic
- chemically $C0_2$, Mg0, Na_20, Ca0 and $Si0_2$ depleted; K_20, Al_20_3 + Fe_20_3 enriched; high TAAS, Peral, M-D score, Cu, Zn; Cu-Zn = 0.16
- petrographically 10-20% tiny, variably to highly saussuritized plagioclase laths in an ultrafine, variably sericitic and chloritic anhedral quartzo-feldspathic groundmass with considerably skeletal, black leucoxene crystals.

61-91-FW - below significant Cu-Zn mineralization
- megascopically a fine-grained greenish mafic volcanic
- chemically Mg0, Fe_20_3, Na_20 depleted; $C0_2$, $Si0_2$ + Ca0 enriched
- petrographically abundant fine, highly altered plagioclase crystals in mass of carbonate, quartzo-feldspathic material and chlorite; some prominent microshear bands filled with carbonate, quartz and chlorite cut the slide.

64-82e-FW - deep Main Zone hole, possible unmapped structure?, below significant Cu-Zn mineralization
- megascopically a fine-grained, moderably schistose mafic volcanic
- chemically $C0_2$, Na_20, Ca0, $Si0_2$ depleted; Mg0, Fe_20_3, Al_20_3 enriched; very high TAAS, Peral, M-D score, DF_5; Cu-Zn = 3.35
- petrographically a brecciated rock with extensive fine chlorite superimposed on a very fine anhedral quartzo-feldspathic groundmass; outlines of original plagioclase laths still visible-now altered to chlorite +/- quartz, biotite; coarser quartz and carbonate occur in fractures.

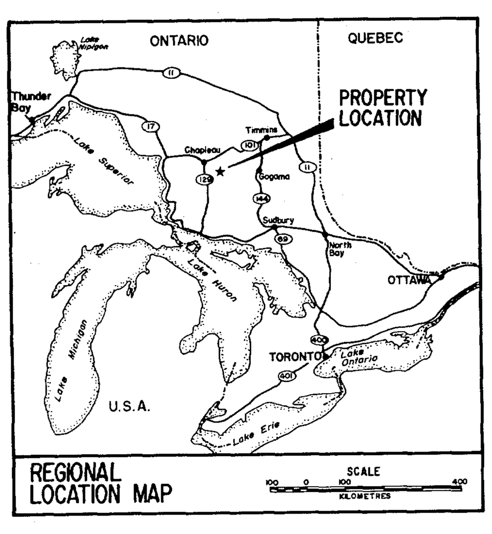
65-72e-FW - deep Main Zone hole at 350N/300W, sample just below decent "LC", Zn + Cu values
- megascopically a fairly typical, very fine-grained greenish mafic volcanic, considerable microveining
- chemically weakly depleted in MgO, $Fe2O_3$, Na_2O; enriched in CO_2, SiO_2; Cu:Zn = 0.88
- petrographically a strongly chloritic rock with chlorite superimposed on a fine, anhedral quartzo-feldspathic groundmass with some relict twinned plagioclose still visible. Much carbonate occurs in east-west microfractures and disseminated throughout groundmass along with abundant fine leucoxene.

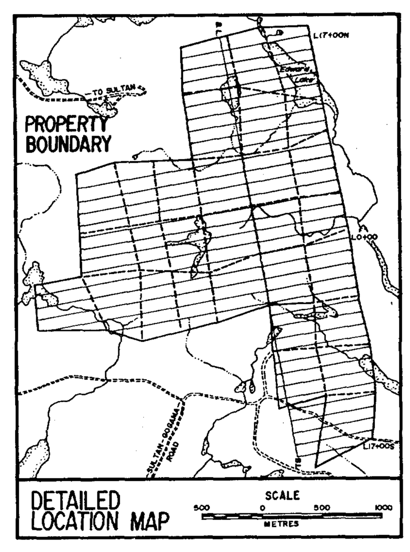
66-108-FW - chemically MgO, Fe_2O_3, Na_2O, CaO, SiO_2 depleted; weak K_2O, CO_2, enrichment.

- petrographically 5-7% clear quartz grains and angular fragments and a like amount of prominent black leucoxene in a mass of carbonate, quartzo-feldspathic material, sericite and chlorite. Chlorite/sericite microshears traverse the slide. The amount of carbonate alteration is impressive. This appears to be one of the "digestive diorite" rocks.

68-46e-FWa - hole in vicinity of Copper Knob structure, no economic mineralization intersected

- megascopically a very-fine grained, creamy greyish, silicified-looking volcanic
- chemically Mg0, Fe_20_3, Na_20 depleted; $C0_2$ enriched; Cu:Zn = 4.33
- petrographically, scattered patches of very-fine grained quartzo-feldspathic material in a pervasively carbonatized ultrafine chloritic siliceous matrix containing considerable fine disseminated opaques (leucoxene?). Some of the above patches have crystal or crystal remnant outlines. Rock looks like a fine, highly altered intermediate to mafic volcanic.





L E G E N D

GEOLOGY

MIDDLE TO LATE PRECAMBRIAN (PROTEROZOIC)

MAFIC INTRUSIVE ROCKS

- **11** — 11 Diabase dikes, porphyritic diabase dikes.
- **10** — 10 Lamprophyre dikelets.

FELSIC INTRUSIVE ROCKS

- **9** — 9 Syenite dikelets.
  9a Quartz-feldspar-porphyry dikes.

EARLY PRECAMBRIAN (ARCHEAN)

METASEDIMENTS

EPICLASTIC METASEDIMENTS

- **7** — 7b Shale, argillite, slate; may be graphitic.
  7g Graphitic argillite.

CHEMICAL METASEDIMENTS

- **6** — 6a Brecciated chert, chert breccia.
  6b Banded chert (± 7b, 2a).
  6c Massive chert.
  6d Argillaceous chert.
  6e Chert-pyrite breccia.
- **IF** — IF Magnetite-rich lamine interbedded with one or more among units 6, 6a, 7a.

MAFIC INTRUSIVE ROCKS

- **5** — 5a Gabbro, diorite.

ULTRAMAFIC INTRUSIVE ROCKS

- **4** — 4 Peridotite.

METAVOLCANICS

FELSIC METAVOLCANICS

- **3** — 3a Massive.
  3d Tuff, lapilli-tuff.
  3f Porphyritic (feldspar).

INTERMEDIATE METAVOLCANICS

- **2** — 2a Ash, lapilli-tuff.
  2d Porphyritic.

MAFIC METAVOLCANICS

- **1** — 1a Massive.
  1c Porphyritic flows.
  1e Pillowed flows.
  1p Massive, medium-grained flows.
  1q Variolitic flows.
  1r Brecciated mafic volcanics.

ABBREVIATIONS

Ag	Silver
Au	Gold
cp	Chalcopyrite
Cu	Copper
Fe	Iron
gf	Graphite
gn	Galena
hem	Hematite
Il	Ilmenite
mag	Magnetite
Pb	Lead
po	Pyrrhotite
py	Pyrite
sp	Sphalerite
Zn	Zinc
bn	Bornite
mal	Malachite

SYMBOLS

- Geological contact, inferred
- Outcrop
- Fault or shear zone
- Trench (bedrock, overburden)
- Channel sample
- KRS-#x Surface grab sample
- Foliation, strike and dip
- Bedding, strike and dip
- Joint, strike and dip
- Bush road
- Glacial ice direction
- Previous diamond drill hole

N

S C A L E

50 0 50 100 150 200 250

M E T R E S

EAST SHEET

KIRKTON RESOURCES CORPORATION

SHUNSBY PROPERTY · SWAYZE AREA

PROPERTY GEOLOGICAL COMPILATION

Project No: C-1251	By: P. Sobie, W.E. Brereton
Scale: 1:2500	Drawn: A & N Cartographics
Drawing No: 1a	Date: November, 1989; Revised Nov. 1990

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63.6118

200

41010NE0087 63.6118 CUNNINGHAM

210


KIRKTON RESOURCES CORPORATION
SHUNSBY PROPERTY - CUNNINGHAM TWP
MAIN ZONE LOWER CHERTS
DETAILED GEOLOGY
Project No: C-1302
By: P Sobie
Scale: 1:125
Drawn: A&N Cartographics
Drawing No: 3
Date: September, 1990
MPH Consulting Limited
63.6118
SCALE
METRES
0
5
10
20
1,1q
"Variolitic Andesite"
1,5a
"Footwall Diorite"
Volcanic Complex
"Basement Fault Zone"
"BASEMENT FAULT ZONE"
highly strained melange
of chert and argillite units,
draped over volcanic complex
"Footwall Diorite"
Major Fault
in this area?
extensive brecciation and
strain associated with
fault
Argillaceous Chert
Volcanic Breccia Unit
high grade cp-py mineral-
ization as matrix and as
semi-massive thin horizons
Zone of Brecciation
related to dyke with extensive
cp, Fe-carb, mal and py as
blebs, fracture fillings
"Basement Fault
Zone"
"Footwall Diorite"
Volcanic Complex
Az 262°
IDEALIZED
SURFACE EXPOSURE
STRATIGRAPHIC SECTION
"BASEMENT
FAULT
ZONE"
LEGEND
GEOLOGY
MIDDLE TO LATE PRECAMBRIAN (PROTEROZOIC)
MAFIC INTRUSIVE ROCKS
FELSIC INTRUSIVE ROCKS
EARLY PRECAMBRIAN (ARCHEAN)
METASEDIMENTS
CHEMICAL METASEDIMENTS
MAFIC INTRUSIVE ROCKS
ULTRAMAFIC INTRUSIVE ROCKS
METAVOLCANICS
FELSIC METAVOLCANICS
INTERMEDIATE METAVOLCANICS
MAFIC METAVOLCANICS
ABBREVIATIONS
SYMBOLS
muck pile
pool
mud
dirt road
hillside
creek
drainage creek
edge of cut
muck & mud
220

EAST SHEET

KIRKTON RESOURCES CORPORATION

SHUNSBY PROPERTY - CUNNINGHAM TWP.

TOTAL FIELD MAGNETICS

Project No: C-1302	By: M.K., S.B., K.B., D.J.
Scale: 1:2500	Drawn: MPH
Drawing No: Map 4b	Date: December, 1990

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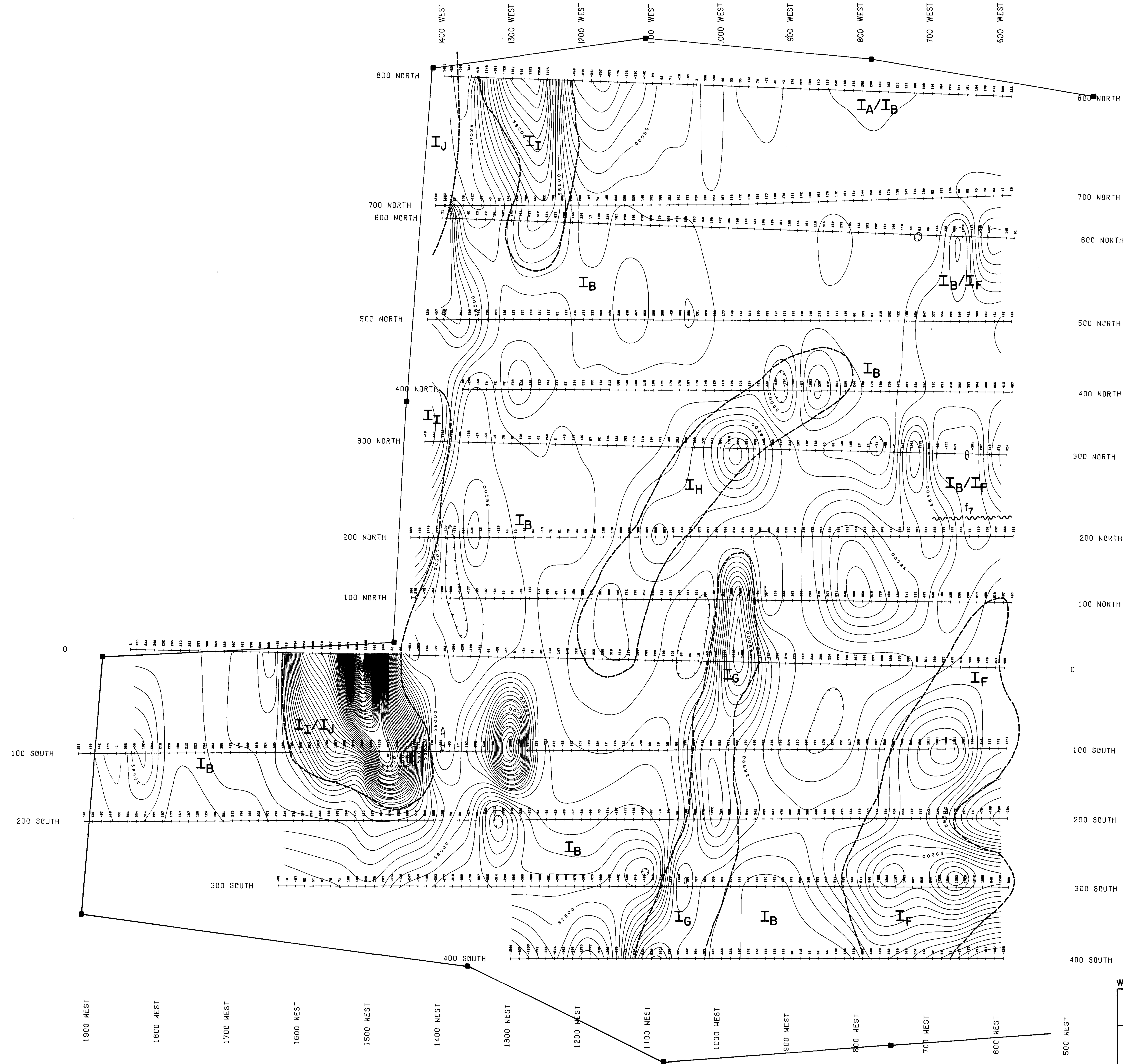
230



LEGEND

INSTRUMENT:	EDA Omni Plus
BASE STATION RECORDER	EDA Omni IV
297	Magnetic Value Base Value 58000nT
	Magnetic Contour
	Magnetic Depression
Contour Interval	100 nT Base Value 58000nT
INTERPRETATION	
	Magnetic Contact
I	Magnetic Domain
I_A	Magnetic Subdomain
	Fault

SCALE 50 0 50 100 150 200 METRES

WEST SHEET

KIRKTON RESOURCES CORPORATION

SHUNSBY PROPERTY - CUNNINGHAM TWP

TOTAL FIELD MAGNETICS

Project No: C-1302	By: M.K., S.B., K.B., D.J
Scale: 1:2500	Drawn: MPH
Drawing No: Map 4b	Date: December, 1990

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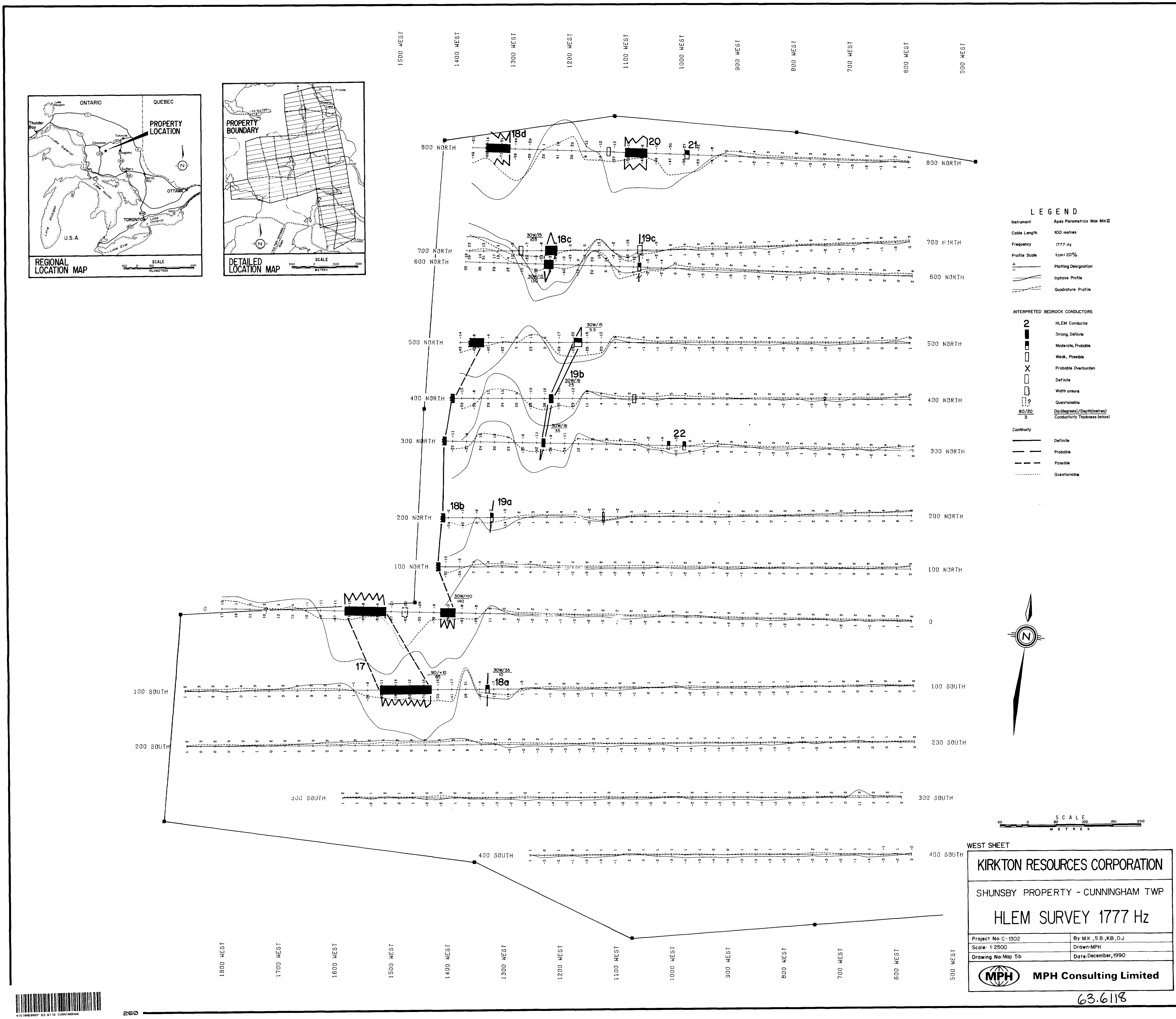
EAST SHEET
KIRKTON RESOURCES CORPORATION
SHUNSBY PROPERTY - CUNNINGHAM TWP.
HLEM SURVEY 1777 Hz
Project No: C-1302
By: M.K., S.B., K.B., D.J.
Scale: 1:2500
Drawn: MPH
Drawing No: Map 5a
Date: December, 1990
MPH Consulting Limited
63.6118
SCALE
METRES
LEGEND
Instrument
Apex Parametrics Max Min II
Cable Length
100 metres
Frequency
1777 Hz
Profile Scale
1cm = 20%
Plotting Designation
Inphase Profile
Quadrature Profile
INTERPRETED BEDROCK CONDUCTORS
HLEM Conductor
Strong, Definite
Moderate, Probable
Weak, Possible
Probable Overburden
Definite
Width unsure
Questionable
Dip(degrees)/Depth(metres)
Conductivity Thickness(mhos) Interpreted from 444 Hz data
Continuity
Definite
Probable
Possible
Questionable
Fault
Major, persistent
Minor, impersistent
Lineament
Dike interpreted from geology
INTERPRETATION 100 metre cable
INTERPRETATION 50 metre cable
REGIONAL LOCATION MAP
DETAILED LOCATION MAP
PROPERTY LOCATION
PROPERTY BOUNDARY
ONTARIO
QUEBEC
U.S.A.
TORONTO
BASE LINE



KIRKTON RESOURCES CORPORATION

SHUNSBY PROPERTY - CUNNINGHAM TWP

HLEM SURVEY 1777 Hz

Project No: C-1302	By: M.K., S.B., K.B., D.J.
Scale: 1:2500	Drawn: MPH
Drawing No: Map 5b	Date: December, 1990

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260


LEGEND
Instrument Apex Parametrics Max Min II
Cable Length 100 metres
Frequency 444 Hz
Profile Scale 1cm=20%
Plotting Designation
Inphase Profile
Quadrature Profile
INTERPRETED BEDROCK CONDUCTORS
HLEM Conductor
Strong, Definite
Moderate, Probable
Weak, Possible
Probable Overburden
Definite
Width unsure
Questionable
80°E/20 / 3 Dip(degrees)/Depth(metres) / Conductivity Thickness (mhos)
Continuity
Definite
Probable
Possible
Questionable
Fault
Major, persistent
Minor, impersistent
Lineament
Dike interpreted from geology
REGIONAL LOCATION MAP
DETAILED LOCATION MAP
PROPERTY LOCATION
PROPERTY BOUNDARY
INTERPRETATION 100 metre cable
INTERPRETATION 50 metre cable
BASE LINE
SCALE
METRES
EAST SHEET
KIRKTON RESOURCES CORPORATION
SHUNSBY PROPERTY - CUNNINGHAM TWP.
HLEM SURVEY 444 Hz
Project No: C-1302
By: M.K., S.B., K.B., D.J.
Scale: 1:2500
Drawn: MPH
Drawing No: Map 6a
Date: December, 1990
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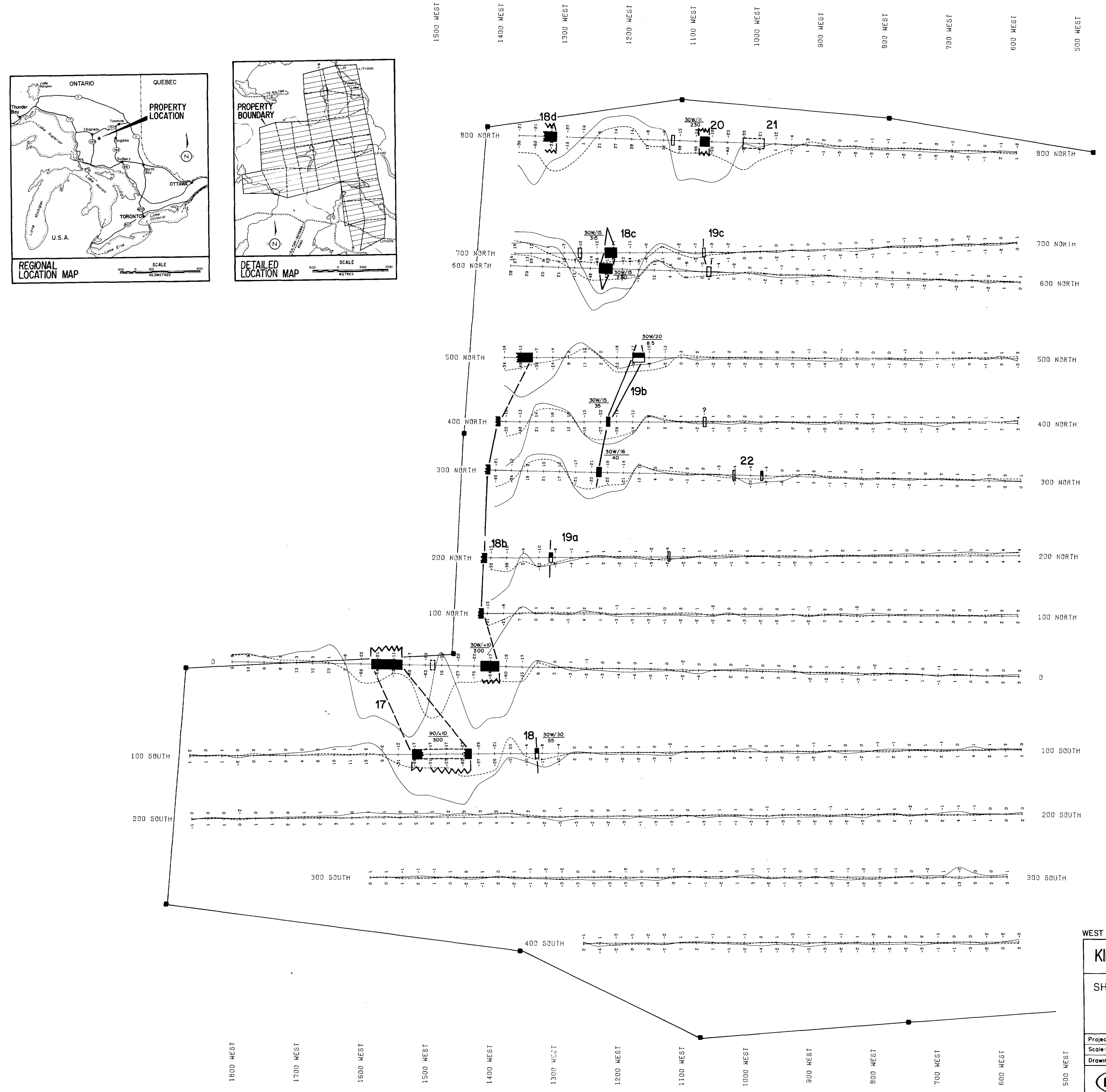
63.6118



L E G E N D

Instrument	Apex Parametrics Max Min II
Cable Length	100 metres
Frequency	444 Hz
Profile Scale	1cm = 20%
+ / −	Plotting Designation
	Inphase Profile
	Quadrature Profile

INTERPRETED BEDROCK CONDUCTORS

2	HLEM Conductor
	Strong, Definite
	Moderate, Probable
	Weak, Possible
X	Probable Overburden
	Definite
	Width unsure
?	Questionable
80/20 over 3	Dip(degrees)/Depth(metres) over *Conductivity Thickness (mhos)*

Continuity

	Definite
	Probable
	Possible
	Questionable

Fault

	Major, persistent
	Minor, impersistent
	Lineament

SCALE 50 0 50 100 150 200 METRES

WEST SHEET

KIRKTON RESOURCES CORPORATION

SHUNSBY PROPERTY - CUNNINGHAM TWP

HLEM SURVEY 444 Hz

Project No: C-1302	By: M.K., S.B., K.B., D.J.
Scale: 1:2500	Drawn: MPH
Drawing No: Map 6b	Date: December, 1990

MPH Consulting Limited

63.6118


500 WEST
400 WEST
300 WEST
200 WEST
100 WEST
BASE LINE
100 EAST
MAIN (JOUBIN) FAULT

300 WEST
200 WEST
100 WEST
BASE LINE
100 EAST
200 EAST
300 EAST
650 NORTH
600 NORTH
550 NORTH
500 NORTH
450 NORTH
400 NORTH
350 NORTH
300 NORTH
250 NORTH
200 NORTH
150 NORTH
100 NORTH
50 NORTH
0
50 SOUTH
100 SOUTH
200 SOUTH
250 SOUTH
300 SOUTH
350 SOUTH
MAIN (JOUBIN) FAULT
55
54(14b)
48(14a)
42b(13b)
56
43(13a)
42a(12)
44
45
46(8)
50
49
41(2d)
47(6)
52
51(7)
53

300


300 WEST
200 WEST
100 WEST
BASE LINE
100 EAST
200 EAST
300 EAST
650 NORTH
600 NORTH
550 NORTH
500 NORTH
450 NORTH
400 NORTH
350 NORTH
300 NORTH
250 NORTH
200 NORTH
150 NORTH
100 NORTH
50 NORTH
0
50 SOUTH
100 SOUTH
200 SOUTH
250 SOUTH
300 SOUTH
350 SOUTH
MAIN (JOUBIN) FAULT
f_7
54(14b)
55
48(14a)
42b(13b)
56
43(13a)
42a(12)
44
45
46(8)
50
49
41(2d)
47(6)
52
51(7)
53

L E G E N D

GEOLOGY

MIDDLE TO LATE PRECAMBRIAN (PROTEROZOIC)

MAFIC INTRUSIVE ROCKS

- 11 — 11 Diabase dikes.
- 10 — 10 Lamprophyre dikes and sills.

FELSIC INTRUSIVE ROCKS

- 9 — 9a Quartz-feldspar-porphyry dikes and sills.
  9b Fine-grained felsic intrusive.

EARLY PRECAMBRIAN (ARCHEAN)

METASEDIMENTS

EPICLASTIC METASEDIMENTS

- 7 — 7a Conglomerate, conglomeratic arenite.
  7b Conglomerate with chert clasts (chloritic).
  7c Quartzite, sandstone, greywacke.
  7d Argillite/greywacke.
  7e Thinly laminated arenite.

CHEMICAL METASEDIMENTS

- 6 — 6a Brecciated chert, chert breccia.
  6b Banded chert (± 7b, 2a).
  6c Massive chert.
  6d Argillaceous chert.
  6e Chert-pyrite breccia.
  6f Siliceous carbonate sediment.
- IF — MIF · Chert-magnetite iron formation.
  chlIF · Chloritic magnetite iron formation.
  SIF · Chert-sulphide iron formation, (py, po ± cp, sp, gf).
  MS · Massive pyrite-pyrrhotite (± cp, sp).

MAFIC INTRUSIVE ROCKS

- 5 — 5a Diorite.
  5b Gabbro.
  5c Glomeroporphyritic gabbro.
  5d Amphibolite/pyroxenite.

ULTRAMAFIC INTRUSIVE ROCKS

- 4 — 4 Peridotite.

METAVOLCANICS

INTERMEDIATE TO FELSIC METAVOLCANICS

- 2 — 2a Feldspar porphyritic ash tuff.
  2b Feldspar porphyritic lapilli tuff, tuff breccia.
  2c Quartz eye/chert frag chloritic volcanics.
  2d Porphyritic (quartz).
  2e Porphyritic (feldspar).
  2h Breccia

MAFIC METAVOLCANICS

- 1 — 1a Massive, fine-grained.
  1c Porphyritic flows.
  1e Pillowed flows.
  1p Massive, medium to course-grained flows.
  1q Variolitic flows.
  1r Mafic tuff breccia, mafic fragmental, pillow breccia.
  1t Tuffaceous mafic rocks

ABBREVIATIONS

Ag	Silver
Au	Gold
chl	Chlorite
cp	Chalcopyrite
Cu	Copper
ep	Epidote
Fe	Iron
Fe-carb	Iron carbonate
gf	Graphite
gn	Galena
hem	Hematite
Il	Ilmenite
lcx	Levcoxene-bearing
mag	Magnetite
Pb	Lead
po	Pyrrhotite
py	Pyrite
ser	Sericite
sh	Sheared
sil	Siliceous
sp	Sphalerite
stgrs	Stringers
Zn	Zinc
bn	Bornite
mal	Malachite

SYMBOLS

- Geological contact, inferred
- Outcrop
- Fault or shear zone
- Trench (bedrock, overburden)
- 3.53,.02,.52,.34 / 5.0, 25 — Channel sample with analytical value Cu%, Pb%, Zn%, Ag oz./ton / m.
- KRS-11x — Surface grab sample
- Foliation, strike and dip
- Bedding, strike and dip
- Joint, strike and dip
- Bush road
- Glacial ice direction
- Previous diamond drill hole

holes A-D	Cominco, 1954
hole 54-305	American Metal Co., 1954
holes 01-57	Shunsby Gold Mines, 1955
holes 58-74	Shunsby Gold Mines, 1956/57
holes S-57-1 to 3	Martin Shunsby, 1957
holes 75-92	Shunsby Mines, 1960/61, 1964
holes 93-115, Jim1,2 SE 1-4	FRJ Prospecting Syndicate, 1965
holes 68-01 to 23	Consolidated Shunsby Mines, 1968
holes 74-01 to 21	Grandora Exploration, 1974
holes MW-80-1,2	Placer, 1980
holes 81-01 to 30	MW Resources, 1981

- Proposed diamond drill hole

N

S C A L E

50 0 50 100 150 200 250

M E T R E S

EAST SHEET

KIRKTON RESOURCES CORP.

SHUNSBY PROPERTY · SWAYZE AREA

GEOLOGY

Project No: C-1302	By: P. Sobie, W.E. Brereton
Scale: 1:2500	Drawn: A & N Cartographics
Drawing No: 1a	Date: November, 1991

MPH Consulting Limited

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L E G E N D

GEOLOGY

MIDDLE TO LATE PRECAMBRIAN (PROTEROZOIC)

MAFIC INTRUSIVE ROCKS

- **11** — 11 Diabase dikes.
- **10** — 10 Lamprophyre dikes and sills.

FELSIC INTRUSIVE ROCKS

- **9** — 9a Quartz-feldspar-porphyry dikes and sills. 9b Fine-grained felsic intrusive.

EARLY PRECAMBRIAN (ARCHEAN)

METASEDIMENTS

EPICLASTIC METASEDIMENTS

- **7** — 7a Conglomerate, conglomeratic arenite. 7b Conglomerate with chert clasts (chloritic). 7c Quartzite, sandstone, greywacke. 7d Argillite/greywacke. 7e Thinly laminated arenite

CHEMICAL METASEDIMENTS

- **6** — 6a Brecciated chert, chert breccia. 6b Banded chert (± 7b, 2a). 6c Massive chert. 6d Argillaceous chert. 6e Chert-pyrite breccia. 6f Siliceous carbonate sediment.
- **IF** — MIF Chert-magnetite iron formation. chlIF Chloritic magnetite iron formation. SIF Chert-sulphide iron formation, (py, po ± cp, sp, gf). MS Massive pyrite-pyrrhotite (± cp, sp).

MAFIC INTRUSIVE ROCKS

- **5** — 5a Diorite. 5b Gabbro. 5c Glomeroporphyritic gabbro. 5d Amphibolite/pyroxenite.

ULTRAMAFIC INTRUSIVE ROCKS

- **4** — 4 Peridotite.

METAVOLCANICS

INTERMEDIATE TO FELSIC METAVOLCANICS

- **2** — 2a Feldspar porphyritic ash tuff. 2b Feldspar porphyritic lapilli tuff, tuff breccia. 2c Quartz eye/chert frag chloritic volcanics. 2d Porphyritic (quartz). 2e Porphyritic (feldspar). 2h Breccia

MAFIC METAVOLCANICS

- **1** — 1a Massive, fine-grained. 1c Porphyritic flows. 1e Pillowed flows. 1p Massive, medium to course-grained flows. 1q Variolitic flows. 1r Mafic tuff breccia, mafic fragmental, pillow breccia. 1t Tuffaceous mafic rocks

ABBREVIATIONS

Ag	Silver
Au	Gold
chl	Chlorite
cp	Chalcopyrite
Cu	Copper
ep	Epidote
Fe	Iron
Fe-carb	Iron carbonate
gf	Graphite
gn	Galena
hem	Hematite
Il	Ilmenite
lcx	Levcoxene-bearing
mag	Magnetite
Pb	Lead
po	Pyrrhotite
py	Pyrite
ser	Sericite
sh	Sheared
sil	Siliceous
sp	Sphalerite
stgrs	Stringers
Zn	Zinc
bn	Bornite
mal	Malachite

SYMBOLS

- Geological contact, inferred
- Outcrop
- Fault or shear zone
- Trench (bedrock, overburden)
- 3.53, 02, .52, .34 / 5.0, 25 — Channel sample with analytical values Cu%, Pb%, Zn%, Ag oz/ton / m.
- KRS-11x — Surface grab sample
- Foliation, strike and dip
- Bedding, strike and dip
- Joint, strike and dip
- Bush road
- Glacial ice direction
- Previous diamond drill hole

holes A-D	Cominco, 1954
hole 54-305	American Metal Co., 1954
holes 01-57	Shunsby Gold Mines, 1955
holes 58-74	Shunsby Gold Mines, 1956/57
holes S-57-1 to 3	Martin Shunsby, 1957
holes 75-92	Shunsby Mines, 1960/61, 1964
holes 93-115, Jim1,2 SE 1-4	FRJ Prospecting Syndicate, 1965
holes 68-01 to 23	Consolidated Shunsby Mines, 1968
holes 74-01 to 21	Grandora Exploration, 1974
holes MW-80-1,2	Placer, 1980
holes 81-01 to 30	MW Resources, 1981

- Proposed diamond drill hole

S C A L E

50 0 50 100 150 200 250

M E T R E S

WEST SHEET

KIRKTON RESOURCES CORP.

SHUNSBY PROPERTY · SWAYZE AREA

GEOLOGY

Project No: C-1302	By: P. Sobie, W.E. Brereton
Scale: 1:2500	Drawn: A & N Cartographics
Drawing No: 1b	Date: November, 1991

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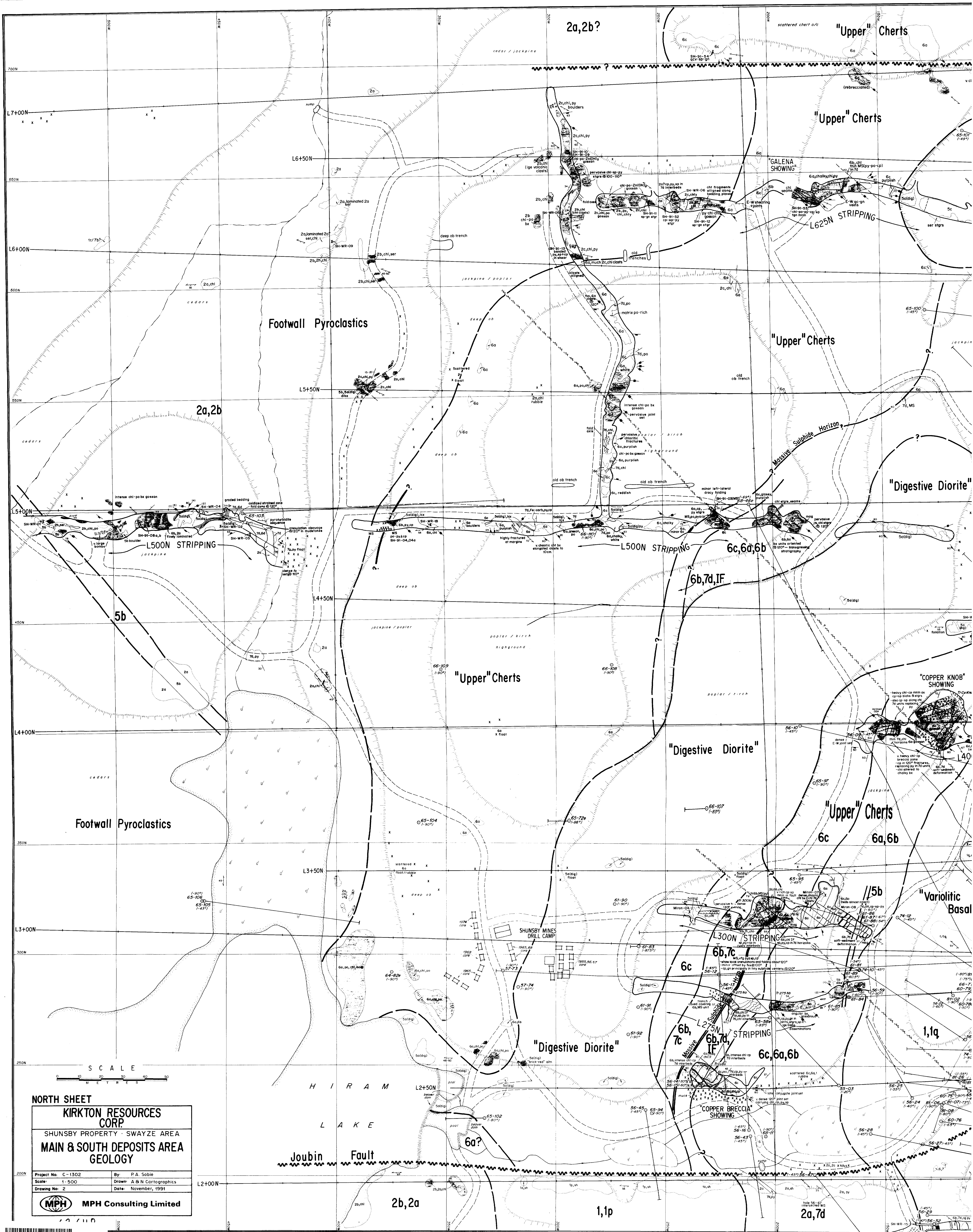
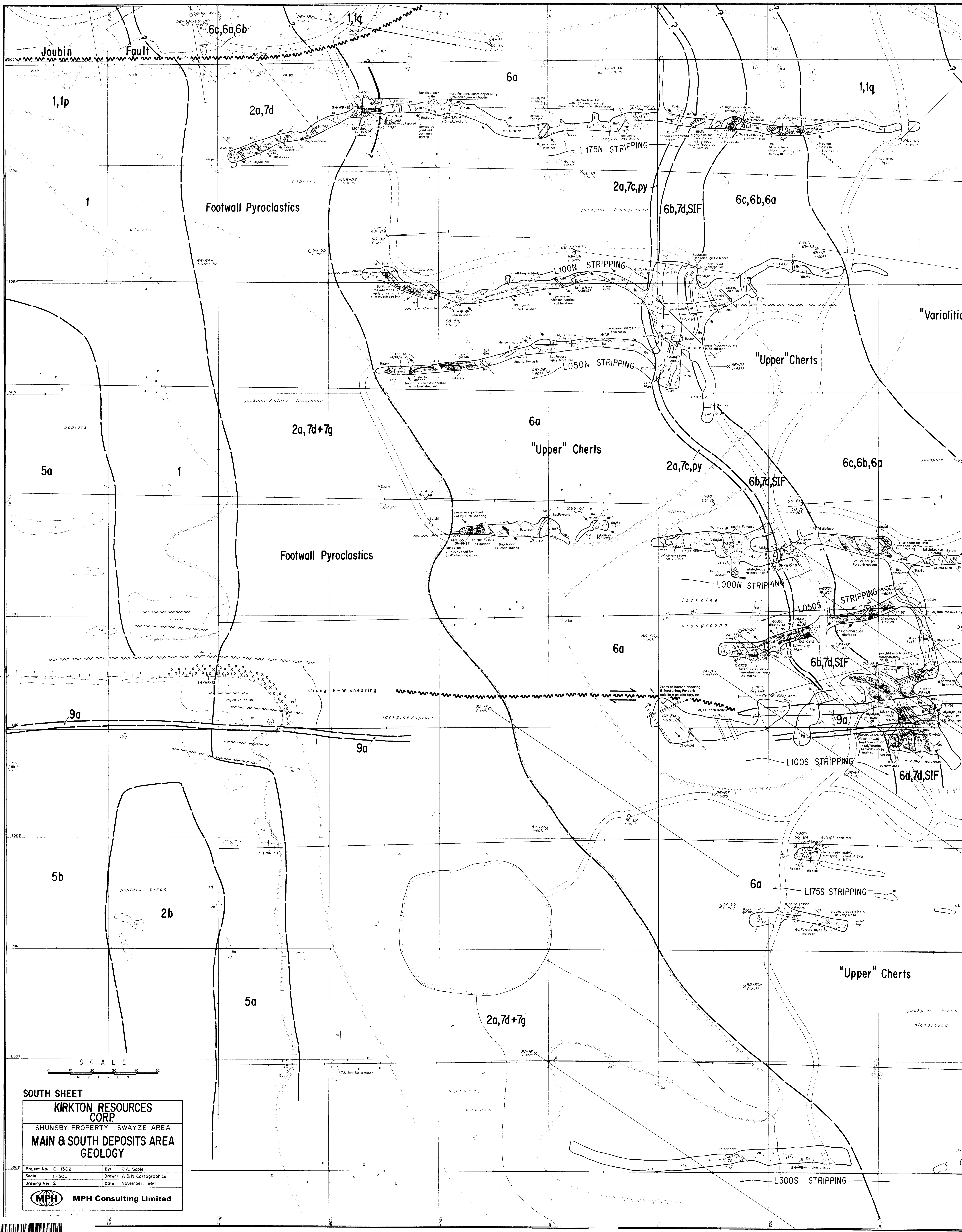
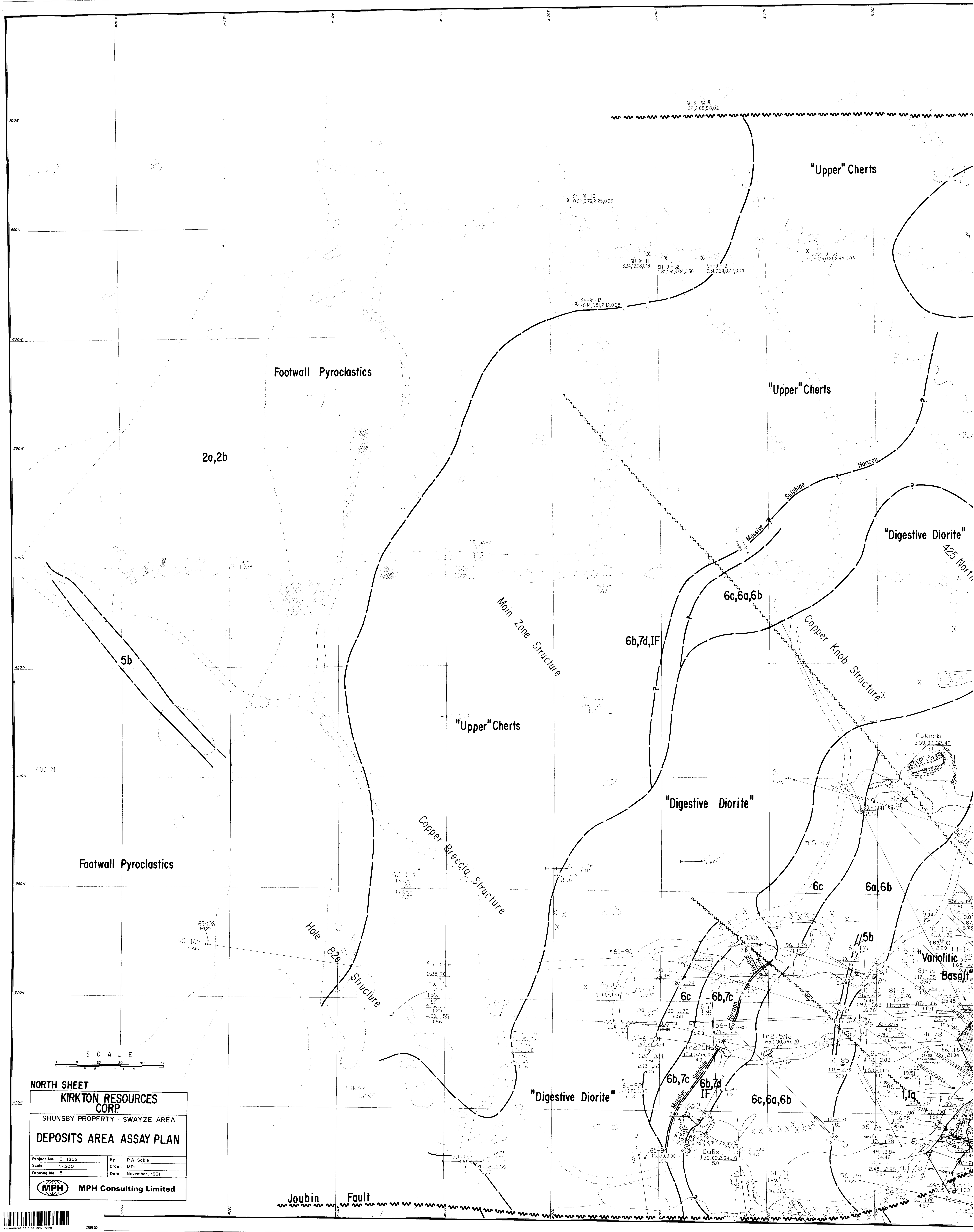
330

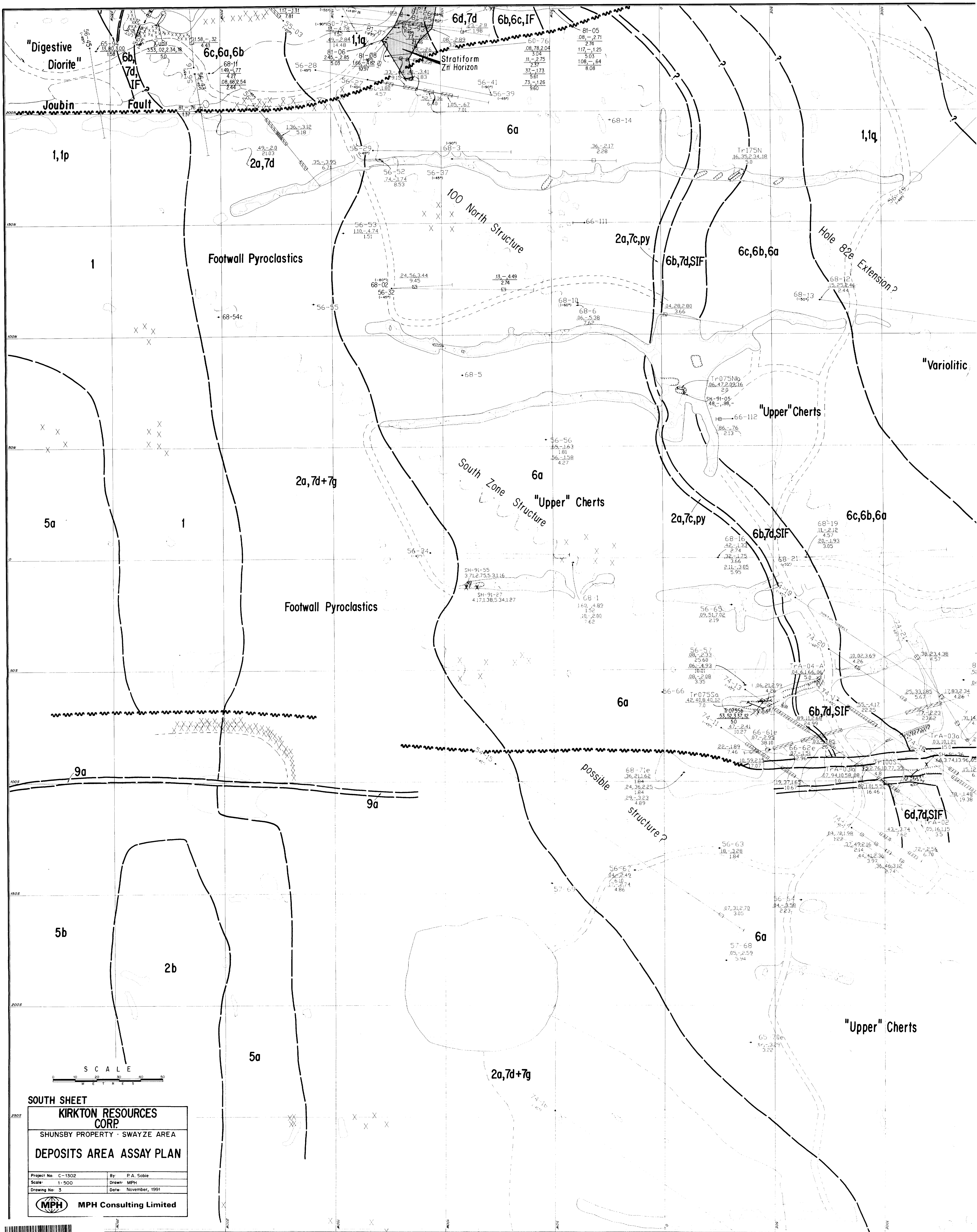

2a,2b?
"Upper" Cherts
L7+00N
L6+50N
"GALENA SHOWING"
L625N STRIPPING
L6+00N
Footwall Pyroclastics
"Upper" Cherts
L5+50N
2a,2b
Massive Sulphide Horizon
"Digestive Diorite"
L5+00N
L500N STRIPPING
L500N STRIPPING
6c,6a,6b
6b,7d,IF
L4+50N
5b
"Upper" Cherts
"COPPER KNOB" SHOWING
L4+00N
"Digestive Diorite"
Footwall Pyroclastics
"Upper" Cherts
6c
6a,6b
L3+50N
5b
"Variolitic Basal
L3+00N
SHUNSBY MINES DRILL CAMP
L300N STRIPPING
6b,7c
6c
L275N STRIPPING
6b, 7c
6b,7d, IF
6c,6a,6b
1,1q
"Digestive Diorite"
SCALE
0 10 20 30 40 50
METRES
H I R A M
L2+50N
L A K E
COPPER BRECCIA SHOWING
6a?
Joubin Fault
L2+00N
2b,2a
1,1p
2a,7d
NORTH SHEET
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY · SWAYZE AREA
MAIN & SOUTH DEPOSITS AREA GEOLOGY
Project No: C-1302
By: P.A. Sobie
Scale: 1:500
Drawn: A & N Cartographics
Drawing No: 2
Date: November, 1991
MPH Consulting Limited

340



Joubin Fault
1,1p
2a,7d
6c,6a,6b
1,1q
6a
L175N STRIPPING
1
Footwall Pyroclastics
2a,7c,py
6b,7d,SIF
6c,6b,6a
L100N STRIPPING
"Variolitic
L050N STRIPPING
"Upper" Cherts
2a,7d+7g
6a
"Upper" Cherts
5a
1
2a,7c,py
6b,7d,SIF
6c,6b,6a
Footwall Pyroclastics
L000N STRIPPING
L050S STRIPPING
6a
6b,7d,SIF
strong E-W shearing
9a
9a
9a
L100S STRIPPING
6d,7d,SIF
5b
2b
6a
L175S STRIPPING
"Upper" Cherts
5a
2a,7d+7g
L300S STRIPPING
SCALE
METRES
SOUTH SHEET
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY · SWAYZE AREA
MAIN & SOUTH DEPOSITS AREA GEOLOGY
Project No: C-1302
By: P.A. Sobie
Scale: 1:500
Drawn: A & N Cartographics
Drawing No: 2
Date: November, 1991
MPH Consulting Limited


"Upper" Cherts
Footwall Pyroclastics
"Upper" Cherts
2a,2b
Massive Sulphide Horizon
"Digestive Diorite"
425 North
6c,6a,6b
Main Zone Structure
Copper Knob Structure
6b,7d,IF
5b
"Upper" Cherts
400 N
"Digestive Diorite"
Copper Breccia Structure
Footwall Pyroclastics
6c
6a,6b
Hole 82e Structure
"Variolitic Basalt"
6c
6b,7c
6b,7c
6b,7d IF
6c,6a,6b
"Digestive Diorite"
Joubin Fault
CuKnob
SCALE
METRES
NORTH SHEET
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY · SWAYZE AREA
DEPOSITS AREA ASSAY PLAN
Project No: C-1302
Scale: 1:500
Drawing No: 3
By: P.A. Sobie
Drawn: MPH
Date: November, 1991
MPH Consulting Limited


"Digestive Diorite"
Joubin Fault
Stratiform Zn Horizon
1,1p
1,1q
6a
6d,7d
6b,6c,IF
6c,6a,6b
2a,7d
Footwall Pyroclastics
100 North Structure
2a,7c,py
6b,7d,SIF
6c,6b,6a
Hole 82e Extension ?
"Variolitic
"Upper" Cherts
South Zone Structure
2a,7d+7g
5a
1
possible structure ?
9a
6d,7d,SIF
5b
2b
SCALE
METRES
0 10 20 30 40 50
SOUTH SHEET
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY · SWAYZE AREA
DEPOSITS AREA ASSAY PLAN
Project No: C-1302
Scale: 1:500
Drawing No: 3
By: P.A. Sobie
Drawn: MPH
Date: November, 1991
MPH Consulting Limited
378

EAST SHEET

KIRKTON RESOURCES CORP.

SHUNSBY PROPERTY - SWAYZE AREA

GEOPHYSICAL COMPILATION

TRENDED DATA

PROJECT NO: C-1302	BY: W.E. BRERETON, J.R.
SCALE: 1:2500	DRAWN: MPH TORONTO
MAP NO: 4a	DATE: NOVEMBER, 1991

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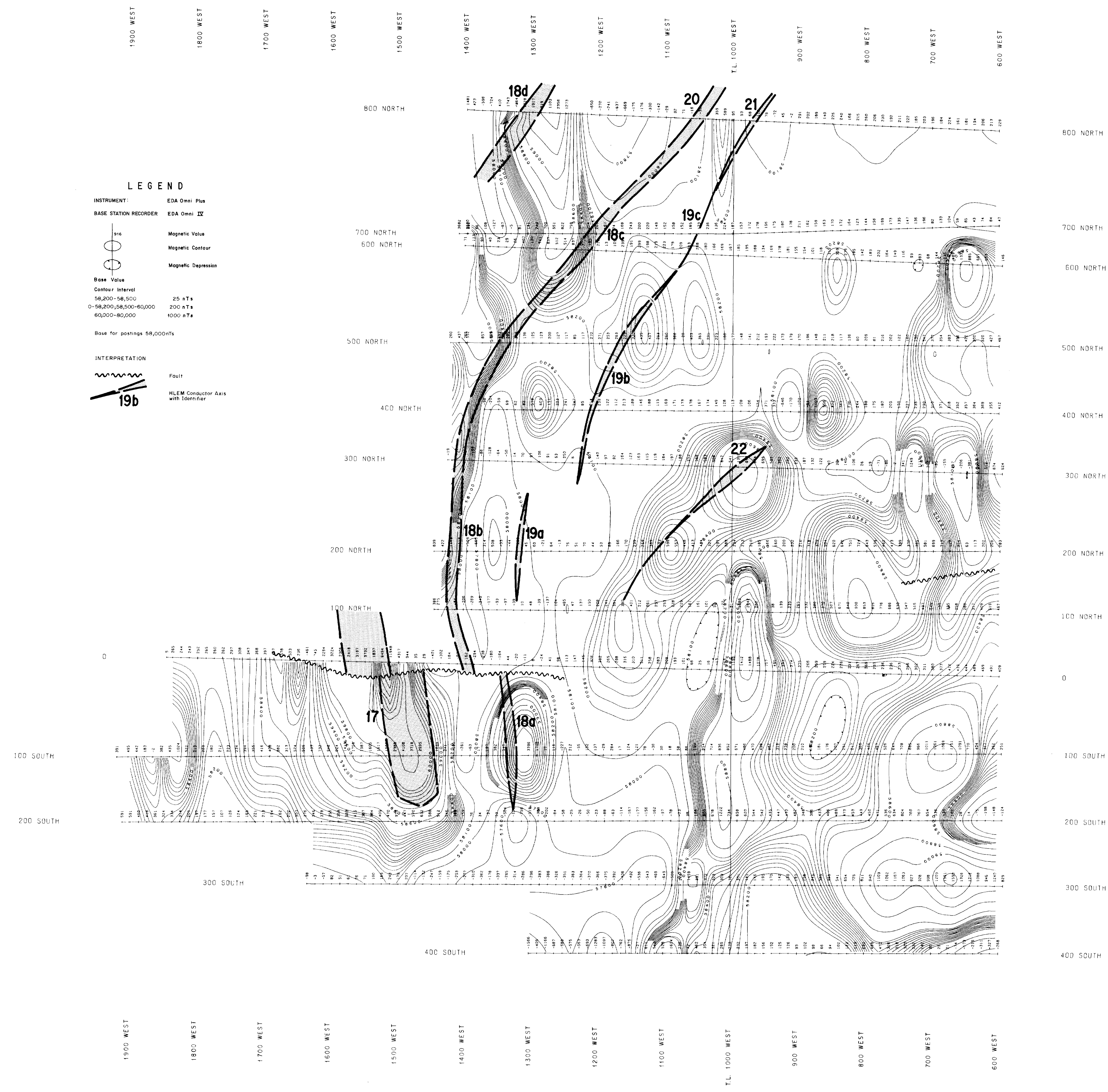

WEST SHEET

KIRKTON RESOURCES CORP.

SHUNSBY PROPERTY - SWAYZE AREA

GEOPHYSICAL COMPILATION

TRENDED DATA

PROJECT NO: C-1302	BY: W.E. BRERETON, J.R.
SCALE: 1:2500	DRAWN: MPH TORONTO
MAP NO: 4b	DATE: NOVEMBER, 1991

MPH CONSULTING LIMITED

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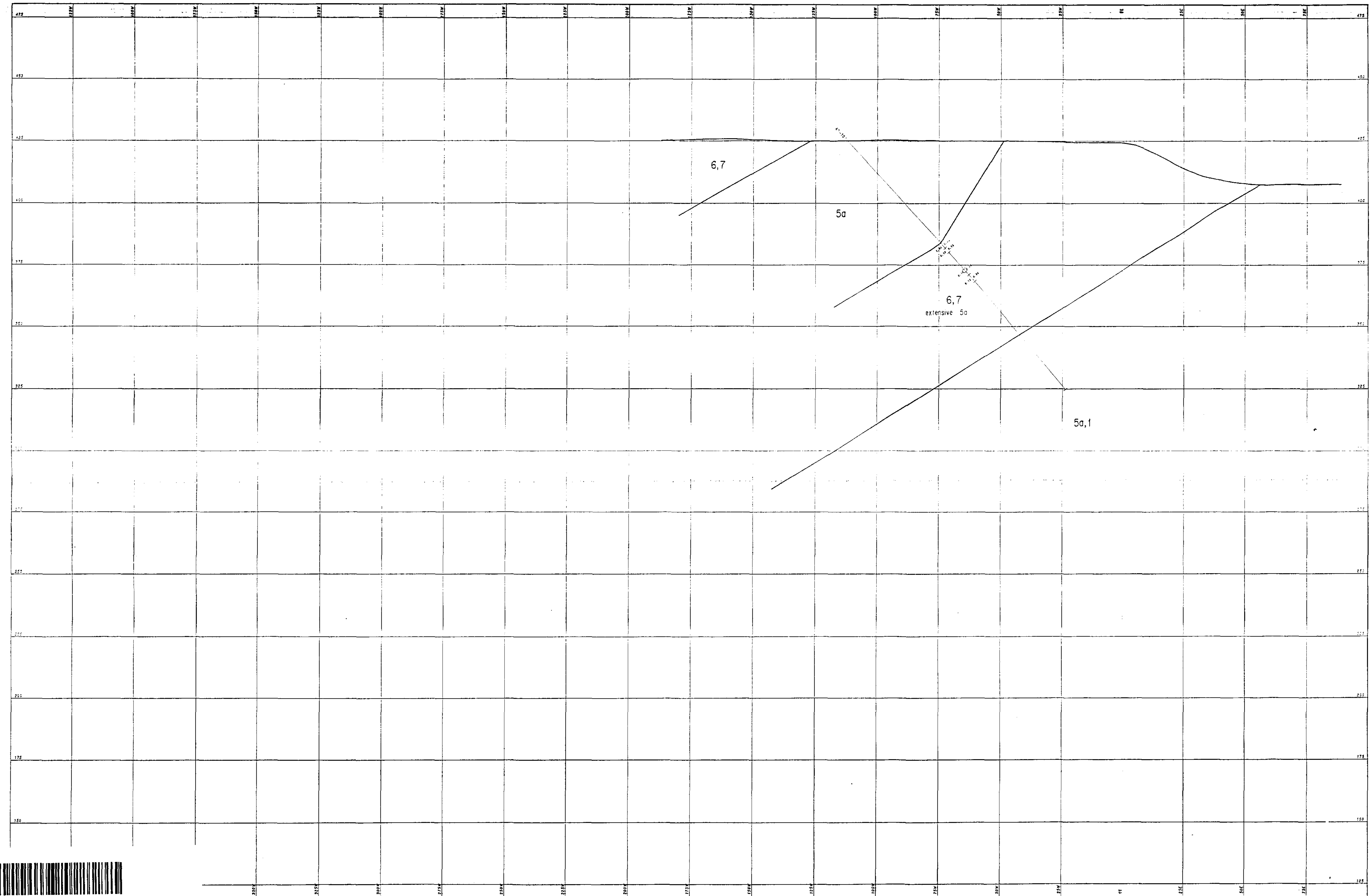
41O08NE0057 63.6118 CUNNINGHAM

390



41010NE0087 63.6118 CUNNINGHAM

400

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

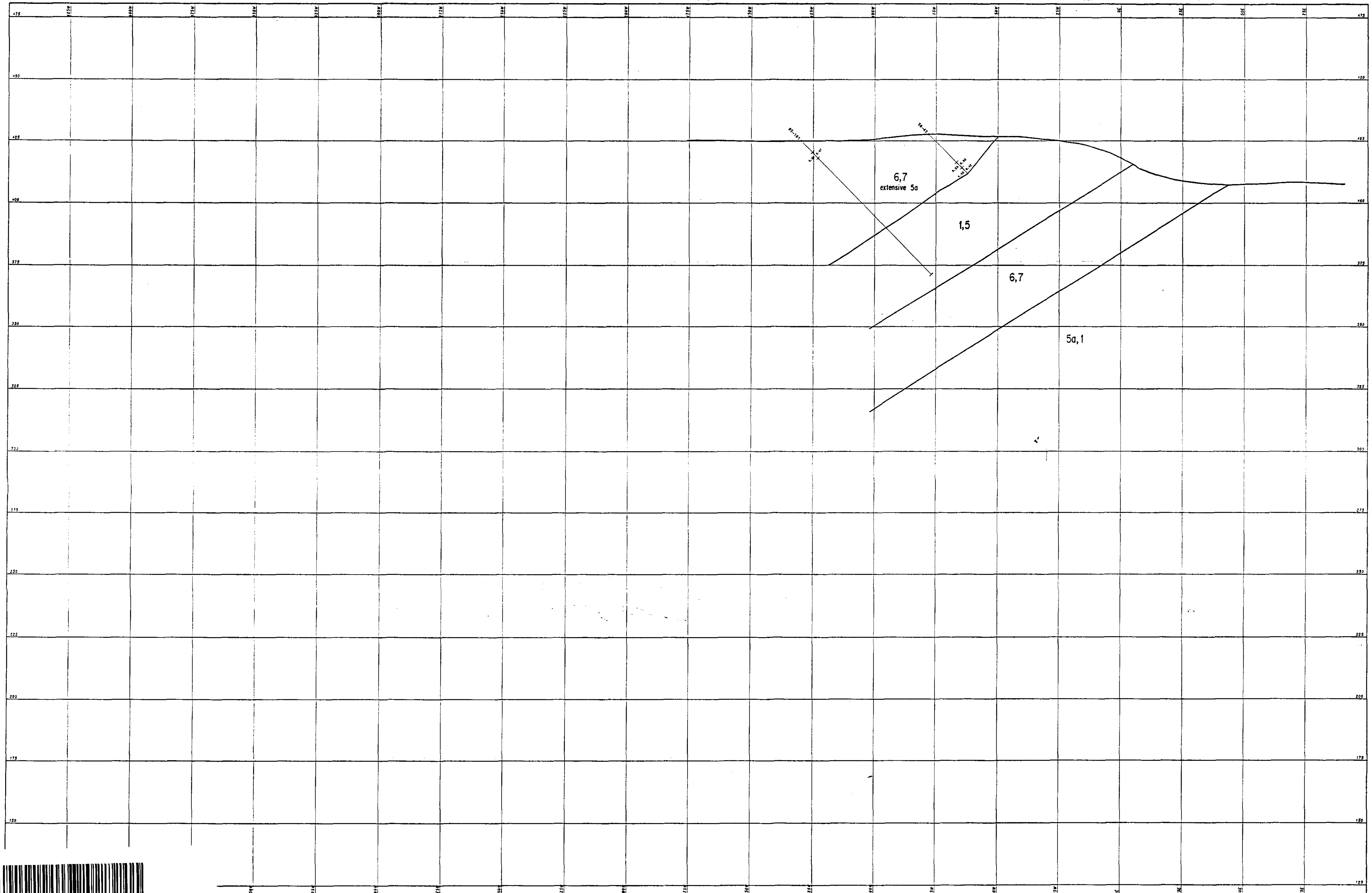
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 6+50 North
(+/-25m window)

Kirkton Resources Corporation

63.6118



410

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

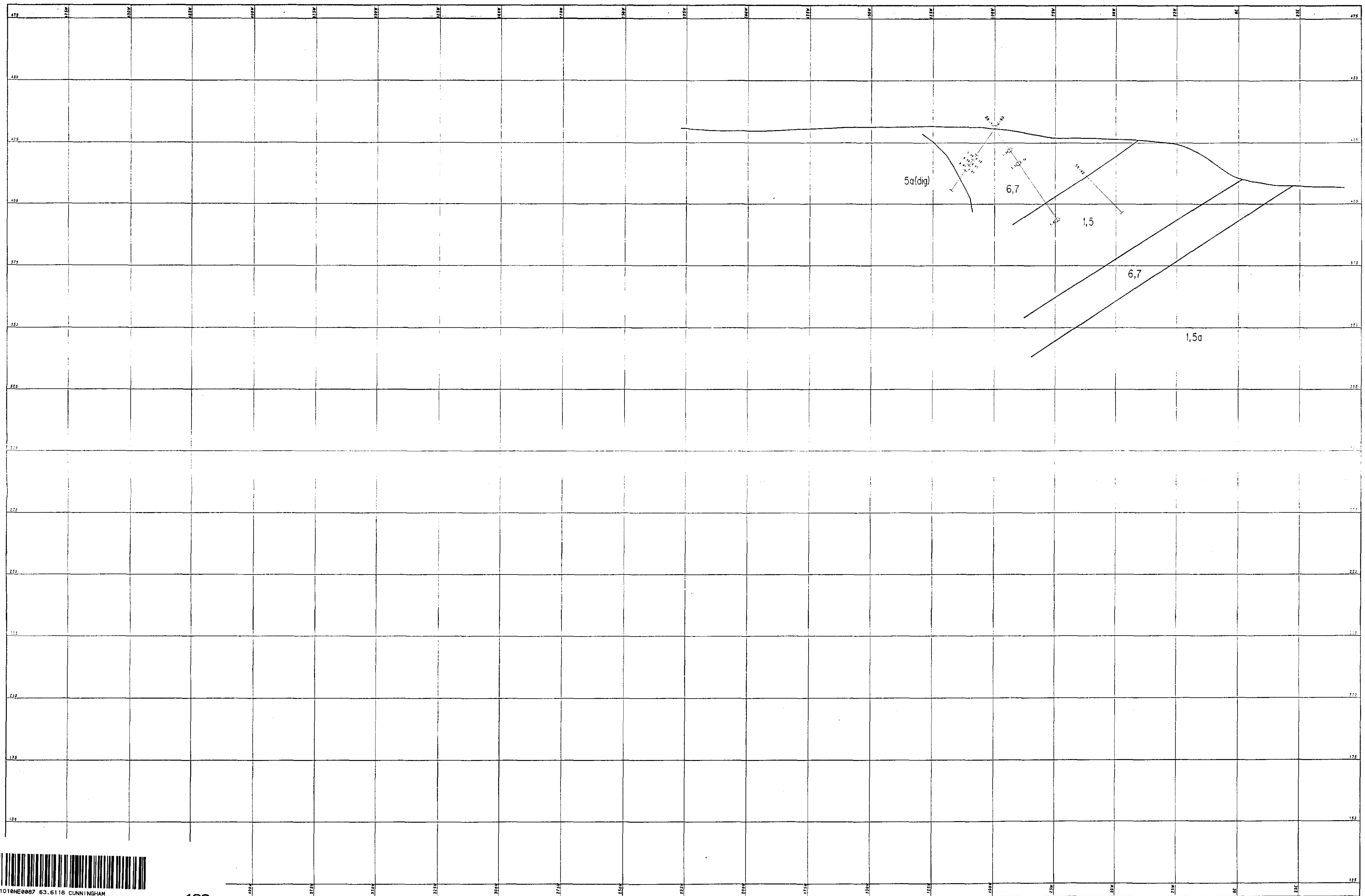
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 6+00 North
(+/-25m window)

Kirkton Resources Corporation

63.6118



420

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

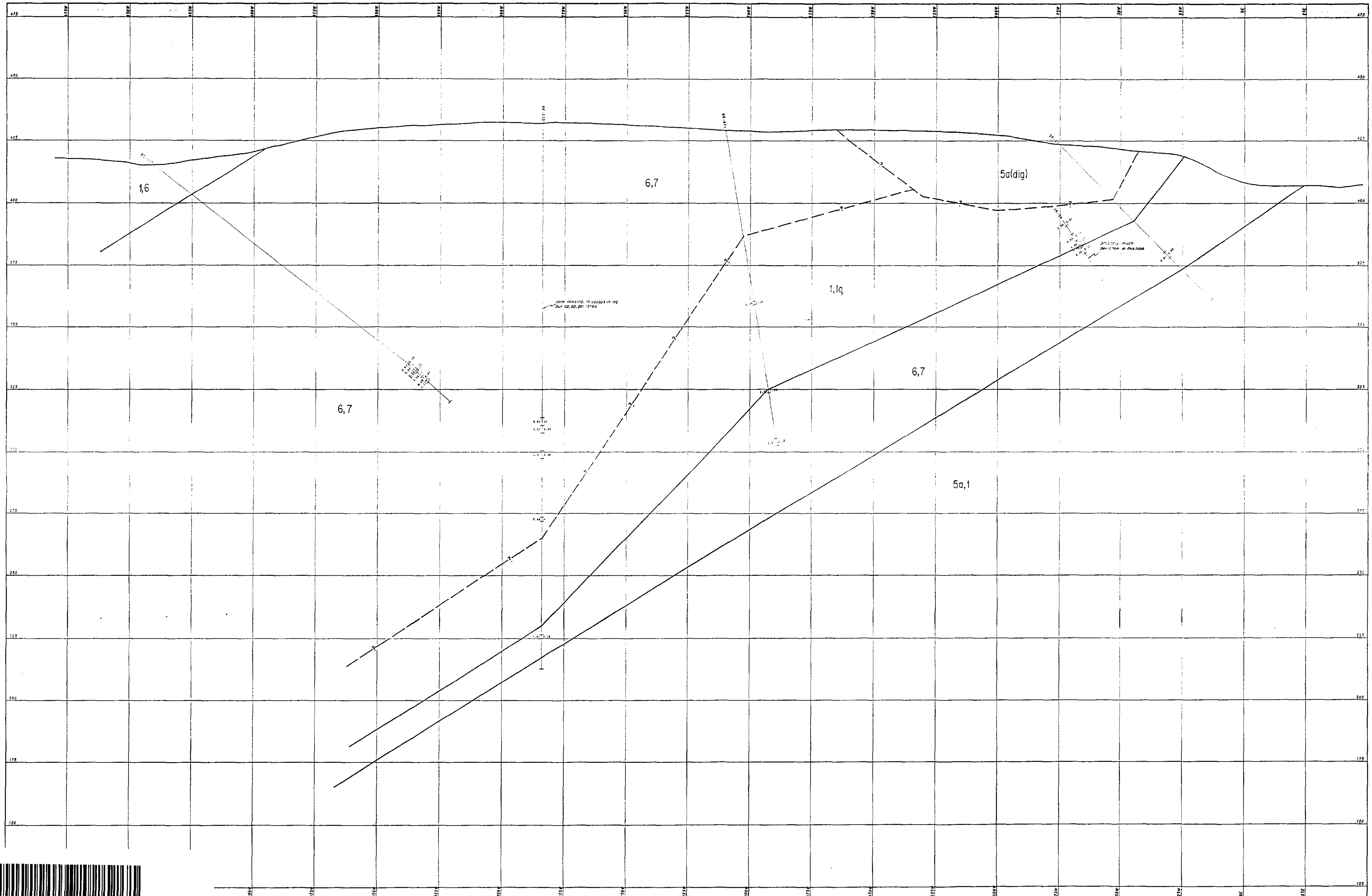
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 5+50 North
(+/-25m window)

Kirkton Resources Corporation

63.6118



430

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

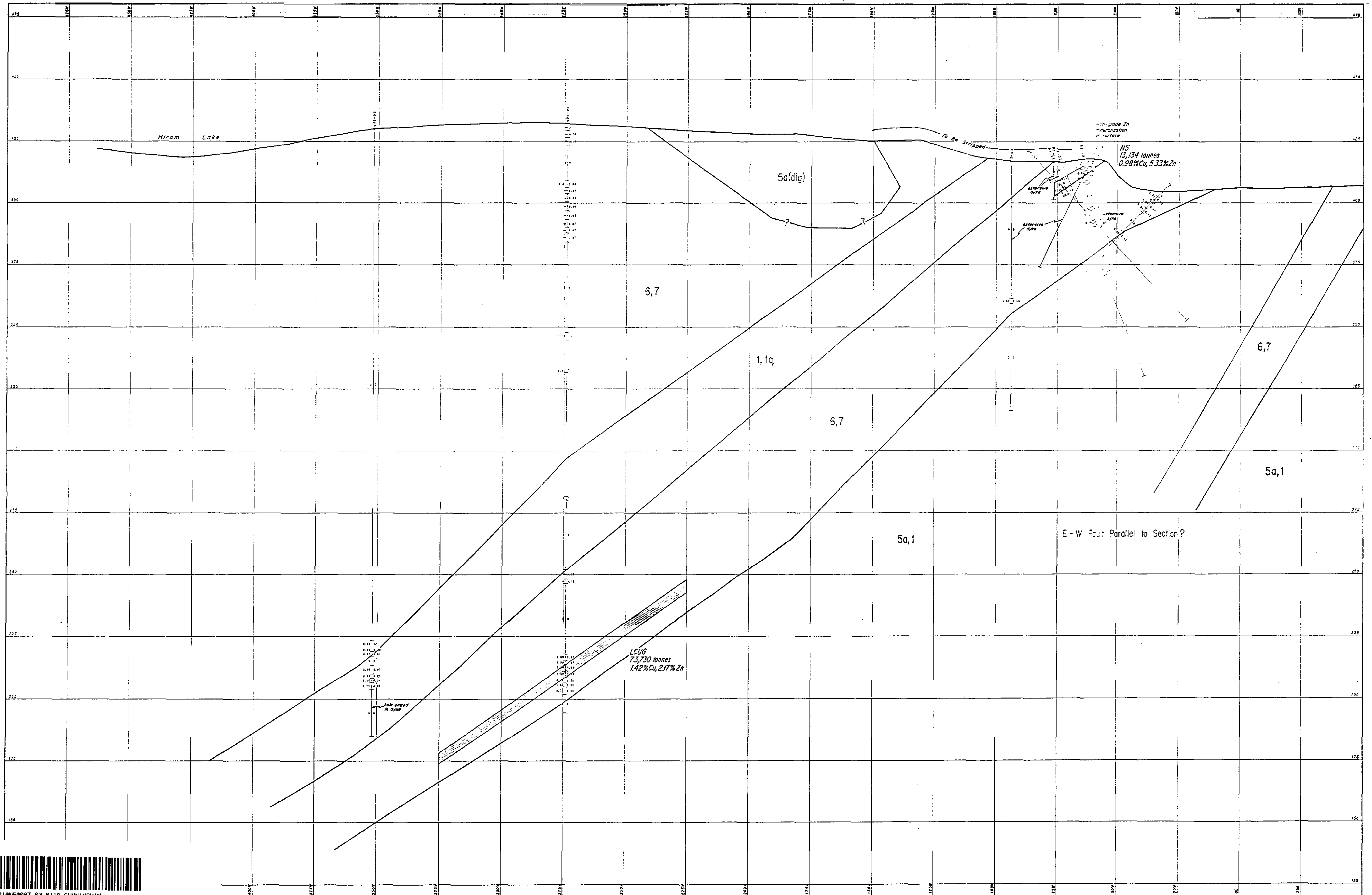
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 5+00 North
(+/-25m window)

Kirkton Resources Corporation

63.6118



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MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

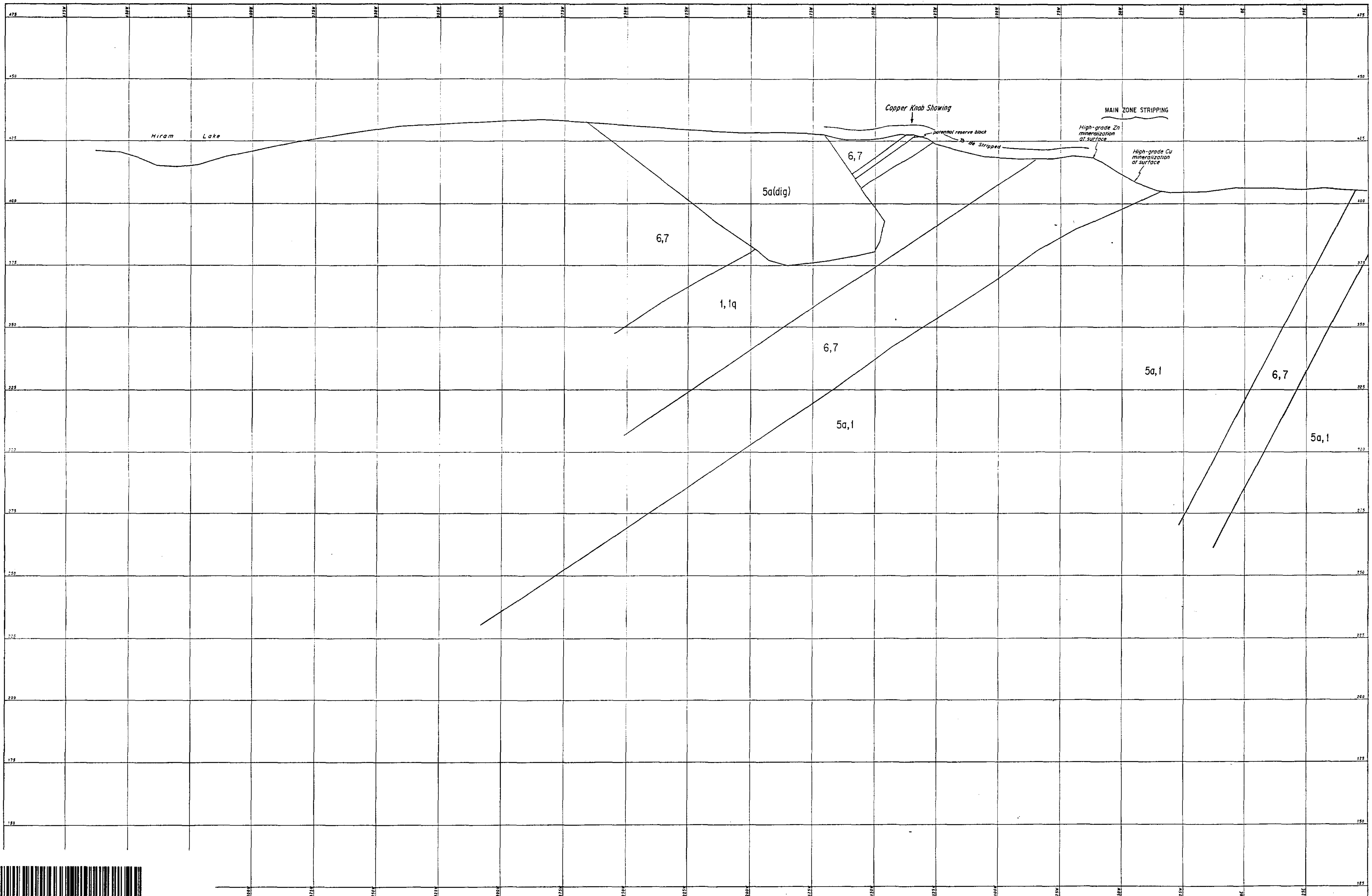
SCALE	DATE	SHEET
1:500	23/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 4+25 North
(+25/-24.75m window)

Kirkton Resources Corporation

63.6118



450

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY

- 7 Argillite, Graphitic Argillite
- 6 Chert, Chert Breccia, Argillaceous Chert
- 5a(dig) "Digestive" Diorite
- 2 Intermediate to Felsic Pyroclastics
- 1q Variolitic Mafic Volcanics
- 1, 5a "Footwall Diorite" Volcanic Complex

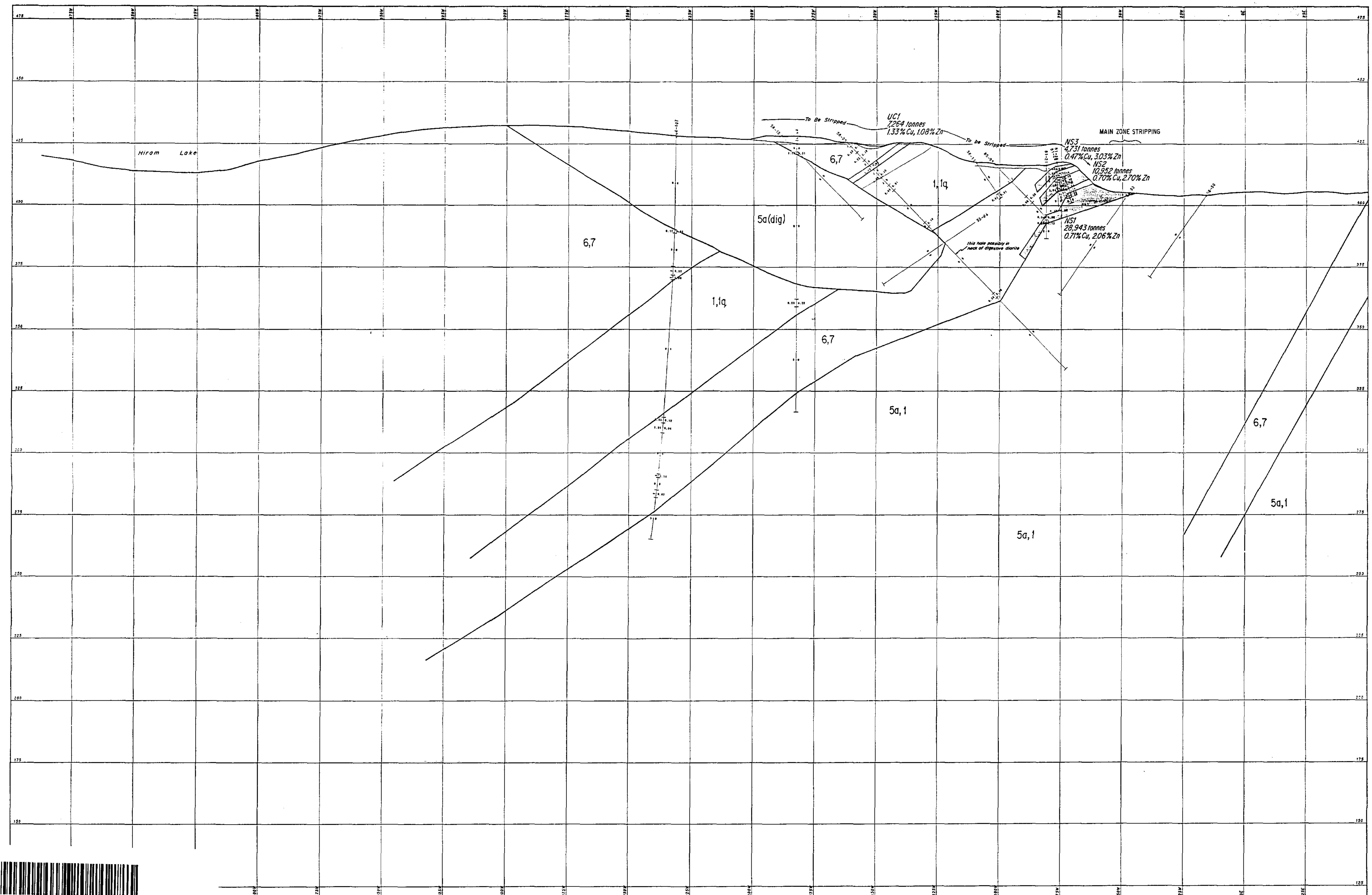
SCALE	DATE	SHEET
1:500	23/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 4+00 North
(+/-.25m window)

Kirkton Resources Corporation

63.6118



460

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
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1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

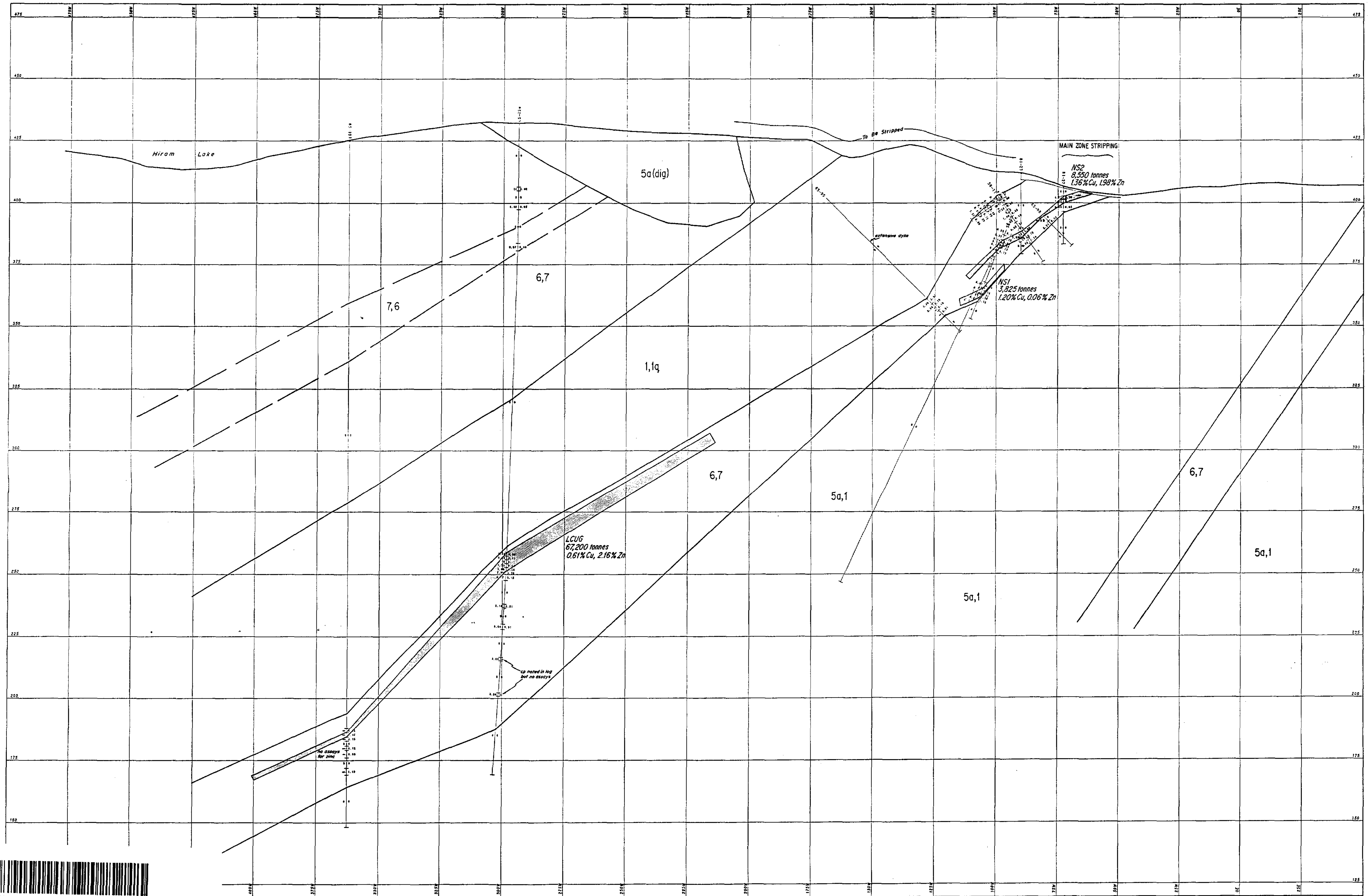
SCALE	DATE	SHEET
1:500	28/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 3+75 North
(+24.75/-12.5m window)

Kirkton Resources Corporation

63.6118



470

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
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5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

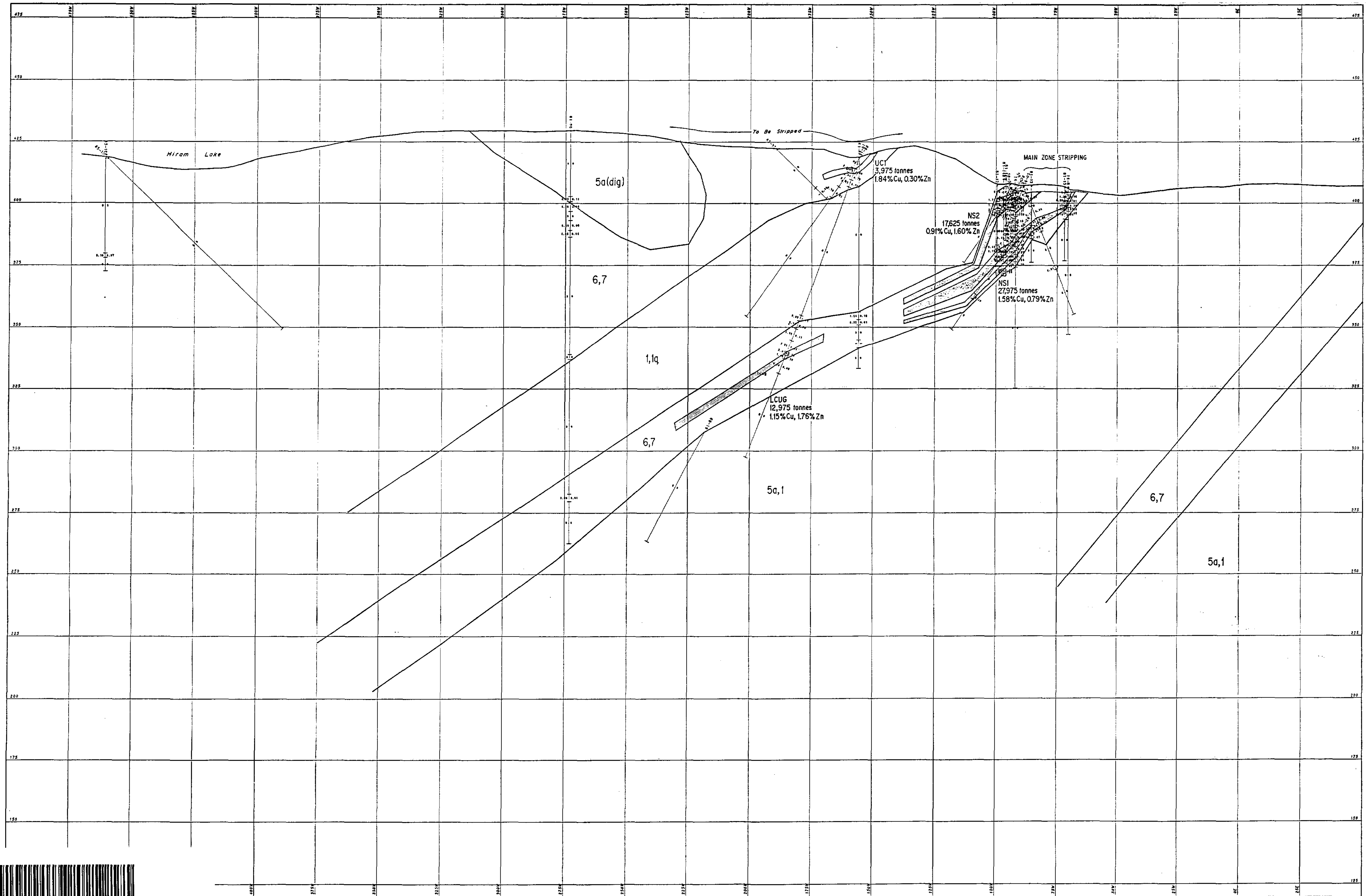
SCALE	DATE	SHEET
1:500	23/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 3+50 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



480

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

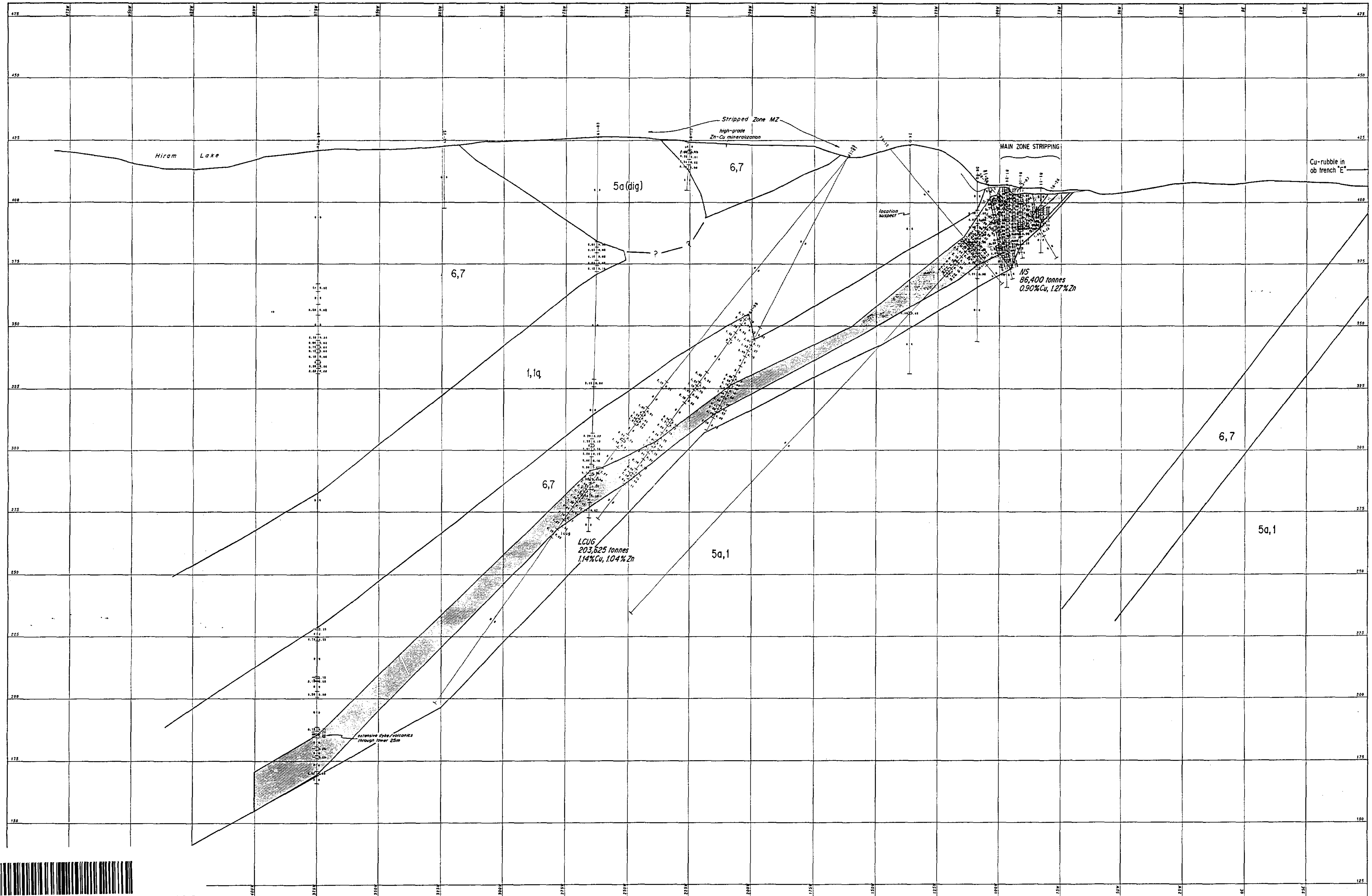
SCALE	DATE	SHEET
1:500	24/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 3+25 North
(+/-12.5m window)

Kirkton Resources Corporation

636118



490

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

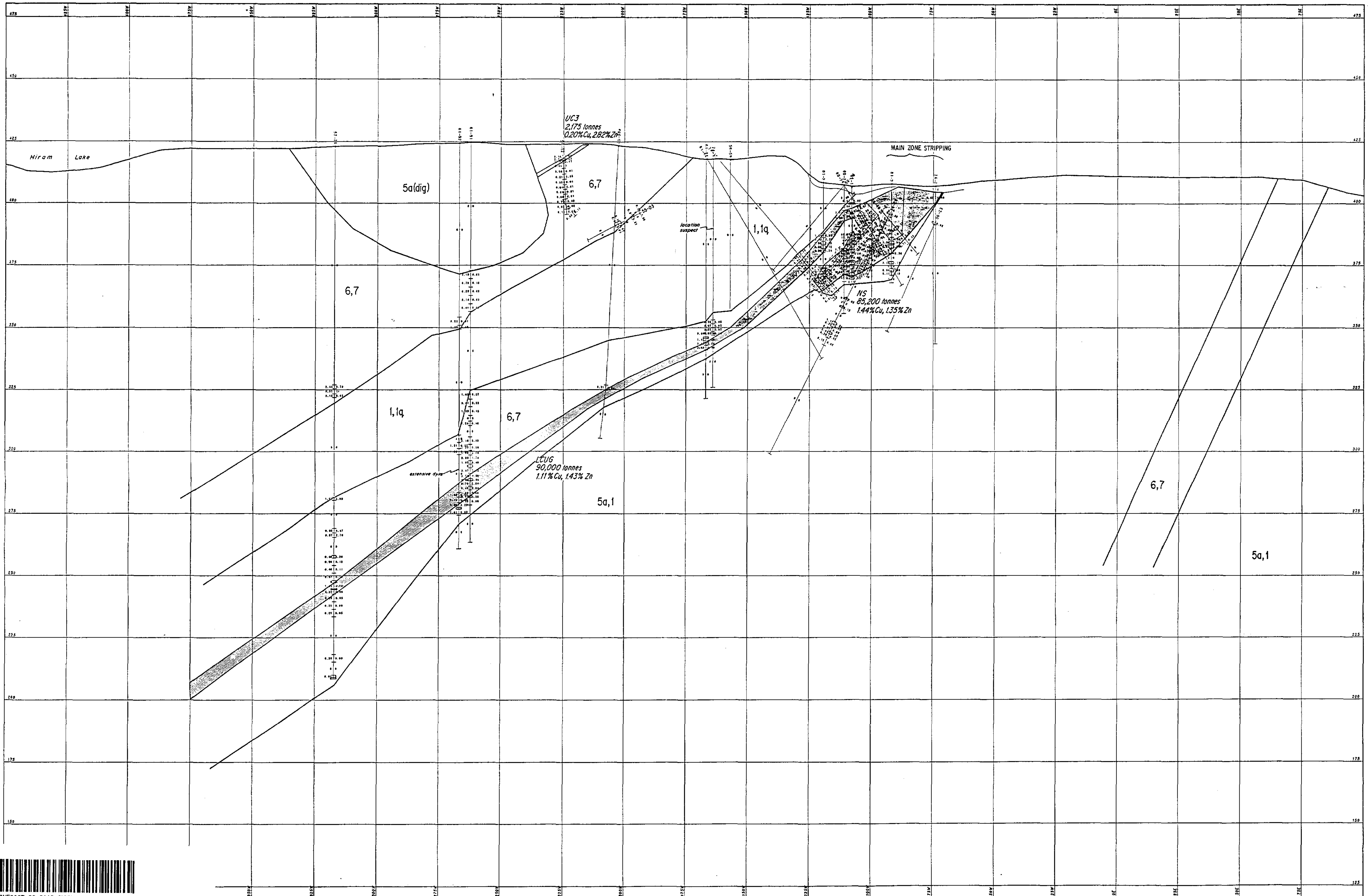
SCALE	DATE	SHEET
1:500	24/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 3+00 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



41010NE0087 63.6118 CUNNINGHAM

500

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

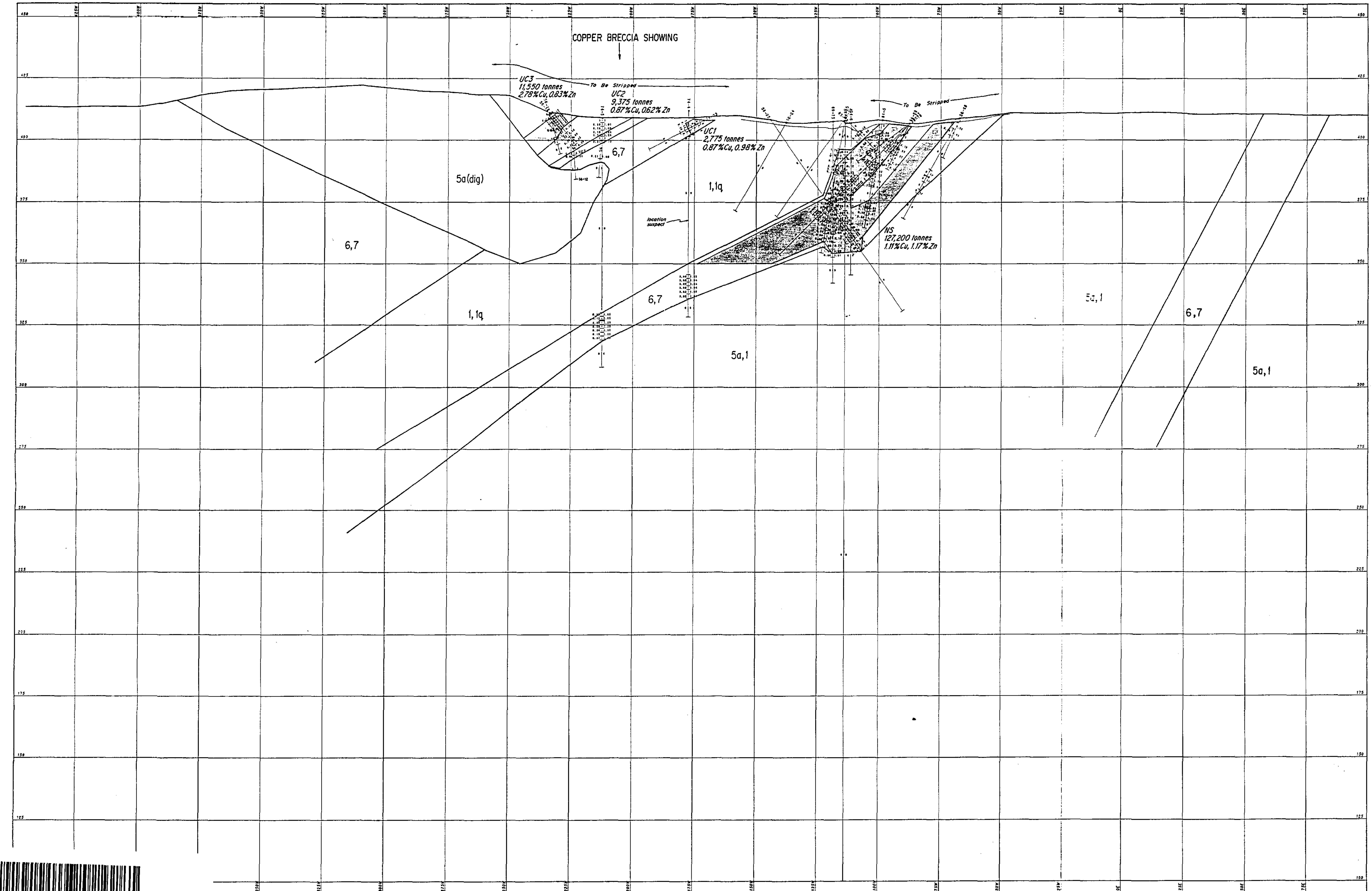
SCALE	DATE	SHEET
1:500	24/10/90	1 of 1
	REF No.	
	C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 2+75 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



4101ØNE0087 63.6118 CUNNINGHAM

510

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

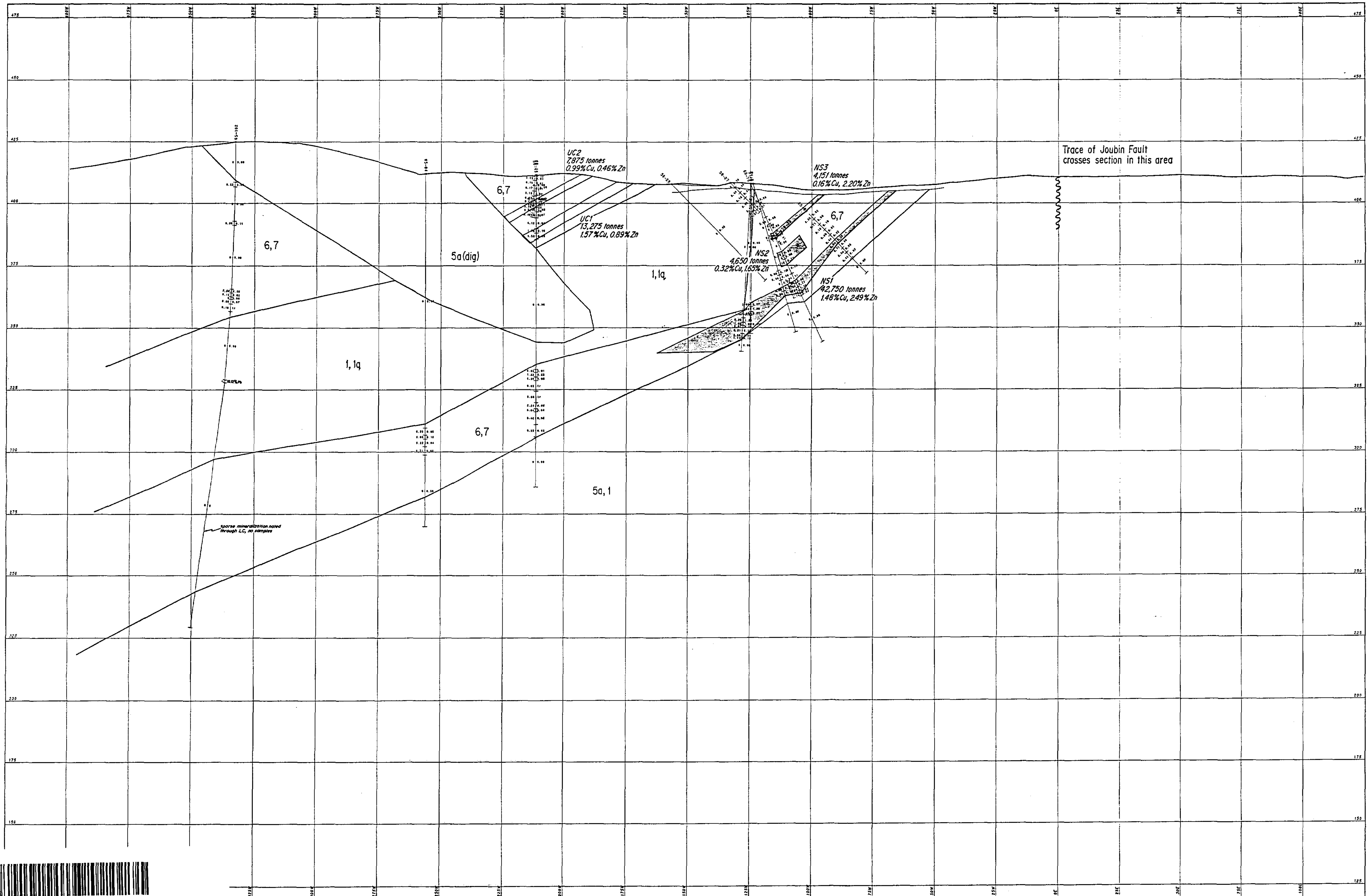
SCALE	DATE	SHEET
1:500	24/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 2+50 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



520

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

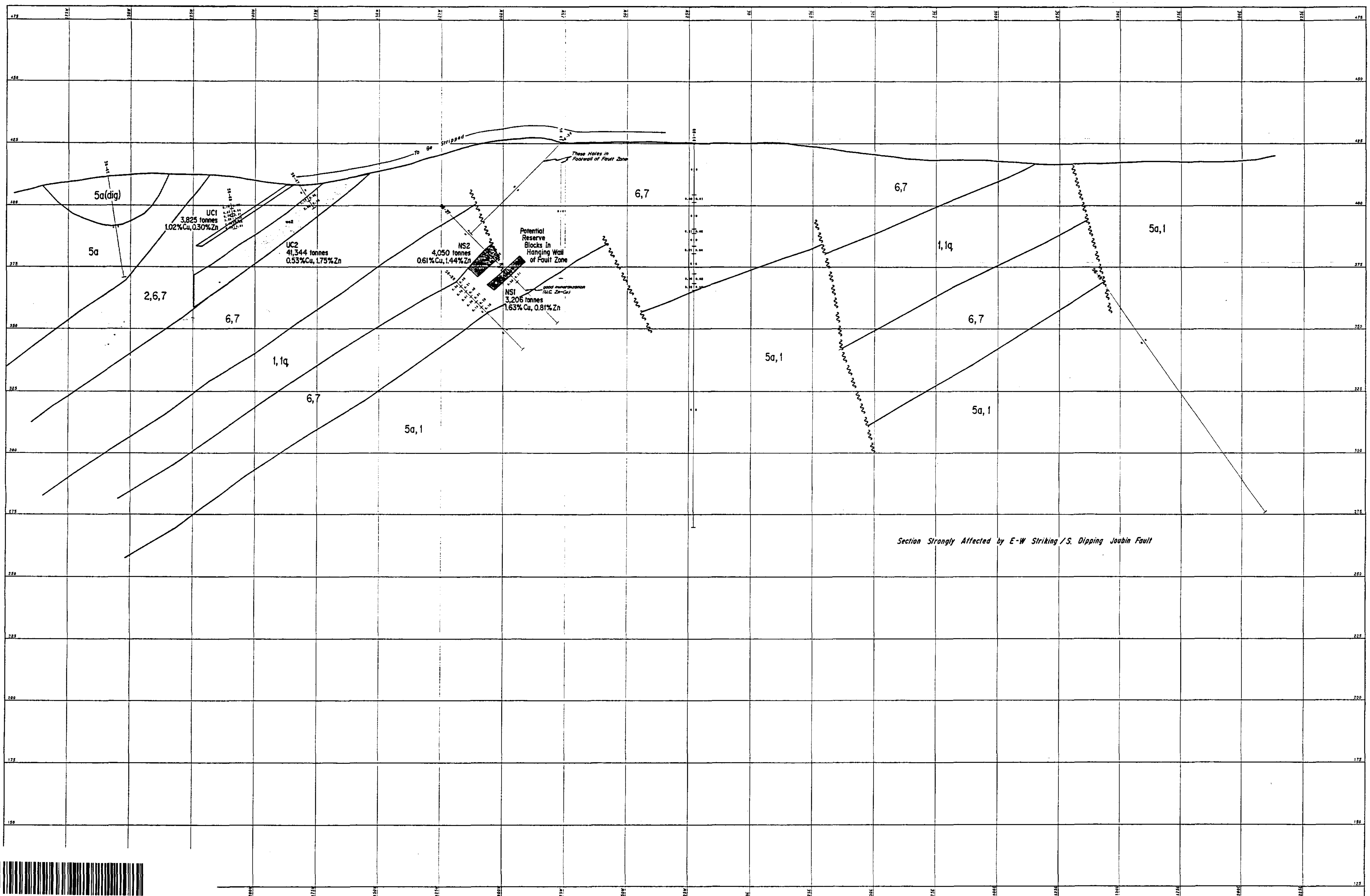
SCALE	DATE	SHEET
1:500	22/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 2+25 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



530

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

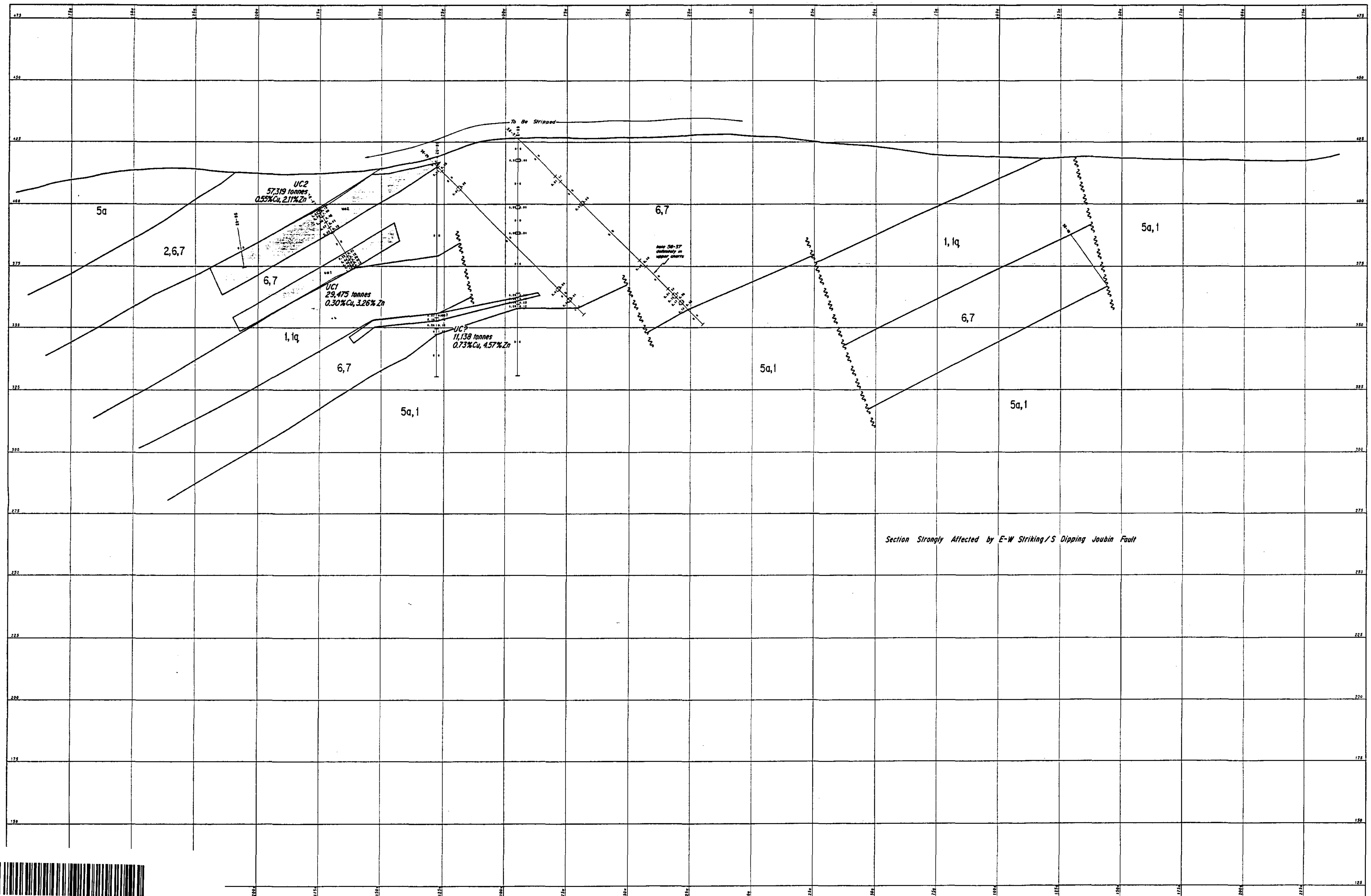
SCALE	DATE	SHEET
1:500	25/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 2+00 North
(+12.5/-6.25m window)

Kirkton Resources Corporation

63.6118



MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

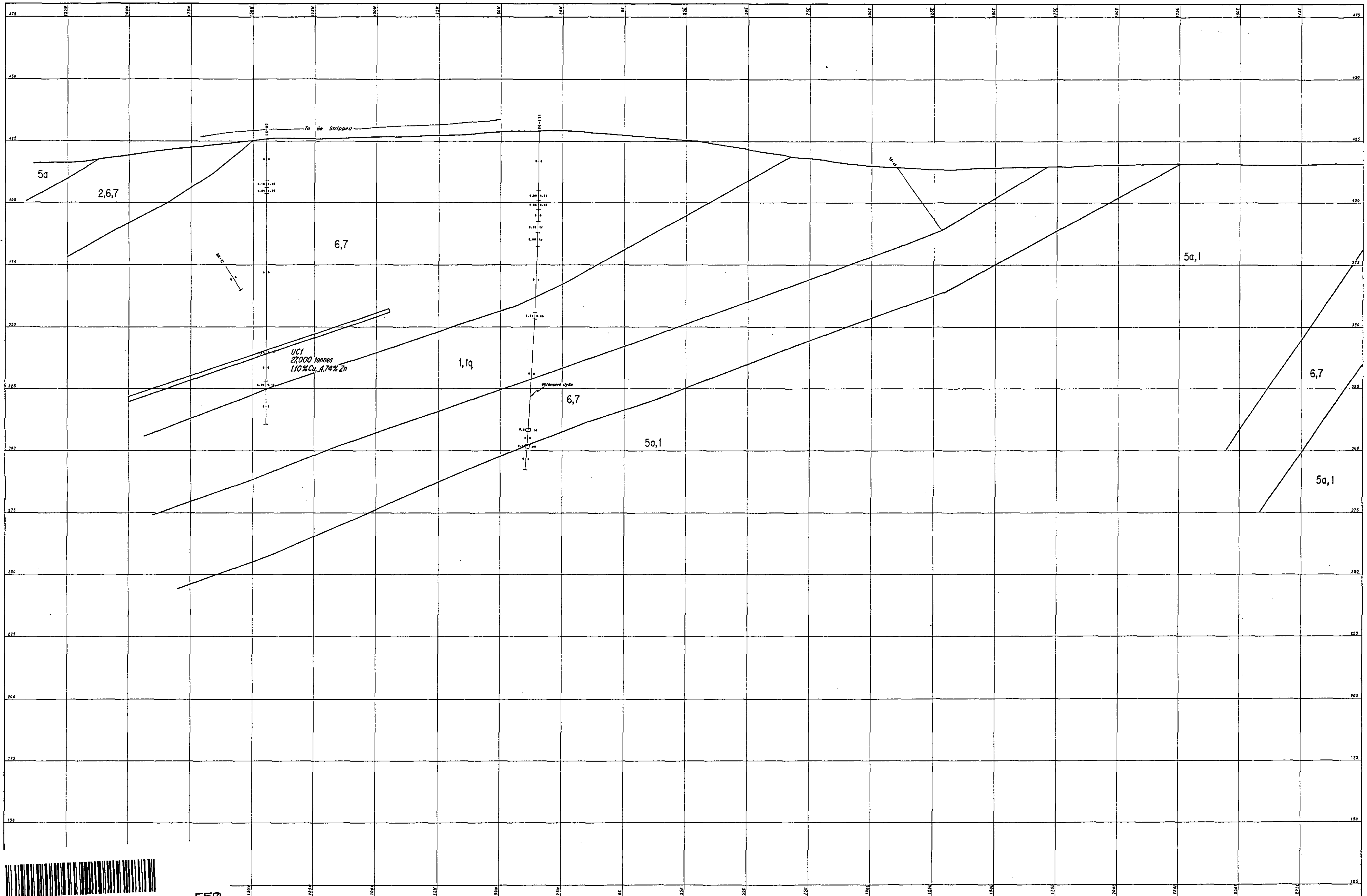
SCALE	DATE	SHEET
1:500	25/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 1+87.5 North
(+6.25/-12.5m window)

Kirkton Resources Corporation

63.6118



550

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

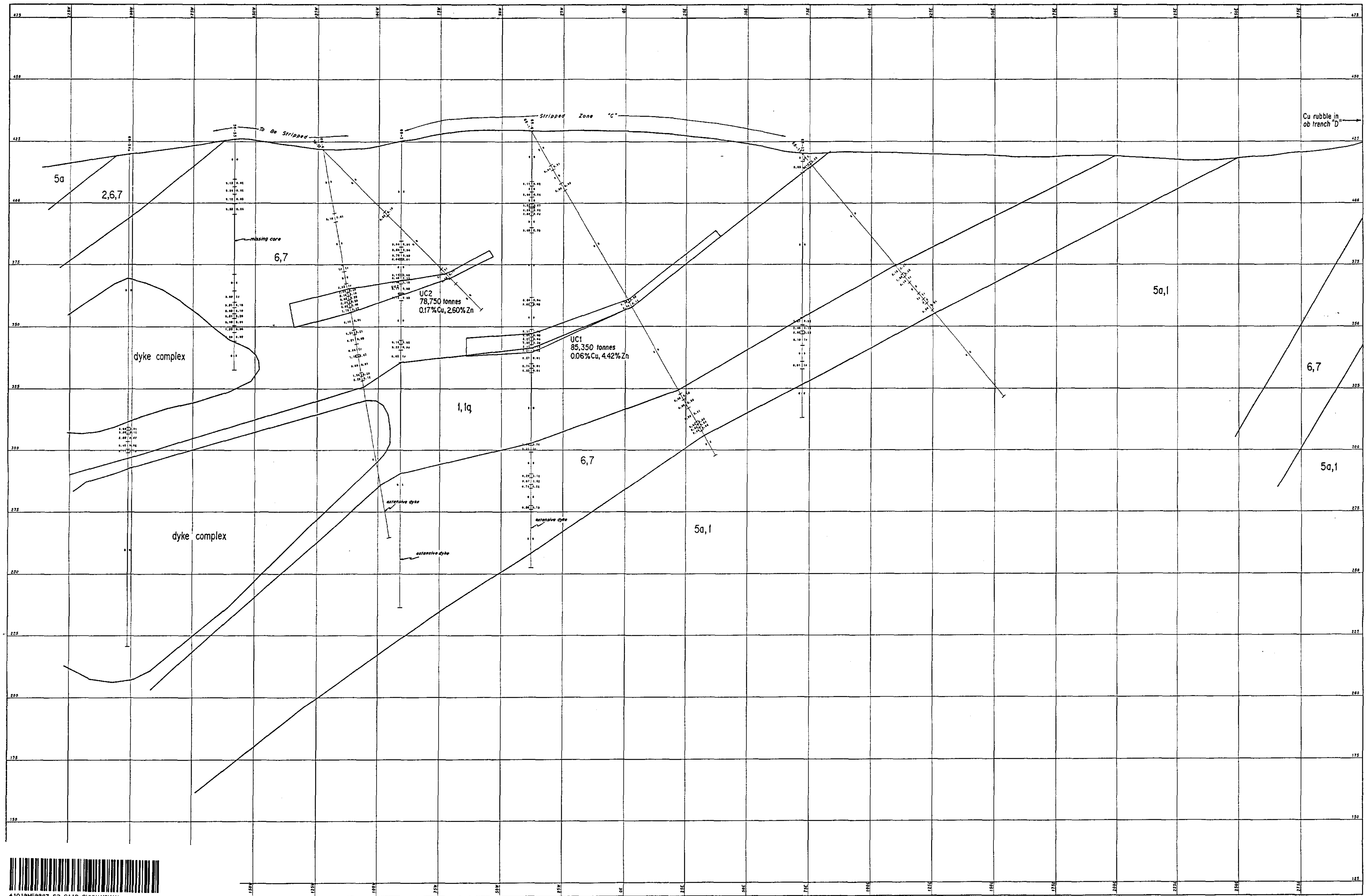
SCALE	DATE	SHEET
1:500	25/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 1+50 North
(+/-25m window)

Kirkton Resources Corporation

63.6118



41010NE0087 63.6118 CUNNINGHAM

560

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

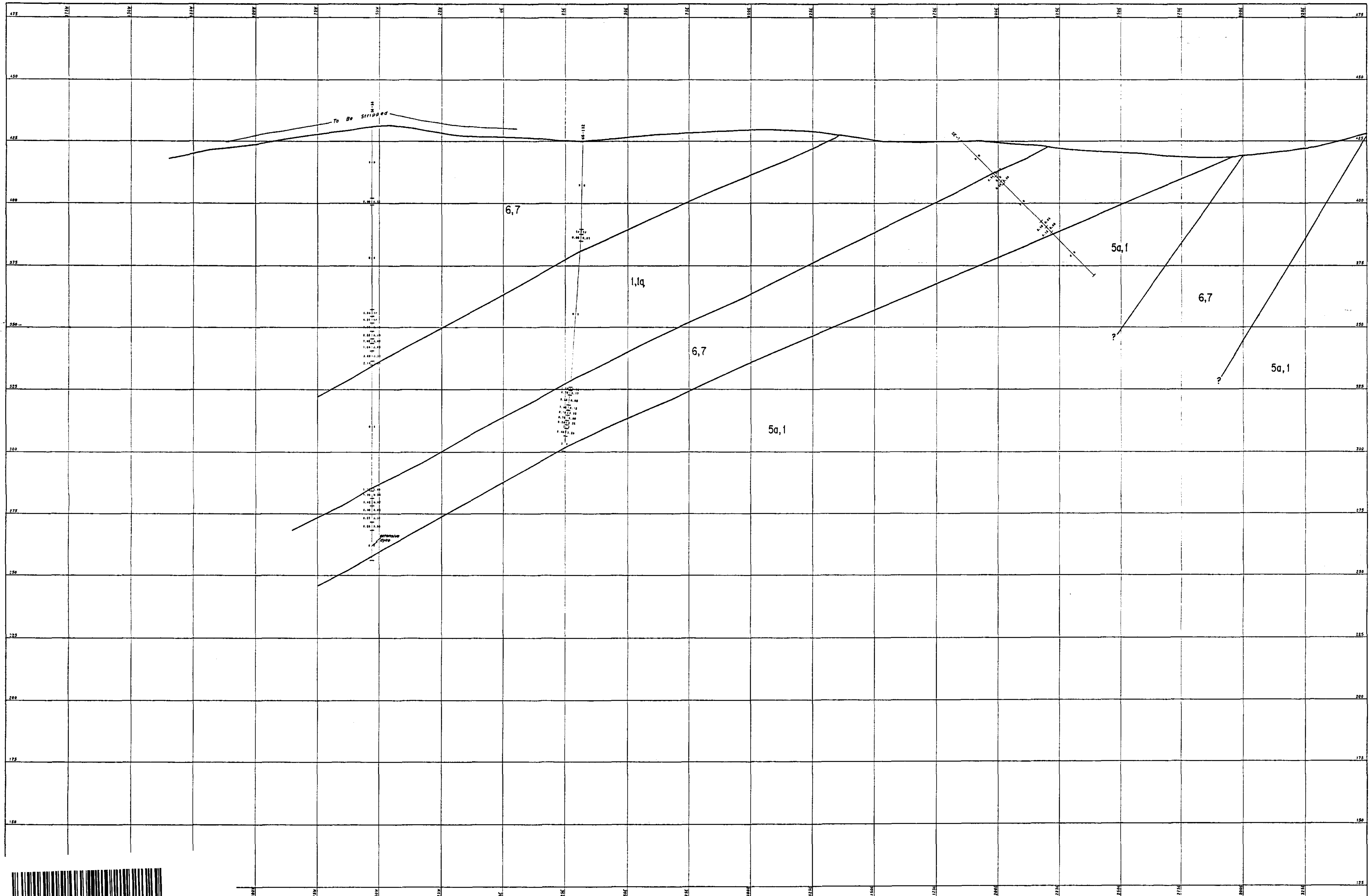
SCALE	DATE	SHEET
	25/10/90	1 of 1
1:500	REF No.	
	C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 1+00 North
(+/-25m window)

Kirkton Resources Corporation

63.6118



570

MPH Consulting Limited

..ES :
Zn(%) to left of hole trace. Cu(%) to right

GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

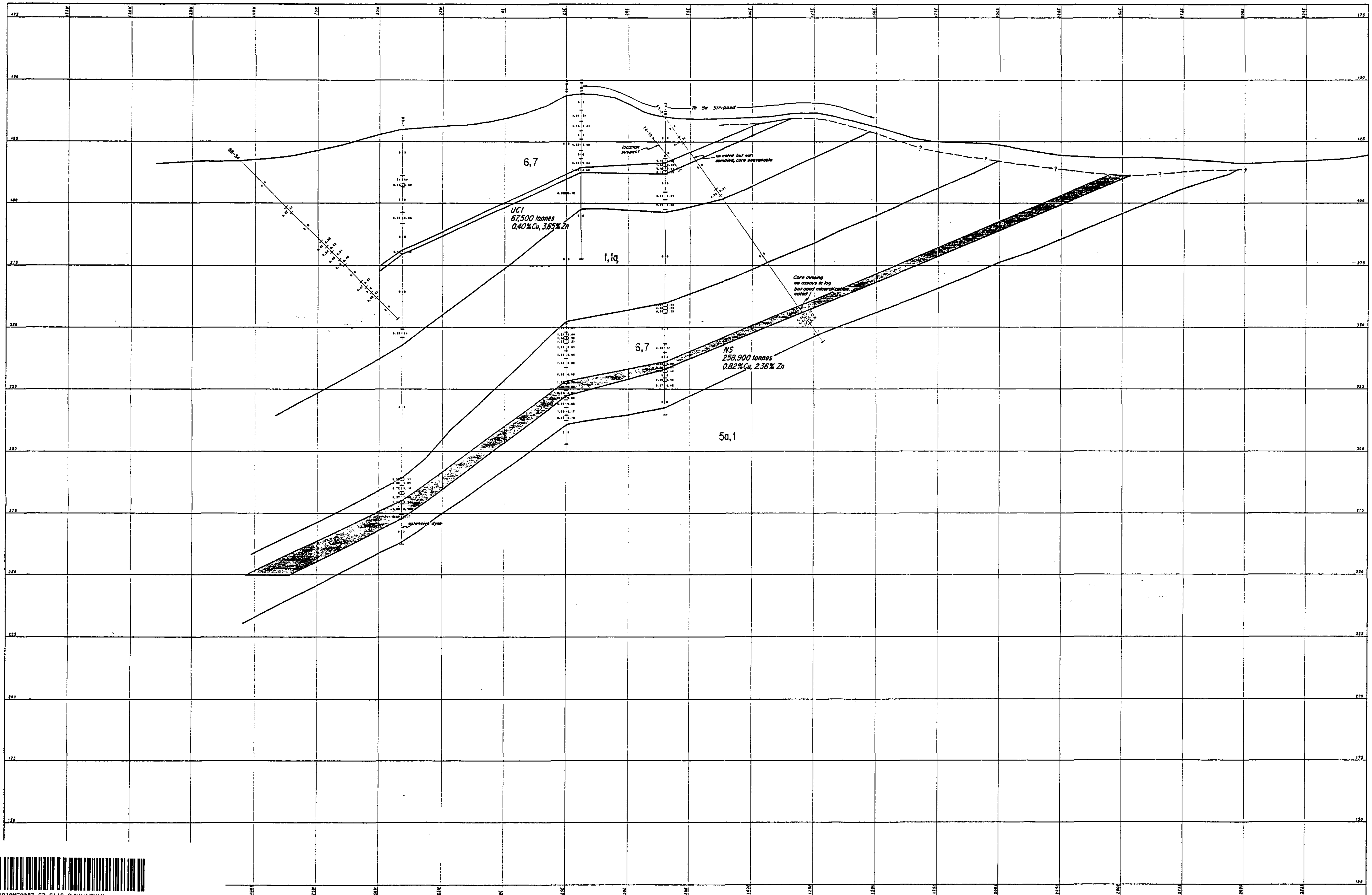
SCALE	DATE	SHEET
1:500	24/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 0+50 North
(+/-25m window)

Kirkton Resources Corporation

63.6118



580

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

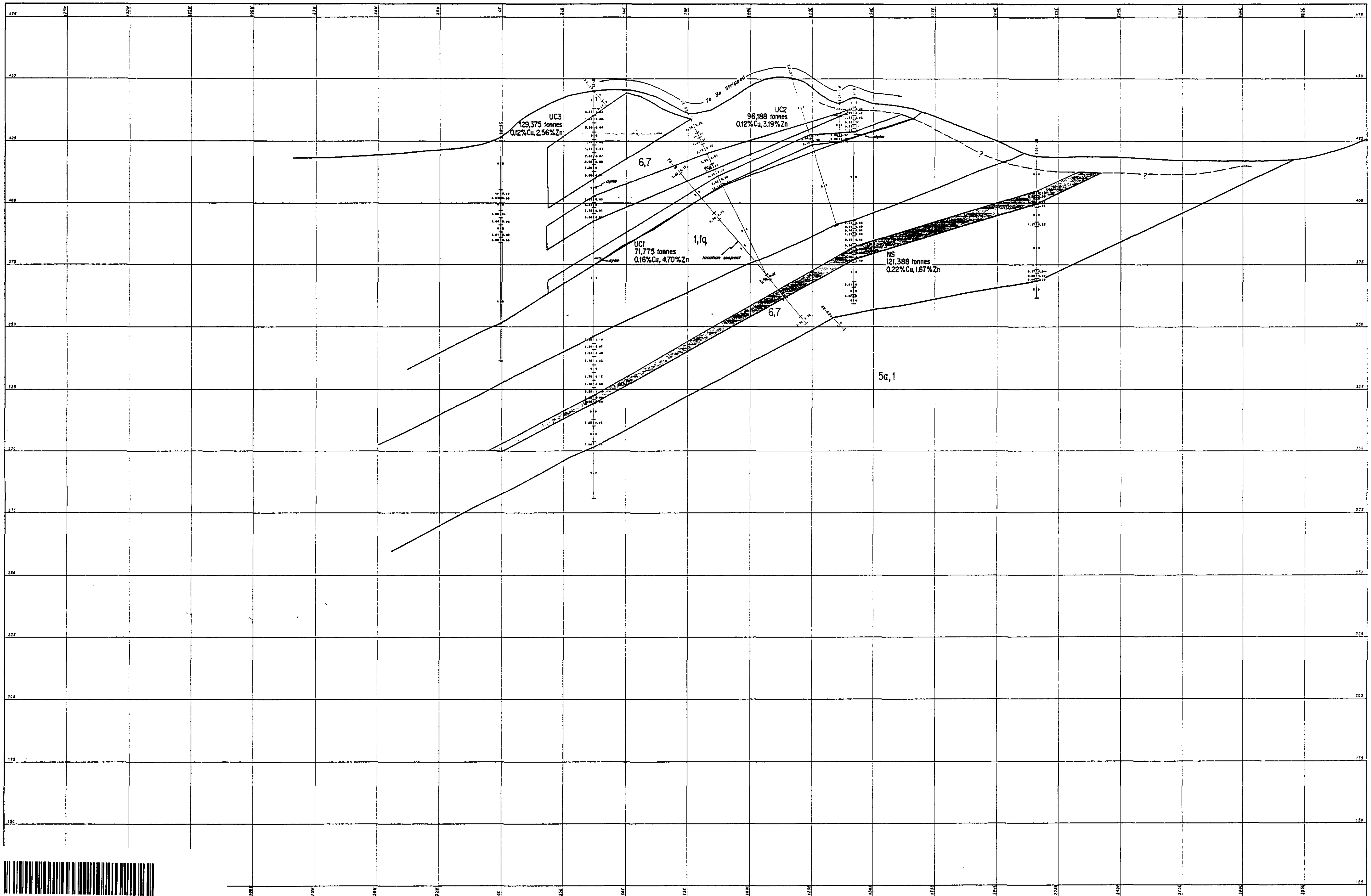
SCALE	DATE	SHEET
1:500	24/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 0+00 North
(+/-25m window)

Kirkton Resources Corporation

63.6118



MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY

- 7 Argillite, Graphitic Argillite
- 6 Chert, Chert Breccia, Argillaceous Chert
- 5a(dig) "Digestive" Diorite
- 2 Intermediate to Felsic Pyroclastics
- 1q Varioliitic Mafic Volcanics
- 1,5a "Footwall Diorite" Volcanic Complex

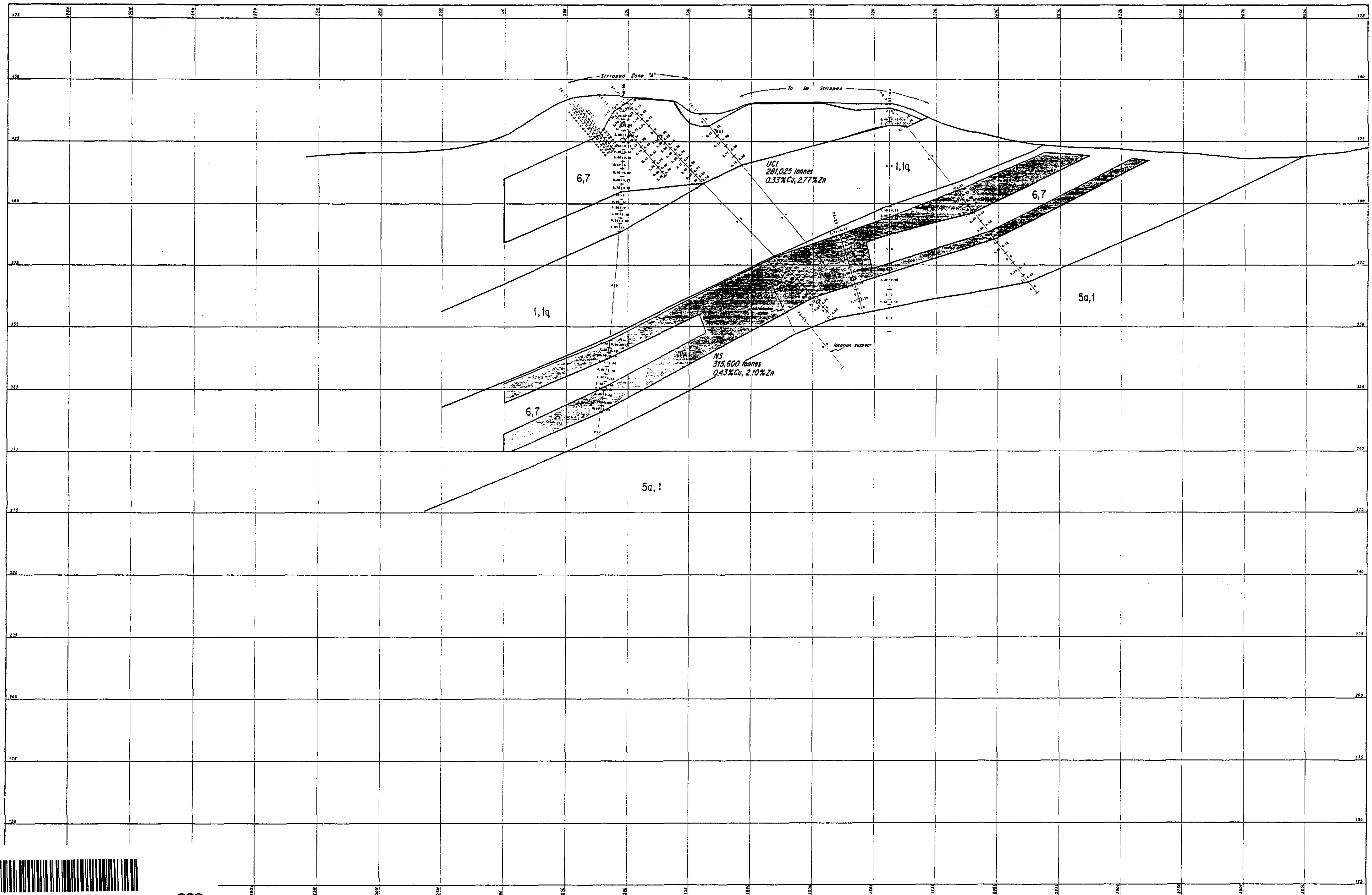
SCALE	DATE	SHEET
1:500	24/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 0+50 South
(+25/-12.5m window)

Kirkton Resources Corporation

63.6118



MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

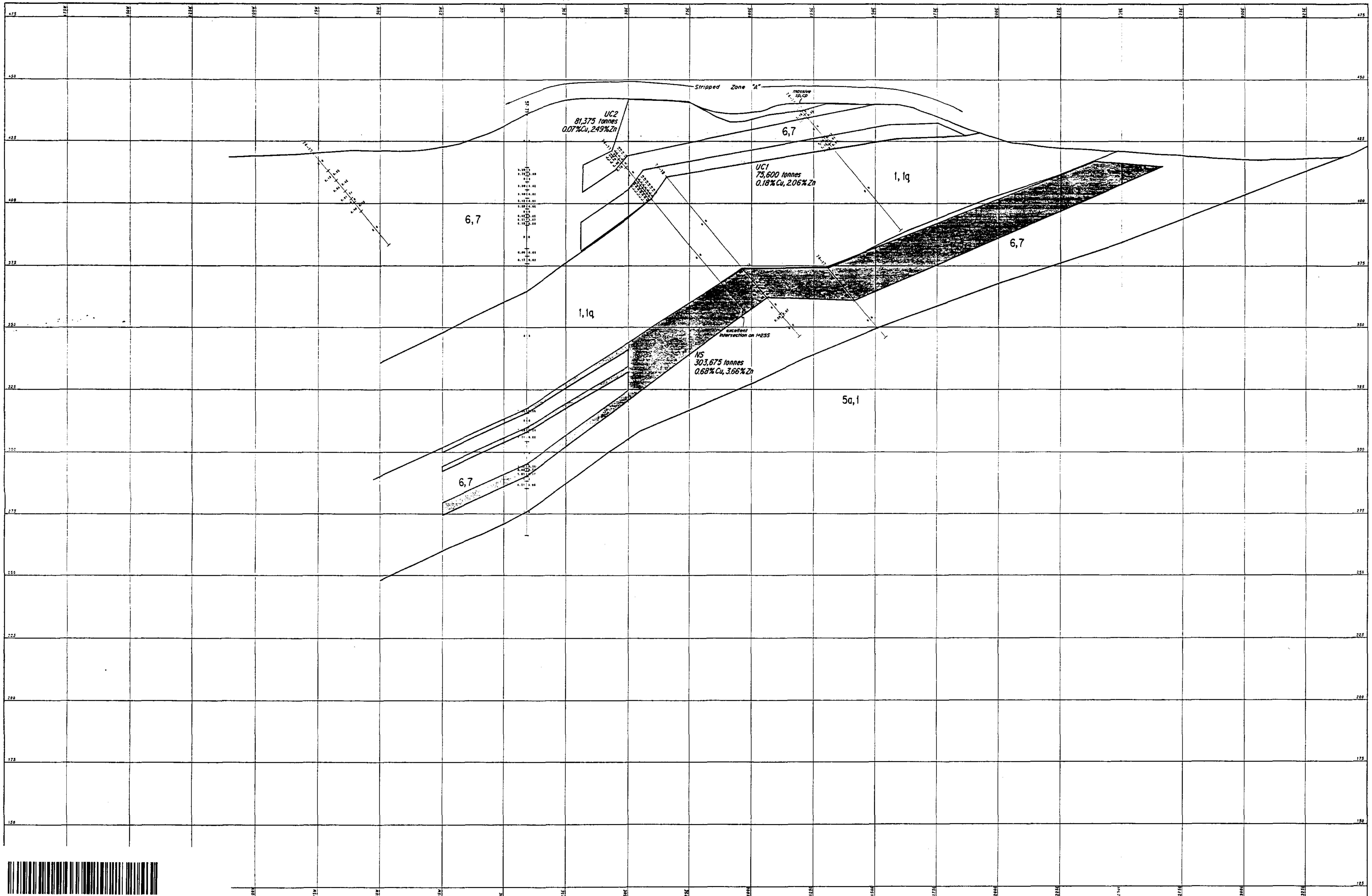
SCALE	DATE	SHEET
1:500	25/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 0+75 South
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

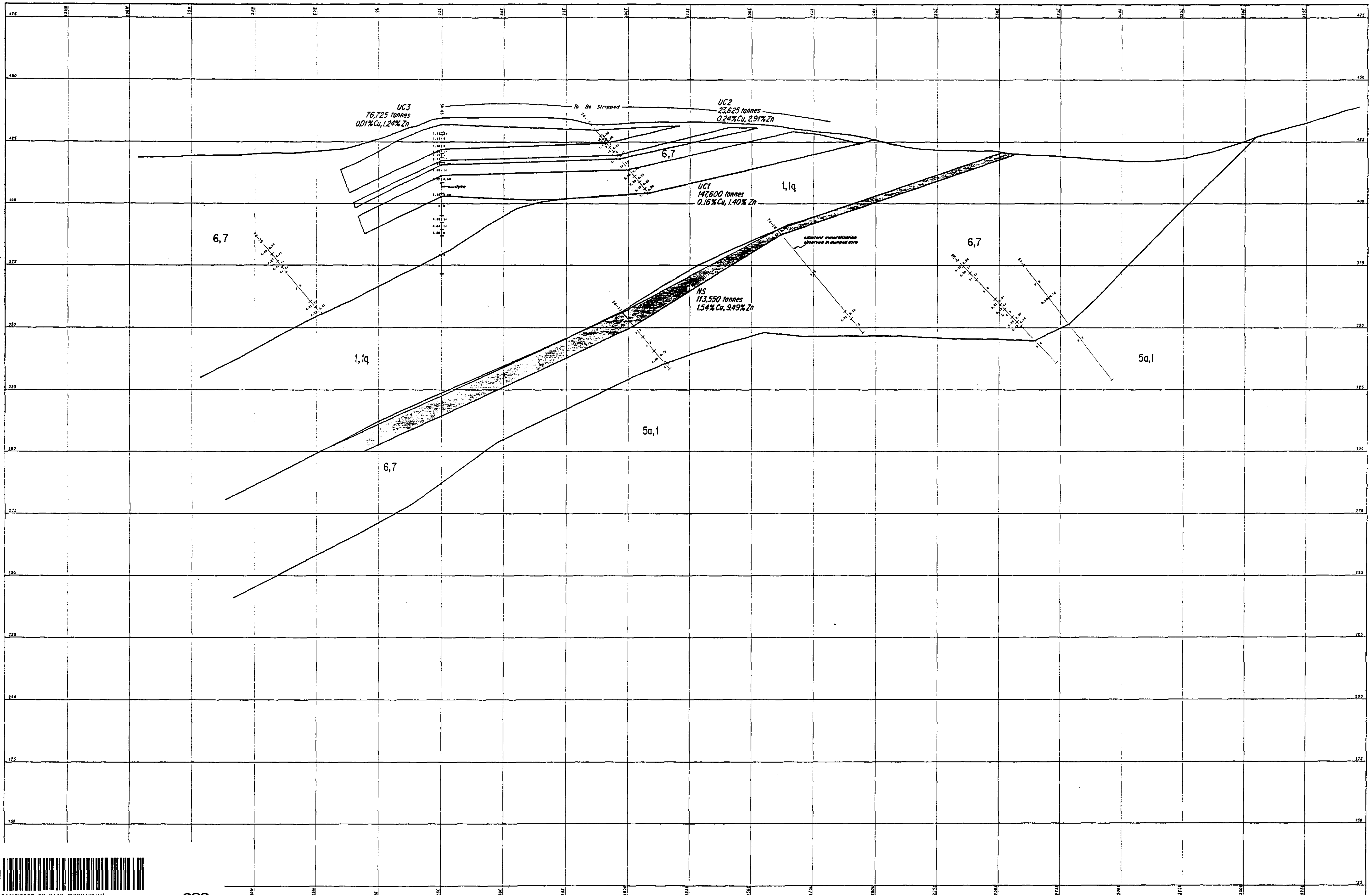
SCALE	DATE	SHEET
1:500	25/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 1+00 South
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



620

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

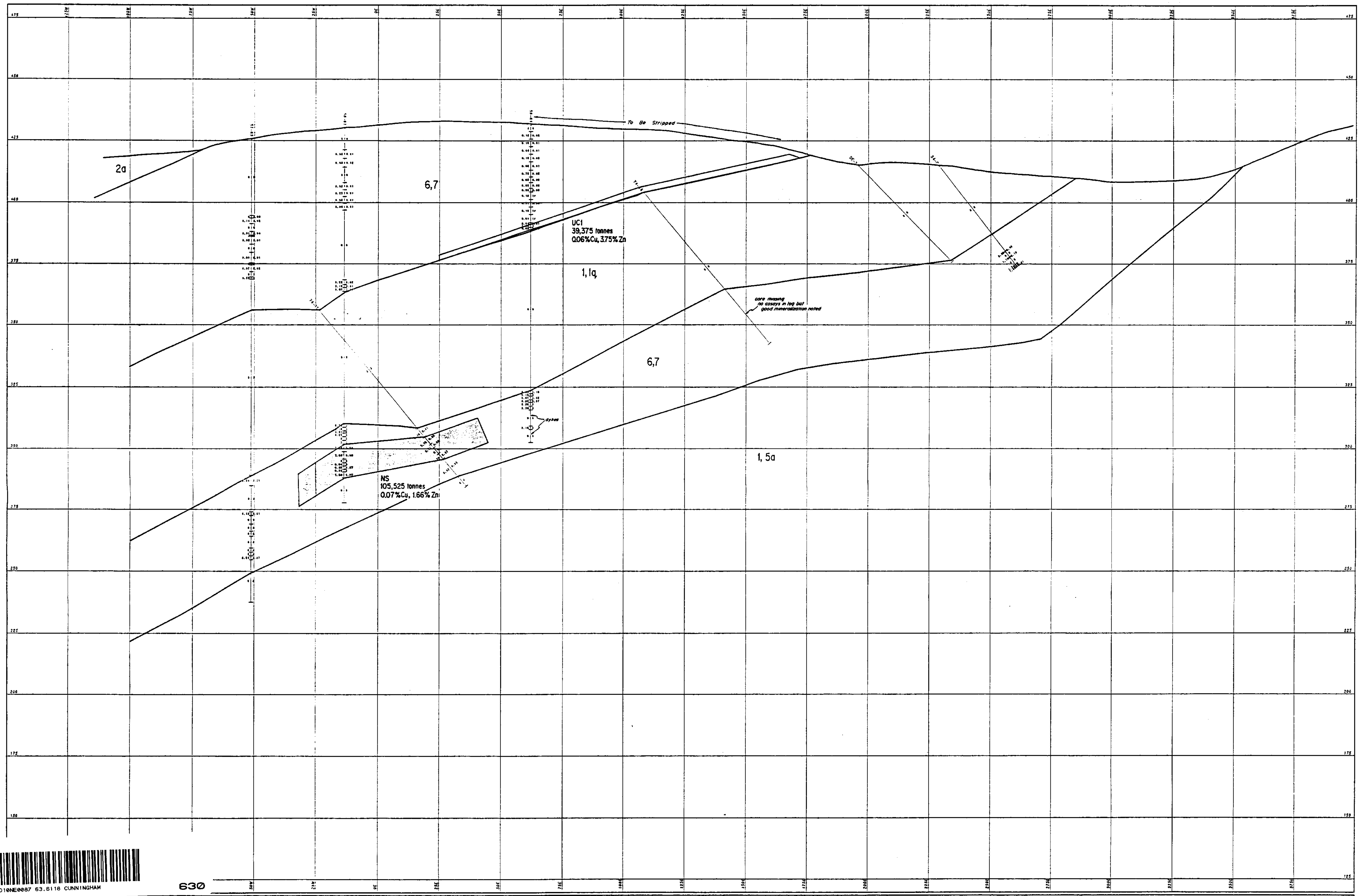
SCALE	DATE	SHEET
1:500	25/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 1+25 South
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



630

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace. Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

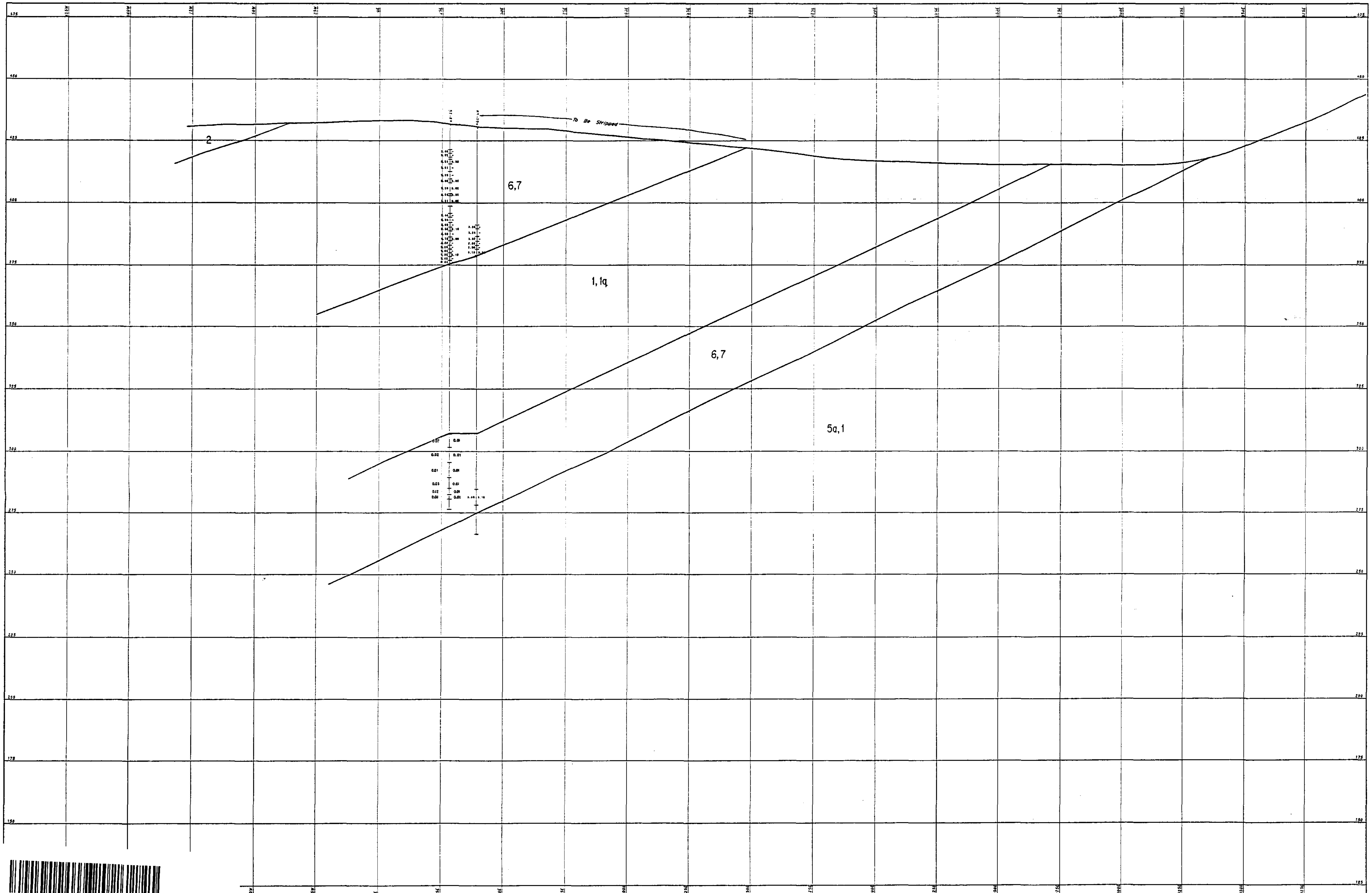
SCALE	DATE	SHEET
1:500	28/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 1+50 South
(+12.5/-25m window)

Kirkton Resources Corporation

63.6118



640

MPH Consulting Limited

Zn(%) to left of hole trace, Cu(%) to right

GEOLOGY

7 Argillite, Graphitic Argillite

6 Chert, Chert Breccia, Argillaceous Chert

5a(dig) "Digestive" Diorite

2 Intermediate to Felsic Pyroclastics

1q Variolitic Mafic Volcanics

1,5a "Footwall Diorite" Volcanic Complex

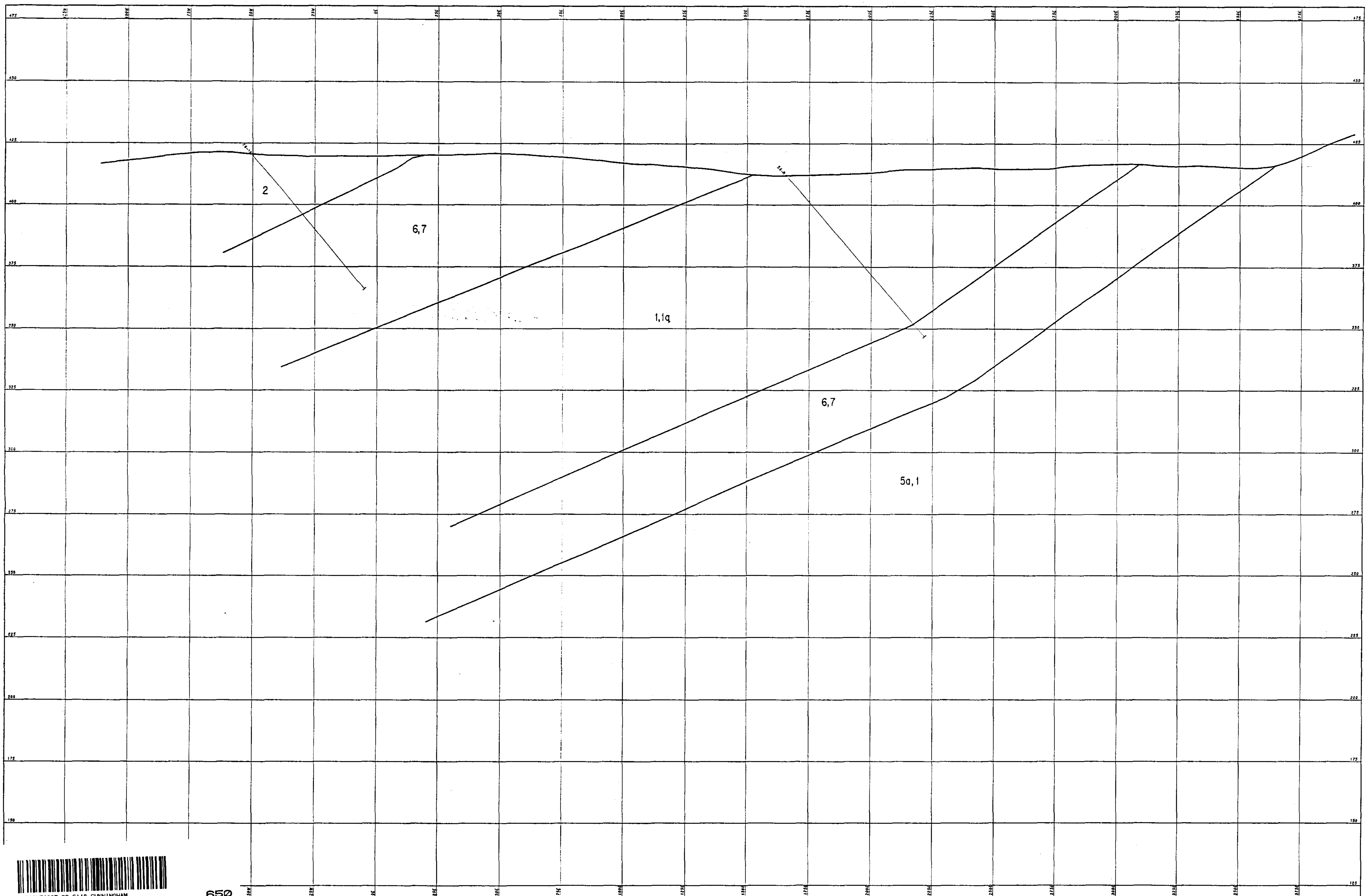
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 2+00 South
(+/-25m window)

Kirkton Resources Corporation

63.6118



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MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
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1, 5a "Footwall Diorite" Volcanic Complex

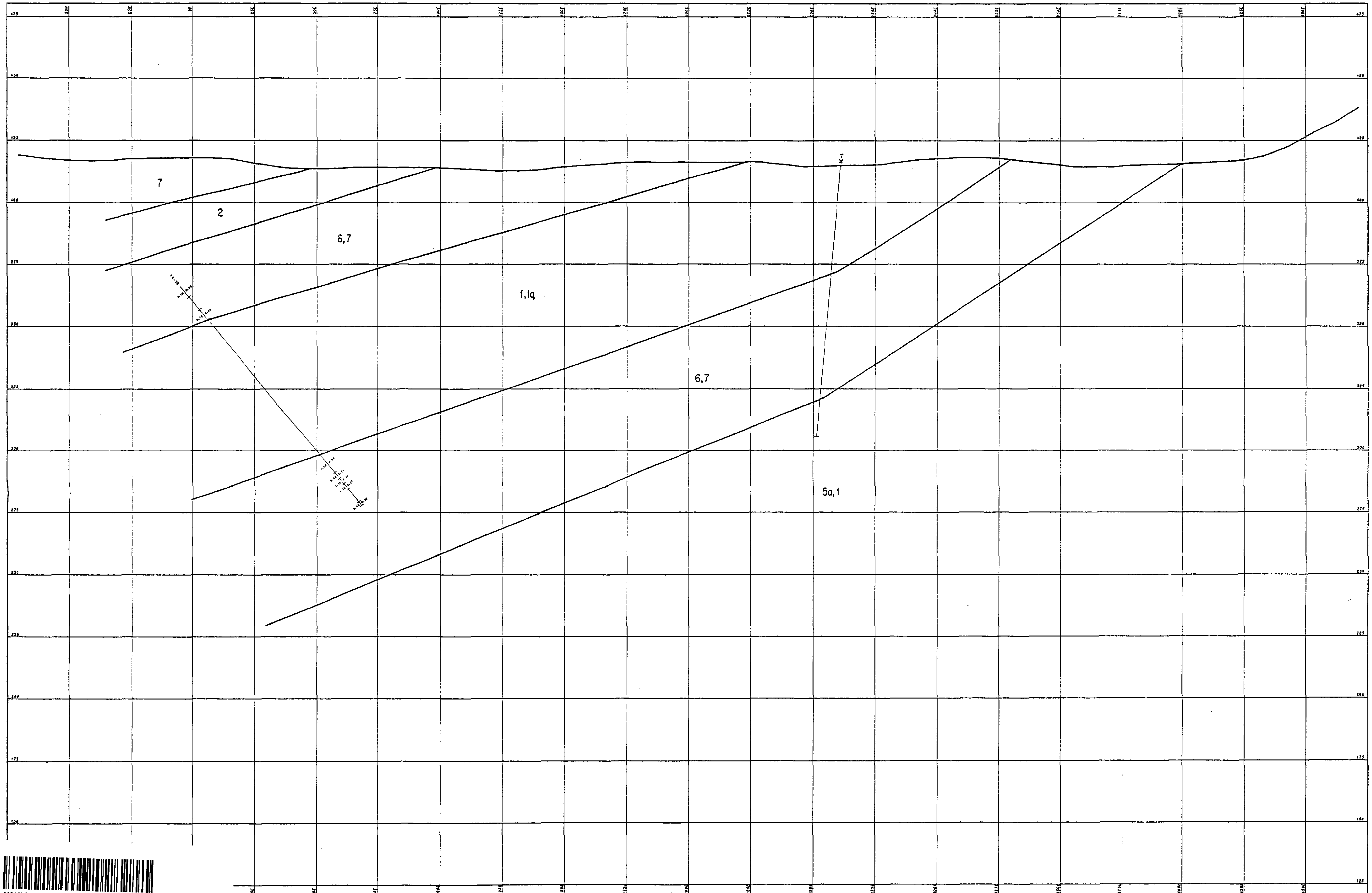
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 2+50 South
(+/-25m window)

Kirkton Resources Corporation

63.6118



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MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace. Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
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1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

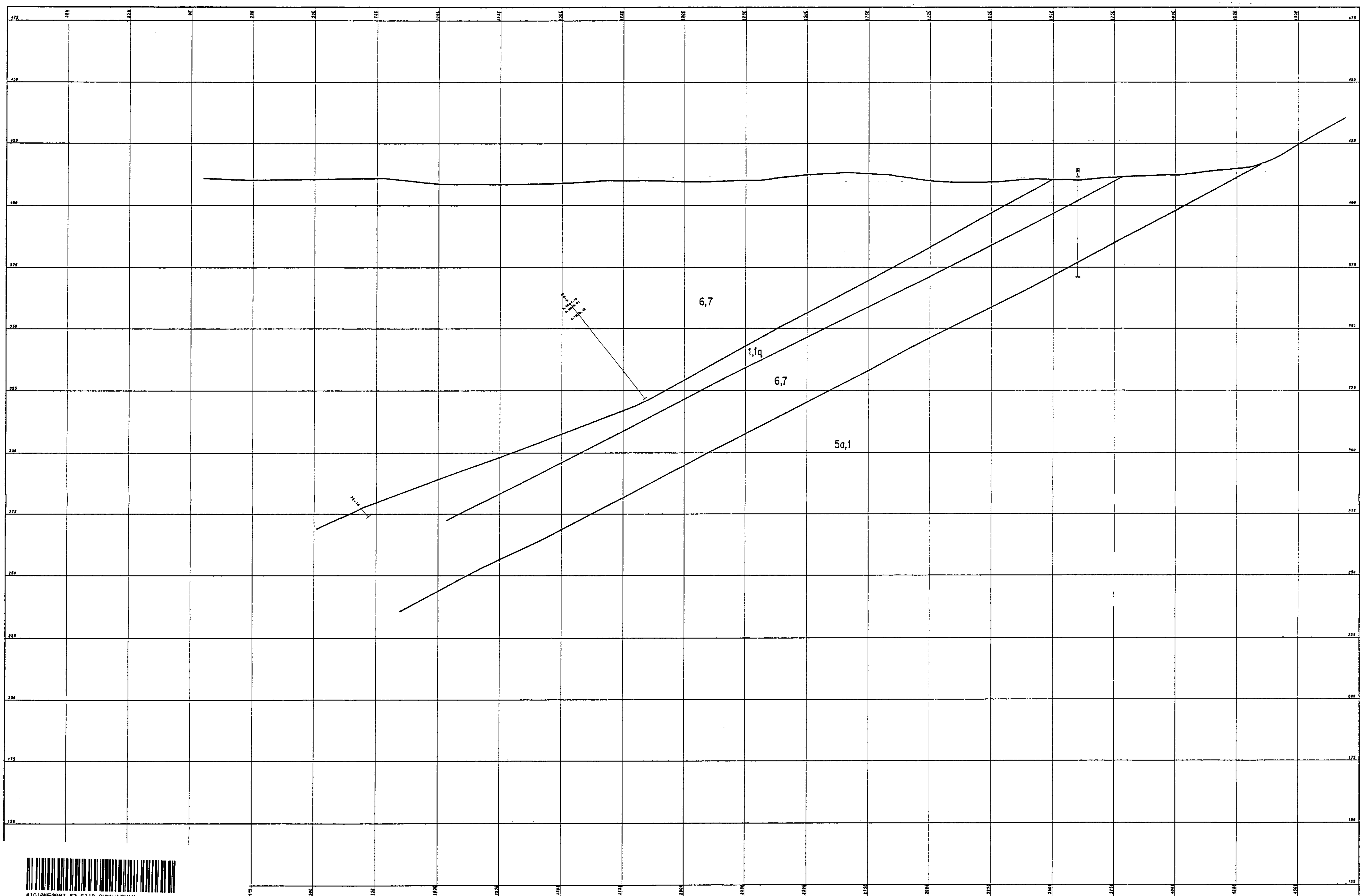
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No.	
	C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 3+00 South
(+/-25m window)

Kirkton Resources Corporation

63.6118



670

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
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1, 5a "Footwall Diorite" Volcanic Complex

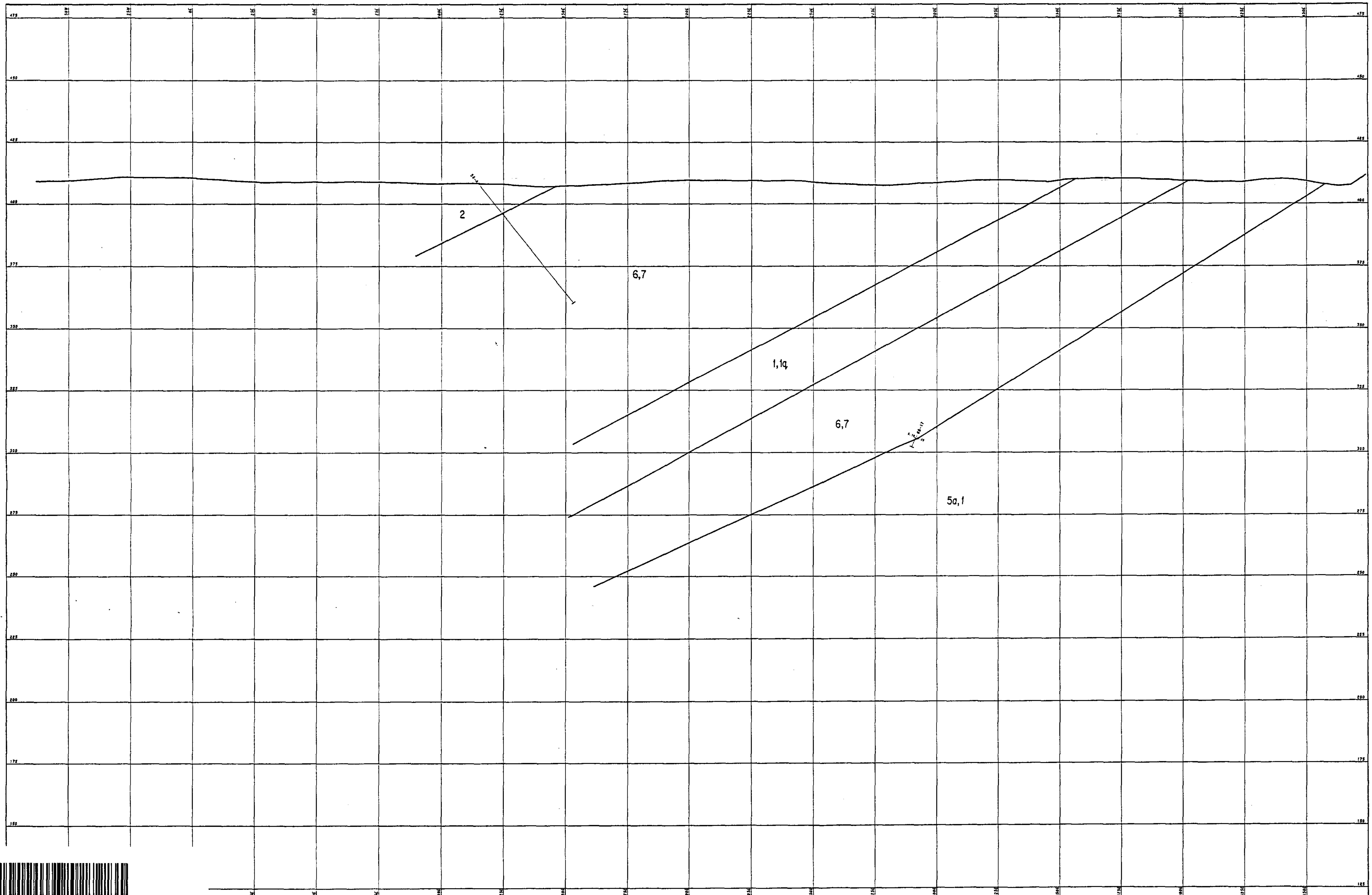
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 3+50 South
(+/-25m window)

Kirkton Resources Corporation

63.6118



680

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

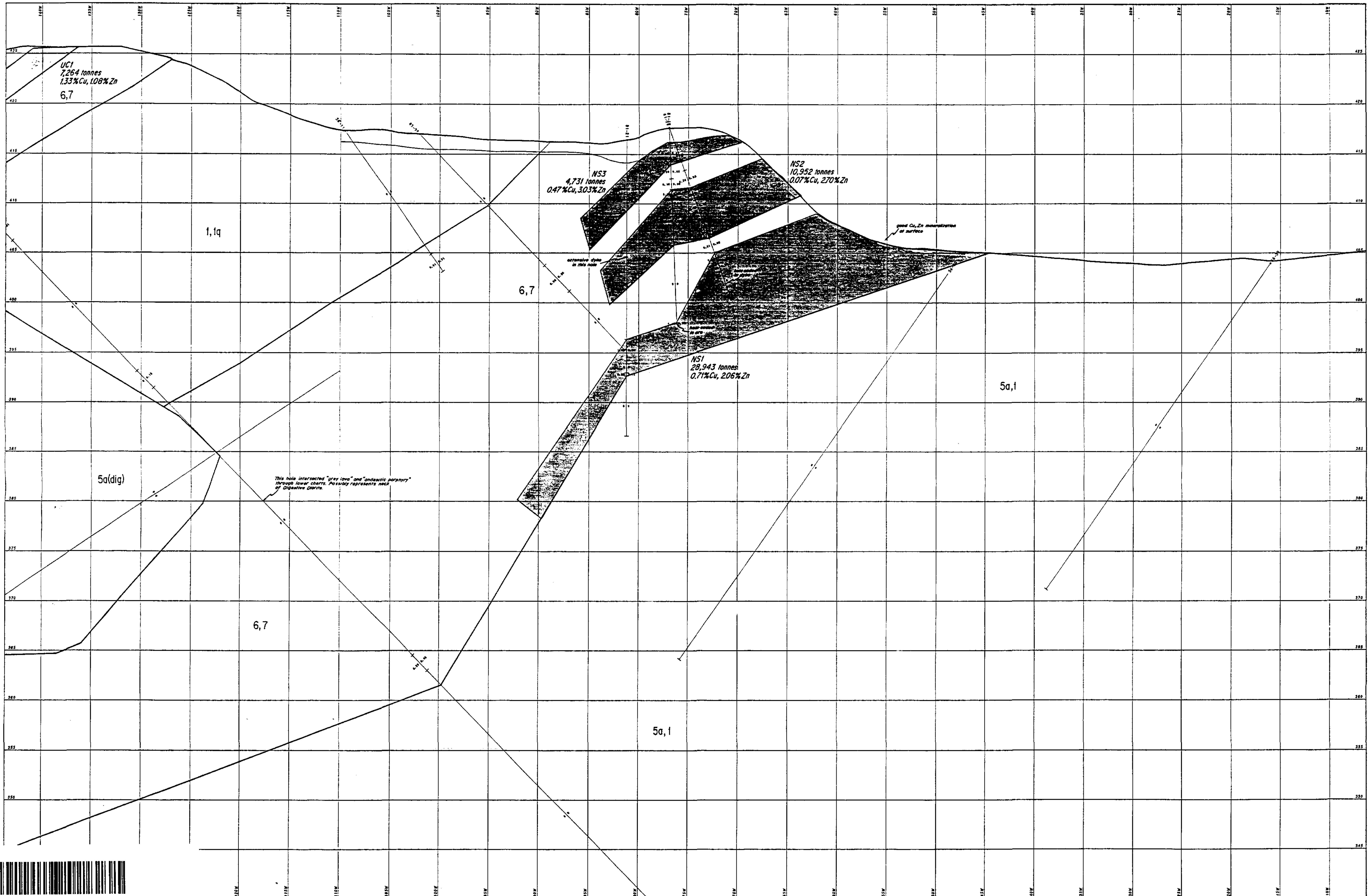
SCALE	DATE	SHEET
1:500	29/10/90	1 of 1
	REF No. C-1302	

0 25 50m

Shunsby Property
Cunningham Township
Section 4+00 South
(+25/-50m window)

Kirkton Resources Corporation

63.6118



690

41010NE0087 63.6118 CUNNINGHAM

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Varioiltic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

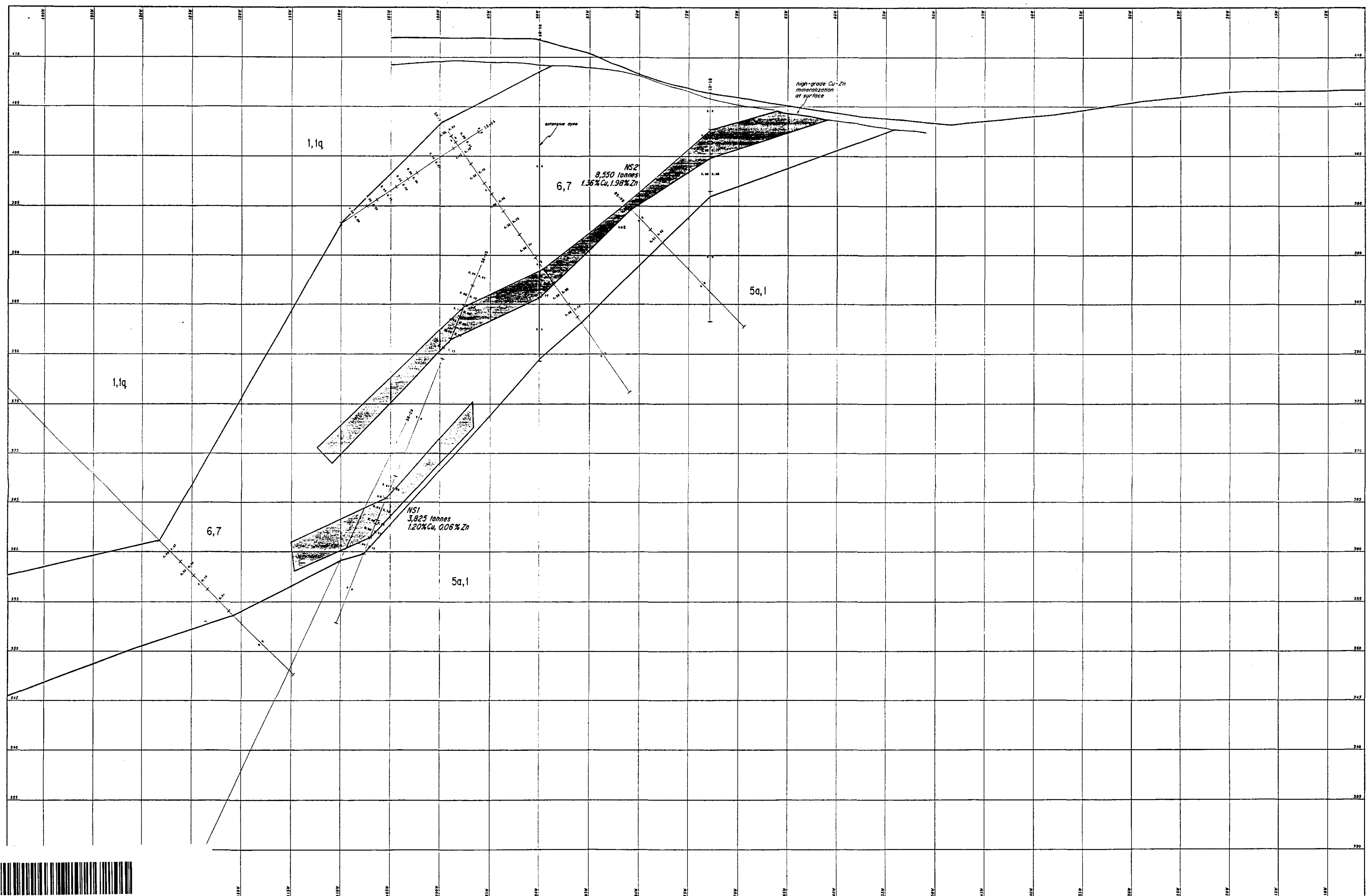
SCALE	DATE	SHEET
1:125	31/10/90	1 of 1
	REF No. C-1302	

0 6.25 12.50m

Shunsby Property
Detailed Main Zone
Section 3+75 North
(+24.75/-12.5m window)

Kirkton Resources Corporation

63.6118



700

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

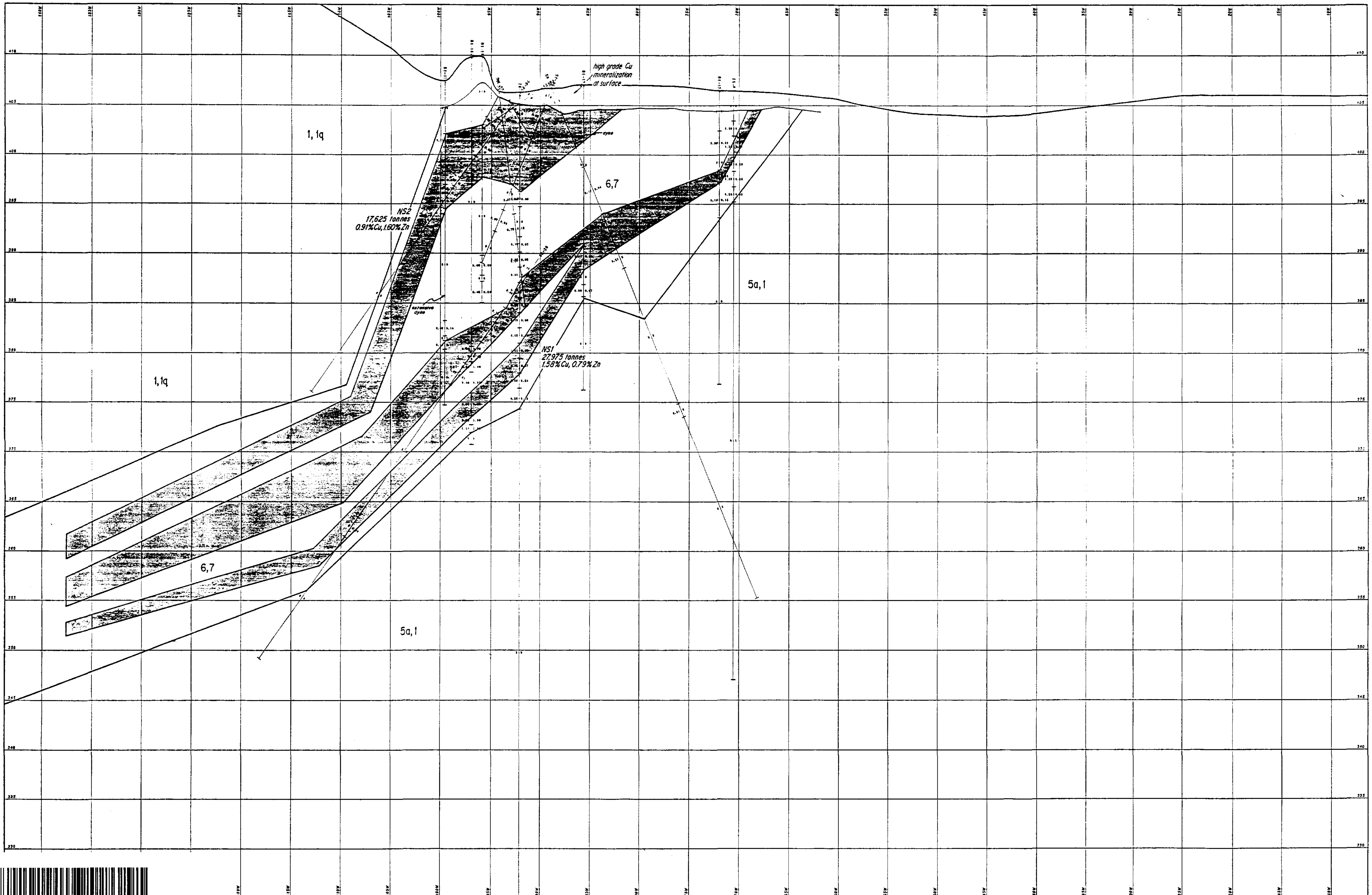
SCALE	DATE	SHEET
	30/10/90	1 of 1
1:125	REF No.	
	C-1302	

0 6.25 12.50m

Shunsby Property
Detailed Main Zone
Section 3+50 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



710

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

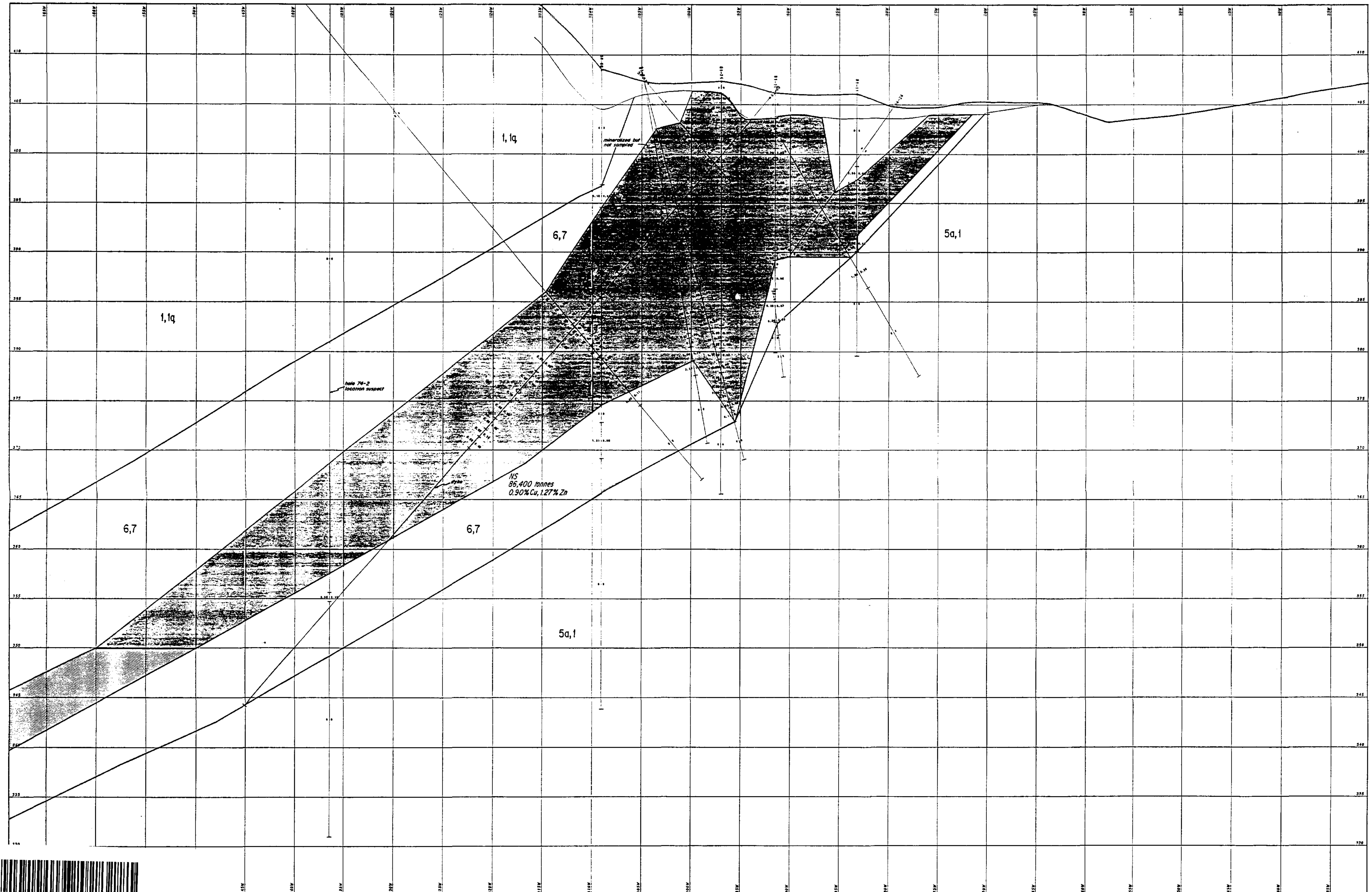
SCALE	DATE	SHEET
1:125	30/10/90	1 of 1
	REF No. C-1302	

0 6.25 12.50m

Shunsby Property
Detailed Main Zone
Section 3+25 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



720

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1, 5a "Footwall Diorite" Volcanic Complex

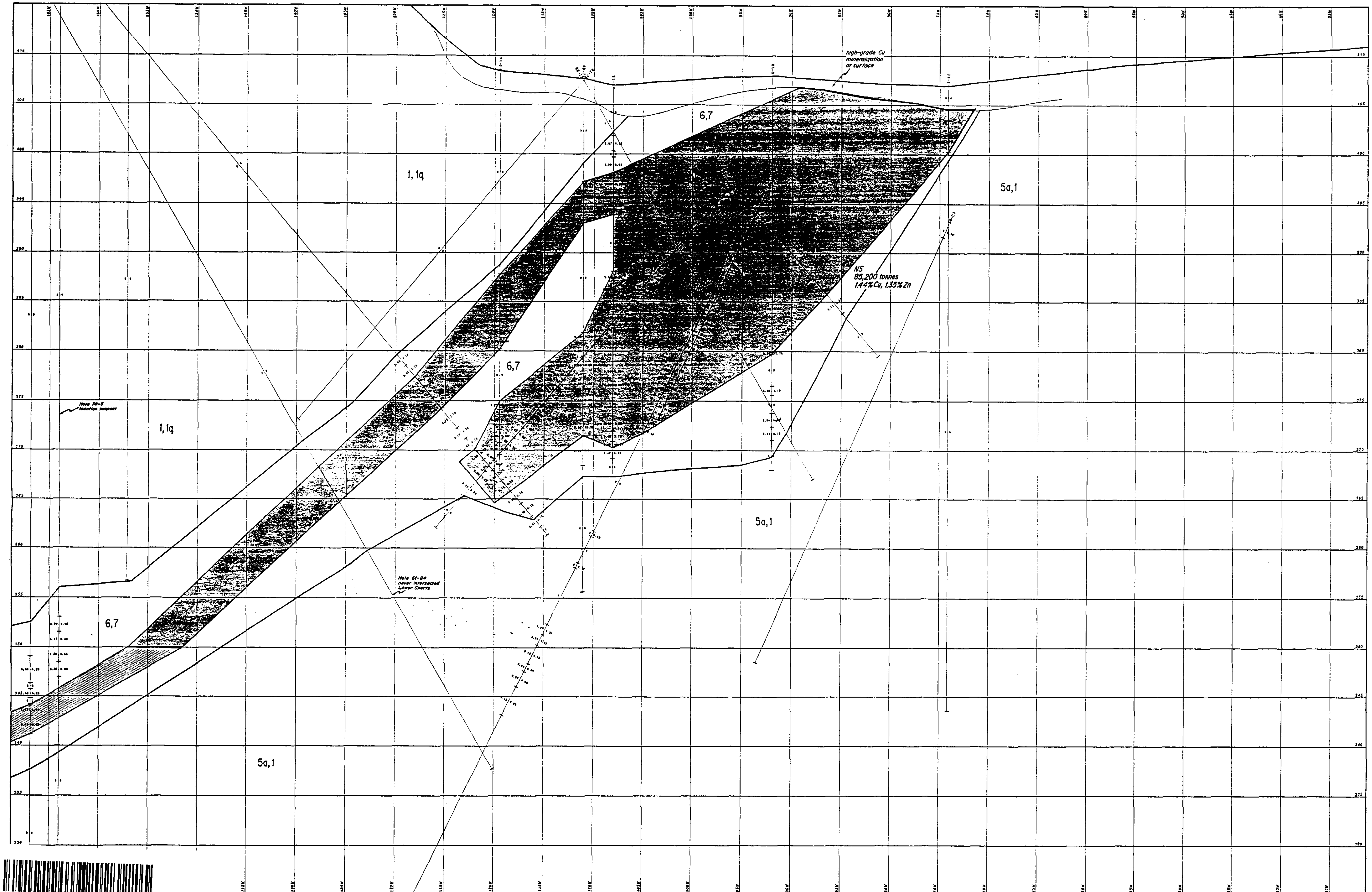
SCALE	DATE	SHEET
1:125	30/10/90	1 of 1
	REF No. C-1302	

0 6.25 12.50m

Shunsby Property
Detailed Main Zone
Section 3+00 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



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MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
1q Variolitic Mafic Volcanics
1,5a "Footwall Diorite" Volcanic Complex

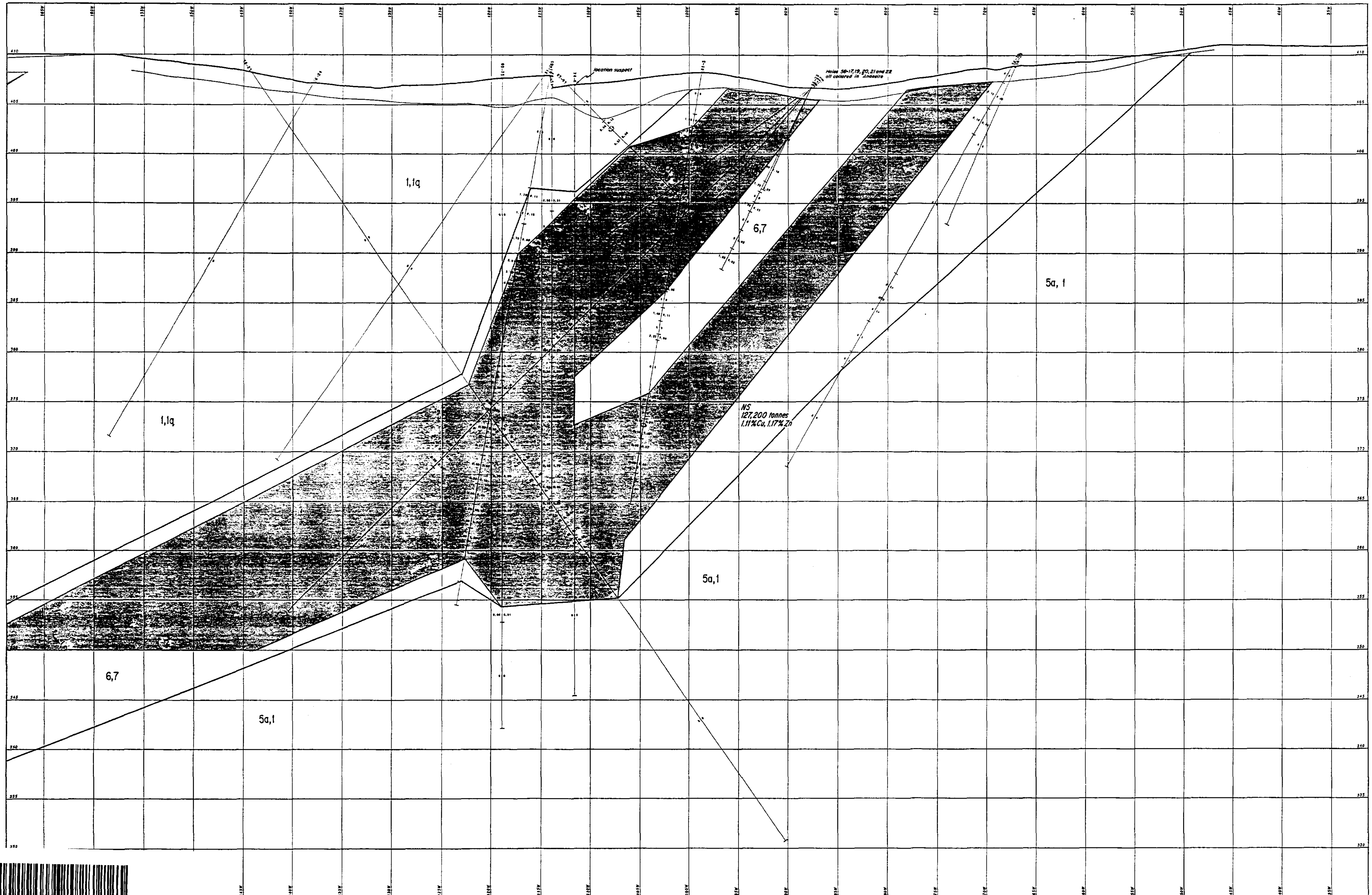
SCALE	DATE	SHEET
1:125	30/10/90	1 of 1
	REF No. C-1302	

0 6.25 12.50m

Shunsby Property
Detailed Main Zone
Section 2+75 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



740

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
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1, 5a "Footwall Diorite" Volcanic Complex

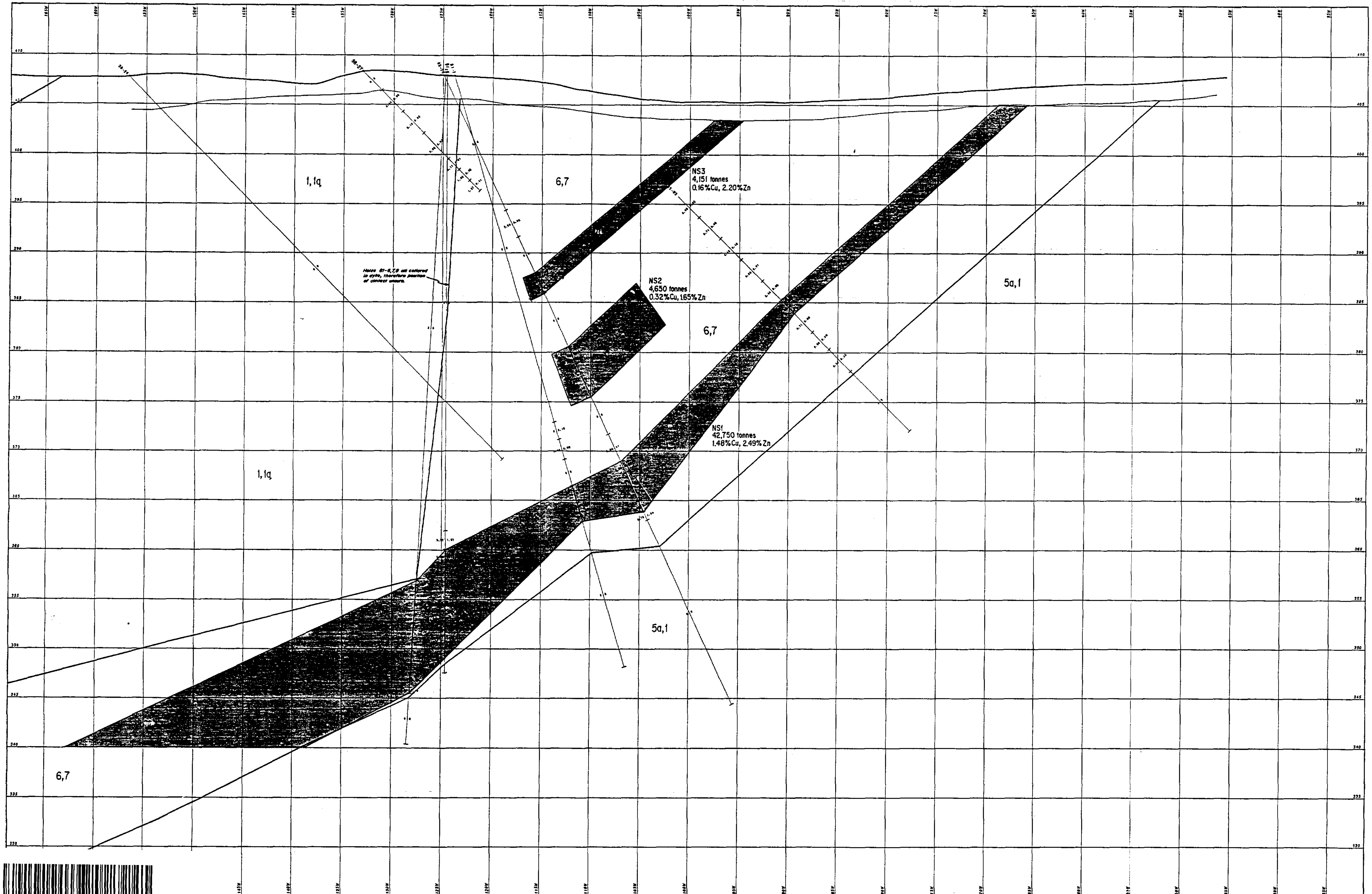
SCALE	DATE	SHEET
1:125	30/10/90	1 of 1
	REF No. C-1302	

0 6.25 12.50m

Shunsby Property
Detailed Main Zone
Section 2+50 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118



750

MPH Consulting Limited

NOTES :
Zn(%) to left of hole trace, Cu(%) to right
GEOLOGY
7 Argillite, Graphitic Argillite
6 Chert, Chert Breccia, Argillaceous Chert
5a(dig) "Digestive" Diorite
2 Intermediate to Felsic Pyroclastics
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SCALE	DATE	SHEET
1:125	30/10/90	1 of 1
	REF No. C-1302	

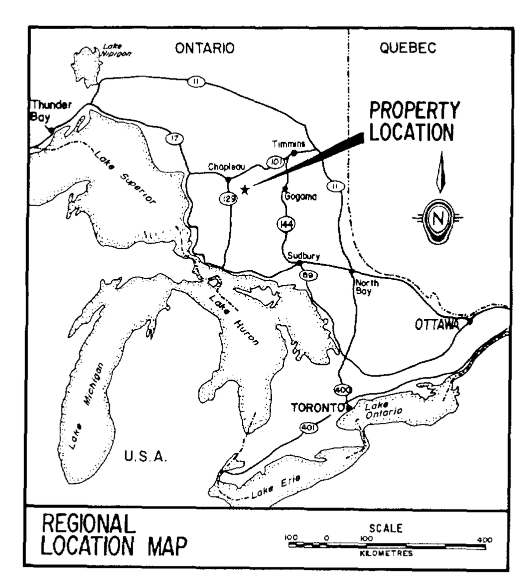
0 6.25 12.50m

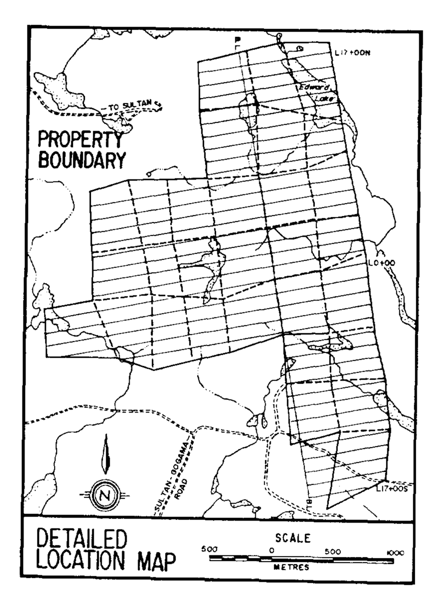
Shunsby Property
Detailed Main Zone
Section 2+25 North
(+/-12.5m window)

Kirkton Resources Corporation

63.6118

MAIN ZONE
SOUTH ZONE
"Footwall Diorite" Volcanic Complex
"Lower Cherts"
"Upper Cherts"
"Digestive Diorite"
Copper Knob Showing
Copper Breccia Showing
Area "M2" Stripping
Area "C" Stripping
Area "A" Stripping
MAIN (JOUBIN) FAULT
Cedar Swamp
graphite within gabbro/volcanic complex
N D
ABBREVIATIONS
Ag Silver
Au Gold
cp Chalcopyrite
Cu Copper
Fe Iron
gf Graphite
gn Galena
hem Hematite
Il Ilmenite
mag Magnetite
Pb Lead
po Pyrrhotite
py Pyrite
sp Sphalerite
Zn Zinc
bn Bornite
mal Malachite
SYMBOLS
Geological contact, inferred
Outcrop
Fault or shear zone
Trench (bedrock, overburden)
Channel sample
Surface grab sample
Foliation, strike and dip
Bedding, strike and dip
Joint, strike and dip
Bush road
Glacial ice direction
Previous diamond drill hole
holes A-D Cominco, 1954
hole 54-305 American Metal Co., 1954
holes 01-57 Shunsby Gold Mines, 1955
holes 58-74 Shunsby Gold Mines, 1956/57
holes S-57-1 to 3 Martin Shunsby, 1957
holes 75-92 Shunsby Mines, 1960/61, 1964
holes 93-115, Jim1,2 SE 1-4 FRJ Prospecting Syndicate, 1965/66
holes 68-01 to 23 Consolidated Shunsby Mines, 1968/69
holes 74-01 to 21 Grandora Exploration, 1974
holes MW-80-1,2 Placer, 1980
holes 81-01 to 30 MW Resources, 1981





LEGEND

INSTRUMENTS	EDA Omni Plus
926	Magnetic Value
	Magnetic Contour
	Magnetic Depression
BASE VALUE:	58000nT
CONTOUR INTERVALS	
58000-58500nT	100 nT
58500-60000 nT	500 nT
60000 >	1000nT
INTERPRETATION	
Fault	
	Major, persistent
	Minor, impersistent

KIRKTON RESOURCES CORP.

SHUNSBY PROPERTY - CUNNINGHAM TWP.

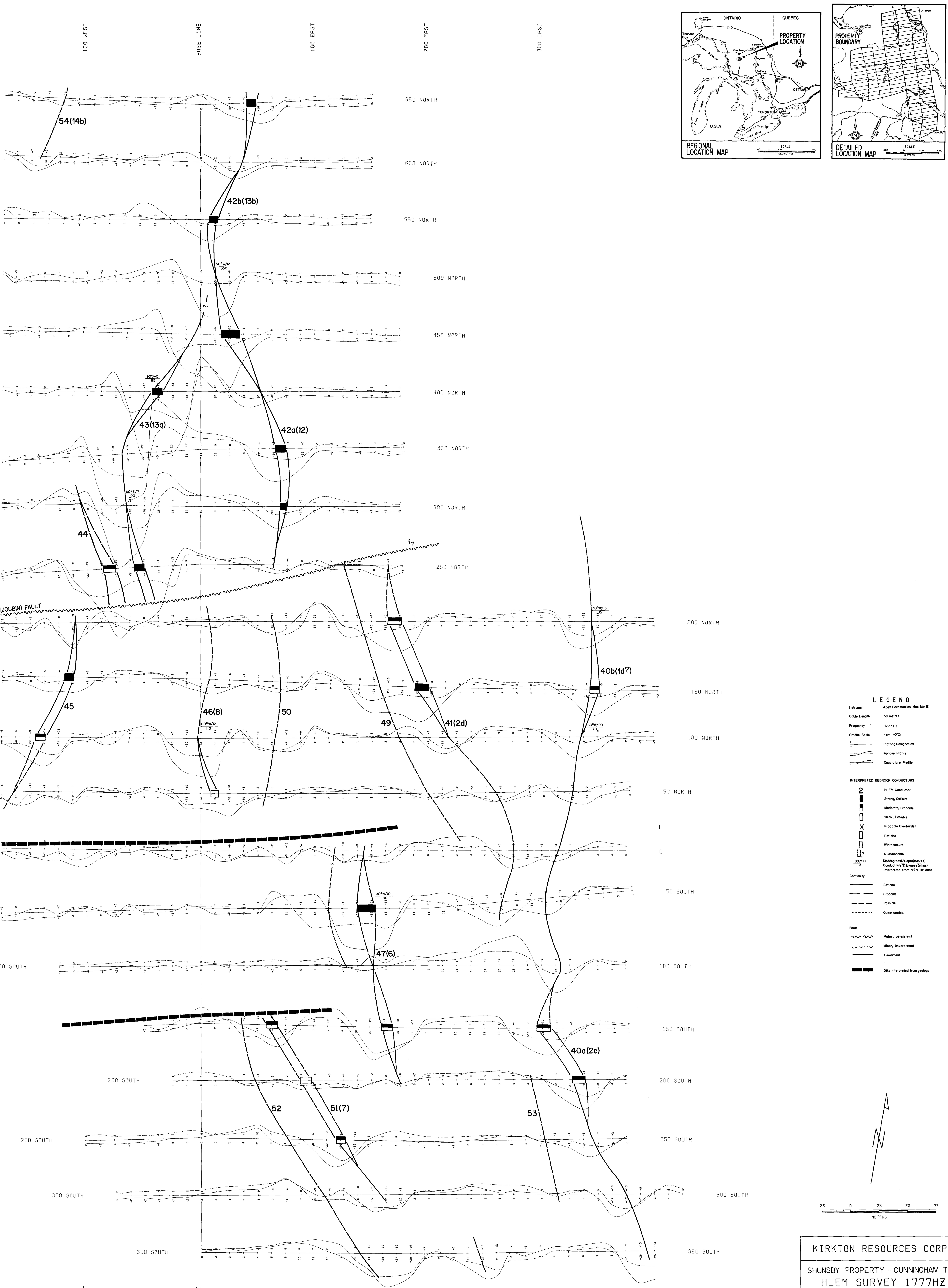
TOTAL FIELD MAGNETICS

MAIN & SOUTH DEPOSITS AREA

PROJECT NO: C-1302	BY: D. JONES, K.B., R.C.
SCALE: 1:1000	DRAWN: MPH TORONTO
MAP NO: Map 7	DATE: December, 1990

MPH Consulting Limited

63.6118



LEGEND

Instrument	Apex Parametrics Max Min II
Cable Length	50 metres
Frequency	1777 Hz
Profile Scale	1cm = 10%
+ —	Plotting Designation
	Inphase Profile
	Quadrature Profile

INTERPRETED BEDROCK CONDUCTORS

2	HLEM Conductor
	Strong, Definite
	Moderate, Probable
	Weak, Possible
X	Probable Overburden
	Definite
	Width unsure
?	Questionable
80/20 over 3	Dip (degrees)/Depth (metres) Conductivity Thickness (mhos) Interpreted from 444 Hz data

Continuity

	Definite
	Probable
	Possible
	Questionable

Fault

	Major, persistent
	Minor, impersistent
	Lineament
	Dike interpreted from geology

KIRKTON RESOURCES CORP.

SHUNSBY PROPERTY - CUNNINGHAM TWP.

HLEM SURVEY 1777HZ

MAIN & SOUTH DEPOSITS AREA

PROJECT NO: C-1302	BY: D. JONES, K.B.
SCALE: 1:1000	DRAWN: MPH TORONTO
MAP NO: Map 8	DATE: December, 1990

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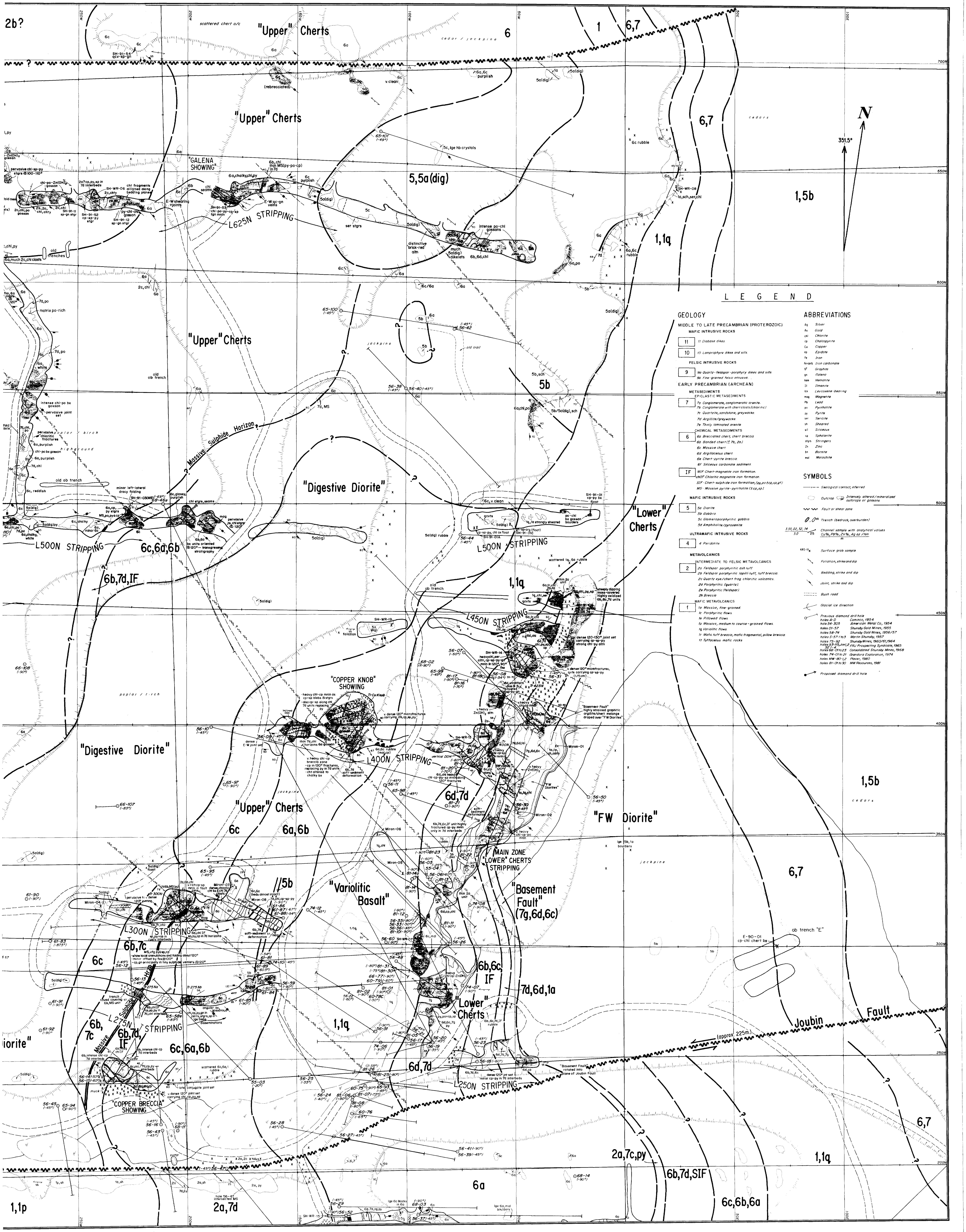
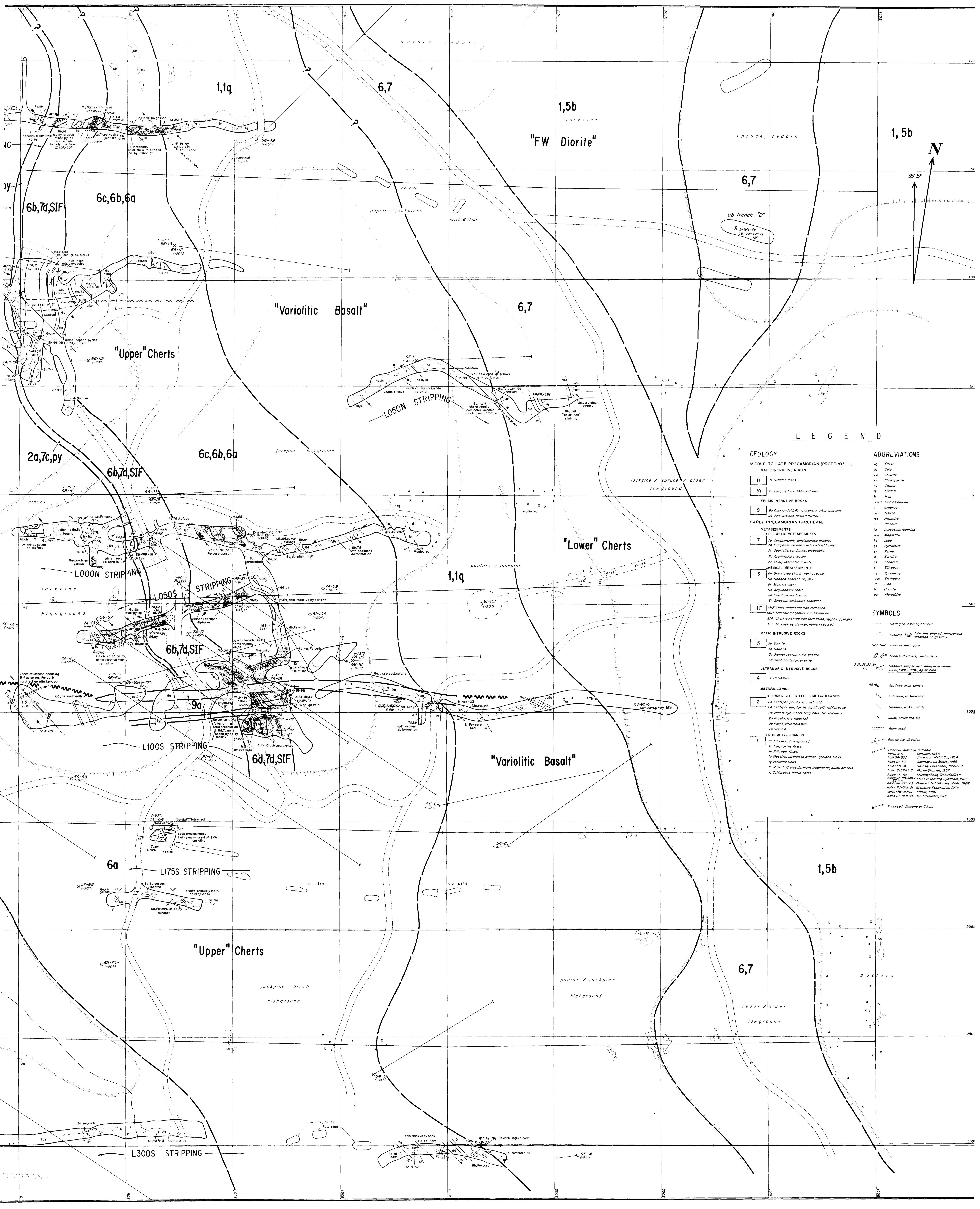
100 WEST
BASE LINE
100 EAST
200 EAST
300 EAST
400 EAST
650 NORTH
600 NORTH
550 NORTH
500 NORTH
450 NORTH
400 NORTH
350 NORTH
300 NORTH
250 NORTH
200 NORTH
150 NORTH
100 NORTH
50 NORTH
0
50 SOUTH
100 SOUTH
150 SOUTH
200 SOUTH
250 SOUTH
300 SOUTH
350 SOUTH
54(14b)
42b(13b)
42a(12)
43(13a)
44
45
46(8)
50
49
41(2d)
40b(1d?)
47(6)
40a(2c)
52
51(7)
53
30°W/12 350
90°/5 85
60°E/7 90
30°W/5
60°W/12 110
60°W/20 70
30°W/10 30
JOUBIN) FAULT
ONTARIO
QUEBEC
PROPERTY LOCATION
U.S.A.
TORONTO
REGIONAL LOCATION MAP
SCALE
PROPERTY BOUNDARY
DETAILED LOCATION MAP
SCALE
METRES
LEGEND
Instrument Apex Parametrics Max Min II
Cable Length 50 metres
Frequency 444 Hz
Profile Scale 1cm=10%
Plotting Designation
Inphase Profile
Quadrature Profile
INTERPRETED BEDROCK CONDUCTORS
2 HLEM Conductor
Strong, Definite
Moderate, Probable
Weak, Possible
X Probable Overburden
Definite
Width unsure
? Questionable
60°W/20 3 Dip(degrees)/Depth(metres) Conductivity Thickness(mhos)
Continuity
Definite
Probable
Possible
Questionable
Fault
Major, persistent
Minor, impersistent
Lineament
Dike interpreted from geology
25 0 25 50 75
METERS
KIRKTON RESOURCES CORP.
SHUNSBY PROPERTY - CUNNINGHAM TWP
HLEM SURVEY 444HZ
MAIN & SOUTH DEPOSITS AREA
PROJECT NO: C-1302
SCALE: 1:1000
MAP NO: Map 9
BY: D. JONES, M.B.
DRAWN: MPH TORONTO
DATE: December, 1990
MPH
MPH Consulting Limited
63.6118



"Upper" Cherts
"GALENA SHOWING"
L625N STRIPPING
5,5a(dig)
1,5b
1,1q
6,7
N
351.5°
Massive Sulphide Horizon
"Digestive Diorite"
L500N STRIPPING
6c,6a,6b
6b,7d,IF
"Lower" Cherts
L450N STRIPPING
"COPPER KNOB" SHOWING
L400N STRIPPING
6d,7d
"FW Diorite"
MAIN ZONE "LOWER" CHERTS STRIPPING
"Basement Fault" (7g,6d,6c)
"Variolitic Basalt"
L300N STRIPPING
6b,7c
6c
L275N STRIPPING
6b,7c
6b,7d,IF
"Lower" Cherts
6b,6c,IF
7d,6d,1a
Joubin Fault
(approx. 225m)
L250N STRIPPING
"COPPER BRECCIA" SHOWING
2a,7c,py
6b,7d,SIF
6c,6b,6a
6a
2a,7d
1,1p
L E G E N D
GEOLOGY
MIDDLE TO LATE PRECAMBRIAN (PROTEROZOIC)
MAFIC INTRUSIVE ROCKS
11 11 Diabase dikes.
10 10 Lamprophyre dikes and sills.
FELSIC INTRUSIVE ROCKS
9 9a Quartz-feldspar-porphyry dikes and sills.
9b Fine-grained felsic intrusive.
EARLY PRECAMBRIAN (ARCHEAN)
METASEDIMENTS
EPICLASTIC METASEDIMENTS
7 7a Conglomerate, conglomeratic arenite.
7b Conglomerate with chert clasts (chloritic).
7c Quartzite, sandstone, greywacke.
7d Argillite/greywacke.
7e Thinly laminated arenite.
CHEMICAL METASEDIMENTS
6 6a Brecciated chert, chert breccia
6b Banded chert (± 7b, 2a).
6c Massive chert.
6d Argillaceous chert.
6e Chert-pyrite breccia.
6f Siliceous carbonate sediment.
IF MIF Chert-magnetite iron formation.
chIF Chloritic magnetite iron formation.
SIF Chert-sulphide iron formation, (py,po±cp,sp,gf).
MS Massive pyrite-pyrrhotite (±cp,sp).
MAFIC INTRUSIVE ROCKS
5 5a Diorite.
5b Gabbro.
5c Glomeroporphyritic gabbro.
5d Amphibolite/pyroxenite.
ULTRAMAFIC INTRUSIVE ROCKS
4 4 Peridotite.
METAVOLCANICS
INTERMEDIATE TO FELSIC METAVOLCANICS
2 2a Feldspar porphyritic ash tuff.
2b Feldspar porphyritic lapilli tuff, tuff breccia.
2c Quartz eye/chert frag chloritic volcanics.
2d Porphyritic (quartz).
2e Porphyritic (feldspar).
2h Breccia
MAFIC METAVOLCANICS
1 1a Massive, fine-grained.
1c Porphyritic flows.
1e Pillowed flows.
1p Massive, medium to course-grained flows.
1q Variolitic flows.
1r Mafic tuff breccia, mafic fragmental, pillow breccia.
1t Tuffaceous mafic rocks
ABBREVIATIONS
Ag Silver
Au Gold
chl Chlorite
cp Chalcopyrite
Cu Copper
ep Epidote
Fe Iron
Fe-carb Iron carbonate
gf Graphite
gn Galena
hem Hematite
Il Ilmenite
lcx Leucoxene-bearing
mag Magnetite
Pb Lead
po Pyrrhotite
py Pyrite
ser Sericite
sh Sheared
sil Siliceous
sp Sphalerite
stgrs Stringers
Zn Zinc
bn Bornite
mal Malachite
SYMBOLS
Geological contact, inferred
Outcrop
Intensely altered/mineralized outcrops or gossans
Fault or shear zone
Trench (bedrock, overburden)
3.53,.02,.52,.34 / 5.0 25
Channel sample with analytical values Cu%, Pb%, Zn%, Ag oz/ton / m.
KRS-11
Surface grab sample
Foliation, strike and dip
Bedding, strike and dip
Joint, strike and dip
Bush road
Glacial ice direction
Previous diamond drill hole
holes A-D Cominco, 1954
hole 54-305 American Metal Co., 1954
holes 01-57 Shunsby Gold Mines, 1955
holes 58-74 Shunsby Gold Mines, 1956/57
holes S-57-1 to 3 Martin Shunsby, 1957
holes 75-92 Shunsby Mines, 1960/61, 1964
holes 93-115, Jim1,2 SE 1-4 FRJ Prospecting Syndicate, 1965
holes 68-01 to 23 Consolidated Shunsby Mines, 1968
holes 74-01 to 21 Grandora Exploration, 1974
holes MW-80-1,2 Placer, 1980
holes 81-01 to 30 MW Resources, 1981
Proposed diamond drill hole



1,1q
6,7
1,5b
"FW Diorite"
1,5b
N
351.5°
6,7
ob trench "D"
6b,7d,SIF
6c,6b,6a
"Variolitic Basalt"
6,7
"Upper" Cherts
L050N STRIPPING
2a,7c,py
6b,7d,SIF
6c,6b,6a
"Lower" Cherts
1,1q
L000N STRIPPING
L050S STRIPPING
6b,7d,SIF
9a
L100S STRIPPING
6d,7d,SIF
"Variolitic Basalt"
6a
L175S STRIPPING
1,5b
"Upper" Cherts
6,7
L300S STRIPPING
spruce, cedars
jackpine
poplars / jackpines
much 6 float
jackpine highground
jackpine / spruce / alder lowground
poplars / jackpine
old drill road
jackpine / birch highground
poplar / jackpine highground
cedar / alder lowground
poplars
L E G E N D
GEOLOGY
MIDDLE TO LATE PRECAMBRIAN (PROTEROZOIC)
MAFIC INTRUSIVE ROCKS
11 — 11 Diabase dikes
10 — 10 Lamprophyre dikes and sills
FELSIC INTRUSIVE ROCKS
9 — 9a Quartz-feldspar-porphyry dikes and sills. 9b Fine-grained felsic intrusive.
EARLY PRECAMBRIAN (ARCHEAN)
METASEDIMENTS
EPICLASTIC METASEDIMENTS
7 — 7a Conglomerate, conglomeratic arenite. 7b Conglomerate with chert clasts (chloritic). 7c Quartzite, sandstone, greywacke. 7d Argillite/greywacke. 7e Thinly laminated arenite.
CHEMICAL METASEDIMENTS
6 — 6a Brecciated chert, chert breccia. 6b Banded chert (± 7b, 2a). 6c Massive chert. 6d Argillaceous chert. 6e Chert-pyrite breccia. 6f Siliceous carbonate sediment.
IF — MIF Chert-magnetite iron formation. chlIF Chloritic magnetite iron formation. SIF Chert-sulphide iron formation, (py, po ±cp, sp, gf). MS Massive pyrite-pyrrhotite (±cp, sp).
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5 — 5a Diorite. 5b Gabbro. 5c Glomeroporphyritic gabbro. 5d Amphibolite/pyroxenite.
ULTRAMAFIC INTRUSIVE ROCKS
4 — 4 Peridotite
METAVOLCANICS
INTERMEDIATE TO FELSIC METAVOLCANICS
2 — 2a Feldspar porphyritic ash tuff. 2b Feldspar porphyritic lapilli tuff, tuff breccia. 2c Quartz eye/chert frag chloritic volcanics. 2d Porphyritic (quartz). 2e Porphyritic (feldspar). 2h Breccia
MAFIC METAVOLCANICS
1 — 1a Massive, fine-grained. 1c Porphyritic flows. 1e Pillowed flows. 1p Massive, medium to course-grained flows. 1q Variolitic flows. 1r Mafic tuff breccia, mafic fragmental, pillow breccia. 1t Tuffaceous mafic rocks
ABBREVIATIONS
Ag Silver
Au Gold
chl Chlorite
cp Chalcopyrite
Cu Copper
ep Epidote
Fe Iron
Fe-carb Iron carbonate
gf Graphite
gn Galena
hem Hematite
Il Ilmenite
lcx Leucoxene-bearing
mag Magnetite
Pb Lead
po Pyrrhotite
py Pyrite
ser Sericite
sh Sheared
sil Siliceous
sp Sphalerite
stgrs Stringers
Zn Zinc
bn Bornite
mal Malachite
SYMBOLS
Geological contact, inferred
Outcrop
Intensely altered/mineralized outcrops or gossans
Fault or shear zone
Trench (bedrock, overburden)
3.53, 02, .52, .34 / 5.0 25 Channel sample with analytical values Cu%, Pb%, Zn%, Ag oz./ton / m.
KRS-11 Surface grab sample
Foliation, strike and dip
Bedding, strike and dip
Joint, strike and dip
Bush road
Glacial ice direction
Previous diamond drill hole
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holes 74-01 to 21 Grandora Exploration, 1974
holes MW-80-1,2 Placer, 1980
holes 81-01 to 30 MW Resources, 1981
Proposed diamond drill hole

"Upper" Cherts
5,5a(dig)
6,7
1,5b
1,1q
5b
"Upper" Cherts
possible structures
Massive Sulphide Horizon
"Digestive Diorite"
425 North Structure
"Lower" Cherts
6c,6a,6b
6b,7d,IF
Copper Knob Structure
Stratiform Zn horizon
CuKnob
"Digestive Diorite"
"FW Diorite"
6c
6a,6b
6d,7d
5b
"Variolitic Basalt"
"Basement Fault" (7g,6d,6c)
6c
6b,7c
6b,6c IF
7d,6d,1a
"Lower" Cherts
6b,7c
6b,7d IF
6c,6a,6b
1,1q
6d,7d
Joubin Fault
(approx. 225m)
6a
2a,7c,py
6b,7d,SIF
6c,6b,6a
1,1q
6,7
N
351.5°
LEGEND
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sp Sphalerite
stgrs Stringers
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Fault or shear zone
Trench (bedrock, overburden)
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holes MW-80-1,2 Placer, 1980
holes 81-01 to 30 MW Resources, 1981
Proposed diamond drill hole
Inferred hypothermal breccia structure axis
700N
650N
600N
550N
500N
400N
350N
300N
250N

N
351.5°
Main Zone Extension ?
Copper Breccia Extension ?
Hole 82e Extension ?
1,1q
6,7
1,5b
"FW Diorite"
1, 5b
6,7
"Variolitic Basalt"
6,7
er" Cherts
6c,6b,6a
"Lower" Cherts
1,1q
6b,7d,SIF
6d,7d,SIF
"Variolitic Basalt"
1,5b
"Upper" Cherts
6,7
LEGEND
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Au Gold
chl Chlorite
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Cu Copper
ep Epidote
Fe Iron
Fe-carb Iron carbonate
gf Graphite
gn Galena
hem Hematite
Il Ilmenite
lcx Leucoxene-bearing
mag Magnetite
Pb Lead
po Pyrrhotite
py Pyrite
ser Sericite
sh Sheared
sil Siliceous
sp Sphalerite
stgrs Stringers
Zn Zinc
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mal Malachite
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Fault or shear zone
Trench (bedrock, overburden)
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Bedding, strike and dip
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Bush road
Glacial ice direction
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holes MW-80-1,2 — Placer, 1980
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Proposed diamond drill hole
Inferred hypothermal breccia structure axis