GM 46442

REPORT ON REVERSE CIRCULATION DRILLING PROGRAM, ACHATES PROPERTY

Ministère de l'Énergie et des Ressources
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REPORT ON

REVERSE CIRCULATION DRILL PROGRAM

ACHATES PROPERTY

CHAPAIS, QUEBEC

for

MINNOVA INC.

Toronto, Ontario
July, 1987

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MPH Consulting Limited

SUMMARY

An extensive reverse circulation drill program was carried out on the Achates property of Minnova Inc. (formerly Corporation Falconbridge Copper Exploration), in the Chapais area of northern Quebec during late March and early April of 1987.

The work was carried out subsequent to an MPH ground geophysical program of VLF-EM and magnetometer surveys which served to delineate a number of airborne geophysical features. These and their immediate environments were tested for the presence of gold and/or base metal deposits by the reverse circulation drill program. The 78 holes were located to sample the basal overburden and bedrock immediately down-ice from and directly into the EM and magnetic anomalies.

Overburden cover is relatively thin, averaging some 16.4 ft (5 m), and consists primarily of variably re-worked and oxidized Chibougamau Till which was derived from ice which advanced towards the south-southwest. A lower till from the northwest is sporadically present.

Much of this overburden material presented a less than ideal sampling medium for heavy minerals work given its often oxidized and sandy, ablationary nature. Accordingly, -200 mesh geochemical analyses were carried out to augument the heavy minerals work. A further corollory of this is that overburden responses from mineralized zones may be very subtle and that even relatively modest indications may be significant.

A total of 19 gold grains was observed in tabling and panning operations on the overburden samples, of which 17 were classified as abraded and 2 as irregular. The grains are sporadically distributed and do not form any pattern consistent with a bedrock source on the Achates property. These would appear to represent regional background for this type of till material.

Overburden heavy mineral concentrate assays (Au, As, Cu, Zn Ag) have been re-calculated by computer as "equivalent values". This manipulation takes into account original sample and concentrate weights, and as such, more truly reflects metal distribution within the overburden material. This calculation has served to delineate more potentially anomalous samples then were initially indicated from the raw assay data.

Bedrock samples were subjected to binocular microscopic examination and whole rock and trace metal analyses. The analytical data were subsequently processed via an MPH computer-based lithogeochemical/volcanogenic evaluation program. This has served to delineate several bedrocks as anomalously enriched in trace metals and/or showing characteristics indicative of mineralization/alteration processes.

The results of all the overburden and bedrock chemical work relative to the ground geophysics indicate five main target areas with potential for gold ± base metal mineralization as follows:

(i) Hole 15-21 Area
(ii) Hole 53-55 and Hole 22-33 Area
(iii) Hole 48-49 Area
(iv) Magnetic Domain I_D/Conductive Zone 8a-h
(v) Hole 69-71-72 and Hole 75-76 Areas

it is recommended that a program of backhoe trenching be initiated, in addition to previous recommendations for soil geochemical surveys, to examine conductive/magnetic/structural targets in the vicinity of the anomalous holes.

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1.0 INTRODUCTION

This report presents and discusses the results of a 78 hole reverse circulation drilling program carried out by MPH Consulting Limited of Toronto on behalf of Corporation Falconbridge Copper Exploration (now Minnova Inc.) of Toronto, over the latter's Achates Property in north-central Quebec.

The drill program was carried out subsequent to MPH magnetometer and VLF-EM geophysical surveys with the purpose of testing geophysically defined targets by seeking geochemical and mineralogical indicators of gold and/or polymetallic sulphides in the glacial overburden down-ice from the anomalies. Geophysical zones of interest were also tested directly by drilling providing a sample of material for assay. All bedrock samples were further submitted for whole rock analysis and binocular microsopic examination.

The bedrock chemical data were subsequently evaluated via an MPH computer-based Volcanogenic Evaluation program to assist in lithologic determinations and to help detect any significant enrichment/depletion trends which may be present.

The exploration program is outlined including a description of the reverse circulation methodology, analytical and statistical procedures, and results are presented. Recommendations are made to further evaluate the gold/base metal potential of the property, all in the context of the geology and mineral deposits of the Chapais-Chibougamau region.

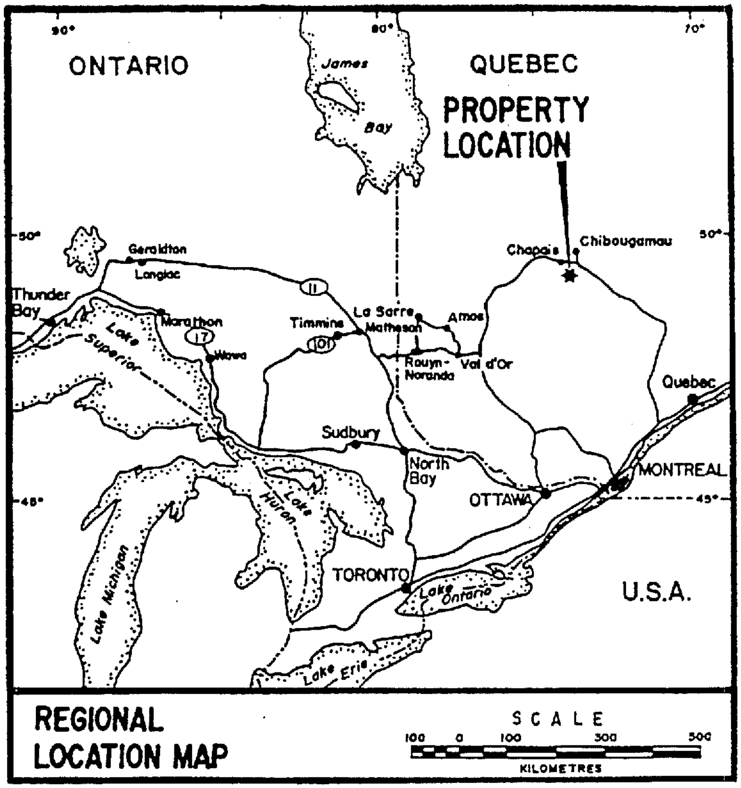
2.0 LOCATION, ACCESS AND INRASTRUCTURE

The project area is situated approximately 15 km southeast of the town of Chapais in Brongniart Township, within the Chibougamau mining district of north-central Quebec (Figure 1).

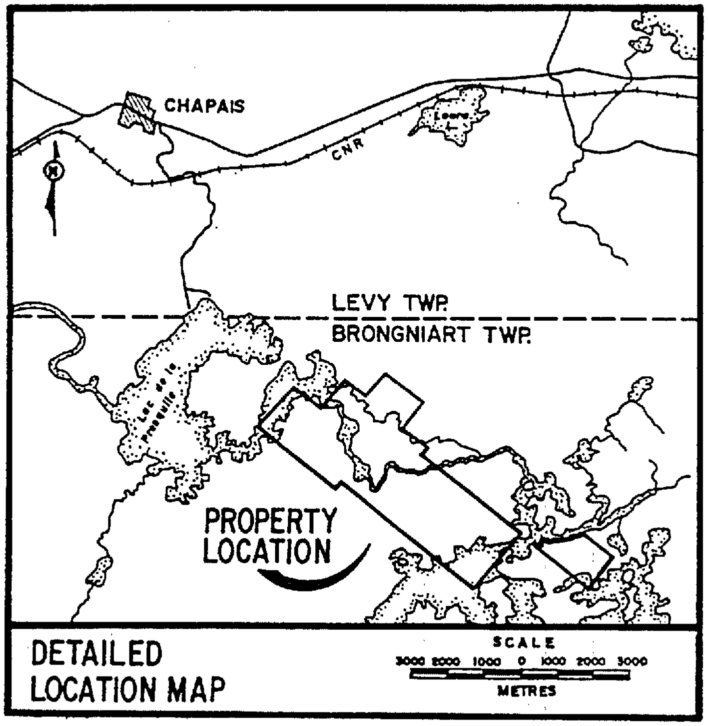
The town of Chibougamau, located approximately 20 km to the northeast of the property, is the centre of an active mining and exploration camp, and as such, all manner of mining and exploration services and equipment as well as logistical support is readily available. The transportation infrastructure includes the main line of the CNR railroad. Quebec highway 58 connects Chapais-Chibougamau to Val d'Or to the southwest, and to Trois Rivieres on the St. Lawrence River, approximately 400 km to the south.

The Achates property is most conveniently accessed by helicopter or alternatively by truck to the pumping station for Chapais on Lac de la Presqu'ile from which a skidoo in winter or boat in summer can be utilized.

The Achates terrain is rather typical of the Chibougamau district of the northeastern Abitibi, with relatively thin overburden cover and surface morphological features controlled by bedrock topography and structures. This control is much more pronounced than in the more deeply overburden-covered central Abitibi region. Muskeg swamp and low-lying alders are much less abundant relative to the latter with much of the project area covered by dense black spruce forests suitable for logging operations.



REGIONAL LOCATION MAP



DETAILED LOCATION MAP

CORPORATION FALCONBRIDGE COPPER EXPLORATION

ACHATES PROPERTY

LOCATION MAP

Project No. C-941	By: S.J.Bate
Scale:	Drawn: MPH
Drawing No: Figure 1	Date: January 1987

MPH Consulting Limited

3.0 PROPERTY

The Achates property covered by the reverse circulation drill program consists of 123 contiguous unpatented mining claims. The property totals some 1,968 hectares (4,863 acres), more or less, all located in Brongniart Township and more properly described as follows:

Licence	Claims	No. of Claims
335808	1,2	2
406408	1,2	2
408689	1,2,3	3
408690-91	1 - 4 inclusive	8
408758	1 - 4	4
408759	1 - 5	5
408760	1,2,4,5	4
410090	3,4,5	3
429270	3,4,5	3
429271	1,2,3,4	4
429273	5	1
429274	1,2,3	3
429276	3,4,5	3
429277	3,4	2
429278	3,4	2
429279	4,5	2
429280	1	1
429281	1	1
435973-7	5 inclusive	5
435978	4,5	2
435979	2,3	2
435980	1,2,3	3
435981	1 - 4	4
435982-435985	1 - 5 inclusive	25
435987	4,5	2

Licence	Claims	No. of Claims
435988	5	1
435991-92	1 - 5 inclusive	10
435993	1,3,4,5	4
435994	5	1
440021	3,4,5	3
440024	3,4,5	3
440025	1,2,3	3
440028	4,5	2
		123 claims

To maintain the claims in good standing, assessment work is required by the Quebec government on an annual expenditure basis for each claim as follows:

First year:	\$5/hectare (i.e. \$80/claim)
Second year:	\$10/hectare (i.e. \$160/claim)

Work performed on one claim may be applied to other claims of the same group provided the claims are continguous and the claim grouping does not exceed 480 hectares (1,200 acres).

There is also an annual tax of \$0.75/hectare which must be paid to the government within 10 days of the expiration date of the claim.

The holder of a claim(s) who wishes to retain his rights must apply for a development licence no later than 10 days prior to the expiration of a claim. The licence is valid for one year and must be renewed each year.

4.0 EXPLORATION PROCEDURES

4.1 The Reverse Circulation Drilling Method

4.1.1 General

Overburden or reverse circulation drilling consists of drilling through the unconsolidated (Quaternary) materials overlying bedrock with dual-tube rods and a tricone bit using a water-air mixture as drill fluid. The resultant slurry is visually monitored, collected, sampled and then processed to obtain a concentrate of heavy minerals. This concentrate is then analysed optically and geochemically to detect ore or indicator particles and/or indicator elements.

The method is based on the principle that there are dispersion trains created in tills during glacial over-riding which can be detected and traced back, up-ice, to the source area (Figure 2). The use of heavy mineral concentrates greatly enhances anomalous metals concentrations making the method extremely sensitive to distant deposits.

One of the most important applications of the method is in the detailed follow-up to airborne and/or ground geophysical surveys.

4.1.2 Glacial Sediments and Dispersion Trains

Approximately 97% of Canada's land surface was glaciated during the Quaternary. Figure 3 summarizes the types of glacial sediments and their associated land forms.

Lodgement till is the most favourable drift exploration medium because in general, the source of clasts in the till will be directly up-ice. In till, the concentration of ore clasts shows a sharp peak at or near the source followed up a

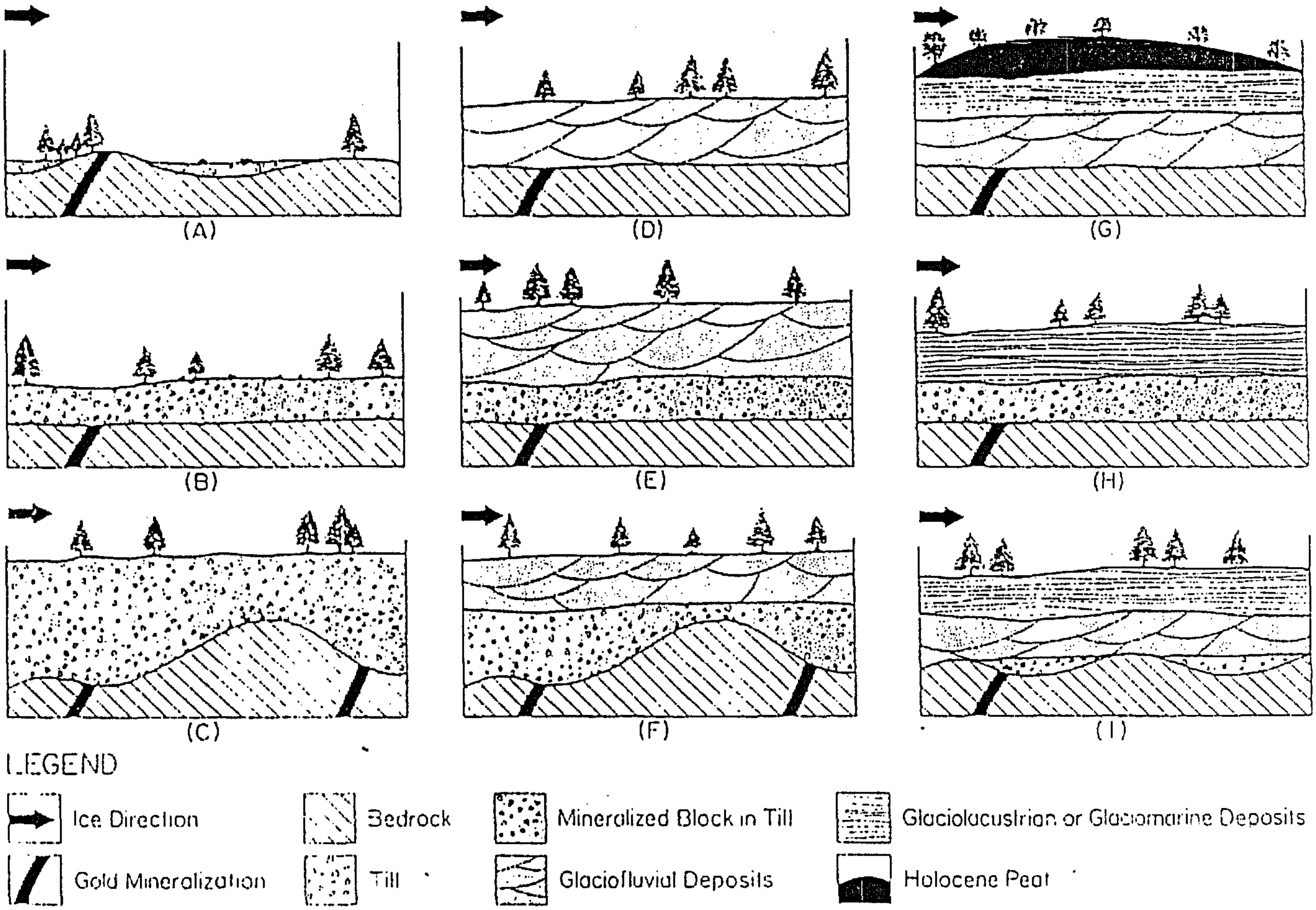


Figure 2: Conceptual model of the generation of mineralized trains in overburden material (after Fortesque, 1983.)

rapid then gradual, i.e. approximately exponential, decline in the down-ice direction. The size, shape and continuity (and therefore detectability) of a dispersion train will depend on many factors. These include size and composition of source, bedrock topography, vigour of glacial quarrying and abrasion, etc. Boulders closest to source will be larger and more angular. Down-ice comminution leads to a decrease in average clast size and increase in sphericity.

There is a recognizable indicator train almost 10 miles long down-ice from the George Lake Zn deposit in northern Saskatchewan. In the Noranda area, anomalous Cu-Zn values have been recorded in till up to 1.5 km down-ice from the Horne deposit while geochemical anomalies in till are restricted to within 1,000 ft. of the nearby West Macdonald low grade Zn deposit. A dispersion train appears to extend for over 6 miles down-ice from the Kidd Creek Mine near Timmins based on a 1970-71 Geological Survey of Canada overburden drilling program. The above program also showed that the separation between anomalous lenses in till and bedrock increases down-ice from the Kam-Kotia deposit near Timmins. This is interpreted as representing relict shear planes in the glacier.

In gold exploration, dispersion trains seem to be most easily detectable at distances of 1 km or less from source. In some cases, down-ice dispersion may be very limited. At the Golden Pond deposit, for example, the recognizable gold train seems to be no more than 200 m long. Trains may also be very narrow, 200 m or less in some cases, and have a distinct pencil-like form, e.g. Dome Mine near Timmins. An example of the effect of bedrock topography on down-ice dispersion is to be seen at the Golden Hope Estrades deposit. Here, a bedrock ridge immediately down-ice from the deposit has completely blocked the formation of any significant dispersion fans.

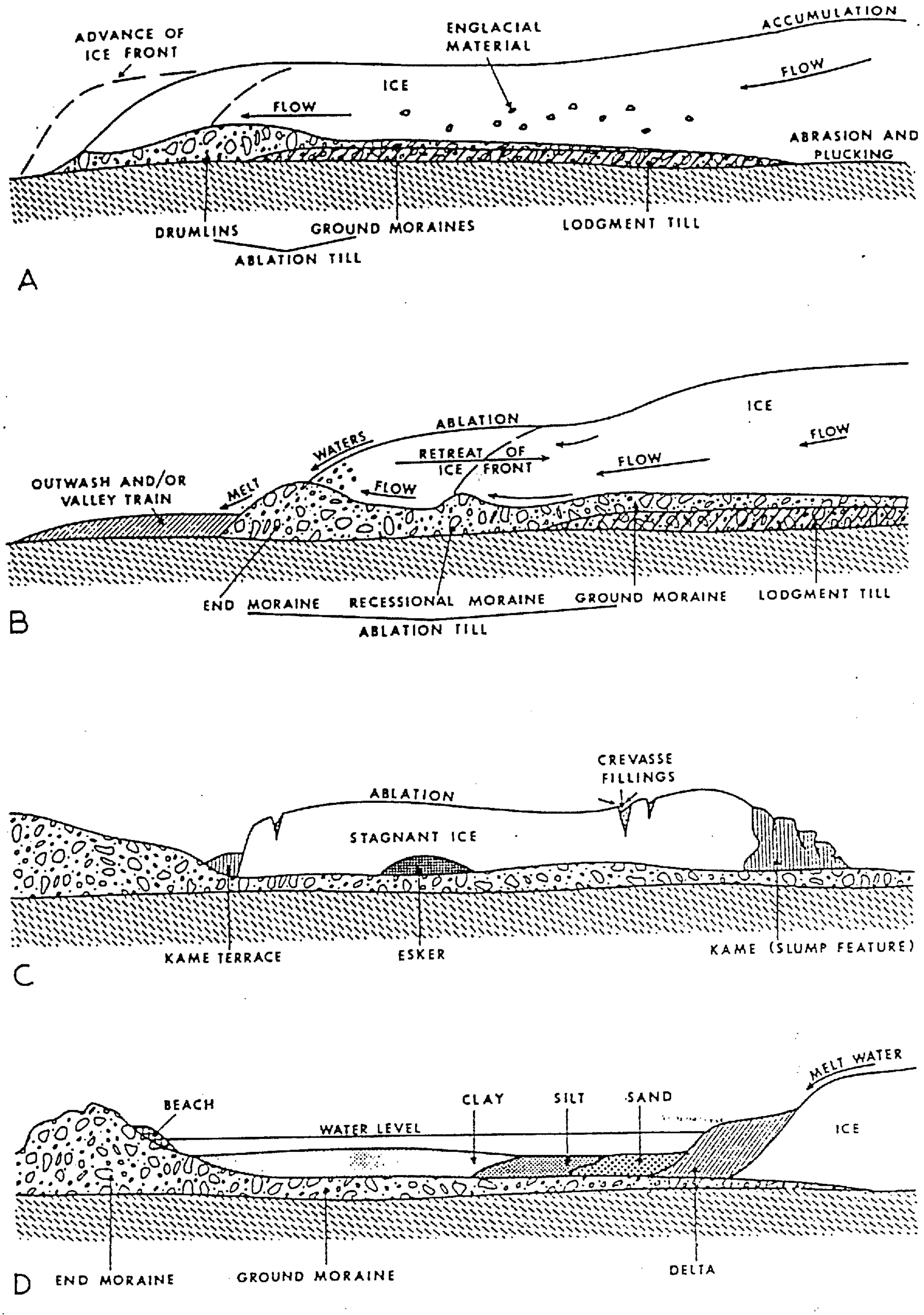


Figure 3: Glacial sediment and landform deposition relative to ice front.

Gold trains can also be very subtle in some cases for a number of reasons including extent of orebody subcrop, size of gold grains, nature of overburden, etc.

When in close proximity to the source, anomalous values are concentrated in the basal part of the till sheet so that this area of the overburden column is of prime importance during sampling. Spectacular sulphide concentrations may occur down-ice from a sulphide deposit. In such cases, it is not necessary to await geochemical analyses. Additional overburden drilling can progress based directly on the visual (real-time) results.

The stratified varieties of drift, i.e. bedded gravels, sands, silts and clays, are a less favourable sampling medium because the fluvial re-working inherent in their formation may make it difficult or impossible to identify the bedrock source area. Placer-like concentrations, in which normal background values are upgraded, may develop during the meltwater re-working of glacial debris. This can produce spurious anomalies in an overburden drilling program. This effect, however, has been used to advantage in esker sampling.

Varved clays representing rock flour washed out of glacial drift and deposited in proglacial lakes are (to date) virtually useless in minerals exploration and are not usually sampled during the drilling process. Analyses on varved clays over the Kidd Creek and South Bay polymetallic massive sulphide orebodies, for example, show no signs of the underlying mineralization.

During drilling, the clays serve the useful purpose of sealing the hole which results in good sample return. In addition, sulphide minerals survive well in the reducing environment that exists beneath the clay cap; oxidation and leaching of sulphides can be a problem in some exposed tills.

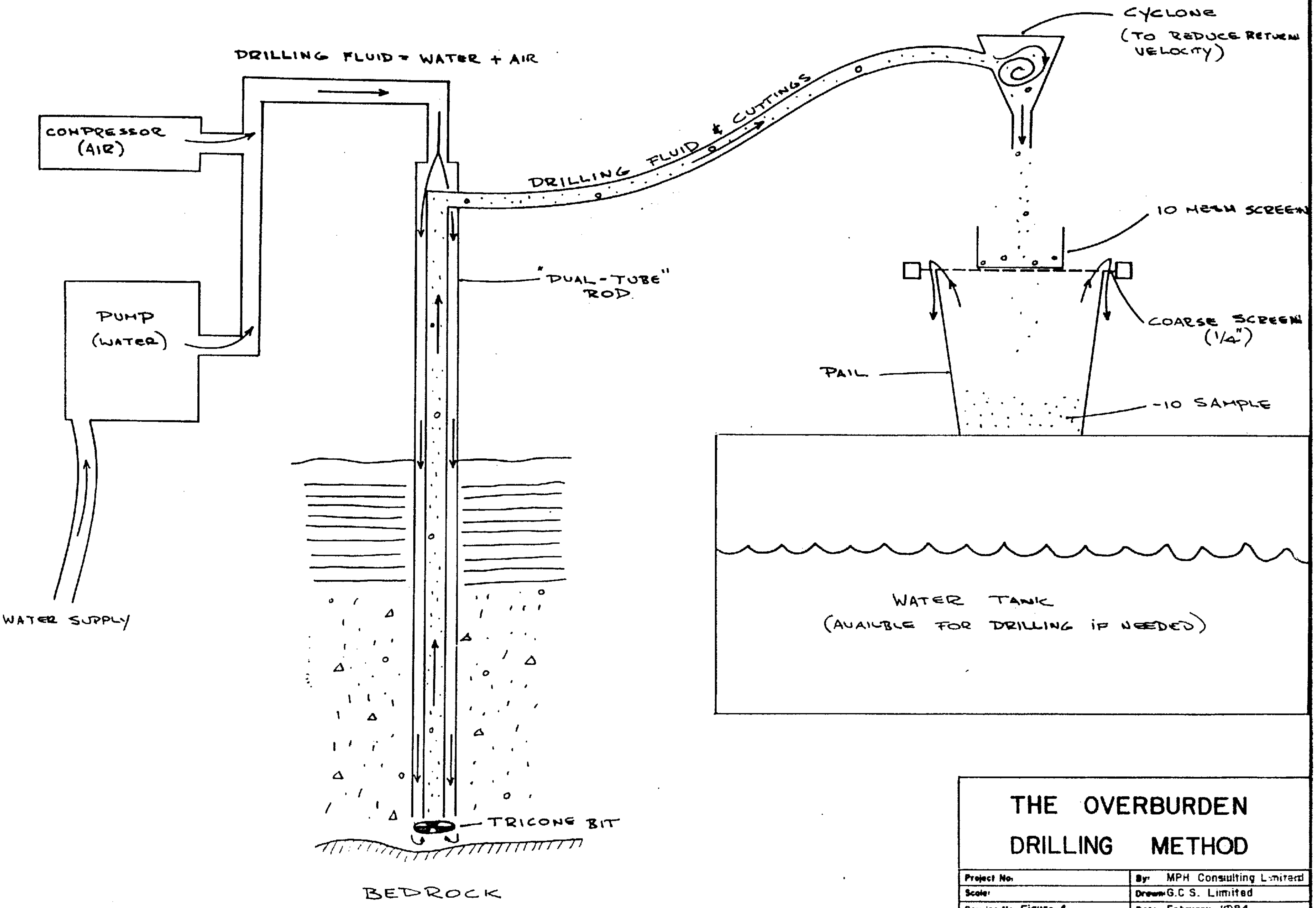
4.1.3 Drilling and Sampling

The reverse ciculation method uses an approximately 3 inch O.D. dual-tube drill pipe. The drill fluid consisting of water and air is pumped down between the inner and outer tubes, past the drill bit and back up the inner tube with the cuttings which are then collected and sampled. The return water overflows the sampling tub and is collected in the underlying tank. This water may then be re-used as drilling fluid or conversely water may be pumped or hauled entirely from some external source.

The drill and accessory equipment such as pumps and compressors weighs about 20 tons and is mounted either on the back of a large tracked carrier such as a Nodwell or on skids so that it can be towed from drill site to drill site by a medium-sized tractor. A permanent or removable drillshack erected around the drill protects drillers and geologists from the elements and allows for year-round operation (24 hours per day if desired).

Figure 4 illustrates the drilling-sampling procedure.

Three drillers are normally required to carry out the drilling, to haul water if necessary, to make roads, to effect repairs, etc. A geologist and an assistant are also present. The geologist logs the overburden section by "feeling" the return and monitoring the material collecting in a relatively



THE OVERBURDEN DRILLING METHOD

Project No:
By: MPH Consulting Limited
Scale:
Drawn: G.C.S. Limited
Drawing No: Figure 4
Date: February, 1984

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coarse sieve (usually about 10 mesh). The helper bags samples and generally assists the geologist. Logging is generally done in imperial units.

Although it will emerge in the geochemical results in any event, the visual monitoring is very important since the recognition of an ore clast during the drilling allows the geologist to modify/extend the program while the drill is in the immediate area or to act immediately on significant results.

The return is normally sampled at 5 ft intervals or at major sedimentary boundaries. The bulk of the +10 mesh material is discarded after inspection during the drilling as is the return from most boulders. A five foot run normally yields about 15 lbs (6.8 kg) of -10 mesh material. An overburden hole is usually continued 2-5 ft into bedrock to ensure that the bit is not in a boulder. Obviously, if a very large boulder is encountered in a hole, the resulting interpretations as to "bedrock" will prove to be incorrect. The progress of a tricone bit into bedrock (or boulders) is generally at a slow rate (average 5 feet per hour) and therefore it is not usually cost effective to proceed further into suspected bedrock unless previous knowledge or unusual geological circumstances dictate.

4.1.4 Sample Processing and the Heavy Minerals Concentrate

The following describes the typical processing methods applied to gold exploration as used by Overburden Drilling Management Ltd. in this program. Other means of sample treatment exist, but the adopted procedures are regarded as effective in obtaining reliable results.

At the processing laboratory in Ottawa, the field samples are first wet screened at 10 (Tyler) mesh (No. 12 Canada or U.S. Standard). The -10 mesh material is then passed across a Deister shaking table to produce a heavy minerals preconcentrate. Any grains of native gold present in the samples will be seen on the table and be recorded by the laboratory technician during this operation. Samples containing gold grains are subjected to a careful panning operation in which the gold grains are isolated for microscopic inspection, measurement and micro-photography if desired.

Overburden Drilling Management Ltd. generally classify gold grains as being "abraded", "irregular" or "delicate" (Figure 5). These shapes are felt to be generally indicative of transport distance with delicate grains being closest to source, perhaps a few tens of meters, with heavily abraded grains having travelled much longer distances on the order of a kilometer or more. This however does not address the possibilities and problems of secondary or recrystallized gold (Mann, 1984, Webster and Mann, 1984).

The table preconcentrates are passed through a heavy media (methylene iodide; S.G. = 3.3) to effect the true heavy minerals separation. This will contain mainly the common sulphides, free gold, magnetite, garnet and epidote (a more complete list of minerals is presented in Table 2). The magnetic fraction is then removed. A 3/4 split is sent for geochemical analysis with a ¼ split retained for reference purposes.

Individual grains can be further subjected to Scanning Electron Microscope or microprobe work to determine the presence of trace elements (which may "fingerprint" a source area),

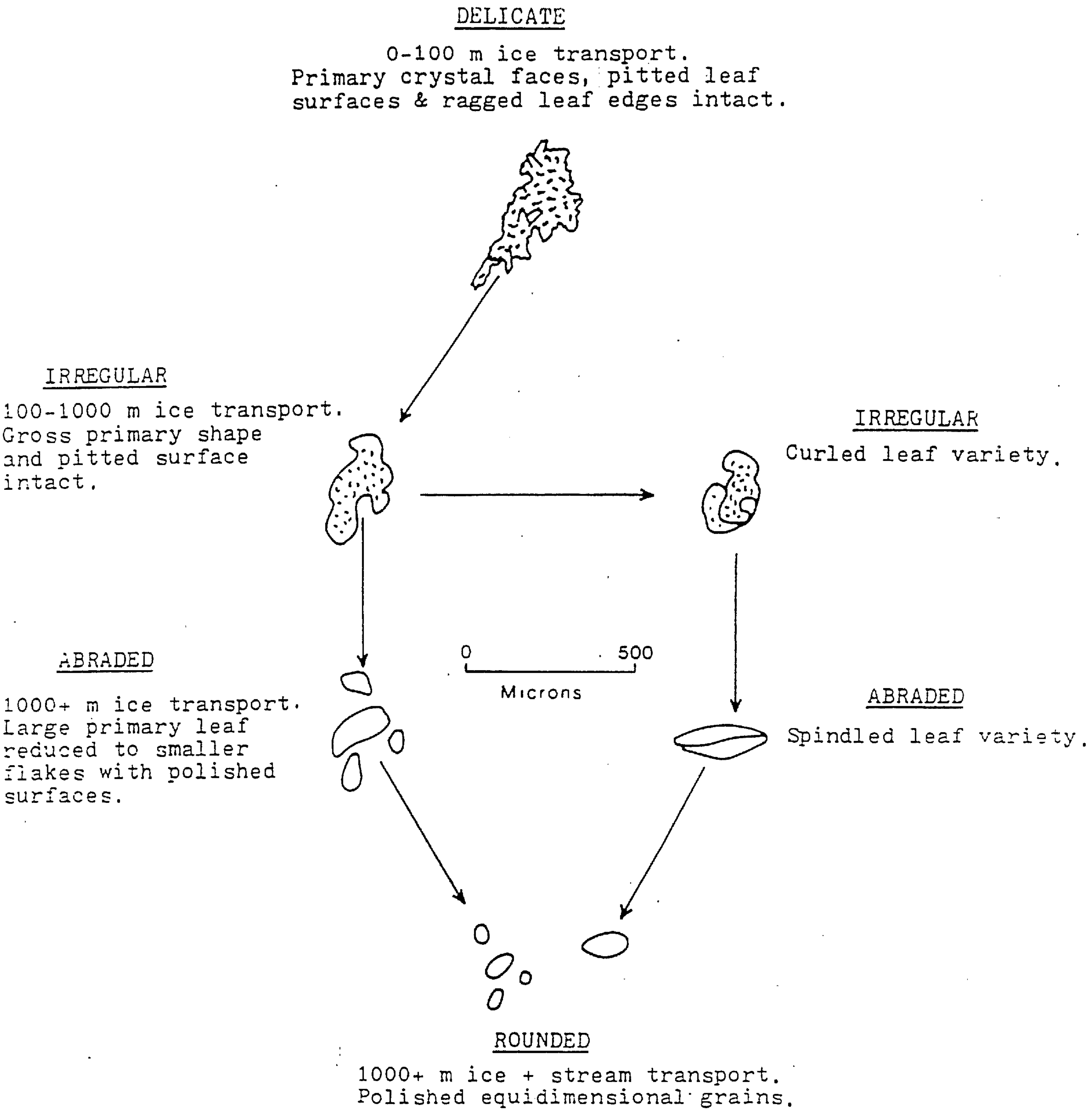

Figure 5: Grain Shape Parameters.

TABLE 1
LIST OF MINERALS WITH SPECIFIC GRAVITIES 3.3

Native Elements

Arsenic
Copper
*Diamond
*Gold
Iron
Mercury
*Platinum
Silver
Tellurium

Sulphides, Arsenides, Tellurides, Sulphosalts

All minerals have S.G. 3.3. Common examples include:

*Arsenopyrite
Bornite
Calaverite
*Chalcopyrite
*Galena
*Molybdenite
Pyrargyrite
*Pyrite
*Pyrrhotite
*Sphalerite
Stibnite
Tetrahedrite

Oxides

Anatase
Bixbyite
Brookite
*Cassiterite
Chrysoberyl
*Columbite
*Corundum
Cuprite
(Diaspore)
Goethite
*Hematite
*Ilmenite
Lepidocrocite
(Limonite)
Manganite
Massicot
Microlite
Periclase
Perovskite
Psilomelane
Pyrolusite
*Rutile
*Spinels
*Tantalite
Tungstite
*Uraninite
Zincite

Silicates

Allanite
*(Amphiboles)
Astrophyllite
(Axinite)
(Bustamite)
(Celsian)
Chloritoid
Clinohumite
*(Clinopyroxenes)
(Clinozoisite)
Enigmatite
*(Epidotes)
*Garnets
(Helvites)
*Kyanite
Lavenite
*(Olivines)
*(Orthopyroxenes)
Pyroxmangite
Rhodonite
Sapphirine
*Sphene
*Staurolite
*Topaz
Vesuvianite
Willemite
*Zircon

Others

Anglesite
Azurite
*Barite
Caledonite
Carnotite
Celestite
Cerrusite
Crocoite
Hydrozincite
Malachite
*Monazite
Phosgenite
Powellite
Pyromorphite
Rhodocrosite
*Scheelite
Scorzalite
*Siderite
Smithsonite
Strontianite
Vanadinite
Witherite
*Wolframite
Wulfenite

Species in parentheses may have specific gravities less than 3.3 depending on variable elemental substitutions.

Most commonly expected species indicated with asterisks.

and to examine morphological features such as the folding of grains, re-crystallization, etc. The value of the microscope was amply demonstrated in one instance around Timmins where some highly anomalous Cu values were shown by microscopic examination to be caused by copper filings derived from O-rings on a water pump and not by copper-bearing minerals. This sort of contamination has now been virtually eliminated in overburden drilling work. Heavy mineral concentrates can also be viewed under ultraviolet light or be examined by a scintillometer in the case of uranium exploration.

Occasionally, the "lights" are of interest as in exploration for asbestos or the common lithium-beryllium minerals. Appropriate heavy media can be used to isolate specific gravity ranges of interest.

Concentration ratios for the "heavies" vary between 100:1 to 200:1. This concentration greatly enhances anomalous metal values making the method extremely sensitive with respect to achieving detection limits and increasing peak to background ratios. For example, if Cu background in till was 100 ppm, the addition of a few grains of chalcopyrite constituting another 100 ppm Cu to the sample would only double the standard -80 mesh anomaly but would produce a huge heavy minerals anomaly of 10,000 to 20,000 ppm because of the concentration ratio.

4.1.5 Applications

There are applications for overburden drilling on both the regional and detailed scales. Regional work involves wider hole spacings, up to 1 km or more apart. Such large step-outs are allowed by the high sensitivity of the method. The usual purpose of regional work is to intersect an indicator train which can then be traced back up-ice where the probable source area can be explored by detailed overburden drilling, geophysics and diamond drilling.

A very important use of the method is in follow-up to airborne and/or ground geophysical surveys to assist diamond drilling in anomaly evaluation. In this way all or most of the anomalies located during a survey can be evaluated, not only those with the highest geophysical rating. The overburden drilling approach is also very useful in evaluating long, formational anomalies.

A standard approach in the case of EM conductors is to drill a string of holes immediately down-ice from the conductive zone with a hole spacing of 100 to 300 m. This results in a reading on the entire conductive zone. This is particularly desirable since the actual economic deposit may not be part of the main conductor or may be a less conductive part off or beside same. In addition, it is common practice to drill an overburden hole(s) directly into the conductor. There have been instances of direct ore intersections being made during overburden drilling (e.g., the Asarco gold deposit, Timmins, Ontario).

Another detailed application is to further explore a property where a favourable contact or small deposit is known from previous work and the bedrock information gained from overburden drilling is also very important for lithologic correlation and rock geochemistry.

4.1.6 Interpretational Considerations

The drilling technology is now fairly advanced and more sophisticated improvements, e.g. computer monitoring during the drilling process, are already on the drawing boards. Likewise the sample processing and analytical techniques are now fairly rapid, effective and accurate.

One of the great problems of overburden drilling is in the interpretation of the analytical/processing results. This is particularly so in the case of gold exploration where the "nugget effect" of a single large grain of gold in a small heavy minerals sample may give rise to a very high yet possibly meaningless gold value. It may also be difficult in some cases to distinguish between high background levels of gold and a truly significant anomaly. In geophysics, this would be a question of trying to separate the "signal" from the "noise" when the two can be of the same order of magnitude.

These problems are further complicated in areas of extremely complex glacial geology as in portions of the Clay Belt of northern Ontario-Quebec.

One technique that we at MPH Consulting have used to advantage in interpretation is to calculate, generally by computer, an "equivalent metal" value. This takes into account the analytical value and weight of the HMC and the original sample weight utilizing a formula of the form:

$$\frac{\text{Analysis ug/g* x Proportion Heavy Mineral ug/g}}{1{,}000} = \begin{array}{l}\text{Equivalent}\\ \text{concentrate of}\\ \text{metal (ng/g)*}\end{array}$$

*An original value would be in ng/g resulting in an equivalent concentration in pg/g.

This, in effect, is a reflection of the metal content per gram of original till sample. Such equivalent values often project a much more meaningful picture of metal distribution in overburden.

We recognize however that such calculations are, in part, a reflection of glacial lithology. A fluvial sand, for example, would have a much larger heavy minerals endowment, reflecting the fluvial concentration process inherent in its formation, than a clay-rich till. The former would give a higher equivalent number, other things being equal.

A further problem is the failure to recognize that the overburden material may not be giving the desired "reading" on the up-ice bedrock stratigraphy. This will be the case if the desired tills are absent or only poorly developed or if the over-riding glaciers were not in contact with bedrock. This latter effect may be much more common than previously thought. Such overburden samples, no matter how carefully processed and analyzed, will not be indicative of the up-ice bedrock. For example, if drilling immediately down-ice from a strong EM conductive zone, one should expect to see some indication of that conductor, e.g. graphite or sulphide chips, to be confident that the method is indeed working.

Another problem in the case of gold work is the potential loss of fine gold during the drilling and processing and the potential loss of gold in compound grains (e.g. gold in quartz) during the heavy media separation. This can be a major problem in the case of very fine grained gold deposits.

In summary, however, there is little doubt that if glacial conditions are correctly interpreted and if the method is properly applied, the reverse circulation technique can be extremely effective one in mineral exploration in glaciated terrain.

4.2 Lithogeochemical Methodology

Lithogeochemical techniques have been developed over the last decade to enable chemical characterization of bedrock, and to distinguish favourable geological conditions for gold and base metal mineralization from those judged to be unfavourable, using subtle mineralogical and chemical indicators. Properly used, the techniques can help to distinguish "enriched" or altered horizons from those exhibiting more "normal" metamorphic mineralogical and chemical characteristics.

4.2.1 Rock Classification

Chemical classifications of the bedrock chip samples are herein performed by five methods: Jensen Cation Plot (Jensen, 1976; Grunsky, 1981), the methods of Irvine and Barager (1971), by their silica and titania contents, and by the method of Floyd and Winchester (1977). The Jensen scheme is based strictly on the chemistry of the (subalkaline) volcanic rocks while the Irvine and Barager method is based in part on the normative mineral percentages calculated from the major rock-forming components, and on an AFM ternary plot. Classifications based on the silica and titania contents of rocks, though not nearly as complex, are less sensitive to regional metamorphic alteration processes.

This is the fundamental principle behind the plot of Floyd and Winchester, which plots silica vs Zr/TiO_2, all of which are relatively immobile during secondary alteration processes, and as such have proven to be extremely useful in the classification of Archean volcanic rocks (Picard et Piboule, 1986). Also included is a plot of TiO_2 vs Zr, which has proved to be of use in determining fractionation trends and stratigraphic relationships within the Abitibi Subprovince (Davies and Whitehead, 1980, 1979). Since all of these classification schemes are designed to be used exclusively on volcanic rocks all terminology contained therein for the classification of non-extrusive rock types is in terms of chemo-volcanic equivalents.

4.2.2 Volcanogenic Evaluations

The geochemical analysis of the major oxides (SiO_2, TiO_2, Al_2O_3, FeO_T, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5 and LOI) may be used to help characterize rock types or to aid in identifying unusual chemical features which may be present due to mineralizing processes. At MPH Consulting Limited, a microcomputer system is used to evaluate whole rock geochemical data for the purposes of classification (as previously discussed) and the detection of the presence of geochemical conditions that may be the result of volcanogenic or hydrothermal mineralization processes (Siriunas, 1984). The intent of the procedure is not to replace geological or mineralogical procedures but rather to be used as an additional tool on which to base exploration decisions.

Alteration components that might effect the classifications of rock type or be closely related to volcanogenic mineralization are examined more specifically by the computer methodology employed. The program examines a number of residual components (MgO, K_2O, CaO, NaO, FeO_T, SiO_2) whose deviation from expected ranges may be indicative of hydrothermal alteration. Combinations of various oxide components are also examined in a number of ratios and discriminant functions. Base metal evaluations of felsic volcanics include total alkali alteration score (TAAS) and the Marcotte-David Score (DF1), along with the peraluminosity index, which is also useful for gold evaluation of bedrock samples. Discriminant functions 2 through 5 analyze various components commonly associated with volcanogenic base metal deposits. Gold evaluations concentrate on mafic volcanics and include recognition of carbonatization, soda depletion and high gold, arsenic and K_2O values.

TAAS 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) x 100, after Hashimoto, 1977). As MgO and K_2O contents of a volcanic rock increases 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 typically exhibit TAAS's greater than 70 due to their inherently high MgO and K_2O contents, respectively. Highly altered felsic volcanic rocks will have TAAS values in excess of 80 or 90.

Discriminate analysis is a statistical technique that can be used to help "discriminate" between different populations (i.e. background and anomalous) in a larger population of multivariate (i.e. multielement) data. Based on known data, an equation with varying proportions 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 as to minimize the overlap between the two populations The Marcotte-David Score (Marcotte and David, 1981) is based on the linear equation:

$$1.91 - 0.57\ Na_2O + 0.30\ MgO - 0.26\ CaO + 1.44\ TiO_2 - 0.18\ Fe_T$$

which was derived from 574 felsic (greater than or equal to 60% SiO_2) volcanic rock samples representing 22 deposits in the Abitibi region. Scores greater than 1.5 are interpreted to occur (with 80% probability) in a mineralogical environment while scores between 0.5 and 1.5 include the overlap in background and anomalous populations. The test area used for their study was the Normetal deposit and environs. Similarly, discriminant functions 2 through 5 derived from published and unpublished studies of felsic volcanic rocks in the Abitibi, Wabigoon and Uchi belts of the Superior Province, classify the samples with varying components. These components include:

Fe_T, Zn for DF2
Fe_T, Na_2O and Zn for DF3
Fe_T, Na_2O, MgO and CaO for DF4
Fe_T, MgO, MnO for DF5

The higher the discriminate score the more anomalous the sample, and the "suite" of discriminant functions effectively covers the pertinent geological environments.

MacGeehan and Hodgson (1981) have reported anomalies in the peralaminosity index ($Al_2O_3/(CaO + K_2O) + Na_2O) \times 100$) of volcanic rocks surrounding the producing mines in the Red Lake area. Relative enrichment in aluminum is also noted to be associated with gold deposits in felsic environments at the Bousquet Mine (Valliant et al., 1983) and possibly at the deposits in the Hemlo area (Patterson, 1984).

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 Crockett, 1981; Whitehead et al., 1981). Carbonatization can be recognized by the ratio of weight percent carbon dioxide to lime, a ratio greater than 1.5 being considered significant. 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).

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 has also been reported by the use of the absolute potash and arsenic contents of these rocks (Whitehead et al., 1981).

5.0 GEOLOGY AND MINERAL DEPOSITS

5.1 Regional Geology

The Achates claim group lies within the Matagami-Chibougamau greenstone segment of the overall Abitibi Greenstone Belt. Generally referred to as the Chapais-Chibougamau mining area, it forms the eastern extemity of the Abitibi and is bounded to the north and south by Archean gneissic and granitic terrains, and to the east by the Proterozoic Grenville Front tectonic zone (Figure 6).

The Archean rocks of the area can be broadly subdivided into two volcano-sedimentary packages; the Roy Group of two mafic-to-felsic volcanic cycles with minor turbiditic and chemical sedimentary assemblages, and the overlying Opimiska Group of dominantly sedimentary and minor volcanic assemblages (Allard et al., 1979). These have been folded about north-south axes and subsequently refolded isoclinally about east-west axes, resulting in near vertical dips and trends ranging from east-west to northwest-southeast. The Chibougamau anticline is the central resultant structure, bounded to the north by the Chibougamau syncline and to the south by the Chapais syncline, with the Achates property inferred to lie on the southern flank of the latter. Intruding the volcanic rocks of the Roy Group are numerous large differentiated mafic sills of synvolcanic and comagmatic origin. The Doré Lake Complex and the Cummings Complex, the two major intrusives, are found within the axes of the Chibougamau Anticline and the Chibougamau and Chapais synclines respectfully, with lateral extents ranging to 100 kms. Each formation of the Roy Group contains a large component of mafic sills, especially the two mafic members, the Obatogamau and Gilman Formations.

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Granitic plutons ranging in composition from granodiorite to granite are common throughout the Chapais-Chibougamau area, as they are throughout the Abitibi, and these generally show a spatial relationship to the axis of anticlinal structures. Post-tectonic diabase dykes belonging to the Abitibi swarm cut all lithologies. Minor Proterozoic tillites and meltwater sediments are found along the west side of major northeast trending faults, attesting to an extensive Proterozoic continental glaciation.

A north-northeast trending fault set is the most prominent in the Chapais-Chibougamau area with several regional structures. Sets trending east-west, northwest are less common and generally of shorter extent.

Metamorphism is generally of greenschist or epidote-amphibolite facies, with the higher grades spatially associated with intrusive bodies where amphibole gneissic rocks are common.

Pliestocene glaciation scoured the area producing the present surface morphology. The abundance of intrusive bodies which resist weathering and scouring processes have resulted in much less drift cover than in many areas of the Abitibi.

Intercalated with the volcanic rocks of the Roy Group are regional sedimentary-tuffaceous units with abundant graphite, argillite, sulphides and oxide iron formation which typically appear as airborne EM ± magnetic zones. Such geophysical indicators have proven to be associated with gold and/or polymetallic deposits (i.e. Golden Pond and Estrades) in the Casa Berardi area of the Abitibi, and their presence in the Chapais-Chibougamau region (and the Achates property in particular) is regarded as being significant.

Gold deposits within the immediate area are primarily variations of the lode-gold type, with Cu-Au mineralization structurally controlled in a variety of host rocks often with a spatial association to mafic intrusive complexes. Volcanogenic massive sulphide deposits occur within the felsic members of the Roy Group, namely the Waconichi and Blondeau Formations.

5.2 Mineral Deposits

After the Republic of South Africa's Witwatersrand, which produced some 1,114 million ounces of gold between 1884 and 1978, the greatest gold mining area of the western world is Canada's Abitibi belt. Mines within the Abitibi had produced more than 133 million ounces of gold between 1906 and 1981, of which the Chapais-Chibougamau region has contributed approximately 3 million ounces.

Several major gold and base metal deposits are present in the general region. Salient characteristics of some of these deposits, pertinent to further exploration in the area, are described below:

(a) Matagami Camp

The first discovery and still the largest deposit (approximately 25 million tons) in the Matagami Camp is the Mattagami Lake massive sulphide base metal deposit discovered in 1957. The deposit was found in follow-up to airborne geophysical surveys flown in 1956. A number of other massive sulphide deposits (12 in all) were found over a three township area, subsequent to the main discovery, including the Orchan, Norita, New Hosco, Bell Allard, Radiore A, Radiore B, Bell Channel and Garon Lake. At least five of the deposits became producing mines.

The Mattagami Lake mine has been in production since 1964. In the year to December 31, 1985, the Mattagami Lake mill treated 1,208,000 tons of ore to produce 9,453 tons of copper, 42,325 tons of zinc, 250,000 oz silver and 4,044 oz gold. Reserves at the main Mattagami Lake Mine at December, 1985 were indicated to be 1,805,000 tons grading 0.42% Cu, 4.86% Zn, 0.60 oz Ag/ton and 0.01 oz Au/ton. There is no production from most of the other smaller deposits, at this time. Some of the smaller deposits have been mined out (e.g. Bell Allard [production: 258,124 tons at 9,30% Zn, 1.15% Cu, 1.08 oz Ag/ton and 0.012 oz Au/ton). Noranda Mines has controlled most of the production from this camp.

A major new discovery was reported by Noranda in October, 1985 on the Isle-Dieu Matagami Mine property, 1.5 km west of the Mattagami shaft. The discovery hole (N. 85-2) gave 18 ft (1702-1820 ft) of 0.59% Cu, 26.36% Zn and 1.78 oz Ag/ton. Hole No. 85-3 gave 43.6 ft (1370-1413.6 ft) of 0.65% Cu, 27.51% Zn and 3.20 oz of Ag/ton and 14.6 ft (1583.4-1598 ft) of 0.93% Cu, 19.93% Zn and 1.03 oz Ag/ton.

In April (Northern Miner; April 21, 1986) Noranda announced a hole (86-29) which intersected 104.8 ft (1705.4-1810.2 ft) of 1.08% Cu, 31.94% Zn and 3.92 oz Ag/ton and 18.3 ft (1571.1-1589.4 ft) of 19.3% Zn and 3.07 oz Ag/ton. This hole underlines the fact that significant new discoveries can be made even within the heart of a major mining camp.

District geology is described by MacGeehan et al (1981).

> "The Matagami mining district lies 150 km north of Noranda, Quebec on the north side of the Abitibi Greenstone belt in the Superior Province of the Canadian Shield. A series of twelve pyrite-pyrrhotite-sphalerite-chalcopyrite-bearing massive sulphide deposits occur clustered within a major Archean volcanic centre composed of a bimodal suite of basalts and rhyolites intruded by contemporaneous gabbro dykes and sills and under-

lain by the Bell River Igneous Complex, a high-level, subvolcanic layered gabbro-anorthosite pluton. This assemblage of volcanic rocks, stratiform sulphide deposits and contemporaneous intrusions was then metamorphosed to the greenschist facies and folded into a westward-plunging anticlinal structure. The Bell River Igneous Complex occupies the core of the anticline and is flanked by volcanic rocks on either limb. A series of granitic rocks were intruded at a later date. There is poor outcrop in much of the district, and the geology has mostly been established from drill-core correlation, geophysical interpretation and underground mapping in the mines.

On the south limb of the anticline, the massive sulphide deposits, including the Bell Allard, Orchan and Mattagami Lake mines, are all located at or toward the base of the 'key tuffite', a thin semi-continuous mixed cherty tuffaceous unit traced for over 10 km on strike along a rhyolite-andesite contact. Sharpe (1968) divided this stratigraphy into the rhyolitic Watson Lake Group, underlying the 'key tuffite', and an overlying Wabassee Group, composed predominantly of basalt and andesite, but including several rhyolitic units, one of which overlie the 'key tuffite' at the Orchan Mine.

On the north limb of the anticline these stratigraphic subdivisions cannot be recognized, mainly because the 'key tuffite' is not present. However, the volcanic stratigraphy there includes seven basalt units, a pillowed feldspar porphyry (FP) and three rhyolite flows. Most of the sulphide deposits are associated with the Norita and Bell Channel rhyolites at the base of the exposed volcanic succession, but the Garon Lake deposit is developed above, in the stratigraphically higher Garon Lake rhyolite. Above this mineralized rhyolite-basalt sequence, and extending to the known top of the belt, is a thick section of mainly pillowed basalt, loosely termed the 'Wabasee Group' cut by numerous sills of similar composition. No ore deposits have been found in this sequence to date.

Petrographic studies and chemical analyses of the basalt-rhyolite sequence on the northern side of the camp show the volcanic rocks to be of tholeiitic affinity. The basalts are iron-rich, low-potassium tholeiites, and the rhyolites are quartz-rich (75% SiO_2), but oligoclase-normative, tholeiitic rocks termed dacite in some classification systems. Most of the volcanic rocks associated with mineralization were hyrdothermally altered during sub-seafloor geothermal activity. The basalts were spilitized, silicified and bleached to rocks of andesitic or dacitic appearance, and the rhyolites frequently chloritized. However, the primary nature of the rocks can be identified from textures and by mapping individual altered flow-units along strike into less altered domains."

(b) Lac Shortt Gold Mine, Gand Township

Located 25 km northeast of Desmaraisville, Quebec, Falconbridge's Lac Shortt gold deposit commenced production in 1984 with estimated reserves of 2 million tons grading 6.4 g/t (uncut), to the 500 m level. Original exploration in 1950 investigated a prominent circular aeromagnetic anomaly now known to correspond to the magnetite-rich mafic rock forming the footwall of the ore zone. The property was further explored during the 1950's and mid-1960's by McWatters Gold Mines Ltd. and Candore Exploration Ltd. The latter company drilled some 24 shallow diamond drill holes. Further drilling by Opawica Explorations Ltd. in 1976 resulted in significant gold intersections and the property was subsequently optioned to Corporation Falconbridge Copper in 1979. Underground exploration commenced in 1981 subsequent to 8,800 m of surface drilling which defined 626,000 tonnes grading 6.4 g/t to a depth of 265 m. Initial production was at a rate of 750 tonnes per day and commenced in September of 1984.

The orebody is found within mafic flow/intrusive stratigraphy similar to, and possibly contemporaneous with, that of the Upper Roy Group, specifically the Blondeau Formation, of the Chapais-Chibougamau area. Just south of the mine, there is a Proterozoic polymictic fragmental unit, apparently concordant, which contains angular clasts of mafic lava, intermediate volcaniclastic, chert and massive bedded and nodular pyrite/pyrrhotite. The southwest extension of the Campbell-Gwillim-Waconichi Lake fault passes 3 km south of the mine and is a structure spatially associated with many of the gold/base metal deposits of the Chapais-Chibougamau area. The orebody is located in a subparallel shear, the Lac Shortt fault, characterized by a dolomite-quartz-green mica schist unit 25 m in width. An intrusion of syenitic composition is found within the Lac Shortt fault spatially associated with the orebody where its texture becomes granoblastic and composition more potash feldspar-rich with minor carbonates, sericite, plagioclase and pyrite.

The orebody itself is tabular in form, 300 m long, more than 500 m deep and averages 5.5 m in width. On its hangingwall is a complex series of altered mafic pyroclastic rocks and lapilli tuffs, while the footwall rocks consist of mafic pillowed flows and a massive mafic rock referred to as diorite in the mine. The contact between these two footwall rocks is highly sheared and trends obliquely to the Lac Shortt fault, and much of the diorite, as well as some of the pillow lava, is magnetite-rich. Ore is confined to the Lac Shortt fault and a series of oblique splays that trend roughly north-south, parallel to the sheared contact between mafic footwall rocks. All major foliations follow these two trends. Texturally, the orebody is variably cataclastic and mylonitic and gold occurs associated with a rock composed of carbonate, potash feldspar and pyrite, as very fine grained disseminations and micro-inclusions.

Gold is also found in lower concentrations within carbonate veins and masses, generally at the junctions of splay structures and the main ore zone.

Alteration is pervasive within footwall, hangingwall and ore lithologies, following a predictable sequence generally consistent with carbonatization, sulphidation and potash-feldspar alteration processes (Morasse et al, 1986). Peripheral alteration is characterized by abundant magnetite within carbonatized mafic volcanic footwall rock. This grades into a reddish-black, non-magnetic hematitic altered rock found on both hanging and footwall sides of the orebody, extending to 15 m from the orebody. With increasing intensity of alteration, the hematitic rock grades into a red syenitic rock consisting primarily of K-feldspar, carbonate and pyrite. This progressive alteration sequence is an excellent field indicator to better mineralization, and outside of mineralized zones it is generally weak and obscured by regional metamorphism, which here is of greenschist facies.

The Lac Shortt gold deposit is rather typical of Archean Abitibi lode gold deposits, with concentration occurring at the intersection of a shear zone and a structurally competent, iron-rich host-rock, in this case the diorite. High grade gold seams are concentrated at the structurally favourable shear zone intersection, and the gold is spatially and possibly genetically associated with a felsic intrusion, in this case the "syenite". A progressive alteration sequence of magnetite-hematite-pyrite, calcite-dolomite-ankerite, and development of potash feldspar occur such that the ore is found within a carbonate-K-feldspar-pyrite rock. Also present, and commonly associated with gold deposits in the Abitibi, are the Timiskaming-type polymictic breccia unit and fuchsite within the quartz-dolomite-green mica schist unit. These are all important characteristics for gold exploration within the Chapais-Chibougamau mining district.

The Bachelor Lake Gold Mine in Desmaraisville exhibits fundamentally similar characteristics to those described above.

(c) Opemiska Copper-Gold Deposits, Chapais

These Cu-Au vein deposits which together total 20 ore zones and four mines; the Springer, Perry, Robitaille and Cooke, are located in Chapais, approximately 45 km southwest of Chibougamau. Though discovered in 1929, production was delayed until 1954 due to the lack of transportation infrastructure in the area. Production to 1984 totalled more than 23 million tonnes grading 2.38% Cu, 1.03 g/t Au and 10.9 g/t Ag with estimated reserves then of 2,600,000 tonnes with a grade of 1.03% Cu, 1.18 g/t Au and 9.02 g/t Ag.

The Opemiska Mine area lies within the Blondeau Formation of the upper Roy Group, with the deposits found primarily within the Ventures Sill, a large, differentiated, comagmatic intrusive body. Small deposits are also found within the volcanic flows, pyroclastites and sediments of the Blondeau Formation, as well as the stratigraphically higher Bourbeau Sill. These rocks all dip steeply to the south as they lie on the south flank of the Chibougamau Anticline where the Chapais Syncline is faulted and folded to form an east-plunging, overturned antiform-synform pair. Granitic plutons occupy the centre of the Chibougamau anticline and a large intrusive, the Presqu'ile Granite is found 3 km to the south of the Opemiska deposits. Later intermediate to mafic dykes, with minor ultramafic, lamprophyric and syenitic types cut all rocks of the Blondeau Formation.

Within the immediate deposit area, pillowed and massive mafic flows of the Upper Gilman Formation are overlain by the lowermost Blondeau Formation unit, massive rhyolitic domes and flows which grade into felsic crystal and lithic tuffs, turbidites and siliceous exhalites containing graphitic and sulphide-rich horizons. The 1,000 m thick Ventures Sill overlies these volcaniclastics, and varies in composition from a clinopyroxene-rich pyroxenite at its base through successive differentiates of black pyroxenite, green pyroxenite, a foliated gabbro sequence and finally the ophitic Ventures Gabbro. Locally, granophyric units are present at the top of the sill, as is a disseminated sulphide zone up to 6 m wide containing pyrrhotite and chalcopyrite. A 550 m thick volcanic unit consisting primarily of pyroclastites with minor flows separates the Ventures Sill from the Blondeau Sill which is a granoblastic differentiate consisting of a bronzite pyroxenite followed by leucogabbro (epidiorite) and diorite (quartz gabbro) members.

Structurally, the area is complex with structures intimately associated with mineralization. An initial folding episode oriented about a north-south axis resulted in "Z-folds" throughout the area and produced an antiform north of the property and a synform near the Springer Shaft. The second episode, which resulted in major anticline-syncline structures throughout the mining camp, was oriented about an east-southeast axis and was associated with the Kenoran Orogeny. Five major fracture systems are present, of which three pre-date and two post-date mineralization. Pre-dating are a series of normal faults which strike NNW and dip steeply to the SW, an east-west fracture series with dips varying between steeply northward and steeply southward, and the major regional shear, the Gwillim Lake Fault which strikes N 69° E and shows an apparent left-lateral displacement of 3,300 m. Two minor systems, one striking 120-130° and dipping steeply to the southwest, and the other with a northward trend cut through host rocks and the mineralization (Salmon et al., 1984).

Mineralization itself is generally concentrated within conjugate fractures developed with the east-west system following zones of weakness generated by the folding episodes. These are best developed within the most brittle differentiates, namely the gabbroic phases of the sill. The conjugate fractures are thought to be associated with the Kenoran orogeny (Watkins and Riverin, 1982) and are also felt to be associated with long-lived movements along the Gwillim Lake shear system (Guya, 1984; Salmon et al., 1984). Guya et al., (1986) now consider the Gwillim Lake shear system to post-date mineralization and to therefore be unrelated, however, this major structure is spatially associated with all deposits within the mining camp.

Ore mineralogy is dominated by chalcopyrite with gold found as flakes within and along fine fractures. Minor amounts of sphalerite, galena, molybdenite, scheelite, arsenopyrite and uraniferous minerals are common and widespread. Gangue mineralogy of the veins consists of quartz, calcite, pyrite and pyrrhotite with minor biotite, stilpnomelane, actinolite, potassic feldspar, axinite, clinozoisite, chlorite, magnetite and hematite. Also present as extremely minor constituents are linnaeite and gersdorffite as well as illmenite, leucoxene and rutile. There is generally a zonal distribution such that gold and quartz are more abundant at stratigraphically higher positions within the mine (i.e. Cooke Mine) while Cu and other base metals as well as carbonate are more abundant at lower positions (i.e. Springer and Perry Mines).

Alteration is confined to relatively narrow envelopes one to two times vein width, but seen only on the north side of many of the veins, especially within the Springer Mine (Salmon et al., 1984). This generally consists of the development of biotite and K-feldspar haloes consistent with minor K_2O and Na_2O enrichment. Copper, sulphur and to a lesser extent, Ag, Co, Ni and Zn show enrichment in vein walls. Mn shows strong depletion, in all probability related to the destruction of pyroxene (uralitisation) in the wall rock.

Pb isotope data, and all textural, structural and mineralogical evidence suggest that these deposits are syn-tectonic, with the metals leached from the volcaniclastic rocks of the Blondeau Formation and deposited in fractures within chemically (iron-rich) and rheologically (brittle) suitable host rocks, mafic sills. All facets of these deposits are consistent with deposition from ore-bearing, CO_2-dominated metamorphic fluids, with the exception of the presence of minor tungsten, which suggests the involvement of primary magmatic constituents (Walkins and Riverin, 1982; Guya, 1984; Guya et al., 1986). The proximity of the Gwillim Lake shear (as a conduit) and the various granitic bodies, in particular the Presqu'ile Granite (as a fluid source) are probably salient in this regard.

(d) Gwillim Gold Mine - McKenzie Township

Located 8 km northwest of Chibougamau, the Gwillim Mine of Camchib Resources Ltd. came into production in 1980. As with most deposits in the Chibougamau mining area, it was discovered long ago, in 1934, and was slowly developed through a series of exploration programs while held by different companies. Some 137 holes totalling 18,600 m had been drilled before Campbell Chibougamau Mines Ltd. acquired the property through Norbeau in 1974. An exploration decline and subsequent bulk sample, followed by the increase in the price of gold resulted in a production decision in 1980, despite the rather small size at that time of 170,000 tonnes grading 7.96 g/t.

The deposit lies within the Gilman Formation of the Roy Group, in a steeply dipping, overturned sequence on the north limb of the Chibougamau syncline. Andesitic rocks occupy the upper and felsic rocks the lower mine sections. Units strike 070° and dip 80° to the north, with mafic pillow tops toward the south. The regional N60°E-trending Campbell-Gwillim-Waconichi Lake fault cuts the volcanic pile 500 m south of the mine resulting in significant left-lateral displacement and downthrow of the northwestern block.

The mine sequence is divided into three cycles: a mafic North Zone, a felsic Central Zone and a mafic Southern Zone. The North Zone consists principally of mafic flows and sills with a bedded "graphitic tuff" horizon just north of the mine. The Central Zone is composed of dacitic flows enclosing quartz-feldspar porphyry dykes and lenses and gabbroic sills with a cherty, brecciated felsic tuff marking its southern extremity. The Southern Zone overlies this unit and is composed primarily of mafic pillowed flows and gabbroic sills with minor QFP dyke intrusions (Bouchard et al., 1984).

A carbonate schist unit separates the North and Central Zones, and based on its extent, petrography and associated deformational characteristics, is regarded as a shear. Schistosity is essentially E-W; slightly discordant to stratigraphy (ENE) as are all major gold-bearing veins within the mine. These are generally confined to the North and Central Zones and are composed essentially of quartz and carbonate with lesser pyrite and chalcopyrite. Enclosing rocks vary and are quite altered in some cases, but would appear to be limited to mafic flows and gabbroic sills despite the proximal association of felsic units in the Central Zone. This is a common characteristic of Archean lode-gold deposit, as fractures develop in brittle lithologies with gold deposition dependant upon chemical suitability, namely an iron-rich composition. Vein sizes vary between veinlet-sized structures up to the major gold-bearing zones of the mine, the North and Main Veins which average 2 to 3 m in width and have 180 and 130 m slope lengths respectively on the 350 ft level.

In the Central Zone, similar vein structures occur within felsic lithologies and despite greater sulphide compositions, are subeconomic in gold. As with the economic varieties, pervasive carbonatization, sericitization and shearing are common wallrock alteration features though quite local. Chemically, this alteration is shown by Al_2O_3 and K_2O enrichment combined with Na_2O depletion as well as weak TiO_2 and Fe_2O_3 depletion, and Au values vary. Later northwest-trending carbonate veinlets cut the mineralized zones. Gold is submicroscopic with grades increasing with pyrite and chalcopyrite content which often occur along the borders of the thinner veins. Native silver occurs on a 1.2:1 ratio with gold.

Suspected concordant mineralization is recognized within the Central Mine Zone, and these deposits can generally be considered to lie at the base and top of the felsic pile. The South (gold) Zone consists of small gold-rich lenses of massive pyrite with 5% chalcopyrite at the east end and 10% sphalerite at the west end of the mineralized zone. The Signal Zone (also within the Central Mine Zone) is a thin subeconomic sulphide horizon consisting of pyrrhotite, pyrite and chalcopyrite. This zone is felt to be a vein by Bouchard et al., (1984), due to its regular morphology and strong sericite-chlorite alteration on the quartz-carbonate-pyrite sheared wallrock. The South gold zone also shows epigenetic features such as association with quartz-feldspar porphyries within altered (carbonate-chlorite-epidote) flows and gabbro sills. Mineralized lenses are locally displaced due to minor faulting. Little in the way of primary volcanogenic mineralization and alteration features are noted, and it appears highly probable that further research will confirm an epigenetic origin for all mineralization.

(e) Lac Doré Complex Deposits (Portage, Henderson and Copper Rand Mines)

These deposits are all found on the northern limb of the Chibougamau Anticline. Recently, the geologically similar Corner Bay deposit (Bertoni and Vachan, 1984) was discovered on the southern limb. The Portage, Henderson and Copper Rand Mines all lie along or are associated with the same shear zone within the anorthositic rocks of the Lac Doré Complex.

Discovery of mineralization dates back to 1903 although intermittent work in the area never establishing economic reserves. A second wave of exploration in the mid-1950's including airborne and ground geophysical surveys followed by extensive diamond drill programs on the ice of Lac Chibougamau and Lac Doré resulted in the delineation of economic deposits and official production by 1960. Since then, these Chibougamau deposits have produced well over 20 million tons of ore grading approximately 1.8% Cu and 0.1 oz/ton Au.

The Lac Doré Complex is a large differentiated sill found within the upper part of the Waconichi Formation of the Roy Group, and extends for a strike length of 53 km. It occurs on both limbs of the Chibougamau Anticline and is thought to be at least 5 km and probably 7 km thick (Allard, 1976). It is also thought to extend at least 10 km into the Grenville Province (Allard, 1978). The intrusion consists of a lower anorthosite zone, a middle layered zone, a ferrodiorite zone, a sodagranophyre zone and an upper border zone. The Anorthosite Zone is as much as 3 km thick and shows cyclical sequences of anorthosites, gabbroic anorthosites, anorthositic gabbros and gabbros with the Fe/Mg ratio increasing with successive sequences. Primary cumulus textures and structures remain, but pyroxene has been replaced by chlorite, the calcic plagioclase by albite, and zoisite/epidote/clinozoisite and the Fe-Ti oxides by sphere. This zone hosts all of the major Cu-Au deposits. The Layered Zone consists of 5 members comprising three successions of magnetitites/ferropyroxenites with intervening gabbroic anorthosites. The Upper Border Zone is composed of anorthositic gabbros and gabbros. The great thickness of the sill has resulted in large crystals (up to 40 cm) and has also contributed to the extensive and well-developed differentiation.

The sill has been subjected to igneous intrusion (along the axis of the Chibougamau Anticline) and Kenoran tectonism, and as such shows major structural features common to the Chapais-Chibougamau region. These include major E-W trending folds as well as four regional fracture sets: an oldest E-W striking thrust fault trend (Kapunapotagen and Faribault Faults), a northeast-trending set (Gwillim, Lac Doré, Henderson-Portage-Copper Rand Cu-bearing shear zones and the McKenzie and Taché Lake Faults), west-northwest trending shear zones (which host several Copper Rand ore bodies), and a north-south trending fracture set, abundant near the Grenville Front.

As mentioned, most of the Chibougamau ore bodies occur in a northeast trending shear zone which dips steeply (40-60°) southward and is offset by later faults. Those which occur in west-northwesterly trending shears are felt to be associated in that those shears are conjugates of the NE system, and both are felt to have been formed by N-S compressional forces (Archambault et al., 1984). Subsequent intrusion implacement which prompted significant vertical movement, as well as lateral movement in later faults such as as the Lac Doré have resulted in opposing structural characteristics for these two deposit types.

Mineralization within these broad (up to 500 m in width) shear zones is generally in the form of a sulphide schist which shows pronounced layering of sulphide-rich and sulphide-poor (chlorite-sericite-quartz-ankerite schist) layers with sulphides ranging from massive to disseminated. Sulphides are predominantly pyrite, chalcopyrite and pyrrhotite with minor pentlandite, tetrahedite, mackinawite valeriite, violarite, magnetite, sphalerite, galena and arsenopyrite also identified. These generally form massive "lenses" which dip slightly steeper than the shear itself, giving the ore bodies an en echelon appearance in plan. Gold is sub-microscopic and predominantly associated with pyrite; where pyrite is associated with other sulphides, gold grades are much lower.

A fracture-type ore is also generally present, consisting of quartz-calcite veins with patches and veinlets of chalcopyrite, pyrite, pyrrhotite, sphalerite and galena. These generally are oriented east-west (dipping steeply south) and are located on the footwall and hangingwall of the main shear zones. Fracture-type ore yields the highest Cu grades, and veins may be up to 2-3 m wide and hundreds of metres long.

A secondary oxidation zone in the near-surface portions of the shear zones is generally extensive with ore minerals such as limonite, chalcocite, malachite and native copper. This, obviously, is an excellent exploration guide, as are the extensive shear zones.

Mechanical analysis of the Henderson ore bodies (Guya and Koo, 1975; Guya et al., 1979) and the Copper Rand deposits (Archambault et al., 1984) attribute their form to both solid and liquid state mobilization of a pre-existing ore during regional metamorphism. Sulphur isotope data for these deposits indicate remobilization of primary volcanogenic sulphur, and fluid enclusion studies suggest the fluids are essentially a co-existing NaCl + $CaCl_2$ rich brine and a methane-rich fluid. These data would appear to attribute the ore-forming fluids to deep ground water brines localized in earlier shears formed by the emplacement of the Chibougamau Pluton within the Lac Doré Complex.

(f) Stratiform/Stratabound Deposits

Within the Chapais-Chibougamau mining district, structural control is the key characteristic of the main economic deposits. However, stratiform/stratabound massive sulphide deposits are common in other portions of the Abitibi, e.g. the Matagami and Noranda areas. The preponderance of regional INPUT conductive zones within the Chapais region, along with small volcanogenic discoveries such as the "8-5" zone of Falconbridge's Cooke Mine, and Northgate's Lemoine mine suggest that these deposit types are likely present. Regional geology suggests that the Blondeau Formation is correlative with the broad volcano-sedimentary package which hosts the Golden Pond-Estrades deposits, and possibly the Agnico-Eagle Mine. The Lemoine Mine occurs within the stratigraphically lower Waconichi Formation. Salient characteristics of these deposits are described below.

(i) <u>Agnico-Eagle Mine, Joutel Township</u>

Located near Joutel, this gold mine produced 610,000 ounces of gold from 3.3 million tons of ore between 1974 and 1984, with reserves at that time being 1,401,592 tons grading 0.203 oz gold per ton. Exploration leading to its discovery began in February, 1962 with ground geophysical surveys outlining coincident magnetic and electromagnetic anomalies. Subsequent diamond drill testing and continued exploration resulted in a feasibility study in 1967, and regular production began in 1974.

The deposit occurs in felsic pyroclastic rocks at the top of a mafic metavolcanic cycle on the south limb of a northwest trending syncline. The volcanic sequence is overlain by a carbonaceous, pyritic schist that is a regional marker horizon, and a large granitic stock 6 km in diameter intrudes the stratigraphy, along with later tonalite-trondjemite complexes.

The gold is contained within a stratabound/stratiform carbonate-sulphide-silicate-oxide facies iron formation which immediately overlies a sequence of partially welded felsic tuff and lapilli tuff. The carbonaceous schist, which contains pyrite bands and nodules, immediately overlies the ore zone.

The ore-bearing sequence is distinctly zoned with an outward change from an iron silicate facies exhalite at the centre of the orebody to iron carbonate (siderite) facies exhalite, with pyritic laminae common in both facies. Gold mineralization is directly associated with fine euhedral pyrite and Fe-dolomite veins, neither of which has a primary sedimentary origin (Wyman et al, 1986). These Fe-dolomite veins are associated with shear zone fracture systems that appear broadly conformable with primary lithologies but in detail are crosscutting. Fine pyrite selvages and wispy stratiform pyritic offshoots from the veins contain the majority of the gold, and these structures do not show deformational features common throughout the mine sequence, suggesting that they are later.

The contact metamorphic aureole of a crosscutting diabase dyke, in the north mine area, has produced iron sulphides, magnetite and silicates in a skarn-like assemblage dominated by calcite, but only partially obscures the above genetic and mineralization features. Local remobilization has resulted in a more heterogeneous distribution of the gold, prompting syngenetic models.

The Agnico-Eagle however, exhibits all of the classical epigenetic lode gold features; crosscutting mineralization, gold-Fe dolomite association, sulphidation (i.e. the fine-grained pyrite selvages), structural control and marked depletion of base metals in relation to Au, Sb, Bi, Hg, As, W and B. Moreover, trace element and isotope data clearly differentiate between the primary sedimentary siderite and pyrite, and the Fe-dolomite and sulphidized pyrite which contain the gold (Wyman et al, 1986). Auriferous H_2O-CO_2-H_2S fluid flow appears to have been localized by the zone of deformed rocks, and gold was precipitated at the intersection of this zone and an ideal host-rock, namely an iron-rich chemical sediment.

Any pyrite and/or pyrrhotite zones in this region should therefore be thoroughly evaluated for their gold potential. It is our finding that many such zones have not been assayed for gold in the past.

(ii) The Golden Pond Gold Deposits, Casa Berardi Township

At least four separate gold deposits are now known to be present on the Golden Pond property located in the northern Abitibi Greenstone Belt area, some 40 km southwest of the Selbaie Mine. Estimated reserves at the Golden Pond and Golden Pond East deposits currently total approximately 6.3 million tons of 0.255 oz Au/ton with roughly equivalent tonnages in both zones (Canadian Mining Journal, April 1986).

Since 1975, Inco has done more than 67,000 m of diamond drilling on the property, with the discovery hole drilled in 1981. The hole was spotted to intersect a ground electromagnetic-magnetic anomaly, now known to be a small satellitic zone to the south of the main Golden Pond deposit. Golden Knight Resources Inc. of Vancouver became a 40% joint venture partner in 1983 by spending $3,000,000 on exploration with Inco remaining as operator.

Subsequent reverse circulation programs showed a significant gold-arsenic dispersal train to be present up to 400 m down-ice of the known deposit and also delineated two additional dispersal trains, one 1 km to the west and the other 2.5 km east of the Golden Pond deposit. Follow-up to these led directly to the discovery of the Golden Pond East deposit.

On-going exploration programs, both surface and underground have resulted in the partial delineation of the Golden Pond West, Golden Pond, 134E and Golden Pond East Zones.

The property lies on the south limb of a regional synclinorium, straddling the contact between a lower sequence of volcanics and an overlying thick sedimentary pile. The "Golden Pond trend", a sequence of mainly sedimentary rock units which hosts all known gold occurrences on the property, trends E-W and dips almost vertically between the two major units. Regional iron formations and graphitic horizons bound the sequence on both north and south sides, with turbiditic sediments found within. The volcanic rocks of the sequence host the major gold deposits.

There is a major zone of east-west faulting, shearing and alteration, designated the "Casa Berardi Break", which extends through the deposit area. All of Inco's gold zones lie within 200 m of the "Break", and it is believed to pass approximately 1 km north of the Estrades deposit.

The Golden Pond deposits consist primarily of quartz-carbonate (ankerite)-pyrite-arsenopyrite-gold veins, although disseminated pyrite and arsenopyrite in vein wallrocks is also of economic importance. Gold also occurs in sub-economic quantities within graphite-pyrite sulphide facies iron formation and in chlorite-pyrite facies iron formation units. The volcanic and volcaniclastic host rocks to the economic deposits are altered to the assemblage sericite-chlorite-Fe dolomite-ankerite ± tourmaline ± chloritoid ± chromian muscovite. Two or more parallel vein/alteration systems are commonly present within any given zone. Alteration zones show marked increases in FeO, MgO, CaO, MnO and TiO_2 (as well as a halo of greater than 100 ppb Au), and a strong decrease in SiO_2. These trends are consistent with the leaching of SiO_2 from altered host rocks, and the formation of quartz-carbonate veins and ferruginous carbonate alteration zones (Pattison et al., 1986). Evidence for K metasomatism is absent, although K_2O and Al_2O_3 show minor depletion.

Key points at Golden Pond in our opinion include the cross-cutting, quartz-sulphide vein nature of the mineralization, and its occurrence near a regional INPUT-magnetic zone reflective of sulphide-graphite-oxide iron formation. The mineralization is encased in a carbonate-sericite-chlorite alteration halo, with individual veins enveloped by wallrocks containing disseminated pyrite, arsenopyrite and greater than 100 ppb Au. These rocks are enriched in Fe, Mg, Mn, Ti, Ca and volatiles and depleted in Si, Al and K. The abundance of arsenopyrite in the deposit indicates that arsenic may be a very useful pathfinder element in this region.

(iii) The Estrades Deposit, Estrades Township

The Estrades deposit was discovered by the Golden Hope-Teck Corporation joint venture in late 1985. The deposit occurs in an Archean clastic sedimentary and felsic volcaniclastic sequence (locally graphitic and pyritic) with interbedded mafic to intermediate volcanic flows and associated pyroclastics. The discovery would appear to be in the same broad regional stratigraphic package which contains the Golden Pond deposits and possibly the Agnico-Eagle mine.

Information from drilling to-date suggests a steeply dipping, tabular massive sulphide deposit striking east-west. The discovery hole, spotted approximately 400 ft south of the north Golden Hope boundary cut a 35.1 ft section grading 0.2 oz gold per ton and 9.15 oz silver with high copper and zinc values (Northern Miner, December 2, 1985).

Estrades stratigraphy is described as mafic to intermediate volcanics overlain by felsic volcanics/pyroclastics which host the deposit. These are overlain in turn by another mafic unit, a thin sedimentary unit and a felsic unit, of which the mafic volcanic unit contains a 10-20 m thick chalcopyrite stringer zone (N.M. Magazine, June 1987).

Drilling has been concentrated on two weakly conductive zones which probably represent a common horizon. The western part of the conductor has a strike component of more than 600 meters, while the eastern part extends for approximately 1,100 meters. Both are separated by a narrow gap occupied by a magnetic high which appears to represent a cross-cutting diabase dyke emplaced along a fault.

The orebody, which ranges in thickness from 0.5-8 m, is hosted by a quartz-sericite schist in the hangingwall and a volcaniclastic sediment comprising the footwall. These horizons form a thin but persistent unit in an environment generally characterized by mafic to intermediate volcanics.

Mineralogy consists predominantly of fragmental textured pyrite, sphalerite and chalcopyrite with minor galena and pyrrhotite. Rare arsenopyrite, tetrahedrite, freibergite and secondary oxidation zone minerals also occur. Most gold is within the massive sulphides, however, the quartz-sericite schist is also auriferous. The schist is depleted in sodium and enriched in magnesium relative to the other felsic volcanic rocks.

Of importance to other exploration in this area is the fact that Teck drilled an extremely weak, albeit discrete, airborne conductor. A similarity to the Selbaie discovery is suggested in this regard.

Recently released figures based on extensive drilling indicate 2.68 million tons at 0.13 oz Au/T, 3.13 oz Ag/T, 0.85% Cu and 7.39% Zn (Northern Miner Magazine, June 1987). The gold values are particularly noteworthy.

5.3 Exploration Models

The foregoing illustrate the probable types of gold deposits which can be expected in the area and may serve as models to guide exploration:

(a) Stratiform/stratabound deposits, including cross-cutting quartz vein zones, within interflow sedimentary-felsic volcaniclastic-tuffaceous-sedimentary environments near volcanic contacts (Golden Pond).

(b) Stratiform/stratabound volcanogenic massive sulphide deposits in a generally felsic volcanic-sedimentary environment (Estrades, Lemoine, "8-5", Mattagami).

(c) Structurally-controlled, shear zone-hosted lode gold deposits within iron-rich lithologies such as iron formation (Agnico-Eagle), small dioritic intrusives (Lac Shortt), major differentiated sills (Opemiska, Chibougamau) and mafic flows/ sills (Gwillim). Spatially associated felsic intrusives may be present, as at the Lac Shortt and Bachelor Lake Mines.

The following models are also considered prospective in the area:

(d) Structurally-controlled, intrusive-associated, quartz stockwork types of deposits localized along the margins of or within intermediate to felsic plutons. Such deposits are well represented in the Val d'Or area to the southwest.

(e) Disseminated gold deposits associated with carbonated, pyritic mafic volcanics. Such deposits are important sources of gold ore elsewhere in the Abitibi, noteably in the Timmins area (Owl Creek Mine, Dome Mine).

6.0 PROPERTY GEOLOGY

6.1 Lithostratigraphic Interpretation

A large number of ground-delineated EM conductive zones were the foci of the reverse circulation drill program, as were magnetic domains which exhibited sub-parallel orientation with these conductive features (Map 1). The immediate environs of the intersection of these horizons and faults/lineaments were also targetted, in light of the structurally-controlled nature of much of the Chapais-Chibougamau mineralization. This philosophy has resulted in a rather comprehensive coverage of the property with the 78 drill holes, and allows for a preliminary interpretation of property geology. The binocular microscope and chemical work has been of great assistance in determining rock types.

Previous airborne geophysical surveys, as well as the recent MPH ground geophysical surveys and the present reverse circulation drill program, indicate that the property is underlain by a steeply northward dipping sequence of metavolcanic and volcaniclastic rocks with several interbedded/interlayered metasedimentary and/or pyroclastic units. Synvolcanic sills are inferred to represent a significant portion of the volcanic stratigraphy. These units all trend southeasterly (approximately 135°), and while considerable undulation of conductive horizons is indicated, major fold closures appear to be absent. The volcanic stratigraphy is indicated to be cut by three major ENE-trending faults/shear zones with significant lateral movement probable for the southernmost of these (f_1). Several faults/lineaments are indicated to be present with preferred orientations dominantly northeasterly, while other shorter features trend north-northwesterly to due north (Map 2). Later intrusive bodies include the large Presqu'ile Granite to the west of the property, a smaller granitic body in the vicinity of the south end of Lac a l'Eau Jaune, and an inferred diabase dyke which appears to intrude along ENE fault f_6.

The lowermost stratigraphic unit, located along the southern property boundary (grid south), is believed to be comprised of tholeiitic basalts as seen by hole 87-18. Several weak, elliptical magnetic anomalies suggest that more iron-rich zones are present within these flows. There appears to be an intermediate to felsic calc-alkaline volcanic unit consisting of flows, pyroclastic and possibly porphyritic intrusions overlying the tholeiites. Drill holes 87-01, 87-11, 87-14, 87-16, 87-19, 87-20 and 87-43 all penetrated dacitic to rhyolitic lithologies, generally schistose and displaying variable shearing, carbonatization and sericitization. Textures appear clastic and moderately porphyroblastic (qtz-feldspar) in the case of hole 87-43.

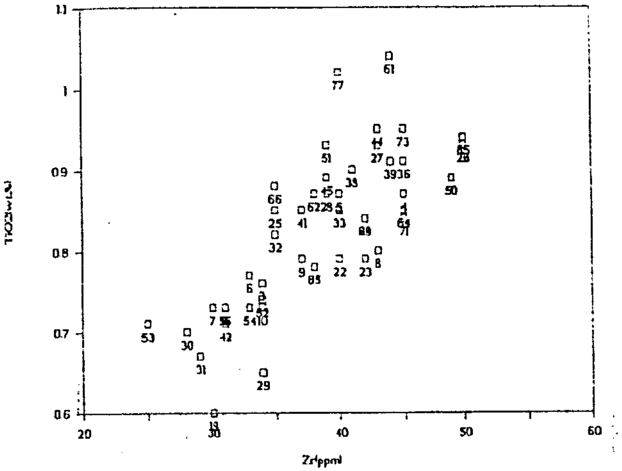
This horizon is in turn overlain by a metasedimentary/tuffaceous unit which hosts massive sulphide-type mineralization, as seen by holes 87-17 and 87-21, both of which were spotted to penetrate the immediate environment of Conductive Zone 21. This horizon appears to be contiguous with that represented by Conductive Zone 19, and as such, transects the entire main portion of the property. Hole 87-12 intersected a similar sulphidic felsic rock, however, the entire sample was sent to Bondar-Clegg due to its small size, precluding examination. Although faults f_3, f_6, f_{11} and f_{14} cut this horizon without exhibiting significant lateral movement, both weak and strong subparallel and elliptical magnetic anomalies are present between faults f_6 and f_{14}. In addition, a major dyke-like intrusive body is indicated from magnetic data along fault f_6. Drill hole 87-10 penetrated an extremely weathered iron-rich intermediate to mafic rock, thought to represent a proximal facies to the iron-formation.

A second volcanic cycle overlies those horizons and begins with a thick unit (300-500 m) which appears to consist predominantly of calc-alkaline basaltic and andesitic flows/tuffs as seen by drill holes 87-02, 87-04, 87-13, 87-15, 87-22, 87-23, 87-24, 87-26, 87-27 and 87-28. These rocks are generally grey, fine-grained and granoblastic with no significant alteration or mineralization. Several weak conductors present within this unit (i.e. Conductors 14, 15, 16, 20, 22) and tuffaceous/clastic textures in the bedrock of hole 87-24 suggest that intercalated sedimentary-pyroclastic units are present. Also present are weak magnetic highs which suggest synvolcanic sills or a more mafic lithology. Several samples within this unit including 87-03 and 87-09 (andesites) and 87-25, 87-29, 87-42 and 87-53 (basalts) were classified as tholeiites, however, no obvious stratigraphic relationship to explain their relative positions is discernable. Rather, it would appear that an intercalation of mafic flows and synvolcanic intrusives is present, similar to the complex stratigraphy described for the Upper Roy Group by Picard et Piboule (1986).

This unit is overlain by a thin metasedimentary/tuffaceous horizon of intermediate composition which contains massive pyrite and graphite mineralization in bedrock samples from holes 87-54 and 87-55, respectively. This horizon is host to Conductive Zone 12, which transects the entire main portion of the property. Again, west of fault f_6, and specifically in the area of fault f_{11}, linear sub-parallel magnetic features are present along this horizon. A pyritic (± pyrrhotitic) andesitic rock was penetrated by hole 87-08 in this region. Conductive Zone 11, a similar strong bedrock feature which is parallel to Conductive Zone 12 from L35+00W to Lac a l'Eau Jaune, would appear to represent a conductive horizon within volcanic flows. Holes 87-30, 87-31, 87-32, 87-33 and 87-44, all spotted to intersect this horizon penetrated mafic volcanics and did not encounter mineralization to explain the conductivity. It would appear then that this conductive feature may not extend to the subcrop (i.e. bedrock-overburden interface) surface.

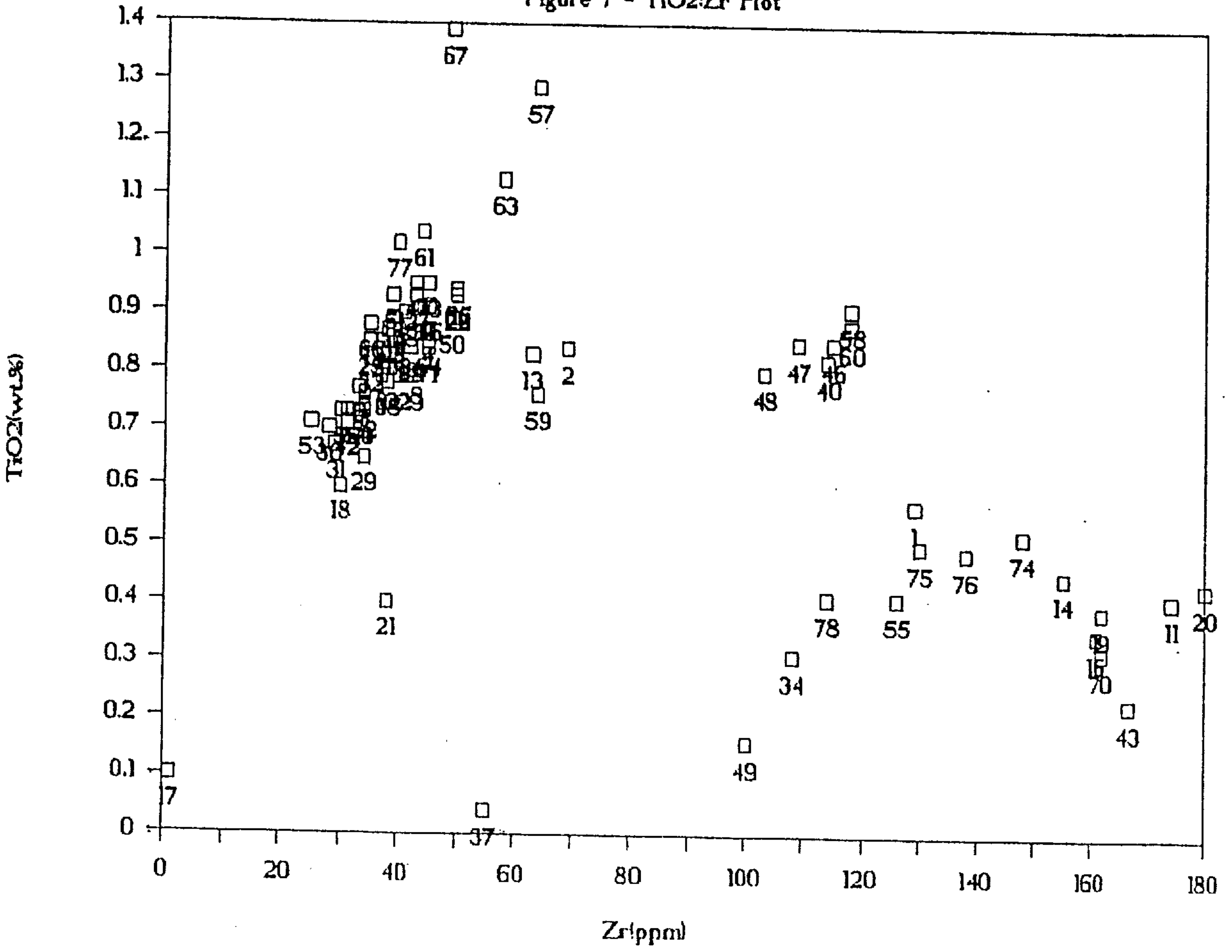
Both these conductive horizons, and the stratigraphically lower set, exhibit minor right-lateral offsets in the zone between faults f_2 and f_1. Also, magnetic anomalies east of fault f_1 are aligned parallel to this feature. It seems likely therefore that this zone is a major shear and that significant lateral relative movement occurred along this feature. Drill hole 87-34, targeted to penetrate a conductive environment within this zone (possibly correlative with the Conductive Zone 12 horizon) encountered a graphitic, carbonatized, schistose dacitic rock.

A thick (approximately 500 m) sequence of tholeiitic basalts and andesites (as seen by holes 87-05, 07, 09, 10, 35, 36,38, 39) overlies the conductors and appears to be host to large sill-like bodies as manifested by the broad, moderate susceptibility domain I_D. The presence of a conductive zone (8a-h) along the southern (i.e footwall) flank of this domain suggests that a lean iron-formation and/or a tuff/metasediment horizon are other causal possibilities, however, overlying rocks are less mafic, suggesting the presence of sills as likely. No overburden drill holes penetrated this domain although holes 87-06, 87-51 and 87-52 which display some chemical alteration were spotted just down-ice from, and therefore stratigraphically just below these features. Again, these magnetic features are localized to the west of fault f_6, suggesting that this fault represents a major paleo-demarcation despite the evidence of little or no lateral movement. Slightly more felsic andesites, still of tholeiitic character, overlie the basalts for approximately another 200-300 m. These rocks (samples 87-40, 87-46, 87-47, 87-48, 87-58 and 87-60) appear as massive to schistose intermediate volcanics exhibiting minor to significant alteration, including carbonatization, alkali-depletion and Fe, Mg-enrichment. These are the only rocks which plot in a truly intermediate position on the TiO_2:Zr Diagram (Figure 7) and as such, quite likely represent true fractionation products.



CFCE Achates

Figure 7 - TiO2:Zr Plot



This thick sequence of volcanics is overlain by a thin (inferred) metasedimentary/felsic flow/tuffaceous unit which hosts Conductive Zones 5-6-7. This horizon appears to be that which hosts the Hansen Showing, and transects the entire main property from the northwest boundary to Lac a l'Eau Jaune. Massive pyrite was penetrated within a metasedimentary host rock by hole 87-59, and massive graphite within a quartz-veined felsic volcanic by hole 87-37. Other holes which tested this horizon were 87-49, 87-56 and 87-61. These encountered a schistose felsic metavolcanic, a metasedimentary and a tuffaceous rock, respectively. Quartz veining and some alteration are indicated.

Overlying this horizon and extending to the property boundary appears to be a thick sequence of calc-alkaline basalts with several iron-rich sills indicated by elliptical zones of moderate magnetic susceptibility. Moderate to weak conductive zones within this region were not explained by holes spotted to penetrate these features. Intrusive textures were encountered by holes 87-57, 87-63, 87-65 and 87-67, all spotted to penetrate areas of higher magnetic susceptibility.

East of Lac a l'Eau Jaune, large scale gabbroic intrusives dominate as determined from QMER mapping and from the general magnetic signature. Two major INPUT conductors do transect this portion of the property. The rocks here appear to be offset in a left-lateral sense along fault f_1 from the main property area. Widely-spaced holes 87-68, 87-73 and 87-77 penetrated tholeiitic basalts, the inferred predominant lithology in this area. Magnetic signature indicates that large gabbroic intrusives occupy much of the area immediately southeast of Lac a l'Eau Jaune, and conductive zones are absent from this region. Within the basalts though, several conductive zones are indicated to be present. The northernmost (Conductive Zones 31a-d and 32a-d) was targeted by drill holes

87-69, 87-71 and 87-72, all of which penetrated variably schistose and graphitic calc-alkaline andesitic tuffaceous rocks. Further south, Conductive Zone 34-35-29b, which also exhibits an elliptical magnetic high, was targeted by drill hole 87-74. This penetrated a carbonatized calc-alkaline dacitic schist. Similar rocks though more graphitic, were penetrated by holes 87-75 and 87-76 in the magnetic domain II_C/Conductive Zone 27b environment west of fault f_{17}, suggesting that these two horizons are correlative and have been offset in a left-lateral sense by fault f_{17}. Several weak conductors, and drill holes 87-74 and 87-78 which both penetrated dacitic tuffaceous rocks, suggest that thin tuffaceous and/or sedimentary horizons are intercalated with the basalts through the southern portion of this area. Significantly, the bedrock of hole 87-78 is calc-alkaline in character, suggesting two distinct cycles are present.

To summarize, a rather complex stratigraphy is indicated for both property regions. The main property area is believed to consist of a lowermost tholeiitic basalt flow/sill unit with overlying intermediate to felsic volcanics and volcaniclastics followed by a metasedimentary unit. The second cycle consists predominantly of calc-alkaline mafic flows with intercalated tuff units as well as synvolcanic sills, overlain by an intermediate tuff/metasediment unit (variably present) represented by Conductive Zones 11, 12. The third cycle is tholeiitic in character, consisting of basalts and large sills overlain by andesites and a thin sequence of felsic volcaniclastics and metasediments represented by Conductive Zones 5-6-7. A fourth cycle of calc-alkaline basalts and sills extending to the property boundary is believed to be the uppermost stratigraphic unit. A correlation with the Blondeau and/or Upper Gilman Formations, as described by Picard and Piboule (1986) for the region west of Chapais, would appear to be likely based on the limited sampling thus far.

The eastern portion of the property appears from limited sampling to consist predominantly of tholeiitic basalts and large-scale gabbroic intrusions. The two conductive horizons present, though, show similar characteristics to those represented by Conductive Zones 11-12 and 5-6-7, suggesting that this region may be in part correlative with cycles two and three. If this is indeed the case, left-lateral relative displacement along fault f_1, would be in the order of one kilometre, consistent with that known for other major faults in the region.

6.2 Glacial Geology

Late Wisconsinan to Holocene age (see Table 2) glacial drift covers the surface over much of the Abitibi region, ranging in thickness from 0-100 m. While two distinct till sheets are generally present, these are inferred to represent deposition from a single glacier (Veillette, 1986). Cross-striations evident on infrequent outcrop consistently show an older flow with superimposed later striae; however, the absence of differential weathering surfaces (i.e. exposure to air or water, rather than ice) suggests that a redirection of the same glacier occurred.

Large-scale glacial lineations throughout the area east of Hudson Bay/James Bay, along with assymetric stoss and lee outcrop morphology suggest primary northeast to southwest ice movement. Many of the outcrops within the Chibougamau area however also show straie on their lee faces with a mean azimuth of 122° (Figure 8, after Bouchard and Martineau, 1984). Similarly, in the Abitibi-Timiskaming region cross-striations consistently show an older south-southwest orientation (180-220°) with a superimposed south-southeast (130-170°) strike (Figure 9, after Veillette, 1986). In Labrador, the predominant flow direction is southeasterly, however, a prior flow event toward the north is indicated by similar striational features (Klassen and Bolduc, 1984).

CENOZOIC	QUATERNARY	HOLOCENE			
		PLEISTOCENE	WISCONSIN	LATE	25,000 - 10,000 years B.P.
				MIDDLE	55,000 - 25,000
				EARLY	55,000
			SANGAMON		interglacial; widespread soil development
			ILLINOIAN		till
			YARMOUTH		interglacial
			KANSAN		till
			AFTONIAN		interglacial
			NEBRASKAN		till
			BLANCAN ?		preglacial
	TERTIARY	PLIOCENE			1 M years B.P.

TABLE 2

Late Cenozoic Time Scale With Respect To Glacial-Stratigraphic Nomenclature.

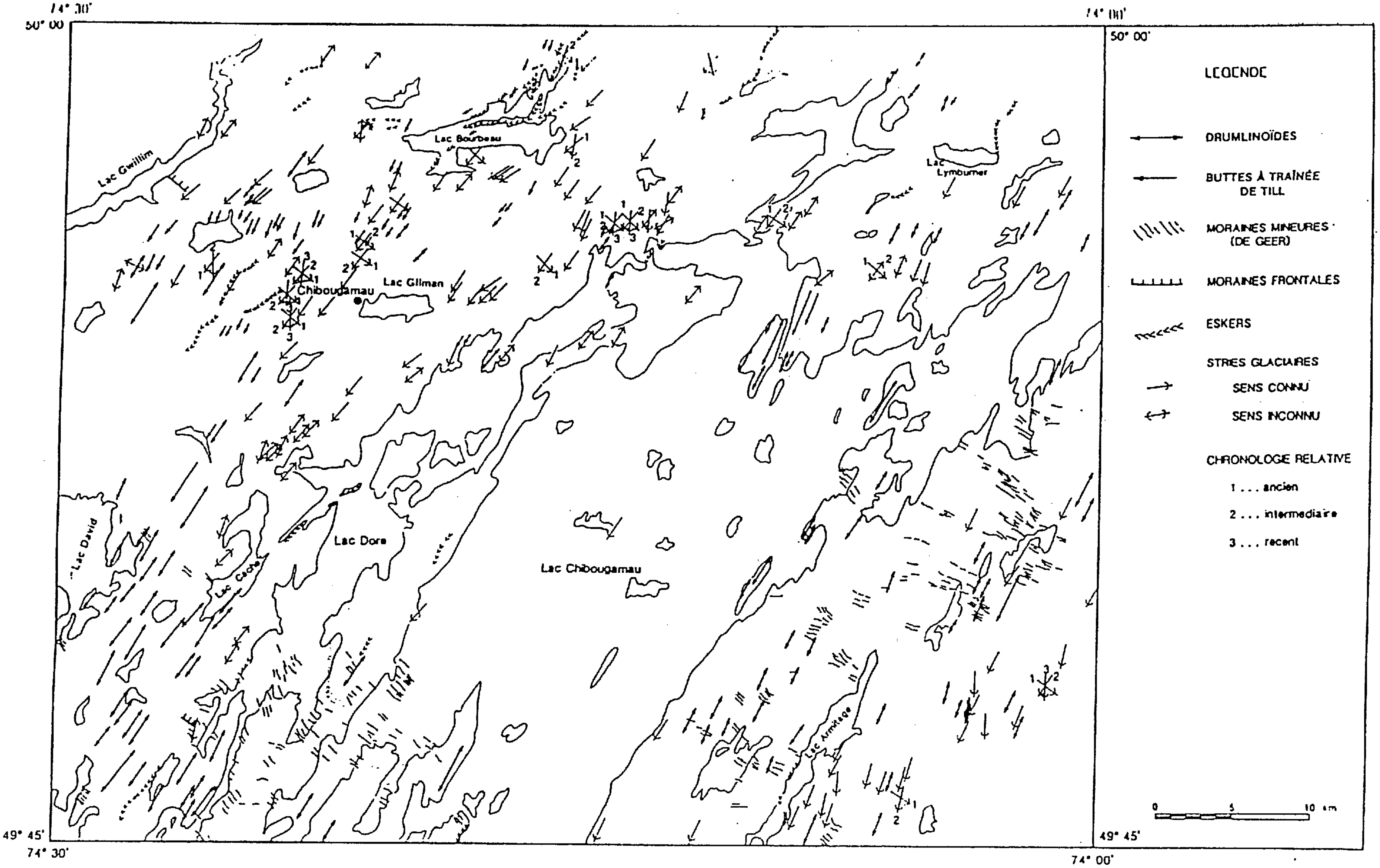


Figure 8: Géologie glaciaire de la région de Chibougamau (after Bouchard et Martineau, 1984)

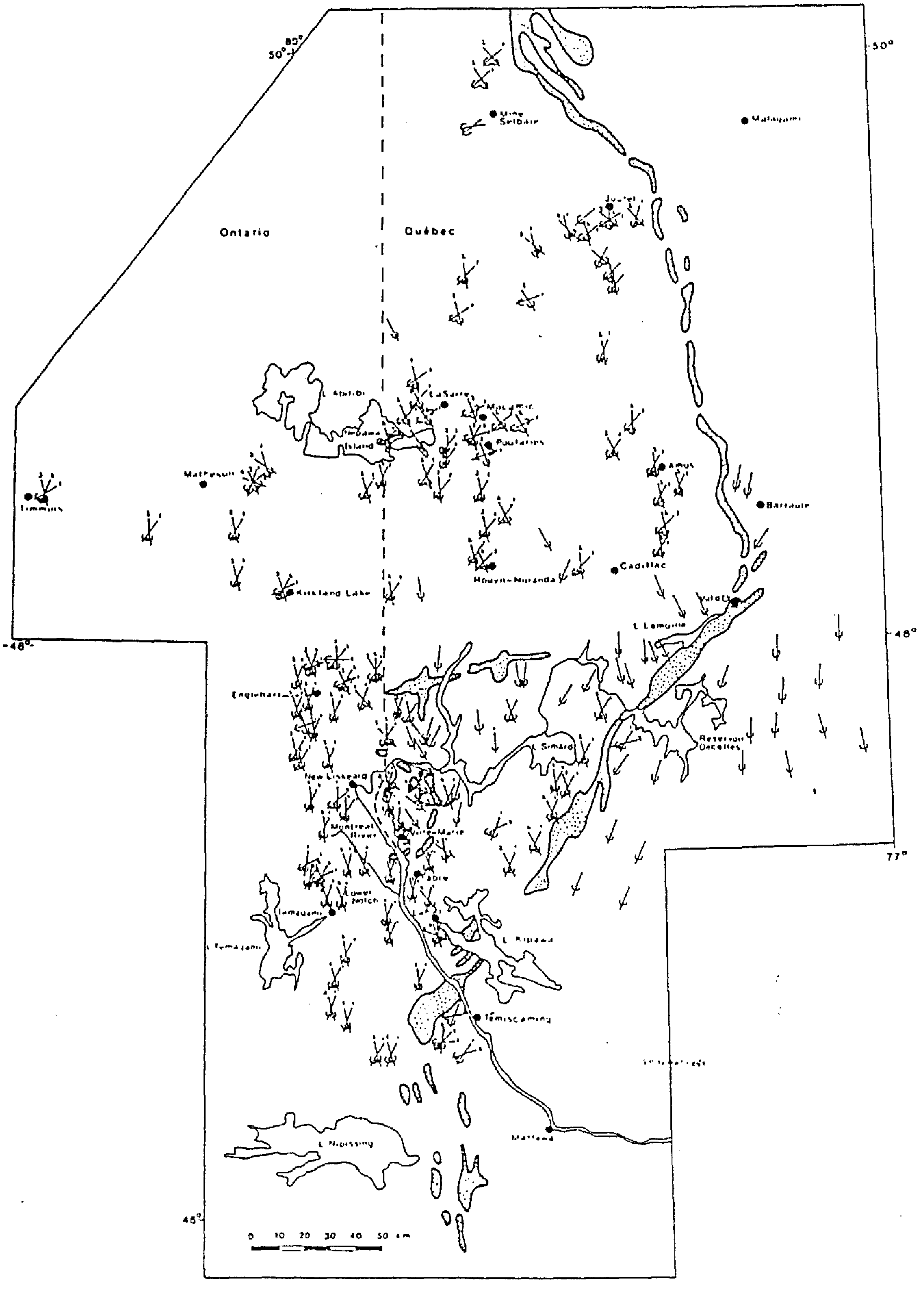


Figure 9: Cross-striated sites within the Abitibi-Temiskaming Region (after Veillette, 1986).

These observations, when considered along with work in Keewatin (Shilts et al, 1979), Manitoba (Clayton et al, 1985) and on Baffin Island (Andrews and Miller, 1979), point to a "multidome" or multiple ice centre Wisconsinan ice sheet which was dynamic in its surging movement and morphology. Certainly the varied and radiating ice flow indicators suggest the existence of an outflow centre in north-central Quebec prior to that known as the New Quebec (formerly Labrador) ice dome or ice divide (Hughes, 1964; Prust et al, 1968; Prust, 1970). It is this earlier outflow centre which deposited the "lower till", while primary morphological features such as drumlins and outcrop shape resulted from later movements. The exact location, size and shape of this earlier ice flow centre has not yet been precisely determined, however, it is thought to have been located east of Hudson Bay due to the lack of Paleozoic limestone erratics within these deposits. Certainly, a complex morphology is suggested by the varied cross-striae trends seen in Eastern Canada.

As ice receded from the area, the periglacial terrain tilted northward as a result of isostatic adjustment. North-flowing Arctic drainage was impeded by the receding ice mass and combined with southward flushing of melt waters to produce proglacial ponding. This ponding produced Lake Barlow and subsequently Lake Ojibway which inundated the region to depths in excess of 300 ft some 8100 years B.P. Following this, sedimentation in the proglacial lakes is represented by deep water varved silts and clays (which can be shown to correspond to the rapid glacial retreat of 138 m/yr, Antos, 1925) and shallower fine sand facies. Several large eskers developed as a response to deglaciation and these commonly show the same general trend as the Harricana-Lake McConnel Moraine. This complex is believed to extend to the Lake Simcoe area, making it the longest body of glaciofluvial material in Canada (Veillette, 1986).

This complex is now thought to be a marginal deglaciation feature, and not an interlobate moraine between the Keewatin ice flow to the northwest and the New Quebec ice sheet to the northeast. That most eskers show the same general trend as the Harricana-Lake McConnell Moraine suggests that a major correction in meltwater direction occurred during deglaciation. Depending upon proximity to these glaciofluvial features, Quarternary stratigraphy encountered during overburden drilling can become quite complex.

Till deposits of the older advance (Lower Till) from the west-northwest are well preserved in bedrock depressions beneath younger deposits (Upper Till) from the north-northeast. This is an important exploration consideration in that bedrock depressions (i.e. weathering "lows") are often the locus of shearing, alteration and mineralization. It is clear that in many areas the older tills have been extensively modified or destroyed by the subsequent re-advance; however, two complete glacial stratigraphic sections are often present, consisting of upper sediments (including clays and sills) and underlying clastic horizons. Generally, a well-developed till veneer comprising both lodgement and overlying ablationary and melt-out facies with areas of silty to gravelly material is present, the latter we feel representing re-worked tills rather than true glaciofluvial outwash.

7.0 REVERSE CIRCULATION DRILLING OPERATIONS

The Achates reverse circulation drilling program consisted of seventy-eight holes totalling 1640 ft (500 m) completed during late March and early April of 1987.

By way of exploration philosophy, reverse circulation holes were spotted both directly on and immediately down-ice (10-100 m) from HLEM and magnetic targets. Experience at the Golden Knight deposit and elsewhere in the region has shown this method most effective in evaluating the gold potential of such targets. The holes directly into the EM conductors usually identify the cause of the conductivity, and provide bedrock material for assay. The down-ice holes provide a reading, via the overburden, on the overall conductor or sedimentary/tuffaceous stratigraphy of which the specific EM conductor may be a relatively minor portion. This, in turn, recognizes that the gold deposit may be within the overall conductive environment but not part of the conductor per se, e.g. the Golden Knight deposit area.

Bradley Brothers Limited, of Timmins, was the drill contractor, supplying a Super-Acker dual-tube reverse circulation drill mounted on an FN 160 Nodwell tracked carrier. Also supplied were a smaller FN 60 Nodwell tracked carrier for water haulage, and a D-5 support tractor for plowing snow, clearing roads, etc.

The drill crew consisted of a drill operator or "runner", a runner's helper and a water hauler, as well as the tractor operator when needed. The following MPH personnel were involved with the reverse circulation drilling:

W.E. Brereton, P.Eng.	Consultant
G.P. Sinclair, B.Sc.	Project Geologist
P.A. Sobie, B.Sc.	Project Geologist
M. Anderson	Sampler

MPH and Bradley personnel were housed at the Motel Le Routier in Chapais during the program. Access to the property was gained by driving to Lac de la Prequ'ile and crossing the lake by skidoo. Alternatively, a helicopter based in Chibougamau was used.

The overburden samples collected during drilling were sent to the laboratory of Overburden Drilling Management Ltd. for heavy mineral processing in Ottawa. Standard visual monitoring was carried out during the tabling pre-concentration process with any samples in which gold was observed subjected to a careful panning operation in order to isolate and characterize each individual grain. Three-quarter splits were then sent to Bondar-Clegg & Co. Ltd. for Au, As, Cu, Zn and Ag analyses, with the remaining one-quarter split retained for microscopic examination and as a permanent record. Sample processing results can be found in Appendix A.

At Bondar-Clegg, any samples containing significant visible gold grains were analysed by the pulp and metallics method whereby the coarser fraction of the sample (+150 mesh), which presumably contains the gold grains, were analyzed separately from the fine fraction (-150 mesh) and the results combined to give a final weighted average value.

Au was analyzed by fire assay preconcentration followed by aqua regia dissolution and atomic absorption analysis. Cu, Zn and Ag were analyzed by atomic absorption after a hydrochloric acid-nitric acid digestion and As was determined by a colorimetric determination following nitric acid-perchloric acid digestion. Certificates of analyses are presented in Appendix B.

Bedrock chip samples (+12 mesh) were sent to Bondar Clegg in Ottawa for whole rock analysis and for analyses of Au, As, Cu, Zn and Ag contents. A vial of +12 chips were also sent to MPH in Toronto for subsequent binocular microscopic examination and classification.

Average overburden depth encountered on the Achates property was 16.4 feet (5 m), with a maximum depth to bedrock of 59 ft in hole 87-65. Fifteen tricone bits were used for an average of 96 ft (29.3 m), indicating difficult drilling conditions. Shallow holes in particular are hard on bits due to inconsistent pressure, as the entire Nodwell often vibrates. Table 3 presents a more detailed breakdown of the drilling statistics.

An average of 109.3 ft per 11 hour shift or 5 holes per day was achieved reflective of the shallow overburden coverage in this region.

TABLE 3

Hole #	Bit #	Footage	Comments	Total Footage per bit	Total Footage for project
FA-87-1	CB68724	27'	-		27'
FA-87-2	CB68724	38'	-		65'
FA-87-3	CB68724	36'	damaged in bedrock	101'	101'
FA-87-4	CB68726	17'	-		118'
FA-87-5	CB68726	53'	damaged in bedrock	70'	171'
FA-87-6	J000651	29'	damaged in bedrock	29'	200'
FA-87-7	CB68725	17'	-		217'
FA-87-8	CB68725	11'	-		228'
FA-87-9	CB68725	25'	-		253'
FA-87-10	CB68725	17'	-		270'
FA-87-11	CB68725	14'	-		284'
FA-87-12	CB68725	4'	-		288'
FA-87-13	CB68725	20'	-		308'
FA-87-14	CB68725	32'	-		340'
FA-87-15	CB68725	23'	-		363'
FA-87-16	CB68725	13'	-		376'
FA-87-17	CB68725	19'	-		395'
FA-87-18	CB68725	14'	-		409'
FA-87-19	CB68725	19'	-		428'
FA-87-20	CB68725	15'	-		443'
FA-87-21	CB68725	15'	damaged in bedrock	258'	458'
FA-87-22	K000767	17'	-		475'
FA-87-23	K000767	22'	-		497'
FA-87-24	K000767	28'	-		525'
FA-87-25	K000767	17'	-		542'
FA-87-26	K000767	13'	lost (sub, 1 rod lost)	97'	555'
FA-87-27	K000769	15'	-		570'
FA-87-28	K000769	5'	-		575'
FA-87-29	K000769	12'	-		587'
FA-87-30	K000769	10'	-		597'
FA-87-31	K000769	15'	-		612'
FA-87-32	K000769	15'	-		627'
FA-87-33	K000769	20'	-		647'
FA-87-34	K000769	10'	-		657'
FA-87-35	K000769	22'	-		679'
FA-87-36	K000769	24'	-		703'
FA-87-37	K000769	27'	-		730'
FA-87-38	K000769	9'	-		739'
FA-87-39	K000769	16'	-		755'
FA-87-40	K000769	20'	damaged in overburden, hole redrilled	220'	775'
	K000715	35'	-		810'

TABLE 3 (cont'd)

Hole #	Bit #	Footage	Comments	Total Footage per bit	Total Footage for project
FA-87-41	K000715	14'	-		824'
FA-87-42	K000715	31'	damaged in bedrock	80'	855'
FA-87-43	K000768	15'	-		870'
FA-87-44	K000768	15'	-		885'
FA-87-45	K000768	14'	-		899'
FA-87-46	K000768	39'	-		938'
FA-87-47	K000768	14'	damaged in bedrock	97'	952'
FA-87-48	I000573	21'	-		973'
FA-87-49	I000573	16'	-		989'
FA-87-50	I000573	10'	-		999'
FA-87-51	I000573	10'	-		1009'
FA-87-52	I000573	7'	damaged in bedrock	64'	1016'
FA-87-53	K000717	33'	-		1049'
FA-87-54	K000717	36'	-		1085'
FA-87-55	K000717	30'	-		1115'
FA-87-56	K000717	15'	damaged in bedrock	114'	1130'
FA-87-57	K000716	22'	-		1152'
FA-87-58	k000716	55'	-		1207'
FA-87-59	k000716	27'	-		1234'
FA-87-60	k000716	30'	damaged in bedrock	134'	1264'
FA-87-61	k000573	15'	-		1279'
FA-87-62	k000573	11'	damaged in bedrock	26'	1290'
FA-87-63	k000718	25'	-		1315'
FA-87-64	k000718	25'	damaged in bedrock	50'	1340'
FA-87-65	k000719	63'	-		1403'
FA-87-66	k000719	22'	damaged in bedrock	85'	1425'
FA-87-67	k000714	15'	damaged in bedrock	15'	1440'
FA-87-68	k000764	22'	-		1462'
FA-87-69	k000764	40'	-		1502'
FA-87-70	k000764	5'	-		1507'
FA-87-71	k000764	5'	-		1512'
FA-87-72	k000764	9'	-		1521'
FA-87-73	k000764	35'	-		1556'
FA-87-74	k000764	15'	-		1571'
FA-87-75	K000764	15'	-		1586'
FA-87-76	K000764	11'	-		1597'
FA-87-77	K000764	23'	-		1620'
FA-87-78	K000764	20'	damaged in bedrock		1670'

Average footage/bit = 96'
Average depth to bedrock = 16.4'

8.0 REVERSE CIRCULATION RESULTS

8.1 Local Glacial Geology

Quarternary stratigraphy in the Chapais area, where well-developed, generally consists of a lower till, lower sediments, upper till and upper sediments, capped by lacustrine or fluvial sediments. Recent organics and muskeg vegetation cover much of the area. A third clay-rich till (Cochrane Till) which represents the latest glacial advance and is common in northwestern Quebec, is absent.

The lowermost till, derived from the northwest, is generally absent due to the shallow overburden on the Achates property. Where present, it generally has a sandy to clayey matrix with abundant pebble to cobble-sized clasts. Clasts within this till are predominantly subangular intermediate to mafic volcanics and metasediments, indicating that they have been scoured from relatively proximal bedrock. This till is best preserved in bedrock depressions where it has been sheltered from later, overriding glacial advances, and as such it is evident in holes 87-05 and 87-42, but absent elsewhere. Its general absence attests to the scouring/reworking effect of the subsequent re-advance of the ice sheet. This till, and especially its lodgement till facies, represents an excellent sampling medium for an exploration program.

Lower sediments generally consist of gritty, hard-packed clays, silty sands and sandy gravels and lie directly on top of lower tills. Isolated lenses of boulders and cobbles, again of predominantly proximal lithologies, possibly representing lag deposits (i.e. fluvial stream channels), are common within this unit. These lower sediments are also best preserved in bedrock depressions.

The upper till (Chibougamau Till) unit, which is now known to have been deposited from ice which advanced towards azimuth 212° in this area, is variably present on the Achates property ranging in thickness from 1 to 5 m. Where present, the compact silt to fine sand matrix varies between olive-brown (unoxidized) to orange-brown (oxidized), or grey, representing carbonate presence. Angular to sub-angular clasts are common where the matrix is well developed, and generally consist of proximal lithologies. In general, the upper till in the hole 87-02, 87-10, 87-15 to 87-21, 87-24, 87-31, 87-33, 87-44, 87-54, 87-55, 87-58 to 87-61, 87-69 areas is fairly well developed, and as such, represents a reasonably good sampling medium. In other areas its till nature is blurred by extensive reworking and/or oxidation such that the majority of the fines have been removed, the matrix is sandy and clasts much more rounded and heterogeneous in composition. Volcanic clasts comprise the major portion of this till with minor amounts of sediments, granitics, chemical sediments and carbonate. Portions of this till sequence often contain cobble horizons representing fluvial lag deposits, and much of the material appears ablationary. These types of tills represent less than ideal sampling media.

The upper sediments typically consist of a fine sand sequence with variable clay and silt horizons, ranging up to 40-50 ft in thickness. This unit is particularly well-developed in the northwestern portion of the property (i.e. hole 87-65 area). Although of little use as a sampling medium, this lacustrine sequence does provide a cap which allows for good return of sample material during the drilling operation.

Primary fluvial material such as clean, sorted sands and gravels were encountered overlying, or to the exclusion of tills in several holes located adjacent to bodies of water. Most noteably, the area east of Lac a l'eau Jaune, the hole 87-67 area and the hole 87-06 area appear to contain fluvial deposits.

Recent organics, predominantly muskeg and humus, blanket much of the property area and range up to 11 ft in thickness in low swampy areas.

8.2 Visual Gold Grain Count

A total of 19 gold grains was observed in tabling and panning operations by O.D.M., of which 2 were classified as "irregular" and 17 as "abraded". Of these, single grains were found in the overburden from holes 87-02, 13, 15, 45, 48, 53, 54, 55, 61, 63 and 68. Two grains (both irregular) were within the overburden of 87-16, and three abraded grains were found in holes 87-65 and 87-58.

In addition, significant pyrite (i.e greater than 20%) was found within the HMC's of holes 87-13, 14, 18, 21, 22, 33, 46, 47 and 69.

Table 4 summarizes gold grain counts within the context of the host glacial sediments.

It should be noted that in other areas of the Abitibi, most noteably Casa Berardi, an elevated background resulting from regional gold mineralization has prompted researchers to consider as many as 10 gold grains as explorationally insignificant. However, we have found overburden gold grain background in the region south of Chapais to be extremely low, with samples containing multiple gold grains rare. As such, all gold grain occurrences probably merit some consideration.

8.3 Analytical Results - Overburden

8.3.1 General

Equivalent values have been calculated from all HMC assays and have served to better delineate background, elevated (possibly anomalous) and significant (probably anomalous) values. Table 5 summarizes these data, which are compiled

TABLE 4

DRILL HOLE SUMMARY

Lithology	Fluvial Sediments	Upper Glaciofluvial Sediments	Upper (Chibougamau) Till	Lower Glaciofluvial Sediments	Lower Till	Bedrock
87-01	- (no significant grains or assays)	-	-	not present	not present	int. vol.
87-02	not sampled	1 abr. Au	516 ppm Cu 2080 ppm Zn	not present	not present	int.-mafic vol.
87-03	not present	-	-	not present	not present	int.-mafic vol.
87-04	-	-	-	not present	not present	int.-mafic vol.
87-05	not present	-	3 abr. Au 600 ppb Au	-	3605 ppm Zn	int.-mafic vol.
87-06	-	-	-	not present	not present	mafic vol.
87-07	not present	-	-	not present	not present	int.-mafic schist
87-08	not sampled	not present	not present	not present	not present	int.-mafic vol.
87-09	not present	-	-	not present	not present	int.-mafic vol./I.F.
87-10	not present	not present	-	not present	not present	int.-mafic vol./I.F.
87-11	not present	not present	-	not present	not present	int.-mafic vol.
87-12	not present	not present	580 ppb Au	not present	not present	int.-mafic vol./tuff
87-13	not present	not present	1 abr. Au 40% py	not present	not present	int.-mafic vol.
87-14	not present	not sampled	up to 60% py	not present	not present	felsic-int. schist
87-15	not present	not present	1 abr. Au	not present	not present	int.-mafic schist/tuff
87-16	not present	not present	2 irr. Au	not present	not present	felsic-int. schist
87-17	not present	not present	-	not present	not present	meta-sedi. 122 ppm As 65 ppb Au
87-18	not present	not present	50% py	not present	not present	int.-mafic vol.
87-19	not present	not present	-	not present	not present	felsic-int. vol.

Lithology	Fluvial Sediments	Upper Glaciofluvial Sediments	Upper (Chibougamau) Till	Lower Glaciofluvial Sediments	Lower Till	Bedrock
87-20	not present	not present	-	not present	not present	felsic-int. vol./tuff
87-21	not present	not present	70% py	not present	not present	int. vol./tuff
87-22	not present	not present	40% py	not present	not present	int.-mafic vol.
87-23	not present	not present	-	not present	not present	int.-mafic vol.
87-24	not present	not present	-	not present	not present	int.-mafic vol./tuff
87-25	-	not present	not present	not present	not present	mafic-vol.
87-26	-	-	-	not present	not present	int.-mafic vol.
87-27	not present	not present	-	not present	not present	int.-mafic vol.
87-28	-	not present	not present	not present	not present	int.-mafic vol.
87-29	-	not present	not present	not present	not present	mafic vol.
87-30	-	not present	not present	not present	not present	meta-vol.
87-31	not present	-	-	not present	not present	int.-mafic vol.
87-32	not present	not present	-	not present	not present	int.-mafic vol.
87-33	not present	not present	70% py	not present	not present	int.-mafic vol.
87-34	-	not present	not present	not present	not present	int.-mafic vol./schist
87-35	-	not present	not present	not present	not present	mafic vol./schist
87-36	-	-	-	not present	not present	mafic vol.
87-37	-	-	not present	not present	not present	felsic vol.
87-38	-	not present	not present	not present	not present	mafic vol.
87-39	-	not present	not present	not present	not present	int.-mafic vol./tuff
87-40	not present	-	-	not present	not present	int. vol.

Lithology	Fluvial Sediments	Upper Glaciofluvial Sediments	Upper (Chibougamau) Till	Lower Glaciofluvial Sediments	Lower Till	Bedrock
87-41	-	not present	not present	not present	not present	mafic vol.
87-42	not present	-	-	-	-	mafic vol./intr.
87-43	not present	not present	-	not present	not present	felsic-int. vol.
87-44	not present	not present	-	not present	not present	mafic vol.
87-45	1 abr. Au	not present	not present	not present	not present	mafic vol./tuff
87-46	not present	-	70% py 3600 ppm Cu	not present	not present	int.-mafic vol.
87-47	not present	-	50% py 2490 ppm Cu	not present	not present	int.-mafic vol.
87-48	not present	-	1 abr. Au 590 ppb Au 348 ppb As	not present not present	not present not present	int.-mafic meta-sed. vol.
87-49	-	-	-	not present	not present	felsic-int. schist
87-50	-	not present	not present	not present	not present	int.-mafic vol.
87-51	-	not present	not present	not present	not present	mafic-schist
87-52	-	not present	not present	not present	not present	int.-mafic vol.
87-53	1 abr. Au	-	2048 ppm Cu	not present	not present	int.-mafic intrusive
87-54	-	-	1 abr. Au	not present	not present	felsic-int. vol./sed.
87-55	not present	not present	1 abr. Au	not present	not present	felsic-int. vol./sed.
87-56	not present	-	-	not present	not present	meta-sed.
87-57	-	-	-	not present	not present	int.-mafic intrusive
87-58	-	1 abr. Au	2 abr. Au	not present	not present	int.-mafic vol.
87-59	-	-	-	not present	not present	meta-sed.
87-60	not present	-	-	not present	not present	int.-mafic vol.

Lithology	Fluvial Sediments	Upper Glaciofluvial Sediments	Upper (Chibougamau) Till	Lower Glaciofluvial Sediments	Lower Till	Bedrock
87-61	not present	not present	1 abr. Au 440 ppm As	not present	not present	mafic vol./sed.
87-62	not present	not present	-	not present	not present	mafic vol.
87-63	not present	1 abr. Au	-	not present	not present	mafic intr.
87-64	not present	-	-	not present	not present	int.-mafic vol.
87-65	not present	-	-	not present	not present	int. intr.
87-66	not present	-	-	not present	not present	mafic vol.
87-67	-	-	not present	not present	not present	mafic vol.
87-68	-	1 abr. Au 620 ppb Au	-	not present	not present	mafic vol.
87-69	-	-	70% py	not present	not present	gf schist/ sed.
87-70	not present	not present	not present	not present	not present	felsic-int. vol./schist
87-71	not present	not present	not present	not present	not present	int.-mafic vol.
87-72	-	not present	not present	not present	not present	int.-mafic vol./tuff
87-73	-	-	-	not present	not present	mafic intr.
87-74	-	-	-	not present	not present	felsic-int. schist
87-75	not present	-	-	not present	not present	felsic-gf schist
87-76	not present	not present	-	not present	not present	felsic-gf schist
87-77	-	not present	not present	not present	not present	felsic-gf schist
87-78	-	not present	not present	not present	not present	felsic-int. vol.

and more comprehensively presented on Map 3 and in Appendix E.

As a general statement, this calculation has served to identify more samples as elevated or significant, than were initially obvious from raw assay data (Figures 10a-e).

8.3.2 Gold

HMC equivalent gold values show a polymodal distribution which allows delineation of values into background (0-500 ppt), elevated (500-1100 ppt) and statistically significant (greater than 1100 ppt) populations (Figure 10a). The dearth of gold grains on the property, and within this area in general lessens the likelihood of the "nugget effect", and as such the calculated equivalent values are regarded as being more truly reflective of the initial overburden gold content.

Elevated equivalent gold values were found in the overburden of holes 87-06, 11, 12, 14, 15, 19, 24, 26, 27, 28, 29, 30, 33, 35, 36, 37, 42, 45, 46, 50, 54, 63 and 72. Significant or potentially anomalous values include those from the overburden of holes 87-02, 05, 18, 23, 48, 53, 58, 59, 68, 69 and 78. The highest equivalent value, 3304 ppt, was from the basal sample of hole 87-48.

8.3.3 Arsenic

Arsenic equivalent values are well defined in terms of background (0-650 ppb), elevated (650-1100 ppb) and probably anomalous (greater than 1100 ppb) populations (Figure 10b). Few anomalous values are present although elevated values were found in the overburden of holes 87-14, 19, 23, 48 and 53. Significant values include those from the overburden of holes 87-33, 48, 61 and 69, with the highest value, 4156.78 ppb, found in the basal sample of hole 87-69.

TABLE 5

HMC Statistical Summary

Element	No. Samples	Ave.	Std. Dev.	Min.	Maximum	Background Population	Elevated Population	Significant Population
Au (ppb)	163	97.52	122.90	2.50	620.00	0-500	500+	-
eAu (ppt)	163	412.40	514.98	11.93	3,304.00	0-500	500-1,100	1,100+
As (ppm)	163	52.77	118.93	2.00	1,080.00	0-300	300+	-
eAs (ppb)	163	257.26	484.94	2.21	4,156.78	0-650	650-1,100	1,100+
Cu (ppm)	163	305.65	499.49	27.00	3,600.00	0-1500	1,500+	
eCu (ppb)	163	1,545.04	2,472.72	24.86	17,333.33	0-2300	2,300-3,500	3,500+
Zn (ppm)	163	107.57	324.79	16.00	3,605.00	0-300	300+	-
eZn (ppb)	163	546.85	1,395.25	13.26	13,854.51	0-1000	1,000-1,700	1,700+
Ag (ppm)	163	0.31	0.35	0.05	2.20	0-2	2+	-
eAg (ppb)	163	1.60	1.62	0.09	7.28	0-2	2-5	5+

e = equivalent value

CFCE Achates

Figure 10a - HMC Gold Assays

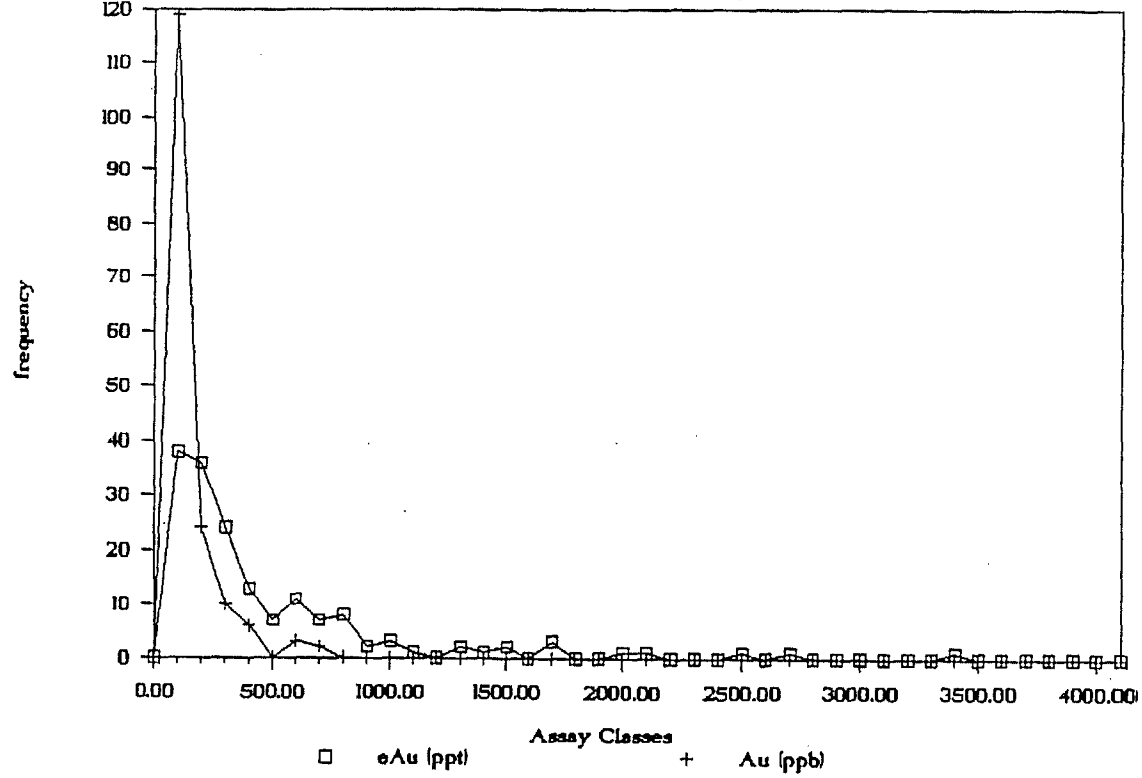


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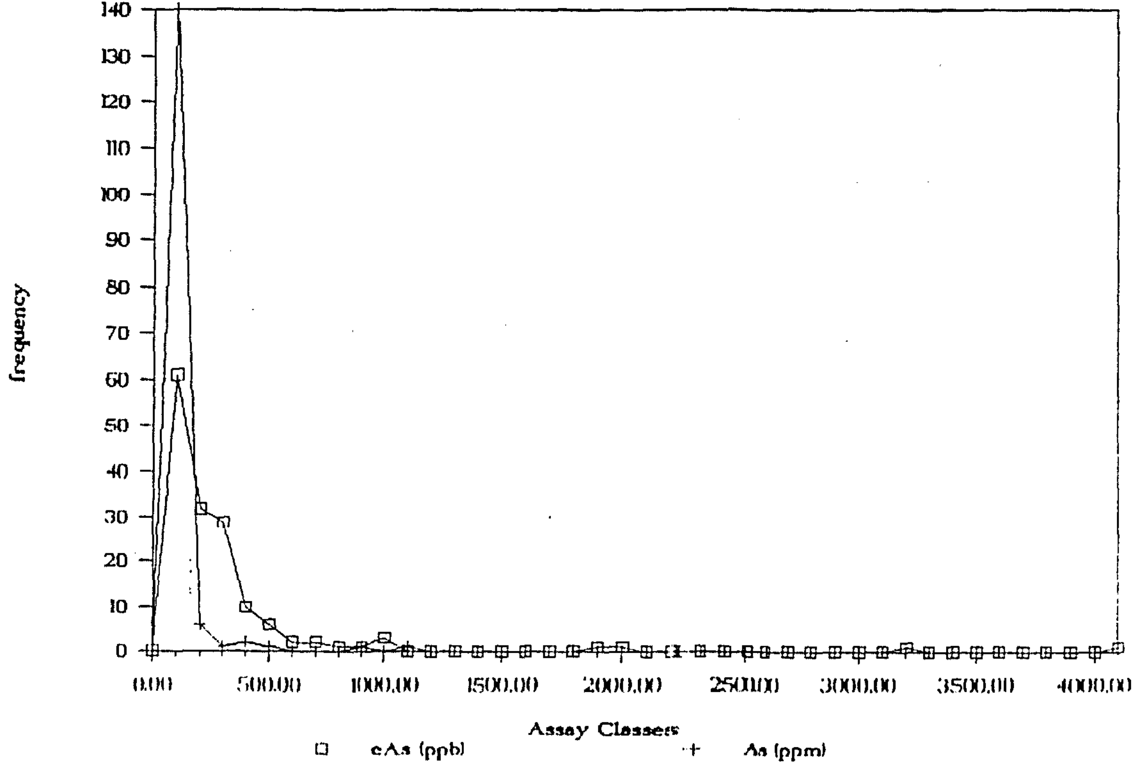
Figure 10b - HMC Arsenic Assays



8.3.4 Copper

HMC equivalent values show an extremely "noisy" polymodal distribution (Figure 10c) which is in all likelihood a function of the copper endowment of this camp, as well as the varied bedrock lithologies present on the property. Background copper equivalents are regarded as being in the 0-2300 ppb range, elevated as 2300-3500 ppb, and significant values as being greater than 3500 ppb.

Elevated equivalent values were found within the overburden of holes 87-07, 14, 15, 18, 19, 26, 27, 42, 45, 46, 48, 52, 53 and 58. Significant or probably anomalous values were found in holes 87-13, 14, 33, 46, 47, 53, 57, 67, 69 and 77, with the maximum value, 17,333.33 ppb. found in the basal sample of hole 87-46.

8.3.5 Zinc

HMC equivalent values are well-delineated in terms of background (0-1000 ppb), elevated (1,000-1,700 ppb) and significant (greater than 1700 ppb) populations (Figure 10d). Elevated values were found within the overburden of holes 87-01, 06, 14, 19, 31, 42, 48, 52 and 69. Significant values include those from the overburden of holes 87-02, 05, 13, 14, 48 and 58, with the highest value, 13854.51 ppb, from the lower till of hole 87-05.

8.3.6 Silver

HMC equivalent values are uniformly low (Figure 10e), however, samples with significant values of greater than 5 ppb include those from the overburden of holes 87-10, 27, 45, 46, 47, 48, 61, 68 and 77.

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Figure 10c - HMC Copper Assays

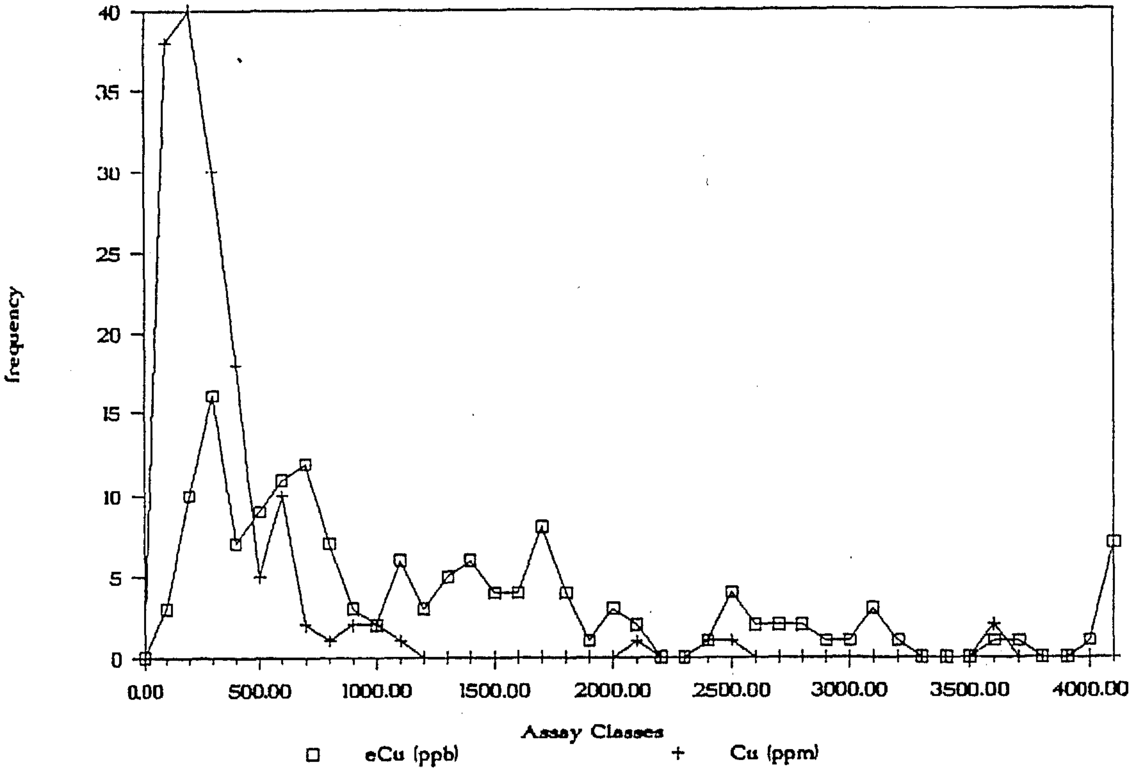

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Figure 10d - HMC Zinc Assays

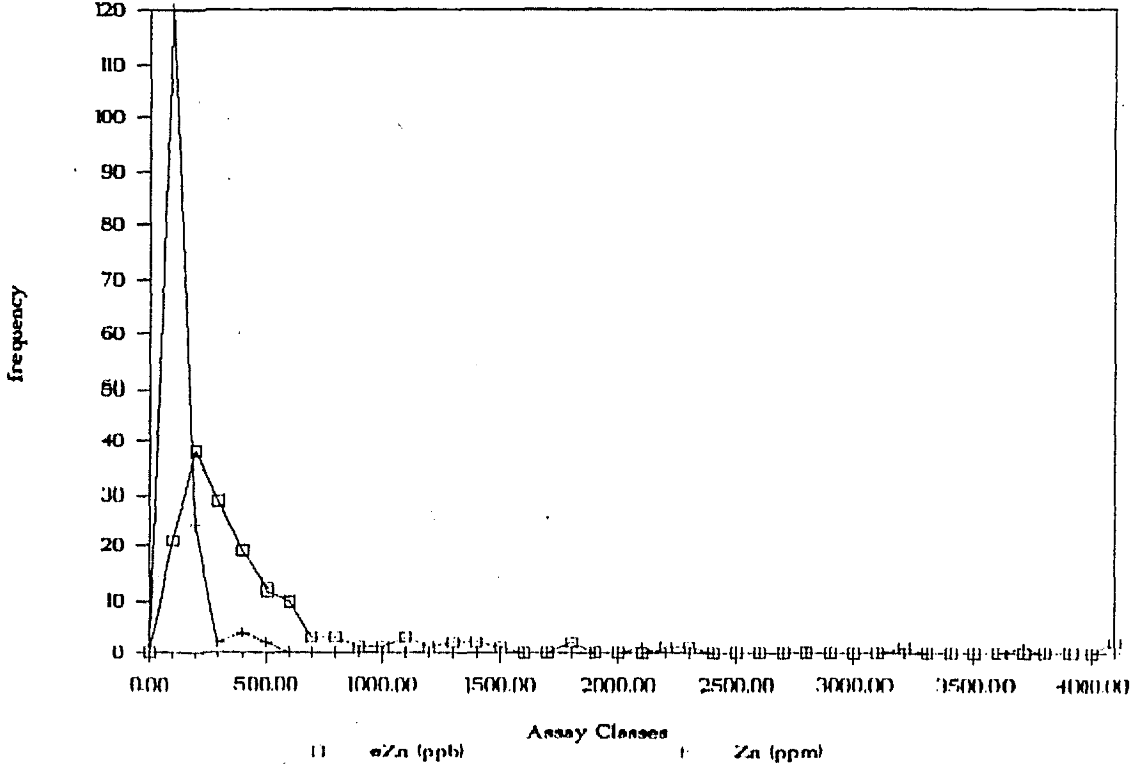

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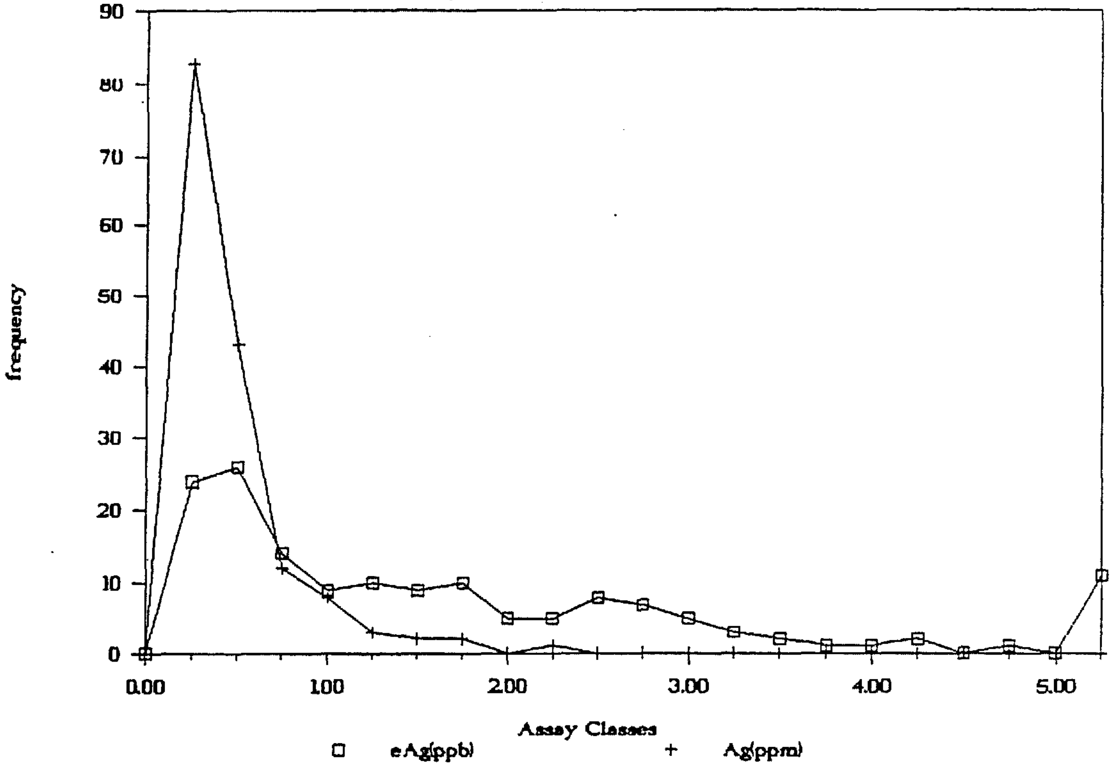
Figure 10e - HMC Silver Assays



8.3.7 -200 Mesh Equivalent Values

In general these are uniformly low, such that any elevated values are regarded as being anomalous. Elevated Au values were only found within hole 87-69. The arsenic equivalent value from the basal sample of hole 87-48 is moderately elevated, and that from hole 87-69 significantly so. Anomalous copper values were found in hole 87-10, 13, 14, 33, 40, 46 and 69. Elevated zinc values were found within the overburden of holes 87-05, 14 and 69. Nickel values were elevated in holes 87-02, 13, 33, 47, 48 and 69. The highest -200 mesh equivalent values for all elements were found within the basal sample of hole 87-69 in support of high equivalent HMC values.

8.4 Analytical Results - Bedrock

8.4.1 Whole Rock Analyses

All bedrock samples on the Achates property were submitted to Bondar-Clegg in Ottawa for whole rock analysis consisting of the major and minor rock-forming oxides (SiO_2, Al_2O_3, FeO_T, CaO, MgO, Na_2O, K_2O, TiO_2, MnO, P_2O_5, LOI) plus Zr.

The Achates property lithologies were found to include metavolcanic, metasedimentary and intrusive types, with compositions varying from mafic to felsic (Map 2). Chemical classifications (Jensen Classification; Jensen, 1976; Grunsky, 1981) included both tholeiitic and calc-alkaline mafic rocks, and predominantly calc-alkaline intermediate to felsic rocks (Figure 11). Lithological determinations were performed using a binocular microscope, the logs of which are presented in Appendix D. Augmenting these examinations, the Floyd and Winchester SiO_2:TiO_2/Zr Plot of 1977 is presented in Figure 12.

All samples were crushed with a split portion pulverized to -200 mesh. The oxide analyses were performed by DC Plasma Emission Spectroscopy after a lithium metaborate fusion. Zirconium analyses was performed by the X-Ray Florescence (XRF) method following crushing and pulverizing.

8.4.2 Trace Metal Analyses

Bedrock chip samples from all holes were sent to Bondar-Clegg in Ottawa for standard base and precious metal analyses (Au, As, Cu, Zn, Ag), the certificatges of analysis for which are presented in Appendix B. Assay methods included fire assay/atomic absorption for Au, nitric-aqua regia digestion/atomic absorption for Cu, Zn and Ag, and colour matrix determination following nitric acid-perchloric acid digestion for arsenic.

The majority of values are within background ranges; however, several samples did yield modestly anomalous assays. These include: gold assays of 65 ppb and 45 ppb from hole 87-17 and 87-21, respectively; an arsenic assay of 122 ppm from hole 87-17; copper assays of 287 and 237 ppm from holes 87-59 and 87-25, respectively; and zinc assays of 405, 192 and 191 ppm from holes 87-59, 61 and 25, respectively.

8.4.3 Volcanogenic Evaluation

The volcanogenic evaluation of Achates bedrock samples has delineated a number of samples which exhibit features considered to be possibly indicative of base-precious metal mineralization. These, when considered along with alteration/mineralization features noted during drill and binocular microscopic logging, may be significant in a variety of exploration contexts. Table 6 summarizes and eleborates upon the computer printouts presented in Appendix F. Anomalous characteristics or discriminatory function scores are underlined. Often it is a combination of several subtle features which result in altered samples.

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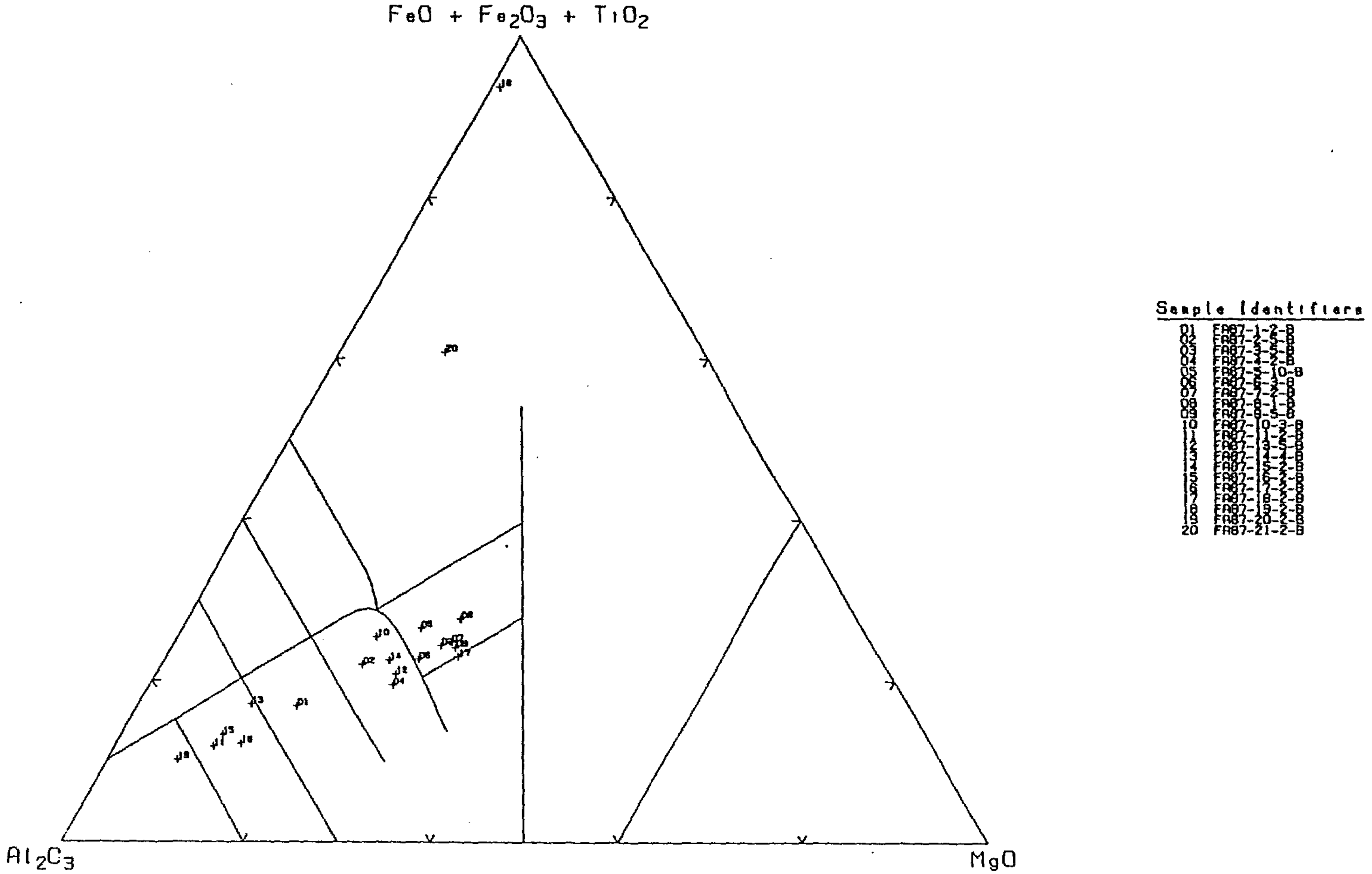

Sample Identifiers	
01	FA87-1-2-B
02	FA87-2-5-B
03	FA87-3-5-B
04	FA87-4-2-B
05	FA87-5-10-B
06	FA87-6-3-B
07	FA87-7-2-B
08	FA87-8-1-B
09	FA87-9-5-B
10	FA87-10-3-B
11	FA87-11-2-B
12	FA87-13-5-B
13	FA87-14-4-B
14	FA87-15-2-B
15	FA87-16-2-B
16	FA87-17-2-B
17	FA87-18-2-B
18	FA87-19-2-B
19	FA87-20-2-B
20	FA87-21-2-B

Figure 11: Jensen Cation Plot

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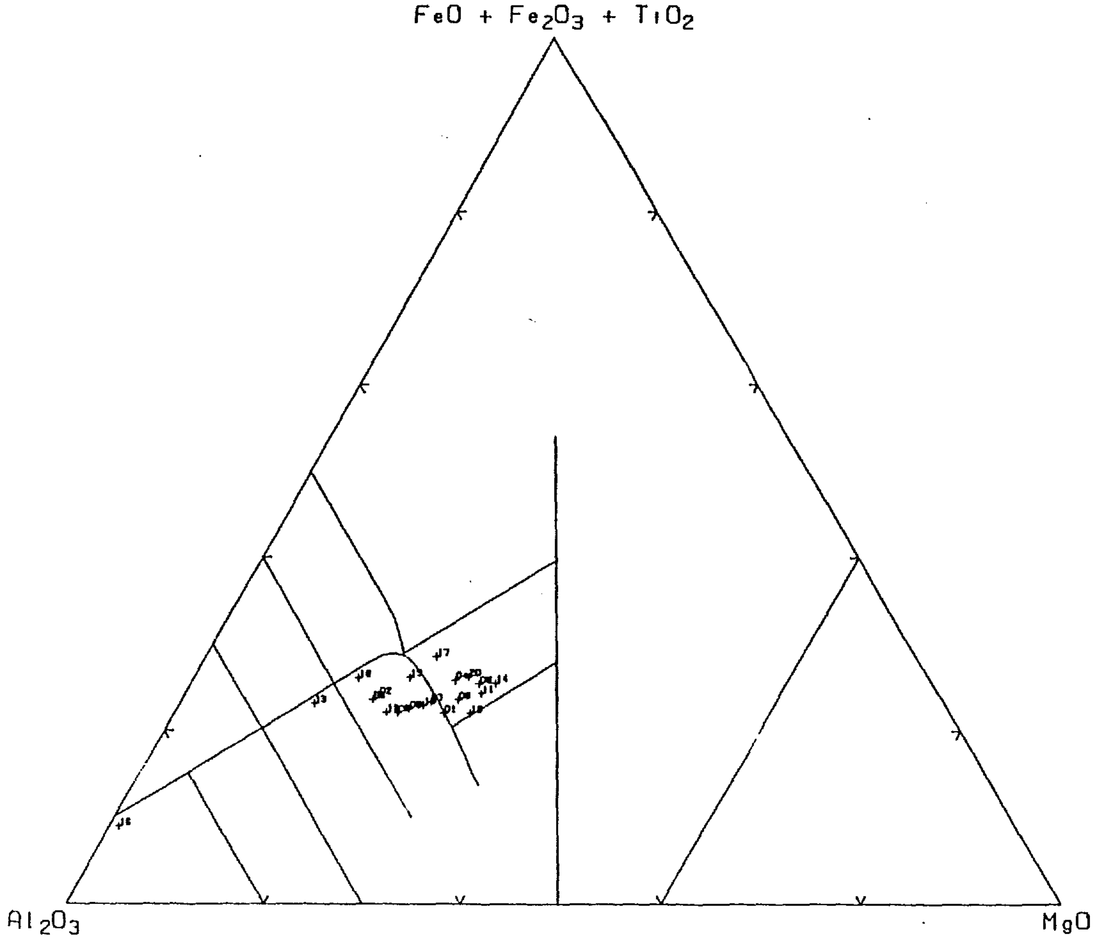

Sample Identifiers

01	FA87-22-2-B
02	FA87-23-2-B
03	FA87-24-4-B
04	FA87-25-3-B
05	FA87-26-2-B
06	FA87-27-3-B
07	FA87-28-2-B
08	FA87-29-2-B
09	FA87-30-2-B
10	FA87-31-3-B
11	FA87-32-4-B
12	FA87-33-2-B
13	FA87-34-2-B
14	FA87-35-2-B
15	FA87-36-3-B
16	FA87-37-4-B
17	FA87-38-2-B
18	FA87-39-1-B
19	FA87-40-5-B
20	FA87-41-2-B

Figure 11: Jensen Cation Plot

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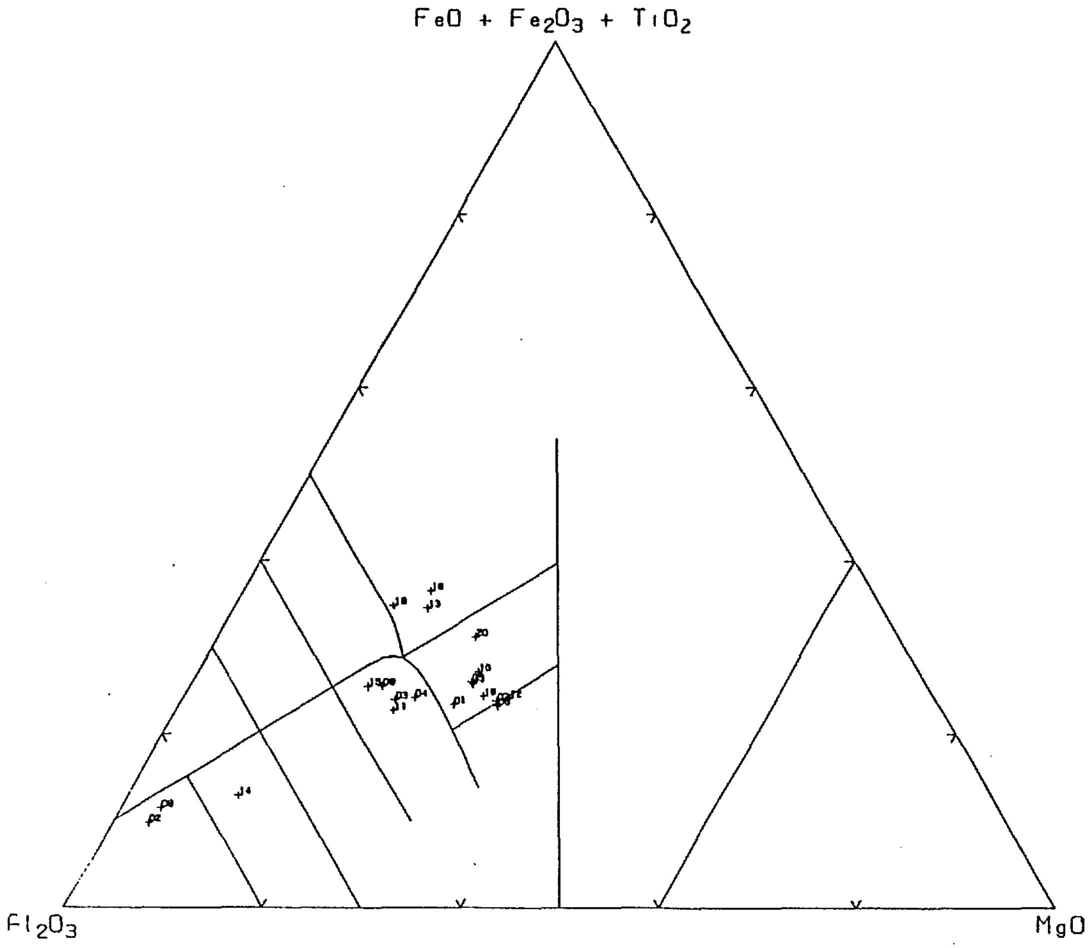

Sample Identifiers

01	FA87-42-5-8
02	FA87-43-2-8
03	FA87-44-3-8
04	FA87-45-2-8
05	FA87-46-4-8
06	FA87-47-3-8
07	FA87-48-3-8
08	FA87-49-2-8
09	FA87-50-2-8
10	FA87-51-2-8
11	FA87-52-2-8
12	FA87-53-6-8
13	FA87-54-8-8
14	FA87-55-5-8
15	FA87-56-2-8
16	FA87-57-3-8
17	FA87-58-10-8
18	FA87-59-3-8
19	FA87-60-5-8
20	FA87-61-3-8

Figure 11: Jensen Cation Plot

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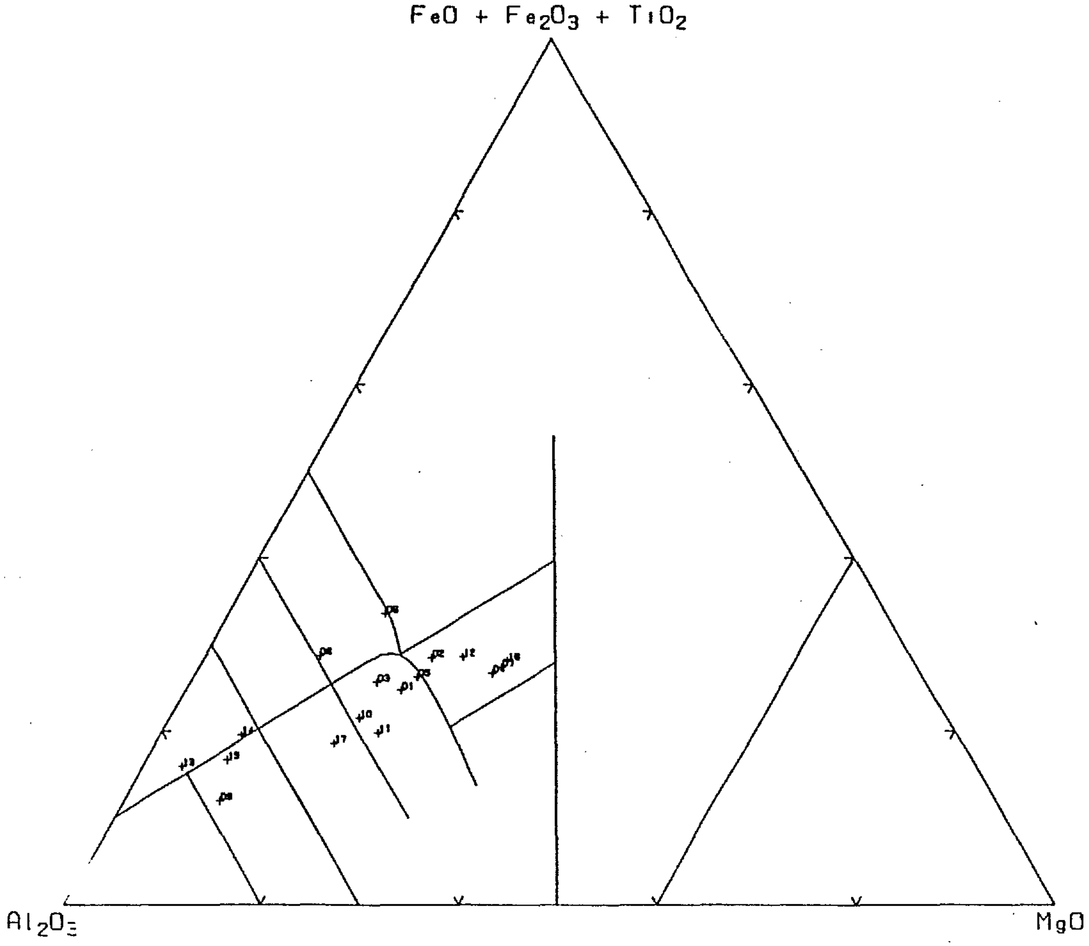

Sample Identifiers

01	FA87-62-2-B
02	FA87-63-4-B
03	FA87-64-2-B
04	FA87-65-3-B
05	FA87-66-3-B
06	FA87-67-3-B
07	FA87-68-5-B
08	FA87-69-4-B
09	FA87-70-1-B
10	FA87-71-1-B
11	FA87-72-2-B
12	FA87-73-2-B
13	FA87-74-2-B
14	FA87-75-2-B
15	FA87-76-0-B
16	FA87-77-5-B
17	FA87-78-3-B

Figure 11: Jensen Cation Plot

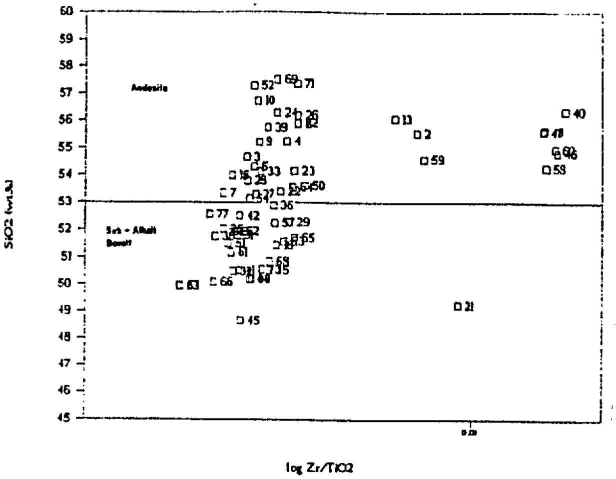

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Figure 12 - Floyd and Winchester Plot

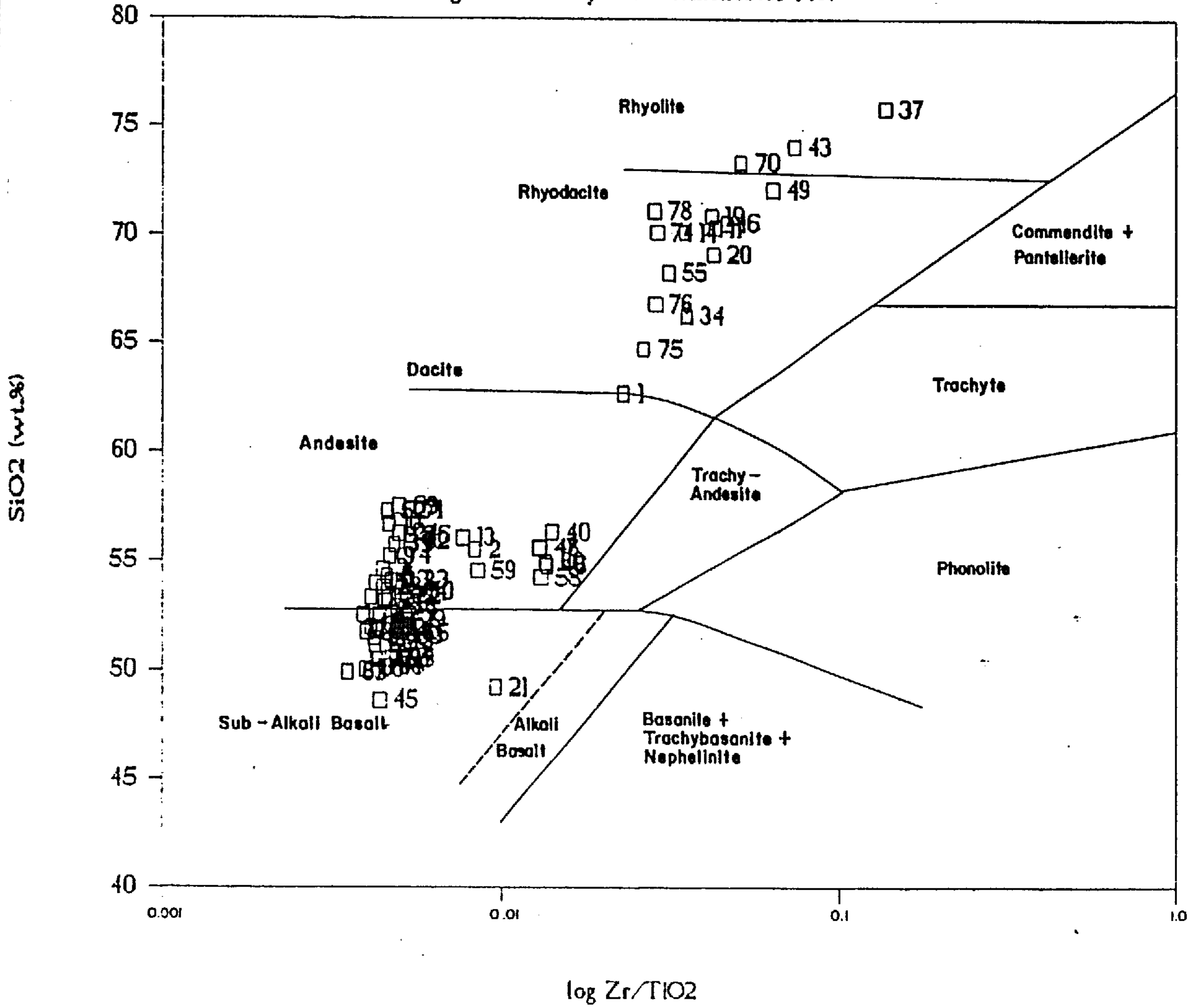

TABLE 6

Sample No.	Classification	LOI/CaO	TAAS	DF1	DF2	DF3	DF4	DF5	PI	Au/As	Residuals/Alteration
87-01	C-A dacite	0.18	25.24	-1.55	-8.83	-8.83	-4.27	-1.99	1.12	5/5	Carbonatization
87-03	Th Andesite	0.13	39.23	-0.09	-4.52	-5.04	-0.88	3.26	1.33	5/3	Fe,Mg-enriched, Na-depleted
87-06	Th Basalt	0.07	39.90	-0.47	-3.13	-3.55	-0.54	3.58	1.24	5/1	Fe,Mg-enriched, Na-depleted
87-07	Th Andesite	0.34	42.24	-0.11	-7.87	-8.53	-6.14	-3.90	1.10	5/15	Na-depleted; schistose
87-09	Th Andesite	0.05	40.03	-0.30	-4.60	-4.86	-1.30	4.76	1.14	5/2	Fe,Mg-enriched
87-10	C-A Andesite	0.02	24.82	-1.23	-4.94	-5.60	-1.50	1.68	1.09	5/2	Na depleted
87-11	C-A Dac-Rhyodacite	0.12	28.59	-0.50	-9.25	-9.35	-2.63	-1.40	1.52	5/3	Na/Ca/K_2O-depleted
87-16	C-A Dac-Rhyodacite	0.18	27.78	-0.84	-8.77	-8.72	-1.94	-1.41	1.48	5/2	Na/Ca/K_2O-depleted
87-17	Metasediment	25.54	59.05	-16.16	44.32	49.38	49.28	-36.87	7.19	65/122	Massive sulphides; Fe, Au, As, Si-enriched
87-19	C-A Dac-Rhyodacite	0.29	30.68	-0.71	-9.22	-9.12	-1.99	-0.32	1.33	5/2	Pervasive carbonatization
87-21	Metasediment	0.32	28.00	-4.54	13.87	13.80	18.32	4.95	1.28	45/42	Fe,Si-enriched; Na,Ca,Mg-depleted; massive py
87-28	C-A Andesite	0.11	31.70	-0.51	-5.39	-5.98	-2.95	2.08	1.24	5/2	Pervasive carbonatization
87-29	Th Basalt	0.40	28.84	-2.05	-12.42	-12.79	-12.27	-9.36	0.74	5/21	Silica-enriched; Fe, Mg-depleted; pervasive carbonatization
87-36	C-A Basalt	0.31	28.98	-1.22	-7.22	-7.71	-5.50	-3.47	1.10	5/2	Na, Mg-depleted
87-37	C-A Rhyolite	0.32	3.92	-2.80	-10.05	-9.37	-1.37	-1.91	0.88	5/7	Alkali-depleted; massive gf-py; pervasive carbonatization
87-43	C-A Rhyolite	0.32	16.69	-1.09	-10.67	-10.70	-3.46	-2.88	1.37	5/2	Alkali, Mg-depleted; porphyroblastic
87-44	C-A Basalt	0.26	25.85	-2.36	-5.73	-5.58	-4.84	-3.49	0.98	5/10	Mg-depleted
87-45	C-A Basalt	0.39	27.69	-2.45	-10.11	-10.09	-11.62	-12.50	0.87	5/62	Fe,Mg-depleted; pervasive carbonatization
87-47	Th Andesite	0.10	41.55	0.24	-5.28	-5.69	-1.15	3.68	1.22	5/2	Fe,Mg-enriched; Na-depleted
87-48	Th Andesite	0.38	47.86	0.49	-6.24	-6.61	-2.56	0.75	1.36	10/56	Fe,Mg-enriched; alkali depleted; pervasive carbonatization
87-51	Th Basalt	0.45	54.01	0.71	-2.50	-2.81	0.50	1.61	1.97	5/14	Fe,Mg-enriched; alkali, Ca-depleted; schistose
87-52	C-A Andesite	0.07	21.69	-1.24	-7.76	-8.61	-5.49	-1.34	0.97	5/4	Na-depleted; extensive silicification
87-53	Th Basalt/Intrusive	0.25	44.65	0.41	-5.06	-5.70	-2.68	1.75	1.45	10/2	Mg-enriched; alkali depleted; carbonatization
87-54	Th Dac-Rhyodacite	0.33	30.82	-1.88	-2.26	-2.61	-0.01	-2.28	1.18	20/25	Fe-enriched; massive py
87-55	C-A Dac-Rhyodacite	0.35	18.49	-2.09	-9.46	-9.32	-5.23	-4.30	0.94	5/2	Alkali-enriched; massive gf
87-57	Th Basalt	0.07	29.10	-1.87	0.42	0.60	5.32	3.70	1.08	5/2	Fe,Zn-enriched; alkali-depleted
87-59	Th Andesite	0.23	25.16	-2.91	2.99	3.02	0.64	-2.80	0.92	15/7	Fe,Mg, Zn-enriched; alkali-depleted; sheared?
87-61	Th Basalt	0.35	41.75	-0.29	-2.23	-2.71	-1.96	-2.59	1.24	5/12	Na,Mg-depleted; schistose?
87-63	Th Basalt	0.08	30.97	-0.97	-2.97	-3.28	0.16	2.16	1.15	5/2	Fe,Mg-enriched
87-67	Th Basalt	0.08	22.02	-2.13	-2.29	-1.31	1.62	3.84	1.02	5/2	Fe-enriched; Mg-depleted
87-69	C-A Andesite	0.37	34.97	-0.18	-5.98	-6.56	-3.36	-2.82	1.66	15/12	Fe-enriched; Na-depleted; graphitic, carbonatization
87-70	C-A Dac-Rhyodacite	0.58	24.38	-1.18	-9.98	-9.65	-1.61	-1.59	1.27	5/3	Ca-depleted; pervasive carbonatization; schistose
87-71	C-A Andesite	0.31	26.58	-1.28	-8.57	-8.82	-6.28	-5.21	1.17	5/2	Fe,Mg-depleted; minor carbonatization
87-73	Th Basalt	0.36	32.39	-1.03	-7.57	-8.07	-5.93	-3.68	1.05	5/34	Fe,Mg-depleted
87-74	Th Dac-Rhyodacite	0.36	21.37	-0.67	-9.26	-9.66	-3.89	-2.16	1.40	20/2	Alkali-depleted; py-gf schist
87-75	C-A Dac Rhyodacite	0.29	16.37	-1.50	-10.13	-10.85	-7.03	-4.42	1.10	5/2	Alkali-depleted; ser-gf schist
87-77	Th Basalt	0.39	48.07	-0.59	-2.86	-3.25	-0.58	2.62	1.50	5/2	Fe,Mg-enriched, alkali depleted; qtz-ser-py schist; carbonatization
87-78	C-A Dac-Rhyodacite	0.25	26.47	-1.10	-7.49	-7.28	0.29	1.79	1.11	5/2	Fe,Mg-enriched; alkali-depleted

C-A - Calc-Alkaline; Th - Tholeiitic; TAAS - Total Alkali Alteration Score; DF - Discriminant Function; PI - Peraluminosity Index

9.0 DISCUSSION OF RESULTS

The generally shallow and often ablationary nature of the till on the Achates property, and the variable oxidation of this material in many cases, has, we feel, resulted in a less than ideal sampling medium in some areas. The dearth of precious and base metal grains within heavy mineral concentrates may be in part reflective of these conditions. A further corollory of this is that very subtle anomalous features may be significant. It was in recognition of these oxidation processes that the -200 mesh geochemical work was carried out. These analyses have assisted in our interpretation in several areas.

The lithogeochemical work on bedrock chips has added greatly to the geological "picture" on the Achates property, and in conjunction with till geochemical and geophysical data, indicates a number of environments on the Achates property which may be permissive for base ± precious metal mineralization. In particular, favourable environments include:

(i) Conductive Zones 16-17-18-19-21

This horizon of volcaniclastic/tuffaceous/metasedimentary rocks caps the "cycle I" tholeiitic sequence and is overlain by calc-alkaline mafic volcanics. At its eastern extent, the Hole 15-21 Area appears to consist of a schistose felsic volcaniclastic/tuffaceous horizon with an overlying turbiditic unit. The area is bracketed by ENE-trending fault f_3 to the west and the f_1-f_2 shear to the east where the horizon is truncated. Hole 87-17 penetrated massive pyrite bedrock which assayed 65 ppb Au/122 ppm As. The bedrock of hole 87-21 assayed 45 ppb Au/42 ppm As. Holes 87-16, 87-19 and 87-21 in footwall, or underlying rocks, show statistically significant alterations including alkali-depletion (87-16, 87-21), Fe, Si-enrichment (87-21 and 87-17), sericitization (87-16) and carbonatization (87-16, 87-18, 87-19). Two irregular gold grains were found in the poorly-developed shallow till of hole 87-16. Hole 87-18, located approximately 100 m down-ice, contains the statistically significant gold equivalent value of 1960 ppt. In addition, elevated equivalent element values include Cu in hole 87-18, all of Au, As, Cu, Zn and Ag in hole 87-19 and Ag in hole 87-20 and 87-21. Up-ice holes are barren in both gold grains and in significant analytical values.

Felsic sericitic and carbonatized rocks and possible iron-rich chemical sediments were penetrated further to the northwest along this horizon, within the broad zone designated as Magnetic Domain I_F and Conductive Zones 16, 17, 18 and 19. The bedrock of holes 87-10 and 87-11, in the vicinity of the magnetic lithology, were both Na-depleted. Significant equivalent element values include Cu in holes 87-10 and 87-13 and Zn in 87-13. One abraded gold grain and 40% py were also found in the basal overburden of hole 87-13.

Intermediate between these two areas, hole 87-14 was spotted down-ice of the horizon and several sub-parallel magnetic features, where a small fault cuts the stratigraphy.

A schistose, sericitic dacitic bedrock was penetrated, and the overburden contained 60% pyrite in the basal samples while equivalent values are significant in Cu and elevated in Au, As, Zn and Ag. This area would also appear to hold promise, possibly more so than Magnetic Domain I_F, however the proximity of the Obatogamau River may preclude summer follow-up.

(ii) <u>Conductive Zones 11-12</u>

This horizon appears to consist of dacitic tuffaceous and metasedimentary rocks, overlying the "cycle II" calc-alkaline sequence, and is indicated to be only variably present. It is certainly in evidence between faults f_6 and f_3 where the

Hole 53-55 and Hole 22-33 Areas, along this horizon between faults F_6 and F_3, in particular, appear promising. One gold grain was found in each of holes 87-53, 87-54 and 87-55 in the vicinity of fault f_6, which appears to be a major structural feature. Hole 87-53, spotted down-ice from the conductive zone contained significant equivalent Au and Cu values, and elevated As and Ag equivalent values. Massive pyrite and massive graphite were penetrated by holes 87-54 and 87-55, while footwall sample 87-53 is enriched in Mg and alkali-depleted, suggesting a classical volcanogenic alteration zone. In the fault f_3 area, elevated Au-Cu equivalent values were found in holes 87-26 and 27, while holes 28, 29 and 30 contained elevated eAu values. To the southeast, hole 87-23 contains significant eAu and elevated eAs, and hole 87-33 is probably anomalous in Cu and As, and elevated in Au, while hole 87-24 contains elevated eAu. Hole 87-33 also contained 70% pyrite in the basal overburden sample, and many of the holes along this horizon are elevated or probably anomalous in Ag.

It is possible that this favourable stratigraphy extends further to the northwest along Conductive Zone 12a-b, however, the coincidence of linear magnetic features suggests an iron-rich facies or lithology not seen southeast of fault f_6. This area is felt to have less potential for mineralization, as overburden thickness increases dramatically and holes located down-ice do not indicate that a dispersal train is present. Only one abraded gold grain was seen, that in the upper sediments of hole 87-02. The till of this hole did contain significant Zn equivalent values. A significant gold equivalent value is found within the same sample which contained the gold grain.

(iii) Conductive Zones 5-6-7

This horizon, which transects the entire main property from the northwest boundary to Lac a l'Eau Jaune, appears to represent an intermediate to felsic metavolcanic/tuffaceous/sedimentary unit capping a thick tholeiitic flow/sill stratigraphy. Overlying rocks consist of calc-alkaline basalts and synvolcanic sills, extending to the northern property boundary. Underlying rocks as seen in holes 87-46, 87-47, 87-56 and 87-61 show Na-depletion, while Fe and Mg-enrichment is noted in holes 87-47, 87-48 and 87-59. The Hole 36-40 Area, which extends to the Hansen Showing would seem promising on the basis of the bedrock of hole 87-37, an alkali-depleted, carbonatized rhyolite with a massive pyrite-graphite seams and quartz-carbonate veining. Elevated eAu values were contained in holes 87-36 and 87-37, and anomalous -200 mesh equivalent Cu values were noted in the overburden of hole 87-40. The Hole 46-47 Area is encouraging on the basis of 50-70% pyrite within the HMC's and anomalous Cu and Ag equivalent values for both holes. Hole 87-46 is anomalous in -200 mesh equivalent Cu and elevated in eAu, while 87-47 is anomalous in -200 mesh equivalent Ni. Both of these holes are down-ice from the conductor, which is indicated to be cut by a fault in this area. Stratigraphy and alteration characteristics are similar to those for Estrades-type volcanogenic mineralization.

It is more difficult to delineate specific areas, due to the wide hole spacing northwest of the Obatogamau River along this horizon, but certainly the Hole 48-49 Area in the vicinity of fault f_6, and the Hole 59-60 Area in the vicinity of fault f_{11} appear promising. The overburden of hole 87-48 contained one abraded gold grain and probably anomalous equivalent Au, As, Zn and Ag, as well as elevated Cu values. The bedrock here is a carbonatized intermediate volcanic, while up-ice hole 87-49 penetrated a schistose felsic rock within the vicinity of the conductive environment and was barren of gold grains and elevated assays. Hole 87-59 contains significant equivalent Au values. In addition, the overburden from hole 87-58 contains 3 abraded gold grains, significant Zn, and elevated Au, Cu and Ag equivalent values. Hole 87-61 contains one gold grain and significant equivalent Zn and Ag values within shallow, poorly-developed till.

(iv) Magnetic Domain I_D/Conductive Zone 8a-h

This horizon would appear to represent major synvolcanic sills and/or iron-rich sediments within the tholeiitic sequence ("cycle III"), and is cut by a number of NE-trending faults as well as major faults f_6 and f_{11}. One abraded gold grain and elevated Au, Cu and Zn equivalent values were found in the poorly-developed shallow overburden of proximal hole 87-45. Hole 87-05, which is located down-ice, contains 3 abraded gold grains in upper sediments, as well as elevated Ag and significant Au and Zn (also -200 mesh Zn and Ni) equivalent values within a well-developed basal till facies. Bedrocks were generally of tuffaceous mafic rock exhibiting extensive alteration in the form of carbonatization, silicification, alkali-depletion, Ca-depletion and Fe, Mg-enrichment. The limited geologic knowledge here hints at potential for Gwillim-type mineralization.

(v) East of Lac a l'Eau Jaune

While appearing to host more intrusive type lithologies, a favourable lithostratigraphic horizon in the Hole 69-71-72 Area (Conductive Zones 31a-d and 34a-d) is indicated to be present. These holes penetrated a schistose graphitic andesitic tuff/metasediment bedrock, with significant Na-depletion noted in hole 87-69 and Fe-Mg depletion in hole 87-71. The well-developed basal overburden of hole 87-69 contains significant equivalent Au, As, Cu and Zn values, as well as the highest -200 mesh equivalent values noted for all of Au, As, Cu, Zn and Ni. Up-ice holes 87-68 and 87-72, while containing elevated gold equivalent values, do not show the impressive polymetallic enrichment of 87-69.

Also of interest within this area of the property is Magnetic Domain II_C/Conductive Zone 27b in the Hole 75-76 Area, indicated to be a graphitic quartz-sericite schist horizon. The magnetic response suggests that mafic sills are prominent along this horizon also, and both this zone and that in the Hole 69-71-72 Area are offset by NNW-trending fault f_{17}. Hole 87-75 is depleted in sodium and the overburden of down-ice hole 87-77 contains significant Cu and Ag equivalent values while hole 87-78 (further down-ice) contains significant Au equivalent values.

10.0 CONCLUSIONS

The MPH reverse circulation drill program has served to augment previous geophysical surveys and meager geological information. The results indicate the property to be underlain by a mixed tholeiitic and calc-alkaline volcanic flow/sill stratigraphic regime containing several regional EM conductors within pyroclastic/volcaniclastic/sediment horizons. The Achates lithologies appear to be broadly correlative with the second or upper cycle of Roy Group volcanism, more specifically the Upper Gilman and/or the Blondeau Formations.

The reverse circulation drill program encountered a fairly typical overburden section for this region of the Abitibi, in that drift cover varies dramatically in both thickness and quality within the property boundaries. Much of the overburden material is of marginal usefullness as a heavy mineral sampling medium due to its thin, oxidized, ablationary nature.

Lithogeochemical work on the bedrock samples has been of great assistance in helping to delineate areas with enhanced mineral potential.

Combined overburden heavy mineral analytical data, as well as lithogeochemical/volcanogenic evaluations of bedrock samples have served to delineate a number of target areas for further evaluation within the Achates property. The most significant of these are as follows:

(i) The Hole 15-21 Area where bedrock lithologies and mineralization/alteration features suggest potential for volcanogenic type mineralization. Shallow, poorly-developed overburden contains several anomalous indicators down-ice from this horizon.

(ii) The Hole 53-55 and Hole 22-33 Area where elevated HMC gold grain counts and increased analytical values are present. Lithologies, mineralization and alteration features suggest potential for volcanogenic-type mineralization.

(iii) Conductive Zone 5-6-7, though probably transecting the entire property, shows elevated overburden grain counts and increased analytical values in all down-ice holes (which are quite variable in sample quality). Bedrock samples suggest potential for volcanogenic and/or Casa Berardi-type stratiform/stratabound mineralization on the basis of lithologies, mineralization, alteration and structure. A major shear zone along the shore of Lac a l'Eau Jaune appears to truncate the above three horizons, and may be a prime target for structurally-controlled gold deposits.

(iv) Results from Magnetic Domain I_D/Conductive Zone 8a-h, hint at potential for structurally-controlled lode-type gold mineralization hosted by iron-rich lithologies particularly on the basis of bedrock analyses and mineralogical and analytical indicators within a well-developed till section down-ice.

(v) The Hole 69-71-72 Area may have potential for volcanogenic and/or Golden Hope-type mineralization on the basis of bedrock lithologies and alteration. Down-ice hole 87-69 contained probably anomalous Au, As, Cu, Zn (both ±200 mesh) values in well-developed overburden. The Hole 75-76 Area, also east of Lac a l'Eau Jaune, may be potentially favourable for similar mineralization, or Gwillim/Chibex-type deposits in mafic sills inferred to be present within a graphitic quartz-sericite schist horizon.

We would rank the Hole 67-71-72 Area, the Hole 53-55 and 22-33 Areas and Conductive Zones 5-6-7, especially in the Hole 48-49 Area as being the most attractive targets for further exploration on the basis of all of our work to date.

11.0 RECOMMENDATIONS

Assimilating all of the preceding results and conclusions, it is felt that the five target areas described previously should be subjected to follow-up exploration. The main follow-up technique should be backhoe trenching on conductive/magnetic features or interpreted structural zones in the area of anomalous overburden holes. This work should be in addition to recommendations for surficial soil geochemical surveys already presented to Minnova.

The deeper overburden material in all trenches should be collected for heavy minerals work and geochemical analysis. Any mineralized or "rusty" boulders should likewise be sampled in addition to sampling of bedrock material.

Further work in the form of additional trenching and diamond drilling should be contingent on the results of the foregoing relative to the exploration models for the property area.

Respectfully submitted,

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OVERBURDEN DRILLING MANAGEMENT LIMITED - LABORATORY SAMPLE LOG

ABBREVIATIONS

CLAST:

SIZE OF CLAST:

G: GRANULES
P: PEBBLES
C: COBBLES
BL: BOULDER CHIPS
BK: BEDROCK CHIPS

% CLAST COMPOSITION

V/S	VOLCANICS AND SEDIMENTS
GR	GRANITICS
LS	LIMESTONE
OT	OTHER LITHOLOGIES (REFER TO FOOTNOTES BELOW)
TR	ONLY TRACE PRESENT
NA	NOT APPLICABLE

MATRIX:

S/U	SORTED OR UNSORTED				
SD	SAND	Y	YES FRACTION PRESENT	F:	FINE
ST	SILT	N	FRACTION NOT PRESENT	M:	MEDIUM
CY	CLAY			C:	COARSE

COLOR:

B: BEIGE
GY: GREY
GB: GREY BEIGE
GN: GREEN
GG: GREY GREEN
BN: BROWN
BK: BLACK
OC: OCHRE
PK: PINK
OE: ORANGE

DESCRIPTION:

BLD: BOULDER CHIPS
BDK: BEDROCK CHIPS

FOOTNOTES:

A GRITTY CLAY LUMPS PRESENT

B SMOOTH CLAY LUMPS PRESENT

C ORGANICS PRESENT

D SAMPLE HIGHLY OXIDIZED

ABBREVIATIONS

NUMBER OF GRAINS:

T: NUMBER FOUND ON SHAKING TABLE
P: NUMBER FOUND AFTER PANNING

THICKNESS:

C: CALCULATED THICKNESS OF GRAIN
M: ACTUAL MEASURED THICKNESS OF GRAIN

MPFA1APR.WR1

TOTAL # OF SAMPLES IN THIS REPORT = 40

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)					AU		DESCRIPTION											CLASS
						M. I. CONC					CLAST					MATRIX						
	TABLE SPLIT	+10 CHIPS	TABLE FEED	TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG	MAG	NO. V.G.	CALC PPB	SIZE	%				S/U	SD	ST	CY	COLOR		
												V/S	GR	LS	OT					SD	CY	
FA-87																						
01-01	7.5	0.0	7.5	127.3	91.3	36.0	26.7	9.3	0	NA												
02-01	3.5	0.0	3.5	82.4	69.9	12.5	10.7	1.8	1	140												
-02	2.5	0.0	2.5	76.8	71.4	5.4	4.7	0.7	0	NA												
-03	5.3	0.0	5.3	111.8	88.6	23.2	18.8	4.4	0	NA												
-04	6.5	0.0	6.5	108.3	76.7	31.6	17.6	14.0	0	NA												
03-01	4.1	0.0	4.1	79.9	72.6	7.3	5.8	1.5	0	NA												
-02	1.9	0.0	1.9	56.6	52.1	4.5	3.6	0.9	0	NA												
-03	2.9	0.0	2.9	64.8	59.2	5.6	4.2	1.4	0	NA												
-04	4.3	0.0	4.3	76.8	64.8	12.0	8.9	3.1	0	NA												
04-01	1.0	0.0	1.0	37.9	35.1	2.8	2.1	0.7	0	NA												
05-01	4.9	0.0	4.9	92.8	75.2	17.6	12.5	5.1	1	81												
-02	4.9	0.0	4.9	117.9	95.3	22.6	15.3	7.3	1	98												
-03	6.0	0.0	6.0	128.2	100.4	27.8	19.4	8.4	0	NA												
-04	6.0	0.0	6.0	138.0	109.0	29.0	18.1	10.9	0	NA												
-05	8.5	0.0	8.5	168.2	131.1	37.1	23.1	14.0	0	NA												
-06	6.8	0.0	6.8	115.1	85.7	29.4	19.3	10.1	1	52												
-07	7.4	0.0	7.4	128.9	94.3	34.6	21.0	13.6	0	NA												
-08	3.4	0.0	3.4	77.8	64.0	13.8	9.8	4.0	0	NA												
-09	2.7	0.0	2.7	86.4	75.0	11.4	7.7	3.7	0	NA												
06-01	4.7	0.0	4.7	97.8	81.7	16.1	11.6	4.5	0	NA												
-02	6.2	0.0	6.2	74.9	50.1	24.8	17.9	6.9	0	NA												
07-01	1.4	0.0	1.4	49.1	44.2	4.9	3.7	1.2	0	NA												
09-01	0.5	0.0	0.5	15.0	13.8	1.2	1.0	0.2	0	NA												
-02	0.9	0.0	0.9	14.1	11.7	2.4	1.7	0.7	0	NA												
-03	1.7	0.0	1.7	17.0	11.6	5.4	4.1	1.3	0	NA												
-04	1.3	0.0	1.3	15.2	13.1	2.1	1.7	0.4	0	NA												
10-01	1.5	0.0	1.5	29.6	23.9	5.7	4.7	1.0	0	NA												
-02	2.3	0.0	2.3	33.0	24.7	8.3	6.5	1.8	0	NA												
11-01	0.3	0.0	0.3	8.1	7.0	1.1	1.0	0.1	0	NA												
12-01	0.1	0.0	0.1	5.6	5.3	0.3	0.2	0.1	0	NA												
-02	1.2	0.6	0.6	12.3	11.8	0.5	0.4	0.1	0	NA												
13-01	3.5	0.1	3.4	70.2	47.1	23.1	16.8	6.3	0	NA												
-02	2.1	0.0	2.1	40.3	31.8	8.5	6.2	2.3	0	NA												
-03	0.9	0.0	0.9	25.1	22.3	2.8	2.2	0.6	0	NA												
-04	1.5	0.0	1.5	23.9	11.7	12.2	7.6	4.6	1	11												
14-01	1.8	0.0	1.8	44.5	34.5	10.0	9.1	0.9	0	NA												
-02	1.7	0.0	1.7	41.7	28.2	13.5	12.5	1.0	0	NA												
-03	1.8	0.0	1.8	35.3	24.1	11.2	9.9	1.3	0	NA												
15-01	3.2	0.0	3.2	58.1	40.9	17.2	13.4	3.8	1	368												
16-01	1.4	0.0	1.4	31.6	26.0	5.6	4.3	1.3	2	1039												

MPFA2APR.WR1

TOTAL # OF SAMPLES IN THIS REPORT = 39

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)					AU		DESCRIPTION											CLASS
						M. I. CONC					CLAST					MATRIX						
	TABLE SPLIT	+10 CHIPS	TABLE FEED	TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG	MAG	NO. V.G.	CALC PPB	SIZE	%				S/U	SD	ST	CY	COLOR		
												V/S	GR	LS	OT					SD	CY	
FA-87																						
17-01	2.3	0.0	2.3	43.6	36.1	7.5	6.1	1.4	0	NA												
18-01	1.0	0.0	1.0	22.0	17.1	4.9	4.2	0.7	0	NA												
19-01	1.1	0.0	1.1	50.0	35.7	14.3	10.4	3.9	0	NA												
20-01	0.8	0.0	0.8	32.1	27.7	4.4	3.5	0.9	0	NA												
21-01	0.8	0.0	0.8	27.4	20.1	7.3	1.0	6.3	0	NA												
22-01	1.0	0.0	1.0	25.0	20.3	4.7	4.5	0.2	0	NA												
23-01	4.2	0.0	4.2	72.2	48.1	24.1	18.3	5.8	0	NA												
24-01	3.0	0.0	3.0	55.9	40.8	15.1	11.5	3.6	0	NA												
-02	2.4	0.0	2.4	41.6	31.2	10.4	7.9	2.5	0	NA												
-03	3.6	0.0	3.6	51.1	38.2	12.9	10.2	2.7	0	NA												
25-01	3.2	0.0	3.2	62.9	46.7	16.2	11.0	5.2	0	NA												
-02	0.4	0.0	0.4	9.1	8.3	0.8	0.6	0.2	0	NA												
26-01	1.7	0.0	1.7	27.8	21.0	6.8	5.5	1.3	0	NA												
27-01	0.5	0.0	0.5	21.2	15.6	5.6	4.4	1.2	0	NA												
-02	1.2	0.0	1.2	18.4	14.2	4.2	2.8	1.4	0	NA												
28-01	6.7	0.5	6.2	95.4	77.0	18.4	16.1	2.3	0	NA												
29-01	2.9	0.2	2.7	41.6	32.6	9.0	7.2	1.8	0	NA												
30-01	5.1	0.5	4.6	86.0	57.0	29.0	20.3	8.7	0	NA												
31-01	3.7	0.0	3.7	63.3	45.1	18.2	14.6	3.6	0	NA												
-02	0.9	0.0	0.9	18.7	14.5	4.2	3.6	0.6	0	NA												
-04	2.2	0.0	2.2	9.0	8.4	0.6	0.4	0.2	0	NA												
32-01	3.8	1.0	2.8	65.8	45.2	20.6	15.9	4.7	0	NA												
-02	6.2	0.0	6.2	88.4	59.4	29.0	22.7	6.3	0	NA												
-03	1.9	0.0	1.9	49.0	40.6	8.4	6.2	2.2	0	NA												
33-01	2.5	0.0	2.5	56.6	44.5	12.1	9.9	2.2	0	NA												
-03	2.3	0.2	2.1	53.6	48.0	5.6	5.6	0.0	0	NA												
34-01	4.3	0.2	4.1	55.3	38.0	17.3	14.6	2.7	0	NA												
35-01	2.7	0.0	2.7	64.9	49.4	15.5	12.5	3.0	0	NA												
36-01	6.5	0.0	6.5	116.0	84.3	31.7	28.7	3.0	0	NA												
-02	5.6	0.0	5.6	166.4	133.5	32.9	24.6	8.3	0	NA												
37-01	7.5	0.0	7.5	181.7	150.3	31.4	25.7	5.7	0	NA												
-02	7.4	0.0	7.4	182.4	139.8	42.6	30.7	11.9	0	NA												
-03	6.0	0.0	6.0	140.0	115.0	25.0	19.2	5.8	0	NA												
38-01	4.6	0.0	4.6	114.0	93.0	21.0	18.2	2.8	0	NA												
40-01	0.8	0.0	0.8	29.6	26.0	3.6	3.1	0.5	0	NA												
-02	3.0	0.0	3.0	77.1	63.3	13.8	10.4	3.4	0	NA												
-03	2.1	0.0	2.1	49.9	40.5	9.4	7.4	2.0	0	NA												
-04	3.3	0.0	3.3	100.0	79.1	20.9	17.5	3.4	0	NA												
41-01A	1.5	0.0	1.5	21.9	15.8	6.1	4.9	1.2	0	NA												

MPFA3APR.WR1

OVERBURDEN DRILLING MANAGEMENT LIMITED

TOTAL # OF SAMPLES IN THIS REPORT = 39

LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)					AU		DESCRIPTION									CLASS
						M. I. CONC					CLAST					MATRIX				
	TABLE SPLIT	+10 CHIPS	TABLE FEED	TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG	MAG	NO. V.G.	CALC PPB	SIZE	%				S/U SD	ST CY	COLOR		
												V/S	GR	LS	OT			SD	CY	
FA-87																				
41-01B	11.1	0.0	11.1	32.8	27.2	5.6	4.6	1.0	0	NA										
42-01	2.2	0.0	2.2	51.1	40.2	10.9	8.9	2.0	0	NA										
-02	6.2	0.0	6.2	113.4	82.1	31.3	24.0	7.3	0	NA										
-03	5.2	0.0	5.2	105.2	77.3	27.9	21.4	6.5	0	NA										
-04	1.4	0.0	1.4	34.4	30.8	3.6	3.0	0.6	0	NA										
43-01	1.1	0.0	1.1	27.6	23.2	4.4	3.7	0.7	0	NA										
44-01	2.1	0.0	2.1	54.1	45.1	9.0	6.6	2.4	0	NA										
-02	3.7	0.0	3.7	87.3	65.6	21.7	16.6	5.1	0	NA										
45-01	5.0	0.3	4.7	108.9	71.2	37.7	28.5	9.2	1	35										
46-01	5.6	10.1	-4.5	119.4	95.9	23.5	18.9	4.6	0	NA										
-02	3.9	0.0	3.9	89.1	72.8	16.3	11.8	4.5	0	NA										
-03	1.8	0.0	1.8	36.9	28.5	8.4	6.5	1.9	0	NA										
47-01	0.4	0.0	0.4	17.6	15.3	2.3	1.8	0.5	0	NA										
-02	0.5	0.0	0.5	22.8	20.9	1.9	1.5	0.4	0	NA										
48-01	2.3	0.0	2.3	48.8	34.4	14.4	11.6	2.8	0	NA										
-02	2.0	0.0	2.0	61.4	51.5	9.9	8.4	1.5	1	120										
49-01	1.0	0.0	1.0	23.1	19.2	3.9	3.1	0.8	0	NA										
50-01	1.9	0.1	1.8	43.1	33.8	9.3	7.2	2.1	0	NA										
51-01	2.9	0.3	2.6	54.6	43.9	10.7	10.7	0.0	0	NA										
52-01	0.8	0.6	0.2	13.7	11.9	1.8	1.7	0.1	0	NA										
53-01	5.4	0.0	5.4	118.3	90.7	27.6	20.8	6.8	1	18										
-02	2.3	0.0	2.3	54.7	43.7	11.0	8.8	2.2	0	NA										
-03	4.1	0.0	4.1	65.6	48.7	16.9	12.6	4.3	0	NA										
-04	2.0	0.0	2.0	33.3	27.5	5.8	4.8	1.0	0	NA										
-05	2.9	0.0	2.9	47.2	39.6	7.6	6.3	1.3	0	NA										
54-01	1.2	0.0	1.2	39.2	34.3	4.9	4.2	0.7	0	NA										
-02	3.0	0.0	3.0	65.3	53.1	12.2	9.2	3.0	0	NA										
-04	2.3	0.0	2.3	88.7	75.0	13.7	12.2	1.5	0	NA										
-05	6.4	0.0	6.4	119.8	92.0	27.8	20.6	7.2	1	376										
-06	3.3	0.0	3.3	79.7	64.3	15.4	11.9	3.5	0	NA										
-07	2.3	0.0	2.3	57.2	45.9	11.3	7.8	3.5	0	NA										
55-01	1.7	0.0	1.7	39.4	32.5	6.9	5.4	1.5	0	NA										
-02	2.0	0.0	2.0	38.3	29.1	9.2	6.9	2.3	1	308										
-03	1.8	0.0	1.8	34.1	25.8	8.3	6.3	2.0	0	NA										
-04	1.5	0.0	1.5	34.7	28.8	5.9	4.6	1.3	0	NA										
56-01	2.5	0.0	2.5	42.5	31.0	11.5	8.7	2.8	0	NA										
57-01	4.4	0.0	4.4	92.3	70.5	21.8	16.2	5.6	0	NA										
-02	0.6	0.0	0.6	21.8	19.5	2.3	1.8	0.5	0	NA										
58-01	2.6	0.0	2.6	40.3	33.7	6.6	4.5	2.1	0	NA										

MPFA1MAY.WR1
TOTAL # OF SAMPLES IN THIS REPORT = 45

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)					AU		DESCRIPTION											CLASS
						M. I. CONC					CLAST					MATRIX						
	TABLE SPLIT	+10 CHIPS	TABLE FEED	TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG	MAG	NO. V.G.	CALC PPB	SIZE	%				S/U	SD	ST	CY	COLOR		
												V/S	GR	LS	OT					SD	CY	
FA-87																						
58-02	5.2	0.0	5.2	106.3	85.6	20.7	15.7	5.0	1	314												
-03	5.4	0.0	5.4	103.7	77.7	26.0	19.2	6.8	0	NA												
-04	7.6	0.0	7.6	130.3	100.1	30.2	19.4	10.8	0	NA												
-05	4.8	0.0	4.8	112.5	95.9	16.6	12.7	3.9	0	NA												
-06	6.8	0.0	6.8	155.6	120.6	35.0	26.6	8.4	1	186												
-07	6.6	0.0	6.6	118.9	85.4	33.5	23.8	9.7	1	122												
-08	7.6	0.0	7.6	165.6	123.3	42.3	30.7	11.6	0	NA												
-09	6.5	0.0	6.5	271.3	237.5	33.8	23.6	10.2	0	NA												
59-01	3.5	0.0	3.5	87.9	69.8	18.1	13.9	4.2	0	NA												
-02	3.2	0.0	3.2	75.0	54.7	20.3	15.1	5.2	0	NA												
60-01	5.6	0.0	5.6	108.1	79.0	29.1	22.8	6.3	0	NA												
-02	1.0	0.0	1.0	23.7	18.7	5.0	4.0	1.0	0	NA												
-03	4.0	0.0	4.0	75.6	56.8	18.8	13.3	5.5	0	NA												
-04	2.8	0.0	2.8	107.9	93.0	14.9	11.2	3.7	0	NA												
61-01	2.9	0.0	2.9	71.7	58.8	12.9	12.2	0.7	0	NA												
-02	2.7	0.0	2.7	65.0	54.5	10.5	8.7	1.8	1	244												
62-01	3.9	0.0	3.9	92.8	77.3	15.5	13.5	2.0	0	NA												
63-01	5.2	0.0	5.2	107.9	77.3	30.6	24.9	5.7	1	154												
-02	3.8	0.0	3.8	62.6	42.6	20.0	15.2	4.8	0	NA												
-03	5.5	0.0	5.5	132.7	100.6	32.1	23.8	8.3	0	NA												
64-01	1.2	0.0	1.2	36.0	30.5	5.5	4.5	1.0	0	NA												
65-01	5.8	0.0	5.8	114.1	84.0	30.1	23.0	7.1	0	NA												
-02	4.1	0.0	4.1	105.0	82.6	22.4	17.0	5.4	0	NA												
66-01	3.8	0.0	3.8	91.6	71.8	19.8	15.0	4.8	0	NA												
-02	6.9	0.0	6.9	137.5	103.3	34.2	25.7	8.5	0	NA												
67-01	1.5	0.0	1.5	46.6	38.9	7.7	6.3	1.4	0	NA												
-02	0.7	0.0	0.7	21.2	19.6	1.6	0.9	0.7	0	NA												
68-01	1.8	0.0	1.8	50.6	37.8	12.8	9.8	3.0	0	NA												
-02	6.0	0.0	6.0	120.1	110.6	9.5	4.0	5.5	1	723												
-03	1.2	0.0	1.2	19.1	14.7	4.4	3.2	1.2	0	NA												
-04	0.7	0.0	0.7	19.2	16.3	2.9	2.6	0.3	0	NA												
69-01	6.4	0.0	6.4	161.3	133.9	27.4	22.9	4.5	0	NA												
-02	6.0	0.0	6.0	116.4	85.0	31.4	23.9	7.5	0	NA												
-03	1.2	0.0	1.2	46.0	27.7	18.3	17.9	0.4	0	NA												
72-01	2.6	0.2	2.4	44.6	35.6	9.0	6.8	2.2	0	NA												
73-01	7.2	0.0	7.2	163.7	134.8	28.9	22.7	6.2	0	NA												
74-01	0.5	0.0	0.5	21.8	20.4	1.4	1.2	0.2	0	NA												
75-01	1.4	0.0	1.4	34.4	28.5	5.9	4.8	1.1	0	NA												
76-01	1.0	0.0	1.0	34.4	29.1	5.3	4.3	1.0	0	NA												
77-01	2.2	0.0	2.2	68.4	55.9	12.5	9.4	3.1	0	NA												
-02	1.5	0.0	1.5	46.3	40.3	6.0	4.0	2.0	0	NA												
-03	7.1	0.0	7.1	143.8	119.7	24.1	23.3	0.8	0	NA												
-04	2.4	0.0	2.4	43.9	32.8	11.1	7.1	4.0	0	NA												
78-01	5.9	0.0	5.9	158.2	141.5	16.7	11.7	5.0	0	NA												

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MPFA1MAY.WR1                                     OVERBURDEN DRILLING MANAGEMENT LIMITED
TOTAL # OF SAMPLES IN THIS REPORT =     45
                                                       LABORATORY SAMPLE LOG

SAMPLE   WEIGHT (KG.WET)           WEIGHT (GRAMS  DRY)           AU                DESCRIPTION                       CLASS
  NO.    ==================  =============================== =========== =========================================  ==========
                                              M. I. CONC                    CLAST               MATRIX
                                           ================              =================== =====================
          TABLE  +10  TABLE  TABLE   M.I.  CONC.  NON        NO.   CALC  SIZE      %         S/U SD   ST CY COLOR
          SPLIT CHIPS FEED   CONC   LIGHTS TOTAL  MAG   MAG  V.G.  PPB       ===============                ======
                                                                             V/S GR   LS  OT                SD  CY
         __________________  _____________ _________________ ___________ ___________________ _____________________  ______

   FA-87
   78-02   5.3   0.0   5.3   123.2   94.1  29.1  21.6   7.5   0      NA
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GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA1APR.WR1                                    NUMBER OF GRAINS
TOTAL # OF PANNINGS        5           -----------------------------------
                                       ABRADED   IRREGULAR  DELICATE TOTAL NON    CALC V.G.
SAMPLE #  PANNED                       ========  =========  ======== ===== MAG      ASSAY
           Y/N    DIAMETER   THICKNESS    T    P    T    P    T    P       GMS      PPB    REMARKS

FA-87
   01-01    N   NO VISIBLE GOLD

   02-01    N     100 X  100      20 C    1                               1
                                                                       --------------------
                                                                          1  10.7       140

     -02    N   NO VISIBLE GOLD

     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

   03-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

   04-01    N   NO VISIBLE GOLD

   05-01    N      50 X  125      18 C    1                               1
                                                                       --------------------
                                                                          1  12.5        81

     -02    N      75 X  125      20 C    1                               1
                                                                       --------------------
                                                                          1  15.3        98

     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

     -05    N   NO VISIBLE GOLD

     -06    N      50 X  125      18 C    1                               1
                                                                       --------------------
                                                                          1  19.3        52

     -07    N   NO VISIBLE GOLD

     -08    N   NO VISIBLE GOLD

     -09    N   NO VISIBLE GOLD

   06-01    N   NO VISIBLE GOLD
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GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA1AFR.WR1                                     NUMBER OF GRAINS
TOTAL # OF PANNINGS        5            -----------------------------------
                                        ABRADED   IRREGULAR  DELICATE TOTAL NON     CALC V.G.
SAMPLE #  PANNED                        ========  =========  ======== ===== MAG       ASSAY
           Y/N    DIAMETER    THICKNESS    T    P     T   P     T    P      GMS       PPB    REMARKS

FA-87

     -02     N  NO VISIBLE GOLD

   07-01     N  NO VISIBLE GOLD

   09-01     N  NO VISIBLE GOLD

     -02     N  NO VISIBLE GOLD

     -03     N  NO VISIBLE GOLD

     -04     N  NO VISIBLE GOLD

   10-01     N  NO VISIBLE GOLD

     -02     N  NO VISIBLE GOLD

   11-01     N  NO VISIBLE GOLD

   12-01     N  NO VISIBLE GOLD

     -02     N  NO VISIBLE GOLD

   13-01     N  NO VISIBLE GOLD

     -02     N  NO VISIBLE GOLD

     -03     N  NO VISIBLE GOLD

     -04     Y      25 X   50       8 C          1                         1                 EST. 40% PYRITE
                                                                        --------------------
                                                                           1    7.6       11

   14-01     Y  NO VISIBLE GOLD                                                              EST. 60% PYRITE

     -02     Y  NO VISIBLE GOLD                                                              EST. 60% PYRITE

     -03     Y  NO VISIBLE GOLD                                                              EST. 40% PYRITE

   15-01     N     100 X  200      29 C    1                               1
                                                                        --------------------
                                                                           1   13.4      368

   16-01     Y      75 X   75      15 C               1                    1                 EST. 5% PYRITE
                   125 X  150      27 C               1                    1
                                                                        --------------------
                                                                           2    4.3     1039
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GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA1APR.WR1                                 NUMBER OF GRAINS
TOTAL # OF PANNINGS       5          -----------------------------------
                                     ABRADED   IRREGULAR  DELICATE TOTAL NON    CALC V.G.
SAMPLE #  PANNED                     ========  =========  ======== ===== MAG     ASSAY
          Y/N    DIAMETER  THICKNESS   T    P    T    P    T    P        GMS     PPB    REMARKS

FA-87
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GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA2AFR.WR1                                         NUMBER OF GRAINS
TOTAL # OF PANNINGS        5             -----------------------------------
                                         ABRADED   IRREGULAR  DELICATE TOTAL NON    CALC V.G.
SAMPLE #  PANNED                         ========  =========  ======== ===== MAG      ASSAY
          Y/N    DIAMETER   THICKNESS     T    P    T    P    T    P        GMS      PPB    REMARKS


   FA-87
   17-01    N   NO VISIBLE GOLD

   18-01    Y   NO VISIBLE GOLD                                                              EST. 50% PYRITE

   19-01    N   NO VISIBLE GOLD

   20-01    N   NO VISIBLE GOLD

   21-01    Y   NO VISIBLE GOLD                                                              EST. 70% PYRITE

   22-01    Y   NO VISIBLE GOLD                                                              EST. 40% PYRITE

   23-01    N   NO VISIBLE GOLD

   24-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -03    N   NO VISIBLE GOLD

   25-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

   26-01    N   NO VISIBLE GOLD

   27-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

   28-01    N   NO VISIBLE GOLD

   29-01    N   NO VISIBLE GOLD

   30-01    N   NO VISIBLE GOLD

   31-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

   32-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -03    N   NO VISIBLE GOLD
```

```
GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA2APR.WR1                                    NUMBER OF GRAINS
TOTAL # OF PANNINGS        5           -----------------------------------
                                       ABRADED   IRREGULAR  DELICATE TOTAL NON    CALC V.G.
SAMPLE #  PANNED                       ========  =========  ======== ===== MAG      ASSAY
           Y/N    DIAMETER   THICKNESS    T    P    T    P    T    P       GMS      PPB    REMARKS

   FA-87

   33-01    N   NO VISIBLE GOLD

     -03    Y   NO VISIBLE GOLD                                                             EST. 70% PYRITE

   34-01    N   NO VISIBLE GOLD

   35-01    N   NO VISIBLE GOLD

   36-01    N   NO VISIBLE GOLD

     -02    Y   NO VISIBLE GOLD                                                             EST. 2% PYRITE

   37-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -03    N   NO VISIBLE GOLD

   38-01    N   NO VISIBLE GOLD

   40-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

  41-01A    N   NO VISIBLE GOLD
```

```
GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA3APR.WR1                                    NUMBER OF GRAINS
TOTAL # OF PANNINGS        2           -----------------------------------
                                       ABRADED   IRREGULAR  DELICATE TOTAL NON    CALC V.G.
SAMPLE #  PANNED                       ======== =========  ======== ===== MAG      ASSAY
           Y/N    DIAMETER   THICKNESS    T    P    T    P    T    P       GMS      PPB    REMARKS

   FA-87
  41-01B    N   NO VISIBLE GOLD

   42-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

   43-01    N   NO VISIBLE GOLD

   44-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

   45-01    N       75 X  100      18 C   1                          1
                                                                  --------------------
                                                                     1  28.5        35

   46-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -03    Y   NO VISIBLE GOLD                                                          EST. 70% PYRITE

   47-01    Y   NO VISIBLE GOLD                                                          EST. 50% PYRITE

     -02    N   NO VISIBLE GOLD

   48-01    N   NO VISIBLE GOLD

     -02    N       75 X  100      18 C   1                          1
                                                                  --------------------
                                                                     1    8.4      120

   49-01    N   NO VISIBLE GOLD

   50-01    N   NO VISIBLE GOLD

   51-01    N   NO VISIBLE GOLD

   52-01    N   NO VISIBLE GOLD

   53-01    N       50 X   75      13 C   1                          1
                                                                  --------------------
                                                                     1   20.8       18
```

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GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA3APR.WR1                                    NUMBER OF GRAINS
TOTAL # OF PANNINGS       2            -----------------------------------
                                       ABRADED   IRREGULAR  DELICATE TOTAL NON    CALC V.G.
SAMPLE #  PANNED                       ========  =========  ======== ===== MAG      ASSAY
           Y/N    DIAMETER   THICKNESS    T    P    T    P    T    P       GMS      PPB    REMARKS

   FA-87

     -02    N   NO VISIBLE GOLD

     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

     -05    N   NO VISIBLE GOLD

   54-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

     -05    N      75 X  275      34 C    1                               1
                                                                      ---------------------
                                                                          1   20.6       376

     -06    N   NO VISIBLE GOLD

     -07    N   NO VISIBLE GOLD

   55-01    N   NO VISIBLE GOLD

     -02    N      75 X  150      22 C    1                               1
                                                                      ---------------------
                                                                          1    6.9       308

     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

   56-01    N   NO VISIBLE GOLD

   57-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

   58-01    N   NO VISIBLE GOLD
```

```
GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA1MAY.WR1                                     NUMBER OF GRAINS
TOTAL # OF PANNINGS        1            ------------------------------------
                                        ABRADED    IRREGULAR  DELICATE TOTAL NON     CALC V.G.
SAMPLE #  PANNED                        ========   =========  ======== ===== MAG       ASSAY
          Y/N    DIAMETER   THICKNESS    T    P     T    P     T    P        GMS       PPB    REMARKS

   FA-87
   58-02   N      150 X  150      29 C   1                             1
                                                                   ---------------------
                                                                       1   15.7       314

     -03   N    NO VISIBLE GOLD

     -04   N    NO VISIBLE GOLD

     -05   N    NO VISIBLE GOLD

     -06   N      125 X  175      29 C   1                             1
                                                                   ---------------------
                                                                       1   26.6       186

     -07   N      125 X  125      25 C   1                             1
                                                                   ---------------------
                                                                       1   23.8       122

     -08   N    NO VISIBLE GOLD

     -09   N    NO VISIBLE GOLD

   59-01   N    NO VISIBLE GOLD

     -02   N    NO VISIBLE GOLD

   60-01   N    NO VISIBLE GOLD

     -02   N    NO VISIBLE GOLD

     -03   N    NO VISIBLE GOLD

     -04   N    NO VISIBLE GOLD

   61-01   N    NO VISIBLE GOLD

     -02   N      100 X  125      22 C   1                             1
                                                                   ---------------------
                                                                       1    8.7       244

   62-01   N    NO VISIBLE GOLD

   63-01   N      125 X  150      27 C   1                             1
                                                                   ---------------------
                                                                       1   24.9       154

     -02   N    NO VISIBLE GOLD
```

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GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA1MAY.WR1                                    NUMBER OF GRAINS
TOTAL # OF PANNINGS        1           ----------------------------------
                                       ABRADED   IRREGULAR  DELICATE TOTAL NON    CALC V.G.
SAMPLE #  PANNED                       ========  =========  ======== ===== MAG      ASSAY
           Y/N    DIAMETER   THICKNESS    T    P    T    P    T    P       GMS      PPB    REMARKS

   FA-87

     -03    N   NO VISIBLE GOLD

   64-01    N   NO VISIBLE GOLD

   65-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

   66-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

   67-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

   68-01    N   NO VISIBLE GOLD

     -02    N     100 X  150      25 C    1                              1
                                                                      --------------------
                                                                         1    4.0       723

     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

   69-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD

     -03    Y   NO VISIBLE GOLD                                                           EST. 70% PYRITE

   72-01    N   NO VISIBLE GOLD

   73-01    N   NO VISIBLE GOLD

   74-01    N   NO VISIBLE GOLD

   75-01    N   NO VISIBLE GOLD

   76-01    N   NO VISIBLE GOLD

   77-01    N   NO VISIBLE GOLD

     -02    N   NO VISIBLE GOLD
```

```
GOLD CLASSIFICATION
===================
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

MPFA1MAY.WR1                                    NUMBER OF GRAINS
TOTAL # OF PANNINGS        1           -----------------------------------
                                       ABRADED   IRREGULAR  DELICATE TOTAL NON    CALC V.G.
SAMPLE #  PANNED                       ========  ========= ======== ===== MAG      ASSAY
           Y/N    DIAMETER   THICKNESS    T    P    T    P    T    P      GMS      PPB    REMARKS

   FA-87
     -03    N   NO VISIBLE GOLD

     -04    N   NO VISIBLE GOLD

   78-01    N   NO VISIBLE GOLD

   78-02    N   NO VISIBLE GOLD
```

APPENDIX B

Certificates of Analysis - Overburden, Bedrock

+200 Mesh Overburden Assays

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BONDAR-CLEGG

Geochemical Lab Report

REPORT: 017-1825

PROJECT: NONE

SAMPLE	ELEMENT	Cu	Zn	Ag	As	Au	Testwt
NUMBER	UNITS	PPM	PPM	PPM	PPM	PPB	gms
FA87-01-01-3/4		81	304	0.3	25	40	
FA87-02-01-3/4		286	85	<0.1	45	365	5.00
FA87-02-02-H		263	115	0.1	126	75	2.00
FA87-02-03-3/4		359	2080	0.1	49	20	8.00
FA87-02-04-3/4		516	193	0.2	93	65	
FA87-03-01-3/4		85	102	0.1	7	35	2.00
FA87-03-02-H		232	60	0.1	7	70	2.00
FA87-03-03-3/4		50	46	<0.1	3	40	2.00
FA87-03-04-3/4		53	35	<0.1	5	15	4.00
FA87-04-01-H		548	184	0.4	44	<50	1.27
FA87-05-01-3/4		150	71	<0.1	24	215	6.00
FA87-05-02-3/4		160	86	0.1	33	600	9.00
FA87-05-03-3/4		144	64	0.2	45	35	
FA87-05-04-3/4		153	72	0.1	50	45	9.00
FA87-05-05-3/4		150	79	0.4	94	30	
FA87-05-06-3/4		189	119	<0.1	76	60	
FA87-05-07-3/4		158	59	0.2	52	25	
FA87-05-08-3/4		348	3605	0.8	75	30	4.00
FA87-05-09-3/4		345	77	0.2	98	45	3.00
FA87-06-01-3/4		92	114	<0.1	8	100	6.00
FA87-06-02-3/4		61	354	0.2	9	145	7.00
FA87-07-01-H		855	127	0.8	79	35	2.00
FA87-09-01-H		IS	IS	IS	IS	<55	0.97
FA87-09-02-H		IS	IS	IS	IS	<50	1.36
FA87-09-03-H		76	24	<0.1	9	35	2.00
FA87-09-04-H		144	25	<0.1	15	100	0.99
FA87-10-01-H		88	49	1.6	6	70	2.00
FA87-10-02-3/4		126	31	0.1	3	35	3.00
FA87-11-01-H		IS	IS	IS	IS	155	0.76
FA87-12-01-H		IS	IS	IS	IS	<555	0.09
FA87-12-02-H		IS	IS	IS	IS	580	0.17
FA87-13-01-3/4		96	17	<0.1	15	20	
FA87-13-02-3/4		39	22	0.1	5	<25	2.00
FA87-13-03-H		127	160	<0.1	15	<50	1.43
FA87-13-04-3/4		528	472	0.4	37	30	3.00
FA87-14-01-3/4		359	179	0.1	80	50	4.00
FA87-14-02-3/4		257	175	0.1	75	95	7.00
FA87-14-03-3/4		547	242	0.4	125	70	2.00
FA87-15-01-3/4		543	142	0.5	114	130	8.00
FA87-16-01-H		489	95	0.4	63	55	2.00

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BONDAR-CLEGG

Geochemical Lab Report

REPORT: 017-1869

PROJECT: NONE PAGE 1

SAMPLE ELEMENT	Cu	Zn	Ag	As	Au	Testwt
NUMBER UNITS	PPM	PPM	PPM	PPM	PPB	gms
EA-87-17-01-3/4	63	31	0.3	15	<50	1.50
EA-87-18-01-H	545	58	0.3	75	350	1.70
EA-87-19-01-3/4	246	94	0.3	67	50	5.00
EA-87-20-01-H	279	62	0.4	47	<50	1.70
EA-87-21-01-H	215	45	1.5	167	220	3.50
EA-87-22-01-H	172	26	0.4	30	<20	2.50
EA-87-23-01-3/4	347	106	0.6	114	345	
EA-87-24-01-3/4	247	84	0.5	54	40	4.00
EA-87-24-02-3/4	188	55	0.5	51	80	5.00
EA-87-24-03-3/4	517	137	0.6	59	145	5.00
EA-87-25-01-3/4	218	31	0.5	18	60	5.00
EA-87-25-02-H	IS	IS	IS	IS	<135	0.37
EA-87-26-01-3/4	543	60	0.5	47	225	2.00
EA-87-27-01-H	232	36	0.5	40	45	2.00
EA-87-27-02-3/4	825	52	2.2	63	<500	1.00
EA-87-28-01-3/4	39	18	0.1	3	160	
EA-87-29-01-3/4	133	26	0.1	14	150	3.00
EA-87-30-01-3/4	43	23	0.3	9	115	
EA-87-31-01-3/4	316	201	0.6	51	50	8.00
EA-87-31-02-H	291	84	0.5	34	<50	1.50
EA-87-31-04-H	IS	IS	IS	IS	<270	0.19
EA-87-32-01-3/4	27	21	0.2	7	<10	9.00
EA-87-32-02-3/4	27	20	<0.1	9	20	8.00
EA-87-32-03-3/4	107	34	<0.1	57	<25	2.00
EA-87-33-01-3/4	314	100	0.1	62	185	3.75
EA-87-33-03-3/4	3540	18	0.1	900	200	2.00
EA-87-34-01-3/4	295	49	0.7	70	45	8.00
EA-87-35-01-3/4	203	60	0.1	84	120	6.00
EA-87-36-01-3/4	28	16	0.1	6	40	8.50
EA-87-36-02-3/4	227	21	0.1	22	150	8.00
EA-87-37-01-3/4	34	20	<0.1	5	50	8.00
EA-87-37-02-3/4	94	26	0.1	6	65	
EA-87-37-03-3/4	147	76	0.3	32	165	
EA-87-38-01-3/4	29	31	<0.1	5	75	
EA-87-39-02-H	2335	40	<0.1	1080	235	0.85
EA-87-40-01-H	152	60	<0.1	45	<50	1.85
EA-87-40-02-3/4	162	59	<0.1	51	95	3.50
EA-87-40-03-3/4	140	56	<0.1	63	35	3.50
EA-87-40-04-3/4	106	37	<0.1	40	40	
EA-87-41-01A-H	46	28	0.6	2	60	2.50

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BONDAR-CLEGG

Geochemical Lab Report

REPORT: 017-1923

PROJECT: NONE PAGE 1

SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Zn PPM	Ag PPM	As PPM	Au PPB	Testwt gms
FA87-41-1B-H		45	24	0.2	4	195	3.00
FA87-42-1-3/4		36	41	0.1	8	120	5.00
FA87-42-2-3/4		131	46	<0.1	36	30	
FA87-42-3-3/4		257	104	0.2	88	20	
FA87-42-04-H		973	375	0.5	44	180	1.50
FA87-43-01-H		191	81	0.6	36	30	2.50
FA87-44-1-3/4		370	62	0.3	18	<15	3.50
FA87-44-2-3/4		225	129	0.4	46	60	
FA87-45-01-3/4		309	112	0.8	41	110	
FA87-46-01-3/4		54	29	0.2	5	115	
FA87-46-02-3/4		595	34	0.4	13	45	7.00
FA87-46-03-3/4		3600	43	1.1	17	35	3.00
FA87-47-01-H		2490	86	1.1	43	80	1.00
FA87-47-02-H		IS	IS	IS	IS		1.14
FA87-48-01-3/4		442	185	0.8	144	395	6.00
FA87-48-02-3/4		441	388	1.3	348	590	4.00
FA87-49-01-H		129	52	<0.1	33	<50	1.50
FA87-50-01-3/4		53	54	0.2	11	140	4.00
FA87-51-01-3/4		293	25	<0.1	32	30	6.00
FA87-52-01-H		234	96	0.4	39	<50	1.00
FA87-53-01-3/4		52	22	<0.1	2	240	
FA87-53-02-3/4		231	45	0.3	12	70	4.50
FA87-53-03-3/4		124	22	0.4	19	20	8.00
FA87-53-04-H		2045	40	0.9	307	65	3.00
FA87-53-05-3/4		984	24	0.6	79	105	3.00
FA87-54-01-H		115	26	0.1	10	110	2.50
FA87-54-02-3/4		113	26	<0.1	5	<10	5.00
FA87-54-04-3/4		238	27	0.6	4	<10	7.00
FA87-54-05-3/4		159	23	0.5	4	5	
FA87-54-06-3/4		127	19	0.3	10	<10	7.00
FA87-54-07-3/4		166	57	0.8	33	30	4.00
FA87-55-01-3/4		320	38	0.4	21	<25	2.00
FA87-55-02-3/4		105	22	0.1	4	15	3.00
FA87-55-03-3/4		162	20	0.4	8	<15	3.00
FA87-55-04-H		168	108	<0.1	72	<50	1.00
FA87-56-01-3/4		236	62	0.6	41	<50	1.00
FA87-57-01-3/4		46	16	0.2	3	65	
FA87-57-02-H		1058	80	<0.1	20	<50	1.00
FA87-58-01-H		106	45	<0.1	8	300	3.00

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BONDAR-CLEGG

Geochemical Lab Report

REPORT: 017-1969

PROJECT: NONE

SAMPLE ELEMENT	Cu	Zn	Ag	As	Au	Testwt
NUMBER UNITS	PPM	PPM	PPM	PPM	PPB	gms
FA87-58-02-3/4	200	83	0.3	30	400	9.00
FA87-58-03-3/4	212	82	0.1	34	30	
FA87-58-04-3/4	234	85	0.4	36	70	9.00
FA87-58-05-3/4	299	76	0.2	42	20	7.00
FA87-58-06-3/4	510	69	0.2	39	95	
FA87-58-07-3/4	208	85	<0.1	41	350	
FA87-58-08-3/4	232	131	0.5	41	25	
FA87-58-09-3/4	405	475	0.5	56	105	
FA87-59-01-3/4	104	28	<0.1	4	235	8.00
FA87-59-02-3/4	43	27	<0.1	4	25	9.00
FA87-60-01-3/4	52	50	<0.1	4	15	
FA87-60-02-H	98	121	0.1	8	<50	1.50
FA87-60-03-3/4	64	38	0.3	4	55	7.00
FA87-60-04-3/4	131	68	0.2	23	50	5.00
FA87-61-01-3/4	168	43	0.1	41	80	6.00
FA87-61-02-3/4	327	111	1.2	440	100	5.00
FA87-62-01-3/4	80	34	0.2	8	60	8.00
FA87-63-01-3/4	196	57	0.3	54	15	
FA87-63-02-3/4	332	92	0.2	80	60	9.00
FA87-63-03-3/4	300	82	0.7	69	115	
FA87-64-01-H	338	112	<0.1	37	80	2.50
FA87-65-01-3/4	307	93	0.4	63	45	
FA87-65-02-3/4	320	99	0.3	53	85	9.00
FA87-66-01-3/4	377	99	0.4	38	85	8.00
FA87-66-02-3/4	238	64	0.1	29	10	
FA87-67-01-3/4	656	152	0.2	IS	35	2.50
FA87-67-02-H	IS	IS	IS	IS	<140	0.36
FA87-68-01-3/4	63	46	0.1	10	190	3.50
FA87-68-02-H	64	30	0.2	7	620	
FA87-68-03-H	80	42	1.6	9	95	2.00
FA87-68-04-H	96	64	0.4	IS		1.50
FA87-69-01-3/4	58	31	0.2	46	<5	
FA87-69-02-3/4	106	32	<0.1	20	40	
FA87-69-03-3/4	795	67	0.1	209	75	
FA87-72-01-3/4	89	40	0.2	5	275	3.00
FA87-73-01-3/4	365	126	0.4	45	50	
FA87-74-01-H	IS	IS	IS	IS	<60	0.89
FA87-75-01-H	273	100	0.6	91	40	3.00
FA87-76-01-H	177	31	0.1	8	<15	3.00
FA87-77-01-3/4	689	39	0.9	29	40	5.00

REPORT: 017-1969

PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Zn PPM	Ag PPM	As PPM	Au PPB	Testwt gms
EA87-77-02-H		481	52	0.9	23	<25	2.50
EA87-77-03-3/4		106	25	0.1	8	15	
EA87-77-04-3/4		377	31	0.6	50	<15	4.00
EA87-78-01-3/4		42	23	0.5	5	620	6.00
EA87-78-02-3/4		243	53	0.1	30	55	

-200 Mesh Overburden Assays

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BONDAR-CLEGG

Geochemical Lab Report

REPORT: 017-2459

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SAMPLE NUMBER	ELEMENT UNITS	Ni PPM	Cu PPM	Zn PPM	As PPM	Au PPB
FA-87-1-1-G		13	12	22	4	<5
FA-87-1-2-B		50	32	68	5	<5
FA-87-2-1-G		19	16	20	3	<5
FA-87-2-2-G		21	14	24	3	<5
FA-87-2-3-G		61	31	64	3	<5
FA-87-2-4-G		141	31	28	4	<5
FA-87-2-5-B		99	102	48	3	<5
FA-87-3-1-G		23	27	24	5	<5
FA-87-3-2-G		26	34	28	3	<5
FA-87-3-3-G		12	12	20	<2	<5
FA-87-3-4-G		15	14	22	<2	<5
FA-87-3-5-B		95	138	56	<2	<5
FA-87-4-1-G		39	46	34	3	<5
FA-87-4-2-B		111	134	78	13	<5
FA-87-5-1-G		11	11	14	2	<5
FA-87-5-2-G		15	12	16	<2	<5
FA-87-5-3-G		18	13	18	3	<5
FA-87-5-4-G		22	16	22	3	<5
FA-87-5-5-G		15	12	16	3	<5
FA-87-5-6-G		14	12	20	4	<5
FA-87-5-7-G		17	14	20	2	<5
FA-87-5-8-G		17	16	140	4	<5
FA-87-5-9-G		33	21	22	4	<5
FA-87-5-10-B		84	123	96	4	<5
FA-87-6-1-G		16	21	20	4	5
FA-87-6-2-G		39	39	21	3	<5
FA-87-6-3-B		49	160	42	3	<5
FA-87-7-1-G		32	45	32	4	<5
FA-87-7-2-B		75	115	74	17	<5
FA-87-8-1-B		55	135	34	2	<5
FA-87-9-1-G		53	84	40	4	<5
FA-87-9-2-G		85	78	52	2	<5
FA-87-9-3-G		63	75	36	4	<5
FA-87-9-4-G		60	91	38	4	<5
FA-87-9-5-B		74	126	52	<2	<5
FA-87-10-1-G		54	94	52	<2	5
FA-87-10-2-G		51	93	40	<2	<5
FA-87-10-3-B		49	44	28	2	<5
FA-87-11-1-G		57	68	38	<2	<5
FA-87-11-2-B		20	24	50	4	<5

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SAMPLE NUMBER	ELEMENT UNITS	Ni PPM	Cu PPM	Zn PPM	As PPM	Au PPB
FA-87-12-1-G		64	102	60	<2	<5
FA-87-12-2-G		67	57	50	<2	<5
FA-87-13-1-G		20	20	14	<2	<5
FA-87-13-2-G		20	15	20	<2	<5
FA-87-13-3-G		30	27	26	<2	<5
FA-87-13-4-G		70	75	50	5	5
FA-87-13-5-B		97	86	44	<2	<5
FA-87-14-1-G		30	42	52	2	<5
FA-87-14-2-G		27	36	54	5	<5
FA-87-14-3-G		27	38	40	<2	<5
FA-87-14-4-B		21	16	54	<2	<5
FA-87-15-1-G		18	24	20	<2	<5
FA-87-15-2-B		113	115	92	21	<5
FA-87-16-1-G		14	18	18	<2	<5
FA-87-16-2-B		23	12	52	<2	<5
FA-87-17-1-G		13	13	16	<2	<5
FA-87-17-2-B		10	44	64	129	<5
FA-87-18-1-G		40	32	32	<2	10
FA-87-18-2-B		98	43	60	<2	<5
FA-87-19-1-G		13	12	18	<2	<5
FA-87-19-2-B		23	33	38	4	<5
FA-87-20-1-G		14	13	16	2	<5
FA-87-20-2-B		27	34	102	3	<5
FA-87-21-1-G		16	20	22	7	<5
FA-87-21-2-B		44	87	100	39	5
FA-87-22-1-G		12	12	12	<2	<5
FA-87-22-2-B		121	170	120	6	<5
FA-87-23-1-G		15	17	16	<2	<5
FA-87-23-2-B		104	116	64	28	<5
FA-87-24-1-G		14	13	16	2	<5
FA-87-24-2-G		15	17	18	2	<5
FA-87-24-3-G		25	24	24	2	<5
FA-87-24-4-B		120	150	72	7	<5
FA-87-25-1-G		33	36	38	2	<5
FA-87-25-2-G		58	74	48	4	<5
FA-87-25-3-B		103	204	140	<2	<5
FA-87-26-1-G		22	33	24	<2	<5
FA-87-26-2-B		109	112	84	5	<5
FA-87-27-1-G		24	22	26	2	<5
FA-87-27-2-G		47	44	48	3	<5

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SAMPLE	ELEMENT	Ni	Cu	Zn	As	Au
NUMBER	UNITS	PPM	PPM	PPM	PPM	PPB
FA-87-27-3-B		99	109	58	3	<5
FA-87-28-1-G		17	24	24	3	<5
FA-87-28-2-B		119	152	80	2	<5
FA-87-29-1-G		19	22	26	3	<5
FA-87-29-2-B		58	96	72	32	<5
FA-87-30-1-G		26	24	34	6	<5
FA-87-30-2-B		95	34	92	2	<5
FA-87-31-1-G		16	21	34	2	<5
FA-87-31-2-G		25	32	34	2	5
FA-87-31-3-B		104	55	124	6	5
FA-87-31-4-G		99	57	116	11	5
FA-87-32-1-G		23	21	38	<2	<5
FA-87-32-2-G		19	22	34	2	<5
FA-87-32-3-G		20	21	28	2	10
FA-87-32-4-B		93	93	60	6	5
FA-87-33-1-G		15	15	24	2	5
FA-87-33-2-B		98	133	62	14	<5
FA-87-33-3-G		101	123	64	19	10
FA-87-34-1-G		18	22	22	2	5
FA-87-34-2-B		29	48	40	3	5
FA-87-35-1-G		11	13	16	2	10
FA-87-35-2-B		76	89	60	3	5
FA-87-36-1-G		12	10	14	<2	<5
FA-87-36-2-G		25	22	22	2	5
FA-87-36-3-B		70	86	68	3	5
FA-87-37-1-G		19	13	22	<2	<5
FA-87-37-2-G		20	16	24	<2	<5
FA-87-37-3-G		30	31	38	2	20
FA-87-37-4-B		9	17	24	5	10
FA-87-38-1-G		15	11	20	<2	5
FA-87-38-2-B		73	114	96	3	<5
FA-87-39-1-B		85	124	86	11	<5
FA-87-39-2-G		81	128	92	11	<5
FA-87-40-1-G		13	15	18	<2	<5
FA-87-40-2-G		14	14	20	<2	<5
FA-87-40-3-G		17	196	20	<2	<5
FA-87-40-4-G		22	14	24	4	5
FA-87-40-5-B		95	39	84	<2	<5
FA-87-41-1A-G		19	24	36	<2	<5
FA-87-41-1B-G		20	21	26	<2	<5

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PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	Ni PPM	Cu PPM	Zn PPM	As PPM	Au PPB
FA-87-41-2-B		75	87	68	<2	<5
FA-87-41-3-G		77	85	70	<2	<5
FA-87-42-1-G		19	17	24	<2	<5
FA-87-42-2-G		16	21	30	<2	<5
FA-87-42-3-G		19	16	22	<2	<5
FA-87-42-4-G		69	61	36	<2	<5
FA-87-42-5-B		131	138	68	3	<5
FA-87-43-1-G		21	20	34	<2	<5
FA-87-43-2-B		8	12	32	<2	<5
FA-87-44-1-G		19	19	20	<2	<5
FA-87-44-2-G		20	17	26	<2	<5
FA-87-44-3-B		111	104	160	14	<5
FA-87-45-1-G		14	16	14	<2	<5
FA-87-45-2-B		93	111	168	68	<5
FA-87-46-1-G		18	10	12	<2	5
FA-87-46-2-G		27	44	28	<2	5
FA-87-46-3-G		49	229	38	<2	<5
FA-87-46-4-B		53	184	36	4	5
FA-87-47-1-G		65	95	42	3	<5
FA-87-47-2-G		104	56	46	3	<5
FA-87-47-3-B		77	71	60	<2	<5
FA-87-48-1-G		35	28	36	8	10
FA-87-48-2-G		64	41	56	18	<5
FA-87-48-3-B		131	73	84	6	<5
FA-87-49-1-G		18	15	60	2	30
FA-87-49-2-B		5	14	108	3	<5
FA-87-50-1-G		21	22	24	<2	5
FA-87-50-2-B		94	112	62	<2	5
FA-87-51-1-G		26	27	40	<2	<5
FA-87-51-2-B		96	150	124	13	<5
FA-87-52-1-G		27	24	18	2	<5
FA-87-52-2-B		82	125	36	5	5
FA-87-53-1-G		28	22	24	<2	35
FA-87-53-2-G		21	16	20	<2	5
FA-87-53-3-G		26	15	24	<2	<5
FA-87-53-4-G		62	71	28	7	<5
FA-87-53-5-G		70	71	40	<2	<5
FA-87-53-6-B		149	103	64	2	<5
FA-87-54-1-G		19	13	15	<2	10
FA-87-54-2-G		12	10	14	<2	<5

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PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	Ni PPM	Cu PPM	Zn PPM	As PPM	Au PPB
FA-87-54-4-G		20	41	24	<2	<5
FA-87-54-5-G		19	14	18	<2	<5
FA-87-54-6-G		17	10	18	<2	<5
FA-87-54-7-G		27	24	48	2	<5
FA-87-54-8-B		87	127	100	20	10
FA-87-55-1-G		13	21	18	<2	<5
FA-87-55-2-G		18	17	20	<2	10
FA-87-55-3-G		27	33	28	2	<5
FA-87-55-4-G		38	26	36	3	<5
FA-87-55-5-B		25	17	128	2	<5
FA-87-56-1-G		35	15	16	2	<5
FA-87-56-2-B		110	112	56	3	<5
FA-87-57-1-G		15	13	14	2	5
FA-87-57-2-G		52	70	52	<2	<5
FA-87-57-3-B		9	85	46	2	<5
FA-87-58-1-G		22	20	32	<2	<5
FA-87-58-2-G		18	16	26	<2	<5
FA-87-58-3-G		18	18	18	<2	<5
FA-87-58-4-G		17	16	18	<2	<5
FA-87-58-5-G		19	27	20	<2	5
FA-87-58-6-G		26	24	22	<2	<5
FA-87-58-7-G		24	28	28	<2	<5
FA-87-58-8-G		21	17	26	<2	<5
FA-87-58-9-G		22	25	44	<2	<5
FA-87-59-1-G		28	26	22	<2	<5
FA-87-59-2-G		12	9	12	<2	<5
FA-87-60-1-G		11	10	12	<2	<5
FA-87-60-2-G		55	28	20	2	<5
FA-87-60-3-G		16	13	18	<2	<5
FA-87-60-4-G		20	14	16	<2	<5
FA-87-61-1-G		15	13	16	<2	<5
FA-87-61-2-G		31	21	48	7	<5
FA-87-62-1-G		18	13	20	<2	<5
FA-87-63-1-G		14	11	18	3	<5
FA-87-63-2-G		13	16	18	2	<5
FA-87-63-3-G		19	18	20	<2	<5
FA-87-64-1-G		44	17	30	<2	10
FA-87-65-1-G		13	14	12	2	<5
FA-87-65-2-G		20	22	22	<2	<5
FA-87-66-1-G		17	18	18	<2	10

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Geochemical Lab Report

REPORT: 017-2459

PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	Ni PPM	Cu PPM	Zn PPM	As PPM	Au PPB
FA-87-66-2-G		21	22	22	2	5
FA-87-67-1-G		41	41	26	2	<5
FA-87-67-2-G		114	122	60	5	<5
FA-87-68-1-G		30	28	32	4	10
FA-87-68-2-G		32	22	30	4	<5
FA-87-68-3-G		45	37	48	5	<5
FA-87-68-4-G		28	29	38	6	5
FA-87-69-1-G		28	23	30	3	<5
FA-87-69-2-G		17	11	16	3	<5
FA-87-69-3-G		88	105	90	20	10
FA-87-72-1-G		25	23	36	12	<5
FA-87-73-1-G		14	12	12	15	<5
FA-87-74-1-G		21	20	26	7	<5
FA-87-75-1-G		21	16	28	<2	<5
FA-87-76-1-G		20	15	22	<2	<5
FA-87-77-1-G		36	39	44	4	<5
FA-87-77-2-G		30	34	46	5	10
FA-87-77-3-G		26	21	30	6	<5
FA-87-77-4-G		43	48	48	9	5
FA-87-78-1-G		17	12	18	3	<5
FA-87-78-2-G		28	29	28	3	<5

Bedrock Assays

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Geochemical Lab Report

REPORT: 017-1739

PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Zn PPM	Ag PPM	As PPM	Au PPB
FA87-1-2-B		33	70	<0.1	5	<5
FA87-2-5-B		96	54	<0.1	3	<5
FA87-3-5-B		139	58	<0.1	3	<5
FA87-4-2-B		143	86	<0.1	23	<5
FA87-5-10-B		120	82	<0.1	2	<5
FA87-6-3-B		154	47	<0.1	<2	<5
FA87-7-2-B		113	80	<0.1	15	<5
FA87-8-1-B		140	31	<0.1	2	<5
FA87-9-5-B		129	49	<0.1	2	<5
FA87-10-3-B		52	31	<0.1	2	<5
FA87-11-2-B		24	46	<0.1	3	<5
FA87-13-5-B		91	41	<0.1	<2	<5
FA87-14-4-B		19	54	<0.1	<2	<5
FA87-15-2-B		120	98	<0.1	19	<5
FA87-16-2-B		12	55	<0.1	2	<5
FA87-17-2-B		48	84	0.3	122	65
FA87-18-2-B		56	59	<0.1	<2	<5
FA87-19-2-B		34	41	<0.1	<2	<5
FA87-20-2-B		30	105	<0.1	2	5
FA87-21-2-B		89	99	0.2	42	45
FA87-22-2-B		169	140	<0.1	5	5
FA87-23-2-B		105	68	<0.1	33	<5
FA87-24-4-B		156	66	<0.1	4	<5
FA87-25-3-B		237	191	<0.1	2	10
FA87-26-2-B		109	74	<0.1	4	5
FA87-27-3-B		109	57	<0.1	2	<5
FA87-28-2-B		166	72	<0.1	<2	<5
FA87-29-2-B		94	76	<0.1	21	5
FA87-30-2-B		32	91	<0.1	<2	<5
FA87-31-3-B		54	120	<0.1	9	<5
FA87-32-4-B		97	69	<0.1	14	<5
FA87-33-2-B		127	64	<0.1	7	5
FA87-34-2-B		49	34	<0.1	5	15
FA87-35-2-B		120	57	<0.1	2	<5
FA87-36-3-B		95	67	<0.1	2	<5
FA87-37-4-B		16	22	0.1	7	<5
FA87-38-2-B		121	106	<0.1	3	5
FA87-39-1-B		129	96	<0.1	17	<5
FA87-40-5-B		44	73	<0.1	2	10
FA87-41-2-B		97	67	<0.1	<2	<5

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SAMPLE NUMBER	ELEMENT UNITS	Cu PPM	Zn PPM	Ag PPM	As PPM	Au PPB
FA87-42-5-B		135	64	<0.1	15	<5
FA87-43-2-B		13	30	<0.1	2	5
FA87-44-3-B		114	148	<0.1	10	<5
FA87-45-2-B		132	175	0.3	62	<5
FA87-46-4-B		184	27	<0.1	2	<5
FA87-47-3-B		80	54	<0.1	2	<5
FA87-48-3-B		85	78	<0.1	56	10
FA87-49-2-B		13	107	0.1	3	5
FA87-50-2-B		117	64	<0.1	4	<5
FA87-51-2-B		150	121	<0.1	14	<5
FA87-52-2-B		144	36	<0.1	4	<5
FA87-53-6-B		112	68	0.1	2	10
FA87-54-8-B		130	101	0.3	25	20
FA87-55-5-B		23	131	0.1	2	<5
FA87-56-2-B		113	55	0.1	<2	<5
FA87-57-3-B		92	47	<0.1	2	<5
FA87-58-10-B		70	64	<0.1	8	<5
FA87-59-3-B		287	405	0.6	7	15
FA87-60-5-B		69	42	0.2	2	5
FA87-61-3-B		136	192	0.1	12	<5
FA87-62-2-B		116	65	<0.1	<2	<5
FA87-63-4-B		98	58	0.1	<2	<5
FA87-64-2-B		82	69	0.1	<2	5
FA87-65-3-B		98	54	<0.1	<2	<5
FA87-66-3-B		118	37	<0.1	<2	<5
FA87-67-3-B		158	66	<0.1	<2	<5
FA87-68-5-B		114	120	<0.1	<2	10
FA87-69-4-B		144	101	0.1	12	15
FA87-70-1-B		21	18	<0.1	3	<5
FA87-71-1-B		118	101	<0.1	2	<5
FA87-72-2-B		78	39	<0.1	4	<5
FA87-73-2-B		95	46	<0.1	34	<5
FA87-74-2-B		34	59	<0.1	2	20
FA87-75-2-B		9	54	<0.1	<2	<5
FA87-76-0-B		14	73	<0.1	<2	5
FA87-77-5-B		128	89	<0.1	2	<5
FA87-78-3-B		54	36	<0.1	<2	<5

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REPORT: 117-1739

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SAMPLE	ELEMENT	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI
NUMBER	UNITS	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
FA87-1-2-B		58.30	0.53	14.80	4.98	0.13	3.09	6.74	3.97	0.53	0.25	3.90
FA87-2-5-B		52.50	0.79	15.60	8.31	0.18	4.78	10.10	2.55	0.05	0.24	3.00
FA87-3-5-B		51.70	0.72	14.20	10.50	0.19	7.03	9.88	1.00	<0.01	0.19	4.10
FA87-4-2-B		48.30	0.76	14.10	6.68	0.14	5.38	8.38	3.29	0.57	0.24	9.25
FA87-5-10-B		49.50	0.79	13.70	10.70	0.29	5.87	8.93	1.92	0.07	0.22	6.25
FA87-6-3-B		48.90	0.73	13.70	12.70	0.20	7.48	10.30	1.00	0.02	0.23	2.35
FA87-7-2-B		45.50	0.62	12.20	9.46	0.13	6.41	9.96	0.44	1.17	0.15	12.00
FA87-8-1-B		53.30	0.76	14.20	8.90	0.19	6.19	9.34	2.77	0.13	0.23	1.60
FA87-9-5-B		53.00	0.76	13.60	10.20	0.23	7.34	9.02	2.17	0.12	0.32	1.55
FA87-10-3-B		55.50	0.71	14.20	9.52	0.16	4.56	13.40	0.47	0.02	<0.01	0.90
FA87-11-2-B		68.00	0.40	15.50	2.90	0.04	1.71	3.76	3.37	1.14	<0.01	1.45
FA87-13-5-B		53.90	0.80	15.40	8.16	0.13	5.90	9.49	1.68	1.24	<0.01	1.85
FA87-14-4-B		67.40	0.43	13.80	4.40	0.08	1.92	4.04	2.26	2.04	<0.01	1.60
FA87-15-2-B		48.40	0.65	13.60	7.93	0.19	4.90	11.80	2.03	0.73	<0.01	7.35
FA87-16-2-B		67.40	0.33	15.00	3.41	0.03	1.74	2.91	3.96	0.91	<0.01	1.65
FA87-17-2-B		2.03	0.06	2.20	59.30	<0.01	0.29	0.25	<0.01	0.07	<0.01	32.95
FA87-18-2-B		45.60	0.53	13.90	10.10	0.15	7.65	10.10	1.45	0.01	<0.01	8.15
FA87-19-2-B		68.50	0.38	14.40	2.94	0.07	2.11	3.09	4.16	1.10	<0.01	2.80
FA87-20-2-B		68.10	0.42	16.50	2.36	0.03	1.21	4.01	3.87	2.06	0.02	1.50
FA87-21-2-B		43.40	0.35	8.51	28.50	0.12	2.78	6.95	0.17	0.05	<0.01	7.65
FA87-22-2-B		48.90	0.72	15.10	9.14	0.17	6.47	9.32	2.34	<0.01	0.09	6.10
FA87-23-2-B		50.00	0.73	14.90	8.86	0.16	4.15	10.10	3.64	0.42	0.02	7.70
FA87-24-4-B		51.40	0.77	14.90	8.44	0.15	4.01	9.43	2.70	<0.01	0.11	5.15
FA87-25-3-B		48.60	0.79	14.60	11.20	0.24	6.48	10.70	1.70	0.02	0.02	3.20
FA87-26-2-B		52.60	0.87	15.30	8.20	0.18	4.96	8.31	3.75	<0.01	<0.01	4.00
FA87-27-3-B		47.70	0.83	14.80	8.37	0.13	5.13	9.04	3.82	0.25	0.02	8.65
FA87-28-2-B		51.20	0.83	15.20	9.54	0.27	5.96	12.10	0.73	<0.01	0.05	4.30
FA87-29-2-B		40.90	0.51	10.10	7.97	0.27	5.18	12.10	1.42	0.30	0.11	18.60
FA87-30-2-B		45.40	0.61	14.20	9.85	0.17	6.55	8.31	3.42	<0.01	0.03	9.20
FA87-31-3-B		45.80	0.59	14.40	8.89	0.20	5.42	12.00	1.16	0.57	0.11	12.45
FA87-32-4-B		44.20	0.72	13.60	10.20	0.17	7.11	10.50	1.50	0.26	0.10	13.10
FA87-33-2-B		47.30	0.74	14.10	7.44	0.12	4.25	11.00	2.11	0.71	0.12	11.20
FA87-34-2-B		61.40	0.29	12.80	6.68	0.10	2.19	6.33	2.18	0.98	0.16	6.85
FA87-35-2-B		45.80	0.71	14.10	11.80	0.19	7.92	9.70	1.29	0.01	0.10	5.70
FA87-36-3-B		46.60	0.80	13.90	9.69	0.22	4.63	11.50	1.00	0.47	0.02	12.20
FA87-37-4-B		74.60	0.04	12.10	1.51	0.02	0.11	3.37	6.27	0.29	0.12	3.25
FA87-38-2-B		45.30	0.81	14.60	12.30	0.19	5.64	9.84	2.58	<0.01	<0.01	8.80
FA87-39-1-B		51.00	0.83	15.00	9.40	0.25	3.47	9.61	2.40	<0.01	0.19	5.85
FA87-40-5-B		49.70	0.72	13.00	8.20	0.12	6.46	7.83	2.70	<0.01	0.04	8.85
FA87-41-2-B		47.10	0.79	14.60	11.80	0.22	6.99	11.60	1.01	0.02	0.08	3.35

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Geochemical Lab Report

REPORT: 117-1739

PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	SiO2 PCT	TiO2 PCT	Al2O3 PCT	Fe2O3* PCT	MnO PCT	MgO PCT	CaO PCT	Na2O PCT	K2O PCT	P2O5 PCT	LOI PCT
FA87-42-5-B		49.30	0.67	14.80	9.96	0.27	6.61	11.90	1.05	0.04	0.09	5.25
FA87-43-2-B		69.80	0.22	13.80	1.84	0.04	0.48	3.47	3.59	0.93	0.06	3.50
FA87-44-3-B		46.00	0.87	15.90	9.57	0.22	4.97	11.00	3.65	0.14	0.07	9.25
FA87-45-2-B		39.40	0.72	13.40	8.49	0.15	4.71	11.50	2.57	0.67	<0.01	16.50
FA87-46-4-B		51.80	0.80	12.90	10.20	0.19	6.29	9.65	2.54	0.68	0.24	2.25
FA87-47-3-B		52.50	0.80	13.40	9.68	0.17	7.68	9.23	1.58	<0.01	0.09	3.05
FA87-48-3-B		49.20	0.71	12.90	9.67	0.15	7.33	6.83	1.68	0.49	0.17	8.90
FA87-49-2-B		67.40	0.15	13.30	2.32	0.03	0.52	3.56	4.29	1.71	0.24	4.00
FA87-50-2-B		49.80	0.83	15.80	10.20	0.21	4.44	10.70	1.57	0.03	0.09	3.90
FA87-51-2-B		45.90	0.83	15.10	13.10	0.18	7.61	5.53	1.32	0.43	0.24	8.30
FA87-52-2-B		54.00	0.70	13.20	7.33	0.15	4.16	15.00	<0.01	<0.01	0.22	3.30
FA87-53-6-B		45.60	0.65	14.40	11.60	0.19	8.76	10.80	0.06	<0.01	0.25	9.00
FA87-54-8-B		46.30	0.64	12.50	13.60	0.15	4.19	9.17	1.13	0.40	0.19	10.30
FA87-55-5-B		62.70	0.38	13.10	2.70	0.05	1.53	5.70	4.75	0.84	0.20	6.60
FA87-56-2-B		49.30	0.69	15.70	10.00	0.24	4.00	15.00	0.67	<0.01	0.19	5.30
FA87-57-3-B		50.10	1.24	13.70	15.70	0.23	4.56	7.94	3.30	0.06	0.38	1.65
FA87-58-10-B		47.70	0.80	12.10	9.39	0.14	5.95	10.10	1.94	0.16	0.33	9.10
FA87-59-3-B		48.90	0.68	12.50	12.70	0.10	3.22	8.54	3.08	0.69	0.24	6.45
FA87-60-5-B		54.10	0.87	14.10	10.50	0.20	7.44	9.10	2.55	0.13	0.25	2.75
FA87-61-3-B		44.10	0.90	12.50	12.90	0.14	6.04	8.98	0.60	0.83	0.24	10.90
FA87-62-2-B		48.00	0.80	15.30	9.82	0.25	4.99	11.90	1.84	0.01	0.27	4.35
FA87-63-4-B		49.90	1.09	15.10	12.30	0.21	5.72	11.50	1.53	0.13	0.30	2.80
FA87-64-2-B		49.20	0.78	15.20	9.80	0.32	4.17	10.60	2.16	0.09	0.27	4.55
FA87-65-3-B		48.30	0.88	14.30	12.50	0.19	7.94	8.41	1.49	0.08	0.38	3.00
FA87-66-3-B		47.20	0.83	15.90	11.50	0.22	5.62	11.60	1.92	0.08	0.31	2.15
FA87-67-3-B		48.60	1.35	15.40	14.10	0.46	3.90	11.80	2.53	0.15	0.15	2.80
FA87-68-5-B		45.40	0.70	13.00	12.20	0.16	7.58	9.03	1.90	<0.01	0.34	10.60
FA87-69-4-B		50.00	0.73	14.10	9.45	0.12	4.41	7.39	1.00	0.10	0.35	9.45
FA87-70-1-B		69.80	0.30	13.60	2.58	0.02	1.35	1.56	5.11	0.80	0.08	2.85
FA87-71-1-B		50.30	0.74	14.50	7.06	0.12	3.78	8.57	2.62	0.27	0.20	9.20
FA87-72-2-B		53.30	0.89	16.10	7.23	0.13	4.87	9.77	3.31	<0.01	0.18	2.10
FA87-73-2-B		42.90	0.81	12.40	11.00	0.26	5.74	11.70	0.63	0.17	0.12	14.80
FA87-74-2-B		65.20	0.48	14.10	3.50	0.12	0.56	5.27	2.22	1.48	0.22	6.10
FA87-75-2-B		57.50	0.44	13.00	4.67	0.18	1.19	9.82	1.12	0.95	0.26	9.50
FA87-76-0-B		62.10	0.46	13.70	3.89	0.12	1.19	6.88	3.49	1.14	0.17	6.65
FA87-77-5-B		47.50	0.92	13.20	12.80	0.15	7.93	7.53	1.12	0.08	0.20	9.65
FA87-78-3-B		68.60	0.40	11.90	4.69	0.08	2.73	3.55	4.44	0.14	0.23	2.75

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Geochemical Lab Report

REPORT: 117-1739

PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	Total PCT	Zr PPM
FA87-42-5-B		99.94	31
FA87-43-2-B		97.73	167
FA87-44-3-B		101.63	43
FA87-45-2-B		98.12	39
FA87-46-4-B		97.53	115
FA87-47-3-B		98.17	109
FA87-48-3-B		98.04	103
FA87-49-2-B		97.52	100
FA87-50-2-B		97.58	49
FA87-51-2-B		98.54	39
FA87-52-2-B		98.07	34
FA87-53-6-B		101.30	25
FA87-54-8-B		98.58	33
FA87-55-5-B		98.55	126
FA87-56-2-B		101.09	31
FA87-57-3-B		99.06	64
FA87-58-10-B		97.72	118
FA87-59-3-B		97.11	64
FA87-60-5-B		101.99	118
FA87-61-3-B		98.13	44
FA87-62-2-B		97.53	38
FA87-63-4-B		100.58	58
FA87-64-2-B		97.13	45
FA87-65-3-B		97.47	50
FA87-66-3-B		97.34	35
FA87-67-3-B		101.24	49
FA87-68-5-B		100.91	38
FA87-69-4-B		97.10	42
FA87-70-1-B		98.05	162
FA87-71-1-B		97.36	45
FA87-72-2-B		97.87	50
FA87-73-2-B		100.52	45
FA87-74-2-B		99.25	148
FA87-75-2-B		98.63	130
FA87-76-0-B		99.78	138
FA87-77-5-B		101.09	40
FA87-78-3-B		99.51	114

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Geochemical Lab Report

REPORT: 117-1739

PROJECT: NONE PAGE 1B

SAMPLE NUMBER	ELEMENT UNITS	Total PCT	Zr PPM
FA87-1-2-B		97.21	129
FA87-2-5-B		98.10	69
FA87-3-5-B		99.51	34
FA87-4-2-B		97.10	45
FA87-5-10-B		98.24	40
FA87-6-3-B		97.61	33
FA87-7-2-B		98.05	30
FA87-8-1-B		97.61	43
FA87-9-5-B		98.31	37
FA87-10-3-B		99.45	34
FA87-11-2-B		98.27	174
FA87-13-5-B		98.55	63
FA87-14-4-B		97.97	155
FA87-15-2-B		97.59	31
FA87-16-2-B		97.34	161
FA87-17-2-B		97.15	1
FA87-18-2-B		97.64	30
FA87-19-2-B		99.54	162
FA87-20-2-B		100.08	180
FA87-21-2-B		98.49	38
FA87-22-2-B		98.35	40
FA87-23-2-B		100.68	42
FA87-24-4-B		97.06	42
FA87-25-3-B		97.55	35
FA87-26-2-B		98.17	50
FA87-27-3-B		98.74	43
FA87-28-2-B		100.18	39
FA87-29-2-B		97.47	34
FA87-30-2-B		97.75	28
FA87-31-3-B		101.58	29
FA87-32-4-B		101.46	35
FA87-33-2-B		99.10	40
FA87-34-2-B		99.96	108
FA87-35-2-B		97.33	38
FA87-36-3-B		101.02	45
FA87-37-4-B		101.68	55
FA87-38-2-B		100.06	41
FA87-39-1-B		98.00	44
FA87-40-5-B		97.62	114
FA87-41-2-B		97.55	37

Chemex Labs Ltd.
Analytical Chemists * Geochemists * Registered Assayers
450 MATHESON BLVD. E., UNIT 54, MISSISSAUGA,
ONTARIO, CANADA L4Z-1R5
PHONE (416) 890-0310

To : M P H CONSULTING LTD.
ATTN: P. ROLLINSON
2406 - 120 ADELAIDE ST. WEST
TORONTO, ON
M5H 1T1
Project : C-971
Comments: ATTN: PAUL SOBIE

Page No. : 1
Tot. Pages: 1
Date : 30-JUN-87
Invoice # : I-8716569
P.O. # :

CERTIFICATE OF ANALYSIS A8716569

SAMPLE DESCRIPTION	PREP CODE		Cu ppm	Zn ppm	Ag ppm Aqua R	AS ppm	Au ppb FA+AA					
FA-87-37-05	205	--	33	50	0.1	11	15					

CERTIFICATION : Hart Bichler

APPENDIX C

Reverse Circulation Drill Logs

MPH Consulting Limited

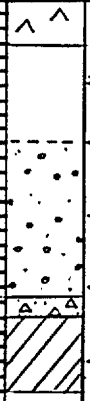
OVERBURDEN DRILL LOG

Hole FA-87-01

Property/Area Falconbridge Copper/Achates
Township Brongniart
Claim No.
Location L45W, 10+15 South
Zone 1
Logged by G.P. Sinclair
Sampler M.R. Anderson

Date(s) 25/3/87
Drilling Co. Bradley Bros. Ltd. (M. whissel
Bit No. CB 78524 (std), used sub
Depth to bedrock 6.7 m (22')
Total depth 8.3 m (27')
Sample screening -12

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag [illegible]
					- Recent muskeg and organics 1.0-3.0 - no return					
			1		3.0 Mixed granule and pebbles, little matrix, reasonable sorting, M.V.'s predominate - Poor return throughout	40	25	81	304	0.3
			+12 2		6.2 Chibougamau Till - thin grey clayey sd. w predominantly mafic clasts some with considerable py.	<5	5	33	70	<0.1
					6.7 Bedrock Altered, fine grained med. grey-green rock, pervasively carbonitized. - becoming lighter green with depth; rusty orange oxidization on foliation planes - fresher med. grey-green rock at 27' intensely carb'd, minor v.f.g. py dissems. <<1% E.O.H. 8.3 m					

MPH Consulting Limited

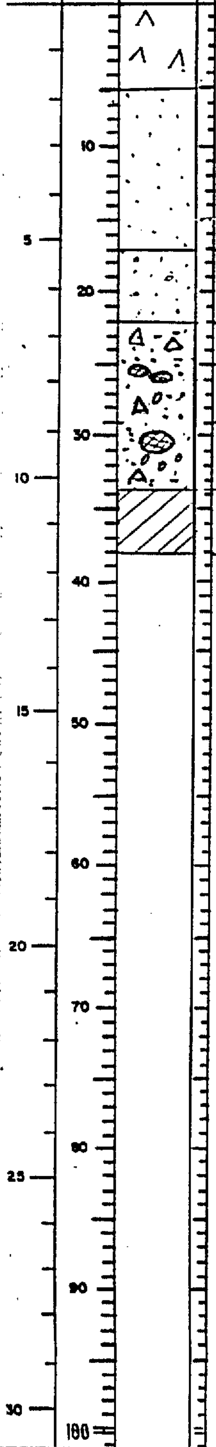
OVERBURDEN DRILL LOG

Hole FA-87-2

Property/Area Falconbridge Copper /Achated
Township Brongniart
Claim No.
Location L 46W 6+65S
Zone 1
Logged by G.P. Sinclair
Sampler M.R. Anderson

Date(s) 25/3/87
Drilling Co. Bradley Bros. Ltd.
Bit No. CP 78624
Depth to bedrock 10.3 m (33.5')
Total depth 11.6 m (38')
Sample screening -12

Remarks



SAMPLE No.	GRAINS Au	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
1	1ABR	365	45	286	85	<0.1
2		75	126	263	115	0.1
3		20	49	359	2030	0.1
4		65	93	516	193	0.2
+12 5		<5	3	96	54	<0.1

DESCRIPTIVE LOG

0 – 1.8 minor organics

1.8 minor sand/very poor return

6.6 Chibougamau till grey w mainly local clasts
Clayey 90% grey gritty clay balls, hard drilling, 10% mainly mafic clasts w some I.F.
- clasts much more hetrolithic at 26'
- blk ang. cobble at 26'; green m.v. 27.5', little matrix
- grey f. sand hosted till
- 29½–31' bld

10.3 Bedrock Altered med.-dk. green, f. grained massive rock with lighter green bands of more altered carb'd material along with minor calcite veining
- tuffaceous looking?
- minor py in v.s. cubes & dissems.

MPH Consulting Limited

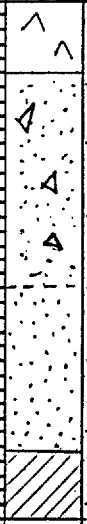
OVERBURDEN DRILL LOG

Hole FA-87-3

Property/Area Falconbridge Copper / Achates
Township Brongniart
Claim No.
Location L41 W, 6+65 South
Zone 1
Logged by G.P. Sinclair
Sampler M.R. Anderson

Date(s) 25/3/87
Drilling Co. Bradley Bros. Ltd.
Bit No. CB 78624
Depth to bedrock 9.6m (32.2')
Total depth 11 m (36')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		-Recent muskeg & organics					
1		- minor f. silt/clay, grey brown 1.8 Chibougamau till (?) grey silt hosted, 20% mainly mafic granules & pebbles. Poor return after 16'	35	7	85	102	0.1
2		- fine silt hosted till?	70	7	232	60	0.1
3		- much more heterolithic composition though reasonably sorted	40	3	50	45	<0.1
4		- little matrix present as v.f.g. brown silt	15	5	53	35	<0.1
+12 5			<5	3	139	58	<0.1

9.6 Bedrock light to med. green med fine grained rock, quite massive, mottled app. w/ cons. carbonate
- minor v.f.g. pyrite disseminations <1%

M. 5 10 15 20 25 30
Ft. 10 20 30 40 50 60 70 80 90 100

MPH Consulting Limited

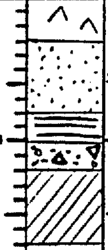
OVERBURDEN DRILL LOG

Hole FA-87-04

Property/Area CFCE Actales
Township Brongniart
Claim No.
Location L41W 4+50S Zone 1
lake edge
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 27/3/87
Drilling Co. Bradley Bros. Ltd
Bit No. CB 68776
Depth to bedrock 3.6m (12')
Total depth 5.0m (16.4')
Sample screening -12 mesh

Remarks



M.	Ft.	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
				- recent muskeg & organics					
				- minor f. silt, grey - little return					
				- 2.5m dk. grey-blue clean clay					
	10	1		- 3.0m Chibougamau till - fine	<50	44	548	184	2.4
5		+12 2		grey sand matrix (20%) & 80% clasts, 80% local	<5	23	143	86	<0.1
	20								
				3.6m Bedrock - Starts off as light green massive f. grained rock with 10-15% carb. veining. Becomes blacker at 4.2m with more pervasive carbonitization (30%) - V. minor v.f.g. Py. seen in darker sections.					
	30								
10									
	40								
15	50								
	60								
20									
	70								
	80								
25									
	90								
30	100								

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA 87-05

Property/Area CFCE Activated
Township Brongniart
Claim No.
Location L46 W 1+50S
Zone 1
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 27/2/87
Drilling Co. Bradley Bros. Ltd.
Bit No. CB 68725
Depth to bedrock 14.8m (48.7')
Total depth 16.3m (53')
Sample screening -12 mesh

Remarks

DESCRIPTIVE LOG

0-1.0 - Recent muskeg & organics

1.0 Sediments - grey clay grading into brown silt.

2.6 Chibougamau till - fine grained, sand hosted pebbley till; hetrolithic pebbles

- little f.sd. matrix
- Cobbley 23'; granite
- Narrow clay seam, gritty then clean
- back to hetrolithic pebble till, including serquanite

10.9 Lower till - light grey fine silt matrix w 50% locals 70% locals at 10m, 50% at 10.6m

- grey clayey sand at 10.7m
- 30% cl.-sd. matrix at 11.6m quite hetrolithic
- green M.V. cobble 13m; 70% mafics of hard, grey sand nodules & smaller pebble sized clasts.
- Clayey sand 14m.
- 90% green m. volcanics 14.6m

14.8 Bedrock Med. bright green, f.g. altered int-> mafic volc.?; 75mm qtz. vein; clay filled fracture 15.35m

- very narrow (1mm) carb. veins throughout
- minor <1% py throughout & as occasional blebs.

SAMPLE No.	GRAINS Au	ANALYTICAL				
		Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
1	1 ABR	215	24	150	71	<0.1
2	1 ABR	600	33	160	86	0.1
3		35	45	144	64	0.2
4		45	50	153	72	0.1
5		30	94	150	79	0.4
6	1 ABR	60	76	189	119	<0.1
7		25	52	158	59	0.2
8		30	75	349	3655	0.3
9		45	98	345	77	0.2
+12 10		<5	2	120	82	<0.1

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA -87 -05

Property/Area CFCE, Achates

Township Brongniart

Claim No.

Location L 51W, 0+40N Zone 1
(0+50N is in lake)

Logged by G P Sinclair

Sampler M Anderson

Date(s) 27/3/87

Drilling Co. Bradley Bros. Ltd.

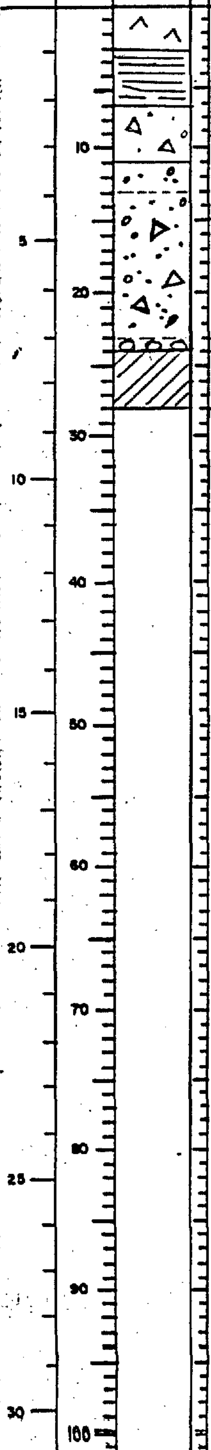
Bit No. J000651

Depth to bedrock 7.3m (24')

Total depth 8.7m (29')

Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		0-1.0- Recent muskeg & organics 1.0 Sediments - Clean grey clay grading into light brown silt 2.1 Chibougamau till - fine grey sd hosted till					
1		with hetrolithic granular clasts	100	8	92	114	<0.1
2	5		145	9	61	354	0.2
+12 3		-70% local clasts after 7m, pebble size	<5	<2	154	47	<0.1
		7.3 Bedrock -dark green & black mottled f. grained volc.? with pervasive carbonitization; rock is massive & contains occasional py. stringers, up to 10% in places. -minor carb veining 8.3m					

MPH Consulting Limited

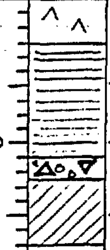
OVERBURDEN DRILL LOG

Hole FA-87-07

Property/Area CFCE Acheiez
Township Brongniart
Claim No.
Location L55W, 1+70S
Zone 1
Logged by E.P. Sinclair
Sampler M. Anderson

Date(s) 27-3-87
Drilling Co. Bradley Bros. Ltd.
Bit No. CB 684726 (new bit)
Depth to bedrock 3.7m (12.5')
Total depth 5.3m (17')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag Ppm
	10				- Recent Muskeg and organics - brown, then grey clean clay					
			1		3.2m Chibougamau till - gravely till; f. grey sand matrix w predominantly local lithologies	35.	77	855	127	0.5
5			+12 2			<5	15	113	80	<0.1
10	20 30				3.7m Bedrock Med green fine grained int. → Mafic volc. Pervasively carb'd along with qtz-carb. veining -rock is moderately foliated - Sulphides as rare small Py. cubes					
	40									
15	50									
	60									
20	70									
	80									
25	90									
30										

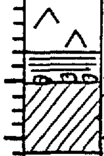
OVERBURDEN DRILL LOG

Hole FA-87-08

Property/Area CFCE Achaltez
Township Brongniart
Claim No.
Location L54W, 4+25
Zone I
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 23/03/87
Drilling Co. Bradley Bros' Ltd.
Bit No. CB 6P#26
Depth to bedrock 1.7m (6')
Total depth 3.3m (11')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	[illegible]
					- Recent Muskeg and Organics 1.3m Sediments					
			+12 1		Clean brown clay followed by thin grey sand and mainly local clasts (Poor return here)	<5	2	140	31	<0.1
					1.7m Bedrock Med green slightly mottled looking m.v.? rock carbonitized. - very minor, very fine grained sulphides either po/py cannot tell					

MPH Consulting Limited

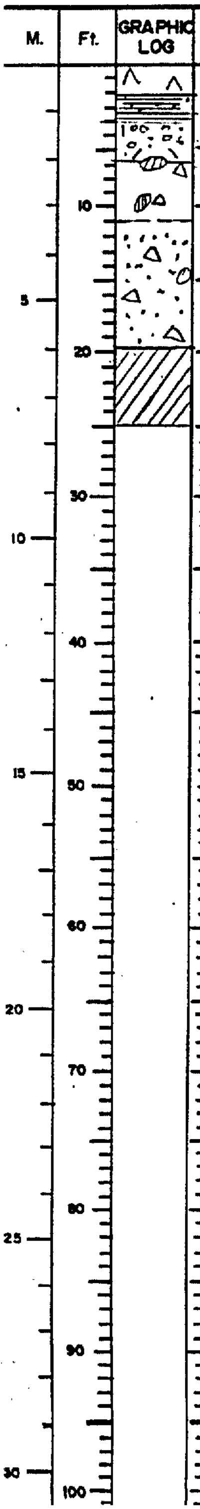
OVERBURDEN DRILL LOG

Hole FA-87-09

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L54W, 7+10S
Zone 1
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 28/3/87
Drilling Co. Bradley Bros Ltd.
Bit No. CB68726
Depth to bedrock 5.8m (19.6')
Total depth 7.6m (25')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au ppb	As ppm	Cu ppm	Zn ppm	[illegible]
		0-0.6 muskeg 0.6 Sediments					
1		- thin brown sandy clay seam	<55	15	15	15	15
2 B		- pebbley section, little return 1.0m pebbley with minor brown	<50	15	15	15	15
3		sandy matrix; 80% mafic clasts	35	9	76	24	<0.1
4		- M.V. boulder 1.8→2.1 21 Chibougamau till - grey sand till	100	15	144	25	<0.1
+12 5		- 3.3m 90% green M.V. rock frags., little matrix.	<5	2	129	49	<0.1

Bedrock 5.8m - med to dark green and black mottled looking fine grained rock, only weakly foliated

- minor qtz-carb veining
- v.f.g. sulphides <1%
- more extensively carbonitized towards 7.3m
- good return at end of hole

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OVERBURDEN DRILL LOG

Hole FA-87-10

Property/Area CFCE Actabed

Township Brongniart

Claim No.

Location L54W 7+70S

Zone 1

Logged by G.P. Sinclair

Sampler M. Anderson

Date(s) 28/3/87

Drilling Co. Bradley Bros. Ltd.

Bit No. CB 68726

Depth to bedrock 3.85m (13')

Total depth 5.5m (18')

Sample screening -12 mesh

Remarks

SAMPLE No.	GRAINS Au	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
1		70	6	88	49	1.6
2		35	3	126	31	0.1
+12 3		<5	2	52	31	<0.1

DESCRIPTIVE LOG

0-2m no return

2.1 Chibougamau till
- brown sand hosted till, non calc. matrix with 90% local (M.V. cobbles and pebbles)
- poor return after 4m.

3.85 Bedrock light to medium green highly altered M.V.? rock considerable carbonitization
- Sulphides as f.g. dissems. of Po/Py
- bedrock sfc. exhibits considerable orange brown alteration of foliation planes.
- rock much fresher beyond 4.5m

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OVERBURDEN DRILL LOG

Hole EA-87-11

Property/Area CFCE Activities
Township Brongniart
Claim No.
Location L54W, 8+65 South
Zone I
Logged by G.P. Sinclair
Sampler M Anderson

Date(s) 29/3/87
Drilling Co. Bradley Bros, Ltd.
Bit No. CB 68726
Depth to bedrock 2.7m (9.5')
Total depth 4.3m (14.2')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
					0-2.1 no return 2.1m Chibougamau till - thin brown sand hosted till					
		▽ . ▽	1		above bedrock - very little	155	IS	IS	IS	IS
	10	▨	+12 2		Sample; mainly local clasts including minor I.F.	<5	3	24	46	<0.1
5										
	20				2.7m Bedrock Light greenish f. grained massive rock, becoming blacker - alternating lighter and darker bands - minor, occasionally carbonatized areas - grey tuffaceous looking at 4.1m					
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-12

Property/Area CFCE Acketed
Township Brongniart
Claim No.
Location L52W, 8+65S
Zone 1
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 29/03/87
Drilling Co. Bradley Bros. Ltd.
Bit No. CB 62 726
Depth to bedrock 0.8m
Total depth 1.4m
Sample screening -12 mesh

Remarks
Sample 2 taken from ground water stack

GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Z PPm	Ag PPm
	2		no return	580	IS	IS	IS	IS
▨	1		0.8 Bedrock red. green, fine grained, slightly mottled looking rock with minor <1% sulphide dissems. throughout sfc. weathers orange-yellow. -Very small sample recovered. -Sample #12-2 is from ground around hole - contains both brown sand and bedrock chips.	<555	IS	IS	IS	IS

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-13

Property/Area CFCE Actalas
Township Brongniart
Claim No.
Location L49W, 9+10S
Zone 1
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 29/03/87
Drilling Co. Bradley Bros. Ltd.
Bit No. CB 68726
Depth to bedrock 4.4m (14.2')
Total depth 6.0m (20')
Sample screening -12 mesh

Remarks
- Sample #1 collected on ground under Stack

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
			1		0-1.8 no return	20	15	96	17	<0.1
			2		1.8 Chibougamau till - grey/brown sand hosted till with mainly	<25	5	39	22	<0.1
	10		3		local clasts.	<50	15	127	160	<0.1
			4	1 ABR ←	- quite cobbley	30	37	528	472	0.4
5	20		+12 5		-3.1m, 90% local (boulder?) abundant sulphides.	<5	<2	91	41	<0.1
					~4.4 Bedrock light to medium green, fine grained meta volcanic rock showing weak foliation.					
	30									
10					- Carbonate as veins throughout rock.					
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30										

MPH Consulting Limited

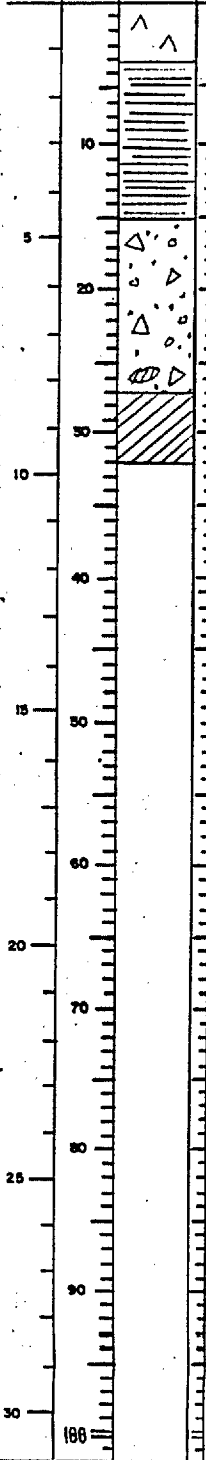
OVERBURDEN DRILL LOG

Hole FA-87-14

Property/Area CFCF Ashates
Township Brongniart
Claim No.
Location L33+60W, 9+60S
lake edge, Zone 1
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 29/3/87
Drilling Co. Bradley Bros. Ltd
Bit No. CB 62726
Depth to bedrock 8.3 m (27')
Total depth 9.6 m (32')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
		- Recent muskeg and organics - Poor return 0.5 - 1.5m 1.3 Sediments - grey smooth clay. 4.6 Chibougamau till					
1		predominantly local clasts in cobble and boulder sized; very little matrix.	50	80	359	179	0.1
2			95	75	257	175	0.1
3		-90% locals by 5.3m including minor sulfide Py. in green m.v.	70	125	547	242	0.4
+12 4			<5	<2	19	54	<0.1
		8.3 Bedrock med. green, f. grained, foliated meta-volcanic rock. -Carb. veining 8.8m					

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-15

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L15W, 4+90S

Zone 2

Logged by G.P Sinclair

Sampler M. Anderson

Date(s) 30/3/88

Drilling Co. Bradley Bros. Ltd.

Bit No. CB 67726

Depth to bedrock 4.8m (16')

Total depth 7.1m (23')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au PPb	As PPm	Cu PPm	Zn PPm	Hg PPm
	10	^ ^ ^			0-3.3.m peat 3.3 Chibougamau till					
5		▽ ∘ △	1	1ABR	- f. grey sand hosted cobbley till with predominantly local clasts - mafic volcanics, massive py.	130	114	543	142	0.5
	20	▨	+12 2			<5	19	120	98	<0.1
10	30 40				4.8 Bedrock dark green-gray rock, fine grained, quite soft - minor, narrow carb veins - minor py cubes and occasional disseminations - rock is moderately foliated - greywacke					
15	50 60									
20	70 80									
25	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-16

Property/Area CFCE Activities

Township Brongniart

Claim No.

Location L12W, 6+45S

Zone 2

Logged by E.P. Sinclair

Sampler M. Anderson

Date(s) 30/03/87

Drilling Co. Bradley Bros. Ltd.

Bit No. CB 687426

Depth to bedrock 2.5m (8.5')

Total depth 4.2m (13.5')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		^ ^			0 – 1.7 Peat 1.7 Chibougamau till					
		▽	1	21RR	– grey f. sand hosted till	55	63	489	95	0.4
	10	▨	+12. 2		with mainly local pebble sized clasts	<5	2	12	55	<0.1
5					2.5 Bedrock med - bright green, mod. foliated m.v.? with minor carbonitization and sulphides					
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA. 87-17

Property/Area CFCE Abitibi
Township Bourgmont
Claim No.
Location L10W. 5+50S
Zone 2
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 30/3/87
Drilling Co. Bradley Bros. Ltd.
Bit No. CB 68726
Depth to bedrock ≃ 2.7m (9')
Total depth 5.7m (19')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
					0-1.2m no return					
		∴	1		1.2 Chibougamau till - grey sand hosted till with mainly local clasts.	<50	15	63	31	0.3
5	10	▨	} Poor return #2 2		~2.7 Bedrock - Poor return massive f.g. pyrite with minor gf.? - Some bornite apparent under mag.	65	122	48	84	0.3
	20									
10	30									
	40									
15	50									
20	60									
	70									
25	80									
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-18

Property/Area CFCE Arbutus

Township Brongniart

Claim No.

Location L10W, 6+60S

Zone 2

Logged by G.P. Sinclair

Sampler M. Anderson

Date(s) 30/3/87

Drilling Co. Bradley Bros. Ltd.

Bit No. CB68726

Depth to bedrock 2.7 m (9')

Total depth 4.7 m (14')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
		^ ^			- Peat + muskeg					
			1 B		~1.5 Chibougamau till(?) - light grey sand with minor clasts - very poor return throughout	350	75	585	58	0.3
	10	▨	+12 2		2.7 Bedrock bright, med. green rock, fine grained, slightly mottled looking with considerable carb veining	<5	<2	56	59	<0.1
5										
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

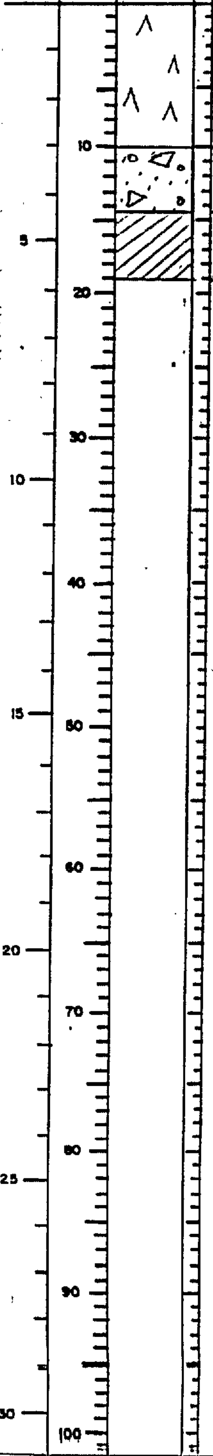
OVERBURDEN DRILL LOG

Hole FA-87-19

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L 7W, 5+25S
Zone 2
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 30/3/87
Drilling Co. Bradley Bros. Ltd.
Bit No. CB 68726
Depth to bedrock 4.3m (14.5')
Total depth 5.7m (19')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
		-0-3.0 peat					
1		3.0 Chibougamau till grey sand hosted till, 80% matrix with mainly local, pebble sized clasts	50	67	246	94	0.
+2 2			<5	<2	34	41	<0.
		4.3 Bedrock Mainly light green f. grained int. volc.? with 15% qtz-carb veining. Minor (1-2%) fine grained py. - preferentially in veins. Considerable carb veining at 5.5m					

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-20

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L5W 5+00S

Zone 2

Logged by G.P. Sinclair

Sampler M. Anderson

Date(s) 30/3/87

Drilling Co. Bradley Bros. Ltd.

Bit No. CB68726

Depth to bedrock 3.0 m (10')

Total depth 4.5m (15')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Au lim
					0-2.4 Peat					
					2.4 Chibougamau till good grey fine sand hosted till. - abundant (70%+) local clasts					
	10	◦▽◁	1			<50	47	279	62	0.4
		▨	+12 2			5	2	30	105	<0.1
5					3.0 Bedrock light green, felsic xtl tuff (<1mm qtz xtls); v. minor pyrite, <1% - small chloritic patches - occasional carbonitization - much paler green after 3.5m					
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-21

Property/Area CFCE [illegible]

Township Brongniart

Claim No.

Location L5W, 4+80S

Zone 2

Logged by G.P. Sinclair

Sampler M. Anderson

Date(s) 01/04/87

Drilling Co. Bradley Bros. Ltd.

Bit No. CB 68 #25

Depth to bedrock 3.0 m (10')

Total depth 4.6 m (15')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		^ ^			0-1.7m Peat poor return					
		∇ Δ	1		2.0 Chibougamau till - thin; f. grey sand matrix w 70% local clasts mainly granular and pebble sized	220	167	215	45	1.5
	10	▨	+12 2			45	42	89	99	0.2
5	20				3.0 m Bedrock begins at fine to med. grained massive Pyrite, - dark grey carb'd host rock 3.6 m					
10	30									
	40									
15	50									
	60									
20	70									
	80									
25	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-22

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L4W, 1+50S
Zone 2
Logged by G P Sinclair
Sampler M R Anderson

Date(s) 1/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K006767
Depth to bedrock 4.1 (13.5')
Total depth 5.2 (17')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		^ ^			0-2m No return 2-4 Poor return - minor peat					
	10		1		- minor, dk. grey slightly gritty clay.	<20	30	172	26	0.4
5		▨	+12 2		4.1 <u></u>Bedrock - Pale to med. green f.g. int. volc. - minor carb. veining, <1% py. in occasional blebs	5	5	169	140	<0.1
	20									
10	30									
	40									
15	50									
	60									
20	70									
25	80									
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-23

Property/Area CFCE Activities
Township Bronquait
Claim No.
Location L4W, 1+30S

Logged by GP Sinclair
Sampler MR Anderson

Date(s) 1/4/87

Drilling Co. Bradley Bros Ltd. (M. Whisse!)
Bit No. K000 767
Depth to bedrock 5.3m (17')
Total depth 6.7m (22')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
					0 - 3.3 little or no return					
	10	∴	1		3.4 Chibougamau till -grey, med. sand. hosted 60% local pebble/granular sized clasts	345	114	347	106	0.6
5	20	▨	HZ 2		5.2 Bedrock - grey to dk. grey, highly altered - minor dissem py, <1% - cons. carb veining 6.2 - 6.3	<5	33	105	68	<0.1
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-24

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L2W, 1+10S
Zone 2
Logged by G P Sinclair
Sampler M R Anderson

Date(s) 1/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K080767
Depth to bedrock 7.0m (23')
Total depth 8.6m (28')
Sample screening -12 mesh

Remarks

DESCRIPTIVE LOG

0-2 little/no return
- minor peat
- minor clay

2-2 Chibougamau till
- good pebble till, fine grey sand matrix - poor return
- clasts predom. local incl. rare massive py

6.0- less matrix

6.0-7.0 - cobbley

7.0m Bedrock - Pale green, f.g. tuffaceous rock.
- 1% f.g. py (<1mm), fairly evenly distributed.
- 7.5 - py to perhaps 2%, carb. veining
- 8.2 darker, more olive green, 1.5mm py flakes to 2%

SAMPLE No.	GRAINS Au	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
1		40	54	247	54	0.7
2		80	51	188	55	0.3
3		145	59	517	137	0.4
+12 4		<5	4	156	66	<0.1

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OVERBURDEN DRILL LOG

Hole FA-87-25

Property/Area CFCE [illegible]

Township Brongniart

Claim No.

Location L7W, 1+35S

Zone 2

Logged by GP Sinclair

Sampler M R Anderson

Date(s) 1/4/87

Drilling Co. Bradley Bros Ltd. (M. Whissel)

Bit No. K800767

Depth to bedrock 3.6m (12')

Total depth 5.3m (17')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		^ ^			0-2.7 poor return, minor peat					
					2.7-2.8 Fluvial Sediments					
	10	∴	1		very heterogeneous, sm. pebbles	60	18	218	31	0.5
			2			<135	15	15	15	15
5		▨	+12 3		3.4 - poor return	10	2	237	191	<0.1
	20				3.6 Bedrock dk grey-blue f.g. foliated meta-sed. - more altered beyond 3.8m carbonatized - Sulphides 1% + [illegible] as occasional blebs					
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-26

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L10W, 1+55S

Zone 2

Logged by GP Sinclair

Sampler MR Anderson

Date(s) 1/4/87

Drilling Co. Bradley Bros Ltd (M. Whissel)

Bit No. K 000 767

Depth to bedrock 3.4m (11.5')

Total depth 3.9m (13')

Sample screening -12 mesh

Remarks lost one rod, bit & sub in hole

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au Ppb	As PPm	Cu PPm	Zn Ppm	[illegible]
		^ ^			0-2 peat, poor return					
		≡ ≡			2.0 fine sand					
	10	Δ •..	1			225	47	543	60	0.5
		▨	+2 2		3.1 Chibougamau till thin grey sand hosted till.	5	4	109	74	<0.1
5										
	20				3.3 Bedrock - Bright, med. green f.g. int. volc? w carb. veins -rare <<1% py.					
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

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OVERBURDEN DRILL LOG

Hole FA-87-27

Property/Area CFCE Achates

Township Brongniart

Claim No. /

Location L10W, 1+40S
Zone 2

Logged by G P Sinclair

Sampler M R Anderson

Date(s) 1/4/87

Drilling Co. Bradley Bros Ltd (M. Whissel)

Bit No. K000769 new bit, sub, rod

Depth to bedrock 3.2m (10.5')

Total depth 4.7m (15')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		^ ^			0-1.8 poor return					
					1.2 Chibougamau till					
		▽ ∆	1		- good, hard grey sandy till, 70% locals, mainly pebble-sized	45	40	232	36	0.5
	10		2			<500	63	825	52	2.2
		▨	+12 3			<5	2	109	57	<0.1
5					3.2 Bedrock Olive-grey, f.g., v. weakly foliated rock - quite carbonatized - <1% sm. py cubes, well distributed					
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-28

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L11W, 2+40S
Zone 2
Logged by G P Sinclair
Sampler M R Anderson

Date(s) 1/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. KB00769
Depth to bedrock 1.2m (3.8')
Total depth 1.8 m (5.0')
Sample screening −12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	[illegible]
			1		0-1m — no return	160	3	39	18	0.1
			+12 2		1m - weathered - stained granular gravel on sfc.	<5	<2	166	72	<0.1
					1.2 Bedrock Med. pale green f.g. rock - mildly foliated - carbonatization pervasive - (mildly reactive) -minor <1% f.g. dissem py					

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-29

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L13W, 2+15S

Zone 2

Logged by G P Sinclair

Sampler M R Anderson

Date(s) 2/4/87

Drilling Co. Bradley Bros Ltd. (M. Wissel)

Bit No. K000 769

Depth to bedrock 2.2m (7.2')

Total depth 3.7m (12')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
		^ ^			0-2.2 little/no return					
			1		1.4-2.2 - minor mixed pebbles, & minor sand matrix	150	14	133	26	0.1
	10	▨	+12 2			5	21	94	76	<0.1
					2.2 Bedrock - hard, f.grained, foliated, dk grey & med. grey rock w qtz veining c̄ 1-2% py. -rusty weathering on f-planes 3.6 m.					
5										
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-30

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L13W, 0+85S

Zone 2

Logged by G P Sinclair

Sampler M R Anderson

Date(s) 2/4/87

Drilling Co. Bradley Bros Ltd. (M. Whissel)

Bit No. K008 769

Depth to bedrock 2.1m (6')

Total depth 3.0m (10')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	 As ppm	 Cu ppm	 Zn ppm	 Ag ppm
		◦△◦ ▷	1		0-1.7m little/no return – minor oxidized pebbles, quite heterolithic comp.	115	9	43	23	0.3
		▨	+12 2			<5	<2	32	91	<0.1
	10									
					1.7 Bedrock Med. pale green, f.g., med. foliated rock (int. vol?) Minor carb in place.					
5										
	20				2.5 – yellow-greenish					
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

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OVERBURDEN DRILL LOG

Hole FA-87-31

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L14W, 1+05S
Zone 2

Logged by G P Sinclair

Sampler M R Andersen

Date(s) 2/4/87

Drilling Co. Bradley Bros Ltd. (M. Wilussel)

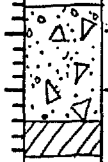
Bit No. K080769

Depth to bedrock 3.6 m (12')

Total depth 4.4 m (14.5')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		^			0-1.3 no return					
			1		1.3 ox'd pepples 50% locals 1.35 Chibougamau till – good, grey sand hosted, 80% locals at base including m.s.	50	51	316	201	0.6
	10		2			<50	34	291	84	0.5
			3 (+12)			<5	9	54	12.0	<0.1
5			4 (-12)			<270	15	15	15	15
	20				3-6 Bedrock – green to olive-green, slightly foliated, f.g. (int. vdc.?) w/ cons. carb. veining at 4.2 m					
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

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OVERBURDEN DRILL LOG

Hole FA-87-32

Property/Area CFCE Achates

Township Bourguiant

Claim No.

Location L6W, 0+20S

Zone 2

Logged by GP Sinclair

Sampler M R Anderson

Date(s) 2/4/87

Drilling Co. Bradley Bros Ltd (M. Whissel)

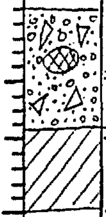
Bit No. K000769

Depth to bedrock 2.8m (9.5')

Total depth 4.5m (15')

Sample screening -12mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
			1		0.3-Chibougamau Till v. hetero, mainly granule sized clasts (reasonably rounded) in ox'd, brown sand host.	<10	7	27	21	0.1
			2			20	9	27	20	<0.1
			3			<25	57	107	34	<0.1
	10		+12 4		1.2 - Felsic cobble	<5	14	97	69	<0.1
5	20 30				2.8 Bedrock - slightly coarse grained, med. pale green rock - more olive green 3.5m- 3.7 qtz-carb. veining 10-14cm - alt. brown-green, brown-gold (Fe-Mg carb.?) - extensive veining, alteration throughout - v. minor 1mm py cubes in qtz veins - more py, alteration below 4m.					
10	40									
15	50 60									
20	70 80									
25	90									
30	100									

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OVERBURDEN DRILL LOG

Hole FA-87-33

Property/Area CFCE Achats

Township Brongniant

Claim No. /

Location L2W, BL+00
Zone 2

Logged by G P Sinclair

Sampler M R Anderson

Date(s) 2/4/87

Drilling Co. Bradley Bros Ltd (M. Lhissel)

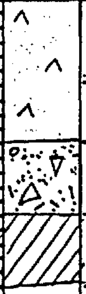
Bit No. Kords 769

Depth to bedrock 4.5 m (15')

Total depth 6 m (20')

Sample screening -12 mesh

Remarks



M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
					0 - 3m peat, poor return 3.5 Chibougamau fill grey sandy matrix (70% matrix) w mainly pebble sized clasts					
	10		1		clayey-sand matrix beyond 4.1 m	185	62	314	100	0.1
5			2 (+12)			5	7	127	64	<0.1
	20		3 (-12)		4.5 Bedrock - Med. green-olive f.g. mod'y foliated (int. volc.) w carb. veining, rare 1mm py cubes - 5.2 py increasing v.f.g. - 5.6 more chloritic	200	900	3540	18	0.1
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-34

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L1E, 1+40S
Zone 3
Logged by GP Sinclair
Sampler M R Anderson

Date(s) 2/4/87
Drilling Co. Bradley Bros Ltd. (M. Wilisse)
Bit No. K000 769
Depth to bedrock 1.8 m (6.6')
Total depth 3.1 m (10')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		^			0-0.5 peat, minor return					
		?	1		0.5-2.0 grey sand	45	70	295	49	0.7
			+12 2			15	5	49	34	<0.1
	10				2.0 Bedrock Med. bright green, quite f.g., mod. foliated rock - minor carbonate - more altered towards 3m					
5										
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

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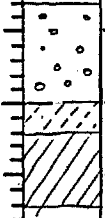
OVERBURDEN DRILL LOG

Hole FA-87-35

Property/Area CFCE Actinites
Township Bromgmant
Claim No.
Location L 9+50W, 2+50N
Zone 2
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 2/4/87
Drilling Co. Bradley Bros Ltd. (M. Wissel)
Bit No. K000769
Depth to bedrock ~5.1m (17')
Total depth 6.7m (22')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
					0-2-3 little/no return					
	10		1		2.3 - gravelly till? - poor return; fine grey sand w mainly pebble sized clasts	120	84	203	60	0.1
5	20		+12 2		4.6 Bedrock - 95% sub angular bright, med-dk. green, med-fine grained rock - no obv. S - no carb.	<5	2	120	57	<0.1
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

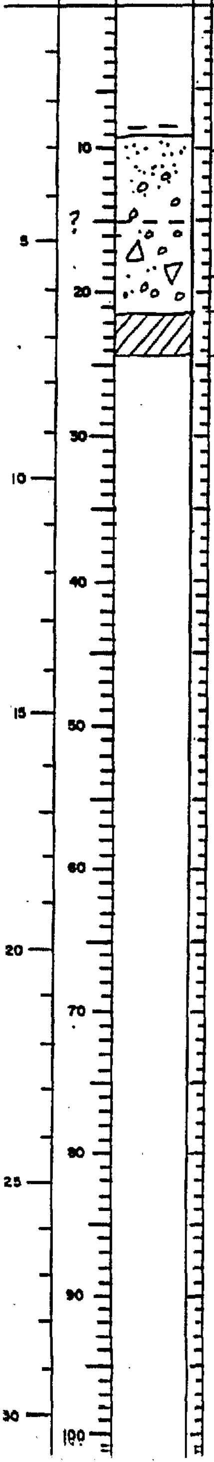
OVERBURDEN DRILL LOG

Hole FA-87-36

Property/Area CFCE Achates
Township Brongniart ✓
Claim No.
Location L3W, 3+75N
Zone 2
Logged by GP Sinclair
Sampler M R Anderson

Date(s) 3/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K 060769
Depth to bedrock 6·4m (21·5')
Total depth 7-3m (24·5)
Sample screening -12 mesh

Remarks



DESCRIPTIVE LOG

0-1.5 little return

<u>1.5-6.5</u> <u>Glaciofluvial</u> - f. silt, f. sand & gravel
- 1.5-3.0 - f. sand
- reasonable sorting initially
- v. heterolithic sd & gr.
- yellow oxidized section here

<u>6-5</u> <u>Bedrock</u> f. grained, greenish-olive, rather featureless rock
- minor (<1%) Py
- darker olive section 7·0m

SAMPLE No.	GRAINS Au	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
1		40	6	28	16	0.1
2		150	22	227	21	0.1
+12 3		<5	2	95	67	<0.1

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OVERBURDEN DRILL LOG

Hole FA-87-37

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L3W, 4+90N
Zone 2
Logged by G P Sinclair
Sampler M R Anderson

Date(s) 3/4/87
Drilling Co. Bradley Bros Ltd (M. L'Nussel)
Bit No. K008769
Depth to bedrock 6.0m (20-21')
Total depth 8.2m (27')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
	10	░	1		0 – 6.0m Glacio fluvial sequence - sand & gravel	50	5	34	20	<0.1
5		░	2		5.3 - cobbley - mainly qtz'itic	65	6	94	26	0.1
	20	░	3			165	32	147	76	0.3
		▨	+12 4		6.0 Bedrock – Massive yellow to yellow brownish, hard rock with considerable qtz & qtz-carbonate veining - mainly white & greyish white qtz after 7.7. - gp seams in qtz 7.5-7.7 w minor 2% py - gp & py seam 8.0m	<5	7	16	22	0.1
10	30									
	40									
15	50									
	60									
20	70									
25	80									
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-38

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L5W, 3+40N

Zone 2

Logged by GP Sinclair

Sampler MR Anderson

Date(s) 3/4/87

Drilling Co. Bradley Bros Ltd. (M. Lelissier)

Bit No. K060769

Depth to bedrock 1.7m (5.8')

Total depth 2.7m (9')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
		^ ^			0-0.5 peat					
		⁘	1		0.5-1.7 f.sd. (poor return)	75	5	29	31	<0.1
		▨	+12 2	–		5	3	121	106	<0.1
	10				1.7 Bedrock Light-medium green f. grained, slightly mottled looking (int. volc.?) - minor carb. veining - minor, occasional py blebs <1%					
5										
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

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OVERBURDEN DRILL LOG

Hole FA-87-39

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L7W, 3+40N

Logged by GP Sinclair
Sampler MR Andersen

Date(s) 3/4/87

Drilling Co. Bradley Bros Ltd. (M. Wuissel)
Bit No. K000769
Depth to bedrock 3.5 (12')
Total depth 5.0 (16')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
		^ ^			0-2m peat					
	10	?			2-3m no return					
		▨	1 (+12)		≃3.5 Bedrock - med-bright green, f.g., foliated (sheared) int.-mafic volc. - req. network of carb. veinlets & larger 4-6mm veins - minor v.f.g. py cubes <1% total	<5	17	129	96	<0.1
5		▨	2 (-12)			235	1080	2335	40	<0.1
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

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OVERBURDEN DRILL LOG

Hole FA-87-40

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location ≅ 7+60W, 5+00N

Zone 2

Logged by GP Sinclair

Sampler MR Anderson

Date(s) 3/4/87

Drilling Co. Bradley Bros Ltd. (M. Whissel)

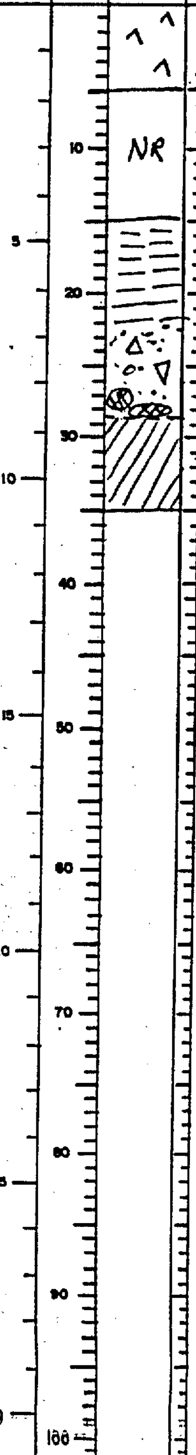
Bit No. K000769/K000715; 1 new sub

Depth to bedrock 8.7m (28.5')

Total depth 10.7m (35')

Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		0-1.7 peat					
		1.7 no return					
1		4.7- Glacio lacustrine/Fluv. - silt then f. sand	<50	45	152	60	<0.1
2		6.6 Chibougamau Till - grey, fine sand matrix, 60% local clasts	95	51	162	54	<0.1,
3			35	63	140	56	<0.1
4		8.0 - appearance of yellow qtz-carb pebbles - 50% local clasts	40	40	106	37	<0.1
+12 5		8.4- slightly more matrix	10	2	44	73	<0.1
		8.7 Bedrock Med-dk green, f.g. variably carbonatized (m. - int. volc.); no obv. S.					

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-41

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L20W, 1+65N
Zone 2
Logged by G P Sinclair
Sampler M R Anderson

Date(s) 3/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K000 715
Depth to bedrock 3m (10')
Total depth 4.2m (13.6')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au PPb	As PPm	Cu PPm	Zn PPm	Ag
		?	1		0-3 no return	60	2	46	28	0.6
	10	▨	+12 2		3m Bedrock - med-dk. green, fine grained int-mafic volc.	<5	<2	97	67	<0.1
5										
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-42

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L22W, 3+75 S

Zone 2

Logged by GP Sinclair

Sampler M R Anderson

Date(s) 3/4/87

Drilling Co. Bradley Bros Ltd. (M Whissel)

Bit No. K'000 715

Depth to bedrock 8.2 m (27.2')

Total depth 9.5 m (31.5')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
	10		1		<u>0.5 Chibougamu till</u> sandy till - f. grey sand. matrix - v. heterogeneous,	120	8	36	40	0.1
5			2		5.7- - thin gravel seam	30	36	131	46	<0.1
	20		3		<u>6.0 Lower till</u> good till: minor grey sand matrix 85% local clasts	20	88	257	104	0.2
			4			180	44	973	375	0.5
	30		+12 5			<5	15	135	64	<0.1
10	40				<u>8.7 Bedrock</u> - Dark green somewhat coarser grained gabbroic looking rock - minor py in qtz veins - qtz-carb. veining 9.2					
15	50									
	60									
20	70									
	80									
25	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-43

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L22W, 7+00S
Zone 2

Logged by GP Sinclair

Sampler MR Anderson

Date(s) 4/4/87

Drilling Co. Bradley Bros Ltd. (M. Lelievre)

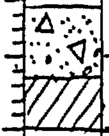
Bit No. K 800768

Depth to bedrock 3.4 m (11.5')

Total depth 4.6 m (15')

Sample screening -12 mesh

Remarks



M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag
					0-3 little – no return					
	10		1		≃2.0 . Chibougamau till (gy) with mainly granule sized clasts	30	36	191	81	0.6
			+12 2	-		5	2	13	30	<0.1
5	20				3.4m Bedrock - light grey-green, f.g. hard, quartzitic rock (int. – fels volc?) - sm. blk., (chloritic?) patches - minor, occ. sm. carb. veins - minor py stringers total <1%					
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole [illegible] 87-44

Property/Area CFCE Achats
Township Brongniart
Claim No.
Location L20W, 1+50S
Zone 2
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 4/4/87
Drilling Co. Bradley Bros Ltd (M. Lelievel)
Bit No. K008768
Depth to bedrock 3.7m (~11-12')
Total depth 4.5m (15')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
			1		0-0.5 Peat ~0.5 Chibougamau Till brown-grey sand & gravel	<15	18	370	62	0 3
	10		2		2.0 little/no return	60	46	225	129	0.4
			+12 3		3.2-3.6 - more locally derived clasts - to 90% locals above bedrock	<5	10	114	148	<0.1
5	20				3.7 Bedrock - grey to greenish grey, f.g. rather fractured rock → tuffaceous? moderately though perv. carbonatized & minor 2mm carb. veins - v. minor py.					
	30									
10	40									
15	50									
	60									
20	70									
	80									
25	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-45

Property/Area CFCE Abitibi

Township Brongniart

Claim No.

Location L20W, 2+60N

Zone 2

Logged by GP Sinclair

Sampler MR Anderson

Date(s) 4/4/87

Drilling Co. Bradley Bros. Ltd (M. G. [illegible])

Bit No. 1 K000768

Depth to bedrock 2.3 m (8.6')

Total depth 4.3 m (14')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		?	1	1 ABR	0-2.3 - little/no return	110	4	309	112	0.8
	10	▨	+12 2		2.3 *Bedrock* dk. grey mud-stone with 5-7% v.f.g. py. quite schistose rock - 3.5 - minor qtz veining. - alternating mudstone/silt-stone? - minor green alt. min. along planes of schistocity	<5	62	132	175	0.3

M. 5 10 15 20 25 30

Ft. 10 20 30 40 50 60 70 80 90 100

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OVERBURDEN DRILL LOG

Hole FA-87-46

Property/Area CFCE Achates

Township Bronguiart

Claim No.

Location L17W, 4+50N

Zone 2

Logged by G P Sinclair

Sampler M R Anderson

Date(s) 4/4/87

Drilling Co. Bradley Bros Ltd. (M. Whissel)

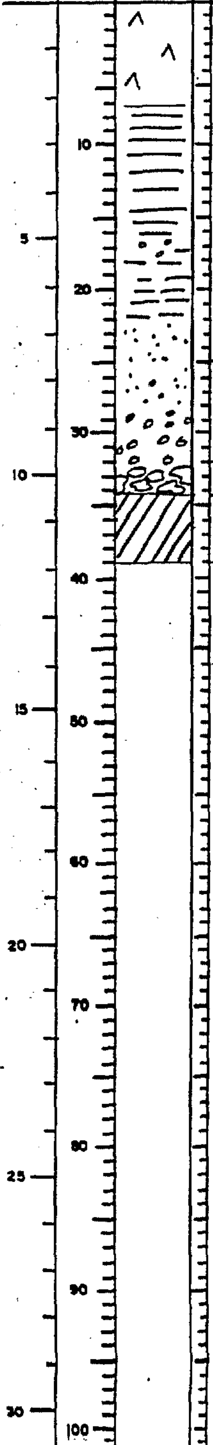
Bit No. K 600768

Depth to bedrock 10.4 (34')

Total depth 11.8 (39.1')

Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
			Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
1		0-2 peat 2.0 Lacustrine Sequence - dark grey clean clay 4.5 silt then f. sand - minor pebbles 6.8 - f. sand 8.2 - abundant fluvial gravel 9.6 - 90% local rock frags.	115	5	54	29	0.2
2			45	13	595	34	0.4
3		10.3 Bedrock - v dk. green, f.gd mafic volcanic	35	17	3600	43	1.1
+12 4		-hematite staining on planes of schistocity - 2% pyrite scattered about - carbonitization, minor q.v. present as well as occ. epidote stringers - minor sp. noted	<5	2	184	27	<0.1

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-47

Property/Area CFCE Achates

Township Bronguiart

Claim No. /

Location L16+15W, 4+50N

Zone 2

Logged by GP Sinclair

Sampler MR Anderson

Date(s) 4/4/87

Drilling Co. Bradley Bros Ltd. (M. Whissel)

Bit No. K000 768

Depth to bedrock 3.2 (10.7')

Total depth 4.1 (14')

Sample screening - 12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		●	1		0-4 little/no return - minor pebbles, v. heterogeneous	80	43	2490	86	1.1
	10		2				IS	IS	IS	IS
		▨	+12 3		2.5- abundant local clasts	<5	2	80	54	<0.1
5					3.2 Bedrock dk-med green - v. minor v.f.g. py on f-planes & disseminated throughout.					
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

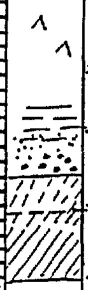
OVERBURDEN DRILL LOG

Hole FA-87-48

Property/Area CFCE Activities
Township Brongniart
Claim No.
Location L27W, 4+60N
Zone 3
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 4/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. I000 873
Depth to bedrock 4.7m (15.5')
Total depth 6.2 m (20.5)
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
					0-1.6 peat & muskeg					
	10		1		1.6 thin lacustrine sequence - f. silt, silt, f. sand	395	144	442	185	0.8
			2	1ABR	3.0 Chibougamau till thin Sandy till.	590	348	441	388	1.3
5	20		+12 3		4.0 85% locals, green mafic volcanics predominate	10	56	85	78	<0.1
10	30 40				4.7 Bedrock · med-dark to v.dk. green, f.grained, alt. volcanic - sm scale crinkly folding in one polv. carb'd section w 1% py.  2mm - grey v.f.g. groundmass around 5.5m - 10% carb veins by 6m					
15	50									
	60									
20	70									
25	80									
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-49

Property/Area CFCE Activities

Township Bourgmont.

Claim No.

Location L27W, 5+15N

Zone 3

Logged by GPSinclair

Sampler MR Anderson

Date(s) 5/4/87

Drilling Co. Bradley Bros Ltd. (M. Whissel)

Bit No. I000573

Depth to bedrock 3.2m (10.7')

Total depth 4.9m (16')

Sample screening - 12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As Ppm	Cu PPm	Zn PPm	Ag Ppm
		^			0-0.3 minor peat / poor return					-
	10	∴ °Δ°	1		0.3-1.8 Sediments sand & gravel	<50	33	129	52	<0.1
		▨	+12 2		1.8 Chibougamau till thin, minor grey brown sand matrix w predom local clasts towards 2.8	5	3	13	107	0.1
5	20				3.2 Bedrock - pale light yellow to pale green, mainly qtz-sericite rock; v.f. grained, foliated, occasional carbonate veins - minor gp. seams - pale green towards bottom					
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-50

Property/Area CFCE Achates
Township Bronguiaut
Claim No.
Location L22W, 8+60N
Zone 3
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 5/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. 2000573
Depth to bedrock 2.6 (8.5')
Total depth 3.1 (10.2')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
					0-1 - minor peat					√
		∴	1		- minor pebbles - poor return	140	11	53	54	0.2
	10	▨	+12 2		2.2 - pebbly sandy	<5	4	117	64	<0.1
5	20				2.6 Bedrock - med. pale green, f.g., minor carb. veining <5% - v. minor, v.f.g. py <0.5mm dia. - intermediate-felsic volc.					
10	30									
	40									
15	50									
	60									
20	70									
25	80									
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-51

Property/Area CFCE Acliclites

Township Brongniart

Claim No.

Location L30W, 1+85N
Zone 3

Logged by GP Sinclair

Sampler M R Anderson

Date(s) 5/4/87

Drilling Co. Bradley Bros Ltd. (M. Whissel)

Bit No. 1000573

Depth to bedrock 1.6m (5')

Total depth 3.0m (10')

Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		∴	1		0-0.5 little/no return, minor peat	30	32	293	25	<0.1
	10	▨	+12 2		0.5-1.5 Sediments - minor sand	<5	14	150	121	<0.1
					1.6 Bedrock - Olive green well foliated rock - alt. lighter & darker bands - occ. 2-4mm py cubes					
5										
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-52

Property/Area CFLE Achates
Township Brongniart
Claim No.
Location L30W, 1+90N
Zone 3
Logged by GPSinclair
Sampler MRAnderson

Date(s) 5/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. 1000573
Depth to bedrock 1.0m (3')
Total depth 2.3m (6.5')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
			1		0.-0.7 - little/no return - peat	<50	39	234	96	0.4
		▨	+12 2			<5	4	144	36	<0.1
					1.0 bedrock - similar to hole #51 (pale green, f.g. rock) Sulphides better distributed throughout, though 1-2% - minor po - q.v. 1.8m, grey var. - carb veining as well, separate from q.v.					
	10									
5										
	20									
	30									
10										
	40									
15										
	50									
	60									
20										
	70									
	80									
25										
	90									
30										
	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-53

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L31W, 3+90S (on road)
Zone 3
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 5/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K000717
Depth to bedrock 9.2 m (30')
Total depth 10 m (32.8')
Sample screening -12 mesh

Remarks

GRAPHIC LOG

SAMPLE No.	GRAINS Au	Au ppb	As ppm	Cu ppm	Zn ppm	[illegible]
1	1ABR	240	2	52	22	<0.1
2		70	12	231	45	0.3
3		20	19	124	22	0.4
4		65	307	2045	40	0.9
5		105	79	984	24	0.6
+12 6		10	2	112	68	0.1

DESCRIPTIVE LOG

0-2.5 – little, no return Sample #1 from below drill deck on ground
– bouldery

little return 2-8 – minor granules, v. heterolithic

7.0 better return, minor brown sand matrix, v. hetero clasts

7-8 – more matrix

8.5 – cobbles – incl. meta sed. & qtz.

9.5 Bedrock Mottled, dk. green & white med. fine grained (dyke rock ?) intensely & perv. carbonatized incl. carb. veins
– no obv. sulphides

MPH Consulting Limited

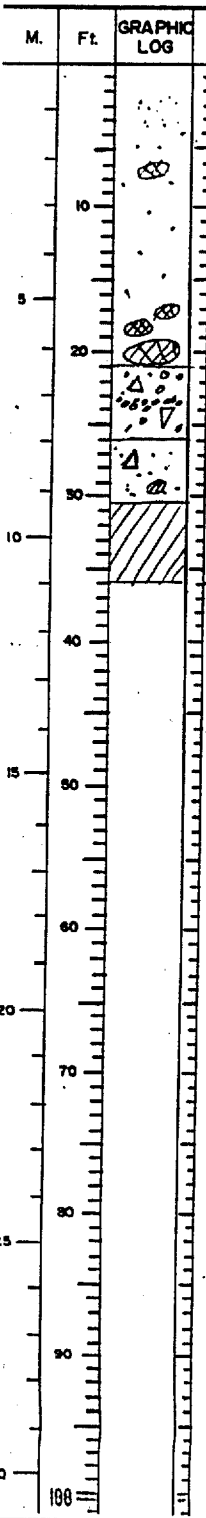
OVERBURDEN DRILL LOG

Hole FA-87-54

Property/Area CFCE Achates
Township Bourquant
Claim No.
Location L31+55W, 2+50S
Zone 3
Logged by GP Sinclair
Sampler M R Anderson

Date(s) 5/4/83
Drilling Co. Bradley Bros Ltd. (M. Wissell)
Bit No. K000417
Depth to bedrock 9.2m (30.2')
Total depth 11 m (36')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	ANALYTICAL				
		Au Ppb	As Ppm	Cu Ppm	Zn Ppm	Ag Ppm
1		110	10	115	26	0.1
2		<10	5	113	26	<0.1
3						
4		<10	4	238	27	0.6
5	1ABR	5	4	159	23	0.2
6		<10	10	127	19	0.3
7		30	33	166	57	0.3
+12 8		20	25	130	101	0.3

DESCRIPTIVE LOG

0-2 little/no return

- boulders, cobbles, brown sand matrix

5.7 - 60% local clasts
~6.0 - dk. green m.v. bld.

6.3 Chibougamou till
- thin gravel seam, hetero
- sandier matrix beyond 7.0m
- bedded gravels, v. hetero lithic

8.0m till, compact, grey sand hosted till, 30% matrix, 70% local clasts

9.1 Bedrock - orange-rusty weathered rind - grey when fresh - f.g. quartzitic, pervasively carbonatized, py throughout to massive f.g. py seams 10 - 20mm across

MPH Consulting Limited

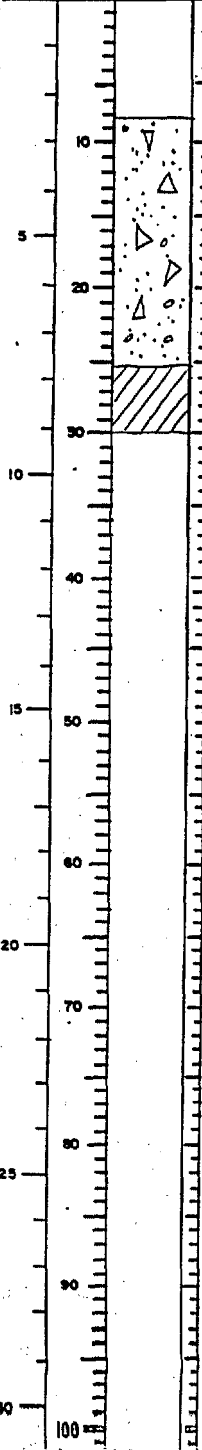
OVERBURDEN DRILL LOG

Hole FA-87-55

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L31+20W, 2+50S
Zone 3
Logged by GPSinclair
Sampler MR Andersen

Date(s) 6/5/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K000717
Depth to bedrock 7.7 (25.5')
Total depth 9.0 (30')
Sample screening -12 mesh

Remarks



DESCRIPTIVE LOG

0-2.5 little/no return

2.5 Chibougamau till - sandy, brown-grey sandy matrix (40-50% matrix) & mainly pebble sized clasts heterolithic comp.

50% local clasts 5m

7.7 Bedrock Qtz feldspar porphyry

Felsic rock: - mainly greenish white with brown weathered areas
- grain sizes to 6mm - feldspar, qtz & some green ferromag
- abund qtz eyes to 3mm
- 1% py cubes scattered about - locally to 3% f.g. dissems.
- no carb. alt.

SAMPLE No.	GRAINS Au	ANALYTICAL Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
1		<25	21	320	38	0.4
2	1ABR	15	4	105	22	0.1
3		<15	8	162	20	0.4
4		<50	72	168	108	<0.1
+12 5		<5	2	23	131	0.1

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-56

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L38W, 4+10N

Zone 3

Logged by G P Sinclair

Sampler M R Andersen

Date(s) 6/4/87

Drilling Co. Bradley Bros Ltd. (M. Whissel)

Bit No. K000717

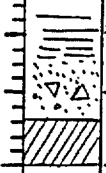
Depth to bedrock 3.3m (11.7')

Total depth 4.5m (15')

Sample screening -12 mesh

Remarks

M. | Ft. | GRAPHIC LOG



SAMPLE No.	GRAINS Au	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
1		<50	41	236	62	0.6
+12 2		<5	<2	113	55	0.1

DESCRIPTIVE LOG

0 - 1.7

1.7 Sediments

clean grey clay

2.0 f. silt, silt to f. sand

2.7 Chibougamau till thin, grey sand host, 70% local, granule sized clasts

3.3 Bedrock - bright med. green f.g. m. volc with 1-2% py cubes, variably carb'd; occ. small carb veins

- becomes more altered 4.2m 2mm yellow-cream coloured veinlets. - less py.
- slightly coarse grained at bottom.

MPH Consulting Limited

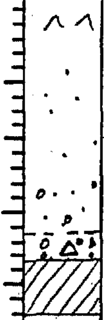
OVERBURDEN DRILL LOG

Hole FA-87-57

Property/Area [illegible]
Township Brongniart
Claim No.
Location L37+80W, 6+75N
Zone 3
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 6/4/87
Drilling Co. Bradley Bros Ltd (M. [illegible])
Bit No. KCTB 716
Depth to bedrock 5.7 m (18.7')
Total depth 6.7 m (22.0')
Sample screening -12 mesh

Remarks



DESCRIPTIVE LOG

0-4m peat little/no return

4.6 - minor gravel, sorted, v. heterogeneous, some sandy interbeds

5.2 thin till unit, 80% local clasts; 20% matrix of brown sand

5.7 Bedrock - dk. greenish black, mottled, med grained gabbro w 1% mag. po, some py, trace cpy.

- minor carb veining & increase in S content to 3-4% at 6.5m

SAMPLE No.	GRAINS Au	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
1		65	3	46	16	0.2
2		<50	20	1058	80	<0.1
3		<5	2	92	47	<0.1

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole 5A-87-58

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L44W 3+25N

Zone 3

Logged by G P Sinclair

Sampler M R Anderson

Date(s) 6/4/87

Drilling Co. Bradley Bros Ltd (M. [illegible])

Bit No. K000716

Depth to bedrock 15m (49.5')

Total depth 16.5m (54.5')

Sample screening - 12 mesh

Remarks

DESCRIPTIVE LOG

0-1.7 little/no return
- minor f. brown sed

1.7 Sediments - G-fluv./fluv. sequence sands & gravels well sorted, rounded, varied

7.8 Chibougamau till grey brown sand - 60% local, pebble sized clasts
- some reworking here - lg volume of mat'l.
- mafic cobble 10.6
- some thin sorted section

12m - 80% locals, grey sand matrix

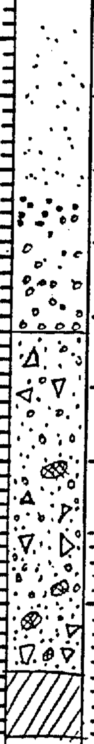
12.6 - cobbley, granitic

13m - more sd. matrix
- more heterolithic comp.

13.7 - 60% locals

14.0 - gabbroic bld.
- 70% bedrock at 14.8m

15m Bedrock - dk. med green rock m.v.? - f. grained, pervasively carbonatized in places



SAMPLE No.	GRAINS Au	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
1		300	8	106	45	<0.1
2	1ABR	400	30	200	83	0.3
3		30	34	212	82	0.1
4		70	36	234	85	0.4
5		20	42	299	76	0.2
6	1ABR	95	39	510	69	0.2
7	1ABR	350	41	208	55	<0.1
8		25	41	232	131	0.5
9		105	56	405	475	0.5
+12 10		<5	8	70	64	<0.1

MPH Consulting Limited

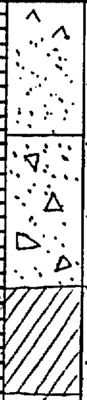
OVERBURDEN DRILL LOG

Hole 51-87-59

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L51W, 4+65N
Zone 3
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 6/14/87
Drilling Co. Bradley Bros Ltd. (Al Whissel)
Bit No. K000716
Depth to bedrock 6.0 m (20')
Total depth 8.2 m (27')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
					0-1 peat 1.3 Sediments f. silt, silt, f. sd & minor gravel					
			1		2.8 Chibougamau till poorer section - gray sd rooted till	235	4	104	28	<0.1
			2		4- same, predom locals	25	4	43	27	<0.1
			+12 3		6.0 Bedrock: Pale, med green f.g. altered (int. volc?) with abundant carb veining & py to 30% - intensely sheared.	15	7	287	405	0.6

MPH Consulting Limited

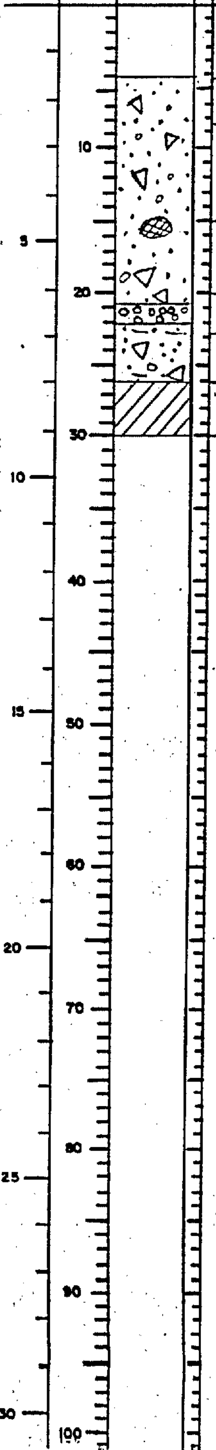
OVERBURDEN DRILL LOG

Hole FA-87-60

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L50+60W, 4+50N
Zone 3
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 6/4/87
Drilling Co. Bradley Bros. Ltd. (M. Whissel)
Bit No. K000 #16
Depth to bedrock 7.9m (26')
Total depth 9.0m (30')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As Ppm	Cu Ppm	Zn Ppm	Ag
		0 – 1.7 little return oxidized top layer					
N.S.							
1		1.7 Chibougamau till – Grey brown sand matrix	15	4	52	50	<0.1
2		– 4.8-5.0 M.V. cobble	<50	8	98	121	0.1
3		– 6.3 thin sorted cs. sd. seam	55	4	64	38	0.3
4		– 6.6 clayey sandy till	50	23	131	68	0.2
+12 5			5	2	69	42	0.2
		7.9 Bedrock – Dark - med green M.V. – slightly foliated – 8.4 minor carb veining					

MPH Consulting Limited

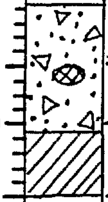
OVERBURDEN DRILL LOG

Hole FA-87-61

Property/Area CFCE Actates
Township Brongniart
Claim No.
Location L 32W 4+70N
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 7/4/87
Drilling Co. Bradley Bros. Ltd.
Bit No. K000-573
Depth to bedrock 3.2m (10.5')
Total depth 4.5m (15')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag Pp
1		0-0.6 no return, minor muskeg 0.6 Chibougamau till - good grey fine sand hosted till	80	41	168	43	0.1
2	1ABR		100	440	327	111	1.2
+12 3		-2.0-2.2 m.v. bld	<5	12	136	192	0.1
		3.2 Bedrock dk green fine grained, well foliated m.v.(?) - systematic carb veining (1mm veinlets) in upper portion - no visible sulphides					

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-62

Property/Area CECE Achaled
Township Brongniart
Claim No.
Location L 34w, 12+75N
Zone 3
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 7/4/87
Drilling Co. Brodley Bros. Ltd.
Bit No. K000 573
Depth to bedrock 2.2 m (7')
Total depth 3.3 m (11')
Sample screening -12 mesh

Remarks

GRAPHIC LOG	SAMPLE No.	GRAINS Au	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
△∴△	1		60	8	80	34	0.2
▨	+12 2		<5	<2	116	65	<0.1

DESCRIPTIVE LOG

0-1.0 Little/no return

<u>1.0 Chibougamau Till</u> - grey brown sand hosted till w 60% local clasts pebble size and over
- upper portion is oxidized

<u>2.2 Bedrock</u> med. green fine grained, quite massive rock w v. narrow black seams (<<1mm) containing minor sulphides
- below 2.6m rock is more altered with carb. veining to 15%

M. 5 10 15 20 25 30

Ft. 10 20 30 40 50 60 70 80 90 100

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-63

Property/Area CFCE Achabi
Township Brongniart
Claim No.
Location L41W, 13+50N
Zone 3
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 7/4/87
Drilling Co. Bradley Bros. Ltd.
Bit No. K000 718
Depth to bedrock 6.5m (21.5')
Total depth 7.6m (25')
Sample screening -12 mesh

Remarks

M. 5 10 15 20 25 30

Ft. 10 20 30 40 50 60 70 80 90 100

DESCRIPTIVE LOG

0 -1.0 minor peat

2.0 Lacustrine sequence
- silt grading into well sorted fine sand

4.3 Chibougamau till
- gravelly sand hosted till with 70% local clasts

-6.2 gravel layer, 95% sub-angular pebble sized local clasts

6.5 Bedrock bright med. green slightly coarser grained (~0.5mm) rock.
- massive texture with minor narrow carb. veinlets
- <1%, well dist. sulphides.

SAMPLE No.	GRAINS Au	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
1	1AGR	15	54	196	57	0.3
2		60	20	337	92	0.2
3		115	69	300	82	0.7
4		<5	<2	98	58	0.1

MPH Consulting Limited

OVERBURDEN DRILL LOG

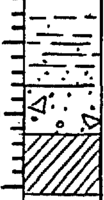
Hole FA-87-64

Property/Area CFCE Activities
Township Brongniart
Claim No.
Location L44W, 11+65N
Zone 3
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 7/4/87

Drilling Co. Bradley Bros Ltd.
Bit No. K000718
Depth to bedrock 6.4m (21.5')
Total depth 7.7m (25.3')
Sample screening -12 mesh

Remarks



M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
					0-3.8 minor peat, little/no return					
			1		3.8 Lacustrine sequence - clean, dk grey clay balls - grading into silt and fine sand	80	37	338	112	<0.1
			+12 2		5.5 Chibougamau till - good sand hosted till with 70% local clasts.	5	<2	82	69	0.1
					6.4 Bedrock massive, bright med-green, fine grained m.v.					

MPH Consulting Limited

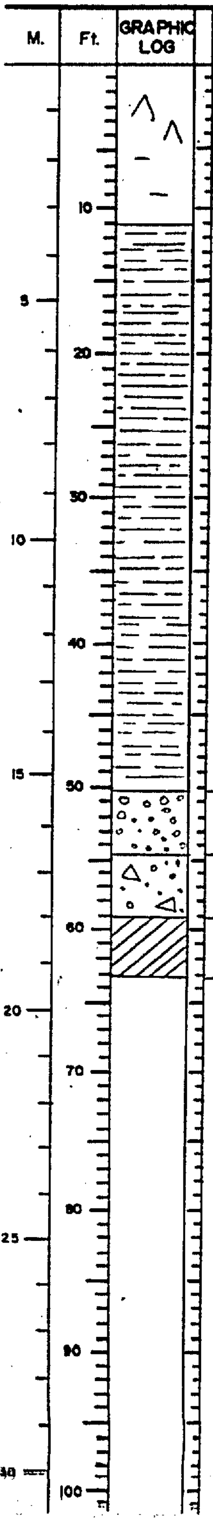
OVERBURDEN DRILL LOG

Hole FA-87 65

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L 44 W, 11+85N
Zone 3
Logged by E.P. Sinclair
Sampler M. Anderson

Date(s) 7/4/87
Drilling Co. Bradley Bros. Ltd.
Bit No. K000J 719
Depth to bedrock 17.9m (59')
Total depth 18.2 m (63')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
		0 - 3.2m Poor return - Minor peat					
		3.4 Lacustrine sequence - light brown silt - occasional clay sections					
1		15.3 - fluvial sequence - hetrolithic gravel, little matrix	45	63	307	93	0.4
2		16.4 Chibougamau till - brown-grey sand matrix with hetrolithic clasts	85	53	320	99	0.3
+12 3			<5	<2	98	54	<0.1
		17.9 Bedrock - begins as dk.-med green foliated m.v. with occasional carb. veining -18.7m texture changes to "honeycomb" with larger dk. green grains (2-3mm) in a lighter green groundmass.					

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-88-66

Property/Area CFCE [illegible]

Township Brongniart

Claim No.

Location L49W, 9+10N

Zone 3

Logged by G.P. Sinclair

Sampler M. Anderson

Date(s) 7/4/87

Drilling Co. Bradley Bros. Ltd.

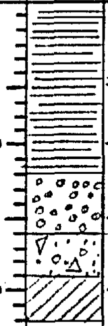
Bit No. KD00719

Depth to bedrock 5.7m (19')

Total depth 6.4m (22')

Sample screening -12 mesh

Remarks hole collared above stream / bit lost crown tooth

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL Au PPb	As PPm	Cu PPm	Zn PPm	Ag
					-0 Lacustrine Sequence - clean dark clay					
			1		-3.4 Sorted gravel	85	38	377	99	0.4
			2		-5.0 Chibougamau Till - thin grey/brown sand hosted till with ~70% local clasts	10	29	238	64	0.1
			+12 3			<5	<2	118	37	<0.1
					-5.7 Bedrock - dk. - med green, fine grained m.V. - rather featureless with only slight foliation - minor carb. veining.					

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-67

Property/Area CFCE Achates

Township Brongniart

Claim No.

Location L51W, 7+85N

Zone 3

Logged by G.P. Sinclair

Sampler M. Anderson

Date(s) 7/4/87

Drilling Co. Bradley Bros. Ltd.

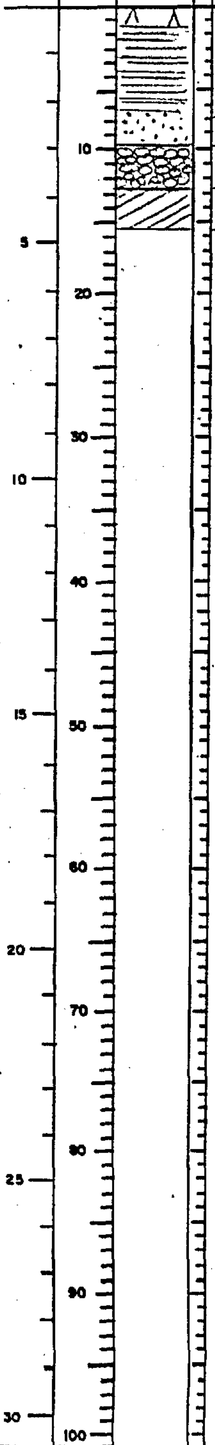
Bit No. Koon 714

Depth to bedrock 3.8m (12.6')

Total depth 4.6m (15.5')

Sample screening -12 mesh

Remarks - new bit lost crown tooth



DESCRIPTIVE LOG

- 0-0.5 minor peat

- 0.5 Lacustrine sequence
  - v.f. silt - minor clay

- 2.5 Fluvial sequence
  - grey/brown sand.

3.0 95% med. green M.V. gravel with little matrix
- Sub angular → angular with rare exotic pebbles

3.8 Bedrock dk. - med green, fine grained rock showing little texture.

SAMPLE No.	GRAINS Au	ANALYTICAL				
		Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
1		35	IS	656	152	0.2
2		<140	IS	IS	IS	IS
+12 3		<5	<2	158	66	<0.1

MPH Consulting Limited

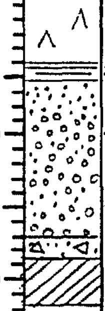
OVERBURDEN DRILL LOG

Hole FA-87-68

Property/Area CFCE A-Lake
Township Brongniart
Claim No.
Location L28E, 16+40N
Zone 4
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 9/4/87
Drilling Co. Bradley Bros Ltd.
Bit No. K000 764
Depth to bedrock 5.7m (18.5')
Total depth 6.5m (21.5')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	ANALYTICAL Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
1		190	10	63	46	0.1
2	1 ABR	620	7	64	30	0.7
3	—	95	9	80	42	1.6
4			15	76	64	[illegible]
+12 5		10	<2	114	120	<0.1

DESCRIPTIVE LOG

0-1.5 peat

1.5 Sediments - clean clay
1.7 clean sand interbedded with sorted v. heterolithic gravel

5.25 Chibougamau till - thin brown sand hosted till. ~70% local clasts

5.7 Bedrock dk.-med. green, fine grained rock. only slightly foliated.
- Pervasively carbonitized throughout, 15-20% veins and stringers
- Minor pyrite as discrete very fine grains <<1%

M.: 5, 10, 15, 20, 25, 30
Ft.: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

MPH Consulting Limited

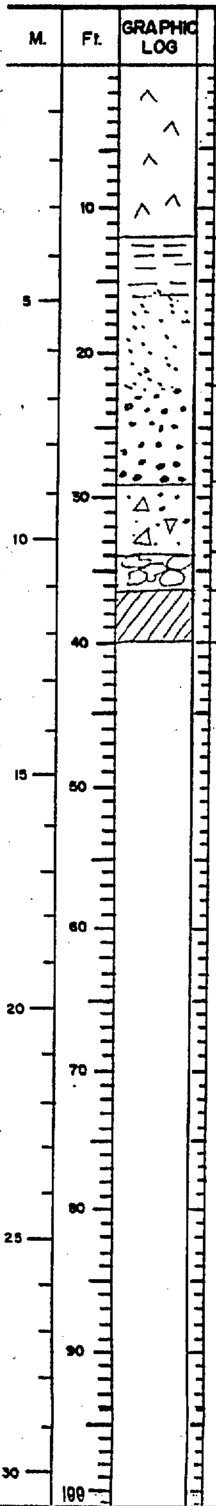
OVERBURDEN DRILL LOG

Hole FA-87-69

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L27+25E, 14+00N
Zone 4
Logged by GPSinclair
Sampler MRAnderson

Date(s) 7/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K 000764
Depth to bedrock 11-3m (36-5')
Total depth 12-2m (40')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPm	As PPm	Cu PPm	Zn PPm	Ag PPm
		0-3.7 peat					
		3.7 Sediments f. silt, poor return					
NS		6.4 - rounded, sorted gravel heterolithic					
1		8.7 Chibougamau till - good, grey brown sand hosted; 65% local clasts	<5	46	55	31	0.2
2		10.3 - black, meta-sed (very near to bedrock) 85% of total with 2-4% py	40	20	106	32	<0.1
3			75	209	795	67	0.1
+12 4		11.3 Bedrock - Altered meta-sed: blk, fine grained, schistose, slightly graphitic with 3-5% py - carb. veining to 7% total. more extensive (20% tot.) at 12m.	15	12	144	101	0.1

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-70

Property/Area CFLE Achates
Township Brongniart
Claim No.
Location L23E, 12+30N
Zone 4
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 9/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K000764
Depth to bedrock 0.45m (2')
Total depth 1.4m (5')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	A
					0 – 0.75 no return					
		▨	+12 1		0.75m Bedrock – highly altered, bleached & sheared, volc? Starts off as f.g. 'schistose, pale light green to pale pink rock with weathered out 'py spots' – becomes brownish red at 1.0m – some 3mm py cubes here.	<5	3	21	18	<01
	10									
5	20									
	30									
10	40									
15	50									
	60									
20	70									
	80									
25	90									
30	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-71

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L23E, 15+20N
Zone 4
Logged by GPSinclair
Sampler MR Anderson

Date(s) 9/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K000764
Depth to bedrock 0.3m (1.2')
Total depth 1.5m (5')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
		▨	+12 1		<u>0.3m Bedrock</u> - Medium light green, f.g. intermediate volc. - mildly foliated - minor carbonate veins to 4mm - Minor <<1% py - carb veining increases slightly with depth	<0.5	2	118	101	<0.1
	10									
5										
	20									
	30									
10										
	40									
15										
	50									
	60									
20										
	70									
	80									
25										
	90									
30										
	100									

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-72

Property/Area CFLE Achates
Township Bromgniart
Claim No.
Location L23E, 16+00N
Zone 4
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 9/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K000764
Depth to bedrock 1.5m (4.5')
Total depth 2.7m (9')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag
		⁘	1		0-1.6 little/no return - med. sand, ox'd.	275	5	89	40	0.2
		▨	+12 2		~1.5 Bedrock - Pale, med. green, f.g., massive int. volc. - minor qtz + carb. veins - minor po, tr. cpy?	<5	4	78	39	<0.1
	10									
5										
	20									
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

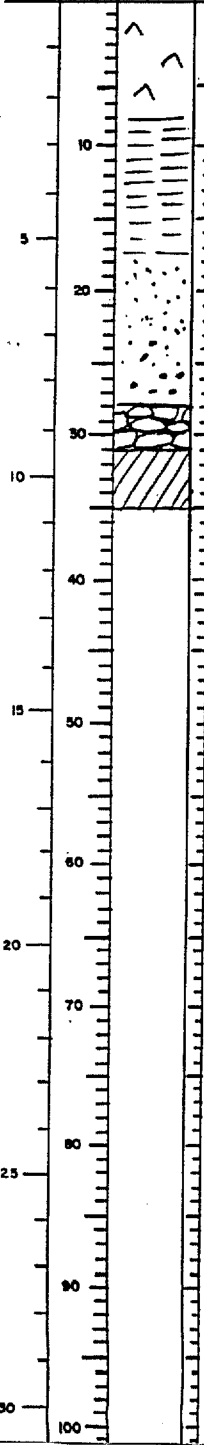
OVERBURDEN DRILL LOG

Hole FA-87-73

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L18+10E, 12+70N
Zone 4
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 9/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K060764
Depth to bedrock 9.3m (31')
Total depth 10.7m (35')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		0-1.5 peat, poor return 1.5 Sediments - f. silt - f. sand - minor pebbles 6.2 gravelly					
1		8-6 Bedrock gravel - 95% local	50	45	365	126	0.4
+12 2		9.3 Bedrock Fine to med. grained dark med. green slightly mottled looking rock - black chloritic patches - minor py present ± minor v.f.g. cpy ? dissems. - minor qtz veining - slightly coarser grained toward 10.4 m - - thin patches with slightly more Sulphides to 3%	<5	34	95	46	<0.1

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-74

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L18E 7+40N
Zone 4
Logged by GP Sinclair
Sampler MR Anderson

Date(s) 9/4/87
Drilling Co. Bradley Bros Ltd. (M. Whissel)
Bit No. K000764
Depth to bedrock 2-1m (7')
Total depth 4-5m (15')
Sample screening -12 mesh

Remarks

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
		^ ^ ═ ═ ○ ○ ○	1		0–0.3 Recent muskeg & humus 1.1 Sediments	<60	JS	JS	JS	JS
	10	▨	+12 2		- fine silt → f. sand - thin gravelly bed 60-70% locals	20	2	34	59	<0.1
5 10	20 30 40				2.1 Bedrock - pale to v. pale green, well foliated, f. grained rock (felsic volc.?) 3.0 more highly altered - carb. veining with dark chloritic bands & minor py stringers <1% total 4.0 - rock is more sheared, foliated, becomes brownish green, qtz veining, 1% py 4.5 - much less altered, pale green, foliated. v.f.g py cubes					
15	50									
	60									
20	70									
	80									
25	90									
30	100									

MPH Consulting Limited

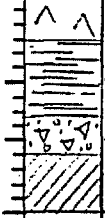
OVERBURDEN DRILL LOG

Hole FA-87-75

Property/Area CFCE Activated
Township Brongniart
Claim No.
Location L17E, 9+40N
Zone 4
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 10/4/87
Drilling Co. Bradley Bros Ltd. (M. Wh
Bit No. K000 764
Depth to bedrock 3.3m (11')
Total depth 4.5m (15')
Sample screening -12 Mesh

Remarks



SAMPLE No.	GRAINS Au	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
1		40	91	273	100	0.6
+12 2		<5	<2	9	54	<0.1

DESCRIPTIVE LOG

0-1.0m Peat

1.0m Lacustrine Sequence
- well Sorted silt

2.4m Chibougamau till
- grey gritty clay-sand hosted till.
- fairly heterolithic, ~50% local clasts.

3.3m Bedrock - dark to medium blue green, fine grained rock with pervasive sericitization.

3.7m Carbonate veins to 6mm with occasional pyrite grains to 2mm.

MPH Consulting Limited

OVERBURDEN DRILL LOG

Hole FA-87-76

Property/Area CFCE Arbalet

Township Brongniart

Claim No.

Location L 15+8E, 8+62N
Zone 4

Logged by G.P. Sinclair

Sampler M. Anderson

Date(s) 10/4/87

Drilling Co. Bradley Bros Ltd.

Bit No. koo0 764

Depth to bedrock 2.1m (7')

Total depth 3.3m (11')

Sample screening -12 mesh

Remarks Drilled at edge of swamp

M.	Ft.	GRAPHIC LOG	SAMPLE No.	GRAINS Au	DESCRIPTIVE LOG	ANALYTICAL				
						Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
					0-1.3 peat / poor return.					
			1		1.3 black massive volcanic boulder.	<15	8	177	31	0.1
	10		+12 2			5	<2	14	73	<.1
					1.7 Chibougamau till thin grey sand hosted till with 60% local clasts.					
5										
	20				2.1 Bedrock pale to medium green-blue/green qtz-sericite shist. ~15% carbonatization in veins.					
	30									
10										
	40									
15	50									
	60									
20										
	70									
	80									
25										
	90									
30	100									

MPH Consulting Limited

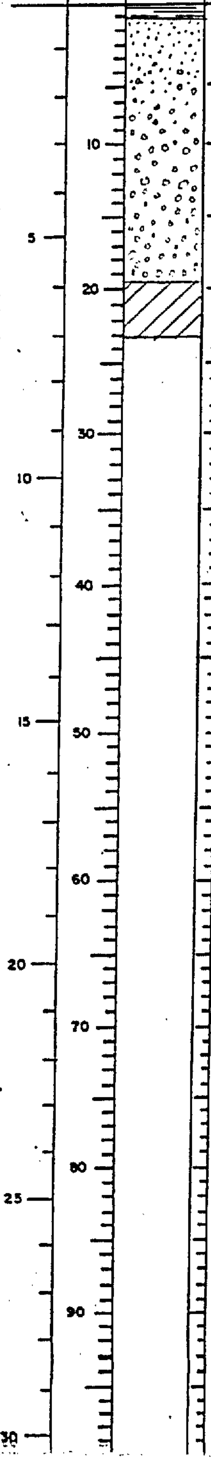
OVERBURDEN DRILL LOG

Hole FA-87-77

Property/Area CFCE Achates
Township Brongniart
Claim No.
Location L11E, 1+40 N
Zone 4
Logged by G.P. Sinclair
Sampler M. Anderson

Date(s) 10/4/87
Drilling Co. Bradley Bros' Ltd.
Bit No. Koon 764
Depth to bedrock 5.9m (19.5')
Total depth 7.0m (23')
Sample screening -12 mesh

Remarks



SAMPLE No.	GRAINS Au	Au ppb	As ppm	Cu ppm	Zn ppm	Ag ppm
1		40	29	689	39	0.9
2		<25	23	481	52	0.9
3		15	8	106	25	0.1
4		<15	50	377	31	[illegible]
+12 5		<5	2	128	89	<0.1

DESCRIPTIVE LOG

0-0.2 Clean grey clay.

<u>0.2 Fluvial Sequence</u> - fine sand grading into gravel
- 1.8m, very heterogeneous gravel with minor (<5%) sand matrix
- few sulphides

<u>5.9 Bedrock</u> - medium green, fine grained, well foliated meta-volcanic rock.
- well carbonitized throughout in veins and stingers.
- <1% pyrite cubes and blebs.

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OVERBURDEN DRILL LOG

Hole FA-87-78

Property/Area CFCE Achated

Township Brongniart

Claim No.

Location L11E, 2+20S

Zone 4

Logged by G.P. Sinclair

Sampler M. Anderson

Date(s) 10/4/87

Drilling Co. Bradley Bros Ltd

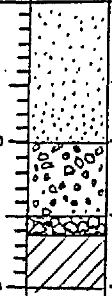
Bit No. K000 764

Depth to bedrock 5.0m (16.5')

Total depth 6.0m (20')

Sample screening -12 mesh

Remarks



DESCRIPTIVE LOG

0 - 3.0 Lacustrine sequence

- light brown sand, oxidized toward surface

3.0 Fluvial sequence

- Very hetrolithic gravel, minor matrix.

-4.7 m, bedrock gravel; ~85% local clasts.

5.0 Bedrock - medium green, fine grained schistose rock

SAMPLE No.	GRAINS Au	Au PPb	As PPm	Cu PPm	Zn PPm	Ag PPm
1		620	5	42	23	05
2		55	30	243	53	0.1
+12 3		<5	<2	54	36	<0.1

APPENDIX D

Binocular Microscope Examination Logs

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chapais Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-01-02	L45+00W, 10+15S	- green-grey to grey-black - very fine-grained, leucocratic - massive, granoblastic - mineralogy predom hblde, qtz, plag, calcite ± mag, chl - very minor f-gr sulph (py, born, po?) diss throughout - rusty oxidation along fract planes	- pervasive carbonatization - no significant mineralization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 5 33 70 0.1	intermediate metavolcanic	Andesite/Dacite (calc-alkaline)
FA-87-02-05	L46+00W, 6+65S	- grey-black to black - fine-grained to very fine-grained - massive, granoblastic - mineralogy predominantly hblde, plag with minor qtz, calcite - some chloritic sections - sulphides essentially absent	- minor carbonatization - no significant mineralization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 3 96 54 0.1	intermediate to mafic metavolcanic	Andesite (calc-alkaline)
FA-87-03-05	L41+00W, 6+65S	- green-grey to grey, mottled - fine to medium-grained, leucocratic - massive to porphyroblastic (plag porphyroblasts) - mineralogy predom hblde, plag, qtz, chlorite, calcite, wh mica - very minor fine-grained py	- minor carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 3 139 58 0.1	intermediate to mafic metavolcanic	Andesite (tholeiitic)
FA-84-04-02	L41+00W, 4+50S	- grey-black to black - fine-grained, leucocratic - massive, granoblastic - mineralogy predominantly hblde, plag, gnt (almandine) with minor qtz, biotite ± chl, carb - minor hematite smears along qtz-carb microveinlets	- minor carbonatization and qtz-carb microveinlets	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 23 143 86 0.1	intermediate to mafic metavolcanic	Andesite (calc-alkaline)
FA-87-05-10	L46+00W, 1+30S	- grey-black, mottled - fine-grained to very fine-grained - massive, granoblastic - mineralogy predominantly hblde, plag, qtz, with minor carb, biotite	- fracture, 75 mm qtz vein noted in log	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 120 82 0.1	intermediate to mafic metavolcanic	Andesite (tholeiitic)

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chapais Examined by: P Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-06-03	L51+00W, 0+40N	- mottled green-black to black - fine-grained, leucocratic - mass to porphyroblastic (plag) - min predom hblde, plag, qtz, bio ± carb, chl - up to 10% vf-gr diss py and c-gr euhedral cubes - very minor po, bornite	- significant sulphides as pseudo-stringers - minor qtz-carb micro-veinlets	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 154 47 0.1	mafic metavol-canic	Basalt (tholeiitic)
FA-87-07-02	L55+00W, 1+70S	- grey-black, mottled - fine-grained, leucocratic - massive/granoblastic to schistose/lepidoblastic - mineralogy predom hblde, plag, carb, qtz, act, chl + white mica - sulphides essentially absent - minor qtz-carb microveinlets	- pervasive carbonatization - minor sericitization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 15 113 80 0.1	intermediate to mafic metavolcanic, schist	Andesite (tholeiitic)
FA-87-08-01	L54+00W, 4+75S	- black to green-black, mottled - fine-grained - massive, granoblastic - min predom hblde, plag, almand gnt, qtz ± act, epidote? - minor py ± po (very fine-grained) disseminated cubes - significant qtz-veining	- qtz veinlets - minor py, po	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 140 31 0.1	intermediate to mafic metavolcanic	Andesite (tholeiitic)
FA-87-09-05	L54+00W, 7+10S	- green-black to black - fine-grained - massive, granoblastic - min predom hblde, plag, qtz ± carb - void spaces where min have been weathered out - signif rusty oxides, sulph - IF? - minor f-gr euhedral py present	- minor carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 129 49 0.1	intermediate to mafic volcanic/possibly sulphide-oxide IF	Andesite (tholeiitic)
FA-87-10-03	L54+00W, 7+70S	- grey-black to black - very fine-grained - massive, granoblastic to siliceous - mineralogy predominantly hblde, plag, ctz with very minor euhedral py - significant rust smears, rusty silicates - IF?	- no significant alteration/mineralization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 [illegible] [illegible] 0.1	intermediate to mafic metavolcanic/ silicate facies IF	Andesite (calc-alkaline/ tholeiitic

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chapais Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-11-02	L54+00W, 8+65S	- grey-black to black, mottled - very fine-grained, leucocratic - massive/granoblastic to schistose/ lepidoblastic - mineralogy predominantly qtz, white mica, plag, hblde, carbonate - occasional f-gr euhed almand grn - very minor sulphides ± oxidation	- mildly sericitized, carbonatized	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 3 24 46 0.1	intermediate to mafic metavolcanic	Dacite to Rhyodacite (calc-alkaline)
FA-87-12-01	L52+00W, 8+65S	INSUFFICIENT B/R MATERIAL - Entire Sample Sent to Bondar-Clegg		Au ppb As ppm Cu ppm Zn ppm Ag ppm	555 I.S. I.S. I.S. I.S.		
FA-87-13-05	L49+00W, 9+10S	- green-grey to grey - fine to very fine-grained - massive, granoblastic to clastic? - mineralogy predominantly indeterminate mafics, qtz, plag, white mica, carb - minor very fine-grained disseminated py	- mildly carbonatized - carb veins noted in log	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 91 41 0.1	intermediate to mafic metavolcanic/ metasediment?	Andesite (calc-alkaline)
FA-87-14-04	L33+60W, 9+60S	- grey to green-grey, mottled - very fine-grained, leucocratic - slightly schistose to massive, slightly lepidoblastic - mineralogy predominantly qtz, plag, white mica, ± hblde, biotite, carb - sulphides absent	- pervasively sericitized	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 19 54 0.1	felsic to intermediate schistose metavolcanic	Dacite to Rhyodacite (calc-alkaline)
FA-87-15-02	L15+00W, 4+90S	- grey to grey-black, mottled - vf-gr, leucocratic-fragmental - massive to slightly schistose - miner predom hblde, qtz, white mica, plag ± bio, gf? - cut by qtz vein (5 mm in width) - c-gr euhed py assoc with veinlts, appears recrystallized	- qtz veinlets with significant associated euhedral py	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 19 120 96 0.1	intermediate to mafic schistose metavolcanic/tuff	Andesite (calc-alkaline)

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chapais Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-89-16-02	L121+00W, 6+45S	- grey to green-grey - med to f-gr, leucocratic - schistose/lepidoblastic to massive/granoblastic - mineralogy predominantly qtz, plag, white mica, hblde ± carb - significant rust staining, but sulphides essentiallay absent	- significant carbonatization, sericitization	Au ppb	5	schistose felsic to intermediate metavolcanic	Dacite to Rhyodacite (calc-alkaline)
				As ppm	2		
				Cu ppm	12		
				Zn ppm	55		
				Ag ppm	0.1		
FA-87-17-02	L10+00W, 5+50S	- dull orange-brown, bronze - very fine-grained, metallic - massive, phyllite? - appears to be massive sulphides: predominantly pyrrhotite, py ± chalcopyrite, bornite - all appear to be recryst (i.e. nodular, extremely f-gr)	- massive sulphides	Au ppb	65	sulphidic metasediment?	Fe-rich sediment
				As ppm	122		
				Cu ppm	48		
				Zn ppm	84		
				Ag ppm	0.3		
FA-87-18-02	L10+00W, 6+60S	- grey to black, mottled - fine-grained, leucocratic - massive, granoblastic - mineralogy predominantly hblde, qtz, plag ± carb, white mica - occasional very fine-grained sulphides	- significant carbonatization, sericitization	Au ppb	2	intermediate to mafic metavolcanic	Basalt (tholeiitic, Mg-rich)
				As ppm	2		
				Cu ppm	56		
				Zn ppm	59		
				Ag ppm	0.1		
FA-87-19-02	L7+00W, 5+25S	- grey, mottled - medium to fine-grained - massive, granoblastic - mineralogy predominantly qtz, plag, white mica, hblde (± chl/act) + carb - very minor fine-grained py	- significant carbonatization	Au ppb	2	felsic to intermediate metavolcanic	Dacite to Rhyodacite (calc-alkaline)
				As ppm	2		
				Cu ppm	34		
				Zn ppm	41		
				Ag ppm	0.1		
FA-87-20-02	L5+00W, 5+00S	- dull grey to cream-coloured, peppery - very fine-grained to fine-grained - massive to slightly clastic, granoblastic - mineralogy predominantly quartz, plag with minor hblde (porphyroblasts?) + carb - very minor disseminated py	- significant carbonatization	Au ppb	5	felsic to intermediate metavolcanic/tuff	Dacite to Rhyodacite (calc-alkaline)
				As ppm	2		
				Cu ppm	30		
				Zn ppm	105		
				Ag ppm	0.1		

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporations Falconbridge Copper Property/Area: Achates / Chalais Examined by: P. Sobrie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-21-02	L5+00W, 4+80S	- dull grey-bronze, metallic - fine-grained to medium-grained - mass/grano to equigran phyllite - min predom qtz, plag, carb & indiscrim vf-gr mafic min (hblde?, opx?) - vf-gr recryst py approx 20%, also primary c-gr euhed py (5%)	- minor qtz/carb microveining - significant py content - significant carbonatization	Au ppb	45	intermediate metavolcanic/ phyllite/tuff with massive py seam	Fe-rich Sediment ?
				As ppm	42		
				Cu ppm	89		
				Zn ppm	99		
				Ag ppm	0.2		
FA-87-22-02	L4+00W, 1+50S	- pale green/grey, mottled - fine-grained, leucocratic - massive/granoblastic to porphyroblastic (plag-saussuritized) - min predom qtz, carb, white mica, mafic minerals, plag - very minor fine-grained euhedral disseminated py	- pervasive carbonatization - minor sericitization	Au ppb	5	intermediate to metavolcanic	Andesite (calc-alkaline)
				As ppm	5		
				Cu ppm	169		
				Zn ppm	140		
				Ag ppm	0.1		
FA-87-23-02	L4+00W, 1+30S	- dark grey, mottled - very fine-grained, leucocratic - massive, granoblastic - minerology predominantly hblde, plag, qtz, bio, white mica + carb - very minor fine-grained disseminated py	- minor carbonatization ± sericitization	Au ppb	5	intermediate to mafic metavolcanic	Andesite (calc-alkaline)
				As ppm	33		
				Cu ppm	105		
				Zn ppm	68		
				Ag ppm	0.1		
FA-87-24-04	L2+00W, 1+10S	- dark grey, mottled - medium-grained, leucocratic - appears clastic, peppery texture - mineralogy predominantly qtz, fspar, bio, hblde, white mica	- no significant alteration/mineralization	Au ppb	5	intermediate to mafic metavolcanic/ tuff	Andesite (calc-alkaline)
				As ppm	4		
				Cu ppm	156		
				Zn ppm	66		
				Ag ppm	0.1		
FA-87-25-03	L7+00W, 1+35S	- dark grey to black, mottled - fine-grained, leucocratic - massive/granoblastic to schistose/ lepidoblastic - mineralogy predom hblde, plag, bio, qtz, carb - very minor f-gr diss	- minor carbonatization	Au ppb	10	mafic metavolcanic	Basalt (tholeiitic)
				As ppm	2		
				Cu ppm	237		
				Zn ppm	19[illegible]		
				Ag ppm	0.1		

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chapais Examined by:

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-26-02	L10+00W, 1+55S	- grey, mottled - vf to f-gr, leucocratic - massive, granoblastic - min predom plag, qtz, carb and very f-gr mafics (aug, epidote ± hblde) and white mica - very minor diss fine-grained py	- minor carbonatization, sericitization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 4 109 74 0.1	intermediate to mafic meta-volcanic	Andesite (calc-alkaline)
FA-87-27-02	L10+00W, 1+40S	- INSUFFICIENT B/R MATERIAL - entire sample sent to Bondar-Clegg		Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 109 57 0.1	intermediate to metavolcanic	Andesite (calc-alkaline)
FA-87-28-02	L11+00W, 2+40S	- light grey, mottled - fine-grained, leucocratic - massive, granoblastic - min predom plag, qtz, carb, mafics (hblde?, chl, act) and white mica - very minor disseminated fine-grained py	- pervasive carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 166 72 0.1	intermediate to mafic metavolcanic	Andesite (calc-alkaline)
FA-87-29-02	L13+00W, 2+15S	- grey to grey-black, mottled - vf to f-gr, leucocratic - massive, granoblastic - min predom hblde (± epidote, augite, plag, qtz, white mica and carb - minor med-grained euhedral py	- pervasive carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 21 94 76 0.1	mafic meta-volcanic	Basalt (tholeiitic)
FA-87-30-02	L13+00W, 0+85S	- green-grey to grey, mottled - fine-grained, leucocratic - massive, granoblastic - mineralogy predom mafics (epidote, hblde, chl, plag, qtz, carb - very minor diss py	- pervasive carbonatization - siliceous	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 32 91 0.1	mafic meta-volcanic	Basalt (tholeiitic)

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: CORPORATION FALCONBRIDGE COPPER Property/Area: ACHATES / CHAPAIS Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-31-02	L14+00W, 1+05S	- green-grey to grey, mottled - fine-grained, leucocratic - mass/granoblastic to weakly foliated/lepidoblastic - min predom qtz, plag, mafics (vf-gr but appear to be hblde, ± epidote, chl) + carb, wh mica, minor bio - v minor f-gr diss py	- pervasive carbonatization sericitization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	270 IS IS IS IS	intermediate to mafic metavolcanic	Basalt (tholeiitic?)
FA-87-32-04	L6+00W, 0+20S	- lt grey to grey, mottled - fine-grained, leucocratic - massive, granoblastic - min predom hblde, plag, qtz, carb ± white mica - sig qtz-carb veining with rusty qtz, minor f-gr euhedral py assoc	- pervasive carbonatization - extensive qtz-carb veining	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 14 97 69 0.1	intermediate to mafic metavolcanic	Andesite (tholeiitic)
FA-87-33-02	L2+00W, 0+00N	- green-grey to grey, mottled - vf-gr to f-gr, leucocratic - massive, granoblastic - min predom mafics (hblde?), plag, qtz ± carb, white mica, chl - very minor f-gr diss euhedral py	- pervasive carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 7 127 64 0.1	intermediate to mafic metavolcanic	Andesite (calc-alkaline)
FA-87-34-02	L1+00E, 1+40S	- green-grey to grey, mottled - vf-gr to f-gr, leucocratic - mod foliated, lepidoblastic to granoblastic - min predom plag, qtz (hblde ± activolite, chl) carb white mica and graphite	- pervasive carbonatization, moderately graphitic, schistose	Au ppb As ppm Cu ppm Zn ppm Ag ppm	15 5 49 34 0.1	amphibole schist / intermediate metavolcanic	Dacite to Rhyodacite (calc-alkaline)
FA-87-35-02	L9+50W, 2+50N	- green-grey, mottled - med to f-gr, leucocratic - mass/granoblastic to mod foliated/lepidoblastic - min predom mafics (hblde, epi ± act), plag, qtz, carb, white mica - minor f-gr diss euhedral py	- pervasive carbonatization, sericitization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 120 57 0.1	mafic metavolcanic/schist	Basalt (tholeiitic)

MPH Consulting Limited

BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chapais Examined by: P. Sibe

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-36-03	L3+00W, 3+75N	- INSUFFICIENT B/R MATERIAL - entire sample sent to Bondar-Clegg		Au ppb	5	mafic metavolcanic	Basalt (calc-alkaline)
				As ppm	2		
				Cu ppm	95		
				Zn ppm	67		
				Ag ppm	0.1		
FA-87-37-04	L3+00W, 4+90N	- yel-grey to grey-white - f to med-gr, leucocratic - massive, granoblastic - min predom quartzo-feldspathic ± carb, mafics, wh mica - minor diss euhedral py - extensive qtz-carb veining, gf-py seams	- extensive carbonatization, qtz-carb veining - gf-py seam within qtz	Au ppb	5	felsic meta-volcanic	Rhyolite (calc-alkaline)
				As ppm	7		
				Cu ppm	16		
				Zn ppm	22		
				Ag ppm	0.1		
FA-87-38-02	L5+00W, 3+40N	- grey to grey-black, mottled - fine-grained, leucocratic - massive/granoblastic to schistose/lepidoblastic - min predom hblde, plag, qtz, white mica - minor very f-gr diss py	- minor carb veining	Au ppb	5	mafic meta-volcanic	Basalt (tholeiitic)
				As ppm	3		
				Cu ppm	121		
				Zn ppm	106		
				Ag ppm	0.1		
FA-87-39-01	L7+00W, 3+40N	- medium grey, mottled - fine-grained, leucocratic - mass to clastic, granoblastic - mineralogy predom indeterminate mafics, plag, qtz ± white mica, carb	- pervasive carbonatization	Au ppb	5	intermediate to mafic metavolcanic tuff	Andesite (calc-alkaline)
				As ppm	17		
				Cu ppm	129		
				Zn ppm	96		
				Ag ppm	0.1		
FA-87-40-05	L7+60W, 5+00N	- grey-black, mottled white - fine-grained, leucocratic - massive granoblastic - min predom quartzo-feldspathic, indeterminate mafics, carb, minor white mica - minor f-gr euhedral py	- pervasive carbonatization (Mg-carb?)	Au ppb	10	intermediate metavolcanic schist	Andesite (tholeiitic, high Mg)
				As ppm	2		
				Cu ppm	44		
				Zn ppm	73		
				Ag ppm	0.1		

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: CORPORATION FALCONBRIDGE COPPER Property/Area: ACHATES / CHAPAIS Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-41-02	L20+00W, 1+65N	- grey-black, mottled - f to m-gr, leucocratic - massive, granoblastic - min predom mafics (indeterminate) plag, carb, qtz + minor white mica - minor diss f-gr py, po - extensive rust staining	- minor carbonatization, extensive rust staining	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 97 67 0.1	mafic metavolcanic	Basalt-Tholeiitic
FA-87-42-05	L22+00W, 3+75S	- grey-black, mottled - f to med-gr, leucocratic - massive, granoblastic to schistose, lepidoblastic - min predom mafics (indeter) plag, carb, qtz, wh mica + irridescent blue cpx (acmite?) - minor diss euhedral py	- minor carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 15 135 64 0.1	amphibolite/ mafic metavolcanic	Basalt-Tholeiitic
FA-87-43-02	L22+00W, 7+00S	- grey-black, mottled white - f to m-gr, leucocratic - massive, granoblastic to schistose, lepidoblastic - mildly porphyro (qtz, fspar) - min predom qtz-felds with minor bio, white mica, chl? - v minor diss f-gr euhedral py	- minor carb microveinlets	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 13 30 0.1	meta-rhyolite/ qtz-feldspar porphyry?	Rhyolite (calc-alkaline)
FA-87-44-03	L20+00W, 1+50S	- grey-black, mottled - very fine-grained - mass to schistose, granoblastic to lepidoblastic - min predom indeter mafics with minor plag, qtz, carb, wht mica - minor diss vf-gr py, qtz-carb microveinlets	- minor quartz-carb microveinlets	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 10 114 148 0.1	mafic metavolcanic	Basalt (calc-alkaline)
FA-87-45-02	L20+00W, 2+60N	- grey-black to grey, peppery - f to med-gr, poss fissility - mass/granoblastic to weakly foliated/lepidoblastic - min predom mafics (indeter), carb, plag, qtz, white mica - minor carb microveinlets	- extensive carbonatization, carb microveining	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 62 132 175 0.3	mafic metavolcanic/ tuff	Basalt (calc-alkaline)

MPH Consulting Limited BINOCULAR MICROSCOPE EXAMINATION LOG

Client: CORPORATION FALCONBRIDGE COPPER Property/Area: ACHATES / CHAPAIS Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-46-04	L17+00W, 4+50N	- green-black, mottled - f-gr, moder leucocratic - mass/granoblastic to schistose/ lepidoclastic - min predom indeter mafics, qtz, plag, carb, white mica - minor py ± sph as diss cubes and stringers	- minor carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 184 27 0.1	intermediate to mafic metavolcanic	Andesite (tholeiitic)
FA-87-47-03	L16+15W, 4+50N	- green-grey - medium to fine-grained - massive/granoblastic to foliated/ lepidoblastic - min predom indeter mafics, plag, qtz + white mica - minor vf-gr diss py	- no significant alteration or mineralization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 80 54 0.1	intermediate to mafic metavolcanic	Andesite (tholeiitic, high Mg)
FA-87-48-03	L27+00W, 4+60S	- green-grey to grey - vf-gr, mod leucocratic - massive, granoblastic - min predom indeter mafics, qtz, plag + carb, minor white mica - very minor diss f-gr euhedral py	- pervasive carbonatization (Mg-carb?)	Au ppb As ppm Cu ppm Zn ppm Ag ppm	10 56 85 78 0.1	intermediate to mafic metavolcanic	Andesite (tholeiitic, high Mg)
FA-87-49-02	L27+00W, 5+15S	- pale yellow to light grey - very fine-grained - mass/granoblastic to mod schistose/lepidoblastic - min predom qtz-felds with minor platey white mica, act + carb - minor gf seams noted in drill log	- moderate carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 3 13 107 0.1	felsic to intermediate schistose metavolcanic/ metasediment	Dacite/Rhyodacite (calc-alkaline)
FA-87-50-02	L22+00W, 8+60N	- green-grey to grey, mottled - fine-grained, leucocratic - mass, granoblastic - mineralogy predom indeterminate mafics (± chl?) plag, qtz, carb	- pervasive carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 4 117 64 0.1	intermediate to mafic metavolcanics	Andesite (calc-alkaline)

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chapais Examined by: P. Sebe

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-51-02	L30+00W, 1+85N	- white to olive-green-grey - fine-grained, leucocratic - well-foliated, lepidoblastic - min predom hblde (epidote, act?) plag, qtz, carb, white mica - minor medium to c-gr euhedral py	- pervasive carbonatization - minor c-gr py	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 14 150 121 0.1	mafic schist/ metavolcanic?	Basalt (tholeiitic)
FA-87-52-02	L30+00W, 1+90N	- grey - vf-gr to f-gr - massive, granoblastic - min predom indeter mafics, qtz, plag - extensive qtz (veins?) - carb veining noted in drill log	- extensive silicification/ veining	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 4 144 36 0.1	intermediate to mafic metavolcanic	Andesite (calc-alkaline)
FA-87-53-06	L31+00W, 3+90S	- grey-black, mottled - medium-grained, leucocratic - massive, granoblastic to porphyroblastic (plag) - min predom hblde, plag + mag, ilmenite?, white mica, qtz, carb - sig hematite staining, minor dissem py	- minor carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	10 2 112 68 0.1	intermediate to mafic instrusive- diorite? gabbro?	Basalt (tholeiitic)
FA-87-54-08	L31+55W, 2+50S	- grey to rust-coloured - very fine to fine-grained - mass/granoblastic to crudely clastic/bedded? - min predom qtz-felds, py, white mica, mafic - mass py seams (recrystallized/ nodular py) approx 20 mm across	- massive py seams	Au ppb As ppm Cu ppm Zn ppm Ag ppm	20 25 130 101 0.3	felsic to intermediate metavolcanic/ gwke?/tuff	Dacite to Rhyodacite (calc-alkaline)
FA-87-55-05	L31+20W, 2+50N	- grey to rust-coloured - very fine to fine-grained - massive/granoblastic to crudely clastic/bedded?/porphyroblastic? - min predom quartzo-feldspathic, white mica, minor mafics - massive gf seams	- massive gf seams	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 23 131 0.1	felsic to intermediate metavolcanic/ gwke/tuff	Dacite to Rhyodacite (calc-alkaline)

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chanas Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-56-02	L38+00W, 4+10N	- green-grey to grey - fine-grained, leucocratic - mass/grano to arenaceous/clastic - min predom qtz-felds with indeter mafic component ± carb, chl? - sig (1-2%) c-gr euhed py ± mass py - cut by qtz vnlets ranging from transparent to "milky"	- qtz veinlets, minor carbonatization - significant py	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 113 55 0.1	mudstone-greywacke (metasediment)	Basaltic (calc-alkaline)
FA-87-57-03	L37+80W, 6+75N	- green-black, mottled grey - medium-grained, leucocratic - mass, hypidiomorphic gran texture ranging to lepidoblastic - min predom plag, hblde ± mag, py, white mica, bio - minor carb veining noted in log with signif po, py ± cpy	- minor carb veining with associated py, po + cpy	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 92 47 0.1	intermediate to mafic intrusive/amphibolite	Basaltic (tholeiitic-high iron)
FA-87-58-10	L44+00W, 3+25S	- grey, mottled - very fine-grained, leucocratic - massive, granoblastic - min predom indeter mafics, qtz, plag + carb, minor white mica - very minor diss fine-grained py	- minor carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 8 70 64 0.1	intermediate to mafic metavolcanic	Andesite (tholeiitic)
FA-87-59-03	L51+00W, 4+65N	- green-grey - f to vf-gr, leucocratic - schistose, fissile? - min predom qtz, plag, white mica, amphibole - up to 5% diss f-gr euhed py	- minor carbonatization	Au ppb As ppm Cu ppm Zn ppm Ag ppm	15 7 287 405 0.6	schistose metasediment/int metavolcanic	Andesitic (tholeiitic-high iron)
FA-87-60-05	L50+60W, 4+50N	- grey to grey-black, mottled - vf-gr, mildly leucocratic - massive, granoblastic - min predom indeter mafics, qtz, plag + carb, white mica - signif (up to 10%) vf-gr sulphide (py-po?, sph?) stringers	- minor carb veining, stringer sulphides, rust-staining	Au ppb As ppm Cu ppm Zn ppm Ag ppm	5 2 69 42 0.2	intermediate to mafic metavolcanic	Andesite (tholeiitic)

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper

Property/Area: Achates / Chapais

Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-61-03	L32+00W, 4+70N	- green-grey to grey - vf-gr to f-gr, phyllitic? - mass, granoblastic to schistose, slightly lepidoblastic - min predom plag, qtz, white mica, amphibole - very minor vf-gr disseminated py	- significant qtz-carb veinlets, regularly spaced-stockworks?	Au ppb	5	schistose metasediment / tuff	Basaltic (tholeiitic)
				As ppm	12		
				Cu ppm	136		
				Zn ppm	192		
				Ag ppm	0.1		
FA-87-62-02	L34+00W, 12+75N	- light green-grey to grey - very fine-grained - massive, granoblastic - min predom plag, qtz, indeter mafics, white mica - very minor disseminated py	- minor carb veining	Au ppb	5	mafic metavolcanic	Basalt (calc-alkaline)
				As ppm	2		
				Cu ppm	116		
				Zn ppm	65		
				Ag ppm	0.1		
FA-87-63-04	L41+00W, 13+50N	- black to grey-black, mottled - med-grained, leucocratic - massive, granoblastic to hypidiomorphic - min predom hblde, plag, qtz ± magnetite, carb - very minor fine-grained disseminated py ± po	- significant carb-veining	Au ppb	5	mafic meta-intrusive	Basalt (calc-alkaline
				As ppm	2		
				Cu ppm	98		
				Zn ppm	58		
				Ag ppm	0.1		
FA-87-64-02	L44+00W, 11+65N	- grey, mottled - very f-gr, leucocratic - massive, granoblastic - min predom plag, indeter mafics, qtz - very minor f-gr diss py ± po	- no significant alteration/mineralization	Au ppb	5	intermediate to mafic metavolcanic	Andesite (calc-alkaline)
				As ppm	2		
				Cu ppm	82		
				Zn ppm	69		
				Ag ppm	0.1		
FA-87-65-03	L44+00W, 11+85N	- grey-black, mottled - medium to c-gr, leucocratic - massive, hypidiomorphic - min predom hblde (± chl), qtz, plag, white mica - signif (up to 5%) sulphide stringers (py ± po, cpy)	- no significant alteration/mineralization	Au ppb	5	Dioritic porphyry?	Basalt (tholeiitic)
				As ppm	2		
				Cu ppm	98		
				Zn ppm	54		
				Ag ppm	0.1		

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Chapais Examined by: P. Sbci

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-66-03	L49+00W, 9+10N	- grey/black, mottled - very fine-grained - massive, granoblastic - min predom indeter mafics, plag ± qtz ± carb - no visible sulphides, minor rust-staining	- no significant alteration/mineralization	Au ppb	5	mafic meta-volcanic	Basalt (calc-alkaline?)
				As ppm	2		
				Cu ppm	118		
				Zn ppm	37		
				Ag ppm	0.1		
FA-87-67-03	L51+00W, 7+85N	- grey/black, mottled - fine to med-gr, leucocratic? - mass, granoblastic to hypidiomorphic - min predom hblde, carb, plag ± qtz, white mica, mag - very minor diss fine-grained py, po	- significant carbonatization	Au ppb	5	mafic meta-volcanic	Basalt (tholeiitic)
				As ppm	2		
				Cu ppm	158		
				Zn ppm	66		
				Ag ppm	0.1		
FA-87-68-05	L28+00E, 16+40N	- grey/black, mottled - fine to med-gr, leucocratic - massive, granoblastic to hypidiomorphic - min predom hblde, carb, plag ± qtz, white mica, mag - very minor diss fine-grained py, po	- moderate carbonatization - signif qtz-carbonate micro-veinlets and stringers	Au ppb	10	mafic meta-volcanic/ intrusive	Basalt (tholeiitic)
				As ppm	2		
				Cu ppm	114		
				Zn ppm	120		
				Ag ppm	0.1		
FA-87-69-04	L27+25E, 14+00N	- black, mottled - vf-gr, moderately leucocratic - massive, granoblastic - min predom indeter mafics, graphite, qtz, carb, white mica - minor diss py	- graphitic - signif qtz veining with associated pyritic graphite	Au ppb	15	metasediment/ gf schist/ tuff	Andesitic (calc-alkaline)
				As ppm	12		
				Cu ppm	144		
				Zn ppm	101		
				Ag ppm	0.1		
FA-87-70-01	L23+00W, 12+30N	- yellow/white, mottled - f-gr to med-gr - massive/granoblastic to schistose/lepidoblastic - min predom qtz-felds, carb, indeter mafics, white mica - significant rust staining	- sheared? - signif carbonatization	Au ppb	5	intermediate to felsic metavolcanic/ schist	Dacite to Rhyodacite (calc-alkaline)
				As ppm	3		
				Cu ppm	21		
				Zn ppm	18		
				Ag ppm	0.1		

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: CORPORATION FALCONBRIDGE COPPER Property/Area: ACHATES / CHAPAIS Examined by: P. Sobie

HOLE-SAMPLE#	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-71-01	L23+00E, 15+20N	- grey/green to black, mottled - very fine-grained, leucocratic - massive, granoblastic - min predom indeter mafics, plag ± white mica, qtz - minor disseminated py	- minor carbonate microveining	Au ppb	5	intermediate to mafic metavolcanic	Andesite (calc-alkaline)
				As ppm	2		
				Cu ppm	118		
				Zn ppm	101		
				Ag ppm	0.1		
FA-87-72-02	L23+00E, 16+00N	- grey/gree to grey, mottled - vf-gr, leucocratic - massive, granoblastic to clastic, hypidiomorphic - min predom qtz, white mica, plag, carb + mag - minor py, po, gf - significant rust-staining	- significant rust staining and weathering of sulphides - trace po, py, gf?	Au ppb	5	intermediate to mafic metavolcanic/tuff	Andesite (calc-alkaline)
				As ppm	4		
				Cu ppm	78		
				Zn ppm	39		
				Ag ppm	0.1		
FA-87-73-02	L18+00E, 12+70N	- green/black, mottled - coarse to med-gr, leucocratic - massive, granoblastic to hypidiomorphic - min predom hblde, plag, qtz - minor disseminated f-gr py ± cpy?	- no significant alteration/mineralization	Au ppb	5	mafic intrusive/metavolcanic	Basaltic (tholeiitic)
				As ppm	34		
				Cu ppm	95		
				Zn ppm	46		
				Ag ppm	0.1		
FA-87-74-02	L18+00E, 7+40N	- grey, mottled - f-gr, leucrocratic, vitreous - schistose, lepidoblastic - min predom white mica, qtz, bio?, ± gf - significant py component to schist	- pyritic, schistose - graphitic	Au ppb	20	qtz-ser schist/phyllite	Dacitic to Rhyodacitic (tholeiitic)
				As ppm	2		
				Cu ppm	34		
				Zn ppm	59		
				Ag ppm	0.1		
FA-87-75-02	L17+00E, 9+40N	- grey/black, mottled - f-gr, leucocratic, vitreous - schistose, lepidoblastic - min predom white mica, qtz, gf, indeter mafics, carb	- sericitic, graphitic - signif carb veining	Au ppb	5	graphite-qtz-ser schist	Dacite to Rhyodacite (calc-alkaline)
				As ppm	2		
				Cu ppm	9		
				Zn ppm	54		
				Ag ppm	0.1		

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BINOCULAR MICROSCOPE EXAMINATION LOG

Client: Corporation Falconbridge Copper Property/Area: Achates / Champs Examined by: P. Sobie

HOLE-SAMPLE*	LOCATION/GRID	DESCRIPTION	ALTERATION/MINERALIZATION	ANALYTICAL		FIELD NAME	CHEMICAL COMPOSITION
FA-87-76-02	L15+08E, 8+62N	- green/grey, mottled - very fine-grained, leucocratic vitreous - schistose, lepidoclastic - min predom white mica, qtz + gf, carb - significant quartz-carb veining	- sericitic, graphitic - signif qtz-carb veinlets, micro-veinlets	Au ppb	5	qtz-ser-gf schist?	Dacitic to Rhyodacitic (calc-alkaline)
				As ppm	2		
				Cu ppm	14		
				Zn ppm	73		
				Ag ppm	0.1		
FA-87-77-05	L11+00E, 1+40N	- black, mottled - fine-grained, leucocratic - schistose, lepidoblastic - min predom indeter mafics, white mica, plag, qtz + gf, carb - signif c to med-gr euhedral py	- minor carbonatization - significant py - minor quartz-carb veinlets	Au ppb	5	mafic schist	Basaltic (tholeiitic)
				As ppm	2		
				Cu ppm	128		
				Zn ppm	89		
				Ag ppm	0.1		
FA-87-78-03	L11+00E, 2+20S	- grey/green/mottled - very fine-grained, leucocratic - massive/granoblastic to mod schistose/lepidoblastic - min predom plag, indeter mafics, white mica, qtz, carb - minor disseminated py	- significant carbonatization	Au ppb	5	intermediate to felsic metavolcanic	Dacitic to Rhyodacitic (calc-alkaline)
				As ppm	2		
				Cu ppm	54		
				Zn ppm	36		
				Ag ppm	0.1		
				Au ppb			
				As ppm			
				Cu ppm			
				Zn ppm			
				Ag ppm			
				Au ppb			
				As ppm			
				Cu ppm			
				Zn ppm			
				Ag ppm			

APPENDIX E

Geochemical Statistics, Plots

Sample	Cu	Zn	Ag	As	Au	-200Ni	-200Cu	-200Zn	-200As	-200Au	Sam.wt.	Non.mag	eCu	eZn	eAg	eAs	eAu	e-200Ni	e-200Cu	e-200Zn	e-200As	e-200Au
FA87-01-01-3/4	81.00	304.00	0.30	25.00	40.00	13.00	12.00	22.00	4.00	2.50	7.50	26.70	384.48	1442.99	1.42	118.67	189.87	61.71	56.96	104.43	18.99	11.87
FA87-02-01-3/4	286.00	85.00	0.05	45.00	365.00	19.00	16.00	20.00	3.00	2.50	3.50	10.70	1165.79	346.48	0.20	183.43	1487.81	77.45	65.22	81.52	12.23	10.19
FA87-02-02-H	263.00	115.00	0.10	126.00	75.00	21.00	14.00	24.00	3.00	2.50	2.50	4.70	659.25	288.27	0.25	315.84	188.00	52.64	35.09	60.16	7.52	6.27
FA87-02-03-3/4	359.00	2080.00	0.10	49.00	20.00	61.00	31.00	64.00	3.00	2.50	5.30	18.80	1697.91	9837.48	0.47	231.75	94.59	288.50	146.62	302.69	14.19	11.82
FA87-02-04-3/4	516.00	193.00	0.20	93.00	65.00	141.00	31.00	28.00	4.00	2.50	6.50	17.60	1862.89	696.78	0.72	335.75	234.67	509.05	111.92	101.09	14.44	9.03
FA87-03-01-3/4	85.00	102.00	0.10	7.00	35.00	23.00	27.00	24.00	5.00	2.50	4.10	5.80	160.33	192.39	0.19	13.20	66.02	43.38	50.93	45.27	9.43	4.72
FA87-03-02-H	232.00	60.00	0.10	7.00	70.00	26.00	34.00	28.00	3.00	2.50	1.90	3.60	586.11	151.58	0.25	17.68	176.84	65.68	85.89	70.74	7.58	6.32
FA87-03-03-3/4	50.00	46.00	0.05	3.00	40.00	12.00	12.00	20.00	1.00	2.50	2.90	4.20	96.55	88.83	0.10	5.79	77.24	23.17	23.17	38.62	1.93	4.83
FA87-03-04-3/4	53.00	35.00	0.05	5.00	15.00	15.00	14.00	22.00	1.00	2.50	4.30	8.90	146.26	96.59	0.14	13.80	41.40	41.40	38.64	60.71	2.76	6.90
FA87-04-01-H	548.00	184.00	0.40	44.00	25.00	39.00	46.00	34.00	3.00	2.50	1.00	2.10	1534.40	515.20	1.12	123.20	70.00	109.20	128.80	95.20	8.40	7.00
FA87-05-01-3/4	150.00	71.00	0.05	24.00	215.00	11.00	11.00	14.00	2.00	2.50	4.90	12.50	510.20	241.50	0.17	81.63	731.29	37.41	37.41	47.62	6.80	8.50
FA87-05-02-3/4	160.00	86.00	0.10	33.00	600.00	15.00	12.00	16.00	1.00	2.50	4.90	15.30	666.12	358.04	0.42	137.39	2497.96	62.45	49.96	66.61	4.16	10.41
FA87-05-03-3/4	144.00	64.00	0.20	45.00	35.00	18.00	13.00	18.00	3.00	2.50	6.00	19.40	620.80	275.91	0.86	194.00	150.89	77.60	56.04	77.60	12.93	10.78
FA87-05-04-3/4	153.00	72.00	0.10	50.00	45.00	22.00	16.00	22.00	3.00	2.50	6.00	18.10	615.40	289.60	0.40	201.11	181.00	88.49	64.36	88.49	12.07	10.06
FA87-05-05-3/4	150.00	79.00	0.48	94.00	30.00	15.00	12.00	16.00	3.00	2.50	8.50	23.10	543.53	286.26	1.45	340.61	108.71	54.35	43.48	57.98	10.87	9.06
FA87-05-06-3/4	189.00	119.00	0.05	76.00	60.00	14.00	12.00	20.00	4.00	2.50	6.80	19.30	715.24	450.33	0.19	287.61	227.06	52.98	45.41	75.69	15.14	9.46
FA87-05-07-3/4	158.00	59.00	0.20	52.00	25.00	17.00	14.00	20.00	2.00	2.50	7.40	21.00	597.84	223.24	0.76	196.76	94.59	64.32	52.97	75.68	7.57	9.46
FA87-05-08-3/4	348.00	3605.00	0.80	75.00	30.00	17.00	16.00	140.00	4.00	2.50	3.40	9.80	1337.41	13854.51	3.07	288.24	115.29	65.33	61.49	538.04	15.37	9.61
FA87-05-09-3/4	345.00	77.00	0.20	98.00	45.00	33.00	21.00	22.00	4.00	2.50	2.70	7.70	1311.85	292.79	0.76	372.64	171.11	125.48	79.85	83.65	15.21	9.51
FA87-06-01-3/4	92.00	114.00	0.05	8.00	100.00	16.00	21.00	20.00	4.00	5.00	4.70	11.60	302.75	375.15	0.16	26.33	329.08	52.65	69.11	65.82	13.16	16.45
FA87-06-02-3/4	61.00	354.00	0.20	9.00	145.00	39.00	39.00	21.00	3.00	2.50	6.20	17.90	234.82	1362.71	0.77	34.65	558.17	150.13	150.13	80.84	11.55	9.62
FA87-07-01-H	855.00	127.00	0.80	79.00	35.00	32.00	45.00	32.00	4.00	2.50	1.40	3.70	3012.86	447.52	2.82	278.38	123.33	112.76	158.57	112.76	14.10	8.81
FA87-09-01-H					27.50	53.00	84.00	40.00	4.00	2.50	0.50	1.00					73.33	141.33	224.00	106.67	10.67	6.67
FA87-09-02-H					25.00	85.00	78.00	52.00	2.00	2.50	0.90	1.70					62.96	214.07	196.44	130.96	5.04	6.30
FA87-09-03-H	76.00	24.00	0.05	9.00	35.00	63.00	75.00	36.00	4.00	2.50	1.70	4.10	244.39	77.18	0.16	28.94	112.55	202.59	241.18	115.76	12.86	8.04
FA87-09-04-H	144.00	25.00	0.05	15.00	100.00	60.00	91.00	38.00	4.00	2.50	1.30	1.70	251.08	43.59	0.09	26.15	174.36	104.62	158.67	66.26	6.97	4.36
FA87-10-01-H	88.00	49.00	1.60	6.00	70.00	54.00	94.00	52.00	1.00	5.00	1.50	4.70	367.64	204.71	6.68	25.07	292.44	225.60	392.71	217.24	4.18	20.89
FA87-10-02-3/4	126.00	31.00	0.10	3.00	35.00	51.00	93.00	40.00	1.00	2.50	2.30	6.50	474.78	116.81	0.38	11.30	131.88	192.17	350.43	150.72	3.77	9.42
FA87-11-01-H					155.00	57.00	68.00	38.00	1.00	2.50	0.30	1.00					688.89	253.33	302.22	168.89	4.44	11.11
FA87-12-01-H					277.50	64.00	102.00	60.00	1.00	2.50	0.10	0.20					740.00	170.67	272.00	160.00	2.67	6.67
FA87-12-02-H					580.00	67.00	57.00	50.00	1.00	2.50	0.60	0.40					515.56	59.56	50.67	44.44	0.89	2.22
FA87-13-01-3/4	96.00	17.00	0.05	15.00	20.00	20.00	20.00	14.00	1.00	2.50	3.40	16.80	632.47	112.00	0.33	98.82	131.76	131.76	131.76	92.24	6.59	16.47
FA87-13-02-3/4	39.00	22.00	0.10	5.00	12.50	20.00	15.00	20.00	1.00	2.50	2.10	6.20	153.52	86.60	0.39	19.68	49.21	78.73	59.05	78.73	3.94	9.84
FA87-13-03-H	127.00	160.00	0.05	15.00	25.00	30.00	27.00	26.00	1.00	2.50	0.90	2.20	413.93	521.48	0.16	48.89	81.48	97.78	88.00	84.74	3.26	8.15
FA87-13-04-3/4	528.00	472.00	0.40	37.00	30.00	70.00	75.00	50.00	5.00	5.00	1.50	7.60	3566.93	3188.62	2.70	249.96	202.67	472.89	506.67	337.78	33.78	33.78
FA87-14-01-3/4	359.00	179.00	0.10	80.00	50.00	30.00	42.00	52.00	2.00	2.50	1.80	9.10	2419.93	1206.59	0.67	539.26	337.04	202.22	283.11	350.52	13.48	16.85
FA87-14-02-3/4	257.00	175.00	0.10	75.00	95.00	27.00	36.00	54.00	5.00	2.50	1.70	12.50	2519.61	1715.69	0.98	735.29	931.37	264.71	352.94	529.41	49.02	24.51
FA87-14-03-3/4	547.00	242.00	0.40	125.00	70.00	27.00	38.00	40.00	1.00	2.50	1.80	9.90	4011.33	1774.67	2.93	916.67	513.33	198.00	278.67	293.33	7.33	18.33
FA87-15-01-3/4	543.00	142.00	0.50	114.00	130.00	18.00	24.00	20.00	1.00	2.50	3.20	13.40	3031.75	792.83	2.79	636.50	725.83	100.50	134.00	111.67	5.58	13.96
FA87-16-01-H	489.00	95.00	0.40	63.00	55.00	14.00	18.00	18.00	1.00	2.50	1.40	4.30	2002.57	389.05	1.64	258.00	225.24	57.33	73.71	73.71	4.10	10.24
FA-87-17-01-3/4	63.00	31.00	0.30	15.00	25.00	13.00	13.00	16.00	1.00	2.50	2.30	6.10	222.78	109.62	1.06	53.04	88.41	45.97	45.97	56.58	3.54	8.84
FA-87-18-01-H	545.00	58.00	0.30	75.00	350.00	40.00	32.00	32.00	1.00	10.00	1.00	4.20	3052.00	324.80	1.68	420.00	1960.00	224.00	179.20	179.20	5.60	56.00
FA-87-19-01-3/4	246.00	94.00	0.30	67.00	50.00	13.00	12.00	18.00	1.00	2.50	1.10	10.40	3101.09	1184.97	3.78	844.61	630.30	163.88	151.27	226.91	12.61	31.52
FA-87-20-01-H	279.00	62.00	0.40	47.00	25.00	14.00	13.00	16.00	2.00	2.50	0.80	3.50	1627.50	361.67	2.33	274.17	145.83	81.67	75.83	93.33	11.67	14.58
FA-87-21-01-H	215.00	45.00	1.50	167.00	220.00	16.00	20.00	22.00	7.00	2.50	0.80	1.00	358.33	75.00	2.50	278.33	366.67	26.67	33.33	36.67	11.67	4.17
FA-87-22-01-H	172.00	26.00	0.40	30.00	10.00	12.00	12.00	12.00	1.00	2.50	1.00	4.50	1032.00	156.00	2.40	180.00	60.00	72.00	72.00	72.00	6.00	15.00
FA-87-23-01-3/4	347.00	106.00	0.60	114.00	345.00	15.00	17.00	16.00	1.00	2.50	4.20	18.30	2015.90	615.81	3.49	662.29	2004.29	87.14	98.76	92.95	5.81	14.52
FA-87-24-01-3/4	247.00	84.00	0.50	54.00	40.00	14.00	13.00	16.00	2.00	2.50	3.00	11.50	1262.44	429.33	2.56	276.00	204.44	71.56	66.44	81.78	10.22	12.78
FA-87-24-02-3/4	188.00	55.00	0.50	51.00	80.00	15.00	17.00	18.00	2.00	2.50	2.40	7.90	825.11	241.39	2.19	223.83	351.11	65.83	74.61	79.00	8.78	10.97
FA-87-24-03-3/4	517.00	137.00	0.60	59.00	145.00	25.00	24.00	24.00	2.00	2.50	3.60	10.20	1953.11	517.56	2.27	222.89	547.78	94.44	90.67	90.67	7.56	9.44
FA-87-25-01-3/4	218.00	31.00	0.50	18.00	60.00	33.00	36.00	38.00	2.00	2.50	3.20	11.00	799.17	142.08	2.29	82.50	275.00	151.25	165.00	174.17	9.17	11.46
FA-87-25-02-H					67.50	58.00	74.00	48.00	4.00	2.50	0.40	0.60					135.00	116.00	148.00	96.00	8.00	5.00
FA-87-26-01-3/4	543.00	60.00	0.50	47.00	225.00	22.00	33.00	24.00	1.00	2.50	1.70	5.50	2342.35	258.82	2.16	202.75	970.59	94.90	142.35	103.53	4.31	10.78
FA-87-27-01-H	232.00	36.00	0.50	40.00	45.00	24.00	22.00	26.00	2.00	2.50	0.50	4.40	2722.13	422.40	5.87	469.33	528.00	281.60	258.13	305.07	23.47	29.33
FA-87-27-02-3/4	825.00	52.00	2.20	63.00	250.00	47.00	44.00	48.00	3.00	2.50	1.20	2.80	2566.67	161.78	6.84	196.00	777.78	146.22	136.89	149.33	9.33	7.78
FA-87-28-01-3/4	39.00	18.00	0.10	3.00	160.00	17.00	24.00	24.00	3.00	2.50	6.20	16.10	135.03	62.32	0.35	10.39	553.98	58.86	83.10	83.10	10.39	8.66

Sample	Cu	Zn	Ag	As	Au	-200Ni	-200Cu	-200Zn	-200As	-200Au	Sam.wt.	Non.mag	eCu	eZn	eAg	eAs	eAu	e-200Ni	e-200Cu	e-200Zn	e-200As	e-200Au
FA-87-29-01-3/4	133.00	26.00	0.10	14.00	150.00	19.00	22.00	26.00	3.00	2.50	2.70	7.20	472.89	92.44	0.36	49.78	533.33	67.56	78.22	92.44	10.67	8.89
FA-87-30-01-3/4	43.00	23.00	0.30	9.00	115.00	26.00	24.00	34.00	6.00	2.50	4.60	20.30	253.01	135.33	1.77	52.96	676.67	152.99	141.22	200.06	35.30	14.71
FA-87-31-01-3/4	316.00	201.00	0.60	51.00	50.00	16.00	21.00	34.00	2.00	2.50	3.70	14.60	1662.56	1057.51	3.16	268.32	263.06	84.18	110.49	178.88	10.52	13.15
FA-87-31-02-H	291.00	84.00	0.50	34.00	25.00	25.00	32.00	34.00	2.00	5.00	0.90	3.60	1552.00	448.00	2.67	181.33	133.33	133.33	170.67	181.33	10.67	26.67
FA-87-31-04-H					135.00	99.00	57.00	116.00	11.00	5.00	2.20	0.40					32.73	24.00	13.82	28.12	2.67	1.21
FA-87-32-01-3/4	27.00	21.00	0.20	7.00	5.00	23.00	21.00	38.00	1.00	2.50	2.80	15.90	204.43	159.00	1.51	53.00	37.86	174.14	159.00	287.71	7.57	18.93
FA-87-32-02-3/4	27.00	20.00	0.05	9.00	20.00	19.00	22.00	34.00	2.00	2.50	6.20	22.70	131.81	97.63	0.24	43.94	97.63	92.75	107.40	165.98	9.76	12.20
FA-87-32-03-3/4	107.00	34.00	0.05	57.00	12.50	20.00	21.00	28.00	2.00	10.00	1.90	6.20	465.54	147.93	0.22	248.00	54.39	87.02	91.37	121.82	8.70	43.51
FA-87-33-01-3/4	314.00	100.00	0.10	62.00	185.00	15.00	15.00	24.00	2.00	5.00	2.50	9.90	1657.92	528.00	0.53	327.36	976.80	79.20	79.20	126.72	10.56	26.40
FA-87-33-03-3/4	3540.00	18.00	0.10	900.00	200.00	101.00	123.00	64.00	19.00	10.00	2.10	5.60	12586.67	64.00	0.36	3200.00	711.11	359.11	437.33	227.56	67.56	35.56
FA-87-34-01-3/4	295.00	49.00	0.70	70.00	45.00	18.00	22.00	22.00	2.00	5.00	4.10	14.60	1400.65	232.65	3.32	332.36	213.66	85.46	104.46	104.46	9.50	23.74
FA-87-35-01-3/4	203.00	60.00	0.10	84.00	120.00	11.00	13.00	16.00	2.00	10.00	2.70	12.50	1253.09	370.37	0.62	518.52	740.74	67.90	80.25	98.77	12.35	61.73
FA-87-36-01-3/4	28.00	16.00	0.10	6.00	40.00	12.00	10.00	14.00	1.00	2.50	6.50	28.70	164.84	94.19	0.59	35.32	235.49	70.65	58.87	82.42	5.89	14.72
FA-87-36-02-3/4	227.00	21.00	0.10	22.00	150.00	25.00	22.00	22.00	2.00	5.00	5.60	24.60	1329.57	123.00	0.59	128.86	878.57	146.43	128.86	128.86	11.71	29.29
FA-87-37-01-3/4	34.00	20.00	0.05	5.00	50.00	19.00	13.00	22.00	1.00	2.50	7.50	25.70	155.34	91.38	0.23	22.84	228.44	86.81	59.40	100.52	4.57	11.42
FA-87-37-02-3/4	94.00	26.00	0.10	6.00	65.00	20.00	16.00	24.00	1.00	2.50	7.40	30.70	519.96	143.82	0.55	33.19	359.55	110.63	88.50	132.76	5.53	13.83
FA-87-37-03-3/4	147.00	76.00	0.30	32.00	165.00	30.00	31.00	38.00	2.00	20.00	6.00	19.20	627.20	324.27	1.28	136.53	704.00	128.00	132.27	162.13	8.53	85.33
FA-87-38-01-3/4	29.00	31.00	0.05	5.00	75.00	15.00	11.00	20.00	1.00	5.00	4.60	18.20	152.99	163.54	0.26	26.38	395.65	79.13	58.03	105.51	5.28	26.38
FA-87-39-02-H	2335.00	40.00	0.05	1080.00	235.00	81.00	128.00	92.00	1.00	2.50												
FA-87-40-01-H	152.00	60.00	0.05	45.00	25.00	13.00	15.00	18.00	1.00	2.50	0.80	3.10	785.33	310.00	0.26	232.50	129.17	67.17	77.50	93.00	5.17	12.92
FA-87-40-02-3/4	162.00	59.00	0.05	51.00	95.00	14.00	14.00	20.00	1.00	2.50	3.00	10.40	748.80	272.71	0.23	235.73	439.11	64.71	64.71	92.44	4.62	11.56
FA-87-40-03-3/4	140.00	56.00	0.05	63.00	35.00	17.00	196.00	20.00	1.00	2.50	2.10	7.40	657.78	263.11	0.23	296.00	164.44	79.87	920.89	93.97	4.70	11.75
FA-87-40-04-3/4	106.00	37.00	0.05	40.00	40.00	22.00	14.00	24.00	4.00	5.00	3.30	17.50	749.49	261.62	0.35	282.83	282.83	155.56	98.99	169.70	28.28	35.35
FA-87-41-01A-H	46.00	28.00	0.60	2.00	60.00	19.00	24.00	36.00	1.00	2.50	1.50	4.90	200.36	121.96	2.61	8.71	261.33	82.76	104.53	156.80	4.36	10.89
FA87-41-1B-H	45.00	24.00	0.20	4.00	195.00	20.00	21.00	26.00	1.00	2.50	11.10	4.60	24.86	13.26	0.11	2.21	107.75	11.05	11.60	14.37	0.55	1.38
FA87-42-1-3/4	36.00	41.00	0.10	8.00	120.00	19.00	17.00	24.00	1.00	2.50	2.20	8.90	194.18	221.15	0.54	43.15	647.27	102.48	91.70	129.45	5.39	13.48
FA87-42-2-3/4	131.00	46.00	0.05	36.00	30.00	16.00	21.00	30.00	1.00	2.50	6.20	24.00	676.13	237.42	0.26	185.81	154.84	82.58	108.39	154.84	5.16	12.90
FA87-42-3-3/4	257.00	104.00	0.20	88.00	20.00	19.00	16.00	22.00	1.00	2.50	5.20	21.40	1410.21	570.67	1.10	482.87	109.74	104.26	87.79	120.72	5.49	13.72
FA87-42-04-H	973.00	375.00	0.50	44.00	180.00	69.00	61.00	36.00	1.00	2.50	1.40	3.00	2780.00	1071.43	1.43	125.71	514.29	197.14	174.29	102.86	2.86	7.14
FA87-43-01-H	191.00	81.00	0.60	36.00	30.00	21.00	20.00	34.00	1.00	2.50	1.10	3.70	856.61	363.27	2.69	161.45	134.55	94.18	89.70	152.48	4.48	11.21
FA87-44-1-3/4	370.00	62.00	0.30	18.00	7.50	19.00	19.00	20.00	1.00	2.50	2.10	6.60	1550.48	259.81	1.26	75.43	31.43	79.62	79.62	83.81	4.19	10.48
FA87-44-2-3/4	225.00	129.00	0.40	46.00	60.00	20.00	17.00	26.00	1.00	2.50	3.70	16.60	1345.95	771.68	2.39	275.17	358.92	119.64	101.69	155.53	5.98	14.95
FA87-45-01-3/4	309.00	112.00	0.80	41.00	110.00	14.00	16.00	14.00	1.00	2.50	4.70	28.50	2498.30	905.53	6.47	331.49	889.36	113.19	129.36	113.19	8.09	20.21
FA87-46-01-3/4	54.00	29.00	0.20	5.00	115.00	18.00	10.00	12.00	1.00	5.00	4.50	18.90	302.40	162.40	1.12	28.00	644.00	100.80	56.00	67.20	5.60	28.00
FA87-46-02-3/4	595.00	34.00	0.40	13.00	45.00	27.00	44.00	28.00	1.00	5.00	3.90	11.80	2400.34	137.16	1.61	52.44	181.54	108.92	177.50	112.96	4.03	20.17
FA87-46-03-3/4	3600.00	43.00	1.10	17.00	35.00	49.00	229.00	38.00	1.00	2.50	1.80	6.50	17333.33	207.04	5.30	81.85	168.52	235.93	1102.59	182.96	4.81	12.04
FA87-47-01-H	2490.00	86.00	1.10	43.00	80.00	65.00	95.00	42.00	3.00	2.50	0.40	1.80	14940.00	516.00	6.60	258.00	480.00	390.00	570.00	252.00	18.00	15.00
FA87-47-02-H					4.50	104.00	56.00	46.00	3.00	2.50	0.50	1.50					18.00	416.00	224.00	184.00	12.00	10.00
FA87-48-01-3/4	442.00	185.00	0.80	144.00	395.00	35.00	28.00	36.00	8.00	10.00	2.30	11.60	2972.29	1244.06	5.38	968.35	2656.23	235.36	188.29	242.09	53.80	67.25
FA87-48-02-3/4	441.00	388.00	1.30	348.00	590.00	64.00	41.00	56.00	18.00	2.50	2.00	8.40	2469.60	2172.80	7.28	1948.80	3304.00	358.40	229.60	313.60	100.80	14.00
FA87-49-01-H	129.00	52.00	0.05	33.00	25.00	18.00	15.00	60.00	2.00	30.00	1.00	3.10	533.20	214.93	0.21	136.40	103.33	74.40	62.00	248.00	8.27	124.00
FA87-50-01-3/4	53.00	54.00	0.20	11.00	140.00	21.00	22.00	24.00	1.00	5.00	1.80	7.20	282.67	288.00	1.07	58.67	746.67	112.00	117.33	128.00	5.33	26.67
FA87-51-01-3/4	293.00	25.00	0.05	32.00	30.00	26.00	27.00	40.00	1.00	2.50	2.60	10.70	1607.74	137.18	0.27	175.59	164.62	142.67	148.15	219.49	5.49	13.72
FA87-52-01-H	234.00	96.00	0.40	39.00	25.00	27.00	24.00	18.00	2.00	2.50	0.20	1.70	2652.00	1088.00	4.53	442.00	283.33	306.00	272.00	204.00	22.67	28.33
FA87-53-01-3/4	52.00	22.00	0.05	2.00	240.00	28.00	22.00	24.00	1.00	35.00	5.40	20.80	267.06	112.99	0.26	10.27	1232.59	143.80	112.99	123.26	5.14	179.75
FA87-53-02-3/4	231.00	45.00	0.30	12.00	70.00	21.00	16.00	20.00	1.00	5.00	2.30	8.80	1178.43	229.57	1.53	61.22	357.10	107.13	81.62	102.03	5.10	25.51
FA87-53-03-3/4	124.00	22.00	0.40	19.00	20.00	26.00	15.00	24.00	1.00	2.50	4.10	12.60	508.10	90.15	1.64	77.85	81.95	106.54	61.46	98.34	4.10	10.24
FA87-53-04-H	2045.00	40.00	0.90	307.00	65.00	62.00	71.00	28.00	7.00	2.50	2.00	4.80	6544.00	128.00	2.88	982.40	208.00	198.40	227.20	89.60	22.40	8.00
FA87-53-05-3/4	984.00	24.00	0.60	79.00	105.00	70.00	71.00	40.00	1.00	2.50	2.90	6.30	2850.21	69.52	1.74	228.83	304.14	202.76	205.66	115.86	2.90	7.24
FA87-54-01-H	115.00	26.00	0.10	10.00	110.00	19.00	13.00	15.00	1.00	10.00	1.20	4.20	536.67	121.33	0.47	46.67	513.33	88.67	60.67	70.00	4.67	46.67
FA87-54-02-3/4	113.00	26.00	0.05	5.00	5.00	12.00	10.00	14.00	1.00	2.50	3.00	9.20	462.04	106.31	0.20	20.44	20.44	49.07	40.89	57.24	4.09	10.22
FA87-54-04-3/4	238.00	27.00	0.60	4.00	5.00	20.00	41.00	24.00	1.00	2.50	2.30	12.20	1683.25	190.96	4.24	28.29	35.36	141.45	289.97	169.74	7.07	17.68
FA87-54-05-3/4	159.00	23.00	0.50	4.00	5.00	19.00	14.00	18.00	1.00	2.50	6.40	20.60	682.38	98.71	2.15	17.17	21.46	81.54	60.08	77.25	4.29	10.73
FA87-54-06-3/4	127.00	19.00	0.30	10.00	5.00	17.00	10.00	18.00	1.00	2.50	3.30	11.90	610.63	91.35	1.44	48.08	24.04	81.74	48.08	86.55	4.81	12.02
FA87-54-07-3/4	166.00	57.00	0.80	33.00	30.00	27.00	24.00	48.00	2.00	2.50	2.30	7.80	750.61	257.74	3.62	149.22	135.65	122.09	108.52	217.04	9.04	11.30
FA87-55-01-3/4	320.00	38.00	0.40	21.00	12.50	13.00	21.00	18.00	1.00	2.50	1.70	5.40	1355.29	160.94	1.69	88.94	52.94	55.06	88.94	76.24	4.24	10.59

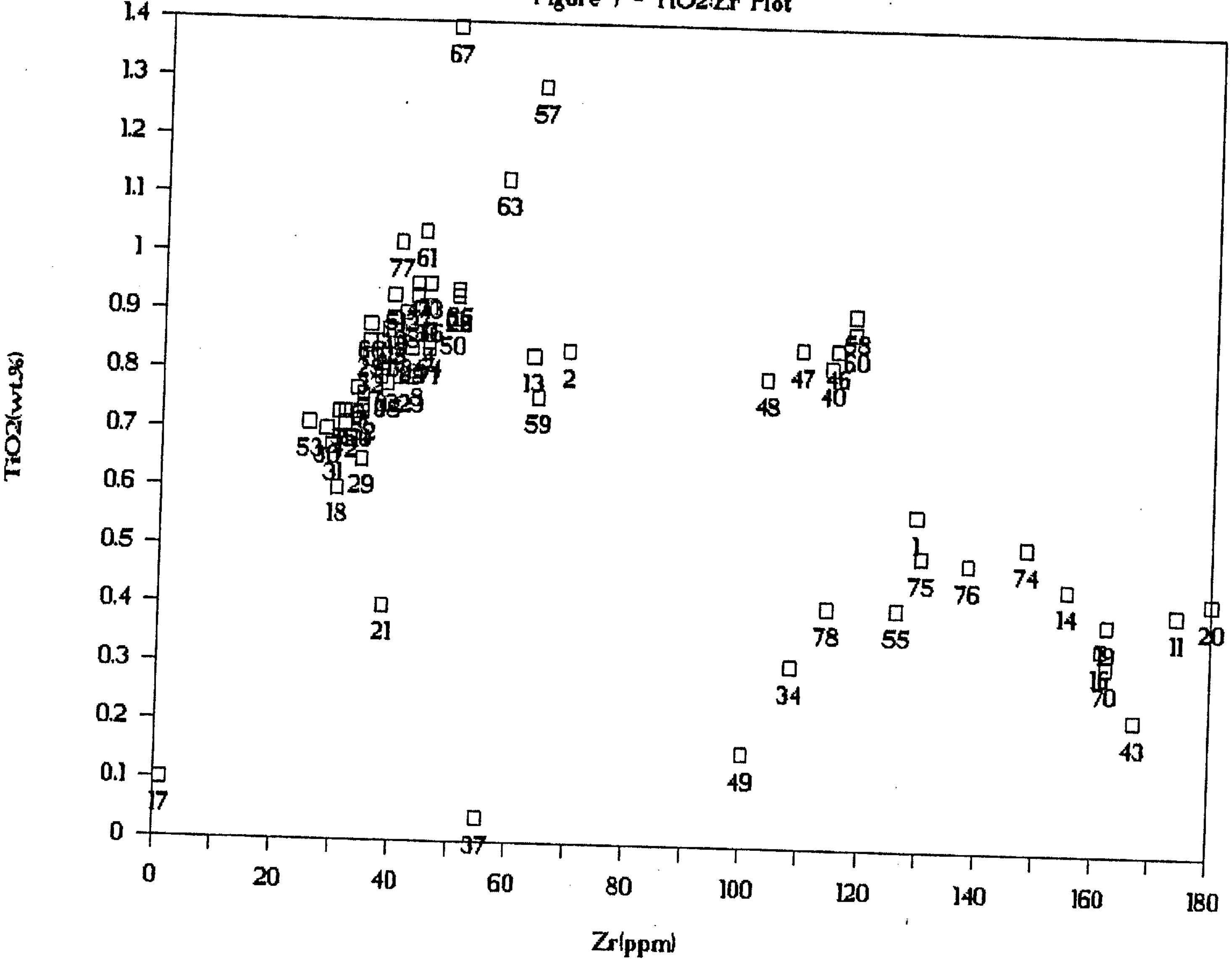
FA87-55-01-3/4	320.00	38.00	0.40	21.00	12.50	13.00	21.00	18.00	1.00	2.50	1.70	5.40	1355.29	160.94	1.69	68.94	52.94	55.06	88.94	76.24	4.24	10.59

Sample	Cu	Zn	Ag	As	Au	-200Ni	-200Cu	-200Zn	-200As	-200Au	Sam.wt.	Non.mag	eCu	eZn	eAg	eAs	eAu	e-200Ni	e-200Cu	e-200Zn	e-200As	e-200Au
FA87-55-02-3/4	105.00	22.00	0.10	4.00	15.00	18.00	17.00	20.00	1.00	10.00	2.00	6.90	483.00	101.20	0.46	18.40	69.00	82.80	78.20	92.00	4.60	46.00
FA87-55-03-3/4	162.00	20.00	0.40	8.00	7.50	27.00	33.00	28.00	2.00	2.50	1.80	6.30	756.00	93.33	1.87	37.33	35.00	126.00	154.00	130.67	9.33	11.67
FA87-55-04-H	168.00	108.00	0.05	72.00	25.00	38.00	26.00	36.00	3.00	2.50	1.50	4.60	686.93	441.60	0.20	294.40	102.22	155.38	106.31	147.20	12.27	10.22
FA87-56-01-3/4	236.00	62.00	0.60	41.00	25.00	35.00	15.00	16.00	2.00	2.50	2.50	8.70	1095.04	287.68	2.78	190.24	116.00	162.40	69.60	74.24	9.28	11.60
FA87-57-01-3/4	46.00	16.00	0.20	3.00	65.00	15.00	13.00	14.00	2.00	5.00	4.40	16.20	225.82	78.55	0.98	14.73	319.09	73.64	63.82	68.73	9.82	24.55
FA87-57-02-H	1058.00	80.00	0.05	20.00	25.00	52.00	70.00	52.00	1.00	2.50	0.60	1.80	4232.00	320.00	0.20	80.00	100.00	208.00	280.00	208.00	4.00	10.00
FA87-58-01-H	106.00	45.00	0.05	8.00	300.00	22.00	20.00	32.00	1.00	2.50	2.60	4.50	244.62	103.85	0.12	18.46	692.31	50.77	46.15	73.85	2.31	5.77
FA87-58-02-3/4	200.00	83.00	0.30	30.00	400.00	18.00	16.00	26.00	1.00	2.50	5.20	15.70	805.13	334.13	1.21	120.77	1610.26	72.46	64.41	104.67	4.03	10.06
FA87-58-03-3/4	212.00	82.00	0.10	34.00	30.00	18.00	18.00	18.00	1.00	2.50	5.40	19.20	1005.04	388.74	0.47	161.19	142.22	65.33	85.33	85.33	4.74	11.85
FA87-58-04-3/4	234.00	85.00	0.40	36.00	70.00	17.00	16.00	18.00	1.00	2.50	7.60	19.40	796.42	289.30	1.36	122.53	238.25	57.86	54.46	61.26	3.40	8.51
FA87-58-05-3/4	299.00	76.00	0.20	42.00	20.00	19.00	27.00	20.00	1.00	5.00	4.80	12.70	1054.81	268.11	0.71	148.17	70.56	67.03	95.25	70.56	3.53	17.64
FA87-58-06-3/4	510.00	69.00	0.20	39.00	95.00	26.00	24.00	22.00	1.00	2.50	6.80	26.60	2660.00	359.88	1.04	203.41	495.49	135.61	125.18	114.75	5.22	13.04
FA87-58-07-3/4	208.00	85.00	0.05	41.00	350.00	24.00	28.00	28.00	1.00	2.50	6.60	23.80	1000.08	408.69	0.24	197.13	1682.83	115.39	134.63	134.63	4.81	12.02
FA87-58-08-3/4	232.00	131.00	0.50	41.00	25.00	21.00	17.00	26.00	1.00	2.50	7.60	30.70	1249.54	705.56	2.69	220.82	134.65	113.11	91.56	140.04	5.39	13.46
FA87-58-09-3/4	405.00	475.00	0.50	56.00	105.00	22.00	25.00	44.00	1.00	2.50	6.50	23.60	1960.62	2299.49	2.42	271.10	508.31	106.50	121.03	213.01	4.84	12.10
FA87-59-01-3/4	104.00	28.00	0.05	4.00	235.00	28.00	26.00	22.00	1.00	2.50	3.50	13.90	550.70	148.27	0.26	21.18	1244.38	148.27	137.68	116.50	5.30	13.24
FA87-59-02-3/4	43.00	27.00	0.05	4.00	25.00	12.00	9.00	12.00	1.00	2.50	3.20	15.10	270.54	169.88	0.31	25.17	157.29	75.50	56.62	75.50	6.29	15.73
FA87-60-01-3/4	52.00	50.00	0.05	4.00	15.00	11.00	10.00	12.00	1.00	2.50	5.60	22.80	282.29	271.43	0.27	21.71	81.43	59.71	54.29	65.14	5.43	13.57
FA87-60-02-H	98.00	121.00	0.10	8.00	25.00	55.00	28.00	20.00	2.00	2.50	1.00	4.00	522.67	645.33	0.53	42.67	133.33	293.33	149.33	106.67	10.67	13.33
FA87-60-03-3/4	64.00	38.00	0.30	4.00	55.00	16.00	13.00	18.00	1.00	2.50	4.00	13.30	283.73	168.47	1.33	17.73	243.83	70.93	57.63	79.80	4.43	11.08
FA87-60-04-3/4	131.00	68.00	0.20	23.00	50.00	20.00	14.00	16.00	1.00	2.50	2.80	11.20	698.67	362.67	1.07	122.67	266.67	106.67	74.67	85.33	5.33	13.33
FA87-61-01-3/4	168.00	43.00	0.10	41.00	80.00	15.00	13.00	16.00	1.00	2.50	2.90	12.20	942.34	241.20	0.56	229.98	448.74	84.14	72.92	89.75	5.61	14.02
FA87-61-02-3/4	327.00	111.00	1.20	440.00	100.00	31.00	21.00	48.00	7.00	2.50	2.70	8.70	1404.89	476.89	5.16	1890.37	429.63	133.19	90.22	206.22	30.07	10.74
FA87-62-01-3/4	80.00	34.00	0.20	8.00	60.00	18.00	13.00	20.00	1.00	2.50	3.90	13.50	369.23	156.92	0.92	36.92	276.92	83.08	60.00	92.31	4.62	11.54
FA87-63-01-3/4	196.00	57.00	0.30	54.00	15.00	14.00	11.00	18.00	3.00	2.50	5.20	24.90	1251.38	363.92	1.92	344.77	95.77	89.38	70.23	114.92	19.15	15.96
FA87-63-02-3/4	332.00	92.00	0.20	80.00	60.00	13.00	16.00	18.00	2.00	2.50	3.80	15.20	1770.67	490.67	1.07	426.67	320.00	69.33	85.33	96.00	10.67	13.33
FA87-63-03-3/4	300.00	82.00	0.70	69.00	115.00	19.00	18.00	20.00	1.00	2.50	5.50	23.80	1730.91	473.12	4.04	398.11	663.52	109.62	103.85	115.39	5.77	14.42
FA87-64-01-H	338.00	112.00	0.05	37.00	80.00	44.00	17.00	30.00	1.00	10.00	1.20	4.50	1690.00	560.00	0.25	185.00	400.00	220.00	85.00	150.00	5.00	50.00
FA87-65-01-3/4	307.00	93.00	0.40	63.00	45.00	13.00	14.00	12.00	2.00	2.50	5.80	23.00	1623.22	491.72	2.11	333.10	237.93	68.74	74.02	63.45	10.57	13.22
FA87-65-02-3/4	320.00	99.00	0.30	53.00	85.00	20.00	22.00	22.00	1.00	2.50	4.10	17.00	1769.11	547.32	1.66	293.01	469.92	110.57	121.63	121.63	5.53	13.82
FA87-66-01-3/4	377.00	99.00	0.40	38.00	85.00	17.00	18.00	18.00	1.00	10.00	3.80	15.00	1984.21	521.05	2.11	200.00	447.37	89.47	94.74	94.74	5.26	52.63
FA87-66-02-3/4	238.00	64.00	0.10	29.00	10.00	21.00	22.00	22.00	2.00	5.00	6.90	25.70	1181.95	317.84	0.50	144.02	49.66	104.29	109.26	109.26	9.93	24.83
FA87-67-01-3/4	656.00	152.00	0.20		35.00	41.00	41.00	26.00	2.00	2.50	1.50	6.30	3673.60	851.20	1.12		196.00	229.60	229.60	145.60	11.20	14.00
FA87-67-02-H					70.00	114.00	122.00	60.00	5.00	2.50	0.70	0.90					120.00	195.43	209.14	102.86	8.57	4.29
FA87-68-01-3/4	63.00	46.00	0.10	10.00	190.00	30.00	28.00	32.00	4.00	10.00	1.80	9.80	457.33	333.93	0.73	72.59	1379.26	217.78	203.26	232.30	29.04	72.59
FA87-68-02-H	64.00	30.00	0.20	7.00	620.00	32.00	22.00	30.00	4.00	2.50	6.00	4.00	56.89	26.67	0.18	6.22	551.11	28.44	19.56	26.67	3.56	2.22
FA87-68-03-H	80.00	42.00	1.60	9.00	95.00	45.00	37.00	48.00	5.00	2.50	1.20	3.20	284.44	149.33	5.69	32.00	337.78	160.00	131.56	170.67	17.78	8.89
FA87-68-04-H	96.00	64.00	0.40		4.50	28.00	29.00	38.00	6.00	5.00	0.70	2.60	475.43	316.95	1.98		22.29	138.67	143.62	188.19	29.71	24.76
FA87-69-01-3/4	58.00	31.00	0.20	46.00	2.50	28.00	23.00	30.00	3.00	2.50	6.40	22.90	276.71	147.90	0.95	219.46	11.93	133.58	109.73	143.12	14.31	11.93
FA87-69-02-3/4	106.00	32.00	0.05	20.00	40.00	17.00	11.00	16.00	3.00	2.50	6.00	23.90	562.98	169.96	0.27	106.22	212.44	90.29	58.42	84.98	15.93	13.28
FA87-69-03-3/4	795.00	67.00	0.10	209.00	75.00	88.00	105.00	90.00	20.00	10.00	1.20	17.90	15811.67	1332.56	1.99	4156.78	1491.67	1750.22	2088.33	1790.00	397.78	198.89
FA87-72-01-3/4	89.00	40.00	0.20	5.00	275.00	25.00	23.00	36.00	12.00	2.50	2.40	6.80	336.22	151.11	0.76	18.89	1038.89	94.44	86.89	136.00	45.33	9.44
FA87-73-01-3/4	365.00	126.00	0.40	45.00	50.00	14.00	12.00	12.00	15.00	2.50	7.20	22.70	1534.35	529.67	1.68	189.17	210.19	58.85	50.44	50.44	63.06	10.51
FA87-74-01-H					30.00	21.00	20.00	26.00	7.00	2.50	0.50	1.20					96.00	67.20	64.00	83.20	22.40	8.00
FA87-75-01-H	273.00	100.00	0.60	91.00	40.00	21.00	16.00	28.00	1.00	2.50	1.40	4.80	1248.00	457.14	2.74	416.00	182.86	96.00	73.14	128.00	4.57	11.43
FA87-76-01-H	177.00	31.00	0.10	8.00	7.50	20.00	15.00	22.00	1.00	2.50	1.00	4.30	1014.80	177.73	0.57	45.87	43.00	114.67	86.00	126.13	5.73	14.33
FA87-77-01-3/4	689.00	39.00	0.90	29.00	40.00	36.00	39.00	44.00	4.00	2.50	2.20	9.40	3925.21	222.18	5.13	165.21	227.88	205.09	222.18	250.67	22.79	14.24
FA87-77-02-H	481.00	52.00	0.90	23.00	12.50	30.00	34.00	46.00	5.00	10.00	1.50	4.00	1710.22	184.89	3.20	81.78	44.44	106.67	120.89	163.56	17.78	35.56
FA87-77-03-3/4	106.00	25.00	0.10	8.00	15.00	26.00	21.00	30.00	6.00	2.50	7.10	23.30	463.81	109.39	0.44	35.00	65.63	113.77	91.89	131.27	26.25	10.94
FA87-77-04-3/4	377.00	31.00	0.60	50.00	7.50	43.00	48.00	48.00	9.00	5.00	2.40	7.10	1487.06	122.28	2.37	197.22	29.58	169.61	189.33	189.33	35.50	19.72
FA87-78-01-3/4	42.00	23.00	0.50	5.00	620.00	17.00	12.00	18.00	3.00	2.50	5.90	11.70	111.05	60.81	1.32	13.22	1639.32	44.95	31.73	47.59	7.93	6.61
FA87-78-02-3/4	243.00	53.00	0.10	30.00	55.00	28.00	29.00	28.00	3.00	2.50	5.30	21.60	1320.45	288.00	0.54	163.02	298.87	152.15	157.58	152.15	16.30	13.58
AVERAGE	305.65	107.57	0.31	52.77	97.52	30.09	32.09	30.12	2.72	3.81			1545.04	546.85	1.60	257.26	412.40	135.61	145.63	139.91	13.75	18.91
MAXIMUM	3600.00	3605.00	2.20	1080.00	620.00	141.00	229.00	140.00	20.00	35.00			17333.33	13854.51	7.28	4156.78	3304.00	1750.22	2088.33	1790.00	397.78	198.89
MINIMUM	27.00	16.00	0.05	2.00	2.50	11.00	9.00	12.00	1.00	2.50			24.86	13.26	0.09	2.21	11.93	11.05	11.60	14.37	0.55	1.21

Sample	Cu	Zn	Ag	As	Au	-200Ni	-200Cu	-200Zn	-200As	-200Au	Sam.wt.	Non.mag	eCu	eZn	eAg	eAs	eAu	e-200Ni	e-200Cu	e-200Zn	e-200As	e-200Au
STD.DEV.	499.49	324.79	0.35	118.93	122.90	22.04	31.51	17.75	3.10	4.01			2472.72	1395.25	1.62	484.94	514.98	151.45	201.97	151.41	32.74	24.55
AVE+2*STD.DEV.	1304.63	757.14	1.01	290.63	343.33	74.17	95.12	65.63	8.93	11.82			6490.48	3337.34	4.83	1227.14	1442.36	438.51	549.57	442.74	79.22	68.01

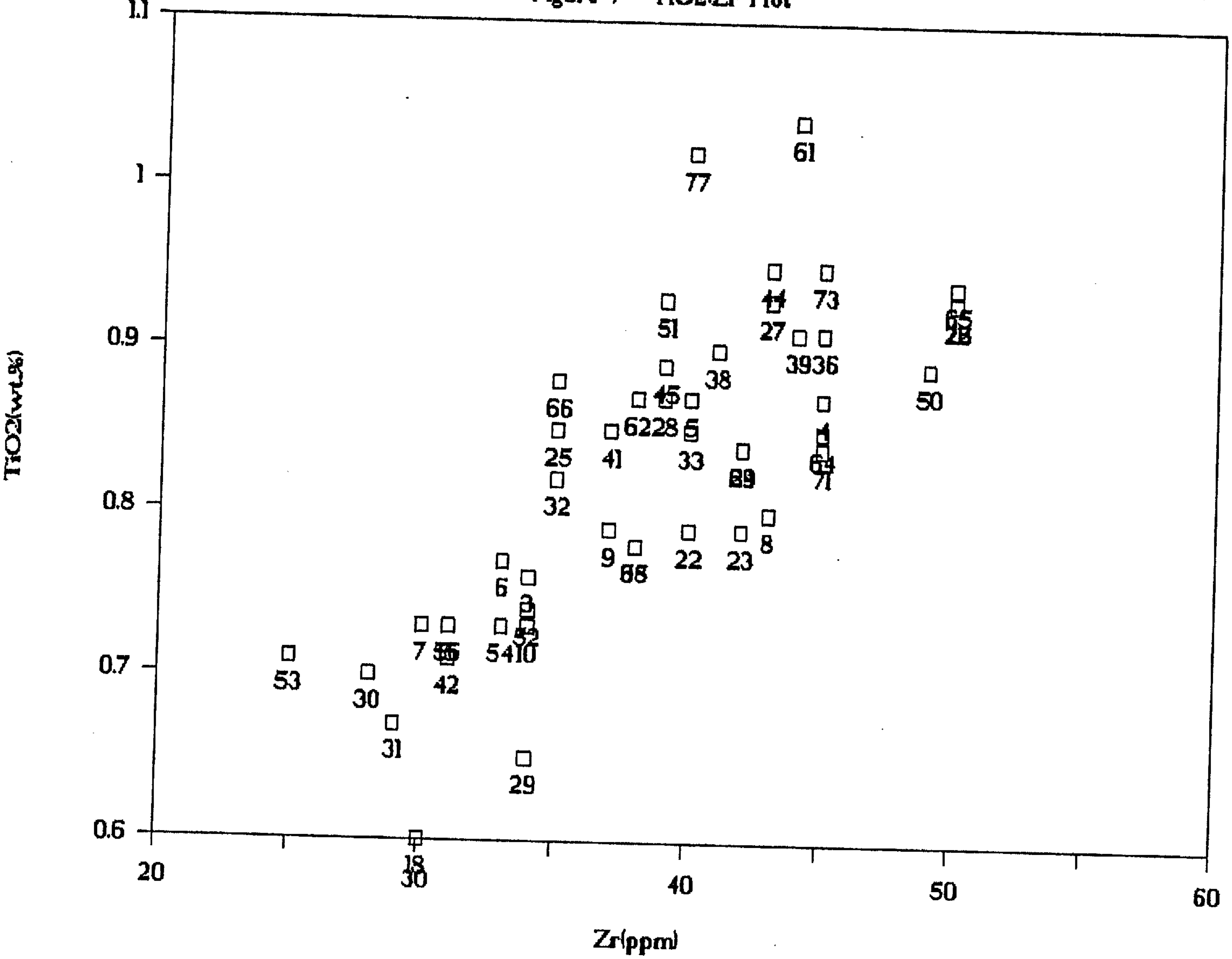
CFCE Achates

Figure 7 - TiO2:Zr Plot

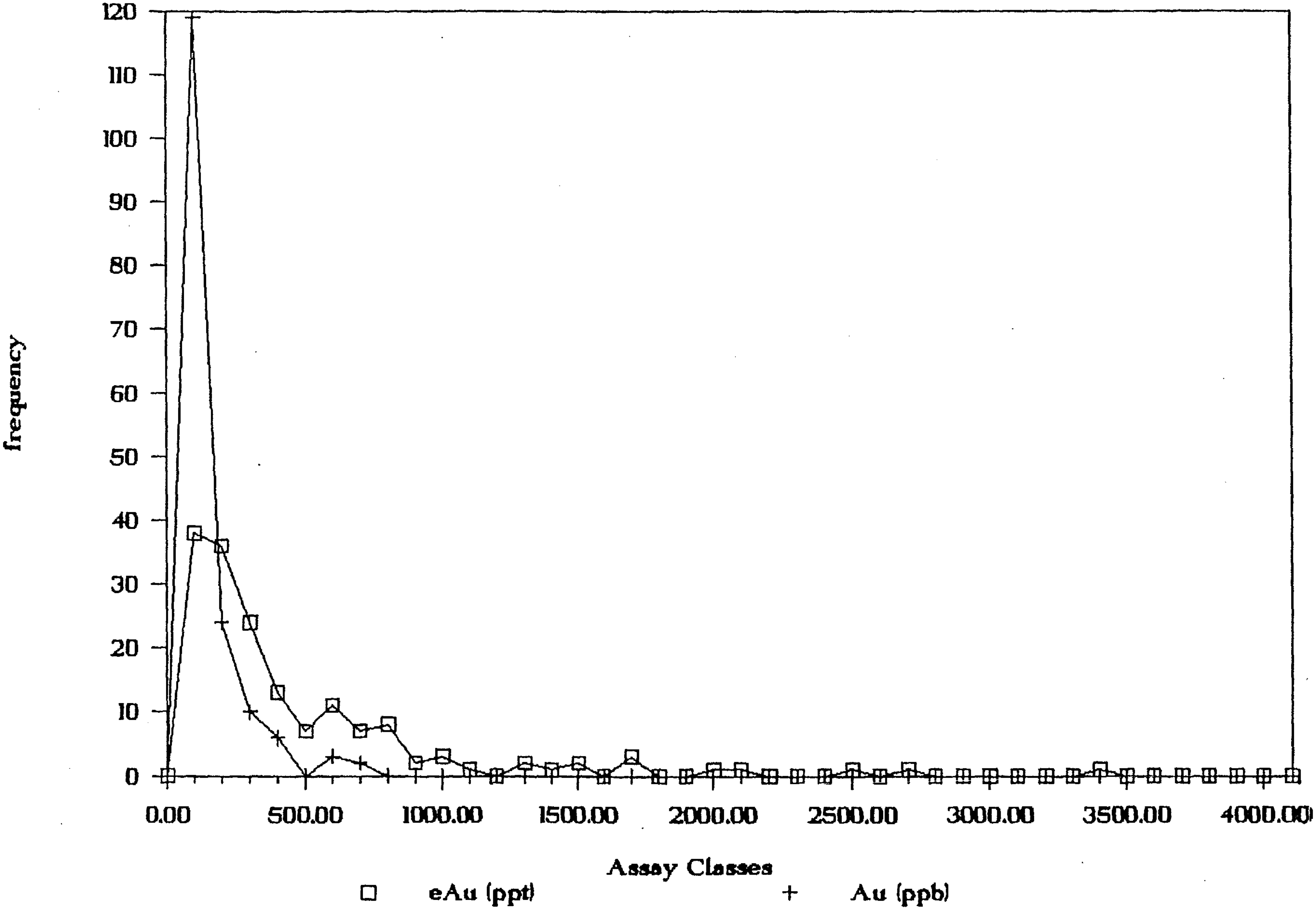


CFCE Achates

Figure 7 - TiO2:Zr Plot



CFCE Achates



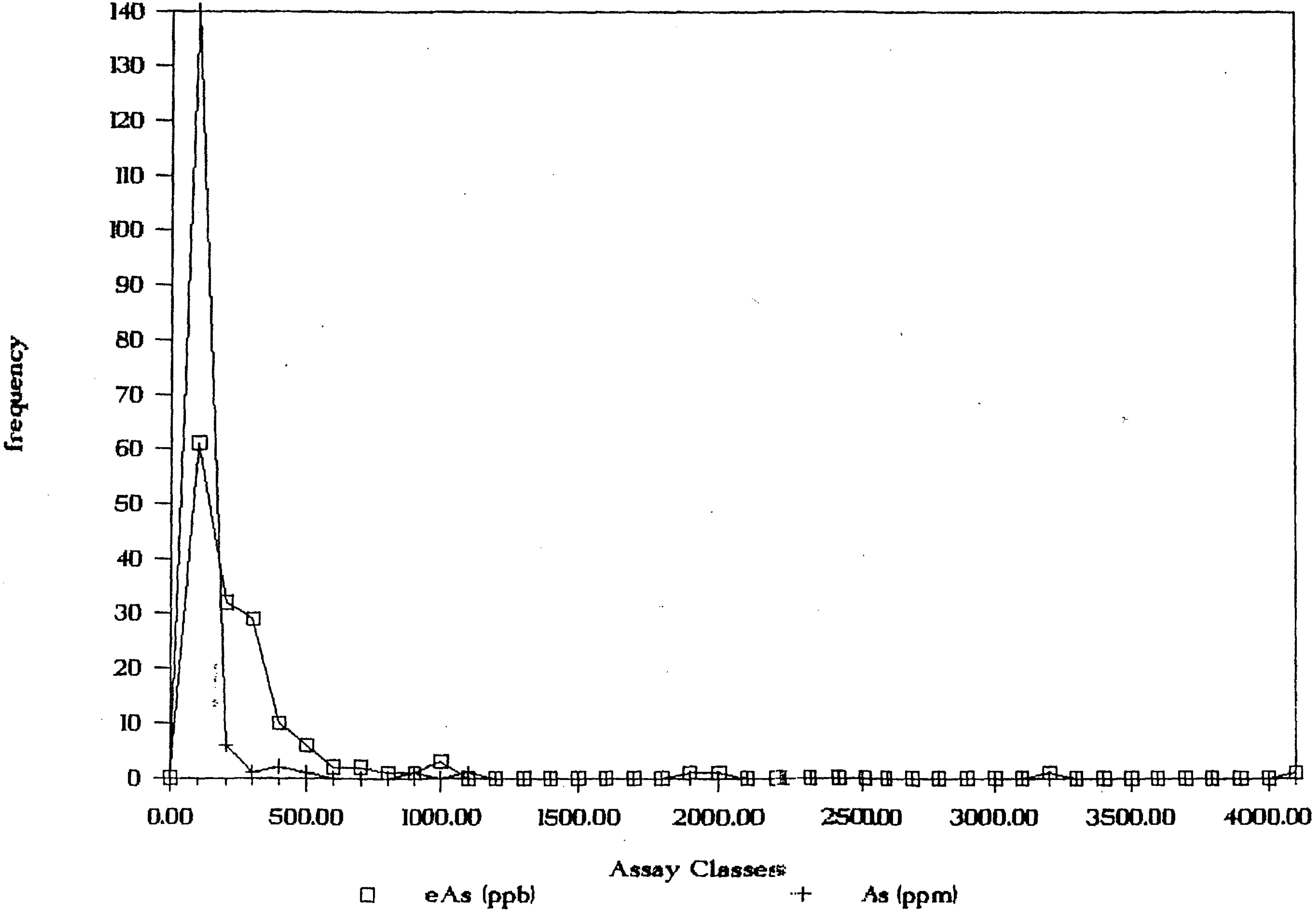


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Figure 10b - HMC Arsenic Assays

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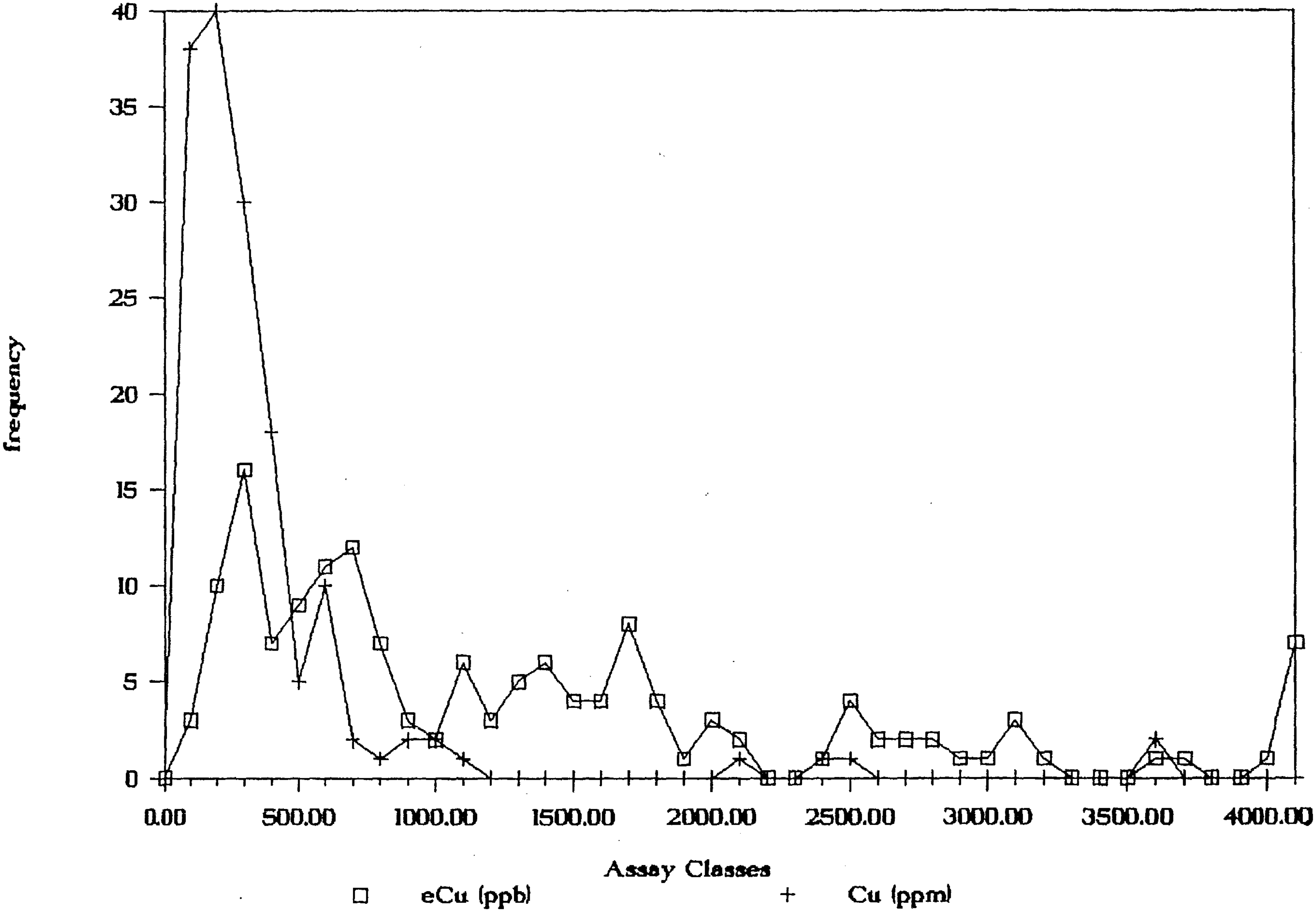
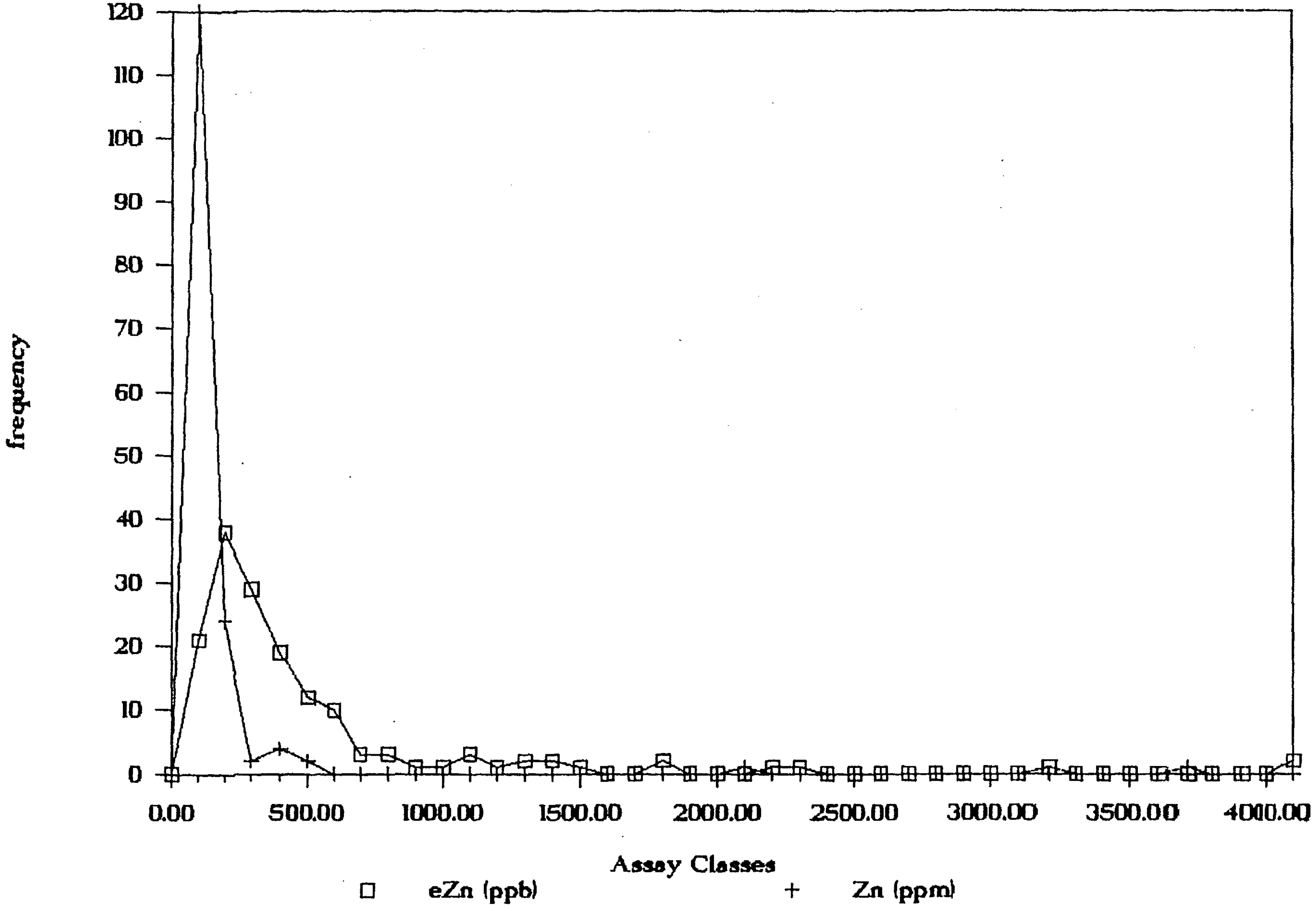
Figure 10c - HMC Copper Assays



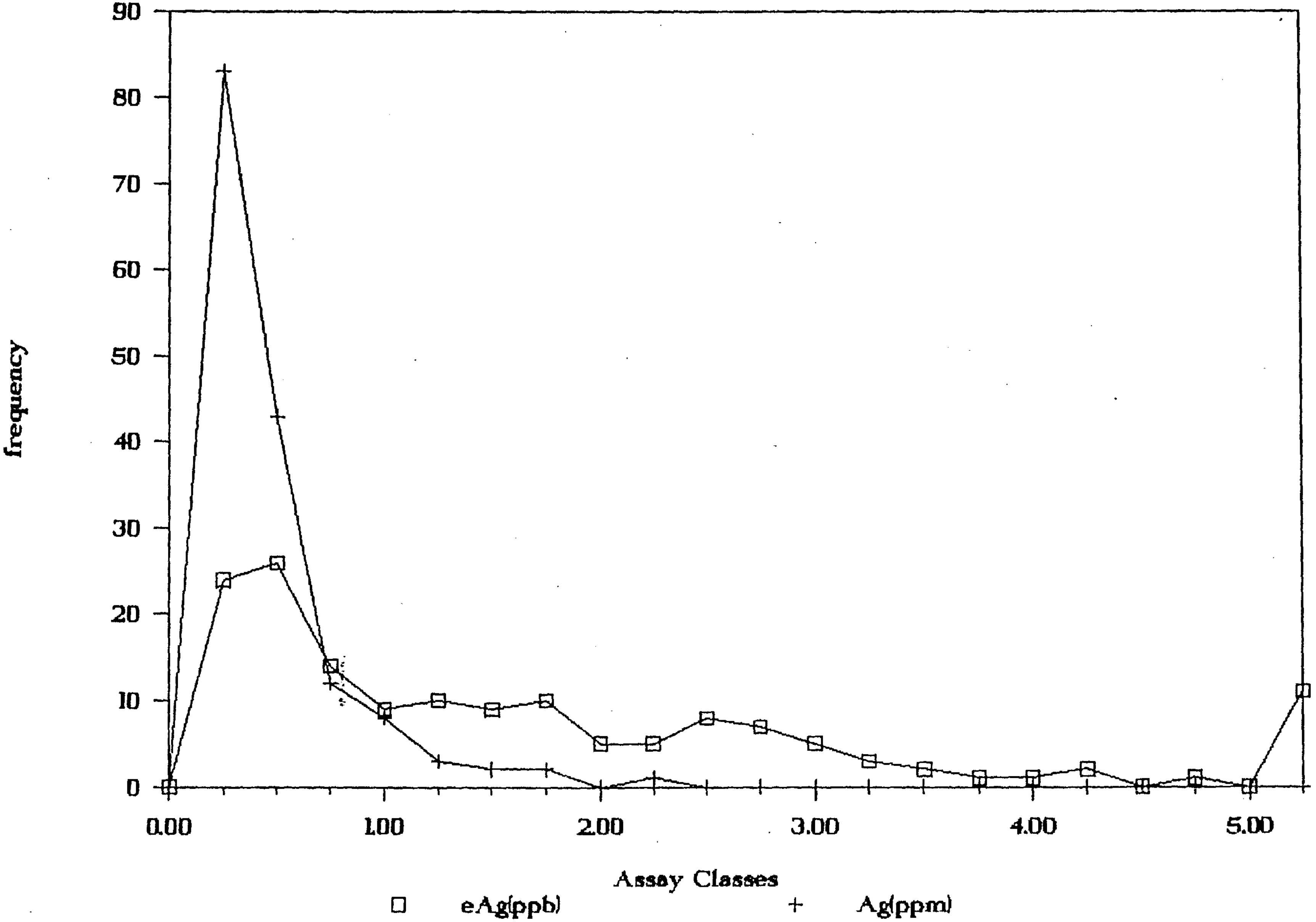
CFCE Achates

Figure 10d - HMC Zinc Assays



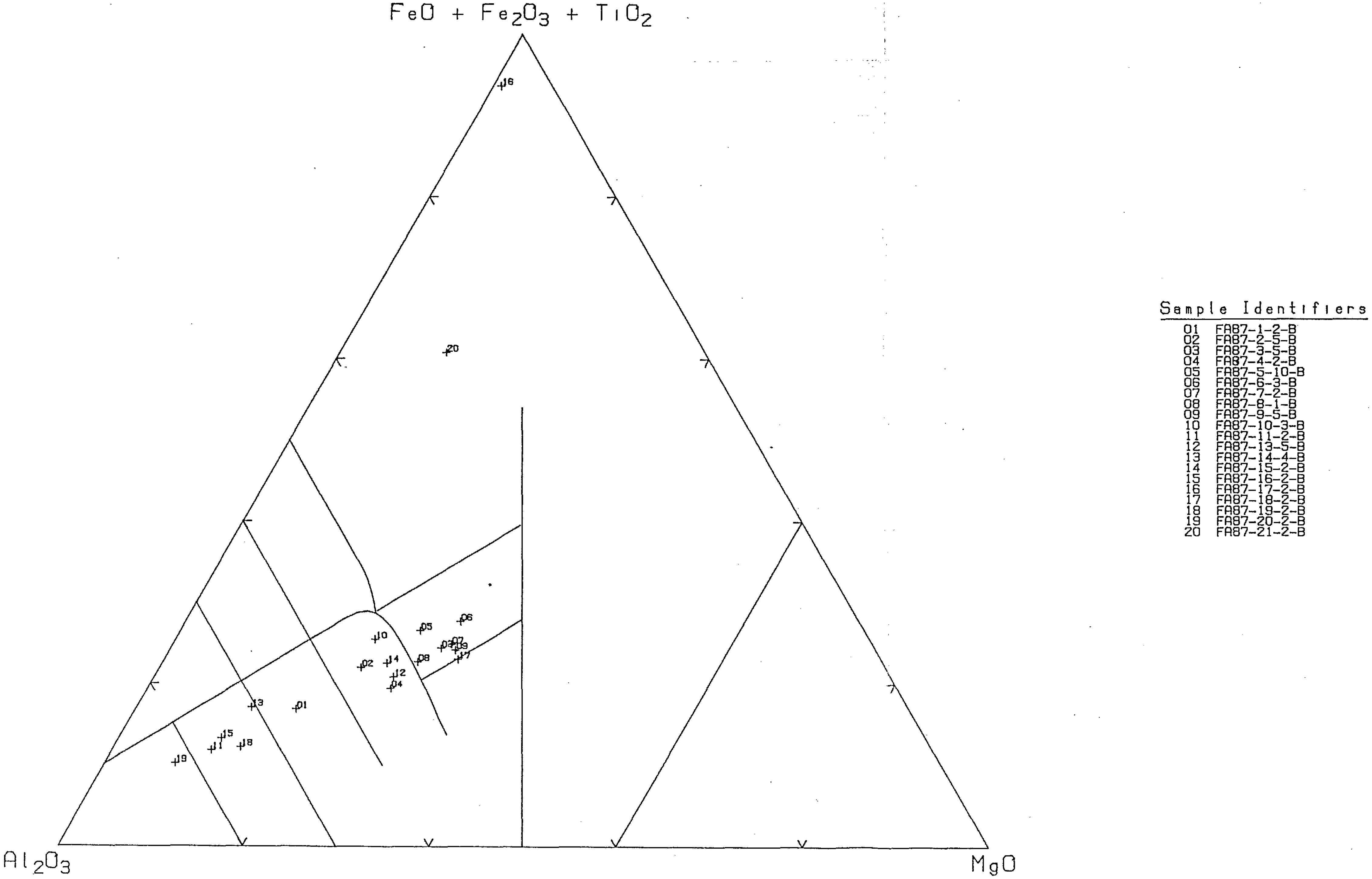
CFCE Achates

Figure 10e - HMC Silver Assays



RCKPLT

MPH CONSULTING



Sample Identifiers

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03	FA87-3-5-B
04	FA87-4-2-B
05	FA87-5-10-B
06	FA87-6-3-B
07	FA87-7-2-B
08	FA87-8-1-B
09	FA87-9-5-B
10	FA87-10-3-B
11	FA87-11-2-B
12	FA87-13-5-B
13	FA87-14-4-B
14	FA87-15-2-B
15	FA87-16-2-B
16	FA87-17-2-B
17	FA87-18-2-B
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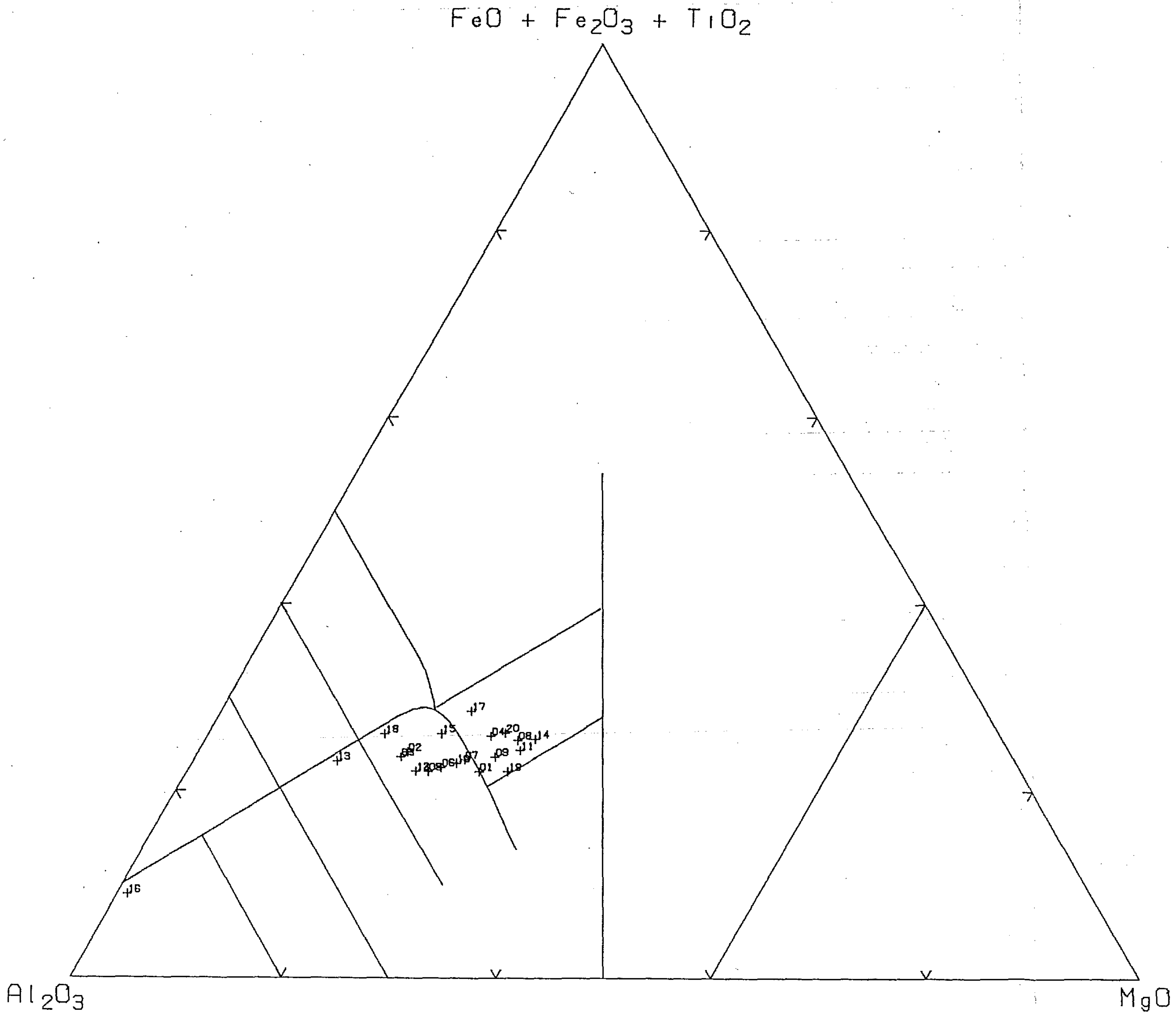
Jensen Cation Plot

MPH CONSULTING



Jensen Cation Plot

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08	FA87-29-2-B
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16	FA87-37-4-B
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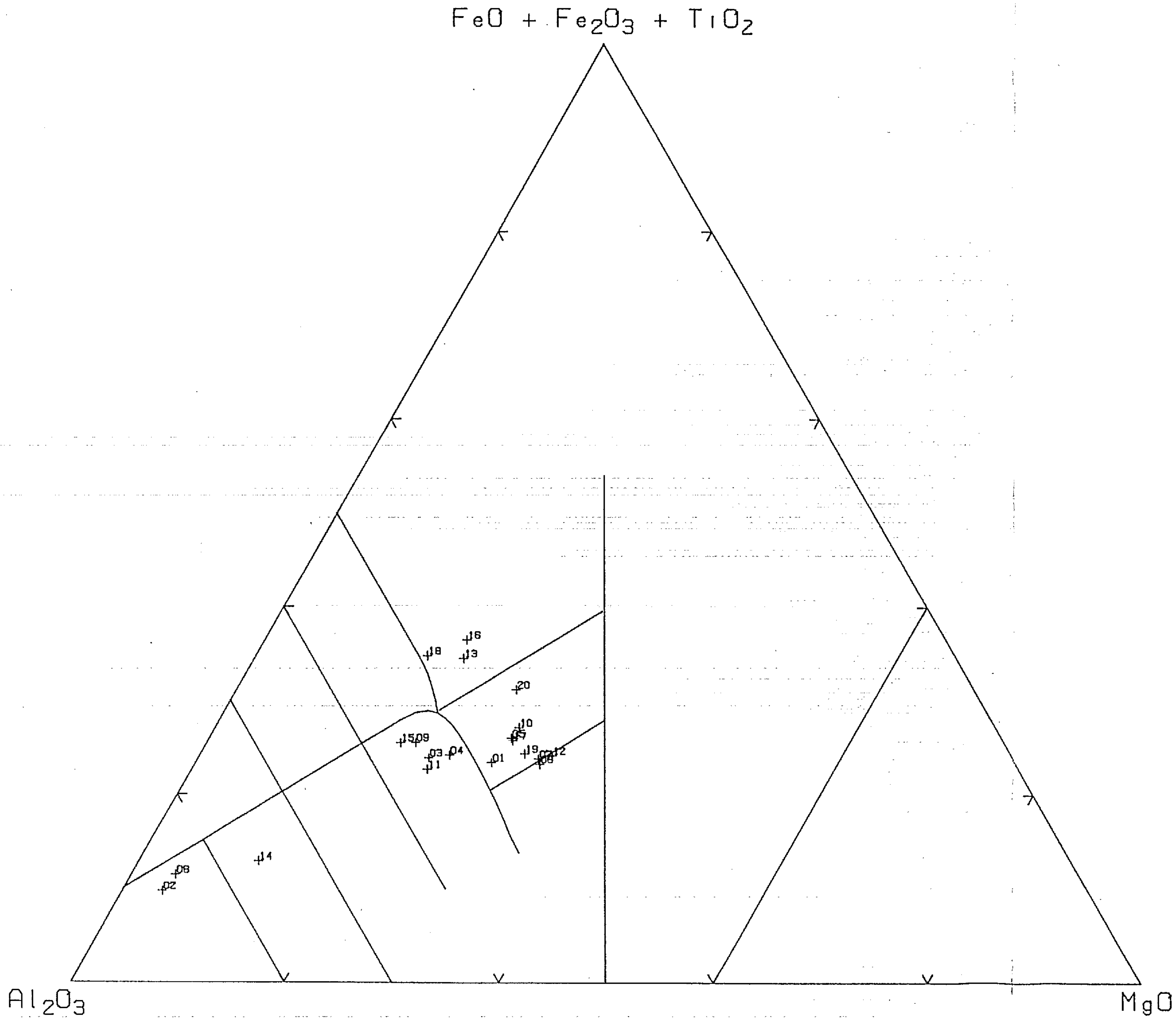
RCKPLT

MPH CONSULTING



Jensen Cation Plot

Sample Identifiers	
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08	FA87-49-2-B
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14	FA87-55-5-B
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17	FA87-58-10-B
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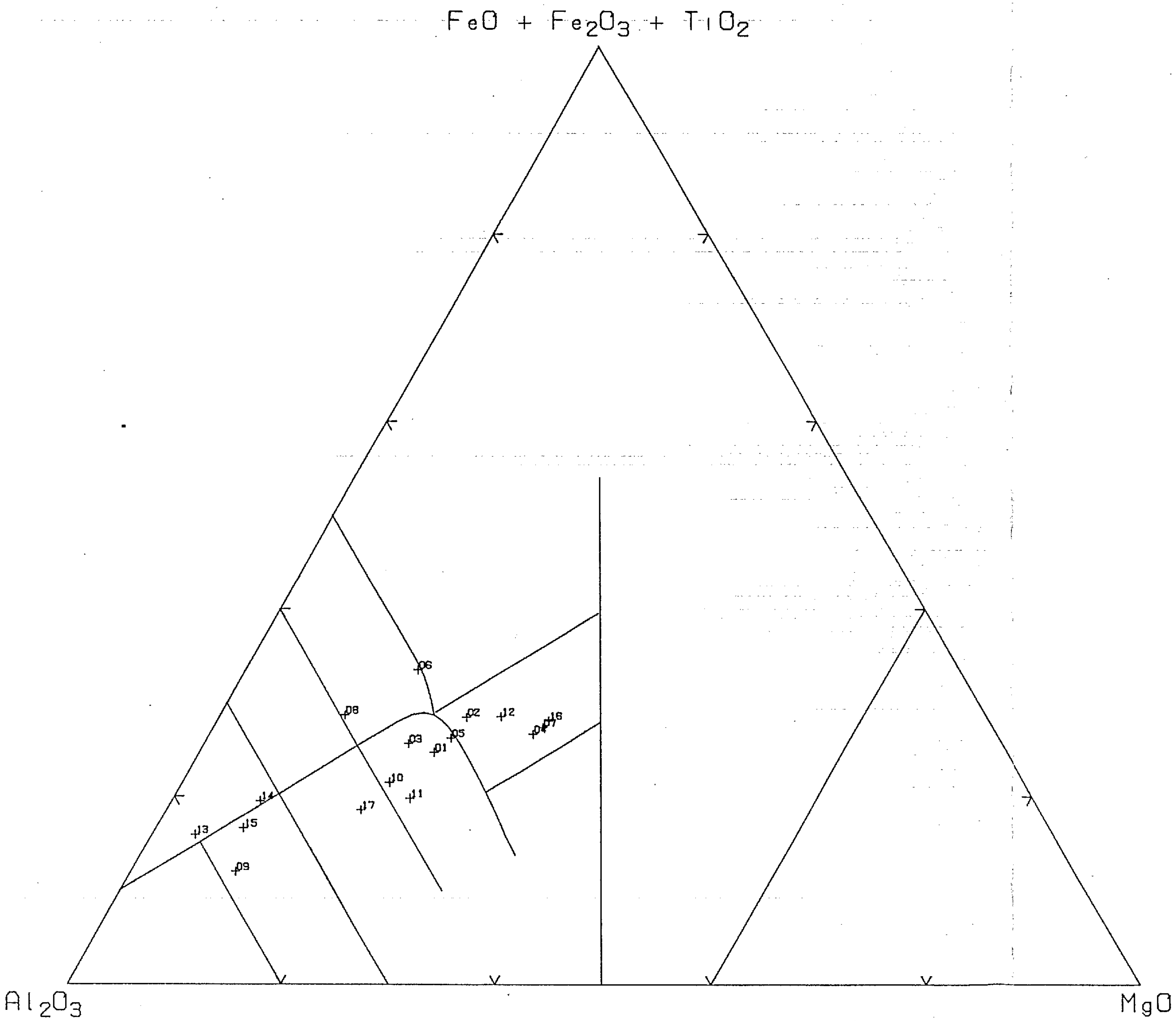
20	FA87-61-3-B

RCKPLT

MPH CONSULTING

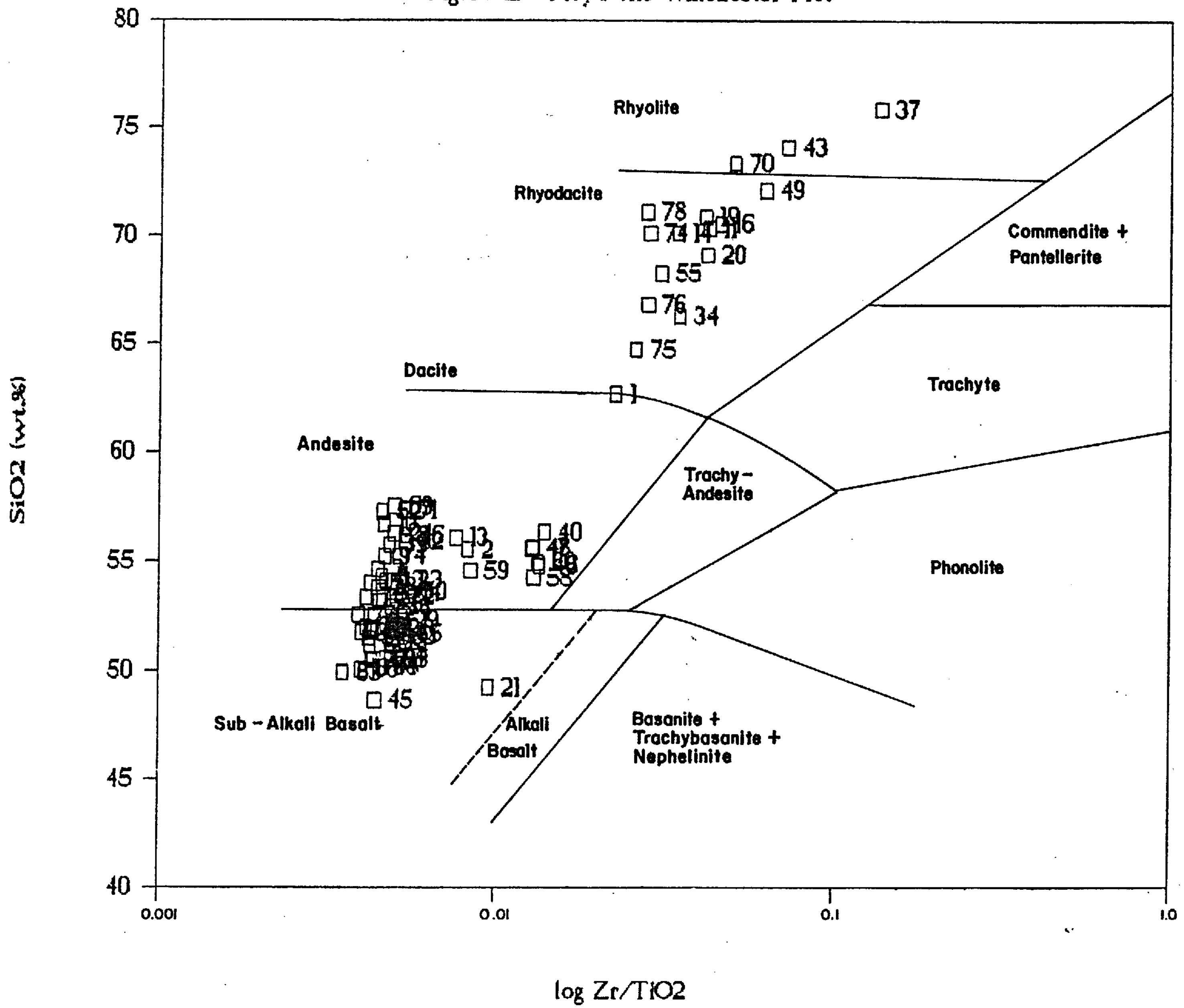


Jensen Cation Plot

Sample Identifiers	
01	FA87-62-2-B
02	FA87-63-4-B
03	FA87-64-2-B
04	FA87-65-3-B
05	FA87-66-3-B
06	FA87-67-3-B
07	FA87-68-5-B
08	FA87-69-4-B
09	FA87-70-1-B
10	FA87-71-1-B
11	FA87-72-2-B
12	FA87-73-2-B
13	FA87-74-2-B
14	FA87-75-2-B
15	FA87-76-0-B
16	FA87-77-5-B
17	FA87-78-3-B

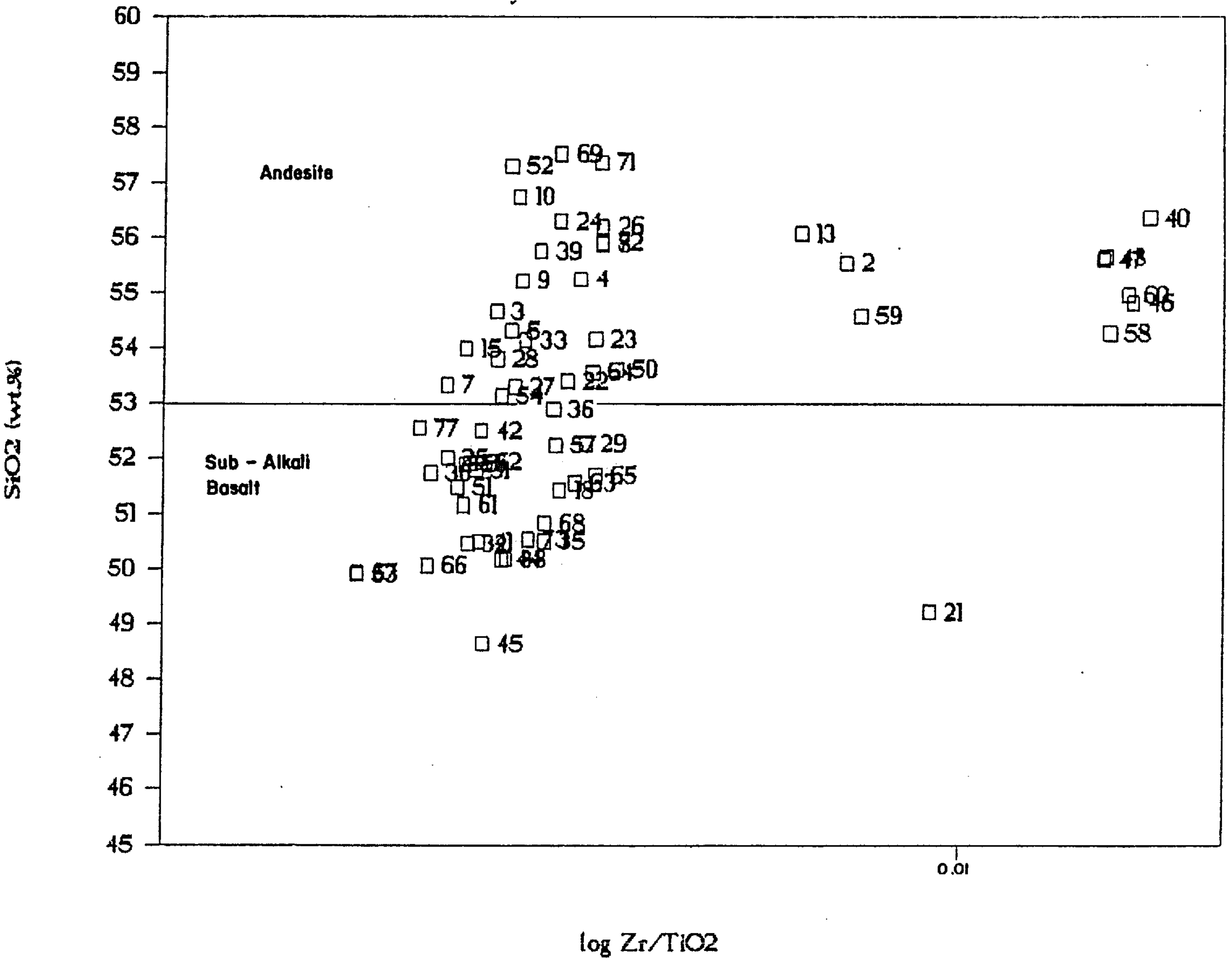
CFCE Achates

Figure 12 - Floyd and Winchester Plot



MPH Consulting Limited

Floyd and Winchester Plot (1978)



APPENDIX F

Volcanogenic Evaluations

```
FA-87-01

SiO2 58.3    Al2O3 14.8    Fe2O3 4.98
FeO 0          MgO 3.09      CaO 6.74
Na2O 3.97      K2O .53      TiO2 .53
P2O5 .25       MnO .13       LOI 3.9
Sum of Oxide Values  93.01999

NORMALIZED OXIDE VALUES
SiO2 62.67  Al2O3 15.91  Fe2O3 2.18
FeO 2.85       MgO 3.32      CaO 7.25
Na2O 4.27      K2O .57      TiO2 .57
P2O5 .27       MnO .14

FA-87-01

OTHER RATIOS ETC.
    K2O/Na2O                .13
    FeT/MgO                 1.61
    LOI/CaO                 .18
   TiO2/Zr                  .44
    TAAS                    25.24
C : F : K       63.1 : 33.8 : 3.1
C : F : A       34.3 : 18.4 : 47.4
C : A : K       41.1 : 56.8 : 2
A : F : K       70.2 : 27.2 : 2.5
Peraluminosity Index        1.12
    Au                      5
    As                      5
    Cu                      33
    Zn                      70


FA-87-01

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE ANDESITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE ANDESITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   DACITE ( 62.67 %)
   TITANIA CLASSIFICATION:
   DACITE ( .57 %)


FA-87-01

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.63   K2O -.27    Fe2O3 -3.94

 Na2O  .14   CaO  .59     SiO2  .33

DISCRIMINANT FUNCTIONS
              DF1 -1.55
              DF2 -8.83
              DF3 -8.83
              DF4 -4.27
              DF5 -1.99
```

```
FA-87-02

SiO2 52.5   Al2O3 15.6   Fe2O3 8.310001
FeO 0         MgO 4.78     CaO 10.1
Na2O 2.55     K2O .05     TiO2 .79
P2O5 .24      MnO .18      LOI 3
Sum of Oxide Values  94.5

NORMALIZED OXIDE VALUES
SiO2 55.56  Al2O3 16.51  Fe2O3 2.42
FeO 5.73      MgO 5.06     CaO 10.69
Na2O 2.7      K2O .05     TiO2 .84
P2O5 .25      MnO .19

FA-87-02

OTHER RATIOS ETC.
    K2O/Na2O              .02
    FeT/MgO               1.74
    LOI/CaO               9.000001E-02
   TiO2/Zr                1.22
    TAAS                  27.62
C : F : K      55.3 : 44.5 : .2
C : F : A      32.9 : 26.5 : 40.6
C : A : K      44.7 : 55.1 : .2
A : F : K      60.4 : 39.5 : .2
Peraluminosity Index      1.16
    Au                    5
    As                    3
    Cu                    96
    Zn                    54

FA-87-02

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 55.56 %)
   TITANIA CLASSIFICATION:
   DACITE ( .84 %)


FA-87-02

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.41   K2O -.52    Fe2O3 -2.68

 Na2O -.99   CaO  2.29    SiO2 -.21

DISCRIMINANT FUNCTIONS
               DF1 -1.26
               DF2 -6.75
               DF3 -6.97
               DF4 -3.3
               DF5 -.49
```

```
FA-87-03

SiO2 51.7   Al2O3 14.2   Fe2O3 10.5
FeO 0         MgO 7.03     CaO 9.88
Na2O 1        K2O .000001 TiO2 .72
P2O5 .19      MnO .19      LOI 4.1
Sum of Oxide Values  94.58

NORMALIZED OXIDE VALUES
SiO2 54.66  Al2O3 15.01  Fe2O3 2.35
FeO 7.88      MgO 7.43     CaO 10.45
Na2O 1.06     K2O 0       TiO2 .76
P2O5 .2       MnO .2

FA-87-03

OTHER RATIOS ETC.
    K2O/Na2O                0
    FeT/MgO                 1.49
    LOI/CaO                 .13
   TiO2/Zr                  2.24
    TAAS                    39.23
C : F : K      42.9 : 57.1 : 0
C : F : A      27.5 : 36.6 : 35.9
C : A : K      43.4 : 56.6 : 0
A : F : K      49.5 : 50.5 : 0
Peraluminosity Index        1.33
    Au                      5
    As                      3
    Cu                      139
    Zn                      58


FA-87-03

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 54.66 %)
   TITANIA CLASSIFICATION:
   DACITE ( .76 %)


FA-87-03

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  1.72  K2O -.54    Fe2O3 -.69

 Na2O -2.56  CaO  1.78    SiO2  1.3

DISCRIMINANT FUNCTIONS
               DF1 -9.000001E-02
               DF2 -4.52
               DF3 -5.04
               DF4 -.88
               DF5  3.26
```

```
FA-87-04

SiO2 48.3   Al2O3 14.1   Fe2O3 6.68
FeO 0         MgO 5.38     CaO 8.38
Na2O 3.29     K2O .57     TiO2 .76
P2O5 .24      MnO .14      LOI 9.25
Sum of Oxide Values  87.4

NORMALIZED OXIDE VALUES
SiO2 55.26  Al2O3 16.13  Fe2O3 2.59
FeO 4.55      MgO 6.16     CaO 9.59
Na2O 3.76     K2O .65     TiO2 .87
P2O5 .27      MnO .16

FA-87-04

OTHER RATIOS ETC.
    K2O/Na2O                .17
    FeT/MgO                 1.24
    LOI/CaO                 .32
   TiO2/Zr                  1.93
    TAAS                    33.78
C : F : K      54 : 43.3 : 2.6
C : F : A      33.2 : 26.6 : 40.1
C : A : K      44.3 : 53.5 : 2.2
A : F : K      58.7 : 39 : 2.4
Peraluminosity Index        1.03
    As                      23
    Cu                      143
    Zn                      86


FA-87-04

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 55.26 %)
   TITANIA CLASSIFICATION:
   DACITE ( .87 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-04

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.21  K2O  .23    Fe2O3 -6.7

 Na2O  .25   CaO -1.16    SiO2  1.64

DISCRIMINANT FUNCTIONS
               DF1 -1
               DF2 -9.890001
               DF3 -9.95
               DF4 -7.32
               DF5 -4.83
```

```
FA-87-05

SiO2 49.5   Al2O3 13.7   Fe2O3 10.7
FeO 0         MgO 5.87     CaO 8.93
Na2O 1.92     K2O .07     TiO2 .79
P2O5 .22      MnO .29      LOI 6.25
Sum of Oxide Values  91.15

NORMALIZED OXIDE VALUES
SiO2 54.31  Al2O3 15.03  Fe2O3 2.51
FeO 8.3       MgO 6.44     CaO 9.8
Na2O 2.11     K2O .08     TiO2 .87
P2O5 .24      MnO .32

FA-87-05

OTHER RATIOS ETC.
    K2O/Na2O              .04
    FeT/MgO               1.82
    LOI/CaO               .21
   TiO2/Zr                2.18
    TAAS                  35.38
C : F : K      44.6 : 55.1 : .3
C : F : A      28.6 : 35.4 : 36.1
C : A : K      44.1 : 55.6 : .3
A : F : K      50.4 : 49.4 : .3
Peraluminosity Index      1.21
    Au                    5
    As                    2
    Cu                    120
    Zn                    82


FA-87-05

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 54.31 %)
   TITANIA CLASSIFICATION:
   DACITE ( .87 %)


FA-87-05

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.21   K2O -.38    Fe2O3 -1.48

 Na2O -1.4   CaO -.03     SiO2  1.97

DISCRIMINANT FUNCTIONS
               DF1 -.77
               DF2 -4.7
               DF3 -4.99
               DF4 -1.56
               DF5  2.08
```

```
FA-87-06

SiO2 48.9   Al2O3 13.7   Fe2O3 12.7
FeO 0         MgO 7.48     CaO 10.3
Na2O 1        K2O .02     TiO2 .73
P2O5 .23      MnO .2       LOI 2.35
Sum of Oxide Values  94.21

NORMALIZED OXIDE VALUES
SiO2 51.9   Al2O3 14.54  Fe2O3 2.37
FeO 10        MgO 7.94     CaO 10.93
Na2O 1.06     K2O .02     TiO2 .77
P2O5 .24      MnO .21

FA-87-06

OTHER RATIOS ETC.
    K2O/Na2O              .02
    FeT/MgO               1.7
    LOI/CaO               .07
   TiO2/Zr                2.33
    TAAS                  39.9
C : F : K      40 : 59.9 : .1
C : F : A      27 : 40.3 : 32.7
C : A : K      45.2 : 54.8 : .1
A : F : K      44.7 : 55.2 : .1
Peraluminosity Index      1.24
    Au                    5
    As                    1
    Cu                    154
    Zn                    47


FA-87-06

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.9 %)
   TITANIA CLASSIFICATION:
   DACITE ( .77 %)


FA-87-06

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  1.31  K2O -.4     Fe2O3  .43

 Na2O -2.27  CaO  1.19    SiO2  1.93

DISCRIMINANT FUNCTIONS
               DF1 -.47
               DF2 -3.13
               DF3 -3.55
               DF4  .54
               DF5  3.58
```

```
FA-87-07

SiO2 45.5   Al2O3 12.2   Fe2O3 9.46
FeO 0         MgO 6.41     CaO 9.96
Na2O .44      K2O 1.17    TiO2 .62
P2O5 .15      MnO .13      LOI 12
Sum of Oxide Values  85.3

NORMALIZED OXIDE VALUES
SiO2 53.34  Al2O3 14.3   Fe2O3 2.49
FeO 7.74      MgO 7.51     CaO 11.68
Na2O .52      K2O 1.37    TiO2 .73
P2O5 .18      MnO .15

FA-87-07

OTHER RATIOS ETC.
    K2O/Na2O              2.63
    FeT/MgO               1.48
    LOI/CaO               .34
   TiO2/Zr                2.43
    TAAS                  42.13
C : F : K      42.3 : 52.9 : 4.8
C : F : A      29.2 : 36.5 : 34.3
C : A : K      43.8 : 51.3 : 4.9
A : F : K      46.2 : 49.3 : 4.4
Peraluminosity Index      1.1
    Au                    5
    As                    15
    Cu                    113
    Zn                    80


FA-87-07

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 53.34 %)
   TITANIA CLASSIFICATION:
   DACITE ( .73 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-07

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.14  K2O  1.07   Fe2O3 -5.02

 Na2O -2.65  CaO -.57     SiO2  3.97

DISCRIMINANT FUNCTIONS
               DF1 -.11
               DF2 -7.87
               DF3 -8.53
               DF4 -6.14
               DF5 -3.9
```

```
FA-87-08

SiO2 53.3    Al2O3 14.2    Fe2O3 8.899999
FeO 0         MgO 6.19      CaO 9.34
Na2O 2.77     K2O .13      TiO2 .76
P2O5 .23      MnO .19       LOI 1.6
Sum of Oxide Values  95.33999

NORMALIZED OXIDE VALUES
SiO2 55.9    Al2O3 14.89   Fe2O3 2.37
FeO 6.27      MgO 6.49      CaO 9.8
Na2O 2.91     K2O .14      TiO2 .8
P2O5 .24      MnO .2

FA-87-08

OTHER RATIOS ETC.
    K2O/Na2O                 .05
    FeT/MgO                  1.44
    LOI/CaO                  .05
   TiO2/Zr                   1.86
    TAAS                     34.28
C : F : K      49.6 : 49.8 : .5
C : F : A      31.5 : 31.6 : 36.9
C : A : K      45.8 : 53.7 : .5
A : F : K      53.6 : 45.9 : .5
Peraluminosity Index         1.08
    Au                       5
    As                       2
    Cu                       140
    Zn                       31


FA-87-08

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 55.9 %)
   TITANIA CLASSIFICATION:
   DACITE ( .8 %)


FA-87-08

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  1.31  K2O -.46    Fe2O3 -1.7

 Na2O -.82   CaO  1.75    SiO2  1.23

DISCRIMINANT FUNCTIONS
               DF1 -.88
               DF2 -6.25
               DF3 -6.41
               DF4 -1.71
               DF5  2.2
```

```
FA-87-09

SiO2 53     Al2O3 13.6   Fe2O3 10.2
FeO 0         MgO 7.34     CaO 9.020001
Na2O 2.17     K2O .12     TiO2 .76
P2O5 .32      MnO .23      LOI 1.55
Sum of Oxide Values  95.96

NORMALIZED OXIDE VALUES
SiO2 55.23  Al2O3 14.17  Fe2O3 2.36
FeO 7.44      MgO 7.65     CaO 9.399999
Na2O 2.26     K2O .13     TiO2 .79
P2O5 .33      MnO .24

FA-87-09

OTHER RATIOS ETC.
    K2O/Na2O              .06
    FeT/MgO               1.39
    LOI/CaO               .05
   TiO2/Zr                2.14
    TAAS                  40.02
C : F : K      43.4 : 56.1 : .5
C : F : A      28.5 : 36.9 : 34.6
C : A : K      44.9 : 54.6 : .5
A : F : K      48.2 : 51.3 : .4
Peraluminosity Index      1.14
    Au                    5
    As                    2
    Cu                    129
    Zn                    49


FA-87-09

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 55.23 %)
   TITANIA CLASSIFICATION:
   DACITE ( .79 %)


FA-87-09

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  2.41  K2O -.46    Fe2O3 -.46

 Na2O -1.42  CaO  1.3     SiO2  1.86

DISCRIMINANT FUNCTIONS
               DF1 -.3
               DF2 -4.6
               DF3 -4.86
               DF4 -.13
               DF5  4.76
```

```
FA-87-10

SiO2 55.5   Al2O3 14.2   Fe2O3 9.520001
FeO 0         MgO 4.56     CaO 13.4
Na2O .47      K2O .02     TiO2 .71
P2O5 .000001  MnO .16      LOI .9
Sum of Oxide Values  97.81

NORMALIZED OXIDE VALUES
SiO2 56.74  Al2O3 14.52  Fe2O3 2.26
FeO 6.72      MgO 4.66     CaO 13.7
Na2O .48      K2O .02     TiO2 .73
P2O5 0        MnO .16

FA-87-10

OTHER RATIOS ETC.
    K2O/Na2O              .04
    FeT/MgO               2.09
    LOI/CaO               .02
   TiO2/Zr                2.15
    TAAS                  24.81
C : F : K      55.4 : 44.5 : .1
C : F : A      35.4 : 28.4 : 36.2
C : A : K      49.4 : 50.6 : .1
A : F : K      56 : 43.9 : .1
Peraluminosity Index      1.09
    Au                    5
    As                    2
    Cu                    52
    Zn                    31


FA-87-10

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 56.74 %)
   TITANIA CLASSIFICATION:
   DACITE ( .73 %)


FA-87-10

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .21   K2O -.66    Fe2O3 -.17

 Na2O -3.31  CaO  6.54    SiO2  1.09

DISCRIMINANT FUNCTIONS
               DF1 -1.23
               DF2 -4.94
               DF3 -5.6
               DF4 -1.5
               DF5  1.68
```

```
FA-87-11

SiO2 68     Al2O3 15.5   Fe2O3 2.9
FeO 0         MgO 1.71     CaO 3.76
Na2O 3.37     K2O 1.14    TiO2 .4
P2O5 .000001  MnO .04      LOI 1.45
Sum of Oxide Values  96.72

NORMALIZED OXIDE VALUES
SiO2 70.31  Al2O3 16.03  Fe2O3 1.96
FeO .93       MgO 1.77     CaO 3.89
Na2O 3.48     K2O 1.18    TiO2 .41
P2O5 0        MnO .04

FA-87-11

OTHER RATIOS ETC.
    K2O/Na2O              .34
    FeT/MgO               1.69
    LOI/CaO               .12
   TiO2/Zr                .24
    TAAS                  28.59
C : F : K      65.5 : 24 : 10.5
C : F : A      28.2 : 10.3 : 61.4
C : A : K      30 : 65.2 : 4.8
A : F : K      80.5 : 13.6 : 5.9
Peraluminosity Index      1.52
    Au                    5
    As                    3
    Cu                    24
    Zn                    46


FA-87-11

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE DACITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE ANDESITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 70.31 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .41 %)


FA-87-11

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.16   K2O -.04    Fe2O3 -2.61

 Na2O -.49   CaO -.22     SiO2 -1.19

DISCRIMINANT FUNCTIONS
               DF1 -.5
               DF2 -9.25
               DF3 -9.350001
               DF4 -2.63
               DF5 -1.4
```

```
FA-87-13

SiO2 53.9   Al2O3 15.4   Fe2O3 8.16
FeO 0         MgO 5.9      CaO 9.49
Na2O 1.68     K2O 1.24    TiO2 .8
P2O5 .000001  MnO .13      LOI 1.85
Sum of Oxide Values  96.11

NORMALIZED OXIDE VALUES
SiO2 56.08  Al2O3 16.02  Fe2O3 2.39
FeO 5.49      MgO 6.14     CaO 9.87
Na2O 1.75     K2O 1.29    TiO2 .83
P2O5 0        MnO .14

FA-87-13

OTHER RATIOS ETC.
    K2O/Na2O                 .74
    FeT/MgO                  1.38
    LOI/CaO                  .06
   TiO2/Zr                   1.32
    TAAS                     39
C : F : K      47.4 : 47.4 : 5.3
C : F : A      29.6 : 29.6 : 40.8
C : A : K      40.2 : 55.4 : 4.5
A : F : K      55.4 : 40.2 : 4.5
Peraluminosity Index         1.21
    Au                       5
    As                       2
    Cu                       91
    Zn                       91


FA-87-13

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 56.08 %)
   TITANIA CLASSIFICATION:
   DACITE ( .83 %)


FA-87-13

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  1.17   K2O   .67    Fe2O3 -2.21

 Na2O -2      CaO  2.08    SiO2 -.06

DISCRIMINANT FUNCTIONS
               DF1 -.14
               DF2 -5.77
               DF3 -6.2
               DF4 -2.69
               DF5  .94
```

```
FA-87-14

SiO2 67.4   Al2O3 13.8   Fe2O3 4.4
FeO 0         MgO 1.92     CaO 4.04
Na2O 2.26     K2O 2.04    TiO2 .43
P2O5 .000001  MnO .08       LOI 1.6
Sum of Oxide Values  96.12

NORMALIZED OXIDE VALUES
SiO2 70.12  Al2O3 14.36  Fe2O3 2.01
FeO 2.31      MgO 2        CaO 4.2
Na2O 2.35     K2O 2.12    TiO2 .45
P2O5 0        MnO .08

FA-87-14

OTHER RATIOS ETC.
    K2O/Na2O              .9
    FeT/MgO               2.29
    LOI/CaO               .13
   TiO2/Zr                .29
    TAAS                  38.61
C : F : K      50.5 : 33.2 : 16.3
C : F : A      26 : 17.1 : 56.9
C : A : K      28.4 : 62.4 : 9.2
A : F : K      69.1 : 20.7 : 10.2
Peraluminosity Index      1.44
    Au                    5
    As                    2
    Cu                    19
    Zn                    54


FA-87-14

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE DACITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE ANDESITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 70.12 %)
   TITANIA CLASSIFICATION:
   DACITE ( .45 %)


FA-87-14

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.03   K2O  .92    Fe2O3 -1.25

 Na2O -1.67  CaO -.05     SiO2  .63

DISCRIMINANT FUNCTIONS
               DF1 -.1
               DF2 -7.69
               DF3 -8.01
               DF4 -1.32
               DF5  .17
```

```
FA-87-15

SiO2 48.4   Al2O3 13.6   Fe2O3 7.93
FeO 0         MgO 4.9      CaO 11.8
Na2O 2.03     K2O .73     TiO2 .65
P2O5 .000001  MnO .19      LOI 7.35
Sum of Oxide Values  89.65

NORMALIZED OXIDE VALUES
SiO2 53.99  Al2O3 15.17  Fe2O3 2.4
FeO 5.8       MgO 5.47     CaO 13.16
Na2O 2.26     K2O .81     TiO2 .73
P2O5 0        MnO .21

FA-87-15

OTHER RATIOS ETC.
    K2O/Na2O              .36
    FeT/MgO               1.62
    LOI/CaO               .19
   TiO2/Zr                2.35
    TAAS                  28.94
C : F : K      56.1 : 41 : 2.9
C : F : A      36.8 : 26.9 : 36.2
C : A : K      49.1 : 48.3 : 2.6
A : F : K      55.7 : 41.4 : 3
Peraluminosity Index      .92
    Au                    .5
    As                    19
    Cu                    120
    Zn                    98


FA-87-15

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 53.99 %)
   TITANIA CLASSIFICATION:
   DACITE ( .73 %)


FA-87-15

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.68  K2O  .39    Fe2O3 -5.1

 Na2O -1.17  CaO  2.72    SiO2  2.15

DISCRIMINANT FUNCTIONS
               DF1 -1.7
               DF2 -7.95
               DF3 -8.28
               DF4 -6.5
               DF5 -3.52
```

```
FA-87-16

SiO2 67.4   Al2O3 15      Fe2O3 3.41
FeO 0         MgO 1.74      CaO 2.91
Na2O 3.96     K2O .91      TiO2 .33
P2O5 .000001  MnO .03       LOI 1.65
Sum of Oxide Values  95.53

NORMALIZED OXIDE VALUES
SiO2 70.55  Al2O3 15.7    Fe2O3 1.92
FeO 1.49      MgO 1.82      CaO 3.05
Na2O 4.15     K2O .95      TiO2 .35
P2O5 0        MnO .03

FA-87-16

OTHER RATIOS ETC.
    K2O/Na2O                 .23
    FeT/MgO                  1.96
    LOI/CaO                  .18
   TiO2/Zr                   .22
    TAAS                     27.78
C : F : K      62.8 : 28.9 : 8.3
C : F : A      27.5 : 12.6 : 59.9
C : A : K      30.2 : 65.8 : 4
A : F : K      78.7 : 16.6 : 4.8
Peraluminosity Index         1.48
    Au                       5
    As                       2
    Cu                       12
    Zn                       55


FA-87-16

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE DACITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE ANDESITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 70.55 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .35 %)


FA-87-16

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.22     K2O -.26    Fe2O3 -2.29

 Na2O  .11     CaO -1.23    SiO2 -.62

DISCRIMINANT FUNCTIONS
               DF1 -.84
               DF2 -8.770001
               DF3 -8.72
               DF4 -1.94
               DF5 -1.41
```

```
FA-87-17

SiO2 2.03   Al2O3 2.2    Fe2O3 59.3
FeO 0          MgO .29      CaO .25
Na2O .000001  K2O .07     TiO2 .06
P2O5 .000001  MnO .000001  LOI 32.95
Sum of Oxide Values  58.41

NORMALIZED OXIDE VALUES
SiO2 3.48   Al2O3 3.77   Fe2O3 2.67
FeO 88.94      MgO .5       CaO .43
Na2O 0         K2O .12     TiO2 .1
P2O5 0         MnO 0

FA-87-17

OTHER RATIOS ETC.
    K2O/Na2O                1.701412E+36
    FeT/MgO                 202.84
    LOI/CaO                 25.54
   TiO2/Zr                  10
    TAAS                    59.05
C : F : K      .5 : 99.4 : .1
C : F : A      .5 : 95.5 : 4
C : A : K      10 : 87.3 : 2.8
A : F : K      4 : 95.8 : .1
Peraluminosity Index        7.19
    Au                      65
    As                      122
    Cu                      48
    Zn                      84


FA-87-17

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC HIGH IRON BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   DEPLETED ( 3.48 %)
   TITANIA CLASSIFICATION:
   ULTRAMAFIC ( .1 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-17

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -52.9  K2O  2.74   Fe2O3  36.11

 Na2O  18.61 CaO -61.43   SiO2  17.99

DISCRIMINANT FUNCTIONS
              DF1 -16.16
              DF2  44.32
              DF3  49.38
              DF4  49.28
              DF5 -36.87
```

```
FA-87-18

SiO2 45.6   Al2O3 13.9   Fe2O3 10.1
FeO 0         MgO 7.65     CaO 10.1
Na2O 1.45     K2O .01     TiO2 .53
P2O5 .000001  MnO .15      LOI 8.15
Sum of Oxide Values  88.68

NORMALIZED OXIDE VALUES
SiO2 51.42  Al2O3 15.67  Fe2O3 2.29
FeO 8.19      MgO 8.63     CaO 11.39
Na2O 1.64     K2O .01     TiO2 .6
P2O5 0        MnO .17

FA-87-18

OTHER RATIOS ETC.
    K2O/Na2O                 .01
    FeT/MgO                  1.32
    LOI/CaO                  .24
   TiO2/Zr                   2
    TAAS                     39.87
C : F : K      43.6 : 56.3 : 0
C : F : A      28.6 : 37 : 34.4
C : A : K      45.4 : 54.6 : 0
A : F : K      48.2 : 51.8 : 0
Peraluminosity Index         1.2
    Au                       5
    As                       2
    Cu                       56
    Zn                       59


FA-87-18

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC MAGNESIUM-RICH BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.42 %)
   TITANIA CLASSIFICATION:
   DACITE ( .6 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-18

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .35   K2O -.28    Fe2O3 -4.05

 Na2O -1.43  CaO -.35     SiO2  1.9

DISCRIMINANT FUNCTIONS
              DF1 -.58
              DF2 -7.12
              DF3 -7.48
              DF4 -4.47
              DF5 -1.32
```

```
FA-87-19

SiO2 68.5   Al2O3 14.4   Fe2O3 2.94
FeO 0         MgO 2.11     CaO 3.09
Na2O 4.16     K2O 1.1     TiO2 .38
P2O5 .000001  MnO .07      LOI 2.8
Sum of Oxide Values  96.64

NORMALIZED OXIDE VALUES
SiO2 70.88  Al2O3 14.9   Fe2O3 1.95
FeO .99       MgO 2.18     CaO 3.2
Na2O 4.3      K2O 1.14    TiO2 .39
P2O5 0        MnO .07

FA-87-19

OTHER RATIOS ETC.
    K2O/Na2O              .27
    FeT/MgO               1.4
    LOI/CaO               .29
   TiO2/Zr                .24
    TAAS                  30.68
C : F : K      63.5 : 26.8 : 9.7
C : F : A      29.3 : 12.4 : 58.3
C : A : K      31.9 : 63.3 : 4.8
A : F : K      77.6 : 16.5 : 5.9
Peraluminosity Index      1.33
    Au                    5
    As                    2
    Cu                    34
    Zn                    41


FA-87-19

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE DACITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE ANDESITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 70.88 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .39 %)


FA-87-19

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .32   K2O -.1     Fe2O3 -2.4

 Na2O  .35   CaO -.82     SiO2 -.1

DISCRIMINANT FUNCTIONS
               DF1 -.71
               DF2 -9.22
               DF3 -9.12
               DF4 -1.99
               DF5 -.32
```

```
FA-87-20

SiO2 68.1   Al2O3 16.5   Fe2O3 2.36
FeO 0         MgO 1.21     CaO 4.01
Na2O 3.87     K2O 2.06    TiO2 .42
P2O5 .02      MnO .03      LOI 1.5
Sum of Oxide Values  98.54

NORMALIZED OXIDE VALUES
SiO2 69.11  Al2O3 16.75  Fe2O3 1.95
FeO .4        MgO 1.23     CaO 4.07
Na2O 3.93     K2O 2.09    TiO2 .43
P2O5 .02      MnO .03

FA-87-20

OTHER RATIOS ETC.
    K2O/Na2O              .53
    FeT/MgO               1.95
    LOI/CaO               .12
   TiO2/Zr                .24
    TAAS                  29.33
C : F : K      68.3 : 13.9 : 17.8
C : F : A      30.3 : 6.2 : 63.5
C : A : K      29.8 : 62.4 : 7.8
A : F : K      81.8 : 8 : 10.2
Peraluminosity Index      1.35
    Au                    5
    As                    2
    Cu                    30
    Zn                    105


FA-87-20

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE RHYOLITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE DACITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 69.11 %)
   TITANIA CLASSIFICATION:
   DACITE ( .43 %)


FA-87-20

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.65   K2O  .89    Fe2O3 -3.07

 Na2O  .04   CaO  .06     SiO2 -2.19

DISCRIMINANT FUNCTIONS
               DF1 -.83
               DF2 -8.55
               DF3 -8.55
               DF4 -3.17
               DF5 -2.37
```

```
FA-87-21

SiO2 43.4   Al2O3 8.51    Fe2O3 28.5
FeO 0         MgO 2.78      CaO 6.95
Na2O .17      K2O .05      TiO2 .35
P2O5 .000001  MnO .12       LOI 7.65
Sum of Oxide Values  88.16001

NORMALIZED OXIDE VALUES
SiO2 49.23  Al2O3 9.649999
                          Fe2O3 2.1
FeO 27.2      MgO 3.15      CaO 7.88
Na2O .19      K2O .06      TiO2 .4
P2O5 0        MnO .14

FA-87-21

OTHER RATIOS ETC.
    K2O/Na2O                  .32
    FeT/MgO                   10.25
    LOI/CaO                   .32
   TiO2/Zr                    1.05
    TAAS                      28.46
C : F : K        21 : 78.9 : .2
C : F : A        16.8 : 63.1 : 20.1
C : A : K        45.4 : 54.3 : .3
A : F : K        24.1 : 75.8 : .1
Peraluminosity Index          1.28
    Au                        45
    As                        42
    Cu                        89
    Zn                        99


FA-87-21

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC HIGH IRON BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 49.23 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .4 %)


FA-87-21

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -6.07   K2O -.13    Fe2O3   15.67

 Na2O -2.53   CaO -4.93    SiO2   8.05

DISCRIMINANT FUNCTIONS
              DF1 -4.54
              DF2  13.87
              DF3  13.8
              DF4  18.32
              DF5  4.95
```

```
FA-87-22

SiO2 48.9   Al2O3 15.1   Fe2O3 9.140001
FeO 0         MgO 6.47     CaO 9.32
Na2O 2.34     K2O .000001 TiO2 .72
P2O5 9.000001E-02
              MnO .17      LOI 6.1
Sum of Oxide Values  91.56

NORMALIZED OXIDE VALUES
SiO2 53.41  Al2O3 16.49  Fe2O3 2.42
FeO 6.8       MgO 7.07     CaO 10.18
Na2O 2.56     K2O 0       TiO2 .79
P2O5 .1       MnO .19

FA-87-22

OTHER RATIOS ETC.
    K2O/Na2O              0
    FeT/MgO               1.41
    LOI/CaO               .2
   TiO2/Zr                1.98
    TAAS                  35.69
C : F : K      47.9 : 52.1 : 0
C : F : A      29.6 : 32.2 : 38.3
C : A : K      43.6 : 56.4 : 0
A : F : K      54.3 : 45.7 : 0
Peraluminosity Index      1.23
    Au                    5
    As                    5
    Cu                    169
    Zn                    140


FA-87-22

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 53.41 %)
   TITANIA CLASSIFICATION:
   DACITE ( .79 %)


FA-87-22

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .25   K2O -.43    Fe2O3 -3.45

 Na2O -.86   CaO  .16     SiO2  .46

DISCRIMINANT FUNCTIONS
               DF1 -.73
               DF2 -5.53
               DF3 -5.76
               DF4 -3.72
               DF5 -.54
```

```
FA-87-23

SiO2 50      Al2O3 14.9    Fe2O3 8.859999
FeO 0          MgO 4.15      CaO 10.1
Na2O 3.64      K2O .42      TiO2 .73
P2O5 .02       MnO .16       LOI 7.7
Sum of Oxide Values  92.32

NORMALIZED OXIDE VALUES
SiO2 54.16   Al2O3 16.14   Fe2O3 2.42
FeO 6.46       MgO 4.5       CaO 10.94
Na2O 3.94      K2O .45      TiO2 .79
P2O5 .02       MnO .17

FA-87-23

OTHER RATIOS ETC.
    K2O/Na2O                .11
    FeT/MgO                 2.13
    LOI/CaO                 .23
   TiO2/Zr                  1.88
    TAAS                    24.96
C : F : K      56.6 : 41.7 : 1.7
C : F : A      35.4 : 26.1 : 38.4
C : A : K      47.3 : 51.3 : 1.4
A : F : K      58.6 : 39.8 : 1.6
Peraluminosity Index        .95
    Au                      5
    As                      33
    Cu                      105
    Zn                      68


FA-87-23

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 54.16 %)
   TITANIA CLASSIFICATION:
   DACITE ( .79 %)


FA-87-23

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.9   K2O -.03    Fe2O3 -3.23

 Na2O  .41   CaO  1.42    SiO2  .63

DISCRIMINANT FUNCTIONS
               DF1 -2.42
               DF2 -6.74
               DF3 -6.67
               DF4 -3.7
               DF5 -2.87
```

```
FA-87-24

SiO2 51.4   Al2O3 14.9   Fe2O3 8.439999
FeO 0         MgO 4.01     CaO 9.43
Na2O 2.7      K2O .000001 TiO2 .77
P2O5 .11      MnO .15      LOI 5.15
Sum of Oxide Values  91.29

NORMALIZED OXIDE VALUES
SiO2 56.3   Al2O3 16.32  Fe2O3 2.49
FeO 6.08      MgO 4.39     CaO 10.33
Na2O 2.96     K2O 0       TiO2 .84
P2O5 .12      MnO .16

FA-87-24

OTHER RATIOS ETC.
    K2O/Na2O             0
    FeT/MgO              2.1
    LOI/CaO              .17
   TiO2/Zr               2
    TAAS                 24.83
C : F : K      55.9 : 44.1 : 0
C : F : A      33.2 : 26.1 : 40.7
C : A : K      44.9 : 55.1 : 0
A : F : K      60.9 : 39.1 : 0
Peraluminosity Index      1.14
    Au                    5
    As                    4
    Cu                    156
    Zn                    66


FA-87-24

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 56.3 %)
   TITANIA CLASSIFICATION:
   DACITE ( .84 %)


FA-87-24

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.62  K2O -.54    Fe2O3 -3.1

 Na2O -.76   CaO  1.23    SiO2  .59

DISCRIMINANT FUNCTIONS
               DF1 -1.6
               DF2 -6.95
               DF3 -7.13
               DF4 -3.77
               DF5 -2.56
```

```
FA-87-25

SiO2 48.6   Al2O3 14.6   Fe2O3 11.2
FeO 0         MgO 6.48     CaO 10.7
Na2O 1.7      K2O .02     TiO2 .79
P2O5 .02      MnO .24      LOI 3.2
Sum of Oxide Values  93.46

NORMALIZED OXIDE VALUES
SiO2 52     Al2O3 15.62  Fe2O3 2.45
FeO 8.58      MgO 6.93     CaO 11.45
Na2O 1.82     K2O .02     TiO2 .85
P2O5 .02      MnO .26

FA-87-25

OTHER RATIOS ETC.
    K2O/Na2O              .01
    FeT/MgO               1.73
    LOI/CaO               9.000001E-02
   TiO2/Zr                2.43
    TAAS                  34.37
C : F : K      46.1 : 53.9 : .1
C : F : A      29.9 : 34.9 : 35.2
C : A : K      45.9 : 54 : .1
A : F : K      50.1 : 49.8 : .1
Peraluminosity Index      1.16
    Au                    10
    As                    2
    Cu                    237
    Zn                    191


FA-87-25

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 52 %)
   TITANIA CLASSIFICATION:
   DACITE ( .85 %)


FA-87-25

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .14   K2O -.39    Fe2O3 -1.31

 Na2O -1.5   CaO  1.52    SiO2  .99

DISCRIMINANT FUNCTIONS
               DF1 -.96
               DF2 -2.32
               DF3 -2.63
               DF4 -1.57
               DF5  1.77
```

```
FA-87-26

SiO2 52.6   Al2O3 15.3   Fe2O3 8.2
FeO 0         MgO 4.96     CaO 8.310001
Na2O 3.75     K2O .000001 TiO2 .87
P2O5 .000001  MnO .18      LOI 4
Sum of Oxide Values  93.58999

NORMALIZED OXIDE VALUES
SiO2 56.21  Al2O3 16.35  Fe2O3 2.53
FeO 5.61      MgO 5.3      CaO 8.88
Na2O 4.01     K2O 0       TiO2 .93
P2O5 0        MnO .19

FA-87-26

OTHER RATIOS ETC.
    K2O/Na2O              0
    FeT/MgO               1.65
    LOI/CaO               .15
   TiO2/Zr                1.86
    TAAS                  29.14
C : F : K      54.2 : 45.8 : 0
C : F : A      32.1 : 27.2 : 40.7
C : A : K      44.1 : 55.9 : 0
A : F : K      60 : 40 : 0
Peraluminosity Index      1.12
    Au                    5
    As                    4
    Cu                    109
    Zn                    74


FA-87-26

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 56.21 %)
   TITANIA CLASSIFICATION:
   DACITE ( .93 %)


FA-87-26

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.19    K2O -.58    Fe2O3 -2.77

 Na2O  .27    CaO  .43     SiO2  .1

DISCRIMINANT FUNCTIONS
               DF1 -1.33
               DF2 -6.55
               DF3 -6.5
               DF4 -2.74
               DF5 -.33
```

```
FA-87-27

SiO2 47.7   Al2O3 14.8   Fe2O3 8.37
FeO 0         MgO 5.13     CaO 9.04
Na2O 3.82     K2O .25     TiO2 .83
P2O5 .02      MnO .13      LOI 8.649999
Sum of Oxide Values  89.48001

NORMALIZED OXIDE VALUES
SiO2 53.31  Al2O3 16.54  Fe2O3 2.6
FeO 6.07      MgO 5.73     CaO 10.1
Na2O 4.27     K2O .28     TiO2 .93
P2O5 .02      MnO .15

FA-87-27

OTHER RATIOS ETC.
    K2O/Na2O              .07
    FeT/MgO               1.63
    LOI/CaO               .29
   TiO2/Zr                2.16
    TAAS                  29.49
C : F : K      54.3 : 44.6 : 1.1
C : F : A      33.6 : 27.6 : 38.7
C : A : K      46.1 : 53 : .9
A : F : K      57.8 : 41.2 : 1
Peraluminosity Index      1
    Au                    5
    As                    2
    Cu                    109
    Zn                    57


FA-87-27

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 53.31 %)
   TITANIA CLASSIFICATION:
   DACITE ( .93 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-27

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.69  K2O -.11    Fe2O3 -4.95

 Na2O  .92   CaO -.64     SiO2  .83

DISCRIMINANT FUNCTIONS
               DF1 -1.77
               DF2 -8.41
               DF3 -8.28
               DF4 -5.24
               DF5 -4.26
```

```
FA-87-28

SiO2 51.2   Al2O3 15.2   Fe2O3 9.54
FeO 0         MgO 5.96     CaO 12.1
Na2O .73      K2O .000001 TiO2 .83
P2O5 .05      MnO .27      LOI 4.3
Sum of Oxide Values  95.16001

NORMALIZED OXIDE VALUES
SiO2 53.81  Al2O3 15.97  Fe2O3 2.45
FeO 6.82      MgO 6.26     CaO 12.72
Na2O .77      K2O 0       TiO2 .87
P2O5 .05      MnO .28

FA-87-28

OTHER RATIOS ETC.
    K2O/Na2O              0
    FeT/MgO               1.6
    LOI/CaO               .11
   TiO2/Zr                2.23
    TAAS                  31.7
C : F : K      50.8 : 49.2 : 0
C : F : A      31.7 : 30.7 : 37.5
C : A : K      45.8 : 54.2 : 0
A : F : K      55 : 45 : 0
Peraluminosity Index      1.24
    Au                    5
    As                    2
    Cu                    166
    Zn                    72


FA-87-28

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 53.81 %)
   TITANIA CLASSIFICATION:
   DACITE ( .87 %)


FA-87-28

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .43   K2O -.51    Fe2O3 -1.9

 Na2O -2.78  CaO  3.92    SiO2  .26

DISCRIMINANT FUNCTIONS
               DF1 -.51
               DF2 -5.39
               DF3 -5.98
               DF4 -2.95
               DF5  2.08
```

```
FA-87-29

SiO2 40.9   Al2O3 10.1   Fe2O3 7.97
FeO 0         MgO 5.18     CaO 12.1
Na2O 1.42     K2O .3      TiO2 .51
P2O5 .11      MnO .27      LOI 18.6
Sum of Oxide Values  78.26

NORMALIZED OXIDE VALUES
SiO2 52.26  Al2O3 12.91  Fe2O3 2.57
FeO 6.85      MgO 6.62     CaO 15.46
Na2O 1.81     K2O .38     TiO2 .65
P2O5 .14      MnO .34

FA-87-29

OTHER RATIOS ETC.
    K2O/Na2O              .21
    FeT/MgO               1.54
    LOI/CaO               .4
   TiO2/Zr                1.91
    TAAS                  28.84
C : F : K      55.5 : 43.3 : 1.2
C : F : A      39.6 : 30.9 : 29.6
C : A : K      56.5 : 42.2 : 1.2
A : F : K      48.2 : 50.3 : 1.4
Peraluminosity Index      .74
    Au                    5
    As                    21
    Cu                    94
    Zn                    76


FA-87-29

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 52.26 %)
   TITANIA CLASSIFICATION:
   DACITE ( .65 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-29

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -4.98   K2O   .3     Fe2O3 -10.01

 Na2O -.72    CaO -.32      SiO2  7.03

DISCRIMINANT FUNCTIONS
               DF1 -2.05
               DF2 -12.42
               DF3 -12.79
               DF4 -12.27
               DF5 -9.359999
```

```
FA-87-30

SiO2 45.4   Al2O3 14.2   Fe2O3 9.850001
FeO 0         MgO 6.55      CaO 8.310001
Na2O 3.42     K2O .000001 TiO2 .61
P2O5 .03      MnO .17       LOI 9.2
Sum of Oxide Values  87.76

NORMALIZED OXIDE VALUES
SiO2 51.73  Al2O3 16.18  Fe2O3 2.4
FeO 7.94      MgO 7.46      CaO 9.47
Na2O 3.9      K2O 0        TiO2 .7
P2O5 .03      MnO .19

FA-87-30

OTHER RATIOS ETC.
    K2O/Na2O              0
    FeT/MgO               1.5
    LOI/CaO               .32
   TiO2/Zr                2.5
    TAAS                  35.81
C : F : K      46.5 : 53.5 : 0
C : F : A      29.7 : 34.3 : 36
C : A : K      45.2 : 54.8 : 0
A : F : K      51.2 : 48.8 : 0
Peraluminosity Index      1.08
    Au                    5
    As                    2
    Cu                    32
    Zn                    91


FA-87-30

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.73 %)
   TITANIA CLASSIFICATION:
   DACITE ( .7 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-30

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.99   K2O -.29    Fe2O3 -4.48

 Na2O  .83   CaO -2.48    SiO2  1.58

DISCRIMINANT FUNCTIONS
               DF1 -1.55
               DF2 -7
               DF3 -6.87
               DF4 -4.28
               DF5 -2.81
```

```
FA-87-31

SiO2 45.8   Al2O3 14.4   Fe2O3 8.890001
FeO 0         MgO 5.42     CaO 12
Na2O 1.16     K2O .57     TiO2 .59
P2O5 .11      MnO .2       LOI 12.45
Sum of Oxide Values  88.46

NORMALIZED OXIDE VALUES
SiO2 51.78  Al2O3 16.28  Fe2O3 2.36
FeO 6.92      MgO 6.13     CaO 13.57
Na2O 1.31     K2O .64     TiO2 .67
P2O5 .12      MnO .23

FA-87-31

OTHER RATIOS ETC.
    K2O/Na2O                .49
    FeT/MgO                 1.64
    LOI/CaO                 .31
   TiO2/Zr                  2.31
    TAAS                    31.27
C : F : K      52.1 : 45.7 : 2.2
C : F : A      33.7 : 29.5 : 36.8
C : A : K      46.8 : 51.2 : 2
A : F : K      54.3 : 43.5 : 2.1
Peraluminosity Index        1.07
    Au                      5
    As                      1
    Cu                      1
    Zn                      1


FA-87-31

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.78 %)
   TITANIA CLASSIFICATION:
   DACITE ( .67 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-31

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.09  K2O   .34    Fe2O3 -5.34

 Na2O -1.8   CaO  1.89    SiO2  1.33

DISCRIMINANT FUNCTIONS
               DF1 -1.37
               DF2 -9.49
               DF3 -9.96
               DF4 -6.87
               DF5 -4.02
```

```
FA-87-32

SiO2 44.2   Al2O3 13.6   Fe2O3 10.2
FeO 0         MgO 7.11     CaO 10.5
Na2O 1.5      K2O .26     TiO2 .72
P2O5 .1       MnO .17      LOI 13.1
Sum of Oxide Values  87.56

NORMALIZED OXIDE VALUES
SiO2 50.48  Al2O3 15.53  Fe2O3 2.54
FeO 8.2       MgO 8.12     CaO 11.99
Na2O 1.71     K2O .3      TiO2 .82
P2O5 .11      MnO .19

FA-87-32

OTHER RATIOS ETC.
    K2O/Na2O                .18
    FeT/MgO                 1.43
    LOI/CaO                 .36
   TiO2/Zr                  2.34
    TAAS                    38.07
C : F : K      45.2 : 53.8 : 1
C : F : A      30.1 : 35.8 : 34.1
C : A : K      46.4 : 52.6 : 1
A : F : K      48.3 : 50.8 : .9
Peraluminosity Index        1.11
    Au                      5
    As                      14
    Cu                      97
    Zn                      69


FA-87-32

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 50.48 %)
   TITANIA CLASSIFICATION:
   DACITE ( .82 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-32

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.83   K2O  .07    Fe2O3 -4.69

 Na2O -1.17  CaO -.54     SiO2  2.28

DISCRIMINANT FUNCTIONS
               DF1 -.66
               DF2 -7.38
               DF3 -7.7
               DF4 -5.33
               DF5 -2.85
```

```
FA-87-33

SiO2 47.3   Al2O3 14.1   Fe2O3 7.44
FeO 0         MgO 4.25     CaO 11
Na2O 2.11     K2O .71     TiO2 .74
P2O5 .12      MnO .12      LOI 11.2
Sum of Oxide Values  87.37

NORMALIZED OXIDE VALUES
SiO2 54.14  Al2O3 16.14  Fe2O3 2.56
FeO 5.36      MgO 4.86     CaO 12.59
Na2O 2.42     K2O .81     TiO2 .85
P2O5 .14      MnO .14

FA-87-33

OTHER RATIOS ETC.
    K2O/Na2O              .33
    FeT/MgO               1.75
    LOI/CaO               .3
   TiO2/Zr                2.13
    TAAS                  27.42
C : F : K      57.6 : 39.2 : 3.1
C : F : A      36.3 : 24.7 : 39
C : A : K      47 : 50.5 : 2.5
A : F : K      59.4 : 37.6 : 3
Peraluminosity Index      .99
    Au                    5
    As                    7
    Cu                    127
    Zn                    64


FA-87-33

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 54.14 %)
   TITANIA CLASSIFICATION:
   DACITE ( .85 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-33

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.89  K2O   .43    Fe2O3 -6.32

 Na2O -.95   CaO   1.42    SiO2  1.66

DISCRIMINANT FUNCTIONS
               DF1 -1.59
               DF2 -9.71
               DF3 -10.02
               DF4 -7.88
               DF5 -6.67
```

```
FA-87-34

SiO2 61.4   Al2O3 12.8   Fe2O3 6.68
FeO 0         MgO 2.19     CaO 6.33
Na2O 2.18     K2O .98     TiO2 .29
P2O5 .16      MnO .1       LOI 6.85
Sum of Oxide Values  92.62

NORMALIZED OXIDE VALUES
SiO2 66.29  Al2O3 13.82  Fe2O3 1.93
FeO 4.75      MgO 2.36     CaO 6.83
Na2O 2.35     K2O 1.06    TiO2 .31
P2O5 .17      MnO .11

FA-87-34

OTHER RATIOS ETC.
    K2O/Na2O               .45
    FeT/MgO                3.05
    LOI/CaO                .33
   TiO2/Zr                 .29
    TAAS                   27.14
C : F : K      52.9 : 41 : 6.1
C : F : A      30.5 : 23.6 : 45.9
C : A : K      38.2 : 57.4 : 4.4
A : F : K      62.8 : 32.3 : 4.8
Peraluminosity Index       1.23
    Au                     15
    As                     5
    Cu                     49
    Zn                     34


FA-87-34

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE ANDESITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   DACITE ( 66.29 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .31 %)

FA-87-34

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.88   K2O  .08    Fe2O3 -.95

 Na2O -1.89  CaO  1.01    SiO2  2.27

DISCRIMINANT FUNCTIONS
               DF1 -1.35
               DF2 -7
               DF3 -7.36
               DF4 -1.34
               DF5 -.43
```

```
FA-87-35

SiO2 45.8   Al2O3 14.1   Fe2O3 11.8
FeO 0         MgO 7.92     CaO 9.7
Na2O 1.29     K2O .01     TiO2 .71
P2O5 .1       MnO .19      LOI 5.7
Sum of Oxide Values  90.66001

NORMALIZED OXIDE VALUES
SiO2 50.52  Al2O3 15.55  Fe2O3 2.44
FeO 9.520001  MgO 8.74     CaO 10.7
Na2O 1.42     K2O .01     TiO2 .78
P2O5 .11      MnO .21

FA-87-35

OTHER RATIOS ETC.
    K2O/Na2O              .01
    FeT/MgO               1.49
    LOI/CaO               .18
   TiO2/Zr                2.05
    TAAS                  41.93
C : F : K      39.9 : 60.1 : 0
C : F : A      26.4 : 39.8 : 33.9
C : A : K      43.8 : 56.2 : 0
A : F : K      46 : 54 : 0
Peraluminosity Index      1.29
    Au                    5
    As                    2
    Cu                    120
    Zn                    57


FA-87-35

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 50.52 %)
   TITANIA CLASSIFICATION:
   DACITE ( .78 %)


FA-87-35

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .72   K2O -.28    Fe2O3 -2

 Na2O -1.61  CaO -.7      SiO2  1.63

DISCRIMINANT FUNCTIONS
               DF1 -.28
               DF2 -5.02
               DF3 -5.37
               DF4 -1.95
               DF5  1.07
```

```
FA-87-36

SiO2 46.6   Al2O3 13.9   Fe2O3 9.689999
FeO 0         MgO 4.63     CaO 11.5
Na2O 1        K2O .47     TiO2 .8
P2O5 .02      MnO .22      LOI 12.2
Sum of Oxide Values  88.08999

NORMALIZED OXIDE VALUES
SiO2 52.9   Al2O3 15.78  Fe2O3 2.61
FeO 7.55      MgO 5.26     CaO 13.05
Na2O 1.14     K2O .53     TiO2 .91
P2O5 .02      MnO .25

FA-87-36

OTHER RATIOS ETC.
    K2O/Na2O                 .46
    FeT/MgO                  2.09
    LOI/CaO                  .31
   TiO2/Zr                   2.02
    TAAS                     28.98
C : F : K      51.5 : 46.5 : 1.9
C : F : A      33.2 : 29.9 : 36.9
C : A : K      46.5 : 51.7 : 1.7
A : F : K      54.2 : 44 : 1.8
Peraluminosity Index         1.1
    Au                       5
    As                       2
    Cu                       95
    Zn                       67


FA-87-36

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 52.9 %)
   TITANIA CLASSIFICATION:
   DACITE ( .91 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-36

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.69  K2O   .19    Fe2O3 -4.06

 Na2O -2.1   CaO  1.67    SiO2  1.89

DISCRIMINANT FUNCTIONS
              DF1 -1.22
              DF2 -7.2
              DF3 -7.71
              DF4 -5.5
              DF5 -3.47
```

```
FA-87-37

SiO2 74.6    Al2O3 12.1    Fe2O3 1.51
FeO 0          MgO .11       CaO 3.37
Na2O 6.27      K2O .29      TiO2 .04
P2O5 .12       MnO .02       LOI 3.25
Sum of Oxide Values  98.33

NORMALIZED OXIDE VALUES
SiO2 75.87  Al2O3 12.31  Fe2O3 .54
FeO .9         MgO .11       CaO 3.43
Na2O 6.38      K2O .29      TiO2 .04
P2O5 .12       MnO .02

FA-87-37

OTHER RATIOS ETC.
    K2O/Na2O                .05
    FeT/MgO                 13.99
    LOI/CaO                 .32
   TiO2/Zr                  .07
    TAAS                    3.92
C : F : K      88.3 : 9.100001 : 2.6
C : F : A      42.4 : 4.4 : 53.2
C : A : K      43.8 : 54.9 : 1.3
A : F : K      90.4 : 7.4 : 2.1
Peraluminosity Index        .88
    Au                      5
    As                      7
    Cu                      16
    Zn                      22


FA-87-37

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE RHYOLITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE RHYOLITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 75.87 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .04 %)


FA-87-37

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.04  K2O -1.18   Fe2O3 -2.06

 Na2O  2.91  CaO  .43     SiO2  1.58

DISCRIMINANT FUNCTIONS
              DF1 -2.8
               DF2 -10.05
               DF3 -9.37
               DF4 -1.37
               DF5 -1.91
```

```
FA-87-38

SiO2 45.3    Al2O3 14.6    Fe2O3 12.3
FeO 0          MgO 5.64      CaO 9.84
Na2O 2.58      K2O .000001 TiO2 .81
P2O5 .000001   MnO .19       LOI 8.8
Sum of Oxide Values  90.26

NORMALIZED OXIDE VALUES
SiO2 50.19  Al2O3 16.18  Fe2O3 2.56
FeO 9.96       MgO 6.25      CaO 10.9
Na2O 2.86      K2O 0        TiO2 .9
P2O5 0         MnO .21

FA-87-38

OTHER RATIOS ETC.
    K2O/Na2O                 0
    FeT/MgO                  2.18
    LOI/CaO                  .27
   TiO2/Zr                   2.2
    TAAS                     31.23
C : F : K      45.9 : 54.1 : 0
C : F : A      29.8 : 35.1 : 35.1
C : A : K      46 : 54 : 0
A : F : K      50 : 50 : 0
Peraluminosity Index         1.11
    Au                       5
    As                       3
    Cu                       121
    Zn                       106


FA-87-38

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 50.19 %)
   TITANIA CLASSIFICATION:
   DACITE ( .9 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-38

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2      K2O -.27    Fe2O3 -1.69

 Na2O -.11    CaO -.77     SiO2  1.09

DISCRIMINANT FUNCTIONS
               DF1 -1.83
               DF2 -3.78
               DF3 -3.79
               DF4 -1.67
               DF5 -1.66
```

```
FA-87-39

SiO2 51      Al2O3 15      Fe2O3 9.399999
FeO 0         MgO 3.47      CaO 9.609999
Na2O 2.4      K2O .000001 TiO2 .83
P2O5 .19      MnO .25       LOI 5.85
Sum of Oxide Values  91.44

NORMALIZED OXIDE VALUES
SiO2 55.77  Al2O3 16.4   Fe2O3 2.55
FeO 6.96      MgO 3.79     CaO 10.51
Na2O 2.62     K2O 0        TiO2 .91
P2O5 .21      MnO .27

FA-87-39

OTHER RATIOS ETC.
    K2O/Na2O              0
    FeT/MgO               2.71
    LOI/CaO               .19
   TiO2/Zr                2.07
    TAAS                  22.4
C : F : K      55 : 45 : 0
C : F : A      32.6 : 26.7 : 40.7
C : A : K      44.5 : 55.5 : 0
A : F : K      60.4 : 39.6 : 0
Peraluminosity Index      1.18
    Au                    5
    As                    17
    Cu                    129
    Zn                    96


FA-87-39

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 55.77 %)
   TITANIA CLASSIFICATION:
   DACITE ( .91 %)


FA-87-39

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.34  K2O -.52    Fe2O3 -2.22

 Na2O -1.05  CaO  1.28    SiO2  .5

DISCRIMINANT FUNCTIONS
              DF1 -1.72
              DF2 -5.45
              DF3 -5.68
              DF4 -2.93
              DF5 -1.29
```

```
FA-87-40

SiO2 49.7   Al2O3 13      Fe2O3 8.2
FeO 0         MgO 6.46      CaO 7.83
Na2O 2.7      K2O .000001 TiO2 .72
P2O5 .04      MnO .12       LOI 8.850001
Sum of Oxide Values  88.17

NORMALIZED OXIDE VALUES
SiO2 56.37  Al2O3 14.74  Fe2O3 2.52
FeO 6.1       MgO 7.33      CaO 8.88
Na2O 3.06     K2O 0        TiO2 .82
P2O5 .05      MnO .14

FA-87-40

OTHER RATIOS ETC.
    K2O/Na2O             0
    FeT/MgO              1.27
    LOI/CaO              .33
   TiO2/Zr               .72
    TAAS                 38.04
C : F : K      47.1 : 52.9 : 0
C : F : A      29.8 : 33.5 : 36.7
C : A : K      44.8 : 55.2 : 0
A : F : K      52.3 : 47.7 : 0
Peraluminosity Index      1.13
    Au                   10
    As                   2
    Cu                   44
    Zn                   73


FA-87-40

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC MAGNESIUM-RICH BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 56.37 %)
   TITANIA CLASSIFICATION:
   DACITE ( .82 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-40

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .53   K2O -.48    Fe2O3 -4.27

 Na2O -.6    CaO -1.2     SiO2  2.83

DISCRIMINANT FUNCTIONS
                      DF1 -.44
                      DF2 -7.88
                      DF3 -8.060001
                      DF4 -4.35
                      DF5 -1.47
```

```
FA-87-41

SiO2 47.1   Al2O3 14.6   Fe2O3 11.8
FeO 0         MgO 6.99     CaO 11.6
Na2O 1.01     K2O .02     TiO2 .79
P2O5 .08      MnO .22      LOI 3.35
Sum of Oxide Values  93.26

NORMALIZED OXIDE VALUES
SiO2 50.51  Al2O3 15.66  Fe2O3 2.46
FeO 9.18      MgO 7.5      CaO 12.44
Na2O 1.08     K2O .02     TiO2 .85
P2O5 9.000001E-02
              MnO .24

FA-87-41

OTHER RATIOS ETC.
    K2O/Na2O              .02
    FeT/MgO               1.69
    LOI/CaO               9.000001E-02
   TiO2/Zr                2.3
    TAAS                  35.74
C : F : K      44.7 : 55.2 : .1
C : F : A      29.5 : 36.4 : 34.1
C : A : K      46.3 : 53.6 : .1
A : F : K      48.4 : 51.5 : .1
Peraluminosity Index      1.19
    Au                    5
    As                    2
    Cu                    97
    Zn                    67


FA-87-41

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 50.51 %)
   TITANIA CLASSIFICATION:
   DACITE ( .85 %)


FA-87-41

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .17   K2O -.32    Fe2O3 -1.34

 Na2O -2.05  CaO  1.89    SiO2  1.02

DISCRIMINANT FUNCTIONS
               DF1 -.74
               DF2 -4.29
               DF3 -4.71
               DF4 -1.8
               DF5  1.44
```

```
FA-87-42

SiO2 49.3   Al2O3 14.8   Fe2O3 9.96
FeO 0         MgO 6.61     CaO 11.9
Na2O 1.05     K2O .04     TiO2 .67
P2O5 9.000001E-02
              MnO .27      LOI 5.25
Sum of Oxide Values  93.91001

NORMALIZED OXIDE VALUES
SiO2 52.5   Al2O3 15.76  Fe2O3 2.31
FeO 7.46      MgO 7.04     CaO 12.67
Na2O 1.12     K2O .04     TiO2 .71
P2O5 .1       MnO .29

FA-87-42

OTHER RATIOS ETC.
    K2O/Na2O              .04
    FeT/MgO               1.5
    LOI/CaO               .14
   TiO2/Zr                2.29
    TAAS                  33.92
C : F : K      48.7 : 51.2 : .1
C : F : A      31.3 : 32.9 : 35.8
C : A : K      46.6 : 53.3 : .1
A : F : K      52 : 47.9 : .1
Peraluminosity Index      1.18
    Au                    5
    As                    15
    Cu                    135
    Zn                    64


FA-87-42

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 52.5 %)
   TITANIA CLASSIFICATION:
   DACITE ( .71 %)


FA-87-42

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .52   K2O -.4     Fe2O3 -2.32

 Na2O -2.27  CaO  3.05    SiO2  .75

DISCRIMINANT FUNCTIONS
               DF1 -.79
               DF2 -5.68
               DF3 -6.18
               DF4 -3.15
               DF5  1.91
```

```
FA-87-43

SiO2 69.8    Al2O3 13.8    Fe2O3 1.84
FeO 0          MgO .48       CaO 3.47
Na2O 3.59      K2O .93      TiO2 .22
P2O5 .06       MnO .04       LOI 3.5
Sum of Oxide Values  94.22

NORMALIZED OXIDE VALUES
SiO2 74.08  Al2O3 14.65   Fe2O3 1.83
FeO .11        MgO .51       CaO 3.68
Na2O 3.81      K2O .99      TiO2 .23
P2O5 .06       MnO .04

FA-87-43

OTHER RATIOS ETC.
    K2O/Na2O                  .26
    FeT/MgO                   3.83
    LOI/CaO                   .32
   TiO2/Zr                    .14
    TAAS                      16.69
C : F : K       82.3 : 6.8 : 10.9
C : F : A       32.9 : 2.7 : 64.4
C : A : K       32.4 : 63.3 : 4.3
A : F : K       90.1 : 3.8 : 6.1
Peraluminosity Index          1.37
    Au                        5
    As                        2
    Cu                        13
    Zn                        30


FA-87-43

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE RHYOLITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE DACITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 74.08 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .23 %)


FA-87-43

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.22  K2O -.34    Fe2O3 -3.22

 Na2O -.18   CaO -.2       SiO2  .39

DISCRIMINANT FUNCTIONS
               DF1 -1.09
               DF2 -10.67
               DF3 -10.7
               DF4 -3.46
               DF5 -2.88
```

```
FA-87-44

SiO2 46      Al2O3 15.9   Fe2O3 9.57
FeO 0          MgO 4.97     CaO 11
Na2O 3.65      K2O .14     TiO2 .87
P2O5 .07       MnO .22      LOI 9.25
Sum of Oxide Values  91.67

NORMALIZED OXIDE VALUES
SiO2 50.18  Al2O3 17.35  Fe2O3 2.59
FeO 7.07       MgO 5.42     CaO 12
Na2O 3.98      K2O .15     TiO2 .95
P2O5 .08       MnO .24

FA-87-44

OTHER RATIOS ETC.
    K2O/Na2O                .04
    FeT/MgO                 1.93
    LOI/CaO                 .26
   TiO2/Zr                  2.21
    TAAS                    25.85
C : F : K       55.8 : 43.6 : .5
C : F : A       34.9 : 27.3 : 37.9
C : A : K       47.7 : 51.8 : .4
A : F : K       57.9 : 41.6 : .5
Peraluminosity Index        .98
    Au                      5
    As                      10
    Cu                      114
    Zn                      148


FA-87-44

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 50.18 %)
   TITANIA CLASSIFICATION:
   DACITE ( .95 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-44

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.44  K2O -.15    Fe2O3 -4.31

 Na2O  .95   CaO  .81     SiO2 -.36

DISCRIMINANT FUNCTIONS
                 DF1 -2.36
                 DF2 -5.73
                 DF3 -5.58
                 DF4 -4.84
                 DF5 -3.49
```

```
FA-87-45

SiO2 39.4   Al2O3 13.4   Fe2O3 8.49
FeO 0         MgO 4.71     CaO 11.5
Na2O 2.57     K2O .67     TiO2 .72
P2O5 .000001  MnO .15      LOI 16.5
Sum of Oxide Values  80.98001

NORMALIZED OXIDE VALUES
SiO2 48.65  Al2O3 16.55  Fe2O3 2.74
FeO 6.97      MgO 5.82     CaO 14.2
Na2O 3.17     K2O .83     TiO2 .89
P2O5 0        MnO .19

FA-87-45

OTHER RATIOS ETC.
    K2O/Na2O             .26
    FeT/MgO              1.8
    LOI/CaO              .39
   TiO2/Zr               2.28
    TAAS                 27.69
C : F : K      56.1 : 41.3 : 2.7
C : F : A      37.2 : 27.4 : 35.4
C : A : K      50 : 47.6 : 2.4
A : F : K      54.9 : 42.4 : 2.8
Peraluminosity Index     .87
    Au                   5
    As                   62
    Cu                   132
    Zn                   175


FA-87-45

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 48.65 %)
   TITANIA CLASSIFICATION:
   DACITE ( .89 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-45

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -6.13  K2O  .82    Fe2O3 -9.890001

 Na2O  1.06  CaO -1.87    SiO2  2.71

DISCRIMINANT FUNCTIONS
              DF1 -2.45
              DF2 -10.11
              DF3 -10.09
              DF4 -11.62
              DF5 -12.5
```

```
FA-87-46

SiO2 51.8   Al2O3 12.9   Fe2O3 10.2
FeO 0          MgO 6.29     CaO 9.649999
Na2O 2.54      K2O .68     TiO2 .8
P2O5 .24       MnO .19      LOI 2.25
Sum of Oxide Values  94.5

NORMALIZED OXIDE VALUES
SiO2 54.82  Al2O3 13.65  Fe2O3 2.43
FeO 7.52       MgO 6.66     CaO 10.21
Na2O 2.69      K2O .72     TiO2 .85
P2O5 .25       MnO .2

FA-87-46

OTHER RATIOS ETC.
    K2O/Na2O                .27
    FeT/MgO                 1.62
    LOI/CaO                 .07
   TiO2/Zr                  .74
    TAAS                    36.39
C : F : K      46.4 : 51 : 2.6
C : F : A      31.7 : 34.8 : 33.5
C : A : K      47.3 : 50.1 : 2.6
A : F : K      47.8 : 49.7 : 2.5
Peraluminosity Index        .94
    Au                      5
    As                      2
    Cu                      184
    Zn                      27


FA-87-46

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 54.82 %)
   TITANIA CLASSIFICATION:
   DACITE ( .85 %)


FA-87-46

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .98   K2O  .18    Fe2O3 -.98

 Na2O -.94   CaO  1.56    SiO2  2.67

DISCRIMINANT FUNCTIONS
                     DF1 -1
                     DF2 -5.39
                     DF3 -5.55
                     DF4 -.91
                     DF5  2.27
```

```
FA-87-47

SiO2 52.5   Al2O3 13.4   Fe2O3 9.68
FeO 0         MgO 7.68     CaO 9.229999
Na2O 1.58     K2O .000001 TiO2 .8
P2O5 9.000001E-02
              MnO .17      LOI 3.05
Sum of Oxide Values  94.39

NORMALIZED OXIDE VALUES
SiO2 55.62  Al2O3 14.2   Fe2O3 2.44
FeO 7.04      MgO 8.140001
                           CaO 9.78
Na2O 1.67     K2O 0       TiO2 .85
P2O5 .1       MnO .18

FA-87-47

OTHER RATIOS ETC.
    K2O/Na2O              0
    FeT/MgO               1.26
    LOI/CaO               .1
   TiO2/Zr                .78
    TAAS                  41.55
C : F : K      43 : 57 : 0
C : F : A      28 : 37.2 : 34.8
C : A : K      44.6 : 55.4 : 0
A : F : K      48.3 : 51.7 : 0
Peraluminosity Index      1.22
    Au                    5
    As                    2
    Cu                    80
    Zn                    54


FA-87-47

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC MAGNESIUM-RICH BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 55.62 %)
   TITANIA CLASSIFICATION:
   DACITE ( .85 %)


FA-87-47

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  2.67  K2O -.57    Fe2O3 -1.22

 Na2O -2.03  CaO  1.37    SiO2  2.11

DISCRIMINANT FUNCTIONS
               DF1  .24
               DF2 -5.28
               DF3 -5.69
               DF4 -1.15
               DF5  3.68
```

```
FA-87-48

SiO2 49.2   Al2O3 12.9   Fe2O3 9.67
FeO 0         MgO 7.33     CaO 6.83
Na2O 1.68     K2O .49     TiO2 .71
P2O5 .17      MnO .15      LOI 8.899999
Sum of Oxide Values  88.38

NORMALIZED OXIDE VALUES
SiO2 55.67  Al2O3 14.6   Fe2O3 2.5
FeO 7.59      MgO 8.29     CaO 7.73
Na2O 1.9      K2O .55     TiO2 .8
P2O5 .19      MnO .17

FA-87-48

OTHER RATIOS ETC.
    K2O/Na2O              .29
    FeT/MgO               1.32
    LOI/CaO               .38
   TiO2/Zr                .78
    TAAS                  47.86
C : F : K      37 : 60.9 : 2.1
C : F : A      24 : 39.6 : 36.4
C : A : K      38.9 : 58.9 : 2.2
A : F : K      47.1 : 51.2 : 1.8
Peraluminosity Index      1.36
    Au                    10
    As                    56
    Cu                    85
    Zn                    78


FA-87-48

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC MAGNESIUM-RICH BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 55.67 %)
   TITANIA CLASSIFICATION:
   DACITE ( .8 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-48

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  1.33  K2O  9.000001E-02
                        Fe2O3 -2.84

 Na2O -1.69  CaO -2.53    SiO2  2.95

DISCRIMINANT FUNCTIONS
               DF1  .49
               DF2 -6.24
               DF3 -6.62
               DF4 -2.56
               DF5  .75
```

```
FA-87-49

SiO2 67.4   Al2O3 13.3   Fe2O3 2.32
FeO 0         MgO .52      CaO 3.56
Na2O 4.29     K2O 1.71    TiO2 .15
P2O5 .24      MnO .03      LOI 4
Sum of Oxide Values  93.45

NORMALIZED OXIDE VALUES
SiO2 72.12  Al2O3 14.23  Fe2O3 1.77
FeO .65       MgO .56      CaO 3.81
Na2O 4.59     K2O 1.83    TiO2 .16
P2O5 .26      MnO .03

FA-87-49

OTHER RATIOS ETC.
    K2O/Na2O                 .4
    FeT/MgO                  4.45
    LOI/CaO                  .35
   TiO2/Zr                   .16
    TAAS                     22.15
C : F : K      73.4 : 10.6 : 16
C : F : A      35.2 : 5.1 : 59.7
C : A : K      34.3 : 58.2 : 7.5
A : F : K      82.4 : 7 : 10.6
Peraluminosity Index         1.09
    Au                       5
    As                       3
    Cu                       13
    Zn                       107


FA-87-49

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE RHYOLITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE DACITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 72.12 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .16 %)


FA-87-49

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.53  K2O   .6     Fe2O3 -3.5

 Na2O  .46   CaO -.56     SiO2  1.19

DISCRIMINANT FUNCTIONS
              DF1 -1.75
              DF2 -9.24
              DF3 -9.16
              DF4 -3.62
              DF5 -3.65
```

```
FA-87-50

SiO2 49.8   Al2O3 15.8   Fe2O3 10.2
FeO 0         MgO 4.44     CaO 10.7
Na2O 1.57     K2O .03     TiO2 .83
P2O5 9.000001E-02
              MnO .21      LOI 3.9
Sum of Oxide Values  92.88

NORMALIZED OXIDE VALUES
SiO2 53.62 Al2O3 17.01  Fe2O3 2.51
FeO 7.62      MgO 4.78     CaO 11.52
Na2O 1.69     K2O .03     TiO2 .89
P2O5 .1       MnO .23

FA-87-50

OTHER RATIOS ETC.
    K2O/Na2O              .02
    FeT/MgO               2.3
    LOI/CaO               .11
   TiO2/Zr                1.82
    TAAS                  26.69
C : F : K      51.5 : 48.4 : .1
C : F : A      31 : 29.1 : 39.9
C : A : K      43.7 : 56.2 : .1
A : F : K      57.8 : 42.1 : .1
Peraluminosity Index      1.28
    Au                    5
    As                    4
    Cu                    117
    Zn                    64


FA-87-50

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 53.62 %)
   TITANIA CLASSIFICATION:
   DACITE ( .89 %)


FA-87-50

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.64  K2O -.43    Fe2O3 -1.86

 Na2O -1.79  CaO  1.99    SiO2 -.33

DISCRIMINANT FUNCTIONS
               DF1 -1.31
               DF2 -5.36
               DF3 -5.74
               DF4 -2.68
               DF5 -.87
```

```
FA-87-51

SiO2 45.9   Al2O3 15.1   Fe2O3 13.1
FeO 0         MgO 7.61     CaO 5.53
Na2O 1.32     K2O .43     TiO2 .83
P2O5 .24      MnO .18      LOI 8.3
Sum of Oxide Values  89.16001

NORMALIZED OXIDE VALUES
SiO2 51.48  Al2O3 16.94  Fe2O3 2.61
FeO 10.87     MgO 8.54     CaO 6.2
Na2O 1.48     K2O .48     TiO2 .93
P2O5 .27      MnO .2

FA-87-51

OTHER RATIOS ETC.
    K2O/Na2O                .32
    FeT/MgO                 1.72
    LOI/CaO                 .45
   TiO2/Zr                  2.38
    TAAS                    54.01
C : F : K      27.9 : 70.4 : 1.7
C : F : A      17.4 : 44.1 : 38.5
C : A : K      30.6 : 67.5 : 1.9
A : F : K      46 : 52.7 : 1.3
Peraluminosity Index        1.97
    Au                      5
    As                      14
    Cu                      150
    Zn                      121


FA-87-51

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.48 %)
   TITANIA CLASSIFICATION:
   DACITE ( .93 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-51

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .42   K2O  .18    Fe2O3 -.53

 Na2O -1.62  CaO -5.35    SiO2  .53

DISCRIMINANT FUNCTIONS
              DF1  .71
              DF2 -2.5
              DF3 -2.81
              DF4  .5
              DF5  1.61
```

```
FA-87-52

SiO2 54      Al2O3 13.2    Fe2O3 7.33
FeO 0          MgO 4.16      CaO 15
Na2O .000001  K2O .000001 TiO2 .7
P2O5 .22       MnO .15      LOI 3.3
Sum of Oxide Values  94.25

NORMALIZED OXIDE VALUES
SiO2 57.3    Al2O3 14.01   Fe2O3 2.33
FeO 4.9        MgO 4.41      CaO 15.92
Na2O 0         K2O 0        TiO2 .74
P2O5 .23       MnO .16

FA-87-52

OTHER RATIOS ETC.
    K2O/Na2O                 1.701412E+36
    FeT/MgO                  1.76
    LOI/CaO                  .07
   TiO2/Zr                   2.18
    TAAS                     21.69
C : F : K       63.1 : 36.9 : 0
C : F : A       40.6 : 23.7 : 35.7
C : A : K       53.2 : 46.8 : 0
A : F : K       60.1 : 39.9 : 0
Peraluminosity Index         .97
    Au                       5
    As                       4
    Cu                       144
    Zn                       36


FA-87-52

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 57.3 %)
   TITANIA CLASSIFICATION:
   DACITE ( .74 %)


FA-87-52

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.63   K2O -.64    Fe2O3 -3.1

 Na2O -3.83  CaO  8.01    SiO2  2.26

DISCRIMINANT FUNCTIONS
               DF1 -1.24
               DF2 -7.76
               DF3 -8.609999
               DF4 -5.49
               DF5 -1.34
```

```
FA-87-53

SiO2 45.6   Al2O3 14.4   Fe2O3 11.6
FeO 0         MgO 8.76     CaO 10.8
Na2O .06      K2O .000001 TiO2 .65
P2O5 .25      MnO .19      LOI 9
Sum of Oxide Values  91.36

NORMALIZED OXIDE VALUES
SiO2 49.91  Al2O3 15.76  Fe2O3 2.35
FeO 9.310001  MgO 9.59     CaO 11.82
Na2O .07      K2O 0       TiO2 .71
P2O5 .27      MnO .21

FA-87-53

OTHER RATIOS ETC.
    K2O/Na2O                0
    FeT/MgO                 1.32
    LOI/CaO                 .25
   TiO2/Zr                  2.84
    TAAS                    44.65
C : F : K       38.6 : 61.4 : 0
C : F : A       25.5 : 40.6 : 33.9
C : A : K       43 : 57 : 0
A : F : K       45.5 : 54.5 : 0
Peraluminosity Index        1.45
    Au                      10
    As                      2
    Cu                      112
    Zn                      68


FA-87-53

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC MAGNESIUM-RICH BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 49.91 %)
   TITANIA CLASSIFICATION:
   DACITE ( .71 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-53

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  1.55  K2O -.28    Fe2O3 -2.3

 Na2O -2.91  CaO  .42     SiO2  1.29

DISCRIMINANT FUNCTIONS
              DF1   .41
              DF2 -5.06
              DF3 -5.7
              DF4 -2.68
              DF5  1.75
```

```
FA-87-54

SiO2 46.3   Al2O3 12.5   Fe2O3 13.6
FeO 0          MgO 4.19     CaO 9.17
Na2O 1.13      K2O .4      TiO2 .64
P2O5 .19       MnO .15      LOI 10.3
Sum of Oxide Values  87.12

NORMALIZED OXIDE VALUES
SiO2 53.14  Al2O3 14.35  Fe2O3 2.46
FeO 11.84      MgO 4.81     CaO 10.53
Na2O 1.3       K2O .46     TiO2 .73
P2O5 .22       MnO .17

FA-87-54

OTHER RATIOS ETC.
    K2O/Na2O                .35
    FeT/MgO                 3.24
    LOI/CaO                 .33
   TiO2/Zr                  2.21
    TAAS                    30.82
C : F : K      40.9 : 57.5 : 1.6
C : F : A      27.6 : 38.9 : 33.5
C : A : K      44.4 : 53.9 : 1.7
A : F : K      45.6 : 52.9 : 1.5
Peraluminosity Index        1.18
    Au                      20
    As                      25
    Cu                      130
    Zn                      101


FA-87-54

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC HIGH IRON BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 53.14 %)
   TITANIA CLASSIFICATION:
   DACITE ( .73 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-54

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -3.34  K2O   .13    Fe2O3   .24

 Na2O -1.93  CaO -1.11    SiO2   3.52

DISCRIMINANT FUNCTIONS
               DF1 -1.88
               DF2 -2.26
               DF3 -2.61
               DF4 -.01
               DF5 -2.28
```

```
FA-87-55

SiO2 62.7   Al2O3 13.1   Fe2O3 2.7
FeO 0         MgO 1.53     CaO 5.7
Na2O 4.75     K2O .84     TiO2 .38
P2O5 .2       MnO .05      LOI 6.6
Sum of Oxide Values  91.87

NORMALIZED OXIDE VALUES
SiO2 68.25  Al2O3 14.26  Fe2O3 2.05
FeO .8        MgO 1.67     CaO 6.2
Na2O 5.17     K2O .91     TiO2 .41
P2O5 .22      MnO .05

FA-87-55

OTHER RATIOS ETC.
    K2O/Na2O                 .18
    FeT/MgO                  1.76
    LOI/CaO                  .35
   TiO2/Zr                   .33
    TAAS                     18.49
C : F : K      77.1 : 16.7 : 6.2
C : F : A      40.5 : 8.8 : 50.7
C : A : K      42.8 : 53.7 : 3.4
A : F : K      80.8 : 14 : 5.2
Peraluminosity Index         .94
    Au                       5
    As                       2
    Cu                       23
    Zn                       131


FA-87-55

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE DACITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE DACITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 68.25 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .41 %)


FA-87-55

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.32  K2O -.13    Fe2O3 -4.8

 Na2O  .89   CaO  .67     SiO2  1.86

DISCRIMINANT FUNCTIONS
               DF1 -2.09
               DF2 -9.46
               DF3 -9.32
               DF4 -5.23
               DF5 -4.3
```

```
FA-87-56

SiO2 49.3   Al2O3 15.7   Fe2O3 10
FeO 0         MgO 4        CaO 15
Na2O .67      K2O .000001 TiO2 .69
P2O5 .19      MnO .24      LOI 5.3
Sum of Oxide Values  95.01

NORMALIZED OXIDE VALUES
SiO2 51.89  Al2O3 16.53  Fe2O3 2.31
FeO 7.4       MgO 4.21     CaO 15.79
Na2O .71      K2O 0       TiO2 .73
P2O5 .2       MnO .25

FA-87-56

OTHER RATIOS ETC.
    K2O/Na2O              0
    FeT/MgO               2.5
    LOI/CaO               .11
   TiO2/Zr                2.35
    TAAS                  20.33
C : F : K      58.7 : 41.3 : 0
C : F : A      37 : 26 : 37
C : A : K      50 : 50 : 0
A : F : K      58.7 : 41.3 : 0
Peraluminosity Index      1.07
    Au                    5
    As                    2
    Cu                    113
    Zn                    55


FA-87-56

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.89 %)
   TITANIA CLASSIFICATION:
   DACITE ( .73 %)


FA-87-56

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.23  K2O -.43    Fe2O3 -2.23

 Na2O -2.64  CaO  6.28    SiO2 -.21

DISCRIMINANT FUNCTIONS
               DF1 -2.18
               DF2 -5.7
               DF3 -6.28
               DF4 -4.15
               DF5 -1.49
```

```
FA-87-57

SiO2 50.1   Al2O3 13.7   Fe2O3 15.7
FeO 0         MgO 4.56     CaO 7.94
Na2O 3.3      K2O .06     TiO2 1.24
P2O5 .38      MnO .23       LOI 1.85
Sum of Oxide Values  95.91001

NORMALIZED OXIDE VALUES
SiO2 52.24  Al2O3 14.28  Fe2O3 2.86
FeO 12.16     MgO 4.75     CaO 8.28
Na2O 3.44     K2O .06     TiO2 1.29
P2O5 .4       MnO .24

FA-87-57

OTHER RATIOS ETC.
    K2O/Na2O              .02
    FeT/MgO               3.44
    LOI/CaO               .07
   TiO2/Zr                2.02
    TAAS                  29.1
C : F : K      40.9 : 58.9 : .2
C : F : A      27.3 : 39.4 : 33.3
C : A : K      45 : 54.8 : .2
A : F : K      45.7 : 54.1 : .2
Peraluminosity Index      1.08
    Au                    5
    As                    2
    Cu                    92
    Zn                    47


FA-87-57

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC HIGH IRON BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 52.24 %)
   TITANIA CLASSIFICATION:
   ANDESITE ( 1.29 %)


FA-87-57

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.37  K2O -.4     Fe2O3  4.06

 Na2O  .04   CaO -.84     SiO2  1.86

DISCRIMINANT FUNCTIONS
               DF1 -1.87
               DF2  .42
               DF3  .6
               DF4  5.32
               DF5  3.7
```

```
FA-87-58

SiO2 47.7    Al2O3 12.1    Fe2O3 9.390001
FeO 0          MgO 5.95      CaO 10.1
Na2O 1.94      K2O .16      TiO2 .8
P2O5 .33       MnO .14       LOI 9.100001
Sum of Oxide Values  87.9

NORMALIZED OXIDE VALUES
SiO2 54.27  Al2O3 13.77  Fe2O3 2.62
FeO 7.26       MgO 6.77     CaO 11.49
Na2O 2.21      K2O .18     TiO2 .91
P2O5 .38       MnO .16

FA-87-58

OTHER RATIOS ETC.
    K2O/Na2O                 .08
    FeT/MgO                  1.58
    LOI/CaO                  .26
   TiO2/Zr                   .77
    TAAS                     33.66
C : F : K       49.1 : 50.3 : .6
C : F : A       33 : 33.8 : 33.2
C : A : K       49.5 : 49.8 : .7
A : F : K       49.2 : 50.1 : .6
Peraluminosity Index         .96
    Au                       5
    As                       8
    Cu                       70
    Zn                       64


FA-87-58

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 54.27 %)
   TITANIA CLASSIFICATION:
   DACITE ( .91 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-58

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.78    K2O -.21     Fe2O3 -3.87

 Na2O -1.2    CaO  .55      SiO2  3.91

DISCRIMINANT FUNCTIONS
                DF1 -.92
                DF2 -7.28
                DF3 -7.58
                DF4 -4.54
                DF5 -2.43
```

```
FA-87-59

SiO2 48.9   Al2O3 12.5   Fe2O3 12.7
FeO 0          MgO 3.22     CaO 8.54
Na2O 3.08      K2O .69     TiO2 .68
P2O5 .24       MnO .1       LOI 6.45
Sum of Oxide Values  89.6

NORMALIZED OXIDE VALUES
SiO2 54.58  Al2O3 13.95  Fe2O3 2.43
FeO 10.57      MgO 3.59     CaO 9.53
Na2O 3.44      K2O .77     TiO2 .76
P2O5 .27       MnO .11

FA-87-59

OTHER RATIOS ETC.
    K2O/Na2O                  .22
    FeT/MgO                   3.95
    LOI/CaO                   .23
   TiO2/Zr                    1.19
    TAAS                      25.16
C : F : K      46.5 : 50.8 : 2.8
C : F : A      31.6 : 34.5 : 34
C : A : K      46.8 : 50.4 : 2.8
A : F : K      48.3 : 49 : 2.7
Peraluminosity Index          .92
    Au                        15
    As                        7
    Cu                        287
    Zn                        405


FA-87-59

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC HIGH IRON BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 54.58 %)
   TITANIA CLASSIFICATION:
   DACITE ( .76 %)


FA-87-59

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -3.38  K2O   .33     Fe2O3  .45

 Na2O -.06   CaO -.71      SiO2   3.37

DISCRIMINANT FUNCTIONS
                     DF1 -2.91
                     DF2  2.99
                     DF3  3.02
                     DF4  .64
                     DF5 -2.8
```

```
FA-87-60

SiO2 54.1   Al2O3 14.1   Fe2O3 10.5
FeO 0         MgO 7.44     CaO 9.100001
Na2O 2.55     K2O .13     TiO2 .87
P2O5 .25      MnO .2       LOI 2.75
Sum of Oxide Values  98.43

NORMALIZED OXIDE VALUES
SiO2 54.97  Al2O3 14.33  Fe2O3 2.41
FeO 7.43      MgO 7.56     CaO 9.25
Na2O 2.59     K2O .13     TiO2 .88
P2O5 .25      MnO .2

FA-87-60

OTHER RATIOS ETC.
    K2O/Na2O              .05
    FeT/MgO               1.41
    LOI/CaO               .1
   TiO2/Zr                .75
    TAAS                  39.38
C : F : K      43.9 : 55.6 : .5
C : F : A      28.8 : 36.4 : 34.8
C : A : K      45 : 54.5 : .5
A : F : K      48.7 : 50.9 : .4
Peraluminosity Index      1.12
    Au                    5
    As                    2
    Cu                    69
    Zn                    42


FA-87-60

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 54.97 %)
   TITANIA CLASSIFICATION:
   DACITE ( .88 %)


FA-87-60

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  2.76  K2O -.49    Fe2O3   .29

 Na2O -1.08  CaO  1.7     SiO2   1.25

DISCRIMINANT FUNCTIONS
               DF1 -.35
               DF2 -4.02
               DF3 -4.18
               DF4  .84
               DF5  5.2
```

```
FA-87-61

SiO2 44.1   Al2O3 12.5   Fe2O3 12.9
FeO 0         MgO 6.04     CaO 8.979999
Na2O .6       K2O .83     TiO2 .9
P2O5 .24      MnO .14      LOI 10.9
Sum of Oxide Values  86.18

NORMALIZED OXIDE VALUES
SiO2 51.17  Al2O3 14.5   Fe2O3 2.78
FeO 10.96     MgO 7.01     CaO 10.42
Na2O .7       K2O .96     TiO2 1.04
P2O5 .28      MnO .16

FA-87-61

OTHER RATIOS ETC.
    K2O/Na2O                 1.37
    FeT/MgO                  2.13
    LOI/CaO                  .35
   TiO2/Zr                   2.36
    TAAS                     41.75
C : F : K      37 : 59.8 : 3.2
C : F : A      25.5 : 41.2 : 33.3
C : A : K      41.8 : 54.6 : 3.6
A : F : K      43.4 : 53.8 : 2.9
Peraluminosity Index         1.24
    Au                       5
    As                       12
    Cu                       136
    Zn                       192


FA-87-61

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.17 %)
   TITANIA CLASSIFICATION:
   DACITE ( 1.04 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-61

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.13  K2O   .73    Fe2O3 -1.7

 Na2O -2.2   CaO -2.36    SiO2   3.6

DISCRIMINANT FUNCTIONS
               DF1 -.29
               DF2 -2.23
               DF3 -2.71
               DF4 -1.96
               DF5 -2.59
```

```
FA-87-62

SiO2 48     Al2O3 15.3   Fe2O3 9.82
FeO 0         MgO 4.99     CaO 11.9
Na2O 1.84     K2O .01     TiO2 .8
P2O5 .27      MnO .25      LOI 4.35
Sum of Oxide Values  92.43

NORMALIZED OXIDE VALUES
SiO2 51.93 Al2O3 16.55  Fe2O3 2.49
FeO 7.32      MgO 5.4      CaO 12.88
Na2O 1.99     K2O .01     TiO2 .87
P2O5 .29      MnO .27

FA-87-62

OTHER RATIOS ETC.
    K2O/Na2O              .01
    FeT/MgO               1.97
    LOI/CaO               .11
   TiO2/Zr                2.29
    TAAS                  26.68
C : F : K      53.9 : 46.1 : 0
C : F : A      33.7 : 28.8 : 37.5
C : A : K      47.3 : 52.7 : 0
A : F : K      56.5 : 43.4 : 0
Peraluminosity Index      1.1
    Au                    5
    As                    2
    Cu                    116
    Zn                    65


FA-87-62

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.93 %)
   TITANIA CLASSIFICATION:
   DACITE ( .87 %)


FA-87-62

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.67  K2O -.38    Fe2O3 -3.08

 Na2O -1.29  CaO  2.6     SiO2  .26

DISCRIMINANT FUNCTIONS
               DF1 -1.61
               DF2 -6.29
               DF3 -6.59
               DF4 -4.12
               DF5 -1.31
```

```
FA-87-63

SiO2 49.9   Al2O3 15.1   Fe2O3 12.3
FeO 0         MgO 5.72     CaO 11.5
Na2O 1.53     K2O .13     TiO2 1.09
P2O5 .3       MnO .21      LOI 2.8
Sum of Oxide Values  96.81

NORMALIZED OXIDE VALUES
SiO2 51.55  Al2O3 15.6   Fe2O3 2.68
FeO 9.03      MgO 5.91     CaO 11.88
Na2O 1.58     K2O .13     TiO2 1.13
P2O5 .31      MnO .22

FA-87-63

OTHER RATIOS ETC.
    K2O/Na2O               .08
    FeT/MgO                2.15
    LOI/CaO                .08
   TiO2/Zr                 1.95
    TAAS                   30.97
C : F : K      47.2 : 52.4 : .5
C : F : A      30.6 : 34 : 35.5
C : A : K      46.1 : 53.4 : .4
A : F : K      50.9 : 48.7 : .4
Peraluminosity Index       1.15
    Au                     5
    As                     2
    Cu                     98
    Zn                     58


FA-87-63

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.55 %)
   TITANIA CLASSIFICATION:
   DACITE ( 1.13 %)


FA-87-63

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.22   K2O -.32    Fe2O3  .44

 Na2O -1.77  CaO  2.77    SiO2  .4

DISCRIMINANT FUNCTIONS
              DF1 -.97
              DF2 -2.97
              DF3 -3.28
              DF4  .16
              DF5  2.16
```

```
FA-87-64

SiO2 49.2   Al2O3 15.2   Fe2O3 9.8
FeO 0         MgO 4.17     CaO 10.6
Na2O 2.16     K2O 9.000001E-02
                          TiO2 .78
P2O5 .27      MnO .32      LOI 4.55
Sum of Oxide Values  91.83999

NORMALIZED OXIDE VALUES
SiO2 53.57  Al2O3 16.55  Fe2O3 2.48
FeO 7.37      MgO 4.54     CaO 11.54
Na2O 2.35     K2O .1      TiO2 .85
P2O5 .29      MnO .35

FA-87-64

OTHER RATIOS ETC.
    K2O/Na2O              .04
    FeT/MgO               2.35
    LOI/CaO               .13
   TiO2/Zr                1.89
    TAAS                  25.04
C : F : K      53.6 : 46 : .4
C : F : A      32.8 : 28.1 : 39.1
C : A : K      45.5 : 54.2 : .3
A : F : K      57.9 : 41.7 : .4
Peraluminosity Index      1.14
    Au                    5
    As                    2
    Cu                    82
    Zn                    69


FA-87-64

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 53.57 %)
   TITANIA CLASSIFICATION:
   DACITE ( .85 %)


FA-87-64

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.16  K2O -.34    Fe2O3 -2.58

 Na2O -1.1   CaO  1.67    SiO2  .34

DISCRIMINANT FUNCTIONS
               DF1 -1.76
               DF2 -5.95
               DF3 -6.2
               DF4 -3.4
               DF5 -.38
```

```
FA-87-65

SiO2 48.3   Al2O3 14.3   Fe2O3 12.5
FeO 0         MgO 7.94     CaO 8.41
Na2O 1.49     K2O .08     TiO2 .88
P2O5 .38      MnO .19      LOI 3
Sum of Oxide Values  93.46

NORMALIZED OXIDE VALUES
SiO2 51.68  Al2O3 15.3   Fe2O3 2.55
FeO 9.74      MgO 8.5      CaO 9
Na2O 1.59     K2O 9.000001E-02
                          TiO2 .94
P2O5 .41      MnO .2

FA-87-65

OTHER RATIOS ETC.
    K2O/Na2O              .06
    FeT/MgO               1.57
    LOI/CaO               .11
   TiO2/Zr                1.88
    TAAS                  44.79
C : F : K      36.6 : 63.1 : .3
C : F : A      24 : 41.3 : 34.7
C : A : K      40.8 : 58.9 : .3
A : F : K      45.5 : 54.2 : .3
Peraluminosity Index      1.4
    Au                    5
    As                    2
    Cu                    98
    Zn                    54


FA-87-65

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 51.68 %)
   TITANIA CLASSIFICATION:
   DACITE ( .94 %)


FA-87-65

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  1.61  K2O -.31    Fe2O3 -.05

 Na2O -1.69  CaO -1.05    SiO2  1.32

DISCRIMINANT FUNCTIONS
               DF1  .16
               DF2 -3.42
               DF3 -3.73
               DF4  .54
               DF5  3.4
```

```
FA-87-66

SiO2 47.2   Al2O3 15.9   Fe2O3 11.5
FeO 0         MgO 5.62     CaO 11.6
Na2O 1.92     K2O .08     TiO2 .83
P2O5 .31      MnO .22      LOI 2.15
Sum of Oxide Values  94.26

NORMALIZED OXIDE VALUES
SiO2 50.07  Al2O3 16.87  Fe2O3 2.47
FeO 8.75      MgO 5.96     CaO 12.31
Na2O 2.04     K2O .08     TiO2 .88
P2O5 .33      MnO .23

FA-87-66

OTHER RATIOS ETC.
    K2O/Na2O                 .04
    FeT/MgO                  2.04
    LOI/CaO                  .06
   TiO2/Zr                   2.51
     TAAS                    29.62
C : F : K      49.2 : 50.5 : .3
C : F : A      31.2 : 32 : 36.7
C : A : K      45.8 : 53.9 : .3
A : F : K      53.3 : 46.5 : .3
Peraluminosity Index         1.15
    Au                       5
    As                       2
    Cu                       118
    Zn                       37


FA-87-66

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 50.07 %)
   TITANIA CLASSIFICATION:
   DACITE ( .88 %)


FA-87-66

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.25  K2O -.26    Fe2O3 -1.61

 Na2O -1.07  CaO  1.91    SiO2 -.37

DISCRIMINANT FUNCTIONS
                   DF1 -1.59
                   DF2 -5.07
                   DF3 -5.28
                   DF4 -2.13
                   DF5 -.39
```

```
FA-87-67

SiO2 48.6   Al2O3 15.4   Fe2O3 14.1
FeO 0         MgO 3.9      CaO 11.8
Na2O 2.53     K2O .15     TiO2 1.35
P2O5 .15      MnO .46      LOI 2.8
Sum of Oxide Values  97.31

NORMALIZED OXIDE VALUES
SiO2 49.94  Al2O3 15.83  Fe2O3 2.93
FeO 10.4      MgO 4.01     CaO 12.13
Na2O 2.6      K2O .15     TiO2 1.39
P2O5 .15      MnO .47

FA-87-67

OTHER RATIOS ETC.
    K2O/Na2O              .06
    FeT/MgO               3.61
    LOI/CaO               .08
   TiO2/Zr                2.84
    TAAS                  22.02
C : F : K      50.3 : 49.2 : .5
C : F : A      32.8 : 32 : 35.2
C : A : K      48 : 51.5 : .5
A : F : K      52.1 : 47.4 : .5
Peraluminosity Index      1.02
    Au                    5
    As                    2
    Cu                    158
    Zn                    66


FA-87-67

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC ANDESITE
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 49.94 %)
   TITANIA CLASSIFICATION:
   ANDESITE ( 1.39 %)


FA-87-67

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.51  K2O -.24    Fe2O3  1.72

 Na2O -.59   CaO  2.59    SiO2  .12

DISCRIMINANT FUNCTIONS
               DF1 -2.13
               DF2 -1.29
               DF3 -1.31
               DF4  1.62
               DF5  3.84
```

```
FA-87-68

SiO2 45.4   Al2O3 13     Fe2O3 12.2
FeO 0         MgO 7.58     CaO 9.03
Na2O 1.9      K2O .000001 TiO2 .7
P2O5 .34      MnO .16      LOI 10.6
Sum of Oxide Values  89.31

NORMALIZED OXIDE VALUES
SiO2 50.84  Al2O3 14.56  Fe2O3 2.46
FeO 10.08     MgO 8.49     CaO 10.11
Na2O 2.13     K2O 0       TiO2 .78
P2O5 .38      MnO .18

FA-87-68

OTHER RATIOS ETC.
    K2O/Na2O              0
    FeT/MgO               1.61
    LOI/CaO               .35
   TiO2/Zr                2.05
    TAAS                  40.96
C : F : K      39.7 : 60.3 : 0
C : F : A      27 : 40.9 : 32.1
C : A : K      45.7 : 54.3 : 0
A : F : K      43.9 : 56.1 : 0
Peraluminosity Index      1.15
    Au                    10
    As                    2
    Cu                    114
    Zn                    120


FA-87-68

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 50.84 %)
   TITANIA CLASSIFICATION:
   DACITE ( .78 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-68

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .19   K2O -.28    Fe2O3 -1.78

 Na2O -.88   CaO -1.64    SiO2  2.89

DISCRIMINANT FUNCTIONS
               DF1 -.72
               DF2 -3.68
               DF3 -3.86
               DF4 -1.45
               DF5  .22
```

```
FA-87-69

SiO2 50      Al2O3 14.1    Fe2O3 9.45
FeO 0          MgO 4.41      CaO 7.39
Na2O 1         K2O .1       TiO2 .73
P2O5 .35       MnO .12       LOI 9.45
Sum of Oxide Values  86.93

NORMALIZED OXIDE VALUES
SiO2 57.52  Al2O3 16.22  Fe2O3 2.57
FeO 7.47       MgO 5.07      CaO 8.5
Na2O 1.15      K2O .12      TiO2 .84
P2O5 .4        MnO .14

FA-87-69

OTHER RATIOS ETC.
    K2O/Na2O                .1
    FeT/MgO                 2.14
    LOI/CaO                 .37
   TiO2/Zr                  2
    TAAS                    34.97
C : F : K       43.3 : 56.2 : .5
C : F : A       25.1 : 32.6 : 42.2
C : A : K       37.1 : 62.4 : .5
A : F : K       56.2 : 43.4 : .4
Peraluminosity Index        1.66
    Au                      15
    As                      12
    Cu                      144
    Zn                      101


FA-87-69

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 57.52 %)
   TITANIA CLASSIFICATION:
   DACITE ( .84 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-69

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.72  K2O -.39     Fe2O3 -2.75

 Na2O -2.59  CaO -1.61     SiO2  1.59

DISCRIMINANT FUNCTIONS
                      DF1 -.18
                      DF2 -5.98
                      DF3 -6.56
                      DF4 -3.36
                      DF5 -2.82
```

```
FA-87-70

SiO2 69.8    Al2O3 13.6    Fe2O3 2.58
FeO 0          MgO 1.35      CaO 1.56
Na2O 5.11      K2O .8       TiO2 .3
P2O5 .08       MnO .02       LOI 2.85
Sum of Oxide Values  95.12

NORMALIZED OXIDE VALUES
SiO2 73.38  Al2O3 14.3    Fe2O3 1.89
FeO .74        MgO 1.42      CaO 1.64
Na2O 5.37      K2O .84      TiO2 .32
P2O5 .08       MnO .02

FA-87-70

OTHER RATIOS ETC.
    K2O/Na2O                .16
    FeT/MgO                 1.91
    LOI/CaO                 .58
   TiO2/Zr                  .2
    TAAS                    24.38
C : F : K       70 : 21.6 : 8.399999
C : F : A       29.9 : 9.2 : 60.9
C : A : K       31.6 : 64.6 : 3.8
A : F : K       82.7 : 12.5 : 4.9
Peraluminosity Index        1.27
    Au                      5
    As                      3
    Cu                      21
    Zn                      18


FA-87-70

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE DACITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE DACITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 73.38 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .32 %)


FA-87-70

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.29    K2O -.47     Fe2O3 -2.42

 Na2O   1.42  CaO -2.2      SiO2   .6

DISCRIMINANT FUNCTIONS
                   DF1 -1.18
                   DF2 -9.979999
                   DF3 -9.649999
                   DF4 -1.61
                   DF5 -1.59
```

```
FA-87-71

SiO2 50.3    Al2O3 14.5    Fe2O3 7.06
FeO 0          MgO 3.78      CaO 8.57
Na2O 2.62      K2O .27      TiO2 .74
P2O5 .2        MnO .12       LOI 9.2
Sum of Oxide Values  87.68

NORMALIZED OXIDE VALUES
SiO2 57.37   Al2O3 16.54   Fe2O3 2.55
FeO 4.95       MgO 4.31      CaO 9.770001
Na2O 2.99      K2O .31      TiO2 .84
P2O5 .23       MnO .14

FA-87-71

OTHER RATIOS ETC.
    K2O/Na2O                .1
    FeT/MgO                 1.87
    LOI/CaO                 .31
   TiO2/Zr                  1.87
    TAAS                    26.58
C : F : K       57.1 : 41.5 : 1.4
C : F : A       33.1 : 24 : 42.9
C : A : K       43.1 : 55.9 : 1
A : F : K       63.3 : 35.5 : 1.2
Peraluminosity Index        1.17
    Au                      5
    As                      2
    Cu                      118
    Zn                      101


FA-87-71

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 57.37 %)
   TITANIA CLASSIFICATION:
   DACITE ( .84 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-71

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -2.32  K2O -.2      Fe2O3 -5.31

 Na2O -.76   CaO -.13      SiO2  1.11

DISCRIMINANT FUNCTIONS
               DF1 -1.28
               DF2 -8.57
               DF3 -8.82
               DF4 -6.28
               DF5 -5.21
```

```
FA-87-72

SiO2 53.3   Al2O3 16.1   Fe2O3 7.23
FeO 0         MgO 4.87     CaO 9.770001
Na2O 3.31     K2O .000001 TiO2 .89
P2O5 .18      MnO .13      LOI 2.1
Sum of Oxide Values  95.3

NORMALIZED OXIDE VALUES
SiO2 55.93  Al2O3 16.89  Fe2O3 2.51
FeO 4.57      MgO 5.11     CaO 10.25
Na2O 3.47     K2O 0       TiO2 .93
P2O5 .19      MnO .14

FA-87-72

OTHER RATIOS ETC.
    K2O/Na2O                0
    FeT/MgO                 1.48
    LOI/CaO                 .07
   TiO2/Zr                  1.86
    TAAS                    27.14
C : F : K      58.6 : 41.4 : 0
C : F : A      34.1 : 24  : 41.9
C : A : K      44.8 : 55.2 : 0
A : F : K      63.6 : 36.4 : 0
Peraluminosity Index        1.12
    Au                      5
    As                      4
    Cu                      78
    Zn                      39


FA-87-72

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   ANDESITE ( 55.93 %)
   TITANIA CLASSIFICATION:
   DACITE ( .93 %)


FA-87-72

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -.08   K2O -.6     Fe2O3 -3.45

 Na2O -.26   CaO  2.19    SiO2 -.77

DISCRIMINANT FUNCTIONS
               DF1 -1.23
               DF2 -7.88
               DF3 -7.96
               DF4 -3.96
               DF5 -1.28
```

```
FA-87-73

SiO2 42.9   Al2O3 12.4   Fe2O3 11
FeO 0         MgO 5.74     CaO 11.7
Na2O .63      K2O .17     TiO2 .81
P2O5 .12      MnO .26      LOI 14.8
Sum of Oxide Values  84.86

NORMALIZED OXIDE VALUES
SiO2 50.55  Al2O3 14.61  Fe2O3 2.72
FeO 9.21      MgO 6.76     CaO 13.79
Na2O .74      K2O .2      TiO2 .95
P2O5 .14      MnO .31

FA-87-73

OTHER RATIOS ETC.
    K2O/Na2O              .27
    FeT/MgO               1.92
    LOI/CaO               .36
   TiO2/Zr                2.11
    TAAS                  32.39
C : F : K      47.3 : 52 : .7
C : F : A      32.2 : 35.4 : 32.4
C : A : K      49.5 : 49.8 : .7
A : F : K      47.5 : 51.9 : .6
Peraluminosity Index      1.05
    Au                    5
    As                    34
    Cu                    95
    Zn                    46


FA-87-73

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 50.55 %)
   TITANIA CLASSIFICATION:
   DACITE ( .95 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-73

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -3.04  K2O  .03    Fe2O3 -4.6

 Na2O -1.99  CaO  .24     SiO2  3.78

DISCRIMINANT FUNCTIONS
               DF1 -1.03
               DF2 -7.57
               DF3 -8.07
               DF4 -5.93
               DF5 -3.68
```

```
FA-87-74

SiO2 65.2   Al2O3 14.1   Fe2O3 3.5
FeO 0         MgO .56      CaO 5.27
Na2O 2.22     K2O 1.48    TiO2 .48
P2O5 .22      MnO .12      LOI 6.1
Sum of Oxide Values  93

NORMALIZED OXIDE VALUES
SiO2 70.11  Al2O3 15.16  Fe2O3 2.13
FeO 1.47      MgO .6       CaO 5.67
Na2O 2.39     K2O 1.59    TiO2 .52
P2O5 .24      MnO .13

FA-87-74

OTHER RATIOS ETC.
    K2O/Na2O                .67
    FeT/MgO                 6.27
    LOI/CaO                 .36
   TiO2/Zr                  .35
    TAAS                    21.37
C : F : K       68.8 : 17.7 : 13.6
C : F : A       31.9 : 8.2 : 59.9
C : A : K       32.5 : 61.1 : 6.4
A : F : K       80.6 : 11 : 8.399999
Peraluminosity Index        1.4
    Au                      20
    As                      2
    Cu                      34
    Zn                      59


FA-87-74

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC RHYOLITE
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC ANDESITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 70.11 %)
   TITANIA CLASSIFICATION:
   DACITE ( .52 %)


FA-87-74

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.87  K2O  .45    Fe2O3 -3

 Na2O -1.82  CaO  .8      SiO2  .55

DISCRIMINANT FUNCTIONS
               DF1 -.67
               DF2 -9.26
               DF3 -9.66
               DF4 -3.89
               DF5 -2.46
```

```
FA-87-75

SiO2 57.5    Al2O3 13      Fe2O3 4.67
FeO 0          MgO 1.19      CaO 9.82
Na2O 1.12      K2O .95      TiO2 .44
P2O5 .26       MnO .18       LOI 9.5
Sum of Oxide Values  88.86

NORMALIZED OXIDE VALUES
SiO2 64.71  Al2O3 14.63  Fe2O3 2.18
FeO 2.76       MgO 1.34      CaO 11.05
Na2O 1.26      K2O 1.07     TiO2 .5
P2O5 .29       MnO .2

FA-87-75

OTHER RATIOS ETC.
    K2O/Na2O                 .85
    FeT/MgO                  3.91
    LOI/CaO                  .29
   TiO2/Zr                   .38
    TAAS                     16.37
C : F : K       70.4 : 23.5 : 6.1
C : F : A       39.7 : 13.2 : 47.1
C : A : K       43.9 : 52.2 : 3.8
A : F : K       73.9 : 20.7 : 5.4
Peraluminosity Index         1.1
    Au                       5
    As                       2
    Cu                       9
    Zn                       54


FA-87-75

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE DACITE
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT SUB-ALKALINE
   SILICA CLASSIFICATION:
   DACITE ( 64.71 %)
   TITANIA CLASSIFICATION:
   DACITE ( .5 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-75

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -3      K2O   .23    Fe2O3 -4.81

 Na2O -3.03  CaO   3.83    SiO2   2.43

DISCRIMINANT FUNCTIONS
              DF1 -1.5
              DF2 -10.13
              DF3 -10.85
              DF4 -7.03
              DF5 -4.42
```

```
FA-87-76

SiO2 62.1   Al2O3 13.7   Fe2O3 3.89
FeO 0         MgO 1.19     CaO 6.88
Na2O 3.49     K2O 1.14    TiO2 .46
P2O5 .17      MnO .12      LOI 6.65
Sum of Oxide Values  92.95

NORMALIZED OXIDE VALUES
SiO2 66.81  Al2O3 14.74  Fe2O3 2.11
FeO 1.87      MgO 1.28     CaO 7.4
Na2O 3.75     K2O 1.23    TiO2 .49
P2O5 .18      MnO .13

FA-87-76

OTHER RATIOS ETC.
    K2O/Na2O              .33
    FeT/MgO               3.27
    LOI/CaO               .3
   TiO2/Zr                .36
    TAAS                  18.37
C : F : K      71.8 : 20.3 : 7.9
C : F : A      38.4 : 10.8 : 50.8
C : A : K      41.1 : 54.4 : 4.5
A : F : K      77.1 : 16.5 : 6.4
Peraluminosity Index      1.04
    Au                    5
    As                    2
    Cu                    14
    Zn                    73


FA-87-76

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE DACITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE ANDESITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   DACITE ( 66.81 %)
   TITANIA CLASSIFICATION:
   DACITE ( .49 %)


FA-87-76

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO -1.8    K2O  .22    Fe2O3 -3.68

 Na2O -.48    CaO  1.78    SiO2  1.24

DISCRIMINANT FUNCTIONS
               DF1 -1.82
               DF2 -9.17
               DF3 -9.29
               DF4 -4.51
               DF5 -3.01
```

```
FA-87-77

SiO2 47.5   Al2O3 13.2   Fe2O3 12.8
FeO 0         MgO 7.93     CaO 7.53
Na2O 1.12     K2O .08     TiO2 .92
P2O5 .2       MnO .15      LOI 9.649999
Sum of Oxide Values  90.39

NORMALIZED OXIDE VALUES
SiO2 52.55  Al2O3 14.6   Fe2O3 2.68
FeO 10.33     MgO 8.770001
                           CaO 8.33
Na2O 1.24     K2O 9.000001E-02
                          TiO2 1.02
P2O5 .22      MnO .17

FA-87-77

OTHER RATIOS ETC.
    K2O/Na2O              .07
    FeT/MgO               1.61
    LOI/CaO               .39
   TiO2/Zr                2.55
    TAAS                  48.07
C : F : K      33.3 : 66.4 : .3
C : F : A      22.1 : 44.1 : 33.7
C : A : K      39.4 : 60.2 : .4
A : F : K      43.2 : 56.5 : .3
Peraluminosity Index      1.5
    Au                    5
    As                    2
    Cu                    128
    Zn                    89


FA-87-77

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   THOLEIITIC BASALT
   IRVINE-BARAGAR CLASSIFICATION:
   THOLEIITIC BASALT ALKALINE
   SILICA CLASSIFICATION:
   BASALT ( 52.55 %)
   TITANIA CLASSIFICATION:
   DACITE ( 1.02 %)
   HIGH LOI NOTED IN THIS SAMPLE!


FA-87-77

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  1.36  K2O -.28    Fe2O3 -.1

 Na2O -2.05  CaO -2.39    SiO2  2.6

DISCRIMINANT FUNCTIONS
               DF1  .59
               DF2 -2.86
               DF3 -3.25
               DF4  .58
               DF5  2.62
```

```
FA-87-78

SiO2 68.6   Al2O3 11.9   Fe2O3 4.69
FeO 0         MgO 2.73     CaO 3.55
Na2O 4.44     K2O .14     TiO2 .4
P2O5 .23      MnO .08      LOI 2.75
Sum of Oxide Values  96.48001

NORMALIZED OXIDE VALUES
SiO2 71.1   Al2O3 12.33  Fe2O3 1.97
FeO 2.6       MgO 2.83     CaO 3.68
Na2O 4.6      K2O .15     TiO2 .41
P2O5 .24      MnO .08

FA-87-78

OTHER RATIOS ETC.
    K2O/Na2O                 .03
    FeT/MgO                  1.72
    LOI/CaO                  .25
   TiO2/Zr                   .36
    TAAS                     26.47
C : F : K      59.7 : 39.2 : 1.1
C : F : A      31.8 : 20.9 : 47.4
C : A : K      39.9 : 59.4 : .7
A : F : K      68.8 : 30.3 : .8
Peraluminosity Index         1.11
    Au                       5
    As                       2
    Cu                       54
    Zn                       36


FA-87-78

ROCK CLASSIFICATIONS
   JENSEN CLASSIFICATION:
   CALC-ALKALINE ANDESITE
   IRVINE-BARAGAR CLASSIFICATION:
   CALC-ALKALINE ANDESITE SUB-ALKALINE
   SILICA CLASSIFICATION:
   RHYOLITE ( 71.1 %)
   TITANIA CLASSIFICATION:
   RHYOLITE ( .41 %)


FA-87-78

VOLCANOGENIC EVALUATION
RESIDUALS

  MgO  .98   K2O -1.1     Fe2O3 -.57

 Na2O  .64   CaO -.32      SiO2  2.49

DISCRIMINANT FUNCTIONS
               DF1 -1.1
               DF2 -7.49
               DF3 -7.28
               DF4  .29
               DF5  1.79
```