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ONTARIO GEOLOGICAL SURVEY

Open File Report 5356

Deep Overburden Drilling and Geochemical Sampling in Benoit, Melba, Bisley, Maisonville, Morrisette, Arnold, Grenfell, Lebel, Eby, Otto, Boston and McElroy Townships.

Districts of Timiskaming and Cochrane

by

R. E. Routledge, Ian Thomson, I.S. Thompson and J.A. Dixon

1981

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Funding for this project was provided equally by the Ontario Ministry of Northern Affairs and the Federal Department of Regional Economic Expansion under the Community and Rural Resource Subsidiary Agreement.

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E.G. Pye, Director
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PREFACE

This open file report is the second of a series describing the results from the "basal till survey" or "deep overburden sampling" component of the Kirkland Lake Initiatives Program (KLIP). KLIP is a multiparameter program of geoscientific investigation by the Ontario Geological Survey funded equally by the Ontario Ministry of Northern Affairs and the Federal Department of Regional Economic Expansion under the Community and Rural Resource Subsidiary Agreement.

For this, the second year of the geochemical survey, drilling and sampling was completed at a reconnaissance density over portions of twelve townships. To effect the work, the special expertise and resources available in the private sector were fully utilized. Project design and specifications were drawn up by the staff of the Geophysics/ Geochemistry Section of the Ontario Geological Survey. Management of the field program was undertaken by Derry, Michener and Booth, Toronto, who provided a team of geologists to supervise the drilling, logging and sampling and arranged subcontracts for the summer and winter drilling and also for the initial preparation of the overburden samples.

To retain confidentiality of the geochemical data, analysis of the overburden and bedrock samples was completed

at commercial laboratories under contracts supervised directly by the staff of the Geophysics/Geochemistry Section.

Derry, Michener and Booth presented two comprehensive reports following the summer and winter drilling authored by R.E. Routledge, I.S. Thompson and J.A. Dixon. These reports provided a full description of the field program together with an interpretation of the Quaternary and bedrock geology encountered and the mineralogy of the heavy mineral concentrates. Also included were interpretive maps based on the drilling and other public information.

The reports from Derry, Michener and Booth were combined, amended and augmented by Ian Thomson, Geochemist with the Geophysics/Geochemistry Section, to include the results of geochemical analysis and supplementary information available from Survey sources. It is this combined report that is here presented in Open File form.

In planning, executing and compiling the results of this survey program, Cam Baker, geologist with the Engineering and Terrain Geology Section of the Ontario Geological Survey, has played an important role. Prior mapping of the surficial geology by Baker and other has provided the primary information upon which the survey is based. Regular consultation with Baker considerably strengthened understanding of the Quaternary sedimentary, environments revealed by the drilling program. It is hoped that this close working relationship will continue throughout the life of the project.

Geochemical and mineralogical dispersion patterns in the overburden are controlled primarily by the glacial sedimentary environment. It is recommended that explorationists study all available information, including the interrelated overburden and bedrock data presented here, carefully and then apply the results imaginatively to the search for new mineralization in the Kirkland Lake area.

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ABSTRACT

The report presents an account of a 78-hole reverse circulation drilling program conducted in the Kirkland Lake district in the summer of 1980 and the winter 1981. The work is part of the Kirkland Lake Initiatives Program (KLIP) designed to provide geoscientific data for use in mineral exploration in the Kirkland Lake area. Included in the report are complete drill logs, mineralogical descriptions and geochemical analysis of overburden and bedrock samples, a description of the results obtained and criteria for the interpretation of the mineralogical and geochemical data.

Drilling, logging, sampling, sample processing and analytical techniques are fully described. Drilling costs for the summer 1980 work averaged $14.24 per foot ($46.72 per metre) and for the winter 1981 work $24.36 per foot ($79.92 per metre).

The drill area is underlain by deformed early Archean mafic to felsic metavolcanics and Timiskaming metasediments and alkalic metavolcanics. The Otto, Lebel and McElroy Stocks, and the Round Lake Batholith, intrude the early Archean volcanics south of Kirkland Lake. Flat-lying Cobalt Group, Gowganda Formation sediments of Proterozoic age unconformably overlie Archean rocks along the western margin of the drill area. The drill area straddles the Kirkland Lake-Larder Lake fault, a major structural feature which has a close spatial relationship to several large gold deposits.

South of the height of land marking the Arctic/Atlantic watershed Wisconsinan glacial deposits are a simple suite of thin basal tills and thin to thick glaciofluvial esker-delta deposits covered by an extensive deep mantle of glaciolacustrine clays. In contrast, a thick sequence of stacked tills, glaciofluvial clastics and glaciolacustrine clays on the east flank of the extensive Highway esker-delta complex, is found north of the divide.

Free gold and high concentrations of sulphides (principally pyrite) are reported in heavy mineral concentrates from overburden samples collected in various parts of the drill area. Similarly, geochemical analysis reveals increased abundances of Cu, Pb, Zn, As and Au in overburden samples from several holes. These results indicate the presence of dispersal trains originating from gold and/or sulphide mineralization up-ice (NNW) of these holes. Abnormaly high concentrations of Zn and Au are reported from bedrock sampled in Holes 80-4 and 81-5 respectively. Further work is warranted to evaluate the full significance of all these features.

The detection of a pyrite-magnetite dispersal train 4 miles (6 km) down-ice from iron formationm at the Adams Mine has confirmed the effectiveness of overburden drilling as a prospecting tool and for evaluating mineral potential in the Kirkland Lake area.

Deep Overburden Drilling and Geochemical Sampling in Benoit, Melba, Bisley, Maisonville, Morrisette, Arnold, Grenfell, Lebel, Eby, Otto, Boston and McElroy Townships.

Districts of Timiskaming and Cochrane

by

R.E. Routledge[1], Ian Thomson[2], I.S. Thompson[3] and J.A. Dixon[4]

1. INTRODUCTION

1.1 General Backround

Under the terms of an agreement dated May 20. 1980, with the Ontario Ministry of Natural Resources and the Ontario Geological Survey (OGS), Derry, Michener and Booth (DMB) was granted responsibility for a two part program of overburden drilling and sampling to be conducted in the summer of 1980 and the winter of 1980-81. This involved project planning jointly with the OGS, engaging drilling contractors, execution of the field drilling program and sample collection, binocular microscopic examination of sample concentrates and bedrock chips, data compilation and the preparation of preliminary reports.

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Manuscript approved by the Section Chief, Geophysics/Geochemistry Section, October 9, 1981. This report is published with the permission of E.G. Pye, Director, Ontario Geological Survey.

Sub-contracts for the summer and winter drilling project were awarded to Heath & Sherwood Drilling of Kirkland Lake, Ontario, and Bradley Brothers of Timmins, Ontario, respectively. Overburden Drilling Management of Ottawa, Ontario were sub-contracted to process all the overburden samples collected and prepare various subsamples and concentrates.

The summer drilling program was completed between July 23, and August 18, 1980, during which time 53 holes were drilled. Drill holes and samples collected during the summer program are identified by the prefix 80- . The winter drilling program commenced February 23, 1981, and terminated March 23, 1981, after 25 holes had been completed. Drill holes and samples collected during the winter program are identified by the prefix 81- .

Direction and co-ordination for the overburden drilling program was provided by Ian Thomson, Geochemist, Ontario Geological Survey, assisted by D. Wadge, J. Lourim and D. Guindon.

1.2 The Kirkland Lake Initiatives Program

Overburden drilling is one of a number of projects within the Kirkland Lake Initiatives Program (KLIP). KLIP is equally funded by the Federal Department of Regional Economic Expansion and the Ontario Ministry of Northern Affairs under the Community and Rural Resource Development Subsidiary Agreement. The objective of KLIP is to stimulate

exploration and mine development in the Kirkland Lake district by providing a comprehensive geoscientific data base for use by private industry. Investigations include stratigraphic mapping, an airborne geophysical survey, and a comprehensive investigation of the geochemistry and mineralogy of till sheets and associated Quaternary sediments in order to assess the mineral potential of the drift-covered areas.

1.3 Objectives

From its inception in May 1978 the intent of the KLIP overburden drilling program has been to:-

(a) Determine the distribution and concentration of indicator elements, mineral and rocks in the till sheet(s) as a means of evalutating the mineral potential of areas where bedrock exposures are sparse or absent.

(b) Determine the composition, thickness and distribution of glacial deposits with a view to:-

(i) aiding the interpretation of geochemical data;

(ii) further elucidating the Quaternary history of the area and qualify existing maps of surficial materials; and

(iii) identifying subsurface conditions that might affect the interpretation of airborne geophysical surveys.

(c) Provide further information on composition of the bedrock, depth to bedrock, and bedrock topography as an aid to geological mapping and ground geophysical surveys

To effect this, drilling and sampling was undertaken at a reconnaissance density across the survey area. During the summer, drilling was carried out along provincial highways, township and all-weather access roads. The objective of the winter work was to drill off-road, using bush and winter roads and the increased mobility offered by frozen swamps and muskeg, to reach areas inaccessible in the summer.

1.4 Previous Work

Gold fever and ensuing rushes initiated prospecting in the survey area at the turn of the century and as early as 1902 geological mapping had begun. Gold and base metal prospecting has been intermittently active since then and systematic geologic mapping and compilation by government agencies has kept pace to provide a comprehensive data base to guide exploration. The Ontario Geological Survey of the Ontario Ministry of Natural Resources (previously the Ontario Department of Mines) has published geologic maps at scales of 1:31,680 to 1:12,000, and a recent geologic compilation at 1:253,440, which cover the seven townships in the drill area. These are Grant (1964); Lawton (1957); Lovell (1971, 1972); Thomson and Abraham (1950); and Pyke et al (1973).

Recent investigations by Downes (1979), and Jensen (1978a, 1978b, 1979), into the relationship of gold to stratigraphy and structure in the Kirkland Lake area and airborne electromagnetic and magnetic surveys (Questor INPUT Mark VI and Proton Precession magnetometer), OGS (1979), Pitcher (1979), have been funded under KLIP.

Discussion of the glacial stratigraphy and interpretation of glacial events during the Pleistocene in the Kirkland Lake area is available in Hughes (1960, 1965); Boissonneau (1966a, b, 1968); Lee (1979a); and Prest (1970). Baker and Storrison (1979); Baker (1980a, b); and Baker et al. (1980) have mapped the surficial deposits on a scale of 1:50,000 throughout the drill area and vicinity as part of KLIP field investigations. Progress in KLIP Quaternary investigations during 1979 is described by Thomson and Guindon (1979). Averill and Thomson (1981) report on the initial phase of KLIP overburden drilling in Catharine, McElroy and other adjoining townships to the east and south of the drill area.

2. DESCRIPTION OF THE DRILL AREA

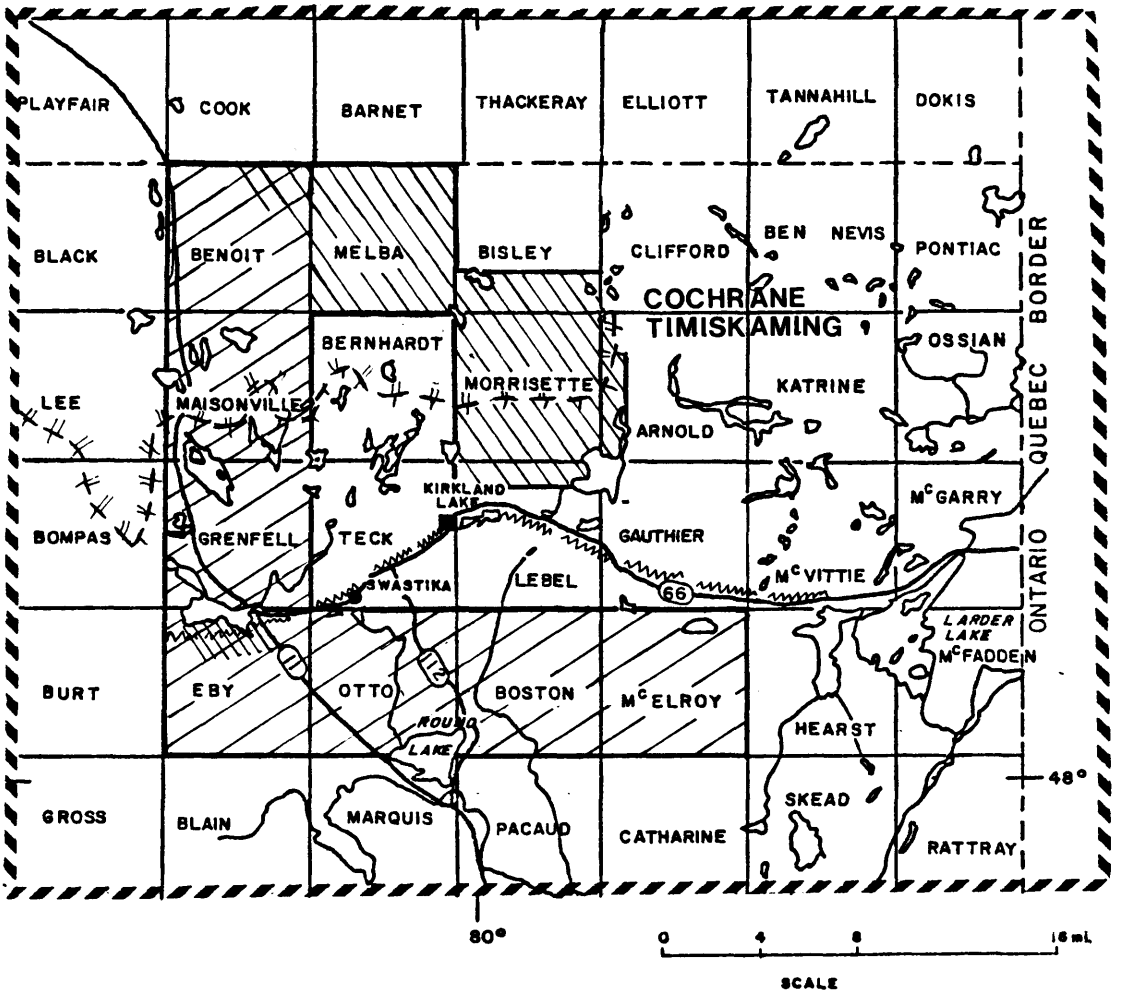
2.1 Location and Access

Drilling was carried out during the summer of 1980 and the winter of 1981 in adjacent areas near Kirkland Lake, Ontario (Figure 1).

The 1980 summer drill area encloses seven contigous townships describing an "L" shape west and south of the town of Kirkland Lake. Benoit, Maisonville and Grenfell Townships are the north-south limb, while Eby, Otto, Boston and McElroy Townships form the lower limb of the "L". Major highways and branch roads, including concession and all-weather bush roads provide access in the drill area. The highways include TransCanada Highway #11, #66 and #112, in addition to gravel and blacktop routes #564 and #650 (the Adams Mine road).

The summer drill area is located in the prolific Kirkland Lake-Larder Lake gold camp and straddles the western extension of the Kirkland-Larder "Break" along which the one currently producing gold mine, the Wilroy-Macassa, and numerous former major gold producers are aligned. The lower tier of townships, Eby, Otto, Boston and McElroy, lie south of the town of Kirkland Lake and down-ice from the "Break", the Adams Iron Mine, and parts of the Otto, McElroy and Lebel stocks.

The 1981 winter drill area covers Melba and Morrisette Townships along with small portions of Arnold, Benoit,



1980 Reverse circulation drill area

1981 Reverse circulation drill area

Hudson Bay-St. Lawrence River divide

Northern Basin (Great Clay Belt)

Southern Basin (Little Clay Belt)

Kirkland Lake-Larder Lake Fault

Figure 1 - Drilling Location Map

Bisley and Lebel Townships. Lying to the northeast, north and northwest of Kirkland Lake, the drill area extends northwest-southeast and straddles the Hudson Bay-St. Lawrence watershed. Except for Benoit Township and the northwest corner of Melba Townships, which are accessible by Trans Canada Highway#11 and Wavell Road, highway access to the drill area was effected via Highway #66 and the Goodfish Road, and also by the Esker Lakes Provincial Park road. Drill hole sites were spotted along logging roads leading from these highways.

Three holes were drilled south of Kenogami Lake in Eby Township within the 1980 summer drill area. These were drilled in order to extend coverage of the economically important Kirkland Lake-Larder Lake fault zone in an area which was inaccessible during the summer.

2.2 Physiography

The drill area is characterized by moderate to subdued topography typical of Precambrian Shield terrain. Elevations average about 1,000 ft. ASL (300 metres) and range from 800 ft. (244 metres) at Boston Creek in the southeast to 1,363 ft. (416 metres) ASL at Mt. Kempis in the north.

Drill collar elevations, measured by the OGS, vary from 882 ft. (269 metres) to 1,135 ft. (346 metres). As suspected, the bedrock relief determined from drilling is somewhat more pronounced. Bedrock elevations in drill holes were

from 774 ft. (236 metres) to 1,112 ft. (339 metres) and average 966 ft. (294 metres). Thus, maximum bedrock relief is 338 ft. (103 metres) as opposed to 253 ft. (77 metres) at the ground surface.

The Hudson Bay (Arctic)-St. Lawrence (Atlantic) watershed trends sinuously east-west through Maisonville, Bernhart and Morrisette Townships. A number of large lakes including Sesekinika, Swan, Wewegimok, Wolf, Amikongami, and Bernhardt Lakes are clustered about the height of land. Drainage from these reservoirs proceeds either north, mostly via the White Clay and Black Rivers, or south via Crooked Creek and the Blanche River.

The Black River occupies a northwest-trending depression (fault valley) and also draws water from Bisley, Barnet and Cochenour Creeks in the north of the drill area. The north-flowing Little Black River and Melba Creek drain the far northeastern parts of the area.

The south-flowing Boston Creek and the Misema River drain the eastern section of the area. In Morrisette and Lebel Townships, drainage is largely internal or east via Morrisette and Heart Creeks to Victoria and McTavish Lakes and thence to the Misema River.

Major landforms are bedrock highlands, swamp land and esker-delta complexes. Shallow drift, for the most part glaciolacustrine sediments and weathered till, intermittently cover bedrock topographic highs. These bedrock-drift complexes constitute about 40% of the drill area north of

the divide and are markedly prominent south of the divide in Grenfell, Eby, Otto, Boston and McElroy Townships where they form about 70% or more of the area. Swamp deposits and clay plains fill intervening depressions between the bedrock-drift complexes.

Volcanic rocks of the Blake River and Larder Groups occupy low areas and appear to be less resistant than other major litho-types. A bedrock depression, floored by the Blake River Group, is walled on the west by Cobalt Group sedimentary rocks which outcrop along the west margin of the northern portion of the drill area and by Kinojevis Group volcanics which form the height of land on the south. The height of land, in conjunction with the depression, appears to have played a major role in localizing the Highway Esker-delta complex and in impeding minor re-advances of the waning ice mass after it passed north of the continental divide.

The relief of prominent esker ridges such as the Highway Esker in the west, the Munroe Esker in the east, the Airport Esker, and the esker along Highway #112 south of Swastika is subdued by surrounding sand aprons recognizable by their characteristic vegetation and plain-like topography.

3. EXPLORATION WITH THE REVERSE CIRCULATION ROTARY DRILLING METHOD

Method and costs for the use of reverse circulation rotary drilling in drift prospecting are described by Skinner (1972), and a case history of its successful application in the vicinity of Matheson, immediately north of the KLIP area, is described by Thompson (1979).

In theory, sub-cropping concentrations of economic minerals were continuously abraded or plucked by the sole of the glacier and,together with barren bedrock, were incorporated within the ice during southerly advance of the Wisconsinan continental ice mass. This material was deposited as lodgment or basal till from the moving sole of the glacier or transported englacially. Englacial debris may have been released at the glacier snout, when the rates of wasting and advance at the ice front were equal, or the debris melted out of the ice as ablation till after stagnation of the ice mass during recession. Economic minerals, occurring as discrete clasts or in rock fragments, underwent dispersal and communition at varying rates during transport to be deposited as constituents of the till commonly called dispersal trains. The outline of these dispersal trains within a till sheet is generally a cone which migrates upwards and outwards within a till sheet as distance from the parent source increases. Dispersal trains are generally narrow and of finite length but possess areal dimensions many times larger

than of the subcrop area of the parent deposit. The much larger size of the dispersal train as an expoloration target therefore increases the probability of discovery of the ore body.

From the foregoing, and considering that till can be subjected to additional transport by subsequent glacial advances, or reworked as glaciofluvial sediments, it is clear that either primary or secondary dispersal trains may occur at any stratigraphic position. Therefore to optimize drift exploration the entire overburden profile must be sampled. Correct interpretation of the overburden stratigraphy, Quaternary depositional environments and sequence of glacial events is essential for determining the significance of geochemical and heavy mineral anomalies and in tracing these anomalies to source.

The mobility, rapid drilling rates, low footage costs ($10-$15/ft.)($32-$49/m) and technical suitability for drilling deep overburden favour reverse circulation rotary drilling as a cost-effective exploration tool in areas of deep glacial overburden. Continous sampling provides complete information on the Quaternary stratigraphy. The large drill diameter (3")(7.6 cm) ensures the return of sufficient material to compensate for heterogeneity of till composition so that representative samples will be collected for later mineralogical and geochemical study.

The detection of minute concentrations of dispersed ore minerals in till requires sophisticated geochemical analysis of the clay (rock flour) and heavy mineral fractions. In addition, systematic binocular microscopic identification of ore and gangue minerals is carried out on the heavy mineral concentrates, to complement the geochemical analyses.

4. THE DRILL PROGRAM

4.1 Drilling Pattern

In keeping with the principal concern of KLIP Quaternary investigations in accumulating Pleistocene geologic data as a means of evaluation of regional mineral potential, a reconnaissance pattern of drilling on 2-mile (3.2 km) centres was initially planned to provide a drilling density of up to 15-20 holes per township. Drill site selection was guided by ease of access, outcrop distribution, and later modified in the field to ensure that holes were drilled in overburden where depths were considered to exceed 15 ft.(5 m) to maintain cost effectiveness. Backhoe sampling of tills was carried out concurrently during the summer of 1980 by O.G.S. in areas of shallow or discontinuous drift cover.

By establishing a reconnaissance-type drill pattern it was acknowledged that drilling was unlikely to encounter the narrow dispersal trains expected from small individual gold ore bodies typical of the area. To further maintain the role of KLIP in assembling information rather than prospecting, drill sites were selected without consideration of known mineral occurences, geophysical anomalies or property boundaries.

At the request of OGS, the drill hole spacings were reduced to approximately 1 mile (1.5 km) south of the Kirkland Lake/Larder Lake "Break". More detailed sampling of

of the tills was intended to allow appraisal of the mineral potential of this economically important area and, to some extent, permit differentiation of economic mineral trains from a variety of potential sources such as the west extension of the Kirkland Lake Break, the Otto, McElroy and Lebel stocks, in addition to the Adams Mine.

4.2 Drilling and Sampling

4.2.1 The Technique and Specifications

"Dual-tube reverse circulation rotary drilling" effectively summarises the overburden drilling technique. An air compressor, coupled with a high-pressure water pump, injects a mixture of air and water through the annulus between the inner tube and outer wall of the dual tube drill rod down to the rotary bit face. The tricone rotary bit crushes coarse material to chips of less than 0.5" (1.25 cm) diameter and chips and finer materials return as slurry to surface through the inner 1" (2.54 cm) diameter tube. A geologist constantly monitors and logs the sample as it is discharged from a cyclone which dissipates air and water pressure from the returning slurry. The slurry is screened through a 10 mesh (Tyler) screen and collected in buckets. The water spills from the bucket, leaving the sample material behind, and is then recycled, via a holding tank, to the drill.

Drill equipment specifications for the program are listed below:-

- Compressor: free air delivery capacity of 100 cfm at 125-150 psi.
- High-pressure water pump: piston-type with a water delivery capacity of 15 gallons per minute
- Bit-sub: adpts 2.75" dual-tube rods to the 2.94" diameter bits
- Rotary bit: tricone-type with tungsten carbide buttons mounted on the roller cones

4.2.2 The 1980 Summer Drilling Program

The reverse circulation rotary drilling system used by Heath & Sherwood Drilling Limited during the 1980 summer program consisted of a modified, fully hydraulic, Acker drill with a 10 ft. feed and supporting equipment including an air compressor, water pump, and auxiliary sampling equipment. The system is fully enclosed for all-weather operation and is mounted on a modified Eaton Timberjack Model 230 skidder. The skidder is a centre-articulated, 4-wheel drive vehicle capable of on-road speeds of up to 25 km/h. The chassis is extended to accept the drilling equipment and this results in a large turning-radius and reduces the off-road manoeverability of the rig. However, the on-road performance of the rig was the chief factor in selecting this vehicle over conventional tracked carriers since drilling was carried out on roads. This resulted in substantial time - cost savings on between-hole moves.

The budget for the 1980 summer program was based on 4 weeks of continuous operation at the rate of one 10-hour shift per day, 6 days per week. Sundays were set aside for

mechanical maintenance. The reverse circulation drilling sub-contract was structured on an hourly basis with a footage premium. To ensure optimum drilling rates were maintained, it was therefore necessary to check access routes, spot holes and prepare drilling sites in advance. Several days of preparation time before mobilization of the drill were budgeted and it was anticipated that some time would be lost in tuning-up the drill rig during the start-up of operations.

Mobilization and drilling commenced on July, 1980 and drilling was terminated on August 16, 1980. The drill was demobilized to Kirkland Lake on August 18. Apart from the usual minor breakdowns and bush road access problems after heavy rains, the drill program proceeded uneventfully as planned with no major interruptions. Within this framework, drilling was to have continued until budgeted funds were exhausted. Although sufficient funds remained in the budget at the close of the summer program to carry on for an additional two days, drilling was suspended because further work would have required long drill moves incurring disproportionately higher costs in float charges. Drill operations on an hourly basis are distributed as follows:-

Operation	Hours	% of Total
(a) Drilling	128.25	60
(b) Moving between holes	48	22
(c) Mechanical down-time	22.75	11
(d) Terrain problems	15	7

Most of the mechanical down-time encountered in the first and third weeks of the program was related to malfunctioning high-stage compression in the air compressor. Internal by-passing in rods while drilling Holes 80-41 and 80-541 accounted for loss of several hours.

Road access problems were encountered after the move from Hole 80-2 where the roadbed over muskeg became water-saturated from heavy rains and could not sustain the weight of the Timberjack. A D7 Caterpillar tractor was used to pull the rig from the soft shoulder of the road. In McElroy Township, time was lost due to terrain problems caused again by heavy rain. Holes 80-48 and 80-49 were drilled 1 mile north of the Adams Mine road on a bush road which was impassable for both the fuel supply pick-up and water supply trucks. The Timberjack ran out of diesel fuel within 1/2 mile (.8 km) of the Adams Mine road on its return from drilling the two unexpectedly deep holes.

A total of 3,476 ft. (1059.5 m) in 53 holes was drilled. Table 1 illustrates the hole and footage distribution on a township basis. Several hundred feet more than the above total were expended in non-productive drilling during tune-up problems experienced in Holes 80-1 and 80-2. Rotary bits were worn out prematurely by particularly difficult drilling conditions in coarse gravel and bouldery overburden in Holes 80-9 and 80-18. This meant shifting the collar

location of each hole by several tens of feet and redrilling to attempt to complete the hole to bedrock. Holes 80-1, 80-4, 80-9, 80-41 and 80-49 were abandoned before reaching bedrock. Compressor problems during tune-up drilling of Hole 80-1 dictated abandoning this hole at 127 ft.(38.7 m). Well-sorted glacial fluvial sands under strong hydrostatic head filled the lower rods when adding a rod at completion of the 10 ft. feed in Holes 80-9 and 80-49, and could not be cleared from rods. At 195 ft.(59.4 m), in Hole 80-4, the friction caused by drilling through many large boulders severely impeded rotary action of the drill and caused considerable difficulty in retrieving the rods after the hole was finally abandoned. Water loss to extremely permeable gravel in Hole 80-41 caused excessive wear and bit failure resulting in abandoning this hole.

At the request of OGS, Hole 80-541 was drilled adjacent to Hole 80-41 and sampled in order to investigate the reproduceability of results from the laboratory processing and mineral identification in concentrates for corresponding horizons between holes.

Final adjustment of drill sites in the field resulted in as many as four holes being drilled in townships adjoining the seven planned townships. These additional townships are Black, Blain, Burt, Catharine, Lee and Pacaud.

Performance statistics are summarized below:-

Total drilling days	20.5	
DMB man-days	78	
Holes completed	53	
Overburden samples collected	233	
Holes per day	2.6	
Total footage	3,476	1,095.5 m
Average depth (ft.)	65.5	20 m
Average daily footage	169.6	51.7 m
Samples per hole	5.3	
Average bit footage	165.5	50.4 m
Holes per bit	2.6	
Total drilling costs	$49,480.53	
Cost per day	$2,413.68	
Cost per foot	$14.24	$46.72/m

Consumables

21 tricone bits
9 bit subs
2 starter rods
8 dual tube rods*

* - One rod lost down-hole, one badly damaged. Others "belled" at couplings or with damaged "0" ring seats.

The proportionate cost per foot of the various operating categories and down-hole consumables may be broken down as follows:-

Category	$ Per Foot	%	$/m
Operating (hourly cost)	8.08	56.8	26.51
Down-hole consumables	5.37	37.7	17.62
Mobilization/Demobilization	0.26	1.8	0.85
Accommodation, Travel, Misc.	0.53	3.7	1.74
	$14.24	100.0%	$46.72

The costs in most categories are exceptionally favourable for a reconnaissance program and this is largely attributable to the ease of access and on-road mobility of the Timberjack. Bit consumption was high in comparison to the 1979 program but this is a reflection of increased bit wear normal for the long sections of coarse clastic sediments drilled in the 1980 summer program. Above average dual-tube rod consumption was experienced and most of this resulted from the belling of box ends of rods due to the high torque required to maintain rotation of the rods and overcome the friction of drilling through coarse gravel, cobbles and boulders in the deep overburden. In particular, three rods were belled and one rod, bit sub and bit were lost down-hole in Hole 18 when the bit became wedged in sloping broken bedrock.

4.2.3 The 1981 Winter Drilling Program

The reverse circulation rotary drilling system used by Bradley Bros. Limited during the 1981 winter program consists of a modified, fully hydraulic "Longyear 38" drill with a two-foot feed and support equipment, including a Sullair 185 air compressor, Bean water pump and auxiliary sampling equipment. The system may be operated in open air or fully enclosed for all-weather operation and is mounted on a Nodwell FN 160 carrier. The Nodwell is a flex-track type crawler tractor capable of off-road speeds of 2 to 3 km per hour depending on snow conditions. A smaller Nodwell

model FN 60 services the drill by carrying the 500 gallon water tank and dual-tube drill rods.

The budget for the 1981 winter program was based on 24 days of continuous operation at the rate of one ten-hour shift per day, six days per week. Sundays were set aside for mechanical maintenance. The drilling sub-contract was structured on an hourly basis with no footage premium.

Several days of preparation time before mobilization of the drill were budgeted in order to check access routes, spot holes and prepare drilling sites in advance. However, this was precluded by deep, loose snow conditions in early February which proved impassable on snowmobile or on foot. Mobilization routes were planned in advance, leaving holes to be spotted during actual drilling operations.

Mobilization and drilling commenced on February 23, 1981, and drilling was terminated on March 21. The drill was demobilized to Timmins on March 23, 1981.

Access routes to drill sites were initially planned as a series of closed loops to minimize travel between holes and eliminate extra demobilization-mobilization between areas where holes were grouped. To complete the access routes as planned required crossing the Black River, Little Black River, and Melba, Barnet and Morrisette Creeks, in addition to swampy areas. The rapid accumulation of snow in early winter, together with the extended February thaw, prevented the formation of ice on water courses and the freezing of swamp and muskeg to thicknesses of at least 2 ft.

necessary to support the 17 to 18 ton weight of the Nodwell carrier. Access routes were revised accordingly and this resulted in additional moving time while backtracking along roads, in greater distances between holes, and extra demobilization-mobilization of the drill.

Approximately ten hours were lost through terrain problems. The Nodwell FN 60 broke through pond ice and frozen swamps several times in the attempt to take on water and required either winching to free itself or towing by the drill Nodwell FN 160.

Broken axles on each of the Nodwells accounted for a loss of two shifts. The hydraulic head failed while drilling Hole 80-25 and caused several hours' delay in an unsuccessful attempt to repair it in the field. This last hole was completed by slower manual chucking to end the program.

Apart from the weather and terrain problems and the two major breakdowns, drilling proceeded smoothly with few delays.

Hours spent on the various drill operations are distributed as follows:

Operation	Hours	% of Total	% of Total (travel omitted)
Mobilization/demobilization	23.75	9	12
Drilling	85.9	33	44
Moving between holes	52.0	20	27
Mechanicl down-time	23.16	9	12
Terrain problems	10.21	4	5
Travel and site access	65.0	25	-

Two trucks, one a four-wheel drive, and snowmobiles were used for daily travel between Kirkland Lake and the drill sites.

Travel amounted to 25% of total shift time because of the considerable distances involved. On several occasions, the FN 60 Nodwell was used for travel to and from the drill site because the alder overgrowth on roads rendered access impossible by the faster snowmobiles.

A total of 2,242 ft. (683 m) in 25 holes was drilled. Table 2 illustrates the hole and footage distribution on a township basis. One hundred and sixty-eight feet additional to the above total were expended in non-productive redrilling of Hole 81-6 in the attempt to reach bedrock after the bit failed during drilling. In the attempt to carry out "fill-in" drilling while en route to scheduled hole 81-15, hole 81-14A was collared one mile south of Hole 81-11. However, bedrock was reached within 4 ft. of surface and the hole was abandoned.

Performance statistics are summarized below:

Total drilling days	24	
DMB man-days	77	
Holes completed	25	
Overburden samples collected	121	
Holes per day	1	
Total footage	2,242	00.683 m
Average depth (ft.)	89.7	27.3 m
Average daily footage	93.4	28.5 m
Samples per hole	4.8	
Average bit footage	280.2	85.4 m
Holes per bit	3	
Total drilling costs	$54,609.08	
Cost per day	$ 2,275.38	
Cost per foot	$ 24.36	$79.92/m
Consumables	8 tricone bits 2 bit subs	

The proportionate cost per foot of the various operating categories and down-hole consumables is distributed as follows:

Category	$ Per Foot	%	$/m
Operating (hourly cost)	17.12	70.3	56.17
Down-hole consumables	3.21	13.2	10.53
Mobilization/demobilization	0.91	3.7	2.99
Accommodation, travel, misc.	3.12	12.8	10.23
	$24.36	100.0	$79.92

The costs in most categories are reasonable for a winter reconnaissance program, particularly in view of the poor access and adverse winter conditions. Cost per foot is 171% higher than for the 1980 summer program, but this was not unexpected and is a result of the slower walking rate of the tracked carrier in comparison to the wheeled Timberjack used in summer, higher fuel cost for winter operations, the difficult access and terrain, and the deeper overburden. Costs of consumables during the winter program were reduced by 40%; a reflection of both the experience of the crew and the capability of the Longyear drill.

4.3 Logging Procedures

In the attainment of KLIP goals, as in all overburden exploration program, the importance of determining the distribution, provenance, age, mode of deposition and stratigraphic relationships of tills and other glacial sediments cannot be overstressed. The character of glacial dispersal

trains is determined by the glacial events which are in turn recorded in the overburden stratigraphy. Accurate stratigraphic logging of disturbred reverse circulation sample slurries as they are delivered at a rapid pace through the cyclone requires a knowledge of Quaternary geology and the local characteristics of till within the drill area in addition to considerable experience in recognizing these units under drill-operating conditions.

Dr. I. Thomson and C. L. Baker of the Ontario Geological Survey provided valuable information on the morphology, stratigraphy and geochemistry of Quaternary sediments in the KLIP area and Baker kindly conducted a field trip to assist in the orientation of DMB personnel. Their experiences in observations gained during the 1979 KLIP drilling programme, in addition to their individual studies in the area, were shared in advance of drilling and during periodic visits to drill sites.

Particular care was exercised in logging the stratigraphy and in collecting and describing the samples. Overburden drill logs (Appendix A) provide a graphic representation of the overburden section (Figure 2) are supplemented by descriptive notes made on site by the geologist. Colour and oxidation state, sorting (i.e. variation and proportion of megaclast sizes (+10 mesh), and ratios of matrix to coarse clastic fractions), relative degree of rounding of the various fractions, and lithology of clasts in the sample

TILL (Debris flows; till-like in appearance)



Matrix fine-medium sand ± silt. Pebbly. Record colour of silt.



Matrix as above. Cobbly.



Clayey matrix* (gritty lumps on screen and/or clay coating on pebbles). Cobbly. Record colour of clay.

GRAVEL



Matrix medium-coarse sand or granules. Pebbly.



Matrix as above. Cobbly. ( bouldery)



Pebbly with sand interbeds.

SAND



Record grain size (fine, medium, coarse): note thickness of layers and degree of oxidation.



Pebbly sand interbed (few one-quarter inch pebbles on screen).

CLAY



Record colour and compactness. Note varves and any sand or silt interbeds. Solid upper unit denotes organics: muck, peat and swamp deposits developed on clay.

SILT



Record colour.

BEDROCK



Record colour, texture, grain size, and veining or structures. Note economic mineralization.

* clay balls, silty clay balls.

Figure 2 - Graphic Log for Overburden Drilling

were recorded. Contacts between individual units were inferred upon a change in any one or a number of these parameters. Individual units were assigned a field name, e.g. till or glaciofluvial gravel, on the basis of the above parameters, although it is readily admitted that other criteria including the geochemical and heavy mineral characteristics of these units, when later determined, could alter this classification. A case in point is distinguishing among diamicton-type sediments, e.g. till or debris flow turbidites occurring as proximal facies of glaciofluvial deltas which have a till-like appearance.

Minerals of economic importance, such as base metal sulphides, and gangue minerals, such as quartz and carbonate, were recorded when observed in both the overburden samples and in bedrock chips while drilling bedrock.

Bedrock chips were described in general macroscopic terms and assigned field names such as basalt, syenite, diabase, etc., based upon examination with the hand lens.

Logging and sampling personnel were provided by Derry, Michener & Booth. For the 1980 summer program logging was shared by a geologist and a geomorphologist. Normally one logger and one sampling technician worked the 10-hour drill-shift with the auxilliary logger responsible for supervision and logistics. Geologist, R. E. Routledge, geomorphologist, J. A. Dixon, and sampler, T. McMurty, were on site during the four-week programme. I. S. Thompson, of DMB, visited the site from August 7 to 10 to review progress.

During the 1981 winter program, logging was shared by a geomorphologist during the first two weeks of the program, whereas two geologists shared the logging during the third week. Normally, one logger and one sampling technician worked the ten-hour shift with the auxiliary logger responsible for supervision, logistics and locating drill sites. Only one geologist and assisting technician were required to handle the logging and sampling during the final four days of the field program. Geologist R.E. Routledge, geomorphologist J.A. Dixon, geologist E.J. Stuart and sampler D. Richardson were on site during the four-week program. I.S. Thompson, of DMB, visited the site from March 15 to 17 to review progress. C. Baker and D. Wadge, of the OGS, each spent a day monitoring drilling and sampling on site. Dr. I. Thomson, of the OGS, discussed coordination of the winter program during a visit to Kirkland Lake.

4.4 Sampling Procedure

KLIP overburden sampling followed the normal procedures employed during exploration with the reverse circulation drill.

Slurry sample return from the cyclone was screened through a 10 mesh stainless steel sieve and the -10 fraction collected in a 5-gallon plastic pail. Both the +10 and -10 mesh fractions were examined during logging. The +10 mesh fraction was discarded in the field except for about 10% to

20% of the till and some gravel horizons which were returned to the sample pail as a permanent record of coarse fraction lithology. The +10 mesh fraction is rejected because it is dominantly rock chips and not a suitable medium from which to prepare monomineralic heavy mineral concentrates. Moreover, past exploration experience has shown that ore mineral dispersal trains are readily detected in the -10 mesh fraction. Silt size fines held in suspension and overflowing from the 5-gallon pail were collected in a 2-gallon pail and combined with the sample during bagging.

A 4 to 8 kg sample was taken from all clastic sediments (till; glaciofluvial sand and gravels). Where the individual clastic units were thin, they were sampled individually; otherwise, till sampling intervals were between 3 and 5 ft. (.9 m and 1.5 m), and uniform glaciofluvial clastics were sampled at intervals up to 15 ft.(4.5 m).

Glaciolacustrine clay and fine sand horizons were not sampled because these sediments are so transported that they are of little use in exploration or in provenance studies on a local scale. Wood chips and other organic material occasionally found in glaciolacustrine or glaciofluvial deltaic sediments were collected and individually logged for later age-dating by OGS.

Aluminum scoops were used to transfer sample material from the collector pails to 14" x 16" (35.5 cm x 40.5 cm) 3 mil polyethylene bags. For each hole, sample bags were

numbered sequentially with each sample number prefixed by the hole number, e.g. KLIP 80-01-01. Samples were sealed in 5-gallon steel pails and shipped by bus to Overburden Drilling Management's laboratory in Ottawa, Ontario.

Most of the overburden holes were drilled from 2 ft. to 5 ft. (.6 m to 1.5 m) into the underlying bedrock. In several holes, up to 13 ft.(4 m) of broken bedrock or bedrock with overburden in seams, was drilled to ensure the bedrock had in fact been reached.

A small split of each bedrock sample was retained by DMB for later preliminary lithologic identification by binocular microscope. The -10 mesh bedrock fraction was shipped with overburden samples to the laboratory where a further split was obtained and forwarded to OGS for geochemical analysis.

Details of the number of overburden and bedrock samples collected are summarized in Tables 1 and 2.

4.5 Sample Processing

All overburden samples were shipped by bus to Overburden Drilling Management's laboratory in Ottawa, Ontario where they were processed in accordance with OGS specifications illustrated in Figure 3 - Sample Processing Flow Sheet. Detailed description of processing and contamination controls is given in the report on the 1979 KLIP drilling by Averill and Thomson (1981).

Table 1

SUMMER 1980 DRILLING AND SAMPLING STATISTICS

HOLE NUMBER	ELEVATION (METRES/FEET)	FOOTAGE DRILLED OVERBURDEN	FOOTAGE DRILLED BEDROCK	DEPTH OF HOLE (FEET)	SAMPLES COLLECTED OVERBURDEN	SAMPLES COLLECTED BEDROCK
Benoit Township						
KLIP-80-02	290/951	0 - 157	157 - 161	161	14	1
-03	302/991	0 - 89	89 - 102	102	15	1
-04	297/974	0 - 195	-	195	27	-
-05	346/1135	0 - 24	24 - 32	32	2	1
-06	303/994	0 - 79	79 - 82	82	6	1
-07	324/1063	0 - 116	116 - 119	119	9	1
-08	318/1043	0 - 61	61 - 74	74	12	1
-09	308/1010	0 - 115	-	115	14	-
-10	304/997	0 - 91	91 - 95	95	11	1
-11	338/1109	0 - 55	55 - 60	60	10	1
-12	325/1066	0 - 73	73 - 75	75	13	1
Totals 11		1,055	55	1,110	133	9
Black Township						
KLIP-80-01	331/1086	0 - 127	-	127	11	-
Blain Township						
KLIP-80-27	298/977	0 - 71	71 - 74	74	1	1
Boston Township						
KLIP-80-36	310/1017	0 - 28	28 - 30	30	3	1
-38	302/991	0 - 16	16 - 18	18	1	1
Totals 2		44	4	48	4	2
Burt Township						
KLIP-80-22	328/1076	0 - 26	26 - 35	35	2	1
Catharine Township						
KLIP-80-39	298/977	0 - 25	25 - 28	28	3	1
-40	309/1014	0 - 13	13 - 15	15	1	1
Totals 2		38	5	43	4	2

Table 1
(Continued)

HOLE NUMBER	ELEVATION (METRES/FEET)	FOOTAGE DRILLED OVERBURDEN	FOOTAGE DRILLED BEDROCK	DEPTH OF HOLE (FEET)	SAMPLES COLLECTED OVERBURDEN	SAMPLES COLLECTED BEDROCK
Eby Township						
KLIP-80-23	301/987	0 - 101	101 - 103	103	1	1
-24	305/1000	0 - 68	68 - 70	70	3	1
-25	305/1000	0 - 41	41 - 45	45	1	1
-26	298/977	0 - 67	67 - 72	72	1	1
-28	313/1027	0 - 52.5	52.5 - 55	55	2	1
-29	313/1027	0 - 27	27 - 31	31	2	1
Totals 6		356.5	19.5	376	10	6
Grenfell Township						
KLIP-80-16	318/1043	0 - 18	18 - 21	21	1	1
-17	323/1059	0 - 89	89 - 92	92	2	1
-18	318/1043	0 - 95	95 - 98	98	3	1
*		(0 - 91)	(91 - 96)	(96)	-	(1)
-19	327/1073	0 - 48.5	48.5 - 52	52	1	1
-20	304/997	0 - 10	10 - 13	13	1	1
-21	306/1004	0 - 48	48 - 53	53	1	1
Totals 6		308.5	20.5	329	9	6
Lee Township						
KLIP-80-41	316/1036	0 - 50	50 - 53	53	2	1
Maisonville Township						
KLIP-80-13	311/1020	0 - 22	22 - 26	26	2	1
-15	334/1096	0 - 93.5	93.5 - 95	95	16	1
Totals 2		115.5	5.5	121	18	2
McElroy Township						
KLIP-80-47	278/912	0 - 92.5	92.5 - 95	95	2	1
-48	304/997	0 - 102	102 - 104	104	7	1
-49	293/961	0 - 151	-	151	6	-
-50	305/1000	0 - 4	4 - 8	8	-	1
-51	302/991	0 - 54	54 - 58	58	1	1
-38	309/1014	0 - 11	11 - 15	15	1	1
Totals 6		414.5	16.5	431	17	5

* redrilled to obtain bedrock sample.

Table 1
(Continued)

HOLE NUMBER	ELEVATION (METRES/FEET)	FOOTAGE DRILLED OVERBURDEN	FOOTAGE DRILLED BEDROCK	DEPTH OF HOLE (FEET)	SAMPLES COLLECTED OVERBURDEN	SAMPLES COLLECTED BEDROCK
Otto Township						
KLIP-80-30	295/968	0 - 13	13 - 17	17	1	1
-31	306/1004	0 - 21	21 - 25	25	2	1
-32	291/954	0 - 47	47 - 50	50	2	1
-33	293/961	0 - 66	66 - 69	69	2	1
-34	293/961	0 - 84.5	84.5 - 87	87	2	1
-35	277/909	0 - 135	135 - 140	140	2	1
-43	301/987	0 - 31	31 - 35	35	1	1
-44	280/918	0 - 58	58 - 60	60	1	1
-45	308/1010	0 - 12	12 - 15	15	1	1
-46	313/1027	0 - 22	22 - 24	24	1	1
Totals 10		489.5	32.5	522	15	10
Pacaud Township						
KLIP-80-37	269/882	0 - 18	18 - 20	20	-	1
-41	317/1040	0 - 50	-	50	1	-
-541	317/1040	0 - 103	103 - 110	110	4	1
-42	296/971	0 - 26	26 - 27	27	1	1
Totals 4		197	10	207	7	3
TOTALS		3,292.5	183.5	3,476	233	48

Table 2

WINTER 1981 DRILLING AND SAMPLING STATISTICS

HOLE NUMBER	ELEVATION (METRES/FEET)	FOOTAGE DRILLED OVERBURDEN	FOOTAGE DRILLED BEDROCK	DEPTH OF HOLE (FEET)	SAMPLES COLLECTED OVERBURDEN	SAMPLES COLLECTED BEDROCK
Arnold Township						
KLIP-81-18	317/1040	0 - 33	33 - 36	36	1	1
Benoit Township						
KLIP-81-21	299/981	0 - 112	112 - 116	116	9	1
Bisley Township						
KLIP-81-11	327/1073	0 - 43	43 - 47	47	2	1
Eby Township						
KLIP-81-01	317/1040	0 - 62	62 - 66	66	-	1
-02	317/1040	0 - 55	55 - 57	57	4	1
-03	321/1053	0 - 22	22 - 25	25	3	1
Totals 3		139	9	148	7	3
Lebel Township						
KLIP-81-14	339/1112	0 - 81	81 - 85	85	10	1
-15	329/1079	0 - 29	29 - 34	34	1	1
Totals 2		110	9	119	11	2
Melba Township						
KLIP-81-04	329/1079	0 - 29	29 - 32	32	2	1
-05	320/1050	0 - 129	129 - 132	132	12	1
-06	303/994	0 - 170	170 - 173	173	10	1
-07	308/1010	0 - 124	124 - 129	129	9	1
-08	306/1004	0 - 129	129 - 131	131	8	1
-22	303/994	0 - 93	93 - 96	96	12	1
-23	301/987	0 - 77	77 - 81	81	1	1
-24	303/994	0 - 78	78 - 42	42	1	1
-25	298/977	0 - 175	175 - 180	180	15	1
Totals 9		964	32	996	70	9

Table 2
(Continued)

HOLE NUMBER	ELEVATION (METRES/FEET)	FOOTAGE DRILLED OVERBURDEN	FOOTAGE DRILLED BEDROCK	DEPTH OF HOLE (FEET)	SAMPLES COLLECTED OVERBURDEN	SAMPLES COLLECTED BEDROCK
Morrisette Township						
KLIP-81-09	318/1043	0 - 35	35 - 40	40	3	1
-10	314/1030	0 - 52	52 - 56	56	-	1
-12	313/1023	0 - 36	36 - 40	40	1	1
-13	331/1086	0 - 131	131 - 135	135	4	1
-16	321/1053	0 - 101	101 - 105	105	3	1
-17	317/1040	0 - 112	112 - 116	116	2	1
-19	335/1099	0 - 141	141 - 145	145	4	1
-20	314/1030	0 - 140	140 - 143	143	4	1
Total 8		748	32	780	21	8
TOTALS 25		2,149	93	2,242	121	25

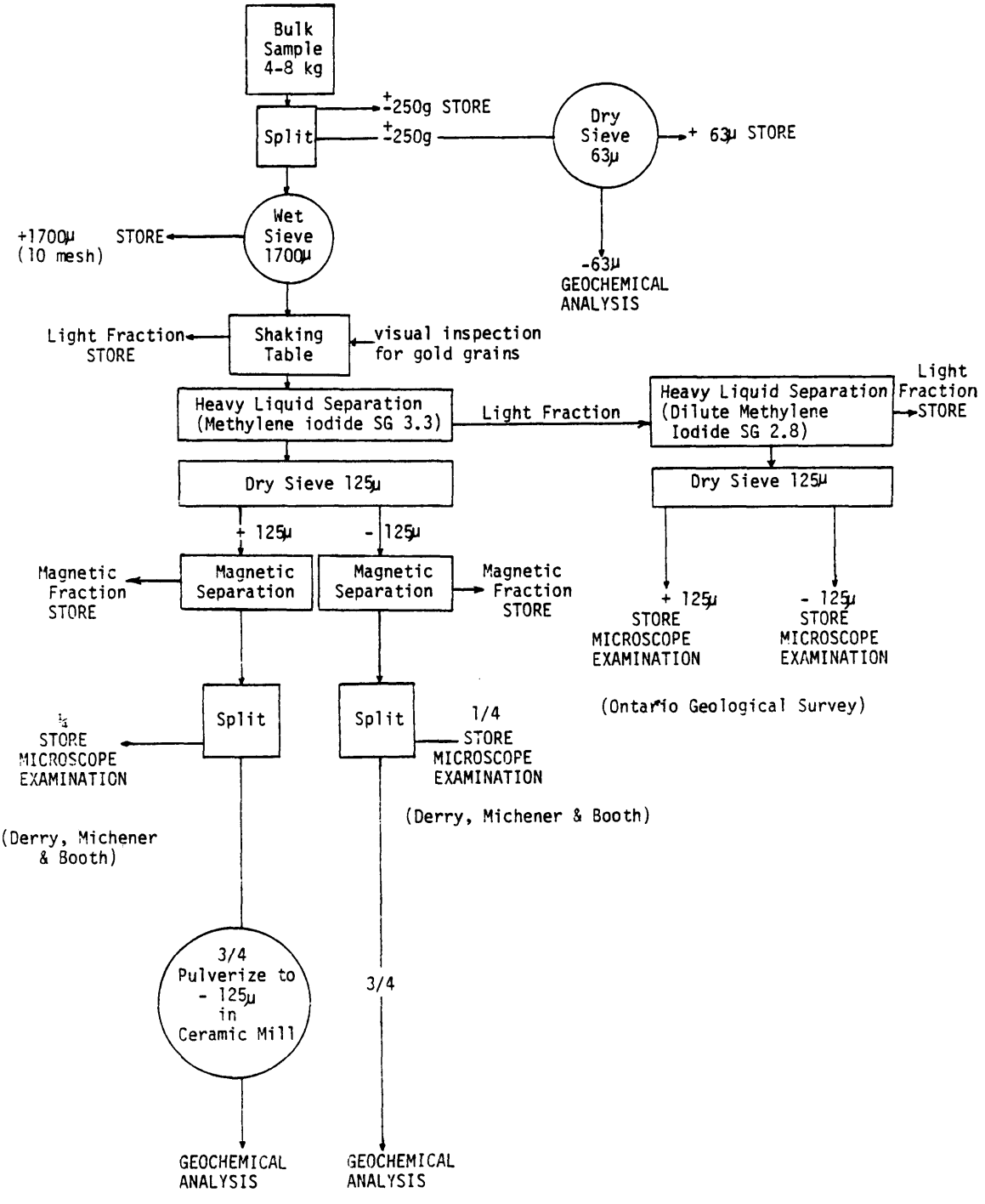


Figure 3 - Sample Processing Flow Sheet
(Overburden Samples)

During processing the 4 to 8 kg bulk samples are separated into a series of splits and sieve separates following pre-concentration on a wet shaking table and gravity separation into heavy and mid-density mineral concentrates using methylene iodide. End products, splits, representative reject splits, and light fractions are stored for permanent record. Mineralogy of concentrates was identified by binocular microscope examination and splits were sent for geochemical analysis. These end products are:-

1. -63 micron sample from the original sample for geochemical analysis.
2. Mid-density minerals separated by dilute methylene iodide (S.G. 2.8).
3. Non-magnetic heavy mineral concentrates separated by methylene iodide (S.G. 3.3).
4. Magnetic heavy mineral fractions separated by hand magnet from the heavy mineral concentrates.

The mid-density and heavy mineral concentrates were sieved to produce a +125 micron and -125 micron fraction. Together with bedrock chips, one-quarter splits of the heavy concentrates were examined under binocular microscope by DMB. OGS retained the mid-density minerals for binocular

microscope identification and 3/4 heavy mineral splits were returned to OGS for geochemical analysis.

The reasoning behind the design of the sample processing as shown in the flow sheet is:-

1. The -63 micron fraction of the original bulk sample is important in determining the existence of post-glacial hydromorphic anomalies derived from secondary geochemical dispersion.

2. Previous study of the tills of the Kirkland Lake area (Lee 1963, 1979) suggests that the -2 mm fraction is naturally bimodal at ± 125 microns. Further, grain size is, to a large extent, a reflection of transport distance (coarse material is probably dominantly of local derivation) and can thus be used as an aid interpreting the mineralogical and geochemical data.

3. Gangue minerals important in exploring for ore deposits are commonly lighter than the 3.3 specific gravity of heavy mineral concentrates and therefore a mid-density separation was taken for binocular microscope examination.

Sample processing data was recorded by Overburden Drilling Management in detailed laboratory sample logs

attached in Appendix B. The logs list weights for the various table and geochemical splits and heavy mineral and mid-density concentrates. Grains of visible gold appearing on the shaker table during processing were also recorded. Brief descriptions of +10 mesh and matrix fractions were given and on the basis of these descriptions samples were classified as either sand, gravel or till.

It should be noted that many samples labeled "till" in the laboratory processing logs were field identified as poorly-sorted, mafic glaciofluvial gravels which on the table would give the appearance of being a till. Holes 80-41 and 80-541 were drilled adjacent to one another to test the between-hole variability in heavy mineral constituents and hence to test the reproduceability of results. In this case, the gravels in Hole 80-41 were labeled tills whereas in 80-541 they were labeled correctly as gravels. The laboratory classifications were therefore disregarded and the field classifications were not altered.

During the 1980 summer program a total of 233 overburden samples were collected in the field. Fifteen 5 ft.(1.5 m) gravel samples in Holes 80-2, 80-3 and 80-4 were composited by combining three consecutive samples from a respective hole in order to reduce the cost of processing these samples by 33%.

Two hundred and twenty-four samples, including the five composited samples, were processed by the laboratory. Of these, there was insufficient material to table from samples

80-32-02 and 80-40-01 and no concentrates were produced. Samples 80-33-01 and 02 were lost in transport to the laboratory. The bedrock -10 mesh samples on hole 03 and 18 were inadvertently processed.

Heavy and mid-density mineral concentrates were produced from a total of 123 samples collected during the 1981 winter program. This included a surface sample of glaciofluvial sand drilled in aborted Hole 81-14A and Sample 81-01-01, a -10 mesh bedrock sample, which was inadvertently processed as an overburden sample. Insufficient heavy minerals were contained in Sample 81-14-10 to produce a +125 micron concentrate.

5 BEDROCK GEOLOGY

5.1 Regional Geology

The drill area is situated in the southeast part of the Superior Structual Province and is underlain by the Precambrian rocks of the southwest portion of the Abitibi metavolcanic-metasedimentary belt. East-west-trending, steeply-dipping, mafic to felsic volcanic rocks and interflow sediments of early Archean age are unconformably succeeded by Timiskaming conglomerates, arkoses, greywackes and argillites. Gabbro and periodotite have intruded the early Archean rocks locally and are prominent in the northern townships of the drill area. Complex folding and faulting took place about 2.5 b.y. ago. Contemporaneous with and following regional metamorphism to greenschist facies, the volcanic-sedimentary assemblage was invaded by hornblende granite and syenite forming the large bodies such as the Otto, McElroy and Lebel Stocks in addition to the Round Lake Batholith found in the southern tier of townships. Undeformed Gowganda Formation conglomerate, arkose, greywacke and argillite of the Proterozoic Cobalt Group are angularly unconformable on Archean rocks along the west margin of the drill area. Numerous north-south-oriented,resistant diabase dykes, belonging to either the Matachewan (Nipissing) or later dyke swarms, form knolls surrounded by the glacial cover in many parts of the drill area.

On the basis of chemical characteristics and rock stratigraphic relationships of the early Archean volcanics of

the drill area, Jensen (1978a, b) recognizes seven sub-divisions which appear, in part, to represent three volcanic cycles (Figures 4 and 5). In order of decreasing age these are:-

1. Pacaud calc-alkalic tuffs, probably the top of an early volcanic cycle;

2. Webewawa Group, komatiitic rocks - the base of a later volcanic cycle;

3. Catharine Group, tholeiitic basalts; and the

4. Skead Group, calc-alkalic assemblage at the top of the cycle;

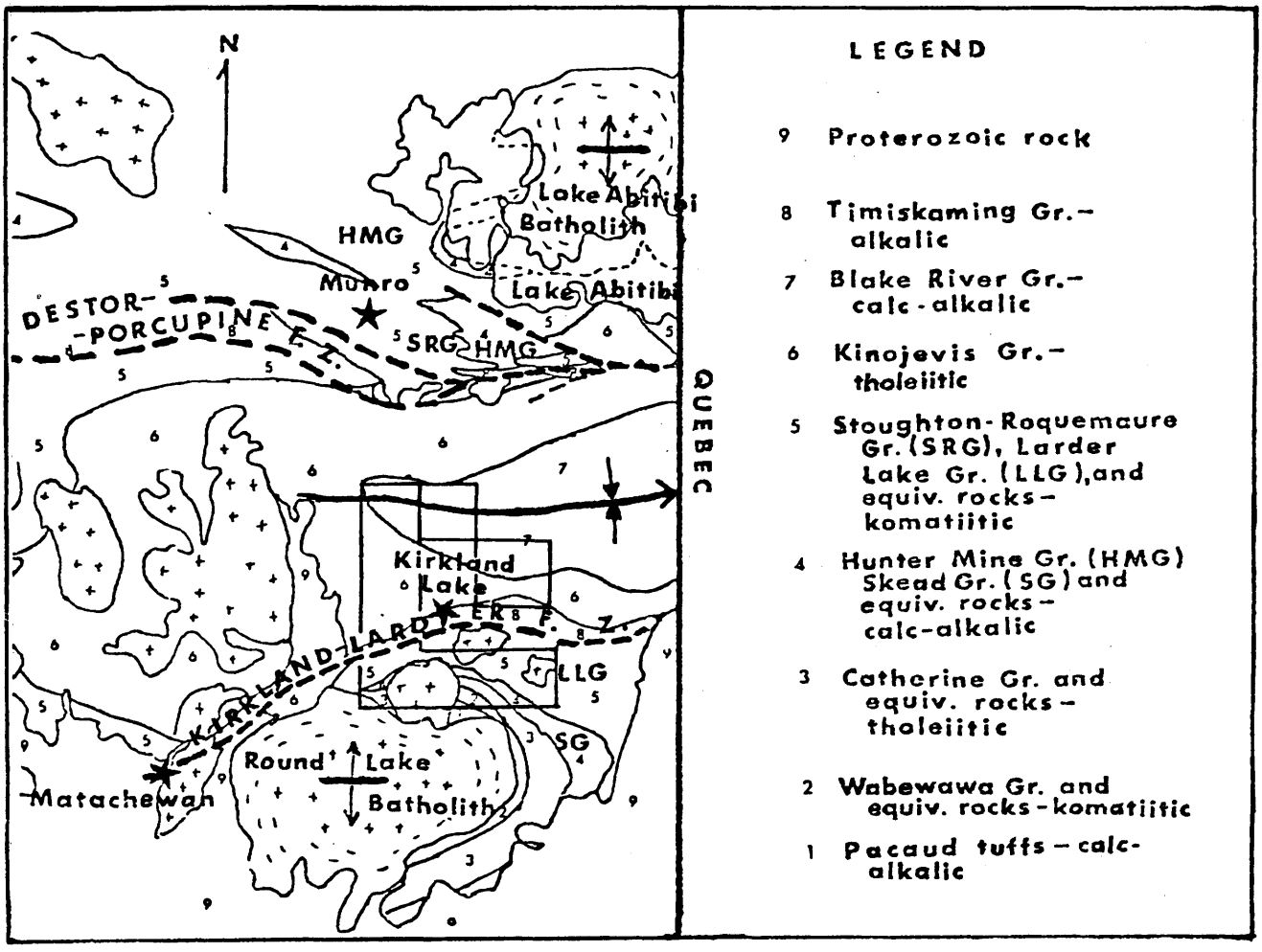
5. Larder Lake Group, komatiitic basaltic and ultramafic rocks and interflow metasediments unconformably overly the Skead Group and form a renewed volcanic cycle.

   The Larder lake group is succeeded by the;

6. Kinojevis Group, tholeiitic basalts and gabbro intrusives which are in turn followed by the;

7. Blake River Group, calc-alkalic sequence of andesites, dacites and rhyolites.

The Timiskaming Group metasediments, trachytes and trachytic breccias of alkalic affinity unconformably overlie the Kinojevis Group and are in fault contact with the Larder Lake group to the south along the Kirkland Lake-Larder Lake Break which trends east-west from Larder Lake through Kirkland Lake and Swastika to Matachewan.



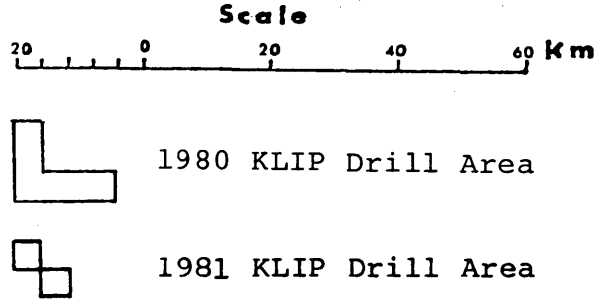


Figure 4 - Sketch Geology of the 1980 - 1981 KLIP Drill Area (modified after Jensen, 1979)

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

[8]
- 8a Conglomerate
- 8b Arkose, conglomeratic arkose
- 8c Quartzite and greywacke
- 8d Argillite

ARCHEAN-PROTEROZOIC

[7] Matachewan (Nipissing) - Keweenawan
Undifferentiated diabase (gabbro) dykes

ARCHEAN

[6] Felsic Intrusive Rocks
- 6a Granite, hornblende granite, hornblende-biotite granite
- 6b Syenite, quartz syenite
- 6c Mesocratic syenite, syenite porphyry
- 6d Granodiorite, quartz diorite
- 6e Aplite
- 6f Tonalite to adamellite

[5] Mafic Intrusive Rocks
- 5a Serpentinite, peridotite
- 5b Gabbro, diorite, in part course volcanic flows

[4] Timiskaming Metasediments and Metavolcanics
- 4a Conglomerate
- 4b Basal grit, quartzite, greywacke
- 4c Argillite
- 4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

[3] Felsic Metavolcanics, Tuffs and Metasediments
- 3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
- 3b Felsic-dacitic and silicic tuff, agglomerate
- 3c Iron formation, chert, paragneiss, tuffaceous sediments
- 3d Argillite

[2] Intermediate to felsic volcanics; andesite, dacite

[1] Mafic volcanics, basalt, andesite-basalt, amphibolite, amphibolite, lesser ultra mafic flows.

Figure 5 - Stratigraphic column; bedrock lithology of the 1980-81 KLIP Drill Area as shown on geologic compilation Chart 1 (in pocket).

O.G.S. township geologic maps of varying scales and publication dates were modified and integrated into a compilation of bedrock geology on a scale of 1:50,000 shown on Chart 1. This aided both in program planning and interpretation of drilling results. Bedrock formations common to the KLIP area are illustrated on the simplified sketch geology in Figure 4. Most of these lithologic units were intersected in drilling and later identified by binocular microscope examination carried out on bedrocks sample splits by DMB. No attempt was made to sub-divide the metavolcanic rocks on a chemical basis into calc-alkalic, tholeiitic or komatiitic affinities as this was beyond the scope of this report. With the aid of previous mapping, the major time-stratigraphic units such as Early Archean, Timiskaming, and Proterozoic Gowganda formations were recognized.

5.2 Bedrock Encountered in the Drill Programs

In general, drilling results verified published mapping of buried bedrock lithology and contact positions; however, where bedrock in holes did not correspond to published maps, lithologic contacts were revised accordingly or heretofor unknown units added to the compilation map. Descriptions of the bedrock in each of the holes which reached bedrock are provided in Appendix D.

5.2.1 Mafic Volcanics (Unit 1)

Metamorphosed basalt, andesite-basalt, tuffaceous andesite-basalt and amphibolite were intersected in 11 of the 48 summer 1980 holes which penetrated bedrock. These were identified by their dark greenish gray to black colours, aphanitic to fine-grained, equigranular or porphyritic and massive to schistose fabrics. The slightly lighter colour, fresher and more siliceous appearance of specimens of this unit were termed andesite-basalt. The foliated mafic-streaked aphanitic varieties with stretched feldspars were described as tuffaceous. Saussauritized calcic feldspar, alteration of pyroxenes, increased percentage of epidote and garnet (up to 15%) occurred in the foliated felty matrix of basalts found in four holes drilled within 300 m (1,000 ft.) north of the Round Lake Batholith contact in the vicinity of the village of Boston Creek. These are aspects of contact metamorphism related to the intrusion of the Round Lake Batholith.

Quartz veining and minor carbonatization of basalt was found in Hole 80-7. Carbonatization along with quartz-carbonate veining was also found in the tuffaceous andesite-basalt in Hole 80-24. Less than 1% disseminated very fine pyrite (in lenses) in Hole 80-24 and very fine, weakly disseminated pyrite in the felty green saussauritized basalt in Hole 80-25 are characteristic of the rocks of the Larder Lake group.

Mafic metavolcanic rock of basalt composition was intersected in Holes 81-3, 81-7, 81-13, and 81-22. Dark green chloritic schist of the Larder Lake Group, silicified with concordant lenses and veining of white quartz carrying traces of chalcopyrite, was intersected in Hole 81-3 in Eby Township. Porphyritic to equigranular, weakly to well-foliated metabasalts of the Kinojevis Group were encountered in Holes 81-7, 81-13 and 81-22. Slight silicification was noted in Hole 81-13. Basalts of the Kinojevis Group were, however, devoid of economic indicator minerals.

A mottled, green and white rock having angular, elongated white feldspar fragments set in a dark green chloritic schistose matrix was intersected in Hole 81-14 drilled in the Kinojevis Group volcanics close to their contact with Timiskaming Group metasediments. The cataclastic deformation indicated by the texture of this rock is probably related to major shearing or faulting along the contact between the Timiskaming and Kinojevis Groups in Lebel Township.

5.2.2 Intermediate to Felsic Volcanics (Unit 2)

In the 1980 drill area, intermediate to felsic volcanics were identified only in Hole 80-3 and 80-18. Light greenish to pale gray, granular, glassy volcanic in Hole 80-3 belongs to the Blake River Group. Andesite porphyry occurs as a sub-unit of the Kinojevis Group in Hole 80-18.

The 1981 winter drill area is underlain primarily by Blake River Group intermediate to felsic volcanic flows and pyroclastics in Benoit, Melba and the north half of Morrisette Townships. Intermediate metavolcanic rocks were intersected in 9 holes; 81-4, 81-5, 81-6, 81-11, 81-12, 81-18, 81-19, 81-23 and 81-25. Volcanic rock of intermediate to felsic composition was intersected in Hole 81-8 and in Hole 81-21 bedrock is a dacite breccia. This breccia may be related to a fault and/or the intrusion of a gabbro body mapped just south of the hole.

The intermediate volcanics are light to greenish-grey, weakly foliated, porphyritic and very fine-grained to aphanitic. In Hole 81-11, pervasive saussauritization of plagioclase has produced a light pistachio green colour. Incipient garnet replacement of hornblende in several samples was observed. White quartz veining was found in bedrock of Holes 81-4, 81-6, 81-11 and 81-23. Chlorite and cubes of pyrite in thin white quartz veins were identified in Hole 81-5; traces of tarnished pyrite were found in Hole 81-8; few cubes of pyrite in Hole 81-18; smears of pyrite on quartz vein walls in Hole 81-25. Weakly foliated intermediate to felsic volcanics of dacitic to rhyodacitic composition, in Holes 81-8 and 81-25, varied from grey to bluish-grey and porphyritic very fine-grained to aphanitic.

5.2.3 Felsic Metavolcanics, Tuffs and Metasediments (Unit 3)

Dacite, rhyodacite and equivalent tuffs were intersected in Holes 80-2, 80-8 and 80-10 over the Blake River Group

felsic volcanics and in Hole 80-16 drilled in the Kinojevis Group mafic volcanics. Dacites and rhyodacites are light gray to bluish-gray and porphyritic to porphyry-textured with a glassy gray matrix. Tuffaceous rocks are distinctly fine-banded with discontinuous blueblack to greenish streaking in the matrix. Hematite coatings on foliation or fracture surfaces were observed in Hole 80-8.

A variety of tuffaceous rocks, including tuffaceous intermediate volcanics, intermediate to felsic tuffs, intermediate tuff breccia, siliceous to dacitic tuff and silicic quartz ash (crystal) tuff was encountered in Holes 81-9, 81-10, 81-16, 81-17 and 81-24. These rock types are members of the Blake River Group.

These fragmental rocks are white and light to greenish-grey in colour and exhibit banded, streaky fabric, or textures with very fine ejecta, such as rounded, glassy quartz spindles and shards. Matrix is variable from glassy-cherty to chloritic and schistose. Pyrite content of the tuffs ranges from a few disseminated oxidized or tarnished cubes to 1% or less. It occurs as finely disseminated pyrite in the matrix, concentrations along individual beds, or streaks associated with mafic minerals. Distinctive coarser-grained, non-striated modified cubes and pyritohendrons were observed in Hole 81-16.

5.2.4 Timiskaming Metasediments and Metavolcanics (Unit 4)

Timiskaming greywackes were intersected in Holes 80-52 and 80-51. Metasedimentary and metavolcanic rocks of the Timiskaming Group are similar in many respects to interflow metasediments of the early Archean volcanics. Argillite was intersected in Holes 80-15 and 80-45 but these were collared over the Kinojevis and Larder Lake Groups, respectively, and the argillite may be early Archean in age. Graphitic-pyritic argillite in Hole 80-45 is the source of a KLIP INPUT conductor lying immediately north of the hole. Greywacke in Hole 80-39 drilled over the Catharine Group may represent either an interflow sediment or an outlier of Timiskaming sediments. Porphyritic trachyte in contact with diabase was intersected in Hole 80-29 drilled in the thin metavolcanic unit sandwiched between the Round Lake Batholith and the Otto Stock. As trachytes are associated with alkalic flows in the Timiskaming Group, this could be of Timiskaming age.

Grey, moderately sorted, fine-grained feldspathic quartzite found in Hole 81-2 and a schistose metasandstone of similar colour and grain size in Hole 81-15, are members of the Timiskaming Group metasediments. Cross-cutting quartz veinlets carry chalcopyrite and in adjacent wall rock schist in Hole 81-15. Hole 81-2 was collared in Eby Township south of Kenogami Lake and Hole 81-15 in Lebel Township, northeast of Kirkland Lake.

5.2.5 Mafic Intrusive Rocks (Unit 5(b)

Fine to medium-grained, sub-ophitic, greenish-gray, massive gabbro was intersected in Holes 80-6 and 80-50. Gabbro of this unit may represent coarsely crystalline basal flows or gabbro sills.

5.2.6 Felsic Intrusive Rocks (Unit 6)

Leucocratic, fine to medium-grained, equigranular to porphyritic biotite-hornblende granitic and syenitic intrusive rocks of the Round Lake Batholith, and the Otto and McElroy Stocks were intersected in 15 holes. The Otto syenite demonstrated the greatest variability in composition and texture resulting from assimilation of volcanic country rocks. Dark pinkish-gray, fine-grained mesocratic syenite was encountered in Holes 80-33 and 80-44 located near contacts between syenite and mafic volcanics. This mesocratic variety was also encountered in Hole 80-30 close to a fault which offsets the stock in the vicinity of the Blanche River. The roof pendant of volcanics mapped approximately 1 km (1/2 mi) to the northwest may extend further south than previously indicated. Alternatively, a concealed slice of metavolcanics may be present along the fault.

Hole 81-1, drilled on he southeast shore of Kenogami, penetrated a light pink to buff and green-tinged buff coloured, very fine-grained xenomorphic-textured quartzo-feldspathic rock. Mafic and opaque minerals are absent except for 1% to 3% disseminated pyrite. This unit occurs

in an area underlain by Timiskaming Group metasediments and thus appears to be an exotic rock type. The texture and mineralogy suggest that it is a felsic hypabyssal dyke rock. A sample of rock slurry collected from the drill was processed to yield a heavy mineral concentrate containing 37% pyrite. Geochemical analysis of the heavy minerals gave values of 1190 ppm Cu, and 240 ppm Zn and 12,000 ppb Au indicative of weak mineralization.

A fine-grained, porphyritic intrusive of tonalite to adamellite composition was found in Hole 81-20 drilled in north-central Morrisette Township. This unit was previously unknown in this area of abundant exposures of Blake River Group intermediate volcanics. The overburden-filled depression, in which Hole 81-20 was collared, is linear and conformable to the regional strike suggesting that this unit is a narrow sill flooring the valley between hills of volcanic outcrop.

5.2.7 Diabase (Unit 7)

Mapping has shown that north-south trending diabase dykes outcrop frequently because of their resistance to erosion. The effort to avoid drilling in areas of outcrop or shallow overburden resulted in diabase being intersected only in Holes 80-11, 80-29 and 80-38. The north- south trending country rock and lineations in the diabase of Hole 80-38 suggest that this may have been intruded concordantly as a sill.

5.2.8 Gowganda Formation (Unit 8)

Gowganda Formation conglomerates, arkoses, argillites and quartzitic siltstone were intersected in seven holes drilled on the west margin of the drill area. The previously mapped position of the contact between the Gowganda Formation and Kinojevis Group volcanics required modification following the results of drilling in Holes 80-12 and 80-14. The Gowganda Formation rocks were typically devoid of economic minerals.

6. SURFICIAL

6.1 Glacial History of the Drill Area

The earlier Nebraskan, Kansan and Illinoian glacial events are believed to have effected the Abitibi Upland physiographic region during the Pleistocene Epoch; however, the record of each has been obscured or entirely removed by successive glaciations with presently existing deposits formed during the retreat of the last episode - the Wisconsinan. North of the Hudson Bay-St. Lawrence Watershed these Wisconsinan deposits are for the most part represented by complex cyclic strata of stacked tills, glaciofluvial sediments and glaciolacustrine clays. South of the divide the deposits are a simple suite composed of basal till, gravel and overlying stratum of glaciolacustrine clay. Continental Wisconsinan ice, forming the Keewatin section of the Laurentide ice mass, advanced S 10°E and receeded to the north towards James Bay. Thin, stoney, sandy lodgment till was deposited during advance.

During retreat of the ice, the meltwaters were ponded between the glacier and the then existing drainage divide which was displaced to the south by isostatic delevelling, to form large lakes. Differential isotatic rebound allowed a slow northward migration of the divide and hence the outlets for the glacial lakes (Vincent and Hardy 1979). Glacial Lake Barlow with outlets at LaCave and later Temiscaming, was the first lake to inundate the study area

about 10,000 year B.P. (Baker 1980a). Growing as the ice retreated to a probable maximum limit just north of the present divide, Lake Barlow was restricted to the Timiskaming basin by the emergence of the Angliers sill. This sill and a later one at Kinojevis, Quebec, controlled the drainage of glacial Lake Ojibway which developed to the north (Vincent and Hardy 1979).

Lake Ojibway continued expansion north of the present divide until separation of the Laurentide ice mass into the Hudson and New Quebec lobes permitted drainage into Hudson Bay.

Thick accumulations of glacial lacustrine varved clays, silt and fine sands were deposited in Lakes Barlow and Ojibway. These sediments have been termed the "Great Clay Belt" north of the present day divide and the "Little Clay Belt" south of the divide.

During the retreat of the ice margin, esker deposits formed marking the routes of former sub-glacial metwater streams which attained open channel-flow at or near the ice margin. Debouching streams locally formed delta complexes as the ice retreated. The succession of interbedded tills, glaciofluvial clastics and glaciolacustrine clays in drill holes north of the divide indicates the position of an oscillating ice front with minor fluctuations of the ice margin terminating against resistent basic volcanic bedrock along the continental divide.

As water levels dropped during the draining of Lakes Barlow and Ojibway, wave action reworked tills, eskers and associated deltaic deposits into lag deposits and developed sand plains. Eolian sand dunes flanking the Highway Esker in the northwest sector of the drill area were formed by winowing of emergent eskers, deltas and glaciolacustrine sand plains to represent the final stages of deglaciation in the drill area.

The surficial geology of the drill area is displayed in a simplified form on Chart 2 accompanying this report. Interpretive profiles showing the subsurface relationships between sedimentary sequences encountered in the drilling across the survey area also accompany this report.

6.2 Quaternary Stratigraphy of the 1980 Summer Drill Area

6.2.1 Introduction

The glacial overburden in the drill area occurs in two distinctly different stratigraphic assemblages separated by the present day Hudson Bay-St. Lawrence divide;

(A) A relatively constant retreat occurred during deglaciation south of the divide (Southern Basin) as evidenced by the uncomplicated sequence of basal till, glaciofluvial clastics and glaciolacustrine deposits.

(B) The sequence is quite different north of the divide (Northern Basin). Multiple till horizons, interbedded with ice-contact coarse clastics and

glaciolacustrine clays in Benoit Township, reflect a complex depositional environment. This is envisioned as an oscillating ice margin during the retreat of the Wisconsinan ice, coupled with glaciofluvial sedimentation and related glaciolacustrine facies during development of the Highway Esker-delta complex.

Descriptions of these assemblages in each basin are treated separately as follows:-

6.2.2 Southern Basin

Four basic sedimentary units are recognized in the Southern Basin on interpretation of 38 drill holes. These units correlate to those identified by Averill and Thomson (1981), in the 1979 KLIP drilling and are:-

- Basal till: sub-glacial debris deposited at the glacier sole (or bedrock-ice interface)
- Debris flows - till-like turbidite: englacial and supraglacial materials melting out and flushed off wasting ice as debris flows and deposited on the lake bottom peripheral to the ice front.
- Glaciofluvial sediments: stratified sand and gravel deposited in esker and deltaic environments, subsequently modified by littoral activity of glacial lakes.

- Glaciolacustrine sediments: fine, well-sorted sands, silts, and varved clays deposited in glacial lakes.

Basal Till

A basal till unit was intersected in 16 holes collared south of the divide in Maisonville and Grenfell Townships and extending east through Eby, Otto and Boston to McElroy Townships. This thin till is intermittently present. Varying from 6" to 10'(15 cm to 3 m), till thickness is generally 1' to 3' (.3 m to 1 m) with the greater thicknesses under deeper overburden either at lower elevations within the basin or to the north near the height of land. This reflects rapid infilling of later sediments and preservation of the till in bedrock depressions whereas at higher levels, the upper surface of the basal till was subjected to oxidation and reworking in the high-energy zone of Lake Barlow. In Hole 80-17, immediately south of the divide, a 10 ft. (3 m) thickness of till was probably preserved by rapid burial beneath sand and gravel prograding off the flanks of the Highway Esker.

The till varies in texture and composition from sandy clay through pebbly sand to gravelly. As till fabrics are distrubed by drilling, clay content is manifested as clay balls, silty and gritty clay balls, and clay coatings on pebbles as screened during drilling. In most cases clay content was less than 5% to nil and tills were therefore

distinguished by dark greenish-grey colour, poor sorting, sub-angular to sub-rounded pebbles and cobbles, pebble striations and clay coatings. Mafic and intermediate volcanic pebbles and cobbles comprised 70% or more of the coarse clasts with granite and syenite contributing up to 30%. The dark, greenish colour and mafic lithologic composition closely resemble underlying Kinojevis and Larder Lake Groups volcanics. Basal till in holes drilled over, or down-ice of, the Round Lake Batholith or Otto and McElroy Stocks, show a mixed lithology in response to dilution by granite or syenite abraded from these felsic intrusives.

The matrix in the upper portion of the basal till in Holes 80-20 and 80-28 exhibits a brown colour characteristic of oxidation. The 980' to 990' (299 m to 302 m) elevation of this till is close to low lake levels evidenced by terrigenous peaty oxidized clay in Hole 80-28. This suggests that tills at slightly higher elevations may have emerged briefly and been subjected to leaching typical of presently exposed tills found on bedrock-drift complexes (Baker and Storrison 1979; Baker 1980a).

Debris Flows - Turbidite

A discontinuous, thin till-like unit between underlying glaciofluvial clastics and succeeding glaciolacustrine sediments was intersected only in Holes 80-22, 80-28 and 80-32.

Thickness and composition is variable from 9 ft. (2.7 m) of bouldery and cobbly sand till reflecting local Gowganda origin, in Hole 80-22, through 3 ft. (1 m) of oxidized mafic gravelly and clayey sand till in Hole 80-28, to 1 1/2 ft. (.5 m) of silty sand till in Hole 80-32. Despite variability of composition, the poor sorting indicative of short transport, similar stratigraphic position and spatial relationship to eskers points to a common origin for these diamicton sediments. A satisfactory working hypothesis is that melt water embayments in the ice margin formed as the ice surface wasted down through the roof of esker tunnels. Increased surface area of ice at the embayment permitted more rapid melt-out of englacial debris, which sloughed off the ice margin as debris flows, or was dumped from calving ice onto the proglacial lake bottom. Much of these debris flows would be incorporated in prograding subaqueous fan clastics and would only form an identifiable turbiditic unit at the distal fringe of the fan where volume of glaciofluvial sediment is reduced. This would account for the limited areal extent and discontinuous nature of this turbidite unit.

Glaciofluvial Sediments

Surficial mapping and drilling have traced three SSE-trendinging esker systems within the south tier of townships in the drill area. From west to east, these are

the Highway Esker in Grenfell and Eby Townships; an unnamed esker parallel to Highway #112 in Otto Township; and the Munro Esker parallel to the west boundary of McElroy Township.

Twenty-two holes penetrated glaciofluvial esker-delta deposits. Sixteen of these intersected thin, 3 ft. to 10 ft. (1 m to 3 m), distal delta facies or thicker, 17 ft. to 102 ft.(5.2 m to 31 m), proximal esker flank facies beneath either glaciolacustrine clay or shallow glaciolacustrine sands and beach deposits. Stratification and sorting is better developed and probably reflects cross-bedding in thicker sections of proximal esker facies. Thin intersections, particularly those superjacent to bedrock occurring far removed from the esker core are typically not sorted.

Composition of the coarse, poorly-sorted sediments closely mirrors upstream bedrock lithology. Most intersections of glaciofluvial materials were greenish-gray coloured, coarse cobbly to medium gravels and pebbly granular sands. In the Highway #112 esker system, the mafic volcanic content of gravels dominates as shown in Hole 80-45 collared over the Larder Lake Group north of the Otto Stock. Syenite content amounts to 15% just south of the syenite contact in Hole 80-44 and by Hole 80-35, 3 miles (5km) south, syenitic clasts are dominant. Similarly, in Holes 80-24, 80-26 and 80-28 drilled over the Highway esker system, the underlying volcanics and Round Lake Batholith granites strongly influence the +10 mesh glaciofluvial sediment composition.

Two townships east, a transition from granitic and/or syenitic rich gravels in the upper portion to volcanic-rich gravels at bedrock was observed in Hole 80-47, collared over the McElroy Stock, where it is buried by glaciofluvial sediments of the Munro Esker. Melt waters of the Munro Esker were initially ice floored over the McElroy Stock while down-cutting through volcanic debris-laden levels of basal ice. This sediment load was derived from Larder and Kinojevis Groups to the north and was the first to be deposited as the stream lowered onto syenite bedrock. As stream base levels to the north reached lower ice containing a higher proportion of McElroy Syenite englacial debris, this basal material was transported south and deposited over the volcanic-rich gravels.

Basal till underlies the glaciofluvial clastics only in Holes 80-33, 80-35 and 80-36 which are situated at the limits of subsurface distribution of these deposits. The general absence of basal till beneath the esker gravels and the close correspondence of the lithology of the glaciofluvial sediments with underlying bedrock, are features of sub-glacial glaciofluvial environments. Sub-glacial streams in the drill area had, therefore, eroded basal tills during deposition of the esker-delta complexes. The linear, ribbon-like configuration of the esker systems in the Southern Basin, as opposed to the Northern Basin, points to a relatively constant rate of regional retreat of the ice

front. Gradients and volume of melt-water flow were sufficient to down-cut through the ice floor to bedrock and likely produced an open channel environment at the ice margin.

Glaciolacustrine Sediments

Glaciolacustrine sediments mantle about 90% of the drill area in the Southern Basin. They are found in pockets in all but the highest elevations on the bedrock-drift complexes and attain thicknesses of up to 93 ft.(28 m) in depressions. Measured elevations of the lower contact of the clay unit in Hole 80-35 and the upper contact of the highest glaciolacustrine sand unit in Hole 80-1 indicate that Lake Barlow attained a depth of at least 291 ft.(88.7 m).

A representative section of the glaciolacustrine sediment begins with basal fine sand and silt succeeded by sandy-silty clay, varved dark bluish-grey clay, grey clay (locally with brown silty varves) and brown to yellow-brown oxidized clay at surface. Clays interdigitate with fine sand and silt or grade into an apron of these coarse-grained sediments adjacent to eskers. Thin beds of small angular pebbles, of volcanic origin, are found locally throughout the lay column. These are probably drop stones released from floating ice calved off the ice margin.

A dark blue-grey clay was found in holes 80-23 to 80-27 at elevations below 975 and 945 ft.(297 and 288 m). This

dark unit was not logged north of the divide or in other holes in the Southern Basin which penetrated clays below these elevations. The blue-grey colour may be a reflection of deposition under reducing conditions as suggested by Averill and Thomson (1981); however, this environment should have been widespread below the 945 ft.(288 m) elevation suggesting that factors in addition to oxidation state are required to account for this colour change. Provenance and composition of the clays, in addition to their specific location within the Southern Basin, may be more important determinants of the dark colouration.

Brown to yellow-brown oxidized lacustrine clay is found from surface to depths of between 5 and 12 ft.(1.5 and 3.6 m) with a maximum penetraton of oxidation to 19 ft.(5.8 m). Dark brown muck deposits suggestive of terrigenous origin and the oxidized character of individual clay units interstratified with other lacustrine sediments in Hole 80-28 represent proximity to a terrestrial organic environment and a hiatus in a sedimentation respectively. The presence of interbedded clays in Holes 80-17, 80-19 and 80-47 and sandy layers in the clay column in Holes 80-33 and 80-34 may record changes from quiet to disturbed water conditions reflecting seasonal or climatic variations and/or changes in the rate of ice melting and sediment introduction to the basin.

6.2.3 Northern Basin

The limited off-road mobility of the Timberjack confined the choice of drill sites to those accessible by road. Drill sites in Benoit and Maisonville Townships were located on roads branching off Highway 11 which follows the Highway Esker. This complex of glaciofluvial and deltaic deposits trends north-south for over 24 miles (39 kilometres) along the west margin of the drill area and assumes considerable areal extent north of the divide. It is joined by a small segment of the Watabeag Esker in the far north-northwest. These two eskers form part of a regionally extensive plain of glaciofluvial sediments described by Boissonneau (1966b). The origin of the cyclic till-outwash-clay sequences is intimately linked to the depositional environment of this esker-delta complex. A less complex depositional environment probably prevailed beyond the distal limits of the complex. The implications are, therefore, that interpretation of events from stratigraphy in the drill area north of the divide is unique to the esker and fringing environments and, without additional supportive drill data, should not be considered to have regional application.

Tills

Overburden stratigraphy undergoes a transition from glaciofluvial sediments in the esker ridge through interstratified glaciofluvial clastics and tills to mainly

(stratified?) tills with minor interbedded glaciofluvial materials.

Till units exhibit heterogeneity in lithologic composition and texture. The intercalation of tills of diverse characteristics with poorly-sorted, locally-derived, volcanic-rich glaciofluvial gravels made the logging of the disturbed reverse circulation samples difficult, particularly where the clay content of tills is minimal. This type of environment is encountered in Holes 80-3, 80-4, 80-7 and 80-10 where drilling penetrated thinly alternating beds of fine and medium matrix sands in gravels and where these thin units are interbedded with tills. "Diamicton" sediments were classed at tills from the degree of angularity, poor sorting, grey colour and fineness of matrix sand, the clay content as gritty balls or coatings on pebbles, and by striations on pebbles.

Hole to hole correlation of individual thin, lenticular units would portray a false impression of continuity, particularly where bedrock outcrops between holes. Therefore, on the Surficial Geology Chart 2 and Profile C-C, the overburden units are arbitrarily grouped by gross characteristics into interbedded tills and glaciofluvial sediments and undifferentiated tills respectively.

Till was intersected overlying bedrock in seven holes. A distinct basal till correlating to Unit 9 of the Southern Basin was distinguishable only in Holes 80-3, 80-8 and 80-15. Apart from its greater thickness of 50 ft.(15 m),

the till unit in Hole 80-11 is of similar composition and may correlate to thin basal tills of the Southern Basin. A basal clay till was intersected superjacent to bedrock in Holes 80-7, 80-10 and 80-12. There is no evidence to determine whether this clay till is equivalent to the stony sand tills in the Southern Basin.

Thicknesses of individual till units within the Northern Basin range from 1 ft. to 50 ft.(.3 m to 15 m) with variable composition from gritty, sandy-clay till to boulder-rich gravelly till. Thin stratification recognized in tills occurring higher in the section may reflect original layering of melted-out englacial debris, flow till or stratification from successive pulses of waterlain turbidite. Clay-rich "tills" interbedded with glaciofluvial gravels, such as in Hole 80-7, may also be waterlain turbidites.

Platy glaciolacustrine clay recorded in Holes 80-4, 80-6 and 80-12 was compacted by overriding glacial ice. Hole 80-4 was drilled in the valley of the Black River, a major fault-controlled bedrock depression having the same NW orientation as the Timiskaming rift valley. Tills may have been preferentially deposited in the depression (and preserved) through the exertion of bedrock control in locally funnelling ice down the valley. In this section the tills are separated by three clay units 1 ft. to 5 ft.(.3 m to 1.5 m) thick to document a minimum of four glacial pulses

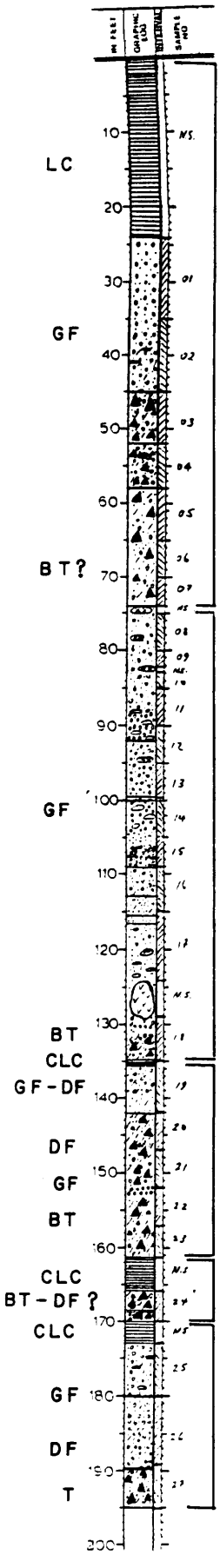
(Figure 6). An upper till overlying 56 ft.(17 m) of glaciofluvial gravels could be interpreted as a 5th pulse, although it is not indisputably a basal till. As Hole 80-4 was terminated in till without reaching bedrock at 195 ft.-(59.4 m), additional ice margin oscillations may be recorded at depth.

Two and three pulses can be interpreted from the clay-till stratigraphy in Holes 80-6 and 80-12, respectively.

A brown to yellow-brown, oxidized upper portion of till underlying glaciolacustrine clay is evident in Holes 80-6 and 80-9. This may signify a short period during which weathering of the tills took place. This uppermost till unit is between 10 to 56 ft.(3 to 17 m) thick and is correlatable, albeit at different elevations, in Holes 80-4 and 80-6, 80-8 to 80-12.

Glaciofluvial Sediments

Drill holes revealed considerable buried thicknesses of glaciofluvial sediment interspersed with glaciolacustrine and till units east of the surface limits of the Highway Esker-delta complex where glaciolacustrine clay surrounds sporadic islands of glaciofluvial materials. Since basic and felsic volcanics of the Kinojevis and Blake River Groups lying to the north are a source terrain common to both till and derived glaciofluvial clastics, colour and gross composition were not important criteria in differentiating interbedded tills and glaciofluvial material in the field.



LC	Glaciolacustrine Clay
GF	Glaciofluvial and deltaic coarse clastics
DF	Debris flows; turbidites with till-like appearance
CLC	Compacted glaciolacustrine clay
T	Till
BT	Lodgment or basal till
]1	Glacial depositional cycle - till, stratified glaciofluvial clastics, glaciolacustrine clay

Figure 6 - Stratigraphic Section in Hole 80-4 Illustrating up to Five Cycles of Ice Margin Oscillation (see Fig. 2 for Graphic Log Legend)

Lack of matrix clays, greater degree of rounding, sorting of individual beds, and relative proportions and angularity of lithologies resistant to abrasion were considered critical indications of fluvial transport in defining the esker deposits. Greenish-gray to beige-brown (oxidized) coarse and medium sands and gravel, with medium or coarse sand constituting up to 70% of the matrix were classed as glacio-fluvial gravel and sand. Repeated return of coarse matrix alternating with finer matrix sands suggests interbedding, possibly cross bedding. In contrast to the volcanics, quartz and granite lithic clasts appear to have survived further transport and were concentrated in the granular and fine pebble component of the +10 fractions screened during the sampling. Many of these glaciofluvial samples were classified as "till" on the basis of poor sorting during laboratory processing. This resulted from homogenizing of thinly interlayered, coarser and finer-grained sediments during sample collection. Permeability and inferred good sorting of interbedded glaciofluvial deposits is illustrated by artesian flow encountered in bedded, coarse sand aquifers at depths of 90 to 110 ft.(27 to 34 m) in Holes 80-2 and 80-9.

Serpentine flakes, wood chips and cuttings from a log in coarse sand were encounted between 135 and 155 ft.(41 and 47 m) in Hole 80-2. Serpentinized basic intrusions are mapped in the vicinity of Hole 80-2 and are the probable

source of the serpentine flakes. The survival of organic material and the locally derived serpentine flakes, both materials of low hydraulic equivalence, indicates these must have settled out with fine sands in relatively quiet water conditions which alternated with more dynamic conditions capable of transporting coarse sands.

Glaciolacustrine Sediments

In cross-section C-C^{1}, lacustrine fine sand and silt wedging off the Highway Esker was developed by washing of esker deposits in the littoral zone of Lake Barlow-Ojibway. This fine clastic wedge extends 2 miles (3 km) east from the esker core and overlies glaciolacustrine clay. Glaciofluvial sediments deposited in esker and deltaic conditions are widespread at depth below a cover of glaciolacustrine clay extending beyond the most easterly drill holes.

Drill Holes 80-4, 80-6, 80-9 and 80-10 were collared in glaciolacustrine clays which in general are thinner and not as widespread on surface as in the Southern Basin. Although a 93 ft.(28 m) section of the clay was cut in Hole 80-2, shallower water conditions prevailed in the proglacial lake due to proximity to the height of land and the presence of thick esker deposits. This resulted in a proportionately greater amount of glaciolacustrine sand as intersected in holes such as 80-1, 80-7 and 80-14.

Clay stratigraphy is similar to that in the Southern Basin. Oxidized clay at surface is transitional to grey,

and varved grey clay within 14 ft.(4 m) of surface. Basal sections of the clays are typically fine-sandy and silty clay grading to fine sand. Brown ozidized clay at 28 ft.-(8.5 m) in Hole 80-6 may record a temporary cessation of sedimentation.

Fine sands and silts found in glaciolacustrine aprons are composed of well-sorted quartz, feldspar and lesser lithic fragments and exhibit yellow to red-brown oxidation at surface. Thicknesses vary from 7 ft.(2 m) in Hole 80-14 to 103 ft.(31 m) in Hole 80-1. Wood chips and conifer needles were sampled in Hole 80-1 between 70 and 85 ft.(21 and 26 m). As many as seven periods of quiet water lacustrine sedimentation are indicated by the presence of layers of clay in the section. A 22 ft.(6 m) thick fossil glaciolacustrine sand apron was identified overlying a compacted lake clay and glaciofluvial sediments, and succeeded by till units at depth between 45 and 67 ft.(14 and 20 m) in Hole 80-6. This indicates that the process of melt water ponding and washing of glaciofluvial sediments operated with each successive glacial readvance.

The remnant lacustrine clay horizons intersected between tills at depth in Holes 80-4, 80-6 and 80-12 are platey, stiff, sandy clays and are distinctly different from uncompacted clay deposited by the final stage of glaciolacustrine deposition within the Northern Basin.

6.3 Quaternary Stratigraphy of the 1981 Winter Drill Area

6.3.1 Introduction

Results of the 1980 summer drilling program indicate that glacial overburden in the Kirkland Lake area occurs in two distinctly different assemblages separated by the Hudson Bay-St. Lawrence divide. South of the divide, the overburden is an uncomplicated sequence of basal till, glaciofluvial clastics and glaciolacustrine fine sands and clays. In contrast, the overburden north of the divide is a complex assemblage of; 1) basal till, debris flows; and 2) undifferentiated tills or interstratified tills and glaciofluvial sediments with thin intercalations of lacustrine clays in the upper levels of the sedimentary sequence. These are overlain by and interdigitate with glaciolacustrine clays and fine sands. The 1980 summer drilling north of the divide was confined by road access to the east flank of the Highway Esker and it was recognized that this complex represented a unique glacial depositional environment and that drilling further east in areas remote from the esker would probably intersect a less complicated overburden section.

In the 1981 winter program, eight holes extended drill coverage to the east of the Highway Esker complex north of the divide in Benoit and Melba Townships. A further 14 holes were drilled between the Airport and Munro Esker-delta systems in an area centered 6 miles (10 km) east of the Highway Esker complex. This extended the drill coverage

both north and south of the divide in Morrisette and Lebel Townships. The 1981 winter drilling verified that the number and diversity of glacial stratigraphic units on the east flank of the Highway Esker-delta complex north of the divide, at least within the Kirkland Lake (KLIP) area, are unique and are not developed elsewhere in the areas drilled to date.

The complexity of the Highway Esker-delta sedimentation may be attributed to the following: the markedly larger areal dimensions of the Watabeag-Highway Esker systems compared to other esker systems in the region suggests that it represents the major spillways for melt waters emanating from the retreating Laurentide ice mass. Larger volumes of water were available to supply greater sediment load in contrast to other eskers. In addition, at least one southward oscillation of the ice front resulted in the ice margin overriding earlier deposited glacial materials. The greater average depth of overburden indicates that overburden has been either preferentially channeled and deposited within the Black River fault valley (the valley itself possibly down-faulted in this area) or simply preserved in this bedrock depression. Similar complex glacial stratigraphy, previously drilled in the Matheson area just northwest of the KLIP drill area (Thompson 1979), supports the concept that the overburden sequence found in the flanks of this Highway Esker is not merely a function of greater contribution of available sediments and their preservation but is also the

result of a glacial event which affected only the northeast section of the KLIP area.

6.3.2 Sedimentary Units

The overburden sediments are subdivided into five units on interpretation of drilling results in both the 1980 and 1981 programs. These are:

- Basal or lodgment till: sub-glacial debris deposited at the glacier sole.
- Debris flows: turbidite sediments which are till-like in appearance and represent en-glacial and supra-glacial material melting out and flushed off wasting ice as debris flows and deposited on the lake bottom peripheral to the ice front.
- Undifferentiated till: sub-glacial debris deposited at the glacier sole but occurring in various stratigraphic positions other than on bedrock.
- Glaciofluvial sediments: coarse clastics deposited in ice contact, esker streams, and sub-aqueous fans and delta environments. This unit includes rhythmic successions of coarse clastics and clastics-clay diamicton rhythmites.
- Glaciolacustrine sediments: well-sorted fine sands, silts, and varved clays which settled from the proglacial lake.

Basal Till

From 6" to 12' (15 cm to 3.6 m) of basal or lodgement till lying on bedrock is preserved within depressions between bedrock drift complexes in three separate areas. In general, basal till averaged 3 ft. (1 m) or less in thickness as guaged from 12 holes numbered 81-2, 81-3, 81-8, 81-9, 81-13, 81-14, 81-16, 81-19, 81-20, 81-22, 81-23 and 81-25, which intersected this unit.

Basal till is identified by its poor sorting, green-grey colour of the silt and clay matrix, and angularity of the largely intermediate volcanic rock coarse fraction. The basal till in the winter 1981 area is a pebbly to gravely sand till which is locally cobbly and granular. The distinctive green-tinged clay and silt matrix amounts to less than 5% to 20% of the -10 fraction. This indicates the overall matrix clay-silt is less than 10%. The 80% clay-silt matrix in Hole 81-14 was logged in basal till under glaciolacustrine clay. Clay content decreases with depth which suggests the overlying glaciolacustrine clay has somehow become mixed into the till. Gravels classified as glaciofluvial or washed till in Holes 81-8, 81-19 and 81-20 varied from well-sorted open work to poorly-sorted with grey to greenish silt-clay matrix with depth. The grading with depth to underlying basal till having similar coarse clast sorting and lithology suggests that the upper portions of the basal tills have been reworked by lake water action. The upper portion of the basal till in Hole 81-14, and the

basal till in Hole 81-13, show brown-tinged colour of the matrix silts and clays characteristic of oxidation. The elevations of these oxidized tills coincide with stabilized proglacial lake levels in the area reported at 290 m and 320 m by Baker and Storrison (1979). Aerated ground water flow at this base level during the periods of lake level stability may account for the oxidation of these tills.

Debris Flows - Turbidites

Debris flows (turbidites) were intersected only in Holes 81-2, 81-6 and 81-21. This 2 to 3 ft (0.6 m to 1 m) thick unit is till-like in appearance in that it is a diamicton having poorly-sorted coarse cobbles and pebbles and a matrix which produces grey silt-clay balls on the 10 mesh screen during sample recovery. It is distinguishable from a true till only by the greater degree of rounding of pebbles and cobbles, in addition to a grey rather than the grey-green matrix colour characteristic of till. The lack of compaction, rounding of clasts and poor sorting are similar to glacio-fluvial rhythmites except the clay-silt in rhythmites is bedded (platey).

This turbidite unit occurs only locally associated with glaciofluvial esker sediments which they overlie within 10 ft. to 30 ft. (3 m to 10 m) above bedrock subcrop. The debris flows, as the term implies, were formed through the supraglacial accumulation of melt-out englacial debris which then slumped or flowed off the ice margin to be deposited on

the proglacial lake bottom. Alternatively, the source of this unit may be englacial debris melting out from the base of floating ice.

Undifferentiated Till

A distinctive 3 ft. (1 m) coarse cobbly diamicton was intersected in Hole 81-21. An angular sandy diamicton, interpreted to be debris flows, underlie this unit at 93 ft. (28.3 m) whereas glaciofluvial gravels overlie it. A feature distinguishing this till from debris flows is the colour of the grit-sand-silt matrix which forms green coloured, rather than grey, sand-silt balls during screening. The presence of this unit indicates a minor advance or oscillation in the ice front which deposited a later stage basal (?) till. This interpretation is supported by the compacted nature of the underlying lake bottom sediments and clastic units.

Glaciofluvial Sediments

Glaciofluvial sediments ranging in thickness from 1 ft. to 129 ft. (0.3 m to 39.3 m) were intersected in 19 holes. Holes 81-4 and 81-5 were drilled on the Airport Esker whereas the remaining holes intersected glaciofluvial sands and gravels buried beneath glaciolacustrine clays or sand aprons flanking the eskers. Of these, Holes 81-9, 81-11, 81-13 and 81-14 were drilled on the flanks of the Airport Esker; Holes 81-11, 81-12, 81-15, 81-16, 81-17,

81-18, 81-19 and 81-20 tested overburden between the Munro and Airport Eskers; and Holes 81-6 to 81-8, and 81-21 to 81-25 were collared on the east flank of the Highway Esker-delta complex north of the divide. Hole 81-2 was put down on the west flank of the complex south of the divide.

Glaciofluvial gravels were identified by the high degree of rounding of coarse clasts, good sorting and lack of significant silt or clay matrix in poorly sorted intervals. Gray to beige, medium to coarse sand matrix generally forms 30% to 40% of the bulk but varies from less than 5% (in open-work gravel) to 50%. Commonly, gravels are cobbly and granule-rich. Glaciofluvial sand units are often granular, medium to coarse grained, and brown to beige in colour.

Open-work gravels were found in Holes 81-2, 81-5, 81-11 and 81-21. These are characterized in drilling by poor return of drilling fluids through loss of water to the gravels. Permeable glaciofluvial sand and gravel aquifers were identified in Hole 81-6 at two stratigraphic positions.

Coarse-clast lithology of the gravels is dominantly intermediate volcanics with a lesser mafic volcanic component reflecting a source in the Blake River Group volcanics which underlie most of the drill area. Argillite cobbles and pebbles in gravels from Holes 81-2 and 81-3 are derived from the underlying Cobalt Group Gowganda Formation. Traces of limestone (in the +10 fraction) were recorded in the laboratory for 29 glaciofluvial samples. The source of

these limestone clasts is presumed to be the Paleozoic limestones on the Hudson Bay platform. Thus the glaciofluvial gravels contain bedrock material derived from both near and distant sources. However, the fact that only traces of limestone remain in the +10 fraction of the glaciofluvial gravel is important inasmuch as this gives a perspective on relative transport distances. Economic minerals and favourable lithologies encountered in thedrilling can be assumed for by and large to be derived from sources located within a reasonable up-ice distance of glaciofluvial sample sites.

A rhythmic succession of upward-fining coarse to fine glaciofluvial clastics and interbedded clays was recognized in Holes 81-2, 81-21, 81-22 and 81-25. These sequences varied in thickness from 30 ft. to 61 ft. (9 m to 18.5 m) and stratigraphically overlie buried glaciolacustrine sand and clays and are succeeded by a later phase of glaciolacustrine deposition.

These glaciofluvial rhythmites are interpreted to represent seasonal or cyclic influxes of coarse clastics followed by quiet glaciofluvial or glaciolacustrine deposition of silts and clays. The depositional environment of these rhythmites was probably close to the ice margin. Ryhthmites were laid down during a short halt and/or slow withdrawal following the southward oscillation of the ice front which deposited the undifferentiated till and debris flows occurring above the buried glacial lacustrine deposits found in Benoit and northeastern Melba Townships.

Glaciolacustrine Sediments

Twenty-one holes were collared in glaciolacustrine clays and sands which, according to surface mapping (Baker and Storrison 1979; Baker 1980a; Baker et al 1980; Baker, 1981 in press), cover approximately 95% of the drill area.

The clays vary in thickness from 7 ft. to 96 ft. (2 m to 29 m) with an average thickness of approximately 49 ft. (15 m). The average depth of the clays drilled during the winter program is considerably greater than during the summer program.

Organic deposits of mud, muck and peat are developed on the clays at surface. These average 1 to 3 ft. (0.3 m to 1 m) with the thickest measuring 10 ft. (3 m).

Clay stratigraphy is 1 to 12 ft. (0.3m to 3.6 m) yellow-brown surface-oxidized clay grading into grey clay. At the water table, grey clay is watersaturated and becomes soupy and sticky. Plastic and soft clays become stiff and semi-plastic with depth. Light and dark grey varves were observed in nine holes numbered 81-1, 81-6, 81-7, 81-10, 81-17, 81-20, 81-22, 81-23 and 81-25. Dark bluish grey clay below grey clay was seen only in Holes 81-6, 81-17, 81-20, 81-23 and 81-24. The elevation of the upper contact of these dark grey clays does not correspond f om hole to hole. The darker coloration does not appear to have been a function of depth but must have been related to local reducing conditions or a local influx of darker coloured suspended load within the proglacial lake. Rounded to

to spherical dropstones in thin layers within clay are common near the base of the glaciolacustrine sediments which commonly display a lowermost section of up to 10 ft. (3 m) of very fine sand and silt.

Brownish-grey, slightly oxidized clay, sandwiched between grey clays, was logged in Hole 81-1 between 22 and 27 ft. (6.7 m and 8.2 m). As Hole 81-1 is located on the southeast shore of Lake Kenogami, this brownish-grey clay may represent previously exposed glaciolacustrine clay which was subsequently buried by recent clays in Lake Kenogami.

A 1 ft. (0.3 m) thick dark brown mud unit of terrigenous appearance was encountered at 117 ft. (35.7 m) in Hole 81-8. Overlying a sequence of basal till and glaciofluvial gravels and sands, this unit lies at the base of glaciolacustrine fine sands. The oxidized organic-rich nature of this is unique among deep sediments encountered in the present drilling program. The source and depositional environments of the dark brown mud is as yet unknown.

Glaciolacustrine silts and well-sorted very-fine and medium sand intersections range from 16 to 84 ft. (5 m to 26 m). These deposits are found either at the base of clay sections or are exposed at surface adjacent to eskers. The thickest accumulation was drilled in Hole 81-19 on the west flank of the Munro Esker in Morrisette Township. A wedge of medium to fine sand is developed as a marginal facies to the glaciofluvial sediments of the esker core, thinning westward and interfingering with glaciolacustrine

clays. Fine to medium glaciolacustrine sands are difficult to differentiate from glaciofluvial sand deposited in esker-delta environments on the basis of granulometric characteristics alone. Constrasting compositional maturity distinguishes these sands in as much as glaciolacustrine sediments are quartz-rich and well-sorted with a higher degree of rounding/sphericity, as well as having lower feldspar and lithic fragment contents.

Wood chips associated with fine pebbly dropstones and platy clay beds within a fine sand section were collected at 79 ft. (24 m) and 84 to 87 ft. (25.6 to 26.5 m) in Hole 81-8. These were sent to OGS for C^{14} age dating.

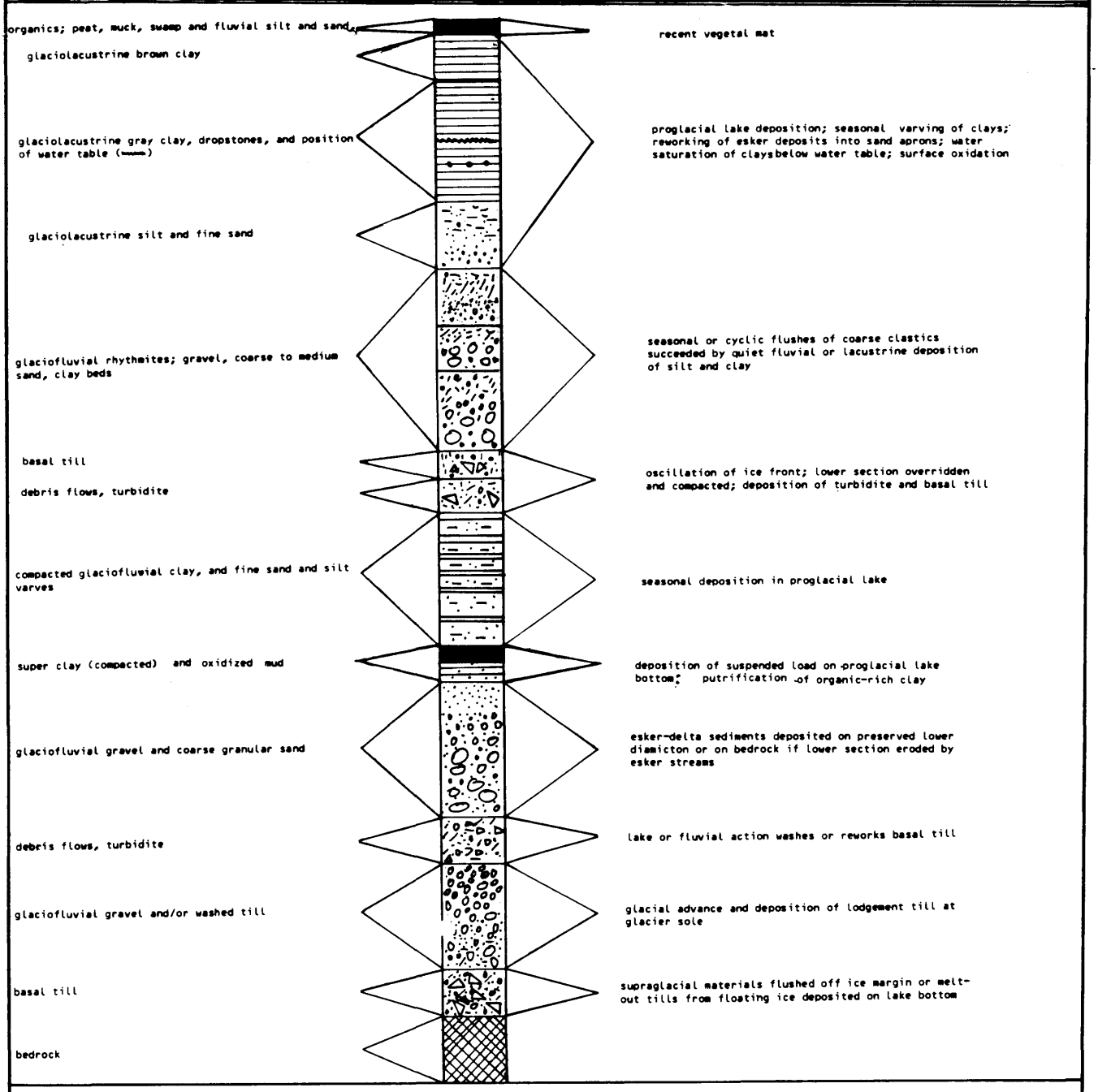
Buried glaciolacustrine clay and/or sand were intersected in 8 holes. Thin clay beds intercallated with glaciofluvial gravels were logged in Holes 81-3 and 81-5. In Holes 81-7, 81-8, 81-13, 81-14, 81-19 and 81-22, very fine to medium sands ranged in thickness from 2 ft. to 82 ft. (0.6 m to 25 m). Average thickness of this buried unit is 45 ft. (13.7 m). These sands resemble glaciolacustrine sands at surface in that they are characterized by good sorting and rounding/sphericity with similar content of feldspar and lithic fragments. In Hole 81-25, 68 ft. (21 m) of clyclothems composed of compacted grey clays (superclay) and very fine sands and silts overlie a lower sequence of glaciofluvial rhythmites. This sequence represents a period of seasonal proglacial lake deposition during the interval between retreat of the ice front and the minor readvance

recorded in glacial stratigraphy in the northeast sector of the drill area.

An idealized overburden profile illustrating the sequence of glacial events in the 1981 KLIP drill area is presented in Figure 7. While acknowledging that individual units, from which the idealized profile is constructed, are discontinuous both spatially and temporally, (in that they may be unique to specific depositional environments such as the Highway Esker and localized effects of glacial re-advance) the profile summarizes glacial events in the KLIP area as interpreted from drill logs.

Figure 7

Idealized Overburden Profile Illustrating the Sequence of Glacial Events in the 1981 KLIP Drill Area



(see Fig. 2 for Graphic Log Legend)

7. GUIDELINES FOR DRIFT EXPLORATION IN THE DRILL AREA

7.1 Criteria for the Application of Drift Prospecting

Cost effective exploration involves the selection of prospecting methods which fit both the character of the type of mineral deposit sought and the physical environment of the area to be investigated. Theory and case histories of overburden drilling and exploration are provided by Averill (1978) and Thompson (1979). Thomson and Wadge (1980), Averill and Thomson (1981), and Thomson and Lourim (1981), recommended guidelines for drift prospecting with the overburden drill in the Kirkland Lake area. In drift exploration a knowledge of the provenance and mode of deposition of any surficial deposit, its thickness and stratigraphic position, are critical to interpreting the significance of heavy mineral and geochemical anomalies and in tracing them to source. The character of the various surficial sediments sampled in the present program is thus considered further in terms of their application to drift prospecting.

7.1.1 Till

The most reliable sample medium is lodgment till where derived directly from bedrock. Compact lodgment or basal till (Unit 1 - Chart 2) is transported in the base of the ice and deposited from moving ice at the bedrock-ice interface. Many variables affect the depositional thickness

of till and the most important of these are the amount of material available for incorporation in the ice, the efficiency of the ice in eroding the material and the environment where deposition takes place. If very little material is abraded and carried by the ice, the dispersal trains from economic mineral concentrations in the bedrock are liable to be narrow and discontinuous and anomalies may be correspondingly weak and erratic. Thicker till sheets tend to provide a much larger and more continuous dispersion fans. Where thick till is overridden and the upper sections eroded by subsequent advances, the original dispersion train may be truncated at the contact with upper, younger units. The relatively high sulphide content of tills in comparison with glaciofluvial clastics demonstrates the importance of till in drift exploration. Retransported second generation tills are generally a poorer medium to sample because of dilution of primary dispersal trains derived from the older tills.

When tracing anomalies found in undifferentiated tills, the explorationist should be aware that secondary anomalies, derived from dispersal trains in older tills or placer material in glaciofluvial sediments, may have contributed to the heavy mineral fraction isolated for study. On the other hand, these tills could have derived anomalous heavy mineral concentrations directly from ore deposits outcropping on bedrock at higher elevations and thus provide a direct indication of mineralization. Discrimination between the

different sources of heavy minerals will require further close-spaced overburden drill holes in addition to a good knowledge of the local glacial stratigraphy.

7.1.2 Debris Flows - Turbidites

The various possible origins for debris flows renders follow-up of any anomalies found in this unit more difficult. Debris flows may originate as meltout material, either subglacially from floating ice or supraglacially as materials washed off the ice front, or they may occur as flow tills interlayered with glaciofluvial sediments debouching from the ice front. The debris flows may suffer a loss of finely comminuted material through washing and oxidation. In general, however, any anomalies will be somewhat further removed from source than those in basal or lodgment tills.

7.1.3 Glaciofluvial Clastic Sediments

Glaciofluvial sediments are typically further transported from source than tills and hence are the least favourable sampling medium. However, relatively short transport distances for gravels in the KLIP area suggested by results of the 1980 summer program, indicates that gravels can be a useful sample medium. In this area, detailed inspection of the coarse fraction of the +10 mesh portion of the sample generally provides information on bedrock lithologies immediately up-ice. The oldest, or lowermost,

glaciofluvial sediments are naturally preferred since they contain the highest proportion of material derived from local lithologies. Sediments higher in the profile normally contain material from more distant sources in addition to reworked and possibly placer heavy mineral concentrations. These sediments require very careful sampling and detailed interpretation to determine source areas.

7.2 Drift Prospecting in the Southern Basin

After overcoming bedrock resistance in the area of the height-of-land, the advance of Wisconsinan ice probably experienced an increased rate of flow. The reduced pressure at the glacier sole in the down-ice shadow of the height-of-land and wet conditions of basal ice caused by the reduced pressure and possible water-damming near the ice front, likely resulted in fairly clean ice along the glacier sole. These conditions during advance, together with the interpreted cessation of basal ice flow along the glacier sole during recession, resulted in the deposition of a thin basal till within the drill area in the Southern Basin. The size of the target dispersal fans in either the till or the debris flow unit are likely to be small and discontinuous. Thus in addition to any strong anomalies encountered, weak heavy mineral anomalies detected in the thin till will assume importance in any exploration program.

The 1980 summer drilling determined that bedrock materials appear in thin glaciofluvial gravel units within 1 to 3 miles(1.5 to 5 km) downstream. Heavy mineral concentration of gold and base metal sulphide minerals capable of surviving fluvial transport over this distance could be traced to source by further overburden drilling.

7.3 Drift Prospecting in the Northern Basin

Basal till was buried by later stacked tills and by glaciofluvial clastics as repeated ice margin fluctuations modified earlier deposits and left their own record. Continued flow of ice conveying debris to the glacier snout,in addition to greater supply of remnant glacial sediment from previous advances, readily available for ice transport,accounts for the increased thickness of till and till-like units. In part, upper diamicton units logged as tills may actually be debris flows. Heavy mineral anomalies discovered in lodgment till (Unit 1 - Chart 2) adjacent to bedrock in depressions will not be far removed from bedrock sources; however, younger tills (Unit 3 - Chart 2) higher in the stratigraphic column have incorporated other glacial materials. Overriden glaciolacustrine sediments have contributed clay to the overlying upper basal tills (flow-tills or turbidites) in deep depressions whereas elsewhere, at higher elevations, gravelly-sand tills succeed glaciolacustrine clay and are most probably derived froma combination of older glaciofluvial material, till and possibly new material

eroded from bedrock. Therefore, very weak heavy mineral anomalies would be expected and, if detected in reverse circulation drilling, would be worthy of follow-up.

Glaciofluvial sedimentation persisted in the area now marked by the Highway Esker during each oscillation of the ice margin and permitted a great accumulation of material in the esker-delta complex. The oldest or lowermost glaciofluvial sediments probably formed in a regime comparable to that in the Southern Basin and similar procedures might apply to tracing heavy mineral anomalies. Intervals higher in the stratigraphic section would be expected to contain reworked glaciofluvial materials and hence locating the bedrock source would require considerable further effort and detailed interpretation.

7.4 Sub-surface Conditions Affecting the Interpretation of Airborne Geophysical Anomalies

Airborne geophysical surveys most affected by inhomogeneity, variable depth and conductivity of overburden are electromagnetic surveys. In effect, the added depth of glacial overburden reduces depth penetration of the electromagnetic field into bedrock. Conductive glaciolacustrine clays act as weak horizontal conductors which absorb and attenuate the primary field as well as induced secondary fields produced by bedrock conductors. Weak response from horizontal sheet-like clay conductors is minimized by

vertical transmitter coil configurations commonly used on airborne systems which at the same time maximize the induced signal from the often steeply dipping bedrock conductors found in Precambrian terrain. Integrated horizontal and vertical coil configurations are used on several popular AEM systems which in theory are designed to detect both shallow dipping and vertically dipping bedrock conductors.

The deep and relatively uniform glaciolacustrine clay cover within the Southern Basin would be expected to effectively mask response from any shallow dipping, weakly conductive bodies as well as vertical dipping bodies of limited extent. This clay mantle should present no problem in detecting vertically dipping sheet-like or tabular conductors with relatively great depth extent and weak conductors of great strike length which extend into shallow burried or exposed bedrock in bedrock-drift complexes. Interpretation of geophysical anomalies should therefore take into account the weaker signal strength of the anomalies to be expected in conductors continuing under overburden in bedrock depressions.

Small deposits concealed beneath clay in bedrock depressions, such as conductive gold-sulphide deposits occurring along non-conductive fault zones, could easily remain undetected. Therefore, other exploration tools such as overburden drilling are required to achieve effective coverage of geologically favourable areas.

The greater average depth of overburden, the interlayering of glaciolacustrine clay or clay tills with glaciofluvial clastic sediments and the lenticular character of clays within the glaciofluvial sediments in the Northern Basin, is expected to produce "noise" which will effectively mask shallow dipping conductors as well as short-strike length vertical conductors. Interpretation of AEM anomalies lying beneath thick glaciofluvial sediments should be relatively simple since most of these non-conductive sediments lie directly on bedrock. The strength of such anomalies would, of course, be an inverse function of the depth of the glaciofluvial clastics.

The abundant magnetite in the dispersal train derived from the iron formation at the Adams Mine in Boston Township, may be detectable by high sensitivity magnetometer surveys. Effects of magnetite in the overburden would probably be seen as a slight distortion in the regional magnetic trend south of the Adams Mine.

8. THE NON-MAGNETIC HEAVY MINERAL CONCENTRATES

8.1 Binocular Microscope Identification of the Heavy Minerals

Estimation of the relative abundances of minerals in the non-magnetic heavy mineral concentrates was carried out with a 7 to 30 power binocular microscope. A routine grain-counting technique was employed in order to reduce subjective bias introduced during mineral identification by several geologists. The first step involved separation and estimation of the abundance of residual magnetite that had not been removed previously by hand-magnet. The abundance of magnetite was estimated by comparing the grid areas of each fraction of the concentrate. The non-magnetic fraction was then examined in detail for gold, base metal sulphides and gangue minerals of potential economic significance.

The second step involved a grain count. The magnetic and non-magnetic fractions were returned to the sample vial and remixed by shaking. The concentrate was then evenly distributed on grid paper and a square containing approximately 100 grains was selected for counting. The total count of each of the individual minerals identified, with the exception of magnetite, were summed. The reciprocal of this sum, multiplied by 100% minus the percent magnetite, produced a constant by which each mineral-count total was multiplied to obtain the relative percentage within the concentrate.

Crystal habit, lustre, twinning, cleavage and hardness were employed for the identification of heavy minerals. To a limited extent, use of the petrographic microscope and standard oils aided in determining isotropy and relative refactive index of certain minerals.

The minerals identified and their relative abundance (%) were entered on forms provided by the OGS (Appendix D). Additional minerals, generally not common to the mineral concentrates, and information such as grain size and sorting were also recorded on the forms.

8.2 Mineralogy of the Summer 1980 Heavy Mineral Concentrates

8.2.1 General

The most abundant heavy minerals identified in concentrates are a suite common to samples taken in the 1979 KLIP program and generally representative of englacial overburden elsewhere. The most common minerals identified in the non-magnetic concentrate are, in order of abundance: garnet, epidote, pyroxene, sulphides, zircon group minerals and ilmenite. Small percentages of an emerald green mineral (possibly chrome diopside) and a colourless vitreous mineral (spinel?), in addition to residual magnetite, were also consistently identified. Occasionally, the low specific gravity minerals quartz and amphibole are reported in the concentrates. A general estimate of the average abundances

in the +125 micron vs the -125 micron fractions for the most common minerals constituting 70%-80% of heavy minerals in tills and glaciofluvial clastics is:-

	%Garnet	%Epidote (+125μ/-125μ)	%Pyroxene (+125μ/-125μ)	%Sulphides (+125μ/-125μ)
Southern Basin				
Till	24/21	22/24	20/28	2.9/1.5
Glaciofluvial Clastics	27/20	26/27	21/25	1.1/0.9
Northern Basin				
Till	28/23	28/23	25/32	3.2/2.9
Glaciofluvial Clastics	40/19	21/19	18/26	1.5/1.0

Absolute abundances of these minerals in tills are lower in the Southern Basin. Felsic intrusive stocks constitute almost 50% of the survey area in the Southern Basin in contrast to the volcanics which dominate in the Northern Basin. Increased quantities of zircon group minerals derived from the intrusive stocks dilute those minerals generally related to the metamorphic and volcanic rocks.

In the Northern Basin, garnet, epidote, and the sulphide minerals show a slight tendency to occur perferentially in the +125 micron fraction and, except for epidote, the same is true in the Southern Basin. This suggests that epidote has undergone further transport and was probably derived mainly from the north. Contact metamorphic effects from the intrusion of the felsic stocks in the Southern Basin have raised the metamorphic grade to the almandine-amphibolite facies in which epidote is unstable, resulting in a smaller proportion available for glacial transport. Pyroxenes occur preferentially in the -125 micron size. Since the likely origin is in fine grained

volcanic rocks, the grain size of pyroxenes is probably a reflection of their source rock characteristics.

Average distribution and ratio of occurrences in +125 vs -125 micron sizes for glaciofluvial clastics is similar to tills. It is significant that sulphide content, although generally low, is 2 to 3 times as high in tills as it is in glaciofluvial clastics. Sulphide (pyrite) contents are reduced by fluvial comminution and oxidation to about half that of tills whereas proportionately, garnet has a marked increase in the +125 micron fraction due to its resistance to abrasion and chemical stability.

8.2.2 Heavy Mineral Distribution Patterns

Gold

Native gold is readily identified during shaker table pre-concentration. With approval from OGS, DMB requested the laboratory to report on any gold seen while tabling samples. Visible gold colours were seen in 45 samples; however, during logging of the heavy mineral concentrates no gold was observed. It can be assumed that most of the free gold will be in the three-quarter split sent for geochemical analysis. Furthermore, since only a few thousand mineral grains from each concentrate were examined under the microscope, one or two very fir grains of gold can easily be overlooked.

Table 3 correlates visible gold identified during tabling with anomalous heavy minerals in the concentrates and the classification of the sample in which the gold was found.

Past experience in overburden drilling has shown that trace quantities of gold distributed throughout the overburden column are generally related to erratic occurrences of quartz veining in volcanic rocks throughout the Precambrian terrain. With the exception of Hole 80-24 most of these are therefore of little consequence. One gold grain in sample 24-02 (mafic glaciofluvial gravel) and four more in the sample 24-03 (basal till) occur superjacent to tuffaceous andesite-basalt rock with minor carbonatization and quartz carbonate veinlets carrying very fine disseminated pyrite.

Limonitized pyrite, trace chalcopyrite, pyrite with quartz, massive pyrite and hematite in concentrates of Hole 80-24 are additional indicators suggesting that this is a significant anomaly. Bedrock in Hole 80-25, some 4 km (2 1/2 miles) west of Hole 80-24, contains very fine, weakly disseminated pyrite in basaltic rock which may be in part intermediate tuff. Carbonate and quartz veinlets are also noted on the drill log. The mafic glaciofluvial gravel overlying bedrock in Hole 80-25 also contains about 4% pyrite in the heavy mineral concentrates. Hole 80-24 and 80-25 were collared in Eby Township approximately 3 km down-ice of the Kirkland Lake-Larder Lake "Break".

Table 3

SUMMER 1980 SAMPLES WITH VISIBLE GOLD IDENTIFIED DURING SHAKING TABLE PRE-CONCENTRATION

Sample No. KLIP-80-	Visible Gold (Au) Colours	#Indicator Heavy Minerals in Concentrates	Sample Classification
02 - 01, 02, 03	1		*G.F. Pebbly sand
- 09	1	Corundum, rusty light mineral	G.F. Granular sand
03 - 07	1	Sulphides	G.F. Cobbly mafic gravel
- 08	1		G.F. Cobbly mafic gravel
- 13	1		Clay till
- 16	1		Broken bedrock
04 - 01	1		G.F. Mafic gravel
- 02	1		G.F. Mafic gravel/till
- 03	2		Till
- 05	1	Pyrite with quartz (-125μ)	Till
- 06	1	Pyrite with quartz (+125μ)	Till
- 08, 09, 10	1	Pyrite with quartz (±125μ)	G.F. Bouldery cobbly gravel
- 20	1	Sulphides, pyrite with quartz	Till
- 26	1	Sulphides, pyrite with quartz	Till
06 - 02	1	Sulphides, pyrite with quartz (-125μ)	Till
- 06	1	Rock chips and pyrite with quartz	G.F. coarse cobbly gravel
07 - 01	2	Pyrite with quartz	G.F. mafic gravel
- 06	1	Hematite, pyrite with quartz (+125μ)	Gravel and till
- 08	1	Hematite, pyrite with quartz (+125μ)	G.F. Bouldery gravel
08 - 04	1	Pyrite with quartz	G.F. Coarse gravel

- Indicator means indicative of a potentially mineralized geological environment.
* - Glaciofluvial

Table 3
(Continued)

SUMMER 1980 SAMPLES WITH VISIBLE GOLD IDENTIFIED DURING SHAKING TABLE PRE-CONCENTRATION

Sample No. KLIP-80-	Visible Gold (Au) Colours	#Indicator Heavy Minerals in Concentrates	Sample Classification
08 - 11,	1	Sulphides, pyrite with quartz	Gravelly till
- 12	1	± Sulphides, pyrite with quartz	Gravelly till
09 - 06	2	± Sulphides, ± colourless vitreous mineral	Till
- 07	1	Hematite, pyrite with quartz	Till
- 08	2	± Sulphides, pyrite with quartz	Till
10 - 03	1		Till
- 10	1	± Sulphides	Till
11 - 01	1		Till
- 06	1		Till
- 08	1	Colourless vitreous mineral	Till
15 - 05	1	Rock chips, massive pyrite	G.F. Gravell and sand
- 10	1		G.F. Gravel - washed
- 12	1	Sulphides. pyrite	G.F.
	1	with quartz	Gravel
- 14	1	Sulphides, quartz	Boulder till
- 15	2	Coarse crystalline pyrite; sulphides	G.F. Mafic granular sand
- 16	1	Olivine, rusty light mineral	Basal sand till
17 - 02	1	Rusty light mineral	Basal till
24 - 02	1	Limonitized pyrite, trace chalcopyrite, pyrite with quartz, massive pyrite and hematite	G.F. Mafic gravel
- 03	4	Massive pyrite, pyrite with quartz	Basal till

Table 3
(Continued)

SUMMER 1980 SAMPLES WITH VISIBLE GOLD IDENTIFIED DURING SHAKING TABLE PRE-CONCENTRATION

Sample No. KLIP-80-	Visible Gold (Au) Colours		#Indicator Heavy Minerals in Concentrates	Sample Classification
27 - 01	1			Basal till
28 - 01	1		Granular pyrite	Debris flow turbidite
34 - 01	2	?	Pyrite with carbonate, amphibole (-125μ)	G.F. Sandy gravel
35 - 01	3	?	Sulphides	G.F. Coarse sand to gravel
47 - 01	3 (1.1 mm grain)		Sulphides	G.F. Bouldery gravel
48 - 07	1		Pyrite with quartz, rock chips	G.F. Granular sand

TOTAL - 45 samples

Cross-faulting dislocates the Kirkland Lake-Larder Lake Break at the contact between Timiskaming Group metasediments and the Larder Lake Group, north of these holes, and is considered a favourable geologic environment for gold deposition. Gold-quartz-sulphide mineralization may be distributed along the break NNE of Hole 80-24. The mineral assemblages in Holes 80-24 and 80-25 are regarded as significant and further investigations are warranted in the area south of Kenogami Lake to trace the origin of the indicator minerals.

Sulphide Minerals

Traces of chalcopyrite were observed in Holes 80-1, 80-51 and 80-23. Chalcopyrite (± bornite) in Hole 80-1 occurs in +125 micron size lacustrine sands. This occurrence is of very minor significance to exploration, however, since it occurs in highly transported glaciolacustrine sands. The source of trace chalcopyrite in glaciofluvial gravels of Hole 80-51 may lie with sulphides in the Larder Lake Group volcanics to the north of this hole.

Elevated concentrations of sulphides of 7% to 48% were observed in basal till in Holes 80-38 and 80-47 and on high-standing glaciofluvial (esker) gravels in Holes 80-41 and 80-541 drilled in Boston Township. Pyrite is preferentially concentrated in the +125 micron size; however, the -125 micron size is also weakly enriched.

Pyrite and magnetite, massive pyrite and pyrite in quartz are additional minerals in Hole 80-541. Magnetite in the heavy concentrates of these holes approaches 30%-41% contrasting with magnetite in other concentrates which averages 8%-20%. Holes 80-38 and 80-42 were collared adjacent to, and in, an area of low ground and bedrock-drift complexes oriented parallel to the ice flow direction which would have channelled ice flow and influenced glacial dispersion. This depression extends 6 km (4 miles) north to the Adams Mine which is located within a broad band of basalts and Algoma-type iron formation. The enrichment of sulphides and magnetite in the concentrates of these widely spaced holes indicates a source of considerable areal extent which is thought to be the coarse pyritic horizons interbedded with the magnetite-cherts of the iron formation located at the Adams Mine.

Other Features

Single-hole sulphide-rich concentrates occur elsewhere in the drill area, e.g. Holes 80-32 and 80-35. This may point to gold mineralization at the north contact of the Otto Stock in the vicinity of the Blanche River Fault.

Enrichment in hematite, up to 21%, appears in till concentrates of Holes 80-09 and 80-10 drilled north of Bourkes in Benoit Township. Hematite linings on fractures in basalt bedrock were observed in Hole 80-08 drilled near the contact with a gabbro intrusive in the north half of the drill

area. Hematite alteration may be continous around this contact and may have contributed to the concentrates of Holes 80-09 and 80-10 drilled down-ice from this contact.

8.3 Mineralogy of the Winter 1981 Heavy Mineral Concentrates

8.3.1 General

Three mineral groups consistently accounted for approximately 80 percent of the minerals indentified in the one quarter splits of the heavy mineral concentrates. In order of abundance, these physically resistant and chemically stable minerals are pyroxenes, garnet, and epidote. Sulphides, hematite, ilmenite and zircon group minerals are commonly present together with the frequent appearance of colourless vitreous minerals, residual magnetite and a small percentage of emerald green material. Occasionally mild to light density minerals, such as quartz and amphibole are reported in the concentrates. A general estimate of the ratio of average abundance in the +125 micron versus the -125 micron fraction for the most common heavy minerals in tills and glaciofluvial clastics is:-

	%Pyroxene	%Garnet (+125μ/-125μ)	%Epidote (+125μ/-125μ)	%Sulphides
Basal Till (15 samples)	38/43	28/23	14/16	2/3
Debris Flows (4 samples)	35/36	28/36	17/16	3/3
Undifferentiated Till (1 sample)	41/34	17/20	30/19	1.5/1
Glaciofluvial Clastics (±100 samples)	38/40	30/24	14/14	3/3

The percentages of common heavy minerals show little variability between tills and glaciofluvial clastics in contrast to a wide variability in the area drilled during the 1980 summer program. This is readily explained by the relatively homogeneous source terrain of intermediate and lesser mafic volcanics in the winter area in contrast to a heterogeneous source terrain of mafic and intermediate volcanics, granite-syenite and gabbro intrusives, in addition to Gowganda and Timiskaming sediments which supplied material for the overburden drilled during the summer of 1980.

8.3.2 Heavy Mineral Distribution Patterns

Gold

An understanding of the natural geochemical abundance of the target commodity, its physical resistance to abrasion and its chemical stability in the glacial and periglacial environment, are important in the assessment of gold in heavy mineral concentrates. The very low natural abundance of gold, even in mineable concentrations, results in a correspondingly low probability of glacially dispersed gold from any ore deposits occurring uniformly in measurable quantities within heterogeneous glacial materials.

Physically and chemically stable gangue minerals, such as quartz and carbonates and heavy minerals, such as pyrite and other sulphide minerals, are commonly associated with gold deposits in much higher concentrations than gold. These, and alteration products, such as hematite, assume greater importance as "indicator heavy minerals" which can define an area as potentially auriferous even if visible gold is absent from the sample.

Samples containing unsually high concentrations of indicator heavy minerals and gold colours reported in concentrates during shaking table preconcentration are listed in Table 4.

Seventeen gold colours, varying in size from less than 50 microns to 1,200 microns, were counted in 7 overburden samples as they passed over the shaking table. This lesser number of gold colours, in contrast to the 45 colours found in the Summer 1980 program, is attributable to two factors:

(1) the fewer number of samples processed during the 1981 program, and

(2) much of the 1980 drilling was carried out south of the Kirkland Lake-Larder Lake Break in a geological environment proven to be favourable for gold deposition.

Gold was not observed during binocular microscope examination of the winter 1981 heavy mineral concentrates. It is thus assumed that most of the gold colours observed while tabling samples will be in the three-quarter splits submitted for chemical analysis. Since only a few thousand mineral grains from each concentrate were examined, one or two very fine grains of gold could easily be overlooked. This was the principal reason for requesting a visible gold count on the shaking table. All of the visible gold occurs in Melba and Morrisette Townships as described below:-

Table 4

WINTER 1981 SAMPLES WITH VISIBLE GOLD IDENTIFIED DURING SHAKING TABLE PRE-CONCENTRATION AND WITH ELEVATED CONCENTRATIONS OF HEAVY MINERALS

Sample No. KLIP-80-	Visible Gold (Au) Colours	#Indicator Heavy Minerals in Concentrates(%)	Sample Classification
01-01	0	sulphides (37.2), (+125μ) leucoxene (2.0)	sand on bedrock
02-01	0	ilmenite (11.6), sulphides (5.1), (-125μ), hematite (1.3)	gravel
05-05	2 (1 at 200μ, 1 at 250μ)	ilmenite (3.5), sulphide (2.7)(-125μ) trace chalcopyrite	gravel
05-10	2 (at 300μ)	nil	gravel (placer) thin unit on bedrock in Black River
05-12	0	sulphides (27.4 - 35.7%) (-125μ)	gravel
06-08	0	hematite (9.2 - 10.0), sulphides (3.1 - 6.7%) (±125μ)	sand and pebbly gravel
07-07	0	sulphides (4.6 - 9.8), hematite, (2), colourless vitreous mineral (12)	sand and gravel
08-03	0	sulphides (59.6), granular pyrite and pyrite with carbonate (+125μ)	fine glacio-lacustrine sand
13-02	1 (at 400μ)	sulphides (6.6), emerald green material (2), tr fine pyrite, pyrite with carbonate (+125μ)	cobbly gravel, sand matrix
15-01	0	sulphides (13 - 62.5), (±125μ), colourless vitreous mineral (15)	till (gravel?), Note: quartz-chalcopyrite-py bedrock

Table 4
(Continued)

WINTER 1981 SAMPLES WITH VISIBLE GOLD IDENTIFIED DURING SHAKING TABLE PRE-CONCENTRATION AND WITH ELEVATED CONCENTRATIONS OF HEAVY MINERALS

Sample No. KLIP-80-	Visible Gold (Au) Colours	#Indicator Heavy Minerals in Concentrates(%)	Sample Classification
19-04	3 (1 at 850μ, 1 at 400μ, 1 at 200μ)	sulphides (3.3), trace pyrite-bearing rock chips, coarse crystalline pyrite, fine pyrite (+125μ)	basal till
22-07	3 (1 at 150μ, 1 at 50μ)	sulphides (2.2), tr coarse crystalline pyrite, fine pyrite (-125μ)	gravelly sand (till?)
25-10	3 (1 at 1200μ, 1 at 400μ, 1 at 350μ)	sulphides (5.8), spodumene (3.0), pyrite with quartz, coarse crystalline pyrite, pyrite-bearing rock chips (±125μ)	coarse cobbly gravel (till?)
25-12	3 (1 at 400μ, 1 at 450μ, 1 at 500μ)	sphene (1), sulphides (1.2), magnetite (7.0), spodumene (5.0), coarse crystalline pyrite, fine pyrite, tr. pyrite with quartz hematite (+125μ)	coarse sand

Hole 81-25, Melba Township

Glaciofluvial gravel samples 81-25-10 and 81-25-12 each contained 3 gold colours. Pyrite-bearing rock chips, sulphides, pyrite with quartz and coarse crystalline pyrite were associated with the gold in sample 10. In sample 12, fine pyrite, traces of pyrite with quartz and coarse crystalline pyrite, although constituting only 1% of the sulphides, are considered to be further indicators of mineralization. Sample 10 occurs at the base of the glaciofluvial sediments whereas sample 12 occurs at the top of the gravel and basal till section at the base of Hole 81-25. The glaciofluvial sediments and the lower gravel/till section are dominantly composed of intermediate volcanics of the Blake River Group. Both sections are locally enriched in pebbles of hematite iron formation, banded chert, and bedded tuff and pyrite. A rounded pebble of massive pyrite containing a black mineral, possibly sphalerite, was found in sample 81-25-02 in the upper rhythmite section.

The Blake River Group is host to massive sulphide and gold deposits to the east in the Noranda-Malartic-Val d'Or area of Quebec. The chert-pyritic tuff-hematite iron formation may represent an exhalite suite lying up-ice of Hole 81-25. Exhalite lithologies are favourable for base metals and are particularly favourable for gold where occurring within felsic to intermediate volcanic sequences as has been proven in gold camps elsewhere. Additional drift prospecting in this area is warranted.

Hole 81-22, Melba Township

Three colours were observed in the -125 micron fraction of 81-22-07. This sample is from a glaiofluvial gravelly sand. Both fine and coarse crystals of pyrite, amounting to 2%, are present in the concentrate. This hole is located approximately 1.5 miles (3 km) north-northeast of Hole 81-25. A 2 ft (0.6 m) rhyolite tuff boulder was cut lower in the sequence in Hole 81-22 and this may be derived from a common source for both Holes 81-25 and 81-22. Since gold was not observed in the basal till of either hole, the source of the gold and this felsic pyroclastic exhalative environment is likely situated 1 to 2 miles (1.5 to 3.5 km) northwest of Holes 81-25 and 81-22.

Hole 81-19, Morrisette Township

Basal Till sample 81-19-04 carried three colours of gold and 3% sulphides, including traces of pyrite-bearing rock chips and fine and coarse crystalline pyrite. This hole is located on the west flank of the Munro Esker where gold has been previously reported in glaciofluvial esker sediments (Lee, 1963; Averill and Thomson, 1981; Thomson and Guindon, 1979). The occurrence of gold in basal till indicates a potential bedrock gold source immediately up-ice of Hole 81-19. Abundant outcrop is exposed northwest of Hole 81-19; however, bedrock directly to the north and northeast is concealed by deep glaciolacustrine fine sands and glaciofluvial esker deposits.

It is recommended that detailed prospecting of the bedrock-drift area and drilling of more overburden drill holes north of Hole 81-19 be undertaken to explore for the source of these gold anomalies.

Hole 81-05, Melba Township

"Airport esker" gravels carried 2 colours of gold in each of samples 81-05-5 and 81-05-10. Both these samples have slightly raised contentrations of ilmenite in addition to 3% sulphides in sample 5. 36.7% sulphides were recorded in sample 12 and considerable excess residual magnetite (6% to 9%) was removed from samples 10 to 12. The sulphides in association with ilmenite and residual magnetite are indicators of placer heavy minerals within the esker and hence are far removed from source.

Hole 81-13, Morrisette Township

In Hole 81-13, one gold colour is associated with fine pyrite and pyrite with carbonate amounting to 7% in a cobbly gravel in sample 81-13-02. Gold was not observed in the concentrates of the underlying basal till in this hole; therefore, the gold in esker gravel may be of placer origin or derived from a bedrock source at least one mile up-ice of Hole 81-13.

Sulphide Minerals

The unusually high sulphide concentrations in Hole 81-15, 63%, are derived directly from bedrock sources. Sample 81-15-01 was taken adjacent to bedrock which contains

quartz veining and abundant pyrite with traces of chalcopyrite associated with the quartz. The Timiskaming greywacke host lies within half a kilometre south of its faulted contact with the Kinojevis Group volcanics; a setting favourable for gold deposition.

Very high sulphides (54%) in sample 81-08-03 appear to be a glaciolacustrine beach placer which formed through reworking of the 10% sulphides concentration in an underlying coarser, pebbly-sand beach deposit (sample 81-08-04).

Hematite

Elevated concentrations of hematite and sulphides in heavy mineral concentrates were recorded in gravel samples 81-06-08 and 81-07-07 taken near the base of glaciofluvial profiles, in Holes 81-06 and 81-07, respectively. Cherty hematite, black banded chert and cherty rhyolite pebbles were observed in the +10 mesh fraction of sample 81-06-08. As previously mentioned, massive pyrite, banded tuffs, cherts and hematite pebbles were noted in Hole 81-25 and also hematite was described in summer program Holes 80-09 and 80-10. Buff chert pebbles were identified in the basal till of Hole 81-08.

These six holes were drilled within a 5 to 6 km (3 to 4 miles) area centered over the Black River valley in the northeast sector of the drill area. Assuming that a single felsic volcanic - exhalite environment is the source for these minerals and grains and that the sulphide facies of the exhalite is more easily eroded, the floor of the Black

River bedrock depression, to the northwest of these holes, is recommended as a favourable area to prospect for both gold and massive sulphide deposits.

Spodumene

Spodumene, the lithium-bearing pyroxene, was identified in concentrations of 2% to 6% in gravel samples 81-25-02 and 07 and in basal till sample 81-22-12. Spodumene in Hole 81-25 occurs in the upper section of the glaciofluvial sediments indicating a long transport distance. The occurrence within the basal till of Hole 81-22, located 3 km north of Hole 81-25, suggests that a source of pegmatite and possibly uranium mineralization lies immediately northwest of Hole 81-22 in Barnet Township.

Diamonds

Various reports on the Kirkland Lake area have dealt with the potential for diamond occurrences (Lee, 1968; Averill and Thomson, 1981). During examination of the heavy mineral concentrates, particular care was exercised in examining garnets and pyroxenes to identify pyrope and chrome diopside as indicators of potential occurrences of kimberlite as a source for diamonds. Pyrope was not distinguised from other garnets and an emerald green material (chrome dioxide) appears to occur in small concentrations ranging from 1 to 8 percent in most of the holes throughout the 1981 KLIP drill area. An area favourable for diamond prospecting was not outlined.

8.4 Reproducibility of Heavy Mineral Distribution Patterns

Comparison of data obtained from heavy mineral concentrates for corresponding gravel horizons at the top of Hole 80-41 and adjacent test Hole 80-541 are of interest in testing the reproducibility of the survey technique.

Absolute abundances of common heavy minerals and sulphides (pyrite) in corresponding concentrates samples 80-41-01 and 80-541-01 (Appendix D) compare favourably. The increased concentrations of sulphides, from 7% to 13%, are two to four times the mean value and are readily apparent in both the -125 and +125 micron fractions in both holes. In corresponding samples 80-41-02 and 80-541-02 sulphides are enriched only in Hole 541. Sample recovery was intermittent to poor in these two holes and coupled with the normal hetrogeneity of materials in these glaciofluvial gravels, a variation in results is not unexpected. Geochemical analyses of these concentrates and the -63 micron fraction will likely show slightly less variability. As Averill and Thomson (1981), points out, metal content of undistrubed samples collected 10 ft. apart from the same stratigraphic level in an anomalous till horizon will normally vary by 50% or more. Conditions in which 100% recovery of materials is achieved from a homogeneous sampling medium in which ore constituents are evenly distributed are almost never met in the field as past experience with the reverse circulation method has shown. This again serves to stress the importance of carefully assessing the significance of weakly

anomalous heavy minerals or geochemical analyses in the light of the normally wide variability of ore constituents dispersed within glacial overburden materials.

9. GEOCHEMISTRY OF THE OVERBURDEN AND BEDROCK SAMPLES

9.1 Introduction

Geochemical analysis of samples collected during the Summer 1980 and Winter 1981 drilling was completed at commercial laboratories under contracts administered directly by staff of the Ontario Geological Survey. Final sample preparation, analysis and data compilation were co-ordinated by Ian Thomson, Geochemist, Geophysics/ Geochemistry Section, Ontario Geological Survey, assisted by D. Wadge and J. Lourim. The analytical data so obtained are presented in tabular form in Appendix E.

For this preliminary geochemical evaluation, the following materials were subject to a common analytical schedule:

A. Overburden Samples:

(i) -1700 mm + 0.125 mm (coarse) non-magnetic heavy (SG + 3.3) mineral fraction.

(ii) -0.125 mm (fine) non-magnetic heavy (SG +3.3) mineral fraction.

(iii) -0.063 mm whole sample sieved separate.

B. Bedrock Samples:

(i) +1.700 mm rock chips.

In addition to Au, Ag, and the normal base metals Cu, Pb, Zn, Mo, and Ni, most samples have been analyzed for U and As. In some samples, either the -1.700 + 0.125 mm or -0.125 mm heavy mineral fractions are too small to permit

analysis for Au, As and U as the analytical methods that are employed for these elements require a relatively large sample. A lack of sample material may be due to one of several causes including: loss of -63 micron material due to overflow of suspended fines at the time of sample collection; the thinness of some sampled overburden units and resultant paucity of heavy minerals; and lack of either +0.125 or -0.125 mm material in well-sorted glaciofluvial and glaciolacustrine sediments.

9.2 Sample Preparation

Initial preparation of all the overburden samples was completed by Overburden Drilling Management and is fully described in an earlier section of this report. Briefly, bulk samples of overburden material were processed into various grain size and specific gravity separates using sieves, a shaking table and heavy liquids. The prepared sample material together with all residues were delivered to the Ontario Geological Survey. Samples of bedrock obtained from the reverse circulation rotary drilling were delivered directly to the Ontario Geological Survey.

Prior to analysis, the samples received final preparation in the Geoscience Laboratories of the Ontario Geological Survey as follows:

(i) The coarse (-1.7 + 0.125 mm) non-magnetic heavy mineral fraction samples were pulverized to minus 0.125 mm in a ceramic mill.

(ii) The rock samples (plus 10 mesh chips) were mixed and split to yield a subsample which was ground to minus 0.125 mm in a ceramic mill.

The fine (-0.125 mm) non-magnetic heavy mineral concentrates and the minus 63 micron whole sample sieved separates passed directly to the analytical phase without grinding.

9.3 Sample Analysis

9.3.1 Analytical Procedures

The determination of Cu, Pb, Zn, Ni, Mo, As and Ag in the Summer 1980 samples was carried out by Barringer Magenta Limited of Toronto while these same elements were determined in the Winter 1981 samples by Bondar-Clegg and Company Limited of Ottawa. Both laboratories used the same analytical techniques specified by the Ontario Geological Survey.

For the determination of Cu, Pb, Zn, Ni, Mo and Ag a 0.25 g sample was digested in an acid mixture comprising 1 ml of HNO_3 and 3 ml of $HClO_4$ on a hot plate to fumes of $HClO_4$. After digestion, the solution was allowed to cool, diluted to 5 ml with metal-free water and mixed. Cu, Pb, Zn, Ni and Ag were determined by atomic absorption using an air-acetylene flame. Molybdenum was analyzed by atomic absorption using a nitrous oxide-acetylene flame. Prior to aspiration, a 1 ml aliquot of sample solution was mixed with

100 ml of a 20,000 ppm Al solution. Molybdenum standard solutions were prepared with a similar Al concentration.

For the determination of As, 0.25 g of sample material were mixed with 1 g of potassium pyrosulphate and fused. After cooling 5 ml of 6N HCl were added and the sample warmed gently on a hot plate. The resulting solution was transferred to a reaction vessel, to which 5 ml 6N HCl and 2 ml 15% K_2I were added, mixed and the solution allowed to stand for 5 minutes. 0.5 ml of stannous chloride were added and the solution diluted to 2000 ml with metal-free water and allowed to stand for half an hour. Three grams of mossy zinc were added and the reaction allowed to procede for one hour with the gases derived passing through a lead acetate trap ahead of a 5 ml solution of AgDDC (diethydithio-carbonate) in chloroform in which the nascent As was captured. Arsenic was determined colorimetrically using a spectrophotometer in which the samples were compared with calibrated standards.

The determination of Au and U was carried out by NAS Laboratories of Hamilton using a neutron activation-delayed neutron counting procedure.

For the determination of Au, 0.5 g of sample material was placed in a polyethylene vial, capped and sealed. Neutron irradiation was provided by the McMaster University reactor where the samples were transferred into the reactor pheumatically from a automatic loader. After irradiation the samples were transferred pneumatically to a counting

chamber where, after an appropriate delay, the sample was counted. Following counting, the samples were ejected into a shielded storage container where they were allowed to cool. Calibration was carried out using natural materials of known gold concentration.

Uranium was determined on the same 0.5 g sample using a similar procedure to the Au analysis.

The 0.5 g sample weight was selected to accommodate the relatively large number of low weight samples and thus ensure continuity throughout the analytical program. Further, the non-destructive neutron activation procedure was employed to ensure that sufficient material could be retained from every sample for archive purposes.

9.3.2 Detection Limits

Detection limits for the analytical procedures employed are summarized in Table 5. In the data listing presented in Appendix E, samples with trace element concentrations below the detection limit are assigned an arbitrary value as shown in Table 5. This procedure was adopted to aid rapid computer handling of the data. Samples with insufficient material to permit analysis for a particular element are designated I.S. in the data listings.

9.3.3 Reliability of the Analytical Data

Quality control on the analytical procedure was provided by the use of control standard samples and duplicate

Table 5 - Detection limits for the trace elements analyzed and arbitrary figures assigned for values falling below the detection limit.

Element	Detection Limit	Arbitrary Limit
Cu	2	1
Pb	2	1
Zn	2	1
Ni	2	1
Mo	2	1
As	2	1
Ag	0.5	0.2
Au	20 ppb	10 ppb
U	0.2	0.1

Values in parts per milion except where indicated.

samples. These were prepared and inserted into the analytical schedule by the staff of the Geophysics/ Geochemistry Section and were unknown to the laboratories carrying out the work. At least two quality control samples were present in any group of twenty consecutive samples passing through the laboratories. Two features of the analytical data are considered in assessing reliability; these are accuracy and precision.

Analytical accuracy is the ability to measure a known, predetermined content of trace elements in a sample and is here used to assess confidence when comparing results from analysis of the Summer of 1980 and Winter 1981 samples (and also the 1979 samples). Accuracy and hence compatability was determined using control standard samples. The result of replicate analysis of carefully prepared splits of two of the standard samples are shown in Table 6. These indicate that, overall, the results of the two analytical schedules may be compared with confidence. There is weak evidence that the Pb data obtained by Bondar-Clegg are uniformly 2-3 ppm higher than Barringer Research but this is not considered significant. Similarly Bondar-Clegg report consistently higher values of Mo than Barringer. However, because the results are close to the detection limit for this element the apparent relationship is of doubtfull significance.

The analytical precision, a measure of the reproducibility of individual results, is here used to further assess confidence in the laboratory data and its suitability for

	MR80-CHM		VT80-CHM	
	Summer '80 (12)[1]	Winter '80 (9)[1]	Summer '80 (18)[1]	Winter '80 (13)[1]
Cu ppm	29.08 (26-32)	30.33 (26-34)	22.22 (18-31)	22.17 (20-32)
Pb ppm	11.66 (8-13)	14.33 (8-16)	7.94 (6-10)	10.73 (8-14)
Zn ppm	400.66 (374.624)	441.5 (250-490)	62.56 (51-70)	62.18 (50-79)
Ni ppm	124.16 (105.135)	131.30 (98-151)	39.22 (25-44)	35.50 (28-50)
Mo ppm	3.16 (2-4)	5.12 (3-8)	3.38 (2-6)	6.45 (4-9)
As ppm	9.27 (7-10)	9.20 (5-11)	2.22 (2-3)	2.15 (2-3)
Ag ppm	N.D.[2]	N.D.[2]	N.D.[2]	N.D.[2]
Au ppb	152.7	184.0	188.57	188.00
U ppm	7.47 (6.6-8.1)	6.93 (5.9-7.7)	8.34 (7.4-9.9)	8.65 (8.1-9.2)

Table 6: Range and means[3] element contents of standard samples MR80-CHM and VT80-CHM reported from replicate determinations made during analysis of the Summer '80 and Winter '81 overburden samples.

1. Number of replicate determinations.
2. Not detected.
3. Arithmetic mean.

detailed interpretation. Precision was computed using all available duplicate samples following the procedures of Garrett (1979). Results of the statistical treatment of the data are presented in Table 7.

Analytical precision of ±25 percent or less at the 95 percent confidence level is considered acceptable for exploration geochemical procedures with a precision of ±15 percent or less generally regarded as excellent. Referring to the results of the statistical analysis (Table 7), the following points are considered significant:

(i) The precision reported for Cu, and U is excellent, lying well within the generally accepted limits and indicating data which can be appraised with a high level of confidence.

(ii) Precision for Pb, Zn, Ni and Mo is marginally poorer although still well within normal acceptance limits.

(iii) Precision for As during analysis of the Winter '81 samples is close to the limits of acceptance. This figure is misleading however, since examination of the data shows that many of thecontrol samples contain levels close to the analytical detection limit. At these levels, precision is normally reduced due to noise inherent in the analytical procedures employed, which creates large relative percentage changes in metal concentrations. Further evaluation of the data

ELEMENT	PRECISION	
	Summer '80	Winter '80
Cu	6.01	6.66
Pb	15.12	17.50
Zn	9.16	17.08
Ni	10.88	13.93
Mo	17.17	16.72
As	13.03	25.21
Ag	N.D.[2]	N.D.[2]
Au	67.54	84.34
U	8.44	7.94

Table 7: Analytical precision[1] of trace element data in percent at the ninety-five percent confidence level.

1. After the procedure of Garrett (1979).
2. Insufficient samples above detection limits to calculate precision.

shows that at levels ten times the detection limit or greater analytical precision improves to ±8.93 percent at the 95 percent confidence level.

(iv) Precision for Au is poor, lying well outside normal acceptance levels. This is not considered to be a reflection of the neutron activation-delayed neutron counting procedure employed since multiple analysis of single samples gives excellent precision. The problem here relates to: a) the inhomogenous distribution of Au in the samples, particularly the heavy mineral concentrates, where Au may occur as free gold grains or as discrete inclusions in sulphide or other mineral phases, and b) the small weight (0.5 g) used for analysis which does not provide a representative aliquot for Au which, as already stated is inhomogenously distributed. Grinding and rolling aid homogenization of the sample but experience has shown that these procedures cannot fully overcome the very real limitations caused by the low sample weight. For the present program, it was not possible to use a larger sample weight since for many samples only a few grams of heavy mineral concentrate were available for analysis. In view of the low precision and hence loss of confidence in the analytical results, caution is advised in interpreting the data.

(v) No precision is quoted for Ag since too few samples reported values above the detection limit to permit reliable statistical treatment.

9.4 Discussion

9.4.1 Interpretive Criteria

It is not the purpose of this report to provide a detailed or extensive interpretation of the data. Rather, background information originally presented by Averill and Thomson (1981) is repeated here to aid the reader in appraising the geochemical results and reaching valid working conditions.

It is expected that the analysis of the -0.063 mm sieved fractions of the samples will be of lesser value in identifying proximity to mineralization due to the extreme dilution factor in glacial overburden. The heavy mineral concentrates, in contrast, should be very sensitive indicators of glacial dispersion trains in the overburden. All anomalies should be one-hole anomalies because the drill holes are widely spaced.

Base metals such as Cu, Zn and Ni occur in low concentrations in the structures of silicate minerals such as pyroxene and iron sulphide minerals such as pyrite and pyrrhotite, as well as in high concentrations in Cu, Zn and Ni sulphide ore minerals. The silicate minerals produce a

Cu-Zn-Ni background of 50 to 100 ppm. Significant concentrations (10 to 20 percent) of pyrite may increase the background level to 200 to 500 ppm. Values greater than 700 ppm normally indicate the presence of minerals such as chalcopyrite, sphalerite or pentandite.

Once a heavy mineral anomaly has been identified, the approximate location of its bedrock source can be predicted by considering the stratigraphic position of the anomaly in the overburden section. Anomalies in the basal till will normally indicate a source relatively close to, but up-ice from the anomalous drill hole. If the anomaly occurs preferentially in the coarse (+0.125 mm) heavy mineral fraction, the source is probably very local. In the case of a basal till anomaly, the source should be directly up-ice (N10 degrees W) from the drill hole, while debris flow-turbidite anomalies may be derived from a source in any northerly direction. Anomalies in glaciofluvial esker sediments, particularly where the sediments do not directly overlie bedrock (e.g. the north half of the Highway Esker), may have originated several miles glacially upstream.

Stratigraphic position <u>within</u> a particular horizon is important in determining both the distance to the source and the grade of the source. For example, a Cu anomaly of 2000 ppm at the bottom of the basal till horizon would probably be related to nearby mineralization. While a gold anomaly of 3000 ppb at the top of a thick section of till could be

indicative of significant mineralization some distance away (1 to 4 km) to the north.

At this time, some further consideration is given to the results of the gold analysis. The relative inhomogeneity of the samples, coupled with the low sample weight used for analysis, results in the following characteristics:

(i) High gold values recorded in the data listings are a reliable measure of the gold present in the sample material analyzed and hence a reliable positive indicator of the presence of gold.

(ii) Conversely, low gold values reflect a low gold content in the sample material analyzed. However, because it cannot be confidently asserted that the sample is truly representative, low gold values cannot be confidently interpreted as indicating low gold potential.

In short, the absolute abundance of gold, as shown by the attached analytical lists, is not a reliable indicator of the presence of gold mineralization in the bedrock. To offset this loss of confidence, the following procedures are suggested:

(i) Examination of the distribution of As which is a good indicator element for gold mineralization (Boyle 1979). Arsenic is more widely distributed in the bedrock and present in much larger concentrations than the gold. Hence, it is more

homogeneously distributed in the samples collected and the resulting analytical data are suitable for more rigorous evaluation. Other possible indicator elements are Cu, Ag, Zn and Pb (Boyle 1979; Thomson et al. 1948).

(ii) Examination of the sample descriptions for the presence of carbonatized rock chips, carbonate minerals, vein quartz and/or sulphide minerals. These features are suggestive of altered and mineralized environments which may contain gold.

(iii) Examination of the bedrock geology using existing maps to identify areas favourable for gold which may be screened using the above criteria and any others thought by the investigator to be significant.

It is realized that many of the minerals characteristic of alteration found around gold mineralization in the Kirkland Lake-Larder Lake area, or as gangue in the ore, do not concentrate in the heavy (SG + 3.3) fraction. The carbonate minerals calcite, ankerite, dolomite, magnesite and the gangue minerals tourmaline, fuschite and quartz (notably a characteristic dark quartz) have lower specific gravities and have not been fully investigated by the present study. Accordingly, the Ontario Geological Survey is examining the mineralogy and geochemistry of other fractions of the

overburden samples. The results of these studies are published as they are completed (Thomson and Lourim 1981).

9.4.2 Gold Potential

Because of the complex influences described above and consequent careful appraisal of all data required for a complete interpretation, comment is here confined to the most conspicuous features.

The Timiskaming Group metasandstone with quartz veinlets and sulphides encountered in Hole 81-15 is auriferous (1600 ppb Au) and also carries raised concentrations of Cu, presumably in the chalcopyrite reported from the bedrock chips. Glaciofluvial gravels overlying bedrock in this hole are also enriched in Cu, Ni and As and to some extent Au, indicating the presence of potentially gold bearing rocks to the north.

Elsewhere, bedrock in Hole 81-18 and Hole 81-25 also contains slightly raised concentrations of Au as do Holes 81-16 and 81-17, indicating further areas of gold enrichment in the Archean.

In Eby Township, the basal till in Hole 80-24 contains Au in association with raised levels of Cu and As confirming the potential for gold mineralization indicated by the mineralogy of the heavy mineral concentrates. A similar geochemical association is encountered in Hole 81-02 southwest of Kenogami Lake suggesting a potential for gold

mineralization beneath and west of the south end of the lake.

To the east, in Otto Township, the basal till in Hole 80-31 is enriched in Au in the coarse fraction of the heavy mineral concentrates. There are no supporting geochemical features in As or Cu, however, the underlying bedrock, syenite of the Otto Stock, shows evidence of being the source of raised gold in the overburden. The bedrock sample from Hole 80-31 was processed to yield a heavy mineral concentrate containing 75,000 ppb Au. Further east, Hole 80-35 also located over the Otto Stock contains slightly enhanced levels of Au, As and Cu in the heavy mineral fraction of basal till. Gold mineralization to the north, most probably within the stock and localized on or near the north-south fault marked by the Blanche River Valley, is indicated by the present data.

In Grenfell Township, Holes 80-17 and 80-20 both carry raised levels of Au in the basal till. Hole 80-17 contains As and Cu with the Au, possibly indicating closer proximity to gold mineralization or a different gological environment.

Holes 80-12 and 80-15 in Maisonville Township both contain thick till sections which are erratically gold-bearing. There is a tendency for Au values to increase with depth in Hole 80-12, peaking close to bedrock indicating a source relatively close to the hole. In Hole 80-15, the multiple till intersections are all generally auriferous with a tendency for As to increase close to bedrock

indicating a proximal, weakly arsenical, source rock.

In the far north of the survey area, Holes 81-08, 81-22 and 81-23 carry strong Au values in the basal till. In 81-08, the Au is associated with raised values of Cu, Zn and Ni suggesting a source of gold in mafic or ultramafic host rocks.

Elsewhere in the northern part of the survey area, undifferentiated tills high in the sections encountered in Holes 80-9 and 80-10 contain Au. The gold is presumably derived from the interbedded glaciofluvial gravels which are often quite rich in Au in the heavy mineral concentrates. Indeed, there is a clear tendency for the heavy mineral fractions of glaciofluvial and glaciolacustrine clastic sediments in Benoit and Melba Townships to be enriched in Au (Holes 80-2, 80-3, 80-4, 80-6, 80-7, 80-9, 80-10, 81-5, 81-6, 81-7, 81-8, 81-24 and 81-25). The northern parts of these two townships and the ground to the north are indicated as having a very high potential for gold mineralization. The presence of As with the Au in Holes 81-24 and 81-25 is considered to indicate close proximity to the bedrock source area.

A similar pattern of auriferous sands and gravels is found in the south. In the west, sands and gravels in Holes 80-24, 80-25 and 80-26 carry gold, presumably derived from mineralization on or close to the Kirkland Lake-Larder Lake fault. Since Holes 81-1, 81-2 and 81-3 are largely barren,

the source area is interpreted to lie between these holes and the 1980 holes to the south. The presence of As with the Au in Holes 80-24 and 80-25 is interpreted to indicate a position relatively close to the bedrock source.

Holes 80-34 and 80-35 also carry Au and As in glaciofluvial sands close to bedrock. A source in mineralized ground within the Otto Stock, north of these holes is indicated.

Further east, Au bearing fluvioglacial sands and gravels related to the Munro Esker were encountered in Holes 80-39, 80-47, 80-48, 80-49 and 80-51. The source of this gold is assumed to be along the Kirkland Lake-Larder Lake fault to the north.

9.4.3 Base Metal Potential

Consideration is here confined to the most prominent geochemical features of the bedrock and basal till encountered in the drill program.

The graphitic argillite encountered in Hole 80-45 is distinctively enriched in Zn with associated Cu indicative of weak mineralization. The coarse fraction of the heavy minerals recovered from glaciofluvial gravels immediately overlying the bedrock are also rich in Zn and Cu indicating a further source to the north. The cluster of strong EM conductors immediately north of Hole 80-45 (O.G.S., 1979) are thus identified as having a potential for base metal

mineralization and ground in this area deserves detailed prospecting.

To the west, the increased content of Cu, As and Au in Hole 80-24 have already been discussed and recognized as probably indicating potential Au rather than base metal mineralization. Hole 80-22, further west in Burt Township, is of more immediate interest. Copper and Zn are visibly enriched in the fine fraction of the heavy mineral fraction in the upper part of the till section. The preferential enrichment of the fines and position high in the till section indicate the probable presence of base metal mineralization in bedrock to the north-northwest, and relatively distant from the hole.

Northeast of Kirkland Lake, Holes 81-13 and 81-14 contain moderately elevated levels of Cu in the basal till. In Hole 81-14, there is evidence of an association with Pb suggesting base metal potential. In Hole 81-13, the evidence suggests an association with Ni which, while it is possibly indicative of base metal potential, tends to suggest a source in weakly mineralized mafic or ultramafic rocks.

9.4.4 Reproducibility of the Geochemical Distribution Patterns

Analytical data obtained from samples collected from Holes 80-41 and 80-541 provide an opportunity to examine the reproducibility of the geochemical distribution patterns. The two holes were drilled approximately 20 ft (6 m) apart

and samples collected from surface down to 40 ft (12 m) are from comparable fluvioglacial gravel units in an esker-kame complex.

Unfortunately, the two holes were not sampled over exactly the same intervals, nevertheless, the following features can be observed in the data.

1. In the coarse heavy mineral fraction and the -0.063 mm sieved separates absolute abundances and downhole distribution trends in the two holes are very similar for Cu, Pb, Zn, Ni, Mo, As, Ag and U.

2. Au values in the -0.063 mm sieved separates from the two holes are also very similar.

3. In the fine heavy mineral fraction, there are some marked differences between the two holes. Cu values are consistently higher in 80-41 while Ni values also tend to be higher in this hole. In contrast, Zn and U values are consistently higher in Hole 80-541 while Ag, Mo and Pb show a tendency towards greater concentrations in this hole.

4. Gold values in the coarse and fine heavy mineral concentrates are erratic in both holes with little or no similarity in distribution patterns. (There is, perhaps, a tendency for the fine fraction to be enriched in gold relative to the coarse fraction.)

Overall, the two holes are similar with relative abundances and distribution trends comparable for all elements. Variability between the two holes is generally better than the ±50% considered usual by Averill and Thomson (1981) and

is readily accountable in terms of the inhomogeneity typical of glacial sediments. These results are considered representative of the survey program and illustrate the variability and hence level of confidence that can be expected from the geochemical data.

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APPENDIX A

DRILL LOGS

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 23 Jul 19 80

SHIFT 13:30 TO 18:50

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-01 LOCATION 80°16'30"W / 48°22'10"N Black Tp.

GEOLOGIST PER / JAD DRILLER A. Stroney BIT NO. B 59922 BIT FOOTAGE 0-127' (127')

MOVE TO HOLE 11:30 hrs - 13:30 hrs (from float to first set-up)

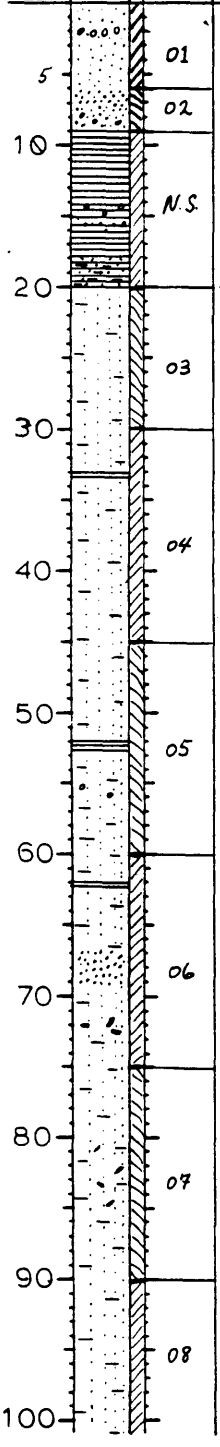
DRILL 13:30 hrs - 17:10 hrs

MECHANICAL DOWN TIME Nil

DRILLING PROBLEMS Bit failed in gravel pavement at 127' - hole

~~OTHER~~ abandoned

MOVE TO NEXT HOLE 17:10 hrs - 18:50 hrs



DESCRIPTIVE LOG

Fine to medium well sorted sand, few pebbly layers and clay beds

Coarse to medium well sorted sand mainly subrounded to rounded quartz with approx 5% feldspar and lesser lithics ≈ 2%

Varved grey lacustrine clay, semi-plastic, few granules and dropstones

fine sandy and silty - gradational to fine sand

Fine sand and silt - deltaic or lacustrine - yellow-brown colour; occasional quartz granules and fine sand beds, minor clay matrix; very few lithics - submature composition - deep water lacustrine sands

yellow-brown clay matrix < 5%

grey clay matrix < 5%

dropstones - mafic volcanics and few granitics - granule sized

fine to medium sand

wood chips

organics - bleached conifer needles

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 23 Jul 19 80

SHIFT 13:30 TO 18:50

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP-80-01 LOCATION 80°16'30"W/48°22'10"N Benoit Tp.

GEOLOGIST RER/JAD DRILLER A. Stronoy BIT NO. B59922 BIT FOOTAGE 0-127'

MOVE TO HOLE ____

DRILL ____

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS compressor not delivering adequate pressure

OTHER and by-passing occurring in rods.

MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
			08	Grey sandy clay
				Fine sand and silt
110			09	
				Grey clay beds and fine sand and silt
120			10	Sand - medium to coarse
			11	Gravel with coarse sand matrix up to 60%.
				felsic volcanics 30%, mafic volcanics 20%, granites 40%,
130				no return quartz granules ≈ 5%

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 24 Jul 19 80
SHIFT 08:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLM 80-02 LOCATION 80°14'05"W/48°21'50"N Benoit Tp.
GEOLOGIST R.E.R / T.M. DRILLER A. Stroney BIT NO. 020052 BIT FOOTAGE 0-308'
MOVE TO HOLE 17:10 hrs - 18:50 hrs (Jul 23/80)
DRILL 08:30 - 10:10; 11:30 - 15:30 hrs.
MECHANICAL DOWN TIME 10:10 - 11:30 hrs; 15:30 - 17:10 hrs
DRILLING PROBLEMS rods by-passing - "O" rings replaced in all rods, check
OTHER wrench required; compressor repaired 1100 - 1300 hrs.
MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10				Organics - swamp deposit.
				Brown oxidized lacustrine clay
				Grey lacustrine sandy clay
20				
				increasingly plastic
30				
40				
50				
60				
				few granule to pebble size angular mafic volcanic drop stones
70			01	Pebbly sand, few cobbles, mega clasts to coarse sand matrix
			02	30:70; pebbles dominantly volcanic, felsic component > mafics, granitics and quartz component mainly in coarse sand and granules
			03	mafic volcanic boulder
80				
			04	Pebbly sand
90			05	grey clay - gritty
				mafic volcanic boulder
			06	Gravel with medium sand matrix, pebbles dominantly dark coloured green-grey volcanics
			NS	granitic boulder
100			07	

composited by Laboratory

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 25 Jul 19 80
SHIFT ____ TO ____
TOTAL HOURS ____
CONTRACT HOURS ____

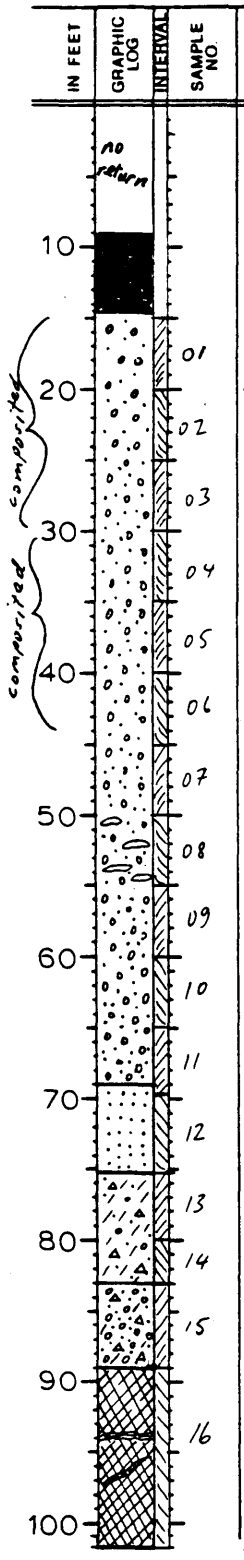
HOLE NO. KLIP 80-02 LOCATION 80°14'05"W/48°21'50"W Benoit Tp.
GEOLOGIST RER/TM DRILLER A. Strojny BIT NO. 020052 BIT FOOTAGE 0-308'
MOVE TO HOLE ____
DRILL 08:30 hrs - 10:15 hrs, 12:30 - 14:45 hrs, pull rods to 15:30 hrs.
MECHANICAL DOWN TIME 10:15 - 12:30 hrs
DRILLING PROBLEMS Bit subs oversize - driller to town for replacements - standby.
OTHER ____
MOVE TO NEXT HOLE 15:30 hrs - 20:00 hrs - rig struck twice.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			07	
			08	Coarse sand - aquifer
110				
			09	Coarse granular sand, 10% granules pebbly <5% pebbles
120				Coarse granular sand
			10	Coarse sand - bedded
			(2 bags)	
130				Coarse granular sand, occasional pebble, probably interbedded (cross-bedded) with sand beds
			11	
			(2 bags)	serpentine flakes in sand
140				
				wood chips
			12	increasingly coarse - granular sand
150				
			13	log - organics
			14	Sandy gravel with largely mafic volcanic pebbles
160			15	
				Bedrock - light grey, glassy porphyritic dacitic metavolcanic.
170				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 26 JuL 1980
SHIFT 08:00 TO 20:25
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP-80-03 LOCATION 80°10'10"W / 48°20'05"N Benoit Twp
GEOLOGIST BER/TM DRILLER A. Strojny BIT NO. B59920 BIT FOOTAGE 0-102'(102')
MOVE TO HOLE 10:30 hrs - 12:55 hrs (2:25 hrs)
DRILL 12:55 - 13:45 hrs
MECHANICAL DOWN TIME NIL - rig stuck - tractor (D6) required to pull out
DRILLING PROBLEMS off road shoulder - Down 0830hrs to 1030hrs.
OTHER ____
MOVE TO NEXT HOLE 13:45 hrs - 14:55 hrs (1:10 Hrs)



DESCRIPTIVE LOG

Brown organics and swamp deposit

Gravel - dominantly mafic and intermediate volcanics

cobbly

Coarse to medium sand

Grey clay till, few rounded to subrounded mafic volcanic pebbles

Gravelly till, mainly mafic volcanic pebbles, few grey clay balls (gritty), and sand matrix

Bedrock - Broken with clay seams and pebbles, pale green aphanitic rock matrix, felsic to intermediate volanic, darker colour at depth - possible contact with diabase

KLIP 80-03

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 26 Jul 19 80
SHIFT 0 8:00 TO 20:25
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLIP 80-04 LOCATION 80° 11'30"W/48° 21'00"N Benoit Twp
GEOLOGIST RSR/SAD/TM DPILLER A. Strojay BIT NO. B59920 BIT FOOTAGE 102'-195'(297')
MOVE TO HOLE 13:45 - 14:55 Hrs (1 Hr 10 min)
DRILL 14:55 - 19:10 (4 hrs 15 min)
MECHANICAL DOWN TIME nil
DRILLING PROBLEMS Reached limit of drill @ ± 190' - pushed to 195' abandoned
OTHER - ran out of rods - consid. or able difficulty met in pulling rods.
MOVE TO NEXT HOLE 19:10 - 20:25 (to Esso Stn - Butler Rest. for wkend)

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				Light brown oxidized clay
10			N.S.	Grey lacustrine clay - semi plastic and sticky
20				
			01	Gravel - dark colour - largely mafic and intermediate volcanics
30				
40			02	Coarse gravel - few cobbles and some clay (grey)
			03	Till, pebbly and sandy with few clay balls
50				mafic volcanic boulder
			04	Gravelly sandy till
60			05	Till, - increased clay content, pebbly and sandy
			06	
70			07	
			N.S.	
			08	Gravel - bouldery and cobbly, cobbles of mafic and intermediate volcanics
80			09	
			N.S.	
			10	
			11	Coarse gravel - granule fraction of gravel increasing
90			12	
				intermediate volcanic boulder
			13	
100			14	

mafic volcanics

intermediates

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 26 Jul 1980 — HOLE NO. KLIP 80-04 — LOCATION 80°11'30"W / 48°21'00"N Benoit Twp.
GEOLOGIST RER/JOO/TM — DRILLER Art Strojay — BIT NO. B59220 — BIT FOOTAGE 297'
SHIFT 0500 TO 2025 — MOVE TO HOLE
TOTAL HOURS — DRILL
MECHANICAL DOWN TIME
CONTRACT HOURS — DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			14	Cobbly gravel, mafic volcanics - 60%, granites 40%
				Coarse sand
			15	Coarse gravel, cobbly, megaclasts 60%, sand matrix 40%, dominantly mafic volcanics with fewer granitic cobbles
110			16	
				Fine sand
120			17	Pebbly sand - fine sand matrix 90%, ≈ 10% granules, cobbles < 1%
				cobbly with medium sand matrix
				granite boulder
			N.S.	fine grained basalt, gabbro or diabase boulder
130			18	Pebbly gravel, pebbles 20% with clay balls - probably a till?
				Laminated grey clay - platy chunks on screen
140			19	Till? fine sand matrix with pebbles of mafic volcanics and lesser granitics
			20	increased clay content, no pebbles, sandy till -
				clay till -
150			21	pebbly till
				coarse gravel ½'
			22	Clay till, 40% clay 60% pebbles and sand
160			23	
			N.S	Lacustrine clay, grey stiff, non-sticky, very little fine sand, laminated platy clay, possibly varved in center of unit
			24	Sandy clay till, - gritty clay balls with few pebbles
170				Gravelly till
			NS	Lacustrine clay - grey
			25	Gravel grading to coarse gravel, mainly mafic green grey pebbles and cobbles but less volcanics than in till. Rounded to sub-rounded granitic pebbles and cobbles; cobbles of light grey intermediate to felsic
180				volcanic - dacite, occasional chert pebble noted.
			26	Gravelly till - very little clay, but clay content increasing, possibly washed upper portion of till sheet
190			27	Clay till, gritty, sandy clay balls
				end of hole 195' - drilling problems -
				- reached effective limit of drilling in coarse clastics and boulders without using casing - drill laboured
200				and jerky - rods binding in boulders.

KLIP 80-04

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 28/July 1980

SHIFT
08:00 TO 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. KLIP 80-05 LOCATION 80 6400W/48°20'20"N Benoit Tp.
GEOLOGIST REB/IAD/TM DRILLER A.Sc-ej Wy BIT NO. B59924 BIT FOOTAGE 0-33'
MOVE TO HOLE 8:15 - 8:25
DRILL 9:15 - 10:45
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 10:45 -

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
			N.S.	Road 860 Gravel and Coarse oxidized brown sand.
10			01	Medium sand. light brown colour with no +10 pebbles
20			02	Medium gravel, matrix coarse sand to medium sand. Some granite pebbles well rounded clasts
30			03	Bedrock - Gowganda conglomerate Pink to dark red granite boulders in dark argillite matrix

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 28 July 19 80

SHIFT 08:00 TO _____

TOTAL HOURS _____

CONTRACT HOURS _____

HOLE NO. KLIP 80-06 LOCATION 80°19'00"W/48°20'05"N Benoit Tp.

GEOLOGIST RER/JAD/TM DRILLER A. Strojny BIT NO. B59224 BIT FOOTAGE 32-114'

MOVE TO HOLE 10:45 - 11:00 hrs

DRILL 11:10 - 12:28 hrs pull rods to 12:45 hrs

MECHANICAL DOWN TIME _____

DRILLING PROBLEMS _____

OTHER _____

MOVE TO NEXT HOLE 12:45 hrs - 13:55

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Surface organics, soil, some sand and stones
				No return
				Grey lacustrine clay, sticky and plastic
10				
20				
30				Brown oxidized clay bed
				Grey lacustrine clay
			01	Pebbly, sandy till with brown clay matrix - oxidized
40				grey clay matrix with increased sand component, few cobbles
			02	felsic to intermediate composition
				Fine to medium sand, very few granules and pebbles
50			03	Laminated sandy clay bed
				very thin clay beds in fine to medium sand
				few granitic (lithic) granules; subrounded to rounded quartz grains
60			04	with few dark lithics and feldspar grains. - lacustrine sand?
			NS	Yellow-brown sandy clay - oxidized, few rounded aphanitic
70				mafic volcanic pebbles at 67'
			05	Gravel - fine to medium sand matrix, pebbly and coarser 74'-78',
			06	possibly thin interbedded sand and gravel
				Coarse cobbly gravel 77-78'
80			07	Bedrock - fine to medium grained diabase or gabbro
90				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 28 July 19 80
SHIFT 09:00 TO ____
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-07 LOCATION 80°16'40"W/48°18'00"N Benoit Tp
GEOLOGIST RSR/JAD/TM DRILLER A Strojny BIT NO. 020051 BIT FOOTAGE 0-119'
MOVE TO HOLE 12:30 - 13:55 hrs
DRILL 13:55 - 15:05 hrs; 15:35 - 17:10 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS bit blocked @ 75', pull rods, redrill
OTHER ____
MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Fine to medium sand
				Brown lacustrine clay - oxidized
10				Fine to medium lacustrine sand
20				Grey lacustrine clay
30				
40				Silty grey lacustrine clay slightly stiff
50			01	Gravel, medium, sub angular to subrounded pebbles, felsic volcanics - ~80% of 40mm; medium sand matrix - immature dark coloured medium gravel
				Mafic volcanic boulder
60				
			02	Coarse sand grading to granular gravel - interbedded sequence sands and gravel beds -
				Gravelly coarse to medium sand
				Till - clay coatings on pebbles and few clay balls
70			03	
				weathered salmon pink granitic boulder
80			04	cobbly gravel
				Coarse gravel - medium sand matrix
				Till? - interlayered sand and gravel with clay balls -
			NS	sandy bouldery till, massive clay ball
90			05	
			NS	granitic boulders
			NS	
			NS	
				Coarse gravel - lenses of gravelly till?
100			06	

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 28 July 1980
SHIFT 08:00 TO _____
TOTAL HOURS _____
CONTRACT HOURS _____

HOLE NO. KLIP 80-07 LOCATION 80°16'40"W/48°18'00"N Benoit Tp
GEOLOGIST KER/JAO/TA DRILLER A Strojny BIT NO. 020051 BIT FOOTAGE 0-119'
MOVE TO HOLE _____
DRILL _____
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE _____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			06	
			07	Gravel - cobbly and bouldery
110			08	
			09	Till, sandy clay till with few pebbles
			10	Bedrock - dark green aphanitic mafic volcanic possibly amygdaloidal with carbonate fillings or possibly carbonate veined.
120				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 29 Jul 19 80
SHIFT 08:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-09 LOCATION 80° 11'22"W/48 18 10"N 3rd Concess. Rd. Benoit Twp
GEOLOGIST JER/JAD/TM DRILLER A. Strojay BIT NO. BS9921 / BS9925 BIT FOOTAGE 0-105' / 0-115'
MOVE TO HOLE 11:40 hrs - 12:55 hrs
DRILL 12:55 - 15:45 Hrs; 16:30 hrs - 16:55 Hrs; 09:10 - 11:20 hrs 30 Jul 80
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS rods sanded-in at 105' - (15:45 hrs.), re drilled at 16:30 hrs
OTHER rods stuck at 55' - end shift - worked to get truck pump.
MOVE TO NEXT HOLE 11:20 - 12:30 hrs 30 Jul 80

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Yellow-Brown oxidized lacustrine clay and organics. plastic - nonsticky clay
10				Grey lacustrine clay, slightly sandy and sticky
20				varved brown-grey and grey clay
				Brown oxidized clay layer at 25½' sandy grey clay
30			01	Gravelly till? clay coatings on pebbles and occasional grey clayball; rounded and sub rounded pebbles
			02	Brown clay till, sandy and pebbly.
40			03	Sandy brown clay till
			04	Brown sandy till
50			05	Gravelly brown till with gravel lenses
			06	Coarse gravel and gravelly till, gravel lenses, grey brown gravelly till; gradational to grey gravelly till at 55'
			07	Sandy gravel - till?
60			08	Gravelly till, grey clay balls - gritty clay typical
			MS.	medium gravel red granite boulder
			09	Grey clay till Gravelly till
70			10	Brown gravel - coarse sandy and granular matrix - rounded pebbles, subrounded to sub angular sand and granules - outwash - alluvial sands. Pebbles mainly dark volcanics; granules of granitic lithics, quartz and feldspar. - aquifer.
80			11	Coarse, granular sand, matrix sands compositionally and texturally immature lithics ~ 80%, angular to subrounded.
				Coarse granular sand - few pebbles only
90			12	
				aquifer.
			13	
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 29-30 Jul 19 80
SHIFT 0800 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLP 80-09 LOCATION 80° 11' 22" W / 48° 18' 10" N 3rd Concess. Rd. Benoit Tp.
GEOLOGIST RER/JAD/Tm. DRILLER A Strojny BIT NO. B59926 BIT FOOTAGE 0-115'
MOVE TO HOLE ____
DRILL ____
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			13	Coarse granular sand, few pebbles
110			14	Gravelly coarse granular sand, +10 to -10 fractions = 1 to 1. dominantly intermediate and mafic volcanic granules
				end of hole - 105' - rods sanded during rod change
120				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 30 Jul 19 80

SHIFT 08:00 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-10 LOCATION 80° 09' 15"W / 48° 18' 10"N 3rd Concess. Benoit Tp.

GEOLOGIST RER/JAD/TM DRILLER M Strojny BIT NO. B59925 BIT FOOTAGE 115 - 170 / 0 - 95'

MOVE TO HOLE 11:20 Hrs - 12:30 hrs (1:10hrs) O 20054

DRILL 12:30 hrs - 13:15 hrs / 13:40 - 16:45

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS Bit B59925 failed at 45'-50', two rods balled at adapter

OTHER Box ends; hole moved 15' and redrilled with new bit.

MOVE TO NEXT HOLE 16:45 hrs - 17:50 hrs (1:05 hrs)

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				Road bed material and gritty brown oxidized clay
				Brown to yellow-brown oxidized lacustrine clay
10				
				Grey, sticky, semi-plastic lacustrine clay
20				
30			01	Gravel (-till?) dark green grey color to coarse fraction (10 m) intermediate volcanic clast component dominant. Clay coatings on pebbles and few gritty, grey clay balls - washed gravelly till or outwash and till. Grey intermediate gabbro porphyritic boulder 34'
			N.S.	chert and felsic volcanic pebbles, few platy-schist fragments
40			02	Gravel - no clay balls; dark green grey color; few rounded pebbles; granules sub rounded to angular
			03	Coarse gravel - gravelly till. striated pebble, roughly rounded and smooth rounded pebbles, clay balls mafic pebble with pyrrhotite grains, granitic pebbles, mafic to intermediate volcanics predominant
50			04	Gravelly till. increased clay balls and comminuted-platy clay
			05	shard-like mafic volcanic clast with pyrite cube
60			06	angular quartz pebble with chlorite and pyrrhotite, weathered granitic pebble with pyrite
			07	small pebbles - 5-8 mm, rounded.
70			08	Pebbly granular sand, medium to coarse sand matrix - till?
				Gravelly till - mafic volcanic and granitic boulders,
			09	Gra. br - gritty grey clay till
80			10	decreasing grey clay ball content - increased sand.
			11	
			N.S.	schistose mafic volcanic boulder
90			11	Clay till - grey,
			12	Bedrock - light to medium green aphanitic intermediate to felsic volcanic-andesite to dacite. Platy - fractured on surface, with fracture fillings of calcite and epidote.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 31/July 19 80
SHIFT
08:00 TO 18:00
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLIP 80-11 LOCATION 80°11'45"W/48°16'50"N Benoit Tp.
GEOLOGIST REA/JAO/T.M DRILLER A. STROINY BIT NO. 020054 BIT FOOTAGE 95' - 155'
MOVE TO HOLE 16:45 - 17:50 hrs
DRILL 08:30 hrs. - 11:10 hrs. pull rods to 11:30 hrs.
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 11:30 hrs - 13:20 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG	
			N.S.	organics brown oxidized fine to medium sand.	
			01	Sandy till with clay balls and angular clasts coated with clay.	
10			02	Sandy till with lenses of coarse sand.	
			03		
20			04	Sandy till with some clay balls.	
			05		
30			06		
			07	Sandy till with an abundance of granite pebbles & cobbles. pyrite present in granite.	pebbles & cobbles.
40			08	Sandy till with few boulders and more clay balls with angular mafic volcanic clips.	clay than in previous sample
			09	angular clasts with grey clay coatings pyrite present in some of the clasts.	some striations on clasts.
50			10		
			11	Bedrock - fine grained, dark grey diabase	
60					

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 31 Jul 19 80
SHIFT 08:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-12 LOCATION 80°15'12"W / 48°16'42"N Benoit Twp
GEOLOGIST RCR/JAD DRILLER A. Strojay BIT NO. B59223 BIT FOOTAGE 0'-75'
MOVE TO HOLE 11:30 - 13:20
DRILL 13:20 - 14:30
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 14:30 - 16:00 Hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Brown organics and gravel intermittant return
10			01	Dark coloured gravelly sand till, few brown clay balls, clay coatings on pebbles occasional cobble
			02	brown clay content increased ≈ 15%
20			03	Grey gravelly sand till, grey clay balls,
			04	
30			05	Platy grey sandy clay Fine sand Gravelly sand till
			06	Coarse sand
40			07	Gravelly sand till, grey clay balls
			08	Fine sandy grey till, few pebbles Gravelly till - very little clay
50			09	
			10	mafic volcanic boulder
60			11	Gravel - similar to gravelly till but no clay balls - washed?
				Gravelly till - grey clay balls Boulder till - Gowganda slabs, and a mafic volcanic boulder
			12	
70			13	Grey clay till - few pebbles
			14	Gowganda argillite, dark grey and slaty,
80				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 31 Jul 19 80

SHIFT
8:00 TO 18:00

TOTAL HOURS

CONTRACT HOURS

HOLE NO. KLP 80-13 LOCATION 80 16' 16" W / 48° 15' 15" N Maisonville Twp
GEOLOGIST RSR/JAD DRILLER A Strojny BIT NO. B59223 BIT FOOTAGE 75'-101'
MOVE TO HOLE 14:30 - 16:00 hrs
DRILL 16:00 - 16:15 hrs.
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER gas tank on water truck loose - repaired; mast on rig repaired - welded.
MOVE TO NEXT HOLE 16:15 - 18:00 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10			01	Pebbly coarse to medium sand, mafic volcanic and Gowganda Fm. argillite pebbles few cobbles - volcanic
			02	granitic boulder
20			03	Gowganda Fm. argillite
30				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 1 Aug 19 80

SHIFT 08:00 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-14 LOCATION 80°16'45"W/48°13'10"N Lee Twp

GEOLOGIST RCR/JMD/TM DRILLER A. Strojny BIT NO. B59923 BIT FOOTAGE 101'-154'

MOVE TO HOLE 16:45 hrs - 18:00 hrs (Jul. 31/80)

DRILL 08:55 - 9:20 hrs pull rods to 9:40 hrs.

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS ____

OTHER ____

MOVE TO NEXT HOLE 9:40 - 11:35 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				no return
				Fine reddish brown oxidized sand
10				Grey lacustrine clay - soupy
				sandy clay
20				
				sticky and increasingly plastic
30				
				fine sandy darker grey clay
40				
			01	Gravel, mainly mafic volcanics, grey fine to coarse sand - washed till??
			02	Pebbly sand till, grey clay balls, similar to gravel
				argillite slab, grey gritty clay between slab and bedrock - possibly lodgement till
50			03	Gowganda Fm. argillite
60				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 1 Aug 19 80

SHIFT
08:00 TO 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. KLIP-80-15 LOCATION 80°12'40"W/48°12'25"N Maisonville Twp
GEOLOGIST RER/JAD/TM DRILLER A. Strojay BIT NO. B59923 BIT FOOTAGE 154'-249'
MOVE TO HOLE 9:40 - 11:45 hrs
DRILL 11:45 - 15:00 hrs (pull rods to 15:30) - wash tank
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS chuck studs sheared - head repaired 1800 hrs -
OTHER _____
MOVE TO NEXT HOLE 15:45 - 16:15 - Sesekinika, 16:50 - 17:40 to next hole.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Brown organics, sand, pebbles and brown clay - oxidized till
			01	Gravelly sand till, grey clay balls
10			02	Bouldery, cobbly gravel with fine to medium brown (oxidized) sand matrix, pebbles mainly dark greenish grey - mafic volcanics with few smaller granitics
20				Coarse gravel, well rounded mafic volcanic pebbles
			03	gabbro - diabase boulder Coarse pebbly sand, brown sand matrix
30			04	Gravelly sand till, grey sand matrix, grey clay balls and clay coatings on pebbles
			05	Gravelly sand, brown medium to coarse matrix
40			06	Pebbly sand till, few grey clay balls, and clay coatings on the mainly mafic volcanic pebbles, increased % clay matrix
			07	Clay till
			NS	spherulitic felsic volcanic boulder
50			08	Pebbly sand till, grey sand, striated pebbles, - no clay except few clay balls at 53', few cobbles
			09	
60			10	
			NS	mafic volcanic boulder
			10	Gravelly sand, no clay 65'-66', clay balls reappear at 66' - washed till?
			11	- intermediate volcanic boulder
70			12	Gravel, cobbly and bouldery
			13	Pebbly sand till, abundant grey clay balls, grades to clay till then gravelly till by 77'
80			14	
			15	Boulder till, granite boulders
			NS	Pebbly coarse granular sand, dark colour
			NS	andesite boulders, well rounded pebbles and granules
			15	
90			16	Pebbly sand till, grey clay balls, much less sand than above unit, becomes gravelly at base.
			17	Bedrock - platy, black, foliated; fractured with Fe coatings. Argillite? but finished at 95' - ended penetration in bedrock.
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 2 Aug 1980
SHIFT 09:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-16 LOCATION 80°15'55"W/48°11'10"N Grenfell Tp.
GEOLOGIST R&R/JAD DRILLER A Strojny BIT NO. 020020 BIT FOOTAGE 0-21'
MOVE TO HOLE 09:30 - 09:40 hrs
DRILL 10:00 - 10:40 hrs. pull rods to 10:50 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 10:50 - 11:30 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				no return
				Coarse cobbly, bouldery gravel
10			01	granite boulder, mafic volcanic, diabase and gabbro boulder. Brown, coarse sand matrix
20			02	Bedrock - light green to medium greenish grey intermediate to felsic volcanic rock

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 2 Aug 1980
SHIFT 08:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-17 LOCATION 80° 16' 10"W/48° 10' 30"N Gremfell Tp
GEOLOGIST RER/DMD DRILLER A. Strojay BIT NO. 020020 BIT FOOTAGE 21'-12'
MOVE TO HOLE 10:50 hrs - 11:30 hrs
DRILL 11:35 - 13:55 hrs. pull rods to 14:10 hrs.
MECHANICAL DOWN TIME pick-up truck to town to repair hole in radiator 14:45 - 17:10 hrs.
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 14:20 - 14:45 hrs; 17:15 - 17:30 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Organics - no return
				Sandy yellowish brown oxidized lacustrine clay
10				Brown medium sand, brown clay 10'-11'
				Fine brown sand
				Grey lacustrine clay - sand free
20				Very fine sand and silt
				Sandy grey clay
				Silt and very fine sand
30				
				Fine sand and silt, grey colour
40				Fine to medium sand
				Medium sand
				Fine sand, occasional granule-size mafic volcanic angular
50				Very fine sand and silt
				Fine to medium sand
60				Fine well sorted sand
70				Organics - wood chips
80				Gravel, dark green colour, largely mafic and intermediate pebbles, few grey clay balls - washed till
			01	cobbly - no clay at 82'-83', clay balls reappear 84'-85' - till
			02	fine grained dark red (weathered) granitic boulder in sandy till
90				Sand till
			03	Bedrock - very fine grained dark green mafic volcanic - basalt

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 5 Aug 1980

SHIFT 0:800 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-18 LOCATION 80°13'30"W/48°09'30"N Grenfell Tp.
GEOLOGIST RER/JAD/TM DRILLER A. Strojny BIT NO. 79495 BIT FOOTAGE 0-98'
MOVE TO HOLE 17:10 - 18:00 hrs on Aug 2, 08:45 - 9:15 hrs Aug. 5.
DRILL 09:15 - 10:30 hrs. / #10B - 13:05 hrs - 14:15 hrs. - Pullrods to 14:45 hrs
MECHANICAL DOWN TIME Three rods bellied, one rod bit sub and bit 79495 lost down hole *
DRILLING PROBLEMS Bit lost roller in broken - sand filled - fractured bedrock at 98'
OTHER redrilled - 18B - bedrock intersected at 94'-96' and sampled; 80-18-05
MOVE TO NEXT HOLE 14:45 - 15:25 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Brown fine grained sands lacustrine to deltaic glaciofluvial no return - sand on surface.
10				Brownish grey lacustrine clay
				Lacustrine fine sand and silt, few coarse quartz grains
20				Medium sand
				Fine sand and silt
30				
40				
50				
				Fine to medium sand and few 2-3mm drop stones
60				
				Medium well sorted brown sand with occasional drop stones
70			01	Pebbly granular sand - 2'
				Coarse granular sand
80				KLIP-80-18B
			02	Pebbly medium sand occasional brownish to grey clay balls
90			03	Coarse granular sand with pebbles
			04	Cobbly gravel with medium sand matrix Mixed mafic volcanic and sand - broken bedrock. Bit failure at 97'-98'
100				Sample

* Strojny to town to replace rods. 1 3/4 hours down time.

New Bit - 020022 (+Sub) 0-96'

90 — 05 — Bedrock; medium greenish grey foliated meta volcanic andesite to basalt composition. Broken and fractures filled with sand - abundant sand in ~10 cm fraction.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 5 Aug 19 80

SHIFT
08:00 TO 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. KLIP 80-19 LOCATION 80°14'15"W/48°07'45"N Grenfell Tp.
GEOLOGIST RR/JAD/TM DRILLER A. Strojny BIT NO. 0200:22 BIT FOOTAGE 96'-148'
MOVE TO HOLE 14:45 hrs - 15:25 hrs.
DRILL 15:25 - 16:00 hrs - pull rods to 16:20 hrs.
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 16:20 hrs - 17:00 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Brown pebbly oxidized sand and clay
				Lacustrine fine sand and silt - grey colour
10				Brown clay - non-gritty
20				fine sand and silt
30				
				Grey clay - very thin bed, semi-plastic, non gritty
40				
				Hard pan Comminated brown-grey sandy clay
			01	Gravelly till - dark green colour dominantly mafic volcanic pebbles and very little clay
50			02	Bedrock - aphanitic to very fine grained, dark green meta-gabbro or coarse metavolcanic, surface soft - altered and fractured

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 6 1980
SHIFT
08:00 TO 18:00
TOTAL HOURS
CONTRACT HOURS

HOLE NO. 80-20 LOCATION 80° 16' 30"W / 48° 04' 10"N Grenfell Tp.
GEOLOGIST RER/JAD/TM DRILLER A Strojny BIT NO. 020022 BIT FOOTAGE 148' - 161'
MOVE TO HOLE 16:20 - 17:00 hrs
DRILL 08:30 - 09:30
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 9:30 - 10:55

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
			N.R.	some clay balls (brown) oxidized
			01	sandy clay to 4' upper portion oxidized (1') some clay balls, clay coated clasts.
10			02	Bed Rock upper surface fractured with clay filled seams. Gowganda Fm. sandstone – arkosic
20				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug. 6 19 80

SHIFT
08:00 TO 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. 80-21 LOCATION 80° 11' 12" W/48° 06' 20" N Grenfell Tp
GEOLOGIST RER/JAD/TM DRILLER A. Strojay BIT NO. 020019 BIT FOOTAGE 0-53'
MOVE TO HOLE 9:30 - 10:50
DRILL 10:55 - 12:10
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 12:15

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			N.R.	Organics and oxidized Brown clay.
10				grey-green clay
20				varved clay
30				
40				
			01	grey clay becoming sandy
50			02	sandy clay till pebbles coated in clay and some sandy clay balls.
				Bed Rock.
				Gowganda Fm. - greywacke to arkose
60				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 6 Aug 19 80

SHIFT 0800 TO 1900

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-22 LOCATION 80°17'45"/48°08'00"N Burt Tp

GEOLOGIST RER/SMD/TM DRILLER A. Strojny BIT NO. 020019 BIT FOOTAGE 53'-88'

MOVE TO HOLE ____

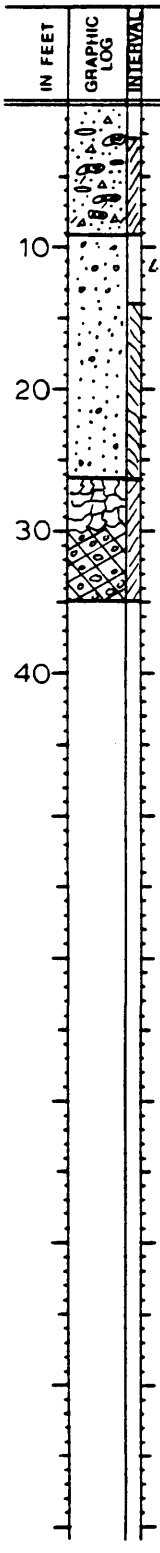
DRILL 13:55 - 14:25 hrs. pull rods to 14:35

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS Loss of return at surface and 9' to 14'

OTHER ____

MOVE TO NEXT HOLE 14:35 - 16:35 hrs.



DESCRIPTIVE LOG

No return - to intermittent return to 5'

Bouldery, cobbly sand till, boulders and cobbles of argillite, very little clay

Lost return 9'-14'

Coarse brown oxidized sand and pebbles.

Mafic coarse to granular sand, few pebbles only

Bedrock - broken to 30', some mafic sand

Gowganda conglomerate.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 6 Aug 19 80
SHIFT 0900 TO 1900
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-23 LOCATION 80°14'55"W/48°03'00"N Eby Tp.
GEOLOGIST BSR/JAD/TM DRILLER M. Strojny BIT NO. 020019 BIT FOOTAGE 88'-191'
MOVE TO HOLE 14:35 - 16:35 hrs
DRILL 16:35 - 18:10 hrs pull rods to 18:24 ; wash water tanks
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS Access to holes on Hwy #66 difficult to impossible due to raised
OTHER shoulders on road bed under reconstruction.
MOVE TO NEXT HOLE 18:24 - 18:50 hrs Aug 6.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				Brown sandy clay & pebbles - mixed road bed material
10				Grey, varved lacustrine clay, sticky
20				
				dark medium and light grey varved clay, varves approx. 1" thick
30				
40				
				dark grey varves stiff, light grey varves sticky and plastic
50				
60				
70				
80				
				occasional granule-size drop stone - mafic volcanic composition.
90				
				fine sandy clay
100			01	Till - gravelly till, abundant clay at top - decreasing clay content to < 1% by 100'. Pebbles predominantly mafic - till has dark green colour and sandy matrix

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 6 Aug 19 80
SHIFT 08:00 TO 19:00
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLIP 80-23 LOCATION 80°14'55"W / 48°03'00"N Eby Tp.
GEOLOGIST LER/JAD DRILLER A. Strojny BIT NO. 020019 BIT FOOTAGE 89'-191'
MOVE TO HOLE
DRILL
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
105			01	Till
			02	Bedrock - pink fine grained equigranular granite - fractured with some clay and pebble filling - aquifer

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 7 Aug 19 80
SHIFT 0800 TO _____
TOTAL HOURS _____
CONTRACT HOURS _____

HOLE NO. KLIP 80-24 LOCATION 80°12'45"W/48°03'27"N Eby Tp.
GEOLOGIST KSR/JAO/TM DRILLER H. Shajny BIT NO. D200019 BIT FOOTAGE 191'-261'
MOVE TO HOLE 0:830 - 09:00 hrs
DRILL 09:00 - 10:20 hrs. pull rods to 10:40 hrs
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 10:40 hrs - 11:30 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				Road bed sand and pebbles.
				Brown oxidized lacustrine clay
				Grey lacustrine clay and roots, clay sticky and plastic
10				
20				Dark grey stiff clay, lesser lighter grey sticky, plastic clay - varved
30				
40				
50				minor grit in clay
60			01	Coarse dark gravel mafic and intermediate volcanics 95% in coarse greenish grey sand matrix, pebbles sub-angular; few sub-rounded; granule-size fraction 25% felsic volcanics, remainder quartz and light lithics. 5% pyrite noted in a pebble.
			02	Medium gravel, greenstones 50%, shale/slate -
			03	Pebbly sand till, sand 60%: pebbles 40%. Clay coatings on pebbles.
			04	
70				Bedrock - weathered, fractured surface, carbonate veining 1-2 mm thick; thick; yellow coatings, and minor pyrite. Light green laminated metavolcanic rock, probably a tuff. Few chips are sheared-like broken Cominia with laminite staining on surfaces.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 7 May 1980
SHIFT 08:00 TO _____
TOTAL HOURS _____
CONTRACT HOURS _____

HOLE NO. KLIP 80-25 LOCATION 80°15'40"W/48°03'27"N Ely Tp.
GEOLOGIST RCR. JAP. DRILLER A. Strojny BIT NO. 020056 BIT FOOTAGE 0-45'
MOVE TO HOLE 10:40 - 11:30 hrs.
DRILL 11:30 - 12:20 hrs., pull rods to 12:45 hrs.
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 12:45 - 15:15 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG	
				Road bed brown clayey sand and pebbles, black organics	
				Brown oxidized clay.	
10				Grey lacustrine clay, medium grey, sandy to sticky and plastic	
20				granules and chip stones	
				Dark medium grey stiff lacustrine clay	
30					
			01	Gravel, largely mafic megaclasts in coarse sand matrix of 50% sand	
40			02	Bedrock, surface broken. Foliated dark green aphanitic mafic volcanic, Pale green layers - possibly bedded with carbonate veinlets, intermediate tuff? and may be silicified. Disseminated fine pyrite cubes in quartz veinlet and adjacent wall.	
50					

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 7 Aug 1980
SHIFT 0800 TO 1800
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-26 LOCATION 80°14'25"W / 48°02'27"N Eby Tp
GEOLOGIST KEK/SADITM DRILLER A. Shojny BIT NO. D20058 BIT FOOTAGE 45'-117'
MOVE TO HOLE 12:45 – 13:15 hrs.
DRILL 13:15 – 1415 hrs pull rods to 14:30 hrs.
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 1430 hrs – 15:30 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Organics, & brown, oxidized, dessicated gritty clay.
				Yellow-brown oxidized lacustrine clay
10				Grey lacustrine clay - light medium grey colour
				Dark medium grey, varved clay.
20				sticky and plastic
30				
40				
50				
60			01	Gravel, 60% granite pebbles and granules, 40% mixed volcanics
				Pebbly, granular ss gravelly coarse sand.
70			02	Bedrock - granite gneiss -; fractured, weathered surface; salmon pink to brick red, possibly with inclusions of mafic material. Even grained texture ±1mm. Fractures filled with epidote.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 7 Aug 19 80
SHIFT 0:600 TO 17:30 hrs
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLM 80-27 LOCATION 80°11'20"W/48°00'32"N Blain Tp.
GEOLOGIST RK JMD TM DRILLER A. Strojny BIT NO. 020056 BIT FOOTAGE 117'-191'
MOVE TO HOLE 14:30 - 15:30 hrs
DRILL 15:30 - 16:20 hrs. pullouts to 16:45 and wash tank.
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 16:10 - 17:00 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10				Dark brown oxidized gritty clay Light yellow-brown clay Grey Lacustrine clay
20				
30				Dark grey stiff clay
40				
50				
60				gritty clay gritty with drop stones
70			01 02	Gravelly till - 25-30% granitics in dark coloured sub angular to sub rounded gravel of pebbles and cobbles. Clay coatings and striae on several pebbles. No clay balls - till or washed till Bedrock - fine grained hornblende granite - foliated to gneissic, pink colour
80				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 8 Aug 19 80

SHIFT 0600 TO 1245 hrs.

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-28 LOCATION 80°11'15"W/48°02'05"N Eby Tp.

GEOLOGIST RCK/ISTAVO DRILLER A Stajny BIT NO. 020056 BIT FOOTAGE 191' - 246'

MOVE TO HOLE 16:10 - 1700 hrs (7 hrs)

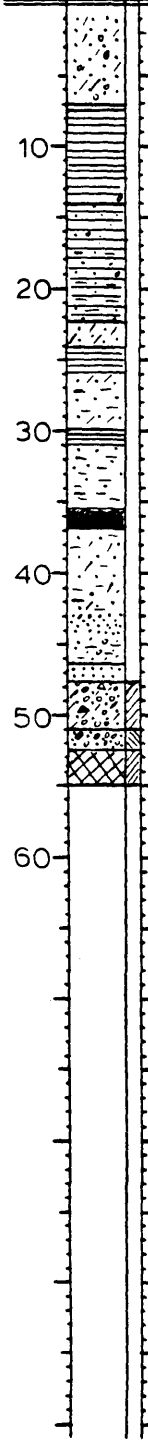
DRILL 0815 - 0905 pull rods to 0915 hrs

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS ____

OTHER ____

MOVE TO NEXT HOLE 0915 - 0940 hrs.



DESCRIPTIVE LOG	
Sand, brown oxidized clay and pebbles.	Lacustrine sand.
Brown oxidized lacustrine clay	
Grey lacustrine clay, occasional drop pebbles, clay probably interbedded with fine sand and silt.	
sand and brown oxidized clay matrix	
Lacustrine fine sand and silt with clay matrix or beds	
Brown oxidized clay grading to grey clay	
Fine sand and silt	
Dark brown mud - peaty deposit.	
Fine sand and silt with clay matrix beds, occasional granule dropstones	
Medium sand	
Fine sand and silt, few granules - drop stones	
Medium sand	
Grangeby sand till, brown to grey clay balls - possibly mixed lacustrine clay and gravel or oxidized upper till surface	
Gravel, mixed lithology, 20% granites, dark volcanics	60-70%
Bedrock, foliated, pink, fine grained granite	hornblende

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 8 Aug 1980
SHIFT 0800 TO 1245
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-29 LOCATION 80°09'35"W/48°01'28"N Eby Tp.
GEOLOGIST RER/JST/JAD DRILLER A. Stogny BIT NO. 220058 BIT FOOTAGE 0-31'
MOVE TO HOLE 09:15 - 09:45
DRILL 09:45 - 10:15 hrs pull rods to 10:30 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 10:30 hrs - 11:10 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Brown organics and sand
				Medium oxidized sand, few pebbles
10				Sandy brown lacustrine clay
				Brown lacustrine clay
				gritty
20			01	Gravelly mafic (dark grey) sand with few pebbles and cobbles
				Coarse mafic sand
			02	
30			03	Bedrock - broken at surface, dark grey very fine grained rock, possibly comminuted or fractured and filled with light buff grey material, " diabase with porphyritic texture or a fragmental.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 8 Aug 19 80

SHIFT
0:30 TO 12:45 hrs

TOTAL HOURS
———

CONTRACT HOURS
———

HOLE NO. KLIP 80-30 LOCATION 80°05'25"W/48°00'52"N Otto Tp.
GEOLOGIST RICHISTJAD DRILLER A. Stojay BIT NO. 0200SB BIT FOOTAGE 31'-48'
MOVE TO HOLE 10:30 - 11:10 hrs
DRILL 11:10 - 11:45 hrs, pull rods to 12:05 hrs
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 12:05 hrs - 12:35 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Brown lacustrine clay, stiff-
				slightly sandy with a few pebbles
10			01	Gravel, cobbly intermediate volcanic boulder 11'-12'
			02	Coarse pebbly granular sand
				Bedrock - pinkish grey medium grained (1-1½ mm) syenite -
20				hornblende & mafic minerals 20-25%. - Otto syenite

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 8+9 Aug. 1980

SHIFT
0800 TO 12:45 Aug 8

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. KLIP 80-31 LOCATION 80°08'50"W/48°03'03"N Eby Tp.
GEOLOGIST IST/REE/JAR DRILLER A. Strojny BIT NO. 028058 BIT FOOTAGE 48'-73'
MOVE TO HOLE _____
DRILL 12:35 - 12:45 on Aug. 9 8:15 - 8:55 Aug. 9
MECHANICAL DOWN TIME 12:45 - 21:00 Aug. 8
DRILLING PROBLEMS Compressor valve switch Malfunction
OTHER _____
MOVE TO NEXT HOLE 9:05 - 9:50

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG	
				No Return - No org. Seen.	
10				Brown Lacustrine Clay	
				Grey Lacustrine clay	
				← Return blocked here on Aug. 8 on Aug. 9 the first material retrieved at this depth	
20			01 (dA Wash)	Till Chunks - sandy clay till	was sandy till
			02	Bedrock	pink hornblende, massive granite minor joint planes - No sulphide seen.
30					

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 9 Aug 19 80
SHIFT
0800 TO ____
TOTAL HOURS
____
CONTRACT HOURS
____

HOLE NO. KLP 80-32 LOCATION 80° 06'25"W / 48° 04'12"N Otto Tp
GEOLOGIST IST/ID/TM DRILLER Shantz BIT NO. 020058 BIT FOOTAGE 73-123'
MOVE TO HOLE 9.05 - 9.50
DRILL 9.50 - 10.35
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER Ian Thomson OGS Monitoring
MOVE TO NEXT HOLE 10:55

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Brown Lacustrine clay - minor silt
10				
				Lacustrine Clay - Grey
20				
30				(Brownish clay 10%)
				Clay - Grey
40			02	Till - clay/silt balls - included +10 mesh stns
			01	Gravel - 50/50 granite (pink) & black mafic volcanic - but granite > 6 to 1 ratio possible "sandy till" - talk.. +10 mesh stns.
50				Bedrock - massive pink Hornblende granite with "pebbles" representing inclusions of mafic volc which granite is seen often in outcrop.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 9 Aug. 1980
SHIFT
08:02 TO ____
TOTAL HOURS
____
CONTRACT HOURS
____

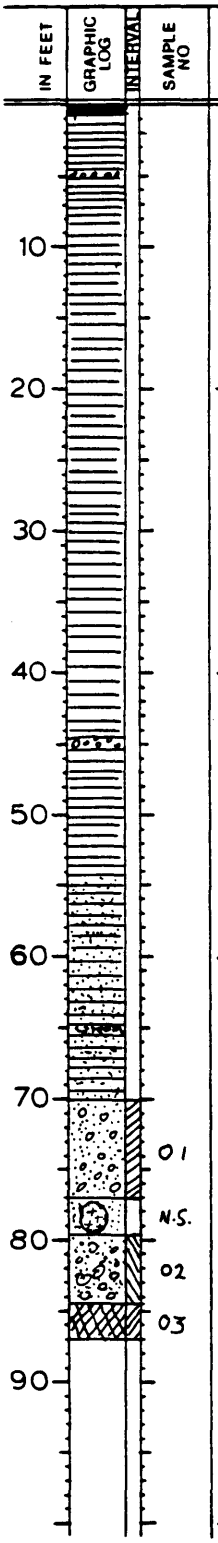
HOLE NO. KLIP 80-33 LOCATION 80°07'00"W/48°03'00"N Otto Tp.
GEOLOGIST ISI/JO / T.M. DRILLER A. Stevens BIT NO. 020058 BIT FOOTAGE 123'-192'
MOVE TO HOLE 10:55 - 11:45
DRILL 11:46 - 13:15 pull rods to 13:50 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 13:50 - 14:00 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Oxidized brown clay.
				Brown silty clay
				Grey clay Lacustrine
10				Varved
20				grey clay no varves
30				
40				
				gritty sand layer
50				
				coarse sand to fine gravel
60			01	
			02	Sandy till, silty clay balls, angular pebbles, clay coated pebbles.
			03	Bedrock
70				Hard massive Hybrid Hornblende rich granite, variegated colour - dull red/purple/brown No sulphides, Upper section jointed sand filled.
80				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug. 9 1980
SHIFT
08:00 TO 17:35
TOTAL HOURS
CONTRACT HOURS

HOLE NO. 80-34 LOCATION 80°07'35"W/48°01'20"N Otto Tp
GEOLOGIST IST/SAR/TM DRILLER A. Strajny BIT NO. 020058 BIT FOOTAGE 192'-279'
MOVE TO HOLE 13:50 - 14:00
DRILL 14:00 - 15:45
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 16:00 - 16:45



DESCRIPTIVE LOG

Brown organic matter
oxidized Brown clay minor silt. stones
Grey clay
Loose clay
clay minor silt (grey) Lacustrine
gravel.
interbedded silt/sand/clay
Sand loose
More sand than clay
Sandy gravel/ 50% granite, 30% mafic Vol.
Granite Boulder
gravel (coarse)
70% granite 20% mafic
Bedrock pink Hb granite 5% Hb

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 11 19 80

SHIFT
08:00 TO 11:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. KLIP 80-35 LOCATION 80°04'10"W/48°01'45"N Otto Tp
GEOLOGIST RER/JAD DRILLER A. Strojny BIT NO. 020055 BIT FOOTAGE 0-140'
MOVE TO HOLE 16:00 - 16:45 hrs (10 Aug)
DRILL 08:30 - 10:30
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 10:30 - 11:40

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				Soil - Brown clay + silt (oxidized)
10			N.R.	No Return grey clay creamy texture
20				Varved clay thin brown layers between thicker grey layers.
30				
40				
50				
				gritty clay
60				Creamy clay (grey)
				gritty clay. grey clay gritty clay grey clay gritty grey clay with some +10 angular pebbles. (Haase Kgn 145)
70				grey clay creamy
			N.R.	No return
80				
90				
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 11 19 80
SHIFT 08:00 TO ____
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-35 LOCATION 80°04' 10"W/48°01'45"N Otto Tp
GEOLOGIST RER/JAB DRILLER A Stevens BIT NO. 020055 BIT FOOTAGE 0-140'
MOVE TO HOLE ____
DRILL 08:30 - 10:30
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 10:30 - 11:40

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				grey clay (more dense)
110				grey clay becoming silty sand lens.
				Greg clay sand with small pebbles.
				sand with clay (grey lacustrine) silty sandy clay
120				Fine to medium sand.
			01	coarse sand to fine gravel dominantly granite
130				granule to pebble gravel
			02	sandy clay till, some silty clay balls.
			03	silt filled silty clay balls, clay coatings on some clasts.
				Bedrock
140				Pink granite, upper surface jointed with some sand infilling.
150				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 11 Aug 19 80

SHIFT 0800 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP-80-36 LOCATION 79°59'55"W/48°01'45"N Boston Tp

GEOLOGIST KER/SMD DRILLER A. Strojny BIT NO. 020055 BIT FOOTAGE 140'-170'

MOVE TO HOLE 10:30 - 11:40 hrs

DRILL 11:55 - 12:30 hrs pull rods to 12:45 hrs & fuel rig

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS ____

OTHER ____

MOVE TO NEXT HOLE 12:50 - 13:40 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10			01	Brown (oxidized) medium sand, well sorted deltaic or esker flank sands few granitic-syenitic granules
20			02	
30			03 04	Pebbly sand till, 75% mafic to intermediate volcanic and 25% granitic or syenitic in pebble fraction. Minute amount of grey clay balls but clay coatings on pebbles. Sandy grey matrix. Few chert clasts with pyrite noted. (till thickness ≥ 6') Bedrock - fine grained dark greenish to black rock with disseminated pyrite and epidote veining or alteration. Diabase or trap rock.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 11 Aug 1980
SHIFT 08:00 TO 18:00
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLP 80-37 LOCATION 79°56'55"W/48°00'39"N Pacaud Tp.
GEOLOGIST RLR/JAD/TM DRILLER A. Stojny BIT NO. 020055 BIT FOOTAGE 170'-190'
MOVE TO HOLE 12:50 - 13:40 hrs
DRILL 13:40 - 14:10 hrs. pull rods to 14:15 hrs.
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 14:15 - 14:40 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10				Brown oxidized varved clay - alternating silty - very fine sandy clay and clay
				Brown (oxidized) fine, well sorted lacustrine sand.
20			01	Bedrock - foliated, very fine grained to aphanitic, dark green mafic volcanic - basalt. up to 10% disseminated pyrite in a few chips

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 11 19 80
SHIFT 08:00 TO 18:00 hrs.
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP. 80-38 LOCATION 79°56'10"W/48°0'03"N Boston Twp.
GEOLOGIST RER/JAD DRILLER A. Stevenson BIT NO. 020055 BIT FOOTAGE 190'-208'
MOVE TO HOLE 14:13 - 15:40 hrs
DRILL 15:43 - 16:00 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 16:00 - 16:40 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				oxidized silty, sandy Brown clay
10				brown clay
			01	sandy till with some clay & angular pebbles with clay coatings
			02	Bed Rock
20				upper surface...jointed...with...oxidized...surfaces.....
				Fine-grained, medium gray diabase

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 11 Aug 19 80
SHIFT 08:00 TO 17:35
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-39 LOCATION 79°52'23"W/48°00'25"N Catharine Tp.
GEOLOGIST RER/JAD DRILLER A. Stojny BIT NO. 020055 BIT FOOTAGE 209'-236'
MOVE TO HOLE 16:00 - 16:40 hrs
DRILL 16:40 - 17:10 hrs pull rods and clean tanks to 17:25 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 17:25 - 17:35 hrs - shut down for day

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Fine oxidized brown sand
			01	Gravel - granitics 40%, volcanics 60% in +10 m
10			02	Cobbly gravel - cobbles mainly intermediate and mafic volcanics, granitics 25%; pebbles - intermediate volcanics - 50%, mafics 25%, granitics - 20%
				Gravel, pebbly and granular - oxidized brown medium sand matrix, intermediate and - mafic volcanics 80% in +10 m.
20			03	Coarse gravel
			04	Bedrock - very fine-grained to aphanitic, dark green mafic rock - basaltic composition
30				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 13 19 80
SHIFT
08:00 TO _____
TOTAL HOURS
_____
CONTRACT HOURS
_____

HOLE NO. KLIP 80-40 LOCATION 79°52'23"W/48°00'20"N Cathermie Tp
GEOLOGIST RER/JMD DRILLER A Sleeping BIT NO. 020053 BIT FOOTAGE 0-15'
MOVE TO HOLE 08:30 - 08:55 hrs
DRILL 08:55 - 09:15 hrs.
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 09:15 - 09:50

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG	
				organics and a small amount of oxidized clay	
			NR	No return	
10			01	Till?? clay, silt + granule gravel	
			02	Bedrock.	
				Dark greenish-grey, aphanitic metavolcanic - basalt	
20					

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 12 19 80

SHIFT
08:00 TO ____

TOTAL HOURS
____

CONTRACT HOURS
____

HOLE NO. KLIP 80-41 LOCATION 79°54'30"W/48°00'10"N Parand Tp.
GEOLOGIST RER/JAD DRILLER A. Skrajny BIT NO. 020053 BIT FOOTAGE 15'-65'
MOVE TO HOLE 09:15 - 09:50 hrs
DRILL 09:50 - 10:40 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS 10:25 pull rods at 50' sanded in hole abandoned (casing
OTHER water moved to location 15 yds along road.
MOVE TO NEXT HOLE 10:40 - 10:45 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG	
			N.R.	No Return	
				oxidized fine sand and silt.	
10				gravel no sand.	
			01	sandy gravel becoming oxidized	
20					
			02	alternating layers of oxidized and unoxidized layers of gravel and sand.	
30					
			N.S.	granite boulder frequent indications of sulphides	
			02		
40					
			N.R.	No Return	
				hole abandoned	
50					
60					

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 13 Aug 19 80
SHIFT 0800 TO 18:30hrs
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KL1P80-541 LOCATION 79°54'30"W/49°00'10"N Amax Rd Pacaud Tp
GEOLOGIST RER JAD Jm DRILLER A. Strojay BIT NO. 010005 BIT FOOTAGE 30'-140'
MOVE TO HOLE — moved from 80-41 approximately 75' to west
DRILL 08:45-09:45 hrs ; 11:30hrs - 13:35 hrs , pulled rods to 13:49 hrs.
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS loss of return in extremely permeable gravel - return
OTHER intermittent from 60' to 103' (note: Two previous trys at this hole failed at 7' & 30')
MOVE TO NEXT HOLE 13:49 - 14:55 hrs (bit 020053 - 65'-136')
(bit 010005 - 0-30')

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
10			01	Brown oxidized gravel and cobbles Pebbly granular gravel, very little matrix coarse sand, pebbles small 4-20 mm, intermediate, felsic and mafic volcanic pebbles 80% of clasts. brown oxidized non-gritty clay
20				
30			02	
40				
50			03	very little return - water loss to gravels Brown oxidized non-gritty clay
60				
70				lost return poor return mafic volcanic boulders
80			04	
90				Lost return
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 13 Aug 19 80
SHIFT 0:800 TO 19:30
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLIP 80-541 LOCATION 79°54'30"W / 48°00'10"N Pacaud Tp.
GEOLOGIST RCR/SHD/JM DRILLER A. Shojny BIT NO. 010005 BIT FOOTAGE 30'-140'
MOVE TO HOLE
DRILL
MECHANICAL DOWN TIME
DRILLING PROBLEMS lost return water
OTHER
MOVE TO NEXT HOLE 13:49 - 14:55 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			04	Pebbly granular gravel - extremely permeable
			05	Bedrock - finely ground chips
110				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 13 Aug 1980

SHIFT 0:800 TO 18:30

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-42 LOCATION 795448W/4800 42N Pacaud Tp

GEOLOGIST RCR/JAD/TM DRILLER A. Stojny BIT NO. 010005 BIT FOOTAGE 140'-167'

MOVE TO HOLE 13:45 - 14:50 hrs

DRILL 14:50 - 15:25 hrs (pull rods to 15:35)

MECHANICAL DOWN TIME 16:00 - 17:30 hrs - water truck flat tire repair

DRILLING PROBLEMS ____

OTHER ____

MOVE TO NEXT HOLE 15:35 - 16:00 hrs, 17:30 hrs - 18:30 Hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Black peaty muck and oxidized brown clay
				Brown oxidized lacustrine clay
10				Grey lacustrine clay, soupy and sticky
20				fine sandy - silty grey clay
			01	6" Pebbly sand till - few grey clay balls, largely mafic volcanic derived
			02	pebbles and sand mixed with broken bedrock
30				Bedrock - dark green aphanitic foliated mafic volcanic - basalt. pyrite disseminated in fine to 1 mm aggs.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 14 1980
SHIFT
08:00 TO ____
TOTAL HOURS
____
CONTRACT HOURS
____

HOLE NO. KLIP 80-43 LOCATION 80°00'52"W/48°02'35"N Otto Tp.
GEOLOGIST RER/JAD DRILLER A. Strojay BIT NO. 010005 BIT FOOTAGE 167' - 202'
MOVE TO HOLE 15:25 - 16:00 hrs - 17:30 hrs - 18:30 hrs 13 Aug/80
DRILL 09:30 - 10:05 pull rods 10:30 hrs.
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER 5:00 water truck stuck, no water on drill rig
MOVE TO NEXT HOLE 10:30 - 11:00 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				light brown clay
10				
				grey clay cremey
20				
30			01	sandy clay till with grits and pebbles.
			02	Bedrock
				Granite, darker volcanics with some granitic material - inclusions or melanocratic granite-syenite
40				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 14 Aug 19 80

SHIFT 8:00 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-44 LOCATION 80°03'42"W/48°04'37"N Otto Twp

GEOLOGIST RSR/JMD DRILLER A. Strojny BIT NO. 010005 / 020023 BIT FOOTAGE 202'-257' / 0-60'

MOVE TO HOLE 10:30 - 11:00 hrs

DRILL 11:00 - 11:20; 12:00 - 12:30 hrs; 13:05 - 13:25 hrs.

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS Bit lost roller @ 50' replaced bit; drilled and sampled

OTHER bit - pulled rods and drilled to finish hole

MOVE TO NEXT HOLE 13:25 - 14:15 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				road bed
				Brown oxidized lacustrine clay
10				gradational colour change to grey clay
20				
30				
40				
50				Fine to medium sand with few pebbles
			01	Gravel - pebbly granular gravel, matrix medium sand
				about 30%; 85% intermediate and mafic volcanics; 15% granitics. in pebble
60			02	fraction.
				Bedrock - medium to fine grained salmon pink phenocrysts in
				fine grained, dark green matrix, possibly hydrated contact zone
				between Otto syenite and meta volcanics?

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 14 Aug 1980

SHIFT 09:00 TO 18:00

TOTAL HOURS ———

CONTRACT HOURS ———

HOLE NO. KLIP 80-45 LOCATION 80°03'30"W / 48°05'45"N Otto Tp

GEOLOGIST LGK/JAD DRILLER A Stojanj BIT NO. 020023 BIT FOOTAGE 60' - 75'

MOVE TO HOLE 13:25 - 14:15 hrs

DRILL 14:15 - 14:35 hrs. pull rods to 14:45 hrs.

MECHANICAL DOWN TIME ———

DRILLING PROBLEMS ———

OTHER ———

MOVE TO NEXT HOLE 14:45 hrs - 15:20 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				no return - fine to medium sands on surface
				Fine to medium sand
10			01	Gravel, mainly intermediate and mafic volcanic pebbles.
			02	Bedrock - bedded black metasedimentary rock - return water black - finely disseminated pyrite in graphitic argillite - explains source of Input conductor located immediately north of hole
20				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 14 Aug 19 80

SHIFT
0800 TO 18:00

TOTAL HOURS
—

CONTRACT HOURS
—

HOLE NO. KLIP 80-46 LOCATION 79°01'15"W/48°04'05"N Otto Tp
GEOLOGIST KER/JAD DRILLER A. Strojny BIT NO. 020023 BIT FOOTAGE 75'-99'
MOVE TO HOLE 14:45 hrs - 15:20 hrs
DRILL 15:20 - 16:05 hrs
MECHANICAL DOWN TIME —
DRILLING PROBLEMS —
OTHER —
MOVE TO NEXT HOLE 16:05 - 17:30 hrs ; 08:15 - 0830 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Organics and brown oxidized clay - willow swamp.
10				Grey lacustrine clay - stiff
20				gritty clay
			01	Gravel 2" 4"
			02	Bedrock - Otto Syenite.
30				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 15 Aug 19 80
SHIFT 08:00 TO 20:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 80-47 LOCATION 79°51'00"W/48°03'08"N McElroy Tp
GEOLOGIST RER/JAD DRILLER A Strojny BIT NO. 020023 BIT FOOTAGE 99' - 194'
MOVE TO HOLE 08:15 - 08:30 hrs
DRILL 09:00 - 10:20 hrs pull rods to 10:30 hrs.
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER water truck stuck 08:30 - 08:55 hrs
MOVE TO NEXT HOLE 10:30 hrs - 12:40 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				no return
				Brown, oxidized, slightly silty, lacustrine clay
10				
20				Grey, slightly silty, lacustrine clay
30				
40				
50				
60				Silt and very fine sand
70				very fine sand and silt Grey clay Silt
80				very fine sand and silt
			01	Bouldery, cobbly gravel, coarse clasts (+10) almost entirely granitic
				Coarse sand bed
90			02	Gravel - % granitics decreased to 50%, granitics mainly in coarse pebbles and cobbles. Volume % increased, few opaque yellowish chert pebbles
			03	Broken bedrock and gravel
				Bedrock - fine to medium grained, pink, hornblende granite - McElroy Stock - free quartz from quartz veining and inclusions(?) of mafic and felsic volcanics
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 15 Aug 1980

SHIFT 0800 TO 2000

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-48 LOCATION 79°50'45"W/48°04'50"N McElroy Tp

GEOLOGIST RER/JAD DRILLER A. Strojny BIT NO. 020023 BIT FOOTAGE 194'-298'

MOVE TO HOLE 10:30 hrs to 12:40 hrs

DRILL 12:40 hrs - 14:15 hrs - pull rods to 14:30 hrs

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS water exhausted in hole - no access for water truck

OTHER ____

MOVE TO NEXT HOLE 14:30 - 15:50 hrs. (take on water at small lake)

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG	
10			01	Coarse brown sand, few small pebbles, occasional cobble	
20					
30			02	Gravel - sandy gravel, mixed lithology in +10m, medium grey volcanics >> granitics with few meta sedimentary schist pebbles - some limonitic Coarse grey granular sand	
40			03	Coarse well sorted sand, few granules	
50			04	granule size increasing - few pebbles	
60				occasional pebbles only	
70			05		
80					
90			06	grey clay in matrix Coarse granular sand - few pebbles only	
100			07	granite boulder	

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 15 Aug 1980

SHIFT 08:00 TO 20:00

TOTAL HOURS ———

CONTRACT HOURS ———

HOLE NO. KLIP 80-48 LOCATION 79°50'45"W / 48°04'50"N McElroy Tp

GEOLOGIST RSR/TAD DRILLER A. Stojay BIT NO. 020023 BIT FOOTAGE 194'-298'

MOVE TO HOLE ———

DRILL ———

MECHANICAL DOWN TIME ———

DRILLING PROBLEMS ———

OTHER ———

MOVE TO NEXT HOLE ———

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			07	
			08	Bedrock - pink hornblende granite, - McElroy Stock - some mafic material either thin dykes or inclusions.
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 15 Aug 19 80
SHIFT 0800 TO 2000
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLIP 80-49 LOCATION 79°51'00"W/48°04'13"N McElroy Tp.
GEOLOGIST PLR/JAP DRILLER A Stryjny BIT NO. B59000 BIT FOOTAGE 0-151'
MOVE TO HOLE 14:30 - 15:50 hrs
DRILL 16:15 - 17:55 hrs. pull rods to 18:15 hrs.
MECHANICAL DOWN TIME 15:50 - 16:15 hrs - wait for new bits
DRILLING PROBLEMS rods sanding in at each rod change from 115'
OTHER abandoned hole at 151' - bit blocked, water almost exhausted - change out of bits - fuel -
MOVE TO NEXT HOLE 18:15 - 18:30 hrs - Tinker pack out of fuel -

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Rusty brown very fine oxidized sand
				Grey very fine sand and silt - lacustrine - possibly aeolian?
10				
20				
				silty clay
30				granules & fine sand
				Fine sand, no silt
40				
				Very fine sand and silt
50				
				Fine grey sand - no silt
60				
				Fine to medium, well sorted sand
			01	Coarse, pebbly granular sand, oxidized - brown - probable river channel
70				
				Fine to medium sand
80				
			02	gradational coarsening to medium to coarse granular sand
90				
			03	Coarse granular sand
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 15 Aug 19 80

SHIFT 08:00 TO 20:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 80-49 LOCATION 79°51'00"W/48°04'13"N McElroy Tp

GEOLOGIST BER/JAD DRILLER A. Stojcy BIT NO. 859000 BIT FOOTAGE 0-151'

MOVE TO HOLE ____

DRILL 16:15 - 17:55 hrs. pull rods to 18:15 hrs.

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS 100% sanding in at each rod change from 115', abandoned hole at 151'.

OTHER ____

MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
110			03	Coarse granular grey sand with pebbles
			04	
120				
				Medium, well sorted, grey sand, angular granules ccSb, deltaic deposition - esker delta.
130			05	
140			06	
				no return, bit plugged - rods sanded - abandoned hole
150				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 16 19 80

SHIFT
08:00 TO 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. KLIP 80-50 LOCATION 79°52'25"W/48°02'5"N McElroy Tp

GEOLOGIST JAD/REA DRILLER A. Strojay BIT NO. B59001 BIT FOOTAGE 0-8'

MOVE TO HOLE 08:30 - 11:30

DRILL 13:40 - 14:00

MECHANICAL DOWN TIME Bleed line (Fuel) outs, move to road (11:30 pumpen wate. truck to 13:30

DRILLING PROBLEMS _____

OTHER _____

MOVE TO NEXT HOLE 14:00 to 14:30

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				oxidized clay (Brown)
				Sandy brown clay
			01	Bedrock, upper surface fractured
10				Dark greenish gray, fine to medium grained, massive - gabbro or coarse basalt flow

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 14 19 80
SHIFT
08:00 TO 16:00
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLIP 80-51 LOCATION 79°51'40"W/48°03'37"N McElroy
GEOLOGIST JAD/REL DRILLER A. Skrajny BIT NO. B59001 BIT FOOTAGE 8'-66'
MOVE TO HOLE 14:00 - 14:30
DRILL 14:35 - 15:49
MECHANICAL DOWN TIME
DRILLING PROBLEMS 14:45 pull rods @ 35' - 15:06 start over
OTHER
MOVE TO NEXT HOLE

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10			N.R.	No Return (brown clay)
20				
30				silty brown clay.
40				silt and clay layer possible varves or rythmites silt with afew granule size pebbles. silt and clay layers again possible rythmites
50			01	sand and gravel with cobbles no clay.
			02	Bedrock upper surface fractured and broken
60				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Aug 16 1980

SHIFT
08:00 TO 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. KLIP 80-52 LOCATION 79°52'32"W/48°04'17"N McElroy.
GEOLOGIST JAD/RER DRILLER A. Stojay BIT NO. B59001 BIT FOOTAGE 66'-84'
MOVE TO HOLE 16:04 - 16:16
DRILL 16:20 - 16:35 pull rods to 16:50 hrs,
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 16:50 - 18:00 hrs - clean tanks and rig - move to Adams Mine Road through gate - demobilize.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Oxidized brown clay
				silty Brown clay
10			01	Sandy till angular clasts, some cobbles, gritty clay balls.
			02	Bedrock.
				Blue-medium grey fine-grained inequigranular meta volcanic or possibly metasediment.
20				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 24 Feb 19 81

SHIFT
0800 TO 0600

TOTAL HOURS

CONTRACT HOURS

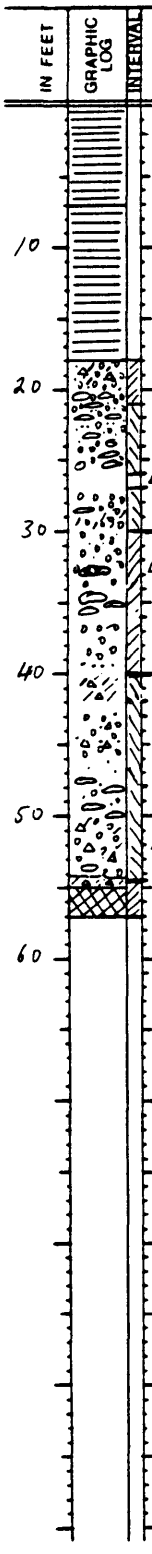
HOLE NO. KLIP 81-01 LOCATION 80°11'52"W/48°05'15"N Eby Tp.
GEOLOGIST RER/JAD DRILLER R. Fournel BIT NO. B62330 BIT FOOTAGE 0'-66'
MOVE TO HOLE Feb-23 12:15 hrs -
DRILL 09:25 hrs - 10:55 hrs.
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 11:00 - 1330 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
	no return			
10				Grey glacio lacustrine clay.
20				Brownish grey slightly oxidized glacio lacustrine clay
30				Grey glacio lacustrine clay, plastic - varved - light grey stiff and dark grey plastic varves
40				
50				
				fine sand and silt in grey clay
60				grit and misc rounded stones in clay
			01	Bedrock - light grey slightly pink fine grained volcanic or hypabyssal intrusive rock. Quartz veining - bull white quartz. Pyrite disseminated in 1/16-1mm cubes and cubic aggregates - greenish light grey - chloritic shear planes. Foliation in some chips.
70				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 24 Feb 19 81
SHIFT 0800 TO 1800 hrs
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO KLIP-81-02 LOCATION 80°15'42"W/48°05'11"N Eby Tp
GEOLOGIST RER/JAD DRILLER R. Fournel BIT NO B62330 BIT FOOTAGE 66'-123'
MOVE TO HOLE 11:00 hrs - 13:30 hrs
DRILL 13:30 hrs - 17:30 hrs ; 09:50 hrs - 10:45 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS Standby for water 15:13-15:35 hrs / Compressor hose replacement
OTHER 9:45 - 9:50 hrs, " " 10:00 - 10:55 hrs - mucky stuck in creek
MOVE TO NEXT HOLE 10:45 hrs - 11:35 hrs



DESCRIPTIVE LOG

Yellow brown oxidized glacio lacustrine clay with fine sand and grit.

Grey glacio lacustrine clay.

Turbidite ? or mixed clay and gravel - clay coatings and pebbly with 1-3-20% rounded pebbles of mafic and intermediate volcanic composition

Coarse cobbly gravel - mafic to intermediate volcanic cobbles in medium to coarse grey sand matrix < 50%. - Layered epidote altered porphyritic metadiorite and gabbro rounded non-spherical pebbles & coarse cobbly granitic rich layer - 5-10% granitics few clay-silt balls and clay coatings at 29' mafic volcanic boulder @ 32½'

Till? very few small clay-silt-grit balls and clay coatings - granitic clasts almost nil - Gowganda argillites 10-20%. light grey gritty, platy clay - compacted - and gritty clay-silt balls - fine pebbly silty till.

Cobbly Till - occasional granitic clasts, few Gowganda argillite plates - good clay coatings and few cobbles.

Sandy clay, (silty?) - clay coated clasts, basal till.

Bedrock - Timiskaming foliated greywacke - silica rich and dark grey, aphanitic platy chips.

* L.R. - lost to poor return - poor return continuous from 30' - matrix-free open gravels and return outside rods to surface.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE 25 Feb 1981

SHIFT 08:00 TO 15:10 hrs

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLIP 81-03 LOCATION 80°14'03"W/48°05'09"N Eby Tp.

GEOLOGIST RER/JAD DRILLER R. Fournel BIT NO. B 62330 BIT FOOTAGE 123'-148'

MOVE TO HOLE 10:45 hrs - 11:35 hrs

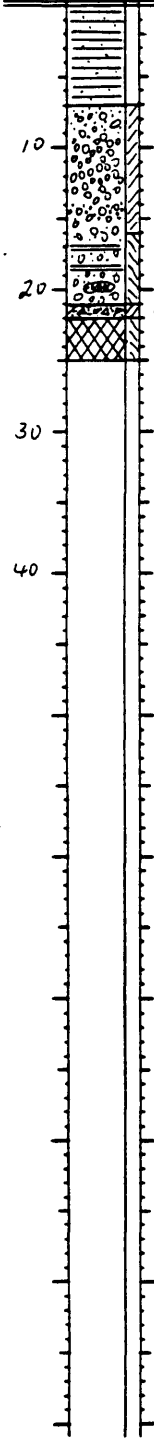
DRILL 11:35 - 12:35 hrs.

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS ____

OTHER ____

MOVE TO NEXT HOLE Demob to highway 66 12:35 hrs - 14:40 hrs
14:40 - 15:10 hrs travel to Kirkland Lake - standby for float.



DESCRIPTIVE LOG

Yellow brown oxidized glacio lacustrine clay - slightly sandy.

Dark coloured mafic volcanic-rich pebble gravel sand matrix 20-30% at top grading to ~5% with depth. rounding decreases w/depth to subangular immature open gravel (water loss 60-60%). Rounded + sphericity good in felsic-granitic upto 5% in granules
14'-15' medium coarse sand matrix increased to 30-40% - sandy gravel
platy light grey gritty clay 17'-18' - thin clay beds in sandy gravel
granite boulder 19'-20'

Pebbly sand till, clay-silt matrix ~10%

Bedrock: diabase or porphyritic basalt -
medium grained feldspar in dark green-grey schistose
fine grained to aphanitic matrix

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE Feb. 26 1981

SHIFT
8:00 TO 18:00

TOTAL HOURS

CONTRACT HOURS

HOLE NO KLIP 81-04 LOCATION 80°03'11"W/48°17'15"N Melba Tp
GEOLOGIST RER/JAD DRILLER R Fournel BIT NO. B 62326 BIT FOOTAGE 0-32'
MOVE TO HOLE Mob. 8:30 to 13:30 → set up - to 14:10
DRILL 14:10 to 15:30
MECHANICAL DOWN TIME Broken axle (left Rear) @ 16:00 → road by 17:30.
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 15:30 to 16:00

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
	N.R.			Yellowish Brown (oxidized) fine to medium sand
10	N.R.			
20			01	Brown medium glaciofluvial sand
			02	Gravel well rounded mafic, intermediate volcanic pebbles, lesser granitics in coarse brown sand matrix.
30			03	Bedrock - Greenish medium grey, fine grained to aphanitic meta volcanic of intermediate composition. Abundant quartz as conglomerate or veining - carbonate alteration - propyllitized?

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE FEB. 27/2019 81

SHIFT
9:00 TO 18:00

TOTAL HOURS

CONTRACT HOURS

HOLE NO. KLP81-05 LOCATION 80°03'36"W/48°16'49"N Melba Tp.
GEOLOGIST J.A.D. / RER DRILLER R. Fournel BIT NO. 862326 BIT FOOTAGE -32'-164'
MOVE TO HOLE 14:00 to 15:00
DRILL Feb 27 - 15:10 to 17:30 / Feb 28 8:30 to 14:05
MECHANICAL DOWN TIME 8:00 to 14:00 Fix broken axle
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 14:05 to

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
			N.R.	Sandy with some angular to clasts.
			L.R.	Low return because sand and water are coming up out side of drill rods.
10				medium sand.
			01	some granule clasts.
20				
			02	Medium sand some granule clasts angular to sub rounded
30				coarse sand to fine gravel
			03	gravel (medium) some cobbles. coarse gravel - very little sand matrix
				becoming more sandy
40			04	gravel with some sand., sulphides present in some clasts.
				Sandy gravel and granules
50			05	
			06	gravel with very little sand matrix
60			N.R.	
			06	sandy gravel, some sulphide present in clasts.
70				granule gravel with some sand matrix
				granule gravel angular to sub-rounded
			07	
80				clay on some granule clasts. with some angular cobble fragments.
				Finer granule gravel very few larger clasts.
90			08	gravel becoming coarser, some rounded to sub-angular 70% angular fragments of cobbles.
				coarse gravel very little matrix
			L.R.	low return (possible open work gravel)
100			09	

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE FEB 28 19 81
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO KLP81-05 LOCATION 80°03'36"W / 48°18'45"N Melba Tp
GEOLOGIST J.A.D./R.E.R. DRILLER R. Fournel BIT NO. B62326 BIT FOOTAGE 36'-164'
MOVE TO HOLE ____
DRILL Feb. 28 9:30 to 14:05
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 14:05 to

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			09	well rounded pebbles. with angular clast. Fragments green intermediat volcanics. Frequent cobbles. Felsic rich (pink) cobbles
110			10 LR.	Low return. Cobble gravel with some granule matrix. very little sand present. quartz rich. SANDY gravel
			N.S.	Boulder (int. volcanic) green with some quartz carbonate) medium to fine sand. few +10 granule clasts.
120			11	gravel. clay lens in gravel some clay on pebbles.
			12	coarse gravel primarily greenish with some felsic rich pink clasts.
130			13	Bed Rock. - clay seams in broken bedrock greenish-grey intermediate volcanic
140				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 2 19 81

SHIFT 8:00 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLP81-06 LOCATION 80°06'28"W/48°17'31"N Melba Tp.

GEOLOGIST BER/JAD. DRILLER R. Fournel BIT NO. B61475 (rebuilt B61476) BIT FOOTAGE 0-162' 0-173'

MOVE TO HOLE March 2 @ 14:00 stopped @ creek to build bridge 18:00 March 2 ended @ 11:00

DRILL 11:15 to 17:00 March 3 10:30 to 15:00

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS 17:00 rods plugged @ 165' pull rods march 3, 8:30 to 10:30

OTHER redrill 10:30 hrs to 15:00 hrs with new bit.

MOVE TO NEXT HOLE 15:00 to 17:00 clean tools.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10				Soupy grey lacustrine clay - water saturated.
20				
30				slightly plastic - less water content
40				
50				Light and medium grey varves
60				
70				dark grey clay
80				
90				sticky plastic clay with dark and medium grey varves
				gritty, sandy clay
		01		Gravel - green, rounded mafic pebbles of fine to medium size, (5-10 mm)
100		N.S.		Bedrock boulder - pinkish grey, fine grained, green to greenish grey - weathered on exterior, fresh surface hard water wi
		01		

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 2/3 19 81

SHIFT 8:00 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO KLP 81-06 LOCATION 80°06'28"W / 48°17'31"N Melba Tp.

GEOLOGIST B.E.R. / A.H. DRILLER R. Fournel BIT NO B61475, B61476 BIT FOOTAGE ____

MOVE TO HOLE ____

DRILL March 2 - 11:15 to 17:00 March 3 - 10:30 to 15:00.

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS March 2 17:00 bit plugged. March 3 pull rods, bit, sub + reed plugged 8:00 to 10:30

OTHER New bit required. (B61476) Bit plugged 12:00 to 12:10.

MOVE TO NEXT HOLE 15:00 to 18:00. clean tank.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
			01	Pebbly to gravelly sand, matrix same 80% occasional grey silt - clay ball; - green colour to gravel - fluvial clays?
			02	Largely angular pebbles and cobbles, coarsening to cobbly gravel
110				
			03	Medium light grey sand - arkosic lithic sand aquifer
120				
			04	
130				cobbly layer 6"-1' medium well sorted lithic sand
			05	
140				
				cobbly layer < 6"
			06	gabbro boulder
150				aquifer @ 156'
			07	Coarse cobbly gravel - mainly (50%) light grey intermediate volcanic cobbles, granite 30%, gabbro 10-20%,
160			08	clay coatings and very few grey clay silt pebbles - turbidite?
			09	very little matrix <30%; cherty hematite f.f. pebble @ 157' 157' black banded chert cobbles and boulders - cherty rhyolite?
			NS	- matrix coarse sand increased to 60-70%; & felsic volcanics increased - pebbly gravel grades to granule gravel
170			10	30-40% granules in +10 m - granites 60% of granule fraction
			11	160' - dominantly intermediate volcanics - granites much less - one laminated quartzite pebble -, cherts and occasional porphyry pebbles.
				164' - granular gravel - very little sand matrix some well rounded pebbles, most clasts are angular, likely immature (fluvial gravel).
180				coarse gravel is well rounded. clay present on some clasts
				166-168' - granular & sub rounded pebbles clay present on some clasts.
				Bedrock - 170'-173', green, foliated, talcose with clay seams. Schistose to phyllitic foliation, intermediate (andesitic) metavolcanic.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 4 19 81
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO KLP 81-07 LOCATION 80°08'37"W/48°17'18" Melba Tp.
GEOLOGIST J.A.D./R.E.R. DRILLER R. Fenerel BIT NO. B6/476 BIT FOOTAGE 173'-301'
MOVE TO HOLE March 3 15:00 to 17:30 clean tanks.
DRILL 10:00 to 13:30.
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER Std. wait for water and thaw lines + swivel 9:00 to 10:00
MOVE TO NEXT HOLE 13:30 to 18:00.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Brown oxidized clay
10				grey lacustrine clay greasy feel
20				grey clay with thin brown layers possible varved sequence
30				
40				
50				becoming silty, gritty clay.
60			01	gravel some clasts are clay coated becoming sandy
				wood chips present.
70			02	medium sand
				Fine to medium sand
80				coarse sand and some +10 granule
			03	fine (lacustine) sand.
90				
			04	gravel, cobbles present, sand matrix
100			05	Fine to medium sand, well sorted - rounded but not spherical grains, quartz ~75%, feldspars 20%, hornblende ~5% - glaus lacustrine sand?

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 4 19 81
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLP81-07 LOCATION 80°08'37"W/48°17'18" Melba TP
GEOLOGIST J.A.A./REED. DRILLER R Fearnell BIT NO. B61426 BIT FOOTAGE 172'-302'
MOVE TO HOLE ____
DRILL 10:00 to 13:30
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 13:30 to 18:00

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			05	fine to medium glacio fluvial sand, occasional intermediate volcanic cobble.
			06	Coarse cobbly, bouldery gravel, 99% intermediate to mafic green-grey volcanics and porphyritic volcanics. matrix greenish medium sand ± 10%. Angular pebbles; granules to pebbly
110			07	granular gravel - boulders larger 107'-108' - matrix < 20% sand.
			08	1% granitic clasts and quartz increased in granule fraction, rounding and sphericity accordingly greater.
120				
			09	Coarse pebbly granular sand, rounded to subangular clasts, coarse sand and granule gravel beds?
			10	yellowish green clay + some angular rock chips.
130				Sheared with clay seams + some quartz carbonate veins - yellowish green clay and soft rock chips. Dark green chloritic cuttings and lighter grey chips - 2 rock types - gradational zone or contact zone?
140				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 5 1981

SHIFT 8:00 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO. KLR81-08 LOCATION 80°08'15"W/48°18'29"N Melba Tp

GEOLOGIST R.E.R./J.A.D. DRILLER R. Fournel BIT NO. B61476 BIT FOOTAGE 302'-432'

MOVE TO HOLE March 4/13:30 to 15:30 16:00 to 17:30 March 5 - 10:30 to 10:45

DRILL 10:45 to 14:25

MECHANICAL DOWN TIME 15:30 to 16:00 hydraulic clutch 17:30 hydraulic clutch

DRILLING PROBLEMS ____

OTHER 17:00 broken axle on bogie wheel small washwell (Lost all day March 6)

MOVE TO NEXT HOLE 14:25 to 17:00

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10				Yellow-brown oxidized glacio lacustrine clay - stiff
				Stiff, grey glacio lacustrine clay,
				water table
				Sandy, water saturated, sticky - semi plastic grey clay
20				
				sandy clay
			01	Gravel - angular largely mafic to intermediate volcanic pebbles, weathered and fresh granitics in granule fraction. Granules 40%, pebbles 10%, medium sand matrix 50% - clay coatings and rare clay-silt balls -
30			02	Cobbly, pebbly (coarse) gravel - less granitics, but still granule gravel - minor amounts of clay - very fine sandy - silty, chunky or platy clay.
40			03	
			04	Fine glacio lacustrine sand, rounded spheroidal quartz pebbly sand
				Platy, compact (stiff)
50			05	Fine glacio lacustrine sand, well sorted quartz, garnet, hornblende and feldspar grains.
60				
70				
80				wood chips, few fine pebbles and platy clay.
				wood chips grey platy clay -
90				
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 5 1981
SHIFT 8:00 TO 1800
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO KLP81-08 LOCATION 80° 08'15"W/48° 18' 29"N Melba Tp
GEOLOGIST REK/SAB DRILLER R. Fennel BIT NO. 061476 BIT FOOTAGE 302'-433'
MOVE TO HOLE ____
DRILL ____
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
0				few pebbles and clay
110				fine sand
				Compact - stiff very fine sandy, silty grey clay. Dark brown (oxidized - terrigenous?) mud or clay
120				Sand fine to medium - artesian aquifer
			06	Cobbly dark green unilithic gravel - mostly porphyritic intermediate volcanics with lesser medium grained gabbro - very few granitic clasts. Some rounded pebbles but most angular Intermed. volc. bubble 123-124' - abundant white vein quartz cobbles and pebbles; - clay coatings on pebbles fragment and abundant silt-clay balls after 124' Till?
			07	
			08	
130			09	125'- dark greenish to bluish grey very fine grained intermediate to mafic volcanic porphyry cobbles and pebbles - occasional rounded buff chert pebbles.
				127'- compact with abundant clay balls - bouldery till
140				pebble boulder @ 128'
				- Basal Till? - possibly top of section washed
				Bedrock 129'-131' - broken at surface - medium to pickle green, fine grained intermediate to mafic porphyritic volcanic rock. Fractured with black serpentine developed on planes. Mottled colour from pickle green (epidote) alteration of pale blue grey fresh colour. Resembles lower portion of overlying till could be but not upper portion.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 2 19 81

SHIFT 8:00 TO 18:00

TOTAL HOURS ____

CONTRACT HOURS ____

HOLE NO KLIP 81-09 LOCATION 80°00' 15"W / 48° 15' 15" Morrisette Tp.

GEOLOGIST J.A.D./R.E.R. DRILLER R. Fournel BIT NO. B62331 BIT FOOTAGE 0 - 40'

MOVE TO HOLE 8:00 to 10:30 (clean tank.)

DRILL 11:00 to 13:00

MECHANICAL DOWN TIME ____

DRILLING PROBLEMS ____

OTHER ____

MOVE TO NEXT HOLE 13:00 to 15:10

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
			01	coarse sand some granules in coarse sand (likely glacio-fluvial sand)
10				
20			02	coarse to medium sand coarse sand some granules
30			03	coarse sand and gravel some clay on pebbles after 33' possible till?
				green boulder int. volcanic (similar in appearance to ultimate Bedrock.)
			04	Bedrock: Dacitic tuff - spherical 1-3 mm glassy ash clasts of clear to light green in very fine grained to aphanitic glassy and shardy (streaky) matrix. - white interbedded material 1 cm widths - carbonate or qtz-carbonate
40				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 7 19 81

SHIFT
8:00 TO 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO KLIP81-10 LOCATION 79°57'38"W/48°14'46"N Morrisette Tp.
GEOLOGIST R.E.R./JAP DRILLER R.Fenerel BIT NO. B62331 BIT FOOTAGE 40'-96'
MOVE TO HOLE 13:00 to 15:10
DRILL 15:10 to 16:30.
MECHANICAL DOWN TIME _____
DRILLING PROBLEMS _____
OTHER _____
MOVE TO NEXT HOLE 16:30 to 18:00

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				Brown silty fluvial (overridged) clay with organic material and pebbles
10				Grey stiff-sticky glaciolacustrine clay. - varved.
20				
30				Dark grey glaciolacustrine clay - stiff and plastic.
40				
50				few rounded, subspherical mafic volcanic grits and pebbles in clastal clay
			01	Bedrock: light grey dacitic ash tuff - spherical to ellipsoidal 1 mm dark to clear green glassy blebs (quartz?) in a glassy green matrix
60				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 9 19 81

SHIFT
8:00 TO 18:00

TOTAL HOURS
———

CONTRACT HOURS
———

HOLE NO. KLP 81-11 LOCATION 80°00'15"W / 48°16'56"N Bisley Tp.
GEOLOGIST R.F.L. DRILLER R. Fenchel BIT NO. B62331 BIT FOOTAGE 96'-1431
MOVE TO HOLE 8:00 to 9:05
DRILL 9:05 to 14:30
MECHANICAL DOWN TIME ———
DRILLING PROBLEMS wait for water 9:30 hrs to 11:00 hrs. / 11:30 - 12:25 / 13:00-14:00
OTHER ———
MOVE TO NEXT HOLE 14:30 to 15:45

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
	N.R.			
	N.R.			
10				Pebbly granular polymictic gravel with coarse sand matrix. - Bouldery - granite boulder at 9½' gabbro at 10'. Few cobbles ; brown oxidized colour Pebbles well rounded.
			01	
20				Pebbly granitic gravel and coarse sand
	L.R.			
30			02	Pebbly granular gravel , coarse to medium sand matrix - high permeability - open gravel with poor to intermittant return
40				Gravel - increased pebble fraction
			03	Bedrock: Light clear greenish 3m-1cm banding in medium to dark grey tuffaceous sil/ultra volcanic at surface. Banding absent after 44' - grades to uniform pistachio green (epidote alteration) with sericite euhedral blue quartz eyes in very fine grained to aphanitic foliated matrix . Some hornblende in 1 mm aggregates. 1mm - (2/mm) carbonate veining. - Intermediate meta volcanic rock.
50				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 9 19 81

SHIFT
8:00 TO 18:00

TOTAL HOURS
—

CONTRACT HOURS
—

HOLE NO. KLP 81-12 LOCATION 79°57'54"W / 48°16'19"N Morrisette Tp.

GEOLOGIST R.E.R. / E.S. DRILLER R. Fournel BIT NO. B 62331 BIT FOOTAGE 143'-183'

MOVE TO HOLE —

DRILL 15:45 to 16:30

MECHANICAL DOWN TIME —

DRILLING PROBLEMS —

OTHER —

MOVE TO NEXT HOLE 16:30 to 17:45

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Grey silty fluvial clay with organics
				Grey, sticky-plastic glacio lacustrine clay
10				
20				medium grey colour
				6" gravel - rounded mafic pebbles.
30				Bedrock: Intermediate volcanic rock; light greenish foliated aphanitic texture. Colour change to slightly darker green to blue green with increased grain size by 38'
			01	
			02	
40				
50				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 11 19 81

SHIFT
8:00 TO to 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO KLIP 8143 LOCATION 79°59'59"W/48°11'47"N Monnisette Tp.
GEOLOGIST REK DRILLER R. Fournel BIT NO. B62331 BIT FOOTAGE 183'-318'
MOVE TO HOLE 8:00 to 10:55
DRILL 10:55 to 13:50
MECHANICAL DOWN TIME Broke base of tripod - End slide for welding repairs
DRILLING PROBLEMS Water coming to hole 9/4
OTHER Consumables - worn out lowermost rod - is 1" rod.
MOVE TO NEXT HOLE 13:50 to 14:55

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Muskeg - organics - roots - vegetable mat
10				Soupy grey (water saturated) glacio lacustrine clay
20				
30			NR.	
40				
50				Slightly more plastic, sticky
60				
70				
80				few pebbles - occ. stones
90				
				Very fine glaciolacustrine sand with interbeds of grey clay.
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 10 19 81

SHIFT
8:00 TO 16:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO KLP 81-13 LOCATION 79°59'59"W/48°11'47"N Morrisette Tp.
GEOLOGIST R.E. Rathbun DRILLER R. Fournel BIT NO B62331 BIT FOOTAGE 8.3'-318'
MOVE TO HOLE 0 hrs - 10:55 hrs.
DRILL 10:55 - 13:50 hrs.
MECHANICAL DOWN TIME broke bung base of tower - end shift for welding repairs
DRILLING PROBLEMS after move to next hole.
OTHER
MOVE TO NEXT HOLE 13:50 - 14:55 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
110			01	Glaciofluvial pebbly granular gravel - some clay.
			N.S.	Very fine glaciolacustrine sand
120			NR	
			02	Cobbly volcanic-rich gravel - 25% coarse sand matrix
			N.S	Very fine grained to aphanitic dark green meta volcanic - boulder with 1/2-1 mm hornblende phenocrysts pseudomorphs after pyroxene(?). Pyrite aggregates in calcite form and stringers
			03	
130			04	
			05	Basal Till - cobbles, pebbles in brown tinged (oxidized) 20% matrix of greenish silt-clay. Mainly mafic volcanic coarse clasts. - good lodgement till.
140				Bedrock: Very fine grained to aphanitic brown-weathered basalt similar to boulder above. - clay in broken rock as seams - possible clay till.
150				
160				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 11 19 81
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLM 81-14 LOCATION 79°58'00"W/48°10'52"N Lebel Tp
GEOLOGIST R.E.R. DRILLER R. Fournel BIT NO. B.62331 BIT FOOTAGE 318'-403'
MOVE TO HOLE 13:50 to 14:55 (march 10)
DRILL 9:30 to 11:10
MECHANICAL DOWN TIME 14:56 to 18:00 repair base of mast
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			01	Sand and pebbly granular coarse brown (oxidized) sand. - mostly basaltic pebbles with lesser granitics and felsic volcanics.
10				silty clay beds - platy brown clay in fine to medium sand. fine to medium sand after 10' - grey-buff non-oxidized colour. occas. v. thin grey silt-clay bed.
20			02	Fine to medium sand - esker related - glaciofluvial sand above
30			03	becoming feldspar and lithic (granitic) rich with increased grain size.
40			04	Granular coarse sand = granules 5% - brown sand matrix
50				Gravelly sand - 1'-2'
			05	Coarse sand fining with depth.
60				fine sand
			06	Gravelly sand. boulder 0 - felsic foliated light green and yellow green streaky tuffaceous -
70			07	Till - clayey-silty sand till - oxidized sandy-silty clay balls 80% with light, slightly green-tinged buff colour, oxidized tuff boulder 72'-73'.
		NS	07	75' - grey silty-sandy clay balls - and boulders with decreasing clay content and increasing competence
			08	
			09	
80			10	quartz boulder 80' and 81' - quartz veins in oxidized schistose felsic volcanic rock. - oxidized cobbles.
			11	Bedrock: broken - 80'-81', solid after 81½' - brown weathered schist to 82'. - ½" quartz veins. - Light to medium green fine grained porphyritic volcanic rock.
90				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 11 19 81

SHIFT
8:00 TO 16:20

TOTAL HOURS
—

CONTRACT HOURS
—

HOLE NO. KLP. 81-15 LOCATION 79°56'37"W/48°10'45"N Lebel Tp.
GEOLOGIST R.E.R. DRILLER R. Faucael BIT NO. B61476 BIT FOOTAGE 433'-467'
MOVE TO HOLE 12:30 - 14:30
DRILL 14:20 to 15:30
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE 15:30 to 16:20 - drum-up for day - move drill to 4/6 site takes FN60 + 5 roundtrips out. 17:10 - 17:35 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
	H_2O			Water
				Organics - alder roots and muskeg mat
10				Yellow-brown oxidized fluvial clay.
				Grey sticky, slightly silty - gritty glaciolacustrine clay
20				
			01	Gravel: well rounded clasts, granules 60%, pebbles and cobbles 30%, and medium sand matrix 10% - +10 cm intermediate to mafic volcanics (and intrusives) to 80% with 20% felsic volcanics.
30			02	
				Bedrock: Fine grained green greywacke? - well sorted sandy texture - pyrite in very fine cubes disseminated throughout. Lenses along black fractures up to 3-5%. One quartz composite vein with chalcopyrite lining walls. One chip with disseminated chalcopyrite at 33'.
40				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 12 19 81
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO KLIP 81-16 LOCATION 79°56'03"W / 48° 11'40"N Morrisette Tp
GEOLOGIST R.E.R./E.S. DRILLER R. Percival BIT NO. 61476 BIT FOOTAGE 467'-573'
MOVE TO HOLE 8:00 to 9:00
DRILL 9:00 - 14:00
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS Jerome problems - 1100 hrs - 13:10 hrs - see next page
OTHER ____
MOVE TO NEXT HOLE 14:00 to 14:45

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
10				Rusty brown oxidized fine well sorted sand - glacio lacustrine esker related (reworked) apron
20				Grey fine to medium sand gradually coarsening. - beach sand?
			NS.	Fine glacio lacustrine sand
30				
40				
50			NS	
60				slightly coarser - to medium sand
				very thin clay bed with fine pebbles and granules
70				Very fine glacio lacustrine sand and silt - finer than upper section - beige grey with less mafic minerals and lithics - more mature - reworked?
80				
			01	thin horizon of sand and well rounded pebbles - poorly sorted, mainly mafic composition
90			02	Gabbro boulder @ 85½ - 87' (fine grained porphyritic) Coarse cobbly gravel of largely mafic to intermediate composition with ± 10% granitics. Matrix 10% coarse sand. - clasts coarsening with depth.
100			03	Till - sandy silty (clay) nodules - very little clay in matrix, angular pebbles; compact.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 12 19 91
SHIFT 8:00 TO 16:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO KLP 81-16 LOCATION 79°56'03"W/48°11'40"N Monsonette Tp.
GEOLOGIST R.E.K. DRILLER B. Fauvel BIT NO. 61476 BIT FOOTAGE 467'-572'
MOVE TO HOLE ____
DRILL ____
MECHANICAL DOWN TIME ____
~~DRILLING~~ Terrain PROBLEMS Sleek EN60 mucker in heavy dew - pond - left rods in
OTHER hole - pulled it out with drill EN160 - + continued to drill - 11 hrs - 13 hrs.
MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			03	Pebbly sand till - silt-sand-grit, grey balls.
			04	
				Bedrock: Light medium grey, aphanitic, intermediate tuffaceous volcanic rock. Quartz-carbonate veining - abundant irregular chips of white material having irregular contacts with volcanic wall rock. 103'-105' increase of white material. Volcanic contains disseminated pyrite cubes up to 10% in some chips but finely distributed in most chips.
110				
120				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 12 19 81
SHIFT 9:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLP 81-17 LOCATION 79°55'37"W / 48°12'29"N Monsette Tp
GEOLOGIST R.E.R. DRILLER R. Fenerel BIT NO. 62328 BIT FOOTAGE 0-116'
MOVE TO HOLE 14:00 to 14:45
DRILL 14:45 to 17:25
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 09:45hrs - 11:30 hrs March 13/81

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				Brown silty clay and organics - fluvial
				Grey very fine sand and silt - fluvial or glaciofluvial ?
10				Grey sticky, soupy (water saturated) glaciolacustrine clay
20				Darker grey, sticky and plastic
30				
40				
50				stiff (compact) very slightly silty dark grey and light grey varves
60				
70				
80				Grey silt, minor clay
90				
100			01	Gravel - rounded pebbles, granules 80% medium to ~~coarse~~ sand matrix - poorly sorted, intermediate volcanic composition, granules ≈ 60%.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 12 19 81
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLIP 81-17 LOCATION 79°55'37"W/48°12'29"N Monsiette Tp.
GEOLOGIST RCR/ES. DRILLER R. Fournel BIT NO. 862328 BIT FOOTAGE 0-116'
MOVE TO HOLE ____
DRILL ____
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE ____

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
110			01	mtr moderate volcanic boulder 103'-104'. Well sorted 8-10 mm well rounded pebbles - epidotized green - weak return - almost no matrix - permeable open - gravel - cobbly
			02	
			03	Bedrock: Light grey andesitic to dacitic fragmental rock.
120				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 13 1981

SHIFT
9:00 TO 18:00

TOTAL HOURS
_____

CONTRACT HOURS
_____

HOLE NO. KLIP 81-16 LOCATION 79°53'12" W / 48°13'33" N Arnold Tp.

GEOLOGIST R.E.R. DRILLER R. Fournel BIT NO. 62328 BIT FOOTAGE 116'-152'

MOVE ~~TO~~ HOLE 9:45 to 11:30

DRILL 11:30 to 12:45

MECHANICAL DOWN TIME _____

DRILLING PROBLEMS _____

OTHER _____

MOVE TO NEXT HOLE 12:45 - 14:15 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO	DESCRIPTIVE LOG
				Dark brown peaty - organic rich mud
10	NR			Fine sand and silt (glaciolacustrine)
				poor return
20				
30			01	Gravel - intermediate volcanic-rich with rounded pebbles and cobbles, grey medium to coarse sand matrix
			02	
				Bedrock: light green porphyritic intermediate to felsic volcanic of dacite to rhyodacite? composition
40				<10% phenocrysts of hornblende and round blebs of quartz in a glassy matrix having conchoidal fracture - relatively hard.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 13, 14 19 81
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLP 81-19 LOCATION 79° 53' 46" W/ 48° 15' 35" N Morrisette Tp
GEOLOGIST REK. DRILLER R. Fenerel BIT NO. 62323 BIT FOOTAGE 0-145'
MOVE TO HOLE 12:45 - 14:15 hrs (March 13/81)
DRILL 15:05 - 17:55 hrs / 9:00 - 11:30 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS wait for fuel and water 9:00 to 9:40 hrs.
OTHER ____
MOVE TO NEXT HOLE 11:30 to 13:30. hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Organics
				Fine glacio lacustrine sand - brown oxidized at surface.
10				
20				grey sandy clay bed
30				very fine pyrite in sand - graduation colour change from brown to grey
40				Fine to medium sand with abundant pyrite
50				Very fine sand and silt
60				
70				
80				grey glacio lacustrine clay bed Layer of rounded pebbles
90				Fine sand
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 13 19__
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLP BH 9 LOCATION 79° 53' 46" W / 48° 15' 35" N / Monsette Tp.
GEOLOGIST R.E.L. DRILLER R. Fournel BIT NO. B62323 BIT FOOTAGE 0-145'
MOVE TO HOLE ____
DRILL ____
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 11:30 - 13:30 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Very fine sand and silt - increasing grain size to fine sand with depth.
110				
				few pebbles and granules in fine sand
120			01	Gravel - cobbly with fine to medium sand matrix - probably ice rafted
			NS.	Fine glaciolacustrine sand
130			02	Gravel - largely angular coarse pebbles, and occasional cobble, of mafic to intermediate composition; cobbles of light grey tuff fragment, matrix of medium to coarse sand
			03	
			NS.	intermediate volcanic boulder
140			03	
			04	Gravelly till - cobbly and coarse pebbly - similar in composition to above gravels but more compact. Clay-silt coatings on pebbles and few clay-silt-grit balls. Overlying gravels show increase in matrix fines with depth - and possibly washed till.
			05	
150				Bedrock - 141' - light medium green porphyritic to porphyry with fine grained crystals of hornblende in an aphanitic matrix. Intermediate composition - ~~tuffaceous~~ - andesite porphyry or andesitic tuff. Traces of sulphide smears - pyrrhotite, rare chalcopyrite.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 14 1981
SHIFT 8:00 TO 19:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO KLP 81-20 LOCATION 79°56'16"W / 48°15'35"N Monsie Mc Tp
GEOLOGIST R.E.R. DRILLER R. Fournel BIT NO. 62323 BIT FOOTAGE 145'-238'
MOVE TO HOLE 11:30 to 13:30 hrs
DRILL 13:30 hrs - 16:45 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE Demobil up 16:45 hrs - 19:15 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
	N.R.			Organics - fluvial swamp mat and alder roots
10				Grey glaciolacustrine clay
20				
30				
40				
50				Darker grey stiff - compact, sticky clay. minor silt and coarse sand - probably varved
60				
70				
80				Grey silt and minor clay.
90				
100				Compact - stiff dark grey clay bed.

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 14 1981
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

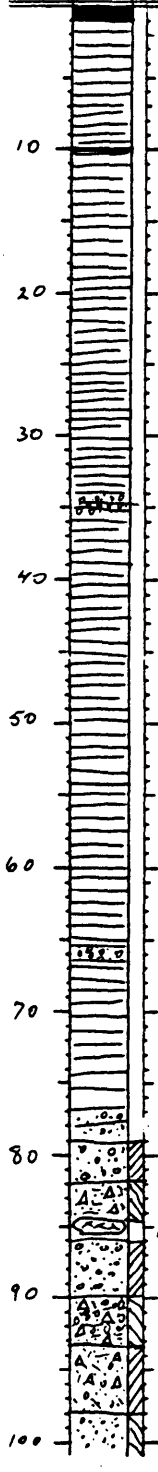
HOLE NO KLP 81-20 LOCATION 79°56'16"W/48°15'35"N Monsette Tp
GEOLOGIST R.E.R. DRILLER R. Fournel BIT NO. 62323 BIT FOOTAGE 145'-288'
MOVE TO HOLE 11:30 to 13:30
DRILL 13:30 to 16:45 hrs
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE demobilize to Esker Lake road - 1645 - 1915 hrs.

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Silt and very fine glaciolacustrine sand
110				few pebbles in grey clay bed silt and very fine sand grey clay bed silt and very fine sand clay and pebbles
120			01	Coarse, cobbly, bouldery gravel - dark green angular clasts - mafic to intermediate volcanic-rich granitics ≤5%, virtually no matrix - (washed??)
			02	Gravel - sub angular to sub rounded pebbles and granules of mafic volcanic composition in coarse sand matrix. glassy white quartz @ 126'-128'
130			03	medium grained, foliated Biotite (chloritized) granite boulder 125'-131' Pebbly granule gravel with coarse sand matrix; - 138 granite boulder and frequent granite pebbles and cobbles.
			04	Till - similar in appearance to above but matrix poorly sorted with clay-silt-grit balls 10%. - pebbly granules and till. - occasional cobble.
140			05	Bedrock: Mottled greenish grey, fine grained equigranular rock. — gritty feel, medium hardness. Plagioclase (white feldspar) and lesser quartz in rounded to euhedral 1-3 mm grains along with mafic minerals < ½ mm in chloritic matrix. Coarse volcanic or fine intrusive of intermediate composition
150				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 16 19 81
9 17
SHIFT
8:00 TO 19:00
TOTAL HOURS
CONTRACT HOURS

HOLE NO KLP 81-21 LOCATION 80°10'29"W/48°21'48"N Benoit Tp.
GEOLOGIST R.E.R. DRILLER R. Fawcett BIT NO. 62323 BIT FOOTAGE 258'-404'
MOVE TO HOLE Depart to highway #6 0800-11:00 hrs - Float to Wawell 11:00-13:45 hrs - Move to hole 13:15-14:30
DRILL 16:45 hrs - 17:30 hrs / 0900 - 11:40 hrs.
MECHANICAL DOWN TIME
DRILLING PROBLEMS Locate source of water at drainage beaver pond - 1430-1645 + set-up.
OTHER
MOVE TO NEXT HOLE 11:40 - 13:30 hrs.



DESCRIPTIVE LOG

Organics - fibrous swamp mat and alder roots

Yellow brown to buff oxidized glaciolacustrine clay

Grey sticky glaciolacustrine clay

loose stones and sand

slightly stiff - compact clay

few pebbles

coarse sand in clay, few rounded pebbles

Pebbly granular gravel coarse beige; mostly coarse sandy matrix

Sandy till ? grey clay-silt-sand balls, granular and pebbly brown gravel dark coloured granite to granodiorite boulder

Gravel - coarse sandy beige matrix - higher % granitics and more rounding of detritus than above unit - Pebbly granular gravel - matrix fines increasing with depth

Till - green colour - coarse, cobbly, with silt-sand-grit clay balls

Sandy till with granules and few pebbles + pebbles well rounded - turbidite sequence??

Granular coarse sand

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 17 19 81

SHIFT 8:00 TO 18:00

TOTAL HOURS

CONTRACT HOURS

HOLE NO. KLP 81-21 LOCATION 80°10'29"W/48°21'48"N Benoit Tp.

GEOLOGIST R.E.R. DRILLER R.Fournel BIT NO. 62323 BIT FOOTAGE 286-404'

MOVE TO HOLE

DRILL 8:00 to 11:40.

MECHANICAL DOWN TIME

DRILLING PROBLEMS

OTHER

MOVE TO NEXT HOLE 11:40 to 13:30

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
			07	Till - mafic-rich rounded pebbles in poorly sorted matrix - grey silt-clay balls - Re Cretaceous?? granite boulders and diabase/gabbro green mafic intermediate volcanic boulder.
			NS	
			08	Pebbly coarse sand - grades to gravel with well rounded pebbles 80% volcanics, 20% granitics. - matrix supported less than 10% pebbles and granules; ~80% sand. - permeable gravel. - increased sand matrix at base - granite cobble at 110'.
110			09	
			10	
				Bedrock - Breccia - fine grained gabbro or basalt from 112-113' followed by rock consisting of angular fragments of glassy lite grey dacite material in < 10% matrix of dark green basalt or gabbro. - contact breccia between foliated dacite and gabbro intrusive? or flow top breccia?
120				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 17 1981
SHIFT
8:00 TO 18:00
TOTAL HOURS
CONTRACT HOURS

HOLE NO KLIP 81-22 LOCATION 80°07'05"W/48°21'39"N Melba Tp
GEOLOGIST IST/RIEL DRILLER R. Fournel BIT NO. 62323 BIT FOOTAGE 404'-500'
MOVE TO HOLE 11:40 to 13:30
DRILL 13:20 to 17:40
MECHANICAL DOWN TIME
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Organics
				Buff brown oxidized glacio lacustrine clay
				Grey, sticky, glacio lacustrine
10				Varved dark grey stiff clay and lite grey sticky clay.
20				Grey, sticky, plastic clay.
				gritty, sandy layer
30				gabbro boulder
			01	Gravel coarse sand bed - minor clay-silt balls, but coarse sandy matrix -
			02	Till? granular and pebbly with rounded clasts and grey silt-clay balls? - diamicton?
40			03	Pebbly granular sand, gravelly concentrated in granule fraction - 10-20% grades to pebbly granular sand with clay -
			04	silt balls -
50			05	48' abundant clay-silt - 50% with pebbly granular sand till or diamicton silted-up glacial sediments?
			06	51' Pebbly granular gravel with beige coarse to medium sand matrix - granules 30-40% in subrounded to subangular pebbles and cobbles.
				silt balls in gravelly sand - grades to granular sand with pebbles
60			07	cyclic sequence - rhythmites?
			08	Pebbly, sandy clay diamicton
70			09	Clayey, silty sandy diamicton
			N.S.	gabbro boulder
				rhyolite tuff boulder
			09	cobbly - gravelly diamicton
80				Some stratified (platy) clay-silt nodules - not till.
			10	
				mafic volcanic boulder
			11	very fine to fine sand with beige colour grades to clayey-silty gravelly sand -
90			12	92' green-silt balls in gravelly-granule-sand - till. - basal till?
			13	
				Bedrock very fine, grained equigranular, dark green metabasalt
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 18 19 81
SHIFT 8:00 TO 18:00
TOTAL HOURS ____
CONTRACT HOURS ____

HOLE NO. KLP-81-23 LOCATION 80°06'23"W/48°20'53" Melba Tp
GEOLOGIST R.E.R. DRILLER R. Fesserel BIT NO. B61478 BIT FOOTAGE 0-91
MOVE TO HOLE 10:30 to 11:15 hrs
DRILL 11:15 - 13:00
MECHANICAL DOWN TIME ____
DRILLING PROBLEMS ____
OTHER ____
MOVE TO NEXT HOLE 13:00 hrs - 1600 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Organics - wood chips and roots
				Dark grey-Brown clay
				Yellow-Brown to Buff oxidized glaciolacustrine clay
10				
				water table
				Grey soupy-sticky (water saturated) clay
20				
30				
40				
50				Stiff (compact) grey clay and light grey clay - varved
60				
70				
				Dark grey glaciolacustrine clay - gritty and sandy
			01	Mafic gravelly till - poorly sorted grey matrix sand, no silt-clay
80			02	balls but mostly angular clasts with some rounded pebbles, some coarse coatings of clay on clasts - washed till?
				Bedrock: Light green fragmental or intermediate volcanic - aphanitic textured with some fine grained dyke? material
				Thin quartz veins.
90				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 19 19 81

SHIFT
8:00 TO 18:00

TOTAL HOURS

CONTRACT HOURS

HOLE NO. KLP 81-24 LOCATION 80°08'41"W / 48°20'55"N Melba Tp.
GEOLOGIST R.E.R. DRILLER R. Fournel BIT NO. 61478 BIT FOOTAGE 81-123'
MOVE TO HOLE 13:00 to 16:00 setup shack to 17:30 / delayed by plugged filter on FN160. and frozen fuel lines
DRILL 10:15 to 14:00
MECHANICAL DOWN TIME
DRILLING PROBLEMS wait for fuel and water 8:10 to 10:10 : wait for water
OTHER 11:25 to 12:30, 12:55 to 13:15 - water pump on FN60 freezing-up.
MOVE TO NEXT HOLE 1400 - 1505 hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Peaty dark brown to black organics
				Yellow brown oxidized glaciolacustrine clay - stiff and plastic.
10				
				Grey soupy (water saturated) glaciolacustrine clay - streaky and soft - light medium grey
20				
30				Dark grey compact - stiff glaciolacustrine clay pebbles in clay.
			01	Gravel - pebbles, cobbles, felsic volcanic rubble with quartz clasts - no matrix - 1' or less thick
40			02	
				Bedrock - broken at surface - abundant quartz and calcite, calcite basal crystals ½-1cm, - veining in felsic volcanic rock.
50				- Felsic light bluish grey aphanitic at surface with fine irregular wisps and seams of mafic material - biotite? - rusty magnetic (hematite) after pyrite noted along quartz - wallrock contacts. Quartz white to glassy variety - Dark coloured bedrock with depth - Light to medium grey, slightly foliated rock with less quartz veining. Few streaks and blebs of mafic minerals - tuffaceous? - Layer of green grey quartzite at 41½'! Interlayered tuffs and meta sediments?

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 20/21 1981
SHIFT 0930 TO 1930 hrs
TOTAL HOURS
CONTRACT HOURS

HOLE NO KLP 81-25 LOCATION 80°08'05"W / 48°19'57"N Melba Tp
GEOLOGIST R.E.R. DRILLER R. Fournel BIT NO. 61478 BIT FOOTAGE 123'-303'
MOVE TO HOLE 14:00 - 15:05 hrs.
DRILL 15:05 - 17:30 hrs. / 1030 - 14:26 hrs.
MECHANICAL DOWN TIME 15:25 - 16:30 hrs / 9:00 - 10:30 hrs. - attempt to repair hydraulic
DRILLING PROBLEMS valve - sand jams in head - hydraulic head unserviceable -
OTHER resort to manual chucking to complete hole.
MOVE TO NEXT HOLE Demobilize

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Stiff compact yellow brown to buff (oxidized) glacio lacustrine clay
10				Stiff compact grey glacio lacustrine clay
				water table
				Soupy (water saturated) varved grey glacio lacustrine clay.
20				Pebbly granule gravel with medium to coarse beige sand matrix slightly fine granule gravel - sand matrix 50% Largely mafic to intermediate volcanics with 10% granites
			01	Pebbly and cobbly granite - to granodiorite boulders - increasingly boulder and cobbly gabbro boulder
		N.S.		
30				Gravel - very coarse sandy matrix 40%, subrounded clasts, permeable one pebble of hematite iron formation @ 25½'
			02	- cobbly and bouldery dominantly fine grained gabbro - basalt and less granitic boulders and cobbles; one rounded pebble of massive fine grained pyrite with very fine filaments of black mineral (sphalerite??) sample # 2 - one clear glassy banded chert pebble and banded tuff and pyrite pebble at 34'
40			03	- boulder of gabbro with pyrrhotite = pentlandite -
			04	Pebbly, cobbly with clay coatings at 40'+ - well rounded pebbles and cobbles, sandy grey matrix grades from coarse to poorly sorted with depth. - coarse cobbly gravel. - platy clay - thin clay beds -
			05	
50				Granule sand - beige medium sand matrix - 60% volcanics, 40% granitics minor platy clay at base of unit.
			06	Coarse gravel with granule matrix, very little coarse sand few cobbles
		L.P.		
60			06	Medium to fine sand and granules platy grey clay - clay bed. medium sand bed - 1'
			07	
				Platy clay - very fine sand and silt - lacustrine or quiet fluvial sedimentation.
70			08	Coarse granular sand grades to pebbly gravel & then to clay and pebbles - platy clay in beds.
			09	Coarse cobbly - bouldery gravel, fine to medium sand matrix mainly volcanics to mafic volcanics
80				epidote altered, few fractures and shatter zones clasts -
			10	79' coarse cobbly gravel - fine to medium sand, few grey-white chert clasts
				80' - foliated mafic (basalt) volcanic cobbles with pyrite - platy clay bed
			11	Platy clay, pebbles and fine sand.
90				Grey glacio lacustrine clay, soft silty, no sand.
		NS		
100				

ONTARIO GEOLOGICAL SURVEY
REVERSE CIRCULATION DRILL HOLE LOG

DATE March 20/21 19 81
SHIFT
8:00 TO 19:30
TOTAL HOURS
CONTRACT HOURS

HOLE NO. KLIP 81-25 LOCATION 80°08'05"W/48°19'57"N Melba Tp.
GEOLOGIST L.E.B. DRILLER R. Fenerald BIT NO. BG 14178 BIT FOOTAGE 128'-305'
MOVE TO HOLE
DRILL March 21 - 10:30 Hrs - 14:25 Hrs - drawing - demob.
MECHANICAL DOWN TIME - 900 - 1030 hrs -
DRILLING PROBLEMS
OTHER
MOVE TO NEXT HOLE Demob'd system to trunk road - 14:25 - 19:00 Hrs

IN FEET	GRAPHIC LOG	INTERVAL	SAMPLE NO.	DESCRIPTIVE LOG
				Silt and very fine sand
				Light to white clay
				Compact dark grey, stiff, clay
				Silt and lesser very fine sand
110				drop stones and grey clay beds 1 cm thick.
				Dark grey stiff-compact and planar laminated clay
				Silt - super clay
				Silt and very fine sand
120				clay bed with drop stones
				silt
				Super clay with few drop stones
				silt
				clay and rafted drop stones
130				silt and very fine sand.
				silty clay grades to dark medium grey super clay
				grit in clay bed
140				silty clay & silt to silt and very fine sand - sequence
				Silty laminated clay with rounded to ellipsoidal drop stones
				Laminated grey clay with silt layers.
				Super clay
150				Silt with mean clay (matrix?)
				- very fine sand in silt
				Super clay
				Silt and very fine sand
			12	pebble boulder in coarse sand with mafic lithics to 25% -
				blue granules grades to gravel at 158'
160			13	Fine pebbly granular gravel - coarse sand matrix - rounded to subangular clasts
				≤ 20% - largely mafic to intermediate volcanic and
				blue cherts, granitics, and jasper or quartz - hematite pebble
				matrix coarse sand increases at 158'
			14	Volcanic rich, pebbly granule gravel to coarse granular sand with pebble
			NS	pebble boulder with abundant fine pyrite
170			14	Medium beige sand bed - 2'
				Pebbly, granular sand grades to coarse sand to medium sand with poor sorting
			15	and cobbles and green matrix colour - till
				Sand till - green poorly sorted sandy matrix, cobbles and pebbles.
			16	
180				Bedrock: Light medium grey porphyritic intermediate
				volcanic rock - very fine grained mafic phenocrysts
				in an aphanitic grey matrix; - soft -;
				- andesite or trachyte composition.
				- white carbonate veining.
190				

APPENDIX B

BINOCULAR DESCRIPTIONS, +1.70 mm BEDROCK CHIP SAMPLES

1980 SUMMER DRILLING

K.L.I.P.-80-02-15 DACITE TO RHYODACITE. Light gray, porphyritic to porphyry with white potassic feldspar 0.5 to 1.0 mm, and occasional gray plagioclase phenocrysts in a dominantly glassy gray feldspar and quartz matrix. Very slight saussauritization of some feldspars. Limonite staining on several chips, no visible fresh sulphides.

K.L.I.P.-80-03-16 INTERMEDIATE TO FELSIC VOLCANIC. Light greenish to pale gray, equigranular and glassy aphanitic. Few pyrite grains less than 1%. Overburden pebbles from seams in broken bedrock mixed with bedrock chips.

K.L.I.P.-08-05-03 GOWGANDA CONGLOMERATE. Compositionally and texturally immature, poorly sorted mixed megaclast lithology, coarse sandy matrix consisting of 0.5 to 2.0 mm subangular feldspar and felsic lithics up to 40%; 60% dark minerals (lithics) and quartz in grains less than 0.1 mm, and about 5% rounded aphanitic mafic clasts 0.5 to 1.0 mm. Megaclasts dominantly 30% pinkish-white to salmon pink biotite granite and brick-red syenite. Biotite component is chloritic. Remaining clasts of andesite porphyry, basalt, and diabase-gabbro. No economic mineralization observed.

K.L.I.P.-08-06-07 GABBRO. Greenish, fine to medium-grained, inequigranular and sub-ophitic. Grain sizes from 0.5 to 1.5 mm with white plagioclase crystals in euhedral plates larger than interstitial amphibole (uralite) plates.

K.L.I.P.-80-07-10 BASALT. Medium, greenish-gray aphanitic equigranular, and weakly foliated. Plagioclase to pyroxene-amphibole 50:50. Slight alteration to carbonate with quartz veinlets concordant to foliation.

K.L.I.P.-80-08-13 FELSIC TUFF. Light to medium gray, aphanitic and discontinuously layered. Finely banded, light and medium gray with rounded dark gray lenses and spindles up to 0.5 mm; streaky white and fine green laminae and porphyry texture with white phenocrysts (crystal ash) 0.1 to 0.5 mm in a gray matrix. Dacite to rhyodacite composition. One fine cube of pyrite noted.

K.L.I.P.-80-10-12 DACITIC TUFF. Light greenish gray, aphanitic and weakly foliated with occasional thin, dark green discontinuous streaks. Grain size 0.01 mm, rounded mafic minerals to 5%, and 20% feldspar crystals in glassy(?) matrix. Irregular quartz-feldspar masses up to 2 mm.

K.L.I.P.-80-11-11 DIABASE. Slightly greenish-tinged gray with fine to very fine grained, mainly sub-ophitic texture with few chips showing sub-diabasic texture. Grain size 0.3 to 1.0 mm. Saussauritization of plagioclase variable from fresh white to pistachio (zoisite) green, with minor carbonate alteration. Pyroxene (uralite) to plagioclase ratio 60:40. Occasional limonite on fracture faces; no fresh sulphides, planar quartz in a few chips, probably qurtz veinlets.

K.L.I.P.80-12-14 GOWGANDA ARGILLITE. Uniform medium-gray, grain size sub-microscopic, moderately hard with indistinct sub-concoidal fracture. Platey chips indicate bedding fissility. Very fine cubes of pyrite 0.05 mm to 0.1 mm disseminated in quartz along the fracture faces.

K.L.I.P.80-13-03 GOWGANDA ARGILLITE. Same as K.L.I.P.-80-12-14, no pyrite observed.

K.L.I.P.-80-14-03 GOWGANDA ARGILLITE. Medium gray, siliceous - See 80-12-14 and 13-03.

K.L.I.P.-80-15-17 KEEWATIN OR TIMISKAMING ARGILLITE. Dark gray, thinly foliated/lalminated and phyllitic. Grain size sub-microscopic except locally where recrystallization to amphibole porphyroblasts, less than 0.05 mm, has occurred. No graphite, rare pyrite in anhedral very fine aggregates.

K.L.I.P.-80-16-02 DACITE - RHYODACITE. Light bluish-gray, uniformly aphanitic and foliated. Vague lineation of white feldspar crystals in gray, glassy, sub-microscopic matrix. Fine curvilinear mafic streaks and finely laminated fragments in a few chips suggest viscous flow and brecciation, possibly tuffaceous. Occasional trace of very fine pyrite.

K.L.I.P.-80-17-03 ANDESITE - BASALT. Greenish-gray, aphanitic and equigranular with grain sizes less than 0.1 mm. Gray saussauritized feldspar 75%, light gray feldspar 10-15%, hornblende 10-15% in porphyroblasts 0.1 to 0.3 mm. Rare bleb of fine pyrite, very little carbonate in matrix.

K.L.I.P.-80-18-05 ANDESITE. Medium gray, aphanitic with porphyry texture. Subhedral 0.1 mm white plagioclase and 0.2 mm subhedral black pyroxene (amphibole?) in gray to greenish-gray sub-microscopic groundmass.

K.L.I.P.-80-19-02 PORPHYRITIC BASALT. Greenish-gray and weakly foliated with 0.1 to 0.25 mm white, zoned euhedral plates of plagioclase, and white rims on gray feldspar centres, in dark green amphibole-plagioclase aphanitic matrix. Phenocrysts vary from 10 to 15%.

K.L.I.P.-80-20-02 GOWGANDA ARKOSE. Medium gray, well-sorted, fine-grained (0.1 mm) arkosic quartzite to arkose. 1% to 3% biotite, 5% to 15% pink feldspar with remaining percentage gray quartz and feldspar. No carbonate, cement probably silica.

K.L.I.P.-80-21-02 GOWGANDA FORMATION. Medium gray impure quartzitic siltstone and oligomictic conglomeratic arkosic sandstone with pebble-size, or greater, clasts of white, pinkish-white and green epidote-stained vein quartz clasts. Matrix is multi-mineralic, poorly sorted and immature, possible greywacke. Stratigraphy may be gradational (graded bedding) fining from conglomeratic sandstone to siltstone, or possibly interbedded units.

K.L.I.P.-80-23-02 ROUND LAKE GRANITE. Light pink, medium-grained, equigranular with granitic texture. White, clear gray to pink-weathered 0.5 to 1.0 mm feldspar up to 60% in sub- to euhedral zoned crystals. Quartz 25-30%, fine-grained, interstitial and as 1 to 3 mm occasional phenocrysts with hexagonal cross-section. 15% hornblende in 0.1 to 0.5 mm sub- to euhedral crystals occurring interstitial to, surrounding, and included by quartz. Biotite in hexagonal books less than 1%. Epidote alteration of feldspars adjacent to hornblende.

K.L.I.P.-80-24-04 TUFFACEOUS ANDESITE - BASALT. Light greenish to greenish-gray, foliated, streaky and aphanitic. Equigranular elongate white plagioclase and green amphibole 0.1 to 0.5 mm in varying proportions from 60:40 to 50:50. Minor carbonatization. Quartz-carbonate veinlets discordant and concordant to foliation/lamination. Concordant disseminated lenses of very fine pyrite less than 1%.

K.L.I.P.-80-25-02 BASALT. Dark gray to black, aphanitic, equigranular and well foliated. Equal proportions of felty-green, saussauritized plagioclase and black hornblende (uralitized pyroxene), less than 0.1 mm grain size. Metamorphosed basalt, - amphibolite. Very fine, weakly disseminated pyrite in a few chips.

K.L.I.P.-80-26-02 ROUND LAKE GRANITE. Salmon pink to red, medium grained (1 mm) equigranular and apparently massive with 3 to 5% white plagioclase, 60% pink tabular K-spar, acicular and tabular black hornblende up to 10-12%, largely interstitial quartz, with few 1 mm aggregates, up to 10%, and less than 5% zoisite alteration of hornblende and surrounding feldspars.

K.L.I.P.-80-27-02 ROUND LAKE GRANITE. Light orange-pink, fine to medium grained equigranular and massive. Up to 65% sub- to euhedral 1 to 1.5 mm tabular laths of white to orangey-pink, weathered alkali feldspar with 5% interstitial 0.2 to 1.0 mm

patches and plates of biotite (pseudomorphic after amphibole?). Very fine, pale olive green, acicular amphibole less than 1%. Anhedral 1-2 mm quartz up to 30%.

K.L.I.P.-80-28-03 ROUND LAKE GRANITE. Pink, massive, fine to medium-grained inequigranular hornblende granite. 70% subhedral tabular, white to pink alkali feldspar as 1 mm crystals bearing quartz inclusions, and 8% plates of 0.2 to 1.0 mm black hornblende in an interstitial ground mass of fine quartz constituting 30-35%.

K.L.I.P.-80-29-03 TRACHYTE. White to medium gray and porphyritic with 10% dark gray acicular amphibole (0.5 mm) set in a glassy gray aphanitic (submicroscopic 30x) matrix. Subconcoidal fracture. Fracture set, 1-3 mm spacing, and irregular hair-width fractures with fillings of black aphanitic material. Contact with fine to medium-grained diabase-textured, black to "salt and pepper" diabase. Very finely disseminated pyrite in diabase matrix.

K.L.I.P.-80-30-02 OTTO QUARTZ SYENITE. Medium-grained (1-2 mm), equigranular leucocratic quartz syenite to granite and predominating pinkish gray, fine-grained porphyritic mesocratic variety with 20% gray and pinkish altered subhedral feldspar phenocrysts 0.5 to 0.8 mm in a mafic matrix composed of very fine hornblende, biotite, feldspar and quartz.

K.L.I.P-80-31-02 OTTO SYENITE. Pink leucocratic, medium-grained, equigranular and massive. Pink 1 mm alkali feldspar (albite or perthite from striae-twinning) up to 85%, with 5-8% black tabular hornblende, 0.5 to 1.0 mm, altered to biotite. 10% very fine interstitial quartz.

K.L.I.P.-80-32-03 OTTO SYENITE. Pink, fine to medium-grained (0.5 to 1.0 mm), equigranular hypidiomorphic texture. Pink and white sub- to euhedral alkali feldspar up to 75%; 15% euhedral black hornblende (pyroxene?) less than 1mm; interstitial quartz 1-5%. Less than 1% biotite in 1 mm curved books, probably an alteration product. Minor green epidote

alteration of hornblende. Porphyritic mafic to intermediate hypabyssal intrusive or coarse volcanic pebbles in sample indicates broken bedrock and/or open seams.

K.L.I.P.-80-33-03 OTTO SYENITE. Pink-tinged dark gray, massive mesocratic seriate porphyry. Phenocrysts of salmon pink and pink-rimmed concentrically zoned sub- to euhedral feldspar up to 1%, 0.1 to 1.0 mm acicular and platey black amphibole altering to biotite up to 15%, and 5% pale green tabular pyroxene, 0.1 to 0.2 mm. Phenocrysts are set in an orangey-pink, very fine grained feldspar-quartz ground mass.

K.L.I.P.-80-34-03 OTTO SYENITE. Light pink, fine to medium-grained, equigranular, hypidiomorphic (granitic) massive texture. Grain size is 0.5 to 1.0 mm. 80% pink feldspar 0.5 to 1.5 mm; acicular euhedral black hornblende 10-15%. Very little visible free quartz, interstitial quartz less than 10%.

K.L.I.P.-80-35-03 OTTO SYENITE. Similar to #32-03 and #34-03. Hornblende 5-8%.

K.L.I.P.-80-36-04 BASALT - AMPHIBOLITE. Greenish-gray, aphanitic, foliated. Less than 0.1 mm to submicroscopic sized (<30 X) equigranular felty mass of gray calcic feldspar and amphibole. Euhedral 0.5 mm pyrite cubes locally disseminated less than 1%.

K.L.I.P.-80-37-01 METABASALT. Gray to slightly green-tinged gray, aphanitic, moderately foliated and saussauritized. Grain size 0.1 to 0.2 mm. Epidote 10-15% in matrix. Cubes of aggregated pyrite up to 20% in several chips.

K.L.IO.P.-80-38-02 DIABASE. Medium gray, fine grained, diabasic, equigranular and massive. Fresh sub- to euhedral, gray to dark gray, tabular calcic plagioclase 0.5 to 1.0 mm up to 85%, with black 0.5 mm anhedral pyroxene 10-15%. Feldspar colour variable from gray to poikillitic white up to 60% of feldspar content.

Green-gray elongate plates of interstitial pyroxene up to 40% of pyroxene content. Vague primary lineations suggest intrusion as an anorthositic sill.

K.L.I.P.-80-39-04 KEEWATIN OR TIMISKAMING GREYWACKE. Dark greenish-gray, fine-grained, moderately sorted, foliated bedded. Quartz up to 70%; lithic fragments and feldspar 30%. Colour suggests derivation from mafic rocks, i.e. mafic wacke. Traces of pink in matrix indicate incipient garnet growth. Cross-cutting hair-width pink veinlets of granitic material. Occasional trace of very fine pyrite.

K.L.I.P.-80-40-02 BASALT. Greenish-gray, equigranular, aphanitic and foliated. Green feldspar (saussauritized) up to 60%; dark green to black amphibole-pyroxene 40%. Moderate carbonate in felty matrix.

K.L.I.P.-80-541-05 PARAGNEISS. Medium gray, fine-grained porphyroblastic and foliated/gneissic. Composed of 80% quartz and sub-hedral gray feldspar (plagioclase) with 20% euhedral books of biotite forming a lineation and varying in size from 0.1 mm to 5% phenocrysts up to 1 mm. Occasional irregular 1 mm aggregate of fine pyrite. Sample contaminated with gravel of mixed lithology.

K.L.I.P.-80-42-02 ANDESITE - BASALT. Two phases, a dark greenish-gray very fine-grained phase and a pale glassy apple-green aphanitic phase. Both are equigranular and well-foliated. Possible contact between two flows. Fabric of one phase is felty, 0.1 to 0.2 mm, with 65% saussauritized green feldspar and 35% black amphibole-pyroxene and the other phase glassy green, saussauritized feldspar up to 90% with 10% mafics. Possibly a tachyte or andesite. 1% disseminated pyrite in the felty phase.

K.L.I.P.-80-43-02 OTTO SYENITE - QUARTZ SYENITE. Pink leucocratic, medium-grained, equigranular massive varying to mesocratic dark pink-hued gray, fine to very fine-grained equigranular and massive. Leucosyenite composed of 75% 1 mm sub- to anhedral alkali feldspar;

15-20% black aggregated biotite altering to green-gray tremolite; and 10% quartz occurring interstially and as inclusions in feldspar. One rounded red garnet with thin chalky-pink reaction rim. Mesocratic syenite is composed of 30-40% biotite in books, 0.1 to 1.0 mm in a ground mass of anhedral brick-red (altered) feldspar and quartz constituting 60-65%. One cube of pyrite noted.

K.L.I.P.-80-44-02 OTTO MESOCRATIC SYENITE. Dark, pinkish-gray, fine-grained equigranular massive phase. 50-60% anhedral salmon pink feldspar 0.7 to 1.0 mm; fine to very fine biotite and hornblende in masses constituting 35-50% separating the feldspar and quartz. Quartz up to 10% largely interstitial with few free crystals and aggregates up to 1 mm.

K.L.I.P.-80-45-02 TIMISKAMING GRAPHITIC ARGILLITE. Dark gray, schistose, with incipient mica development and authigenic platey pyrite less than 1% along foliation planes with lesser amounts on fracture faces. Graphitic beds are thinly interbedded with the argillite.

K.L.I.P.-80-46-02 OTTO SYENITE. Pink, medium to coarse-grained and porphyritic. Light pink, coarse (broken) poikilitic alkali (perthitic?) feldspars 60-70% with interstitial relic amphibole 0.5 to 3.0 mm altered to greenish-black masses of biotite with less than 1% associated pale red garnet. Pyrite smear on a biotite cleavage face noted.

K.L.I.P.-80-47-03 McELROY HORNBLENDE GRANITE. Gray-pink, fine to medium-grained, equigranular with (granitic) hypidiomorphic texture. Pinkish weathered white, 0.5 to 1.0 mm sub- to euhedral tabular alkali feldspar up to 70%; 10-25% black to greenish-black plates and prisms of hornblende (after pyroxene?), and quartz less than 10%. Hornblende and quartz are interstitial to feldspar. Tabular, glassy-opaque quartz fragments indicate quartz veining with vein widths 1-4 mm.

K.L.I.P.-80-48-08 McELROY HORNBLENDE GRANITE. Pink, fine to medium-grained, equigranular, with euhedral prismatic hornblende - see sample #80-47-03. High percentage of mafics and chips of equigranular dark gray amphibolite (plagioclase and hornblende) indicate contamination of granite and/or presence of inclusions, possibly near contact with mafic volcanic rocks.

K.L.I.P.-80-50-01 GABBRO SILL OR MASSIVE BASALT FLOW. Dark greenish-gray, fine to medium-grained, equigranular (0.5 to 1.0 mm), apparently massive with gabbroic texture. Feldspars altered from white to salmon pink and red with less weathered-appearing saussauritized green. Short tabular dark green uralitized pyroxene. One 1 mm cube of oxidized pyrite observed.

K.L.I.P.-80-51-02 BROKEN BEDROCK. Volcanic chips contaminated with gravel from broken condition of bedrock surface.

K.L.I.P.-80-52-02 KEEWATIN OR TIMISKAMING GREYWACKE. Sugary bluish medium gray, poorly-sorted, sub-rounded to sub-angular clasts 0.25 to 1.5 mm, in very fine quartz matrix. Quartz 90%; brick-red granitic lithic clasts less than 1%; mafic lithics 5%. Foliation/bedding distinct. Traces of pyrite disseminated, and as less than 0.1 mm aggregates, parallel to distinct foliation/bedding. Minor carbonate in matrix.

1981 WINTER DRILLING

K.L.I.P.-81-01-01 APLITE. Light, pink-tinged buff to green-tinged buff coloured, very fine grained, xenormorphic textured hypabyssal rock. Mineralogy is 20% quartz interstitial to 75% anhedral 0.2 to 0.5 mm pinkish white feldspar. Mafic and opaque minerals absent except for 1-3% pyrite disseminated as well-formed cubes up to 1 mm and as anhedral masses. Light green sericite developed on sheer surfaces. White (bull) quartz occurs as veining or coarse crystals devoid of economic or indicator minerals.

K.L.I.P.-81-02-05 TIMISKAMING GROUP FELDSPATHIC (DIRTY) QUARTZITE. Grey, very fine-grained moderately sorted, foliated metasediment. Sub-rounded to sub-angular grains, mostly 0.1 mm with a few up to 0.3 mm. Clear to grey quartz 85%, grey feldspar 5%, and a few black hornblende (?) grains 1%. Very few chalky to orangy-red fine minerals present, possibly garnet.

K.L.I.P.-81-03-04 METABASALT. Dark green, aphanitic, chloritic schist. White quartz-veining, with traces of carbonate and discontinuous quartz lenses concordant and subconcordant to schistosity. Trace of very fine chalcopyrite in quartz.

K.L.I.P.-81-04-03 INTERMEDIATE METAVOLCANIC. Grey, aphanitic, weakly foliated intermediate to felsic volcanic. Grey feldspar - 90%, white feldspar 2-3%, and quartz set in a hypidiomorphic holocrystaline fabric. White, non-mineralized quartz veining concordant to foliation. No economic minerals noted.

K.L.I.P.-81-05-13 INTERMEDIATE METAVOLCANIC. Greenish grey, foliated aphanitic metavolcanic of intermediate (andesite) composition. Less than 1% very finely disseminated pyrite in matrix. Cubes of pyrite and specks of light green chlorite in 1-2 mm thick white quartz veins.

K.L.I.P.-81-06-11 INTERMEDIATE METAVOLCANIC. Greenish grey, aphanitic schist of intermediate volcanic derivation. Occasional black amphibole porphyroblasts occur as lineation in a greenish medium grey, somewhat felty fabric composed of 85% saussauritized plagioclase with 10% mica developed on phyllitic foliation planes. Pistachio green alteration to a few chips. Abundant concordant barren, thin, white crystalline to sugary quartz veins. No economic mineralization observed.

K.L.I.P.-81-07-10 MAFIC METAVOLCANIC (INTRUSIVE?). Green, very fine-grained porphyritic weakly foliated mafic volcanic with phenocrysts composed of anhedral masses of white to greenish grey poikilitic feldspar set in a soft, dark green aphanitic (chloritic) matrix. Texture and composition gradational to light grey fabric composed of beige to buff anhedral

feldspar in a clear quartz matrix with 1% mafic minerals. Possibly a eutectic texture such as granophyre? Fabric soft and subject to brown weathering on surface of chips.

K.L.I.P.-81-08-09 INTERMEDIATE TO FELSIC VOLCANIC. Grey colour, very fine-grained weakly foliated porphyritic metavolcanic of intermediate to felsic composition. 5-10% 1-3 mm prismatic hornblende (pseudomorphic after pyroxene) and laths of clear green plagioclase in an inequigranular hypidmorphic matrix composed chiefly of very fine (0.1 mm) grey plagioclase, white fledspar (K-spar) and lesser amphibole and interstitial quartz. Trace of garnet and tarnished pyrite.

K.L.I.P.-81-09-04 SILICIC TO DACITIC TUFF. Light grey to clear grey foliated aphanitic fragmental. Texture variable from shard-textured very fine-grained glassy translucent silicious metapumice to principally equigranular schistose quartz-feldspar tuff. Sample contains 20% white aphanitic quartz with few cubes of tarnished pyrite. The quartz may represent concordant veining or quartzite layers.

K.L.I.P.-81-10-01 SILICIC (QUARTZ) ASH - CRYSTAL TUFF. Ligh grey, weakly foliated inequigranular and siliceous. Spherical and spindle-shaped to subangular clear and grey quartz ash up to 2 mm is set in an inequigranular 0.1 mm xenomorphic groundmass of anhedral clear grey quartz and finer anhedral to euhedral laths of white feldspar. Quartz consitutes 90%, feldspar 10%, with rare mafic and oxidized sulphide grains.

K.L.I.P.-81-11-03 INTERMEDIATE METAVOLCANIC. Light, pistachio green to greenish grey, porphyritic very fine-grained to aphanitic, foliated intermediate volcanic. 2-3% euhedral phenocrysts of black amphibole up to 1/2 mm set in a

very fine grained to aphanitic greenish matrix of patchily to pervasively saussauritized (epidote altered) plagioclase. Incipient replacement of several hornblende phenocrysts by garnet. Yellow to white, banded, cherty clear and whitish quartz and feldspar and clear quartz lenses in chips composed of white quartz-feldspar may represent concordant cherty tuff beds or intruded quartz veining. Minor white barren vein quartz.

K.L.I.P.-81-12-02 INTERMEDIATE METAVOLCANIC. Greenish grey, foliated, equigranular aphanitic metavolcanic. Apple green, somewhat mottled appearance to the matrix under 7 to 30 X. Matrix composed almost exclusively of green to dark green feldspar saussauritized to varying degrees as indicated by colour. No mafic or economic minerals, or quartz observed.

K.L.I.P.-81-13-05 METABASALT. Brown weathered to dark green, well foliated, aphanitic equigranular ophitic metavolcanic. 2-3% buff weathered plagioclase laths and lath aggregates stand out from the ophitic texture composed of 30% finer-grained grey matrix feldspar laths and lath aggregates surrounded by altered green pyroxene. Silification by thin, concordant quartz veining and lensing along foliation planes noted in several chips. No economic mineralization observed.

K.L.I.P.-81-14-11 CATACLASITE. Mottled, green and white, schist with 70-80% angular, elongate, white feldspar (albite) fragments 0.1 to 1 mm, oriented parallel to sub-parallel to schistosity in a dark green chloritic aphanitic matrix. Abundant barren, glassy white to yellow stained clear quartz occurs as vuggy aggregates of 1 to 2 mm crystals, individual crystals, and laminated chips. The schist weather yellow-brown.

K.L.I.P.-81-15-02 TIMISKAMING GROUP METASANDSTONE. Grey colour, fine grained (0.2 mm) moderately sorted, schistose metasediment composed of subangulr clear to dark grey quartz (80%), chalky, kaolin altered feldspar (10%), black hornblende (5%), and traces of incipient garnet. A pink arkosic bed noted. Strongly foliated zones of quartz-hornblende-tremolite schist may represent differential shearing along less competent beds. Veinlets of quartz or quartz-hornblende transverse to schistosity carry chalcopyrite smeared on vein walls and associated with mafic minerals (hornblende) within the vein. Small blebs of chalcopyrite occur in schist adjacent to, but discreet from, lenses of introduced quartz.

K.L.I.P.-81-16-04 INTERMEDIATE TO FELSIC TUFF. Well foliated, light greenish grey, aphanitic and distinctly to indistinctly banded quartzofeldspathic rock. Grain size is chiefly submicroscopic, varying from glassy-cherty to just discernible and exhibiting 0.1 to 0.4 mm rounded fragments (ejecta). Abundant white to glassy clear quartz in 1 to 4 mm concordant veins or beds, along with a white and clear laminated cherty variety. Pyrite very finely disseminated in the matrix and in coarser-grained, non-striated modified cubes and pyritohedrons which appear to be confined to individual beds.

K.L.I.P.-81-17-03 INTERMEDIATE VOLCANIC TUFF BRECCIA. White to light green-tinged grey fragmental dacitic to andesitic material along with chips to schistose-chloritic, streaky material. Fabric is variable, exhibiting both fragmental and flow textures. Rounded spindles and blebs (shards) are evident in the light grey material which is likely bomb to ash size ejecta within the dark green tuffaceous flow matrix. Fine-grained pyrite (1%) in streaks associated with dark green material.

K.L.I.P.-81-18-02 PORPHYRITIC INTERMEDIATE METAVOLCANIC. Light greenish grey, moderately foliated, aphanitic intermediate volcanic of andesite-dacite to latite composition. Green saussauritized feldspar (plagioclase) up to 85%, interstitial white quartz 10-12% and 1% phenocrysts of 1/2 mm subhedral black amphibole and green feldspar. Grain size of matrix submicroscopic (30X) to 0.5 mm. Infrequent round blebs of pyrite (1%).

K.L.I.P.-81-19-05 INTERMEDIATE METAVOLCANIC. Greenish grey, very finely-grained to aphanitic slightly foliated intermediate volcanic composed of 0.2 to 0.5 mm of anhedral green-grey plagioclase up to 90%, white anhedral feldspar - 1%, and mafic minerals such as amphibole, 5-10%. Pyrite smears on fracture surfaces.

K.L.I.P.-81-20-05 HYPABYSSAL INTRUSIVE OF TONALITIC TO ADAMELLITE COMPOSITION. Light grey, very fine-grained porphyritic hypidiomorphic granular texture having 1-5%, 1/2 to 4 mm clear grey to translucent white laths and subhedral feldspar (K-spar) phenocrysts set in a clear, quartz-feldspar matrix constituting 90% of the fabric. Some feldspar phenocrysts exhibit a yellowish cast and others a slight greenish tinge with a very weak foliation evident in a few chips. Otherwise the rock appearance is fresh. Anhedral black amphibole (hornblende) occurs as minute crystals in the matrix but chiefly in rounded to irregular habit constituting about 5-8% of the rock. No economic minerals noted.

K.L.I.P.-81-21-10 DACCITE BRECCIA. Light grey, uniformly aphanitic, dacite interbedded and locally replaced by dark, glassy green, soft, chloritic aphanitic matrix material. Matrix material is less than 10%, and occurs as converging veinlets, lenses, and concve embayments into the dacite and carries inclusions of partially assimilated blebs and angular

dacite fragments with white reaction borders. Few chips of matrix material show strong foliation. A fault and gabbro intrusive are mapped in the vicinity of this hole and the texture is suggestive of a fault and/or intrusive breccia. No economic mineralization noted. Minor carbonate associated with the matrix material.

K.L.I.P.-81-22-13 METABASALT. Dark greenish grey, aphanitic equigranular foliated metavolcanic rock. Grain size 0.1 to 0.5 mm. White and greenish grey plagioclase up to 60-70%, dark green to black mafics (pyroxene) 30-40%. No visible sulphides or other economic mineralization.

K.L.I.P.-81-23-02 INTERMEDIATE METAVOLCANIC. Slightly greenish grey, aphanitic, equigranular weakly foliated rock. Few very thin 1 mm quartz veins and minor local silicification. No economic minerals noted.

K.L.I.P.-81-24-02 TUFFACEOUS INTERMEDIATE METAVOLCANIC. Light to medium grey, foliated tuffaceous, intermediate to felsic metavolcanic. Sample contaminated by overlying gravel mixed with broken bedrock.

K.L.I.P.-81-25-16 PORPHYRITIC DACIT TO RHYODACITE. Light bluish grey, aphanitic, porphyritic intermediate to felsic metavolcanic rock. 3-5% phenocrysts (amphibole) 0.1 to 0.4 mm in a grey feldspar-quartz (?) matrix. Feldspars non-saussauritized; K-spar probably present. Lithocomposition may be rhyodacite. 1-2 mm thick quartz veins - blebs, and smears of pyrite on vein walls.

APPENDIX C

SAMPLE WEIGHTS

HEAVY MINERAL CONCENTRATES

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-80-01-01	5.6	Few Grains	5.6	319.5	5.5	127.3	13.4	2.6	16.0	4.0	26.0	36.2	0	—	sorted, fine beige	SAND
02	4.6	Few Grains	4.6	282.3	7.6	163.9	15.5	3.9	3.8	1.5	72.0	37.9	0	—	sorted-med. beige	SAND
03	6.1	Few Grains	6.1	293.4	117.5	81.9	0.5	0.1	7.6	2.3	3.0	42.3	0	—	sorted-v. fine beige	SAND
04	6.0	Few Grains	6.0	205.2	114.7	97.2	<0.05	<0.05	0.6	0.5	0.2	52.4	0	—	"	SAND
05	6.0	Few Grains	6.0	221.5	78.5	103.7	0.2	<0.05	1.9	0.6	5.4	87.0	0	—	"	SAND
06	6.0	Few Grains	6.0	276.7	34.0	239.9	1.6	0.2	21.3	6.5	16.8	79.6	0	—	"	SAND
07	6.0	Few Grains	6.0	200.0	69.6	113.9	7.0	1.5	22.9	7.0	10.6	24.6	0	—	"	SAND
08	7.2	Few Grains	7.2	234.1	49.9	159.2	5.1	0.7	22.9	7.6	7.1	53.2	0	—	"	SAND
09	13.5	Few Grains	13.5	304.2	38.2	290.1	17.2	2.1	64.9	20.6	18.1	65.0	0	—	"	SAND
10	4.0	Few Grains	4.0	254.8	86.2	66.2	3.3	0.3	20.5	6.3	11.6	2.3	0	—	"	SAND
11	4.8	0.1	4.7	331.6	35.1	145.9	12.1	2.8	12.9	5.2	36.0	3.9	0	Cobbles 80% Volcanic 10% Granitic	Full Fines Tail grey	TILL
02-01,02,03	18.0	0.1	17.9	278.8	16.0	395.6	50.5	14.2	24.0	10.3	73.3	33.8	1	Pebbles 90% Volcanic	sorted, med-coarse beige	SAND
04	5.6	<<0.1	5.6	284.2	9.6	257.0	23.2	5.5	8.6	2.7	46.0	21.1	0	"	"	SAND
05	6.0	<<0.1	6.0	336.0	8.6	193.8	16.2	4.2	6.6	2.5	37.0	20.7	0	DISCARDED IN FIELD	sorted-coarse beige	GRAVEL
06	6.0	<<0.1	6.0	356.0	11.7	248.6	17.8	4.5	7.5	2.4	40.8	26.6	0	"	"	"
07	7.0	<0.1	7.0	328.6	10.0	358.9	13.2	3.9	2.8	1.5	50.0	20.6	0	"	"	"
08	7.5	Few Grains	7.5	261.9	1.4	189.7	19.2	4.1	1.2	0.6	29.6	4.2	0	"	"	"
09	9.6	<0.1	9.6	339.5	1.8	102.8	28.4	6.3	2.4	0.8	25.5	4.4	1	"	"	"
10	14.8	0.2	14.6	234.6	0.4	122.2	36.8	5.5	4.0	1.5	32.2	5.6	0	PEBBLES	"	"

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63μm		+125μm Non-mag	+125μm Mag	−125μm Non-mag	−125μm Mag	+125μm	−125μm				
Klip 80-02-11	13.8	0.3	13.5	291.2	1.3	100.9	32.2	5.1	3.8	1.2	28.7	5.5	0	Grains, Pebbles	Coarse Beige	Gravel
12	18.2	1.0	17.2	269.0	0.5	270.6	48.5	3.2	6.6	2.1	73.7	10.7	0	"	Coarse-Medium Beige	"
13	6.0	0.1	5.9	309.1	8.5	267.4	14.1	1.5	10.8	2.5	29.7	30.2	0	Fine Cuttys 70% Foreign	Wide Fines Tail, grey-Beige	Till
14	6.4	0.1	6.3	306.5	12.8	233.2	14.9	2.7	10.9	2.8	30.0	27.9	0	Pebbles 90% Volcanic	"	"
03-01, 03, 03	7.3	0.4	6.9	771.4	108.9	509.0	16.9	2.9	11.9	3.9	66.3	40.1	0	Discarded in Field	Unsorted Full Fines Tail Grey	Till
03-04, 05, 06	9.4	0.2	9.2	762.1	12.1	605.9	21.2	3.9	13.9	4.3	94.7	53.6	0	"	"	"
07	3.3	<0.1	3.3	240.1	12.0	204.0	11.5	2.0	6.8	2.3	33.8	20.4	1	"	"	"
08	3.9	0.1	3.8	278.7	18.4	185.1	6.3	1.9	3.3	1.6	37.3	19.8	1	"	"	"
09	4.1	<0.1	4.1	264.8	17.6	235.7	8.8	1.7	4.3	1.7	41.3	22.0	0	"	"	"
10	4.6	Few Grains	4.6	268.3	7.5	170.5	6.3	0.7	9.0	2.9	25.4	45.9	0	−	Fine Beige	Sand
11	5.0	"	5.0	209.8	9.6	221.2	2.8	0.4	10.7	3.3	27.0	66.7	0	−	"	"
12	4.6	"	4.6	237.7	12.1	202.1	1.6	0.2	9.2	3.6	34.2	79.8	0	−	"	"
13	4.5	0.1	4.4	260.6	42.1	156.0	3.0	0.6	7.8	2.6	17.5	46.4	1	Cobbles Fine Sand Balls Both Volcanic	Full F.T. Grey	Till
14	2.9	<0.1	2.9	260.4	35.4	190.0	6.8	1.1	3.8	1.2	31.9	27.5	0	Discarded in Field	Unsorted Full F.T. Grey	Till
15	4.7	0.3	4.4	284.2	48.4	198.1	8.8	2.0	5.2	1.5	39.6	29.0	0	Cob's G clay lumps Both Volc.	Full F.T. Grey	"
16	7.6	<0.1	7.6	270.6	34.1	226.8	16.2	5.6	9.2	3.4	52.3	31.9	1	Discarded in Field	Unsorted Full F.T. Grey	"
04 - 01	5.5	<0.1	5.5	329.6	18.1	197.2	16.3	4.2	8.2	3.3	39.2	22.9	1	"	"	"
02	5.5	<0.1	5.5	289.7	11.7	249.6	19.6	4.0	11.6	3.7	42.8	21.6	1	"	Unsorted Wide F.T Grey	"
03	4.5	<0.1	4.5	240.8	15.0	213.8	14.8	2.4	13.1	3.7	31.7	21.9	2	"	Unsorted Full F.T. Grey	"

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63 μm		+125 μm Non-mag	+125 μm Mag	− 125 μm Non-mag	− 125 μm Mag	+125 μm	−125 μm				
KLIP-80-04-04	4.1	Few Grains	4.1	230.7	14.3	174.6	12.8	2.8	8.6	3.0	26.9	15.4	0	Discarded in Field	Unsorted Full F.T. Grey	Till
05	5.8	0.4	5.4	323.4	15.2	261.8	21.0	4.3	9.7	3.4	48.9	17.1	1	Cob's 60% volc.	Wide F.T. Grey	"
06	5.0	<0.1	5.0	330.8	13.4	199.7	17.9	3.9	7.6	3.0	36.6	14.7	1	Discarded in Field	Unsorted Wide F.T. Grey	"
07	4.5	0.3	4.2	285.4	14.0	181.6	12.0	2.9	8.0	3.2	27.2	21.3	0	Cob's 50% volc.	Full F.T. Grey	"
08,09,10	11.9	<0.1	11.9	865.4	44.6	555.6	41.0	11.2	19.5	7.7	104.5	57.1	1	Discarded in Field	Unsorted Wide F.T. Grey	"
11,12,13	16.3	<0.1	16.3	982.8	52.7	694.8	50.9	14.9	29.8	11.2	138.1	78.5	0	"	Unsorted Wide F.T. Grey	"
14	6.5	Few Grains	6.5	313.1	17.8	225.7	24.2	8.3	11.8	4.8	47.1	22.4	0	"	Unsorted Full F.T. Grey	"
15	5.9	<0.1	5.9	346.3	13.8	294.0	19.6	4.8	11.4	4.9	63.3	38.9	0	"	"	"
16	6.3	Few Grains	6.3	262.8	9.6	191.9	19.5	2.9	27.4	8.8	38.2	43.1	0	"	Unsorted Full F.T. beige	"
17	5.3	<0.1	5.3	290.1	21.6	218.4	19.9	6.2	10.9	4.4	60.5	25.1	0	"	Unsorted Wide F.T. Grey	"
18	5.6	<0.1	5.6	308.0	9.7	203.0	18.0	5.4	5.7	3.1	48.3	34.4	0	"	"	"
19	7.4	0.1	7.3	280.5	12.0	222.0	17.0	4.5	10.6	3.9	55.6	43.4	0	Cobs 60% volc. 1% lime	Full F.T. Grey	"
20	6.0	0.3	5.7	329.0	28.7	252.3	11.7	3.4	5.4	2.2	59.8	40.3	1	"	"	"
21	6.8	0.1	6.7	345.5	47.2	258.6	12.7	4.5	5.3	2.2	60.1	43.4	0	Cobs 50% volc.	Full F.T. Grey 1% clay (5 Ft.)	"
22	5.5	0.1	5.4	323.3	32.9	239.5	17.0	4.8	9.8	3.8	49.6	35.7	0	Cobs 60% volc.	Full F.T. Grey	"
23	5.1	<0.1	5.1	322.2	25.1	242.8	14.1	3.4	7.4	2.6	52.3	31.2	0	Discarded in Field	Unsorted Full F.T. Grey	"
24	7.4	0.3	7.1	304.6	29.0	171.3	12.0	3.6	5.6	2.9	37.3	17.7	0	Cobs 60% volc.	Full F.T. Grey	"
25	6.4	<0.1	6.4	368.2	113.4	228.6	24.2	10.0	8.3	4.6	43.3	16.9	0	Discarded in Field	Unsorted Mod.-Wide F.T. Grey	"
26	8.8	<0.1	8.8	362.4	11.8	229.4	21.2	7.4	7.3	3.9	44.7	17.4	1	"	"	"

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

Sample Number	Weight (kg, wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-80-04-27	5.4	0.4	5.0	328.2	32.4	137.0	8.9	3.2	3.9	2.4	26.8	18.0	0	Cobs. 70% vole.	Wide F.T w. clay grey	Till
05-01	5.0	Few Grans	5.0	252.4	3.4	177.8	15.9	2.6	2.6	1.0	36.8	10.1	0	Grans	Medium LT brown	Sand
02	5.0	"	5.0	226.5	6.2	189.3	15.3	7.0	2.4	1.1	34.6	11.2	0	"	Coarse brown	Sand
06-01	5.3	0.2	5.1	303.6	15.2	136.0	18.7	4.6	10.2	3.7	27.2	20.5	0	Cobs. 45% vole.	Full-F.T. clay grey	Till
02	7.2	Few Grans	7.2	309.1	17.5	148.1	19.9	2.2	25.4	7.0	30.5	25.8	1	Grans	Fine Beige	Sand
03	4.7	"	4.7	297.5	3.1	135.0	19.4	2.3	23.9	6.6	24.5	27.9	0	"	" Very clean	"
04	6.5	"	6.5	315.9	2.6	158.0	23.2	3.1	23.8	7.9	33.1	24.6	0	"	"	"
05	5.8	<0.1	5.8	292.4	28.7	154.3	15.9	3.6	20.3	7.9	22.7	27.9	0	Discarded in field	Unsorted Full F.T. Grey-Bge	Till
06	6.6	<0.1	6.6	329.2	14.3	196.8	23.3	7.7	13.7	5.9	31.8	17.4	1	"	"	"
07-01	7.5	<0.1	7.5	280.3	22.4	194.7	24.1	6.7	15.3	5.5	33.7	23.8	2	"	"	"
02	8.2	<0.1	8.2	303.1	20.2	166.1	19.1	3.4	21.8	5.2	25.5	22.1	0	"	"	"
03	7.9	<0.1	7.9	279.6	12.6	157.4	18.9	4.0	23.7	5.7	23.3	25.3	0	"	"	"
04	7.4	<0.1	7.4	309.9	10.3	219.9	26.7	6.0	13.2	4.4	43.7	23.4	0	"	"	"
05	7.1	<0.1	7.1	295.8	7.2	169.5	20.4	5.2	7.1	2.8	35.0	12.0	0	"	Unsorted Wide F.T. Gr-Bge	"
06	7.0	<0.1	7.0	264.6	18.3	181.5	19.6	5.1	9.4	3.7	34.0	20.0	1	"	Unsorted Full F.T. Gr-Bge	"
07	5.5	<0.1	5.5	316.0	13.4	182.6	24.0	7.0	9.0	3.5	37.8	16.0	0	"	"	"
08	12.4	<0.1	12.4	265.3	11.7	227.1	47.3	9.9	27.8	8.2	59.6	29.9	1	"	Unsorted Full F.T. Grey	"
09	5.3	0.3	5.0	357.0	63.5	165.8	7.9	2.1	6.3	2.8	23.8	27.0	1	Cobs, dy lumps 60% vole 2% lime	Full F.T. Grey	"
08-01	4.2	Few Grans	4.2	278.6	14.2	168.5	20.8	4.5	16.0	5.7	29.3	19.2	0	Discarded in Field	Unsorted Full F.T. Bge.	"

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

Sample Number	Weight (kg. wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-80-08-02	6.5	(((0.1	6.5	296.1	20.6	202.4	22.4	5.2	18.1	6.6	35.2	25.8	0	Discarded In Field	Unsorted Full F.T. Dye	Till
03	3.5	Few Grains	3.5	286.8	10.8	138.9	14.4	3.4	5.7	2.4	27.8	11.0	0	"	Unsorted Wide F.T. Dye	"
04	3.6	(((0.1	3.6	323.6	15.8	141.4	13.6	5.0	6.4	2.6	33.8	18.9	1	"	Unsorted Full F.T. Grey	"
05	5.5	0.6	4.9	318.9	21.0	166.0	22.3	3.7	13.6	3.8	25.8	24.9	0	Cob's, clay lumps 55% volc.	Full F.T. grey	"
06	5.6	0.3	5.3	349.9	24.7	167.7	15.8	3.6	10.2	3.5	28.9	21.9	0	Cobs 40% volc.	"	"
07	4.5	0.2	4.3	254.6	22.9	178.6	12.0	3.3	7.4	2.7	27.7	22.3	0	Cob's. 70% volc.	"	"
08	4.4	(((0.1	4.4	301.6	49.9	163.5	11.0	3.1	9.9	3.5	23.9	27.7	0	Discarded In Field	Unsorted Full F.T. Grey	"
09	4.0	(((0.1	4.0	274.5	42.6	134.2	9.1	2.1	10.4	3.3	17.4	26.9	0	"	"	"
10	4.6	(((0.1	4.6	302.9	28.4	204.7	14.7	3.3	8.9	2.9	31.2	25.3	0	"	"	"
11	7.4	(((0.1	7.4	276.0	18.3	239.1	22.6	6.4	12.7	5.0	40.7	24.9	1	"	"	"
12	5.0	(((0.1	5.0	342.7	23.7	196.3	14.1	4.8	6.5	2.5	33.1	20.7	1	"	"	"
09-01	5.7	Few Grains	5.7	360.5	14.0	204.5	17.8	4.0	11.6	3.8	32.8	24.5	0	"	"	"
02	5.0	(0.1	5.0	389.3	13.7	181.5	10.6	3.5	9.2	2.1	26.3	21.5	0	Cob's, clay lumps 50% volc	Full F.T. grey	Till
03	6.1	(0.1	6.1	298.1	5.1	116.2	13.7	1.7	7.5	1.8	31.4	19.5	0	Cob's 30% volc.	"	"
04	6.2	(((0.1	6.2	305.1	10.0	243.0	17.4	2.9	7.6	2.3	45.9	14.5	0	Discarded In Field	Unsorted Full F.T. Dye	"
05	4.3	Few Grains	4.3	353.1	12.0	206.1	17.7	4.6	6.3	2.2	41.8	13.5	0	"	" Gr. Dye	"
06	5.9	"	5.9	342.9	13.8	160.6	15.5	3.8	10.4	3.6	30.8	21.4	2	"	"	"
07	6.1	"	6.1	308.1	12.4	224.6	17.2	4.1	7.3	2.5	41.7	19.6	1	"	"	"
08	4.0	"	4.0	344.2	27.5	202.1	13.2	3.3	7.2	2.2	32.1	26.1	2	"	Unsorted Full F.T. Gr. Dye	"

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-80-09-09	3.5	« 0.1	3.5	390.5	19.6	232.5	14.3	3.7	5.1	1.4	36.7	13.5	0	DISCARDED IN FIELD	UNSORTED FULL F.T, bge.	TILL
10	12.7	0.1	12.6	237.2	0.8	171.9	33.6	17.4	1.8	0.8	50.0	3.2	0	PEB's. 50% V.1 50% Lim	COARSE bge.	GRAVEL.
11	6.8	0.1	6.7	292.0	1.6	165.8	19.4	8.9	1.1	0.1	24.6	1.9	0	PEB's 70% Vol, 2-3% Lim	"	"
12	6.0	0.1	5.9	281.2	1.5	162.5	17.4	10.2	2.2	2.1	24.6	2.5	0	COB's. 60% Vol	"	"
13	4.0	< 0.1	4.0	259.8	1.4	172.6	12.4	7.4	2.1	1.6	25.5	2.5	0	DISCARDED IN FIELD	COARSE, bge WELL SORTED	"
14	2.3	« 0.1	2.3	221.0	1.9	150.8	6.5	3.9	0.4	0.2	21.7	1.2	0	"	"	"
10-01	3.8	« 0.1	3.8	315.7	49.8	142.0	12.3	3.1	11.4	4.8	25.3	22.7	0	"	UNSORTED FULL F.T. bge.	TILL
02	7.1	« 0.1	7.1	361.4	13.5	269.5	31.2	10.6	15.8	6.7	52.4	25.0	0	"	"	"
03	4.9	« 0.1	4.9	283.9	20.0	166.6	16.6	5.9	12.6	5.2	26.8	24.1	1	"	"	"
04	6.4	Few grains	6.4	314.1	35.3	199.4	18.5	5.0	18.4	6.9	32.8	29.9	0	"	"	"
05	6.5	Few grains	6.5	369.5	25.2	222.1	24.7	6.4	10.4	4.8	49.9	20.9	0	"	"	"
06	4.5	Few grains	4.5	349.4	36.2	215.0	19.0	7.6	14.0	5.5	40.0	28.6	0	"	"	"
07	5.8	Few grains	5.8	361.3	36.3	170.6	16.6	4.7	10.4	4.3	34.9	19.4	0	"	"	"
08	4.0	Few grains	4.0	340.0	42.7	194.4	26.6	7.7	13.8	5.4	34.4	22.2	0	"	"	"
09	5.4	0.3	5.1	319.5	32.6	171.6	14.1	5.9	9.3	4.9	30.3	23.7	0	COB's 70% Vol	FULL F.T w. CLAY bge	TILL
10	3.9	0.3	3.6	329.9	40.9	180.4	11.0	4.5	6.0	3.6	32.4	13.2	1	"	"	"
11	4.0	0.3	3.7	404.5	37.7	184.1	10.3	4.5	5.0	3.6	28.9	16.7	0	COB's 95% Vol	"	"
11-01	4.4	« 0.1	4.4	317.6	14.8	195.2	20.0	5.9	4.3	2.8	31.1	14.1	1	DISCARDED IN FIELD	UNSORTED WIDE FT, grey-bge	"
02	4.4	0.1	4.3	360.4	21.0	173.7	12.7	4.5	9.5	4.5	24.0	19.3	0	COB's 70% Vol, GCIs	WIDE F.T. grey-bge.	"
03	4.9	0.2	4.7	318.2	14.8	179.6	15.6	5.4	10.6	4.5	26.8	20.1	0	COB's 85% Vol	"	"

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63μ		+125μ Non-mag	+125μ Mag	− 125μ Non-mag	− 125μ Mag	+125μ	−125μ				
KLIP-80-11-04	4.2	Few grains	4.2	330.7	18.7	131.5	3.4	4.6	9.4	3.0	21.9	18.2	0	DISCARDED IN FIELD	UNSORTED, FULL FT, grey	TILL
05	5.1	Few grains	5.1	308.1	17.6	166.2	18.5	4.6	10.7	3.4	26.5	23.4	0	"	"	"
06	5.2	Few grains	5.2	347.4	13.9	201.3	55.5	5.4	33.7	3.8	20.5	1.8	1	"	"	"
07	5.0	0.2	4.8	354.1	18.0	207.6	47.0	5.5	35.6	3.7	20.5	1.7	0	COB's 80% Vol, GCIS	WIDE FT. grey	"
08	6.7	0.3	6.4	343.1	15.8	287.0	64.3	7.3	31.0	3.8	2.8	2.8	0	"	FULL FT grey	"
09	5.6	≪0.1	5.6	352.2	9.9	238.4	13.5	5.7	4.9	1.9	38.1	15.9	0	DISCARDED IN FIELD	UNSORTED, WIDE FT, grey	"
10	6.2	≪0.1	6.2	369.4	11.7	282.0	19.9	11.4	10.0	6.4	44.9	16.6	0	"	"	"
12-01	5.0	0.3	4.7	358.7	17.3	132.0	14.9	3.9	11.4	5.4	25.9	17.9	0	COB's 60% Vol	FULL FT bge.	"
02	3.9	0.3	3.6	344.9	16.6	107.8	11.3	3.1	9.2	4.8	19.0	20.2	0	"	"	"
03	4.0	0.2	3.8	346.3	15.8	129.1	9.3	2.1	9.9	4.5	19.3	23.5	0	"	FULL FT w. clay bge	"
04	3.8	Few grains	3.8	300.4	3.1	122.9	8.2	0.9	12.6	5.0	21.1	27.2	0	—	FINE, bge	SAND.
05	5.0	Few grains	5.0	341.1	14.2	157.0	9.4	2.1	10.7	4.4	26.0	19.2	0	—	COARSE TO FINE, bge	"
06	4.9	Few grains	4.9	306.4	0.2	189.4	10.6	2.4	2.3	1.7	33.5	3.2	0	—	COARSE, bge	"
07	5.5	0.2	5.3	375.9	10.0	195.0	10.0	2.3	9.0	3.5	34.6	20.9	0	COB's 40% Vol, 2% Lim	WIDE FT grey	TILL
08	5.1	0.3	4.8	280.3	21.1	171.2	13.2	3.6	9.8	4.2	28.1	28.4	1	COB's, GCIS 60% Vol, 2% Lim	FULL FT w. clay, grey	"
09	5.3	0.1	5.2	346.3	19.4	200.0	13.4	3.4	10.0	4.5	34.1	29.1	0	COBS 50% Vol	"	"
10	6.5	0.3	6.2	365.3	22.4	201.6	17.8	5.2	14.9	5.4	29.5	35.2	0	COBS 40% Vol	"	"
11	5.0	0.3	4.7	317.1	14.5	219.7	15.9	3.8	9.6	3.7	41.2	25.6	0	COBS 80% Vol	"	"
12	4.5	Few grains	4.5	376.3	30.1	159.5	8.8	3.0	8.4	3.5	25.7	22.7	0	DISCARDED IN FIELD	UNSORTED FULL FT, grey	"

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg, wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63 μm		+125 μm Non-mag	+125 μm Mag	−125 μm Non-mag	−125 μm Mag	+125 μm	−125 μm				
KLIP-80-12-13	3.3	0.4	2.9	311.3	29.9	137.8	5.8	2.7	4.9	2.6	20.5	28.4	0	COB's, GCIS 80% Vol	FULL F.T. grey	TILL
13-01	4.9	Few grains	4.9	359.8	13.0	224.4	7.5	5.9	8.1	3.8	37.4	14.2	0	DISCARDED IN FIELD	UNSORTED, WIDE F.T, bge	"
02	5.4	Few grains	5.4	331.2	10.5	183.0	18.0	6.1	11.5	5.6	31.9	19.0	0	"	"	"
14-01	6.0	0.3	5.7	389.7	23.7	205.8	14.6	8.7	13.2	6.8	47.4	18.3	0	COB's 90% Vol	FULL FT grey	"
02	3.1	⟨0.1	3.1	370.5	28.5	153.9	10.8	4.8	7.9	4.1	23.4	15.5	0	DISCARDED IN FIELD	UNSORTED WIDE F.T, grey	"
15-01	5.7	0.2	5.5	350.0	19.6	162.0	20.2	7.4	12.7	5.9	31.5	20.8	0	COB's, SILT BALLS 50% Vol	FULL FT, bge	"
02	6.5	⟨0.1	6.5	384.3	13.4	261.2	19.4	15.2	9.2	4.5	38.1	22.3	0	DISCARDED IN FIELD	UNSORTED FULL F.T, bge	"
03	7.1	⟨0.1	7.1	336.7	9.3	210.6	31.2	9.7	11.6	5.6	49.7	23.4	0	"	" (grey)	"
04	6.0	0.2	5.8	382.9	15.6	171.6	21.5	6.9	20.4	6.7	24.5	27.6	0	COB's 80% Vol	FULL F.T. grey	"
05	7.1	0.2	6.9	365.9	16.5	209.9	27.2	7.9	12.5	5.1	35.9	16.8	1	COB's 70% Vol	FULL FT w. clay grey	"
06	6.8	0.5	6.3	370.7	17.6	148.2	29.6	5.5	12.4	5.1	24.2	18.4	0	COBS 80% Vol 2% Lim	"	"
07	7.4	0.7	6.7	335.9	24.8	194.7	26.2	6.2	13.6	3.4	31.7	22.3	0	COB's, GCIS 90% Vol	"	"
08	4.4	0.1	4.3	319.3	10.1	133.7	14.1	3.7	7.3	2.2	22.5	15.3	0	COB's 60% Vol	WIDE F.T. grey-bge	"
09	5.3	0.2	5.1	328.7	22.8	147.9	13.3	3.6	8.1	2.5	28.3	21.2	0	"	FULL FT, grey	"
10	5.4	0.2	5.2	365.9	26.1	170.4	14.2	5.6	8.0	2.4	31.2	19.3	1	COB's 70% Vol	"	"
11	5.5	0.4	5.1	349.1	22.3	242.9	11.9	3.9	6.2	2.4	37.3	20.8	0	COB's 65% Vol	"	"
12	5.5	0.2	5.3	373.2	30.9	159.1	15.0	3.0	8.9	3.0	26.4	21.6	1	COB's 70% Vol	"	"
13	6.0	0.4	5.6	365.3	24.7	174.6	14.9	4.1	9.3	3.3	31.9	19.5	0	COBS, GCIS 85% Vol	FULL FT w. clay, grey	"
14	6.6	0.3	6.3	368.2	23.2	219.1	20.5	8.4	9.6	3.4	45.6	20.5	1	COBS 50% Vol	WIDE FT w. clay, grey	"

OVERBURDEN DRILLING MANAGEMENT LIMITED

LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-80-15-15	6.5	⟪ 0.1	6.5	353.3	10.0	174.1	4.8	8.3	4.3	2.3	36.5	14.7	2	DISCARDED IN FIELD	UNSORTED MOD F.T, grey	TILL
16	3.9	0.3	3.6	296.4	23.5	127.1	11.2	4.3	3.7	1 8	22.9	14.1	1	Cobs 50% Vol	MOD-WIDE FT w. clay, grey	"
16-01	6.4	⟨ 0.1	6.4	361.4	22.6	260.7	20.4	13.6	6.4	2.7	70.9	30.7	0	DISCARDED IN FIELD	UNSORTED. POOR - MOD FT. grey	"
17-01	5.1	0.3	4.8	335.9	49.7	134.1	10.4	3.3	5.5	2.6	24.5	22.0	0	Cobs, GCIs 60% Vol	FULL F.T. w. clay grey	"
02	6.7	0.6	6.1	266.7	23.3	157.9	14.5	6.3	8.1	3.0	33.2	19.5	1	Cobs, GCIs 45% Vol	"	"
18-01	6.6	Few grains	6.6	385.7	6.5	227.6	19.7	6.7	5.3	2.6	53.7	17.4	0	DISCARDED IN FIELD	UNSORTED WIDE F.T. bge	"
02	5.3	Few grains	5.3	358.2	12.0	180.1	8.8	2.5	5.0	1.7	35.3	26.2	0	"	UNSORTED FULL FT, bge	"
03	4 9	Few grains	4.9	323.0	13.5	172.7	11.2	3.4	9.7	3.9	29.8	34.6	0	"	"	"
04	5.8	Few grains	5.8	353.0	33.6	133.0	10.0	4.7	13.1	4.2	20.0	23.7	0	"	"	"
19-01	5.1	0.4	4.7	347.8	52.1	163.9	11.0	8.2	5.0	4.1	47.5	27.2	0	Cob's 90% Vol	WIDE FT w. clay grey	"
20-01	2.1	0.3	1.8	365.7	14.2	140.6	6.8	3.1	3.4	1.6	22.1	10.1	0	Cobs, GCIs 85% Vol	"	"
21-01	0.7	⟨ 0.1	0.7	291.4	23.3	99.1	1.8	1.1	1.2	0.5	8.9	7.8	0	Cobs 10% Vol	FULL F.T. w. clay grey - bge	"
22-01	1.7	0.5	1.2	356.1	18.6	68.5	0.9	1.1	0.3	0.2	22.5	9.2	0	Cobs >95% Vol	—	MILLED BOULDER.
02	6.1	Few grains	6.1	350.3	18.1	211.1	17.7	5.1	13.0	4.9	40.7	35.8	0	—	FINE, grey	SAND
23-01	7.7	0.4	7.3	310.4	15.6	212.3	21.8	7.8	11.8	4.6	45.5	21.1	0	Cobs 60% Vol	FULL F.T. w. clay grey	TILL
24-01	7.0	⟪ 0.1	7.0	376.0	27.5	250.7	22.7	10.0	9 6	4.7	60.6	18.5	0	DISCARDED IN FIELD	UNSORTED, WIDE FT, grey	"
02	7.2	⟨ 0.1	7.2	323.3	11.3	106.0	26.3	8.6	15.2	4.8	18.1	12.2	1	"	"	"
03	5.9	2.0	3.9	336.2	10.1	103.4	9.1	2.4	8.0	2.8	20.0	20.5	4	Cobs 90% Vol	WIDE F.T. w. clay, grey	"
25-01	5.9	0.2	5.7	309.7	14.1	206.4	9.6	5.7	9.6	3.8	38.9	16.0	0	Cobs 70% Vol	FULL F.T. grey	"

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg. wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63 μm		+125 μm Non-mag	+125 μm Mag	−125 μm Non-mag	−125 μm Mag	+125 μm	−125 μm				
KLIP-80-26-01	6.0	≪ 0.1	6.0	330.5	12.6	243.0	20.2	6.4	9.3	4.1	51.7	21.6	0	DISCARDED IN FIELD	UNSORTED, WIDE F.T., grey	TILL
27-01	4.9	0.4	4.5	348.5	11.0	230.4	21.7	8.6	7.9	3.6	49.8	20.8	1	Cobs 50% Vol.	WIDE F.T. w. clay grey	"
28-01	6.0	0.3	5.7	310.2	22.8	158.7	28.2	6.4	20.6	9.1	28.0	19.3	1	Cobs, Gels 50% Vol	FULL FT bge	"
02	3.8	0.3	3.5	307.0	28.3	112.2	8.2	3.6	7.4	5.0	26.2	17.5	0	Cobs 40% Vol	WIDE FT. w. clay grey	"
29-01	5.4	Few grains	5.4	299.4	11.5	257.7	15.3	6.6	7.9	4.4	53.3	19.0	0	DISCARDED IN FIELD	UNSORTED WIDE F.T, grey	"
02	4.4	Few grains	4.4	304.7	13.3	153.3	11.5	3.4	16.2	8.5	29.6	33.2	0	—	FINE, grey-green	SAND
30-01	7.6	0.1	7.5	309.5	8.7	232.0	21.6	8.7	7.8	3.6	51.9	18.0	0	Cobs 10% Vol	WIDE F.T. grey	TILL
31-01	3.4	0.4	3.0	317.5	42.9	91.0	7.3	1.8	8.8	2.9	14.3	17.3	0	Cobs 15% Vol	FULL F.T. w. clay bge	"
01 1A WASH	2.0	< 0.1	2.0	299.6	81.0	193.7	2.8	0.4	3.5	1.2	11.4	15.2	0	Cobs 10% Vol	FINE SAND, SILT	—
32-01	1.4	1.1	0.3	304.1	0.3	142.2	1.3	0.2	0.2	0.1	6.7	44.2	0	Cobs 50% Vol	POR-MOD FT w. clay, grey	TILL
02	1.1	1.1	0.0	259.9	0.5									INSUFFICIENT	SAMPLE	—
34-01	12.4	≪ 0.1	12.4	365.2	13.6	358.5	43.1	13.9	16.8	8.6	74.8	38.7	2	DISCARDED IN FIELD	UNSORTED MOD. F.T. grey	TILL
02	18.4	2.2	16.2	392.0	15.4	290.8	26.3	19.7	27.1	11.3	67.7	26.1	0	Cobs 50% Vol	WIDE F.T w clay grey	"
35-01	7.2	≪ 0.1	7.2	339.3	13.7	150.1	25.8	10.9	10.1	4.7	32.1	18.3	3	DISCARDED IN FIELD	UNSORTED MOD FT, grey	"
02	5.4	0.7	4.7	353.9	11.9	186.4	17.4	5.2	5.8	2.7	10.2	15.8	0	Cobs 50% Vol	WIDE F.T. w. clay grey	"
36-01	5.6	Few grains	5.6	397.3	4.3	244.4	18.2	3.4	5.5	1.8	45.2	17.0	0	—	MEDIUM GRAINED, bge	SAND
02	6.0	Few grains	6.0	297.3	5.2	186.4	22.8	4.8	8.1	2.7	40.2	16.6	0	"	"	"
03	1.9	0.1	1.8	422.4	26.4	113.1	5.5	1.8	5.1	1.9	17.8	12.4	0	Cobs 40% Vol	FULL F.T. w. clay grey	TILL
38-01	3.9	0.5	3.4	345.6	19.3	92.6	7.6	8.6	5.5	8.7	17.5	9.2	0	Cobs 80% Vol	MOD FT w. clay grey	"

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63μ		+ 125μ Non-mag	+ 125μ Mag	− 125μ Non-mag	− 125μ Mag	+ 125μ	− 125μ				
KLIP-80-39-01	3.6	⟨0.1	3.6	317.4	9.8	163.8	12.9	5.8	6.4	4.7	35.7	19.4	0	DISCARDED IN FIELD	UNSORTED MOD F.T., bge	TILL
02	4.0	0.1	3.9	344.4	6.7	261.5	17.5	7.1	8.6	5.6	70.0	34.3	0	COBS 40% Vol	FULL F.T. bge	"
03	4.1	⟨0.1	4.1	373.6	17.9	190.9	12.9	4.1	9.9	6.2	38.7	34.0	0	DISCARDED IN FIELD	UNSORTED, WIDE F.T. bge	"
40-01	0.2	0.1		128.4	0.6									COB'S 65% Vol	INSUFFICIENT SAMPLE	—
41-01	2.4	0.3	2.1	407.5	23.7	96.9	5.8	2.5	1.8	1.2	32.8	10.9	0	COBS 40% Vol	MOD F.T w. clay grey-green	TILL
02	1.6	Few grains	1.6	278.7	21.6	89.5	6.9	2.4	2.4	1.4	36.8	12.4	0	DISCARDED IN FIELD	UNSORTED, POOR F.T., grey-green	"
03	1.3	0.1	1.2	265.6	24.5	170.3	11.5 INCLUDES MIN. FROM	5.3 COARSE HEAVY m 43-01	0.9	0.8	20.9	8.5	0	COBS 40% Vol	POOR F.T w. clay grey	"
42-01	3.6	0.3	3.3	366.2	59.0	240.8	14.8	4.7	3.0	7.6	53.4	52.1	0	COBS 60% Vol	FULL F.T. w. clay grey	"
43-01	3.0	0.8	2.2	332.2	14.8	131.8	MIXED 41	WITH 03	4.6	3.4	23.4	10.4	0	COBS 15% Vol	WIDE FT w. clay grey	"
44-01	6.1	0.1	6.0	481.2	17.8	205.9	23.4	10.9	8.2	3.7	50.4	17.3	0	COBS 50% Vol	"	"
45-01	2.6	0.2	2.4	101.8	9.9	113.5	6.6	1.8	9.7	3.1	17.0	20.5	0	COBS, GCIS 70% Vol	FULL FT w. clay grey	"
46-01	1.1	0.1	1.0	202.9	43.9	96.2	13.5	1.2	6.1	1.4	11.3	13.7	0	COBS 10% Vol	FULL F.T. w clay grey	"
47-01	5.6	Few grains	5.6	373.0	70.0	225.7	22.2	6.1	14.9	10.8	49.2	30.8	1, 1.1mm dia	DISCARDED IN FIELD	UNSORTED FULL F.T. grey	"
02	5.3	⟨0.1	5.3	259.7	11.7	221.2	30.0	11.3	9.6	10.1	54.1	22.9	0	"	UNSORTED WIDE F.T. grey	"
48-01	6.4	0.2	6.2	275.0	5.2	172.1	12.2	4.0	2.6	0.9	39.4	10.5	0	PEB? 50% Vol, 2-3% 1mm	COARSE bge, False F.T.	GRAVEL
02	5.5	⟨0.1	5.5	353.1	13.2	280.6	15.5	4.4	4.0	1.5	78.9	22.7	1	—	COARSE, bge	SAND
03	6.0	⟨0.1	6.0	376.8	5.7	258.1	21.0	7.5	2.8	1.2	60.5	13.7	0	—	"	"
04	5.1	⟨0.1	5.1	256.8	3.1	145.0	12.9	3.8	1.2	0.4	35.6	8.2	0	—	"	"
05	5.6	⟨0.1	5.6	302.4	2.5	141.8	17.4	4.5	2.0	0.9	37.8	9.3	0	—	"	"

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63 μm		+125 μm Non-mag	+125 μm Mag	−125 μm Non-mag	−125 μm Mag	+125 μm	−125 μm				
KLIP-80-48-06	5.0	0.3	4.7	323.0	7.9	127.8	14.1	4.1	3.7	1.6	30.9	12.2	0	COBS 80% Vol	WIDE F.T. grey	TILL.
07	5.6	<0.1	5.6	367.6	16.9	209.1	15.1	4.7	6.0	2.6	59.7	22.3	1	DISCARDED IN FIELD	UNSORTED FULL F.T, grey	"
49-01	5.5	Few grains	5.5	321.2	9.0	133.5	13.9	3.9	5.2	2.5	32.7	15.1	0	—	FINE TO MED bge	SAND
02	6.0	Few grains	6.0	302.0	8.1	188.2	16.2	3.2	5.0	1.7	52.0	22.4	0	—	MEDIUM bge	"
03	7.8	0.2	7.6	367.3	2.5	178.8	20.1	5.0	4.0	1.4	54.0	14.7	0	PEBS 80% Vol	COARSE grey	"
04	7.4	<0.1	7.4	384.2	3.7	241.0	18.4	4.9	3.1	1.3	67.1	14.8	0	—	"	"
05	8.0	<0.1	8.0	340.1	1.8	256.5	28.0	6.5	6.5	2.8	82.4	21.9	0	—	MEDIUM grey	"
06	5.5	Few grains	5.5	355.4	1.4	226.5	25.5	6.2	4.2	2.0	76.9	16.2	0	—	"	"
51-01	5.9	1.0	4.9	298.7	44.3	216.7	21.5	7.8	15.2	13.5	58.6	31.3	0	COBS 90% Vol	FULL F.T. w clay grey	TILL
52-01	3.2	0.4	2.8	259.8	25.3	120.5	5.6	2.9	3.1	2.2	16.5	14.7	0	COBS 75% Vol	WIDE F.T. grey	"
KLIP-80 541-01	3.7	0.6	3.1	285.1	13.3	87.8	6.5	4.7	2.2	3.9	26.1	12.9	0	Cobs 50% Vol	COARSE grey-green	GRAVEL
02	2.8	0.5	2.3	308.2	9.8	91.7	8.2	4.8	1.9	2.7	24.8	5.6	0	"	"	"
03	1.6	0.1	1.5	269.5	22.8	86.3	5.6	2.9	1.6	1.9	19.1	11.8	0	"	"	"
04	3.1	0.3	2.8	248.7	37.3	123.6	4.3	3.2	2.6	3.6	25.9	31.8	0	"	COARSE, w. clay FALSE F.T. (poor)	"

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-80-48-06	5.0	0.3	4.7	323.0	7.9	127.8	14.1	4.1	3.7	1.6	30.9	12.2	0	COBS 80% Vol	WIDE F.T. grey	TILL.
07	5.6	<0.1	5.6	367.6	16.9	209.1	15.1	4.7	6.0	2.6	59.7	22.3	1	DISCARDED IN FIELD	UNSORTED FULL F.T., grey	"
49-01	5.5	Few grains	5.5	321.2	9.0	133.5	13.9	3.9	5.2	2.5	32.7	15.1	0	—	FINE TO MED bge	SAND
02	6.0	Few grains	6.0	302.0	8.1	188.2	16.2	3.2	5.0	1.7	52.0	22.4	0	—	MEDIUM bge	"
03	7.8	0.2	7.6	367.3	2.5	178.8	20.1	5.0	4.0	1.4	54.0	14.7	0	PEBS 80% Vol	COARSE grey	"
04	7.4	<0.1	7.4	384.2	3.7	241.0	18.4	4.9	3.1	1.3	67.1	14.8	0	—	"	"
05	8.0	<0.1	8.0	340.1	1.8	256.5	28.0	6.5	6.5	2.8	82.4	21.9	0	—	MEDIUM grey	"
06	5.5	Few grains	5.5	355.4	1.4	226.5	25.5	6.2	4.2	2.0	76.9	16.2	0	—	"	"
51-01	5.9	1.0	4.9	298.7	44.3	216.7	21.5	7.8	15.2	13.5	58.6	31.3	0	COBS 90% Vol	FULL F.T. w clay grey	TILL
52-01	3.2	0.4	2.8	259.8	25.3	120.5	5.6	2.9	3.1	2.2	16.5	14.7	0	COBS 75% Vol	WIDE F.T. grey	"
KLIP-80 541-01	3.7	0.6	3.1	285.1	13.3	87.8	6.5	4.7	2.2	3.9	26.1	12.9	0	Cobs 50% Vol	COARSE grey-green	GRAVEL
02	2.8	0.5	2.3	308.2	9.8	91.7	8.2	4.8	1.9	2.7	24.8	5.6	0	"	"	"
03	1.6	0.1	1.5	269.5	22.8	86.3	5.6	2.9	1.6	1.9	19.1	11.8	0	"	"	"
04	3.1	0.3	2.8	248.7	37.3	123.6	4.3	3.2	2.6	3.6	25.9	31.8	0	"	COARSE, w. clay FINE F.T. (poor)	"

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-81-01-01	2.5	<0.1	2.5	169.3	54.7	76.2	5.7	2.4	7.6	1.9	5.4	5.6	O	Pyrite bearing white granite cuttings	Fine grey sand and cuttings	SAND CAVE AND BEDROCK
02-01	3.5	1.4	2.1	272.6	3.7	110.4	10.7	3.3	2.6	1.3	24.8	2.7	O	Cobs 90% v/s Predominately Cobalt	Sorted coarse grey	GRAVEL
02	4.0	1.4	2.6	336.6	7.3	100.4	14.6	3.9	5.4	1.7	22.6	5.1	O	"	"	GRAVEL
03	7.0	3.7	3.3	340.9	4.4	161.9	15.2	3.6	5.0	1.5	38.1	5.3	O	"	"	GRAVEL
04	6.2	2.3	3.9	284.8	9.1	178.2	14.2	3.6	5.7	2.0	36.9	6.3	O	Cobs 90% v/s Predominately Cobalt Trace lime	Unsorted grey	TILL
05-01	5.3	0.4	4.9	209.8	0.2	89.4	8.1	1.9	0.4	0.3	19.8	0.3	O	Granules 50% v/s 50% Gr	Sorted coarse brown	SAND
02	3.6	<0.1	3.6	250.8	1.5	156.8	12.4	2.1	5.7	1.9	33.1	8.5	O	Granules	Sorted medium brown	SAND
03	4.6	1.2	3.4	226.0	0.7	81.0	11.8	5.5	1.6	0.7	20.2	1.9	O	Pebs 70% v/s 30% Gr	Sorted coarse beige	GRAVEL
04	6.3	2.2	4.1	276.3	1.0	182.1	18.3	6.6	3.0	1.6	50.3	3.7	O	"	"	GRAVEL
05	5.6	2.0	3.6	253.2	1.8	95.7	18.0	7.4	3.2	1.5	25.6	3.7	1 at 200μ 1 at 250μ Transported	Cobs 70% v/s 30% Gr Cuttings from one check: Malachite-quartz vein	"	GRAVEL
06	6.0	2.1	3.9	255.6	0.7	113.3	9.2	4.4	0.8	0.7	34.4	2.4	O	Cobs 75% v/s 25% Gr	"	GRAVEL
07	4.2	1.3	2.9	238.2	0.4	74.3	4.2	1.9	0.3	0.2	19.5	0.3	O	Pebs 70% v/s 30% Gr	"	GRAVEL
08	4.3	1.4	2.9	237.8	0.9	103.7	9.2	5.2	0.4	0.3	32.4	1.9	O	"	"	GRAVEL
09	3.8	1.4	2.4	243.6	1.0	113.0	6.3	4.1	0.4	0.4	39.6	2.0	O	Pebs 75% v/s 25% Gr	"	GRAVEL
10	6.7	1.2	5.5	221.7	0.1	89.6	11.9	3.7	2.7	1.3	24.9	4.4	2(300μ) Transported	Cobs 85% v/s	"	GRAVEL
11	4.5	1.1	3.4	255.8	8.1	175.6	7.0	1.5	4.3	1.7	33.0	14.1	O	Cobs 90-95% v/s	Unsorted grey-beige	TILL
12	6.0	2.7	3.3	255.2	1.8	141.6	9.9	5.2	1.8	0.9	49.9	5.8	O	Pebs 75% v/s	Sorted coarse grey	GRAVEL
03-03	0.8	0.2	0.6	111.6	6.8	55.9	1.5	0.2	1.8	0.5	4.5	4.0	O	Cobs 85% v/s 15% Gr	Unsorted grey with silt	TILL
04-01	4.8	0	4.8	250.6	9.2	118.0	10.1	2.4	4.9	1.7	24.6	9.4	O	NIL	Sorted medium-coarse beige	SAND

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg. wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-81-04-02	1.2	0.7	0.5	153.8	3.4	51.6	1.7	0.4	1.0	0.3	8.5	1.5	O	Cobs 85% v/s Tr Lime	Sorted coarse grey	GRAVEL
06-01	7.2	2.1	5.1	310.1	3.7	162.1	15.0	4.5	5.9	2.6	33.0	8.9	O	Pebs 30% Gr 70% v/s Tr Lime	Unsorted beige-grey	TILL
02	6.5	0.2	6.3	287.8	1.8	145.4	14.1	2.9	6.5	2.4	22.7	13.2	O	Pebs 20% Gr 80% v/s	Sorted medium brown	SAND
03	4.0	Few Pebbles	4.0	366.2	1.3	152.2	18.0	3.8	5.5	2.5	22.9	8.6	O	Few volcanic pebs	Sorted fine brown	SAND
04	5.7	0	5.7	305.1	1.7	138.7	21.3	4.4	10.4	3.7	18.8	8.6	O	NIL	Sorted fine grey	SAND
05	7.6	<0.1	7.6	271.8	1.6	164.0	24.7	5.3	13.2	4.9	22.3	11.3	O	Few volcanic pebs	"	SAND
06	7.1	0	7.1	248.5	2.3	171.2	23.0	4.5	17.4	6.1	21.0	13.9	O	NIL	"	SAND
07	6.9	1.1	5.8	317.2	4.7	258.7	18.9	7.9	2.9	1.7	50.3	5.2	O	Cobs 95% v/s	Sorted coarse beige	GRAVEL
08	7.0	1.0	6.0	284.7	1.5	240.2	9.4	34	0.5	0.2	32.5	1.6	O	Cobs Tr Lime 90% v/s	"	GRAVEL
09	5.7	0.8	4.9	277.9	2.1	227.5	10.0	4.3	1.5	0.5	41.5	3.5	O	Cobs >95% v/s	"	GRAVEL
10	6.0	2.7	3.3	269.4	3.0	117.4	21.7	20.7	8.6	5.2	17.7	5.7	O	Pebs 95% v/s	"	GRAVEL
07-01	5.6	1.0	4.6	250.0	6.1	167.7	19.6	5.7	6.3	2.5	32.2	7.6	O	Cobs Tr Lime 80% v/s	Unsorted grey with clay	TILL
02	5.6	0	5.6	262.6	8.0	150.6	17.9	4.0	6.7	2.8	21.6	10.2	O	NIL	Sorted fine grey	SAND
03	5.5	0	5.5	227.8	7.6	121.4	11.2	2.5	13.5	4.2	12.1	11.0	O	"	"	SAND
04	5.3	2.0	3.3	260.1	4.4	115.2	9.2	2.7	5.9	1.7	22.5	8.2	O	Pebs 95% v/s	Unsorted grey	TILL
05	5.6	<0.1	5.6	233.6	2.5	130.4	10.2	1.3	11.7	3.5	11.6	16.9	O	Few volcanic pebs	Sorted fine grey	SAND
06	7.0	1.5	5.5	248.3	2.9	160.3	17.9	6.9	3.6	1.4	43.5	5.0	O	Cobs Tr Lime >95% v/s	Sorted coarse grey	GRAVEL
07	5.3	2.5	2.8	221.7	5.1	121.8	9.9	3.9	1.8	0.8	39.1	5.1	O	"	"	GRAVEL
08	6.0	2.0	4.0	219.0	2.9	151.8	8.1	2.3	1.0	0.5	28.9	2.9	O	Cobs Tr Lime 90% v/s	"	GRAVEL

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg. wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63 μm		+125 μm Non-mag	+125 μm Mag	−125 μm Non-mag	−125 μm Mag	+125 μm	−125 μm				
KLIP-81-07-08	6.1	1.2	4.9	266.4	0.3	184.1	2.2	0.2	0.1	Few Grains	20.0	0.7	0	Pebs Tr Lime 90% v/s	Sorted coarse grey	GRAVEL
08-01	6.3	1.4	4.9	276.5	20.4	154.0	10.1	2.9	10.2	3.4	19.2	17.6	0	Pebs 60% v/s 40% Gr	Unsorted beige-grey with silt	TILL
02	3.1	1.0	2.1	137.5	7.1	203.3	5.5	1.5	2.1	0.7	43.4	6.1	0	Pebs 80% Gr Tr Lime	"	TILL
03	6.3	0	6.3	219.9	5.9	71.6	2.6	0.2	15.7	4.2	3.7	2.1	0	NIL	Sorted very fine beige	SAND
04	3.3	0.4	2.9	206.0	22.8	43.7	1.7	0.2	10.3	2.9	1.8	8.5	0	Pebs SCls 50% Gr 50% v/s	Sorted medium-fine beige	SAND
05	7.1	0	7.1	205.0	10.5	122.5	7.3	1.0	27.8	9.4	5.0	22.1	0	NIL	Sorted very fine beige	SAND
06	5.4	1.1	4.3	194.6	17.0	144.0	8.8	3.0	3.1	1.1	25.5	9.7	0	Cobs 85% v/s Tr Lime	Unsorted grey green with grey clay	TILL AND BEDROCK
07	6.0	2.5	3.5	199.9	5.3	119.7	4.9	1.7	1.4	0.6	24.2	5.9	0	Cobs 99% v/s Tr Lime	Predominately grey green rock cuttings	BOULDER OR BEDROCK
08	2.2	0.6	1.6	116.6	3.3	32.4	0.6	0.1	0.7	0.2	4.9	3.6	0	"	"	BOULDER OR BEDROCK
09-01	6.1	<0.1	6.1	190.4	0.3	148.3	17.9	5.4	2.4	1.3	35.5	4.3	0	Granules	Sorted coarse beige	SAND
02	6.5	<0.1	6.5	207.6	1.4	107.3	16.6	4.3	3.6	1.8	28.6	5.5	0	"	"	SAND
03	6.3	1.4	4.9	225.1	45.0	126.9	10.3	2.5	12.7	5.0	18.7	22.4	0	Cobs 50% v/s 50% Gr	Unsorted grey-beige with silt	TILL
11-01	3.1	1.8	1.3	182.5	0.8	49.8	2.6	2.2	0.8	0.7	10.1	2.6	0	Cobs 25% Gr 75% v/s Tr Lime	Sorted coarse beige	GRAVEL
02	1.4	0.9	0.5	150.5	0.4	27.0	1.5	0.3	0.3	0.05	5.3	1.3	0	Cobs 90% v/s 10% Gr	Unsorted grey-green	TILL
12-01	0.7	0.1	0.6	75.9	8.2	48.5	0.2	0.1	0.2	0.05	4.1	1.2	0	Cobs 99% v/s	"	TILL AND BEDROCK
13-01	5.1	1.1	4.0	289.4	45.4	75.4	3.2	0.5	15.2	4.3	9.5	14.4	0	Cobs 95% v/s	Unsorted grey with silt	TILL
02	6.1	1.8	4.3	317.7	25.8	124.3	11.2	2.5	6.7	1.7	26.8	10.9	1(400μ) TRANSPORTED	Cobs 90% v/s Tr Lime	"	TILL
03	5.8	1.1	4.7	285.2	3.1	116.2	19.1	4.6	5.8	2.0	48.6	12.8	0	"	Unsorted grey	TILL
04	2.9	1.0	1.9	251.7	9.2	79.7	1.1	0.1	0.4	0.1	24.9	6.3	0	Cobs GCls 95% v/s	Unsorted grey-green with pale yellow silt	TILL AND BEDROCK

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg. wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-81-14-01	7.1	1.1	6.0	261.8	1.1	202.3	28.5	6.0	19.1	7.5	30.0	18.7	O	Pebs 75% v/s 20% Gr	Unsorted beige	TILL
02	6.9	Few grains	6.9	254.2	9.6	156.3	6.4	0.5	22.6	6.3	9.7	39.5	O	NIL	Sorted fine beige	SAND
03	7.0	Few grains	7.0	221.9	10.4	163.0	18.1	3.1	12.6	3.9	30.3	18.1	O	NIL	Sorted medium-fine beige	SAND
04	6.7	0.9	5.8	281.0	<0.1	180.6	25.4	5.2	4.0	1.8	41.2	4.1	O	Pebs 70% v/s 25% Gr	Sorted coarse beige	GRAVEL
05	5.0	0.8	4.2	293.6	10.0	173.9	10.0	1.6	21.1	4.1	16.3	18.8	O	Pebs 80% v/s 15% Gr	Unsorted grey-beige with silt	TILL
06	5.3	<<0.1	5.3	200.7	16.6	119.1	11.8	2.2	5.0	1.3	29.1	4.9	O	Cobs 90% v/s 5% Gr	Unsorted grey-beige	TILL
07	8.1	1.9	6.2	281.9	14.2	125.7	8.6	1.9	4.2	1.0	21.1	5.7	O	Cobs GCls 90% schist 5% Gr	Unsorted beige with pale yellow clay	TILL
08	5.9	2.0	3.9	302.3	9.9	131.3	10.4	1.7	5.2	1.0	27.7	7.2	O	Cobs GCls 90% v/s 5% Gr	Unsorted grey-beige with pale yellow clay	TILL
09	5.3	1.7	3.6	212.9	10.0	106.3	2.5	0.2	1.2	0.2	18.9	6.2	O	Cobs GCls 80% v/s 15% Gr	"	TILL
10	2.6	0.9	1.7	207.3	10.0	58.6	0.1	0.1	0.1	<0.1	7.3	1.4	O	Cobs GCls 20% schist 80% quartz-carbonate^ wi	Unsorted reddish brown with pale yellow clay	TILL
14A-01	1.7	1.0	0.7	211.3	6.6	50.3	2.6	3.0	1.8	1.3	5.7	3.6	O	Cobs 5% v/s 90% sand	Unsorted golden brown	TILL
15-01	5.4	2.1	3.3	291.7	42.8	154.3	15.0	2.3	8.5	2.3	24.3	15.5	O	Cobs Tr Lime 90% v/s	Unsorted grey with silt	TILL
16-01	3.9	0.7	3.2	298.2	10.5	132.6	3.4	0.5	17.2	3.7	15.9	21.5	O	Cobs 95% v/s Tr Lime	"	TILL
02	7.9	2.9	5.0	312.6	21.2	209.9	15.3	4.4	3.5	0.9	45.0	6.7	O	Cobs 90% v/s Tr Lime	Unsorted grey	TILL
03	2.2	1.1	1.1	267.9	13.3	99.8	4.1	0.8	2.3	0.2	15.2	6.5	O	Cobs 90% v/s 5% Gr	"	TILL
17-01	8.5	2.1	6.4	238.9	17.4	180.8	14.1	7.2	7.8	3.5	34.9	15.1	O	Cobs GCls 90% v/s 5% Gr	Unsorted grey-beige with grey clay	TILL
02	2.4	1.1	1.3	277.7	7.8	119.4	6.7	2.0	4.6	1.7	25.0	11.6	O	Cobs 95% v/s 4% Gr	Unsorted grey	TILL
18-01	1.3	0.3	1.0	230.3	19.1	93.4	5.2	1.3	6.5	2.6	10.9	13.0	O	Cobs 90% v/s 5% Gr	Unsorted grey-beige with silt	TILL
19-01	2.1	0.2	1.9	253.9	74.9	85.5	1.2	0.9	3.8	1.8	8.4	14.4	O	Cobs 95% v/s 4% Gr	"	TILL

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg. wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63 μ		+125 μ Non-mag	+125 μ Mag	−125 μ Non-mag	−125 μ Mag	+125 μ	−125 μ				
KLIP-81-19-02	7.7	2.0	5.7	264.0	4.4	270.9	21.4	6.5	4.1	1.6	74.0	7.8	0	Cobs 90% v/s 5% Gr	Unsorted grey.	TILL
03	7.0	1.4	5.6	255.4	6.9	140.6	17.2	6.6	7.5	2.9	33.5	8.8	0	"	Unsorted grey with silt	TILL
04	7.1	2.0	5.1	302.0	10.6	103.2	18.7	4.8	15.6	4.9	21.3	9.6	3 (1 of 800 μ) (1 of 400 μ) (1 of 200 μ) TRANSFERRED	Cobs 95% v/s Tr Lime	"	TILL
20-01	7.4	1.8	5.6	291.6	20.0	238.2	17.3	5.2	6.3	2.5	64.2	15.0	0	Cobs 90% v/s 8% Gr	Unsorted grey	TILL
02	6.6	1.5	5.1	264.3	4.6	183.1	15.1	3.9	5.5	2.2	44.9	8.5	0	Cobs 85% v/s Tr Lime	"	TILL
03	7.9	1.9	6.0	267.5	3.1	215.8	17.2	4.4	3.8	1.8	57.4	6.6	0	Cobs 90% v/s Tr Lime	"	TILL
04	8.0	1.9	6.1	323.6	6.1	203.3	15.1	3.3	8.7	3.0	42.5	10.9	0	Cobs 85% v/s Tr Lime	"	TILL
03-01	4.9	1.6	3.3	154.1	20.1	73.1	9.3	2.9	6.5	1.9	13.2	5.0	0	Cobs 90% v/s 8% Gr	Unsorted grey-beige with silt	TILL
02	2.0	0.4	1.6	161.9	31.7	57.7	4.5	0.8	5.2	1.1	10.5	6.2	0	Cobs 95% v/s 4% Gr	"	TILL
21-08	7.0	1.8	5.2	158.0	1.9	190.8	24.1	9.6	6.1	2.3	47.8	8.5	0	Cobs 80% v/s Tr Lime	Unsorted grey	TILL
22-02	8.1	1.2	6.9	127.8	2.5	277.	18.8	3.1	6.0	1.8	72.1	9.9	0	Cobs 50% Gr 50% v/s Tr Lime	Sorted coarse-medium grey-beige	GRAVEL
03	8.1	2.0	6.1	157.4	0.9	145.9	13.6	3.9	1.9	0.5	31.4	3.9	0	Cobs 35% Gr 65% v/s Tr Lime	"	GRAVEL
05	7.2	2.1	5.1	197.7	11.8	138.1	13.9	3.9	6.6	2.9	33.4	6.8	0	Cobs 80% v/s 15% Gr	Unsorted grey with clay	TILL
06	8.6	2.2	6.4	153.7	1.4	106.9	15.0	4.4	3.8	1.9	23.3	4.2	0	Cobs 75% v/s 20% Gr	"	TILL
07	9.0	2.4	6.6	192.6	4.7	196.2	17.3	5.9	4.8	2.3	50.7	11.5	3 1 (150 μ) 1 (>50 μ) TRANSFERRED	Cobs 80% v/s Tr Lime	Unsorted grey with silt	TILL
08	5.2	1.0	4.2	170.6	10.4	92.9	11.5	4.0	5.5	2.9	20.1	7.7	0	Cobs GCls 75% v/s 20% Gr	Unsorted grey with clay	TILL
09	9.6	2.0	7.6	155.3	8.8	98.4	11.8	3.9	6.1	3.2	21.5	9.0	0	Cobs GCls 85% v/s 10% Gr	"	TILL
10	6.3	0.5	5.8	131.6	2.6	163.9	9.2	3.5	11.1	5.8	29.2	17.1	0	Cobs 60% v/s 35% Gr	"	TILL
11	6.3	<<0.1	6.3	164.5	9.3	70.5	5.9	2.2	6.7	3.3	11.1	8.8	0	95% v/s	"	TILL

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg, wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	−63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-81-22-12	7.5	2.0	5.5	142.8	3.4	132.7	4.6	2.6	1.0	0.6	29.1	3.6	0	Few cuttings 85% v/s Tr Lime	Unsorted grey green with clay	TILL
23-01	8.0	3.0	5.0	218.4	13.8	188.1	29.4	12.3	5.7	3.2	49.6	6.9	0	Cobs 80% v/s 20% Gr	Unsorted grey with clay	TILL
24-01	3.5	2.0	1.5	112.1	2.0	22.3	3.6	0.3	1.6	0.2	5.1	1.5	0	Cobs 50% v/s 50% Gr	"	TILL
25-01	8.0	1.5	6.5	150.1	13.2	150.4	18.5	6.6	3.1	1.8	36.4	3.9	0	Cobs 70% v/s 30% Gr	"	TILL
03	8.5	2.0	6.5	153.9	15.7	131.3	17.6	5.4	5.3	3.0	31.2	4.5	0	Cobs 60% v/s 40% Gr	"	TILL
04	8.0	1.5	6.5	190.2	8.1	99.2	15.4	3.5	9.0	5.3	21.0	7.9	0	Cobs 70% v/s 30% Gr	"	TILL
05	8.5	0.5	8.0	141.6	2.7	180.3	25.4	3.5	12.1	6.8	42.1	11.4	0	Pebs 50% Gr 50% v/s Tr Lime	Unsorted beige with clay	TILL
06	8.0	3.0	5.0	182.3	19.5	129.5	9.4	3.3	5.8	3.7	25.5	6.8	0	Cobs 50% v/s 50% Gr	"	TILL
07	9.0	1.0	8.0	129.0	7.3	193.7	17.9	5.0	9.4	4.2	40.7	11.9	0	Pebs 80% Gr 20% v/s Tr Lime	Unsorted grey with silt	TILL
08	2.0	0.1	1.9	128.3	5.9	83.2	3.3	0.9	1.0	0.4	14.1	2.3	0	Pebs 50% Gr 50% v/s Tr Lime	Unsorted grey with clay	TILL
09	10.0	3.0	7.0	164.7	15.0	88.0	15.2	5.7	9.1	4.2	16.9	9.3	0	Cobs 85% v/s	"	TILL
10	9.5	2.5	7.0	128.8	7.4	150.1	21.2	8.9	7.6	3.8	34.1	8.4	3 1E 300μ 1E 125μ 1E 63μ Transmitted	Cobs 80% v/s	"	TILL
11	3.0	1.5	1.5	129.1	28.6	75.5	2.7	1.6	1.3	0.7	10.7	5.9	0	Cobs 75% v/s	"	TILL
12	7.5	0.4	7.1	176.6	8.2	322.2	16.6	6.5	0.8	0.5	37.1	3.4	3 1E 420μ 1E 177μ 1E 500μ Transmitted	Cobs 50% v/s 50% Gr Tr Lime	Sorted medium-coarse grey	SAND
13	8.5	1.5	7.0	137.5	2.1	283.7	24.4	9.6	2.9	1.5	48.8	2.9	0	Pebs 70% v/s 1% Lime	Sorted coarse grey	GRAVEL
14	9.0	1.5	7.5	175.8	1.8	185.2	14.6	5.5	1.4	0.9	24.1	2.1	0	Pebs, granules 65% v/s 35% Gr	"	GRAVEL
15	7.5	0.4	7.1	108.3	2.1	138.2	9.2	2.8	3.9	2.2	17.9	5.7	0	Cobs 95% v/s	Unsorted grey with clay	TILL
21-01	8.0	1.5	6.5	180.6	3.7	204.3	15.6	5.0	6.2	3.2	50.3	12.3	0	Cobs 60% v/s 40% Gr	Unsorted grey-beige with clay	TILL
02	8.5	2.0	6.5	203.3	5.4	129.5	16.0	4.7	3.7	2.0	31.8	3.9	0	Cobs 60% v/s Tr Lime	"	TILL

OVERBURDEN DRILLING MANAGEMENT LIMITED
LABORATORY SAMPLE LOG

Sample Number	Weight (kg., wet)			Weight (grams, dry)									Grains	Description		Classification
	Table Split	+ 10 Rock Chips	− 10 Table Feed	Geochem Split		Table Conc.	Heavy Mineral Conc.				Mid Density Conc.		V.G.	+ 10	Matrix	
				Whole	− 63μ		+125μ Non-mag	+125μ Mag	−125μ Non-mag	−125μ Mag	+125μ	−125μ				
KLIP-81-21-03	9.0	1.5	7.5	254.7	2.0	194.7	24.3	7.7	4.7	2.8	39.4	6.9	O	Cobs 70% v/s Tr Lime	Unsorted grey beige with clay	TILL
04	8.0	2.0	6.0	209.4	9.9	189.7	23.0	6.9	7.1	3.8	47.0	5.0	O	Cobs 20% Gr 80% v/s Tr Lime	"	TILL
05	8.0	0.4	7.6	195.4	2.4	160.3	15.5	4.0	2.6	1.5	38.8	3,4	O	Cobs 40% Gr 60% v/s Tr Lime	"	TILL
06	6.9	1.9	5.0	222.5	3.4	131.5	9.9	2.6	2.5	1.0	25.8	5.2	O	Pebs 65% v/s 35% Gr	Unsorted grey-beige	TILL
07	1.8	0.7	1.1	136.0	3.3	64.2	3.0	0.8	1.1	0.3	8.8	3.1	O	Cobs 70% v/s 30% Gr	"	TILL
09	5.4	0.5	4.9	197.9	7.6	138.9	17.2	6.1	6.0	2.5	50.1	8.5	O	Cobs 95% v/s Tr Lime	Unsorted grey-green with clay	TILL
22-01	8.1	1.6	6.5	214.8	3.9	189.0	25.5	8.9	5.4	3.5	48.9	5.0	O	Cobs GCIs 85% v/s Tr Lime	Unsorted grey-beige with clay	TILL
04	7.3	1.2	6.1	199.5	3.4	179.0	16.5	6.3	2.7	1.8	47.5	4.3	O	Cobs 25% Gr 75% v/s Tr Lime	"	TILL
25-02	7.4	2.5	4.9	157.3	2.1	152.0	18.5	8.4	3.2	2.0	35.0	4.0	O	Cobs 70% v/s 30% Gr	"	TILL

APPENDIX D

BINOCULAR DESCRIPTIONS,

HEAVY (SG + 3.3) MINERAL CONCENTRATES

1980 SUMMER DRILLING

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-01-01C	28		4	6	8	28		poor	8 % emerald green material 15 % colourless vitreous mineral 3 % magnetite
01-01F	22			8	15	17		poor	14 % colourless vitreous mineral 24 % magnetite
01-02C	45			8	6	15	8	poor	15 % vitreous brown mineral 6 % magnetite
01-02F	48		1	5	20	9		poor	12 % emerald green material 3 % colourless vitreous mineral 2 % magnetite
01-03C	43		1	9	3	16		poor	24 % emerald green material 3 % colourless vitreous mineral
01-03F	23			22	16	11		poor	15 % emerald green material 8 % colourless vitreous mineral 5 % magnetite
01-04C									insufficient sample
01-04F	37		5	5	7	22		poor	1 % emerald green material 22 % colourless vitreous mineral
01-05C	52		2	3	2	19	5	poor	chalco pyrite (bornite?)(2%) 3 % colourless vitreous mineral 15 % magnetite
01-05F	18			9	.	9		poor	17 % emerald green material 46 % colourless vitreous mineral
01-06C	36		3	8		20	8	well	26 % emerald green material
01-06F	26			10	2	20		poor	30 % emerald green material 13 % colourless vitreous mineral
01-07C	39		2	4	6	15	4	well	15 % emerald green material 13 % colourless vitreous mineral
01-07F	30			3	3	19		poor	16 % emerald green material 28 % colourless vitreous mineral
01-08C	30		8		8	30	5	poor	11 % emerald green material 8 % colourless vitreous mineral
01-08F	24		4	9	6	13		poor	8 % emerald green material 36 % colourless vitreous mineral
01-09C	54		4	1	16	15	2	poor	2 % emerald green material 6 % colourless vitreous mineral
01-09F	20		2	12	8	21		poor	6 % emerald green material 30 % colourless vitreous mineral
01-10C	34		2	2	23	26		poor	2 % emerald green material 13 % colourless vitreous mineral
01-10F	30		4	4	17	29		poor	6 % emerald green material 10 % colourless vitreous mineral
01-11C	41		10	4	14	16	2	poor	4 % olivine 8 % colourless vitreous mineral
01-11F	36		2	4	8	21		poor	15 % emerald green material 13 % colourless vitreous mineral

Sample No.	%garnet	%hematitic	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-02-01C									
02-02C	38		1	3	28	23	2	poor	5 % magnetite
02-03C									
02-01F									
02-02F	36				16	27	11	poor	9 % colourless vitreous mineral
02-03F									
02-04C	48		4	1	23	8	4	poor	3 % emerald green material 4 % colourless vitreous mineral 5 % magnetite
02-04F	32				22	17	12	poor	7 % emerald green material 10 % colourless vitreous mineral
02-05C	39		1	2	29	22	1	well	2 % emerald green material 4 % colourless vitreous mineral
02-05F	26		10		20	14	12	poor	6 % emerald green material 10 % colourless vitreous mineral 1 % magnetite
02-06C	42		2	2	22	12	14	poor	4 % emerald green material 1 % colourless vitreous mineral
02-06F	29		6		12	25	8	poor	2 % emerald green material 17 % colourless vitreous mineral
02-07C	41		5		19	16		poor	5 % emerald green material 11 % colourless vitreous mineral 2 % magnetite
02-07F	28		6		11	13	2	poor	8 % emerald green material 31 % colourless vitreous mineral 1 % magnetite
02-08C	51			5	18	13	4	poor	9 % emerald green material
02-08F	25		2		20	27	5	poor	20 % colourless vitreous mineral 1 % magnetite
02-09C	51		1	2	13	18	2	poor	4 % emerald green material 3 % colourless vitreous mineral 4 % magnetite 1 % corundum
02-09F	35			5	12	1	23	poor	4 % emerald green material 18 % colourless vitreous mineral 1 % magnetite
02-10C	43				12	15	5	poor	5 % colourless vitreous mineral 20 % magnetite
02-10F	27			5	18	32	34	poor	2 % emerald green material 11 % colourless vitreous mineral 2 % magnetite
02-11C	53		1	2	14	17	1	poor	4 % emerald green material 1 % colourless vitreous mineral 3 % magnetite
02-11F	35			3	7	28	10	poor	4 % emerald green material 7 % colourless vitreous mineral 2 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-02-12 C	34			2	17	7	14	poor	12 % emerald green material 13 % magnetite
02-12 F	27		2	5	12	37	7	poor	2 % emerald green material 5 % colourless vitreous mineral 1 % magnetite
02-13C	56		2	2	17	12	1	poor	6 % emerald green material 3 % colourless vitreous mineral
02-13F	32		6	2	10	34	4	poor	2 % emerald green material 8 % colourless vitreous mineral 2 % magnetite
02-14C	44		1	2	20	11	1	poor	7 % emerald green material 6 % colourless vitreous mineral 8 % magnetite
02-14E	48		2	4	16	10	2	poor	5 % emerald green material 7 % colourless vitreous mineral 6 % magnetite
03-01C									
03-02C	31		2		24	19	9	poor	7 % emerald green material 7 % colourless vitreous mineral One 0.8mm clear spinel crystal
03-03C									
03-01F									
03-02F	27				32	28	3	poor	2 % emerald green material 7 % colourless vitreous mineral
03-03F									
03-04C									
03-05C	31		1		31	19	10	poor	3 % emerald green material 4 % colourless vitreous mineral
03-06C									
03-04F									
03-05F	35		1		22	25	4	poor	9 % emerald green material 17 % colourless vitreous mineral
03-06F									
03-07C	31		5	1	22	25	2	poor	4 % emerald green material
03-07F	21		9	7	21	21	2	poor	9 % emerald green material 11 % colourless vitreous mineral
03-08C	22		4		25	31	6	poor	4 % emerald green material 6 % colourless vitreous mineral 2 % magnetite
03-08F	19		2	3	22	42	3	poor	3 % emerald green material 12 % colourless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-03-09C	28			17	11	30	5	poor	5 % emerald green material 4 % colourless vitreous mineral
03-09F	18			2	9	48	4	poor	2 % emerald green material 16 % colourless vitreous mineral
03-10C	35		1		23	31	4	poor	6 % emerald green material 1 % magnetite
03-10F	21				12	65	5	poor	7 % emerald green material 11 % colourless vitreous
03-11C	45				18	23	5	poor	4 % emerald green material 5 % colourless vitreous mineral
03-11F	25			5	11	34	3	poor	3 % emerald green material 20 % colourless vitreous mineral
03-12C	21	3	3		27	44	2	poor	coarse crystalline pyrite
03-12F	20	3	1		19	46	10	poor	2 % magnetite
03-13C	21	5	1		31	40	1	poor	
03-13F	25	5	3		26	42		well	
03-14C	28	4	9		34	25		poor	granular pyrite pyrite with quartz
03-14F	21	5	1		23	43	3	well	4 % colourless vitreous mineral
03-15C	23	5	2		50	14	1	poor	5 % magnetite
03-15F	26	3	1		29	40	1	well	
04-01C	43	5	1		23	26	2	poor	
04-01F	21	2	1		35	41		well	
04-02C	27	4	3		33	33		poor	
04-02F	24	2	1		28	41	3	well	1 % emerald green material
04-03C	26	2	2		34	32	3	poor	
04-03F	19	2	1		33	35	7	well	2 % magnetite
04-04C	28	3	1		29	24	5	poor	1 % emerald green material 3 % colourless vitreous mineral 5 % magnetite
04-04F	22	3	1		23	31	6	well	9 % colourless vitreous mineral 4 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-04-05C	22	3	4		33	27	8	poor	2 % colourless vitreous mineral pyrite with quartz 1 % magnetite
04-05F	25	3	5		29	30	5	well	1 % emerald green material pyrite with quartz 2 % magnetite
04-06C	27	2	3		31	30	4	poor	pyrite with quartz 2 % magnetite
04-06F	22	5	1		32	28	7	well	1 % colourless vitreous mineral 3 % magnetite
04-07C	26	5	3		35	27	3	poor	1 % emerald green material 1 % colourless vitreous mineral
04-07F	24	3	2		25	36	5	well	1 % emerald green material 1 % colourless vitreous mineral 3 % magnetite
04-08C									
04-09C	20	3	4		35	33	2	poor	pyrite with quartz 2 % magnetite
04-10C									
04-08F									
04-09F	22	5	2		32	31	5	well	pyrite with quartz 3 % magnetite
04-10F									
04-11C									
04-12C	26	4	6		28	25	8	poor	pyrite with quartz 3 % magnetite
04-13C									
04-11F									
04-12F	24	3	3		21	37	6	well	1 % emerald green material pyrite with quartz 4 % magnetite
04-13F									
04-14C	22	6	6		29	30	5	poor	pyrite with quartz 1 % magnetite
04-14F	20	4	4		23	37	7	well	5 % pyrite with quartz magnetite
04-15C	24	4	4		25	38	3	poor	1 % pyrite with quartz magnetite
04-15F	22	3	4		21	36	9	well	4 % pyrite with quartz magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-04-16C	28	3	3		28	29	7	poor	1 % pyrite with quartz magnetite
04-16F	23	2	3		20	40	6	well	5 % pyrite with quartz magnetite
04-17C	27	2	3	1	28	33	4	poor	1 % pyrite with quartz magnetite
04-17F	23	1	6		25	35	5	well	5 % pyrite with quartz magnetite
04-18C	22	5	9		22	32	5	poor	5 % pyrite with quartz magnetite
04-18F	19	4	7		20	37	7	well	5 % pyrite with quartz magnetite
04-19C	25	5	7		25	31	6	poor	1 % pyrite with quartz magnetite
04-19F	24	4	8		19	34	8	well	3 % pyrite with quartz magnetite
04-20C	27	4	8		26	28	5	poor	2 % emerald green material pyrite with quartz
04-20F	25	5	7		25	28	6	well	3 % pyrite with quartz magnetite
04-21C	30	3	7		28	25	6	poor	4 % pyrite with quartz magnetite 2 % rock chip
04-21F	22	5	4		21	35	7	well	2 % emerald green material 3 % pyrite with quartz magnetite
04-22C	26	3	6		25	31	7	poor	2 % pyrite with quartz magnetite
04-22F	23	4	4		23	37	5	well	4 % pyrite with quartz magnetite
04-23C	27	3	5		32	30	3	poor	pyrite with quartz
04-23F	21	3	4		25	37	5	well	5 % pyrite with quartz magnetite
04-24C	29	5	5		32	29	1	poor	pyrite with quartz
04-24F	19	5	7		19	36	8	well	1 % emerald green material 5 % pyrite with quartz magnetite
04-25C	33	4	6		27	25	4	poor	1 % pyrite with quartz magnetite
04-25F	20	4	4		20	40	7	well	5 % pyrite with quartz magnetite
04-26C	31	5	8		33	14	7	poor	1 % colourless vitreous mineral 1 % pyrite with quartz magnetite
04-26F	21	1	8		19	36	9	well	1 % emerald green material 5 % pyrite with quartz magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-04-27C	30	3	8		27	25	4	poor	1 % pyrite with quartz rock chip 2 % magnetite
04-27F	19	4	9		19	34	9	well	pyrite with quartz 6 % magnetite
05-01C	33	3	1		35	23	3	poor	1 % magnetite
05-01F	26	4	2		23	28	10	well	1 % emerald green material 1 % colourless vitreous mineral pyrite with quartz 5 % magnetite
05-02C	33	8	1	1	34	19	3	poor	1 % magnetite
05-02F	20	3	7		18	33	12	well	1 % colourless vitreous mineral pyrite with quartz 6 % magnetite
06-01C	37	4	1		20	23	9	poor	1 % emerald green material 5 % magnetite
06-01F	23	4	2		21	31	11	well	2 % colourless vitreous mineral 6 % magnetite
06-02C	26	3	2		23	34	9	poor	pyrite with quartz 4 % magnetite
06-02F	21	4	1		19	42	6	well	2 % emerald green material 5 % magnetite
06-03C	26	3	1		24	35	5	poor	2 % emerald green material 4 % magnetite
06-03F	25	3	1		21	38	5	well	1 % colourless vitreous mineral 1 % rock chip 5 % magnetite
06-04C	27	3	1		25	32	7	poor	1 % colourless vitreous mineral 4 % magnetite
06-04F	25	3	1		21	34	8	well	1 % emerald green material 7 % magnetite
06-05C	29	4	2		25	31	5	poor	1 % emerald green material 3 % magnetite
06-05F	22	1	3		19	38	8	well	1 % emerald green material pyrite with quartz 8 % magnetite
06-06C	26	4	5		23	33	5	poor	1 % colourless vitreous mineral pyrite with quartz 3 % magnetite
06-06F	20	4	1		20	41	7	well	1 % rock chip 6 % magnetite
07-01C	29	5	4		25	27	5	poor	2 % emerald green material pyrite with quartz 4 % magnetite
07-01F	20	3	3		21	39	8	well	1 % emerald green material 1 % colourless vitreous mineral pyrite with quartz 4 % magnetite
07-02C	25	3	4		28	30	6	poor	1 % colourless vitreous mineral pyrite with quartz 3 % magnetite
07-02F	18	4	4		29	36	5	well	pyrite with quartz 4 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	% zircon group	sorting	Remarks
KLIP-80-07-03 C	24	5	3		27	30	8	poor	4 % pyrite with quartz magnetite
07-03 F	21	3	2		24	38	7	well	5 % pyrite with quartz magnetite
07-04C	31	6	4		27	25	3	poor	1 % emerald green material 2 % pyrite with quartz magnetite
07-04F	18	4	2		25	36	10	well	4 % pyrite with quartz magnetite
07-05C	25	4	7		26	25	10	poor	3 % pyrite with quartz magnetite
07-05F	23	4	5		20	37	8	well	3 % pyrite with quartz magnetite
07-06C	27	5	2	1	24	31	10	poor	pyrite with quartz
07-06F	18	1	4		17	43	11	well	1 % emerald green material 4 % magnetite
07-07C	27	4	2		30	25	10	poor	2 % pyrite with quartz magnetite
07-07F	19	5	3		22	38	6	well	3 % emerald green material 4 % magnetite
07-08C	30	7	5		27	25	4	poor	1 % pyrite with quartz magnetite
07-08F	17	1	4		20	43	5	well	1 % emerald green material 2 % colourless vitreous mineral 7 % magnetite
07-09C	29	4	8		33	25	1	poor	1 % pyrite with quartz magnetite
07-09F	20	4	2		18	39	6	well	2 % emerald green material 6 % pyrite with quartz magnetite
08-01C	35	4	1		31	26	2	poor	1 % magnetite
08-01F	23	2	1		20		7	well	4 % colourless vitreous mineral 5 % magnetite
08-02C	40	4	1		25	27		poor	1 % emerald green material 2 % colourless vitreous mineral
08-02F	24	4	tr.		19	40	8	well	1 % colourless vitreous mineral 5 % magnetite
08-03C	31	5	tr.		27	34	3	poor	1 % emerald green material
08-03F	22	5			18	38	8	well	2 % emerald green material 1 % rock chip 6 % magnetite
08-04C	27	8	5		23	28	5	poor	4 % pyrite with quartz magnetite
08-04F	25	5	1		24	37	5	well	3 % pyrite with quartz magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-08-05C	29	5	2		36	24	3	poor	1% emerald green material
08-05F	28	5	2		28	34		well	1 % colourless vitreous mineral 2 % magnetite
08-06C	36	7	4		38	15		poor	pyrite with quartz
08-06F	21	4	2		24	43	4	well	1 % rock chip 2 % magnetite
08-07C	33	8	5		30	21	3	poor	1 % emerald green material pyrite with quartz
08-07F	19	5	3		15	43	5	well	1 % emerald green material 6 % colourless vitreous mineral 3 % magnetite
08-08C	31	4	6		32	21	4	poor	pyrite with quartz 2 % magnetite
08-08F	28	4	2		30	25	6	well	1 % emerald green material 3 % magnetite
08-09C	29	4	7		25	24	8	poor	pyrite with quartz 3 % magnetite
08-09F	21	4	4		22	37	8	well	pyrite with quartz 4 % magnetite
08-10C	35	4	5		23	21	9	poor	1 % emerald green material pyrite with quartz 2 % magnetite
08-10F	27	5	5		24	30	6	well	pyrite with quartz 2 % magnetite
08-11C	30	5	5		34	21	3	poor	pyrite with quartz 1 % magnetite
08-11F	24	4	2		21	40	3	well	pyrite with quartz 5 % magnetite
08-12C	26	5	5		26	33	3	poor	1 % emerald green material pyrite with quartz 1 % magnetite
08-12F	27	4	5		23	34	2	well	pyrite with quartz 4 % magnetite
09-01C	24	4	4		25	39	4	poor	pyrite with quartz
09-01F	24	3	2		25	36	6	well	pyrite with quartz 4 % magnetite
09-02C	27	3	4		35	26	4	poor	pyrite with quartz 1 % magnetite
09-02F	21	3	2		20	42	5	well	1 % emerald green material pyrite with quartz 6 % magnetite
09-03C	31	1	tr.		36	24	6	poor	2 % magnetite
09-03F	26	2	1		26	32	5	well	2 % colourless vitreous mineral 5 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-09-04C	28	3			33	28	7	poor	1 % magnetite
09-04F	18	2	tr.		24	42	6	well	3 % emerald green material 6 % magnetite
09-05C	25	5	1		31	30	4	poor	2 % rock chip 2 % magnetite
09-05F	18	3			22	38	6	well	2 % emerald green material 4 % colourless vitreous mineral 6 % magnetite
09-06C	24	6	4		28	33	3	poor	1 % emerald green material pyrite with quartz
09-06F	16	3	1		22	43	7	well	1 % colourless vitreous mineral 6 % magnetite
09-07C	27	4	3		30	31	3	poor	pyrite with quartz 1 % magnetite
09-07F	20	3	2		20	41	6	well	1 % emerald green material 1 % colourless vitreous mineral 7 % magnetite
09-08C	26	4	4		27	31	4	poor	pyrite with quartz 3 % magnetite
09-08F	20	3			23	42	6	well	2 % emerald green material 4 % magnetite
09-09C	31	5	2		27	26	6	poor	pyrite with quartz 2 % magnetite
09-09F	21	4	2		25	37	7	well	pyrite with quartz 4 % magnetite
09-10C	27	3	1		21	31	5	poor	9 % colourless vitreous mineral 2 % magnetite
09-10F	20	3	1		23	38	8	well	2 % colourless vitreous mineral 4 % magnetite
09-11C	40	4		3	22	15	6	poor	1 % vitreous brown mineral 3 % colourless vitreous mineral 1 % hypersthene (grey green) 5 % magnetite
09-11F	13	21	1	4	25	4		well	9 % colourless vitreous mineral 23 % magnetite
09-12C	40	3	1		22	13	5	poor	1 % magnetite with quartz tr % pyrite with magnetite 5 % rock chip 10 % magnetite
09-12F	20	12	2	7	21	27	4	poor	pyrite with quartz 7 % magnetite
09-13C	5	9	1		20	13		well	4 % colourless vitreous mineral 3 % hypersthene (grey green) 3 % rock chip 3 % magnetite
09-13F	21	11	1	12	7	27	9	poor	9 % colourless vitreous mineral 2 % magnetite
09-14C	35	8	2	3	27	9	3	poor	5 % hypersthene (grey green) 5 % rock chip massive pyrite 3 % leucoxene
09-14F	11	7	1	1	16	33	2	poor	17 % colourless vitreous mineral 12 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-10-01C	25	6	7	1	36	11		poor	2 % emerald green material 4 % colourless vitreous mineral 5 % rock chip 3 % leucoxene
10-01F	26	6		8	40	3		poor	15 % colourless vitreous mineral 2 % magnetite
10-02C	28	5	6		37	10		poor	5 % emerald green material 5 % rock chip 4 % leucoxene
10-02F	28	9	2	20	11	5		poor	24 % colourless vitreous mineral
10-03C	29	5	10		34	14		well	5 % amphiboles (hornblende) 3 % hypersthene (grey green) 1 % rock chip
10-03F	28	6	1	19	17	3		poor	20 % colourless vitreous mineral 5 % magnetite
10-04C	26	10	6		42	16		poor	pyrite with epidote
10-04F	22	6	2		24	12	1	well	34 % colourless vitreous mineral 2 % magnetite
10-05C	28	5	9	3	32	14		poor	3 % amphiboles (hornblende) 3 % rock chip 1 % sphene 3 % magnetite
10-05F	23	18		6	26	4	1	poor	22 % colourless vitreous mineral 1 % magnetite
10-06C	26	3	8	2	36	15		poor	pyrite with epidote 2 % amphiboles (hornblende) 3 % rock chip 5 % magnetite
10-06F	32	.		4	27	21		poor	10 % colourless vitreous mineral 5 % magnetite
10-07C	25	5	5	1	36	15		poor	3 % amphiboles (hornblende) 1 % tourmaline 5 % rock chip 3 % magnetite
10-07F	19		2	18	29	19		poor	11 % colourless vitreous mineral 1 % magnetite
10-08C	20	10	3	5	37	14		well	5 % amphiboles (hornblende) 4 % colourless vitreous mineral 3 % magnetite
10-08F	23		2	12	4	4		poor	4 % emerald green material 50 % colourless vitreous mineral 2 % magnetite
10-09C	28				34	28	5	poor	2 % emerald green material 2 % colourless vitreous mineral 1 % magnetite
10-09F	29	2	2		32	17	5	poor	3 % emerald green material 8 % colourless vitreous mineral 2 % magnetite
10-10C	32	5	5	2	20	20	5	poor	8 % emerald green material 3 % colourless vitreous mineral
10-10F	18	1	5		31	25	3	poor	12 % emerald green material 5 % colourless vitreous mineral
10-11C	23		1		44	22	8	poor	2 % magnetite
10-11F	9	3	3		28	28	3	poor	3 % emerald green material 24 % colourless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-11-01C	35		4		31	11	4	poor	4 % emerald green material 8 % colourless vitreous mineral
11-01F	32			1	25	15	12	poor	4 % emerald green material 9 % colourless vitreous mineral 1 % magnetite
11-02C	43			1	22	14	14	poor	4 % emerald green material 2 % magnetite
11-02F	41			2	25	11	3	poor	8 % emerald green material 10 % colourless vitreous mineral
11-03C	38	3			26	14	13	poor	5 % emerald green material
11-03F	15		2	2	24	36	5	poor	2 % emerald green material 9 % colourless vitreous mineral 5 % magnetite
11-04C	38		2	3	26	10	12	poor	3 % emerald green material 3 % colourless vitreous mineral 2 % magnetite
11-04F	30		4		27	15	15	poor	9 % emerald green material 9 % colourless vitreous mineral 2 % magnetite
11-05C	27	1			25	16	24	poor	4 % emerald green material 3 % colourless vitreous mineral
11-05F	32		2		19	24	7	poor	5 % emerald green material 11 % colourless vitreous mineral
11-06C	18				18	41	4	poor	11 % emerald green material 6 % colourless vitreous mineral 1 % magnetite
11-06F	19	2			11	26	2	poor	15 % emerald green material 26 % colourless vitreous mineral
11-07C	17				11	50	4	poor	4 % emerald green material 15 % colourless vitreous mineral
11-07F	23				11	22	3	poor	6 % emerald green material 34 % colourless vitreous mineral
11-08C	19				16	41	6	poor	3 % emerald green material 16 % colourless vitreous mineral
11-08F	16	2	2		16	27	4	well	7 % emerald green material 27 % colourless vitreous mineral
11-09C	40	1	1		22	22	9	poor	3 % emerald green material 2 % colourless vitreous mineral
11-09F	31	1			21	34	3	poor	3 % emerald green material 8 % colourless vitreous mineral
11-10C	39	1	1		24	15	18	poor	2 % emerald green material 2 % colourless vitreous mineral 2 % magnetite
11-10F	19				21	28	3	poor	12 % emerald green material 17 % colourless vitreous mineral
12-01C	48				26	17	4	poor	4 % colourless vitreous mineral
12-01F	28				16	32	9	poor	6 % emerald green material 9 % colourless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-12-02 C	39		2	2	23	13	14	poor	6 % emerald green material 2 % colourless vitreous mineral
12-02 F	31		1		12	30	2	poor	15 % emerald green material 8 % colourless vitreous mineral
12-03 C	30	3		1	39	20	4	poor	3 % emerald green material
12-03 F	32	1			17	27	4	poor	6 % emerald green material 14 % colourless vitreous mineral
12-04 C	36	1			27	16	11	poor	3 % emerald green material 4 % colourless vitreous mineral
12-04 F	21	1			17	43	2	well	2 % emerald green material 11 % colourless vitreous mineral 3 % magnetite
12-05 C	35	2			21	14	12	poor	4 % emerald green material 10 % colourless vitreous mineral
12-05 F	25	2			21	33	8	well	4 % colourless vitreous mineral 6 % magnetite
12-06 C	27	4	2		25	18	7	poor	pyrite with carbonate 9 % emerald green material 5 % colourless vitreous mineral 3 % magnetite
12-06 F	26		1	1	21	29	12	poor	2 % emerald green material 4 % colourless vitreous mineral 4 % magnetite
12-07 C	24	2			40	14	5	poor	12 % emerald green material 36 % colourless vitreous mineral 4 % magnetite
12-07 F	20	3		1	31	15	14	well	6 % emerald green material 3 % colourless vitreous mineral 7 % magnetite
12-08 C	32	7	10		12	23	8	poor	massive pyrite 3 % emerald green material 3 % colourless vitreous mineral 2 % magnetite
12-08 F	27	2			25	29	9	well	2 % emerald green material 2 % colourless vitreous mineral 3 % magnetite
12-09 C	36	2	12		20	15	8	poor	5 % emerald green material 3 % colourless vitreous mineral massive pyrite
12-09 F	12	1			20	36	4	well	13 % emerald green material 11 % colourless vitreous mineral 2 % magnetite
12-10 C	21	5	8		32	26	3	poor	1 % emerald green material 4 % colourless vitreous mineral massive pyrite pyrite with epidote
12-10 F	26	3	4	2	21	27	8	well	4 % colourless vitreous mineral massive pyrite 5 % magnetite
12-11 C	19	3	11		25	28	7	poor	coarse crystalline pyrite 3 % emerald green material 3 % rock chip
12-11 F	16	2	10		23	34	5	poor	3 % emerald green material 6 % colourless vitreous mineral massive pyrite
12-12 C	24		1		31	21	6	poor	2 % emerald green material 4 % colourless vitreous mineral 5 % magnetite 6 % hypersthene (grey green)
12-12 F	25		9		21	34	3	poor	2 % emerald green material 4 % colourless vitreous mineral 2 % magnetite massive pyrite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	Sorting	Remarks
KLIP-80-12-13 C	19	2	6		29	31	6	well	5 % emerald green material 2 % colourless vitreous mineral massive pyrite
12-13 F	19	2	4	2	30	35	3	well	2 % emerald green material 3 % colourless vitreous mineral massive pyrite
13-01 C	31				28	23	8	poor	6 % colourless vitreous mineral 5 % rock chip
13-01 F	26	1			23	37	3	poor	1 % emerald green material 9 % colourless vitreous mineral
13-02 C	14	3	7	1	34	25	6	poor	2 % emerald green material 8 % colourless vitreous mineral massive pyrite
13-02 F	18	2			33	27	6	well	1 % emerald green material 8 % colourless vitreous mineral 4 % magnetite
14-01 C	15	3	7		27	28	3	poor	8 % colourless vitreous mineral massive pyrite 6 % rock chip 3 % magnetite
14-01 F	20	1	3		25	34	6	well	6 % colourless vitreous mineral massive pyrite 5 % magnetite
14-02 C	21	2	6	1	33	27	2	poor	2 % emerald green material 2 % colourless vitreous mineral massive pyrite 2 % magnetite
14-02 F	26	3	4		30	23	5	poor	3 % colourless vitreous mineral massive pyrite 5 % magnetite
15-01 C	20	1	5		34	24	3	well	3 % emerald green material massive pyrite 6 % rock chip 3 % magnetite
15-01 F	14	2	5		43	22	11	well	pyrite bearing rock chips 2 % colourless vitreous mineral massive pyrite 1 % magnetite
15-02 C	18	3	3	1	26	30	10	poor	1 % emerald green material 4 % colourless vitreous mineral massive pyrite 3 % magnetite
15-02 F	15	1			30	32	15	well	1 % emerald green material 3 % colourless vitreous mineral 2 % magnetite
15-03 C	18	2	9		30	25	9	poor	2 % emerald green material 4 % colourless vitreous mineral pyrite with quartz massive pyrite
15-03 F	15	3	6		27	32	13	well	1 % emerald green material massive pyrite 3 % magnetite
15-04 C	24	3	7		29	27	3	poor	2 % colourless vitreous mineral massive pyrite 5 % magnetite
15-04 F	17	1	3	2	24	33	13	poor	5 % colourless vitreous mineral massive pyrite 2 % magnetite
15-05C	18	5	5		26	23	7	poor	4 % colourless vitreous mineral massive pyrite 8 % rock chip 4 % magnetite
15-05F	17		7		34	29	4	well	4 % colourless vitreous mineral massive pyrite 3 % rock chip 2 % magnetite
15-06C	14	6	9		32	23	7	poor	pyrite with magnetite massive pyrite 5 % rock chip 3 % magnetite
15-06F	20	4	1		30	27	7	well	4 % emerald green material 4 % colourless vitreous mineral 2 % rock chip 2 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	Sorting	Remarks
KLIP-80-15-07C	17	6	2		40	29	2	poor	4 % colourless vitreous mineral
15-07F	25	2	tr.		21	29	8	well	4 % emerald green material 12 % colourless vitreous mineral
15-08C	25	3	4		32	17	5	poor	6 % emerald green material 7 % colourless vitreous mineral 1 % rock chip
15-08F	21	2	tr.		28	29	5	well	3 % emerald green material 9 % colourless vitreous mineral 2 % hypersthene (grey green)
15-09C	34	1	1		27	22	6	poor	5 % emerald green material 3 % colourless vitreous mineral 1 % magnetite
15-09F	23	1	1		27	31	5	well	6 % emerald green material 6 % colourless vitreous mineral
15-10C	47	2	2		27	11	6	poor	3 % emerald green material 2 % colourless vitreous mineral
15-10F	34				35	25	4	well	2 % emerald green material 2 % colourless vitreous mineral
15-11C	49	2	2		19	15	3	poor	6 % emerald green material 1 % colourless vitreous mineral 2 % feldspar
15-11F	34	1	11		.	19	3	well	limonitized pyrite
15-12C	36	13	8		11	17	4	poor	10 % emerald green material pyrite with quartz
15-12F	31	6	1		22	32	3	well	3 % emerald green material 1 % colourless vitreous mineral
15-13C	42		3		28	13	4	poor	5 % emerald green material 2 % colourless vitreous mineral 2 % quartz
15-13F	22	1			16	22	9	well	2 % emerald green material 4 % colourless vitreous mineral
15-14C	32	2	5		34	17	7	poor	3 % colourless vitreous mineral
15-14F	35		4		21	27	4	well	3 % emerald green material 6 % colourless vitreous mineral 1 % quartz
15-15C	36	1	4		32	13	7	poor	4 % rusty light mineral 1 % magnetite with quartz pyrrhotite (3%)
15-15F	35		tr.		16	24	11	well	5 % emerald green material 8 % colourless vitreous mineral coarse crystalline pyrite
15-16C	14		7		23	25	19	poor	7 % emerald green material 2 % magnetite 2 % olivine
15-16F	12	2	2		17	22	28	well	6 % emerald green material 7 % colourless vitreous mineral 1 % rusty light mineral
16-01C	31	1	3		18	17	15	poor	11 % emerald green material 2 % magnetite with quartz 3 % magnetite
16-01F	24		1		15	12	19	well	16 % emerald green material 5 % colourless vitreous mineral 4 % rusty light mineral 2 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-17-01C	49	1	2		28	10	5	poor	4 % emerald green material 1 % colourless vitreous mineral
17-01F	23		tr.		20	30	6	well	2 % emerald green material 8 % colourless vitreous mineral
17-02C	40		5		17	18	16	poor	2 % emerald green material pyrite with epidote 4 % rusty light mineral
17-02F	28	1	1		23	24	10	well	5 % emerald green material 6 % colourless vitreous mineral 3 % rusty light mineral
18-01C	53	1			16	17	8	poor	2 % emerald green material 1 % rock chip 1 % magnetite
18-01F	29		tr.		18	32	8	well	4 % emerald green material 6 % colourless vitreous mineral 1 % magnetite
18-02C	47	2	tr.		20	15	10	poor	4 % emerald green material 1 % magnetite
18-02F	19	1			18	29	13	well	5 % emerald green material 14 % colourless vitreous mineral 1 % magnetite
18-03C	36	1	tr.		22	22	8	poor	6 % emerald green material 1 % colourless vitreous mineral 3 % rusty light mineral 1 % magnetite
18-03F	31				19	24	7	well	4 % emerald green material 15 % colourless vitreous mineral
18-04C	41	1	tr.		24	13	11	poor	1 % emerald green material 1 % colourless vitreous mineral 7 % rusty light mineral
18-04F	31	2			11	33	11	well	2 % emerald green material 7 % colourless vitreous mineral 3 % rusty light mineral
19-01C	19	4	5		30	25	12	poor	1 % emerald green material 3 % colourless vitreous mineral pyrite with quartz
19-01F	21	4	5		31	20	12	well	2 % colourless vitreous mineral pyrite with quartz 5 % rock chip
20-01C	27	3	2		31	16	11	poor	1 % emerald green material 2 % colourless vitreous mineral 6 % rock chip
20-01F	24	2	1		30	21	12	well	1 % emerald green material 3 % colourless vitreous mineral 4 % rock chip
21-01C	22	3	1	1	29	24	8	poor	5 % colourless vitreous mineral massive pyrite 6 % rock chip
21-01F	21	3	2		33	23	13	well	2 % emerald green material 3 % colourless vitreous mineral massive pyrite
22-01C	21	3	6		25	18	20	poor	1 % emerald green material 3 % colourless vitreous mineral 1 % rusty light mineral pyrite with quartz
22-01F	20	4	5	1	29	22	14	well	1 % emerald green material 2 % colourless vitreous mineral 1 % rusty light mineral pyrite with quartz
22-02C	19	3	7		29	26	12	poor	2 % colourless vitreous mineral 2 % rusty light mineral massive pyrite
22-02F	17	2	1		31	28	12	well	2 % emerald green material 3 % colourless vitreous mineral 2 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-23-01 C	15	3	7		30	28	9	poor	2 % colourless vitreous mineral 1 % rusty, light mineral massive pyrite 4 % magnetite
23-01 F	16	2	4		30	31	11	well	1 % emerald green material 2 % colourless vitreous mineral massive pyrite 2 % magnetite
24-01 C	10	5	32	1	14	20	4	poor	pyrite bearing rock chips pyrite with quartz massive pyrite
									15 % magnetite chalcopyrite (tr.)
24-01 F	13	5	11		26	34	7	well	pyrite with quartz massive pyrite 3 % magnetite
24-02 C	17	6	19		23	26	7	poor	pyrite with quartz massive pyrite limonitized pyrite
									2 % magnetite chalcopyrite (tr.)
24-02 F	19	4	5		31	26	6	well	2 % emerald green material 7 % colourless vitreous mineral massive pyrite 1 % magnetite
24-03 C	20	5	19		31	13	8	poor	3 % colourless vitreous mineral pyrite with quartz massive pyrite 5 % magnetite
24-03 F	15	4	5		29	26	14	well	6 % colourless vitreous mineral massive pyrite 1 % magnetite
25-01 C	20	3	6		28	26	10	poor	1 % emerald green material 2 % colourless vitreous mineral massive pyrite 4 % magnetite
25-01 F	15	2	5		31	32	12	well	2 % colourless vitreous mineral massive pyrite 1 % magnetite
26-01 C	21	3	10		24	28	8	poor	1 % emerald green material 3 % colourless vitreous mineral pyrite with quartz massive pyrite
26-01 F	27	2	4		24	27	12	well	2 % emerald green material 1 % colourless vitreous mineral 2 % massive pyrite
27-01 C	28	4	5		26	14	14	poor	5 % emerald green material 3 % colourless vitreous mineral 2 % magnetite
27-01 F	24	2	2		14	38	6	well	2 % emerald green material 11 % colourless vitreous mineral 1 % magnetite
28-01 C	38	3	tr.		19	26	7	well	3 % emerald green material 3 % colourless vitreous mineral granular pyrite tr. magnetite
28-01 F	27				21	30	6	well	4 % emerald green material 12 % colourless vitreous mineral
28-02 C	20	1			34	30	11	well	3 % emerald green material 1 % magnetite
28-02 F	26				26	24	9	well	9 % emerald green material 6 % colourless vitreous mineral 1 % magnetite
29-01 C	34	2			25	27	5	poor	2 % emerald green material 3 % colourless vitreous mineral 2 % magnetite
29-01 F	17	1			27	33	5	poor	7 % emerald green material 10 % colourless vitreous mineral tr. magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	Sorting	Remarks
KLIP-80-29-02C	35			1	31	19	9	well	2 % emerald green material 2 % colourless vitreous mineral tr. magnetite
29-02F	21				34	24	4	well	9 % emerald green material 8 % colourless vitreous mineral
30-01C	27	2			22	17	14	well	17 % emerald green material tr. magnetite
30-01F	37				13	20	10	well	15 % emerald green material 6 % colourless vitreous mineral
31-01C	41				20	20	6	poor	5 % emerald green material 8 % colourless vitreous mineral 1 % magnetite
31-01F	13				20	45	8	well	7 % emerald green material 7 % colourless vitreous mineral
31-01AC	25				32	20	14	well	4 % emerald green material 1 % colourless vitreous mineral 3 % magnetite
31-01AF	24				22	33	4	well	4 % emerald green material 12 % colourless vitreous mineral
32-01C	17	2	17		10	51		poor	pyrite bearing rock chips
32-01F	12	1	4		36	20	4	well	22 % emerald green material
34-01C	24		6		26	23	14	poor	6 % emerald green material 1 % amphiboles (hornblende) pyrite with carbonate
34-01F	11	1	2		6	63	8	poor	5 % emerald green material 4 % colourless vitreous mineral 1 % magnetite
34-02C	36	1	2		16	29	13	well	3 % colourless vitreous mineral
34-02F	20				17	27	24	well	6 % emerald green material 6 % colourless vitreous mineral 2 % magnetite
35-01C	28		7		22	24	12	well	2 % emerald green material 4 % colourless vitreous mineral
35-01F	23		2		17	26	7	well	7 % emerald green material 17 % colourless vitreous mineral
35-02C	33		2		16	29	18	well	2 % colourless vitreous mineral
35-02F	28				30	17	5	well	12 % emerald green material 7 % colourless vitreous mineral
36-01C	37	2			16	26	5	well	6 % emerald green material 8 % colourless vitreous mineral
36-01F	18				23	37	10	poor	12 % emerald green material
36-02C	35				28	15	19	well	2 % emerald green material 1 % colourless vitreous mineral
36-02F	24			1	26	17	15	poor	9 % emerald green material 7 % colourless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-36-03C	22				24	24	11	well	19 % emerald green material
36-03 F	27				31	28	3	well	6 % emerald green material 4 % colourless vitreous mineral
38-01C	12	9	21		27	9	6	poor	9 % emerald green material 2 % colourless vitreous mineral 4 % magnetite
38-01F	12				33	12	20	well	6 % emerald green material 18 % colourless vitreous mineral
39-01 C	22	1	1		14	23	12	poor	23 % emerald green material 3 % colourless vitreous mineral
39-01F	13			2	21	19	9	well	13 % emerald green material 23 % colourless vitreous mineral
39-02C	20				37	14	12	poor	14 % emerald green material 3 % colourless vitreous mineral
39-02 F	18	1	3		18	31	5	well	9 % emerald green material 14 % colourless vitreous mineral
39-03C	24	2			22	19	10	poor	15 % emerald green material 3 % colourless vitreous mineral 3 % rusty light mineral
39-03F	13	2			13	24	11	well	31 % emerald green material 3 % colourless vitreous mineral 2 % rusty light mineral
41-01C	6	4	12		23	25	10	poor	6 % emerald green material 8 % rusty light mineral 2 % magnetite
41-01F	13	3	9		42	10	6	poor	10 % emerald green material 4 % colourless vitreous mineral 2 % magnetite
41-02C	7	1	48		22	2	5	well	7 % emerald green material 2 % colourless vitreous mineral 2 % rusty light mineral 3 % magnetite
41-02F	9	2	24		42	5	2	well	7 % emerald green material 7 % colourless vitreous mineral
41-03C	19	4	3		6	41	6	well	15 % emerald green material 4 % rusty light mineral
41-03F	11	3	8		27	14	3	poor	21 % emerald green material 6 % colourless vitreous mineral 1 % rusty light mineral
42-01C	8	1	9		41	14	4	poor	18 % emerald green material 2 % rusty light mineral 1 % rock chip
42-01F	16	2	4		23	15	10	well	17 % emerald green material 12 % colourless vitreous mineral
43-01C									NO SAMPLE
43-01F	16				7	21	12	well	41 % emerald green material 2 % colourless vitreous mineral
44-01C	20	2	7		27	14	16	poor	7 % emerald green material 2 % colourless vitreous mineral 2 % rusty light mineral with pyrite epidote
44-01F	18	2	3		21	18	16	well	7 % emerald green material 15 % colourless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-45-01C	25	2	1		33	14	11	well	8 % emerald green material 4 % colourless vitreous mineral
45-01F	24		1		26	33	4	well	11 % colourless vitreous mineral
46-01C	1		4		7	85	3	poor	pyrite bearing rock chips
46-01F	16	2	2		9	13	9	well	38 % emerald green material 9 % colourless vitreous mineral
47-01C	15		13		37	20	6	poor	7 % emerald green material 2 % colourless vitreous mineral
47-01F	14		5		28	25	12	well	2 % emerald green material 15 % colourless vitreous mineral
47-02C	19	4	15		11	4	8	well	9 % emerald green material 1 % colourless vitreous mineral 10 % rusty light mineral 10 % magnetite
47-02F	18		8		6	26	6	poor	14 % emerald green material 20 % colourless vitreous mineral 8 % rusty light mineral
48-01C	28	4			26	19	12	poor	6 % emerald green material 3 % colourless vitreous mineral 2 % magnetite
48-01F	14		tr.		41	16	11	well	5 % emerald green material 13 % colourless vitreous mineral
48-02C	31		tr.		18	18	16	poor	8 % emerald green material 5 % colourless vitreous mineral 1 % rock chip
48-02F	17		tr.		44	12	10	well	7 % emerald green material 10 % colourless vitreous mineral
48-03C	27				22	25	19	poor	4 % colourless vitreous mineral 1 % rock chip 1 % quartz
48-03F	26	1			17	21	18	poor	6 % emerald green material 9 % colourless vitreous mineral
48-04C	28	2			17	24	19	poor	1 % emerald green material 5 % colourless vitreous mineral 3 % magnetite
48-04F	27	1			22	23	18	well	3 % emerald green material 3 % colourless vitreous mineral 2 % magnetite
48-05C	16	3			33	22	12	poor	5 % colourless vitreous mineral 7 % rock chip 2 % magnetite
48-05F	26	2			28	23	9	well	3 % emerald green material 6 % colourless vitreous mineral 3 % magnetite
48-06C	21	1			32	22	13	well	1 % emerald green material 4 % colourless vitreous mineral 5 % magnetite
48-06F	22	3			26	24	14	well	3 % emerald green material 5 % colourless vitreous mineral 2 % magnetite
48-07C	21	3	4		27	24	10	poor	3 % emerald green material 6 % colourless vitreous mineral pyrite with quartz
48-07F	18	3	1		32	26	11	well	1 % emerald green material 4 % colourless vitreous mineral 3 % rock chip

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-80-49-01C	14	2			42	28	16	poor	5 % emerald green material 4 % colourless vitreous mineral 1 % magnetite
49-01F	16	2			32	23	19	well	2 % emerald green material 4 % colourless vitreous mineral 1 % magnetite
49-02C	17	2		1	32	26	13	poor	4 % emerald green material 2 % colourless vitreous mineral 2 % magnetite
49-02F	16	1			33	25	17	well	5 % emerald green material 4 % colourless vitreous mineral 3 % magnetite
49-03C	20	4	14		25	21	9	poor	3 % emerald green material 4 % colourless vitreous mineral pyrite with quartz massive pyrite
49-03F	21	3	4		32	24	10	poor	3 % emerald green material 2 % colourless vitreous mineral
49-04C	19	3	10		32	25	9	poor	2 % colourless vitreous mineral pyrite with quartz massive pyrite
49-04F	18	3	7		34	27	9	well	4 % colourless vitreous mineral massive pyrite
49-05C	15	4	12		28	25	9	poor	1 % colourless vitreous mineral pyrite with quartz massive pyrite 5 % magnetite
49-05F	17	4	6		26	28	12	well	3 % colourless vitreous mineral massive pyrite 4 % magnetite
49-06C	16	2	8		31	27	12	poor	1 % emerald green material massive pyrite 3 % magnetite
49-06F	17	4	4		32	26	10	well	4 % emerald green material massive pyrite 4 % magnetite
51-01C	9	6	37		21	18	4	poor	5 % coarse crystalline pyrite pyrite with quartz massive pyrite
									4 % magnetite chalcopyrite (tr)
51-01F	8	6	27		26	22	7	well	2 % emerald green material massive pyrite 2 % magnetite
52-01C	6	5	29		26	27	7	poor	coarse crystalline pyrite massive pyrite 1 % magnetite
52-01F	7	4	18		27	30	6	well	2 % emerald green material 2 % colourless vitreous mineral massive pyrite 3 % magnetite
541-01C	11	5	17	1	26	19	8	poor	pyrite with magnetite massive pyrite 8 % rock chip 5 % magnetite
541-01F	11	4	7		34	23	9	well	4 % emerald green material 5 % colourless vitreous mineral 3 % magnetite
541-02C	13	5	5		29	21	12	poor	2 % emerald green material pyrite with magnetite 5 % rock chip 7 % magnetite
541-02F	11	4	6		31	23	13	well	4 % emerald green material pyrite with magnetite 4 % rock chip 4 % magnetite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	Sorting	Remarks
KLIP-80-541-03C	11	3	1		36	26	14	poor	3 % emerald green material 2 % rock chip 4 % magnetite
541-03F	10	3	3		34	27	14	well	3 % emerald green material 2 % rock chip 4 % magnetite
541-04C	8	5	13		32	25	13	poor	pyrite with quartz massive pyrite 5 % rock chip
541-04F	9	4	5		31	24	13	well	4 % emerald green material pyrite with quartz 6 % rock chip 4 % magnetite

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Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-02-01C	28		4	3	11	27	17	poor	2% Magnetite 1% colorless vitreous mineral 3% sphene 4% emerald green material
02-01F	28	1	5	12	12	39	3	poor	1% magnetite 4% emerald green material 6% colorless vitreous mineral
02-02C	40	2	8		12	20	10	poor	6% emerald green material 2% colorless vitreous mineral
02-02F	24		9		11	35	6	poor	10% colorless vitreous mineral 1% sphene 2% magnetite 3% emerald green material
02-03C	29	2	5		23	27	7	poor	4% sphene 2% emerald green material 1% magnetite
02-03F	36		8		11	22	14	well	6% emerald green material 3% sphene
02-04C	45				10	34	10	poor	2% magnetite arsenopyrite present leucoxene present
02-04F	32		3		13	29	8	poor	14% colorless vitreous mineral 1% emerald green material
03-01C	32				7	44	2	poor	2% magnetite 3% spodumene 6% emerald green material 6% colorless vitreous mineral
03-01F	19	1			16	45	8	well	1% magnetite 2% emerald green material 8% colorless vitreous mineral
03-02C	24		1		13	45	8	poor	2% magnetite 3% emerald green material 5% colorless vitreous mineral coarse & fine pyrite
03-02F	13		1		22	31	11	well	1% magnetite 8% emerald green material 10% colorless vitreous mineral 2% spodumene coarse & fine pyrite
03-03C	24				15	24	15	poor	9% sphene 6% emerald green material 6% colorless vitreous mineral
03-03F	31				17	34	2	poor	16% colorless vitreous mineral
04-01C	27				33	31	6	poor	1% magnetite 3% emerald green material
04-01F	34		2		22	34	6	poor	.5% magnetite 2% emerald green material
04-02C	19	6	1		23	22	7	poor	22% emerald green material (pyroxene)
04-02F	31				15	41	10	well	2% emerald green material (Cr diopside)
05-01C	31				10	38	6	poor	8% sphene 4% emerald green material 4% colorless vitreous mineral
05-01F	31	2			17	37	4	poor	3% sphene 5% emerald green material
05-02C	21	2			24	29	17	well	4% sphene 3% emerald green material
05-02F	13				8	55	11	well	2% sphene 2% emerald green material 9% colorless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-05-03C	29		2		9	49	7	poor	4% sphene
05-03F	24				13	42	10	well	12% colorless vitreous mineral
05-04C	42	tr			1	38	15	poor	1% emerald green material 3% colorless vitreous mineral
05-04F	21				9	50	9	well	2% emerald green material 10% colorless vitreous mineral
05-05C	29	1	1		1	63	4	poor	tr chalcopyrite 1% magnetite 1% colorless vitreous mineral tr calcite(carbonate)
05-05F	26		3	4	4	60	4	well	1% magnetite tr chalcopyrite
05-06C	23	2	2		2	42	5	poor	13% magnetite 10% rock chips tr pyrite with carbonate
05-06F	22		3	1	7	50	8	well	2% magnetite 7% colorless vitreous mineral fine & massive pyrite
05-07C	26				5	46	9	poor	13% magnetite 1% colorless vitreous mineral
05-07F	7	1		1	2	55	13	well	1% magnetite 19% colorless vitreous mineral
05-08C	22		2	1	1	44	10	poor	9% magnetite 12% colorless vitreous mineral massive pyrite
05-08F	10	2	2	1	9	48	21	well	2% magnetite 5% colorless vitreous mineral fine & massive pyrite
05-09C	17	2	3		2	48	15	poor	10% magnetite 4% colorless vitreous mineral fine & massive pyrite
05-09F	18	3	8		5	38	23	well	1% magnetite 6% colorless vitreous mineral
05-10C	33				5	43	10	poor	6% magnetite 3% colorless vitreous mineral
05-10F	28			1	5	54	6	well	1% magnetite 5% colorless vitreous mineral
05-11C	23	2	1		3	58	7	poor	4% magnetite 3% colorless vitreous mineral tr fine pyrite
05-11F	24			1	13	47	11	well	1% magnetite 3% colorless vitreous mineral
05-12C	9	1	36		1	27	8	poor	9% magnetite 9% colorless vitreous mineral tr calcite (carbonate) fine & massive pyrite
05-12F	15	2	27		8	25	8	well	2% magnetite 13% colorless vitreous mineral tr calcite(carbonate) fine & massive pyrite
06-01C	44		3		4	34	5	poor	8% magnetite 3% colorless vitreous mineral fine & massive pyrite
06-01F	32				3	47	6	well	1% magnetite 11% colorless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-06-02C	49			1	3	33	10	well	3% magnetite 2% emerald green material
06-02F	41				4	41	4	well	1% magnetite 9% colorless vitreous mineral
06-03C	45				2	42	6	well	3% magnetite 2% colorless vitreous mineral
06-03F	41	1			5	41	4	well	1% magnetite 5% colorless vitreous mineral 2% emerald green material
06-04C	49				4	35	5	well	2% magnetite 1% colorless vitreous mineral 3% emerald green material
06-04F	31				6	42	2	well	2% magnetite 13% colorless vitreous mineral 4% emerald green material
06-05C	48				2	36	7	well	2% magnetite 5% colorless vitreous mineral
06-05F	42				5	34	6	well	2% magnetite 11% colorless vitreous mineral
06-06C	48		1		2	39	6	well	2% magnetite 3% colorless vitreous mineral
06-06F	26	1			12	45	10	poor	4% colorless vitreous mineral
06-07C	50	2			12	26	10	poor	
06-07F	30	1			8	45	7	well	8% colorless vitreous mineral
06-08C	27	10	7		10	30	14	poor	3% colorless vitreous mineral
06-08F	23	9	3		22	29	8	well	6% colorless vitreous mineral
06-09C	32		3		18	25	20	poor	2% colorless vitreous mineral
06-09F	43	2	2		7	36	5	well	5% colorless vitreous mineral
06-10C	12				8	56	16	poor	8% sphene
06-10F	11				2	22	59	poor	6% colorless vitreous mineral
07-01C	39		tr		16	26	16	poor	3% sphere pyrite
07-01F	16	2			24	45	13	well	
07-02C	55		tr		13	26	6	well	pyrite
07-02F	18				8	69	3	poor	1% emerald green material

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-07-03C	56				6	24	12	well	2% sphene
07-03F	9				4	77	6	poor	4% sphene
07-04C	34		7	2	18	27	7	poor	5% sphene
07-04F	25				1	65	7	poor	1% sphene
07-05C	54				14	22	7	well	4% sphene
07-05F	39				6	47	5	well	2% sphene
07-06C	32				4	31	32	poor	
07-06F	16				9	45	12	well	3% sphene 14% colorless vitreous mineral
07-07C	19		5		9	58	7	poor	2% emerald green material tr pyrite bearing rock chips
07-07F	29	2	10		8	20	20	well	12% colorless vitreous mineral
07-08C	48		7		8	34	2	poor	1% magnetite
07-08F	19		3		15	45	9	well	9% colorless vitreous mineral
07-09C	63				4	26	7	poor	
07-09F	28	3			13	34	16	well	5% colorless vitreous mineral
08-01C	29	3			6	38	18	poor	6% emerald green material
08-01F	16				30	38	5	well	10% colorless vitreous mineral 1% emerald green material
08-02C	15		1		16	41	4	well	20% colorless vitreous mineral 2% sphene abundant granular pyrite & pyrite with carbonate
08-02F	32		2		11	25	5	well	21% colorless vitreous mineral 5% emerald green material
08-03C	39		60		14	19	7	poor	abundant granular pyrite & pyrite with carbonate
08-03F	35	2	2		12	49		poor	
08-04C	46		10		16	22	6	poor	tr sphene pyrite with carbonate
08-04F	16				13	53	5	well	1% sphene 12% colorless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-08-05C	53		4		12	22	8	well	tr pyrite with carbonate
08-05F	40		8			36	6	well	1% sphene 10% colorless vitreous mineral
08-06C	32	3	8		16	13	13	poor	5% colorless vitreous mineral 8% sphene 3% emerald green material
08-06F	23		4		19	39	5	well	11% colorless vitreous mineral
08-07C	53	4	4		9	20	1	poor	8% emerald green material
08-07F	22	2			15	37	12	well	12% colorless vitreous mineral
08-08C	24	4			11	62		well	
08-08F	13	2	5		2	52		well	26% colorless vitreous mineral
09-01C	34				15	30	9	poor	9% sphene 3% colorless vitreous mineral
09-01F	16				7	49	3	well	25% colorless vitreous mineral
09-02C	35				10	37	15	poor	3% colorless vitreous mineral
09-02F	24				8	55	3	well	6% colorless vitreous mineral 4% emerald green material 1% magnetite
09-03C	35	1	1		13	41	3	poor	2% magnetite tr chalcopyrite 2% sphene coarse pyrite 3% colorless vitreous mineral
09-03F	30				13	42	3	well	1% magnetite 3% emerald green material 8% colorless vitreous mineral
11-01C	36		tr		9	36	13	poor	3% magnetite 3% colorless vitreous mineral coarse pyrite
11-01F	21	1	1		3	37	11	well	5% magnetite 21% colorless vitreous mineral tr massive pyrite
11-02C	5	2	tr		77	9	5	poor	1% magnetite 1% colorless vitreous mineral tr coarse pyrite
11-02F	3	1	2		80	7	4	well	2% colorless vitreous mineral 1% magnetite tr coarse pyrite
12-01C	18		4		17	38	7	poor	7% colorless vitreous mineral 1% magnetite coarse pyrite 8% sphene
12-01F	30	1	3		20	30	8	well	8% colorless vitreous mineral
13-01C	23		3		18	48	4	poor	2% colorless vitreous mineral 1% magnetite
13-01F	24		2		17	41	3	well	1% magnetite 13% colorless vitreous mineral coarse pyrite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-13-02C	22		7		22	40	7	poor	1% magnetite 2% emerald green material fine pyrite, pyrite with carbonate
13-02F	23		1		16	39	8	well	.5% magnetite 12% colorless vitreous mineral fine pyrite, tr. emerald green material
13-03C	28	1	2		21	36	5	poor	2% magnetite 7% colorless vitreous mineral coarse & fine pyrite
13-03F	19	1	2		13	40	6	well	1% magnetite 1% sphene coarse pyrite 10% colorless vitreous mineral 8% emerald green material
13-04C	17	1	2		9	51	5	poor	2% magnetite 3% sphene coarse & fine pyrite 4% colorless vitreous mineral 6% emerald green material
13-04F	13	2	4		11	47	6	well	1% magnetite 3% sphene tr rusty light mineral 10% colorless vitreous mineral 3% emerald green material coarse & fine pyrite
14-01C	24				24	30	8	poor	2% magnetite tr. rock chip 6% sphene 7% colorless vitreous mineral
14-01F	19				16	46	7	well	1% magnetite tr. emerald green material 2% sphene 8% colorless vitreous mineral
14-02C	31				26	27	6	well	2% magnetite 6% sphene 2% colorless vitreous mineral
14-02F	32	1			22	34	6	well	.5% magnetite 6% colorless vitreous mineral
14-03C	27	1			19	40	9	well	1% magnetite 4% colorless vitreous mineral
14-03F	28	1			21	34	3	well	.5% magnetite 11% colorless vitreous mineral 2% sphene
14-04C	28				16	43	8	poor	2% magnetite 3% emerald green material
14-04F	30				15	41	4	well	1% magnetite 2% sphene 2% emerald green material 5% colorless vitreous mineral
14-05C	25				22	41	9	poor	1% magnetite 3% sphene
14-05F	24				27	36	3	well	1% magnetite 1% sphene 7% colorless vitreous mineral .6% emerald green material
14-06C	20				33	32	4	poor	2% magnetite 4% sphene 3% emerald green material 2% colorless vitreous mineral
14-06F	23				24	35	8	well	1% magnetite 2% sphene 3% emerald green material 4% colorless vitreous mineral
14-07C	30		3		27	19	16	poor	5% sphene
14-07F	16				27	43	14	well	
14-08C	25	6				44	25	poor	
14-08F	23	2			22	38	5	well	10% colorless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-14-09C	21	4	tr		14	25	25	poor	11% sphene fine pyrite
14-09F	29	5	3		26	32	5	well	
14-10C									no sample
14-10F	34	4			15	43	4	well	small sample
15-01C	3		62		16	13	6	poor	
15-01F	15		13		11	33	13	poor	15% colorless vitreous mineral
16-01C	17	2	4		25	32	19	poor	
16-01F	17	2	2		22	32	24	poor	
16-02C	31	3	tr		21	28	17	poor	coarse & massive pyrite
16-02F	16	3	2		23	50	6	well	14% colorless vitreous mineral
16-03C	29		2		28	37	3	poor	2% colorless vitreous mineral tr sphene arsenopyrite leucoxene
16-03F	16				19	44	22	well	
17-01C	21		5		21	46	8	poor	tr amphiboles (hornblende)
17-01F	21		5		10	31	21	poor	12% colorless vitreous mineral
17-02C	20		2		32	32	10	poor	5% sphene
17-02F	16			2	5	31	10	well	5% sphene 13% colorless vitreous mineral
18-01C	39		tr		27	23	8	poor	4% sphene pyrite bearing rock chips, fine pyrite, pyrite with carbonate, granular pyrite
18-01F	23		9		20	34	7	well	7% colorless vitreous mineral flake of drill steel
19-01C	33		2		31	21	12	poor	tr leucoxene massive pyrite
19-01F	35				17	33	8	well	6% sphene
19-02C	25		tr		32	25	11	poor	7% colorless vitreous mineral pyrite bearing rock chips fine pyrite
19-02F	15		tr		14	52	14	well	5% colorless vitreous mineral pyrite bearing rock chips, fine pyrite, pyrite with carbonate, granular pyrite

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-19-03C	31		1		13	42	7	poor	3% magnetite 2% colorless vitreous mineral 1% sphene coarse pyrite
19-03F	21		1		14	51	1	well	2% magnetite 3% sphene 8% colorless vitreous mineral tr emerald green material coarse pyrite
19-04C	25		3		13	42	5	poor	2% magnetite 2% sphene tr. emerald green material 8% colorless vitreous mineral tr. pyrite bearing rock chips, coarse pyrite
19-04F	15	1	tr.		9	56	8	well	.5% magnetite 2% sphene 3% colorless vitreous mineral 5% emerald green material fine pyrite
20-01C	26		4		10	37	6	poor	3% magnetite 6% colorless vitreous mineral 7% sphene coarse pyrite pyrite bearing rock chips
20-01F	25		2		23	42	4	well	2% magnetite 4% colorless vitreous mineral coarse pyrite, fine pyrite
20-02C	33		1		9	45		poor	3% magnetite 6% colorless vitreous mineral 3% sphene coarse pyrite
20-02F	30		1		9	40	9	well	1% magnetite 7% colorless vitreous mineral 3% sphene fine pyrite
20-03C	27				14	37	6	poor	2% magnetite 9% colorless vitreous mineral 7% emerald green material
20-03F	28	2			19	32	4	well	2% magnetite 10% colorless vitreous mineral 3% sphene
20-04C	23				15	46	8	poor	1% magnetite 6% colorless vitreous mineral 2% sphene
20-04F	26				18	39	1	well	1% magnetite 1% sphene 11% colorless vitreous mineral 5% emerald green material
21-01C	38		1	1	14	34	3	poor	2% magnetite coarse & fine pyrite 5% colorless vitreous mineral 3% emerald green material
21-01F	31		tr		12	38	5	well	1% magnetite 3% sphene Coarse pyrite 7% colorless vitreous mineral 4% emerald green material
21-02C	25		2		15	43	5	poor	2% magnetite 3% sphene 2% emerald green material fine & coarse pyrite 3% colorless vitreous mineral
21-02F	31		3		14	35	5	well	2% magnetite 1% sphene 7% colorless vitreous mineral Coarse & fine pyrite 2% emerald green material
21-03C	15	2	5		5	50	5	poor	2% magnetite 12% colorless vitreous mineral coarse & fine pyrite 5% emerald green material
21-03F	32	tr.	4		15	38	3	well	1% magnetite 5% colorless vitreous mineral Coarse & fine pyrite 3% emerald green material
21-04C	17		2		30	41	2	poor	3% magnetite 2% sphene 5% colorless vitreous mineral coarse pyrite; coarse epidote
21-04F	20	2	1		19	34	12	well	1% magnetite 11% colorless vitreous mineral tr emerald green material coarse pyrite
21-05C	29	tr			21	29	2	poor	2% magnetite 3% sphene 6% emerald green material 7% colorless vitreous mineral
21-05F	22		1		19	34	2	well	1% magnetite 1% sphene 7% emerald green material coarse pyrite 12% colorless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-21-06C	22		tr		13	35	9	well	2% magnetite 4% sphene Coarse pyrite 7% colorless vitreous mineral 9% emerald green material
21-06 F	18		2		20	38	6	well	2% magnetite 2% sphene 2% emerald green material 11% colorless vitreous mineral
21-07C	30				20	40	5	poor	2% magnetite 3% colorless vitreous mineral
21-07F	22	1	2		20	36	4	well	2% magnetite coarse & fine pyrite 13% colorless vitreous mineral 1% emerald green material
21-08C	32		tr		14	50		poor	2% magnetite 2% sphene coarse & fine pyrite
21-08F	16	1	2		20	41	6	well	1% magnetite coarse & fine pyrite 2% emerald green material 11% colorless vitreous mineral
21-09C	22		2		16	44	4	poor	2% magnetite coarse & fine pyrite 2% emerald green material 8% colorless vitreous mineral
21-09F	21		1		34	34	3	well	1% magnetite coarse & fine pyrite 2% emerald green material 4% colorless vitreous mineral
22-01C	31		2		13	30	7	poor	2% magnetite 5% sphene 4% emerald green material 6% colorless vitreous mineral
22-01F	30	1	3		10	39	4	well	2% magnetite coarse & fine pyrite 3% emerald green material 8% colorless vitreous mineral
22-02C	24				20	42	1	poor	3% magnetite 8% colorless vitreous mineral 3% sphene coarse epidote
22-02F	20	1	tr		28	29	4	well	.5% magnetite fine pyrite 6% emerald green material 12% colorless vitreous mineral
22-03C	23		1		18	35	7	poor	2% magnetite coarse pyrite 8% emerald green material 6% colorless vitreous mineral
22-03F	21	2	2		20	32	4	well	2% magnetite coarse & fine pyrite 4% emerald green material 15% colorless vitreous mineral
22-04C	39		4		9	38	1	poor	2% magnetite fine & coarse pyrite 4% colorless vitreous mineral pyrite with quartz 3% emerald green material
22-04F	17		1		10	56	3	well	2% magnetite 11% colorless vitreous mineral coarse & fine pyrite
22-05C	24	1	2		11	46	7	poor	2% magnetite pyrite bearing rock chips 5% colorless vitreous mineral coarse & fine pyrite 2% emerald green material
22-05F	16		2		22	38	5	well	1% magnetite coarse pyrite 12% colorless vitreous mineral 4% emerald green material
22-06C	29		1		9	37	12	poor	2% magnetite 1% sphene fine pyrite 4% emerald green material 5% colorless vitreous mineral
22-06F	26		3		18	40	1	well	1% magnetite coarse & fine pyrite 3% emerald green material 7% colorless vitreous mineral
22-07C	27		tr		17	39	3	poor	2% magnetite coarse & fine pyrite 3% sphene 9% colorless vitreous mineral
22-07F	22		2		22	27	5	well	2% magnetite fine pyrite 4% emerald green material 16% colorless vitreous mineral

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	sorting	Remarks
KLIP-81-22-08C	35		1		14	40	3	poor	2% magnetite coarse pyrite 3% colorless vitreous mineral 22% sphene tr emerald green material
22-08F	20		1		21	43	3	well	1% magnetite fine & coarse 1% emerald green material pyrite 10% colorless vitreous mineral
22-09C	22		1		21	43	1	poor	3% magnetite 1% sphene coarse pyrite 2% emerald green material 7% colorless vitreous mineral
22-09F	24		2		11	41	3	well	1% magnetite coarse & fine 3% emerald green material pyrite 14% colorless vitreous mineral
22-10C	43		1		10	37	1	poor	3% magnetite coarse & fine 2% emerald green material pyrite 5% colorless vitreous mineral
22-10F	26	1	tr		14	45	2	well	1% magnetite 2% emerald green material fine pyrite 10% colorless vitreous mineral
22-11C	35	tr		1	10	37	3	poor	2% magnetite 1% spodumene 11% colorless vitreous mineral 1% sphene
22-11F	36	tr	2		10	35	5	well	.5% magnetite 3% spodumene coarse & 3% emerald green material fine pyrite 5% colorless vitreous mineral
22-12C	35		1	1	10	35	5	poor	2% magnetite 2% spodumene fine pyrite 4% emerald green material pyrite bearing rock 87% colorless vitreous mineral chips
22-12F	29	1	2		13	36	4	well	1% magnetite 8% colorless vitreous mineral 6% spodumene coarse pyrite
23-01C	27	1	3	1	10	43	5	poor	3% magnetite 7% colorless vitreous mineral coarse & fine pyrite
23-01F	21	1	2		9	41	8	well	1% magnetite coarse & fine pyrite 15% colorless vitreous mineral 2% emerald green material
24-01C	9	tr.	2		8	14	1	well	.5% magnetite 4% emerald green material coarse pyrite 62% zoisite arsenopyrite
24-01F	19	tr.	1		9	33	3	well	.5% magnetite 4% emerald green material coarse pyrite 31% zoisite arsenopyrite
25-01C	31		2		17	37	5	poor	2% magnetite 3% colorless vitreous mineral fine & coarse 3% emerald green material pyrite
25-01F	35		5	1	6	35	3	well	1% magnetite 12% colorless vitreous mineral fine & coarse 2% emerald green material pyrite
25-02C	30	1	4		13	41	3	poor	1% magnetite pyrite with carbonate 1% colorless vitreous mineral coarse & fine 6% spodumene pyrite
25-02F	30		3	1	8	43	5	well	1% magnetite 10% colorless vitreous mineral coarse & fine pyrite
25-03C	32		6	1	10	45	3	poor	1% magnetite 3% colorless vitreous mineral coarse & fine pyrite
25-03F	33		tr	2	15	40	2	well	1% magnetite 2% emerald green material Coarse & fine 6% colorless vitreous mineral pyrite
25-04C	24		2	1	13	40	6	poor	2% magnetite 2% sphene pyrite bearing 2% emerald green material rock chips 10% colorless vitreous mineral coarse pyrite large pyroxene
25-04F	33		1		12	51	1	well	.5% magnetite coarse pyrite 1% colorless vitreous mineral tr emerald green material

Sample No.	%garnet	%hematite	%sulphides	%ilmenite	%epidote	%pyroxene	%zircon group	Sorting	Remarks
KLIP-81-25-05C	23				22	38	5	poor	15% magnetite 1% sphene coarse pyrite 7% colorless vitreous mineral 2% emerald green material
25-05F	27		5		13	39	4	well	1% magnetite 1% sphene coarse pyrite 2% emerald green material 9% colorless vitreous mineral
25-06C	32	1	3		21	31	5	poor	1% magnetite coarse & fine 4% emerald green material pyrite 5% colorless vitreous mineral pyrite with quartz
25-06F	35		3		16	35	2	well	1% magnetite coarse pyrite 4% emerald green material 6% colorless vitreous mineral
25-07C	25		1		17	36	1	poor	2% magnetite 4% spodumene coarse pyrite 8% emerald green material pyrite bearing rock 6% colorless vitreous mineral chips pyrite with qtz.
25-07F	22		1		21	39	5	well	15% magnetite coarse pyrite 8% emerald green material 4% colorless vitreous mineral
25-08C	24		2		10	51	4	poor	2% magnetite coarse pyrite 3% sphene 3% spodumene
25-08F	26		1		11	42	5	well	15% magnetite coarse pyrite 1% emerald green material colorless vitreous mineral
25-09C	20		2		15	38	3	poor	2% magnetite coarse pyrite 4% emerald green material pyrite bearing 16% colorless vitreous mineral rock chips
25-09F	22		1	1	16	43	3	well	15% magnetite coarse pyrite 5% emerald green material 10% colorless vitreous mineral
25-10C	25		6		10	46	1	poor	2% magnetite coarse pyrite 6% colorless vitreous mineral pyrite bearing rock chips 3% spodumene pyrite with quartz
25-10F	31		1		13	34	2	well	1% magnetite coarse & fine 7% emerald green material pyrite 12% colorless vitreous mineral
25-11C	20		9		11	39	2	poor	2% magnetite coarse & fine pyrite 1% emerald green material pyrite with 17% colorless vitreous mineral carbonate
25-11F	38		5		5	33	3	well	15% magnetite coarse & fine pyrite 4% emerald green material 12% colorless vitreous mineral
25-12C	35	tr.	1		8	35		well	7% magnetite 5% spodumene 8% colorless vitreous mineral coarse & fine pyrite 1% sphene pyrite with quartz
25-12F	32		tr		9	36	3	well	1% magnetite fine & coarse pyrite 5% emerald green material 14% colorless vitreous mineral
25-13C	20		4		7	54	3	poor	2% magnetite 11% colorless vitreous mineral pyrite with coarse & fine pyrite quartz
25-13F	29	1	6		7	40	6	well	1% magnetite 1% emerald green material 10% colorless vitreous mineral
25-14C	32	2	2		6	41	3	poor	2% magnetite coarse & fine pyrite 6% emerald green material pyrite with 6% colorless vitreous mineral quartz
25-14F	25				10	38	14	well	16% magnetite 3% emerald green material 11% colorless vitreous mineral
25-15C	28	tr	tr		12	49		poor	1% magnetite coarse pyrite 6% emerald green material 4% colorless vitreous mineral
25-15F	26	2			5	57	1	well	1% magnetite 1% emerald green material 8% colorless vitreous mineral

APPENDIX E

ANALYTICAL DATA

OVERBURDEN AND BEDROCK SAMPLES

DATA PRESENTATION

The analytical data are listed sequentially in the accompanying tables. Results from each hole are grouped together and then subdivided according to the subsample fractions obtained from the original bulk samples to permit cross reference with stratigraphic and mineralogical data. Drill hole and sample identification numbers are common throughout this report.

The following information is presented:

i) Drill hole identification number.

ii) UTM co-ordinates of the drill hole.

iii) Collar elevation in feet.

iv) Sub-sample type (e.g. -0.63 mm whole samples sieved separate).

v) Sample identification number.

vi) Depth (in feet) of drill intersection from which the sample was obtained.

vii) Composition of the sample material as per drill logs.

viii) Analytical data in ppm or ppb as indicated. Note samples with element concentrations below the detection limits are assigned an arbitrary value (see text of report): Samples with insufficient material to permit analysis are designated I.S.

HOLE-NO: 80-001
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UTM-COORD: 5536,3566
ELEVATION: 1,086

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-001-01	0.0- 5.0	SAND	12	68	52	14	3	3	.1	20	9.7
80-001-02	5.0- 9.0	SAND	11	26	50	12	3	3	.1	40	7.2
80-001-03	20.0- 30.0	SILT	IS	IS	IS	IS	IS	IS	IS	10	IS
80-001-04	30.0- 45.0	CLAY	IS	IS	IS	IS	IS	IS	IS	10	IS
80-001-05	45.0- 60.0	CLAY	IS	IS	IS	IS	IS	IS	IS	10	IS
80-001-06	60.0- 75.0	SAND	31	22	70	17	6	1	.1	100	7.1
80-001-07	75.0- 90.0	SAND	68	39	82	66	4	14	.1	10	17.5
80-001-08	90.0-105.0	CLAY	71	30	87	27	4	15	.1	40	19.4
80-001-09	105.0-120.0	CLAY	46	19	69	20	4	6	.1	100	9.9
80-001-10	120.0-123.0	SAND	37	20	58	20	6	5	.1	40	7.9
80-001-11	123.0-127.0	SAND	45	74	64	32	6	18	.1	20	8.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-001-01	0.0- 5.0	SAND	7	74	33	10	2	3	.1	460	31.1
80-001-02	5.0- 9.0	SAND	7	155	32	9	2	2	.1	20	36.2
80-001-03	20.0- 30.0	SILT	7	55	35	29	4	3	.1	1200	42.1
80-001-04	30.0- 45.0	CLAY	125	395	124	48	4	IS	.2	10	IS
80-001-05	45.0- 60.0	CLAY	18	51	32	12	3	7	.1	40	42.5
80-001-06	60. - 75.0	SAND	40	52	39	12	4	5	.2	40	45.9
80-001-07	75.0- 90.0	SAND	65	71	69	34	3	65	.2	100	39.9
80-001-08	90.0-105.0	CLAY	77	61	84	34	6	32	.1	140	47.0
80-001-09	105.0-120.0	CLAY	65	71	74	35	2	31	.2	10	40.5
80-001-10	120.0-123.0	SAND	45	44	57	31	3	27	.1	60	52.1
80-001-11	123.0-127.0	GRAVEL	44	175	60	22	3	28	.1	420	37.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-001-01	0.0- 5.0	SAND	20	10	35	23	2	2	.2	20	2.9
80-001-02	5.0- 9.0	SAND	12	17	28	16	3	1	.1	40	2.3
80-001-03	20.0- 30.0	SILT	5	1	12	8	2	1	.1	40	1.2
80-001-04	30.0- 45.0	CLAY	7	2	12	8	2	2	.1	40	1.3
80-001-05	45.0- 60.0	CLAY	5	1	11	7	2	1	.1	20	1.5
80-001-06	60.0- 75.0	SAND	6	2	15	8	2	1	.1	40	2.2
80-001-07	75.0- 90.0	SAND	7	2	13	8	1	1	.1	20	1.8
80-001-08	90.0-105.0	CLAY	6	2	13	8	1	2	.2	20	1.9
80-001-09	105.0-120.0	CLAY	9	2	16	9	1	3	.1	40	2.0
80-001-10	120.0-123.0	SAND	7	1	14	10	1	2	.2	20	1.8
80-001-11	123.0-127.0	GRAVEL	7	3	16	10	1	2	.4	20	1.6

HOLE-NC: 80-002
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UTM-COORD: 5568,3567
ELEVATION: 951

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-002-01	15.0- 20.0	SAND	40	20	56	32	4	16	.1	200	7.7
80-002-04	80.0- 90.0	SAND	48	19	49	25	4	7	.1	140	7.5
80-002-05	90.0- 93.0	CLAY	39	27	54	22	4	6	.1	15000	8.6
80-002-06	93.0-100.0	GRAVEL	46	19	52	22	3	6	2.8	340	7.8
80-002-07	100.0-103.0	GRAVEL	34	22	54	15	4	5	.1	40	9.0
80-002-08	103.0-110.0	SAND	19	19	51	8	4	5	.1	120	8.8
80-002-09	110.0-120.0	SAND	20	20	53	12	6	4	.1	160	9.5
80-002-10	120.0-130.0	SAND	16	23	56	13	3	4	.1	1000	7.8
80-002-11	130.0-140.0	SAND	20	21	53	13	6	4	.1	400	7.8
80-002-12	140.0-150.0	SAND	27	12	52	16	3	4	.4	380	6.7
80-002-13	150.0-156.0	GRAVEL	52	83	30	11	2	6	.1	1300	8.5
80-002-14	156.0-157.0	GRAVEL	94	415	44	16	3	32	.1	840	8.3

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-002-01	15.0- 20.0	SAND	34	76	53	36	3	31	.1	600	39.4
80-002-04	80.0- 90.0	SAND	35	50	43	17	3	14	.1	260	30.1
80-002-05	90.0- 93.0	CLAY	34	88	35	18	3	7	.1	100	35.9
80-002-06	93.0-100.0	GRAVEL	61	47	33	21	4	13	.1	240	34.5
80-002-07	100.0-103.0	GRAVEL	65	96	44	17	5	7	.1	160	39.2
80-002-08	103.0-110.0	SAND	31	91	37	10	3	15	.2	160	39.1
80-002-09	110.0-120.0	SAND	27	96	37	11	4	6	.1	240	8.2
80-002-10	120.0-130.0	SAND	15	76	31	8	4	3	.1	480	45.2
80-002-11	130.0-140.0	SAND	22	94	28	8	2	8	.2	660	36.4
80-002-12	140.0-150.0	SAND	50	58	31	15	4	25	.1	640	37.8
80-002-13	150.0-156.0	GRAVEL	27	445	43	11	4	9	.1	760	46.5
80-002-14	156.0-157.0	GRAVEL	170	2050	67	19	4	30	.4	360	36.8

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-002-01	15.0- 20.0	SAND	7	3	17	12	1	3	.1	10	1.5
80-002-04	80.0- 90.0	SAND	10	4	18	17	3	2	.1	20	1.4
80-002-05	90.0- 93.0	CLAY	9	21	19	17	1	2	.1	10	1.6
80-002-06	93.0-100.0	GRAVEL	13	2	22	19	3	3	.2	10	1.6
80-002-07	100.0-103.0	GRAVEL	12	3	22	17	2	1	.1	10	1.5
80-002-08	103.0-110.0	SAND	30	7	47	22	2	4	.4	20	0.6
80-002-09	110.0-120.0	SAND	39	9	51	32	3	2	.4	60	0.8
80-002-10	120.0-130.0	SAND	54	13	60	32	3	IS	.4	10	0.9
80-002-11	130.0-140.0	SAND	65	12	73	38	3	IS	.2	20	1.8
80-002-12	140.0-150.0	SAND	37	17	41	34	4	IS	.4	20	1.0
80-002-13	150.0-156.0	GRAVEL	12	4	20	10	2	1	.1	20	1.9
80-002-14	156.0-157.0	GRAVEL	24	27	48	18	2	3	.2	10	1.5

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-002-15	157.0-161.0	BEDROK	62	10	63	78	6	1	.1	10	.4

HOLE-NO: 80-003
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UTM-COORD: 5616,3536
ELEVATION: 991

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-003-01	15.0- 20.0	GRAVEL	30	21	47	16	4	7	.1	1200	7.2
80-003-04	30.0- 35.0	GRAVEL	42	42	42	25	4	14	.1	280	6.9
80-003-07	45.0- 50.0	GRAVEL	47	14	53	25	4	12	.2	480	7.5
80-003-08	50.0- 55.0	GRAVEL	36	23	50	22	4	10	.1	260	8.6
80-003-09	55.0- 60.0	GRAVEL	26	15	43	11	4	2	.1	420	9.6
80-003-10	60.0- 65.0	GRAVEL	10	16	43	10	4	2	.2	440	7.6
80-003-11	65.0- 70.0	GRAVEL	32	11	59	13	7	2	.1	660	5.6
80-003-12	70.0- 75.0	SAND	135	21	134	14	4	2	.1	160	7.9
80-003-13	75.0- 80.0	TILL	42	12	53	26	8	7	.2	40	5.7
80-003-14	80.0- 83.0	TILL	56	14	46	26	3	5	.2	10	7.5
80-003-15	83.0- 89.0	TILL	45	14	44	18	4	6	.2	80	7.2

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-003-01	15.0- 20.0	GRAVEL	22	40	43	16	3	9	.1	240	22.8
80-003-04	30.0- 35.0	GRAVEL	23	35	54	20	3	10	.1	740	28.7
80-003-07	45.0- 50.0	GRAVEL	32	28	45	20	4	24	.1	5100	29.2
80-003-08	50.0- 55.0	GRAVEL	24	32	46	19	3	16	.2	480	29.1
80-003-09	55.0- 60.0	GRAVEL	10	35	32	11	3	5	.2	320	24.7
80-003-10	60.0- 65.0	GRAVEL	8	30	29	11	3	4	.2	300	23.3
80-003-11	65.0- 70.0	GRAVEL	9	33	28	11	2	4	.1	1300	27.0
80-003-12	70.0- 75.0	SAND	34	40	55	15	2	17	.2	260	29.5
80-003-13	75.0- 80.0	TILL	61	41	56	22	3	14	.1	660	25.8
80-003-14	80.0- 83.0	TILL	36	54	51	18	2	13	.1	40	29.2
80-003-15	83.0- 89.0	TILL	52	50	53	18	3	14	.1	40	33.5

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-003-01	15.0- 20.0	GRAVEL	7	2	15	12	1	1	.1	10	1.3
80-003-04	30.0- 35.0	GRAVEL	6	2	14	10	1	1	.1	20	1.1
80-003-07	45.0- 50.0	GRAVEL	6	2	15	13	2	1	.1	10	1.4
80-003-08	50.0- 55.0	GRAVEL	6	2	16	12	2	1	.2	20	1.4
80-003-09	55.0- 60.0	GRAVEL	5	2	14	11	1	1	.2	10	1.3
80-003-10	60.0- 65.0	GRAVEL	5	3	16	12	1	1	.1	10	2.3
80-003-11	65.0- 70.0	GRAVEL	5	2	15	10	2	1	.2	10	2.7
80-003-12	70.0- 75.0	SAND	5	2	14	10	1	4	.2	10	2.3
80-003-13	75.0- 80.0	TILL	8	2	17	15	2	2	.4	10	1.6
80-003-14	80.0- 83.0	TILL	7	2	13	12	2	1	.1	10	1.3
80-003-15	83.0- 89.0	TILL	8	3	17	17	2	1	.1	10	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-003-16	89.0-102.0	BEDROK	90	1	57	81	11	2	.1	20	2.4

HOLE-NO: 80-004
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UTM-COORD: 5604,3551
ELEVATION: 974

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-004-01	24.0- 35.0	GRAVEL	50	18	57	26	4	15	.4	100	7.9
80-004-02	35.0- 45.0	GRAVEL	31	12	46	27	6	14	.2	10	7.3
80-004-03	45.0- 52.0	TILL	30	14	50	25	3	11	.2	120	6.3
80-004-04	52.0- 58.0	TILL	25	13	54	22	3	20	.2	60	8.3
80-004-05	58.0- 65.0	TILL	28	17	44	27	4	12	.2	240	5.7
80-004-06	65.0- 70.0	TILL	30	18	44	26	3	14	.2	220	8.2
80-004-07	70.0- 75.0	TILL	34	17	57	25	3	11	.2	60	7.4
80-004-08	75.0- 80.0	GRAVEL	41	15	43	29	3	9	.2	100	4.7
80-004-11	85.0- 90.0	GRAVEL	58	18	59	33	4	17	.4	320	7.6
80-004-14	99.0-105.0	GRAVEL	54	18	65	35	3	16	.2	200	8.4
80-004-15	105.0-109.0	GRAVEL	30	17	44	23	4	11	.1	10	7.0
80-004-16	109.0-115.0	GRAVEL	27	14	41	17	4	7	.1	20	6.2
80-004-17	115.0-129.0	TILL	64	16	56	30	4	12	.2	340	9.2
80-004-18	129.0-135.0	GRAVEL	66	19	71	25	6	12	.2	60	8.7
80-004-19	135.0-142.0	TILL	91	20	83	25	4	12	.2	40	8.7
80-004-20	142.0-147.0	TILL	52	13	56	28	4	8	.4	40	6.8
80-004-21	147.0-152.0	TILL	61	23	74	31	4	13	.2	20	10.5
80-004-22	152.0-157.0	GRAVEL	51	14	48	26	4	20	.4	10	8.1
80-004-23	157.0-161.0	TILL	145	22	64	24	3	10	.4	40	8.5
80-004-24	166.0-170.0	TILL	105	125	64	61	6	7	.1	20	8.5
80-004-25	173.0-180.0	GRAVEL	60	645	53	34	4	19	.1	140	10.1
80-004-26	180.0-189.0	TILL	90	125	65	24	4	15	.4	20	10.5
80-004-27	189.0-195.0	TILL	80	27	90	50	7	19	.4	20	10.0

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-004-01	24.0- 35.0	GRAVEL	28	37	43	23	2	33	.2	20	30.5
80-004-02	35.0- 45.0	GRAVEL	18	38	45	22	4	27	.2	1900	21.8
80-004-03	45.0- 52.0	TILL	12	34	36	19	3	22	5.6	100	28.2
80-004-04	52.0- 58.0	TILL	14	31	37	19	4	14	.2	1400	26.5
80-004-05	58.0- 65.0	TILL	13	34	36	17	3	18	.1	3600	29.6
80-004-06	65.0- 70.0	TILL	19	47	39	20	2	26	.4	1300	24.5
80-004-07	70.0- 75.0	TILL	23	30	47	25	3	18	.2	40	22.8
80-004-08	75.0- 80.0	GRAVEL	54	25	54	35	3	12	.2	200	18.0
80-004-11	85.0- 90.0	GRAVEL	37	34	42	23	3	26	.1	80	21.3
80-004-14	99.0-105.0	GRAVEL	29	30	40	22	3	19	.1	60	20.0
80-004-15	105.0-109.0	GRAVEL	34	47	39	25	2	9	.1	380	28.9
80-004-16	109.0-115.0	GRAVEL	16	37	35	21	3	19	.2	700	19.0
80-004-17	115.0-129.0	TILL	44	32	51	33	4	14	.2	140	24.5
80-004-18	129.0-135.0	GRAVEL	52	42	58	32	3	40	.4	660	24.0
80-004-19	135.0-142.0	TILL	54	51	56	28	3	21	.2	840	25.0
80-004-20	142.0-147.0	TILL	70	38	63	47	4	25	.1	900	24.1
80-004-21	147.0-152.0	TILL	85	53	63	34	2	31	1.0	10	24.0
80-004-22	152.0-157.0	GRAVEL	87	46	56	27	2	19	2.0	3800	23.5
80-004-23	157.0-161.0	TILL	75	245	49	22	6	15	.2	60	21.0
80-004-24	166.0-170.0	TILL	79	89	56	41	3	17	.1	40	24.8
80-004-25	173.0-180.0	GRAVEL	43	275	56	26	4	4	.2	140	32.0
80-004-26	180.0-189.0	TILL	56	57	49	22	6	27	.4	720	32.6
80-004-27	189.0-195.0	TILL	88	73	159	57	2	37	.4	20	25.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-004-01	24.0- 35.0	GRAVEL	7	1	17	15	1	2	.4	10	1.7
80-004-02	35.0- 45.0	GRAVEL	8	3	19	15	1	1	.1	10	1.7
80-004-03	45.0- 52.0	TILL	6	2	17	13	1	1	.1	20	1.5
80-004-04	52.0- 58.0	TILL	9	2	20	15	2	2	.1	10	1.6
80-004-05	58.0- 65.0	TILL	9	3	18	17	1	2	.2	20	1.2
80-004-06	65.0- 70.0	TILL	7	2	13	13	1	1	.2	20	1.2
80-004-07	70.0- 75.0	TILL	6	3	11	14	2	2	.4	10	1.0
80-004-08	75.0- 80.0	GRAVEL	11	1	14	20	1	1	.1	20	1.3
80-004-11	85.0- 90.0	GRAVEL	7	3	11	14	1	1	.1	10	1.5
80-004-14	99.0-105.0	GRAVEL	14	1	18	16	1	1	.1	10	1.5
80-004-15	105.0-109.0	GRAVEL	7	2	12	13	2	1	.1	20	1.7
80-004-16	109.0-115.0	GRAVEL	7	1	12	12	1	2	.2	20	2.3
80-004-17	115.0-129.0	TILL	14	1	15	18	1	1	.4	10	1.0
80-004-18	129.0-135.0	GRAVEL	15	1	16	17	2	1	.4	10	1.4
80-004-19	135.0-142.0	TILL	11	2	15	13	1	3	.2	40	1.5
80-004-20	142.0-147.0	TILL	9	1	11	17	1	2	.1	10	1.2
80-004-21	147.0-152.0	TILL	8	2	13	12	1	2	.4	10	1.1
80-004-22	152.0-157.0	GRAVEL	8	1	14	14	1	1	.1	40	1.2
80-004-23	157.0-161.0	TILL	8	1	13	14	2	1	.2	10	1.2
80-004-24	166.0-170.0	TILL	9	6	15	10	2	1	.1	10	1.5
80-004-25	173.0-180.0	GRAVEL	5	1	12	7	2	1	.1	10	1.3
80-004-26	180.0-189.0	TILL	10	4	16	14	2	2	.1	10	1.8
80-004-27	189.0-195.0	TILL	12	3	19	18	2	1	.1	20	0.9

HOLE-NO: 80-005
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UTM-COORD: 5537,3537
ELEVATION: 1,135

-1.60C+0.125MM NCN-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-005-01	5.0- 15.0	SAND	10	12	40	7	4	5	.1	40	5.9
80-005-02	15.0- 24.0	GRAVEL	37	16	46	27	4	10	.1	60	8.1

-C.125MM NCN-MAGNETIC HEAVY MINERAL FRACTICN(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-005-01	5.0- 15.0	SAND	12	47	31	8	3	2	.1	40	26.2
80-005-02	15.0- 24.0	GRAVEL	185	53	46	63	4	IS	.4	60	27.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-005-01	5.0- 15.0	SAND	12	6	22	18	2	1	.1	10	1.1
80-005-02	15.0- 24.0	GRAVEL	23	3	30	45	2	1	.1	10	1.1

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-005-03	24.0- 32.0	BEDROK	69	2	70	52	4	3	.2	40	.9

HOLE-NO: 80-006
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UTM-COORD: 5569,3535
ELEVATION: 994

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-006-01	35.0- 40.0	TILL	32	18	50	12	3	8	.1	140	9.6
80-006-02	40.0- 45.0	TILL	9	13	40	9	4	5	.1	80	9.0
80-006-03	45.0- 55.0	SAND	8	16	41	7	6	3	.1	10	9.8
80-006-04	55.0- 67.0	SAND	11	18	45	11	6	3	.1	200	9.0
80-006-05	71.0- 75.0	GRAVEL	15	16	43	8	3	4	.2	120	8.9
80-006-06	75.0- 79.0	GRAVEL	34	19	47	16	6	8	.1	60	9.9

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-006-01	35.0- 40.0	TILL	33	60	41	14	4	10	.1	700	33.8
80-006-02	40.0- 45.0	TILL	7	45	29	8	3	10	.1	80	32.6
80-006-03	45.0- 55.0	SAND	6	55	27	6	3	3	.1	100	40.2
80-006-04	55.0- 67.0	SAND	5	52	28	6	3	3	.2	1600	31.7
80-006-05	71.0- 75.0	GRAVEL	10	53	28	8	2	1	.1	620	38.4
80-006-06	75.0- 79.0	GRAVEL	22	76	36	11	4	6	.1	200	43.6

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-006-01	35.0- 40.0	TILL	7	4	13	9	1	2	.1	10	1.8
80-006-02	40.0- 45.0	TILL	7	2	13	9	1	2	.2	10	1.9
80-006-03	45.0- 55.0	SAND	14	6	24	16	2	2	.1	10	3.9
80-006-04	55.0- 67.0	SAND	8	6	17	12	3	2	.2	10	4.1
80-006-05	71.0- 75.0	GRAVEL	5	3	10	18	2	1	.1	10	1.5
80-006-06	75.0- 79.0	GRAVEL	9	2	12	17	2	2	.1	20	1.9

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-006-07	79.0- 82.0	BEDROK	30	3	184	38	4	15	.1	10	1.4

HOLE-NO: 80-007
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UTM-COORD: 5537,3496
ELEVATION: 1,063

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AL PPB	U PPM
80-007-01	48.0- 55.0	GRAVEL	36	50	63	22	4	15	.1	140	7.7
80-007-02	55.0- 67.0	GRAVEL	39	26	50	15	3	7	.2	40	5.8
80-007-03	67.0- 75.0	TILL	50	33	50	16	4	14	.2	140	7.0
80-007-04	75.0- 83.0	GRAVEL	51	105	57	22	6	10	.4	10	6.1
80-007-05	83.0- 97.0	TILL	76	135	75	20	3	14	.4	10	6.8
80-007-06	97.0-105.0	TILL	42	89	76	17	4	9	.2	160	6.8
80-007-07	105.0-111.0	GRAVEL	45	31	53	22	4	12	.2	80	8.2
80-007-08	111.0-114.0	GRAVEL	42	34	61	22	4	12	.2	40	7.2
80-007-09	114.0-116.0	TILL	82	22	51	36	6	17	.4	10	9.4

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AL PPB	U PPM
80-007-01	48.0- 55.0	GRAVEL	27	54	66	20	2	19	1.2	160	26.2
80-007-02	55.0- 67.0	GRAVEL	20	42	36	20	3	20	.2	10	23.8
80-007-03	67.0- 75.0	TILL	37	37	41	18	3	11	.2	40	25.8
80-007-04	75.0- 83.0	GRAVEL	27	58	42	19	4	10	.2	10	27.1
80-007-05	83.0- 97.0	TILL	38	98	60	19	4	22	.2	40	23.5
80-007-06	97.0-105.0	TILL	29	67	58	20	3	26	.1	1600	29.5
80-007-07	105.0-111.0	GRAVEL	25	65	42	18	4	21	.1	5200	25.8
80-007-08	111.0-114.0	GRAVEL	40	36	46	19	3	15	.1	40	30.4
80-007-09	114.0-116.0	TILL	73	39	48	23	3	27	.4	920	34.3

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-007-01	48.0- 55.0	GRAVEL	7	1	12	13	1	2	.1	10	1.5
80-007-02	55.0- 67.0	GRAVEL	6	2	9	7	2	1	.1	20	1.6
80-007-03	67.0- 75.0	TILL	8	5	11	10	1	1	.2	20	1.6
80-007-04	75.0- 83.0	GRAVEL	7	2	11	9	1	2	.1	20	1.8
80-007-05	83.0- 97.0	TILL	12	2	16	15	2	1	.2	20	1.6
80-007-06	97.0-105.0	TILL	7	2	10	9	2	1	.1	10	1.3
80-007-07	105.0-111.0	GRAVEL	7	2	12	11	1	2	.1	10	1.4
80-007-08	111.0-114.0	GRAVEL	8	2	12	11	1	2	.1	10	1.4
80-007-09	114.0-116.0	TILL	10	8	20	17	1	2	.2	10	1.2

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-007-10	116.0-119.0	BEDROK	86	1	97	43	3	1	.1	10	IS

HOLE-NO: 80-008
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UTM-COORD: 5570,3506
ELEVATION: 1,043

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-008-01	7.0- 12.0	SAND	8	13	42	9	4	2	.1	60	7.3
80-008-02	12.0- 17.0	SAND	11	18	41	9	3	3	.2	40	8.0
80-008-03	17.0- 21.0	GRAVEL	20	14	48	12	4	3	.1	40	8.7
80-008-04	21.0- 25.0	GRAVEL	60	13	46	17	4	3	.1	10	8.1
80-008-05	25.0- 30.0	TILL	52	8	41	17	3	5	.1	10	5.5
80-008-06	30.0- 35.0	TILL	38	12	49	13	6	5	.2	40	7.1
80-008-07	35.0- 39.0	TILL	31	21	58	14	6	6	.1	40	7.3
80-008-08	39.0- 45.0	TILL	57	15	69	15	6	11	.1	40	8.0
80-008-09	45.0- 48.0	TILL	37	15	81	16	6	11	.1	60	7.5
80-008-10	48.0- 53.0	GRAVEL	54	20	61	15	3	9	.2	60	8.1
80-008-11	53.0- 58.0	TILL	48	18	65	20	4	8	.2	140	9.0
80-008-12	58.0- 61.0	TILL	50	14	63	21	4	5	.1	10	7.6

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-008-01	7.0- 12.0	SAND	7	36	29	7	3	2	.1	1900	25.1
80-008-02	12.0- 17.0	TILL	7	53	31	8	3	2	.1	10	28.5
80-008-03	17.0- 21.0	GRAVEL	12	38	32	9	3	5	.1	140	34.2
80-008-04	21.0- 25.0	GRAVEL	175	40	45	44	3	8	.1	20	30.1
80-008-05	25.0- 30.0	TILL	55	41	40	25	6	9	3.8	300	23.7
80-008-06	30.0- 35.0	TILL	46	55	57	23	4	5	.1	10	25.4
80-008-07	35.0- 39.0	TILL	59	53	46	17	3	11	.4	60	36.9
80-008-08	39.0- 45.0	TILL	82	41	68	19	3	13	.2	10	35.4
80-008-09	45.0- 48.0	TILL	78	66	83	25	3	25	.1	40	20.7
80-008-10	48.0- 53.0	GRAVEL	58	54	66	21	3	16	.2	40	34.1
80-008-11	53.0- 58.0	TILL	62	48	68	29	2	13	.2	10	39.4
80-008-12	58.0- 61.0	TILL	70	46	57	24	3	15	2.8	340	32.5

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-008-01	7.0- 12.0	SAND	7	2	16	12	1	1	.1	10	2.1
80-008-02	12.0- 17.0	TILL	5	2	16	10	1	2	.2	120	1.6
80-CC8-03	17.0- 21.0	GRAVEL	7	2	18	13	2	2	.1	10	2.3
80-C08-04	21.0- 25.0	GRAVEL	29	1	37	98	2	2	.1	10	1.2
80-008-05	25.0- 30.0	TILL	16	4	23	33	2	3	.1	10	1.1
80-CC8-06	30.0- 35.0	TILL	11	2	19	19	2	2	.1	10	1.2
80-008-07	35.0- 39.0	TILL	11	2	21	17	2	2	.1	10	1.9
80-C08-08	39.0- 45.0	TILL	7	1	14	9	2	3	.4	10	1.7
80-CC8-09	45.0- 48.0	TILL	8	1	16	9	2	2	.2	10	1.8
80-0C8-10	48.0- 53.0	GRAVEL	9	1	17	10	2	2	.1	10	1.4
80-008-11	53.0- 58.0	TILL	12	2	21	20	2	1	.1	20	1.8
80-008-12	58.0- 61.0	TILL	10	1	19	18	1	2	.4	10	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-0C8-13	61.0- 64.0	BEDRCK	70	1	74	51	4	2	.2	10	.5

HOLE-NO: 80-009
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UTM-COORD: 5602,3502
ELEVATION: 1,010

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-009-01	28.0- 33.0	TILL	39	18	57	22	4	21	.4	60	6.6
80-009-02	33.0- 37.0	TILL	16	10	56	13	4	5	.1	60	5.1
80-009-03	37.0- 42.0	TILL	18	13	48	13	6	2	.1	10	6.0
80-009-04	42.0- 47.0	TILL	14	10	59	10	4	3	.1	20	6.5
80-009-05	47.0- 52.0	TILL	21	12	46	11	3	3	8.2	140000	5.0
80-009-06	52.0- 55.0	TILL	30	32	60	17	4	6	.1	40	8.1
80-009-07	55.0- 58.0	TILL	37	13	58	20	4	5	1.0	17000	6.6
80-009-08	58.0- 60.0	TILL	83	16	55	20	4	6	.1	120	8.7
80-009-09	63.0- 67.0	TILL	32	21	55	13	3	3	.1	140	7.4
80-009-10	67.0- 75.0	GRAVEL	22	28	58	14	4	2	.2	40	11.0
80-009-11	75.0- 85.0	SAND	29	31	90	17	3	2	.1	20	9.8
80-009-12	85.0- 95.0	SAND	27	36	79	17	3	3	.1	20	10.3
80-009-13	95.0-105.0	SAND	30	34	83	12	3	3	.1	260	14.2
80-009-14	105.0-115.0	SAND	49	35	88	24	4	6	.1	180	5.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-009-01	28.0- 33.0	TILL	43	41	52	20	2	24	.4	10	24.3
80-009-02	33.0- 37.0	TILL	9	29	33	10	3	1	.1	40	14.7
80-009-03	37.0- 42.0	TILL	7	33	31	8	3	3	.1	80	19.2
80-009-04	42.0- 47.0	TILL	9	36	31	7	3	2	.1	80	22.3
80-009-05	47.0- 52.0	TILL	13	45	33	8	3	2	.1	20	27.7
80-009-06	52.0- 55.0	TILL	35	35	45	16	4	13	.1	40	34.3
80-009-07	55.0- 58.0	TILL	47	39	55	19	4	8	.1	20	23.5
80-009-08	58.0- 60.0	TILL	84	32	45	20	3	12	.1	240	26.3
80-009-09	63.0- 67.0	TILL	34	45	36	10	3	6	.2	100	30.8
80-009-10	67.0- 75.0	GRAVEL	35	60	49	17	3	5	.1	4000	23.9
80-009-11	75.0- 85.0	SAND	50	57	73	30	4	2	.1	40	9.1
80-009-12	85.0- 95.0	SAND	41	70	53	34	3	6	.1	100	9.0
80-009-13	95.0-105.0	SAND	55	63	56	20	3	8	.2	10	IS
80-009-14	105.0-115.0	SAND	78	64	72	41	4	IS	.2	10	IS

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-009-01	28.0- 33.0	TILL	9	2	17	12	1	1	.2	10	1.6
80-009-02	33.0- 37.0	TILL	9	1	23	10	2	2	.1	10	1.3
80-009-03	37.0- 42.0	TILL	9	2	19	12	2	1	.1	10	1.5
80-009-04	42.0- 47.0	TILL	10	2	19	15	2	2	.4	10	1.5
80-009-05	47.0- 52.0	TILL	8	1	17	13	1	2	.4	10	1.7
80-009-06	52.0- 55.0	TILL	10	1	18	15	1	2	.1	10	2.1
80-009-07	55.0- 58.0	TILL	10	1	19	13	2	3	.2	10	1.6
80-009-08	58.0- 60.0	TILL	15	2	17	32	3	1	.1	10	1.4
80-009-09	63.0- 67.0	TILL	12	2	19	15	2	1	.4	10	1.1
80-009-10	67.0- 75.0	GRAVEL	165	26	164	73	1	4	.4	10	0.7
80-009-11	75.0- 85.0	SAND	135	22	144	70	2	4	.2	10	0.5
80-009-12	85.0- 95.0	SAND	145	25	164	78	2	5	.4	10	0.8
80-009-13	95.0-105.0	SAND	135	20	154	75	2	5	.4	120	0.8
80-009-14	105. -115.0	SAND	160	28	164	81	2	12	.2	340	0.6

HOLE-NO: 80-010
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UTM-COORD: 5627,3503
ELEVATION: 997

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-010-01	28.0- 40.0	GRAVEL	81	15	71	23	4	6	.1	10	6.7
80-010-02	40.0- 45.0	GRAVEL	50	70	71	26	4	22	.1	200	7.2
80-010-03	45.0- 50.0	TILL	54	22	87	37	4	12	.1	700	9.2
80-010-04	50.0- 55.0	TILL	42	20	75	24	4	8	.1	200	8.1
80-010-05	55.0- 60.0	TILL	64	15	76	30	6	16	.1	80	7.3
80-010-06	60.0- 65.0	TILL	52	18	65	33	4	13	.1	80	7.0
80-010-07	65.0- 70.0	TILL	68	12	79	36	4	5	.1	100	8.1
80-010-08	70.0- 75.0	TILL	88	9	44	39	3	4	.2	100	4.3
80-010-09	75.0- 80.0	TILL	58	17	53	43	4	9	.1	1400	8.0
80-010-10	80.0- 85.0	TILL	48	14	50	24	4	5	.1	20	7.4
80-010-11	88.0- 91.0	TILL	135	14	60	34	6	7	.1	620	7.2

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-010-01	28.0- 40.0	GRAVEL	66	46	60	26	3	6	.1	20	26.3
80-010-02	40.0- 45.0	GRAVEL	49	70	66	32	4	30	.1	120	24.7
80-010-03	45.0- 50.0	TILL	55	37	67	32	3	22	.1	80	25.3
80-010-04	50.0- 55.0	TILL	47	40	69	25	4	11	.1	160	31.7
80-010-05	55.0- 60.0	TILL	55	37	53	20	3	15	.1	80	20.7
80-010-06	60.0- 65.0	TILL	58	45	78	29	4	22	.2	340	23.4
80-010-07	65.0- 70.0	TILL	79	61	61	38	3	13	.1	420	29.0
80-010-08	70.0- 75.0	TILL	88	28	63	39	4	4	.1	200	20.4
80-010-09	75.0- 80.0	TILL	76	36	60	43	4	11	.1	280	24.1
80-010-10	80.0- 85.0	TILL	62	34	56	31	3	9	.1	19000	23.5
80-010-11	88.0- 91.0	TILL	110	84	54	30	3	13	.1	400	26.3

-C.C63MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-010-01	28.0- 40.0	GRAVEL	7	1	14	11	1	IS	.1	10	1.4
80-010-02	40.0- 45.0	GRAVEL	8	2	16	15	2	2	.4	10	1.7
80-010-03	45.0- 50.0	TILL	9	1	16	14	2	2	.2	10	1.7
80-010-04	50.0- 55.0	TILL	6	2	12	10	2	1	.1	10	1.8
80-010-05	55.0- 60.0	TILL	9	2	15	12	2	IS	.2	100	1.8
80-010-06	60.0- 65.0	TILL	7	1	16	12	2	1	.4	40	1.6
80-010-07	65.0- 70.0	TILL	8	2	17	13	2	1	.2	10	1.3
80-010-08	70.0- 75.0	TILL	11	1	12	12	2	1	.1	40	1.4
80-010-09	75.0- 80.0	TILL	9	2	15	14	2	1	.2	20	1.3
80-010-10	80.0- 85.0	TILL	11	2	15	14	2	1	.1	20	1.1
80-010-11	88.0- 91.0	TILL	20	5	20	18	3	1	.4	10	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-010-12	91.0- 95.0	BEDROK	91	1	88	36	3	1	.1	10	.2

HOLE-NO: 80-011
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UTM-COORD: 5597,3478
ELEVATION: 1,109

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-011-01	5.0- 10.0	TILL	28	15	42	10	3	2	.1	560	10.5
80-011-02	10.0- 15.0	TILL	18	14	54	10	3	3	.1	1000	7.8
80-011-03	15.0- 20.0	TILL	18	14	51	12	4	3	.1	360	6.4
80-011-04	20.0- 25.0	TILL	42	14	54	16	3	5	.1	40	7.7
80-011-05	25.0- 30.0	TILL	37	10	50	17	4	6	.1	80	6.0
80-011-06	30.0- 35.0	TILL	34	9	57	35	4	4	.1	60	3.3
80-011-07	35.0- 40.0	TILL	30	4	48	34	4	3	.1	120	2.3
80-011-08	40.0- 45.0	TILL	44	7	54	35	3	3	.1	420	2.8
80-011-09	45.0- 50.0	TILL	31	16	60	13	3	5	.1	10	6.3
80-011-10	50.0- 55.0	TILL	37	15	45	12	3	4	.1	10	6.9

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-011-01	5.0- 10.0	TILL	32	61	33	12	3	3	.1	700	42.7
80-011-02	10.0- 15.0	TILL	10	46	31	8	3	2	.1	660	29.6
80-011-03	15.0- 20.0	TILL	18	24	31	12	4	4	.1	760	30.6
80-011-04	20.0- 25.0	TILL	37	39	39	20	3	5	.1	60	25.6
80-011-05	25.0- 30.0	TILL	46	33	65	17	4	8	.1	80	25.2
80-011-06	30.0- 35.0	TILL	24	12	32	18	3	4	.1	20	14.9
80-011-07	35.0- 40.0	TILL	30	14	36	18	3	4	.2	320	11.3
80-011-08	40.0- 45.0	TILL	29	16	38	19	3	7	.1	20	9.0
80-011-09	45.0- 50.0	TILL	46	42	39	13	3	8	.1	800	20.3
80-011-10	50.0- 55.0	TILL	135	47	46	13	3	7	.1	140	27.4

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-011-01	5.0- 10.0	TILL	12	3	17	14	2	1	.1	20	1.8
80-011-02	10.0- 15.0	TILL	7	2	14	11	2	1	.1	10	1.5
80-011-03	15.0- 20.0	TILL	8	4	14	13	2	1	.1	10	1.5
80-011-04	20.0- 25.0	TILL	7	2	15	13	2	1	.2	20	1.7
80-011-05	25.0- 30.0	TILL	11	2	14	11	2	2	.1	10	1.8
80-011-06	30.0- 35.0	TILL	9	3	15	12	2	1	.1	10	1.7
80-011-07	35.0- 40.0	TILL	11	4	18	16	2	2	.1	10	1.7
80-011-08	40.0- 45.0	TILL	19	5	25	23	2	1	.2	10	1.3
80-011-09	45.0- 50.0	TILL	18	4	22	19	2	1	.1	100	1.4
80-011-10	50.0- 55.0	TILL	38	2	27	25	2	1	.1	20	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-011-11	55.0- 60.0	BEDROCK	96	1	59	42	3	1	.1	10	.2

HOLE-NO: 80-012
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UTM-COORD: 5550,3474
ELEVATION: 1,066

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-012-01	9.0- 15.0	TILL	16	16	52	10	3	4	.1	60	5.9
80-012-02	15.0- 20.0	TILL	17	16	51	9	3	3	.1	60	6.7
80-012-03	20.0- 25.0	TILL	17	17	57	7	3	3	.1	40	6.7
80-012-04	25.0- 28.0	TILL	16	13	49	8	3	3	.1	160	6.2
80-012-05	28.0- 33.0	TILL	19	13	56	11	3	4	.1	80	6.2
80-012-06	33.0- 38.0	SAND	19	12	49	12	3	2	.1	40	5.7
80-012-07	38.0- 42.0	TILL	25	12	90	12	4	4	.1	260	4.8
80-012-08	42.0- 48.0	TILL	35	61	164	19	4	10	.1	80	6.6
80-012-09	48.0- 53.0	TILL	34	15	74	15	4	5	.1	160	7.2
80-012-10	53.0- 58.0	TILL	42	22	52	43	4	4	.2	40	7.1
80-012-11	58.0- 63.0	TILL	145	26	57	170	30	4	.6	240	5.4
80-012-12	63.0- 71.0	TILL	97	14	70	27	6	6	.2	100	5.9
80-012-13	71.0- 73.0	TILL	185	9	59	15	4	1	.1	10	6.9

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-012-01	9.0- 15.0	TILL	11	32	33	9	3	3	.2	80	23.1
80-012-02	15.0- 20.0	TILL	11	48	35	10	3	4	.1	60	28.9
80-012-03	20.0- 25.0	TILL	9	39	30	9	3	5	.1	1100	27.1
80-012-04	25.0- 28.0	TILL	8	40	33	9	3	3	.1	200	26.8
80-012-05	28.0- 33.0	TILL	9	42	33	10	3	3	.1	460	26.3
80-012-06	33.0- 38.0	SAND	12	37	29	9	3	15	.1	100	11.4
80-012-07	38.0- 42.0	TILL	20	51	42	15	3	7	.1	120	21.1
80-012-08	42.0- 48.0	TILL	43	36	47	20	3	9	.1	3200	29.5
80-012-09	48.0- 53.0	TILL	42	78	54	21	3	13	1.0	160	23.1
80-012-10	53.0- 58.0	TILL	41	51	62	76	6	12	.6	60	26.4
80-012-11	58.0- 63.0	TILL	69	38	43	51	7	15	.2	80	23.2
80-012-12	63.0- 71.0	TILL	145	34	44	17	2	10	.1	10	28.9
80-012-13	71.0- 73.0	TILL	315	41	41	14	4	6	.2	3000	28.4

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-012-01	9.0- 15.0	TILL	10	7	16	15	2	1	.1	20	1.8
80-012-02	15.0- 20.0	TILL	9	7	16	18	2	1	.1	20	1.0
80-012-03	20.0- 25.0	TILL	9	5	16	16	2	1	.1	340	1.6
80-012-04	25.0- 28.0	TILL	7	9	17	13	2	2	.1	10	2.9
80-012-05	28.0- 33.0	TILL	7	4	14	12	1	1	.1	10	1.8
80-012-06	33.0- 38.0	SAND	11	14	22	17	2	IS	.1	10	IS
80-012-07	38.0- 42.0	TILL	7	3	14	10	1	1	.4	10	1.8
80-012-08	42.0- 48.0	TILL	8	4	12	11	2	1	.1	70	1.6
80-012-09	48.0- 53.0	TILL	7	3	12	11	1	2	.4	160	1.6
80-012-10	53.0- 58.0	TILL	7	2	13	17	2	1	.1	10	1.6
80-012-11	58.0- 63.0	TILL	10	4	13	14	3	3	.4	10	1.5
80-012-12	63.0- 71.0	TILL	11	3	15	14	3	1	.1	10	1.4
80-012-13	71.0- 73.0	TILL	20	9	23	24	1	2	.2	10	1.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-012-14	73.0- 75.0	BEDROK	37	1	97	77	4	5	.2	10	3.3

HOLE-NO: 80-013
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UTM COORD: 5541,3446
ELEVATION: 1,020

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-013-01	4.0- 15.0	TILL	30	12	49	20	3	1	.2	10	6.9
80-013-02	15.0- 22.0	TILL	28	205	50	8	3	1	.1	20	6.9

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-013-01	4.0- 15.0	TILL	29	57	34	9	2	2	.1	10	30.2
80-013-02	15.0- 22.0	TILL	24	47	32	10	4	1	.1	20	26.8

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-013-01	4.0- 15.0	TILL	8	4	14	12	1	1	.1	20	1.7
80-013-02	15.0- 22.0	TILL	9	3	14	14	1	1	.1	10	1.8

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-013-03	22.0- 26.0	BEDROK	43	8	94	70	4	6	.2	10	3.5

HOLE-NO: 80-014
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UTM-COORD: 5535,3406
ELEVATION: 1,036

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-014-01	41.0- 45.0	GRAVEL	140	16	55	26	5	12	.2	160	6.6
80-014-02	45.0- 47.0	TILL	51	10	51	14	3	2	.1	80	5.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-014-01	41.0- 45.0	GRAVEL	145	51	56	24	3	28	.2	980	26.0
80-014-02	45.0- 47.0	TILL	76	48	34	13	3	4	.1	480	29.6

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-014-01	41.0- 45.0	GRAVEL	17	3	14	10	1	2	.1	10	1.5
80-014-02	45.0- 47.0	TILL	34	3	20	16	1	1	.1	10	1.8

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-014-03	47.0- 53.0	BEDROK	35	2	78	65	4	3	.4	80	3.7

HOLE-NO: 80-015
****

UTM-COORD: 5587,3399
ELEVATION: 1,096

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-015-01	4.0- 10.0	TILL	28	13	45	30	2	1	.1	40	7.2
80-015-02	10.0- 17.0	GRAVEL	37	20	54	15	4	4	.1	80	6.4
80-015-03	17.0- 30.0	TILL	36	15	54	25	2	4	.1	140	7.7
80-015-04	30.0- 34.0	TILL	43	10	56	15	4	2	.1	140	4.9
80-015-05	34.0- 37.0	TILL	46	12	60	20	4	3	.1	20	6.5
80-015-06	37.0- 43.0	TILL	49	10	58	16	4	2	.1	100	5.7
80-015-07	43.0- 47.0	TILL	48	8	51	21	3	4	.1	340	5.2
80-015-08	49.0- 55.0	TILL	67	15	134	64	4	3	.2	220	6.6
80-015-09	55.0- 60.0	TILL	34	15	56	12	4	8	.1	240	8.2
80-015-10	60.0- 67.0	TILL	27	15	62	13	4	4	.2	300	7.1
80-015-11	67.0- 70.0	TILL	39	15	54	11	4	3	.1	140	7.0
80-015-12	70.0- 73.0	GRAVEL	88	42	45	37	3	32	.4	120	6.4
80-015-13	73.0- 77.0	TILL	61	22	82	15	4	5	.4	20	7.2
80-015-14	77.0- 81.0	TILL	57	20	72	22	3	12	.2	340	9.6
80-015-15	81.0- 91.0	TILL	65	36	134	29	4	12	1.8	500	7.3
80-015-16	91.0- 93.5	TILL	69	30	70	58	3	14	.2	100	5.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-015-01	4.0- 10.0	TILL	31	40	35	15	4	5	.2	220	25.6
80-015-02	10.0- 17.0	GRAVEL	17	31	33	11	6	1	.2	180	20.8
80-015-03	17.0- 30.0	TILL	48	49	49	25	2	10	.1	1900	27.2
80-015-04	30.0- 34.0	TILL	33	30	40	14	1	3	.1	120	24.3
80-015-05	34.0- 37.0	TILL	28	39	46	16	3	9	.1	60	19.3
80-015-06	37.0- 43.0	TILL	41	36	46	11	3	4	.2	10	22.9
80-015-07	43.0- 47.0	TILL	39	32	53	13	3	5	.2	200	26.0
80-015-08	49.0- 55.0	TILL	36	46	56	12	3	5	.1	3400	32.0
80-015-09	55.0- 60.0	TILL	52	45	49	13	2	17	.1	2100	27.4
80-015-10	60.0- 67.0	TILL	49	48	62	16	3	11	.2	140	28.9
80-015-11	67.0- 70.0	TILL	49	60	57	19	3	3	.2	140	32.6
80-015-12	70.0- 73.0	GRAVEL	58	73	50	19	3	22	.2	120	35.5
80-015-13	73.0- 77.0	TILL	56	35	48	13	2	9	1.4	100	39.8
80-015-14	77.0- 81.0	TILL	62	50	69	21	3	14	.1	3800	40.9
80-015-15	81.0- 91.0	TILL	135	44	54	34	3	16	.1	60	28.0
80-015-16	91.0- 93.5	TILL	125	56	69	53	3	10	.4	100	17.6

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AL PPB	U PPM
80-015-01	4.0- 10.0	TILL	12	3	17	17	1	1	.1	10	1.5
80-015-02	10.0- 17.0	GRAVEL	9	2	14	13	1	1	.4	10	1.4
80-015-03	17.0- 30.0	TILL	9	2	14	12	2	1	.1	20	2.0
80-015-04	30.0- 34.0	TILL	12	2	17	11	2	1	.1	10	1.5
80-015-05	34.0- 37.0	TILL	11	2	17	13	2	1	.2	40	1.7
80-015-06	37.0- 43.0	TILL	11	4	18	13	3	1	.1	40	1.6
80-015-07	43.0- 47.0	TILL	12	2	17	15	2	1	.1	20	1.9
80-015-08	49.0- 55.0	TILL	11	4	17	14	2	1	.2	20	2.0
80-015-09	55.0- 60.0	TILL	9	4	15	12	2	1	.1	10	1.5
80-015-10	60.0- 67.0	TILL	9	4	16	11	1	1	.1	10	1.6
80-015-11	67.0- 70.0	TILL	10	3	16	12	1	1	.2	10	1.4
80-015-12	70.0- 73.0	GRAVEL	8	5	13	9	1	1	.1	100	1.5
80-015-13	73.0- 77.0	TILL	12	4	16	13	1	1	.1	10	1.5
80-015-14	77.0- 81.0	TILL	14	3	23	25	1	1	.1	20	1.6
80-015-15	81.0- 91.0	TILL	19	4	23	26	2	1	.1	40	1.6
80-015-16	91.0- 93.5	TILL	18	3	21	24	2	3	.1	20	1.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-015-17	93.5- 95.0	BEDROCK	27	3	154	36	3	13	.2	10	.3

HOLE-NO: 80-016
****

UTM-COORD: 5547,3368
ELEVATION: 1,043

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-016-01	5.0- 18.0	GRAVEL	79	225	50	48	3	11	.2	40	5.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-016-01	5.0- 18.0	GRAVEL	245	16	47	155	4	12	.2	320	14.2

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-016-01	5.0- 18.0	GRAVEL	56	3	51	56	2	2	.1	40	0.9

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-016-02	18.0- 21.0	BEDROK	68	1	44	28	3	1	.1	10	1.4

HOLE-NO: 80-017
****

UTM-COORD: 5545,3347
ELEVATION: 1,059

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-017-01	79.0- 85.0	TILL	48	16	59	14	3	12	.2	360	9.7
80-017-02	85.0- 89.0	TILL	110	15	67	27	6	37	.1	200	6.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-017-01	79.0- 85.0	TILL	40	49	40	15	2	10	.2	10	23.0
80-017-02	85.0- 89.0	TILL	125	40	34	28	3	135	.1	180	19.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-017-01	79.0- 85.0	TILL	8	2	12	9	2	1	.2	40	1.8
80-017-02	85.0- 89.0	TILL	15	3	20	20	1	7	.1	10	0.7

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-017-03	89.0- 92.0	BEDROK	98	1	74	26	3	1	.2	10	.3

HOLE-NO: 80-018
****

UTM-COORD: 5577,3340
ELEVATION: 1,043

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-C18-01	65.0- 80.0	SAND	15	13	41	9	3	2	.1	40	8.2
80-018-02	80.0- 90.0	SAND	18	12	48	8	3	3	.1	40	6.9
80-018-03	90.0- 96.0	SAND	26	12	58	9	3	3	.1	10	6.4
8C-018-04	96.0- 98.0	TILL	33	12	54	15	2	2	.2	20	6.2

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-C18-01	65.0- 80.0	SAND	9	69	31	9	3	2	.1	10	34.4
80-018-02	80.0- 90.0	SAND	10	43	27	7	3	2	.1	10	28.0
80-018-03	90.0- 96.0	SAND	7	41	30	7	3	2	.1	10	25.0
80-018-04	96.0- 98.0	TILL	10	39	26	6	2	2	.4	480	29.8

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-018-01	65.0- 80.0	SAND	8	3	15	10	1	2	.1	20	1.7
80-018-02	80.0- 90.0	SAND	8	2	14	9	2	2	.1	10	2.2
80-018-03	90.0- 96.0	SAND	7	3	13	9	2	1	.1	20	2.4
8C-C18-04	96.0- 98.0	TILL	6	2	12	8	2	1	.1	20	1.6

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-018-05	91.0- 96.0	BEDROK	99	1	47	59	3	1	.1	20	.3

HOLE-NC: 80-019
****

UTM-COORD: 5565,3306
ELEVATION: 1,073

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-019-01	45.0- 48.5	TILL	145	6	48	28	3	13	.1	60	4.3

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-019-01	45.0- 48.5	TILL	71	32	36	22	2	12	.2	540	21.5

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-019-01	45.0- 48.5	TILL	8	3	13	8	2	1	.1	10	1.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-019-02	48.5- 52.0	BEDROK	67	1	86	53	3	2	.1	20	.3

HOLE-NO: 80-C20
****

UTM-COORD: 5540,3310
ELEVATION: 997

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-020-01	5.0- 10.0	TILL	40	13	53	10	3	2	.1	10	5.6

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-020-01	5.0- 10.0	TILL	18	31	26	7	3	2	.1	5500	25.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-020-01	5.0- 10.0	TILL	14	6	16	12	1	1	.1	10	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-020-02	10.0- 13.0	BEDROK	30	2	46	44	2	4	.4	20	2.6

HOLE-NO: 80-021
****

UTM-COORD: 5606,3283
ELEVATION: 1,004

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-021-01	47.0- 48.0	TILL	34	12	33	13	2	3	.1	10	3.6

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-021-01	47.0- 48.0	TILL	29	38	31	22	2	10	.1	100	11.9

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-021-01	47.0- 48.0	TILL	9	3	19	24	3	2	.2	10	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-021-02	48.0- 53.0	BEDROK	39	1	40	59	2	5	.4	10	.7

HOLE-NO: 80-022
****

UTM-COORD: 5525,3240
ELEVATION: 1,076

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-022-01	2.5- 9.0	TILL	215	17	194	50	4	IS	.1	10	IS
80-022-02	14.0- 26.0	TILL	24	13	46	10	4	4	.1	20	5.7

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-022-01	2.5- 9.0	TILL	925	132	807	100	5	IS	3.0	10	IS
80-022-02	14.0- 26.0	TILL	29	24	26	12	3	3	.1	860	21.6

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-022-01	2.5- 9.0	TILL	41	6	63	58	2	4	.1	20	2.8
80-022-02	14.0- 26.0	TILL	15	2	23	20	2	1	.1	20	1.5

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-022-03	26.0- 35.0	BEDROK	15	1	49	57	2	3	.1	40	2.2

HOLE-NO: 80-023
****

UTM-COORD: 5560,3201
ELEVATION: 987

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-023-01	98.0-101.0	TILL	91	17	48	22	4	15	.2	40	5.6

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-023-01	98.0-101.0	TILL	120	36	47	27	2	22	.2	10	12.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-023-01	98.0-101.0	TILL	15	7	21	17	1	2	.1	10	1.8

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-023-02	101.0-103.0	BEDROK	13	1	30	19	3	2	.2	20	.6

HOLE-NO: 80-024
****

UTM-COORD: 5588,3229
ELEVATION: 1,000

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-024-01	57.0- 63.0	GRAVEL	245	17	59	48	4	36	.4	2000	3.6
80-024-02	63.0- 66.0	GRAVEL	215	15	57	44	3	40	.2	780	4.5
80-024-03	66.0- 68.0	TILL	205	45	67	37	4	140	.2	1000	4.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-024-01	57.0- 63.0	GRAVEL	155	31	41	38	3	30	.2	40	21.1
80-024-02	63.0- 66.0	GRAVEL	96	25	36	27	2	35	.1	740	17.0
80-024-03	66.0- 68.0	TILL	83	23	36	31	2	90	.2	120	19.2

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-024-01	57.0- 63.0	GRAVEL	18	1	20	12	1	2	.1	40	1.3
80-024-02	63.0- 66.0	GRAVEL	25	2	26	16	2	2	.1	10	1.1
80-024-03	66.0- 68.0	TILL	20	3	34	23	2	85	.1	20	1.5

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-024-04	68.0- 70.0	BEDROK	49	1	67	9	4	28	.1	10	.3

HOLE-NO: 80-C25
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UTM-COORD: 5551,3229
ELEVATION: 1,000

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-025-01	34.5- 41.0	GRAVEL	95	12	49	35	4	16	.8	2100	5.2

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-025-01	34.5- 41.0	GRAVEL	65	30	43	34	2	50	.1	60	19.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-025-01	34.5- 41.0	GRAVEL	18	3	20	15	1	1	.1	20	1.5

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-025-02	41.0- 45.0	BEDROK	48	1	67	43	3	1	.1	10	.9

HOLE-NO: 80-026
****

UTM-COORD: 5567,3208
ELEVATION: 997

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-026-01	59.0- 67.5	GRAVEL	68	15	34	23	3	15	.1	320	5.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-026-01	59.0- 67.5	GRAVEL	49	23	33	32	3	16	.2	11000	14.4

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-026-01	59.0- 67.5	GRAVEL	20	3	22	15	1	2	.6	10	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-026-02	67.5- 72.0	BEDROK	17	1	32	27	3	2	.1	10	1.0

HOLE-NC: 80-027
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UTM-COORD: 5605,3174
ELEVATION: 997

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-027-01	68.0- 71.0	TILL	87	25	50	36	4	31	.1	240	5.4

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-027-01	68.0- 71.0	TILL	49	35	47	28	3	16	2.4	160	19.2

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-027-01	68.0- 71.0	TILL	18	2	23	23	1	2	.1	10	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-027-02	71.0- 75.0	BEDROK	13	1	36	26	1	2	.1	10	.5

HOLE-NO: 80-028
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UTM-COORD: 5604,3203
ELEVATION: 1,027

-1.6CC+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-028-01	48.0- 51.0	TILL	32	18	53	11	3	2	.1	100	7.6
80-028-02	51.0- 52.5	GRAVEL	130	17	54	32	6	4	.1	100	3.2

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-028-01	48.0- 51.0	TILL	15	42	27	7	4	2	.1	100	32.9
80-028-02	51.0- 52.5	GRAVEL	55	23	33	25	2	3	.1	60	11.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-028-01	48.0- 51.0	TILL	9	4	14	10	1	1	.4	10	1.4
80-028-02	51.0- 52.5	GRAVEL	39	5	32	31	1	1	.2	10	1.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-028-03	52.5- 55.0	BEDROK	7	1	25	16	2	1	.1	20	.6

HOLE-NO: 80-029
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UTM-COORD: 5628,3191
ELEVATION: 1,027

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-029-01	17.0- 25.0	SAND	32	12	56	14	4	2	.1	140	4.2
80-029-02	25.0- 27.0	SAND	29	10	55	11	2	1	.1	120	4.6

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-029-01	17.0- 25.0	SAND	18	33	42	10	3	2	.1	100	28.0
80-029-02	25.0- 27.0	SAND	23	19	39	11	3	2	.1	40	11.8

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-029-01	17.0- 25.0	SAND	44	4	57	37	1	3	.1	10	1.4
80-029-02	25.0- 27.0	SAND	53	3	60	51	2	2	.1	10	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-029-03	27.0- 31.0	BEDROCK	90	1	89	58	1	2	.2	10	.8

HOLE-NO: 80-030
****

UTM-COORD: 5679,3182
ELEVATION: 968

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-030-01	10.5- 13.0	GRAVEL	27	15	41	27	4	5	.1	40	6.7

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-030-01	10.5- 13.0	GRAVEL	26	30	40	22	4	5	.1	240	19.2

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-030-01	10.5- 13.0	GRAVEL	24	5	27	30	1	3	.4	40	1.5

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-030-02	13.0- 17.0	BEDROK	2	1	40	29	2	2	.2	10	1.4

HOLE-NO: 80-031
****

UTM-COORD: 5636,3222
ELEVATION: 1,004

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-031-01	20.0- 21.5	TILL	66	23	66	23	6	3	.1	3200	9.4

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-031-01	20.0- 21.5	TILL	15	33	27	8	4	4	.1	40	25.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-031-01	20.0- 21.5	TILL	8	4	13	9	2	1	.1	20	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-031-02	21.5- 25.0	BEDROK	9	10	36	26	2	2	.1	10	3.0

HOLE-NC: 80-032
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UTM-COORD: 5666,3244
ELEVATION: 954

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-032-01	42.5- 47.0	GRAVEL	340	26	324	125	23	IS	.4	60	4.4
80-032-02	41.0- 42.5	TILL	IS	IS	IS	IS	IS	IS	IS	IS	IS
80-032-02	41.0- 42.5	TILL	IS	IS	IS	IS	IS	IS	IS	IS	IS

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-032-01	42.5- 47.0	GRAVEL	IS	IS	IS	IS	IS	IS	IS	10	IS

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-032-01	42.5- 47.0	GRAVEL	65	36	82	85	4	12	.2	10	IS
80-032-02	41.0- 42.5	TILL	IS	IS	IS	IS	IS	IS	IS	10	IS

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-032-03	47.0- 50.0	BEDROK	22	8	30	32	2	2	.1	10	3.6

HOLE-NC: 80-033
****

UTM-COORD: 5658,3221
ELEVATION: 961

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-033-03	66.0- 69.0	BEDROK	34	6	23	18	4	2	.1	40	3.2

HOLE-NO: 80-034
****

UTM-COORD: 5651,3190
ELEVATION: 961

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-034-01	70.0- 77.0	GRAVEL	185	13	74	53	6	19	.1	180	12.7
80-034-02	80.0- 84.0	GRAVEL	135	18	56	44	6	16	.1	140	10.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-034-01	70.0- 77.0	GRAVEL	180	9	69	49	2	30	.4	360	36.7
80-034-02	80.0- 84.0	GRAVEL	10	23	25	9	2	24	.1	140	27.6

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-034-01	70.0- 77.0	GRAVEL	19	6	22	19	2	2	.2	40	2.3
80-034-02	80.0- 84.5	GRAVEL	21	5	22	21	2	3	.1	10	2.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-034-03	84.5- 87.0	BEDROK	8	5	12	17	3	2	.1	10	1.5

HOLE-NO: 80-035
****

UTM-COORD: 5694,3198
ELEVATION: 909

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-035-01	123.0-132.0	GRAVEL	140	22	154	74	4	25	1.0	21000	7.9
80-035-02	132.0-135.0	TILL	81	22	52	46	4	17	.2	180	5.8

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-035-01	123.0-132.0	GRAVEL	120	56	60	50	4	17	.2	2200	25.4
80-035-02	132.0-135.0	TILL	75	67	40	46	3	19	.2	920	17.2

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-035-01	123.0-132.0	GRAVEL	17	3	21	24	2	2	.1	10	1.5
80-035-02	132.0-135.0	TILL	16	7	23	28	2	2	.1	10	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-035-03	135.0-140.0	BEDROK	4	4	10	12	2	2	.1	20	.3

HOLE-NO: 80-036
****

UTM-COORD: 5746,3158
ELEVATION: 1,017

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-036-01	0.0- 15.0	SAND	20	13	38	10	3	1	.1	220	4.8
80-036-02	15.0- 27.0	SAND	17	13	39	9	2	2	.1	260	4.9
80-036-03	27.0- 28.0	TILL	56	18	38	15	6	4	.1	100	6.0

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-036-01	0.0- 15.0	SAND	10	22	25	9	2	2	.1	100	16.8
80-036-02	15.0- 27.0	SAND	19	32	27	9	3	2	.1	2300	19.3
80-036-03	27.0- 28.0	TILL	65	31	26	14	6	3	.1	2700	22.6

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-036-01	0.0- 15.0	SAND	14	6	29	27	2	2	.1	40	1.3
80-036-02	15.0- 27.0	SAND	14	2	27	24	2	1	.1	40	0.9
80-036-03	27.0- 28.0	TILL	27	4	33	26	2	1	.2	10	1.7

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-036-04	28.0- 30.0	BEDROK	245	1	94	26	4	2	.1	10	.3

HOLE-NO: 80-037
****

UTM-COORD: 5785,3179
ELEVATION: 882

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-037-01	18.0- 20.0	BEDROK	91	1	65	79	4	2	.1	10	.3

HOLE-NO: 80-038
****

UTM-COORD: 5794,3183
ELEVATION: 991

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-038-01	11.5- 16.0	TILL	205	1	45	60	7	5	.6	40	3.7

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-038-01	11.5- 16.0	TILL	200	1	36	44	6	2	.4	60	7.5

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-038-01	11.5- 16.0	TILL	71	6	52	60	4	2	.1	20	0.7

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-038-02	16.0- 18.0	BEDROK	95	1	56	59	3	4	.1	10	.8

HOLE-NO: 80-039
****

UTM-COORD: 5651,3175
ELEVATION: 977

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-039-01	3.0- 10.0	GRAVEL	43	17	50	34	4	8	.1	140	8.3
80-039-02	10.0- 20.0	GRAVEL	44	17	37	34	4	6	.1	100	4.9
80-039-03	20.0- 25.0	GRAVEL	33	13	35	34	4	9	.1	220	4.6

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-039-01	3.0- 10.0	GRAVEL	39	26	54	37	2	10	.1	560	15.5
80-039-02	10.0- 20.0	GRAVEL	50	24	46	41	3	13	.1	260	18.5
80-039-03	20.0- 25.0	GRAVEL	32	19	37	34	4	13	.1	40	15.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-039-01	3.0- 10.0	GRAVEL	23	3	35	44	2	3	.1	960	1.5
80-039-02	10.0- 20.0	GRAVEL	35	9	45	61	2	4	.4	10	1.4
80-039-03	20.0- 25.0	GRAVEL	24	1	26	41	2	3	.2	10	1.5

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-039-04	25.0- 28.0	BEDROK	59	1	124	115	3	2	.1	10	.7

HOLE-NO: 80-C4C
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UTM-COORD: 5841,3174
ELEVATION: 1,014

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-040-01	12.0- 13.0	TILL	30	11	40	24	3	7	.1	IS	IS

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-040-01	12.0- 13.0	TILL	24	19	31	16	2	10	.1	IS	IS

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-040-01	12.0- 13.0	TILL	30	10	55	46	1	1	.1	10	IS

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-040-02	13.0- 15.0	BEDROK	68	1	60	100	3	3	.1	10	IS

HOLE-NO: 80-041
****

UTM-COORD: 5815,3169
ELEVATION: 1,040

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-041-01	5.0- 20.0	GRAVEL	235	14	36	100	4	5	1.0	80	4.7
80-041-02	20.0- 32.0	GRAVEL	455	1	42	235	6	21	.8	560	2.2
80-041-03	35.5- 40.0	GRAVEL	150	42	39	50	4	5	.1	140	21.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-041-01	5.0- 20.0	GRAVEL	860	12	27	115	6	8	.8	80	3.0
80-041-02	20.0- 32.0	GRAVEL	775	1	27	265	10	10	1.2	1900	2.1
80-041-03	35.5- 40.0	GRAVEL	545	5	34	175	24	15	1.2	140	2.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-041-01	5.0- 20.0	GRAVEL	92	12	50	125	2	2	.1	20	1.0
80-041-02	20.0- 32.0	GRAVEL	140	15	59	185	4	3	.1	40	0.8
80-041-03	35.5- 40.0	GRAVEL	81	17	54	185	2	3	.2	10	0.3

HOLE-NO: 80-541
****

UTM-COORD: 5815,3168
ELEVATION: 1,040

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-541-01	5.0- 20.0	GRAVEL	215	3	44	135	6	10	1.2	20	4.5
80-541-02	20.0- 40.0	GRAVEL	320	4	44	105	4	10	2.2	20	6.0
80-541-03	40.0- 60.0	GRAVEL	175	11	44	64	8	7	.6	10	6.0
80-541-04	60.0-103.0	GRAVEL	275	18	44	78	8	10	1.0	120	5.8

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-541-01	5.0- 20.0	GRAVEL	265	3	46	115	4	15	1.2	3100	8.5
80-541-02	20.0- 40.0	GRAVEL	465	75	41	115	22	15	9.8	140	5.4
80-541-03	40.0- 60.0	GRAVEL	315	14	48	105	20	15	1.4	140	4.7
80-541-04	60.0-103.0	GRAVEL	365	12	72	110	19	12	1.2	280	10.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-541-01	5.0- 20.0	GRAVEL	87	21	69	165	2	1	.2	40	1.2
80-541-02	20.0- 40.0	GRAVEL	79	44	61	195	2	2	.1	60	1.2
80-541-03	40.0- 60.0	GRAVEL	68	20	50	145	2	3	.1	40	0.8
80-541-04	60.0-103.0	GRAVEL	65	15	57	115	2	2	.1	10	1.5

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-541-05	103.0-110.0	BEDROK	44	7	45	57	3	3	.1	10	1.1

HOLE-NO: 80-042
****

UTM-COORD: 5811,3180
ELEVATION: 971

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-042-01	25.5- 26.0	TILL	285	22	61	115	6	30	.4	220	3.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-042-01	25.5- 26.0	TILL	395	45	144	205	4	19	.4	200	11.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-042-01	25.5- 26.0	TILL	36	4	28	37	2	3	.1	10	1.6

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-042-02	26.0- 27.0	BEDROK	90	1	73	105	3	5	.1	10	.3

HCLE-NO: 80-043
****

UTM-COORD: 5732,3214
ELEVATION: 987

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-043-01	29.5- 31.0	TILL	IS	IS	IS	IS	IS	IS	IS	60	IS

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-043-01	29.5- 31.0	TILL	205	97	56	25	3	4	.1	80	28.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-043-01	29.5- 31.0	TILL	26	8	43	44	3	2	.1	10	2.2

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-043-02	31.0- 35.0	BEDROK	30	26	53	59	3	2	.2	10	2.2

HCLE-NC: 80-044
****

UTM-COORD: 5700,3251
ELEVATION: 918

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-044-01	52.0- 58.0	GRAVEL	115	25	99	83	6	13	.1	240	5.7

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-044-01	52.0- 58.0	GRAVEL	185	74	144	75	3	38	.1	80	24.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-044-01	52.0- 58.0	GRAVEL	28	3	35	42	1	1	.1	10	2.5

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-044-02	58.0- 60.0	BEDROK	115	1	72	49	2	3	.2	10	2.4

HOLE-NO: 80-045
****

UTM-COORD: 5702,3273
ELEVATION: 1,010

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-045-01	8.0- 12.0	GRAVEL	230	19	494	43	4	10	.1	80	4.9

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-045-01	8.0- 12.0	GRAVEL	210	27	694	25	3	6	.1	140	17.5

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-045-01	8.0- 12.0	GRAVEL	56	5	314	36	2	2	.1	10	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-045-02	12.0- 15.0	BEDROK	335	15	2750	92	5	3	.6	20	.9

HCLE-NO: 80-046
****

UTM-COORD: 5730,3240
ELEVATION: 1,027

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-C46-01	21.0- 22.0	GRAVEL	46	11	42	16	7	4	.1	200	10.0

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-046-01	21.0- 22.0	GRAVEL	155	26	50	34	4	13	.2	60	12.5

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-046-01	21.0- 22.0	GRAVEL	16	3	22	19	1	1	.1	10	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-046-02	22.0- 24.0	BEDROCK	135	3	61	19	3	2	.4	20	1.5

HOLE-NO: 80-047
****

UTM-COORD: 5857,3227
ELEVATION: 912

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-047-01	81.0- 91.0	GRAVEL	205	31	69	195	12	34	8.4	76000	6.8
80-047-02	91.0- 93.0	GRAVEL	210	245	69	195	13	35	4.2	40	7.3

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-047-01	81.0- 91.0	GRAVEL	265	87	79	145	6	35	.6	5000	15.7
80-047-02	91.0- 93.0	GRAVEL	255	365	80	155	7	31	7.2	160	17.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-047-01	81.0- 91.0	GRAVEL	17	2	21	38	1	2	.1	10	0.9
80-047-02	91.0- 93.0	GRAVEL	20	41	24	65	2	2	.1	10	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-047-03	93.0- 95.0	BEDROK	16	8	31	75	3	2	.2	10	1.3

HOLE-NO: 80-048
****

UTM-COORD: 5860,3257
ELEVATION: 997

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-048-01	7.0- 25.0	SAND	37	18	46	33	4	6	.1	280	6.0
80-048-02	25.0- 35.0	GRAVEL	31	45	45	24	3	3	.2	40	5.9
80-048-03	35.0- 50.0	SAND	20	17	45	17	3	2	.1	240	7.3
80-048-04	50.0- 65.0	SAND	25	14	45	18	4	2	.1	60	5.8
80-048-05	65.0- 80.0	SAND	20	12	41	16	4	3	.1	100	5.4
80-048-06	80.0- 95.0	SAND	26	14	44	19	3	3	.1	100	6.3
80-048-07	95.0- 97.0	SAND	36	16	46	19	6	4	.1	120	6.7

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-048-01	7.0- 25.0	SAND	44	46	35	42	4	8	.1	3900	13.8
80-048-02	25.0- 35.0	GRAVEL	32	38	36	20	2	3	.1	10000	23.7
80-048-03	35.0- 50.0	SAND	34	39	35	23	3	11	.1	140	17.3
80-048-04	50.0- 65.0	SAND	52	42	40	32	3	7	.1	120	IS
80-048-05	65.0- 80.0	SAND	24	56	36	25	4	7	.1	60	12.8
80-048-06	80.0- 95.0	SAND	27	49	36	25	3	5	.1	800	16.7
80-048-07	95.0- 97.0	SAND	53	35	37	20	6	5	.1	7300	12.7

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-048-01	7.0- 25.0	SAND	32	5	51	62	1	2	.1	40	1.1
80-048-02	25.0- 35.0	GRAVEL	17	3	27	37	1	1	.1	10	1.1
80-048-03	35.0- 50.0	SAND	16	3	27	38	1	1	.1	20	1.0
80-048-04	50.0- 65.0	SAND	19	3	32	47	2	2	.1	20	0.7
80-048-05	65.0- 80.0	SAND	17	4	31	40	1	2	.2	10	0.9
80-048-06	80.0- 95.0	SAND	21	5	32	51	3	2	.1	10	1.0
80-048-07	95.0- 97.0	SAND	17	2	26	38	2	2	.1	20	0.9

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-048-08	97.0- 99.0	BEDROK	30	4	32	68	5	2	.1	10	.9

HOLE-NO: 80-049
****

UTM-COORD: 5857,3245
ELEVATION: 961

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-C49-01	63.0- 75.0	SAND	36	9	47	22	6	3	.1	60	5.2
80-C49-02	75.0- 90.0	SAND	18	11	36	14	4	3	.1	180	3.7
80-C49-03	90.0-105.0	SAND	66	14	53	69	6	50	.2	160	4.7
80-C49-04	105.0-120.0	SAND	61	16	54	62	4	35	.1	140	5.6
80-C49-05	120.0-135.0	SAND	56	25	52	47	6	25	.2	120	5.7
80-C49-06	135.0-145.0	SAND	44	16	45	42	4	20	.2	480	6.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-049-01	63.0- 75.0	SAND	44	23	37	21	4	6	.1	160	12.4
80-049-02	75.0- 90.0	SAND	16	32	36	15	4	3	.1	40	12.6
80-C49-03	90.0-105.0	SAND	80	30	55	73	6	65	.1	180	18.0
80-C49-04	105.0-120.0	SAND	90	47	51	66	4	120	.1	140	19.1
80-049-05	120.0-135.0	SAND	53	32	46	37	3	55	.2	160	18.0
80-C49-06	135.0-145.0	SAND	47	44	49	47	3	25	.2	20	18.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-049-01	63.0- 75.0	SAND	25	2	35	50	1	3	.1	10	0.7
80-049-02	75.0- 90.0	SAND	11	1	21	28	1	1	.1	10	0.9
80-049-03	90.0-105.0	SAND	27	2	34	56	1	8	.1	10	0.9
80-C49-04	105.0-120.0	SAND	26	1	29	50	2	3	.1	10	1.1
80-049-05	120.0-135.0	SAND	24	4	31	49	1	6	.1	10	IS
80-C49-06	135.0-145.0	SAND	31	2	35	47	1	2	.1	20	0.7

HOLE-NC: 80-050
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UTM-COORD: 5839,3221
ELEVATION: 1,000

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AL PPB	U PPM
80-050-01	4.0- 8.0	BEDROK	92	1	58	30	2	2	.1	80	.2

HOLE-NO: 80-C51
****

UTM-COORD: 5849,3235
ELEVATION: 991

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-051-01	50.0- 54.0	GRAVEL	495	23	164	485	33	90	1.0	160	3.8

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-051-01	50.0- 54.0	GRAVEL	665	55	234	715	13	75	.6	1800	11.9

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-051-01	50.0- 54.0	GRAVEL	57	1	31	155	2	1	.1	20	1.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-051-02	54.0- 58.0	BEDROK	51	1	60	275	3	4	.2	10	.8

HOLE-NO: 80-052
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UTM-COORD: 5837,3247
ELEVATION: 1,014

- 1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-052-01	8.0- 11.0	TILL	51	15	84	82	4	11	.1	80	4.8

- 0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-052-01	8.0- 11.0	TILL	99	28	204	175	3	24	.1	20	13.5

- 0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-052-01	8.0- 11.0	TILL	29	2	42	195	3	3	.1	40	0.9

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
80-052-02	11.0- 15.0	BEDROK	61	1	58	515	3	6	.1	10	.1

HOLE-NO: 81- 01
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UTM-COORD: 5597.3261
ELEVATION: 1,040

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 01-01	62.0- 66.0	BEDROK	16	1	20	8	4	1	0.2	40	0.9

HOLE-NO: 81- 02
****

UTM-COORD: 5552.3261
ELEVATION: 1,040

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 02-01	18.0- 26.0	TILL	59	34	36	28	4	28	0.2	10	13.6
81- 02-02	27.0- 30.0	GRAVEL	45	4	28	20	6	23	0.2	10	3.9
81- 02-03	30.0- 40.0	TILL	75	8	26	32	1	35	0.5	10	3.5
81- 02-04	40.0- 54.0	TILL	32	16	20	20	4	17	0.5	160	8.7

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 02-01	18.0- 26.0	TILL	83	38	22	44	1	9	5.0	10	14.2
81- 02-02	27.0- 30.0	GRAVEL	90	24	24	32	1	4	0.5	40	15.1
81- 02-03	30.0- 40.0	TILL	154	20	36	49	4	28	0.5	40	12.7
81- 02-04	40.0- 54.0	TILL	78	24	48	28	6	11	0.2	10	17.5

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 02-01	18.0- 26.0	TILL	44	132	42	55	15	3	0.2	80	1.5
81- 02-02	27.0- 30.0	GRAVEL	24	24	35	36	18	1	0.2	320	1.0
81- 02-03	30.0- 40.0	TILL	28	119	40	70	13	3	0.2	60	1.2
81- 02-04	40.0- 54.0	TILL	24	93	41	36	18	2	0.2	40	0.9

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 02-05	54.0- 57.0	BEDROK	24	1	80	53	4	4	0.2	10	3.4

HOLE-NO: 81- 03
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UTM-COORD: 5571.3260
ELEVATION: 1,053

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 03-01	07.0- 16.0	GRAVEL	69	30	34	32	4	6	0.2	120	8.3
81- 03-02	16.0- 21.0	SAND	67	14	32	18	8	2	0.2	10	5.3
81- 03-03	21.0- 22.0	TILL	86	16	32	30	6	5	0.2	20	5.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 03-01	07.0- 16.0	GRAVEL	24	22	32	8	6	2	0.2	10	18.5
81- 03-02	16.0- 21.0	SAND	50	28	75	55	4	8	0.2	10	15.4
81- 03-03	21.0- 22.0	TILL	111	36	124	40	6	9	0.2	10	19.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 03-01	07.0- 16.0	GRAVEL	16	8	17	10	1	1	0.2	20	0.8
81- 03-02	16.0- 21.0	SAND	12	10	20	12	1	1	0.2	100	1.2
81- 03-03	21.0- 22.0	TILL	28	16	38	28	9	2	0.2	180	1.2

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 03-04	22.0- 25.0	BEDROK	89	1	114	120	4	4	0.2	10	0.1

HOLE-NO: 81- 04
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UTM-COORD: 5707.3485
ELEVATION: 1,079

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 04-01	20.0- 28.0	SAND	11	12	20	16	6	1	0.2	10	7.8
81- 04-02	28.0- 29.0	GRAVEL	40	14	20	16	6	4	0.2	10	6.4

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 04-01	20.0- 28.0	SAND	14	24	20	8	4	2	0.2	10	22.7
81- 04-02	28.0- 29.0	GRAVEL	81	32	32	14	8	4	0.5	IS	0.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 04-01	20.0- 28.0	SAND	12	8	22	12	4	1	0.2	720	1.3
81- 04-02	28.0- 29.0	GRAVEL	58	179	67	85	13	1	0.2	10	1.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 04-03	29.0- 32.0	BEDRUK	45	1	69	75	4	1	0.2	10	0.4

HOLE-NO: 81- 05
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UTM-COORD: 5703.3514
ELEVATION: 1,050

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 05-01	12.0- 20.0	SAND	16	8	20	18	8	11	0.2	10	5.9
81- 05-02	20.0- 30.0	SAND	10	8	16	12	6	2	0.2	10	5.9
81- 05-03	30.0- 36.0	GRAVEL	32	86	32	22	8	2	0.2	10	7.1
81- 05-04	40.0- 43.0	GRAVEL	75	28	22	12	8	5	0.2	10	11.1
81- 05-05	43.0- 50.0	GRAVEL	60	24	63	30	8	2	0.2	280	7.9
81- 05-06	62.0- 70.0	GRAVEL	27	48	30	14	8	2	0.5	20	5.0
81- 05-07	70.0- 80.0	GRAVEL	64	15	78	40	5	1	0.2	10	7.4
81- 05-08	80.0- 94.0	GRAVEL	85	11	38	10	5	2	0.2	10	5.2
81- 05-09	94.0-104.0	SAND	110	11	40	28	6	1	0.2	10	5.6
81- 05-10	104.0-114.0	GRAVEL	23	8	28	16	3	1	0.2	10	5.9
81- 05-11	116.0-125.0	SAND	28	11	28	16	4	2	0.2	10	4.8
81- 05-12	125.0-129.0	GRAVEL	39	13	34	28	4	3	0.2	20	6.0

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 05-01	12.0- 20.0	SAND	75	44	83	22	6	IS	1.0	10	0.1
81- 05-02	20.0- 30.0	SAND	12	22	20	40	10	2	0.2	10	17.9
81- 05-03	30.0- 36.0	GRAVEL	37	44	32	36	6	3	0.2	280	16.1
81- 05-04	40.0- 43.0	GRAVEL	61	42	97	14	4	3	0.2	10	18.7
81- 05-05	43.0- 50.0	GRAVEL	3350	36	108	34	6	18	1.0	40	23.0
81- 05-06	62.0- 70.0	GRAVEL	300	114	179	75	4	89	2.0	IS	0.1
81- 05-07	70.0- 80.0	GRAVEL	IS	IS	IS	IS	IS	IS	IS	IS	IS
81- 05-08	80.0- 94.0	GRAVEL	400	610	255	137	7	IS	1.0	IS	IS
81- 05-09	94.0-104.0	SAND	560	66	168	78	6	IS	1.0	IS	IS
81- 05-10	104.0-114.0	GRAVEL	49	34	70	12	4	1	0.2	120	16.8
81- 05-11	116.0-125.0	SAND	32	15	50	10	3	5	0.2	10	17.7
81- 05-12	125.0-129.0	GRAVEL	480	38	130	146	4	78	4.0	3300	8.2

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 05-01	12.0- 20.0	SAND	73	32	86	75	11	IS	0.2	IS	0.1
81- 05-02	20.0- 30.0	SAND	28	28	40	28	8	IS	0.2	10	1.8
81- 05-03	30.0- 36.0	GRAVEL	62	93	90	195	22	IS	0.2	10	0.5
81- 05-04	40.0- 43.0	GRAVEL	89	196	208	110	15	IS	0.2	400	1.1
81- 05-05	43.0- 50.0	GRAVEL	440	67	228	160	22	6	0.2	10	1.3
81- 05-06	62.0- 70.0	GRAVEL	130	345	244	185	18	IS	0.2	40	1.5
81- 05-07	70.0- 80.0	GRAVEL	170	74	217	185	13	IS	0.2	IS	0.1
81- 05-08	80.0- 94.0	GRAVEL	140	345	267	255	18	IS	0.2	10	0.8
81- 05-09	94.0-104.0	SAND	159	153	262	200	18	5	0.2	10	0.9
81- 05-10	104.0-114.0	GRAVEL	84	58	212	105	15	IS	0.2	IS	0.1
81- 05-11	116.0-125.0	SAND	20	16	23	32	9	1	0.2	20	1.1
81- 05-12	125.0-129.0	GRAVEL	97	330	208	185	18	9	0.2	10	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 05-13	129.0-132.0	BEDROK	55	1	220	22	4	6	0.8	1000	0.9

HOLE-NO: 81- 06
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UTM-COORD: 5665,3490
ELEVATION: 994

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 06-01	96.0-105.0	SAND	55	11	32	20	5	3	0.2	10	5.6
81- 06-02	105.0-110.0	GRAVEL	12	27	16	6	6	7	0.2	160	8.7
81- 06-03	110.0-120.0	SAND	15	27	24	8	3	4	0.2	10	8.9
81- 06-04	120.0-131.0	SAND	7	27	20	8	4	1	0.2	10	8.7
81- 06-05	131.0-145.0	SAND	109	27	50	32	4	6	0.2	10	5.0
81- 06-06	145.0-152.0	SAND	8	21	16	4	4	1	0.2	10	9.4
81- 06-07	152.0-157.0	GRAVEL	42	19	45	12	4	1	0.2	10	6.5
81- 06-08	157.0-162.0	GRAVEL	3600	19	40	20	4	5	0.5	20	13.2
81- 06-09	162.0-166.0	SAND	78	21	55	24	4	6	0.2	20	6.4
81- 06-10	168.0-170.0	SAND	88	15	32	38	5	11	0.2	10	5.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 06-01	96.0-105.0	SAND	65	34	20	10	4	7	0.2	2000	30.7
81- 06-02	105.0-110.0	GRAVEL	10	40	16	6	5	3	0.2	10	27.9
81- 06-03	110.0-120.0	SAND	8	61	12	4	3	4	0.2	10	33.0
81- 06-04	120.0-131.0	SAND	7	56	12	4	4	2	0.2	10	29.7
81- 06-05	131.0-145.0	SAND	5	47	16	6	2	1	0.2	120	40.3
81- 06-06	145.0-152.0	SAND	12	56	14	4	1	1	0.2	10	27.3
81- 06-07	152.0-157.0	GRAVEL	136	52	157	12	4	4	0.2	920	33.1
81- 06-08	157.0-162.0	GRAVEL	270	93	65	48	4	IS	0.5	IS	IS
81- 06-09	162.0-166.0	SAND	205	320	146	24	3	5	0.2	1300	24.8
81- 06-10	168.0-170.0	SAND	128	23	45	16	3	3	0.2	200	10.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 06-01	96.0-105.0	SAND	16	20	25	28	1	2	0.2	10	1.9
81- 06-02	105.0-110.0	GRAVEL	28	49	38	36	1	1	0.2	10	1.7
81- 06-03	110.0-120.0	SAND	32	36	45	36	11	2	0.2	10	3.0
81- 06-04	120.0-131.0	SAND	32	16	43	32	9	1	0.2	10	3.2
81- 06-05	131.0-145.0	SAND	20	16	40	24	1	1	0.2	10	3.0
81- 06-06	145.0-152.0	SAND	34	20	36	24	1	1	0.2	10	2.2
81- 06-07	152.0-157.0	GRAVEL	66	20	82	90	1	1	0.2	20	1.3
81- 06-08	157.0-162.0	GRAVEL	89	102	96	115	9	2	0.2	10	1.0
81- 06-09	162.0-166.0	SAND	58	97	65	75	9	2	0.2	10	1.1
81- 06-10	168.0-170.0	SAND	153	32	203	115	11	2	0.2	IS	15

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 06-11	170.0-173.0	BEDROK	154	1	76	80	4	1	0.6	10	0.4

HOLE-NO: 81- 07
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UTM-COORD: 5639.3487
ELEVATION: 1,010

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 07-01	59.0- 68.0	SAND	101	21	60	22	6	16	0.2	10	8.6
81- 07-02	68.0- 80.0	SAND	26	11	32	20	5	2	0.2	10	7.2
81- 07-03	80.0- 95.0	SAND	57	25	30	12	4	2	0.2	40	7.9
81- 07-04	95.0- 97.0	GRAVEL	154	465	43	16	7	5	0.5	80	6.5
81- 07-05	97.0-104.0	SAND	17	25	28	8	3	2	0.2	40	8.3
81- 07-06	104.0-109.0	GRAVEL	90	25	50	22	4	4	0.5	200	5.9
81- 07-07	109.0-114.0	SAND	12	23	40	8	5	4	0.2	10	9.4
81- 07-08	114.0-120.0	GRAVEL	62	29	36	24	4	2	0.2	10	5.8
81- 07-09	120.0-125.0	SAND	1740	47	36	137	13	13	1.0	20	5.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 07-01	59.0- 68.0	SAND	58	61	24	16	5	11	0.2	10	29.3
81- 07-02	68.0- 80.0	SAND	85	56	24	16	6	25	0.2	10	40.8
81- 07-03	80.0- 95.0	SAND	44	34	18	12	5	7	0.2	10	34.9
81- 07-04	95.0- 97.0	GRAVEL	31	47	28	8	4	6	0.5	10	22.3
81- 07-05	97.0-104.0	SAND	10	52	14	6	4	1	0.2	10	25.9
81- 07-06	104.0-109.0	GRAVEL	131	38	97	16	3	11	0.2	1800	25.5
81- 07-07	109.0-114.0	SAND	297	66	60	60	5	20	0.2	960	19.4
81- 07-08	114.0-120.0	GRAVEL	164	52	55	28	3	11	0.2	10	0.1
81- 07-09	120.0-125.0	SAND	15	15	15	15	15	15	15	15	15

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 07-01	59.0- 68.0	SAND	24	12	32	28	4	1	0.2	10	1.3
81- 07-02	68.0- 80.0	SAND	12	8	18	16	1	3	0.2	10	1.5
81- 07-03	80.0- 95.0	SAND	75	330	56	24	1	1	0.2	10	2.7
81- 07-04	95.0- 97.0	GRAVEL	165	80	231	50	6	6	0.2	180	1.9
81- 07-05	97.0-104.0	SAND	20	16	28	22	1	1	0.2	10	2.9
81- 07-06	104.0-109.0	GRAVEL	62	32	80	80	13	1	0.2	80	1.6
81- 07-07	109.0-114.0	SAND	183	175	195	97	8	2	0.4	10	1.2
81- 07-08	114.0-120.0	GRAVEL	60	28	90	75	4	1	0.2	10	0.7
81- 07-09	120.0-125.0	TILL	63	44	86	60	4	3	0.2	15	0.1

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 07-10	125.0-129.0	BEDROK	80	1	80	80	4	4	0.2	10	0.2

HOLE-NO: 81- 08
****

UTM-COORD: 5642.3508
ELEVATION: 1,004

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 08-01	24.0- 32.0	GRAVEL	31	15	28	12	6	15	0.2	10	5.7
81- 08-02	32.0- 38.0	GRAVEL	53	23	65	60	10	72	0.2	10	9.0
81- 08-03	38.0- 42.0	GRAVEL	64	21	91	36	19	156	0.2	10	5.5
81- 08-04	42.0- 45.0	SAND	123	27	50	55	5	82	0.5	20	4.5
81- 08-05	45.0- 60.0	SAND	122	19	168	28	5	22	0.2	10	10.3
81- 08-06	120.0-124.0	GRAVEL	70	11	36	20	10	5	0.2	10	5.0
81- 08-07	125.0-127.0	GRAVEL	232	56	65	60	3	33	0.2	40	6.5
81- 08-08	127.0-129.0	TILL	273	21	50	106	5	IS	1.5	IS	1.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 08-01	24.0- 32.0	GRAVEL	71	25	45	20	6	39	0.2	10	28.4
81- 08-02	32.0- 38.0	GRAVEL	97	34	40	36	4	42	0.2	10	25.5
81- 08-03	38.0- 42.0	GRAVEL	117	91	146	50	5	53	0.2	10	41.0
81- 08-04	42.0- 45.0	SAND	130	84	157	50	5	27	0.2	10	37.9
81- 08-05	45.0- 60.0	SAND	130	52	152	55	4	27	0.2	10	49.3
81- 08-06	120.0-124.0	GRAVEL	310	159	174	55	3	45	0.5	10	35.2
81- 08-07	125.0-127.0	GRAVEL	339	80	124	60	4	59	0.2	5800	30.2
81- 08-08	127.0-129.0	TILL	275	80	152	80	5	7	0.5	IS	0.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 08-01	24.0- 32.0	GRAVEL	8	10	20	12	1	1	0.2	280	1.3
81- 08-02	32.0- 38.0	GRAVEL	40	36	90	20	2	1	0.2	10	1.3
81- 08-03	38.0- 42.0	GRAVEL	10	6	20	6	6	3	0.4	10	2.5
81- 08-04	42.0- 45.0	SAND	12	10	24	8	6	1	0.2	10	2.2
81- 08-05	45.0- 60.0	SAND	12	10	20	8	4	3	0.2	10	3.6
81- 08-06	120.0-124.0	GRAVEL	24	10	36	16	6	1	0.2	10	0.9
81- 08-07	125.0-127.0	GRAVEL	164	62	103	50	6	1	0.2	10	1.0
81- 08-08	127.0-129.0	TILL	106	12	86	45	4	1	0.2	10	1.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 08-09	129.0-131.0	BEDROK	48	1	80	60	4	1	0.2	10	0.5

HOLE-NO: 81- 09
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UTM-COORD: 5740.3447
ELEVATION: 1,043

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 09-01	0.0- 17.0	SAND	16	13	28	14	6	1	0.2	10	5.9
81- 09-02	17.0- 30.0	SAND	12	11	28	12	4	3	0.2	10	7.4
81- 09-03	30.0- 35.0	TILL	40	17	32	12	4	2	0.2	10	8.0

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 09-01	0.0- 17.0	SAND	10	34	20	10	4	1	0.2	40	26.3
81- 09-02	17.0- 30.0	SAND	14	34	20	8	4	1	0.2	10	27.1
81- 09-03	30.0- 35.0	TILL	38	34	10	8	2	1	0.2	10	24.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 09-01	00.0- 17.0	SAND	130	74	139	130	9	8	0.2	15	0.1
81- 09-02	17.0- 30.0	SAND	28	22	49	20	2	2	0.2	1500	1.4
81- 09-03	30.0- 35.0	TILL	12	12	14	10	2	1	0.2	20	0.7

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 09-04	35.0- 40.0	BEDROK	54	1	50	44	4	1	0.2	10	0.1

HOLE-NO: 81- 10
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UTM-COORD: 5774.3439
ELEVATION: 1,030

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 10-01	52.0- 56.0	BEDROK	46	1	46	40	4	1	0.2	10	0.5

HOLE-NO: 81- 11
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UTM-COORD: 5739,3479
ELEVATION: 1,073

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 11-01	8.0- 20.0	SAND	1240	80	40	34	8	2	0.2	10	15.6
81- 11-02	20.0- 43.0	SAND	119	16	26	24	4	2	0.2	10	2.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 11-01	8.0- 20.0	SAND	925	87	70	55	6	1	0.2	20	8.6
81- 11-02	20.0- 43.0	SAND	159	40	45	32	3	IS	0.2	IS	IS

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 11-01	8.0- 20.0	SAND	500	320	360	183	18	5	0.2	10	2.0
81- 11-02	20.0- 43.0	SAND	710	250	770	195	24	IS	0.2	IS	0.1

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 11-03	43.0- 47.0	BEDROK	68	1	70	54	4	1	0.2	10	0.4

HOLE-NO: 81- 12
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UTM-COORD: 5772.3469
ELEVATION: 1,023

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 12-01	35.0- 36.0	GRAVEL	170	13	50	20	3	IS	0.2	IS	IS

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 12-01	35.0- 36.0	GRAVEL	744	25	46	23	6	IS	0.2	IS	IS

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 12-01	35.0- 36.0	GRAVEL	24	12	36	32	4	1	0.2	10	0.9

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 12-02	36.0- 40.0	BEDROK	52	1	40	76	4	1	0.2	10	0.1

HOLE-NO: 81- 13
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UTM-COORD: 5744.3384
ELEVATION: 1,086

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 13-01	108.0-116.0	GRAVEL	490	40	235	43	5	26	0.5	10	9.3
81- 13-02	118.0-124.0	GRAVEL	95	25	45	36	5	17	0.2	40	5.4
81- 13-03	128.0-129.0	GRAVEL	24	19	55	14	6	2	0.2	10	5.6
81- 13-04	129.0-131.0	TILL	304	13	36	93	2	5	0.5	180	4.3

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 13-01	108.0-116.0	GRAVEL	83	15	38	20	1	8	0.2	20	19.0
81- 13-02	118.0-124.0	GRAVEL	87	49	34	24	3	16	0.2	10	18.1
81- 13-03	128.0-129.0	GRAVEL	56	15	24	16	3	11	0.2	120	14.9
81- 13-04	129.0-131.0	TILL	352	66	40	150	4	8	0.5	15	0.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 13-01	108.0-116.0	GRAVEL	12	8	20	14	4	1	0.2	10	1.4
81- 13-02	118.0-124.0	GRAVEL	32	16	32	28	4	1	0.2	10	0.7
81- 13-03	128.0-129.0	GRAVEL	60	44	71	50	6	1	0.2	600	1.2
81- 13-04	129.0-131.0	TILL	120	16	109	128	6	2	0.2	10	0.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 13-05	131.0-135.0	BEDROK	122	1	86	222	4	3	3.2	10	0.1

HOLE-NO: 81- 14
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UTM-COORD: 5770.3366
ELEVATION: 1,112

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 14-01	000.0-008.0	SAND	13	15	28	16	6	3	0.2	20	5.3
81- 14-02	12.0- 28.0	SAND	16	15	119	12	4	1	0.2	20	6.0
81- 14-03	28.0- 36.0	SAND	23	15	24	12	4	3	0.2	10	6.3
81- 14-04	36.0- 47.0	SAND	70	27	50	28	5	14	0.2	10	7.6
81- 14-05	47.0- 66.0	SAND	51	15	32	24	6	15	0.2	10	5.8
81- 14-06	66.0- 69.0	SAND	73	21	36	32	5	19	0.4	40	3.6
81- 14-07	69.0- 72.0	TILL	95	30	28	32	4	14	0.2	60	4.0
81- 14-08	74.0- 77.0	TILL	30	19	22	20	5	8	0.2	20	4.1
81- 14-09	77.0- 80.0	TILL	20	17	32	12	4	2	0.2	10	5.9
81- 14-10	80.0- 81.0	TILL	305	13	24	20	5	14	0.2	10	3.8

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 14-01	000.0-008.0	SAND	8	38	20	8	4	2	0.2	10	15.4
81- 14-02	12.0- 28.0	SAND	13	23	14	10	5	3	0.2	10	21.7
81- 14-03	28.0- 36.0	SAND	23	23	16	12	3	2	0.2	10	20.7
81- 14-04	36.0- 47.0	SAND	32	181	20	12	6	2	0.2	10	21.8
81- 14-05	47.0- 66.0	SAND	18	19	16	8	5	2	0.2	10	13.0
81- 14-06	66.0- 69.0	SAND	32	47	18	10	2	4	0.2	10	17.5
81- 14-07	69.0- 72.0	TILL	28	56	16	12	2	4	0.2	10	16.1
81- 14-08	74.0- 77.0	TILL	24	19	12	10	4	6	0.2	20	14.9
81- 14-09	77.0- 80.0	TILL	640	445	18	106	6	26	0.2	200	14.5
81- 14-10	80.0- 81.0	TILL	IS	IS	IS	IS	IS	IS	IS	IS	IS

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 14-01	0.0- 8.0	SAND	10	10	28	10	4	1	0.2	10	3.3
81- 14-02	12.0- 28.0	SAND	12	10	32	8	2	1	0.2	10	1.2
81- 14-03	28.0- 36.0	SAND	8	1	16	10	4	1	0.2	10	2.3
81- 14-04	36.0- 47.0	SAND	40	140	44	40	4	1	0.2	IS	0.1
81- 14-05	47.0- 66.0	SAND	10	12	16	10	4	1	0.2	10	1.7
81- 14-06	66.0- 69.0	SAND	16	6	20	14	4	1	0.2	10	0.8
81- 14-07	69.0- 72.0	TILL	18	10	32	28	4	3	0.2	10	0.7
81- 14-08	74.0- 77.0	TILL	70	64	40	50	4	2	0.2	10	0.6
81- 14-09	77.0- 80.0	TILL	124	14	55	58	6	3	0.2	10	0.4
81- 14-10	80.0- 81.0	TILL	60	14	44	34	6	1	0.2	10	0.2

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 14-11	81.0- 85.0	BEDROK	86	1	32	72	1	5	0.2	10	0.1

HOLE-NO: 81- 15
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UTM-COORD: 5789.3365
ELEVATION: 1,079

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 15-01	26.0- 29.0	GRAVEL	475	21	32	170	3	140	2.0	10	3.9

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 15-01	26.0- 29.0	GRAVEL	402	25	20	68	3	61	1.0	320	15.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 15-01	26.0- 29.0	GRAVEL	16	1	18	12	1	1	0.2	10	1.4

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 15-02	29.0- 34.0	BEDROK	320	1	66	16	8	5	0.2	1600	8.4

HOLE-NO: 81- 16
****

UTM-COORD: 5796,3382
ELEVATION: 1,053

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 16-01	84.0- 85.0	SAND	87	21	108	36	8	30	0.2	120	6.1
81- 16-02	85.0- 99.0	GRAVEL	75	15	28	38	4	44	0.2	10	5.4
81- 16-03	99.0-101.0	TILL	107	10	50	24	6	22	0.2	10	5.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 16-01	84.0- 85.0	SAND	26	15	16	12	2	10	0.2	60	18.3
81- 16-02	85.0- 99.0	GRAVEL	40	30	16	12	3	17	0.2	200	16.2
81- 16-03	99.0-101.0	TILL	196	34	28	24	2	18	0.2	1800	18.3

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 16-01	84.0- 85.0	SAND	14	1	20	14	1	2	0.2	10	3.0
81- 16-02	85.0- 99.0	GRAVEL	14	14	16	12	1	1	0.2	10	0.2
81- 16-03	99.0-101.0	TILL	36	20	36	40	6	2	0.2	10	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 16-04	101.0-105.0	BEDROK	68	1	50	68	1	4	0.2	220	0.2

HOLE-NO: 81- 17
****

UTM-COORD: 5801.3397
ELEVATION: 1,040

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 17-01	97.0-110.0	GRAVEL	112	45	40	20	1	3	0.2	360	2.7
81- 17-02	110.0-112.0	GRAVEL	614	24	32	297	2	IS	0.2	IS	IS

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 17-01	97.0-110.0	GRAVEL	115	34	16	32	3	8	0.2	10	15.2
81- 17-02	110.0-112.0	GRAVEL	340	19	16	20	2	15	0.2	10	11.6

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 17-01	97.0-110.0	GRAVEL	34	16	32	26	4	1	0.2	10	0.8
81- 17-02	110.0-112.0	GRAVEL	55	16	49	65	4	1	0.2	10	1.1

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 17-03	112.0-116.0	BEDROK	98	1	76	96	4	2	0.2	300	0.2

HOLE-NO: 81- 18
****

UTM-COORD: 5832.3417
ELEVATION: 1,040

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 18-01	32.0- 33.0	GRAVEL	47	15	16	16	3	5	0.2	10	7.2

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 18-01	32.0- 33.0	GRAVEL	78	34	16	8	2	4	0.5	10	31.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 18-01	32.0- 33.0	GRAVEL	12	10	14	14	4	1	0.2	20	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 18-02	33.0- 36.0	BEDROK	40	1	70	100	4	15	0.2	380	0.3

HOLE-NO: 81- 19
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UTM-COORD: 5824.3453
ELEVATION: 1,099

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 19-01	116.5-121.0	GRAVEL	80	143	32	24	4	2	0.2	10	2.0
81- 19-02	126.0-133.0	GRAVEL	77	11	28	26	2	8	0.2	100	4.3
81- 19-03	133.0-136.0	GRAVEL	235	19	91	98	4	81	2.0	2000	8.1
81- 19-04	140.0-141.0	TILL	43	181	22	24	2	3	0.2	10	7.0

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 19-01	116.5-121.0	GRAVEL	106	102	36	32	2	14	0.2	10	25.7
81- 19-02	126.0-133.0	GRAVEL	113	13	36	24	2	1	0.2	10	14.4
81- 19-03	133.0-136.0	GRAVEL	46	29	24	14	3	1	0.2	10	22.0
81- 19-04	140.0-141.0	TILL	28	62	26	12	11	1	0.5	20	22.3

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 19-01	116.5-121.0	GRAVEL	8	10	16	14	4	1	0.2	10	1.2
81- 19-02	126.0-133.0	GRAVEL	32	20	40	45	8	1	0.2	10	1.0
81- 19-03	133.0-136.0	GRAVEL	28	20	34	34	4	1	0.2	10	1.6
81- 19-04	140.0-141.0	TILL	20	36	22	26	4	1	0.2	20	1.7

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 19-05	141.0-145.0	BEDROK	32	1	52	86	4	1	0.2	120	0.5

HOLE-NO: 81- 20
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UTM-COORD: 5793.3453
ELEVATION: 1,030

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 20-01	119.0-124.0	GRAVEL	84	20	38	60	11	16	0.5	10	5.4
81- 20-02	124.0-132.0	GRAVEL	26	12	29	16	1	1	0.2	10	5.1
81- 20-03	132.0-136.5	GRAVEL	16	6	24	14	6	1	0.5	10	4.7
81- 20-04	136.5-140.0	TILL	12	12	23	10	1	1	0.5	10	5.5

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 20-01	119.0-124.0	GRAVEL	136	38	29	28	1	9	0.5	520	16.2
81- 20-02	124.0-132.0	GRAVEL	66	28	24	14	9	1	0.2	10	15.8
81- 20-03	132.0-136.5	GRAVEL	44	24	22	12	1	1	0.5	10	17.2
81- 20-04	136.5-140.0	TILL	14	16	17	6	6	1	0.2	20	15.1

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 20-01	119.0-124.0	GRAVEL	24	12	22	26	4	1	0.2	10	0.9
81- 20-02	124.0-132.0	GRAVEL	55	62	58	50	6	1	0.2	10	0.8
81- 20-03	132.0-136.0	GRAVEL	84	36	109	53	8	1	0.2	10	1.2
81- 20-04	136.5-140.0	TILL	20	18	28	32	6	1	0.2	10	1.2

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 20-05	140.0-143.0	BEDROK	12	1	32	22	4	1	0.2	20	0.8

HOLE-NO: 81- 21
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UTM-COORD: 5615.3567
ELEVATION: 981

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 21-01	79.0- 82.0	SAND	75	174	37	24	6	12	1.0	10	8.3
81- 21-02	82.0- 85.0	TILL	32	1	38	40	1	9	0.2	10	7.5
81- 21-03	86.0- 90.0	GRAVEL	26	12	40	28	6	10	0.5	20	7.9
81- 21-04	90.0- 93.0	TILL	36	10	27	24	1	5	0.2	10	6.5
81- 21-05	93.0- 98.0	TILL	20	30	36	16	4	3	0.2	10	6.4
81- 21-06	98.0-101.0	SAND	24	12	25	12	1	1	0.2	10	5.3
81- 21-07	101.0-103.5	TILL	16	10	47	24	9	1	0.2	10	6.0
81- 21-08	106.0-111.0	SAND	42	1	29	22	4	4	0.2	10	7.5
81- 21-09	111.0-112.0	SAND	52	82	33	20	13	1	0.2	10	6.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 21-01	79.0- 82.0	SAND	51	8	68	24	1	18	0.2	220	29.6
81- 21-02	82.0- 85.0	TILL	38	12	34	100	1	23	0.5	10	24.9
81- 21-03	86.0- 90.0	GRAVEL.	28	12	24	22	1	20	0.2	8800	26.6
81- 21-04	90.0- 93.0	TILL	24	200	39	24	9	4	0.2	10	27.3
81- 21-05	93.0- 98.0	TILL	36	64	28	16	1	7	0.2	3300	23.2
81- 21-06	98.0-101.0	SAND	55	24	22	16	4	18	0.2	10	20.1
81- 21-07	101.0-103.5	TILL	20	97	32	123	1	4	0.2	10	11.4
81- 21-08	106.0-111.0	SAND	80	91	39	22	1	5	0.2	10	17.4
81- 21-09	111.0-112.0	SAND	73	58	26	20	6	2	0.2	10	16.8

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 21-01	79.0- 82.0	SAND	16	16	30	30	6	1	0.2	10	1.1
81- 21-02	82.0- 85.0	TILL	28	28	32	200	8	1	0.2	10	0.9
81- 21-03	86.0- 90.0	GRAVEL	45	36	71	58	4	1	0.2	10	1.8
81- 21-04	90.0- 93.0	TILL	12	22	20	32	4	1	0.2	10	1.2
81- 21-05	93.0- 98.0	TILL	28	34	40	36	4	1	0.2	10	1.1
81- 21-06	38.0-101.0	SAND	18	18	20	26	4	1	0.2	10	1.1
81- 21-07	101.0-103.5	TILL	18	71	40	32	6	1	0.2	10	1.3
81- 21-08	106.0-111.0	SAND	45	36	62	74	8	1	0.2	10	1.8
81- 21-09	111.0-112.0	SAND	50	10	53	70	8	1	0.2	10	1.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 21-10	112.0-116.0	BEDROK	80	1	56	104	4	1	0.2	170	0.1

HOLE-NO: 81- 22
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UTM-COORD: 5658.3563
ELEVATION: 994

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 22-01	30.0- 37.0	GRAVEL	97	1	31	50	1	150	0.2	10	7.2
81- 22-02	37.0- 40.0	TILL	30	8	28	20	1	7	0.2	10	6.0
81- 22-03	40.0- 43.0	SAND	26	58	26	22	1	10	0.2	10	7.0
81- 22-04	43.0- 48.0	SAND	58	24	40	32	9	28	0.2	20	7.8
81- 22-05	48.0- 51.0	SAND	49	18	46	34	11	7	0.2	100	7.2
81- 22-06	51.0- 57.0	GRAVEL	59	12	41	28	11	18	0.2	10	6.5
81- 22-07	57.0- 62.0	SAND	58	20	55	26	13	14	0.2	10	7.2
81- 22-08	62.0- 70.0	SAND	121	20	30	28	6	9	0.2	10	7.7
81- 22-09	70.0- 80.0	GRAVEL	73	16	40	40	11	21	1.0	10	8.0
81- 22-10	80.0- 86.0	CLAY	40	28	44	22	9	7	0.5	10	6.2
81- 22-11	86.0- 91.0	SAND	16	32	31	8	1	2	0.2	8000	6.8
81- 22-12	91.0- 93.0	TILL	44	20	40	16	9	4	0.2	14000	7.1

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 22-01	30.0- 37.0	GRAVEL	52	12	24	30	1	24	0.2	10	25.1
81- 22-02	37.0- 40.0	TILL	28	12	20	18	4	5	0.2	40	14.3
81- 22-03	40.0- 43.0	SAND	32	183	26	18	6	4	0.5	10	16.0
81- 22-04	43.0- 48.0	SAND	62	40	38	28	6	13	0.2	10	27.8
81- 22-05	48.0- 51.0	SAND	46	32	29	50	11	10	0.2	10	22.9
81- 22-06	51.0- 57.0	GRAVEL	38	28	28	24	9	30	0.2	10	23.3
81- 22-07	57.0- 62.0	SAND	54	40	31	24	6	18	0.2	10	19.2
81- 22-08	62.0- 70.0	SAND	104	30	35	28	1	48	0.2	10	20.6
81- 22-09	70.0- 80.0	GRAVEL	97	28	37	70	6	13	0.2	920	23.3
81- 22-10	80.0- 86.0	CLAY	20	93	28	12	9	4	0.2	1300	21.8
81- 22-11	86.0- 91.0	SAND	12	58	26	6	1	2	0.2	10	24.4
81- 22-12	91.0- 93.0	TILL	75	47	32	16	9	1	0.2	5800	25.0

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 22-01	30.0- 37.0	GRAVEL	22	12	34	26	1	1	0.2	80	1.7
81- 22-02	37.0- 40.0	TILL	45	53	40	43	6	1	0.2	10	1.0
81- 22-03	40.0- 43.0	SAND	102	66	103	65	4	2	0.2	10	1.1
81- 22-04	43.0- 48.0	SAND	20	16	40	45	4	1	0.2	10	1.3
81- 22-05	48.0- 51.0	SAND	14	8	28	36	4	1	0.2	10	1.2
81- 22-06	51.0- 57.0	GRAVEL	24	18	32	36	4	1	0.2	10	1.8
81- 22-07	57.0- 62.0	SAND	16	16	24	86	4	1	0.2	840	1.6
81- 22-08	62.0- 70.0	SAND	20	10	32	46	2	1	0.2	10	1.2
81- 22-09	70.0- 80.0	GRAVEL	16	32	28	38	4	2	0.2	10	1.2
81- 22-10	80.0- 86.0	CLAY	20	10	28	36	4	1	0.2	10	2.3
81- 22-11	86.0- 91.0	SAND	32	1	36	32	2	1	0.2	10	1.0
81- 22-12	91.0- 93.0	TILL	102	28	168	97	6	1	0.2	10	2.0

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 22-13	93.0- 96.0	BEDROK	68	1	50	168	4	3	0.2	10	0.1

HOLE-NO: 81- 23
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UTM-COORD: 5668,3552
ELEVATION: 987

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 23-01	76.0- 77.0	TILL	93	53	48	34	9	21	0.2	20	7.9

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 23-01	76.0- 77.0	TILL	106	136	40	24	1	18	0.2	10000	25.5

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 23-01	76.0- 77.0	TILL	18	10	32	36	4	1	0.2	10	1.2

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 23-02	77.0- 81.0	BEDROK	36	1	86	72	4	1	0.2	60	0.5

HOLE-NO: 81- 24
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UTM-COORD: 5633,3553
ELEVATION: 994

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 24-01	37.0- 38.0	GRAVEL	1035	102	38	12	11	12	0.5	60	3.3

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 24-01	37.0- 38.0	GRAVEL	400	119	53	22	9	5	0.5	10	9.4

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 24-01	37.0- 38.0	GRAVEL	65	1	44	80	10	1	0.2	10	0.9

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 24-02	38.0- 42.0	BEDROK	86	1	42	82	4	3	0.2	10	0.3

HOLE-NO: 81- 25
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UTM-COORD: 5646,3536
ELEVATION: 977

-1.600+0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 25-01	18.0- 27.0	GRAVEL	135	31	47	36	9	30	0.2	20	7.4
81- 25-02	29.0- 35.0	GRAVEL	121	12	42	75	9	41	1.0	4600	7.2
81- 25-03	35.0- 41.0	SAND	66	24	55	26	1	20	0.2	10	6.7
81- 25-04	41.0- 45.5	SAND	106	16	32	28	13	12	0.2	4900	6.8
81- 25-05	45.5- 50.5	SAND	49	16	30	16	1	11	0.2	10	5.6
81- 25-06	59.0- 61.0	GRAVEL	62	32	40	32	9	82	1.0	19000	11.2
81- 25-07	61.0- 70.0	SAND	49	16	36	18	4	5	0.2	10	7.1
81- 25-08	70.0- 74.0	GRAVEL	62	18	87	24	9	8	0.2	300	6.5
81- 25-09	74.0- 79.0	GRAVEL	80	82	42	36	11	12	0.5	10	9.1
81- 25-10	79.0- 86.0	GRAVEL	115	24	65	53	11	14	0.5	160	6.9
81- 25-11	86.0- 88.0	SAND	196	84	54	53	13	43	0.5	10	5.1
81- 25-12	154.0-156.0	GRAVEL	52	20	39	24	9	13	0.2	40	5.6
81- 25-13	156.0-166.0	GRAVEL	205	22	52	28	11	66	0.5	10	6.5
81- 25-14	168.0-172.0	SAND	32	26	30	12	9	3	0.2	10	6.2
81- 25-15	172.0-175.0	TILL	14	28	33	8	11	1	0.2	10	7.6

-0.125MM NON-MAGNETIC HEAVY MINERAL FRACTION(SG+3.3)

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 25-01	18.0- 27.0	GRAVEL	71	56	34	28	6	45	0.5	68000	26.6
81- 25-02	29.0- 35.0	GRAVEL	144	12	53	110	9	31	1.0	680	20.0
81- 25-03	35.0- 41.0	SAND	36	58	40	20	1	15	0.2	140000	27.7
81- 25-04	41.0- 45.5	SAND	93	24	68	20	8	19	0.5	10	26.7
81- 25-05	45.5- 50.5	SAND	66	26	44	22	9	31	0.2	9800	22.7
81- 25-06	59.0- 61.0	GRAVEL	44	40	36	20	4	23	0.2	5200	26.2
81- 25-07	61.0- 70.0	SAND	44	20	31	14	4	19	0.2	20	20.8
81- 25-08	70.0- 74.0	GRAVEL	66	47	40	18	6	12	0.2	2000	13.4
81- 25-09	74.0- 79.0	GRAVEL	66	49	45	20	9	26	0.2	5200	29.3
81- 25-10	79.0- 86.0	GRAVEL	75	40	50	36	6	16	0.2	10	22.9
81- 25-11	86.0- 88.0	SAND	460	305	309	103	13	42	1.0	260	25.5
81- 25-12	154.0-156.0	GRAVEL	117	76	64	20	9	16	0.2	IS	0.1
81- 25-13	156.0-166.0	GRAVEL	275	53	45	28	18	27	1.0	580	23.6
81- 25-14	168.0-172.0	SAND	71	67	30	18	9	1	0.2	20	21.3
81- 25-15	172.0-175.0	TILL	18	53	31	8	9	1	0.2	10	27.8

-0.063MM WHOLE SAMPLE SIEVED SEPARATE

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 25-01	18.0- 27.0	GRAVEL	16	1	24	20	4	1	0.2	10	1.2
81- 25-02	29.0- 35.0	GRAVEL	14	1	22	20	2	3	0.2	10	1.3
81- 25-03	35.0- 41.0	SAND	24	1	38	24	6	1	0.2	10	1.1
81- 25-04	41.0- 45.5	SAND	14	1	16	16	4	1	0.2	10	1.3
81- 25-05	45.5- 50.5	SAND	12	1	16	14	4	2	0.2	10	1.1
81- 25-06	59.0- 61.0	GRAVEL	14	1	16	24	4	1	0.2	10	1.6
81- 25-07	61.0- 70.0	SAND	10	1	16	12	2	1	0.2	10	1.5
81- 25-08	70.0- 74.0	GRAVEL	10	1	12	12	4	1	0.2	10	1.0
81- 25-09	74.0- 79.0	GRAVEL	12	1	16	20	4	1	0.2	10	1.1
81- 25-10	79.0- 86.0	GRAVEL	14	12	26	20	4	1	0.2	10	1.3
81- 25-11	86.0- 88.0	SAND	16	1	24	12	2	1	0.2	10	1.2
81- 25-12	154.0-156.0	GRAVEL	10	1	20	14	2	1	0.2	10	1.1
81- 25-13	156.0-166.0	GRAVEL	53	16	53	40	2	3	0.2	10	1.0
81- 25-14	168.0-172.0	SAND	60	20	44	38	4	1	0.2	120	1.0
81- 25-15	172.0-175.0	TILL	32	14	36	24	6	1	0.2	10	1.3

BEDROCK CHIPS

SAMPLE NUMBER	DEPTH (FT)	SAMPLE MATERIAL	CU PPM	PB PPM	ZN PPM	NI PPM	MO PPM	AS PPM	AG PPM	AU PPB	U PPM
81- 25-16	175.0-180.0	BEDROK	34	1	50	58	4	1	0.2	380	0.5

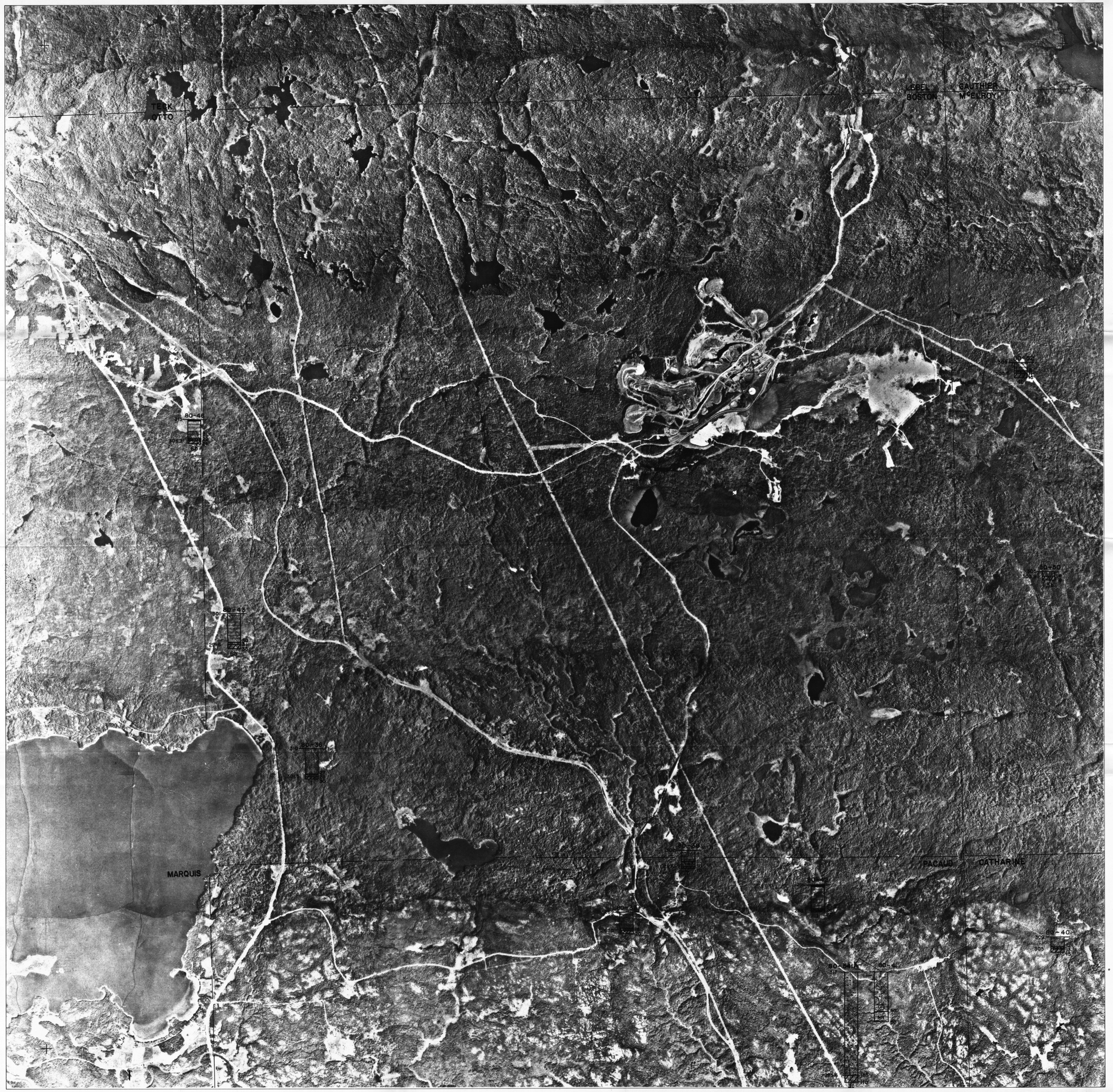
KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

BOSTON TOWNSHIP

Fig. M-2

REVERSE CIRCULATION DRILL HOLE DATA

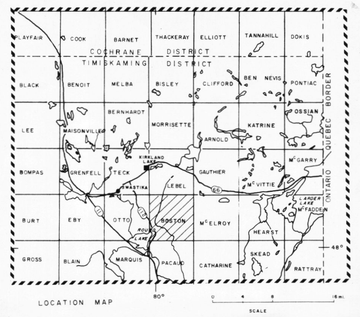


0 1 2

KILOMETRES

0

MILES



LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 — 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN–PROTEROZOIC

7 — Matachewan (Nipissing) - Keweenawan
Undifferentiated diabase (gabbro) dykes

ARCHEAN

6 — Felsic Intrusive Rocks
6a Granite, hornblende granite, hornblende-biotite granite
6b Syenite, quartz syenite
6c Mesocratic syenite, syenite porphyry
6d Granodiorite, quartz diorite

5 — Mafic Intrusive Rocks
5a Serpentinite, peridotite
5b Gabbro, diorite, in part course volcanic flows

4 — Timiskaming Metasediments and Metavolcanics
4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

3 — Keewatin Metavolcanics
3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 — Intermediate to felsic volcanics; andesite, dacite

1 — Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

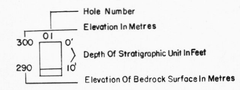
- Swamp deposits, muck, peat
- Clay
- Silt
- Sand
- Gravel, sand-pebble matrix with cobbles
- Till, clay matrix with pebbles and cobbles
- Till, sandy matrix with pebbles and cobbles
- Boulder
- Bedrock

SOURCES OF INFORMATION

Logging of reverse circulation drill holes and binocular microscopic identification of bedrock lithology by Derry, Michener & Booth, Toronto, under contract to the Ontario Geological Survey, Ministry of Natural Resources, 1980.

Elevations of drill hole collars measured by the Ontario Geological Survey, 1980, using the precision aneroid barometer method.

Air photo mosaics, provided by the Ontario Geological Survey, were prepared by Questor Surveys Limited, Toronto from 1970 photography by the Ontario Ministry of Natural Resources.



KIRKLAND LAKE AREA

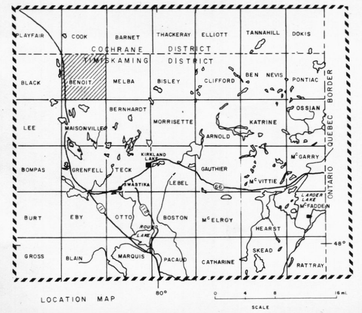
DISTRICT OF TIMISKAMING

BENOIT TOWNSHIP

Fig. M-1

REVERSE CIRCULATION DRILL HOLE DATA

0 1 2
KILOMETRES
0 1
MILES



LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN-PROTEROZOIC

7 Matachewan (Nipissing)
Undifferentiated diabase (gabbro) dykes

ARCHEAN

6 Felsic Intrusive Rocks
6a Granite, hornblende granite, hornblende-biotite granite
6b Syenite, quartz syenite
6c Mesocratic syenite, syenite porphyry
6d Granodiorite, quartz diorite
6e Aplite
6f Tonalite to adamellite

5 Mafic Intrusive Rocks
5a Serpentinite, peridotite
5b Gabbro, diorite, in part course volcanic flows

4 Timiskaming Metasediments and Metavolcanics
4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

3 Felsic Metavolcanics, Tuffs and Metasediments
3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 Intermediate to felsic volcanics; andesite, dacite

1 Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

- Swamp deposits, muck, peat
- Clay
- Silt
- Sand
- Gravel, sand-pebble matrix with cobbles
- Till, clay matrix with pebbles and cobbles
- Till, sandy matrix with pebbles and cobbles
- Boulder
- Bedrock

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Elevations of drill hole collars measured by the Ontario Geological Survey, 1980, using the precision aneroid barometer method. Elevations of 1981 drill hole collars estimated from 1:50,000 N.T.S. series topographic maps.

Air photo mosaics, provided by the Ontario Geological Survey, were prepared by Questor Surveys Limited, Toronto from 1970 photography by the Ontario Ministry of Natural Resources.

Hole Number (1981 series prefixed 81-)
300 01 Elevation in Metres
Depth Of Stratigraphic Unit In Feet
290 10 Elevation Of Bedrock Surface In Metres

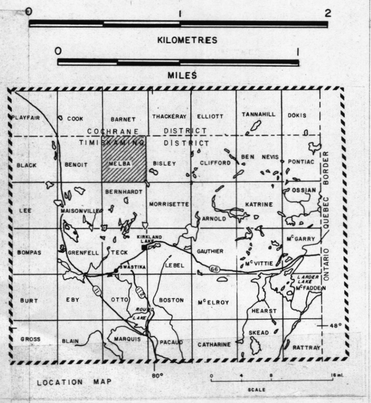
2250

KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

MELBA TOWNSHIP

Fig. M-9
REVERSE CIRCULATION DRILL HOLE DATA



LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN-PROTEROZOIC

7 Matachewan (Nipissing)
Undifferentiated diabase (gabbro) dykes

ARCHEAN

6 Felsic Intrusive Rocks
6a Granite, hornblende granite, hornblende-biotite granite
6b Syenite, quartz syenite
6c Mesocratic syenite, syenite porphyry
6d Granodiorite, quartz diorite
6e Aplite
6f Tonalite to adamellite

5 Mafic Intrusive Rocks
5a Serpentinite, peridotite
5b Gabbro, diorite, in part course volcanic flows

4 Timiskaming Metasediments and Metavolcanics
4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

3 Felsic Metavolcanics, Tuffs and Metasediments
3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 Intermediate to felsic volcanics; andesite, dacite

1 Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

- Swamp deposits, muck, peat
- Clay
- Silt
- Sand
- Gravel, sand-pebble matrix with cobbles
- Till, clay matrix with pebbles and cobbles
- Till, sandy matrix with pebbles and cobbles
- Boulder
- Bedrock

SOURCES OF INFORMATION

Logging of reverse circulation drill holes and binocular microscopic identification of bedrock lithology by Derry, Michener & Booth, Toronto, under contract to the Ontario Geological Survey, Ministry of Natural Resources, 1980.

Elevations of drill hole collars measured by the Ontario Geological Survey, 1980, using the precision aneroid barometer method. Elevations of 1981 drill hole collars estimated from 1:50,000 N.T.S. series topographic maps.

Air photo mosaics, provided by the Ontario Geological Survey, were prepared by Questor Surveys Limited, Toronto from 1970 photography by the Ontario Ministry of Natural Resources.

Hole Number
Elevation in Metres
300 81 0'
Depth Of Stratigraphic Unit in Feet
290 10'
Elevation Of Bedrock Surface in Metres

KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

MORRISETTE TOWNSHIP

Fig. M-10

REVERSE CIRCULATION DRILL HOLE DATA

MELBA
BERNHARDT
BISLEY
CLIFFORD
MORRISETTE
ARNOLD
TECK
LEBEL
GAUTHIER

81-11 327 N.R. 8 23 L.P. 29 41 314.5 43 47 2
81-12 312 2 305 3014 2
81-09 318 33 3072 3b 40
81-10 314 8 238.1 3b
81-20 314 5 80 97 109 113 124 136 143 271.3 6f
81-19 325 20 38 48 70 83 85 117 121 126 292.3 145 2
81-18 317 N.R. 5 10 306.8 2 35
81-17 317 6 80 97 105 112 116 272.8 3b
81-16 321 15 20 63 84 85 290.8 98 101 2,5b
81-13 331 10 17 32 37 108 116 118 89 95 290.8
81-15 329 3 6 26 28 34 320.3 4b

LOCATION MAP

SCALE

LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 — 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN-PROTEROZOIC

7 — Matachewan (Nipissing)
Undifferentiated diabase (gabbro) dykes

ARCHEAN

6 — Felsic Intrusive Rocks
6a Granite, hornblende granite, hornblende-biotite granite
6b Syenite, quartz syenite
6c Mesocratic syenite, syenite porphyry
6d Granodiorite, quartz diorite
6e Aplite
6f Tonalite to adamellite

5 — Mafic Intrusive Rocks
5a Serpentinite, peridotite
5b Gabbro, diorite, in part course volcanic flows

4 — Timiskaming Metasediments and Metavolcanics
4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

3 — Felsic Metavolcanics, Tuffs and Metasediments
3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 — Intermediate to felsic volcanics; andesite, dacite

1 — Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

- Swamp deposits, muck, peat
- Clay
- Silt
- Sand
- Gravel, sand-pebble matrix with cobbles
- Till, clay matrix with pebbles and cobbles
- Till, sandy matrix with pebbles and cobbles
- Boulder
- Bedrock

SOURCES OF INFORMATION

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Elevations of drill hole collars measured by the Ontario Geological Survey, 1980, using the precision aneroid barometer method. Elevations of 1981 drill hole collars estimated from 1:50,000 N.T.S. series topographic maps.

Air photo mosaics, provided by the Ontario Geological Survey, were prepared by Questor Surveys Limited, Toronto from 1970 photography by the Ontario Ministry of Natural Resources.

Hole Number
Elevation in Metres
300 01 0'
Depth Of Stratigraphic Unit in Feet
290 10
Elevation Of Bedrock Surface in Metres

2258

CHART I
KIRKLAND LAKE AREA
DISTRICT OF TIMISKAMING

BEDROCK GEOLOGY OF THE DRILL AREA

0 1 2 KILOMETRES

0 1 2 MILES



LOCATION MAP

LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation
8 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN–PROTEROZOIC

7 Matachewan (Nipissing)
Undifferentiated diabase (gabbro) dykes

ARCHEAN

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6a Granite, hornblende granite, hornblende-biotite granite
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6d Granodiorite, quartz diorite
6e Aplite
6f Tonalite to adamellite

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5b Gabbro, diorite, in part course volcanic flows

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4a Conglomerate
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3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 Intermediate to felsic volcanics; andesite, dacite

1 Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

Lithologic contact

Fault, lineament

Breccia, cataclasite

81-02 Location of overburden drill hole K.L.I.P.-81-02 with bedrock intersection of unit 1. '01' and '80' series holes drilled in winter 1981 and summer 1980 respectively; '79' series drilled by Overburden Drilling Management Ltd. under separate contract in 1979.

SOURCES OF INFORMATION

Logging of reverse circulation drill holes and binocular microscopic identification of bedrock lithology by Derry, Michener & Booth under contract to the Ontario Geological Survey - Ministry of Natural Resources, 1980.

Geological compilation from Grant, 1964; Hogg, 1964; Jensen, 1972, 1975, 1978a, 1978b, 1979; Lawton, 1957; Lovell, 1971, 1972; Moore, 1966; Pyke et al, 1973; Rupert and Lovell, 1970; Thomson and Griffis, 1941.

Base map after N.T.S. series 32D/4, 32D/5, 42A/1 and 42A/8.

CHART 2

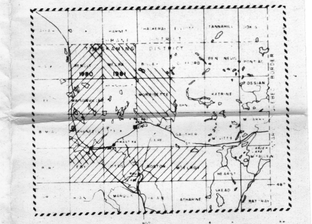
KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

SURFICIAL GEOLOGY OF THE DRILL AREA

0 1 2 KILOMETRES

0 1 2 MILES



LEGEND

PLEISTOCENE STRATIGRAPHY

- Glaciofluvial sediments, buried limit of esker and deltaic deposits
- Glaciofluvial sediments, surface limit of modified esker and deltaic deposits
- 6 Buried glaciolacustrine clay and fine sands
- 5 Glaciofluvial rhythmites
- 4 Interstratified till (flow till - turbidite) and glaciofluvial sediments with thin intercalations of lacustrine clay
- 3 Undifferentiated tills, may be in part unit 2
- 2 Debris flows (turbidite, till-like in appearance)
- 1 Basal till
- Bedrock-drift complex; shallow basal till and glaciolacustrine sediments on intermittently exposed bedrock

SYMBOLS

- 81-02 ● Reverse circulation drill hole No. K.L.I.P. 81-02
- (1) Buried limit of till units
- >>> Esker ridge
- A——A' Line of section for profile A-A'

Note: Coarse clastic members only are illustrated. Glaciolacustrine clays, fine sand and silts are widespread on surface beyond surface limits of glaciofluvial sediments.

SOURCES OF INFORMATION

Logging of reverse circulation drill holes and interpretation of subsurface overburden stratigraphy by Derry, Michener & Booth under contract to the Ontario Geological Survey (OGS), Ministry of Natural Resources, 1980.

Surface limits of glacial units adapted or modified from Baker and Storrison (1979), Baker (1980a), and Baker, Seaman and Steele (1980).

Elevations of drill hole collars measured by the Ontario Geological Survey, 1980, using the precision aneroid barometer method. Elevations of 1981 drill hole collars estimated from 1:50,000 N.T.S. series topographic maps.

Surface topography from 1:50,000 series N.T.S. Maps 32D/4, 32D/5, 42A/1 and 42A/8.

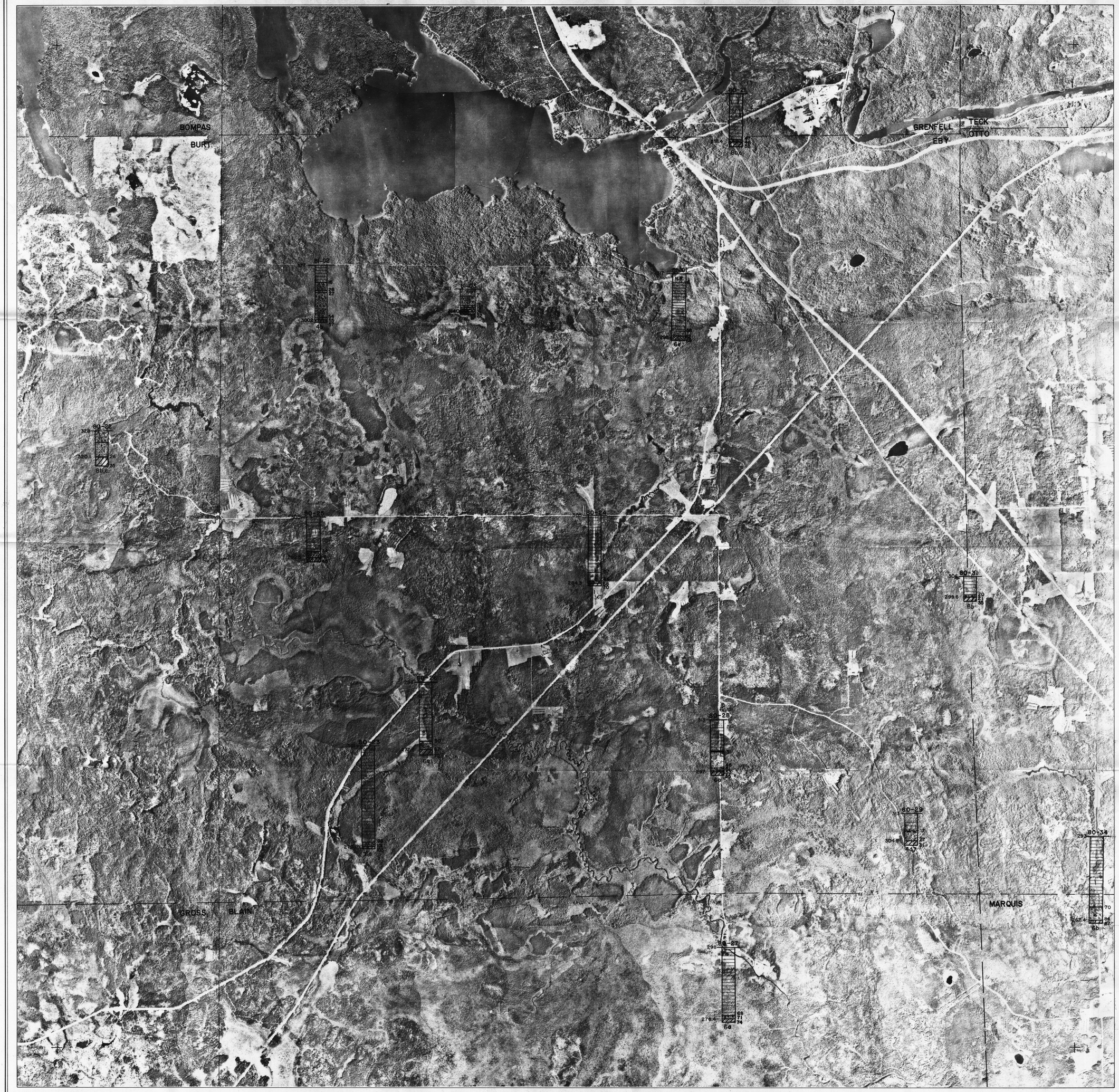
KIRKLAND LAKE AREA

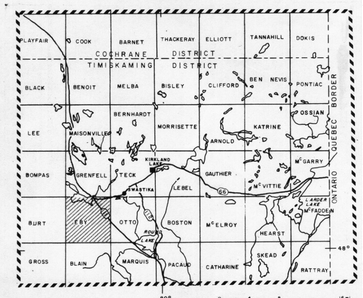
DISTRICT OF TIMISKAMING

EBY TOWNSHIP

Fig. M-3

REVERSE CIRCULATION DRILL HOLE DATA





LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 — 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN-PROTEROZOIC

7 — Matachewan (Nipissing)
Undifferentiated diabase (gabbro) dykes

ARCHEAN

6 — Felsic Intrusive Rocks
6a Granite, hornblende granite, hornblende-biotite granite
6b Syenite, quartz syenite
6c Mesocratic syenite, syenite porphyry
6d Granodiorite, quartz diorite
6e Aplite
6f Tonalite to adamellite

5 — Mafic Intrusive Rocks
5a Serpentinite, peridotite
5b Gabbro, diorite, in part course volcanic flows

4 — Timiskaming Metasediments and Metavolcanics
4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

3 — Felsic Metavolcanics, Tuffs and Metasediments
3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 — Intermediate to felsic volcanics; andesite, dacite

1 — Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

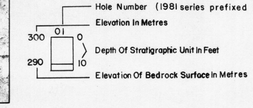
- Swamp deposits, muck, peat
- Clay
- Silt
- Sand
- Gravel, sand-pebble matrix with cobbles
- Till, clay matrix with pebbles and cobbles
- Till, sandy matrix with pebbles and cobbles
- Boulder
- Bedrock

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Elevations of drill hole collars measured by the Ontario Geological Survey, 1980, using the precision aneroid barometer method. Elevations of 1981 drill hole collars estimated from 1:50,000 N.T.S. series topographic maps.

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KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

GRENFELL TOWNSHIP

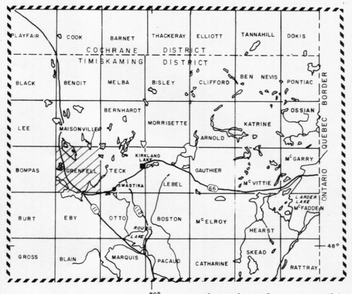
Fig. M-4

REVERSE CIRCULATION DRILL HOLE DATA

LEE
BOMPAS
MAISONVILLE
GRENFELL
BERNHARDT
TECK
BURT
EBY
OTTO

80-16 318 312.5 30
80-17 323 295.5 40
80-18 354 289 65 79 69 32
80-20 301 95
80-19 327 312.5 45
80-21 305 294.4 45 33 95.5

0 1 2
KILOMETRES
0
MILES



LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 — 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN-PROTEROZOIC

7 — Matachewan (Nipissing) - Keweenawan
Undifferentiated diabase (gabbro) dykes

ARCHEAN

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6a Granite, hornblende granite, hornblende-biotite granite
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4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

Keewatin Metavolcanics

3 — 3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 — Intermediate to felsic volcanics; andesite, dacite

1 — Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

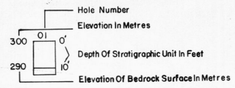
- Swamp deposits, muck, peat
- Clay
- Silt
- Sand
- Gravel, sand-pebble matrix with cobbles
- Till, clay matrix with pebbles and cobbles
- Till, sandy matrix with pebbles and cobbles
- Boulder
- Bedrock

SOURCES OF INFORMATION

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Elevations of drill hole collars measured by the Ontario Geological Survey, 1980, using the precision aneroid barometer method.

Air photo mosaics, provided by the Ontario Geological Survey, were prepared by Questor Surveys Limited, Toronto from 1970 photography by the Ontario Ministry of Natural Resources.



2262

KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

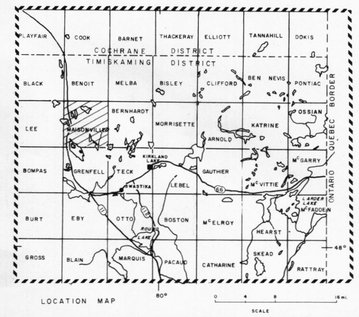
MAISONVILLE TOWNSHIP

Fig. M-5

REVERSE CIRCULATION DRILL HOLE DATA

0 1 2
KILOMETRES

0 1
MILES



LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 — 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN–PROTEROZOIC

7 — Matachewan (Nipissing) - Keweenawan
Undifferentiated diabase (gabbro) dykes

ARCHEAN

6 — Felsic Intrusive Rocks
6a Granite, hornblende granite, hornblende-biotite granite
6b Syenite, quartz syenite
6c Mesocratic syenite, syenite porphyry
6d Granodiorite, quartz diorite

5 — Mafic Intrusive Rocks
5a Serpentinite, peridotite
5b Gabbro, diorite, in part course volcanic flows

4 — Timiskaming Metasediments and Metavolcanics
4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

3 — Keewatin Metavolcanics
3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 — Intermediate to felsic volcanics; andesite, dacite

1 — Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

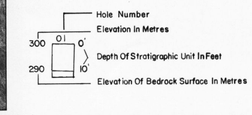
- Swamp deposits, muck, peat
- Clay
- Silt
- Sand
- Gravel, sand-pebble matrix with cobbles
- Till, clay matrix with pebbles and cobbles
- Till, sandy matrix with pebbles and cobbles
- Boulder
- Bedrock

SOURCES OF INFORMATION

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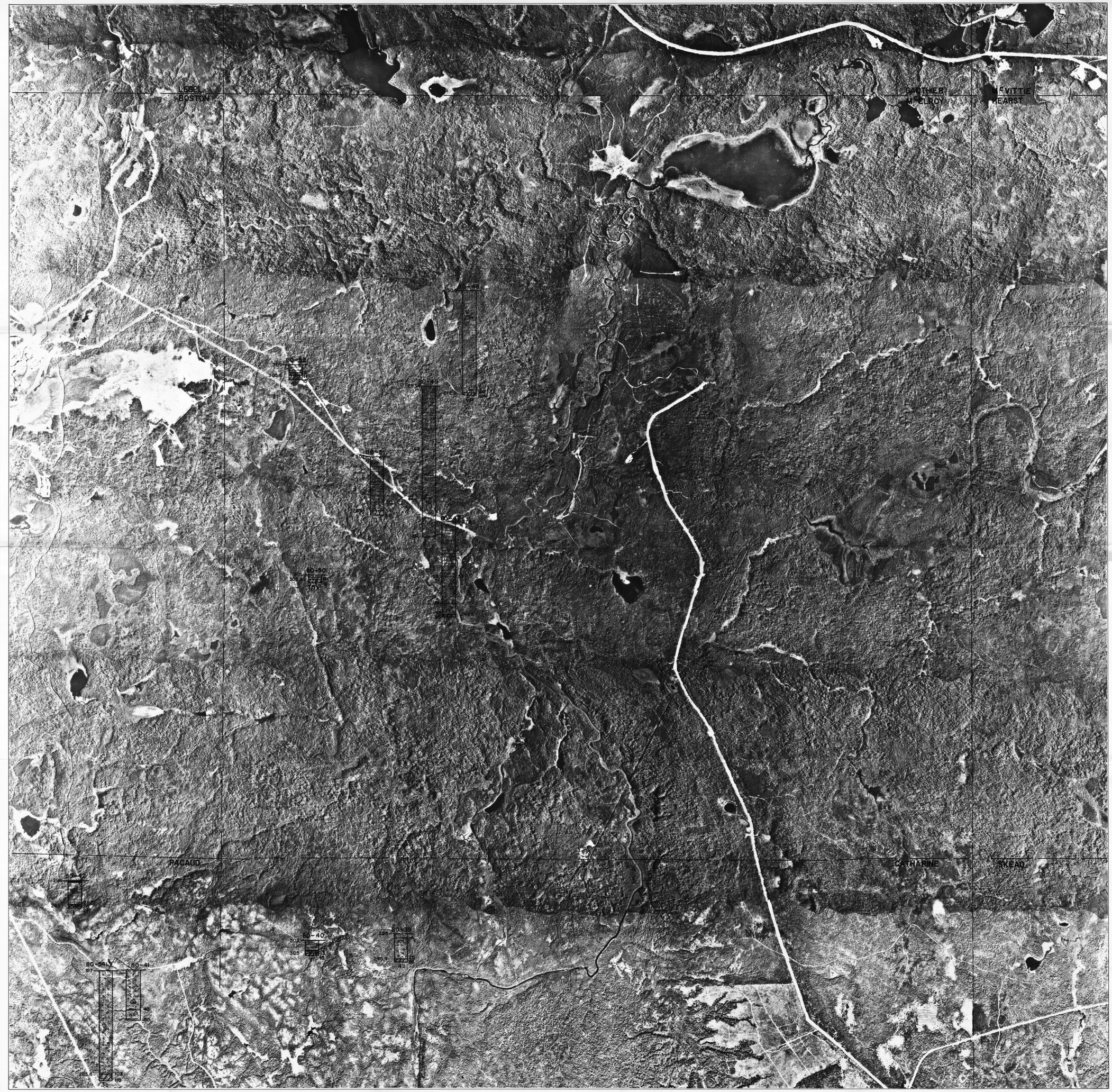
KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

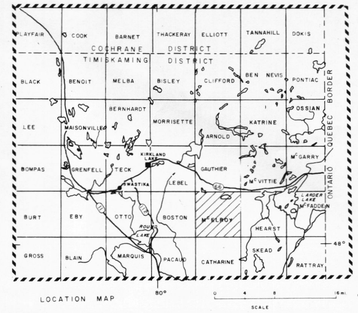
McELROY TOWNSHIP

Fig. M-6

REVERSE CIRCULATION DRILL HOLE DATA



0 1 2
KILOMETRES
0 1
MILES



LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 — 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN-PROTEROZOIC

7 — Matachewan (Nipissing) - Keweenawan
Undifferentiated diabase (gabbro) dykes

ARCHEAN

6 — Felsic Intrusive Rocks
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4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

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3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 — Intermediate to felsic volcanics; andesite, dacite

1 — Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

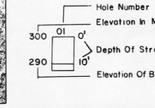
- Swamp deposits, muck, peat
- Clay
- Silt
- Sand
- Gravel, sand-pebble matrix with cobbles
- Till, clay matrix with pebbles and cobbles
- Till, sandy matrix with pebbles and cobbles
- Boulder
- Bedrock

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2271

KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

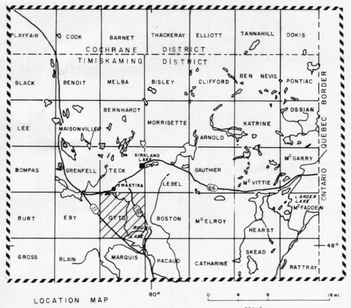
OTTO TOWNSHIP

Fig. **M-7**

REVERSE CIRCULATION
DRILL HOLE DATA

GRENFELL
EBY
TECK
OTTO
LEBEL
BOSTON
BLAIN
MARQUIS
PACAUD

80-45 306 304.3 6d
80-44 280 280.3 6b
80-46 319 306.3 6b
80-32 291 276.7 6b
80-31 306 299.6 6b
80-33 293 272.9 6b
80-43 301 291.6 6bc
80-29 313 304.8 4d
80-34 293 287.4 5b
80-30 295 284 283.4 6b
80-35 274 235.9 6b
80-36 310 301.5 1



0 1 2
KILOMETRES

0 1
MILES

LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation
[8] 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN-PROTEROZOIC

[7] Matachewan (Nipissing) - Keweenawan
Undifferentiated diabase (gabbro) dykes

ARCHEAN

[6] Felsic Intrusive Rocks
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6b Syenite, quartz syenite
6c Mesocratic syenite, syenite porphyry
6d Granodiorite, quartz diorite

[5] Mafic Intrusive Rocks
5a Serpentinite, peridotite
5b Gabbro, diorite, in part course volcanic flows

[4] Timiskaming Metasediments and Metavolcanics
4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

[3] Keewatin Metavolcanics
3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

[2] Intermediate to felsic volcanics; andesite, dacite

[1] Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

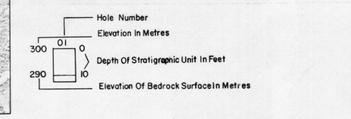
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KIRKLAND LAKE AREA

DISTRICT OF TIMISKAMING

LEBEL TOWNSHIP

Fig. M-8

REVERSE CIRCULATION DRILL HOLE DATA

BERNHARDT | MORRISETTE

TECK | LEBEL

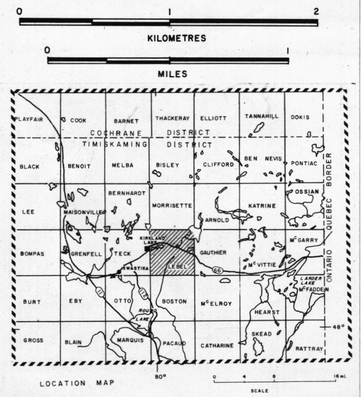
ARNOLD

OTTO | BOSTON

GAUTHIER

McELROY





LEGEND

BEDROCK LITHOLOGY

PRECAMBRIAN

PROTEROZOIC

Huronian
Cobalt Group
Gowganda Formation

8 8a Conglomerate
8b Arkose, conglomeratic arkose
8c Quartzite and greywacke
8d Argillite

ARCHEAN-PROTEROZOIC

7 Matachewan (Nipissing)
Undifferentiated diabase (gabbro) dykes

ARCHEAN

6 Felsic Intrusive Rocks
6a Granite, hornblende granite, hornblende-biotite granite
6b Syenite, quartz syenite
6c Mesocratic syenite, syenite porphyry
6d Granodiorite, quartz diorite
6e Aplite
6f Tonalite to adamellite

5 Mafic Intrusive Rocks
5a Serpentinite, peridotite
5b Gabbro, diorite, in part course volcanic flows

4 Timiskaming Metasediments and Metavolcanics
4a Conglomerate
4b Basal grit, quartzite, greywacke
4c Argillite
4d Tuff, agglomerate, trachyte, trachytic agglomerate and breccia

3 Felsic Metavolcanics, Tuffs and Metasediments
3a Dacite, rhyodacite, lesser rhyolite, quartz-feldspar porphyry
3b Felsic-dacitic and silicic tuff, agglomerate
3c Iron formation, chert, paragneiss, tuffaceous sediments
3d Argillite

2 Intermediate to felsic volcanics; andesite, dacite

1 Mafic volcanics, basalt, andesite-basalt, amphibolite, lesser ultra mafic flows

SYMBOLS

- Swamp deposits, muck, peat
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