INTRODUCTION

A large sedimentary exhalitive barite deposit, known as the Tea Claims or the Samovar property, located near MacMillan Pass, Yukon is the subject of this report, the purpose of which will be to examine the work done on the property in the past and to evaluate its potential for development in the future as a source of drilling mud grade barite.

The Tea Claims are located on map sheets 1050-2 and 105J-15, about 120 miles northeast of Ross River, the nearest source of supplies, and 345 miles by road from Whitehorse. Access from the Canol is by a 12 kilometer road which was constructed to haul ore to Ross River. The access road leaves the Canol Road at approximately kilometer 415 (Mile 253.6) or about 2 miles northeast of MacMillan Bridge Number 1.

One hundred claims were staked on this barite showing in August of 1975 by Welcome North Mines Ltd. James Dodge who was consulting for Welcome North, optioned the property and over a period of several years attempted to finance and develop the mine. Several large samples were collected and analyzed at various times. In 1976 R.C. Carne mapped the property and reported that there were at least 68,000 tons of mud grade material on the property. In 1981 Peter Coolen with the Department of Indian Affairs and Northern Development mapped the property to get an independent view of the potential of the property. During this visit core drilling was attempted, but was unsuccessful. Dodge had drilled four small diameter core holes on the main outcrops in 1976, which indicated about 242,000 tons of API grade barite. Specific gravity analysis showed that much of the barite was between 4.17 and 4.24, however, interbedded lower grade material made it difficult to maintain grade on a direct shipping basis. Mining was begun in 1980 in an arrangement between Milchem Canada Ltd. and Yukon Barite, the company that James Dodge had formed in 1976. In the early 1980's Dodge made financial arrangements with Ed Eisenmann to fund mining and construction of a grinding mill to be located in Ross River. During this period approximately 2000 tons of ore were moved to the plant site west of Ross River and another 5600 tons were stockpiled near the ferry on the east side of the Pelly River. Since 1983, the property has been idle due to litigation which resulted in the court awarding the property to Ed Eisenman. As a result of the disagreement, the grinding mill was never installed at Ross River.

The Tea Claims represent a very large tonnage of barite composed of a mixture of low and high grade material. There are probably several million tons of barite-bearing material at the site, but at the present the orebody is not fully explored for either its quality or quantity. The past efforts at exploration have been very limited in their scope and the size of the core used was inadequate for the nature
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of the ore. The mining operations were also done in a manner that unavoidable contamination was introduced into the ore. Because of these past problems, it is important to identify the exact extent of the ore and its quality so as to plan a mine which will utilize the resource to the fullest extent possible and to provide information about the orebody to be sure that mining is being done at the best site. Mining began at the lowest outcrop of the ore and subsequent interest has been focused on this area without the benefit of having explored the rest of the property to determine the best location for mining.

The barite zone at the Tea Claims in the mine pits exceeds 100 feet in thickness in two separate layers of approximately 70 and 50 feet separated by a 30 foot shale unit. This sequence has been folded into a series of west plunging folds which cross a high cone shaped hill and are exposed across the top and particularly on the east and south slope of the hill. The ore itself consists of interbedded layers of high grade barite with layers of carbonate rich barite, lower grade barite, shale, and chert. These relationships will make selective mining difficult but not impossible.

GEOLOGY

The regional geology of the area is well described in Carnes (1976), Coolen (1982), and Abbot (1981), and therefore will not be described in detail here. A copy of Coolen's report is appended to this report. The Tea barite deposit occurs in the Lower Earn Group of Upper Devonian to Lower Mississippian age (Coolen, 1982), and is underlain by the silvery weathering black shale which hosts the Jason and Tom sulfide deposits to the east. The stratigraphic sequence from bottom to top is (1) black shale below the barite, (2) two layers of barite separated by shale, (3) shales and cherts overlying the barite, and (4) limestone.

The lower unit of barite measures 71 feet with the bottom covered. The lower 18 feet of the section contains one 4 1/2 foot wide zone of iron stained dirt plus a six inch clay seam which probably represents a fault. The next twelve feet are more massive barite which contains a few clay selvages. The main mining face is about 40 feet wide and contains mainly high grade massive barite, but it also contains a series of leached carbonate-barite zones (barytocalcite?) which are up to two feet wide, but more commonly 4 to 6 inches wide. There are also rare chert and shale zones. The upper and lower beds are separated by a shale and chert horizon which is on the order of 30 feet thick. The lower 10 feet of the upper bed contain abundant carbonate zones (barytocalcite?) and one four inch argillite layer. The upper 14 1/2 feet are lower grade and were not included in the original mining area. Specific gravity of a series of samples are shown in the accompanying chart.

ORE QUALITY
A series of chip samples were taken across the faces of the mining areas in such a way as to collect some of each individual bed and as nearly as possible approach a channel sample. Each sample is represented on the accompanying chart with values for the width of the sample, its position relative to the others collected, the specific gravity of the original bulk sample taken, and the specific gravity of the plus 3/4 inch sizes.

In pit one, 11 of the 15 bulk samples have a specific gravity of 4.107. When screened over a 3/4 inch screen, the plus 3/4 inch material was upgraded to 4.136 or .031. The 9.5 feet on the south side of the pit shown by samples 39501-39504 have a weighted specific gravity of 4.21. This is the only section in this pit likely to yield direct ship material. The fines average 4.099 or almost the same as the original bulk sample.

In pit two only one sample exceeds 4.20. The weighted average of the bulk samples is 4.038. Screening upgraded the coarse material to 4.072 or an increase of .034. The weighted specific gravity of the fines is just a little higher than the original feed.

Screening will upgrade the ore about +.03 for a loss of 1/3 of the feed. In actual practice a trommel screen will probably knock a little more of the waste off and upgrade the material as much as .05.

Four core holes drilled by Yukon Barite in 1979 show that the barite has gravities up to 4.37, but most values range between 4.17-4.24 (see appendix to Coolen 1982). Results of analyses on the drill core show averages of 4.21 to 4.24 over widths of 50 to 60 feet. Drill logs for the holes were not available to the author so it is impossible to determine whether or not drilling has washed away the low grade spongy zones, therefore high grading the results. None of the holes penetrated the full ore zone, either.

ORE QUANTITY

Based on the four core holes drilled by Yukon Barite in 1979, Coolen (1982) determined that there were 160,876 tonnes of drill indicated and 64,636 tonnes of inferred ore grade material with a specific gravity of 4.2 or better. This compares favorably with Yukon Barite's 205,181 tonnes.

Using Coolen's sections, I have recalculated the reserves as shown on Table I. Based on this data the ore in Block A defined by drillhole #1 is 102,050 tons at 4.013 weighted average gravity. If beds 2 and 4 are selectively eliminated then the tonnage drops to 48,425 at 4.23. Block B has 120,363 tons at 4.084 weighted average. By selectively mining out beds 2 and 4 the tonnage drops to 60,955 at 4.229 weighted specific gravity. Block C contains 28,800 tons of ore at 4.20 specific gravity. Thus we have a total of
251,213 tons of ore at a weighted average of 4.063. Selective mining would yield 138,120 tons at a weighted average of 4.223. An additional 164,000 tons of ore which is less certain has a weighted gravity of 4.258. Since only a small portion of the property has been drilled, the potential for a large tonnage is excellent. In order to properly mine this ore, it will be necessary to further define the orebody by drilling.

ECONOMIC EVALUATION

The most profitable way to use this ore is to direct ship the barite without having to process it. Stock pile samples from previous mining show values below 4.20 even with screening, however. Industry practice is to aim for a specific gravity of 4.22. Direct shipping requires specific gravities in the rock to be at least 5 points and preferably 7 or 8 points above the product grade desired in order to allow for unavoidable contamination which will get in the ore. Great care is required to maintain the gravity in direct ship mining. Some operators at Battle Mountain, Nevada were careful enough in the early 1970's that after stripping the ore they would sweep the outcrop with a broom and then blow it off with compressed air. In this mine, because of the interbedding of barite with the lower grade materials and because of the steep walls above, which have allowed waste to mingle with the ore, it has been impossible to maintain the quality. There are two things which can be done at the mine to solve this problem: (1) identify a higher grade zone which will support direct shipping, (2) mine from the top down so that waste will not get into the ore. Other options include (1) beneficiating the ore, (2) mixing it with higher grade ores and/or (3) very selectively mining the orebody.

The most appropriate beneficiation method would probably be to jig it, a relatively inexpensive process which might be effective on this ore except for the materials that are just below 4.20 and much of this ore is just below 4.20. From the standpoint of using the mineral in the most efficient manner, jigging will be required eventually.

There are other properties available in the area which might serve as possible sources to upgrade the ore. At least on a short-term basis. Approximately 15 miles west of the junction of Canol Road and the Robert Campbell Highway and about 1 mile northwest of the South Canol Road is a property known as Barite Mountain, a high-grade vein type barite having widths of five or six feet and specific gravities of 4.30 to 4.35. Tonnages which could be removed for a reasonable cost would be limited, but if mining at Tea were done carefully and the specific gravity needed to be increased only two or three points, then it might be a viable option.

Selective mining will be required, especially if a
direct shipping operation is chosen unless drilling defines a high grade ore body which will not need selective mining. Even with a beneficiation plant some selectivity will probably be necessary.

MARKETING

Barite for the Canadian Arctic comes primarily from southern Alberta and British Columbia, northeastern British Columbia and Nevada. In 1984 Magcobar opened the Fireside barite mine in northeastern British Columbia. The ore is ground in Watson Lake, Yukon and shipped in wooden boxes up the Dempster Highway to Inuvik. About 10,000 tons were supplied from this source in 1984. The remaining 5-10,000 tons used in the arctic drilling were supplied via the Mackenzie river from southern Alberta, and Nevada. This material is shipped by rail to Hay River, NWT and thence by barge to Tuktoyaktuk. Prices range from $200 Canadian in southern Alberta to $500 Canadian in the Arctic.

The largest portion of the cost of barite in the arctic is transportation. Since the Yukon barite is already much closer to the end use area it has a distinct advantage over other sources and will be able to capture a large share of the arctic market as long as the quality is maintained and a demonstration of ability to deliver is shown. It is likely that this property will be able to capture at least half of the arctic market and probably more. Some barite may also be sold to markets to the south, but with an operation already in production near Watson Lake, it will be difficult to compete toward the south.

Production costs in Nevada run (US Dollars):

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>$12</td>
</tr>
<tr>
<td>Grinding</td>
<td>15</td>
</tr>
<tr>
<td>Bagging</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
</tr>
</tbody>
</table>

If we assume that costs of production at tea will be 40% higher because of the northern location and a 5% grinding loss will be experienced because of ice in the ore, then the production cost will be $46.72 US exclusive of transportation cost. Transport cost at $0.20 per ton-mile would be $180 US for the haul to Inuvik for a total cost of $226 US. Cost of the wooden shipping containers to carry the bags would add no more than another $20 per ton for a total cost of about $250 US. At today's exchange rates, that means as much as $150 CAN per ton could be profit, or some of that margin could be used for leverage in obtaining sales.

DEVELOPMENT

Because of the investment of up to $2 million US, it is imperative that the orebody and its beneficiation be well
understood. For this reason, it is recommended that ten core holes of N size be drilled along the limbs of the syncline and on the southwest slope of the hill to determine if the present mining location is the best and to establish the need for and the proper method of beneficiation. The locations of the proposed holes are indicated on the enclosed geologic map. The drilling would total about 2000 feet which can be drilled by Caron Drilling in Whitehorse for $50-55 CAN per foot inclusive of all costs except dozer time which would be at the rate of $85-90 CAN per hour. This program would determine if the investment in plant and equipment would be justified, how development of the mine should proceed, and whether beneficiation is presently necessary.

While the dozer is there, at least two large bulk representative samples of 600-1000 pounds each should be collected for a jig test and for other determinations as to the beneficiation processes that might be necessary.

Mining efficiency will be improved if mining can be done from the top downwards so that there is maneuvering room in the pit and so that there will not be a wall of waste to contaminate the ore as in the past. Mining on top would also require a new road. Even if mining proceeds in the present location, it would be most desirable to eliminate the switchbacks in the present road above the scalehouse. The topographic information generated in 1984 should prove useful for planning these improvements.

CONCLUSIONS

The Tea Claims represent a very large tonnage of barite-bearing material which at present is only slightly explored. Ore reserves are at least 250,000 tons of a mixture of high and low grade ore. Unfortunately the higher grade ore is mostly inferred and it needs definition. In order to justify the expenditure of the investment necessary to get the property into production, it will be necessary to undertake a program of drilling and bulk sampling to identify the best place to begin mining and to plan the mine so that the most ore can be removed for the least cost. Bulk representative samples for beneficiation tests should be taken and tested to determine whether beneficiation is necessary and if it is, how this would best be accomplished.
June 3, 1986

Eisenman Enterprises
1612 1st Avenue
Greeley, Colorado 80631

Attn: Mr. Ed Eisenman

Subject: Results of Hand Jig Tests on Barite Ore Samples, Designated Our Project No. P-1249.

Gentlemen:

In accordance with our discussions Mr. Wallace Mitchell came to our laboratory on May 29, 1986 to observe our laboratory procedures for making specific gravity analyses on barite samples and conducting hand jig tests. Mr. Mitchell brought to our laboratory channel cut samples for compositing (P-1249-A) and an ore stockpile sample (P-1249-B).

Mr. Mitchell picked out three rocks from the stockpile sample for specific gravity analysis and showed the following:

<table>
<thead>
<tr>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

All specific gravities were conducted using a LeChatelier bottle in a kerosene medium.

In the hand jig test it was found to be most effective to remove the minus 20 mesh from the crushed ore (Sample P-1249-A to minus 1/2 inch and Sample P-1249-B to about minus 1 inch) and then to successively hand jigged using 3, 8, and 20 mesh 8 inch sieves.

Although the analyses on the individual rock samples showed specific gravities of 4.30 to 4.39, the hand jig test results did not show sink products this high. Results are summarized in the table on the following page.
June 3, 1986
Eisenman Enterprises
Page -2-

<table>
<thead>
<tr>
<th>Product</th>
<th>Channel Cut Comp.</th>
<th>Ore Stock Pile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% WT</td>
<td>Sp. Gr.</td>
</tr>
<tr>
<td>-1/2&quot;-3M Sink</td>
<td>32.4</td>
<td>4.17</td>
</tr>
<tr>
<td>Float</td>
<td>9.6</td>
<td>3.86</td>
</tr>
<tr>
<td>-1&quot;-3M Sink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Float</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-3/8M Sink</td>
<td>17.0</td>
<td>4.21</td>
</tr>
<tr>
<td>Float</td>
<td>6.1</td>
<td>3.86</td>
</tr>
<tr>
<td>-8-20M Sink</td>
<td>11.4</td>
<td>4.08</td>
</tr>
<tr>
<td>Float</td>
<td>1.7</td>
<td>3.92</td>
</tr>
<tr>
<td>Comb. Sink</td>
<td>60.8</td>
<td>4.18</td>
</tr>
<tr>
<td>Float</td>
<td>17.4</td>
<td>3.91</td>
</tr>
<tr>
<td>-20M</td>
<td>21.8</td>
<td>4.10</td>
</tr>
<tr>
<td>Head (calc)</td>
<td>100.0</td>
<td>4.11</td>
</tr>
</tbody>
</table>

With the relatively high specific gravities in the float products and marginal gravities in the concentrates (sink product) it appears that consistently obtaining a 4.2+ specific gravity product could be difficult and considerable barite would be lost in the float product. Further testing is required on samples from other areas of the ore body to determine if there are any marked variations in the ore body.

We understand that Mr. Mitchell is planning to conduct drilling, sampling, and testing at the mine site to further evaluate the property. If check analyses and/or testing is desired we would be pleased to work with you.

Very truly yours,
DAWSON METALLURGICAL LABORATORIES, INC.

Harmel A. Dawson,
President

cc: A. Wallace Mitchell

HAD-cac
## Specific Gravities

### Selective Rock Samples

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>WEIGHT SP. GR.</th>
<th>ASSAY</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample A</td>
<td>4.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample B</td>
<td>4.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample C</td>
<td>4.39</td>
<td></td>
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</tbody>
</table>

### Grinding Products

<table>
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<tr>
<th>MESH</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>+10</td>
<td></td>
</tr>
<tr>
<td>+14</td>
<td></td>
</tr>
<tr>
<td>+20</td>
<td></td>
</tr>
<tr>
<td>+28</td>
<td></td>
</tr>
<tr>
<td>+35</td>
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<td>+48</td>
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<td>+150</td>
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<td>+200</td>
<td></td>
</tr>
<tr>
<td>+325</td>
<td></td>
</tr>
<tr>
<td>-325</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks:

- 

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**DAWSON METALLURGICAL LABORATORIES, INC.**

P. O. Box 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

**PROJECT NO.** P-1249
**DATE** 5/29/86
**BY** LA

**TEST NO.**

**NAME** Eisenman Industries
### Jig Test

**NAME:** Eisenman Enterprises  

**PRODUCT** | **Weight** | **% WT** | **ASSAY** | **% WT** | **SP. GR.** | **SP. GR.** |
---|---|---|---|---|---|---|
-1/2" +3 Sink | 3224 | 32.4 | 77.1 | 32.4 | 4.17 | 1.35 |
Float | 958 | 9.6 | 22.9 | 9.6 | 3.86 | .37 |
-3 +8 Sink | 1692 | 17.0 | 73.6 | 17.0 | 4.21 | 0.72 |
Float | 607 | 6.1 | 26.4 | 6.1 | 3.86 | 0.24 |
-8 +20 Sink | 1131.0 | 11.4 | 87.0 | 11.4 | 4.08 | 0.47 |
Float | 168 | 1.7 | 13.0 | 1.7 | 3.92 | 0.07 |
-20 Mesh | 2160 | 21.8 | | 21.8 | 4.10 | 0.89 |
Head (calc) | 9940 | | | | 4.11 | |

**REMARKS:**

**PRODUCT** | **Wt%** | **SP. GR.** |
---|---|---|
Comb. Sink | 60.8 | 4.18 |
Comb. Float | 17.4 | 3.91 |

**MESH**

<table>
<thead>
<tr>
<th>MESH</th>
<th>%</th>
</tr>
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<tbody>
<tr>
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<tr>
<td>-14</td>
<td></td>
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<td>-20</td>
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<tr>
<td>-325</td>
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<td>-625</td>
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**MACHINE**

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<tr>
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<tr>
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**% SOLIDS**

<table>
<thead>
<tr>
<th>% SOLIDS</th>
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**TEMPERATURE**

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<tbody>
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**REMARKS:**
### Jig Test

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>Weight</th>
<th>% WT</th>
<th>Sp. Gr.</th>
<th>UNITS</th>
<th>Sp. Gr.</th>
<th>DISTRIBUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1&quot; +3M Sink</td>
<td>3742</td>
<td>37.7</td>
<td>4.19</td>
<td></td>
<td>1.58</td>
<td></td>
</tr>
<tr>
<td>Float</td>
<td>1561</td>
<td>15.7</td>
<td>3.96</td>
<td></td>
<td>0.62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5503</td>
<td>53.4</td>
<td>2.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-3 +8M Sink</td>
<td>1338</td>
<td>17.5</td>
<td>4.25</td>
<td></td>
<td>0.57</td>
<td></td>
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<tr>
<td>Float</td>
<td>765</td>
<td>7.7</td>
<td>3.85</td>
<td></td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2100</td>
<td>21.2</td>
<td>0.87</td>
<td></td>
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<tr>
<td>-8 +20M Sink</td>
<td>527.0</td>
<td>5.3</td>
<td>4.27</td>
<td></td>
<td>0.23</td>
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<tr>
<td>Float</td>
<td>405.0</td>
<td>4.1</td>
<td>3.90</td>
<td></td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>932.0</td>
<td>9.4</td>
<td>0.39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-20 Mesh</td>
<td>1598</td>
<td>3.96</td>
<td>0.64</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Head (calc)</td>
<td>9933.0</td>
<td>100.0</td>
<td>4.10</td>
<td></td>
<td>4.10</td>
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</tbody>
</table>

### Remarks:

- **PRODUCT**
- **Weight**
- **% WT**
- **Sp. Gr.**
- **UNITS**
- **Sp. Gr.**

### Distribution Mesh %

- **+10**
- **+14**
- **+20**
- **+28**
- **+35**
- **+48**
- **+65**
- **+100**
- **+150**
- **+200**
- **+325**
- **-325**

### Machine

- **R.P.M.**
- **% SOLIDS**
- **TEMPERATURE**
- **REMARKS**
SUBJECT
Analysis for heavy metals of barite samples submitted in behalf of HALLIBURTON Services, Ltd., Canada

PURPOSE
To determine lead, cadmium, mercury, and arsenic contents of the submitted samples

CONCLUSION
The contents were determined down to a precision of 1/100 of a ppm. The "cleanest" of the five samples was that identified as Faffi White Barite.

cc: L.F. Meier
    D. Waller

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that IMCO Services shall not be liable for any loss or damage, whether due to act or omission, resulting from such report or its use.

IMCO FORM 868 REV-11/79
SAMPLE IDENTIFICATION

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Log #</th>
<th>Further Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WM-1011-11A</td>
<td>Yukon Core 1979</td>
</tr>
<tr>
<td>2</td>
<td>WM-1011-11B</td>
<td>Yukon Ourcrop</td>
</tr>
<tr>
<td>3</td>
<td>WM-1108-8</td>
<td>Casablanca Red Barite</td>
</tr>
<tr>
<td>4</td>
<td>WM-1108-9</td>
<td>Faffi White Barite</td>
</tr>
<tr>
<td>5</td>
<td>WM-1113-10</td>
<td>Cash Industries Barite</td>
</tr>
</tbody>
</table>

TEST PROCEDURE

All samples were sent to Southwest Petroleum labs for the analysis of the mercury and arsenic, since we do not yet have a hydride generator. The lead and cadmium were run here using the API proposed method for heavy metal analysis with the following modifications:

1) The HCA 2200 furnace was used instead of the flame, giving us higher sensitivity

2) The method of sample addition was employed so as to remove as many interferences as possible

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## TEST DATA

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Lead (ppm)</th>
<th>Cadmium (ppm)</th>
<th>Mercury (ppm)</th>
<th>Arsenic (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.58</td>
<td>0.96</td>
<td>0.27</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>2</td>
<td>9.2</td>
<td>0.68</td>
<td>0.16</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>3</td>
<td>292</td>
<td>0.70</td>
<td>0.53</td>
<td>0.32</td>
</tr>
<tr>
<td>4</td>
<td>0.50</td>
<td>0.16</td>
<td>0.20</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>5</td>
<td>655</td>
<td>15.2</td>
<td>0.13</td>
<td>1.10</td>
</tr>
</tbody>
</table>

## DISCUSSION

Mercury and arsenic must be done using a cold vapor technique. We will have that capability by sometime next year.

Samples #3 and #5 have high lead contents. Sample #5 is high enough that it may affect a high pH mud.

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November 15, 1979

Mr. L. F. Maier, President
Halliburton Services Limited
275 Amoco Building
444 Seventh Avenue, S.W.
Calgary T2P 0X8, Canada

Dear Mr. Maier:

We now have lead, cadmium, and mercury numbers in ppm on four of the five barite samples of interest to Halliburton-Canada.

<table>
<thead>
<tr>
<th>Sample Identification</th>
<th>Lead</th>
<th>Cadmium</th>
<th>Mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yukon (Core)</td>
<td>58.0</td>
<td>0.96</td>
<td>0.26</td>
</tr>
<tr>
<td>Yukon (Outcrop)</td>
<td>9.2</td>
<td>0.68</td>
<td>0.13</td>
</tr>
<tr>
<td>Casablanca (Morocco)</td>
<td>292.0</td>
<td>0.70</td>
<td>0.51</td>
</tr>
<tr>
<td>Faffi White (Morocco)</td>
<td>0.5</td>
<td>0.16</td>
<td>0.19</td>
</tr>
</tbody>
</table>

The mercury concentrations were determined by Southern Petroleum Labs (Houston), and they also are working on arsenic concentrations in case they are needed. The lead and cadmium numbers were obtained by our analytical group. An item in our 1980 capital will give us in-house capability for mercury and arsenic, as well.

The testing of the Idaho barite sample from Cash Industries is in progress. We should have results in about a week.

We are pleased to be able to be of assistance to you.

Sincerely yours,

Roger Bleier, Manager
Fluids Development & Services

RB:pp

cc: Bill Taylor
    Doyle Waller
SUBJECT
Crude barite from Yukon Barite Company

PURPOSE
To determine the quality of barite offered to Halliburton in Canada by Yukon Barite Company

CONCLUSION
This barite has a specific gravity of 4.287 on the core sample and 4.281 in the outcrop sample. Both samples have 20 ppm water soluble calcium. Both samples have barium sulfate contents around 90% with approximately 5% quartz. The iron content is less than 0.5%. The core sample has 58 ppm lead and 0.96 ppm cadmium while the outcrop sample has 9.2 ppm lead and 0.68 ppm cadmium.

cc: D. Waller
    L.F. Maier
SAMPLE IDENTIFICATION

WM-1011-11A - Core sample
SM-1011-11B - Outcrop sample

Samples from James S. Dodge Pres. (P. Eng) of Yukon Barite Company to Mr. D.D. Waller of IMCO. Mr. L.F. Maier of Halliburton in Calgary requested the analysis. Mr. Maier's phone is (403) 269-6141.

TEST PROCEDURE

The ground sample was analyzed for water soluble calcium and specific gravity in accordance with API specifications for barite.

The analytical section of the laboratory also determined the mineral content of each sample by x-ray and A.A.

The mercury analysis is being performed in the near future and will be reported at a later date.

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## TEST DATA

**Table I - API Quality Assurance Analysis on Yukon Barite**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Core</th>
<th>Outcrop</th>
<th>API Specs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>4.287</td>
<td>4.281</td>
<td>4.20 Min.</td>
</tr>
<tr>
<td>Water Soluble Calcium, ppm</td>
<td>20</td>
<td>20</td>
<td>250 Max.</td>
</tr>
</tbody>
</table>

Note: Screen analysis not performed since the sample was ground in this lab.

**Table II - X-ray and A.A. analysis on Yukon Barite**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Core</th>
<th>Outcrop</th>
</tr>
</thead>
<tbody>
<tr>
<td>BaSO</td>
<td>87.5-89.5%</td>
<td>89-91%</td>
</tr>
<tr>
<td>Quartz</td>
<td>5-6%</td>
<td>4.5-5.5%</td>
</tr>
<tr>
<td>Calcite</td>
<td>0.5-1.0%</td>
<td>None found</td>
</tr>
<tr>
<td>Amorphous and minor trace minerals</td>
<td>4.5-5.5%</td>
<td>4.5-5.5%</td>
</tr>
<tr>
<td>Strontium (Sr)</td>
<td>0.22%</td>
<td>0.22%</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>0.46%</td>
<td>0.31%</td>
</tr>
<tr>
<td>Lead</td>
<td>58 ppm</td>
<td>9.2 ppm</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.96 ppm</td>
<td>0.68 ppm</td>
</tr>
</tbody>
</table>

**NOTICE:** This report is limited to the described sample tested. Any person using or relying on this report agrees that IMCO SERVICES shall not be liable for any loss or damage, whether due to act or omission, resulting from such report or its use.
DISCUSSION

The two samples are within API specifications for barite in so far as the specific gravity and water soluble calcium. The x-ray data is also well within our expectations for use as IMCO BAR, however until the report is received on the mercury content one should hold off on commitments for this material. Also if the radiation count is required on this barite source the minimum sample of 25 kg must be supplied to our lab.

CONFIDENTIAL

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that IMCO SERVICES shall not be liable for any loss or damage, whether due to act or omission, resulting from such report or its use.
**DRILL HOLE RECORD**

- **Project:** TEA
- **Drilled By:** Cape Diamond Drilling
- **Logged By:** A.W. Hitchcock
- **Total Depth:** 202
- **Date:** July 4, 1986 - July 6, 1986

**Co-ordinates:** North __________ East __________

**Elevation:**

---

### DEPTH

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Recovery</th>
<th>Sample Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>12</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>14</td>
<td>66%</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>16</td>
<td>85%</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>20</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>23</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>27</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>28</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>30</td>
<td>35</td>
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</tr>
<tr>
<td>30</td>
<td>31</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>39</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

### DESCRIPTION OF MATERIAL DRILLED

- 0 feet: Black sticky broken shale (rocky with small quartzite pebbles)
- 9 to 12 feet: Black broken silicious shale with veining
- 12 to 14 feet: Black fractured carbonaceous shale
- 14 to 16 feet: W/ occasional 1/8” bivite rock
- 16 to 20 feet: Black silicious shale becoming more carbonaceous in lower part to 1/4” across, some slow concoidal lapping
- Bedding creates core @ 30° from perpendicular do highly broken, nodules increase in last 1 foot to 30-40% of rock
- 20 to 23 feet: Black shale, highly carbonaceous in part
- 23 to 27 feet: Black shale slightly more silicious. One band of coalescing nodules in lower part
- 27 to 28 feet: Triassic sed. cemen.
- 28 to 30 feet: Bedding 25° from perpendicular. Coalescing nodules making 40-70% of rock w/ carbonaceous or silicious material remains
- 30 to 31 feet: Vuggy 1 to 2 m zones @ 36
# DRILL HOLE RECORD

**Drill Hole No.:** 5  **Inclination:**

**Property:**

**Co-ordinates:** North  East

**Elevation:**

**Date:**

**Drilled By:**

**Logged By:**

**Total Depth:**

<table>
<thead>
<tr>
<th>DEPTH FROM</th>
<th>DEPTH TO</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>42</td>
<td>95</td>
<td>95</td>
<td></td>
<td>2&quot; Fractured at bottom w/possible pyromelane for.</td>
</tr>
<tr>
<td>42</td>
<td>46½</td>
<td>95</td>
<td>95</td>
<td></td>
<td>2&quot; Shale seam @ 40.</td>
</tr>
<tr>
<td>46½</td>
<td>51½</td>
<td>98</td>
<td>98</td>
<td>4.17</td>
<td>49-51.5 Fine lami. W/ fracture parallel to face. Shiny features @ 45. Fracture w/ Brite 1½ at 48½. Redring 10° from face to face. Several hard silicifies layers up to ½&quot; thick.</td>
</tr>
</tbody>
</table>
DRILL HOLE RECORD

Drill Hole No.: 5  Inclination:  
Property:  
Coordinates: North  East  
Elevation:  

Date:  
Drilled By:  
Logged By:  
Total Depth:  

<table>
<thead>
<tr>
<th>DEPTH FROM</th>
<th>DEPTH TO</th>
<th>SAMPLE NUMBER</th>
<th>SAMPLE RECOVERY</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
</table>
| 51 1/2     | 56 1/2   | 90            | 90              | 4.15     | 51.5-54.5  
Fine laminated baiite with numerous 1"  
Laminated layers containing abundant  
K-another filled fractures. Slump features at 56  
| 56 1/2     | 62       | 90            | 90              | 4.07     | 54.5-58.9  
Fault zone at 57, rock collapsed  
| 62         | 67       | 85            | 85              | 4.23     | 61-64  
Top 6" is then massive baiite w/ fine  
Laminations. Looks like high grade  
| 67         | 72       | 95            | 95              | 4.35     | 67-72  
Do becoming shaly in lower 6"  
| 72         | 77       | 95            | 95              | 4.37     | 72-77  
Do siliciclasts again 1" thick at 72  
| 77         | 82       | 95            | 95              | 3.94     | 77-79  
Masive to finely laminated to 20% becoming  
More laminated than coalescing nodules  
| 82         | 85       | 60            | 60              | 3.88     | 79-81  
Fault zone at 81% siliciclasts evident  
| 85         | 95       | 60            | 60              | 3.88     | 81-85  
Scattered nodules in upper 10" in carbonate  
Shale which is more siliciclasts  
Several layers of carbonates  

Page 3
## Drill Hole Record

**Drill Hole No.:** 5  
**Inclination:**  
**Property:**  
**Co-ordinates: North**  
**East:**  
**Elevation:**  
**Date:**  
**Drilled By:**  
**Logged By:**  
**Total Depth:**  

<table>
<thead>
<tr>
<th>Depth From</th>
<th>Depth To</th>
<th>Sample Recovery</th>
<th>Sample Number</th>
<th>Analyses Sp. Gr.</th>
<th>Analyses BaSO4</th>
<th>Analyses Cond.</th>
<th>Description of Material Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>90</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Abundant siltstone breccia</td>
</tr>
<tr>
<td>90</td>
<td>92</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>85-97 enclosing nodular layers</td>
</tr>
<tr>
<td>92</td>
<td>94½</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40% of rock at top increasing</td>
</tr>
<tr>
<td>94½</td>
<td>99</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>to 90% in lower part. 87-95</td>
</tr>
<tr>
<td>99</td>
<td>104</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>laminated breccia with some</td>
</tr>
<tr>
<td>104</td>
<td>109</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>nodular layers. Free parallel to</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>core. Broken laminated breccia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>with sound 4% siltstone layers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Massive laminated gray breccia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>92-94 becoming more argillaceous</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>with enclosing nodular beds increasing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>toward 96%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nodular breccia beds with 40% breccia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>at top decreasing to 10% at bottom</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Matrix is black carbonaceous shale</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bedding is 15° from prop. to core.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Black shale with scattered breccia nodules</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt; 2 less than 10% of rock. Becomes highly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Carbonaceous at 102. Dilatent zone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>at 101 has white clay in openings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Black carbonaceous shale. Pyrite nodules</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>at 108. Widely scattered breccia nodules</td>
</tr>
</tbody>
</table>
**DRILL HOLE RECORD**

Drill Hole No.: 5  
Inclination:  
Property:  
Co-ordinates: North  East  
Elevation:  
Date:  
Drilled By:  
Logged By:  
Total Depth:  

<table>
<thead>
<tr>
<th>DEPTH FROM</th>
<th>DEPTH TO</th>
<th>SAMPLE NUMBER</th>
<th>RECOVERY</th>
<th>SAMPLE FROM</th>
<th>TO</th>
<th>ANALYSES</th>
<th>Sp. Gr.</th>
<th>BaSO₄</th>
<th>Cond.</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>109</td>
<td>112</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>laminated breccia with abundant argillaceous bands. Fracture paralleling core at 119 ft.</td>
</tr>
<tr>
<td>112</td>
<td>117</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>117-117 laminated breccia w/ several 1” silicicous zones &amp; a large dike (?) filled fracture paralleling the core. Bedding is 10° from perpendicular to core.</td>
</tr>
<tr>
<td>117</td>
<td>122</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.58</td>
<td>116.5-118</td>
<td>113-117 Calcereous laminated breccia w/diike (?)</td>
<td></td>
</tr>
<tr>
<td>122</td>
<td>127</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.91</td>
<td>119-121</td>
<td>Calcereous massive breccia. Several 1” layers of silicicous material.</td>
<td></td>
</tr>
<tr>
<td>132</td>
<td>133</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.21</td>
<td>130-131</td>
<td>130-131 massive laminated breccia.</td>
<td></td>
</tr>
<tr>
<td>132</td>
<td>133</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>128-130 Porous punkey calcereous zone.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>130-1317 laminated breccia becoming nodular at bottom. 1° black shale zone. 1° black shale.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Black shale w/ scattered calcite.</td>
</tr>
<tr>
<td>Depth From</td>
<td>Depth To</td>
<td>Sample Recovery</td>
<td>Sample Number</td>
<td>Analyses</td>
<td>Description of Material Drilled</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>------------</td>
<td>----------</td>
<td>-----------------</td>
<td>---------------</td>
<td>----------</td>
<td>--------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>133° 4&quot;</td>
<td>179° 8&quot;</td>
<td>95%</td>
<td>14-140</td>
<td>4.01</td>
<td>Basaltic gabbro and milled interbedded with dolomite.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.17</td>
<td>137-140</td>
<td></td>
<td></td>
<td></td>
<td>Sandstone, 70% biotite, 30% orthoamphibole.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.08</td>
<td>149-149</td>
<td></td>
<td></td>
<td></td>
<td>Sandstone, 70% biotite, 30% orthoamphibole.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.31</td>
<td>2.5</td>
<td>149.5-149</td>
<td></td>
<td></td>
<td>Siltstone with biotite mica schist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.23</td>
<td>2</td>
<td>149-152</td>
<td></td>
<td></td>
<td>Siltstone with biotite mica schist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.07</td>
<td></td>
<td>152-154</td>
<td>2</td>
<td></td>
<td>50% biotite and from 179° 5&quot; - 179° 10&quot; (marked).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.57</td>
<td>2</td>
<td>154-156</td>
<td>2</td>
<td></td>
<td>Two barren zones cut by several thin biotite veins.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.43</td>
<td>2</td>
<td>156-158</td>
<td>2</td>
<td></td>
<td>The lower shows altered andesite.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 4.33     | 2       | 158-160         | 2            |          | Altered andesite with chlorite and carbonates.
**DRILL HOLE RECORD**

**Drill Hole No.: 5**

**Property:**

**Co-ordinates: North__________ East__________**

**Elevation:**

**Date:**

**Drilled By:**

**Logged By:**

**Total Depth:**

<table>
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<tr>
<th>DEPTH</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>FROM</td>
<td>TO</td>
<td></td>
<td>Sp. Gr.</td>
<td>BaSO4</td>
</tr>
<tr>
<td>8.64</td>
<td>8.06</td>
<td></td>
<td>4.34</td>
<td>✓</td>
</tr>
<tr>
<td>8.06</td>
<td></td>
<td></td>
<td>4.03</td>
<td></td>
</tr>
<tr>
<td>8.64</td>
<td>8.26</td>
<td></td>
<td>4.34</td>
<td>✓</td>
</tr>
<tr>
<td>8.26</td>
<td>8.52</td>
<td></td>
<td>4.26</td>
<td>✓</td>
</tr>
<tr>
<td>8.52</td>
<td>8.54</td>
<td></td>
<td>4.27</td>
<td>✓</td>
</tr>
<tr>
<td>8.54</td>
<td></td>
<td></td>
<td>4.32</td>
<td>✓</td>
</tr>
<tr>
<td>8.58</td>
<td></td>
<td></td>
<td>4.29</td>
<td>✓</td>
</tr>
<tr>
<td>8.60</td>
<td></td>
<td></td>
<td>4.30</td>
<td>✓</td>
</tr>
<tr>
<td>7.38</td>
<td></td>
<td></td>
<td>3.89</td>
<td></td>
</tr>
<tr>
<td>178'3”</td>
<td>180'3”</td>
<td>100%</td>
<td>1.09</td>
<td>4.36</td>
</tr>
<tr>
<td>180'3”</td>
<td>181'8”</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>181'8”</td>
<td>182'10”</td>
<td>100%</td>
<td>4.08</td>
<td></td>
</tr>
<tr>
<td>182'10”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SAMPLE RECOVERY** | **ANALYSES** | **DESCRIPTION OF MATERIAL DRILLED** |
|-----------------|---------------|-----------------------------------|
### DRILL HOLE RECORD

Drill Hole No.: 5  Inclination: __________  __________  __________

Property: __________

Co-ordinates: North __________ East __________

Elevation: __________

Date: __________

Drilled By: __________

Logged By: __________

Total Depth: 202'

<table>
<thead>
<tr>
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<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>182' 5&quot;</td>
<td>191' 5&quot;</td>
<td>85%</td>
<td>Sample 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>191' 5&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sp. Gr.</td>
<td>Sandstone bedding at 73°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BaSO4</td>
<td>Sandstone bedding at 73°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cond.</td>
<td>Sandstone bedding at 73°</td>
</tr>
</tbody>
</table>

... (continued with similar entries for 191' 5" to 191' 3", 191' 3" to 190' 8", etc.)...
## Drill Hole Record

**Drill Hole No.:** 5  
**Inclination:**  
**Property:**  
**Co-ordinates: North** ——— **East**  
**Elevation:**  
**Date:**  
**Drilled By:**  
**Logged By:** TC  
**Total Depth:**  

**Grid angle at 202° = 53° uncorrected**

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FROM TO</td>
<td></td>
<td>Sp Gr.</td>
<td>BaSO4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|       |                 |               |         |       |       | en foliation (diagonal to pyritic)
|       |                 |               |         |       |       | at 194' 12" thick ore, pyritic nodules (50%)
|       |                 |               |         |       |       | on the base of thin pyritic nodules - embedded with
|       |                 |               |         |       |       | pyritic pyrite (50%) with thin bed being 1" thick
|       |                 |               |         |       |       | 197' 5" thick 40% pyritic and carbonaceous nodules
|       |                 |               |         |       |       | 197' 8" thick 40% banded, carbonaceous pyritic seams
|       |                 |               |         |       |       | 199' 10" thick hematite, limpid zone
|       |                 |               |         |       |       | fine nodules base, and a zone of mica nodules
|       | 200' 7" to 202' 20% banded ore, predominantly |
|       |                 |               |         |       |       | an individual thin pyritic zone with thin seams
|       |                 |               |         |       |       | at 194' 12" thick, thin pyritic seams |
|       |                 |               |         |       |       | pyritic pyrite (50%) with thin bed being 1" thick |
|       |                 |               |         |       |       | pyritic pyrite (50%) with thin bed being 1" thick |
|       |                 |               |         |       |       | pyritic pyrite (50%) with thin bed being 1" thick |

*Document may contain additional details not fully transcribed or visible in the image.*
**DRILL HOLE RECORD**

**Date:** July 1, 1986 - July 7, 1986

**Drilled By:** Canam Diamond Drilling

**Logged By:** A.W. Mitchell

**Property:** Tea

**Co-ordinates:** North _ East

**Co-ordinates:** North _ East

**Deep from** - **To** | **Sample Recovery** | **Sample Number** | **Analyses** | **Sp. Gr.** | **BaSO4** | **Cond.** |
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>15%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>14</td>
<td>15%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>19</td>
<td>70</td>
<td>17.5-19</td>
<td>3.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description of Material Drilled**

- Bulking 20° from perpendicular. Small nodules in argillaceous matrix - 60% calcareous in part.
- Horizontal layer at bottom with rare nodules.
- Massive laminated biotite-calcarenite.
- Massive calcarenite ½" laminated at 14½. A ½" calcite vein crosscut core at 13½. Fractured except bottom foot.
- Massive to laminated biotite-calcarenite.
- Broken laminated ¾ nodular biotite.
- Slumped in lower part.
- Broken up to 9". Coalescing nodular beds in upper part grading into laminated at bottom.
- Laminated biotite-upper 6" and lower 5".
- Wet punkey brown material including some biotite in horizon.
- Punkey brown material with partly weathered copper.
- Massive laminated biotite in occasional "V" siderite.
<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Recovery</th>
<th>Sample Number</th>
<th>Analyses</th>
<th>Description of Material Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-37</td>
<td>90</td>
<td>31-33</td>
<td>4.22</td>
<td>Massive, faint, a few laminations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33-35</td>
<td>3.62</td>
<td>Gypsum and calcite, at 33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35-37</td>
<td>3.89</td>
<td>Slumped at 35 with more included argillaceous material, broken at 36 with pumice and talcum</td>
</tr>
<tr>
<td>37-42</td>
<td>80</td>
<td>38-39½</td>
<td>4.45</td>
<td>9&quot; pumice layer to grey material (beaded carbonate?)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40-42</td>
<td>3.98</td>
<td>Massive to minor laminated breccia</td>
</tr>
<tr>
<td>42-47</td>
<td>95</td>
<td>42-44</td>
<td>4.20</td>
<td>Massive, laminated breccia with rack and abraded slumps, red, brown and tan pumice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>44-46</td>
<td>3.98</td>
<td>Slumped features, red brown and tan pumice</td>
</tr>
<tr>
<td>47-52</td>
<td>98</td>
<td>48-50</td>
<td>4.23</td>
<td>Massive breccia widely spaced laminations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-52</td>
<td>4.40</td>
<td>Calcite, top 2&quot;, 5&quot; at 48</td>
</tr>
<tr>
<td>52-56½</td>
<td>98</td>
<td>52-54½</td>
<td>4.06</td>
<td>Massive breccia with some laminations, disrupted bedding at 52 (worn talc?) lower 2&quot; is thick</td>
</tr>
<tr>
<td></td>
<td></td>
<td>56½-59½</td>
<td>4.46</td>
<td>Lukash with scattered nodules, up to ½&quot; across</td>
</tr>
<tr>
<td>56½-61</td>
<td>90</td>
<td>56-59½</td>
<td>4.11</td>
<td>Massive breccia, rare laminations, 1&quot; tan pumice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>59-61</td>
<td>4.11</td>
<td>at 59 and 61½</td>
</tr>
</tbody>
</table>
### DRILL HOLE RECORD

**Drill Hole No.:** 6  
**Property:**  
**Co-ordinates: North**  
**East**  
**Elevation:**  
**Inclination:**  
**Date:**  
**Drilled By:**  
**Logged By:**  
**Total Depth:**

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<th>DEPTH FROM</th>
<th>DEPTH TO</th>
<th>SAMPLE NUMBER</th>
<th>SAMPLE RECOVERY</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
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</thead>
<tbody>
<tr>
<td>61.5</td>
<td>61.5</td>
<td>95</td>
<td>61-62</td>
<td>4.12</td>
<td>Calcite at 62 (4&quot;) 62.5-62.6&quot;</td>
</tr>
<tr>
<td>61.5</td>
<td>72</td>
<td>90</td>
<td>62-67</td>
<td>4.32</td>
<td>20 2&quot; pumpky zone at 61.5, 63, 64, and 66.5</td>
</tr>
<tr>
<td>72</td>
<td>77</td>
<td>80</td>
<td>67-71</td>
<td>4.15</td>
<td>20 bedding crossed core 15° from pumpky zone</td>
</tr>
<tr>
<td>77</td>
<td>80</td>
<td>100</td>
<td>71-80</td>
<td>4.32</td>
<td>Calcite at 72 (4&quot;) pumpky zone 6&quot; at 74</td>
</tr>
<tr>
<td>80</td>
<td>82</td>
<td>90</td>
<td>81-77</td>
<td>4.32</td>
<td>Massive calcite pumpky zone 6&quot; at 74</td>
</tr>
<tr>
<td>82</td>
<td>87</td>
<td>90</td>
<td>87-82</td>
<td>4.27</td>
<td>Calcite at 72 (4&quot;) and on margins of pumpky zone</td>
</tr>
<tr>
<td>87</td>
<td>91</td>
<td>80</td>
<td>82-87</td>
<td>4.27</td>
<td>Upper 1' massive calcite becoming laminated in</td>
</tr>
<tr>
<td>91</td>
<td>96</td>
<td>90</td>
<td>91-96</td>
<td>4.27</td>
<td>Lower portion Remaides black carbonaceous</td>
</tr>
<tr>
<td>96</td>
<td>101</td>
<td>85</td>
<td>96-101</td>
<td>3.33</td>
<td>Argilite w/ scattered 1/4&quot; layers of nodular calcite</td>
</tr>
<tr>
<td>101</td>
<td>106</td>
<td>80</td>
<td>98-101</td>
<td>3.33</td>
<td>Bedding plane 30° from pumpky core. Slickens on led. plane</td>
</tr>
<tr>
<td>103-106</td>
<td>80</td>
<td>80</td>
<td>103-106</td>
<td>3.28</td>
<td>Black argilite w/ very finely dissemed py 2%</td>
</tr>
<tr>
<td>106-106</td>
<td></td>
<td></td>
<td>106-106</td>
<td>3.28</td>
<td>Do more calcite nodules</td>
</tr>
<tr>
<td>106-106</td>
<td></td>
<td></td>
<td>106-106</td>
<td>3.28</td>
<td>Upper 3&quot; argilite with calcite nodules increasing</td>
</tr>
<tr>
<td>106-106</td>
<td></td>
<td></td>
<td>106-106</td>
<td>3.28</td>
<td>Downward. Remainder laminated calcite w/ 30%</td>
</tr>
<tr>
<td>106-106</td>
<td></td>
<td></td>
<td>106-106</td>
<td>3.28</td>
<td>Argilaceous beds lower 6&quot; argilite w/ scattered calcite</td>
</tr>
<tr>
<td>106-106</td>
<td></td>
<td></td>
<td>106-106</td>
<td>3.28</td>
<td>Small fracture perp. to bedding common</td>
</tr>
<tr>
<td>106-106</td>
<td></td>
<td></td>
<td>106-106</td>
<td>3.28</td>
<td>Large calcite at 97. Two pumpky material</td>
</tr>
<tr>
<td>106-106</td>
<td></td>
<td></td>
<td>106-106</td>
<td>3.28</td>
<td>Makes 1&quot; core 100-104. This zone crosscut bedding</td>
</tr>
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### Drill Hole Record

**Drill Hole No.:** 6  **Inclination:**

**Property:**

---

<table>
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<th>Drilled By:</th>
<th>Logged By:</th>
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</table>

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**Co-ordinates: North**

**East**

**Elevation:**

---

**Date:**

---

**Drilled By:**

---

**Logged By:**

---

**Total Depth:**

---

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<tr>
<th>DEPTH</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
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<tbody>
<tr>
<td>FROM</td>
<td>TO</td>
<td>RECOVERY</td>
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</tr>
<tr>
<td>101</td>
<td>106</td>
<td>80</td>
<td>Sp. Gr.</td>
</tr>
<tr>
<td>106</td>
<td>111</td>
<td>75</td>
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<tr>
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<td>113-115</td>
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<td>116</td>
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<td>90</td>
<td>115-117</td>
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<td>116</td>
<td>121</td>
<td>90</td>
<td>119-121</td>
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<td>126</td>
<td>95</td>
<td>121-123</td>
</tr>
<tr>
<td>126</td>
<td>131</td>
<td>95</td>
<td>123-125</td>
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<td>126</td>
<td>131</td>
<td>95</td>
<td>125-127</td>
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<td>131</td>
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<td>127-129</td>
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<td>95</td>
<td>129-131</td>
</tr>
<tr>
<td>126</td>
<td>131</td>
<td>95</td>
<td></td>
</tr>
</tbody>
</table>
## DRILL HOLE RECORD

**Drill Hole No.:** 6  
**Inclination:**  
**Property:**  
**Co-ordinates: North**  
**Elevation:**  
**Date:**  
**Drilled By:**  
**Logged By:**  
**Total Depth:**  

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<tr>
<th>DEPTH</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>FROM</td>
<td>TO</td>
<td>Sp. Gr.</td>
<td>BaSO₄</td>
<td>Cond.</td>
</tr>
<tr>
<td>131</td>
<td>134</td>
<td>4.26</td>
<td></td>
<td>Massive laminated barite. Several 1/2&quot; arg.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.32</td>
<td></td>
<td>Lenses in upper 1.5, Lenses at 4&quot; 50% hole.</td>
</tr>
<tr>
<td>136</td>
<td>141</td>
<td>4.30</td>
<td></td>
<td>in 1/4&quot; lenses.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.31</td>
<td></td>
<td>Massive laminated barite. Top 1/4&quot; punky</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.34</td>
<td></td>
<td>Lenses 4&quot; Shafts.</td>
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<tr>
<td>141</td>
<td>144.5</td>
<td>4.18</td>
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<td>Massive laminated barite, 1/4&quot; arg. at 143</td>
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<td>1/2&quot; punny material @ 142-1/2&quot; along one edge</td>
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<td>Core to 144. Calcareous, 145-146</td>
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<tr>
<td>146</td>
<td>152</td>
<td>4.19</td>
<td></td>
<td>Great parallel core.</td>
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<td></td>
<td>Upper 6&quot; red brown punky zone.</td>
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<tr>
<td>152</td>
<td>157</td>
<td>4.25</td>
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<td>Remainder laminated barite. Vuggy zone</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>with incrustations at 152. Laminations elastic at 152</td>
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<tr>
<td>157</td>
<td>162</td>
<td>4.08</td>
<td></td>
<td>Slumped zone at 152. Upper 3&quot; laminated</td>
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<td>barite becoming more arg. downward.</td>
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<td>唐下1/4 argillite with quartz veined</td>
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<td></td>
<td></td>
<td>zone to bedding. Scattered crystals to 2</td>
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<td></td>
<td>4&quot; barite hole just above 157. Calcareous 152-152</td>
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<tr>
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<td>Laminated barite with up to 30% arg. mol in</td>
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<td></td>
<td></td>
<td></td>
<td>barite. Calcite veins 157</td>
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<tr>
<td>DEPTH FROM TO</td>
<td>SAMPLE RECOVERY</td>
<td>SAMPLE NUMBER</td>
<td>ANALYSES Sp. Gr. BaSO4 Cond.</td>
<td>DESCRIPTION OF MATERIAL DRILLED</td>
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<tr>
<td>---------------</td>
<td>-----------------</td>
<td>---------------</td>
<td>-------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>16.7 163.5</td>
<td>75%</td>
<td></td>
<td></td>
<td>interbedded argillite and basalt, interbeds grade into 6% to argillite.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nearly 70% fine to medium sand.</td>
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<tr>
<td>163.5 175</td>
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<td></td>
<td></td>
<td>Silt and argillite, with 10% to 16% rounded and odd bentonite.</td>
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<td>Organic material, 10% to 16% sandstone.</td>
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<td></td>
<td></td>
<td>191 to 192, DPNS-5. Throughout unit is sandstone.</td>
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<tr>
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<td></td>
<td></td>
<td>Bedrock occur in the form of laminated sand and siltstone.</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>Width on follows:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>164' 6&quot; thick</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>168' 10&quot; thick, interbedded sandstone and fine sand with interbedded siltstone.</td>
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<td></td>
<td></td>
<td>170' 7&quot; thick</td>
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<td>171' 8&quot; thick, interbedded sandstone with 70% siltstone.</td>
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<td>Organic material, 10% to 16% sandstone.</td>
</tr>
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<td>Interbedded sandstone and siltstone.</td>
</tr>
<tr>
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<td>Width on follows:</td>
</tr>
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<td></td>
<td>172' 9&quot; thick, laminated sandstone, fine sandstone.</td>
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<tr>
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<td>26% to 30% sandstone.</td>
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<td></td>
<td>Calcite vein at 166' 6&quot;, 9&quot; thick, 92 feet north.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>9&quot; vein, 30' in width (9-150 feet width).</td>
</tr>
<tr>
<td>DEPTH</td>
<td>SAMPLE</td>
<td>ANALYSES</td>
<td>DESCRIPTION OF MATERIAL DRILLED</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>----------</td>
<td>----------------------------------</td>
<td></td>
</tr>
<tr>
<td>FROM</td>
<td>TO</td>
<td>SAMPLE</td>
<td>Sp. Gr.</td>
<td>B.S.S.</td>
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<tr>
<td>175'</td>
<td>177</td>
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<td>177</td>
<td>181</td>
<td>95</td>
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<td>183</td>
<td>95</td>
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<td>185</td>
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<td>187.25</td>
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<tr>
<td>187.25</td>
<td>188.25</td>
<td>100</td>
<td></td>
<td></td>
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<tr>
<td>188.25</td>
<td>193.75</td>
<td>90%</td>
<td>185.5-191</td>
<td>4.21</td>
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<td>191-193</td>
<td>4.18</td>
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<tr>
<td>193.75</td>
<td>250</td>
<td>90%</td>
<td>193-195</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>195-197</td>
<td>4.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>197-199</td>
<td>4.27</td>
</tr>
</tbody>
</table>

DESCRIPTION OF MATERIAL DRILLED:
- Laminated and nodular beds with 40% argillite: clayey argillite with 5% pyrite nodules.
- Laminated and argillite with 5% Py - m.g. pyrite nodules.
- Laminated and argillite with 10% Py - m.g. pyrite nodules.
- Laminated and argillite: 15% argillite and mica.
- Fine sandstone layers and a few slump features.
- Massive laminated beds w/5% argillite: clayey argillite 2.5% thick.
- Massive argillite up 2.5" thick at 193.75.
- Massive argillite 213' thick with many fine laminae and wedges.
## DRILL HOLE RECORD

**Drill Hole No.:** 6  
**Inclination:**  
**Property:**  
**Co-ordinates: North:**  
**East:**  
**Elevation:**  
**Date:**  
**Drilled By:**  
**Logged By:**  
**Total Depth:**

### DEPTH

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<th>TO</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>Sp. Gr.</th>
<th>BaSO₄</th>
<th>Cond.</th>
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<tbody>
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<td>159-201</td>
<td>3.93</td>
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<tr>
<td>at 212'</td>
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<td>✓</td>
<td>✓</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>203-207</td>
<td>4.29</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>205-207</td>
<td>4.31</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>207-209</td>
<td>4.35</td>
<td>✓</td>
<td>✓</td>
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</tr>
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<td>209-211</td>
<td>4.03</td>
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### SAMPLE RECOVERY

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<tr>
<td>205-207</td>
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<td>224-226</td>
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### ANALYSES

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<td>4.41</td>
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<td>4.27</td>
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<td>✓</td>
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<tr>
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<td>✓</td>
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### DESCRIPTION OF MATERIAL DRILLED

- *[Sample Data and Analysis Details]*
  - Sample 1: Description of material per depth range.
  - Sample 2: Description of material per depth range.
  - Sample 3: Description of material per depth range.

---

*Note: Detailed geological notes and analyses not fully transcribed.*
### Drill Hole Record

**Drill Hole No.:** 6  
**Inclination:**  
**Property:**  
**Co-ordinates:** North  
**East:**  
**Elevation:**  
**Date:**  
**Drilled By:**  
**Logged By:**  
**Total Depth:**

<table>
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<tr>
<th>Depth From (ft)</th>
<th>Depth To (ft)</th>
<th>Sample Recovery %</th>
<th>Sample Number</th>
<th>Analyses</th>
<th>Description of Material Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>255</td>
<td>257.4</td>
<td>100</td>
<td>255-257.4</td>
<td>4.25</td>
<td>1/2&quot; moderate weathered sand.</td>
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<tr>
<td>257.4</td>
<td>267.4</td>
<td>90</td>
<td>261-263</td>
<td>3.83</td>
<td>Massive chloritic cleat, with 1&quot; quartz vein at 254'</td>
</tr>
<tr>
<td>267.4</td>
<td>269.34</td>
<td>100</td>
<td>264.5-272</td>
<td>4.17</td>
<td>Black pyritic cleat, agglutinate sand content.</td>
</tr>
<tr>
<td>267.4</td>
<td>291.95</td>
<td>95</td>
<td>272-274</td>
<td>4.30</td>
<td>Basalt, laminated, massive, with 5-7% agglutinate.</td>
</tr>
</tbody>
</table>

- **Sp. Gr.**
- **BaSO4**
- **Cond.**

**Sample Number:**
- 255-257.4
- 258-261
- 262-264
- 265-267
- 267.4-269.4
- 269.5-272
- 272-274
- 274.2-276
- 291.95-293.2

**Analyses:**
- 4.25
- 4.05
- 4.15
- 4.25
- 4.16
- 4.24
- 4.24
- 4.26
- 4.30

**Description of Material Drilled:**
- Massive chloritic cleat, with 1" quartz vein at 254'.
- Massive chloritic cleat, with 1" quartz vein at 254'.
- Massive chloritic cleat, with 1" quartz vein at 254'.
- Massive chloritic cleat, with 1" quartz vein at 254'.
- Massive chloritic cleat, with 1" quartz vein at 254'.
- Massive chloritic cleat, with 1" quartz vein at 254'.
- Massive chloritic cleat, with 1" quartz vein at 254'.
- Massive chloritic cleat, with 1" quartz vein at 254'.
- Massive chloritic cleat, with 1" quartz vein at 254'.

---

**Drill Hole Record**

**Drill Hole No.:** 6  
**Inclination:**  
**Property:**  
**Co-ordinates: North**  
**East**  
**Elevation:**  
**Date:**  
**Drilled By:**  
**Logged By:**  
**Total Depth:**  

<table>
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<tr>
<th>DEPTH FROM</th>
<th>DEPTH TO</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>330'-332'</td>
<td>347'-359'</td>
<td>100%</td>
<td>302-312</td>
<td>4.14</td>
<td>clastic (15%) argillite from 296'-298.5'</td>
</tr>
<tr>
<td>347'-359'</td>
<td>364'-372'</td>
<td>4.12</td>
<td>320-332</td>
<td>4.30</td>
<td>molybdenite at 372'</td>
</tr>
<tr>
<td>364','-372'</td>
<td>380'-388'</td>
<td>100%</td>
<td>345-367</td>
<td>4.13</td>
<td>silicic breccia at 276.5' and from 289'/41.280'</td>
</tr>
<tr>
<td>380'-398'</td>
<td>399'/400'</td>
<td>100%</td>
<td>367-380</td>
<td>4.17</td>
<td>bedding cleat at 399', clay 7/8' Part at 784'</td>
</tr>
<tr>
<td>399'/400'</td>
<td>300'-320'</td>
<td>100%</td>
<td>380-398</td>
<td>4.25</td>
<td>laminated slate w/10% argillite lamellae, upper and lower</td>
</tr>
<tr>
<td>300'-309'</td>
<td>309'/313'</td>
<td>100%</td>
<td>304-318</td>
<td>4.18</td>
<td>gneiss and fine gneiss, upper and lower</td>
</tr>
<tr>
<td>309'/313'</td>
<td>319'/323'</td>
<td>100%</td>
<td>316-326</td>
<td>4.35</td>
<td>black pyritic clay (contained in borehole)</td>
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<tr>
<td>319'/323'</td>
<td>332'</td>
<td>95</td>
<td>320-330</td>
<td>4.35</td>
<td>brown, massive, lobed sandstone, upper and lower</td>
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<tr>
<td>320'-322'</td>
<td>322'</td>
<td>100%</td>
<td>322-332</td>
<td>4.38</td>
<td>black pyritic clay (contained in borehole)</td>
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<td>322'-322'</td>
<td>340'</td>
<td>100%</td>
<td>330-352</td>
<td>4.34</td>
<td>black pyritic clay (contained in borehole)</td>
</tr>
</tbody>
</table>

**Note:** no acid
**DRILL HOLE RECORD**

**Drill Hole No.**: __________ **Inclination**: __________

**Property**: __________________________________________________________________________

**Co-ordinates**: North ___________ East ___________ **Elevation**: ___________

**Date**: ____________________________________________________________________________

**Drilled By**: _________________________________________________________________________

**Logged By**: _________________________________________________________________________

**Total Depth**: _______________________________________________________________________

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<thead>
<tr>
<th>DEPTH</th>
<th>SAMPLE</th>
<th>SAMPLE</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>FROM</td>
<td>TO</td>
<td>RECOVERY</td>
<td>NUMBER</td>
<td>Sp. Gr.</td>
</tr>
<tr>
<td>332</td>
<td>332.9</td>
<td>90%</td>
<td>335-33</td>
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</tr>
<tr>
<td>332.9</td>
<td>333.4</td>
<td>100</td>
<td>335-33</td>
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<tr>
<td>333.4</td>
<td>34</td>
<td>95%</td>
<td>335-357</td>
<td>4.19</td>
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<tr>
<td>337</td>
<td>339</td>
<td>4.26</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>339</td>
<td>341</td>
<td>4.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>341</td>
<td>343</td>
<td>4.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>343</td>
<td>343.5</td>
<td>4.32</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>343.5</td>
<td>343.5</td>
<td>95%</td>
<td>343-345.5</td>
<td>4.32</td>
</tr>
</tbody>
</table>

**Note**: Lenticular shaped shears and recrusted beds, circular closure in the top 6½ cm. 

**Note**: Massive laminations to near bedded textures.

**Note**: Upper 1½" is cut by several microfractures which offset bedding by 1½ to 1 ½", producing equally

**Note**: Abundant minor quartz. The beds are silicified

**Note**: From 333.5' end of section is trunc 341
**DRILL HOLE RECORD**

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>FROM</td>
<td>TO</td>
<td>Sp. Gr.</td>
<td>Bo504</td>
<td>Cond.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>possible synclinal fault of this bedding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6° by 3°4&quot; near parallel to the core for 1/16 of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>344°, bedding is also continued in same area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>bedding c/a: 50°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>black syenite clast - clastic arenite - rock with bad</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>with slow drilling: upper contact is carbonaceous</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and unit is slightly carbonaceous throughout</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upper 3' contain 15% andicula shaped and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>rounded (up to medium sized (up to 1&quot; by</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2&quot; in size) fuchro nodules which decease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>in abundance to 2-3% for rest of hole</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>extremely horizons are on carbonaceous</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>arenite from 357&quot;3/8&quot; and from 358&quot;4/8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>359&quot;3 (36425% Arenite in this zone)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>rock is strongly quartz veined al;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>346&quot;352&quot; 359&quot;2 360&quot;2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>bedding c/a: 45°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acid test uncorrected 57°</td>
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</table>
# DRILL HOLE RECORD

**Inclination:** 90°

**Total Depth:** 207'  

**Logged By:** A. W. Mitchell

## SAMPLE RECOVERY

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
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</thead>
<tbody>
<tr>
<td>FROM</td>
<td>TO</td>
<td></td>
<td>Sp. Gr.</td>
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</tr>
<tr>
<td>0</td>
<td>11</td>
<td>8</td>
<td>1</td>
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</tr>
<tr>
<td>14</td>
<td>18</td>
<td>85</td>
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<tr>
<td>16</td>
<td>24</td>
<td>90</td>
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<tr>
<td>21</td>
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</tr>
<tr>
<td>26</td>
<td>31.5</td>
<td>85</td>
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<td></td>
</tr>
<tr>
<td>31.5</td>
<td>36.5</td>
<td>80</td>
<td>315-34</td>
<td>3.70</td>
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<td>90</td>
<td>365-39</td>
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<td>42</td>
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<td>42-45</td>
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<td>48-51</td>
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<td>57</td>
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<td>51-54</td>
<td>4.04</td>
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<tr>
<td>57</td>
<td>62</td>
<td>85</td>
<td>57-60</td>
<td>4.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60-63</td>
<td>4.13</td>
</tr>
</tbody>
</table>

- Bannister broken massive.
- Top 6" mud then remainder laminated.
- Bannister becoming more massive downward. Bedding 35°.
- Qtz veined chert.
- Upper 13" do followed by 2' slumped le with rig up chert of chert then remainder tan mud.
- Laminated to massive bannister with 2-6" Punky zone. Calcareous throughout.
- Bedding 35° from peg.
- Upper 4" calcite.
- Laminated bannister calcite in lower 3'.
- Of a brown Punky zone 3".
- Do 4" calcite zone @ 50'.
- Aragonite material becoming more alab. down.
- Laminated bannister two 5" calcite zone 54-57.
- Do Calc up 3' w'restd zone below.
- Bedding 50° from peg.
<table>
<thead>
<tr>
<th>DEPTH FROM</th>
<th>TO</th>
<th>SAMPLE NO.</th>
<th>RECOVERY</th>
<th>SAMPLE</th>
<th>Sp. Gr.</th>
<th>B&amp;SO4</th>
<th>Cond.</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
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<tbody>
<tr>
<td>5.2</td>
<td>6.7</td>
<td>95</td>
<td>63-66</td>
<td>4.08</td>
<td></td>
<td></td>
<td></td>
<td>Laminated brezite upper 6&quot; calc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>64-69</td>
<td>4.34</td>
<td></td>
<td>3</td>
<td></td>
<td>ped. n. 6&quot;</td>
</tr>
<tr>
<td>6.7</td>
<td>7.2</td>
<td>90</td>
<td>69-73</td>
<td>4.17</td>
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<td>Laminated brezite</td>
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<tr>
<td>7.2</td>
<td>7.7</td>
<td>95</td>
<td>72-75</td>
<td>4.27</td>
<td></td>
<td>3</td>
<td></td>
<td>Laminated to massive brezite</td>
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<tr>
<td>7.7</td>
<td>8.2</td>
<td>90</td>
<td>78-81</td>
<td>4.17</td>
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<td>3</td>
<td></td>
<td>to calc. lower 9&quot;</td>
</tr>
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<td>8.2</td>
<td>8.7</td>
<td>90</td>
<td>81-84</td>
<td>4.05</td>
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<td></td>
<td></td>
<td>do 6&quot; shale at 86</td>
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<tr>
<td>8.7</td>
<td>9.2</td>
<td>90</td>
<td>84-97</td>
<td>4.16</td>
<td></td>
<td></td>
<td></td>
<td>do 4&quot; calc. at 90</td>
</tr>
<tr>
<td>9.2</td>
<td>9.7</td>
<td>95</td>
<td>93-96</td>
<td>4.74</td>
<td></td>
<td>3</td>
<td></td>
<td>do becoming more massive</td>
</tr>
<tr>
<td>9.7</td>
<td>10.2</td>
<td>80</td>
<td>96-99</td>
<td>4.26</td>
<td></td>
<td>3</td>
<td></td>
<td>Laminated brezite 1&quot; calc. at 97</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>99-102</td>
<td>4.35</td>
<td></td>
<td>3</td>
<td></td>
<td>and 6&quot; at 98</td>
</tr>
<tr>
<td>10.2</td>
<td>10.7</td>
<td>90</td>
<td>102-105</td>
<td>4.24</td>
<td></td>
<td>3</td>
<td></td>
<td>More argillaceous at 102</td>
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<tr>
<td>10.7</td>
<td>11.2</td>
<td>80</td>
<td>105-111</td>
<td>4.32</td>
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<td>3</td>
<td></td>
<td>Laminated brezite plunges in</td>
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<td></td>
<td></td>
<td>111-113</td>
<td>4.24</td>
<td></td>
<td>3</td>
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<td>upper portion</td>
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<td>11.6</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calc. punkey zone at 113</td>
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<tr>
<td>11.6</td>
<td>12.1</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>do, fracture parallels were</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>filled w/white material</td>
</tr>
<tr>
<td>12.1</td>
<td>12.6</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Laminated brezite upper 6&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>show brecciated</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>do, cemented w/white to 12.6&quot;</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Upper 3&quot; massive brezite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>grading downward</td>
</tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>to argillite, dominated by</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Than calcite, siliceous shale</td>
</tr>
</tbody>
</table>

ANALYSES:
- Gr. B&SO4
- 4.4n
- 4.4M
- 4.2M
- 4.8n
- 5.0n

Total Depth: 12.6 ft.
## DRILL HOLE RECORD

**Drill Hole No.**: 
**Inclination**: 

**Property**: 

**Co-ordinates**: North: __________ East: __________

**Elevation**: __________

**Date**: 

**Drilled By**: 

**Logged By**: 

**Total Depth**: __________

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION &amp; MATERIAL DRILLED</th>
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<tbody>
<tr>
<td>FROM</td>
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<td>Bo5O4</td>
</tr>
<tr>
<td>126</td>
<td>131</td>
<td>90</td>
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<td>154</td>
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<tr>
<td>202</td>
<td>207</td>
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</tr>
</tbody>
</table>

- **Argillite**: Upper 1' than 9" silty matrix.
- **Upper 6' argillite with free, horn. bauxite**: Upper 18" dominated to massive bauxite, then arg w/ occasional decreasing downwards.
- **Siliceous shale, massive with minute fly veinlet crossing bedding**: Bed 60° to 75°, 16" pegmatite lens at 141'.
- **Do very greenish on dip plane**: Do, highly altered. Be, crystals.
- **Siliceous shale 8" brecciated bauxite @ 154'**: Siliceous shale.
- **16' 176'177': Pegmatite dike at 167', 172'.
- **Limestone, calcite veined - Siliceous shale brecciated in part**: Argillite grading downward to be mixed bauxite, arg w/ calcite veins. Ty dike.
- **Above 1' bauxite**: Massive bauxite, light gray 1' than siliceous shale. 3' then 1' mixed bauxite shale + calcite. Lower dike grading downward to shale & inclusion zone.
- **Siliceous shale w/ dike, pegmatite**:
**DRILL HOLE RECORD**

Drill Hole No.: 8  
Inclination: 48° N 5° W

Date: July 10 - July 12, 1986

Drilled By: Carson Diamond Drilling

Logged By: A.W. Mitchell

Total Depth: 200 feet

---

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<th>FROM</th>
<th>TO</th>
<th>SAMPLE</th>
<th>RECOVERY</th>
<th>SAMPLE</th>
<th>NUMBER</th>
<th>ANALYSES</th>
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<td>11</td>
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<td></td>
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<td>Limestone w/ some shale bedding nearby.</td>
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<td>11</td>
<td>19</td>
<td>90</td>
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<td></td>
<td></td>
<td></td>
<td>Calcite.</td>
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<td>19</td>
<td>22</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calcite becoming non-calcite last 1'.</td>
</tr>
<tr>
<td>22</td>
<td>27</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calcite, some 4&quot; layers non-calcite.</td>
</tr>
<tr>
<td>27</td>
<td>32</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Massive limestone covered small carbonaceous layer. Associated at top beds nearly pure to calcite.</td>
</tr>
<tr>
<td>32</td>
<td>37</td>
<td>95</td>
<td>32-35</td>
<td>3.98</td>
<td>35-40</td>
<td>4.03</td>
<td></td>
<td>Massive limestone becoming nodular + scattered calcite last 6&quot;</td>
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<tr>
<td>37</td>
<td>42</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Siliceous shale 1'; then scattered nodules becoming more massive last 1'2&quot;</td>
</tr>
<tr>
<td>42</td>
<td>47</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Massive laminated good grade, possible arg. meta. last 6&quot; 6&quot; core at 59.</td>
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<tr>
<td>47</td>
<td>52</td>
<td>85</td>
<td>55-59</td>
<td>3.91</td>
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<td></td>
<td></td>
<td>12&quot; core at 67. Massive broken limestone.</td>
</tr>
<tr>
<td>52</td>
<td>57</td>
<td>85</td>
<td>59-62</td>
<td>5:98</td>
<td>62-65</td>
<td>5.97</td>
<td></td>
<td>Massive laminated breccia last 6&quot; 6&quot; core at 59.</td>
</tr>
<tr>
<td>57</td>
<td>67</td>
<td>90</td>
<td>65-68</td>
<td>3.94</td>
<td>68-71</td>
<td>4.03</td>
<td></td>
<td>2 band of 1&quot; thick Shale at 71</td>
</tr>
<tr>
<td>67</td>
<td>70</td>
<td>95</td>
<td></td>
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<td></td>
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<td>do.</td>
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<tr>
<td>70</td>
<td>75</td>
<td>95</td>
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<td>do.</td>
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<tr>
<td>75</td>
<td>76</td>
<td>95</td>
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<td></td>
<td></td>
<td></td>
<td>do.</td>
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</table>
## DRILL HOLE RECORD

**Drill Hole No.:** 8  
**Inclination:**  

**Property:**  

**Co-ordinates:** North  East  

**Elevation:**  

**Date:**  

**Drilled By:**  

**Logged By:**  

**Total Depth:**  

<table>
<thead>
<tr>
<th>DEPTH FROM</th>
<th>DEPTH TO</th>
<th>SAMPLE RECOVERY</th>
<th>SAMPLE NUMBER</th>
<th>ANALYSES</th>
<th>DESCRIPTION OF MATERIAL DRILLED</th>
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<tr>
<td>74</td>
<td>85.5</td>
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<td>74-79</td>
<td>4.04</td>
<td>Massive barite laminated in part</td>
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<td>85.5</td>
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<td>88-88</td>
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<td>Last 4 ft large barite, calc 71.79%</td>
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<td>111</td>
<td>115</td>
<td>90</td>
<td>88-91</td>
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<td>Massive barite, calc 81, 90, 101, 107-110%</td>
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<td>115</td>
<td>120</td>
<td>80</td>
<td>88-91</td>
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<td>Siliceous shale upper 18&quot;, remains barite</td>
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<td>120</td>
<td>130</td>
<td>85</td>
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<td>Massive laminated barite, calc 93.1 at 118</td>
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<td>130</td>
<td>139</td>
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<td>Last 4&quot; siliceous shale</td>
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<td>139</td>
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<td>Massive barite, some mixed org material</td>
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<tr>
<td>149.5</td>
<td>159.5</td>
<td>95</td>
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<td>Massively halved fine-grained barite</td>
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<td>Calc 140, 145, 153, 158-159.5, 142, 163-165%</td>
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<tr>
<td>169.5</td>
<td>179.5</td>
<td>95</td>
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<td>Siliceous shale, varying amounts of</td>
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<td>scattered nodules</td>
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<td>Siliceous shale w/ 3-6&quot; barite layer</td>
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**Sp. Gr.**

**BaSO4**

**Cond.**
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