PRELIMINARY REPORT ON GEOLOGY AND GEOCHEMISTRY
OMINECA MINING DIVISION
NTS 94C/4W

PAUL GROUP OF CLAIMS - 125°47'W/56°05'N

<table>
<thead>
<tr>
<th>Name of Claim</th>
<th>Record Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>BARRY</td>
<td># 2197</td>
</tr>
<tr>
<td>EDNA</td>
<td># 2198</td>
</tr>
<tr>
<td>PAUL</td>
<td># 2199</td>
</tr>
<tr>
<td>HELEN</td>
<td># 2200</td>
</tr>
</tbody>
</table>

REPORT NO. 1

AUTHOR:  J.N. HELSEN
OWNER:  NORANDA MINES LIMITED
OPERATOR:  MATTAGAMI LAKE EXPLORATION LIMITED
DATE:  DECEMBER 1980
ABSTRACT

Late in the 1979 field season the staking of four claims of 20 units was carried out, followed by a reconnaissance sediment sampling program. This program was continued during the 1980 field season. Some preliminary geology and prospecting was done as well with some encouraging results.

The area of interest is situated at about 70km north of Takla Landing (1/2 hour flying time) in very rugged terrain. Access is only by helicopter.
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LOCATION AND ACCESS

The four claims, hereafter referred to as the Osilinka claims, are situated in the northern part of the Hogem Batholith. The area is accessible only by helicopter, and the centre of the claims lies about 70km almost straight north of Takla Landing.

A Northern Mountain Helicopter Inc. base was located at Lovel Cove (5 minutes flying time from Takla Landing). For this purpose a lodge was rented on the premises of Mr. & Mrs. McCormick who own and operate the Takla Trading Post.

The area of investigation is very rugged. It is made up by ridges of jagged peaks with glaciers and cirques. The highest peak (no name) of the area occurs on the property and measures 2,410m above sea level. The weather pattern is very unreliable. The two northern claims, HELEN and BARRY, contain the headwaters of the Osilinka River (Figure 1).
PROPERTY DEFINITION

The four claims (Table 1), generally referred to as the Osilinka claims, were staked in September 1979 and recorded in October 1979.

TABLE 1: The Osilinka Claims

<table>
<thead>
<tr>
<th>Name</th>
<th>Record Number (month of record)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BARRY</td>
<td>#2197(10)</td>
<td>20</td>
</tr>
<tr>
<td>EDNA</td>
<td>#2198(10)</td>
<td>20</td>
</tr>
<tr>
<td>PAUL</td>
<td>#2199(10)</td>
<td>20</td>
</tr>
<tr>
<td>HELEN</td>
<td>#2200(10)</td>
<td>20</td>
</tr>
</tbody>
</table>

These four claims are owned by Noranda Mines Limited and operated by Mattagami Lake Exploration Limited.

The four claims have been grouped recently into the PAUL group.
PURPOSE OF THE WORK

During the 1979 field season sediments were collected from the Hogem Batholith. One anomalous molybdenum value prompted the staking of the Osilinka claims in September. The staking of these claims was immediately followed by an additional sediment sampling programme.

In the summer of 1980 more work was carried out in and around the claims. This work consisted of a geochemical survey, geology and prospecting in order to locate a potential source for the anomalous molybdenum value in sediment #266.
GEOLOGY OF THE REGION

The geology of the region, i.e. the Northern Hogem Batholith, is summarized in the descriptive notes which accompany the GSC Maps 962A and 1030A. In essence it can be said that the Northern Hogem Batholith is made up by Upper Jurassic and/or Lower Cretaceous intrusions which consist predominantly of granodiorites, quartz diorites and allied rocks known as the Omineca Intrusions. The Hogem Batholith is also known for several copper occurrences (Lorraine deposit).

More recent work on the Hogem Batholith (Garnett, 1978) divides it up into several phases which range from Upper Triassic to Lower Cretaceous.

The Hogem Batholith is situated within a belt of Lower Mesozoic, predominantly volcanic rocks, with the Pinchi fault zone to the west as a main structural feature.
WORK DONE

A high molybdenum value in a sediment (#266) taken in the Hogem Batholith during a grassroots exploration program in 1979 generated an extension of the field season in this area. During this extended period the Osilinka claims were staked and subsequently sampled in order to confirm the high value. Much silt sampling was done outside the boundaries of the claims due to the rugged nature of the topography within the claims. Another reason for sampling outside the claim boundaries is the determination of background and threshold values.

In 1980 the work on and near the property was continued. This work consisted of sediment and soil sampling, geological surveying and prospecting.

The thresholds (mean value + two standard deviations) used for the Osilinka claim are given below. These thresholds are a combination of data obtained from the regional exploration program and the property work.

<table>
<thead>
<tr>
<th>Element</th>
<th>Threshold (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>15</td>
</tr>
<tr>
<td>Mo</td>
<td>10</td>
</tr>
<tr>
<td>Cu</td>
<td>200</td>
</tr>
<tr>
<td>Pb</td>
<td>30</td>
</tr>
<tr>
<td>Zn</td>
<td>150</td>
</tr>
<tr>
<td>Ag</td>
<td>2</td>
</tr>
</tbody>
</table>

The same values are used for both soils and sediments.

A total of 14 days i.e. 70 mandays were spent on the Osilinka claims. These include travel, set-up camp, work performed as well as bad weather days.

SCALE OF KILOMETRES

0 0.5 1.0 1.5 2.0 Km.
GEOCHEMICAL SURVEY

A total of 68 sediment samples were collected during the 1979 (sample numbers smaller than 100) and 1980 (sample numbers greater than 1000) field seasons (Figure 2). These sediments were analyzed for W, Mo, Cu, Pb, Zn and Ag. Some of the 1979 samples were also analyzed for Sn but these results are not reported here. The 1980 samples have been analyzed for Au as well (Figures 3, 4 & 5).

Among these sediments a few samples show anomalous W and/or Mo values, but are otherwise normal. Only four samples show borderline values for Cu, Pb or Zn. None of the Ag or Au values were anomalous. All the values are in ppm except Au which is expressed in ppb.

Some nine soils were collected as well, and analyzed for W, Mo, Cu, Pb, Zn, Ag and Au. These soils obviously were taken from mountainous slopes with little vegetation. The soils in general are very immature and originate from the C-horizon because the B-horizon is non-existent. None of the soils (in ppm except Au) shows any anomalous values.

The gold values in both soils and sediments were done by atomic absorption method with a detection limit of 10 ppb. All values thus obtained were 10 ppb. Consequently, no importance is attached to these gold values. The have not been plotted on any of the maps.

In summary, only the W and Mo values in the sediments seem to be significant for further work.
'P' prefix indicates soil sample.
All values are in ppm

MATTAGAMI LAKE EXPLORATION LIMITED.
WESTERN FIELD OFFICE
EDMONTON, ALBERTA

B.C. TUNGSTEN PROJECT.
OSILINKA CLAIMS

FIGURE 3
1979 SEDIMENTS, 1980 SEDIMENTS & SOILS W. Mo.

SCALE OF KILOMETERS
0 10 15 20 km

DRAWN BY: D.R. BULL.
DATE: NOVEMBER 1980
"P" prefix indicates soil sample.

All values are in ppm.
GEOLOGY

While carrying out a geology survey some prospecting was also done.

The geology of the area consists mainly of intrusive rocks ranging from diorites to granites. Granitic gneisses to gneisses are abundant on the PAUL claim. The two traverses A-B (stations 1 to 7) and C-D (stations 8 to 11) on this claim occur mainly in a succession of outcrops in granitic gneiss to gneiss, which can contain up to 50% mafic minerals. A vertical fault (strike 28°) runs through this claim, and can be traced at the other side of the ridges (Figure 7). The fault plane is very rusty in colour, most likely due to pyrite mineralization. Massive quartz however occurs as well in the fault. Swarms of mafic dykes cut through the granites and/or granitic gneisses. Small epidote veins (Station 8), up to 2cm wide, also cut through the medium grained granitic intrusive. A third set of dykes which appear to be more felsic because of its whitish colour, however, contains very fine actinolite crystals.

The profile of Figure 6 shows alaskitic dykes cutting granitic intrusives with iron staining. They appeared, from the helicopter, to be similar to a boulder with molybdenite mineralization picked up at the toe of the glacier in the valley.

The presence of gneissosity in the granites suggests an Upper Triassic age for much of the rock in the area.

Prospecting in the area led to the location of a few molybdenite occurrences, either in float boulders, in quartz veins or related to faults (Figure 7). In some cases pyrite or chalcopyrite accompanied the molybdenite.
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1042</td>
<td>Diorite, unmineralized</td>
</tr>
<tr>
<td>#1044</td>
<td>Diorite, unmineralized</td>
</tr>
<tr>
<td>#1046</td>
<td>Diorite, unmineralized</td>
</tr>
<tr>
<td>#1050</td>
<td>Diorite, unmineralized</td>
</tr>
<tr>
<td>#1052</td>
<td>Diorite, some molybdenite in pegmatite veins</td>
</tr>
<tr>
<td>#1054</td>
<td>Diorite, some molybdenite in pegmatite veins</td>
</tr>
<tr>
<td>#1060</td>
<td>Molybdenite in syenite</td>
</tr>
<tr>
<td>#1069</td>
<td>Diorite with disseminated pyrite</td>
</tr>
<tr>
<td>#1071</td>
<td>Diorite with quartz vein with pyrite</td>
</tr>
<tr>
<td>#1073</td>
<td>Massive quartz with minor pyrite</td>
</tr>
<tr>
<td>#1075</td>
<td>Iron stained diorite with minor pyrite</td>
</tr>
<tr>
<td>#1077</td>
<td>Fine grained diorite with minor pyrite</td>
</tr>
<tr>
<td>#1079</td>
<td>Quartz vein with Fe-staining</td>
</tr>
</tbody>
</table>

**FIGURE 6**: Sketch of the relationship between dykes and faults of the vertical cliff on the Paul claim (A-B traverse). (Not to Scale)
CONCLUSIONS

In summary, the Osilinka claims have a complex history of intrusions and metamorphism compounded by at least three phases of dykes cutting through the intrusive rocks followed by faulting. Some Mo mineralization has been recognized either in veins, in moraine rubble or boulders. More detailed geology and prospecting is recommended.
REFERENCES


GSC Map 962A, 1949, McConnell Creek, Cassiar district with descriptive notes, Geology by C.S. Lord

GSC Map 1030A, 1954, Aiken Lake, Cassiar district, Geology by J.E. Armstrong, and E.F. Roots
CERTIFICATE

I, Jan Helsen, of the City of Edmonton, Province of Alberta, do hereby certify that:

1. I am a geologist residing at 11515 - 75 Avenue, Edmonton.

2. I am a graduate of the University of Leuven, Belgium with a "Licenciat in Geologie".

3. I am a graduate of McMaster University, Ontario, with a M.Sc. (1970) and a Ph.D. (1976) in geology.

4. I have been practicing my profession since 1976 and am at present Exploration Geologist with Mattagami Lake Exploration Limited.

5. I am a fellow of the Geological Association of Canada.

6. I supervised the work that is described in this report.

Dated: December 7, 1980

J. Helsen, Ph.D.
APPENDIX I

COST OF THE GEOCHEMICAL ANALYSES
APPENDIX I - Cost of the Geochemical Analyses

A total of 68 sediments were collected and sent for analysis to the Noranda Exploration Company Limited laboratories in Vancouver. All samples were analyzed for W, Mo, Cu, Pb, Zn and Ag at the following rates.

1979 sediments - 32 in total

$2.50/sediment for W, $1.00/sediment for Mo, $0.60/sediment for each additional element i.e. Cu+Pb+Zn+Ag = $2.40/sediment

6 elements in 32 sediments @ $5.90/sediment $188.80

1980 sediments - 38 in total

$2.50/sediment for W, $1.25/sediment for Mo, $0.60/sediment for each additional element i.e. Cu+Pb+Zn+Ag = $2.40/sediment

6 elements in 38 sediments @ $6.15/sediment 233.70

28 sediments were analyzed for Au @ $2.50/sediment 70.00

1980 soils - 9 in total

(Same rates as for 1980 sediments)

7 elements in 9 soils @ $8.65/soil 77.85

TOTAL COST FOR ANALYSES $570.35

An outline of the geochemical procedures as applied by Noranda Labs is given below.
Methodology of the Geochemical Laboratory

Physical methods of sample treatment.
Rock and core samples involve crushing and pulverizing with a rotary plate or a ring and puck pulverizer, whichever is appropriate. Subsequently, the >200 mesh sample is rolled to insure uniformity.

For sediment and soil samples, these are dried at ca. 80°C for 24 to 48 hours.
The samples are then sieved to <80 mesh with nylon screen; the >80 mesh (reject) material is discarded.
The panned heavy mineral samples are analyzed as received without further analysis by atomic absorption is as follows:

Hydrofluoric-perchloric-nitric acid decomposition (HF/HCl4-HNO3)
The analysis of silicate rock for major elements, i.e. alkaline and earth alkaline metals, is performed by decomposition with hydrofluoric-perchloric-nitric acid, with subsequent removal of the fluoride ion. Total dissolution of the major constituents is accomplished and this method is suitable for determination of Na, K, Mg, Ca, Mn, Fe, Rb, Sr, and Ba. Silicon is not determined since it volatilizes during dissolution.

This method is not intended to replace the elaborate fusion techniques (eg. Li2O2 fusion) for major oxide analysis, and should be used as a supplementary method for geochemical exploration where quick results are necessary. (Anal. Chim. Acta 32, 1, 1965).

Whole rock analysis employing lithioborate fusion
An atomic absorption procedure is used for the analysis of rock to determine Si, Al, Fe, Mg, Ca, K, Na, Mn, Cr, Sr, and Ti. The method employs a lithium metaborate (Li2O2) fusion and dissolution in diluted nitric acid. This is recommended for whole rock analysis of rocks and core of widely ranging major element composition. (Atomic Absorp. News1. 2, 25, 1969).

The lab intends to implement the Bernas Type teflon-lined bomb for decomposition of ores and minerals at a later date.
The lab will continue the policy that after operating costs of the lab have been covered, any surplus will be rebated on a pro-rated basis.

There is considerable difference of opinion regarding what geochemical methods to use in exploration. Since there is no universally suitable method for any geochemical analysis which is mainly due to varying sample material, in order to maintain quality control and consistent data, it is important to request the same decomposition and analytical methods, when various labs are contracted.

For further information please contact the Noranda Vancouver Laboratory at the following number: (604) 684-9246.
APPENDIX II

STATEMENT OF COSTS FOR THE OSILINKA CLAIMS - PAUL GROUP
APPENDIX II - Statement of Costs for the Osilinka Claims - PAUL Group

Wages

Total salary/month for five man crew including payroll burden and bush bonus.

Total $ 8,180.55 or $ 54.54/manday

Travel, set-up camp, days lost to bad weather, 20 mandays $ 1,090.80
Geochemical Survey 25 mandays 1,363.50
Geology survey and prospecting 25 mandays 1,363.50

Accomodation

$ 30.00/manday x 70 mandays 2,100.00

Equipment Rental

SBX radiophone for 14 days @ $ 5.00 70.00

Vehicle Rental

14 days, 1 pick-up truck (Bow Mac) @ $ 500.00 233.33
14 days, 1 panel van (Bow Mac) @ $ 575.00 268.33

Geochemical Analyses

Itemized in Appendix I 570.35

Helicopter 206B, Northern Mountain Helicopter Inc.

15.6 hours @ $ 305.00/hour 4,758.00
358.8 gallons of fuel @ $ 2.00/gallon 717.60

Report Writing
Drafting

TOTAL COSTS

$ 12,934.81