GEOLOGICAL AND RADIOMETRIC SURVEYS

ELLIOT LAKE PROPERTY

HIGHLAND-CROW RESOURCES LTD.

RECEIVED
NUV - 2.1982
MINING LANDS SECTION

OCTOBER, 1982
# TABLE OF CONTENTS

## INTRODUCTION

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

## GEOLOGICAL SURVEY

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>11</td>
</tr>
</tbody>
</table>

## RADIOMETRIC SURVEY

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>17, 18, 19</td>
</tr>
</tbody>
</table>

## REPORT OF WORK

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>22</td>
</tr>
<tr>
<td>23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
</tr>
</tbody>
</table>

## APPENDIX 1

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
</tr>
</tbody>
</table>
Introduction

The deposits in the Elliot Lake-Blind River areas north of Lake Huron, constitute one of the world's largest concentrations of uranium mineralization. The Pronto Mine near Blind River was the site of the first discovery in 1953, however, the bulk of the ore concentrations occur within the Quirke Lake Syncline north of the Town of Elliot Lake. Uranium mineralization occurs in placer or modified placer deposits in fluvial pyritic quartz-pebble conglomerates and grits of the Matinenda Formation of the Elliot Lake Group of the Huronian Supergroup. The world's largest concentration of gold (with lesser uranium) mineralization occur in pyritic quartz-pebble conglomerates of early Proterozoic age in the Upper Witswatersrand system of South Africa and represents a potential anologue with the Elliot Lake Deposits.

The geological and radiometric surveys described in this report represent a preliminary phase of exploration to assess the potential for significant gold (and new uranium) concentrations in the Elliot Lake environment.
Property Location and Access

The Elliot Lake Property, (fig. 1), comprises 37 unpatented mining claims in a continuous block beginning just west of Gullbeak Lake in southwestern Bolger Township and westward to just east of Little Moon Lake in Timmermans Township. Figure 2 shows the approximate boundaries of the claim group which includes the following claims; SSM 577117 to SSM 577123, Timmermans Township; SSM 577083 to SSM 577086, SSM 577089 to SSM 577091; SSM 577093 to SSM 577096 and SSM 577098 to SSM 577116 in Bolger Township.

The property is located just west of the Town of Elliot Lake (approximately 10 km) and is reasonably accessible via seasonal roads from the townsite. Much of the area has been logged recently allowing additional access.

The total property is currently held by Mr. A. Rich, 11003 - 84 Avenue, Edmonton, Alberta, T6G OV6, (Lic. C. 32498).

Previous Geological Work

The area was first mapped by Collins (1917, 1925) and later by Robertson (1963). Numerous regional investigations from 1914 to the present have been recorded and summaries of this work is given by Robertson (1976), Roscoe (1957, 1960), Ruzicka (1976) and Theis (1979). Various mining companies have explored parts of the claim group and the Elliot Lake ores generally, notably;
Figure 1: Location of Elliot Lake Property
Algoma Uranium Mines Ltd., Big Game Mines Ltd., Shell Canada Ltd., Falconbridge Nickel Mines Ltd., and others. Details of this exploration can be obtained from the assessment files, office of the Resident Geologist, Sault Ste. Marie. Thesis studies covering specific topics and/or areas are also on file at the above office.

Area Covered by the Surveys

The total claim group (37 claims) was surveyed on a controlled grid. A base line was established across the property (bearing of 312°), beginning approximately 650 feet (195 m) north of the main access bush road at post No. 2, claim SSM 577091 and terminating at the northeast shore of Little Moon Lake. A second short baseline was cut south of the Caribou Lake between stations 76 and 96. Cross line stations were established at 100 foot spacing. A total of 28.40 line miles (45.44 kms) were cut to establish the grid (fig. 3). Air photo coverage at 1' = ½ mile was also used in the survey.

Geological mapping, prospecting and sampling was carried out by D. G. Innes and Associates Ltd., during August and September, 1982. Maps, reports etc., were prepared by D. G. Innes and Associates Ltd. in September and October, 1982.
Figure 3: Elliot Lake Property Grid

ELLIOI LAKE PROPERTY GRID
Physiography

The topography is generally one of moderate relief with a few prominent hills (50 m relief). Outcrop areas generally stand up and a few cliff sections of up to 20 m are observed. Fault and linear features shown on figure 4 are marked by distinct valleys. Low swampy areas are minor and occur close to lakes and streams. Much of the area has been logged recently and there remains only minor stands of commercial timber. Hardwoods, including maple and birch cover most of the higher areas in open forest. Cedar, balsam and poplar occupy the lower areas. Small creeks and lakes generally drain west and south; beavers have damned many of the small creeks, especially in the west and southwest part of the claim group.
Regional Geological Setting

The general geology of the Elliot Lake area and discussions of the well known uranium deposits of the Elliot Lake Basin are given by; Robertson (1963, 1968, 1969 and 1976); Hoscoe (1957, 1969); Pienaar (1965); and Ruzicka (1976). Numerous other more specific papers on various aspects of the uranium camp (such as Fralick and Miall, 1981), have also been published since the discovery of the deposits in 1953. The reader is referred to these publications and their extensive bibliographies for a more detailed background.

The uranium ore deposits of the Elliot lake area occur associated with pyritic quartz-pebble conglomerates of the Matinenda Fm., of the Elliot Lake Group at the base of the Huronian Supergroup. Recent work would suggest that the Huronian Supergroup was deposited in a rift framework (Bennett and Innes, 1979; Sims et al, 1980), and that the Matinenda Fm., represents an early Fluvial (braided stream) system within this environment, (Parviainen, 1973; Theis, 1979).

The Matinenda Fm., thickens southward and is best exposed west of the property at the nose of the Chiblow Anticline and along the southern margin of the Quirke Lake Syncline (figure 2). The basal sections consist of coarse gritty sandstone interbedded with pyritic oligomictic quartz-pebble conglomerates. This section is both laterally and vertically gradational with coarse-grained
subarkose wacke. Roscoe (1969), showed that this stratigraphy was controlled by sediment genesis and basement tectonics. There is a progressive younging of basal units to the north and basement uplift resulted in the prograding of coarser facies to the south. Basement topography exerted strong control as evidenced by the infilling of paleovalleys (southeast trending paleochannels) by grit and conglomerate units.

Known uraniferous pyritic quartz-pebble conglomerate zones or reefs are illustrated by figure 6. Of these zones, only deposits within the Nordic and Quirke zones are being mined. Ore grade mineralization appears to be limited to the conglomeratic facies within the basal 40m in each of these zones and is probably fluvially controlled (Theis, 1979). The interbedded sandstones are not known to carry any significant mineralization. A similar situation exists in the South African and Brazilian deposits where both uranium and gold was concentrated in pyritic quartz-pebble conglomerates. In both cases uranium concentration rapidly decreases away from the conglomeratic units (Hinter, 1976; Coetzee, 1965). This relationship has always been problematic in that other accessory heavy minerals including zircon, chromite, pyrite and iron oxides that are associated with the uranium concentrations do not necessarily decrease in the enclosing sandstones. Recently, Pretorius (1980) and others have reported that new and large gold concentrations (with little or no uranium) are being found in the South African deposits within the sandstone facies stratigraphically above the established conglomerate reefs. As well, a significant
part of the South African gold production now comes from the carbon-leader type of ore which may or may not be associated with the conglomeratic horizons. These ores do not carry significant uranium mineralization.

Past exploration and exploration philosophy in the Elliot Lake area has been restricted to the classical basal mineralization associated with conglomeratic horizons. Gold is known from these lithologies but the concentrations present appear to be very low (from trace to 0.005 oz Au/ton). Roscoe (1969) reports that many samples from ore zones contain about 0.01 oz Au/ton with a few assays up to 0.04 oz Au/ton. From the above it is obvious that gold is present in the system, however, it does not appear that economic concentrations will be found in the presently mined uraniferous conglomerates. However, even here, gold is not routinely assayed for in any lithology other than the uraniferous conglomerates. The absence of gold in these deposits may be due to its absence in the source area rocks, and/or conditions of sedimentation where such that gold was not concentrated during deposition of the uraniferous conglomerates. It is also possible that gold was present and has migrated through repeated periods of reworking to positions higher in the stratigraphy. As well, sites of gold deposition and concentration in this system may be other than that occupied by uranium.
Geology of the Claim Group.

Prior to the actual grid survey, much of the claim group and surrounding area was mapped in a reconnaissance fashion. The area between the Town of Elliot Lake and Matinenda Lake to the west was examined along access roads, lakes and by selected traverses. 1 inch to ¼ mile airphotos were used together with topographic (1:50,000) and geological maps in the reconnaissance. In addition, all past exploration data on file in the Office of the Resident Geologist, Sault Ste. Marie was reviewed.

The baseline was cut at 312° so that the crossline grid would cut the bedding and allow for more stratigraphic control during the mapping. Crosslines were established at 400 foot intervals with stations at 100 foot intervals. The grid was then mapped in detail and the resulting geologic date is illustrated by figure 4.

Outcrop exposures are not numerous throughout much of the claim group except for areas in the northeast, central and southwest. In many cases, outcrop shown on figure 4 are exposed as small windows in thin till cover. Southwest of Caribou Lake, vertical cliff sections up to 16 m high were observed and most had talus accumulations at the base.

Most of the rocks mapped within the claim group belong to the Matinenda Formation, and consist of quartzites, feldspathic sandstones, pebbly arkose and oligomictic quartz-pebble conglomerates. It is difficult to correlate the above members with those
pebble concentrations fill scour channels and quartz-pebble lags define small scale unconformities at the top of cross-beds. Other good examples of these features were observed at station 20S, line 120 and between stations 4S and 8S, lines 64 and 60.

North and east of Caribou Lake a few outcrops of medium-grained to fine-grained feldspathic sandstone and arkose were observed. A few outcrops contained weak pebble concentrations and one outcrop showed good development of small scale festoon cross-bedding. This lithology may represent the westward equivalent of the Stinson Member of the Matinenda Formation. This unit appears to be less radioactive than the grit member previously described.

Northeast of Caribou Lake, a few small outcrops of grey-black finely laminated argillite-siltstone occur, stratigraphically above the Matinenda Formation lithologies. Very little of this rock unit was observed and it is assumed to belong to the McKay Formation.

A thin medium-grained diabase dike trending 110° was observed cutting coarse-grained pebbly arkose between stations 4S and 8S on line 76. The diabase is pyroxenitic and is assumed to be Nipissing-type.

A few late quartz veins and stringers were observed, mainly in areas of shearing and fracturing.

The Matinenda Formation lithologies generally trend northwest (90° to 155°) and dip shallowly to the northeast (10° to 35°). The few bedding features observed including cross-bedding and scours, were not sufficient to make reliable paleocurrent measurements.
However, a south to southeast "sense" of direction was obtained. The above structures and lithologies are consistent with fluvial, braided stream sedimentation.

Two north-trending topographic linears probably mark fault structures and are illustrated on figure 4. Both structures are defined by shearing and quartz-veining in the enclosing arkose. These structures are probably those defined on Map 2014 (Robertson, 1963). Jointing is commonly developed both sub-parallel and perpendicular to bedding in the Matinenda Formation lithologies. Other joint sets were recorded and are illustrated on figure 4.

Samples of all representative lithologies were taken for thin section and analysis. As well, all above background (RA) outcrops were sampled for assay. Information gained from the mapping, together with assessment file data (especially the diamond drill data) is currently being compiled in an attempt to better define the stratigraphy across the claim group.

**Surficial Geology**

Most of the claim group is covered by a relatively thin mantle of bouldery till, especially the higher areas. Large glacial erratics and boulder concentrations are common along high ridges and talus is commonly developed at the base of cliff sections. Glaciofluvial gravels and sands are preserved between the outcrop ridges and recent clays, silts and bog deposits are observed along water courses and around the small lakes and ponds.
Radiometric Survey

Introduction

Coincident with the geological survey, a ground radiometric survey was conducted over the total claim grid. This survey was carried out in an attempt to aid mapping and stratigraphic definition. As well, concentrations of uranium and thorium can be used as a guide to finding concentrations of other heavy minerals including gold. Hydrocarbon seams might also be detected using this type of survey.

Survey Method

The total claim grid was surveyed using a McPhar TV-1A scintillometer. 1,345 stations were read and all outcrops were checked. The instrument was calibrated at the start of the survey and was constantly checked. Background values for $T_1$, $T_2$ and $T_3$ were established daily over water (Quimby Lake). Values at each reading site were recorded and later plotted on a grid base map. These values were also treated to distinguish between K, U and Th according to the following formulas:

\[
\begin{align*}
\text{if } T_1 \text{ background} - T_1 \text{ reading} &= 0 \\
\text{then } K, U, Th &= 0 \\
Th &= T_3 \text{ background} - T_3 \text{ reading} \\
U &= T_2 \text{ background} - T_2 \text{ reading} \times (3.5 \times Th) \\
K &= (Th + U) - (T_1 \text{ reading} - T_1 \text{ background})
\end{align*}
\]
These values were then plotted on a grid base (figure 5). Details on the theory of radiometric instrument capabilities and uses are appended.

Results

The total corrected data is illustrated by figure 5. By comparing figures 4 and 5, it is obvious that a contour of figure 5 would primarily reflect the outcrop pattern in figure 4. However, with close inspection, it appears that the coarse-grained pebbly-arkose or grit unit (Ryan equivalent?) is distinguishable from the underlying fine-grained basal quartzite and the overlying finer grained arkose-sandstone (Stinson equivalent). This RA variation between members is true for the main Elliot Lake Camp, and it appears that these signatures can be used for stratigraphic mapping on the property. Both the basal and upper quartzite lithologies are relatively flat with respect to U and Th, while the grit member records 2 to 3 times background levels for U and Th. In addition, the K values are as expected, considerably higher. The occasional high reading from either of the quartzite units usually corresponds to thin pebble beds and lag pebble concentrations.

Hydrocarbon horizons were not observed in the field so that response to the scintillometer could not be tested. Some quartz-pebble conglomerate beds in the grit unit were found to be quite
anomalous (up to 20 times background) and many of these can be followed using the scintillometer. These beds were sampled and will be assayed.

There is some indication that the grit member can be traced through thin overburden. In comparing figure 4 with figure 5, some areas between outcrops in the grit member, continue to reflect the signature RA levels. This may also be due to the high concentration of locally derived boulders in the till mantle.

Specific areas of above background readings are detailed as follows:

1. L24, Stn. 21N; conglomerate boulders close to bedrock gave 10x BG, Th.

2. L24, Stn. 26N; thin pebble bed in medium to fine grained arkose gave 4x BG, U.

3. L32, Stns. 1 to 6S; thin boulder till gave 4 to 5x BG in U and Th.

4. L40, Stns. 5 to 11S; mainly pebbly arkose and thin till gave 5 to 10x BG, U.

5. L44, Stns. 3 to 12S; mainly pebbly arkose and thin till gave 3 to 5x BG, U.

6. L48, Stns. 12 to 18S; mainly pebbly arkose gave 3 to 4x BG, U.

7. L56, Stns. 9 to 15S; mainly bouldery till gave 3 to 5x BG in U and Th.
8. L64, Stns. 2 to 4S; pebbly arkose gave up to 20 x BG, U and 8 x BG, Th.

9. L76, Stn. 1N; a reading of 5 x BG, U was obtained in a boulder field of arkose. Stns. 1 to 16S gave 2 to 5 x BG in similar till.

10. L84, Stns. 2 to 12N; thin till gave 2 to 4 x BG, U.

11. Baseline station 82 + 75; outcrop of oligomictic quartz pebble conglomerate gave 17.5 x BG, U and 10 x BG, Th.

12. L88, Stns. 1 to 2N; pebbly arkose gave up to 12 x BG, U and 8 x BG, Th. At Stn. 9N and arkose gave 8 x BG, U.

13. L96, Stns. 5 + 185; pebbly arkose plus thin conglomerate beds gave up to 20 x U, (eg. Stn. 5S and 11S). Stns. 1 to 9N gave 2 to 4 x BG in thin boulder till.

14. L100 Stns. 14 to 26S; arkose and pebbly arkose plus thin till cover gave up to 20 x BG, U (eg. 15S and 21S) but averaged 5 to 8 x BG, U. Stns. 1 to 11N gave 2 to 4 x BG, U in thin boulder till.

15. L104, Stns. 1 to 12N; gave 2 to 4 x BG, U in thin till. Stns. 20 to 29S gave 4 to 6 x BG, U and Th in outcrops of pebbly arkose.

16. L108, Stn. 13S, 20 to 26S; gave 3 to 6 x BG in U and Th in arkose and thin till.

17. L112, Stns. 14 to 26S; thin boulder till and outcrop of arkose gave 4 to 5 x BG, U and up to 8 x BG, Th.
18. L116, Stns. 15 to 24S; 4 to 5 x BG, U was obtained from outcrops of pebbly arkose.
SELECTED REFERENCES

Bennett, G., and Innes, D. G.

Bottrill, T. J.

Coetzee, F.

Collins, W. H.

Fralick, P. W. and Miall, A. D.
1981: Sedimentology of the Matinenda Formation; O.G.S. MP. 98.

Frarey, M. J.
Leahy, E. J.

Minter, W. E. L.

O.G.S. Resident Geologist's Office
Assessment Files
Sault Ste. Marie, Ontario

Pienaar, P. J.
1963: Stratigraphy, Petrology and Genesis of the Elliot Lake Group, Blind River, Ontario, including the Uraniferous Conglomerate; G.S.C. Bull. 83.

Pretorius, D. A.
1980: FNM Lecture Series, Laurentian University (per. comm.).

Richardson, K. A., Killeen, P. G. and Charbonneau, B. W.

Robertson, J. A.
1968a: Geology of Township 149 and 150; O.D.M. G.R. 57.


Robinson, A.


Roscoe, S. M.

1957: Geology and Uranium Deposits, Quirke Lake - Elliot Lake, Blind River Area, G.S.C. Paper 56-7.


Ruzicka, V.


Ruzicka, V., and Steacy, H. R.


Sims, P. K., Card, K. D., Morey, G. B. and Peterman, Z. A.


Theis, N. J.

# REPORT OF WORK

**ELLIOT LAKE PROPERTY**

<table>
<thead>
<tr>
<th>LINECUTTING</th>
<th>DATES WORKED</th>
<th>HOURS WORKED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. J. Jamieson</strong></td>
<td>08/11/82</td>
<td>9½ 9½ 9 9</td>
</tr>
<tr>
<td>Notre Dame Du Nord</td>
<td>08/12/82</td>
<td>10 10 10 10</td>
</tr>
<tr>
<td>Province of Quebec</td>
<td>08/13/82</td>
<td>10 10 10 10</td>
</tr>
<tr>
<td></td>
<td>08/14/82</td>
<td>10 10 10 10</td>
</tr>
<tr>
<td><strong>2. E. Jamieson</strong></td>
<td>08/15/82</td>
<td>7 10 10 10</td>
</tr>
<tr>
<td>Notre Dame Du Nord</td>
<td>08/16/82</td>
<td>10 10 10 10</td>
</tr>
<tr>
<td>Province of Quebec</td>
<td>08/17/82</td>
<td>9 9 9 9</td>
</tr>
<tr>
<td><strong>3. A. Wabi</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notre Dame Du Nord</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Province of Quebec</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4. D. McLearin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notre Dame Du Nord</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Province of Quebec</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total line miles cut: 28.40
<table>
<thead>
<tr>
<th>GEOLOGICAL MAPPING</th>
<th>DATES WORKED</th>
<th>HOURS WORKED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. D. G. Innes</td>
<td>08/13/82</td>
<td>4</td>
</tr>
<tr>
<td>R. R. No. 1</td>
<td>08/14/82</td>
<td>8</td>
</tr>
<tr>
<td>Wasi Road</td>
<td>08/15/82</td>
<td>8</td>
</tr>
<tr>
<td>Callander, Ontario</td>
<td>08/16/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/17/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/18/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/19/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/20/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/21/82</td>
<td>8</td>
</tr>
<tr>
<td>2. M. Grant</td>
<td>08/13/82</td>
<td>4</td>
</tr>
<tr>
<td>760 Chapelle St.</td>
<td>08/19/82</td>
<td>8</td>
</tr>
<tr>
<td>Sudbury, Ontario</td>
<td>08/20/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/21/82</td>
<td>8</td>
</tr>
<tr>
<td>3. R. Poulin</td>
<td>08/22/82</td>
<td>8</td>
</tr>
<tr>
<td>3171 Romeo Street</td>
<td>08/23/82</td>
<td>8</td>
</tr>
<tr>
<td>Val Caron, Ontario</td>
<td>08/24/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/25/82</td>
<td>8</td>
</tr>
<tr>
<td>4. T. Kampman</td>
<td>08/26/82</td>
<td>4</td>
</tr>
<tr>
<td>46 Thorncliffe Cr.</td>
<td>08/27/82</td>
<td>8</td>
</tr>
<tr>
<td>Sudbury, Ontario</td>
<td>08/28/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/29/82</td>
<td>8</td>
</tr>
<tr>
<td>5. D. Card</td>
<td>08/30/82</td>
<td>8</td>
</tr>
<tr>
<td>86 Penfield Drive</td>
<td>08/31/82</td>
<td>8</td>
</tr>
<tr>
<td>Kanata, Ontario</td>
<td>09/01/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>09/02/82</td>
<td>8</td>
</tr>
</tbody>
</table>

... 21
<table>
<thead>
<tr>
<th>GEOPHYSICAL SURVEY</th>
<th>DATES WORKED</th>
<th>HOURS WORKED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. D. G. Innes</td>
<td>08/14/82</td>
<td>4</td>
</tr>
<tr>
<td>R. R. No. 1</td>
<td>08/15/82</td>
<td>8</td>
</tr>
<tr>
<td>Wasi Road</td>
<td>08/16/82</td>
<td>8</td>
</tr>
<tr>
<td>Callander, Ontario</td>
<td>08/17/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/18/82</td>
<td>8</td>
</tr>
<tr>
<td>2. R. Poulin</td>
<td>08/19/82</td>
<td>8</td>
</tr>
<tr>
<td>3171 Romeo Street</td>
<td>08/20/82</td>
<td>8</td>
</tr>
<tr>
<td>Val Caron, Ontario</td>
<td>08/21/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/22/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/23/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/24/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/25/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/26/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/27/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/28/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/29/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/30/82</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>08/31/82</td>
<td>8</td>
</tr>
<tr>
<td>DRAFTING AND REPORT WRITING</td>
<td>DATES WORKED</td>
<td>HOURS WORKED</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>D. G. Innes</td>
<td>10/18/82</td>
<td>9</td>
</tr>
<tr>
<td>R. R. No. 1</td>
<td>10/19/82</td>
<td>8</td>
</tr>
<tr>
<td>Wasi Road</td>
<td>10/20/82</td>
<td>8½</td>
</tr>
<tr>
<td>Callander, Ontario</td>
<td>10/21/82</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>10/24/82</td>
<td>8</td>
</tr>
<tr>
<td>C. Innes</td>
<td>10/21/82</td>
<td>4</td>
</tr>
<tr>
<td>R. R. No. 1</td>
<td>10/23/82</td>
<td>8</td>
</tr>
<tr>
<td>Wasi Road</td>
<td>10/24/82</td>
<td>8</td>
</tr>
</tbody>
</table>
CERTIFICATE

I, DANIEL GRANT INNES, of the Town of Callander, in the District of Parry Sound, in the Province of Ontario, hereby certify as follows:

1. That I am a geologist and reside at R. R. No. 1, Wasi Road, Callander, Ontario.

2. That I hold a Master of Science degree in Geology from Laurentian University, Sudbury, Ontario.

3. That I am a Fellow of the Geological Association of Canada.

4. I have been practising in my profession since 1968 in Canada and the United States.

5. That my report dated October 26, 1982 on the Elliot Lake Property is based on personal examination, published government geological reports and maps and government assessment work files.

6. That the examination and field work of the property was made by me on August 13, 14, 15 and 26, 1982. As well, approximately 16 days additional field work on the property was carried out between June 1980 and August, 1982.

D. G. Innes
H.B. Sc., M. Sc., F.G.A.C.
October 26, 1982
APPENDIX 1

McPhar Model TV - 1 Scintillometer

Specifications, theory and U, Th determinations
SECTION 1

INTRODUCTION

Model TV-1 is a three threshold scintillometer. Measurements are based on the spectral characteristics or energy levels of gamma radiation from radioactive elements. Selection of the operating threshold is made by means of the threshold selector switch.

The instrument is designed primarily for reconnaissance. The selective thresholds however provide the capability to differentiate between gamma radiations emanating from uranium and thorium and to provide quantitative information relating to each.

The meter is calibrated to display zero to 100 counts per minute. A four position scale multiplier switch provides four full scale ranges of 100, 1000, 10,000 and 100,000 counts per minute. A fifth position on this switch is employed to test the condition of the batteries.

The variable time constants are tied in with the threshold selector switch. In the wide open (maximum sensitivity) operation, a fast or slow time constant may be selected. In the upper thresholds (lower net count), the long time constant only is in effect.

The detecting element is a 1-1/4 by 1 inch sodium iodide crystal coupled to a photomultiplier tube. These are hermetically sealed, magnetically shielded and mounted in the forward end of the scintillometer housing.

A speaker provides a variable pitch output with changing radiation levels. A speaker control, mounted on the top of the instrument, can be used to adjust the pitch for any given level of radiation.
SECTION 2
SPECIFICATIONS

2 - 1 THRESHOLD POSITIONS

T₁ at 0.2 Mev. - measures the total count across the entire gamma energy spectrum for maximum sensitivity.

T₂ at 1.6 Mev. - measures characteristic uranium and thorium radiations.

T₃ at 2.5 Mev. - measures diagnostic thorium radiations only.

2 - 2 MEASUREMENT RANGES

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Full Scale Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>x 1</td>
<td>100</td>
</tr>
<tr>
<td>x 10</td>
<td>1,000</td>
</tr>
<tr>
<td>x 100</td>
<td>10,000</td>
</tr>
<tr>
<td>x 1000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

2 - 3 TIME CONSTANTS

T₁ F (Fast) - 1 second
T₁ S (Slow) - 10 seconds
T₂ - 10 seconds
T₃ - 10 seconds

2 - 4 SPEAKER

A speaker is mounted in a top compartment of the instrument.
The variable pitch output of the speaker is governed by the intensity of radiation and can also be adjusted by a speaker pitch control.

2 - 5 BATTERY SUPPLY

The instrument operates from two "c" size flashlight type cells, located in the handle. Ordinary zinc carbon cells may be used. From the standpoint of longer life and low temperature operation, the alkaline type should be employed wherever available.

Both the high and low voltages, generated internally to operate the instrument, are regulated to a high degree of stability. The batteries can be allowed to drop to one half of their initial voltage without any effect on the operation of the instrument.

2 - 6 SENSITIVITY

The instrument, on threshold 2, registers approximately 50 counts per minute on an in-situ measurement, (2π geometry) over homogeneous material containing 5 parts per million uranium or thorium

2 - 7 TEMPERATURE RANGE

The instrument has been designed to operate over the temperature range of -35 to +55 degrees centigrade. Low temperatures require the use of alkaline type batteries.
2 - 8 DETECTOR CRYSTAL

The sodium iodide crystal is 1 inch in diameter and 1-1/4 inches thick. The crystal is coupled to the photomultiplier in a permanent hermetically sealed housing.

2 - 9 WEIGHT

The total weight of the instrument is 3 pounds.

2 - 10 DIMENSIONS

The length including rubber end guards is 13 inches. The maximum height is 8 inches.

2 - 11 ACCESSORIES

The scintillometer is supplied with a leather belt holster, a thorium calibrating source, spare batteries and an instruction manual.
Gamma Ray Spectra from Natural Ores or their Constituents
SECTION 3
GENERAL DESCRIPTION AND APPLICATIONS.

The gamma ray detecting principle lies in the sodium iodide crystal. Gamma rays entering the crystal interact with the crystal atoms, resulting in free electrons and light emission. The optically coupled photomultiplier converts the light emission to electrical pulses. The magnitude of the electrical pulses bear a relationship to the energy levels the intercepted gamma rays.

Various radioactive elements have characteristic gamma energy spectrums. The nature of the spectrum for a given element can be used to advantage in identifying it in the presence of other radioactive elements. Figure 1 shows spectral curves for the three main elements of interest in radioactive surveys: potassium, uranium and thorium.

Thorium emits gamma rays with energy levels exceeding 2.5 Mev. The highest energy radiation from potassium is about 1.6 Mev. The three vertical lines marked $T_1$, $T_2$, and $T_3$ show the location of the threshold settings of the TV-1 scintillometer after the instrument has been calibrated. Threshold $T_3$ at 2.5 Mev. allows only those electrical pulses to be registered whose amplitudes correspond to gamma rays with energy levels above 2.5 Mev. $T_2$ similarly responds to gamma energy levels above 1.6 Mev. When both thorium and uranium are present during a measurement, then the reading at $T_2$ contains counts resulting from both elements whereas $T_3$ contains counts from thorium only.
It is possible then, to subtract the count due to thorium in the $T_2$ reading, leaving the count from uranium only. The count representing thorium in the $T_2$ reading is a fixed multiple of the $T_3$ reading. In the TV-1 scintillometer, this multiple is 3.5. That is, the count in $T_2$ due to uranium is $T_2 - 3.5 T_3$. A thorium calibrating source and calibration procedure, provided with the instrument, ensures that this is always the case.

Once the count in $T_2$ has been resolved into net count for uranium, it is possible to arrive at a quantitative estimate of the material grade. This requires reference to certain conditions described in section 6-3.
SECTION 4

OPERATING INSTRUCTIONS

4-1 INSPECTION

After the instrument is unpacked, it should be carefully inspected for possible damage received during transit. If any shipping damage is detected, immediately file a claim for damage in shipment with the carrier.

4-2 CONTROLS AND THEIR FUNCTION

There are six controls on the instrument. Their functions are described below.

4-3 OFF-ON SWITCH

This is a slide switch located under the front barrel. The instrument is permanently turned on while this switch is in the on position.

4-4 TRIGGER SWITCH

This is a spring return on-off switch. Pulling the trigger will turn the instrument on. The instrument turns off when the switch is released.

Note: The trigger switch will over-ride the off-on slide switch when the slide switch is in the off position. The purpose of the trigger is to act as a battery saver when the instrument is used intermittently. The slide switch can be left in the OFF position.
4-5 METER SCALE SWITCH

This is a five position switch. Four positions are used to change the meter scale and the fifth is used to check the battery supply.

4-6 THRESHOLD SWITCH

This is a four position switch. The first two positions are used to select either the fast or slow time constant to be employed with threshold $T_1$. The remaining two positions select thresholds $T_2$ and $T_3$ to which the slow time constant, only, is applied.

4-7 SPEAKER CONTROL

This is a potentiometer control located at the top of the instrument. Rotation of this control performs the function of setting the sound pitch for any given radiation level. The setting of the control is at the operator's option and can be set to give zero output or a pitched tone output at background levels. After a setting is selected, changes in repetition rate or frequency will indicate a change in background level.

4-8 CALIBRATION CONTROL

This control is concealed under the left hand vinyl covered panel. To expose the control, lay the instrument flat with the handle toward the operator and the meter to the right. Remove four panel retaining screws and note that there are two short screws and two long screws. The long screws fit the top and bottom holes. Lift the panel clear. This exposes the calibration control which is a small 10 revolution trimpot. A small screw driver is provided with the instrument to fit the adjustment screw on the potentiometer.
CALIBRATION PROCEDURE

1. Set the scintillometer on a flat surface with the calibration control facing up and the meter in an easily read position.

2. Turn the instrument ON with the slide switch.

3. Set the scale switch on the X 100 position.

4. Set the threshold switch on $T_2$.

5. Rest the thorium source on the barrel of scintillometer and move it forward or backward until the meter reads 35 divisions. This is 3500 counts per minute and well above the influence of any background.

6. Switch the threshold switch to $T_3$ and read the meter. It should read 10 divisions to have the necessary ratio of $\frac{T_2}{T_3} = 3.5$

7. If the meter does not indicate 10 divisions then adjust the calibration until a reading of 10 is obtained.

8. Return the threshold switch to $T_2$ and note that the $T_2$ reading will have changed. Shift the thorium source to again obtain a reading of 35 and again recheck $T_3$.

9. This is a back and forth adjustment procedure with the object of obtaining a ratio of 3.5 for $\frac{T_2}{T_3}$. The numbers of 10 and 35 are only used for convenience. Any set of figures may be used.

10. When a ratio of $\frac{T_2}{T_3} = 3.5$ is arrived at, the instrument is calibrated.

A first time calibration may appear lengthy and awkward, however, future calibrations will be considerably speeded up if the following is observed.

Immediately following a calibration procedure, place the thorium
source, with the small diameter side, up against the end of the scintillometer. Take a reading on $T_3$. Record this reading and refer to it in future calibration checks. If the future readings are high or low then calibration will be effected by adjusting the calibration control to obtain the same reading again.
SECTION 6

DETERMINATION FOR URANIUM, THORIUM

6-1 EXPLANATION OF T₁, T₂ AND T₃ READINGS

Following a calibration procedure, the three thresholds are established on the gamma energy spectrum, in the positions shown in Figure 1. T₃ is set at 2.5 Mev. and from the curves of the three elements displayed, it is noted that only thorium contains gamma radiation with energy levels above 2.5 Mev. The use of T₃ then forms the basis of a diagnostic test for thorium. The number of counts, measured under controlled conditions, can also form the basis of a quantitative evaluation for thorium.

T₂ is at 1.6 Mev. and from the curves, it is apparent that this threshold provides a diagnostic test for the presence of both uranium and thorium. The number of counts due to uranium in a sample containing both is readily established by subtracting 3.5 times the T₃ counts. The difference represents the counts relating to uranium. The subtraction of 3.5 times the T₃ count is valid since this is the basis of the calibration procedure with the thorium source. The count remaining after the subtraction can further be related to the quantity of uranium (in equilibrium) that is present.

T₁ is at 0.2 Mev. and measurements with this threshold will include gamma counts from all three elements of potassium,
uranium and thorium. This is the most sensitive threshold position since it includes practically the entire energy spectrum. It is common therefore to employ threshold one for general reconnaissance.

6-2 BACKGROUND MEASUREMENTS

So far, the influence of natural background radiation has not been introduced. It is recognized however, that measurements on any sample material include count contributions from background radiation. When the count yield from a sample or in-situ measurement is low, it is necessary to subtract the background count prior to any attempt at qualitative or quantitative evaluation.

For survey work, the background count on all thresholds should be recorded at an area away from any known source of radioactivity.

For sample work, the background should be taken at the location of the measurement site but with radioactive samples removed to such a distance that random position changes of the samples do not influence the general background level. In all cases, no radioactive articles, personal or otherwise, should be in the vicinity of the instrument.

Background count levels are generally low and difficult to establish to any high degree of accuracy, particularly in the upper threshold settings. Extra care should be taken to measure the background.

Fortunately the background does not have to be measured frequently so a longer time can be taken to arrive at a more accurate measurement.
The background is recorded and subtracted from future readings.
The background should be rechecked from time to time but the frequency of rechecking depends on the nature of the work.

6-3 ISOLATING URANIUM

From a sample or outcrop containing both uranium and thorium, the net count due to uranium is obtained as follows.

1. Measured background counts at $T_3 = C_{3B}$
   and background counts at $T_2 = C_{2B}$

2. Measured counts on sample at $T_3 = C_3$
   and counts on sample at $T_2 = C_2$

3. Counts at $T_3$ due to thorium $= C_3 - C_{2B} = C_{3Th}$
   Counts at $T_2$ due to thorium and uranium $= C_2 - C_{2B} = C_2(U+Th)$

4. Counts at $T_2$ due to uranium only
   
   $C_{2U} = C_2(U+Th) - 3.5C_{3Th}$

$C_{2U}$ = Net counts per minute in threshold 2 due to uranium after the subtraction of all background and thorium counts. $C_{2U}$ can then be applied toward a quantitative estimate of grade as per Section 6-4.

$C_{3Th}$ = Net counts per minute in threshold 3 due to thorium after the subtraction of the background counts.

6-4 QUANTITATIVE EVALUATION

The relationship between the counts per minute obtained from radioactive material and the assay grade of the material is
subject to many variables.

Among these are; geometry of the material, distribution of the radioactive elements in the material, volume, density, distance of probe to source, background changes, and equilibrium state.

The most dependable method of quantitative evaluation includes the control of as many of the variables as possible by establishing fixed procedures. The measurements on test samples are then related to accurately assayed samples of preferably the same or near the same grade as the grade of the test samples.

In-situ measurements are more difficult to relate because of lack of control on the source. However, several considerations can be applied to minimize the variables.

To enhance the usefulness of the instrument on initial applications, an approximate relationship between counts per minute and grade is tabulated below. The operator is cautioned to use these as approximations only until verification with assayed samples can be obtained. Assumption is made that the uranium is in equilibrium.

**TEST CONDITIONS**

5 lb. Sample: The diameter of the container containing 5 lbs. of crushed material was 4-1/2 inches.

The probe was brought into contact with material through the top of the container.
In-Situ:
The readings shown in the in-situ column were extrapolated from the approximate empirical relationship between hand samples and the same material of homogeneous consistency in-situ, as follows:

<table>
<thead>
<tr>
<th>5 lb. Sample</th>
<th>2π Geometry (probe in contact with flat outcrop of the same material)</th>
<th>4π Geometry (probe recessed in ground so crystal is considered completely covered)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 c.p.m.</td>
<td>10 c.p.m.</td>
<td>20 c.p.m.</td>
</tr>
</tbody>
</table>

GRADE LEVELS (Parts per million)

<table>
<thead>
<tr>
<th>Uranium p.p.m.</th>
<th>T₂ c.p.m. (5 lb.)</th>
<th>T₂ c.p.m. (2π)</th>
<th>Thorium p.p.m.</th>
<th>T₃ c.p.m. (5 lb.)</th>
<th>T₃ c.p.m. (2π)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>5</td>
<td>50</td>
<td>10</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>100</td>
<td>50</td>
<td>500</td>
<td>100</td>
<td>15</td>
<td>150</td>
</tr>
<tr>
<td>1,000</td>
<td>500</td>
<td>5,000</td>
<td>1,000</td>
<td>150</td>
<td>1,500</td>
</tr>
</tbody>
</table>

T₂ = net counts for uranium = C₂U (Section 6-3)

T₃ = net counts for thorium = C₃Th (Section 6-3)
**Report of Work**

**Geological and Radiometric**

**ANTHONY RICH**

**Address**

1100 84 Avenue, Edmonton, Alberta, T6G 0V6

**Survey Company**

D.G. INNES AND ASSOCIATES LTD.

**Name and Address of Author (of Technical report)**

D.G. INNES, 8645 Mclvor Dr., SUDBURY, ONTARIO, P3A 5E9

**Credits Requested per Each Claim in Columns at right**

<table>
<thead>
<tr>
<th>Mining Claim Number</th>
<th>Claim Days</th>
<th>Expended Days</th>
<th>Expended Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH 5771121</td>
<td>30</td>
<td>5771122</td>
<td>5771123</td>
</tr>
<tr>
<td>SH 5771117</td>
<td>40</td>
<td>5771118</td>
<td>5771119</td>
</tr>
<tr>
<td>SH 5771114</td>
<td>60</td>
<td>5771115</td>
<td>5771116</td>
</tr>
<tr>
<td>SH 5771113</td>
<td>80</td>
<td>5771117</td>
<td>5771118</td>
</tr>
<tr>
<td>SH 5771112</td>
<td>100</td>
<td>5771119</td>
<td>5771120</td>
</tr>
<tr>
<td>SH 5771111</td>
<td>120</td>
<td>5771121</td>
<td>5771122</td>
</tr>
<tr>
<td>SH 5771110</td>
<td>140</td>
<td>5771123</td>
<td>5771124</td>
</tr>
<tr>
<td>SH 5771109</td>
<td>160</td>
<td>5771125</td>
<td>5771126</td>
</tr>
<tr>
<td>SH 5771108</td>
<td>180</td>
<td>5771127</td>
<td>5771128</td>
</tr>
<tr>
<td>SH 5771107</td>
<td>200</td>
<td>5771129</td>
<td>5771130</td>
</tr>
<tr>
<td>SH 5771106</td>
<td>220</td>
<td>5771131</td>
<td>5771132</td>
</tr>
<tr>
<td>SH 5771105</td>
<td>240</td>
<td>5771133</td>
<td>5771134</td>
</tr>
<tr>
<td>SH 5771104</td>
<td>260</td>
<td>5771135</td>
<td>5771136</td>
</tr>
<tr>
<td>SH 5771103</td>
<td>280</td>
<td>5771137</td>
<td>5771138</td>
</tr>
<tr>
<td>SH 5771102</td>
<td>300</td>
<td>5771139</td>
<td>5771140</td>
</tr>
<tr>
<td>SH 5771101</td>
<td>320</td>
<td>5771141</td>
<td>5771142</td>
</tr>
<tr>
<td>SH 5771100</td>
<td>340</td>
<td>5771143</td>
<td>5771144</td>
</tr>
</tbody>
</table>

**Total Expenditures**

| S                  | 15 | 900 |

**Instructions**

Expenses (excluding power stripping) performed on claim.

Calculation of Expenditure:

Total Expenditures = S

**Date**

Sep 3, 1982

**For Office Use Only**

Date Addressed as Received: 02/20

Branch Director: G.R. St. John

**Certification of Authenticity**

I, the undersigned, do hereby certify that I have personal and intimate knowledge of the facts set forth in this Report of Work annexed hereto, having performed the work described in the Report and have personally examined the same, and that the annexed report is true.

D.G. INNES, 8645 McIvor Dr., SUDBURY, ONTARIO, P3A 5E9

9/1/82
<table>
<thead>
<tr>
<th>Recorded Holder</th>
<th>ANTHONY RICH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Township or Area</td>
<td>TIMMERMANS AND BOLGER TOWNSHIPS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of survey and number of Assessment days credit per claim</th>
<th>Mining Claims Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geophysical</td>
<td>SSM 557098 to 101 inclusive</td>
</tr>
<tr>
<td>Electromagnetic</td>
<td>577103 to 10 inclusive</td>
</tr>
<tr>
<td>Magnetometer</td>
<td>577112-15</td>
</tr>
<tr>
<td>Radiometric</td>
<td>577117 to 19 inclusive</td>
</tr>
<tr>
<td>Induced polarization</td>
<td>577121 to 23 inclusive</td>
</tr>
<tr>
<td>Other</td>
<td>577094 to 96 inclusive</td>
</tr>
<tr>
<td>Section 77 (19): See “Mining Claims Assessed” column</td>
<td>577089 to 91 inclusive</td>
</tr>
<tr>
<td>Geological</td>
<td>40 days</td>
</tr>
<tr>
<td>Geochemical</td>
<td></td>
</tr>
<tr>
<td>Man days ☐ Airborne ☐</td>
<td></td>
</tr>
<tr>
<td>Special provision ☑ Ground ☑</td>
<td></td>
</tr>
<tr>
<td>☑ Credits have been reduced because of partial coverage of claims.</td>
<td></td>
</tr>
<tr>
<td>☐ Credits have been reduced because of corrections to work dates and figures of applicant.</td>
<td></td>
</tr>
</tbody>
</table>

Special credits under section 77 (16) for the following mining claims

10 DAYS RADIOMETRIC 20 DAYS GEOLOGICAL

SSM 577111  
577120  
577093

No credits have been allowed for the following mining claims

☒ not sufficiently covered by the survey  ☐ Insufficient technical data filed

SSM 577083 to 86 inclusive

577102  
577116

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical — 80; Geological — 40; Geochemical — 40; Section 77(19) — 60; 828 (83/6)
Dear Madam:

We have received reports and maps for a Geological and Geophysical (Radiometric) Survey submitted under Special Provisions (credit for Performance and Overage) on Mining Claims SSH 577121 et al in the Townships of Timmermans and Bolger.

This material will be examined and assessed and a statement of assessment work credits will be issued.

Yours very truly

E.F. Anderson
Director
Land Management Branch
Whitney Block, Room 6450
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-1380

cc: Anthony Rich
    11003-84 Avenue
    Edmonton, Alberta, T6G 0V6

cc: D.G. Innes
    8 Thorncliffe Crescent
    Sudbury, Ontario, P3A 5E9
May 27, 1983

Anthony Rich  
11003 - 84 Avenue  
Edmonton, Alberta  
T6G 0V6

Dear Sirs:

RE: Geophysical (Radiometric) and Geological Survey submitted on Mining Claims 577098 et al in the Townships of Timmermans & Bolger

Enclosed are the plans, in duplicate, for the above-mentioned survey.

Please show the claim lines and claim numbers on these plans and return them to this office.

For further information, please contact Mr. F.W. Matthews at 416/965-1380.

Yours very truly,

E.F. Anderson  
Director  
Land Management Branch  
Whitney Block, Room 6450  
Queen's Park  
Toronto, Ontario  
M7A 1W3  
Phone: 416/965-1380

D. Kinug:mc

Encls:

cc: Mining Recorder  
Sault Ste.Marie, Ontario
1983 08 03

Mrs. M.V. St. Jules
Mining Recorder
875 Queen Street East
P.O. Box 669
Sault Ste. Marie, Ontario
P6A 5N2

Dear Madam:

Enclosed are two copies of a Notice of Intent with statements listing a reduced rate of assessment work credits to be allowed for a technical survey. Please forward one copy to the recorded holder of the claims and retain the other. In approximately fifteen days from the above date, a final letter of approval of these credits will be sent to you. On receipt of the approval letter, you may then change the work entries on the claim record sheets.

For further information, if required, please contact Mr. F.W. Matthews at 416/965-1380.

Yours very truly,

E.F. Anderson
Director
Land Management Branch
Whitney Block, Room 6450
Queen's Park
Toronto, Ontario
M7A 1W3
Phone: 416/965-1316

D. Kinig:mc

cc: Anthony Rich
    11003 - 84 Avenue
    Edmonton, Alberta
    T6G 0V6

cc: Mr. G.H. Ferguson
    Mining & Lands Commissioner
    Toronto, Ontario
An examination of your survey report indicates that the requirements of The Ontario Mining Act have not been fully met to warrant maximum assessment work credits. This notice is merely a warning that you will not be allowed the number of assessment work days credits that you expected and also that in approximately 15 days from the above date, the mining recorder will be authorized to change the entries on his record sheets to agree with the enclosed statement. Please note that until such time as the recorder actually changes the entry on the record sheet, the status of the claim remains unchanged.

If you are of the opinion that these changes by the mining recorder will jeopardize your claims, you may during the next fifteen days apply to the Mining and Lands Commissioner for an extension of time. Abstracts should be sent with your application.

If the reduced rate of credits does not jeopardize the status of the claims then you need not seek relief from the Mining and Lands Commissioner and this Notice of Intent may be disregarded.

If your survey was submitted and assessed under the “Special Provision-Performance and Coverage” method and you are of the opinion that a re-appraisal under the “Man-days” method would result in the approval of a greater number of days credit per claim, you may, within the said fifteen day period, submit assessment work breakdowns listing the employees names, addresses and the dates and hours they worked. The new work breakdowns should be submitted direct to the Lands Management Branch, Toronto. The report will be re-assessed and a new statement of credits based on actual days worked will be issued.
Mrs. H.V. St. Jules  
Mining Recorder  
Ministry of Natural Resources  
875 Queen Street East  
P.O. Box 669  
Sault Ste. Marie, Ontario  
P6A 5N2

Dear Madam:

RE: Geophysical (Radiometric) and Geological Survey on Mining Claims SSM 577098 et al in the Townships of Timmermans & Bolger.

The Geophysical (Radiometric) and Geological Survey assessment work credits as listed with my Notice of Intent dated August 3, 1983 have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours very truly,

E.F. Anderson  
Director  
Land Management Branch  
Whitney Block, Room 6450  
Queen's Park  
Toronto, Ontario  
M7A 1W3  
Phone: 416/965-1380  

D. Kinngtsc

cc: Anthony Rich  
11003 - 84 Avenue  
Edmonton, Alberta  
T6G 0V6

cc: Resident Geologist  
Sault Ste. Marie, Ontario
<table>
<thead>
<tr>
<th>SSM</th>
<th>SSM</th>
<th>SSM</th>
<th>SSM</th>
<th>SSM</th>
</tr>
</thead>
<tbody>
<tr>
<td>577121</td>
<td>577117</td>
<td>577112</td>
<td>577107</td>
<td>577102</td>
</tr>
<tr>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
</tr>
<tr>
<td>577122</td>
<td>577118</td>
<td>577113</td>
<td>577108</td>
<td>577103</td>
</tr>
<tr>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
</tr>
<tr>
<td>577123</td>
<td>577119</td>
<td>577114</td>
<td>577109</td>
<td>577104</td>
</tr>
<tr>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
</tr>
<tr>
<td>577120</td>
<td>577115</td>
<td>577110</td>
<td>577105</td>
<td>577100</td>
</tr>
<tr>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
<td>SSM</td>
</tr>
<tr>
<td>577116</td>
<td>577111</td>
<td>577106</td>
<td>577101</td>
<td>577096</td>
</tr>
</tbody>
</table>

**Timbermane Twp.**

**Bolger Twp.**

---

**Highland Crow Resources Ltd.**

**Elliot Lake Property Claim Group Sketch**

---

1 inch = 4/4 mile
For additional information
see maps:

Bolger-0057

#1
#2