REPORT ON

HEAVY MINERAL SAMPLING PROGRAM

MARY SUE PROPERTY
CAITHNESS TOWNSHIP
ONTARIO
NTS 42G/4

PREPARED FOR

GEMCAL PROSPECTING SYNDICATE

Graeme Scott BSc

March 25, 2001
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INTRODUCTION

This report summarizes the results of a heavy mineral sampling program by Arjadee Prospecting on The Mary Sue Property located south of Hearst, north eastern Ontario. The report is prepared at the request of George Silverman for the GemCal Prospecting Syndicate 75 Acton Road Toronto. The work program was supervised by Robert Dillman of Arjadee Prospecting, Mt Brydges Ontario assisted by Graeme Scott of Toronto.

The survey was conducted on the dates of July 18 & 19 and October 2, 1999. The total cost of the field program and this report is $6,201.00.

LOCATION AND ACCESS (Figure 2)

The Mary Sue Property is located in Caithness Twp 65 kilometres southeast of Hearst, Ontario. The property is accessible by ATV off of the unmaintained Big Pike Lake road which extends off of the CNR access road south of Hearst.

CLAIM INFORMATION

The Mary Sue Property consists of 2 mining claims totalling 19 units in Caithness Twp, Porcupine mining division, Ontario. The claims are IQW/o held by George Silverman in trust for the GemCal Prospecting Syndicate. Pertinent claim information is include in Appendix I.

PHYSIOGRAPHY

The property is located north of the Great Lakes-Hudson Bay drainage divide so all major drainages in the region flow north. This includes the Opasatika River which bisects the property.

The property lies within the Opasatika Lake portion of the Abitibi Uplands sub-region of the James Bay physiographic region. (Morris 1999)

The Property has very little relief and is defined by broad, flat terrain. The property is centered around a small lake and a slow flowing creek drains the lake northward into a swampy area which covers the northern portion of the claims.

Most areas of the property have been extensively logged. Thick, immature bush has regrown in the logged areas. Forested areas contain spruce, jack-pine, birch and poplar.

A very large gravel pit is located directly south of the property.
1 - 8 GEMCAL PROPERTIES

1. GERRI-DEE PROPERTY
2. NORMA-DEE PROPERTY
3. GOAT RIVER PROPERTY
4. MARY-SUE PROPERTY
5. BIG PIKE LAKE PROPERTY
6. KAP PROPERTY
7. SOUTH CROW CREEK PROPERTY
8. PATRICIA PROPERTY

OTHERS:

9. AGRIUM RESOURCES
10. CANABRAVA DIAMOND CORP / KENNECOTT CANADA I.V.

Figure 2.
PROPERTY LOCATION MAP
Gemcal Prospecting Syndicate
Hearst-Kapuskasing Region, Ontario
PREVIOUS WORK

Diamond exploration has not been documented in this region until the release of results obtained in 1997 of a heavy mineral survey preformed by the Ontario Geological Survey over a section of the Kapuskasing Structural Zone, south of Kapuskasing, Ontario. Sporadic diamond exploration occurred through the mid-60's at Coral Rapids, north of Kapuskasing and more recently, in the Wawa region where numerous kimberlites and diamond bearing dykes have now been discovered.

Within the area, exploration for base metals and gold has been conducted through the 60's and 70's. On the property, no records have been found to indicate any extensive mineral exploration. Some pits and trenches were noted in the metasediments and metavolcanic rocks along the Big Pike Lake road but no record of this work was found in the assessment files.

Within the region, Agrium Resources is mining apatite from the Cargill Carbonatite located in Cargill Township. The operation produces phosphate to be used as a fertilizer.

A lake sediment survey conducted by the OGS detected a Ni Cr anomaly in the small lake located in the central portion of the claim block. (OGS OFR-6014)

The regional heavy mineral sampling program conducted by the OGS (Morris 1999) detected 2 G9 pyrope garnets, 6 chromite grains and 1 picroilmenite from a sample taken from a creek draining the small lake (38MA-98)

GEOLOGY

The Mary Sue Property is situated within a region underlain by four Archean bedrock domains (Figure 4). The domains include:

1.) a metavolcanic suite consisting of amphibolite, schists and amphibole-pyroxene-plagioclase gneiss;
2.) a metasedimentary suite consisting of greywacke, arkose, and iron formation;
3.) a migmatite-metasedimentary-metavolcanic complex consisting of supra crustal, metavolcanic and minor metasedimentary rocks, and mafic and granite gneiss;
4.) felsic intrusive suite consisting of massive granite, foliated granite and granite pegmatite.

The property is underlain by east-northeast trending metasedimentary rocks. An Iron formation is mapped to the southwest of the property and likely trends across the claims.

The Mary Sue property lies at the juncture of a northeast trending fault which is sub-parallel to bedding and a series of faults trending to the northwest. Fault junctures such as this are considered an important factor in kimberlite emplacement.

An aeromagnetic survey by the OGS detected a circular magnetic anomaly centered under the south
FIGURE 3.
REGIONAL GEOLOGY MAP
KAPUSKASING-HEARST REGION
ONTARIO

---LEGEND---

6 CARBONATITE
5 FELSIC INTRUSIVE
M Migmatitic metasediments
4 ULTRAMAFIC INTRUSIVE
3 METASEDIMENTARY ROCKS
2 FELSIC TO INTERMEDIATE ROCKS
1 MAFIC METAVOLCANIC ROCKS

FAULT
KSZ Kapuskasing Structural Zone
OLF Opasatika Lake Fault
RLF Rafis Lake Fault
CCF Crow Creek Fault

DIABASE DYKE
◆ KIMBERLITE INDICATOR MINERALS

GEMCAL PROPERTY
west end of the small lake on the property which lies along the interpreted northeast trending fault. The regional heavy mineral survey conducted

**QUATERNARY GEOLOGY**

The surficial deposits of glacial till cover most areas of the property. Till was deposited during several pulses of the Wisconsinan glaciation (Figure 5). Striae found in the region suggest three ice advances have occurred, the youngest advance was orientated 120° and two older sets orientated 160° and 220° (Boissoneau, 1968).

The different striae correspond to pulses of an ice sheet moving in a general north to south direction. The youngest striae, 120°, reflects an ice pulse moving northwest to southeast and deposited the Cochrane till. The Cochrane ice pulse overrode and reworked the Monteith flow-till deposited during the initial Wisconsinan ice advance which generally moved northeast to southwest.

Glacial deposits on the property are comprised of clayish boulder till. The material consists of approximately 95 to 100% fine-clay matrix material and particles ranging from grit to boulder-sized rocks. Rock fragments generally consist of: limestone, granite, gneiss, diabase, garnet-rich gneiss, metasedimentary schists and fine-grained metavolcanic fragments.

A line of sand and gravel deposits trending south-southwest crosses the west-central region of the property. The deposits represent glacial outwash, forming during a period of glacial melting. This gravel has been exploited in a large pit just south of the property.

Much of the property is overlain by swamp and flat, boggy terrain. Recent deposits forming in these environments include peat and silt deposits. Local sand and gravel deposits are continuously developing along active streams on the property.

**WORK PROGRAM**

Five samples were taken from the property and submitted for heavy mineral analysis. These included three stream sediment samples (BP-03, BP-05, BP-06) and two samples of glacial outwash material (BP-01 & BP-04). Samples were located using topography and/or GPS and the locations have been plotted on a 1:20,000 map (Figure 6).

Samples were processed by Robert Dillman in Mount Brydges, Ontario. The techniques used to produce a heavy mineral concentrate from each sample are presented in Table 1. Microscope examination of each heavy mineral concentrate was preformed by R. Dillman.

Samples consisted of approximately 7-15 kg of gravel material sieved in the field through a 5 mm screen. Each sample was further sorted by screening into several fractions of +2.0 mm, +1.0 mm and
TABLE 1. ---

PROCESS TO ACHIEVE
HEAVY MINERAL CONCENTRATE AND
KIMBERLITE INDICATOR MINERAL IDENTIFICATION

SAMPLE COLLECTION

10 kg gravel
-5.0 mm

SIEVE

2.0 mm

SIEVE

-1.0 mm

SIEVE

+0.5 mm

SIEVE

-0.5 mm

-5.0 mm heavy mineral concentrate

microscope examination

1.0 mm heavy mineral concentrate

microscope examination

+0.5 mm heavy mineral concentrate

remove magnetic minerals

heavy mineral concentration using Lithium Metatungstate sp. g. 3.0

lite minerals discarded

microscope examination

-0.5 mm heavy mineral concentrate

remove magnetic minerals

heavy mineral concentration using Lithium Metatungstate sp. g. 3.0

lite minerals discarded

microscope examination

microprobe analysis of "KIM's"
-1.0 mm size. Heavy minerals within the three largest fractions were gathered in the field by manually operated jigs. -1.0 mm fractions from each sample were sorted in the laboratory into two fractions using a No. 20 screen (0.5 mm). The heaviest minerals were extracted from each residual using a mechanical cable-jig. Any magnetic minerals contained in the heavy mineral concentrates were removed on a magnetic tray. Refinement of the heavy mineral concentrate based on a specific gravity of 3.0 was accomplished using lithium metatungstate. Final concentrates were searched for kimberlite indicator minerals using a microscope under 20x magnification.

Mineral grains suspected of being kimberlitic were analyzed by Robert Barnett of Lambeth, Ontario. An electron microscope was used for grain analysis. Results of grain analyses are appended to this report.

**RESULTS OF WORK**

Kimberlite indicator minerals were confirmed by micro probe analysis in one of the heavy mineral concentrates from the Mary Sue property (BP-05). The kimberlite indicator minerals include: pyrope garnet (G9), chromite and picroilmenite. The indicator mineral results are shown below.

Minerals sometimes occurring in kimberlite which were identified in the concentrates include: eclogite garnet, low Na and low Na-Cr bearing clinopyroxenes. Additional minerals observed in the stream sediment samples include: Niobium rutile (BP-05) This mineral is also found in kimberlites.

Dillman reports that BP-06 also contains some opaque grains which may be chromite indicators. These grains have not yet been submitted for micro probe analysis. It is important to note that the concentrate size from the stream sediments taken from these locations were quite small and may not be representative.

Micro probe results and plots are included as Appendix II.

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<th>Picroilmenite</th>
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HEAVY MINERAL SAMPLE LOCATION

GEMCAL PROSPECTING SYNDICATE
DIadem RESOURCES LTD

HEAVY MINERAL SAMPLE LOCATIONS
MARY SUE PROPERTY - CAITHNESS TWP

Drawn By: G. Scott  March 2001
CONCLUSION AND RECOMMENDATIONS

The work program was successful in identifying a chromite kimberlite indicator mineral anomaly on a drainage from a circular magnetic anomaly which is also coincident with a Ni-Cr lake sediment anomaly. Previous sampling by the OGS at this site (Morris 1999) also returned G9 pyrope, chromite and Picroilmenite. Niobium Rutile was also detected at site BP-05. This mineral is also sometimes associated with kimberlites.

It is recommended that the magnetic low located under the small lake be tested by diamond drilling. Either an angle hole from the shore of the lake or during the winter from on the ice. If the program is conducted during winter months the anomaly could be further detailed by a ground magnetic survey from the ice over the lake.
COST OF RECOMMENDATIONS

Ground Magnetic Survey $1,500.00

Diamond Drilling
500 metres @ 75.00/ meter $37,500.00

10% Contingency $3,900.00

Sub Total $39,000.00

TOTAL $42,000.00

Submitted By,

Graeme Scott B.Sc

Mary Sue Report page 6 of
REFERENCES


Gurney, J.J. 1984. A correlation between garnets and diamonds in kimberlite; in Kimberlite Occurrence and Origin: A Basis for Conceptual Models in Exploration, University of Western Australia, Perth, Western Australia, publication no.8, p.143-166.


Ontario Department of Mines 1963. Magladery Creek; Ontario Department of Mines, aeromagnetic series map 2238 G, scale 1:63,360.

Ontario Department of Mines 1967. Kapuskasing Sheet; Ontario Department of Mines, preliminary geological map P.398, scale 1 inch to 2 miles.

Ontario Department of Mines 1967. Hearst Sheet; Ontario Department of Mines, preliminary geological map P.397, scale 1 inch to 2 miles.


CERTIFICATE

I, Graeme Scott of 17 Malabar Place, Toronto, Ontario, M3B 1A4. Do hereby certify that:

1. I am a geologist and registered Ontario Geoscientist.

2. I attended the University of Western Ontario between 1985 to 1988 and obtained a Bachelors of Science degree in Geology.

3. I have worked continuously in the mining industry for the past 19 years.

4. I have participate in successful base, precious metal and diamond exploration programs throughout North and South America.

5. The data presented in this report is based on review of data and reports listed in the bibliography, the results of work conducted by Arjadee Prospecting and my participation in the work programs from June to October 1999.

Graeme Scott
B.Sc. Geologist
APPENDIX I

CLAIM INFORMATION
### Mining Lands - Mining Claims Summary

**Porcupine - Division 60**

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APPENDIX II

MICRO PROBE RESULTS
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**SAMPLE A3 GRAIN 12**

**MARYSUE CAITHNESS TOP.**

**Mg-ALMANDINE**

**SAMPLE BP-5 GRAIN 2**

**MARYSUE CAITHNESS TOP.**

**GERRI DEE SCHAFFIELD TOP.**

**Mg-ALMANDINE GT ELOGITE**

**SAMPLE BP-5 GRAIN 3**

**MARYSUE CAITHNESS TOP.**

**SAMPLE GD-5 GRAIN 22**

**MARYSUE CAITHNESS TOP.**

**GERRI DEE SCHAFFIELD TOP.**

**Mg-ALMANDINE GT ELOGITE**

**SAMPLE GD-5 GRAIN 27**

**MARYSUE CAITHNESS TOP.**

**GERRI DEE SCHAFFIELD TOP.**

**Mg-ALMANDINE GT ELOGITE**

**SAMPLE GD-5 GRAIN 31**

**MARYSUE CAITHNESS TOP.**

**GERRI DEE SCHAFFIELD TOP.**

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**Ti** | .030 | * | .047 | * | .047 | * | .049 | * | .052 | * | .045 | * | .681 | * | .039 | *
**Al** | 6.098 | * | 5.000 | * | 5.043 | * | 4.730 | * | 4.785 | * | 5.097 | * | 5.454 | * | 6.736 | *
**Fe** | 3.301 | * | 3.008 | * | 2.795 | * | 3.254 | * | 3.409 | * | 3.058 | * | 4.679 | * | 3.556 | *
**Mn** | .090 | * | .075 | * | .070 | * | .100 | * | .082 | * | .076 | * | .073 | * | .121 | *
**Mg** | 5.041 | * | 5.515 | * | 5.549 | * | 5.382 | * | 5.413 | * | 5.017 | * | 5.393 | * | 4.487 | *
**O** | 32.000 | * | 32.000 | * | 32.000 | * | 32.000 | * | 32.000 | * | 32.000 | * | 32.000 | * | 32.000 | *
**F/M** | .673 | .559 | .516 | .623 | .645 | .625 | .881 | .920 |
**F/FM** | .402 | .359 | .340 | .384 | .392 | .385 | .468 | .450 |

1 SAMPLE A1 GRAIN 5
2 SAMPLE A2 GRAIN 4
3 SAMPLE A2 GRAIN 5
4 SAMPLE A2 GRAIN 9
5 SAMPLE A3 GRAIN 2
6 SAMPLE A3 GRAIN 8
7 SAMPLE BP-5 GRAIN 4
8 SAMPLE BP-5 GRAIN 7

CHROMITE, R. DILLMAN, KAP SAMPLES, September 13 1999, R.L.B.
Diamond Inclusion Field

wt % CrO$_4$$^2-$ vs wt % MgO

RLB
GARNET - R. DILLMAN
KAP - BP-5  (Sept. 9 1999)

wt % CaO

wt % Cr₂O₃

RLB
Dear Robert,

The identity of "non-indicator" minerals, in the KAP samples A, GD, BP and RG, received September 9 1999, for which analyses were not provided is:

A1 grains 1,2,3 - tourmaline
6 - s. ilmenite
7 - almandine
11 - grossular almandine ss
12 - spessartine almandine ss

A2 grains 1 - perovskite
2,3,6-8 - s. ilmenite
10 - amphibole
11,14 - spessartine almandine ss
15 - grossular andradite ss

A3 grains 3 - melanite
5 - tourmaline
7 - s. ilmenite

BP-5 grains 5 - Nb rutile
6 - tourmaline
9 - Fe cpx

BP-7 grains 1,2 - Ca,Zr,Ti oxide
6,12,17,20 - s. ilmenite
8 - melanite
18 - rutile
22 - almandine
23,24,25 - spessartine almandine ss
26 - epidote

GD-2 grains 3,24 - tourmaline
5,10 - magnetite
6,8,9,11-14,17-21 - s. ilmenite
23 - rutile
GD-3 grains 1 - tourmaline
2,7,8,9,11-16,20 - magnetite
21,28 - grossular almandine ss
23,24,27 - spessartine almandine ss
18 - Fe phosphate
19 - amphibole
29 - almandine

RC12 grains 1,2 - Sn + Pb
4,7 - tourmaline
5,6 - s. ilmenite
9 - melanite
11 - grossular almandine ss

Sincerely,

R. L. Barnett
Dear Sir or Madam

Submission Number: 2.21011
Transaction Number(s): W0160.00083

Subject: Approval of Assessment Work

We have approved your Assessment Work Submission with the above noted Transaction Number(s). The attached Work Report Summary indicates the results of the approval.

At the discretion of the Ministry, the assessment work performed on the mining lands noted in this work report may be subject to inspection and/or investigation at any time.

If you have any question regarding this correspondence, please contact STEVEN BENETEAU by email at steve.beneteau@ndm.gov.on.ca or by phone at (705) 670-5855.

Yours Sincerely,

Ron Gashinski
Supervisor, Geoscience Assessment Office

Cc: Resident Geologist
    George Charles Silverman
    (Claim Holder)

Assessment File Library
    George Charles Silverman
    (Assessment Office)
**Work Report Summary**

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Client(s):

194482  SILVERMAN, GEORGE CHARLES

Survey Type(s):

BENEF

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External Credits:

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Reserve:

$201  Reserve of Work Report#: W0160.00083

$201  Total Remaining

Status of claim is based on information currently on record.