REPORT

OF

RADIOMETRIC SURVEY

OF

CASAN MINING LIMITED

DOBIE MINERAL CLAIMS

GAUTHIER TOWNSHIP, TIMISKAMING DISTRICT

LARDER LAKE DIVISION

Date: April 23, 1982

Prepared by:

CANDALE MINING MANAGEMENT SERVICES LIMITED

G.L. Roberts, P.Eng., M.E.I.C
President

G.C. Roberts
Exploration Manager


REGISTERED PROFESSIONAL ENGINEER
G. L. ROBERTS
PROVINCE OF ONTARIO

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GENERAL

This report describes the results of a program of extensive radiometric surveying, conducted and carried out under the supervioion of Candale Mining Management Services Limited, covering a four-claim group property of Casan Mining Limited, located in Gauthier Township, East Kirkland Lake gold area, Ontario. The work was carried out by the writer and his assistants in July and August of 1981.

The four claims were staked in 1979, adjacent to the original group of 18 claims staked in 1976. The radiometric survey was completed on a grid system of cut lines already existing on the four claims. The majority of the survey was done on the two northeasterly claims. At stations every one to hundred feet on a line a reading was recorded with the McPhar Spectrometer. These readings were recorded and are detailed on a map of the property (see Appendix).

This program used techniques and methods developed in 1978 when a radiometric survey was completed on the eighteen-claim group. (See report dated August 21, 1978). The correlation between the radiometric and anomalic areas and other surveyed anomalic areas such as the EM and Geochemical Surveys, was quite strong. Therefore, this recent program was undertaken.

SURVEYED CLAIM AREA

The four claims covered by this report are continuous and are identified as follows:

L-489658
L-489659
L-489660
L-489661

LOCATION AND ACCESS

The property is located at the north central part of Gauthier Township, one mile north of Dobie, tying on to the north of Upper Canada Mine. It extends northwesterly with its northwest part adjoining to the northeast of Crestland Mines Limited, formerly Northland Mines Limited.

Access was made by truck from Kirkland Lake via Highway #66 to Northlands Park, and by a bush road from Northlands Park, eastward through the No. 1 shaft area of Northland Mines to the bush road which runs across the central part of the property and turns to the northern boundary of the property.

PREVIOUS WORK

Casan has not engaged in any previous work with respect to these four claims, but detailed work has been completed upon the main body of the twenty-two claim group. A detailed work history follows:

In the winter of 1976-77, the Company conducted a program of geophysical surveys on this eighteen-claim group. The surveys were carried out by Cana Exploration Consultants Limited, and the results were described by Dr. S.S. Szetu in a report dated January 20th, 1977. Readers are referred to this report for the geophysical data and also to the history of the property.

It should be noted here that the airborne E.M. anomaly referred to in said report was conducted by Upper Canada Mines Ltd.,

apparently prior to May, 1966, and the ground follow-up E.M. surveys were conducted in March and May 1966 by Moreau Woodward and Company Limited, of Toronto. While the first survey failed, the second survey succeeded in detecting a conductor zone at an inferred depth of over 210' on the ground held under option by Upper Canada Mines. The conductor zone opens to the west to a patented claim then held by Northland Mines.

Data in the office of the Resident Geologist at Kirkland Lake also showed one hole drilled in 1966 on the then known as Taylor Option, logged by J.G. Bragg, Chief Geologist, Upper Canada Mines. This hole was located at the central part of then Claim 79866 across the eastern section of the airborne E.M. anomaly, which showed stronger conduction to the west. The hole cut a narrow band of graphite sediments with occasional bands and nodules of pyrite at a considerable depth.

Another hole was drilled to a shallow depth of 148.6' at a location further east by the then owner of the property, Mr. T.C. Taylor, for assessment work purposes. According to Mr. Taylor, the drill site found near L28N, 1450'E was the setup for this shallow hole.

As Casan Mining Limited now has claims covering the full length of the airborne conductor, including the unchecked and apparently more outstanding western section, detailed information about these drill holes and other relavent data will be added to the Company's compilation map for further evaluation. During the month

of June 1978, the Company, Casan Mining Limited, conducted two programs, a geological survey and a radiation survey, on this eighteen-claim group. The surveys were carried out by Cana Exploration Consultants Limited under the direction of Dr. S.S. Szetu and the results are described by the Author, Dr. S.S. Szetu, in his reports dated July 29th, 1978 and August 21st, 1978.

The geological report produced for Casan Mining Limited by Cana Exploration Consultants Limited and written by Dr. S.S. Szetu dated July 29, 1978, requested that detailed surface sampling of the claims held by this Company be carried out before any drilling exploration be undertaken.

Casan Mining Limited contracted with Dynamic Construction Ltd. of Toronto to undertake the excavation of trenches and surface blasting, trenching and drilling that would allow detailed sampling of the rock areas available for exploration. This work was carried out in 1978 and submitted in our report dated December 10, 1978.

A thorough geochemical survey was undertaken and completed in 1980, and the results demonstrated an extremely strong relationship and coordination between the geochemical anomalic areas and the E.M. anomalic areas already defined. The results and map produced can be found in our report dated October 20, 1980.

Casan Mining contracted Dynamic Construction of Toronto to drill selected anomalic areas in 1980 and 1981; the results of each drilling program are expressed in their corresponding reports, dated October 29, 1980 and October 25, 1981. In the summer of 1981, a geochemical survey of the four claim block was undertaken by Candale Mining Management Services Limited. The results appear in our

report dated April 21st, 1982

TOPOGRAPHY

Most of the area covered by the claims involved is covered with glacial sand overburden to depths of up to 150'. Few areas have rock exposed on or near the surface, which would allow sampling to a definitive extent. Many swamps and a few creeks are present. Sand eskers rising to 100' are common. A section map of the topography is shown on the map of Appendix III.

GEOLOGY

The north part of the property is mostly underlain by Keewatin acid volcanics and the central part is underlain by Timiskaming sediments with two narrow zones of interbanded acid volcanics. The southwest part of the property is underlain by Algoman Syenite and Porphyry Syenite, intruding the sediments.

The volcanics and sediments are steeply dipping and apparently schistosed to various degrees. The contacts between the various rock formations are all covered by overburden.

SURVEY METHODS

A line grid spaced at 400' intervals had been extended into three of the four northerly claims at the time this radiometric survey was completed. These picket lines were at a northeast-southwest direction turned off from two base lines established at N45^{o}W. Stations were chained at 100' intervals with pickets.

A McPhar TV-1 Spectrometer was used to obtain the readings. The instrument was held above groundlevel and stationary for a moment and the reading recorded when the readings were consistent. To the best of our ability, the exact procedure was carried out at each of the 43 stations which had been laid out on the grid. Readings were also recorded on the northern boundaries of the new picket lines.

SPECTROMETER - GENERAL

The instrument used to complete the survey was a McPhar TV-1 Spectrometer, Serial Number 177-101. A detailed description of the instrument can be found in the Appendix.

BACKGROUND

The background reading was recorded as 500 CPM.

Background is the minor radioactivity shown by the spectrometer which is not due to abnormal amounts of radioactive minerals nearby. The background is accounted for by cosmic rays and minor residual radioactivity in the vicinity.

CONCLUSIONS AND RECOMMENDATIONS

Results of the survey have been plotted in CPM on the accompanying map in Appendix IV.

It should be noted that this detailed map supplied here can be attached to the previously completed radiometric survey map in the report of August 21st, 1978, for a complete over-view of the Casan property.

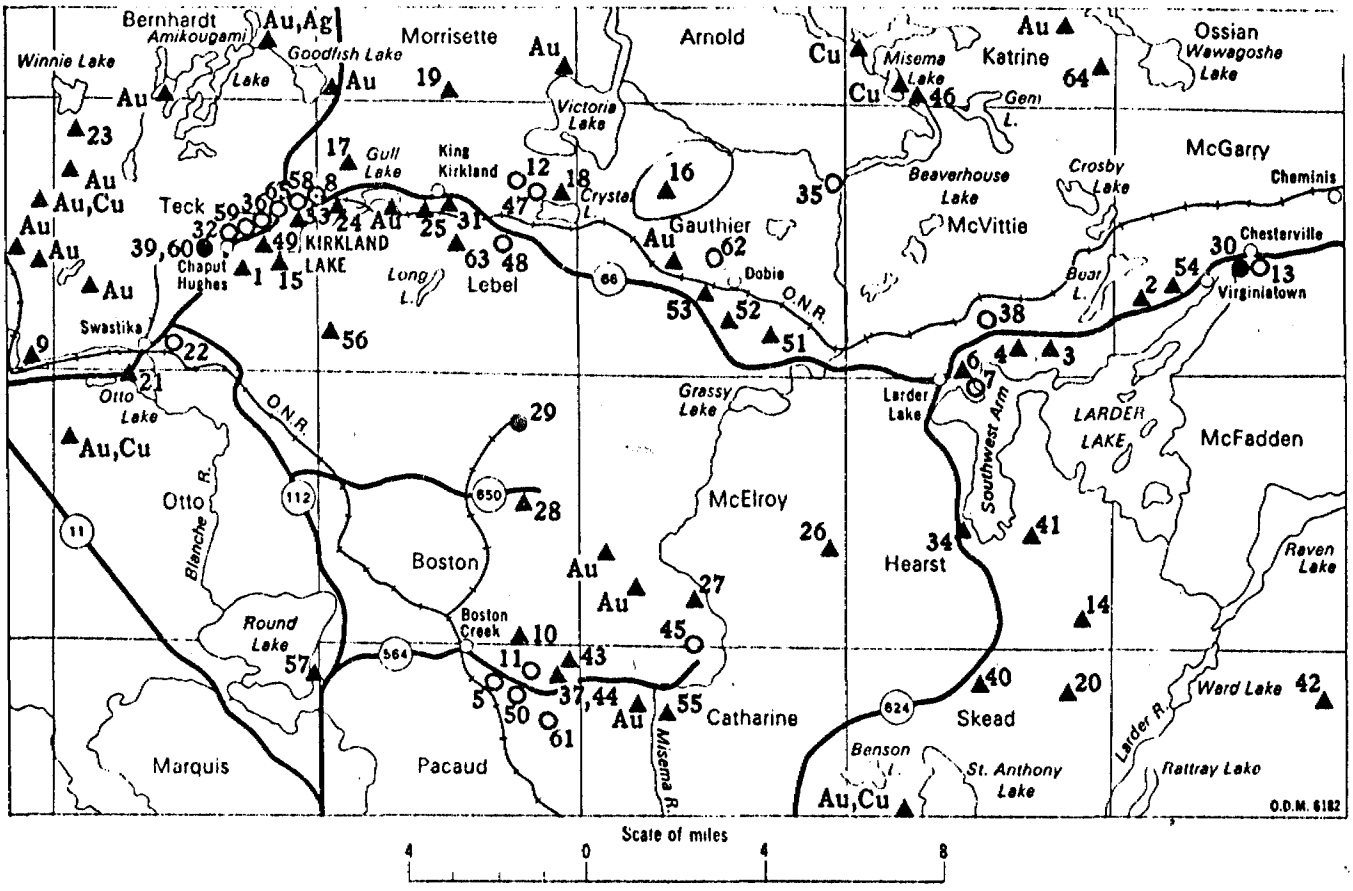
The completed survey points out no extremely impressive anomalic

areas for future explorations. More exploration is needed in the main body of the property, not in this northern boundary. The low readings also supply us with information about the possible depths of the overburden in the area.

APPENDIX I

General Map of Area

PROPERTIES, PAST AND PRESENT PRODUCERS, MINERAL OCCURRENCES



- ▲ Occurrence
- ● Producer
- ◌ Past Producer

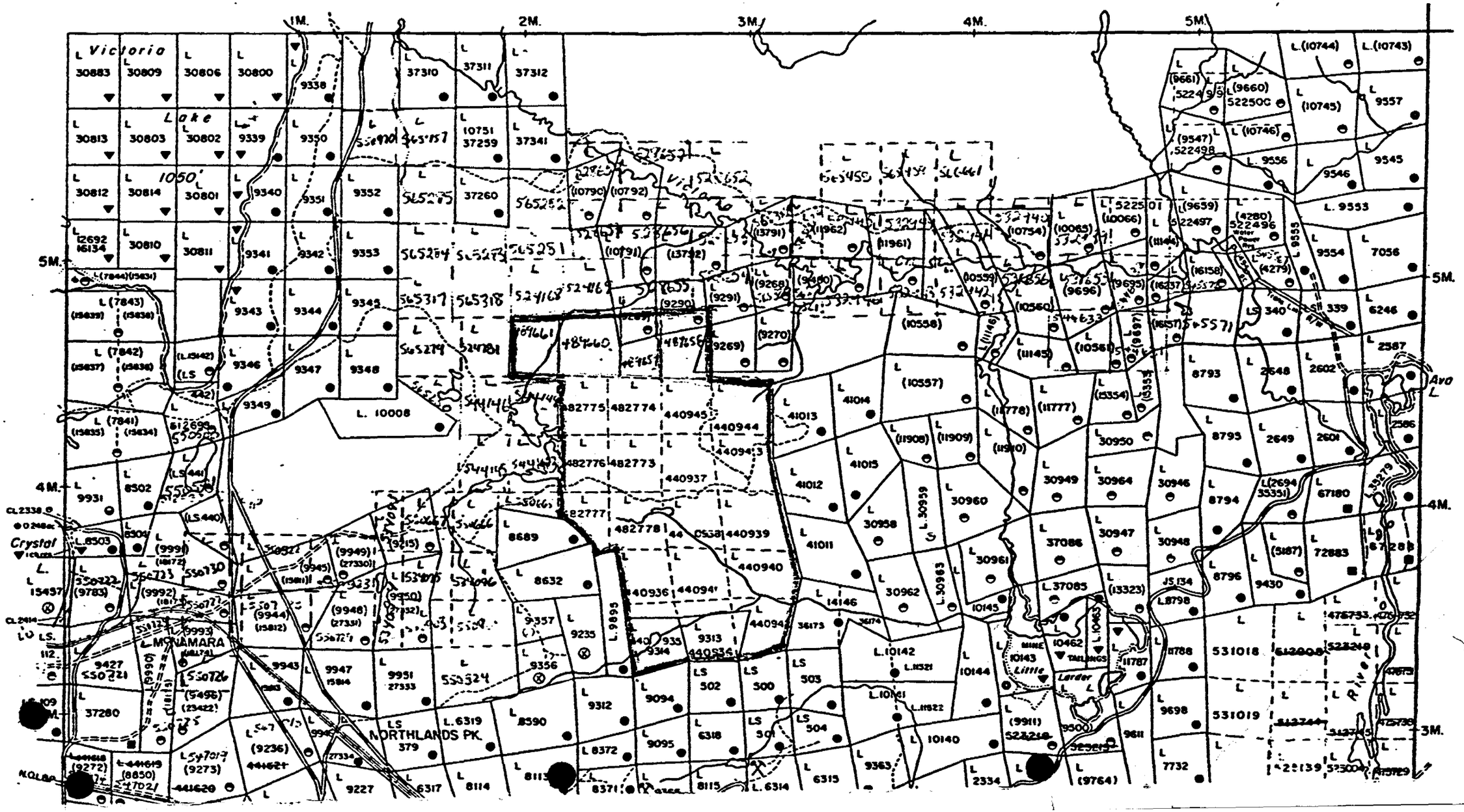
Ag – Silver Pb – Lead
Au – Gold U – Uranium
Cu – Copper Zn – Zinc
Fe – Iron

1. Amalgamated Kirkland Mines .... Au
   Amalgamated Larder Mines
2. Barber-Larder occurrence ..... Au
3. Cheminis occurrence ..... Au
4. Fernland occurrence ..... Au
5. Amity mine ..... Cu
   Argosy Mining Corp.
6. New Laguerre occurrence ..... Au
7. Raven River mine ..... Au
8. Associated Arcadia Nickel Corp. (Toburn mine) ..... Au
9. Baldwin Consolidated Mines ..... Au
10. Bargnesi Mines ..... Cu,Au
11. Barry-Hollinger mine ..... Au
12. Bidcop Mines (Bidgood mine) .... Au
13. Chesterville Mines ..... Au
14. Combined Larder Mines, The .... Au
15. Consolidated Canorama Explorations (Hudson-Rand) ..... Au
16. Consolidated Northland Mines ... Au
17. Continental Kirkland Mines ..... Au
18. Crystal Kirkland (Max Kaplan) . U,Au
19. Dolsan Mines (Mallard Lake) ..... Pb,Ag,Cu
20. Fabis (LaFond) occurrence ..... Au
    Gateford Mines
21. Crescent occurrence ..... Au
22. Golden Gate mine ..... Au
23. Gauthier (Winnie Lake) ..... Cu,Zn
24. Glenora (Albert Kokotow) ..... Au
25. Harrison (Kirkrovale) ..... Au
26. Hearst-Larder (Detfield Lowe and Emil Chorzepa) Zn,Pb,Cu
27. Hennesey occurrence ..... Au
28. Jalore Mining Co. ..... Fe,Pb,Zn
29. The Adams Mine ..... Fe
30. Kerr Addison Mines ..... Au
31. King Kirkland Gold Mines ..... Au
32. Kirkland Minerals Corp. (Kirkland Lake gold mine) ..... Au
33. Kirkland Townsite Gold Mines ... Au
34. Korola-Larder Mines ..... Au
35. Upper Beaver Mine (Argonaut) (Lake Beaverhouse) ..... Cu,Au
36. Lake Shore Mines ..... Au
37. Lebon Gold Mines ..... Au
38. Lomega (Omega) mine ..... Au
39. Macassa Gold Mines ..... Au
40. Manor occurrence ..... Au
41. Martin-Bird Gold Mines ..... Au
42. Mathias occurrence ..... Cu
43. Miller occurrence ..... Au
44. Miller Independence ..... Au
45. Mirado Nickel Mines (Cathroy mine) ..... Au
46. Misema Lake Mining Corp. (Forwood) ..... Au,Cu
47. Moffat-Hall mine ..... Au
48. Morris-Kirkland Gold Mines ..... Au
49. Northgate Exploration (Kirkland-Hudson Bay) ..... Au
50. Patterson mine ..... Cu
51. Princeton Gold Mines (Ritoria mine) ..... Au
52. Queenston Gold Mines ..... Au
53. Queenston Gold Mines (Anoki mine) ..... Au
54. Rio Algom Mines (Armistice) .... Au
55. Riverton Gold Mines (Gold Hill) . Au
56. Shelp (Dane Copper) ..... Cu
57. Sheroomac Mining Corp. (Round Lake cooper) ..... Cu,Zn
58. Sylvanite gold mine ..... Au
59. Teck Corporation (Teck-Hughes mine) ..... Au
60. Tegren Goldfields ..... Au
61. Trethewey-Ossian mine (Mrs. Claire Cameron) ..... Cu
62. Upper Canada Mines ..... Au
63. Upper Canada Mines (Pawnee-Kirkland) ..... Au
64. Wadge Mines (Walsh Katrine) ..... Cu
65. Wright-Hargreaves Mine ..... Au

APPENDIX II

Map of Claim Area

ARNOLD TP. M.321



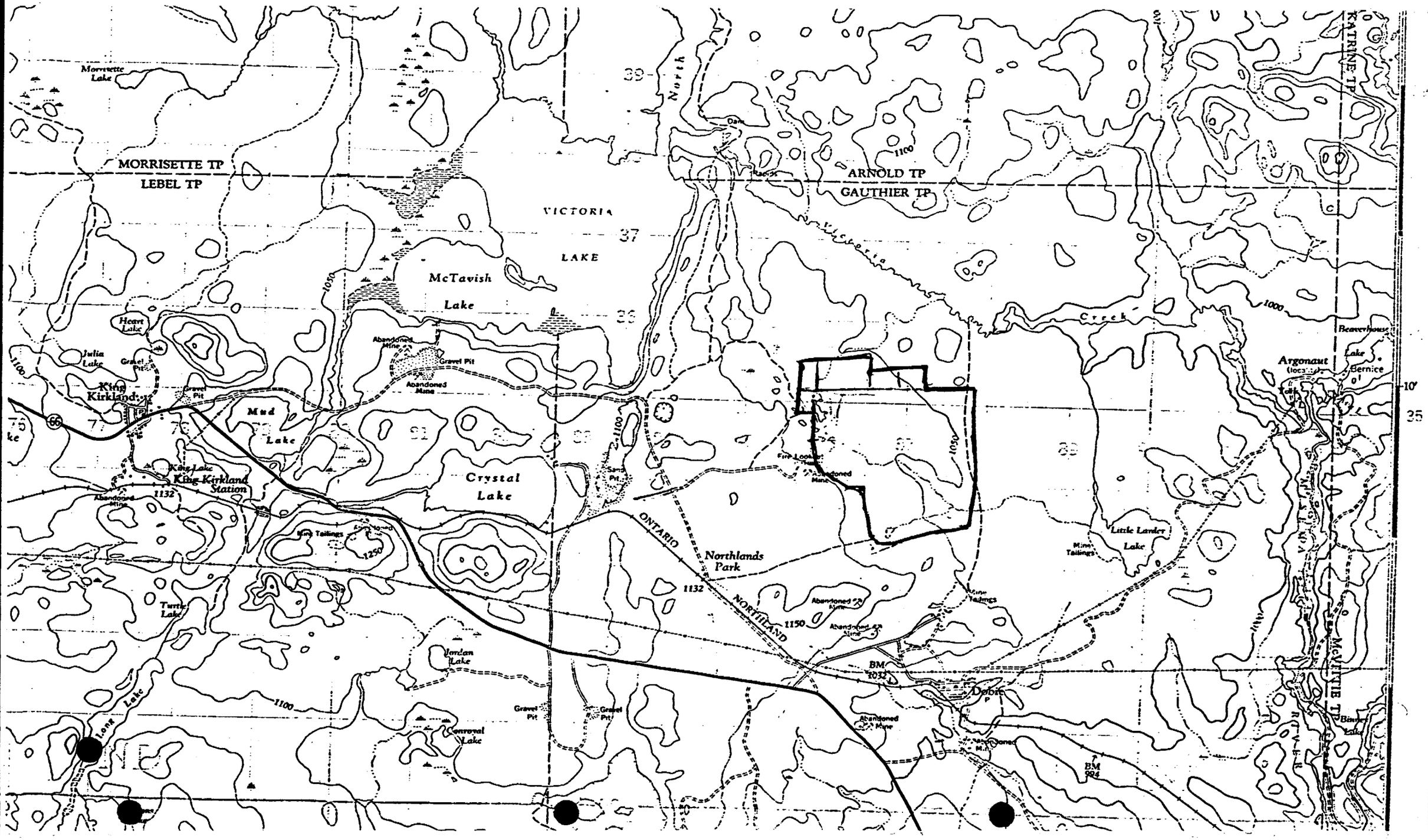
BEL TP. M.359

IE TP. M.370

APPENDIX III

Map Showing Topographic Contours

Of Claim Area


MORRISETTE TP
LEBEL TP
ARNOLD TP
GAUTHIER TP
KATRINE TP
VICTORIA
LAKE
McTavish
Lake
Morrisette
Lake
Heart
Lake
Julia
Lake
King
Kirkland
Mud
Lake
King Lake
King Kirkland
Station
Crystal
Lake
Turtle
Lake
Long
Lake
Jordan
Lake
Conroy
Lake
Northlands
Park
ONTARIO
NORTHLAND
Little Lander
Lake
Debden
McVITTIE TP
Argonaut
Bernice
Lake
Beaverhouse
Lake
Creek
Victoria
North
Gravel Pit
Abandoned
Mine
Mine
Tailings
Fire Lookout
Tower
Sand
Pit
BM
1032
BM
994
1100
1050
1000
1150
1132
1250
66
10'
35

APPENDIX IV

DETAILS OF McPHAR TV-1 SPECTROMETER

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 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 magnitudes of the electrical pulses bear a realtionship 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 indentifying 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 T3 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.

APPENDIX V

DETAIL MAP OF SOIL ANALYSIS

PLOTTED IN CPM SCALE 1"-200'

1983 07 21

2.5211

Mr. George J. Koleszar
Mining Recorder
Ministry of Natural Resources
4 Government Road East
P.O. Box 984
Kirkland Lake, Ontario
P2N 1A2

Dear Sir:

RE: Geophysical (Radiometric) Survey on Mining Claims
L 489658 in the Township of Gauthier

The Geophysical (Radiometric) Survey assessment work credits as shown on the attached statement 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. Kinvig:mc

Encl.

cc: Casan Mining Limited
Suite 806
110 Bloor Street West
Toronto, Ontario
M5S 1M4

cc: Resident Geologist
Kirkland Lake, Ontario

Ministry of Natural Resources
Ontario

Technical Assessment Work Credits

File 2.5211

1983 07 21

Recorded Holder: CASAN MINING LIMITED

Township or Area: GAUTHIER TOWNSHIP

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	
Electromagnetic _____ days	
Magnetometer _____ days	
Radiometric 20 days	L 489658-59
Induced polarization _____ days	
Section ~~77(18)~~ 77(19) _____ days	
Geological _____ days	
Geochemical _____ days	
Man days ☐ Airborne ☐	
Special provision ☒ Ground ☒	
☐ Credits have been reduced because of partial coverage of claims.	
☐ Credits have been reduced because of corrections to work dates and figures of applicant.	

Special credits under section ~~77(19a)~~ 77(16) for the following mining claims

No credits have been allowed for the following mining claims

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

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)~~ 77(19)

Ontario

2.5211

Ministry of Natural Resources

Recording Office
4 Gov't Road East
Kirkland Lake, Ontario
P2N 1A2

Notification of recording

of assessment work credits

RECEIVED
DEC - 3 1982
MINING LANDS SECTION

Lands Administration Branch
Mining Lands Section
Ministry of Natural Resources
Room 1617, Whitney Block
Queen's Park, Toronto
M7A 1W3

Date of recording of work: November 26, 1982

Recorded holder: CASAN MINING LIMITED

Address: Suite 806, 110 Bloor St. W., Toronto, Ont. M5S 1M4

Township or Area: Gauthier Township

Type of survey and number of Assessment days credit per claim		Mining claims
Geophysical		
Electromagnetic	days	
Magnetometer	days	
✓ Radiometric 20	days	L 489658-59
Induced polarization	days	
Section 86 (18)	days	
Geological	days	
Geochemical 40 -2.5210	days	
Man days ☐	Airborne ☐	
Special provision ☐	Ground ☐	

Notice to recorded holder:

☒ Survey reports and maps in duplicate be submitted to the Lands Administration Branch, Toronto within 60 days from the date of recording of this work.

☐ Reports and maps are being forwarded to the Lands Administration Branch with this letter.

Mining recorder /lp

c.c. George L. Roberts
#86, 1350 Winding Trail
Mississauga, Ont.
L4Y 2T8

Ministry of Natural Resources
Ontario

Geotechnical Report Approval

File 2.5211

Jan 28/83

Mining Lands Comments

☑ To: Geophysics Mr. Barclay

Comments

☑ Approved ☐ Wish to see again with corrections | Date Feb 28/83 | Signature

☐ To: Geology - Expenditures

Comments

☐ Approved ☐ Wish to see again with corrections | Date | Signature

☐ To: Geochemistry

Comments

L.D.

☐ Approved ☐ Wish to see again with corrections | Date | Signature

☐ To: Mining Lands Section, Room 6462, Whitney Block. (Tel: 5-1380)

1593 (81/10)

1982 12 23 2.5211

Mining REcorder
Ministry of Natural Resources
4 Government Road East
P.O. BOx 984
Kirkland Lake, Ontario
P2N 1A2

Dear Sir:

We have received reports and maps for a Geophysical (Radiometric) Survey submitted under Special Provisions (credit for Performance and Coverage) on Mining Claims L 489658 in the Township of Gauthier.

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

DW:sc

cc: Casan Mining Limited
Toronto, Ontario

PLAN 20

RADIOMETRIC SURVEY

SCALE: 1"=200'

DATE: April 23/82

INSTRUMENT: McPHAR TV-1 SPECTROMETER

SERIAL NO 177-101

BACKGROUND 50 x 10 = 500 cpm

LEGEND

- ALDER/GRASS SWAMP
- SWAMP WITH TREES
- HIGH GROUND
- CREEK
- POND/LAKE
- BUSH ROAD
- OBSERVED/ASSUMED BOUNDARY
- CLAIM POST ASSUMED
- CLAIM POST FOUND
- CLAIM LINE OBSERVED
- CLAIM LINE ASSUMED
- PICKET LINE
- PICKET LINE PROPOSED

400 — COUNTS PER MINUTE
1017 — SAMPLE NO.
Station

REGISTERED PROFESSIONAL ENGINEER
G. L. ROBERTS
PROVINCE OF ONTARIO

L489661

L489660

L489659

L489658

L482775

L482774

L440945

L60

L56

L52

L48

L44

L40N

L36

L32

L28

L24

BASE LINE

BEAVER POND

No. 2

CUT