REPORT ON

AIRBORNE GEOPHYSICAL SURVEY

PILGRIM CREEK ~~AND STOBIE TOWNSHIP AREA~~

ONTARIO

FOR

CANADIAN JOHNS—MANVILLE CO., LIMITED

BY

HUNTEC LIMITED
TORONTO, ONTARIO

OCTOBER, 1967

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63-2275.

I INTRODUCTION

Between June 29th and July 6th, 1967, an airborne geophysical survey comprising in-phase and out-of-phase electromagnetometer, total field fluxgate magnetometer, scintillometer, and spectrometer was carried out by Lockwood Survey Corporation for Canadian Johns-Manville Co., Limited over ~~583~~ 292 claims, in ~~two~~ ONE irregular shaped block~~s~~.

The airborne survey was over ~~two~~ ONE area~~s~~ including the claim block~~s~~; about 36 miles north and 15 miles east of Sudbury. Included are parts of the Townships of ~~Grigg, Fraleck, Stobie & Marconi~~ TURNER, DUNDEE + SEAGRAM. Mining District of Sudbury.

Traverse lines were spaced at 1/4 mile, on a bearing approximately 30° ~~east of north~~, and north-south ~~respectively~~ in the ~~two~~ block~~s~~. Appropriate tie-lines were flown.

The mean terrain clearance for the E.M. and magnetometer bird was 100 ft.; and 200 ft. for the scintillometer and spectrometer housed in the helicopter.

Photographs of the terrain below the aircraft were exposed at intervals of 1.5 secs. throughout the survey on 35 mm. film. This photography was used to establish the actual flight path of the aircraft whilst on survey.

The area has been subdivided into three map sheets at a scale of 1 inch to 1320 ft., with planimetry traced from uncontrolled mosaics.

MAP SHEET No. 3 COVERS THE PILGRIM CREEK AREA

The survey was undertaken by the following personnel:

- R. Boyd, Pilot

- Smith, Engineer

- H. Sandau, Navigator

- T. Pederson, Operator

- D. Fenwick, Data Reduction

The aircraft used for the survey was a Sikorsky S-55, registration GF—GHV.

II THE ELECTROMAGNETIC SURVEY

II.1 The Electromagnetic System

The helicopter-borne E.M. system used for this survey was developed by Hunting Survey Corporation and was described by Dr. N. R. Paterson in "Helicopter E.M. Test, Mobrun Ore Body, Noranda," in Canadian Mining Journal, November, 1961. The system measures the in-phase and out-of-phase components of the secondary electromagnetic field, in terms of the primary field at the receiver. Receiving and transmitting coils are held vertical and coaxial in a towed "bird", a distance of 30 feet apart and 100 feet below the helicopter. The sensitivity of the measuring system is such that the minimum recognizable in-phase anomaly is about 8 parts per million. Noise on the in-phase profile should be less than 5 parts per million. The frequency of the alternating electromagnetic field is 4000 cycles per second.

The system so designed is sensitive to large bodies at a depth of up to 250 feet below the "bird". Anomalies in the range 8 to 100 parts per million are commonly obtained over sulphide bodies when this equipment is operated at a "bird" height of 100 feet. The anomaly amplitude decreases with increasing depth (and increasing height) at a roughly 3.8 power. Consequently, an anomaly of 8 parts per million could be caused by a large body buried 150 feet below ground or a very small body at surface.

The ambiguity is to some extent resolved by studying the shape of the anomaly.

II.2 Effect of Magnetic Bodies on Electromagnetic Response

The survey area is characterized by high magnetic relief; therefore, in assessing the significance of any particular anomaly it is essential to note the correlation with strong magnetic relief, as well as geological structural correlation.

The effect of a strong magnetic field on the electromagnetic response is to degrade, to a variable extent, the in-phase component only; the out-of-phase component is unaffected. Therefore, anomalies in areas of low magnetic relief cannot have been degraded, whereas anomalies in areas of high magnetic relief may have had their in-phase response degraded, resulting in an apparently low ratio, hence, low apparent conductivity. The extreme case is where the magnetic field due to the causative body is considerably stronger than the secondary field being measured at the receiving coil, resulting in a negative in-phase anomaly.

II.3 Presentation of Data

The electromagnetic data is presented as contours of the anomaly in the inphase component relative to the local background level at an interval of 10 ppm of the primary field and with ratios of in-phase to out-of-phase components at the peaks of the anomalies.

II.4 Comments on Electromagnetic Data

The electromagnetic maps are characterised by many anomalies which occur on only one flight line. These anomalies in general are of low amplitude, poor ratio, and relatively wide, suggesting a relationship with conductive overburden rather than bedrock conductor.

Many negative anomalies are noted on the maps; some are considered to be real whilst others are probably due to instrumental defects. The genuine negative anomaly therefore reflects the presence of a low conductivity but highly magnetic causative body. The test for genuineness is to check the exact correlation between the electromagnetic and magnetic records.

A rapid investigation of the records reveals several anomalies which merit further investigation. These anomalies are: ~~on Line 13, on the township boundery between Stobie and Marconi, ratio 4.5/0.5; Line 15, Grigg Township, ratio 3.8/1.5, a rather wide anomaly; Line 18, Fraleck Township, ratio 2.5/0.8, a small anomaly observed over 3 lines, correlates with a pronounced east-west magnetic feature; Line 30, ratio 2.0/1.4, may be part of broad zone.~~ Several rather wide anomalies occur on Line 40(2), 43(2) and 44; these anomalies have good amplitude, up to 90 ppm inphase anomaly, but their widths are relatively high which would result in a very low conductivity-width factor. These may prove to be of graphitic origin or occurring in shear zones.

Probably the most significant anaomly in the area is on Line 46 with an indicated ratio of 0.7/4.0. Since this anomaly is over-riding a regional high, the amplitude as shown is too great; never-theless, the anomaly has good shape, reasonable amplitude and good ratio and should be checked on the ground.

III THE SCINTILLOMETER SURVEY

III.1 The Scintillometer and Spectrometer

The scintillometer used for the survey was the Harwell Model 1531B,with a 200 cps zero suppression and full scale deflection of 2000 cps; the integrating time was 1 second, chart speed 6 inches per minute. This equipment was mounted on the floor of the helicopter. The scintillometer was used in conjunction with an APN-1 radio altimeter which recorded the clearance of the helicopter above the ground; the APN-1 was calibrated at 100 ft., 200 ft., 300 ft., and 400 ft. ground clearance. An examination of the records show that the APN-1 has a relatively slow response, hence, the APN-1 slightly lags the scintillometer.

The Spectrometer used for the survey was the Sharpe Instruments Model GIS-2, a solid state scintillation counter. It has seven ranges from 10 to 10,000 cps, with energy level discrimination. This equipment was modified for airborne use and adjusted to discriminate against potassium The integration time was adjusted to 1 second.

III.2 Data Reduction

The maps have been prepared with a contour interval of 100 cps with respect to a background level of 500 cps of total radiation (1531B) and at intervals of 1 cps above a background of 5 cps in the thorium-uranium energy level (GIS-2).

The records are uncorrected for variation in elevation or any other effects and record the sum total radiation as detected at the instrument head; the topographic effects are not removed.

III.3 Source of Radioactivity

In airborne radioactivity surveys only three naturally occurring radioactive elements and their daughter products are important. They are uranium, thorium and potassium 40. Only those radionuclides that decay by gamma-ray emission are detected and measured with scintillation equipment.

Radioactivity measured at survey altitude has three natural components:

1. Gamma-ray activity from radionuclides in and on the ground.
2. Gamma-ray activity from radionuclides in the air.
3. Gamma-ray activity produced by cosmic rays.

The ground component comes from the surface and upper few inches of the ground and consists of gamma rays from natural radionuclides and fission products in fallout. The radionuclides in air are very variable and their effects cannot be entirely separated. For good scintillometer resolution, therefore, it is necessary to have considerable areas of outcrop or residual soils; conversely, water covered areas, extensive glacial or alluvial

deposits or swamp provide an effective cover, thus masking any gamma ray emission from the bedrock.

III.4 Comments on Scintillation Data

The total radiation count as shown by the 1531B instrument is contoured above the 500 cps level; ~~at this level the contours outline the Algoman silicic intrusive rocks in the west half of Marconi Township, and through Stobie and Grigg Townships~~.

~~The major anomaly other than in the above mentioned belt is on the south end of Line 47 and attains a level of 900 cps; this is a known mineral occurrence of uranium shown on Preliminary Geological Map No. P. 301, "Maple Mountain Sheet"~~.

The Sharpe Instrument had a very fast response rate and the record is very irregular with many "spike-like" anomalies; all those over 5 cps have been mapped. Many of these "spikes" just exceed the 5 cps level and as such do not always appear to correlate from line to line; these anomalies may correlate if the records are examined in more detail. The major anomalies of 10 cps or more generally correlate well over several lines, ~~particularly in the vicinity of Stobie Lake where the radiometric strike appears to be broken in crossing the lake, suggesting that Stobie Creek and Stobie Lake may be structurally controlled~~. Several other major, wide anomalies are noted throughout the survey area but are not known to correlate with geologic features.

IV THE MAGNETIC SURVEY

IV.1 The Airborne Magnetometer

The instrument used for this survey was the Gulf MK III Fluxgate Magnetometer which measures the strength of the earth's total magnetic field in the direction of maximum force. The instrument was housed in the centre section of the towed bird, the controls and recorder being housed in the helicopter.

The instrument was used with full scale deflection of 600 gamma with a noise level of ± 2 gamma.

IV.2 Presentation of Data

The magnetic data is presented as contours of the total magnetic field at a basic interval of 10 gamma with multiple intervals where the gradient warrants.

The diurnal variation was removed by the standard procedure of closing the loop and distributing the mis-closure.

The contour map has been reduced for convenience to an arbitrary datum of 5000 gamma; the 5000 gamma reading on the map represents a true reading of about 59,500 gamma.

IV.3 Magnetic Constants

The relevant magnetic constants for the area are:

Total field strength	-	0.594 oersted: 59,400 gamma
Declination	-	8° West
Inclination	-	76° North

IV.4 Comments on the Magnetic Data

The magnetic maps show contouring which is generally sympathetic to the geological contacts shown on Preliminary Geological Map No. P. 301.

The area mapped as Silicic Intrusive Rocks (Algoman), unit 6, are represented by relatively low amplitude regional gradients and variations in the magnetic field. In contrast to this the Mafic Volcanic Rocks (Keewatin), unit 2, and the areas mapped as Gowganda Formation, unit 12, are characterised by very narrow, large amplitude anomalies with very steep gradients; the anomalies are up to 2000 gamma amplitude. The trend of the magnetic anomalies in general follow the predominant strike, ~~being essentially north-south in Marconi Township, east-west in the north of Stobie Township, and south-east through Grigg Township~~.

The magnetic map of Turner Township reflects the presence of the mapped iron formation with a prominent anomaly of 3000 gamma with a northeast-southwest trend over about 2 miles with the maximum anomaly over Bull Lake.

A circular boss-like feature is noted approximately midway between Hazel and Bull Lakes.

Many faults and dyke-like features are discernible from the magnetic contour map, especially in the south west and north east of the area.

V RECOMMENDATIONS

The interpretation of the survey embodied in this report is essentially a rapid geophysical appraisal of the survey area; as such it can incorporate only as much geological information as the interpreter has available. It should be judicously used, therefore, as a guideline by geologists thoroughly familiar with the area and who are in a better position to have a "feel" for the geological significance of any particular feature.

The electromagnetic system used for this survey detects electrically continuous conductors, especially massive sulphides, at relatively shallow depths; therefore, any anomalous situation of further interest should be accurately located on the ground by a comparable E.M. system. It would be extremely advantageous for a geologist to accompany this crew, who, as soon as the peak response is located, could make a rapid geological appraisal of the site and if necessary call off further work if a graphitic or other non metalliferous conductor is found. If all factors are favourable, a magnetometer traverse may assist in determining further parameters of the causative body; the airborne magnetics should be a guide in this. Depending on the local geological detail, a decision then must be made to either drill or trench the anomaly in order to define the exact nature of the conductor.

VI INSTRUMENT SPECIFICATIONS

VI.1 ELECTROMAGNETIC SYSTEM:

Manufacturer:	Lockwood Survey Corporation Ltd. (formerly Hunting Survey Corporation Ltd.)
Type:	In-phase/Out-of-phase System.
Serial No.:	Unit 3.
Frequency:	4000 cycle per second.
Power Source:	28 volts.
Coil Size:	18 inches.
Coil Separation:	30 feet - vertical, co-axial.
Power Output:	10 watt.
Sensitivity:	400 parts per million (0.04%).
Calibration:	100 parts per million step.
Noise Level:	± 6 parts per million.
Recorder:	Texas Instrument.
Chart Speed:	3 inches per minute.
In Phase:	Red ink.
Out-of-Phase:	Blue ink.

VI.2 SCINTILLOMETER SYSTEM:

a)	Manufacturer:	"Harwell".
	Type:	1531B (modified for 28 volt operation).
	Crystal Size:	5 inch by 1 inch: Thallium-activated Sodium. Iodide: three detector heads.

	Power Source:	28 volt.
	Sensitivity:	2000 counts per second.
	Zero Suppression:	200 counts per second.
	Integrating Time:	1 second.
	Calibration:	200 counts per second per micro roengten per hour.
	Calibration Source:	Thin radium sheet; 5 micro curie.
	Recorder:	Mosely, zero at centre scale, per working left to right (red ink).
	Chart Speed:	2 inches per minute.
b)	Manufacturer:	"Sharpe Instruments"
	Type:	G.1.S—2.
	Crystal:	2 inch by 2 inch: Sodium Iodine crystal, Thallium-activated.
	Sensitivity:	30 counts per second.
	Noise Envelope:	2.5 counts per second.
	Average Background:	1.5 counts per second.
	Integrating Time:	1 second.
	Discrimination:	Against Potassium.
	Recorder:	Mosely, zero on bottom edge of chart paper (blue ink) (Shared with 1531B).

VI.3 MAGNETOMETER SYSTEM:

Manufacturer:	Gulf Research & Development Corporation.
Type:	Mark III Fluxgate.
Unit No.	6.
Power Source:	28 volt.
Sensitivity:	500 gamma.
Step:	500 gamma.
Noise envelope:	2 gamma.
Recorder:	Gulf.
Chart Speed:	3 inches per minute.

VI.4 ELEVATION CONTROL:

Type:	APN-1.
Serial No.:	29663.
Power Source:	28 volt.
Calibration Range:	0-400 feet.
Power Output:	1/10 Watt.
Operating Frequency:	400 mega cycle.
Chart Speed:	6 inches per minute.

VI.5 CAMERA:

Manufacturer:	Canadian Applied Research.
Model:	MK8.
Serial No.:	8106.
Exposure interval:	1.5 second.

VI.5 Camera - (cont'd)

Film Size:	35 mm.
Shutter:	Focal Plane.

VII SURVEY PROCEDURE

All instrument calibrations were checked and adjusted immediately before and/or after take-off, and checked for normal function, e.g., pen alignment, automatic stepping, standardization and degree of noise. Assuming all systems were functioning satisfactorily, the flight would proceed following predetermined flight lines marked on uncontrolled mosaics at a scale of 1 inch to 600 ft., at the predetermined separation.

The helicopter followed a systematic predetermined pattern of flight lines and tie lines at an average elevation of 200 ft.

The position of the helicopter was recorded by a vertically mounted camera; there was no significant lag between any instrument and the recorded position. Every time the camera fired, a reference mark was printed on all records and numbered to correspond with the film frame number.

The magnetometer and electromagnetic system detector heads were in the bird, the controls and recorder being mounted in the helicopter with the scintillometers, camera and APN-1.

VIII DATA REDUCTION AND PRESENTATION

The flight produces positioning film, duly processed, magnetometer, scintillometer, electromagnetic and APN-1 continuous records with appropriate frame numbers and field annotations, plus an operator's Daily Flight Report.

The track of the helicopter is recovered on the photographic mosaics by examination of the film; prominent features, i.e., roads, lake-shore etc. are used for the transposition.

The intersections of tie and flight lines are accurately determined on film and transferred to the records. The frame numbers of the individual plotted points relocated on the mosaic are identified on each record.

The flight line network is divided into conveniently sized circuits and from one intersection as reference, the magnetic closure error around each circuit is determined and distributed uniformly around each circuit such that the correction applied to the magnetic baseline results in a uniform datum of all these magnetometer records throughout the area; this is the datum used for contouring.

The electromagnetic record is baselined with respect to the local background level.

The scintillometer record is baselined with respect to an appropriate count level.

The data for each survey are individually transferred to separate intercept tapes; the data transferred consist of the plotted fiducial point and the intercept of the predetermined contour interval with the trace, and the position and values of high and lows.

The intercepted data are transferred to the flight line plot by linearly interpolating between plotted fiducial points. The transferred data are then contoured, and subsequently fair drawn.

HUNTEC LIMITED

for J. W. Prior, M.Sc., F.G.S.,
Geophysicist

Norman R. Paterson, Ph.D.,
P. Eng.,
Geophysicist

PERSONNEL

Pilot: R. Boyd,
c/o Dominion Helicopters,
Maple, Ontario.

Engineer:
Smith,
c/o Dominion Helicopter,
Maple, Ontario.

Navigator:
H. Sandau (Lockwood Survey Corp).,
527 Kennedy Road,
Scarborough.

Operator:
T. Pedersen (L.S.C.),
135 Tyndall Ave.,
Apt. 316,
Toronto 3.

Data Reduction:

D. Fenwick (L.S.C.),
2035 Victoria Park Ave.,
Apt. 7, Scarborough.

Geophysicist:

J. W. Prior, M.Sc., F.G.S., (Huntec Ltd.),
78 Gatesview Avenue,
Scarborough.

900

ASSESSMENT WORK BREAKDOWN

1. Type of Survey ..... AERO-MAGNETIC .....

2. Township or Area ..... PARTS of TURNER, DUNDEE, SEAGRAM Twps. .....

3. Numbers of Mining Claims Traversed by Survey ..... 292 (292) .....
139874 - 139981 incl; 140502 - ~~140653~~ 140793 incl; 141131 - 141148 incl; 141205 - 141222 incl; 141223-27 incl; 141228-29 + 141230; 142080-97 incl; 142062-79 incl; 142054-61 incl; .....

4. Number of Miles of Line Cut ..... (109.5) Flown ..... 109.5 .....

*5. Number of Stations Established ..... Continuous recording CONTINUOUS RECORDING .....

*6. Make and type of Instrument Used (MARK 3 Fluxgate - GULF RESEARCH & DEV. CORP.)

*7. Scale Constant or Sensitivity ..... 600 GAMMAS (600 GAMMAS) .....

*8. Frequency Used and Power Output .....
↓ MARK 3 FLUXGATE - GULF RESEARCH & DEV CORP)

9. Summary of Assessment Credits (details on reverse side)

Total 8 hour Technical Days (Include Consultants, Draughting etc.) .....

Total 8 hour Line-Cutting Days .....

Calculation

_____	x 7 =	_____	+	_____	=	4,380	÷ 292 =	15
Technical				Line-cutting			Number of claims	Assessment credits per claim

The dates listed on this form represent working time spent entirely within the limits of the above listed claims ☑ Check
If otherwise, please explain .....

Dated: NOVEMBER 10th, 1967 Signed: .....
NOVEMBER 10TH 1967

Note: (A) * Complete only if applicable.
(B) Complete list of names, addresses and dates on reverse side.
(C) Submit separate breakdown for each type of survey.
(D) Submit in duplicate.

ASSESSMENT WORK BREAKDOWN

1. FIELD WORK

Type of Work	Name & Address	Dates Worked	Number of 8 hour days
		(PART OF PERIOD JUNE 29 - PART OF PERIOD JUNE 24 -	
PILOT	R. BOYD - MAPLE, ONT.	JULY 6/67.)	
ENGINEER	SMITH - MAPLE, ONT.	" " "	
NAVIGATOR	H. SANDAH - SCARBORO, ONT.	" " "	
OPERATOR	T. PEDERSEN - TORONTO, ONT.	" " "	

2. CONSULTANTS

Name & Address	Dates Worked (specify in field or office)	Number of 8 hour days

3. DRAUGHTSMAN, TYPING, OTHERS (specify)

Name & Address	Type of Work	Dates Worked	Number of 8 hour days
D. FENWICK, SCARBORO ONT.	DATA REDUCTION	JULY 1967	
J.W. PRIOR, SCARBORO, ONT.	GEOPHYSICIST	"	

TOTAL 8 HOUR TECHNICAL DAYS _____

4. LINE-CUTTING

Name	Address	Dates Worked	Number of 8 hour days

TOTAL 8 HOUR LINE-CUTTING DAYS _____

ASSESSMENT WORK BREAKDOWN

1. Type of Survey ..... AERO - ELECTROMAGNETIC .....

2. Township or Area ..... PARTS of TURNER, DUNDEE, SEAGRAM .....

3. Numbers of Mining Claims Traversed by Survey ..... 292 (292) .....

139874 - 139981 incl.; 140502 - ~~140597~~ 140693 incl.; 141131 - 141148 incl.; 141205 - 141222 incl.; 141223 - 27 incl.; 141228-29-30; 142080 - 142097 incl.; 142062 - 142079 incl.; 142054 - 142061 incl.;

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4. Number of Miles of Line Cut ..... Flown 109.5 (109.5)

*5. Number of Stations Established ..... CONTINUOUS RECORDING (CONTINUOUS RECORDING)

*6. Make and type of Instrument Used ..... IN PHASE — OUT OF PHASE SYSTEM; LOCKWOOD SURVEY CORP.

*7. Scale Constant or Sensitivity ..... 400 PARTS per MILLION (0.04%) .....

*8. Frequency Used and Power Output ..... 4,000 CYCLES PER SEC. — 28 VOLTS .....
(4,000 CYCLES PER SEC - 28 VOLTS)

9. Summary of Assessment Credits (details on reverse side)

Total 8 hour Technical Days (Include Consultants, Draughting etc.) .....

Total 8 hour Line-Cutting Days .....

Calculation

_____	x 7 =	_____	+	_____	=	(4,380) 4,380	÷ (292) 292	= (15) 15
Technical				Line-cutting			Number of claims	Assessment credits per claim

The dates listed on this form represent working time spent entirely within the limits of the above listed claims ☐ Check
If otherwise, please explain .....

Dated: NOVEMBER 10th, 1967 Signed: [signature]

Note: (A) * Complete only if applicable.
(B) Complete list of names, addresses and dates on reverse side.
(C) Submit separate breakdown for each type of survey.
(D) Submit in duplicate.

ASSESSMENT WORK BREAKDOWN

1. FIELD WORK

Type of Work	Name & Address	Dates Worked (PART OF PERIOD)	Number of 8 hour days
PILOT	R. BOYD, MAPLE, ONT.	PART OF PERIOD JUNE 29TH - JULY 6TH/67 (JUNE 29TH - JULY 6TH 1967)	
ENGINEER	SMITH, MAPLE, ONT	" "	
NAVIGATOR	H. SANDAY, SCARBORO, ONT.	" "	
OPERATOR	T. PEDERSEN, TORONTO, ONT	" "	

2. CONSULTANTS

Name & Address	Dates Worked (specify in field or office)	Number of 8 hour days

3. DRAUGHTSMAN, TYPING, OTHERS (specify)

Name & Address	Type of Work	Dates Worked	Number of 8 hour days
D. FENWICK, SCARBORO, ONT.	DATA REDUCTION	JULY 1967	
J.D. PRIOR, " "	GEOPHYSICIST	"	

TOTAL 8 HOUR TECHNICAL DAYS _____

4. LINE-CUTTING

Name	Address	Dates Worked	Number of 8 hour days

TOTAL 8 HOUR LINE-CUTTING DAYS _____

ASSESSMENT WORK BREAKDOWN

1. Type of Survey AIR - RADIOMETRIC

2. Township or Area PARTS OF TURNER, DUNDEE, SCAGRAM TWPS.

3. Numbers of Mining Claims Traversed by Survey 292 (292)

139874 - 139981 incl; 140502 - ~~140693~~ 140595 incl; 141131 - 141198 incl; 141205 - 141222 incl; 141223 - 27 incl; 141228 - 29 - 30; 142080 - 142097 incl; 142062 - 142079 incl; 142054 - 142061 incl.;

4. Number of Miles of Line Cut ..... Flown 109.5 (109.5)

*5. Number of Stations Established CONTINUOUS RECORDING (CONTINUOUS RECORDING)

*6. Make and type of Instrument Used HARWELL 1531-B SCINTILLOMETER - SHARPE INSTRUMENTS G-1-5-2 (SCINTILLOMETER - SHARPE INSTRUMENTS)

*7. Scale Constant or Sensitivity (2000 COUNTS PER SEC. & 30 COUNTS PER SEC. RESPECTIVELY)

*8. Frequency Used and Power Output POWER SOURCE 28 VOLTS (POWER SOURCE 28 VOLTS)

(2000 COUNTS PER SEC.; 30 COUNTS PER SEC RESPECTIVELY)

9. Summary of Assessment Credits (details on reverse side)

Total 8 hour Technical Days (Include Consultants, Draughting etc.) .....

Total 8 hour Line-Cutting Days .....

Calculation

(2,190) (292) (7.5)

$$\frac{\text{Technical}}{\quad} \times 7 = \frac{\quad}{\quad} + \frac{\text{Line-cutting}}{\quad} = \frac{2,190}{\quad} \div \frac{292}{\text{Number of claims}} = \frac{7.5}{\text{Assessment credits per claim}}$$

The dates listed on this form represent working time spent entirely within the limits of the above listed claims ☐ Check
If otherwise, please explain .....

Dated: NOVEMBER 10th 1967 Signed: [signature]

Note: (A) * Complete only if applicable.
(B) Complete list of names, addresses and dates on reverse side.
(C) Submit separate breakdown for each type of survey.
(D) Submit in duplicate.

ASSESSMENT WORK BREAKDOWN

1. FIELD WORK

Type of Work	Name & Address	Dates Worked	Number of 8 hour days
PILOT	R. BOYD, MAPLE, ONT.	(PARTS OF PERIOD JUNE 19TH - JULY 6TH/67 JUNE 29TH → JULY 6TH/64)	
ENGINEER	SMITH, MAPLE, ONT.	" " "	
NAVIGATOR	H. SANDAU, SCARBORO, ONT	" " "	
OPERATOR	T. PEDERSEN-TORONTO, ONT	" " "	

2. CONSULTANTS

Name & Address	Dates Worked (specify in field or office)	Number of 8 hour days

3. DRAUGHTSMAN, TYPING, OTHERS (specify)

Name & Address	Type of Work	Dates Worked	Number of 8 hour days
D. FENWICK, SCARBORO, ONT.	DATA REDUCTION	JULY 1967	
J.W. PRIOR " "	GEOPHYSICIST	" "	

TOTAL 8 HOUR TECHNICAL DAYS _____

4. LINE-CUTTING

Name	Address	Dates Worked	Number of 8 hour days

TOTAL 8 HOUR LINE-CUTTING DAYS _____

Exploration Department,
December 18th, 1967.

Mr. R. V. Scott,
Chief,
Mining Lands Branch,
Parliament Buildings,
Toronto 2, Ontario.

Dear Sir:

The data listed below will clarify details of the attached Report and Maps prepared by Huntec Limited of Toronto covering an airborne geophysical survey on Company mining claims situated in the Pilgrim Creek and Stobie Township Areas of Ontario, dated October 1967.

At this time the report is being filed for assessment purposes on the Pilgrim Creek block only. This includes a total of 292 claims located in the Townships of Turner, Seagram and Dundee. These claims are numbered 139874 to 139981 inclusive; 140502 to 140597 inclusive; 141131 to 141148 inclusive; 141205 to 141230 inclusive; and 142054 to 142097 inclusive. The results covering this area are shown on Huntec Map Sheet No. 3.

Note that a red pencil line has been drawn through those portions of the Huntec Report which are not applicable to the Pilgrim Creek Group.

The geological rock types, contacts and structures shown on the Pilgrim Creek Map Sheet in Turner and Dundee Townships have been taken from 200 scale plans compiled by Company Geologists during 1966 - 67. No information, Government or Company, is available at this Time for the Seagram Township Group.

Report, maps and Assessment Work Breakdown sheets are herewith filed in duplicate.

Trusting this data proves satisfactory, I remain

Yours very truly,

F. J. Evelegh,
Regional Geologist.

cc: H. K. Conn - Asbestos
file
Encls.
REGISTERED MAIL

EASTERN ONTARIO
MINING DIVISION

ONTARIO

63.2275
PARLIAMENT BUILDINGS
TORONTO 2, ONTARIO
TEL. 365-1322

DEPARTMENT OF MINES

OFFICE OF MINING RECORDER

June 21, 1968.

Mr. K.M. Hallock,
Mining Recorder,
5 Young Street N.,
Sudbury, Ontario.

Dear Sir:

The geophysical assessment work credits as shown on the attached list have been approved as of the above date. Please inform the recorded holder and so indicate on your records.

Yours very truly,

Fred W. Matthews,
Mining Recorder.

/AR

cc: Canadian Johns-Manville Co.Ltd.,
Drawer 810,
Matheson, Ontario.

cc: Mr. J.F. Donovan,
Resident Geologist,
1349 La Salle Blvd.,
Sudbury, Ontario.

File: 83.2275

THE MINING ACT

Assessment Work Credits

Name: CANADIAN JOHNS-MANVILLE CO. LIMITED

Township or Area: Turner, Seagram and Dundee Townships

Number of Assessment work days per claim:

(Airborne
Geophysical - 15 Magnetometer
15 Electromagnetic

Geological -

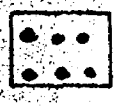
Geochemical -

Mining Claims:

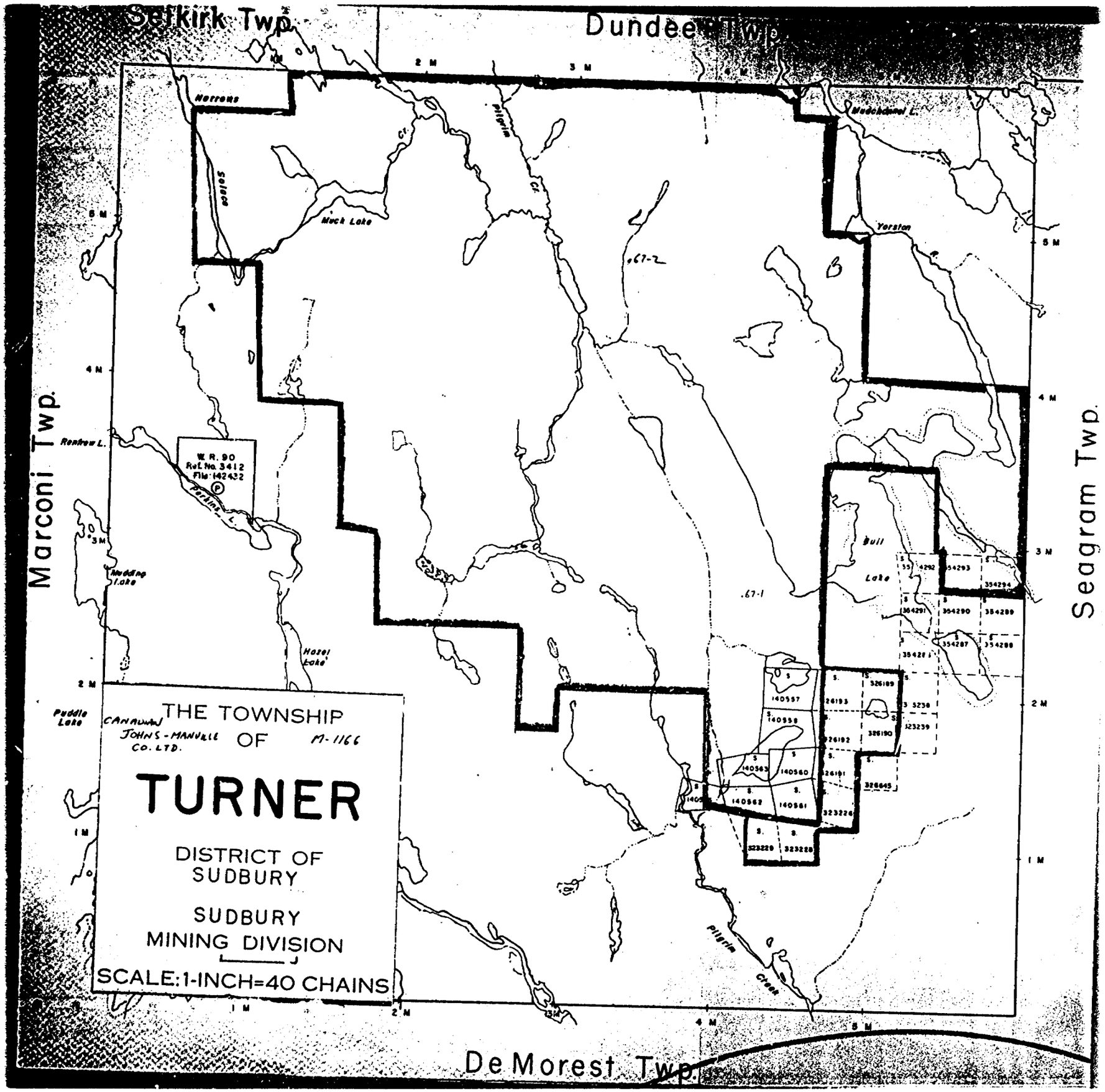
Radiometric - 7.5

S 139874 to 139981 inclusive 8
140502 to 140597 inclusive 16
141181 to 141148 inclusive 18
141205 to 141230 inclusive 26
142054 to 142097 inclusive 44
112

LEGEND SHEET - TURNER TWP

	16	Gabbro
	16D	Nipissing diabase - including associated differentiates
	16F	Olivine Diabase
	15	Lorraine Quartzite
	14C	Gowganda Quartzite
	14G	Gowganda Greywacke
	9A	Basal Conglomerate
	7	Basement Complex
	2	Acid Volcanics - Primarily Rhyolite
	1	Intermediate Volcanics - Predominantly Andesite
	I.F.	Iron Formation

LEGEND RE. 35mm mgs TO FOLLOW. (


Setkirk Twp.
Dundee Twp.
Marconi Twp.
Seagram Twp.
De Morest Twp.
Herrons
Solace
Pilgrim Cr.
Muckchannel L.
Muck Lake
Yorston
Renfrew L.
W. R. 90
Ref. No. 3412
File 142432
Perdue L.
Wedding Lake
Hazel Lake
Puddle Lake
Bull Lake
Pilgrim Creek
CANADIAN JOHNS-MANVILLE CO. LTD.
THE TOWNSHIP OF
M-1166
TURNER
DISTRICT OF SUDBURY
SUDBURY MINING DIVISION
SCALE: 1-INCH=40 CHAINS

CANADIAN JOHNS MANVILLE COMPANY

AIRBORNE GEOPHYSICAL SURVEY

(A)

CONTOUR INTERVAL	10 GAMMA
MEAN FLIGHT LINE SPACING	1320 FEET
MEAN TERRAIN CLEARANCE	200 FEET
250 GAMMA CONTOUR	~~~
50,000 GAMMA CONTOUR	~~~
10 GAMMA CONTOUR	
MAGNETIC LOW	(▲ ▼ ▲)
FIDUCIAL POINTS	0 5000 6
FLIGHT LINES	

PILGRIM CREEK AREA

MAGNETIC MAP

SCALE

1000 0 1000 2000 3000 4000 5000 FEET

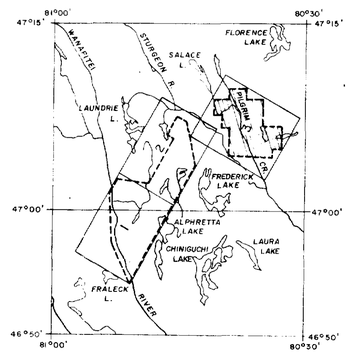
1 Inch to 1320 Feet

Flown and Compiled by

LOCKWOOD SURVEY CORPORATION LIMITED

TORONTO, CANADA

1967 63-2275



DUNDEE - 0010, # 1

CANADIAN JOHNS MANVILLE COMPANY

AIRBORNE GEOPHYSICAL SURVEY

(A)

MARCONI

LYMAN LAKE

SELKIRK CREEK

MUDDING LAKE

RENFREW LAKE

RIVER

PERKINS LAKE

DUNDEE

PUDDLE LAKE

STURGEON

HAZEL LAKE

TURNER

PILGRIM

BULL LAKE

YORSTON LAKE

SEAGRAM LAKE

DEMOREST

MEAN FLIGHT LINE SPACING ..... 1320 FEET
MEAN TERRAIN CLEARANCE ..... 200 FEET
ELECTROMAGNETIC CONTOURS 5,10,15 etc. ..... 1, 2, 3, 4 etc. .....
NEGATIVE CONTOURS 0, -5, -10 etc. ..... 1, -2, -3, -4 etc. .....
FIDUCIAL POINTS ..... O 3690
FLIGHT LINES .....

The contours represent amplitude of in phase response of the resultant field expressed in parts per million of the primary. The figures (23/02) represent amplitude in phase component / quadrature component. The frequency of the primary current is 4000 cycles per second.

PILGRIM CREEK AREA

ELECTROMAGNETIC MAP

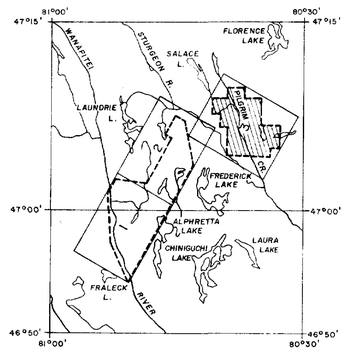
63.2275

SCALE

1000 FEET 0 1000 2000 3000 4000 5000 FEET

1 Inch to 1320 Feet

Flown and Compiled by
LOCKWOOD SURVEY CORPORATION LIMITED
TORONTO, CANADA
1967



DUNDEE - 0010, #2.

CANADIAN JOHNS MANVILLE COMPANY

AIRBORNE GEOPHYSICAL SURVEY

LEGEND SHEET - TURNER TWP.

	16	Gabbro
	16D	Nipissing diabase - including associated differentiates
	16F	Olivine Diabase
	15	Lorraine Quartzite
	14C	Gowganda Quartzite
	14G	Gowganda Greywacke
	9A	Basal Conglomerate
	7	Basement Complex
	2	Acid Volcanics - Primarily Rhyolite
	1	Intermediate Volcanics - Predominantly Andesite
	I.F.	Iron Formation

LYMAN LAKE
RENFREW LAKE
PERKINS LAKE
PUDDLE LAKE
STURGEON LAKE
HAZEL LAKE
PILGRIM LAKE
BULL LAKE
SEAGRAM LAKE
YORSTON LAKE
SELKIRK CREEK
DUNDEE
YORSTON
SEAGRAM
RIVER
KURNER
DEMOREST

(A)

MEAN FLIGHT LINE SPACING ..... 1320 FEET
MEAN TERRAIN CLEARANCE ..... 200 FEET
RADIOMETRIC LOW .....
FIDUCIAL POINTS 03690
FLIGHT LINES .....

Total Radioactivity Contour Interval ..... 100 C.P.S.
500 C.P.S. Contour .....
100 C.P.S. Contour .....
Partial Radioactivity Contour Interval
(Threshold Value 1.65 MeV) ..... 1 C.P.S.
Partial Radioactivity Contour .....

PILGRIM CREEK AREA

RADIOMETRIC MAP

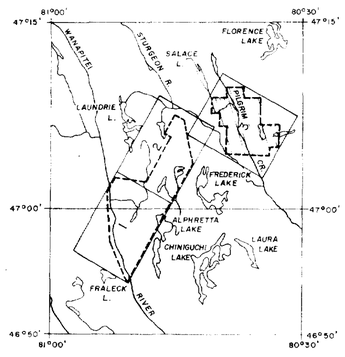
SCALE

1000 FEET 0 1000 2000 3000 4000 5000 FEET

1 Inch to 1320 Feet

Flown and Compiled by
LOCKWOOD SURVEY CORPORATION LIMITED
TORONTO, CANADA
1967

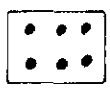
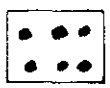
63:2075



DUNDEE - 0010, #3

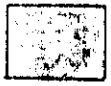
220

LEGEND SHEET - TURNER TWP

	16	Gabbro
	16D	Nipissing diabase - including associated differentiates
	16F	Olivine Diabase
	15	Lorraine Quartzite
	14C	Gowganda Quartzite
	14G	Gowganda Greywacke
	9A	Basal Conglomerate
	7	Basement Complex
	2	Acid Volcanics - Primarily Rhyolite
	1	Intermediate Volcanics - Predominantly Andesite
	I.F.	Iron Formation

DUNDEE - 0010, #1, #2, #3

Legend Sheet - Turner Twp

	16	Gabbro
	16D	Nipissing diabase - including associated differentiates
	16F	Olivine Diabase
	15	Lorraine Quartzite
	14C	Gowganda Quartzite
	14G	Gowganda Greywacke
	9A	Basal Conglomerate
	7	Basement Complex
	2	Acid Volcanics - Primarily Rhyolite
	1	Intermediate Volcanics - Predominantly Andesite
	I.F.	Iron Formation