42A01SW8922 2.8046 EBY

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REPORT ON
VERTICAL GRADIENT AEROMAGNETIC SURVEY,
BURT, HOLMES AND EBY TOWNSHIPS

RECEIVED
APR 29 1985
MINING LANDS SECTION

NTS 42A/1

D.R.B. Rainsford
April, 1985

42A01SW8922 2.8046 EBY

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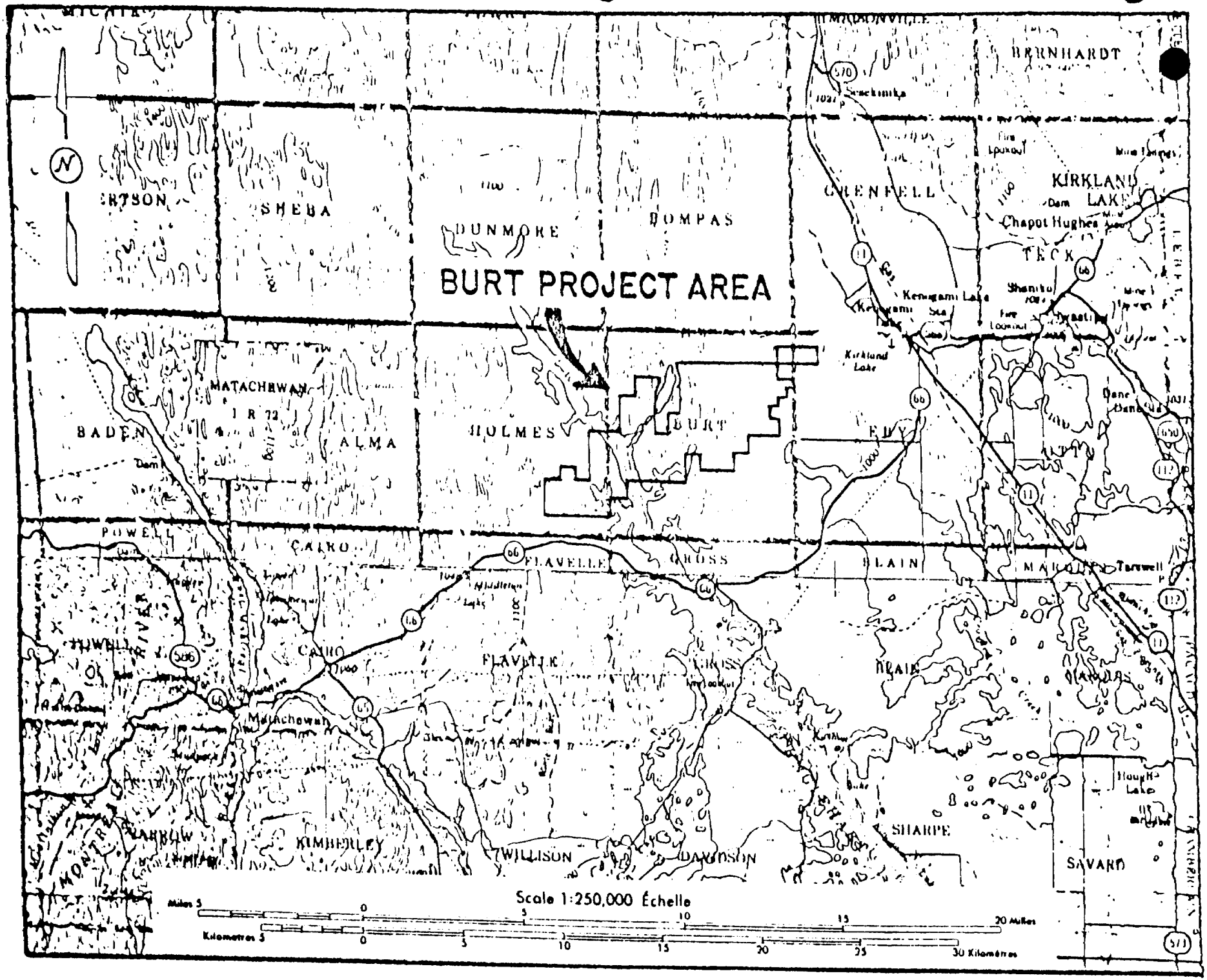
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Figure 1

Location Map



1.0 INTRODUCTION

A 560 line kilometre combined total magnetic field, vertical gradiometer and VLF-EM survey was flown for Billiton Canada Ltd. by Kenting Earth Sciences Ltd., Ottawa, between December 13, 1983 and December 15, 1983. The purpose of this report is to present the results of the vertical magnetic gradiometer survey and to discuss the conclusions that may be drawn from them. The reader is referred to an earlier report by F.L. Jagodits (1984), submitted for assessment, which presents the results of the total field magnetic and VLF-EM surveys.

1.1 Location and Access

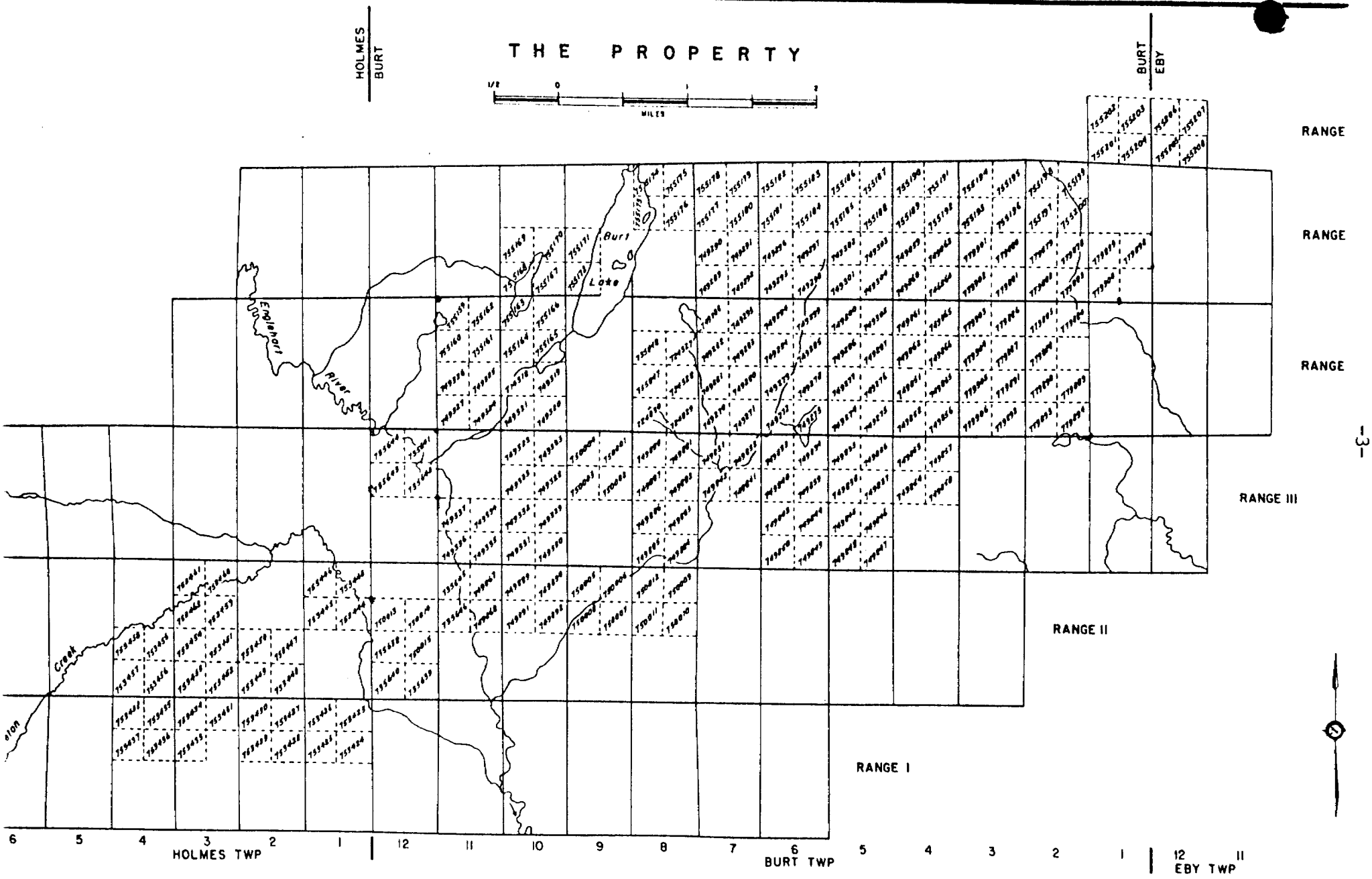
The property is located approximately 20 kilometers southwest of the town of Kirkland Lake in the townships of Burt, Holmes and Eby. It is accessible via an all-weather secondary gravel road from Provincial Highway 66, about 20 road kilometers southwest of its intersection with Trans Canada Highway, Route 11 (Figure 1). An extensive system of bush and logging roads provides local access to the various parts of the property.

1.2 Property and Ownership

The property consists of 247 contiguous unpatented mineral claims located in Burt, Holmes and Eby Twps. in the Larder Lake Mining Division of Ontario (Figure 2). The claims are listed in Table 1.

1.3 General Geology

The detailed Archean geology of the Burt project area is not well understood due to extensive Pleistocene and Proterozoic cover. The Timiskaming Group sediments and alkalic volcanic rocks have been mapped along the Larder Lake fault zone to the east and west of the Burt project area. Magnetic and electromagnetic patterns in the intervening



igure 2 Disposition of Claims

TABLE I
BURT PROJECT-LIST OF CLAIMS

Claim Numbers from	to	No. of Claims	Township
L749270	L749305	36	Burt
L749318	L749337	20	Burt
L735638	L735644	7	Burt
L749831	L749868	38	Burt
L749881	L749890	10	Burt
L750001	L750015	15	Burt
L724827	L724830	4	Burt
L735645	L735648	4	Burt
L749891	L749892	2	Burt
L753423	L753431	9	Holmes
L753433	L753438	6	Holmes
L753443	L753462	20	Holmes
L779878	L779894	17	Burt
L779898	L779906	9	Burt
L755159	L755205	46	Burt
L755205	L755208	4	Eby
TOTAL	247		

area are similar to those over the areas of known Archean geology. It is tentatively concluded therefore that the Timiskaming Group underlies a substantial portion of the Huronian and Cenozoic cover in the Burt project area.

1.4 Previous Work

The first record of geological work in the area was published by H.C. Cooke of the Geological Survey of Canada (GSC) in 1919. The Burt project area was included as part of a much larger area mapped on a scale of one inch to one mile.

Aeromagnetic series maps at the same on inch to one mile scale based on a 1949 survey were published by the GSC in 1956.

A map of surficial deposits in the region at the reconnaissance scale of one inch to two miles was published by O.L. Hughes of the GSC in 1960.

The most detailed geological work on the Burt-Holmes area was published by the OGS in 1966. The mapping by J.C.G. Moore was produced on a scale of one inch to one half mile.

The most recent work in the area was done in 1983 by L.S. Jensen of the OGS as part of an ongoing stratigraphic synthesis of the Timmins-Kirkland Lake one inch to one mile sheet. This project which began in 1978 has been summarized in a series of brief OGS progress reports.

A multidisciplinary project funded by the Ontario Ministry of Northern Affairs and the Federal Department of Regional Economic Expansion called the Kirkland Lake Initiatives Program (KLIP) covered a large area to the immediate east of the Burt project area. A regional basal till sampling programme, a major part of the KLIP project, provides a useful data base for the Burt programme (Fortescue et al, 1984).

2.0 SURVEY SPECIFICATIONS AND INSTRUMENTATION

2.1 General

The survey was maintained at an altitude of 150 metres above ground level and a ground speed of about 250 KPH. Visual navigation with uncontrolled photo mosaics was used for the survey. Traverses were flown north-south at a 200 metre spacing.

2.2 Instrumentation

Two Scintrex models VIQ 23I and 1A1 optically pumped caesium vapour magnetometers were mounted in a tail stinger vertical gradiometer configuration with a sensor separation of 1.83 metres. Data was collected using a Kenting KDSS-5 digital logging system. Analogue charts were printed out on a Centronix model 122 Printer/Plotter. Altitude and flight paths were recorded using a Honeywell HG7602 radar altimeter and an AS-5 35mm strip camera respectively.

2.3 Data Reduction and Presentation

(a) Transcribing of Airborne Data

The airborne data collected by the KDSS-5 logging system on DC300 data cartridges was transcribed onto ½ inch computer tape using both cartridge copies to maximize data recovery. Recovery was 100%.

(b) Editing of data

The raw airborne data on ½ inch tape was placed in an ISAM file on the disk storage module. The data base was edited for the required lines, their extent, spurious samples, dropouts and instrument malfunctions, etc. The digitized analogue channels containing radar or barometric altimeter data were decoded and continuity checked.

(c) Flight Path Recovery

Flight path was recovered on 1:10,000 scale photo mosaic maps using the tracking film, the flight path digitized and subjected to a speed check.

(d) Compilation

The flight track and airborne data were merged matching time. The total field magnetic data had single point spikes removed with a pattern recognition algorithm using fourth differences.

The magnetic data were levelled using a largely computerized method as follows:

i) find all intersection between traverse and control lines in the survey, calculate the coordinates of the intersection points and store them in an intersection file.

ii) extract from the data base magnetic values at each intersection of traverse/control line.

iii) automatic determination of levelling corrections for traverse/control line intersections.

A general description of the computer part of the levelling adjustment calculations follows:

i) Input the intersection file containing coordinates of the intersection points of control and traverse line magnetic values at the intersection points.

ii) Adjust control/traverse line data by shifting the datum of each line by an appropriate amount so that the mean square sum of the differences along each line is minimum This is an iterative method using least squares, adjusting first the datums of control lines then traverses. This does not introduce any datum shift in the overall survey.

iii) Estimate traverse line adjustment, i.e. (traverse line magnetic value) and control line adjustments as estimated in (ii).

The estimated adjustments were examined for consistency and printed out for manual examination. An edit directive file was created for manual changes required and applied against the intersection file. A level file was then produced and applied to the data base and the magnetic data levelled.

The gradient data were calculated from the total field measurements at the two sensors and scaled for the sensor separation. The gradient data were levelled using the following digital filtering parameters.

filter type	-	MARTIN-GRAHAM
lower cut-off	-	0.0062 cycles per sample interval
lower roll-off	-	0.0062 cycles per sample interval
upper cut-off	-	0.123 cycles per sample interval
upper roll-off	-	0.031 cycles per sample interval

These filtered data correspond to wavelengths between 150 meters and 3 km. The gradient data was then contoured using a 0.025 nT per metre where plotting would allow.

3.0 DISCUSSION OF RESULTS

Examination of the contoured vertical magnetic gradient reveals several distinct magnetic provinces. The eastern part of the survey area is dominated by rapid changes in magnetic gradient corresponding to outcropping Archean mafic volcanics of the Kinojevis group (unit 6). To the north of the Kinojevis group, an ENE-WSW band of reduced gradient, about 600 metres wide, appears to delineate Archean sediments belonging to the Timmiskaming group (unit 8). To the south a distinctive, narrow, linear "high" separates the Kinojevis group from a region of subdued magnetic activity in the southeastern corner of the survey area. The

linear feature corresponds to a band of Archean volcanics of the Skead group (unit 4). A large Archean syenite body (unit 10) accounts the low gradient zone. It is thought that the magnetic anomaly that wraps around the syenite is probably due to the contact metamorphism of the country rock. A similar feature is observed around the syenite pluton in the north-western part of the survey area.

The central part of the survey area is dominated by Huronian sediments belonging to the Gowganda formation. This unit obscures the underlying Archean geology. The trace of Timmiskaming sediments has tentatively been delineated below the Huronian cover. The western part of the central area is occupied by the Englehart river valley in which

considerable thickness of fluvial sediments has accumulated. As with the rest of the central area, the river valley has a subdued gradient pattern indicating that the Archean geology is deeply buried. It is not clear whether the cover in the area of the Englehart river is simply unconsolidated sediments or whether it includes Proterozoic rocks of the Huronian as well.

The western end of the survey area is characterized by a region of subdued magnetic gradients in the northwestern corner of the project area. This region corresponds to a large syenite pluton. Around the edge of the pluton a narrow band of high gradient is observed, similar to that bounding the pluton in the southeastern part of the project area. Contact metamorphism is thought to be the cause of the magnetic response. South of the syenite a gradient pattern very similar to that observed in the east is observed. The high gradients and convoluted field is, again, due to Kinojevis mafic volcanics which emerge from

beneath the Huronian cover.

A number of structural features can be identified from the data. Several northwest-southeast trending faults have been interpreted throughout the area. The occurrence of a strong magnetic anomaly oriented in the same direction is thought to represent a diabase dyke intruded along one of these faults. A major northeast-southwest fault is interpreted along the western edge of the Huronian cover. It is thought that the Huronian sediments may have been deposited in a Graben structure.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The vertical gradient magnetic data have served to delineate the major lithological units within the project area. It has also been possible, in part, to trace the Archaen geology below the Huronian cover. The Huronian sediments, themselves, appear to form a fairly complete cover over the Archean in the central part of the Property. Faults have also been identified in the area and may form significant structures with respect to previous metal mineralization.

Follow-up should be concentrated in areas where structural features cross-cut favourable geological horizons. VLF-EM surveys should then be conducted in the areas that have been selected in order to locate the structures on the ground.

22/4/1985

D.R.B. Rainsford

Geophysicist

REFERENCES

Cooke, H.C. (1922) — Kenogami, Round and Larder Lake Areas, Timmiskaming District, Ontario GSC Memoir 131, Pt. 1.

Jagodits F.L. (1984) — Report on Airborne Geophysical Surveys, Burt, Holmes and Eby Townships, District of Timmiskaming, Larder Lake Mining Division, Ontario

J.C.G. Moore, (1962) — Map 2078 Holmes-Burt Area, Geology Map published by the Ontario Department of Mines in 1966 at a scale of 1 inch = ½ mile.

APPENDIX

LIST OF PERSONNEL

NAME	ADDRESS	
G. Carter	380 Hunt Club Road, OTTAWA, Ontario K1G 3N3	Pilot
S. Hay	380 Hunt Club Road, OTTAWA, Ontario K1G 3N3	Pilot
M. Andrews	380 Hunt Club Road, OTTAWA, Ontario K1G 3N3	Electronic Technician
J. Simpson	380 Hunt Club Road, OTTAWA, Ontario K1G 3N3	Data Technician
D. Darbha	380 Hunt Club Road, OTTAWA, Ontario K1G 3N3	Geophysicist
K. Lall	Billiton Canada Ltd. 141 Adelaide Street West Suite 1006 Toronto, Ontario M5H 3L9	Drafting
D. Rainsford	Billiton Canada ltd. 141 Adelaide Street West Suite 1006 Toronto, Ontario M5H 3L9	Reporting Geophysicist

WRITER'S DECLARATION

I, Desmond R.B. Rainsford, DO HEREBY CERTIFY:

1. THAT I am a Geophysicist in the employ of Billiton Canada Ltd., with offices at Suite 1006, 141 Adelaide Street, West, Toronto, Ontario, M5H 3L9

2. THAT I am a graduate of the University of Bristol 1978, with a Bachelor of Science Degree in Geology.

3. THAT I am a graduate of the Royal School of Mines, University of London 1979, with a Master of Science Degree in Geophysics.

4. THAT I am a member of the Society of Exploration Geophysicists.

5. THAT I have practised my profession for over five years.

6. THAT this report dated April 22nd, 1985 is based on a review of published and unpublished reports, maps and data, and on field work carried out.

DATED at Toronto, Ontario this twenty second day of April, 1985.

D.R.B. Rainsford

D.R.B. Rainsford

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Mining Lands Section

File No 2.8046

Control Sheet

TYPE OF SURVEY

✓ GEOPHYSICAL

____ GEOLOGICAL

____ GEOCHEMICAL

____ EXPENDITURE

MINING LANDS COMMENTS:

L.D. lgd

D. Hurst

Signature of Assessor

85.05.06

Date

Ministry of Natural Resources Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

Mining Act

2.8046

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

#167

Type(s) of Survey(s): **Vertical Gradient Aeromagnetic** W

Township or Area: **Burt, Holmes, Eby**

Claim Holder(s): **BILLITON CANADA LTD.**

Prospector's Licence No.: **T1535**

Address: **1006-141 Adelaide St. W. Toronto, Ontario M5H 3L9**

Survey Company: **Kenting Earth Sciences Ltd.**

Date of Survey (from & to): 13 (Day) 12 (Mo.) 83 (Yr.) 15 (Day) 12 (Mo.) 83 (Yr.)

Total Miles of line Cut:

Name and Address of Author (of Geo-Technical report): **D.R.B. Rainsford, Billiton Canada Ltd., 1006-141 Adelaide St. W. Toronto, Ont. M5H 3L9**

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Radiometric	
	Geophysical - Other	
	Geophysical	
	Geochemical	

Man Days		Days per Claim
Complete reverse side and enter total(s) here	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Radiometric	
	Geophysical - Other	
	Geophysical	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	20.7
	Radiometric	

RECEIVED
MAY 02 1985
MINING LANDS SECTION

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
L	see attached list				

Please Note:
Credits have been reduced on some claims, as maximum credits allowed are 80 days

LARDER LAKE MINING DIV.
RECEIVED
APR 25 1985
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

Total number of mining claims covered by this report of work: **247**

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures: $ ÷ 15 = Total Days Credits

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date: April 23rd

Recorded Holder or Agent (Signature): P. Walty

For Office Use Only

Total Days Cr. Recorded: 5051.2

Date Recorded: APR 25 1985

Mining Recorder:

Date Approved as Recorded: As Revised Statement

Branch Director:

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: **D.R.B. Rainsford, Billiton Canada Ltd., 1006-141 Adelaide St. W. Toronto, Ont. M5H 3L9**

Date Certified: 23/4/1985

Certified by (Signature): D.R.B. Rainsford

BURT PROJECT-LIST OF CLAIMS

	Days Applied		Days Applied		Days Applied
L 749270	20.8	L 749320	~~20.8~~ 19.6	L 749844	20.8
L 749271	20.8	L 749321	~~20.8~~ 19.6	L 749845	20.8
L 749272	20.8	L 749322	~~20.8~~ 19.6	L 749846	20.8
L 749273	20.8	L 749323	~~20.8~~ 19.6	L 749847	20.8
L 749274	20.8	L 749324	~~20.8~~ 19.6	L 749848	20.8
L 749275	20.8	L 749325	~~20.8~~ 19.6	L 749849	20.8
L 749276	20.8	L 749326	~~20.8~~ 19.6	L 749850	20.8
L 749277	20.8	L 749327	~~20.8~~ 19.6	L 749851	20.8
L 749278	20.8	L 749328	~~20.8~~ 19.6	L 749852	20.8
L 749279	20.8	L 749329	20.8	L 749853	20.8
L 749280	20.8	L 749330	~~20.8~~ 19.6	L 749854	20.8
L 749281	20.8	L 749331	~~20.8~~ 19.6	L 749855	20.8
L 749282	20.8	L 749332	20.8	L 749856	20.8
L 749283	20.8	L 749333	~~20.8~~ 19.6	L 749857	20.8
L 749284	20.8	L 749334	20.8	L 749858	20.8
L 749285	20.8	L 749335	~~20.8~~ 19.6	L 749859	20.8
L 749286	20.8	L 749336	~~20.8~~ 19.6	L 749860	20.8
L 749287	20.8	L 749337	20.8	L 749861	20.8
L 749288	20.8	L 735638	~~20.8~~ 19.6	L 749862	20.8
L 749289	20.8	L 735639	~~20.8~~ 19.6	L 749863	20.8
L 749290	20.8	L 735640	~~20.8~~ 19.6	L 749864	20.8
L 749291	20.8	L 735641	~~20.8~~ 19.6	L 749865	20.8
L 749292	20.8	L 735642	~~20.8~~ 19.6	L 749866	20.8
L 749293	20.8	L 735643	~~20.8~~ 19.6	L 749867	~~20.8~~ 19.6
L 749294	20.8	L 735644	~~20.8~~ 19.6	L 749868	~~20.8~~ 19.6
L 749295	20.8	L 749831	20.8	L 749881	20.8
L 749296	20.8	L 749832	20.8	L 749882	20.8
L 749297	20.8	L 749833	20.8	L 749883	20.8
L 749298	20.8	L 749834	20.8	L 749884	20.8
L 749299	20.8	L 749835	20.8	L 749885	20.8
L 749300	20.8	L 749836	20.8	L 749886	20.8
L 749301	20.8	L 749837	20.8	L 749887	~~20.8~~ 19.6
L 749302	20.8	L 749838	20.8	L 749888	20.8
L 749303	20.8	L 749839	20.8	L 749889	~~20.8~~ 19.6
L 749304	20.8	L 749840	20.8	L 749890	~~20.8~~ 19.6
L 749305	20.8	L 749841	20.8	L 750001	20.8
L 749318	~~20.8~~ 19.6	L 749842	20.8	L 750002	~~20.8~~ 19.6
L 749319	~~20.8~~ 19.6	L 749843	20.8	L 750003	~~20.8~~ 19.6

BURT PROJECT-LIST OF CLAIMS

	Days Applied		Days Applied		Days Applied
L 750004	~~20.8~~ 19.6	L 753444	~~20.8~~ 19.6	L 779900	20.8
L 750005	~~20.8~~ 19.6	L 753445	~~20.8~~ 19.6	L 779901	20.8
L 750006	~~20.8~~ 19.6	L 753446	~~20.8~~ 19.6	L 779902	20.8
L 750007	~~20.8~~ 19.6	L 753447	~~20.8~~ 19.6	L 779903	20.8
L 750008	~~20.8~~ 19.6	L 753448	~~20.8~~ 19.6	L 779904	20.8
L 750009	20.8	L 753449	~~20.8~~ 19.6	L 779905	20.8
L 750010	20.8	L 753450	~~20.8~~ 19.6	L 779906	20.8
L 750011	~~20.8~~ 19.6	L 753451	~~20.8~~ 19.6	L 755159	20.8
L 750012	~~20.8~~ 19.6	L 753452	~~20.8~~ 19.6	L 755160	~~20.8~~ 19.6
L 750013	~~20.8~~ 19.6	L 753453	~~20.8~~ 19.6	L 755161	~~20.8~~ 19.6
L 750014	~~20.8~~ 19.6	L 753454	~~20.8~~ 19.6	L 755162	20.8
L 750015	~~20.8~~ 19.6	L 753455	~~20.8~~ 19.6	L 755163	20.8
L 724827	20.8	L 753456	~~20.8~~ 19.6	L 755164	~~20.8~~ 19.6
L 724828	20.8	L 753457	20.8	L 755165	~~20.8~~ 19.6
L 724829	20.8	L 753458	20.8	L 755166	20.8
L 724830	20.8	L 753459	~~20.8~~ 19.6	L 755167	20.8
L 735645	~~20.8~~ 19.6	L 753460	~~20.8~~ 19.6	L 755168	20.8
L 735646	~~20.8~~ 19.6	L 753461	~~20.8~~ 19.6	L 755169	20.8
L 735647	20.8	L 753462	~~20.8~~ 19.6	L 755170	20.8
L 735648	20.8	L 779878	20.8	L 755171	20.8
L 749891	~~20.8~~ 19.6	L 779879	20.8	L 755172	20.8
L 749892	~~20.8~~ 19.6	L 779880	20.8	L 755173	20.8
L 753423	20.8	L 779881	20.8	L 755174	20.8
L 753424	~~20.8~~ 19.6	L 779882	20.8	L 755175	20.8
L 753425	~~20.8~~ 19.6	L 779883	20.8	L 755176	20.8
L 753426	20.8	L 779884	20.8	L 755177	20.8
L 753427	20.8	L 779885	20.8	L 755178	20.8
L 753428	~~20.8~~ 19.6	L 779886	20.8	L 755179	20.8
L 753430	20.8	L 779887	20.8	L 755180	20.8
L 753431	20.8	L 779888	20.8	L 755181	20.8
L 753432	~~20.8~~ 19.6	L 779889	20.8	L 755182	20.8
L 753433	~~20.8~~ 19.6	L 779890	20.8	L 755183	20.8
L 753434	20.8	L 779891	20.8	L 755184	20.8
L 753435	20.8	L 779892	20.8	L 755185	20.8
L 753436	~~20.8~~ 19.6	L 779893	20.8	L 755186	20.8
L 753437	20.8	L 779894	20.8	L 755187	20.8
L 753438	20.8	L 779898	20.8	L 755188	20.8
L 753443	~~20.8~~ 19.6	L 779899	20.8	L 755189	20.8

BURT PROJECT-LIST OF CLAIMS

	Days Applied
L 755190	20.8
L 755191	20.8
L 755192	20.8
L 755193	20.8
L 755194	20.8
L 755195	20.8
L 755196	20.8
L 755197	20.8
L 755198	20.8
L 755199	20.8
L 755200	20.8
L 755201	20.8
L 755202	20.8
L 755203	20.8
L 755204	20.8
L 755205	20.8
L 755206	20.8
L 755207	20.8
L 755208	20.8

Ontario

Ministry of Natural Resources

File _____

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Airborne Magnetic Gradiometer

Township or Area Burt, Holmes and Eby Twps.

Claim Holder(s) Billiton Canada Ltd.

Survey Company Kenting Earth Sciences Ltd.

Author of Report D.R.B. Rainsford

Address of Author Billiton Canada Ltd. 1006-141 Adelaide W. Toronto

Covering Dates of Survey December 13-15, 1985 (linecutting to office)

Total Miles of Line Cut _____

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

DAYS per claim.

Geophysical
–Electromagnetic _____
–Magnetometer _____
–Radiometric _____
–Other _____
Geological _____
Geochemical _____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer 20.8 Electromagnetic _____ Radiometric _____ (enter days per claim)

DATE: 22/4/1985 SIGNATURE: D.R.B. Rainsford Author of Report or Agent

Res. Geol. _____ Qualifications 2.4517

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

See attached list

If space insufficient, attach list

TOTAL CLAIMS 247

OFFICE USE ONLY

837 (5/79)

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing _____

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

_____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

INDUCED POLARIZATION RESISTIVITY

Instrument _____

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

BURT PROJECT-LIST OF CLAIMS

L 749270
L 749271
L 749272
L 749273
L 749274
L 749275
L 749276
L 749277
L 749278
L 749279
L 749280
L 749281
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L 749885
L 749886
L 749887
L 749888
L 749889
L 749890
L 750001
L 750002
L 750003

Cont'd

BURT PROJECT-LIST OF CLAIMS

L 750004	L 753444	L 779900
L 750005	L 753445	L 779901
L 750006	L 753446	L 779902
L 750007	L 753447	L 779903
L 750008	L 753448	L 779904
L 750009	L 753449	L 779905
L 750010	L 753450	L 779906
L 750011	L 753451	L 755159
L 750012	L 753452	L 755160
L 750013	L 753453	L 755161
L 750014	L 753454	L 755162
L 750015	L 753455	L 755163
L 724827	L 753456	L 755164
L 724828	L 753457	L 755165
L 724829	L 753458	L 755166
L 724830	L 753459	L 755167
L 735645	L 753460	L 755168
L 735646	L 753461	L 755169
L 735647	L 753462	L 755170
L 735648	L 779878	L 755171
L 749891	L 779879	L 755172
L 749892	L 779880	L 755173
L 753423	L 779881	L 755174
L 753424	L 779882	L 755175
L 753425	L 779883	L 755176
L 753426	L 779884	L 755177
L 753427	L 779885	L 755178
L 753428	L 779886	L 755179
L 753430	L 779887	L 755180
L 753431	L 779888	L 755181
L 753432	L 779889	L 755182
L 753433	L 779890	L 755183
L 753434	L 779891	L 755184
L 753435	L 779892	L 755185
L 753436	L 779893	L 755186
L 753437	L 779894	L 755187
L 753438	L 779898	L 755188
L 753443	L 779899	L 755189

Cont'd

BURT PROJECT-LIST OF CLAIMS

L 755190
L 755191
L 755192
L 755193
L 755194
L 755195
L 755196
L 755197
L 755198
L 755199
L 755200
L 755201
L 755202
L 755203
L 755204
L 755205
L 755206
L 755207
L 755208

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

_____

Corrections made _____

_____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

_____

Additional information (for understanding results) _____

_____

_____

AIRBORNE SURVEYS

Type of survey(s) Magnetic Gradiometer

Instrument(s) Two Scintex VIW 23I IA2 Caesium vapour magnetometers

(specify for each type of survey)

Accuracy 0.01 nT

(specify for each type of survey)

Aircraft used Piper Navajo, C-FFRY

Sensor altitude 150 metres

Navigation and flight path recovery method visual navigation from photomosaic, flight path film and photomosaic

Aircraft altitude 150 metres Line Spacing 200 metres

Miles flown over total area 497.66 km (309.23 miles) Over claims only 206.32 km (128.20 miles)

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken _____

_____

_____

Total Number of Samples _____

Type of Sample _____
(Nature of Material)

Average Sample Weight _____

Method of Collection _____

_____

Soil Horizon Sampled _____

Horizon Development _____

Sample Depth _____

Terrain _____

_____

Drainage Development _____

Estimated Range of Overburden Thickness _____

_____

_____

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis _____

_____

_____

_____

General _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ANALYTICAL METHODS

Values expressed in: per cent ☐
p. p. m. ☐
p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others _____

Field Analysis (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Field Laboratory Analysis

No. (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Commercial Laboratory (_____ tests)

Name of Laboratory _____

Extraction Method _____

Analytical Method _____

Reagents Used _____

General _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Ministry of Natural Resources
Ontario

Technical Assessment Work Credits

File: 2.8046

Date: 1985 05 14

Mining Recorder's Report of Work No.: 167

Recorded Holder: BILLITON CANADA LTD

Township or Area: BURT, HOLMES, EBY TOWNSHIPS

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	L 749270 to 305 inclusive 749318 to 337 inclusive 735638 to 644 inclusive 749831 to 868 inclusive 749881 to 892 inclusive 750001 to 015 inclusive 724827 to 830 inclusive 735645 to 648 inclusive 753423 to 428 inclusive 753430 to 438 inclusive 753443 to 462 inclusive 779878 to 894 inclusive 779898 to 905 inclusive 755159 to 173 inclusive 755175-76-77 755180 to 201 inclusive 755203 to 208 inclusive
Electromagnetic _____ days	
Magnetometer 21 days	
Radiometric _____ days	
Induced polarization _____ days	
Other _____ days	
Section 77 (19) See "Mining Claims Assessed" column	
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 (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

L 755174-78-79
755202

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:

Ministry of
Natural
Resources

May 29/85

1985 05 14

Your File: 167
Our File: 2.8046

Mining Recorder
Ministry of Natural Resources
4 Government Road East
Kirkland Lake, Ontario
P2N 1A2

Dear Sir:

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. R.J. Pichette at 416/965-4888.

Yours sincerely,

S.E. Yundt
Director
Land Management Branch

Whitney Block, Room 6643
Queen's Park
Toronto, Ontario
M7A 1W3

S. Hurst:mc

Encls.

cc: Billiton Canada Ltd
Suite 1006
141 Adelaide Street West
Toronto, Ontario
M5H 3L9

cc: Mr. G.H. Ferguson
Mining & Lands Commissioner
Toronto, Ontario

Ministry of Natural Resources

Ontario

Notice of Intent

for Technical Reports

1985 05 14

2.8046/167

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 Land Management Branch, Toronto. The report will be re-assessed and a new statement of credits based on actual days worked will be issued.

1985 06 04

Your File: 167
Our File: 2.8046

Mining Recorder
Ministry of Natural Resources
4 Government Road East
Kirkland Lake, Ontario
P2N 1A2

Dear Sir:

RE: Notice of Intent dated May 14, 1985
Geophysical (Magnetometer) Survey on
Mining Claims L 749270, et al, in
Burt, Holmes and Eby Townships

The assessment work credits, as listed with the above-mentioned Notice of Intent, have been approved as of the above date.

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

Yours sincerely,

S.E. Yundt
Director
Land Management Branch

Whitney Block, Room 6643
Queen's Park
Toronto, Ontario
M7A 1W3
Phone:(416)965-4888

S. Hurst:mc

cc: Billiton Canada Ltd
Suite 1006
141 Adelaide Street West
Toronto, Ontario
M5H 3L9

cc: Mr. G.H. Ferguson
Mining & Lands Commissioner
Toronto, Ontario

Encl.

cc: Resident Geologist
Kirkland Lake, Ontario

Billiton Canada Ltd.

Suite 1006
141 Adelaide Street West
Toronto, Ontario M5H 3L9

Telephone (416) 362-6624
Telex 06-23518

April 24, 1985

Mr. S.E. Yundt
Director Land Management Branch
Whitney Block, Room 6643
Queen's Park, Ontario

Dear Sir:

Please find attached two copies of a report titled "Report on Vertical Gradient Aeromagnetic Survey, Burt, Holmes and Eby Townships".

This work is being submitted for assessment on Billiton's Burt Township project claims. A report of work has been sent to the Kirkland Lake mining recorder.

Trusting that this is satisfactory.

Yours sincerely,

D.R.B. Rainsford
Geophysicist

RECEIVED
APR 29 1985
MINING LANDS SECTION

DRB/sa
Encl.

Dunmore Twp.

Burt Twp.

Flavelle Twp.

Chief L.

Kenaja Cr.

Englehart R.

Middleton

Galer L.

Holmes L.

VI V IV III II I

12 11 10 9 8 7 6 5 4 3 2 1

THE TOWNSHIP OF HOLMES

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE: 1-INCH=40 CHAINS

LEGEND

PATENTED LAND
CROWN LAND SALE
LEASES
LOCATED LAND
LICENSE OF OCCUPATION
MINING RIGHTS ONLY
SURFACE RIGHTS ONLY
ROADS
IMPROVED ROADS
KING'S HIGHWAYS
RAILWAYS
POWER LINES
MARSH OR MUSKEG
MINES
CANCELLED

NOTES

400' Surface rights reservation around lakes and rivers

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.+ S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition
(N) SEC. 36/80	W. 24/82	29/11/82	S.R.& M.R.

NATURAL RESOURCES
MAY 6 1985
TITLES SECTION

PLAN NO.- M.224

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

42A01SW8922 2.8046 EBY

200

J.v.K.

BURT TOWNSHIP

LARDER LAKE MINING DIVISION

DISTRICT OF TIMISKAMING

SCALE 40 CHAINS TO ONE INCH

M.334

N

LEGEND

PATENTED LAND	(P)
CROWN LAND SALE	C.S.
LEASES	(L)
LICENSE OF OCCUPATION	L.O.
LOCATED LAND	Loc.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
CANCELLED	C.

400' surface rights reservation along the shores of all lakes and rivers.

Areas withdrawn from staking under Section 43 of the Mining Act (R.S.O. 1970).

	Order No.	File	Date	Disposition
R_1	W.7/74	104317	21/2/74	S.R.O.
R_2	W.71/76	100581	15/12/76	S.R.O.
R_3	NR.W.33/79	139857	14/5/79	S.R.O.
R_4	NR.W.92/80	129365	9/7/80	S.R.O.
R_5	W.24/82	188522	29/11/82	S.R.&M.R.

BOMPAS TWP.

HOLMES TWP.

EBY TWP.

VI

V

IV

III

II

I

Portage 3 Miles

Burt Lake

FILE 164586

AREA WITHDRAWN FROM STAKING SECTION 42 MINING ACT

TOWER SITE S.R.O. RESERVED

CABIN SITE

MNR Rs.26 Pit No.269 Pit No.10474

Gravel File: 186049

D.H.O. PIT 1315

12 11 10 9 8 7 6 5 4 3 2 1

GROSS TWP.

ONTARIO

MINISTRY OF NATURAL RESOURCES

SURVEYS AND MAPPING BRANCH

42A01SW8922 2.8046 EBY

Grenfell Twp. M.351

Burt Twp. M.334

Otto Twp. M.379

Blain Twp. M.418

VI

V

IV

III

II

I

12 11 10 9 8 7 6 5 4 3 2 1

THE TOWNSHIP OF

EBY

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE: 1-INCH=40 CHAINS

LEGEND

PATENTED LAND	P
CROWN LAND SALE	C.S.
LEASES	L
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	

NOTES

400' surface rights reservation along the shores of all lakes and rivers.

AREAS WITHDRAWN FROM STAKING
under Sec. 43 of The Mining Act (R.S.O. 1970).

Order No.	File	Date	Disposition

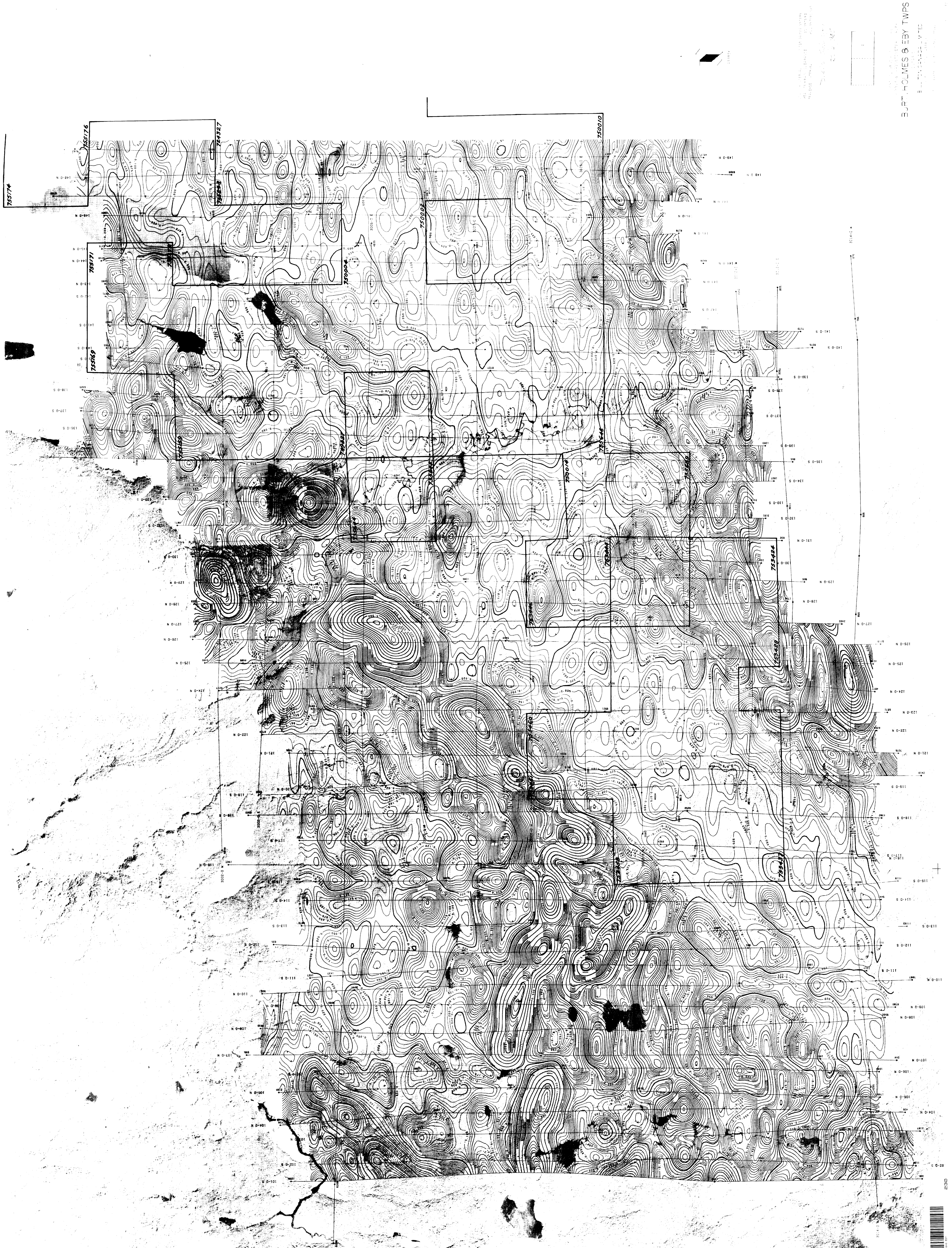
NATURAL RESOURCES
MAY 6 1985
TITLES SECTION

PLAN NO.- M-345

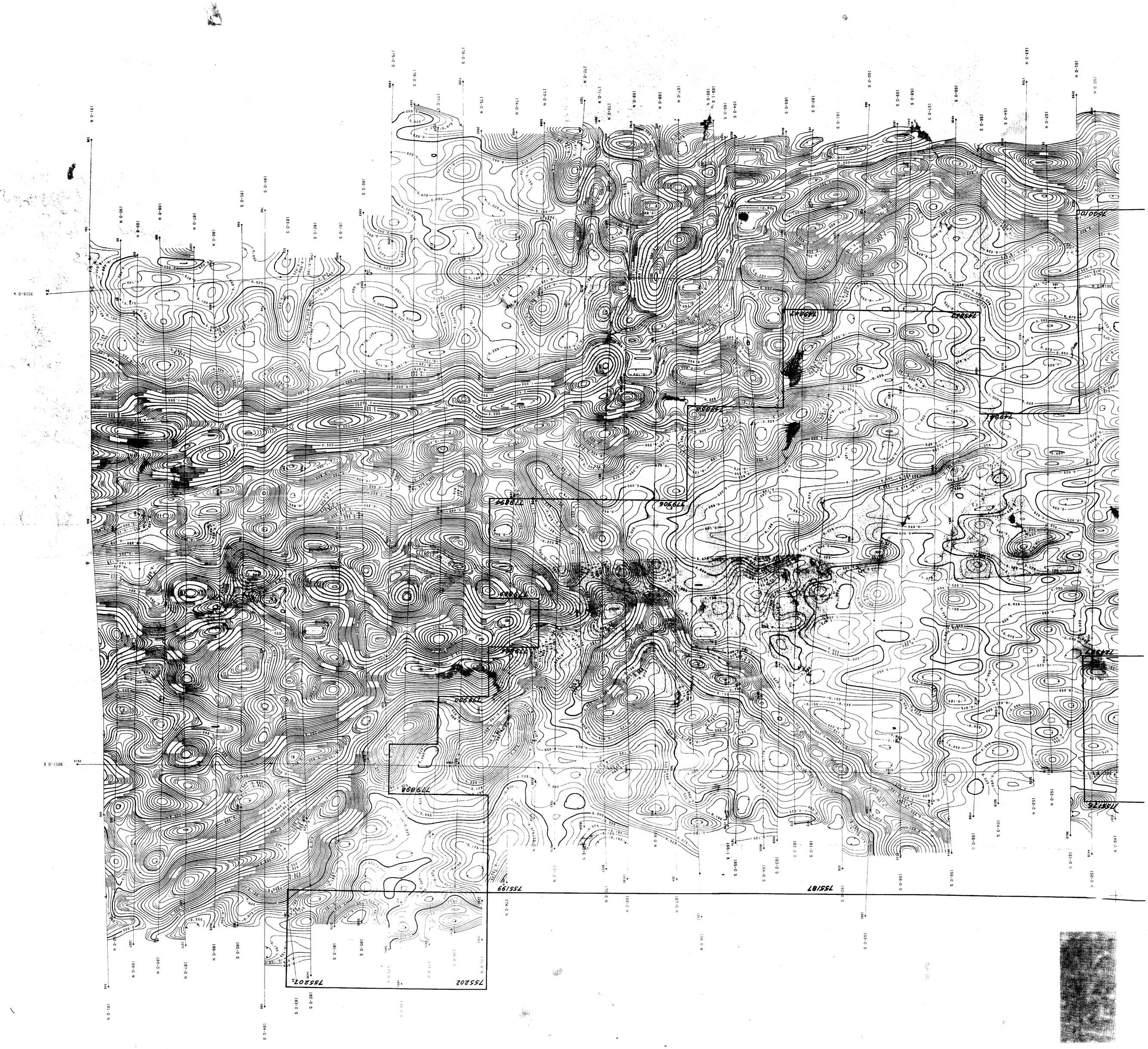
ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

42A01SW8922 2.8046 EBY

K. Kalamov


BURT, HOLMES & EBY TWPS
755174
755176
724327
750010
755171
750004
750002
755169
755159
750014
753424
753428
753437
230

BURT-HOLMES & EBY TMPS



LEGEND

PRECAMBRIAN

PROTEROZOIC

- Db — DIABASE
- 11 — HURONIAN SUPERGROUP (Gowganda Formation)

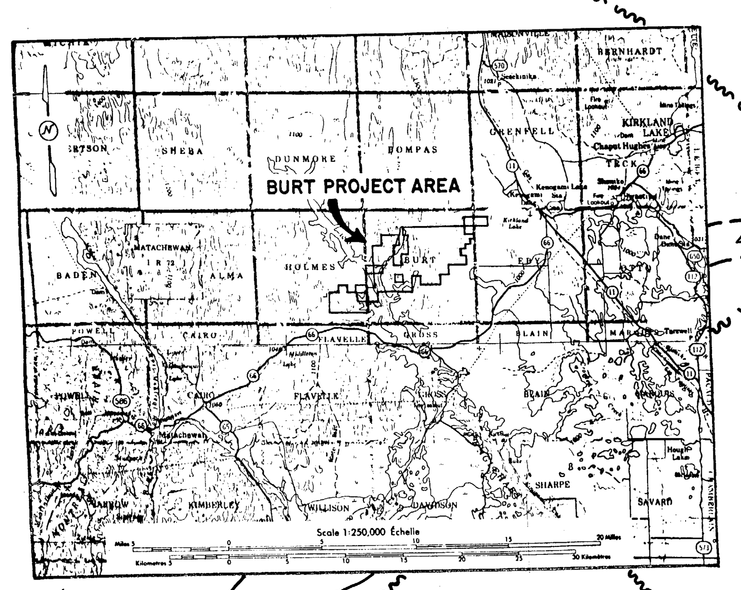
ARCHEAN

- 10 — SYENITE (monzonite, granodiorite intrusions)
- 8 — TIMISKAMING GROUP
- 6 — KINOJEVIS GROUP
- 4 — SKEAD GROUP

FAULT (inferred)

GEOLOGICAL CONTACT (inferred)

" " (conjectural)



Kenogami Lake

Burt Lake

Db?

Db

4?

N

BILLITON CANADA LIMITED		
BURT PROPERTY		
INTERPRETATION OF VERTICAL GRADIENT MAGNETIC DATA		
AUTHOR: D. Rainsford	MAP NO: NTS: 42A/1	SCALE: 1:10,000
DRAWN BY: kaml	DATE: April 1985	REPORT:
		ENCL. NO: 1

100 0 200 400 600 800 METRES

D.R.B. Rainsford
22/4/1985

28016