REPORT
ON
GEOLOGICAL SURVEY ON GRID B
HARKER TOWNSHIP
LARDER LAKE MINING DIVISION
ONTARIO

M. J. Crawford

January 21, 1982

HARKER-HOLLOWAY CLAIM GROUP - GRID B
PHELPS DODGE CORPORATION OF CANADA, LTD.

LOCATION

The Harker-Holloway claim group is located thirty-five miles east of Matheson, Ontario, in the southeastern corner of Harker Township and the northwest corner of adjacent Holloway Township, District of Cochrane, Larder Lake Mining Division, Ontario. The group is approximately one to one and one-quarter miles southeast of Harker Lake in Harker Township and approximately two to two and one-half miles south of Highway 101. The nine claims border the eastern and southern margins of the patented Coin Lake property.

ACCESS

Access is most easily gained from Highway 101, which crosses the northern parts of Harker and Holloway Townships in an east-west direction. The claims can be reached by driving south on a number of good logging roads a few miles east of the Ghost River and roughly across from the Ghost Range fire tower north of Highway 101. After approximately four miles the end of the main logging road is reached and the nearest claim (L 561998) is approximately one-half mile to the east.

PROPERTY HOLDER

Golden Harker Explorations, Ltd.
H. L. Banting, Vice President
80 Richmond St., West Suite 604
Toronto, Ontario M5H 2A4

ASSESSMENT WORK CONDUCTED BY

Phelps Dodge Corporation of Canada, Ltd.
D. A. Firth, Vice President and General Manager
68 Yonge Street - Suite 219
Toronto, Ontario M5E 1L1

CLAIM NUMBERS

Harker Township

L 561998	L 578854

Holloway Township

L 578844	L 578848
L 578845	L 578849
L 578846	L 578850
L 578847	

DATE OF SURVEY

October - November, 1981

SUMMARIZED GEOLOGY

The property is underlain by a thick sequence of massive and pillowed dacite flows and minor interbedded dacite tuff, coarse diabasic and pillowed basalt flows, fine grained rhyolite flows and discontinuous lenses and minor, feature-less andesitic flows. The rocks strike 60-110° and dip steeply (70-90°) to the south; pillow tops indicate the volcanic sequence has been overturned and youngs to the south.

TABLE OF FORMATIONS (FROM OLDEST TO YOUNGEST)

Dacite I
Dacite II
Andesite I

Dacite II
Andesite I
Basalt I
Basalt II
Basalt I
Basalt II
Basalt I & II
Andesite II
Rhyolite I
Andesite III
Basalt III
Andesite IV
Basalt I & II

DESCRIPTION OF FORMATIONS

Dacite I

Massive, coarse grained dacite flows, generally featureless. Finer grained zones probably represent chilled margins of individual flow units. Light greenish-gray colour. Rare, discontinuous flow-top breccia units. 800 feet thick.

Dacite II

Fine to medium grained pillowed flows, occasionally spherulitic. Pillows generally one to two inches in length, flattened, with thin (1/8 to 1/4 inches) selvages. Where spherulitic, spherule density is low and individual spherules are widely spaced. Rare interbedded horizons of dacitic tuff. 400 to 600 feet thick.

Andesite I

Light to dark green, fine to medium grained, massive, generally featureless andesite flows. Thicker individual flow units occasionally coarser grained and diabasic in texture. 100 to 200 feet thick.

Andesite II

A relatively thin unit of light to dark green, siliceous, massive, fine to medium grained andesite. Generally featureless except for distinctly curved, quasi-conchoidal breaking pattern; also occassionally vesicular with quartz and calcite fillings. Approximately 100 feet thick.

Andesite III

Distinctive, slightly chloritized and sheared, bright green andesite. Slightly foliated, fine to medium grained. Approximately 80 feet in thickness.

Andesite IV

Very similar to Andesite II and featureless except for abundant partings of black chlorite which parallel the flow edges; however, no apparent schistosity or foliation is obvious in the fine to medium grained, light green groundmass.

Basalt I

Massive, generally coarse grained, diabasic basalt flows. Featureless. Fine to medium grained zones probably represent chilled margins of individual flow units. 1 - 2% disseminated cubic pyrite. Up to 600 feet thick.

Basalt II

Fine to medium grained, pillowed, coarse spherulitic basalt flows. Pillows well-developed, up to four feet in length, squat and undeformed. Pillow cores are slightly epidotized; selvages are up to an inch thick and contain abundant concentrations of thick spherules. Ropy surface textures and remnant implosion brecciation. Sequences of pillowed basalt are between 100 - 200 feet in thickness.

Basalt III

Very distinctive unit composed of dark green-black angular fragments of basalt (1/8 to 1/4 inch in diameter) in a chloritic, ashy matrix with smaller, white lapilli (?) fragments. Probably a tuffaceous, fragmental unit of basaltic composition. However, some clusters of fragments can be "put back together" and suggest the unit may also be a flow breccia unit. Approximately 20 - 30 feet in thickness.

Rhyolite I

Aphanitic, black-dark grey to buff-white in colour, occasional flow banding. Vesicular in places which are occasionally filled with quartz, calcite or epidote. Exhibits the same distinctive, curved, quasi-conchoidal breaking pattern exhibited by the Andesite II, with which it is in contact.

STRUCTURE

The volcanic units strike 60 - 110° and dip steeply (70-90°) to the south; pillow tops indicate the volcanic sequence has been overturned and youngs to the south. Major faults trend northwest - southeast and involve dislocations of at least 500 feet (where determined). Connecting cross-faults and less extensive parallel breaks have only slightly dislocated the volcanic units. A major east-west (strike ?) fault is inferred to separate the dacite volcanics in the northern part of the claim group from the adjacent basaltic units. More local zones of shearing, foliation, alteration to chlorite and epidote and pressure solution occur adjacent to the prominent northwest - southeast fault zones.

MINERALIZATION

Gold mineralization occurs on the Coin Lake property, which borders the claim group to the west. Gold is associated with pyrite in quartz vein stockworks localized in sheared, silicified basalt. Gold values averaged .25 ounces per ton over nearly three feet (Satterly, 1952). The Coin Lake property may be an extension of the Harker mineralization, which consists of gold-bearing, pyritic quartz lenses and pyrite-filled fractures in an east - west shear zone roughly parallel to the strike of the volcanic units.

SUMMARY OF EXPLORATION WORK

An 8,000 foot long baseline was cut at 55° across the claim group. Twenty-two winglines at 400 foot intervals totalled 8.2 miles in length and stations were chained every 100 feet. Detailed geologic mapping (1" = 400') and a VLF-EM survey with 50 foot stations were conducted on the grid.

GEOLOGIST

M. J. Crawford
10 Damude Drive
Box 916
Fonthill, Ontario L0S 1E0

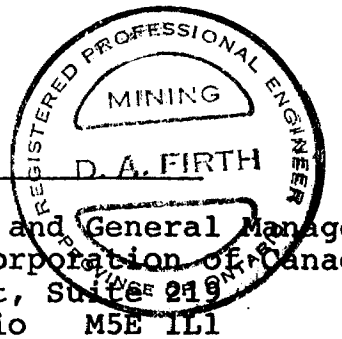
B. Sc. (Hon) 1976 University of Western Ontario
M. Sc. 1981-1982 University of Toronto

RESPECTFULLY SUBMITTED BY

Mark J. Crawford — January 21/1982

M. J. Crawford — Date

CERTIFIED BY

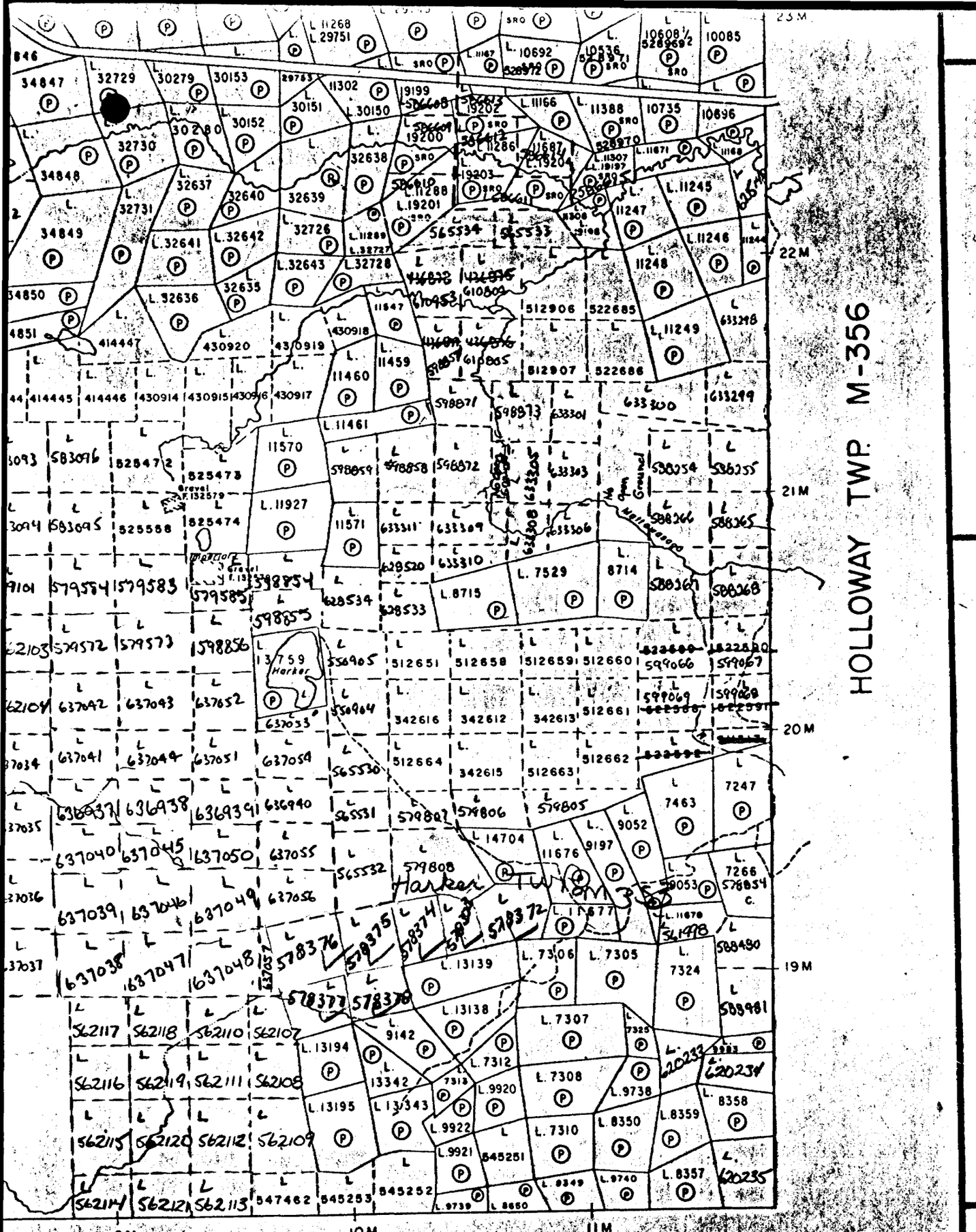


D. A. Firth
Vice President and General Manager
Phelps Dodge Corporation of Canada, Ltd.
68 Yonge Street, Suite 219
Toronto, Ontario M5E 1L1

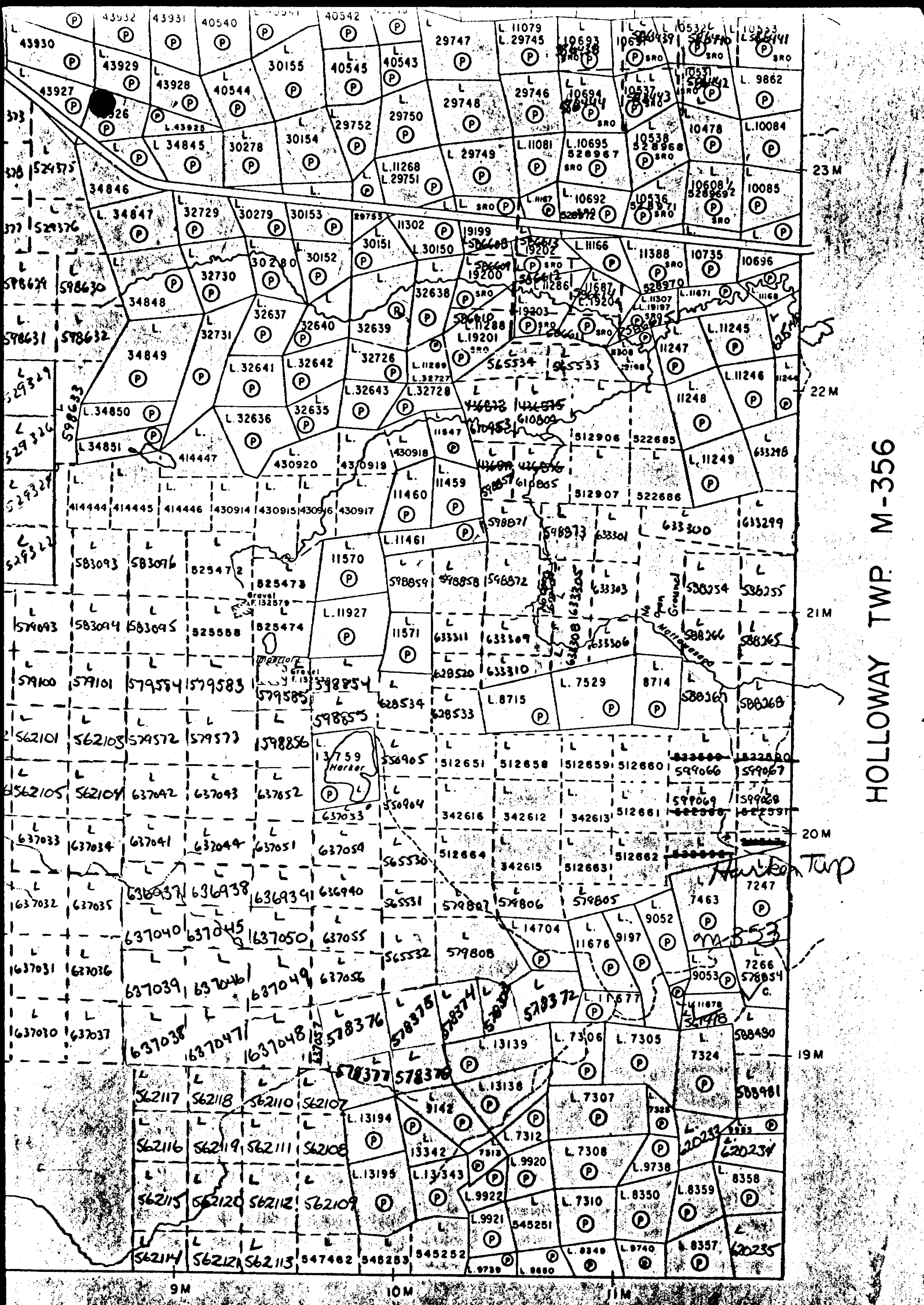
REFERENCE

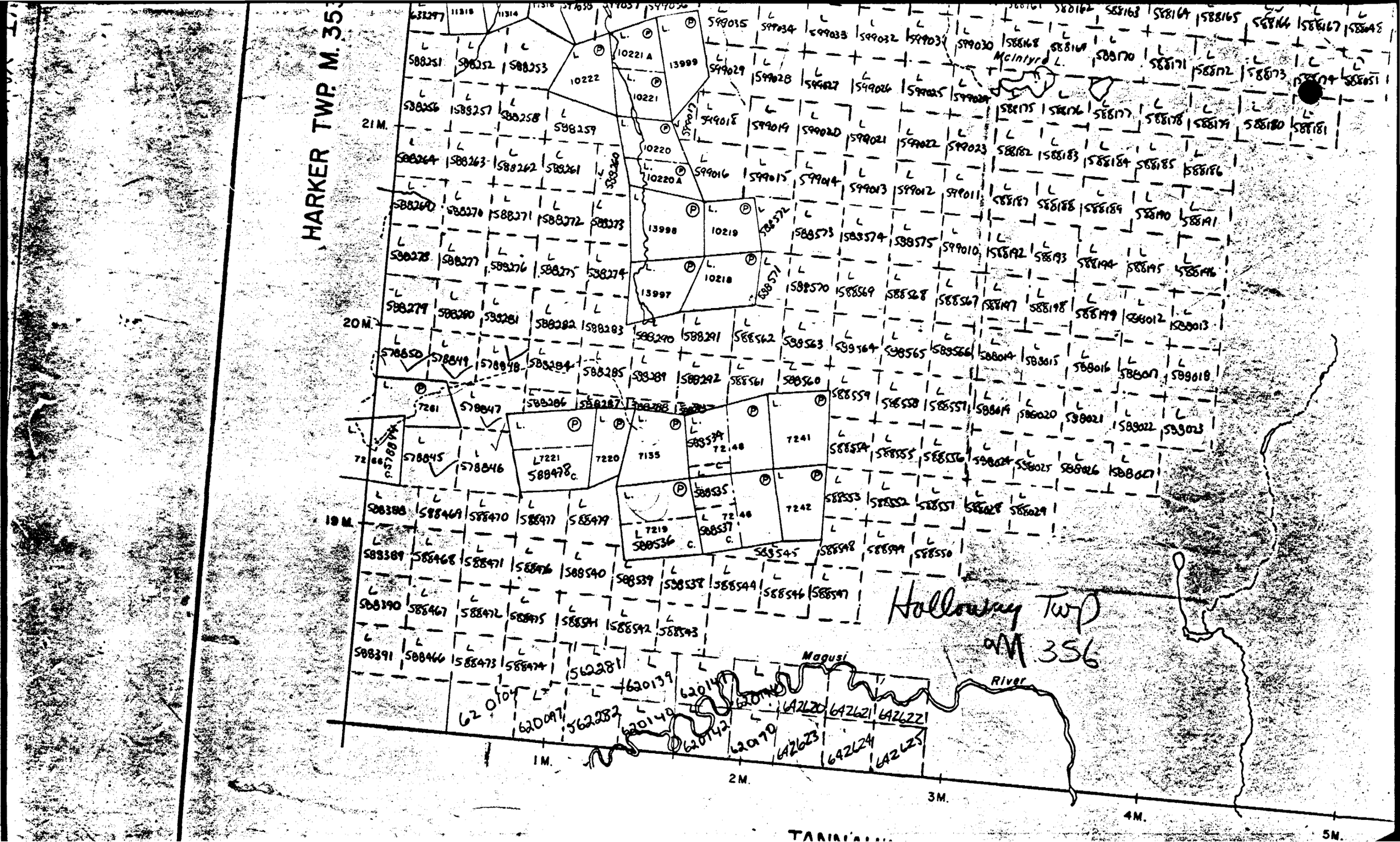
Satterly, J.
1952: The Geology of Harker Township, Ontario Dept. of Mines, Volume LX, Part 7, 1951, 47 pp.

MJC:ph
1/21/82


HOLLOWAY TWP. M-356
Harker TWP
Harker
25M
22M
21M
20M
19M
9M
10M
11M

OTT TWP. M-347


HOLLOWAY TWP. M-356
ELLIOTT TWP. M-347
Harker Twp
23 M
22 M
21 M
20 M
19 M
9 M
10 M
11 M


HARKER TWP. M. 35
Holloway Twp
9M 356
Magusi
River
McIntyre
21M.
20M.
19M.
1M.
2M.
3M.
4M.
5M.
10221 A
10222
10221
10220
10220 A
13999
13998
13997
10219
10218
7281
7221
7220
7135
7241
7242
7219
72.48
72.46
72.66

Ministry of Natural Resources
Ontario

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

Harker File

W8108000224 2.4924 The Min.

32D05NE0014 2.4924 HOLLOWAY

900

Type of Survey(s): GEOLOGICAL grid on Harker Tuple 2 2.4924	Township or Area: HARKER AND HOLLOWAY 319/5N
Claim Holder(s): PHELPS DODGE CORPORATION OF CANADA LTD.	Prospector's Licence No.: T 1125
Survey Company: 219 - 68 YONGE ST. TORONTO, ONTARIO M5E 1L1	Survey Dates (linecutting to office): 16 Day / 9 Mo. / 81 Yr. — 31 Day / 12 Mo. / 81 Yr.
	Total Miles of line Cut: 9.7
Name and Address of Author (of Geo-Technical report): MARK J. CRAWFORD, Box 916, FONTHILL, ONT LOS 1E2	7 maps 1 rep

Special Provisions Credits Requested

Instructions

For first survey:
Enter 40 days. (This includes line cutting)

For each additional survey: using the same grid:
Enter 20 days (for each)

	Days per Claim
Geophysical	
- Electromagnetic	
- Magnetometer	
- Radiometric	
- Other	
Geological	20
Geochemical	

Man Days

Instructions

Complete reverse side and enter total(s) here

	Days per Claim
Geophysical	
- Electromagnetic	
- Magnetometer	
- Radiometric	
- Other	
Geological	
Geochemical	

Airborne Credits

Note: Special provisions credits do not apply to Airborne Surveys.

	Days per Claim
Electromagnetic	
Magnetometer	
Radiometric	

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.

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
L	561998	~~40~~
	578844	~~20~~
	578845	~~20~~
	578846	~~20~~
	578847	~~20~~
	578848	20
	578849	~~20~~
	578850	~~20~~
	578854	~~20~~

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.

HARKER
MINING DIV.
RECEIVED
JUL 12 1982
AM 7 8 9 10 11 12 1 2

Total number of mining claims covered by this report of work: 9

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
180	JUL 12 1982	
	Date Approved as Recorded: 83:04:08	Regional/Branch Director

Report Completed

Date of Report	Recorded Holder or Agent (Signature)
JULY 8, 1982	D.A. Firth VICE-PRES. & GEN. MGR.

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.A. FIRTH 68 YONGE ST, SUITE 219, TORONTO, ONT M5E 1L1

Date Certified	Certified by (Signature)
JULY 8, 1982	D.A. Firth

1362 (81/2)

Ministry of Natural Resources
Ontario

Geotechnical Report Approval

File 2.4924

Dec 15/82

Mining Lands Comments

☐ To: Geophysics

Comments

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

☑ To: Geology - Expenditures W.R. Kustra

Comments

☑ Approved ☐ Wish to see again with corrections | Date Jan 20/83 | Signature W Kustra

☐ To: Geochemistry

Comments

(1)

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

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

1593 (81/10)

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) GEOLOGICAL

Township or Area HARKER AND HOLLOWAY

Claim Holder(s) PHELPS DODGE CORPORATION OF CANADA LTD.
219 - 68 YONGE ST.
TORONTO, ONTARIO
M5E 1L1

Survey Company _____

Author of Report MARK J. CRAWFORD

Address of Author BOX 916, FONTHILL, ONT L0S1E0

Covering Dates of Survey OCTOBER - DECEMBER, 1981
(linecutting to office)

Total Miles of Line Cut 9.7

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	20
Geochemical	

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

Magnetometer_____ Electromagnetic_____ Radiometric_____
(enter days per claim)

DATE: JULY 8, 1982 SIGNATURE: _____
Author of Report or Agent

Res. Geol._____ Qualifications 2.2241

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

L 561998
L 578844
L 578845
L 578846
L 578847
L 578848
L 578849
L 578850
L 578854

TOTAL CLAIMS 9

If space insufficient, attach list

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 _____

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) _____

Instrument(s) _____

(specify for each type of survey)

Accuracy _____

(specify for each type of survey)

Aircraft used _____

Sensor altitude _____

Navigation and flight path recovery method _____

_____

Aircraft altitude _____ Line Spacing _____

Miles flown over total area _____ Over claims only _____

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_____

_____

_____

_____

_____

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_____

_____

_____

1982 07 22 2.4924

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 Geological Survey submitted under Special Provisions (credit for Performance and Coverage) on Mining Claims L 561998 et al in theTownships of Harker and Holloway.

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: 416/965-1316

J. Skura/sc

c.c. Phelps Dodge Corporation
Toronto, Ontario

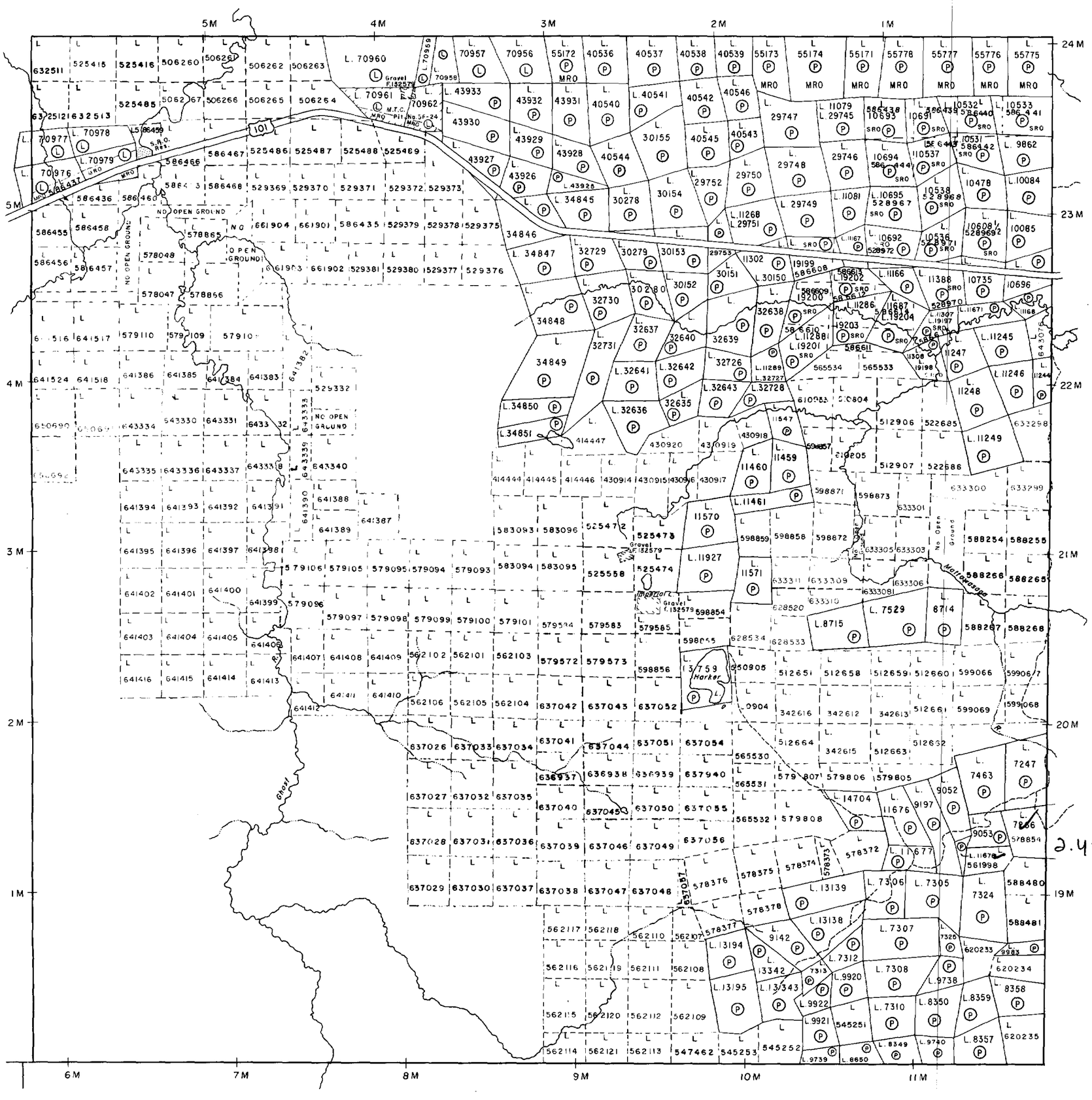
c.c. Mark J. Crawford
Fonthill, Ontario

LAMPLUGH TWP. M-358

GARRISON TWP. M-349

HOLLOWAY TWP. M-356

ELLIOTT TWP. M-347



THE TOWNSHIP
OF

HARKER

DISTRICT OF
COCHRANE

LARDER LAKE
MINING DIVISION

SCALE: 1-INCH 40 CHAINS

LEGEND

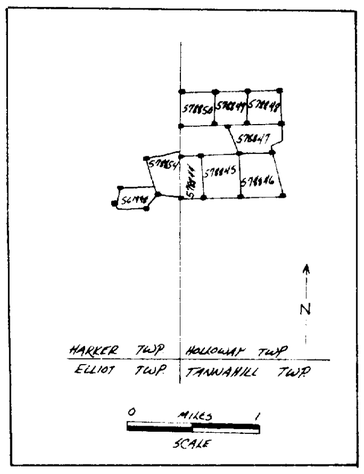
PATENTED LAND	● or (P)
CROWN LAND SALE	C.S.
LEASES	(L)
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C
PATENTED S.R.O.	

NOTES

400' Surface Rights reservation along the shores of all lakes and rivers.

PLAN NO. M-353

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH



PHELPS DODGE CORPORATION OF CANADA
OCTOBER - NOVEMBER, 1981

GEOLOGISTS: M J. CRAWFORD
R. J. MOYE

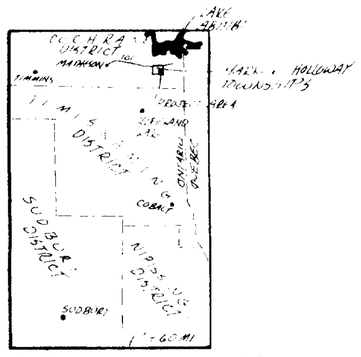
COMPILED AND DRAFTED BY M.J.C.
1/18/82
M J Crawford 3/11/82
Verified

400' 200' 0 400'
1 INCH = 400'

VEGETATION ABBREVIATIONS

sp = spruce
ald = alder
bch = birch
tam = tamarack
mus = muskeg

210



PROJECT LOCATED IN SOUTH-EASTERN HARKER TOWNSHIP, COCHRANE DISTRICT, LARDER LAKE MINING DIVISION

SYMBOLS

- SMALL OUTCROP
- OUTLINE OF LARGER OUTCROP
- AREA CONTAINING DISPERSED OUTCROP
- INFERRED GEOLOGIC CONTACT
- STRIKE, DIP, DIRECTION OF DIP
- STRIKE, VERTICAL DIP
- STRIKE, DIP OF PILLOWED UNITS (CONVEX DIRECTION INDICATES STRATIGRAPHIC TOP)
- INFERRED FAULT PLANE
- SHEARING / SCHISTOSITY
- SHAFT
- MINE DUMP
- TRENCH
- TEST PIT
- CLAIM POST (LOCATED)
- CLAIM POST (ESTIMATED)
- LOGGING ROAD
- SWAMP
- STREAM

ABBREVIATIONS

Py = Pyrite
QV = QUARTZ VEIN
QTZ = QUARTZ
CHL = CHLORITE / CHLORITIC
EPID = EPIDOTE

EXPLANATION

CENOZOIC

RECENT AND PLEISTOCENE
Clay, sand, glacial erratics

PRECAMBRIAN

VOLCANICS

1) BASALT
a) fine grained massive flow
b) coarse-grained (diabasic) flow
c) pillowed flow
d) pillowed, spherulitic flows
e) flow-top breccia
f) vesicular-amygdaloidal flow
g) tuff-agglomerate
h) feldspar porphyry

2) ANDESITE
a) fine grained massive flow
b) coarse grained (diabasic) flow
c) pillowed flow
d) pillowed, spherulitic flows
e) flow-top breccia
f) vesicular-amygdaloidal flow
g) tuff-agglomerate
h) feldspar porphyry

3) DACITE
a) fine grained massive flow
b) coarse grained massive flow
c) pillowed flow

3) DACITE (continued)
d) flow-top breccia
e) tuff-agglomerate
f) feldspar porphyry

4) RHYOLITE
a) white, fine grained flow
b) gray-black fine grained flow
c) vesicular-amygdaloidal flow
d) flow top breccia

INTRUSIVES

6) DIABASE
a) dike
b) sill

18) SYENITE
a) pink, porphyritic syenite