2.2834





# AIRBORNE ELECTROMAGNETIC SURVEY

ESSO MINERALS CANADA

WALKER-WILKIE AREA, ONTARIO

PROJECT #20033 AUGUST 1978

Questor Surveys Limited, 6380 Viscount Road, Mississauga, Ontario L4V 1H3

## INTRODUCTION

This report contains our interpretation of a portion of the results of an airborne electromagnetic survey flown in the Walker-Wilkie Area, Northeastern Ontario, on July 14, 15, 16 and 17, 1978. A brief description of the survey procedure together with recommendations for ground follow-up is included.

The survey totalled 505 line miles and was performed by Questor Surveys Limited. The survey aircraft was a Britten Norman Trislander C-GSZI and the operating base was Timmins, Ontario.

The area outline is shown on a 1:250,000 map at the end of this report. This is part of the National Topographic Series, Map Sheet 42A.

## MAP COMPILATION

The base maps are uncontrolled mosaics constructed from 1" = 1320' Ontario Department of Natural Resources photographs. These mosaics were reproduced at a scale of 1" = 1/4 mile, on stable transparent film from which white prints can be made.

Flight path recovery was accomplished by comparison of the prints of the 35mm film with a mosaic in order to locate the fiducial points. These points are approximately 4500 feet apart.

SURVEY PROCEDURE

Terrain clearance was maintained as close to 400 feet as possible, with the E.M. Bird at approximately 150 feet above the ground. A normal S-pattern flight path using approximately one mile turns was used. The equipment operator logged the flight details and monitored the instruments.

A line spacing of 1/8 mile was used.

RESULTS

Conductive clay covers most of this surveyed area and has caused considerable disturbance on the first two or three INPUT channels. In the assessment of the area, I have attempted to discriminate surficial responses from legitimate bedrock conductors. Conductors that are considered to have a bedrock origin, have been circled and allocated a number. All of these are discussed briefly in a table that follows. Those responses that are considered surficial have been circled with a broken line.

Data acquired in the northwest portion of the survey area was severely disturbed by the power dam at Twin Falls on the Abitibi River.

Of the 21 zones that have been outlined on the map as possible bedrock conductors, 19 are recommended for further work.

D. Watson

D. Watson

| CONDUCTIVE ZONE | APPARENT CONDUCTIVITY THICKNESS | MAGNETIC CORRELATION | COMMENTS | FURTHER WORK RECOMMENDED |
|---|---|---|---|---|
| 12 | low | direct magnetic correlation with northern most conductor | Low conductivity-thickness values have been approximated for the anomalies of these two apparent conductors and the source of the anomalies are questionable. | Yes; but on a low priority. |
| 14 | low to moderate | high direct magnetic correlation at the east end; some lower mag peaks to the west | This long staggered horizon does not appear too interesting because of its length and low conductivity. Graphite in small amounts could be a cause of some of the conduction. | Yes; Suggest that the east end be examined because of the magnetics associated with the conduction. |
| 15 | low to moderate | high magnetic correlation | Some work has been done on this conductor and pyrite, pyrrhotite and some chalcopyrite have been encountered in a drill hole. | Yes;The east end centered around anomaly 42D is recommended for work. This anomaly is a definite bedrock response. |

# APPENDIX

## EQUIPMENT

The aircraft are equipped with Mark VI INPUT (R) airborne E.M. systems and Geometrics G 803 proton precession magnetometers. Radar altimeters are used for vertical control. The outputs of these instruments together with fiducial timing marks are recorded by means of galvanometer type recorders using light sensitive paper. Thirty-five millimeter continuous strip cameras are used to record the actual flight path.

### (I) BARRINGER/QUESTOR MARK VI INPUT (R) SYSTEM

The Induced Pulse Transient (INPUT) system is particularly well suited to the problems of overburden penetration. Currents are induced into the ground by means of a pulsed primary electromagnetic field which is generated in a transmitting loop around the aircraft. By using half sine wave current pulses and a loop of large turns-area, the high output power needed for deep penetration is achieved.

The induced current in a conductor produces a secondary electromagnetic field which is detected and measured after the termination of each primary pulse. Detection is accomplished by means of a receiving coil towed behind the aircraft on four hundred feet of cable, and the received signal is processed and recorded by equipment in the aircraft. Since the measurements are in the time domain rather than the frequency domain common to continuous wave systems, interference effects of the primary transmitted field are eliminated. The secondary field is in the form of a decaying voltage transient originating in time at the termination of the transmitted pulse. The amplitude of the transient is, of course, proportional to the amount of current induced into the conductor and, in turn, this current is proportional to the dimensions, the conductivity and the depth beneath the aircraft.

The rate of decay of the transient is inversely proportional to conductivity. By sampling the decay curve at six different time intervals, and recording the amplitude of each sample, an estimate of the relative conductivity can be obtained. By this means, it is possible to discriminate between the effects due to conductive near-surface materials such as swamps and lake bottom silts, and those due to genuine bedrock sources. The transients due to strong conductors such as sulphides exhibit long decay curves and are therefore commonly recorded on all six channels. Sheet-like surface materials, on the other hand, have short decay curves and will normally only show a response in the first two or three channels.

The samples, or gates, are positioned at 310, 490, 760, 1120, 1570 and 2110 micro-seconds after the cessation of the pulse. The widths of the gates are 180, 180, 360, 360, 540 and 540 micro-seconds respectively.

For homogeneous conditions, the transient decay will be exponential and the time constant of decay is equal to the time difference at two successive sampling points divided by the log ratio of the amplitudes at these points.

## (II) GEOMETRICS G-803 PROTON PRECESSION MAGNETOMETER

The magnetometers which measure the total magnetic field have a sensitivity of 1 gamma and a range from 20,000 gammas to 100,000 gammas.

Because of the high intensity field produced by the INPUT transmitter, the magnetometer results are recorded on a time-sharing basis. The magnetometer head is energized while the transmitter is on, but the read-out is obtained during a short period when the transmitter is off. Using this technique, the head is energized for 1.15 seconds and then the transmitter is switched off for 0.15 seconds while the precession frequency is being recorded and converted to gammas. Thus a magnetic reading is taken every 1.3 seconds.

## DATA PRESENTATION

The symbols used to designate the anomalies are shown in the legend on each map sheet, and the anomalies on each line are lettered in alphabetical order in the direction of flight. Their locations are plotted with reference to the fiducial numbers on the analog record.

A sample record is included to indicate the method used for correcting the position of the E.M. Bird and to identify the parameters that are recorded.

All the anomaly locations, magnetic correlations, conductivity-thickness values and the amplitudes of channel number 2 are listed on the data sheets accompanying the final maps.

## GENERAL INTERPRETATION

The INPUT system will respond to conductive overburden and near-surface horizontal conducting layers in addition to bedrock conductors. Differentiation is based on the rate of transient decay, magnetic correlation and the anomaly shape together with the conductor pattern and topography.

Power lines sometimes produce spurious anomalies but these can be identified by reference to the monitor channel.

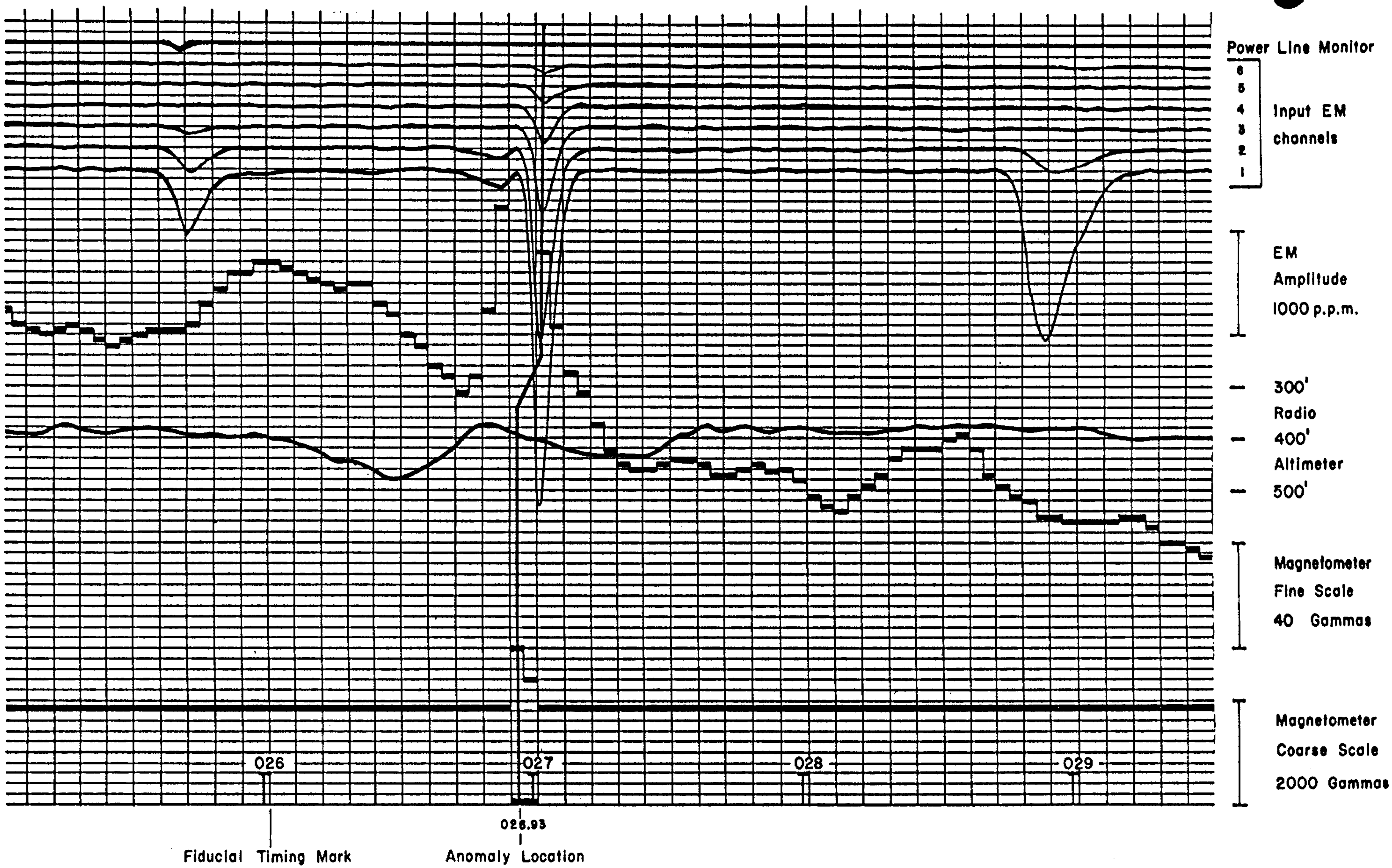
Railroad and pipeline responses are recognized by studying the film strips.

Graphite or carbonaceous material exhibits a wide range of conductivity. When long conductors without magnetic correlation are located on or parallel to known faults or photographic linears, graphite is most likely the cause.

Contact zones can often be predicted when anomaly trends coincide with the lines of maximum gradient along a flanking magnetic anomaly. It is unfortunate that graphite can also occur as relatively short conductors and produce attractive looking anomalies. With no other information than the airborne results, these must be examined on the ground.

Serpentinized peridotites often produce anomalies with a character that is fairly easy to recognize. The conductivity which is probably caused in part by magnetite, is fairly low so that the anomalies often have a fairly large response on channel #1; they decay rapidly, and they have strong magnetic correlation. INPUT E. M. anomalies over massive magnetites show a relationship to the total Fe content. Below 25 - 30%, very little or no response at all is obtained, but as the percentage increases the anomalies become quite strong with a characteristic rate of decay which is usually greater than that produced by massive sulphides.

Commercial sulphide ore bodies are rare, and those that respond to airborne survey methods usually have medium to high conductivity. Limited lateral dimensions are to be expected and many have magnetic correlation caused by magnetite or pyrrhotite. Provided that the ore bodies do not occur within formational conductive zones as mentioned above, the anomalies caused by them will usually be recognized on an E.M. map as priority targets.




Representative INPUT, Magnetometer and Altimeter Recording


BROWER
FOX
574
STIMSON
Stimson
Diamond
SWEATMAN
FINDLAY
Bingle
CANADIAN
NATIONAL
ST JOHN
Arpin
PYNE
MORTIMER
SHERRING
MARATHON
Fire Lookout
Potter
Tunis
NEWMARKET
AURORA
EDWARDS
WESLEY
MOODY
Devonshire
960
Niddville
Microwave
Montrock
Iroquois Falls
578
Nellie Lake
Ansonville
TEEFY
RICKARD
McCART
Porquis (abandoned)
Onagon
Twin Falls
Dam
KNOX
11
67
577
Welsh
CALVERT
Porquis Junction
Kelso
Kilburn
DUNDONALD
CLERGUE
WALKER
WILKIE
COULSON
626
McIntosh Springs
Barbers Bay
Monteith
Val Gagné
Alert
Abandoned
GERMAN
STOCK
TAYLOR
CARR
BEATTY
KETTLE LAKES PROVINCIAL PARK
Night Hawk Centre
101
Shillington
Anthony
Matheson
Belleek
Wataybeag
East Peninsula
MACKLEM
CURRIE
BOWMAN
HISLOP
ONTARIO
BOND
Holtyre
572
Ramore
THOMAS
SHERATON
EGAN
PLAYFAIR
Black
River
Moose Lake
Reid L
Sheraton L

Ontario

# Ministry of Natural Resources

File__________

## GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL

TECHNI 42A09NW0133 2.2834 WILKIE 900 ETC.

Type of Survey(s) Airborne Electromagnetic

Township or Area Wilkie Township

Claim Holder(s) Hollinger Mines Limited
Box 320, Timmins, Ontario P4N 7E2

Survey Company Questor Surveys Limited

Author of Report D. Watson

Address of Author 6380 Viscount Road, Mississauga, Ontario L4V 1H3

Covering Dates of Survey July 14 - November 2, 1978 (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 ____ Electromagnetic 20 Radiometric ____ (enter days per claim)

DATE: Nov 6/78 SIGNATURE: D Watson
Author of Report or Agent

OFFICE USE ONLY

Res. Geol. L.D. Qualifications 2.2595

Previous Surveys

| File No. | Type | Date | Claim Holder |
|---|---|---|---|
| | | | |

**MINING CLAIMS TRAVERSED**
**List numerically**

(prefix) (number)

| | | |
|---|---|---|
| L.496979 | L.504855 | L.499013 |
| L.496980 | L.504856 | L.499014 |
| L.496981 | L.504857 | L.499015 |
| L.496982 | L.504858 | L.499016 |
| L.496983 | L.504859 | L.499017 |
| L.496984 | L.504860 | L.499018 |
| L.496985 | L.504861 | L.499019 |
| L.496986 | L.504862 | L.499020 |
| L.496987 | L.504863 | L.499021 |
| L.496988 | L.504864 | L.499022 |
| L.504846 | L.504865 | L.499023 |
| L.504847 | L.504877 | L.499024 |
| L.504848 | L.504878 | L.499025 |
| L.504849 | L.504879 | L.499026 |
| L.504850 | L.504880 | L.499027 |
| L.504851 | L.504881 | L.499028 |
| L.504852 | L.504882 | L.499029 |
| L.504853 | L.499011 | L.499030 |
| L.504854 | L.499012 | |

If space insufficient, attach list

TOTAL CLAIMS 56

## 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) Electromagnetic Survey

Instrument(s) Mark VI Input (R) Airborne EM System
(specify for each type of survey)

Accuracy Magnetics - 5 gammas E.M. - 50 ppm.
(specify for each type of survey)

Aircraft used Britton Norman Trislander C-GSZ1

Sensor altitude 150'

Navigation and flight path recovery method Normal S-pattern flight path using approximate one mile turns.

Aircraft altitude 400' Line Spacing 1/8 mile

Miles flown over total area 505 Over claims only 28

28 x 40 = 1120 ÷ 56 = 20 days

# 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 ______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

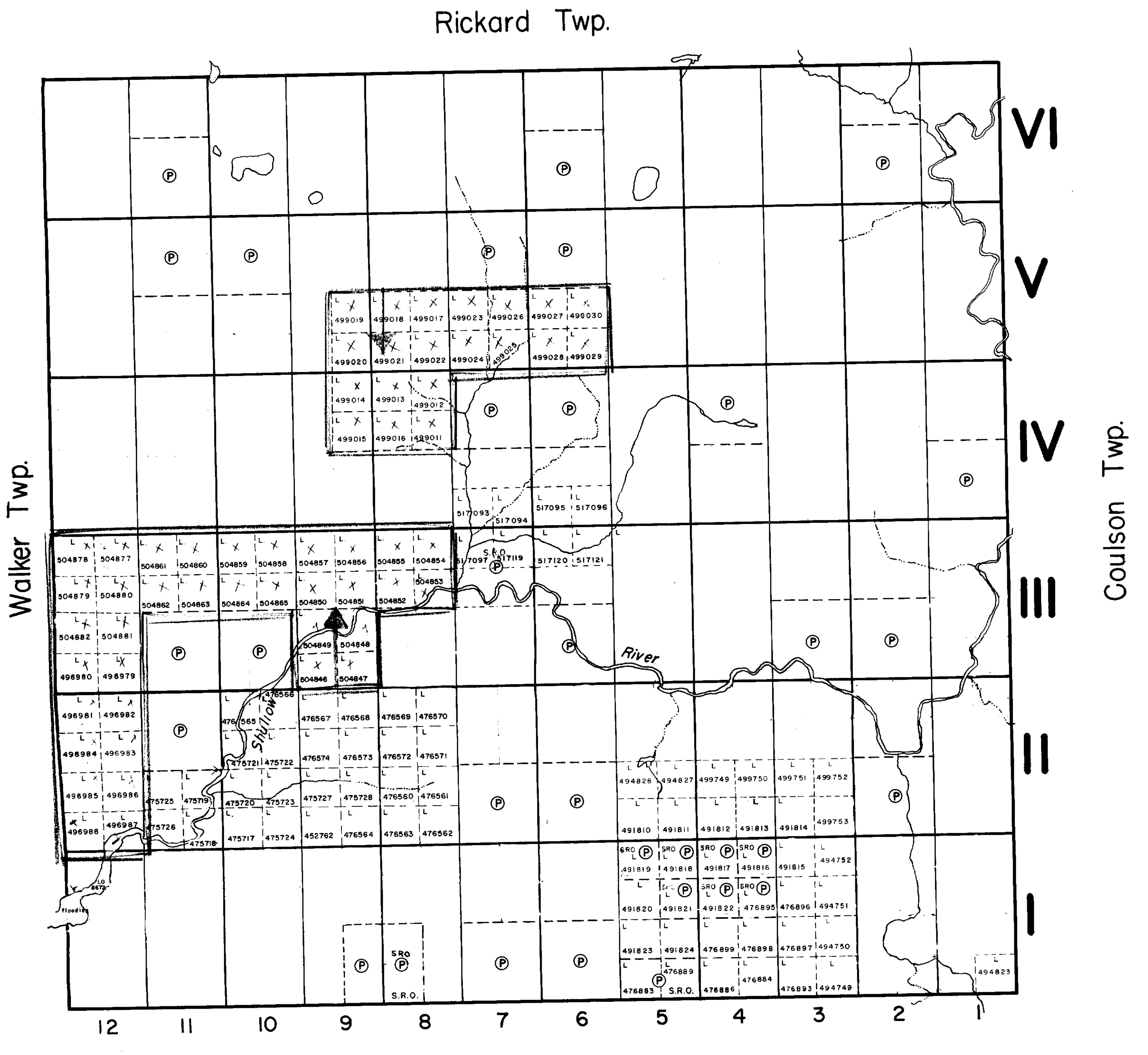
______________________________

______________________________

| NAME: | COMPANY NAME: |
|---|---|
| COMPANY TELEPHONE: (A.C. ) | COMPANY LOCALITY: |

| FILE NUMBER | DATE | RETURNED |
|---|---|---|
| Monmouth TWP | Feb 15/88 | |
| 2 2754 ✓ | | |
| 2 1899 ✓ | | |
| 41 ✓ | | |
| 25 ✓ | | |
| 21481 ✓ | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

BOOTH: | RETURNING: NO ☐ YES ☐ | FICHE OUTSTANDING: NO ☐ YES ☐




# THE TOWNSHIP OF WILKIE

2.2834

DISTRICT OF COCHRANE

LARDER LAKE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

## LEGEND

| | |
|---|---|
| PATENTED LAND | Ⓟ |
| CROWN LAND SALE | C.S. |
| LEASES | Ⓛ |
| 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 | |

## NOTES

400' Surface rights reservation around all lakes and rivers.

DATE OF ISSUE
NOV - 9 1978
SURVEYS AND MAPPING BRANCH

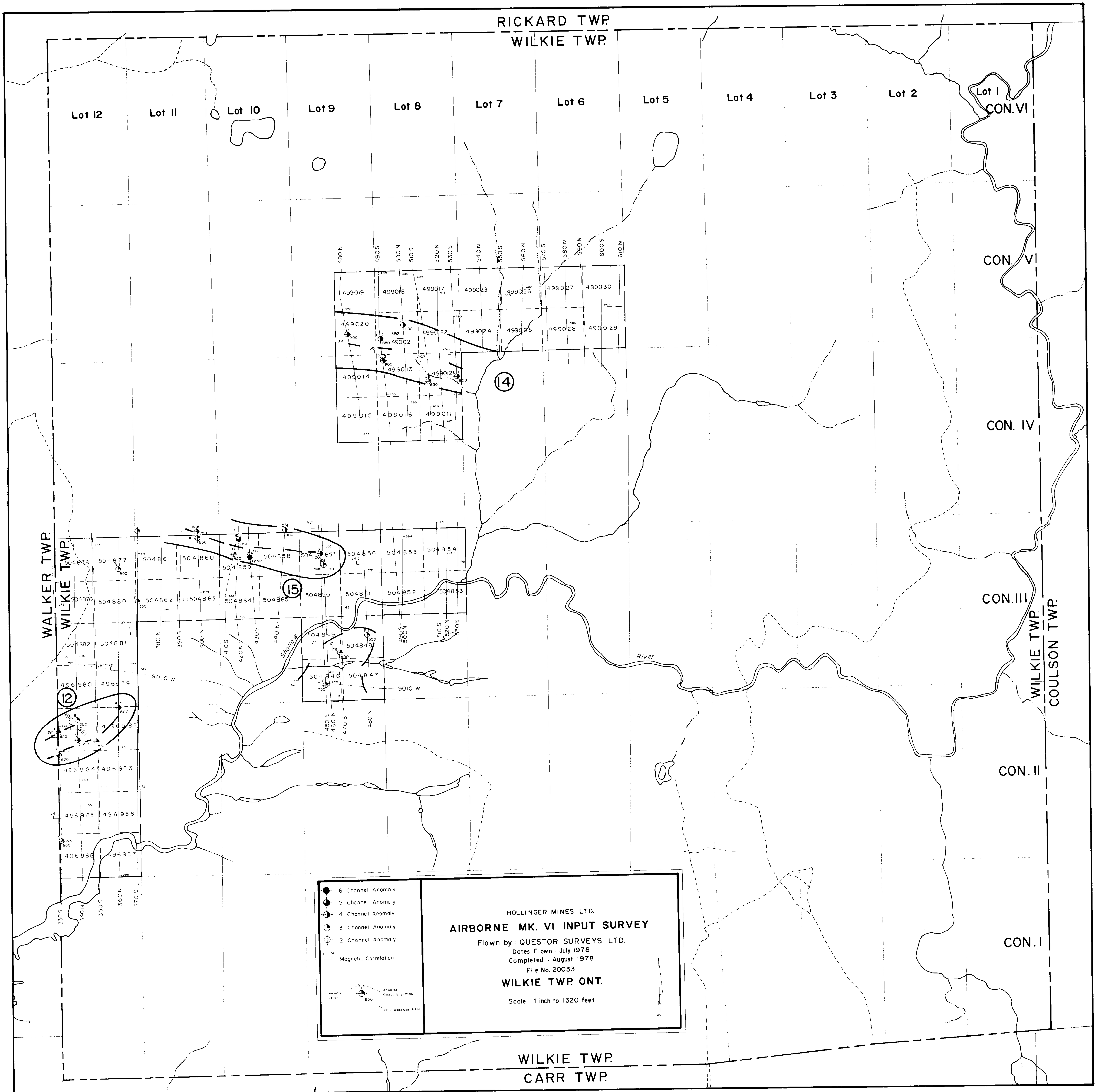
PLAN NO.- M.398

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

42A09NW0133 2.2834 WILKIE

200

B.D.




42A05NW0133 2.2834 WILKIE

210