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REPORT ON

MINING LANDS SECTION

ELECTROMAGNETIC (H.E.M.) and MAGNETOMETER SURVEY

ON

HUFFMAN TOWNSHIP PROPERTY

FOR

TONAPAH RESOURCES INC. VANCOUVER, B.C.

MAY 16, 1984

JOHN R. BOISSONEAULT, B.Sc. P.Eng. Geologist, Engineer

2.740





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INTRODUCTION

During the period of March 14 to April 10, 1984, a geophysical field party carried out a magnetometer and horizontal loop electromagnetic survey on the Huffman Township property of Tonapah Resources Inc., in the Porcupine Mining Division of northeastern Ontario. This was done under the supervision of a professional engineer.

The survey grid consisted of cut-out and chained, north-south picket lines, 400 feet apart, with stations established every 100 feet, a total of 19.5 miles. The location of the grid, relative to the claim boundaries, is shown on the "General Plan" on a scale of 1 inch = 400 feet.

The property consists of 25 claims, and is located in the southwest corner of Huffman Township. Of these claims, twenty-four form a rectangle, one mile from north to south and one and one-half miles from east to west, while the twenty-fifth is tied on to the eastern boundary. The claims are identified as follows: P-683202, P-684003 to P-684012, P-688086 to P-688096, P-683182 to P-683183 and P-683961. These are shown on the "General Plan", and on the "Location and Claim Map".

The claim block covers an area of considerable relief, with high hills in the southern part and a low lying swampy section running east-west along the medial line of the claim block. There are several lakes on the property, the largest being Boundary Lake, on the western edge. There are several outcrop on the property, particularly in the western section, where the overburden is quite thin.

One of the purposes of the survey was to detect sub-surface concentrations of metallically conducting mineralization, with anomalous magnetic susceptibility, which might occur beneath the grid covered, and within the range of the instruments. Some of the gold bearing ore deposits in the Precambrian Shield, occur as bodies of auriferous pyrite which are sometimes distinguishable from the enclosing rocks by their electrical conductivity. Another purpose was to discover possible mineralized shear zones or other structures containing gold or other metals; these zones are usually conductive at the frequency employed. It was also hoped that the magnetics might provide additional data which could be used to interpret the geology and the structural features on the property.

Unfortunately, anomalous geophysical responses may also be caused by features which have little or no commercial significance. These are often undistinguishable from features of interest, by the geophysical means employed.

GEOLOGICAL BACKGROUND

The area surveyed lies within a belt of mafic metavolcanics, which make up the lower part and the south limb of the Swayze Syncline. These formations are mainly sheared tholeitic flows of Archean (Early Precambrian) age. They are mainly fine grained, but contain massive, medium to coarse grained sections, in the eastern part of the property. The strike of the flows is almost east-west (280°), and the dip is steep and to the north. Several belts of ironstone or interbedded ferruginous chert occur concordantly within the volcanics. One of these belts lies

along the southern boundary of the property for most of its length. The stratigraphically overlying clastic sediments of the more inner part of the syncline are found along the northern edge of the claim block. The meta-volcanics lie in contact with the regional granite along an east-west line to the south of the Tonapah property.

A large fault zone, which is referred to as the "Jerome Fault", crosses the eastern half of the claim block in a direction of N-40°-W (320°). The northeastern side has been displaced northwestward for about 3000'. This fault zone is considered to have much bearing on the localization of the gold deposits at the Jerome Mine, which lies about three miles to the northwest of the claim block.

INSTRUMENTATION AND PROCEDURE

A Scintrex M.F.-1, fluxgate type magnetometer unit was used for the survey, with readings taken at each station, at 100 foot intervals, along the north-south lines. The instrument measures the vertical component of the earth's magnetic field, at the point where the reading is taken. Its accuracy of ± 5 gamma is sufficient in this area where the magnetic relief is considerable, even away from the ironstone formations. The readings are subject to diurnal variation and other drift factors such as temperature; therefore a "tie-in" procedure is used to correct this. The instrument is set daily at a base station and the survey is conducted in loops (8N, 12N, 12S, 8S); then the base line stations are read during a short interval and the readings from the cross lines are adjusted to the base line stations. The corrected readings are presented on three plans entitled

"Magnetic Contours", "East", "Central" and "West". The contour interval is 100 gamma, and the scale is 1 inch = 200 feet.

A Max-Min II electromagnetic unit was used for the H.E.M. part of the survey, at a frequency of 1777 Hz. This frequency was selected because it is considered to be high enough to indicate the features anticipated to be of interest (mineralized shear zones), but not high enough to pick up conductive overburden to the extent that it would mark the desired features. The horizontal loop configuration (loops horizontal and coplanar) is utilized, and the cable length selected was 400 feet. The transmitting and receiving coils are moved in line, held at constant separation by the cables, through which is passed a reference signal. inphase and outphase components of the resultant electromagnetic field are measured at the receiver and are expressed as a percentage of the free air primary field. These are presented in profile on three plans entitled "H.E.M. Profiles", "East", Central" and "West". The surface scale is 1 inch = 200 feet and the H.E.M. scale is 1 inch = 10%.

MAGNETIC RESULTS

The most prominent magnetic features on the survey grid are long irregular, east-west trending highs and flanking lows of from 1000 to 5000 gamma of relief, which are undoubtedly the reflection of magnetic ironstone formations. The longest of these formations runs along the south boundary in the western and central sections and then turns southward, off the property in the eastern section. The faulted extension of this formation runs along the base line and slightly north

of it on the eastern section of the claim block. The ironstones seem to consist of two parallel bands, with the northern band being considerably less magnetic; but more conductive than the southern band.

The general magnetic trend is east-west and the magnetic relief increases toward the west. This is consistent with the anticipated strike of the mafic metavolcanics, which underlie most of the property, and suggests a thinning of the overburden to the west. The occurrence of several outcrop along the shore of Boundary Lake confirms this. There are several isolated magnetic highs, particularly in the west, which are probably due to boulders of magnetic ironstone in the overburden, near the surface. Superimposed on the east-west trend is a long magnetic trough of 100 to 200 gamma below background, which starts at about 7+00 north on line 48+00 east and strikes south -70°-west (250°) up to about 5+00 south on line 12+00 east. A flanking magnetic ridge, to the north of the trough, extends from line 32+00 east to line 4+00 east and has a relief of 200 to 1000 gamma. The cause of these features is presently unknown.

Two other prominent magnetic features were revealed, both occurring in the central portion of the property. These are long narrow linear magnetic highs, striking north 45° to 50° west (315° to 310°), and probably caused by diabase dikes. An interesting point is that these linear highs appear to be displaced segments of the same anomaly, and that the point of displacement appears to be the long magnetic trough referred to in the preceding paragraph.

The general magnetic trend is clearly displaced by a fault which crosses the eastern part of the claim block

in a direction of north-40°-west (320°). This is undoubtedly the Jerome Fault described under "Geological Background" (see Magnetic Contours, East Sheet).

ELECTROMAGNETIC RESULTS

The electromagnetic portion of the survey reveals that several areas of anomalous conductivity occur on the claim block. A long axis of moderate to strong conductivity along the southern edge of the property ("H") and about 400' north of the base line, on the eastern side of the Jerome Fault ("E"), is undoubtedly caused by the most northerly of the two ironstone formations. Excluding these, there are four series of electromagnetic anomalies on the property, one of which may be accounted for, and three of which have unknown causes.

The most important of these is the series of narrow conductors along, and just north of the base line, in the central portion of the property. These include "A", "B" and "B₁". Conductor "A" as indicatld at 3+00 north on line 24+ 00 and at 4+00 north on line 28+00, is of moderate strength, less than 100 feet wide, dips steeply to the north and trends slightly north of east. This anomaly is very weakly indicated on several lines to the east. Conductor "B" is well indicated at 3+00 north on line 44+00 where the conductivity is moderate to strong; otherwise it is similar to "A" and its axis is clearly indicated to the west on lines 40+00, 36+00, and 32+00, where the conductivity is low. Conductor "B1" flanks "B" to the south and is well indicated near the base line on lines 44+00 and 48+00; it is narrow (less than 50 feet) and the conductivity is low, but the axis may extend as far east as line 60+00.

There is another interesting series of electromagnetic anomalies on the southeastern part of the claim block. These include "F", "F $_1$ ", "G" and "G $_1$ ". Conductor "G" is the best of these and is strongest on line 64+00 at 14+00 south. The zone is in excess of 100 feet wide and almost vertical; its axis, striking east-west is weakly indicated on lines 64+00 and 68+00. Parallel conductors "F" and "F $_1$ " are narrow zones of low conductivity and are clearly indicated on line 48+00 at 10+00 and 12+00 south.

Conductors "C" and "C1" were picked up at the northern end of lines 48+00 and 52+00. Unfortunately the profiles could not be completed because the lines end at the property boundary. However, it seems that these are broad parallel zones of moderate conductivity, striking northeasterly and having steep dips.

Conductor "D" is a long east-west axis of moderate to strong conductivity, at 10+00 to 12+00 north extending from line 68+00 to line 84+00 near the property's eastern boundary. On most lines the zone appears to be about 100 to 50 feet wide and has an almost vertical dip. This anomaly appears to reflect the western extension of an ironstone formation containing graphite and sulphides, which was drilled by Falconbridge Nickel Mines in 1966 to the east. Low values in gold and copper were obtained over a 16 foot width in this hole.

CONCLUSIONS AND RECOMMENDATIONS

The geophysical survey has detected several zones of anomalous conductivity on the claim block. It appears

that some of these are indications of ironstone formations, and the Falconbridge program of 1966 has shown that the ironstones contain low values in gold and copper. Despite this, and the possibility that these formations could contain higher concentrations of these metals on the property, I consider these to be of secondary interest.

Of primary interest are the series of conductors near the base line, in the central portion of the property. The reasons for the high priority that I place on these are as follows. Some of the gold deposits in the area are associated with disseminations and stringers of pyrite and chalcopyrite which have mineralized shear and fracture zones near a large fault (eg. Chester deposits). zones are intensely silicified and lie within areas of dolomite carbonatization. Their conductivities are similar to those encountered during the survey and they lie within magnetic lows resulting from the destruction of magnetic minerals, in the host rock, during the carbonatization process. Examination of the H.E.M. profiles and the magnetics in the central section reveals that the conductive zones lie within or near long narrow, subtle, but extensive magnetic lows. Furthermore, both the conductivity and the magnetic features appear to terminate against the Jerome Fault, which several geologists feel, is the localizing influence on the Jerome gold deposits to the northwest. I therefore recommend that both conductors "A" and "B" be tested by diamond drilling. "A" should be intersected between lines 24+00 and 28+00, while "B" should be drilled at line 44+00, with the hole extended to cut "B₁".

Conductor "G" is also a high priority target since

it has all the features of the anomalies referred to in the previous paragraph. It lies within a broad magnetic low and crosses line 72+00, only a few feet from the Jerome Fault. This conductor should also be tested by drilling, the best location being line 64+00 or slightly east of it. The flanking conductor "G1" is of lower priority, but should also be further investigated if this is possible.

Unfortunately conductors "C" and " C_1 " obviously extend across the northern boundary of the property and the absence of data makes interpretation difficult. I feel however, that they are of sufficient importance to pursue further, even if this means reaching some agreement with the owners of the claims bordering the property to the north. These anomalies also terminate against the Jerome Fault and could be an extension of those in the central section.

Conductors "F" and "F₁" are weak and are well indicated only in one place; however they are within an area of linear magnetic lows and should also be tested by subsurface exploration. Both conductors could be intersected by one drill hole collared on line 48+00 and drilled about 30° west of south.

Conductor "D" is probably the ironstone formation drilled by Falconbridge. This is a target of secondary priority, but the occurrence of low grade gold and copper on the Falconbridge property to the east give it some importance. The company should consider testing the formation further west; this could be accomplished by a drill hole in the vicinity of line 62+00 east.

The recommended program would consist of at least five diamond drill holes, with an average depth of 400 feet for a total of 2000 feet. If an agreement can be reached to acquire the claims to the north, then conductors "C" and "C1" could be tested with one drill hole about 600 feet deep, extending the program to 2600 feet of drilling.

I suggest that the company do at least one day of detail geophysics and property examination prior to drilling. The geophysics would consist of vertical loop electromagnetics over the strongest section of each conductor, in order to better locate the conductor axis and ascertain dip. The examination of each anomaly area would determine the best sites for drill location and access. In this way the planning of the drilling program would be facilitated, and the exact location, direction and dip of each hole would be determined with more precision, resulting in savings in diamond drilling costs.

Respectfully submitted,

J.R. BOISSONEAULT M. B.Sc. P.Eng.

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J. R. BOISSONEAULT THE

LOCATION AND CLAIM MAP TONAPAH RESOURCES INC. HUFFMAN TOWNSHIP ONTARIO

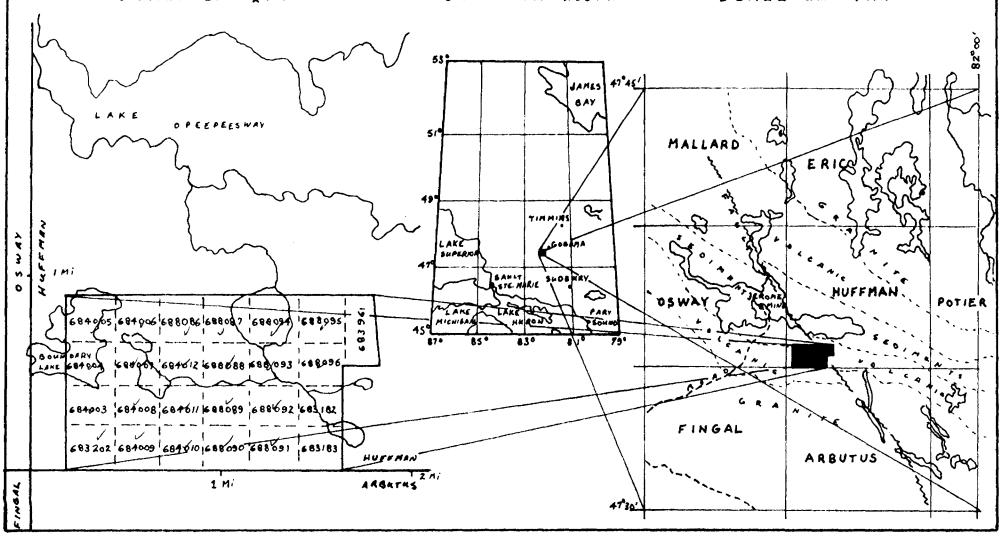




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Ministry of Natural Resources

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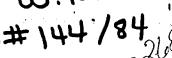
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Name and Postal Address of Person Certifying

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Mr. Bruce Hanley Mining Recorder Ministry of Natural Resources 60 Wilson Avenue Timmins, Ontario P4N 287

Dear Sir:

We have received reports and maps for a Geophysical (Electromagnetic) Survey submitted under Special Provisions (credit for Performance and Coverage) on Mining Claims P 683202 et al in the Township of Huffman.

This material will be examined and assessed and a statement of assessment work credits will be issued.

Yours sincerely,

S.E. Yundt Director Land Management Branch

Whitney Block, Room 6643 Queen's Park Toronto, Ontario M7A 1W3 Phone: (416) 965 1380

A. Barr:sc

cc: Tonapah Resources Inc Suite 300 800 West Pender St Vanouver, B.C. V6C 2V8

cc: John R. Boissoneault 670 Spruce Street N Timmins, Ontario P4N 6P3

Mining Lands Section

File No 2.6825

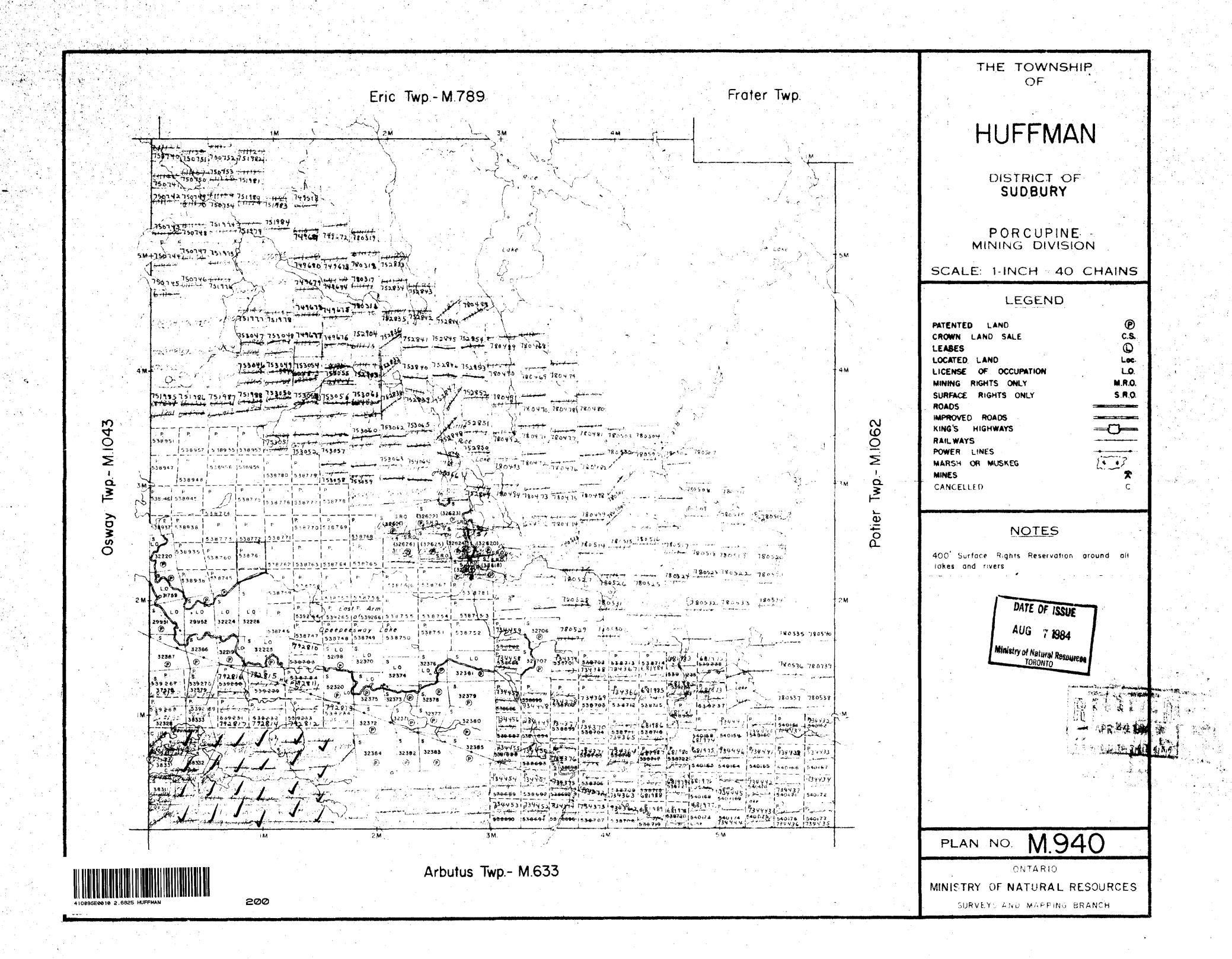
Control Sheet

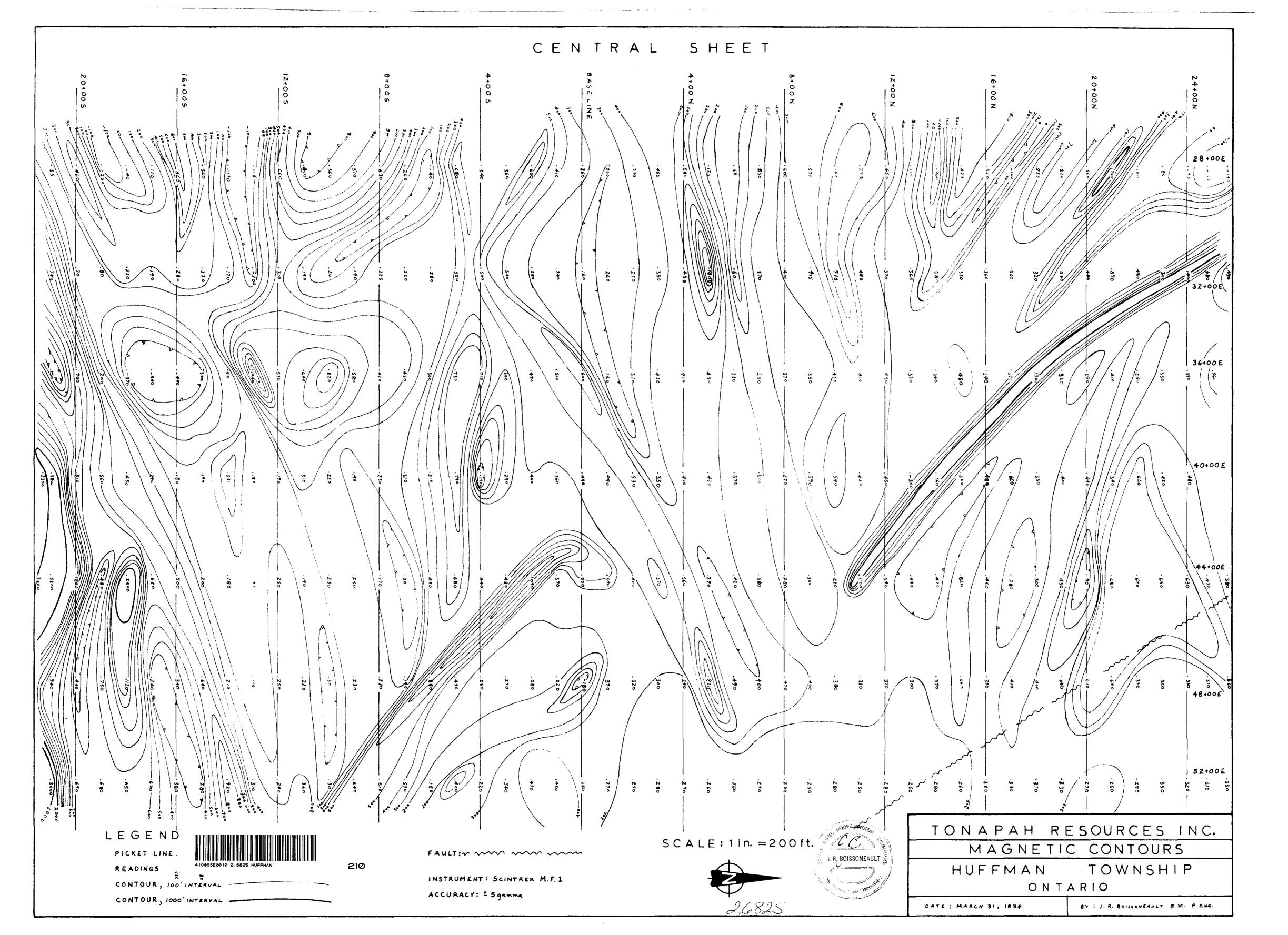
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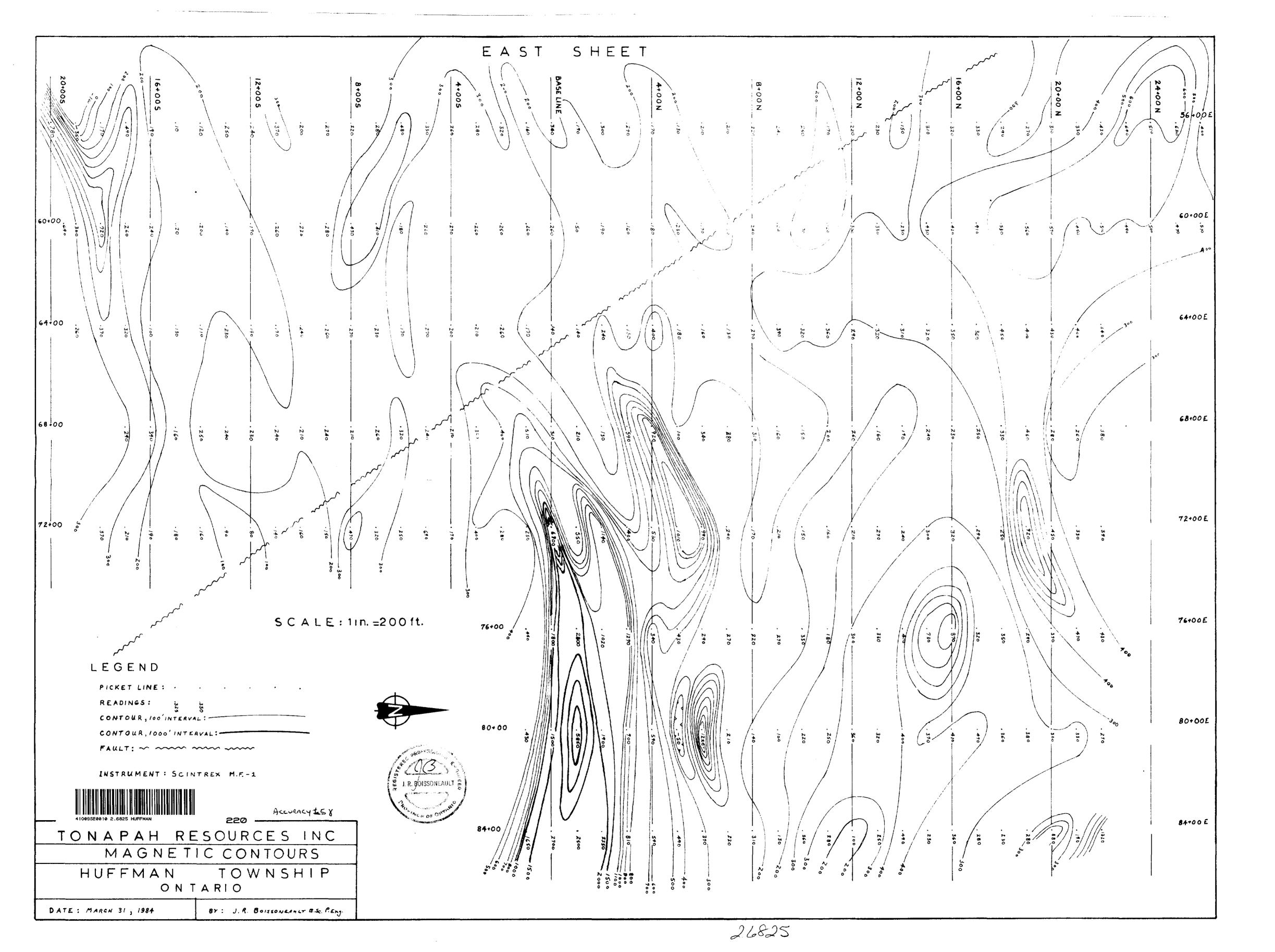
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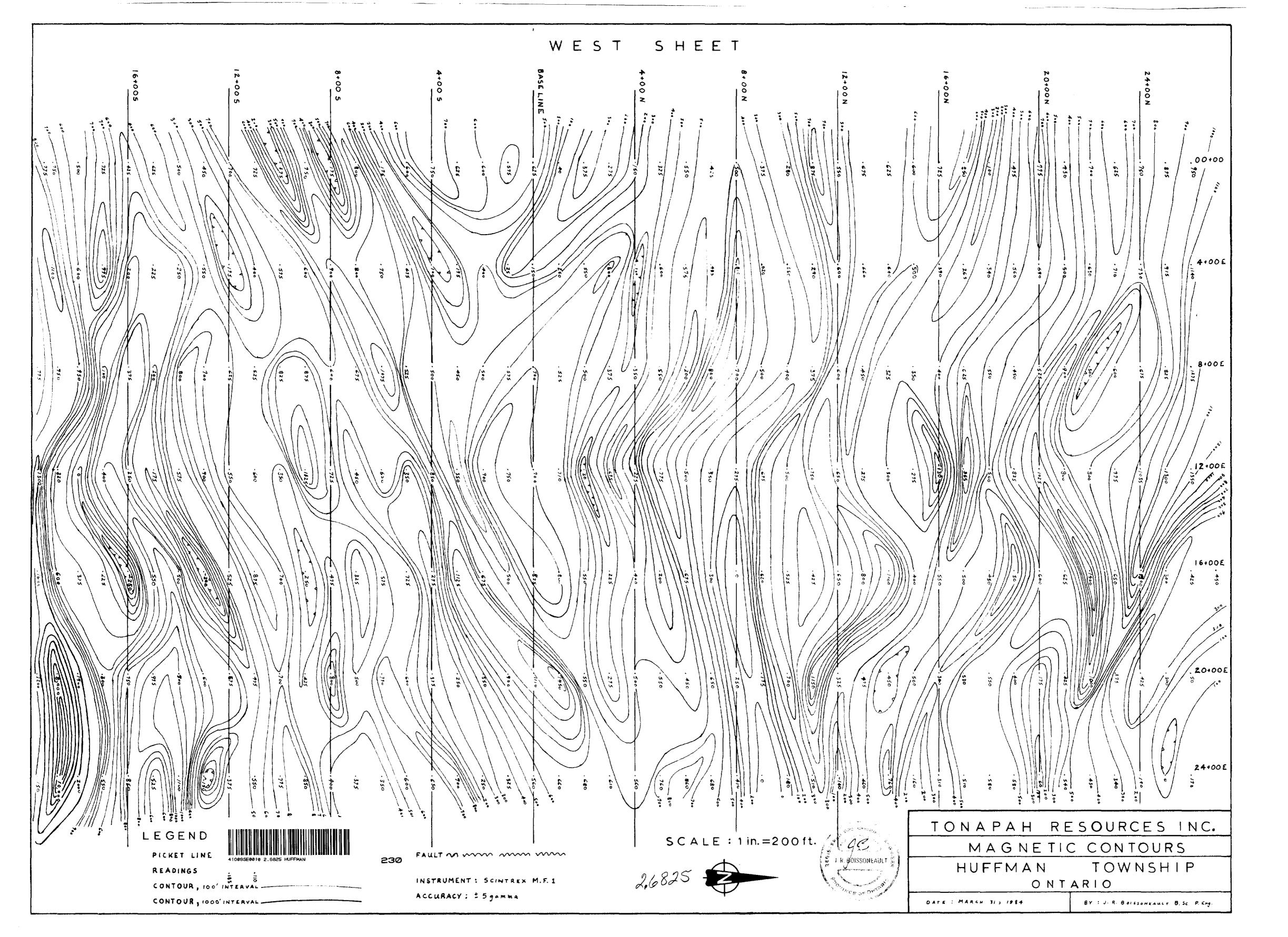
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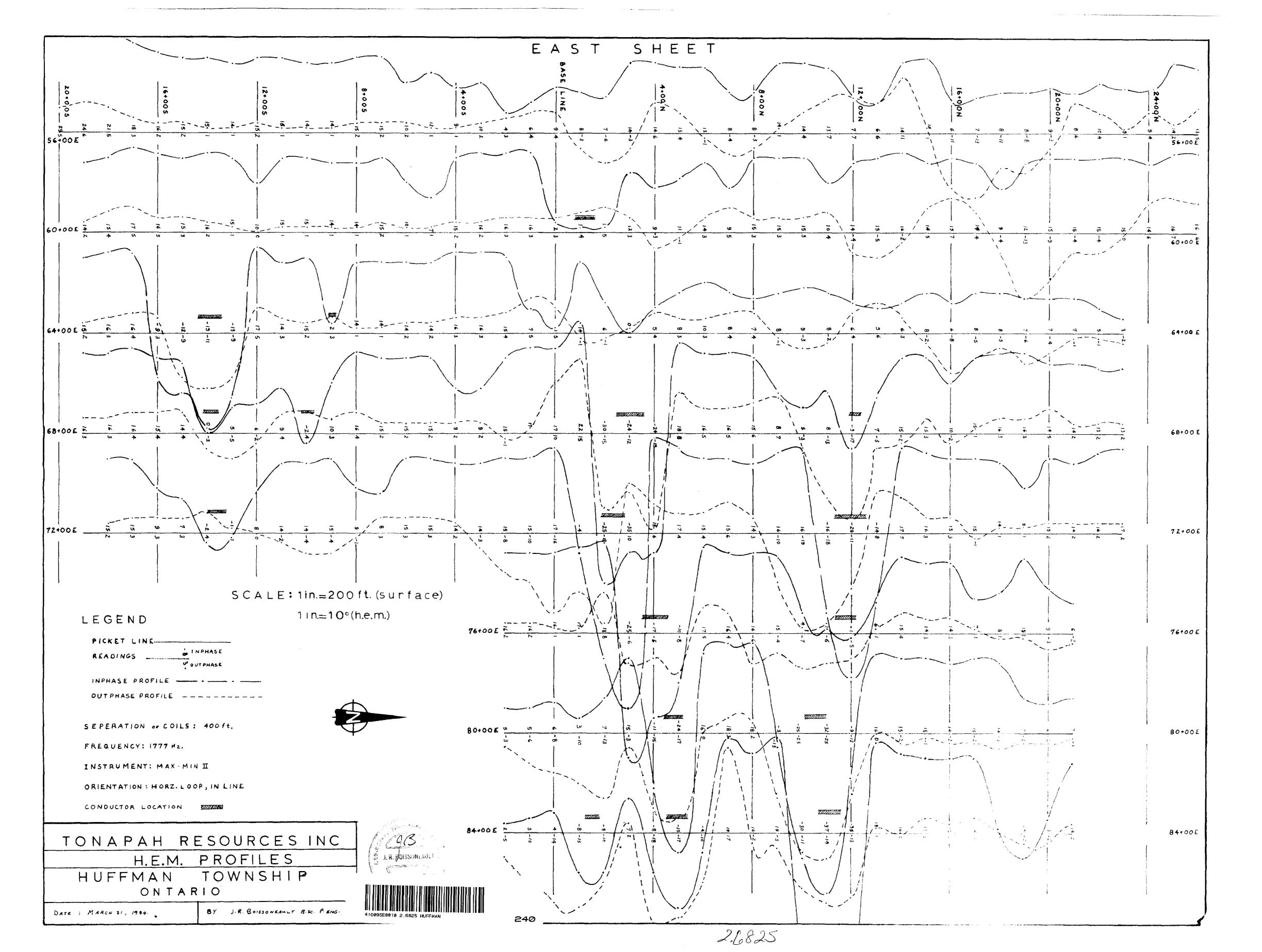
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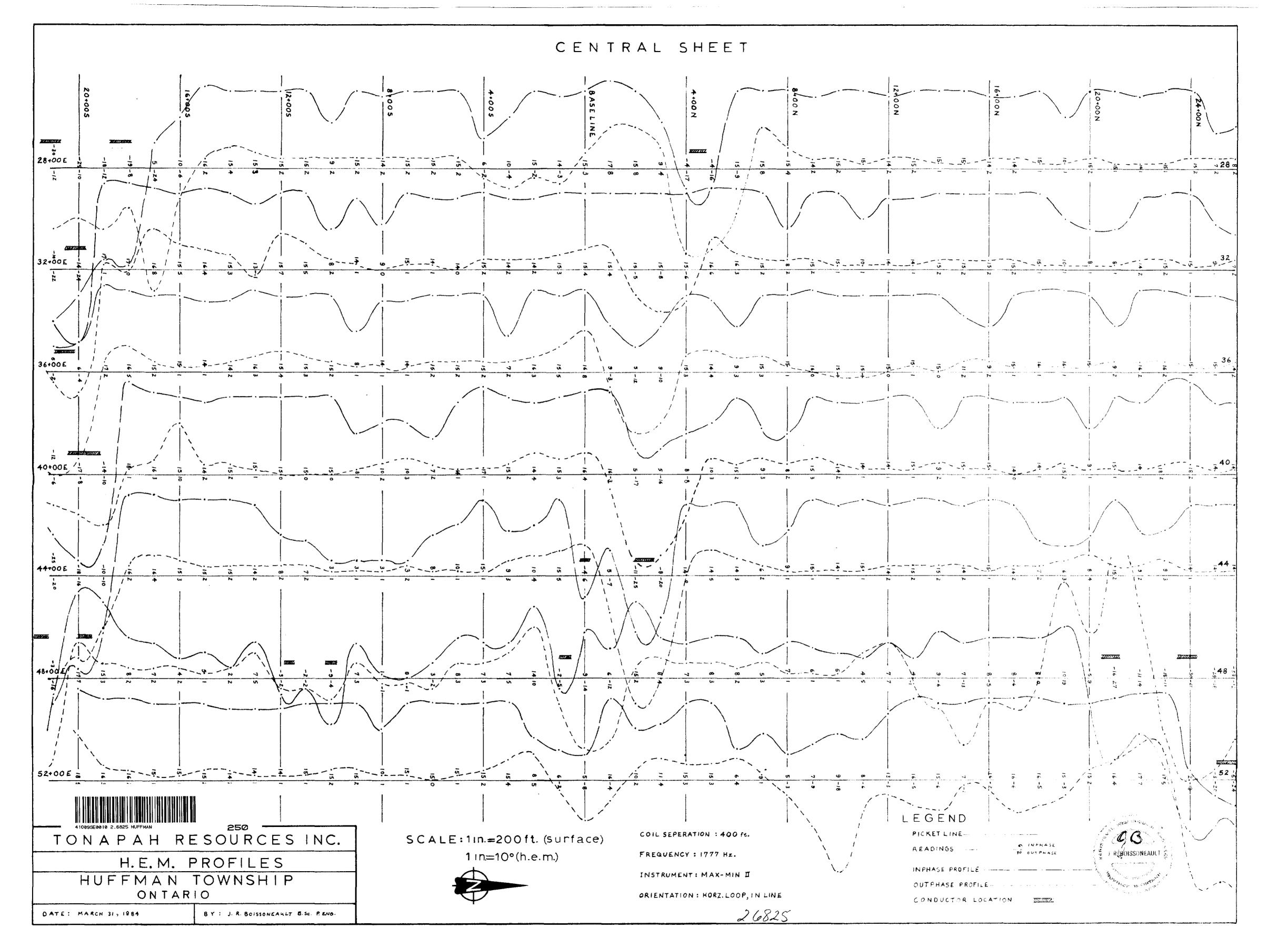


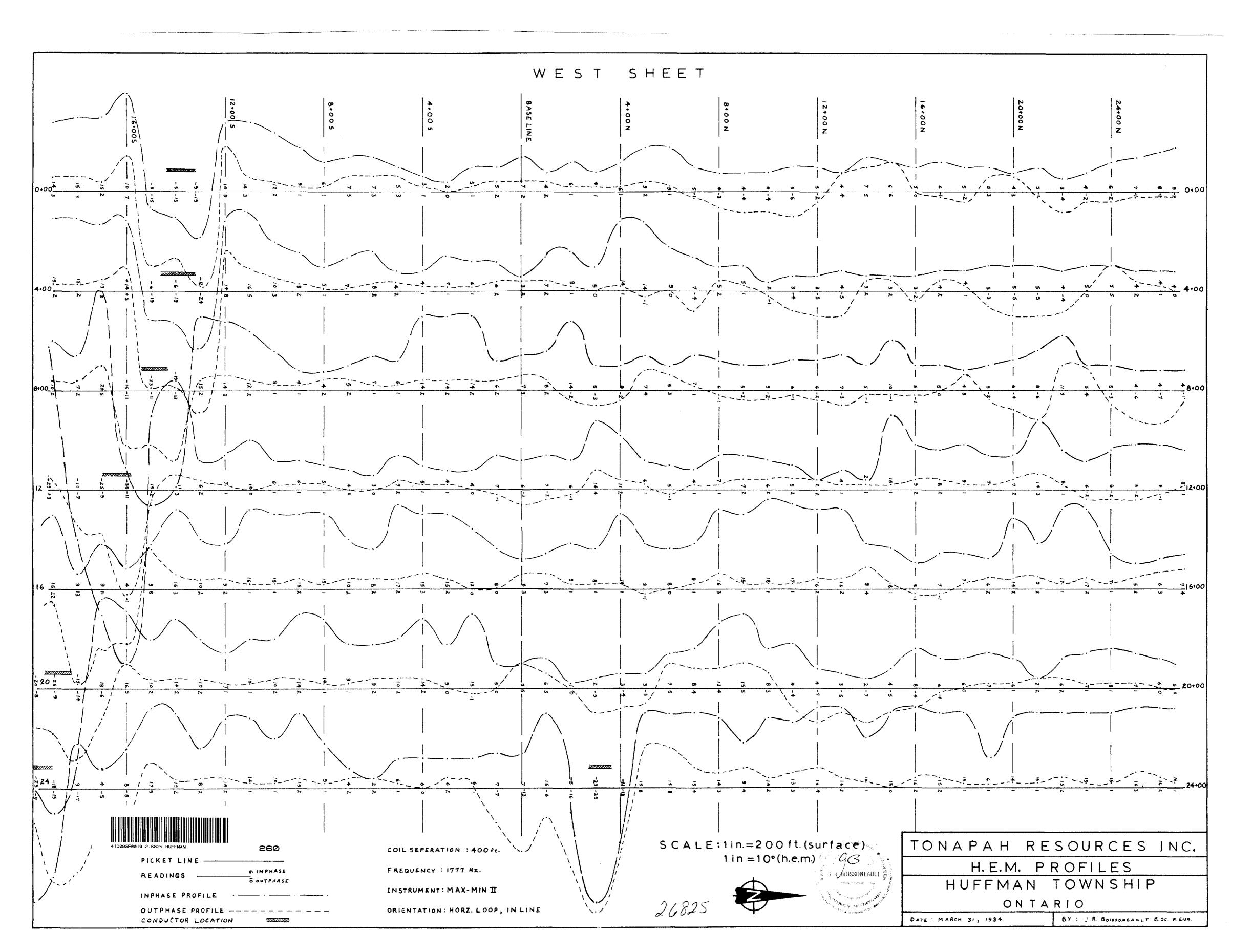












GENERAL PLAN

SCALE: 11n.=400 ft.

