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PROJECT NAME:

**MICROFILMED**

TITLE:

INTERPRETATION OF RENISON EAST AREA  
DIGHEM SURVEY (D B TRUSSELL)

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REPORT A 14

INTERPRETATION OF RENISON EAST  
AREA DIGHEM SURVEY

By: Devin Trussell  
January 1984

REPORT A14INTERPRETATION OF RENISON EAST  
DIGHEM SURVEYINTRODUCTION

In April 1983 DIGHEM carried out an airborne EM survey over the EL 5/63 area 6. The line spacing was 200m. The EM bird height was 35m. The magnetometer altitude was 50m. The DIGHEM EM system consisted of 3 coil pairs - one operating at 900Hz, with the axis in the direction of flight and the other two operating at 900Hz and 385Hz with vertical axis. The coil separation was 9m. The EM data were recorded with a sensitivity of .25 ppm. The magnetic data were recorded with a sensitivity of 1nT.

The contractor has prepared a report on the DIGHEM work. All significant anomalies were selected using objective criteria. The depth and conductivity width of horizontal and vertical sources which would generate the observed anomalies are presented in tabular form in the DIGHEM report. In addition the contractor has given descriptive comments on those anomalies believed to be due to genuine bedrock conductors. Accompanying the DIGHEM report are five 1:10 000 scale plans - Electromagnetic anomalies, probable bedrock conductors, resistivity, and two magnetic plans. All except one of the magnetic plans are plotted showing both the flight lines and the topographic base.

WORK DONE

The DIGHEM survey was carried out over an area which in 1975 had been covered by the Input EM method. The DIGHEM survey, it was hoped, would detect small conductors missed by the Input survey. Where relevant the Input follow up programme is referred to in this report.

Much of the area was flown with north south oriented lines as well as east west lines. This was done to better delineate possible east west striking conductors. Previous geological work indicated that east west structures may be interesting.

Considerable ground geophysics has been carried out south of the Pieman River. The whole area has been covered by a ground magnetic survey. The interpretation of this data will be the subject of a separate report. A substantial amount of dipole dipole IP has also been done. The results of this work are summarised in "Geophysics of the Renison Grid" by D Trussell, June 1978. The IP information will not be covered again here except as it directly relates to DIGHEM follow up targets.

The DIGHEM magnetic and resistivity plans were used to prepare a geological interpretation of the DIGHEM survey results.

DISCUSSION

## A. Geology Interpreted from Geophysical Information

The aeromagnetic contour map and the resistivity contour plan were studied to obtain geological information. Faults, major magnetic bodies, formational conductors and the conductors discussed in the following section have been marked on the base plans for the area.

## North of the Pieman River

North of the Pieman River the dominant feature are two ultrabasics. These delineate the Huskisson syncline. They are semi-continuous magnetic anomalies striking NNW in the western and central eastern part of the area. They are generally quite conductive as well as being highly magnetic. East of the eastern ultrabasic body is a formational conductor which is continuous (except for fault off-sets) from the Pieman River to the northern boundary of the survey. From the Pieman River to halfway to the northern boundary there is another conductor 150m to the east of the first. There is also a conductor on the western flank of the eastern ultrabasic from the Pieman River halfway to the northern boundary. South of the Pieman River Electrolytic Zinc has intensively explored the eastern conductors. For this reason this conductor merits serious examination.

East of the eastern ultrabasic there is a north-south striking magnetic anomaly which is due to a weakly magnetic marker horizon.

## South of the Pieman River

The Pieman River coincides with a major interruption in the continuity of magnetic anomalies. The western ultrabasic does cross the Pieman but for only a few hundred meters. A major ultrabasic occurs in the western side of the southern part of EL 5/63. From 5 731 000 north to the River the ultrabasic is not in evidence. In the western portion of this part of the EL there is a pair of magnetic anomalies which indicate an anticlinal fold in the area. On the east side of the southern half of the EL there is a continuous magnetic anomaly which in only one place has sufficient magnetic susceptibility to be due to ultrabasic. A major magnetic anomaly occurs on the southern edge of the EL. It suggests the presence of a sub-outcropping intrusive.

Conductors of considerable strike length occur in three areas - The Exe River valley, the Fentons area and east of the eastern boundary. The latter is the continuation to the south of the conductor east of the eastern ultrabasic.

## B. Geophysical Targets

The Renison East area records contain an unusually large number of conductors. In the following discussion the DIGHEM anomalies of possible economic interest are described. The anomaly labelling used in the DIGHEM report is used.

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## 1. Anomalies North of the Pieman River

60D. This anomaly is part of the major conductor flanking the east side of the eastern ultrabasic located north of the Pieman River. This conductor which stretches from line 300 north to line 10 (where it is open to the north) is undoubtedly due to conductive sediments. However, carbonaceous shales are excellent hosts for economic sulphides. It is therefore recommended that this major conductor be carefully investigated. The southern portion of the conductor has been extensively tested by Electrolytic Zinc. On line 60 the conductor is atypical in character. DIGHEM interprets it to be a thick conductor on this line. The conductivity width product is 15 Siemens. The depth of burial is 16m. A Genie EM survey is recommended over this anomaly.

90xB. This anomaly is in the vicinity of Input anomaly GAG. The follow up of GAG was inconclusive. A complete report on the GAG work is contained in "Interim Report on Ground Follow Up Work on Input Anomaly GAG" by G F Pigott, April 14, 1977. The DIGHEM analysis indicates the conductor comes to surface. However, the amplitude of the anomaly is very small so this calculation can be in serious error. A Genie ground EM survey is recommended to pin point the anomaly location.

90B, 100C. This anomaly lies within serpentinite. DIGHEM analysis indicates the conductor comes to surface. Previous regional geochemical work should have responded if the conductor was of interest. The most probable cause of the anomaly is a conductive shear within the serpentinite. However, a field inspection of the area by a geologist is recommended.

110A. This anomaly is in an area not covered by previous Comstaff work. The DIGHEM analysis indicates the conductor is at a depth of 60m and has a high conductivity width. A deep penetration of EM method or IP is needed to follow up this response.

130C, 140A and (150C, 160A). This anomaly is in the vicinity of Input anomaly GAM. No follow up work was carried out on GAM. It was to be examined in the 1976/77 field season but this was not done. The response was apparently written off as probably being due to weathered ultrabasic. The anomaly is in a regional sense in a similar position to the Fentons prospect. The depth of the source is 10m or less. Some geochemical encouragement should therefore exist. A Genie survey should be carried out if there is any geochemical or geological support for the anomaly.

120xA, 1060D, 130xC. These anomalies are located close to the axis of the Huskisson syncline. Contrary to DIGHEM's interpretation, the source is probably at substantial depth. The anomaly amplitudes are very small. A deep probing EM survey is necessary to adequately test this anomaly. An isolated magnetic anomaly occurs some 200m NNE of the conductor. It should be examined at the same time as the EM anomaly.

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130E, 1140D, (130F, 130G). These anomalies are the most promising ones in the formational conductor located on the western flank of the major eastern ultrabasic. Input anomaly GAI is located 400m south of the selected DIGHEM target. Ground EM was done at GAI and it was written off as a surface conductor. The DIGHEM analysis places the conductor at a depth of 12m and gives it a conductivity width of 30 Siemens. If work is done on this anomaly the grid lines should be extended sufficiently far east so that anomalies 130F and 130G are also covered. These anomalies are coincident with Input anomaly GAH. Follow up on GAH was never carried out. It remains a "low priority" INPUT anomaly. DIGHEM places the source of 130F and 130G at a depth of 40m.

A Genie survey of the area is recommended. One kilometer long lines are necessary to cover both 130E and 130G.

160E, 170E, 180G, 170F, 180H and 190K. There are three separate conductors in this area which is in the vicinity of Input anomaly GAO. In the Input follow up a conductor was not found. There is considerable doubt that the grid was correctly located. The area has substantial glacial cover. Anomaly 190K is likely due to an outcropping conductor and it is this which was probably thought to be the source of GAO. Anomalies 170F and 180H are ascribed to a source which is at a depth of 27m and therefore unlikely to have any obvious surface manifestation. Finally, a conductor formed by anomalies 160E, 170E and 180G is at a depth of 20m. It is recommended the area be covered with a large grid and surveyed with Genie EM method.

190H. This response is in the same general position as 60D. That is, it is on the east flank of the eastern ultrabasic. It is selected for further work on the basis of the response is due to a thick conductor. The predicted depth of burial is 20m. A Genie survey would therefore accurately locate the position of the conductor.

## 2. Anomalies South of the Pieman River

190A and 210Ax. These isolated anomalies are probably due to deep (50m) conductors. A deep probing EM method or IP is recommended for these anomalies. The Genie Method is unlikely to have sufficient penetration.

190G, 1140B, and 200C. This isolated conductor crosses the Pieman River. It is best examined south of the River where the 1140B response indicates a thick source. EM methods will not be effective in the area since the HEC power line is nearby.

230Hx and 240Bx. These isolated anomalies are probably due to deep conductors. Follow up will be difficult because HEC power lines are fairly close.

270F. This anomaly is located in the Exe River area. Hole RBD 2 should have intersected the source of this response. The area is currently one of active interest. The DIGHEM anomaly is due to a deep (40m+) conductor. Further work is dependent on sorting out why RBD 2 failed to intersect worthwhile mineralisation.

1120C and 310E. This anomaly lies on a minor magnetic anomaly and is therefore quite promising. The depth of burial of the conductor is 28m. The area has been traversed by IP. There is some evidence for a conductor in the resistivity data. Resistivities in the area are generally low (less than 200 ohm m). A Genie survey is however recommended in the first instance although a time domain EM technique may be necessary to cope with the low resistivities.

340B and 340C. These anomalies are in the vicinity of INPUT anomaly GAK. IP work has been done in the area. A near surface chargeability and low resistivity anomaly is located at 3750E on 2800N and 3700E on 2600N. The DIGHEM anomalies are due to near surface conductors. The likely source is conductive shears within the ultrabasic. In any event previously carried out grid geochemical work should have been conclusive in establishing the merit of the anomaly. No further work is proposed.

350L and 1110B. This conductor strikes NNE. A grid with NW lines would be necessary if follow up work were done. IP coverage is available. There is a broad chargeability and conductivity anomaly on N=2 and greater separations. Input anomaly GAL was located some 400m west. A PEM survey was done in the area. RBE 6, a vertical hole, was drilled to test the EM anomaly and an anomalous tin geochemical anomaly at 2600N 4760E. The hole passed through 20m of glacial alluvium and then encountered steeply dipping carbonaceous and pyritic shales. These undoubtedly are the cause of the geophysical response. The DIGHEM interpretation placed the depth of the conductor at 20m. No further work is recommended on this anomaly.

390B. This isolated anomaly is in a similar position to 340B and 340C. The DIGHEM analysis places the conductor at surface so previous geochemical work should have been encouraging if the anomaly had merit. IP coverage does not extend far enough west but there is an indication of a near surface chargeability anomaly. Follow up is not recommended. However, since the anomaly is close to the western boundary of the licence area a field inspection should be carried out by a geologist.

410C. This is a very low amplitude anomaly which implies a great depth of burial. A deep penetration EM technique is necessary to follow up this anomaly. IP work was done in the area and no anomalous responses were obtained. The resistivity of the ground is very high so there is no problem with conductive overburden.

The anomalies in the far south eastern corner of the licence area coincide with graphitic sediments. These gave strong IP and SP anomalies. Further work is therefore not recommended.

Anomalies in and around the Fentons area will have to be checked in some detail against drilling results and other information. The area to the north west of RBE 38 is suitable for EM investigation since it is far enough away from power lines. More specifically 180A and 190C should be covered with a Genie EM survey. North east striking lines would be preferred in this area.

SUMMARY OF RECOMMENDATIONS

## Genie EM follow up (7 total)

60D\*  
90xB\*  
130E - 130G group\*  
160E - 190K group\*  
190H\*  
180A  
1120C group

## Deep Penetration EM (5 total)

110A\*  
120xA\* and magnetic anomaly  
190A  
210Ax  
410C

## Field Inspection or Review (4 total)

100C\*  
130C\*  
270F  
390B

## Anomalies adjacent to power line (3 total)

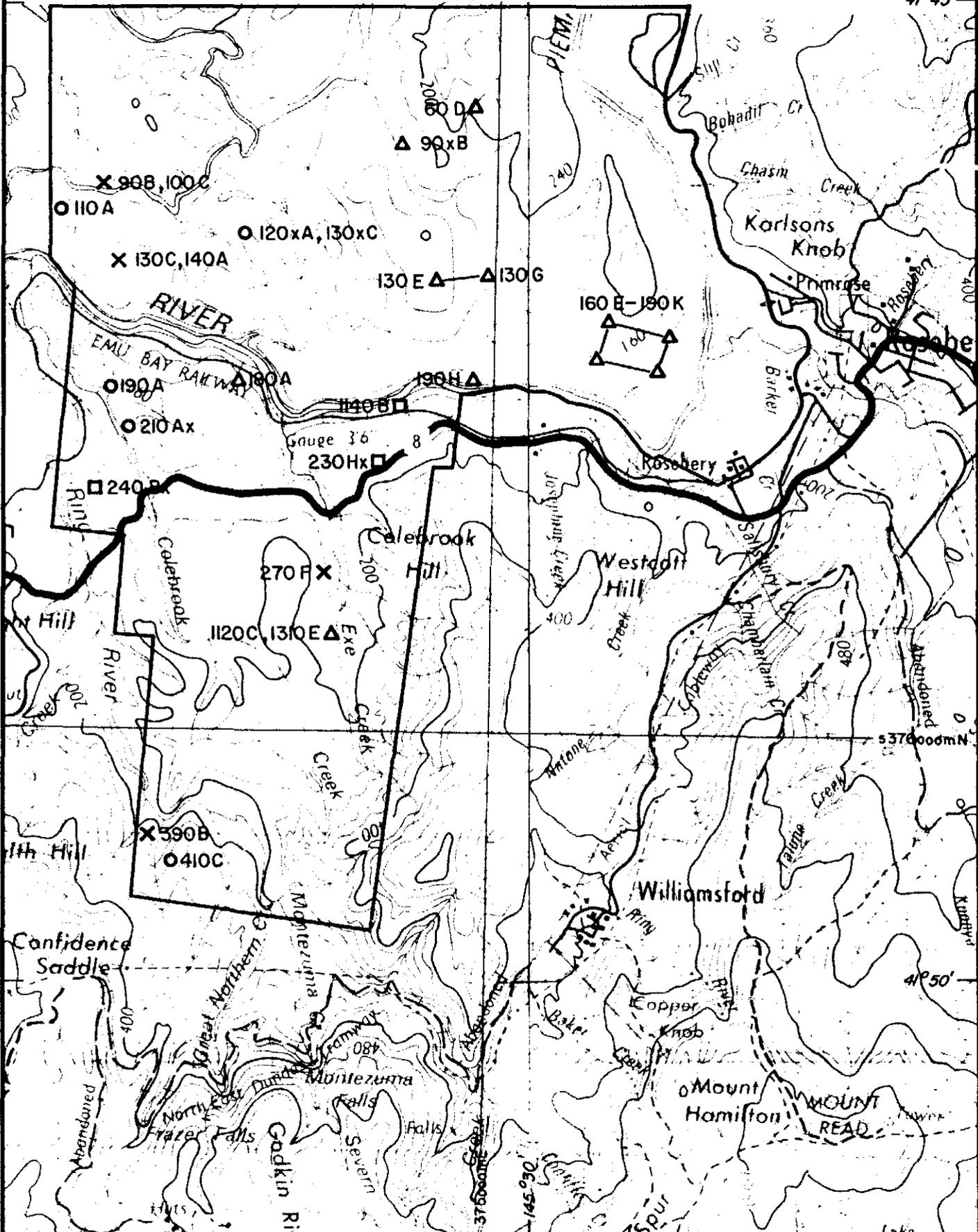
1140B  
230Ax  
240Bx

Anomalies marked \* are north of the Pieman River.

The above anomalies have been plotted on the 1:50,000 plan of the EL 5/63 Area 6.

5 cm

41°45'



- △ Genie EM follow up
- Deep probing EM follow up
- Near powerline
- × Field inspection or review

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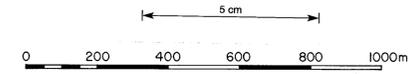
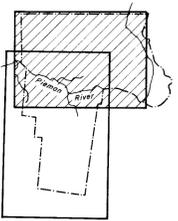
EL 5/63 AREA 6

SUMMARY OF RECOMMENDATIONS FOR DIGHEM GROUND FOLLOW UP

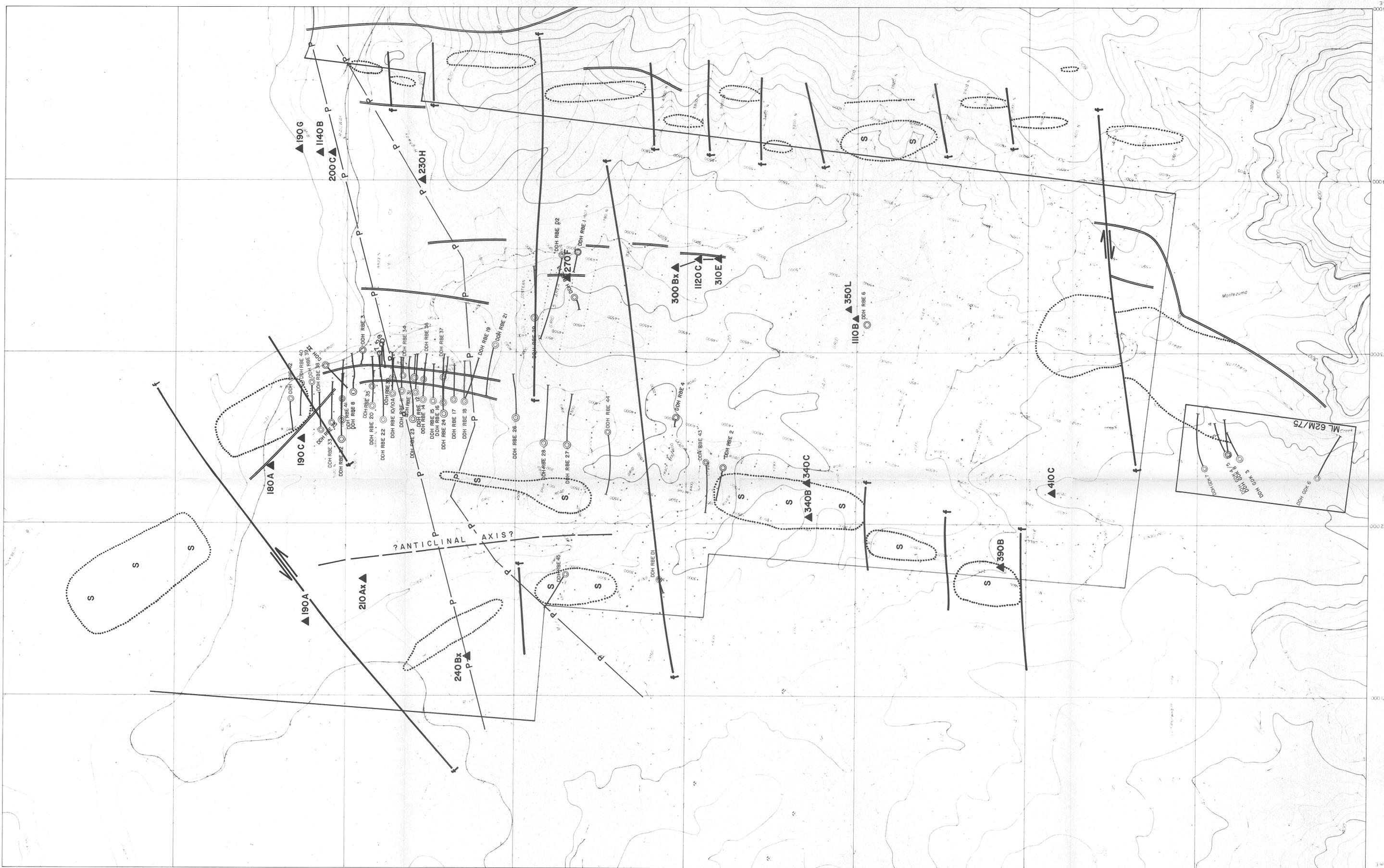


- ▲ Important EM anomalies
- ⋯ Magnetic anomalies
- - - Serpentine
- ▬ Formational conductors

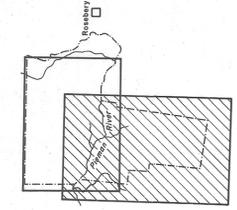
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COMSTAFF PROPRIETARY LIMITED			
PROJECT	EL 5/63 - AREA 6		
AREA	NORTHERN PORTION		
DATA	<b>GEOLOGY INTERPRETED FROM DIGHEM SURVEY</b>		
COMPILED	D.B.Trussel	SCALE	1 : 10000
DRAWN	January 1984	REF No	TAS-2-3788
AMENDED			



- ▲ Important EM anomalies
- Magnetic anomalies
- S Serpentinite
- Formational conductors
- P Power lines



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**COMSTAFF PROPRIETARY LIMITED**

SOUTHERN PORTION OF COMSTAFF LEASE EL 5/63 AREA 6

COMPILED D.B. Trussel	DATE 1/84
AMEND#	
SCALE 1 : 10000	
PLAN No TAS/2/3789	

**GEOLOGY INTERPRETED  
FROM DIGHEM SURVEY**

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