

MAR 19980022: PEACE RIVER

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ALBERTA MINERAL AGREEMENT # 939 6080067
ASSESSMENT WORK REPORT
ON A TOTAL FIELD GROUND MAGNETIC SURVEY

by

N. Ralph Newson, M.Sc., P. Eng., P. Geol., P. Geo., F.G.A.C.

for

PRIMO RESOURCES LTD

Saskatoon, Saskatchewan.

Oct. 20, 1998

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SUMMARY

A ground magnetic survey was carried out on two areas of Alberta Mineral Agreement # 939-6080067. The total magnetic field strength was measured on the main grid on a 200m x 25m spacing, and on a 100m x 25m spacing on the north grid.

The property is in an area with geology favorable for the discovery of diamonds. Archean crust is one of the essential elements present. This is overlain by a thick sequence of Phanerozoic sedimentary rocks, which would permit any kimberlitic or lamproitic intrusions to balloon out to form large, shallow deposits as in Saskatchewan. The Phanerozoic rocks have suffered one major deformation, which created the Peace River Arch, and some minor deformations, which have produced anticlinal structures. These structures are believed to provide access for intrusions, and are considered a positive indicator for diamond-bearing rocks. There is some evidence that volcanism has occurred in the region.

Till samples taken in the region have been analysed for diamond indicator minerals, and some indicators have been found. The property is in the middle of the Peace River Trend of diamond indicator minerals.

Magnetic surveys have been the single most successful method of finding kimberlites in Saskatchewan, and it was deemed appropriate to use that method here.

On the main grid, four magnetic anomalies which might be a source of the diamonds were found. Drilling is recommended to check these anomalies. It is suggested that a water-well drilling rig be used in the first phase, as a way to keep costs down.

On the north grid, the presence of a layer of volcanic material at a shallow depth could not be unequivocally proven, but there is qualitative evidence to suggest that it may be present.

1.0 INTRODUCTION

This report describes a total field ground magnetic survey carried out on Alberta Mineral Agreement 939-6080067 on behalf of Primo Resources Ltd., of Vancouver.

The purpose of the work was to acquire data on an area which had been previously surveyed by airborne magnetic techniques, and which appeared to contain anomalies of the type sometimes caused by kimberlitic bodies intrusive into Phanerozoic supracrustal rocks. Because the country rocks are Phanerozoic sedimentary rocks, most compositions of diamond source-rocks would show a magnetic contrast with the surrounding rocks. It is therefore appropriate to carry out a magnetic survey at this stage of exploration. However, in some places, notably in Africa, kimberlites do not show a contrast with sedimentary country rocks, so it is recognized that a magnetic survey may not detect all possible diamond source-rocks.

Field work dates were September 29 to October 10, 1998. Data reduction, processing and interpretation were carried out October 12 to 15 inclusive.

2.0 THE PROPERTY: OWNERSHIP, LOCATION AND ACCESSIBILITY

The property consists of the Alberta Mineral Agreements 939-6080065, 939-6080066, 939-6080067, 939-7060148, 939-7060149. It is in NTS areas 83 N 13 and 84 C 4, near the intersection of 56° 00' north latitude, and 117° 34' west longitude, about 15 km south of the town of Grimshaw, or 20 km southwest of the town of Peace River. The cadastral survey description is as follows:

T79 R23 W5 Sections 1- 36.
T80 R23 W5 Sections 1- 36.
T81 R23 W5 Sections 1- 36.
T79 R24 W5 Sections 1- 36.
T80 R24 W5 Sections 1- 36.

Ownership is registered in the name of Primo Resources Ltd. of Vancouver, B.C.

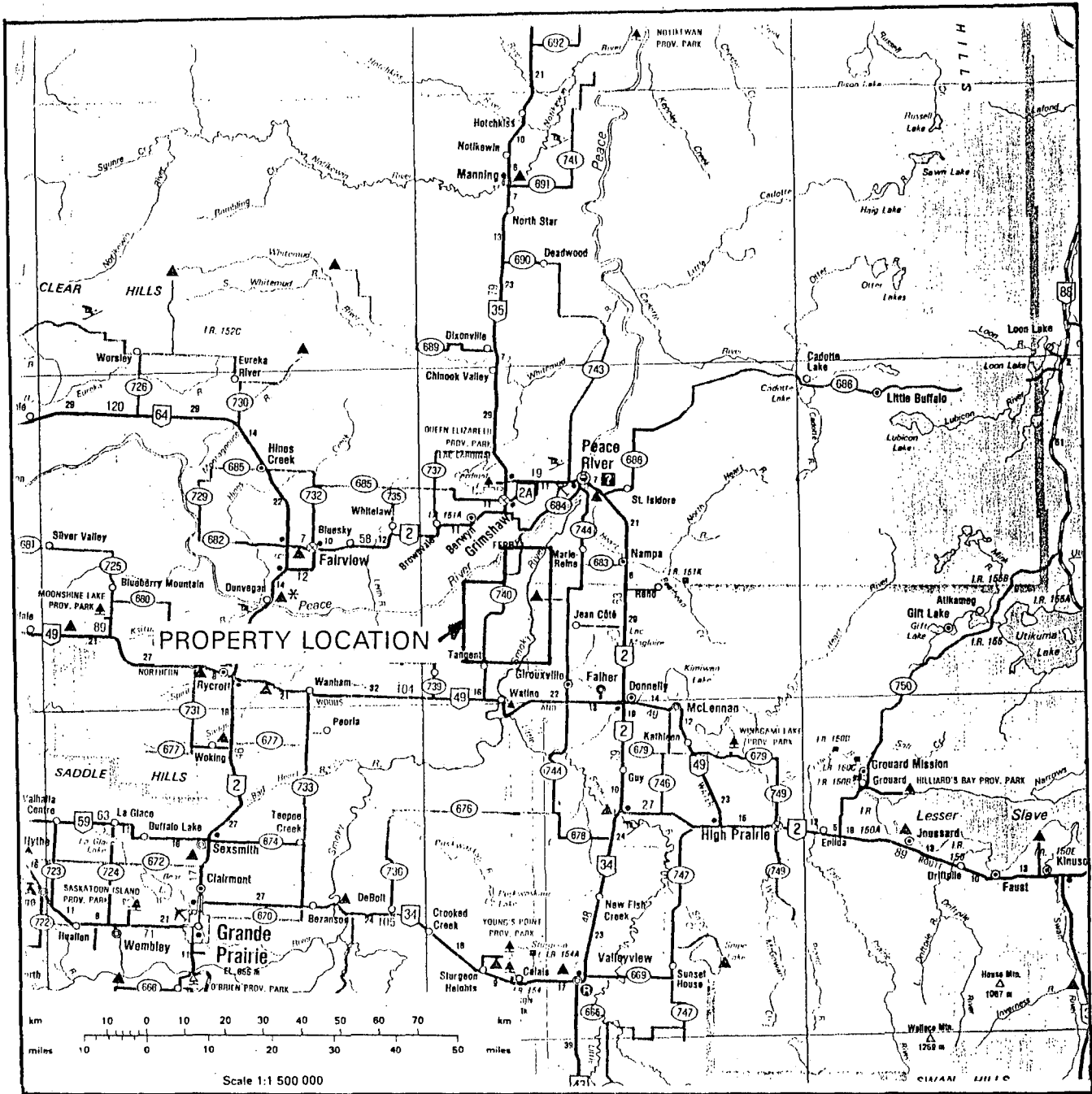
Paved provincial highway 740 passes through the property. Grid roads provide access to all parts of the surveyed grid, and no part of the grid is more than a few hundred metres from a road.

3.0 GEOLOGY AND MINERALIZATION OF THE PROPERTY

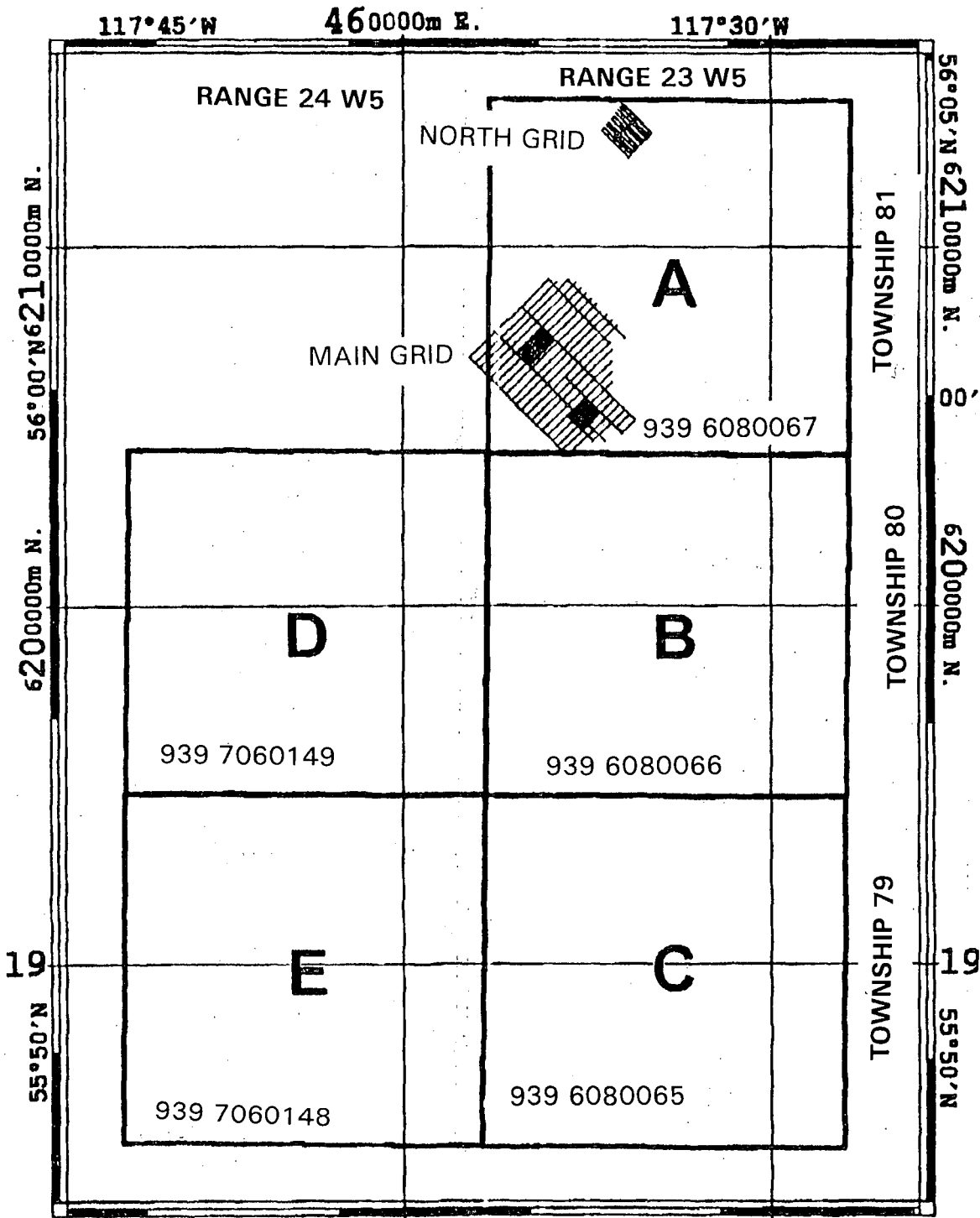
3.1 GEOLOGY

The Precambrian basement which underlies the property is of Archean age (Ross et al, 1991), and therefore meets the first criterion for the occurrence of diamond deposits. On top of the basement is a thick sequence of Phanerozoic rocks, including at least part of the section of the mid Cretaceous sandstones and mudstones which host the kimberlites found in Fort à la Corne, Saskatchewan, and those found nearby in Alberta.

The subcrop is indicated to be Kaskapau Formation over most of the property, with a band of Dunvegan Formation across the centre of the property. These formations are mid- to Upper Cretaceous age, and are underlain regionally by the "fish scales"



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ALBERTA MINERAL AGREEMENT # 939 6080067	
FIG. 1: GENERAL LOCATION MAP	
NTS 83 N 13, 84 C 4. TWP 81, R 23, W5	
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Scale: SHOWN	Date: Oct. 1998



117°45'W 460000m E. 117°30'W
 56°05'N 6210000m N. 00' 6200000m N. 11
 55°50'N 19
 117°45'W 30' 47 117°25'W
 UTM Zone 11U Clarke 1866 (NAD 27)

PRIMO RESOURCES LTD	
ALBERTA MINERAL AGREEMENT # 939 6080067	
FIG. 2: DETAILED LOCATION MAP	
NTS 83 N 13, 84 C 4. TWP 81, R 23, W5	
NEWSON MANAGEMENT & CONSULTING LTD	
Scale: SHOWN	Date: Oct. 1998

Formation, which is a useful marker, fairly easily identified, and which indicates the approximate centre of the time-stratigraphic interval containing the Fort à la Corne, Saskatchewan kimberlites.

In the Fort à la Corne area of Saskatchewan, which is the nearest geologically similar area where kimberlitic intrusions have been discovered and adequately described in the literature, the top of the Paleozoic carbonate sequence defines the lower limit of significant development of large kimberlitic bodies (Scott Smith et al, 1994). It is suggested that the hot kimberlitic magma passed through the dry carbonates uneventfully, but when it hit the water-bearing sands and shales, it vaporized the water, causing a huge explosion, which created a large crater which was subsequently filled with kimberlitic material. The similarity of the geology in the area of the present property to that of Saskatchewan means that this is one of the target types that should be sought here.

Major Phanerozoic structures which underlie or are close to the property include the Peace River Arch, the Peace River embayment, and numerous faults striking north-westerly, of which the Normandville fault is a prominent member. The process of forming an arch causes the rock to be under tension, and provides easier access to intrusives than if the tensional environment did not exist.

Igneous activity has occurred in the area, as indicated by some thick beds of volcanic material close to surface.

The property is covered with Pleistocene glacial drift, probably fairly thin on the upland areas, but likely thick in the pre-glacial river valleys. Till sampling for diamond indicator minerals by both federal and provincial agencies has resulted in finding many diamond indicator minerals. The property is in the centre of the "Peace River Trend" an area defined by the occurrence of a number of diamond indicator minerals

3.2 MINERALIZATION

No bedrock mineralization, diamonds or otherwise, is known to exist on the property.

4.0 PREVIOUS WORK ON AND NEAR THE PROPERTY

The federal government, as part of its national program, has done aeromagnetic surveys of the area which includes the property. The present property owners have carried out low-level airborne magnetic surveys over the property, and these data were analysed by the Euler deconvolution method, to detect features which might be due to kimberlitic intrusions. The work described herein was the next step to follow up results of the airborne survey and analysis.

Various government agencies have sampled tills in the province, and have analysed the tills for diamond indicator minerals. As noted above, the property is in the centre of an area anomalous for diamond indicator minerals.

5.0 TOTAL FIELD MAGNETIC SURVEY

5.1 PURPOSE

The purpose of the survey discussed herein was to detect the magnetic signatures of any diamond source-rocks which might be present. The area of the main grid contains a number of Euler deconvolution anomalies, obtained by processing the data from the aeromagnetic survey done by the present owners. These are being submitted under separate cover, and the reader is referred to them. The purpose of the survey of the northern grid is to see if volcanic material intersected in an oil well there has a magnetic signature.

5.2 METHOD

The method used in this survey was to measure the strength of the resultant magnetic field at regularly spaced points on a line grid established on the property.

The main grid used here had a spacing between lines of 200 metres, with readings taken at 25 metre intervals. Lines were run in a northeast-southwest direction because the Euler anomalies were distributed in a general northwest-southeast direction. In areas of particular interest, intermediate lines were established at a spacing of 50 metres.

Control for the line grid was by means of a "total-station" surveying instrument, which can be used to set up control points with an accuracy of centimetres. A flag or picket was placed at every station.

Because this property is in farm and ranch country, every picket and every piece of flagging had to be picked up after the survey, and this is included in the cost of the lines.

The North Grid had a line spacing of 100 metres, with stations at 25 metres. Lines were oriented northwest-southeast. Since we were looking for circular features, it didn't seem to be too critical what the line direction was, and that orientation enables us to use a seismic line for the base line, and to use a second seismic line and the main highway as tie lines.

The resultant magnetic field is the vector sum of induced and remanent magnetism, modified by geometrical considerations, i.e. the topographic effect. Induced magnetism depends on the magnetic susceptibility of the rocks present, and the strength of the earth's magnetic field. Remanent magnetism is usually small, and is ignored in mineral exploration surveys. Any contribution by remanent magnetism to the resultant vector is part of the overall magnetic signature of a particular rock unit. Topographic effects result from the fact that the sensor is not always the same distance above the rock. When the operator is standing on bare rock, the sensor is 2 m above the rock (the length of the staff on which the sensor head is mounted). When the reading is being taken on the ice in the middle of a lake, for example, the distance from sensor to bedrock can be very much more than that. Even if the rocks are exactly the same, the reading taken over the lake will be significantly lower.

Short term external magnetic influences can cause considerable variation in readings taken at different times at the same point. Accordingly, it is necessary to take continuous readings at a base station magnetometer which does not move, so that variations in the magnetic readings with time (referred to as diurnal variations) can

be removed from the survey results.

The magnetometers used in this survey, both base station and field units, are proton magnetometers, which operate on the principle of nuclear magnetic resonance. This method is very accurate, and is completely free of instrument drift. The main base station magnetometer used was a Scintrex IGS-2/MP-4 unit, reading directly in nanoteslas. The readings, and times at which each reading is made, are recorded automatically in the solid state memory of the instrument. The field instrument was a Scintrex MP-3 unit, similar to the base unit insofar as magnetic capabilities are concerned. The base station unit was set to make measurements every 2 seconds for the first part of the survey, and every 3 seconds for the latter part.

Diurnal variations were removed from the field measurements by connecting the field and base station units together, and running the built-in correction program. The program looks at each field reading, then looks at the reading taken at the same time by the base station (if necessary, it carries out a straight-line interpolation between the values recorded at the two nearest times before and after the time of the field reading). If the base station reading varies from a reference value, the program removes this variance from the value recorded by the field instrument.

5.3 RESULTS

The results are presented here as maps of contoured total magnetic values (Maps 1 to 4, Appendix A). Maps 1 to 3 are three different plates covering the main grid, and Map 4 is on the northern grid.

5.3.1 MAIN GRID

The maximum magnetic relief is 51 nt. In general, the magnetic pattern is consistent with that of the low-level airborne survey done by the present owners. That survey shows the present ground grid to be in a saddle between two areas of higher magnetic readings, and the readings on the ground grid rise towards both sides. The maps of the main grid are contoured values of randomly gridded values, (using Geosoft's RANGRID program) as opposed to line-gridded values. Line-gridding with Geosoft's BIGRID program introduces a bias, tending to elongate features perpendicular to the line direction. This is appropriate for many situations where targets are stratigraphically controlled, but since the target here is circular features, it was thought worthwhile to try random gridding. Accordingly, both random- and line-gridding were tried, and it was found that the randomly gridded data did seem to display the data better. Only the randomly gridded maps are here presented.

The correlation between the Euler anomalies derived from the low-level aeromagnetic data and distinctive features on the ground survey is not good. A single closed contour at 250N, 600W coincides well with a shallow Euler anomaly, but a single closed contour does not an anomaly make. In the writer's experience in Saskatchewan the magnetic contrast between kimberlitic material and the Cretaceous country rocks is such as to produce positive anomalies of 25 to 400 nt. However, the contrast may be lower here, and until we can get some data on relative magnetic susceptibilities, it is worthwhile to look at any coincident features.

In the northern part of the grid (Map A) shallow Euler anomaly (labeled "A") at about 100N, 300W has no expression on the ground survey. One at about 100S, 600W coincides with a single closed depression contour, flanked by a single closed

high contour. Three deeper Euler anomalies in the northern part of the grid do not coincide with any feature on the ground survey. A deep anomaly (300- 400m) at about 50S, 300E coincides with protuberance in an isomagnetic contour, which could be significant. It is in a magnetically noisy area, which may augment the response, or may detract from it.

In the central area (Map 2), a significant response (labeled "B") was noted at about 1600S, 725W. It is fairly circular in shape, and is defined by three closed contour lines. Although that line is a bit noisy, this appears to be a real response. A less well developed response labeled "C" is seen on the same line, at 300W. These lie about 200m grid southwest (geographic south) of Euler anomalies, and it is tempting to assume they are due to the same cause. The airborne work should be checked against the topography to see if the lines are plotted correctly. The writer has checked the ground work against the topography, and it is correct.

A number of other Euler anomalies are seen on the area covered by Map 2, but they do not coincide with a significant response in the ground survey. Even if they are displaced by the same amount as is suggested might be the case for the anomalies near ground anomalies B and C, they do not coincide with any feature.

On Map 3, the southern plate of the main grid there is a significant response, labeled "D". Euler anomalies coincide with both the north and south ends of this anomaly, and one lies on the western flank of it. This anomaly is not round, as is the common shape of one caused by a pipe, but not all pipes are round, and not all phases of kimberlite in a pipe need have the same magnetic susceptibility. Thus, this response could be due to a pipe which is not circular, or to a magnetic phase of a pipe in which the other phases are not as magnetic. This anomaly was surveyed on lines spaced at 50 metres.

A second strong positive response was defined at 2200S, 1500W by 4 closed contour lines. It is mainly defined by a reading at one station, although the flanking readings are slightly above the readings at the next closest stations. It is real, however, because the operator took a number of readings several metres on both sides of the station, and the values were at least as high as at the station. This does not coincide with an Euler anomaly. It is not by itself worthy of follow-up, but may be, if anomaly D proves to be due to a kimberlite.

5.3.2 NORTH GRID

The results of the survey of the northern grid are presented here as Map 4, the contoured values of line-gridded data. Magnetic relief is 62 nt. The readings increase steadily from north to south on the grid, which fits with pattern noted in the airborne survey. There is no response which strongly points to a magnetic source near surface. However, centred at 2000N, and extending from 200E to 500E is a slight rise in the magnetic readings, separated from the rising regional trend to the south by a slight trough. This might be caused by a small amount of volcanic material near surface, or it might be a part of the regional trend.

In this environment the regional trend should be mainly caused by the Precambrian basement, which is deeply buried in this area. Magnetic features at depth should therefore not show too much of a gradient. Qualitatively, the feature at 2000N, stretching from 200E to 500E appears to be too sharp to be caused by a magnetic body at depth, and may therefore be due to a near-surface body. The writer was not engaged to do any depth-to-source calculations, but it is suggested that such calculations should be done.

Similarly, the peak at 1440N, 250E seems to be a bit too sharp to be caused by a body at depth, which would suggest that the area of high readings south of about 1800N may also be due to a sheet of magnetic material at a shallow depth. However, the peak at 1440N, 250E was interpolated from readings at 200E and 300E, and is the only sharp peak inside the grid. (Some other sharp gradients occur at the edge of the grid, but these may be "edge effects" of the contouring program.)

6.0 CONCLUSIONS AND RECOMMENDATIONS

1. The total field magnetic survey of the main grid has outlined a few magnetic features which might be caused by a kimberlitic source.
2. There is poor correlation between the Euler anomalies and the results of the ground survey.
3. The main grid anomalies given a letter label deserve to be followed up by drilling. The order of priority is D, B, C, and A. The cheapest method would be to use a water well rig for the shallow anomalies to recover chips of material. If the material is kimberlitic, then a diamond drill could be brought in to recover core for study. Because the area could contain oil and gas, the rig would have to be equipped with a blow-out preventer, and with other equipment to prevent contamination of the surface by material from the hole.
4. The survey of the north grid did not clearly define a shallow layer of volcanic material, but there is some qualitative evidence of a shallow source for some of the magnetic peaks. Depth-to-source calculations should be done for these.

N. Ralph Newson, M.Sc., P.Eng., P.Geol., P. Geo., F.G.A.C.

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APPENDIX A

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6.0 CONCLUSIONS AND RECOMMENDATIONS

- 1. The total field magnetic survey of the main grid has outlined a few magnetic features which might be caused by a kimberlitic source.
- 2. There is poor correlation between the Euler anomalies and the results of the ground survey.
- 3. The main grid anomalies given a letter label deserve to be followed up by drilling. The order of priority is D, B, C, and A. The cheapest method would be to use a water well rig for the shallow anomalies to recover chips of material. If the material is kimberlitic, then a diamond drill could be brought in to recover core for study. Because the area could contain oil and gas, the rig would have to be equipped with a blow-out preventer, and with other equipment to prevent contamination of the surface by material from the hole.
- 4. The survey of the north grid did not clearly define a shallow layer of volcanic material, but there is some qualitative evidence of a shallow source for some of the magnetic peaks. Depth-to-source calculations should be done for these.

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ALBERTA MINERAL AGREEMENT # 939 6080067

CERTIFIED STATEMENT OF COSTS

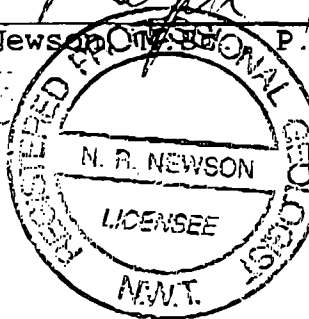
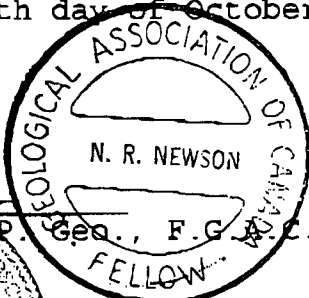

TO ACCOMPANY A REPORT DATED OCTOBER 20, 1998, TITLED "ALBERTA MINERAL AGREEMENT # 939 6080067, ASSESSMENT WORK REPORT ON A TOTAL FIELD GROUND MAGNETIC SURVEY"

Magnetic survey:	78.95 km @ \$100	\$7895.00
	10.95 km @ \$150.00	\$1642.50
	Report	\$ 500.00
Total		\$10037.50
GST @ 7%		\$ 702.63
Total with GST		\$10740.13

I hereby certify:

1. that I carried out the work described in the above-captioned report, and to which the costs set out herein apply
2. that the work was carried out under a fixed price per kilometre contract
3. that the costs set out herein are the true costs to carry out the work described in the above-captioned report, to which this Certified Statement of Costs is appended.

Dated at Saskatoon, Saskatchewan this 20th day of October, 1998

N. Ralph Newson
 N. Ralph Newson, P. Eng., P. Geol., F.G.A.C.




ALBERTA MINERAL AGREEMENT # 093 0909030001

CERTIFIED STATEMENT OF COSTS

TO ACCOMPANY A REPORT DATED MAY 24, 1995, TITLED "ALBERTA MINERAL AGREEMENT # 093 0909030001, ASSESSMENT WORK REPORT ON A TOTAL FIELD GROUND MAGNETIC SURVEY"

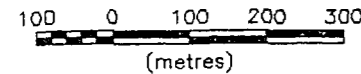
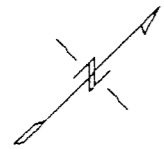
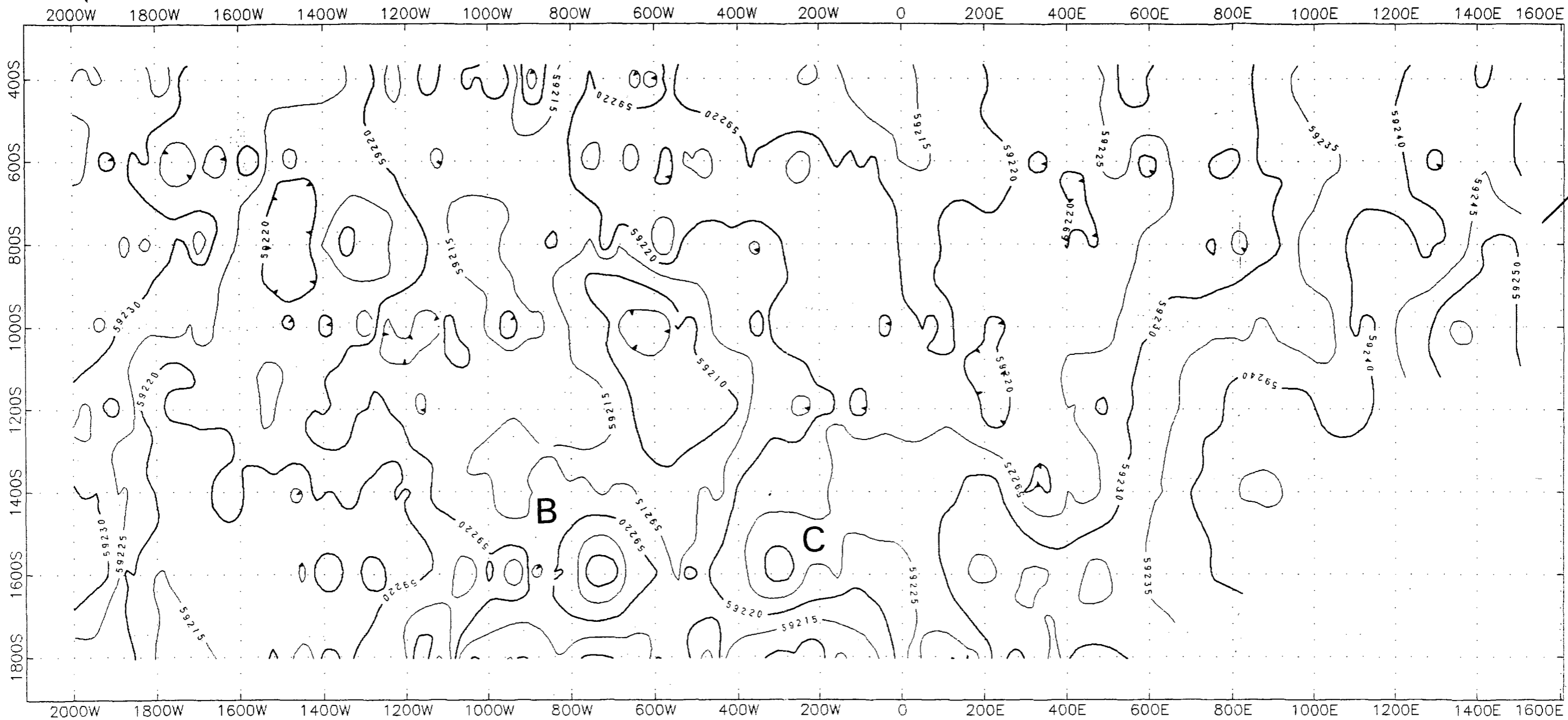
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	10.95 km @ \$150.00	\$1642.50
	Report	\$ 500.00
Total		\$10037.50
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3. that the costs set out herein are the true costs to carry out the work described in the above-captioned report, to which this Certified Statement of Costs is appended.

Dated at Saskatoon, Saskatchewan, this 20th day of October, 1998

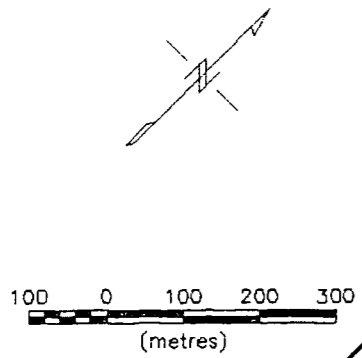
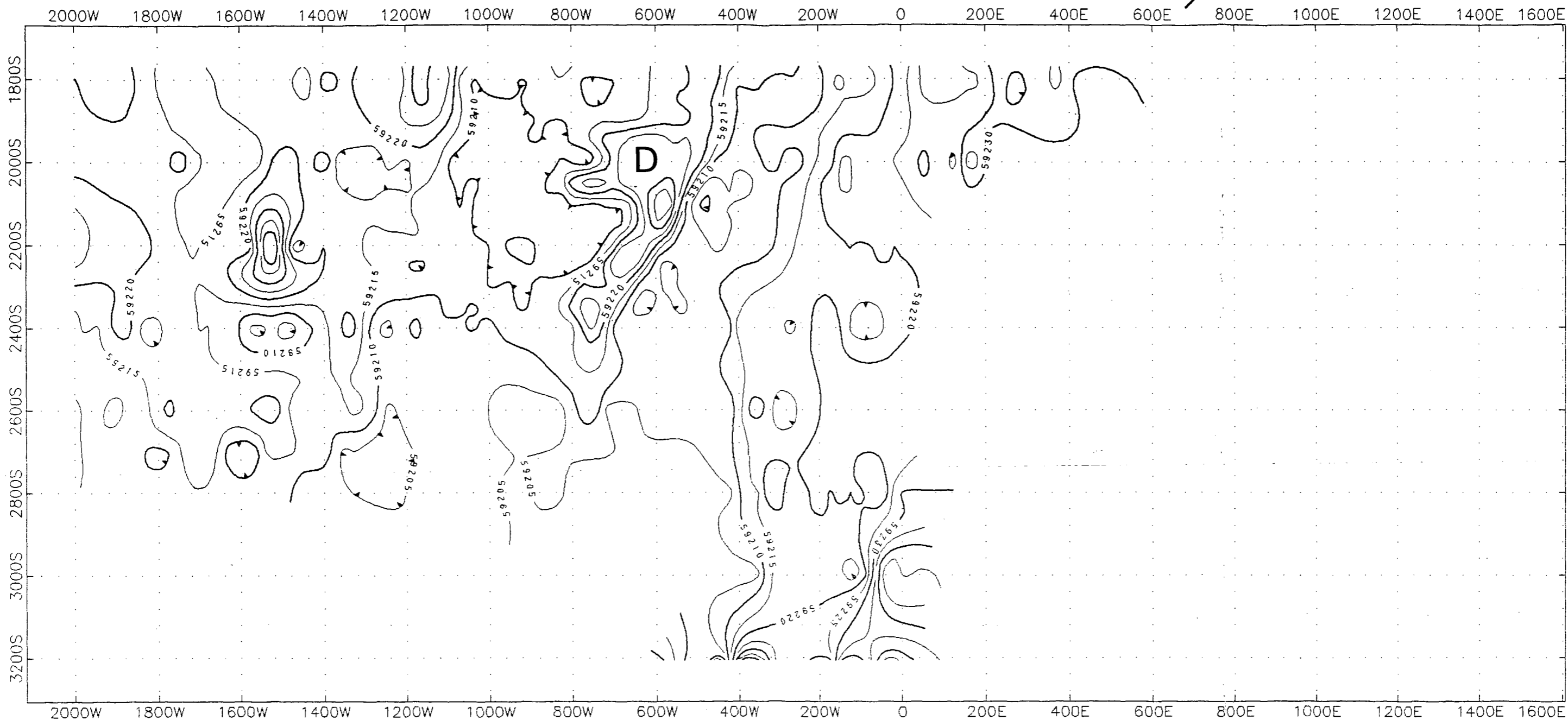
N. Ralph Newson, M.Sc., P.Eng. P.Geol., P. Geo., F.G.A.C.



117°33'W

56°00'N

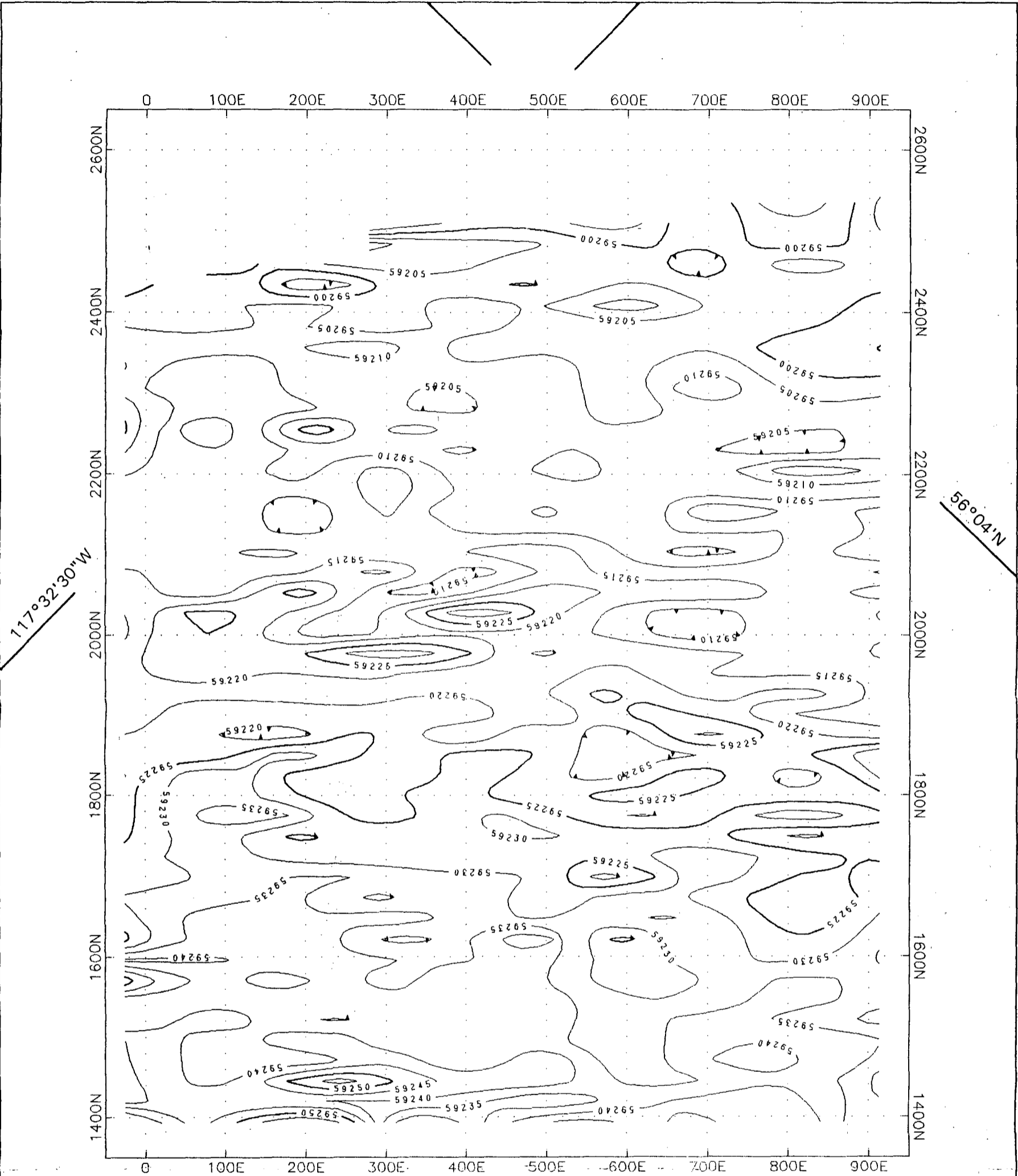
PRIMO RESOURCES LTD	
ALBERTA MINERAL AGREEMENT # 939 6080067	
MAP 2: MAIN GRID, CENTRE PLATE	
TOTAL MAGNETIC FIELD	
NTS 83 N 13, 84 C 4. TWP 81, R 23, W5	
NEWSON MANAGEMENT & CONSULTING LTD	
Scale: 1:10,000	Date: Oct. 1998



117°33'W

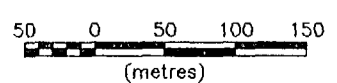
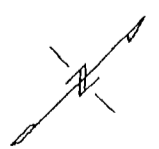
55°59'30"N

PRIMO RESOURCES LTD	
ALBERTA MINERAL AGREEMENT # 939 6080067	
MAP 3: MAIN GRID, SOUTH PLATE	
TOTAL MAGNETIC FIELD	
NTS 83 N 13, 84 C 4. TWP 81, R 23, W5	
NEWSON MANAGEMENT & CONSULTING LTD	
Scale: 1:10,000	Date: Oct. 1998



117°32'30"W

56°04'N



PRIMO RESOURCES LTD	
ALBERTA MINERAL AGREEMENT # 939 6080067	
MAP 4: NORTH GRID	
TOTAL MAGNETIC FIELD	
NTS 83 N 13, 84 C 4. TWP 81, R 23, W5	
NEWSON MANAGEMENT & CONSULTING LTD	
Scale: 1:5,000	Date: Oct. 1998