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M A G N E T I C S U R V E Y

STUART'S BLUFF RANGE

NORTHERN TERRITORY

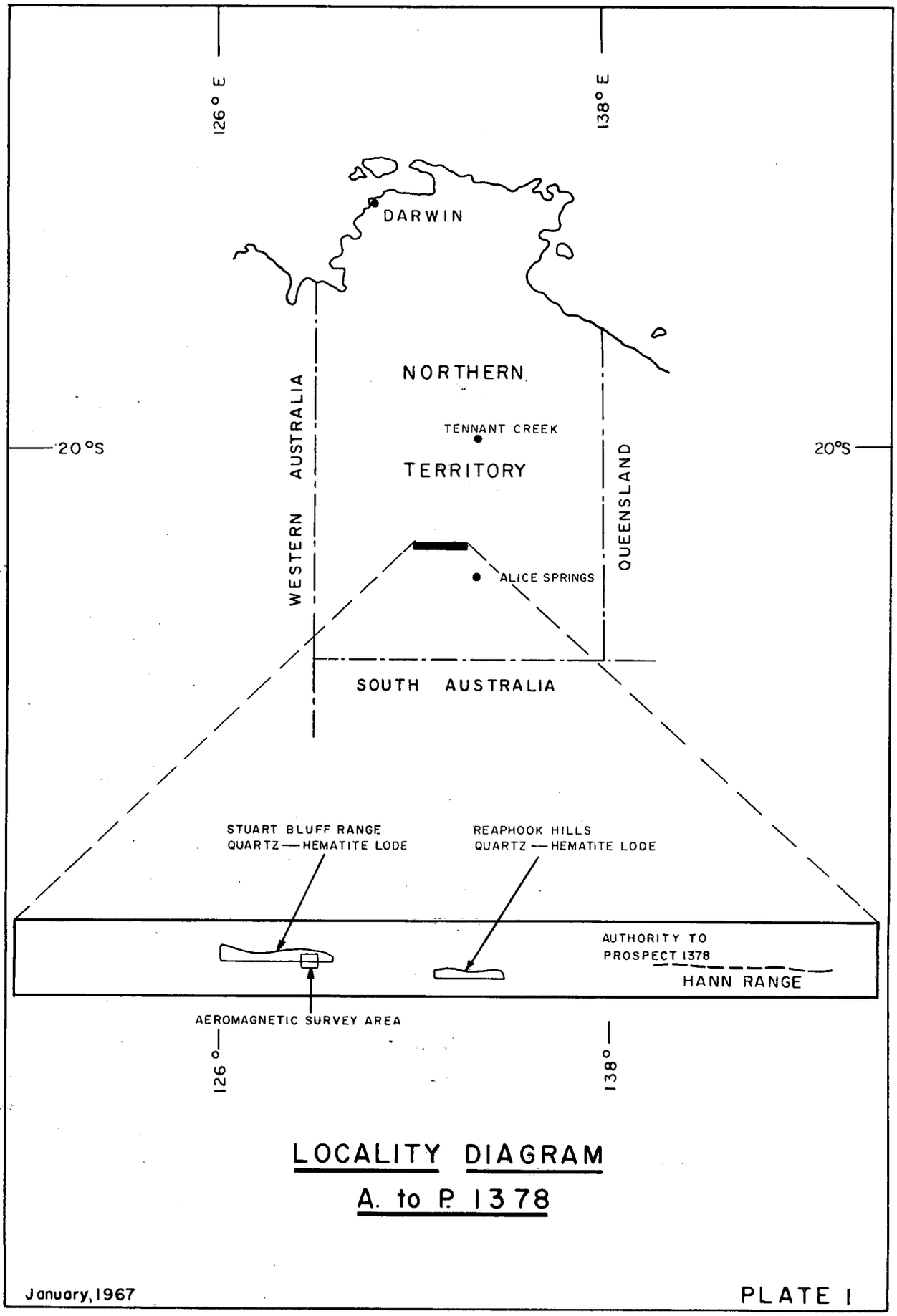
FOR

TRANS PACIFIC PETROLEUM N. L.

BY

WONGELA GEOPHYSICAL PTY. LTD.

FEBRUARY 1967



LOCALITY DIAGRAM

A. to P. 1378

January, 1967

PLATE 1

ABSTRACT

Results of the magnetic survey at Stuart's Bluff Range have confirmed that the quartz haematite gossans of the Stuart's Bluff Range and Reaphook Hills areas are associated with elongate magnetic bodies of appreciable size at average depths of about 300 feet. The source of the magnetism is probably magnetite, from which the haematite of the gossans has been derived by oxidation. The similarity of the gossan occurrences and their associated magnetic anomalies with the mineralisation of the Tennant Creek area is discussed. It is concluded that there is a possibility of economic gold and base metal mineralisation associated with the magnetic bodies. Areas of special interest are recommended for further examination by induced polarisation survey and test drilling.

CONTENTS

INTRODUCTION

In late November and early December 1966, Wongela Geophysical Pty. Ltd. conducted a ground magnetic survey and soil sampling programme in the Stuart's Bluff Range and Reaphook Hills areas for Trans Pacific Petroleum N.L. Radioactivity measurements were also made at selected locations in the Stuart's Bluff Range and Hann Range areas. The survey was planned to aid in the evaluation of the area from the viewpoint of economic mineralisation. More specifically, to help determine whether or not the quartz-haematite gossans are related to deeper seated bodies containing magnetite and possibly associated ore deposits.

All of the above areas are included in Prospecting Authority No. 1378 issued to Trans Pacific Petroleum N.L. The Authority has an area of 976 square miles and the centre of the area is about 130 miles northwest of Alice Springs (see Plate 1).

The area is very accessible. Stuart's Bluff Range and Reaphook Hills are reached by driving north from Alice Springs along the all weather Stuart Highway for 13 miles, then continuing for about 120 miles along the graded Yuendumu Road. The Hann Range area is about 62 miles north of Alice Springs and is reached via the Stuart Highway.

Topographically the area is very flat modified only by the quartz-haematite gossans and resistant residuals of quartzite and conglomerate. Some of these residuals form the Stuart's Bluff Range, Reaphook Hills and Hann Range. Vegetation is generally moderately light with local patches of dense scrub.

The magnetic survey comprised a series of traverses across the gossans. In addition, traverses were run in the alluvium covered areas between them. Station spacing was generally 100 feet. However, a small proportion of the work was done at 200 feet and 50 feet station spacing. Traverse spacing was generally 1000 feet in areas of close control but some additional traverses at 500 feet spacing were run in the W7-W11 area.

A total of 2206 magnetometer stations was observed on 59 traverses totalling 220,500 feet. The Stuart's Bluff Range area comprised 40 traverses totalling 162,100 feet and the Reaphook Hills area comprised 19 traverses totalling 58,400 feet.

Soil samples were taken for geochemical analysis concurrent with the magnetometer work. A total of 1078 was collected. All magnetometer traverses were sampled except for a small section of traverse CW16 from N2800 to N4200. Sampling interval was 200 feet except for the southern extensions of traverses run on gossan W32, which were sampled at 400 foot intervals.

Radioactive measurements were made in the Stuart's Bluff Range and Hann Range areas. The results are discussed later in the Report.

The traverse layout is shown on Plates 2 and 3 and traverses have been labelled according to their positions relative to the gossans. The numbering of the gossans is the same as used by Layton and runs from W1 through W45. The easternmost traverse run on a gossan is called A. Additional traverses proceeding westward are B, C, D etc. The location of a station on a traverse is described in feet north or south of the baseline. For example, station BW38 N1800 means that the station is 1800 feet north of the baseline on traverse BW38; which is the second most easterly traverse on gossan W38.

GEOLOGY

A detailed account of the geology is included in W. Layton's report* and only a brief summary is included here.

The rocks in the area comprise upper Proterozoic sediments and granites and schists of the Precambrian Arunta block. The quartz-haematite gossans are emplaced in the granites.

The upper-Proterozoic sediments are silicified sandstones and conglomerates and form well developed bluffs up to 400 feet high. They strike approximately east and west and dip north at about 20°.

The granite is exposed beneath the sandstone scarps at both Stuart's Bluff Range and Reaphook Hills. It is foliated and deeply weathered and is the host rock for the quartz-haematite gossans.

Schists are present at Mr. Wedge and the Hann Range. They are not known to contain minerals of economic importance although a trace of yellow radioactive mineral was reported to have been found in a pegnatite in the Hann Range.

The quartz-haematite gossans form a striking series of elongate outcrops emplaced in fracture zones and fissures in the granite close to the sandstone escarpments of Stuart's Bluff Range and Reaphook Hills. They vary from a few feet to about 150 feet in width; generally strike east-west and dip south with dips ranging between 60 and 80 degrees. In the Stuart's Bluff Range area the line of gossans is about 7 - 8 miles long and in the Reaphook Hills area they extend over about 4 miles. Individual gossans range up to 2 miles in length and they rise to a maximum height of 200 feet above the level of the surrounding plain. They are composed principally of quartz and massive haematite with a small proportion of specular haematite of later age.

Analysis of the gossans has shown the presence of haematite and ilmenite but no magnetite. Gold and copper have also been detected in spot test samples.

* The quartz-haematite are bodies of Stuart's Bluff Range N.T. W. Layton Ph.D. 1966 (unpublished).

PREVIOUS GEOPHYSICS

Aeromagnetic work was done in the area in 1963 for Pacific American Oil Company as part of the investigation of the oil potential of the Ngalia Trough. Flight line spacing was two miles and the information obtained was not of much practical use for a mineral investigation.

A small detailed aeromagnetic survey was done in September 1964 by the Bureau of Mineral Resources (J. S. Milson 1965). The survey area measured two miles by two and a half miles and covers the group of gossans now called W7 to W11 and the eastern ends of gossans W36-38. Line spacing was 3/20 of a mile and the survey was flown at a height of 250 feet above the ground.

The results of the survey indicate the presence of magnetic bodies at depths of from 200 to 400 feet. The inference is drawn that these bodies contain magnetite which has been oxidised above the water table to form the haematite seen in outcrop.

It was apparent from this work that magnetic surveys can be very useful in the investigation of the area.

Further magnetic work was carried out by Layton in mid-1966 in the vicinity of gossans W1 and W2. An Elsec portable ground magnetometer was used, and a small number of readings was taken on a grid pattern. The results indicate that there is a magnetic anomaly associated with gossan W2.

RESULTS OF THE SURVEY

(a) Geochemical and Rock Sampling.

Analyses of the soil samples taken concurrent with the magnetic readings are in progress. When they are completed a study of the correlation between the magnetic data and geochemical results will be done. A list of the geochemical and rock samples taken is shown in Appendix (D).

(b) Radioactive Measurements.

Tests for radioactivity were carried out using a Geiger counter. The instrument was checked before use by observing its performance on samples of ore from Mary Kathleen and Rum Jungle, and while in operation care was taken to obtain stable readings at each location tested.

In general the radioactive count was very low on the Upper Proterozoic sandstones, conglomerates and quartzites. The granite underlying these sediments gave higher readings with counts of up to two-and-one-half times background count.

The sediments were tested at six locations on the bluffs overlooking the line of anomalies W4 to W45 in the Stuart's Bluff Range area and also over a one and a half mile section in the Hann Range east of the Stuart Highway.

No significant radioactivity readings were recorded from pegmatites on the south side of the Hann Range Bluff and no sign of radioactive mineral was found. A series of five pegmatites were examined for radioactivity over a distance of one and a half miles east from the Stuart Highway. Results were negative in all cases.

(c) Magnetic Survey.

The results of the magnetic survey are shown on Plates (4) to (8). They have been presented as contours of vertical magnetic intensity on Plates (4) to (6) at a scale of 800' = 1 inch and a contour interval of 25 gammas. They are also presented as profiles on Plates (5), (7) and (8) at the same horizontal scale and a vertical scale of 100 gammas to the inch.

The magnetic profiles were smoothed to a small degree before contouring by removing some of the sharp spikes associated with many of the gossan outcrops.

The survey was originally designed as a series of individual traverses and no great care was taken to accurately level the traverses with respect to one

(c) Magnetic Survey (continued)

another. Notwithstanding this, it is felt that the blocks of contours present a reliable picture. Profiles A/2 W7 and E/2 W5 were not included in the contours as they were not levelled with respect to the existing profiles. The contours for different sections of the areas are not on the same datum and care should be taken to observe the no correlation notations on the Plates.

The relative magnetic values along the profiles are considered to be accurate to about 20 gammas.

The gossan outcrops are shown on both profiles and contours so that they can be correlated readily with the magnetic results.

Anomalies were observed on most gossan outcrop areas. In both areas, the pattern is very similar. There are generally sharp shallow anomalies associated with the outcrops superimposed on deeper broader anomalies of varying degrees of amplitude.

The anomalies form elongate trends generally striking east and west. An exception is at the eastern end of the Stuart's Bluff Range area where the strike is N.60 degrees E in the zone of gossans W1 to W4. This strike direction continues into the alluvium covered area south of gossans W3 and W5.

In the Reaphook Hills area the anomalies are relatively small in amplitude from gossan W32 to gossan W28. Apart from the shallow anomaly spikes the deeper anomalies have amplitudes of only 100 gammas.

There is a marked increase in amplitude at gossan W27 and a well developed trend continues on to gossan W25 with maximum amplitudes of about 300 gammas for the deeper seated anomalies.

In the Stuart's Bluff range area there is an anomaly of amplitude about 200 gammas associated with gossans W1, W2, and W3. This anomaly does not continue southwest from gossan W3 but along strike in the alluvium covered area south of gossans W5 and W6, there is a build-up to an anomaly with an amplitude of 500 to 600 gammas.

The anomaly pattern changes strike between gossans W6 and W7 to east and west. This could be related to a change in strike of the observed fault pattern.

The gossans W7 to W11 are associated with an anomaly pattern which has two maxima, one near gossans W7 and W8 and one close to gossan W11. Amplitudes associated with these maxima are about 500 and 300 gammas respectively.

(c) Magnetic Results (continued)

This pattern is about 3,000 feet in length. The intensity decreases rapidly on the western end of gossan W7 then builds up to an elongate well defined trend associated with gossans W36 to W39. Maximum amplitudes for the deep seated anomalies in this trend approach 700 gammas. The individual gossans exhibit pronounced high amplitude shallow anomalies superimposed on the deeper anomaly.

The anomaly trend associated with gossans W36-W39 can be extended to gossans W40, W23 and W22. Anomaly amplitudes diminish to 200 gammas near gossan W22 and correlation further west is obscure because of the widely spaced control, low amplitude anomalies and the discontinuity and variable strike of the gossans up to W16 near the Yuendumu Road.

The group of gossans W42 to W45 west of the Yuendumu Road were checked for magnetic response with three isolated profiles only. The response pattern was similar to the other areas. Anomaly amplitudes ranged from 200 to 500 gammas.

Rock samples from the gossans with one exception did not exhibit magnetism when tested with the survey magnetometer. The exception was a sample from gossan W38, which caused an appreciable deflection on the magnetometer.

DISCUSSION OF RESULTS

Before progressing to a detailed discussion of the magnetic results, some comments on the similarities of the Stuart's Bluff Range gossan occurrences to those at Tennant Creek seem to be pertinent.

The quartz-haematite gossans at Tennant Creek are emplaced in fissures and crush zones in metamorphosed sediments. Whereas haematite is the predominant iron mineral above the water table, magnetite predominates below. The economic gold and copper mineralisation is closely related to the quartz and iron mineralisation.

The gossans at Stuart's Bluff Range are emplaced principally in faults and fissures in granite instead of sediments, however, a later stage of mineralisation also intruded the Upper Proterozoic quartzites.

The gossans at Tennant Creek are only several hundred feet long. At Stuart's Bluff Range they range up to thousands of feet in length. The widths of the gossans are comparable in both localities, however, those at Tennant Creek dip steeply north whereas those at Stuart's Bluff Range dip steeply south.

There are certain similarities in the magnetic features mapped in this area to those at Tennant Creek. Both areas show minor type anomalies from surface or near-surface sources superimposed on broader anomalies arising from deeper seated sources. The deeper seated sources in both areas show a marked correlation with quartz-haematite gossans. Like the gossans, the Tennant Creek magnetic anomalies do not form the pronounced elongate trends as seen in the Stuart's Bluff Range area. Their sources seem to be more spherical than dykelike and a little narrower. Magnetic intensities are generally comparable, though the strongest anomalies are noted in the Tennant Creek area.

It is highly likely that the source of the deeper seated anomalies is magnetite, however, it is also possible that pyrrhotite may be present.

Quantitative analyses have been carried out of many of the magnetic profiles. These analyses are incorporated in a discussion of the gossans and the magnetic results relating to them.

REAPHOOK HILLS AREA

Gossans W32, W31. These effectively constitute a single gossan extending continuously over about two miles. The strike is N 80° W and the dip is 85° south. Five traverses totalling 15,400 feet were run over about one and a half miles.

The magnetic results indicate magnetic material at very shallow depths. In general the highest readings were obtained on the gossans. Depth estimates range from surface to a maximum of 100 - 150 feet on BW32. There is no evidence for the presence of a large magnetic body at greater depth.

Gossan W30. A small gossan approximately 300 feet long, striking N 70° E and dipping 85° S. No anomalous reading was obtained on the gossan itself or on the single traverse run.

Gossan W29. A small gossan about 500 feet long striking N 50° E and dipping 70° S. Two traverses totalling 4,800 feet were run; one across the gossan and the other in an alluvium area near the west end of the gossan. A sharp negative kick was noted on the top of the gossan, however, no significant anomaly was observed on either traverse.

Gossan W28. A small gossan striking N 80° E and dipping 70° S. There was no significant anomaly on the one traverse run over the gossan.

Gossans W27, W26, W25. These gossans form a discontinous line of outcrop striking about N 75° E and dipping at 60-75° S. A deep seated anomaly with amplitudes up to 300 gammas is more or less continuous over about 8,000 feet of this line. Further work should be done to properly delineate this anomaly trend. Calculations on selected profiles indicate an average width of about 750 feet for the source, depths in the range 150-400', a dip of 75° S and a susceptibility of about 2,000 x 10^{-6} c.g.s. units.

Results of the calculations for the individual profiles are as follows:

Profile	Depth to Top of Source	Width	Dip	Susceptibility
CW28	300-400'			
AW27	450-600'			
BW27	300-350'	700-800'	75°S	1600-2200 x 10^{-6}
AW27	150-250'			
BW26	150-300'			
CW25	250-400'			

STUART'S BLUFF RANGE AREA

Gossans W1-W4. These gossans strike approximately N 60° E and dip about 70° S. A total of 5 traverses totalling 12,700 feet was run. Shallow surface anomalies are evident, however, there is a deeper seated anomaly with an amplitude of about 200 gammas which extends over about 2,500 feet. Calculations on the profiles give the following results:-

Profile C/2 W1 — Depth 550-600 feet; Width 1300-1500 feet; Dip 80° S Susceptibility 1000-1500 x 10^{-6}.

Profile B W1 — Depth 430-500 feet.

Areas Between Gossans W3 and W7. There are only two small gossans in this area, W5 and W6. They are on strike with gossan W7 to the west and seem to be related to an east-west control feature. Strong shallow anomalies were recorded on both gossans, but in both cases the crest of an anomaly from a deeper seated source is located well to the south. Evidence from the two profiles run over gossans W5 and W6 as well as from those run in the alluvium covered area between gossans W3 and W5 indicates an intense anomaly with an amplitude of 500-600 gammas striking N 60° E and on line with the strike of the W1-W4 gossans.

The anomaly is about 5000 feet in length. Calculations indicate a width of about 600 feet and a depth in the range 200-400 feet. Further control is required to delineate this feature more accurately.

A shallow (depth 150-250') anomaly was recorded on the southern end of profile BW3. The significance of this anomaly is not known as there is no outcrop.

Profile DW5 is in an alluvium area about 1000 feet east of the end of gossan W7. A low amplitude anomaly (150 gammas) is indicated to be on strike with gossan W8 and at a depth of 250-400 feet.

Gossans W7 - W11. These E-W gossans form a series of parallel outcrops up to 4,000 feet in length and about 5,000 feet wide in a north-south direction. The strike is N 80° E and the dip is about 70° S. The magnetic profiles exhibit strong surface and near-surface anomalies on the gossans. These are superimposed on anomalies from deeper sources. They indicate a zone about 3,000 feet long with depth estimates in the range 200-300'. The zone comprises two distinct anomalies of the deeper seated type; one is coincident with gossans W7 and W8 and the other with gossan W11. Amplitudes are about 500 and 300 gammas respectively. Calculations on these deeper anomalies are complicated because of the severe interference from the surface sources.

The ground survey results agree well with the aeromagnetic survey results and it is considered that the most efficient means of carrying out large scale detailed surveying of the area would be by means of an airborne magnetometer survey.

Preliminary inspection seems to indicate a correlation between geochemical anomalies obtained on an earlier survey and magnetic anomalies. Samples taken on the subject survey are currently being analysed and the results will aid in the evaluation of the correlation.

Gossans W36-W40. This zone of gossans strikes E-W and dips 70° S. They range up to 4,000 feet in length each and form a well-defined zone about two miles long. A series of traverses was run along the zone at a spacing of 1,000 feet. It is evident that the gossans give rise to pronounced surface or near-surface anomalies. Traverses were extended to cross gossans W13 and W14, however, only the former showed a surface anomaly. Underlying gossans W36 to W40 is a well-defined deep seated anomaly. The source is elongate and extends for at least 8,000 feet. It has an average depth of 200-300' and a width of between 500 and 1,000 feet.

Calculations on some of the profiles give the following results:-

Profile	Depth	Width	Dip	Susceptibility
AW 38	250-350'			
BW 38	120-180'			
CW 38	150-250'			
DW 38	300'	1000-1200'	85° S	1700×10^{-6}
EW 38	340-360'	500- 550'	75° S	$3500\text{-}4200 \times 10^{-6}$
AW 39	100-250'			
BW 39	200'			
CW 39	100-180'			
AW 40	160-200'			

Gossan W23. This is a small gossan striking N 75° E and dipping 70° S. Two magnetic traverses indicate a deep seated source about 250' deep and 600' wide. The source is possibly continuous with that underlying gossans W36-W40.

Gossan W22. A small gossan, 200 feet long striking N 65° E, dipping 70° S. There is a low amplitude anomaly coincident with the gossan at a depth of 50-120'. A more pronounced anomaly of amplitude 200 gammas with a source 150-250' deep is mapped 1600' to the south. The relationship of these anomalies to those further east is obscure. There may be continuity, however, further work is needed to verify this.

Gossans W19-W16. These gossans form a scattered, discontinuous group of outcrops. There is expression of a shallow magnetic source on most outcrops and some evidence for continuity of a deeper seated anomaly source in line with the trend inclinations from the W36-W40 gossan group and possibly through gossans W23 and W22.

Amplitudes of the anomalies are in the range 100-200 gammas, and depth estimates range from 100 to 400 feet. The northern planks of the anomalies are not well defined, for except in the case of profile CW16, readings were discontinued on the northern ends of the traverses when the quartzite bluffs were encountered.

On the information available, the gossans appear to strike at a different angle to the trend of the deep seated anomaly source. More detail is required for complete delineation of the anomaly pattern in this area.

Gossans W42-W45. These gossans form a fairly continuous zone of outcrop a little over three miles long on the western side of the Yuendumu Road. They strike east and west and dip 70° S. The three magnetic profiles all indicate shallow anomalies associated with the outcrops, more pronounced on CW43 and CW45. There is evidence for a deeper seated anomaly source up to 200 feet deep on all profiles.

CONCLUSIONS AND RECOMMENDATIONS

The results of the magnetic survey have confirmed that the quartz haematite gossans of the Stuart's Bluff Range and Reaphook Hills areas are associated with very shallow magnetic sources in turn related to deeper seated magnetic bodies of large size. The source of the magnetism is probably magnetite from which the haematite of the gossans is derived by oxidation. Ilmenite and pyrrhotite are possible contributors to the magnetism, although only the weakly magnetic ilmenite has been detected in gossan samples.

The magnetic bodies appear to be dykelike in form; they vary from 100 to 600 feet deep, from 500 to 1200 feet wide, up to 8000 feet long and are steeply dipping to the south. In view of the similarity of the gossans and associated magnetic anomalies to those at Tennant Creek there is a possibility of economic gold and base metal mineralisation associated with the magnetic bodies.

When the geochemical results are available they can be used in conjunction with the magnetic results to select test drilling locations. Induced Polarisation surveys can also be used in this regard. They can define areas of best conductor response along the magnetic anomaly trends. This work could be very valuable in selecting test locations because there is a possibility that economic mineralisation is restricted to the hanging wall or the footwall of the magnetic body.

A 14 day programme of Induced Polarisation work would provide about 75,000 feet of control at a gross cost of about $8,000.

Pending further geochemical results the recommended areas for investigation by Induced Polarisation surveys and follow up test drilling are listed in order of recommended priority:

(a) STUARTS' BLUFF RANGE AREA

(1) Gossans W36 - W39

Follow up of work should be directed to these gossans between Profiles BW38 and AW 39. Calculations indicate depths of between 150 and 300 feet to the magnetic source and source widths between 500 and 1000 feet.

(2) Gossans W7 - W11

The anomaly extends over about 3000 feet but the chief zone of interest is between EW5 and BW7, a distance of 2000 feet. Depth estimates are in the range 200 to 300 feet and indications are that there are at least two distinct bodies.

(3) Gossans W1 - W3

The anomaly extends over about 2500 feet and the recommended zone of interest is between Profiles BW1 to AW3. Depth estimates are about 500 feet and the width is in excess of 1000 feet.

If encouraging results are obtained from the above areas it is recommended that detailed aeromagnetic coverage be obtained for better delineation of the trends already indicated and incompletely mapped, and the rest of the area.

(b) REAPHOOK HILLS AREA

(1) Gossans W25 - W28

The zone of more or less continuous anomaly extends over about 8000 feet and investigation is recommended between BW27 and AW25. Depth estimates for the source are about 250-400 feet and the width is about 700 feet.

(2) Gossans W31, W32

Investigation should be directed to that zone already investigated with the magnetometer from Profile BW32 to Profile EW32. Depths are within 150 feet of the surface.

As for the Stuart's Bluff Range area, detailed aeromagnetic work should be done if encouraging results are obtained with Induced Polarisation and test drilling.

Lindsay N Ingall

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February, 1967.

ACKNOWLEDGMENTS

It is desired to thank the Director, Bureau of Mineral Resources for permission to incorporate results from the Napperby Aeromagnetic Survey in this Report.

REFERENCES

Layton W. 1966 — The Quartz Haematite ore bodies of Stuart's Bluff Range - Northern Territory. (Unpubl.)

Daly J. 1957 — Magnetic Prospecting at Tennant Creek - Northern Territory 1935-37. Bur. Min. Resour. Bulletin No. 44.

Milsom J.S. 1965 — Napperby Detailed Aeromagnetic Survey Northern Territory 1964 Bur. Min. Resour. Aust. Rec. 1965/51.

APPENDIX A

OPERATIONAL STATISTICS

Date of commencement of survey	... ...	29th November, 1966
Date of completion of survey	... ...	11th December, 1966
Number of Magnetometer stations	... ...	2206
Feet of traverse observed	... ...	220,500
Number of traverses	... ...	59
Geochemical samples taken	... ...	1078
Radioactive measurements taken	... ...	10

APPENDIX B

OPERATIONAL PROCEDURE

The magnetic survey was done using a fluxgate magnetometer which measured the vertical magnetic intensity. Readings were taken at 100 feet intervals generally, with a small proportion taken at 50 feet and 200 feet intervals. A complete list of the magnetometer traverses is shown in Appendix E.

The geochemical sampling was done by digging a shallow hole and obtaining a sample of soil from the bottom. In most cases the holes were nine inches deep, however on stony ground it was only possible to dig down two or three inches. Several locations were sampled at different depths from surface down to thirty inches. These are shown in Appendix D. Rock samples were also taken during the course of the survey and a list of the samples is also shown in Appendix D.

Traverses were generally run north and south, which is perpendicular to the strike of the most of the gossans. This orientation was changed to N 30 degrees W in the area of outcrop of gossans W1 to W4, to maintain the perpendicularity to strike. Surveying was by means of compass traversing. Wooden pegs were set at traverse extremities and at the baseline intersections of the traverses. In addition identifiable points on the traverses were pricked onto aerial photographs.

APPENDIX C

PERSONNEL AND EQUIPMENT

PERSONNEL

Geophysicist	-	L.N. Ingall
Field assistants	-	N. Johns
		N.D. Bowe
		H.J. Paul
		R. Vale
		J. Aspinall

EQUIPMENT

Two long wheel base Land Rovers

One Sharpe MF1 Fluxgate Magnetometer

One Geiger Counter

APPENDIX D

GEOCHEMICAL SAMPLES

Date Collected	Profile	Samples	Number
29.11.66	AW7	N2,6,10: S 2, 6, 10, 14, 18, 22, 26	10
	BW7	" "	10
30.11.66	CW7	N2,6,10: S 2, 6, 10, 14, 18	8
	DW7	" "	8
	EW5	N0,4,8 :S 4, 8, 12, 16, 20, 24, 28	10
	DW5	" "	10
	AW38	N 2, 6, 10: S 2, 6, 10, 14, 18	8
	BW38	N 2 - 34: S 2 - 18	14
	CW38	N 14 - 34:	6
		Sub-total	84
1.12.66	BW5	N 0, 4, 8: S 4, 8	5
	CW5	N 0, 4, 8: S 4, 8	5
	DW38	N 4 - 32: S 0 - 28	16
	EW38	N 0 - 32:	9
	BW3	Nil - Profile Sampled each 400' only	
	DW3	Nil - " " " " "	
	CW38	S 4 - 28	7
		Sub-total	42
2.12.66	EW5	Nil - sampled 400' only	
	AW7	Nil - " " "	
	AW3	N 0 - 16	5
	C/2 W1	N 4 - 20	5
	CW1	N 0, 6, 10, 14, 18	5
	AW4	N 2 - 18	5
	BW1	N 2 - 18	5
		Sub-total	25
3.12.66	EW38	S 4 - 28	7
	AW39	S 4 - 28: N 2 - 14	11
	BW39	S 4 - 8: N 0 - 16	7
	CW39	S 4 - 8: N 0 - 20	8
	AW40	N 2 - 26	7
	AW23	N 2 - 22	6
	BW23	N 2 - 22	6
		Sub-total	52
4.12.66	BW16	N 22, 26	2
	CW16	N 22, 26	2
		Sub-total	4

No sampling December 5th

Date Collected	Profile	Samples	Number
6.12.66	CW27	S 4 - 20 N 0 - 12	9
	BW27	S 4 - 20 N 0 - 8	8
	CW25	(On gossan W26) S 0 - 16 N 0 - 16	10
	BW24	(On gossan W25) S 0 - 20 N 0 - 8	8
	AW24	" " " S 4 - 20 N 0 - 16	10
	CW24	" " " S 4 - 20 N 0 - 8	8
		Sub-total	53
7.12.66	AW26	N 0 - 12 S 4 - 28	11
	BW26	N 0 - 12 S 4 - 28	11
	AW27	N 0 - 8 S 4 - 24	9
	CW28	N 0 - 8 S 4 - 24	9
	BW28	N 0 - 12 S 4 - 8	6
	CW29	N 0 - 4 S 4 - 16	6
	DW29	N 0 - 4 S 4 - 16	6
	CW30	N 0 - 12 S 4 - 8	6
	CW31	N 0 - 12 S 4 - 12	7
		Sub-total	71
8.12.66	BW32	N 2, 4, 6, 8, 10, 12, 14: S 2, 6, 10	10
	CW32	N 2, 4, 6, 8, 10, 12: S 0, 2, 6, 10, 14, 18	12
	DW32	N 0, 2, 4, 6, 8, 10: S 2, 4, 6, 10, 14, 12, 14, 16, 18, 20: 18	17
	EW32	N 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20: S 2, 6, 10, 14, 18	16
		Sub-total	55
9.12.66	BW16	N 0 - 18	10
	CW16	N 0 - 18	10
	BW20	N 0 - 26	14
	CW20	N 0 - 26	14
	AW22	N 0 - 38	20
	AW19	N 0 - 26	14
	BW19	N 0 - 30	16
		Sub-total	98
10.12.66	C/2 W1	Ext. S 1, 3, 5, 7, 9, 11, 13, 15, 17	9
	BW1	Ext. S 2 - 14	7
	BW3	Ext. S 22 - 50	15
	DW3	Ext. S 22 - 56	18
	BW5	Ext. S 12 - 36	13
	CW42	N 0 - 10 S 2 - 26	19
	CW43	N 0 - 14 S 2 - 12	14
	CW45	N 0 - 12 S 2 - 20	17
		Sub-total	112
11.12.66	E/2 W5	N 0 - 12 S 2 - 30	22
	A/2 W7	N 0 - 12 S 2 - 30	22
	CW7 Ext.	S 22 - 32	6
	DW7 Ext.	S 22 - 32	6
	CW38	00 - Surface, 9"	2
	CW38	S 400 - Surface, 12", 24", 30"	4
	AW7	S 1050 - Surface, 12", 15", 24"A, 24"B	5
	C/2 W7	S 3050 - Surface, 12", 24", 30"	4
		Sub-total	71

Field work concluded 11.12.66

APPENDIX D (Continued)

ROCK SAMPLES

AW4	N1000	on Gossan		W4
AW3	N1080	"	"	W3
BW1	N900	"	"	W1
AW39	N400	"	"	W39
	N1300	"	"	W38
	N1600			Quartzite
BW39	N800	"	"	W39
	N1360	"	"	W38
CW39	N700	"	"	W39
	N2000			Quartzite
AW40	N2240	"	"	W40
BW38	S100	"	"	W36
	N100	"	"	W37
	N1100	"	"	W38
	N550	"	"	W37
CW38	S100	"	"	W36
DW38	N270	"	"	W37
	N1060	"	"	W38
EW38	N900	"	"	W38
	N3800			Quartzite
		Total		20

APPENDIX E

MAGNETOMETER TRAVERSES

Reaphook Hills Area

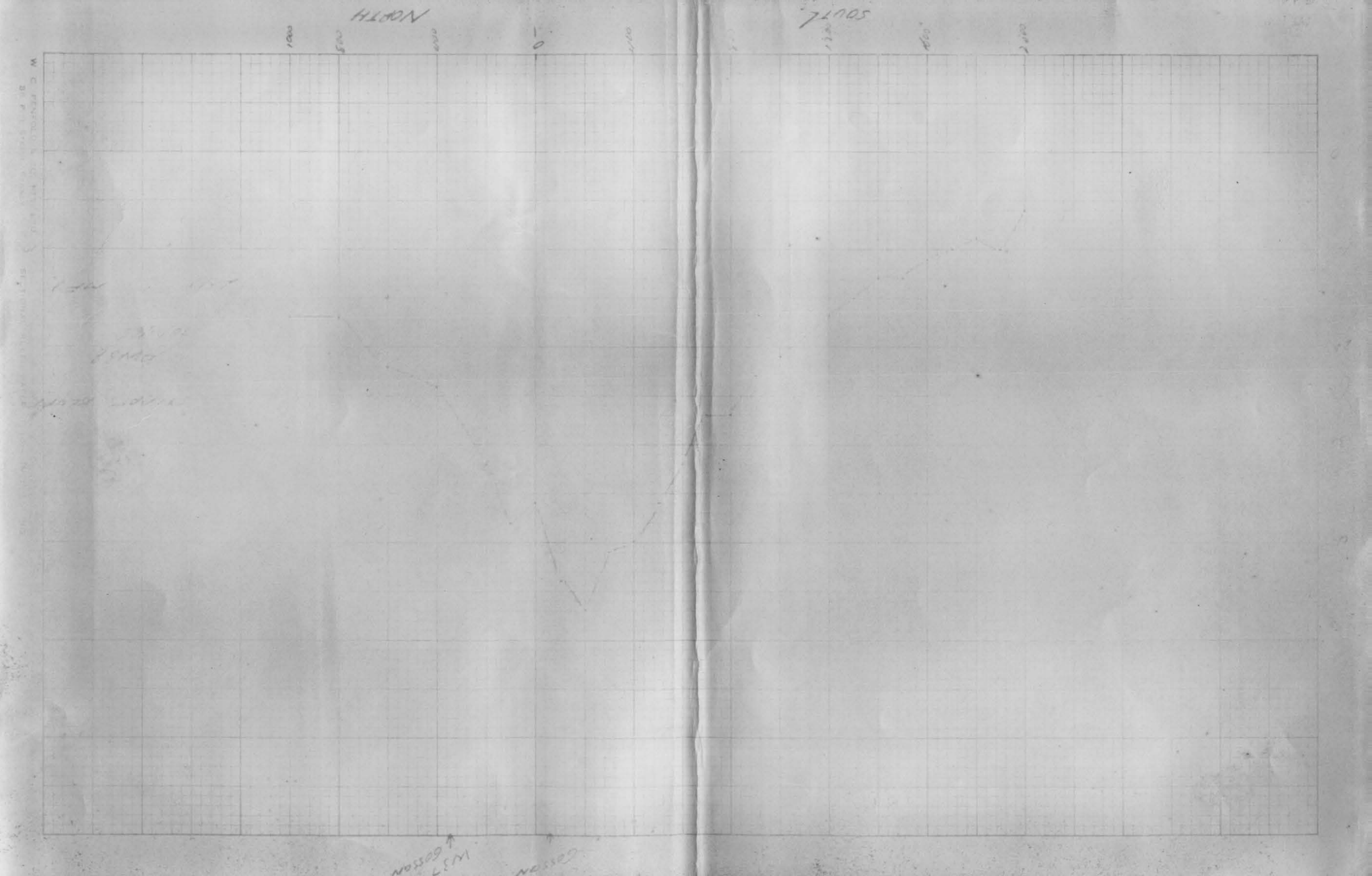
Traverse	From	To	Feet
BW32	N1400	S1000	2400
CW32	N1200	S1800	3000
DW32	N2000	S1800	3800
EW32	N2000	S1800	3800
CW31	N1200	S1200	2400
CW30	N1200	S1000	2200
CW29	N600	S1800	2400
DW29	N600	S1800	2400
BW28	N1200	S1000	2200
CW28	N1000	S2600	3600
AW27	N1000	S2600	3600
BW27	N1000	S2000	3000
CW27	N1400	S2000	3400
AW26	N1400	S3000	4400
BW26	N1400	S3000	4400
CW25	N1800	S2000	3800
AW24	N1800	S2000	3800
BW24	N1000	S2000	3000
CW24	N1000	S2000	3000

Stuart's Bluff Range Area

CW1	N1800	00	1800
AW4	N2000	00	2000
BW1	N2000	S1400	3400
C/2 W1	N2000	S1700	3700
AW3	N1800	00	1800
C/2 W1	N1100	E 300	300
BW3	N2000	S5000	7000
DW3	N2000	S5600	7600
BW5	N1000	S3600	4600
CW5	N1000	S1000	2000
DW5	N1000	S2800	3800
EW5	N1000	S9600	10600
E/2 W5	N1200	S3000	4200
AW7	N1000	S9600	10600
A/2 W7	N1200	S3000	4200
BW7	N1000	S2800	3800
CW7	N1000	S3200	4200
DW7	N1000	S3200	4200
W14			200
AW38	N1000	S2000	3000
BW38	N3400	S2000	5400
CW38	N3400	S3000	6400
DW38	N3400	S3000	6400
EW38	N3400	S3000	6400

Traverse	From	To	Feet
AW39	N1600	S3000	4600
BW39	N1800	S1000	2800
CW39	N2000	S1000	3000
AW40	N2600	00	2400
AW23	N2400	00	2400
BW23	N2400	00	2400
AW22	N3800	00	3800
AW19	N2600	00	2600
BW19	N3000	00	3000
BW20	N2600	00	2600
CW20	N2600	00	2600
BW16	N2800	00	2800
CW16	N4200	00	4200
CW42	N1000	S2600	3600
CW43	N1400	S1200	2600
CW45	N1200	S2000	3200
		Total Footage:	220,500
		Total Number of Stations:	2,206
		Number of Traverses:	59


200
0
-200


NORTH
SOUTH

700

600

50

600

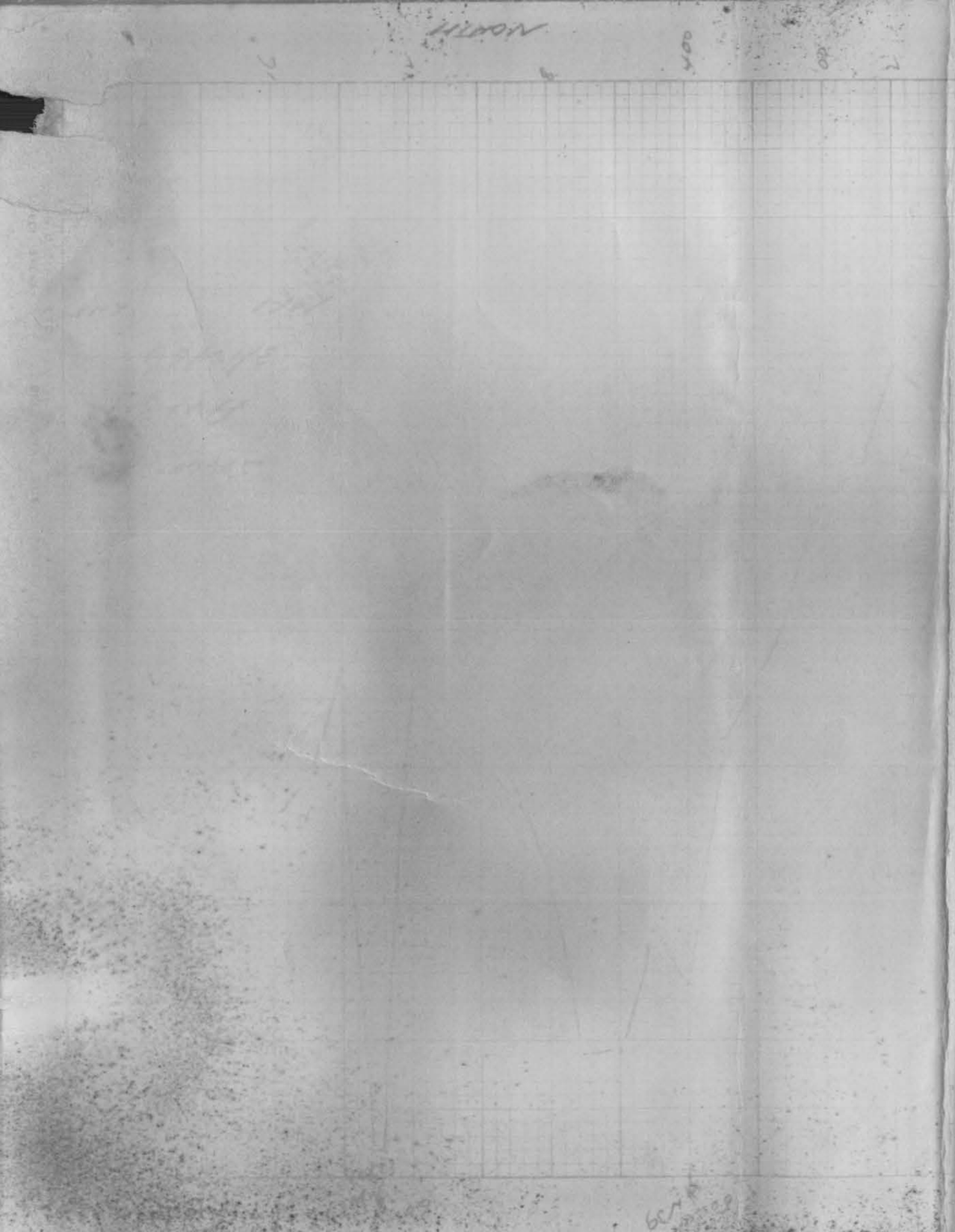
500

-100

Gossan NW39

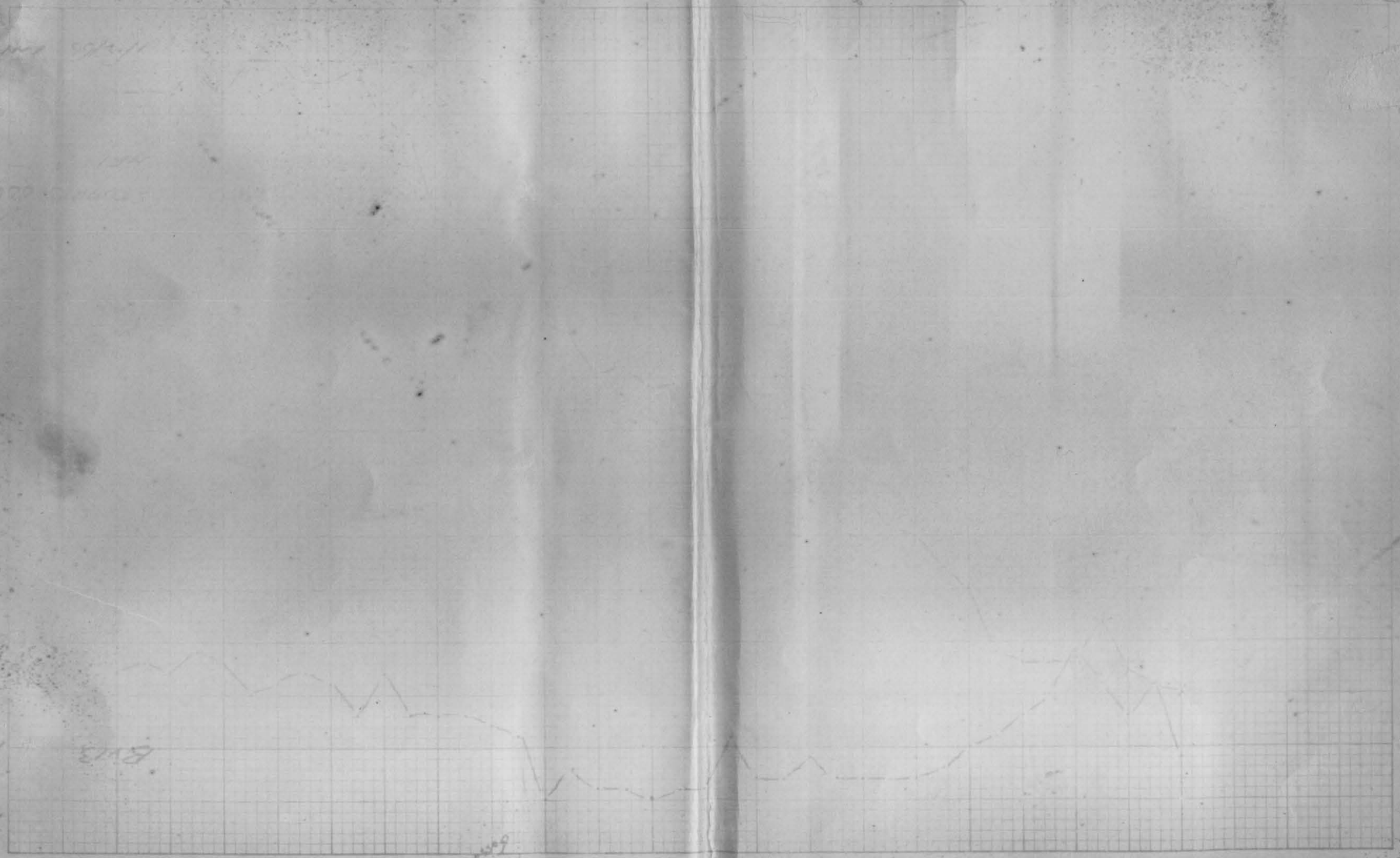
Gossan NW38

NORTH



NORTH

NORTH



W. C. PENFOLD & CO. LTD.
86 Pitt Street, S.

60°58'W
A-111

60°58'W
N-7

NORTH

200

100

0

2000 1600 1200 800

400 0 400 800 1200

NORTH

CW7 12/1986

(kv1000 – 5200)

Gossan
N11

Gossan
N8

Gossan
N7

600

500

400

200

100

0

-100

2400

2200

2000

1600

1400

1200

800

SOUTH

400

200

0

400

600

1000

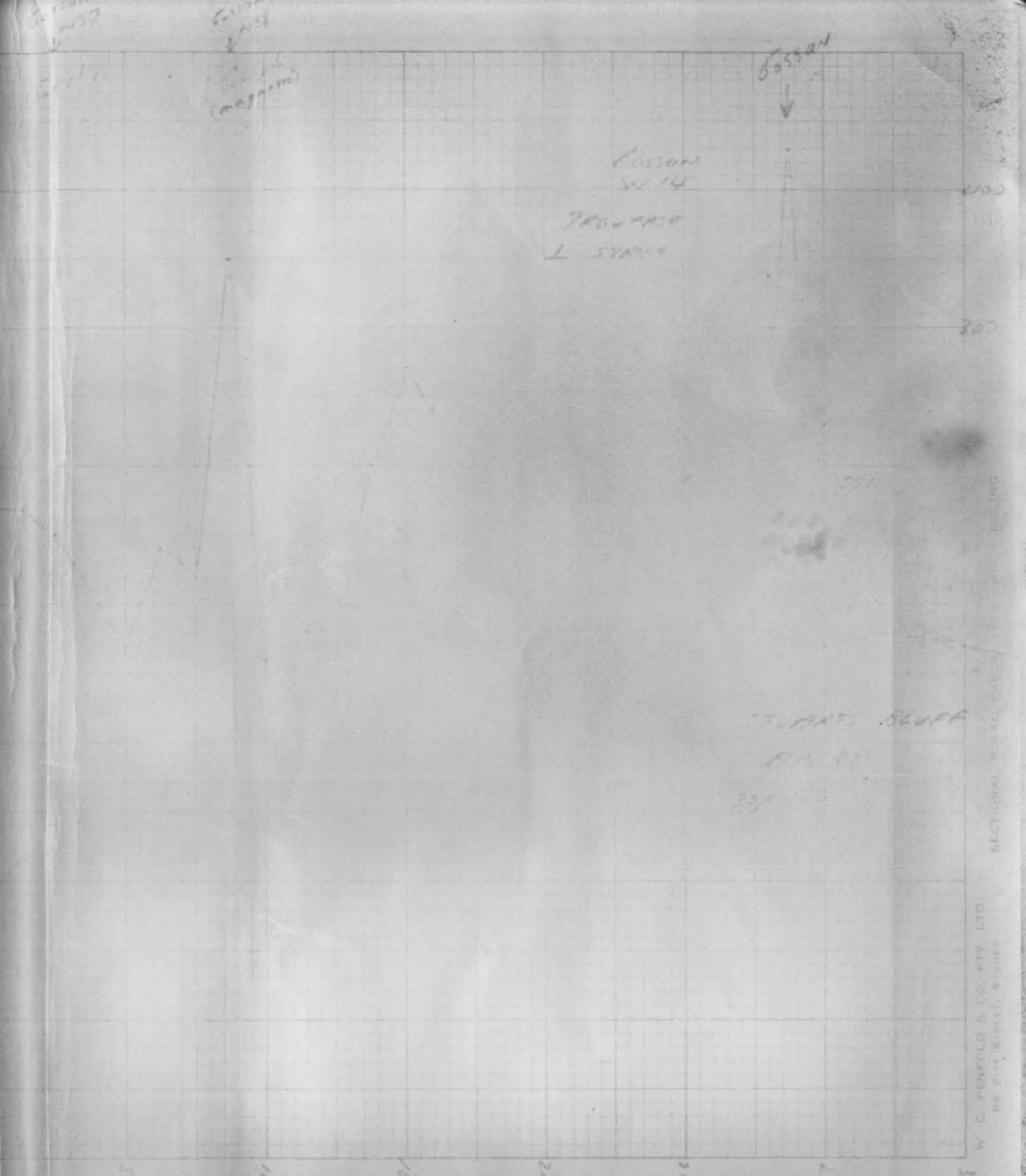
NORTH

200

100

SOUTH


SOUTH


Gosson
No 14
Tertiary
L. Strata
Tertiary Bluff
No 11
NORTH

Gossan N36 55

Gossan N37 65

Gossan N38?

Gossan N13/1

STEWARTS BLUFF

CW 38

SOUTH

NORTH

W. C. PENFOLD & CO. PTY. LTD.
85 PITT STREET, SYDNEY

Gossan W36

Gossan W37

Gossan W38

Gossan W39

600

500

400

300

200

100

0

-100

-200

-100

-200

SOUTH

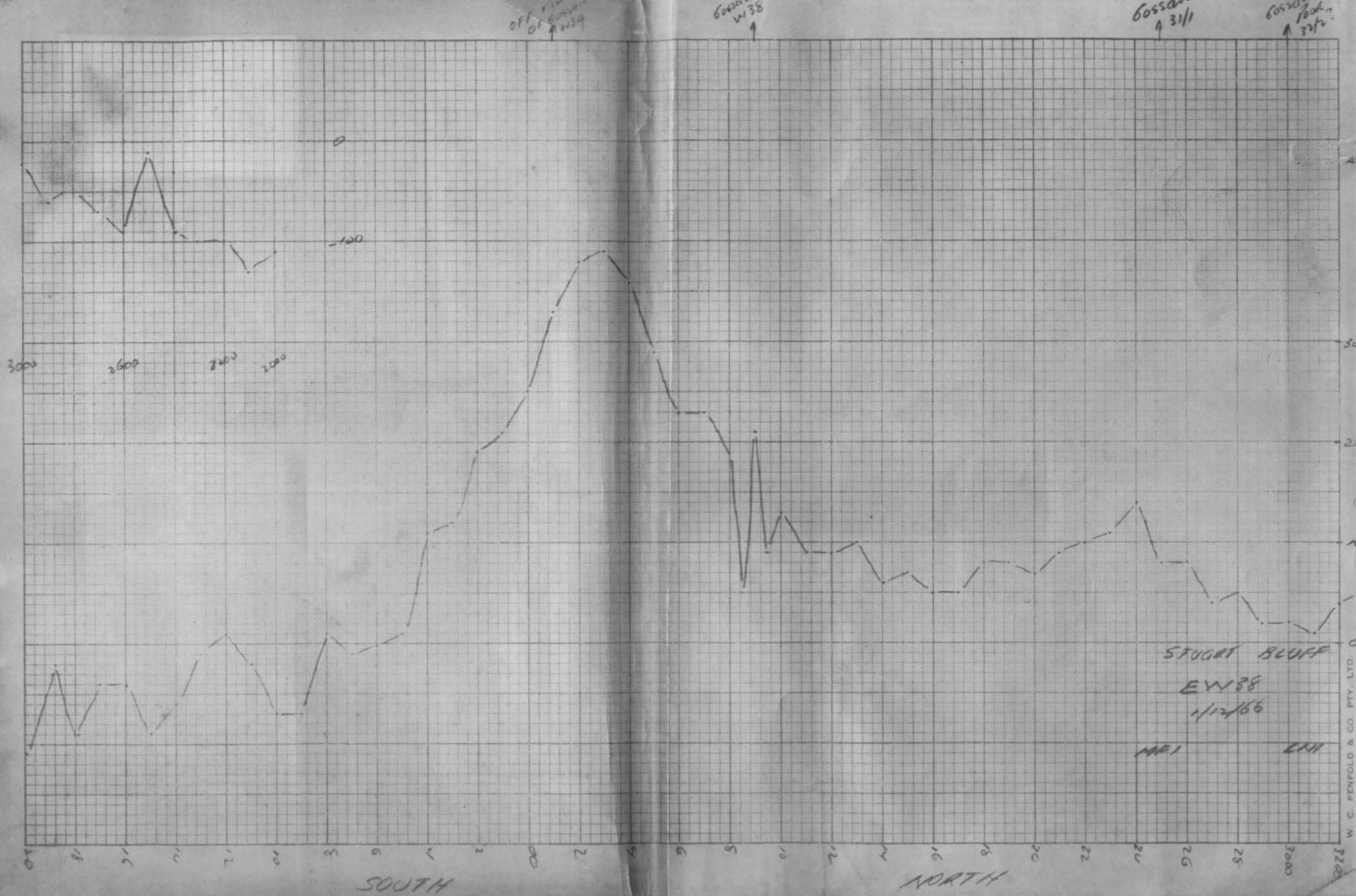
NORTH

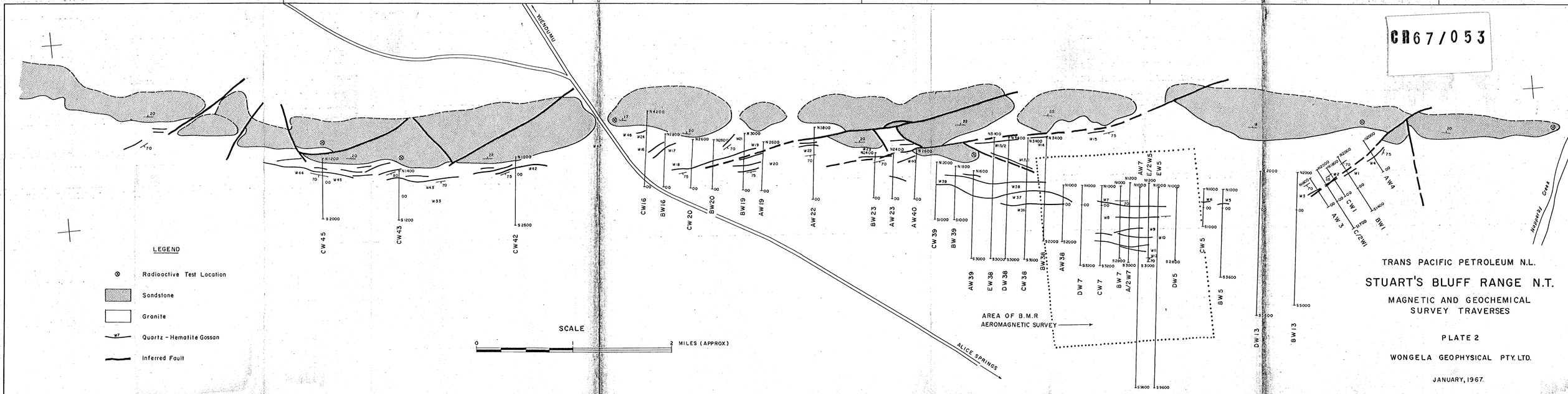
STOKES BCUPH
1-12-66.
D/W3B

W1 E1

(53000 - N3400)

W. C. PENFOLD & CO. PTY. LTD. SECTIONAL RULED PAPER, 10 TO THE INCH RULING
58 PITT STREET, SYDNEY


0
-100
3000
2600
2400
2000
SOUTH
NORTH
STUART BLUFF
EW38
1/12/66
MRL
EXH
W C. PENFOLD & CO. PTY. LTD.
88 PITT STREET, SYDNEY
SECTIONAL RULED



TRANS PACIFIC PETROLEUM N.L.

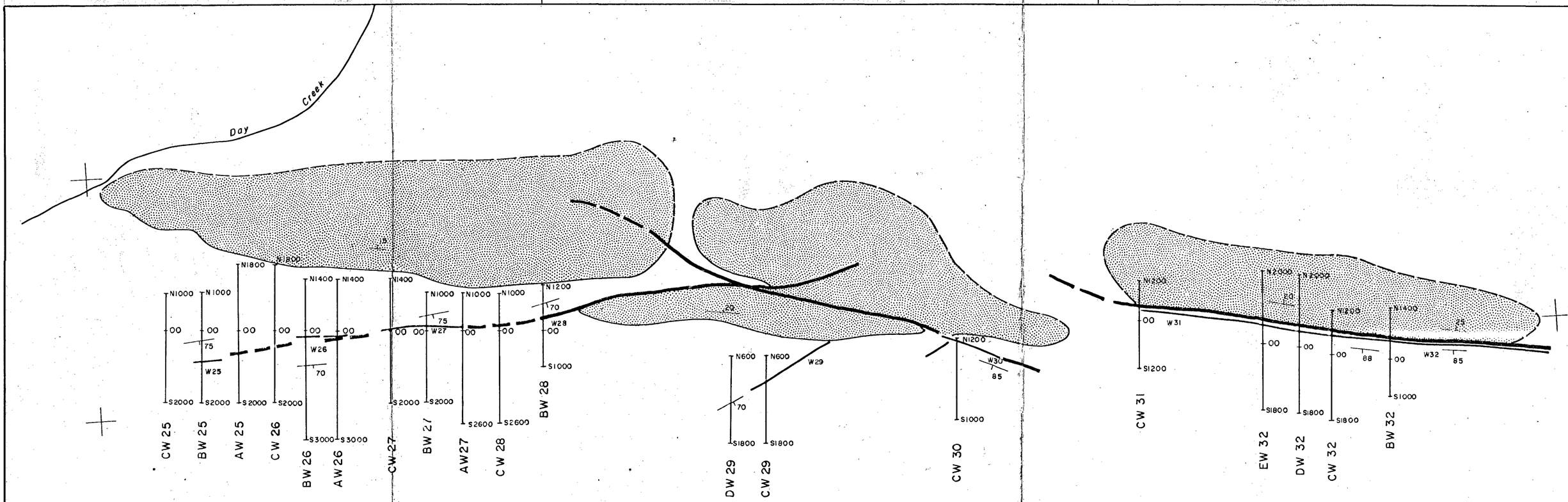
STUART'S BLUFF RANGE N.T.

MAGNETIC AND GEOCHEMICAL SURVEY TRAVERSES

PLATE 2

WONGELA GEOPHYSICAL PTY. LTD.

JANUARY, 1967.



LEGEND

- Sandstone
- Granite
- W25 Quartz - Hematite Gossan
- Inferred Fault

SCALE

0 1 2 MILES (APPROX.)

TRANS PACIFIC PETROLEUM N.L.

REAPHOOK HILLS

MAGNETOMETER AND GEOCHEMICAL SAMPLING TRAVERSES

PLATE 3

WONGELA GEOPHYSICAL PTY. LTD.

JANUARY, 1967.

TRANS PACIFIC PETROLEUM N.L.

STUART'S BLUFF RANGE

NORTHERN TERRITORY

VERTICAL MAGNETIC INTENSITY CONTOURS

Horizontal Scale – 1 inch = 800 feet

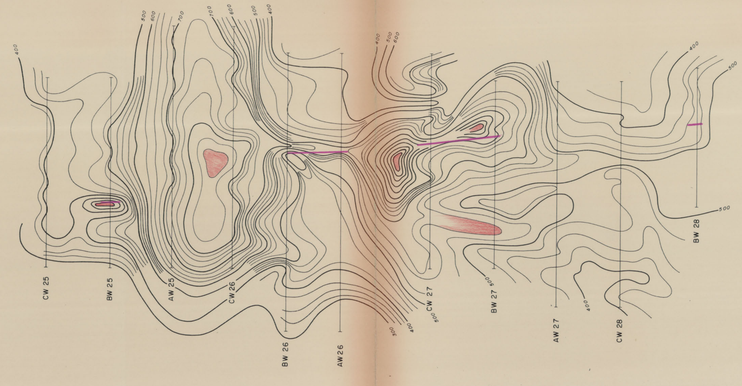
Contour interval 25 gammas

INTERPRETED BY L. N. INGALL

WONGELA GEOPHYSICAL PTY LTD.

Date : — February 1967

PLATE 4



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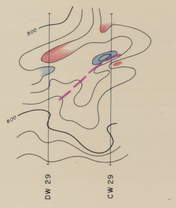
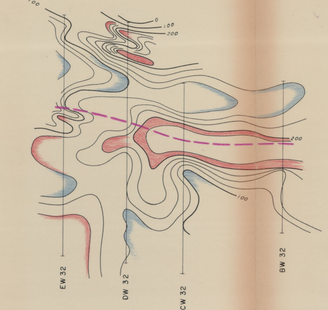


NO CORRELATION

NO CORRELATION

NO CORRELATION



TRANS PACIFIC PETROLEUM N.L.

STUART'S BLUFF RANGE

(REAPHOOK HILLS)

NORTHERN TERRITORY

VERTICAL MAGNETIC INTENSITY CONTOURS

Horizontal Scale = 1 inch = 800 feet

Contour interval 25 gammas

INTERPRETED BY L.N. INGALL

WONGELA GEOPHYSICAL PTY LTD.

Date — January 1967

LEGEND

HIGH

LOW

GOSSAN

PLATE 5

TRANS PACIFIC PETROLEUM N.L.

STUART'S BLUFF RANGE

NORTHERN TERRITORY

VERTICAL MAGNETIC INTENSITY CONTOURS & PROFILES

Horizontal Scale – 1 inch = 800 feet

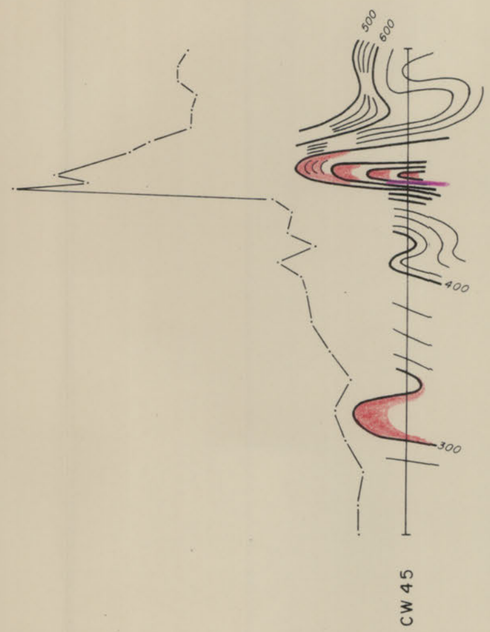
Vertical Scale – 100 gammas = 1 cm.

Contour interval 25 gammas

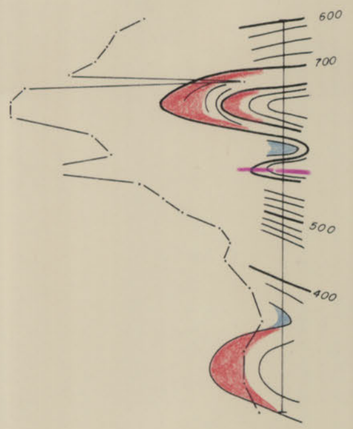
INTERPRETED BY L.N. INGALL

WONGELA GEOPHYSICAL PTY. LTD.

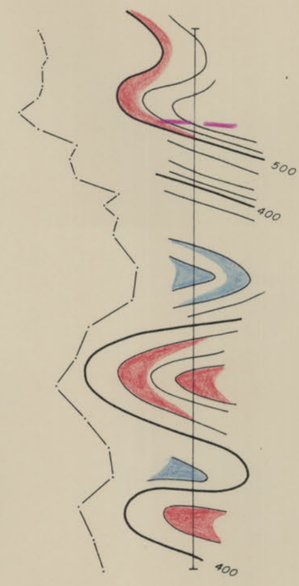
Date : — February 1967



CW 45



CW 43



CW 42

LEGEND

HIGH

LOW

GOSSAN

PLATE 6.