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Geochemical and Radiometric Investigations Manton Area, Northern Territory, 1968

by

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GEOCHEMICAL AND RADIOMETRIC INVESTIGATIONS MANTON AREA, NORTHERN TERRITORY, 1968.

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RECORDS 1969/35

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SUMMARY

A reconnaissance geological geochemical and radiometric survey was carried out in the Manton Area, Northern Territory, in 1968.

The geological succession in the area is the same is that in the Rum Jungle East Area.

Some low-order anomalous lead and zinc zones were outlined, together with some small cobalt and nickel anomalies. Follow-up work is recommended to test these anomalous zones.

Anomalous radioactivity in the southern part of the area, within the Crater Formation was outlined and detailed follow-up work is recommended.

INTRODUCTION

Between the 19 August and 12th November, 1968, a reconnaissance auger drilling, geochemical, geological and radiometric investigation was carried out in the Manton Area by the Darwin Uranium Group of the Bureau of Mineral Resources. The choice of the area was influenced by the trend of the Coomalie Dolomite/Golden Dyke Formation contact which is a favourable stratigraphic horizon for economic mineral deposits in the Rum Jungle Area. Previous work had been done in the area by the Rio Tinto Company Limited, from 1954 to 1960 and by the Bureau of Mineral Resources from 1954 to 1957; this work showed that the Manton Area warranted further investigation.

LOCATION AND PHYSIOGRAPHY

The Manton Area lies three miles west of the Stuart Highway approximately 43 miles south of Darwin, and is situated within the Manton Dam water catchment Reserve. It covers an area of approximately twelve square miles. (See Plate 1).

The area is bounded on the northern side by the Acacia Gap Quartzite, which forms resistant ridges several hundred feet high, on the southern side by the Rum Jungle Complex, and to the east by the Manton Dam. Most of the area consists of low-lying black soil flats derived from the shales of the Golden Dyke Formation, but the conglomerates and quartzites of the Crater Formation form prominent ridges in the south-western portion of the area.

The drainage of the area is by several small creeks flowing eastwards into Manton Dam.

The main access to the Manton Area is by the Woodcutters North West Track, which leaves the Stuart Highway approximately 47 miles south of Darwin, the area lies approximately six miles north-west of the Stuart Highway along this track. Access within the area itself was provided by seversl unformed tracks and by bull-dozed tracks put down by the B.M.R., the main ones being along the base line 202N, and along traverse line 88 west.

The area becomes inaccessible during the wet season and the field party was unable to move into the area until August, due to swampy conditions during the earlier part of the year.

HISTORY

The regional geology of the Manton Area has been described by Mc lone (1958) in his report on the Darwin-Adelaide River Area, and the regional geology is shown on the Rum Jungle 1-mile : 1 inch special sheet, published by the B.M.R.

During 1954, geologists of the Rio Tinto Company Limited (Pegg, 1954) carried out a preliminary geological and radiometric investigation of the area west of Manton Dam. As a result of this work, the company applied to the Administrator of the Northern Territory for a mineral lease covering the area immediately to the west of Manton Dam. Prior to granting the lease, the Administrator requested the Bureau of Mineral Resources to examine the area and assess its prospects, since the area lies in the Manton Dam water catchment Reserve.

As a result of this request, a geophysical survey was undertaken by the B.M.R. in 1954 (Barlow, 1956), using vehicle-borne radiometric equipment as well as self potential and electromagnetic methods. One of the self-potential anomalies was diamond drilled by the B.M.R. in 1954 (Dow, 1955; Debnam, 1955). No further work was recommended.

In 1954, the Rio Tinto Comapny was also granted Authorities to Prospect over the area of Crater Formation near Manton Dam. This investigation culminated in three diamond drill holes being drilled to test the radioactive pebble conglomerate beds of the Crater Formation immediately west of Manton Dam. (Rattigan, 1955).

An airborne radiometric survey of the Rum Jungle Area was made by the Bureau of Mineral Resources in 1967 (Livingstone, 1959), and ten anomalies were located in the Manton Area. This airborne survey was followed up by ground investigation of the radiometric anomalies (Warin, 1959). Of the ten anomalies in the Manton Area, nine were found to be associated with granite and one was associated with the radioactive pebble conglomerate beds of the Crater Formation. No further work was recommended.

METHODS

Due to the distance of the Manton Area from Batchelor township, a field campwas set up in the area for the duration of the survey.

A series of north-south traverse lines were pegged by a contract surveyor, 1200 feet apart, and were tied to the Rum Jungle East grid. Auger holes were drilled every 200 feet along each traverse bu a power-operated Gemco auger drill, and were drilled to identifiable weathered rock wherever possible. A bottom hole sample was collected from each hole and submitted to the Australian Mineral Development Laboratories, Adelaide (Amdel) for analysis by Atomic Absorption Spectrophotometer for copper, lead, zinc, cobalt and nickel. In areas of outcrop, or areas inaccessible to the Gemco drill, samples were collected with a mattock.

Auger holes were tested for radioactivity with Harwell type 1368A ratemeters, readings being recorded every foot. Geological mapping was based on the interpretation of auger cuttings, supplemented by any available outcrop, and the geological map was drawn on a scale of 600 feet to the inch.

Auger drilling commenced in the Manton Area on 19th August and concluded on 12th November. Most of the drilling was done by a Gemco drill owned and operated by the Bureau of Mineral Resources, but some holes were drilled by a Gemco drill made available by the Mines Branch, Northern Territory Administration. Footage drilled was made up as follows: -

Bureau of Mineral Resources	-	14,111 feet
Mines Branch, N.T.	-	2,462 feet
Total footage	-	16,573 feet

STRATIGRAPHY

The geological succession in the Manton Area comprises a series of slightly metamorphosed Lower Proterozoic sedimentary formations resting unconformably on the Rum Jungle Complex. The meta-sediments are intruded by amphibolite and quartz tourmaline veins.

The following units were recorded in the area in order of increasing age (See Plate 2).

Superficial deposits
Acacia Gap Tongue
Golden Dyke Formation
Coomalie Dolomite
Crater Formation
Rum Jungle Complex

The geological succession in the Manton Area is similar to that recorded in the Rum Jungle East and Acacia Areas. They have previously been described by Dodson & Shatwell (1965), Shatwell (1966), Semple (1967, 1968), and Willis (1969).

Rum Jungle Complex

The Rum Jungle Complex, described by Rhodes (1964), forms the southern boundary of the area, and most of the traverse lines terminate near the boundary of the granite. The main outcrops were encountered in the eastern portion of the area and consisted of the leucocratic variety as described by Rhodes. In areas of non-outcrop, the granite was generally overlain by a cream coloured quartz sand containing highly weathered granite fragments.

Crater Formation

The Crater Formation occurs in the southern part of the area, where it unconformably overlies the Rum Jungle Complex. In the south-western portion of the area, rocks of the Crater Formation crop out to form prominent ridges. These rocks have been described by Miezitis (in preparation).

Five main rock types were distinguished within the Crater Formation, viz. flaggy quartzite, quartz pebble conglomerate, quartz mica schist, sheared quartzite amd sheared greywacke. The quartz pebble conglomerate proved valuable as a marker horizon in the Crater Formation.

Both the Rum Jungle Complex and the Crater Formation are intruded by veins and irregular bodies of quartz tourmaline. These intrusions occur mainly in the eastern portion of the area where they form low hills. In some places the tourmaline is very coarse-grained. Two small intrusions of quartz tourmaline also occur within the Crater Formation in the western portion of the area.

Coomalie Dolomite

The Coomalie Dolomite occupies the central portion of the Manton Area. The only outcrops are of a fine-grained quartzite and a ferruginous sandstone, together with quartz ironstone breccia. In places this quartz ironstone breccia appears similar to the Haematitic Quartzite Breccia (H.Q.B.) which occurs as a separate rock unit on the western side of the Rum Jungle Granite Complex.

The non-outcropping areas of dolomite are marked by a mantle of deep, well-sorted quartz sand.

Near the northern boundary of the area, the dolomite is locally separated from the shales and schists of the Golden Dyke Formation by a transition zone of black calcilutite. This transition zone is gradational and does not occur in the western portion of the area. Outcrops of this block calcilutite were only noted in the eastern portion of the area, where they consist of a well bedded rock, rich in iron and very calcareous. One outcrop is highly sheared and contains chlorite.

Golden Dyke Formation

Rocks of the Golden Dyke Formation occupy the northern portion of the Manton Area, but outcrops are restricted to one small area of chert and one of silicified shale. Other exposures are of small quartzite outcrops lithologically similar to the Acacia Gap Tongue. From auger cuttings the main rock types in the Golden Dyke Formation are considered to be schists and shales with minor sandstone bands.

A band of amphibolite is present within the Golden Dyke Formation near the top of the Formation and trends parallel to the ridge of Acacia Gap Tongue immediately to the north. This amphibolite band continues to the eastern margin of the area, but not found on traverse lines 136 West and 148 West near the western margin of the area. However, it is probable that the amphibolite in this area is merely obscured by a superficial deposit of fine quartz sand; this suggestion is supported by the results of a Slingram Survey (Gardener, in prep.) which shows strong anomalies on both 136 and 148 west traverse lines.

Acacia Gap Tongue

The Acacia Gap Tongue forms the northern boundary of the area, and occurs as resistant ridges several hundred feet high. It may represent an arenaceous facies within the Golden Dyke Formation.

Superficial Deposits

Undifferentiated Cainozoic ferruginous quartz sand covers the north-western portion of the area, and numerous laterite outcrops occur throughout the area. The laterite in places contains fragments of the underlying rocks, such as quartzite and silicified shale fragments.

Alluvial deposit occur chiefly in swampy areas and consist largely of a black humic soil.

STRUCTURE

No detailed structural work was possible during the survey and the following remarks are based largely on the observed trends of the geological boundaries.

The Manton Area consists of a sequence of Lower Proterozoic meta-sedimentary formations that converge towards the eastern part of the area at Manton Dam and broaden out to the west. In the eastern part of the area, the structure is complicated by a series of approximately north-south trending faults,associated in some places with quartz tourmaline veins.

A tight anticline occurs in the south-eastern part of the area within the sheared quartzites of the Crater Formation.

In the western part of the area, the main feature of interest is the "Celia Embayment". It was found that "Celia Embayment" was not closed off at its eastern end by granite of the Rum Jungle Complex, as shown on the Rum Jungle 1 mile : 1 inch Special Sheet. Instead, the sediments were found to be continuous from Manton Dam around the edge of the granite, and a separate inlier of granite was found to occur north of the main Rum Jungle Complex.

GEOCHEMICAL AND RADIOMETRIC RESULTS

The geochemical and radiometric results are tabulated in Appendix 1, and are illustrated on Plates 3, 4, and 5.

Geochemical results:

The results are plotted as profiles at a scale of 1" = 600' and illustrated on Plates 3 and 4.

The results obtained for the Manton Area were generally disappointing. Only five lead values were greater than 100 p.p.m. These are as follows:

800 p.p.m.	124W	240N
115 "	64W	232N
390 "	16W	228N
220 "	4W	230N
460 "	8E	234N

The high lead values on traverse lines 16W, 4W, and 8E, appear to define a roughly east-west trending zone of anomalous lead values. The associated zinc values are as follows:

190 p.p.m.	16W	228N
110 "	4W	230N
180 "	8E	234N

Cu, Co, and Ni values in each case are less than 100 p.p.m.

Maximum values for copper, zinc, cobalt, and nickel, are as follows (in p.p.m.):

Cu	370	on	16W	216N
Zn	530	on	16W	216N
Co	1800	on	32E	222N
Ni	530	on	40E	226N

A summary of the geochemical anomalies is given in Table 1.

Radiometric Results

The radiometric profiles are shown on Plate 5, at a scale of 600 feet to the inch. Holes in which values increase with depth are marked with an arrow.

The main areas of interest lie within the Crater Formation in the southern portion of the area, and particularly in its south-eastern part. Radiometric values that increase with depth extend from traverse 8 East to traverse 124 West within this southern portion.

The highest radiometric reading for the area was .050 mR/Hr, recorded on traverse line 8E at 188N at a depth of 19 feet, in the Crater Formation. Most of the high values occur within the Crater Formation and the Rum Jungle Complex, and to a lesser extent in the Golden Dyke Formation. The Coomalie Dolomite showed generally below background radioactivity.

Plate 6 shows the radiometric values obtained in four costeans put down by the B.M.R. in 1954 to test an S.P. anomaly. (Barlow, 1955). The maximum value obtained was 0.017 mR/Hr in costean C1. A B.M.R. diamond drill hole was put down in 1954 between costeans C1 and C2 (See Plate 6). No significant radioactivity was recorded and no further work was recommended (Dow, 1955).

TABLE 1.

SUMMARY OF ANOMALIES

Type	Location	Peak Values	Association	Remarks
Co and Ni	40E - 32E 216N - 226N	Co 1800 ppm. at 32E 222N Ni 530 ppm at 40E 226N	120 ppm. Zn	In Golden Dyke Formation
Pb	8E - 16W 226N - 236N	Pb 460 ppm. at 8E 234N	180 ppm. Zn 0.021 mR/Hr at 8E 236N (bottom hole value)	In Golden Dyke Formation (near contact with amphibolite).
Zn	16W - 40W 214N - 226N	Zn 510 ppm. at 16W 216N	370 ppm. Cu	In Black Calcilutite. Transition Zone between Coomalie Dolomite and Golden Dyke Formation.
Pb	124W 236N - 246N	Pb 800 ppm. at 124W 240N (single hole value)	150 ppm. Zn	In Golden Dyke Formation.

CELIA EMBAYMENT

RECONNAISSANCE TRAVERSES

Following the completion of work in the Manton Area, three lines of holes were drilled in the Celia Embayment area, as recommended by Y. Miezitis, in order to determine the extent and lithological character of the meta-sediments in this area. The location of these traverses is shown on Plate 7.

Holes were drilled at intervals of approximately one-tenth of a mile along each traverse line. Bottom hole samples were collected and submitted to the Australian Mineral Development Laboratories, Adelaide (Amdel) for analysis by Atomic Absorption Spectrophotometer for copper, lead, zinc, cobalt and nickel. All holes were probed for radioactivity with Harwell type 1368A ratemeters. All holes were drilled where possible, to identifiable weathered rock, total footage drilled being 803 feet.

No Golden Dyke Formation was intersected, sediments being of the Beestons Formation and the Celia Dolomite.

Appendix II gives a summary of the geochemical and radiometric results.

A summary of the geology is given in Table 2. The results are tabulated according to traverse and hole numbers, the holes being numbered from north to south along each traverse.

TABLE 2.

Hole Number.	Rock Type	Formation
Celia 1 Traverse:		
68128000	Granite	Rum Jungle Complex
68128001	Mica Schist	Beestons Formation
68128002-68128007	Dolomite	Celia Dolomite
68128008	Granite	Rum Jungle Complex
68128009	Granite	Rum Jungle Complex
Celia 2 Traverse:		
68128021	Granite	Rum Jungle Complex
68128020	Granite	Rum Jungle Complex
68128019/68128015	Dolomite	Celia Dolomite
68128014	Sheared quartzite	Beestons Formation
68128013	Mica schist	Beestons Formation
68128012/68128010	Granite	Rum Jungle Complex
Celia 3 Traverse:		
(Continued)		

Celia 3 Traverse:

Hole Number	Rock Type	Formation
68128022	Granite	Rum Jungle Complex
68128023	Granite	Rum Jungle Complex
68128024	Laterite	-
68128025/ 68128029	Dolomite	Celia Dolomite
68128030/ 68128033	Laterite	-
68128034	Dolomite	Celia Dolomite
68128035	Shale	Beestons Formation
68128036	Graphitic shale	
68128037	Mica schist	
68128038	?Quartzite	
68128039	Chloritic schist	

Geochemical Results:

Maximum values obtained from each traverse are given below: -

Celia 1

Zn	250	p.p.m.	In Celia Dolomite (Sample No. 68128003)
Co	500	"	
Ni	160	"	

Celia 2

Co	100	"	In Celia Dolomite (Sample No. 68128018)

Celia 3

Cu	110	"	In Mica Schist of Beestons Formation. (Sample No. 68128037).
Zn	140	"	
Co	420	"	
Ni	100	"	

Radiometric Results:

The maximum radiometric value obtained was 0.025 mR/Hr at 18 feet occurring within the Celia Dolomite on the Celia 2 traverse.

The results showed that the granite generally gave readings above background (taken as 0.015 mR/Hr) and a few scattered holes within the Celia Dolomite and the Beestons Formation also showed above background radioactivity.

CONCLUSIONS

The geochemical results in the Manton Area were generally disappointing; the maximum anomalous lead value was 800 p.p.m., this being a single hole value.

A low-order anomalous lead zone with associated zinc was outlined on traverses 8E to 16W, with anomalous radioactivity on the 8E traverse line. This appears to be the area of most interest.

Sporadic high cobalt and nickel values occur mainly in the eastern part of the area.

Anomalous radiometric values are restricted mainly to the Crater Formation and the Rum Jungle Complex in the southern portion of the area, but anomalous radioactivity occurs in the Golden Dyke Formation on traverse lines 40 West, 28 West and 8 East.

RECOMMENDATIONS

More closely spaced auger drilling is considered to be warranted in the vicinity of the anomalous geochemical values listed in Table 1. This would involve drilling holes 200 feet apart on traverse lines spaced 400 feet either side of the existing traverses, in order to determine the lateral extent of the anomalous zones.

Detailed follow-up work is also considered to be warranted in the area showing anomalous radiometric values within the Crater Formation, particularly in the south-eastern parts of the surveyed area. This follow-up drilling should also be on traverses spaced 400 feet apart, with holes being drilled every 200 feet on each traverse.

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APPENDIX 1

GEOCHEMICAL DATA

MANTON AREA

Auger drill samples from the Manton Area are listed by the co-ordinate position and sample number. Samples were analysed at AMDEL by Atomic Absorption Spectrophotometer and all the results are in parts per million. A minus sign (-) in front of a number means "less than".

All samples were taken from the bottom of the auger hole with the depth shown. Where mattock samples were taken they are indicated thus "M/SAMPLE".

Auger holes were probed (Harwell 1368A ratemeter) for radio-activity; maximum value for each hole is recorded, in mR/hr.

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126451	148W	292N	25	25	10	15	20	.009	9
52		290N	25	15	30	15	25	.010	23
53		288N	5	10	5	5	5	.009	23
54		286N	5	5	5	5	5	.009	23
55		284N	5	25	10	5	5	.010	23
56		282N	5	10	10	5	10	.010	23
57		280N	5	30	5	10	10	.011	20
58		278N	5	25	10	5	5	.009	35
59		276N	10	15	5	5	5	.010	23
60		274N	65	35	90	30	55	.010	20
61		272N	20	30	15	15	20	.007	6
62		270N	10	5	60	15	5	.007	23
63		268N	15	30	15	20	15	.009	24
64		266N	10	10	10	10	15	.007	29
65		264N	15	25	10	15	20	.008	23
66		262N	15	30	10	15	20	.009	23
67		260N	15	25	10	15	20	.010	23
68		258N	15	15	10	10	10	.013	23
69		256N	5	15	10	5	5	.011	23
70		254N	15	10	20	5	5	.011	23
71		252N	30	10	15	10	10	.011	23
72		250N	10	5	10	- 5	- 5	.010	23
73		248N	50	10	40	20	15	.010	23
74		246N	20	10	20	5	- 5	.010	29

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126475	148W	244N	70	15	85	120	200	.010	29
76		242N	15	10	150	30	80	.011	23
77		240N	75	10	190	40	110	.010	23
78		238N	30	5	120	30	75	.008	23
79		236N	60	5	140	80	170	.008	29
80		234N	50	5	50	90	55	.009	23
81		232N	5	5	5	5	5	.008	19
82		230N	10	5	5	5	5	.008	29
83		228N	40	30	15	35	35	.013	23
84		226N	90	25	40	20	25	.010	23
85		224N	20	30	10	10	20	.011	23
86		222N	15	10	5	10	15	.011	29
87		220N	15	25	10	10	15	.011	23
88		218N	20	35	10	30	30	.010	23
89		216N	30	15	10	30	50	.009	23
90		214N	30	25	10	80	55	.009	23
91		212N	25	30	10	30	50	.012	23
92		210N	20	25	10	10	30	.010	23
93		208N	15	30	10	15	30	.008	17
94		206N	10	30	10	15	20	.009	17
95		204N	15	10	10	10	20	.011	17
68126308		202N	10	10	5	5	15	.008	20
09		200N	10	10	5	5	15	.007	17
10		198N	15	10	10	5	15	.010	18
11		196N	10	10	5	- 5	15	.009	18
12		194N	5	10	5	- 5	15	.007	17
13		192N	5	5	5	- 5	20	.005	28
14		190N	5	5	5	- 5	20	.006	23
15		188N	5	5	5	- 5	20	.005	23
16		186N	5	5	5	5	20	.007	17
17		184N	10	15	20	10	25	.007	6
18		182N	10	5	15	15	25	.007	23
19		180N	10	5	5	5	15	.007	23
20		178N	130	5	380	270	490	.010	29
21		176N	5	10	5	- 5	5	.007	23
22		174N	5	15	5	5	5	.006	23
23		172N	55	5	15	25	25	.010	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126324	148W	170N	40	5	25	15	25	.007	23
25		168N	10	15	5	10	15	.008	6
26		166N	5	5	5	- 5	5	.012	21
27		164N	20	30	10	10	25	.008	6
28		162N	15	25	10	- 5	10	.011	5
29		160N	5	15	10	- 5	5	.015	17
30		158N	5	15	10	- 5	5	.013	17
31		156N	20	15	10	- 5	5	.016	17
32		154N	10	25	100	25	10	.010	23
33		152N	5	5	5	- 5	5	.006	5
34		150N	5	20	10	10	15	.010	29
35		148N	50	20	50	25	60	.010	20
36		146N	120	25	100	40	80	.008	14
37		144N	10	20	5	- 5	5	.007	23
38		142N	10	20	10	5	5	.008	23
39		140N	10	10	5	- 5	15	.007	19
40		138N	10	10	5	- 5	10	.007	23
41		136N	10	25	10	- 5	5	.007	23
42		134N	10	25	15	- 5	5	.010	23
43		132N	5	15	10	- 5	5	.010	27
44		130N	5	5	20	5	10	.007	23
45		128N	20	20	160	25	30	.011	23
46		126N	5	15	10	5	5	.007	8
47		124N	5	15	70	10	10	.009	23
48	148W	122N	5	5	15	5	5	.007	17
68126450	136W	284N	95	30	60	10	10	.010	23
49		282N	100	10	180	20	55	.011	23
48		280N	5	10	5	5	5	.010	23
47		278N	10	10	15	10	10	.008	23
46		276N	5	15	10	5	5	.008	29
45		274N	10	10	10	5	10	.008	23
44		272N	10	10	10	5	10	.007	18
43		270N	10	10	15	10	10	.008	23
42		268N	50	25	60	15	35	.012	29
68126418		266N	15	15	80	10	10	.014	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126417	136W	264N	10	20	10	10	10	.011	23
16		262N	10	20	25	10	5	.012	23
15		260N	15	35	10	10	15	.011	20
14		258N	15	35	10	15	15	.012	23
13		256N	20	70	10	10	25	.012	23
12		254N	15	40	5	10	25	.012	23
11		252N	5	25	- 5	- 5	5	.015	23
10		250N	5	25	5	- 5	5	.013	23
09		248N	60	30	80	15	50	.011	23
08		246N	15	15	30	5	30	.010	23
07		244N	20	15	10	- 5	10	.012	23
06		242N	40	15	30	5	15	.009	23
05		240N	55	15	160	100	80	.009	23
04		238N	100	15	190	25	65	.007	23
03		236N	50	5	55	10	25	.010	23
02		234N	35	5	35	35	80	.017	23
01		232N	50	10	130	50	100	.032	23
400		230N	55	20	160	50	100	.015	23
399		228N	50	25	140	65	80	.014	23
98		226N	60	30	60	10	30	.013	23
97		224N	15	25	5	10	10	.017	29
96		222N	15	20	5	5	10	.013	24
95		220N	15	25	5	5	15	.013	29
94A		218N	15	20	5	15	15	.012	23
94		216N	20	25	5	15	15	.011	19
93		214N	70	10	20	15	35	.009	17
92		212N	15	5	35	20	15	.005	29
91		210N	10	10	5	- 5	15	.005	14
90		208N	15	20	5	10	10	.006	17
89		206N	10	20	5	5	5	.008	17
88		204N	5	10	10	10	5	.007	17
87		202N	10	10	5	5	10	.017	17
86		200N	10	20	5	5	5	.011	17
85		198N	10	10	- 5	5	15	.013	17
84		196N	10	10	5	5	10	.011	17
83		194N	5	5	- 5	- 5	5	.008	17
82		192N	5	5	- 5	- 5	5	.008	17
81		190N	5	5	5	5	5	.006	17

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126480	136W	188N	10	5	5	5	10	.007	17
79		186N	5	5	5	- 5	10	.005	17
78		184N	5	15	5	- 5	15	.006	17
77		182N	5	15	5	- 5	15	.008	23
76		180N	5	10	5	- 5	15	.006	23
75		178N	10	20	5	5	30	.006	11
74		176N	5	5	80	25	130	.007	23
		174N	NOT DRILLED						
		172N	NOT DRILLED						
73		170N	80	10	55	60	80	.009	23
72		168N	10	25	5	5	15	.009	5
71		166N	10	5	5	- 5	5	.011	17
70		164N	5	15	5	- 5	10	.011	11
69		162N	60	15	20	5	5	.011	17
68		160N	5	15	5	- 5	5	.013	17
67		158N	5	15	5	- 5	5	.013	17
66		156N	5	15	5	- 5	5	.013	23
65		154N	5	40	15	- 5	5	.014	23
64		152N	50	20	100	50	80	.006	23
63		150N	10	25	80	60	160	.009	13
62		148N	5	5	5	5	15	.006	6
61		146N	15	20	80	25	100	.006	29
60		144N	5	10	5	- 5	15	.006	8
59 59		142N	15	10	20	5	15	.008	23
58		140N	15	10	55	- 5	10	.012	29
57		138N	5	20	150	15	30	.011	23
56		136N	80	40	55	5	15	.011	23
55		134N	5	20	110	15	15	.015	29
54		132N	15	20	130	15	25	.013	23
53		130N	10	20	75	10	10	.010	20
52		128N	30	20	40	25	50	.006	19
51		126N	5	5	35	5	5	.008	15
50		124N	5	30	15	5	5	.012	9
49	136W	122N	5	30	20	- 5	5	.012	9

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126532	124W	274N	15	25	35	5	18	.009	12
31		272N	5	5	8	- 5	8	.007	17
30		270N	5	5	- 5	- 5	10	.007	17
29		268N	5	- 5	- 5	- 5	5	.009	17
28		266N	5	8	- 5	- 5	8	.009	17
27		264N	50	15	55	12	45	.010	23
26		262N	40	75	470	35	70	.013	23
25		260N	15	20	150	20	8	.007	23
24		258N	10	15	140	90	8	.007	23
23		256N	10	10	80	25	10	.007	23
22		254N	12	30	30	5	25	.008	17
21		252N	10	10	10	50	18	.007	17
20		250N	15	15	10	10	20	.008	17
19		248N	5	5	8	- 5	10	.009	17
18		246N	- 5	15	5	- 5	5	.010	17
17		244N	40	25	170	40	90	.011	17
16		242N	30	40	45	- 5	15	.008	17
15		240N	40	800	150	5	30	.012	17
14		238N	75	10	130	95	75	.008	17
13		236N	60	20	100	65	85	.008	17
12		234N	50	15	45	60	90	.010	17
11		232N	60	25	150	40	90	.009	17
10		230N	60	10	180	35	90	.010	17
09		228N	45	8	130	60	80	.008	17
08		226N	45	8	110	40	60	.010	17
07		224N	45	10	35	35	30	.011	17
06		222N	45	15	35	30	30	.008	17
05		220N	10	25	5	20	30	.008	17
04		218N	5	10	5	5	15	.010	17
03		216N	10	15	5	8	25	.011	17
02		214N	20	15	10	15	25	.011	17
01		212N	25	15	15	15	25	.012	17
500		210N	15	10	10	10	20	.008	17
499		208N	- 5	5	5	5	10	.008	17
98		206N	10	5	5	5	10	.008	17
97		204N	10	5	5	5	10	.009	17
96		202N	15	15	10	10	15	.011	23
68127251		200N	5	10	5	- 5	- 5	.012	17

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68127252	124W	198N	5	12	5	- 5	- 5	.011	11
53		196N	25	20	10	5	20	.014	11
54		194N	20	30	15	10	20	.012	11
55		192N	18	30	10	10	20	.012	11
56		190N	18	20	10	5	10	.014	17
57		188N	15	35	10	10	20	.008	11
58		186N	25	40	10	10	25	.012	11
59		184N	25	35	10	15	35	.012	11
60		182N	15	25	10	5	10	.010	11
61		180N	8	20	10	5	10	.007	11
62		178N	8	10	10	- 5	5	.010	11
63		176N	270	45	40	25	110	.011	11
64		174N	25	5	40	20	35	.010	23
65		172N	25	5	30	25	120	.009	23
66		170N	15	20	60	65	35	.009	23
67		168N	12	20	30	5	5	.015	23
68		166N	35	12	30	15	35	.015	23
69		164N	8	15	15	10	35	.008	23
70		162N	5	5	5	- 5	5	.014	23
71		160N	5	10	220	85	260	.021	23
72		158N	5	5	15	5	20	.021	23
73		156N	5	10	160	40	190	.011	23
74		154N	5	15	15	5	35	.008	11
75		152N	5	8	40	10	25	.011	35
76		150N	45	30	100	50	100	.019	12
77		148N	12	8	120	35	210	.013	29
78		146N	5	10	15	- 5	10	.016	23
79		144N	5	10	15	- 5	5	.015	23
80		142N	5	10	10	- 5	5	.020	29
81		140N	5	10	20	- 5	- 5	.017	23
82		138N	18	15	110	15	25	.015	23
83		136N	18	25	100	10	15	.012	17
84		134N	5	12	10	- 5	- 5	.012	9
85		132N	8	5	20	5	5	.013	19
86		130N	5	20	10	- 5	5	.022	23
87		128N	5	12	10	- 5	- 5	.011	18
88		126N	8	25	10	5	10	.010	8
89	124W	124N	5	5	30	- 5	15	.010	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126533	112W	268N	5	95	10	- 5	8	.009	17
34		266N	15	25	10	5	18	.006	3
35		264N	5	75	5	- 5	8	.011	17
36		262N	5	45	5	- 5	10	.009	17
37		260N	5	10	- 5	- 5	5	.007	17
38		258N	30	15	180	12	75	.011	17
39		256N	50	10	65	20	65	.007	23
40		254N	10	15	60	8	10	.006	23
41		252N	10	5	130	80	8	.005	23
42		250N	15	5	20	15	10	.006	23
43		248N	10	15	15	10	10	.007	29
44		246N	5	- 5	- 5	- 5	8	.007	20
45		244N	5	- 5	- 5	- 5	8	.010	23
46		242N	5	8	- 5	- 5	- 5	.011	23
47		240N	5	10	- 5	- 5	- 5	.010	23
48		238N	30	5	20	5	5	.010	23
49		236N	20	10	20	- 5	8	.011	23
50		234N	10	15	5	- 5	- 5	.008	23
51		232N	25	- 5	15	5	8	.008	23
52		230N	10	- 5	15	5	25	.009	23
53		228N	20	5	10	- 5	8	.009	23
54		226N	100	- 5	65	15	65	.010	23
55		224N	110	15	60	20	55	.010	23
56		222N	90	30	110	40	60	.008	23
57		220N	130	30	85	55	75	.009	23
58		218N	10	5	5	- 5	10	.009	23
59		216N	20	10	5	8	25	.009	20
60		214N	20	10	8	10	30	.010	17
61		212N	20	8	8	10	25	.008	17
62		210N	20	35	8	20	35	.009	17
63		208N	25	45	10	20	35	.009	17
64		206N	20	15	8	10	25	.009	17
65		204N	15	15	8	8	20	.007	17
66		202N	15	10	5	5	15	.008	15
68127250		200N	15	20	10	5	15	.009	11
49		198N	25	20	10	10	15	.009	11
48		196N	18	20	10	10	20	.010	11
47		194N	20	25	10	10	15	.010	11
46		192N	8	12	5	5	5	.013	17

Sample No.	Co-ordinates	Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68127245	112W 190N	20	30	10	20	35	.009	11
44	188N	15	25	10	5	15	.016	17
43	186N	15	20	5	5	10	.010	11
42	184N	15	20	10	5	15	.011	11
41	182N	10	12	5	5	5	.012	11
40	180N	8	12	5	5	5	.009	11
39	178N	8	10	5	- 5	5	.009	11
38	176N	8	12	5	5	10	.009	11
37	174N	5	12	10	- 5	- 5	.008	11
36	172N	5	15	15	- 5	- 5	.009	11
35	170N	5	12	5	- 5	- 5	.009	11
34	168N	8	12	5	- 5	5	.009	11
33	166N	5	12	10	5	5	.010	17
32	164N	12	35	10	5	5	.010	11
31	162N	5	12	10	- 5	- 5	.009	18
30	160N	5	12	5	- 5	5	.014	30
29	158N	5	5	10	- 5	- 5	.016	23
28	156N	20	25	10	5	20	.020	11
27	154N	15	5	10	- 5	- 5	.018	23
26	152N	10	15	10	5	5	.016	23
25	150N	10	20	10	5	20	.017	15
24	148N	10	15	10	5	5	.018	23
23	146N	5	5	- 5	- 5	5	.016	23
22	144N	10	10	10	- 5	5	.014	23
21	142N	5	5	10	- 5	5	.020	23
20	140N	5	5	10	- 5	10	.012	18
19	138N	15	25	20	15	15	.012	10
18	136N	15	20	15	15	15	.011	9
17	134N	60	15	60	25	35	.012	23
16	132N	10	5	50	10	10	.014	23
15	130N	10	10	30	10	10	.016	11
14	128N	10	5	70	15	10	.018	23
13	126N	5	5	50	5	5	.015	20
12	124N	5	5	25	- 5	- 5	.012	20

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126677	100W	256N	80	45	90	50	40	.013	6
76		254N	110	15	140	25	80	.012	23
75		252N	40	35	100	55	15	.009	23
74		250N	35	20	140	25	5	.008	29
73		248N	40	15	110	30	5	.008	17
72		246N	40	20	310	130	15	.007	23
71		244N	20	20	10	5	5	.009	14
70		242N	5	15	5	- 5	- 5	.008	17
69		240N	10	15	10	- 5	5	.011	14
68		238N	25	15	10	- 5	5	.015	17
67		236N	90	30	270	35	100	.014	23
66		234N	100	20	120	30	85	.012	23
65		232N	120	35	350	90	100	.015	35
68126581		230N	85	10	95	30	70	.008	23
80		228N	100	10	95	40	65	.012	23
79		226N	55	15	50	25	20	.010	23
78		224N	35	20	30	8	15	.008	15
77		222N	20	15	15	5	8	.008	23
76		220N	70	20	50	10	30	.009	29
75		218N	65	20	90	65	55	.008	23
74		216N	50	10	130	55	50	.010	23
73		214N	75	10	55	30	50	.010	23
72		212N	90	10	50	70	50	.010	23
71		210N	60	35	60	10	25	.009	23
70		208N	12	5	5	8	15	.009	17
69		206N	50	5	25	19	30	.006	13
68		204N	12	5	10	8	15	.007	17
67		202N	15	10	10	8	20	.008	17
68127174		200N	25	10	10	5	10	.009	23
75		198N	25	25	10	5	10	.009	11
76		196N	25	25	10	5	10	.008	11
77		194N	15	10	10	5	10	.006	11
78		192N	15	10	10	5	10	.008	11
79		190N	15	10	10	5	10	.008	11
80		188N	10	5	10	- 5	5	.009	11
81		186N	10	5	5	- 5	5	.007	11
82		184N	10	10	10	- 5	5	.008	11
83		182N	10	10	10	5	10	.010	11
84		180N	5	5	5	5	5	.007	11

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68127185	100W	178N	5	5	5	- 5	5	.009	11
86		176N	10	5	5	5	5	.006	11
87		174N	10	15	10	10	5	.008	9
88		172N	10	5	10	- 5	5	.008	15
89		170N	5	5	10	5	15	.002	11
90		168N	5	5	10	5	- 5	.005	17
91		166N	5	10	15	5	5	.005	11
92		164N	35	5	20	10	10	.005	11
93		162N	- 5	5	- 5	- 5	- 5	.007	15
94		160N	- 5	5	- 5	- 5	- 5	.015	23
95		158N	- 5	5	5	- 5	- 5	.015	23
96		156N	5	- 5	5	- 5	35	.021	23
97		154N	10	5	5	5	35	.012	6
98		152N	5	- 5	20	5	5	.027	23
99		150N	15	5	140	25	25	.020	23
200		148N	5	5	30	5	5	.018	23
01		146N	5	10	40	5	10	.018	23
02		144N	5	5	20	- 5	- 5	.013	23
03		142N	5	5	10	- 5	- 5	.024	18
04		140N	10	10	85	20	80	.016	23
05		138N	5	5	30	- 5	5	.012	12
06		136N	15	5	30	5	- 5	.013	23
07		134N	80	5	50	35	35	.011	23
08		132N	5	10	10	5	- 5	.015	6
09		130N	25	15	120	20	10	.013	15
10		128N	20	10	30	5	10	.019	15
11	100W	126N	10	10	120	20	25	.013	11
68126678	88W	254N	75	35	160	75	100	.012	23
79		252N	90	20	55	30	65	.012	23
80		250N	25	20	140	30	15	.009	23
81		248N	40	35	25	15	20	.011	9
82		246N	25	20	110	30	10	.009	23
83		244N	40	30	120	35	50	.010	23
84		242N	45	25	30	8	25	.013	23
85		240N	30	35	25	10	20	.012	23
86		238N	25	30	10	- 5	25	.013	23
87		236N	60	30	10	- 5	15	.014	23
88		234N	50	15	10	12	35	.017	17

Sample No.	Co-ordinates	Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126689	88W 232N	35	30	10	- 5	20	.021	23
90	230N	25	30	5	- 5	15	.017	23
91	228N	40	20	55	10	60	.013	23
92	226N	40	45	25	- 5	20	.012	23
93	224N	60	15	150	65	90	.011	23
94	222N	50	15	110	25	70	.012	23
95	220N	120	30	240	35	100	.012	29
96	218N	30	20	80	40	85	.013	23
97	216N	30	15	80	20	70	.009	23
98	214N	35	20	120	30	80	.012	23
99	212N	80	15	70	20	65	.011	23
700	210N	100	15	150	25	100	.013	23
01	208N	30	15	90	50	85	.010	23
02	206N	25	15	90	40	50	.012	23
03	204N	80	15	140	45	85	.010	23
04	202N	50	20	80	50	80	.011	23
68127173	200N	40	5	65	35	50	.007	23
72	198N	65	5	60	60	60	.008	23
71	196N	130	10	50	20	60	.008	23
70	194N	90	25	35	10	35	.008	23
69	192N	70	15	30	10	25	.006	11
68	190N	30	35	10	10	40	.006	11
67	188N	15	15	10	- 5	10	.008	11
66	186N	10	10	5	- 5	5	.007	11
65	184N	5	10	5	- 5	5	.008	11
64	182N	10	15	20	5	5	.008	11
63	180N	15	20	10	10	5	.006	11
62	178N	10	10	10	10	20	.008	11
61	176N	15	15	10	10	10	.008	11
60	174N	10	5	10	- 5	- 5	.006	23
59	172N	5	5	5	- 5	- 5	.008	23
58	170N	5	25	5	5	- 5	.005	16
57	168N	5	35	10	- 5	- 5	.006	11
56	166N	5	5	5	- 5	- 5	.007	23
55	164N	5	- 5	5	5	5	.010	16
54	162N	5	- 5	5	- 5	5	.012	23
53	160N	5	5	25	25	40	.014	23
52	158N	5	5	5	- 5	- 5	.015	23
51	156N	5	5	10	5	5	.014	23
50	154N	5	5	10	5	5	.016	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68127149	88W	152N	10	5	35	35	35	.010	23
48		150N	70	5	120	15	80	.017	23
47		148N	30	10	140	25	60	.010	23
46		146N	5	5	20	- 5	- 5	.015	16
45		144N	5	10	30	- 5	35	.012	23
44		142N	10	5	45	5	15	.008	23
43		140N	10	5	65	5	5	.004	12
42		138N	10	5	50	5	5	.008	23
41		136N	15	15	150	15	15	.011	13
40		134N	5	5	110	15	15	.011	19
39	88W	132N	10	5	110	10	35	.017	15
68126731	76W	254N	50	30	10	5	15	.010	7
30		252N	85	30	90	15	70	.010	23
29		250N	75	20	60	30	60	.017	23
28		248N	35	20	110	55	5	.009	22
27		246N	35	30	130	45	5	.006	29
26		244N	40	30	130	20	65	.010	23
25		242N	60	35	75	30	65	.012	23
24		240N	70	35	120	30	90	.011	23
23		238N	40	35	10	10	20	.012	12
22		236N	30	65	5	5	5	.017	23
21		234N	45	45	10	5	5	.016	23
20		232N	40	35	5	5	5	.029	23
19		230N	15	15	5	5	5	.025	23
18		228N	25	45	15	5	15	.019	23
17		226N	210	20	60	85	60	.014	23
16		224N	60	20	90	60	60	.010	23
15		222N	80	20	65	40	70	.011	23
14		220N	50	35	110	35	80	.011	23
13		218N	25	15	110	35	90	.012	23
12		216N	50	15	100	40	90	.013	23
11		214N	60	15	340	50	90	.011	23
10		212N	60	20	35	15	20	.011	23
09		210N	180	35	45	35	70	.013	23
08		208N	130	20	75	150	130	.011	23
07		206N	15	15	15	5	20	.009	23
06		204N	20	15	10	5	20	.010	18
05		202N	15	15	15	5	15	.009	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max.	Hole
68127107	76W	200N	5	5	5	- 5	- 5	.008	23
08		198N	5	5	5	- 5	- 5	.006	23
09		196N	5	15	10	- 5	- 5	.007	23
10		194N	5	5	10	- 5	- 5	.006	15
11		192N	10	15	5	5	10	.008	23
12		190N	10	5	5	5	5	.008	23
13		188N	20	5	5	5	5	.009	23
14		186N	10	5	5	- 5	15	.010	23
15		184N	10	20	5	- 5	- 5	.008	23
16		182N	10	20	5	5	- 5	.005	15
17		180N	5	5	5	- 5	5	.006	18
18		178N	5	5	5	- 5	20	.006	15
19		176N	5	5	10	- 5	- 5	.006	20
20		174N	5	35	5	- 5	5	.006	16
21		172N	5	15	5	- 5	- 5	.012	23
22		170N	5	20	5	- 5	- 5	.012	23
23		168N	5	15	5	- 5	15	.012	23
24		166N	5	20	5	- 5	10	.011	23
25		164N	5	15	5	- 5	5	.012	23
26		162N	5	15	- 5	20	- 5	.010	9
27		160N	5	5	45	20	10	.013	23
28		158N	5	5	10	10	5	.014	23
29		156N	5	45	25	25	- 5	.016	23
30		154N	10	10	35	- 5	- 5	.016	-
31		152N	5	25	25	5	- 5	.022	23
32		150N	10	20	25	- 5	- 5	.018	18
33		148N	10	10	25	- 5	- 5	.013	9
34		146N	10	10	45	- 5	- 5	.021	23
35		144N	10	15	50	5	20	.016	18
36		142N	5	15	45	5	50	.015	11
37		140N	15	10	80	5	10	.013	7
38	76W	138N	15	15	25	- 5	- 5	.015	8
68126732	64W	254N	15	45	5	- 5	5	.010	29
33		252N	15	20	5	- 5	5	.008	23
127079		250N	25	30	10	10	25	M/SAMPLE	
78		248N	25	30	15	10	30	M/SAMPLE	
77		246N	20	30	30	5	25	M/SAMPLE	
76		244N	35	15	120	30	35	.005	23

ple No.	Co-ordinates	Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68127075	64W 242N	5	20	120	25	5	.006	23
74	240N	5	20	130	45	10	.006	23
73	238N	60	15	90	30	70	.008	23
68127064	236N	50	55	50	40	70	.022	7
65	234N	10	65	- 5	- 5	40	.009	23
66	232N	60	115	- 5	- 5	70	.012	23
67	230N	30	20	- 5	- 5	5	.013	23
68	228N	45	15	- 5	- 5	15	.015	23
69	226N	45	10	20	10	25	.014	23
70	224N	35	15	15	5	10	.011	23
71	222N	50	15	130	70	80	.011	23
72	220N	10	5	90	25	50	.008	23
68127080	218N	15	5	80	25	80	.010	23
81	216N	25	5	100	10	40	.009	23
82	214N	70	5	150	120	210	.007	23
83	212N	25	5	80	25	80	.[illegible]	23
84	210N	180	5	25	5	[illegible]	.[illegible]	23
85	208N	5	10	5	- 5	[illegible]	.[illegible]	23
86	206N	5	5	5	- 5	[illegible]	.006	23
87	204N	5	5	10	- 5	[illegible]	.[illegible]	23
88	202N	10	10	15	5	35	.[illegible]	3
89	200N	5	15	10	- 5	10	.00[illegible]	
90	198N	5	15	5	- 5	10	.009	
91	196N	30	35	15	25	35	.007	
92	194N	5	15	5	[illegible]	5	.008	
93	192N	5	55	5	- 5	20	.00[illegible]	23
94	190N	5	20	- 5	- [illegible]	20	.009	19
95	188N	5	15	5	- [illegible]	5	.00[illegible]	21
96	186N	5	5	- 5	- 5	5	.00[illegible]	16
97	184N	5	5	15	- 5	15	.005	20
98	182N	5	5	5	- 5	20	.005	
99	180N	5	5	5	- 5	5	M[illegible]	
7100	178N	20	15	5	- 5	- 5	M/SAMPL[illegible]	
01	176N	5	5	5	- 5	- 5	M/SAMPLE	
02	174N	5	10	5	- 5	- 5	M/SAMPLE	
03	172N	5	5	5	- 5	- 5	M/SAMPLE	

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68127104	64W	170N	5	5	5	- 5	- 5	M/SAMPLE	
05		168N	10	15	10	- 5	10	M/SAMPLE	
06		166N	5	5	10	- 5	- 5	M/SAMPLE	
68127024		164N	5	20	15	5	10	.016	23
25		162N	18	35	90	- 5	5	.017	23
26		160N	25	35	160	30	25	.025	23
27		158N	5	35	60	- 5	- 5	.025	23
28		156N	10	35	30	- 5	- 5	.022	11
29		154N	5	10	30	- 5	- 5	.018	23
30		152N	5	55	30	5	5	.013	7
31		150N	12	30	15	- 5	- 5	.017	4
32		148N	8	20	20	- 5	- 5	.013	5
33		146N	5	10	35	- 5	- 5	.015	8
34		144N	5	15	35	- 5	- 5	.013	7
35	64W	142N	12	10	40	- 5	- 5	.013	11
68126734	52W	254N	40	45	15	10	15	.008	4
35		252N	40	35	5	5	5	.012	23
36		250N	50	20	90	20	50	.008	22
37		248N	60	20	45	40	30	.011	23
38		246N	35	20	80	20	50	.010	29
39		244N	10	10	100	35	5	.012	23
40		242N	15	25	200	35	35	.008	23
41		240N	30	15	130	70	10	.010	23
42		238N	60	65	170	40	60	.010	23
42A		236N	45	35	15	5	10	.013	29
43		234N	80	5	60	10	35	.014	23
43A		232N	80	25	10	- 5	10	.012	23
44		230N	50	30	25	60	35	.009	7
68127063		228N	25	20	5	- 5	5	.012	23
62		226N	25	20	20	5	50	.009	23
61		224N	10	20	5	- 5	5	.010	23
60		222N	80	10	15	5	30	.010	23
59		220N	35	10	60	25	50	.011	23
58		218N	40	10	60	25	60	.008	23
57		216N	50	10	100	35	50	.007	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68127056	52W	214N	230	10	70	50	80	.006	23
55		212N	50	10	30	70	40	.007	10
54		210N	85	20	80	60	90	.007	23
53		208N	10	5	15	- 5	15	.007	17
52		206N	15	10	30	- 5	5	.006	23
51		204N	25	45	15	5	10	.007	23
50		202N	10	10	5	5	5	.010	17
49		200N	10	5	5	- 5	5	.010	15
48		198N	8	10	5	- 5	5	.010	23
47		196N	8	10	10	- 5	5	.006	14
46		194N	10	10	10	- 5	10	M/SAMPLE	
45		192N	5	20	5	- 5	5	M/SAMPLE	
44		190N	5	30	5	- 5	10	M/SAMPLE	
43		188N	8	20	5	- 5	5	M/SAMPLE	
42		186N	8	5	5	- 5	5	M/SAMPLE	
41		184N	8	10	5	- 5	5	M/SAMPLE	
40		182N	10	5	5	- 5	- 5	M/SAMPLE	
39		180N	10	10	5	- 5	10	M/SAMPLE	
38		178N	8	10	5	- 5	5	M/SAMPLE	
37		176N	8	15	5	- 5	10	M/SAMPLE	
36		174N	8	15	10	- 5	5	M/SAMPLE	
68127023		172N	5	10	10	- 5	- 5	.015	15
22		170N	5	15	10	- 5	- 5	.012	8
21		168N	8	20	15	- 5	- 5	.017	11
20		166N	8	15	15	- 5	- 5	.013	3
19		164N	10	10	20	- 5	- 5	.024	23
18		162N	12	20	30	- 5	- 5	.022	23
17		160N	5	10	20	- 5	- 5	.014	8
16		158N	5	15	15	- 5	- 5	.015	23
15		156N	20	30	20	- 5	15	.020	23
14		154N	18	5	120	15	20	.012	15
13		152N	65	5	90	15	10	.016	14
12		150N	85	20	130	25	15	.015	14
11		148N	30	10	75	15	60	.010	23
10		146N	10	15	30	- 5	- 5	.019	15
09		144N	25	10	20	- 5	5	.016	9
08		142N	5	15	30	5	5	.008	11
07		140N	12	10	10	5	10	.012	4

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68127006	52W	138N	12	10	55	10	35	.015	11
05	52W	136N	18	15	30	50	5	.011	9
68126758	40W	252N	75	10	90	30	35	.012	23
57		150N	5	5	150	35	15	.008	23
56		248N	10	5	130	25	5	.007	23
55		246N	5	5	170	80	15	.005	23
54		244N	10	10	100	40	10	.007	23
53		242N	15	10	130	50	5	.007	23
52		240N	30	15	110	60	20	.007	29
51		238N	50	10	50	15	25	.011	23
50		236N	75	15	30	5	5	.010	23
49		234N	70	15	65	30	35	.013	23
48		232N	90	20	160	40	100	.012	23
47		230N	75	15	50	10	30	.026	23
46		228N	50	20	20	5	15	.018	23
45		226N	50	20	240	20	95	.015	23
68126966		224N	100	45	55	50	60	.009	23
67		222N	30	45	5	- 5	10	.013	23
68		220N	20	20	5	- 5	10	.014	23
69		218N	50	20	120	70	100	.009	23
70		216N	25	5	30	10	35	.007	23
71		214N	75	5	80	60	80	.008	23
72		212N	20	5	10	10	35	.009	23
73		210N	30	10	30	5	25	.010	11
74		208N	20	10	5	- 5	10	.006	14
75		206N	50	10	75	80	120	.006	23
76		204N	18	10	5	- 5	10	.008	14
77		202N	20	20	75	80	160	.007	23
78		200N	18	10	5	- 5	15	.005	20
79		198N	5	5	5	- 5	10	.008	23
80		196N	10	10	5	- 5	10	.007	21
81		194N	10	5	5	- 5	5	.009	23
82		192N	10	10	5	- 5	- 5	.009	23
83		190N	8	10	5	- 5	5	.022	23
84		188N	10	10	5	5	5	.011	23
85		186N	5	10	5	- 5	5	.023	23
86		184N	5	5	10	5	5	.027	23
87		182N	120	20	75	50	70	.010	23
88		180N	75	15	100	70	100	.007	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126969	40W	178N	25	10	10	5	10	.032	23
90		176N	18	10	10	5	5	.036	23
91		174N	20	15	10	10	10	.015	15
92		172N	25	15	10	5	15	.013	7
93		170N	10	20	5	- 5	- 5	.018	4
94		168N	10	20	15	- 5	5	.024	23
95		166N	10	10	20	- 5	5	.020	23
96		164N	10	15	20	- 5	5	.010	8
97		162N	10	10	50	- 5	5	.013	9
98		160N	5	5	20	- 5	- 5	.017	12
99		158N	20	30	10	30	60	.010	5
7000		156N	25	15	75	25	75	.011	23
01		154N	5	10	35	5	5	.010	15
02		152N	8	10	55	5	5	.011	7
03		150N	5	15	50	5	5	.012	23
04	40W	148N	5	10	60	10	10	.013	16
68126759	28W	250N	30	30	120	30	60	.010	23
60		248N	10	20	140	60	10	.007	23
61		246N	10	20	100	50	10	.007	23
62		244N	35	10	60	30	60	.006	23
63		242N	80	75	200	60	100	.009	23
64		240N	50	45	200	70	130	.012	23
65		238N	15	15	120	40	5	.012	23
66		236N	15	15	130	50	5	.008	23
67		234N	15	15	110	65	15	.007	23
68		232N	70	15	90	60	80	.007	23
69		230N	50	15	25	65	20	.010	23
70		228N	50	45	20	35	25	.008	3
71		226N	35	45	25	5	15	.022	23
72		224N	75	15	360	120	120	.018	23
73		222N	90	15	100	65	95	.015	23
74		220N	20	10	50	35	50	.022	23
75		218N	10	20	220	35	380	.025	23
76		216N	50	40	30	30	50	.014	10
77		214N	25	20	10	15	20	.015	17
68126965		212N	20	5	5	- 5	10	.009	23
64		210N	30	5	15	10	25	.008	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126963	28W	208N	20	5	10	5	25	.009	23
62		206N	20	20	30	50	80	.009	23
61		204N	18	5	5	- 5	10	.007	23
60		202N	10	5	10	- 5	10	.007	23
59		200N	10	20	20	5	10	.008	6
58		198N	8	10	20	5	10	.005	23
57		196N	15	25	15	5	25	.008	23
56		194N	- 5	- 5	5	5	- 5	.022	23
55		192N	8	5	5	- 5	5	.011	7
54		190N	80	5	95	- 5	90	.023	23
53		188N	20	- 5	10	60	15	.005	5
52		186N	8	- 5	5	5	- 5	.007	5
51		184N	15	5	10	- 5	5	.022	23
50		182N	5	5	5	- 5	5	.009	6
49		180N	15	55	90	- 5	5	.016	23
48		178N	15	- 5	35	- 5	5	.017	23
47		176N	30	- 5	35	- 5	5	.016	23
46		174N	15	5	30	- 5	10	.013	20
45		172N	10	20	15	- 5	5	.008	6
44		170N	10	20	20	5	5	.007	6
43		168N	12	10	15	5	5	.015	10
42	28W	166N	80	10	90	60	45	.008	23
68126797	16W	248N	40	50	55	25	40	.011	23
96		246N	45	50	15	5	25	.012	5
95		244N	30	10	10	- 5	15	.006	6
94		242N	10	10	10	- 5	15	.007	23
93		240N	30	10	15	- 5	20	.005	1
92		238N	60	20	55	5	35	.010	19
68128280		236N	15	10	15	5	15	M/SAMPLE	
68128279		234N	18	25	20	25	35	M/SAMPLE	
68126791		232N	5	20	130	25	5	.007	23
90		230N	15	30	130	50	10	.006	23
89		228N	60	390	190	30	40	.010	23
88		226N	15	20	5	- 5	- 5	.012	23
87		224N	65	55	10	- 5	5	.013	23
86		222N	10	35	5	- 5	- 5	.012	23
85		220N	25	20	10	- 5	- 5	.013	23
84		218N	65	20	50	30	70	.015	23

Sample No.	Co-ordinates		Cu	pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126783	16W	216N	370	60	510	70	140	.012	10
82		214N	5	10	5	- 5	- 5	.008	11
81		212N	5	10	5	- 5	- 5	.007	23
80		210N	5	10	5	- 5	5	.007	17
79		208N	5	10	5	- 5	5.	.008	23
78		206N	5	5	5	- 5	5	.009	23
68126922		204N	25	30	15	10	25	M/SAMPLE	
23		202N	30	30	15	10	25	M/SAMPLE	
24		200N	20	30	10	10	15	M/SAMPLE	
25		198N	8	10	5	- 5	- 5	.015	23
26		196N	10	20	5	- 5	- 5	.022	23
27		194N	60	45	95	60	50	.014	6
28		192N	20	30	15	20	25	.016	10
29		190N	15	30	30	- 5	- 5	.033	23
30		188N	12	30	10	- 5	- 5	.022	12
31		186N	18	45	10	- 5	- 5	.025	14
32		184N	12	30	10	- 5	- 5	.028	23
33		182N	75	30	95	60	60	.007	23
34		180N	15	30	15	5	10	.017	5
35		178N	10	5	10	- 5	- 5	.035	14
36		176N	12	20	15	- 5	- 5	.018	11
37		174N	18	15	30	- 5	- 5	.023	12
38		172N	120	20	90	50	70	.017	23
39		170N	15	10	20	- 5	- 5	.021	13
40	16W	168N	20	25	10	10	10	.015	o
68126832	4W	250N	10	5	5	- 5	5	.008	11
31		248N	20	20	5	- 5	10	.010	11
30		246N	40	20	45	5	40	.011	20
29		244N	35	15	20	- 5	25	.018	11
28		242N	170	25	40	20	75	.013	23
27		240N	15	25	10	5	15	.011	23
26		238N	40	25	30	5	10	.012	23
25		236N	45	20	85	25	50	.010	23
24		234N	15	35	120	20	5	.008	23
23		232N	15	35	120	20	5	.008	23
23		232N	20	25	80	20	5	.007	23
22		230N	75	220	110	50	35	.011	23
21		228N	20	15	20	5	15	.013	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126820	4W	226N	10	- 5	- 5	- 5	- 5	.015	23
19		224N	60	5	- 5	- 5	- 5	.021	23
18		222N	10	10	15	- 5	20	.015	23
17		220N	80	85	20	5	20	.013	23
16		218N	25	10	50	- 5	20	.012	23
15		216N	60	20	70	30	60	.013	23
14		214N	30	20	120	30	130	.017	23
13		212N	10	15	10	- 5	10	.010	21
12		210N	10	20	10	- 5	5	.008	17
11		208N	10	25	10	5	20	.009	23
10		206N	5	10	5	- 5	5	.007	20
09		204N	10	15	10	5	5	.010	17
08		202N	5	20	10	5	15	.007	17
07		200N	5	20	5	5	5	.008	23
06		198N	5	20	15	10	80	.012	23
05		196N	5	20	5	10	5	.018	14
04		194N	5	15	5	5	5	.025	7
03		192N	5	20	10	- 5	- 5	.020	9
02		190N	5	35	15	- 5	- 5	.023	20
01		188N	5	20	20	- 5	- 5	.028	20
800		186N	10	30	10	- 5	5	.023	19
99		184N	10	25	15	5	5	.025	15
98	4W	182N	15	15	40	5	15	.020	14
68126833	8E	236N	120	55	25	110	60	.021	6
34		234N	85	460	180	50	10	.015	23
35		232N	25	100	200	35	5	.011	23
36		230N	20	25	130	20	5	.009	23
37		228N	15	25	120	35	5	.010	23
38		226N	50	35	40	35	35	.011	23
39		224N	110	15	100	15	80	.017	23
40		222N	20	15	5	- 5	- 5	.020	23
41		220N	85	25	40	- 5	65	.015	11
42		218N	25	20	5	5	5	.015	23
43		216N	85	20	50	5	35	.017	23
44		214N	40	5	20	- 5	10	.013	23
45		212N	60	10	15	20	20	.012	23
46		210N	60	15	60	25	80	.013	23
47		208N	20	35	10	5	15	.012	19

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio metric	Hole Depth Feet
68126848	8E	206N	45	15	20	45	50	.015	6
49		204N	10	5	20	5	20	.013	23
50		202N	10	5	5	- 5	- 5	.017	19
51		200N	5	5	5	- 5	5	.016	18
52		198N	5	5	5	- 5	- 5	.026	23
53		196N	10	15	10	- 5	- 5	.028	15
54		194N	30	5	5	- 5	5	.011	7
55		192N	5	5	- 5	- 5	5	.010	5
56		190N	5	5	- 5	- 5	- 5	M/SAMPLE	
57		188N	5	35	130	25	160	.050	23
58		186N	10	35	5	- 5	5	.029	23
59	8E	184N	5	25	10	- 5	- 5	.022	13
68126885	20E	234N	85	15	80	55	110	.015	23
84		232N	160	25	100	50	100	.012	23
83		230N	60	25	40	15	70	.011	23
82		228N	75	15	45	5	35	.020	23
81		226N	40	35	210	20	40	.017	23
80		224N	25	15	130	25	5	.018	23
79		222N	15	15	120	25	- 5	.012	23
78		220N	15	15	130	70	5	.010	23
77		218N	70	25	140	20	50	.014	23
76		216N	50	5	10	5	15	.015	23
75		214N	35	5	10	- 5	5	.013	23
74		212N	20	5	5	- 5	5	.015	23
73		210N	60	10	25	35	90	.012	23
72		208N	60	5	80	25	60	.012	23
71		206N	140	15	70	40	60	.013	23
70		204N	5	15	65	20	80	.014	23
68126860		202N	5	15	5	- 5	100	.012	23
61		200N	5	15	5	5	5	.015	23
62		198N	25	45	10	5	20	.017	15
63		196N	25	35	10	5	15	.014	23
64		194N	15	25	5	- 5	10	.016	23
65		192N	5	20	5	- 5	- 5	.015	17
66		190N	5	20	5	- 5	10	.018	23
67		188N	10	15	5	- 5	5	.013	23
68		186N	10	15	10	5	10	.012	9
69	20E	184N	10	10	40	- 5	40	.013	23

Sample No.	Co-ordinates		Cu	Pb	Zn	Co	Ni	Max. Radio-metric	Hole Depth Feet
68126886	32E	232N	90	25	70	100	260	.012	23
87		230N	45	35	45	170	260	.011	18
88		228N	75	25	85	50	220	.012	23
89		226N	20	25	20	15	40	.008	5
90		224N	20	15	20	5	40	.008	8
91		222N	15	25	15	1800	90	.010	6
92		220N	15	25	20	20	50	.012	5
93		218N	10	25	65	20	10	.018	23
94		216N	20	25	20	25	40	.011	5
95		214N	40	25	40	50	65	.014	6
96		212N	50	25	25	15	40	.017	23
97		210N	25	15	10	5	15	.026	23
98		208N	220	15	85	10	40	.017	12
99		206N	60	5	50	25	60	.013	23
9000		204N	5	15	20	15	80	.012	23
01		202N	15	15	25	25	150	.010	23
02		200N	10	15	15	15	85	.007	23
03		198N	10	5	15	5	25	.007	23
04	32E	196N	5	5	5	- 5	5	.009	23
68126921	40E	226N	65	20	120	75	530	.010	23
20		224N	100	30	110	20	70	.012	23
19		222N	25	20	50	25	10	.009	23
18		220N	15	20	95	10	10	.008	23
17		218N	65	35	70	75	80	.011	23
16		216N	35	30	20	35	70	.009	5
15		214N	30	20	10	25	60	.012	6
14		212N	35	30	15	30	50	.009	3
13		210N	120	5	60	80	100	.016	23
12		208N	40	30	190	40	150	.023	23
11		206N	200	25	160	280	330	.025	23
10		204N	75	20	15	10	40	.012	23
68126905		202N	100	45	65	20	50	.012	29
06		200N	30	5	85	50	50	.014	23
68126909		198N	12	20	5	5	10	.012	13
08		196N	15	20	15	35	40	.011	6
07		194N	150	20	60	80	80	.008	23

APPENDIX 11

GEOCHEMICAL DATA

CELIA TRAVERSES 1, 11 and 111

Auger drill samples from the Celia Embayment Area are listed by the sample number (See locality diagram for position of samples).

Samples were analysed at AMDEL by Atomic Absorption Spectrophotometer and all the results are in parts per million. A minus sign (-) in front of a number means "less than".

All samples were taken from the bottom of the auger hole, with the depth shown.

Auger holes were probed (Harwell 1368A ratemeter), for radioactivity; maximum value for each hole is recorded, in mR/hr.

CELIA 1

Sample No.	Cu	Pb	Zn	Ni	Co	Max. Radio-metric	Hole Depth Feet
68128000	15	20	15	5	5	.016	9
01	20	5	120	10	10	.013	20
02	10	5	10	60	25	.010	23
03	30	5	250	500	160	.012	23
04	30	20	20	50	15	.014	24
05	25	10	40	40	10	.015	14
06	8	5	10	5	5	.010	22
07	5	5	15	30	5	.008	24
08	5	5	10	5	5	.014	12
68128009	10	5	40	5	- 5	.014	23

CELIA 11

68128010	5	8	45	5	5	.011	23
11	- 5	8	20	5	5	.014	18
12	- 5	5	10	5	5	.021	23
13	18	5	75	65	25	.010	29
14	- 5	5	30	- 5	- 5	.012	23

Sample No.	Cu	Pb	Zn	Ni	Co	Max. Radio-metric	Hole Depth Feet
68128015	5	5	10	10	5	.008	12
16	- 5	5	30	75	70	.010	23
17	30	10	50	70	25	.009	23
18	12	5	40	35	100	.025	35
19	10	15	15	5	10	.017	12
20	5	20	20	- 5	5	.023	21
68128021	10	25	20	- 5	- 5	.024	23
			CELIA 111				
68128022	20	35	10	35	20	.010	8
23	40	15	20	5	- 5	.021	23
24	75	25	10	20	- 5	.013	11
25	20	25	30	50	15	.009	23
26	10	35	10	15	5	.010	8
27	20	30	15	15	15	.012	23
28	30	35	15	50	25	.012	9
29	30	25	10	30	50	.013	17
30	20	30	10	20	15	.011	23
31	10	25	10	5	5	.011	13
32	20	35	10	20	15	.013	23
33	20	35	10	20	10	.012	23
34	10	25	60	65	35	.010	23
35	55	25	55	65	35	.012	23
36	40	30	45	70	20	.012	29
37	110	25	140	420	100	.013	27
38	65	20	75	65	35	.010	23
68128039	10	15	30	50	20	.010	23


PLATE 1
DIAMOND DRILLING
GEOLOGICAL AND
GEOPHYSICAL SURVEYS
1968
RUM JUNGLE AREA
ACACIA AREA
Acacia Creek
MANTON RIVER
ADELAIDE RIVER
MANTON AREA
Manton Dam
DARWIN
Darwin River
RUM JUNGLE COMPLEX
GIANTS REEF FAULT
SLINGRAM, RESISTIVITY AND RADIOMETRIC SURVEYS
RUM JUNGLE EAST GRID
WOODCUTTERS AREA
AREA 44 EXTENDED
HUANDOT
COOMALIE GAP WEST (NORTHERN SECTION)
COOMALIE GAP WEST (SOUTHERN SECTION)
COOMALIE CREEK
STUART HIGHWAY
MT FITCH NORTH
MT FITCH
MT BURTON AREA
MT BURTON
RUM JUNGLE
BROWNS S-W
RUM JUNGLE TRIANGLE (NORTH)
AREA 55 B
AREA 55
FINNISS RIVER
RUM JUNGLE TRIANGLE (SOUTH)
RUM JUNGLE CREEK SOUTH
Australian Railway
BATCHELOR
POWER LINE
Airfield
BATCHELOR LATERITES EXTENDED
GOULD AREA
GOULD Airfield
MT MINZA AREA
WATERHOUSE GRANITE
WATERHOUSE NO 2 PROSPECT
TO 642 W
12°50'
13°00'
131°00'
131°10'
Reference to Australian standard 1:250,000 map series
DARWIN
PINE CREEK
MILES
LEGEND
Geochemical Surveys 1968
Geophysical Surveys 1968
Diamond drill holes completed since October 1967, or in progress October 1968
Areas of rotary- percussion drilling, 1968
(Based on D52/A8/301)
To accompany Record 1969/35
D52/A8/338

Plate 2

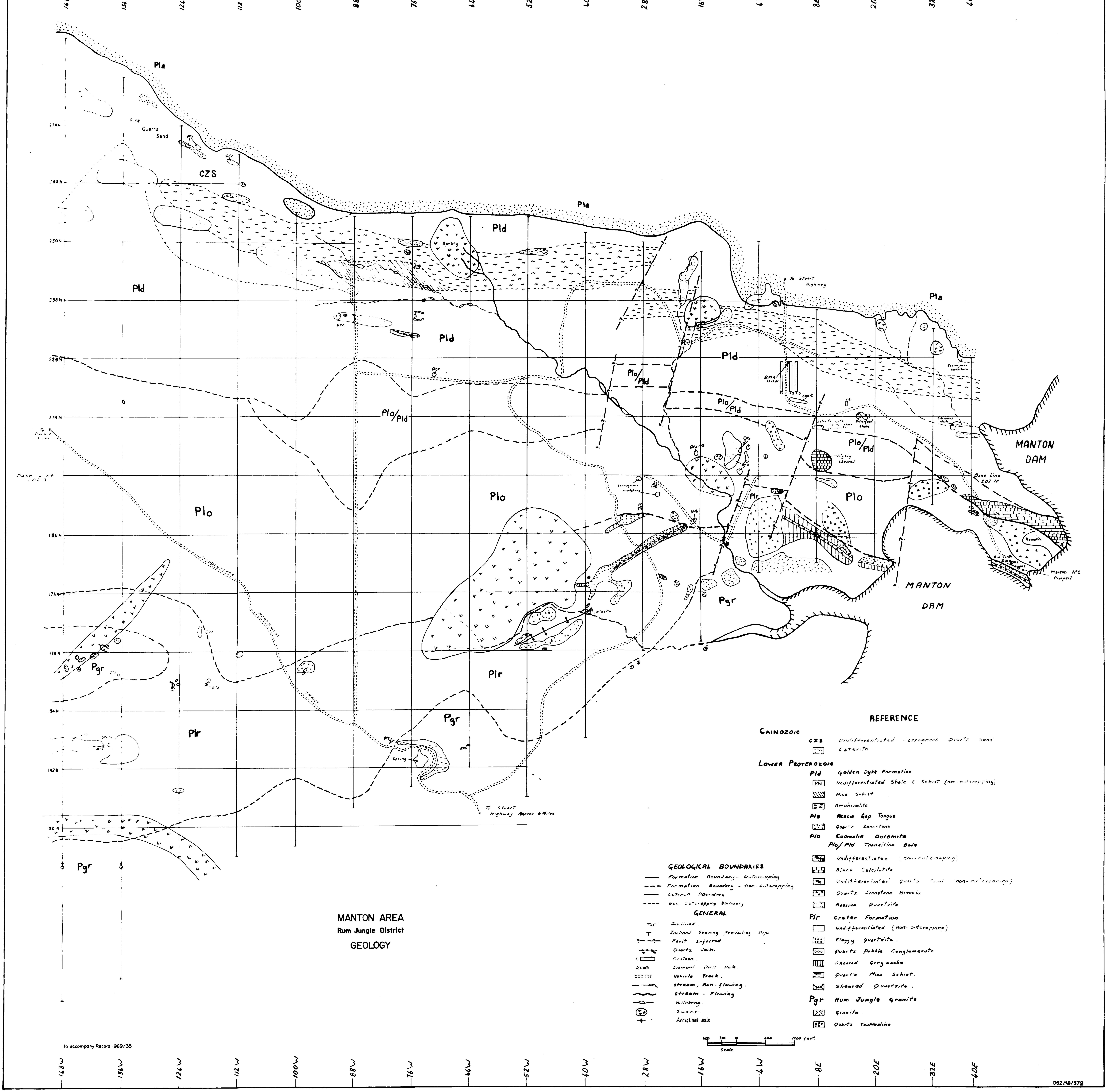
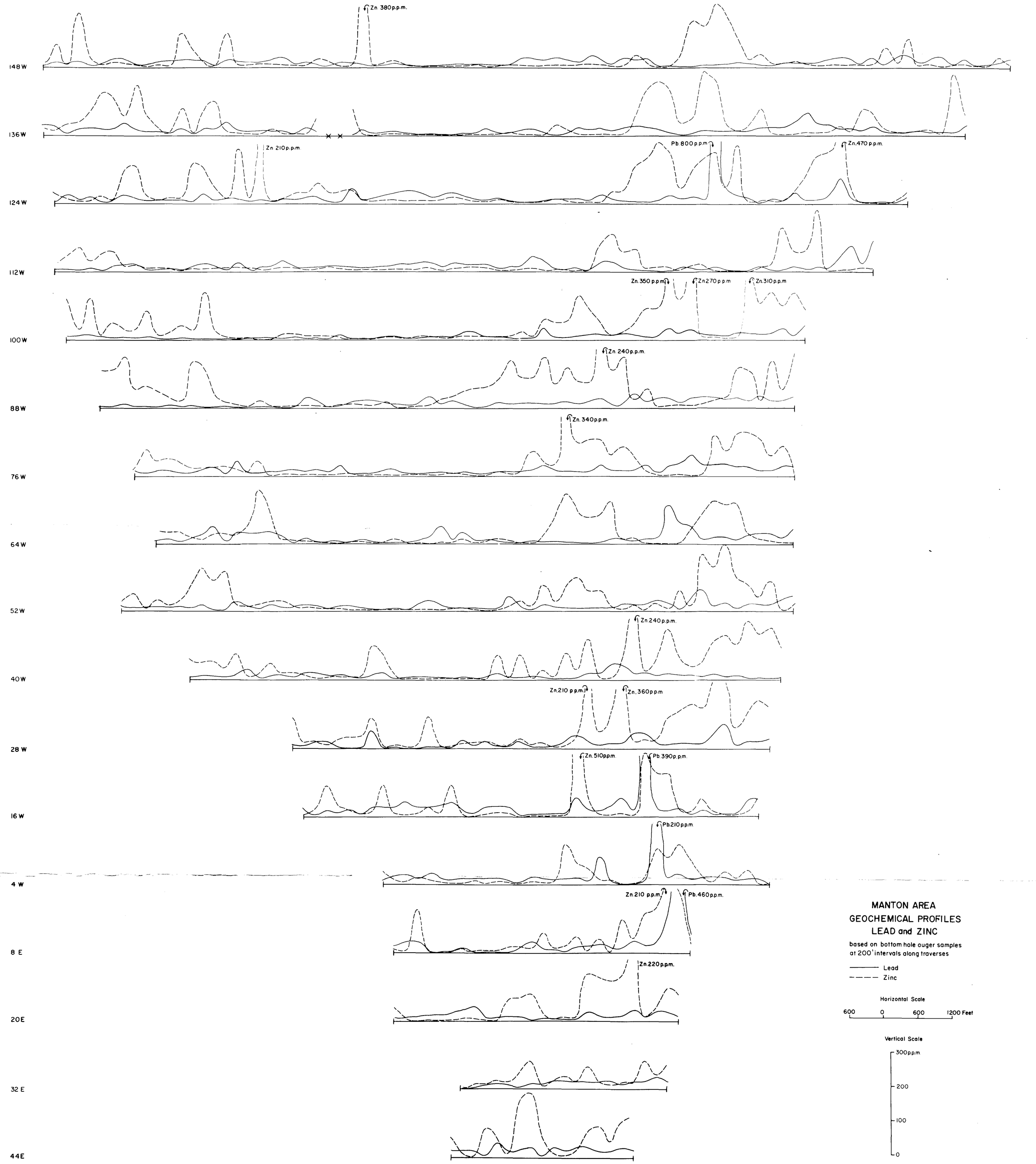

MANTON AREA
Rum Jungle District
GEOLOGY
REFERENCE
Cainozoic
CZS Undifferentiated Ferruginous Quartz Sand
Laterite
Lower Proterozoic
Pld Golden Dyke Formation
Pld Undifferentiated Shale & Schist (non-outcropping)
Mica Schist
Amphibolite
Pla Acacia Gap Tongue
Quartz Sandstone
Plo Coomalie Dolomite
Plo/Pld Transition Beds
Undifferentiated (non-outcropping)
Black Calcilutite
Plo Undifferentiated Quartz Sand (non-outcropping)
Quartz Ironstone Breccia
Massive Quartzite
Plr Crater Formation
Undifferentiated (non-outcropping)
Flaggy Quartzite.
Quartz Pebble Conglomerate
Sheared Greywacke.
Quartz Mica Schist.
Sheared Quartzite.
Pgr Rum Jungle Granite
Granite.
Quartz Tourmaline
GEOLOGICAL BOUNDARIES
Formation Boundary - Outcropping
Formation Boundary - non-outcropping
Outcrop Boundary
Non-Outcropping Boundary
GENERAL
Inclined.
Inclined Showing Prevailing Dip
Fault Inferred
Quartz Vein.
Costean.
D.D.H. Diamond Drill Hole.
Vehicle Track.
Stream, Non-flowing.
Stream - Flowing
Billabong.
Swamp.
Anticlinal axis
600 300 0 600 1200 feet
Scale
Pla
CZS
Pld
Plo/Pld
Plo
Plr
Pgr
MANTON DAM
Base Line 202 N
Manton No1 Prospect
Spring
Laterite
To Stuart Highway
To Stuart Highway Approx 6 Miles
Fine Quartz Sand
148W 136W 124W 112W 100W 88W 76W 64W 52W 40W 28W 16W 4W 8E 20E 32E 40E
274N 262N 250N 238N 226N 214N 190N 178N 166N 154N 142N 130N
To accompany Record 1969/35
D52/A8/372

PLATE 3

118N 124N 130N 136N 142N 148N 154N 160N 166N 172N 178N 184N 190N 196N 202N 208N 214N 220N 226N 232N 238N 244N 250N 256N 262N 268N 274N 280N 286N 292N 298N



MANTON AREA
GEOCHEMICAL PROFILES
LEAD and ZINC

based on bottom hole auger samples at 200' intervals along traverses

——— Lead
– – – – Zinc

Horizontal Scale

600 0 600 1200 Feet

Vertical Scale

300 p.p.m.
200
100
0

To accompany Record 1969/35

D52/A8/373 PL.8

118N 124N 130N 136N 142N 148N 154N 160N 166N 172N 178N 184N 190N 196N 202N 208N 214N 220N 226N 232N 238N 244N 250N 256N 262N 268N 274N 280N 286N 292N

148 W

Nickel 490p.p.m.

136W

124W

Nickel 210 p.p.m.

Nickel 260p.p.m.

Copper 270p.p.m.

112W

100W

88W

76 W

Copper 210p.p.m.

64 W

Nickel 210p.p.m.

52 W

Copper 230p.p.m

40W

28 W

Nickel 380p.p.m.

16W

Copper 360p.p.m.

4W

8E

20E

Copper 220 p.p.m.

Cobalt 1800 p.p.m.

Nickel 260p.p.m.

32E

Nickel 330 p.p.m.

Cobalt 280p.p.m

Nickel 530p.p.m.

44E

MANTON AREA
RUM JUNGLE EAST
GEOCHEMICAL SURVEY 1968
COPPER, COBALT and NICKEL PROFILES

based on bottom hole samples at 200' intervals along traverses

Copper

Cobalt

Nickel

X Indicates hole not drilled

Horizontal Scale

600 0 600 1200 Feet

Vertical Scale

300 p.p.m

200

100

0

To accompany Record 1969/35

D52/A8/374 PL 8

PLATE 5

120N 126N 132N 138N 144N 150N 156N 162N 168N 174N 180N 186N 192N 198N 204N 210N 216N 222N 228N 234N 240N 246N 252N 258N 264N 270N 276N 282N 288N 294N

148W

136W

124W

112W

100W

88W

76W

64W

52W

40W

28W

16W

4W

8E

20E

32E

40E

010 020 030 mR/Hr

050 mR/Hr

MANTON AREA
RADIOMETRIC PROFILES

based on highest value in each auger hole

× indicates mattock sample

↑ indicates that maximum reading was recorded at bottom of hole

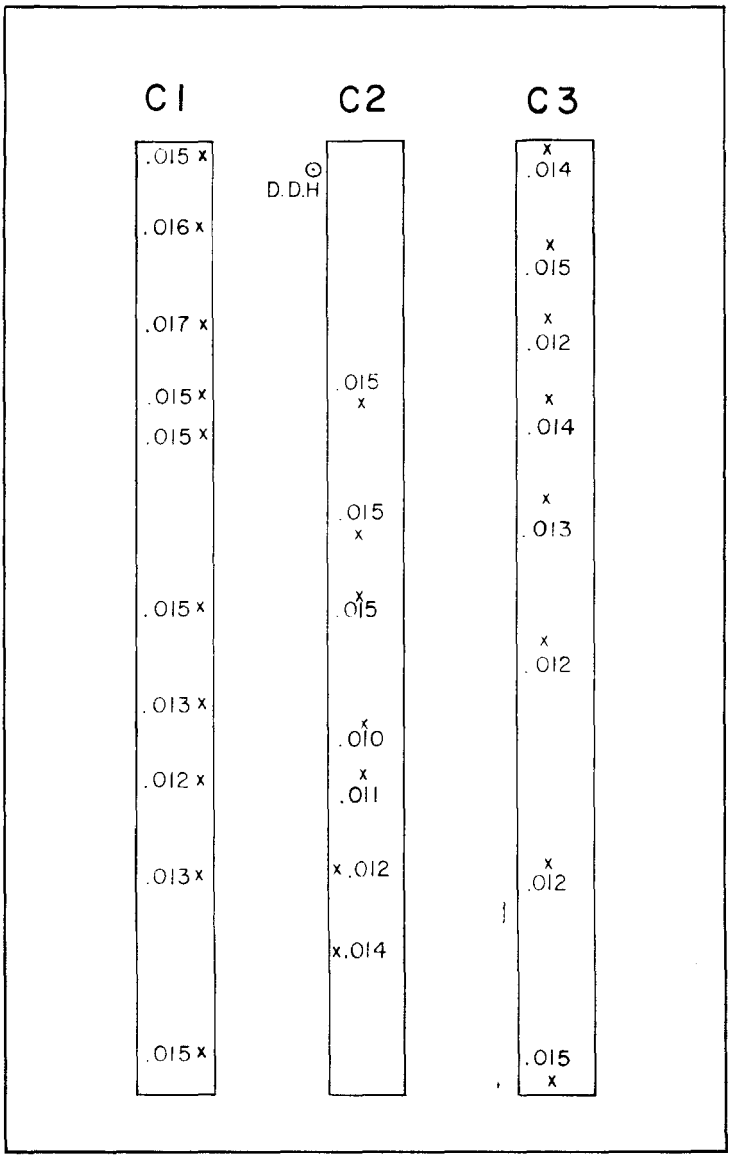
600 0 600 1200 Feet

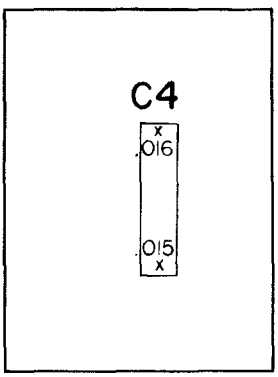
To accompany Record 1969/35

D52/A8/375 PL.8

RADIOMETRIC VALUES OBTAINED IN COSTEANS

Plate 6





Readings in MR/Hr.

x indicates point where reading taken.

⊙ D.D.H. B.M.R. Diamond Drill Hole.

N.B. For location of costeans see plate 2

100 50 0 100 feet

To accompany Record 1969/35

D52/A8/376

Plate 7

RUM JUNGLE DISTRICT

Showing Location of Celia Traverses

68128000 - Sample Numbers.

12°50'

12°55'

13°00'

13°05'

68128039

Celia III Traverse

68128021

Celia II Traverse

68128000

Celia 1 Traverse

68128010

68128009

68128022

CELIA EMBAYMENT.

granite

granite intruding schist

Woodcutters North-West Track

MANTON DAM

NORTH AUSTRALIAN RAILWAY.

RUM JUNGLE COMPLEX.

Mt. FITCH

granite met. sed. contact

EMBAYMENT.

RUM JUNGLE

ARCHAEAN SCHIST & GNEISSES

granite intruding schist

"granitised" Plr arkose

granite met. sed. contact

granite met. sed. contact?

BATCHELOR

STUART HIGHWAY

LEGEND

LOWER PROTEROZOIC

GOODPARLA GROUP

- Pld - GOLDEN DYKE FORMATION
- Pla - MASSON FORMATION - ACACIA GAP TONGUE

BATCHELOR GROUP

- Plo - COOMALIE DOLOMITE
- Plr - CRATER FORMATION
- Pll - CELIA DOLOMITE
- Ple - BEESTONS FORMATION

META-SEDIMENTS

quartz-feldspar-mica schist

? ARCHAEAN

banded iron formation.

RUM JUNGLE COMPLEX

0 ½ 1 2 mls.

To accompany Record 1969/35

D52/A8/377

After Y. Miezitis