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1967/5

GEOCHEMICAL AND RADIOMETRIC RESULTS FROM THREE AREAS, WOODCUTTERS PROSPECT RUM JUNGLE EAST, NORTHERN TERRITORY

by

Wahlan Wirakusumah

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SUMMARY

From 1964 to the present the Darwin Uranium Group of the Bureau of Mineral Resources has been engaged in exploration for uranium and base metals in the Woodcutters area, Rum Jungle East. Diamond drilling to test radiometric and geochemical anomalies is currently (1967) in progress. To assist with solution of some of the problems that arose during the survey Wahlan Wirakusumah, Colombo Plan Fellow from Indonesia was attached to the Darwin Uranium Group to sample and map the L5 anomaly and gossan and L1 anomaly.

In this report sampling methods and results are compared with those obtained from previous work. Results showed that there is some correlation between mattock and auger cutting samples.

A sample at 23 ft depth from L1 anomaly area showed high lead content (2%), this area was found to contain small irregular patches of gossan.

Samples collected from the L5 gossan averaged 2.9% lead and were highly anomalous in copper and zinc.

Samples were analyzed by atomic absorption spectrophotometer at the Acton Chemical Laboratory.

A brief resume of radiometric records is given.

INTRODUCTION

The purpose of this report is to set down the results of a project I completed when attached as a Colombo Plan Fellow to the Darwin Uranium Group of the Bureau of Mineral Resources, Australia.

I worked with the field parties of the Bureau at Rum Jungle Area, N.T. from August to November 1966, where detailed geophysical and geochemical prospecting was in progress.

Geochemical samples were collected and geological mapping was carried out in Woodcutters Area, 52 miles south of Darwin and 3 miles east of Rum Jungle Complex, while I was attached to the geochemical party.

During December these samples were analyzed at the Acton Chemical Laboratory under the supervision of Mr A.D. Haldane.

Three areas were selected which contain high order lead-zinc anomalies. (Plate 1).

Area I. L5 anomaly area. Mattock soil samples were collected along traverse 220S along a line previously auger drilled. The object was to compare analytical results to determine if mattock samples were anomalous over the ore deposit.

Area II. L5 anomaly area, consists of gossan containing limonite, hematite, cerussite, and other minerals. Chip samples were collected across the width of gossan to determine distribution of trace elements.

Area III. L1 anomaly area. Samples were taken from auger drill cuttings along traverse 120S and 118S, to establish trace elements distribution from the surface to bottom of the holes.

In this report the results of mattock soil samples and auger cutting samples are compared with previous work. The analyses were done by using atomic absorption spectrophotometer techniques.

Auger drill holes were probed and radiometric readings were recorded at intervals of one foot.

Mr D.G. Semple (Geologist) was in charge of the Geochemical party at Batchelor, N.T. and Mr B.B. Farrow (Geophysicist) carried out the Geophysical prospecting in the same area.

GEOLOGICAL SETTING

R.G. Dodson and D.O. Shatwell (1965) described the geological succession in the Rum Jungle East area as follows:

Recent	:	Superficial deposits
Tertiary	:	Laterite
Lower Proterozoic	:	Accacia Gap Tongue
		Golden Dyke Formation

Coomalie Dolomite
Crater Formation

The Woodcutters Prospect (Plate 1) consists chiefly of the Golden Dyke Formation - grey and purple siltstone, overlain by slate, sericite, chlorite schist and dolomite. In addition outcrops of fine grained silicified rocks of chert and quartzite were noted; these may be calcareous in depth. The Golden Dyke Formation is underlain by the Coomalie Dolomite and at Woodcutters may grade into it in depth.

Black graphitic and purple shale were identified from auger cuttings in some places in the survey area.

Folds axes strike nearly north and dips average 60 degrees east and west.

Faults are common and strike north and north-east.

MINERALISATION

The mineralisation occurs in the Golden Dyke Formation and is possibly of syngenetic origin.

Crystalline cubes of pyrite are found in most places in this formation. Limonitic and hematitic gossans were found in the L1 and L5 anomalous areas.

D.O. Shatwell noted manganese oxide in L1 which is associated with the lead anomaly.

L5 gossan lies between traverses 204S and 208S, along 40E, and is approximately 400 ft long and 25 ft wide. It contains limonite, hematite, cerussite and green minerals and quartz (Plate 3). The structure is banded, texture is cavernous and fine fragments of green minerals of chlorite and talc partly fill the cavities.

At anomaly L1 irregular patches of gossan crop out over an area of some hundreds of square feet.

SAMPLE COLLECTION

A number of samples were collected from:

<u>Area I (L5), Plate 2</u>

Mattock samples.
Along 220S, from 32E to 37E every 50 ft. Diamond Drill Hole (DDH) 66/3 was collared on 220S, 33E.

Area II (L5), Plate 3

Chip samples.
Each sample was collected across the width of the gossan.
Samples were cut at 25 ft intervals.

Area III (L1), Plate 4A and 4B

Auger drill samples.
Plate 4A shows the samples were collected along traverse 120S, from 30E to 52E, at 100 ft intervals. Bottom hole samples were obtained from average depth of 23 feet.
Plate 4B shows the samples collected from 37E, 38E and 39E along traverse 118S. The holes were sampled at 3 ft intervals.

GEOCHEMICAL AND RADIOMETRIC RESULTS

GEOCHEMICAL RESULTS

Geochemical results in the areas are shown on the Plates 2, 3, 4A and 4B.

Area I, (Plate 2)

The lead values range from 150 to 650 ppm, the 650 ppm peak lead value at 37E coincides with the up dip projection of the ore deposit intersected by DDH 66/3. Results of diamond drilling show that 78 feet 8 inches of core assaying 9.1% Pb, 19.4% Zn and 6.4 ozs of silver was intersected.

The peak value from auger cuttings of 1840 ppm lead was at 36E, and it appears that there is some correlation between the two high values indicating the possible usefulness of mattock sampling. Copper and zinc showed low values, which average 36 ppm for copper and 40 ppm for zinc. Samples from auger cuttings average 63 ppm copper.

Plate 2A shows the profile of auger cuttings and mattock soil sample results, and it can be seen that geochemical values showed a tendency to increase eastwards. The profiles also show that contrast between the mattock sample results is not as great as those from auger samples.

Area II, (Plate 3)

Gossan and quartz veins crop out in the area. The samples showed highly anomalous lead with analyses ranging from 5,000 ppm to 48,500 ppm. The copper analyses range from 250 ppm to 4,400 ppm; zinc is also anomalous.

The lead peak value of 48,500 ppm (4.85%) was at the southern end of the crush zone where the gossan contained cerussite. The average lead content of the gossan is 2.9%.

The results from DDH 66/1 at 208S, 42E contained maximum 1.79% lead, and from DDH 66/2 at 204S, 42E recorded maximum of 5.15% lead.

Area III, (Plate 4A, 4B)

Quartzite, silicified dolomite(?), and gossan containing manganese crop out in the area. The gossan appears to be associated with the lead anomaly.

Samples collected from holes 3 ft intervals (Plate 4B), showed that at the first 3 ft geochemical values are high, then decrease and towards the bottoms of the holes have a tendency to increase.

The results from L1 anomaly area showed a peak value of 20,000 ppm lead at 37E, 118S. Zinc values are high, the peak value of 3,562 being recorded at 37E, 118S. Plate 4C shows the profiles of lead and zinc values. Copper and other elements showed low values.

Previous work showed the lead peak value of 10,000 ppm at 120S, 36E, two hundred feet south of the 118 traverse line.

RADIOMETRIC RESULTS

Auger drill holes were probed using Harwell Type 1368A ratemeters and radiometric readings were recorded every foot.

Plate 4C shows the geological units obtained from an examination of auger cuttings; and the maximum radiometric values both from soil and weathered rocks.

The radiometric values were not anomalous; readings recorded from the soil layer were higher than from weathered rocks and appear to be associated with laterite. The only significant results are those associated with geochemical anomalies (.015 mR/Hr at 37E, .014 mR/Hr at 38E along traverse 120S; and .034 mR/Hr at 37E along 118S).

The radiometric records from the whole area of the Woodcutters Prospect are being combined into a progress report by D.G. Semple.

CONCLUSION

Although the results of geochemical analyses of mattock samples show much less contrast than auger cuttings they appear to be a useful tool for reconnaissance geochemical prospecting in areas where transported soils are thin.

Gossan from L5 anomaly area assays 2.9% lead and is highly anomalous copper and zinc.

Another orebody (lead and uranium) may be discovered in the L1 anomaly area. This is suggested from the increasing geochemical values at the depth, and the associated high radiometric readings.

ACKNOWLEDGMENT

I wish to thank all of the crews of the Bureau of Mineral Resources field parties in Rum Jungle Area. Thanks are due to Mr J.F. Ivanac, who supervised the work reported here and to Mr A.D. Haldane and his colleagues of the Acton Chemical Laboratory for supervising the analytical work.

REFERENCES

GARDENER, J.E., and SHATWELL, D.O., 1966 - Summary of Activities, 1966 Darwin Uranium Group, Rum Jungle Area, 1966. Bur. Min. Resour. Aust. Rec. 1966/196 (unpubl.).

SHATWELL, D.O., 1966 - Geochemical and Radiometric Investigations, Rum Jungle East Area, Bur. Min. Resour. Aust. Rec. 1966/34 (unpubl.).

PLATE 1

WOODCUTTERS PROSPECT, RUM JUNGLE AREA

GEOLOGY, ELECTROMAGNETIC AXES, GEOCHEMICAL ANOMALIES AND RADIOMETRIC CONTOURS

Locality Map
Radiometric and Geochemical
Surveys 1966

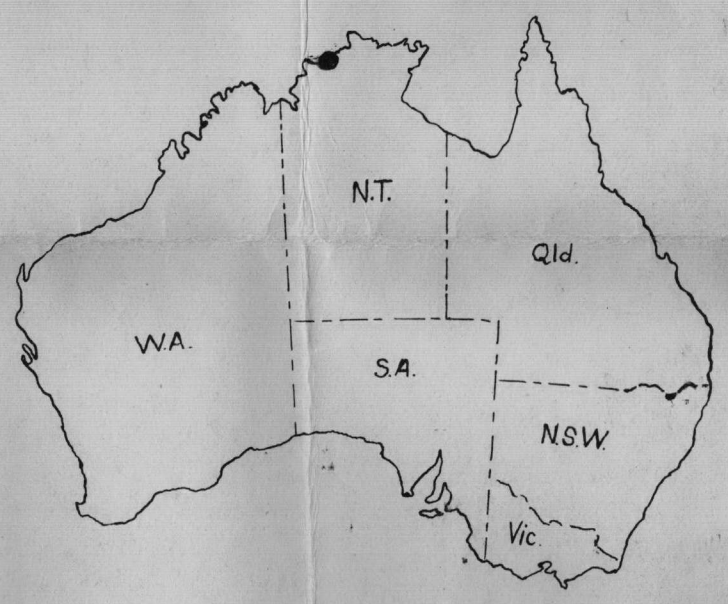
Reference

LOWER PROTEROZOIC

Golden Dyke formation — Pld
- Black shale
- Sericitic schist
- Amphibolite and chloritic schist
- Pyritic quartzitic sandstone
- Quartzite and chert
- Siltstone

Coomalie Dolomite — Plo
- Dolomite

- Formation boundary, position approximate
- Lithological boundary
- Outcrop boundary
- Fault, full line position accurate, broken line position approximate, queried, inferred
- Gossan
- Dip and strike of bedding
- Contour
- Vehicle track
- Stingrum anomaly axis
- Zone of manganese mineralisation
- Lead contours at 100, 200, 400 ppm (Auger samples)
- Copper contours at 150, 300 ppm (Auger samples)
- Radiometric contours at .025, .050 mR/hr (Maximum values in auger holes)
- Diamond drill hole proposed
- " " in progress
- " " completed
- AI Areas discussed in text



RESULTS			
DDH	Footage	Mineralization	
66/1	474	407'–438'	
66/2	352	280'–299'	
66/3	646'6"	508'10"–587'6"	
66/5	478'	383'–420'	
66/6	572'	518'–538'	Mines
66/7	636'	—	Mines
66/8	653'	—	
66/9	in progress		
66/10	546'		
66/11	in progress		
66/12	"		Mines
66/13	"		"
67/1	"		

SCALE
400 0 400 800 1200 FEET

To accompany record 1967/5

D52/A/26

PLATE 2

	32 E		33		34		35		36		37E
Mattock samples			Collar DDH 66/3,66/11 ↓								220S
Cu	36	50	42	32	26	30	36	30	26	36	50
Pb	150	188	250	188	150	188	280	312	250	275	650
Zn	31	68	50	39	29	35	30	30	42	40	

Auger cutting weathered rock											
Cu	28				46				95		82
Pb	60				250				1840		880
Zn	(not done)										

COMPARISON OF RESULTS OF MATTOCK SAMPLES WITH AUGER DRILL / WEATHERED ROCK SAMPLES ALONG 220S TRAVERSE WOODCUTTERS AREA RUM JUNGLE EAST

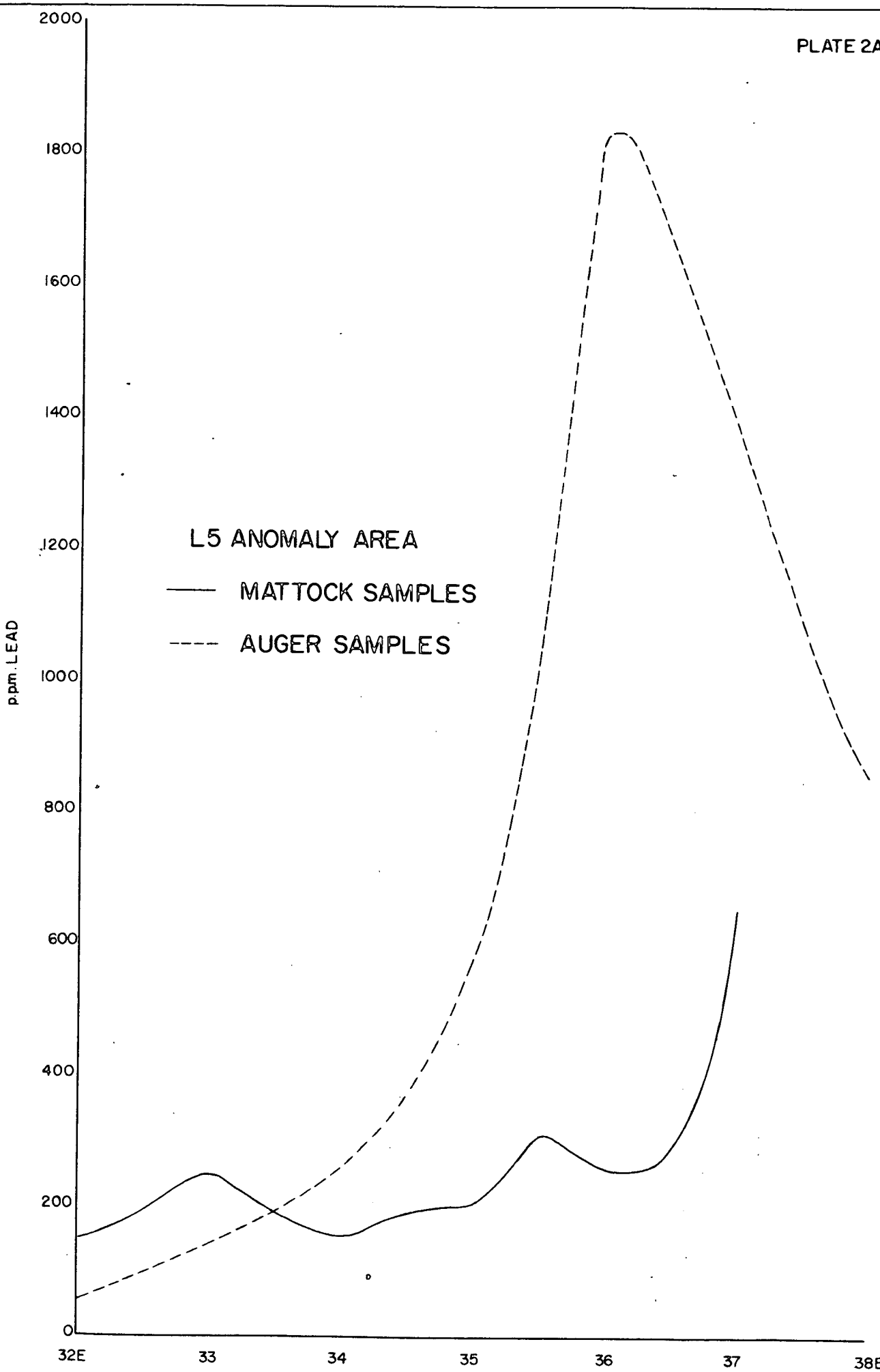
RESULTS IN P.P.M.

SCALE 1:600

To accompany record 1967/5

D52/A4/103 GE

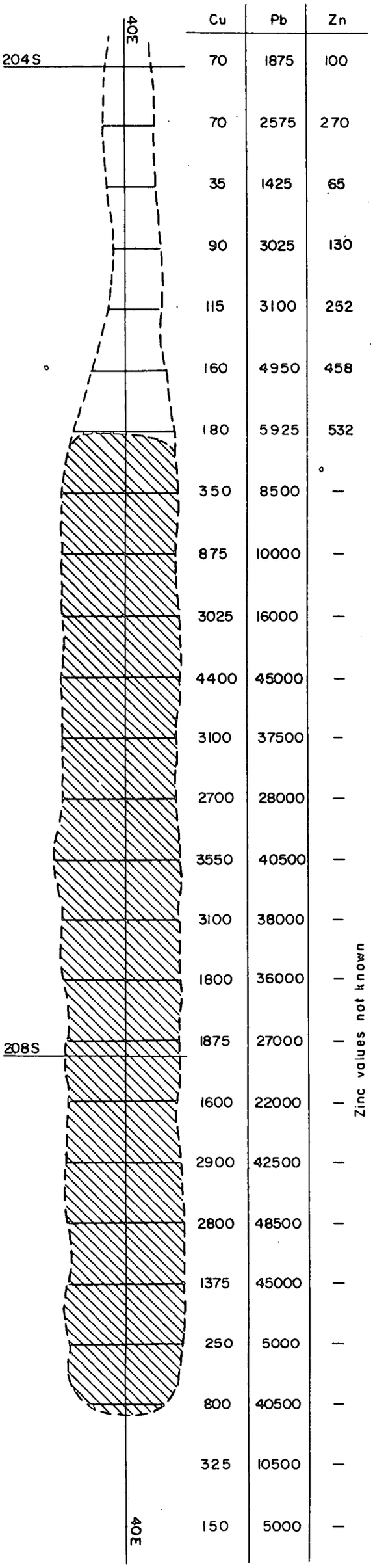
PLATE 2A



PROFILE OF LEAD VALUES ALONG 220 S

WOODCUTTER'S AREA, RUM JUNGLE EAST

PLATE 3



Cu	Pb	Zn
70	1875	100
70	2575	270
35	1425	65
90	3025	130
115	3100	252
160	4950	458
180	5925	532
350	8500	—
875	10000	—
3025	16000	—
4400	45000	—
3100	37500	—
2700	28000	—
3550	40500	—
3100	38000	—
1800	36000	—
1875	27000	—
1600	22000	—
2900	42500	—
2800	48500	—
1375	45000	—
250	5000	—
800	40500	—
325	10500	—
150	5000	—

GOSSAN SAMPLING
WOODCUTTER'S PROSPECT
RUM JUNGLE EAST

SCALE 1:600

LEGEND

Cerussite-bearing Gossan

Quartz Veins

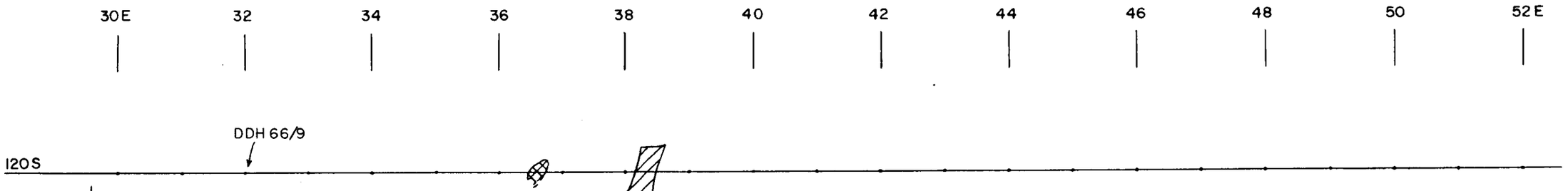
Boundary Line

Results in p.p.m.

To accompany record 1967/5

D52/A4/100 GE

PLATE 4A



Cu	310	65	65	58	85	195	162	50	92	122	50	35	575	100	86	38	40	46	40	44	52	44	35
Pb	25	–	–	–	150	232	3750	1300	900	2050	188	–	188	62	25	125	25	50	50	62	88	38	88
Zn	500	115	115	115	138	275	1512	288	688	1438	450	150	562	185	138	110	145	49	95	146	216	191	216

GEOCHEMICAL SAMPLING

ALONG 120°S TRAVERSE LINE

WOODCUTTER'S AREA

RUM JUNGLE EAST

Results in p.p.m.

SCALE 1:200

LEGEND

Quartzite (silicified dolomite)

Gossan

To accompany record 1967/5

D52/A4/101 GE

PLATE 4B

118 S

Depth	37E Cu	Pb	Zn
0'			
3'	100	17,250	1,390
6'	72	4,288	665
9'	100	3,700	980
12'	72	3,385	620
15'	130	5,800	1,255
23'	230	20,000	3,562
40'	1,625	9,875	2675

	38E Cu	Pb	Zn
0'			
3'	252	5,950	825
6'	268	5,200	1,238
9'	252	4,300	1,200
12'	252	4,500	1,225
15'	308	5,500	1,975

	39E Cu	Pb	Zn
0'			
3'	100	1,950	325
6'	68	450	262
9'	85	850	738
12'	80	1,050	575

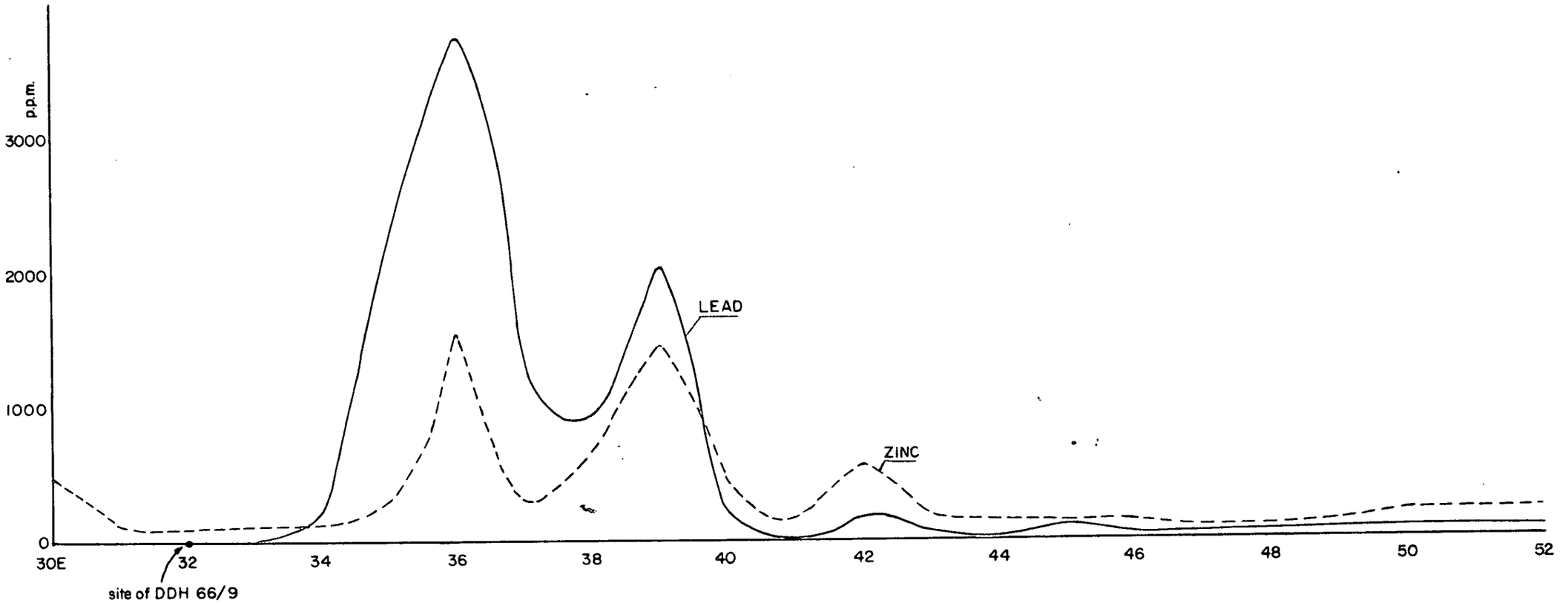
118 S

RESULTS OF GEOCHEMICAL SAMPLING OF AUGER DRILL CUTTINGS AT 37E 38E & 39E ALONG 118S IN P.P.M. WOODCUTTERS AREA RUM JUNGLE EAST

To accompany record 1967/5

D52/A4/105

PLATE 4C



LI ANOMALY AREA

PROFILE OF LEAD & ZINC VALUES (AUGER CUTTINGS)

ALONG 120 S

WOODCUTTER'S AREA

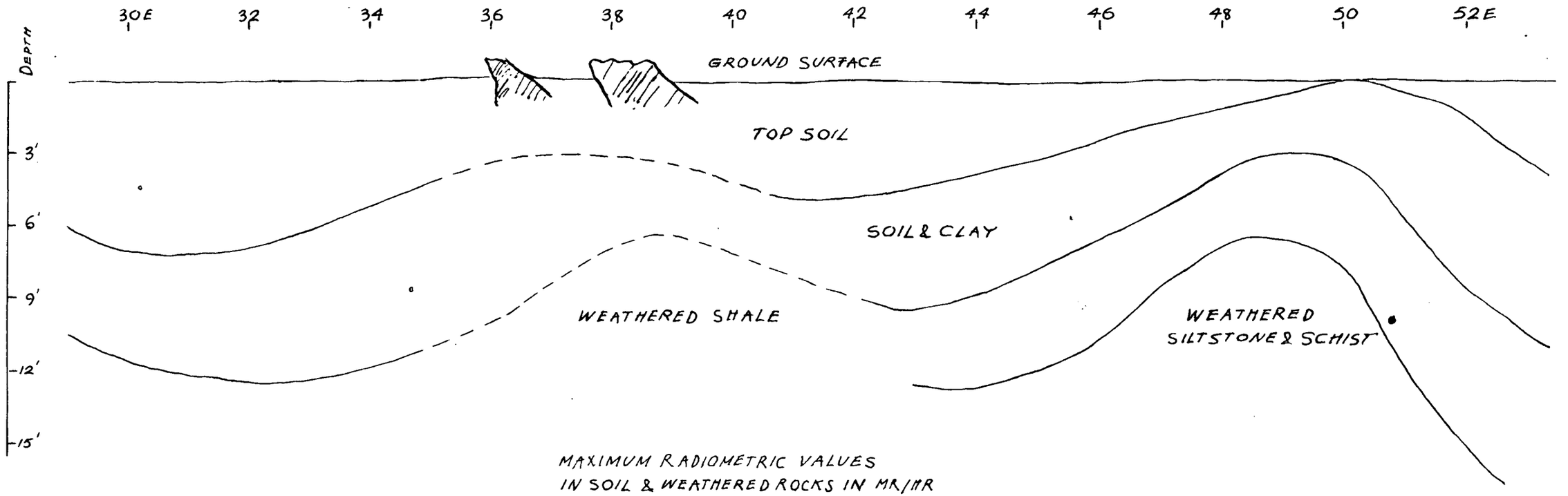
RUM JUNGLE EAST

Scale 1 inch = 200 ft

To accompany record 1967/5

D52/A4/102 G.E.

PLATE 5



MAXIMUM RADIOMETRIC VALUES
IN SOIL & WEATHERED ROCKS IN MR/HR

SOIL	.013	.013	.011	.009	.012	.008	.013	.015	.013	.008	.008	.013	.010	.013	.008	.008	.009	.007	.007	.006	.008	.007	.011
WEATH. ROCKS	.011	.009	.010	.007	.008	.008	.013	.011	.014	.009	.010	.011	.010	.009	.007	.008	.007	–	.006	.007	.008	.006	.006

GEOLOGICAL PROFILE
ALONG TRAVERSE 120S

OUTCROP

To accompany record 1967/5

D 52/A4/106