REPORT ON PROSPECTING

EXPLORATION LICENCE No. 1[illegible]

NORTHERN TERRITORY

1972

Report No. 187

By

G. Pietsch
D. Tucker

TABLE OF CONTENTS

LIST OF PLATES

1. INTRODUCTION

Exploration Licence (E. L.) No. 121 is located near the Nicholson River in the north-eastern part of the Northern Territory near the Queensland border. See Plate 1, Location Map, E. Ls. 121, 122, 124 and 125.

At the Red Rock Anomaly two radiometric anomalies, associated with altered acid volcanics of the Cliffdale Volcanics, were subjected to further geological and radiometric investigation and were then tested at depth by a drilling programme consisting of five rotary-percussion drill holes totalling 983 feet.

At the Crippled Horse Anomaly, radiometric anomalies are associated with near vertical alteration zones in an acid volcanic sequence of the Cliffdale Volcanics. Uranium mineralisation is patchily distributed within these zones.

A total of 5.5 miles of track was prepared by bulldozing to give access to the Crippled Horse Anomaly. Some proposed drill sites could not be prepared, due to the steep slope, and bars of altered volcanics the outcrops of which proved impossible to bulldoze.

The bulldozer was able to establish only two alternative sites and a modified drilling programme of two holes totalling 400 feet was completed.

2. CONCLUSIONS

2.1 Red Rock Anomaly

At Red Rock, spectrometer traverses indicated positive uranium contribution and a surface sample assayed 105 ppm U_3O_8.

The radiometric anomalies were associated with zones of altered, haematised acid volcanics of the Cliffdale Volcanics. The alteration zones are in contact with a sandstone breccia, interpreted as a fault zone along which sandstones of the Westmoreland Conglomerate have been thrust under the Cliffdale Volcanics.

Drilling revealed that mineralisation is patchy at depth and where anomalous values were encountered, they represent only very low grade mineralisation.

2.2 Crippled Horse Anomaly

No significant uranium mineralisation was encountered during drilling. The two drill holes are considered to have not adequately tested the alteration zones. The dimensions of the surface exposure are not impressive and only very patchy mineralisation is indicated. Further drilling would require substantial costs to establish accessible and useful drill sites.

3. RECOMMENDATIONS

3.1 In view of the low grade and patchy nature of mineralisation, no further work is recommended at Red Rock Anomaly.

3.2 Although testing is considered inadequate at the Crippled Horse Anomaly, the results obtained to date do not appear to justify the cost of additional drilling, and therefore no further work is recommended.

4. REGIONAL GEOLOGY

Basement rocks in the area consist of Lower Proterozoic schists, slates and gneisses of the Murphy Metamorphics, which have been intruded by the Nicholson Granite. These basement rocks are exposed in an east-west trending block, the Murphy Tectonic Ridge, which separates the McArthur Basin to the north and west from the South Nicholson Basin to the south.

The regional stratigraphic sequence is as follows:

Lower Cretaceous
UNCONFORMITY

Lower Cambrian
UNCONFORMITY

South Nicholson Basin	McArthur Basin
Upper Proterozoic	
South Nicholson Group	
Mittiebah Sandstone	
Mullera Formation	
Constance Sandstone	
Wallis Siltstone Member	
Pandanus Siltstone Member	
UNCONFORMITY	
Lower Proterozoic	Lower Proterozoic
Fickling Beds	Karns Dolomite
UNCONFORMITY	UNCONFORMITY
	Tawallah Group
	Fish River Formation
	Masterton Formation
	Gold Creek Volcanic Member
	Wollogorang Formation
	Settlement Creek Volcanics
	Aquarium Formation
	Sly Creek Sandstone
	McDermott Formation
Peter's Creek Volcanics	Peter's Creek Volcanics
Carolina Sandstone Member	Carolina Sandstone Member
Westmoreland Conglomerate	Westmoreland Conglomerate
UNCONFORMITY	UNCONFORMITY

Rocks of the Murphy Tectonic Ridge

Norris Granite
Cliffdale Volcanics
Nicholson Granite
Murphy Metamorphics

In the eastern part of the area the basement rocks are overlain by an acid volcanic sequence, the Cliffdale Volcanics, which defines the base of the Carpentarian System. The Cliffdale Volcanics act as host rock to uranium mineralization at the Eva Mine and to copper mineralization at Norris Copper.

The Norris Granite intrudes both basement rocks and the Cliffdale Volcanics, and is associated with the introduction of minor tin and tungsten mineralization.

The Tawallah Group overlies this sequence, a section of dominantly shallow water sediments and volcanics, with volcanics prominent near the base, being deposited in the McArthur Basin. Only the basal Westmoreland Conglomerate and the Peter's Creek Volcanics are exposed in the South Nicholson Basin. These crop out only on the northern rim of the basin, and are overlain by the Fish River Formation of Carpentarian Age, which has a sequence of feldspathic and quartzose sandstones with some basic and intermediate volcanics.

The McArthur Basin is a shallow elongate basin, with low angle bedding dips near the centre of the basin. Local steep dips are found along the northern margin of the Murphy Tectonic Ridge. The basin is cut by the north-west to south-east trending Calvert Fault.

The Westmoreland Conglomerates, and the Peter's Creek Volcanics act as host rocks for uranium mineralization. Mineralization has been found in fault zones in the Westmoreland Conglomerate associated with sheared basic rocks. In the Peter's Creek Volcanics mineralization is found in shear zones and volcanic plugs. Low grade uranium mineralization has also been found in a tuff bed at the base of the Peter's Creek Volcanics.

Copper mineralization occurs in the Gold Creek Member of the Masterton Formation where it is localized in collapse breccia pipes, formed during the late stages of the extrusive activity.

The Tawallah Group is succeeded by further Carpentarian sedimentation, the McArthur Group, represented by the Karns dolomite in the McArthur Basin and by the Fickling Beds in the South Nicholson Basin.

These formations mark the upper limit of Carpentarian deposition in the area. Minor copper, lead and manganese mineralization has been recorded in the Karns Dolomite. During the Adelaidian period, deposition occurred only in the South Nicholson Basin where a succession of shallow water sediments was deposited. The basal formation, the Constance Sandstone unconformably overlies the Fickling Beds. The Constance Sandstone has two siltstone members, the basal Pandanus Siltstone Member which crops out in the northern part of the basin, and the Wallis Siltstone Member. Both of these members are dominantly micaceous siltstone with minor fine sandstones, and glauconitic siltstones occur in the Wallis Siltstone. The Constance sandstone is a medium grained sandstone with very minor interbedded siltstone. The overlying Mullera Formation is made up of micaceous siltstone, shale, quartz, sandstone, glauconitic sandstone and ferruginous sediments. This formation is overlain by the Mittiebah Sandstone, which consists of quartzose and feldspathic sandstones.

This Adelaidian sequence was followed by the Lower to Middle Cambrian Bukalara Sandstone, which was deposited as a thin extensive sheet over much of the South Nicholson and McArthur Basin.

Subsequent deposition is not recorded in the area until the Lower to Middle Cretaceous, when a sequence of claystones, siltstones,sandstones and conglomerate were deposited over the area. Post Cretaceous weathering, lateritization, erosion and redeposition has given rise to Cainozoic alluvials, laterite, soil, and sand cover.

5. ROTARY PERCUSSION DRILLING PROGRAMME

5.1 Drilling and Sampling

Drilling was carried out by Mitchell Drilling Contractors of Brisbane with a Mayhew 1000 rig mounted on a Foden tandem drive truck. Drilling commenced at Red Rock on October 3rd and was completed at Crippled Horse Anomaly on October 18.

In all, a total of seven vertical holes were drilled for a total of 1,383 feet of drilling.

Bulk samples were taken over five foot intervals. Each was split and a 2 lb sample was submitted for assay while a duplicate 2 lb sample was retained for submission to the Mines Branch, Northern Territory Administration. All samples were assayed for uranium by fluorometric analysis, by Geochemical and Mineralogical Laboratories (N.T.) Pty. Ltd., Darwin.

Lithological and gamma spectrometer logs were recorded in a low radiometric background area near the site.

5.2 Results of Drilling Programme - Red Rock Anomaly

Red Rock is situated approximately 7.2 miles east of the Eva Mine. Access was gained along the existing track from the Eva Mine via the Pandanus Creek Mine and Chapmans Camp. Many sections of this track were cleaned up with the bulldozer. See Plate 2, Location of Field Activities 1972, E.L. 121.

The surface radiometric anomaly lies on a scree slope below a sandstone escarpment which rises up to about 400 feet above the valley floor. The valley area itself is gently undulating with a relief of about 50 feet.

The rocks underlying the valley are shown, by patchy outcrops of acid intrusive and extrusive rocks, to belong respectively to the Norris Granite and the Cliffdale Volcanics (Tucker, 1971). These rocks are overlain unconformably by the sandstones and conglomerates of the Westmoreland Conglomerate which form the escarpment.

At Red Rock the Cliffdale Volcanics are locally thrust faulted over the Westmoreland Conglomerate. See Plate 3, Red Rock Anomaly, Geological and Radiometric Map and Plate 4, Red Rock Anomaly, Percussion Drill Sections. This fault is marked along the scree slope by a series of outcrops of quartzite breccia striking approximately east-west and dipping about 35° south. North-south trending cross-faulting has tilted a central block southward. In this block the major fault is dipping 55° south.

"Hot Spot" anomalous radioactivity occurs in altered and haematised volcanics in contact with this breccia.

Five holes were drilled to test for uranium mineralisation in volcanics adjacent to the fault zone at depth. (Table 1).

TABLE 1

Hole No.	Co-ordinates	Total Depth
PDRR1	10210N 10100E	200 ft
PDRR2	10025N 10400E	200 ft
PDRR3	10042N 10300E	220 ft
PDRR4	10003N 10200E	220 ft
PDRR5	9957N 10096E	143 ft
	Total:	983 ft

The assay results (see Appendix 1) show that no significant uranium values were intersected by any of the five holes. Although no ore grade mineralisation was detected, holes PDRR1 and PDRR3 show anomalous uranium values (2-3 times background) in the volcanics immediately above the thrust fault.

In holes PDRR2, 3 and 4, not only did the drill pass through the thrust fault contact from volcanics to sandstone but it passed on through the unconformity back into the volcanics. See Plate 4, Red Rock Anomaly, Percussion Drill Sections.

It is considered that this area is adequately tested and that no further drilling is warranted.

5.3 Results of Drilling Programme - Crippled Horse Anomaly

The Crippled Horse Anomaly is associated with near vertical alteration zones in Cliffdale Volcanics and is located 9.4 miles east-north-east of the Eva Mine.

Access to the drill sites was gained by bulldozing five miles of new road northward over the escarpment from the existing track between Chapmans Camp and Red Rock.

The geology of this area is described by Taylor and Charles (1971) (Fig. 4). Two holes were drilled to test the alteration zones at depth (Table 2).

TABLE 2

Hole No.	Co-ordinates	Depth
PDCH1	187N 321E	200 ft
PDCH2	143N 284E	200 ft
	Total:	400 ft

The fact that the anomaly lies on the top of a steep sided hill scattered with ridge outcrops of silicified acid volcanics, which are immovable to a bulldozer alone, resulted in access not being gained to several of the proposed drill sites near the top of the hill.

PDCH1 is located on a northeasterly trending alteration zone on the southern flank of the hill. PDCH2 is at the base of the hill on the projected intersection of the same north-easterly and a major northerly trending alteration zone. See Plate 5, Crippled Horse Anomaly, Geological and Radiometric Plan.

PDCH1 passed out of the alteration zone on which it was collared only 25 feet below surface. The remainder of the hole passed through a variety of unaltered acid volcanics. PDCH2 intersected quartz veining in weathered volcanics in the first 10 feet, below which it passed continuously through unaltered acid volcanics, see Plate 6, Crippled Horse Anomaly, Percussion Drill Sections.

No significant uranium mineralisation was intersected in either of these holes. See assay values in Appendix 1 and Plate 6. Anomalous uranium values were encountered in the alteration zone in the top 25 feet of PDCH1 but these are only 2-3 times background and are about one tenth of the peak value obtained from surface sampling of "hot spots" (i.e. 105 ppm U_3O_8).

PDCH2 intersected anomalous uranium values of up to five times background (i.e. up to 31 ppm U_3O_8) between 5 and 15 feet. No other anomalous values were encountered.

Although the two holes recently drilled are not considered to have adequately tested the alteration zones, the high cost of regaining access and of blasting in order to prepare further drill sites does not seem warranted for such a prospect.

As commented previously (Taylor and Charles (1971)), the dimensions of the surface anomaly, which is confined to a few narrow alteration zones, are not impressive and the potential volume of mineralised material is probably low. If further drilling were to be undertaken however, and it is not recommended herein, it is strongly suggested that angle

holes be drilled from the flank of the hill in order to ensure intersecting the near vertical alteration zones at depth.

A Mineral Lease of 40 acres known as Crippled Horse Anomaly ML348C has been pegged and applied for.

6. OTHER ACTIVITIES

Two mining leases were pegged and applied for at the Eva Mine. These are known as Eva North, ML 347C and Eva South, ML 351C.

7. STATEMENT OF EXPENDITURE

Expenditure on the area the subject of Exploration Licence No. 121 for the year ended December 31, 1972 was :-

Geology		2,801
Geophysics		1,350
Geochemistry		1,150
Drilling		6,569
General		3,174
	$	15,044

APPENDIX 1

Rotary Percussion Drill Logs
Red Rock and Crippled Horse Anomalies

NORANDA AUSTRALIA LIMITED

DRILL RECORD

From	To	Sample Length	Recovery	%	Sample No.	Assays U_3O_8						Geological Log	Angle to core	Survey Depth	Survey Bearing	Survey Inclination	Notes T1	T2	T3	T4
					PCPD	ppm														
													Background reading				52	10	5	25
0	5	5			701	9						Fine grained acid volcanic, haematitized and quartz veined					85	15	8	25
5	10	5			702	10						As above					68	13	5	25
10	15	5			703	7						As above					70	14	6	2
15	20	5			704	11						As above and quartz veining becoming less frequent					74	13	6	2
20	25	5			705	13						As above					62	12	5	25
25	30	5			706	7						Purple fine grained acid volcanic with green phenocrysts and minor quartz veining					62	13	5	2
30	35	5			707	5						As above					68	12	5	2
35	40	5			708	7						As above and minor haematitized fine grained acid volcanic					64	11	5	2
40	45	5			709	8						Purple fine grained acid volcanics					64	12	5	2
45	50	5			710	8						As above and minor red brown acid volcanics					66	13	6	2
50	55	5			711	8						Red brown acid volcanic					64	11	5	2
55	60	5			712	9						Purple and green fine grained acid volcanics					64	11	6	2
60	65	5			713	6						As above					65	12	5	2
65	70	5			714	7						As above					60	11	5	2
70	75	5			715	6						As above					66	12	5	2
75	80	5			716	5						As above					60	10	5	2
80	85	5			717	4						Purple and green fine grained acid volcanics					60	11	5	2
85	90	5			718	4						As above					64	11	6	25
90	95	5			719	5						As above					62	10	6	15
95	100	5			720	4						Dark red-brown fine grained acid volcanic					66	13	6	15
100	105	5			721	4						As above					62	12	4	2
105	110	5			722	4						As above					66	12	6	25
110	115	5			723	5						As above					68	13	5	2
115	120	5			724	4						As above					68	13	5	2
120	125	5			725	5						As above					66	11	6	2
125	130	5			726	3						As above and quartz veining					64	10	6	2
130	135	5			727	4						As above					68	12	6	2
135	140	5			728	4						As above					64	13	6	2
140	145	5			729	5						As above					64	11	6	2
												Remainder logged in different area new background	Background Reading				23	4	3	15
145	150	5			730	4						Dark red brown fine grained acid volcanic					35	6	4	2
150	155	5			731	4						As above					35	7	4	15
155	160	5			732	4						As above					34	6	3	15
160	165	5			733	5						As above					30	5	25	15
165	170	5			734	4						As above					36	7	3	15
170	175	5			735	5						As above					35	6	4	15
175	180	5			736	6						As above					36	6	3	15
180	185	5			737	6						As above					36	6	3	15
185	190	5			738	6						As above					36	6	3	15
190	195	5			739	6						As above					32	5	3	2
195	200	5			740	5						As above					34	7	4	15
												End of Hole.								

Drilled by Mitchell Drilling Type of Drilling Rotary Percussion Hole Size - % Recovery - Surveyed by - Instrument Used --

Date Started 16 October, 1972 Date Completed 17 October, 1972 Logged by D. C. TUCKER Sampled By D.C. TUCKER Record Completed M.F. FOY

No. of Hole CH-1 Location Pandanus Creek - Crippled Horse Depth of Hole 200' Co-ords.of Collar 187N, 321E Bearing - Inclination Vertical.

NORANDA AUSTRALIA LIMITED

DRILL RECORD

From	To	Sample Length	Recovery		Sample No.	Assays U_3O_8						Geological Log	Angle to core	Survey			Notes			
				%										Depth	Bearing	Inclination				
					PCPD	ppm											T1	T2	T3	T4
0	5	5			741	7						Weathered light brown acid volcanic quartz veined					54	10	5	2
5	10	5			742	14						As above					64	11	5	2
10	15	5			743	31						Dark red brown fine grained acid volcanics					68	11	6	1.5
15	20	5			744	10						As above					62	11	5	2
20	25	5			745	5						As above					60	11	5	1.5
25	30	5			746	5						As above					56	10	5	1.5
30	35	5			747	5						As above					60	10	5	2
35	40	5			748	4						As above					60	10	5	1.5
40	45	5			749	5						As above					60	11	4	2
45	50	5			750	4						As above					60	11	5	2
50	55	5			751	4						As above					58	11	5	2
55	60	5			752	6						As above					60	10	4	2
60	65	5			753	5						As above					60	11	5	2
65	70	5			754	6						As above					60	11	5	2
70	75	5			755	6						As above					60	11	4	2
75	80	5			756	8						As above					62	10	5	1.5
80	85	5			757	6						As above					60	9	5	2
85	90	5			758	6						As above					60	10	4	2
90	95	5			759	4						As above					62	11	5	2
95	100	5			760	5						As above					62	10	4	1.5
100	105	5			761	9						As above					75	15	8	2.5
105	110	5			762	9						As above					68	11	5	2.5
110	115	5			763	7						As above					58	9	3	1.5
115	120	5			764	5						As above					54	8	4	2
120	125	5			765	7						Ad above					52	10	5	2
125	130	5			766	5						As above					52	9	5	1.5
130	135	5			767	7						As above					58	10	5	1.5
135	140	5			768	5						As above					62	10	5	1.5
140	145	5			769	5						As above					50	10	4	1.5
145	150	5			770	4						As above					57	10	4	1.5
150	155	5			771	4						As above					50	10	4	2
155	160	5			772	5						As above					54	9	5	1.5
160	165	5			773	7						As above					56	8	3	2
165	170	5			774	5						As above					64	11	5	1.5
170	175	5			775	5						As above					68	12	6	1.5
175	180	5			776	8						As above					68	12	5	1.5
180	185	5			777	9						As above					72	11	6	2
185	190	5			778	5						As above					60	9	5	2
190	195	5			779	4						As above					54	10	5	1.5
195	200	5			780	4						As above					58	11	5	1.5
												End of Hole	Background reading				52	8	4	1.5

Drilled by Mitchell Drilling Type of Drilling Rotary Percussion Hole Size - % Recovery - Surveyed by - Instrument Used -

Date Started 18 October, 1972 Date Completed 18 October, 1972 Logged by D.C. TUCKER Sampled By D.C. TUCKER Record Completed M.F. FOY

No. of Hole CH 2 Location Pandanus Creek - Crippled Horse Depth of Hole 200' Co-ords.of Collar 143N, 284E Bearing - Inclination Vertical.

NORANDA AUSTRALIA LIMITED

DRILL RECORD

From	To	Sample Length	Recovery		Sample No.	Assays U_3O_8	Geological Log	Angle to core	Survey Depth	Survey Bearing	Survey Inclination	Notes T1	T2	T3	T4
				%	PCPD	ppm									
0	5	5			501	15	Pale brown weathered acid volcanics with minor bleached and haematitic patches								
5	10	5			502	16	Pale green chloritized acid volcanics					35	5	3	1
10	15	5			503	16	Pale green chloritized acid volcanics					45	7	4	2
15	20	5			504	18	Partly pale green chloritized acid volcanics, partly red fine grained acid lava with small quartz phenocrysts.					35	4	3	1.5
20	25	5			505	5	Haematitic medium grained quartzite					40	5	3	1
25	30	5			506	3	Haematitic medium grained quartzite very minor grains pale green silicate - nontronite?					30	5	2	1
30	35	5			507	4	Haematitic medium grained quartzite with very minor vein quartz and nontronite?					38	7	4	2.5
35	40	5			508	5	Haematitic medium grained quartzite plus fine grained quartz porphyry, dark red with pale green (nontronite?) veining.					40	7	4	2
40	45	5			509	3	Haematitic medium grained quartzite					40	6	3	1.5
45	50	5			510	9	Haematitic medium grained quartzite plus very minor red fine grained quartz porphyry and nontronite					35	6	3	2
50	55	5			511	10	Haematitic medium grained quartzite with very fine quartz veining					40	8	4	2
55	60	5			512	8	As above					45	8	4	1.5
60	65	5			513	4	As above					38	5	3	2
65	70	5			514	7	As above					36	6	3	2
70	75	5			515	10	As above					45	8	5	2
75	80	5			516	14	As above					40	8	4	2
80	85	5			517	7	As above					50	8	6	3
85	90	5			518	4	As above					45	8	5	3
90	95	5			519	4	As above					42	8	6	2
95	100	5			520	3	As above					38	7	4	1
100	105	5			521	3	As above					38	7	5	2
105	110	5			522	2	As above					46	9	5	2
110	115	5			523	5	As above					45	8	6	2
115	120	5			524	3	As above					40	7	5	2
120	125	5			525	3	As above					40	7	5	2
125	130	5			526	4	As above					35	7	4	1.5
130	135	5			527	3	As above					44	7	5	2
135	140	5			528	2	As above					36	6	4	1.5
140	145	5			529	2	As above					40	8	5	2
145	150	5			530	2	Haematitic medium-fine grained quartzite					40	6	5	2
150	155	5			531	5	As above					35	7	5	2.5
155	160	5			532	29	As above					38	7	4	1
160	165	5			533	6	As above					54	13	8	2.5
165	170	5			534	7	As above					42	8	6	2
170	175	5			535	5	As above					46	8	6	2
175	180	5			536	3	As above					38	8	5	2
180	185	5			537	2	As above					34	6	3	1
185	190	5			538	2	As above					40	7	5	2
190	195	5			539	5	As above					40	6	5	2.5
195	200	5			540	2	As above					36	6	5	2.5
												40	7	5	2
							End of Hole	Background Reading				30	5	3	1.5

Drilled by Mitchell Drilling Type of Drilling Rotary Percussion Hole Size - % Recovery - Surveyed by - Instrument Used -

Date Started 3 October, 1972 Date Completed 7 October, 1972 Logged by D.C. TUCKER Sampled By D.C. TUCKER Record Completed M.F. FOY

No. of Hole PDRR 1 Location Pandanus Creek - Red Rock Depth of Hole 200' Co-ords.of Collar 10210N, 10100E Bearing - Inclination Vertical

NORANDA AUSTRALIA LIMITED

DRILL RECORD

From	To	Sample Length	Recovery	%	Sample No.	Assays U_3O_8						Geological Log	Angle to core	Survey Depth	Survey Bearing	Survey Inclination	Notes T1	T2	T3	T4
					PCPD	ppm														
0	5	5			541	6						Bulldozed mullock, mostly quartzite					36	7	4	1
5	10	5			542	6						Pink fine grained quartz porphyry, partly weathered and with veins of chloritic clay					40	8	4	1.5
10	15	5			543	7						As above					42	7	4	1
15	20	5			544	6						As above					40	8	4	1
20	25	5			545	7						As above					48	8	4	1.5
25	30	5			546	6						As above					42	8	4	1
30	35	5			547	4						Pale brown weathered fine grained acid volcanic					42	7	4	1
35	40	5			548	3						As above					42	7	4	2
40	45	5			549	5						Dark greeny-grey partly weathered fine grained acid volcanic					45	7	4	1
45	50	5			550	4						As above					42	7	4	2
50	55	5			551	3						As above					40	7	4	1.5
55	60	5			552	3						Dark blue-grey fine grained acid volcanic					38	6	4	1
60	65	5			553	3						As above					44	7	4	1
65	70	5			554	7						Dark purple and green fine grained acid volcanic with narrow quartz veining, green is chlorite and nontronite (?)					40	7	3	2
70	75	5			555	6						As above					40	6	3	2
75	80	5			556	6						As above					40	6	3	1.5
80	85	5			557	5						As above					42	8	3	2
85	90	5			558	3						As above					42	7	4	2
90	95	5			559	4						As above					38	6	3	1
95	100	5			560	6						Dark red brown acid volcanic with narrow quartz veining and part chloritization					40	7	3	1
100	105	5			561	4						As above					40	7	3	1
105	110	5			562	5						As above					40	8	3	2
110	115	5			563	6						As above					44	7	4	1.5
115	120	5			564	5						As above					42	6	3	2
120	125	5			565	6						As above					38	7	4	1.5
125	130	5			566	4						As above					40	7	4	1.5
130	135	5			567	5						As above					40	6	4	2
135	140	5			568	4						As above					42	6	3.5	2
140	145	5			569	5						As above					38	7	3	1.5
145	150	5			570	5						As above and pale pink quartzite					38	6	3.5	1
150	155	5			571	4						As above					36	6	4	1.5
155	160	5			572	4						As above					38	7	4	1.5
160	165	5			573	2						Pale pink quartzite					34	6	3	2
165	170	5			574	2						As above					34	6	3	1
170	175	5			575	5						Dark red-brown and green acid volcanics					38	5	3	2
175	180	5			576	6						As above					38	6	3	1
180	185	5			577	6						As above					40	8	4	1.5
185	190	5			578	5						As above					40	7	3	1.5
190	195	5			579	6						As above					38	7	4	2
195	200	5			580	6						As above					35	6	3	1.5
												End of Hole	Background Reading				32	5	3	1

Drilled by Mitchell Drilling Type of Drilling Rotary Percussion Hole Size - % Recovery - Surveyed by - Instrument Used -

Date Started 8 October, 1972 Date Completed 9 October, 1972 Logged by D.C. TUCKER Sampled By D.C. TUCKER Record Completed M.F. FOY

No. of Hole PDRR 2 Location Pandanus Creek - Red Rock Depth of Hole 200' Co-ords. of Collar 10025N, 10400E Bearing - Inclination Vertical.

NORANDA AUSTRALIA LIMITED

DRILL RECORD

From	To	Sample Length	Recovery	%	Sample No.	Assays U_3O_8						Geological Log	Angle to core	Survey Depth	Survey Bearing	Survey Inclination	Notes T1	T2	T3	T4
					PCPD	ppm														
0	5	5			581	6						Weathered acid volcanics and some bulldozed fill					46	6	3	1.5
5	10	5			582	4						Pale brown weathered acid volcanics					44	7	3	2
10	15	5			583	4						Weathered purple and green acid volcanic					40	8	4	2
15	20	5			584	3						As above					42	6	4	2
20	25	5			585	4						As above					40	8	3	2
25	30	5			586	4						As above					42	8	4	1.5
30	35	5			587	3						As above					42	7	4	1.5
35	40	5			588	4						Purple fine grained acid volcanic					44	6	3	1
40	45	5			589	5						As above					42	7	4	2
45	50	5			590	4						As above					40	8	4	1.5
50	55	5			591	4						As above					42	7	4	2
55	60	5			592	3						As above plus green black fine grained volcanic					42	6	4	2
60	65	5			593	3						Dark red-brown and green black fine grained volcanics					40	7	4	2
65	70	5			594	4						As above					40	6	3	1
70	75	5			595	4						As above					38	6	3	1.5
75	80	5			596	3						Dark red brown fine grained acid volcanics					38	5	3	1.5
80	85	5			597	3						As above					38	6	3	1
85	90	5			598	2						As above					34	5	3	1.5
90	95	5			599	3						As above					34	5	3	1.5
95	100	5			600	3						Dark red brown and green fine grained acid volcanics					40	8	3	2
100	105	5			601	3						As above					38	7	3	2
105	110	5			602	5						As above					38	7	4	1.5
110	115	5			603	3						As above					40	6	4	1.5
115	120	5			604	3						As above					40	7	4	1.5
120	125	5			605	3						As above					40	6	4	2
125	130	5			606	3						As above					38	7	4	2
130	135	5			607	3						As above					38	7	4	2
135	140	5			608	2						As above					37	8	4	1.5
140	145	5			609	3						As above					36	7	4	1.5
145	150	5			610	4						Intensely haematitized dark red brown and green fine grained acid volcanics					32	6	3.5	1.5
150	155	5			611	4						As above plus minor pale pink quartzite					34	5	4	2
155	160	5			612	3						Pale pink quartzite with very minor volcanic fragments					35	7	4	2
160	165	5			613	2						As above					32	6	3.5	1.5
165	170	5			614	2						As above					32	6	3	1.5
170	175	5			615	5						Dark red brown and green fine grained acid volcanics with minor quartzite					40	8	5	2
175	180	5			616	5						Fine grained purple and pale green acid volcanics					40	7	4	1
180	185	5			617	4						As above					40	7	4	1.5
185	190	5			618	5						As above					36	6	4	2
190	195	5			619	4						As above					37	7	5	2.5
195	200	5			620	5						As above					46	8	6	2
200	205	5			621	5						As above					45	8	6	2
205	210	5			622	5						As above					46	8	6	2.5
210	215	5			623	5						As above					46	8	6	2
215	220	5			624	5						As above					40	8	6	2.5
												End of Hole	Background Reading				30	5	3	1.5

Drilled by Mitchell Drilling Type of Drilling Rotary Percussion Hole Size - % Recovery - Surveyed by - Instrument Used -

Date Started 10 October, 1972 Date Completed 12 October, 1972 Logged by D.C. TUCKER Sampled By D.C. TUCKER Record Completed M.F. FOY

No. of Hole PDRR 3 Location Pandanus Creek - Red Rock Depth of Hole 220' Co-ords. of Collar 10042N, 10300E Bearing - Inclination Vertical.

NORANDA AUSTRALIA LIMITED

DRILL RECORD

From	To	Sample Length	Recovery	%	Sample No.	Assays U3O8	Geological Log	Angle to core	Survey Depth	Survey Bearing	Survey Inclination	Notes T1	T2	T3	T4
					PCPD	ppm									
0	5	5			625	4	Bulldozed mullock and weathered acid volcanics					40	8	4	1.5
5	10	5			626	3	Pale brown weathered acid volcanics					40	8	4	2
10	15	5			627	5	As above					38	6	4	2
15	20	5			628	5	As above					40	7	4	1.5
20	25	5			629	5	As above					40	8	4	2
25	30	5			630	6	As above					38	7	3	2
30	35	5			631	3	As above					38	7	4	2
35	40	5			632	2	As above					38	7	3	2
40	45	5			633	2	As above					38	7	4	2
45	50	5			634	2	As above					38	6	3	1.5
50	55	5			635	2	As above					35	5	3	1.5
55	60	5			636	3	As above					36	6	3	1.5
60	65	5			637	2	As above					36	6	3	1
65	70	5			638	2	As above					38	6	3	1.5
70	75	5			639	2	As above					32	5	2.5	2
75	80	5			640	3	As above					38	5	3	1.5
80	85	5			641	2	Dark green and red-brown partly weathered volcanics					38	6	3	1
85	90	5			642	2	As above					34	5	3	1.5
90	95	5			643	4	As above					34	5	3	1.5
95	100	5			644	6	Dark green-black fine grained volcanics					40	6	4	2
100	105	5			645	2	As above					42	7	3.5	2
105	110	5			646	4	As above					42	7	3	2
110	115	5			647	6	Dark green-black fine grained volcanics and minor medium grained pale brown acid volcanics					38	7	4	2
115	120	5			648	9	Medium grained pale brown acid volcanics and minor dark green-black fine grained volcanics.					42	8	4	2
120	125	5			649	10	Pale pink and green acid volcanics					40	8	4	2
125	130	5			650	5	Purple and green acid volcanics					40	6	3	2
130	135	5			651	3	Purple and dark green acid volcanics					38	7	4	2
135	140	5			652	3	As above					36	6	4	1.5
140	145	5			653	2	As above					38	6	3	2
145	150	5			654	3	As above					34	6	4	2
150	155	5			655	3	As above					38	7	4	2
155	160	5			656	4	As above					36	7	3	1.5
160	165	5			657	3	As above					36	7	4	1.5
165	170	5			658	4	Dark red-brown fine grained volcanics					38	7	3	1.5
170	175	5			659	4	As above					32	6	3	1.5
175	180	5			660	6	As above					40	7	4	1
180	185	5			661	4	As above					40	7	4	1.5
185	190	5			662	4	As above and minor pale pink quartzite					36	6	4	2
190	195	5			663	3	Pale pink quartzite and minor dark red brown fine grained volcanics					34	5	4	2
195	200	5			664	2	Pale pink quartzite and very minor pale green volcanics					35	6	3	1.5
200	205	5			665	5	Pale green and minor purple acid volcanics					40	6	4	1.5
205	210	5			666	6	As above					38	6	4	1.5
210	215	5			667	5	As above					36	5	3	2
215	220	5			668	4	As above					35	6	4	2
							End of Hole	Background reading				30	5	3	1.5

Drilled by Mitchell Drilling Type of Drilling Rotary Percussion Hole Size - % Recovery - Surveyed by - Instrument Used -

Date Started 12 October, 1972 Date Completed 13 October, 1972 Logged by D.C. TUCKER Sampled By D.C. TUCKER Record Completed M.F. FOY

No. of Hole PDRR 4 Location Pandanus Creek - Red Rock Depth of Hole 220' Co-ords.of Collar 10003N, 10200E Bearing - Inclination Vertical.

NORANDA AUSTRALIA LIMITED

DRILL RECORD

From	To	Sample Length	Recovery	%	Sample No.	Assays U_3O_8						Geological Log	Angle to core	Survey Depth	Survey Bearing	Survey Inclination	Notes T1	T2	T3	T4
					PCPD	ppm														
0	5	5			670	3						Sandy soil					34	6	35	L5
5	10	5			671	5						Weathered granite					40	6	3	2
10	15	5			672	5						As above					42	7	4	L5
15	20	5			673	6						As above					42	6	4	L5
20	25	5			674	6						As above					44	8	4	L5
25	30	5			675	5						As above					42	8	3	L5
30	35	5			676	4						As above					42	6	3	L5
35	40	5			677	4						As above					40	7	4	L5
40	45	5			678	5						As above					40	6	35	2
45	50	5			679	5						Fresh pink and green granite					38	7	4	2
50	55	5			680	5						As above					38	7	4	2
55	60	5			681	6						As above					40	6	35	2
60	65	5			682	4						As above					36	7	4	2
65	70	5			683	4						As above					40	6	3	2
70	75	5			684	2						As above					42	7	3	L5
75	80	5			685	5						As above					40	7	4	L5
80	85	5			686	5						As above					40	6	4	2
85	90	5			687	3						As above					36	8	4	L5
90	95	5			688	4						As above					38	6	3	L5
95	100	5			689	3						As above					38	7	4	L5
100	105	5			690	4						As above					35	7	35	2
105	110	5			691	3						As above					35	6	3	2
110	115	5			692	3						As above					35	7	4	2
115	120	5			693	4						As above					34	6	35	L5
120	125	5			694	4						As above					36	5	3	L5
125	130	5			695	4						As above					35	6	35	2
												End of Hole								

Drilled by Mitchell Drilling Type of Drilling Rotary Percussion Hole Size - % Recovery - Surveyed by - Instrument Used -

Date Started 13 October, 1972 Date Completed 15 October, 1972 Logged by D. C. TUCKER Sampled By D.C. TUCKER Record Completed M.F. FOY

No. of Hole PDRR 5 Location Pandanus Creek - Red Rock Depth of Hole 130' Co-ords.of Collar 9957N, 10096E Bearing - Inclination Vertical.

137°00'E

138°00'E

17°00'S

18°00'S

Redbank Mine

Wollogorang H.S.

Calvert Hills H.S.

CALVERT RIVER

Creek

NORTHERN TERRITORY

QUEENSLAND

Settlement

E.L. 125

To Westmoreland 22 mls.

Carolina Airstrip

WATERFALL CAMP

E.L. 121

Seigals Creek H.S.

CRIPPLED HORSE ANOMALY

RED ROCK ANOMALY

Eva Mine

EXCLUDED AREA

DRY CREEK GORGE CAMP

Pandanus Creek Airstrip

CHINA WALL

To Corinda 59mls

ANOMALY 30

E.L. 122

E.L. 124

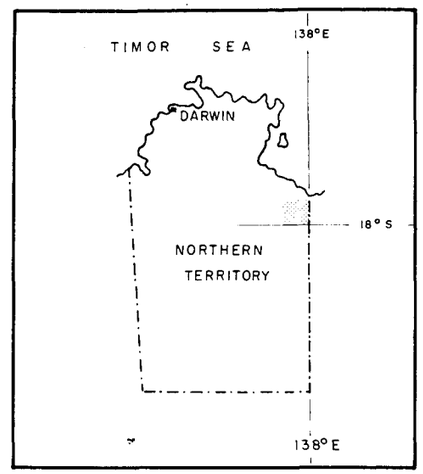
7B

7D

Fish River H.S.

NICHOLSON RIVER

LOCALITY DIAGRAM



—LEGEND—

- EXPLORATION LICENCE BOUNDARY
- MAIN TRACK
- RIVER or CREEK
- H.S. HOMESTEAD
- AIRSTRIP
- MINE
- FIELD CAMP
- ANOMALY DRILLED-1972
- RADIOMETRIC ANOMALY INVESTIGATED-1972
- OUTCROP of GOLD CREEK VOLCANICS

PLATE I

NORANDA AUSTRALIA LTD.

EXPLORATION LICENCES
PANDANUS CREEK
Northern Territory

LOCATION MAP of EXPLORATION LICENCE Nos. 121, 122, 124, 125

Scale 1:500,000

DATE: Feb. 73		DRAWN: N.S.
APPROVED: M. Foy		DRAWING Nº 415-C-509

137° 45" E

138° 00" E

17° 30" S

17° 45" S

137° 41' 20" E

To Westmoreland

Cobar II
Old Parr

Waterfall Camp

Seigals Creek H.S.

E.L. 121

17° 38' 40" S

Crippled Horse Anomaly

Red Rock Anomaly

137° 40' 00" E

Eva Mine

Norris Copper

137° 49' 40" E

137° 53' 10" E

Crystal Hill

Dry Creek Gorge Camp

17° 45' 40" S

Pandanus Creek Airstrip

China Wall

137° 50' 00" E

Pandanus Creek

To Corinda

Fish River

137° 45" E

138° 00 E

—LEGEND—

- EXPLORATION LICENCE BOUNDARY
- MAIN TRACK
- ADDITIONAL ACCESS TRACK (Completed 1972)
- RIVER or CREEK
- H.S. HOMESTEAD
- AIRSTRIP
- MINE
- FIELD CAMP
- ANOMALY DRILLED-1972
- RADIOMETRIC ANOMALY-INVESTIGATED 1972
- SOUTHERN BOUNDARY of OUTCROPPING WESTMORELAND CONGLOMERATE

REFERENCE MAP: CALVERT HILLS - GEOGICAL SERIES - Scale 1:250,000

PLATE. 2

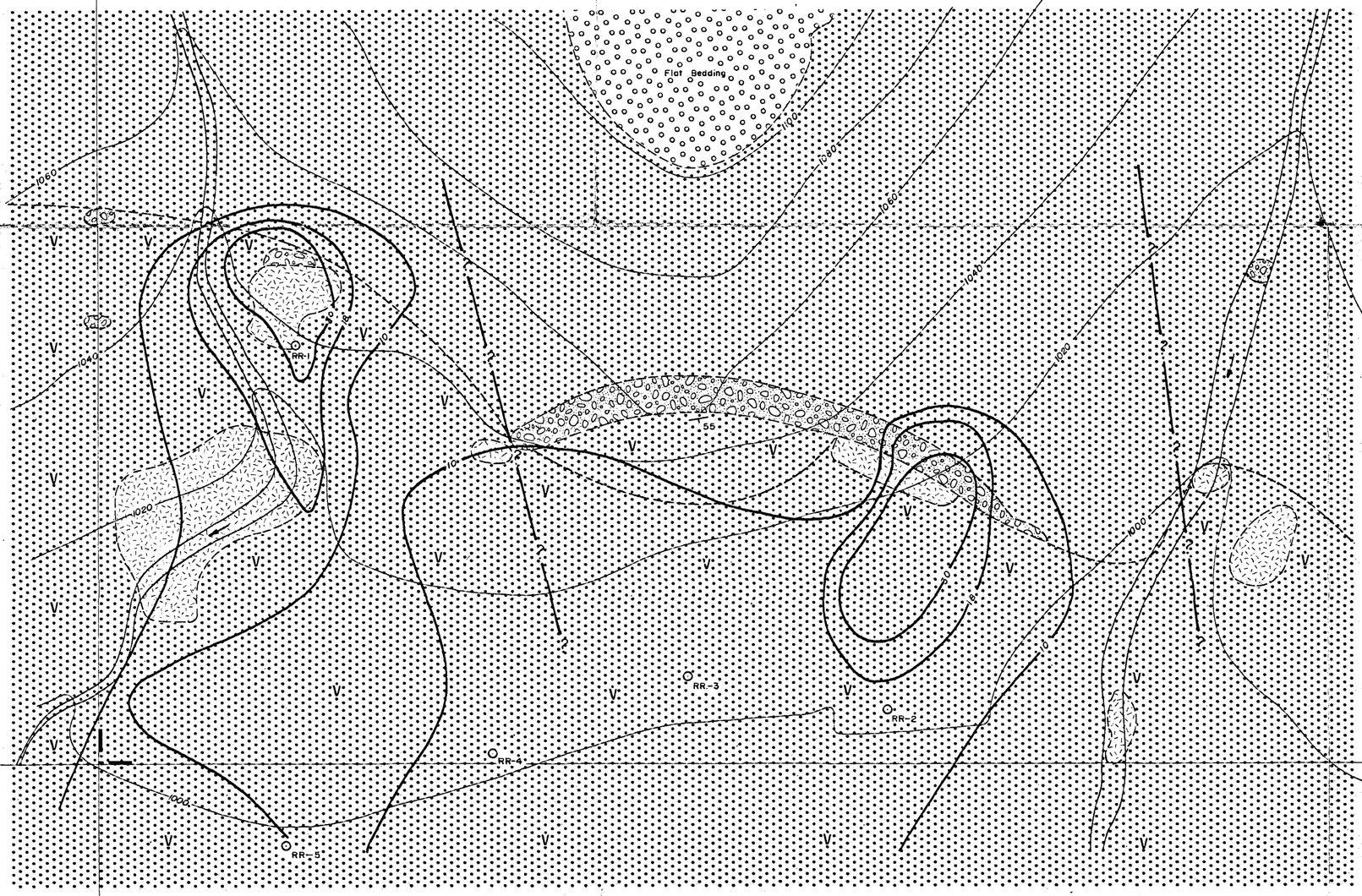
NORANDA AUSTRALIA LTD.

EXPLORATION LICENCE N° 121
PANDANUS CREEK
Northern Territory

LOCATION MAP of FIELD ACTIVITIES-1972

SCALE
1:250,000

DATE: Feb. 1973	MAPPED: G.J. Pietsch	DRAWN. N.S.
APPROVED: M. Foy		DRAWING N° 415-C-511.



10,000 E | 10,100 E | 10,200 E | 10,300 E | 10,400 E | 10,500 E | 10,600 E | 10,700 E

10,400 N | 10,300 N | 10,200 N | 10,100 N | 10,000 N

Magnetic North

-LEGEND-

- SANDSTONE RUBBLE
- SANDSTONE AND VOLCANIC RUBBLE
- SANDSTONE BRECCIA
- WESTMORELAND CONGLOMERATE — COARSE GRAINED SANDSTONE WITH PEBBLE BEDS
- CLIFFDALE VOLCANICS
- TOPOGROGRAPHIC CONTOURS
- 30 µR/hr ISORAD
- STREAM BED
- ROTARY PERCUSSION DRILL HOLE LOCATION AND NUMBER (RR-2)
- GEOLOGICAL OUTCROP BOUNDARY
- INFERRED FAULT
- STRIKE AND DIP (55)
- MINERAL LEASE - DATUM PEG

CR73/84 PLATE. 3

NORANDA AUSTRALIA LTD.

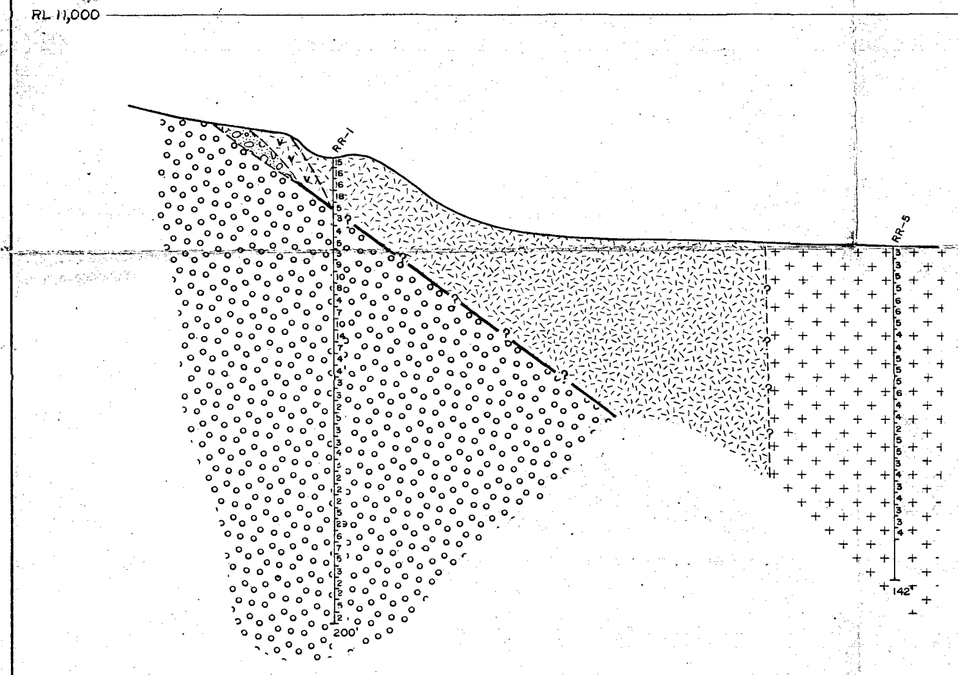
EXPLORATION LICENCE N° 121
PANDANUS CREEK
Northern Territory

RED ROCK ANOMALY
GEOLOGICAL AND RADIOMETRIC MAP

SCALE
FEET 50 25 0 50 100 FEET

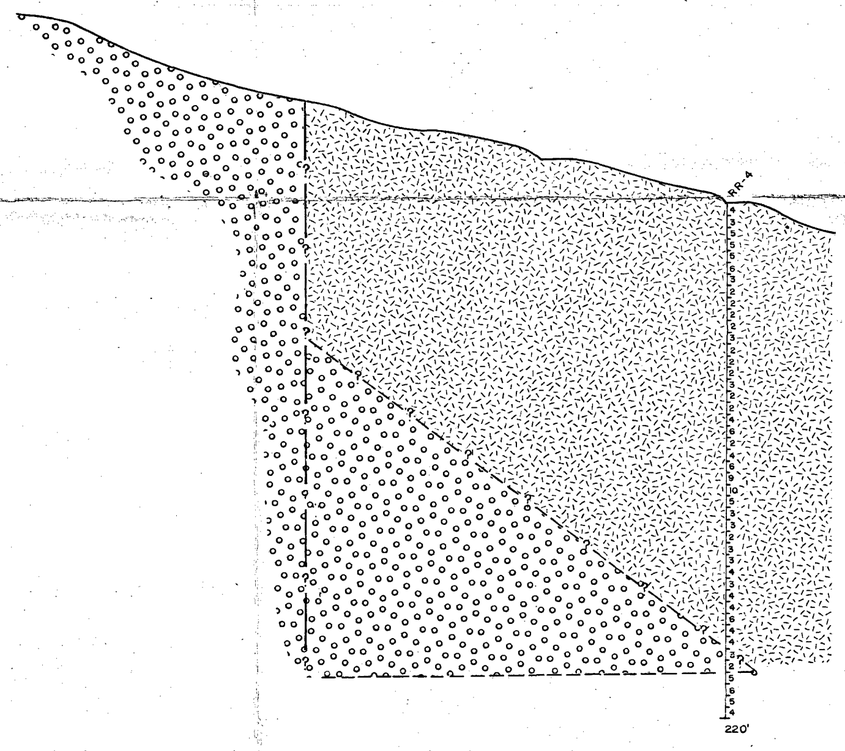
DATE: Feb 1973		DRAWN: AR.
APPROVED: M. Foy		DRAWING N°: 415-C-512

SECTION 10,100 E



LOOKING EAST

SECTION 10,200 E



LOOKING EAST

—LEGEND—

- Westmoreland Conglomerate
- Cliffdale Volcanics
- Altered Humatitic Acid Volcanics
- Sandstone Beccia (Not recognizable from drill cuttings)
- Norris Granite
- Geological Boundary
- Inferred Fault
- Percussion Drill Hole. Location and number.
- Assay Results in ppm U_3O_8

CR73/84 PLATE 4

NORANDA AUSTRALIA LTD.

EXPLORATION LICENCE N° 121
PANDANUS CREEK
Northern Territory

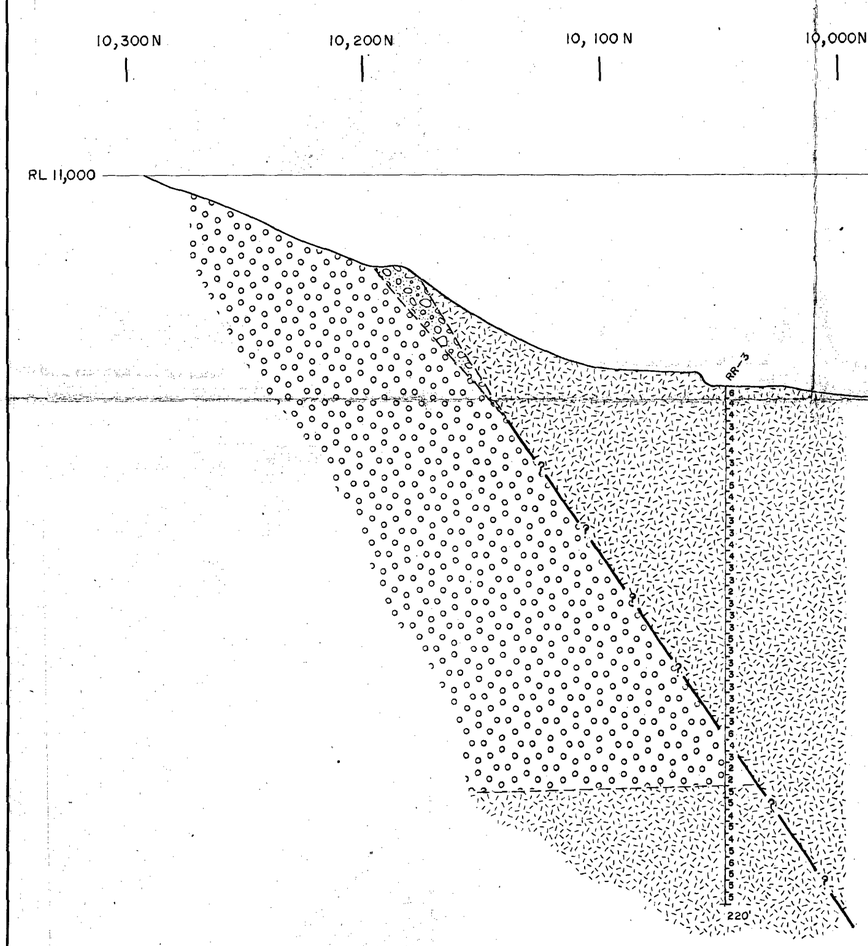
RED ROCK ANOMALY

GEOLOGICAL SECTIONS 10, 100 E and 10,200 E

SCALE
FEET 50 25 0 50 100 FEET

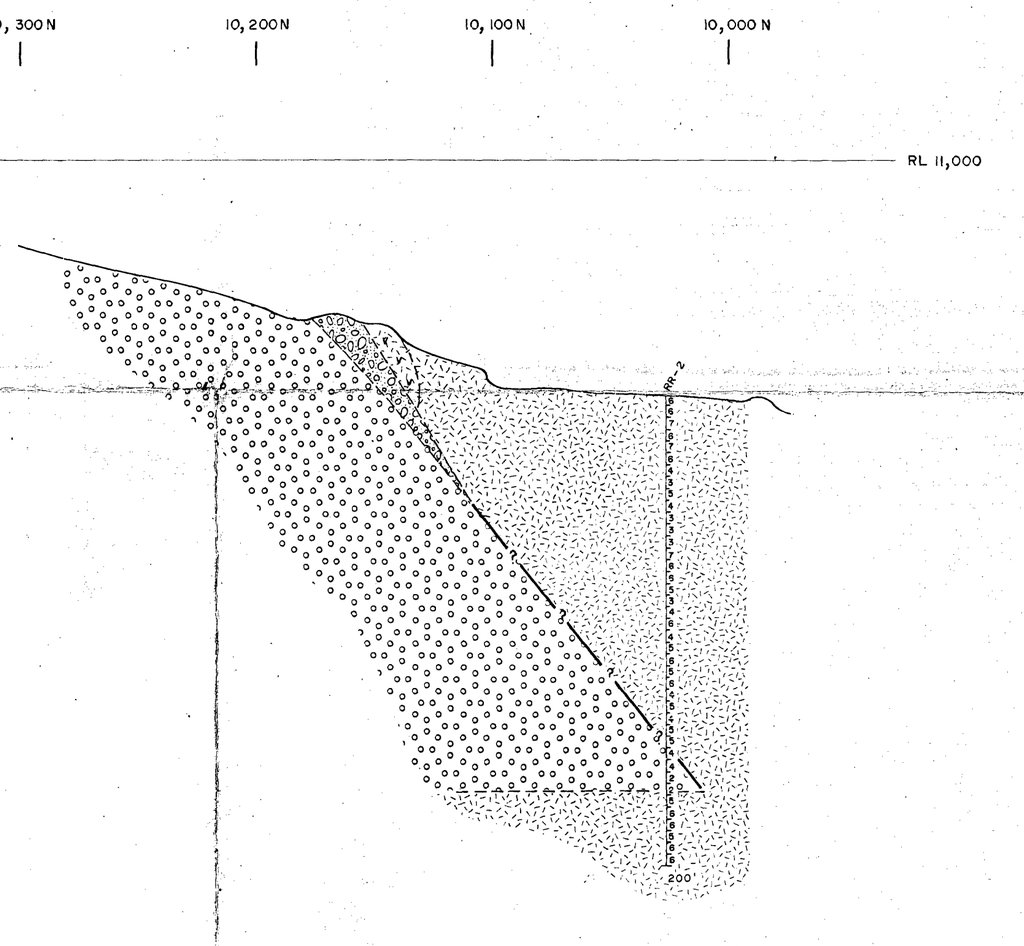
DATE: Feb 1973		DRAWN: A.R.
APPROVED: M. Foy		DRAWING N°: 415-C-513

SECTION 10,300 E



LOOKING EAST

SECTION 10,400 E



LOOKING EAST

-LEGEND-

- Westmoreland Conglomerate
- Cliffdale Volcanics
- Altered Humatitic Acid Volcanics
- Sandstone Beccia (Not recognizable from drill cuttings)
- Norris Granite
- Geological Boundary
- Inferred Fault
- Percussion Drill Hole. Location and number.
- Assay Results in ppm U_3O_8

RR-2 / 4 / 5 / 200'

CR73/84 PLATE 4A

NORANDA AUSTRALIA LTD.

EXPLORATION LICENCE N° 121
PANDANUS CREEK
Northern Territory

RED ROCK ANOMALY

GEOLOGICAL SECTIONS 10,300 E and 10,400 E

SCALE
FEET 50 25 0 50 100 FEET

DATE: Feb 1973		DRAWN: A.R.
APPROVED: M. Foy		DRAWING N°: 415-C-516

Vertical standing, fine grained pinkish dyke rock. Sheared in direction shown. Radiation up to 100 μ R/hr.

Rubble Radiation up to 30 μ R/hr.

Creek

Magnetic North

Radiation up to 150 μ R/hr.

PC-CH 1 — Section 187 N

PC-CH 2 — Section 143 N

—LEGEND—

- Grey brown fine grained flow banded volcanics. Often with a purplish tinge, often chloritised. Radiation- 25 to 30 μR/hr.
- Pinkish medium grained, silicified rhyodacite dyke rock. Radiation - up to 100 μ R/hr.
- Geological outcrop boundary
- Thin dyke or vein
- 10 — Trend of flow banding
- 30 — 30 uR/hr. Isorad
- PC-CH 1 — Percussion drill hole collar with number
- 1000 — Topographic contour (feet)
- Creek or watercourse.

PLATE. 5

Reference map: United Uranium - Dwg N° 851. Geology after Taylor and Charles (1971)

CR73/84

NORANDA AUSTRALIA LIMITED

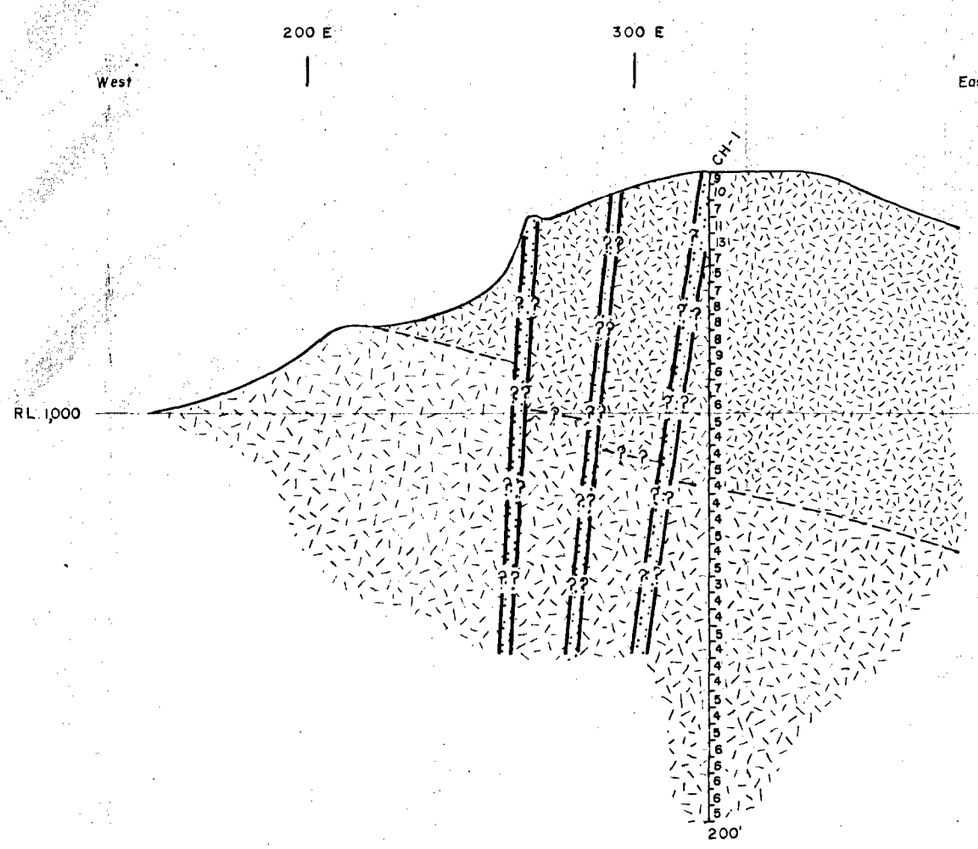
EXPLORATION LICENCE N° 121
PANDANUS CREEK
Northern Territory

CRIPPLED HORSE ANOMALY
GEOLOGICAL and RADIOMETRIC MAP

SCALE
50 0 50 100
FEET

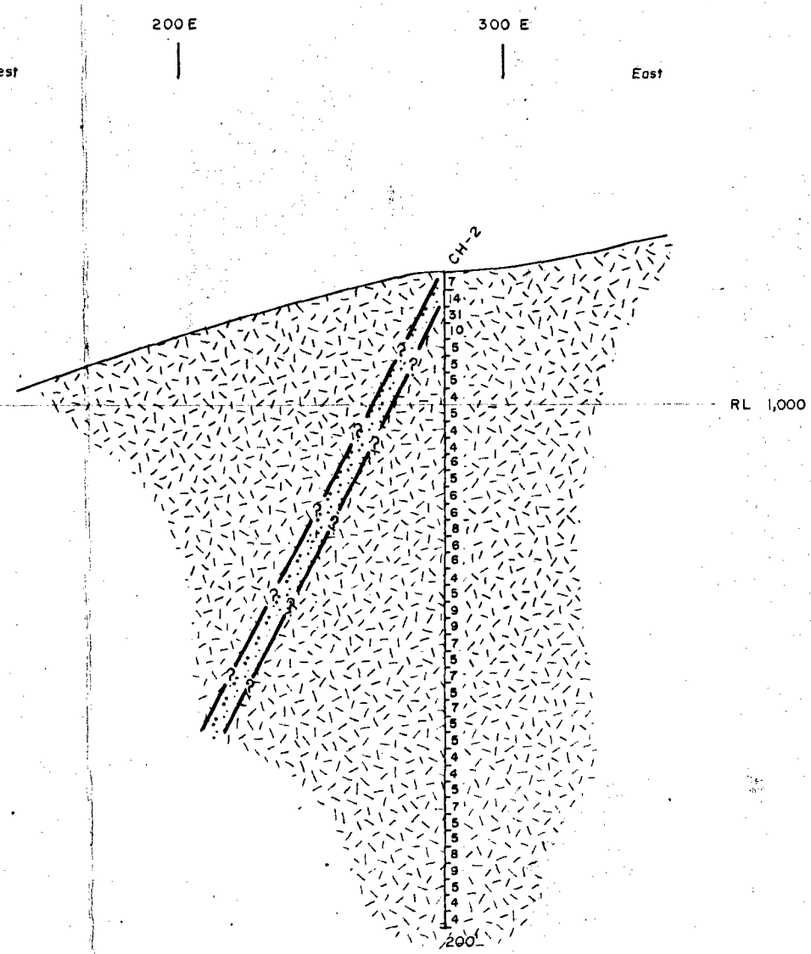
DATE: Feb. 1973	GEOLOGY: G.J. Pietsch	DRAWN: N.S.
APPROVED: M. Foy	DRAWING N° 415-C-514	

SECTION 187 N
Drill Hole CH-1



LOOKING NORTH

SECTION 143 N
Drill Hole CH-2



LOOKING NORTH

-LEGEND-

- Fine Grained Acid Volcanic, Haematized and Quartz Veined
- Purple Fine Grained Acid Volcanic with Green Phenocrysts
- Dark Red Brown Fine Grained Acid Volcanic
- Geological Boundary
- Inferred Fault
- Rotary Percussion Drill Hole: Location and Number
- Assay Results in ppm. U_3O_8

PLATE.6

NORANDA AUSTRALIA LTD.

EXPLORATION LICENCE N°121
PANDANUS CREEK
Northern Territory

CRIPPLED HORSE ANOMALY
PERCUSSION DRILL HOLE SECTIONS 187 N and 143 N

SCALE
FEET 50 25 0 50 100 FEET

DATE: Feb 1973 | DRAWN: A.R.
APPROVED: M. Foy | DRAWING No. 415-C-515