PROSPECTING AUTHORITY NO. 1964

JIM JIM CREEK, NORTHERN TERRITORY

ANNUAL REPORT

FOR YEAR ENDED JUNE 10, 1970

Report No. 139 July 1970.

By

A. C. DUNLOP
C. P. DUNLOP

LIST OF CONTENTS

LIST OF PLATES

SUMMARY

1. A ground investigation of ten anomalies delineated from an airborne spectrometer survey by Geophysical Resources Development has been completed.

2. No economic uranium mineralisation has been located.

3. Two of the anomalies warrant further detailed work.

4. It is considered that no further work is warranted on Prospecting Authority 1964 except for 10 square miles about Spring Peak.

1. INTRODUCTION

Prospecting Authority 1964 covers an area of 270 square miles east of the South Alligator River, N.T. and was granted to Noranda on June 11, 1968. The area is included in the Alligator River and Mt. Evelyn 1:250,000 topographic map sheets compiled by the division of National Mapping, Department of National Development in 1962.

Access to this area is dominated by the monsoonal climate, with a distinct wet season from late November till early May, which causes extensive flooding and water logging. Dry season tracks from Pine Creek and Mataranka provide access from the Stuart Highway and Darwin for five months of the year. Airstrips are situated at Jim Jim, Nourlangie and Patonga. Open woodland and an undulating terrain permit passage to nearly all parts of the Prospecting Authority by four wheel drive vehicle during the latter part of the dry season.

2. WORK PROGRAMME

2.1 Airborne Spectrometer Survey

Geophysical Resources Development contracted to conduct an airborne spectrometer survey over Prospecting Authority 1964 using a Nuclear Enterprises Mark XII Spectrometer with a 6 inch x 4 inch crystal. Their survey was flown during early November 1968, and the results became available early in 1969.

One hundred and seventy nine north north east - south south west traverses were flown across the area. The flight lines were approximately 1000 feet apart and at a mean elevation of 300 feet above ground surface. The results were presented in the form of four radiometric contour maps of the uranium channel. Profile of the total, uranium, thorium and potassium 14 radiation were also shown. From an examination of the data available Geophysical Resources Development selected ten anomalies within Prospecting Authority 1964 and one in adjacent Prospecting Authority 2348, now also held by Noranda. These anomalies have been accorded priority 1, 2 and 3.

Anomaly No.	Priority	Traverse
A.	2	135
B.	2	133
C.	2	132
E.	1	72 - 74
F 1	1	73
F 2	1	73
G.	1	45
H 1	1	36
H 2	1	36
H 3	1	36
J.	3	33
K.	1	43
L.	2	47

2.2 Ground Investigation Programme

Early in November two geologists spent ten days in the area before the onset of the wet season. Accommodation was obtained at the Nourlangie Camp, ten miles north of Prospecting Authority 1964. Access to all anomalies was comparitively easy at this time of the year in four wheel vehicles. During this period all anomalies in Prospecting Authority 1964 were investigated. As time was limited by the approaching wet season, the anomaly at Mt. Basedow in Prospecting Authority 2348 was not investigated.

3. GEOLOGY

The area covered by Prospecting Authority 1964 was mapped by the Bureau of Mineral Resources 1955-58 on 1:250,000 sheets - Mt. Evelyn and Alligator River (Fig. 4). No attempt has been made to remap any of the area. The rocks in this area form part of the eastern margin of the Pine Creek geosyncline of Lower Proterozoic Age. Some later basic intrusions of the Zamu Complex can also be observed. The Goodparla Group is a facies assemblage; Mt. Partridge, Masson and Golden Dyke Formation occupying the primary depositional basin of the Pine Creek Geosyncline (Walpole 1963 Fig. 2). The most prominent rock group in Prospecting Authority 1964 is the Mt. Partridge Formation containing sandstone and quartz pebble conglomerate which contain detrital thorium. The Lower Proterozoic rocks have been folded along N.W. trending axes, with associated shearing prominent at Spring Peak and Mt. Basedow - modifying the sediments to schists.

Outcrop is generally poor, with large areas obscured by river alluvium laterite and sand cover.

TABLE 2

Stratigraphic Table for Jim Jim Creek Area

Era	Age	Symbol	Rock Unit
Cainozoic	Recent	QA	Alluvium
	Undifferentiated	Czs	rubble & sand alluvium
	Upper Proterozoic	Puk	Kombolgie Formation
		Pdi	Zamu Complex Basic intrusive
Pre Cambrian	Lower Proterozoic	Plh	South Alligator Gp.
		Plp	Agicondan System) Goodparla Gp.) Mt. Partridge Formation
	Lower Proterozoic (?)	Pgn	Nanambu Granite

4. GROUND INVESTIGATION PROGRAMME

4.1 Procedure

All ten anomalies outlined by Geophysical Resources Development were examined. The position of the anomalies were transferred from the radiometric contour maps to photo mosaics of the same scale. They were then transferred to 1:50,000 scale aerial photographs for location in the field. Although 35 mm. strip films of all traverses were supplied they proved to be of little use in pinpointing anomalies on the ground because of lack of surface features over a small area.

Anomalous areas were covered by a series of compass traverses usually extending 600 - 800 yards across the area. Instruments used were Scintrex BGS 1 scintillometer and Scintrex GIS 2 spectrometer. The limited time available did not allow for formal radiometric gridding and geological mapping of the anomalies of interest.

4.2 Description of Anomalies

4.2.1 Anomaly A - Priority 2

This anomaly occurs in an area of low relief and very poor outcrop with only laterite remnants surrounded by sand cover. Areas of sand give from 16 - 20 counts per second while laterite areas give 25 - 45 counts per second. These weak anomalies appear to result from a contrast in background radiation. The anomaly is of no significance.

4.2.2 Anomaly B - Priority 2

This anomaly is situated in an area of poor outcrop. An area approximately 300 feet x 200 feet gives 80 - 90 counts per second with small patches of 100 counts per second against a background of 35 - 40 counts per second. Testing with the spectrometer indicates thorium is the main source of radiation. Rubbly outcrops suggest a small area of siliceous grit and sandstone has been cut by a series of narrow quartz veins. The anomaly is of no significance.

4.2.3 Anomaly C - Priority 2

This anomaly is similar to anomaly A, with patches of laterite giving 50 - 60 counts per second against a background of 35 - 40 counts per second for sand and soil cover. This anomaly is of no significance.

4.2.4 Anomaly E - Priority 1

This anomaly occurs in an area of laterite and sand cover. The sand cover gives 20 - 35 counts per second while the laterite gives 50 - 90 counts per second over very large areas. No small source area could be found for this anomaly. The anomaly appears to be of no significance.

4.2.5 Anomaly F 1 - Priority 1

This anomaly consists of an area of rubbly sandstone 150 feet x 400 feet giving 90 - 130 counts per second against a background of 30 - 40 counts per second for soil and sand cover. The anomaly is of no significance.

4.2.6 Anomaly F 2 - Priority 1

This anomaly is similar to anomalies A, C and E with low background and sand cover about laterite. The laterites give 60 - 90 counts per second. The anomaly is of no significance.

4.2.7 Anomaly G - Priority 1

This anomaly is situated near Spring Peak in felspathic sandstones and conglomerates of the Mt. Partridge Formation. The background sandstones and arkoses give 30 - 40 counts per second. A quartz pebble conglomerate bed having a rubbly outcrop gives 200 - 600 counts per second. The conglomerate bed appears to be from 2 to 7 feet thick and is dipping at 55 degrees east. A minimum strike length of 300 feet is exposed. Testing with the GIS 2 indicates thorium is the main source of radiation. Analyses of rock chips verified this and gave <5 ppm U_3O_8 and thorium values 548 - 1015 ppm.

This anomaly warrants detailed radiometric and geological mapping with some petrological investigations of the conglomerates.

4.2.8 Anomaly H 1 - Priority 1

This anomaly is similar to anomaly G with the same quartz pebble conglomerate giving rise to the anomaly with values of 200 - 600 counts per second. In this anomaly the conglomerate has been faulted and possibly folded and it is difficult to estimate its thickness. The strike length appears to be about 400 feet to 500 feet. Analyses of rock chips gave from < 5 - 11 ppm U_3O_8 and from 502 - 2730 ppm Th.

This anomaly also warrants detailed radiometric and geological mapping.

4.2.9 Anomaly H 2 - Priority 1

This anomaly occurs in sandstone and schists of the Mt. Partridge Formation. The background values are 30 - 50 counts per second. Small epidote rich patches give 80 - 140 counts per second. Testing with the spectrometer indicates that the radiation has a thorium source. The anomaly is of no significance.

4.2.10 Anomaly H 3 - Priority 1

This anomaly is similar to H 2 and is situated 1,200 feet to the west. Small patches in arkosic sandstones give 90 - 120 counts per second against a background of 40 - 50 counts per second. This anomaly is of no significance.

4.2.11 Anomaly J - Priority 3

Anomaly J is situated in an area of poor outcrop. Several small patches of brecciated ferruginous siltstone give 100 - 200 counts per second against a background of 40 - 50 counts per second. This anomaly is associated with a prominent fault which has resulted in shearing and staining of adjacent sandstones.

4.2.12 Anomaly K - Priority 1

Anomaly K occurs on Spring Peak among sheared sandstones sericite schists and pebble conglomerates of the Mount Partridge Formation where values of 80 - 240 counts per second particularly about small quartz stringers and quartz epidote muscovite schlieren. The background is 40 - 50 counts per second. Testing with the spectrometer indicates a thorium source for the radiation. The anomalous areas are too weak and patchy to be of importance.

4.2.13 Anomaly L - Priority 2

Anomaly L is situated in felspathic sandstones and grits of the Mount Partridge Formation which have a background of 20 - 30 counts per second. Epidote rich segregations up to 20 - 30 feet long and one foot thick give 80 - 150 counts per second. This anomaly is of no significance.

5. CONCLUSIONS

An exploration programme was carried out in the Jim Jim area in November 1969. Ten anomalies previously outlined in the airborne spectrometer survey were investigated. Location of the anomalies on the ground was particularly successful due to the method of presentation of the data by Geophysical Resources Development.

The ground investigation involved radiometric traverses of each anomaly using BGS 1 Scintillometer with occasional test for uranium and thorium with a GIS 2 Spectrometer. The use of the GIS 2 has proved a good qualitative approach though its use as a quantitative instrument has not proved so successful.

Eight of the ten anomalous areas proved very weak and do not warrant follow-up, but two of the areas G and H warrant detailed geological, radiometric mapping and sampling. These anomalies probably represent the radioactivity investigated by Enterprise Exploration picked up in a radiometric survey in 1957 (Livingstone 1958). Walpole 1962 suggests this radio-activity is due to detrital thorium minerals in a persistant conglomerate horizon.

As the greater part of Prospecting Authority 1964 is of no economic interest it is recommended that it be relinquished, except for about 10 square miles along Spring Peak containing anomalies G and H1. Further work on these two anomalies should be carried out in the 1970 dry season in conjunction with work on Prospecting Authority 2348.

APPENDIX 1

STATEMENT OF EXPENDITURE

Expenditure for the year ending May 31, 1970.	$ 8,447
Expenditure previously reported to May 31, 1969.	13,096
Total expenditure to May 31, 1970.	$ 21,543

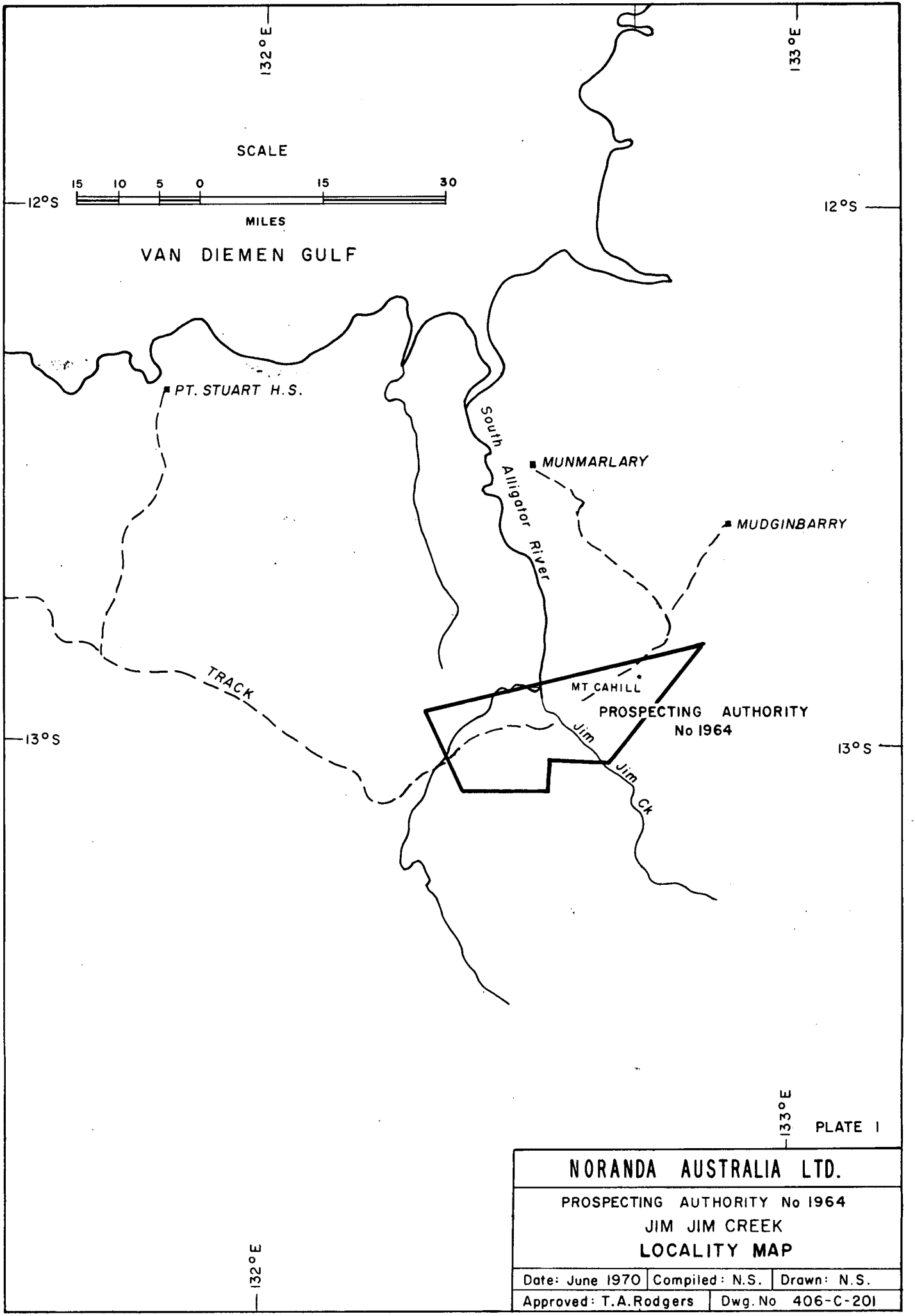
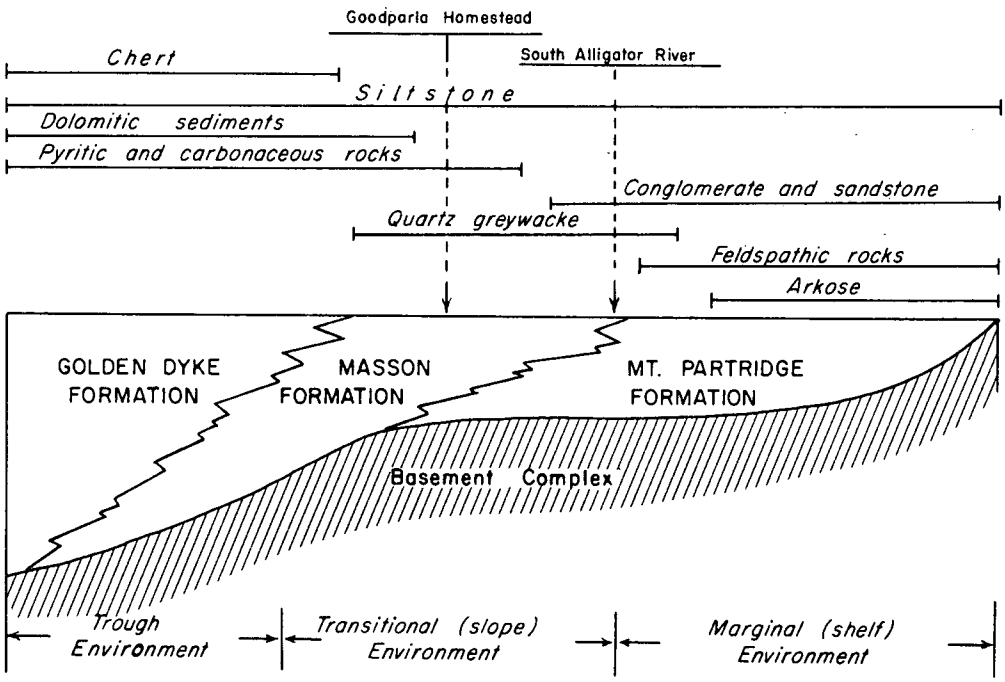


PLATE 1

NORANDA AUSTRALIA LTD.		
PROSPECTING AUTHORITY No 1964 JIM JIM CREEK **LOCALITY MAP**		
Date: June 1970	Compiled: N.S.	Drawn: N.S.
Approved: T.A.Rodgers	Dwg. No 406-C-201	

WEST EAST



Ref. B.M.R. Notes to Mt. Evelyn 1:250,000 N.T.

Diagrammatic Facies relationships within the PINE CREEK Geosyncline.

PLATE 6

NORANDA AUSTRALIA LIMITED		
PROSPECTING AUTHORITY No 1964 JIM JIM CREEK Northern Territory		
Date: June 1970		Drawn: N.S.
Approved: T.A.R		Dwg. No. 406-C-202

PLATE 2

CHANNEL 3 (1.6 TO 2.0 MeV) CONTOURS

AIRBORNE RADIOMETRIC SURVEY

JIM JIM CREEK AREA - N.T.

PROSPECTING AUTHORITY No 1964

NORANDA AUSTRALIA LIMITED

SCALE 1" = 2000' (APPROX)

K — ANOMALIES OF INTEREST
DETAILS IN REPORT

FLIGHT LINE INTERVAL — 1000 FEET
FLIGHT ALTITUDE — 300 FEET M.T.C.
CONTOUR INTERVAL — 5 COUNTS

HORIZONTAL CONTROL BASED ON PHOTO
ASSEMBLY COMPILED BY GEOPHYSICAL
RESOURCES DEVELOPMENT CO., RAMSGATE

N (APPROX.)

SHEET INDEX

1		
2	3	4

SURVEYED AND COMPILED 1969 BY
GEOPHYSICAL RESOURCES DEVELOPMENT CO.
RAMSGATE, N.S.W.

CR 70/56
SHEET 1

PLATE 3

CHANNEL 3 (1.6 TO 2.0 MeV) CONTOURS

AIRBORNE RADIOMETRIC SURVEY

JIM JIM CREEK AREA - N.T.

PROSPECTING AUTHORITY No 1964

NORANDA AUSTRALIA LIMITED

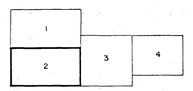
SCALE 1" = 2000' (APPROX.)

FLIGHT LINE INTERVAL — 1000 FEET
FLIGHT ALTITUDE — 300 FEET M.T.C.
CONTOUR INTERVAL — 5 COUNTS

HORIZONTAL CONTROL BASED ON PHOTO ASSEMBLY COMPILED BY GEOPHYSICAL RESOURCES DEVELOPMENT CO., RAMSGATE.

N (APPROX.)

SHEET INDEX



SURVEYED AND COMPILED 1968 BY
GEOPHYSICAL RESOURCES DEVELOPMENT CO.
RAMSGATE, N.S.W.

GRD

CR 70/56

SHEET 2

PLATE 4

CHANNEL 3 (1.6 TO 2.0 MeV) CONTOURS

AIRBORNE RADIOMETRIC SURVEY

JIM JIM CREEK AREA - N.T.

PROSPECTING AUTHORITY No 1964

NORANDA AUSTRALIA LIMITED

SCALE 1" = 2000' (APPROX.)

A ANOMALIES OF INTEREST
DETAILS IN REPORT

FLIGHT LINE INTERVAL — 1000 FEET
FLIGHT ALTITUDE — 300 FEET M.T.C.
CONTOUR INTERVAL — 5 COUNTS

HORIZONTAL CONTROL BASED ON PHOTO ASSEMBLY COMPILED BY GEOPHYSICAL RESOURCES DEVELOPMENT CO., RAMSGATE.

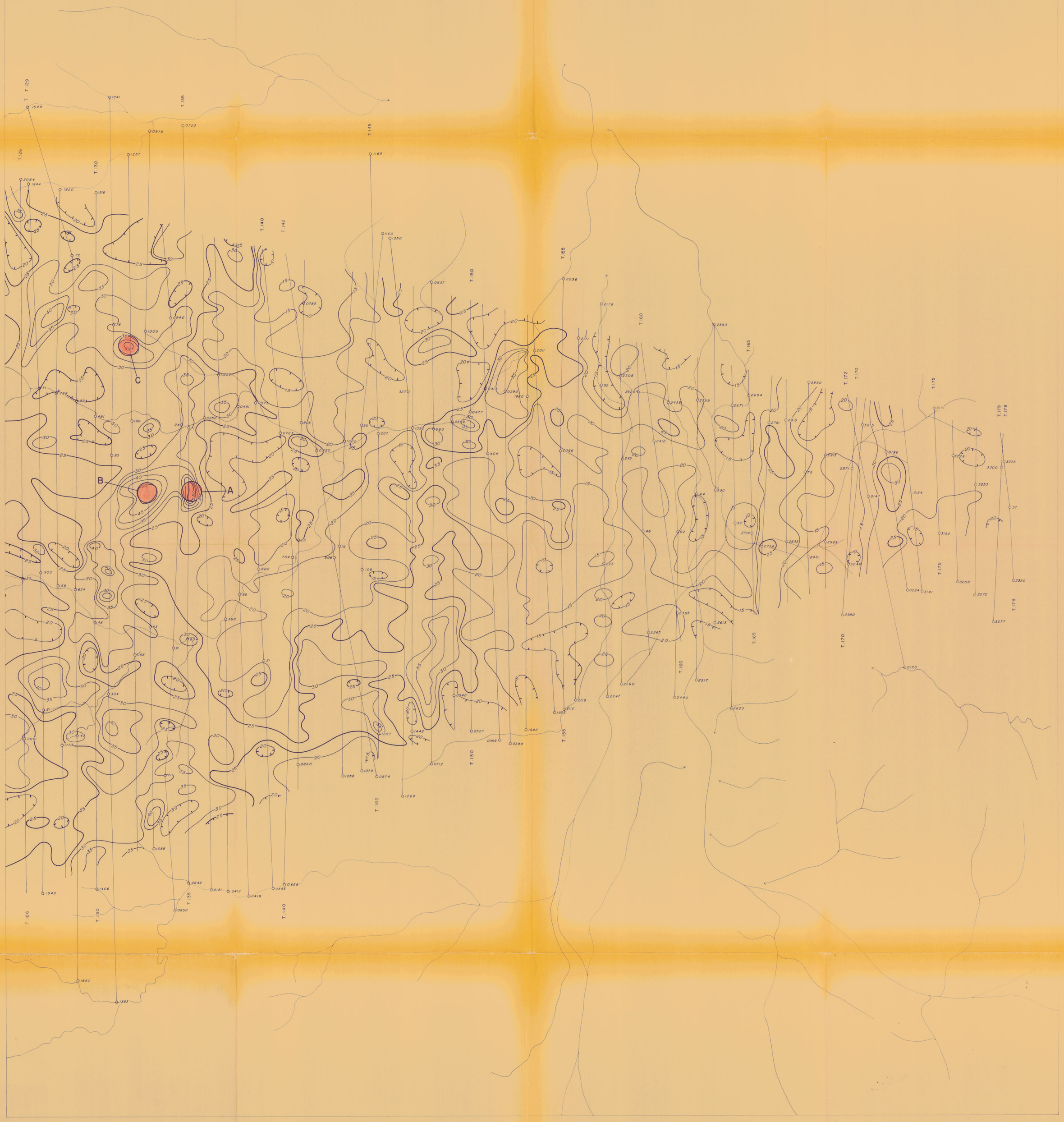
N (APPROX.)

SHEET INDEX

SURVEYED AND COMPILED 1968 BY
GEOPHYSICAL RESOURCES DEVELOPMENT CO
RAMSGATE, N.S.W.

CR 70/56

SHEET 3



B — ANOMALIES OF INTEREST
DETAILS IN REPORT

FLIGHT LINE INTERVAL — 1000 FEET
FLIGHT ALTITUDE — 300 FEET M.T.C.
CONTOUR INTERVAL — 5 COUNTS

HORIZONTAL CONTROL BASED ON PHOTO
ASSEMBLY COMPILED BY GEOPHYSICAL
RESOURCES DEVELOPMENT CO., RAMSGATE.

N (APPROX.)

SHEET INDEX

1			
2		3	4

PLATE 5

CHANNEL 3 (1.6 TO 2.0 MeV) CONTOURS

AIRBORNE RADIOMETRIC SURVEY

JIM JIM CREEK AREA — N.T.

PROSPECTING AUTHORITY No 1964

NORANDA AUSTRALIA LIMITED

SCALE 1" = 2000' (APPROX.)

GRD
SURVEYED AND COMPILED 1968 BY
GEOPHYSICAL RESOURCES DEVELOPMENT CO.
RAMSGATE, N.S.W.

CR 70/56

SHEET 4