C.R.A. EXPLORATION PTY. LIMITED

31st December, 1972.

MEMORANDUM TO : F. E. HUGHES

Copy to : D. H. Mackenzie

From : K. N. O'Sullivan

Final Report A. to P. 3447, "Mt. Harris", N.T.

CONCLUSIONS AND RECOMMENDATIONS

Results to date suggest the granitic monadnock groups of this area to be radioactively anomalous in their stratigraphic context. If outstanding assays confirm this then an aerial survey may be warranted to delineate those sedimentary tracts where auger drilling could profitably be employed.

INTRODUCTION

In furtherance of a regional study of the Burt Plain Basin in a search for sedimentary uranium, and following upon the discovery of carnotite mineralisation associated with caliche in the New Well area some 29 km west of Mt. Harris, Application to Prospect No. 3447 of 749 km^2 was granted for a period of twelve months from 1st October, 1971. A. to P. 3447 was subsequently converted to E.L. 753 on 7th November, 1972 (Plan No. N.T. 1169).

Investigations to date have taken the form of accumulating data on the nature and uranium/thorium content of isolated outcrops of Precambrian granitic rocks that occur as monadnocks above the otherwise featureless surface of Burt Plain.

One airborne radiometric traverse was run across the Mt. Harris group of inliers.

GEOLOGICAL SETTING

The area is situated immediately south of the Reaphook/Hann range of hills, a feature made prominent by thick-bedded quartzite, granule and pebble conglomerates of the northward dipping Adelaidean Vaughan Springs Quartzite. Both east of the Stuart Highway and in the vicinity of Day Creek, the above quartzite is seen in unconformable contact with Precambrian granite, the latter frequently seamed with dykes of quartz and/or haematite.

Topographically A. to P. 3447 may be considered as part of a planar surface dipping at approximately 1 in 700 south and west towards a low area of sub-Recent salt lakes. Two groups of granite outcrops rise abruptly from the plain (see Plan No. N.T. 1169). These rocks are typically pink and brown coarse-grained unstressed porphyritic granite, carrying large phenocrysts of feldspar, but there are exposures of coarse-grained gneissic granites, siliceous gneisses, augen gneisses, and epidote granite in the area. These rocks are normally radioactive, with a uranium content of 2-16 ppm U in the results so far received.

PETROLOGY OF THE MONADNOCK GROUPS

Western Group (Plan No. N.T. 1170)

Although Mt. Harris and adjacent outcrops immediately to the east appear on the geological map as undifferentiated Precambrian, they are in fact primarily granitic in composition and texture, ranging from fine-grained to coarse biotite-feldspar granite and epidote-granite. However, the northeastern margin of Mt. Harris itself presents outcrops of metamorphic sandstone, mica schist and quartz veining whose relationship to the bulk of the granite mass is indeterminable (see Plan No. N.T. 1171). Results to hand indicate a maximum value of 13 ppm U in the feldspathic granite and a minimum value of 2 ppm U in the epidote granite and coarse biotite-feldspar granite (Plan No. N.T. 1171).

Eastern Group (Plan No. N.T. 1172)

This assembly of rock types, although dominantly acid in composition, differs from the western monadnock group in two aspects:

1. Foliated granite or acid gneiss is the norm, non-foliated pink granite occurring in one outcrop only.

2. Veining is common, primarily of quartz with associated haematite and minor pyrite. No assay results are yet to hand but ground radiometric survey data suggests anomalous radioactivity to be not associated with major quartz veining, but rather with material of biotite gneiss or pink granite type (Plan No. N.T. 1173).

RADIOMETRIC INVESTIGATIONS

Surface

Surface radiometric investigations, using a hand-held Scintrex BGS-1S scintillometer, were carried out in traverses across the exposed basement inliers. Rock samples were obtained from points of highest reading and were later scanned again at base camp to eliminate outcrop mass effect. These results, together with brief field petrographic descriptions are tabulated in the following chart and entered upon Plan No.'s N.T. 1171 and 1173).

Against a regional background count of 20-30 cps it was found that the western monadnock group (Mt. Harris group sensu stricto) gave variable readings in situ to a maximum of 300 cps, while the eastern monadnock group gave variable readings to a maximum of 2000 cps.

Airborne

In association with work on E.L.55(New Well) to the west of Mt. Harris one traverse was run across the southeastern corner of A.P. 2447, using the same scintillometer carried in the cabin of a fixed-wing aircraft, flying at 30 m ground clearance. Readings were taken every 10 seconds along the flight lines and the results plotted as Plan No. N.T. 1174. Radiation levels over the area generally were low, but the granite outcrop of Mt. Harris was recognisable at about twice background, while granite 6 km east of Mt. Harris also was unusually radioactive.

KNO'S:ry

K. N. O'Sullivan

REFERENCES

Wells, A.T., Evans, T.G., Nicholas, T. and Glikson, A.Y.	1971	1:250,000 Geological Series, Napperby, N.T. Sheet SF53/9 First Edition. Bur. Min. Resour.

KEYWORDS

Uranium, alluvium, duricrust, metamorphism, sediments-undiff., breccia-other, granite, igneous-undiff., porphyry, gneiss, metaseds.-undiff., schist, facies-continental, basin-closed, Recent, Tertiary, Precambrian, assay-geochem., assay-surf., geochem-rock, geol. mapping-regional, geophys.-rad., petrology, recommendations, sampling, radioactivity.

Locality : Napperby SF53-9 1:250,000 map sheet

LIST OF PLANS

Plan No.	Title	Scale
NT 1169	A. to P. 3447, Mt. Harris, N.T. Locality Plan.	1:250,000
NT 1170	A. to P. 3447, Mt. Harris, N.T. Western Monadnock Group, Sample Locality Plan, Analytical, Petrological and Radiometric Results.	1:46,500
NT 1172	A. to P. 3447, Mt. Harris, N.T. Eastern Monadnock Group, Sample Locality Plan, Petrological Descriptions and Radiometric Investigations.	1:46,500
NT 1174	A. to P. 3447, Mt. Harris, N.T. Airborne Radiometric Survey.	1:250,000

Sample Number	Lithological Description	cps in situ	cps at base b/g = 30 cps	ppm	
				U	Th
220246	Poorly foliated biotite gneiss with irregular feldspar development, often augen-like in structure	170	38		
220247	Quartz vein with manganese and iron staining	50	32		
220248	Sandstone and mica schist, very fine grained	70	30		
220249	Granitic gneiss, biotite banding visible, fairly fresh	120	32	S	D
220250	Granitic gneiss, biotite banding visible, fairly fresh	100	34	T	E
220251	Granitic gneiss, distinctly banded, fresh, traversed by vein or fault breccia containing pyrite and magnetite	100	32	U L	I T
220252	Quartz vein, brecciated ard re-cemented with chalcedonic quartz. Some scattered pyrite	40	30	S	A
220253	Granitic gneiss, dark with abundant biotite	250	32	E	W
220254	As above	120	36	R	A
220255	Quartz vein with haematite and magnetite; 40% mineralisation	40	28		
220256	Quartz vein showing crystals of pyrite and disseminated haematite and magnetite	25	30		
220257	Haematite, banded, associated with quartz veining	50	32		
220258	Banded granitic gneiss with abundant biotite	110	32		
220259	Granitic gneiss, coarsely foliated, moderately weathered	100	36		
220260	Assimilated country rock, hornfelsic texture	100	34		
220261	Granitic gneiss, distinct foliation, fresh	80	30		

220262	Granitic gneiss, coarsely foliated (1.0-1.5 cm foliation), fresh	80	30		
220263	Granitic gneiss, sparse biotite, fresh	120	32	RESULTS	AWAITED
220264	Granite, pink, medium grained, fresh	150	40		
220265	Quartz vein with sparse haematitic mineralisation	25	30		
220266	Quartz vein	40	28		
192763	Coarse biotite-feldspar 150-200 granite	-	-	2	
192764	Coarse biotite-feldspar granite	150-200	-	3	
192765	Coarse biotite-feldspar granite	200	-	7	
192766	Weathered granite	220	-	3	
192767	Weathered granite	220	-	2	
192768	Feldspathic granite (augen gneiss)	300	-	16	
192770	Epidote granite	90	-	6	
192771	Epidote granite	90	-	2	

22°59'

14
5074

73

72

Coarse Biotite-
Feldspar Granite
200cps. 7 p.p.m.U.
192765

Weathered Granite
220cps. 3 p.p.m. U.
192766

Weathered Granite
220cps. 2 p.p.m.U.
192767

Feldspathic Augen Gneiss
300 cps. 16 p.p.m. U.
192768

Metamorphosed sandstone grading
to mica shist.
70cps.
220248

Quartzite
50cps.
220247

Coarse Biotite-
Feldspar Granite
200cps. 2 p.p.m.U.
192763

MT. HARRIS
2369

Granite (as above)
150 cps. 3p.p.m. U.
192764

Biotite-Feldspar
Augen Gneiss
170 cps.
220246

Epidote-Granite
90 cps. 2p p.m. U.
192771

Epidote-Granite
90cps. 6 p.p.m. U.
192770

Biotite-Gneiss
120cps.
220249

15
5151

Gneiss
100cps.
220250

52

53

X.- rock sample location and number

14-Run No.
5151-Photo No. - Position of Photocentres

SCALE 1:46,000

Metres 1000 0 1 2 3 Kilometres

133°00'

M.C.S.

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AP 3447 - MT. HARRIS, N.T.

WESTERN MONADNOCK GROUP,

SAMPLE LOCALITY PLAN, ANALYTICAL, PETROLOGICAL AND RADIOMETRIC RESULTS

K.N.OS.	JAN. '73	1:46,000	PLAN No. N.T. 1170

STUART HIGHWAY

SHEPPARD BORE

06

84

83

82

81

22°59'

45

44

43

47

Quartz Vein only
40 cps.
220266

Vein or Fault Breccia.
Gossanous mineralized with pyrite and hematite
40cps.
220252

Gneiss with visible bands of biotite
100cps.
220251

(Range 80-150 cps)

Granitic Gneiss tending to granite
120cps.
220263

Biotite - Gneiss
80cps.
220261

Gneiss with abundant biotite
250cps.
220253

Quartz-Biotite Hornfels (Assimilated country rock)

Gneiss (as above)
120 cps.
220254

Coarse-biotite Gneiss
80cps. 220262

elsewhere Gneiss
100cps.
220260

(Max. area count
620cps)

Weathered Gneiss
100cps.
220259

Banded Biotite-Gneiss
110cps.
220258

Pink medium-grained granite.
Also hematite and magnetite crystals.
Specimen 150cps.
220264

(Max. area count 2000cps.)

Small quartz vein with about 40% Hematite
40cps.
220255

Quartz vein showing crystals of pyrite and disseminated hematite.
25cps.
220256

Quartz vein with only minor hematite.
25cps.
220265

Hematite Vein

Hematite in Quartz
50cps
220257

Quartz

X - rock sample location and number

15-Run No.
O - Position of Photocentres
43-Photo No.

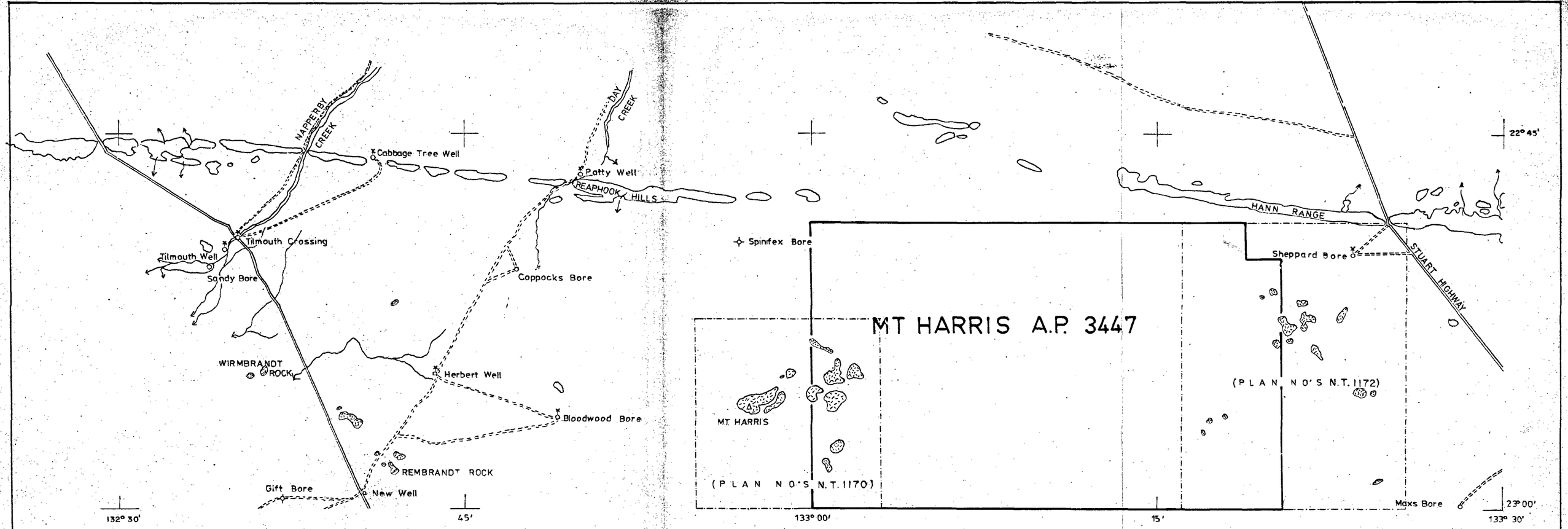
SCALE 1:46,000

Metres 1000 0 1 2 3 Kilometres

C.R.A. EXPLORATION PTY. LIMITED			
AP 3447 - MT. HARRIS, N.T. EASTERN MONADNOCK GROUP, SAMPLE LOCALITY PLAN, PETROLOGICAL AND RADIOMETRIC INVESTIGATIONS			
K.N.OS.	JAN.'73	1:46,000	PLAN No. N.T. 1172

M.C.S.

66



LEGEND

basement outcrop

granitic basement outcrop

SCALE 1:250,000

5 0 5 10 15 20 Kilometres

5 0 5 10 Miles

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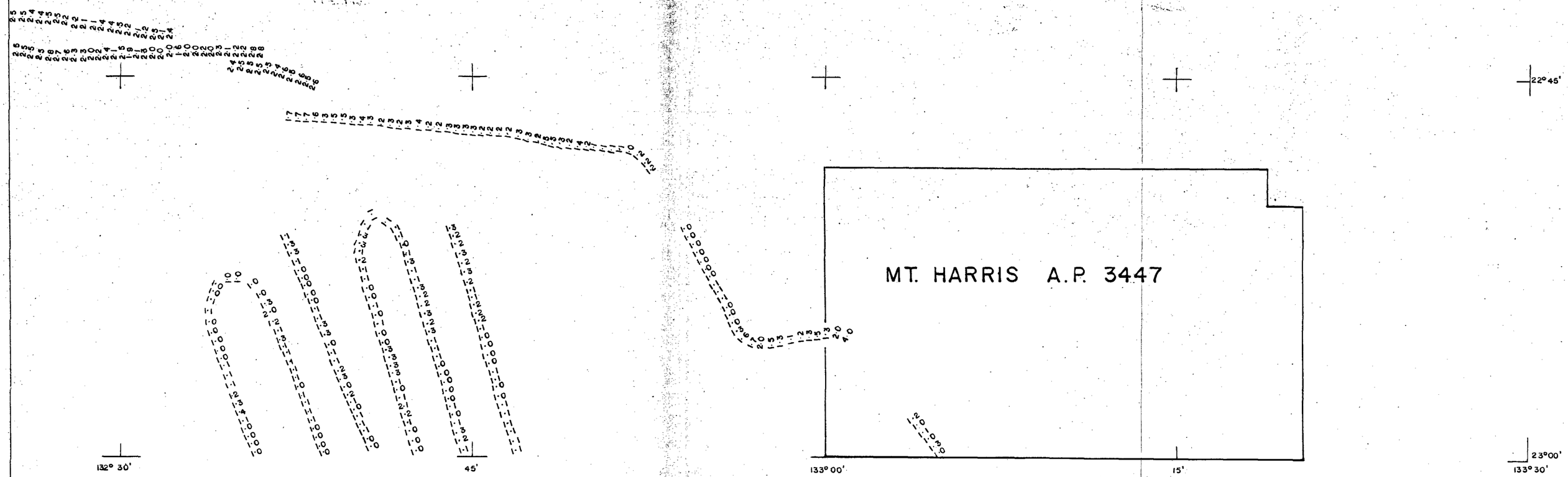
LOCALITY PLAN

K.N.OS.	JAN '73	1:250,000	PLAN No. N.T. 1169



SCALE 1:250,000

5 0 5 10 15 20 Kilometres

5 0 5 10 Miles

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AP 3447

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AIRBORNE RADIOMETRIC SURVEY

K.N.O.S.	JAN. '73	1:250,000	PLAN No. N.T. 1174

M. C. S.