

C.R.A. EXPLORATION PTY. LIMITED

REPORT ON INVESTIGATIONS IN

E.L. 50, WILLOWRA, N.T.

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Date : 21st November, 1973

Submitted to : W. J. Atkinson

Copy to : Mines Branch, Department of the
Northern Territory

CONTENTS

	<u>Page</u>
1. SUMMARY	1
2. CONCLUSION AND RECOMMENDATION	1
3. INTRODUCTION	1
4. SURFACE GEOLOGY	2
5. GROUNDWATER	2
6. AIRBORNE RADIOMETRIC SURVEY	3
7. DRILLING RESULTS	3

APPENDIX - Drill Log and Assay Sheets

1. SUMMARY

Airborne radiometric reconnaissance and a programme of rotary drilling failed to indicate the likely presence of significant uranium mineralisation and low assays of groundwater showed that uranium was probably not entering the E.L.

The area is recommended for relinquishment.

2. CONCLUSION AND RECOMMENDATION

Most of the area contains a thin layer of impure calcrete in which there is no sign of an accumulation of uranium. A thicker development of calcrete occurs along what was probably the ancient channel of Ingallian Creek; silicification of the calcrete occurs in this zone and there are values up to 21 ppm U.

The lack of any uranium mineralisation of significance in the E.L. as a whole is a reflection of the scarcity of available uranium in groundwater, as noted in Section 5.

All the available information therefore shows that it is most unlikely that an economic concentration of uranium mineralisation exists in the E.L. and it is recommended that the area be relinquished.

3. INTRODUCTION

The Willowra E.L. lies approximately 300 km north-northwest of Alice Springs as shown in Plan No. NTA 27. It was granted on 7th February, 1973, for a period of 12 months.

This report describes the results of airborne radiometric reconnaissance and rotary drilling carried out in the area in the current year of tenure.

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4. SURFACE GEOLOGY

The E.L. lies on an extensive sand covered plain whose only relief is provided by one small ridge of calcrete (at the site of hole WA 11) and several small claypans.

Basement rocks of the Arunta Complex outcrop about 60 km away to the south and southwest and consist chiefly of orthogneisses, gneissic granites, schists, quartzites and limestones. Adelaidean rocks, predominantly of arenaceous character, crop out about 25 km to the east.

Although it is not known with certainty, basement rocks are probably shallow in the area covered by the E.L.

5. GROUNDWATER

Several bore water samples were collected concurrently with the drilling programme and a separate report on this work is presently being compiled by C. Laughton. Values of 98, 333 and 716 ppb U were obtained from three bores close to the headwaters of Ingallan Creek where the area is surrounded on three sides and underlain by orthogneisses of the Arunta Complex. Downstream from this locality, moving away from the basement hills onto the sand plains, there is a very sharp decline in the uranium content of bore water and there are no more values greater than 35 ppb U.

Thus it appears that dissolved uranium is being transported for very short distances only and has been removed from groundwater long before reaching the calcretes of the E.L. area.

6. AIRBORNE RADIOMETRIC SURVEY

An initial investigation of the area was made in the form of an airborne radiometric reconnaissance survey. Lines were flown in the western part of the area at a ground clearance of 50 m, and results are shown in Plan No. NTA 27.

The calcrete, although very slightly more radioactive than the Quaternary sand, exhibited no peaks or plateaux of anomalous radiation.

7. DRILLING RESULTS

Eleven holes for a total of 132.5 m were drilled on a 3 km by 1 km grid using a Mayhew 1000 rotary rig. Holes were probed using an Austral Mini Borehole Logger and then bulk sampled on the basis of the probe chart and the geological log.

Geological logs of each hole are given in the Appendix and the drill hole sections in Plan No. NTA 16 show the relationship between geology, uranium content and radioactivity for each hole.

The geological map (Plan No. NTA 27) and the isopach map (Plan No. NTA 28) show that the calcrete consists of a thick central linear section which is approximately coincident with both Ingallan Creek (in the south) and the outcrops of calcrete further to the north (around hole WA 11), and a thin marginal calcrete which extends beneath the sand cover to the north and east.

The thin calcrete may be partly of pedogenic origin. It is generally pink or buff in colour, often porous and may be soft and friable to hard and siliceous. It commonly contains many quartz grains of varying size and degree of roundness; it may also contain clay as well as iron and manganese staining. Its uranium content is seldom more than 10 ppm and averages only about 3 ppm. In most places the underlying sands also contain about 2 or 3 ppm U.

The thickest calcrete, up to 10.5 m in hole WA 9, is usually made up of an upper section similar in composition and appearance to that described above, and a lower one characterised by varying amounts of silicification.

The silicification takes the form of cavity fillings, fracture fillings and almost complete replacement of calcrete by chalcedonic and opaline silica. Some sections consist of almost 100 percent clear silica but there are usually a few small centres of milky calcrete not quite fully altered. In general the zone of silicification is identical to similar occurrences in other Central Australian calcretes such as Mt. Rennie, New Well (Scott, 1973) and Woolla Downs (O'Sullivan, 1973).

Uranium values and radiometric response are usually greatest within the silicified profiles, and the highest assay obtained (21 ppm U in hole WA 6) occurred in such a zone. The higher assays are also influenced by the water table which generally occurs near the top of the silicified zone.

As in other calcretes of the Centre, silicification is coincident with the thickest sections of the calcrete and appears to have occurred in the topographically lowest areas; that is in depressions (drainage channels) on the pre-calcrete land surface. The change from carbonate to silica precipitation indicates a corresponding variation in pH conditions from alkaline to acid.

AKS:ro's

Signed A. K. Scott

REFERENCES

- | | | |
|-------------------|------|--|
| O'Sullivan, K. N. | 1973 | Final Report, E.L. 52, Woolla Downs, N.T.
C.R.A.E. Report (unpubl.) |
| Scott, A. K. | 1973 | Report on Investigations During 1973 in E.L. 55, New Well, N.T.
C.R.A.E. Report (unpubl.) |

KEYWORDS

Uranium, calcrete, Cainozoic, drill- percuss.,
geophys.-rad.

Locality: Mt. Peake SF53-5 1:250,000 sheet.

LIST OF PLANS

<u>Plan No.</u>	<u>Title</u>	<u>Scale</u>
NTa 27	E.L. 50 Willowra Geological and Drilling Plan.	1:50,000
NTa 16	E.L. 50 Willowra Drill Hole Sections.	Horiz. 1:250,000 Vert. 1:500
NTa 28	E.L. 50 Willowra Calcrete Isopachs.	1:50,000

APPENDIX

Drill Log and Assay Sheets

D.P.O. Number: 16542 Locality: WALLOWRA
Depth of Water Table: 4.5m Hole Number: WA 1
Logged By: SM Date Drilled: 25.9.73
Drilled By: ROY BOWMAN Drill Type: MARYHEW 1000

DEPTH (metres)		SAMPLE NUMBER							DESCRIPTION
FROM	TO			U ppm					
0	1.5	224737		5					SOIL Red colour with Fe stained quartz grains
1.5	3.0								SUB SOIL Yellow brown and colour & quartz gravel and few fragments of calcareous
3.0	4.5	224738		3					CALCRETE Buff to white colour containing some quartz
4.5	6.0								SANDY CALCRETE Buff colour which is brown sand
6.0	7.5	224739		2.					SAND Yellow brown colour non calcareous
7.5	9.0								SAND Brown colour non calcareous
9.0	10.5								SAND Brown colour non calcareous

Remarks: *Scabies pending on samples 28-36 cps*

DRILL LOG AND ASSAY SHEET

[illegible]

DRILL LOG AND ASSAY SHEET

[illegible]

Remarks: *Scler. rudis* across 2 angles 30-38 yrs.

Walter A. Luper, 1901 - 1911

D.P.O. Number: 16542 Locality: WILLOWRA
Depth of Water Table: 4.5 m Hole Number: WA 4
Logged By: SM Date Drilled: 26.9.73
Drilled By: RAY BOWMAN Drill Type: MAYHEW 1000

DEPTH (metres)		SAMPLE NUMBER							DESCRIPTION
FROM	TO								
0	1.5	224746		4 10pm 3					Soil Red brown colour & Festined quartz grains
1.5	3.0	224747	11						CALCRETE Pink colour containing quartz grains
3.0	4.5								
4.5	6.0	224748	3						SANDY CALCRETE Buff colour & brown sand.
6.0	7.5	224749	2						SAND Brown colour more calcareous
7.5	9.0								
9.0	10.5								SAND Brown colour more calcareous
				</					

Remarks: Seismic readings across canals 30-36 cps.

DRILL LOG AND ASSAY SHEET

[illegible]

Remarks:

CONFIDENTIAL - SECURITY INFORMATION

D.P.O. Number:

Locality: WILLOW RA

Depth of Water Table: 6.0 m

Hole Number: WA 6

Logged By: Sm

Date Drilled: 26.9.73

Drilled By: RAY BOWMAN

Drill Type: MAYHEW 1000

[illegible]

Remarks: Sinistro, rumbo a rullas 30-38 var

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DRILL LOG AND ASSAY SHEET

D.P.O. Number: 16542. Locality: WILLOWRA
Depth of Water Table: 5.5 m. Hole Number: WA 7
Logged By: SM Date Drilled: 25-9-73
Drilled By: FRANK GADEN Drill Type: EDSON

[illegible]

DRILL LOG AND ASSAY SHEET

D.P.O. Number: 16542 Locality: WILLOWRA
Depth of Water Table: 6.0 m Hole Number: WA 9
Logged By: SM Date Drilled: 25.9.73
Drilled By: RAY BOWMAN Drill Type: MAYHEW 1000

DEPTH (metres)		SAMPLE NUMBER						DESCRIPTION
FROM	TO			U ppm				
0	1.5	224726		1				SOIL Red colour
1.5	3.0							SOIL Red colour & few chips of pink calcite
3.0	4.5	224727		3				CALCRETE Buff coloured containing quartz grains
4.5	6.0							SANDY CALCRETE chips of calcite with brown sand
6.0	7.5	224728		4				SAND Brown colour & chips of calcite and calcite and calcite.
4.5	6.0							
7.5	9.0	224729		5				SAND Yellow brown & few chips of calcite calcareous
6.0	7.5							
9.0	10.5							SAND Yellow brown with chips of calcite and calcite
10.5	12.0							SAND Yellow brown with fragments of calcite and calcite calcite
12.0	13.5							SAND Yellow brown with chips of calcite and calcite
13.5	15.0		224730		3			
15.0	16.5							
16.5	18.0							SILCRETE Chalkstone calcite contaminated by red soil
Remarks:								

L.

D.P.O. Number: Locality: WILLOWRA
Depth of Water Table: Hole Number: WA 9 (CONT)
Logged By: Date Drilled:
Drilled By: Drill Type:

[illegible]

CONFIDENTIAL - SECURITY INFORMATION

D.P.O. Number:

Locality: WILLOWRA

Depth of Water Table: 4.0 m

Hole Number: WA 10

Logged By: Sm

Date Drilled: 25-9-73

Drilled By: FRANK GADEN

Drill Type: EDSON.

DEPTH
(metres)

FROM TO

SAMPLE
NUMBER

DESCRIPTION

0 1.0

1.0	2.5
-----	-----

224723

9
ppn
1

2.5 4.0

4-0

224724

4

4-0	5-5
-----	-----

5-5

5.5	7.0
-----	-----

7.0

224725

4

7.0	8.5
-----	-----

E. S.

Soil Red brown colour

5012 Red brown flower with

fragments of pink enamel.

SANDY CALCARETE *B. 11*

lower = brown sand.

SANDY CALCAREOUS Bld

Shale column with fragments of

Black & brown sandstone

SAND Brown when new

Calagor

SAND Brown above now

Calcaneus

Remarks:

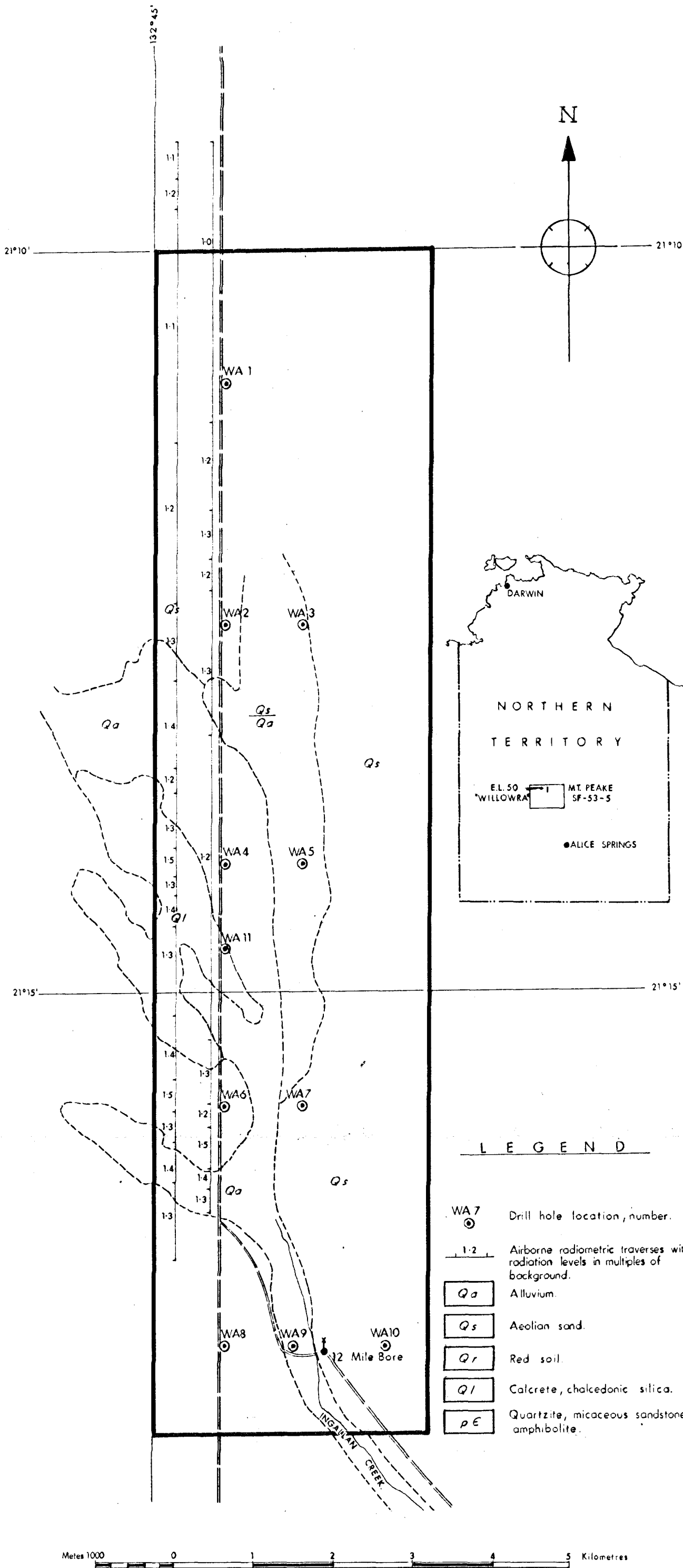
Remarks: Summer readings across samples 32-38 cps

DRILL LOG AND ASSAY SHEET

Drilled By: RAY BOWMAN Drill Type: MAYHEW 1000

DEPTH (metres)		SAMPLE NUMBER							DESCRIPTION
FROM	TO								
0	1.5	224754	9 ppm	1					50% Red colour
1.5	3.0	224755		9					CALCRETE Pink colour containing quartz grains
3.0	4.5								CALCRETE Pink colour containing quartz grains
4.5	6.0								CALCRETE Pink colour containing quartz grains
6.0	7.5	224756		4					SILICIFIED CALCRETE White colour hard & conchoidal fracture and fragments of banded colour
7.5	9.0	224757		3					SAND Dark brown calcareous
9.0	10.5	224758		3					SANDY CALCRETE. Fragments of buff calcite with brown sand
10.5	12.0	224759		3					SAND Fine grain brown colour non calcareous = few fragments of calcite
12.0	13.5								SAND Fine grain brown colour non calcareous
13.5	15.0	224760 224759		1					SAND Red colour (possibly contaminated from top of hole)

Remarks: Scrub oak readings across profiles 28-42 cps



INDEX TO ADJOINING SHEETS.

MT. SOLITAIRE SF-52-4	LANDER R. SF-53-1	BONNEY WELL SF-53-2
MT. THEO SF-52-8	MT. PEAKE SF-53-5	BARROW CK. SF-53-6
MT. DOREEN SF-52-12	NAPPERBY SF-52-9	ALCOOTA SF-52-10

C. R. A. EXPLORATION PTY. LIMITED.

E.L. 50 WILLOWRA

MT. PEAKE SF-53-5.

GEOLOGICAL & DRILLING PLAN.

Geologist :- A.K.Scott

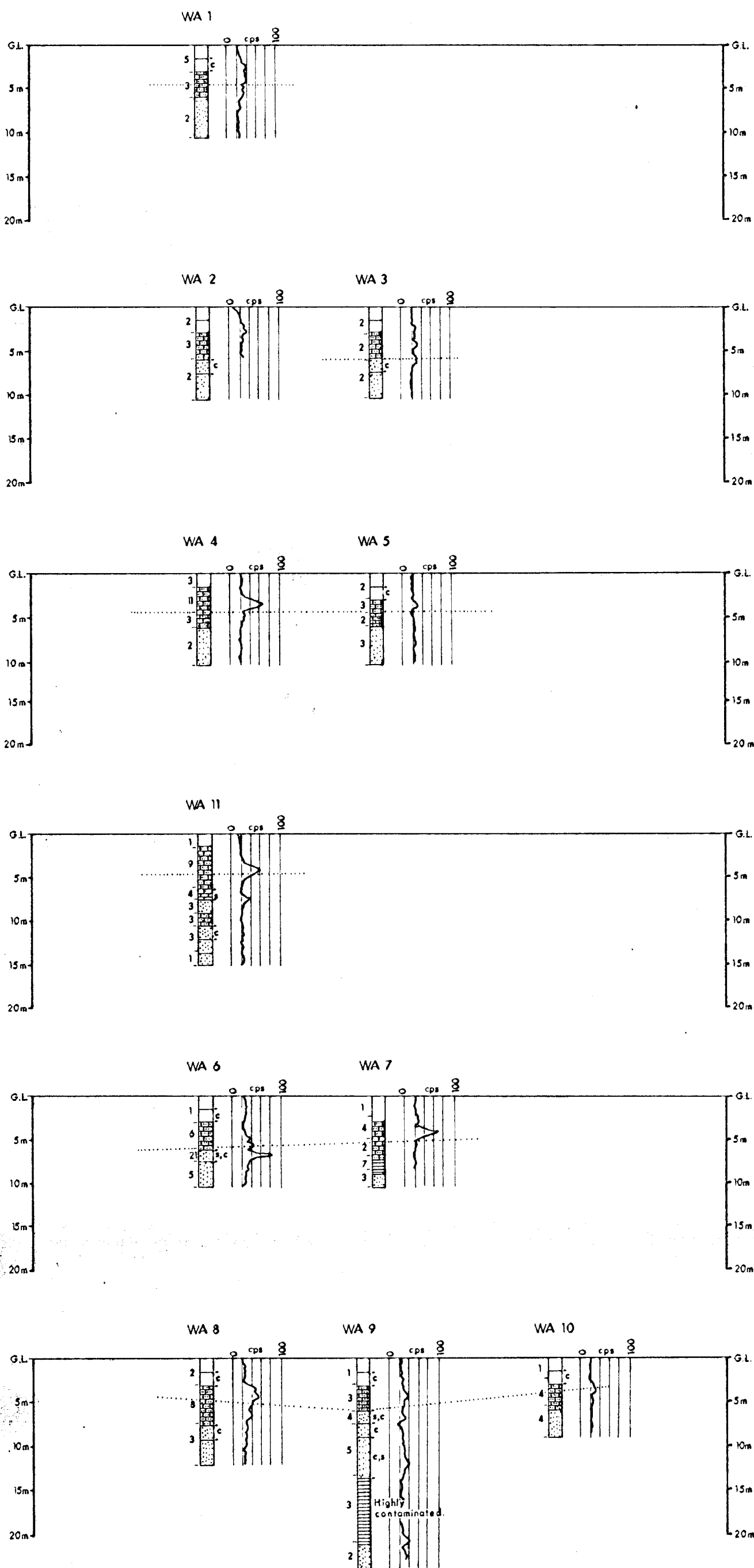
Date :- October, 1973

Report No. 7448

Scale :- 1:50,000

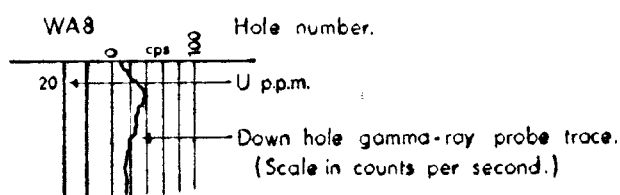
D.P.O. No's 16542

Plan No NTA 27



LEGEND.

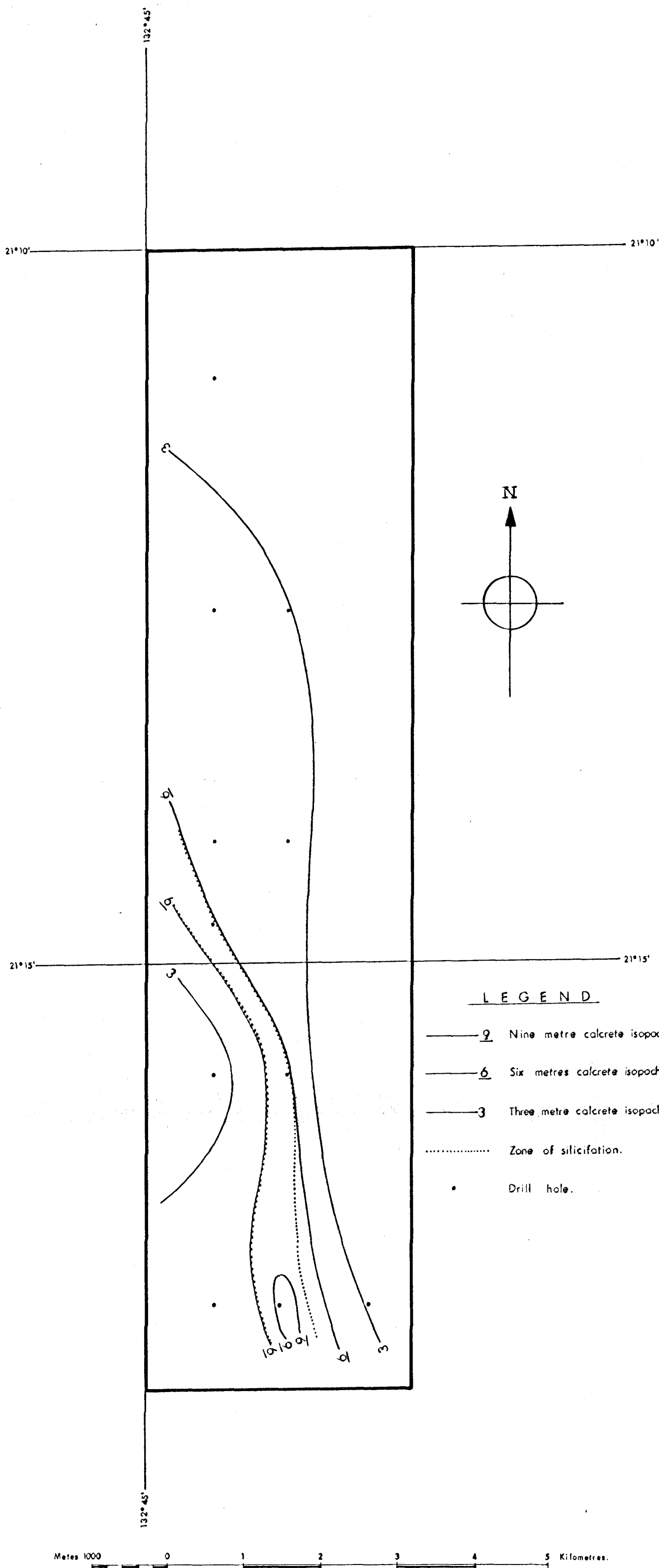
- Soil, surface sand.
- Calcrete (calcareous).
- Impure calcrete. (sandy).
- Silcrete, chalcedony, silicified calcrete.
- Sands, sandstone.
- Sandstone - calcareous.
- Sandstone - siliceous.
- Chalcedonic silica.
- Water table.



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E.L. 50 WILLOWRA . MT. PEAKE SF-53-5. DRILL HOLE SECTIONS.

GEOLOGIST: - AK Scott	DATE: - October, 1973	REPORT No. 7448
Horiz Scale: - 1:25,000 Vert. Scale: - 1:500	D.P.O. No's. 16542	PLAN No. NTa 16



C. R. A. EXPLORATION PTY. LIMITED

E.L. 50 WILLOWRA
MT. PEAKE SF - 53 - 5.
CALCRETE ISOPACHS.

Geologist :- A.K.Scott	Date:- October, 1973	Report No. 7448
Scale:- 1:50,000	D.P.O. No's 16542	Plan No NTa 28.



C.R.A. EXPLORATION PTY. LIMITED

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140 BOURKE STREET, MELBOURNE, 3001

P.O. BOX 384D

TELEPHONE 666-0231

TELEGRAMS: "EXPLORECO"

TELEX AA31840

24th August, 1972.

The Director,
Northern Territory Administration,
P.O. Box 231,
DARWIN,
Northern Territory, 5794.

Dear Sir,

E.L. 50 - Willowra, N.T.

Report for the Quarter Ending 6th August, 1972

Results of the airborne reconnaissance were assessed and a program of auger drilling planned.

Expenditure for the period to 31st July, the nearest accounting period amounted to \$315.

Yours faithfully,

M. Field

for D. S. Carruthers
General Manager.

MF:kc





C.R.A. EXPLORATION PTY. LIMITED

(INC. IN N.S.W.)

140 BOURKE STREET, MELBOURNE, 3001

P.O. BOX 384D

TELEPHONE 666-0231

TELEGRAMS: "EXPLORECO"

TELEX AA31840

24th November, 1972.

The Director,
Mines Branch,
Northern Territory Administration,
P.O. Box 231,
DARWIN, N.T. 5794

Dear Sir,

E.L. 50 - Willowra, N.T.
Report for Quarter Ending 6th November, 1972

No work was undertaken.

Expenditure for the period amounted to \$27.

Yours faithfully,

M. Field

MF:jm

for D. S. Carruthers
General Manager



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P.O. BOX 384D

TELEPHONE 666-0231

TELEGRAMS: "EXPLORECO"

TELEX AA31840

23rd May, 1973

The Director,
Mines Branch,
Department of the Northern Territory,
DARWIN N.T. 5790

Dear Sir,

E.L. 50 - Willowra, N.T.
Report for the Quarter Ending 6th May, 1973

No work was carried out.

The area is scheduled for auger and percussion drilling following completion of work on E.L. 52 - Woolla Downs.

Expenditure for the period ending 30th April, the nearest accounting period, amounted to \$1142.

Yours faithfully,

MField

for D. S. Carruthers,
General Manager

