FINAL REPORT

TO THE NORTHERN TERRITORY DEPARTMENT

OF MINES AND ENERGY

FOR E.L. 2523

29th OCTOBER, 1980 to 28th OCTOBER, 1982

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF MAPS

Map No.	Title	Scale
1	Location of E.L.2523	1:250,000
2523/1	E.L. 2523 - Drill Hole and V.L.F. E.M. Survey Locations	1:250,000
2523/2	E.L. 2523 - V.L.F. E.M. Surveys Profiles	1:10,000

1. SUMMARY

E.L. 2523, No. 2 Bore, was granted to Agip Australia Pty. Ltd. on 29th October, 1980.

One hole was drilled to a depth of 123.7m on the E.L. but it failed to intersect the prospective Mt. Eclipse Sandstone finishing instead in the Mt. Doreen Formation dolomite.

V.L.F. E.M. surveys carried out in 1981 and 1982 suggest that the Mt. Eclipse Sandstone does not extend into E.L. 2523.

An orthophoto map survey carried out in 1981 included E.L. 2523 in its coverage.

2. INTRODUCTION

2.1 Description of Area

ALL THAT piece or parcel of land in the Northern Territory of Australia containing an area of 20.74 square miles (53.72 sq. km) more or less, the boundary of which is described as follows:-

Commencing at the intersection of latitude 22 degrees 40 minutes with longitude 132 degrees 29 minutes thence proceeding to the intersection of latitude 22 degrees 40 minutes with longitude 132 degrees 35 minutes thence proceeding to the intersection of latitude 22 degrees 41 minutes with longitude 132 degrees 35 minutes thence proceeding to the intersection of latitude 22 degrees 41 minutes with longitude 132 degrees 40 minutes thence proceeding to the intersection of latitude 22 degrees 42 minutes with longitude 132 degrees 40 minutes thence proceeding to the intersection of latitude 22 degrees 42 minutes with longitude 132 degrees 29 minutes thence proceeding to the intersection of latitude 22 degrees 40 minutes with longitude 132 degrees 29 minutes, subject to all applications for mining tenements and excluding therefrom all mining tenements granted or registered and all reserves included within the definition of "reserve" in section 7 of of Mining Act.

Refer also to map no. 1, overleaf.

2.2 Location and Access

No. 2 Bore E.L. 2523 is located approximately 200 km north west of Alice Springs in the Napperby Pastoral Lease (see Map 1). Access is via the Yuendumu Beef road which joins the Stuart Highway 20 km north of Alice Springs. The Stuart Highway and the first 90 km of the Yuendumu Beef road are the only part of the route which are sealed.

Within the E.L., access is by station tracks. A few drilling pads have been cleared along these tracks.

2.3 Physiography and Climate

The landscape is uniformly flat with open grassland and in places thick scrub.

The climate is semi-arid, continental, with an average annual rainfall of about 300mm. Rainfall is irregularly distributed throughout the year but tends mainly to fall in the period November - March.

Temperatures commonly exceed 40^{o} C during the summer months and frosts can be expected from April - August.

3. PREVIOUS WORK

The area was mapped at 1:250,000 by the B.M.R. during 1968 and 1969. Reconnaissance gravity and seismic surveys were also carried out in the area by the B.M.R. in 1965, 1969 and 1970.

4. GEOLOGY

4.1 Regional Geology

The stratigraphic units within this general region include a Cainozoic sequence, up to 110m thick, underlain by the Upper Devonian-Lower Carboniferous Mt. Eclipse Sandstone, which is unconformably underlain by Proterozoic Mt. Doreen Formation and Vaughan Springs Quartzite.

The Mt. Eclipse Sandstone, however, has not been intersected in any drill hole on E.L. 2523.

Cainozoic

This is divided into the following rock units:

qr	Red-brown and limey sandy soils.
Tc/Tg	Calcrete and massive gypsum.
Tcss	Calcareous Sandstone gradational to Tc.
Tgsc	Plastic Clay, green-grey, sandy, frequently gypsiferous with a trace of charcoal. Usually interbedded with Tch.
Tch	Yellow to olive-grey and light brown coarse feldspathic sand, pebbly.
Tbcs	Olive-grey and light brown to red sandy clay to clayey sand.
Trfs	Red-brown sand.
Tlss	Deep red-brown lateritic sandstone. Some laterite lenses (Te).
Tcl	Grey clay.
Ta	Yellow limonitic clay.

Possible Cainozoic

Cs/Cf	Silcrete, with minor ferricrete.

This nomenclature is well established from previous investigations of the Cainozoic in the Ngalia Basin by Agip.

Proterozoic

Within the E.L., the following formations of probable Adelaidean age are believed to be present:-

Puq	Mt. Doreen Formation. Black and green shales, greenish turbidite sands, dolomite.
Puv'	Treuer Member of Vaughan Springs Quartzite. Cherty and siliceous shale, white sandstone, occassionally glauconitic.
Puv	Quartzite member of the Vaughan Springs Quartzite, brown-grey quartzite.

These units are in turn, underlain by Lower Proterozoic gneisses and granites of the Arunta Complex.

4.2 Mineralisation

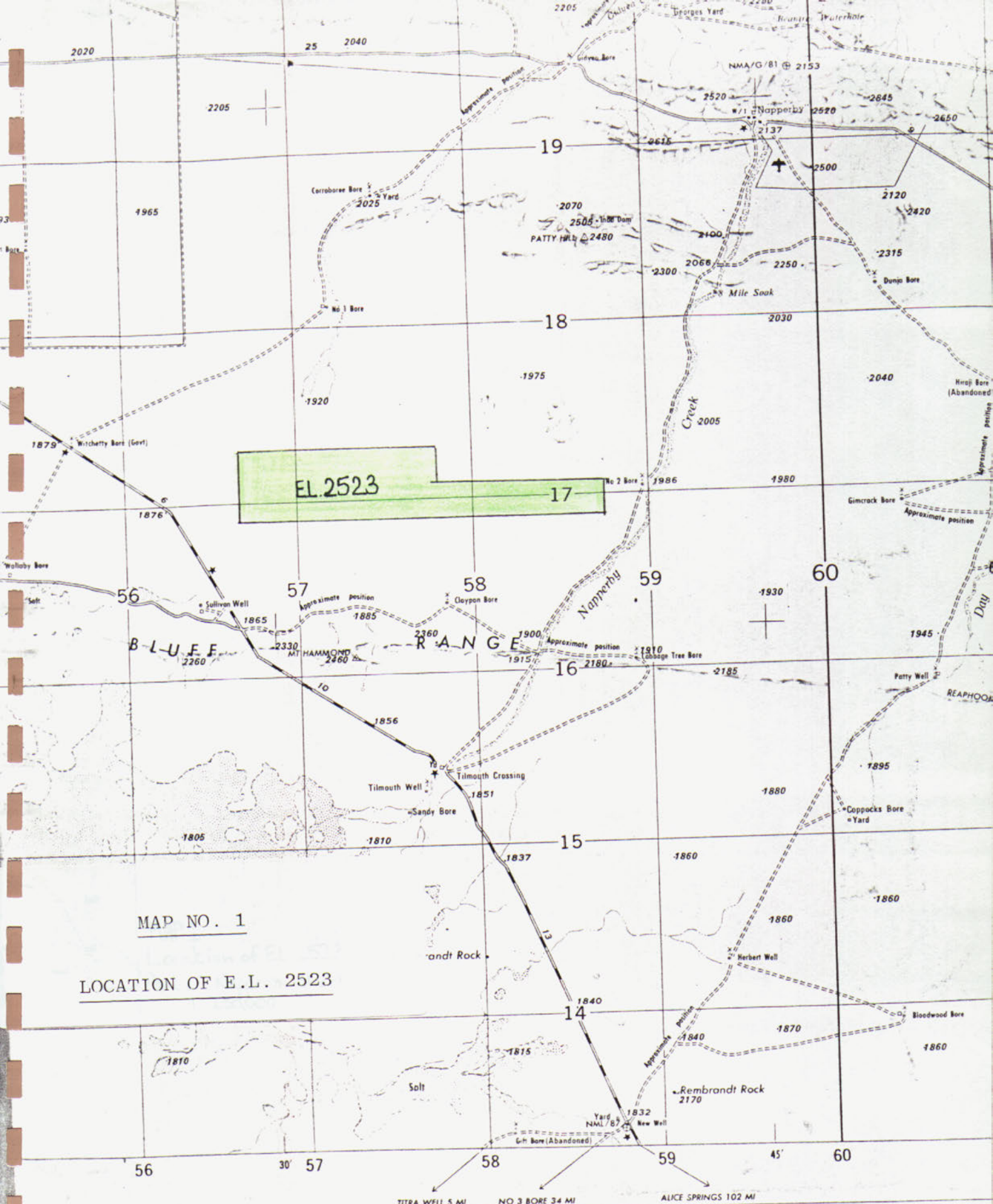
The only unit in the Ngalia Basin known to contain significant deposits of uranium is the Mt. Eclipse Sandstone. On E.L. 2523 however, the Mt. Eclipse Sandstone has not been intersected.

The Tertiary calcrete horizon is weakly radioactive in some areas.

4.3 E.L. Geology

Recent re-evaluation of drilling and geophysical data in E.L. 2523 and in adjoining E.L.'s 1199 and 2524 show that an assymetric sub-basinal syncline in which prospective Mt. Eclipse Sandstone has developed probably does not extend eastwards into E.L. 2523. The eastern nose of this syncline is

now considered to be some 2 km to the west of the licence. Drilling in the E.L. shows that the Tertiary sediments are unconformably underlain by the Mt. Doreen Formation. The area is probably transected by a major westerly-striking fault, informally termed the Midway Fault.



NAPPERBY SF53-9

Scale 1:250,000

Waterhole; water tank; dam; dry lake

Lake, river or stream perennial

Lake, river or stream intermittent

Dam or weir; falls; rapids

Drain or ditch, perennial; intermittent

Spring perennial, intermittent; ricefields

ELEVATIONS SHOWN IN FEET

VERTICAL DATUM IS BASED ON MEAN SEA LEVEL

5. EXPLORATION ACTIVITIES

5.1 Organisation

During the 1981 and 1982 field seasons Agip maintained a base camp on E.L. 1199 close to Witchetty Bore. Non-potable water was obtained from the camp bore, drinking water was trucked from Mt. Wedge Homestead.

Field work was carried out by up to two geologists and two field assistants. Agip maintains a regional office in Alice Springs and a head office in Darwin.

5.2 Drilling and Geophysical Logging

One hole was drilled on this E.L. NT1RD was rotary drilled to 118m and intersected silty, probable Proterozoic, lithology at 108m. The hole was then extended 5.7m by diamond drilling to determine the nature of this unit. A pale purplish-red dolomite was recovered and identified as belonging to the Mt. Doreen Formation. The hole was logged by Geoex Pty. Ltd. for natural gamma and neutron activation. The logging detected minor anomalous radioactivity from 95 to 100m in a Tertiary siltstone (refer to attached drill log).

5.3 Orthophoto Mapping Survey

Geo-Spectrum (Australia) were contracted to carry out 1:80,000 scale and 1:5,000 scale black and white aerial photography of tenement areas held by Agip on the Napperby and Mt. Doreen 1:250,000 scale map sheets and from these to produce a series of 1:20,000, 1:1,000 scale orthophoto map sheets showing Australian Map Grid (A.M.G.) co-ordinates

as well as latitude and longitude. Agip field staff set targets on various drill holes and at known geographic locations.

The 1:20,000 scale orthophoto map includes E.L. 2523 as part of the area of coverage.

5.4 Ground Geophysical Survey

V.L.F. E.M. surveys were carried out both in 1981 and in 1982. In 1981, a survey was carried out along a 3km line across the western part of E.L. 2523. The aim was to detect faults and to locate, if possible, the contact between the Proterozoic rocks and the Mt. Eclipse Sandstone. In 1982, two lines, 82-1 and 82-2 comprising a total of 30 stations were surveyed. These lines run sub-parallel to the 1981 line (see map 2523/2). A Scopas S.E. 80 receiver on loan from the Department of Mines and Energy was used. The Scopas (Single Coil Phase, Amplitude and Strike) receiver employs, as source, V.L.F. transmissions in the 15-25 kHz band. Readings were taken at 100m intervals along the line. The results were plotted using the maximum phase and the % of vertical component in the maximum phase.

Of the readings taken at 100m intervals the maximum azimuth readings appear to be the least successful. The strongest and most useful responses were gained from tilt angle and vertical component measurements. Due to the depth of conductive overburden (80 metres) these responses were still, however, relatively weak with tilt angle variations being less than 4^{o}. The double cross-over anomaly in the vicinity of drill hole NT1RD has been interpreted as being due either to a fault structure or a conductor.

NT1RD intersected dolomite and black, pyritic and carbonaceous shales of the Mt. Doreen Formation.

Appendix 1 of this report contains the V.L.F. E.M. data for the three survey lines.

6. CONCLUSIONS

Drilling on E.L. 2523 failed to intersect the Mt. Eclipse Sandstone; the only unit in the Ngalia Basin known to contain significant uranium mineralisation. Re-evaluation of drilling and geophysical data suggests that the Mt. Eclipse Sandstone does not extend eastwards into E.L. 2523.

The V.L.F. E.M. surveys failed to indicate further substantial targets for drill testing.

7. EXPENDITURE

Expenditure incurred on E.L. 2523 from October, 1980 to August, 1982, inclusive, was as follows:

Labour	$ 7,941.45
Purchases	853.33
Drilling & Logging	5,385.35
Aerial Photography	3,007.22
Geological Studies	4,519.78
Hire of Equipment	143.54
Other Services	1,022.45
Miscellaneous	3,162.04
Alice Springs Office	2,909.57
	$28,944.73

APPENDIX 1

V.L.F. E.M. SURVEYS DATA

Readings from VLF EM Survey 19th to 22nd October 1981

Base Station:- Alice Springs

Interval:- 100 metres

No. 1 Bore East Road Line

Start at east road traverse southwards.

Station No.	Max Azimuth	Tilt Angle	Vertical Component %	Comments
1	10°	0°	3	
2	10°	0°	3	
3	10°	0°	3	
4	10°	2°R	3.5	
5	8°	0°	3.5	33 paces to Peg 7 - 20
6	8°	0°	4.5	
7	10°	0°	4.5	
8	10°	0°	3.5	
9	10°	0°	3.5	31 paces south of NT 1 Hole.
10	10°	1°R	3	
11	10°	0°	3.5	
12	10°	1°R	3	
13	10°	0°	4	
14	12°	0°	3	
15	10°	1°L	4	
16	10°	1°L	3.5	
17	10°	2°L	3.5	
18	12°	0°	3.5	
19	10°	2°R	2	
20	8°	0°	3	
21	8°	2°L	3	
22	8°	1°L	3.5	
23	8°	0°	2.5	13 paces north of Y171
24	10°	0°	2	
25	10°	0°	2	
26	10°	0°	2	
27	10°	0°	2.5	
28	8°	0°	2.5	
29	10°	0°	2.5	
30	10°	0°	2	
31	10°	0°	2	

END.

LINE 82-2 NO. 2 BORE E.L. 2523

STATION	TILT °	% GAIN
82-2-1	0	2.5
82-2-2	0	2.5
82-2-3	0	2
82-2-4	0	2
82-2-5	1R	2.5
82-2-6	1R	2.5
82-2-7	1L	2.5
82-2-8	1L	2.5
82-2-9	1R	2.5
82-2-10	0	2.5
82-2-11	0	2.5
82-2-12	0	2
82-2-13	2R	1.5
82-2-14	1R	2
82-2-15	0	2.5

LINE 82-1 NO. 2 BORE E.L. 2523

STATION	TILT °	% GAIN
82-1-1	0	4.5
82-1-2	0	2.5
82-1-3	0	3
82-1-4	1L	4
82-1-5	1R	3.5
82-1-6	2R	2
82-1-7	0	2
82-1-8	0	2
82-1-9	2L	2
82-1-10	1L	3
82-1-11	0	2.5
82-1-12	0	2.5
82-1-13	1R	2
82-1-14	0	2
82-1-15	0	4

APPENDIX 2

DRILL HOLE LOGS

AGIP AUSTRALIA PTY. LTD.

BOREHOLE No. NT1R TYPE Rotary Mud Page: 1/6

Region Nº 2 BORE-EL2523 Commenced 31·5·81 Machine Schramm

Project Ngalia Basin Completed 1·6·81 Driller T. Cooper

Co-ord 13800N 60600E Total Depth 118 m Probed by Geoex

Azimuth N/A Logged by T.P. Operator J. Watler

Inclination 90° Sampled by N.B. Probed depth 115

Elevation — Contractor Rockdril Scale 1:100

Casing	Scale Depth	Bit	Run	Graphic Log	Radiom	Sample No.	ASSAYS Uppm	ASSAYS Thppm	ASSAYS Vppm	Metres	DESCRIPTION
	0				Qr						0-2 Qr soil, redbrown sandy soil
				G7	Tcss						2-4 Tc Calcrete and massive Gypsum
				G7							4-18 Tcss Calcareous sandstone
	5										
	10				Tcss						
	15										
					Tch						18-24 Tch Yellow to olive grey coarse feldspathic sand with pebbles.
	20										

REMARKS

AGIP
AUSTRALIA PTY. LTD.

BOREHOLE No. N.T.1 R TYPE _____ Page: 2/6

Region _____ Commenced _____ Machine _____

Project _____ Completed _____ Driller _____

Co-ord _____ Total Depth _____ Probed by _____

Azimuth _____ Logged by _____ Operator _____

Inclination _____ Sampled by _____ Probed depth _____

Elevation _____ Contractor _____ Scale _____

Casing	Scale 1/Depth	Rec	Run	Graphic Log	Radiom	Sample No.	ASSAYS Uppm	Thppm	Vppm	Metres	DESCRIPTION
	20				Tch						24 – 58 Tgcs plastic clay greenish gray, and sandy.
	25										
	30				Tgcs						
	35										
	40										

REMARKS

AGIP
AUSTRALIA PTY. LTD.

BOREHOLE No. NT1R TYPE _____ Page: 3/6

Region _____ Commenced _____ Machine _____

Project _____ Completed _____ Driller _____

Co-ord _____ Total Depth _____ Probed by _____

Azimuth _____ Logged by _____ Operator _____

Inclination _____ Sampled by _____ Probed depth _____

Elevation _____ Contractor _____ Scale _____

Casing	Scale Depth	Rec	Run	Graphic Log	Radiom	Sample No.	ASSAYS Uppm	ASSAYS Thppm	ASSAYS Vppm	Metres	DESCRIPTION
	40										
	45										
	50										
	55										
	60										58-62 Silt and Clay v. fine grained - dark grey color with abundant carbonaceous matter

REMARKS

AGIP AUSTRALIA PTY. LTD.

BOREHOLE No. NT1R TYPE _____ Page: 4/6

Region _____ Commenced _____ Machine _____

Project _____ Completed _____ Driller _____

Co-ord _____ Total Depth _____ Probed by _____

Azimuth _____ Logged by _____ Operator _____

Inclination _____ Sampled by _____ Probed depth _____

Elevation _____ Contractor _____ Scale _____

Casing	Scale 1:Depth	Bec.	Run	Graphic Log	Radiom	Sample No.	ASSAYS Uppm	ASSAYS Thppm	ASSAYS Vppm	Metres	DESCRIPTION
	60			N V V V							62-86 Clay with gypsum Light Brown color
	65			G1							
	70			G1							
	75			G1							
	90										

REMARKS

AGIP AUSTRALIA PTY. LTD.

BOREHOLE No. NT1R TYPE _____ Page: 5/6

Region _____ Commenced _____ Machine _____

Project _____ Completed _____ Driller _____

Co-ord _____ Total Depth _____ Probed by _____

Azimuth _____ Logged by _____ Operator _____

Inclination _____ Sampled by _____ Probed depth _____

Elevation _____ Contractor _____ Scale _____

Casing	Scale /Depth	Rec.	Run	Graphic Log	Radiom	Sample No.	ASSAYS Uppm	Thppm	Vppm	Metres	DESCRIPTION
	86										86 - 96 undifferentiated chemical sediment - gypsiferous light olive to light yellow calcareous nodules.
	90			Gy							
	95			Gy							
	100			Gy K Gy K							96 - 100 Silt stone with gypsum Pinkish white to Brown color Strong Kaolinitic Alteration of clays which are interbeded with silt

REMARKS

AGIP
AUSTRALIA PTY. LTD.

BOREHOLE No. NT1R TYPE _____ Page: 6/6

Region _____ Commenced _____ Machine _____

Project _____ Completed _____ Driller _____

Co-ord _____ Total Depth _____ Probed by _____

Azimuth _____ Logged by _____ Operator _____

Inclination _____ Sampled by _____ Probed depth _____

Elevation _____ Contractor _____ Scale _____

Casing	Scale 1Depth	Rec.	Run	Graphic Log	Radiom	Sample No.	ASSAYS Uppm	Thppm	Vppm	Metres	DESCRIPTION
	100			k gy Li k Li Gy k Gy							100 - 108 As above with Limonitic alteration as well - green clay clasts
	105										
	110			BASEMENT							108 - 118 undifferentiated Basement Siltstone Dusky yellow to mid brown color
	115										END OF HOLE AT 118m.
	120										

REMARKS

AGIP AUSTRALIA PTY. LTD.

BOREHOLE No NT1RD TYPE DIAMOND Page: 1 | 1

Region Nagalia Basin | Commenced 17/6/81 | Machine Foxmobile 3

Project Number TNO Bore | Completed 17/6/81 | Driller J. O'Connor

Co-ord 13800N 60600E | Total Depth 123·7m | Probed by GEOEX

Azimuth NA | Logged by RMG | Operator J. Watter

Inclination 90° | Sampled by — | Probed depth 120m

Elevation — | Contractor RockDrill | Scale 1:100

Casing	Scale 1:Depth	Rec	Run	Graphic Log	Radiom	Sample No.	ASSAYS Uppm	Thppm	Vppm	Metres	DESCRIPTION
	115										COMMENCED CORING AT 118m hole In MT DOREEN Formation
	120				PUQ						118 — 123·7m PUQ Dolomite pale purple red common calcite veins slikensides on joints
	125										123·7m End of hole
	130										

REMARKS

APPENDIX 3

DOWNHOLE GEOPHYSICAL LOG

E.L.A 2521

E.L. 1302

E.L. 1199

2520

E.L.A. 2522

E.L.A. 3062

E.L.A. 3068

E.L. 2081

E.L. 1199

E.L. 1199

NTIRD

E.L. 2523

E.L. 2524

Mount Wedge Homestead

Alice Springs

LEGEND

E.L. Boundary

E.L.A. Boundary

NTIRDO 1981 DRILL HOLE

V.L.F. EM. SURVEY LINE

Darwin

Alice Springs

CR82/317

Agip Australia pty. ltd.

NGALIA BASIN

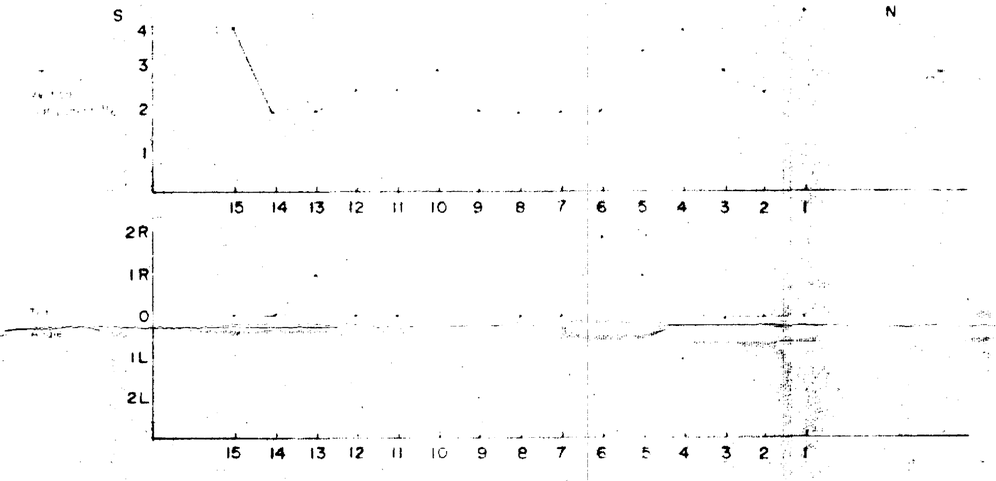
AGIP TENEMENTS

"NAPPERBY" SHEET

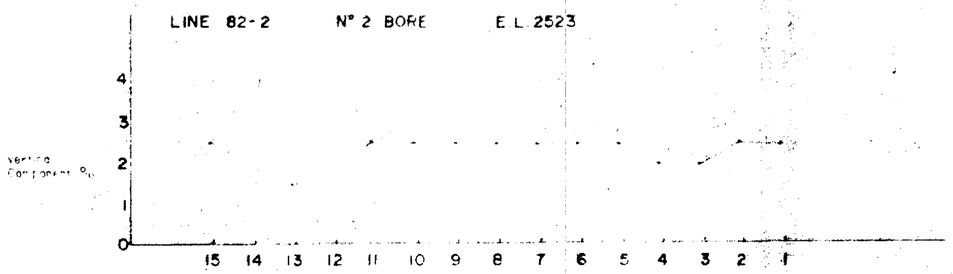
EL 2523 DRILL HOLE and V.L.F. EM. SURVEY

GEOLOGIST: M.A.M	SCALE: 1 250,000
DRAWN BY: N.D.B	DRAWING No: 2523/1
DATE: 81	

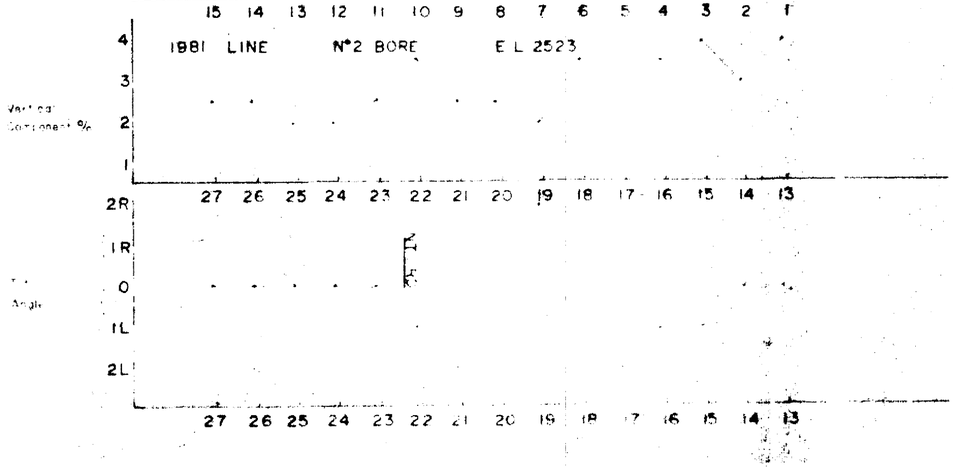
LINE 82-1 N° 2 BORE E.L. 2523 100m. STATIONS



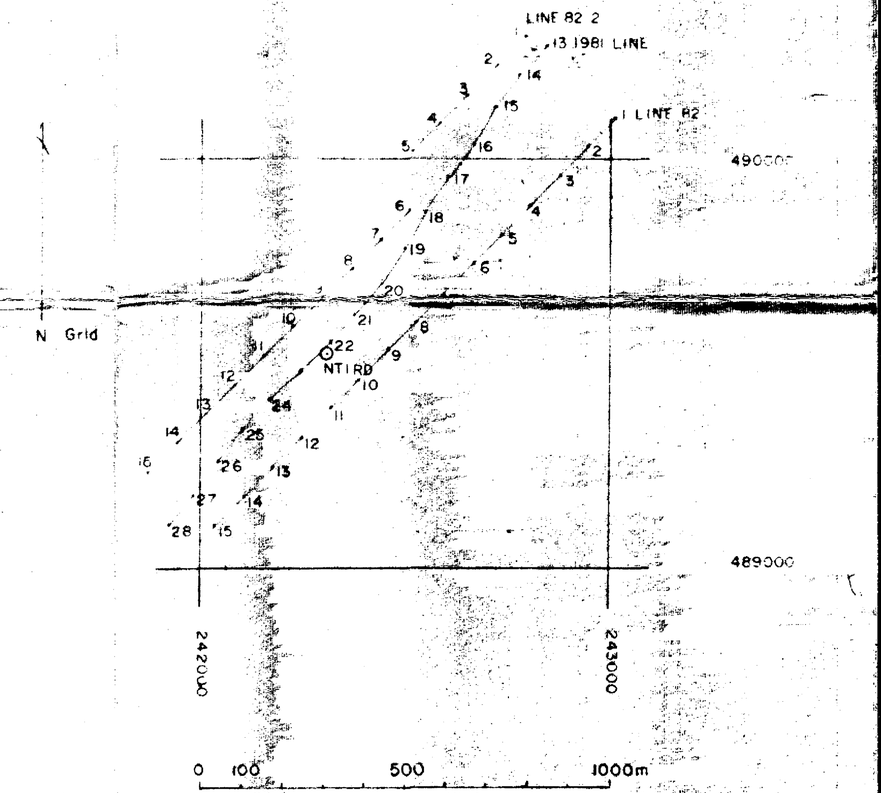
LINE 82-2 N° 2 BORE E.L. 2523



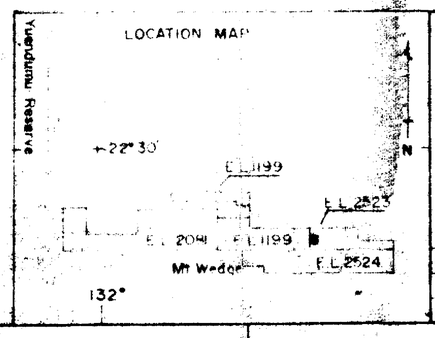
1981 LINE N°2 BORE E.L. 2523



N°2 BORE VLF EM SURVEY LINE AND STATION LOCATIONS



GRID COORDINATES REFER TO ORTHOPHOTOPLAN 480/240



Agip Australia pty. ltd.

E.L. 2523

N° 2 BORE

VLF EM PROFILES

SURVEY LINE & STATION LOCATIONS

GEOLOGIST D.G.M.	SCALE 1: 10 000
DRAWN BY S.A.	
DATE APRIL 82	DRAWING No. 2523/2

CR 82/317

GEOEX PTY. LTD.

CR82/317

NT1R

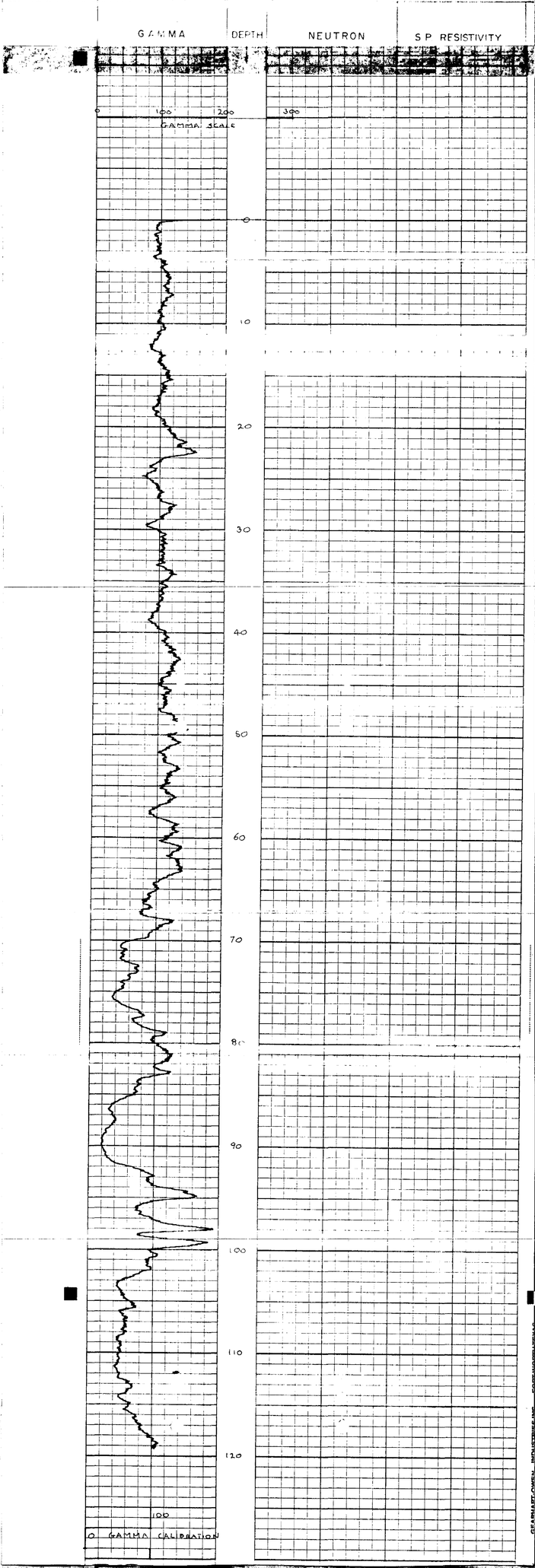
LOGGING DATA

CLIENT AGIP Aust. DATE: 17/6/81

LOCATION	
STATE	NT
REGION	NGALIA BASIN
PROJECT	NUMBER TWO BORE OPERATOR Wells
HOLE DATA	
HOLE Nº	NT 1 RD
HOLE SIZE	150mm to 118m BQ to TD
TOTAL DEPTH (m)	120.8m
CASING DEPTH (m)	PVC to 119m NQ to 118m BQ to TD
SURFACE ELEVATION	
DATUM ELEVATION	
BOREHOLE MEDIUM	WATER + MUD
FLUID LEVEL	
INTERPRETATION DATA	
PROBE Nº	L.
PROBE O.D. (mm)	43
LOGGING SPEED (m/min)	6
PAPER SPEED (m/cm)	

GAMMA	
LOGGED DEPTH (m)	120m
RANGE (cps/cm)	200 CPS
TIME CONSTANT (sec)	3
CALIBRATION STANDARD	100 API UNITS
BACKGROUND COUNTS (cps)	90-110
DETECTOR SIZE	4" x 3/4"
NEUTRON	
LOGGER DEPTH (m)	
RANGE (cps/cm)	
TIME CONSTANT (sec)	
CALIBRATION STANDARDS: 1·9%, 19%, 26% POROSITY	
SOURCE Am Be (3000 mC)	
SPACING (cm)	
ELECTRIC	
LOGGED DEPTH (m)	
RESISTIVITY SCALE (ohm/cm)	CAL STD: 100
S.P. SCALE (mV/cm)	CAL STD: 0,100
PROBE SIZE 16 m	
RESISTIVITY TYPE: SINGLE POINT	

REMARKS



CRA 82/311

LOGGING DATA

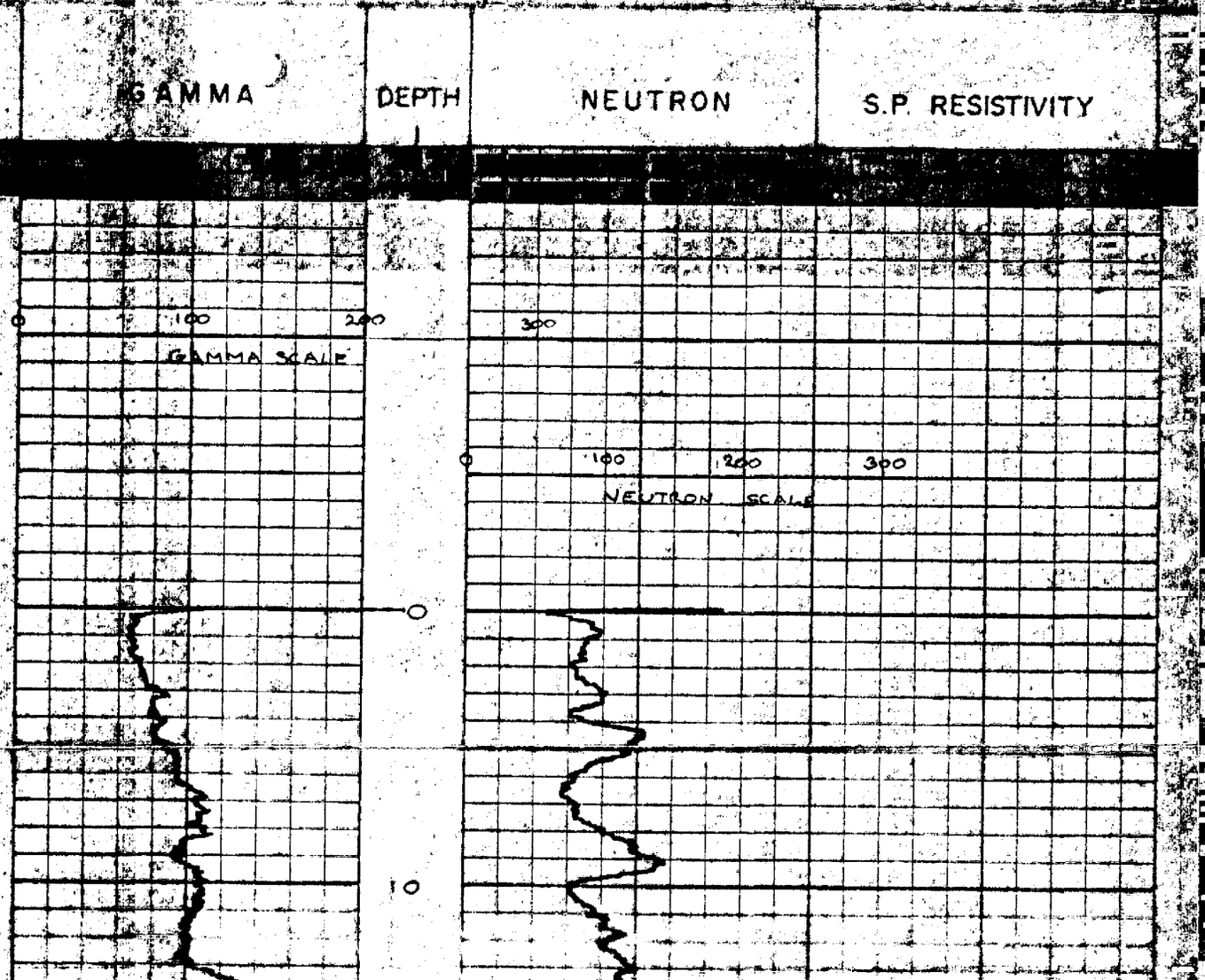
YG43F

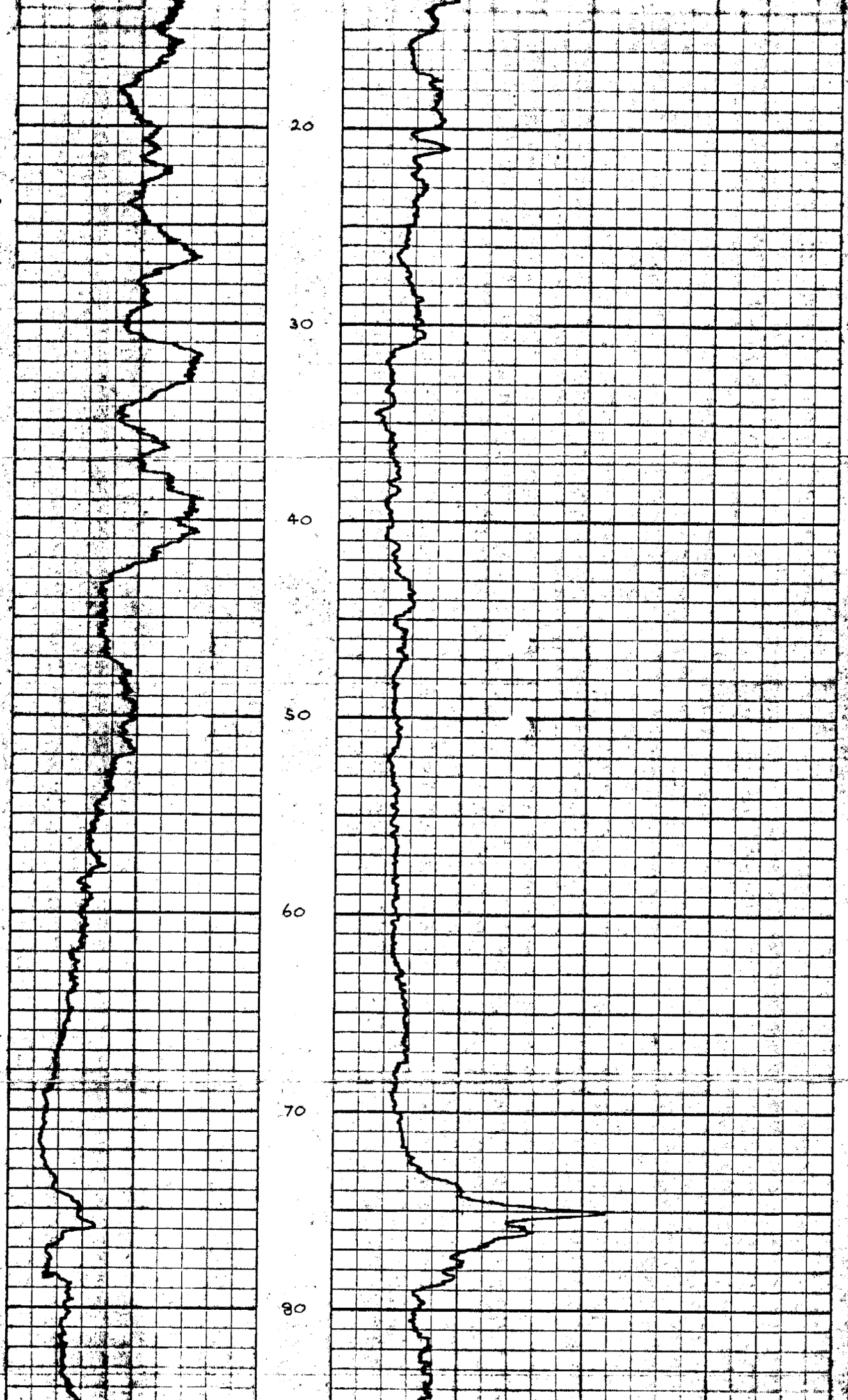
CLIENT: AGIP AUST

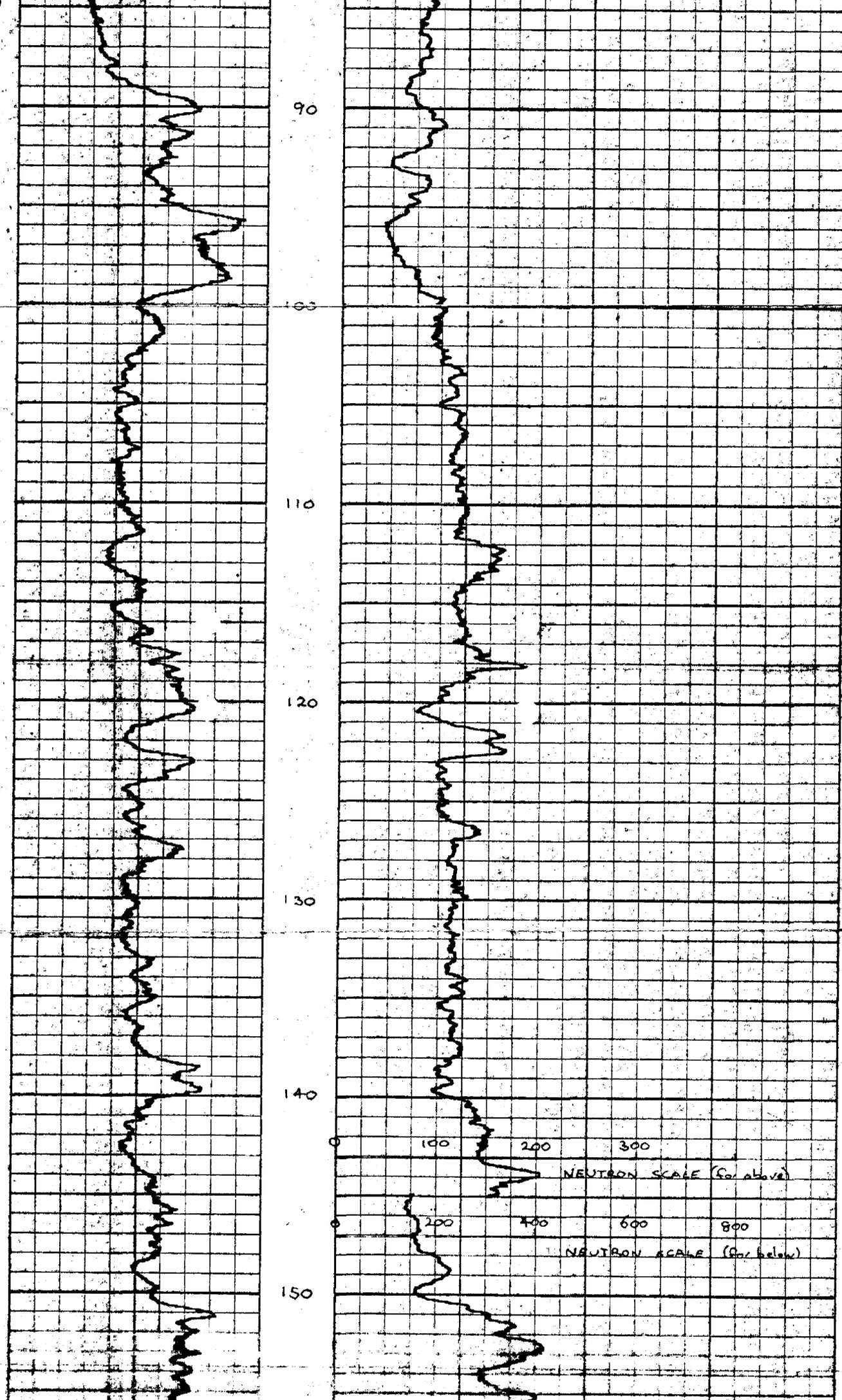
DATE: 18 · 6 · 81

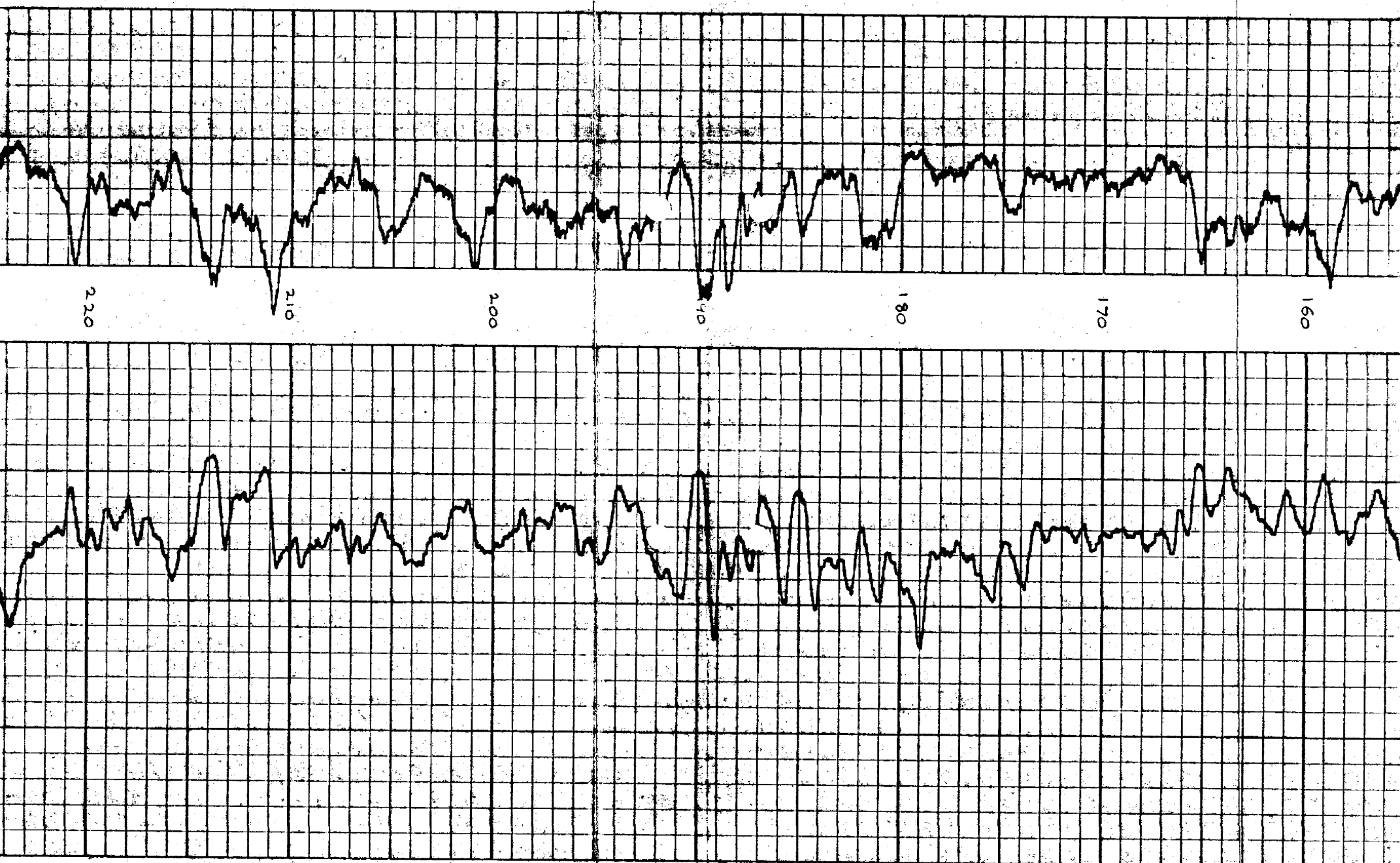
LOCATION	
STATE	NT
REGION	NGALIA BASIN
PROJECT	YARRAGANY OPERATOR J. Walter
HOLE DATA	
HOLE Nº	YG 43 RD
HOLE SIZE	150 mm to 180 m BQ to TD
TOTAL DEPTH (m)	247.5
CASING DEPTH (m)	PVC to 150 m NQ to 150 BQ to TD
SURFACE ELEVATION	
DATUM ELEVATION	
BOREHOLE MEDIUM	WATER & MUD
FLUID LEVEL	
INTERPRETATION DATA	
PROBE Nº	L.N.
PROBE O.D. (mm)	43
LOGGING SPEED (m/min)	6
PAPER SPEED (m/cm)	
REMARKS	

GAMMA	
LOGGED DEPTH (m)	246
RANGE (cps/cm)	20 cpd
TIME CONSTANT (sec)	3
CALIBRATION STANDARD	100 API UNITS
BACKGROUND COUNTS (cps)	180 - 200
DETECTOR SIZE	4" x 3/4"
NEUTRON	
LOGGER DEPTH (m)	246
RANGE (cps/cm)	25 cpd to 145 50 cpd 145 to TD
TIME CONSTANT (sec)	1
CALIBRATION STANDARDS	1·9%, 19%, 26% POROSITY
SOURCE	Am Be (3000 mC)
SPACING (cm)	
ELECTRIC	
LOGGED DEPTH (m)	
RESISTIVITY SCALE (ohm/cm)	CAL. STD: 100
S.P. SCALE (mV/cm)	CAL. STD: 0, 100
PROBE SIZE	m.
RESISTIVITY TYPE	SINGLE POINT

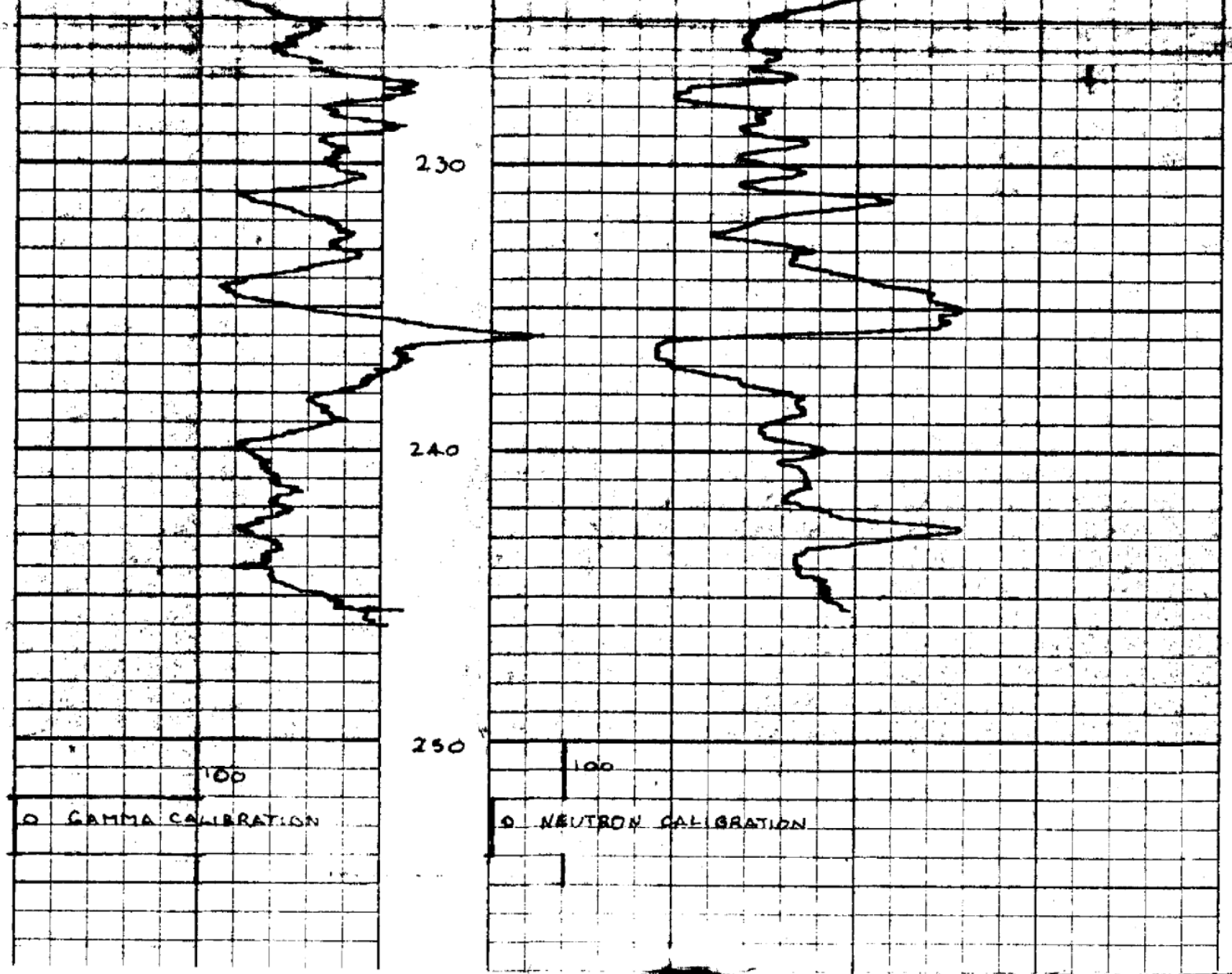



20
30
40
50
60
70
80


90
100
110
120
130
140
150
0
100
200
300
NEUTRON SCALE (for above)
0
200
400
600
800
NEUTRON SCALE (for below)
GEARHART-OWEN INDUSTRIES INC. FORT WORTH, TEXAS
API X METRIC
PART NO. TB-1652-11



RT-OWEN INDUSTRIES INC. FORT WORTH, TEXAS



GERAMAR
API X METRIC
RT NO. 15-1652-11