67

EXOIL (N.T.) PTY. LTD.

WELL COMPLETION REPORT

JAMES RANGE "A" NO. 1

by

N. R. McTaggart and R. L. Pemberton

CONTENTS

APPENDICES

ILLUSTRATIONS

64

S U M M A R Y

The James Range 'A' No. 1 well was drilled by Exoil (N.T.) Pty. Ltd. and partners as a stratigraphic and structural test of the James Range 'A' Anticline, approximately 65 miles south-west of Alice Springs in the Northern Territory of Australia.

The well was air and mist drilled to a total depth of 3,000 feet by Oil Drilling and Exploration Ltd. using a T-32 rig. Spud date was 10th April, 1965 and the well was abandoned as a dry hole on 10th May, 1965. Supervisory and geological personnel were supplied by Exoil.

2,026 feet of Cambrian Pertaoorrta Group and 974 feet of Proterozoic were penetrated. The Pertaoorrta was found to overlie steeply dipping Areyonga and Bitter Springs Formations, indicating considerable pre-Pertaoorrta uplift and erosion of the Proterozoic. The basal formation of the Pertaoorrta appears to be truncated due to onlap, thus contributing to the "bald headedness" of the structure.

Good traces of residual hydrocarbons were noted in the base of the Pertaoorrta but no significant indications of oil or gas were encountered.

RESUME OF DRILLING OPERATIONS

Air drilled $12\frac{1}{4}$" hole to 104 feet. Reamed to 20" to 100 feet. Ran 16" casing to 100 feet and cemented to surface. Drilled $13\frac{3}{4}$" hole to 240 feet with air and to 294 feet with mist. Added hammerdril to string and mist drilled $13\frac{3}{4}$" hole to 659 feet at which depth removed hammerdril. Mist drilled $13\frac{3}{4}$" hole ahead to 835 feet. Ran Induction Electric Log. Ran $10\frac{3}{4}$" casing to 829 feet and cemented to surface. Air drilled $9\frac{7}{8}$" hole to 2032 feet with reduced weight on bit to minimize deviation. Mist drilled $9\frac{7}{8}$" hole ahead to 2994 feet. Cut bottom hole core 2994' - 3000', mudded up, logged. Ran D.S.T. 2721' - 3000', recovering 2170 feet of muddy water. Abandoned well.

INTRODUCTION

James Range 'A' No. 1 was the sixth wildcat well to be completed in the Amadeus Basin, all having been drilled by the Exoil Group. The well was located in O.P. 43, issued to Magellan Petroleum Corporation, and the operation was conducted under farmout arrangements between Magellan and Exoil (N.T.) Pty. Ltd. Exoil's partners in the venture were Transoil (N.T.) Pty. Ltd. and Farmout Drillers No Liability.

The well was drilled approximately 65 miles south-west of Alice Springs to test the petroleum prospects of the Cambrian and Proterozoic sections on an anticlinal feature and to examine the Cambrian in an area of merging shale and carbonate facies. Primary targets were carbonates and sandstones in the Lower Cambrian and sandstones in the middle of the Proterozoic as seen in outcrop.

64

WELL HISTORY

GENERAL DATA:

Well Name and Number: James Range "A" No. 1.

Location: 24°10'42"S; 133°00'40"E
Map Reference - 4 mile Map G.53-1 Henbury

Name and Address of Operator:

Exoil (N.T.) Pty. Ltd.,
1st Floor, Perry House,
Elizabeth Street,
BRISBANE. QUEENSLAND

Name and Address of Tenement Holder:

Magellan Petroleum (N.T.) Pty. Ltd.,
267 Edward Street,
BRISBANE. QUEENSLAND.

Details of Petroleum Tenement:

Oil Permit 43, Northern Territory of Australia

Area: 9,918 square miles

District: Alice Springs

Total Depth: 3,000 feet

Date Drilling Commenced: 10th April, 1965

Date Drilling Completed: 8th May, 1965

Date Well Abandoned: 10th May, 1965

Date Rig Released: 10th May, 1965

Drilling Time to Total Depth: 29 days

Elevation: Ground 1587 feet (approx.)
Kelly Bushing 1600 feet (approx.)

Status: Dry and abandoned

Cost:

DRILLING DATA:

Name and Address of Drilling Contractor:

Oil Drilling and Exploration Limited,
93 York Street,
SYDNEY. N.S.W.

Drilling Plant: Make: National Ideal

Type: Rotary T-32

Rated Capacity with 4½" Drill Pipe: 7,500 feet

Motors (3): Cummins Type N.H. 1600, 200 b.h.p.

Mast: Make: Ideco

Type: Junior Fullview

Rated Capacity: 490,000 lbs.

Pumps:

Make:	Ideal	Ideal
Type:	C-250	C-150
Size:	7¼" x 15"	7¼" x 12"

Air Drilling Equipment:

Unit	Make	Type	Size	Motors
Compressors (3)	Gardner-Denver	WEK	500 c.f.m. 300 p.s.i.	G.M.C. Twin 471
Boosters (2)	Gardner-Denver	RDX	1500 c.f.m. 1500 p.s.i.	Waukesha 148 D.K.U.
Injection Pump	Bethlehem	Triplex	-	G.M.C.

Blow Out Preventor Equipment:

Make:	Hydril	Shaffer	Shaffer
Type:	G.K.	E.F. Double Gate	Rotating
Size:	12"	12"	12"
Series:	900	900	900

Hole Sizes and Depths:

20" hole from surface to 100 feet

13¾" hole from 100 feet to 835 feet

9⅞" hole from 835 feet to 2994 feet

8$\frac{11}{16}$" hole from 2994 feet to 3000 feet

Casing Details:

Size:	16"	10¾"
Weight:	56 lbs.	40.5 lbs.
Grade:	H-40	H-40
Setting Depth:	100 feet	829 feet

Casing Cementing Details:

Size:	16"	10¾"
Setting Depth:	100 feet	829 feet
Cement Used:	165 sacks	285 sacks
Cemented to:	surface	surface
Method:	Rig Pumps-Plug	B-J Cementing Unit Plug

Drilling Fluid:

James Range 'A' No. 1 was drilled from surface to total depth using air and mist as circulating fluids. While mist drilling an aqueous solution of foaming agent and corrosion inhibitor was injected at the rate of six to twelve barrels per hour. The hole was mudded up for logging at total depth.

The following mud and additives were used:-

Gel	11,200 lbs.
Caustic Soda	570 lbs.
Lime	200 lbs.
Tolfoam	529 gals.
Bi-chromate	500 lbs.

Water Supply:

A water bore was drilled for Exoil by Austral Geo. Prospectors Pty. Ltd. 200 feet from the wellsite to a depth of 160 feet. A plentiful supply of fresh water was encountered below 103 feet which was adequate for the complete drilling operation.

Plugging Back and Squeeze Cementation Jobs:

The following plugs were run when the well was abandoned.

Plug No.	Interval	Cement (sacks)	Felt At
1	1885' - 2000'	60	-
2	675' - 840'	80	675'
3	0' - 30'	15	-

LOGGING AND TESTING:

Ditch Cuttings:

Drill cuttings were caught from the end of the blooey line at ten foot intervals while drilling and five foot intervals while coring. Cuttings from air drilling were packaged as they came from the blooey line. While mist drilling, samples were washed and dried before packaging.

Four cuts were made of all samples, two for Exoil, one for Magellan Petroleum and one for the Northern Territory Administration in Alice Springs.

Coring:

Coring equipment consisted of a Hughes Tool Co. 20 foot type 'J' conventional core barrel, Hughes $7\frac{7}{8}$" and

$8\frac{3}{4}$" hard formation core heads and a 60 foot x $6\frac{1}{4}$" Christensen diamond core barrel with $8\frac{11}{16}$" diamond core head.

As no significant hydrocarbon shows were encountered all nine cores were cut in accordance with the subsidy application for stratigraphic information. Core No. 7 (2625' - 2626') was cut when Core No. 6 at 2625' failed to make any penetration. Cores 8 and 9 were taken with the diamond to ensure adequate core intervals after poor penetration of core runs 6 and 7 with conventional core heads.

The following table lists cored intervals and recoveries:-

Core No.	Interval	Amount Cored	Amount Recovered	% Recovered
1	294' - 304'	10'	4'	40
2	659' - 669'	10'	9'4"	93
3	1214' - 1222'	8'	6'5"	80
4	1790' - 1795'	5'	1'	20
5	2085' - 2100'	15'	5'3"	35
6	2625'	Nil	Nil	Nil
7	2625' - 2626'	1'	9"	75
8	2733' - 2743'	10'	10'	100
9	2994' - 3000'	6'	5'10"	97

Total footage cored: 65'

Total footage recovered: 42'7"

Percentage recovered: 66%

Electrical and other Logging:

Two logging runs were made by Welex. For the first run Induction-Electric log, hole fluid consisted of a natural water fill but the hole was mudded up prior to the run at total depth.

The following logs were run on 2" = 100' and 5" = 100' scales.

Induction-Electric Log	Run 1	:	100' - 824'
	Run 2	:	830' - 2992'
Contact-Caliper Log	Run 1	:	830' - 2994'
Acoustic-Velocity Log	Run 1	:	830' - 2990'
Gammy-Ray Log	Run 1	:	Surface - 2973'

Drilling Time and Gas Log:

Rate of penetration was recorded on a Geolograph recorder and is plotted on the composite log as minutes per five-foot interval.

As the hole was drilled with air and mist from surface to total depth, a conventional gas detector was not required. A pilot light was kept burning continuously at the end of the blooey line while drilling and coring for the purpose of detecting any significant amounts of gas encountered.

A Corelab hot-wire gas detector was available on site in the event that mud drilling was required.

Formation Testing:

Two drill stem tests were run over the interval 2721' - 3000' to evaluate porosity indicated on the Contact-Caliper log between 2750' and 3000'.

D.S.T. No. 1: 2721' - 3000'

Misrun - main valve failed to open.

D.S.T. No. 2: 2721' - 3000'

Chokes: Top - open; Bottom - open

I.S.I. Not taken Flowing 60 minutes F.S.I. 30 minutes

I.H.P.	1204 p.s.i.	F.F.P.	946 p.s.i.
I.S.I.P.	Not recorded	F.S.I.P.	959 p.s.i.
I.F.P.	366 p.s.i.	F.H.P.	1101'

Blow: Strong initial blow decreasing and dying in 50 minutes.

Recovery: 2170 feet of muddy brackish water.

Pressure Chart: Figure 3

Conclusions: Test mechanically successful, formation shows fair permeability, is brackish water bearing, sub-artesian.

 59

Detailed test information is included as Appendix 2.

Deviation Surveys:

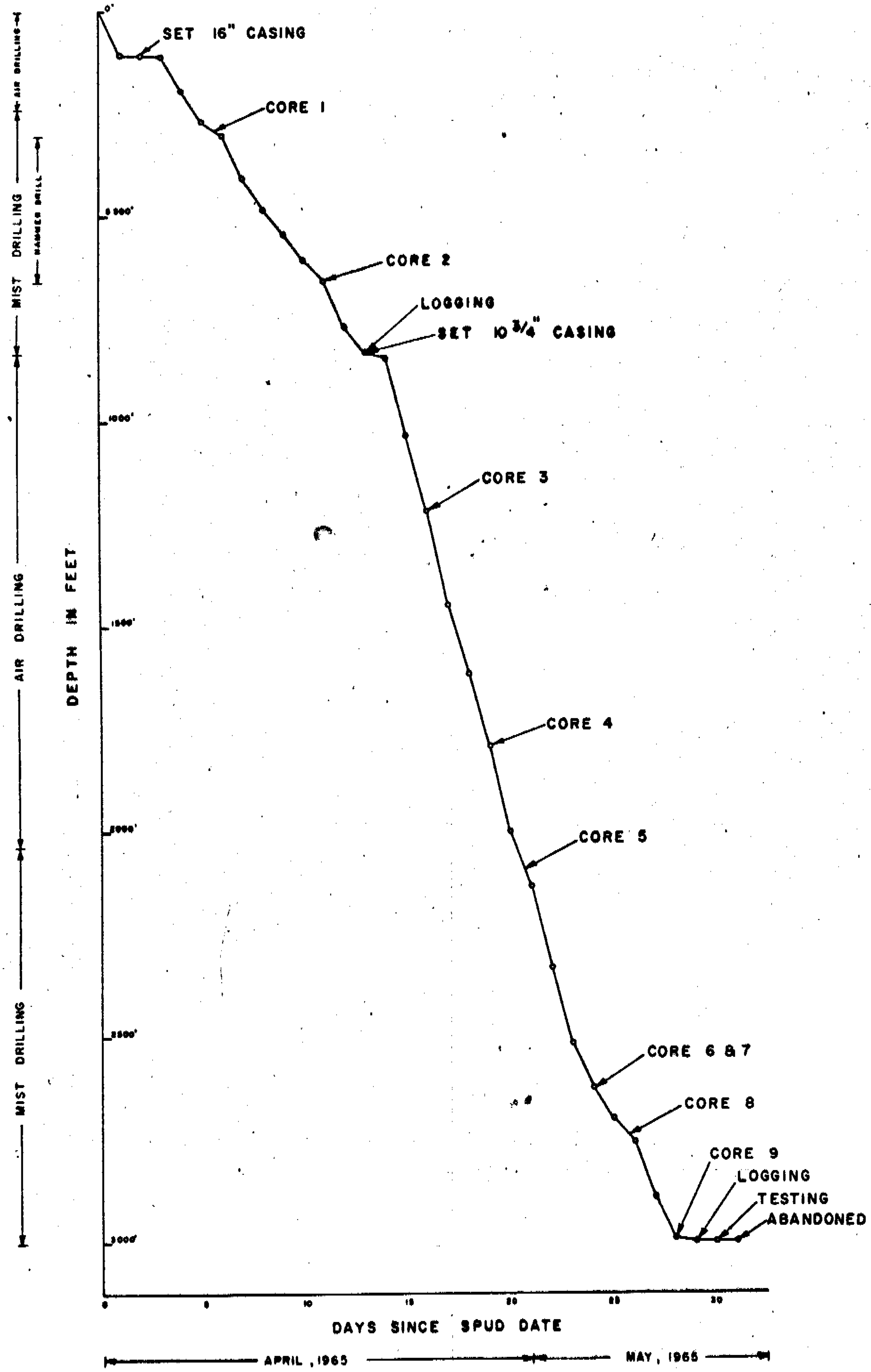
Surveys were taken using a Lane Wells "Sure-Shot" instrument run inside the drill pipe on a sand line.

Deviation was a major problem brought about by steeply dipping beds. Consequently surveys were run at closely spaced intervals and reduced drilling weights were almost always necessary to minimize deviation.

The table below lists all surveys taken:-

188' - $2\frac{3}{4}^\circ$	770' - $4\frac{3}{4}^\circ$	1690' - $4\frac{1}{4}^\circ$
250' - $4\frac{1}{2}^\circ$, 4°	800' - $4\frac{1}{4}^\circ$	1765' - $4\frac{3}{4}^\circ$
279' - $4\frac{1}{2}^\circ$	860' - 4°	1850' - 4°
320' - $3\frac{1}{4}^\circ$	920' - $4\frac{1}{2}^\circ$	1940' - $4\frac{1}{4}^\circ$
380' - $4\frac{1}{4}^\circ$	970' - $4\frac{1}{2}^\circ$	2060' - $4\frac{1}{2}^\circ$
415' - $4\frac{1}{4}^\circ$	1030' - $4\frac{1}{2}^\circ$	2150' - $4\frac{1}{2}^\circ$
438' - 5°	1090' - $4\frac{1}{4}^\circ$	2240' - 4°
470' - $5\frac{1}{2}^\circ$	1150' - misrun	2425' - 6°
490' - 5°	1211' - misrun	2455' - $5\frac{1}{2}^\circ$
530' - $5\frac{1}{4}^\circ$	1252' - misrun	2514' - $5\frac{1}{2}^\circ$
550' - $5\frac{1}{2}^\circ$	1270' - misrun	2610' - 7°
595' - $4\frac{3}{4}^\circ$	1270' - 4°	2670' - $6\frac{1}{2}^\circ$
625' - $5\frac{1}{4}^\circ$	1400' - 4°	2724' - $6\frac{1}{4}^\circ$
650' - $4\frac{3}{4}^\circ$	1453' - $4\frac{1}{2}^\circ$	2791' - $5\frac{1}{4}^\circ$
670' - $4\frac{1}{4}^\circ$	1490' - $4\frac{1}{2}^\circ$	2992' - 5°
702' - $4\frac{3}{4}^\circ$	1580' - 5°	
740' - $4\frac{1}{2}^\circ$	1608' - 5°	

FIG. 2



EXOIL (N.T.) PTY. LTD.

JAMES RANGE 'A' No. 1

TIME VERSUS DEPTH

GEOLOGY

SUMMARY OF PREVIOUS WORK

Geological:

Several geologists and expeditions have made reconnaissance or semi-detailed stratigraphic surveys of the Palmer Valley - James Ranges area. The most notable workers who have made cursory examinations of the area are Chewings, Brown, Tate (of the Horn Expedition), Ward, Mawson and Madigan.

In 1956, the Bureau of Mineral Resources commenced regional mapping of the Amadeus Basin, and Pritchard and Quinlan (1962), incorporating previous nomenclature, defined a set of type stratigraphic units in the northern part of the basin. Frome-Broken Hill Pty. Ltd. undertook regional reconnaissance mapping of the whole of the basin (inter alia Leslie, 1960) and since 1960, Magellan geologists have carried out extensive and locally detailed surveys in the basin, especially in the vicinity of anticlinal features (Stelk and Hopkins, 1962; McNaughton, 1962). Continuing their mapping programme, the Bureau of Mineral Resources covered the southern, western and central areas of the basin and instituted local nomenclature for south-western and central facies variants in the Proterozoic and Cambrian sequences (Wells, Ranford and Cook, 1963). During subsequent coverage of the Henbury 4-mile sheet, Ranford and Cook (1964) elaborated on the mapping of the James Range anticlines and presented a provisional correlation between the south-western and northern facies of the Cambrian and Proterozoic.

Geophysical:

The Bureau of Mineral Resources carried out a reconnaissance helicopter gravity survey of the central

Amadeus area in 1961 and in general, anticlinal features were shown to underlie areas of gravity maxima. The only other geophysical work done in the James Ranges' area was a gravity profile along the Finke River conducted by International Resource Surveys Incorporated and a short reflection seismic survey on the southern flank of the ranges in the vicinity of the Stuart Highway performed by Geophysical Associates Pty. Ltd. The gravity results showed profile minima over the anticlinal trend indicating a salt core, but the seismic results were inconclusive due to poor quality reflections.

Drilling:

No previous drilling for oil had been carried out in the James Range. The nearest wells were Magellan Palm Valley No. 1 and Centralia Oil Waterhouse No. 1, both in progress to the north during drilling of James Range 'A' No. 1.

REGIONAL STRATIGRAPHY

The Amadeus Basin, in its present form, occurs as a latitudinally elongate, downwarped region between the Musgrave (southern) and Arunta (northern) metamorphic-igneous complexes. However, the sediments of the basin are considered to be a merely shelf deposit remnants of a former depositional basin which extended considerably further to the north and east over the Arunta Block. The section covers strata from Upper Proterozoic to Devonian and embraces an aggregate thickness of some 20,000 feet.

In the northern part of the basin the Upper Proterozoic comprises a group of four conformable formations each of which shows evidence of deposition under marine, shallow water conditions. The basal Amadeus unit is the Heavitree Quartzite, a transgressive sandstone/siltstone sequence up to 1,400 feet thick which shows bold outcrop along the truncated northern rim of the basin. The conformably overlying Bitter Springs Limestone consists mainly of algal bearing dolomitic limestone some 3,000 feet in thickness, but varying minor amounts of shale and sandstone also occur and in places the carbonate rock has a high clastic content. The Areyonga Formation, which follows with transitional contact mainly, comprises a mixed unit of siltstones, sandstones and conglomerates of glacial aspect with limestones concentrated at the top and bottom of its sequence. Its thickness is 1,400 feet in the north central part of the basin but it thins markedly to the east and west, suggesting a deltaic accumulation of outwash material. Conformably following this unit, the unfossiliferous Pertatataka Formation comprises up to 2,000 feet of black to vari-coloured shales and siltstones with thin interbeds of glauconitic sandstones and oolitic limestones.

Along the south western margin of the basin the Dean Quartzite and the Pinyinna, the Inindia and the Winnall Beds have been respectively equated with the above four formations. A total thickness of some 14,000 feet has been estimated for these beds and each unit shows an appreciable thickening in comparison with its northern counterpart. In further contrast, local unconformity is suggested between the Inindia and the Winnall Beds in the former's type area and the latter is a distinctly sandy facies variant of the Pertatataka.

The Cambrian deposits of the Amadeus Basin are included under the composite name Pertaoorrta Group, a 5-6,000 feet marine sequence which shows an interesting clastic to carbonate facies change. The better known central facies comprises the predominantly sandy Arumbera Formation, the abundantly fossiliferous Hugh River Shale and the sandy Goyder Formation. Eastward, the uppermost two units become more carbonate rich through an increasing abundance of limestone tongues until, east of Alice Springs, this facies, the Jay Creek Limestone, occupies the entire lithological interval of the two formations.

To the west the Hugh River Shale becomes sandier, particularly in its second and uppermost quarters, whereby it is divisible into the Tempe Member, the Illara Sandstone, the Deception Member and the Petermann Sandstone. The Tempe overlies the Eninta Sandstone which is equivalent to the upper part, at least, of the Arumbera Formation. Further west, the Deception Member also changes to sand and the sequence is mapped as the 3,000 feet thick Cleland Sandstone which overlies the Winnall Beds with unconformity. The Tempe and Illara have been described under the names Mission and Gardner formations by McNaughton.

To the south of the James Ranges, the Chandler Limestone, occurring between the Eninta and the Tempe, comprises up to 300 feet of contorted cherty limestone, dolomite and minor clastics. However, the detailed stratigraphic relationship of the Chandler to the Tempe and the limits of the former's geographical distribution have not, as yet, been established.

Conformably following the Pertaoorrta is the Larapinta Group of fossiliferous marine strata. The basal unit is the Cambo-Ordovician Pacoota Sandstone, up to 2,500 feet thick, composed predominantly of clean quartz sandstone. The overlying Horn Valley Siltstone is 440' thick in the north-west but it thins and pinches out completely eastward and southward. The phosphatic Stairway Sandstone conformably overlies the Horn Valley but is more transgressive, overlapping the lower Larapintine units to the south and east where it unconformably rests upon Pertaoorrta. The formation is almost 900 feet thick in the north west and central parts of the basin but it thins eastward and southward in harmony with its contiguous formations. The top Larapinta unit is the Stokes Formation, comprising up to 2,000 feet of vari-coloured siltstones with limestones in the lower part and some transitional sands at the base.

The Mereenie Sandstone overlies the Stokes Formation conformably in the central part of the Amadeus Basin but elsewhere laps unconformably onto lower Larapintine units. Where conformity exists a basal 450 feet brown sand is always present which contains fossils of Ordovician aspect. The upper part of the Mereenie consists of some 2,000 feet of white to vari-coloured unfossiliferous, possibly continental sandstone, usually assigned to the Silurian on a residual basis. As with the underlying Larapinta units, the Mereenie Sandstone shows thining to the east and south, the latter being the more marked.

The Pertnjara Formation, at least 10,000 feet of continental clastics, overlies the Mereenie with angular unconformity. It comprises a lower siltstone section and an upper unit of red-brown to white silty and pebbly sandstone. Plant and fish remains of Devonian aspect have been found in both sections. The Pertnjara Formation is the topmost Amadeus unit and it occurs as an obscuring fill type deposit over the northern and central regions of the trough.

FORMATIONS PENETRATED:

Stratigraphic Table

Age	Lithological Unit	Formation Tops Depth	Formation Tops Subsea	Thickness
Cambrian	Hugh River Shale	Surface	+1600'	2026'+
Cambrian	Arumbera Sandstone	2026'	426'	400'
Proterozoic	Areyonga Formation	2426'	826'	170'
Proterozoic	Bitter Springs Limestone	2596'	996'	404'+

Detailed Stratigraphy:

Hugh River Shale 0' - 2026' Thickness 2026'+

Age: Cambrian

Predominately red brown micaceous, calcareous, lithic siltstone grading to shale throughout and above 600' to grey, fine to medium, felspathic, calcareous, micaceous sandstone. Also trace of white, fine to coarse non calcareous sandstone above 300'. Shale and siltstone often show mauve and grey colours, presumably as an intermediary stage of weathering from a blue grey calcareous shale parent material first apparent at 850 feet and prominent, but not abundant, below this. Dolomitic limestone minor throughout except below 1,430 feet where it becomes quite conspicuous; mostly white but also grey, blue-grey and amber, microcrystalline, occasionally cherty and styblitic and often silty, grading to shale/siltstone. Traces of gypsum, selenite and anhydrite occur throughout, the first often as (white to pink) 'dogs-tooth spar' gypsum-calcite association.

Arumbera Formation 2026' - 2426' Thickness 400'

Age: Cambrian

Mainly grey, pink, mauve and amber, fine to coarse, quartzose sandstone, some of which, below 2210 feet, becomes clean, white, hard and silicified, showing abundant amber chert apparently as drilled up boulders. Black interstitial material, resembling residual hydrocarbon, common to 2280 feet. Red-brown to blue-grey siltstone and shale, as for Hugh River Shale, attain dominance in middle of formation but for the remainder they are in minor quantity. Traces of white dolomite and blue grey sandy dolomite and dolomitic shale below 2180 feet. Slight trace of nodular to reniform haematite below 2340 feet. On the logs the formation is demarcated by an inverted S.P. curve and by cycle skipping on the Sonic curve, both due to its aquifer characteristics.

Areyonga Formation 2426' - 2596' Thickness 170'

Age: Upper Proterozoic

2426' - 2515' - the principal lithological types appear to be red brown (with trace of grey to blue-grey) siltstone, and white, grey, pink and amber chert. Some chert occurs as pebbles or possibly boulders in pink sandstone, but for the most part it appears to exist as massive beds which show brown to colourless siliceo-calcareous oolites in the 2426' - 2440' interval. Minor red-brown to blue-grey micaceous shale throughout. 2515' - 2596' - section is half red-brown siltstone as above, but remainder comprises a mottled tan and white dolomitic, gypseous sandstone which grades to sandy dolomitic limestone. Below 2560', mottling decreases and sandstone becomes clean quartzose. Traces red-brown, blue-grey, and black shale and grey dolomite occur especially above 2580'.

The top of the Areyonga Formation is placed at the extremely slow sonic break and very high gamma kick at 2426' which coincided with a marked S.P. shift at the base of the Arumbera aquifer system. This top agrees with the first appearance of large quantities of varicoloured oolitic chert, and with a marked increase in the deviation of the hole.

Bitter Springs Limestone 2596' - 3000' Thickness 404'+

Age: Upper Proterozoic

Almost entirely white to grey with minor pink, mauve, amber and grey-green dolomitic limestone with interbeds of similar breccia below 2870'. - mainly dense, microcrystalline, massive, styblitic, occasionally oolitic, highly invaded by veins, irregular ramifications and impregnations of white, colourless, amber and pink chert. Also some thin chert interbeds with trace oolites. Algal stromatolites abundant in bedded carbonate and also in blocks in breccia. Red brown to grey green siltstone minor but persistent throughout and in places dolomitic limestone becomes argillaceous to sandy. Cores show formation to be heavily fractured, jointed and steeply inclined at inconsistent angles.

The top of the Bitter Springs was selected at the change from clastics to predominantly carbonate, which point coincides with very marked shoulders on the Gamma-Acoustic log.

STRUCTURE

James Range 'A' No. 1 well was drilled approximately a thousand feet south of the axis of the James Range 'A' Anticline. The periphery of the anticline is well defined from bold outcrop of Goyder/Pertnjara Formations but the recessive axial inlier of Hugh River Shale shows but vague structural expression in fingers of resistant dolomitic limestone. The anticline is over 24 miles in length and about ten miles across, the flanks being unequally inclined at dips up to 35° on the northern and occasionally to 60° on the southern. By comparison, closure is small around the eastern end of the structure where it merges into the en echelon disposed James Range 'B' Anticline.

James Range 'A' Anticline lies on an anticlinal hinge line which extends from the Gardner Range in the west, through the James Range structures eastward through the Mt. Burrel Anticlinorium to a metamorphic inlier near Hale River. North of this line the Amadeus Basin shows considerable downwarp of strata, a thick fill of Pertnjara Formation, gentle fold elements and reasonably good conformity between stratigraphic units. In contrast, the area to the south of this alignment is characterised by severe faulting, major unconformities and hiati, and appreciable post-depositional folding. For example, in the faulted Gardner Range Anticline, the Pertaoorrta Group rests with marked angular unconformity upon eroded Pertatataka, Areyonga and Bitter Springs, indicating considerable uplift and erosion of the Proterozoic prior to deposition of the Pertaoorrta. Incipient positive folding of the Palaeozoic strata has produced a typical "bald headed" anticlinal feature. While it was realised that this type of structural configuration possibly extended eastward to the James Ranges, surface mapping tended to indicate that the severity of the Pre-Pertaoorrta breaching was decreasing in that direction and consequently the James Range 'A' No. 1 well was programmed for a reasonably full stratigraphic section. Drilling, however, showed that the James Range 'A' Anticline is as equally "bald headed" as the Gardner Range outcrop and possibly even more so on its crest.

REVELANCE TO OCCURRENCE OF PETROLEUM

No significant indication of hydrocarbons was encountered in James Range 'A' No. 1. Through the interval 2000' - 2280', i.e. the extreme base of the Hugh River and the upper two thirds of the Arumbera formations, a black interstitial residue was noted on sand grains. This material did not fluoresce or show any cut with solvent and was interpreted as being an asphaltic residue possibly indicating the former existence of higher hydrocarbons within the beds.

POROSITY AND PERMEABILITY OF SEDIMENTS PENETRATED

The generally pelitic nature of the Hugh River Shale precludes any form of intergranular porosity and the section appeared to lack any reservoir characteristics from sample observations. Yet a fairly good aquifer was encountered at 390' and positive separation on the Contact log indicates porosity in the intervals 890' - 900', 1000' - 1030', 1130' - 1150', 1520' - 1550' and 1560' - 1590'. It is therefore concluded that some porosity due to fracturing must exist and that in all cases except the aquifer, permeabilities are low or non-existent, an observation that is supported by the absence of mudcake buildup on the Caliper log. Lost circulation into the aquifer at 390' was experienced while mudding up for logs.

The Arumbera Formation contains two aquifers, a fresh water zone at the top and a slightly brackish zone at its base, both coinciding with the almost predominantly sand horizons shown on the percentage lithological logs. Mudcake buildup is indicated on the caliper log throughout the formation and also at 2426', the point selected as the unconformity between the Arumbera and the Areyonga. Porosity in the Arumbera is intergranular and it was noted in many of the cuttings that the grains in the sandstones had parted readily under the forces exerted by the bit.

In the Bitter Springs penetrated section, some poor Contact log separation occurs in the intervals 2765' - 2795' and 2870' - 2900' where permeability is shown by mudcake buildup. These indications were supported by good pressure readings and a water recovery of 2170' in Drill Stem Test No. 2 which covered this, the only prospective interval in the formation. No doubt this permeability and porosity is partly due to fracturing or brecciation since both these were commonly noted in cores.

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JAMES RANGE 'A' NO. 1 WELL

CORE DESCRIPTIONS

Core No. 1: 294' - 304' recovered 4'

Red brown siltstone with thin beds of grey sandstone and red brown shale. Sandstone 10-20% of core. Dark to light grey, micaceous, very felspathic, variably calcareous. Fine to medium grained, poorly sorted, contains numerous wafers and inclusions of red brown shale. Occurs in beds less than 1 inch thick, highly lenticular, interbedded with siltstone, shale. Siltstone 70-80% red brown mainly, occasionally grey. Former grades to shale, latter to fine sandstone. Extremely micaceous, calcareous, gritty in quartz grains, some visible lithic grains. Colour due to red brown aphanitic matrix. Shale 20% red brown, micaceous, not particularly calcareous, occurs mainly as thin laminae and lenses in siltstone and sandstone. Apart from calcite filled vughs, core is dense and tight,though extremely absorptive.

Dip of core 18°.

No petroleum indications. Top of core appears to be present - core broken suggesting loss is from bottom.

Core No. 2: 659' - 669' recovered 9'4"

Core is predominantly, at least 90%, red brown siltstone, extremely micaceous, variably lithic and calcareous. Contains anastomosing stringers of pale brown similar coarse siltstone which occasionally grades to fine to medium grained sandstone. Quartz grains in sandstone are minor constituent set in yellowish-brown aphanitic matrix. On the other hand, siltstone grades to irregular beds, often anastomosing, of mauve coloured micaceous shales. These tend to give rock a felted appearance. Vugular masses and both concordant and discordant veins of "dog's tooth" gypsum are common throughout core. Dip of core difficult to determine due to general massive nature of rock - varies 15° - 25°.

No petroleum indications. Top and bottom of core present - loss is decidely from 666'9" - 667'9" interval.

Core No. 3: 1214' - 1222' recovered 6'5"

Core is predominantly red brown siltstone (80% of core) identical with that from Core No. 2 (659' - 669'). Siltstone is micaceous and calcareous. Bedding is accentuated by anastomosing thin stringers of red brown to mauve shale identical with the matrix of the siltstone. Red brown material is seen to be the weathering product of a blue green to blue grey dolomitic silty shale. Contacts between fresh and weathered materials are irregular and haphazardly transgress bedding plans. Irregular anastomosing and vugular masses of gypsum occur throughout both types of material.

Dip of core 20 - 25°.

No petroleum indications. Top of core present - some loss throughout due to grinding of sections against one another but main loss considered to be from bottom of core.

Core No. 4: 1790' - 1795' recovered 1'

Predominantly red brown to mauve siltstone, variably calcareous lithic, micaceous. Grades to blue grey siltstone in a mottled fashion proving it to be a weathering product of the fresher blue grey material. Thin interbeds to ⅛" thickness of blue grey to white cherty dolomite occur, heavily stained with limonite. Bottom of recovered interval shows red brown weathered zone cutting across well interbedded mauve siltstone and thin dolomite. Clastic dykes of mauve siltstone also transgress bedding. Veins or fracture fillings of selenite and anhydrite and vugular masses of gypsum also occur.

No petroleum indications. Dip 15°.

Top of core present. Cones on corehead locked - loss of core from bottom of run. Core recovered showed all information desired - considered no point in making another run.

Core No. 5: 2085' - 2100' recovered 5'3"

Banded grey and mauve silty sandstone. Mauve sections comprise fine interbeds of mauve and lilac coloration varying to thicker bands of predominantly lilac. Visible grains are mainly fine to medium quartz and minor felspar, angular to rounded, set in a silty aphanitic matrix. Rock is micaceous, non calcareous and has a fair amount of black resinous interstitial material resembling asphalt. Trace of intergranular porosity in places but, even though absorptive, core shows evidence of extremely low effective porosity. No other indications of petroleum.

Dip 15° - 20°. Loss of core from bottom due to mechanical failure of core catcher.

Core No. 6: 2525' cut 2" recovered nil.

Core No. 7: 2625' - 2626' recovered 9"

Mainly dense microcrystalline, light grey to white massive dolomite, highly invaded by white to colourless chert to point of crystal replacement and has veins and irregular ramifications. Some of latter appear to have geometric pattern and may be replacement after organic remains. Veins have calcite in association and some gypsum may also be present. Black wavy anastomosing markings traverse the rock in places but do not seem to have any pattern or relation to bedding. Relict bedding seen in places by alternating laminae of white dolomite and neutral chert, latter discontinuous.

No petroleum indications. Dip 50° - 70°.

Core No. 8: 2733' - 2743' recovered 10'3"

Dense, grey to mauve grey (white on broken surfaces) and minor pink dolomite with interbeds of neutral chert as for Core No. 7. Also chert impregnation of dolomite and some chert, calcite organic structures. Trace interbedded grey shale. Core fresh brittle, mainly, but heavily jointed and in places weathered and vuggy. Black filling common in joints and along some bedding planes. Rock for most part massive, relict bedding occasionally seen only where accentuated by chert. Beds folded quite tightly locally but dips average 30° varying 25° to 35°. No petroleum indications.

Core No. 9: 2994' - 3000' recovered 5'10"

Grey dolomite breccia comprising angular fragments of grey silicified, pyritic dolomite and sandy dolomite tightly cemented together by a pink and grey carbonate-clastic matrix. Some of pink staining runs into clasts but for most part is confined to the detrital matrix. Quite a number of clasts contain rounded and elongate chert replaced pelletal impressions. Gypsum-calcite veins are common in places within the matrix. Occasionally the matrix is weathered showing the clasts in marked relief. The only porosity in the rock is where the matrix has been removed but this is very limited. Interval 2996'6" - 2997'2" is a dolomite fragment crowded with algal stromatolithic impressions. No petroleum indications in core. Dip of core indeterminate.

EXOIL NO LIABILITY

DRILL STEM TEST REPORT

Well: James Range "A" Elevation K.B.: 13.5' above G.L.: ________ Date: 9th May, 1965.

Test No.: 1 Interval: 2721'-3000' Operator: O.DE

Tester, Size & Type: Johnston 4¾" Packer, Size & Type 9" Open Hole.

Anchor, Length & O.D.: 279' x 4½" Drill Collar Footage above Tester: 352.5'

Capacity (bbl./foot) - Drill Pipe: .01422 Drill Collars: ________

Pressure Bombs (Type: T1 Position: Bottom; T1 Above Packer

Anchor Perforations (From 2753' To 2773'; (From ____ To ____

Disk Valve Position: NIL Water Cushion: NIL Mud Wt.: 10.8 Vis: 45

Chokes - Top: NIL B.H.: NIL Drill pipe, size & Type: 4½" F.H.

Full Hole, Size & Depth: 9⅞" x 2994' Rat Hole, Size & Depth: 8-11/16" x 6'

Mud Level, Before Valve Opened: Surface After Valve Opened: Surface

Time Record: Started In: 4 p.m. Set Packer: 6.35 pm Valve Opened: 6.37 p.m.

Disk Broken: No disc Valve Shut: 7.07 pm Pulled Packer: 7.35 pm Out of Hole: 9.30 pm

Nature of Blow: ________

Gas flow Measuring Method: ________

Time: ________

Reading: ________

Rate of Flow: ________

Oil or Water Flow: ________

Fluid Recovery: ________

Chart Readings: Time Elapsed, mins: ISI ____ Flowing: ____ FSI ____

Pressures: IHP ____ ISIP ____ IFP ____ FFP ____ FSIP ____ FHP ____

Maximum Temperature: ________

Samples: ________

Remarks: Misrun - main valve did not open

Geologist: N. R. McTaggart

EXOIL NO LIABILITY

DRILL STEM TEST REPORT

Well: James Range "A" Elevation K.B.: 13.5' above G.L.: ______ Date: 10th May, 1965.

Test No.: 2 Interval: 2721'-3000' Operator: O.D.E.

Tester, Size & Type: Johnston 4¾" Packer, Size & Type 9" Open hole.

Anchor, Length & O.D.: 279' x 4½" Drill Collar Footage above Tester: 352.5'

Capacity (bbl./foot) - Drill Pipe: .01422 Drill Collars: ______

Pressure Bombs (Type: T1 Position: Bottom
(T1 Above Packer

Anchor Perforations (From 2753' To 2773'
(From ______ To ______

Disk Valve Position: NIL Water Cushion: NIL Mud Wt.: 10.8 Vis: 45.

Chokes - Top: NIL B.H.: NIL Drill pipe, size & Type: 4½" F.H.

Full Hole, Size & Depth: 9⅞" x 2994' Rat Hole, Size & Depth: 8-11/16" X 6'

Mud Level, Before Valve Opened: Surface After Valve Opened: Surface

Time Record: Started In: 1.30 a.m. Set Packer: 3.23 a.m Valve Opened: 3.25 a.m.

Disk Broken: No disc Valve Shut: 4.25 Pulled Packer: 4.55 Out of Hole: 7 a.m.

Nature of Blow: Strong initial blow decreasing & dying completely in 50 mins.

Gas flow Measuring Method: ______

Time: ______

Reading: ______

Rate of Flow: ______

Oil or Water Flow: ______

Fluid Recovery: 2170 feet of muddy, brackish water.

Chart Readings: Time Elapsed, mins: ISI - Flowing: 60 min. FSI 30 min.

Pressures: IHP 1204 ISIP - IFP 366 FFP 946 FSIP 959 FHP 1101

Maximum Temperature: ______

Samples: 2 x ½ gallon samples from top of column
2 x ½ " " " bottom " " .

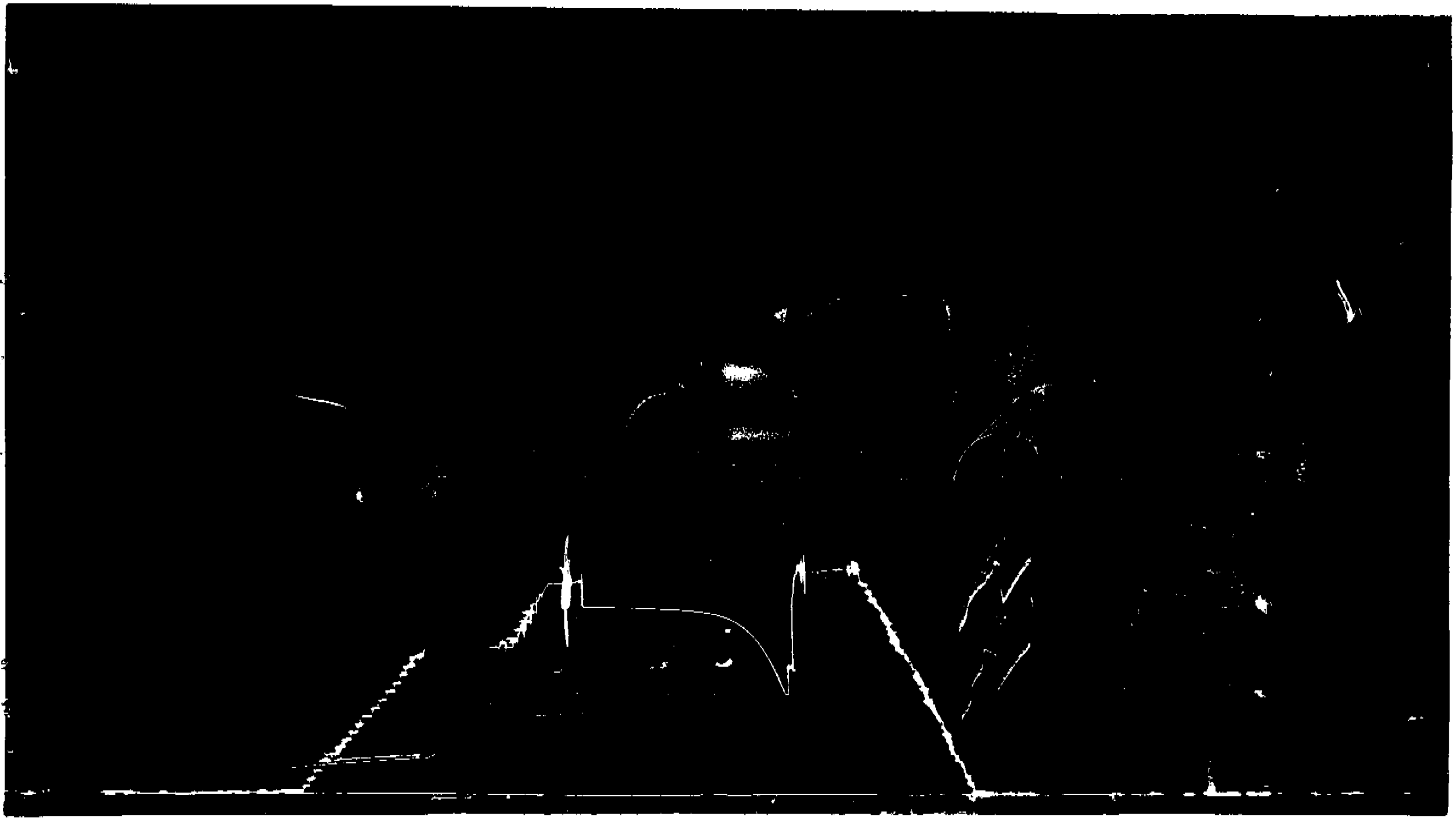
Remarks: Test mechanically successful. Readings taken from bottom chart. Test made to evaluate porosity indicated on microlog 2750' - 3000'.

Geologist: N. R. McTaggart

FIG. 3

E X O I L N. L. D. S. T. No. 2 J A M E S R A N G E

"A" No. 1 B O T T O M R E C O R D E R 2721 - 3000'



NORTHERN TERRITORY ADMINISTRATION—ANIMAL INDUSTRY BRANCH

WATER ANALYSIS

Origin of water JAMES RANGE EXCIL. BORE NO. 2

Reference Sn 65/583

Specimen Advice Note No. 9736

Date sampled 30/4/65

Date received 5/5/65

* Results in milligrams per litre of filtered sample.

Recommended Maximums (see over page).

	Sample	Domestic	Stock	Agriculture
HARDNESS (calculated as $CaCO_3$)—				
" Total	492	500	—	—
" Carbonate	269	—	—	—
" Non-Carbonate	223	—	—	—
ALKALINITY IN EXCESS OF TOTAL HARDNESS	Nil	—	—	—
CHLORIDE	320	500	—	—
SULPHATE	169	250	2,000	—
BICARBONATE	328	—	—	—
		Child 20	—	—
NITRATE	Nil	Adult 120	—	—
FLUORIDE	0.5	1.5	5.0	—
CARBONATE	Nil	—	—	—
SODIUM	184	—	—	—
POTASSIUM	19	—	—	—
CALCIUM	111	100	—	—
MAGNESIUM	52	100	300	—
TOTAL DISSOLVED SALTS	1184	3,000	8,000	1,000
RESIDUE ON EVAPORATION	-	3,000	8,000	1,000

pH 8.2

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The sample, as analysed, is chemically unsuitable for human consumption due to the excess calcium content of the water.

Signature [signature]

Date 15-6-65.

* 14.3 milligrams per litre equals 1 grain per gallon. 437.5 grains equals 1oz.

NORTHERN TERRITORY ADMINISTRATION—ANIMAL INDUSTRY BRANCH

WATER ANALYSIS

Origin of water JAMES RANGE A

EXOIL NO. 1 2025-2400'

Reference Sn 65 / 591

Specimen Advice Note No. 9741

Date sampled 10/5/65

Date received 11/5/65

* Results in milligrams per litre of filtered sample.

Recommended Maximums (see over page).

	Sample	Domestic	Stock	Agriculture
HARDNESS (calculated as $CaCO_3$)—				
" Total	1,970	500	—	—
" Carbonate	137	—	—	—
" Non-Carbonate	1,833	—	—	—
ALKALINITY IN EXCESS OF TOTAL HARDNESS	Nil	—	—	—
CHLORIDE	2,180	500	—	—
SULPHATE	3,430	250	2,000	—
BICARBONATE	167	—	—	—
		Child 20	—	—
NITRATE	Not Determined	Adult 120	—	—
FLUORIDE	" "	1.5	5.0	—
CARBONATE	Nil	—	—	—
SODIUM	2,325 Approx.	—	—	—
POTASSIUM	52	—	—	—
CALCIUM	592	100	—	—
MAGNESIUM	119	100	300	—
TOTAL DISSOLVED SALTS		3,000	8,000	1,000
RESIDUE ON EVAPORATION	9,450	3,000	8,000	1,000

pH 7.7

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The above results are forwarded for your information.

Signature Donald L. Newman

Date 21-6-65.

* 14.3 milligrams per litre equals 1 grain per gallon. 437.5 grains equals 1oz,

NORTHERN TERRITORY ADMINISTRATION—ANIMAL INDUSTRY BRANCH

WATER ANALYSIS

Origin of water JAMES RANGE A BORE NO. 1 EXOIL DST NO. 2 2721-3000 TOP

Reference Sn 65/ 591

Specimen Advice Note No. 9741

Date sampled 10/5/65

Date received 11/5/65

* Results in milligrams per litre of filtered sample.

Recommended Maximums (see over page).

	Sample	Domestic	Stock	Agriculture
HARDNESS (calculated as $CaCO_3$)—				
" Total	1,370	500	—	—
" Carbonate	88	—	—	—
" Non-Carbonate	1,282	—	—	—
ALKALINITY IN EXCESS OF TOTAL HARDNESS	Nil	—	—	—
CHLORIDE	1,080	500	—	—
SULPHATE	4,780	250	2,000	—
BICARBONATE	18	—	—	—
		Child 20	—	—
NITRATE	Not Determined	Adult 120	—	—
FLUORIDE	" "	1.5	5.0	—
CARBONATE	44	—	—	—
SODIUM	2,500 Approx.	—	—	—
POTASSIUM	32	—	—	—
CALCIUM	546	100	—	—
MAGNESIUM	1	100	300	—
TOTAL DISSOLVED SALTS	—	3,000	8,000	1,000
RESIDUE ON EVAPORATION	9,250	3,000	8,000	1,000

pH 9.7

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The above results are forwarded for your information.

Signature [signature]

Date 21-6-65

* 14.3 milligrams per litre equals 1 grain per gallon. 437.5 grains equals 1oz.

NORTHERN TERRITORY ADMINISTRATION—ANIMAL INDUSTRY BRANCH

WATER ANALYSIS

Origin of water JAMES RANGE A.BORE NO. 1 EXOIL DIST NO. 2 2771-3000' BOTTOM

Reference Sn 65 / 591

Specimen Advice Note No. 9741

Date sampled 10/5/65

Date received 11/5/65

* Results in milligrams per litre of filtered sample.

	Sample	Recommended Maximums (see over page). Domestic	Stock	Agriculture
HARDNESS (calculated as $CaCO_3$)—				
" Total	1,340	500	—	—
" Carbonate	50	—	—	—
" Non-Carbonate	1,290	—	—	—
ALKALINITY IN EXCESS OF TOTAL HARDNESS	Nil	—	—	—
CHLORIDE	1,100	500	—	—
SULPHATE	3,796	250	2,000	—
BICARBONATE	45	—	—	—
		Child 20	—	—
NITRATE	Not Determined	Adult 120	—	—
FLUORIDE	" "	1.5	5.0	—
CARBONATE	8	—	—	—
SODIUM	2,300 Approx	—	—	—
POTASSIUM	36	—	—	—
CALCIUM	504	100	—	—
MAGNESIUM	19	100	300	—
TOTAL DISSOLVED SALTS	-	3,000	8,000	1,000
RESIDUE ON EVAPORATION	8,350	3,000	8,000	1,000

pH 9.0

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The above results are forwarded for your information.

Signature [signature]

Date 21-6-65

* 14.3 milligrams per litre equals 1 grain per gallon. 437.5 grains equals 1oz.

PR65 123B

COMPOSITE WELL LOG

EXOIL (N.T.) PTY. LTD. ET. AL.

JAMES RANGE 'A' No. I

PETROLEUM TENEMENT: O.P. 43 STATE: NORTHERN TERRITORY 4-MILE SHEET: HENBURY BASIN: AMADEUS

WELL STATUS: PLUGGED & ABANDONED

LOCATION Lat. 24° 10' 42"
Long. 133° 00' 40"

ELEVATION Ground 1587 feet (approx)
K.B. 1600 feet (approx)

Date Spudded: 10 th. April, 1965
Date Drilling Stopped: 8 th. May, 1965
Date Rig Released 10 th. May, 1965

Total Depth Driller 3000
E. Log 2997

Hole Size	Inches	From	To
	20	0	100
	13 3/4	100	835
	9 7/8	835	2994
	8 11/16	2994	3000

Casing Size	Inches	Wt.	Gr.	Depth	Cmt.	Cmt'd to
	16	56	H-40	100	165 sax	Surface
	10 3/4	40.5	H-40	829	285 sax	Surface

Cement Plugs	From	To	Sacks
1.	1885	2000	60
2.	675	840	80
3.	0	30	15

Well Head Fitting:
Drilled by: Oil Drilling and Exploration Ltd.
Logged by: Welex
Drilling Method: Rotary
Cemented by: Oil Drilling and Exploration & B.J. Services
Mud Logging by: Nil
Lithology by: N.R. Mc Taggart

INDUCTION - ELECTRICAL LOG DATA

RUN No.	1	2		
Date	23-4-65	9-5-65		
First Reading	824	2992		
Last Reading	100	830		
Interval Measured	724	2162		
Casing Welex	100	830		
Casing Driller	100	829		
Depth Reached	829	2997		
Bottom Driller	835	3000		
Mud Nature	Water	Gel/Water		
Density / Viscosity		8.7/40		
Mud Resistivity	4.7	1.4		
Mud Resistivity BHT		1.04/112°F		
pH / Fluid Loss cc/30min.		10.0/6.0		
Origin of Sample	Flow line	Flow line		
Rmf		1.04		
Rmc		1.64		
Bit Size	13 3/4	9 7/8		
Casing Size	16	10 3/4		
Opr. Rig Time				
Truck No.		3222		
Recorded by	C. Myers	C. Myers		
Witness	Mc Taggart	Mc Taggart		

RADIOMETRIC LOG DATA

Type of Log	Gamma Ray
Run No.	1
Date	9-5-65
Total Depth Driller	3000
Top Logged Interval	10
Bottom of Logged Interval	2990
Type of Fluid in Hole	Mud
Fluid Level	Surface
Maximum Recorded Temperature	112°F
Neutron Source, Strength and Type	
Source Spacing — In.	
Length of Measuring Device	28"
O.D. of Instrument — In.	3 5/8"
Time Constant — Secs.	1.5
Logging Speed Ft./min	40
Statistical Variation	± 20 units
Sensitivity Reference	80 units/in
Recorded by	C. Myers

CASING RECORD					OPEN HOLE RECORD		
Run No.	Size-In.	Wt.-Lbs.	Interval - Ft. from	to	Bit Size - In.	Interval - Ft. from	to
Cond.	16		Surface	100	13 3/4	829	835
	10 3/4		Surface	829	9 7/8	835	2994
					8 11/16	2994	3000

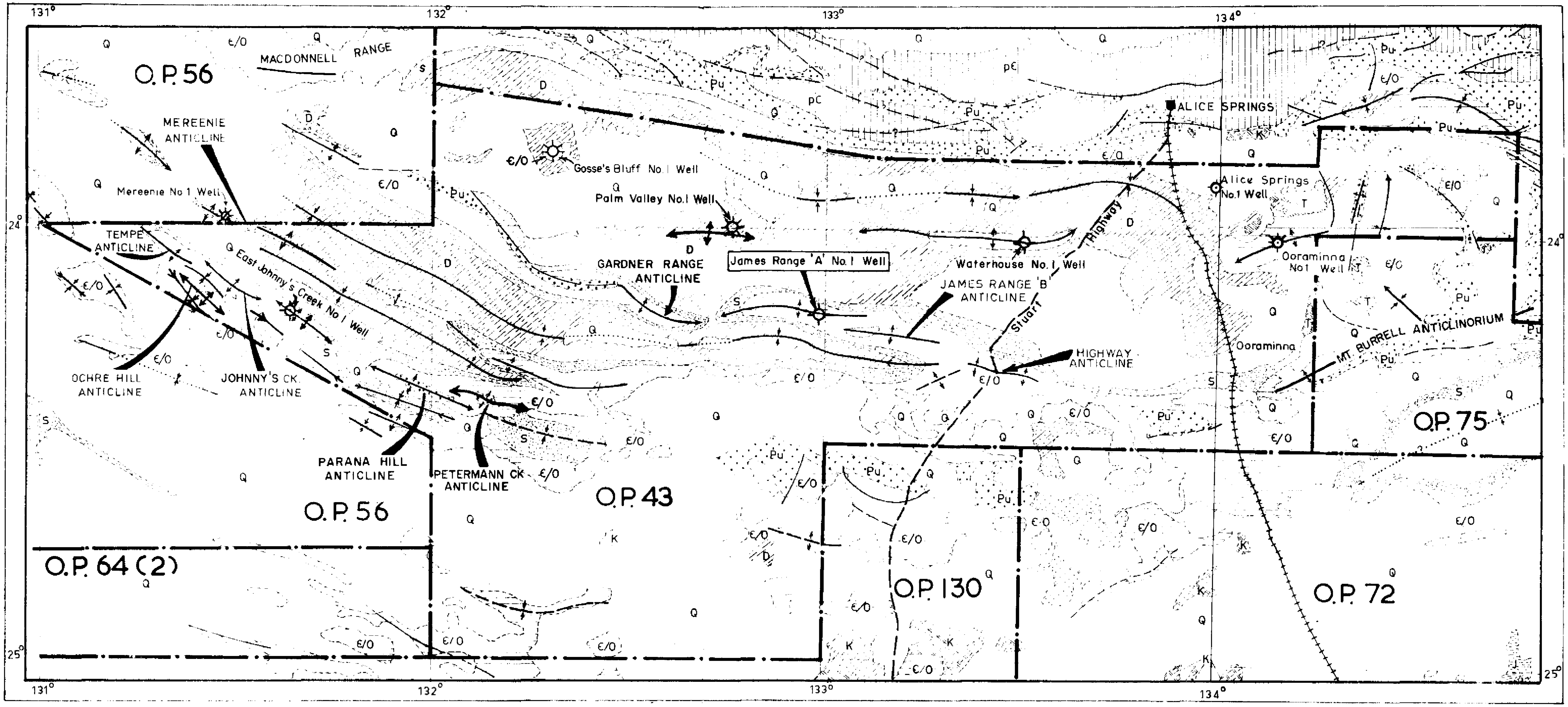
OTHER LOGS

	TO FROM	DATE
CONTACT CALIPER	830' - 2994'	9-5-65
ACOUSTIC VELOCITY	830' - 2990'	9-5-65

LITHOLOGIC REFERENCE

	Sandstone		Limestone
	Siltstone		Dolomite (ca - limey)
	Shale		Dolomitic
lim	Limonite	gy	Gypsum / Selenite
py	Pyrite	gl	Glauconite
he	Haematite	h/c	Residual hydrocarbon
▲	Chert		

FIGURE I



LEGEND

Q — QUATERNARY	D — DEVONIAN
T — TERTIARY — Sediments	S — ? SILURIAN
TERTIARY — Grey billy	€/O — ORDOVICIAN—CAMBRIAN
K — CRETACEOUS	Pu — UPPER PROTEROZOIC
? JURASSIC	p€ — Undifferentiated

Fault

Anticline, showing plunge

Syncline

WELL LOCATION & REGIONAL GEOLOGICAL MAP
JAMES RANGE 'A' No. 1

SCALE OF MILES

16 8 0 16 32

Geology after T. Quinlan, BMR.

Rø5/23 C

WELEX CONTACT CALIPER LOG

COMPANY	EXOIL (N.T.) PTY. LTD.
WELL	James Range "A" No.1
FIELD	Wildcat
County	
State	N.T.

COMPANY EXOIL (N.T.) PTY. LTD.

WELL JAMES RANGE "A" No.1

FIELD WILDCAT

COUNTY ___ STATE NORTHERN TERRITORY

Location: Longitude 133 00 40 East, Latitude 24 10 42 South

Sec. ___ Twp. ___ Rge. ___

Other Services:

Permanent Datum: Ground level. Elev. ___
Log Measured From: Kelly bushings 13.5 Ft. Above Perm. Datum
Drilling Measured From: Kelly bushings

Elev.: K.B. ___ D.F. ___ G.L. ___

Date	May 9, 1965		
Run No.	One		
Depth—Driller	3000		
Depth—Welex	2997		
Btm. Log Inter.	2994		
Top Log Inter.	830		
Casing—Driller	10¾ @829	@	@
Casing—Welex	830		
Bit Size	9⅞		
Type Fluid in Hole	Water base mud		
Dens. | Visc.	10.0 | 60		
pH | Fluid Loss	ml	ml	ml
Source of Sample	Flow line		
R_m @ Meas. Temp.	1.40 @81 °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	1.04 @81 °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	1.64 @81 °F	@ °F	@ °F
Source R_{mf} | R_{mc}	M | M		
R_m @ BHT	1.04 @112°F	@ °F	@ °F
Time Since Circ.			
Max Rec. Temp.	112°F @ 2997	°F @	°F @
Equip. | Location	3222 | Aust.		
Recorded By	C.M. Myers		
Witnessed By	Mr. MacTaggart		

Fold Here

REMARKS Hole was air drilled. Mud was placed in hole just prior to logging.

Change in Mud Type or Additional Samples		
Date | Sample No.		
Depth—Driller		
Type Fluid in Hole		
Dens. | Visc.		
ph | Fluid Loss	ml	
Source of Sample		
R_m @ Meas. Temp.	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F
Source: R_{mf} | R_{mc}		
R_m @ BHT	@ °F	@ °F
R_{mf} BHT	@ °F	@ °F
R_{mc} BHT	@ °F	@ °F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	Tool Type and No.	Pad Type	Tool Position	Other
1	3 11711	4	Centralized	E2, P4, M1.

2" 100'

CALIPER Average Diameter In.	RESISTIVITY OHMS M²/M	RESISTIVITY OHMS M²/M
6" — 16"	1½" Lateral 0 — 20	40
	2" Normal 0 — 20	40