COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Petroleum Search Subsidy Acts
PUBLICATION No. 64

SUMMARY OF DATA AND RESULTS OTWAY BASIN, SOUTH AUSTRALIA

Mount Salt No. 1 Well

OF

OIL DEVELOPMENT NO LIABILITY

Issued under the Authority of the Hon. David Fairbairn

Minister for National Development

1965

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

MINISTER: THE HON. DAVID FAIRBAIRN, D.F.C., M.P.

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THIS REPORT WAS PREPARED FOR PUBLICATION IN THE PETROLEUM EXPLORATION BRANCH
ASSISTANT DIRECTOR: M. A. CONDON

Published by the Bureau of Mineral Resources, Geology and Geophysics

Canberra A.C.T.

FOREWORD

Under the Petroleum Search Subsidy Act 1959-1961, agreements relating to subsidized operations provide that the information obtained may be published by the Commonwealth Government six months after the completion of field work.

The growth of the exploration effort has greatly increased the number of subsidized projects and this increase has led to delays in publishing the results of operations.

The detailed results of subsidized operations may be examined at the offices of the Bureau of Mineral Resources in Canberra and Melbourne (after the agreed period) and copies of the reports may be purchased.

In order to make the main results of operations available early, short summaries are being prepared for publication. These will be grouped by area and date of completion as far as practicable. Drilling projects and geophysical projects will be grouped separately. In due course, full reports will be published concerning those operations which have produced the more important new data.

This Publication contains a summary of data and results of the drilling operation undertaken at Mount Salt No. 1 in the Otway Basin, South Australia. The information has been abstracted by the Petroleum Exploration Branch of the Bureau of Mineral Resources from the well completion report furnished by Oil Development No Liability.

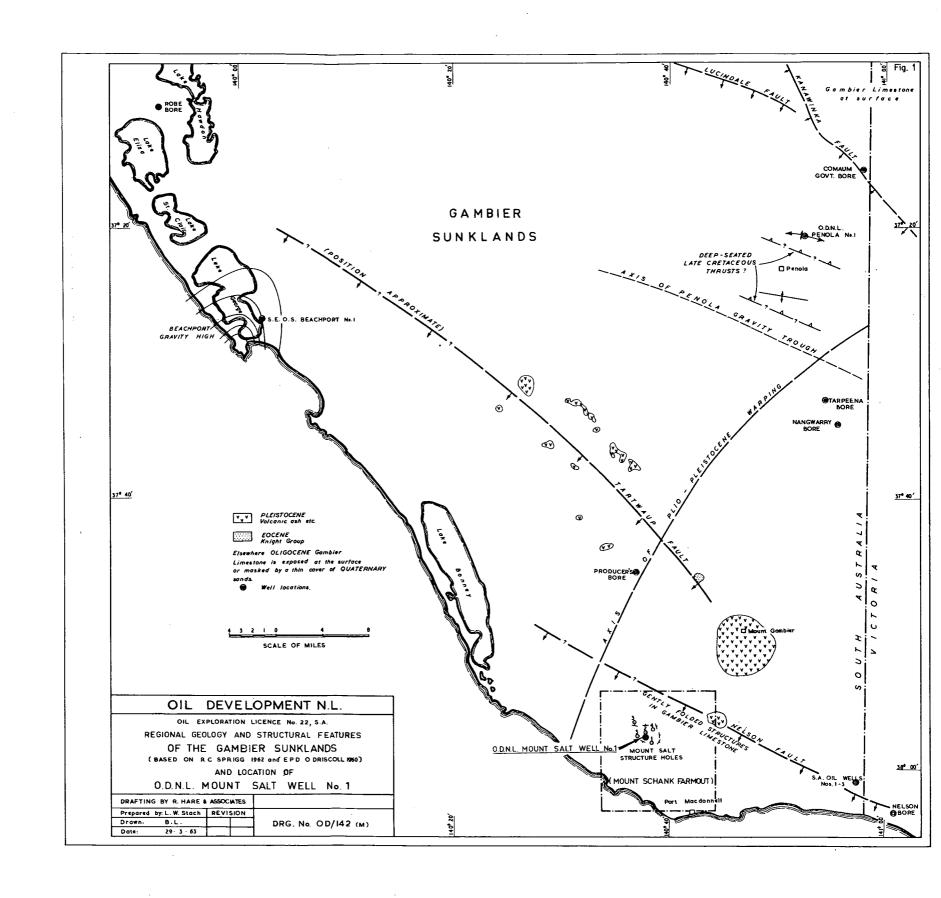
J.M. RAYNER DIRECTOR

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Plate 1: Composite Well Log, Mount Salt No. 1



MOUNT SALT NO. 1

SUMMARY OF DATA AND RESULTS*

SUMMARY

Mount Salt No. 1 Well was located approximately twelve miles south-west of Mount Gambier in the South Australian part of the Otway Basin. The well was drilled by Reading and Bates (Australia) Pty Ltd for Oil Development No Liability, to a total depth of 10,044 feet. Drilling commenced on 9th May, 1962 and was completed on 21st September, 1962. A full programme of logging, testing, and coring was undertaken.

After passing through about 3260 feet of Oligocene and Eocene-Palaeocene sediments, the well entered a thick sequence of Upper Cretaceous sands, siltstones and clays that persisted to total depth. The upper part of this section has been correlated with the (?) Paaratte Formation, and the well bottomed in either basal Upper Cretaceous or uppermost Lower Cretaceous marine or brackish strata that probably correlate with either the top of the Waarre Formation or the Flaxmans Beds of Flaxmans No. 1 Well. The base of the Upper Cretaceous is not clearly defined, and no definite conclusions as to the correlation of the section below the Knight Group (? 590 to ? 3260 feet) have been advanced.

Mount Salt No. 1 Well was drilled to test the petroleum potential of Cretaceous sediments in a closed structure detected by photogeology and proved by a structure drilling programme. Traces of crude oil were detected by core analysis and a show of gas was recorded from the interval 9830 to 9848 feet. Five drillstem tests were attempted but only one, over the interval 9813 to 9892 feet, was successful, obtaining 4070 feet of highly saline water.

The stratigraphic drilling operation at Mount Salt No. 1 was subsidized under the Petroleum Search Subsidy Act 1959-1961, from 980 feet to total depth.

^{*} Abstracted from Well Completion Report, Mount Salt Well No. 1, South Australia, by J. Cundill and L.W. Stach, for Oil Development No Liability, 1963.

WELL HISTORY

General Data

Well name and number: Mount Salt No. 1

Location: Latitude 37°57°25" S. Longitude 140°37°43" E.

Name and address of General Exploration Company of Australia Ltd,
Tenement Holder: 68 Grenfell Street, Adelaide, South Australia

Details of Petroleum Oil Exploration Licence No. 22/1; issued by the

Tenement: State of South Australia

Total Depth: 10,044 feet K.B.

Date drilling commenced: 9th May, 1962

Date drilling completed: 21st September, 1962

Date well abandoned: 23rd September, 1962

Date rig released: 23rd September, 1962

Elevation (ground): 70 feet

Elevation (K.B.): 86 feet (datum for depths)

Status: Dry hole; plugged and abandoned

Cost: £201,000 (approx.)

Drilling Data

Drilling Plant:

Make: National-Ideal

Type: 50

Hole sizes and depths: 22" to 44 feet

17 1/2" to 575 feet 12 1/4" to 5185 feet 8 3/4" to 10044 feet

Casing details:

Size (in.): 18 3/8 13 3/8 9 5/8

Weight (lb./ft): - 48 36

Grade: - H.40 J.55

Setting depth (ft): 44 558 5174

Logging and Testing

Ditch Cuttings:

Interval:

Ten feet from surface to total depth, excluding 93 to

575 feet.

Coring:

Thirty-four cores were cut using a Hughes "J" Type core barrel with both hard formation and soft formation cutter heads. A total of 497 feet was cored and 266

feet (53.5%) recovered.

Sidewall Cores:

None

Electric and other logging:

(Schlumberger):

Electrical Log:

555-10036 feet (5 runs)

Microlog:

555-10036 feet (5 runs)

Caliper Log:

555-10036 feet (5 runs)

Section Gauge Log:

40- 553 feet (1 run)

Continuous Dipmeter:

5174- 9885 feet (1 run)

Temperature Log:

0- 552 feet (4 runs)

Drilling Time and Gas Log:

A Geolograph record of drilling time was kept throughout the drilling of the well, and an Esterline-Angus drilling rate recorder was also used at intervals while drilling. A Wemco hydrogen flame ionizing cell gas detector was operated on the mud stream throughout the drilling of the well. Later, a JW cuttings analyser together with a Waring Blendor, were added to the gas detection equipment.

Formation Testing:

Five drillstem tests were carried out; details are tabulated below:

| Test No. | Interval Tested (feet) | Method | Results |
|----------|------------------------|--------------|---------------------|
| 1 | 9813 - 9892 | Halliburton | Rec. 4070 feet salt |
| | | Hydro-spring | water |
| 2 | 9400 - 9435 | ditto | Misrun |
| 3 | 9390 - 9435 | ditto | Misrun |
| 4 | 9400 - 9435 | ditto | Misrun |
| 5 | 9405 - 9435 | ditto | Misrun |

Deviation Surveys:

Deviation surveys were run with a Totoo instrument; the maximum deviation was 2°, measured at 5650 feet. At 10,032 feet, the deviation was 1 3/4°.

GEOLOGY

General

Over most of the Mount Schank "farmout" area (see Fig. 1) the Oligocene Gambier Limestone is exposed at the surface, but in places it is covered by ridges of Pleistocene aeolianites and at Mount Schank by Pleistocene volcanic ash, scoria and basalt which were extruded through the Gambier Limestone.

Photogeological investigation of the area revealed the presence of very gentle dips in the Gambier Limestone which provided a pattern suggestive of gentle en echelon folding. The drilling of five shallow structure holes to depths of about 1000 feet on the crest, flanks, and plunges of the most prominent of these gentle folds, in the vicinity of the Mount Salt homestead, proved that this structure does, in fact, persist in depth at least into the upper part of the Eocene Knight Group sands and clays, with dips down the flanks and plunges of the order of two degrees. A suitable location for the Mount Salt No. 1 Well was therefore selected close to the surface culmination of the structure, in order to provide a structural test to 10,000 feet of the potentialities of the substantial thickness of marine Cretaceous sediments that was expected to be found underlying the Eocene sands and clays of the Knight Group in this part of the Gambier Sunklands.

Stratigraphy

Palaeontological and palynological data relating to Mount Salt No. 1 Well are not in agreement; the stratigraphic sequence listed here is based on palaeontology and lithology.

Gambier Limestone (Oligocene): Surface to (?) 480 feet

There was no recovery of cuttings over this interval because of loss of circulation. The adjacent Structure Hole No. 2, which was drilled only a few hundred feet away from Mount Salt No. 1, indicated the presence of the Gambier Limesone.

Buccleuch Group (Eocene): (?) 480 to (?) 590 feet (110 feet)

There was no recovery of cuttings over this interval because of loss of circulation. The Buccleuch Group is presumed to be present, by comparison with the adjacent Structure Hole No. 2.

Knight Group (Eocene): (?) 590 to (?) 3260 feet (2670 feet)

Dartmoor Formation (Eocene): (?) 590 to 3131 feet (2541 feet)

Alternating thick beds of poorly consolidated sandstone, siltstone, and soft clay, with a few thin, hard bands of dolomitic sandstone. The sandstones range from fine-grained to pebbly and consist of quartz with subordinate mica, pyrite, and glauconite. The siltstone is brown to dark grey, clayey, micaceous, carbonaceous, and pyritic. The clay is brown or grey, micaceous and carbonaceous, and contains abundant marine fossils including mollusca, fish teeth, and foraminifera.

Bahgallah Formation (Palaeocene): 3131 to (?) 3260 feet (129 feet)

Dark green, silty grit containing limonite and chamosite pellets, and fish teeth of a different type from those found in the Dartmoor Formation. No fossils of definite Palaeocene age were found, but, on the basis of the lithology, this unit was correlated with the Bahgallah Formation of western Victoria.

<u>Upper Cretaceous:</u> (?) 3260 to 10,044 feet (6784 feet+)

Below the base of the Bahgallah Formation, a monotonous sequence of poorly consolidated sand and silt, and soft clay and shale continues to total depth. Feldspars, decomposing to kaolin, are common. The subdivision of this sequence is debatable. It may consist only of the Paaratte Formation, or it may include the Belfast Mudstone, the Flaxmans Beds, and the Waarre Formation. The following subdivisions have been suggested:

| Formation | | Intervals (feet) | |
|--------------------|---------------------|---------------------|-------|
| | 1 | 2 | 3 |
| Paaratte Formation | 3260 | 3260 | 3260 |
| | to | to | to |
| | 5900 | 7460 | 10044 |
| Belfast Mudstone | 5900 | 7460 | |
| | to | to | |
| | to to 9200 10044 | | |
| Flaxmans Beds | 9200 | | |
| | to | | |
| | 9900 | | |
| Waarre Formation | 9900 | | |
| | to | | |
| | 10044 | | |

The palaeontological and palynological evidence suggest that this entire sequence of 6784 feet of sediments, obviously deposited very rapidly and under conditions of turbulence, could all belong to the Upper Cretaceous, and that the lower part of the section is probably not older than Turonian. Both the palaeontological and palynological evidence also indicate that some portion of the upper part of this section should correspond with the Paaratte Formation, and the underlying portion with the Belfast Mudstone, and possibly older formations (Flaxmans Beds and Waarre Formation). However, as there is no marked change in lithology within the Upper Cretaceous section and, in particular, no great thickness of dark grey, glauconitic mudstone grading to siltstone which could correspond directly to the Belfast Mudstone, the possibility still exists that the entire Upper Cretaceous sequence down to total depth could belong to the Paaratte Formation and that the Belfast Mudstone might be present at greater depth than was reached by the Mount Salt well. Arenaceous and calcareous foraminifera and abundant microplankton indicate a partly marine environment alternating with deltaic or estuarine facies.

At this stage, no definite conclusions as to the correlation of the section below the Knight Group can be advanced, other than that it probably represents a greatly thickened sequence of the Upper Cretaceous section found farther to the east in the Otway Basin. The equivalent of this section farther to the west at Beachport is doubtfully represented by only 90 feet of section between the underlying Lower Cretaceous Runnymede Formation and the overlying Knight Group. Farther to the north, at Penola No. 1, Upper Cretaceous sediments are absent altogether, and the Knight Group rests directly on the Lower Cretaceous Runnymede Formation.

The resistivities in the Upper Cretaceous section below the Bahgallah Formation are generally low, down to about 8200 feet, and of the same order as the lower 800 feet of the Dartmoor Formation. Below 8200 feet, however, there is a notable increase in the resistivity.

Structure

The well was drilled on a small closed anticlinal structure identified by surface mapping and confirmed by shallow structure drilling to 1000 feet. It is possible that no closure occurs at depth and that no structural trap exists.

This surface structure is developed in the Gambier Limestone, and the dips on the flanks and plunges of the structure are of the order of two degrees. As some doubt existed as to whether this surface structure persisted in depth, a group of five shallow structure holes were drilled at selected locations to depths of about 1000 feet, which was sufficient in all cases to penetrate a short distance into the upper part of the Knight Group. The drilling of these structure holes proved that the surface structure persists in depth at least into the upper part of the Knight Group.

Although much of the section penetrated by the Mount Salt No. 1 Well is badly affected by cross-bedding and current-bedding, and slumping and other features indicative of rapid deposition under turbulent conditions, the overall dip in the cores, where determinable, appears to be flat. Cross-bedding in sands ranged up to about 25 degrees, but in most cases the cross-bedded sands were truncated by overlying silts or clays along a practically horizontal contact.

Relevance to Occurrence of Petroleum

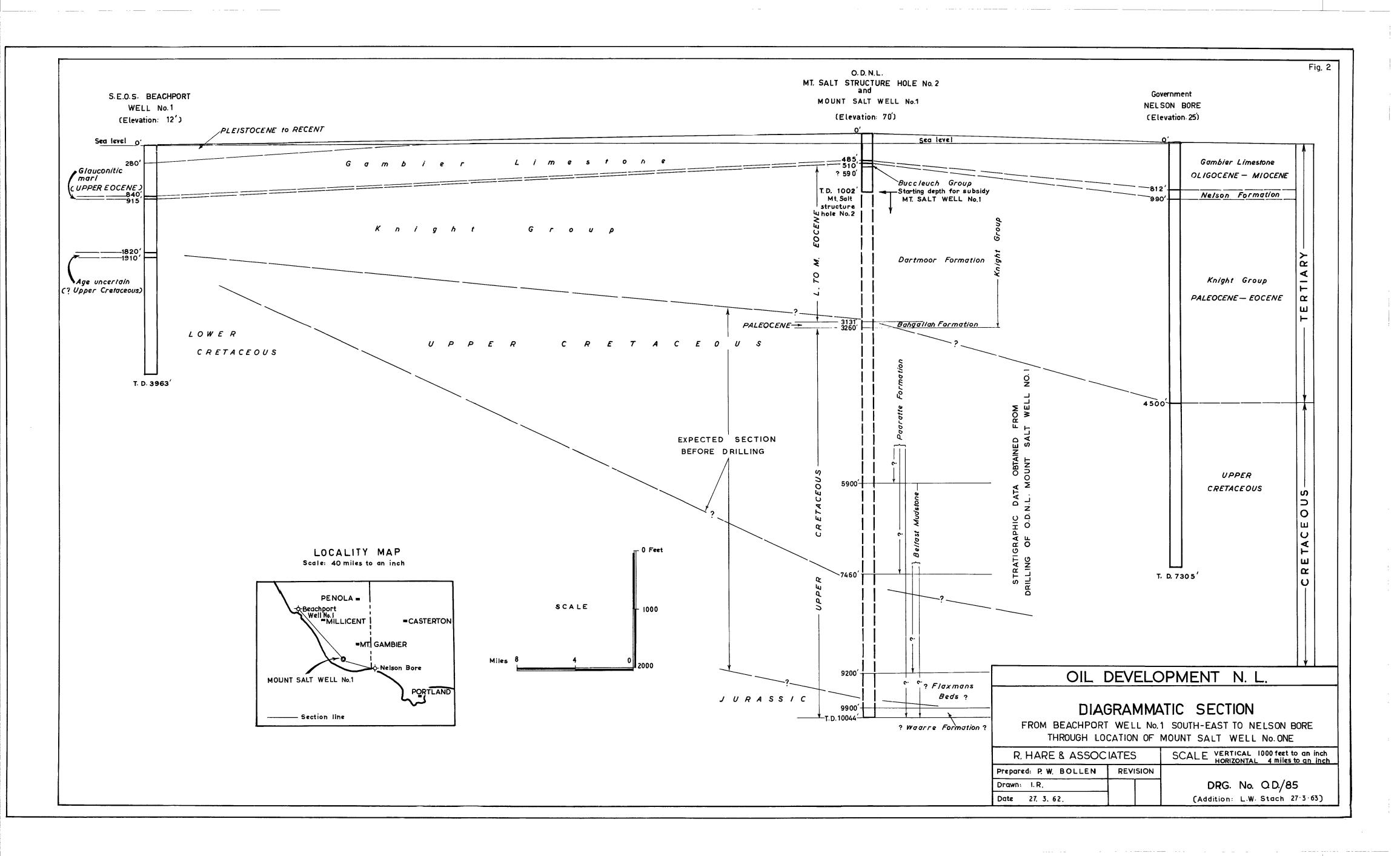
The drilling of Mount Salt No. 1 Well in the central part of the Gambier Sunklands has proved the existence of a thick section of Upper Cretaceous, dominantly marine, clastic sediments. Data available from wells drilled to the north and west, at Penola and Beachport, show that these sediments wedge out completely to the west and north within distances of a few tens of miles, probably against upthrust blocks of Lower Cretaceous sediments.

The Upper Cretaceous sequence consists of interbedded, generally thick beds of highly porous sandstones, impermeable clays and shales, and siltstones, which could provide excellent reservoir and cap rock where closed subsurface structure or fault traps might be developed, or where stratigraphic traps might be present farther updip along the regional gradient rising toward the north.

Analyses of cores indicated the presence of traces of crude oil in a few cores, but hydrocarbon gases were detected in the drilling fluid at only one short interval between 9830 and 9848 feet. The only successful drillstem test showed the presence of highly saline formation water (39,450 ppm), within the interval 9813 to 9892 feet. Assuming that northern closure was lacking at depth in the structure, hydrocarbons could have migrated through the many porous sands present in the section, updip toward the north and north-west along the regional gradient.

Porosity and Permeability of Sediments Penetrated

The upper part of the well section, down to about 5000 feet, is dominantly sandy and generally highly porous and permeable, with only a few thin interbeds of clay and shale. The clay and shale interbeds are probably lenticular so that vertical migration of hydrocarbons



could have taken place through this upper part of the section. Below 5000 feet, however, the proportion of clay and shale increases in the sequence and impermeable beds of a few to several tens of feet in thickness become more frequent toward total depth, separating highly porous and permeable sands up to 100 feet or more in thickness. The impermeable beds appear to be thick enough to be continuous over wide areas and, in this case, they could act as a seal to vertical migration of hydrocarbons from underlying sands. The porosity and permeability of the sands are both generally high; porosities range generally from about 20% to 35%, and permeabilities from a few hundred up to 2000 millidarcys.

Contribution to Geological Concepts resulting from Drilling

The drilling of Mount Salt No. 1 Well has established that a very thick section of dominantly marine sediments of late Cretaceous age are present at depth in the central part of the Gambier Sunklands. Although wells drilled less than fifty miles to the north and northwest of Mount Salt No. 1 have reached Lower Cretaceous section at relatively shallow depths after passing through the Eocene Knight Group, the only Upper Cretaceous sediments previously known in the Gambier Sunklands of South Australia are possibly about 90 feet of section between the Knight Group and Lower Cretaceous in the Beachport well. Within a distance of 50 miles south-east from the Beachport well, the possible 90 feet of Upper Cretaceous sediments have increased to a thickness of nearly 7000 feet, or more, and this same section has wedged out entirely within the distance of 45 miles northwards to the Penola well.

The correlation of the Upper Cretaceous section in the Mount Salt No. 1 Well with the stratigraphic units of the Upper Cretaceous section recognized in the Otway Basin and south-west Victoria is not yet clear, and either more detailed palaeontological study or the drilling of moredeep wells will be necessary, before a precise correlation can be made. At this stage the alternatives appear to be that Mount Salt No. 1 was (i) still in equivalents of the Paaratte Formation at total depth, or (ii) in equivalents of the Belfast Mudstone at total depth, or (iii) in equivalents of the Waarre Formation at total depth. Whichever of these interpretations may be correct, it is very evident that a substantially thicker section of dominantly marine Upper Cretaceous sediments is present in this part of the Gambier Sunklands than has been found to date farther eastwards in the Otway Basin.

The thickness of the Knight Group in the Mount Salt No. 1 Well (about 2670 feet) was found to be comparable to that in the Nelson bore (3510 feet), located about 20 miles to the east, rather than to the lesser thicknesses proved in wells farther to the north and north-west (Penola, 740 feet; Beachport, 920 feet; Robe, 580 feet).

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ADDITIONAL DATA FILED IN THE

BUREAU OF MINERAL RESOURCES

The following additional data relating to Mount Salt No. 1, have been filed in the Bureau of Mineral Resources, Canberra, and are available for reference:

| (i) | Well Completion | Report, by J. Cundill and L.W. Stach | 18 pp. |
|-----|-----------------|---|--------|
| | Appendix 1 | : Petrological report, by J. Cundill | 12 pp. |
| | Appendix 2a | : Palaeontological report, by N.H. Ludbrook | 11 pp. |
| | Appendix 2b | : Palynological report, by P.R. Evans | 4 pp. |
| | Appendix 3 | : Water analysis, by T.R. Frost | 1 p. |
| | Appendix 4 | : Core analyses, by BMR. | 2 pp. |
| | Appendix 5 | : Interpretation of logs, by G. Guigues | 2 pp. |
| | Appendix 6 | : Report on Drillstem Test No. 1. | 1 p. |
| | | | |

- (ii) Daily drilling reports for period 9th May, 1962 to 23rd September, 1962.
- (iii) Well logs including the following:
 - (a) Electrical Log

Run 1, 555 - 5172 feet (2", 5"=100 ft) Run 2, 5174 - 7098 feet (2", 5"=100 ft) Run 3, 6920 - 8560 feet (2", 5"=100 ft) Run 4, 8400 - 9206 feet (2", 5"=100 ft) Run 5, 9100 - 10036 feet (2", 5"=100 ft) (b) Microlog and Caliper Log

```
Run 1, 555 - 5190 feet (2", 5" = 100 ft)
Run 2, 5174 - 7098 feet (2", 5" = 100 ft)
Run 3, 7000 - 8560 feet (2", 5" = 100 ft)
Run 4, 8400 - 9206 feet (2", 5" = 100 ft)
Run 5, 9100 - 10036 feet (2", 5" = 100 ft)
```

(c) Section Gauge Log

(d) Continuous Dipmeter

(e) Temperature Log

Runs 1-4, 0 -
$$552$$
 feet (1", 5" = 100 ft)

(f) Drilling Time and Gas Log.

COMPANY: WELL NUMBER:

OIL DEVELOPMENT N.L. O.D.N.L. MOUNT SALT WELL No.1

PETROLEUM TENEMENT: OIL EXPLORATION LICENCE No 22/1

749' along true bearing 131°18' from NW corner of

From

0′

44'

5 **75**′

<u>To</u>

9992'

9540'

5170

Welded steel plate on 5'riser

Schlumberger Seaco inc.

23′

Reading & Bates (Australia) Pty. Ltd.

Reading & Bates (Australia) Pty. Ltd.

(For Testing and abandonment) Halliburton Co

Surface hole (0-44) Percussion Rig

Grade

H - 40

J-55

5185

Conductor

<u>Wt</u>

48 lb/ft

36 lb ft

(Failed)

Allotment 783, Hundred of Macdonnell, County Grey

South Australia. Latitude 37° 57′ 25°S, Longitude 140° 37′ 43°E

Ground Level - 70.07 above mean low tide Port Adelaide

Kelly Bushing — 86.07'above mean low tide Port Adelaide

<u>To</u>

44'

575'

5185

10 044'

<u>Depth</u>

44'

5**58**′

5174

<u>Sacks</u>

40

40

44

40

LOCATION:

ELEVATION:

Date Spudded:

Date Rig Off:

Total Depth

Hole Size:

Casing:

Cement Plugs:

Well Head Fitting:

Drilling Method:

<u>Casing</u>:

Plugs:

Cemented by:

Drilled by:

Logged by:

9 May, 1962

Diameter

22*

17%"

124"

<u>O. D</u>

18[%]

133/8"

<u>From</u>

9892′

9435'

5070°

-11

1 October, 1962

Driller: 10,044

E-Log: 10,037

Date Drilling Stopped: 21 September 1962

STATE: SOUTH AUSTRALIA

4- MILE SHEET: PENOLA

BASIN: GAMBIER SUNKLANDS (MURRAY OR OTWAY BASIN) WELL STATUS: ABANDONED

0 - 2500'

Vertical Scale: linch=100 feet

DRG. No. O. D./125

SECTION SURVEYS CONTINUOUS DIPMETER SURVEY ELECTRIC LOG DATA MICROLOG CALIPER DATA TEMPERATURE GAUGE RUN NUMBER RUN NUMBER RUN NUMBER 1-3 5 3 16. 5.62 17. 5.62 Date 15. 9. 62. Date 19.6.62 10.7.62 31.7.62 27, 8.62 9. 9. 62 19.6.62 10.7.62 31.7.62 27.8.62 9.9.62 15. 5. 62. Date 5**53** ' First Reading 552**ʻ** 5**5**2′ Total Depth - Schlumb. 9888' 5172 7098 8560° 9206' 10,036 5190' 70981 8560' 9206 First Reading 8400 MEQ 9100' " "_ Driller 5174 7 000′ 40' Last Reading 0′ 0' 9892' 555′ 5174 6920' 9100' 555' Last Reading 8400' 552'x 3 4617' 19 24 4 9361 46351 1924 1560 936 513' 5**52**' " - Reached 9885' Interval Measured 1640 806' Footage Measured 554' 554 Bent, 55**5**′ 5174 ' 5174 ' 5174' 5174' 555 ' 5174 5174 5174' 5174 Depth Reached Mud Nature Casing — Schlumberger 554' 554 5142 5142 5142 Bottom - Driller Density lb/g 10-3 5**58**′ 5142 5142 5142' 5142' 55**8**′ 5142' ___ Casing-Driller 230 5192' 7099' 8561 Bent Viscosity, Marsh Depth Reached 5173 7099 8561 9207 10.037 9207 10, 037 5**56**′ Mud Nature Water 10, 044 575 Full Full Resistivity 1 74 , 66° F Bottom Driller 70 96' 9211 10,044 5203' 7096' 8565' 9211 Fluid Level 5203[′] 3565 69° F 83° F B.H.T. 164° F Mud Nature Max. Temp. Bent Bentonite Cementation Date 15.5.62 16. 5.62 Water Loss, 30m 3-6 cc 10-6 9.6 10.3 10.5 10.4 10.6 9.6 10.3 No circulation 10.5 Density Ib/g 10-4 20007hr 18-30 18.30 Logging Speed 181 230 181 85 230 Time Started Viscosity,(Marsh) Time Finished First Reading 9885 2-10,68°F 1-60, 70°F 1-18, 80°F 1-21, 82°F 1-74, 66°F 2-10, 68°F 1-60, 70°F 1-18, 80°F 1-21, 82°F 1-74, 66°F 19.00 19.00 Resistivity Resistivity BHT | 1.50, 116° |0.90, 126° |0.66, 145° |0.65, 156° | 0.75, 164° |1.50, 116° |0.90, 126° |0.66, 145° |0.65, 156° |0.75, 164° Last Reading 5174 600 600 Sacks Cement 4711 150 Feet Measured 9.5 9.8 9.0 . 9.5 Calculated Top 5.2cc 6.2cc 4.9cc 4.0cc Recorded by G.Guigues 5-2 cc 6.2cc 49cc 4.0 cc 3.6 cc G Guigues Fluid Loss,30 min Recorded by Circ. Circ Computer Ed. Ba Origin of sample Circ. Circ. Circ. Circ. Circ. Circ. Circ. Circ. Mag. Declination 11º East 180,68°F 1.70,55°F 1.30,60°F 1.40,66°F 1.80,80°F 1.80,68°F 1.70,55°F 1.30,60°F 1.40,66°F 1.80,80°F I-56,66°F ---I ---53 2.60,68 240,55°F ---2 60,66°F 2 40,55°F --- | 1.56,66°F Levels Rmc G. Guiques for all runs G. Guigues for all runs G. Guigues Recorded by

Cmt'd to Cement Surface up to 150' and from surface to 44' 1260 sacks 525 sacks 4084 WELL SYMBOLS LITHOLOGIC LEGEND OIL DEVELOPMENT N.L. 1325 Core interval ooo Quartz pebbles c: Carbonaceous No. & % age recovery O.D.N.L. MOUNT SALT WELL No.1 Sand, sandstone ch:Cherry COMPOSITE WELL LOG Cement plug Silt, siltstone t: Feldspathic ___ Clay, shale gl: G/auconitic * SHEET 1 OF 4 Cement rise F_F Mar/ mi: Micaceous Casing diameter Prepared. L.W. STACH REVISION Casing shoe Drawn: I. Rade Limestone Py:Pyritic Remainder of hole: Rotary, National-50 Rig Date: 11. 2. 63. Limestone with sponge spicules & Molluscan fossils

Coal Drafting by: R. HARE & ASSOCIATES *Note: The records of glauconite may actually be chamosite STRATIGRAPHIC SECTION GAUGE & TEMPERATURE SURVEYS (to 558 feet) INTERPRETATIO RESISTIVITY (from 558') BIT $ohms-m^2/m$ TYPE LITHOLOGIC UNITS MICROCA LIPER MICROLOG LITHOLOGIC SPONTANEOUS INTERPRETED DESCRIPTION MUD (ANA GO Leet $A M_1 = 16''$ 20 POTENTIAL (from 558) LITHOLOGY Resistivity — ohms-m²/m LITHOLOGY Core barrek DRILLING RATE % of cuttings AO = 18'8" 200 200 0 all 8¾" (from 558') (Feet per hour) Millivolts Micro 10 Inverse I'x I" HTC-J Micro Normal 2" - +++ AM2=64" 200 H = hard 50 100 150 S = soft Percussion UPPER MEMBER (Percussion hole) not logged Bryozogi limestone, white to cream, with occasional echinoid 44 44 spines, scattered flint nodules, and dolomitic in some places Ш Z To 34" 0 -ഗ > Ш Q B E Σ Ē M E M ď ပ Dense grey somewhat marly limes to ne crowded with sponge 0 Rèed spicules - 300 171/2 O W E R α YT BIE 3 7 Σ 0 400 8 C 4 > Œ G S BUCCLEUCH GROUP Temperature Ŧ Glauconitic green marl 0 0 Fine grained sands to ne, consisting of polished quartz grains with limonite coating in ferruginous and glauconitic matrix S 57**5**′ 5**58**′ Light brn. crystalline to chalky and cherty limestone with tubular fossils. Z Interbeds of: Sand, consisting of coarse sub-rounded translucent 0 clear and smoky quartz grains with some coarse grains of limonite, and siltstone, brown, clayey and slightly micaceous, with traces of pyrite 700 Sand, consisting of very coarse sub-rounded grains of clear and G Smith smoky quartz with some thin interbeds of siltstone as above 1214" 0 Dominantly silt stone, grey to brown, slightly micaceous, with K2P fragments of mollusca in some places, and with some thin interbeds Ž of sand, as above X 900 1 May 1 May Dominantly sand, consisting of very coarse sub-rounded £ polished grains of clear and smoky quartz, with some interbeds of clay, brown to dark brown, silty, with some thin laminae of carbonaceous material 0 995 -1000-H-bit Z > 1011' Rec. 4'6" Grey-brown silt and clay, micaceous, and with flecks マ dip of carbonaceous matter B 2 0 Dominantly sand, consisting of coarse sub-rounded polished quartz grains with some interbeds of silt and clay, as rerun _ _ _ _ above 0.0000 Smith 121/4 Sand, consisting of coarse, polished, well-rounded to sub-rounded 3 K2P 0.0.0.0.0.0 clear to smoky quartz grains with some chert pebbles and traces α. S of glauconite and pyrite. Pebbly near base_ Ø Silt, brown, clayey, micaceous, with some thin laminae of Σ carbonaceous material \supset \propto Dominantly sand, consisting of coarse polished sub-rounded 1300 -0 clear and smoky quartz grains with some mica flakes, pyrite and 0 1320' 2 | 0 glauconite, with some interbeds of silt and clay, grey, H-bit Ø 1340' micaceous, and with carbonaceous laminae in places Rec. α Ш Q 1400-2 ပ ပ rerun 0 Smith Interlaminated silts to ne, dark grey, soft, clayey, very 121/4" micaceous and very fine-grained sandstone with laminae Ø K2P of carbonaceous material - 1500 -X Sand, consisting of coarse sub-rounded quartz grains with some · · · · · · · · Silt, grading to clayey silt, light grey, with traces of S-bit glauconite, and flakes of colorless and brown mica 0 1620' 1621 Rec. 15' I dip S a n d, consisting of very coarse sub-rounded, polished, clear and smoky quartz grains and some pebbles ----- = 0.0.0.0. 2 9 Silt, clayey light grey to brown-grey micaceous and with 0 rerun 0 occasional carbonaceous inclusions Smith 1214" 0 K2P Sand, consisting of coarse rounded to sub-rounded quartz - 18 00-grains, with scattered pebbles of grey to black chert-Σ 0 Silt, light grey to brown-grey, clayey, micaceous, and with > traces of pyrite メ S a n d, consisting of coarse, rounded to subangular, clear and milky 1900 _____ 1920' Interlaminated silt stone, soft, light to medium grey, clayey micaceous œ S- bit = = = 0 with carbonaceous laminae, and c I a y, dark grey to brown, sideritic, 1935 1935 Rec. 7' • 0 • 0 • 0 • 0 • 0 • micaceous, carbonaceous; some interbeds of sand with pebbles 0.0.0.0 0 2 S and, fine to coarse, consisting of rounded to subangular clear 2000 -0.0.0.0 **=**0 · 0 · 0 • 0 • 0 0.0.0.0.0 /rerun and smoky quartz grains, with abundant pebbles of grey and white 0 . 0 . 0 . 0 Smith quartz and traces of pyrite and mica; a few thin interbeds of silt, 0.0.0.0 0.0.0 121/4 =<u>__0.0</u>.0.0 ____ brown to grey, clayey and micaceous K2P ----= = 0.0. = = = 0.0. - 2100-Dominantly silt, brown to grey, clayey micaceous with traces of = • = • = • = pyrite and limonite; some thin interbeds of sand as above and hard band of sandstone at 2184, dolomitic, light grey, fine grained, slightly micaceous, carbonaceous, also at 2215' 0/ 3/3/3/ 3/ 3/ 3/ 3/3/3/3/ H - bit 2194 3 Silt, brown to grey, clayey, micaceous, carbonaceous, with traces of pyrite and carbonate 2300-Reed \12¼"

COMPOSITE WELL LOG

O.D.N.L. MOUNT SALT WELL No.1

2500'-5000' SHEET 2 OF 4

| · | | | | SHE | 500 — 5000 ET 2 0 F 4 5. No.O.D./125 | | | |
|--|--|---|---|--|--|--|---|---|
| BIT TYPE DRILLING (Feet per h | DEVIA AR PLU | DEPTH LITHOLOGY OF POT OT POT OF POT | NTANEOUS INTERPRETED FENTIAL LITHOLOGY Millivolts 15 - +++ | RESISTIVITY ohms-m/m² 0 4 0 AM ₁ =16" 20 0 20 0 200 0 AO=18'8" 200 0 20 AM ₂ =64" 200 | MICROCALIPER Hole Diameter in Inches 12" 14" 16" 18" | MICROLOG Resistivity — ohms-m²/m Micro Inverse I″x I″ 10 20 Micro Normal 2″ 20 | LITHOLOGIC DESCRIPTION | STRATIGRAPHIC INTERPRETATION ON 1 S ON 1 S ON 1 S ON 1 S |
| 2504' Hughes 12 1/4" O SO 2J 2800 H — bit 2818 (5) Hughes 12 1/4" O SQ 2J 2900' 5 — bit | ,008 2800 1° 7 2818 Rec. Nil 2900 | 2600 mi | | | Way former the second to the s | Many March Comment of the Comment of | Dominantly sand, fine to coarse, grey, poorly sorted, with some pyrite; some sand stone, fine—grained, grey, with calcareous cement; some interbeds of silt, brown, clayey, and grey—brown clay, micaceous and with carbonaceous matter. | MOOR FORMATION KNIGHT GROUP MIDDLE EOCENE |
| 2916' Terun Hughes 12'4" OSQ 2J 3056' 6 Hughes 12'4" OWS 3114' S= bit | 3142 | 3000 Py Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q | | | Mary of the second seco | The state of the s | Dominantly clay, brown, soft, silty, micaceous, carbonaceous, with occasional thin bands of sand, medium to coarse grained quartz, with some pebbles, subangular to sub-rounded, with pyrite grains, and few thin bands of sand stone, grey, fine-grained, pyritic and dolomitic in places | DART C LOWER TO |
| 31517 6) rerun Hughes 12 1/4" OWS | 3152 Rec. g/ | 3300 py H L / ½ | | | The property of the property o | Whomphan Jan Carlo Man Jan Jan Jan Jan Jan Jan Jan Jan Jan J | Dominantly s a n d, fine to coarse grained, poorly sorted, subangular to sub-rounded, with some limonite and siderite pellets; some thin interbeds of c I a y, blue-green to brown, glauconitic and micaceous in places. 8' of chamosite greensand in core No.9 | BAHGALLAH FORMATION NGERRIP — GROUF PALEOCENE |
| 3432' S - bit 3450' 7 | 3429 10 3450 Rec. Nii | 3500 g | | My May May May May May May May May May M | Wolly file by grove our parties and all be about the contraction and the contraction a | The state of the s | | W M |
| 8 Hughes 121/4" O SQ 2J 3993' 5 - bit 4011' | ,066 do 3993 | 3800 gl | | | assa karan ett filst eresst messaty tim syressyrik filsterssorthytherssorthythers filsters filsterssorthus southers filsters ett filste | Many March M | Dominantly sand, fine to coarse grained, subangular to sub-rounded, with occasional quartz pebbles, with a few thin beds of coal, dull black, pyritic and with conchoidal fracture, and some thin interbeds of clay as above. Rare thin bands of limestone, hard, brown, crystalline. | FORMATION? |
| 9 Hughes' 12 1/4" OWS 4216' 5 - bit | Rec. 1' Dip | -41 00 - py | | | A The Waster Constitution of the Constitution | Matter William Many American Province Control | | T E F |
| 4231' (10) Hughes 12'/4" OSQ2J 4345' (11) Smith 12'/4" K2 P | 1.74 1.74 1.74 | 4300 c py py s d o o o o o o o o o o o o o o o o o o | | Marrow Ma | May With water to the state of | The state of the s | Dominantly an alternation of moderately thick beds of sand, fine to coarse grained, poorly sorted, subangular to sub-rounded, with few quartz pebbles, separated by thin beds of a lay, grey, silty, micaceous and carbonaceous; rare thin beds of siltstone, grey to brown, glauconitic, micaceous and slightly feldspathic. | ? P A A R A T A T T A C E O U S |
| S bit 4550' (2) Smith 121/4" K 2 P 4658' (3) Smith 121/4' K 2 P 4783' S bit | 7 ² 9 9 0° | 4 600 c py mi | 3 | | Consequence of the constitution of the constit | Mount of the said | | ikoon australis Zone) ———————————————————————————————————— |
| 5 - bit 4798' What is a second of the seco | 16 | -4900 gi | A | | My man to secure of company of the c | The state of the s | | |

COMPOSITE WELL LOG 0. D.N.L. MOUNT SALT WELL No. 1

5000 — 7500' SHEET 3 OF 4 DRG. No. O.D/125

| | | | | | | | | | DRG. No. C |).D/I25 | | | | | , |
|---|--|-----------|---------------------------------|------------------------|--|---------------------|---|---------------------------------------|---|--|---|--|--|---|-------------------------|
| | | | and | | | z | CONTINUOUS DIPMETER SURVEY | · · · · · · · · · · · · · · · · · · · | | RESIS ⁻ ohms- | 「 V T Y - m²/ m | | MICROLOG | | STRATIGRAPHIC |
| BIT TYPE | DRILLING RATE (Feet per hour) | SING | UGS ecovery ips | DEPTH in feet | LITHOLOGY %of cuttings | GAS | (For computation data see log) Depth and degree of dip at tail of arrow; arrow | | INTERPRETED | 0 4 0 AM ₁ =16° 20 | 0 20 | | Resistivity – ohms-m²/ m Micro Inverse IxI" | LITHOLOGIC | SSGIC |
| : | | DEV. | RES | į | 70 | MUD | in azimuth of dip RATING A, Good B, Fair C, Possible | POTENTIAL Millivolts - 15 + | LITHOLOGY | 0 200 0 20 AM ₂ = 64″ 200 | | MICROCALIPER Hole Diameter in inches 12" 14" 16" 18" | 0 10 20 Micro Normal 2" 0 10 20 | DESCRIPTION | UNITS UNITS A G E |
| 5070 | 0 50 100 150 | 0038 | 5038 | | p | y | | | | | | 12 14 10 18 | | | |
| 5038 5044 6 | S-bit | - 50° | 5038 00 5044 Rec | 18 | | | DIP ANGLE | | | ** | | 200 | A Company of the Comp | See previous sheet | C. |
| Hughes 12¼″ | <u>}</u> ,J | 525 sacks | Dip 0° | - 5100 - | c 9 9 9 9 9 9 | 1, | 0° 10° 20° 30° 40° 50° 60° 70° 80° | A A | | 3 2+2 | | Dody Conference of Conference | Mod La | - | Z |
| OWS | 5 | 5174 | | | g | | 1 1 1 1 1 1 1 1 1 1 | \ | | John John John John John John John John | | فاميدهد (1 مدريه) | | | 710 Zone |
| 5185 H-bit 5203' | <u> </u> | 5174 | 5185 - 19 - 5203 - Rec | -5200- | c m | 704 | 2-B | RUN 2 | | | | Martin Control of the | | Dominantly an alternation of thicker beds of sand | |
| Reed 8 ³ /4" | { | 0/6 | Sacks odi O | 1 | c m | 7 E C | 3-B | | | | | | The state of the s | very fine to coarse grain sub-rounded to subangula | zd, LL () |
| TST-I | <u> </u> | # | 4 - 40 | 5300- | | X X A | 5 B | <u> </u> | | | | 4 | | poorly sorted, with thinner beds of clay or | u o |
| 5339' \ (B) | | 9 d O | Pluq | | mi [] | _{ii} σ | - 6-B 7- B | 20/4/200 | | | | | | s hale, grey to brown, silty, micaceous, carbonace and minor thin beds of | = |
| Reed 8 ³ / ₄ " | <u></u> | | | 5400- | С P | A G | 8-C | | | | | | The state of the s | silt stone, grey, micaceous and sometimes glauconitic. | R S 1 8 1 T |
| TST-I | | <u> </u> | 5400 | | | 9.0 | | | | | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | <i>*************************************</i> | Argony My | Thin beds of coal, du black, at about 5250. | 1 2 0 |
| 5485' H — bit 5503' | <u></u> | | 5485 20 5503 | 5 | c 구: : : : : : : m | i N | 9-C | <u> </u> | | | | A | | | |
| \ @ | 7 | | Rec 12' Dip 0' | | | i H L | | | | A | | | | | |
| Reed 83/4" T 5 T- I | 7 | , , | | 5 600- | | py \ | II-B | 3 | | | | | | - | |
| 5669' | \ \ | 20 20 | | | | y | 12-B | Adm | | W | M | | Workship of the state of the st | | Z |
| @ Reed | <u> </u> | | | 5700 | | N N N | -14-8 | | | | | | | - | |
| 8¾" T ST-1 5781' | - | | ,570 | | | 9747 | 15-B | | | 15511115 | | | | | 0 n e |
| H — bit 5798' | <u></u> | | 5781 21 5796 Rec | - 5800· | gl m | ni O | 17-В | | | | | | VALUE OF THE STATE | - | SAP |
| Reed 8 % " | 5 | | Dip | | gl | | 18-B | | | | | | The state of the s | | |
| M \ | <u>}</u> | | | 5900 | c m | i | -19-B 20-B | M | | | | | The state of the s | | 1 7 0 |
| 5943′ | ر س | | | | | A S E | 2I-B | | | | | | | | |
| Reed 8% | <u></u> _ | <u>.</u> | | 6000 | | у | 22-B | A C | | | | | Sharah Million | |) e fla |
| M | | 34° | | | | 1 | -23 | May | | | | | A A A A A A A A A A A A A A A A A A A | | |
| 6096' H – bit 6114' | <u> </u> | | 6096 22 6114 | – 6100 · | |) B | 24-B — 1 | \(\lambda_{\text{A}}\) | | | \$ | | A Company of the Comp | | |
| 23 Reed | | | Rec 18' Dip | | | li Ji | 26-B 25-B | | | | | | The state of the s | | |
| 8¾″ HM 6225′ | <u>, </u> | , 62 20 ′ | ₹ 00 | | | y O | 27-B | | • | | 18 | | WWW. | Dominantly thick beds o | _ \ |
| @ Reed 83% H M 6300 | لم ک | 1 1/4 | | | c | HYD | - 28 1 | | | | | | | s a n d, as above, with occasional quartz pebbl | es, |
| ® ************************************ | <u>(</u> ' | | | 6300 | | y py | 29-C | | | 1/2-1 | | | | or shale, as above | , |
| Reed 8% M | 5 | - e35 | | | 9 9 | الر | 30-C | | | | | WW | MM Market | Minor thin beds of siltstone. | |
| 6395' H – bit 6405' | 2 | | 6395 6405 Rec | - 6400 i | │ | ni | | | | | | | | | |
| 26 Reed 834 2HM | [| | 9' Dip | | | S | | 4 | | | | Thosa and the same of the same | | | |
| 6505' | <u> </u> | | | 6500 | - | by < 1 | | | | | | | | | |
| (27) Reed | | | | | | gl V V V | | | | | | | | | |
| Reed , 8 3/4 2 H M | | | | 6600 | | 0 / 0 % | | | | | | | | | |
| 6669' H — bit | L | 6999 | 6669 | 2 | g | m - | | | | | | - Appendix | A Machania | | |
| 66 88 | <u> </u> | | 6688 Rec 14' | : | PY | | 31-C | | | | | 14 | WAYN W | - | Z O D |
| Reed 8¾″ 2 H M | | | Dip 7 | | c | 0 % | | | | | | | MANA MARIE | | S 1 |
| 6830' | | | | 6800 | | f f | | | | | | W W W W W W W W W W W W W W W W W W W | | | D M |
| 29 Reed 8 34" | \ <u>\</u> | | | | m ==================================== | f f | | | | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | | The state of the s | WWW.VWW | | |
| 8¾″ 2HM | | | | 6900 | | f f | 32-В | | | | | | | | - |
| 6984′ | } | 6984 | 6984 | 4 | c | f ni | | | | | | | | | F A S |
| H-bit 7004' | <u>f</u> | 340 | 7004 Rec | 1 | 91 | f | | | ======================================= | | *************************************** | | | | B E L |
| Reed 8 ³ / ₄ " 2 HM | لم | | 19' Dip | | c | f Py gl py | | | | | | white work of the state of the | What was the state of the state | | |
| 7096' | <u> }</u> } | | | 7100 | | 1 | 33-B 34-B | SCALE CHANGE | | RUN 3 | | 1444 1444 1444 1444 1444 1444 1444 144 | | | |
| Reed 8 ³ /4" M 7196' | <u> </u> | | | | | | | | | | | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | |
| 7196' | 14 | | | 7200 | gl | f Py | 35-C | | | | | | A CONTRACTOR OF THE PROPERTY O | | |
| Reed 8 ³ / ₄ " HM | <u> </u> |)4, | | | gl | f Py mi | 36-₽ | | | | | | A CONTRACTOR OF THE PARTY OF TH | | |
| 7304' | \ <u></u> | -e 730 | | 7300 | gl | | 37-C | | | | | | | +- | |
| Reed 8¾″ HM | } | 3/6 | | | gl — | f | 31 | | | | | | | | |
| | | Ho | | 7400 | c = 1 | f f py f | | | <u> </u> | | | | A A A A A A A A A A A A A A A A A A A | + | |
| 7460' H-bit | | 0 8 0 | 7466 26 | 0 Rec.14' Dip 0° | 1 - • • • • • • | nv | | | | | | A H | JAMA DAMONATONO A STATE OF STA | | BELFAST MST. |
| 7510 | LReed 8 1/2 HM | 0 | 747 | 7 5 0 0 | gl | f | | | | | | | | | छ स |

COMPOSITE WELL LOG O.D.N.L. MOUNT SALT WELL No.1 7500 - 10,044' SHEET 4 OF 4

DRG. No.O.D/125

| | | | | | | | | | DRG. | No.O.D/125 | | | | | | | |
|--|--|--|---|---|----------------------------|---------------------------------------|---|---------------------------------------|------------------------|--|--|---------------------------|--|--|---|----------------------|----------|
| | | | | and | | | CONTINUOUS DIPMETER SURVEY | | leo: | | RESIST ohms— | VITY m ² /m | | MICROLOG | | STRATIGR INTERPRE | |
| BIT TYPE | DRILLING RATE (Feet per hour) | VIATION | ORILL STE | | DEPTH in feet | | (For computation data see log) Depth and degree of dip at tail of arrow; | SPONTAN POTEN Millive | TIAL | LITHOLOGY | A M ₁ = 16" 20 | 0 20 | MICROCALIPER | Resistivity- ohms-m³/m Micro Inverse lxí | LITHOLOGIC | THOLOGIC UNITS | U |
| | 0 50 100 150 | DEV | MUD GAS | ES ES | | | RATING A, Good B, Fair C, Possible | 3 | 0 | 9 | 200 20 AM ₂ = 64" 200 | 0 AO-18 8 200 | Hole Diameter in Inches 12", [4" 16" 18" | 0 10 2 Micro Normal 2" 0 10 20 | | ITHOL | <u>ড</u> |
| Reed | 0 50 100 150 | | | 8 | | gl mi c j py | A, Good B, Fair C, Possible 0° 10° 20° 30° 40° 50° 60° | 170,10 | | | | | | | | J | |
| Reed 8¾ H M 36) | | _ | | | | gi mi c gl | 38-C | | | | W~Vol | \$ | | Control of the Contro | | | |
| 36) R & & d R & d | | 10 | 9/0 | | 7600- | | 40-B | | | | | | In the last of the | | Alternation of thicker beds of sand, very fine to | | |
| (37) Reed 8¾" HM 7695 | | | n used | | | gl f | 42-B | | 7 | | | | | Market Market | coarse grained quartz, subangular to sub-rounded, with occasional grains of | | |
| ľ | <u>{</u> | | , | 8 | 7700 | mi | 42-0 | | 3 | | 3 | 2 | | | felspar and pyrite, with thin - ner beds of a lay or | | |
| 38) Reed, 834, HM, 7774 | <u>}</u> (| | | 830 - 8 | | mi — — f py | | | | | | | No. | AMAYAN | shale, grey to green, soft, silty, micaceous, | | |
| 39 | <u> </u> | | | | 7800 | "" | , | | | | | | | The state of the s | kaolinitic and with traces of glauconite. | | |
| Reed 8¾" HM 7864 | 5 | | | 7 | | c | | | | | | | A | 1 199 Jugaran | | | |
| 40 Reed 8¾ HM 7936 | <u> </u> | | Recil dip? | '6' 7936 | 7900 - 7939 | 1 h | 4 | | | | 2 | 5 | A | Shyreen Why. is | - | | |
| H & S-bits 7948 | 7939 | | 27 | 7949 Rec | | 91 | - 44 43-C | | | | | | AM A | | | | |
| 41) Reed 834, 2HM, 8037 | | | | 8′ 6° Dip 0° | 8000 | mi | <u> </u> | | | | | | Ma. | WWW TO THE TOTAL THE TOTAL TO T | _ | | |
| 8037 42 Reed 8 ³⁴ M | <u>}</u> | | | / / | | gl f | 45-C | | | | | | And Market | A CONTRACTOR OF THE CONTRACTOR | | Z | |
| 874 M 8088 43 | L | | |) | 8100 | c | | | | | | | | | | 0 | |
| Security 8¾″ S6 | ا کر | ,0, | | ¥0/0 | | | | | 1/20 / | | | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | A CONTRACTOR OF THE CONTRACTOR | | ⊦ S | 4 4 |
| 8218 | Mi | 8700 nu | - L | 7 7 7 | 8200 | py py gl py py | | | 3 | | | | A | | - | 0 | |
| Security 8 ³ /4" | <u>{</u> | | | 2 | | c mi | | | 3 | | | | | | | D | |
| S 6 8322 | <u> </u> | ह् 83 22' | 0 | 5 | 8300 | c | | + + + + + + + + + + + + + + + + + + + | 4 | | | | | Wangara A | | Σ | |
| 45) Security 8 ³ / ₄ " | { | 174 | | 00 8 | | | | | | ===================================== | | } | | A A A A A A A A A A A A A A A A A A A | | | |
| 56 8422' H - bit 46)8432' | | | 2 | 8422 | 8400 | mi = f | 46-C | | | | | 3 | NA NA | | | | : |
| 46) ⁸⁴³² | Security 8¾" M4L | | | 8432 Rec 9' Dip | | c mi | | | | | | | | The state of the s | | - | |
| Security 8 ³ 4 M4 L 8538 | <u> </u> | | | 00 | 8500- | gl — py | y | | | | | | | | | S | ŀ |
| 49 ⁸⁵⁶⁵ | Security 8¾ M4 L Security 8¼ M4 L | | | W I H | | 9 | | RUN 4 | | | | | Thomas and the second s | | | F A | - |
| | Hughes 8¾OWS | | | | 8600 | gl py | y i | | | | | | | | Alternation of sand, | ٦ | - |
| 51 ⁸⁶³⁹ 8670' | Hughes 8¾OWS | | | 0 : | | c mi | ii | | | | | No. | | | as above with beds of clay or shale as above, and silts to ne, | Ш | |
| 52) Hughes 8¾″ | | | | χ | 8.700 | c | | | • | | | | | | medium grey, argillaceous, micaceous, carbonaceous. | a | ſ |
| OSC3J | | ,205 | | 080 | | C mi | | | $\left \cdot \right $ | | | | | | | | ٥ |
| 8802 [′] | <u> </u> | I½º | 4 | n | 8800 | | | | | | | 1 | | A The state of the | | | (|
| Hughes 8¾″ OSC3J | | | | 0 4 0 | | gl — — = = = mi | 48-C | | | ====== | | | | | | | |
| 8912' H – bit | [| | | 8912 30 | | mi f | 47-C | | | | | | | The state of the s | | | |
| 8932' 54) | | | 200 | 8932 Rec 16' Dip | : | | | R | | | | | | | | | ٥ |
| Hughes 8³¼″ OSCJ | | | 42 | 2 00 | 9000 | c | 49- C | | | | | | | | | | ľ |
| 9077′ | | | | | | | | | | | | | | | | | 2 |
| 55) Hughes 8¾" | | | | | 9100 | 9 mi | | | | | | | | | | | C |
| OSCJ | | | 0 | 5 | | | 50-B | | UN 5 | | | | AAA | | | | = |
| 9211' 56 Hughes | <u> </u> | | | | 9200 | | ov l | | | | | | | | | | 1 |
| Hughes 0 SC 1 J 57 9281 | | | 8 O | | 9300 | | 5 5 C | | | | | | 1.00mm | | | | |
| Hughes 8¾″ OSCJ | | | 7 4 7 | | 7 9300 | | | | | | | | W. Walker | | | ن | |
| 9352' (58) Hughes 8 34" |] | 940 | 9390 | | 9400 | c | ni f f | | | | | | Avvardavski | | | | |
| OSC3J 9421' H-bit 9440' | | 940 940 943 | 5 900 | 942 31 944 | | | ni f ni | | | | | A | Werybon A | | | ر د د | |
| 59 Hughes 8¾ | 4 | Plu 3 44 sac | DST O | Rec 4' | | c = f | f | | | | | | | | | E D | |
| 8¾* OSC | ا ب | 9540 | | | | | | | | | | | | | | <u> </u> | |
| 9599′ | <u> </u> | | te in irbon | | 96 00 | | - 52 | | | | 1 1 2 1 1 1 1 1 1 1 1 1 1 | | | | RESULTS D.S.T. I | S | |
| ⊚ | ļ) | | c, opposition columnia by the | | | | ni f | | | | | | 1 was | | 4,070' muddy fresh water Cincluding water cushion) | ; M A N S | |
| Hughes 8¾″ OSC | <u>}</u> | | description (0.35% one in | ביי | 9700 | c == 1 | 53-C | | \$ } | | | | | | 300' slightly salty watery mud 4,070' salt water | LAXN | |
| 9753 | | 6 9753' | ogic ogic | TECTION | | | ni f | | | | | | Takkanha an | | Initial Hydrostatic Pressure: 5230 psi Initial Flow Pressure: | ? F | |
| 6 1 | | | | 20 DE | 9800 | mi — — — — m gl — — — — — f | ni d | | | ===== | | | AAAA Saa | | 2880 psi Final Flow Pressure: 4310 psi | | |
| Hughes 8¾″ OSC, 9833′ S — bit ← H — bit | | | 9813 DST | 9833 32 | 5-46 Rec nil | | gy | | | | | ▋▎▕ ▗▎ | | | Final Shut in Pressure: 4310 psi Final Hydrostatic Pressure | | |
| 98 63′ 62 | 5 | | 9892 | 14' | - - 9900 | mi | | | X | | | | : \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | | 5170 psi | <i>i</i> | |
| Hughes 8¾″ OSC 9955′ | | Plue 2 40 sack Plue | | Dip 0° | | mi — E = f mi — E = f mi — E = f f | f | | | | | | 7 Curkany | 5 | | 7.7 1.0 N | |
| 63) Hughes 8 ³ /4" | <u> </u> | fa'ile 20 20 20 20 20 20 20 20 20 20 20 20 20 | 9992 | | | | f py | | | | | | | | | WAAR ORMA | Σ Σ |
| 10.032 | | 0 134 ⁰ | | 10,03 34 | 2 Rec 7' dip ? 10,04 | | ni | | 10044' | | | 17 | 1 Vunus | | +1 | % H | 7 |